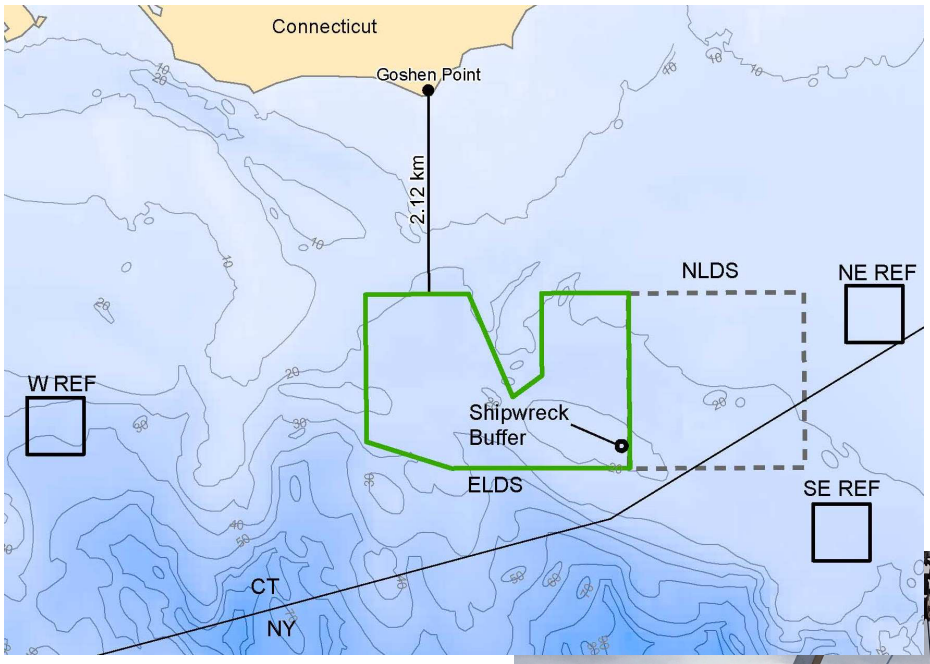
Comprehensive Baseline Survey of the Eastern Long Island Sound Disposal Site - October/November 2017

Disposal Area Monitoring System DAMOS



D A M O S
DISPOSAL AREA MONITORING SYSTEM

Monitoring Survey
Contribution #206
December 2018

US Army Corps of Engineers®
New England District

COMPREHENSIVE BASELINE SURVEY OF THE EASTERN LONG ISLAND SOUND DISPOSAL SITE OCTOBER/NOVEMBER 2017

CONTRIBUTION # 206
December 2018

Contract No. W912WJ-17-D-0003
Report No. 60555577.1

Submitted to:

New England District
U.S. Army Corps of Engineers
696 Virginia Road
Concord, MA 01742-2751

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REPORT DOCUMENTATION PAGE

form approved
OMB No. 0704-0188

1. AGENCY USE ONLY (LEAVE BLANK)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	December 2018	FINAL REPORT

4. TITLE AND SUBTITLE
Comprehensive Baseline Survey of the Eastern Long Island Sound Disposal Site, October/ November 2017

5. FUNDING NUMBERS

6. AUTHOR(S)
AECOM, Diaz and Daughters, CR Environmental, Inc.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
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8. PERFORMING ORGANIZATION REPORT NUMBER
AECOM-60555577.1

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
US Army Corps of Engineers-New England District
696 Virginia Rd
Concord, MA 01742-2751

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
Contribution No. 206

11. SUPPLEMENTARY NOTES
Available from DAMOS Program Manager, Evaluation Branch
USACE-NAE, 696 Virginia Rd, Concord, MA 01742-2751

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT

A comprehensive baseline survey was conducted in October/November 2017 at the Eastern Long Island Sound Disposal Site (ELDS) as part of the Disposal Area Monitoring System (DAMOS) Program. ELDS is a U.S. Environmental Protection Agency (USEPA) designated open ocean disposal site that lies southeast of Groton, Connecticut in Long Island Sound. The 2017 survey effort consisted of a multibeam bathymetric survey to characterize seafloor topography and surficial features over the site and associated reference areas; the use of sediment profile imaging (SPI) and plan-view underwater camera (PV) surveys to further define the physical characteristics of surficial sediments and to assess the benthic colonization status of the site and reference areas; and collection of sediment for laboratory analysis of sediment chemistry, benthic community structure, and non-motile species tissue chemistry to further characterize the surficial sediment quality over the site and associated reference areas.

The multibeam bathymetric survey was conducted over an approximate 2000 × 3000 meter (m) rectangular area that encompassed the full the extent of ELDS and an approximate roughly 600 × 600 meters (m) square area over each of three reference areas being considered for the site. The acoustic survey also included collection of backscatter and side-scan sonar data and is intended to be used as a baseline for comparison with future surveys following initiation of dredged material placement at the site.

SPI and PV images were collected from 45 stations distributed in a gridded pattern across ELDS and at five randomly generated locations within each of three potential reference areas. The images indicated a predominantly fine sand environment which was confirmed by grain size analysis of samples collected from 15 stations across ELDS and three stations in each of the three reference areas. For the biological assessment, the SPI/PV images were supplemented with benthic infauna analysis of 12 samples (nine from ELDS and one from each of the three reference areas). Analysis of the SPI data indicated a Stage II community dominated the site and reference areas. While the benthic infauna analysis indicated fauna indicative of the three successional stages (Stage I, II, and III), it was dominated by Stage II organisms, and the area is considered representative of a stable benthic community in this environment. Mean aRPD values were relatively deep within ELDS.

Sediment samples were also analyzed for chemistry from 15 ELDS and nine reference area stations. Pesticides and polychlorinated biphenyls (PCBs) were generally below detection limits. Metals and polycyclic aromatic hydrocarbons (PAHs) were detected, but at low levels not expected to impact the biological community and at comparable or lower levels than reported for other studies of eastern Long Island Sound. Tissue samples of non-motile organisms were collected for chemical analyses from four stations within ELDS and one from each of the reference areas. As the target organism *Nephtys incinsa* was not present at the site, three species of mollusks were retained for analysis (*Anadara transversa* (transverse ark), *Crepidula fornicata* (common slipper shell), *Mercenaria* (quahog), and *Mya arenaria* (soft-shell clam)). Insufficient sample mass was obtained from two of the reference areas to complete the full set of analyses. There were few detections of pesticides, PCBs, or PAHs in the tissue samples. For the organic compounds that were detected and for metals the concentrations are considered low and representative of the sediment concentrations.

In summary, the 2017 survey is considered a sufficient baseline to allow for informed management of placement of dredged material at this recently designated site. The three reference areas also evaluated in the 2017 survey were found to be representative of the range of conditions found at ELDS and acceptable for use in comparison to ELDS following initiation of dredged material placement.

14. SUBJECT TERMS	15. NUMBER OF TEXT PAGES:
DAMOS, Disposal Site, Dredged Material	109
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified			

This report should be cited as:

AECOM, 2018. Comprehensive Baseline Survey of the Eastern Long Island Sound Disposal Site, October/ November 2017. DAMOS Contribution No. 206. U.S. Army Corps of Engineers, New England District, Concord, MA, 109 pp + Appendices

Note on units of this report: As a scientific data summary, information and data are presented in the metric system. However, given the prevalence of English units in the dredging industry of the United States, conversions to English units are provided for general information in Section 1. A table of common conversions can be found in Appendix A.

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EXECUTIVE SUMMARY

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LIST OF ACRONYMS

ACSM	American Congress on Surveying and Mapping
aRPD	Apparent Redox Potential Discontinuity
ASCII	American Standard Code for Information Interchange
CI	confidence interval
cm	centimeter
CSDS	Cornfield Shoals Disposal Site
CVAA	Cold Vapor Atomic Absorption
cy	cubic yards
DAMOS	Disposal Area Monitoring System
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DGPS	differential GPS
DPP	Digital Photo Professional
EIS	Environmental Impact Statement
ELDS	Eastern Long Island Sound Disposal Site
ELIS	Eastern Long Island Sound
ER-L	Effects Range Low
FOV	field of view
FSEIS	Final Supplemental Environmental Impact Statement
ft	foot or feet
GC-ECD	Gas Chromatography/Electron Capture Detector
GC-MS	Gas Chromatography/Mass Spectrometry
GIS	geographic information system
GPS	global positioning system
GRD	gridded file format
HMW	high molecular weight
ICP-MS	Inductively Coupled Plasma Mass Spectrometry
km	kilometer

LCS	laboratory control sample
LMW	low molecular weight
m	meter
MB	method blank
MBES	multibeam echo sounder
MDL	method detection limit
ME	Maine
MLLW	Mean Lower Low Water
mm	millimeter
MRU	motion reference unit
msec	millisecond
µg/kg	micrograms per kilogram
NA	not applicable
NAD83	North American Datum of 1983
NAE	New England District
NBDS	Niantic Bay Disposal Site
NLDS	New London Disposal Site
nmi	Nautical Mile
NOAA	National Oceanic and Atmospheric Association
NOS	National Ocean Service
NS&T	National Status and Trends
NTRIP	Networked Transport of Radio Technical Commission for Maritime Services (RTCM) via Internet Protocol
ODMDS	Ocean Dredged Material Disposal Site
PAHs	polycyclic aromatic hydrocarbons
PCA	Principal Components Analysis
PCBs	polychlorinated biphenyls
PPS	pulse per second
PV	plan-view
QAPP	Quality Assurance Project Plan

QC	quality control
ROV	remotely operated vehicle
RTK GPS	Real Time Kinematic Global Positioning System
SD	standard deviation
SEIS	Supplemental Environmental Impact Statement
SMMP	Site Management and Monitoring Plan
SOPs	Standard Operating Procedures
SPI	sediment profile imaging
SVP	sound velocity profile
TIF	tagged image file
TOC	total organic carbon
UNH/NOAA CCOM	University of New Hampshire's NOAA Center for Coastal and Ocean Mapping
USACE	U.S. Army Corps of Engineers
UCONN	University of Connecticut
USEPA	U.S. Environmental Protection Agency

1.0 INTRODUCTION

A monitoring survey was conducted at the Eastern Long Island Sound Disposal Site (ELDS) in October/ November 2017 as part of the U.S. Army Corps of Engineers (USACE) New England District (NAE) Disposal Area Monitoring System (DAMOS) Program. DAMOS is a comprehensive monitoring and management program designed and conducted to address environmental concerns associated with the use of aquatic dredged material disposal sites throughout the New England region. An introduction to the DAMOS Program and ELDS, including a brief description of previous site monitoring activities, is provided below.

1.1 Overview of the DAMOS Program

The DAMOS Program features a tiered monitoring protocol designed to ensure that any potential adverse environmental impacts associated with dredged material disposal are promptly identified and addressed (Germano et al. 1994). For over 40 years, the DAMOS Program has collected and evaluated dredged material disposal site data throughout New England. Based on these data, patterns of physical, chemical, and biological responses of seafloor environments to dredged material placement activity have been documented along with evaluation of any impacts to water quality (Fredette and French 2004).

DAMOS monitoring surveys fall into two general categories: confirmatory studies and focused studies. The data collected and evaluated during these studies provide answers to strategic questions in determining next steps in the disposal site management process. DAMOS monitoring results guide the management of disposal activities at existing sites, support planning for use of future sites, and evaluate the long-term status of historical sites (Wolf et al. 2012).

Confirmatory studies are designed to test hypotheses related to expected physical and ecological response patterns following placement of dredged material on the seafloor at established, active disposal sites. Two primary goals of DAMOS confirmatory surveys are to document the physical location and stability of dredged material placed into the aquatic environment and to evaluate the biological recovery of the benthic community following placement of the dredged material. Several survey techniques are employed in order to characterize these responses to dredged material placement. Sequential bathymetric measurements are performed to characterize the height and spread of discrete dredged material deposits or mounds created at open water sites as well as the accumulation/consolidation of dredged material into confined aquatic disposal cells.

Sediment-profile (SPI) and plan view (PV) imaging surveys are often performed in confirmatory studies to provide further physical characterization of the material and to support evaluation of seafloor (benthic) habitat conditions and recovery over time. Each type of data collection activity is conducted periodically at disposal sites, and the conditions found

after a defined period of disposal activity are compared with the long-term data set at specific sites to determine the next step in the site management process (Germano et al. 1994).

Focused studies are periodically undertaken within the DAMOS Program to evaluate candidate sites, as baseline surveys at new sites, to evaluate inactive/historical disposal sites, and to contribute to the development of dredged material placement and monitoring techniques and management planning. Focused DAMOS monitoring surveys often feature additional types of data collection activities as deemed appropriate to achieve specific survey objectives, such as grab sampling of sediment for physical and biological analysis, sub-bottom profiling, sediment coring, towed video, or video collection via a remotely operated vehicle (ROV).

The 2017 ELDS survey was a focused baseline study featuring monitoring of an area that has not yet received dredged material since its designation in 2016. This survey included a baseline acoustic survey, a SPI/PV imaging survey, grab sampling for chemistry/ biology, and benthic drags for invertebrate tissue chemistry.

1.2 Introduction to the Eastern Long Island Sound Disposal Site

The Eastern Long Island Sound Disposal Site (ELDS) is located in the waters of Long Island Sound, entirely within waters of the State of Connecticut (Figure 1-1). ELDS was formally designated as an Ocean Dredged Material Disposal Site (ODMDS) by the USEPA in December 2016 (USEPA, 2016). The site was established given the forecasted long term need for a dredged material placement site in the eastern Long Island Sound region following the closure of the New London Disposal Site (NLDS) and the Cornfield Shoals Disposal Site (CSDS) in December 2016 (Figure 1-1).

ELDS is situated approximately 4.7 kilometers (km) (2.5 nmi) southwest of Eastern Point, Groton, Connecticut (Figure 1-1). The site boundary is a polygon, roughly rectangular in shape and occupies a 4.5 km^2 (1.3 nmi^2) area on the seafloor. Water depths within the site range from approximately 14 meters (45 feet) in the north to 30 meters (m) (100 feet [ft]) in the south. Although some dredged material placement activity may have taken place within the boundaries of ELDS historically (prior to the requirement for tracking of dredged material disposal), there has not been any recorded disposal of any kind.

The polygon shape of the ELDS site boundary apparent in Figure 1-2 owes to presence of areas of hard bottom that were excluded from the disposal site. There is one documented, submerged wreck within the ELDS at 41°15.936' N, 72°05.292' W (USEPA, 2016). A 50 m (164 ft) circular buffer zone will be maintained around its location in order to avoid dredged material placement on/ near the wreck (Figure 1-2).

1.3 Previous Monitoring Events at ELDS

As part of the ELDS designation process, a comprehensive series of field surveys were undertaken to support the preparation of the *Final Supplemental Environmental Impact Statement (FSEIS) for the Designation of Dredged Material Disposal Site(s) in Eastern Long Island Sound (ELIS), Connecticut and New York* (USEPA, 2016). The surveys included side scan sonar data collection/ interpretation (USEPA/Woods Hole Group), physical oceanography data collection/ modelling (Louis Berger/University of Connecticut [UCONN]), biological data collection, (TetraTech), and sediment chemistry data collection (Louis Berger/UCONN). The reports associated with these survey efforts are included as Appendices to the ELIS FSEIS.

A September 2014 DAMOS survey collected additional data over and surrounding ELDS (Carey, 2015). The SPI and PV imaging survey covered the now closed New London Disposal Site and extended west of NLDS to, and including, the historic Niantic Bay Disposal Site (NBDS). To the west of NLDS, a northern and southern transect of SPI locations was surveyed to provide a profile of seafloor conditions. Nine of the transect SPI stations and eight of the reference locations were located within the current boundary of ELDS. Previous monitoring events at ELDS are summarized in Table 1-1.

A review of the previously collected data was used to identify three reference areas for potential future use in comparison with ELDS data as dredged material is placed at the site. These are identified as NE REF, SE REF, and W REF in Figures 1-1 and 1-2. Note that NE REF had been used as a reference area previously for the adjacent (now closed) New London Disposal Site.

1.4 2017 Study Objectives

The October/ November 2017 survey was designed with the overall goal identifying appropriate reference areas and providing additional site information to be used in managing disposal at the site. Specific survey objectives included:

- Further characterize the seafloor topography and surficial features over the full ELDS and the three identified potential reference areas by completing a high resolution acoustic survey (bathymetry, backscatter, and side-scan sonar).
- Use SPI/PV imaging to further define the physical characteristics of surficial sediment and to assess the benthic colonization status of ELDS and the potential reference areas.
- Further characterize the surficial sediment quality over the site and associated reference areas through the collection of sediment for laboratory analysis of sediment chemistry, the collection of non-motile organisms for laboratory analysis of tissue chemistry, and the collection of samples for assessing benthic community structure.

Table 1-1.

Survey Chronology at ELDS

Date (month/year)	Purpose of Survey	No. SPI Stations	Sediment Grab	Additional Studies	Reference/ Contribution No.
July-12	ELDS EIS			Sidescan 2800m × 2200m	ELIS SEIS (USEPA, 2016)
March-13 through January-14	ELDS EIS		Grain Size	Physical Oceanography	ELIS SEIS (USEPA, 2016)
June/July-13	ELDS EIS		Benthic Ecology	Fish Trawls	ELIS SEIS (USEPA, 2016)
September-14	DAMOS focused survey	NLDS: 6 NBDS: 11 Off-Site: 27 REF: 16			DAMOS Data Report 2015-1
February-15	ELDS EIS		Metals, Mercury, PAHs, PCBs, Pesticides, Grain Size, TOC		ELIS SEIS (USEPA, 2016)

*Additional SPI data collected by US EPA prior to 2012

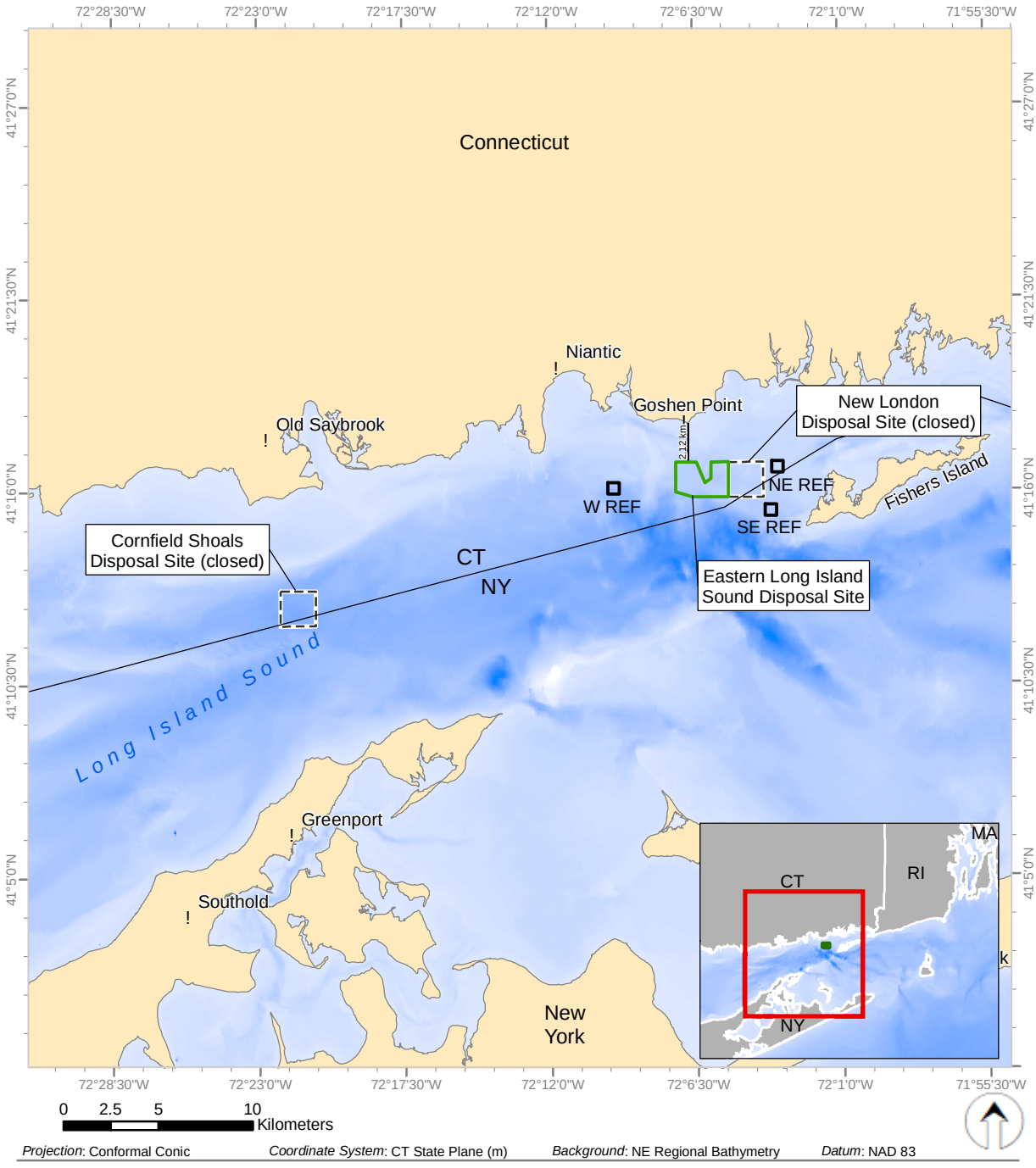


Figure 1-1. Regional location of the Eastern Long Island Sound Disposal Site (ELDS)

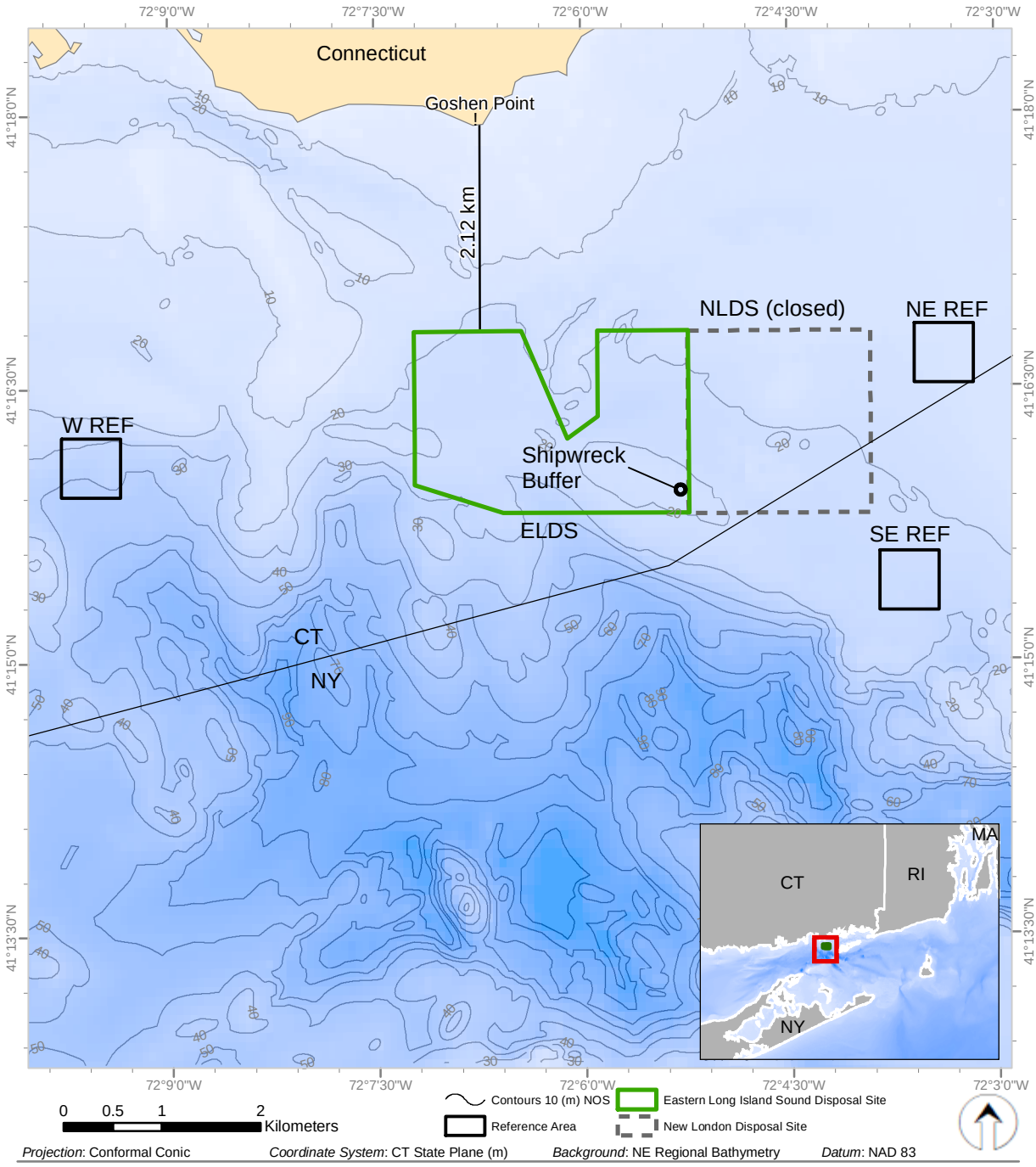


Figure 1-2. Location of the Eastern Long Island Sound Disposal Site (ELDS)

2.0 METHODS

The October 2017 surveys conducted at ELDS were performed by a scientific team from AECOM, Diaz and Daughters, and CR Environmental, Inc. The acoustic survey was conducted 25-27 October 2017 by American Congress on Surveying and Mapping (ACSM) certified hydrograher Christopher Wright (#266) to map bathymetry and characterize the physical substrate in and around the disposal site. The SPI survey was conducted 28-29 October 2017 to provide additional data on the physical characteristics of the site and to assess benthic recolonization within the disposal site compared to reference areas. The sediment grab sampling and benthic drags were conducted on 1-3 November to characterize the surface sediment quality (chemistry and biology) over the ELDS and surrounding reference areas. All surveys were conducted aboard the 55-foot R/V *Jamie Hannah*. Field activities are summarized in Table 2-1, and an overview of the methods used to collect and analyze the survey data is provided below. Detailed Standard Operating Procedures (SOPs) for data collection and processing are presented in the program Quality Assurance Project Plan (QAPP) (AECOM, 2018).

2.1 Navigation and On-Board Data Acquisition

Navigation for the acoustic survey was accomplished using a Hemisphere VS-330 Real Time Kinematic Global Positioning System (RTK GPS) which received base station correction through the Keynet Networked Transport of Radio Technical Commission for Maritime Services (RTCM) via Internet Protocol (NTRIP) broadcast. Horizontal position accuracy in fixed RTK mode was approximately 2 centimeters (cm). A dual-antennae Hemisphere VS110 differential GPS (DGPS) was available if necessary as a backup. The global positioning software (GPS) system was interfaced to a laptop computer running HYPACK hydrographic survey software. HYPACK continually recorded vessel position and GPS satellite quality and provided a steering display for the vessel captain to accurately maintain the position of the vessel along pre-established survey transects and targets. Vessel heading measurements were provided by an IxBlue Octans III fiber optic gyrocompass.

Navigation for the SPI/PV survey, grab sampling, and benthic drags was accomplished using a Hemisphere R110 DGPS capable of sub-meter horizontal accuracy. Navigation data/ targets were recorded using HYPACK software.

2.2 Acoustic Survey

The acoustic survey in this study included bathymetric, backscatter, and side-scan sonar data collection. The bathymetric data provided measurements of water depth that, when processed, were used to map the seafloor topography. Backscatter and side-scan sonar data provided images that supported characterization of surficial topography, sediment texture, and bottom roughness. Backscatter data can be processed into a seamless mosaic image that is corrected for the effect of changing seafloor slope. Side-scan sonar data retains

a higher resolution than backscatter but correction for seafloor slope changes is not possible. The comparison of synoptic acoustic data types has the greatest utility for assessment of bottom conditions because it allows for evaluation and comparison of multiple properties of the seafloor.

2.2.1 Acoustic Survey Planning

The acoustic survey featured a high spatial resolution survey over the newly designated ELDS. For ELDS, a 2,000 × 3,000 m area was selected with a series of survey lines spaced approximately 40 m apart, and cross-tie lines were spaced approximately 300 m apart (Figure 2-1). The survey was designed to cover ELDS entirely and provide greater than 100 percent coverage of the seafloor within the survey area. A 600 × 600 m survey boundary was established over each of the three proposed reference areas (NE REF, SE REF, and W REF), with survey lines spaced approximately 40 m apart, and cross-tie lines spaced approximately 30 m apart (Figure 2-1). Base bathymetric data were obtained from the National Ocean Service (NOS) Hydrographic Database to estimate the transect separation required to obtain full bottom coverage. Hydrographers obtained site coordinates, imported them to ESRI geographic information system (GIS) software, and created planning maps. The proposed survey area encompassing the entire site was then reviewed and approved by NAE.

2.2.2 Acoustic Data Collection

The 2017 multibeam bathymetric survey of ELDS and adjacent reference areas was conducted 25-27 October 2017. Bathymetric, acoustic backscatter, and side-scan sonar data were collected using an R2Sonic 2022 broadband multibeam echo sounder (MBES). This 200-400 kHz system forms up to 256 1- to 2-degree beams (frequency dependent) distributed equiangularly or equidistantly across a 10- to 160-degree swath. For this survey a frequency of 200 kHz and pulse length of 0.050 milliseconds (msec) were selected to maximize the resolution of bathymetric data without compromising the quality of acoustic backscatter data. The MBES transducer was mounted amidships to the port rail of the survey vessel using a high strength adjustable boom. The primary GPS antenna was mounted atop the transducer boom. The transducer depth below the water surface (draft) and antenna height were checked and recorded at the beginning and end of data acquisition, and draft was confirmed using the “bar check” method.

An IxBlue Octans III motion reference unit (MRU) was interfaced to the MBES topside processor and to the acquisition computer. Precise linear offsets between the MRU and MBES were recorded and applied during acquisition. Depth and backscatter data were synchronized using pulse per second (PPS) timing and transmitted to the HYPACK MAX® acquisition computer via Ethernet communications. Several patch tests were conducted during the survey to allow computation of angular offsets between the MBES system components.

The system was calibrated for local water mass speed of sound by performing sound velocity profile (SVP) casts at frequent intervals throughout each survey day using an AML, Inc. MinosX sound velocity profiler.

2.2.3 Bathymetric Data Processing

Bathymetric data were processed using HYPACK HYSWEEP® software. Processing components are described below and included:

- Adjustment of data for tidal elevation fluctuations
- Correction of ray bending (refraction) due to density variation in the water column
- Removal of spurious points associated with water column interference or system errors
- Development of a grid surface representing depth solutions
- Statistical estimation of sounding solution uncertainty
- Generation of data visualization products

Tidal adjustments were accomplished using RTK GPS verified against tide data using records obtained from the National Oceanic and Atmospheric Association's (NOAA) New London Tide Station (#846490). Water surface elevations derived using RTK were adjusted to Mean Lower Low Water (MLLW) elevations using NOAA's VDATUM Model.

Correction of sounding depth and position (range and azimuth) for refraction due to water column stratification was conducted using a series of twenty-seven SVPs acquired by the survey team. Data artifacts associated with refraction remain in the bathymetric surface model at a relatively fine scale (generally less than 5 to 10 cm) relative to the survey depth.

Bathymetric data were filtered to accept only beams falling within an angular limit of 60° to minimize refraction artifacts. Spurious sounding solutions were rejected based on the careful examination of data on a sweep-specific basis.

The R2Sonics 2022 MBES system was operated at 200 kHz. At this frequency, the system has a published beam width of 2.0°. Assuming an average ELDS depth of 22 m and a maximum beam angle of 60°, the average diameter of the beam footprint mid-swath was calculated at approximately 1.0 × 0.9 m (~0.91 m^2). Data were reduced to a cell (grid) size of 2.0 × 2.0 m, acknowledging the system's fine range resolution while accommodating beam position uncertainty. This data reduction was accomplished by calculating and exporting the average elevation for each cell in accordance with USACE recommendations (USACE, 2013).

Statistical analysis of bathymetric data as summarized on Table 2-2 showed negligible tide bias and vertical uncertainty substantially lower than values recommended by

USACE (2013) or NOAA (2015). Note that the most stringent National Ocean Service (NOS) standard for this project depth (Special Order 1A) would call for a 95th percentile confidence interval (95% CI) of 0.41 m at the maximum survey depth (43.1 m) and 0.30 m at the average site depth (22.1 m).

Reduced data were exported in American Standard Code for Information Interchange (ASCII) text format with fields for Easting, Northing, and MLLW Elevation (meters). All data were projected to the Connecticut Mainland State Plane, North American Datum of 1983 (NAD83) (metric). A variety of data visualizations were generated using a combination of ESRI ArcMap (V.10.1) and Golden Software Surfer (V.13). Visualizations and data products included:

- ASCII data files of all processed soundings including MLLW depths and elevations
- Contours of seabed elevation (20-cm, 50-cm and 1.0-m intervals) in a geospatial data file format suitable for plotting using GIS and computer-aided design software
- 3-dimensional surface maps of the seabed created using 2× vertical exaggeration and artificial illumination to highlight fine-scale features not visible on contour layers delivered in grid and tagged image file (TIF) formats, and
- An acoustic relief map of the survey area created using 5× vertical exaggeration, delivered in georeferenced TIF format.

2.2.4 Backscatter Data Processing

Backscatter data were extracted from cleaned MBES TruePix formatted files then used to provide an estimation of surface sediment texture based on seabed surface roughness. Mosaics of backscatter data were created using HYPACK's implementation of GeoCoder software developed by scientists at the University of New Hampshire's NOAA Center for Coastal and Ocean Mapping (UNH/NOAA CCOM). A seamless mosaic of unfiltered backscatter data was developed and exported in grayscale TIF format using a 1m x 1m pixel resolution. Backscatter data were also exported in ASCII format with fields for Easting, Northing, and backscatter (dB). A Gaussian filter was applied to backscatter data to minimize nadir artifacts, and the filtered data were used to develop backscatter values on a 2-m grid. The grid was exported in ESRI binary gridded (GRD) file format to facilitate comparison with other data layers.

2.2.5 Side-Scan Sonar Data Processing

Side-scan sonar data were processed using Chesapeake Technology, Inc. Sonar Wiz software and GeoCoder software to generate a database of images that maximized both textural information and structural detail.

A seamless mosaic of side-scan sonar data was developed using SonarWiz and exported in grayscale TIF format using a resolution of 0.20-m per pixel. Data were

processed using gain adjustment methods to minimize nadir artifacts and facilitate visualization of fine seabed structures.

2.2.6 Acoustic Data Analysis

The processed bathymetric grids were converted to rasters, and bathymetric contour lines and acoustic relief models were generated and displayed using GIS. The backscatter mosaics and filtered backscatter grid were combined with acoustic relief models in GIS to facilitate visualization of relationships between acoustic datasets. This is done by rendering images and color-coded grids with sufficient transparency to allow three-dimensional acoustic relief model to be visible underneath.

2.3 Sediment-Profile and Plan View Imaging Survey

Sediment-profile imaging (SPI) and plan-view (PV) imaging are monitoring techniques used to provide data on the physical characteristics of the seafloor and the diversity and health of the benthic biological community (Germano et al., 2011).

2.3.1 SPI and PV Survey Planning

A 60-station SPI/PV survey was planned to be performed over the site and the three reference areas (NE REF, SE REF, and W REF). Preliminary target SPI/PV station locations (Table 2-3; Figure 2-2) were based on a gridded approach to maximize spatial coverage of the site and review of the preliminary 2017 bathymetry. A random location generator was used to select the target locations of the SPI/PV reference stations (Figure 2-3). Actual SPI/PV station replicate locations are provided in Appendix B. Detailed SPI/PV data collection techniques are presented in the DAMOS program QAPP (AECOM, 2018).

2.3.2 Sediment Profile Imaging (SPI)

The SPI technique involves deploying an underwater camera system to photograph a cross section of the sediment-water interface. In the 2017 survey at ELDS, high resolution SPI images were acquired using a Canon® 7D digital single lens reflex camera mounted inside a pressure-resistant housing. The sediment profile camera system consisted of an 18-megapixel digital camera, a 45° prism, and a mirror that reflected an image of the sediment through the camera lens (Figure 2-4). A strobe mounted inside the prism was used to illuminate the sediment. The digital camera was also equipped with a video feed that was used to send images to the surface via cable so that prism penetration was monitored in real time. The camera was triggered from the surface about one second after bottom contact and after the prism stopped penetrating the sediment. The camera/prism system was mounted in a cradle that was secured to a larger frame, which ensured that the prism penetrated the sediment at a 90° angle.

The profile camera prism window was 15.5 cm wide and 30 cm tall. Approximately eighty (80) kilograms (kg) of lead weights were added to the camera frame to increase prism penetration. Details of the camera settings for each digital image are available in the associated parameters file embedded in each electronic image file. For this survey, the ISO-equivalent was set at 400, shutter speed was 1/160 second, f-stop was f5, and storage was on the camera's internal memory card using Canon's raw image format. Test exposures for focus and color balance were made on deck at the beginning and end of the survey to verify that the camera and electronic systems were working properly.

2.3.3 Plan View Underwater Camera Imaging

A GoPro® HERO4 camera in a shockproof, underwater housing was mounted on the profile camera frame at an oblique angle of approximately 35° to the seafloor and used to collect plan-view images of the seafloor surface. The HERO4 had 4K video resolution and an ultra-wide field of view (FOV). To illuminate the seafloor during video collection, a Bigblue™ 3500 Lumen underwater video light was mounted on the camera frame. The GoPro® camera was turned on at the start of deployment and continuously recorded video footage during the survey. The ability of the PV system to collect usable images was dependent on the clarity of the water column. The HERO4 camera imaged an approximate 0.1 m^2 (40 cm x 25 cm) area in front of the prism.

2.3.4 SPI and PV Data Collection

The 2017 SPI/PV survey of ELDS was conducted 28-29 October 2017. At each SPI station, the vessel was positioned at the target coordinates and the camera system was deployed within a station tolerance of 10 m. A minimum of three replicate sediment-profile images were collected at each of the 60 stations (Appendix C). Plan-view images were collected at 42 of 45 ELDS stations as well as at five locations within each of the three reference areas. Stations ELDS-28, ELDS-41, and ELDS-45 had plan view images that were not analyzable due to turbidity or equipment complications (e.g., camera misalignment). Three replicate analyzable plan-view images were collected at 46 of 60 stations, two replicates at three stations, and one replicate at eight stations.

The DGPS described above was interfaced to HYPACK® software via laptop serial ports to provide a method to locate and record sampling positions. Throughout the survey, the HYPACK® data acquisition system received DGPS data. The incoming data stream was digitally integrated and stored on the laptop's hard drive. The system provided a steering display to enable the vessel captain to navigate to the pre-established survey target locations. The navigator electronically recorded the vessel's position when the equipment contacted the seafloor and the winch wire went slack. Each replicate SPI/PV position was recorded and time stamped. Actual SPI/PV sampling locations were recorded using this system.

2.3.5 SPI and PV Data Analysis

Computer-aided analysis of images provided a set of standard measurements that enabled comparison between different locations and different surveys. Cannon's Digital Photo Professional (DPP) software was used for color checking and correction when needed. All SPI images were evaluated visually with data of all features recorded in a preformatted spreadsheet file. Images were digitally processed using histogram equalization and 0.1 to 1% histogram clipping to enhance contrast and color for determination of the aRPD layer depth with Adobe PhotoShop®. Data from each image were sequentially saved to a spreadsheet file for later analysis.

2.3.5.1 SPI Data Analysis

Analysis of each SPI image was performed to provide measurement of the following standard set of parameters (Diaz and Schaffner, 1988; Rhoads and Germano, 1986):

Sediment Type – The sediment grain size major mode and range were estimated visually from the images using a grain size comparator at a similar scale. Results were reported using the phi scale. Conversion to other grain size scales is provided in Appendix D. The presence and thickness of disposed dredged material were also assessed by inspection of the images.

Penetration Depth – The depth to which the camera penetrated into the seafloor was measured to provide an indication of the sediment density or bearing capacity. The penetration depth can range from a minimum of 0 cm (i.e., no penetration on hard substratum) to a maximum of 30 cm (full penetration on very soft substratum).

Surface Boundary Roughness – Surface boundary roughness is a measure of the vertical relief of features at the sediment-water interface in the sediment-profile image. Surface boundary roughness was determined by measuring the vertical distance between the highest and lowest points of the sediment-water interface. The surface boundary roughness measured over the width of sediment-profile images typically ranges from 0 to 4 cm, and may be related to physical structures (e.g., ripples, rip-up structures, mud clasts) or biogenic features (e.g., burrow openings, fecal mounds, foraging depressions).

Apparent Redox Potential Discontinuity (aRPD) Depth – The aRPD depth provides a measure of the integrated time history of the balance between near-surface oxygen conditions and biological reworking of sediments. Sediment particles exposed to oxygenated waters oxidize and lighten in color to brown or light gray. As the particles are buried or moved down by biological activity, they are exposed to reduced oxygen concentrations in subsurface pore waters and their oxic coating slowly reduces, changing color to dark gray or black. When biological activity is high, the aRPD depth increases; when it is low or absent, the aRPD depth decreases. The aRPD depth was measured by visually assessing color and reflectance boundaries within the images, and for each image a mean aRPD was calculated.

Infaunal Successional Stage – Infaunal successional stage is a measure of the biological community inhabiting the seafloor. Current theory holds that organism-sediment interactions in fine-grained sediments follow a predictable sequence of development after a major disturbance (such as dredged material disposal), and this sequence has been divided subjectively into four stages (Rhoads and Germano 1982, 1986). Successional stage was assigned by assessing which types of species or organism-related activities were apparent in the images (Figure 2-5).

Other miscellaneous observations noted during the SPI analysis included the presence of any gas bubbles (e.g., methane), visual signs of low dissolved oxygen (e.g., sulfide covered tubes, anaerobic sediment at the interface, etc), and presence of any bacterial mats (e.g., *Beggiatoa*). Additional components of the SPI analysis included calculation of means and ranges for the parameters listed above and mapping of means of replicate values from each station. Station means were calculated from three replicates from each station and used in statistical analysis.

2.3.6 PV Data Analysis

The PV images provided a much larger field-of-view than the SPI images and provided valuable information about the landscape ecology and sediment topography in the area where the sediment profile image was taken. Analysis of each PV image was performed to provide additional information about larger scale sedimentary features, density and patch size of surface fauna, density of infaunal burrowers, and occurrences and density of epifaunal foraging patterns on the seafloor of the disposal site and reference areas. Still plan-view images were extracted from the 4K video using GoPro Studio® and scaled to the 40 by 25 cm area in front of the prism using Adobe PhotoShop®. Plan-view images were also digitally processed using histogram equalization to enhance contrast and sharpened to reduce effects of bottom turbidity.

2.4 Sediment Survey

A multi-phase sediment sampling survey was performed at ELDS which included the collection of surficial sediment samples for analytical chemistry and benthic community analysis. Additionally, benthic drags were performed to collect biomass for infaunal tissue chemistry analysis. The objective of this survey was to characterize the surficial sediment quality and benthic community structure of ELDS and associated reference areas.

The surficial sediment survey was conducted 1-3 November 2017. Surficial sediment samples were collected at 15 locations located within ELDS and nine stations located within the three reference areas (three per). These samples were analyzed for grain size, total organic carbon (TOC), metals, PAHs, pesticides, and PCBs. Benthic biology grabs were collected at nine stations located within ELDS and three locations from the reference areas (one per). Additionally, benthic drags using a modified oyster dredge were collected from four areas within ELDS and three locations from the reference areas (one per). All planned

survey locations were finalized in coordination with USACE NAE scientists prior to the commencement of field work. The chemistry and biology sampling stations were paired with a SPI location.

2.4.1 Sediment Chemistry Data Collection

Samples for sediment chemistry and benthic community structure and taxonomic analysis were collected using a 0.1 m^2 Ted Young grab sampler and a 0.04 m^2 Ted Young grab sampler. At each station, the vessel was positioned at the target coordinates, and the grab sampler was deployed within a defined station tolerance of 10 m. Upon recovery, the samples were checked for penetration depth, depth of the apparent redox potential discontinuity (aRPD) layer, sediment color and texture, odor, and observed biota.

Subsamples for grain size, TOC, metals, PAH, pesticide, and PCB analysis were collected from the grab sampler using stainless steel utensils and were homogenized in a decontaminated, stainless steel bowl. The samples were placed in the appropriate glassware for analysis (sample container sizes, preservation requirements, and holding times are detailed in the program QAPP (AECOM, 2018)), wiped clean, and labeled. Between samples, the grab sampler, spoons, and bowl were thoroughly cleaned with a non-phosphate detergent and then rinsed with de-ionized water. Analytical chemistry samples were stored on ice and shipped via courier to Katahdin Analytical Services (Scarborough, Maine [ME]).

2.4.2 Sediment Chemistry Data Analysis

The sediment samples were analyzed for metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc), TOC, pesticides (organochlorines), PAHs (high molecular weight and low molecular weight) and PCBs (NOAA 18 congeners) (Table 2-4). A routine set of quality control (QC) samples was collected, including two field duplicates and one matrix spike duplicate. A rinse blank was collected from the sediment grab sampling and processing equipment and analyzed. Samples were extracted and analyzed within the holding times for the various analytes.

For the metals, pesticides, PAH, and PCB analysis, standard QC included a method blank (MB) and a laboratory control sample (LCS). For TOC, all samples were analyzed in duplicate per the method requirements and QC samples included one MB and a LCS. Additionally, one solid reference material (NIST SRM 1944 New York/New Jersey Waterway Sediment) for TOC and a solid reference material for mercury were also analyzed. Totals for PAHs and DDx were calculated using one half the method detection limit (MDL) for non-detects. Total PCBs were calculated as the sum of the 18 NOAA congeners multiplied by two, with non-detects presented as one half of the MDL.

2.4.3 Benthic Biology Data Collection

Samples for benthic community structure and taxonomic analysis were collected using a 0.4 m^2 Ted Young grab sampler. The samples were removed from the grab sampler and washed into a clean 9.4 liter (2.5-gallon) plastic bucket and sieved through a 0.5 millimeter (mm) mesh screen. The material retained on the sieve was then placed in an appropriate sample container (1 gallon, 1 liter, or 1 pint) and preserved with 10% formalin. After 48 hours, but within the holding time of 10 days, benthic samples were transferred out of the formalin, rinsed on a 500-micron sieve with freshwater and preserved in an 80% ethanol solution. To facilitate the sorting process, all samples were stained in a solution of Rose Bengal biological stain. Benthic infaunal samples were sorted using a dissecting microscope to major taxonomic categories, such as polychaetes, arthropods, mollusks, and echinoderms.

Following sorting, individual species were identified and enumerated. All specimens were identified to the lowest possible taxonomic category (usually species). Organisms such as planktonic fauna and colonial epifauna were not included in the raw data files. Data were recorded on project-specific datasheets and entered into an Excel spreadsheet. The raw data were carefully inspected, and a final dataset was produced for analysis. The final dataset excluded infaunal taxa such as juveniles and indeterminate specimens that could not be identified to the species level, as well as epifauna, shellborers, and parasites. However, indeterminate organisms of valid benthic infaunal species were included in calculations of total density.

2.4.4 Benthic Biology Data Analysis

Infaunal Community Analysis

The PRIMER E (v.7) statistical package was used to calculate several diversity indices, including Shannon's diversity index (H′), Pielou's evenness value (J′), and Fisher's alpha (Clarke and Gorley, 2001). Shannon's index (H′), which is based on information theory and is the most widely used diversity index. Shannon's index assumes that individuals are randomly sampled from an infinitely large population and that all species are present in the sample (Pielou, 1975, Magurran, 1988); neither assumption correctly describes the environmental samples collected in most marine benthic programs. Pielou's evenness index (J') expresses H' relative to the maximum value that H' can obtain when all of the species in the sample are perfectly even. Fisher's alpha model of species abundance (Fisher et al. 1943) has also been widely used and is considered the best index for discriminating among subtly different sites (Taylor, 1978). Fisher's alpha is a measure of diversity that is independent of sample size.

A species-area curve was generated to evaluate the success of sampling the two areas (ELDS and reference) relative to the number of species collected per number of samples. The cumulative species count should increase with the number of samples collected. When

the curve begins to plateau, it indicates that a sufficient number of samples have been collected to estimate the number of species in a given area. PRIMER was also used to calculate the Bray-Curtis Similarity Analysis and Principal Components Analysis (PCA). These multivariate analyses were used to identify patterns in the data, such as differences in faunal assemblages within ELDS compared to the reference areas.

Infaunal Trophic Guilds

To further evaluate the species composition of ELDS relative to the reference areas, all species were assigned to one of six trophic guilds (feeding modes): omnivore/scavenger, subsurface deposit feeder, interface feeder, suspension feeder, surface deposit feeders, or predator (Appendix F). A list of major species included in each trophic guild is presented in Table 2-5.

2.4.5 Benthic Tissue Data Collection

A modified oyster dredge was used to collect sufficient sample mass for tissue analysis. The dredged had a 1.8 m long inner mesh net (0.6 cm openings) reinforced with an outer twine mesh net (0.6 m openings). The dredge had 10 cm teeth and a 1.2 m horizontal opening. Weights were added to the dredge frame to ensure that the teeth had sufficient penetration in the sediment. There were four samples collected from within the disposal site, and one sample collected in each of the proposed reference areas. At each station, the vessel was positioned at the target coordinates, and the benthic dredge was deployed to the seafloor within a defined station tolerance of 25 m of the benthic grab locations (Figure 2-2, Figure 2-3. A starting coordinate was collected and the vessel transited under headway speed in a pre-defined direction. After a several minute drag, an end coordinate was collected and the dredge was retrieved, and placed on the deck. The sediment within the mesh was dumped onto the deck of the vessel and sorted.

The target organism *Nephtys incinsa* was not present in any of the samples collected. Given this observation, the decision was made in coordination with NAE to modify tissue sampling efforts to target mollusks. Species retained for analysis included *Anadara transversa* (transverse ark), *Crepidula fornicata* (common slipper shell), *Mercenaria* (quahog), and *Mya arenaria* (soft-shell clam). The resultant samples were multi-species composites. Of the seven successful tissue drags, four of them required multiple drags to achieve the target tissue volume of 30 grams (g).

Upon collection of the sufficient mollusk biomass, the organisms were transferred into pre-cleaned jars filled with fresh seawater. The seawater was aerated via an external battery powered air stone. Each sample was allowed to depurate for a minimum of 24 hours prior to transfer to Katahdin Analytical Services for chemistry analysis. The tissue samples were analyzed for metals, PAHs, pesticides, PCBs, and lipids.

2.4.6 Benthic Tissue Analysis

Tissue samples were analyzed for metals, pesticides, PAHs and PCBs and prepared with a routine QC sample. One field duplicate sample was collected. Due to a lack of available tissue biomass, pesticides and PCBs were not analyzed at stations SE REF and W REF.

For the metals, pesticides, PAH, and PCB analysis, QC included a method blank (MB) and a LCS. For mercury, a tissue-matrix solid reference material was also analyzed. Analytical data summaries are presented in Tables 3-5 through 3-8 and full analytical data tables are presented in Appendix E.

2.5 Fishing Gear Assessment

During the multibeam survey, approximate locations of any surface marker buoys/ fishing gear were logged. Any targets observed had GPS coordinates recorded using HYPACK software and descriptions noted.

Table 2-1.

October/ November 2017 ELDS Field Activities Summary

Survey	Date	Summary
Bathymetry	25-27 - October - 17	ELDS Area: 2000 x 3000 m Lines: 61 Spacing: 30 - 50 m Reference Areas (3): 600 x 600 m Lines (avg): 14 Spacing: 30 - 50 m
Sediment - Profile Imaging and Plan - View Imaging	28-29 - October - 17	Stations: 60 ELDS: 45 Reference Area: 15
Benthic Drags	1 - November - 17	Stations: 60 ELDS: 4 Reference Area: 3
Sediment Grabs	2-3 - November - 17	Stations: 24 Chemistry/ 12 Benthic ELDS: 15 Chemistry / 9 Benthic Reference Area: 9 Chemistry / 3 Benthic

Table 2-2.

Acoustic Cross-Line Comparison Results
October 25-27, 2017, Values in Meters

	ELDS Site			West Ref.			Northeast Ref.			Southeast Ref.		
+/- Beam Angle Limit	Mean Diff.	SD	95% Conf.	Mean Diff.	SD	95% Conf.	Mean Diff.	SD	95% Conf.	Mean Diff.	SD	95% Conf.
0 (vertical)	0.01	0.07	0.13	0.00	0.06	0.11	0.02	0.03	0.06	0.01	0.04	0.07
5	0.00	0.07	0.14	0.00	0.05	0.10	0.02	0.03	0.06	0.02	0.04	0.08
10	0.01	0.07	0.15	0.00	0.06	0.11	0.03	0.03	0.06	0.02	0.04	0.08
15	0.01	0.07	0.14	0.00	0.06	0.11	0.03	0.03	0.06	0.01	0.04	0.09
20	-0.01	0.08	0.16	-0.01	0.06	0.12	0.02	0.03	0.06	0.00	0.05	0.09
25	-0.01	0.07	0.14	-0.03	0.07	0.14	0.01	0.03	0.07	-0.01	0.05	0.11
30	0.00	0.07	0.14	-0.03	0.07	0.14	0.02	0.03	0.07	-0.01	0.05	0.10
35	-0.01	0.07	0.15	-0.03	0.07	0.15	0.02	0.03	0.06	-0.01	0.05	0.09
40	-0.01	0.07	0.14	-0.02	0.08	0.15	0.02	0.03	0.07	0.00	0.05	0.09
45	0.00	0.08	0.15	-0.01	0.07	0.14	0.01	0.04	0.07	0.00	0.05	0.10
50	-0.01	0.09	0.18	0.00	0.07	0.15	0.01	0.04	0.07	0.01	0.05	0.10
55	-0.02	0.08	0.16	-0.01	0.07	0.14	0.00	0.04	0.07	-0.01	0.05	0.10
60	-0.01	0.08	0.16	0.01	0.08	0.15	0.00	0.04	0.07	-0.01	0.06	0.11
65	0.02	0.06	0.13	0.01	0.09	0.17	0.03	0.03	0.05	0.00	0.07	0.15
Mean	0.00	0.07	0.15	-0.01	0.07	0.13	0.02	0.03	0.06	0.00	0.05	0.10

Notes:

1. Comparisons made between cross-line swaths and a reference surface created using mainstay data to +/- 65 degrees from nadir using 2m x 2m cell average elevations.

2. 95th percentile uncertainty calculated as 2x root mean square per ACOE recommendations.

Table 2-3.

ELDS Proposed SPI/PV, Sediment/Biology Grab, and Tissue Chemistry Locations

Station ID	Location	Easting[1]	Northing[1]	Latitude (N)[2]	Longitude (W)[2]	SPI/PV	Sediment Grab (Physical and Chemical)	Benthic Community Structure Analysis	Tissue Chemistry[3]
ELDS-1	Site	357611.9	202076.6	41° 16.7341'	72° 07.1778'	X			
ELDS-2	Site	357911.9	202076.6	41° 16.7329'	72° 06.9630'	X	X		
ELDS-3	Site	358211.9	202076.6	41° 16.7318'	72° 06.7481'	X			
ELDS-4	Site	358511.9	202076.6	41° 16.7306'	72° 06.5333'	X			
ELDS-5	Site	359711.9	202076.6	41° 16.7257'	72° 05.6739'	X	X	X	
ELDS-6	Site	360011.9	202076.6	41° 16.7244'	72° 05.4590'	X			
ELDS-7	Site	357761.9	201776.6	41° 16.5715'	72° 07.0720'	X			
ELDS-8	Site	358061.9	201776.6	41° 16.5703'	72° 06.8571'	X			
ELDS-9	Site	358361.9	201776.6	41° 16.5691'	72° 06.6423'	X	X	X	
ELDS-10	Site	358661.9	201776.6	41° 16.5679'	72° 06.4274'	X			
ELDS-11	Site	359561.9	201776.6	41° 16.5642'	72° 05.7829'	X			
ELDS-12	Site	359861.9	201776.6	41° 16.5630'	72° 05.5681'	X			
ELDS-13	Site	360161.9	201776.6	41° 16.5618'	72° 05.3533'	X	X	X	X
ELDS-14	Site	357611.9	201476.6	41° 16.4100'	72° 07.1809'	X			
ELDS-15	Site	357911.9	201476.6	41° 16.4088'	72° 06.9661'	X	X	X	X
ELDS-16	Site	358211.9	201476.6	41° 16.4076'	72° 06.7513'	X			
ELDS-17	Site	358511.9	201476.6	41° 16.4064'	72° 06.5365'	X			
ELDS-18	Site	358811.9	201476.6	41° 16.4052'	72° 06.3216'	X			
ELDS-19	Site	359711.9	201476.6	41° 16.4015'	72° 05.6772'	X	X	X	
ELDS-20	Site	360011.9	201476.6	41° 16.4003'	72° 05.4623'	X			
ELDS-21	Site	357761.9	201176.6	41° 16.2473'	72° 07.0751'	X	X		
ELDS-22	Site	358061.9	201176.6	41° 16.2461'	72° 06.8603'	X			
ELDS-23	Site	358361.9	201176.6	41° 16.2449'	72° 06.6455'	X	X		

Table 2-3. (continued)

ELDS Proposed SPI/PV, Sediment/ Biology Grab, and Tissue Chemistry Locations

Station ID	Location	Easting	Northing	Latitude (N)	Longitude (W)	SPI/PV	Sediment Grab (Physical and Chemical)	Benthic Community Structure Analysis	Tissue Chemistry
ELDS-24	Site	358661.9	201176.6	41° 16.2437'	72° 06.4306'	X			
ELDS-25	Site	358961.9	201176.6	41° 16.2425'	72° 06.2158'	X			
ELDS-26	Site	359561.9	201176.6	41° 16.2401'	72° 05.7862'	X			
ELDS-27	Site	359861.9	201176.6	41° 16.2389'	72° 05.5714'	X	X		
ELDS-28	Site	360161.9	201176.6	41° 16.2376'	72° 05.3566'	X			
ELDS-29	Site	357611.9	200876.6	41° 16.0858'	72° 07.1841'	X			
ELDS-30	Site	357911.9	200876.6	41° 16.0847'	72° 06.9693'	X			
ELDS-31	Site	358211.9	200876.6	41° 16.0835'	72° 06.7545'	X	X		
ELDS-32	Site	358511.9	200876.6	41° 16.0823'	72° 06.5396'	X			
ELDS-33	Site	358811.9	200876.6	41° 16.0811'	72° 06.3248'	X	X	X	
ELDS-34	Site	359111.9	200876.6	41° 16.0798'	72° 06.1100'	X			
ELDS-35	Site	359411.9	200876.6	41° 16.0786'	72° 05.8952'	X	X		
ELDS-36	Site	359711.9	200876.6	41° 16.0774'	72° 05.6804'	X			
ELDS-37	Site	360011.9	200876.6	41° 16.0762'	72° 05.4656'	X	X	X	X
ELDS-38	Site	358061.9	200576.6	41° 15.9220'	72° 06.8634'	X			
ELDS-39	Site	358361.9	200576.6	41° 15.9208'	72° 06.6486'	X	X	X	X
ELDS-40	Site	358661.9	200576.6	41° 15.9196'	72° 06.4338'	X			
ELDS-41	Site	358961.9	200576.6	41° 15.9184'	72° 06.2190'	X	X		
ELDS-42	Site	359261.9	200576.6	41° 15.9172'	72° 06.0042'	X			
ELDS-43	Site	359561.9	200576.6	41° 15.9159'	72° 05.7894'	X			
ELDS-44	Site	359861.9	200576.6	41° 15.9147'	72° 05.5746'	X			
ELDS-45	Site	360161.9	200576.6	41° 15.9135'	72° 05.3598'	X			
WREF 1	Reference	354539.4	200674.9	41° 15.9886'	72° 09.3851'	X			

Table 2-3. (continued)

ELDS Proposed SPI/PV, Sediment/ Biology Grab, and Tissue Chemistry Locations

Station ID	Location	Easting	Northing	Latitude (N)	Longitude (W)	SPI/PV	Sediment Grab (Physical and Chemical)	Benthic Community Structure Analysis	Tissue Chemistry
WREF 2	Reference	354098.7	200670.5	41° 15.9878'	72° 09.7006'	X	X		
WREF 3	Reference	354348.6	200805.5	41° 16.0599'	72° 09.5210'	X			
WREF 4	Reference	354516.8	200970.3	41° 16.1483'	72° 09.3998'	X	X	X	X
WREF 5	Reference	354076.1	201050.2	41° 16.1931'	72° 09.7150'	X	X		
NEREF 1	Reference	362733.2	202201.8	41° 16.7806'	72° 03.5095'	X			
NEREF 2	Reference	362973.6	202214.4	41° 16.7864'	72° 03.3372'	X	X		
NEREF 3	Reference	362705.1	202007.0	41° 16.6755'	72° 03.5307'	X	X	X	X
NEREF 4	Reference	362940.8	202011.0	41° 16.6766'	72° 03.3619'	X	X		
NEREF 5	Reference	363124.0	201959.9	41° 16.6482	72° 03.2310'	X			
SEREF 1	Reference	362405.9	199900.3	41° 15.5387'	72° 03.7570'	X	X		
SEREF 2	Reference	362631.2	199785.6	41° 15.4757'	72° 03.5963'	X			
SEREF 3	Reference	362843.7	199855.2	41° 15.5124'	72° 03.4438'	X			
SEREF 4	Reference	362674.6	199535.9	41° 15.3406'	72° 03.5667'	X	X	X	X
SEREF 5	Reference	362301.0	199631.4	41° 15.3938'	72° 03.8336'	X	X		

Notes:
1. Grid coordinates are NAD_1983_StatePlane_Connecticut_FIPS_0600_Meters
2. Geographic coordinates are NAD83 degree decimal minute
3. Coordinates for tissue chemistry samples represent the beginning of the drag line.

Table 2-4.

Summary of Laboratory Analytical Work

	Test Method EPA Test Method No.		
	Sample Prep	**Analytical**	**Instrumentation**
Arsenic (As)	3050B	6020B	ICP-MS
Cadmium (Cd)	3050B	6020B	ICP-MS
Chromium (Cr)	3050B	6020B	ICP-MS
Copper (Cu)	3050B	6020B	ICP-MS
Lead (Pb)	3050B	6020B	ICP-MS
Mercury (Hg)	7471B	7471B	CVAA
Nickel (Ni)	3050B	6020B	ICP-MS
Zinc (Zn)	3050B	6020B	ICP-MS
Polycyclic Aromatic Hydrocarbons (PAHs)	3540C	8270D SIM	GC-MS
Polychlorinated Biphenyls	3540C	8082A	GC-ECD
Pesticides	3540C	8081B	GC-ECD
Total Organic Carbon (TOC)	-	9060A	Carbonaceous analyzer
Grain Size	ASTM D422-63		

Notes:
ICP-MS - Inductively Coupled Plasma Mass Spectrometry
CVAA - Cold Vapor Atomic Absorption
GC-MS - Gas Chromatography/Mass Spectrometry
GC-ECD - Gas Chromatography/Electron Capture Detector

Table 2-5.

List of Major Species in Trophic Faunal Groupings

Trophic Group	Taxonomic Group	Species
Suspension feeders		
	Paguridae	*Pagurus longicarpus*
	Gastropods	*Crepidula fornicata*
	Bivalves	*Anadara transversa*
		Astarte undata
		Parvicardium pinnulatum
Filter feeders		
	Bivalves	*Arctica islandica*
		Crassinella lunulata
		Mya arenia
		Pitar morrhuanus
		Spisula solidissima
Subsurface deposit feeders		
	Tanaissuidae	*Tanaissus psammophilus*
	Polychaetes	*Mediomastus ambiseta*
		Clymenella zonalis
		Aricidea (Acmira) catherinae
		Paradoneis lyra
		Sabellaria vulgaris
		Scalibregma inflatum
	Bivalves	*Nucula proxima*
	Nemerteans	*Carinomella lactea*
Surface deposit feeders		
	Polychaetes	*Tharyx acutus*
		Dipolydora caulleryi
		Dipolydora socialis
		Spiophanes bombyx
		Polycirrus phosphoreus
	Oligochates	
	Amphipods	*Crassicorophium bonellii*
		Microdeutopus anomalus
		Rhepoxynius abronius
Interface feeders	Amphipods	*Ampelisca abdita*
		Byblis serrata
		Unciola inermis

Table 2-5. (continued)

List of Major Species in Trophic Faunal Groupings

Trophic Group	Taxonomic Group	Species
Predators	Gastropods	*Astyris lunata*
		Cotonopsis lafresnayi
	Polychaetes	*Exogone dispar*
		Nephtys picta
		Parexogone hebes
		Nephtys incisa

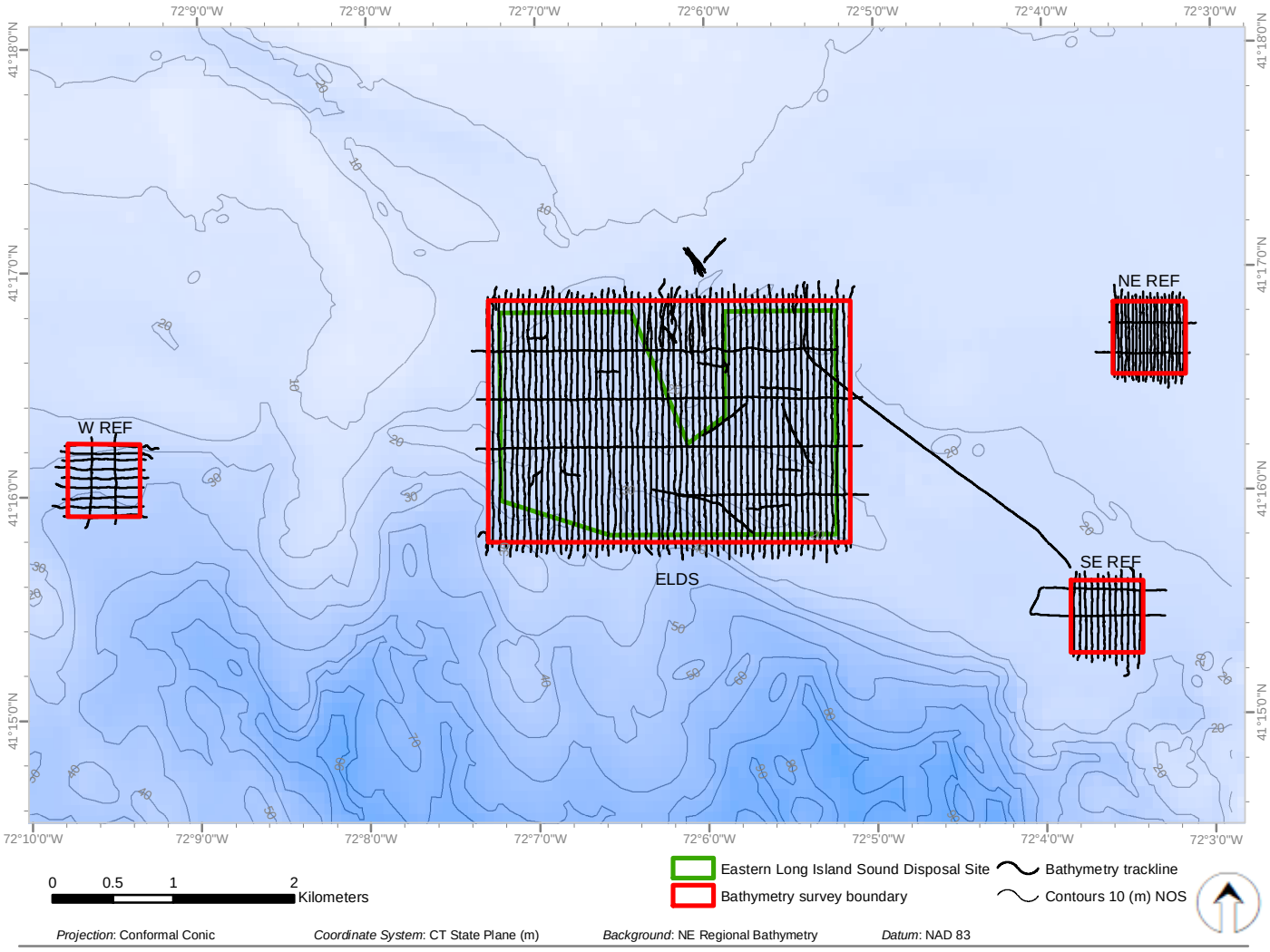


Figure 2-1. ELDS 2017 acoustic survey area and tracklines

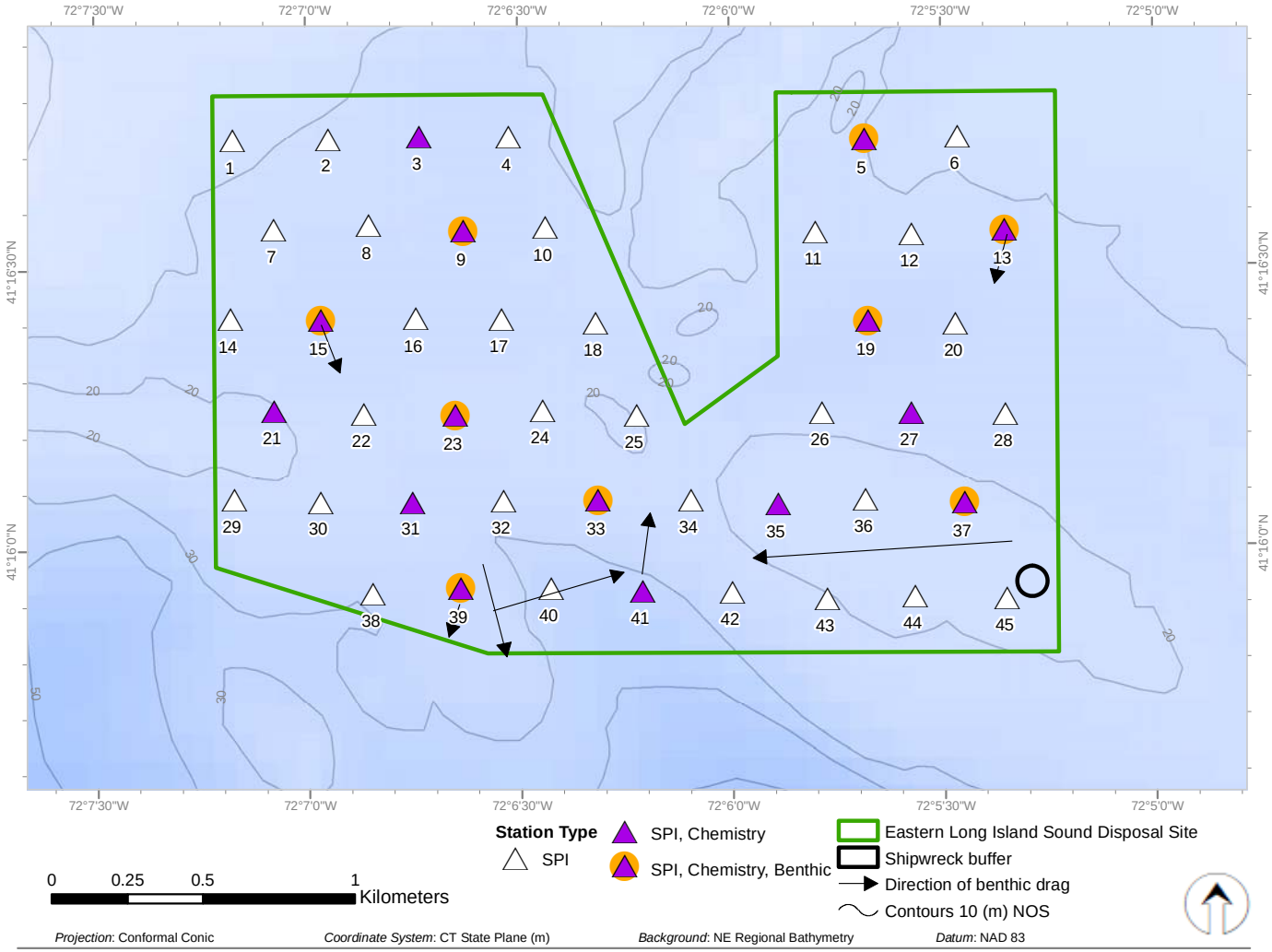


Figure 2-2. ELDS 2017 target station locations for SPI/PV, tissue, benthic, and sediment sampling

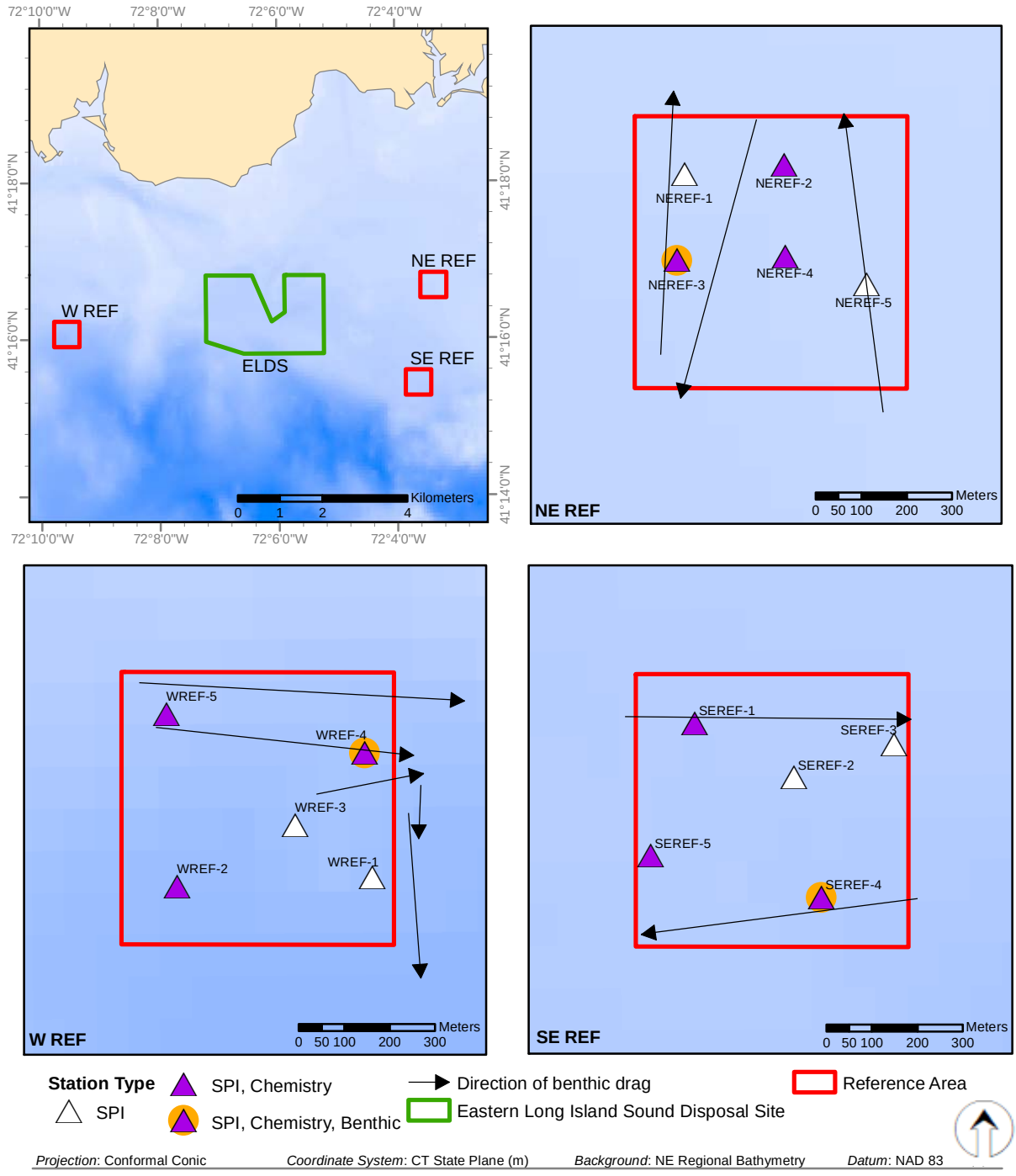


Figure 2-3. Reference area target station locations for SPI/PV, tissue, benthic, and sediment sampling

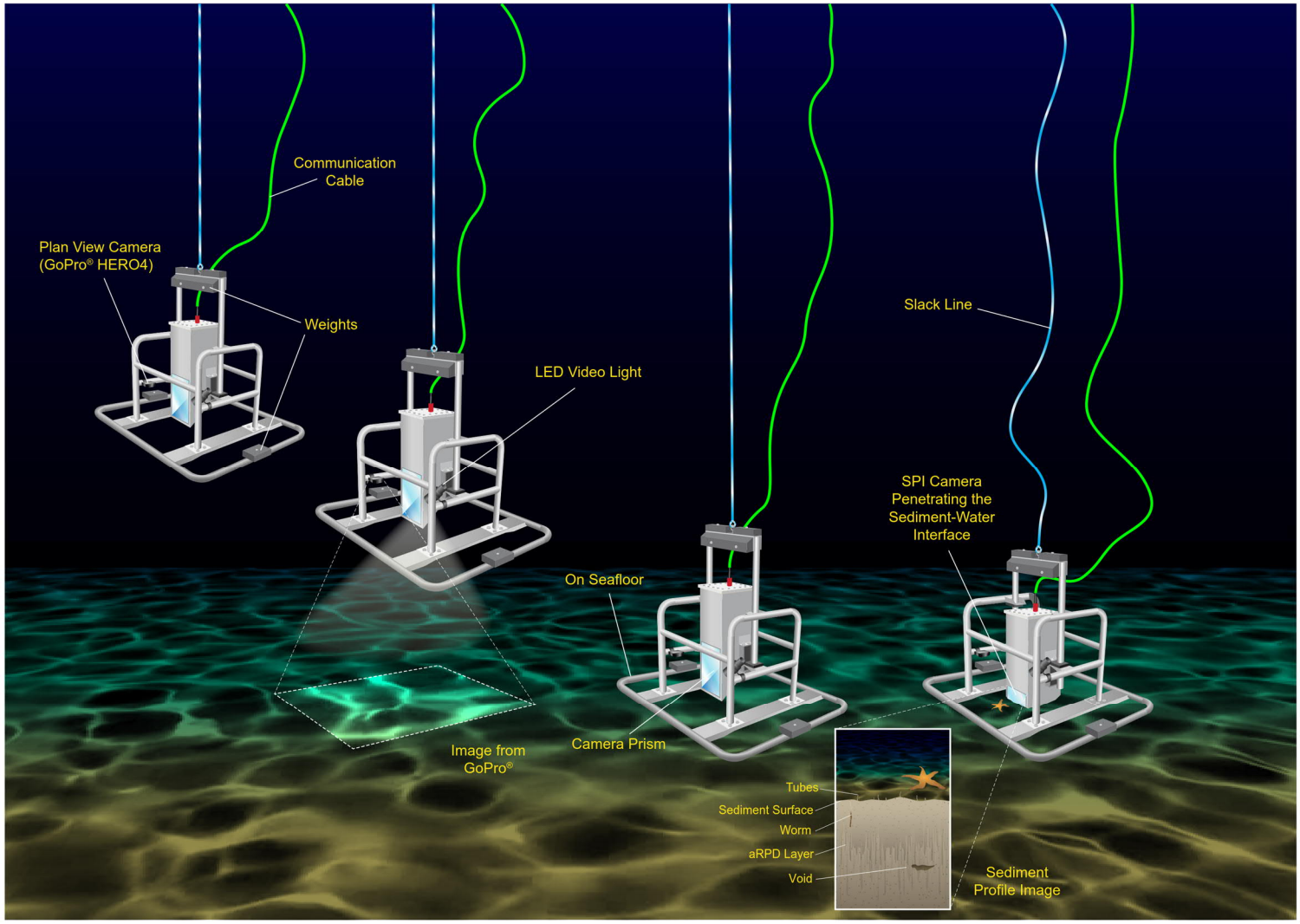


Figure 2-4. Operation of the sediment-profile image camera and plan view-camera system

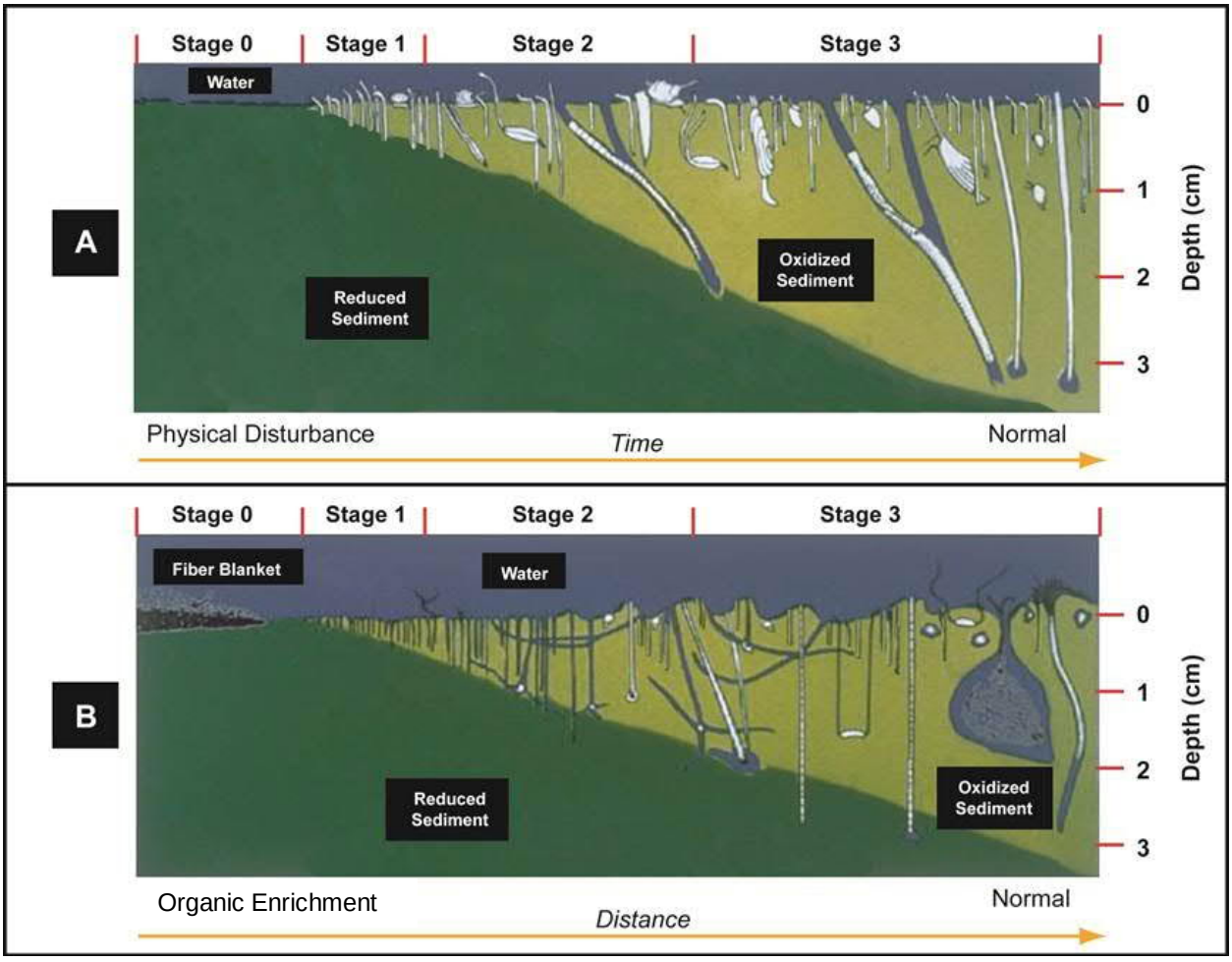


Figure 2-5. The stages of infaunal succession as a response of soft-bottom benthic communities to (A) physical disturbance or (B) organic enrichment; from Rhoads and Germano (1982)

3.0 RESULTS

3.1 Acoustic Surveys

3.1.1 Existing Bathymetry

The 2017 bathymetric survey of ELDS covered the entire footprint of the disposal site as well as the excluded hardbottom area extending into the northern central portion of the site. Water depths within the ELDS site boundaries ranged from approximately 18 m across the central east-west portion of the site to approximately 38 m in the central southern area where a northwest-southeast oriented trough exits the site boundary to deeper waters (Figure 3-1). The average water depth across the site was approximately 22.1 m. An east-west band of shallower water exists across the central part of the site. The hardbottom area excluded from the northern central portion of the site ranged in depth from 15 m to 23 m. This north south oriented hardbottom area is likely an artifact of the last glaciation (Carey, 2015). To the east of the rocky outcrop, water depths ranged from approximately 18 m to approximately 30 m. On the west side of the hardbottom area, water depths ranged from approximately 17 m to approximately 23 m.

Multibeam bathymetric data displayed as an acoustic relief model (hillshading with 5x vertical exaggeration) provided a more nuanced representation of the ELDS seafloor surface (Figure 3-2). Sand waves are apparent in the southwest corner of the site and follow the same northwest-southeast orientation of the trough feature. The eastern portion of the site had numerous small, discrete, circular shaped features apparent that were observed in prior surveys (Carey, 2015). Additionally, there were a series of north-south oriented mini-troughs/ ridges present, which stood out given the otherwise smooth bottom signature of this portion of the site. These features have also been observed in prior data sets (Poppe, et al, 2011)

The three reference areas identified for ELDS and included in the bathymetric and imaging/sampling surveys had water depths that were representative of the range of depths found at ELDS site (Figure 3-3). The NE REF site was the shallowest, with a relatively flat bottom and water depths ranging from 14 m to 16 m. The SE REF site had increasing water depths sloping north to south ranging from 23 m to 27 m. The W REF site was the deepest of the three with depths increasing from 26 m to 41 m moving north to south. In the south eastern quadrant of the W REF site there is a discrete mound feature in approximately 31 m of water, rising approximately 10 m above the surrounding seafloor (Figure 3-4).

3.1.2 Acoustic Backscatter and Side-Scan Sonar

Backscatter intensity is a measure of acoustic return from the seafloor from the multibeam system, which can be exploited for bottom classification purposes (USACE, 2013). Examples of seafloor properties that these data are able to estimate remotely include

the grainsize and roughness of the near-surface sediments (Fonseca and Mayer, 2007). Typically, high backscatter intensity is related to rock or coarse-grained sediment, and low backscatter intensity is indicative of fine grained sediments. The backscatter results from ELDS were presented as a mosaic with darker colors representing a stronger signal return and lighter colors representing a weaker signal return (Figure 3-5). Within the ELDS survey area, the mosaic showed a predominantly smooth seafloor (lighter gray), with a few notable exceptions. The sandwave features that extend for approximately 1 km over the southwest portion of the site, demonstrated an uneven surface texture (alternating dark and light grey signature). The hardbottom area in the excluded northern central area had the strongest signal intensity, indicative of hard or rough surfaces.

The backscatter data was filtered and presented as a colored grid overlaid atop the vertical relief model (Figure 3-6). Sonar imagery and modeled backscatter (in dB) at ELDS suggested a relatively consistent surface texture within the site boundary, with signal returns typically ranging from approximately -23 to -18 dB. A stronger backscatter signal return (approximately -14 to -19 dB) was observed in the excluded hardbottom area, further supporting the presence of rougher surface texture when compared against the signal return from the seafloor within the majority of the site (Figure 3-6). The slightly weaker backscatter signal observed across the site is indicative of a smoother surface produced by relatively finer-grained sediment surfaces.

A mosaic of the side-scan sonar survey results was created and allowed for observation of the surficial features present at the site. The same sea bottom features present in the backscatter results were observed in the side-scan results, including the hardbottom areas and the mini-troughs/ ridges present on its western side (Figure 3-7). The sand waves in the southwest were also clearly visible in the side-scan results.

The NE REF site backscatter and side-scan data revealed a largely featureless, smooth sea bottom, and had the weakest signal return of the three reference areas (Figure 3-8). The filtered backscatter signal return in this area was -23 to -26 dB (Figure 3-9). At the SE REF site there were multiple discrete bottom features with a strong backscatter signal return (darker gray) scattered across the seafloor which predominantly had a lighter grey (weaker) return (Figure 3-8). These targets were also evident in the side-scan sonar data and are likely isolated boulders or rubble. The filtered backscatter signal in this area ranged from -19 to -24 dB (Figure 3-9). The W REF site backscatter had a stronger return (darker grey) that was coincident with the mound that was observed in the bathymetric data set. Irregular seafloor features were observed along the eastern portion of the northern boundary in both the sidescan and the backscatter data of W REF (Figure 3-10). The filtered backscatter signal return was predominantly -14 to -19 dB across the site, with the exception of the northeastern area which had a signal as low as -26 dB (Figure 3-9).

3.2 Sediment Profile and Plan View Imaging

The SPI and PV data were assessed to aid in the physical and biological characterization of the disposal site and the three reference areas. Three replicate images from the SPI/PV camera system were analyzed at each station. The data from three replicates for aRPD depth, prism penetration depth, and boundary roughness were averaged to get a mean value per station. Successional stage for each station replicate was displayed as a pie chart in the figures depicting each of the three replicates. Detailed image analysis results are presented Appendix C. The following sections summarize the results for the reference areas and the disposal site. Statistical comparisons between the reference area and site SPI results are also presented.

3.2.1 Reference Area Stations

3.2.1.1 Physical Sediment Characteristics

SPI stations were located at all three reference sites, capturing the full range of depths found within ELDS. Water depths at the reference SPI stations ranged from 14.6 m at NE REF-4 to 38.1 m at W REF-4. Of the three references areas, NE REF had the greatest SPI camera penetration depths with average an average value of 5.3 cm (Table 3-1, Figure 3-11 and 3-12). The SE REF and W REF stations had lower SPI camera penetration (Figure 3-13), with an average value of 1.6 and 4.2 cm, respectively. Boundary roughness at the three reference stations ranged from 0.1 to 2.5 cm (Figure 3-14). Lower camera penetration depths at the SE REF and W REF can be attributed to larger grain size with a major modal grain size ranging from fine to coarse sand and a maximum grain size of gravel (Figure 3-15 and 3-16). NE REF was comprised of fine sand with a maximum grain size of medium sand. Small scale boundary roughness was dominated by physical processes with NE REF and SE REF with an average of 1.4 cm at both areas, and W REF had lower average boundary roughness of 0.9 cm.

In the PV images, physical processes dominated the sediment surface at all stations. Asymmetrical bedforms were observed in at all five NE REF stations (Figure 3-12), all five SE REF stations (Figure 3-13), and none of the W REF stations.

3.2.1.2 Biological Conditions

Presence of larger infaunal organisms were not commonly observed at the three reference locations, but small tubes at the surface were abundant, particularly at the WREF location with the replicate images having >20 tubes present. Maximum aRPD was greater than the depth of the camera penetration at the majority of the replicates observed at the stations for NE REF, SE REF, and W REF, due to the shallow camera penetration in the predominantly sandy substrate (Figure 3-17). This limited the ability to generate meaningful summary statistics for aRPD. Biological activity was observed in the form of small surface

polychaete tubes. Therefore, overall classification of successional stage for the three reference sites was predominantly characterized as Stage II, acknowledging that the aRPD depths were often greater than 3.5 cm where the camera penetrated to this depth or deeper (Figure 3-18 and 3-19). Only two stations were observed to have oxic feeding voids (Figure 3-20) at NEREF, and these were categorized at Stage III succession (NE REF-4). Tube openings (*Chaetopterus, Diopatra*) were visible at two stations (Figure 3-12); however, beyond those observations, there was limited biological activity present in the PV images. There were not any tracks on the seafloor or fish observed in the PV images.

3.2.2 Disposal Site Stations

3.2.2.1 Physical Sediment Characteristics

Water depths at the ELDS SPI stations ranged from 16.5 m at ELDS-20 to 31.7 m at ELDS-41. The disposal site stations were uniformly observed to have small scale boundary roughness attributed to physical processes. Average boundary roughness was 1.2 cm with a minimum of 0.4 to a maximum of 3.1 cm (Figure 3-21 and 3-22), where camera penetration depth was greater than zero. Mean camera penetration depths ranged from 0 to 13.8 cm (Figure 3-23, 3-24, and 3-25). Major modal grain size at the disposal site locations was similar among replicates as well as between stations with grain size ranging from fine to coarse sand (Figure 3-26 and 3-27), with only two replicates without the presence of gravel (ELDS-1B and ELDS-1C) where these stations had the maximum grain size of medium sand.

In the PV images, physical processes dominated the sediment surface at all stations. Asymmetrical bedforms were observed in 16 of the 42 stations where PV images were collected at ELDS (Figure 3-27).

3.2.2.2 Biological Conditions

Presence of small polychaetous tubes were common throughout the disposal site stations, with few observations of larger, infaunal organisms (Figure 3-25). Oxic voids were not visually observed from images collected throughout the disposal site areas; however, mean aRPD depth was greater than 3.9 cm (Figure 3-28). This was assessed to be largely from physical processes at this site (Figure 3-22). However, infaunal activity can be considered a factor in contributing to the oxidized sedimentary conditions at these station locations. Hermit crabs and hydroids were commonly observed at the surface of disposal site images (Figure 3-29), and the successional stage was ascribed to Stage II, due to the presence of numerous Stage I organisms and deep aRPD throughout the location but lack of observation of Stage III oxic voids or any larger, deeper burrowing infauna (Figure 3-30). There was sparse biological activity present in the PV images (Figure 3-27). There were not any tracks on the seafloor or fish observed in the PV images.

3.2.3 Comparison of ELDS and Reference Areas

The SPI and PV images revealed that the three reference areas spanned the range of physical conditions found at ELDS in terms of camera penetration (Figure 3-31), sediment grain size, and boundary roughness. Biologically, stations at ELDS and the reference sites were quite similar, almost uniformly at successional Stage 2. Given that aRPD measurements were limited at most stations by the depth of camera penetration, a statistical comparison could not be made between the reference areas and ELDS, but the reference areas again spanned the range of values measured at ELDS (Figure 3-32).

3.3 Sediment Survey

3.3.1 Sediment Chemistry

Results of the sediment chemical and physical analysis are summarized below, and full analytical data tables are presented in Appendix E. Basic summary statistics are presented on Table 3-5 through Table 3-9. Totals for PAHs and DDx were calculated using one half the MDL for non-detects. Total PCBs were calculated as the sum of the 18 NOAA congeners multiplied by two, with non-detects presented as one half of the MDL.

In the surficial grain size samples collected at ELDS in 2017, sand formed the single most predominant component of the substratum at all locations (average fraction of 86%, Table 3-4). Fine sand (#200 sieve) was most present in the samples at an average content of 67%. There was no discernable difference in the grain size of the sediments when analyzed on a spatial basis. On an average basis, the samples were made up of 14% fines across the site. Similarly, the reference sites were dominated by fine sand, with total sand content ranging from 79% (NE REF) to 92% (SE REF). The highest content of fines, 21%, was found at NE REF.

The TOC was low in samples from ELDS, ranging from 0.1 to 0.6% (Table 3-5). Reference site TOC values were similarly low, ranging from 0.1 to 0.5%. These low values are consistent with what is typically observed in sand dominated environments (i.e., TOC and percent fines are typically positively correlated). The organic chemistry data were normalized on a TOC basis, and the relative concentrations observed were consistent with dry weight concentrations.

The majority of pesticides were not detected in the ELDS samples (Table 3-6), with the exception of 4,4'-DDE and heptachlor epoxide. The two 4'4-DDE detects were both 0.1 micrograms per kilogram (µg/kg) at ELDS-19 and ELDS-21. The one Heptachlor epoxide detect was at ELDS-37 (0.1 µg/kg). Pesticides were not detected in any of the reference site samples.

Five out of the 18 NOAA congeners were detected at ELDS (PCB 52, 118, 138, 153, and 180). Total PCBs (estimated as the sum of the NOAA 18 congeners multiplied by two)

ranged from 5.3 to 7.7 µg/kg at the site (Table 3-6). The most commonly detected individual congeners at ELDS were PCB 153 and PCB 118. There were very few PCB detections at the reference areas. PCB 52 was detected at W REF (0.1 µg/kg), and NE REF had two detections for PCB 180 (0.4 and 0.5 µg/kg). SE REF did not have any PCB congener detections.

Polycyclic aromatic hydrocarbons (PAHs) were detected at low levels in the majority of the ELDS samples (Table 3-6). The most prevalent PAHs were benzo(b)fluoranthene, chrysene, and fluoranthene which were detected in all samples analyzed. Total low molecular weight (LMW) PAHs ranged in concentration from 8.9 to 253 µg/kg. Total high molecular weight (HMW) PAHS ranged in concentration from 18.9 to 688 µg/kg.

PAH compounds were also detected at low levels in most reference area samples. The most prevalent individual PAHs were benzo(a)anthracene, benzo(b)fluoranthene, chrysene, fluoranthene, and pyrene which were detected in all reference samples analyzed. Total LMW PAHs ranged in concentration from 9.6 to 39.1 µg/kg. Total HMW PAHs ranged in concentration from 28.7 to 283 µg/kg.

Metals were detected in nearly all sediment samples collected at ELDS (Table 3-7). Arsenic ranged from 1.9 mg/kg at ELDS-27 to 6.4 mg/kg at ELDS-5. Chromium ranged from 5.7 to 17.1 mg/kg, copper ranged from 2.0 to 8.3 mg/kg, lead ranged from 4.0 to 13.4 mg/kg, nickel ranged from 2.9 to 52.4 mg/kg, and zinc ranged from 16.7 to 46.6 mg/kg. Mercury (maximum detection of 0.02 mg/kg) and cadmium (maximum detection of 0.04) were detected at the lowest concentrations of the metals analyzed.

At the reference sites, metals were detected in most sediment samples at concentrations similar to the ELDS samples. Arsenic, chromium, copper, lead, nickel, and zinc were detected in all samples that were analyzed. Cadmium was not detected above 0.1 mg/kg. Mercury ranged from concentrations below the detection limit to a maximum observed concentration of 0.02 mg/kg. Mercury was not detected at SE REF.

3.3.2 Benthic Community Structure

The biological assessment developed from the SPI and PV images was supplemented with sample collection for characterization of the benthic infaunal community at one station for each of the three reference areas and nine stations across ELDS. A total of 118 identifiable taxa were determined from the ELDS disposal site locations, and 78 taxa were identifiable from the three reference site locations. The mean species richness at reference locations was 35 species and was 39 species from the disposal stations. Density was 6,425 individuals/m^2 for the three reference locations combined and 6,700 individuals for the combined ELDS locations with mean Shannon-Weiner (Log_2) diversity similar at the reference and disposal site locations (3.78 and 4.10, respectively). The average measures of the benthic community were similar among the disposal and reference sites as well as when averages for these locations were compared to each other (Table 3-8), with the exception of

ELDS-39, that had lower diversity and abundances when compared to the other station locations.

Benthic infaunal taxa identified were typical for eastern Long Island Sound and, in general, the coastal New England region. The reference and disposal area sites were dominated numerically by filter-feeding, small bivalves (*Crassinella lunulata*), *Oligochaeta* spp. (predatory/ omnivores/ scavengers/ subsurface deposit feeders), *Byblis serrata* (interface feeders), and *Aricidia* (*Acmira*) *catherinae* (subsurface deposit feeders) (Table 3-9, Figure 3-33). These species were consistently within the top ten dominant taxa identified from stations sampled within both reference and disposal site areas. Additionally, throughout the sampled area (ELDS and reference sites) there was consistent presence of deposit-feeding and suspension-feeding polychaetes. Non-indigenous (i.e. introduced/alien) taxa frequently observed within Long Island Sound such as green crabs (*Carcinus maenas*) or sea squirts (*Didemnum vexillum*) were not found within the samples collected.

Using Bray-Curtis multivariate calculation to compare the overall similarity of the reference and disposal site station locations with 4th root transformation, there appeared no consistent pattern or trend observed, suggesting that the reference area samples were representative of the wide range of conditions observed at ELDS based on benthic biodiversity (Figure 3-34). W REF and NE REF were more similar to ELDS-23 and the remaining ELDS disposal site locations than to SE REF, which was most similar to ELDS-39 largely due to the dominance at *Crassinella lunulata* at these two stations, as well as these two stations having similar sediment texture comprised of coarse to medium sand, with gravel and a higher fraction of shell hash when compared to other station locations. Non-metric multidimensional scaling of 4th root transformed abundance data shows similar grouping results as the Bray-Curtis similarity (Figure 3-35) with two major groups with ELDS-39/ SE REF forming a sister group to the remaining stations that had similarity ranging between 50-62%.

3.3.3 Tissue Chemistry

Tissue samples were collected from seven locations (one at each of the three reference areas and four locations within ELDS) consisting of a mixture of tissue from *Anadara transversa* (transverse ark), *Crepidula fornicata* (common slipper shell), *Mercenaria* (quahog), and *Mya arenaria* (soft-shell clam). Results of the tissue chemical analysis are summarized below, and full analytical data tables are presented in Appendix E. Basic summary statistics are presented on Table 3-10 through Table 3-12. Totals for PAHs and DDx were calculated using one half the method detection limit (MDL) for non-detects. Total PCBs were calculated as the sum of the 18 NOAA congeners multiplied by two, with non-detects presented as one half of the MDL. All tissue sample results are reported on wet weight basis. There was insufficient sample biomass to complete all of the targeted analyses for SE REF (no pesticides, PCBs) and W REF (no lipids, PCBs, pesticides).

Percent lipids in the ELDS tissue samples ranged from 0.1 to 0.3% (Table 3-10). The two reference area samples contained 0.12% lipids on average. Given the low lipid percentages observed, the data were not evaluated on an adjusted lipids basis.

With the exception of heptachlor, pesticides were not detected in the tissue samples from ELDS (Table 3-11). Heptachlor was observed at concentrations ranging from below detection limits to 1.3 µg/kg (ELDS-37). At NE REF, Heptachlor was also detected at a concentration of 0.44 µg/kg. Additionally, Alpha-BHC was detected at NE REF a concentration of 0.63 µg/kg.

Two out of the 18 NOAA PCB congeners were detected in the ELDS tissue samples (PCB 44 and 52, Table 3-11). The maximum detection was PCB 52 at a concentration of 42 µg/kg. Total PCBs (summed NOAA 18 congeners multiplied by two) ranged from 12.2 to 96.1 µg/kg at the site. PCB congeners were not detected in tissue at N REF; PCBs were not analyzed at SE REF or W REF due to lack of available sample biomass. PAHs were not detected in ELDS or reference area samples (Table 3-11).

Metals were detected in all tissue samples collected at ELDS (Table 3-12). Arsenic ranged from 2.0 mg/kg at ELDS-15 to 2.3 mg/kg at ELDS-37. Cadmium ranged from 3.3 to 4.2 mg/kg, chromium ranged from 0.3 to 0.4 mg/kg, copper ranged from 1.0 to 1.2 mg/kg, lead ranged from 0.2 to 1.6 mg/kg, and zinc ranged from 18.3 to 21.8 mg/kg. Mercury (maximum detection of 0.04 mg/kg) and nickel (maximum detection of 0.2 mg/kg) were detected at the lowest concentrations of the metals analyzed.

At the reference sites, metals were detected in all tissue samples at concentrations similar to the ELDS samples. Arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc were detected in all samples that were analyzed. Mercury ranged from 0.02 mg/kg at SE REF to a maximum observed concentration of 0.06 mg/kg at W REF.

3.4 Surface Marker Buoy Observations

A single lobster trap-style surface marker buoy was observed during the ELDS multibeam survey (Figure 3-36, Table 3-13). It was unclear whether this buoy was fixed or adrift. There were not any buoys observed in any of the reference areas.

Table 3-1.

Summary of SPI Results for Reference Stations (station means)

Station	Water Depth (m)	Grain Size Major Mode (Phi)	Grain-Size Comment	Mean Prism Penetration Depth (cm)	Mean Boundary Roughness (cm)	Predominant Type of Boundary Roughness	Mean aRPD Depth (cm)	# of Tubes Present	Predominant Successional Stage	Surface Fauna Comment
NE REF-1	15.2	4 to 2	Trace of silt-clay on surface, small amount of shell hash	5.3	1.3	Physical	> 5.3	6 to 20	II	Arc clam on surface, may be *Anadera sp*., large white tube top, may be *Chaetopterus sp.*
NE REF-2	14.6	4 to 2	Trace of silt-clay on surface, small amount of shell hash	5.7	1.6	Physical	> 5.7	6 to 20	II	Hermit crab
NE REF-3	15.8	4 to 2	Trace of silt-clay on surface, small amount of shell hash	5.1	1.7	Physical	> 5.1	1 to 5	II	
NE REF-4	15.2	4 to 2	Trace of silt-clay on surface, small amount of shell hash	5.8	1.5	Physical	> 4.8	1 to 5	III	Hermit crabs, tubes on shell
NE REF-5	14.6	4 to 2	Trace of silt-clay on surface, small amount of shell hash	4.6	1.3	Physical	> 4.6	1 to 5	II	
Max	**15.8**			**5.8**	**1.7**		**> 5.7**			
Min	**14.6**			**4.6**	**1.3**		**4.6**			
Mean	**15.1**			**5.3**	**1.5**		**> 5.1**			

Table 3-1. (continued)

Summary of SPI Results for Reference Stations (station means)

Station	Water Depth	Grain Size Major Mode (Phi)	Grain-Size Comment	Mean Prism Penetration Depth (cm)	Mean Boundary Roughness (cm)	Predominant Type of Boundary Roughness	Mean aRPD Depth (cm)	# of Tubes Present	Predominant Successional Stage	Surface Fauna Comment
SEREF-1	24.1	3 to 1	Trace of silt-clay on surface, shell hash	1.1	1.2	Physical	1.1	0	II	Tubes on shell, hermit crab
SEREF-2	26.5	2 to -1	Shell hash	1.5	1.3	Physical	1.5	0	II	
SEREF-3	23.2	3 to 1	Trace of silt-clay on surface, shell hash	0.6	0.8	Physical	0.6	6 to 20	II	Feeding mound, tubes on shell
SEREF-4	25.6	2 to -1	Shell hash	1.5	1.7	Physical	1.5	0	II	Hermit crab
SEREF-5	24.4	2 to -1	Shell hash	3.2	1.9	Physical	3.2	0	II	
Max	**26.5**			**3.2**	**1.9**		**3.2**			
Min	**23.2**			**0.6**	**0.8**		**0.6**			
Mean	**24.9**			**1.6**	**1.4**		**1.6**			
WREF-1	35.7	3 to 1	Trace of silt-clay on surface, shell and shell hash	4.7	0.6	Physical	2.9	>20	II	Tubes on shell, encrusting organisms
WREF-2	36.9	3 to 1	Trace of silt-clay on surface, shell and shell hash	4	0.8	Physical	3.3	>20	II	Hermit crabs, encrusting organisms, tubes on shell
WREF-3	36.0	2 to -1	Trace of silt-clay on surface, shell and shell hash	0.8	1	Physical	0.8	>20	II	Tubes on shell, encrusting organisms
WREF-4	38.1	2 to -1	Trace of silt-clay on surface, shell and shell hash	6.5	1.2	Physical	6.5	>20	II	Tubes on shell, encrusting organisms, eel grass blade
WREF-5	29.0	2 to -1	Trace of silt-clay on surface, shell and shell hash	4.9	0.9	Physical	4.4	>20	II	Hermit crabs, encrusting organisms, tubes on shell
Max	**38.1**			**6.5**	**1.2**		**6.5**			
Min	**29.0**			**0.8**	**0.6**		**0.8**			
Mean	**35.1**			**4.2**	**0.9**		**3.6**			

Note: Given the shallow camera penetration, aRPD depths typically extended past the field of view of the camera prism. Therefore, when applicable, values will carry the “>” modifier.

Table 3-2.

Summary of SPI Results for ELDS Stations (station means)

Station	Water Depth (m)	Grain Size Major Mode (Phi)	Grain-Size Comment	Mean Prism Penetration Depth (cm)	Mean Boundary Roughness (cm)	Predominant Type of Boundary Roughness	Mean aRPD Depth (cm)	# of Tubes Present	Predominant Successional Stage	Surface Fauna Comment
ELDS01	18.9	3 to 1	Trace of silt-clay on surface, shell and shell hash	0.2	0.4	Physical	>0.4	1 to 5	II	Feeding mound
ELDS02	21.6	3 to 1	Trace of silt-clay on surface, shell and shell hash	5.3	0.8	Physical	>3.5	>20	II	Hermit crabs, encrusting organisms, tubes on shell
ELDS03	22.6	2 to -1	Trace of silt-clay on surface, shell and shell hash	4.7	0.8	Physical	>4.7	>20	II	Tubes on shell, encrusting organisms, hermit crabs, snail
ELDS04	22.6	3 to 1	Trace of silt-clay on surface, shell and shell hash	3.5	1.1	Physical	>3.5	6 to 20	II	Tubes on shell, encrusting organisms, hermit crabs, eel grass blade
ELDS05	31.3	2 to -1	Trace of silt-clay on surface, shell and shell hash	4.8	1.9	Physical	>4.8	6 to 20	II	Tubes on shell, encrusting organisms, feeding mound
ELDS06	18.6	2 to -1	Shell and shell hash	6.1	1.8	Physical	>6.1	6 to 20	II	Hermit crabs, tubes on shell
ELDS07	22.6	3 to 1	Trace of silt-clay on surface, shell hash	2.7	0.7	Physical	>2.7	6 to 20	II	Many hermit crabs, feeding mound
ELDS08	22.9	3 to 1	Trace of silt-clay on surface, shell and shell hash	1.5	0.9	Physical	>1.5	6 to 20	II	Hermit crabs, tubes on shell, feeding mound
ELDS09	23.2	3 to 1	Trace of silt-clay on surface, shell and shell hash	6	1.7	Physical	>5.4	0	II	Tubes on shell
ELDS10	22.3	2 to -1	Trace of silt-clay on surface, shell hash	8.1	1.4	Physical	>6.2	6 to 20	II	Feeding mound

Table 3-2. (continued)

Summary of SPI Results for ELDS Stations (station means)

Station	Water Depth	Grain Size Major Mode (Phi)	Grain-Size Comment	Mean Prism Penetration Depth (cm)	Mean Boundary Roughness (cm)	Predominant Type of Boundary Roughness	Mean aRPD Depth (cm)	# of Tubes Present	Predominant Successional Stage	Surface Fauna Comment
ELDS11	20.7	3 to 1	Trace of silt-clay on surface, shell and shell hash	6.1	1	Physical	>5.5	6 to 20	II	Tubes on shell, encrusting organisms
ELDS12	21.3	3 to 1	Trace of silt-clay on surface, shell and shell hash	4.6	1.1	Physical	>4.0	6 to 20	II	Feeding mound
ELDS13	21.0	3 to 1	Trace of silt-clay on surface, shell and shell hash	6.3	1.1	Physical	>5.6	>20	II	Tubes on shell
ELDS14	21.0	3 to 1	Trace of silt-clay on surface, shell and shell hash	3.7	1.7	Physical	>3.3	6 to 20	II	Tubes on shell, encrusting organisms
ELDS15	23.2	3 to 1	Trace of silt-clay on surface, shell and shell hash	8.9	1.4	Physical	>6.1	6 to 20	II	Tubes on shell, feeding mound
ELDS16	23.5	3 to 1	Trace of silt-clay on surface, shell and shell hash	5.7	1.3	Physical	>3.2	>20	II	Hermit crabs, encrusting organisms, tubes on shell, eel grass blade
ELDS17	23.2	3 to 1	Trace of silt-clay on surface, shell and shell hash	4.9	1.6	Physical	>3.8	6 to 20	II	Hermit crabs, tubes on shell
ELDS18	23.2	3 to 1	Trace of silt-clay on surface, shell and shell hash	7	3.1	Physical	>7.0	6 to 20	II	Tubes on shell, hermit crab
ELDS19	28.0	3 to 1	Trace of silt-clay on surface, shell and shell hash	4.7	1.7	Physical	>4.7	1 to 5	II	Hermit crab
ELDS20	16.5	3 to 1	Shell and shell hash	4.5	1.9	Physical	>4.5	1 to 5	II	Hermit crab
ELDS21	20.1	3 to 1	Trace of silt-clay on surface, shell and shell hash	4	1	Physical	>3.1	6 to 20	II	Tubes on shell, encrusting organisms

Table 3-2. (continued)

Summary of SPI Results for ELDS Stations (station means)

Station	Water Depth	Grain Size Major Mode (Phi)	Grain-Size Comment	Mean Prism Penetration Depth (cm)	Mean Boundary Roughness (cm)	Predominant Type of Boundary Roughness	Mean aRPD Depth (cm)	# of Tubes Present	Predominant Successional Stage	Surface Fauna Comment
ELDS22	22.3	3 to 1	Trace of silt-clay on surface, Shell and Shell Hash	4.2	0.9	Physical	>2.6	>20	II	Tubes on shell, encrusting organisms, hermit crab
ELDS23	21.0	3 to 1	Trace of silt-clay on surface, Shell and Shell Hash	5.1	1	Physical	>2.5	>20	II	Tubes on shell, encrusting organisms
ELDS24	21.0	3 to 1	Trace of silt-clay on surface, Shell and Shell Hash	8.3	0.9	Physical	>5.4	>20	II	Tubes on shell
ELDS25	21.0	3 to 1	Trace of silt-clay on surface, Shell and Shell Hash	6.5	1.6	Physical	>3.1	>20	II	Tubes on shell, encrusting organisms
ELDS26	17.4	3 to 1	Trace of silt-clay on surface, Shell and Shell Hash	2.8	1.1	Physical	>2.8	>20	II	Tubes on shell, eel grass blade
ELDS27	23.5	3 to 1	Trace of silt-clay on surface, Shell Hash	2.7	1.1	Physical	>2.7	1 to 5	II	Tubes on shell, encrusting organisms, hermit crab
ELDS28	23.2	3 to 1	Trace of silt-clay on surface, Shell Hash	4	0.5	Physical	>2.6	1 to 5	II	Many hermit crabs
ELDS29	21.9	2 to -1	Shell Hash	7	0.6	Physical	>7.0	0	II	
ELDS30	22.6	2 to -1	Shell Hash	3.2	0.8	Physical	>3.2	0	II	Tubes on shell
ELDS31	22.9	2 to -1	Trace of silt-clay on surface, Shell and Shell Hash	3.8	0.7	Physical	>3.8	6 to 20	II	Hermit crabs, tubes on shell
ELDS32	24.1	3 to 1	Trace of silt-clay on surface, Shell and Shell Hash	9.1	1.3	Physical	>7.0	6 to 20	II	Tubes on shell, encrusting organisms
ELDS33	22.6	3 to 1	Shell and Shell Hash	6	1.4	Physical	>5.3	6 to 20	II	Tubes on shell

Table 3-2. (continued)

Summary of SPI Results for ELDS Stations (station means)

Station	Water Depth (m)	Grain Size Major Mode (Phi)	Grain-Size Comment	Mean Prism Penetration Depth (cm)	Mean Boundary Roughness (cm)	Predominant Type of Boundary Roughness	Mean aRPD Depth (cm)	# of Tubes Present	Predominant Successional Stage	Surface Fauna Comment
ELDS34	21.0	3 to 1	Trace of silt-clay on surface, Shell and Shell Hash	7.7	0.9	Physical	>5.4	>20	II	Hermit crab, tubes on shell, eel grass blade
ELDS35	19.8	3 to 1	Trace of silt-clay on surface, Shell and Shell Hash	5.3	1.6	Physical	>5.1	6 to 20	II	Tubes on shell, eel grass blade
ELDS36	19.2	3 to 1	Trace of silt-clay on surface, Shell and Shell Hash	5.2	0.8	Physical	>5.2	>20	II	Tubes on shell, encrusting organisms
ELDS37	20.1	3 to 1	Trace of silt-clay on surface, Shell and Shell Hash	5.1	1.2	Physical	>4.7	6 to 20	II	Tubes on shell, encrusting organisms
ELDS38	27.4	2 to -1	Shell and Shell Hash	3	0.9	Physical	>3.0	6 to 20	II	Tubes on shell, encrusting organisms, eel grass blade
ELDS39	25.3	2 to -1	Shell and Shell Hash	0.4	0.7	Physical	>0.4	1 to 5	II	Hermit crabs, tubes on shell
ELDS40	31.4	3 to 1	Shell Hash	3.8	1.5	Physical	>3.8	0	II	Encrusting organisms
ELDS41	31.1	3 to 1	Trace of silt-clay on surface, Shell Hash	2.9	1.4	Physical	>2.9	0	II	Hermit crab
ELDS42	24.4	3 to 1	Trace of silt-clay on surface, Shell Hash	2.8	0.8	Physical	>2.8	1 to 5	II	Hermit crab
ELDS43	20.1	3 to 1	Trace of silt-clay on surface, Shell and Shell Hash	2.3	0.7	Physical	>2.3	>20	II	Tubes on shell, encrusting organisms, eel grass blade
ELDS44	19.2	3 to 1	Trace of silt-clay on surface, Shell and Shell Hash	2	1.2	Physical	>2.0	>20	II	Tubes on shell, encrusting organisms, baby starfish

Table 3-2. (continued)

Summary of SPI Results for ELDS Stations (station means)

Station	Water Depth (m)	Grain Size Major Mode (Phi)	Grain-Size Comment	Mean Prism Penetration Depth (cm)	Mean Boundary Roughness (cm)	Predominant Type of Boundary Roughness	Mean aRPD Depth (cm)	# of Tubes Present	Predominant Successional Stage	Surface Fauna Comment
ELDS45	19.8	3 to 1	Trace of silt-clay on surface, Shell and Shell Hash	2.9	0.9	Physical	>2.9	6 to 20	II	Tubes on shell
Max	31.4			**9.1**	**3.1**		**>7.0**			
Min	16.5			**0.2**	**0.4**		**0.4**			
Mean	22.3			**4.7**	**1.2**		**>4.0**			

Note: Given the shallow camera penetration, aRPD depths typically extended past the field of view of the camera prism. Therefore, when applicable, values will carry the “>” modifier.

Table 3-3.

Summary of Station Means by Sampling Locations

Site	n	Mean aRPD (cm)		Maximum Successional Stage Rank		Number of Feeding Voids	
		Mean	**StdDev**	**Mean**	**StdDev**	**Mean**	**StdDev**
Reference Areas							
NE REF	5	> 5.1	> 0.43	2.2	0.45	0.2	0.45
SE REF	5	> 1.6	> 0.98	2	0	0	0
W REF	5	> 3.6	> 2.09	2	0	0	0
Mean		> 3.4		2.1		0.1	
Disposal Area							
ELDS	45	> 4	> 1.63	2	0	0	0

Note:

1. Given the shallow camera penetration, aRPD depths typically extended past the field of view of the camera prism. Therefore, when applicable, values will carry the ">" modifier.
2. n = Number of samples included in analysis.

Table 3-4.

Summary of Grain Size Data for 2017 Sediment Samples

	Gravel (>4.75 mm)					Coarse Sand (2.0-4.75 mm)					Medium Sand (0.425-2.0 mm)					Fine Sand (0.075-0.425 mm)				
	%					%					%					%				
Area	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**
Disposal Site																				
ELDS	15	0.0	6.4	1.4	2.0	15	0.0	5.8	1.5	1.7	15	8.0	29.5	16.0	6.3	15	55.1	80.9	67.0	7.7
Disposal Site Total	**15**	**0.0**	**6.4**	**1.4**	**2.0**	**15**	**0.0**	**5.8**	**1.5**	**1.7**	**15**	**8.0**	**29.5**	**16.0**	**6.3**	**15**	**55.1**	**80.9**	**67.0**	**7.7**
Reference Sites																				
NE REF	3	0.0	0.0	0.0	0.0	3	0.0	0.0	0.0	0.0	3	0.0	0.6	0.2	0.3	3	78.8	79.0	78.9	0.1
SE REF	3	0.0	0.0	0.0	0.0	3	0.0	0.4	0.1	0.2	3	11.9	18.9	15.8	3.5	3	70.5	79.3	75.8	4.7
W REF	3	0.0	7.2	2.4	4.1	3	0.0	1.9	0.6	1.1	3	11.9	17.0	21.5	4.1	3	60.9	63.9	62.8	1.6
Reference Total	**9**	**0.0**	**7.2**	**0.8**	**2.4**	**9**	**0.0**	**1.9**	**0.3**	**0.6**	**9**	**0**	**18.9**	**12.5**	**9.9**	**9**	**60.9**	**79.3**	**72.5**	**7.8**

	Sand (0.075 - 4.75 mm)					Silt (0.005-0.075 mm)					Clay (<0.005 mm)					Fines (Silt + Clay)				
	%					%					%					%				
Area	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**
Disposal Site																				
ELDS	15	74.9	95.1	85.9	5.3	15	3.5	21.2	10.6	4.8	15	1.4	5.0	3.5	1.1	15	4.9	25.1	14.1	5.3
Disposal Site Total	**15**	**74.9**	**95.1**	**85.9**	**5.3**	**15**	**3.5**	**21.2**	**10.6**	**4.8**	**15**	**1.4**	**5.0**	**3.5**	**1.1**	**15**	**4.9**	**25.1**	**14.1**	**5.3**
Reference Sites																				
NE REF	3	78.9	79.4	79.1	0.2	3	19.7	20.7	20.1	0.5	3	0.5	1.0	0.8	0.3	3	20.7	21.1	20.9	0.2
SE REF	3	89.7	94.1	91.7	2.2	3	5.4	9.5	7.7	2.1	3	0.5	0.8	0.6	0.2	3	5.9	10.3	8.3	2.2
W REF	3	85.9	89.6	87.3	2.0	3	9.6	11.8	10.7	1.1	3	0.8	2.9	2.0	1.1	3	10.4	14.1	12.7	2.0
Reference Total	**9**	**78.9**	**94.1**	**86.0**	**5.7**	**9**	**5.4**	**20.7**	**12.9**	**5.7**	**9**	**0.5**	**2.9**	**1.1**	**0.9**	**9**	**5.9**	**21.1**	**14.0**	**5.7**

Note:

1. Duplicates are averaged.

n = Number of samples included in analysis.

Table 3-5.

Percent Total Organic Carbon in ELDS 2017 Sediment Samples

	Total Organic Carbon				
			%		
Area	**n**	**MIN**	**MAX**	**Mean**	**StdDev**
Disposal Site					
ELDS	15	0.1	0.6	0.4	0.1
Disposal Site Total	**15**				
Reference Sites					
NE REF	3	0.3	0.5	0.4	0.1
SE REF	3	0.1	0.2	0.1	0.0
W REF	3	0.2	0.4	0.3	0.1
Reference Total	**9**	**0.1**	**0.5**	**0.3**	**0.1**

Note:

1. Duplicates are averaged.

n = Number of samples included in analysis.

Table 3-6.

Total DDx, Total PCB, and Total PAH in ELDS 2017 Sediment Samples

	Total DDx					Total PCBs				
	µg/kg					µg/kg				
Area	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**
Disposal Site										
ELDS	15	0.1	0.2	0.1	0.0	15	5.3	7.7	6.4	0.8
Disposal Site Total	**15**	**0.1**	**0.2**	**0.1**	**0.0**	**15**	**5.3**	**7.7**	**6.4**	**0.8**
Reference Sites										
NE REF	3	0.1	0.1	0.1	0.0	3	6.0	6.8	6.4	0.4
SE REF	3	0.1	0.1	0.1	0.0	3	4.7	5.5	5.1	0.4
W REF	3	0.1	0.1	0.1	0.0	3	5.5	6.2	5.9	0.4
Reference Total	**9**	**0.1**	**0.1**	**0.1**	**0.0**	**9**	**4.7**	**6.8**	**5.8**	**0.6**

	Total PAHs					Total LMW PAHs					Total HMW PAHs				
	µg/kg					µg/kg					µg/kg				
Area	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**
Disposal Site															
ELDS	15	27.8	759.6	257.8	276.2	15	8.9	252.8	41.8	63.2	15	18.9	688.4	216.0	230.9
Disposal Site Total	**15**	**27.8**	**759.6**	**257.8**	**276.2**	**15**	**8.9**	**252.8**	**41.**	**63.2**	**15**	**18.9**	**688.4**	**216.0**	**230.9**
Reference Sites															
NE REF	3	170.2	314.6	223.7	79.1	3	18.9	31.2	24.2	6.3	3	147.8	283.4	199.6	73.3
SE REF	3	43.6	191.5	100.0	79.9	3	9.6	39.1	19.7	16.8	3	34.0	152.4	80.3	63.3
W REF	3	39.5	104.3	61.4	37.1	3	10.3	15.7	12.6	2.8	3	28.7	88.6	48.9	34.4
Reference Total	**9**	**39.5**	**314.6**	**128.4**	**94.3**	**9**	**9.6**	**39.1**	**18.8**	**10.4**	**9**	**28.7**	**283.4**	**109.6**	**85.9**

Notes:

1. Total DDx is the sum of 4,4’-DDD, 4,4’-DDE, and 4,4’DDT. Non-detected compounds were summed using ½ the MDL.
2. Total PCB is the sum of the NOAA 18 congeners multiplied by 2. Non-detected congeners were summed using ½ the MDL.
3. Total PAH is the sum of the 18 PAH compounds analyzed (naphthalene, 2-methylnaphthalene, 1-methylnaphthalene, acenaphthylene, acenaphthene, fluorene, anthracene, phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene). Non-detected compounds were summed using ½ the MDL.
4. Total LMW PAH is the sum of the 8 PAH compounds analyzed (1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene). Non-detected compounds were summed using ½ the MDL.
5. Total HMW PAH is the sum of the 10 PAH compounds analyzed (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene). benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene. Non-detected compounds were summed using ½ the MDL.
6. Duplicates are averaged.
7. n = number of samples used in analysis

Table 3-7.

Summary of Metals Data for ELDS 2017 Sediment Samples

	Arsenic					Cadmium					Chromium					Copper				
	mg/kg					mg/kg					mg/kg					mg/kg				
Area	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**
Disposal Site																				
ELDS	15	1.9	7.2	3.2	1.6	15	0.0	0.0	0.0	0.0	15	5.7	17.1	9.4	3.0	15	2.0	8.3	4.0	1.8
Disposal Site Total	**15**	**1.9**	**7.2**	**3.2**	**1.6**	**15**	**0.0**	**0.0**	**0.0**	**0.0**	**15**	**5.7**	**17.1**	**9.4**	**3.0**	**15**	**2.0**	**8.3**	**4.0**	**1.8**
Reference Sites																				
NE REF	3	1.3	1.5	1.4	0.1	3	0.0	0.1	0.0	0.0	3	8.7	9.0	8.9	0.2	3	3.6	4.0	3.8	0.2
SE REF	3	2.1	2.6	2.5	0.3	3	0.0	0.0	0.0	0.0	3	5.8	6.1	5.9	0.1	3	1.8	2.1	1.9	0.2
W REF	3	2.1	5.6	3.9	1.7	3	0.0	0.0	0.0	0.0	3	7.7	8.9	8.2	0.7	3	3.2	3.5	3.4	0.1
Reference Total	**9**	**1.3**	**5.6**	**2.6**	**1.4**	**9**	**0.0**	**0.1**	**0.0**	**0.0**	**9**	**5.8**	**9.0**	**7.7**	**1.4**	**9**	**1.8**	**4.0**	**3.0**	**0.9**

	Lead					Mercury					Nickel					Zinc				
	mg/kg					mg/kg					mg/kg					mg/kg				
Area	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**
Disposal Site																				
ELDS	15	4.0	13.4	6.7	2.7	15	0.00	0.02	0.01	0.01	15	2.9	52.4	7.9	12.4	15	16.7	46.6	25.5	9.1
Disposal Site Total	**15**	**4.0**	**13.4**	**6.7**	**2.7**	**15**	**0.00**	**0.02**	**0.01**	**0.01**	**15**	**2.9**	**52.4**	**7.9**	**12.4**	**15**	**16.7**	**46.6**	**25.5**	**9.1**
Reference Sites																				
NE REF	3	4.6	5.1	4.9	0.3	3	0.01	0.02	0.01	0.00	3	4.7	5.4	5.0	0.4	3	20.7	26.1	22.8	2.9
SE REF	3	4.2	4.5	4.3	0.2	3	0.00	0.00	0.00	0.00	3	2.8	3.1	3.0	0.2	3	15.1	16.4	15.8	0.7
W REF	3	5.3	5.6	5.4	0.2	3	0.00	0.01	0.01	0.00	3	3.9	5.1	4.5	0.6	3	20.7	23.8	22.6	1.6
Reference Total	**9**	**4.2**	**5.6**	**4.9**	**0.5**	**9**	**0.00**	**0.02**	**0.01**	**0.01**	**9**	**2.8**	**5.4**	**4.2**	**1.0**	**9**	**15.1**	**26.1**	**20.4**	**3.9**

Note:

1. Duplicates are averaged.
2. n = number of samples used in analysis

Table 3-8.

Summary of Benthic Biology Community Parameters for Reference and ELDS Stations, November 2017

Sample	No. of Species	No. of Individuals ($0.04m^2$)	Shannon's H' (log2)	Pielou's J'	Fisher's alpha
Reference Stations					
NE REF-3	29	150	3.8	0.8	10.7
SE REF-4	31	174	3.3	0.7	11.0
W REF-4	44	447	4.2	0.8	12.1
Average	**35**	**257**	**3.8**	**0.7**	**11.3**
Minimum	**29**	**150**	**3.3**	**0.7**	**10.7**
Maximum	**44**	**447**	**4.2**	**0.8**	**12.1**
ELDS Stations					
ELDS-5	38	169	4.6	0.9	15.3
ELDS-9	32	130	3.8	0.8	13.6
ELDS-13	45	283	4.8	0.9	15.1
ELDS-15	46	241	4.7	0.9	16.9
ELDS-19	36	174	4.3	0.8	13.8
ELDS-23	56	535	4.4	0.8	15.8
ELDS-33	40	209	4.6	0.9	14.7
ELDS-37	41	304	3.8	0.7	12.7
ELDS-39	24	363	1.9	0.4	5.8
Average	**40**	**268**	**4.1**	**0.8**	**13.7**
Minimum	**24**	**130**	**1.9**	**0.4**	**5.8**
Maximum	**56**	**535**	**4.8**	**0.9**	**16.9**

Table 3-9.

Summary of Trophic Faunal Groupings at ELDS Reference Stations, November 2017

Sample	Total No. of Organisms	Omnivore/ Scavengers	Subsurface Deposit Feeders	Interface Feeders	Suspension Feeders	Surface Deposit Feeders	Predators
Reference Stations							
NE REF-3	150	**50**	23	30	31	12	10
SE REF-4	174	27	4	17	22	**101**	5
W REF-4	447	**191**	31	41	43	137	49
ELDS Stations							
ELDS-5	169	**60**	12	16	38	35	11
ELDS-9	130	**71**	14	11	18	9	8
ELDS-13	283	**100**	45	18	65	54	24
ELDS-15	241	**91**	13	32	27	62	23
ELDS-19	174	**74**	18	22	27	27	8
ELDS-23	535	**178**	34	59	88	156	36
ELDS-33	209	**100**	17	24	20	57	5
ELDS-37	304	89	24	14	47	**134**	15
ELDS-39	363	51	2	4	11	**292**	90

Note: Most abundant faunal group shown in bold.

Table 3-10.

Lipids Data for ELDS 2017 Tissue Samples

	Lipids in Tissue				
		% wet weight			
Area	**n**	**MIN**	**MAX**	**Mean**	**StdDev**
Disposal Site					
ELDS	4	0.10	0.30	0.18	0.09
Disposal Site Total	**4**				
Reference Sites					
NE REF	1	0.14	0.14	0.14	NA
SE REF	1	0.10	0.10	0.10	NA
W REF	0	NA	NA	NA	NA
Reference Total	**2**	**0.1**	**0.1**	**0.1**	**0.03**

Note:

1. Duplicates are averaged.
2. n = Number of samples included in analysis.

Not applicable

Table 3-11.

Total DDx, Total PCB, and Total PAH in 2017 Tissue Samples

	Total DDx					Total PCBs				
	µg/kg wet weight					µg/kg wet weight				
Area	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**
Disposal Site										
ELDS	4	0.1	0.2	0.2	0.0	4	10.3	96.1	33.0	42.1
Disposal Site Total	**4**	**0.1**	**0.2**	**0.2**	**0.0**	**4**	**10.3**	**96.1**	**33.0**	**42.1**
Reference Sites										
NE REF	1	0.2	0.2	0.2	NA	1	12.3	12.3	12.3	NA
SE REF	0	NA	NA	NA	NA	0	NA	NA	NA	NA
W REF	0	NA	NA	NA	NA	0	NA	NA	NA	NA
Reference Total	**1**	**0.2**	**0.2**	**0.2**	**NA**	**1**	**12.3**	**12.3**	**12.3**	**NA**

	Total PAHs				
	µg/kg wet weight				
Area	**n**	**MIN**	**MAX**	**Mean**	**StdDev**
Disposal Site					
ELDS	4	59.1	63.3	61.7	1.9
Disposal Site Total	**4**	**59.1**	**63.3**	**61.7**	**1.9**
Reference Sites					
NE REF	1	58.1	58.1	58.1	NA
SE REF	1	61.0	61.0	61.0	NA
W REF	1	62.0	62.0	62.0	NA
Reference Total	**3**	**58.1**	**62.0**	**60.4**	**2.0**

Notes:
1. Total DDx is the sum of 4,4'-DDD, 4,4'-DDE, and 4,4'DDT. Non-detected compounds were summed using ½ the MDL. There were no DDx compounds detected.
2. Total PCB is the sum of the NOAA 18 congeners multiplied by 2. Non-detected congeners were summed using ½ the MDL.
3. Total PAH is the sum of the 18 PAH compounds analyzed (naphthalene, 2-methylnaphthalene, 1-methylnaphthalene, acenaphthylene, acenaphthene, fluorene, anthracene, phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene). Non-detected compounds were summed using ½ the MDL. There were no PAH compounds detected.
4. Duplicates are averaged.
5. n = number of samples included in analysis.
6. NA = Not applicable

Table 3-12.

Summary of Metals Data for 2017 Tissue Samples

	Arsenic					Cadmium					Chromium					Copper				
	mg/kg wet weight					mg/kg wet weight					mg/kg wet weight					mg/kg wet weight				
Area	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**
Disposal Site																				
ELDS	4	2.0	2.2	2.1	0.1	4	3.3	3.8	3.5	0.2	4	0.3	0.4	0.3	0.0	4	1.0	1.1	1.0	0.1
Disposal Site Total	**4**	**2.0**	**2.2**	**2.1**	**0.1**	**4**	**3.3**	**3.8**	**3.5**	**0.2**	**4**	**0.3**	**0.4**	**0.3**	**0.0**	**4**	**1.0**	**1.1**	**1.0**	**0.1**
Reference Sites																				
NE REF	1	2.2	2.2	2.2	NA	1	4.1	4.1	4.1	NA	1	0.6	0.6	0.6	NA	1	1.1	1.1	1.1	NA
SE REF	1	2.8	2.8	2.8	NA	1	0.4	0.4	0.4	NA	1	0.3	0.3	0.3	NA	1	6.8	6.8	6.8	NA
W REF	1	2.2	2.2	2.2	NA	1	0.7	0.7	0.7	NA	1	0.3	0.3	0.3	NA	1	0.8	0.8	0.8	NA
Reference Total	**3**	**2.2**	**2.8**	**2.4**	**0.4**	**3**	**0.4**	**4.1**	**1.7**	**2.0**	**3**	**0.3**	**0.6**	**0.4**	**0.2**	**3**	**0.8**	**6.8**	**2.**	**3.4**

	Lead					Mercury					Nickel					Zinc				
	mg/kg wet weight					mg/kg wet weight					mg/kg wet weight					mg/kg wet weight				
Area	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**
Disposal Site																				
ELDS	4	0.3	1.6	0.9	0.6	4	0.02	0.04	0.03	0.01	4	0.2	0.2	0.2	0.0	4	19.9	21.4	20.4	0.7
Disposal Site Total	**4**	**0.3**	**1.6**	**0.9**	**0.6**	**4**	**0.02**	**0.04**	**0.03**	**0.01**	**4**	**0.2**	**0.2**	**0.2**	**0.0**	**4**	**19.9**	**21.4**	**20.4**	**0.7**
Reference Sites																				
NE REF	1	5.0	5.0	5.0	NA	1	0.03	0.03	0.03	NA	1	0.2	0.2	0.2	NA	1	28.2	28.2	28.2	NA
SE REF	1	1.2	1.2	1.2	NA	1	0.02	0.02	0.02	NA	1	0.2	0.2	0.2	NA	1	13.6	13.6	13.6	NA
W REF	1	0.4	0.4	0.4	NA	1	0.06	0.06	0.06	NA	1	0.2	0.2	0.2	NA	1	16.1	16.1	16.1	NA
Reference Total	**3**	**0.4**	**5.0**	**2.2**	**2.5**	**3**	**0.02**	**0.06**	**0.04**	**0.02**	**3**	**0.2**	**0.2**	**0.2**	**0.0**	**3**	**13.6**	**28.2**	**19.3**	**7.8**

Note:

1. Duplicates are averaged.
2. NA = Not applicable

Table 3-13.

Surface Marker Buoys Observed During the 2017 ELDS Acoustic Survey

Buoy Description	Date	Time	Easting	Northing	Depth (m)	Latitude (N)	Longitude (W)
Single yellow pot buoy	10/26/2017	10:57:45 AM	359502	200757	20.73	41° 16.0136	72° 05.8311

Notes:

1. Grid coordinates are NAD_1983_StatePlane_Connecticut_FIPS_0600_Meters
2. Geographic coordinates are NAD83 degree decimal minute

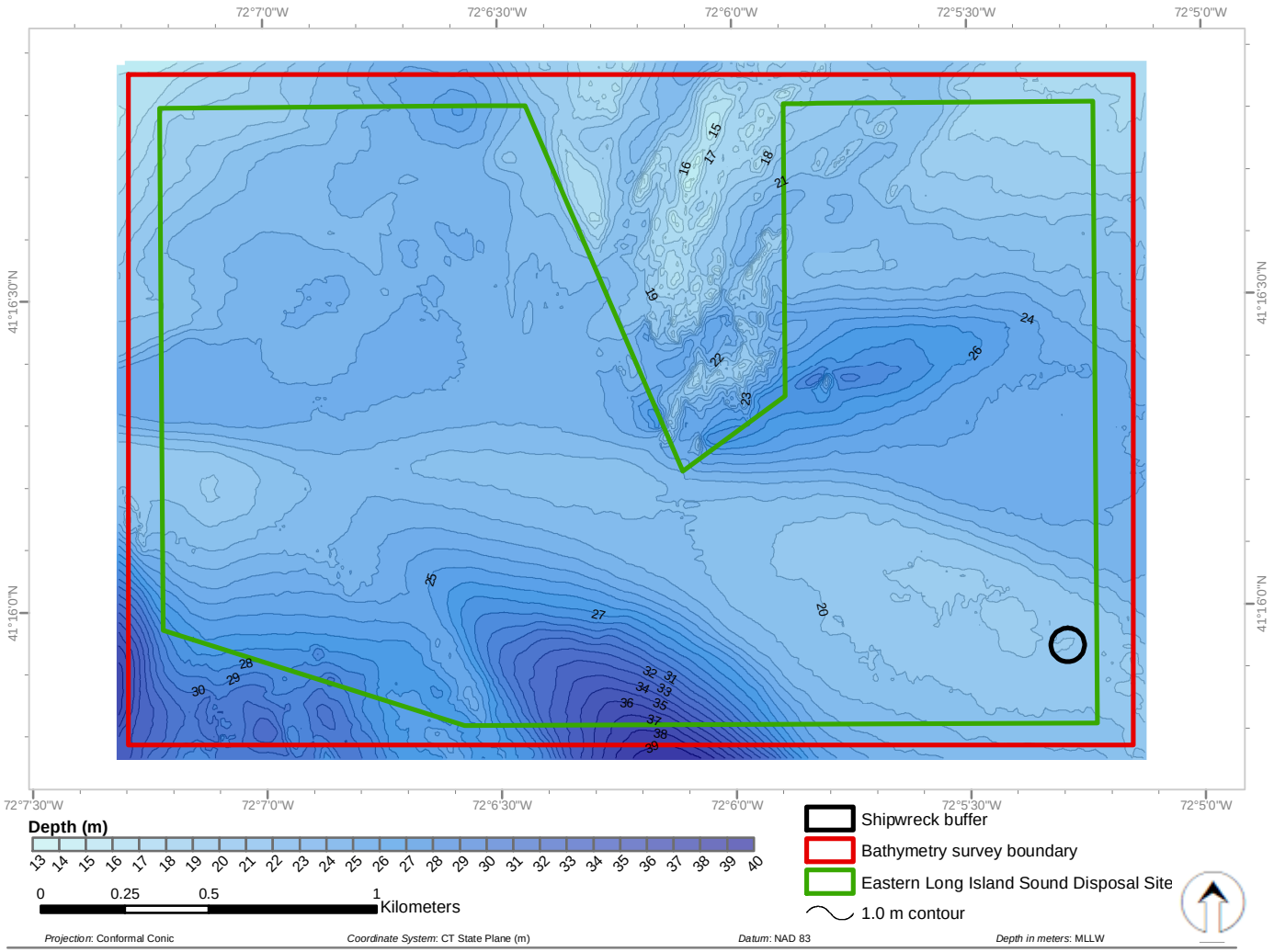


Figure 3-1. Bathymetric contour map of ELDS – October 2017

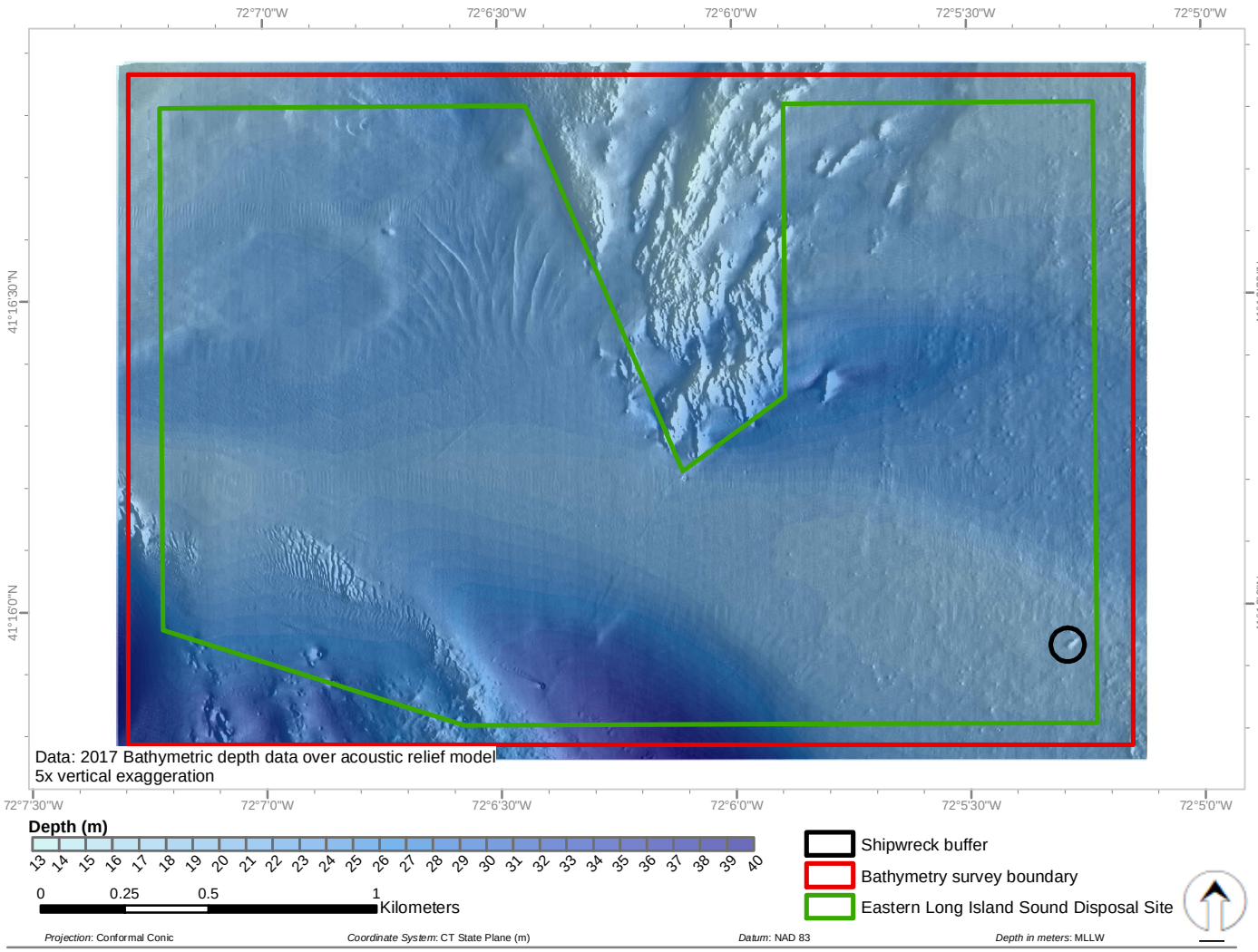


Figure 3-2. Bathymetric depth data over acoustic relief model of ELDS – October 2017

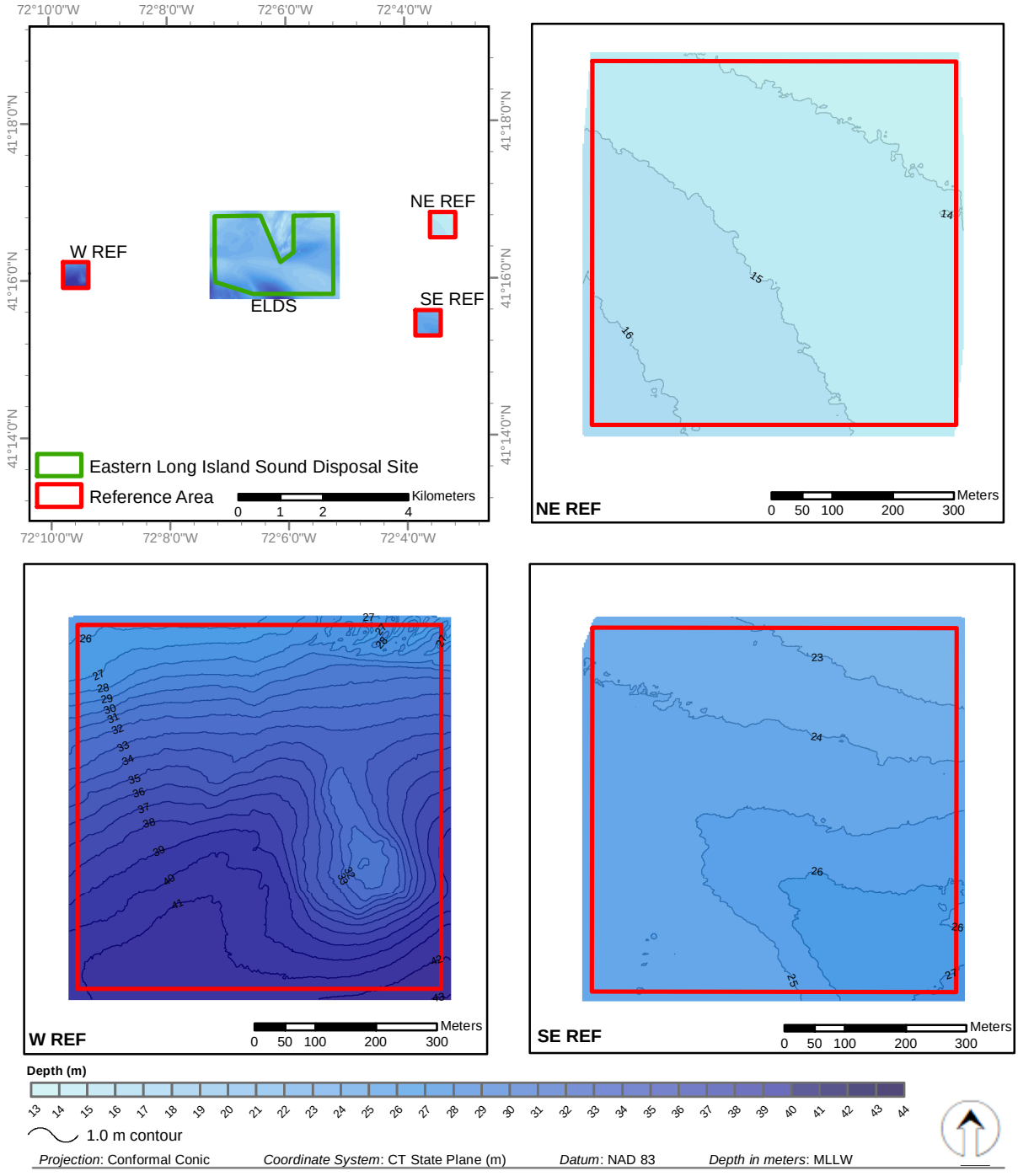


Figure 3-3. Bathymetric contour map of ELDS reference areas – October 2017

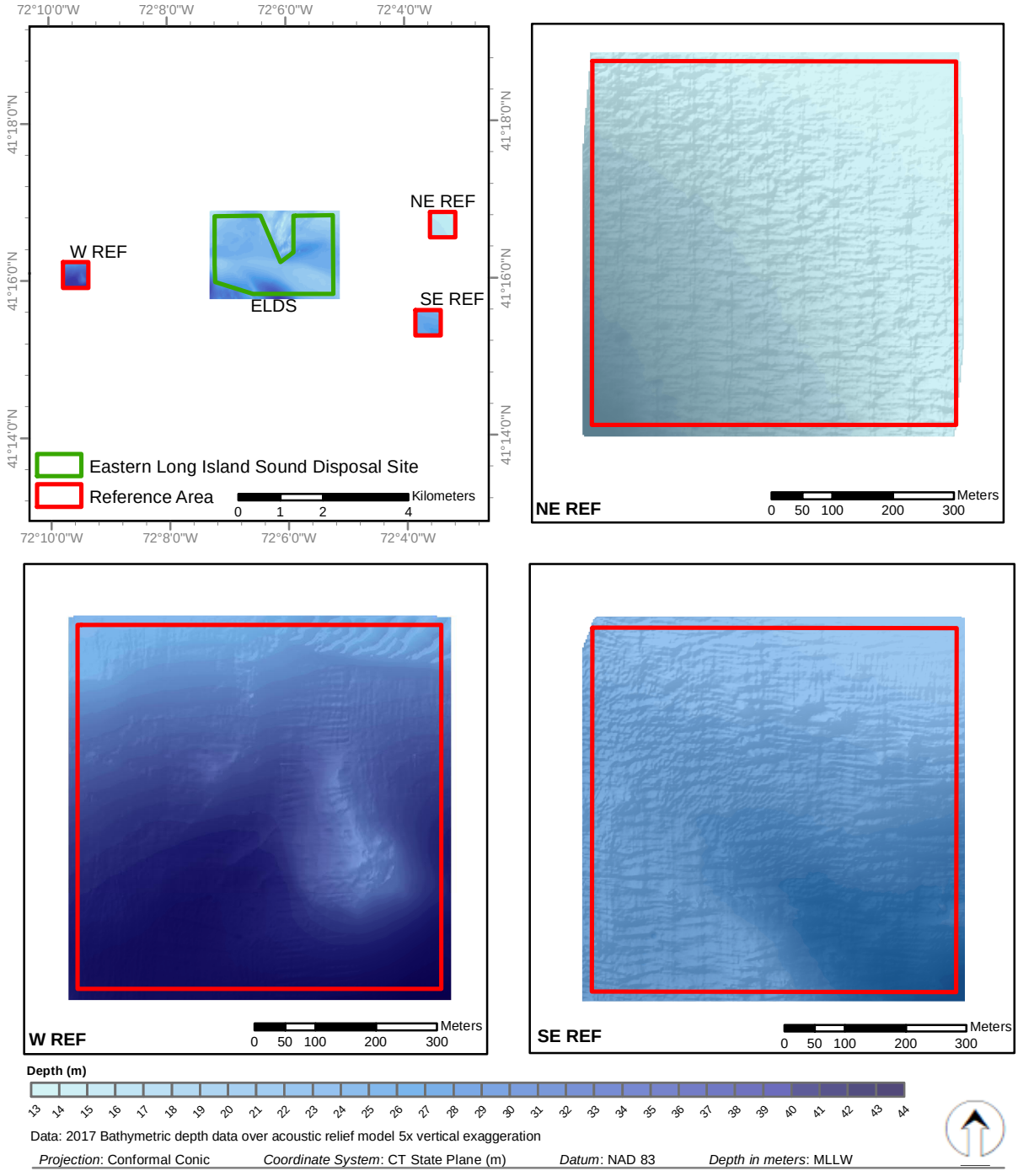


Figure 3-4. Bathymetric depth data over acoustic relief model of ELDS reference areas – October 2017

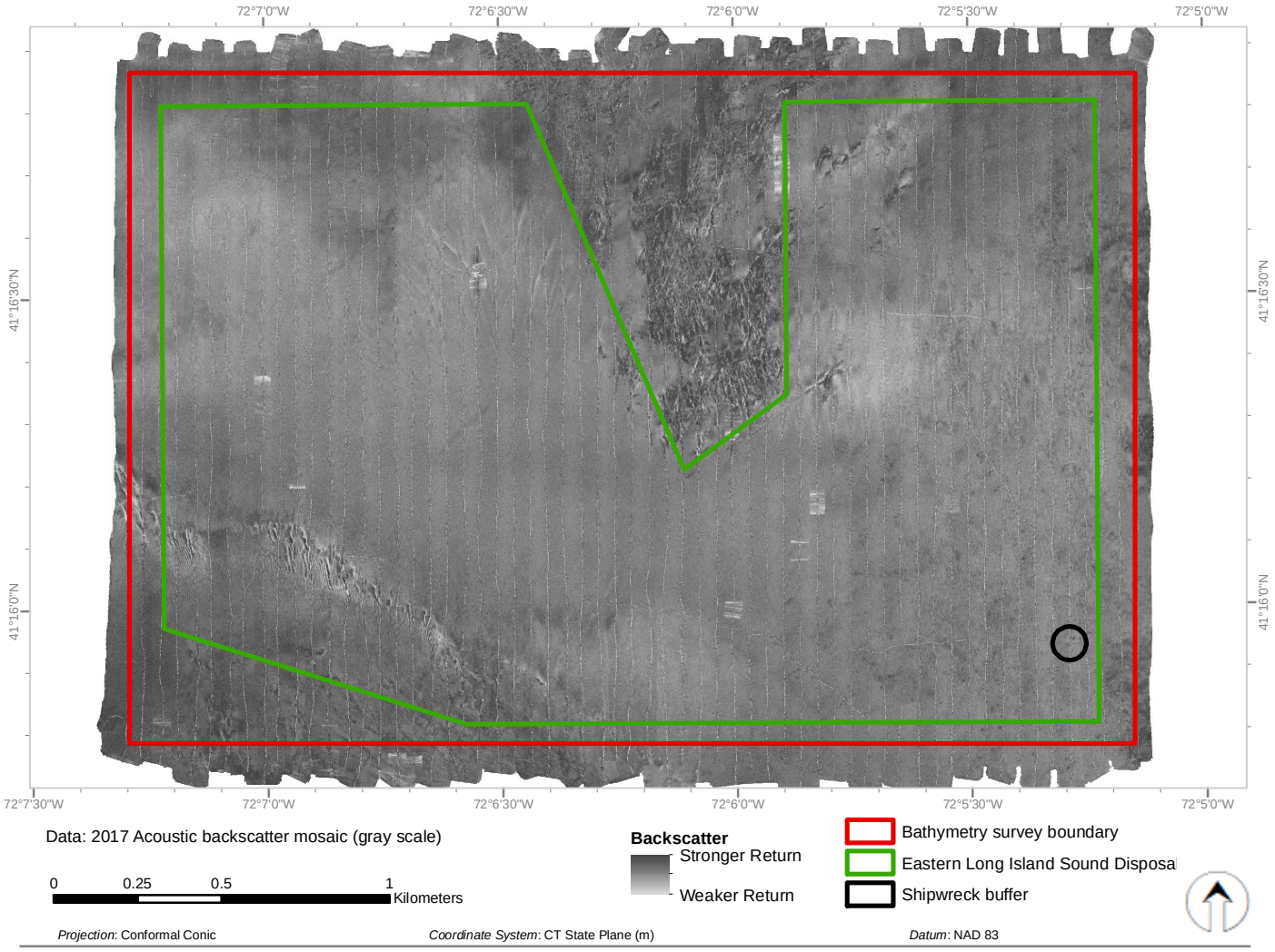


Figure 3-5. Mosaic of unfiltered backscatter data at ELDS – October 2017

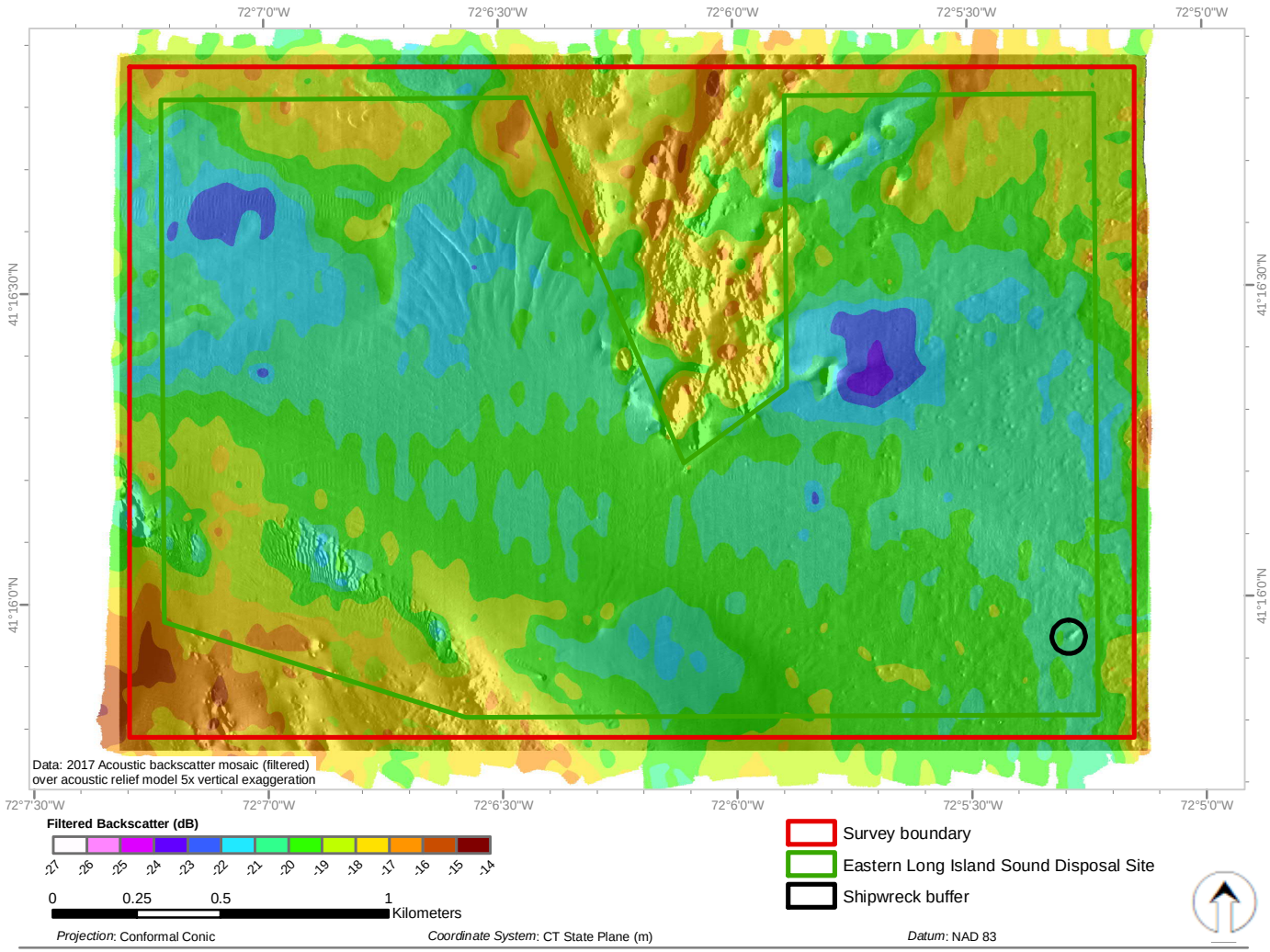


Figure 3-6. Filtered backscatter data over acoustic relief model of ELDS – October 2017

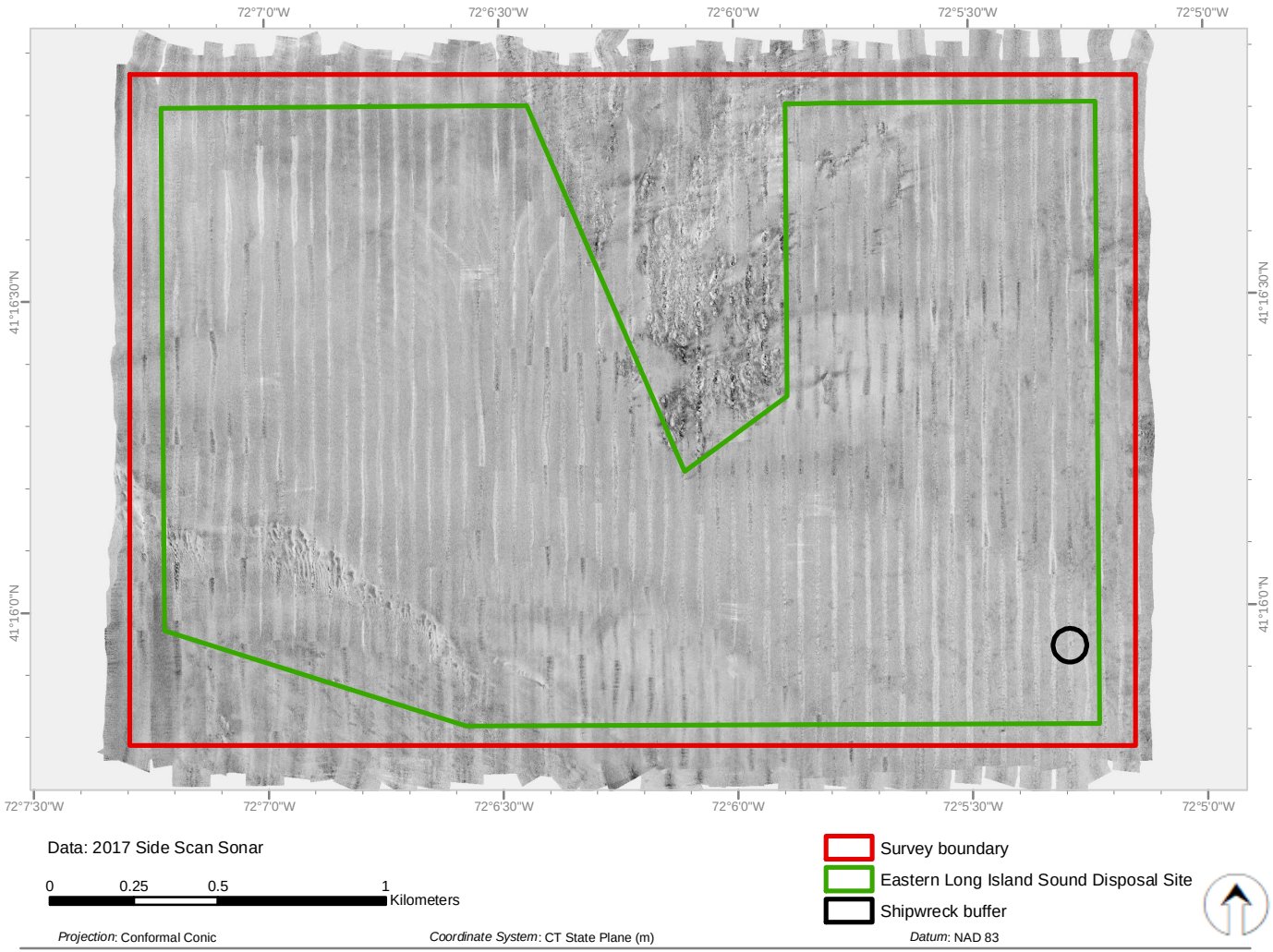


Figure 3-7. Sidescan mosaic of ELDS – October 2017

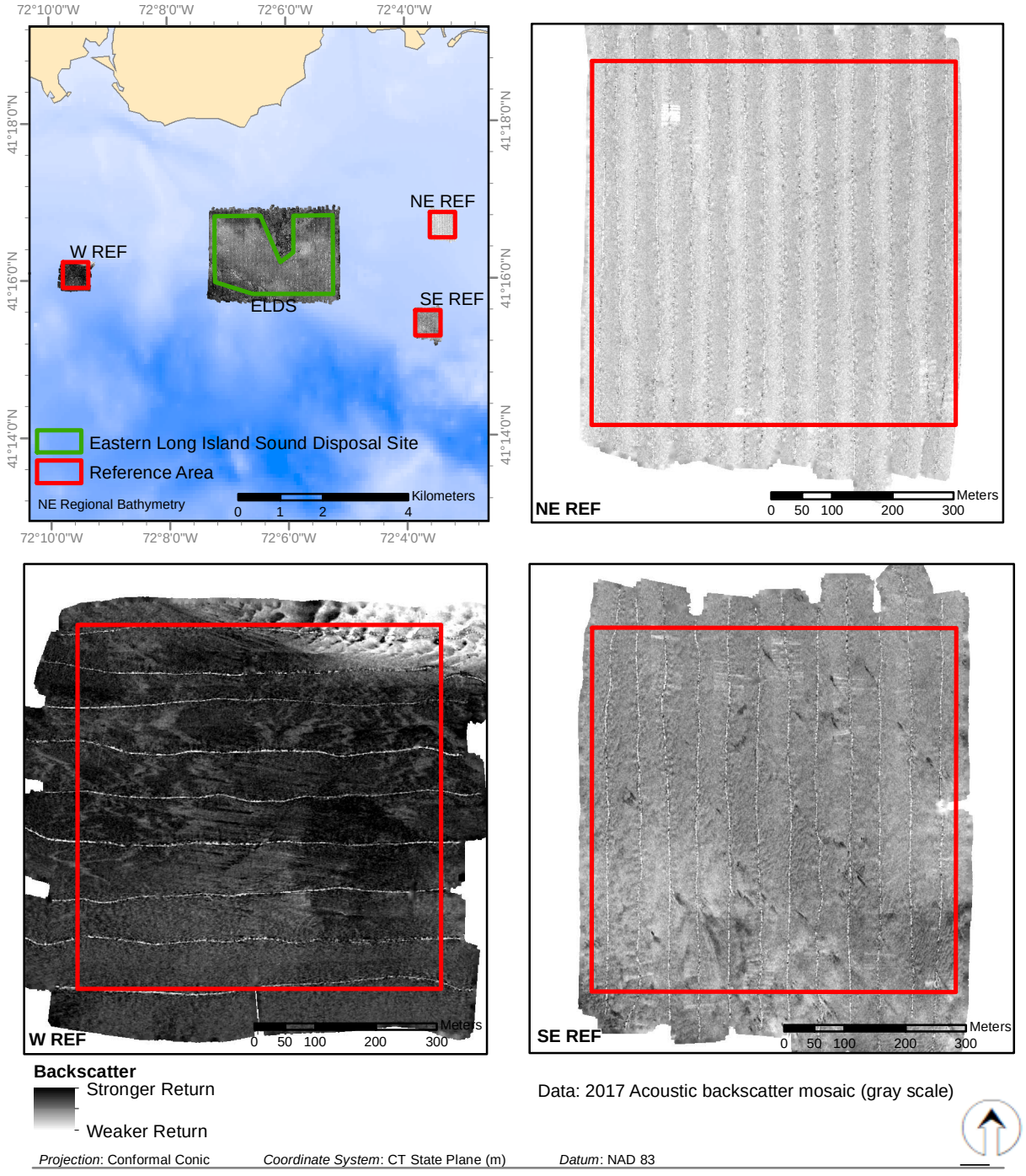


Figure 3-8. Mosaic of unfiltered backscatter data at ELDS reference areas – October 2017

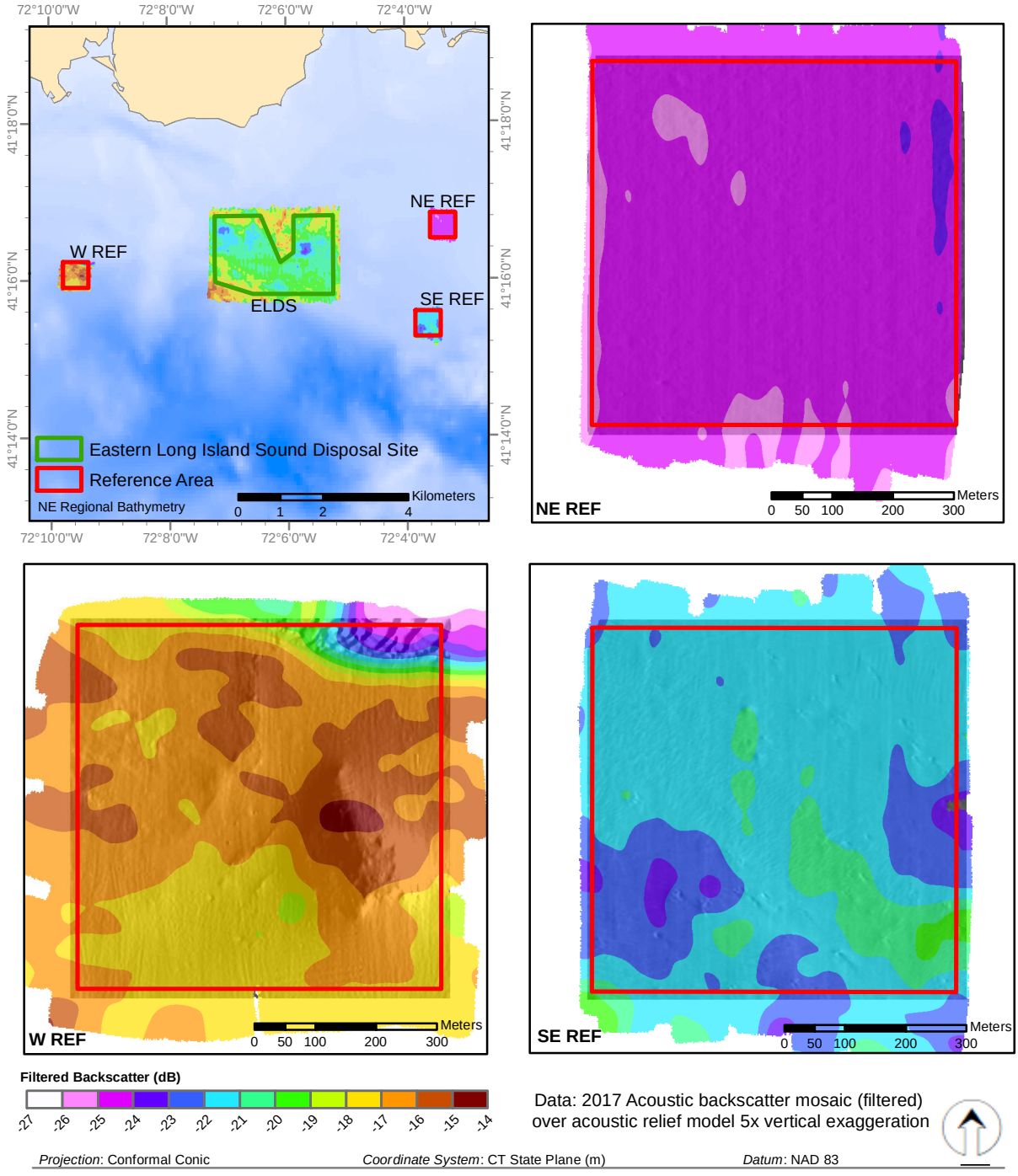


Figure 3-9. Filtered backscatter data over acoustic relief model of ELDS reference areas – October 2017

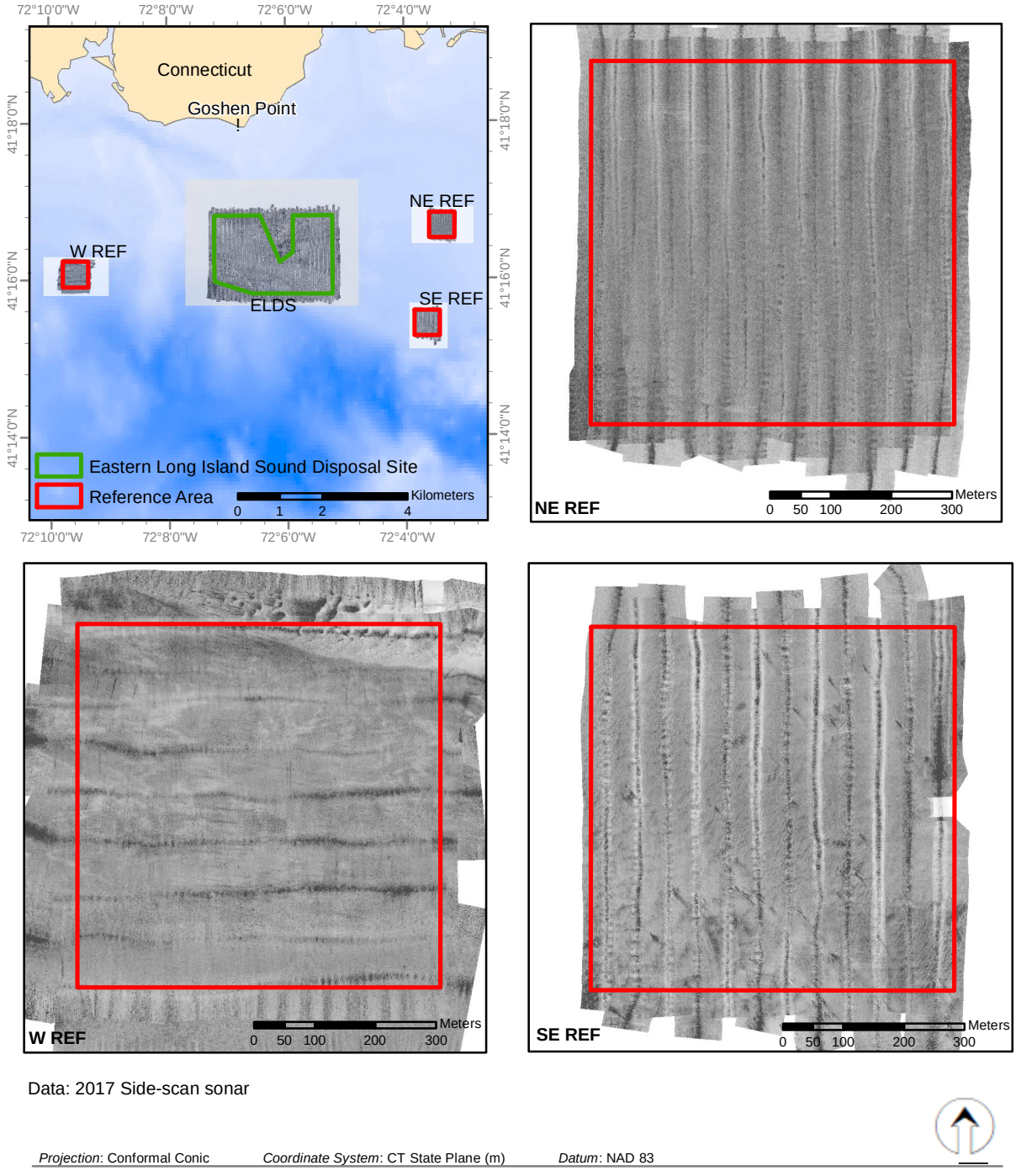


Figure 3-10. Sidescan mosaic of ELDS reference areas – October 2017

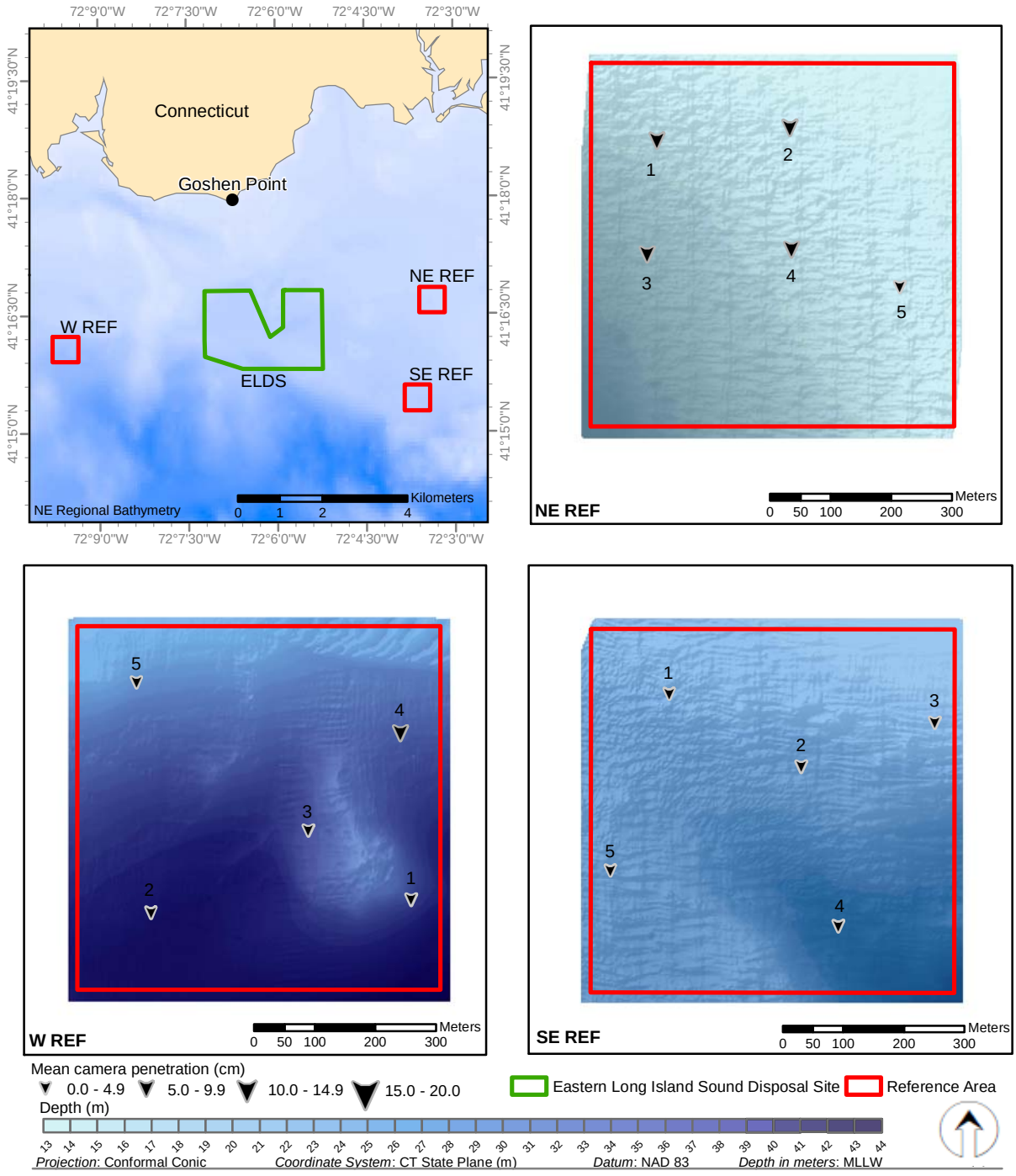
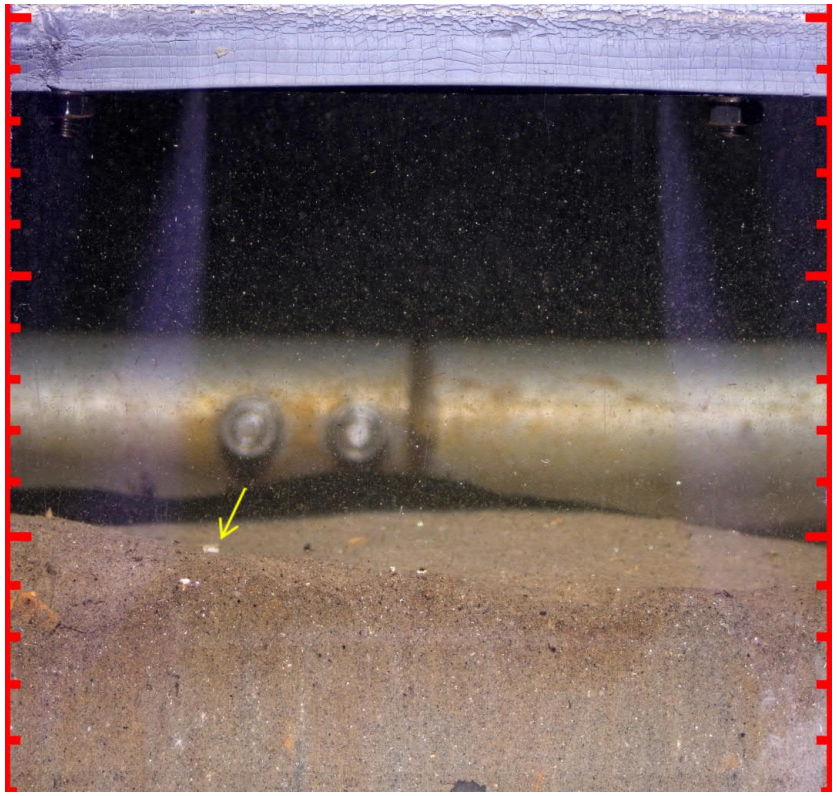
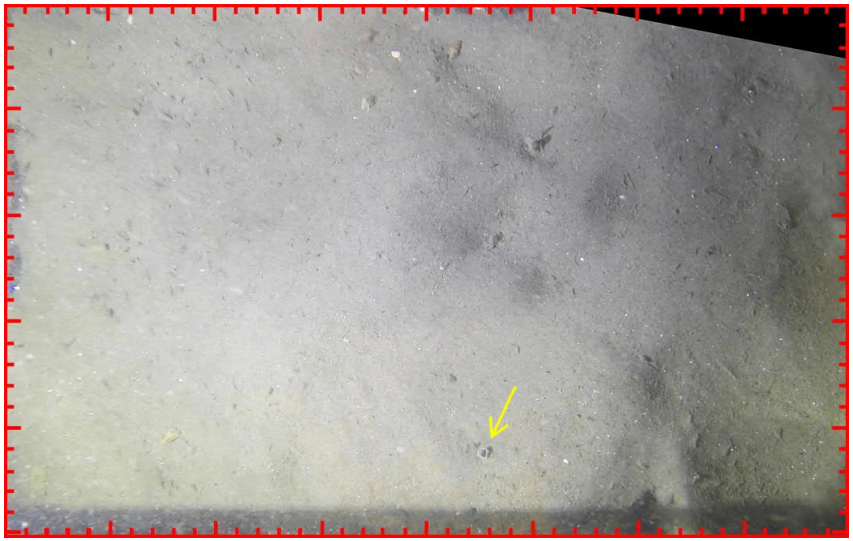


Figure 3-11. Mean station camera prism penetration at ELDS reference areas

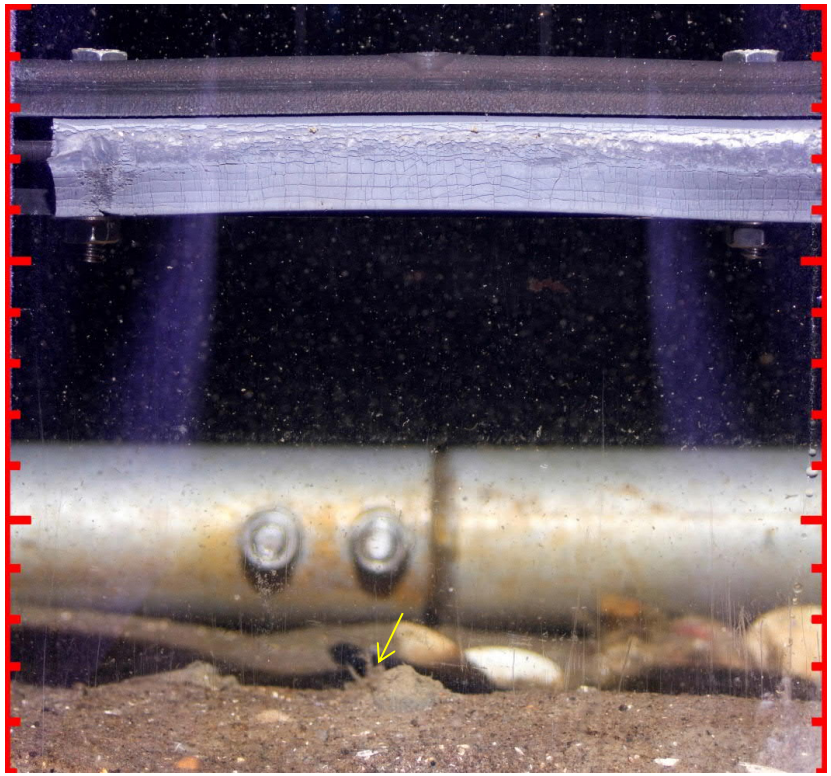


NE REF-4A

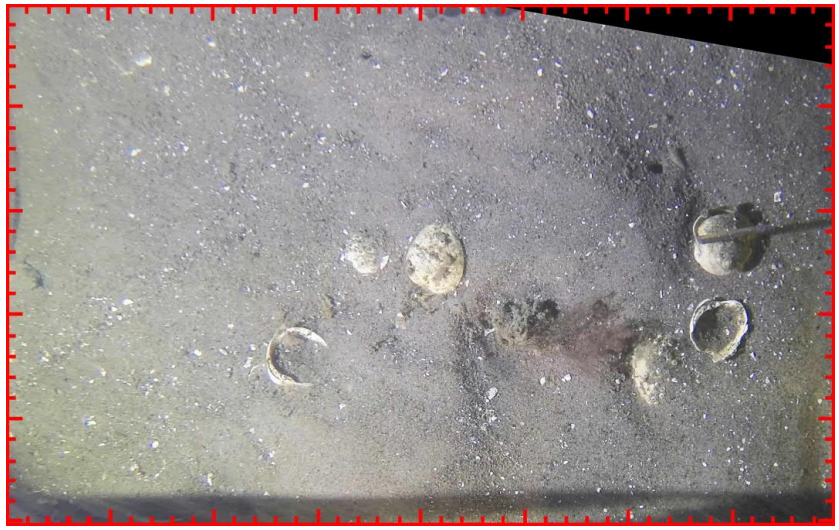


NE REF-4A PV

Figure 3-12. Medium to fine sand characteristic of NE REF in SPI and plan view co-located images at NE REF-4A. *Chaetopterus* tube top visible (see yellow arrows). Shallow camera penetration due to compact, sandy sediments showing small scale boundary roughness due to physical processes. Red tick marks represent 1 cm.



SE REF-3C



SE REF-3C PV

Figure 3-13. Compact, sandy sediment resulting in shallow camera penetration representative of SE REF with shell hash at the surface. Stage I polychaete tubes are visible at yellow arrow. Red tick marks represent 1 cm.

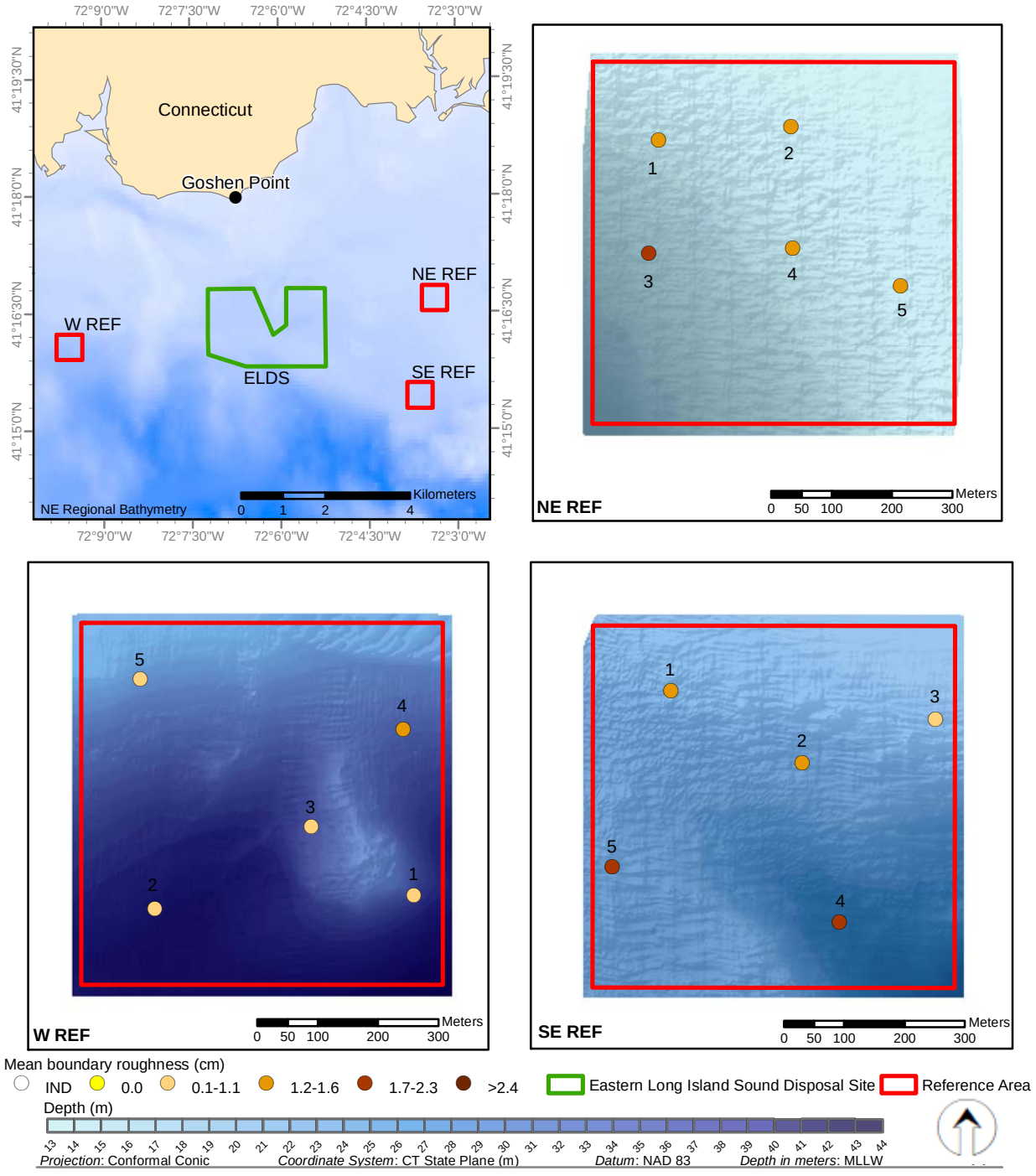


Figure 3-14. Mean station surface boundary roughness (cm) at ELDS reference areas

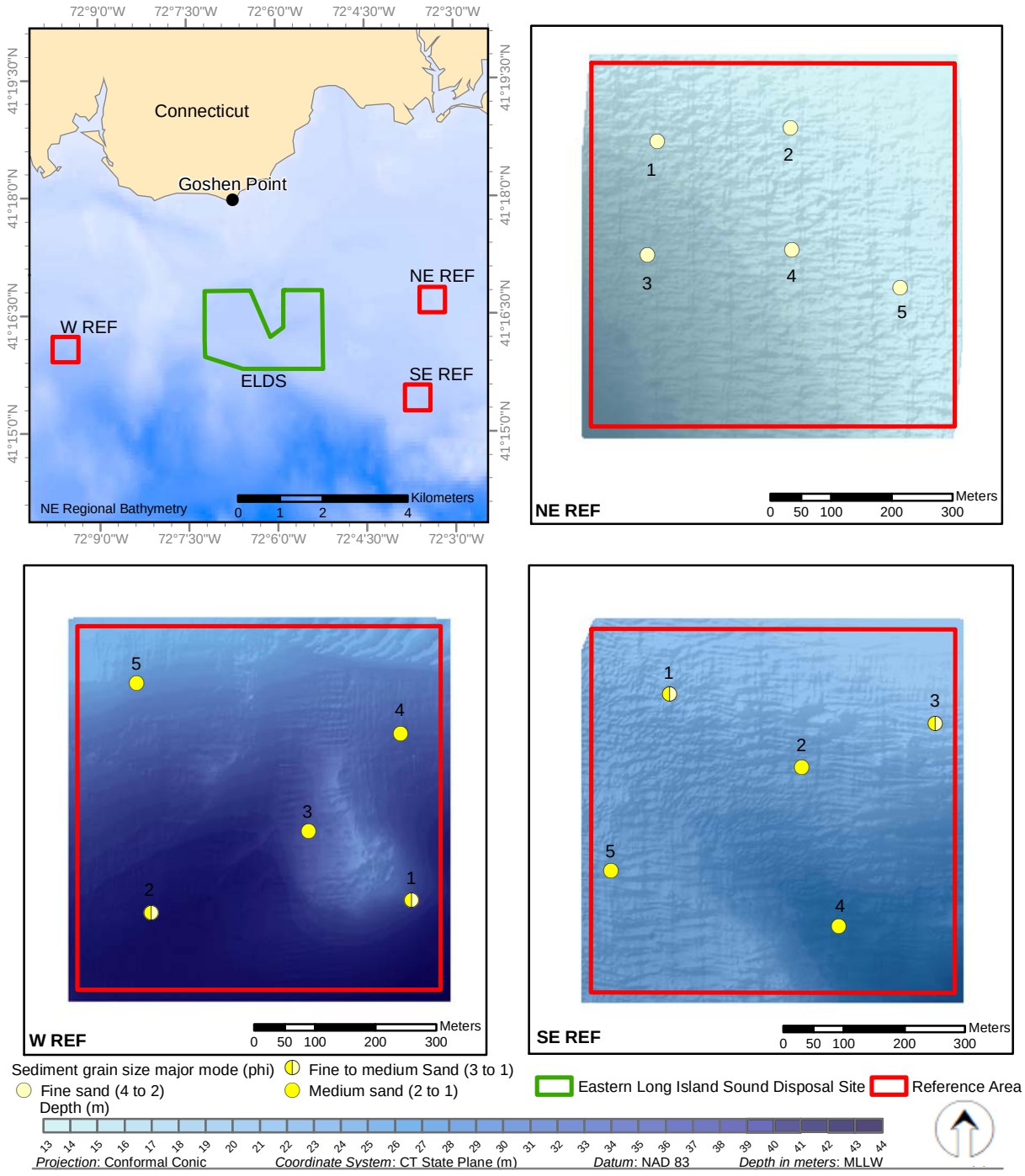
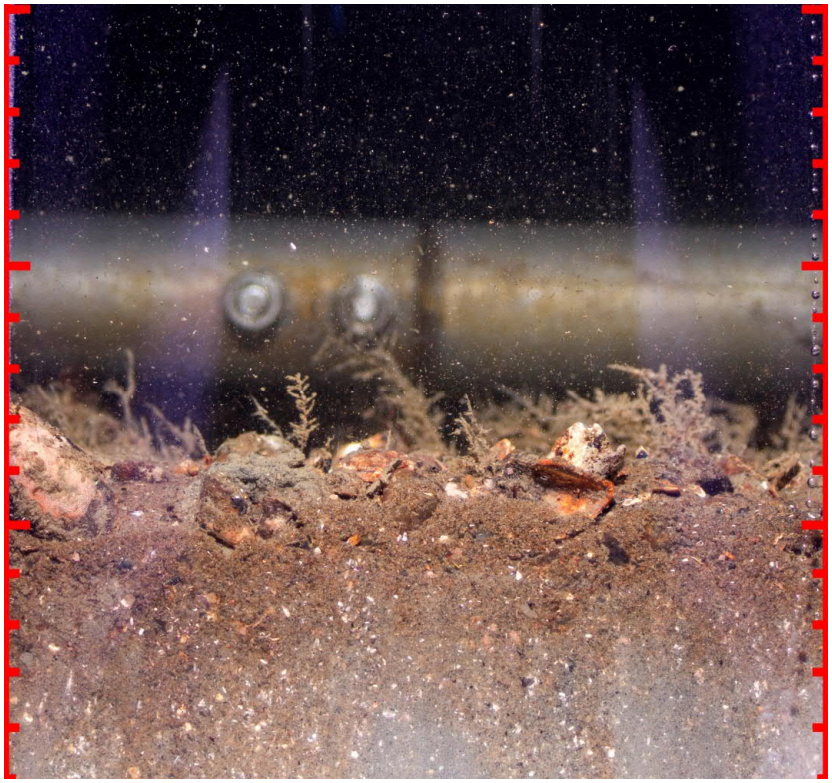


Figure 3-15. Sediment grain size major mode (phi units) at ELDS reference areas

WREF-4B



WREF-1A

Figure 3-16. Representative W REF SPI images that are similar to portions of ELDS with shell hash at the surface mixed into the coarse sand over finer sediment below. Polychaete (circled) in sediment at W REF-4B. Red tick marks represent 1 cm.

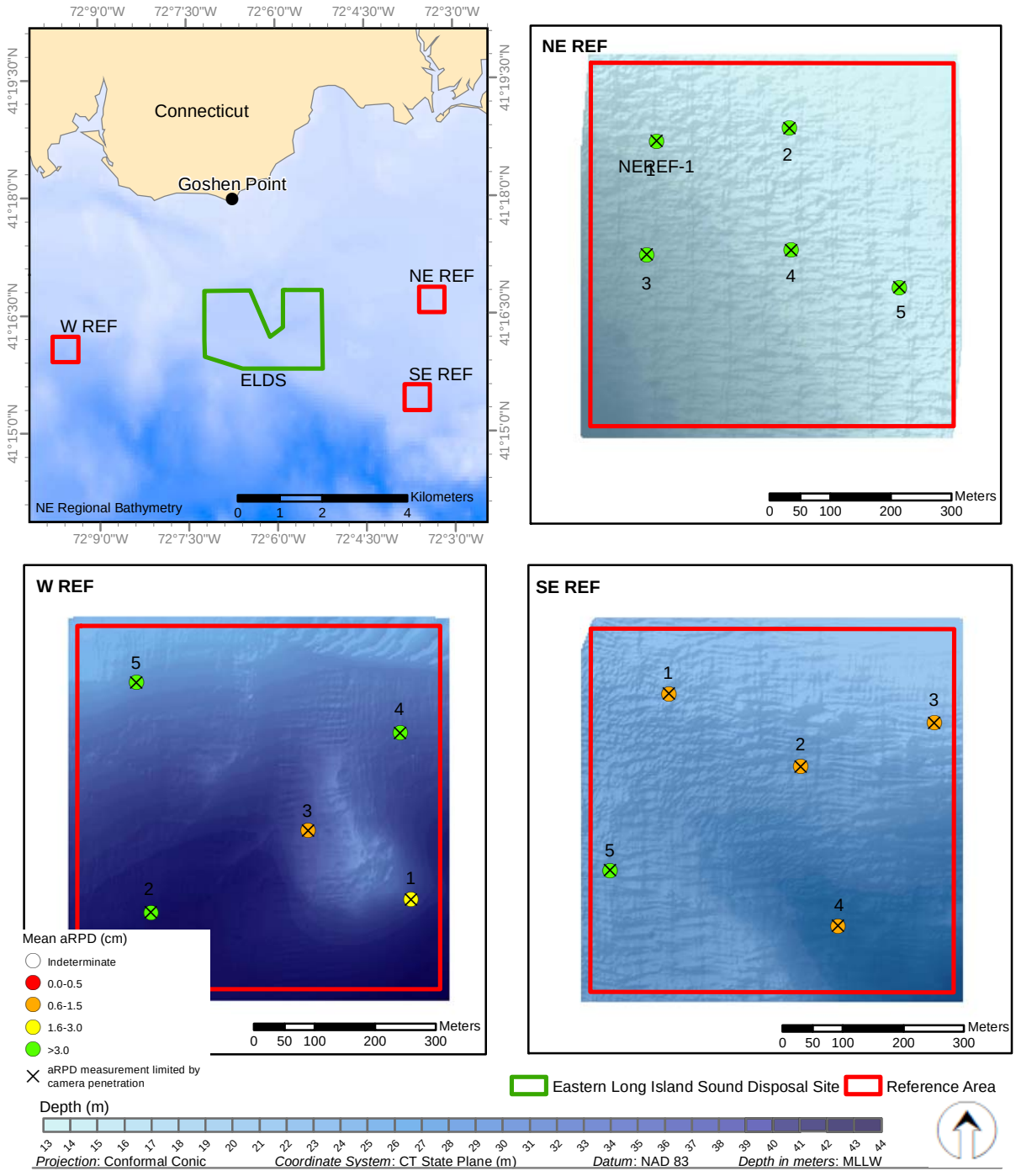


Figure 3-17. Mean station aRPD depth values (cm) at ELDS reference areas

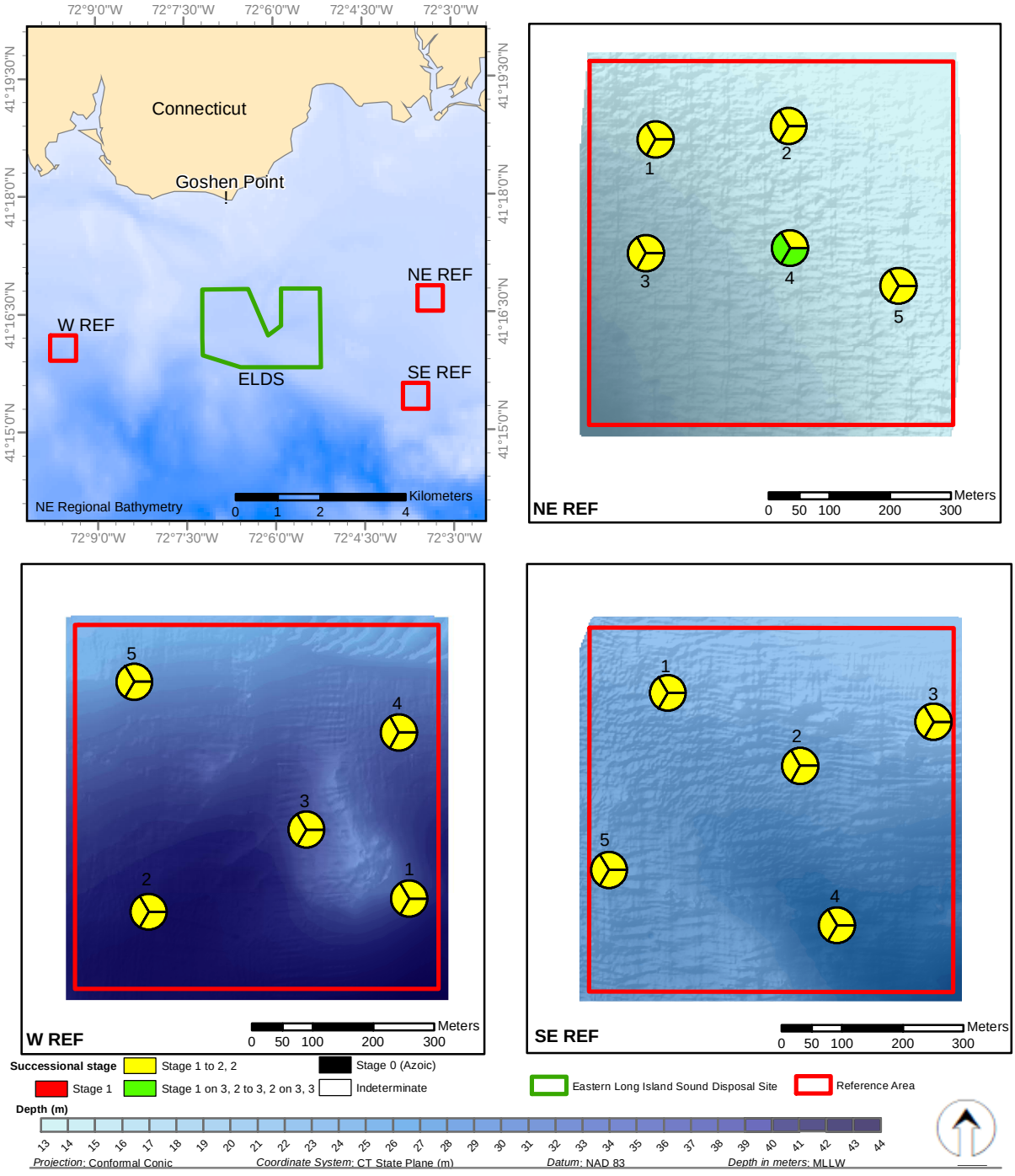
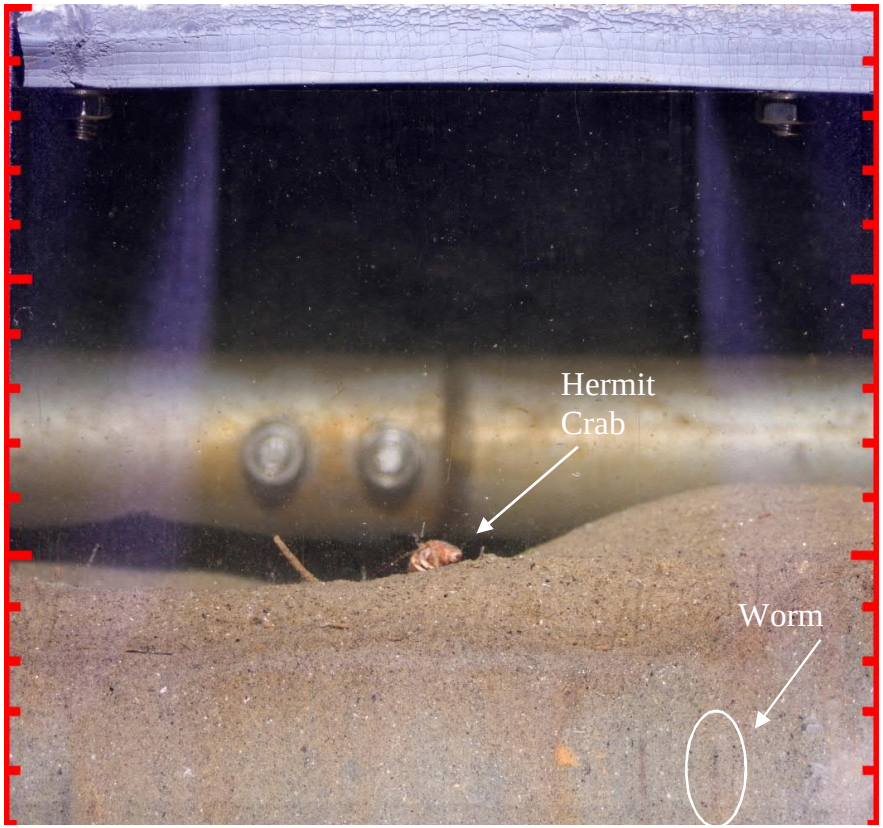
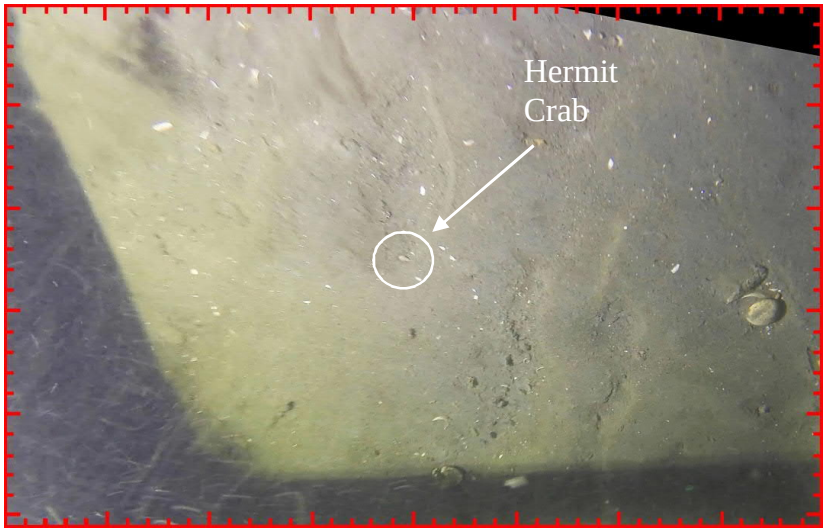


Figure 3-18. Infaunal successional stages found at ELDS reference areas



NEREF-2C



NEREF-2C PV

Figure 3-19. SPI and plan view images representative of NE REF reference area Hermit crab on co-located SPI and plan view images. Worm visible in SPI image from site. Red tick marks represent 1 cm.

NE REF-4B

W REF-2C

Figure 3-20. Reference area images with similar characteristics as ELDS, coarse grained sediment mixed with shell hash. Feeding void present at NE REF-4B. W REF-2C with hydroids at surface. Red tick marks represent 1 cm.

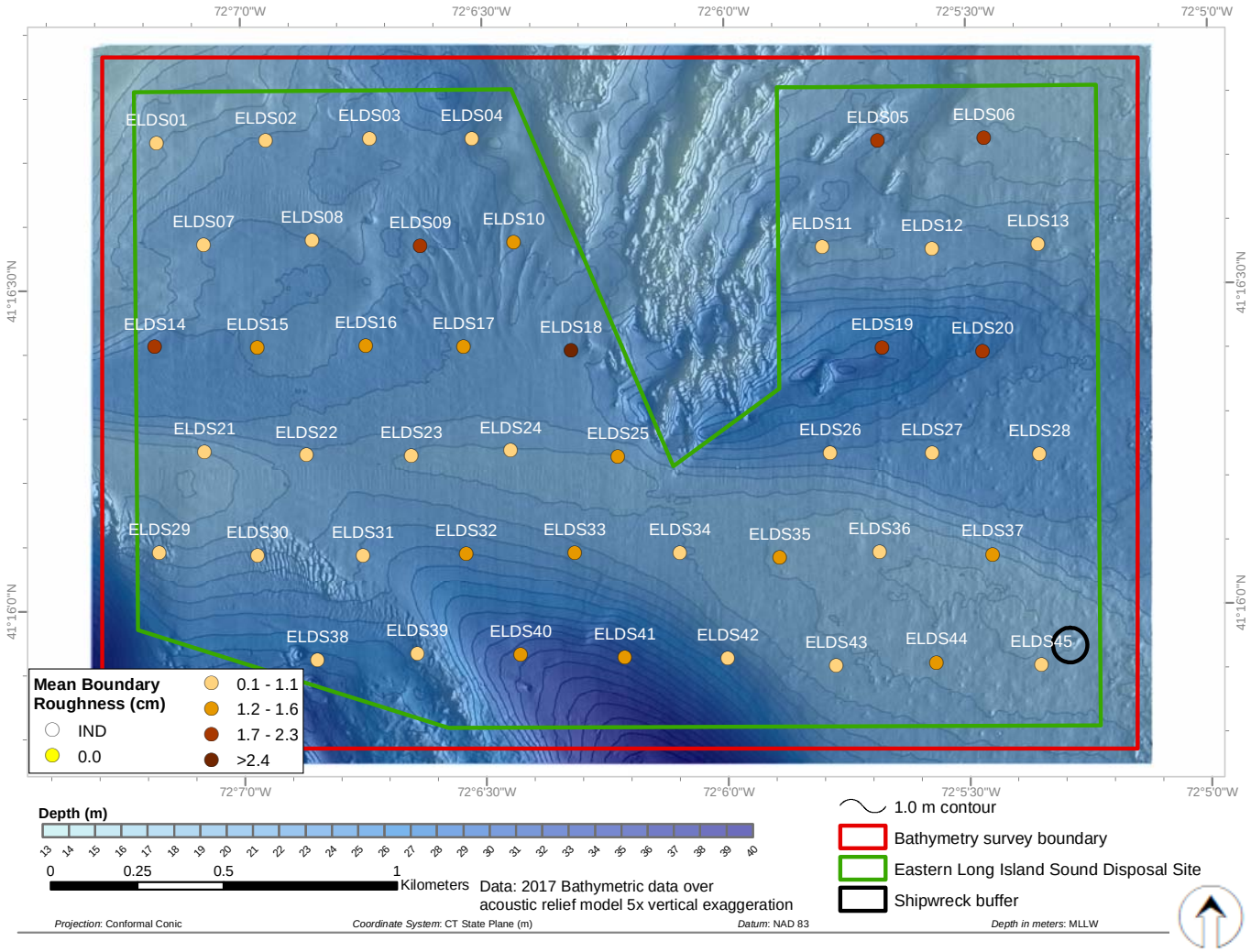
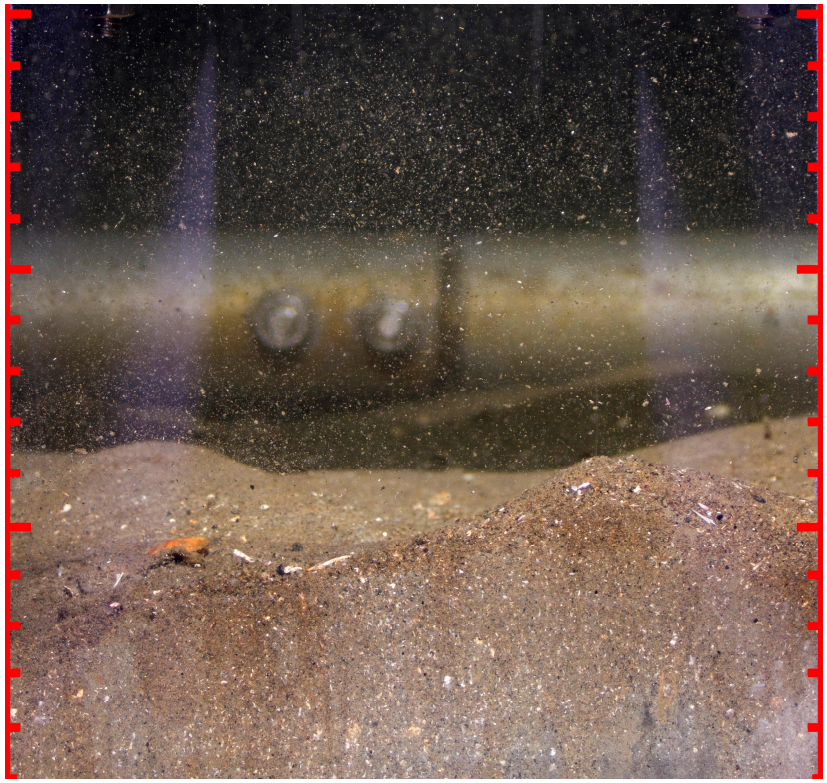
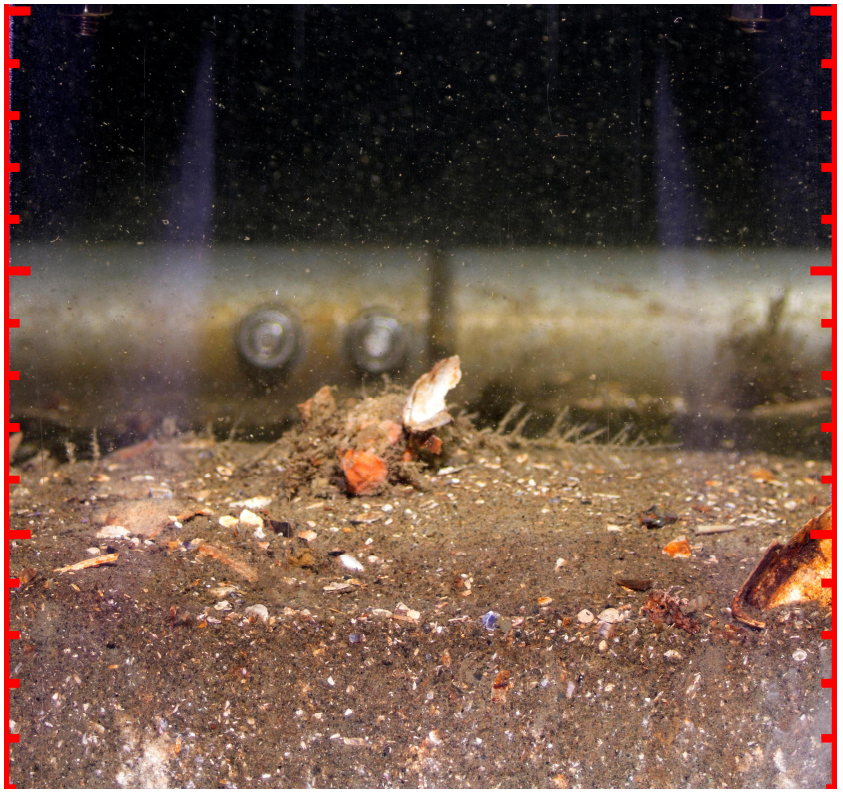


Figure 3-21. Mean station surface boundary roughness (cm) at ELDS



ELDS-20B



ELDS-25B

Figure 3-22. Representative images from the ELDS disposal area displaying sand waves, sediment well mixed with shell hash particles, and shallow camera penetration due to coarse grained sediments. Red tick marks represent 1 cm.

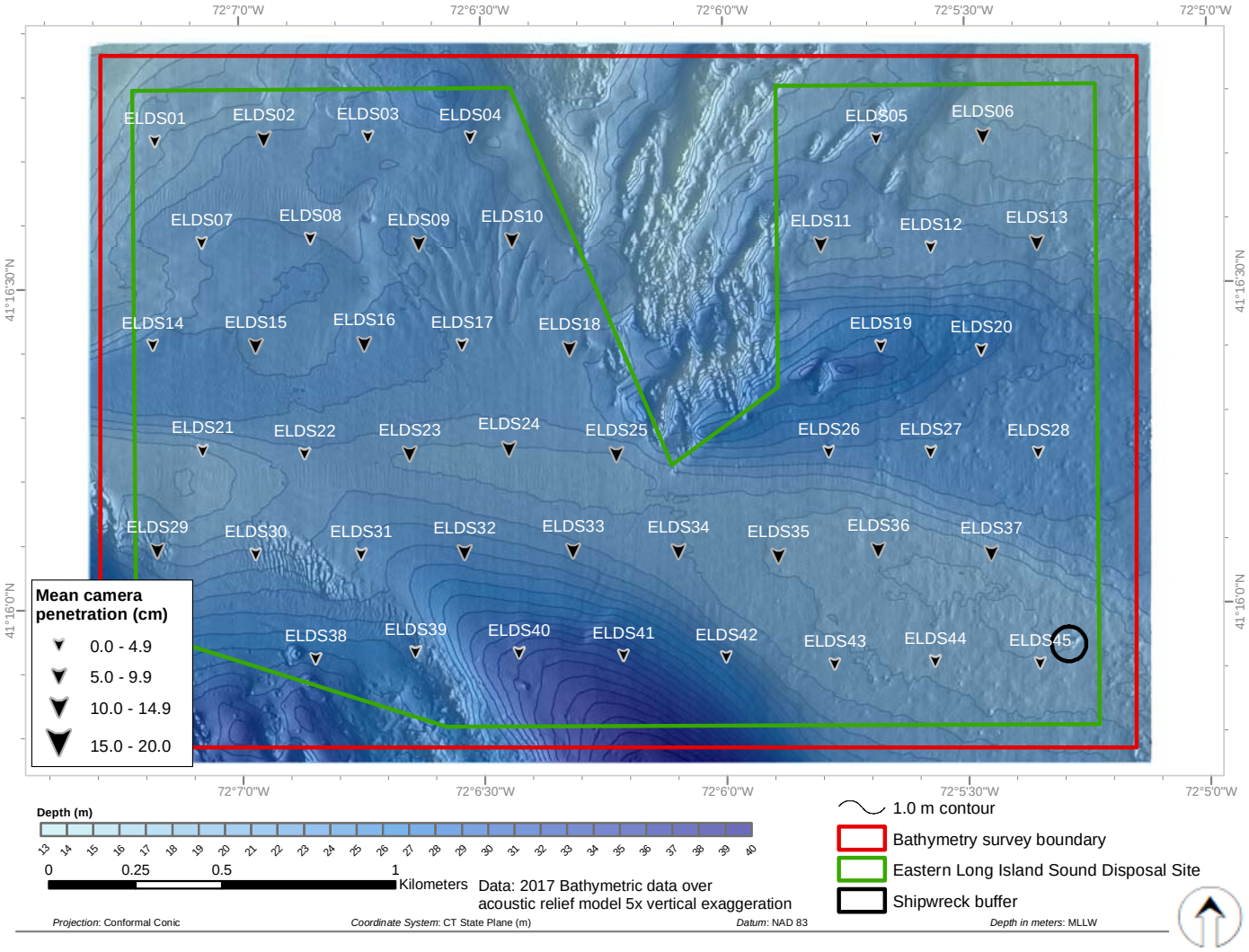
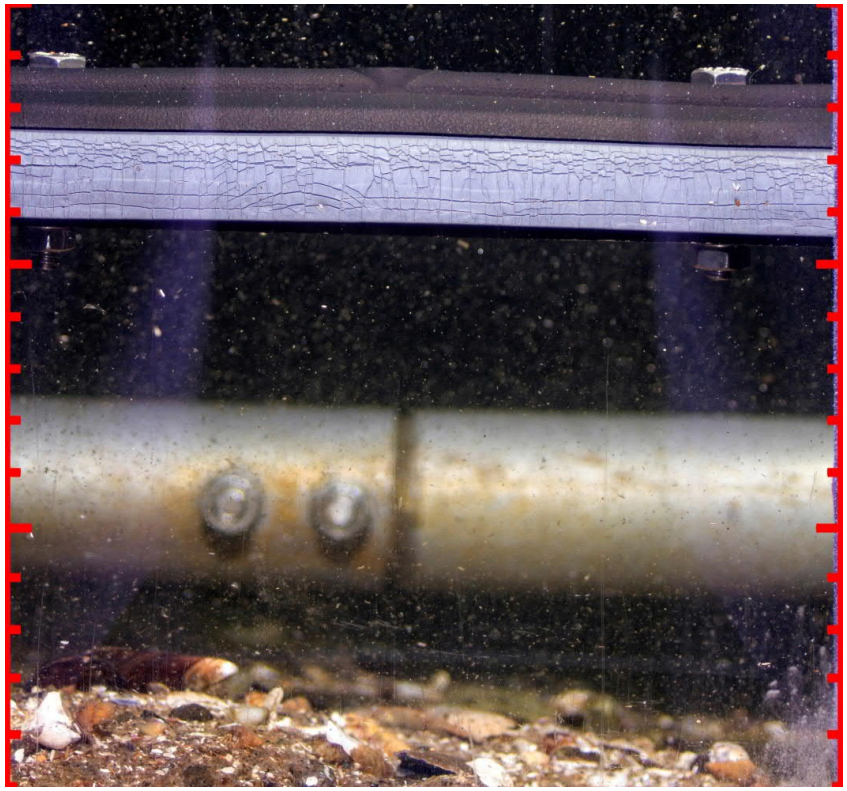
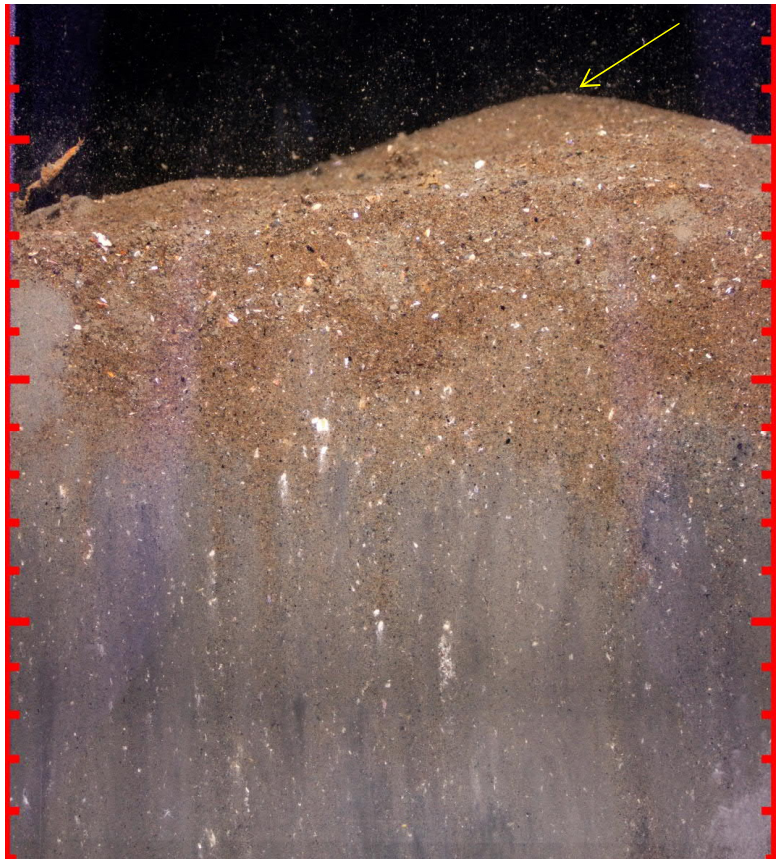


Figure 3-23. Mean station camera prism penetration at ELDS

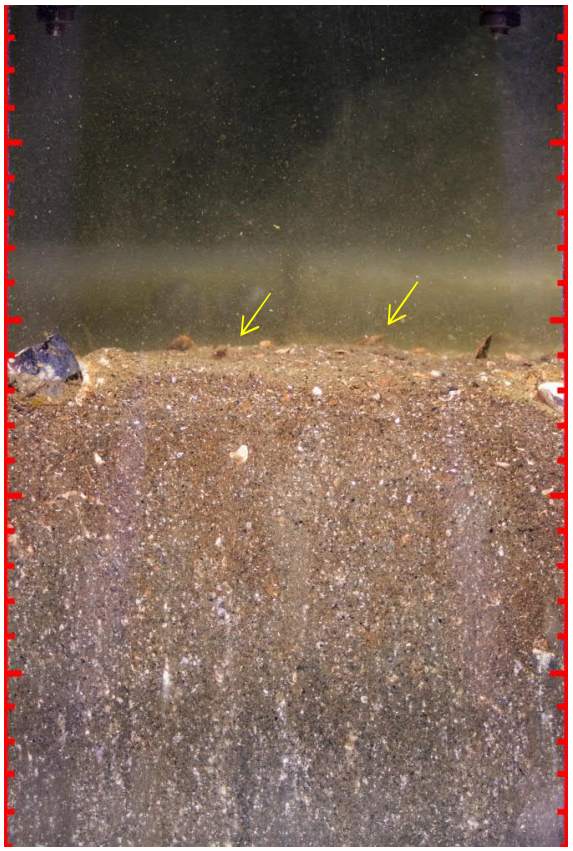


ELDS-39A

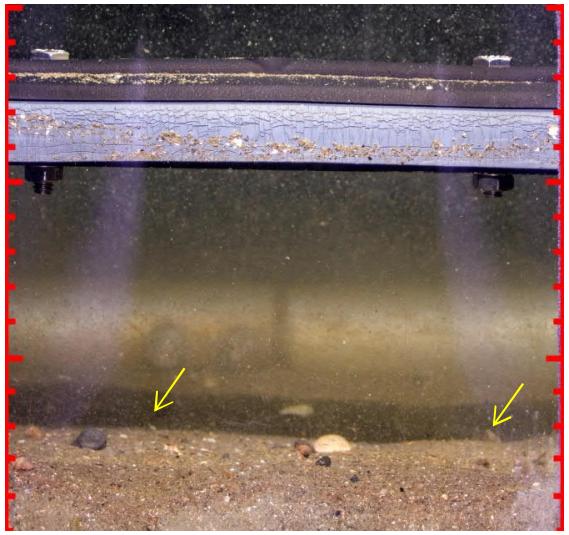


ELDS-10D

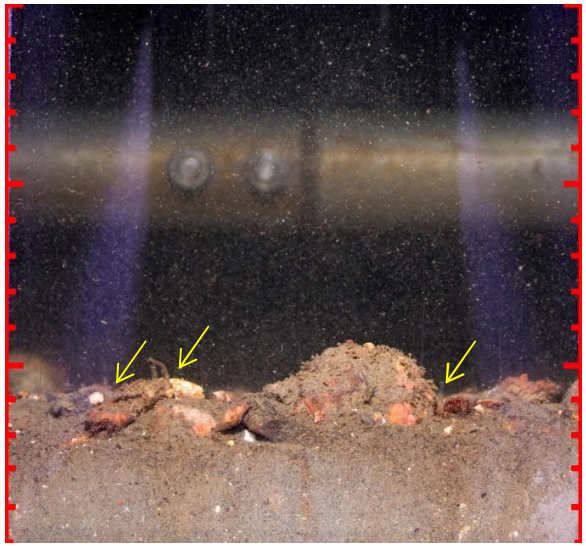
Figure 3-24. Representative images depicting the range of conditions found at ELDS: ELDS-39A (located in the southwest portion of the site) with low penetration depth due to coarse grained sediment and shell hash. ELDS-10D (located in the northwest) displays medium to fine sand over silt mixed with shell hash, allowing deeper camera penetration. Small scale boundary roughness due to physical processes observed as sand waves (yellow arrow). Red tick marks represent 1 cm.



A. ELDS-32B



A. ELDS-42C



C. ELDS-2A

Figure 3-25. Representative images of fine to medium sand with traces of silt found across much of the site. The low penetration depths are attributable to the presence of coarse grained material at these locations. Two of the locations have Stage I organisms present at yellow arrows. Red tick marks represent 1 cm.

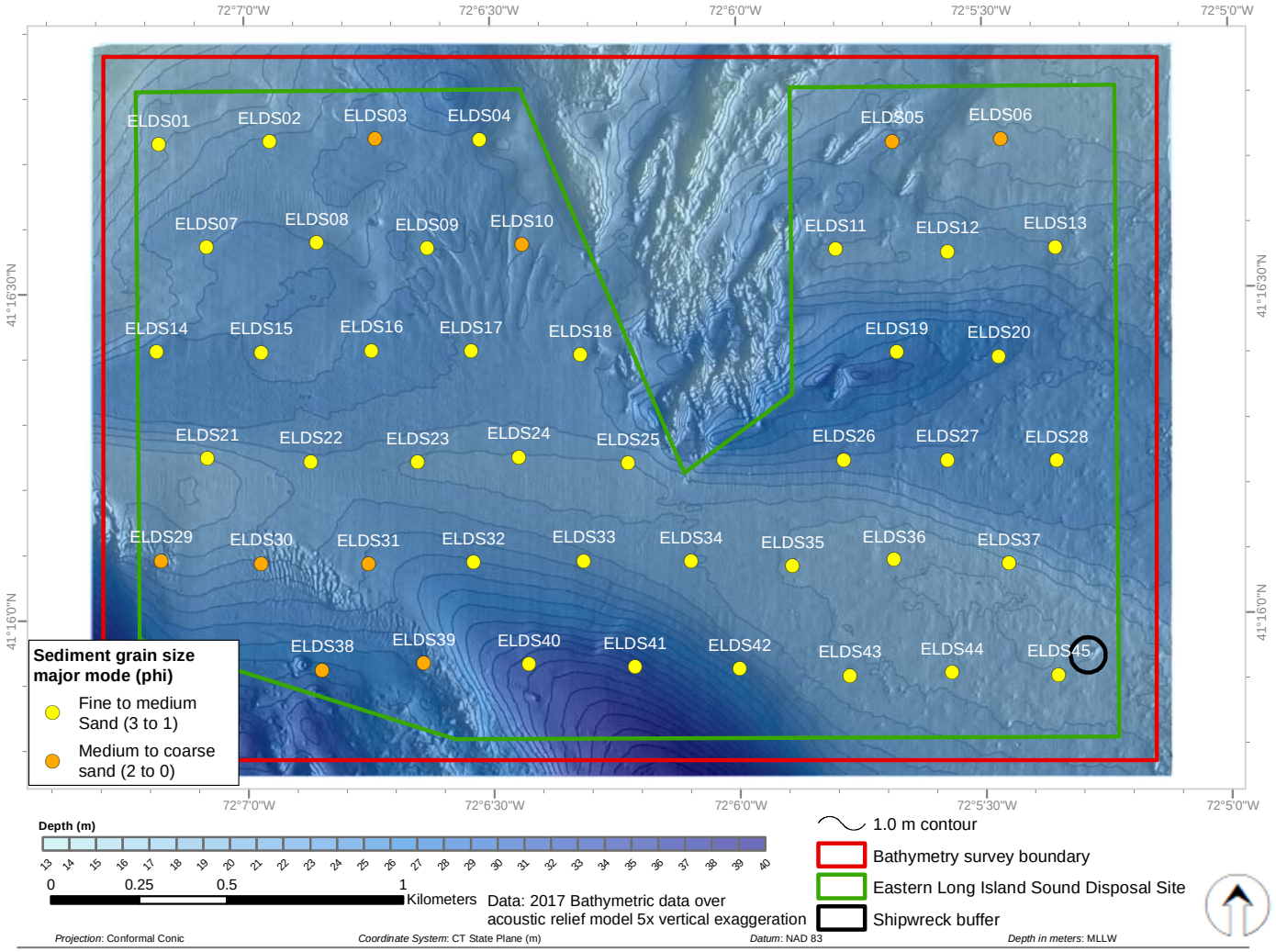
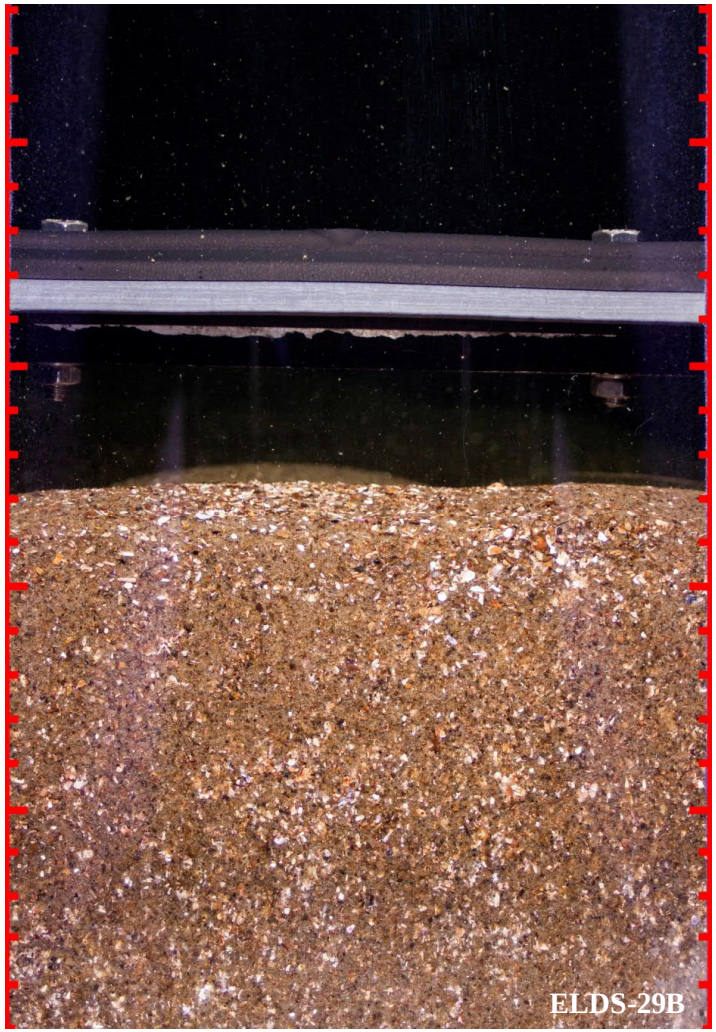


Figure 3-26. Sediment grain size major mode (phi units) at the ELDS



ELDS-29B PV

Figure 3-27. Vertical and horizontal homogeneous medium to coarse sand with shell hash evident in both the SPI and plan view images at ELDS 29-B. Bedforms apparent in the PV images. Red tick marks represent 1 cm.

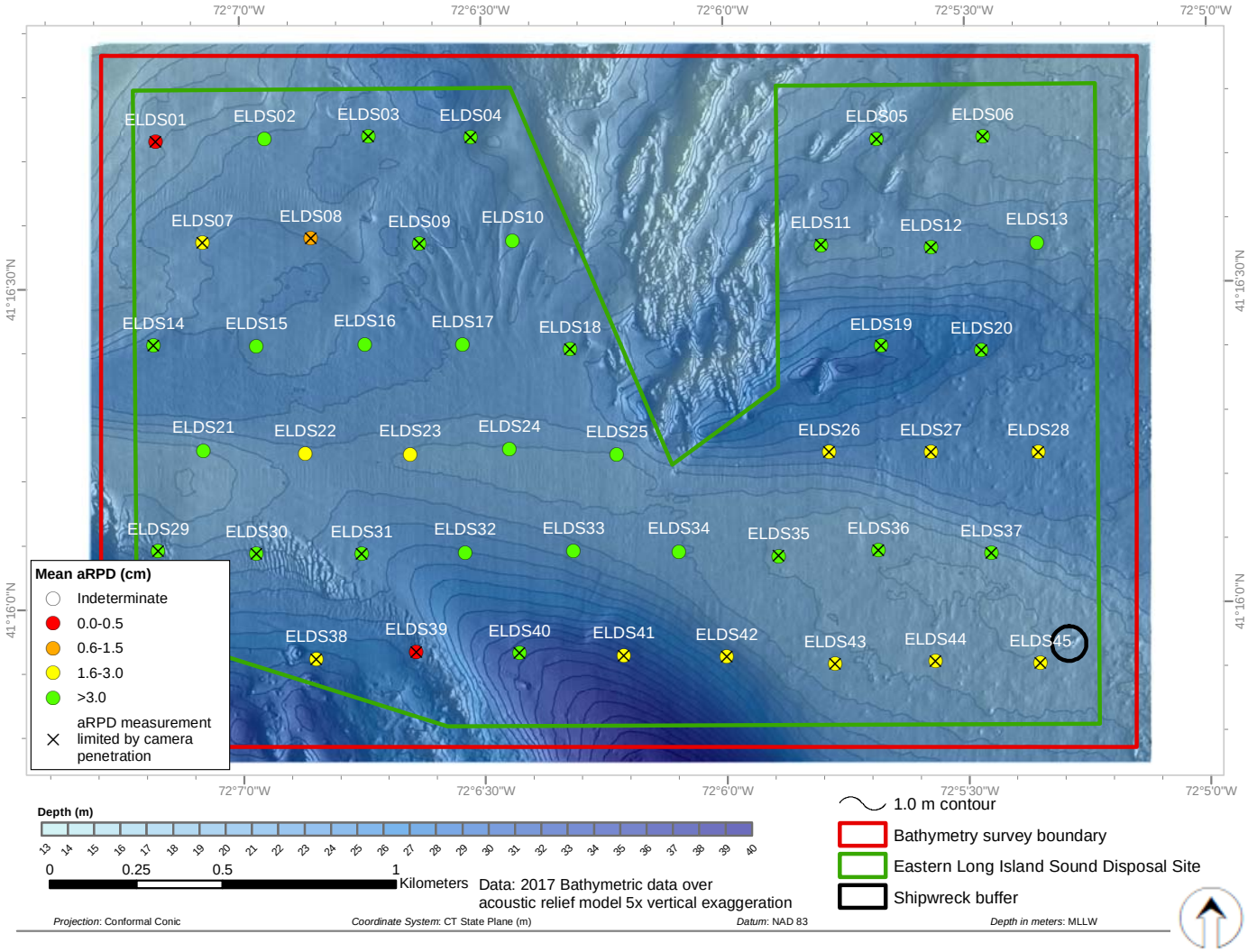


Figure 3-28. Mean station aRPD depth values (cm) at ELDS

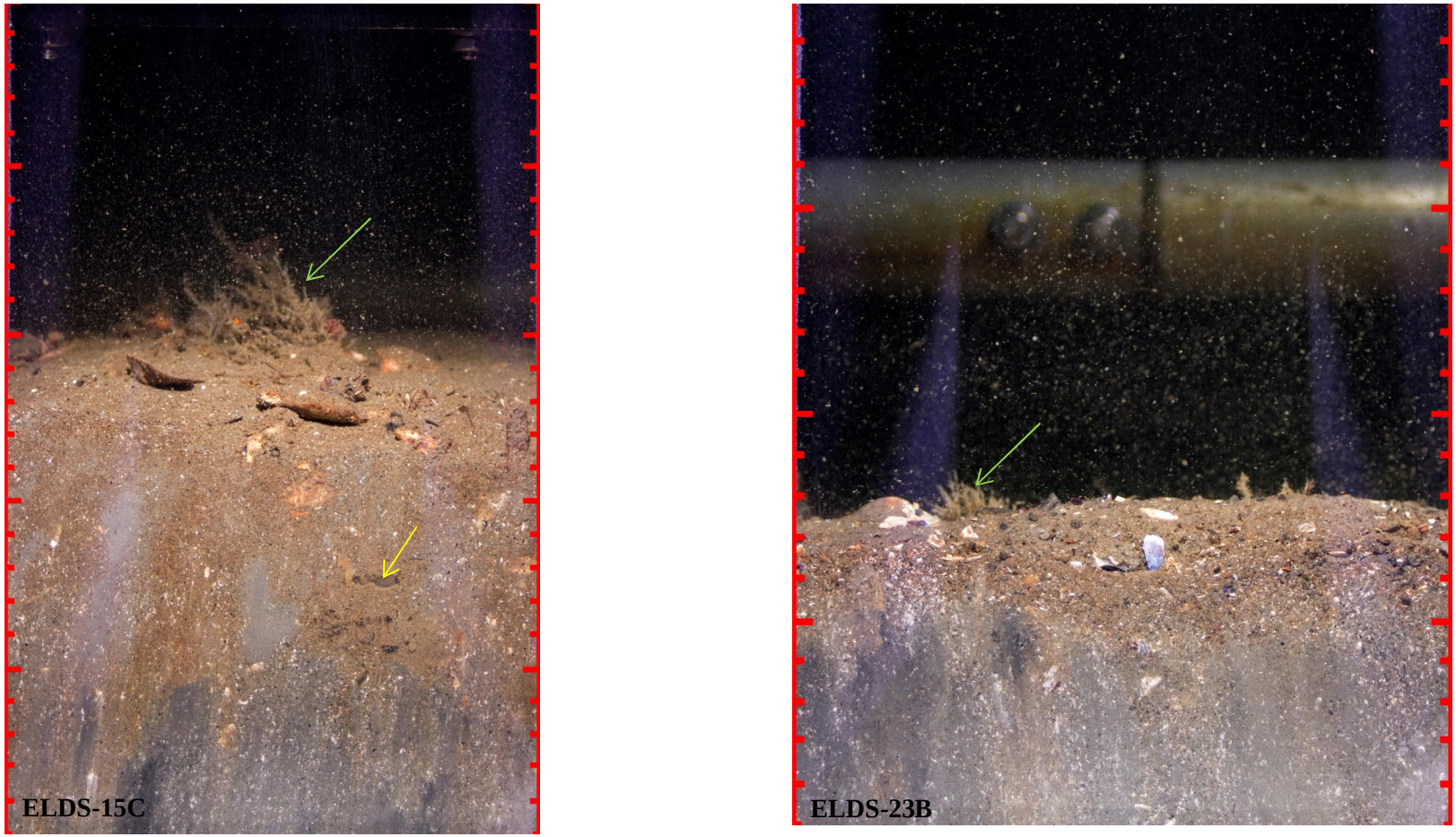


Figure 3-29. Representative sediment characteristics ELDS disposal area. Sediment with shell has at the surface and mixed throughout the sediment with fine to coarse sand above silt to very fine sand and shell pieces below. Yellow arrow in ELDS-15C likely indicates a pocket created by a piece of shell hash pushed to this depth by the camera prism. Both images have hydroids (green arrows) at the surface. Red tick marks represent 1 cm.

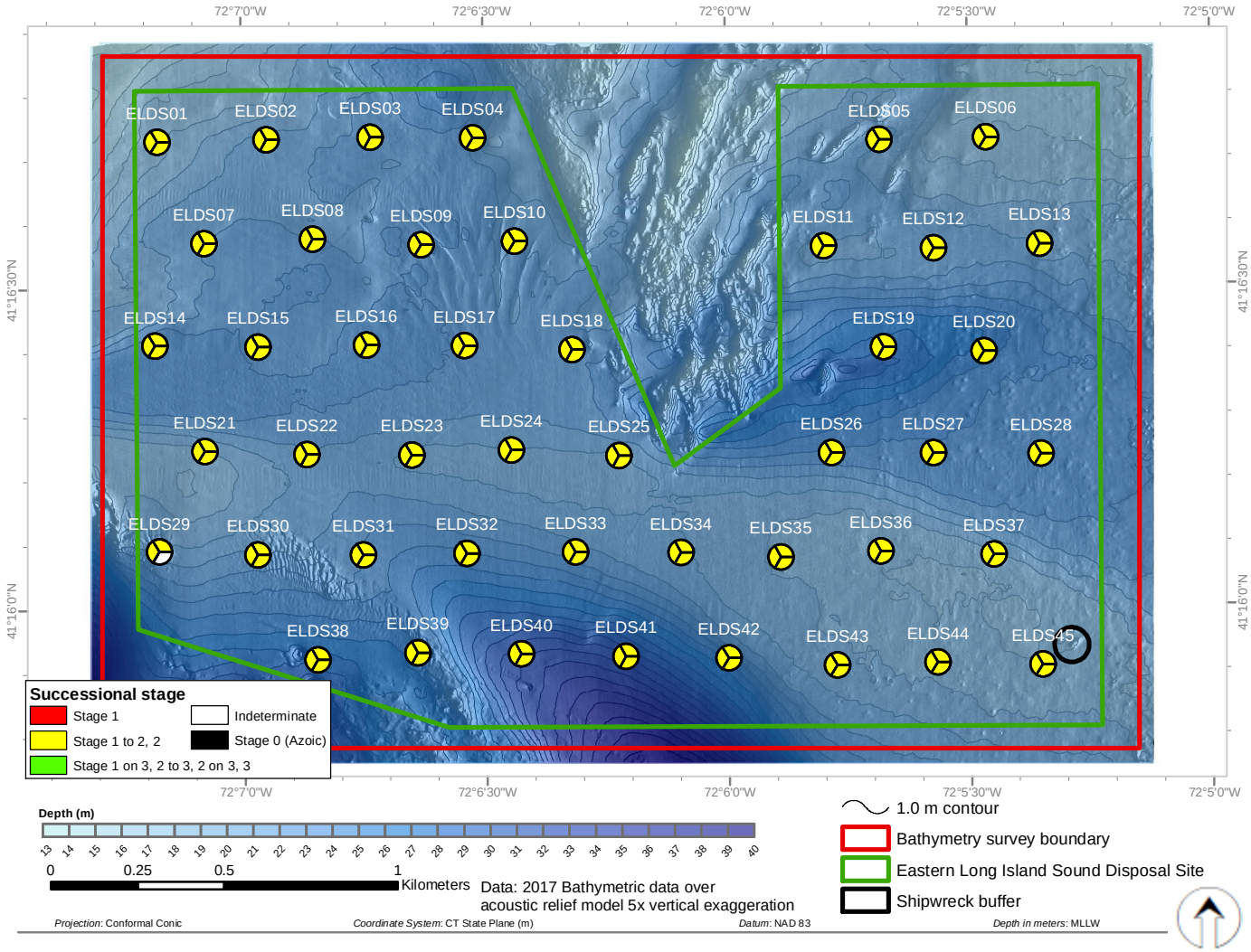


Figure 3-30. Infaunal successional stages found at ELDS

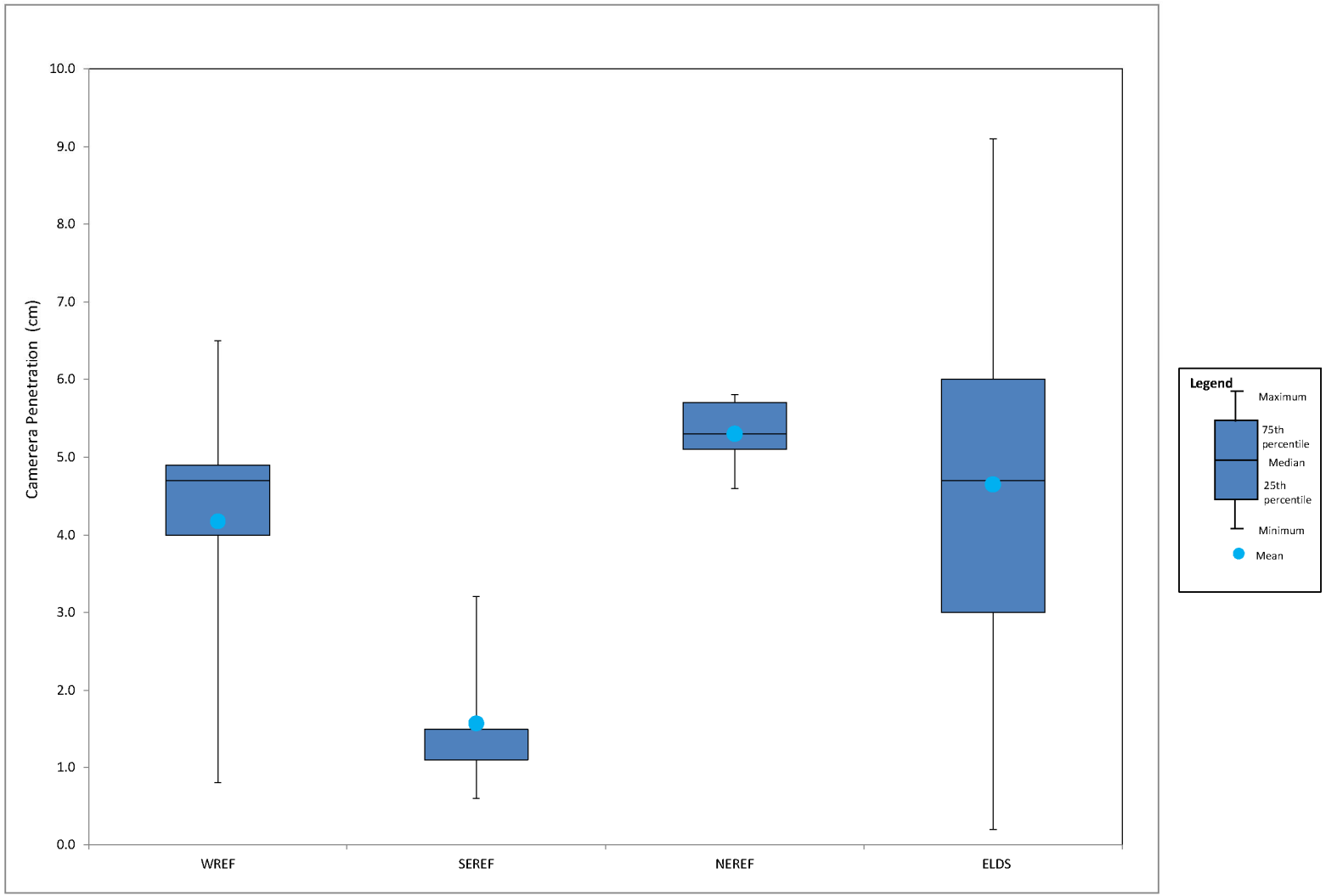
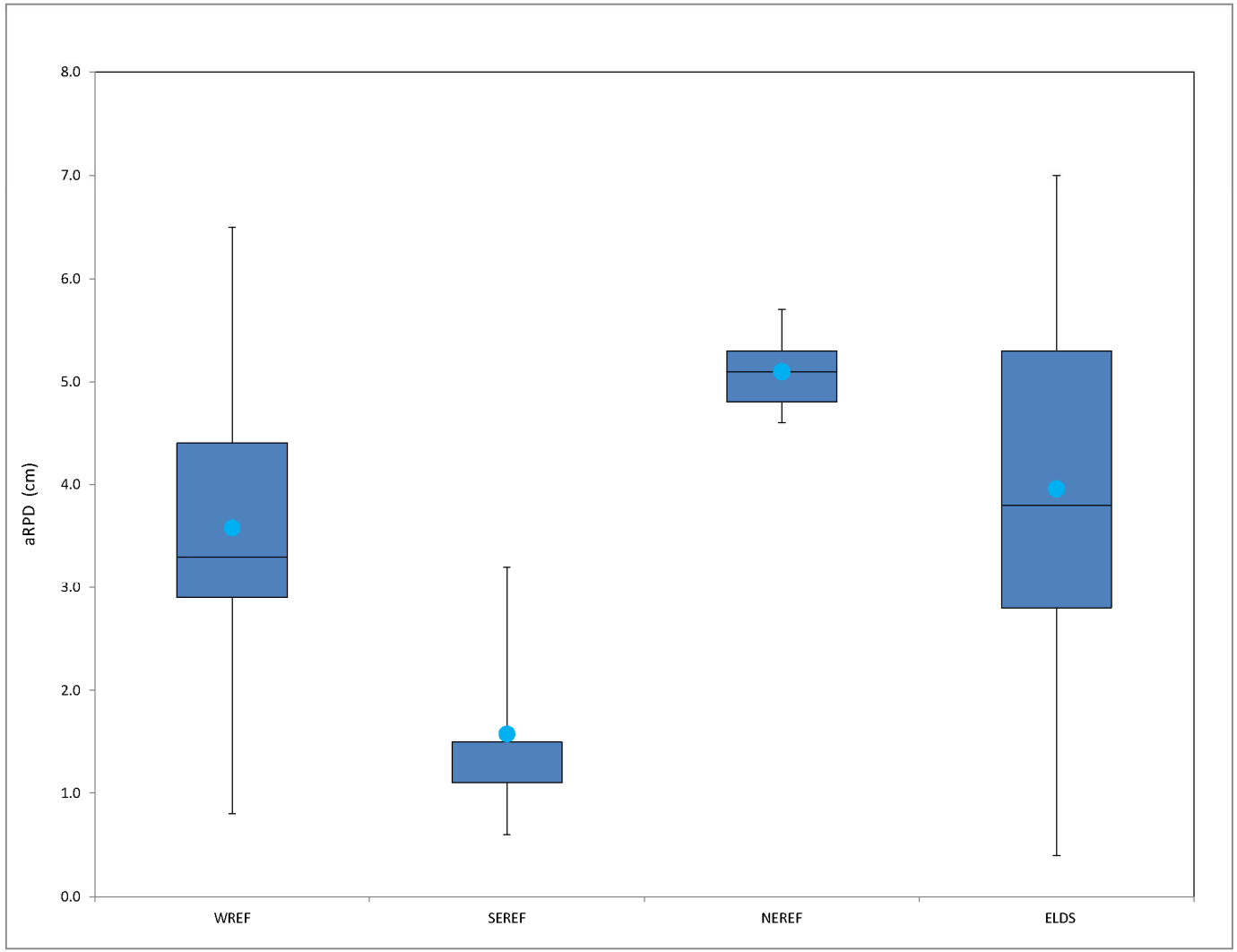
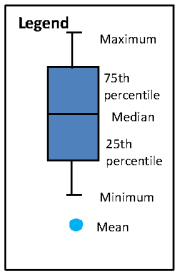


Figure 3-31. Comparison of camera penetration in site and reference locations





Note: Statistics related to aRPD are not to be considered valid as the majority of the data were limited by the depth of camera presentation. This graphic is presented for comparative purposes only.

Figure 3-32. Comparison of aRPD in site and reference locations

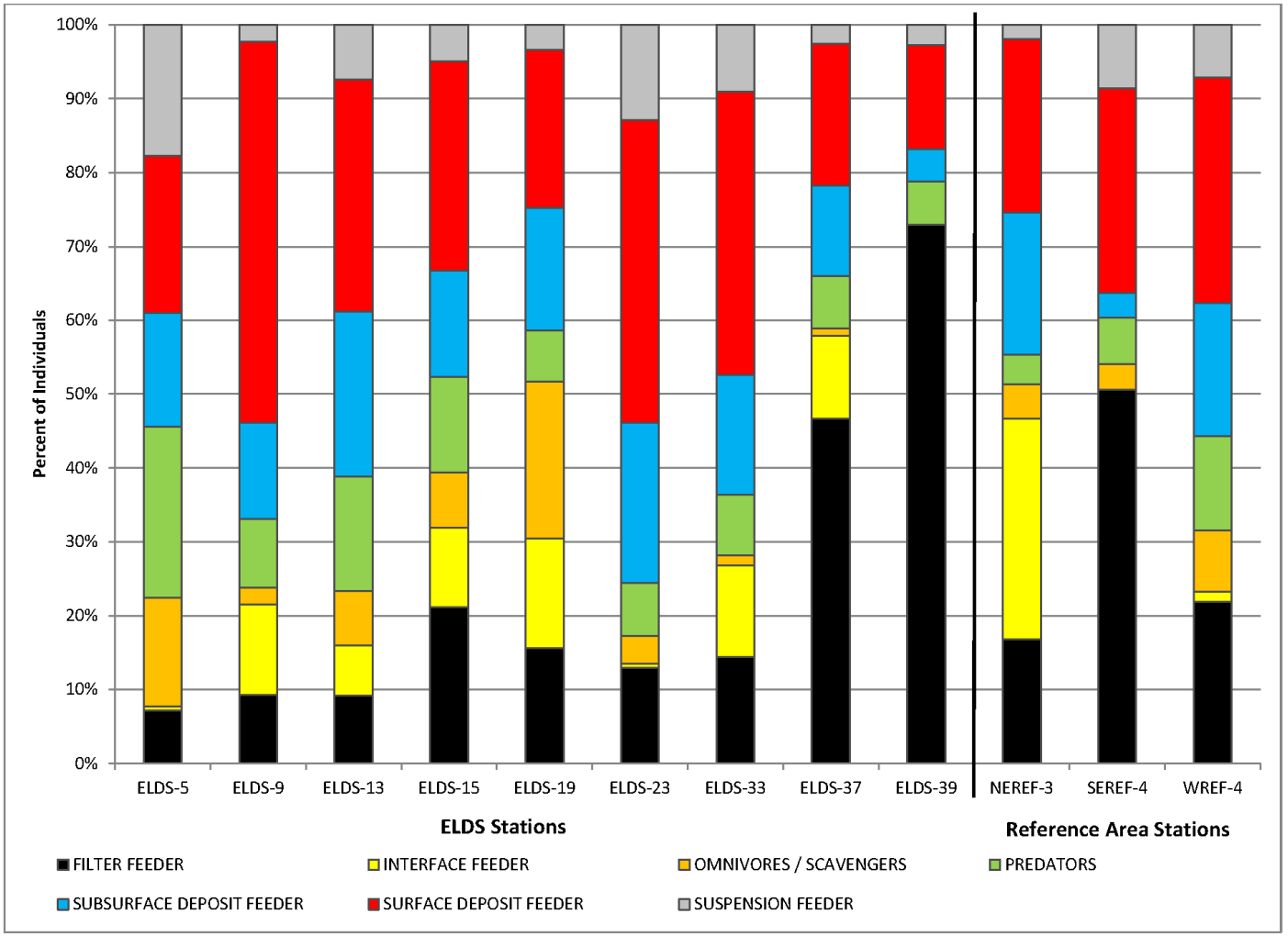


Figure 3-33. Percentage of individuals belonging to each trophic guild at ELDS and reference stations, November 2017

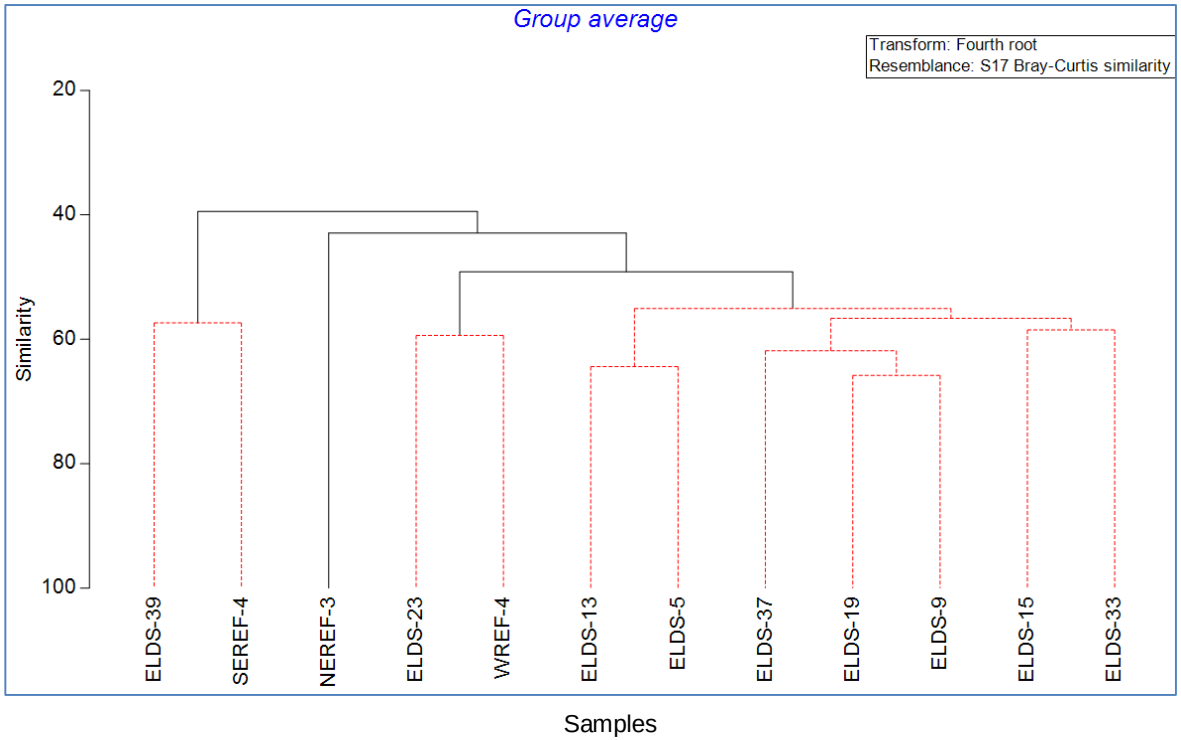


Figure 3-34. Cluster analysis of the reference and ELDS Stations, November 2017.

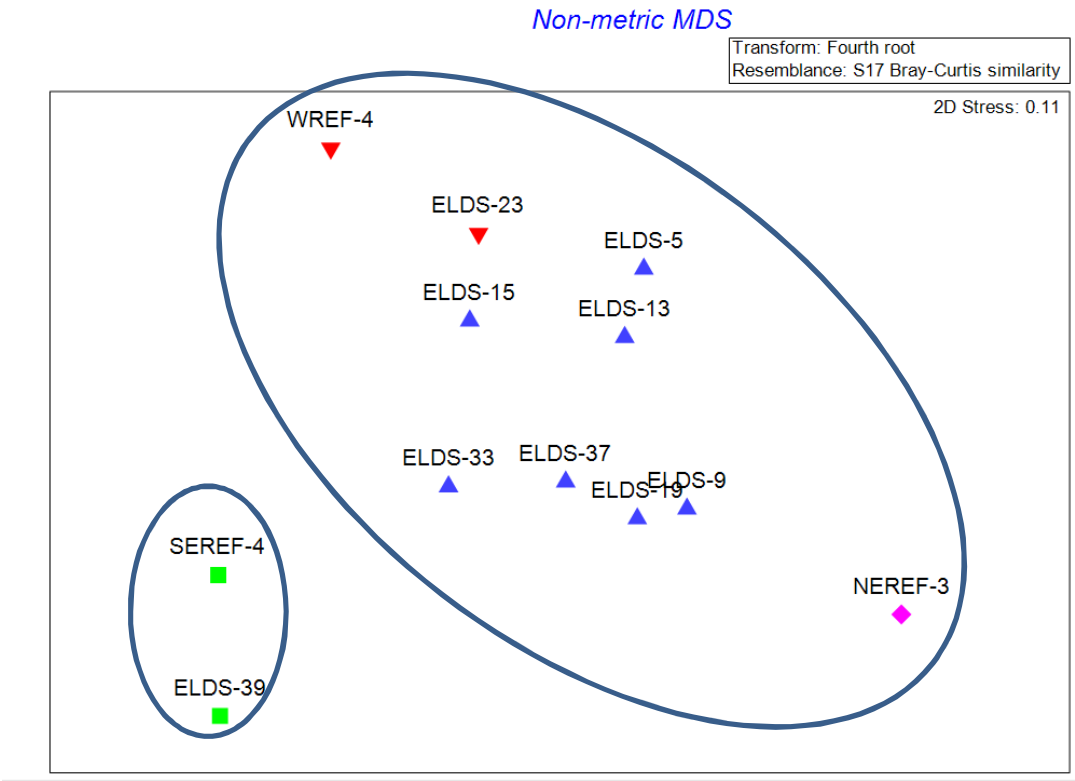


Figure 3-35. Principal component analysis of infaunal data from the reference and ELDS stations, November 2017

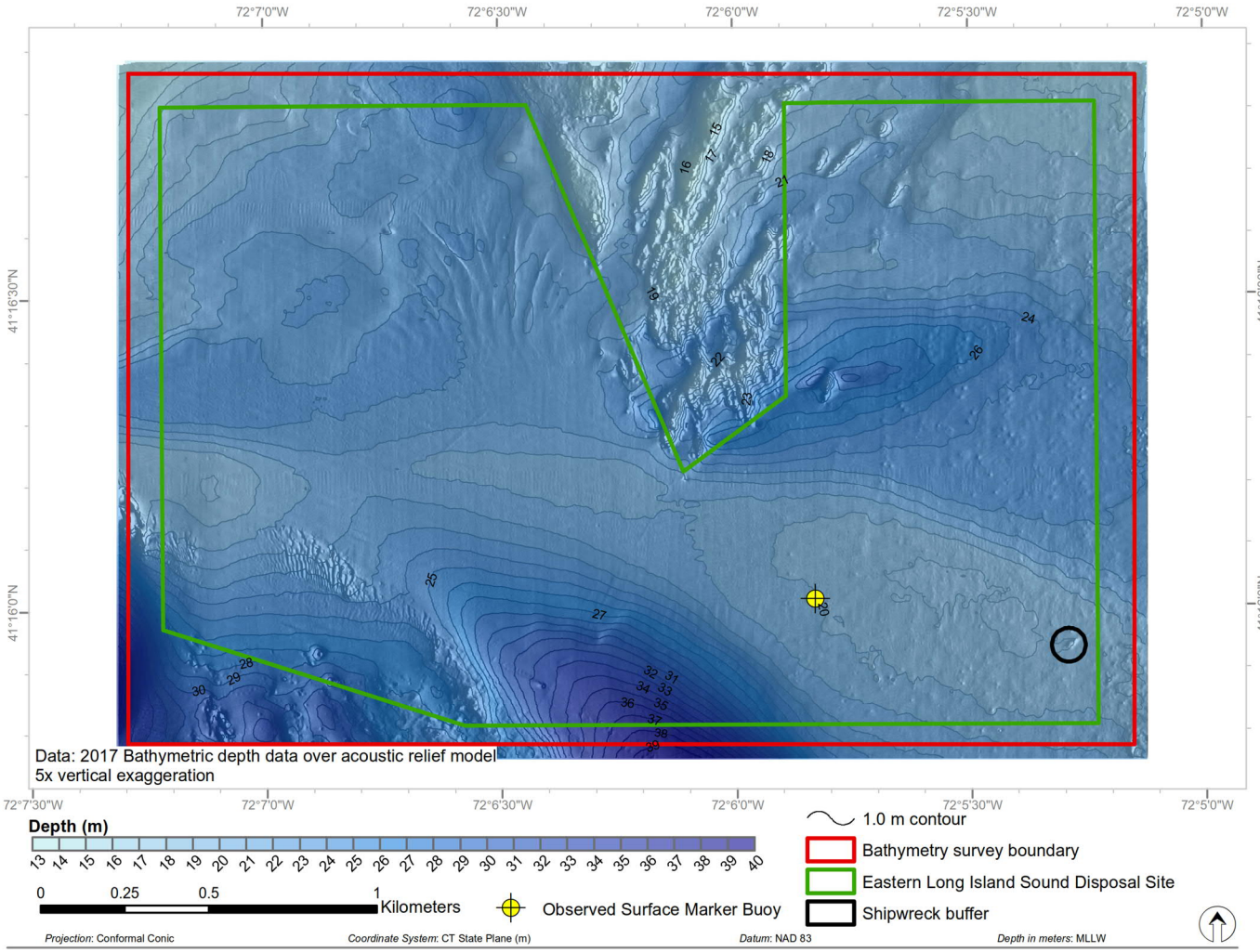


Figure 3-36. Surface marker fishing buoys observed at ELDS

4.0 DISCUSSION

As part of the FSEIS prepared for the designation of ELDS (USEPA, 2016), existing regional data was supplemented with a series of oceanographic surveys and predictive modeling, conducted during 2013-2015. The 2017 DAMOS survey was designed to augment those investigations and provide a comprehensive baseline dataset for the newly designated disposal site prior to the placement of any dredged material and to characterize reference areas that can be used for comparison in future site evaluations.

4.1 Seafloor Topography/ Physical Properties

The high resolution multibeam acoustic survey performed in 2017 will be used as a baseline for management and monitoring of the future placement of dredged material at ELDS. The 2017 survey was compared with a 2010 regional survey that included ELDS (Poppe et al. 2011). Although a rigorous quantitative comparison between the two surveys could not be made, a general comparison revealed a stable seafloor at ELDS with no discernable differences in bottom features or water depths.

Grain size samples were collected in both the 2013 and 2015 as part of the investigations supporting the FSEIS (USEPA, 2016 [Appendix E and G]) for ELDS (Figure 4-1). Grain size analytical results from these investigations were consistent with those of the 2017 survey (Table 4-1). There was also overlap in the SPI station locations in 2017 with those of the 2014 DAMOS survey (Figure 4-2). Comparison of the images from the adjacent stations revealed similar physical conditions (Figures 4-3, 4-4, 4-5). Collectively, the data indicate a stable environment at ELDS over the period the multiple investigations.

The combined acoustic data, SPI and PV imagery, and sediment data collected at the three potential reference areas indicate that they represent the range of conditions found across ELDS.

4.2 Benthic Characterization

A subset of the benthic infaunal community metrics obtained from the 2017 survey were compared to those reported in 2013 samples collected in support of the Final SEIS (USEPA, 2016) as summarized in Table 4-2. While species richness was observed to be higher in 2013, diversity, evenness, and abundance were similar. In both instances the number of samples collected is likely not sufficient to accurately represent the actual diversity within the benthic infaunal community within ELDS. Species-area curve data was plotted using Chao statistic (Chao, 1984). Chao is an estimator that calculates the estimated true species diversity of samples with the assumption that if a community is being sampled, and rare species (singletons) are still being discovered, there are likely more species to be found if the curve does not reach asymptote. For the benthic biology sample results (ELDS and reference combined), results of Chao analysis suggested that the number of samples

collected were not sufficient to account for potential number of singletons as the graph did not reach an asymptotic level (Figure 4-6). However, as DAMOS studies are not established to make fine-scaled assessments of benthic biodiversity, but rather to determine higher-level existing baseline conditions prior to dredge material disposal, this characterization is sufficient to provide a comparison going forward.

Based on the results of the 2017 benthic survey, while there were some observations of Stage III organisms present (e.g, head-down deposit feeding polychaetes) in the grab samples, the community analysis suggested that surficial sediments of ELDS were dominated by Stage II organisms (e.g., surface/ filter feeding invertebrates, including populations of amphipods, bivalves, and oligochaetes). This observation may be somewhat biased by the limited camera penetration at the site. Subsequent monitoring of these locations should assesses the recolonization and recovery of benthic communities post dredge material placement to determine if the disposal areas are providing similar ecological function to reference locations for benthic communities, which are important lower trophic level organisms.

SPI is typically used as a screening-level tool to assess recolonization and recovery of benthic communities at DAMOS-monitored sites. While aRPD depths and prism penetration were similar between the 2014 and 2017 surveys, the evaluation of the successional stage was consistently offset, with conditions interpreted as Stage III in 2014 and Stage II in 2017. A comparison of images from the 2014 and 2017 surveys, particularly those at adjacent stations (Figures 4-3, 4-4, 4-5) indicated that this offset was likely an interpretational difference rather than actual difference in the community structure. While the successional dynamics of invertebrate communities in fine-grained sediments have been analyzed historically using SPI in the DAMOS Program to document system recovery, the successional dynamics of invertebrate communities in higher sand content sediments are not as well known (Germano, 2011). The absence of observed feeding voids and identified Stage III organisms in the 2017 SPI led to the Stage II designation. Given the current uncertainty associated with SPI interpretation in the higher sand content environment found at ELDS, future surveys should continue to include benthic sampling to more fully characterize benthic community structure.

4.3 Chemistry

The sediment chemistry data from the 2017 survey was compared with sediment data collected as part of the ELDS site designation process in 2015 (USEPA, 2016 [Appendix G]). Nine samples from the 2015 study were located within the footprint of what would later be designated as ELDS. Consistent with the 2017 data, TOC for the 2015 samples was on average below 1%. Similarly, pesticides and PCBs were not detected in any of the samples collected in 2015. PAHs and metals concentrations are compared in Tables 4-3 and 4-4, respectively, and were consistent between the 2015 and 2017 sampling efforts. The 2017 ELDS and reference site sediment concentrations were consistently lower than mean values

reported for eastern Long Island Sound in Mitch and Anisfeld (2010). Concentrations were also all below the Effects Range Low (ER-L) values reported in (Long et al., 1995).

The mollusk tissue analysis that included *Anadara transversa* (transverse ark), *Crepidula fornicata* (common slipper shell), *Mercenaria* (quahog), and *Mya arenaria* (soft-shell clam) collected at ELDS and reference site stations in 2017 constitute a baseline of values for future comparison as dredged material is placed at the site. There were few detections of pesticides, PCBs, or PAHs in the tissue samples. Although there is not an existing data set for these species for comparison for the organic and inorganic analytes that were detected, the National Status and Trends (NS&T) program (NOAA, 1999) did compile a tissue data set for blue mussels (*Mytilus edulis*) from Long Island Sound embayments. Almost all of the 2017 data fell below the 10th percentile of concentrations in the NS&T data set, and all fell below the median values of that data set. For analytes that have listed U.S. Food and Drug Administration Action Levels for Crustacea and Mollusks (USFDA, 2011), the 2017 tissue data fell well below those action levels (generally lower by a factor of 10 or more).

4.4 Management Considerations

Based on the results of the 2017 survey, the following management considerations are recommended with initiation of placement of dredged material at ELDS:

- As discussed in the FSEIS, given the location of ELDS in deeper water away from shellfish beds and the absence of other fisheries focusing on the area, placement of material at the site was not expected to impact the fishing industry (USEPA, 2016). Although this assessment was supported by the lack of fishing gear observed during the 2017 survey, observations of fishing activity should be continued during all surveys at ELDS.
- With a controlling depth for disposed material buildup at ELDS set at 18 m, the Site Management and Monitoring Plan (SMMP) provided an estimated capacity of the site of approximately 15 million m^3 (20 million cubic yards [cy]), (USEPA, 2016 [Appendix I]). This capacity estimate should be updated with each subsequent survey as material is placed at the site.
- The three potential reference areas evaluated as part of the 2017 survey all had relevance to ELDS, as they span the range of depths and physical and benthic conditions found at the site. As a result, monitoring of site conditions following dredged material placement should also include the reference area(s) relevant to the specific active areas of placement.
- Continuous tracking of all dredged material disposal operations at ELDS should be performed to: 1) Assess the accuracy of targeted placement at the site; 2) To ensure the buffer is maintained relative to the excluded hardbottom area; and 3) To ensure avoidance of dredge material placement near the charted shipwreck.

- Annual performance of multibeam acoustic surveys following initiation of placement at ELDS should be performed to track the distribution and stability of material at this new site. This monitoring should include assessment following the passage of a hurricane or major nor'easter that affects the site.

- Surveys performed to track benthic recovery following cessation of dredged material placement over a target area should include sediment grabs for infaunal community analysis given the less than optimal performance of SPI in the coarser sediment found at ELDS.

Table 4-1.

Summary of Grain Size Data (2013/ 2015/ 2017)

2013	Gravel % (> 2.0 mm)	Sand % (2.0-0.063)	Silt/ Clay % (< 0.063)
Min	3.2	69.0	6.5
Max	19.8	89.5	20.2
Average	7.7	79.6	12.8
n = 11			
2015	**Gravel % (> 2.0 mm)**	**Sand % (2.0-0.075)**	**Silt/ Clay % (< 0.063)**
Min	0.4	76.1	8.3
Max	4.5	89.7	22.7
Average	2.2	84.2	13.6
n=7			
2017 ELDS	**Gravel % (> 2.0 mm)**	**Sand % (2.0-0.075)**	**Silt/ Clay % (< 0.063)**
Min	0.0	71.6	4.9
Max	8.9	95.1	25.1
Average	2.9	83.0	14.1
n=15			

Table 4-2.

Comparison of 2013 and 2017 Benthic Data Summaries

	Samples	No. of Species	No. of Individuals (0.04 m^2)	Diversity Index (H')	Pielou's J’
2013	11	54	341	2.76	0.69
2017	9	40	268	2.84	0.77

Table 4-3.

Summary of PAH Data for 2015 and 2017 Sediment Samples

	Total PAHs					Total LMW PAHs					Total HMW PAHs				
	µg/kg					µg/kg					µg/kg				
Area	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**
ELDS 2017	15	27.8	759.6	257.8	276.2	15	8.9	252.8	41.8	63.2	15	18.9	688.4	216.0	230.9
ELDS 2015	9	15.0	648.0	218.0	251.7	9	10	58.0	24.8	22.4	9	15.0	590.0	201.5	231.6
Reference Sites	9	39.5	314.6	128.4	94.3	9	9.6	39.1	18.8	10.4	9	28.7	283.4	109.6	85.9

Table 4-4.

Summary of Metals Data for 2015 and 2017 Sediment Samples

	Arsenic					Cadmium					Chromium					Copper				
	mg/kg					mg/kg					mg/kg					mg/kg				
Area	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**
Disposal Site																				
ELDS 2017	15	1.9	7.2	3.2	1.6	15	0.0	0.00	0.0	0.0	15	5.7	17.1	9.4	3.0	15	2.0	8.3	4.0	1.8
ELDS 2015	9	1.7	3.8	2.3	0.6	9	0.0	0.1	0.0	0.0	9	5.4	11.0	7.7	2.1	9	2.7	6.5	4.3	1.3
Reference Sites 2017	9	1.3	5.6	2.6	1.4	9	0.0	0.1	0.0	0.0	9	5.8	9.0	7.7	1.4	9	1.8	4.0	3.0	0.9

	Lead					Mercury					Nickel					Zinc				
	mg/kg					mg/kg					mg/kg					mg/kg				
Area	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**	**n**	**MIN**	**MAX**	**Mean**	**StdDev**
Disposal Site																				
ELDS 2017	15	4.0	13.4	6.7	2.7	15	0.00	0.02	0.01	0.01	15	2.9	52.4	7.9	12.4	15	16.7	46.6	25.5	9.1
ELDS 2015	9	4.1	7.8	5.7	1.5	9	0.02	0.02	0.02	0.00	9	3.2	6.8	4.6	1.3	9	16.8	38.8	23.1	7.5
Reference Sites 2017	9	4.2	5.6	4.9	0.5	9	0.00	0.02	0.01	0.01	9	2.8	5.4	4.2	1.0	9	15.1	26.1	20.4	3.9

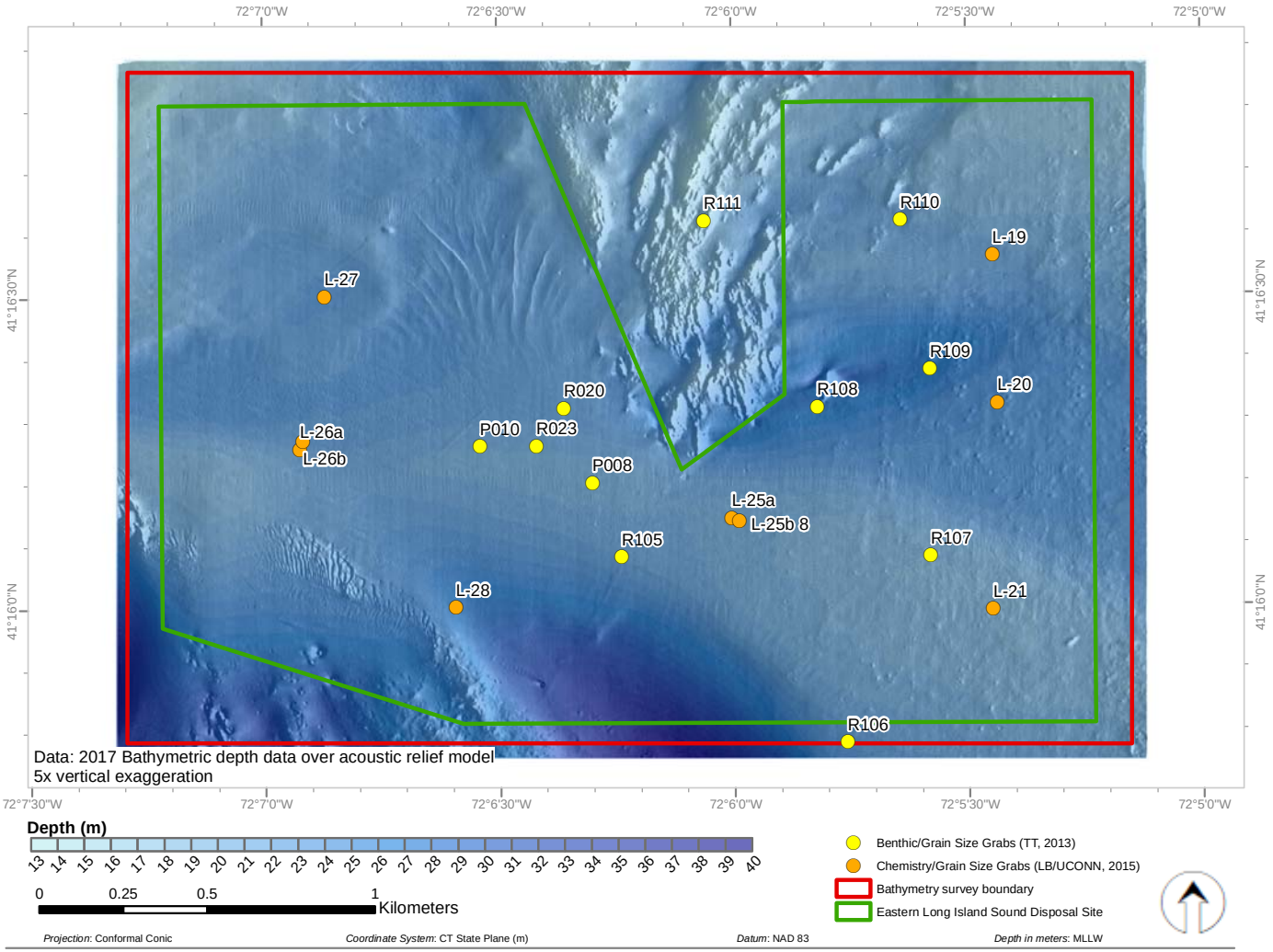


Figure 4-1. Location of grab samples collected during site designation, 2013 and 2015

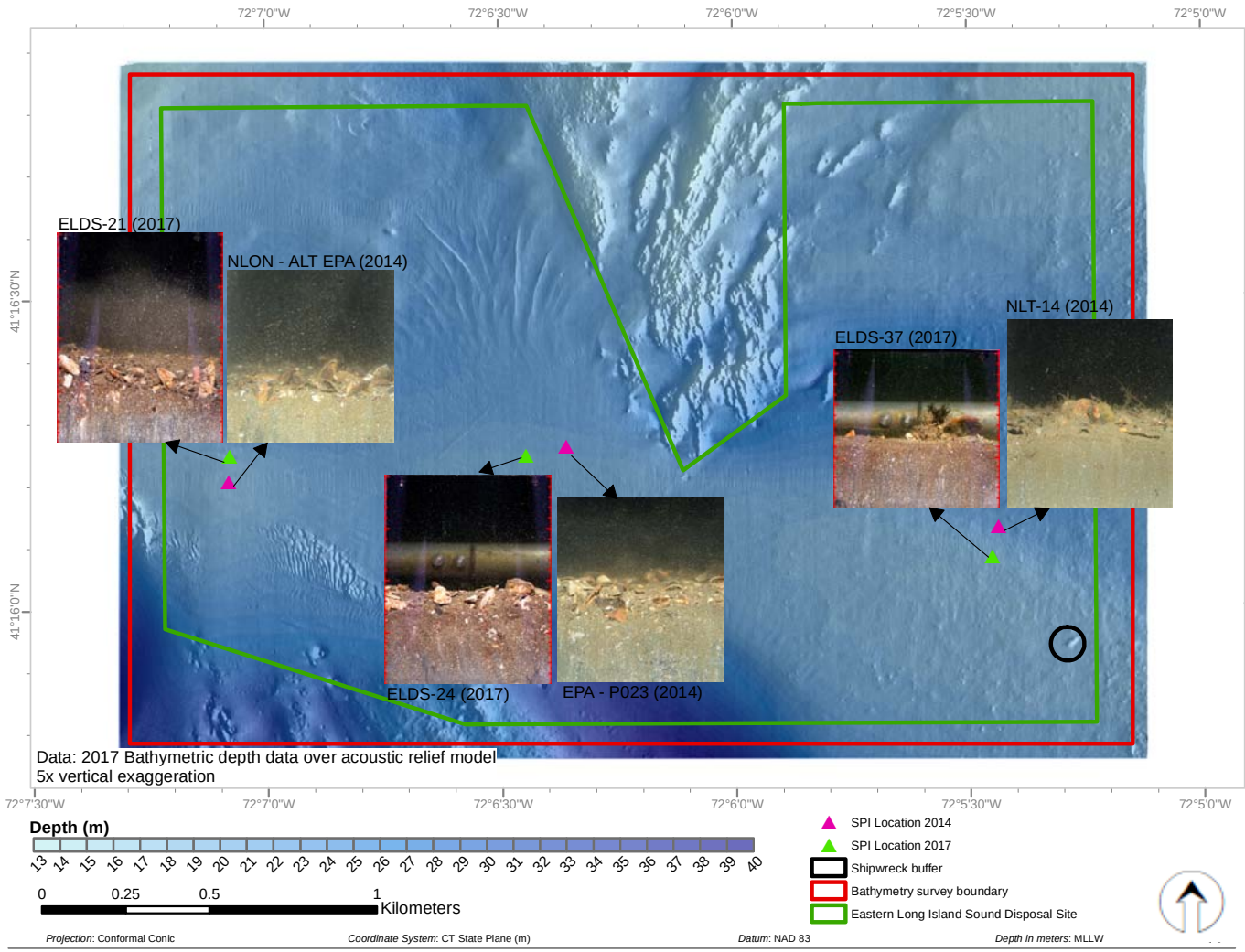


Figure 4-2. Locations of SPI stations used for comparative analysis, 2014 and 2017

ELDS-24C (2017)

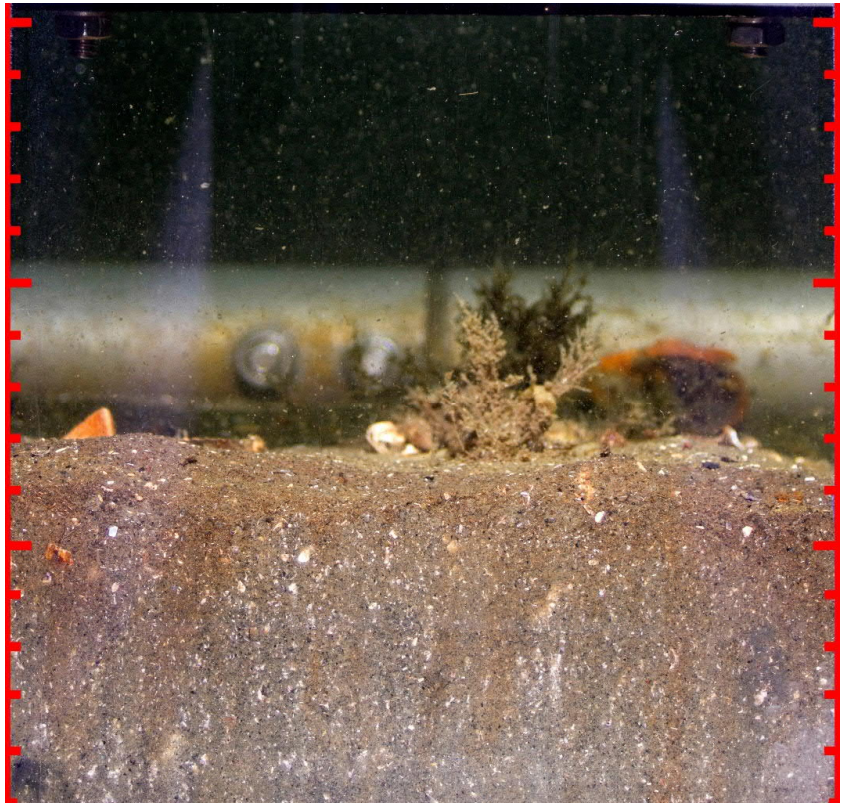
NLDS EPA 23B (2014)

Figure 4-3. Similarity of 2017 and 2014 SPI at stations located in the central portion of ELDS. The images show comparable penetration, physical boundary roughness, and a similar layer of shells/ shell hash at the surface with fine sand/ shell hash to depth. Both images have been characterized as Successional Stage II. Red tick marks represent 1 cm.

ELDS-21B (2017)

NLDS NLON ALT 2B (2014)

Figure 4-4. Similarity of 2017 and 2014 SPI at stations located in the western portion of ELDS. Both images exhibit shallow penetration (mean < 6 cm) due to compact sediment. Surfaces covered with shell hash, shell particles mixed with medium to fine sand. Both images have aRPD physical boundary roughness and are Successional Stage II. Mean aRPD depths are shallow (mean 2.5 cm for ELDS-21B and IND for NLDS NLON ALT-2B). Red tick marks represent 1 cm.



ELDS-37A (2017)

NLDS NLT 14B (2014)

Figure 4-5. Similarity of 2017 and 2014 SPI at stations located in the eastern portion of ELDS. Similar infauna and epifauna (hydroids, Successional Stage I polychaete tubes), shell hash and shell hash particles mixed throughout the sediment. Low camera penetration due to compact sediment at both locations. Trace silt on surfaces. Red tick marks represent 1 cm.

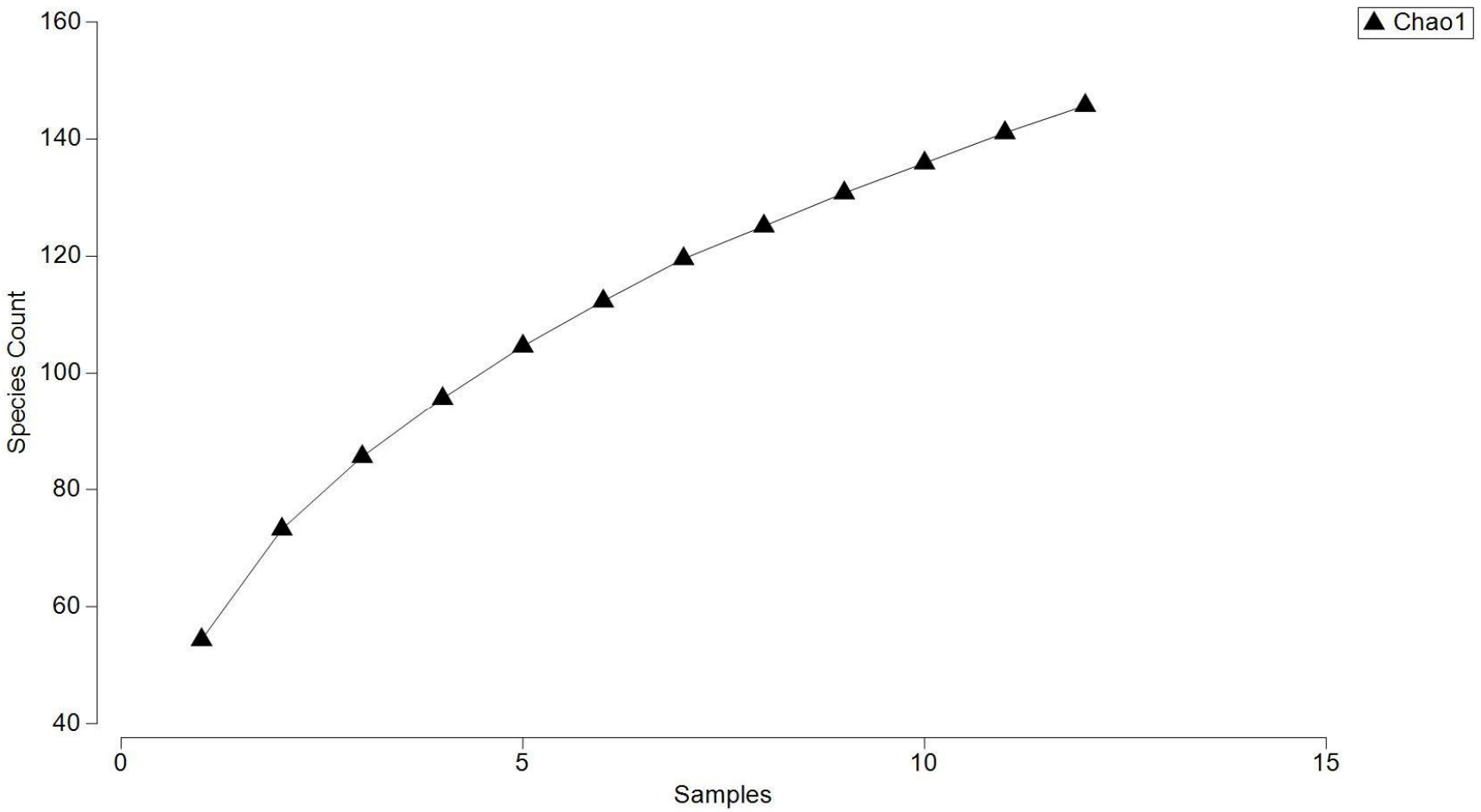


Figure 4-6. Species-Area Accumulation for ELDS and Reference areas

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Appendix A

Table of Common Conversions

US Army Corps
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New England District

APPENDIX A

TABLE OF COMMON CONVERSIONS

Metric	English
Area	
1 Square Kilometer (km2)	247.12 Acres
Length	
1 Kilometer (km)	0.62 Miles (mi)
1 Kilometer (km)	0.54 Nautical Miles (nmi)
1 Meter (m)	3.28 Feet (ft)
1 Centimeter (cm)	0.39 Inches (in)
Volume	
1 Cubic Meter (m^3)	35.31 Cubic Feet (ft^3)
1 Cubic Meter (m^3)	1.31 Cubic Yards (yd^3)

English	Metric
Area	
1 Acre	0.004 Square Kilometers (km^2)
Length	
1 Mile (mi)	1.61 Kilometers (km)
1 Nautical Mile (nmi)	1.85 Kilometers (km)
1 Foot (ft)	0.30 Meters (m)
1 Inch (in)	0.03 Centimeters (cm)
Volume	
1 Cubic Foot (ft^3)	0.03 Cubic Meters (m^3)
1 Cubic Yard (yd^3)	0.76 Cubic Meters (m^3)

Appendix B

ELDS Actual SPI/PV/Sampling Locations

Actual ELDS SPI/PV Replicate Locations

Station	Replicate	Latitude (N)	Longitude (W)
ELDS-01	A	41° 16.7302'	72° 07.1743'
ELDS-01	B	41° 16.7415'	72° 07.1860'
ELDS-01	C	41° 16.7317'	72° 07.1668'
ELDS-02	A	41° 16.7323'	72° 06.9483'
ELDS-02	B	41° 16.7407'	72° 06.9538'
ELDS-02	C	41° 16.7362'	72° 06.9613'
ELDS-03	A	41° 16.7355'	72° 06.7333'
ELDS-03	B	41° 16.7279'	72° 06.7451'
ELDS-03	C	41° 16.7342'	72° 06.7655'
ELDS-04	A	41° 16.7332'	72° 06.5223'
ELDS-04	B	41° 16.7416'	72° 06.5320'
ELDS-04	C	41° 16.7308'	72° 06.5323'
ELDS-05	A	41° 16.7266'	72° 05.6826'
ELDS-05	B	41° 16.7280'	72° 05.6867'
ELDS-05	C	41° 16.7309'	72° 05.6926'
ELDS-06	A	41° 16.7291'	72° 05.4626'
ELDS-06	B	41° 16.7168'	72° 05.4613'
ELDS-06	C	41° 16.7246'	72° 05.4664'
ELDS-07	A	41° 16.5715'	72° 07.0784'
ELDS-07	B	41° 16.5651'	72° 07.0672'
ELDS-07	C	41° 16.5786'	72° 07.0787'
ELDS-08	A	41° 16.5774'	72° 06.8539'
ELDS-08	B	41° 16.5688'	72° 06.8508'
ELDS-08	C	41° 16.5764'	72° 06.8546'
ELDS-09	A	41° 16.5671'	72° 06.6304'
ELDS-09	B	41° 16.5781'	72° 06.6414'
ELDS-09	C	41° 16.5707'	72° 06.6376'
ELDS-10	A	41° 16.5715'	72° 06.4373'
ELDS-10	B	41° 16.5673'	72° 06.4244'
ELDS-10	D	41° 16.5649'	72° 06.4279'
ELDS-11	A	41° 16.5610'	72° 05.7986'
ELDS-11	B	41° 16.5607'	72° 05.7873'
ELDS-11	C	41° 16.5661'	72° 05.7941'
ELDS-12	A	41° 16.5566'	72° 05.5719'
ELDS-12	B	41° 16.5644'	72° 05.5830'
ELDS-12	C	41° 16.5571'	72° 05.5709'
ELDS-13	A	41° 16.5624'	72° 05.3521'
ELDS-13	B	41° 16.5655'	72° 05.3547'
ELDS-13	C	41° 16.5671'	72° 05.3605'
ELDS-14	A	41° 16.4118'	72° 07.1816'
ELDS-14	B	41° 16.4060'	72° 07.1935'
ELDS-14	C	41° 16.4084'	72° 07.1788'

Actual ELDS SPI/PV Replicate Locations

Station	Replicate	Latitude (N)	Longitude (W)
ELDS-15	A	41° 16.4092'	72° 06.9682'
ELDS-15	B	41° 16.4174'	72° 06.9809'
ELDS-15	C	41° 16.4032'	72° 06.9800'
ELDS-16	A	41° 16.4113'	72° 06.7442'
ELDS-16	B	41° 16.4195'	72° 06.7592'
ELDS-16	C	41° 16.4060'	72° 06.7584'
ELDS-17	A	41° 16.4090'	72° 06.5416'
ELDS-17	B	41° 16.4041'	72° 06.5281'
ELDS-17	C	41° 16.4133'	72° 06.5410'
ELDS-18	A	41° 16.4016'	72° 06.3194'
ELDS-18	B	41° 16.4085'	72° 06.3308'
ELDS-18	C	41° 16.4010'	72° 06.3231'
ELDS-19	A	41° 16.4026'	72° 05.6761'
ELDS-19	B	41° 16.4045'	72° 05.6790'
ELDS-19	C	41° 16.4060'	72° 05.6926'
ELDS-20	A	41° 16.3957'	72° 05.4692'
ELDS-20	B	41° 16.4033'	72° 05.4772'
ELDS-20	C	41° 16.4036'	72° 05.4641'
ELDS-21	A	41° 16.2475'	72° 07.0798'
ELDS-21	B	41° 16.2391'	72° 07.0759'
ELDS-21	C	41° 16.2424'	72° 07.0867'
ELDS-22	A	41° 16.2413'	72° 06.8686'
ELDS-22	B	41° 16.2460'	72° 06.8762'
ELDS-22	C	41° 16.2409'	72° 06.8654'
ELDS-23	A	41° 16.2392'	72° 06.6525'
ELDS-23	B	41° 16.2338'	72° 06.6512'
ELDS-23	C	41° 16.2509'	72° 06.6431'
ELDS-24	A	41° 16.2463'	72° 06.4465'
ELDS-24	B	41° 16.2395'	72° 06.4434'
ELDS-24	C	41° 16.2370'	72° 06.4313'
ELDS-25	A	41° 16.2359'	72° 06.2243'
ELDS-25	B	41° 16.2393'	72° 06.2258'
ELDS-25	C	41° 16.2327'	72° 06.2282'
ELDS-26	A	41° 16.2385'	72° 05.7859'
ELDS-26	B	41° 16.2378'	72° 05.7847'
ELDS-26	C	41° 16.2445'	72° 05.7815'
ELDS-27	A	41° 16.2371'	72° 05.5750'
ELDS-27	B	41° 16.2415'	72° 05.5731'
ELDS-27	C	41° 16.2462'	72° 05.5719'
ELDS-28	A	41° 16.2349'	72° 05.3532'
ELDS-28	B	41° 16.2384'	72° 05.3553'
ELDS-28	C	41° 16.2418'	72° 05.3528'

Actual ELDS SPI/PV Replicate Locations

Station	Replicate	Latitude (N)	Longitude (W)
ELDS-29	A	41° 16.0908'	72° 07.1753'
ELDS-29	B	41° 16.0787'	72° 07.1775'
ELDS-29	C	41° 16.0952'	72° 07.1851'
ELDS-30	A	41° 16.0855'	72° 06.9714'
ELDS-30	C	41° 16.0858'	72° 06.9659'
ELDS-30	D	41° 16.0785'	72° 06.9649'
ELDS-31	A	41° 16.0841'	72° 06.7540'
ELDS-31	B	41° 16.0835'	72° 06.7524'
ELDS-31	C	41° 16.0929'	72° 06.7451'
ELDS-32	A	41° 16.0851'	72° 06.5399'
ELDS-32	B	41° 16.0903'	72° 06.5282'
ELDS-32	C	41° 16.0780'	72° 06.5369'
ELDS-33	A	41° 16.0864'	72° 06.3162'
ELDS-33	B	41° 16.0753'	72° 06.3311'
ELDS-33	C	41° 16.0760'	72° 06.3219'
ELDS-34	A	41° 16.0844'	72° 06.0974'
ELDS-34	B	41° 16.0784'	72° 06.1097'
ELDS-34	C	41° 16.0769'	72° 06.1035'
ELDS-35	A	41° 16.0760'	72° 05.8910'
ELDS-35	B	41° 16.0792'	72° 05.8805'
ELDS-35	C	41° 16.0791'	72° 05.9019'
ELDS-36	A	41° 16.0840'	72° 05.6845'
ELDS-36	B	41° 16.0897'	72° 05.6736'
ELDS-36	C	41° 16.0846'	72° 05.6765'
ELDS-37	A	41° 16.0784'	72° 05.4514'
ELDS-37	B	41° 16.0751'	72° 05.4598'
ELDS-37	C	41° 16.0708'	72° 05.4653'
ELDS-38	A	41° 15.9212'	72° 06.8491'
ELDS-38	B	41° 15.9209'	72° 06.8525'
ELDS-38	C	41° 15.9252'	72° 06.8504'
ELDS-39	A	41° 15.9307'	72° 06.6422'
ELDS-39	B	41° 15.9196'	72° 06.6440'
ELDS-39	C	41° 15.9197'	72° 06.6358'
ELDS-40	A	41° 15.9280'	72° 06.4288'
ELDS-40	B	41° 15.9206'	72° 06.4283'
ELDS-40	C	41° 15.9231'	72° 06.4334'
ELDS-41	A	41° 15.9230'	72° 06.2129'
ELDS-41	B	41° 15.9271'	72° 06.2149'
ELDS-41	C	41° 15.9178'	72° 06.2170'
ELDS-42	A	41° 15.9192'	72° 06.0008'
ELDS-42	B	41° 15.9276'	72° 05.9977'
ELDS-42	C	41° 15.9227'	72° 05.9957'

Actual ELDS SPI/PV Replicate Locations

Station	Replicate	Latitude (N)	Longitude (W)
ELDS-43	A	41° 15.9071'	72° 05.7767'
ELDS-43	B	41° 15.9267'	72° 05.7793'
ELDS-43	C	41° 15.9267'	72° 05.7891'
ELDS-44	A	41° 15.9109'	72° 05.5690'
ELDS-44	B	41° 15.9228'	72° 05.5877'
ELDS-44	C	41° 15.9266'	72° 05.5791'
ELDS-45	A	41° 15.9065'	72° 05.3521'
ELDS-45	D	41° 15.9127'	72° 05.3536'
ELDS-45	E	41° 15.9119'	72° 05.3417'
NEREF-1	A	41° 16.7720'	72° 03.5083'
NEREF-1	B	41° 16.7800'	72° 03.5130'
NEREF-1	C	41° 16.7879'	72° 03.5102'
NEREF-2	A	41° 16.7830'	72° 03.3508'
NEREF-2	B	41° 16.7966'	72° 03.3473'
NEREF-2	C	41° 16.7855'	72° 03.3339'
NEREF-3	A	41° 16.6707'	72° 03.5209'
NEREF-3	B	41° 16.6759'	72° 03.5302'
NEREF-3	C	41° 16.6826'	72° 03.5321'
NEREF-4	A	41° 16.6741'	72° 03.3503'
NEREF-4	B	41° 16.6795'	72° 03.3515'
NEREF-4	C	41° 16.6850'	72° 03.3550'
NEREF-5	A	41° 16.6396'	72° 03.2225'
NEREF-5	B	41° 16.6468'	72° 03.2219'
NEREF-5	C	41° 16.6527'	72° 03.2242'
SEREF-1	A	41° 15.5388'	72° 03.7571'
SEREF-1	B	41° 15.5321'	72° 03.7467'
SEREF-1	E	41° 15.5474'	72° 03.7622'
SEREF-2	A	41° 15.4727'	72° 03.6016'
SEREF-2	B	41° 15.4696'	72° 03.6010'
SEREF-2	C	41° 15.4671'	72° 03.6001'
SEREF-3	A	41° 15.5111'	72° 03.4437'
SEREF-3	B	41° 15.5146'	72° 03.4472'
SEREF-3	C	41° 15.5158'	72° 03.4517'
SEREF-4	A	41° 15.3305'	72° 03.5596'
SEREF-4	C	41° 15.3315'	72° 03.5759'
SEREF-4	D	41° 15.3325'	72° 03.5607'
SEREF-5	A	41° 15.3814'	72° 03.8281'
SEREF-5	C	41° 15.3965'	72° 03.8249'
SEREF-5	D	41° 15.3955'	72° 03.8199'
WREF-1	A	41° 15.9908'	72° 09.3902'
WREF-1	B	41° 15.9932'	72° 09.3896'
WREF-1	C	41° 15.9938'	72° 09.3883'

Actual ELDS SPI/PV Replicate Locations

Station	Replicate	Latitude (N)	Longitude (W)
WREF-2	A	41° 15.9808'	72° 09.6980'
WREF-2	B	41° 15.9829'	72° 09.6958'
WREF-2	C	41° 15.9862'	72° 09.6934'
WREF-3	C	41° 16.0559'	72° 09.5085'
WREF-3	D	41° 16.0570'	72° 09.5099'
WREF-3	E	41° 16.0581'	72° 09.5093'
WREF-4	A	41° 16.1390'	72° 09.4013'
WREF-4	B	41° 16.1410'	72° 09.4064'
WREF-4	C	41° 16.1401'	72° 09.4097'
WREF-5	A	41° 16.1859'	72° 09.7130'
WREF-5	B	41° 16.1920'	72° 09.7087'
WREF-5	C	41° 16.1927'	72° 09.7097'

Actual ELDS Sediment Chemistry Locations					
Sample ID	**Time**	**Date**	**Latitude (N)**	**Longitude (W)**	**Water Depth (ft)**
ELDS Stations					
ELDS-13	11:00:16	11/2/2017	41° 16.5643'	72° 05.3552'	69
ELDS-15	12:58:02	11/2/2017	41° 16.4201'	72° 06.9704'	73
ELDS-19	10:49:02	11/2/2017	41° 16.4021'	72° 05.6746'	92
ELDS-21	12:49:05	11/2/2017	41° 16.2453'	72° 07.0647'	65
ELDS-23	12:38:48	11/2/2017	41° 16.2443'	72° 06.6507'	69
ELDS-27	12:26:40	11/2/2017	41° 16.2363'	72° 05.5785'	77
ELDS-3	13:17:11	11/2/2017	41° 16.7349'	72° 06.7601'	72
ELDS-31	9:48:30	11/2/2017	41° 16.0926'	72° 06.7497'	78
ELDS-33	10:12:14	11/2/2017	41° 16.0848'	72° 06.3131'	75
ELDS-35	10:28:37	11/2/2017	41° 16.0773'	72° 05.8963'	66
ELDS-37	10:37:33	11/2/2017	41° 16.0790'	72° 05.4512'	67
ELDS-39	8:43:54	11/2/2017	41° 15.9293'	72° 06.6603'	88
ELDS-41	8:24:12	11/2/2017	41° 15.9258'	72° 06.2306'	101
ELDS-5	11:42:57	11/2/2017	41° 16.7263'	72° 05.6563'	67
ELDS-9	13:08:08	11/2/2017	41° 16.5739'	72° 06.6370'	75
Reference Stations					
NEREF 2	15:42:34	11/2/2017	41° 16.7882'	72° 03.3374'	44
NEREF 3	15:21:58	11/2/2017	41° 16.6794'	72° 03.5320'	50
NEREF 4	15:34:56	11/2/2017	41° 16.6722'	72° 03.3566'	47
SEREF 1	15:10:06	11/2/2017	41° 15.5401'	72° 03.7659'	77
SEREF 4	14:52:12	11/2/2017	41° 15.3491'	72° 03.5601'	84
SEREF 5	15:01:08	11/2/2017	41° 15.3896'	72° 03.8416'	79
WREF 2	14:23:19	11/2/2017	41° 15.9825'	72° 09.6885'	132
WREF 4	13:45:23	11/2/2017	41° 16.1434'	72° 09.3839'	109
WREF 5	13:55:21	11/2/2017	41° 16.2010'	72° 09.7015'	89

Notes:

1. Grid coordinates are NAD_1983_StatePlane_Connecticut_FIPS_0600_Meters

2. Geographic coordinates are NAD83 degree decimal minute

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New England District

Actual ELDS Benthic Grab Sample Locations					
Sample ID	**Time**	**Date**	**Latitude (N)**	**Longitude (W)**	**Water Depth (ft)**
ELDS Stations					
ELDS-5	8:06:41	11/3/2017	41° 16.7215'	72° 05.6679'	70
ELDS-9	10:38:11	11/3/2017	41° 16.5739'	72° 06.6409'	77
ELDS-13	8:19:54	11/3/2017	41° 16.5688'	72° 05.3504'	71
ELDS-15	10:25:33	11/3/2017	41° 16.4049'	72° 06.9628'	75
ELDS-19	8:41:43	11/3/2017	41° 16.4063'	72° 05.6609'	92
ELDS-23	10:11:39	11/3/2017	41° 16.2555'	72° 06.6428'	70
ELDS-33	9:36:33	11/3/2017	41° 16.0858'	72° 06.3232'	76
ELDS-37	9:19:24	11/3/2017	41° 16.0791'	72° 05.4716'	66
ELDS-39	8:52:05	11/2/2017	41° 15.9309'	72° 06.6583'	85
Reference Stations					
NEREF 3	12:56:14	11/3/2017	41° 16.6799'	72° 03.5141'	51
SEREF 4	12:33:42	11/3/2017	41° 15.3398'	72° 03.5696'	87
WREF 4	11:56:27	11/3/2017	41° 16.1445'	72° 09.3829'	110

Notes:

1. Grid coordinates are NAD_1983_StatePlane_Connecticut_FIPS_0600_Meters

2. Geographic coordinates are NAD83 degree decimal minute

US Army Corps of Engineers®
New England District

Actual ELDS Benthic Drag Locations					
Sample ID	**Line**	**Time**	**Northing**	**Latitude (N)**	**Longitude (W)**
ELDS Stations					
ELDS-13	Start	9:22:32	201763.4	41° 16.5546'	72° 05.3454'
ELDS-13	End	9:25:33	201603.3	41° 16.4683'	72° 05.3766'
ELDS-15	Start	8:18:05	201463.5	41° 16.4017'	72° 06.9674'
ELDS-15	End	8:21:15	201307.1	41° 16.3170'	72° 06.9251'
ELDS-37	Start	17:16:48	200749.7	41° 16.0069'	72° 05.3374'
ELDS-37	End	17:24:36	200696.0	41° 15.9814'	72° 05.9514'
ELDS-39	Start	10:38:44	200544.0	41° 15.9032'	72° 06.6453'
ELDS-39	End	10:41:44	200439.5	41° 15.8468'	72° 06.6698'
ELDS-39	Start	11:15:25	200674.5	41° 15.9734'	72° 06.5898'
ELDS-39	End	11:20:11	200377.9	41° 15.8128'	72° 06.5364'
ELDS-39	Start	11:32:51	200522.6	41° 15.8911'	72° 06.5687'
ELDS-39	End	11:37:51	200647.4	41° 15.9569'	72° 06.2553'
ELDS-39	Start	11:59:26	200641.6	41° 15.9535'	72° 06.2142'
ELDS-39	End	12:04:25	200842.6	41° 16.0619'	72° 06.1931'
Reference Stations					
NE REF 3	Start	15:11:46	201785.8	41° 16.5561'	72° 03.5483'
NE REF 3	End	15:19:55	202366.1	41° 16.8695'	72° 03.5244'
NE REF 3	Start	15:33:44	202305.6	41° 16.8360'	72° 03.3934'
NE REF 3	End	15:41:46	201690.4	41° 16.5044'	72° 03.5155'
NE REF 3	Start	15:52:35	201661.7	41° 16.4869'	72° 03.1998'
NE REF 3	End	16:01:41	202319.1	41° 16.8425'	72° 03.2568'
SE REF 4	Start	16:20:40	199515.7	41° 15.3288'	72° 03.4085'
SE REF 4	End	16:29:46	199434.8	41° 15.2877'	72° 03.8388'
SE REF 4	Start	16:48:32	199917.7	41° 15.5487'	72° 03.8641'
SE REF 4	End	16:56:29	199910.2	41° 15.5420'	72° 03.4189'
WREF 4	Start	12:47:52	200884.2	41° 16.1013'	72° 09.3128'
WREF 4	End	12:50:08	200764.8	41° 16.0369'	72° 09.3168'
WREF 4	Start	13:13:41	200860.9	41° 16.0896'	72° 09.4777'
WREF 4	End	13:15:58	200907.6	41° 16.1140'	72° 09.3094'
WREF 4	Start	13:31:25	201009.3	41° 16.1710'	72° 09.7281'
WREF 4	End	13:37:00	200950.1	41° 16.1370'	72° 09.3234'
WREF 4	Start	13:56:20	200825.4	41° 16.0697'	72° 09.3311'

Actual ELDS Benthic Drag Locations

Sample ID	Line	Time	Northing	Latitude (N)	Longitude (W)
WREF 4	End	14:01:25	200462.4	41° 15.8734'	72° 09.3123'
WREF 4	Start	14:22:26	201108.1	41° 16.2246'	72° 09.7572'
WREF 4	End	14:30:47	201068.2	41° 16.2004'	72° 09.2433'

Notes:

1. Grid coordinates are NAD_1983_StatePlane_Connecticut_FIPS_0600_Meters
2. Geographic coordinates are NAD83 degree decimal minute

Appendix C

Sediment Profile Image and Plan View Data

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New England District

SEDIMENT-PROFILE IMAGE ANALYSIS RESULTS

Station	Replicate	Date	Time	Water Depth (m)	Penetration Minimum (cm)	Penetration Maximum (cm)	Penetration Mean (cm)	Boundary Roughness (cm)	Boundary Roughness Type	Grain-Size Major Mode (Phi)	Grain-Size Minimum *(Phi)	Grain-Size Maximum (Phi)
ELDS01	A	10/28/2017	16:54:57	19	0	0.2	0.1	0.2	Physical	3 to 1	>4	-1 to -2
ELDS01	B	10/28/2017	16:56:42	19	0	0	0	0	Physical	3 to 1	>4	2 to 1
ELDS01	C	10/28/2017	16:59:12	19	0.2	1	0.6	0.8	Physical	3 to 1	>4	2 to 1
ELDS02	A	10/28/2017	17:04:20	22	2.9	3.4	3.1	0.5	Physical	3 to 1	>4	-1 to -2
ELDS02	B	10/28/2017	17:05:08	22	10.9	11.9	11.4	1	Physical	3 to 1	>4	- 2 to -6
ELDS02	C	10/28/2017	17:08:28	22	0.7	1.7	1.2	1	Physical	3 to 1	>4	- 2 to -6
ELDS03	A	10/28/2017	17:12:53	23	3.1	3.4	3.2	0.3	Physical	2 to -1	>4	- 2 to -6
ELDS03	B	10/28/2017	17:15:46	23	4.3	5.4	4.9	1.1	Physical	2 to -1	>4	- 2 to -6
ELDS03	C	10/28/2017	17:16:52	23	5.5	6.6	6.1	1.1	Physical	2 to -1	>4	- 2 to -6
ELDS04	A	10/28/2017	17:21:31	23	4.5	5.2	4.9	0.6	Physical	3 to 1	>4	- 2 to -6
ELDS04	B	10/28/2017	17:22:22	23	2.8	4.3	3.6	1.5	Physical	3 to 1	>4	- 2 to -6
ELDS04	C	10/28/2017	17:24:32	23	1.4	2.6	2	1.2	Physical	3 to 1	>4	- 2 to -6
ELDS05	A	10/28/2017	14:18:27	21	3.2	4.3	3.8	1.1	Physical	2 to -1	4 to 2	-1 to -2
ELDS05	B	10/28/2017	14:19:21	21	4.9	7.6	6.3	2.7	Physical	2 to -1	>4	-1 to -2
ELDS05	C	10/28/2017	14:20:08	21	3.4	5.4	4.4	2	Physical	2 to -1	>4	-1 to -2
ELDS06	A	10/28/2017	14:24:26	19	3.5	5.1	4.3	1.7	Physical	2 to -1	4 to 2	-1 to -2
ELDS06	B	10/28/2017	14:27:01	19	4.7	5.7	5.2	1	Physical	2 to -1	4 to 2	-1 to -2
ELDS06	C	10/28/2017	14:27:47	19	7.3	10	8.7	2.8	Physical	2 to -1	4 to 2	-1 to -2
ELDS07	A	10/28/2017	16:48:01	23	0.9	1.2	1	0.3	Physical	3 to 1	>4	-1 to -2
ELDS07	B	10/28/2017	16:50:06	23	4.5	5.1	4.8	0.6	Physical	3 to 1	>4	-1 to -2
ELDS07	C	10/28/2017	16:51:20	23	1.6	2.7	2.2	1.1	Physical	3 to 1	>4	-1 to -2
ELDS08	A	10/28/2017	16:41:21	23	0.5	1.5	1	1.1	Physical	3 to 1	>4	-1 to -2
ELDS08	B	10/28/2017	16:43:13	23	0.7	1.5	1.1	0.8	Physical	3 to 1	>4	-1 to -2
ELDS08	C	10/28/2017	16:43:55	23	1.8	2.8	2.3	0.9	Physical	3 to 1	>4	-1 to -2
ELDS09	A	10/28/2017	16:34:39	23	7.8	9.6	8.7	1.8	Physical	3 to 1	>4	-1 to -2
ELDS09	B	10/28/2017	16:35:28	23	4.5	6.3	5.4	1.8	Physical	3 to 1	>4	-1 to -2
ELDS09	C	10/28/2017	16:37:31	23	3.2	4.6	3.9	1.3	Physical	3 to 1	>4	-1 to -2
ELDS10	A	10/28/2017	16:10:43	22	6.3	8.4	7.4	2	Physical	2 to -1	>4	-1 to -2
ELDS10	B	10/28/2017	16:12:43	22	2.6	3.5	3	0.9	Physical	2 to -1	>4	-1 to -2
ELDS10	D	10/28/2017	16:24:43	22	13.1	14.5	13.8	1.3	Physical	2 to -1	>4	-1 to -2
ELDS11	A	10/28/2017	14:09:34	21	9	10.4	9.7	1.4	Physical	3 to 1	>4	-1 to -2
ELDS11	B	10/28/2017	14:11:14	21	4.9	5.7	5.3	0.8	Physical	3 to 1	>4	-1 to -2
ELDS11	C	10/28/2017	14:11:58	21	3	3.8	3.4	0.8	Physical	3 to 1	>4	-1 to -2
ELDS12	A	10/28/2017	14:01:03	21	2.4	2.7	2.5	0.3	Physical	3 to 1	>4	-1 to -2
ELDS12	B	10/28/2017	14:01:53	21	6.1	8.5	7.3	2.4	Physical	3 to 1	>4	-1 to -2
ELDS12	C	10/28/2017	14:04:09	21	3.6	4.3	3.9	0.7	Physical	3 to 1	>4	-1 to -2
ELDS13	A	10/28/2017	13:54:25	21	8.8	9.5	9.2	0.7	Physical	3 to 1	>4	- 2 to -6

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Station	Replicate	Date	Time	Water Depth (m)	Penetration Minimum (cm)	Penetration Maximum (cm)	Penetration Mean (cm)	Boundary Roughness (cm)	Boundary Roughness Type	Grain-Size Major Mode (Phi)	Grain-Size Minimum *(Phi)	Grain-Size Maximum (Phi)
ELDS13	B	10/28/2017	13:55:01	21	2.4	3	2.7	0.5	Physical	2 to -1	>4	- 2 to -6
ELDS13	C	10/28/2017	13:55:50	21	5.8	8	6.9	2.2	Physical	3 to 1	>4	-1 to -2
ELDS14	A	10/28/2017	15:23:48	21	3.8	4.6	4.2	0.8	Physical	3 to 1	>4	-1 to -2
ELDS14	B	10/28/2017	15:27:01	21	3.5	6.9	5.2	3.4	Physical	3 to 1	>4	-1 to -2
ELDS14	C	10/28/2017	15:29:54	21	1.3	2.2	1.8	0.9	Physical	3 to 1	>4	-1 to -2
ELDS15	A	10/28/2017	15:35:47	23	3.8	4.2	4	0.4	Physical	3 to 1	>4	-1 to -2
ELDS15	B	10/28/2017	15:36:40	23	9.2	11.7	10.4	2.5	Physical	3 to 1	>4	-1 to -2
ELDS15	C	10/28/2017	15:38:30	23	11.8	13	12.4	1.3	Physical	3 to 1	>4	-1 to -2
ELDS16	A	10/28/2017	15:44:11	23	2.1	2.7	2.4	0.7	Physical	3 to 1	>4	-1 to -2
ELDS16	B	10/28/2017	15:45:07	23	5	6	5.5	1.1	Physical	3 to 1	>4	-1 to -2
ELDS16	C	10/28/2017	15:47:42	23	8.2	10.4	9.3	2.2	Physical	3 to 1	>4	- 2 to -6
ELDS17	A	10/28/2017	15:52:39	23	5	6	5.5	1	Physical	3 to 1	>4	- 2 to -6
ELDS17	B	10/28/2017	15:55:51	23	0.4	2	1.2	1.7	Physical	3 to 1	>4	-1 to -2
ELDS17	C	10/28/2017	15:56:46	23	7	9	8	2	Physical	3 to 1	>4	-1 to -2
ELDS18	A	10/28/2017	16:01:36	23	6.1	7.8	6.9	1.7	Physical	3 to 1	4 to 2	-1 to -2
ELDS18	B	10/28/2017	16:02:22	23	6.3	8.4	7.3	2	Physical	3 to 1	>4	-1 to -2
ELDS18	C	10/28/2017	16:04:15	23	3.9	9.4	6.6	5.5	Physical	3 to 1	>4	-1 to -2
ELDS19	A	10/28/2017	13:41:35	28	4.4	5.7	5.1	1.3	Physical	3 to 1	>4	-1 to -2
ELDS19	B	10/28/2017	13:42:22	28	3.2	4.4	3.8	1.2	Physical	3 to 1	>4	-1 to -2
ELDS19	C	10/28/2017	13:43:17	28	4	6.5	5.2	2.5	Physical	3 to 1	>4	-1 to -2
ELDS20	A	10/28/2017	13:47:43	16	2.8	3.7	3.3	0.9	Physical	3 to 1	4 to 2	- 2 to -6
ELDS20	B	10/28/2017	13:48:32	16	3	5.6	4.3	2.6	Physical	3 to 1	4 to 2	-1 to -2
ELDS20	C	10/28/2017	13:50:28	26	5	7.2	6.1	2.2	Physical	3 to 1	4 to 2	- 2 to -6
ELDS21	A	10/28/2017	15:16:22	20	2.6	3.4	3	0.8	Physical	3 to 1	>4	- 2 to -6
ELDS21	B	10/28/2017	15:18:22	20	4.7	5.9	5.3	1.1	Physical	3 to 1	>4	- 2 to -6
ELDS21	C	10/28/2017	15:19:09	20	3.3	4.3	3.8	1	Physical	3 to 1	>4	- 2 to -6
ELDS22	A	10/28/2017	15:09:44	22	3.6	4.8	4.2	1.2	Physical	3 to 1	>4	-1 to -2
ELDS22	B	10/28/2017	15:10:23	22	3.8	4.4	4.1	0.6	Physical	3 to 1	>4	- 2 to -6
ELDS22	C	10/28/2017	15:11:57	22	3.7	4.6	4.2	0.9	Physical	3 to 1	>4	- 2 to -6
ELDS23	A	10/28/2017	14:59:39	21	2.7	3.7	3.2	1	Physical	3 to 1	>4	-1 to -2
ELDS23	B	10/28/2017	15:01:16	21	6.2	7.1	6.7	0.9	Physical	3 to 1	>4	-1 to -2
ELDS23	C	10/28/2017	15:05:05	21	4.7	5.9	5.3	1.2	Physical	3 to 1	>4	-1 to -2
ELDS24	A	10/28/2017	14:50:43	21	8.8	10	9.4	1.2	Physical	3 to 1	>4	-1 to -2
ELDS24	B	10/28/2017	14:52:22	21	7.4	8.2	7.8	0.8	Physical	3 to 1	>4	-1 to -2
ELDS24	C	10/28/2017	14:54:24	21	7.3	8	7.6	0.7	Physical	3 to 1	>4	- 2 to -6
ELDS25	A	10/28/2017	14:41:31	21	5.7	6.8	6.3	1.1	Physical	3 to 1	>4	-1 to -2
ELDS25	B	10/28/2017	14:43:39	21	3.4	4.2	3.8	0.9	Physical	3 to 1	>4	-1 to -2
ELDS25	C	10/28/2017	14:45:58	21	8	10.8	9.4	2.8	Physical	3 to 1	>4	-1 to -2
ELDS26	A	10/28/2017	13:07:16	17	1.4	2	1.7	0.6	Physical	3 to 1	>4	-1 to -2

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ELDS26	B	10/28/2017	13:08:08	17	2.7	3.6	3.1	0.9	Physical	3 to 1	>4	-1 to -2
ELDS26	C	10/28/2017	13:09:12	17	2.6	4.4	3.5	1.8	Physical	3 to 1	>4	- 2 to -6
ELDS27	A	10/28/2017	13:00:13	23	1.6	2.8	2.2	1.3	Physical	3 to 1	>4	-1 to -2
ELDS27	B	10/28/2017	13:00:58	23	1.8	3	2.4	1.2	Physical	3 to 1	>4	-1 to -2
ELDS27	C	10/28/2017	13:01:50	23	3.1	3.8	3.5	0.7	Physical	3 to 1	>4	- 2 to -6
ELDS28	A	10/28/2017	12:53:40	23	1.7	2.2	2	0.5	Physical	3 to 1	>4	-1 to -2
ELDS28	B	10/28/2017	12:54:39	23	2.2	2.7	2.4	0.4	Physical	3 to 1	>4	-1 to -2
ELDS28	C	10/28/2017	12:55:19	23	7.2	7.7	7.5	0.5	Physical	3 to 1	>4	-1 to -2
ELDS29	A	10/28/2017	11:18:16	22	0	0	0	0	Physical	2 to 1	4 to 2	-1 to -2
ELDS29	B	10/28/2017	11:20:24	22	12.2	12.3	12.2	0.2	Physical	2 to -1	4 to 2	-1 to -2
ELDS29	C	10/28/2017	11:22:17	22	8.1	9.6	8.8	1.6	Physical	2 to -1	4 to 2	-1 to -2
ELDS30	A	10/28/2017	11:26:51	23	2.4	2.9	2.7	0.5	Physical	2 to -1	4 to 2	-1 to -2
ELDS30	C	10/28/2017	11:30:19	23	3.9	4.9	4.4	1	Physical	2 to -1	4 to 2	-1 to -2
ELDS30	D	10/28/2017	11:31:55	23	2.3	3.1	2.7	0.8	Physical	2 to -1	4 to 2	-1 to -2
ELDS31	A	10/28/2017	11:38:35	23	3.5	4.5	4	1	Physical	2 to -1	>4	-1 to -2
ELDS31	B	10/28/2017	11:40:51	23	3.9	4.2	4	0.3	Physical	2 to -1	>4	-1 to -2
ELDS31	C	10/28/2017	11:44:07	23	2.9	3.6	3.3	0.7	Physical	2 to -1	>4	-1 to -2
ELDS32	A	10/28/2017	12:04:34	24	8.1	10.5	9.3	2.4	Physical	3 to 1	>4	-1 to -2
ELDS32	B	10/28/2017	12:05:20	24	12.8	13.7	13.3	0.9	Physical	3 to 1	>4	-1 to -2
ELDS32	C	10/28/2017	12:08:03	24	4.4	5.1	4.8	0.7	Physical	3 to 1	4 to 2	-1 to -2
ELDS33	A	10/28/2017	12:12:30	23	6.6	8.1	7.3	1.4	Physical	3 to 1	4 to 2	-1 to -2
ELDS33	B	10/28/2017	12:15:41	23	7.8	8.3	8	0.4	Physical	3 to 1	4 to 2	-1 to -2
ELDS33	C	10/28/2017	12:16:26	23	1.5	3.8	2.6	2.3	Physical	3 to 1	4 to 2	-1 to -2
ELDS34	A	10/28/2017	12:20:03	21	7.7	8.1	7.9	0.4	Physical	3 to 1	>4	- 2 to -6
ELDS34	B	10/28/2017	12:23:27	21	7.5	8.6	8	1	Physical	3 to 1	>4	- 2 to -6
ELDS34	C	10/28/2017	12:24:06	21	6.5	7.8	7.2	1.3	Physical	3 to 1	>4	- 2 to -6
ELDS35	A	10/28/2017	12:27:36	20	3.4	5.8	4.6	2.4	Physical	3 to 1	>4	- 2 to -6
ELDS35	B	10/28/2017	12:28:19	20	3.9	4.7	4.3	0.8	Physical	3 to 1	>4	-1 to -2
ELDS35	C	10/28/2017	12:30:56	20	6.3	7.8	7	1.5	Physical	3 to 1	>4	-1 to -2
ELDS36	A	10/28/2017	12:36:06	19	6.5	7.6	7.1	1.1	Physical	3 to 1	>4	- 2 to -6
ELDS36	B	10/28/2017	12:37:13	19	3.8	4.4	4.1	0.6	Physical	3 to 1	>4	- 2 to -6
ELDS36	C	10/28/2017	12:39:14	19	4.1	4.7	4.4	0.6	Physical	3 to 1	>4	-1 to -2
ELDS37	A	10/28/2017	12:43:30	20	5.8	6.7	6.3	0.9	Physical	3 to 1	>4	- 2 to -6
ELDS37	B	10/28/2017	12:46:43	20	4.4	5.2	4.8	0.7	Physical	3 to 1	>4	-1 to -2
ELDS37	C	10/28/2017	12:47:38	20	3.3	5.3	4.3	2	Physical	3 to 1	>4	-1 to -2
ELDS38	A	10/28/2017	11:04:55	27	0.6	1.1	0.8	0.5	Physical	2 to -1	4 to 2	-1 to -2
ELDS38	B	10/28/2017	11:06:48	27	2.9	4.5	3.7	1.6	Physical	2 to -1	4 to 2	-1 to -2
ELDS38	C	10/28/2017	11:10:20	27	4	4.6	4.3	0.6	Physical	2 to -1	4 to 2	-1 to -2
ELDS39	A	10/28/2017	10:55:38	25	0	0.7	0.3	0.7	Physical	2 to -1	4 to 2	-1 to -2

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ELDS39	B	10/28/2017	10:57:22	25	0	0.6	0.3	0.6	Physical	2 to -1	4 to 2	-1 to -2
ELDS39	C	10/28/2017	10:59:04	25	0.3	1.1	0.7	0.8	Physical	2 to -1	4 to 2	-1 to -2
ELDS40	A	10/28/2017	10:45:22	31	4.7	6.6	5.6	1.9	Physical	3 to 1	4 to 2	-1 to -2
ELDS40	B	10/28/2017	10:47:37	31	2.4	4.6	3.5	2.3	Physical	3 to 1	4 to 2	-1 to -2
ELDS40	C	10/28/2017	10:49:31	31	2	2.5	2.3	0.5	Physical	3 to 1	4 to 2	-1 to -2
ELDS41	A	10/28/2017	10:28:14	31	1.9	3.7	2.8	1.8	Physical	3 to 1	>4	-1 to -2
ELDS41	B	10/28/2017	10:30:16	31	3.1	4.5	3.8	1.5	Physical	3 to 1	>4	- 2 to -6
ELDS41	C	10/28/2017	10:32:15	32	1.6	2.6	2.1	1	Physical	3 to 1	>4	-1 to -2
ELDS42	A	10/28/2017	10:16:13	24	2.4	3.6	3	1.2	Physical	3 to 1	>4	-1 to -2
ELDS42	B	10/28/2017	10:19:21	24	3.9	4.7	4.3	0.8	Physical	3 to 1	>4	-1 to -2
ELDS42	C	10/28/2017	10:22:52	24	0.9	1.4	1.2	0.5	Physical	3 to 1	>4	- 2 to -6
ELDS43	A	10/28/2017	10:03:55	20	2.1	2.7	2.4	0.6	Physical	3 to 1	>4	-1 to -2
ELDS43	B	10/28/2017	10:07:00	20	0.7	1.7	1.2	1	Physical	3 to 1	>4	- 2 to -6
ELDS43	C	10/28/2017	10:09:01	20	3.1	3.5	3.3	0.5	Physical	3 to 1	>4	-1 to -2
ELDS44	A	10/28/2017	9:54:32	19	1.6	2.8	2.2	1.2	Physical	3 to 1	>4	-1 to -2
ELDS44	B	10/28/2017	9:57:34	19	1.9	2.5	2.2	0.6	Physical	3 to 1	>4	-1 to -2
ELDS44	C	10/28/2017	9:58:23	19	0.8	2.5	1.6	1.6	Physical	3 to 1	>4	- 2 to -6
ELDS45	A	10/28/2017	9:31:59	20	3.5	4.1	3.8	0.7	Physical	3 to 1	>4	-1 to -2
ELDS45	D	10/28/2017	9:36:47	20	1.9	2.2	2.1	0.3	Physical	3 to 1	>4	- 2 to -6
ELDS45	E	10/28/2017	9:44:33	20	1.9	3.7	2.8	1.8	Physical	3 to 1	>4	-1 to -2
NEREF-1	A	10/28/2017	18:02:28	15	6.7	6.8	6.8	0.1	Physical	4 to 2	>4	2 to 1
NEREF-1	B	10/28/2017	18:03:24	15	4.1	6.6	5.3	2.5	Physical	4 to 2	>4	2 to 1
NEREF-1	C	10/28/2017	18:04:21	15	3.3	4.6	3.9	1.3	Physical	4 to 2	>4	2 to 1
NEREF-2	A	10/28/2017	17:55:53	15	5.4	6.5	6	1.1	Physical	4 to 2	>4	2 to 1
NEREF-2	B	10/28/2017	17:57:11	15	6.2	8.2	7.2	2.1	Physical	4 to 2	>4	2 to 1
NEREF-2	C	10/28/2017	17:58:57	15	3.1	4.9	4	1.7	Physical	4 to 2	>4	2 to 1
NEREF-3	A	10/28/2017	17:41:09	16	4.9	5.9	5.4	1.1	Physical	4 to 2	>4	2 to 1
NEREF-3	B	10/28/2017	17:41:55	16	1	2.7	1.8	1.7	Physical	4 to 2	>4	-1 to -2
NEREF-3	C	10/28/2017	17:42:42	16	7	9.3	8.1	2.3	Physical	4 to 2	>4	2 to 1
NEREF-4	A	10/28/2017	17:46:16	15	3.2	4.4	3.8	1.2	Physical	4 to 2	>4	2 to 1
NEREF-4	B	10/28/2017	17:47:02	15	6.2	8.4	7.3	2.3	Physical	4 to 2	>4	2 to 1
NEREF-4	C	10/28/2017	17:47:45	15	6	7	6.5	1	Physical	4 to 2	>4	2 to 1
NEREF-5	A	10/28/2017	17:50:46	15	4.7	6.2	5.5	1.5	Physical	4 to 2	>4	2 to 1
NEREF-5	B	10/28/2017	17:51:41	15	3.5	4.6	4	1	Physical	4 to 2	>4	2 to 1
NEREF-5	C	10/28/2017	17:52:31	15	3.7	5.1	4.4	1.4	Physical	4 to 2	>4	2 to 1
SEREF-1	A	10/29/2017	9:23:28	24	0.4	1.3	0.8	0.9	Physical	3 to 1	>4	-1 to -2
SEREF-1	B	10/29/2017	9:24:55	24	1.2	3.1	2.2	1.8	Physical	3 to 1	>4	-1 to -2
SEREF-1	E	10/29/2017	9:34:40	24	0	0.8	0.4	0.8	Physical	3 to 1	>4	-1 to -2
SEREF-2	A	10/29/2017	9:16:36	27	2.2	2.6	2.4	0.4	Physical	3 to 1	>4	-1 to -2

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Station	Replicate	Date	Time	Water Depth (m)	Penetration Minimum (cm)	Penetration Maximum (cm)	Penetration Mean (cm)	Boundary Roughness (cm)	Boundary Roughness Type	Grain-Size Major Mode (Phi)	Grain-Size Minimum *(Phi)	Grain-Size Maximum (Phi)
SEREF-2	B	10/29/2017	9:18:03	27	0.4	2.1	1.2	1.8	Physical	2 to -1	>4	-1 to -2
SEREF-2	C	10/29/2017	9:19:36	27	0	1.8	0.9	1.8	Physical	2 to -1	>4	-1 to -2
SEREF-3	A	10/29/2017	9:11:37	23	0	0.5	0.2	0.5	Physical	2 to -1	>4	-1 to -2
SEREF-3	B	10/29/2017	9:12:29	23	0.6	2.2	1.4	1.6	Physical	3 to 1	>4	-1 to -2
SEREF-3	C	10/29/2017	9:13:17	23	0	0.3	0.2	0.3	Physical	3 to 1	>4	- 2 to -6
SEREF-4X	A	10/29/2017	9:01:22	27	0.6	1.8	1.2	1.2	Physical	2 to -1	>4	-1 to -2
SEREF-4X	C	10/29/2017	9:04:24	27	0.8	2.9	1.9	2.1	Physical	2 to -1	>4	-1 to -2
SEREF-4X	D	10/29/2017	9:07:00	27	0.5	2.2	1.4	1.7	Physical	2 to -1	>4	-1 to -2
SEREF-5	A	10/29/2017	8:53:23	24	3.3	5.6	4.5	2.3	Physical	2 to -1	>4	-1 to -2
SEREF-5	C	10/29/2017	8:56:00	24	1.8	4	2.9	2.2	Physical	2 to -1	>4	-1 to -2
SEREF-5	D	10/29/2017	8:56:43	24	1.6	2.7	2.2	1.1	Physical	2 to -1	>4	-1 to -2
WREF-1	A	10/29/2017	8:18:16	36	5.1	5.5	5.3	0.4	Physical	3 to 1	>4	-1 to -2
WREF-1	B	10/29/2017	8:19:52	36	5.9	6.3	6.1	0.4	Physical	3 to 1	>4	- 2 to -6
WREF-1	C	10/29/2017	8:21:23	36	2.4	3.2	2.8	0.8	Physical	3 to 1	>4	- 2 to -6
WREF-2X	A	10/29/2017	8:07:29	37	2.5	3.7	3.1	1.1	Physical	3 to 1	>4	- 2 to -6
WREF-2X	B	10/29/2017	8:08:43	37	3	3.5	3.2	0.5	Physical	3 to 1	>4	-1 to -2
WREF-2X	C	10/29/2017	8:09:55	37	5.4	6.2	5.8	0.8	Physical	3 to 1	>4	-1 to -2
WREF-3	C	10/29/2017	7:52:26	36	0	0.6	0.3	0.6	Physical	2 to -1	>4	- 2 to -6
WREF-3	D	10/29/2017	7:53:24	36	0	0.5	0.2	0.5	Physical	2 to -1	>4	- 2 to -6
WREF-3	E	10/29/2017	7:54:06	36	0.9	2.8	1.9	1.8	Physical	2 to -1	>4	- 2 to -6
WREF-4	A	10/29/2017	7:44:32	38	4	5	4.5	1.1	Physical	2 to -1	>4	- 2 to -6
WREF-4	B	10/29/2017	7:45:33	38	9.4	10.6	10	1.2	Physical	2 to -1	>4	- 2 to -6
WREF-4	C	10/29/2017	7:46:18	38	4.5	5.8	5.1	1.4	Physical	2 to -1	>4	- 2 to -6
WREF-5	A	10/29/2017	7:59:30	29	4.1	4.7	4.4	0.5	Physical	2 to -1	>4	- 2 to -6
WREF-5	B	10/29/2017	8:00:46	29	5.2	6.1	5.6	1	Physical	2 to -1	>4	-1 to -2
WREF-5	C	10/29/2017	8:01:54	29	4.1	5.4	4.7	1.3	Physical	2 to -1	>4	- 2 to -6

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Station	Replicate	Grain-Size Comment	Tubes (#/imgae)	Burows (#/ikmage)
ELDS01	A	No penetration, Trace of silt-clay on surface	1 to 5	
ELDS01	B	Fine Shell Hash	1 to 5	
ELDS01	C	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	
ELDS02	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS02	B	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS02	C	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS03	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS03	B	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS03	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS04	A	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS04	B	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS04	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS05	A	Shell and Shell Hash	6 to 20	0
ELDS05	B	Trace of silt-clay on surface, Shell Hash	6 to 20	0
ELDS05	C	Trace of silt-clay on surface, Shell and Shell Hash	0	0
ELDS06	A	Shell and Shell Hash	1 to 5	0
ELDS06	B	Shell and Shell Hash	6 to 20	0
ELDS06	C	Shell and Shell Hash	>20	0
ELDS07	A	Trace of silt-clay on surface, Shell Hash	1 to 5	0
ELDS07	B	Trace of silt-clay on surface, Shell Hash	6 to 20	0
ELDS07	C	Trace of silt-clay on surface, Shell Hash	6 to 20	0
ELDS08	A	Trace of silt-clay on surface, Shell and Shell Hash	1 to 5	0
ELDS08	B	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS08	C	Trace of silt-clay on surface, Shell Hash	6 to 20	0
ELDS09	A	Trace of silt-clay on surface, Shell Hash	0	0
ELDS09	B	Trace of silt-clay on surface, Shell and Shell Hash	0	0
ELDS09	C	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS10	A	Trace of silt-clay on surface, Shell Hash	1 to 5	0
ELDS10	B	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS10	D	Trace of silt-clay on surface, Shell Hash	6 to 20	0
ELDS11	A	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS11	B	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS11	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS12	A	Trace of silt-clay on surface, Shell Hash	6 to 20	0
ELDS12	B	Trace of silt-clay on surface, Shell Hash	6 to 20	0
ELDS12	C	Trace of silt-clay on surface, Shell Hash	6 to 20	0
ELDS13	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS13	B	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS13	C	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS14	A	Trace of silt-clay on surface, Shell Hash	6 to 20	0
ELDS14	B	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS14	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS15	A	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS15	B	Trace of silt-clay on surface, Shell and Shell Hash	1 to 5	0
ELDS15	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS16	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS16	B	Trace of silt-clay on surface, Shell and Shell Hash	1 to 5	0
ELDS16	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS17	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS17	B	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS17	C	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS18	A	Shell and Shell Hash	6 to 20	0
ELDS18	B	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS18	C	Trace of silt-clay on surface, Shell and Shell Hash	0	0
ELDS19	A	Trace of silt-clay on surface, Shell Hash	1 to 5	0
ELDS19	B	Trace of silt-clay on surface, Shell Hash	1 to 5	0
ELDS19	C	Trace of silt-clay on surface, Shell Hash	1 to 5	0
ELDS20	A	Shell and Shell Hash	1 to 5	0
ELDS20	B	Shell and Shell Hash	1 to 5	0
ELDS20	C	Shell and Shell Hash	1 to 5	0
ELDS21	A	Trace of silt-clay on surface, Shell and Shell Hash	0	0

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Station	Replicate	Grain-Size Comment	Tubes (#/imgae)	Burows (#/ikmage)
ELDS21	B	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS21	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS22	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS22	B	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS22	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS23	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS23	B	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS23	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS24	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS24	B	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS24	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS25	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS25	B	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS25	C	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS26	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS26	B	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS26	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS27	A	Trace of silt-clay on surface, Shell Hash	0	0
ELDS27	B	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS27	C	Trace of silt-clay on surface, Shell Hash	1 to 5	0
ELDS28	A	Trace of silt-clay on surface, Shell Hash	1 to 5	0
ELDS28	B	Trace of silt-clay on surface, Shell Hash	1 to 5	0
ELDS28	C	Trace of silt-clay on surface, Shell Hash	6 to 20	0
ELDS29	A	Shell Hash	0	
ELDS29	B	Shell Hash	0	0
ELDS29	C	Shell Hash	0	0
ELDS30	A	Shell Hash	0	0
ELDS30	C	Shell and Shell Hash	6 to 20	0
ELDS30	D	Shell Hash	0	0
ELDS31	A	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS31	B	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS31	C	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS32	A	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS32	B	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS32	C	Shell and Shell Hash	6 to 20	0
ELDS33	A	Shell and Shell Hash	6 to 20	0
ELDS33	B	Shell and Shell Hash	6 to 20	0
ELDS33	C	Shell and Shell Hash	>20	0
ELDS34	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS34	B	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS34	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS35	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS35	B	Trace of silt-clay on surface, Shell and Shell Hash	0	0
ELDS35	C	Trace of silt-clay on surface, Shell Hash	6 to 20	0
ELDS36	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS36	B	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS36	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS37	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS37	B	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS37	C	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS38	A	Shell and Shell Hash	6 to 20	
ELDS38	B	Shell and Shell Hash	6 to 20	0
ELDS38	C	Shell and Shell Hash	6 to 20	0
ELDS39	A	Shell and Shell Hash	1 to 5	
ELDS39	B	Shell and Shell Hash	0	
ELDS39	C	Shell and Shell Hash	6 to 20	
ELDS40	A	Shell Hash	1 to 5	0
ELDS40	B	Shell Hash	0	0
ELDS40	C	Shell and Shell Hash	0	0
ELDS41	A	Trace of silt-clay on surface, Shell Hash	0	0
ELDS41	B	Trace of silt-clay on surface, Shell Hash	0	0

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Station	Replicate	Grain-Size Comment	Tubes (#/imgae)	Burows (#/ikmage)
ELDS41	C	Trace of silt-clay on surface, Shell Hash	1 to 5	0
ELDS42	A	Trace of silt-clay on surface, Shell Hash	0	0
ELDS42	B	Trace of silt-clay on surface, Shell Hash	1 to 5	0
ELDS42	C	Trace of silt-clay on surface, Shell Hash	1 to 5	0
ELDS43	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS43	B	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS43	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS44	A	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	0
ELDS44	B	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS44	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
ELDS45	A	Trace of silt-clay on surface, Shell and Shell Hash	1 to 5	0
ELDS45	D	Trace of silt-clay on surface, Shell Hash	6 to 20	0
ELDS45	E	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
NEREF-1	A	Trace of silt-clay on surface, Small amount of Shell Hash	6 to 20	0
NEREF-1	B	Trace of silt-clay on surface, Small amount of Shell Hash	6 to 20	0
NEREF-1	C	Trace of silt-clay on surface, Small amount of Shell Hash	6 to 20	0
NEREF-2	A	Trace of silt-clay on surface, Small amount of Shell Hash	6 to 20	0
NEREF-2	B	Trace of silt-clay on surface, Small amount of Shell Hash	6 to 20	0
NEREF-2	C	Trace of silt-clay on surface, Small amount of Shell Hash	6 to 20	0
NEREF-3	A	Trace of silt-clay on surface, Small amount of Shell Hash	1 to 5	0
NEREF-3	B	Trace of silt-clay on surface, Small amount of Shell Hash	1 to 5	0
NEREF-3	C	Trace of silt-clay on surface, Small amount of Shell Hash	1 to 5	0
NEREF-4	A	Trace of silt-clay on surface, Small amount of Shell Hash	1 to 5	0
NEREF-4	B	Trace of silt-clay on surface, Small amount of Shell Hash	1 to 5	0
NEREF-4	C	Trace of silt-clay on surface, Small amount of Shell Hash	6 to 20	0
NEREF-5	A	Trace of silt-clay on surface, Small amount of Shell Hash	1 to 5	0
NEREF-5	B	Trace of silt-clay on surface, Small amount of Shell Hash	1 to 5	0
NEREF-5	C	Trace of silt-clay on surface, Small amount of Shell Hash	1 to 5	0
SEREF-1	A	Trace of silt-clay on surface, Shell Hash	0	
SEREF-1	B	Trace of silt-clay on surface, Shell Hash	0	0
SEREF-1	E	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	
SEREF-2	A	Shell Hash	6 to 20	0
SEREF-2	B	Shell Hash	0	0
SEREF-2	C	Shell Hash	0	
SEREF-3	A	Trace of silt-clay on surface, Shell Hash	0	
SEREF-3	B	Trace of silt-clay on surface, Shell Hash	6 to 20	0
SEREF-3	C	Trace of silt-clay on surface, Shell and Shell Hash	6 to 20	
SEREF-4X	A	Shell Hash	1 to 5	0
SEREF-4X	C	Shell and Shell Hash	0	0
SEREF-4X	D	Shell Hash	0	0
SEREF-5	A	Shell Hash	0	0
SEREF-5	C	Shell Hash	0	0
SEREF-5	D	Shell Hash	0	0
WREF-1	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
WREF-1	B	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
WREF-1	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
WREF-2X	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
WREF-2X	B	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
WREF-2X	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
WREF-3	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	
WREF-3	D	Trace of silt-clay on surface, Shell and Shell Hash	>20	
WREF-3	E	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
WREF-4	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
WREF-4	B	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
WREF-4	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
WREF-5	A	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
WREF-5	B	Trace of silt-clay on surface, Shell and Shell Hash	>20	0
WREF-5	C	Trace of silt-clay on surface, Shell and Shell Hash	>20	0

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PLAN VIEW ANALYSIS RESULTS

Station	Replicate	Image Area (m2)	Surface Sediment Type	Bedforms	Burrow Openings	Tubes	Comment
ELDS01	**A**	0.1	Thin silt-clay layer over sand	-	+	+	
ELDS01	**B**						No Image
ELDS01	**C**	0.1	Thin silt-clay layer over sand and shell	-	+	+	
ELDS02	**A**	0.1	Thin silt-clay layer over sand and shell	-	-	+	Eel grass detritus
ELDS02	**B**	0.1	Thin silt-clay layer over sand and shell	-	-	+	
ELDS02	**C**	0.1	Thin silt-clay layer over sand and shell	-	-	+	
ELDS03	**A**	0.1	Thin silt-clay layer over sand and shell	-	-	+	High turbidity
ELDS03	**B**	0.1	Thin silt-clay layer over sand and shell	-	-	+	High turbidity
ELDS03	**C**	0.1	Thin silt-clay layer over sand and shell	-	-	+	High turbidity
ELDS04	**A**	0.1	Thin silt-clay layer over sand and shell	-	-	+	High turbidity
ELDS04	**B**	0.1	Thin silt-clay layer over sand and shell	-	-	+	Eel grass detritus
ELDS04	**C**	0.1	Thin silt-clay layer over sand and shell	-	-	-	High turbidity
ELDS05	**A**	0.1	Medium-coarse sand with shell hash	Asymmetric	+	+	
ELDS05	**B**	0.1	Medium-coarse sand with shell hash	Asymmetric	+	+	
ELDS05	**C**	0.1	Medium-coarse sand with shell hash	Asymmetric	+	+	
ELDS06	**A**	0.1	Medium-coarse sand with shell hash	-	+	+	
ELDS06	**B**	0.1	Medium-coarse sand with shell hash	Asymmetric	+	+	
ELDS06	**C**	0.1	Medium-coarse sand with shell hash	Asymmetric	+	+	
ELDS07	**A**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	
ELDS07	**B**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	
ELDS07	**C**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	
ELDS08	**A**	0.1	Thin silt-clay layer over sand	-	-	+	
ELDS08	**B**	0.1	Thin silt-clay layer over sand	-	-	+	
ELDS08	**C**	0.1	Thin silt-clay layer over sand	-	-	+	
ELDS09	**A**	0.1	Thin silt-clay layer over sand	-	-	+	
ELDS09	**B**	0.1	Thin silt-clay layer over sand	-	+	+	Eel grass detritus
ELDS09	**C**	0.1	Thin silt-clay layer over sand	-	+	+	Eel grass detritus
ELDS09	**B**	0.1	Thin silt-clay layer over sand	-	+	+	Eel grass detritus
ELDS09	**C**	0.1	Thin silt-clay layer over sand	-	+	+	Eel grass detritus
ELDS10	**A**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	High turbidity
ELDS10	**B**	0.1	Thin silt-clay layer over sand	Asymmetric	-	-	High turbidity
ELDS10	**D**	0.1	Thin silt-clay layer over sand	Asymmetric	-	-	High turbidity
ELDS11	**A**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	High turbidity
ELDS11	**B**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	
ELDS11	**C**	0.1	Thin silt-clay layer over sand	-	-	+	
ELDS12	**A**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	
ELDS12	**B**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	
ELDS12	**C**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	
ELDS13	**A**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	
ELDS13	**B**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	
ELDS13	**C**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	
ELDS14	**A**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	
ELDS14	**B**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	
ELDS14	**C**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	
ELDS15	**A**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	
ELDS15	**B**	0.1	Thin silt-clay layer over sand	-	-	+	
ELDS15	**C**	0.1	Thin silt-clay layer over sand	-	-	+	
ELDS16	**A**	0.1	Thin silt-clay layer over sand	-	-	+	
ELDS16	**B**	0.1	Thin silt-clay layer over sand	-	-	+	
ELDS16	**C**	0.1	Thin silt-clay layer over sand	-	-	+	
ELDS17	**A**	0.1	Thin silt-clay layer over sand	-	-	+	Eel grass detritus
ELDS17	**B**	0.1	Thin silt-clay layer over sand	-	-	+	Eel grass detritus
ELDS17	**C**						No Image
ELDS18	**A**	0.1	Thin silt-clay layer over sand	-	-	+	
ELDS18	**B**						No Image
ELDS18	**C**						No Image
ELDS19	**A**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	
ELDS19	**B**	0.1	Thin silt-clay layer over sand	Asymmetric	+	-	
ELDS19	**C**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	
ELDS20	**A**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	
ELDS20	**B**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	
ELDS20	**C**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	
ELDS21	**A**	0.1	Medium-coarse sand with shell hash	-	-	+	
ELDS21	**B**	0.1	Medium-coarse sand with shell hash	-	-	+	
ELDS21	**C**	0.1	Medium-coarse sand with shell hash	-	-	+	
ELDS22	**A**	0.1	Medium-coarse sand with shell hash	-	-	+	Eel grass detritus
ELDS22	**B**	0.1	Medium-coarse sand with shell hash	-	-	+	Eel grass detritus
ELDS22	**A**	0.1	Medium-coarse sand with shell hash	-	-	+	Eel grass detritus
ELDS22	**B**	0.1	Medium-coarse sand with shell hash	-	-	+	Eel grass detritus
ELDS22	**C**	0.1	Medium-coarse sand with shell hash	-	-	+	
ELDS23	**A**	0.1	Medium-coarse sand with shell hash	-	-	+	
ELDS23	**B**	0.1	Medium-coarse sand with shell hash	-	-	+	Eel grass detritus
ELDS23	**C**	0.1	Medium-coarse sand with shell hash	-	-	+	
ELDS24	**A**	0.1	Medium-coarse sand with shell hash	-	-	+	Eel grass detritus
ELDS24	**B**	0.1	Thin silt-clay layer over sand and shell	-	-	+	
ELDS24	**C**	0.1	Medium-coarse sand with shell hash	-	-	+	
ELDS25	**A**	0.1	Medium-coarse sand with shell hash	-	-	+	
ELDS25	**B**	0.1	Medium-coarse sand with shell hash	-	-	+	
ELDS25	**C**	0.1	Medium-coarse sand with shell hash	-	-	+	
ELDS26	**A**	0.1	Medium-coarse sand with shell hash				High turbidity
ELDS26	**B**						No Image
ELDS26	**C**						No Image
ELDS27	**A**						No Image
ELDS27	**B**						No Image
ELDS27	**C**	0.1	Thin silt-clay layer over sand and shell	-	-	+	
ELDS28	**A**						No Image
ELDS28	**B**						No Image
ELDS28	**C**						No Image
ELDS29	**A**	0.1	Medium-coarse sand with shell hash	Asymmetric	-	-	
ELDS29	**B**	0.1	Medium-coarse sand with shell hash	Asymmetric	-	-	
ELDS29	**C**	0.1	Medium-coarse sand with shell hash	Asymmetric	-	-	
ELDS30	**A**	0.1	Medium-coarse sand with shell hash	Asymmetric	-	-	
ELDS30	**C**	0.06	Medium-coarse sand with shell hash	Asymmetric	-	-	
ELDS30	**D**	0.06	Medium-coarse sand with shell hash	Asymmetric	-	-	
ELDS31	**A**	0.04	Medium-coarse sand with shell hash	-	-	-	Camera out of alignment
ELDS31	**B**	0.04	Medium-coarse sand with shell hash	-	-	-	Camera out of alignment
ELDS31	**C**	0.04	Medium-coarse sand with shell hash	-	-	-	Camera out of alignment
ELDS32	**A**	0.1	Medium-coarse sand with shell hash	-	-	+	Eel grass detritus

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Station	Replicate	Image Area (m2)	Surface Sediment Type	Bedforms	Burrow Openings	Tubes	Comment
ELDS32	**B**	0.09	Medium-coarse sand with shell hash	-	-	+	High turbidity
ELDS32	**C**	0.1	Medium-coarse sand with shell hash	-	-	+	Eel grass detritus
ELDS33	**A**	0.1	Thin silt-clay layer over sand and shell	Asymmetric	-	+	
ELDS33	**B**	0.1	Thin silt-clay layer over sand and shell	Asymmetric	-	+	
ELDS33	**C**	0.09	Thin silt-clay layer over sand and shell	Asymmetric	-	+	
ELDS34	**A**	0.1	Thin silt-clay layer over sand and shell	-	-	+	
ELDS34	**B**	0.1	Thin silt-clay layer over sand and shell	-	-	+	
ELDS34	**C**	0.1	Thin silt-clay layer over sand and shell	-	-	+	
ELDS35	**A**	0.1	Thin silt-clay layer over sand and shell	-	-	+	Eel grass detritus
ELDS35	**B**	0.1	Thin silt-clay layer over sand and shell	-	-	+	
ELDS35	**C**	0.1	Thin silt-clay layer over sand and shell	-	-	+	Eel grass detritus
ELDS36	**A**						No Image
ELDS36	**B**	0.1	Medium-coarse sand with shell hash	-	-	+	Eel grass detritus
ELDS36	**C**						No Image
ELDS37	**A**	0.1	Medium-coarse sand with shell hash	-	-	+	
ELDS37	**B**						No Image
ELDS37	**C**						No Image
ELDS38	**A**	0.09	Medium-coarse sand with shell hash	-	-	-	
ELDS38	**B**	0.08	Medium-coarse sand with shell hash	-	-	-	Eel grass detritus, High Turbidity
ELDS38	**C**	0.08	Medium-coarse sand with shell hash	-	-	-	Eel grass detritus, High Turbidity
ELDS39	**A**	0.1	Medium-coarse sand with shell hash	-	-	-	
ELDS39	**B**	0.1	Medium-coarse sand with shell hash	Asymmetric	-	-	
ELDS39	**C**	0.1	Medium-coarse sand with shell hash	-	-	-	
ELDS40	**A**	0.1	Medium-coarse sand with shell hash	Asymmetric	-	-	
ELDS40	**B**	0.1	Medium-coarse sand with shell hash	Asymmetric	-	-	
ELDS40	**C**	0.1	Medium-coarse sand with shell hash	-	-	+	*Diopatra* tube top
ELDS41	**A**						No Image
ELDS41	**B**						No Image
ELDS41	**C**						No Image
ELDS42	**A**	0.1	Thin silt-clay layer over sand	Asymmetric	-	-	
ELDS42	**B**						No Image
ELDS42	**C**						No Image
ELDS43	**A**	0.1	Medium-coarse sand with shell hash	-	-	+	High turbidity
ELDS43	**B**	0.1	Medium-coarse sand with shell hash	-	-	+	
ELDS43	**C**	0.1					High turbidity
ELDS44	**A**	0.1	Medium-coarse sand with shell hash	-	-	+	Eel grass detritus
ELDS44	**B**						No Image
ELDS44	**C**	0.1	Thin silt-clay layer over sand	-	-	+	Eel grass detritus
ELDS45	**A**						No Image
ELDS45	**D**						No Image
ELDS45	**E**						No Image
NEREF-1	**A**						No Image
NEREF-1	**B**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	
NEREF-1	**C**						No Image
NEREF-2	**A**						No Image
NEREF-2	**B**						No Image
NEREF-2	**C**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	
NEREF-3	**A**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	
NEREF-3	**B**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	
NEREF-3	**C**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	
NEREF-4	**A**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	Chaetopterus tube top
NEREF-4	**B**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	Chaetopterus tube top
NEREF-4	**C**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	
NEREF-5	**A**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	*Chaetopterus* tube top
NEREF-5	**B**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	
NEREF-5	**C**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	
SEREF-1	**A**	0.1	Medium-coarse sand with shell hash	Asymmetric	-	-	
SEREF-1	**B**	0.1	Medium-coarse sand with shell hash	Asymmetric	-	+	
SEREF-1	**E**	0.1	Medium-coarse sand with shell hash	Asymmetric	-	-	
SEREF-2	**A**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	
SEREF-2	**B**	0.09	Thin silt-clay layer over sand	Asymmetric	+	+	
SEREF-2	**C**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	Eel grass detritus
SEREF-3	**A**	0.1	Thin silt-clay layer over sand	Asymmetric	-	+	
SEREF-3	**B**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	
SEREF-3	**C**	0.1	Thin silt-clay layer over sand	Asymmetric	+	+	Eel grass detritus
SEREF-4X	**A**	0.1	Medium-coarse sand with shell hash	Asymmetric	-	+	
SEREF-4X	**C**	0.1	Medium-coarse sand with shell hash	Asymmetric	-	+	Eel grass detritus
SEREF-4X	**D**	0.1	Medium-coarse sand with shell hash	Asymmetric	-	+	
SEREF-5	**A**	0.1	Medium-coarse sand with shell hash	Asymmetric	-	+	
SEREF-5	**C**	0.1	Medium-coarse sand with shell hash	Asymmetric	-	+	
SEREF-5	**D**	0.1	Medium-coarse sand with shell hash	Asymmetric	-	+	
WREF-1	**A**	0.1	Thin silt-clay layer over sand and shell	-	-	+	
WREF-1	**B**	0.1	Thin silt-clay layer over sand and shell	-	-	+	
WREF-1	**C**	0.1	Thin silt-clay layer over sand and shell	-	-	+	
WREF-2X	**A**	0.1	Thin silt-clay layer over sand and shell	-	-	+	
WREF-2X	**B**	0.1	Thin silt-clay layer over sand and shell	-	-	+	
WREF-2X	**C**	0.1	Thin silt-clay layer over sand and shell	-	-	+	
WREF-3	**C**	0.1	Thin silt-clay layer over sand and shell	-	-	+	Pebbles on surface
WREF-3	**D**	0.1	Thin silt-clay layer over sand and shell	-	-	+	
WREF-3	**E**	0.1	Thin silt-clay layer over sand and shell	-	-	+	
WREF-4	**A**	0.1	Thin silt-clay layer over sand	-	-	+	Pebbles on surface
WREF-4	**B**	0.1	Thin silt-clay layer over sand	-	-	+	Pebbles on surface
WREF-4	**C**	0.1	Thin silt-clay layer over sand	-	-	+	Pebbles on surface
WREF-5	**A**	0.1	Thin silt-clay layer over sand and shell	-	-	+	Eel grass detritus
WREF-5	**B**	0.1	Thin silt-clay layer over sand and shell	-	-	+	
WREF-5	**C**	0.1	Thin silt-clay layer over sand and shell	-	-	+	

Appendix D

Grain Size Scale for Sediments

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Phi (Φ) size	Size range (mm)	Size class (Wentworth class)
< -1	> 2	Gravel
0 to –1	1 to 2	Very coarse sand
1 to 0	0.5 to 1	Coarse sand
2 to 1	0.25 to 0.5	Medium sand
3 to 2	0.125 to 0.25	Fine sand
4 to 3	0.0625 to 0.125	Very fine sand
> 4	< 0.0625	Silt/clay

Appendix E

Summary of Chemistry Results

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Sediment

Analyte		CAS Number	ELDS-3 Result	Qual	ELDS-5 Result	Qual	ELDS-9 Result	Qual	ELDS-13 Result	Qual
GRAIN SIZE AND SOLIDS (%)										
% Clay		20	3.19		5.02		1.38		3.44	
% Silt		19	15.21		10.02		3.49		4.66	
Sieve #10 Coarse Sand (2.0-4.75mm) %Retained		27	3.72		1.87		0		2.6	
Sieve #200 Fine Sand (0.075-.425mm) %Retained		28	61.35		60.04		65.67		67.05	
Sieve #4 Gravel (>4.75mm) %Retained		26	5.19		6.37		0		2.02	
Sieve #40 Medium Sand (0.425-2.0mm) %Retained		29	11.35		16.68		29.47		20.23	
% Solids		17	72		71		77		75	
TOTAL ORGANIC CARBON (UG/G)										
Toc In Soil(1)		14762744	6600		3500		1600		2200	
Toc In Soil(2)		14762744	6500		3500		1200		6400	
Toc In Soil(3)		14762744	3100		4200		NA		NA	
Toc In Soil(4)		14762744	3000		3700		NA		NA	
Toc In Soil(Avg)		14762744	4800		3700		1400		4300	

Analyte		CAS Number	ELDS-15 Result	Qual	ELDS-19 Result	Qual	ELDS-21 Result	Qual	ELDS-23 Result	Qual
GRAIN SIZE AND SOLIDS (%)										
% Clay		20	2.45		4.98		4.28		3.05	
% Silt		19	8.65		13.99		15.49		8.56	
Sieve #10 Coarse Sand (2.0-4.75mm) %Retained		27	0		0.43		5.79		1.51	
Sieve #200 Fine Sand (0.075-.425mm) %Retained		28	80.92		69.31		62.97		66.84	
Sieve #4 Gravel (>4.75mm) %Retained		26	0		0.86		2.89		0	
Sieve #40 Medium Sand (0.425-2.0mm) %Retained		29	7.98		10.42		8.58		20.03	
% Solids		17	70		72		72		71	
TOTAL ORGANIC CARBON (UG/G)										
Toc In Soil(1)		14762744	3200		5200		3600		2200	
Toc In Soil(2)		14762744	4100		4800		4800		2400	
Toc In Soil(3)		14762744	NA		NA		NA		NA	
Toc In Soil(4)		14762744	NA		NA		NA		NA	
Toc In Soil(Avg)		14762744	3600		5000		4200		2300	

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Analyte		CAS Number	ELDS-27 Result	ELDS-27 Qual	ELDS-27D Result	ELDS-27D Qual	ELDS-31 Result	ELDS-31 Qual	ELDS-33 Result	ELDS-33 Qual
GRAIN SIZE AND SOLIDS (%)										
% Clay		20	3.89		3.38		2.52		3.98	
% Silt		19	12.12		6.05		11.26		21.15	
Sieve #10 Coarse Sand (2.0-4.75mm) %Retained		27	0		0		0.11		2.07	
Sieve #200 Fine Sand (0.075-.425mm) %Retained		28	73.95		78.45		73.77		56.28	
Sieve #4 Gravel (>4.75mm) %Retained		26	0		0.61		0.53		0	
Sieve #40 Medium Sand (0.425-2.0mm) %Retained		29	10.04		11.51		11.82		16.52	
% Solids		17	76		72		75		78	
TOTAL ORGANIC CARBON (UG/G)										
Toc In Soil(1)		14762744	4600		2100		1800		4000	
Toc In Soil(2)		14762744	2600		2400		2200		3300	
Toc In Soil(3)		14762744	NA		NA		NA		NA	
Toc In Soil(4)		14762744	NA		NA		NA		NA	
Toc In Soil(Avg)		14762744	3600		2200		2000		3600	

Analyte		CAS Number	ELDS-35 Result	ELDS-35 Qual	ELDS-37 Result	ELDS-37 Qual	ELDS-39 Result	ELDS-39 Qual	ELDS-39D Result	ELDS-39D Qual
GRAIN SIZE AND SOLIDS (%)										
% Clay		20	4.69		4.61		2.79		2.33	
% Silt		19	12.96		4.48		14.68		11.32	
Sieve #10 Coarse Sand (2.0-4.75mm) %Retained		27	2.54		0.35		1.92		1.5	
Sieve #200 Fine Sand (0.075-.425mm) %Retained		28	61.62		72.01		53.5		56.61	
Sieve #4 Gravel (>4.75mm) %Retained		26	1.22		0		0.61		1.25	
Sieve #40 Medium Sand (0.425-2.0mm) %Retained		29	16.96		18.55		26.5		26.99	
% Solids		17	73		70		76		76	
TOTAL ORGANIC CARBON (UG/G)										
Toc In Soil(1)		14762744	4000		3500		4900		1800	
Toc In Soil(2)		14762744	3900		5400		2200		2500	
Toc In Soil(3)		14762744	NA		NA		NA		NA	
Toc In Soil(4)		14762744	NA		NA		NA		NA	
Toc In Soil(Avg)		14762744	3900		4400		3600		2200	

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Analyte		CAS Number	ELDS-41 Result	Qual	NEREF-2 Result	Qual	NEREF-3 Result	Qual	NEREF-4 Result	Qual
GRAIN SIZE AND SOLIDS (%)										
% Clay		20	2.69		0.89		1		0.45	
% Silt		19	6.73		19.98		19.65		20.68	
Sieve #10 Coarse Sand (2.0-4.75mm) %Retained		27	0.41		0		0		0	
Sieve #200 Fine Sand (0.075-.425mm) %Retained		28	76.5		79.03		78.75		78.87	
Sieve #4 Gravel (>4.75mm) %Retained		26	0.16		0		0		0	
Sieve #40 Medium Sand (0.425-2.0mm) %Retained		29	13.51		0.09		0.6		0	
% Solids		17	74		75		75		72	
TOTAL ORGANIC CARBON (UG/G)										
Toc In Soil(1)		14762744	2000		3900		2900		4900	
Toc In Soil(2)		14762744	1900		3800		3400		5600	
Toc In Soil(3)		14762744	2000		NA		NA		NA	
Toc In Soil(4)		14762744	2300		NA		NA		NA	
Toc In Soil(Avg)		14762744	2000		3800		3200		5300	

Analyte		CAS Number	SEREF-1 Result	Qual	SEREF-4X Result	Qual	SEREF-5 Result	Qual	WREF-2X Result	Qual
GRAIN SIZE AND SOLIDS (%)										
% Clay		20	0.46		0.77		0.45		0.8	
% Silt		19	5.41		9.49		8.3		9.58	
Sieve #10 Coarse Sand (2.0-4.75mm) %Retained		27	0		0.36		0		1.89	
Sieve #200 Fine Sand (0.075-.425mm) %Retained		28	77.63		70.49		79.32		63.58	
Sieve #4 Gravel (>4.75mm) %Retained		26	0		0		0		7.17	
Sieve #40 Medium Sand (0.425-2.0mm) %Retained		29	16.5		18.89		11.93		16.98	
% Solids		17	75		82		78		74	
TOTAL ORGANIC CARBON (UG/G)										
Toc In Soil(1)		14762744	1600		1500		1200		3800	
Toc In Soil(2)		14762744	1600		1500		1100		4700	
Toc In Soil(3)		14762744	NA		NA		NA		NA	
Toc In Soil(4)		14762744	NA		NA		NA		NA	
Toc In Soil(Avg)		14762744	1600		1500		1200		4300	

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Analyte		CAS Number	WREF-4 Result	WREF-4 Qual	WREF-5 Result	WREF-5 Qual
GRAIN SIZE AND SOLIDS (%)						
% Clay		20	2.88		2.24	
% Silt		19	10.81		11.84	
Sieve #10 Coarse Sand (2.0-4.75mm) %Retained		27	0		0	
Sieve #200 Fine Sand (0.075-.425mm) %Retained		28	63.89		60.94	
Sieve #4 Gravel (>4.75mm) %Retained		26	0		0	
Sieve #40 Medium Sand (0.425-2.0mm) %Retained		29	22.42		24.98	
% Solids		17	73		74	
TOTAL ORGANIC CARBON (UG/G)						
Toc In Soil(1)		14762744	2400		2800	
Toc In Soil(2)		14762744	2300		2200	
Toc In Soil(3)		14762744	NA		NA	
Toc In Soil(4)		14762744	NA		NA	
Toc In Soil(Avg)		14762744	2400		2500	

Analyte		CAS Number	ELDS-3 Result	ELDS-3 Qual	ELDS-5 Result	ELDS-5 Qual	ELDS-9 Result	ELDS-9 Qual	ELDS-13 Result	ELDS-13 Qual
METALS (MG/KG)										
Arsenic		7440382	3.62		6.41		3.17		1.98	
Cadmium		7440439	0.036	J	0.0043	U	0.0037	U	0.0066	J
Chromium		7440473	10.4		17.1		6.44		7.9	
Copper		7440508	4.52		6.66		1.97		2.9	
Lead		7439921	5.59		11.1		4.76		5.02	
Nickel		7440020	5.99		9.56		3.04		3.99	
Zinc		7440666	29.1		46.6		22.7		17.2	
Mercury		7439976	0.012	J	0.015	J	0.003	U	0.0028	UA

Analyte		CAS Number	ELDS-15 Result	ELDS-15 Qual	ELDS-19 Result	ELDS-19 Qual	ELDS-21 Result	ELDS-21 Qual	ELDS-23 Result	ELDS-23 Qual
METALS (MG/KG)										
Arsenic		7440382	2.78		3.59		2.32		2.78	
Cadmium		7440439	0.011	J	0.035	J	0.022	J	0.018	J
Chromium		7440473	8.46		12.8		9.93		7.24	
Copper		7440508	2.96		6.1		4.41		2.83	
Lead		7439921	5.2		9.34		7.51		4.92	
Nickel		7440020	4.32		6.74		4.74		3.78	
Zinc		7440666	24.1		34.6		25.4		19.5	
Mercury		7439976	0.0035	U	0.018	J	0.017	J	0.0029	U

Analyte		CAS Number	ELDS-27 Result	ELDS-27 Qual	ELDS-27D Result	ELDS-27D Qual	ELDS-31 Result	ELDS-31 Qual	ELDS-33 Result	ELDS-33 Qual
METALS (MG/KG)										
Arsenic		7440382	1.87		1.96		2.48		2.34	
Cadmium		7440439	0.015	J	0.02	J	0.0081	J	0.015	J
Chromium		7440473	7.99		8.16		5.67		8.44	
Copper		7440508	2.87		3.3		2.21		4.16	
Lead		7439921	4.77		5.11		3.98		6.2	
Nickel		7440020	4.23		4.58		2.89		4.82	
Zinc		7440666	19.4		20.4		16.7		21	
Mercury		7439976	0.003	U	0.0062	J	0.0032	U	0.017	J

Analyte		CAS Number	ELDS-35 Result	ELDS-35 Qual	ELDS-37 Result	ELDS-37 Qual	ELDS-39 Result	ELDS-39 Qual	ELDS-39D Result	ELDS-39D Qual
METALS (MG/KG)										
Arsenic		7440382	2.05		2.13		3.75		3.45	
Cadmium		7440439	0.03	J	0.013	J	0.0097	J	0.011	J
Chromium		7440473	13.4		7.73		5.24		5.14	
Copper		7440508	8.26		3.36		2.2		2.01	
Lead		7439921	7.42		5.96		6.91		6.53	
Nickel		7440020	52.4		4.45		2.11		2.25	
Zinc		7440666	24.7		18.2		21.4		21	
Mercury		7439976	0.0035	U	0.012	J	0.0032	U	0.0025	U

Analyte		CAS Number	ELDS-41 Result	ELDS-41 Qual	NEREF-2 Result	NEREF-2 Qual	NEREF-3 Result	NEREF-3 Qual	NEREF-4 Result	NEREF-4 Qual
METALS (MG/KG)										
Arsenic		7440382	2.71		1.5		1.3		1.3	
Cadmium		7440439	0.0066	J	0.053	J	0.03	J	0.018	J
Chromium		7440473	7.3		8.88		9.03		8.7	
Copper		7440508	2.47		3.78		3.99		3.56	
Lead		7439921	5.6		5.11		4.83		4.61	
Nickel		7440020	3.4		4.92		5.38		4.7	
Zinc		7440666	20		26.1		21.5		20.7	
Mercury		7439976	0.0030	U	0.015	J	0.0066	J	0.01	J

Analyte		CAS Number	SEREF-1 Result	SEREF-1 Qual	SEREF-4X Result	SEREF-4X Qual	SEREF-5 Result	SEREF-5 Qual
METALS (MG/KG)								
Arsenic		7440382	2.64		2.14		2.58	
Cadmium		7440439	0.0039	U	0.0057	J	0.0027	U
Chromium		7440473	6.05		5.96		5.79	
Copper		7440508	1.93		2.14		1.75	
Lead		7439921	4.54		4.3		4.15	
Nickel		7440020	3.13		3.06		2.76	
Zinc		7440666	16.4		15.1		15.8	
Mercury		7439976	0.0031	U	0.0025	U	0.0027	U

Analyte		CAS Number	WREF-2X Result	Qual	WREF-4 Result	Qual	WREF-5 Result	Qual
METALS (MG/KG)								
Arsenic		7440382	2.11		5.55		4.14	
Cadmium		7440439	0.01	J	0.0029	U	0.0061	J
Chromium		7440473	7.66		7.89		8.9	
Copper		7440508	3.49		3.21		3.36	
Lead		7439921	5.34		5.64		5.28	
Nickel		7440020	3.91		4.54		5.12	
Zinc		7440666	20.7		23.2		23.8	
Mercury		7439976	0.012	J	0.0035	U	0.0063	J

Analyte		CAS Number	ELDS-3 Result	Qual	ELDS-5 Result	Qual	ELDS-9 Result	Qual	ELDS-13 Result	Qual
PESTICIDES (UG/KG)										
4,4`-DDD		72548	0.024	U	0.027	U	0.023	U	0.025	U
4,4`-DDE		72559	0.023	U	0.025	U	0.022	U	0.023	U
4,4`-DDT		50293	0.0375	U	0.041	U	0.036	U	0.038	U
Total DDTs			*0.1*	*U*	*0.1*	*U*	*0.1*	*U*	*0.1*	*U*
Aldrin		309002	0.034	U	0.037	U	0.033	U	0.034	U
ALPHA BHC		319846	0.041	U	0.045	U	0.040	U	0.042	U
Alpha-Chlordane (cis)		5103719	0.0255	U	0.028	U	0.024	U	0.026	U
BETA BHC		319857	0.04	U	0.044	U	0.038	U	0.04	U
DELTA BHC		319868	0.039	U	0.043	U	0.037	U	0.039	U
Dieldrin		60571	0.0265	U	0.029	U	0.026	U	0.027	U
Endosulfan I		959988	0.029	U	0.032	U	0.028	U	0.029	U
Endosulfan II		33213659	0.041	U	0.045	U	0.040	U	0.042	U
Endosulfan sulfate		1031078	0.07	U	0.075	U	0.065	U	0.07	U
Endrin		72208	0.105	U	0.11	U	0.1	U	0.105	U
Gamma Chlordane		12789036	0.028	U	0.031	U	0.027	U	0.028	U
Gamma-BHC (Lindane)		58899	0.033	U	0.036	U	0.031	U	0.033	U
Heptachlor		76448	0.035	U	0.039	U	0.034	U	0.036	U
Heptachlor epoxide		1024573	0.0265	U	0.029	U	0.026	U	0.027	U
Methoxychlor		72435	0.06	U	0.065	U	0.06	U	0.06	U
TECHNICAL CHLORDANE		12789036	0.435	U	0.480	U	0.415	U	0.44	U
Toxaphene		8001352	0.85	U	0.95	U	0.8	U	0.85	U

Analyte		CAS Number	ELDS-15 Result	ELDS-15 Qual	ELDS-19 Result	ELDS-19 Qual	ELDS-21 Result	ELDS-21 Qual	ELDS-23 Result	ELDS-23 Qual
PESTICIDES (UG/KG)										
4,4`-DDD		72548	0.026	U	0.025	U	0.025	U	0.024	U
4,4`-DDE		72559	0.025	U	0.094	J	0.087	JJ	0.022	U
4,4`-DDT		50293	0.041	U	0.039	U	0.038	U	0.036	U
Total DDTs			*0.1*	*U*	*0.16*		*0.15*		*0.1*	*U*
Aldrin		309002	0.037	U	0.035	U	0.035	U	0.033	U
ALPHA BHC		319846	0.045	U	0.042	U	0.042	U	0.040	U
Alpha-Chlordane (cis)		5103719	0.028	U	0.026	U	0.026	U	0.025	U
BETA BHC		319857	0.043	U	0.041	U	0.041	U	0.039	U
DELTA BHC		319868	0.042	U	0.040	U	0.040	U	0.038	U
Dieldrin		60571	0.029	U	0.028	U	0.027	U	0.026	U
Endosulfan I		959988	0.032	U	0.03	U	0.030	U	0.028	U
Endosulfan II		33213659	0.045	U	0.042	U	0.042	U	0.040	U
Endosulfan sulfate		1031078	0.075	U	0.07	U	0.07	U	0.07	U
Endrin		72208	0.11	U	0.105	U	0.105	U	0.1	U
Gamma Chlordane		12789036	0.03	U	0.029	U	0.028	U	0.027	U
Gamma-BHC (Lindane)		58899	0.035	U	0.034	U	0.033	U	0.032	U
Heptachlor		76448	0.038	U	0.036	U	0.036	U	0.034	U
Heptachlor epoxide		1024573	0.029	U	0.028	U	0.027	U	0.026	U
Methoxychlor		72435	0.065	U	0.06	U	0.06	U	0.06	U
TECHNICAL CHLORDANE		12789036	0.47	U	0.445	U	0.44	U	0.42	U
Toxaphene		8001352	0.9	U	0.85	U	0.85	U	0.8	U

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Analyte		CAS Number	ELDS-27 Result	ELDS-27 Qual	ELDS-27D Result	ELDS-27D Qual	ELDS-31 Result	ELDS-31 Qual	ELDS-33 Result	ELDS-33 Qual
PESTICIDES (UG/KG)										
4,4`-DDD		72548	0.024	U	0.024	U	0.024	U	0.021	U
4,4`-DDE		72559	0.023	U	0.023	U	0.023	U	0.02	U
4,4`-DDT		50293	0.037	U	0.037	U	0.04	U	0.033	U
Total DDTs			*0.1*	*U*	*0.1*	*U*	*0.1*	*U*	*0.1*	*U*
Aldrin		309002	0.034	U	0.033	U	0.034	U	0.030	U
ALPHA BHC		319846	0.041	U	0.041	U	0.041	U	0.036	U
Alpha-Chlordane (cis)		5103719	0.025	U	0.025	U	0.025	U	0.022	U
BETA BHC		319857	0.040	U	0.039	U	0.040	U	0.035	U
DELTA BHC		319868	0.039	U	0.038	U	0.039	U	0.034	U
Dieldrin		60571	0.027	U	0.026	U	0.027	U	0.024	U
Endosulfan I		959988	0.029	U	0.029	U	0.029	U	0.026	U
Endosulfan II		33213659	0.041	U	0.041	U	0.041	U	0.036	U
Endosulfan sulfate		1031078	0.07	U	0.07	U	0.07	U	0.06	U
Endrin		72208	0.1	U	0.1	U	0.1	U	0.09	U
Gamma Chlordane		12789036	0.028	U	0.027	U	0.028	U	0.025	U
Gamma-BHC (Lindane)		58899	0.033	U	0.032	U	0.033	U	0.029	U
Heptachlor		76448	0.035	U	0.035	U	0.035	U	0.031	U
Heptachlor epoxide		1024573	0.027	U	0.026	U	0.027	U	0.024	U
Methoxychlor		72435	0.06	U	0.06	U	0.06	U	0.05	U
TECHNICAL CHLORDANE		12789036	0.430	U	0.425	U	0.430	U	0.380	U
Toxaphene		8001352	0.85	U	0.85	U	0.85	U	0.75	U

Analyte		CAS Number	ELDS-35 Result	ELDS-35 Qual	ELDS-37 Result	ELDS-37 Qual	ELDS-39 Result	ELDS-39 Qual	ELDS-39D Result	ELDS-39D Qual
PESTICIDES (UG/KG)										
4,4`-DDD		72548	0.025	U	0.027	U	0.023	U	0.023	U
4,4`-DDE		72559	0.024	U	0.026	U	0.022	U	0.022	U
4,4`-DDT		50293	0.039	U	0.042	U	0.036	U	0.036	U
Total DDTs			*0.1*	*U*	*0.1*	*U*	*0.1*	*U*	*0.1*	*U*
Aldrin		309002	0.035	U	0.038	U	0.032	U	0.032	U
ALPHA BHC		319846	0.043	U	0.046	U	0.039	U	0.039	U
Alpha-Chlordane (cis)		5103719	0.027	U	0.028	U	0.024	U	0.024	U
BETA BHC		319857	0.042	U	0.044	U	0.038	U	0.038	U
DELTA BHC		319868	0.04	U	0.043	U	0.037	U	0.037	U
Dieldrin		60571	0.028	U	0.030	U	0.026	U	0.025	U
Endosulfan I		959988	0.03	U	0.032	U	0.028	U	0.028	U
Endosulfan II		33213659	0.043	U	0.046	U	0.039	U	0.039	U
Endosulfan sulfate		1031078	0.07	U	0.075	U	0.065	U	0.065	U
Endrin		72208	0.105	U	0.12	U	0.1	U	0.1	U
Gamma Chlordane		12789036	0.029	U	0.031	U	0.027	U	0.027	U
Gamma-BHC (Lindane)		58899	0.034	U	0.036	U	0.031	U	0.031	U
Heptachlor		76448	0.037	U	0.039	U	0.034	U	0.034	U
Heptachlor epoxide		1024573	0.028	U	0.073	J	0.026	U	0.025	U
Methoxychlor		72435	0.06	U	0.065	U	0.06	U	0.055	U
TECHNICAL CHLORDANE		12789036	0.45	U	0.480	U	0.415	U	0.415	U
Toxaphene		8001352	0.9	U	0.95	U	0.8	U	0.8	U

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Analyte		CAS Number	ELDS-41 Result	Qual	NEREF-2 Result	Qual	NEREF-3 Result	Qual	NEREF-4 Result	Qual
PESTICIDES (UG/KG)										
4,4`-DDD		72548	0.025	U	0.024	U	0.025	U	0.027	U
4,4`-DDE		72559	0.023	U	0.022	U	0.024	U	0.025	U
4,4`-DDT		50293	0.038	U	0.036	U	0.039	U	0.041	U
Total DDTs			*0.1*	*U*	*0.1*	*U*	*0.1*	*U*	*0.1*	*U*
Aldrin		309002	0.034	U	0.033	U	0.035	U	0.037	U
ALPHA BHC		319846	0.042	U	0.040	U	0.042	U	0.045	U
Alpha-Chlordane (cis)		5103719	0.026	U	0.025	U	0.026	U	0.028	U
BETA BHC		319857	0.04	U	0.039	U	0.041	U	0.044	U
DELTA BHC		319868	0.039	U	0.038	U	0.04	U	0.042	U
Dieldrin		60571	0.027	U	0.026	U	0.028	U	0.029	U
Endosulfan I		959988	0.029	U	0.028	U	0.03	U	0.032	U
Endosulfan II		33213659	0.042	U	0.040	U	0.042	U	0.045	U
Endosulfan sulfate		1031078	0.07	U	0.07	U	0.07	U	0.075	U
Endrin		72208	0.105	U	0.1	U	0.105	U	0.11	U
Gamma Chlordane		12789036	0.028	U	0.027	U	0.029	U	0.03	U
Gamma-BHC (Lindane)		58899	0.033	U	0.032	U	0.034	U	0.036	U
Heptachlor		76448	0.036	U	0.034	U	0.036	U	0.038	U
Heptachlor epoxide		1024573	0.027	U	0.026	U	0.028	U	0.029	U
Methoxychlor		72435	0.06	U	0.06	U	0.06	U	0.065	U
TECHNICAL CHLORDANE		12789036	0.44	U	0.42	U	0.445	U	0.475	U
Toxaphene		8001352	0.85	U	0.8	U	0.85	U	0.9	U

Analyte		CAS Number	SEREF-1 Result	Qual	SEREF-4X Result	Qual	SEREF-5 Result	Qual	WREF-2X Result	Qual
PESTICIDES (UG/KG)										
4,4`-DDD		72548	0.022	U	0.022	U	0.026	U	0.027	U
4,4`-DDE		72559	0.021	U	0.021	U	0.024	U	0.026	U
4,4`-DDT		50293	0.035	U	0.033	U	0.040	U	0.042	U
Total DDTs			*0.1*	*U*	*0.1*	*U*	*0.1*	*U*	*0.1*	*U*
Aldrin		309002	0.031	U	0.03	U	0.036	U	0.038	U

Analyte		CAS Number	SEREF-1 Result	SEREF-1 Qual	SEREF-4X Result	SEREF-4X Qual	SEREF-5 Result	SEREF-5 Qual	WREF-2X Result	WREF-2X Qual
PESTICIDES (UG/KG)										
ALPHA BHC		319846	0.038	U	0.037	U	0.043	U	0.046	U
Alpha-Chlordane (cis)		5103719	0.024	U	0.023	U	0.027	U	0.028	U
BETA BHC		319857	0.037	U	0.036	U	0.042	U	0.044	U
DELTA BHC		319868	0.036	U	0.034	U	0.041	U	0.043	U
Dieldrin		60571	0.025	U	0.024	U	0.028	U	0.030	U
Endosulfan I		959988	0.027	U	0.026	U	0.031	U	0.032	U
Endosulfan II		33213659	0.038	U	0.037	U	0.043	U	0.046	U
Endosulfan sulfate		1031078	0.065	U	0.06	U	0.075	U	0.08	U
Endrin		72208	0.095	U	0.09	U	0.11	U	0.115	U
Gamma Chlordane		12789036	0.026	U	0.025	U	0.029	U	0.031	U
Gamma-BHC (Lindane)		58899	0.03	U	0.029	U	0.034	U	0.036	U
Heptachlor		76448	0.032	U	0.031	U	0.037	U	0.039	U
Heptachlor epoxide		1024573	0.025	U	0.024	U	0.028	U	0.030	U
Methoxychlor		72435	0.055	U	0.055	U	0.065	U	0.065	U
TECHNICAL CHLORDANE		12789036	0.400	U	0.385	U	0.455	U	0.485	U
Toxaphene		8001352	0.8	U	0.75	U	0.9	U	0.95	U

Analyte		CAS Number	WREF-4 Result	WREF-4 Qual	WREF-5 Result	WREF-5 Qual
PESTICIDES (UG/KG)						
4,4`-DDD		72548	0.025	U	0.026	U
4,4`-DDE		72559	0.024	U	0.024	U
4,4`-DDT		50293	0.039	U	0.040	U
Total DDTs			*0.1*	*U*	*0.1*	*U*
Aldrin		309002	0.035	U	0.036	U
ALPHA BHC		319846	0.043	U	0.044	U
Alpha-Chlordane (cis)		5103719	0.026	U	0.027	U
BETA BHC		319857	0.041	U	0.042	U
DELTA BHC		319868	0.04	U	0.041	U
Dieldrin		60571	0.028	U	0.028	U
Endosulfan I		959988	0.03	U	0.031	U

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Analyte		CAS Number	WREF-4 Result	WREF-4 Qual	WREF-5 Result	WREF-5 Qual
PESTICIDES (UG/KG)						
Endosulfan II		33213659	0.043	U	0.044	U
Endosulfan sulfate		1031078	0.07	U	0.075	U
Endrin		72208	0.105	U	0.11	U
Gamma Chlordane		12789036	0.029	U	0.030	U
Gamma-BHC (Lindane)		58899	0.034	U	0.035	U
Heptachlor		76448	0.036	U	0.037	U
Heptachlor epoxide		1024573	0.028	U	0.028	U
Methoxychlor		72435	0.06	U	0.065	U
TECHNICAL CHLORDANE		12789036	0.450	U	0.460	U
Toxaphene		8001352	0.85	U	0.9	U

Analyte		CAS Number	ELDS-3 Result	ELDS-3 Qual	ELDS-5 Result	ELDS-5 Qual	ELDS-9 Result	ELDS-9 Qual	ELDS-13 Result	ELDS-13 Qual
PCBs (UG/KG)										
PCB 101		37680732	0.265	U	0.29	U	0.24	U	0.26	U
PCB 105		32598144	0.5	U	0.55	U	0.48	U	0.5	U
PCB 118		31508006	0.043	U	0.4	J	0.04	U	0.2	JJ
PCB 126	x	57465288	0.1	U	0.11	U	0.29	JJ	0.10	U
PCB 128		38380073	0.07	U	0.075	U	0.065	U	0.065	U
PCB 138		35065282	0.06	U	0.065	U	0.055	U	0.055	U
PCB 153		35065271	0.11	JJ	0.037	U	0.031	U	0.033	U
PCB 156	x	38380084	0.07	U	0.075	U	0.065	U	0.065	U
PCB 169	x	32774166	0.08	U	0.09	U	0.075	U	0.08	U
PCB 170		35065306	0.065	U	0.07	U	0.06	U	0.06	U
PCB 18		37680652	1.15	U	1.25	U	1.05	U	1.1	U
PCB 180		35065293	0.1	U	0.11	U	0.09	U	0.1	U
PCB 183	x	52663691	0.031	U	0.033	U	0.03	U	0.029	U
PCB 184	x	74472483	0.06	U	0.065	U	0.055	U	0.055	U
PCB 187		52663680	0.07	U	0.075	U	0.065	U	0.065	U
PCB 195		52663782	0.035	U	0.038	U	0.032	U	0.034	U
PCB 206		40186729	0.044	U	0.05	U	0.04	U	0.042	U

Analyte		CAS Number	ELDS-3 Result	ELDS-3 Qual	ELDS-5 Result	ELDS-5 Qual	ELDS-9 Result	ELDS-9 Qual	ELDS-13 Result	ELDS-13 Qual
PCB 209		2051243	0.041	U	0.044	U	0.037	U	0.039	U
PCB 28		7012375	0.1	U	0.11	UL	0.09	U	0.1	UL
PCB 44		41464395	0.041	U	0.04	U	0.04	U	0.040	U
PCB 49	x	41464408	0.16	U	0.17	UL	0.15	U	0.15	UL
PCB 52		35693993	0.048	U	0.05	U	0.04	U	0.046	U
PCB 66		32598100	0.055	U	0.06	U	0.05	U	0.05	U
PCB 77	x	32598133	0.13	U	0.14	U	0.26	JJ	0.12	U
PCB 8		34883437	0.23	U	0.25	U	0.21	U	0.22	U
PCB 87	x	38380028	0.095	U	0.11	U	0.085	U	0.09	U
Total PCBs			*6*		*7*		*5*	*U*	*6*	

Analyte		CAS Number	ELDS-15 Result	ELDS-15 Qual	ELDS-19 Result	ELDS-19 Qual	ELDS-21 Result	ELDS-21 Qual	ELDS-23 Result	ELDS-23 Qual
PCBs (UG/KG)										
PCB 101		37680732	0.25	U	0.28	U	0.285	U	0.28	U
PCB 105		32598144	0.49	U	0.55	U	0.55	U	0.55	U
PCB 118		31508006	0.15	JJ	0.42	JJ	0.046	U	0.044	U
PCB 126	x	57465288	0.095	U	0.11	U	0.11	U	0.11	U
PCB 128		38380073	0.065	U	0.075	U	0.075	U	0.07	U
PCB 138		35065282	0.055	U	0.06	U	0.25	J	0.06	U
PCB 153		35065271	0.12	J	0.11	J	0.44	JJ	0.036	U
PCB 156	x	38380084	0.065	U	0.075	U	0.075	U	0.07	U
PCB 169	x	32774166	0.08	U	0.09	U	0.09	U	0.085	U
PCB 170		35065306	0.06	U	0.065	U	0.07	U	0.065	U
PCB 18		37680652	1.1	U	1.2	U	1.2	U	1.2	U
PCB 180		35065293	0.095	U	0.11	U	0.11	U	0.105	U
PCB 183	x	52663691	0.029	U	0.033	U	0.033	U	0.032	U
PCB 184	x	74472483	0.055	U	0.065	U	0.065	U	0.06	U
PCB 187		52663680	0.065	U	0.075	U	0.075	U	0.07	U
PCB 195		52663782	0.033	U	0.037	U	0.038	U	0.036	U
PCB 206		40186729	0.042	U	0.047	U	0.047	U	0.045	U
PCB 209		2051243	0.039	U	0.043	U	0.044	U	0.042	U

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Analyte		CAS Number	ELDS-15 Result	ELDS-15 Qual	ELDS-19 Result	ELDS-19 Qual	ELDS-21 Result	ELDS-21 Qual	ELDS-23 Result	ELDS-23 Qual
PCBs (UG/KG)										
PCB 28		7012375	0.095	U	0.11	UL	0.11	UL	0.11	UL
PCB 44		41464395	0.039	U	0.044	U	0.045	U	0.043	U
PCB 49	x	41464408	0.15	U	0.17	UL	0.17	UL	0.17	UL
PCB 52		35693993	0.13	JJ	0.23	JJ	0.05	U	0.049	U
PCB 66		32598100	0.05	U	0.055	U	0.055	U	0.055	U
PCB 77	x	32598133	0.12	U	0.14	U	0.14	U	0.13	U
PCB 8		34883437	0.22	U	0.24	U	0.25	U	0.24	U
PCB 87	x	38380028	0.09	U	0.1	U	0.1	U	0.1	U
Total PCBs			*6*		*8*		*7*		*6*	*U*

Analyte		CAS Number	ELDS-27 Result	ELDS-27 Qual	ELDS-27D Result	ELDS-27D Qual	ELDS-31 Result	ELDS-31 Qual	ELDS-33 Result	ELDS-33 Qual
PCBs (UG/KG)										
PCB 101		37680732	0.28	U	0.29	U	0.265	U	0.23	U
PCB 105		32598144	0.55	U	0.55	U	0.5	U	0.44	U
PCB 118		31508006	0.044	U	0.046	U	0.04	U	0.036	U
PCB 126	x	57465288	0.105	U	0.11	U	0.1	U	0.085	U
PCB 128		38380073	0.07	U	0.075	U	0.07	U	0.06	U
PCB 138		35065282	0.06	U	0.065	U	0.06	U	0.19	JJ
PCB 153		35065271	0.035	U	0.037	U	0.03	U	0.2	J
PCB 156	x	38380084	0.07	U	0.075	U	0.07	U	0.06	U
PCB 169	x	32774166	0.085	U	0.090	U	0.08	U	0.07	U
PCB 170		35065306	0.065	U	0.070	U	0.065	U	0.055	U
PCB 18		37680652	1.2	U	1.2	U	1.15	U	0.95	U
PCB 180		35065293	0.31	J	0.11	U	0.1	U	0.085	U
PCB 183	x	52663691	0.032	U	0.033	U	0.03	U	0.026	U
PCB 184	x	74472483	0.06	U	0.065	U	0.06	U	0.05	U
PCB 187		52663680	0.07	U	0.075	U	0.07	U	0.06	U
PCB 195		52663782	0.036	U	0.038	U	0.035	U	0.03	U
PCB 206		40186729	0.045	U	0.047	U	0.044	U	0.037	U
PCB 209		2051243	0.042	U	0.044	U	0.04	U	0.03	U

Analyte		CAS Number	ELDS-27 Result	ELDS-27 Qual	ELDS-27D Result	ELDS-27D Qual	ELDS-31 Result	ELDS-31 Qual	ELDS-33 Result	ELDS-33 Qual
PCBs (UG/KG)										
PCB 28		7012375	0.105	UL	0.11	UL	0.1	UL	0.085	UL
PCB 44		41464395	0.043	U	0.044	U	0.04	U	0.035	U
PCB 49	x	41464408	0.17	UL	0.17	UL	0.16	UL	0.135	UL
PCB 52		35693993	0.049	U	0.05	U	0.05	U	0.04	U
PCB 66		32598100	0.055	U	0.055	U	0.055	U	0.045	U
PCB 77	x	32598133	0.13	U	0.135	U	0.13	U	0.11	U
PCB 8		34883437	0.24	U	0.25	U	0.23	U	0.20	U
PCB 87	x	38380028	0.1	U	0.10	U	0.095	U	0.08	U
Total PCBs			*7*		*6*	*U*	*6*	*U*	*6*	

Analyte		CAS Number	ELDS-35 Result	ELDS-35 Qual	ELDS-37 Result	ELDS-37 Qual	ELDS-39 Result	ELDS-39 Qual	ELDS-39D Result	ELDS-39D Qual
PCBs (UG/KG)										
PCB 101		37680732	0.26	U	0.29	U	0.26	U	0.27	U
PCB 105		32598144	0.5	U	0.55	U	0.5	U	0.5	U
PCB 118		31508006	0.041	U	0.66	JJ	0.042	U	0.043	U
PCB 126	x	57465288	0.1	U	0.11	U	0.1	U	0.1	U
PCB 128		38380073	0.07	U	0.075	U	0.07	U	0.07	U
PCB 138		35065282	0.055	U	0.065	U	0.31	J	0.06	U
PCB 153		35065271	0.12	J	0.038	U	0.36	J	0.035	U
PCB 156	x	38380084	0.07	U	1.4	JJ	0.07	U	0.07	U
PCB 169	x	32774166	0.08	U	0.09	U	0.08	U	0.085	U
PCB 170		35065306	0.06	U	0.07	U	0.06	U	0.065	U
PCB 18		37680652	1.1	U	1.25	U	1.1	U	1.15	U
PCB 180		35065293	0.1	U	0.11	U	0.3	J	0.1	U
PCB 183	x	52663691	0.03	U	1.2	J	0.030	U	0.031	U
PCB 184	x	74472483	0.06	U	0.065	U	0.06	U	0.06	U
PCB 187		52663680	0.07	U	0.075	U	0.07	U	0.07	U
PCB 195		52663782	0.034	U	0.038	U	0.034	U	0.035	U
PCB 206		40186729	0.04	U	0.048	U	0.043	U	0.044	U
PCB 209		2051243	0.04	U	0.045	U	0.040	U	0.041	U

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Analyte		CAS Number	ELDS-35 Result	ELDS-35 Qual	ELDS-37 Result	ELDS-37 Qual	ELDS-39 Result	ELDS-39 Qual	ELDS-39D Result	ELDS-39D Qual
PCBs (UG/KG)										
PCB 28		7012375	0.1	UL	0.11	UL	0.1	UL	0.1	UL
PCB 44		41464395	0.04	U	0.045	U	0.04	U	0.042	U
PCB 49	x	41464408	0.16	UL	0.18	UL	0.16	UL	0.16	UL
PCB 52		35693993	0.05	U	0.05	U	0.046	U	0.048	U
PCB 66		32598100	0.05	U	0.06	U	0.05	U	0.055	U
PCB 77	x	32598133	0.13	U	0.14	U	0.13	U	0.13	U
PCB 8		34883437	0.22	U	0.25	U	0.22	U	0.23	U
PCB 87	x	38380028	0.09	U	1.1	JJ	0.09	U	0.095	U
Total PCBs			*6*		*8*		*7*		*6*	*U*

Analyte		CAS Number	ELDS-41 Result	ELDS-41 Qual	NEREF-2 Result	NEREF-2 Qual	NEREF-3 Result	NEREF-3 Qual	NEREF-4 Result	NEREF-4 Qual
PCBs (UG/KG)										
PCB 101		37680732	0.24	U	0.26	U	0.25	U	0.28	U
PCB 105		32598144	0.47	U	0.5	U	0.49	U	0.55	U
PCB 118		31508006	0.038	U	0.042	U	0.29	JJ	0.045	U
PCB 126	x	57465288	0.09	U	0.1	U	0.095	U	0.11	U
PCB 128		38380073	0.06	U	0.07	U	0.065	U	0.075	U
PCB 138		35065282	0.05	U	0.06	U	0.055	U	0.06	U
PCB 153		35065271	0.072	J	0.034	U	0.032	U	0.036	U
PCB 156	x	38380084	0.06	U	0.07	U	0.065	U	0.075	U
PCB 169	x	32774166	0.075	U	0.08	U	0.075	U	0.085	U
PCB 170		35065306	0.055	U	0.06	U	0.06	U	0.065	U
PCB 18		37680652	1	U	1.1	U	1.05	U	1.2	U
PCB 180		35065293	0.09	U	0.46	JJ	0.095	U	0.37	J
PCB 183	x	52663691	0.027	U	0.03	U	0.029	U	0.032	U
PCB 184	x	74472483	0.055	U	0.06	U	0.055	U	0.065	U
PCB 187		52663680	0.06	U	0.07	U	0.065	U	0.075	U
PCB 195		52663782	0.031	U	0.03	U	0.033	U	0.037	U
PCB 206		40186729	0.039	U	0.043	U	0.041	U	0.046	U
PCB 209		2051243	0.037	U	0.04	U	0.038	U	0.043	U

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Analyte		CAS Number	ELDS-41 Result	ELDS-41 Qual	NEREF-2 Result	NEREF-2 Qual	NEREF-3 Result	NEREF-3 Qual	NEREF-4 Result	NEREF-4 Qual
PCBs (UG/KG)										
PCB 28		7012375	0.09	UL	0.1	U	0.095	U	0.11	U
PCB 44		41464395	0.037	U	0.04	U	0.039	U	0.044	U
PCB 49	x	41464408	0.14	UL	0.16	U	0.15	U	0.17	U
PCB 52		35693993	0.043	U	0.047	U	0.045	U	0.05	U
PCB 66		32598100	0.048	U	0.05	U	0.05	U	0.055	U
PCB 77	x	32598133	0.12	U	0.13	U	0.12	U	0.14	U
PCB 8		34883437	0.21	U	0.23	U	0.22	U	0.24	U
PCB 87	x	38380028	0.085	U	0.095	U	0.09	U	0.1	U
Total PCBs			*5*		*6*		*6*		*7*	

Analyte		CAS Number	SEREF-1 Result	SEREF-1 Qual	SEREF-4X Result	SEREF-4X Qual	SEREF-5 Result	SEREF-5 Qual	WREF-2X Result	WREF-2X Qual
PCBs (UG/KG)										
PCB 101		37680732	0.25	U	0.235	U	0.22	U	0.25	U
PCB 105		32598144	0.49	U	0.46	U	0.42	U	0.48	U
PCB 118		31508006	0.04	U	0.038	U	0.034	U	0.04	U
PCB 126	x	57465288	0.095	U	0.09	U	0.08	U	0.095	U
PCB 128		38380073	0.065	U	0.06	U	0.055	U	0.065	U
PCB 138		35065282	0.055	U	0.05	U	0.047	U	0.055	U
PCB 153		35065271	0.032	U	0.03	U	0.03	U	0.03	U
PCB 156	x	38380084	0.27	JJ	0.06	U	0.055	U	0.065	U
PCB 169	x	32774166	0.08	U	0.07	U	0.065	U	0.075	U
PCB 170		35065306	0.06	U	0.055	U	0.05	U	0.06	U
PCB 18		37680652	1.05	U	1	U	0.9	U	1.05	U
PCB 180		35065293	0.095	U	0.09	U	0.08	U	0.095	U
PCB 183	x	52663691	0.029	U	0.027	U	0.02	U	0.028	U
PCB 184	x	74472483	0.055	U	0.05	U	0.048	U	0.055	U
PCB 187		52663680	0.065	U	0.06	U	0.055	U	0.065	U
PCB 195		52663782	0.033	U	0.031	U	0.028	U	0.03	U
PCB 206		40186729	0.041	U	0.039	U	0.035	U	0.04	U
PCB 209		2051243	0.038	U	0.036	U	0.03	U	0.04	U

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Analyte		CAS Number	SEREF-1 Result	SEREF-1 Qual	SEREF-4X Result	SEREF-4X Qual	SEREF-5 Result	SEREF-5 Qual	WREF-2X Result	WREF-2X Qual
PCBs (UG/KG)										
PCB 28		7012375	0.095	U	0.09	U	0.08	U	0.095	U
PCB 44		41464395	0.039	U	0.037	U	0.033	U	0.038	U
PCB 49	x	41464408	0.15	U	0.14	U	0.125	U	0.145	U
PCB 52		35693993	0.045	U	0.042	U	0.038	U	0.044	U
PCB 66		32598100	0.05	U	0.047	U	0.04	U	0.05	U
PCB 77	x	32598133	0.12	U	0.11	U	0.1	U	0.12	U
PCB 8		34883437	0.22	U	0.2	U	0.19	U	0.21	U
PCB 87	x	38380028	0.09	U	0.085	U	0.075	U	0.09	U
Total PCBs			*6*	*U*	*5*	*U*	*5*	*U*	*5*	*U*

Analyte		CAS Number	WREF-4 Result	WREF-4 Qual	WREF-5 Result	WREF-5 Qual
PCBs (UG/KG)						
PCB 101		37680732	0.28	U	0.26	U
PCB 105		32598144	0.55	U	0.5	U
PCB 118		31508006	0.044	U	0.042	U
PCB 126	x	57465288	0.11	U	0.1	U
PCB 128		38380073	0.07	U	0.07	U
PCB 138		35065282	0.06	U	0.06	U
PCB 153		35065271	0.04	U	0.03	U
PCB 156	x	38380084	0.07	U	0.07	U
PCB 169	x	32774166	0.085	U	0.08	U
PCB 170		35065306	0.065	U	0.06	U
PCB 18		37680652	1.2	U	1.1	U
PCB 180		35065293	0.11	U	0.1	U
PCB 183	x	52663691	0.03	U	0.03	U
PCB 184	x	74472483	0.06	U	0.06	U
PCB 187		52663680	0.07	U	0.07	U
PCB 195		52663782	0.04	U	0.03	U
PCB 206		40186729	0.05	U	0.043	U
PCB 209		2051243	0.042	U	0.04	U

Analyte		CAS Number	WREF-4 Result	WREF-4 Qual	WREF-5 Result	WREF-5 Qual
PCBs (UG/KG)						
PCB 28		7012375	0.11	U	0.1	U
PCB 44		41464395	0.043	U	0.04	U
PCB 49	x	41464408	0.17	U	0.16	U
PCB 52		35693993	0.05	U	0.14	JJ
PCB 66		32598100	0.055	U	0.05	U
PCB 77	x	32598133	0.13	U	0.13	U
PCB 8		34883437	0.24	U	0.23	U
PCB 87	x	38380028	0.1	U	0.095	U
Total PCBs			*6*	*U*	*6*	

Analyte		CAS Number	ELDS-3 Result	ELDS-3 Qual	ELDS-5 Result	ELDS-5 Qual	ELDS-9 Result	ELDS-9 Qual	ELDS-13 Result	ELDS-13 Qual
PAHs (UG/KG)										
1-Methylnaphthalene		90120	1.05	U	1.2	U	1	U	2.6	J
2-Methylnaphthalene		91576	1.4	U	1.5	U	1.25	U	3.2	J
Acenaphthene		83329	0.9	U	1.1	U	0.85	U	1	U
Acenaphthylene		208968	0.7	U	0.8	U	0.7	U	0.8	U
Anthracene		120127	1.7	J	0.8	U	0.7	U	16	J
Benzo(a)anthracene		56553	7.7	J	11	J	1.1	U	79	M
Benzo(a)pyrene		50328	8.4	J	11	J	1.9	U	73	MM
Benzo(b)fluoranthene		205992	13	J	16	J	3.3	J	94	M
Benzo(g,h,i)perylene		191242	5.3	J	7.1	J	1.15	U	40	M
Benzo(k)fluoranthene		207089	4.6	J	5.9	J	1.8	U	35	M
Chrysene		218019	8.7	J	11	J	3.7	J	62	M
Dibenz(a,h)anthracene		53703	1.1	U	1.3	U	1.1	U	14	J
Fluoranthene		206440	14	J	17	J	2.6	J	110	MM
Fluorene		86737	2.0	U	2.2	U	1.9	U	7	J
Indeno(1,2,3-cd)pyrene		193395	5.1	J	7	J	1.1	U	48	M
Naphthalene		91203	1.6	U	1.8	U	1.5	U	1.7	U
Phenanthrene		85018	5.7	J	6.3	J	1.1	U	60	MM
Pyrene		129000	12	J	14	J	1.2	U	84	MM

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Analyte		CAS Number	ELDS-3 Result	ELDS-3 Qual	ELDS-5 Result	ELDS-5 Qual	ELDS-9 Result	ELDS-9 Qual	ELDS-13 Result	ELDS-13 Qual
PAHs (UG/KG)										
Total LMW PAHs			*15*		*16*		*9*	*U*	*92*	
Total HMW PAHs			*80*		*101*		*19*		*639*	
Total PAHs			*95*		*117*		*28*		*731*	

Analyte		CAS Number	ELDS-15 Result	ELDS-15 Qual	ELDS-19 Result	ELDS-19 Qual	ELDS-21 Result	ELDS-21 Qual	ELDS-23 Result	ELDS-23 Qual
PAHs (UG/KG)										
1-Methylnaphthalene		90120	1.05	U	1.1	U	2.5	J	1.1	U
2-Methylnaphthalene		91576	1.4	U	1.45	U	2.8	J	1.5	U
Acenaphthene		83329	0.95	U	1	U	0.9	U	1	U
Acenaphthylene		208968	0.75	U	0.8	U	0.7	U	0.8	U
Anthracene		120127	0.75	U	2.1	J	0.7	U	6.9	J
Benzo(a)anthracene		56553	5.3	J	13	J	6.8	J	65	
Benzo(a)pyrene		50328	5.8	J	15	J	8.8	J	48	
Benzo(b)fluoranthene		205992	8.6	J	19	J	12	J	60	
Benzo(g,h,i)perylene		191242	4.8	J	12	J	6.6	J	26	
Benzo(k)fluoranthene		207089	1.95	U	7.7	J	4.6	J	19	J
Chrysene		218019	6.5	J	13	J	7.3	J	49	
Dibenz(a,h)anthracene		53703	1.15	U	2.4	J	1.05	U	4.7	J
Fluoranthene		206440	8.8	J	17	J	13	J	99	
Fluorene		86737	2	U	2.1	U	1.85	U	2.1	U
Indeno(1,2,3-cd)pyrene		193395	5.4	J	13	J	6.8	J	24	J
Naphthalene		91203	1.65	U	1.7	U	1.5	U	1.7	U
Phenanthrene		85018	3.9	J	9.6	J	6.2	J	31	
Pyrene		129000	7.4	J	18	J	10	J	85	
Total LMW PAHs			*12*		*20*		*17*		*46*	
Total HMW PAHs			*56*		*130*		*77*		*480*	
Total PAHs			*68*		*150*		*94*		*526*	

Analyte		CAS Number	ELDS-27 Result	ELDS-27 Qual	ELDS-27D Result	ELDS-27D Qual	ELDS-31 Result	ELDS-31 Qual	ELDS-33 Result	ELDS-33 Qual
PCBs (UG/KG)										
PCB 101		37680732	0.28	U	0.29	U	0.265	U	0.23	U
PCB 105		32598144	0.55	U	0.55	U	0.5	U	0.44	U
PCB 118		31508006	0.044	U	0.046	U	0.04	U	0.036	U
PCB 126	x	57465288	0.105	U	0.11	U	0.1	U	0.085	U
PCB 128		38380073	0.07	U	0.075	U	0.07	U	0.06	U
PCB 138		35065282	0.06	U	0.065	U	0.06	U	0.19	JJ
PCB 153		35065271	0.035	U	0.037	U	0.03	U	0.2	J
PCB 156	x	38380084	0.07	U	0.075	U	0.07	U	0.06	U
PCB 169	x	32774166	0.085	U	0.090	U	0.08	U	0.07	U
PCB 170		35065306	0.065	U	0.070	U	0.065	U	0.055	U
PCB 18		37680652	1.2	U	1.2	U	1.15	U	0.95	U
PCB 180		35065293	0.31	J	0.11	U	0.1	U	0.085	U
PCB 183	x	52663691	0.032	U	0.033	U	0.03	U	0.026	U
PCB 184	x	74472483	0.06	U	0.065	U	0.06	U	0.05	U
PCB 187		52663680	0.07	U	0.075	U	0.07	U	0.06	U
PCB 195		52663782	0.036	U	0.038	U	0.035	U	0.03	U
PCB 206		40186729	0.045	U	0.047	U	0.044	U	0.037	U
PCB 209		2051243	0.042	U	0.044	U	0.04	U	0.03	U
PCB 28		7012375	0.105	UL	0.11	UL	0.1	UL	0.085	UL
PCB 44		41464395	0.043	U	0.044	U	0.04	U	0.035	U
PCB 49	x	41464408	0.17	UL	0.17	UL	0.16	UL	0.135	UL
PCB 52		35693993	0.049	U	0.05	U	0.05	U	0.04	U
PCB 66		32598100	0.055	U	0.055	U	0.055	U	0.045	U
PCB 77	x	32598133	0.13	U	0.135	U	0.13	U	0.11	U
PCB 8		34883437	0.24	U	0.25	U	0.23	U	0.20	U
PCB 87	x	38380028	0.1	U	0.10	U	0.095	U	0.08	U
Total PCBs			*7*		*6*	*U*	*6*	*U*	*6*	

Analyte		CAS Number	ELDS-35 Result	ELDS-35 Qual	ELDS-37 Result	ELDS-37 Qual	ELDS-39 Result	ELDS-39 Qual	ELDS-39D Result	ELDS-39D Qual
PCBs (UG/KG)										
PCB 101		37680732	0.26	U	0.29	U	0.26	U	0.27	U
PCB 105		32598144	0.5	U	0.55	U	0.5	U	0.5	U
PCB 118		31508006	0.041	U	0.66	JJ	0.042	U	0.043	U
PCB 126	x	57465288	0.1	U	0.11	U	0.1	U	0.1	U
PCB 128		38380073	0.07	U	0.075	U	0.07	U	0.07	U
PCB 138		35065282	0.055	U	0.065	U	0.31	J	0.06	U
PCB 153		35065271	0.12	J	0.038	U	0.36	J	0.035	U
PCB 156	x	38380084	0.07	U	1.4	JJ	0.07	U	0.07	U
PCB 169	x	32774166	0.08	U	0.09	U	0.08	U	0.085	U
PCB 170		35065306	0.06	U	0.07	U	0.06	U	0.065	U
PCB 18		37680652	1.1	U	1.25	U	1.1	U	1.15	U
PCB 180		35065293	0.1	U	0.11	U	0.3	J	0.1	U
PCB 183	x	52663691	0.03	U	1.2	J	0.030	U	0.031	U
PCB 184	x	74472483	0.06	U	0.065	U	0.06	U	0.06	U
PCB 187		52663680	0.07	U	0.075	U	0.07	U	0.07	U
PCB 195		52663782	0.034	U	0.038	U	0.034	U	0.035	U
PCB 206		40186729	0.04	U	0.048	U	0.043	U	0.044	U
PCB 209		2051243	0.04	U	0.045	U	0.040	U	0.041	U
PCB 28		7012375	0.1	UL	0.11	UL	0.1	UL	0.1	UL
PCB 44		41464395	0.04	U	0.045	U	0.04	U	0.042	U
PCB 49	x	41464408	0.16	UL	0.18	UL	0.16	UL	0.16	UL
PCB 52		35693993	0.05	U	0.05	U	0.046	U	0.048	U
PCB 66		32598100	0.05	U	0.06	U	0.05	U	0.055	U
PCB 77	x	32598133	0.13	U	0.14	U	0.13	U	0.13	U
PCB 8		34883437	0.22	U	0.25	U	0.22	U	0.23	U
PCB 87	x	38380028	0.09	U	1.1	JJ	0.09	U	0.095	U
Total PCBs			*6*		*8*		*7*		*6*	*U*

Analyte		CAS Number	ELDS-41 Result	ELDS-41 Qual	NEREF-2 Result	NEREF-2 Qual	NEREF-3 Result	NEREF-3 Qual	NEREF-4 Result	NEREF-4 Qual
PCBs (UG/KG)										
PCB 101		37680732	0.24	U	0.26	U	0.25	U	0.28	U
PCB 105		32598144	0.47	U	0.5	U	0.49	U	0.55	U
PCB 118		31508006	0.038	U	0.042	U	0.29	JJ	0.045	U
PCB 126	x	57465288	0.09	U	0.1	U	0.095	U	0.11	U
PCB 128		38380073	0.06	U	0.07	U	0.065	U	0.075	U
PCB 138		35065282	0.05	U	0.06	U	0.055	U	0.06	U
PCB 153		35065271	0.072	J	0.034	U	0.032	U	0.036	U
PCB 156	x	38380084	0.06	U	0.07	U	0.065	U	0.075	U
PCB 169	x	32774166	0.075	U	0.08	U	0.075	U	0.085	U
PCB 170		35065306	0.055	U	0.06	U	0.06	U	0.065	U
PCB 18		37680652	1	U	1.1	U	1.05	U	1.2	U
PCB 180		35065293	0.09	U	0.46	JJ	0.095	U	0.37	J
PCB 183	x	52663691	0.027	U	0.03	U	0.029	U	0.032	U
PCB 184	x	74472483	0.055	U	0.06	U	0.055	U	0.065	U
PCB 187		52663680	0.06	U	0.07	U	0.065	U	0.075	U
PCB 195		52663782	0.031	U	0.03	U	0.033	U	0.037	U
PCB 206		40186729	0.039	U	0.043	U	0.041	U	0.046	U
PCB 209		2051243	0.037	U	0.04	U	0.038	U	0.043	U
PCB 28		7012375	0.09	UL	0.1	U	0.095	U	0.11	U
PCB 44		41464395	0.037	U	0.04	U	0.039	U	0.044	U
PCB 49	x	41464408	0.14	UL	0.16	U	0.15	U	0.17	U
PCB 52		35693993	0.043	U	0.047	U	0.045	U	0.05	U
PCB 66		32598100	0.048	U	0.05	U	0.05	U	0.055	U
PCB 77	x	32598133	0.12	U	0.13	U	0.12	U	0.14	U
PCB 8		34883437	0.21	U	0.23	U	0.22	U	0.24	U
PCB 87	x	38380028	0.085	U	0.095	U	0.09	U	0.1	U
Total PCBs			*5*		*6*		*6*		*7*	

Analyte		CAS Number	SEREF-1 Result	SEREF-1 Qual	SEREF-4X Result	SEREF-4X Qual	SEREF-5 Result	SEREF-5 Qual	WREF-2X Result	WREF-2X Qual
PCBs (UG/KG)										
PCB 101		37680732	0.25	U	0.235	U	0.22	U	0.25	U
PCB 105		32598144	0.49	U	0.46	U	0.42	U	0.48	U
PCB 118		31508006	0.04	U	0.038	U	0.034	U	0.04	U
PCB 126	x	57465288	0.095	U	0.09	U	0.08	U	0.095	U
PCB 128		38380073	0.065	U	0.06	U	0.055	U	0.065	U
PCB 138		35065282	0.055	U	0.05	U	0.047	U	0.055	U
PCB 153		35065271	0.032	U	0.03	U	0.03	U	0.03	U
PCB 156	x	38380084	0.27	JJ	0.06	U	0.055	U	0.065	U
PCB 169	x	32774166	0.08	U	0.07	U	0.065	U	0.075	U
PCB 170		35065306	0.06	U	0.055	U	0.05	U	0.06	U
PCB 18		37680652	1.05	U	1	U	0.9	U	1.05	U
PCB 180		35065293	0.095	U	0.09	U	0.08	U	0.095	U
PCB 183	x	52663691	0.029	U	0.027	U	0.02	U	0.028	U
PCB 184	x	74472483	0.055	U	0.05	U	0.048	U	0.055	U
PCB 187		52663680	0.065	U	0.06	U	0.055	U	0.065	U
PCB 195		52663782	0.033	U	0.031	U	0.028	U	0.03	U
PCB 206		40186729	0.041	U	0.039	U	0.035	U	0.04	U
PCB 209		2051243	0.038	U	0.036	U	0.03	U	0.04	U
PCB 28		7012375	0.095	U	0.09	U	0.08	U	0.095	U
PCB 44		41464395	0.039	U	0.037	U	0.033	U	0.038	U
PCB 49	x	41464408	0.15	U	0.14	U	0.125	U	0.145	U
PCB 52		35693993	0.045	U	0.042	U	0.038	U	0.044	U
PCB 66		32598100	0.05	U	0.047	U	0.04	U	0.05	U
PCB 77	x	32598133	0.12	U	0.11	U	0.1	U	0.12	U
PCB 8		34883437	0.22	U	0.2	U	0.19	U	0.21	U
PCB 87	x	38380028	0.09	U	0.085	U	0.075	U	0.09	U
Total PCBs			*6*	*U*	*5*	*U*	*5*	*U*	*5*	*U*

Analyte		CAS Number	WREF-4 Result	WREF-4 Qual	WREF-5 Result	WREF-5 Qual
PCBs (UG/KG)						
PCB 101		37680732	0.28	U	0.26	U
PCB 105		32598144	0.55	U	0.5	U
PCB 118		31508006	0.044	U	0.042	U
PCB 126	x	57465288	0.11	U	0.1	U
PCB 128		38380073	0.07	U	0.07	U
PCB 138		35065282	0.06	U	0.06	U
PCB 153		35065271	0.04	U	0.03	U
PCB 156	x	38380084	0.07	U	0.07	U
PCB 169	x	32774166	0.085	U	0.08	U
PCB 170		35065306	0.065	U	0.06	U
PCB 18		37680652	1.2	U	1.1	U
PCB 180		35065293	0.11	U	0.1	U
PCB 183	x	52663691	0.03	U	0.03	U
PCB 184	x	74472483	0.06	U	0.06	U
PCB 187		52663680	0.07	U	0.07	U
PCB 195		52663782	0.04	U	0.03	U
PCB 206		40186729	0.05	U	0.043	U
PCB 209		2051243	0.042	U	0.04	U
PCB 28		7012375	0.11	U	0.1	U
PCB 44		41464395	0.043	U	0.04	U
PCB 49	x	41464408	0.17	U	0.16	U
PCB 52		35693993	0.05	U	0.14	JJ
PCB 66		32598100	0.055	U	0.05	U
PCB 77	x	32598133	0.13	U	0.13	U
PCB 8		34883437	0.24	U	0.23	U
PCB 87	x	38380028	0.1	U	0.095	U
Total PCBs			*6*	*U*	*6*	

Analyte		CAS Number	ELDS-3 Result	ELDS-3 Qual	ELDS-5 Result	ELDS-5 Qual	ELDS-9 Result	ELDS-9 Qual	ELDS-13 Result	ELDS-13 Qual
PAHs (UG/KG)										
1-Methylnaphthalene		90120	1.05	U	1.2	U	1	U	2.6	J
2-Methylnaphthalene		91576	1.4	U	1.5	U	1.25	U	3.2	J
Acenaphthene		83329	0.9	U	1.1	U	0.85	U	1	U
Acenaphthylene		208968	0.7	U	0.8	U	0.7	U	0.8	U
Anthracene		120127	1.7	J	0.8	U	0.7	U	16	J
Benzo(a)anthracene		56553	7.7	J	11	J	1.1	U	79	M
Benzo(a)pyrene		50328	8.4	J	11	J	1.9	U	73	MM
Benzo(b)fluoranthene		205992	13	J	16	J	3.3	J	94	M
Benzo(g,h,i)perylene		191242	5.3	J	7.1	J	1.15	U	40	M
Benzo(k)fluoranthene		207089	4.6	J	5.9	J	1.8	U	35	M
Chrysene		218019	8.7	J	11	J	3.7	J	62	M
Dibenz(a,h)anthracene		53703	1.1	U	1.3	U	1.1	U	14	J
Fluoranthene		206440	14	J	17	J	2.6	J	110	MM
Fluorene		86737	2.0	U	2.2	U	1.9	U	7	J
Indeno(1,2,3-cd)pyrene		193395	5.1	J	7	J	1.1	U	48	M
Naphthalene		91203	1.6	U	1.8	U	1.5	U	1.7	U
Phenanthrene		85018	5.7	J	6.3	J	1.1	U	60	MM
Pyrene		129000	12	J	14	J	1.2	U	84	MM
Total LMW PAHs			*15*		*16*		*9*	*U*	*92*	
Total HMW PAHs			*80*		*101*		*19*		*639*	
Total PAHs			*95*		*117*		*28*		*731*	

Analyte		CAS Number	ELDS-15 Result	ELDS-15 Qual	ELDS-19 Result	ELDS-19 Qual	ELDS-21 Result	ELDS-21 Qual	ELDS-23 Result	ELDS-23 Qual
PAHs (UG/KG)										
1-Methylnaphthalene		90120	1.05	U	1.1	U	2.5	J	1.1	U
2-Methylnaphthalene		91576	1.4	U	1.45	U	2.8	J	1.5	U
Acenaphthene		83329	0.95	U	1	U	0.9	U	1	U
Acenaphthylene		208968	0.75	U	0.8	U	0.7	U	0.8	U
Anthracene		120127	0.75	U	2.1	J	0.7	U	6.9	J

Analyte		CAS Number	ELDS-15 Result	ELDS-15 Qual	ELDS-19 Result	ELDS-19 Qual	ELDS-21 Result	ELDS-21 Qual	ELDS-23 Result	ELDS-23 Qual
PAHs (UG/KG)										
Benzo(a)anthracene		56553	5.3	J	13	J	6.8	J	65	
Benzo(a)pyrene		50328	5.8	J	15	J	8.8	J	48	
Benzo(b)fluoranthene		205992	8.6	J	19	J	12	J	60	
Benzo(g,h,i)perylene		191242	4.8	J	12	J	6.6	J	26	
Benzo(k)fluoranthene		207089	1.95	U	7.7	J	4.6	J	19	J
Chrysene		218019	6.5	J	13	J	7.3	J	49	
Dibenz(a,h)anthracene		53703	1.15	U	2.4	J	1.05	U	4.7	J
Fluoranthene		206440	8.8	J	17	J	13	J	99	
Fluorene		86737	2	U	2.1	U	1.85	U	2.1	U
Indeno(1,2,3-cd)pyrene		193395	5.4	J	13	J	6.8	J	24	J
Naphthalene		91203	1.65	U	1.7	U	1.5	U	1.7	U
Phenanthrene		85018	3.9	J	9.6	J	6.2	J	31	
Pyrene		129000	7.4	J	18	J	10	J	85	
Total LMW PAHs			*12*		*20*		*17*		*46*	
Total HMW PAHs			*56*		*130*		*77*		*480*	
Total PAHs			*68*		*150*		*94*		*526*	

Analyte		CAS Number	ELDS-27 Result	ELDS-27 Qual	ELDS-27D Result	ELDS-27D Qual	ELDS-31 Result	ELDS-31 Qual	ELDS-33 Result	ELDS-33 Qual
PAHs (UG/KG)										
1-Methylnaphthalene		90120	1.05	U	1.1	U	1.1	U	0.75	U
2-Methylnaphthalene		91576	1.4	U	1.45	U	1.4	U	0.95	U
Acenaphthene		83329	0.95	U	1	U	0.95	U	0.65	U
Acenaphthylene		208968	0.75	U	0.8	U	0.8	U	0.5	U
Anthracene		120127	46		1.6	J	0.8	U	1.5	J
Benzo(a)anthracene		56553	170		6.7	J	2.8	J	12	J
Benzo(a)pyrene		50328	130		7.3	J	2.15	U	12	J
Benzo(b)fluoranthene		205992	160		10	J	6.6	J	18	J
Benzo(g,h,i)perylene		191242	63		5.2	J	3	J	7.8	J
Benzo(k)fluoranthene		207089	55		2	U	2	U	6.1	J
Chrysene		218019	130		7.7	J	4.5	J	11	J

Analyte		CAS Number	ELDS-27 Result	ELDS-27 Qual	ELDS-27D Result	ELDS-27D Qual	ELDS-31 Result	ELDS-31 Qual	ELDS-33 Result	ELDS-33 Qual
Dibenz(a,h)anthracene		53703	20	J	1.2	U	1.15	U	1.8	J
Fluoranthene		206440	300		12	J	4.6	J	16	J
Fluorene		86737	4.4	J	2.1	U	2.1	U	1.4	U
Indeno(1,2,3-cd)pyrene		193395	72		5.2	J	3.3	J	6.4	J
Naphthalene		91203	1.6	U	1.7	U	1.7	U	1.15	U
Phenanthrene		85018	71		5.7	J	5.4	J	5.6	J
Pyrene		129000	210		9.4	J	4.7	J	18	
Total LMW PAHs			*127*		*15*		*14*		*13*	
Total HMW PAHs			*1310*		*67*		*35*		*109*	
Total PAHs			*1437*		*82*		*49*		*122*	

Analyte		CAS Number	ELDS-35 Result	ELDS-35 Qual	ELDS-37 Result	ELDS-37 Qual	ELDS-39 Result	ELDS-39 Qual	ELDS-39D Result	ELDS-39D Qual
PAHs (UG/KG)										
1-Methylnaphthalene		90120	1.05	U	1.1	U	12	J	1.1	U
2-Methylnaphthalene		91576	1.4	U	1.45	U	12	J	1.5	U
Acenaphthene		83329	0.95	U	1	U	47		1	U
Acenaphthylene		208968	0.75	U	0.8	U	0.75	U	0.8	U
Anthracene		120127	0.75	U	1.9	J	70		0.8	U
Benzo(a)anthracene		56553	6.1	J	14	J	120		1.3	U
Benzo(a)pyrene		50328	7.1	J	15	J	59		2.2	U
Benzo(b)fluoranthene		205992	12	J	22	J	100		5	J
Benzo(g,h,i)perylene		191242	5.9	J	11	J	30		2.8	J
Benzo(k)fluoranthene		207089	5	J	8.4	J	34		2	U
Chrysene		218019	8.7	J	13	J	85		4.7	J
Dibenz(a,h)anthracene		53703	1.1	U	1.2	U	6.3	J	1.2	U
Fluoranthene		206440	11	J	20	J	280		3.3	J
Fluorene		86737	2	U	2.1	U	56		2.1	U
Indeno(1,2,3-cd)pyrene		193395	6.6	J	10	J	31		3.1	J
Naphthalene		91203	1.6	U	1.7	U	1.65	U	1.7	U
Phenanthrene		85018	6.2	J	8.4	J	290		7.2	J
Pyrene		129000	12	J	18	J	200		3.6	J
Total LMW PAHs			*15*		*18*		*489*		*16*	
Total HMW PAHs			*76*		*133*		*945*		*29*	
Total PAHs			*90*		*151*		*1435*		*45*	

Analyte		CAS Number	ELDS-41 Result	ELDS-41 Qual	NEREF-2 Result	NEREF-2 Qual	NEREF-3 Result	NEREF-3 Qual	NEREF-4 Result	NEREF-4 Qual
PAHs (UG/KG)										
1-Methylnaphthalene		90120	1.2	U	1	U	1	U	1.1	U
2-Methylnaphthalene		91576	1.5	U	1.3	U	1.3	U	1.5	U
Acenaphthene		83329	1	U	0.9	U	0.9	U	1	U
Acenaphthylene		208968	0.8	U	0.7	U	0.7	U	0.8	U
Anthracene		120127	1.9	J	2.1	J	1.8	J	5	J

Analyte		CAS Number	ELDS-41 Result	ELDS-41 Qual	NEREF-2 Result	NEREF-2 Qual	NEREF-3 Result	NEREF-3 Qual	NEREF-4 Result	NEREF-4 Qual
PAHs (UG/KG)										
Benzo(a)anthracene		56553	16	J	16	J	14	J	34	
Benzo(a)pyrene		50328	14	J	14	J	21	J	29	
Benzo(b)fluoranthene		205992	19	J	21	J	32		39	
Benzo(g,h,i)perylene		191242	7.5	J	8.7	J	15	J	18	J
Benzo(k)fluoranthene		207089	6.4	J	9.1	J	11	J	15	J
Chrysene		218019	14	J	16	J	15	J	31	
Dibenz(a,h)anthracene		53703	1.2	U	1.1	U	3.6	J	3.4	J
Fluoranthene		206440	19	J	26		21	J	46	
Fluorene		86737	2.2	U	1.9	U	1.9	U	2.1	U
Indeno(1,2,3-cd)pyrene		193395	8	J	9.9	J	13	J	18	J
Naphthalene		91203	1.8	U	1.6	U	1.5	U	1.7	U
Phenanthrene		85018	5	J	13	J	9.8	J	18	J
Pyrene		129000	26	J	26		22	J	50	
Total LMW PAHs			*15*		*22*		*19*		*31*	
Total HMW PAHs			*131*		*148*		*168*		*283*	
Total PAHs			*146*		*170*		*186*		*315*	

Analyte		CAS Number	SEREF-1 Result	SEREF-1 Qual	SEREF-4X Result	SEREF-4X Qual	SEREF-5 Result	SEREF-5 Qual	WREF-2X Result	WREF-2X Qual
PAHs (UG/KG)										
1-Methylnaphthalene		90120	1	U	1	U	1.1	U	1.1	U
2-Methylnaphthalene		91576	1.3	U	1.4	U	1.4	U	1.4	U
Acenaphthene		83329	0.9	U	0.9	U	0.95	U	1.0	U
Acenaphthylene		208968	0.7	U	0.7	U	0.75	U	0.75	U
Anthracene		120127	0.7	U	3.6	J	0.75	U	0.75	U
Benzo(a)anthracene		56553	6.5	J	16	J	4.6	J	8.6	J
Benzo(a)pyrene		50328	5	J	13	J	2.1	U	8.4	J
Benzo(b)fluoranthene		205992	6.5	J	18	J	5.7	J	13	J
Benzo(g,h,i)perylene		191242	4.8	J	8.9	J	1.3	U	6.7	J
Benzo(k)fluoranthene		207089	3.7	J	6.9	J	2.0	U	6.8	J
Chrysene		218019	7	J	18	J	4.6	J	10	J

Analyte		CAS Number	SEREF-1 Result	SEREF-1 Qual	SEREF-4X Result	SEREF-4X Qual	SEREF-5 Result	SEREF-5 Qual	WREF-2X Result	WREF-2X Qual
PAHs (UG/KG)										
Dibenz(a,h)anthracene		53703	1.1	U	1.1	U	1.1	U	1.1	U
Fluoranthene		206440	6.5	J	26		4.7	J	13	J
Fluorene		86737	1.9	U	2.0	U	2	U	2	U
Indeno(1,2,3-cd)pyrene		193395	3.5	J	6.5	J	1.2	U	8	J
Naphthalene		91203	1.6	U	1.6	U	1.6	U	1.6	U
Phenanthrene		85018	2.3	J	28		1.1	U	7.2	J
Pyrene		129000	10	J	38		6.8	J	13	J
Total LMW PAHs			*10*		*39*		*10*	*U*	*16*	
Total HMW PAHs			*55*		*152*		*34*		*89*	
Total PAHs			*65*		*191*		*44*		*104*	

Analyte		CAS Number	WREF-4 Result	WREF-4 Qual	WREF-5 Result	WREF-5 Qual
PAHs (UG/KG)						
1-Methylnaphthalene		90120	1	U	1.1	U
2-Methylnaphthalene		91576	1.3	U	1.45	U
Acenaphthene		83329	0.9	U	1	U
Acenaphthylene		208968	0.7	U	0.8	U
Anthracene		120127	0.7	U	0.8	U
Benzo(a)anthracene		56553	2.5	J	3	J
Benzo(a)pyrene		50328	2.0	U	2.2	U
Benzo(b)fluoranthene		205992	4.8	J	5.2	J
Benzo(g,h,i)perylene		191242	2.8	J	1.3	U
Benzo(k)fluoranthene		207089	1.9	U	2.05	U
Chrysene		218019	3.3	J	4.1	J
Dibenz(a,h)anthracene		53703	1.1	U	1.2	U
Fluoranthene		206440	4.6	J	4.2	J
Fluorene		86737	1.9	U	2.1	U
Indeno(1,2,3-cd)pyrene		193395	2.8	J	1.25	U
Naphthalene		91203	1.6	U	1.7	U
Phenanthrene		85018	2.2	J	2.8	J

Analyte		CAS Number	WREF-4 Result	WREF-4 Qual	WREF-5 Result	WREF-5 Qual
Pyrene		129000	3.6	J	4.2	J
Total LMW PAHs			*10*		*12*	
Total HMW PAHs			*29*		*29*	
Total PAHs			*40*		*40*	

x - Not an NOAA18 congener.

J - Estimated.

L - Indicates that the flagged compound did not meet DoD criteria in the corresponding Laboratory Control Sample (LCS) and/ or Labor Control Sample Duplicate (LCSD)

prepared and/or analyzed concurrently with the sample.

M - Indicates that the flagged compound did not meet DoD criteria in the Matrix Spike and/or Matrix Spike Duplicate prepared and/or analyzed concurrently with the native sample.

N - Presumptive evidence of a compound based on a mass spectral library search.

NA - Not Analyzed.

U - Not Detected (reported at 1/2 method detection limit).

Totals calculated using 1/2 the method detection limit (MDL) for non-detects.

Total PCBs calculated as the sum of the 18 NOAA congeners multiplied by 2.

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Analyte		CAS_Number	ELDS-13 Result	ELDS-13 Qual	ELDS-15 Result	ELDS-15 Qual	ELDS-37 Result	ELDS-37 Qual	ELDS-37D Result	ELDS-37D Qual
PHYSICAL PARAMETERS (%)										
% Solids		17	100		100		100		100	
% Lipids		1007	0.15		0.1		0.19		0.11	

Analyte		CAS_Number	ELDS-39 Result	ELDS-39 Qual	NEREF Result	NEREF Qual	SEREF Result	SEREF Qual	WREF Result	WREF Qual
PHYSICAL PARAMETERS (%)										
% Solids		17	100		100		100		100	
% Lipids		1007	0.3		0.14		0.1		NA	

Analyte		CAS_Number	ELDS-13 Result	ELDS-13 Qual	ELDS-15 Result	ELDS-15 Qual	ELDS-37 Result	ELDS-37 Qual	ELDS-37D Result	ELDS-37D Qual
METALS (MG/KG)										
Arsenic		7440382	2.11		2.04		2.26		2.09	
Cadmium		7440439	3.5		3.32		3.47		4.17	
Chromium		7440473	0.324		0.283		0.417		0.291	
Copper		7440508	0.986		1.05		1.15		1.02	
Lead		7439921	0.655		1.6		0.395		0.147	
Nickel		7440020	0.212		0.179		0.198		0.205	
Zinc		7440666	20.4		19.9		18.3		21.8	
Mercury		7439976	0.038	N*	0.031		0.024	J	0.039	

Analyte		CAS_Number	ELDS-39 Result	ELDS-39 Qual	NEREF Result	NEREF Qual	SEREF Result	SEREF Qual	WREF Result	WREF Qual
METALS (MG/KG)										
Arsenic		7440382	2.16		2.18		2.81		2.18	
Cadmium		7440439	3.5		4.06		0.432		0.722	
Chromium		7440473	0.341		0.596		0.288		0.26	
Copper		7440508	0.985		1.05		6.8		0.832	

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Analyte		CAS_Number	ELDS-39		NEREF		SEREF		WREF	
			Result	Qual	Result	Qual	Result	Qual	Result	Qual
METALS (MG/KG)										
Lead		7439921	0.866		5.04		1.24		0.369	
Nickel		7440020	0.216		0.225		0.225		0.208	
Zinc		7440666	21.4		28.2		13.6		16.1	
Mercury		7439976	0.022	J	0.028		0.018	J	0.063	

Analyte		CAS_Number	ELDS-13		ELDS-15		ELDS-37		ELDS-37D	
			Result	Qual	Result	Qual	Result	Qual	Result	Qual
PESTICIDES (UG/KG)										
4,4`-DDD		72548	0.055	U	0.05	U	0.05	U	0.047	U
4,4`-DDE		72559	0.05	U	0.0475	U	0.048	U	0.04	U
4,4`-DDT		50293	0.055	U	0.05	U	0.05	U	0.047	U
Total DDTs			*0.2*	*U*	*0.1*	*U*	*0.1*	*U*	*0.1*	*U*
Aldrin		309002	0.0415	U	0.039	U	0.040	U	0.04	U
ALPHA BHC		319846	0.145	U	0.135	U	0.135	U	0.12	U
Alpha-Chlordane (cis)		5103719	0.07	U	0.065	U	0.065	U	0.06	U
BETA BHC		319857	0.095	U	0.09	U	0.09	U	0.08	U
DELTA BHC		319868	0.055	U	0.05	U	0.05	U	0.047	U
Dieldrin		60571	0.15	U	0.14	U	0.14	U	0.13	U
Endosulfan I		959988	0.055	U	0.05	U	0.05	U	0.047	U
Endosulfan II		33213659	0.046	U	0.043	U	0.044	U	0.04	U
Endosulfan sulfate		1031078	0.075	U	0.07	U	0.07	U	0.06	U
Endrin		72208	0.08	UL	0.075	UL	0.075	UL	0.07	UL
Gamma Chlordane		12789036	0.085	U	0.08	U	0.08	U	0.07	U
Gamma-BHC (Lindane)		58899	0.06	U	0.055	U	0.055	U	0.05	U
Heptachlor		76448	0.085	U	0.08	U	1.3	J	0.54	J
Heptachlor epoxide		1024573	0.046	U	0.043	U	0.044	U	0.040	U
Methoxychlor		72435	0.135	U	0.125	U	0.13	U	0.12	U
TECHNICAL CHLORDANE		12789036	1.65	U	1.55	U	1.6	U	1.4	U
Toxaphene		8001352	3.3	U	3.05	U	3.1	U	2.8	U

Analyte		CAS_Number	ELDS-39		NEREF		SEREF		WREF	
			Result	Qual	Result	Qual	Result	Qual	Result	Qual
PESTICIDES (UG/KG)										
4,4`-DDD		72548	0.055	U	0.055	U	NA		NA	
4,4`-DDE		72559	0.049	U	0.05	U	NA		NA	
4,4`-DDT		50293	0.055	U	0.055	U	NA		NA	
Total DDTs			*0.2*	*U*	*0.2*	*U*	NA		NA	
Aldrin		309002	0.04	U	0.041	U	NA		NA	
ALPHA BHC		319846	0.135	U	0.63	J	NA		NA	
Alpha-Chlordane (cis)		5103719	0.065	U	0.07	U	NA		NA	
BETA BHC		319857	0.09	U	0.095	U	NA		NA	
DELTA BHC		319868	0.055	U	0.055	U	NA		NA	
Dieldrin		60571	0.14	U	0.15	U	NA		NA	
Endosulfan I		959988	0.055	U	0.055	U	NA		NA	
Endosulfan II		33213659	0.044	U	0.05	U	NA		NA	
Endosulfan sulfate		1031078	0.07	U	0.07	U	NA		NA	
Endrin		72208	0	UL	0.075	UL	NA		NA	
Gamma Chlordane		12789036	0.08	U	0.08	U	NA		NA	
Gamma-BHC (Lindane)		58899	0.06	U	0.06	U	NA		NA	
Heptachlor		76448	0.58	J	0.44	J	NA		NA	
Heptachlor epoxide		1024573	0.044	U	0.046	U	NA		NA	
Methoxychlor		72435	0.13	U	0.13	U	NA		NA	
TECHNICAL CHLORDANE		12789036	1.6	U	1.65	U	NA		NA	
Toxaphene		8001352	3.15	U	3.2	U	NA		NA	

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Analyte		CAS_Number	ELDS-13		ELDS-15		ELDS-37		ELDS-37D	
			Result	Qual	Result	Qual	Result	Qual	Result	Qual
PCBs (UG/KG)										
PCB 101		37680732	0.55	U	0.6	U	0.5	U	0.38	U
PCB 105		32598144	1.1	U	1.15	U	1	U	0.75	U
PCB 118		31508006	0.09	U	0.095	U	0.08	U	0.06	U
PCB 126	x	34	0.21	U	0.23	U	0.20	U	0.14	U
PCB 128		38380073	0.15	U	0.16	UMM	0.14	U	0.1	U
PCB 138		35065282	0.12	U	0.13	U	0.12	U	0.085	U
PCB 153		35065271	0.07	U	0.075	U	0.065	U	0.048	U
PCB 156	x	38380084	0.15	U	0.16	U	0.14	U	0.1	U
PCB 169	x	32774166	0.17	U	0.18	U	0.16	U	0.12	U
PCB 170		35065306	0.13	U	0.14	U	0.12	U	0.09	U
PCB 18		37680652	2.35	U	2.5	U	2.2	U	1.6	U
PCB 180		35065293	0.21	U	0.23	U	0.20	U	0.14	U
PCB 183	x	52663691	0.065	U	0.065	U	0.06	U	0.043	U
PCB 184	x	74472483	0.13	U	0.13	U	0.115	U	0.085	U
PCB 187		52663680	0.15	U	0.16	U	0.14	U	0.1	U
PCB 195		52663782	0.07	U	0.075	U	0.07	U	0.049	U
PCB 206		40186729	0.09	U	0.095	U	0.085	U	0.06	U
PCB 209		2051243	0.09	U	0.09	U	0.08	U	0.055	U
PCB 28		7012375	0.21	U	0.23	U	0.20	U	0.14	U
PCB 44		41464395	0.09	U	0.09	U	0.51	JJ	0.06	U
PCB 49	x	41464408	0.33	U	0.35	U	0.31	U	0.23	U
PCB 52		35693993	42		0.11	U	0.09	U	0.065	U
PCB 66		32598100	0.11	U	0.12	UM	0.11	U	0.075	U
PCB 77	x	32598133	0.27	U	0.28	U	0.25	U	0.18	U
PCB 8		34883437	0.48	U	0.5	U	0.44	U	0.32	U
PCB 87	x	38380028	0.20	U	0.21	U	0.19	U	0.14	U
Total PCBs			*96*		*13*	*U*	*12*		*8*	*U*
PAHs (UG/KG)										

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Analyte		CAS_Number	ELDS-39		NEREF		SEREF		WREF	
			Result	Qual	Result	Qual	Result	Qual	Result	Qual
PCBs (UG/KG)										
PCB 101		37680732	0.55	U	0.55	U	NA		NA	
PCB 105		32598144	1.1	U	1.1	U	NA		NA	
PCB 118		31508006	0.09	U	0.09	U	NA		NA	
PCB 126	x	34	0.22	U	0.21	U	NA		NA	
PCB 128		38380073	0.15	U	0.15	U	NA		NA	
PCB 138		35065282	0.125	U	0.12	U	NA		NA	
PCB 153		35065271	0.075	U	0.07	U	NA		NA	
PCB 156	x	38380084	0.15	U	0.15	U	NA		NA	
PCB 169	x	32774166	0.175	U	0.17	U	NA		NA	
PCB 170		35065306	0.135	U	0.13	U	NA		NA	
PCB 18		37680652	2.45	U	2.35	U	NA		NA	
PCB 180		35065293	0.22	U	0.21	U	NA		NA	
PCB 183	x	52663691	0.065	U	0.07	U	NA		NA	
PCB 184	x	74472483	0.13	U	0.125	U	NA		NA	
PCB 187		52663680	0.15	U	0.15	U	NA		NA	
PCB 195		52663782	0.075	U	0.07	U	NA		NA	
PCB 206		40186729	0.095	U	0.09	U	NA		NA	
PCB 209		2051243	0.085	U	0.085	U	NA		NA	
PCB 28		7012375	0.22	U	0.21	U	NA		NA	
PCB 44		41464395	0.09	U	0.085	U	NA		NA	
PCB 49	x	41464408	0.34	U	0.33	U	NA		NA	
PCB 52		35693993	0.1	U	0.1	U	NA		NA	
PCB 66		32598100	0.115	U	0.11	U	NA		NA	
PCB 77	x	32598133	0.27	U	0.27	U	NA		NA	
PCB 8		34883437	0.49	U	0.48	U	NA		NA	
PCB 87	x	38380028	0.205	U	0.20	U	NA		NA	
Total PCBs			*13*	*U*	*12*	*U*	NA		NA	

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Analyte		CAS_Number	ELDS-13		ELDS-15		ELDS-37		ELDS-37D	
			Result	Qual	Result	Qual	Result	Qual	Result	Qual
PAHs (UG/KG)										
2-Methylnaphthalene		91576	2.95	UMM	2.8	U	3.2	U	2.9	U
Acenaphthene		83329	3.3	U	3.1	U	3.5	U	3.2	U
Acenaphthylene		208968	3.1	U	3.0	U	3.3	U	3	U
Anthracene		120127	3.2	U	3.1	U	3.4	U	3.1	U
Benzo(a)anthracene		56553	3.95	U	3.8	U	4.2	U	3.8	U
Benzo(a)pyrene		50328	4.7	U	4.5	U	5.0	U	4.55	U
Benzo(b)fluoranthene		205992	3.85	U	3.7	U	4.1	U	3.7	U
Benzo(g,h,i)perylene		191242	2.5	U	2.4	U	2.6	U	2.4	U
Benzo(k)fluoranthene		207089	2.2	UM	2.1	U	2.3	U	2.1	U
Chrysene		218019	3.05	U	2.9	U	3.3	U	2.95	U
Dibenz(a,h)anthracene		53703	4.85	UM	4.6	U	5	U	4.65	U
Fluoranthene		206440	5.5	U	5	U	6	U	5.5	U
Fluorene		86737	3	U	2.9	U	3.2	U	2.9	U
Indeno(1,2,3-cd)pyrene		193395	4.2	U	4.0	U	4.5	U	4.05	U
Naphthalene		91203	4.4	U	4.2	U	4.7	U	4.25	U
Phenanthrene		85018	4.95	U	4.7	U	5	U	4.75	U
Pyrene		129000	2.9	U	2.7	U	3.1	U	2.75	U
Total LMW PAHs	*L*		*25*	*U*	*24*	*U*	*26*	*U*	*24*	*U*
Total HMW PAHs	*H*		*38*	*U*	*35*	*U*	*40*	*U*	*36*	*U*
Total PAHs			*63*	*U*	*59*	*U*	*66*	*U*	*61*	*U*

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Analyte		CAS_Number	ELDS-39		NEREF		SEREF		WREF	
			Result	Qual	Result	Qual	Result	Qual	Result	Qual
PAHs (UG/KG)										
2-Methylnaphthalene		91576	3.0	U	2.8	U	2.9	U	3.0	U
Acenaphthene		83329	3.3	U	3.05	U	3.2	U	3.3	U
Acenaphthylene		208968	3.1	U	2.9	U	3.1	U	3.1	U
Anthracene		120127	3.2	U	3	U	3.1	U	3.2	U
Benzo(a)anthracene		56553	3.9	U	3.7	U	3.9	U	3.9	U
Benzo(a)pyrene		50328	4.7	U	4.4	U	4.6	U	4.7	U
Benzo(b)fluoranthene		205992	3.8	U	3.6	U	3.7	U	3.8	U
Benzo(g,h,i)perylene		191242	2.45	U	2.3	U	2.4	U	2.5	U
Benzo(k)fluoranthene		207089	2.2	U	2	U	2.1	U	2.2	U
Chrysene		218019	3.1	U	2.9	U	3	U	3.1	U
Dibenz(a,h)anthracene		53703	4.8	U	4.5	U	4.7	U	4.8	U
Fluoranthene		206440	5.5	U	5	U	5.5	U	5.5	U
Fluorene		86737	3.0	U	2.8	U	2.9	U	3.0	U
Indeno(1,2,3-cd)pyrene		193395	4.2	U	3.9	U	4.1	U	4.2	U
Naphthalene		91203	4.4	U	4.1	U	4.3	U	4.4	U
Phenanthrene		85018	4.9	U	4.6	U	4.8	U	4.9	U
Pyrene		129000	2.9	U	2.7	U	2.8	U	2.9	U
Total LMW PAHs	*L*		*25*	*U*	*23*	*U*	*24*	*U*	*25*	*U*
Total HMW PAHs	*H*		*37*	*U*	*35*	*U*	*37*	*U*	*37*	*U*
Total PAHs			*62*	*U*	*58*	*U*	*61*	*U*	*62*	*U*

x - Not a NOAA18 congener.
J - Estimated.
L - Indicates that the flagged compound did not meet DoD criteria in the corresponding Laboratory Control Sample (LCS) and/ or Labor Control Sample Duplicate (LCSD) prepared and/or analyzed concurrently with the sample.
M - Indicates that the flagged compound did not meet DoD criteria in the Matrix Spike and/or Matrix Spike Duplicate prepared and/or analyzed concurrently with the native sample.
N - Presumptive evidence of a compound based on a mass spectral library search.
NA - Not Analyzed.
U - Not Detected (reported at 1/2 method detection limit).
Totals calculated using 1/2 the method detection limit (MDL) for non-detects.
Total PCBs calculated as the sum of the 18 NOAA congeners multiplied by 2.

Appendix F

Benthic Biology Results for ELDS Survey

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Table F-1. Species counts for the disposal site stations sampled during the ELDS survey, November 2017.

Taxon	Disposal Site Stations									Total
	ELDS-5	ELDS-9	ELDS-13	ELDS-15	ELDS-19	ELDS-23	ELDS-33	ELDS-37	ELDS-39	
Crassinella lunulata	4		1	42	4	51	22	114	263	501
Oligochaeta spp.	6	45	43	32	5	104	18	18	19	290
Byblis serrata	1	15	11	14	26	3	26	34		130
Mya arenaria	8	7	20	7	22	17	4	22	1	108
Aricidea (Acmira) catherinae	1		8	7	8	59	11	4	3	101
Exogone dispar	12	3	11	2	4	12	3	7	17	71
Crepidula fornicata	16		9	2		43				70
Clymenella zonalis	4	6	5	5	8	25	5	1		59
Crassicorophium bonellii				5		44				49
Tritia trivittata	23		18	3	5					49
Spiophanes bombyx	4	6	8	8	3	11	4	3	1	48
Sabellaria vulgaris	11	1	14	11		2	2	6		47
Astyris lunata	6		12	8		11	1			38
Tharyx acutus	2		4	3	3	11	6	6	3	38
Lyonsia arenosa		2	4	2	2	15	6	5		36
Scalibregma inflatum	4	5	7	2	5		4	9		36
Pagurus longicarpus	11	1		3	3	2	12	2	1	35
Dipolydora socialis	4			1	4		19	7		35
Nephtys picta	1	5	1	11	5	1	8	2		34
Polycirrus phosphoreus	1	1	5	1	1	1	1	5	18	34
Parexogone hebes	8	2	8	2	3	1	3	2	4	33
Pinnixa sayana			1		28			1		30
Paradoneis lyra			4			15	8			27
Microdeutopus anomalus	6		12			2	2	2	1	25
Nucula proxima	2	1	6	3	2	1		7	1	23
Dipolydora caulleryi	8	2		1	10					21
Clymenella torquata	1		8	1	2	3		6		21

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Taxon	Disposal Site Stations									Total
	ELDS-5	ELDS-9	ELDS-13	ELDS-15	ELDS-19	ELDS-23	ELDS-33	ELDS-37	ELDS-39	
Kirkegaardia baptisteae	3	5	5			8				21
Pitar morrhuanus		5	5		1	1	1	6		19
Maldanidae spp.			10	2		1	6			19
Aphelochaeta marioni		1		2	3	5	4	3	1	19
Nephtys incisa	6		6			4		3		19
Parougia caeca						5	12			17
Mediomastus ambiseta		2	8			4		1		15
Rhepoxynius abronius						11	1		3	15
Anadara transversa	1		6	1		5		1		14
Glycera capitata	2	1	1		1	1			8	14
Cotonopsis lafresnayi	2		4	4		3				13
Caprella penantis				5		8				13
Ampharete lindstroemi		1	3	3		3	2	1		13
Carinomella lactea		1	1	2	2	2	1	3	1	13
Protodorvellia kefesteini				3		7	3			13
Syllis spp.			2	2		2	1	1	4	12
Magelona sp.	1	2		2			3	3		11
Spiochaetopterus oculatus		1	3		1	1	1	4		11
Paracaprella tenuis				6		4				10
Stenothoidae spp.						10				10
Ampelisca abdita		1		9						10
Melinna cristata	1	1	2	1	2		2			9
Amphipholis squamata	1	2	1		1	3		1		9
Ophiuroidea spp.				1		2	1	4		8
Unciola inermis			5	3						8
Bipalponephtys cornuta	2					3		3		8
Oxyurostylis smithi					1	2	1	3	1	8
Caprella spp.	2		1					5		8
Dorvellidae spp.								8		8

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Taxon	Disposal Site Stations									Total
	ELDS-5	ELDS-9	ELDS-13	ELDS-15	ELDS-19	ELDS-23	ELDS-33	ELDS-37	ELDS-39	
Polygordius jouinae				4					2	6
Parvicardium pinnulatum									6	6
Cerebratulus lacteus		1	1	2	1	1				6
Glyceridae spp.			4		1	1				6
Nephtys spp.							6			6
Prionospio steenstrupi		1	1		3					5
Sthenelais boa			2			2		1		5
Owenia fusiformis		1			1	2		1		5
Micrura affinis				2	1	1		1		5
Drilonereis longa				2			2			4
Caecum johnsoni									4	4
Parametopella cypris				4						4
Ampharetidae spp.			4							4
Ergaea walshi	1					3				4
Pagurus annulipes				4						4
Leitoscoloplos fragilis	1		1						1	3
Pandora gouldiana			2				1			3
Astarte castanea			1						2	3
Unciola irrorata			3							3
Spisula solidissima				2			1			3
Phyllodoce arenae		1		2						3
Pilargidae spp.								1	2	3
Odostomia spp.			2							2
Tanaissus psammophilus							2			2
Libinia dubia						2				2
Strongylocentrotus droebachiensis							2			2
Cryoturris cerinella								2		2
Rissoa parva					1		1			2
Pectinaria gouldii						2				2

Taxon	Disposal Site Stations									Total
	ELDS-5	ELDS-9	ELDS-13	ELDS-15	ELDS-19	ELDS-23	ELDS-33	ELDS-37	ELDS-39	
Capitella capitata							2			2
Cyathura polita				1		1				2
Mysid spp.				1						1
Diastylis quadrispinosa			1							1
Astarte undata									1	1
Arabella iricolor		1								1
Panopeus herbstii						1				1
Hydroides dianthus						1				1
Arctica islandica									1	1
Amphipoda spp.									1	1
Pherusa affinis								1		1
Naticidae spp.	1									1
Gammarus lawrencianus	1									1
Polinices immaculatus								1		1
Epitomapta roseola							1			1
Periploma leanum					1					1
Parasabella microphthalma							1			1
Cumacean spp.				1						1
Sigalonidae spp.		1								1
Gyptis vittata				1						1
Pagurus pollicaris						1				1
Axius serratus	1									1
Glycera americana						1				1
Sthenelais spp.					1					1
Lucinoma filosa			1							1
Scoletoma fragilis	1									1
Nereis zonata	1									1
Phyllodoce maculata								1		1
Pista elongata						1				1

Taxon	Disposal Site Stations									Total
	ELDS-5	ELDS-9	ELDS-13	ELDS-15	ELDS-19	ELDS-23	ELDS-33	ELDS-37	ELDS-39	
Ophiura robusta								1		1
Urosalpinx cinerea						1				1
Maldane sarsi					1					1
Chaetopleura apiculata						1				1
Total	172	131	306	248	176	551	223	323	370	2500

Table F-2. Species counts for the reference stations sampled during the ELDS survey, November 2017.

Taxon	Disposal Site Stations			Total
	NEREF-3	SEREF-4	WREF-4	
Crassinella lunulata		83	94	177
Oligochaeta spp.	2	4	80	86
Byblis serrata	43			43
Aricidea (Acmira) catherinae		2	25	27
Astyris lunata			25	25
Paracaprella tenuis			22	22
Spiophanes bombyx	7	6	8	21
Mysid spp.			21	21
Mya arenaria	14	3	2	19
Crassicorophium bonellii			19	19
Mediomastus ambiseta	9		10	19
Anadara transversa			19	19
Sabellaria vulgaris			18	18
Tharyx acutus		11	5	16
Cotonopsis lafresnayi	1		15	16
Prionospio steenstrupi	16			16
Pagurus longicarpus	1	2	12	15
Nucula proxima	7	1	6	14
Rhepoxynius abronius		5	9	14
Clymenella zonalis	1	3	8	12
Caprella penantis			12	12
Pitar morrhuanus	11			11
Diastylis quadrispinosa		11		11
Astarte undata		10		10
Tritia trivittata	7			7
Stenothoidae spp.			7	7
Ophiuroidea spp.	1		6	7
Unciola inermis	2		5	7
Maldanidae spp.			6	6
Ampharete lindstroemi		1	5	6
Odostomia spp.	4	2		6
Exogone dispar		1	4	5
Paradoneis lyra	1		4	5
Polygordius jouinae			5	5
Pagurus spp.			5	5
Nephtys picta	2	2		4
Parexogone hebes		4		4
Microdeutopus anomalus		1	3	4
Magelona sp.		4		4
Spiochaetopterus oculatus	4			4

Taxon	Disposal Site Stations			Total
	NEREF-3	SEREF-4	WREF-4	
Melinna cristata	1		3	4
Lyonsia arenosa	2		1	3
Dipolydora caulleryi			3	3
Bipalponephtys cornuta	1		2	3
Parvicardium pinnulatum		3		3
Sthenelais boa			3	3
Owenia fusiformis	3			3
Leitoscoloplos fragilis	2		1	3
Tanaissus psammophilus		1	2	3
Eumida sanguinea			3	3
Levinsenia gracilis	3			3
Polycirrus phosphoreus		2		2
Aphelochaeta marioni		2		2
Nephtys incisa		2		2
Glycera capitata			2	2
Carinomella lactea	2			2
Oxyurostylis smithi	2			2
Cerebratulus lacteus		1	1	2
Drilonereis longa	1		1	2
Pandora gouldiana		1	1	2
Libinia dubia		1	1	2
Strongylocentrotus droebachiensis		2		2
Arabella iricolor	1	1		2
Panopeus herbstii			2	2
Yoldia limatula	2			2
Chiridotea tuftsii		2		2
Scalibregma inflatum	1			1
Ampelisca abdita			1	1
Glyceridae spp.	1			1
Hydroides dianthus			1	1
Arctica islandica		1		1
Amphipoda spp.	1			1
Sthenelais limicola		1		1
Haplosyllis spongiphila			1	1
Ceriantheopsis americana			1	1
Carminella lactea			1	1
Phylo ornatus	1			1
Tritia obsoleta			1	1
Total	157	176	492	825

Station ELDS-13 Taxon	No. of Individuals	Trophic Guild		Station ELDS-15 Taxon	No. of Individuals	Trophic Guild
Mya arenaria	20	1		Sabellaria vulgaris	11	1
Sabellaria vulgaris	14	1		Mya arenaria	7	1
Crepidula fornicata	9	1		Lyonsia arenosa	2	1
Anadara transversa	6	1		Spisula solidissima	2	1
Pitar morrhuanus	5	1		Crepidula fornicata	2	1
Lyonsia arenosa	4	1		Anadara transversa	1	1
Spiochaetopterus oculatus	3	1		Magelona sp.	2	1
Pandora gouldiana	2	1		Ampelisca abdita	9	2
Astarte castanea	1	1		Spiophanes bombyx	8	2
Lucinoma filosa	1	1		Polygordius jouinae	4	2
Spiophanes bombyx	8	2		Unciola inermis	3	2
Unciola inermis	5	2		Cumacean spp.	1	2
Unciola irrorata	3	2		Dipolydora caulleryi	1	2
Diastylis quadrispinosa	1	2		Dipolydora socialis	1	2
Prionospio steenstrupi	1	2		Crassicorophium bonellii	5	2
Tritia trivittata	18	3		Aricidea (Acmira) catherinae	7	3
Aricidea (Acmira) catherinae	8	3		Ampharete lindstroemi	3	3
Kirkegaardia baptisteae	5	3		Tharyx acutus	3	3
Polycirrus phosphoreus	5	3		Tritia trivittata	3	3
Ampharetidae spp.	4	3		Aphelochaeta marioni	2	3
Tharyx acutus	4	3		Melinna cristata	1	3
Paradoneis lyra	4	3		Polycirrus phosphoreus	1	3
Ampharete lindstroemi	3	3		Crassinella lunulata	42	3
Melinna cristata	2	3		Oligochaeta spp.	32	6
Crassinella lunulata	1	3		Byblis serrata	14	6
Oligochaeta spp.	43	6		Nephtys picta	11	6
Byblis serrata	11	6		Paracaprella tenuis	6	6
Exogone dispar	11	6		Caprella penantis	5	6
Parexogone hebes	8	6		Cotonopsis lafresnayi	4	6
Nephtys incisa	6	6		Pagurus annulipes	4	6
Cotonopsis lafresnayi	4	6		Protodorvellia kefesteini	3	6
Syllis spp.	2	6		Pagurus longicarpus	3	6
Pinnixa sayana	1	6		Exogone dispar	2	6
Caprella spp.	1	6		Parexogone hebes	2	6
Nephtys picta	1	6		Syllis spp.	2	6
Microdeutopus anomalus	12	6		Gyptis vittata	1	6
Astyris lunata	12	7		Cyathura polita	1	6
Glyceridae spp.	4	7		Mysid spp.	1	6
Odostomia spp.	2	7		Astyris lunata	8	7
Sthenelais boa	2	7		Carinomella lactea	2	7
Glycera capitata	1	7		Cerebratulus lacteus	2	7
Carinomella lactea	1	7		Micrura affinis	2	7
Cerebratulus lacteus	1	7		Drilonereis longa	2	7
Amphipholis squamata	1	7		Phyllodoce arenae	2	7
Maldanidae spp.	10	8		Ophiuroidea spp.	1	7

Station ELDS-13 Taxon	No. of Individuals	Trophic Guild		Station ELDS-15 Taxon	No. of Individuals	Trophic Guild
Mediomastus ambiseta	8	8		Parametopella cypris	4	7
Clymenella torquata	8	8		Clymenella zonalis	5	8
Scalibregma inflatum	7	8		Nucula proxima	3	8
Nucula proxima	6	8		Maldanidae spp.	2	8
Clymenella zonalis	5	8		Scalibregma inflatum	2	8
Leitoscoloplos fragilis	1	8		Clymenella torquata	1	8
Total	306			Total	248	

Station ELDS-19 Taxon	No. of Individuals	Trophic Guild		Station ELDS-23 Taxon	No. of Individuals	Trophic Guild
Mya arenaria	22	1		Crepidula fornicata	43	1
Lyonsia arenosa	2	1		Mya arenaria	17	1
Periploma leanum	1	1		Lyonsia arenosa	15	1
Pitar morrhuanus	1	1		Anadara transversa	5	1
Spiochaetopterus oculatus	1	1		Ergaea walshi	3	1
Dipolydora caulleryi	10	2		Sabellaria vulgaris	2	1
Dipolydora socialis	4	2		Pitar morrhuanus	1	1
Prionospio steenstrupi	3	2		Spiochaetopterus oculatus	1	1
Spiophanes bombyx	3	2		Hydroides dianthus	1	1
Oxyurostylis smithi	1	2		Spiophanes bombyx	11	2
Owenia fusiformis	1	2		Oxyurostylis smithi	2	2
Aricidea (Acmira) catherinae	8	3		Owenia fusiformis	2	2
Tritia trivittata	5	3		Crassicorophium bonellii	44	2
Aphelochaeta marioni	3	3		Aricidea (Acmira) catherinae	59	3
Tharyx acutus	3	3		Paradoneis lyra	15	3
Melinna cristata	2	3		Tharyx acutus	11	3
Polycirrus phosphoreus	1	3		Kirkegaardia baptisteae	8	3
Crassinella lunulata	4	3		Aphelochaeta marioni	5	3
Rissoa parva	1	3		Ampharete lindstroemi	3	3
Pinnixa sayana	28	6		Pectinaria gouldii	2	3
Byblis serrata	26	6		Pista elongata	1	3
Nephtys picta	5	6		Polycirrus phosphoreus	1	3
Oligochaeta spp.	5	6		Crassinella lunulata	51	3
Exogone dispar	4	6		Oligochaeta spp.	104	6
Pagurus longicarpus	3	6		Exogone dispar	12	6
Parexogone hebes	3	6		Caprella penantis	8	6
Carinomella lactea	2	7		Protodorvellia kefesteini	7	6
Glycera capitata	1	7		Parougia caeca	5	6
Glyceridae spp.	1	7		Paracaprella tenuis	4	6
Cerebratulus lacteus	1	7		Nephtys incisa	4	6
Micrura affinis	1	7		Byblis serrata	3	6
Amphipholis squamata	1	7		Cotonopsis lafresnayi	3	6
Sthenelais spp.	1	7		Bipalponephtys cornuta	3	6
Clymenella zonalis	8	8		Libinia dubia	2	6
Scalibregma inflatum	5	8		Pagurus longicarpus	2	6
Nucula proxima	2	8		Syllis spp.	2	6

Station ELDS-19	No. of	Trophic		Station ELDS-23	No. of	Trophic
Taxon	**Individuals**	**Guild**		**Taxon**	**Individuals**	**Guild**
Clymenella torquata	2	8		Panopeus herbstii	1	6
Maldane sarsi	1	8		Cyathura polita	1	6
Total	176			Nephtys picta	1	6
				Pagurus pollicaris	1	6
				Chaetopleura apiculata	1	6
				Parexogone hebes	1	6
				Rhepoxynius abronius	11	6
				Microdeutopus anomalus	2	6
				Astyris lunata	11	7
				Amphipholis squamata	3	7
				Carinomella lactea	2	7
				Ophiuroidea spp.	2	7
				Sthenelais boa	2	7
				Urosalpinx cinerea	1	7
				Glycera americana	1	7
				Glycera capitata	1	7
				Glyceridae spp.	1	7
				Cerebratulus lacteus	1	7
				Micrura affinis	1	7
				Stenothoidae spp.	10	7
				Clymenella zonalis	25	8
				Mediomastus ambiseta	4	8
				Clymenella torquata	3	8
				Nucula proxima	1	8
				Maldanidae spp.	1	8
				Total	551	

Station ELDS-33	No. of	Trophic		Station ELDS-37	No. of	Trophic
Taxon	**Individuals**	**Guild**		**Taxon**	**Individuals**	**Guild**
Lyonsia arenosa	6	1		Mya arenaria	22	1
Mya arenaria	4	1		Pitar morrhuanus	6	1
Sabellaria vulgaris	2	1		Sabellaria vulgaris	6	1
Pandora gouldiana	1	1		Lyonsia arenosa	5	1
Pitar morrhuanus	1	1		Spiochaetopterus oculatus	4	1
Spisula solidissima	1	1		Anadara transversa	1	1
Spiochaetopterus oculatus	1	1		Magelona sp.	3	1
Parasabella microphthalma	1	1		Dipolydora socialis	7	2
Magelona sp.	3	1		Oxyurostylis smithi	3	2
Dipolydora socialis	19	2		Spiophanes bombyx	3	2
Spiophanes bombyx	4	2		Owenia fusiformis	1	2
Oxyurostylis smithi	1	2		Tharyx acutus	6	3
Aricidea (Acmira) catherinae	11	3		Polycirrus phosphoreus	5	3
Paradoneis lyra	8	3		Aricidea (Acmira) catherinae	4	3
Tharyx acutus	6	3		Aphelochaeta marioni	3	3
Aphelochaeta marioni	4	3		Ampharete lindstroemi	1	3
Ampharete lindstroemi	2	3		Pherusa affinis	1	3

Station ELDS-33	No. of	Trophic		Station ELDS-37	No. of	Trophic
Taxon	**Individuals**	**Guild**		**Taxon**	**Individuals**	**Guild**
Melinna cristata	2	3		Crassinella lunulata	114	3
Polycirrus phosphoreus	1	3		Byblis serrata	34	6
Crassinella lunulata	22	3		Oligochaeta spp.	18	6
Rissoa parva	1	3		Dorvellidae spp.	8	6
Byblis serrata	26	6		Exogone dispar	7	6
Oligochaeta spp.	18	6		Caprella spp.	5	6
Parougia caeca	12	6		Bipalponephtys cornuta	3	6
Pagurus longicarpus	12	6		Nephtys incisa	3	6
Nephtys picta	8	6		Nephtys picta	2	6
Nephtys spp.	6	6		Pagurus longicarpus	2	6
Protodorvellia kefesteini	3	6		Parexogone hebes	2	6
Exogone dispar	3	6		Pinnixa sayana	1	6
Parexogone hebes	3	6		Syllis spp.	1	6
Strongylocentrotus droebachiensis	2	6		Microdeutopus anomalus	2	6
Tanaissus psammophilus	2	6		Pilargidae spp.	1	6
Epitomapta roseola	1	6		Ophiuroidea spp.	4	7
Syllis spp.	1	6		Carinomella lactea	3	7
Microdeutopus anomalus	2	6		Micrura affinis	1	7
Rhepoxynius abronius	1	6		Amphipholis squamata	1	7
Drilonereis longa	2	7		Ophiura robusta	1	7
Ophiuroidea spp.	1	7		Phyllodoce maculata	1	7
Astyris lunata	1	7		Sthenelais boa	1	7
Carinomella lactea	1	7		Cryoturris cerinella	2	7
Maldanidae spp.	6	8		Polinices immaculatus	1	7
Clymenella zonalis	5	8		Scalibregma inflatum	9	8
Scalibregma inflatum	4	8		Nucula proxima	7	8
Capitella capitata	2	8		Clymenella torquata	6	8
Total	223			Mediomastus ambiseta	1	8
				Clymenella zonalis	1	8
				Total	323	

Station ELDS-39	No. of	Trophic		Reference Station NEREF-3	No. of	Trophic
Taxon	**Individuals**	**Guild**		**Taxon**	**Individuals**	**Guild**
Parvicardium pinnulatum	6	1		Mya arenaria	14	1
Astarte castanea	2	1		Pitar morrhuanus	11	1
Arctica islandica	1	1		Spiochaetopterus oculatus	4	1
Astarte undata	1	1		Lyonsia arenosa	2	1
Mya arenaria	1	1		Prionospio steenstrupi	16	2
Polygordius jouinae	2	2		Spiophanes bombyx	7	2
Oxyurostylis smithi	1	2		Owenia fusiformis	3	2
Spiophanes bombyx	1	2		Unciola inermis	2	2
Polycirrus phosphoreus	18	3		Oxyurostylis smithi	2	2
Caecum johnsoni	4	3		Tritia trivittata	7	3
Tharyx acutus	3	3		Levinsenia gracilis	3	3
Aricidea (Acmira) catherinae	3	3		Melinna cristata	1	3
Aphelochaeta marioni	1	3		Paradoneis lyra	1	3

Station ELDS-39	No. of	Trophic		Reference Station NEREF-3	No. of	Trophic
Taxon	**Individuals**	**Guild**		**Taxon**	**Individuals**	**Guild**
Crassinella lunulata	263	3		Byblis serrata	43	6
Oligochaeta spp.	19	6		Nephtys picta	2	6
Exogone dispar	17	6		Oligochaeta spp.	2	6
Parexogone hebes	4	6		Cotonopsis lafresnayi	1	6
Syllis spp.	4	6		Bipalponephtys cornuta	1	6
Pagurus longicarpus	1	6		Pagurus longicarpus	1	6
Rhepoxynius abronius	3	6		Odostomia spp.	4	7
Pilargidae spp.	2	6		Carinomella lactea	2	7
Microdeutopus anomalus	1	6		Glyceridae spp.	1	7
Glycera capitata	8	7		Arabella iricolor	1	7
Carinomella lactea	1	7		Drilonereis longa	1	7
Nucula proxima	1	8		Ophiuroidea spp.	1	7
Leitoscoloplos fragilis	1	8		Mediomastus ambiseta	9	8
Amphipoda spp.	1			Nucula proxima	7	8
Total	370			Yoldia limatula	2	8
				Leitoscoloplos fragilis	2	8
				Clymenella zonalis	1	8
				Phylo ornatus	1	8
				Scalibregma inflatum	1	8
				Amphipoda spp.	1	
				Total	157	

Reference Station SEREF-4	No. of	Trophic		Reference Station WREF-4	No. of	Trophic
Taxon	**Individuals**	**Guild**		**Taxon**	**Individuals**	**Guild**
Arctica islandica	1	1		Anadara transversa	19	1
Astarte undata	10	1		Sabellaria vulgaris	18	1
Mya arenaria	3	1		Mya arenaria	2	1
Pandora gouldiana	1	1		Lyonsia arenosa	1	1
Parvicardium pinnulatum	3	1		Pandora gouldiana	1	1
Magelona sp.	4	1		Ceriantheopsis americana	1	1
Diastylis quadrispinosa	11	2		Hydroides dianthus	1	1
Spiophanes bombyx	6	2		Spiophanes bombyx	8	2
Ampharete lindstroemi	1	3		Unciola inermis	5	2
Aphelochaeta marioni	2	3		Polygordius jouinae	5	2
Aricidea (Acmira) catherinae	2	3		Dipolydora caulleryi	3	2
Polycirrus phosphoreus	2	3		Ampelisca abdita	1	2
Tharyx acutus	11	3		Crassicorophium bonellii	19	2
Crassinella lunulata	83	3		Aricidea (Acmira) catherinae	25	3
Chiridotea tuftsii	2	6		Ampharete lindstroemi	5	3
Exogone dispar	1	6		Tharyx acutus	5	3
Libinia dubia	1	6		Paradoneis lyra	4	3
Nephtys incisa	2	6		Melinna cristata	3	3
Nephtys picta	2	6		Tritia obsoleta	1	3
Oligochaeta spp.	4	6		Crassinella lunulata	94	3
Pagurus longicarpus	2	6		Oligochaeta spp.	80	6
Parexogone hebes	4	6		Paracaprella tenuis	22	6

Reference Station SEREF-4	No. of	Trophic		Reference Station WREF-4	No. of	Trophic
Taxon	**Individuals**	**Guild**		**Taxon**	**Individuals**	**Guild**
Strongylocentrotus droebachiensis	2	6		Mysid spp.	21	6
Tanaissus psammophilus	1	6		Cotonopsis lafresnayi	15	6
Microdeutopus anomalus	1	6		Caprella penantis	12	6
Rhepoxynius abronius	5	6		Pagurus longicarpus	12	6
Arabella iricolor	1	7		Pagurus spp.	5	6
Cerebratulus lacteus	1	7		Exogone dispar	4	6
Odostomia spp.	2	7		Panopeus herbstii	2	6
Sthenelais limicola	1	7		Bipalponephtys cornuta	2	6
Clymenella zonalis	3	8		Tanaissus psammophilus	2	6
Nucula proxima	1	8		Libinia dubia	1	6
Total	176			Haplosyllis spongiphila	1	6
				Rhepoxynius abronius	9	6
				Microdeutopus anomalus	3	6
				Astyris lunata	25	7
				Ophiuroidea spp.	6	7
				Eumida sanguinea	3	7
				Sthenelais boa	3	7
				Glycera capitata	2	7
				Carminella lactea	1	7
				Cerebratulus lacteus	1	7
				Drilonereis longa	1	7
				Stenothoidae spp.	7	7
				Mediomastus ambiseta	10	8
				Clymenella zonalis	8	8
				Nucula proxima	6	8
				Maldanidae spp.	6	8
				Leitoscoloplos fragilis	1	8
				Total	492	

Table F-3. Community parameters for the benthic infaunal samples collected during the RIDS survey, November 2017 (site vs. ref).

Sample	No. of Species	No. of Individuals	Pielou's J'	Fisher's alpha	H'(log2)
Reference Stations					
NEREF-3	29	150	0.789	10.706	3.831
SEREF-4	31	174	0.667	10.975	3.306
WREF-4	44	447	0.771	12.101	4.207
ELDS Stations					
ELDS-5	38	169	0.874	15.251	4.585
ELDS-9	32	130	0.759	13.562	3.795
ELDS-13	45	283	0.881	15.081	4.84
ELDS-15	46	241	0.852	16.868	4.704
ELDS-19	36	174	0.834	13.784	4.31
ELDS-23	56	535	0.762	15.757	4.423
ELDS-33	40	209	0.857	14.689	4.56
ELDS-37	41	304	0.706	12.768	3.784
ELDS-39	24	363	0.405	5.774	1.856

Table F-4. Species counts with trophic guild associations for benthic infaunal samples collected during the ELDS survey, November 2017 (station by station).

Station ELDS-5 Taxon	No. of Individuals	Trophic Guild
Crepidula fornicata	16	1
Sabellaria vulgaris	11	1
Mya arenaria	8	1
Anadara transversa	1	1
Ergaea walshi	1	1
Magelona sp.	1	1
Dipolydora caulleryi	8	2
Dipolydora socialis	4	2
Spiophanes bombyx	4	2
Tritia trivittata	23	3
Kirkegaardia baptisteae	3	3
Tharyx acutus	2	3
Aricidea (Acmira) catherinae	1	3
Melinna cristata	1	3
Polycirrus phosphoreus	1	3
Crassinella lunulata	4	3
Exogone dispar	12	6
Pagurus longicarpus	11	6
Parexogone hebes	8	6
Nephtys incisa	6	6
Oligochaeta spp.	6	6
Bipalponephtys cornuta	2	6
Caprella spp.	2	6
Cotonopsis lafresnayi	2	6
Axius serratus	1	6
Byblis serrata	1	6
Nephtys picta	1	6
Scoletoma fragilis	1	6
Microdeutopus anomalus	6	6
Gammarus lawrencianus	1	6
Astyris lunata	6	7
Glycera capitata	2	7
Amphipholis squamata	1	7
Nereis zonata	1	7
Naticidae spp.	1	7
Clymenella zonalis	4	8
Scalibregma inflatum	4	8
Nucula proxima	2	8
Clymenella torquata	1	8
Leitoscoloplos fragilis	1	8
Total	172	

Station ELDS-9 Taxon	No. of Individuals	Trophic Guild
Mya arenaria	7	1
Pitar morrhuanus	5	1
Lyonsia arenosa	2	1
Spiochaetopterus oculatus	1	1
Sabellaria vulgaris	1	1
Magelona sp.	2	1
Spiophanes bombyx	6	2
Dipolydora caulleryi	2	2
Ampelisca abdita	1	2
Owenia fusiformis	1	2
Prionospio steenstrupi	1	2
Kirkegaardia baptisteae	5	3
Ampharete lindstroemi	1	3
Melinna cristata	1	3
Aphelochaeta marioni	1	3
Polycirrus phosphoreus	1	3
Oligochaeta spp.	45	6
Byblis serrata	15	6
Nephtys picta	5	6
Exogone dispar	3	6
Parexogone hebes	2	6
Pagurus longicarpus	1	6
Amphipholis squamata	2	7
Glycera capitata	1	7
Carinomella lactea	1	7
Cerebratulus lacteus	1	7
Arabella iricolor	1	7
Phyllodoce arenae	1	7
Sigalonidae spp.	1	7
Clymenella zonalis	6	8
Scalibregma inflatum	5	8
Mediomastus ambiseta	2	8
Nucula proxima	1	8
Total	131	

Station ELDS-13 Taxon	No. of Individuals	Trophic Guild
Mya arenaria	20	1
Sabellaria vulgaris	14	1
Crepidula fornicata	9	1
Anadara transversa	6	1

Station ELDS-15 Taxon	No. of Individuals	Trophic Guild
Sabellaria vulgaris	11	1
Mya arenaria	7	1
Lyonsia arenosa	2	1
Spisula solidissima	2	1

Station ELDS-13 Taxon	No. of Individuals	Trophic Guild
Pitar morrhuanus	5	1
Lyonsia arenosa	4	1
Spiochaetopterus oculatus	3	1
Pandora gouldiana	2	1
Astarte castanea	1	1
Lucinoma filosa	1	1
Spiophanes bombyx	8	2
Unciola inermis	5	2
Unciola irrorata	3	2
Diastylis quadrispinosa	1	2
Prionospio steenstrupi	1	2
Tritia trivittata	18	3
Aricidea (Acmira) catherinae	8	3
Kirkegaardia baptisteae	5	3
Polycirrus phosphoreus	5	3
Ampharetidae spp.	4	3
Tharyx acutus	4	3
Paradoneis lyra	4	3
Ampharete lindstroemi	3	3
Melinna cristata	2	3
Crassinella lunulata	1	3
Oligochaeta spp.	43	6
Byblis serrata	11	6
Exogone dispar	11	6
Parexogone hebes	8	6
Nephtys incisa	6	6
Cotonopsis lafresnayi	4	6
Syllis spp.	2	6
Pinnixa sayana	1	6
Caprella spp.	1	6
Nephtys picta	1	6
Microdeutopus anomalus	12	6
Astyris lunata	12	7
Glyceridae spp.	4	7
Odostomia spp.	2	7
Sthenelais boa	2	7
Glycera capitata	1	7
Carinomella lactea	1	7
Cerebratulus lacteus	1	7
Amphipholis squamata	1	7
Maldanidae spp.	10	8
Mediomastus ambiseta	8	8
Clymenella torquata	8	8
Scalibregma inflatum	7	8
Nucula proxima	6	8

Station ELDS-15 Taxon	No. of Individuals	Trophic Guild
Crepidula fornicata	2	1
Anadara transversa	1	1
Magelona sp.	2	1
Ampelisca abdita	9	2
Spiophanes bombyx	8	2
Polygordius jouinae	4	2
Unciola inermis	3	2
Cumacean spp.	1	2
Dipolydora caulleryi	1	2
Dipolydora socialis	1	2
Crassicorophium bonellii	5	2
Aricidea (Acmira) catherinae	7	3
Ampharete lindstroemi	3	3
Tharyx acutus	3	3
Tritia trivittata	3	3
Aphelochaeta marioni	2	3
Melinna cristata	1	3
Polycirrus phosphoreus	1	3
Crassinella lunulata	42	3
Oligochaeta spp.	32	6
Byblis serrata	14	6
Nephtys picta	11	6
Paracaprella tenuis	6	6
Caprella penantis	5	6
Cotonopsis lafresnayi	4	6
Pagurus annulipes	4	6
Protodorvellia kefesteini	3	6
Pagurus longicarpus	3	6
Exogone dispar	2	6
Parexogone hebes	2	6
Syllis spp.	2	6
Gyptis vittata	1	6
Cyathura polita	1	6
Mysid spp.	1	6
Astyris lunata	8	7
Carinomella lactea	2	7
Cerebratulus lacteus	2	7
Micrura affinis	2	7
Drilonereis longa	2	7
Phyllodoce arenae	2	7
Ophiuroidea spp.	1	7
Parametopella cypris	4	7
Clymenella zonalis	5	8
Nucula proxima	3	8
Maldanidae spp.	2	8

Station ELDS-13 Taxon	No. of Individuals	Trophic Guild
Clymenella zonalis	5	8
Leitoscoloplos fragilis	1	8
Total	306	

Station ELDS-15 Taxon	No. of Individuals	Trophic Guild
Scalibregma inflatum	2	8
Clymenella torquata	1	8
Total	248	

Station ELDS-19 Taxon	No. of Individuals	Trophic Guild
Mya arenaria	22	1
Lyonsia arenosa	2	1
Periploma leanum	1	1
Pitar morrhuanus	1	1
Spiochaetopterus oculatus	1	1
Dipolydora caulleryi	10	2
Dipolydora socialis	4	2
Prionospio steenstrupi	3	2
Spiophanes bombyx	3	2
Oxyurostylis smithi	1	2
Owenia fusiformis	1	2
Aricidea (Acmira) catherinae	8	3
Tritia trivittata	5	3
Aphelochaeta marioni	3	3
Tharyx acutus	3	3
Melinna cristata	2	3
Polycirrus phosphoreus	1	3
Crassinella lunulata	4	3
Rissoa parva	1	3
Pinnixa sayana	28	6
Byblis serrata	26	6
Nephtys picta	5	6
Oligochaeta spp.	5	6
Exogone dispar	4	6
Pagurus longicarpus	3	6
Parexogone hebes	3	6
Carinomella lactea	2	7
Glycera capitata	1	7
Glyceridae spp.	1	7
Cerebratulus lacteus	1	7
Micrura affinis	1	7
Amphipholis squamata	1	7
Sthenelais spp.	1	7
Clymenella zonalis	8	8
Scalibregma inflatum	5	8
Nucula proxima	2	8
Clymenella torquata	2	8
Maldane sarsi	1	8
Total	176	

Station ELDS-23 Taxon	No. of Individuals	Trophic Guild
Crepidula fornicata	43	1
Mya arenaria	17	1
Lyonsia arenosa	15	1
Anadara transversa	5	1
Ergaea walshi	3	1
Sabellaria vulgaris	2	1
Pitar morrhuanus	1	1
Spiochaetopterus oculatus	1	1
Hydroides dianthus	1	1
Spiophanes bombyx	11	2
Oxyurostylis smithi	2	2
Owenia fusiformis	2	2
Crassicorophium bonellii	44	2
Aricidea (Acmira) catherinae	59	3
Paradoneis lyra	15	3
Tharyx acutus	11	3
Kirkegaardia baptisteae	8	3
Aphelochaeta marioni	5	3
Ampharete lindstroemi	3	3
Pectinaria gouldii	2	3
Pista elongata	1	3
Polycirrus phosphoreus	1	3
Crassinella lunulata	51	3
Oligochaeta spp.	104	6
Exogone dispar	12	6
Caprella penantis	8	6
Protodorvellia kefesteini	7	6
Parougia caeca	5	6
Paracaprella tenuis	4	6
Nephtys incisa	4	6
Byblis serrata	3	6
Cotonopsis lafresnayi	3	6
Bipalponephtys cornuta	3	6
Libinia dubia	2	6
Pagurus longicarpus	2	6
Syllis spp.	2	6
Panopeus herbstii	1	6
Cyathura polita	1	6
Nephtys picta	1	6

Station ELDS-19 Taxon	No. of Individuals	Trophic Guild

Station ELDS-23 Taxon	No. of Individuals	Trophic Guild
Pagurus pollicaris	1	6
Chaetopleura apiculata	1	6
Parexogone hebes	1	6
Rhepoxynius abronius	11	6
Microdeutopus anomalus	2	6
Astyris lunata	11	7
Amphipholis squamata	3	7
Carinomella lactea	2	7
Ophiuroidea spp.	2	7
Sthenelais boa	2	7
Urosalpinx cinerea	1	7
Glycera americana	1	7
Glycera capitata	1	7
Glyceridae spp.	1	7
Cerebratulus lacteus	1	7
Micrura affinis	1	7
Stenothoidae spp.	10	7
Clymenella zonalis	25	8
Mediomastus ambiseta	4	8
Clymenella torquata	3	8
Nucula proxima	1	8
Maldanidae spp.	1	8
Total	551	

Station ELDS-33 Taxon	No. of Individuals	Trophic Guild
Lyonsia arenosa	6	1
Mya arenaria	4	1
Sabellaria vulgaris	2	1
Pandora gouldiana	1	1
Pitar morrhuanus	1	1
Spisula solidissima	1	1
Spiochaetopterus oculatus	1	1
Parasabella microphthalma	1	1
Magelona sp.	3	1
Dipolydora socialis	19	2
Spiophanes bombyx	4	2
Oxyurostylis smithi	1	2
Aricidea (Acmira) catherinae	11	3
Paradoneis lyra	8	3
Tharyx acutus	6	3
Aphelochaeta marioni	4	3
Ampharete lindstroemi	2	3
Melinna cristata	2	3

Station ELDS-37 Taxon	No. of Individuals	Trophic Guild
Mya arenaria	22	1
Pitar morrhuanus	6	1
Sabellaria vulgaris	6	1
Lyonsia arenosa	5	1
Spiochaetopterus oculatus	4	1
Anadara transversa	1	1
Magelona sp.	3	1
Dipolydora socialis	7	2
Oxyurostylis smithi	3	2
Spiophanes bombyx	3	2
Owenia fusiformis	1	2
Tharyx acutus	6	3
Polycirrus phosphoreus	5	3
Aricidea (Acmira) catherinae	4	3
Aphelochaeta marioni	3	3
Ampharete lindstroemi	1	3
Pherusa affinis	1	3
Crassinella lunulata	114	3

Station ELDS-33 Taxon	No. of Individuals	Trophic Guild
Polycirrus phosphoreus	1	3
Crassinella lunulata	22	3
Rissoa parva	1	3
Byblis serrata	26	6
Oligochaeta spp.	18	6
Parougia caeca	12	6
Pagurus longicarpus	12	6
Nephtys picta	8	6
Nephtys spp.	6	6
Protodorvellia kefesteini	3	6
Exogone dispar	3	6
Parexogone hebes	3	6
Strongylocentrotus droebachiensis	2	6
Tanaissus psammophilus	2	6
Epitomapta roseola	1	6
Syllis spp.	1	6
Microdeutopus anomalus	2	6
Rhepoxynius abronius	1	6
Drilonereis longa	2	7
Ophiuroidea spp.	1	7
Astyris lunata	1	7
Carinomella lactea	1	7
Maldanidae spp.	6	8
Clymenella zonalis	5	8
Scalibregma inflatum	4	8
Capitella capitata	2	8
Total	223	

Station ELDS-37 Taxon	No. of Individuals	Trophic Guild
Byblis serrata	34	6
Oligochaeta spp.	18	6
Dorvellidae spp.	8	6
Exogone dispar	7	6
Caprella spp.	5	6
Bipalponephtys cornuta	3	6
Nephtys incisa	3	6
Nephtys picta	2	6
Pagurus longicarpus	2	6
Parexogone hebes	2	6
Pinnixa sayana	1	6
Syllis spp.	1	6
Microdeutopus anomalus	2	6
Pilargidae spp.	1	6
Ophiuroidea spp.	4	7
Carinomella lactea	3	7
Micrura affinis	1	7
Amphipholis squamata	1	7
Ophiura robusta	1	7
Phyllodoce maculata	1	7
Sthenelais boa	1	7
Cryoturris cerinella	2	7
Polinices immaculatus	1	7
Scalibregma inflatum	9	8
Nucula proxima	7	8
Clymenella torquata	6	8
Mediomastus ambiseta	1	8
Clymenella zonalis	1	8
Total	323	

Station ELDS-39 Taxon	No. of Individuals	Trophic Guild
Parvicardium pinnulatum	6	1
Astarte castanea	2	1
Arctica islandica	1	1
Astarte undata	1	1
Mya arenaria	1	1
Polygordius jouinae	2	2
Oxyurostylis smithi	1	2
Spiophanes bombyx	1	2
Polycirrus phosphoreus	18	3
Caecum johnsoni	4	3
Tharyx acutus	3	3
Aricidea (Acmira) catherinae	3	3

Reference Station NEREF-3 Taxon	No. of Individuals	Trophic Guild
Mya arenaria	14	1
Pitar morrhuanus	11	1
Spiochaetopterus oculatus	4	1
Lyonsia arenosa	2	1
Prionospio steenstrupi	16	2
Spiophanes bombyx	7	2
Owenia fusiformis	3	2
Unciola inermis	2	2
Oxyurostylis smithi	2	2
Tritia trivittata	7	3
Levinsenia gracilis	3	3
Melinna cristata	1	3

Station ELDS-39 Taxon	No. of Individuals	Trophic Guild
Aphelochaeta marioni	1	3
Crassinella lunulata	263	3
Oligochaeta spp.	19	6
Exogone dispar	17	6
Parexogone hebes	4	6
Syllis spp.	4	6
Pagurus longicarpus	1	6
Rhepoxynius abronius	3	6
Pilargidae spp.	2	6
Microdeutopus anomalus	1	6
Glycera capitata	8	7
Carinomella lactea	1	7
Nucula proxima	1	8
Leitoscoloplos fragilis	1	8
Amphipoda spp.	1	
Total	370	

Reference Station NEREF-3 Taxon	No. of Individuals	Trophic Guild
Paradoneis lyra	1	3
Byblis serrata	43	6
Nephtys picta	2	6
Oligochaeta spp.	2	6
Cotonopsis lafresnayi	1	6
Bipalponephtys cornuta	1	6
Pagurus longicarpus	1	6
Odostomia spp.	4	7
Carinomella lactea	2	7
Glyceridae spp.	1	7
Arabella iricolor	1	7
Drilonereis longa	1	7
Ophiuroidea spp.	1	7
Mediomastus ambiseta	9	8
Nucula proxima	7	8
Yoldia limatula	2	8
Leitoscoloplos fragilis	2	8
Clymenella zonalis	1	8
Phylo ornatus	1	8
Scalibregma inflatum	1	8
Amphipoda spp.	1	
Total	157	

Reference Station SEREF-4 Taxon	No. of Individuals	Trophic Guild
Arctica islandica	1	1
Astarte undata	10	1
Mya arenaria	3	1
Pandora gouldiana	1	1
Parvicardium pinnulatum	3	1
Magelona sp.	4	1
Diastylis quadrispinosa	11	2
Spiophanes bombyx	6	2
Ampharete lindstroemi	1	3
Aphelochaeta marioni	2	3
Aricidea (Acmira) catherinae	2	3
Polycirrus phosphoreus	2	3
Tharyx acutus	11	3
Crassinella lunulata	83	3
Chiridotea tuftsii	2	6
Exogone dispar	1	6
Libinia dubia	1	6
Nephtys incisa	2	6
Nephtys picta	2	6

Reference Station WREF-4 Taxon	No. of Individuals	Trophic Guild
Anadara transversa	19	1
Sabellaria vulgaris	18	1
Mya arenaria	2	1
Lyonsia arenosa	1	1
Pandora gouldiana	1	1
Ceriantheopsis americana	1	1
Hydroides dianthus	1	1
Spiophanes bombyx	8	2
Unciola inermis	5	2
Polygordius jouinae	5	2
Dipolydora caulleryi	3	2
Ampelisca abdita	1	2
Crassicorophium bonellii	19	2
Aricidea (Acmira) catherinae	25	3
Ampharete lindstroemi	5	3
Tharyx acutus	5	3
Paradoneis lyra	4	3
Melinna cristata	3	3
Tritia obsoleta	1	3

Reference Station SEREF-4	No. of Individuals	Trophic Guild
Taxon		
Oligochaeta spp.	4	6
Pagurus longicarpus	2	6
Parexogone hebes	4	6
Strongylocentrotus droebachiensis	2	6
Tanaissus psammophilus	1	6
Microdeutopus anomalus	1	6
Rhepoxynius abronius	5	6
Arabella iricolor	1	7
Cerebratulus lacteus	1	7
Odostomia spp.	2	7
Sthenelais limicola	1	7
Clymenella zonalis	3	8
Nucula proxima	1	8
Total	176	

Reference Station WREF-4	No. of Individuals	Trophic Guild
Taxon		
Crassinella lunulata	94	3
Oligochaeta spp.	80	6
Paracaprella tenuis	22	6
Mysid spp.	21	6
Cotonopsis lafresnayi	15	6
Caprella penantis	12	6
Pagurus longicarpus	12	6
Pagurus spp.	5	6
Exogone dispar	4	6
Panopeus herbstii	2	6
Bipalponephtys cornuta	2	6
Tanaissus psammophilus	2	6
Libinia dubia	1	6
Haplosyllis spongiphila	1	6
Rhepoxynius abronius	9	6
Microdeutopus anomalus	3	6
Astyris lunata	25	7
Ophiuroidea spp.	6	7
Eumida sanguinea	3	7
Sthenelais boa	3	7
Glycera capitata	2	7
Carminella lactea	1	7
Cerebratulus lacteus	1	7
Drilonereis longa	1	7
Stenothoidae spp.	7	7
Mediomastus ambiseta	10	8
Clymenella zonalis	8	8
Nucula proxima	6	8
Maldanidae spp.	6	8
Leitoscoloplos fragilis	1	8
Total	492	