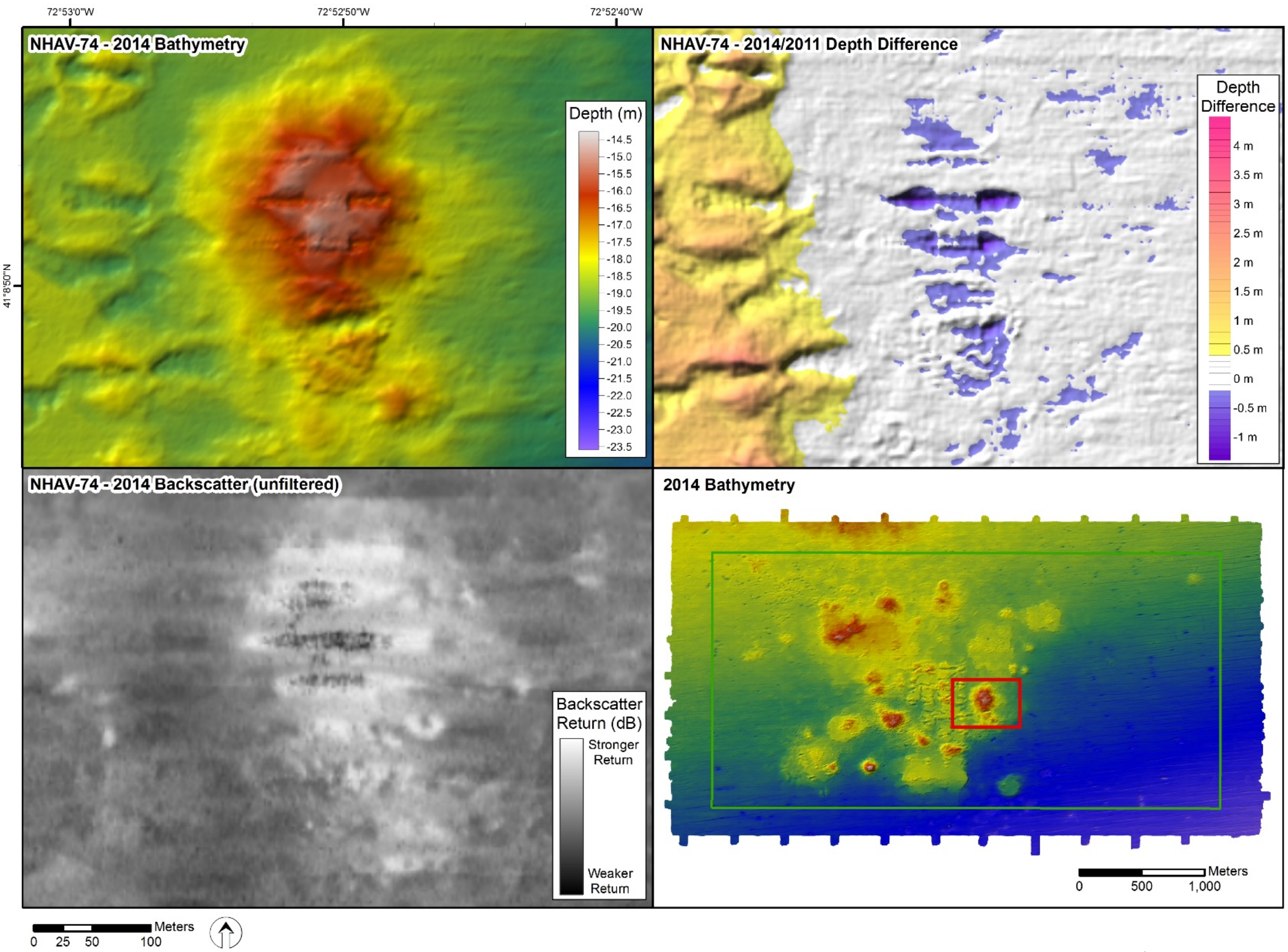
Monitoring Surveys at the Central Long Island Sound Disposal Site
December 2013, January 2014, & August 2014

Disposal Area Monitoring System DAMOS



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13. ABSTRACT

Monitoring surveys were conducted at the Central Long Island Sound Disposal Site (CLDS) in December 2013, January 2014, and August 2014 as part of the Disposal Area Monitoring System (DAMOS) Program. The December 2013 and January 2014 efforts included multibeam bathymetric surveys and the collection of sediment grab samples at recently used portions of the site. The August 2014 survey consisted of a multibeam bathymetric survey of the entire site and the collection of sediment-profile imaging (SPI), plan-view imaging (PV), and benthic grab samples from recently used portions of the site and three reference areas.

One objective of this monitoring was to evaluate a modified disposal approach that had been implemented at the site. Under this approach, DAMOS Program managers directed disposals to a series of target grids, rather than a single point. Since the 2011 survey, over one million cubic meters of dredged material had been placed at CLDS using this approach.

The December 2013 bathymetric survey documented the initial placement of material into a series of target cells, verifying accumulation of 1–2 m of material. The January 2014 bathymetric survey was performed to track the ongoing placement of material in the target grids. Both grids showed substantial accumulation in the period between surveys. The final survey took place in August 2014 after the completion of both New Haven and Norwalk projects and multiple private projects. This survey documented the final distribution of material in the two target grids. This acoustic survey extended beyond the active placement area to record the bottom conditions at the entire CLDS site.

Since the last survey of the whole site in 2005, the dredged material features at CLDS have continued to show the physical stability evidenced in previous work. With the exception of expected areas of accumulation associated with recent placement activity, and expected areas of consolidation of dredged material mounds after initial placement, there was no evidence of significant surface sediment transport beyond the site boundaries or even within the site. The high level of accuracy of seafloor mapping attained by the multibeam technology coupled with USACE's system to record the track of each scow using the site have resulted in a greater understanding of how individual placement events affect existing seafloor topography and further the confidence in the stability of dredged material deposits at this site.

As expected, the biological conditions were found to be in a transitional state just four months after dredged material placement. A mixture of Stage 1, 2, and 3 successional stages were present along with a relatively shallow aRPD that was statistically less than the reference areas. Benthic samples collected from both grids were dominated by pioneering amphipods in comparison to the well-developed and stable infaunal communities observed in reference area samples. These two target grid areas are expected to progress to full benthic recovery with additional time for recolonization and sediment reworking.

The DAMOS surveys of CLDS, including the 2013/2014 effort described in this report, serve to fulfill the monitoring requirements established in the USEPA's Site Management and Monitoring Plan and provided data to inform the ten-year revision of the plan. Given the recent designation of CLDS by USEPA for continued long-term use as an ocean disposal site for dredged material placement, DAMOS monitoring of CLDS will be expanded to include a comprehensive survey of surficial sediment quality at CLDS to aid in long term management of the site.

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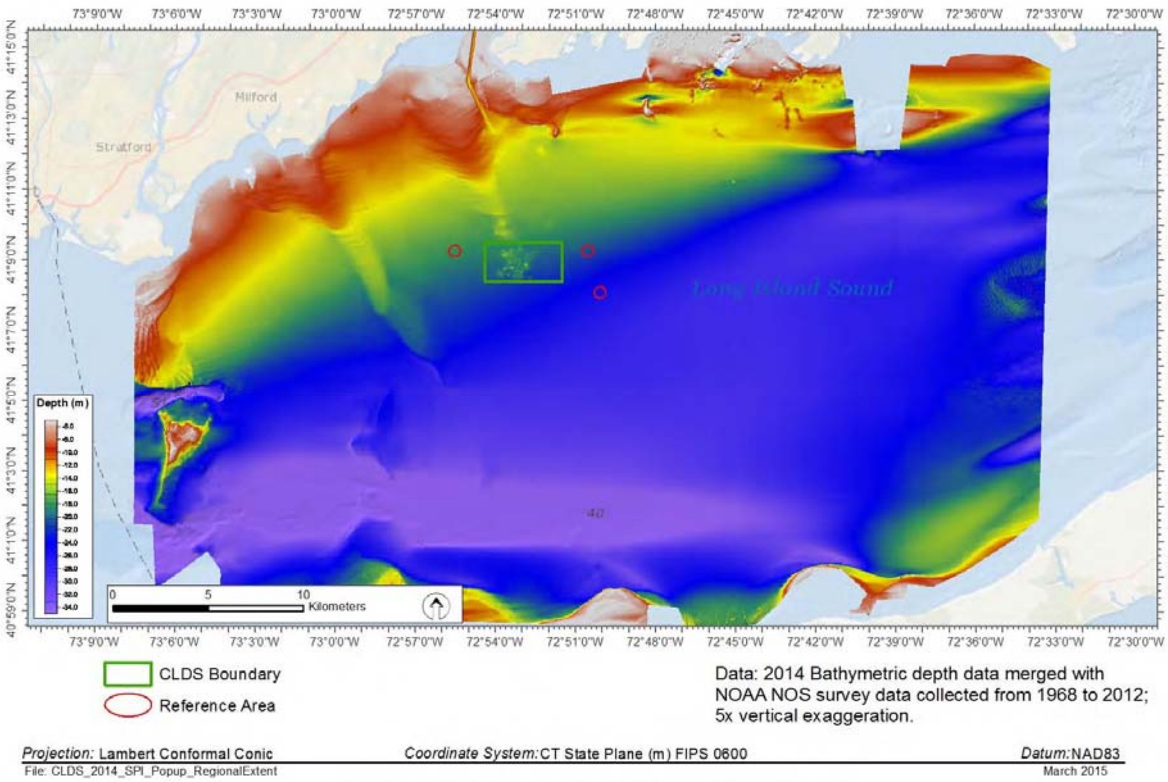

Regional Bathymetry Central Long Island Sound

This regional bathymetric surface represents a mosaic of National Oceanic and Atmospheric Administration survey data collected between 1968 and 2012 merged with bathymetric data collected through the 2014 DAMOS survey effort. This image places the Central Long Island Sound Disposal Site in the bathymetric context of Long Island Sound itself. Coastal features and harbors are apparent along with the New Haven, Connecticut navigation channel which has contributed dredged material to the Central Long Island Sound Disposal Site for over 40 years. In addition, large geologic features that extend into Long Island Sound from the Connecticut coastline are visible including one feature that terminates just north of the disposal site boundary.

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

Monitoring surveys were conducted at the Central Long Island Sound Disposal Site (CLDS) in December 2013, January 2014, and August 2014 as part of the Disposal Area Monitoring System (DAMOS) Program. The December 2013 and January 2014 efforts included multibeam bathymetric surveys and the collection of sediment grab samples at recently used portions of the site. The August 2014 survey consisted of a multibeam bathymetric survey of the entire site and the collection of sediment-profile imaging (SPI), plan-view imaging (PV), and benthic grab samples of recently used portions of the site and three reference areas.

The last DAMOS survey of CLDS was conducted in 2011 and found two of three recently formed disposal mounds to be physically stable and progressing towards full benthic recovery with a prevalence of Stage 3 infauna (AECOM 2013). The one exception was the CLIS-08 mound that exhibited signs of slightly delayed benthic recovery (AECOM 2013).

Since the 2011 survey over one million cubic meters of dredged material has been placed at CLDS. 116,000 m^3 (151,700 yd^3) of the material was placed at the CLIS-10 mound that was initially formed in the 2009–2010 dredging season and had remaining capacity through 2013. The remainder of the material was generated in the 2013–2014 dredging season and included material from New Haven Harbor, CT; Norwalk Harbor, CT; and multiple private projects. Although only dredged material deemed suitable for open water placement by the USEPA can be placed at CLDS, the State of Connecticut required sequential placement of the material from the various projects as part of the long term management strategy for the site. Material from Norwalk Harbor and several of the private projects was placed first followed by placement of material from the much larger New Haven Harbor project. Given the large volume of material to be placed during the dredging season, DAMOS Program managers utilized a modified management strategy and directed scows to a series of target grids, rather than a single point, to optimize the sequential placement approach.

The December 2013 bathymetric survey documented the initial placement of material from Norwalk Harbor into a series of target cells referred to as the NHAV14-S management grid; and material from New Haven Harbor and several private projects into a northern management grid (NHAV14-N). Depth difference analysis of the new target grid areas showed an accumulation of 1–2 m of material, 3.5 m at the previously used CLIS-10 mound, and expected consolidation of the older CLIS-09 mound. There was also an accumulation of material in an area just outside of the NHAV14-N grid as the result of multiple off-target placements from a single project.

The January 2014 bathymetric survey was performed to track the ongoing placement of New Haven Harbor material in the NHAV14-N and NHAV14-S grids. Both grids showed substantial accumulation in the period between surveys, including the area just outside of the NHAV14-N grid that had received off-target placements.

The final survey in this sequence took place in August 2014 after the completion of both New Haven and Norwalk projects and multiple private projects. This survey documented the final distribution of material in the two target grids. This acoustic survey extended beyond the active placement area to record the bottom conditions at the entire CLDS

site. Since the last survey of the whole site in 2005, the dredged material features at CLDS have continued to show the physical stability evidenced in previous work at the site. With the exception of expected areas of accumulation associated with recent placement activity, and expected areas of consolidation of dredged material mounds after initial placement, there was no evidence of significant surface sediment transport beyond the site boundaries or even within the site. The high level of accuracy of seafloor mapping attained by the multibeam technology coupled with USACE's system to record the track of each scow using the site have resulted in a greater understanding of how individual placement events affect existing seafloor topography and further the confidence in the stability of dredged material deposits at this site.

Sediment-profile and plan-view images of recently used disposal mound CLIS-09 as well as the older MQR mound showed well-developed infaunal communities with a prevalence of Stage 3 taxa, and both mounds had successional stages that were statistically similar to reference within 0.5 ranks. The CLIS-10 mound showed delayed benthic recovery that was statistically lower than reference areas, but there was evidence of a benthic infaunal community transitioning between Stage 2 and Stage 3 at every station. The CLIS-08 mound continued to show somewhat delayed benthic recovery (also observed in 2011), but every station showed some evidence of an infaunal community transitioning between Stage 2 and Stage 3. All of the recently used disposal mounds, CLIS-08, CLIS-09, and CLIS-10, had mean apparent redox potential discontinuities (aRPDs) that were statistically lower than the mean aRPD at reference areas; only the MQR mound had mean aRPD values that were statistically similar to reference areas within 1 cm.

As expected, the biological conditions at the NHAV14-N and NHAV14-S grid areas were in a transitional state just four months after dredged material placement activities had been completed. A mixture of Stage 1, 2, and 3 successional stages were present along with a relatively shallow aRPD that was statistically less than the reference areas. Benthic samples collected from both grids were dominated by pioneering amphipods in comparison to the well-developed and stable infaunal communities observed in reference area samples. These two target grid areas are expected to progress to full benthic recovery with additional time for recolonization and sediment reworking.

The DAMOS surveys of CLDS, including the 2013/2014 effort described in this report, serve to fulfill the monitoring requirements established in the USEPA's Site Management and Monitoring Plan and provided data to inform the ten-year revision of the plan. Given the recent designation of CLDS by USEPA for continued long-term use as an ocean disposal site for dredged material placement, DAMOS monitoring of CLDS will be expanded to include a comprehensive survey of surficial sediment quality at CLDS to aid in long term management of the site.

1.0 INTRODUCTION

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

1.1 Overview of the DAMOS Program

The DAMOS Program features a tiered management 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 35 years, the DAMOS Program has collected and evaluated disposal site data throughout New England. Based on these data, patterns of physical, chemical, and biological responses of seafloor environments to dredged material disposal activity have been documented (Fredette and French 2004, Wolf et al. 2012).

DAMOS monitoring surveys fall into two general categories: confirmatory studies and focused studies. 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. The data collected and evaluated during these studies provide answers to strategic management questions in determining the next step in the disposal site management process. Focused studies are periodically undertaken within the DAMOS Program to evaluate inactive or historical disposal sites and contribute to the development of dredged material placement and monitoring techniques. The resulting information is used to guide the management of disposal activities at each site. The 2013/2014 CLDS investigation was a confirmatory study featuring general monitoring of the entire site along with more intense data collection in an area that recently received dredged material.

Two primary goals of DAMOS confirmatory monitoring 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 acoustic monitoring surveys (including bathymetric and acoustic backscatter measurements) are made 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 (CAD) cells. Sediment-profile imaging (SPI) surveys, and more recently the addition of plan-view imaging (PV) as part of the survey, are performed 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 a specific site to determine the next step in the disposal site management process (Germano et al. 1994). Focused DAMOS monitoring surveys may also feature additional types of data collection activities as deemed appropriate to achieve specific survey objectives, such as side-scan sonar, sub-bottom profiling, towed video, sediment coring, or grab sampling.

1.2 Introduction to the Central Long Island Sound Disposal Site

The Central Long Island Sound Disposal Site (CLDS, also historically referred to as CLIS) is located approximately 10.4 km (5.62 nm) south of South End Point, East Haven, Connecticut (Figure 1-1). This general location has been utilized for the disposal of sediments dredged from surrounding harbors for at least 60 years, with well-documented disposal locations since 1973 (ENSR 1998). Starting in 1979, the site has been regularly monitored by the DAMOS Program (ENSR 1998).

The U.S. Environmental Protection Agency's (USEPA) most recent designation of the site in 2005 resulted in a slight enlargement of the boundaries from the previous dimensions (USEPA 2004, 2005). Specifically, the boundary of CLDS was extended northward and eastward to encompass the historical disposal mounds CS-2 and FVP as shown in Figure 1-2 (ENSR 2007). The current boundary of CLDS is a rectangle measuring 4.1 × 2.0 km (total area of 8.2 km^2; or 2.2 × 1.1 nm [total area of 2.4 nm^2]), centered at 41° 08.95' N and 72° 52.95' W (NAD 83) (Figure 1-1).

1.3 Dredged Material Placement at CLDS

The early management strategy at CLDS involved the directed placement of small to moderate volumes of sediment at a moored target buoy to form individual disposal mounds which were spaced relatively far apart within the site boundary (see mounds labeled by name in Figure 1-2). These distinct mounds were monitored over time to assess stability, thickness of dredged material, and benthic recolonization status relative to previous monitoring results and in comparison to nearby reference areas.

Several experimental capping projects were also conducted in the waters of CLDS in the late 1970s and the early 1980s in conjunction with the USEPA to determine the feasibility and effectiveness of using level-bottom capping to isolate sediment with elevated contaminant or toxicity levels from the marine environment. Seven mounds were formed during this period. Six of the mounds (Norwalk, STNH-N, STNH-S, MQR, CS-1, and CS-2) were subsequently capped with coarse- and/or fine-grained material acceptable for unconfined open water placement, and the eighth mound, FVP, was left uncapped (Figure 1-2). The FVP mound was part of the USEPA's Field Verification Program, designed to assess the ability of the monitoring approach and technology to identify impacts of contaminated sediment on the seafloor and to assess the potential for natural recovery in a depositional environment. By 1996, the USEPA no longer allowed placement of unsuitable dredged material with capping to confine the material at Long Island Sound open water sites.

Since the early 1990s, a modified management strategy has been employed at CLDS, whereby the dredged material is placed in a series of closely spaced or contiguous mounds, with the goal of eventually creating circular or semicircular berms on the seafloor. The area inside the berms would form an artificial depression that could be used to contain the spread of less consolidated material. These containment cells would aid in the placement of highly fluid dredged material or material judged to require additional management. Once placed within the confines of the containment cell, the potential for lateral spread of the material is reduced, with the goal of limiting benthic impacts in a given dredging season to as small an area as practicable.

The first containment cell developed at CLDS was used to confine the New Haven 1993 (NHAV-93) mound; a second containment cell was completed in 1999 (Figure 1-2 in Valente et al. 2012). Additional containment cells are also being developed in the south central portion of the site for future placement activities.

Since the previous survey in 2011, over one million cubic meters (1,300,000 yd^3) of material from various dredging projects have been placed at CLDS (Table 1-1; Figure 1-3). Projects that occurred in the 2011/2012 and 2012/2013 disposal seasons were directed to a previously established disposal mound (CLIS-10) while the material generated in the 2013/2014 season required a modified management approach. A detailed record of barge disposal activity at CLDS for the period from October 2011 to April 2014, including the origin of dredged material, the volume deposited, and the disposal location, is provided in Appendix B.

The 2013/2014 disposal season included two Federal Navigation projects in Connecticut (Table 1-1); a maintenance dredging project in Norwalk Harbor of approximately 115,000 m^3 (150,000 yd^3) and an improvement dredging project in New Haven Harbor of approximately 635,000 m^3 (830,000 yd^3), along with multiple private projects that totaled 170,000 m^3 (222,000 yd^3). The material for these Federal and private projects was determined to be suitable for open water placement by USACE and USEPA, but the water quality certificate (WQC) issued by the State of Connecticut required that the maintenance material from the Norwalk Harbor project, along with several of the private projects, be sequenced such that the improvement material from New Haven Harbor be placed last.

To accommodate the large volume of material and project sequencing requirements, two gridded areas were defined in the central and southern portions of CLDS with a total of 25 target placement cells (Figure 1-2). The initial material from New Haven, along with material from private projects, was directed to a target grid in the southern portion of CLDS within a previously established containment cell (NHAV14-N, Figure 1-3). The Norwalk material was placed within a separate target grid (NHAV14-S), and both of the NHAV14-N and NHAV14-S grids received final cover from outer harbor material from New Haven (Figure 1-3).

1.4 Previous Surveys at CLDS

The last comprehensive bathymetric survey of the entire site, conducted in July 2005, followed the official USEPA designation of CLDS as a long-term disposal site under Section 102(c) of the Marine Protection, Research, and Sanctuaries Act (Table 1-2). The site designation included the development of a Site Management and Monitoring Plan (SMMP) that called for a tiered monitoring approach to determine disposal permit compliance, evaluate the short-term and long-term fate of dredged material placed at the site, and assess potential adverse environmental impacts from the use of CLDS for the disposal of dredged material (USEPA 2005).

The 2005 survey showed that the seafloor landscape within the CLDS boundary was characterized by multiple mounds of accumulated dredged material and disposal traces resulting from both historical and more recent placement activities (ENSR 2007). The seafloor within the boundary of CLDS gently sloped from a depth of 18 m (59 ft) mean lower low water (MLLW) in the northwest to a depth of 22 m (72 ft) in the southeast (Figure 1-2). The placement of dredged material created localized areas with shallower depths ranging from 14 to 17 m (46 to 56 ft) MLLW. This high-resolution bathymetric survey of the entire site continues to serve as a baseline for tracking placement of material at the site and to determine the long-term stability of dredged material deposits at CLDS.

Since 2005, continuation of monitoring was performed at CLDS in 2009 and 2011 to implement the tiered monitoring approach outlined in the SMMP (Table 1-2) tracking placement of material and recovery of the benthic community following placement. These investigations included bathymetric and SPI surveys of the active portions of the site along with a focused survey of the older experimental FVP disposal mound. The 2009 survey documented the formation of four discrete disposal mounds formed over the previous four disposal seasons; CLIS-05, CLIS-06, CLIS-07, and CLIS-08 (Valente 2012). The 2009 SPI survey identified reference type conditions at the two older mounds and confirmed the prediction of intermediate benthic recovery at the two newer mounds (Valente 2012).

The 2011 survey documented the formation of new disposal mounds from recent placement activity at the site (CLIS-09 and CLIS-10) and confirmed the continued stability of previously formed mounds (AECOM 2013). Benthic recovery was measured at three recently formed mounds and found to be comparable to reference conditions at CLIS-07 and CLIS-09 with a transitional recovery status at CLIS-08 (AECOM 2013). The CLIS-10 mound was still actively receiving dredged material at the time of the 2011 survey so it was not analyzed for benthic recovery.

In addition to the active portion of the site, the 2011 survey also investigated the stability and benthic recolonization status of the historical Field Verification Program (FVP) mound. FVP was an experimental disposal mound formed from the unconfined open-water placement of 55,000 m^3 (72,000 yd^3) of material from Black Rock Harbor in Bridgeport, CT that had elevated levels of metals and organic contaminants and demonstrated biological toxicity (Scott et al. 1987). In collaboration with USEPA, the mound was left uncapped for research purposes as a field comparison with capped mounds composed of similar material at CLDS (USEPA 2005). Previous monitoring of FVP showed the mound to exhibit phases of classic benthic recovery with periodic relapses due to environmental stresses (AECOM 2012). The 2011 survey found the mound to be physically stable with advanced benthic succession throughout the mound surface (AECOM 2012). Based on these results, it was recommended to continue to leave the FVP mound uncapped with periodic monitoring of benthic recovery and mound stability.

1.5 Study Objectives

The 2013/2014 surveys of CLDS were designed as confirmatory studies of the active portions of the disposal site. Since the last monitoring survey in 2011, 1,057,000 m^3 (1,382,000 yd^3) of dredged material has been placed at CLDS (Table 1-1). A portion of this material followed the typical management approach at the site to place material on discrete disposal mounds in an effort to develop containment cells for future use. In addition to this placement strategy, material from Norwalk Harbor and private projects were placed in a grid pattern, followed by the placement of material from New Haven Harbor in the NHAV14-S and NHAV14-N target areas (Figure 1-3).

The December 2013 survey at CLDS was designed to document the initial phase of Norwalk material placement into the southern target grid and the placement of New Haven and private project material into the northern target grid. The survey involved the following components:

- Multibeam bathymetric survey over the NHAV14-S and NHAV14-N placement areas
- Sediment grab samples to characterize the seafloor within the target grids

The January 2014 survey at CLDS was designed to confirm the continued placement of Norwalk and private project material into the southern and northern target grids respectively, and the placement of New Haven material into the northern target grid. The survey involved the following components:

- Multibeam bathymetric survey over the NHAV14-S and NHAV14-N placement areas
- Sediment grab samples to characterize the seafloor within the target grids

The August 2014 surveys at CLDS were designed document the bathymetry of the entire site, including the NHAV14-S and NHAV14-N target areas, and assess the benthic recolonization status of the recently active portions of the site. The survey involved the following components:

- Multibeam bathymetric survey of the entire site

- Sediment-profile/plan-view imaging survey of the recently active portions of the site (MQR, CLIS-08, CLIS-09, CLIS-10, NHAV14-S, and NHAV14-N)
- Sediment grab samples to characterize the seafloor and assess benthic community structure within recently active placement areas and the CLDS reference areas

These confirmatory surveys were conducted to support the objectives of the Site Management and Monitoring Plan and also provide information for the ten-year update of the SMMP for CLDS.

Table 1-1.

Disposal Activity at CLDS since 2011 (per Scow Logs provided by USACE, October 2015)

Project name	Permit number	Destination	Permittee Total (m³)	Permittee Total (yd³)
Admiral's Wharf	NAE2007214	Mound	3,058	4,000
Breakwater Key Marina	NAE19991265	Mound	9,939	13,000
Brewers Dauntless	NAE2004313	Mound	3,823	5,000
Essex Boat Works	NAE20063889	Mound	2,676	3,500
Gateway Terminal	NAE20071916	Mound	2,676	3,500
Guilford Town Marina	NAE20102089	Mound	11,468	15,000
Guilford Yacht Club	NAE20071989	Mound	7,646	10,000
Housatonic River	NAE20072129	Mound	4,587	6,000
Middle Cove Marina	NAE20062468	Mound	6,499	8,500
Motiva Terminal	NAE2009287	Mound	1,147	1,500
Noank Village Boat Club	NAE20082563	Mound	1,147	1,500
Robert Staab	NAE20072714	Mound	1,147	1,500
Stoney Point Association	NAE201058	Mound	382	500
Sybil's Creek/Branford River	NAE-200201979	Mound	4,970	6,500
Town of Essex	NAE20051674	Mound	3,440	4,500
2011-2012 Disposal Season			**64,605**	**84,500**
Brewers Pilots Point Marina - 2012	NAE-2001-2437	Mound	7,772	10,166
Clinton Yacht Haven - 2012	NAE-2008-2993	Mound	19,122	25,010
Guilford Yacht Club	NAE-2007-1989	Mound	26,032	34,048
Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	Mound	3,058	4,000
Pequot Yacht Club - 2012	NAE-2010-1820	Mound	13,303	17,400
Pine Orchard Yacht Club	NAE-2008-1521	Mound	1,835	2,400
2012-2013 Disposal Season			**71,122**	**93,024**

Table 1-1. (continued)

Disposal Activity at CLDS since 2011 (per Scow Logs provided by USACE, October 2015)

Project name	Permit number	Destination	Permittee Total (m^3)	Permittee Total (yd^3)
Branford Yacht Club 2013	NAE-2013-926	Initial Placement	917	1,200
Brewer Stratford Marina	NAE-2004-52	Initial Placement	12,463	16,301
Cos Cob Marina	NAE-2010-2420	Initial Placement	11,571	15,134
Gateway Waterfront Enterprises	NAE-2007-1916	Initial Placement	29,503	38,588
General Dynamics - Electric Boat	NAE-2006-1203	Initial Placement	24,466	32,000
Guilford Yacht Club	NAE-2007-1989	Final Placement	8,504	11,123
Gulf Oil New Haven Terminal	NAE-2007-1486	Final Placement	25,842	33,800
Gwenmor Marina	NAE-2008-425	Unknown	1,873	2,450
Magellan Terminal - East St.	NAE-2006-2341	Initial Placement	3,058	4,000
Magellan Terminal - Waterfront St.	NAE-2006-2340	Initial Placement	1,529	2,000
Milford Landing	NAE-2011-230	Initial Placement	2,447	3,200
Motiva	NAE-2009-287	Initial Placement	1,123	1,600
New Haven FNP	W912WJ-13-C-0014	Final Placement	635,330	830,980
Noank Village Boat Club - 2012	NAE-2008-2563	Unknown	344	450
Norman Bloom	NAE-2001-2523	Unknown	222	291
Norwalk - Veterans Park	NAE-1990-1092	Initial Placement	3,440	4,500
Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	Initial Placement	115,355	150,878
O&G Industries	NAE-2006-1072	Initial Placement	13,380	17,500
Pequonnock Yacht Club	NAE-2010-368	Initial Placement	12,615	16,500
St. Ann Boat Club	NAE-2012-904	Initial Placement	2,141	2,800
Stony Point Association	NAE-2010-58	Initial Placement	917	1,200
Thames Shipyard and Repair	NAE-2007-491	Initial Placement	9,066	11,858
USCG-NL	NAE-1994-340	Initial Placement	4,740	6,200
2013-2014 Disposal Season			**920,947**	**1,204,533**
Total Disposal Volumes 2011 through 2014			**1,056,674**	**1,382,077**

Table 1-2.

Monitoring Surveys at CLDS since 2005

Date	Survey Type	Bathymetric Coverage	No. SPI Stations	DAMOS Contribution
2005	Monitoring	Entire Site 2500 × 4500 m	None	177
2009	Monitoring	Active Portion of CLDS 1000 × 1500 m	Disposal Mounds: 40 Reference Areas: 18	184
2011	Monitoring and Focused Investigation at FVP	Active Portion of CLDS 1000 × 1900 m FVP Mound 1000 × 950	Disposal Mounds: 35 FVP: 15 Reference Areas: 18	192

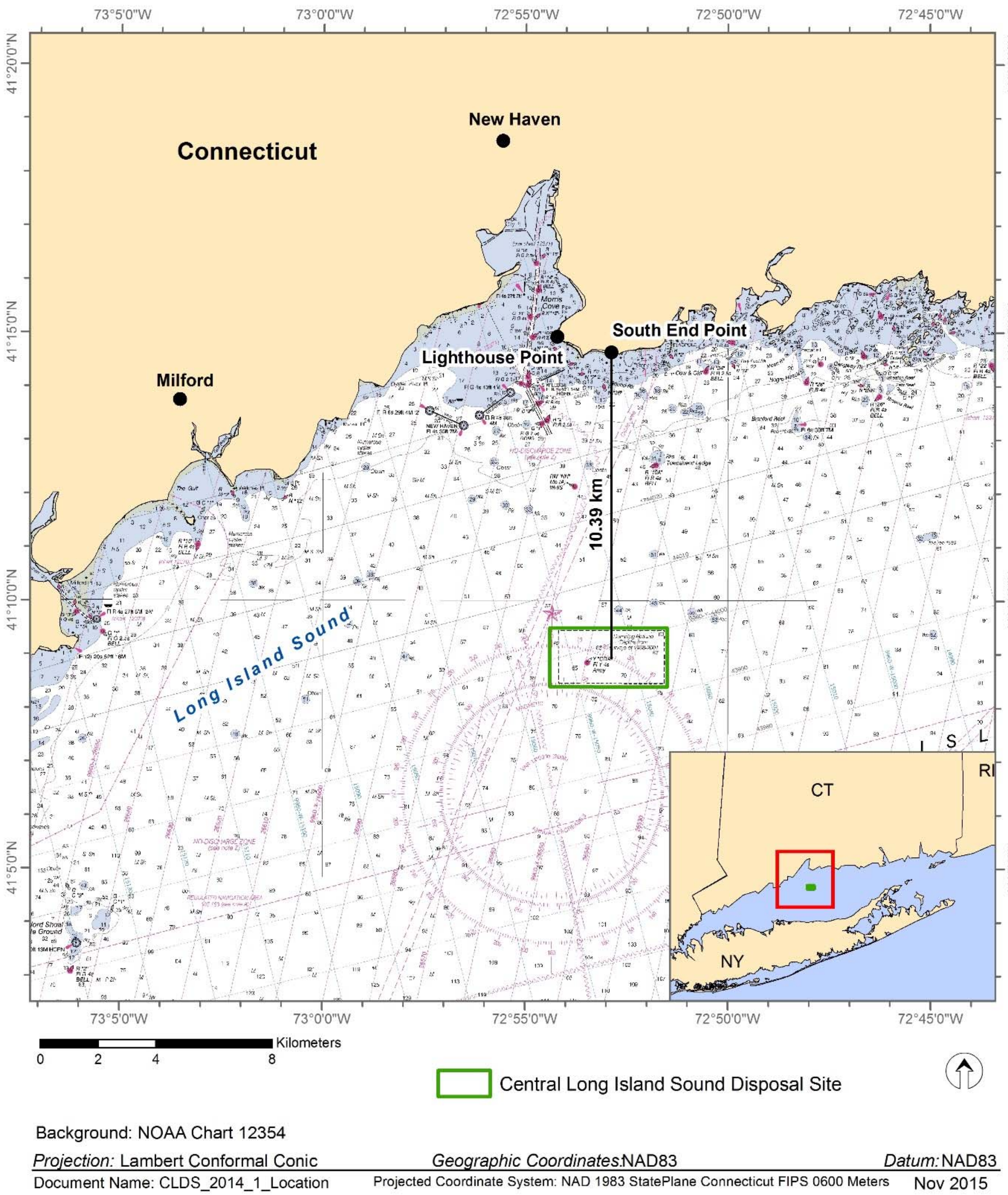


Figure 1-1. Location of the Central Long Island Sound Disposal Site (CLDS)

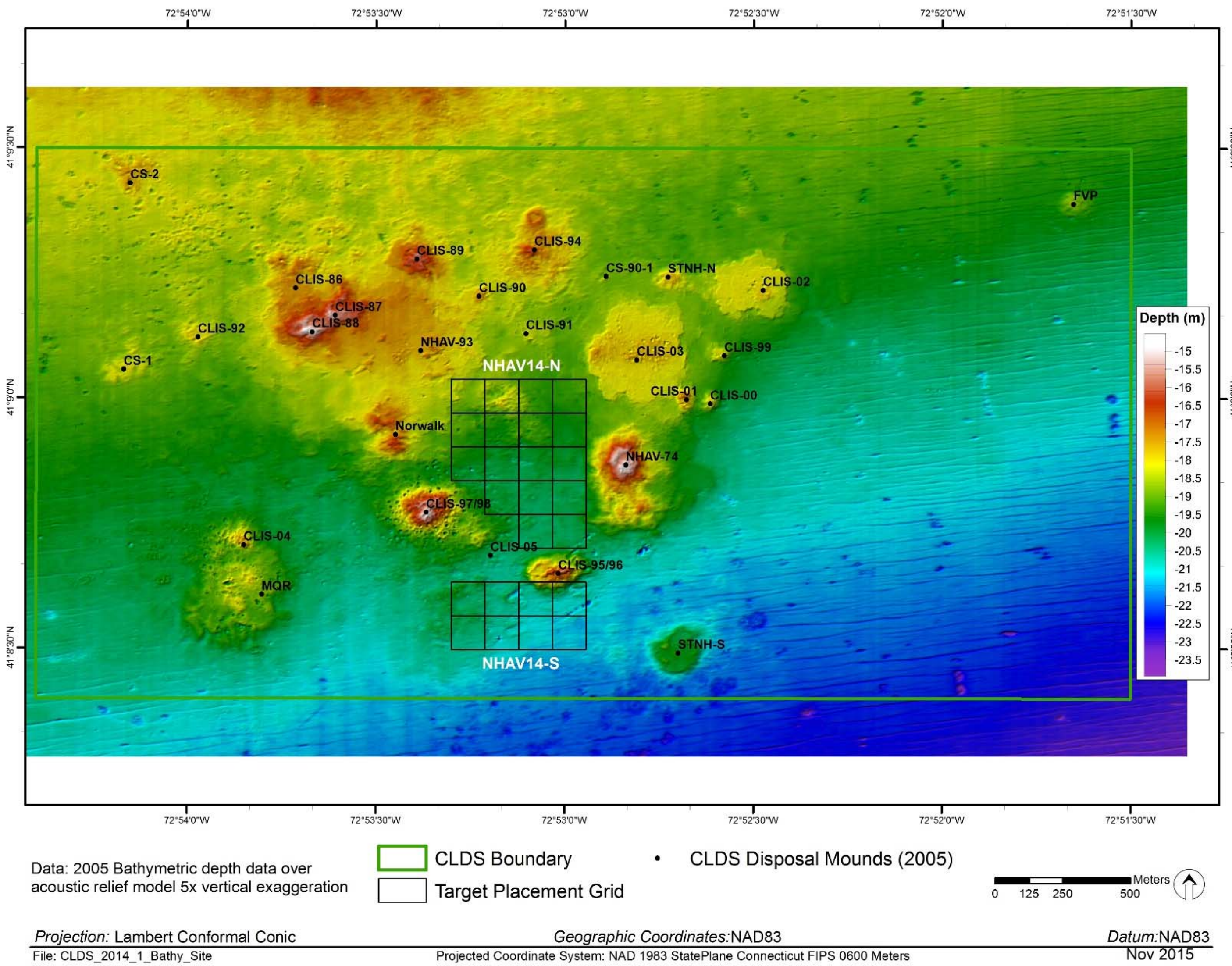


Figure 1-2. Bathymetric data with hillshade relief of the full CLDS from July 2005 survey showing named mound locations

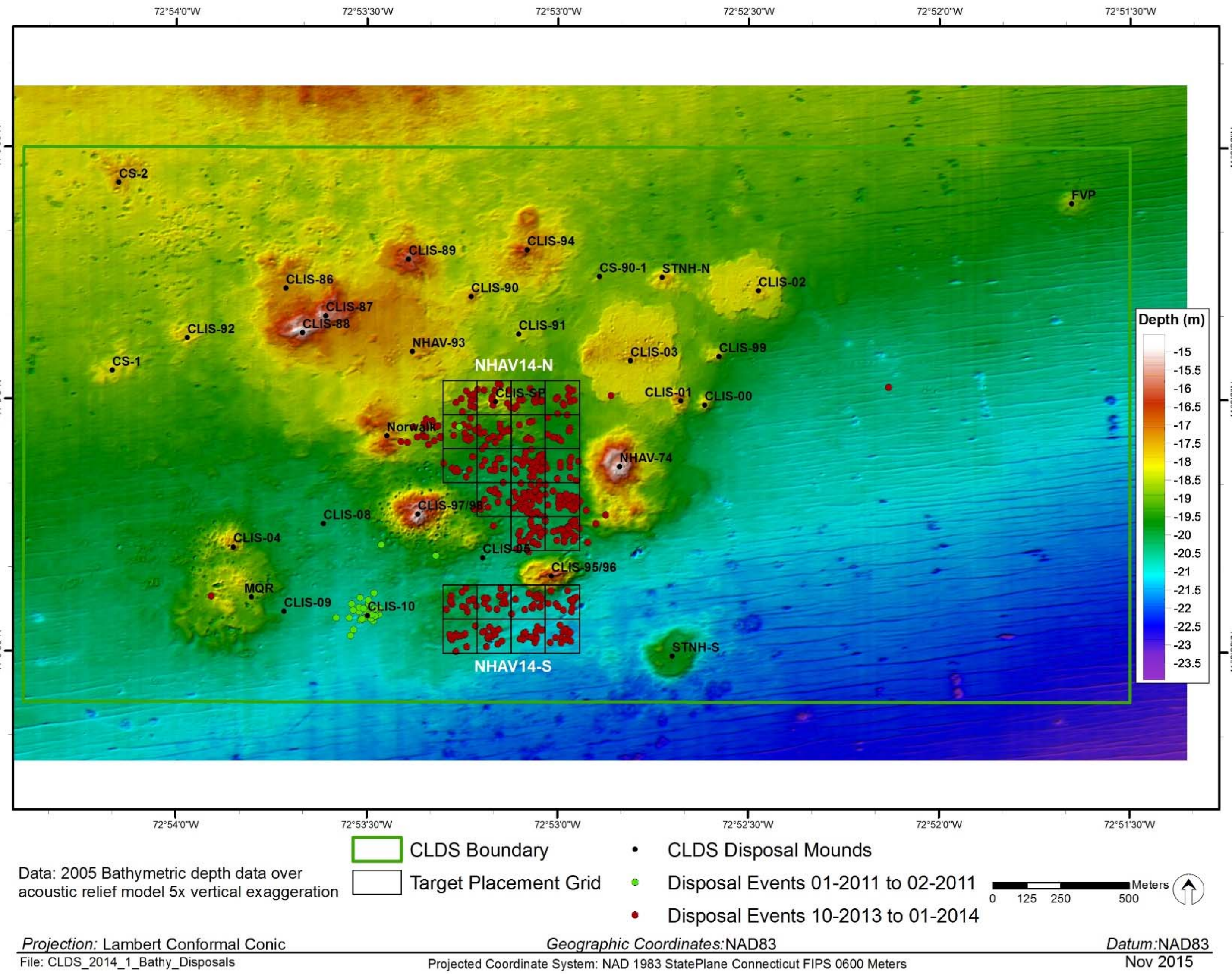


Figure 1-3. Location of disposal events at CLDS (Jan 2011 to Jan 2014)

2.0 METHODS

The 2013/2014 surveys conducted at CLDS were performed by CR Environmental Inc. and Germano & Associates. 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 available in Carey et al. (2013).

2.1 Acoustic Survey

The acoustic survey in this study included bathymetric, backscatter, and side-scan sonar data collection and processing. The bathymetric data provided measurements of water depth that, when processed, were used to map the seafloor topography. The processed data were also compared with previous surveys to track changes in the size and location of seafloor features. This technique is the primary tool of the DAMOS Program for mapping the distribution of dredged material at disposal sites. Backscatter and side-scan sonar data provided images that supported characterization of surface topography, sediment texture, and roughness. Backscatter data can be processed into a seamless image with corrections for topography while side-scan sonar data retains a higher resolution image without correction for topography. The comparison of synoptic acoustic data types has the greatest utility for assessment of dredged material placement.

2.1.1 Acoustic Survey Planning

CR Environmental hydrographers coordinated with USACE NAE scientists and reviewed alternative survey designs. Focused surveys performed during the winter of 2013/2014 included approximately 0.75 km² and 0.5 km² areas occupied in December 2013 and January 2014, respectively (Figures 2-1 and 2-2). The survey conducted in August 2014 covered a 2,500 × 4,500 m area (~11 km²) with a series of survey lines spaced 35-40 m apart and cross-tie lines spaced 400 m apart (Figures 2-1 and 2-2). The August 2014 survey was designed to cover CLDS entirely and provide greater than 100-percent coverage of the seafloor within the survey area (Figure 2-3). Hydrographers obtained site coordinates, imported them to ESRI GIS software, and created planning maps. The proposed survey area encompassing the entire site was then reviewed and approved by NAE scientists.

2.1.2 Navigation and On-Board Data Acquisition

Navigation for the winter 2013/2014 surveys was accomplished using a Hemisphere VS-110 12-channel Differential Global Positioning System (DGPS) and Digital Compass system capable of receiving satellite-based differential corrections (SBAS) and U.S. Coast Guard (USCG) Beacon corrections. Trimble DGPS systems were available as necessary as backups. Both systems are capable of sub-meter horizontal position accuracy. The DGPS system was interfaced to a laptop computer running HYPACK MAX® hydrographic survey software. HYPACK MAX® continually recorded vessel position and DGPS 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.

Navigation for the August 2014 survey was accomplished using a Hemisphere VS-330 270-channel Real-Time Kinematic Global Positioning System (RTK GPS) and Digital Compass system which received on-the-fly corrections from the KeyNetGPS, Inc. Trimble Virtual Reference Station System (VRS). Trimble and Hemisphere differential GPS (DGPS) systems capable of receiving satellite-based differential corrections (SBAS) and U.S. Coast Guard (USCG) Beacon corrections were available as necessary as backups. The RTK GPS system is capable of sub-decimeter horizontal and vertical position accuracy. The RTK GPS system was interfaced to a laptop computer running HYPACK MAX® hydrographic survey software. HYPACK MAX® continually recorded vessel position and RTK 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 relative to intended targets.

Vessel heading measurements were provided by a dual-antenna Hemisphere VS-110 Crescent Digital compass accurate to within 0.05° up to 20 times per second. The pulse-per-second (PPS) signals from the DGPS system was hardware interfaced to the multibeam system and provided microsecond level accuracy of data stream time-tagging from each sensor.

2.1.3 Acoustic Data Collection

Bathymetric, acoustic backscatter, and side-scan sonar data were collected using an Odom MB1 Multibeam Echo Sounder (MBES). This 200-kHz system forms up to 512 3° beams distributed equiangularly or equidistantly across a 120° swath. The MBES transducer was mounted amidships to the port rail of the survey vessel using a high strength adjustable boom, and offsets between the primary RTK GPS antenna and the sonar were precisely measured and entered into HYPACK. The transducer depth below the water surface (draft) was checked and recorded at the beginning and end of data acquisition, and confirmed using the “bar check” method.

A TSS DMS 3-05 motion reference unit (MRU) and the Hemisphere compass system was interfaced to the MBES topside processor. Depth, motion, heading, side scan and backscatter data were PPS time-stamped and transmitted to the HYPACK MAX® acquisition computer via Ethernet communications. Several patch tests were conducted during the surveys 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 profiles (SVP) and conductivity-temperature-depth (CTD) casts at frequent intervals throughout the survey day with an Odom Digibar sound velocity profiler and a Seabird SBE-19 Seacat CTD profiler. Additional confirmations of proper calibration, including static draft, were obtained using the “bar check” method, in which a metal plate was lowered beneath the MBES transducer to a known depth (e.g., 5.0 m) below the water surface. “Bar-check” calibrations were accurate to within 0.02 m in tests conducted at the beginning and end of each survey day.

2.1.4 Bathymetric Data Processing

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

- Adjustment of data for tide fluctuations
- Correction of ray bending associated with refraction 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 for the winter 2013/2014 surveys were accomplished using data recorded at the National Oceanic and Atmospheric Administration's (NOAA) New Haven (Station 8465705). Tide adjustments for the August 2014 survey were accomplished using RTK GPS data merged with NOAA New Haven tide data when RTK fixes were compromised.

Correction of sounding depth and position errors associated with refraction due to water column stratification were conducted using three sound velocity profiles collected during each of the single day winter 2013/2014 surveys and a series of thirty-six SVPs acquired by the survey team during the August 2014 survey. Data artifacts associated with refraction remain in the bathymetric surface model at a relatively fine scale (generally less than five to 10 cm) relative to the survey depth.

Data for the survey conducted December 4, 2013 were filtered to accept only beams falling within an angular limit of 55° to minimize refraction artifacts while ensuring meaningful overlap between adjacent swaths. Data collected during the January and August 2014 surveys were filtered to accept only beams within 50° of nadir. Spurious sounding solutions were flagged or rejected based on the careful examination of data on a sweep-specific basis.

The 219 kHz Odom MB1 MBES system has a published nadir beam width of 3°. The range precision of the MB1 is 3.8 cm with a sounding resolution of 1 cm. The MB1 uses a combination of electronic and interferometric beam forming methods. Both amplitude and phase bottom detection algorithms are used for each beam when calculating ranges (soundings), with a bias towards phase detection occurring very near nadir. Without consideration of interferometric capabilities, the theoretical spatial resolution of the MB1 would be entirely dependent upon the acoustic beam foot print, which is an ellipse formed by a 3 × 5 degree beam with semi-major axis orientation athwart ship. However, interferometric beam forming allows the system to maintain a static footprint across-track equal to the widest portion of the nadir beam ellipse. Thus, data collected at the CLDS mean depth of 19.8 m would retain footprint widths of approximately 1.7 m across the full swath width.

Data were reduced to a cell (grid) size of 2.0 × 2.0 m, acknowledging the system's fine range resolution and approximately 23-m depth range 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).

The National Ocean Service (NOS) standard for the CLDS project depth (Order 1A/1B, NOAA 2015) would call for a 95th percentile confidence interval (95% CI) of 0.59 m at the maximum site depth (23.6 m) and 0.56 m at the mean site depth (19.8m). On December 4, 2013 ninety-five percent of uncertainty values were less than 0.22 m. On January 30, 2014 ninety-five percent of uncertainty values were less than 0.25 m. During the August 2014 survey, ninety-five percent of uncertainty values were less than 0.147 m. Areas and cells with higher uncertainty were limited to higher relief seabed where slopes skewed statistical analysis. The evaluation suggests that elevation comparisons between surveys should be accurate to approximately 20 cm (Table 2-2) and are compliant with suggested performance standards.

Reduced data for each survey were exported in ASCII text format with fields for Easting, Northing, and MLLW elevation (meters). All data were projected to the Connecticut State Plane, NAD83 (metric). A variety of data visualizations were generated using a combination of IVS3D Fledermaus (V.7), ESRI ArcMap (V.10.2.1), and Golden Software Surfer (V.12). Visualizations and data products included:

- ASCII databases 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 (SHP) format suitable for plotting using geographic information system (GIS) and computer-aided design software

- 3-dimensional surface maps of the seabed created using 5× 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

- Raster grid files for the bathymetric and uncertainty surfaces.

2.1.5 Backscatter Data Processing

Backscatter data provided an estimation of surface sediment texture based on sediment surface roughness and were extracted from cleaned files. Mosaics of beam time-series (BTS) 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 BTS data was developed and exported in grayscale TIF format. BTS 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 a grid of backscatter values using a 2-m node interval. The grid of filtered data was delivered in ESRI binary GRD format to facilitate comparison with other data layers.

2.1.6 Side-Scan Sonar Data Processing

The side-scan sonar data collected in August 2014 were processed using Chesapeake Technology SonarWiz software. A seamless mosaic of unfiltered side-scan sonar data was developed and exported in grayscale TIF format using a resolution of 0.2-m per pixel.

2.1.7 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 (images and color-coded grids are rendered with sufficient transparency to allow the three-dimensional acoustic relief model to be visible underneath).

2.2 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 status of the benthic biological community.

2.2.1 SPI and PV Survey Planning

For the CLDS August 2014 survey, a total of 60 SPI/PV stations were surveyed; 45 stations within CLDS focused on four disposal mounds (MQR, CLIS-08, CLIS-09, and CLIS-10; Figure 2-4), and the two active placement areas (NHAV14-N and NHAV14-S); and five randomly located stations in each of three reference areas (2500W REF, 4500E REF, and CLIS REF; Figure 2-5). SPI/PV target station locations are provided in Table 2-3 and actual SPI/PV station replicate locations are provided in Appendix C.

2.2.2 Sediment-Profile Imaging

Sediment-profile imaging (SPI) is a monitoring technique used to provide data on the physical characteristics of the seafloor as well as the status of the benthic biological community (Germano et al. 2011). The technique involves deploying an underwater camera system to photograph a cross section of the sediment-water interface. In the 2014 survey at CLDS, high-resolution SPI images were acquired using a Nikon® D7100 digital single-lens reflex camera mounted inside an Ocean Imaging® Model 3731 pressure housing system. The pressure housing sat atop a wedge-shaped prism with a front faceplate and a back mirror. The mirror was mounted at a 45° angle to reflect the profile of the sediment-water interface. As the prism penetrated the seafloor, a trigger activated a time-delay circuit that fired an internal strobe to obtain a cross-sectional image of the upper 15–20 cm of the sediment column (Figure 2-6).

The camera remained on the seafloor for approximately 20 seconds to ensure that a successful image had been obtained. 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 640, shutter speed was 1/250, f-stop was f9, and storage was in compressed raw Nikon Electronic Format (NEF) files (approximately 30 MB each). Electronic files were converted to high-resolution JPEG (8-bit) format files (4000 × 6000 pixels) using Nikon Capture® NX2 software (Version 2.4.7).

Test exposures of the Kodak® Color Separation Guide (Publication No. Q-13) were made on deck at the beginning and end of the survey to verify that all internal electronic systems were working to design specifications and to provide a color standard against which final images could be checked for proper color balance. After deployment of the camera at each station, the frame counter was checked to ensure that the requisite number of replicates had been obtained. In addition, a prism penetration depth indicator on the camera frame was checked to verify that the optical prism had actually penetrated the bottom to a sufficient depth. If images were missed or the penetration depth was insufficient, the camera frame stop collars were adjusted and/or weights were added or removed, and additional replicate images were taken. Changes in prism weight amounts, the presence or absence of mud doors, and frame stop collar positions were recorded for each replicate image.

Each image was assigned a unique time stamp in the digital file attributes by the camera's data logger and cross-checked with the time stamp in the navigational system's computer data file. In addition, the field crew kept redundant written sample logs. Images were downloaded periodically to verify successful sample acquisition and/or to assess what type of sediment/depositional layer was present at a particular station. Digital image files were renamed with the appropriate station names immediately after downloading as a further quality assurance step.

2.2.3 Plan-View Imaging

An Ocean Imaging® Model DSC16000 plan-view underwater camera (PV) system with two Ocean Imaging® Model 400-37 Deep Sea Scaling lasers mounted to the DSC16000 was attached to the sediment-profile camera frame and used to collect plan-view photographs of the seafloor surface; both SPI and PV images were collected during each "drop" of the system. The PV system consisted of a Nikon D-7000 encased in an aluminum housing, a 24 VDC autonomous power pack, a 500 W strobe, and a bounce trigger. A weight was attached to the bounce trigger with a stainless steel cable so that the weight hung below the camera frame; the scaling lasers projected two red dots that are separated by a constant distance (26 cm) regardless of the field-of-view of the PV system, which can be varied by increasing or decreasing the length of the trigger wire. As the camera apparatus was lowered to the seafloor, the weight attached to the bounce trigger contacted the seafloor prior to the camera frame hitting the bottom and triggered the PV camera (Figure 2-6). 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 500. The additional camera settings used were as follows: shutter speed 1/20, f14, white balance set to flash, color mode set to Adobe RGB, sharpening set to none, noise reduction off, and storage in compressed raw NEF files (approximately 20 MB each). Electronic files were converted to high-resolution JPEG (8-bit) format files (3264 × 4928 pixels) using Nikon Capture® NX2 software.

Prior to field operations, the internal clock in the digital PV system was synchronized with the GPS navigation system and the SPI camera. Each PV image acquired was assigned a time stamp in the digital file and redundant notations in the field and navigation logs. Throughout the survey, PV images were downloaded at the same time as the SPI images after collection and evaluated for successful image acquisition and image clarity.

The ability of the PV system to collect usable images was dependent on the clarity of the water column. Water conditions at CLDS allowed use of a ½-m trigger wire, resulting in an area of bottom visualization approximately 0.5 × 0.3 m in size.

2.2.4 SPI and PV Data Collection

The SPI/PV survey was conducted at CLDS on 15-16 August 2014 aboard the R/V *Jamie Hanna*. At each station, the vessel was positioned at the target coordinates and the camera was deployed within a defined station tolerance of 10 m. Four replicate SPI and PV images were collected at each of the stations (Figures 2-4 and 2-5; Appendix C). The three replicates with the best quality images from each station were chosen for analysis (Appendix D).

The DGPS described above was interfaced to HYPACK® software via laptop serial ports to provide a method to locate and record target sampling locations. Throughout the survey, the HYPACK® data acquisition system received DGPS data. The incoming data stream was digitally integrated and stored on the PC's hard drive. Actual SPI/PV sampling locations were recorded as target files using this system.

2.2.5 SPI and PV Data Analysis

Computer-aided analysis of the resulting images provided a set of standard measurements to allow comparisons between different locations and different surveys. The DAMOS Program has successfully used this technique for over 30 years to map the distribution of disposed dredged material and to monitor benthic recolonization at disposal sites (Germano et al. 2011).

Following completion of data collection, the digital images were analyzed using Adobe Photoshop® CS 5 Version 12.1. Images were first adjusted in Adobe Photoshop® to expand the available pixels to their maximum light and dark threshold range. Linear and areal measurements were recorded as number of pixels and converted to scientific units using the Kodak® Color Separation Guide for measurement calibration. Detailed results of all SPI and PV image analyses are presented in Appendix D.

2.2.5.1 SPI Data Analysis

Analysis of each SPI image was performed to provide measurement of the following standard set of parameters:

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 E. 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 substrata) to a maximum of 20 cm (full penetration on very soft substrata).

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 (sediment surface relief) 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). Biogenic roughness typically changes seasonally and is related to the interaction of bottom turbulence and bioturbational activities.

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 assessing color and reflectance boundaries within the images.

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 2-7).

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.

2.2.5.2 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 pinpoint "optical core" of the sediment profile was taken. Unusual surface sediment layers, textures, or structures detected in any of the sediment-profile images can be interpreted in light of the larger context of surface sediment features; i.e., is a surface layer or topographic feature a regularly occurring feature and typical of the bottom in this general vicinity or just an isolated anomaly? The scale information provided by the underwater lasers allows for accurate density counts (number per square meter) of attached epifaunal colonies, sediment burrow openings, or larger macrofauna or fish which may have been missed in the sediment-profile cross section. Information on sediment transport dynamics and bedform wavelength were also available from PV image analysis. Analysts calculated the image size and field-of-view and noted sediment type; recorded the presence of bedforms, burrows, tubes, tracks, trails, epifauna, mud clasts, and debris; and included descriptive comments (Appendix D).

2.2.6 Statistical Methods

The objectives of the 2014 SPI survey at CLDS were to assess the status of benthic recolonization of the sediment at the disposal sites relative to reference conditions. Statistical analyses were conducted to compare between disposal site (target areas where placement activity was concentrated) and reference areas (undisturbed control areas) for the following SPI variables: 1) aRPD depth, 2) successional stage, and 3) number of subsurface feeding voids counted in each image. These three variables were chosen for comparison because they are known to be key indicators of infaunal activity within soft-bottom systems like Rhode Island Sound. The first step in the statistical approach was to generate basic boxplots for a visual assessment of differences among stations. The second step, described in detail below, tested for significant differences between the reference and placement target area stations in 2014.

Traditionally, the objective of this study would be addressed using point null hypotheses of the form "There is no significant difference in benthic conditions between the reference area and the placement target areas." However, in this instance, an approach using bioequivalence (or interval testing) was considered to be more informative than the point null hypothesis test of "no difference" (Germano 1999). There is almost always some difference (small or large) between variables, and the statistical significance of this difference may or may not be ecologically meaningful. Without an associated power analysis, the results of traditional point null hypothesis testing often provide an inadequate ecological assessment.

In the application of bioequivalence testing, the null hypothesis was chosen as one that presumes the difference is great, i.e., an inequivalence hypothesis (e.g., McBride 1999). This is recognized as a "proof of safety" approach because rejection of this inequivalence null hypothesis requires sufficient proof that the difference was actually small. The null and alternative hypotheses were:

H_0: $d \leq -\delta$ or $d \geq \delta$ (presumes the difference is great)

H_A: $-\delta < d < \delta$ (requires proof that the difference is small)

where d is the difference between a reference mean and a site mean. If the null hypothesis is rejected, then it can be concluded that the two means are equivalent to one another within $\pm\delta$ units. The size of δ should be determined from historical data, and/or best professional judgment, to identify a maximum difference that is within background variability and is therefore not ecologically meaningful. Previously established δ values of 1 cm for aRPD depth, and 0.5 for successional stage rank (on the 0–3 scale) were used.

The test of this interval hypothesis can be broken down into two one-sided tests each of size α (McBride 1999, Schuirmann 1987): 1) based on a normal distribution or 2) on a Student's *t*-distribution when sample sizes are small and variances must be estimated from the data (typical in the majority of environmental monitoring projects). The statistics used to test the interval hypotheses shown here are based on the Central Limit Theorem (CLT) and basic statistical properties of random variables. A simplification of the CLT states that the mean of any random variable is normally distributed. Linear combinations of normal random variables are also normal so a linear function of means is also normally distributed. When a linear function of means is divided by its standard error the ratio follows a *t*-distribution with degrees of freedom associated with the variance estimate. Hence, the *t*-distribution can be used to construct a confidence interval around any linear function of means.

In the sampling design for the 2014 Survey, there were nine distinct areas, three were categorized as reference locations and six were disposal locations.

The three reference areas collectively represented ambient conditions, but if there were mean differences among these three areas then pooling them into a single reference group would have increased the variance beyond true background variability. The effect of keeping the three reference areas separate had no effect on the grand reference mean (when n was equal among these areas), but it maintained the variance as a true background variance for each individual population with a constant mean.

The difference equation, $\hat{d}$, for the comparison of interest was a linear contrast defined as the mean of the three reference means minus the mean of the target area mean (i.e., disposal site):

$$\hat{d} = [\tfrac{1}{3}\ (\text{Mean}_{\text{CLIS REF}} + \text{Mean}_{\text{2500W REF}} + \text{Mean}_{\text{4500E REF}}) - (\text{Mean}_j)] \qquad \text{[Eq.1]}$$

where:

j mean of the respective disposal site (i.e., CLIS-08, CLIS-10, NHAV14-N or NHAV14-S mounds)

The standard errors of the difference equations were calculated from the sum of the variances for the independent variables (which is equal to the variance of the sum):

$$se(\hat{d}) = \sqrt{\sum_j \left(S_j^2 c_j^2 / n_j\right)} \qquad \text{[Eq.2]}$$

where:

$se(\hat{d})$ standard error of the difference equation

$\hat{d}$ observed difference in means between the reference and the target area

c_j coefficients for the j means in the difference equation, $\hat{d}$

S_j^2 variance for the j^{th} area.

n_j number of replicates for the j^{th} area.

The inequivalence null hypothesis was rejected (and equivalence was concluded) if the upper and lower 95% confidence bounds on the difference of means, $\hat{d}$, was fully contained within the interval [–δ, +δ].

Thus the H_0 was rejected if:

$$D_L = \hat{d} - t_{\alpha,\upsilon} se(\hat{d}) > -\delta \quad \text{and} \quad D_U = \hat{d} + t_{\alpha,\upsilon} se(\hat{d}) < \delta \qquad \text{[Eq. 3]}$$

where:

$t_{\alpha,\upsilon}$ upper 100α percentile of a Student's *t*-distribution with υ degrees of freedom

υ degrees of freedom for the standard error. If a pooled residual variance estimate was used, it was the residual degrees of freedom from an ANOVA on all groups (total number of samples minus the number of groups); if separate variance estimates were used, degrees of freedom were calculated based on the Welch-Satterthwaite estimation (Satterthwaite 1946).

Validity of the normality and equal variance assumptions was tested using Shapiro-Wilk's test for normality on the area residuals ($\alpha = 0.05$) and Levene's test for equality of variances among the six areas ($\alpha = 0.05$). If normality was not rejected but equality of variances was, then the variance for the difference equation was based on separate variances for each group.

2.3 Sediment Grab Collection and Analysis

Sediment grab samples were collected during the acoustic surveys on 4 December 2013 and 30 January 2014 (Figure 2-2; Table 2-4) for visual characterization of the bottom type. A 0.02-m^2 Petite Ponar grab was used to collect the samples. The contents of each grab were inspected by a USACE observer during the December 2013 survey, and by the CR Environmental Hydrographer during the January 2014 survey, photographed and evaluated for color, odor, and texture.

2.4 Benthic Grab Collection and Analysis

Sediment grab samples were collected from 12 stations on 23 August 2014 for analysis of grain size, total organic carbon (TOC) and benthic community structure (infaunal analysis; sorting into major taxonomic categories and identification/enumeration to the lowest taxonomic category practicable). The sediment grab samples were obtained and processed as detailed in the DAMOS Quality Assurance Project Plan (QAPP) for the DAMOS Program for grain size (ASTM D422), TOC (EPA Method 9060), and benthic community structure.

Sediment grab samples were collected using a 0.04-m^2 Ted Young-modified Van Veen grab sampler. At each station, the vessel was positioned at the target coordinates (Figure 2-8; Table 2-5) and grab samples were collected within a defined station tolerance of 30 m. The samples were checked for penetration depth (10 cm maximum and 6 cm minimum acceptable penetration depth), depth of the apparent redox potential discontinuity (aRPD) layer, sediment texture, odor, and observed biota.

Two grab samples were collected at each station. One grab sample was processed for TOC and grain size analyses, and the other grab sample was processed for infaunal community analysis. For grain size and TOC, grab samples were collected and the overlying water was first removed with a siphon. Next, the entire contents of the grab sample were homogenized until a consistent color and texture was achieved. An aliquot of sediment was then placed into two clear glass jars, one for TOC analysis and one for grain size analysis.

The sediment grab samples were stored on ice and shipped priority overnight to Katahdin Analytical Services for analysis. Sediment sample containers for TOC (4 oz jars) and grain size (8 oz jars) were provided by the lab.

The sediment grab samples for benthic community analysis were washed into a clean 10-liter plastic bucket and sieved through a 0.5 mm mesh screen. The material retained on the sieve was then placed in an appropriate sample container (1 liter or 500 ml) and preserved with 10% formalin and half a tablespoon of borax to buffer the solution. The samples for benthic infaunal analysis were sent to New England District, US Army Corps of Engineers, 696 Virginia Avenue, Concord, MA for sorting and then to Environmental Research Group (ERG), 843 W. 36th St. Ste. 200, Baltimore, MD for identification and enumeration.

Table 2-1.

2013/2014 Survey Activities at CLDS

Date	Survey Type	Bathymetric Coverage	No. SPI Stations	Sediment Grab Samples
4 December 2013	Monitoring	Norwalk/New Haven Initial Placement Area, 600 × 1000 m	None	6
30 January 2014	Monitoring	Norwalk/New Haven Ongoing Placement Area, 600 × 1000 m	None	7
15-16 August 2014	Monitoring	None	Disposal Mounds: 19 Cap Areas: 26 Reference Areas: 15	12
25-29 August 2014	Monitoring	Entire Site 2500 × 4500 m	None	None

Table 2-2.

Accuracy and Uncertainty Analysis of Bathymetric Data

Survey Date(s)	Quality Control Metric	Results (m) Mean	95% Uncertainty	Range
12/4/2013	Cross-Line Nadir Comparisons	-0.02	0.31	-0.57 - 0.88
	Cross-Line Swath Comparisons	0.00	0.19	
	Within Cell Uncertainty	0.06	0.13	0.00 - 0.58
	Beam Angle Uncertainty (0 - 50d)	-0.01	0.20	0.00 - 2.45
1/30/2014	Cross-Line Nadir Comparisons	0.04	0.44	-0.45 - 0.67
	Cross-Line Swath Comparisons	-0.04	0.29	
	Within Cell Uncertainty	0.07	0.14	0.00 - 0.45
	Beam Angle Uncertainty (0 - 50d)	-0.04	0.22	0.00 - 1.47
8/25-29/14	Cross-Line Nadir Comparisons	0.00	0.16	-0.45 - 0.67
	Cross-Line Swath Comparisons	0.00	0.18	
	Within Cell Uncertainty	0.05	0.09	0.00 - 1.78
	Beam Angle Uncertainty (0 - 50d)	0.00	0.19	0.00 - 1.45

Notes:
1. The mean of cross-line nadir and full swath comparisons are indicators of tide bias.
2. 95% uncertainty values were calculated using the sums of mean differences and standard deviations expressed at the 2-sigma level.
3. Within cell uncertainty values include biases and random errors.
4. Beam angle uncertainty was assessed by comparing cross-line data (50-degree swath limit) with a reference surface created using mainstay transect data.
5. Swath and cell based comparisons were conducted using 2 m x 2 m cell averages. These analyses do not exclude sounding variability associated with terrain slope. Uncertainties associated with slope are depicted on maps within the report.

Table 2-3.

CLDS August 2014 Target SPI/PV Station Locations

CLDS August 2014 Target SPI/PV Station Locations					
Station	**Latitude (N)**	**Longitude (W)**	**Station**	**Latitude (N)**	**Longitude (W)**
NHAV14-N-01	41° 8.997'	72° 53.261'	MQR-01	41° 8.644'	72° 53.797'
NHAV14-N-02	41° 8.990'	72° 53.179'	MQR-02	41° 8.605'	72° 53.823'
NHAV14-N-03	41° 8.999'	72° 53.072'	MQR-03	41° 8.622'	72° 53.819'
NHAV14-N-04	41° 9.003'	72° 52.986'	MQR-04	41° 8.629'	72° 53.771'
NHAV14-N-05	41° 8.949'	72° 53.331'	CLIS-08-01	41° 8.749'	72° 53.602'
NHAV14-N-06	41° 8.927'	72° 53.262'	CLIS-08-02	41° 8.779'	72° 53.613'
NHAV14-N-07	41° 8.937'	72° 53.180'	CLIS-08-03	41° 8.760'	72° 53.641'
NHAV14-N-08	41° 8.944'	72° 53.091'	CLIS-08-04	41° 8.769'	72° 53.587'
NHAV14-N-09	41° 8.942'	72° 53.002'	CLIS-08-05	41° 8.741'	72° 53.626'
NHAV14-N-10	41° 8.872'	72° 53.272'	CLIS-09-01	41° 8.597'	72° 53.696'
NHAV14-N-11	41° 8.861'	72° 53.174'	CLIS-09-02	41° 8.591'	72° 53.746'
NHAV14-N-12	41° 8.870'	72° 53.069'	CLIS-09-03	41° 8.556'	72° 53.723'
NHAV14-N-13	41° 8.860'	72° 52.989'	CLIS-09-04	41° 8.584'	72° 53.710'
NHAV14-N-14	41° 8.807'	72° 53.175'	CLIS-09-05	41° 8.586'	72° 53.681'
NHAV14-N-15	41° 8.806'	72° 53.074'	CLIS-10-01	41° 8.580'	72° 53.513'
NHAV14-N-16	41° 8.794'	72° 52.987'	CLIS-10-02	41° 8.580'	72° 53.457'
NHAV14-N-17	41° 8.739'	72° 53.070'	CLIS-10-03	41° 8.581'	72° 53.485'
NHAV14-N-18	41° 8.734'	72° 52.999'	CLIS-10-04	41° 8.548'	72° 53.498'
NHAV14-S-19	41° 8.588'	72° 53.252'	CLIS-10-05	41° 8.565'	72° 53.483'
NHAV14-S-20	41° 8.587'	72° 53.168'			
NHAV14-S-21	41° 8.596'	72° 53.069'			
NHAV14-S-22	41° 8.587'	72° 53.001'			
NHAV14-S-23	41° 8.516'	72° 53.252'			
NHAV14-S-24	41° 8.541'	72° 53.151'			
NHAV14-S-25	41° 8.517'	72° 53.063'			
NHAV14-S-26	41° 8.536'	72° 53.005'			

Note: Coordinate system NAD83

Table 2-4.

CLDS January 2014 Sediment Grab Actual Station Locations

CLDS January 2014 Grab Locations		
Station	**Latitude (N)**	**Longitude (W)**
20140130-G1	41° 8.525'	72° 52.968'
20140130-G2	41° 8.520'	72° 53.077'
20140130-G3	41° 8.531'	72° 53.157'
20140130-G4	41° 8.610'	72° 53.186'
20140130-G5	41° 8.808'	72° 53.062'
20140130-G6	41° 8.886'	72° 53.039'
20140130-G7	41° 9.007'	72° 53.227'

Notes: Coordinate system NAD83
Station locations for the December 2013 grab survey were not available.

Table 2-5.

CLDS August 2014 Target Benthic Grab Station Locations

CLDS August 2014 Target Benthic Grab Locations		
Station	**Latitude (N)**	**Longitude (W)**
NHAV14-N-07	41° 8.937'	72° 53.180'
NHAV14-N-12	41° 8.870'	72° 53.069'
NHAV14-N-14	41° 8.807'	72° 53.175'
NHAV14-S-21	41° 8.596'	72° 53.069'
NHAV14-S-23	41° 8.516'	72° 53.252'
NHAV14-S-25	41° 8.517'	72° 53.063'
CLIS-10-01	41° 8.580'	72° 53.513'
CLIS-10-03	41° 8.581'	72° 53.485'
CLIS-10-05	41° 8.565'	72° 53.483'
2500W REF-01	41° 9.248'	72° 55.425'
CLIS REF-05	41° 8.025'	72° 50.038'
4500E REF-04	41° 9.244'	72° 50.633'

Note: Coordinate system NAD83

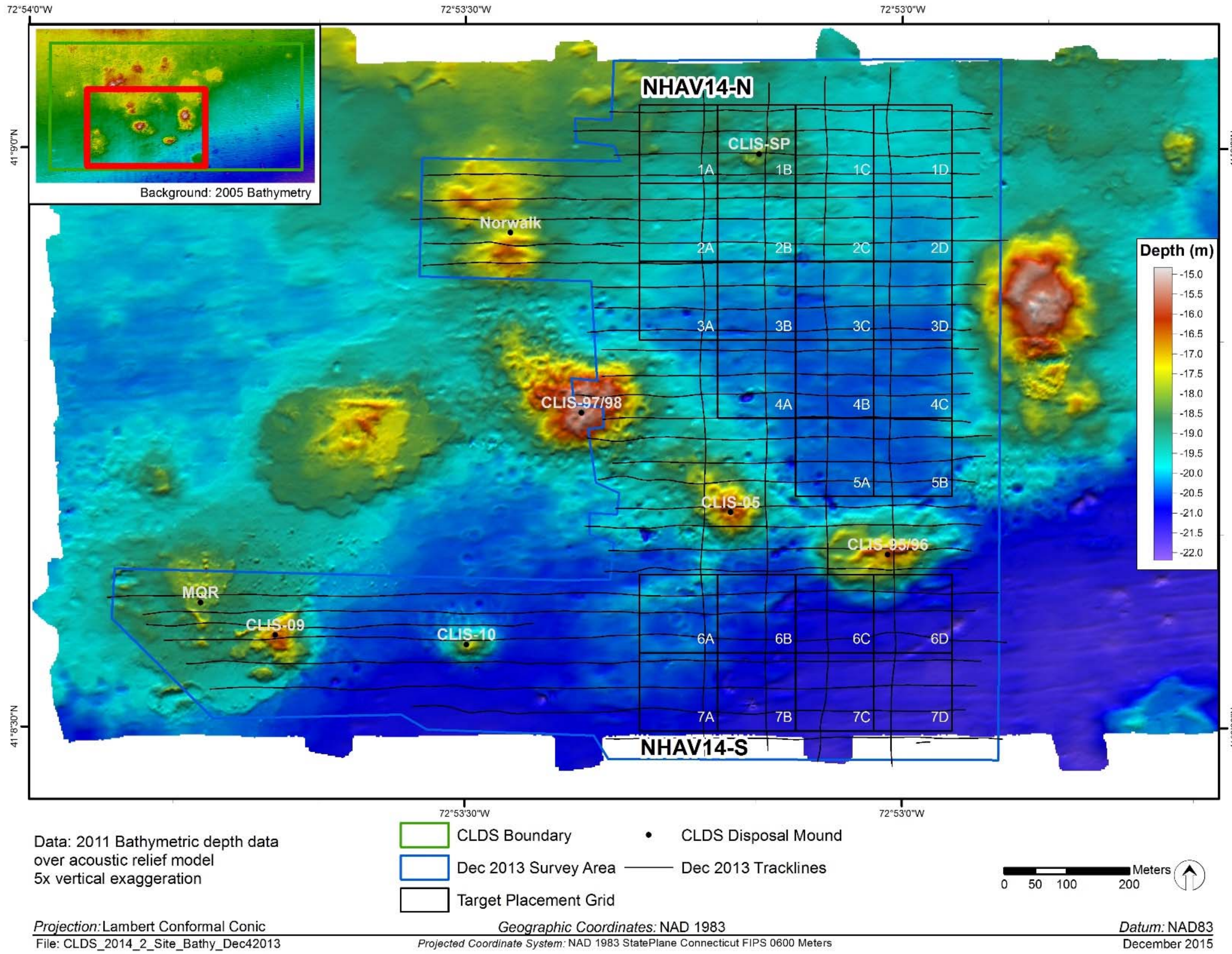


Figure 2-1. CLDS December 2013 bathymetric survey area and transects

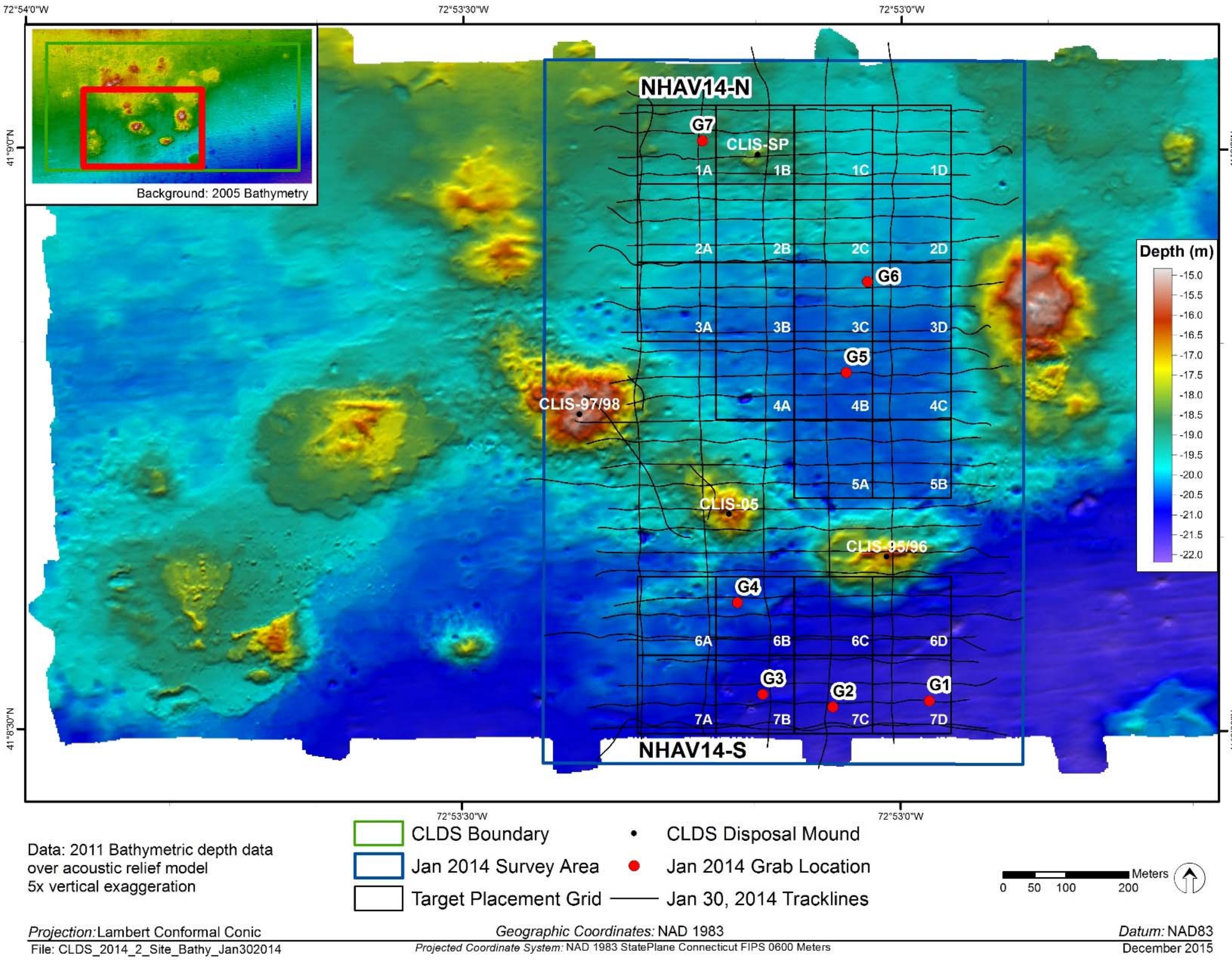


Figure 2-2. CLDS January 2014 bathymetric survey area, transects and sediment grab locations

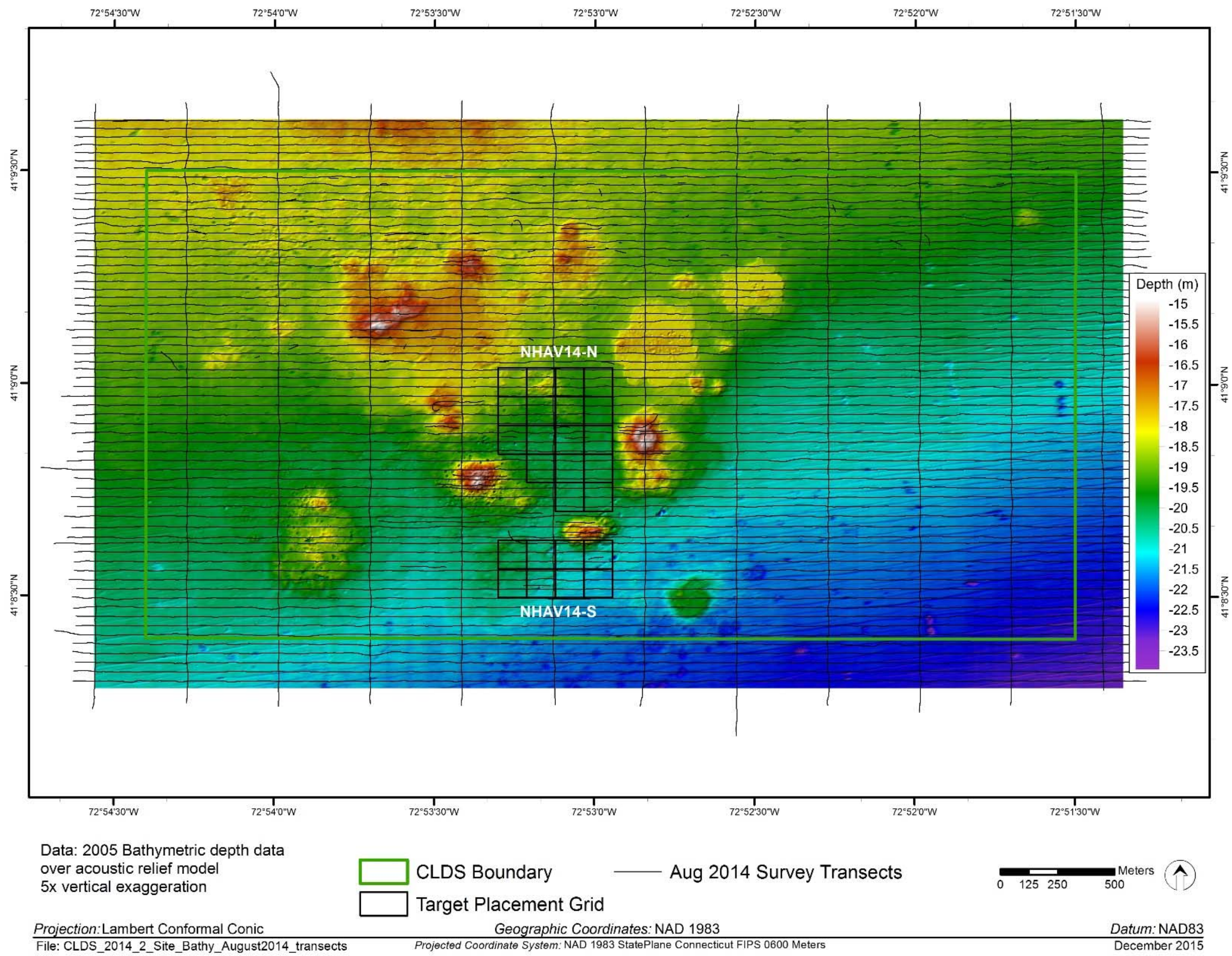


Figure 2-3. CLDS August 2014 bathymetric survey area and transects

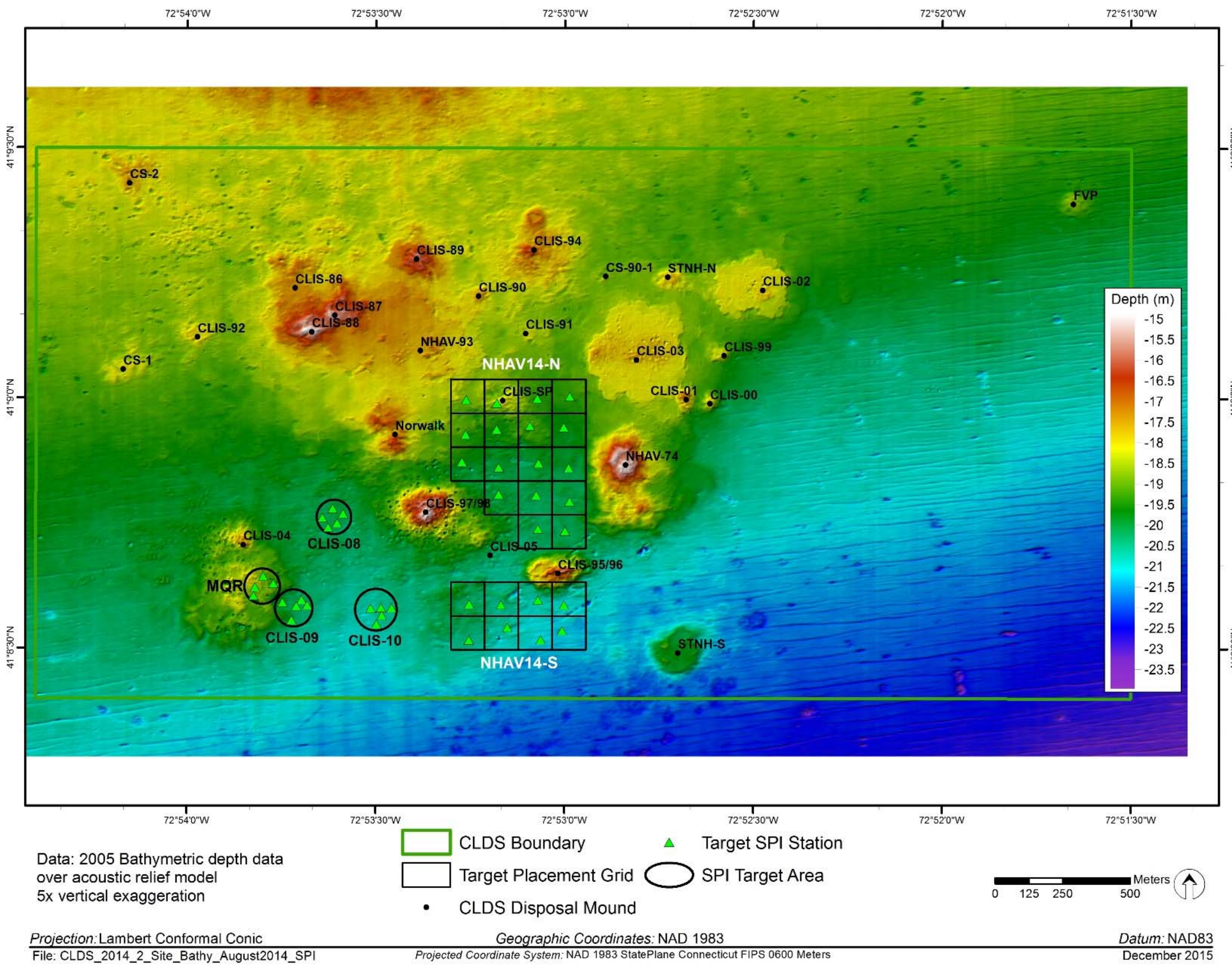


Figure 2-4. CLDS August 2014 target SPI/PV site station locations

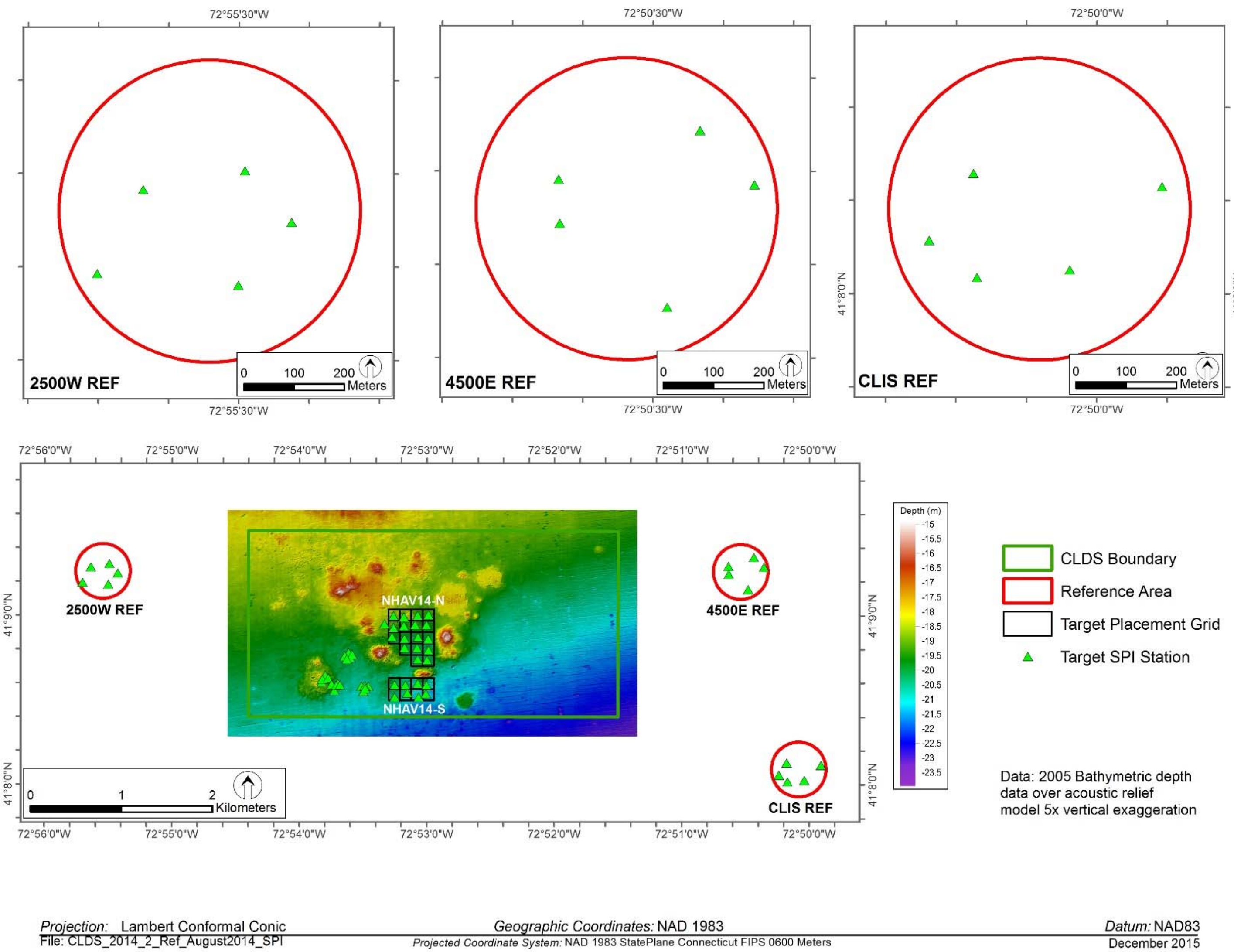


Figure 2-5. CLDS August 2014 target SPI/PV reference area station locations

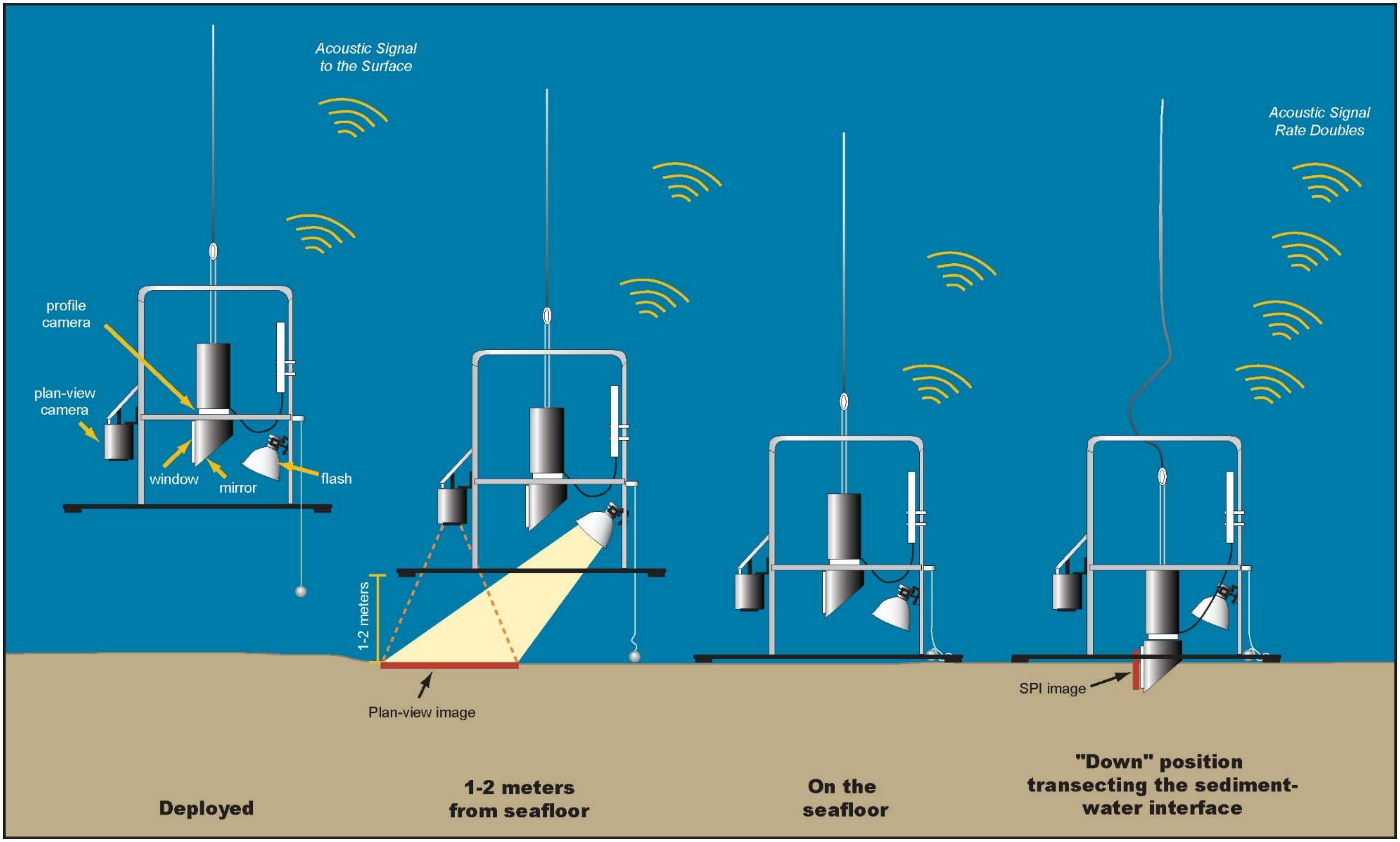


Figure 2-6. Schematic diagram of the SPI/PV camera deployment

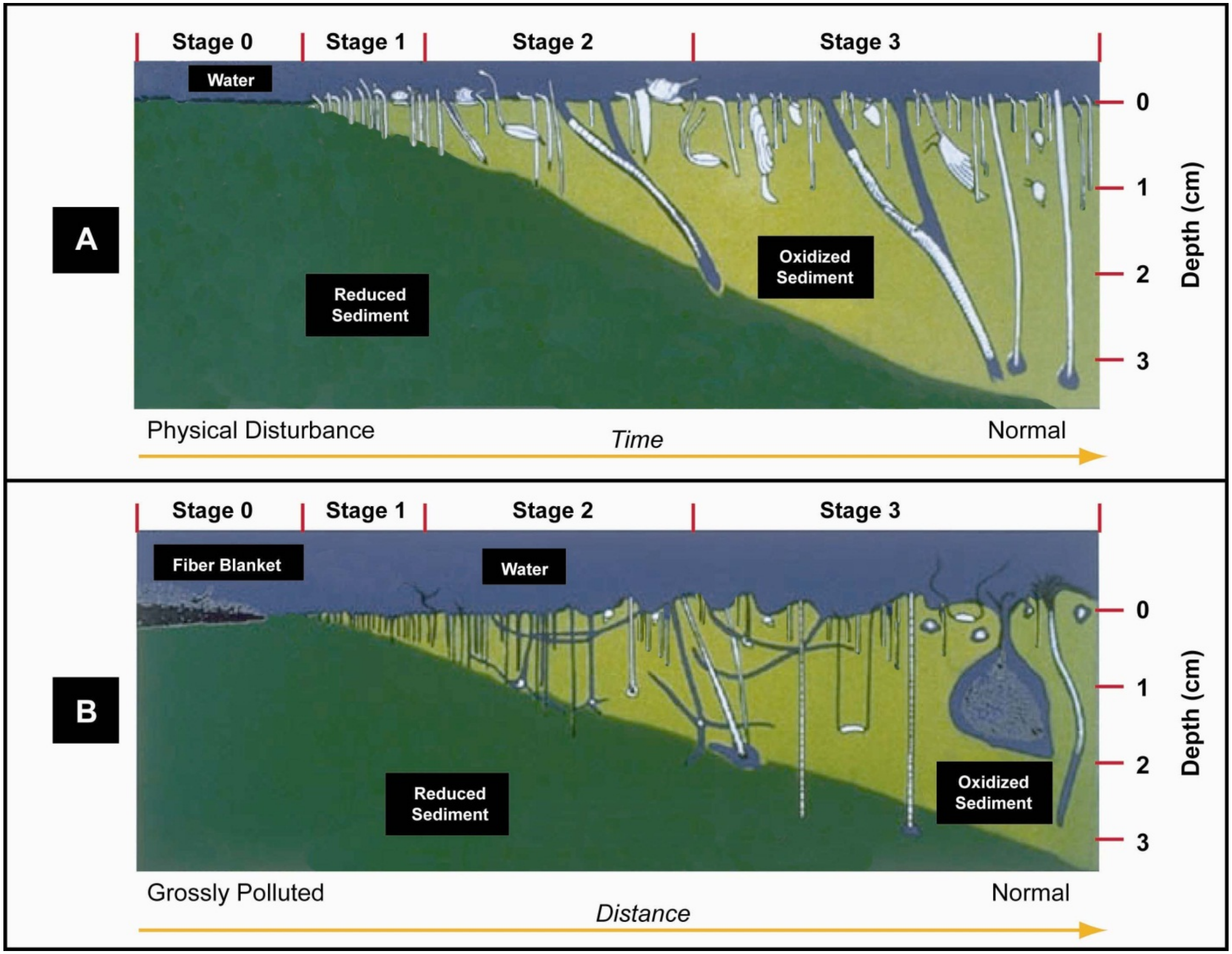


Figure 2-7. The stages of infaunal succession as a response of soft-bottom benthic communities to (A) physical disturbance or (B) organic enrichment; from Rhoads and Germano (1982)

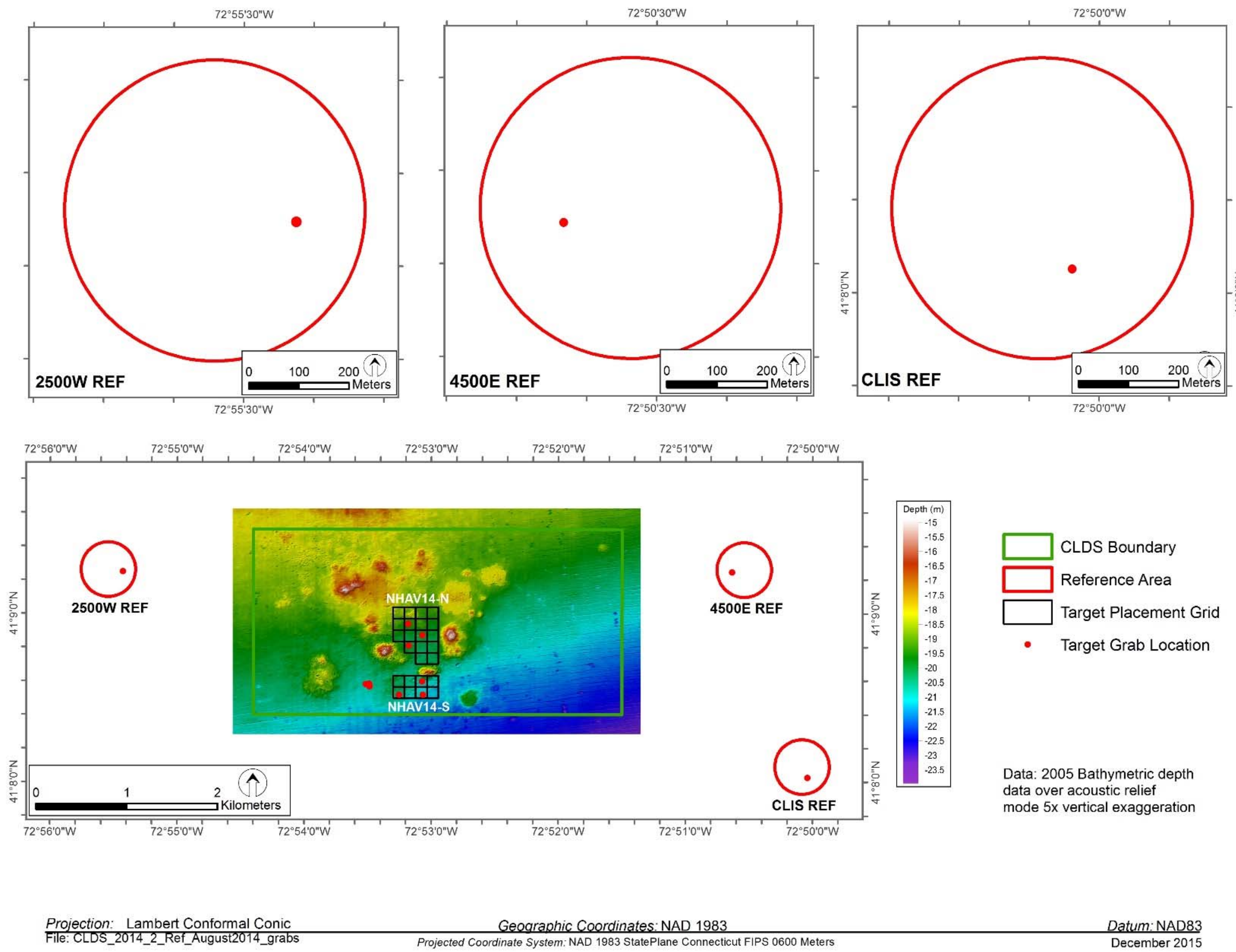


Figure 2-8. CLDS August 2014 sediment grab locations

3.0 RESULTS

Bathymetric surveys were conducted over the NHAV14-S and NHAV14-N target areas at CLDS on 4 December 2013 and 30 January 2014. Sediment grab samples were also collected during the bathymetric survey efforts. A SPI/PV survey was conducted over the active placement areas of the site 15–16 August 2014 and included companion sediment grab samples. This survey was followed by a bathymetric survey of the entire site on 25–29 August 2014. Data from these investigations are presented below and in the subsequent tables and figures.

3.1 December 2013 Survey of the New Haven Target Areas

The bathymetric survey conducted in December 2013 covered the south/central portion of CLDS that was targeted for the placement of material from Norwalk Harbor, New Haven Harbor, and several private projects (see Figure 2-1). The survey was conducted to document the placement of the first phase of material from private projects and New Haven Harbor into the NHAV14-N grid along with Norwalk Harbor material into the NHAV14-S grid.

3.1.1 Acoustic Data

3.1.1.1 Bathymetry

The December 2013 bathymetric survey covered the two target placement grids (NHAV14-S and NHAV14-N) for the New Haven capping project along with extended coverage of several nearby older placement mounds. Adjacent mounds Norwalk, CLIS-SP, CLIS-95/96, CLIS-97/98, CLIS-05, CLIS-09, and CLIS-10 were apparent in the December 2013 survey data (Figure 3-1). The seafloor was approximately 21.5 m (MLLW) at the deepest portions of the survey area and as shallow as 14 m over the tallest mound (CLIS-10).

The mounds that ring the NHAV14-N target area (CLIS-SP, Norwalk, CLIS-97/98, CLIS-05, CLIS-95/96) were apparent as discrete formations that rose 4–6 m above the surrounding seafloor with shoulder areas between the mounds that formed a 1–2 m high connecting berm (Figure 3-1). These mounds defined the border of a containment cell approximately 200,000 m^2 in area with an average depth of approximately 20 m. Several clusters of individual impact craters were visible on the floor of the containment cell as the placement of material from private projects and New Haven Harbor had begun by the time of the December 2013 survey (see Figure 1-3).

The southern target grid (NHAV14-S) was slightly deeper than the northern grid and gradually sloped to a depth of 21.5 m in the southeastern corner (Figure 3-1). Multiple, overlapping placement craters oriented east-west were visible in the southern target grid documenting the placement of material from Norwalk Harbor that took place before the December 2013 survey (see Figure 1-3).

The most recently used placement target areas at CLDS, CLIS-09 and CLIS-10, were also surveyed as part of the December 2013 effort. CLIS-09 was an irregularly shaped feature with a flattened plateau-like surface at 16.5–17 m MLLW (Figure 3-1). The mound had uneven side slopes and was surrounded by a wide apron 1 m above the natural seafloor. In contrast, CLIS-10 was a nearly circular formation with uniform sides and a defined peak approximately 6 m above the surrounding seafloor (Figure 3-1).

The December 2013 survey was designed to overlap with the most recent bathymetric survey of that portion of CLDS conducted in 2011 (see Table 1-2). A depth difference analysis between the 2011 bathymetric dataset and the December 2013 dataset highlighted the areas that experienced changes in depth during that two-year span. A substantial accumulation of dredged material was obvious at the CLIS-10 mound and the NHAV14-S placement area; smaller deposits of sediment accumulation were noted within the NHAV14-N placement area (Figure 3-2). In addition to accumulation areas within the CLIS-10 mound and the two target grids, there was also an area immediately to the west of the NHAV14-N grid that received some placement of dredged material (Figure 3-2). Widespread areas of depth increase were documented at the CLIS-09 mound.

3.1.1.2 Backscatter

Backscatter data were recorded during the December 2013 bathymetric survey at CLDS. Areas of stronger backscatter return were generally associated with historical and recent dredged material placement locations and correlated more with surface texture characteristics than relief (Figure 3-3). The target placement grids exhibited a stronger backscatter signature than the surrounding seafloor, but the signal was not as concentrated as on disposal mound formations. Filtered backscatter also highlighted dredged material deposits with lower returns (-56 to -46 dB) generally limited to native seafloor surfaces and higher returns (-45 to -30 dB) associated with placement formations (Figure 3-4). The backscatter signature of the target grids was on the lower end of this range (-45 to -38 dB). Side-scan sonar was also collected during the multibeam survey; these data were archived and not processed for analysis.

3.1.2 Sediment Grab Samples

Sediment grab samples were collected at six stations for a visual characterization of bottom type. The contents of each grab were evaluated for color, odor, and texture. All grab samples confirmed the presence of fine-grained dredged material at the sample stations within the target grids.

3.2 January 2014 Survey of the New Haven Target Areas

The January 2014 survey effort included the south/central portion of CLDS that was targeted for the placement of material from Norwalk Harbor, New Haven Harbor, and several private projects. The survey was conducted to document the placement of additional material from Norwalk Harbor in NHAV14-S and several private projects and initial placement of material from New Haven Harbor in NHAV14-N.

3.2.1 Acoustic Data

3.2.1.1 Bathymetry

The January 2014 bathymetric survey covered both target placement grid areas and roughly overlapped with the December 2013 survey with the exception of the extended coverage for the CLIS-09 and CLIS-10 mounds in the December 2013 survey (see Figure 2-2). The survey showed the accumulation of additional dredged material in both the north and south placement grids (Figure 3-5).

In the NHAV14-N grid, placement events formed visible tracks of overlapping craters predominantly oriented east-west to form troughs. Within the target grid the majority of the cell floor was filled with dredged material to a depth of approximately 19 m MLLW. In the interior portions of the cell subsequent placement events built up formations of dredged material that coalesced into flat, regular surfaces at a depth of 18 m. A few individual features rose above the 18 m plateau and extended up to 16.5 m (Figure 3-5). Troughs of disposal lines broke up the uniformity of the new containment cell surface.

In the NHAV14-S placement grid, individual dredged material formations were apparent in each of the eight target blocks (Figure 3-5). The mounds had irregular surfaces marked with traces of disposal impact craters with surface depths that ranged from 18.5 m in the shallower portions of the grid to 19.5 m in the deeper portions of the grid. Each small deposit had a similar appearance: irregular mounds with shallow troughs generally oriented east-west.

An analysis of the difference in depth between the January 2014 survey and the December 2013 survey documented the placement of the majority of the remaining Norwalk and private project material, along with the initial phase of outer harbor New Haven material (Figure 3-6). The placement of private project material, and some New Haven material, in the NHAV14-N target area resulted in an irregular distribution of sediment accumulation across the grid, including a 3-meter-tall feature in Block 3C (Figure 3-6). With the exception of this prominent feature, accumulation areas were generally 1–2 m thick separated by 10–15 m wide troughs of little to no apparent accumulation.

Due to the sequencing of disposal operations in the NHAV14-S area, sediment accumulation since the December 2013 survey was limited to the southern row of target blocks (Figure 3-6). Disposal features in these blocks were consistent with the size of the features created in the northern tier of blocks prior to the December 2013 survey. The accumulation areas were 1–1.5 m thick and roughly centered in each 125 x 125 m target block (Figure 3-6).

3.2.1.2 Backscatter

Backscatter data collected in January 2014 showed a heterogeneous surface texture for both the NHAV14-N and NHAV14-S placement areas (Figure 3-7). The three northern rows of target cells in the NHAV14-N grid had relatively weak backscatter returns while the southern two rows had stronger returns with a very strong return in Block 4B. Similarly, the northern row of the NHAV14-S grid had a weaker backscatter return while the southern row had a stronger return. Filtered backscatter from the survey reflected the same results with lower signals in the northern cells of both placement grids (Figure 3-8). Side-scan sonar was also collected during the multibeam survey; these data were archived and not processed for analysis.

3.2.2 Sediment Grab Samples

Sediment grab samples were collected for a visual characterization of bottom type at three stations in the NHAV14-N target grid and four stations in the NHAV14-S target grid. The contents of each grab were photographed and evaluated for color, odor, and texture. All samples confirmed the presence of dredged material within the target grids and were dominated by silt and clay with the exception of very fine sand found at one station in the southern target grid.

3.3 August 2014 Survey of CLDS

The August 2014 survey effort at CLDS included an acoustic survey of the entire site along with a SPI/PV survey of the active placement areas and reference areas. Benthic grabs samples were also collected from the portions of the site with recent placement activity and the CLDS reference areas.

3.3.1 Acoustic Data

3.3.1.1 Bathymetry

The August 2014 bathymetric survey covered the entire site to assess the overall stability of the disposal formations at CLDS, to document the distribution of material at the NHAV14-N and NHAV14-S target grids, and to provide input for the update of the Site Management and Monitoring Plan.

The overall seafloor topography of CLDS gradually sloped from 18 m MLLW in the northwestern corner to 22.5 m in the southeastern corner (Figure 3-9). The central portion of the site was dominated by placement features formed from the placement of dredged material over the last 40 years. Some of these features were roughly circular in shape while others were more irregular with less defined mound peaks (Figure 3-9). The eastern third of the site, and the far western margin, were mostly void of large seafloor features with the exception of a few isolated placement mounds. In these expanses linear east-west furrows were visible along with semi-circular pits of varying sizes. These seafloor features were described in detail in previous investigations at CLDS (ENSR 2007, AECOM 2013).

A total of 37 active and historical placement mounds were evident in the August 2014 bathymetric survey (Figure 3-9). The tallest mounds at the site (NHAV-74, CLIS-97/98, and CLIS-10) rose approximately 5 m above the ambient seafloor while several smaller mounds were less than 1 m tall (Figure 3-9).

The NHAV14-N placement area was apparent as a partially filled portion of an established containment cell. The surface of the placement area remained irregular with an average surface depth of 18 m interrupted by approximately 1 m deep troughs (Figure 3-9). Two features in adjacent target blocks (2C and 3C) rose to approximately 17 m MLLW.

The placement formations in the NHAV14-S placement area had largely coalesced into a single flattened feature with a surface depth of approximately 18.5 m (Figure 3-9). A few small ridges and mounds were apparent within the feature along with a somewhat terraced southern edge that stepped down to an ambient depth of 20.5 m. The eastern margin of the formation was well defined with a steep 1.5–2.0 m drop while the northern and western edges transitioned more gradually to the surrounding seafloor (Figure 3-9).

The 2005 bathymetric survey at CLDS served as a high-resolution baseline for the future monitoring and management of the site. A depth comparison between the 2005 survey and the August 2014 survey documented changes in seafloor topography due to dredged material placement operations and natural processes at the site over that time period (Figure 3-10). During that ten year span the placement mounds at CLDS demonstrated extreme stability with little or no evidence of sediment loss or compaction (Figure 3-10). The mounds that were formed in the seasons immediately preceding the 2005 baseline survey (CLIS-02, CLIS-03, and CLIS-04) did show expected increases in depth since 2005 due to gradual consolidation of the dredged material deposits. Mounds that received material after the 2005 survey (CLIS-05, CLIS-06, CLIS-07, CLIS-08, CLIS-09, CLIS-10, and MQR) showed accumulations of material in proportion to the placement activity for each of those disposal seasons (Figure 3-10).

The localized areas of both depth increase and decrease in the southern portion of the historical NHAV-74 mound were consistent with what was previously observed in the 2011 survey of CLDS and were described in detail in AECOM (2013). Linear troughs to the north of the previously described feature were apparent in the July 2005/August 2014 depth differencing, suggesting a new surface disturbance on the NHAV-74 mound since the 2011 survey (Figure 3-10).

Depth changes at the most recently active mounds (CLIS-09 and CLIS-10), along with the two New Haven target grids (NHAV14-N and NHAV14-S), were apparent in the July 2005/August 2014 depth difference exercise but are better described through the 2013/2014 depth difference comparisons below.

A depth difference comparison between the August 2014 and the December 2013 survey showed the overall accumulation of sediment in the NHAV14-N and NHAV14-S target grids from the placement of material from Norwalk Harbor, New Haven Harbor, and private projects (Figure 3-11). Accumulation was widespread throughout both grids and ranged up to 3.0 m. The accumulation areas extended beyond the margins of the target disposal grids and the extent of the December 2013 survey to the south of NHAV14-S. Two areas of depth increase were also noted over the more recently formed disposal mound CLIS-10 and, to a lesser extent, CLIS-09 (Figure 3-11). The depth increase was less than 0.5 m and likely the result of consolidation of the dredged material at both mounds.

A depth difference comparison between the August 2014 and the January 2014 survey highlighted the last phase of placement operations at the target grids (Figure 3-12). The northern row of target blocks in the NHAV14-N grid experienced isolated pockets of minor consolidation (<0.5 m), the three central rows experienced more substantial (0.5–1.0 m) areas of consolidation and a single area of sediment accumulation in Block 2C, the southernmost row of target blocks experienced up to 2 m of accumulation. Results were more homogenous in the NHAV14-S grid with nearly universal sediment accumulation of 0.5–3.0 m (Figure 3-12).

3.3.1.2 Backscatter and Side-Scan Sonar

Backscatter and side-scan sonar data were recorded during the August 2014 survey at CLDS. The eastern third of CLDS had a relatively homogenous backscatter return with the exception of a higher return around the historical FVP mound in the northeastern corner (Figures 3-13 and 3-14). Concentrated areas of higher backscatter return dominated the central portion of the site and largely correlated with the locations of known disposal mounds. Individual disposal traces and impact craters were apparent throughout this region of CLDS. In some areas higher backscatter returns extended to the north and south beyond the site boundary (Figures 3-13 and 3-14). Recent placement activity in the NHAV14-N and NHAV14-S target grids resulted in an irregular backscatter signature in those areas. Some target blocks exhibited an ambient-like backscatter return and other blocks returned higher signals characteristic of other dredged material formations at the site.

The side-scan sonar mosaic of the August 2014 survey highlighted the uniform seafloor surface of the eastern portion of the site and the notable bottom features of the central and western portions (Figure 3-15). Impact craters and linear traces were apparent around both recent and historical disposal mounds. The NHAV14-N target grid was largely void of visible surface features with the exception of an irregularly shaped formation in the margin of Block 4C. Patchy surface features dominated the NHAV14-S target grid and continued south of the grid towards the CLDS boundary. Several prominent linear features, hundreds of meters long, crossed near the western edge of the NHAV14-S target grid; additional linear features extended to the south of the grid outside of the CLDS boundary.

3.3.2 Sediment-Profile and Plan-View Imaging

SPI images were collected at four CLDS placement mounds (MQR, CLIS-08, CLIS-09, and CLIS-10), the two recent target grids (NHAV14-N and NHAV14-S), and at three reference areas (2500W REF, 4500E REF, and CLIS REF) on 15–16 August 2014. Detailed image analysis results are provided in Appendix D. The following sections summarize the results for the reference areas and for each of the disposal areas. Statistical comparisons between the reference areas and CLDS placement areas SPI results are presented later in this section.

3.3.2.1 Reference Area Stations

Physical Sediment Characteristics at CLDS Reference Areas: All three of the reference areas were characterized by relatively soft mud (i.e., silt/clay) having a grain size major mode of >4 phi (Table 3-1; Figures 3-16 and 3-17). There was no evidence of dredged material at any of the stations sampled in the reference areas, and no evidence of low dissolved oxygen (DO) or sedimentary methane.

Mean replicate camera prism penetration values among the reference area stations ranged from 15.6 to 20.6 cm (Table 3-1). Such high penetration values are typical of the soft, biologically reworked silt/clays that characterize the reference areas. Mean penetration values at several of the CLIS REF stations were lower than those at the other two reference areas (Table 3-1), indicating a thinner horizon of particularly soft (i.e., low relative bearing strength) sediments at this reference location compared to the others. This reference area was located in deeper water than the other reference areas (Table 3-1).

Means of replicate small-scale boundary roughness ranged from 0.2 to 2.1 cm at the reference area stations (Table 3-1); 98% of this roughness was due to the presence of small-scale biogenic features at the sediment surface (e.g., small pits, mounds, and burrow openings) resulting from surface and subsurface feeding and foraging activities of benthic organisms (Figures 3-18 and 3-19). Physical disturbance (e.g., bottom eddies) accounted for the small number of instances where biogenic features did not influence boundary roughness. Mean replicate boundary roughness was higher at the 2500W REF site compared to the other two, though no discernible pattern describes this result.

Biological Conditions at CLDS Reference Areas: The means of replicate aRPD depths among the reference area stations ranged from 2.5 to 4.1 cm (Table 3-1, Figure 3-20). Mean replicate aRPD depths were lower at CLIS REF compared to the other two reference areas. Reference areas 2500W REF and 4500E REF each had at least one station mean below 3 cm but the majority above; CLIS REF had precisely 50% of stations means above 3 cm (Figure 3-20). On the whole, the aRPD depths at all three of the reference areas were relatively deep and consistent with values measured in past surveys. The 2014 images (e.g, Figure 3-21) showed evidence of the surface phytodetrital layer of tan or rust-colored sediment that was observed in the previous CLDS SPI surveys of September 2003 (ENSR 2004), June 2004 (ENSR 2005), and October 2011 (Figure 3-10 in AECOM 2013), but was not observed in October 2009 (Valente et al. 2012).

All of the replicate images from the reference areas showed evidence of Stage 3 taxa (Table 3-1, Figure 3-22). Evidence for the presence of Stage 3 fauna included large-bodied infauna, large subsurface burrows, and/or feeding voids (Figure 3-23). Small tubes constructed by opportunistic Stage 1 taxa were also visible at the sediment surface in at least one of the replicates for all of the 2500W REF stations, resulting in a Stage 1 on 3 successional designation (Table 3-1, Figure 3-24). One replicate for one station at the 4500E REF area had visible Stage 1 taxa, with no Stage 1 taxa documented at the CLIS REF area. The mean number of subsurface feeding voids at the reference area stations ranged from 0 to 5, with an overall average of 1.5 voids per image per station (Table 3-1).

3.3.2.2 CLDS Placement Areas

Physical Sediment Characteristics at Recent CLDS Disposal Areas: At the CLIS-08, CLIS-10, NHAV14-N, and NHAV14-S placement areas, the sediment was fine-grained dredged material, consisting of silt/clay with a grain size major mode of >4 phi (Table 3-2; Figure 3-25). A number of stations at the northern margin of the CLIS-08 mound (Stations 2 and 4) had light-colored clayey silt distinct from the other stations at the mound (Figure 3-26). At the CLIS-09 and MQR placement mounds, most of the dredged material also consisted of silt/clay, but very fine sand (major mode of 4 to 3 phi) occurred as a distinct sand-over-mud stratigraphy at CLIS-09 Stations 1, 2, 4, 5 and MQR stations 1, 2, 4 (Table 3-2; Figure 3-27). Many of the stations at CLIS-09 and MQR had a distinct layering with very fine brown sand on the surface, followed by alternating layers of gray, light brown, and rust colored silt-clay (Figure 3-27). A group of stations on the west side of the mound (28, 30, 33, 34, and 35) had light brown or gray clayey silt layers of varying thickness (Figure 3-28). The fine-grained dredged material observed at the majority of stations was reduced, and there was evidence of subsurface methane at three of the stations (Table 3-2).

The means of replicate camera prism penetration depth varied widely across the disposal site stations, ranging from 6.2 to 20.1 cm (Table 3-2). The stations located over NHAV14-S tended to have the deepest penetration depths, with a mean of 17.5 cm, reflecting the relatively uniform presence of fine-grained dredged material (Figure 3-29). Over the CLIS-09 mound, the dredged material was more variable in composition; some stations had more sand and shells present and others had clay.

The means of replicate small-scale boundary roughness ranged from 0.8 to 1.6 cm, with an overall mean of 1.3 cm (Table 3-2). The origin of this small-scale topography was dominated by biological processes among the station replicates (Table 3-2). Physical roughness elements were caused by the presence of clay clumps at some of the stations with fine-grained dredged material and reworking of the recently placed material, while biological roughness elements were due to features such as feeding pits, burrow openings, and fecal mounds.

Biological Conditions at Recent CLDS Placement Areas: The mean aRPD values at the stations within CLDS ranged from 0.5 to 3.8 cm, with an overall site average of 1.8 cm (Table 3-2, Figure 3-30). Mean aRPD values varied across the site without a particular pattern, but they were generally lower than reference area values (Table 3-3, Figures 3-30 and 3-31).

At the CLIS-08, CLIS-09, CLIS-10, and MQR mounds, the majority of the replicate images (~90%) showed evidence of Stage 3 infauna (Table 3-2, Figure 3-32). Evidence of Stage 3 organisms typically consisted of subsurface feeding voids, burrows, and large polychaete worms (Figure 3-33). Small tubes constructed by opportunistic Stage 1 organisms often were visible at the sediment surface along with the Stage 3 voids and burrows at depth, resulting in Stage 1 on 3 successional designations (Figure 3-34A).

At NHAV14-N and NHAV14-S where placement of dredged material had terminated less than six months prior to the survey, evidence of Stage 3 taxa was more sporadic and there was greater variability among the replicate images compared to the CLIS-08, CLIS-09, CLIS-10, and MQR mounds (Table 3-2, Figure 3-32). Benthic succession at these two disposal areas appeared to be in an intermediate stage, with many of the replicate images showing evidence of a transition from Stage 1 to 2 or Stage 2 to 3 (Figure 3-34B). The mean number of subsurface feeding voids at all mound stations ranged from 0 to 3.7, with an overall average of 1.2 voids per image per station (Table 3-2).

3.3.3 Statistical Comparison of Disposal and Reference Stations

A statistical comparison of mean aRPD and successional stage rank values by sampling location was conducted and is summarized below (Table 3-3 and Figure 3-35).

The mean aRPD data from all nine groups (three reference areas and six placement areas) were combined to assess normality and estimate pooled variance. Results for the normality test indicated that the area residuals (i.e., each observation minus the area mean) were not significantly different from normal (Shapiro-Wilk's test p-value = 0.57). Group standard deviations ranged from 0.1 to 0.8 with the smallest standard deviations occurring at the reference area stations and MQR mound (Table 3-3). Confidence intervals were used to determine results of the inequivalence test (Table 3-4).

When the confidence region for the difference between aRPD mean of reference areas and placement areas is fully contained within the interval [-1, +1], the two aRPD means are considered to be significantly equivalent. All of the placement areas (CLIS-08, CLIS-09, CLIS-10, MQR, NHAV14-N, and NHAV14-S) had lower aRPD values than the mean of the reference areas, with differences in means ranging from 0.9 to 2.2 cm. Only MQR was statistically equivalent. The two target grids with most recent dredged material placement areas had the largest differences in aRPD values compared to the reference areas (Table 3-4).

Two placement mounds, CLIS-09 and MQR, consistently indicated successional stages at Stage 3 or equivalent; the mean ranks for the remaining disposal mounds ranged from 2.0 to 2.6. The successional stage rank for all reference areas was 3. With identical means and zero variance, no statistics were needed for comparisons between reference areas and the CLIS-09 and MQR mounds in order to conclude statistical equivalence.

The difference in the mean successional stage ranks between the remaining placement areas (CLIS-08, CLIS-10, NHAV14-N, and NHAV14-S) and the reference areas ranged from 0.4 to 1.0 less than the reference areas (Table 3-5). When the difference in successional stage rank means is fully contained within the interval [-0.5, +0.5], the successional stage ranks for the placement area and the reference areas are considered to be statistically equivalent. Based on the confidence region for the difference between reference areas and each placement area, none of the placement areas (CLIS-08, CLIS-10, NHAV14-N, and NHAV14-S) were statistically similar to reference.

3.3.4 Sediment Grab Samples

Surface sediment grab samples were collected from stations at the CLIS-10 mound, the NHAV14-N and NHAV14-S capping areas, and each of the CLDS reference areas for analysis of grain size, total organic carbon (TOC), and benthic community structure (Figure 2-8).

3.3.4.1 Grain Size and Total Organic Carbon

All samples were dominated by silt, clay, and fine sand with smaller proportions of medium to coarse sand and, at one station, a small amount of gravel (Table 3-6). Stations from the CLIS-10 mound had lower proportions of fine grained material than the other areas and one of the CLIS-10 stations was dominated by sands. The two target grid areas had relatively similar grain size compositions with fines ranging from 75% to 84% in all samples. As expected, reference areas were primarily fine grained material (89–96%) with only small amounts of fine and medium sand.

Total Organic Carbon at the CLIS-10 stations averaged 1.8% while the two target grid areas averaged 2.2% (Table 3-6). These levels compared well with the reference areas that averaged 2.0%.

3.3.4.2 Benthic Community Analysis

Samples from all three reference areas were dominated by the polychaete *Nephtys incisa* which contributed 25% of the taxa identified at the 2500W reference area, 37% of the taxa at the 4500E reference area, and 57% of the taxa at the CLIS reference area (Appendix F, note that the link between station numbers used in this report and the Lab IDs used in Appendix F are provided in Table 3-6). Species richness of the three reference areas ranged from 9 to 15 species per sample with an overall abundance of 28 to 67 organisms per sample (Table 3-7). Other common species at the reference areas included the polychaetes *Sigambra tentaculata* and *Levinsenia gracilis* and the bivalve *Macoma tenta* (Table 3-8). Along with *Nephtys incisa,* these four species made up over 60% of the organisms at the 4500E reference area, 64% of the organisms at the 2500W reference area, and 75% of the organisms at the CLIS reference area (Appendix F). *Macoma tenta* was absent from the 2500W reference area while *Levinsenia gracilis* and the bivalve *Nucula proxima* were absent from the other two reference areas but fairly abundant at the 2500W reference area (Appendix F).

The three samples collected from the CLIS-10 mound were comprised primarily of polychaetes and bivalves with 11 to 22 species per station and total abundance of 47–81 organisms (Table 3-7). Each mound station was dominated by a different species including *Prionospio perkinsi*, *Pitar morrhuanus*, and *Macoma tenta* but all three stations had large numbers of *Macoma tenta* along with *Nephtys incisa* (Appendix F).

The three stations located within the NHAV14-N grid area were all dominated by the amphipod *Leptocheirus pinguis* (Table 3-7). There was relatively low species richness at two stations with just 4 and 8 species present in each sample; the sample from the third station had 18 species and 140 individuals (Table 3-7). Each sample from the NHAV14-S grid area was dominated by a different species (*Mediomastus ambiseta*, *Leptocheirus pinguis*, and *Nephtys incisa*). Species richness in the three NHAV14-S samples ranged from 7 to 21 species and abundance was 117 and 124 individuals in two samples and 15 individuals at the third station (Table 3-7).

All but one of the disposal area stations had benthic infaunal richness and/or abundance values that were within or exceeded the range of values observed at the reference area stations. Only NHAV14-S-25 had both richness and abundance below the reference station values. NHAV14-N-7 and -14 had richness values below reference values. Species lists overlapped across all stations, with three of the top five most abundant benthic taxa from each of the disposal areas also found among the top five most abundant taxa in one or more of the reference stations (Table 5, Appendix F). Possibly with the exception of NHAV14-S-25, it appears that the benthic communities present in the disposal area stations have recovered to be within the range of reference station results.

Table 3-1.

Summary SPI Results (station means) at the CLDS Reference Areas

Area	Station	Depth (m)	Grain Size Major Mode (phi)[a]	Mean Prism Penetration Depth (cm)	Mean Boundary Roughness (cm)	Dominant Type of Boundary Roughness	Mean aRPD Depth (cm)	Mean # of Subsurface Feeding Voids	Methane Present?	Successional Stages Present[b]		
CLIS REF	REF1	80.0	>4	17.3	0.7	Biological	3.1	1.0	No	3	3	3
	REF2	81.0	>4	17.7	0.7	Biological	3.2	2.3	No	3	3	3
	REF3	80.0	>4	17.0	0.5	Biological	2.5	1.7	No	3	3	3
	REF4	80.0	>4	17.9	0.3	Biological	2.9	0.3	No	3	3	3
	REF5	80.0	>4	16.9	0.6	Biological	2.6	1.3	No	3	3	3
2500W REF	REF1	60.0	>4	19.3	0.7	Biological	3.2	1.7	No	1 on 3	1 on 3	1 on 3
	REF2	60.0	>4	18.9	1.2	Biological	3.4	3.0	No	1 on 3	1 on 3	3
	REF3	59.0	>4	16.8	0.9	Biological	3.4	0.7	No	3	1 on 3	3
	REF4	59.0	>4	17.9	0.7	Biological	4.1	2.3	No	1 on 3	3	3
	REF5	59.0	>4	17.8	1.0	Biological	3.2	1.7	No	1 on 3	3	1 on 3
4500E REF	REF1	65.0	>4	19.8	0.6	Biological	3.9	2.0	No	1 on 3	3	3
	REF2	66.0	>4	18.3	0.7	Biological	3.3	1.7	No	3	3	3
	REF3	63.0	>4	17.8	0.6	Biological	3.4	0.3	No	3	3	3
	REF4	66.0	>4	19.3	0.5	Biological	3.7	1.0	No	3	3	3
	REF5	68.0	>4	17.2	0.8	Biological	3.4	2.0	No	3	3	3
	Max	81.0		19.8	1.2		4.1	3.0				
	Min	59.0		16.8	0.3		2.5	0.3				
	Mean	68.4		18.0	0.7		3.3	1.5				

Ind = Indeterminate
a Grain Size: "/" indicates layer of one phi size range over another (see Appendix E)
b Successional Stage: "on" indicates one Stage is found on top of another Stage (i.e., 1 on 3);"$\rightarrow$" indicates one Stage is progressing to another Stage (i.e., 2$\rightarrow$3)

Table 3-2.

Summary SPI Results (station means) at Placement Mounds CLIS-08, CLIS-09, CLIS-10, MQR, NHAV14-S, and NHAV14-N

Mound	Station	Depth (m)	Grain Size Major Mode (phi)[a]	Mean Prism Penetration Depth (cm)	Mean Boundary Roughness (cm)	Dominant Type of Boundary Roughness	Mean aRPD Depth (cm)	Mean # of Subsurface Feeding Voids	Methane Present?	Successional Stages Present[b]		
CLIS-08	1	62	>4	16.9	0.8	Biological	2.0	0.3	No	2→3	1 on 2	2→3
	2	64	>4	15.5	0.7	Biological	1.3	2.0	No	3	2→3	2→3
	3	63	>4	16.9	0.8	Biological	2.1	1.0	Yes	2→3	1 on 2	1 on 3
	4	63	>4	16.4	0.9	Biological	2.6	1.0	No	1 on 3	2→3	2→3
	5	62	>4	18.8	0.9	Biological	2.2	0.7	Yes	2→3	1	1
	Max	64.0		18.8	0.9		2.6	2.0				
	Min	62.0		15.5	0.7		1.3	0.3				
	Mean	62.8		16.9	0.8		2.0	1.0				
CLIS-09	1	61	4 to 3	7.3	1.4	Physical	2.1	0.7	No	2→3	2→3	Ind
	2	64	4 to 3	8.0	2.4	Biological	2.5	0.7	No	3	2→3	2→3
	3	62	>4	16.9	0.8	Biological	3.1	2.3	Yes	1 on 3	3	3
	4	65	4 to 3	6.2	1.7	Physical	3.8	3.3	No	3	Ind	3
	5	64	4 to 3	8.8	1.3	Biological	1.9	3.7	No	3	3	2→3
	Max	65.0		16.9	2.4		3.8	3.7				
	Min	61.0		6.2	0.8		1.9	0.7				
	Mean	63.2		9.4	1.5		2.7	2.1				

Ind = Indeterminate
a Grain Size: "/" indicates layer of one phi size range over another (see Appendix E)
b Successional Stage: "on" indicates one Stage is found on top of another Stage (i.e., 1 on 3);"→" indicates one Stage is progressing to another Stage (i.e., 2→3)

Table 3-2. (continued)

Summary SPI Results (station means) at Placement Mounds CLIS-08, CLIS-09, CLIS-10, MQR, NHAV14-S, and NHAV14-N

Mound	Station	Depth (m)	Grain Size Major Mode (phi)[a]	Mean Prism Penetration Depth (cm)	Mean Boundary Roughness (cm)	Dominant Type of Boundary Roughness	Mean aRPD Depth (cm)	Mean # of Subsurface Feeding Voids	Methane Present?	Successional Stages Present[b]		
CLIS-10	1	56	>4	15.9	0.8	Biological	1.5	0.7	No	2→3	2→3	1
	2	66	>4	15.6	2.0	Biological	1.9	1.0	No	2→3	2→3	Ind
	3	56	>4	15.3	0.6	Biological	1.0	0.3	No	2→3	2	2→3
	4	65	>4	16.5	1.0	Biological	2.1	3.0	No	3	2→3	1 on 3
	5	60	>4	18.4	3.8	Physical	1.4	0.7	No	1	2→3	1→2
	Max	66.0		18.4	3.8		2.1	3.0				
	Min	56.0		15.3	0.6		1.0	0.3				
	Mean	60.6		16.3	1.6		1.6	1.1				
MQR	1	62	4 to 3	15.4	1.1	Biological	2.4	1.0	No	1 on 3	1 on 3	3
	2	64	4-3 / >4	12.1	1.1	Biological	2.4	1.0	No	3	1 on 3	2→3
	3	62	>4	13.8	1.0	Biological	2.6	2.0	No	1 on 3	3	2→3
	4	64	4 to 3	12.4	1.0	Biological	2.3	0.0	No	1 on 3	2→3	2→3
	Max	64.0		15.4	1.1		2.6	2.0				
	Min	62.0		12.1	1.0		2.3	0.0				
	Mean	63.0		13.4	1.1		2.4	1.0				

Ind = Indeterminate

a Grain Size: "/" indicates layer of one phi size range over another (see Appendix E)

b Successional Stage: "on" indicates one Stage is found on top of another Stage (i.e., 1 on 3);"→" indicates one Stage is progressing to another Stage (i.e., 2→3)

Table 3-2. (continued)

Summary SPI Results (station means) at Placement Mounds CLIS-08, CLIS-09, CLIS-10, MQR, NHAV14-S, and NHAV14-N

Mound	Station	Depth (m)	Grain Size Major Mode (phi)[a]	Mean Prism Penetration Depth (cm)	Mean Boundary Roughness (cm)	Dominant Type of Boundary Roughness	Mean aRPD Depth (cm)	Mean # of Subsurface Feeding Voids	Methane Present?	Successional Stages Present[b]		
NHAV14-S	19	60	>4	16.6	1.4	Biological	1.1	0.7	No	2→3	1 on 3	2
	20	60	>4	15.1	1.1	Physical	0.8	0.3	No	1	1	2
	21	60	>4	14.6	1.5	Biological	0.5	0.0	No	1	1	1
	22	62	>4	20.1	0.6	Biological	1.1	0.0	No	1	1→2	1 on 2
	23	59	>4	18.4	1.8	Biological	0.8	1.3	No	1 on 2	2→3	1 on 2
	24	59	>4	13.6	1.4	Biological	1.2	1.7	No	2	2	2→3
	25	60	>4	16.6	2.1	Physical	1.1	1.3	No	1→2	1→2	2→3
	26	61	>4	18.6	1.9	Biological	2.2	0.7	No	2	3	3
	Max	62.0		20.1	2.1		2.2	1.7				
	Min	59.0		13.6	0.6		0.8	0.0				
	Mean	60.2		17.5	1.5		1.3	1.0				

Ind = Indeterminate

a Grain Size: "/" indicates layer of one phi size range over another (see Appendix E)

b Successional Stage: "on" indicates one Stage is found on top of another Stage (i.e., 1 on 3);"→" indicates one Stage is progressing to another Stage (i.e., 2→3)

Table 3-2. (continued)

Summary SPI Results (station means) at Placement Mounds CLIS-08, CLIS-09, CLIS-10, MQR, NHAV14-S, and NHAV14-N

Mound	Station	Depth (m)	Grain Size Major Mode (phi)[a]	Mean Prism Penetration Depth (cm)	Mean Boundary Roughness (cm)	Dominant Type of Boundary Roughness	Mean aRPD Depth (cm)	Mean # of Subsurface Feeding Voids	Methane Present?	Successional Stages Present[b]		
NHAV14-N	1	60	>4	12.3	1.0	Biological	1.1	0.3	No	1	1→2	1→2
	2	58	>4	13.8	0.7	Biological	1.1	0.0	No	1→2	1	1→2
	3	60	>4	10.6	1.1	Biological	2.3	2.0	No	2→3	1 on 3	1 on 3
	4	60	>4	15.2	1.5	Biological	1.9	1.0	No	2→3	2→3	2→3
	5	57	>4	13.2	1.0	Physical	0.8	1.3	No	1→2	1	1→2
	6	59	>4	12.5	1.3	Biological	1.0	1.3	No	1→2	1→2	1→2
	7	59	>4	15.3	2.4	Physical	0.0	1.3	No	Ind	Ind	Ind
	8	57	>4	9.9	1.5	Physical	1.1	0.3	No	2	2→3	2
	9	60	>4	13.9	1.5	Biological	2.4	0.3	No	1 on 3	1 on 3	1 on 3
	10	59	>4	13.8	2.5	Physical	0.4	1.7	No	1→2	2→3	2→3
	11	58	>4	12.0	1.8	Biological	0.9	1.3	No	1 on 3	2	2→3
	12	57	>4	10.8	1.5	Physical	0.9	2.3	No	2→3	1 on 3	2→3
	13	59	>4	10.9	0.9	Biological	1.3	0.3	No	2 →3	1 on 2	1→2
	14	60	>4	12.2	0.8	Biological	1.9	0.7	No	1 on 2	1 on 2	1 on 2
	15	61	>4	12.7	2.2	Biological	2.0	2.0	No	2→3	2→3	2→3
	16	60	>4	14.4	1.0	Biological	1.4	0.0	No	1→2	1	1
	17	66	>4	17.9	1.3	Biological	0.9	1.0	No	1 on 2	1 on 2	Ind
	18	66	>4	18.1	1.7	Biological	0.5	0.3	No	1	1→2	1→2
	Max	66.0		18.1	2.2		2.0	2.0				
	Min	60.0		12.2	0.8		0.5	0.0				
	Mean	62.6		15.1	1.4		1.3	0.8				

Ind = Indeterminate

a Grain Size: "/" indicates layer of one phi size range over another (see Appendix E)

b Successional Stage: "on" indicates one Stage is found on top of another Stage (i.e., 1 on 3);"→" indicates one Stage is progressing to another Stage (i.e., 2→3)

Table 3-3.

Summary of Station Means by Sampling Location

Site	N	Mean aRPD (cm)		Successional Stage Rank		Number of Feeding Voids	
		Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Reference Areas							
CLIS REF	5	2.9	0.3	3	0	1.3	0.7
2500W REF	5	3.5	0.4	3	0	1.9	0.9
4500E REF	5	3.6	0.2	3	0	1.4	0.7
Mean		3.3		3		1.5	
Placement Mounds							
CLIS-08	5	2.0	0.5	2.6	0.5	1.0	0.6
CLIS-09	5	2.7	0.8	3.0	0.0	2.1	1.4
CLIS-10	5	1.6	0.4	2.6	0.4	1.1	1.1
MQR	4	2.4	0.1	3.0	0.0	1.0	0.8
NHAV14-N	18	1.2	0.7	2.3	0.6	1.0	0.7
NHAV14-S	8	1.1	0.5	2.0	0.6	0.8	0.6
Mean		1.8		2.6		1.2	

Table 3-4.

Summary Statistics and Results of Inequivalence Hypothesis Testing for aRPD Values

Difference Equation	**Observed Difference**	**SE**	***df* for SE**	**95% Confidence Bounds (lower–upper)**	**Results**
$Mean_{REF}$ - $Mean_{CLIS\text{-}08}$	1.3	0.2	19	0.8 - 1.7	d
$Mean_{REF}$ - $Mean_{CLIS\text{-}09}$	0.6	0.4	19	-0.1 - 1.3	d
$Mean_{REF}$ - $Mean_{CLIS\text{-}10}$	1.7	0.2	19	1.4 - 2.1	d
$Mean_{REF}$ - $Mean_{MQR}$	0.9	0.1	18	0.7 - 1.0	s
$Mean_{REF}$ - $Mean_{NHAV14\text{-}N}$	2.1	0.2	32	1.8 - 2.4	d
$Mean_{REF}$ - $Mean_{NHAV14\text{-}S}$	2.2	0.2	22	1.9 - 2.5	d

s = significantly equivalent (i.e., confidence bounds are fully contained within [-1, +1])
d = significantly different (i.e., confidence bounds are not fully contained within [-1, +1]).

Table 3-5.

Summary Statistics and Results of Inequivalence Hypothesis Testing for Successional Stage Values

Difference Equation	Observed Difference	SE	*df* for SE	95% Confidence Bounds (lower–upper)	Results
$Mean_{REF}$ - $Mean_{CLIS-08}$	0.4	0.24	19	-0.08 - 0.88	d
$Mean_{REF}$ - $Mean_{CLIS-09}$	0.0	0.00	19	0.00 - 0.00	s
$Mean_{REF}$ - $Mean_{CLIS-10}$	0.4	0.19	19	0.02 - 0.78	d
$Mean_{REF}$ - $Mean_{MQR}$	0.0	0.00	18	0.00 - 0.00	s
$Mean_{REF}$ - $Mean_{NHAV14-N}$	0.7	0.14	32	0.43 - 0.98	d
$Mean_{REF}$ - $Mean_{NHAV14-S}$	1.0	0.22	22	0.52 - 1.39	d

s = significantly equivalent (i.e., confidence bounds are fully contained within [-0.5, +0.5])
d = significantly different (i.e., confidence bounds are not fully contained within [-0.5, +0.5]).

Table 3-6.

CLDS 2014 Results of Sediment Grain Size Analysis and Percent Total Organic Carbon (TOC), and relationship between Station No. and Lab ID No. used in Appendix F

Location	**Station No.**	**Lab ID No.**	**Total Organic Carbon (%)**	**Fines (%)**	*Silt (%)*	*Clay (%)*	**Total Sand (%)**	*Fine Sand (%)*	*Medium Sand (%)*	*Coarse Sand 9%)*	**Gravel (%)**
NHAV14-N	14	PAM-009	2.3	80.2	*50.5*	*29.7*	19.2	*13.0*	*5.5*	*0.7*	0.6
NHAV14-N	12	PAM-010	2.0	74.9	*50.3*	*24.6*	25.1	*23.4*	*1.5*	*0.2*	0.0
NHAV14-N	7	PAM-011	3.0	83.4	*52.5*	*30.9*	16.6	*14.9*	*1.6*	*0.1*	0.0
NHAV14-S	25	PAM-003	2.2	83.5	*45.0*	*38.5*	16.5	*11.9*	*3.5*	*1.1*	0.0
NHAV14-S	23	PAM-004	2.1	81.3	*47.5*	*33.8*	18.7	*13.4*	*4.3*	*1.0*	0.0
NHAV14-S	21	PAM-005	1.8	79.2	*48.6*	*30.6*	20.8	*19.9*	*0.9*	*0.0*	0.0
CLIS-10	03	PAM-006	1.8	70.8	*49.1*	*21.7*	29.2	*20.7*	*6.0*	*2.5*	0.0
CLIS-10	01	PAM-007	1.6	45.6	*28.3*	*17.3*	54.4	*39.1*	*12.3*	*3.0*	0.0
CLIS-10	05	PAM-008	2.0	79.1	*54.0*	*25.1*	20.9	*14.8*	*3.8*	*2.3*	0.0
2500W REF	01	PAM-012	2.3	95.1	*57.3*	*37.8*	4.9	*4.0*	*0.9*	*0.0*	0.0
CLIS REF	05	PAM-002	1.7	89.6	*57.2*	*32.4*	10.4	*9.8*	*0.6*	*0.0*	0.0
4500E REF	04	PAM-001	1.9	88.7	*53.6*	*35.1*	11.3	*11.1*	*0.2*	*0.0*	0.0

Table 3-7.

Species Richness and Abundance of Species at CLDS, August 2014

Species Richness and Abundance of Species by Station at CLDS

Station	Richness (S)	Abundance (N)	Dominant Taxon	Class, Family of Dominant Taxon
NHAV14-N-07	8	50	*Leptocheirus pinguis*	Malacostraca, Amphipoda, Aoridae
NHAV14-N-12	18	140	*Leptocheirus pinguis*	Malacostraca, Amphipoda, Aoridae
NHAV14-N-14	4	38	*Leptocheirus pinguis*	Malacostraca, Amphipoda, Aoridae
NHAV14-S-21	21	124	*Mediomastus ambiseta*	Polychaeta, Capitellidae
NHAV14-S-23	11	117	*Leptocheirus pinguis*	Malacostraca, Amphipoda, Aoridae
NHAV14-S-25	7	15	*Nephtys incisa*	Polychaeta, Nephtyidae
CLIS-10-01	22	81	*Prionospio perkinsi*	Polychaeta, Spionidae
CLIS-10-03	16	47	*Macoma tenta*	Bivalvia, Tellinidae
CLIS-10-05	11	49	*Pitar morrhuanus*	Bivalvia, Veneridae
2500W REF-01	12	67	*Nephtys incisa*	Polychaeta, Nephtyidae
4500E REF-04	15	38	*Nephtys incisa*	Polychaeta, Nephtyidae
CLIS REF-05	9	28	*Nephtys incisa*	Polychaeta, Nephtyidae

Species Richness and Abundance of Species by Location at CLDS

Location	Richness (S)	Abundance (N)	Dominant Taxon	Class, Family of Dominant Taxon
Mound NHAV14-N	20	228	*Leptocheirus pinguis*	Malacostraca, Amphipoda, Aoridae
Mound NHAV14-S	22	256	*Leptocheirus pinguis*	Malacostraca, Amphipoda, Aoridae
Mound CLIS-10	30	177	*Macoma tenta*	Bivalvia, Tellinidae
2500W REF	12	67	*Nephtys incisa*	Polychaeta, Nephtyidae
4500E REF	15	38	*Nephtys incisa*	Polychaeta, Nephtyidae
CLIS REF	9	28	*Nephtys incisa*	Polychaeta, Nephtyidae

Species Richness and Abundance of Species by Type at CLDS

Type	Richness (S)	Abundance (N)	Dominant Taxon	Class, Family of Dominant Taxon
Disposal Mound	45	661	*Leptocheirus pinguis*	Malacostraca, Amphipoda, Aoridae
Reference	20	133	*Nephtys incisa*	Polychaeta, Nephtyidae

Table 3-8.

Top Ten Dominant Species at CLDS, August 2014

Top Ten Dominant Overall
Leptocheirus pinguis
Nephtys incisa
Mediomastus ambiseta
Macoma tenta
Loimia medusa
Sigambra tentaculata
Tubulanus pellucidus
Prionospio perkinsi
Pitar morrhuanus
Nassarius trivittatus

Top Ten Dominant Reference
Nephtys incisa
Sigambra tentaculata
Levinsenia gracilis
Macoma tenta
Nucula proxima
Yoldia sapotilla
Loimia medusa
Saccoglossus kowalevskii
Tubulanus pellucidus
Nassarius trivittatus

Top Ten Dominant Placement Mounds
Leptocheirus pinguis
Nephtys incisa
Mediomastus ambiseta
Macoma tenta
Loimia medusa
Prionospio perkinsi
Pitar morrhuanus
Tubulanus pellucidus
Nassarius trivittatus
Unciola irrorata

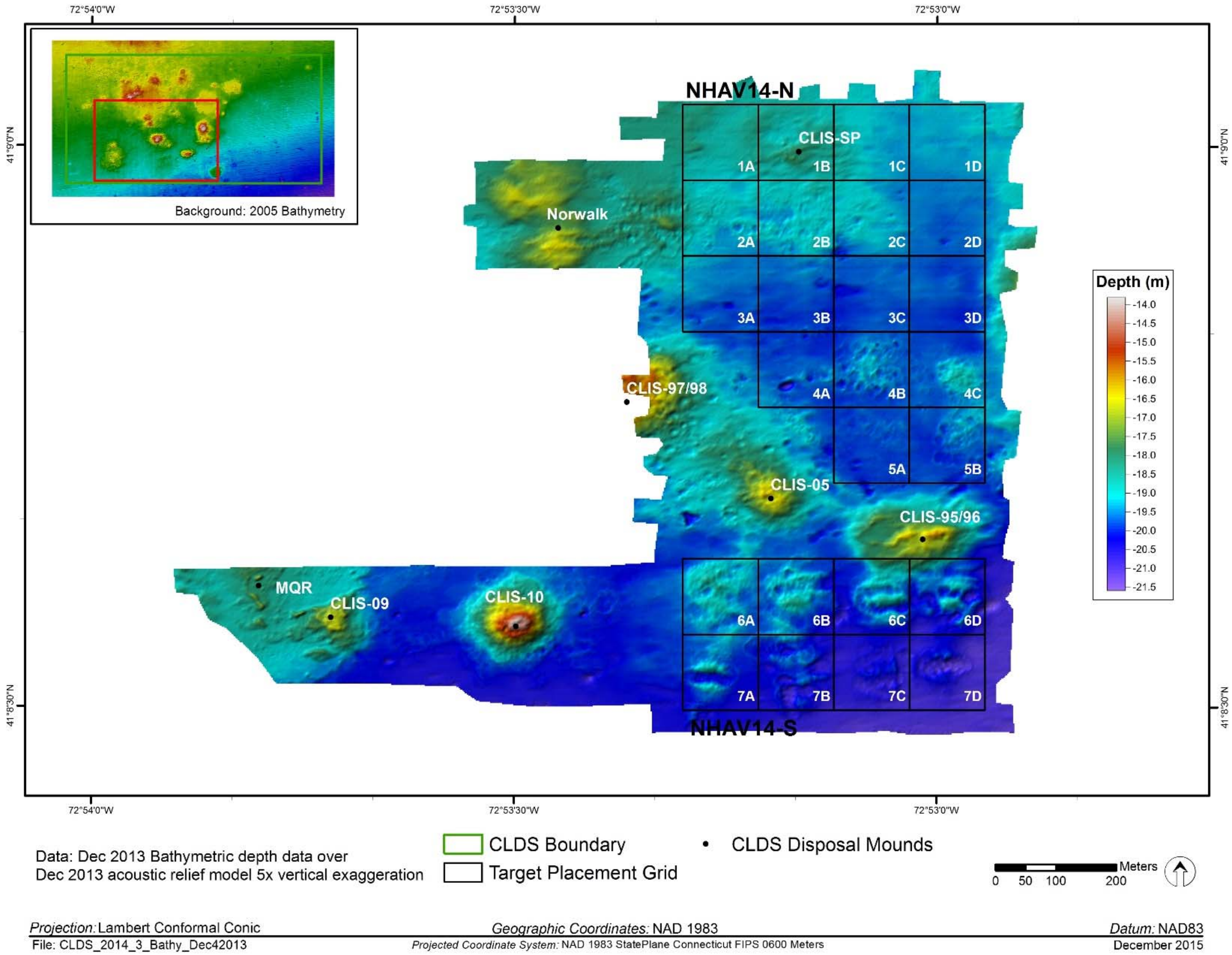


Figure 3-1. Bathymetric depth data over acoustic relief model of CLDS - December 2013

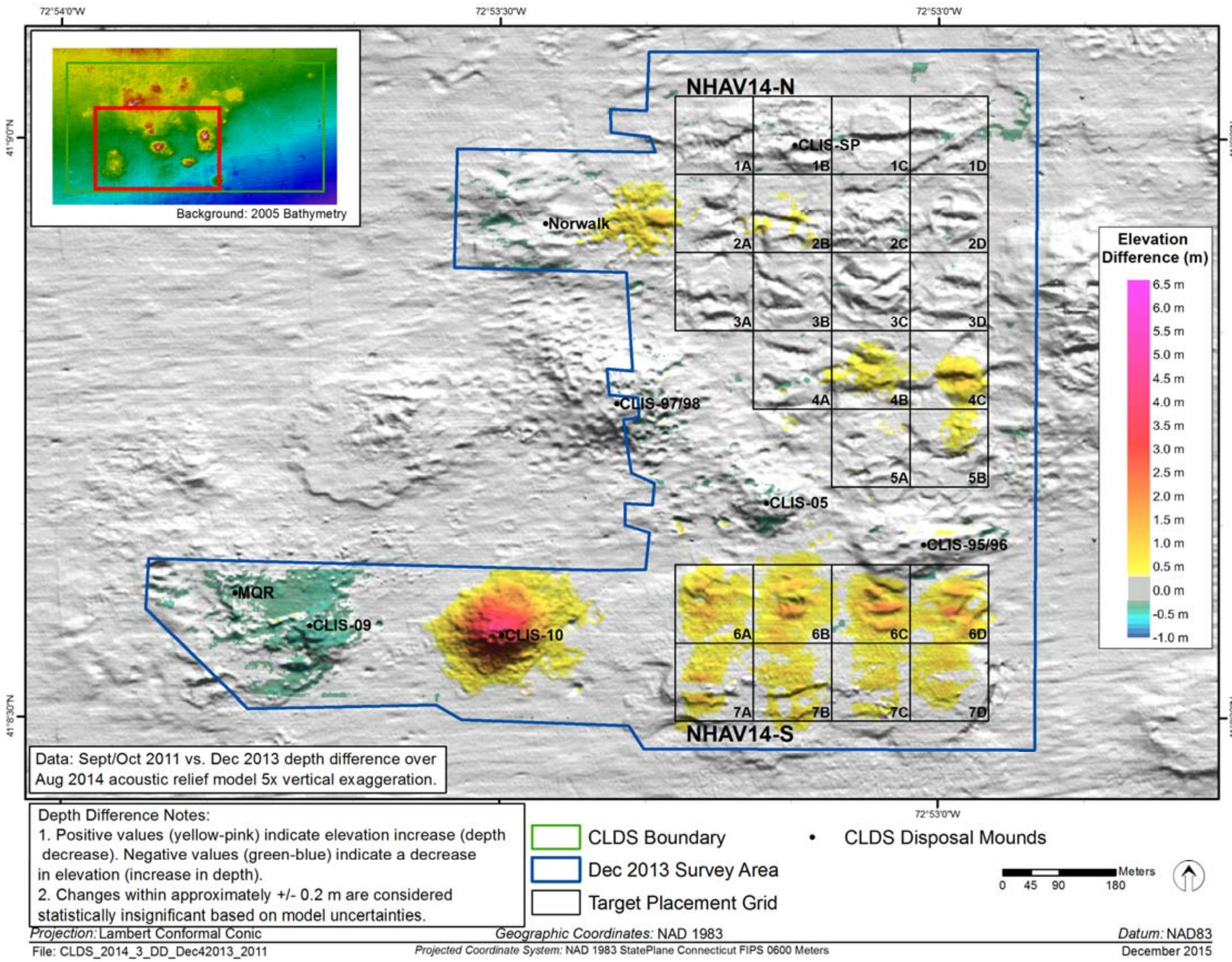


Figure 3-2. CLDS depth difference: December 2013 vs. September/October 2011

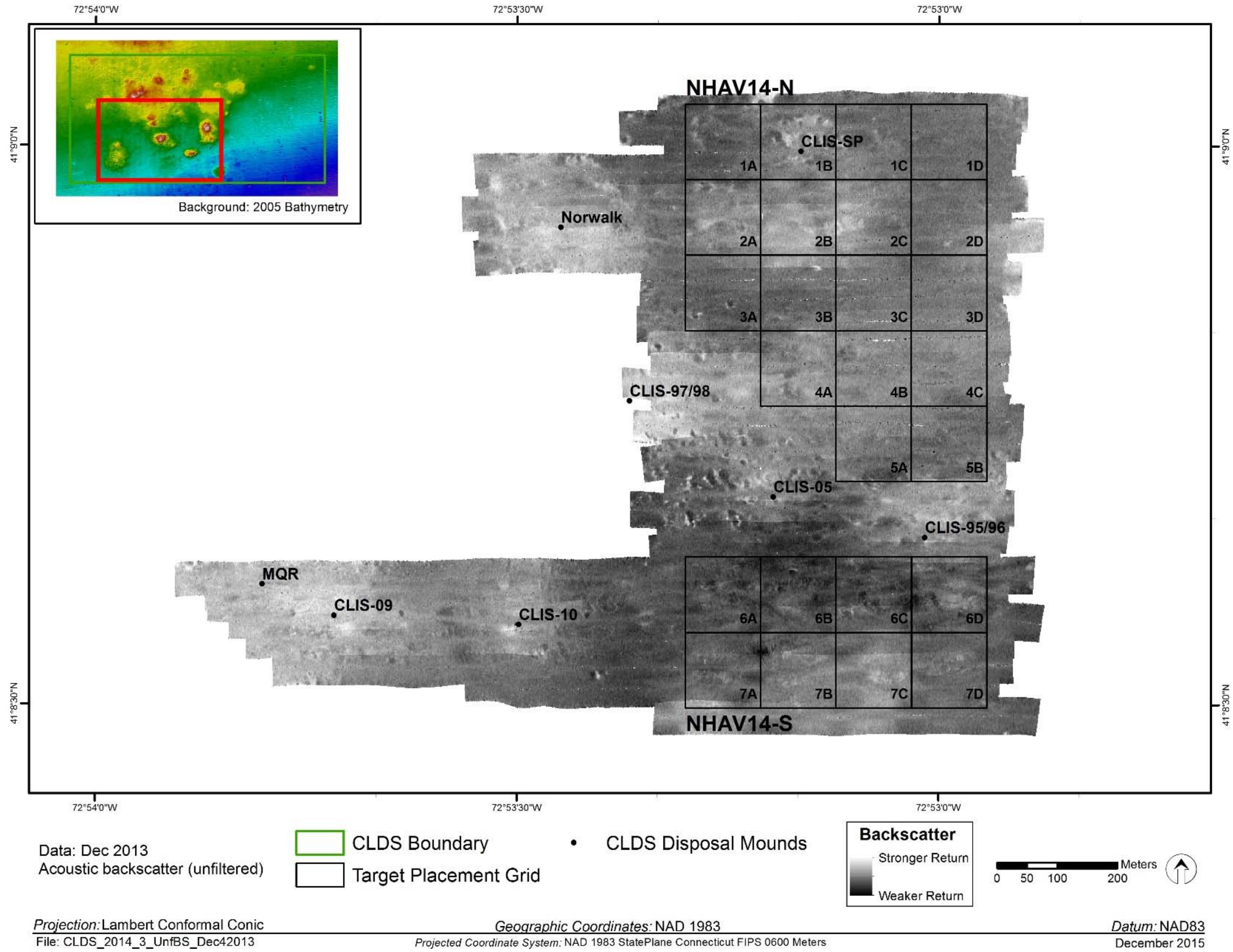


Figure 3-3. Mosaic of unfiltered backscatter data of CLDS - December 2013

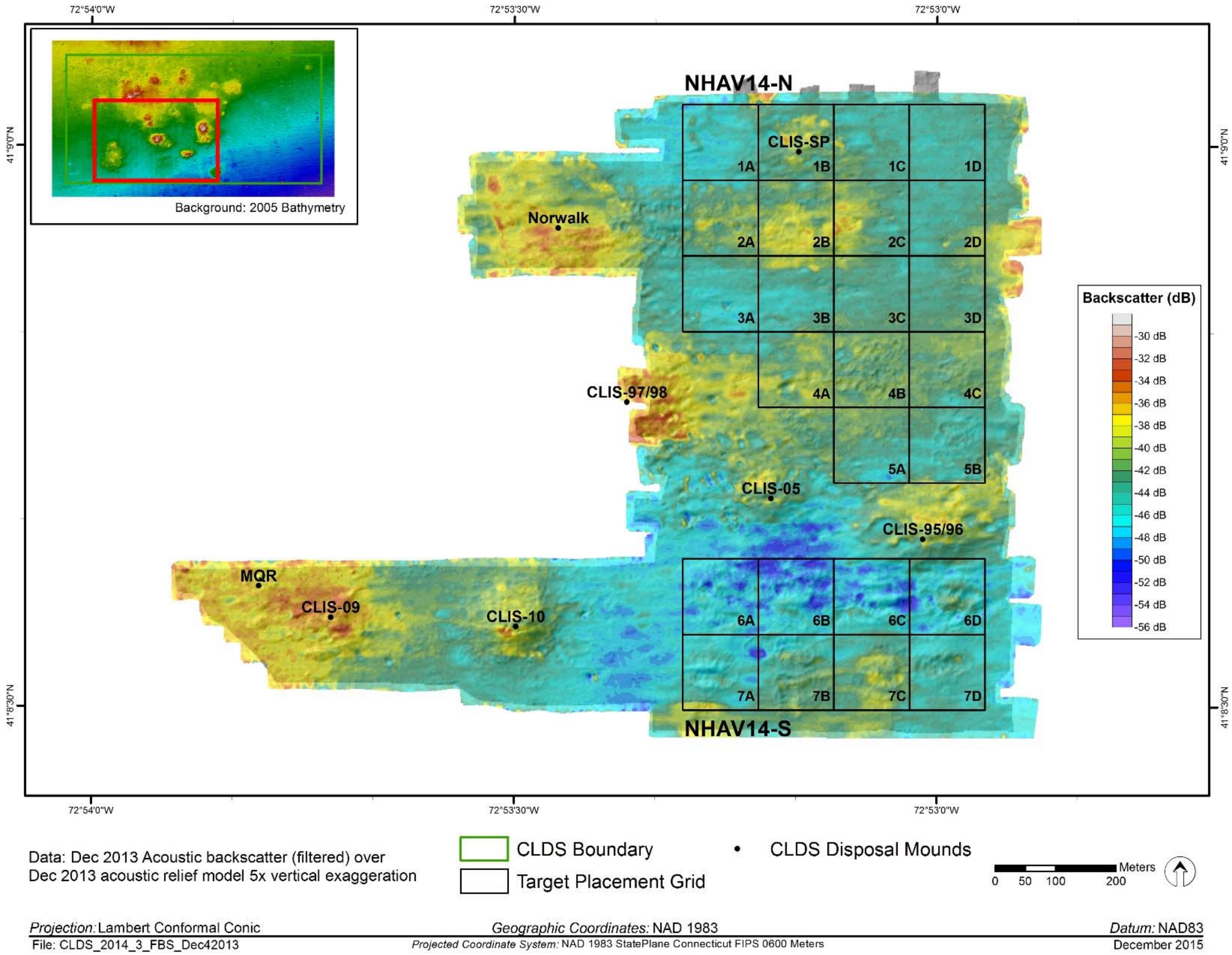


Figure 3-4. Filtered backscatter of CLDS - December 2013

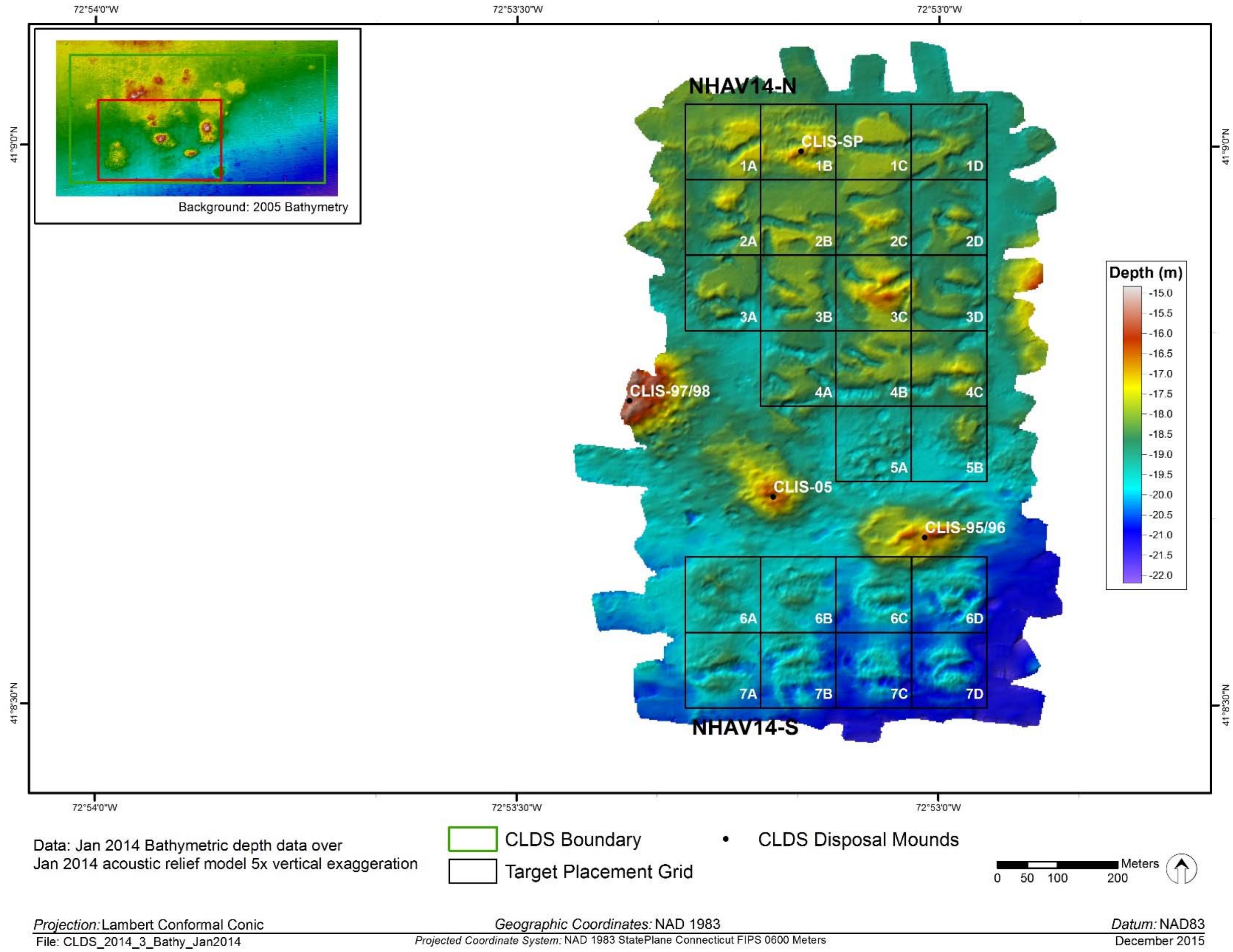


Figure 3-5. Bathymetric depth data over acoustic relief model of CLDS - January 2014

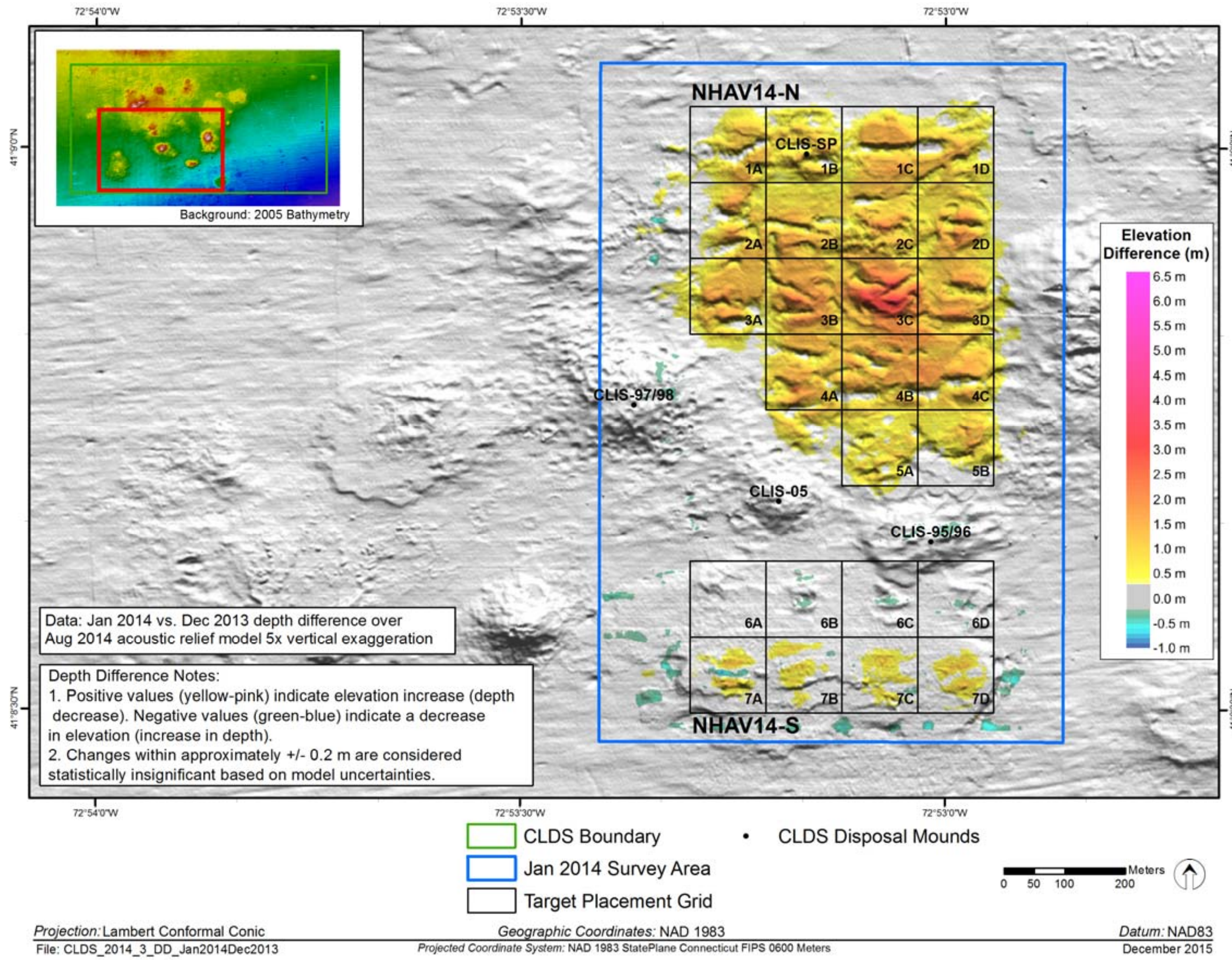


Figure 3-6. CLDS depth difference: January 2014 vs. December 2013

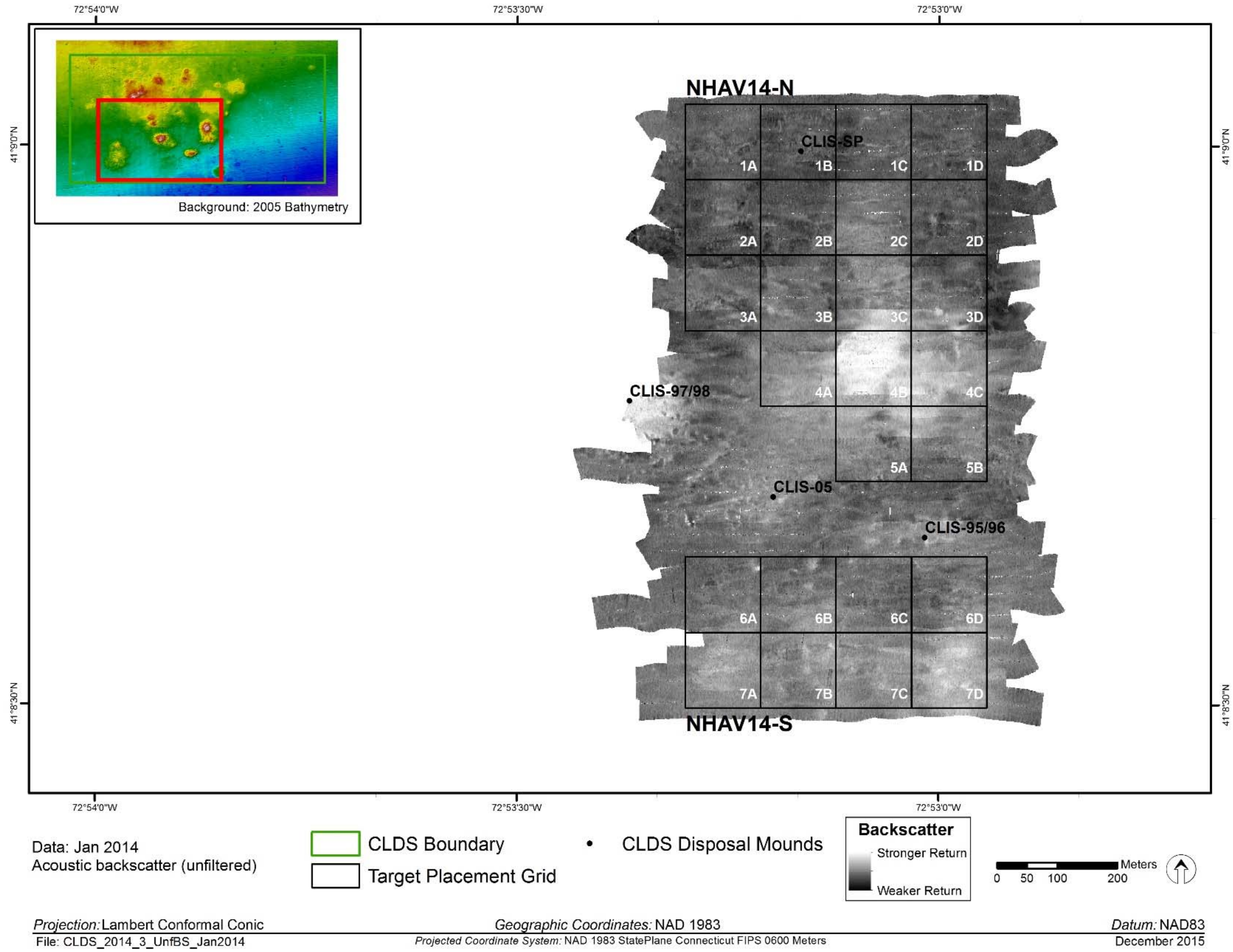


Figure 3-7. Mosaic of unfiltered backscatter data of CLDS - January 2014

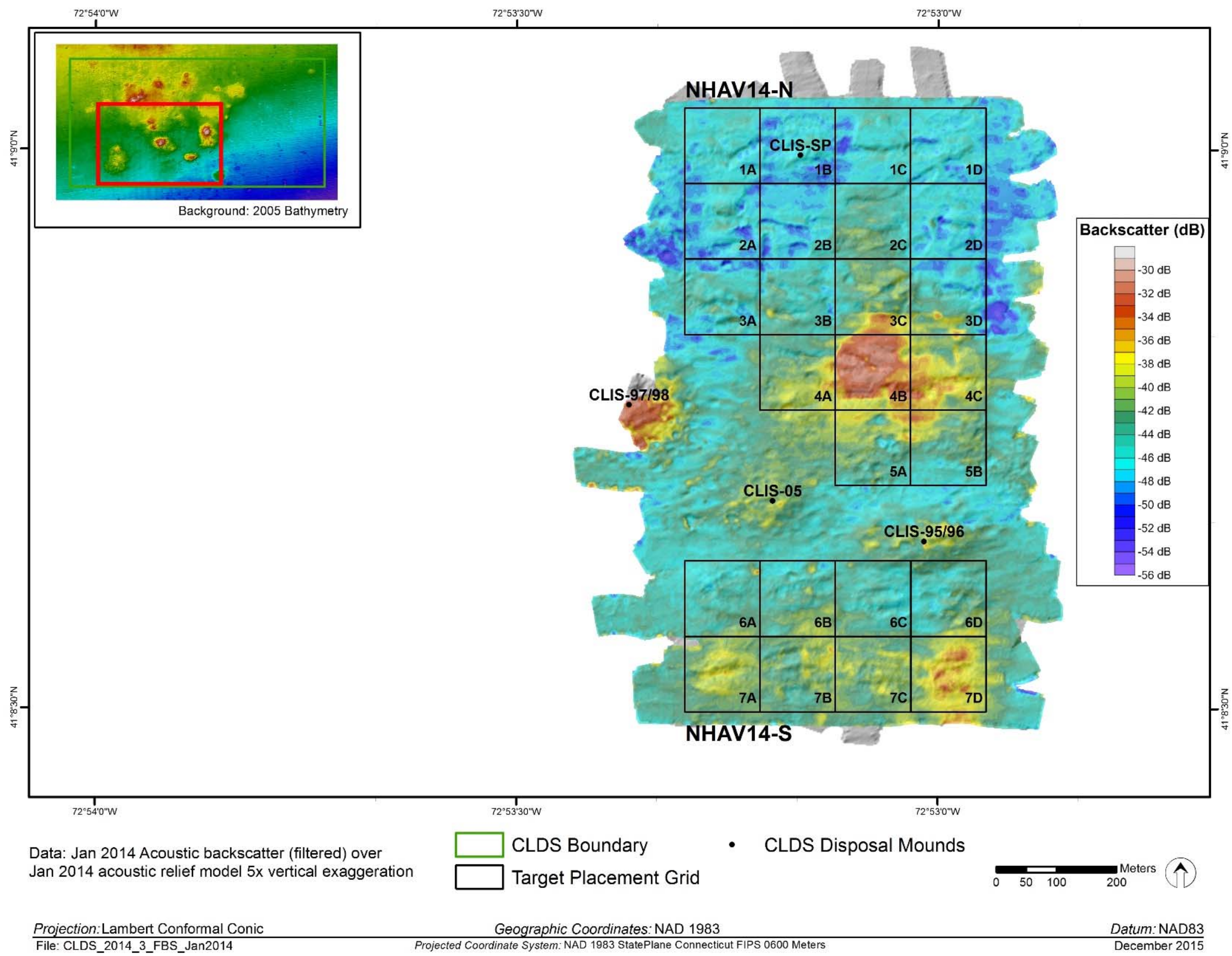


Figure 3-8. Filtered backscatter of CLDS - January 2014

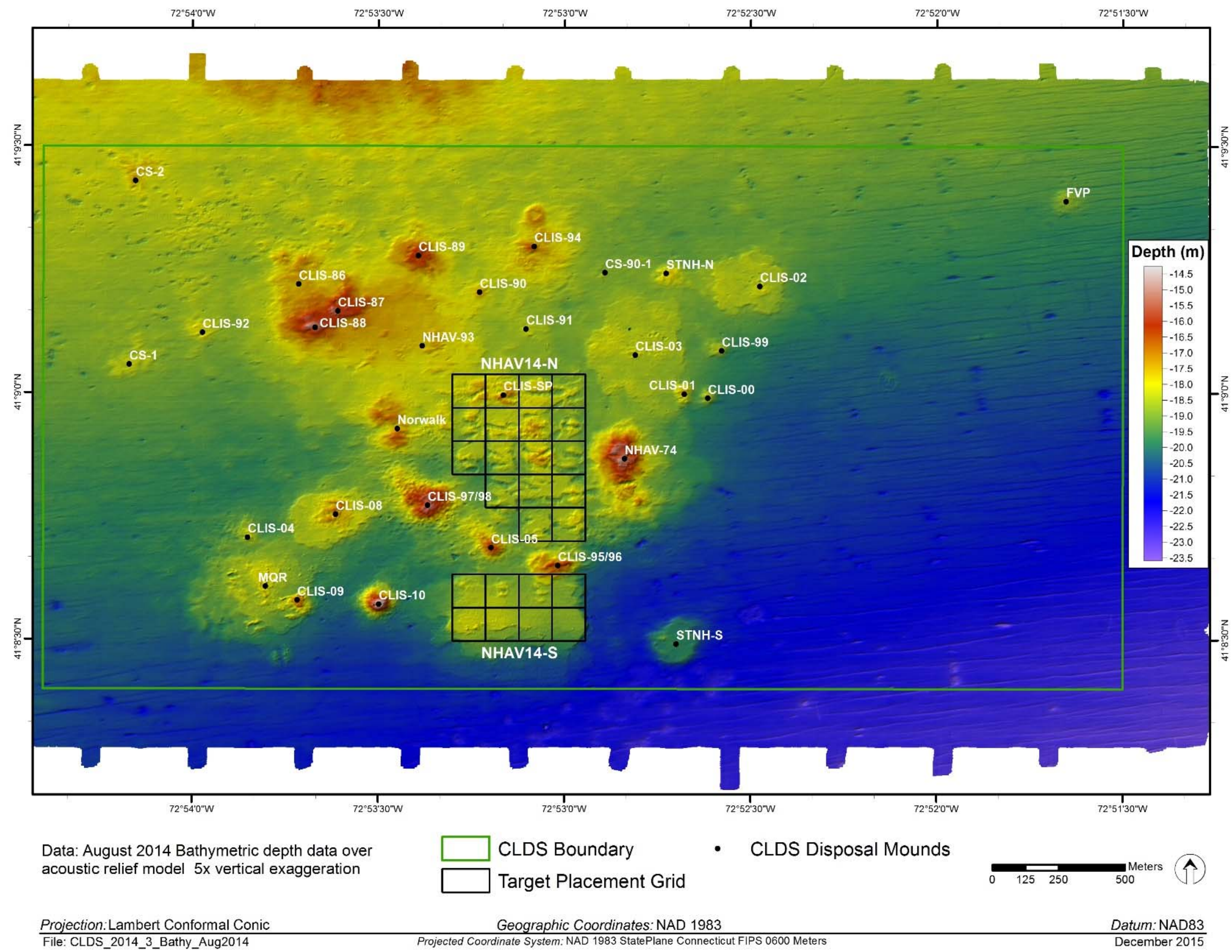


Figure 3-9. Bathymetric depth data over acoustic relief model of CLDS - August 2014

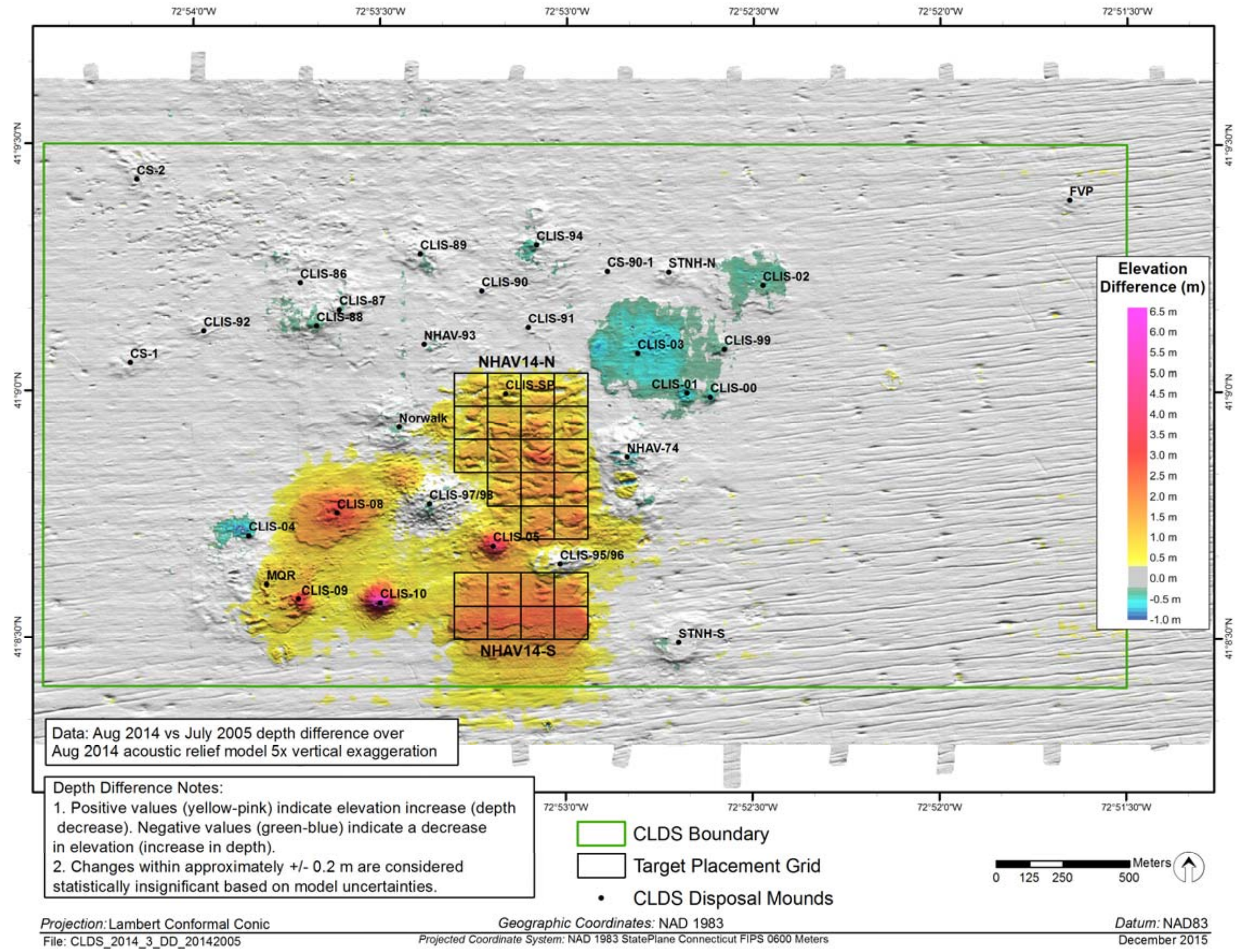


Figure 3-10. CLDS depth difference: August 2014 vs. July 2005

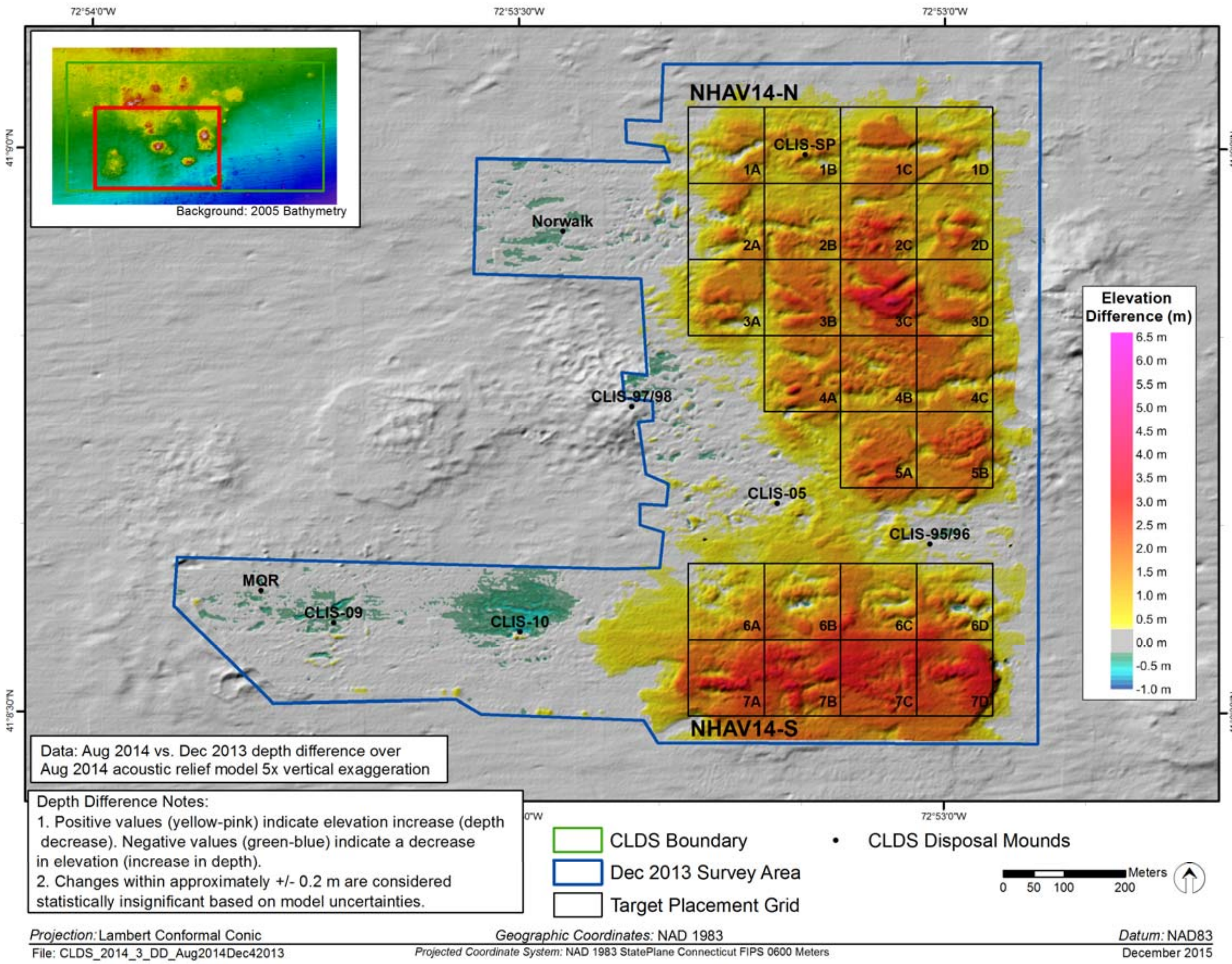


Figure 3-11. CLDS depth difference: August 2014 vs. December 2013

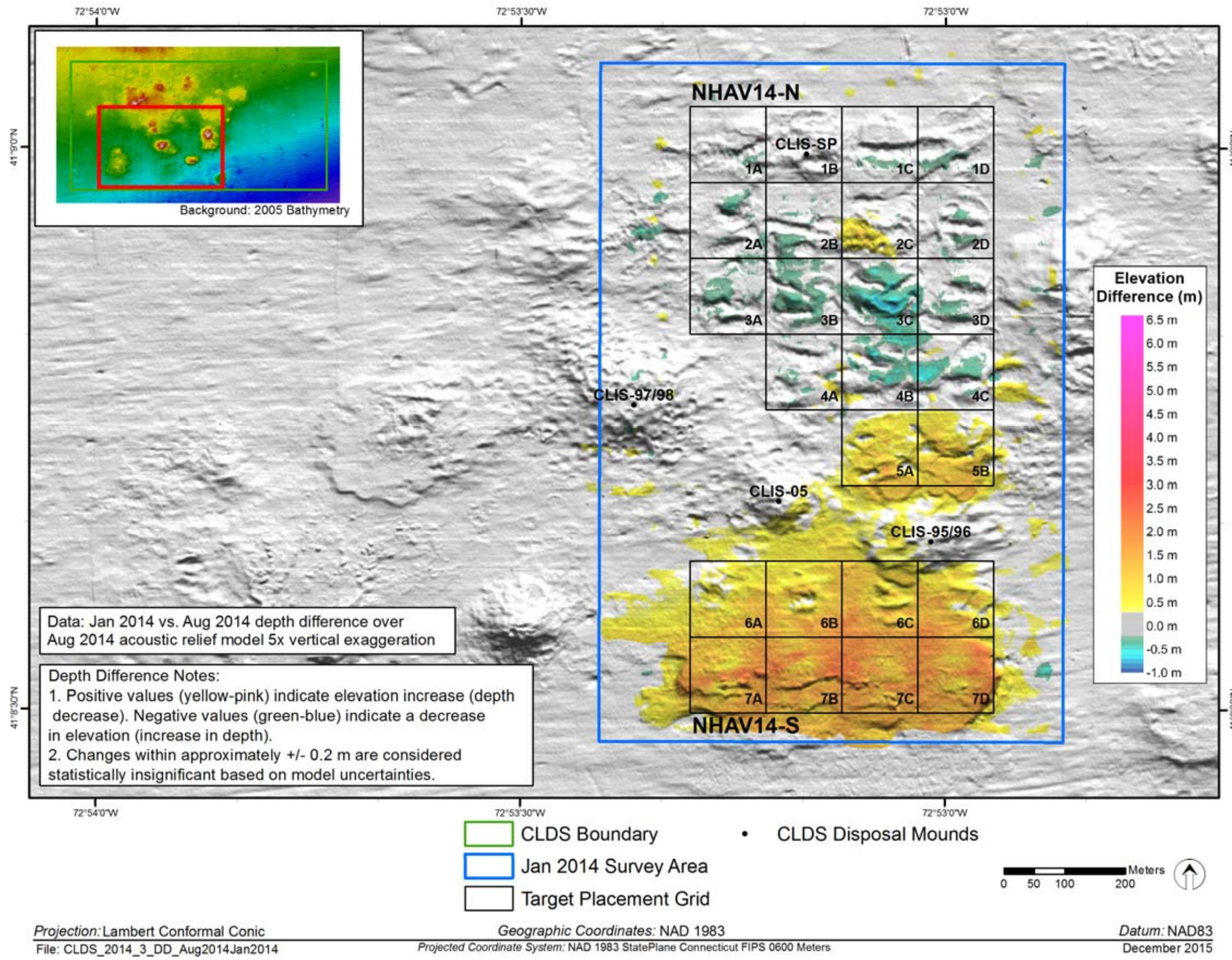


Figure 3-12. CLDS depth difference: August 2014 vs. January 2014

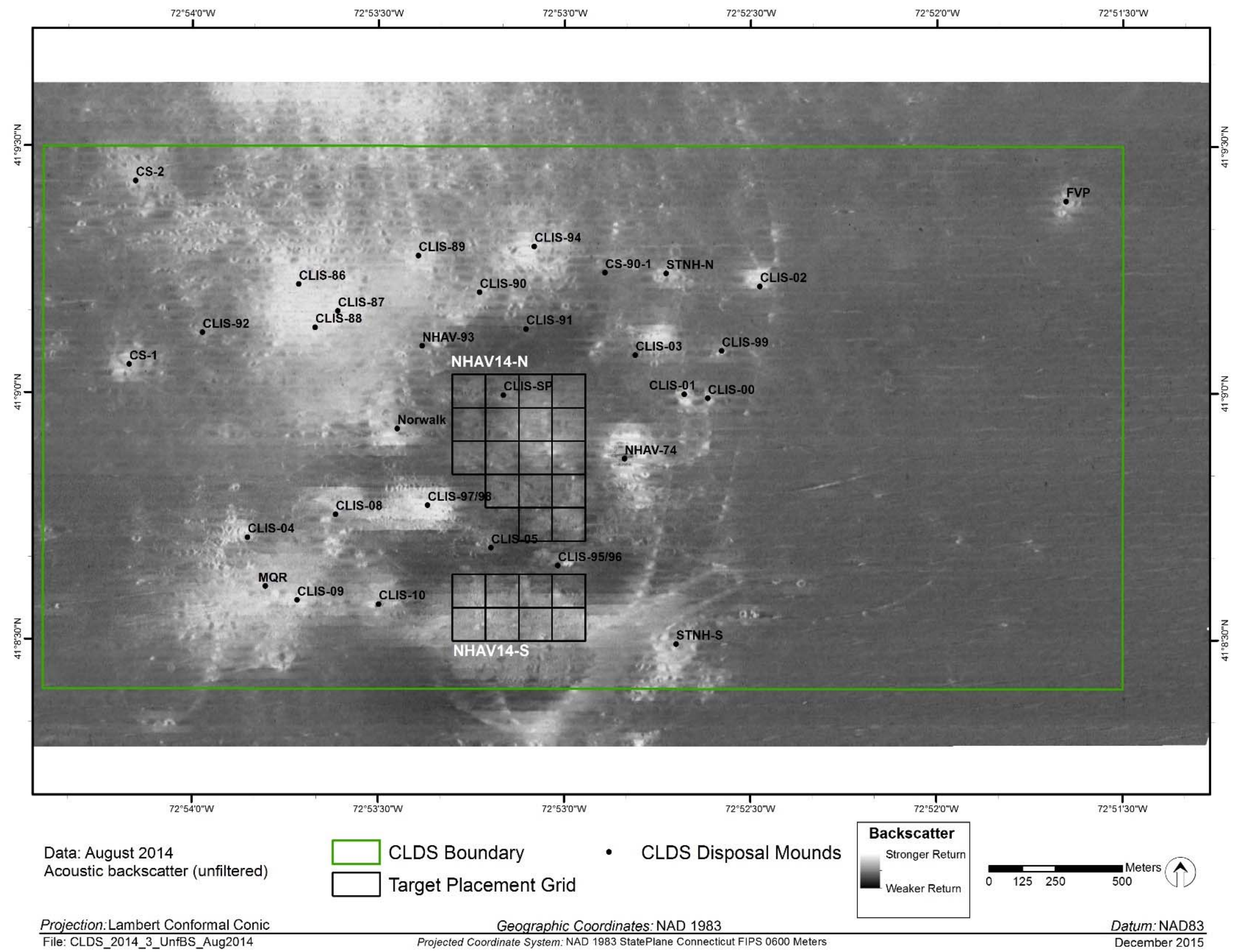


Figure 3-13. Mosaic of unfiltered acoustic backscatter of CLDS - August 2014

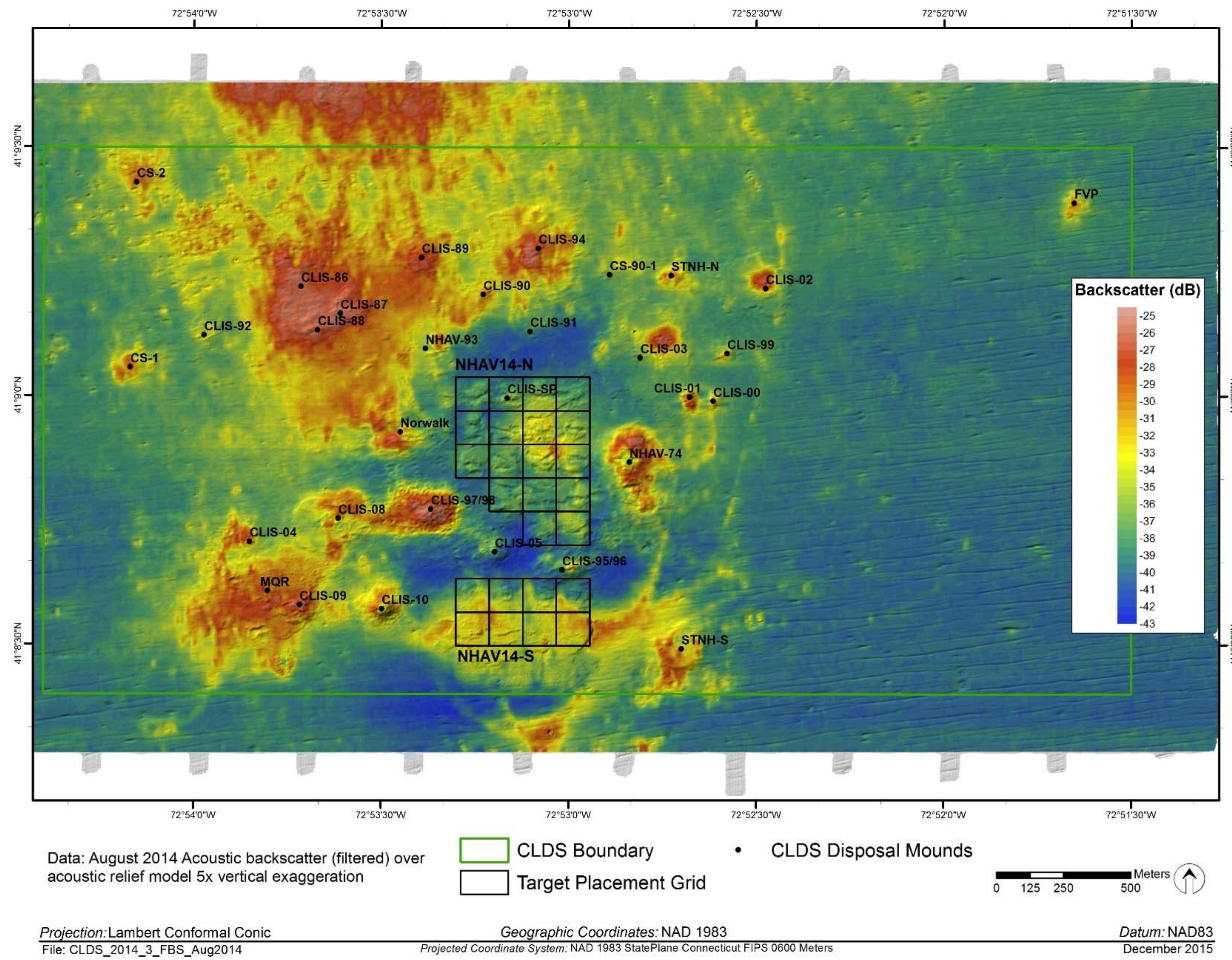


Figure 3-14. Filtered backscatter of CLDS - August 2014

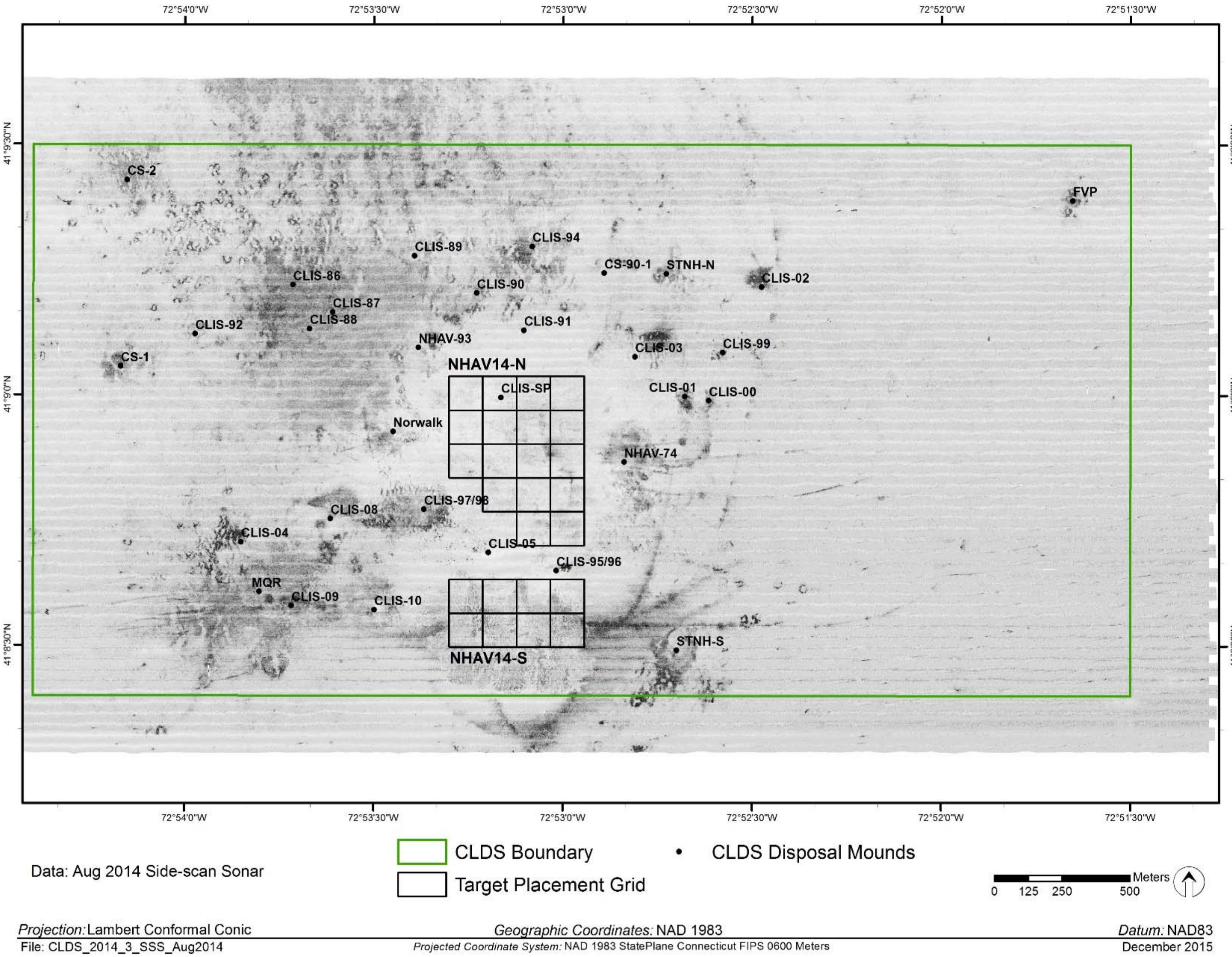


Figure 3-15. Side-scan mosaic of CLDS - August 2014

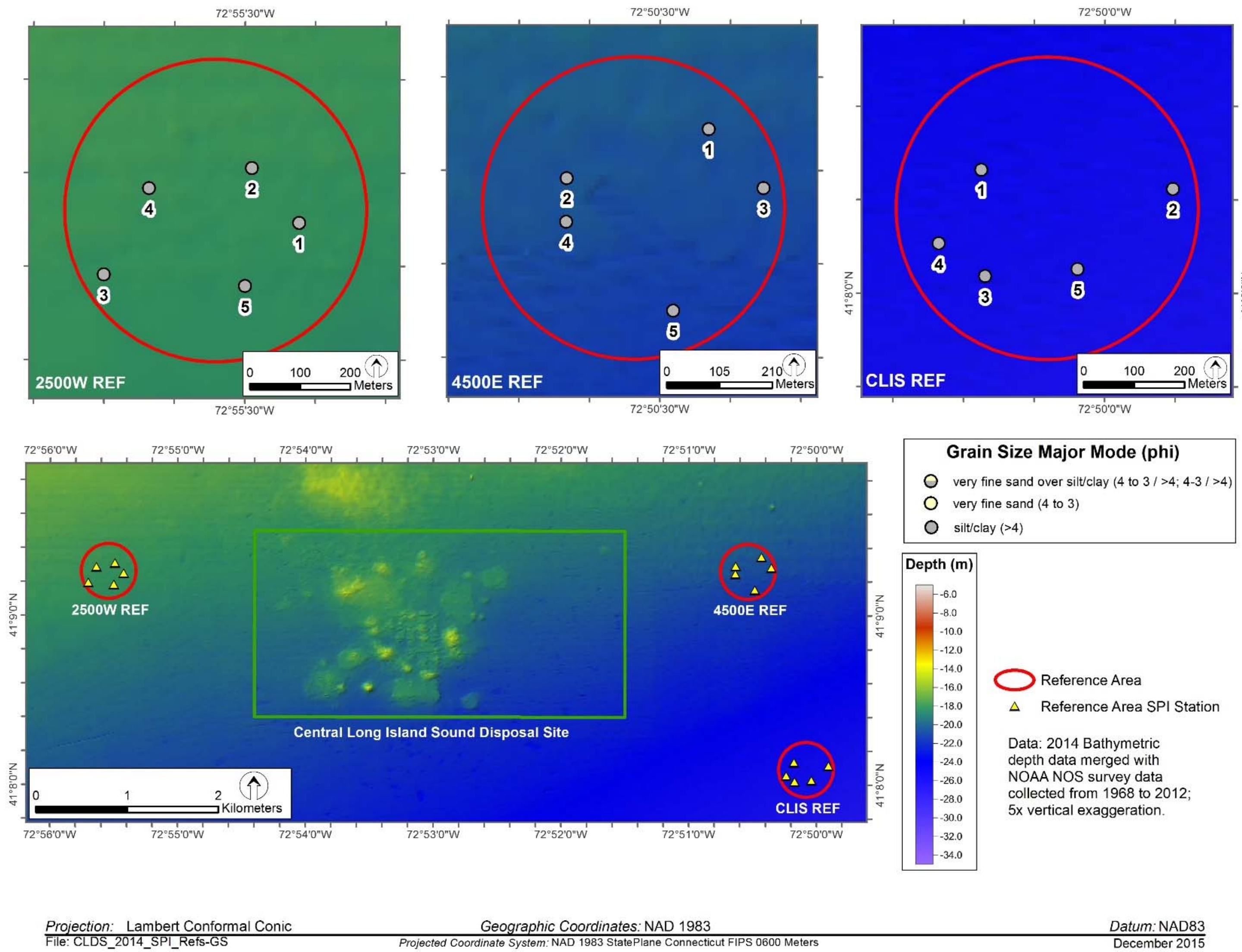


Figure 3-16. Sediment grain size major mode (phi units) at the CLDS reference areas

Figure 3-17. Representative profile images from the three reference areas displaying a surface layer of silty, very-fine sand overlaying predominantly silt-clay sediment at depth.

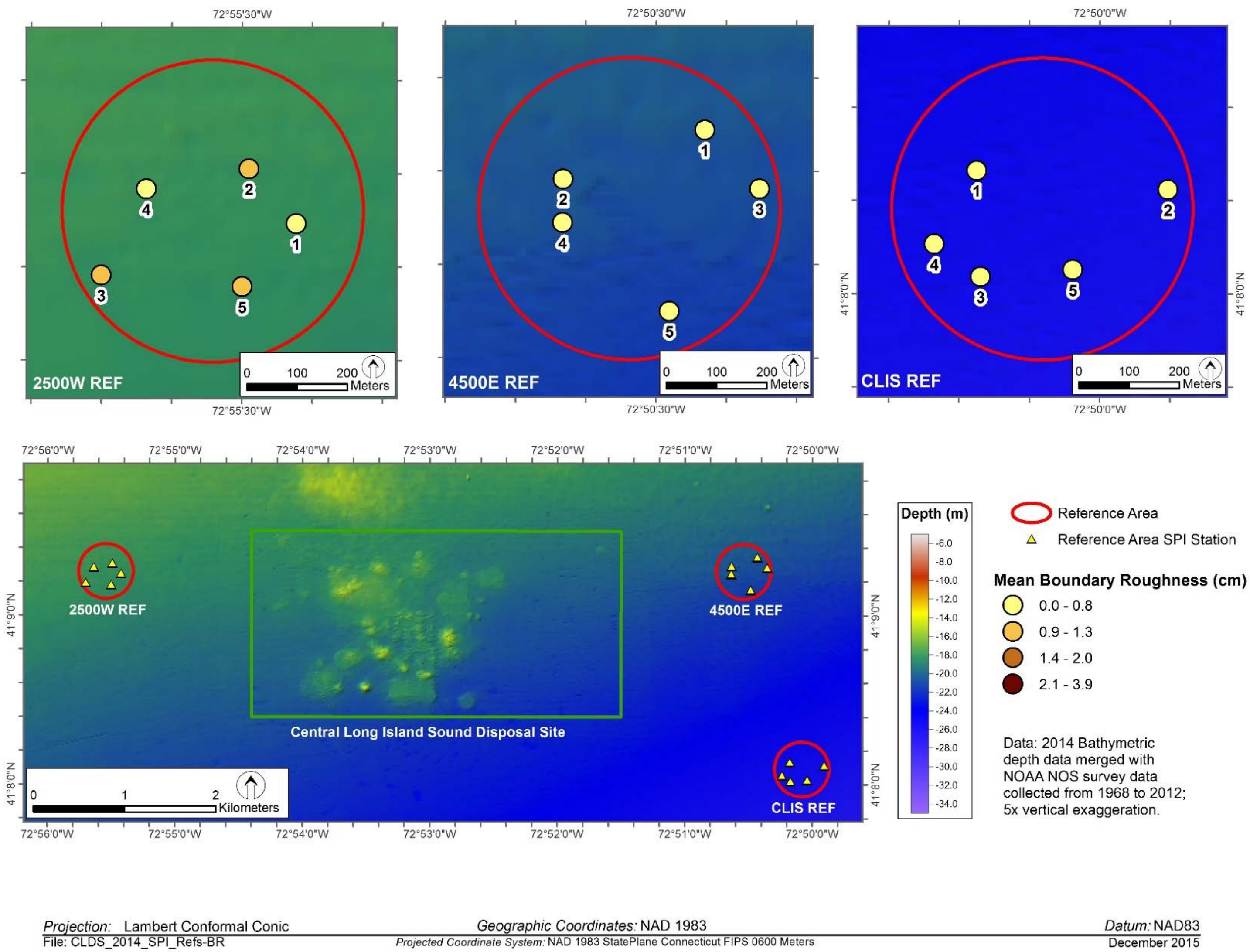


Figure 3-18. Mean station small-scale boundary roughness values (cm) at the CLDS reference areas

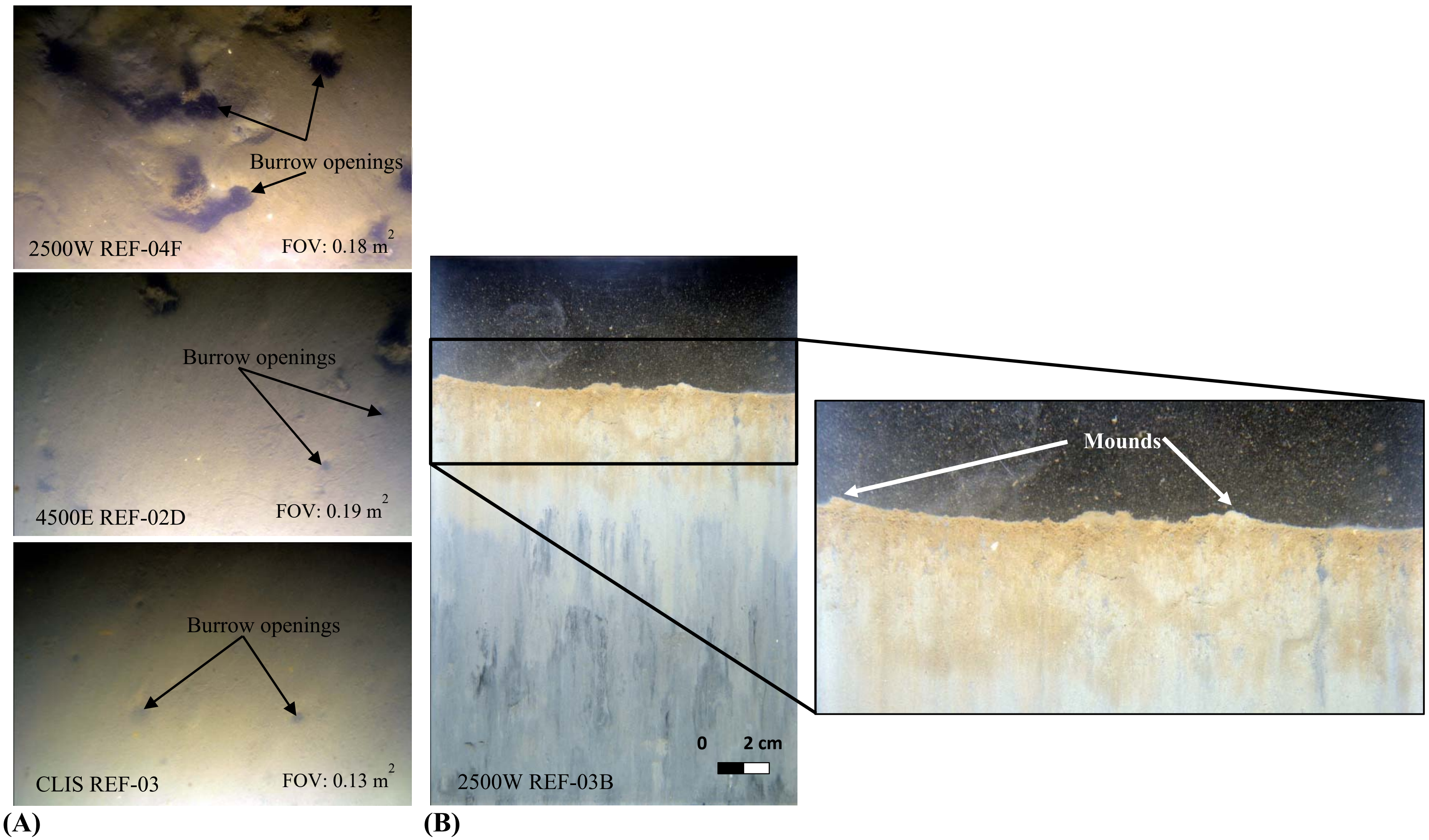


Figure 3-19. (A) Representative plan-view images from the three reference areas displaying a surface layer of silty, very-fine sand (FOV = Field of view). (B) Small-scale surface topography (i.e., boundary roughness), displayed at Station 2500W REF-03, due to the presence of biogenic mounds (highlighted in the enlarged portion of the image) created by the burrowing and feeding activity of subsurface organisms.

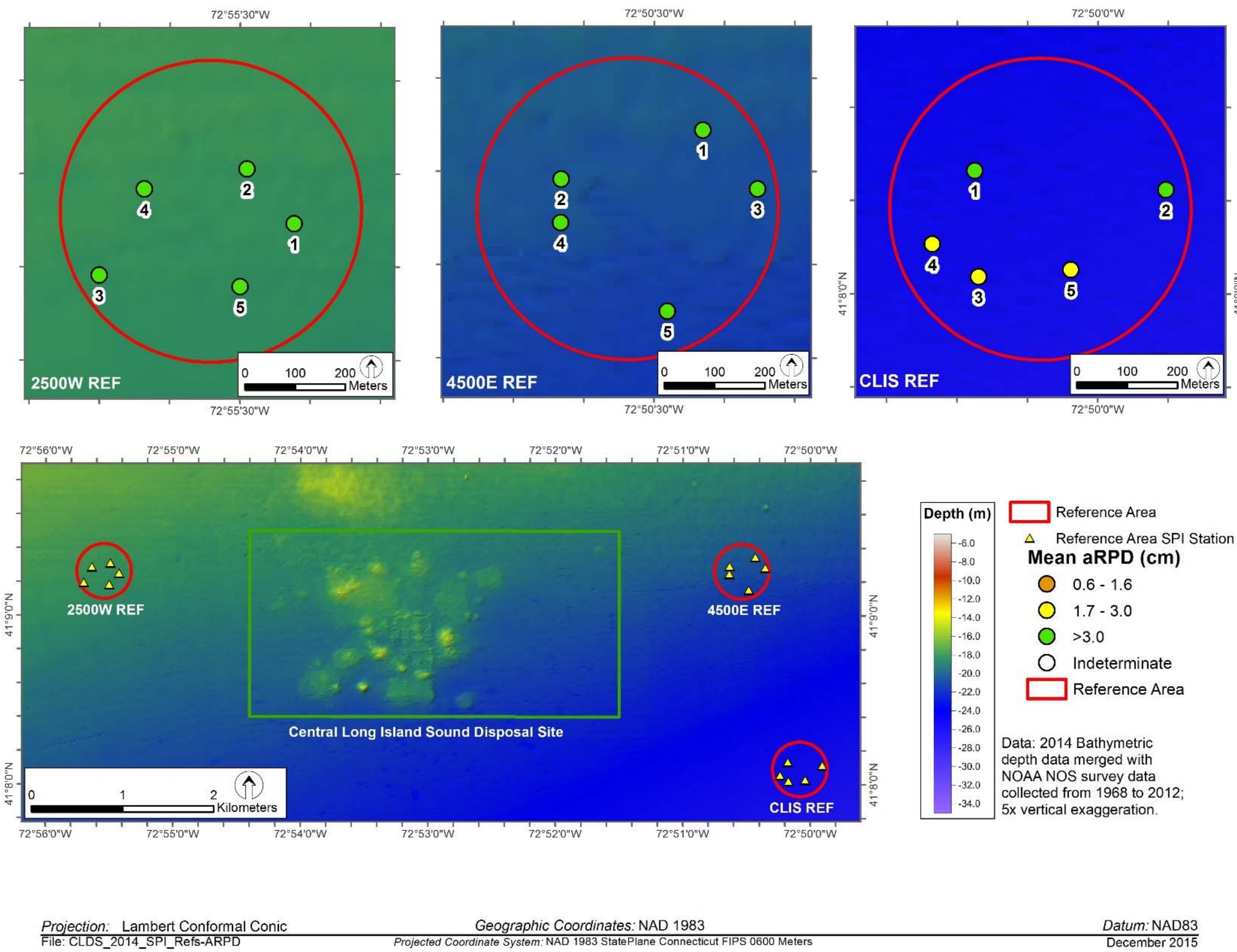
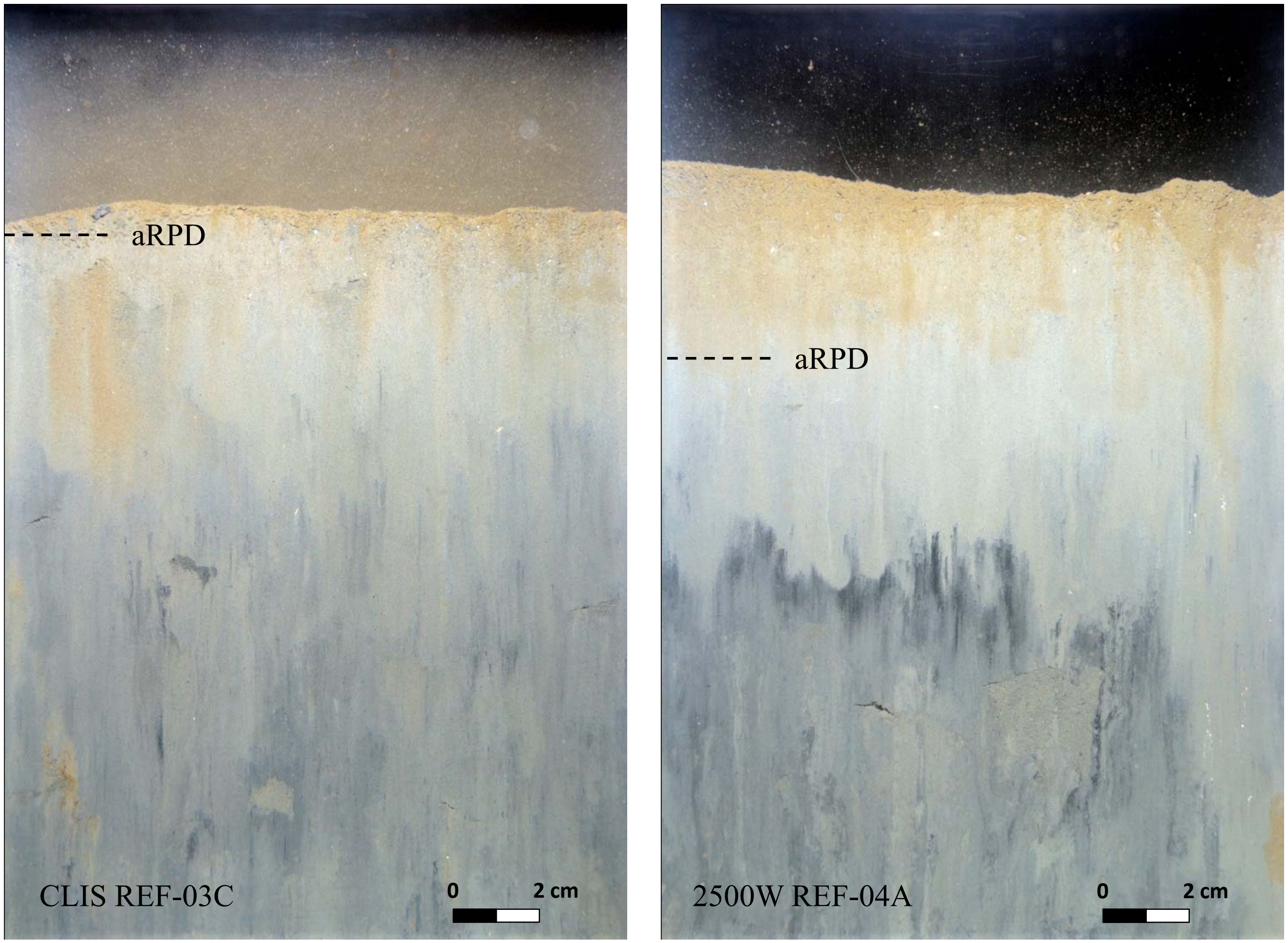


Figure 3-20. Mean station depth of the apparent RPD (cm) at the CLDS reference areas



(A) **(B)**

Figure 3-21. Profile images representing (A) the minimum and (B) the maximum depth ranges of the aRPD at the reference areas. Dashed horizontal line indicates approximate location of aRPD on each image.

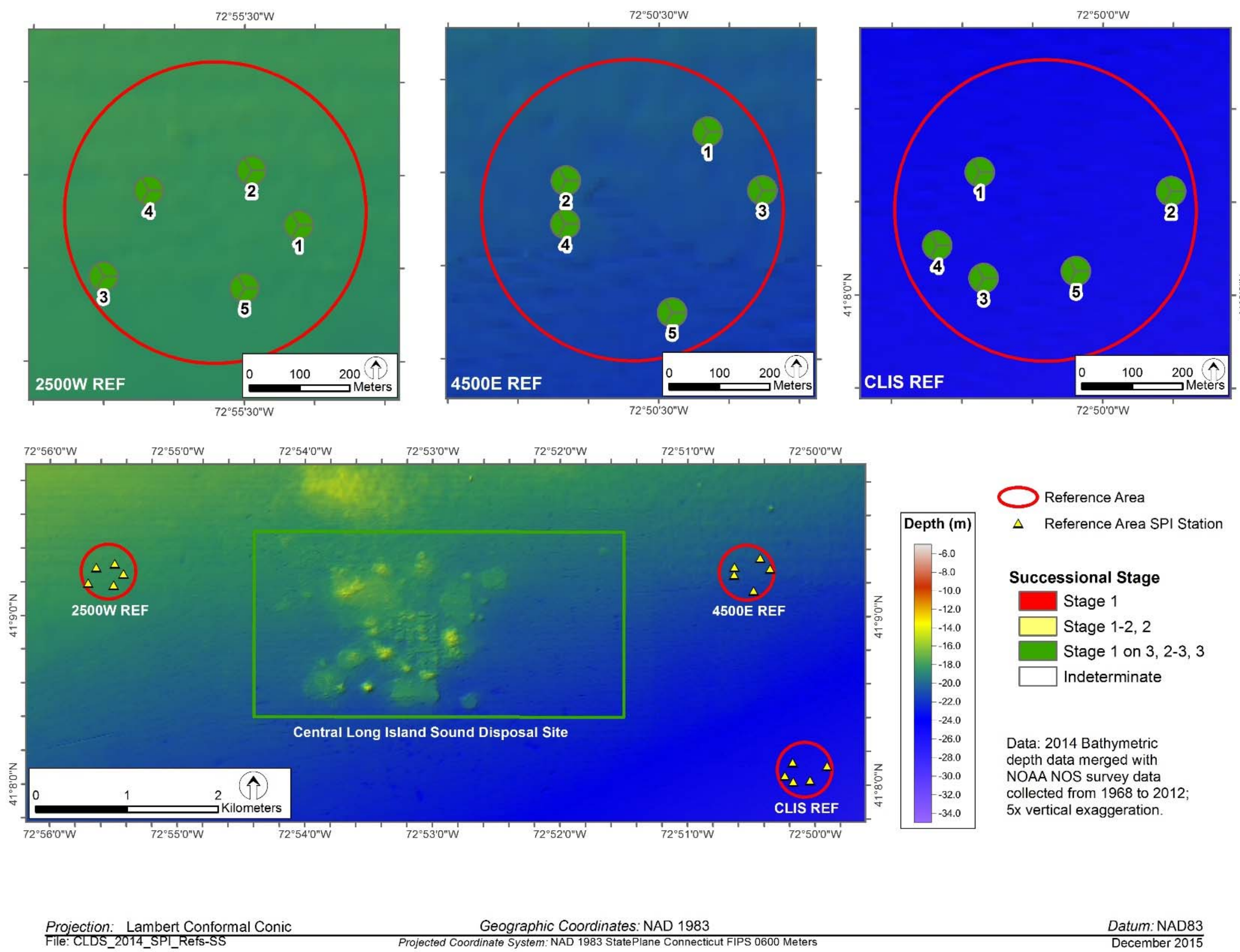
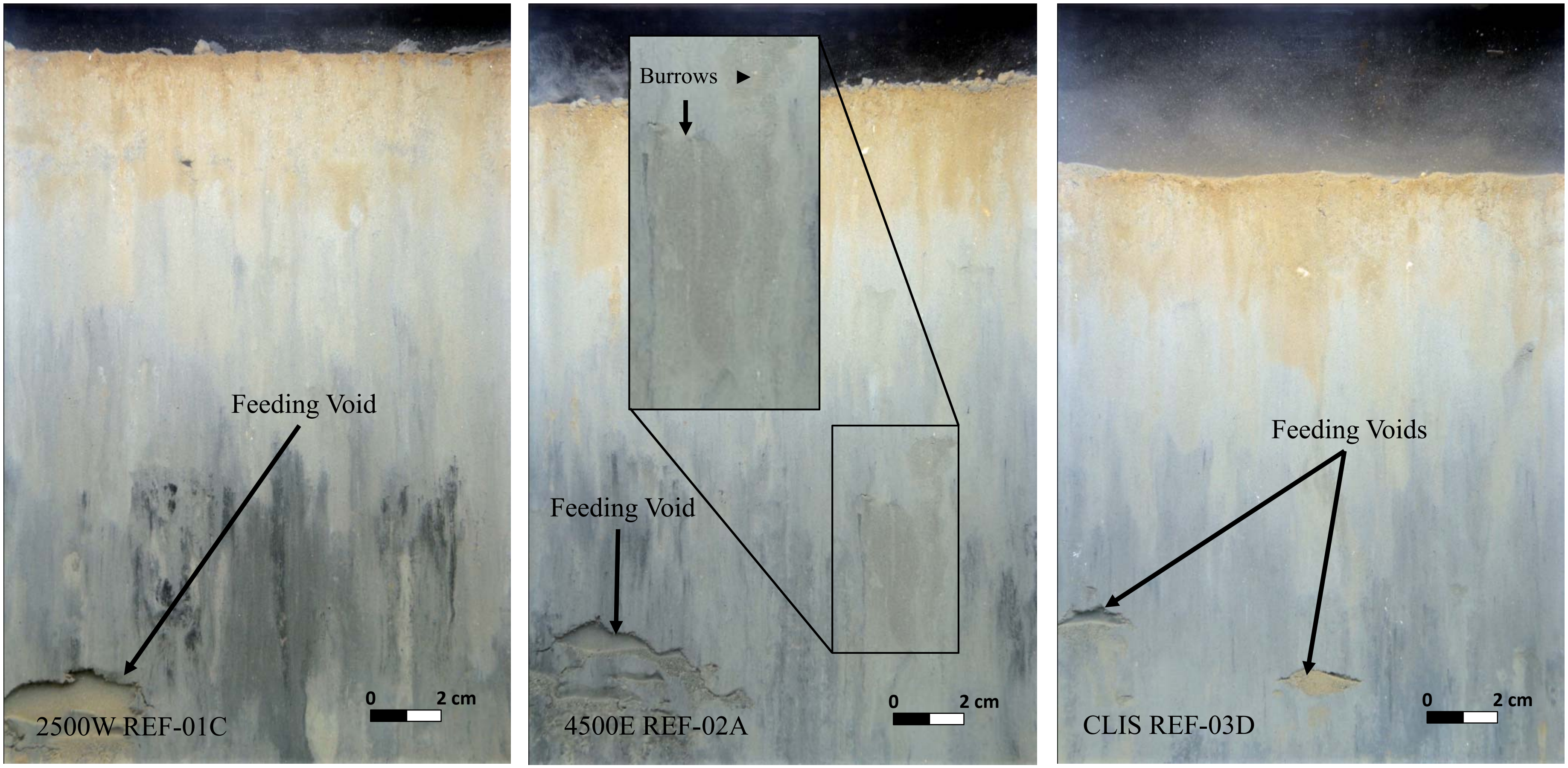


Figure 3-22. Infaunal successional states found at stations sampled at the CLDS reference areas



(A) **(B)** **(C)**

Figure 3-23. Representative profile images illustrating extensive Stage 3 activity observed at the reference area stations: (A) large subsurface feeding void at Station 2500W REF-01; (B) large subsurface feeding void and indications of a large burrow in the enlarged portion of the image at Station 4500E REF-02; and (C) medium-large subsurface feeding voids at Station CLIS REF-03.

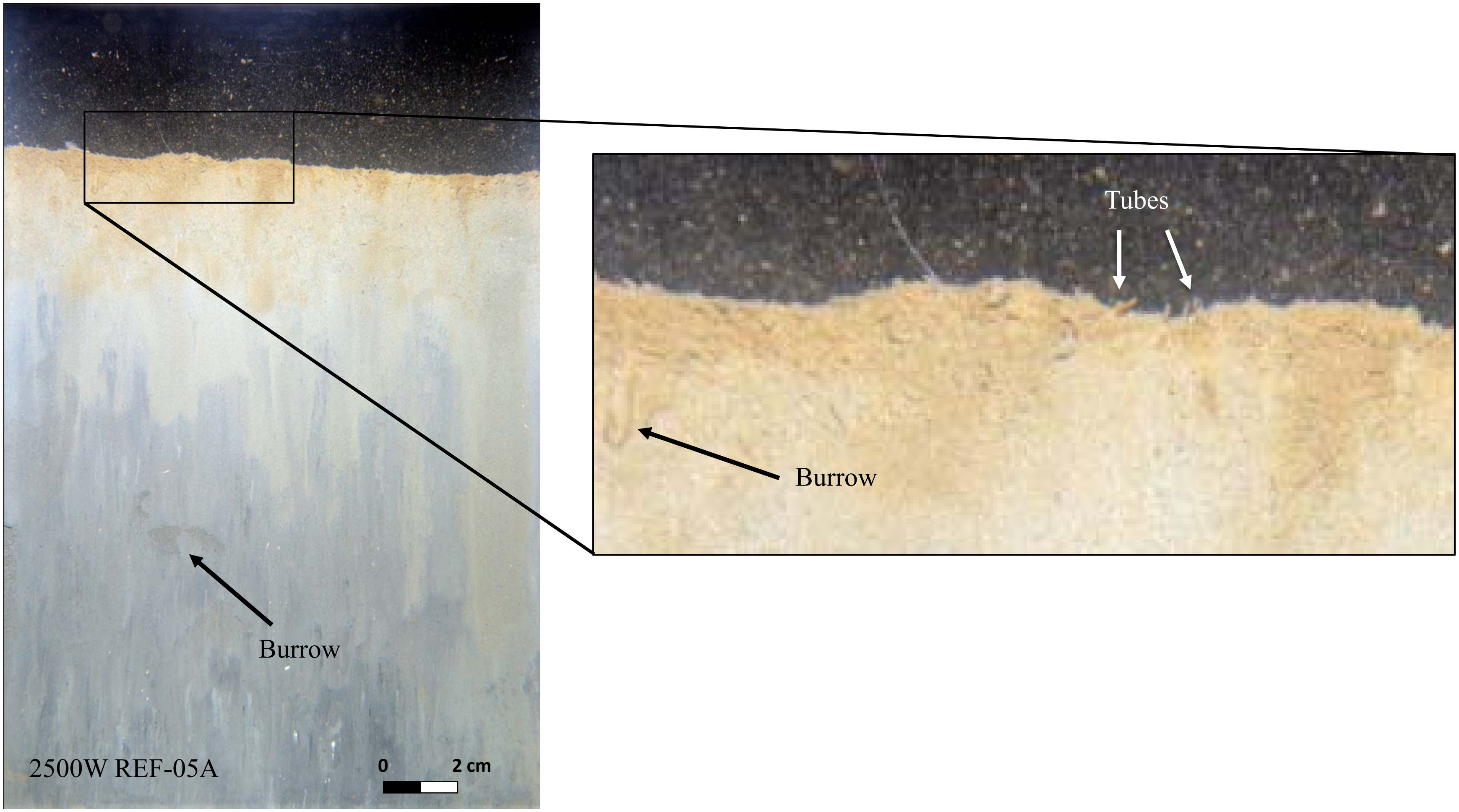


Figure 3-24. Representative profile image depicting the presence of Stage 1 activity represented by surface tubes and surface burrows (enlarged image, right), over Stage 3 activity as indicated by the medium-large subsurface burrow in the main image (left).

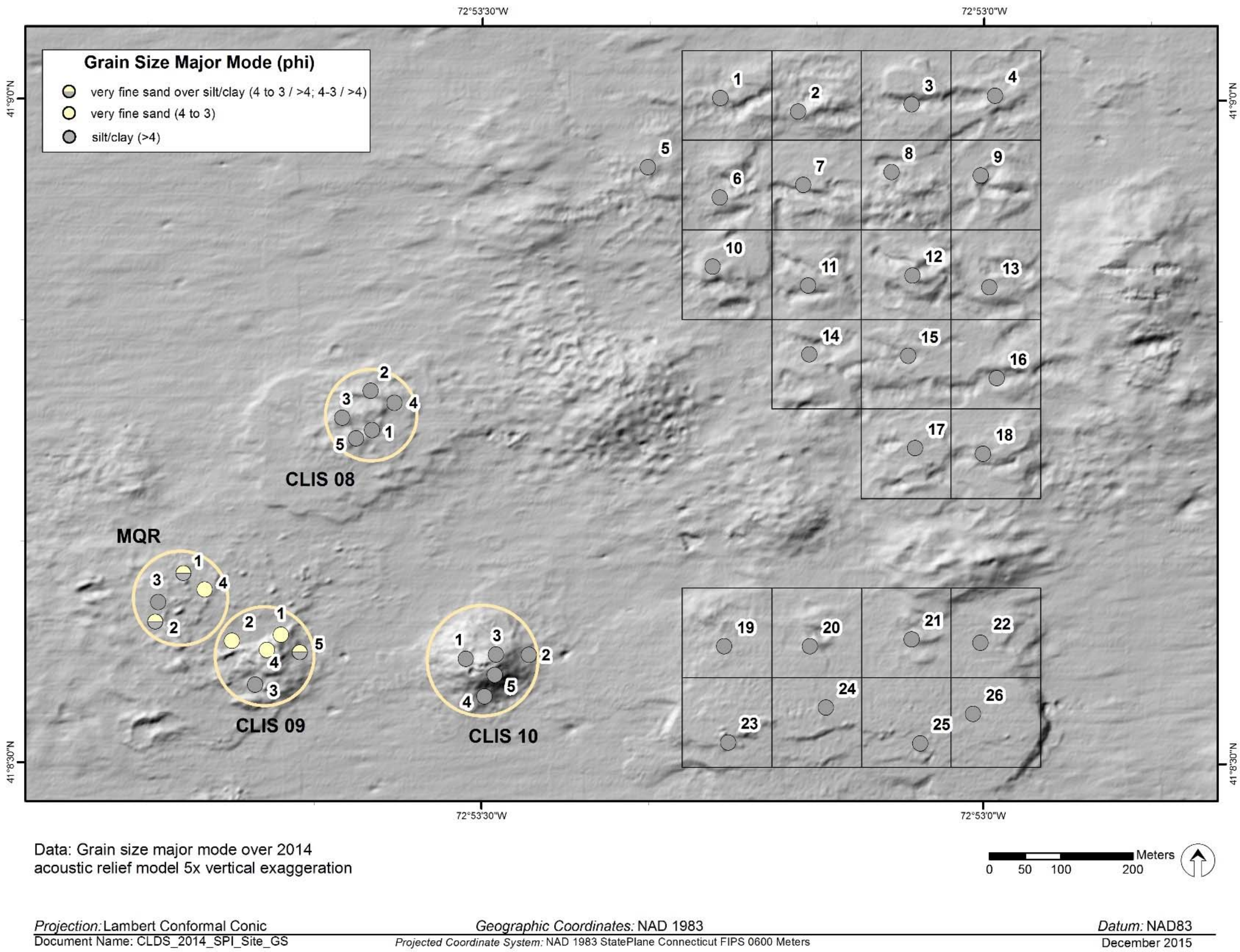


Figure 3-25. Sediment grain size major mode (phi units) at the CLDS

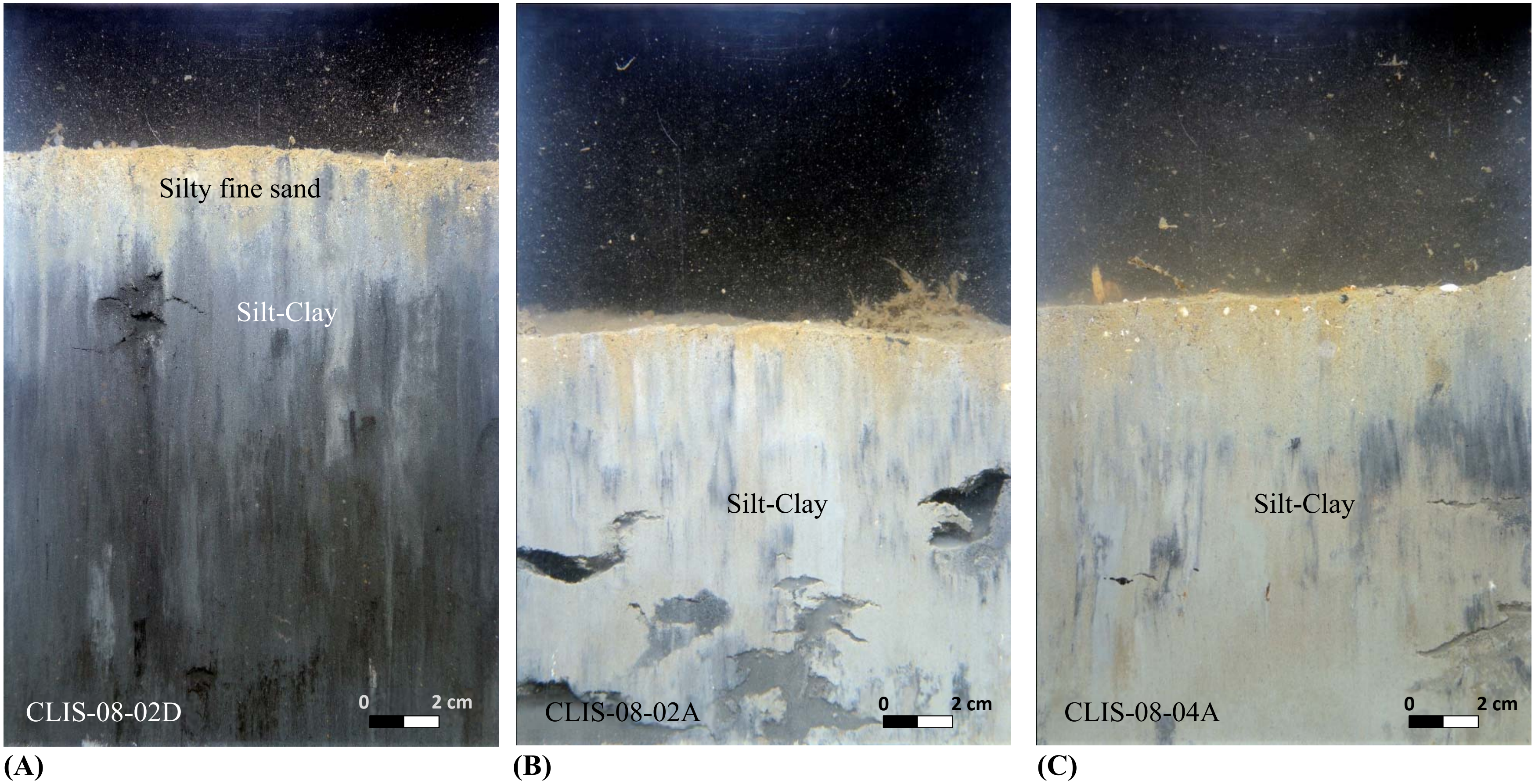
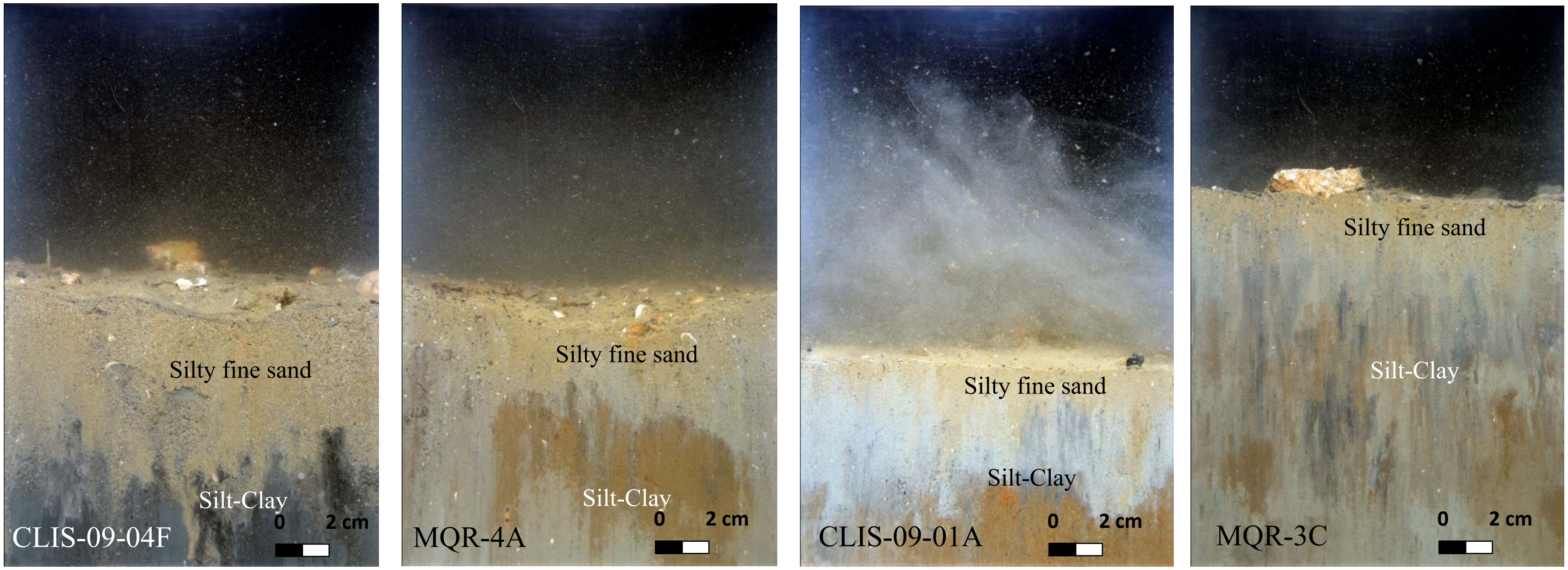


Figure 3-26. (A) Profile image from Station CLIS-08-02 displaying a relatively thin surface layer of silty, very fine sand overlaying predominantly silt-clay sediment at depth. Profile images from Stations CLIS-08-02 (B) and CLIS-08-04 (C) displaying the distinctly light-colored silt-clay present at the northern margins of the CLIS-08 mound.



(A) **(B)** **(C)** **(D)**

Figure 3-27. (A) A representative profile image, from the CLIS-09 mound, displaying a surface layer of silty, very-fine sand overlaying silt-clay sediment at depth. (B) A representative profile image from the MQR mound, displaying a surface layer of silty, very-fine sand overlaying silt-clay sediment at depth. Profile images of mounds CLIS-09 (C) and MQR (D) displaying alternating layers of gray, light brown and rust colored silt-clay.

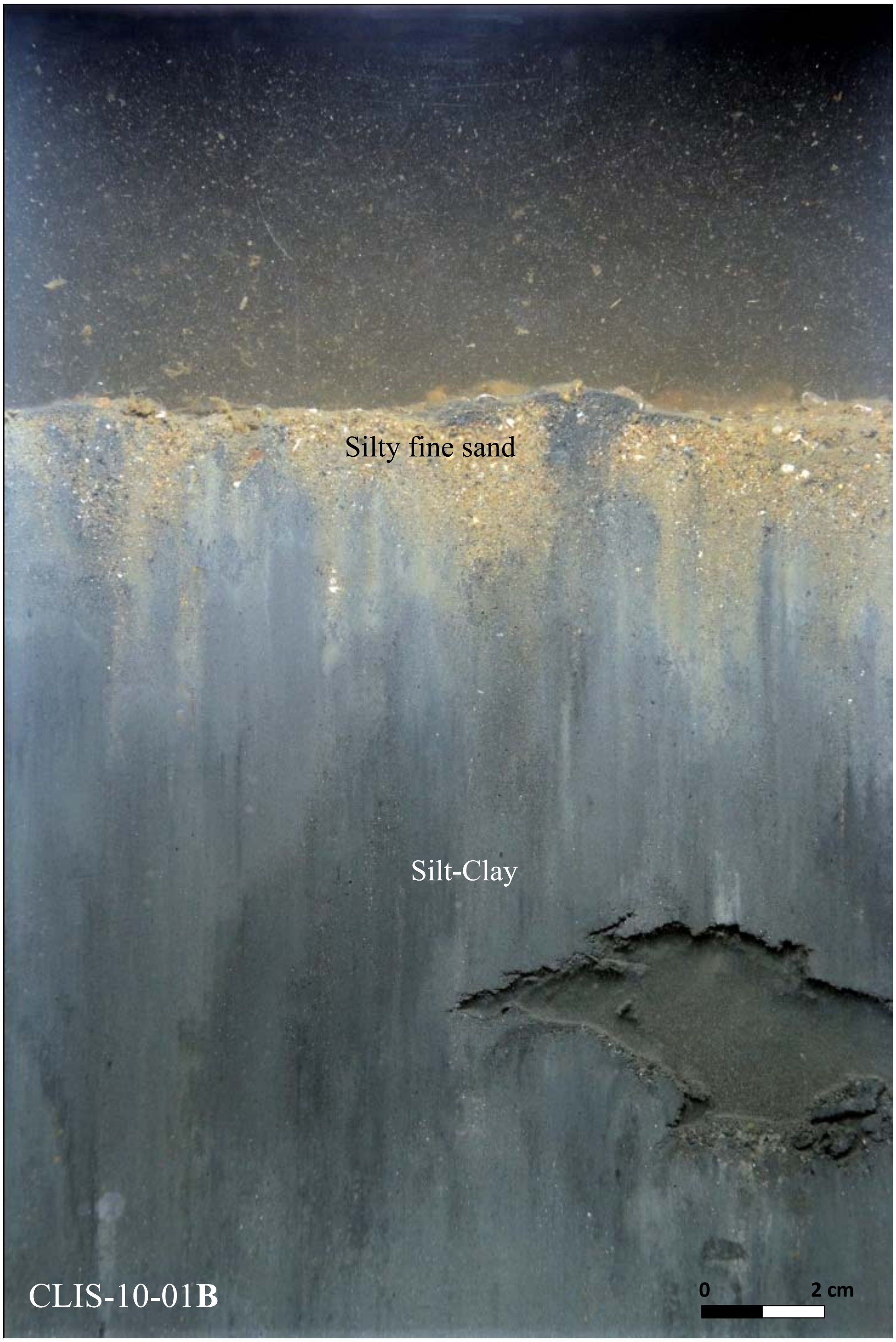


Figure 3-28. Profile image at CLIS-10-01 illustrating a thin surface layer of light brown fine sand followed by gray/black silt-clay

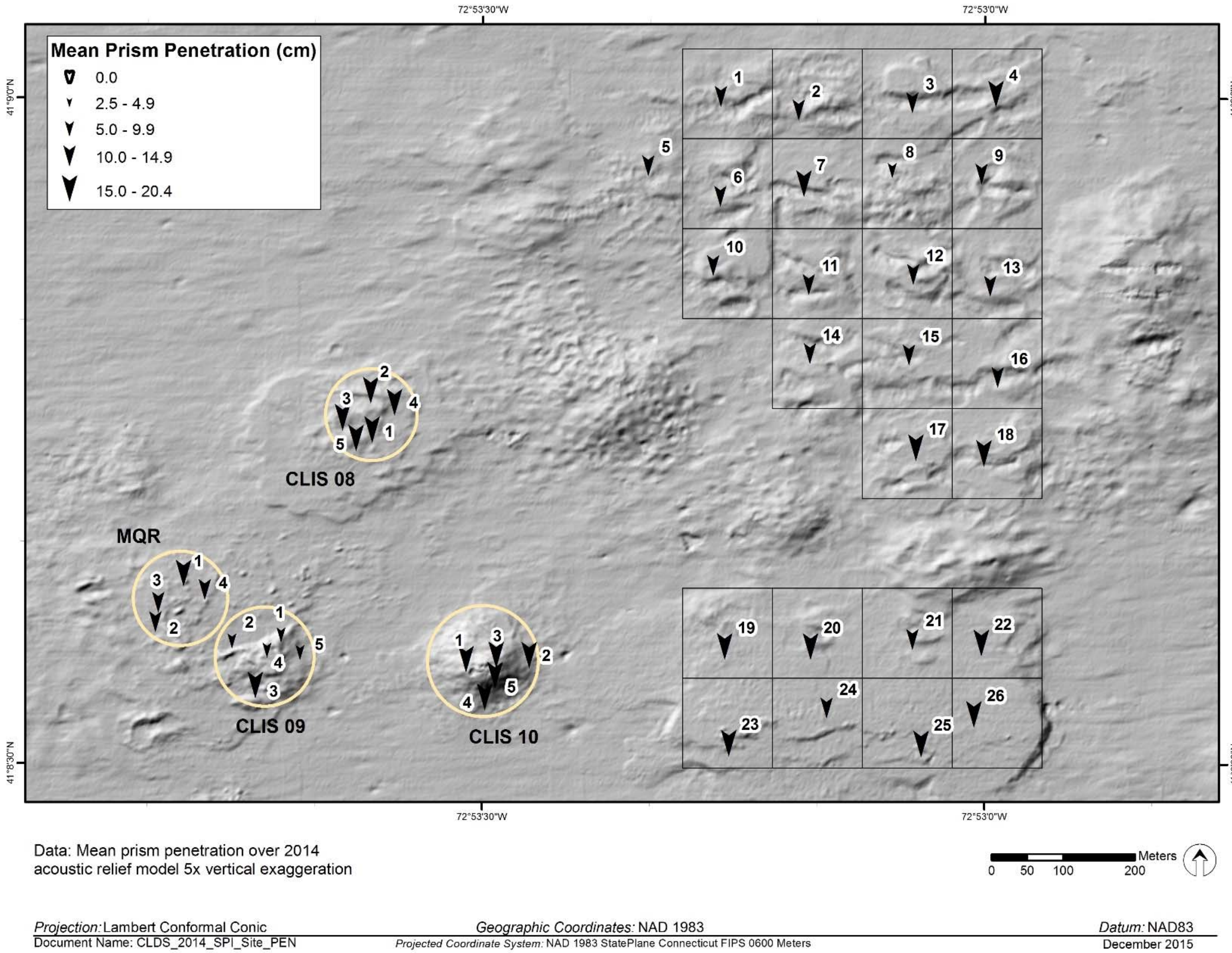


Figure 3-29. Mean station camera prism penetration depths (cm) at CLDS

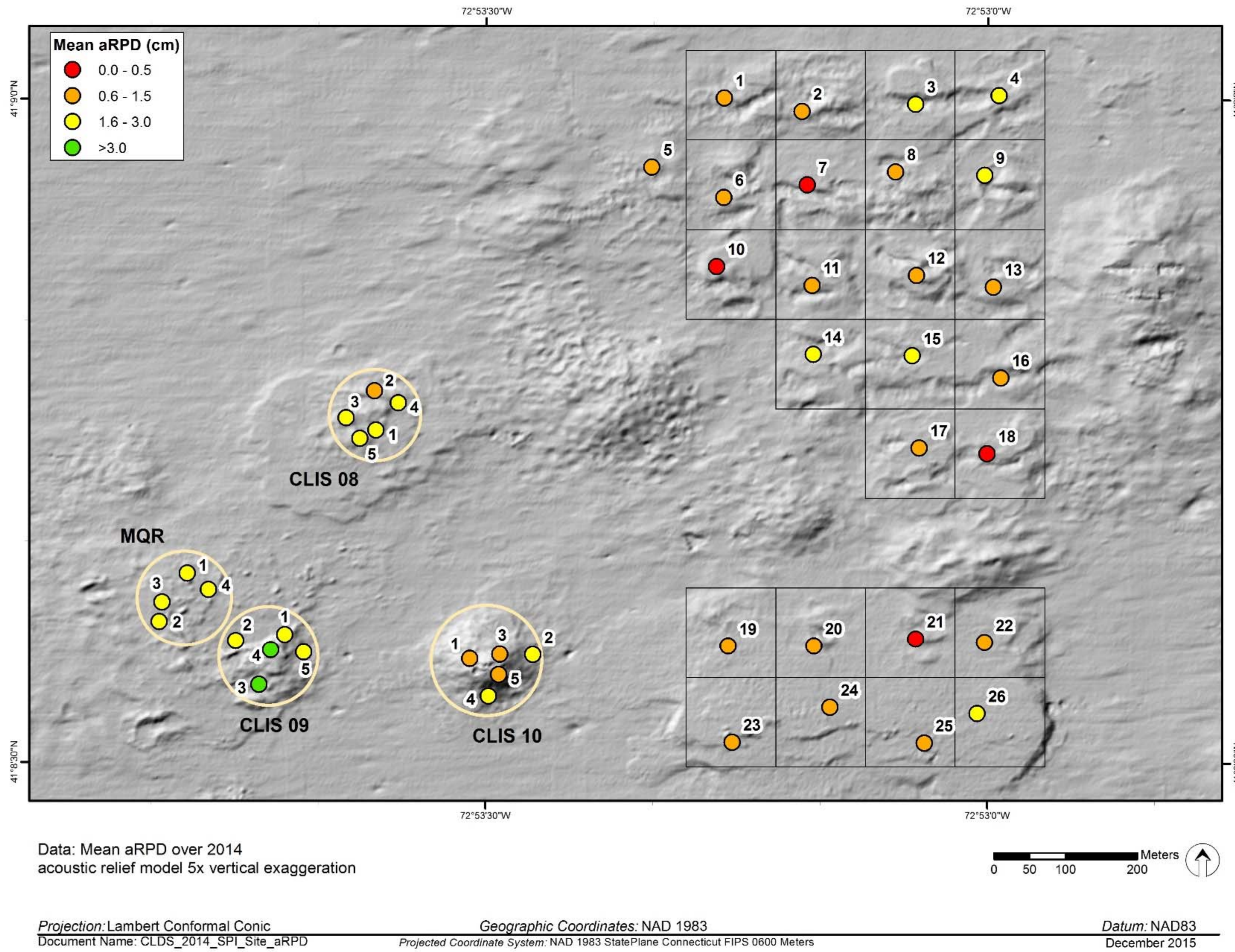
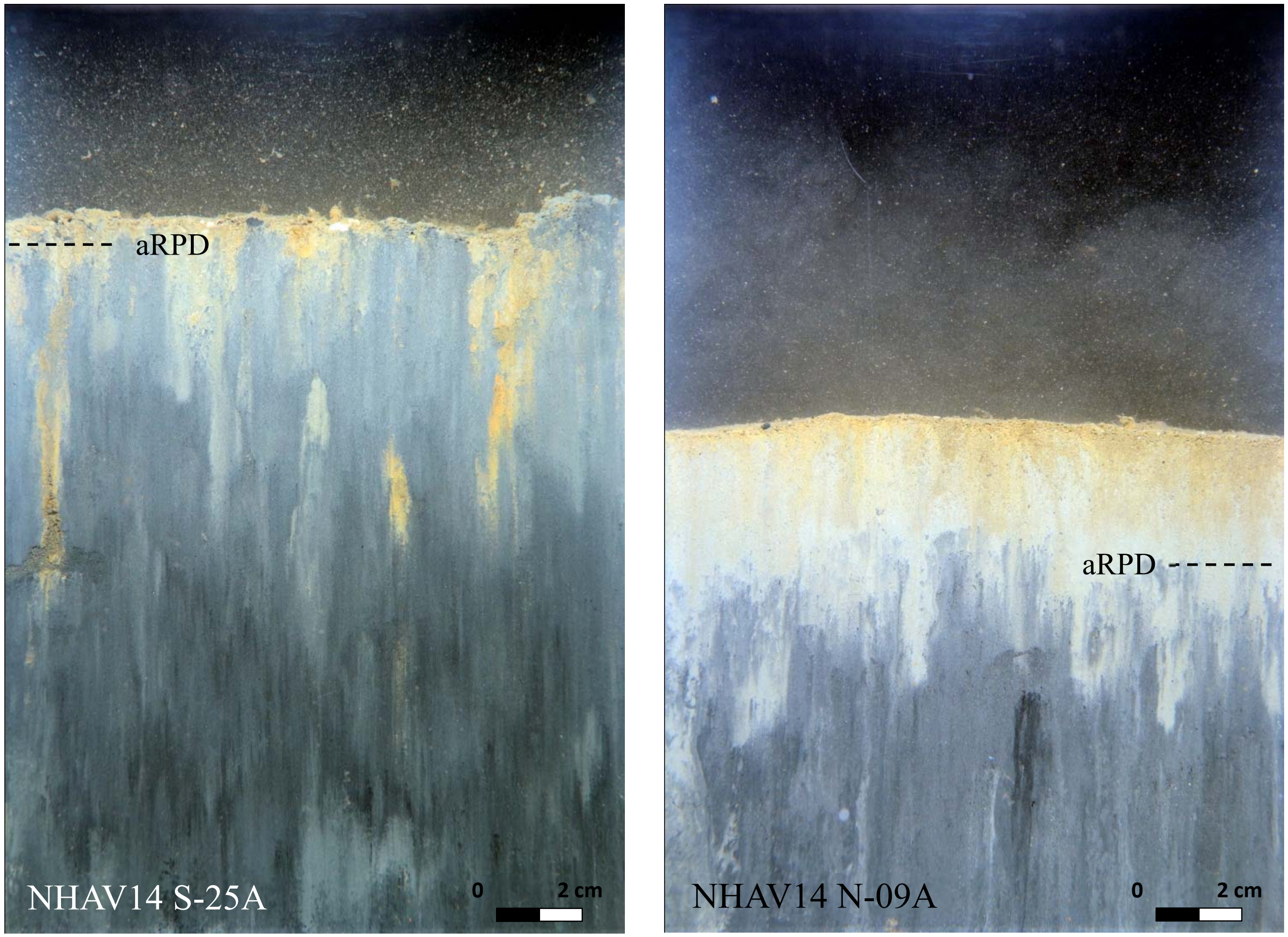


Figure 3-30. Mean station depth of the apparent RPD (cm) at CLDS



(A) **(B)**

Figure 3-31. Profile images representing (A) the minimum and (B) the maximum depth ranges of the aRPD at the CLDS disposal areas. Dashed horizontal line indicates approximate location of the aRPD on each image.

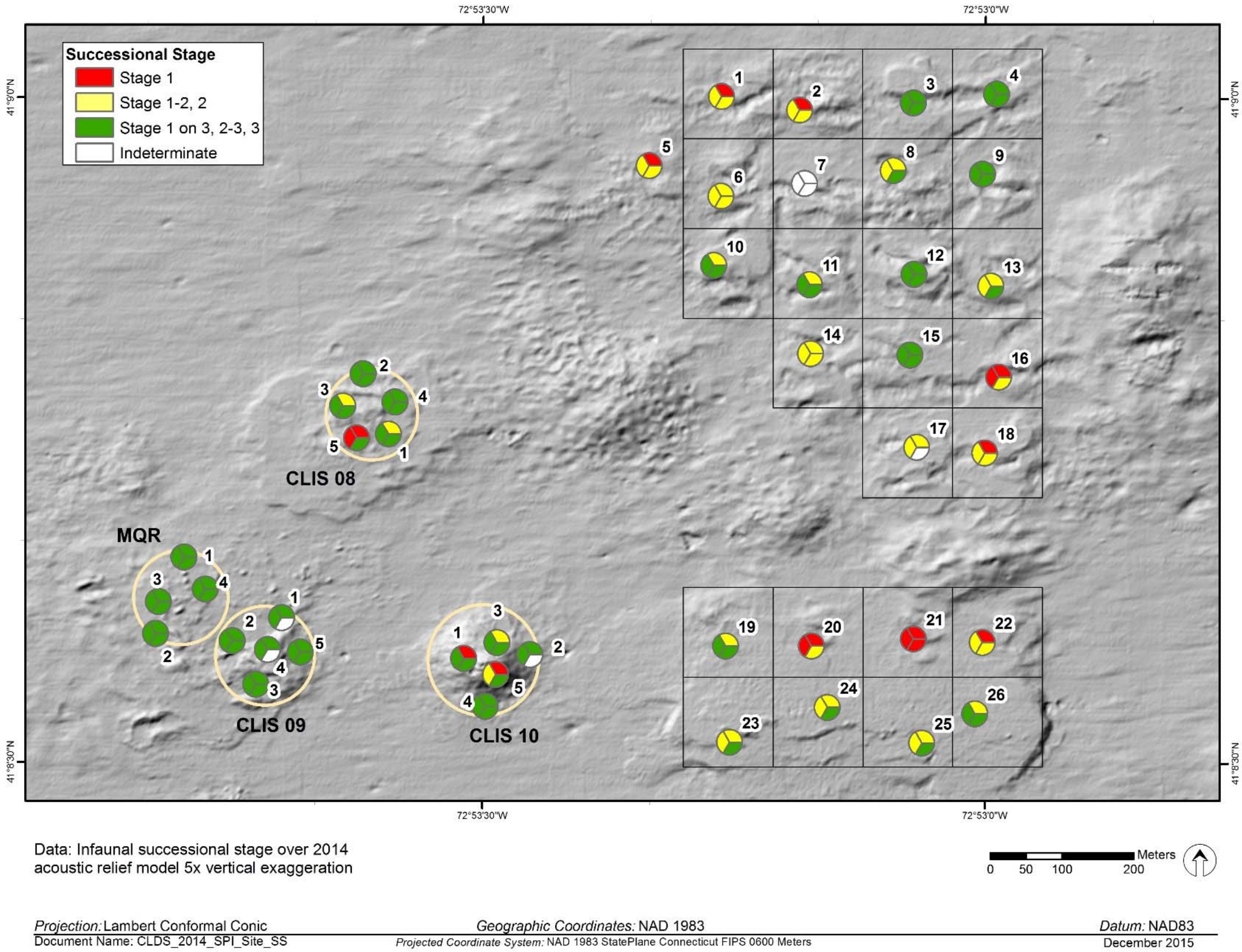
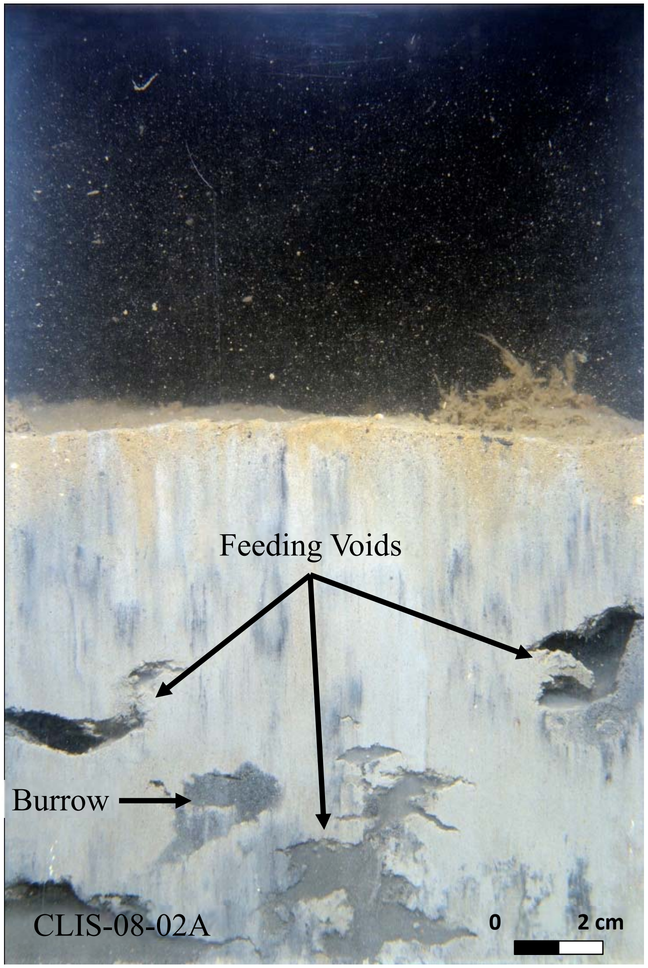
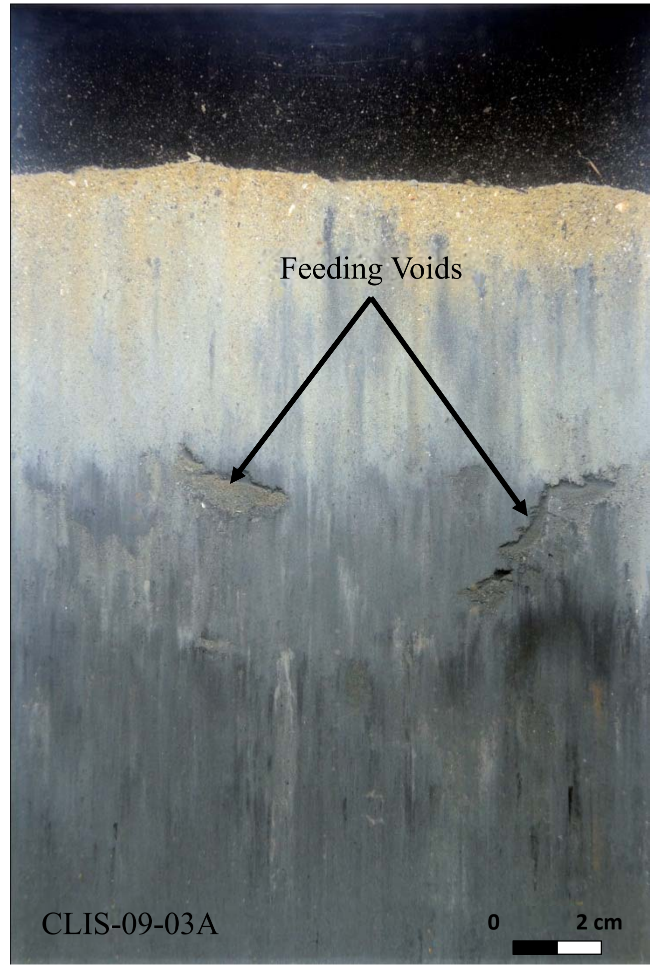


Figure 3-32. Infaunal successional stages found at stations sampled at CLDS



(A)



(B)

Figure 3-33. Representative profile images illustrating extensive Stage 3 activity observed at the disposal area stations: (A) large subsurface feeding voids and indications of a large subsurface burrow at Station CLIS-08-02; (B) large subsurface feeding voids at station CLIS-09-03.

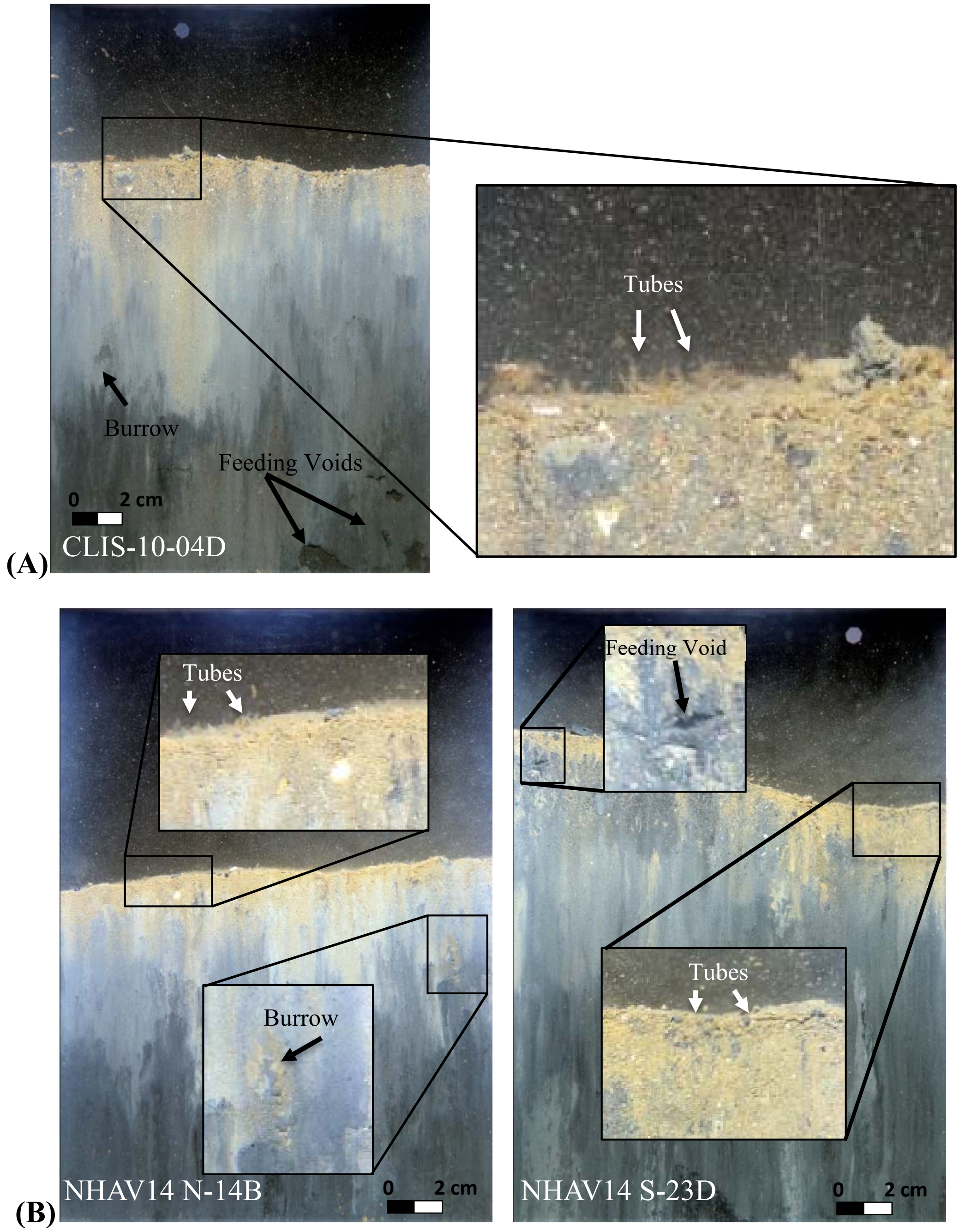


Figure 3-34. (A) Profile image from CLIS-10 depicting the presence of Stage 1 activity represented by surface tubes (enlarged image, right), over Stage 3 activity as indicated by the medium-large subsurface burrow and medium-large feeding voids in the main image (left). (B) Profile images depicting intermediate benthic succession at the NHAV14-N and -S mounds: Stage 1 on 2 at Station NHAV14-N-14 represented by surface tubes over burrowing near the sediment-water interface (left), and at station NHAV14-S-23 represented by surface tubes over feeding voids near the sediment-water interface (right).

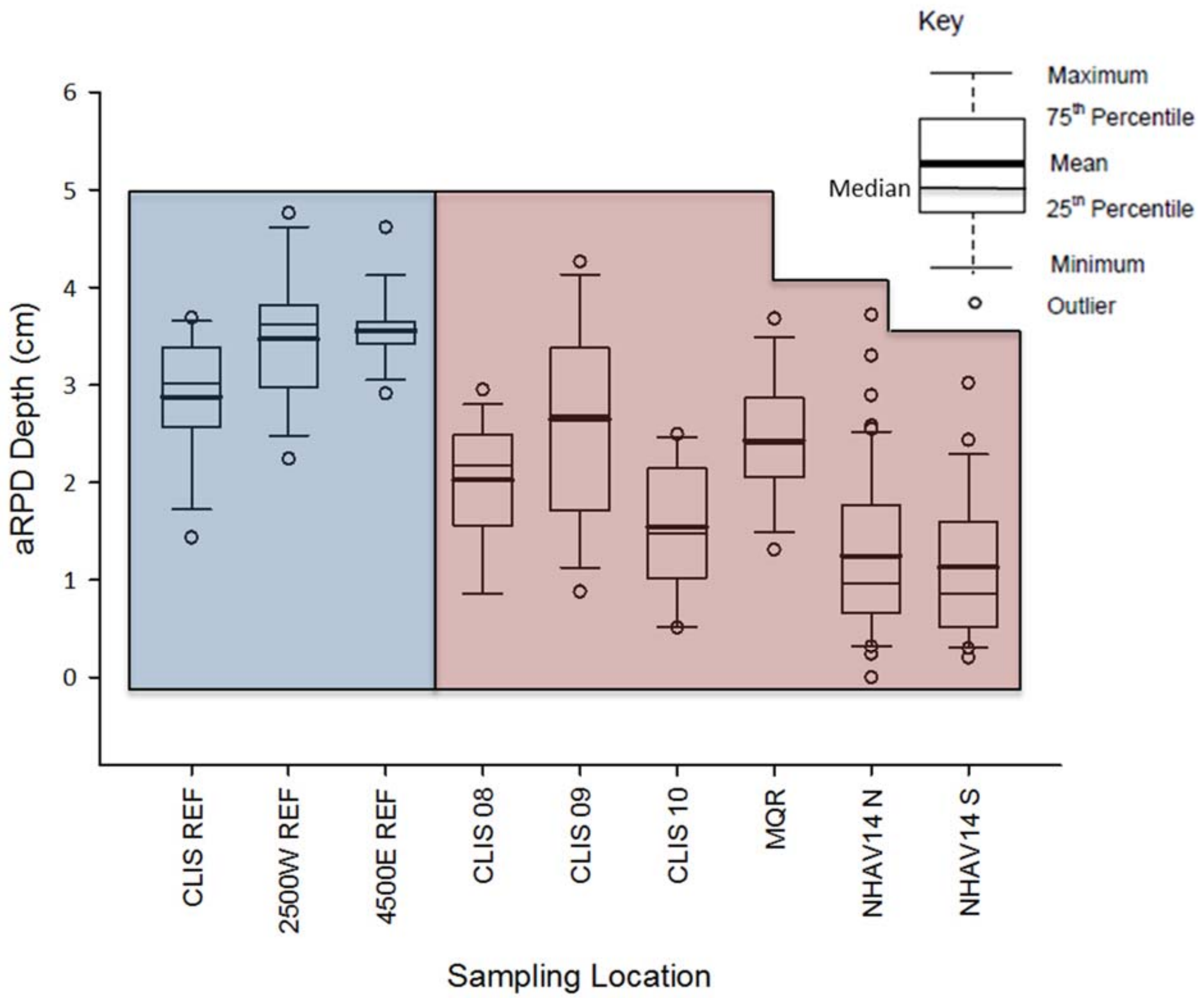


Figure 3-35. Distribution of station aRPD values for the reference areas (blue shade) and disposal mounds (red shade). Note the larger mean and median aRPD values for the reference areas compared to the disposal stations.

4.0 DISCUSSION

The combined 2013 and 2014 surveys at the Central Long Island Sound Disposal Site (CLDS) had multiple objectives. The bathymetric surveys conducted during the 2013-14 dredging season were designed to aid in management of material placement from the large New Haven Harbor and Norwalk Harbor projects and multiple smaller projects. The comprehensive survey conducted in late summer 2014 was designed as a periodic assessment of the overall site and as background for revision of the USEPA's Site Management and Monitoring Plan (SMMP) for CLDS.

4.1 Management of Placement at the 2013-14 New Haven Grid Area

Nearly one million cubic meters of dredged material was placed at CLDS during the 2013-14 dredging season originating from 23 individual projects. The large number of projects and compacted dredging season required for Long Island Sound resulted in work being performed concurrently by multiple dredging contractors. This work schedule and material volume coupled with State of Connecticut requirements to sequence some of the projects, resulted in the need to actively manage placement at the site to provide even distribution of placed material.

In the early years of disposal site operations, this project schedule would have involved one or more moored target buoys that would be relocated over the course of the season based on interim bathymetric surveys. Dredging contractors focused on getting close to the target buoy, but not so close as to risk entanglement with the mooring line. This resulted in a potentially greater spread of material around the target location during a given season.

The advancements in electronic positioning coupled with the Corps' Dredging Quality Management System (DQM) for logging the track of each scow and its release point allowed for implementation of a grid of target locations for managing placement of the dredged material. The 125 m grid cells were only slightly larger than the scows themselves, resulting in good distribution of the dredged material (Figure 1-3) with no issues related to the concurrent projects and multiple dredge contractors. Only a limited number of the scow placements fell outside the target cell boundaries, typically within one cell length away (Figures 4-1 and 4-2).

4.2 Long-Term Stability of Material Placed at CLDS

The area within and surrounding the current CLDS boundary has documented placement of dredged material dating back more than 40 years. The complete mapping of seafloor topography afforded by multi-beam instrumentation provides a more accurate means for tracking the long-term stability of the multiple dredged material deposits on the seafloor at CLDS than the older single-beam technology that required interpolation between discrete survey lines. A multi-beam survey of the entire site was first completed in 2005, and this area was re-surveyed in August 2014. The 2014 survey identified 37 active and historical mounds within the boundaries of CLDS, with the tallest rising approximately 5 m above the seafloor (Figure 3-9). The majority of these mounds were already in place at the time of the 2005 survey allowing for assessment of stability by comparison with the 2014 survey. A depth difference of the two surveys clearly identified the accumulation of material from the placement activities as well as the expected consolidation of material placed just prior to the initial survey (Figure 3-10). The depth difference also clearly demonstrated the long term stability of the dredged material deposits on the seafloor. The majority of the defined mounds experienced the storm conditions of Hurricane Sandy in 2012 as well as a number of powerful nor'easters during the period between the surveys. Many of the mounds predate Hurricane Floyd (1999) and Hurricane Bob (1991), and several even predate Hurricane Gloria (1985). Through multiple surveys spanning nearly four decades, there has been no documented significant loss of material from the site or redistribution of material within the site, i.e., once formed, the dredged material mounds become stable features at this site.

4.3 Biological Recovery of the Benthic Community Following Placement

The 2014 assessment of biological conditions at CLDS included the recently active NHAV14-N and NHAV14-S areas, older mounds where placement had been completed for one to five years (CLIS-08, CLIS-09, and CLIS-10), and the much older MQR mound that has received material periodically dating back to the 1980's when unsuitable dredged material was allowed to be placed at the site followed by capping with suitable material. The recently active grid areas of the 2013-14 dredging season (surveyed less than six months following cessation of placement operations) displayed the expected initial variable levels of biological recovery with areas of successional Stages 1, 2, and 3 and less developed aRPD depths. The slightly older CLIS-10 mound displayed a community predominantly in transition between Stage 2 and Stage 3, but with variability of successional stages ranging from Stage 1 to Stage 1 on 3. This mound had a statistically lower aRPD compared to the reference areas, as expected for a site where placement operations had ceased approximately 18 months prior. The older CLIS-09 mound showed a well-developed infaunal community that was statistically equivalent to reference, but continued to have a reduced aRPD compared to the reference areas. Although there was a predominance of a healthy successional Stage 3 at CLIS-08, some variability still existed, and the aRPD was somewhat reduced as compared to the reference areas (Figure 4-3). Full recovery was apparent only at the MQR mound. The slow recovery at CLIS-08 and CLIS-10 should be monitored, with an option to place additional material at these locations consistent with management plans.

4.4 Management Considerations for CLDS

The comprehensive 2014 survey provided sufficient site-wide data for an overall assessment of the status of CLDS and the management approach for the site as described below.

- Reference Areas – The location, depth, and physical conditions of reference areas 2500W and 4500E are very similar to those of CLDS. While slightly deeper, CLIS-REF is still considered similar in habitat type to CLDS. All three reference areas displayed healthy, mature biological communities. Reference area 2500W had Stage 1 on 3 conditions apparent in at least one replicate for all stations, potentially indicative of a recent disturbance, but not sufficient to preclude Stage 3. All three areas are considered appropriate as reference for evaluation of conditions at CLDS. Inclusion of the reference areas in periodic multi-beam surveys could provide additional characterization data and insight into benthic disturbances (such as trawling) relevant to interpreting imaging and sampling data.

- Monitoring Approach – The combined use of multi-beam bathymetry and sediment-profile/plan view imaging has been an effective approach for initial screening level assessment of the physical and biological status of CLDS. For locations such as CLIS-08 and CLIS-10, where biological recovery has proceeded somewhat slower than expected, additional characterization should be performed following the approach laid out in Germano et al. (1994) or additional material should be directed to those locations.

- Status of Capped Mounds and Overall Site Conditions – Prior to 1973, dredged material had been placed in the vicinity of the present CLDS, but without specific information on the quality of the placed material. Between 1973 and 1993, nine mounds were formed at CLDS where unsuitable dredged material was sequestered beneath suitable dredged material through a process known as level bottom capping (SAIC 1995) (NHAV-74, STNH-N, STNH-S, NOR, MQR, CS-1, CS-2, CLIS-86, NHAV-93 in Figure 1-2). Additionally, a mound of unsuitable dredged material was formed in 1982-83 and was left uncapped as part of joint USEPA/USACE program to field-verify existing test methods for evaluating environmental impacts of aquatic placement of dredged material (Peddicord 1988) (FVP in Figure 1-2). In addition to comparison of sequential bathymetric surveys to assess stability of the material placed at CLDS, a number of surveys have focused on the status of individual mounds, collecting sediment cores to confirm the isolation of unsuitable dredged material within the capped mounds. Given the recent USEPA rulemaking on the long-term designation of CLDS, a comprehensive assessment of the sediment quality over the entire site would aid in planning future placement operations.

- General Management Approach – The established approach for disposal of dredged material at CLDS has been to focus placement at a specific target location for dredging seasons with low to moderate expected total annual volumes. This approach minimizes the area of the seafloor experiencing benthic impacts and builds up individual mounds which, when coalesced, can form a containment ring to limit the lateral spread of larger maintenance dredging projects such as the Norwalk and New Haven Harbors dredging projects in the 2013-14 dredging season. This approach also focuses post-placement monitoring to specific areas to track the expected biological recovery of the benthic system. Given the apparent success of this approach, no changes are proposed at the present time.

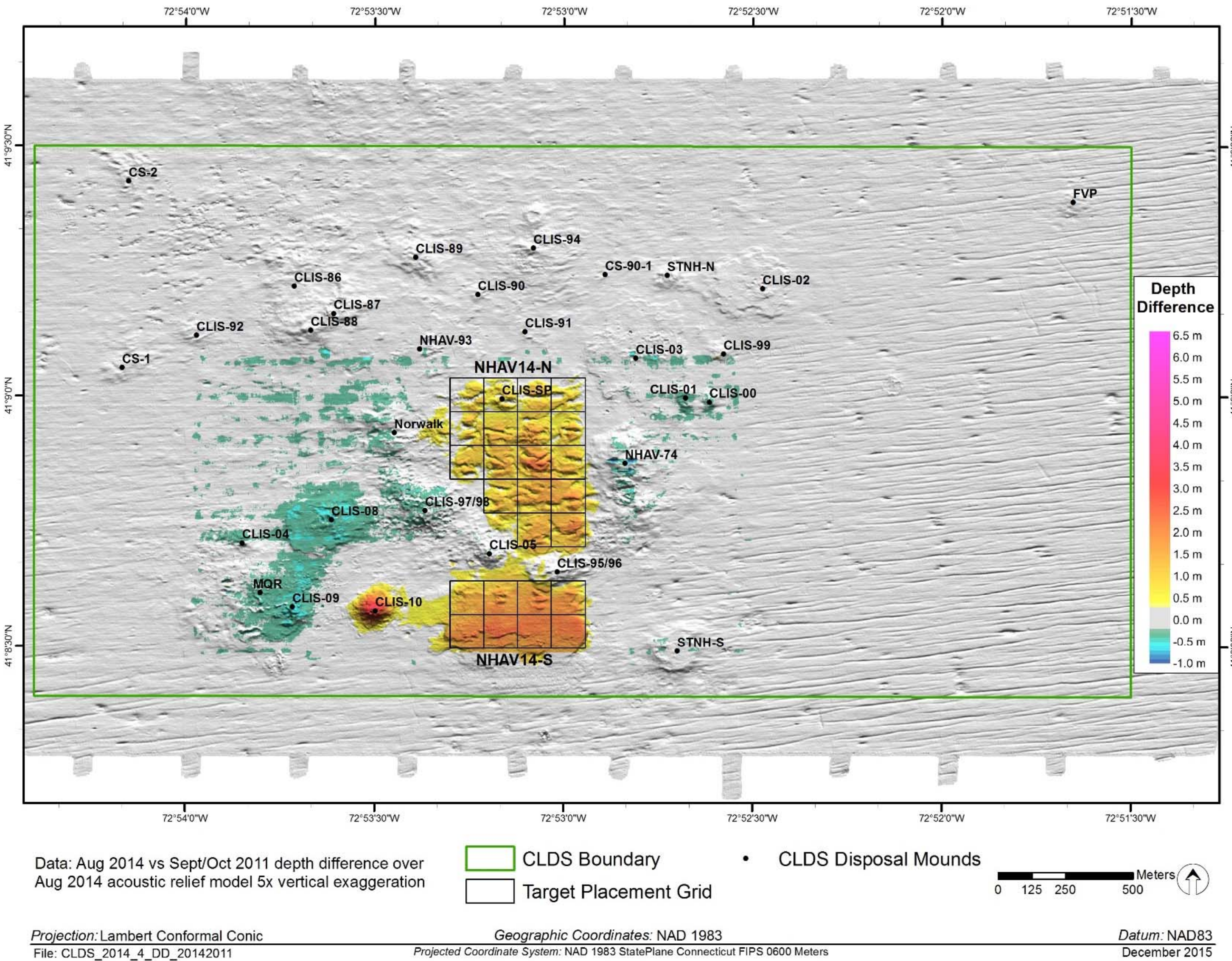


Figure 4-1. Depth difference between August 2014 and Sept/Oct 2011

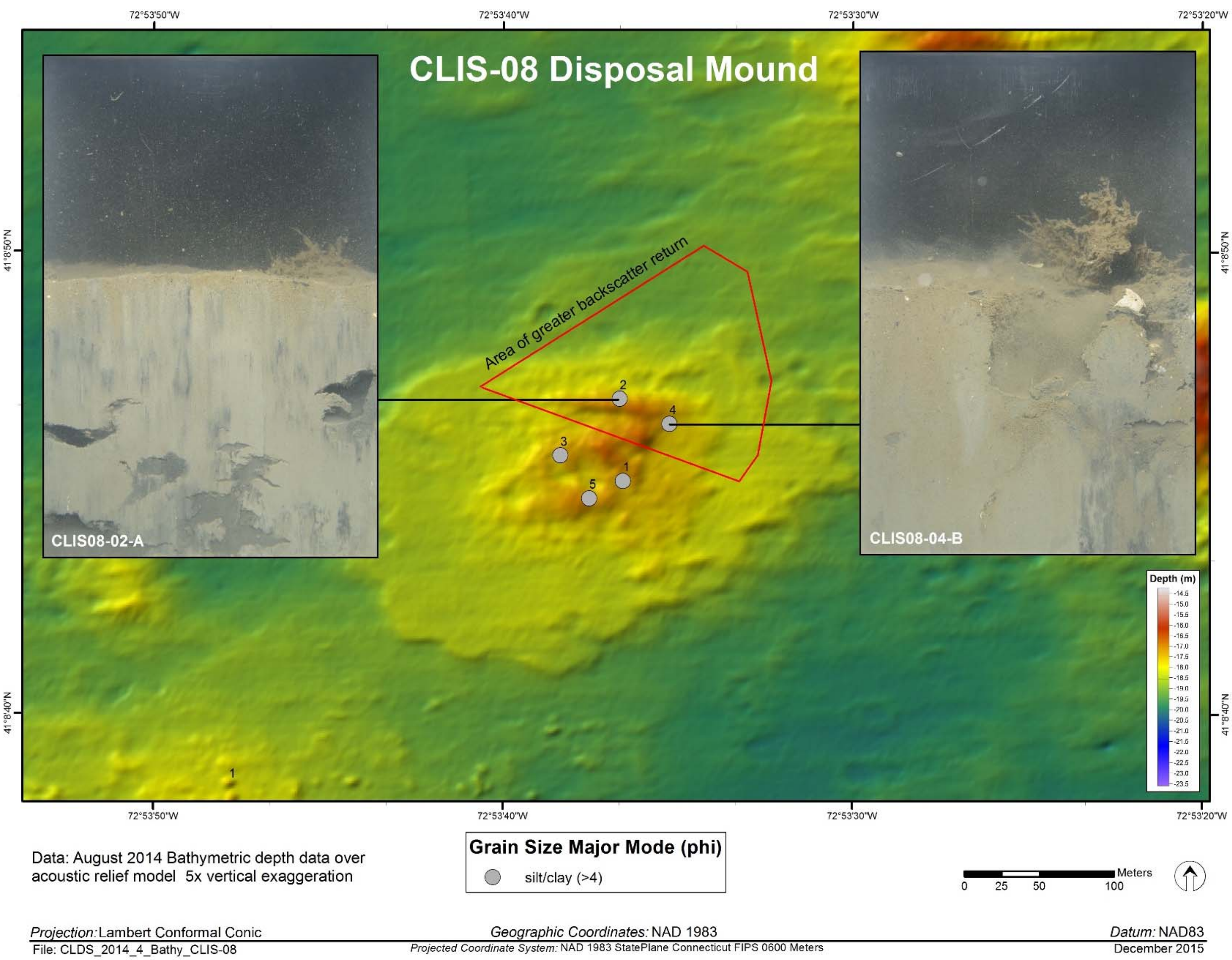


Figure 4-2. Close-up of bathymetry and SPI results at CLIS-08 mound

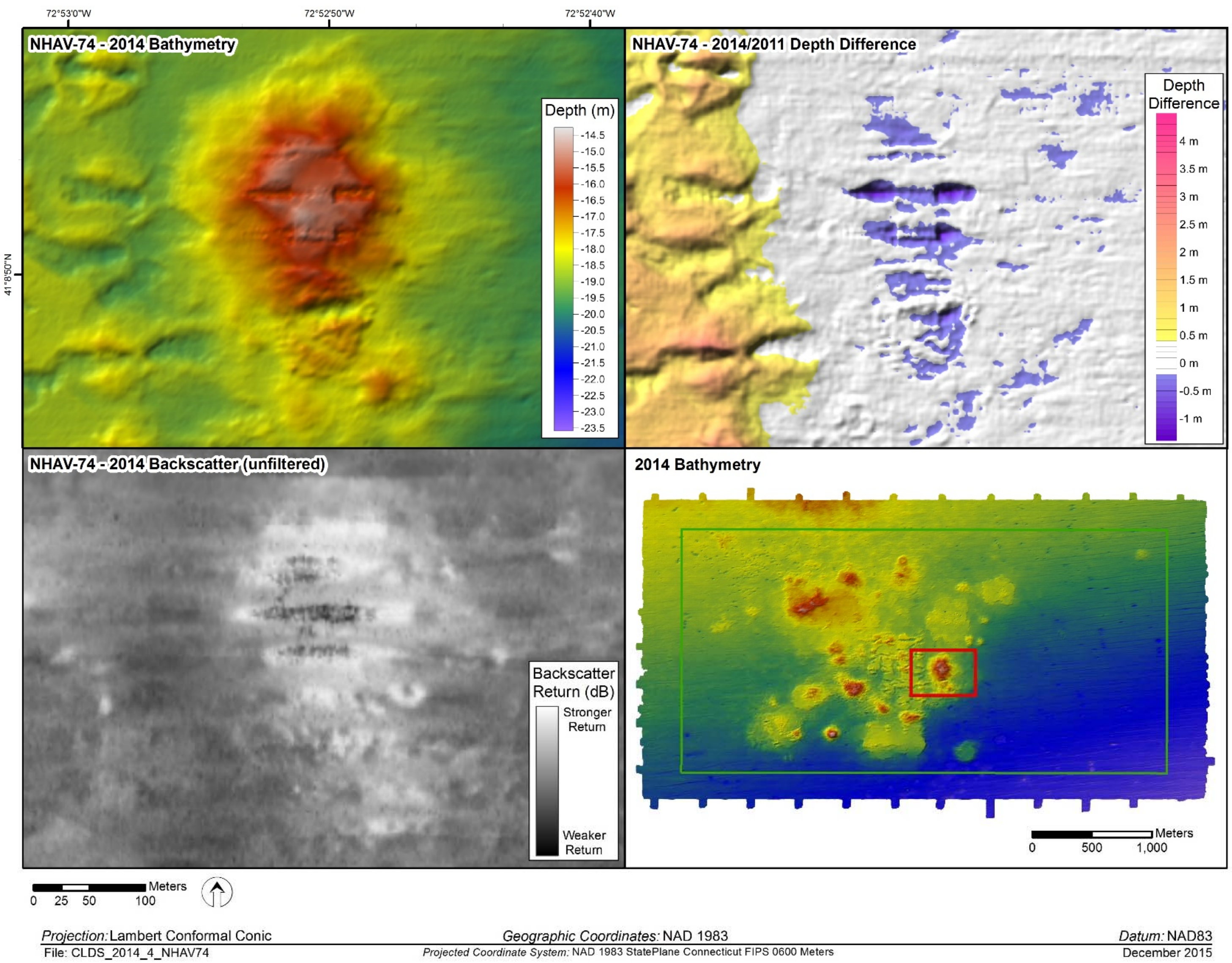


Figure 4-3. Close-up of bathymetry, backscatter, and depth difference at NHAV-74 mound

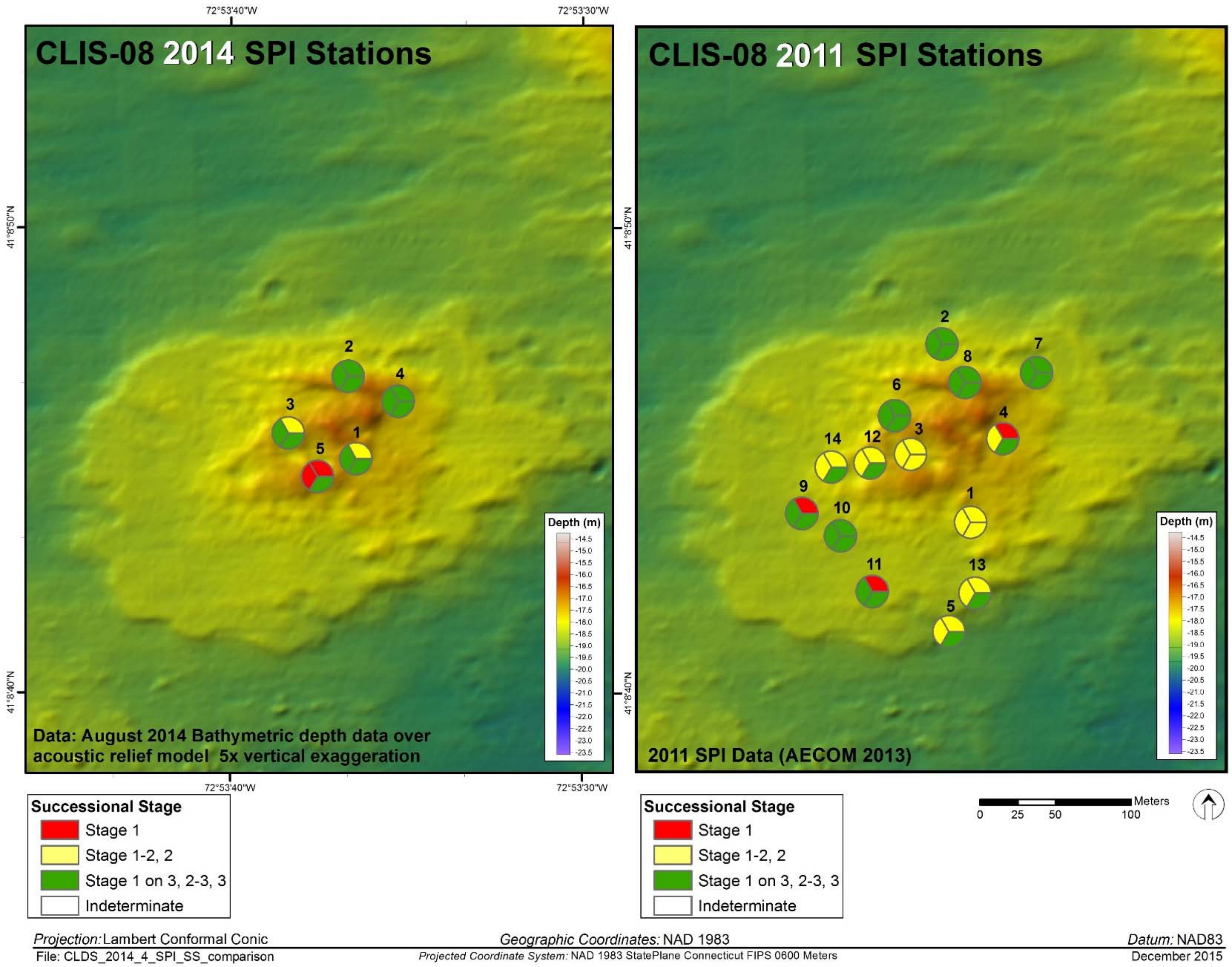


Figure 4-4. Close-up of successional stage from 2014 and 2011 at CLIS-08 mound

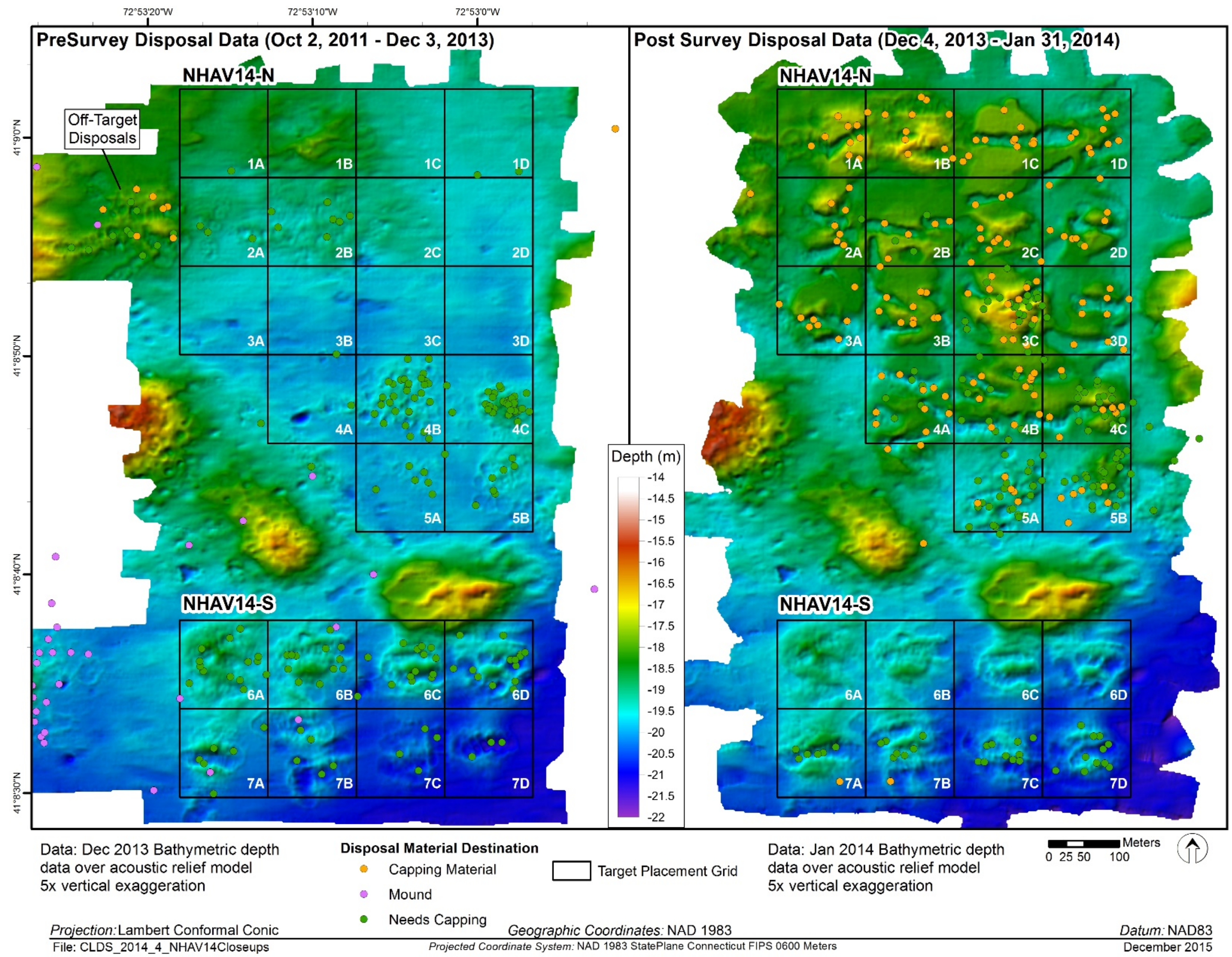


Figure 4-5. Pre-survey and post-survey disposal data at the target placement grids at NHAV14-N and NHAV14-S from October 2011 to January 2014

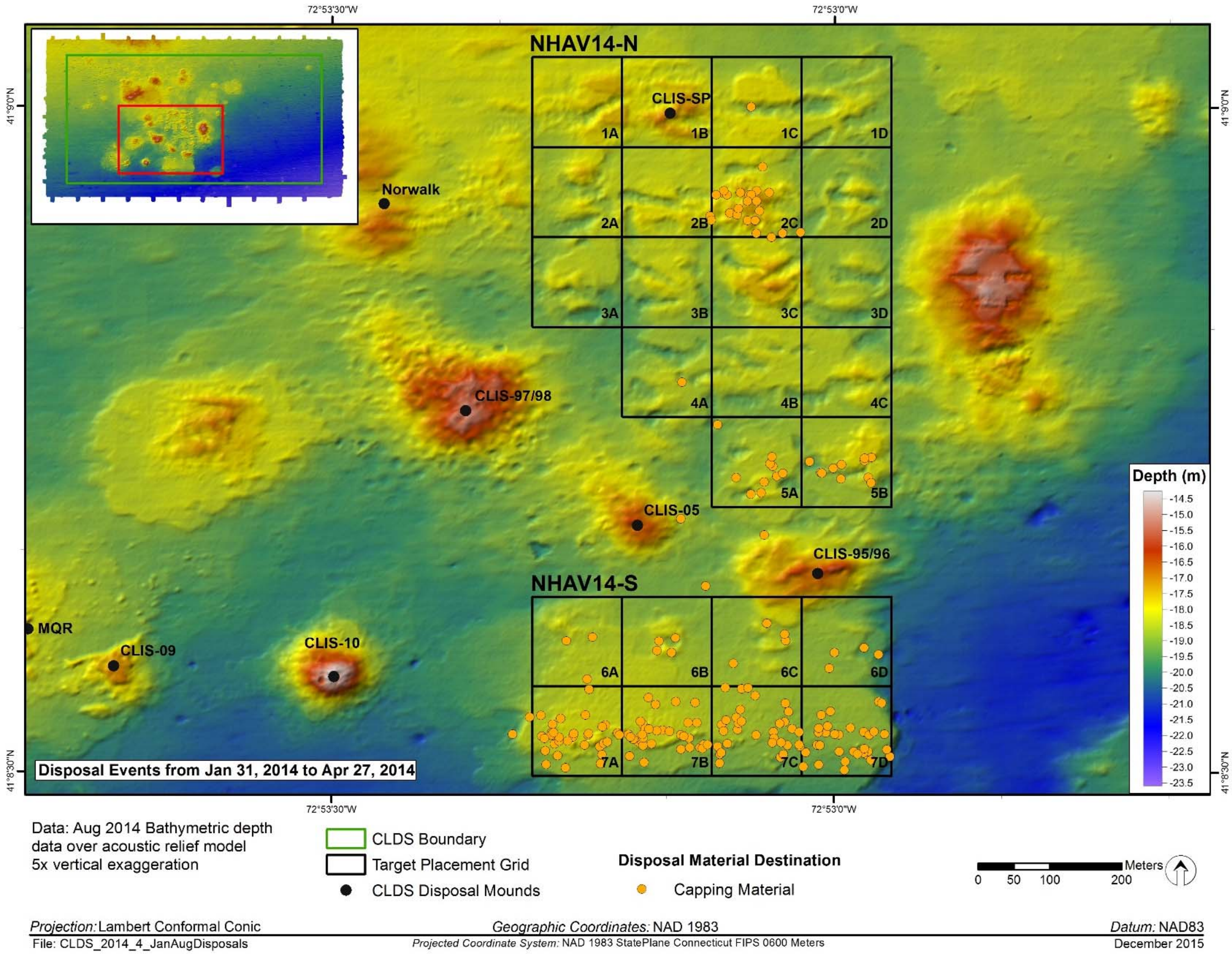


Figure 4-6. Placement of material at NHAV14-N and NHAV14-S from January 2014 to April 2014

5.0 CONCLUSIONS AND RECOMMENDATIONS

The 2013-14 surveys at CLDS were designed to provide a physical and biological assessment of the portions of the disposal area that received dredged material since the last survey in 2011. This was achieved through sequential multibeam bathymetric surveys, sediment-profile imaging surveys, and benthic grab sampling over recently used disposal mounds and the New Haven capping areas. In addition, an acoustic survey was performed over the entire site to assess the long-term stability of dredged material deposits at CLDS in support of the ten-year update of the SMMP. In summary:

- Placement of nearly one million cubic meters of dredged material during the very active 2013-14 dredging season with 23 separate projects was successfully coordinated for CLDS. Three separate multibeam bathymetric surveys tracked the placement during and after the dredging season and revealed even distribution of material in the targeted portion of the site.

- The full site multibeam bathymetric survey confirmed the long term stability of the dredged material deposits within CLDS.

- The imaging surveys and analysis of benthic grabs identified the recovery of the benthic community following the cessation of placement operations at multiple past placement target locations within CLDS.

- The collective results of the 2013-14 surveys as well as the long history of previous surveys for CLDS demonstrate the effectiveness of the targeted placement strategy in managing the site to maximize capacity and minimize environmental impacts.

The comprehensive 2013-14 surveys identified the following recommendations for monitoring and management of the site going forward:

- The reference areas should be surveyed using multibeam technology periodically to provide more context for interpretation of the imaging data and for a more robust comparison with CLDS.

- The somewhat slower recovery of the benthic community at CLIS-08 and CLIS-10 should be evaluated through sediment sampling and analysis.

- Given the long term history of usage of CLDS and the surrounding area for placement of dredged material (dating back well before the requirements for testing the suitability of dredged material for open water placement) and the recent full designation of CLDS by USEPA, a site-wide assessment of surficial sediment quality would aid in the long term management of the site.

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APPENDIX A

TABLE OF COMMON CONVERSIONS

APPENDIX A

TABLE OF COMMON CONVERSIONS

Metric Unit Conversion to English Unit		English Unit Conversion to Metric Unit	
1 meter 1 m	3.2808 ft	1 foot 1 ft	0.3048 m
1 square meter 1 m^2	10.7639 ft^2	1 square foot 1 ft^2	0.0929 m^2
1 kilometer 1 km	0.6214 mi	1 mile 1 mi	1.6093 km
1 cubic meter 1 m^3	1.3080 yd^3	1 cubic yard 1 yd^3	0.7646 m^3
1 centimeter 1 cm	0.3937 in	1 inch 1 in	2.54 cm

APPENDIX B

CLDS DISPOSAL LOG DATA FROM 2011 TO 2014

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	Admiral's Wharf	NAE2007214	CLDS	10/31/2011	-72.89043	41.14467	Mound	500	382
CLDS	Admiral's Wharf	NAE2007214	CLDS	11/3/2011	-72.99248	41.12280	Mound	500	382
CLDS	Admiral's Wharf	NAE2007214	CLDS	11/5/2011	-72.89137	41.14220	Mound	500	382
CLDS	Admiral's Wharf	NAE2007214	CLDS	11/6/2011	-72.89235	41.14275	Mound	500	382
CLDS	Admiral's Wharf	NAE2007214	CLDS	11/9/2011	-72.89173	41.14333	Mound	500	382
CLDS	Admiral's Wharf	NAE2007214	CLDS	11/13/2011	-72.89203	41.14367	Mound	500	382
CLDS	Admiral's Wharf	NAE2007214	CLDS	11/17/2011	-72.89067	41.14238	Mound	500	382
CLDS	Admiral's Wharf	NAE2007214	CLDS	11/19/2011	-72.89123	41.14243	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	10/25/2011	-72.89098	41.14339	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	10/27/2011	-72.89250	41.14312	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	10/27/2011	-72.78109	41.14280	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	10/28/2011	-72.89192	41.14319	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	11/2/2011	-72.89201	41.14316	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	11/3/2011	-72.89132	41.14253	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	11/6/2011	-72.89237	41.14296	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	11/8/2011	-72.89101	41.14287	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	11/14/2011	-72.89153	41.14270	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	11/15/2011	-72.89198	41.14268	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	11/16/2011	-72.89236	41.14279	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	11/18/2011	-72.89150	41.14326	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	11/22/2011	-72.89259	41.14302	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	11/26/2011	-72.89205	41.14269	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	11/27/2011	-72.89254	41.14321	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	11/28/2011	-72.89210	41.14277	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	11/29/2011	-72.89145	41.14314	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	12/1/2011	-72.89219	41.14302	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	12/2/2011	-72.89239	41.14276	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	12/5/2011	-72.89196	41.14287	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	12/6/2011	-72.89265	41.14308	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	12/12/2011	-72.89216	41.14529	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	12/14/2011	-72.89173	41.14358	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	12/17/2011	-72.89231	41.14287	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	12/18/2011	-72.89166	41.14278	Mound	500	382
CLDS	Breakwater Key Marina	NAE19991265	CLDS	12/21/2011	-72.89181	41.14323	Mound	500	382
CLDS	Brewers Dauntless	NAE2004313	CLDS	10/6/2011	-72.86689	41.14392	Mound	500	382
CLDS	Brewers Dauntless	NAE2004313	CLDS	10/8/2011	-72.89140	41.14346	Mound	500	382
CLDS	Brewers Dauntless	NAE2004313	CLDS	10/10/2011	-72.89213	41.14307	Mound	500	382
CLDS	Brewers Dauntless	NAE2004313	CLDS	10/11/2011	-72.89188	41.14350	Mound	500	382
CLDS	Brewers Dauntless	NAE2004313	CLDS	10/14/2011	-72.89321	41.14283	Mound	500	382
CLDS	Brewers Dauntless	NAE2004313	CLDS	10/18/2011	-72.89180	41.14341	Mound	500	382
CLDS	Brewers Dauntless	NAE2004313	CLDS	10/21/2011	-72.89244	41.14321	Mound	500	382
CLDS	Brewers Dauntless	NAE2004313	CLDS	10/22/2011	-72.89151	41.14339	Mound	500	382
CLDS	Brewers Dauntless	NAE2004313	CLDS	10/25/2011	-72.89239	41.14253	Mound	500	382
CLDS	Brewers Dauntless	NAE2004313	CLDS	10/26/2011	-72.89246	41.14380	Mound	500	382
CLDS	Essex Boat Works	NAE20063889	CLDS	10/18/2011	-72.89144	41.14282	Mound	500	382
CLDS	Essex Boat Works	NAE20063889	CLDS	11/21/2011	-72.88782	41.14193	Mound	500	382
CLDS	Essex Boat Works	NAE20063889	CLDS	11/27/2011	-72.88507	41.14445	Mound	500	382
CLDS	Essex Boat Works	NAE20063889	CLDS	11/28/2011	-72.89352	41.14377	Mound	500	382
CLDS	Essex Boat Works	NAE20063889	CLDS	11/29/2011	-72.89282	41.14238	Mound	500	382

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	Essex Boat Works	NAE20063889	CLDS	12/2/2011	-72.89132	41.14263	Mound	500	382
CLDS	Essex Boat Works	NAE20063889	CLDS	12/4/2011	-72.78463	41.18682	Mound	500	382
CLDS	Gatewary Terminal	NAE20071916	CLDS	5/16/2012	-72.89174	41.14322	Mound	500	382
CLDS	Gatewary Terminal	NAE20071916	CLDS	5/16/2012	-72.89049	41.14408	Mound	500	382
CLDS	Gatewary Terminal	NAE20071916	CLDS	5/16/2012	-72.89350	41.14365	Mound	500	382
CLDS	Gatewary Terminal	NAE20071916	CLDS	5/17/2012	-72.89381	41.14473	Mound	500	382
CLDS	Gatewary Terminal	NAE20071916	CLDS	5/17/2012	-72.89202	41.14344	Mound	500	382
CLDS	Gatewary Terminal	NAE20071916	CLDS	5/17/2012	-72.89188	41.14262	Mound	500	382
CLDS	Gatewary Terminal	NAE20071916	CLDS	5/18/2012	-72.89351	41.14613	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	12/7/2011	-72.89219	41.14313	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	12/9/2011	-72.89151	41.14311	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	12/11/2011	-72.89200	41.14311	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	12/12/2011	-72.89196	41.14289	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	12/18/2011	-72.89086	41.14344	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	12/19/2011	-72.89158	41.14302	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	12/21/2011	-72.89171	41.14287	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	12/21/2011	-72.89172	41.14310	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	12/23/2011	-72.89223	41.14270	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	12/24/2011	-72.89777	41.14299	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	12/30/2011	-72.89180	41.14314	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	12/31/2011	-72.89171	41.14294	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	12/31/2011	-72.89183	41.14295	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	1/8/2012	-72.89169	41.14286	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	1/8/2012	-72.89183	41.14297	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	1/9/2012	-72.89217	41.14322	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	1/9/2012	-72.89167	41.14278	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	1/11/2012	-72.89195	41.14292	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	1/11/2012	-72.89164	41.14295	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	1/16/2012	-72.89181	41.14294	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	1/19/2012	-72.89156	41.14299	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	1/21/2012	-72.89167	41.14286	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	1/23/2012	-72.89327	41.14267	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	1/24/2012	-72.89186	41.14299	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	1/25/2012	-72.89166	41.14272	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	1/26/2012	-72.89205	41.14315	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	1/26/2012	-72.89205	41.14283	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	1/26/2012	-72.89165	41.14294	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	1/28/2012	-72.89203	41.14280	Mound	500	382
CLDS	Guilford Town Marina	NAE20102089	CLDS	1/31/2012	-72.89160	41.14349	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/4/2011	-72.89133	41.14293	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/4/2011	-72.89217	41.14292	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/5/2011	-72.89062	41.14230	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/6/2011	-72.89147	41.14305	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/7/2011	-72.89120	41.14293	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/7/2011	-72.89075	41.14270	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/9/2011	-72.88610	41.14570	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/10/2011	-72.89093	41.14263	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/10/2011	-72.89088	41.14230	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/13/2011	-72.89150	41.14280	Mound	500	382

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/14/2011	-72.89123	41.14287	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/19/2011	-72.89203	41.14370	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/20/2011	-72.88877	41.14170	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/21/2011	-72.89103	41.14273	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/21/2011	-72.89167	41.14335	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/22/2011	-72.88727	41.14513	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/23/2011	-72.89110	41.14302	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/30/2011	-72.88633	41.14260	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	12/31/2011	-72.89210	41.14285	Mound	500	382
CLDS	Guilford Yacht Club	NAE20071989	CLDS	1/1/2012	-72.89127	41.14263	Mound	500	382
CLDS	Housatonic River	NAE20072129	CLDS	2/2/2012	-72.89147	41.14352	Mound	500	382
CLDS	Housatonic River	NAE20072129	CLDS	2/2/2012	-72.89111	41.14284	Mound	500	382
CLDS	Housatonic River	NAE20072129	CLDS	2/3/2012	-72.89149	41.14192	Mound	500	382
CLDS	Housatonic River	NAE20072129	CLDS	2/4/2012	-72.89169	41.14266	Mound	500	382
CLDS	Housatonic River	NAE20072129	CLDS	2/4/2012	-72.89234	41.14312	Mound	500	382
CLDS	Housatonic River	NAE20072129	CLDS	2/7/2012	-72.89197	41.14274	Mound	500	382
CLDS	Housatonic River	NAE20072129	CLDS	2/8/2012	-72.89254	41.14266	Mound	500	382
CLDS	Housatonic River	NAE20072129	CLDS	2/9/2012	-72.89285	41.14235	Mound	500	382
CLDS	Housatonic River	NAE20072129	CLDS	2/11/2012	-72.89074	41.14332	Mound	500	382
CLDS	Housatonic River	NAE20072129	CLDS	2/14/2012	-72.89193	41.14275	Mound	500	382
CLDS	Housatonic River	NAE20072129	CLDS	2/14/2012	-72.89205	41.14311	Mound	500	382
CLDS	Housatonic River	NAE20072129	CLDS	2/16/2012	-72.89148	41.14256	Mound	500	382
CLDS	Middle Cove Marina	NAE20062468	CLDS	10/20/2011	-72.89308	41.14335	Mound	500	382
CLDS	Middle Cove Marina	NAE20062468	CLDS	10/23/2011	-72.86775	41.15132	Mound	500	382
CLDS	Middle Cove Marina	NAE20062468	CLDS	10/24/2011	-72.89037	41.14305	Mound	500	382
CLDS	Middle Cove Marina	NAE20062468	CLDS	10/25/2011	-72.89220	41.14408	Mound	500	382
CLDS	Middle Cove Marina	NAE20062468	CLDS	10/26/2011	-72.89155	41.14278	Mound	500	382
CLDS	Middle Cove Marina	NAE20062468	CLDS	10/27/2011	-72.89133	41.14263	Mound	500	382
CLDS	Middle Cove Marina	NAE20062468	CLDS	11/2/2011	-72.89223	41.14305	Mound	500	382
CLDS	Middle Cove Marina	NAE20062468	CLDS	11/3/2011	-72.89432	41.14272	Mound	500	382
CLDS	Middle Cove Marina	NAE20062468	CLDS	11/4/2011	-72.89215	41.14272	Mound	500	382
CLDS	Middle Cove Marina	NAE20062468	CLDS	11/6/2011	-72.89182	41.14303	Mound	500	382
CLDS	Middle Cove Marina	NAE20062468	CLDS	11/7/2011	-72.89303	41.14340	Mound	500	382
CLDS	Middle Cove Marina	NAE20062468	CLDS	11/8/2011	-72.89200	41.14307	Mound	500	382
CLDS	Middle Cove Marina	NAE20062468	CLDS	11/10/2011	-72.89370	41.14325	Mound	500	382
CLDS	Middle Cove Marina	NAE20062468	CLDS	11/11/2011	-72.89235	41.14232	Mound	500	382
CLDS	Middle Cove Marina	NAE20062468	CLDS	11/13/2011	-72.89245	41.14360	Mound	500	382
CLDS	Middle Cove Marina	NAE20062468	CLDS	11/15/2011	-72.89158	41.14310	Mound	500	382
CLDS	Middle Cove Marina	NAE20062468	CLDS	11/16/2011	-72.89222	41.14295	Mound	500	382
CLDS	Motiva Terminal	NAE2009287	CLDS	2/3/2012	-72.89055	41.14362	Mound	500	382
CLDS	Motiva Terminal	NAE2009287	CLDS	2/3/2012	-72.89058	41.14282	Mound	500	382
CLDS	Motiva Terminal	NAE2009287	CLDS	2/7/2012	-72.89163	41.14252	Mound	500	382
CLDS	Noank Village Boat Club	NAE20082563	CLDS	1/8/2012	-72.89126	41.14172	Mound	500	382
CLDS	Noank Village Boat Club	NAE20082563	CLDS	1/11/2012	-72.88988	41.14343	Mound	500	382
CLDS	Noank Village Boat Club	NAE20082563	CLDS	1/22/2012	-72.89061	41.14244	Mound	500	382
CLDS	Robert Staab	NAE20072714	CLDS	10/29/2011	-72.89232	41.14325	Mound	500	382
CLDS	Robert Staab	NAE20072714	CLDS	11/1/2011	-72.88135	41.14427	Mound	500	382
CLDS	Robert Staab	NAE20072714	CLDS	11/2/2011	-72.89226	41.14310	Mound	500	382
CLDS	Stony Point Association	NAE201058	CLDS	1/5/2012	-72.89078	41.14257	Mound	500	382

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	Town of Essex	NAE20051674	CLDS	10/2/2011	-72.88833	41.14287	Mound	500	382
CLDS	Town of Essex	NAE20051674	CLDS	10/6/2011	-72.89040	41.14377	Mound	500	382
CLDS	Town of Essex	NAE20051674	CLDS	10/8/2011	-72.89205	41.14290	Mound	500	382
CLDS	Town of Essex	NAE20051674	CLDS	10/9/2011	-72.89099	41.14250	Mound	500	382
CLDS	Town of Essex	NAE20051674	CLDS	10/10/2011	-72.89193	41.14275	Mound	500	382
CLDS	Town of Essex	NAE20051674	CLDS	10/11/2011	-72.89152	41.14272	Mound	500	382
CLDS	Town of Essex	NAE20051674	CLDS	10/12/2011	-72.89087	41.14290	Mound	500	382
CLDS	Town of Essex	NAE20051674	CLDS	10/13/2011	-72.89508	41.14460	Mound	500	382
CLDS	Town of Essex	NAE20051674	CLDS	10/14/2011	-72.89253	41.14418	Mound	500	382
CLDS	Sybil's Creek/Branford River	200201979	CLDS	1/5/2012	-72.89145	41.14296	Mound	500	382
CLDS	Sybil's Creek/Branford River	200201979	CLDS	1/6/2012	-72.89070	41.14345	Mound	500	382
CLDS	Sybil's Creek/Branford River	200201979	CLDS	1/7/2012	-72.89186	41.14321	Mound	500	382
CLDS	Sybil's Creek/Branford River	200201979	CLDS	2/1/2012	-72.89179	41.14329	Mound	500	382
CLDS	Sybil's Creek/Branford River	200201979	CLDS	2/1/2012	-72.89169	41.14313	Mound	500	382
CLDS	Sybil's Creek/Branford River	200201979	CLDS	2/2/2012	-72.89148	41.14269	Mound	500	382
CLDS	Sybil's Creek/Branford River	200201979	CLDS	2/2/2012	-72.89203	41.14327	Mound	500	382
CLDS	Sybil's Creek/Branford River	200201979	CLDS	2/3/2012	-72.89153	41.14298	Mound	500	382
CLDS	Sybil's Creek/Branford River	200201979	CLDS	2/3/2012	-72.89142	41.14326	Mound	500	382
CLDS	Sybil's Creek/Branford River	200201979	CLDS	2/4/2012	-72.89162	41.14306	Mound	500	382
CLDS	Sybil's Creek/Branford River	200201979	CLDS	2/5/2012	-72.89147	41.14281	Mound	500	382
CLDS	Sybil's Creek/Branford River	200201979	CLDS	2/6/2012	-72.88973	41.14889	Mound	500	382
CLDS	Sybil's Creek/Branford River	200201979	CLDS	2/9/2012	-72.89189	41.14285	Mound	500	382
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	1/15/2013	-72.35754	41.21167	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	1/16/2013	-72.35814	41.21156	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	1/17/2013	-72.35819	41.21067	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	1/17/2013	-72.35808	41.21144	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	1/21/2013	-72.35784	41.21075	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	1/21/2013	-72.35776	41.21149	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	1/23/2013	-72.35748	41.21133	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	1/26/2013	-72.35817	41.21147	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	1/26/2013	-72.35775	41.21140	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	1/28/2013	-72.35760	41.21155	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	1/28/2013	-72.35717	41.21151	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	1/29/2013	-72.35794	41.21158	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	1/30/2013	-72.35839	41.21161	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	2/3/2013	-72.35799	41.21155	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	2/3/2013	-72.35735	41.21122	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	2/5/2013	-72.35833	41.21164	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	2/5/2013	-72.35833	41.21151	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	2/7/2013	-72.35785	41.21158	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	2/7/2013	-72.35853	41.21156	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	2/11/2013	-72.35797	41.21147	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	2/13/2013	-72.35761	41.21161	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	2/14/2013	-72.35782	41.21104	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	2/15/2013	-72.35758	41.21160	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	2/16/2013	-72.35778	41.21146	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	2/19/2013	-72.35778	41.21142	Mound	391	299
CLDS	Brewers Pilots Point Marina - 2012	NAE-2001-2437	CLDS-12	2/22/2013	-72.35834	41.21164	Mound	391	299
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	1/26/2013	-72.89099	41.14280	Mound	610	466

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	1/29/2013	-72.89081	41.14288	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	1/30/2013	-72.89130	41.14267	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	2/2/2013	-72.89076	41.14963	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	2/5/2013	-72.89099	41.14333	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	2/6/2013	-72.89113	41.14291	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	2/7/2013	-72.89113	41.14275	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	2/13/2013	-72.89113	41.14300	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	2/14/2013	-72.89134	41.14300	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	2/15/2013	-72.89199	41.14293	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	2/23/2013	-72.89118	41.14286	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	2/25/2013	-72.89189	41.14285	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	2/26/2013	-72.89123	41.14334	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	2/28/2013	-72.89092	41.14329	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	3/1/2013	-72.89145	41.14289	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	3/2/2013	-72.89106	41.14191	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	3/5/2013	-72.89122	41.14258	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	3/9/2013	-72.89177	41.14240	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	3/10/2013	-72.89243	41.14362	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	3/11/2013	-72.89130	41.14223	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	3/13/2013	-72.89181	41.14289	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	3/16/2013	-72.89151	41.14314	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	3/18/2013	-72.89162	41.14257	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	3/21/2013	-72.89131	41.14327	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	3/25/2013	-72.89132	41.14277	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	3/26/2013	-72.89179	41.14333	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	3/27/2013	-72.89128	41.14300	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	3/29/2013	-72.89146	41.14292	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	4/4/2013	-72.89195	41.14291	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	4/6/2013	-72.89149	41.14281	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	4/8/2013	-72.89170	41.14241	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	4/9/2013	-72.89122	41.14269	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	4/10/2013	-72.89095	41.14271	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	4/13/2013	-72.89175	41.14243	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	4/15/2013	-72.89256	41.14263	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	4/27/2013	-72.89130	41.14260	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	4/28/2013	-72.89170	41.14243	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	4/29/2013	-72.89186	41.14235	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	4/30/2013	-72.89153	41.14252	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	5/1/2013	-72.89221	41.14279	Mound	610	466
CLDS	Clinton Yacht Haven - 2012	NAE-2008-2993	CLDS-12	5/16/2013	-72.89157	41.14246	Mound	610	466
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	1/14/2013	-72.89203	41.14242	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	1/14/2013	-72.89182	41.14288	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	1/15/2013	-72.89175	41.14263	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	1/16/2013	-72.89165	41.14273	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	1/17/2013	-72.89178	41.14288	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	1/21/2013	-72.89232	41.14255	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	1/21/2013	-72.89128	41.14287	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	1/22/2013	-72.89082	41.14303	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	1/25/2013	-72.89093	41.14233	Mound	896	685

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	1/26/2013	-72.89127	41.14277	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	1/26/2013	-72.89138	41.14302	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	1/27/2013	-72.89088	41.14282	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	1/28/2013	-72.89215	41.14263	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	1/28/2013	-72.89177	41.14277	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	1/29/2013	-72.89190	41.14295	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	1/30/2013	-72.89220	41.14258	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/2/2013	-72.89157	41.14290	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/3/2013	-72.89213	41.14225	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/3/2013	-72.89205	41.14258	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/5/2013	-72.89235	41.14258	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/5/2013	-72.89215	41.14238	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/7/2013	-72.89188	41.14272	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/11/2013	-72.89202	41.14237	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/13/2013	-72.88818	41.14482	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/13/2013	-72.89185	41.14277	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/14/2013	-72.89175	41.14305	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/15/2013	-72.89205	41.14323	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/15/2013	-72.89178	41.14312	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/16/2013	-72.89173	41.14292	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/16/2013	-72.89173	41.14288	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/19/2013	-72.89177	41.14307	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/19/2013	-72.89048	41.14345	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/22/2013	-72.89175	41.14303	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/22/2013	-72.89215	41.14287	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/24/2013	-72.89180	41.14300	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/25/2013	-72.89087	41.14322	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	2/25/2013	-72.89205	41.14297	Mound	896	685
CLDS	Guilford Yacht Club	NAE-2007-1989	CLDS-12	3/2/2013	-72.89180	41.14290	Mound	896	685
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6B	10/27/2012	-72.88570	41.14378	Mound	4,000	3,058
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/14/2012	-72.89152	41.14322	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/14/2012	-72.89222	41.14313	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/15/2012	-72.89222	41.14295	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/15/2012	-72.89228	41.14297	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/17/2012	-72.89257	41.14312	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/17/2012	-72.89278	41.14273	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/19/2012	-72.89163	41.14318	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/19/2012	-72.89207	41.14328	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/20/2012	-72.89183	41.14297	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/20/2012	-72.89187	41.14312	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/23/2012	-72.89140	41.14253	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/24/2012	-72.89125	41.14287	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/28/2012	-72.89247	41.14277	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/28/2012	-72.89127	41.14315	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/29/2012	-72.89177	41.14332	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/29/2012	-72.89238	41.14317	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/30/2012	-72.89175	41.14327	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	12/31/2012	-72.89170	41.14317	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	1/1/2013	-72.89148	41.14363	Mound	600	459

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Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	1/2/2013	-72.89173	41.14285	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	1/2/2013	-72.89163	41.14315	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	1/3/2013	-72.89173	41.14257	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	1/4/2013	-72.89248	41.14468	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	1/5/2013	-72.89352	41.14253	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	1/5/2013	-72.89198	41.14277	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	1/6/2013	-72.89017	41.14345	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	1/7/2013	-72.89177	41.14323	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	1/10/2013	-72.89170	41.14295	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	1/11/2013	-72.89155	41.14290	Mound	600	459
CLDS	Pequot Yacht Club - 2012	NAE-2010-1820	CLDS-12	1/11/2013	-72.89203	41.14283	Mound	600	459
CLDS	Pine Orchard Yacht Club	NAE-2008-1521	CLDS-12	5/18/2013	-72.89151	41.14292	Mound	600	459
CLDS	Pine Orchard Yacht Club	NAE-2008-1521	CLDS-12	5/18/2013	-72.89171	41.14347	Mound	600	459
CLDS	Pine Orchard Yacht Club	NAE-2008-1521	CLDS-12	5/21/2013	-72.89168	41.14290	Mound	600	459
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	10/17/2013	-72.88414	41.14618	Needs Capping	500	382
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	10/17/2013	-72.88427	41.14676	Needs Capping	500	382
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	10/19/2013	-72.88461	41.14693	Needs Capping	500	382
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	10/21/2013	-72.88384	41.14686	Needs Capping	500	382
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	10/21/2013	-72.88480	41.14664	Needs Capping	500	382
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	10/23/2013	-72.88506	41.14650	Needs Capping	500	382
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	10/23/2013	-72.88494	41.14661	Needs Capping	500	382
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	10/29/2013	-72.88449	41.14686	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	10/29/2013	-72.88454	41.14634	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	10/30/2013	-72.88455	41.14693	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	10/31/2013	-72.88450	41.14719	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	10/31/2013	-72.88419	41.14691	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	11/2/2013	-72.88424	41.14701	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	11/3/2013	-72.88448	41.14652	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	11/5/2013	-72.88475	41.14688	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	11/5/2013	-72.88482	41.14690	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	11/6/2013	-72.88439	41.14670	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	11/9/2013	-72.88473	41.14672	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	11/15/2013	-72.88415	41.14688	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	11/16/2013	-72.88414	41.14719	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	11/16/2013	-72.88422	41.14687	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	11/17/2013	-72.88448	41.14688	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	11/17/2013	-72.88492	41.14670	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	11/20/2013	-72.88422	41.14626	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	11/21/2013	-72.88471	41.14653	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	11/21/2013	-72.88451	41.14679	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	11/22/2013	-72.88427	41.14694	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	11/30/2013	-72.88445	41.14621	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	12/2/2013	-72.88412	41.14665	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	12/3/2013	-72.88448	41.14652	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	12/4/2013	-72.88467	41.14627	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	12/4/2013	-72.88433	41.14697	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	12/5/2013	-72.88477	41.14640	Needs Capping	400	306
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	12/5/2013	-72.88514	41.14676	Needs Capping	402	307
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	12/6/2013	-72.88408	41.14683	Needs Capping	439	336

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	12/7/2013	-72.88475	41.14681	Needs Capping	416	318
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	12/7/2013	-72.88431	41.14701	Needs Capping	394	301
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	12/8/2013	-72.88445	41.14616	Needs Capping	394	301
CLDS	Brewer Stratford Marina	NAE-2004-52	CL4B	12/12/2013	-72.88522	41.14693	Needs Capping	356	272
CLDS	Branford Yacht Club 2013	NAE-2013-926	CLDS 13/14 4C	12/14/2013	-72.88310	41.14628	Needs Capping	400	306
CLDS	Branford Yacht Club 2013	NAE-2013-926	CLDS 13/14 4C	12/17/2013	-72.88376	41.14644	Needs Capping	400	306
CLDS	Branford Yacht Club 2013	NAE-2013-926	CLDS 13/14 4C	12/18/2013	-72.88262	41.14649	Needs Capping	400	306
CLDS	Noank Village Boat Club - 2012	NAE-2008-2563	CLDS-12	12/14/2013	-72.89204	41.14252	Unknown	450	344
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	11/23/2013	-72.88307	41.14568	Needs Capping	500	382
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	11/25/2013	-72.88273	41.14593	Needs Capping	500	382
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	11/30/2013	-72.88288	41.14578	Needs Capping	500	382
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/1/2013	-72.88305	41.14552	Needs Capping	500	382
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/2/2013	-72.88270	41.14583	Needs Capping	500	382
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/3/2013	-72.88335	41.14533	Needs Capping	500	382
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/4/2013	-72.88303	41.14528	Needs Capping	500	382
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/6/2013	-72.88285	41.14562	Needs Capping	500	382
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/7/2013	-72.88417	41.14520	Needs Capping	500	382
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/7/2013	-72.88332	41.14567	Needs Capping	447	342
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/8/2013	-72.88295	41.14558	Needs Capping	521	398
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/9/2013	-72.88302	41.14557	Needs Capping	426	326
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/11/2013	-72.88315	41.14572	Needs Capping	364	278
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/11/2013	-72.88287	41.14577	Needs Capping	424	324
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/12/2013	-72.88350	41.14563	Needs Capping	452	346
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/14/2013	-72.88270	41.14557	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/16/2013	-72.88255	41.14547	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/17/2013	-72.88303	41.14533	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/18/2013	-72.88312	41.14568	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/21/2013	-72.88283	41.14575	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/22/2013	-72.88255	41.14597	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/27/2013	-72.88263	41.14593	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/28/2013	-72.88245	41.14603	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/28/2013	-72.88260	41.14600	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/29/2013	-72.88238	41.14573	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/30/2013	-72.88263	41.14532	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	12/31/2013	-72.88200	41.14527	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	1/1/2014	-72.88123	41.14618	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	1/4/2014	-72.88165	41.14590	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	1/5/2014	-72.88207	41.14633	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	1/9/2014	-72.88403	41.14558	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	1/10/2014	-72.88257	41.14582	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	1/11/2014	-72.88292	41.14550	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	1/12/2014	-72.88385	41.14718	Needs Capping	400	306
CLDS	Cos Cob Marina	NAE-2010-2420	CL5B	1/12/2014	-72.88515	41.14757	Needs Capping	400	306
CLDS	Gateway Waterfront Enterprises	NAE-2007-1916	CL2B	11/25/2013	-72.88669	41.14886	Needs Capping	4,000	3,058
CLDS	Gateway Waterfront Enterprises	NAE-2007-1916	CL2B	11/25/2013	-72.88565	41.14894	Needs Capping	4,000	3,058
CLDS	Gateway Waterfront Enterprises	NAE-2007-1916	CL2B	11/25/2013	-72.88576	41.14897	Needs Capping	4,000	3,058
CLDS	Gateway Waterfront Enterprises	NAE-2007-1916	CL2B	11/25/2013	-72.88548	41.14901	Needs Capping	4,000	3,058
CLDS	Gateway Waterfront Enterprises	NAE-2007-1916	CL2B	11/26/2013	-72.88586	41.14918	Needs Capping	4,000	3,058
CLDS	Gateway Waterfront Enterprises	NAE-2007-1916	CL2B	11/26/2013	-72.88587	41.14874	Needs Capping	4,000	3,058

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	Gateway Waterfront Enterprises	NAE-2007-1916	CL2B	12/3/2013	-72.88680	41.14907	Needs Capping	4,000	3,058
CLDS	Gateway Waterfront Enterprises	NAE-2007-1916	CL2B	12/4/2013	-72.88636	41.14869	Needs Capping	4,000	3,058
CLDS	Gateway Waterfront Enterprises	NAE-2007-1916	CL2B	12/4/2013	-72.88605	41.14856	Needs Capping	4,000	3,058
CLDS	Gateway Waterfront Enterprises	NAE-2007-1916	CL2B	12/8/2013	-72.88583	41.14902	Needs Capping	1,288	985
CLDS	Gateway Waterfront Enterprises	NAE-2007-1916	CL2B	12/9/2013	-72.88693	41.14897	Needs Capping	1,300	994
CLDS	General Dynamics - Electric Boat	NAE-2006-1203	CL2A	10/18/2013	-72.88333	41.14953	Needs Capping	2,000	1,529
CLDS	General Dynamics - Electric Boat	NAE-2006-1203	CL2A	10/18/2013	-72.88712	41.14872	Needs Capping	2,000	1,529
CLDS	General Dynamics - Electric Boat	NAE-2006-1203	CL2A	10/18/2013	-72.88263	41.14958	Needs Capping	2,000	1,529
CLDS	General Dynamics - Electric Boat	NAE-2006-1203	CL2A	10/19/2013	-72.89017	41.14860	Needs Capping	2,000	1,529
CLDS	General Dynamics - Electric Boat	NAE-2006-1203	CL2A	10/20/2013	-72.88923	41.14882	Needs Capping	2,000	1,529
CLDS	General Dynamics - Electric Boat	NAE-2006-1203	CL2A	10/21/2013	-72.88897	41.14850	Needs Capping	2,000	1,529
CLDS	General Dynamics - Electric Boat	NAE-2006-1203	CL2A	10/21/2013	-72.88872	41.14863	Needs Capping	2,000	1,529
CLDS	General Dynamics - Electric Boat	NAE-2006-1203	CL2A	10/22/2013	-72.88907	41.14907	Needs Capping	2,000	1,529
CLDS	General Dynamics - Electric Boat	NAE-2006-1203	CL2A	10/22/2013	-72.88787	41.14880	Needs Capping	2,000	1,529
CLDS	General Dynamics - Electric Boat	NAE-2006-1203	CL2A	10/23/2013	-72.88947	41.14875	Needs Capping	2,000	1,529
CLDS	General Dynamics - Electric Boat	NAE-2006-1203	CL2A	10/23/2013	-72.88748	41.14958	Needs Capping	2,000	1,529
CLDS	General Dynamics - Electric Boat	NAE-2006-1203	CL2A	10/28/2013	-72.88917	41.14877	Needs Capping	2,000	1,529
CLDS	General Dynamics - Electric Boat	NAE-2006-1203	CL2A	10/29/2013	-72.88917	41.14918	Needs Capping	2,000	1,529
CLDS	General Dynamics - Electric Boat	NAE-2006-1203	CL2A	10/29/2013	-72.88988	41.14857	Needs Capping	2,000	1,529
CLDS	General Dynamics - Electric Boat	NAE-2006-1203	CL2A	10/30/2013	-72.88845	41.14878	Needs Capping	2,000	1,529
CLDS	General Dynamics - Electric Boat	NAE-2006-1203	CL2A	10/30/2013	-72.88800	41.14888	Needs Capping	2,000	1,529
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	1/24/2014	-72.88375	41.14883	Capping Material	400	306
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	1/29/2014	-72.88493	41.14885	Capping Material	400	306
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	1/29/2014	-72.88492	41.14872	Capping Material	361	276
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	1/30/2014	-72.88508	41.14842	Capping Material	266	203
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	1/31/2014	-72.88478	41.14858	Capping Material	285	218
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	1/31/2014	-72.88390	41.14843	Capping Material	336	257
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/1/2014	-72.88490	41.14893	Capping Material	309	236
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/1/2014	-72.88475	41.14890	Capping Material	380	291
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/2/2014	-72.88458	41.14870	Capping Material	324	248
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/2/2014	-72.88453	41.14925	Capping Material	415	317
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/3/2014	-72.88518	41.14892	Capping Material	406	310
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/4/2014	-72.88540	41.14863	Capping Material	374	286
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/4/2014	-72.88538	41.14858	Capping Material	419	320
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/5/2014	-72.88507	41.14867	Capping Material	419	320
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/6/2014	-72.88512	41.14890	Capping Material	413	316
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/6/2014	-72.88495	41.14865	Capping Material	403	308
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/7/2014	-72.88463	41.14895	Capping Material	376	287
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/8/2014	-72.88465	41.14858	Capping Material	355	271
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/8/2014	-72.88438	41.14837	Capping Material	410	313
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/9/2014	-72.88472	41.15000	Capping Material	449	343
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/10/2014	-72.88472	41.14890	Capping Material	419	320
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/10/2014	-72.88463	41.14882	Capping Material	434	332
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/11/2014	-72.88463	41.14842	Capping Material	370	283
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/17/2014	-72.88478	41.14882	Capping Material	400	306
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/18/2014	-72.88493	41.14873	Capping Material	400	306
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/19/2014	-72.88517	41.14895	Capping Material	400	306
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/19/2014	-72.88530	41.14890	Capping Material	400	306
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/20/2014	-72.88420	41.14842	Capping Material	400	306

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	Guilford Yacht Club	NAE-2007-1989	CL2C	2/24/2014	-72.88442	41.14893	Capping Material	400	306
CLDS	Gulf Oil New Haven Terminal	NAE-2007-1486	CL2A	11/20/2013	-72.88855	41.14912	Capping Material	4,000	3,058
CLDS	Gulf Oil New Haven Terminal	NAE-2007-1486	CL2A	11/20/2013	-72.88907	41.14934	Capping Material	4,000	3,058
CLDS	Gulf Oil New Haven Terminal	NAE-2007-1486	CL2A	11/21/2013	-72.88101	41.15012	Capping Material	4,000	3,058
CLDS	Gulf Oil New Haven Terminal	NAE-2007-1486	CL2A	11/21/2013	-72.88880	41.14925	Capping Material	4,000	3,058
CLDS	Gulf Oil New Haven Terminal	NAE-2007-1486	CL2A	11/22/2013	-72.88964	41.14909	Capping Material	4,000	3,058
CLDS	Gulf Oil New Haven Terminal	NAE-2007-1486	CL2A	11/23/2013	-72.88907	41.14875	Capping Material	4,000	3,058
CLDS	Gulf Oil New Haven Terminal	NAE-2007-1486	CL2A	11/23/2013	-72.88846	41.14872	Capping Material	4,000	3,058
CLDS	Gulf Oil New Haven Terminal	NAE-2007-1486	CL2A	11/24/2013	-72.88863	41.14910	Capping Material	4,000	3,058
CLDS	Gulf Oil New Haven Terminal	NAE-2007-1486	CL2A	12/5/2013	-72.88880	41.14929	Capping Material	1,800	1,376
CLDS	Gwenmor Marina	NAE-2008-425	CL5A	10/2/2013	-72.88390	41.14612	Unknown	450	344
CLDS	Gwenmor Marina	NAE-2008-425	CL2A	10/20/2013	-72.88782	41.14913	Unknown	2,000	1,529
CLDS	Magella Term - East St	NAE-2006-2341	CL4A	12/6/2013	-72.88637	41.14643	Needs Capping	1,000	765
CLDS	Magella Term - East St	NAE-2006-2341	CL4A	12/6/2013	-72.88604	41.14704	Needs Capping	1,000	765
CLDS	Magella Term - East St	NAE-2006-2341	CL4A	12/7/2013	-72.88608	41.14692	Needs Capping	1,000	765
CLDS	Magella Term - East St	NAE-2006-2341	CL4A	12/8/2013	-72.88652	41.14669	Needs Capping	1,000	765
CLDS	Magellan Terminal - Waterfront St.	NAE-2006-2340	CL4C	12/7/2013	-72.88353	41.14698	Needs Capping	1,000	765
CLDS	Magellan Terminal - Waterfront St.	NAE-2006-2340	CL4C	12/7/2013	-72.88317	41.14677	Needs Capping	1,000	765
CLDS	Milford Landing	NAE-2011-230	CL5A	11/5/2013	-72.88415	41.14562	Needs Capping	400	306
CLDS	Milford Landing	NAE-2011-230	CL5A	11/6/2013	-72.88437	41.14565	Needs Capping	400	306
CLDS	Milford Landing	NAE-2011-230	CL5A	11/6/2013	-72.88422	41.14575	Needs Capping	400	306
CLDS	Milford Landing	NAE-2011-230	CL5A	11/7/2013	-72.88302	41.14548	Needs Capping	400	306
CLDS	Milford Landing	NAE-2011-230	CL5A	11/8/2013	-72.88387	41.14598	Needs Capping	400	306
CLDS	Milford Landing	NAE-2011-230	CL5A	11/9/2013	-72.88447	41.14583	Needs Capping	400	306
CLDS	Milford Landing	NAE-2011-230	CL5A	11/10/2013	-72.88503	41.14553	Needs Capping	400	306
CLDS	Milford Landing	NAE-2011-230	CL5A	11/11/2013	-72.88408	41.14547	Needs Capping	400	306
CLDS	Motiva	NAE-2009-287	CL3C	1/21/2014	-72.88518	41.14767	Needs Capping	800	612
CLDS	Motiva	NAE-2009-287	CL3C	1/22/2014	-72.88396	41.14797	Needs Capping	800	612
CLDS	Norman Bloom	NAE-2001-2523	CL5A	1/31/2014	-72.88377	41.14573	Unknown	291	222
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1B	12/30/2013	-72.88539	41.14974	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1C	12/30/2013	-72.88522	41.14970	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1D	1/1/2014	-72.88266	41.15031	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1B	1/1/2014	-72.88618	41.15008	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1C	1/2/2014	-72.88513	41.14978	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1B	1/6/2014	-72.88654	41.15030	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1C	1/7/2014	-72.88406	41.14993	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1D	1/7/2014	-72.88277	41.14993	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CLDS	1/7/2014	-72.88696	41.15000	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1B	1/8/2014	-72.88608	41.15030	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1C	1/8/2014	-72.88403	41.14997	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1D	1/8/2014	-72.88287	41.15037	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CLDS	1/9/2014	-72.88712	41.14994	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1B	1/9/2014	-72.88545	41.15030	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1C	1/9/2014	-72.88437	41.14996	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1D	1/9/2014	-72.88310	41.14987	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CLDS	1/10/2014	-72.88716	41.15015	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1B	1/10/2014	-72.88615	41.14980	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1C	1/10/2014	-72.88425	41.15014	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1D	1/10/2014	-72.88279	41.15027	Capping Material	2,613	1,998

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	New Haven FNP	W912WJ-13-C-0014	CLDS	1/10/2014	-72.88701	41.15016	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1B	1/11/2014	-72.88683	41.15032	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1C	1/11/2014	-72.88453	41.15036	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1D	1/11/2014	-72.88286	41.15012	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CLDS	1/12/2014	-72.88714	41.14978	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1B	1/12/2014	-72.88584	41.15048	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1C	1/13/2014	-72.88403	41.14993	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1D	1/13/2014	-72.88306	41.14981	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CLDS	1/13/2014	-72.88733	41.15027	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1C	1/13/2014	-72.88435	41.14999	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CLDS	1/14/2014	-72.88697	41.14973	Capping Material	2,659	2,033
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1B	1/14/2014	-72.88593	41.15052	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1C	1/14/2014	-72.88431	41.14989	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CLDS	1/15/2014	-72.88755	41.15002	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1D	1/15/2014	-72.88260	41.14997	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1D	1/15/2014	-72.88333	41.15007	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CLDS	1/15/2014	-72.88778	41.14990	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	1/16/2014	-72.88728	41.14182	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1B	1/16/2014	-72.88553	41.14986	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1B	1/16/2014	-72.88620	41.14998	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1C	1/16/2014	-72.88485	41.14998	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1D	1/16/2014	-72.86887	41.15041	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1C	1/16/2014	-72.88500	41.14998	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	1/17/2014	-72.88643	41.14182	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2A	1/17/2014	-72.88723	41.14864	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2A	1/17/2014	-72.88720	41.14908	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2A	1/17/2014	-72.88714	41.14937	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2B	1/17/2014	-72.88569	41.14891	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2B	1/18/2014	-72.88614	41.14878	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2C	1/18/2014	-72.88469	41.14868	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2C	1/18/2014	-72.88501	41.14915	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2D	1/18/2014	-72.88337	41.14872	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2D	1/18/2014	-72.88279	41.14906	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2A	1/19/2014	-72.88730	41.14878	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2B	1/19/2014	-72.88545	41.14894	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2B	1/19/2014	-72.88654	41.14891	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2B	1/19/2014	-72.88648	41.14846	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2C	1/19/2014	-72.88443	41.14928	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2C	1/19/2014	-72.88456	41.14925	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2D	1/19/2014	-72.88291	41.14949	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL1D	1/20/2014	-72.88340	41.15001	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2D	1/20/2014	-72.88331	41.14873	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3B	1/20/2014	-72.88662	41.14836	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2A	1/20/2014	-72.88738	41.14888	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3B	1/20/2014	-72.88626	41.14765	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2A	1/20/2014	-72.88734	41.14869	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2C	1/21/2014	-72.88462	41.14872	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2C	1/21/2014	-72.88448	41.14866	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2D	1/21/2014	-72.88317	41.14863	Capping Material	2,613	1,998

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2D	1/21/2014	-72.88377	41.14940	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2D	1/21/2014	-72.88351	41.14875	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3A	1/21/2014	-72.88795	41.14771	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2A	1/21/2014	-72.88744	41.14917	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3B	1/21/2014	-72.88606	41.14769	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL2D	1/21/2014	-72.88283	41.14895	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3A	1/22/2014	-72.88781	41.14760	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3B	1/22/2014	-72.88606	41.14785	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3C	1/22/2014	-72.88453	41.14744	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3C	1/22/2014	-72.88437	41.14744	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3A	1/22/2014	-72.88717	41.14767	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3D	1/22/2014	-72.88274	41.14809	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3D	1/22/2014	-72.88279	41.14776	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3B	1/23/2014	-72.88663	41.14780	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3B	1/23/2014	-72.88570	41.14771	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3C	1/23/2014	-72.88401	41.14770	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3A	1/23/2014	-72.88731	41.14744	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3C	1/23/2014	-72.88437	41.14761	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3B	1/23/2014	-72.88584	41.14804	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3D	1/24/2014	-72.88321	41.14777	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3A	1/24/2014	-72.88832	41.14788	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3A	1/24/2014	-72.88704	41.14811	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3A	1/24/2014	-72.88767	41.14762	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3D	1/24/2014	-72.88277	41.14741	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3B	1/24/2014	-72.88593	41.14805	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3C	1/24/2014	-72.88398	41.14818	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3A	1/25/2014	-72.88774	41.14769	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3C	1/25/2014	-72.88477	41.14808	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3B	1/25/2014	-72.88651	41.14797	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3D	1/25/2014	-72.88242	41.14796	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3C	1/25/2014	-72.88428	41.14795	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3D	1/26/2014	-72.88279	41.14797	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3D	1/26/2014	-72.88320	41.14791	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3C	1/26/2014	-72.88473	41.14824	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3B	1/26/2014	-72.88564	41.14771	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3B	1/26/2014	-72.88606	41.14764	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3C	1/26/2014	-72.88446	41.14789	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3C	1/26/2014	-72.88414	41.14810	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3D	1/26/2014	-72.88251	41.14731	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3D	1/27/2014	-72.88335	41.14738	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3C	1/27/2014	-72.88513	41.14803	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4A	1/27/2014	-72.88668	41.14636	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4A	1/27/2014	-72.88628	41.14699	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4A	1/27/2014	-72.88668	41.14651	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4B	1/27/2014	-72.88393	41.14649	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4B	1/27/2014	-72.88408	41.14693	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4C	1/27/2014	-72.88359	41.14620	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4B	1/27/2014	-72.88435	41.14635	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4A	1/27/2014	-72.88588	41.14679	Capping Material	2,613	1,998

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4C	1/28/2014	-72.88264	41.14651	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4B	1/28/2014	-72.88427	41.14706	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4A	1/28/2014	-72.88571	41.14682	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4C	1/28/2014	-72.88269	41.14656	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4C	1/28/2014	-72.88270	41.14657	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4A	1/28/2014	-72.88593	41.14610	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4B	1/28/2014	-72.88416	41.14684	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4B	1/29/2014	-72.88406	41.14696	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL3C	1/29/2014	-72.88414	41.14737	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4B	1/29/2014	-72.88401	41.14701	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4A	1/29/2014	-72.88648	41.14604	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4A	1/29/2014	-72.88545	41.14650	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4B	1/29/2014	-72.88401	41.14673	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4A	1/29/2014	-72.88551	41.14672	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4A	1/29/2014	-72.88659	41.14697	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4C	1/29/2014	-72.88286	41.14655	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4C	1/30/2014	-72.88356	41.14705	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4A	1/30/2014	-72.88584	41.14626	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4B	1/30/2014	-72.88494	41.14668	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4B	1/30/2014	-72.88473	41.14632	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4C	1/30/2014	-72.88376	41.14646	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4B	1/30/2014	-72.88504	41.14689	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4C	1/30/2014	-72.88255	41.14659	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5A	1/30/2014	-72.88451	41.14569	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4B	1/30/2014	-72.88490	41.14697	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5B	1/30/2014	-72.88343	41.14511	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL4A	1/31/2014	-72.88586	41.14655	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5A	1/31/2014	-72.88435	41.14550	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5A	1/31/2014	-72.88429	41.14538	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5A	1/31/2014	-72.88588	41.14484	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5B	1/31/2014	-72.88283	41.14557	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5B	1/31/2014	-72.88321	41.14552	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5A	1/31/2014	-72.88440	41.14554	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5A	1/31/2014	-72.88496	41.14536	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5B	1/31/2014	-72.88356	41.14542	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5B	1/31/2014	-72.88277	41.14536	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5B	1/31/2014	-72.88335	41.14548	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5A	2/1/2014	-72.88437	41.14562	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5A	2/1/2014	-72.88527	41.14602	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5B	2/1/2014	-72.88272	41.14530	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5B	2/1/2014	-72.88272	41.14562	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5A	2/1/2014	-72.88454	41.14517	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5A	2/1/2014	-72.88450	41.14531	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5A	2/2/2014	-72.88472	41.14515	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5B	2/2/2014	-72.88374	41.14556	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5B	2/2/2014	-72.88283	41.14560	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5B	2/2/2014	-72.88354	41.14542	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5A	2/2/2014	-72.88419	41.14541	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL5B	2/2/2014	-72.88322	41.14535	Capping Material	2,613	1,998

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	New Haven FNP	W912WJ-13-C-0014	CL6A	2/3/2014	-72.88734	41.14336	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL6B	2/3/2014	-72.88624	41.14331	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL6B	2/3/2014	-72.88596	41.14335	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL6C	2/3/2014	-72.88501	41.14303	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL6C	2/3/2014	-72.88414	41.14331	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL6A	2/3/2014	-72.88777	41.14331	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL6B	2/3/2014	-72.88603	41.14316	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL6D	2/4/2014	-72.88341	41.14297	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL6C	2/4/2014	-72.88415	41.14340	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL6D	2/4/2014	-72.88333	41.14317	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL6B	2/4/2014	-72.88627	41.14319	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL6D	2/4/2014	-72.88259	41.14314	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL6C	2/4/2014	-72.88445	41.14353	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL6B	2/5/2014	-72.88547	41.14400	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL6D	2/5/2014	-72.88284	41.14323	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL6C	2/5/2014	-72.88449	41.14464	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	2/5/2014	-72.88792	41.14187	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	2/5/2014	-72.88741	41.14213	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	2/6/2014	-72.88648	41.14179	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	2/6/2014	-72.88573	41.14197	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	2/6/2014	-72.88522	41.14189	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	2/6/2014	-72.88514	41.14272	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	2/6/2014	-72.88284	41.14217	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	2/7/2014	-72.88300	41.14193	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	2/7/2014	-72.88722	41.14198	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	2/7/2014	-72.88740	41.14215	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	2/7/2014	-72.88618	41.14219	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	2/7/2014	-72.88596	41.14255	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	2/8/2014	-72.88489	41.14245	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	2/8/2014	-72.88275	41.14213	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	2/8/2014	-72.88493	41.14220	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	2/8/2014	-72.88767	41.14210	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	2/9/2014	-72.88306	41.14222	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	2/9/2014	-72.88526	41.14199	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	2/9/2014	-72.88797	41.14202	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	2/9/2014	-72.88339	41.14243	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	2/9/2014	-72.88627	41.14218	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	2/9/2014	-72.88259	41.14255	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	2/10/2014	-72.88561	41.14229	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	2/12/2014	-72.88464	41.14262	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	2/14/2014	-72.88359	41.14176	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	2/15/2014	-72.88573	41.14209	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/1/2014	-72.88422	41.14186	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/1/2014	-72.88254	41.14253	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/2/2014	-72.88818	41.14211	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/2/2014	-72.88641	41.14260	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/2/2014	-72.88417	41.14189	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/2/2014	-72.88361	41.14201	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/2/2014	-72.88739	41.14270	Capping Material	2,613	1,998

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/3/2014	-72.88409	41.14243	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/3/2014	-72.88347	41.14216	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL6A	4/3/2014	-72.88743	41.14283	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/4/2014	-72.88564	41.14254	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/4/2014	-72.88487	41.14271	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/5/2014	-72.88325	41.14214	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/5/2014	-72.88778	41.14172	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/5/2014	-72.88606	41.14218	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/5/2014	-72.88692	41.14215	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/6/2014	-72.88520	41.14226	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/6/2014	-72.88587	41.14213	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/6/2014	-72.88344	41.14224	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/6/2014	-72.88410	41.14200	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/6/2014	-72.88747	41.14200	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/7/2014	-72.88249	41.14215	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/7/2014	-72.88720	41.14177	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/7/2014	-72.88715	41.14203	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/7/2014	-72.88556	41.14197	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/7/2014	-72.88549	41.14201	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/7/2014	-72.88357	41.14201	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/8/2014	-72.88551	41.14196	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/8/2014	-72.88819	41.14237	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/8/2014	-72.88403	41.14221	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/8/2014	-72.88649	41.14226	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/9/2014	-72.88709	41.14204	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/9/2014	-72.88510	41.14202	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/10/2014	-72.88520	41.14191	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/10/2014	-72.88280	41.14189	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/10/2014	-72.88775	41.14205	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/10/2014	-72.88657	41.14205	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/10/2014	-72.88415	41.14230	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/11/2014	-72.88359	41.14216	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/11/2014	-72.88810	41.14176	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/11/2014	-72.88674	41.14214	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/11/2014	-72.88434	41.14217	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/12/2014	-72.88316	41.14170	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/12/2014	-72.88380	41.14192	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/13/2014	-72.88765	41.14215	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/13/2014	-72.88801	41.14216	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/13/2014	-72.88656	41.14208	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/13/2014	-72.88492	41.14228	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/14/2014	-72.88267	41.14218	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/14/2014	-72.88689	41.14213	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/15/2014	-72.88476	41.14272	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/15/2014	-72.88718	41.14188	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/15/2014	-72.88654	41.14230	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/16/2014	-72.88866	41.14214	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/16/2014	-72.88414	41.14253	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/16/2014	-72.88650	41.14200	Capping Material	2,613	1,998

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/17/2014	-72.88277	41.14193	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/17/2014	-72.88543	41.14201	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/17/2014	-72.88800	41.14226	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/17/2014	-72.88384	41.14174	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/17/2014	-72.88663	41.14209	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/17/2014	-72.88799	41.14212	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/17/2014	-72.88391	41.14217	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/18/2014	-72.88666	41.14208	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/18/2014	-72.88272	41.14182	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/18/2014	-72.88462	41.14213	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/18/2014	-72.88390	41.14199	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/18/2014	-72.88582	41.14212	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/18/2014	-72.88712	41.14225	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/18/2014	-72.88423	41.14227	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/19/2014	-72.88646	41.14221	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/19/2014	-72.88314	41.14180	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/19/2014	-72.88523	41.14178	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/19/2014	-72.88746	41.14238	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/19/2014	-72.88332	41.14214	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/19/2014	-72.88672	41.14187	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/19/2014	-72.88587	41.14195	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/19/2014	-72.88717	41.14223	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/20/2014	-72.88433	41.14209	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/20/2014	-72.88650	41.14209	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/20/2014	-72.88284	41.14191	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/20/2014	-72.88495	41.14235	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/20/2014	-72.88358	41.14222	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/20/2014	-72.88789	41.14205	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/20/2014	-72.88652	41.14214	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/21/2014	-72.88789	41.14210	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/21/2014	-72.88671	41.14210	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/21/2014	-72.88283	41.14196	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/21/2014	-72.88640	41.14221	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/21/2014	-72.88786	41.14234	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/21/2014	-72.88487	41.14230	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/21/2014	-72.88636	41.14202	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/21/2014	-72.88324	41.14193	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/21/2014	-72.88436	41.14204	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/22/2014	-72.88802	41.14213	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/22/2014	-72.88294	41.14189	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/22/2014	-72.88391	41.14201	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/22/2014	-72.88798	41.14216	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/22/2014	-72.88838	41.14235	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/23/2014	-72.88629	41.14251	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/23/2014	-72.88516	41.14218	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/23/2014	-72.88421	41.14204	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/23/2014	-72.88240	41.14186	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/25/2014	-72.88814	41.14209	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7B	4/25/2014	-72.88575	41.14228	Capping Material	2,613	1,998

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7C	4/26/2014	-72.88512	41.14232	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/26/2014	-72.88246	41.14195	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7D	4/27/2014	-72.88355	41.14238	Capping Material	2,613	1,998
CLDS	New Haven FNP	W912WJ-13-C-0014	CL7A	4/27/2014	-72.88812	41.14193	Capping Material	2,613	1,998
CLDS	Norwalk - Veterans Park	NAE-1990-1092	CL3C	1/12/2014	-72.88412	41.14728	Needs Capping	400	306
CLDS	Norwalk - Veterans Park	NAE-1990-1092	CL3C	1/12/2014	-72.88515	41.14757	Needs Capping	400	306
CLDS	Norwalk - Veterans Park	NAE-1990-1092	CL3C	1/13/2014	-72.88435	41.14785	Needs Capping	400	306
CLDS	Norwalk - Veterans Park	NAE-1990-1092	CL3C	1/14/2014	-72.88427	41.14767	Needs Capping	400	306
CLDS	Norwalk - Veterans Park	NAE-1990-1092	CL3C	1/15/2014	-72.88427	41.14777	Needs Capping	400	306
CLDS	Norwalk - Veterans Park	NAE-1990-1092	CL3C	1/15/2014	-72.88413	41.14800	Needs Capping	400	306
CLDS	Norwalk - Veterans Park	NAE-1990-1092	CL3C	1/16/2014	-72.88405	41.14763	Needs Capping	400	306
CLDS	Norwalk - Veterans Park	NAE-1990-1092	CL3C	1/17/2014	-72.88442	41.14790	Needs Capping	400	306
CLDS	Norwalk - Veterans Park	NAE-1990-1092	CL3C	1/18/2014	-72.88380	41.14772	Needs Capping	400	306
CLDS	Norwalk - Veterans Park	NAE-1990-1092	CL3C	1/18/2014	-72.88398	41.14803	Needs Capping	400	306
CLDS	Norwalk - Veterans Park	NAE-1990-1092	CL3C	1/23/2014	-72.88412	41.14815	Needs Capping	500	382
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6A	10/24/2013	-72.88687	41.14318	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6B	10/25/2013	-72.88558	41.14325	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6A	10/26/2013	-72.88732	41.14376	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6C	10/26/2013	-72.88457	41.14358	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6D	10/27/2013	-72.88271	41.14299	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6C	10/28/2013	-72.88410	41.14352	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6A	10/28/2013	-72.88726	41.14299	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6D	10/29/2013	-72.88361	41.14368	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6B	10/29/2013	-72.88597	41.14306	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6A	10/29/2013	-72.89845	41.14349	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6C	10/30/2013	-72.88516	41.14340	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6B	10/31/2013	-72.88580	41.14374	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6D	10/31/2013	-72.88339	41.14324	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6C	10/31/2013	-72.88533	41.14290	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6A	11/2/2013	-72.88732	41.14310	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6C	11/2/2013	-72.88372	41.14325	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6B	11/3/2013	-72.88574	41.14325	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6A	11/3/2013	-72.88703	41.14335	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6C	11/3/2013	-72.88476	41.14305	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6B	11/4/2013	-72.88652	41.14342	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6D	11/4/2013	-72.88268	41.14310	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6A	11/5/2013	-72.88718	41.14334	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6C	11/6/2013	-72.88409	41.14314	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6B	11/6/2013	-72.88561	41.14353	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6D	11/7/2013	-72.88259	41.14344	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6A	11/8/2013	-72.88748	41.14315	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6A	11/8/2013	-72.88701	41.14340	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6C	11/9/2013	-72.88433	41.14350	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6C	11/9/2013	-72.88425	41.14354	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6B	11/10/2013	-72.88633	41.14308	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6D	11/10/2013	-72.88260	41.14341	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6D	11/11/2013	-72.88288	41.14368	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6A	11/11/2013	-72.88794	41.14322	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6C	11/12/2013	-72.88401	41.14339	Needs Capping	1,410	1,078

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6A	11/12/2013	-72.88796	41.14350	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6B	11/15/2013	-72.88637	41.14341	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6B	11/15/2013	-72.88564	41.14337	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6D	11/16/2013	-72.88251	41.14346	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6C	11/16/2013	-72.88442	41.14310	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6C	11/16/2013	-72.88444	41.14315	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6A	11/16/2013	-72.88817	41.14306	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6D	11/17/2013	-72.88267	41.14329	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6D	11/17/2013	-72.88306	41.14304	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6B	11/17/2013	-72.88651	41.14325	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6A	11/17/2013	-72.88799	41.14328	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6A	11/18/2013	-72.88749	41.14364	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6C	11/18/2013	-72.88422	41.14344	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6B	11/18/2013	-72.88645	41.14343	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6B	11/18/2013	-72.88588	41.14351	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6D	11/19/2013	-72.88276	41.14337	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6C	11/19/2013	-72.88406	41.14318	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6C	11/19/2013	-72.88436	41.14322	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6A	11/19/2013	-72.88800	41.14334	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6D	11/21/2013	-72.88268	41.14337	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL6D	11/21/2013	-72.88331	41.14315	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7A	11/25/2013	-72.88691	41.14250	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7A	11/25/2013	-72.88742	41.14220	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7B	11/26/2013	-72.88594	41.14191	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7A	11/26/2013	-72.88800	41.14209	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7B	11/28/2013	-72.88629	41.14247	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7C	11/28/2013	-72.88420	41.14249	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7C	11/29/2013	-72.88431	41.14196	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7D	11/29/2013	-72.88308	41.14232	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7C	11/30/2013	-72.88399	41.14238	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7D	12/1/2013	-72.88290	41.14232	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7A	12/1/2013	-72.88776	41.14224	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7D	12/1/2013	-72.88340	41.14214	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7A	12/2/2013	-72.88792	41.14204	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7B	12/2/2013	-72.88612	41.14235	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7A	12/2/2013	-72.88776	41.14166	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7B	12/3/2013	-72.88574	41.14202	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7C	12/3/2013	-72.88463	41.14217	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7B	12/3/2013	-72.88636	41.14208	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7C	12/4/2013	-72.88425	41.14216	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7D	12/4/2013	-72.88290	41.14240	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7C	12/5/2013	-72.88480	41.14227	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7D	12/5/2013	-72.88321	41.14253	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7A	12/6/2013	-72.88735	41.14225	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7A	12/7/2013	-72.88797	41.14210	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7B	12/7/2013	-72.88619	41.14215	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7B	12/8/2013	-72.88650	41.14233	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7C	12/8/2013	-72.88495	41.14207	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7C	12/9/2013	-72.88436	41.14210	Needs Capping	1,410	1,078

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7D	12/10/2013	-72.88274	41.14200	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7B	12/11/2013	-72.88604	41.14223	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7C	12/12/2013	-72.88402	41.14237	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7D	12/14/2013	-72.88281	41.14205	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7B	12/15/2013	-72.88638	41.14212	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7C	12/16/2013	-72.88429	41.14233	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7D	12/17/2013	-72.88314	41.14213	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7A	12/17/2013	-72.88802	41.14222	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7B	12/18/2013	-72.88659	41.14230	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7C	12/18/2013	-72.88425	41.14208	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7D	12/19/2013	-72.88300	41.14240	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7A	12/20/2013	-72.88756	41.14218	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7B	12/21/2013	-72.88632	41.14217	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7C	12/23/2013	-72.88448	41.14215	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7D	12/23/2013	-72.88316	41.14195	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7D	12/28/2013	-72.88284	41.14223	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7A	12/29/2013	-72.88765	41.14216	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7B	12/30/2013	-72.88588	41.14240	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7C	12/31/2013	-72.88472	41.14229	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7D	1/1/2014	-72.88275	41.14229	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7A	1/2/2014	-72.88783	41.14216	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7C	1/5/2014	-72.88484	41.14207	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7D	1/8/2014	-72.88364	41.14196	Needs Capping	1,410	1,078
CLDS	Norwalk Harbor Maintenance Dredging	W912WJ-13-C-0014	CL7D	1/10/2014	-72.88295	41.14206	Needs Capping	1,418	1,084
CLDS	O&G Industries	NAE-2006-1072	CL3C	1/6/2014	-72.88487	41.14782	Needs Capping	2,000	1,529
CLDS	O&G Industries	NAE-2006-1072	CL3C	1/8/2014	-72.88143	41.14807	Needs Capping	1,000	765
CLDS	O&G Industries	NAE-2006-1072	CL3C	1/9/2014	-72.88471	41.14728	Needs Capping	1,000	765
CLDS	O&G Industries	NAE-2006-1072	CL3C	1/10/2014	-72.88411	41.14786	Needs Capping	2,000	1,529
CLDS	O&G Industries	NAE-2006-1072	CL3C	1/11/2014	-72.88493	41.14722	Needs Capping	2,000	1,529
CLDS	O&G Industries	NAE-2006-1072	CL3C	1/13/2014	-72.88399	41.14796	Needs Capping	2,000	1,529
CLDS	O&G Industries	NAE-2006-1072	CL3C	1/14/2014	-72.88480	41.14793	Needs Capping	2,000	1,529
CLDS	O&G Industries	NAE-2006-1072	CL3C	1/14/2014	-72.88416	41.14793	Needs Capping	2,000	1,529
CLDS	O&G Industries	NAE-2006-1072	CL3C	1/16/2014	-72.88093	41.14777	Needs Capping	2,000	1,529
CLDS	O&G Industries	NAE-2006-1072	CL3C	1/18/2014	-72.88526	41.14827	Needs Capping	1,500	1,147
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	10/14/2013	-72.88271	41.14661	Needs Capping	450	344
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	10/16/2013	-72.88289	41.14665	Needs Capping	450	344
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	10/16/2013	-72.88271	41.14667	Needs Capping	450	344
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	10/17/2013	-72.88281	41.14667	Needs Capping	450	344
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	10/19/2013	-72.88263	41.14654	Needs Capping	450	344
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	10/19/2013	-72.88272	41.14659	Needs Capping	450	344
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	10/21/2013	-72.88268	41.14652	Needs Capping	450	344
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	10/22/2013	-72.88292	41.14682	Needs Capping	450	344
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	10/23/2013	-72.88304	41.14656	Needs Capping	450	344
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	10/23/2013	-72.88295	41.14685	Needs Capping	450	344
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	10/29/2013	-72.88314	41.14658	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	10/29/2013	-72.88319	41.14662	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	10/30/2013	-72.88257	41.14656	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	10/31/2013	-72.88304	41.14676	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	11/2/2013	-72.88270	41.14672	Needs Capping	400	306

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	11/5/2013	-72.88312	41.14660	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	11/5/2013	-72.88307	41.14651	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	11/6/2013	-72.88375	41.14651	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	11/7/2013	-72.88273	41.14658	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	11/9/2013	-72.88269	41.14653	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	11/15/2013	-72.88264	41.14640	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	11/16/2013	-72.88274	41.14669	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	11/17/2013	-72.88280	41.14648	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	11/17/2013	-72.88271	41.14663	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	11/21/2013	-72.88314	41.14655	Needs Capping	300	229
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	11/22/2013	-72.88283	41.14663	Needs Capping	300	229
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	11/22/2013	-72.88250	41.14676	Needs Capping	300	229
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	11/25/2013	-72.88307	41.14670	Needs Capping	300	229
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	11/26/2013	-72.88314	41.14678	Needs Capping	300	229
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	12/1/2013	-72.88245	41.14653	Needs Capping	300	229
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	12/2/2013	-72.88280	41.14661	Needs Capping	300	229
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	12/3/2013	-72.88276	41.14654	Needs Capping	300	229
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	12/28/2013	-72.88299	41.14656	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	1/10/2014	-72.88285	41.14672	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	1/10/2014	-72.88295	41.14686	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	1/14/2014	-72.88235	41.14664	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	1/15/2014	-72.88262	41.14634	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	1/16/2014	-72.88269	41.14636	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	1/16/2014	-72.88282	41.14647	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	1/17/2014	-72.88253	41.14642	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	1/28/2014	-72.88270	41.14669	Needs Capping	400	306
CLDS	Pequonnock Yacht Club	NAE-2010-368	CL4C	1/30/2014	-72.88295	41.14692	Needs Capping	400	306
CLDS	St. Ann Boat Club	NAE-2012-904	CL4C	12/20/2013	-72.88271	41.14680	Needs Capping	400	306
CLDS	St. Ann Boat Club	NAE-2012-904	CL4C	12/21/2013	-72.88292	41.14671	Needs Capping	400	306
CLDS	St. Ann Boat Club	NAE-2012-904	CL4C	12/23/2013	-72.88291	41.14664	Needs Capping	400	306
CLDS	St. Ann Boat Club	NAE-2012-904	CL4C	12/27/2013	-72.88326	41.14640	Needs Capping	400	306
CLDS	St. Ann Boat Club	NAE-2012-904	CL4C	12/29/2013	-72.88330	41.14656	Needs Capping	400	306
CLDS	St. Ann Boat Club	NAE-2012-904	CL4C	12/31/2013	-72.88328	41.14670	Needs Capping	400	306
CLDS	St. Ann Boat Club	NAE-2012-904	CL4C	1/9/2014	-72.88325	41.14682	Needs Capping	400	306
CLDS	Stony Point Association	NAE-2010-58	CL3C	1/5/2014	-72.88388	41.14787	Needs Capping	400	306
CLDS	Stony Point Association	NAE-2010-58	CL3C	1/5/2014	-72.88460	41.14797	Needs Capping	400	306
CLDS	Stony Point Association	NAE-2010-58	CL3C	1/9/2014	-72.88420	41.14775	Needs Capping	400	306
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	12/6/2013	-72.88511	41.14505	Needs Capping	82	63
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	12/8/2013	-72.88524	41.14641	Needs Capping	119	91
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	12/10/2013	-72.88477	41.14531	Needs Capping	353	270
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	12/12/2013	-72.88466	41.14506	Needs Capping	322	246
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	12/17/2013	-72.88423	41.14630	Needs Capping	500	382
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	12/18/2013	-72.88388	41.14565	Needs Capping	500	382
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	12/21/2013	-72.88442	41.14528	Needs Capping	500	382
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	12/22/2013	-72.88323	41.14865	Needs Capping	500	382
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	12/24/2013	-72.88428	41.14521	Needs Capping	500	382
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	12/28/2013	-72.88495	41.14531	Needs Capping	500	382
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	12/29/2013	-72.88459	41.14544	Needs Capping	500	382
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	12/31/2013	-72.88470	41.14508	Needs Capping	500	382

Placement site name	Project name	Permit number	Target Site Code	Placement date/time	Placement longitude	Placement latitude	Destination	Load volume (cubic yards)	Load volume (cubic meters)
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	1/1/2014	-72.88496	41.14564	Needs Capping	500	382
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	1/5/2014	-72.88412	41.14577	Needs Capping	500	382
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	1/9/2014	-72.88437	41.14529	Needs Capping	1,000	765
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	1/10/2014	-72.88459	41.14497	Needs Capping	400	306
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	1/14/2014	-72.88387	41.14597	Needs Capping	400	306
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	1/15/2014	-72.88451	41.14554	Needs Capping	400	306
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	1/16/2014	-72.88451	41.14597	Needs Capping	400	306
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	1/17/2014	-72.88448	41.14562	Needs Capping	636	486
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	1/21/2014	-72.88407	41.14546	Needs Capping	646	494
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	1/23/2014	-72.88427	41.14518	Needs Capping	700	535
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	1/29/2014	-72.88407	41.14587	Needs Capping	700	535
CLDS	Thames Shipyard and Repair	NAE-2007-491	CL5A	1/30/2014	-72.88489	41.14536	Needs Capping	700	535
CLDS	USCG-NL	NAE-1994-340	CL4A	11/13/2013	-72.88490	41.14637	Needs Capping	600	459
CLDS	USCG-NL	NAE-1994-340	CL4A	11/13/2013	-72.88612	41.14582	Needs Capping	2,000	1,529
CLDS	USCG-NL	NAE-1994-340	CL4A	11/14/2013	-72.88570	41.14725	Needs Capping	600	459
CLDS	USCG-NL	NAE-1994-340	CL4A	11/16/2013	-72.88545	41.14660	Needs Capping	2,000	1,529
CLDS	USCG-NL	NAE-1994-340	CL4A	11/19/2013	-72.88697	41.14637	Needs Capping	500	382
CLDS	USCG-NL	NAE-1994-340	CL4A	12/5/2013	-72.88592	41.14660	Needs Capping	500	382
TOTAL DISPOSAL VOLUME FROM 2011 TO 2014								**1,382,077**	**1,056,674**

APPENDIX C

CLDS ACTUAL SPI/PV AND BENTHIC GRAB REPLICATE LOCATIONS

August 2014
January 2014

CLDS August 2014 SPI/PV Replicate Locations					
Replicate	Latitude (N)	Longitude (W)	Replicate	Latitude (N)	Longitude (W)
NHAV14-N-01A	41° 9.001'	72° 53.263'	NHAV14-N-07A	41° 8.936'	72° 53.180'
NHAV14-N-01B	41° 8.998'	72° 53.262'	NHAV14-N-07B	41° 8.936'	72° 53.180'
NHAV14-N-01C	41° 8.997'	72° 53.260'	NHAV14-N-07C	41° 8.936'	72° 53.179'
NHAV14-N-01D	41° 8.997'	72° 53.259'	NHAV14-N-07D	41° 8.935'	72° 53.180'
NHAV14-N-01E	41° 8.997'	72° 53.260'	NHAV14-N-08A	41° 8.946'	72° 53.092'
NHAV14-N-01F	41° 8.999'	72° 53.261'	NHAV14-N-08B	41° 8.948'	72° 53.092'
NHAV14-N-01G	41° 8.999'	72° 53.263'	NHAV14-N-08C	41° 8.947'	72° 53.093'
NHAV14-N-01H	41° 8.999'	72° 53.263'	NHAV14-N-08D	41° 8.947'	72° 53.092'
NHAV14-N-02A	41° 8.991'	72° 53.185'	NHAV14-N-08E	41° 8.944'	72° 53.093'
NHAV14-N-02B	41° 8.993'	72° 53.182'	NHAV14-N-08F	41° 8.946'	72° 53.095'
NHAV14-N-02C	41° 8.991'	72° 53.181'	NHAV14-N-08G	41° 8.948'	72° 53.094'
NHAV14-N-02D	41° 8.990'	72° 53.181'	NHAV14-N-08H	41° 8.949'	72° 53.094'
NHAV14-N-02E	41° 8.993'	72° 53.180'	NHAV14-N-09A	41° 8.943'	72° 53.003'
NHAV14-N-02F	41° 8.991'	72° 53.184'	NHAV14-N-09B	41° 8.945'	72° 53.003'
NHAV14-N-02G	41° 8.992'	72° 53.183'	NHAV14-N-09C	41° 8.945'	72° 53.004'
NHAV14-N-03A	41° 8.997'	72° 53.072'	NHAV14-N-09D	41° 8.942'	72° 53.001'
NHAV14-N-03B	41° 8.997'	72° 53.073'	NHAV14-N-10A	41° 8.874'	72° 53.270'
NHAV14-N-03C	41° 8.997'	72° 53.075'	NHAV14-N-10B	41° 8.876'	72° 53.271'
NHAV14-N-03D	41° 8.998'	72° 53.075'	NHAV14-N-10C	41° 8.876'	72° 53.272'
NHAV14-N-04A	41° 9.003'	72° 52.989'	NHAV14-N-10D	41° 8.875'	72° 53.271'
NHAV14-N-04B	41° 9.005'	72° 52.991'	NHAV14-N-11A	41° 8.860'	72° 53.175'
NHAV14-N-04C	41° 9.006'	72° 52.989'	NHAV14-N-11B	41° 8.861'	72° 53.174'
NHAV14-N-04D	41° 9.006'	72° 52.990'	NHAV14-N-11C	41° 8.862'	72° 53.174'
NHAV14-N-05A	41° 8.949'	72° 53.335'	NHAV14-N-11D	41° 8.863'	72° 53.174'
NHAV14-N-05B	41° 8.947'	72° 53.335'	NHAV14-N-12A	41° 8.868'	72° 53.071'
NHAV14-N-05C	41° 8.947'	72° 53.334'	NHAV14-N-12B	41° 8.870'	72° 53.072'
NHAV14-N-05D	41° 8.947'	72° 53.334'	NHAV14-N-12C	41° 8.872'	72° 53.072'
NHAV14-N-06A	41° 8.926'	72° 53.263'	NHAV14-N-12D	41° 8.872'	72° 53.072'
NHAV14-N-06B	41° 8.926'	72° 53.263'	NHAV14-N-13A	41° 8.859'	72° 52.994'
NHAV14-N-06C	41° 8.926'	72° 53.263'	NHAV14-N-13B	41° 8.860'	72° 52.992'
NHAV14-N-06D	41° 8.926'	72° 53.262'	NHAV14-N-13C	41° 8.863'	72° 52.993'
			NHAV14-N-13D	41° 8.863'	72° 52.993'

Notes: 1) Coordinate system NAD83
2) This table reflects all attempts to collect SPI/PV replicates at each target station. The three replicates with the best quality images were used for analysis.

CLDS August 2014 SPI/PV Replicate Locations					
Replicate	Latitude (N)	Longitude (W)	Replicate	Latitude (N)	Longitude (W)
NHAV14-N-14A	41° 8.808'	72° 53.174'	NHAV14-S-20E	41° 8.585'	72° 53.168'
NHAV14-N-14B	41° 8.811'	72° 53.174'	NHAV14-S-20F	41° 8.587'	72° 53.169'
NHAV14-N-14C	41° 8.811'	72° 53.175'	NHAV14-S-20G	41° 8.586'	72° 53.171'
NHAV14-N-14D	41° 8.810'	72° 53.177'	NHAV14-S-20H	41° 8.585'	72° 53.172'
NHAV14-N-15A	41° 8.807'	72° 53.075'	NHAV14-S-21A	41° 8.594'	72° 53.071'
NHAV14-N-15B	41° 8.806'	72° 53.074'	NHAV14-S-21B	41° 8.595'	72° 53.072'
NHAV14-N-15C	41° 8.807'	72° 53.076'	NHAV14-S-21C	41° 8.596'	72° 53.073'
NHAV14-N-15D	41° 8.810'	72° 53.074'	NHAV14-S-21D	41° 8.596'	72° 53.072'
NHAV14-N-16A	41° 8.791'	72° 52.987'	NHAV14-S-21E	41° 8.597'	72° 53.074'
NHAV14-N-16B	41° 8.792'	72° 52.989'	NHAV14-S-21F	41° 8.597'	72° 53.070'
NHAV14-N-16C	41° 8.793'	72° 52.988'	NHAV14-S-21G	41° 8.598'	72° 53.073'
NHAV14-N-16D	41° 8.793'	72° 52.988'	NHAV14-S-21H	41° 8.595'	72° 53.076'
NHAV14-N-16I	41° 8.793'	72° 52.986'	NHAV14-S-21I	41° 8.594'	72° 53.072'
NHAV14-N-16J	41° 8.793'	72° 52.987'	NHAV14-S-21J	41° 8.596'	72° 53.073'
NHAV14-N-16K	41° 8.794'	72° 52.989'	NHAV14-S-21K	41° 8.598'	72° 53.072'
NHAV14-N-16L	41° 8.796'	72° 52.989'	NHAV14-S-21L	41° 8.598'	72° 53.072'
NHAV14-N-17A	41° 8.738'	72° 53.068'	NHAV14-S-22A	41° 8.591'	72° 53.003'
NHAV14-N-17B	41° 8.739'	72° 53.071'	NHAV14-S-22B	41° 8.587'	72° 53.008'
NHAV14-N-17C	41° 8.740'	72° 53.070'	NHAV14-S-22C	41° 8.586'	72° 53.004'
NHAV14-N-17D	41° 8.737'	72° 53.069'	NHAV14-S-22D	41° 8.587'	72° 53.004'
NHAV14-N-18A	41° 8.734'	72° 53.000'	NHAV14-S-23A	41° 8.516'	72° 53.254'
NHAV14-N-18B	41° 8.733'	72° 52.999'	NHAV14-S-23B	41° 8.515'	72° 53.253'
NHAV14-N-18C	41° 8.733'	72° 52.999'	NHAV14-S-23C	41° 8.514'	72° 53.252'
NHAV14-N-18D	41° 8.731'	72° 52.997'	NHAV14-S-23D	41° 8.512'	72° 53.249'
NHAV14-S-19A	41° 8.588'	72° 53.258'	NHAV14-S-24A	41° 8.542'	72° 53.157'
NHAV14-S-19B	41° 8.589'	72° 53.258'	NHAV14-S-24B	41° 8.542'	72° 53.154'
NHAV14-S-19C	41° 8.589'	72° 53.256'	NHAV14-S-24C	41° 8.540'	72° 53.151'
NHAV14-S-19D	41° 8.589'	72° 53.256'	NHAV14-S-24D	41° 8.538'	72° 53.152'
NHAV14-S-20A	41° 8.588'	72° 53.173'	NHAV14-S-25A	41° 8.515'	72° 53.063'
NHAV14-S-20B	41° 8.587'	72° 53.170'	NHAV14-S-25B	41° 8.514'	72° 53.064'
NHAV14-S-20C	41° 8.584'	72° 53.172'	NHAV14-S-25C	41° 8.515'	72° 53.063'
NHAV14-S-20D	41° 8.587'	72° 53.172'	NHAV14-S-25D	41° 8.515'	72° 53.064'

Notes: 1) Coordinate system NAD83

2) This table reflects all attempts to collect SPI/PV replicates at each target station. The three replicates with the best quality images were used for analysis.

CLDS August 2014 SPI/PV Replicate Locations					
Replicate	Latitude (N)	Longitude (W)	Replicate	Latitude (N)	Longitude (W)
NHAV14-S-26A	41° 8.537'	72° 53.010'	CLIS-08-04A	41° 8.771'	72° 53.587'
NHAV14-S-26B	41° 8.535'	72° 53.007'	CLIS-08-04B	41° 8.771'	72° 53.583'
NHAV14-S-26C	41° 8.532'	72° 53.007'	CLIS-08-04C	41° 8.767'	72° 53.585'
NHAV14-S-26D	41° 8.534'	72° 53.010'	CLIS-08-04D	41° 8.768'	72° 53.586'
MQR-01A	41° 8.643'	72° 53.797'	CLIS-08-05A	41° 8.744'	72° 53.626'
MQR-01B	41° 8.642'	72° 53.803'	CLIS-08-05B	41° 8.743'	72° 53.621'
MQR-01C	41° 8.644'	72° 53.797'	CLIS-08-05C	41° 8.742'	72° 53.619'
MQR-01D	41° 8.645'	72° 53.800'	CLIS-08-05D	41° 8.741'	72° 53.621'
MQR-02A	41° 8.606'	72° 53.825'	CLIS-09-01A	41° 8.596'	72° 53.700'
MQR-02B	41° 8.603'	72° 53.828'	CLIS-09-01B	41° 8.600'	72° 53.697'
MQR-02C	41° 8.606'	72° 53.826'	CLIS-09-01C	41° 8.598'	72° 53.699'
MQR-02D	41° 8.606'	72° 53.827'	CLIS-09-01D	41° 8.599'	72° 53.698'
MQR-03A	41° 8.621'	72° 53.822'	CLIS-09-02A	41° 8.592'	72° 53.749'
MQR-03B	41° 8.623'	72° 53.822'	CLIS-09-02B	41° 8.591'	72° 53.751'
MQR-03C	41° 8.623'	72° 53.825'	CLIS-09-02C	41° 8.594'	72° 53.749'
MQR-03D	41° 8.621'	72° 53.823'	CLIS-09-02D	41° 8.595'	72° 53.749'
MRQ-04A	41° 8.630'	72° 53.776'	CLIS-09-03A	41° 8.559'	72° 53.725'
MRQ-04B	41° 8.626'	72° 53.773'	CLIS-09-03B	41° 8.558'	72° 53.721'
MRQ-04C	41° 8.627'	72° 53.776'	CLIS-09-03C	41° 8.556'	72° 53.728'
MRQ-04D	41° 8.628'	72° 53.778'	CLIS-09-03D	41° 8.559'	72° 53.725'
CLIS-08-01A	41° 8.751'	72° 53.609'	CLIS-09-04A	41° 8.585'	72° 53.714'
CLIS-08-01B	41° 8.749'	72° 53.599'	CLIS-09-04B	41° 8.587'	72° 53.712'
CLIS-08-01C	41° 8.751'	72° 53.598'	CLIS-09-04C	41° 8.585'	72° 53.714'
CLIS-08-01D	41° 8.751'	72° 53.597'	CLIS-09-04D	41° 8.586'	72° 53.715'
CLIS-08-02A	41° 8.780'	72° 53.611'	CLIS-09-04E	41° 8.583'	72° 53.707'
CLIS-08-02B	41° 8.777'	72° 53.612'	CLIS-09-04F	41° 8.585'	72° 53.711'
CLIS-08-02C	41° 8.777'	72° 53.612'	CLIS-09-04G	41° 8.585'	72° 53.710'
CLIS-08-02D	41° 8.779'	72° 53.612'	CLIS-09-04H	41° 8.584'	72° 53.711'
CLIS-08-03A	41° 8.760'	72° 53.639'	CLIS-09-05A	41° 8.583'	72° 53.681'
CLIS-08-03B	41° 8.757'	72° 53.637'	CLIS-09-05B	41° 8.583'	72° 53.684'
CLIS-08-03C	41° 8.762'	72° 53.639'	CLIS-09-05C	41° 8.586'	72° 53.687'
CLIS-08-03D	41° 8.760'	72° 53.638'	CLIS-09-05D	41° 8.585'	72° 53.683'

Notes: 1) Coordinate system NAD83
2) This table reflects all attempts to collect SPI/PV replicates at each target station. The three replicates with the best quality images were used for analysis.

CLDS August 2014 SPI/PV Replicate Locations		
Replicate	Latitude (N)	Longitude (W)
CLIS-10-01A	41° 8.578'	72° 53.515'
CLIS-10-01B	41° 8.579'	72° 53.516'
CLIS-10-01C	41° 8.578'	72° 53.517'
CLIS-10-01D	41° 8.581'	72° 53.520'
CLIS-10-01E	41° 8.578'	72° 53.512'
CLIS-10-01F	41° 8.578'	72° 53.511'
CLIS-10-01G	41° 8.581'	72° 53.513'
CLIS-10-02A	41° 8.581'	72° 53.453'
CLIS-10-02B	41° 8.581'	72° 53.456'
CLIS-10-02C	41° 8.581'	72° 53.457'
CLIS-10-02D	41° 8.581'	72° 53.459'
CLIS-10-03A	41° 8.582'	72° 53.486'
CLIS-10-03B	41° 8.582'	72° 53.489'
CLIS-10-03C	41° 8.582'	72° 53.488'
CLIS-10-03D	41° 8.582'	72° 53.486'
CLIS-10-04A	41° 8.550'	72° 53.497'
CLIS-10-04B	41° 8.551'	72° 53.500'
CLIS-10-04C	41° 8.551'	72° 53.502'
CLIS-10-04D	41° 8.549'	72° 53.500'
CLIS-10-05A	41° 8.566'	72° 53.487'
CLIS-10-05B	41° 8.565'	72° 53.488'
CLIS-10-05C	41° 8.567'	72° 53.486'
CLIS-10-05D	41° 8.564'	72° 53.485'

Notes: 1) Coordinate system NAD83
2) This table reflects all attempts to collect SPI/PV replicates at each target station. The three replicates with the best quality images were used for analysis.

CLDS August 2014 Reference SPI/PV Replicate Locations					
Replicate	Latitude (N)	Longitude (W)	Replicate	Latitude (N)	Longitude (W)
2500W-REF-01A	41° 9.247'	72° 55.423'	CLIS-REF-03A	41° 8.018'	72° 50.170'
2500W-REF-01B	41° 9.248'	72° 55.422'	CLIS-REF-03B	41° 8.020'	72° 50.166'
2500W-REF-01C	41° 9.249'	72° 55.422'	CLIS-REF-03C	41° 8.020'	72° 50.173'
2500W-REF-01D	41° 9.248'	72° 55.420'	CLIS-REF-03D	41° 8.018'	72° 50.174'
2500W-REF-02A	41° 9.305'	72° 55.490'	CLIS-REF-04A	41° 8.053'	72° 50.236'
2500W-REF-02B	41° 9.304'	72° 55.492'	CLIS-REF-04B	41° 8.053'	72° 50.238'
2500W-REF-02C	41° 9.302'	72° 55.490'	CLIS-REF-04C	41° 8.056'	72° 50.238'
2500W-REF-02D	41° 9.304'	72° 55.489'	CLIS-REF-04D	41° 8.059'	72° 50.236'
2500W-REF-03A	41° 9.191'	72° 55.700'	CLIS-REF-05A	41° 8.026'	72° 50.038'
2500W-REF-03B	41° 9.191'	72° 55.701'	CLIS-REF-05B	41° 8.025'	72° 50.038'
2500W-REF-03C	41° 9.192'	72° 55.702'	CLIS-REF-05C	41° 8.025'	72° 50.037'
2500W-REF-03D	41° 9.193'	72° 55.702'	CLIS-REF-05D	41° 8.026'	72° 50.037'
2500W-REF-04A	41° 9.284'	72° 55.636'	4500E-REF-01A	41° 9.344'	72° 50.431'
2500W-REF-04B	41° 9.281'	72° 55.636'	4500E-REF-01B	41° 9.344'	72° 50.431'
2500W-REF-04C	41° 9.282'	72° 55.634'	4500E-REF-01C	41° 9.340'	72° 50.431'
2500W-REF-04D	41° 9.283'	72° 55.634'	4500E-REF-01D	41° 9.340'	72° 50.431'
2500W-REF-04E	41° 9.280'	72° 55.634'	4500E-REF-02A	41° 9.291'	72° 50.632'
2500W-REF-04F	41° 9.284'	72° 55.636'	4500E-REF-02B	41° 9.292'	72° 50.630'
2500W-REF-04G	41° 9.284'	72° 55.635'	4500E-REF-02C	41° 9.293'	72° 50.632'
2500W-REF-05A	41° 9.179'	72° 55.500'	4500E-REF-02D	41° 9.293'	72° 50.631'
2500W-REF-05B	41° 9.182'	72° 55.502'	4500E-REF-03A	41° 9.281'	72° 50.353'
2500W-REF-05C	41° 9.184'	72° 55.500'	4500E-REF-03B	41° 9.282'	72° 50.358'
2500W-REF-05D	41° 9.180'	72° 55.497'	4500E-REF-03C	41° 9.286'	72° 50.352'
CLIS-REF-01A	41° 8.132'	72° 50.175'	4500E-REF-03D	41° 9.283'	72° 50.353'
CLIS-REF-01B	41° 8.131'	72° 50.176'	4500E-REF-04A	41° 9.245'	72° 50.633'
CLIS-REF-01C	41° 8.129'	72° 50.178'	4500E-REF-04B	41° 9.243'	72° 50.629'
CLIS-REF-01D	41° 8.128'	72° 50.173'	4500E-REF-04C	41° 9.243'	72° 50.632'
CLIS-REF-02A	41° 8.111'	72° 49.903'	4500E-REF-04D	41° 9.243'	72° 50.630'
CLIS-REF-02B	41° 8.113'	72° 49.908'	4500E-REF-05A	41° 9.150'	72° 50.481'
CLIS-REF-02C	41° 8.111'	72° 49.909'	4500E-REF-05B	41° 9.150'	72° 50.482'
CLIS-REF-02D	41° 8.113'	72° 49.907'	4500E-REF-05C	41° 9.151'	72° 50.480'
			4500E-REF-05D	41° 9.154'	72° 50.481'

Notes: 1) Coordinate system NAD83
2) This table reflects all attempts to collect SPI/PV replicates at each target station. The three replicates with the best quality images were used for analysis.

CLDS August 2014 Benthic Grab Replicate Locations		
Replicate	**Latitude (N)**	**Longitude (W)**
NHAV14-N-12a	41° 8.872'	72° 53.068'
NHAV14-N-12b	41° 8.873'	72° 53.067'
NHAV14-N-12c	41° 8.870'	72° 53.063'
NHAV14-N-12d	41° 8.874'	72° 53.074'
NHAV14-N-14a	41° 8.807'	72° 53.176'
NHAV14-N-14b	41° 8.807'	72° 53.175'
NHAV14-N-7a	41° 8.940'	72° 53.181'
NHAV14-N-7b	41° 8.939'	72° 53.182'
NHAV14-S-21a	41° 8.596'	72° 53.073'
NHAV14-S-21b	41° 8.597'	72° 53.073'
NHAV14-S-23a	41° 8.518'	72° 53.254'
NHAV14-S-23b	41° 8.517'	72° 53.255'
NHAV14-S-25a	41° 8.516'	72° 53.065'
NHAV14-S-25b	41° 8.513'	72° 53.065'
NHAV14-S-25c	41° 8.516'	72° 53.063'
CLIS-10-1a	41° 8.577'	72° 53.514'
CLIS-10-1b	41° 8.579'	72° 53.516'
CLIS-10-3a	41° 8.580'	72° 53.483'
CLIS-10-3b	41° 8.583'	72° 53.483'
CLIS-10-5a	41° 8.565'	72° 53.484'
2500W-REF-1a	41° 9.249'	72° 55.426'
2500W-REF-1b	41° 9.250'	72° 55.427'
CLIS-REF-5a	41° 8.023'	72° 50.043'
CLIS-REF-5b	41° 8.024'	72° 50.038'
CLIS-REF-5c	41° 8.025'	72° 50.040'
4500E-REF-4a	41° 9.244'	72° 50.634'
4500E-REF-4b	41° 9.242'	72° 50.634'

Notes: 1) Coordinate system NAD83

CLDS January 2014 Grab Locations		
Station	Latitude (N)	Longitude (W)
20140130-G1	41° 8.525'	72° 52.968'
20140130-G2	41° 8.520'	72° 53.077'
20140130-G3	41° 8.531'	72° 53.157'
20140130-G4	41° 8.610'	72° 53.186'
20140130-G5	41° 8.808'	72° 53.062'
20140130-G6	41° 8.886'	72° 53.039'
20140130-G7	41° 9.007'	72° 53.227'

APPENDIX D

SEDIMENT-PROFILE AND PLAN-VIEW IMAGE ANALYSIS RESULTS FOR CLDS SURVEY, AUGUST 2014

Location	Station	Replicate	Date	Time	Stop Collar Setting (in)	# of Weights (per side)	Water Depth (ft)	Grain Size Major Mode (phi)	Grain Size Minimum (phi)	Grain Size Maximum (phi)	GrnSize Range	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	Boundary Roughness (cm)	Boundary Roughness Type
NHAV14-N	1	A	8/16/2014	11:59:12	12	0 + doors	60	>4	>4	2	>4 to 2	225.7	15.5	15.0	15.8	0.8	biological
NHAV14-N	1	F	8/16/2014	12:42:28	11	0 + doors	62	>4	>4	2	>4 to 2	165.0	11.3	10.9	12.4	1.5	biological
NHAV14-N	1	G	8/16/2014	12:43:18	11	0 + doors	62	>4	>4	2	>4 to 2	148.0	10.2	9.8	10.5	0.8	biological
NHAV14-N	2	D	8/16/2014	12:08:45	12	0 + doors	58	>4	>4	3	>4 to 3	202.8	13.9	13.4	14.1	0.7	biological
NHAV14-N	2	E	8/16/2014	12:34:07	12	0 + doors	57	>4	>4	3	>4 to 3	186.6	12.8	12.5	13.0	0.5	biological
NHAV14-N	2	F	8/16/2014	12:35:21	12	0 + doors	57	>4	>4	3	>4 to 3	212.1	14.6	14.2	15.1	0.9	physical
NHAV14-N	3	A	8/16/2014	12:13:37	12	0 + doors	60	>4	>4	2	>4 to 2	156.9	10.8	9.9	11.4	1.6	biological
NHAV14-N	3	B	8/16/2014	12:14:22	12	0 + doors	60	>4	>4	1	>4 to 1	146.8	10.1	9.5	10.6	1.1	biological
NHAV14-N	3	C	8/16/2014	12:15:06	12	0 + doors	60	>4	>4	1	>4 to 1	159.1	10.9	10.6	11.2	0.6	biological
NHAV14-N	4	B	8/16/2014	12:20:11	12	0 + doors	60	>4	>4	1	>4 to 1	182.8	12.6	11.9	12.8	0.9	physical
NHAV14-N	4	C	8/16/2014	12:20:59	12	0 + doors	60	>4	>4	2	>4 to 2	200.6	13.8	13.3	14.4	1.0	biological
NHAV14-N	4	D	8/16/2014	12:21:51	12	0 + doors	60	>4	>4	1	>4 to 1	282.5	19.4	17.8	20.2	2.4	biological
NHAV14-N	5	A	8/16/2014	11:22:58	12	0 + doors	58	>4	>4	2	>4 to 2	196.0	13.5	13.0	14.1	1.2	physical
NHAV14-N	5	B	8/16/2014	11:23:51	12	0 + doors	58	>4	>4	2	>4 to 2	183.2	12.6	11.9	13.1	1.3	physical
NHAV14-N	5	D	8/16/2014	11:25:26	12	0 + doors	58	>4	>4	2	>4 to 2	198.1	13.6	13.3	13.9	0.6	physical

Location	Station	Replicate	Date	Time	Stop Collar Setting (in)	# of Weights (per side)	Water Depth (ft)	Grain Size Major Mode (phi)	Grain Size Minimum (phi)	Grain Size Maximum (phi)	GrnSize Range	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	Boundary Roughness (cm)	Boundary Roughness Type
NHAV14-N	6	A	8/16/2014	11:28:41	12	0 + doors	59	>4	>4	2	>4 to 2	187.9	12.9	12.6	13.2	0.6	biological
NHAV14-N	6	B	8/16/2014	11:29:31	12	0 + doors	59	>4	>4	2	>4 to 2	163.3	11.2	10.7	12.0	1.3	biological
NHAV14-N	6	D	8/16/2014	11:31:21	12	0 + doors	59	>4	>4	2	>4 to 2	194.7	13.4	12.6	14.6	2.0	physical
NHAV14-N	7	B	8/16/2014	11:35:11	12	0 + doors	59	>4	>4	2	>4 to 2	229.9	15.8	14.9	16.5	1.6	physical
NHAV14-N	7	C	8/16/2014	11:35:59	12	0 + doors	59	>4	>4	2	>4 to 2	239.2	16.4	14.5	18.3	3.8	physical
NHAV14-N	7	D	8/16/2014	11:36:49	12	0 + doors	59	>4	>4	1	>4 to 1	199.4	13.7	12.8	14.5	1.7	physical
NHAV14-N	8	A	8/16/2014	11:40:03	12	0 + doors	57	>4	>4	2	>4 to 2	86.1	5.9	5.1	7.0	2.0	physical
NHAV14-N	8	B	8/16/2014	11:40:45	12	0 + doors	57	>4	>4	2	>4 to 2	100.1	6.9	5.6	7.5	1.9	physical
NHAV14-N	8	F	8/16/2014	12:50:10	14	0 + doors	58	>4	>4	2	>4 to 2	247.3	17.0	16.6	17.3	0.7	biological
NHAV14-N	9	A	8/16/2014	11:45:33	12	0 + doors	60	>4	>4	2	>4 to 2	173.9	11.9	11.6	12.3	0.6	biological
NHAV14-N	9	B	8/16/2014	11:46:19	12	0 + doors	60	>4	>4	2	>4 to 2	281.2	19.3	17.3	20.4	3.1	biological
NHAV14-N	9	C	8/16/2014	11:47:50	12	0 + doors	60	>4	>4	1	>4 to 1	153.1	10.5	10.2	10.9	0.7	biological
NHAV14-N	10	A	8/16/2014	10:52:07	12	0 + doors	59	>4	>4	2	>4 to 2	190.0	13.0	11.8	13.9	2.1	physical
NHAV14-N	10	B	8/16/2014	10:52:50	12	0 + doors	59	>4	>4	2	>4 to 2	212.5	14.6	13.0	15.8	2.8	physical
NHAV14-N	10	D	8/16/2014	10:54:18	12	0 + doors	59	>4	>4	2	>4 to 2	200.2	13.7	12.8	15.4	2.7	physical

Location	Station	Replicate	Date	Time	Stop Collar Setting (in)	# of Weights (per side)	Water Depth (ft)	Grain Size Major Mode (phi)	Grain Size Minimum (phi)	Grain Size Maximum (phi)	GrnSize Range	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	Boundary Roughness (cm)	Boundary Roughness Type
NHAV14-N	11	A	8/16/2014	10:58:01	12	0 + doors	58	>4	>4	1	>4 to 1	178.6	12.3	10.3	14.0	3.7	biological
NHAV14-N	11	B	8/16/2014	10:58:48	12	0 + doors	58	>4	>4	2	>4 to 2	143.8	9.9	9.6	10.3	0.7	biological
NHAV14-N	11	C	8/16/2014	10:59:37	12	0 + doors	58	>4	>4	1	>4 to 1	199.8	13.7	13.3	14.3	1.0	physical
NHAV14-N	12	A	8/16/2014	11:03:57	12	0 + doors	57	>4	>4	2	>4 to 2	157.4	10.8	9.6	11.6	2.0	physical
NHAV14-N	12	B	8/16/2014	11:04:43	12	0 + doors	57	>4	>4	1	>4 to 1	170.5	11.7	11.4	11.8	0.3	biological
NHAV14-N	12	D	8/16/2014	11:06:15	12	0 + doors	57	>4	>4	2	>4 to 2	142.1	9.8	8.7	11.0	2.3	physical
NHAV14-N	13	A	8/16/2014	11:10:17	12	0 + doors	59	>4	>4	2	>4 to 2	168.4	11.6	10.9	12.1	1.1	biological
NHAV14-N	13	B	8/16/2014	11:10:58	12	0 + doors	59	>4	>4	2	>4 to 2	152.3	10.5	10.0	10.3	0.3	biological
NHAV14-N	13	D	8/16/2014	11:13:14	12	0 + doors	59	>4	>4	2	>4 to 2	156.5	10.7	10.1	11.2	1.1	biological
NHAV14-N	14	B	8/16/2014	10:28:57	12	0 + doors	60	>4	>4	2	>4 to 2	178.2	12.2	11.4	12.7	1.3	biological
NHAV14-N	14	C	8/16/2014	10:29:48	12	0 + doors	60	>4	>4	2	>4 to 2	181.1	12.4	12.0	12.4	0.4	biological
NHAV14-N	14	D	8/16/2014	10:30:33	12	0 + doors	60	>4	>4	2	>4 to 2	173.9	11.9	11.6	12.2	0.6	biological
NHAV14-N	15	A	8/16/2014	10:34:12	12	0 + doors	61	>4	>4	1	>4 to 1	138.3	9.5	9.0	10.0	1.0	physical
NHAV14-N	15	B	8/16/2014	10:34:58	12	0 + doors	61	>4	>4	2	>4 to 2	201.5	13.8	10.5	15.5	5.0	biological
NHAV14-N	15	D	8/16/2014	10:36:36	12	0 + doors	61	>4	>4	1	>4 to 1	213.8	14.7	14.3	15.0	0.7	biological

Location	Station	Replicate	Date	Time	Stop Collar Setting (in)	# of Weights (per side)	Water Depth (ft)	Grain Size Major Mode (phi)	Grain Size Minimum (phi)	Grain Size Maximum (phi)	GrnSize Range	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	Boundary Roughness (cm)	Boundary Roughness Type
NHAV14-N	16	I	8/16/2014	10:40:32	12	0 + doors	60	>4	>4	2	>4 to 2	215.5	14.8	13.8	15.6	1.7	biological
NHAV14-N	16	K	8/16/2014	10:42:06	12	0 + doors	60	>4	>4	2	>4 to 2	196.8	13.5	13.1	13.7	0.6	biological
NHAV14-N	16	L	8/16/2014	10:42:51	12	0 + doors	60	>4	>4	2	>4 to 2	216.3	14.9	14.6	15.3	0.7	biological
NHAV14-N	17	A	8/15/2014	15:19:56	13	0	66	>4	>4	2	>4 to 2	232.9	16.0	15.5	16.4	0.9	biological
NHAV14-N	17	B	8/15/2014	15:20:51	13	0	66	>4	>4	2	>4 to 2	240.9	16.5	15.8	17.4	1.7	biological
NHAV14-N	17	D	8/15/2014	15:22:41	13	0	66	>4	>4	2	>4 to 2	308.7	21.2	21.2	21.2	ind	ind
NHAV14-N	18	A	8/15/2014	15:25:19	13	0	66	>4	>4	1	>4 to 1	250.7	17.2	16.0	18.8	2.8	biological
NHAV14-N	18	B	8/15/2014	15:26:08	13	0	66	>4	>4	2	>4 to 2	281.6	19.3	19.0	19.7	0.7	biological
NHAV14-N	18	C	8/15/2014	15:26:55	13	0	66	>4	>4	2	>4 to 2	260.0	17.9	17.1	18.7	1.6	physical
NHAV14-S	19	A	8/15/2014	11:06:24	13	0	60	>4	>4	1	>4 to 1	227.4	15.6	15.3	15.8	0.6	biological
NHAV14-S	19	C	8/15/2014	11:08:30	13	0	60	>4	>4	1	>4 to 1	254.9	17.5	16.3	19.2	2.9	biological
NHAV14-S	19	D	8/15/2014	11:09:16	13	0	60	>4	>4	2	>4 to 2	243.5	16.7	16.5	17.0	0.6	biological
NHAV14-S	20	E	8/15/2014	11:41:15	11	0	60	>4	>4	2	>4 to 2	205.3	14.1	13.7	14.4	0.7	physical
NHAV14-S	20	F	8/15/2014	11:42:01	11	0	60	>4	>4	2	>4 to 2	244.3	16.8	16.3	17.1	0.9	biological
NHAV14-S	20	G	8/15/2014	11:42:44	11	0	60	>4	>4	2	>4 to 2	212.1	14.6	13.8	15.4	1.7	physical
NHAV14-S	21	I	8/16/2014	10:15:28	12	0 + doors	59	>4	>4	2	>4 to 2	218.0	15.0	14.6	15.3	0.6	biological
NHAV14-S	21	J	8/16/2014	10:16:13	12	0 + doors	59	>4	>4	2	>4 to 2	203.2	14.0	13.6	14.2	0.6	biological
NHAV14-S	21	K	8/16/2014	10:16:59	12	0 + doors	59	>4	>4	2	>4 to 2	214.6	14.7	13.1	16.5	3.4	physical
NHAV14-S	22	A	8/15/2014	11:26:04	13	0	62	>4	>4	2	>4 to 2	306.2	21.0	20.6	21.3	0.7	biological
NHAV14-S	22	B	8/15/2014	11:26:48	13	0	62	>4	>4	2	>4 to 2	285.0	19.6	19.1	20.0	0.9	biological
NHAV14-S	22	D	8/15/2014	11:28:49	13	0	62	>4	>4	2	>4 to 2	285.0	19.6	19.4	19.7	0.3	biological
NHAV14-S	23	A	8/15/2014	11:01:14	13	0	59	>4	>4	2	>4 to 2	293.1	20.1	19.7	20.6	0.8	biological
NHAV14-S	23	B	8/15/2014	11:01:49	13	0	59	>4	>4	1	>4 to 1	277.6	19.1	18.3	20.1	1.8	biological
NHAV14-S	23	D	8/15/2014	11:03:12	13	0	59	>4	>4	1	>4 to 1	233.7	16.0	14.7	17.5	2.9	biological

Location	Station	Replicate	Date	Time	Stop Collar Setting (in)	# of Weights (per side)	Water Depth (ft)	Grain Size Major Mode (phi)	Grain Size Minimum (phi)	Grain Size Maximum (phi)	GrnSize Range	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	Boundary Roughness (cm)	Boundary Roughness Type
NHAV14-S	24	A	8/15/2014	10:56:26	13	0	59	>4	>4	2	>4 to 2	210.4	14.4	14.0	14.8	0.8	biological
NHAV14-S	24	C	8/15/2014	10:57:47	13	0	59	>4	>4	2	>4 to 2	192.1	13.2	12.4	14.1	1.7	biological
NHAV14-S	24	D	8/15/2014	10:58:34	13	0	59	>4	>4	2	>4 to 2	193.4	13.3	12.7	14.3	1.6	biological
NHAV14-S	25	A	8/15/2014	10:50:21	13	0	60	>4	>4	2	>4 to 2	246.9	17.0	16.5	17.5	1.0	physical
NHAV14-S	25	B	8/15/2014	10:51:06	13	0	60	>4	>4	2	>4 to 2	272.7	18.7	17.9	19.7	1.8	physical
NHAV14-S	25	D	8/15/2014	10:52:55	13	0	60	>4	>4	2	>4 to 2	206.1	14.2	12.9	16.3	3.4	physical
NHAV14-S	26	A	8/15/2014	10:42:22	13	0	61	>4	>4	2	>4 to 2	278.7	19.1	18.2	20.3	2.1	biological
NHAV14-S	26	B	8/15/2014	10:43:05	13	0	61	>4	>4	0	>4 to 0	235.8	16.2	15.3	17.3	2.0	biological
NHAV14-S	26	C	8/15/2014	10:43:52	13	0	61	>4	>4	1	>4 to 1	298.2	20.5	19.8	21.3	1.5	physical
MQR	1	A	8/15/2014	13:25:26	13	0	62	4 to 3	>4	1	>4 to 1	212.5	14.6	14.1	15.3	1.3	biological
MQR	1	C	8/15/2014	13:27:52	13	0	62	4-3 / >4	>4	1	>4 to 1	190.5	13.1	12.0	13.4	1.4	biological
MQR	1	D	8/15/2014	13:28:40	13	0	62	>4	>4	1	>4 to 1	268.1	18.4	18.1	18.6	0.5	biological
MQR	2	A	8/15/2014	13:36:06	13	0	64	4-3 / >4	>4	1	>4 to 1	195.1	13.4	13.0	13.5	0.4	biological
MQR	2	B	8/15/2014	13:37:15	13	0	64	4-3 / >4	>4	1	>4 to 1	202.8	13.9	13.6	14.1	0.5	biological
MQR	2	C	8/15/2014	13:38:25	13	0	64	4-3 / >4	4	0	4 to 0	129.2	8.9	8.1	10.3	2.2	biological
CLIS-08	1	A	8/15/2014	14:38:54	13	0	62	>4	>4	3	>4 to 3	237.5	16.3	15.7	16.9	1.2	biological
CLIS-08	1	B	8/15/2014	14:40:42	13	0	62	>4	>4	3	>4 to 3	241.2	16.6	16.2	17.0	0.8	biological
CLIS-08	1	C	8/15/2014	14:41:32	13	0	62	>4	>4	3	>4 to 3	261.6	18.0	17.9	18.2	0.3	biological
CLIS-08	2	A	8/15/2014	14:53:55	13	0	64	>4	>4	3	>4 to 3	177.3	12.2	11.7	12.5	0.8	biological
CLIS-08	2	B	8/15/2014	14:54:59	13	0	64	>4	>4	3	>4 to 3	245.2	16.8	16.5	17.1	0.7	biological
CLIS-08	2	D	8/15/2014	14:56:39	13	0	64	>4	>4	3	>4 to 3	253.7	17.4	17.1	17.7	0.6	biological
CLIS-08	3	A	8/15/2014	15:00:19	13	0	63	4 to 3	>4	3	>4 to 3	224.8	15.4	15.1	15.7	0.6	biological
CLIS-08	3	B	8/15/2014	15:01:16	13	0	63	>4	>4	3	>4 to 3	272.3	18.7	18.2	19.1	0.9	biological
CLIS-08	3	C	8/15/2014	15:02:10	13	0	63	>4	>4	3	>4 to 3	242.6	16.7	16.1	17.1	1.0	biological
CLIS-08	4	A	8/15/2014	14:49:00	13	0	63	>4	>4	3	>4 to 3	190.0	13.0	12.6	13.8	1.3	biological
CLIS-08	4	C	8/15/2014	14:51:11	13	0	63	>4	>4	3	>4 to 3	240.9	16.5	16.1	17.2	1.0	biological
CLIS-08	4	D	8/15/2014	14:52:02	13	0	63	>4	>4	3	>4 to 3	286.3	19.7	19.5	20.0	0.5	biological
CLIS-08	5	A	8/15/2014	14:33:46	13	0	62	>4	>4	3	>4 to 3	252.8	17.4	16.7	17.9	1.1	biological
CLIS-08	5	B	8/15/2014	14:34:33	13	0	62	>4	>4	3	>4 to 3	264.3	18.1	17.9	18.5	0.7	biological
CLIS-08	5	D	8/15/2014	14:36:26	13	0	62	>4	>4	2	>4 to 2	304.1	20.9	20.2	21.2	1.0	biological

Location	Station	Replicate	Date	Time	Stop Collar Setting (in)	# of Weights (per side)	Water Depth (ft)	Grain Size Major Mode (phi)	Grain Size Minimum (phi)	Grain Size Maximum (phi)	GrnSize Range	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	Boundary Roughness (cm)	Boundary Roughness Type
CLIS-09	1	A	8/15/2014	12:57:15	11.5	0	61	4 to 3	>4	1	>4 to 1	114.5	7.9	7.5	8.1	0.6	physical
CLIS-09	1	B	8/15/2014	12:59:16	11.5	0	61	4 to 3	>4	1	>4 to 1	131.9	9.1	8.5	9.9	1.4	physical
CLIS-09	1	D	8/15/2014	13:01:26	11.5	0	61	4 to 3	>4	1	>4 to 1	74.2	5.1	3.8	5.9	2.1	biological
CLIS-09	2	B	8/15/2014	12:52:44	11.5	0	64	4 to 3	>4	1	>4 to 1	134.7	9.3	8.9	10.1	1.2	biological
CLIS-09	2	C	8/15/2014	12:53:55	11.5	0	64	4 to 3	>4	2	>4 to 2	82.7	5.7	3.1	7.1	4.0	biological
CLIS-09	2	D	8/15/2014	12:55:11	11.5	0	64	4 to 3	>4	2	>4 to 2	133.6	9.2	8.1	10.1	2.1	biological
CLIS-09	3	A	8/15/2014	12:33:28	13	0	62	>4	>4	1	>4 to 1	261.3	17.9	17.5	18.3	0.8	biological
CLIS-09	3	B	8/15/2014	12:35:19	13	0	62	>4	>4	2	>4 to 2	253.2	17.4	17.0	17.9	1.0	biological
CLIS-09	3	C	8/15/2014	12:36:08	13	0	62	>4	>4	2	>4 to 2	222.3	15.3	14.7	15.4	0.7	biological
CLIS-09	4	A	8/15/2014	12:46:45	11.5	1	65	4 to 3	>4	-4	>4 to -4	113.6	7.8	7.0	8.8	1.7	physical
CLIS-09	4	B	8/15/2014	12:47:38	11.5	1	65	4 to 3	>4	-3	>4 to -3	42.3	2.9	1.7	3.5	1.9	physical
CLIS-09	4	C	8/15/2014	12:48:49	11.5	1	65	4 to 3	>4	-4	>4 to -4	115.3	7.9	7.2	8.6	1.4	biological
CLIS-09	5	A	8/15/2014	13:04:30	11.5	0	56	>4	>4	2	>4 to 2	127.7	8.8	7.5	9.6	2.0	biological
CLIS-09	5	B	8/15/2014	13:05:15	11.5	0	56	4 to 3/>4	>4	-1	>4 to -1	147.6	10.1	9.7	10.5	0.8	biological
CLIS-09	5	C	8/15/2014	13:06:29	11.5	0	56	4 to 3	>4	-4	>4 to -4	108.2	7.4	6.6	7.6	1.0	physical
CLIS-10	1	B	8/15/2014	14:11:00	13	0	56	>4	>4	0	>4 to 0	223.1	15.3	15.0	15.5	0.5	biological
CLIS-10	1	C	8/15/2014	14:11:51	13	0	56	4 to 3 / >4	>4	0	>4 to 0	207.8	14.3	13.4	15.0	1.6	biological
CLIS-10	1	E	8/15/2014	15:52:03	13	0	61	>4	>4	2	>4 to 2	265.5	18.2	18.0	18.3	0.4	biological
CLIS-10	2	B	8/15/2014	14:18:06	13	0	66	>4	>4	1	>4 to 1	252.0	17.3	17.1	17.5	0.4	biological
CLIS-10	2	C	8/15/2014	14:18:58	13	0	66	>4	>4	1	>4 to 1	214.2	14.7	14.1	14.9	0.8	biological
CLIS-10	2	D	8/15/2014	14:19:54	13	0	66	>4	>4	1	>4 to 1	214.2	14.7	11.5	16.4	4.9	physical
CLIS-10	3	A	8/15/2014	14:04:07	13	0	56	>4	>4	1	>4 to 1	198.9	13.7	13.4	13.9	0.6	biological
CLIS-10	3	C	8/15/2014	14:05:54	13	0	56	>4	>4	2	>4 to 2	257.0	17.7	17.4	17.9	0.6	biological
CLIS-10	3	D	8/15/2014	14:07:03	13	0	56	>4	>4	1	>4 to 1	210.8	14.5	14.1	14.8	0.7	biological
CLIS-10	4	A	8/15/2014	13:52:36	13	0	65	>4	>4	1	>4 to 1	266.4	18.3	17.6	18.8	1.2	biological
CLIS-10	4	B	8/15/2014	13:53:27	13	0	65	>4	>4	-1	>4 to -1	225.7	15.5	15.1	16.0	0.9	biological
CLIS-10	4	D	8/15/2014	13:55:53	13	0	65	>4	>4	1	>4 to 1	229.1	15.7	15.3	16.1	0.8	biological
CLIS-10	5	B	8/15/2014	13:59:42	13	0	60	>4	>4	2	>4 to 2	276.1	19.0	18.3	19.9	1.6	physical
CLIS-10	5	C	8/15/2014	14:00:46	13	0	60	>4	>4	1	>4 to 1	252.8	17.4	16.7	18.0	1.3	biological
CLIS-10	5	D	8/15/2014	14:01:30	13	0	60	>4	>4	2	>4 to 2	276.1	19.0	10.8	19.3	8.5	physical

Sediment-Profile Image Analysis Results

Location	Station	Replicate	Date	Time	Stop Collar Setting (in)	# of Weights (per side)	Water Depth (ft)	Grain Size Major Mode (phi)	Grain Size Minimum (phi)	Grain Size Maximum (phi)	GrnSize Range	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	Boundary Roughness (cm)	Boundary Roughness Type
2500W REF	1	A	8/16/2014	8:18:28	13	0	60	>4	>4	3	>4 to 3	274.4	18.8	18.2	19.2	1.0	biological
2500W REF	1	B	8/16/2014	8:19:14	13	0	60	>4	>4	3	>4 to 3	270.2	18.6	18.2	18.8	0.6	biological
2500W REF	1	C	8/16/2014	8:20:01	13	0	60	>4	>4	3	>4 to 3	299.5	20.6	20.3	20.8	0.5	biological
2500W REF	2	B	8/16/2014	8:34:46	12	0	60	>4	>4	3	>4 to 3	293.9	20.2	19.1	21.2	2.1	physical
2500W REF	2	C	8/16/2014	8:35:37	12	0	60	>4	>4	3	>4 to 3	270.4	18.6	18.0	18.7	0.7	biological
2500W REF	2	D	8/16/2014	8:36:21	12	0	60	>4	>4	3	>4 to 3	262.1	18.0	17.6	18.4	0.8	biological
2500W REF	3	A	8/16/2014	8:57:03	12	0	59	>4	>4	3	>4 to 3	262.8	18.0	17.9	18.2	0.3	biological
2500W REF	3	B	8/16/2014	8:57:51	12	0	59	>4	>4	3	>4 to 3	243.0	16.7	16.3	17.2	0.8	biological
2500W REF	3	C	8/16/2014	8:58:42	12	0	59	>4	>4	3	>4 to 3	227.1	15.6	14.5	16.2	1.7	biological
2500W REF	4	A	8/16/2014	8:42:07	12	1	59	>4	>4	2	>4 to 2	257.7	17.7	17.3	18.2	0.9	biological
2500W REF	4	B	8/16/2014	8:42:47	12	1	59	>4	>4	2	>4 to 2	256.4	17.6	17.3	17.8	0.5	biological
2500W REF	4	G	8/16/2014	9:14:23	12	0	59	>4	>4	3	>4 to 3	267.9	18.4	18.0	18.7	0.8	physical
2500W REF	5	A	8/16/2014	9:04:08	12	0	59	>4	>4	3	>4 to 3	255.8	17.6	17.1	18.1	1.0	biological
2500W REF	5	B	8/16/2014	9:04:52	12	0	59	>4	>4	3	>4 to 3	246.9	17.0	16.5	17.4	0.9	biological
2500W REF	5	D	8/16/2014	9:06:28	12	0	59	>4	>4	3	>4 to 3	273.6	18.8	18.2	19.2	1.0	biological
4500E REF	1	A	8/15/2014	8:41:58	13.5	1	65	>4	>4	3	>4 to 3	286.9	19.7	19.4	19.8	0.4	biological
4500E REF	1	C	8/15/2014	8:43:59	13.5	1	65	>4	>4	3	>4 to 3	292.0	20.1	19.9	20.3	0.4	biological
4500E REF	1	D	8/15/2014	8:44:44	13.5	1	65	>4	>4	3	>4 to 3	283.8	19.5	19.0	20.0	1.0	biological
4500E REF	2	A	8/15/2014	9:24:59	13	0	66	>4	>4	2	>4 to 2	281.6	19.3	18.8	19.7	0.9	biological
4500E REF	2	B	8/15/2014	9:25:40	13	0	66	>4	>4	3	>4 to 3	254.1	17.4	17.1	17.6	0.4	biological
4500E REF	2	C	8/15/2014	9:26:34	13	0	66	>4	>4	3	>4 to 3	264.7	18.2	17.6	18.4	0.8	biological
4500E REF	3	A	8/15/2014	9:03:34	13	0	65	>4	>4	3	>4 to 3	266.8	18.3	17.9	18.6	0.8	biological
4500E REF	3	B	8/15/2014	9:04:37	13	0	65	>4	>4	3	>4 to 3	254.9	17.5	17.2	17.7	0.5	biological
4500E REF	3	D	8/15/2014	9:06:44	13	0	65	>4	>4	2	>4 to 2	256.6	17.6	17.4	17.9	0.5	biological
4500E REF	4	A	8/15/2014	9:19:21	13	0	66	>4	>4	3	>4 to 3	266.4	18.3	18.1	18.5	0.4	biological
4500E REF	4	B	8/15/2014	9:20:13	13	0	66	>4	>4	3	>4 to 3	293.5	20.2	19.7	19.9	0.2	biological
4500E REF	4	D	8/15/2014	9:21:55	13	0	66	>4	>4	3	>4 to 3	283.8	19.5	19.1	20.1	1.0	biological
4500E REF	5	B	8/15/2014	9:12:03	13	0	68	>4	>4	3	>4 to 3	239.2	16.4	16.3	16.7	0.4	biological
4500E REF	5	C	8/15/2014	9:12:48	13	0	68	>4	>4	3	>4 to 3	271.0	18.6	17.8	19.5	1.7	biological
4500E REF	5	D	8/15/2014	9:13:37	13	0	68	>4	>4	3	>4 to 3	239.2	16.4	16.2	16.5	0.3	biological

Sediment-Profile Image Analysis Results

Location	Station	Replicate	Date	Time	Stop Collar Setting (in)	# of Weights (per side)	Water Depth (ft)	Grain Size Major Mode (phi)	Grain Size Minimum (phi)	Grain Size Maximum (phi)	GrnSize Range	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	Boundary Roughness (cm)	Boundary Roughness Type
CLIS REF	1	A	8/15/2014	9:45:21	13	0	80	>4	>4	3	>4 to 3	237.5	16.3	16.1	16.5	0.4	biological
CLIS REF	1	B	8/15/2014	9:46:13	13	0	80	>4	>4	3	>4 to 3	265.1	18.2	17.7	18.8	1.2	biological
CLIS REF	1	C	8/15/2014	9:46:57	13	0	80	>4	>4	3	>4 to 3	253.2	17.4	17.0	17.7	0.6	biological
CLIS REF	2	A	8/15/2014	10:13:04	13	0	81	>4	>4	3	>4 to 3	243.9	16.7	16.2	17.1	0.9	biological
CLIS REF	2	B	8/15/2014	10:14:07	13	0	81	>4	>4	3	>4 to 3	276.1	19.0	18.8	19.4	0.6	biological
CLIS REF	2	C	8/15/2014	10:14:50	13	0	81	>4	>4	3	>4 to 3	251.5	17.3	16.8	17.5	0.7	biological
CLIS REF	3	B	8/15/2014	10:01:56	13	0	80	>4	>4	3	>4 to 3	245.2	16.8	16.6	17.3	0.7	biological
CLIS REF	3	C	8/15/2014	10:03:02	13	0	80	>4	>4	3	>4 to 3	248.1	17.0	16.8	17.2	0.4	biological
CLIS REF	3	D	8/15/2014	10:03:48	13	0	80	>4	>4	3	>4 to 3	247.3	17.0	16.8	17.2	0.4	biological
CLIS REF	4	A	8/15/2014	9:56:19	13	0	80	>4	>4	3	>4 to 3	249.4	17.1	16.9	17.4	0.5	biological
CLIS REF	4	B	8/15/2014	9:57:22	13	0	80	>4	>4	3	>4 to 3	265.1	18.2	18.1	18.4	0.3	biological
CLIS REF	4	D	8/15/2014	9:58:49	13	0	80	>4	>4	3	>4 to 3	266.8	18.3	18.3	18.4	0.1	biological
CLIS REF	5	A	8/15/2014	10:06:13	13	0	80	>4	>4	3	>4 to 3	236.7	16.3	15.8	16.7	0.9	biological
CLIS REF	5	B	8/15/2014	10:07:04	13	0	80	>4	>4	3	>4 to 3	243.9	16.7	16.6	16.9	0.3	biological
CLIS REF	5	D	8/15/2014	10:08:36	13	0	80	>4	>4	3	>4 to 3	259.2	17.8	17.5	18.1	0.6	biological

Note: 1) “ind” indicates that the sample result was indeterminate
2) “mean” indicates the mean value across a single sediment profile image

Location	Station	Replicate	RPD Area (sq.cm)	Mean RPD (cm)	Mud Clast Number	Mud Clast State	Methane?	Max bubble size above or below 5 mm diameter?	Low DO?	Comment
NHAV14-N	1	A	11.6	0.8	10+	both	n	-	n	silt-clay, tiny mud clasts (camera artifact) at SWI, tiny tubes at SWI, evidence of burrowing below aRPD at left
NHAV14-N	1	F	20.2	1.4	5	reduced	n	-	n	silt-clay, small reduced mud clasts (camera artifact) at SWI, evidence of burrowing below aRPD at right, tubes in background, hermit crab in background at left
NHAV14-N	1	G	15.5	1.1	10+	reduced	n	-	n	silt-clay, reduced mud clasts at SWI (camera base), evidence of burrowing below aRPD at right, void below aRPD at left, gastropods in background
NHAV14-N	2	D	16.7	1.1	0	-	n	-	n	silt-clay, slight pull-away by faceplate at top of image, small tubes at SWI and in background, burrow casting at SWI at right
NHAV14-N	2	E	12.9	0.9	10+	both	n	-	n	silt-clay, small mud clast artifacts at SWI, small tubes in background, evidence of burrowing below aRPD at center and left
NHAV14-N	2	F	20.0	1.4	10+	reduced	n	-	n	silt-clay, reduced mud clast artifacts at SWI, evidence of burrowing below aRPD at center
NHAV14-N	3	A	34.9	2.4	0	-	n	-	n	silt-clay with very fine sand in upper 2 cm, shell frag in background, gastropod at SWI at left,
NHAV14-N	3	B	33.5	2.3	0	-	n	-	n	silt-clay with some very fine sand in upper 2 cm, voids below aRPD, transected burrows at depth
NHAV14-N	3	C	30.9	2.1	0	-	n	-	n	silt-clay, voids below aRPD at center, evidence of burrowing below aRPD at center and at left, small tubes at SWI
NHAV14-N	4	B	16.6	1.1	10+	both	n	-	n	silt-clay, mud clast artifacts at SWI, void at aRPD at right, evidence of burrowing below aRPD at center and right
NHAV14-N	4	C	34.8	2.4	0	-	n	-	n	silt-clay, voids above aRPD at right, evidence of burrowing below aRPD at right, small tubes at SWI
NHAV14-N	4	D	33.3	2.3	0	-	n	-	n	silt clay, tubes at SWI, evidence of burrowing below aRPD at center and right
NHAV14-N	5	A	13.7	0.9	0	-	n	-	n	silt-clay, voids below aRPD at center and right, highly reduced mud at depth

Location	Station	Replicate	RPD Area (sq.cm)	Mean RPD (cm)	Mud Clast Number	Mud Clast State	Methane?	Max bubble size above or below 5 mm diameter?	Low DO?	Comment
NHAV14-N	5	B	9.5	0.7	10+	reduced	n	-	n	silt-clay, mud clast artfacts at SWI, evidence of burrowing below aRPD at center
NHAV14-N	5	D	12.8	0.9	10+	reduced	n	-	n	silt-clay, mud clast artifacts at SWI, voids below aRPD at center, evidence of burrowing just belowaRPD at center and right
NHAV14-N	6	A	14.1	1.0	10+	reduced	n	-	n	silt-clay, gastropod at SWI at left, void below aRPD at left, void at aRPD at centner, small to med reduced mud clast artifacts at SWI
NHAV14-N	6	B	11.5	0.8	10+	both	n	-	n	silt-clay, mud clast artifacts at SWI, evidence of burrowing below aRPD at left
NHAV14-N	6	D	20.1	1.4	10+	both	n	-	n	silt-clay, surface heavily disturbed from mud doors, voids below aRPD at right, evidence of burrowing below aRPD at center
NHAV14-N	7	B	0.0	0.0	0	-	n	-	n	clay, surface heavily disturbed, aRPD and successional stage cannot be determined due to sediment disturbance, voids below disturbed surface
NHAV14-N	7	C	0.0	0.0	0	-	n	-	n	clay, surface heavily disturbed from mud doors, remanants of the original surface at SWI at right, succesional stage cannot be determined due to sediment disturbance, voids below disturbed surface
NHAV14-N	7	D	0.0	0.0	0	-	n	-	n	clay, surface heavily disturbed from mud doors, succesional stage cannot be determined due to sediment disturbance
NHAV14-N	8	A	11.7	0.8	0	-	n	-	n	silt-clay, burrow casts at SWI at right, evidence of burrowing below aRPD at center
NHAV14-N	8	B	ind	ind	0	-	n	-	n	silt-clay, surface heavily disturbed, void below surface at left, aRPD could not be determined, evidence of burrowing at left
NHAV14-N	8	F	21.2	1.5	0	-	n	-	n	silt-clay, burrow casts at SWI at right, evidence of burrowing below aRPD at left.
NHAV14-N	9	A	54.2	3.7	0	-	n	-	n	silt-clay, small tubes in background, evidence of burrowing below aRPD at center

Location	Station	Replicate	RPD Area (sq.cm)	Mean RPD (cm)	Mud Clast Number	Mud Clast State	Methane?	Max bubble size above or below 5 mm diameter?	Low DO?	Comment
NHAV14-N	9	B	42.1	2.9	0	-	n	-	n	silt-clay, surface slopes down to the left, small tubes in background, transected burrows at depth
NHAV14-N	9	C	7.6	0.5	0	-	n	-	n	silt-clay, shell frag in background, small tubes in background, large void below aRPD at center,
NHAV14-N	10	A	3.5	0.2	10+	both	n	-	n	silt-clay, mud clast artifacts at SWI, surface disturbed at left from prism drag down of debris or shell, evidence of burrowing below aRPD at center, tiny tubes at SW and background
NHAV14-N	10	B	7.2	0.5	10+	both	n	-	n	silt-clay, mud clast artifacts from mud doors at SWI, voids below aRPD at center and right, evidence of burrowing below aRPD at center and left, tiny tubes at SWI and in background
NHAV14-N	10	D	ind	ind	10+	both	n	-	n	Silt-clay with surface disturbed from doors, aRPD cannot be determined, voids below surface at left, shell frag just below surface at center
NHAV14-N	11	A	13.3	0.9	1	reduced	n	-	n	silt-clay, mud clast artifact at SWI, burrow cast mounds in background at left, voids below aRPD at left and center, evidence of burrowing below aRPD at center, tiny shell frags at SWI at center and right
NHAV14-N	11	B	12.6	0.9	6	both	n	-	n	silt-clay, mud clast artifacts at SWI and in background, shell frags at SWI and in background at left, evidence of burrowing below aRPD at center.
NHAV14-N	11	C	13.6	0.9	10+	both	n	-	n	silt-clay, mud clast artifacts at SWI, voids below aRPD at left and right, evidence of burrowing below aRPD at center and right
NHAV14-N	12	A	10.0	0.7	10+	both	n	-	n	silt-clay, mud clast artifacts at SWI and in background, burrow casts at SWI, voids below aRPD at center-left, evidence of burrowing below aRPD at center-left.

Location	Station	Replicate	RPD Area (sq.cm)	Mean RPD (cm)	Mud Clast Number	Mud Clast State	Methane?	Max bubble size above or below 5 mm diameter?	Low DO?	Comment
NHAV14-N	12	B	21.8	1.5	4	reduced	n	-	n	silt-clay, mud clast artifacts at SWI, burrow casts at SWI at center and left, voids below aRPD at center and left, evidence of burrowing below aRPD at left right and center
NHAV14-N	12	D	9.6	0.7	10+	both	n	-	n	silt-clay, mud clast artifacts from doors at SWI, shell frag in background, voids below aRPD at right, polychaete below aRPD at center, burrow casts at SWI at left
NHAV14-N	13	A	37.6	2.6	10+	both	n	-	n	silt-clay, mud clast artifacts at SWI and in background, small tubes in background, void below aRPD at left
NHAV14-N	13	B	4.9	0.3	3	reduced	n	-	n	silt-clay, mud clast artifacts at SWI, gastropod in background, evidence of burrowing below aRPD at left
NHAV14-N	13	D	13.6	0.9	7	both	n	-	n	silt-clay, mud clast artifacts at surface and in background, tiny tubes at SWI
NHAV14-N	14	B	29.7	2.0	0	-	n	-	n	silt-clay, mud clast artifacts at SWI at center, gastropod at SWI, shell frag above aRPD at left, small tubes at SWI and in background, evidence of burrowing below aRPD at right and center-left
NHAV14-N	14	C	37.1	2.5	0	-	n	-	n	silt-clay, shell frag at SWI at right, small tubes at SWI and in background, evidence of burrowing below aRPD at right
NHAV14-N	14	D	16.3	1.1	10+	reduced	n	-	n	silt-clay, mud clast artifacts at SWI and in background, tubes in background, voids below aRPD at center, evidence of burrowing below aRPD at center
NHAV14-N	15	A	25.7	1.8	10+	oxidized	n	-	n	silt-clay, mud clast artifacts at SWI and in background, gastropods at SWI
NHAV14-N	15	B	14.8	1.0	1	reduced	n	-	n	silt-clay, surface slopes downward to the right, voids below aRPD, tubes at SWI, reduced mud clast at SWI at left, evidence of burrowing below aRPD at right
NHAV14-N	15	D	48.1	3.3	7	both	n	-	n	silt-clay, mud clast artifacts at SWI, evidence of burrowing above and below aRPD at left

Location	Station	Replicate	RPD Area (sq.cm)	Mean RPD (cm)	Mud Clast Number	Mud Clast State	Methane?	Max bubble size above or below 5 mm diameter?	Low DO?	Comment
NHAV14-N	16	I	4.7	0.3	10+	both	n	-	n	silt-clay, surface disturbed by mud doors, tubes at SWI and in background, gastropod at SWI at center, evidence of burrowing below aRPD at right
NHAV14-N	16	K	25.3	1.7	4	reduced	n	-	n	silt-clay, mud clast artifacts at SWI and in background, tubes at SWI and in background,
NHAV14-N	16	L	30.7	2.1	10+	both	n	-	n	silt-clay, mud clast artifacts at SWI and in background, tubes at SWI and in background, evidence of burrowing above aRPD at right
NHAV14-N	17	A	18.7	1.3	0	-	n	-	n	silt-clay, void below aRPD at right, evidence of burrowing below aRPD at center and right, tubes at SWI, shell frag below aRPD at center
NHAV14-N	17	B	6.4	0.4	3	reduced	n	-	n	silt clay, tubes at SWI, voids below aRPD at center, evidence of burrowing below aRPD at left right and center
NHAV14-N	17	D	ind	ind	0	-	n	-	n	Silt-clay, last 2 reps over-penetrated
NHAV14-N	18	A	6.2	0.4	2	reduced	n	-	n	silt-clay, large reduced mud clast artifacts s at SWI, small tubes at SWI, shell frag at SWI
NHAV14-N	18	B	4.8	0.3	0	-	n	-	n	silt-clay, tubes at SWI, void below aRPD at center,
NHAV14-N	18	C	10.7	0.7	10+	reduced	n	-	n	silt-clay, surface disturbed, reduced mud clast artifacts at SWI,
NHAV14-S	19	A	11.0	0.8	1	reduced	n	-	n	silt-clay, mud clast artifact at SWI at left, evidence of burrowing below aRPD at center and right
NHAV14-S	19	C	23.3	1.6	0	-	n	-	n	silt-clay, surface slopes down to th eright, tubes at SWI, shell frags above aRPD at left and center, void below aRPD at center, evidence of burrowing below aRPD at right
NHAV14-S	19	D	12.0	0.8	0	-	n	-	n	silt-clay, void below aRPD at center, evidence of burrowing below aRPD at right
NHAV14-S	20	E	27.1	1.9	0	-	n	-	n	fine silt-clay, homogeneous subsurface fabric
NHAV14-S	20	F	3.0	0.2	2	reduced	n	-	n	silt-clay, reduced mud clast artifacts at SWI at center, small tubes at SWI and in background

Location	Station	Replicate	RPD Area (sq.cm)	Mean RPD (cm)	Mud Clast Number	Mud Clast State	Methane?	Max bubble size above or below 5 mm diameter?	Low DO?	Comment
NHAV14-S	20	G	6.9	0.5	1	reduced	n	-	n	silt-clay, shell frag at SWI at center, reduced mud clast artifact at SWI at left, void below aRPD at right
NHAV14-S	21	I	7.7	0.5	0	-	n	-	n	silt-clay, surfce even, tiny tubes at SWI and in background, evidence of burrowing below aRPD at left, shell frag above aRPD at left
NHAV14-S	21	J	7.4	0.5	0	-	n	-	n	silt-clay, tiny tubes at SWI and in background,reduced mud clast artfiacts from doors at SWI, gastropod at SWI
NHAV14-S	21	K	ind	ind	ind	-	n	-	n	clay, surface heavily disturbed, aRPD cannot be determined due to sediment disturbance
NHAV14-S	22	A	22.3	1.5	0	-	n	-	n	silt-clay, tiny tubes at SWI, homogenous DM > penetration
NHAV14-S	22	B	17.7	1.2	9	reduced	n	-	n	silt-clay, tiny tubes at SWI, reduced mud clasts at SWI, evidence of burrowing below aRPD at center, burrow extends from surface below aRPD
NHAV14-S	22	D	10.2	0.7	2	reduced	n	-	n	silt-clay, tiny tubes at SWI, reduced mud clasts at SWI, evidence of burrowing below aRPD at left right and center, U-shaped burrow extends from surface below aRPD at center, burrow extends from surface below aRPD at right
NHAV14-S	23	A	4.4	0.3	2	oxidized	n	-	n	silt-clay, tiny tubes at SWI, ox mud clasts at SWI, voids below aRPD, evidence of burrowing below aRPD at right
NHAV14-S	23	B	19.1	1.3	0	-	n	-	n	silt-clay, tiny tubes at SWI, voids below aRPD at center, evidence of burrowing below aRPD
NHAV14-S	23	D	12.6	0.9	1	reduced	n	-	n	silt-clay, tiny tubes at SWI, reduced mud clast artifact at SWI at left, evidence of burrowing below aRPD at right and left
NHAV14-S	24	A	4.7	0.3	0	-	n	-	n	silt-clay, shell frag at SWI at left, burrow cast at SWI at right, void below aRPD at center, evidence of burrowing below aRPD at left
NHAV14-S	24	C	16.8	1.2	0	-	n	-	n	silt-clay, surface dips in center, evidence of burrowing at and above aRPD

Location	Station	Replicate	RPD Area (sq.cm)	Mean RPD (cm)	Mud Clast Number	Mud Clast State	Methane?	Max bubble size above or below 5 mm diameter?	Low DO?	Comment
NHAV14-S	24	D	29.6	2.0	2	reduced	n	-	n	silt-clay, surface slopes to right slightly, voids below aRPD, evidence of burrowing below aRPD at center and right.
NHAV14-S	25	A	7.6	0.5	0	-	n	-	n	silt-clay, shell frag at SWI at center, void below aRPD at left, evidence of burrowing below aRPD at right
NHAV14-S	25	B	11.9	0.8	10+	both	n	-	n	silt-clay, voids below aRPD at left, evidence of burrowing below aRPD at left, mud clast artifacts at SWI
NHAV14-S	25	D	30.1	2.1	1	reduced	n	-	n	silt-clay, reduced mud clast wiper blade artifact at SWI at center, aRPD substantially deeper on right side of image, void below aRPD at right
NHAV14-S	26	A	35.5	2.4	0	-	n	-	n	silt-clay, evidence of burrowing below aRPD at center
NHAV14-S	26	B	44.0	3.0	4	reduced	n	-	n	silt-clay, mud clast artifacts at SWI at left, evidence of large scale burrowing below aRPD
NHAV14-S	26	C	15.2	1.0	0	-	n	-	n	silt-clay, surface disturbed, burrow casts at SWI at center, void below aRPD at right, evidence of burrowing below aRPD at left right and center
MQR	1	A	19.1	1.3	0	-	n	-	n	Silty very fine sand , shell frag at SWI at left and center, tubes at SWI, evidence of transected burrows throughout profile, bioturbation exceeds prism penetration depth
MQR	1	C	32.0	2.2	0	-	n	-	n	Silty very fine sand over silt-clay, evidence of burrowing below aRPD at center, tubes at SWI, shell frags at SWI at right, large void traversing from SWI to below aRPD at right, small tubes @ SWI
MQR	1	D	53.6	3.7	0	-	n	-	n	silt-clay, burrow at SWI at center left, voids below aRPD at center and left, evidence of burrowing below aRPD at left
MQR	2	A	29.7	2.0	0	-	n	-	n	Silty very fine sand over silt-clay, shell frags at SWI, large void below aRPD at center, evidence of burrowing below aRPD at left, shell frags at aRPD at left and center
MQR	2	B	43.9	3.0	0	-	n	-	n	Silty very fine sand over silt-clay, shell frags at SWI, tubes in background, void below aRPD at left, evidence of burrowing below aRPD at right

Location	Station	Replicate	RPD Area (sq.cm)	Mean RPD (cm)	Mud Clast Number	Mud Clast State	Methane?	Max bubble size above or below 5 mm diameter?	Low DO?	Comment
MQR	2	C	30.2	2.1	0	-	n	-	n	Silty fine sand over silt-clay, Crepidula shell armoring at SWI, large void below aRPD at center left, white organism at SWI, similar organisms on shells in background
MQR	3	A	34.4	2.4	0	-	n	-	n	silt-clay with very fine sand at surface over blue clay layer (DM),small to large voids below aRPD, shell frags at SWI, small tubes at SWI
MQR	3	B	38.3	2.6	0	-	n	-	n	Very fine sandy silt-clay, shell frags at SWI, large void below aRPD, bioturbation depth exceeds prism penetration depth
MQR	3	C	42.8	2.9	0	-	n	-	n	silt-clay with very fine sand in upper few cm, tiny shell frags above and below aRPD, transected burrows at depth
MQR	4	A	35.6	2.4	0	-	n	-	n	Silty very fine sand, shell frags above and below aRPD, evidence of burrowing below aRPD at left, lots of particulates in background on surface
MQR	4	C	27.6	1.9	3	oxidized	n	-	n	Silty very fine sand with shell frags above aRPD, evidence of burrowing below aRPD at right, wood fibers throughout sedimentary matrix
MQR	4	D	37.3	2.6	0	-	n	-	n	Silty very fine sand over silt-clay, tiny shell frags above and below aRPD, burrow castings at SWI at right
CLIS-08	1	A	39.3	2.7	0	-	n	-	n	silt-clay, polychaete burrow traverses from SWI to below aRPD, small tubes @ SWI, traces of Beggiatoa
CLIS-08	1	B	13.4	0.9	0	-	n	-	n	silt-clay, gastropod on surface at right, void below aRPD at right, evidence of burrowing at aRPD, small tubes @ SWI, traces of Beggiatoa
CLIS-08	1	C	36.1	2.5	0	-	n	-	n	silt-clay, evidence of burrowing below aRPD at left and right, small tubes @ SWI, Beggiatoa traces in upper 2 cm
CLIS-08	2	A	12.6	0.9	0	-	n	-	n	silt-clay, brown algage at SWI, large voids below aRPD, shell frags at aRPD at left and right

Location	Station	Replicate	RPD Area (sq.cm)	Mean RPD (cm)	Mud Clast Number	Mud Clast State	Methane?	Max bubble size above or below 5 mm diameter?	Low DO?	Comment
CLIS-08	2	B	29.9	2.0	1	reduced	n	-	n	silt-clay, small wiper blade mud clast at SWI, evidence of large burrower below aRPD at center, aRPD lower at right; small tubes @ SWI
CLIS-08	2	D	12.6	0.9	0	-	n	-	n	silt-clay, small tunicates at SWI at left, void below aRPD at left, worm in burrow at aRPD at center right
CLIS-08	3	A	36.2	2.5	0	-	y	below	n	silt-clay, small ox and red mud clasts at SWI, voids w/ methane bubbles below aRPD at center, traces of Beggiatoa in upper 2 cm
CLIS-08	3	B	22.8	1.6	0	-	n	-	n	silt-clay, large void below aRPD at center, small tubes @ SWI.
CLIS-08	3	C	31.7	2.2	0	-	n	-	n	silt-clay, extra large void below aRPD at left and center, dense assemblage of small tubes @ SWI
CLIS-08	4	A	43.0	3.0	0	-	n	-	n	silt-clay, DM > pen, shell frag just below SWI, bivalve shell at SWI at right, large voids below aRPD at right, med void below aRPD at left, worm in burrow below aRPD at center, tiny worm tubes at SWI
CLIS-08	4	C	32.7	2.2	0	-	n	-	n	silt-clay, burrow extends through aRPD from surface a right, shell frags above aRPD, small tubes @ SWI
CLIS-08	4	D	38.6	2.7	0	-	n	-	n	silt-clay, small shell frag just below SWI, transected burrows at depth
CLIS-08	5	A	29.0	2.0	0	-	n	-	n	silt-clay, void below aRPD center, evidence of burrowing below aRPD center
CLIS-08	5	B	31.7	2.2	1	reduced	y	above	n	silt-clay, large reduced mud clast at SWI on right (camera artifact), traces of Beggiatoa in upper 2-3 cm
CLIS-08	5	D	33.8	2.3	0	-	y	above	n	silt-clay grading up to very fine sand, capitellids visible against faceplate
CLIS-09	1	A	21.8	1.5	0	-	n	-	n	Consolidated silty very fine sand (DM) over sandy silt-clay evidence of extensive burrowing at depth
CLIS-09	1	B	39.1	2.7	0	-	n	-	n	silt-clay grading up to very fine sand, shell frag at SWI, void just below aRPD at left

Location	Station	Replicate	RPD Area (sq.cm)	Mean RPD (cm)	Mud Clast Number	Mud Clast State	Methane?	Max bubble size above or below 5 mm diameter?	Low DO?	Comment
CLIS-09	1	D	ind	ind	0	-	n	-	n	Silty very fine sand, large shells in background, evidence of burrowing just below SWI at right, large void above aRPD at left, penetration only 25% of vertical FOV, aRPD > penetration
CLIS-09	2	B	49.2	3.4	0	-	n	-	n	Silty very fine sand, DM > penetration, void above aRPD at right, evidence of large burrower above and below aRPD at right, small shell frags at aRPD at left, brown algae in background
CLIS-09	2	C	12.9	0.9	0	-	n	-	n	silty very fine sand, surface w/ large burrow opening at right, void below aRPD at right
CLIS-09	2	D	48.2	3.3	0	-	n	-	n	silt-clay grading up to silty very fine sand, void above aRPD at left, evidence of burrowing below aRPD at left and center.
CLIS-09	3	A	34.4	2.4	0	-	n	-	n	silt-clay, void below aRPD at center and right, evidence of burrowing below aRPD at center, small tubes @ SWI
CLIS-09	3	B	44.0	3.0	0	-	y	above	n	silt-clay, void w/ gas bubble just below aRPD and at depth, voids below aRPD at left and right, evidence of burrowing below aRPD at right below void.
CLIS-09	3	C	57.3	3.9	0	-	n	-	n	Very fine sandy silt-clay, void at aRPD at left, evidence of burrowing below aRPD at center
CLIS-09	4	A	49.2	3.4	0	-	n	-	n	silt at depth grading to silty fine to medium sand, shell frags and pebbles armoring surface, fecal pellets overlaying fine sand at right, void below aRPD at right
CLIS-09	4	B	ind	ind	0	-	n	-	n	Silty fine sand, some surface armoring, aRPD > penetration
CLIS-09	4	C	62.1	4.3	0	-	n	-	n	Silty fine to medium sand, extensive reworking to depth, surface armoring with pebble and shell fragments
CLIS-09	5	A	26.2	1.8	0	-	n	-	n	Consolidated silt-clay (all DM), some shell fragments at SWI, subsurface deposit feeders evident
CLIS-09	5	B	32.8	2.2	0	-	n	-	n	Silty fine sand over silt-clay, void above aRPD at right, voids below aRPD at left, evidence of burrowing below aRPD at left and center.

Location	Station	Replicate	RPD Area (sq.cm)	Mean RPD (cm)	Mud Clast Number	Mud Clast State	Methane?	Max bubble size above or below 5 mm diameter?	Low DO?	Comment
CLIS-09	5	C	23.6	1.6	0	-	n	-	n	Poorly-sorted silty fine to very fine sand, feedign voids below aRPD at left and right, worm in burrow above aRPD at center right.
CLIS-10	1	B	20.4	1.4	0	-	n	-	n	silt-clay grading up to very fine sand, large void below aRPD at right, mound of reduced fecal pellets above void at SWI, Mulinia present in upper 2-3 cm.
CLIS-10	1	C	35.5	2.4	0	-	n	-	n	silt-clay grading up to silty very fine sand, lots of shell fragments at SWI and within aRPD layer (shell frags, wood particles, gastropod shells, tunicates, EPS), pectinariade burrow at SWI at right, void below aRPD at left, high density of Mulinia in surface oxidized layer
CLIS-10	1	E	7.5	0.5	6	both	n	-	n	silt-clay grading up to very fine sand, small tubes @ SWI, capitellids at depth, DM > penetration.
CLIS-10	2	B	26.6	1.8	0	-	n	-	n	silt-clay, void below aRPD at left, polychaete in burrow below aRPD at left and center, Mulinia in oxidized layer, transected burrow at bottom left
CLIS-10	2	C	30.0	2.1	1	reduced	n	-	n	silt-clay with very fine sand and Mulinia in surface 2-3 cm, very large burrow below aRPD (arthropod?), reduced mud clasts (camera artifact) at SWI at left.
CLIS-10	2	D	ind	ind	0	-	n	-	n	silt-clay, huge indentation in center of surface due to disturbance (likely from camera), aRPD not identifiable
CLIS-10	3	A	7.5	0.5	0	-	n	-	n	silt-clay, gastropod on surface at center, evidence of burrowing above aRPD at left
CLIS-10	3	C	20.8	1.4	0	-	n	-	n	silt clay with some very fine sand in upper surface layer, fecal pellets at SWI at right, tubes in background at right, disturbed surface, evidence of subsurface burrowing
CLIS-10	3	D	16.6	1.1	0	-	n	-	n	silt-clay, tubes and shell fragments at SWI, void below aRPD at left, transected burrow at bottom left

Location	Station	Replicate	RPD Area (sq.cm)	Mean RPD (cm)	Mud Clast Number	Mud Clast State	Methane?	Max bubble size above or below 5 mm diameter?	Low DO?	Comment
CLIS-10	4	A	36.3	2.5	0	-	n	-	n	silt-clay with shell fragments and very fine sand in upper 3 cm, voids below aRPD at center, void at aRPD at center, evidence of burrowing below aRPD at left and right.
CLIS-10	4	B	22.1	1.5	0	-	n	-	n	silt-clay with fine sand and shell frags just below surface, voids below aRPD at left and right, evidence of burrowing below aRPD at center right.
CLIS-10	4	D	31.5	2.2	0	-	n	-	n	silt-clay, Gammarid on surface at left, small tubes on surface, voids below aRPD at right, evidence of burrowing below aRPD at left
CLIS-10	5	B	9.5	0.6	0	-	n	-	n	silt-clay, shell frag at surface at right, tubes at SWI, homogeneous subsurface texture
CLIS-10	5	C	31.1	2.1	0	-	n	-	n	silt-clay, shell frag at SWI and in upper 2 cm, voids below aRPD at center and right, small tubes at SWI at left
CLIS-10	5	D	18.8	1.3	0	-	n	-	n	silt-clay, tiny tubes at SWI, DM > penetration, some subsurface burrowing
2500W REF	1	A	32.7	2.2	0	-	n	-	n	clay grading up to silt, large feeding void below aRPD at lower right, small tubes @ SWI
2500W REF	1	B	52.8	3.6	0	-	n	-	n	clay grading up to silt, bioturbation in excess of prism penetration depth, small tubes @ SWI
2500W REF	1	C	55.5	3.8	4	reduced	n	-	n	clay grading up to silt, large feeding void below aRPD at left, small feeding void above aRPD in center, 4 reduced mud clasts at SWI are wiper blade artifacts, small tubes @ SWI
2500W REF	2	B	55.1	3.8	0	-	n	-	n	clay grading up to silt, surface slants down to the right, med feeding void above aRPD on left, large feeding voids below aRPD on left and right, small infauna tubes at SWI
2500W REF	2	C	54.7	3.8	0	-	n	-	n	clay grading up to silt, void above aRPD at center, void below aRPD in center, small tubes @ SWI, evidence of subsurface burrowing throughout profile.

Location	Station	Replicate	RPD Area (sq.cm)	Mean RPD (cm)	Mud Clast Number	Mud Clast State	Methane?	Max bubble size above or below 5 mm diameter?	Low DO?	Comment
2500W REF	2	D	38.5	2.6	0	-	n		n	clay grading up to silt, small void at RPD at center, transected burrow at depth lower right
2500W REF	3	A	47.6	3.3	0	-	n	-	n	clay grading up to silt, small void just below RPD at left, transected burrows at depth
2500W REF	3	B	43.4	3.0	0	-	n	-	n	Silt clay with low density of small tubes @ SWI, evidence of subsurface burrowing throughout profile
2500W REF	3	C	56.6	3.9	6	both	n	-	n	silt-clay, large clumps at left of SWI, reduced and oxidized mud clasts on SWI (base sled artifacts), evidence of larger burrow below aRPD
2500W REF	4	A	69.4	4.8	0	-	n	-	n	silt-clay, relatively large void below aRPD at center, evidence of large burrow in lower right corner, gastropd & small tubes @ SWI
2500W REF	4	B	65.9	4.5	0	-	n	-	n	silt-clay, small void above aRPD at center, small and large voids below aRPD at centner, bioturbation depth exceeds prism penetration depth
2500W REF	4	G	43.9	3.0	5	reduced	n	-	n	silt-clay, reduced mud clasts at SWI (base sled artifacts), small shell frag just below SWI, void below aRPD at left, evidence of large burrow at left bottom edge of image
2500W REF	5	A	47.8	3.3	0	-	n	-	n	silt-clay, small tubes at SWI, smal shell frags below aRPD, evidence of subsurface burrowing throughout profile
2500W REF	5	B	52.6	3.6	0	-	n	-	n	silt-clay, void at aRPD at left, void below aRPD at center, evidence of larger burrowers below aRPD a center and left
2500W REF	5	D	40.9	2.8	1	reduced	n	-	n	silt-clay, mud clast at SWI is wiper blade artifact, voids below aRPD at center, transected burrows @ depth, small tubes @ SWI
4500E REF	1	A	49.8	3.4	0	-	n	-	n	silt-clay, small shell frag below aRPD at center, polychate in burrow above aRPD at center, voids below aRPD at left, small tubes @ SWI
4500E REF	1	C	53.6	3.7	3	reduced	n	-	n	silt-clay, mud clasts at SWI are camera artifacts, bivalve shell above aRPD at center, void just above aRPD at right,

Location	Station	Replicate	RPD Area (sq.cm)	Mean RPD (cm)	Mud Clast Number	Mud Clast State	Methane?	Max bubble size above or below 5 mm diameter?	Low DO?	Comment
										voids/transected burrows below aRPD at center and right, shell frag below aRPD at left and right
4500E REF	1	D	67.2	4.6	8	reduced	n	-	n	silt-clay, mud clasts at SWI are wiper-blade artifacts, polychaete in burrow above aRPD at left, voids below SWI at left and center, evidence of large burrow below aRPD at right
4500E REF	2	A	42.4	2.9	10+	both	n	-	n	silt-clay, lots of small mud clasts on at SWI (base sled artifact), shell frag above aRPD at center, large void below aRPD at left, evidence of med to large burrow below aRPD at right
4500E REF	2	B	52.6	3.6	6	oxidized	n	-	n	silt-clay, mud clasts at SWI are camera artifacts, worms visible against faceplate at depth, void below aRPD at center, shell frag below aRPD at centner and right
4500E REF	2	C	49.8	3.4	4	reduced	n	-	n	silt-clay, reduced mud clasts at SWI (camera artifact), void below aRPD, subsurface burrowing throughout profile.
4500E REF	3	A	47.6	3.3	0	-	n	-	n	silt-clay, portions of worms visible against faceplate at depth, evidence of subsurface burrowing
4500E REF	3	B	51.5	3.5	0	-	n	-	n	silt-clay, void below aRPD at center, evidence of med burrow below aRPD at left, bioturbation exceeds prism penetration depth
4500E REF	3	D	50.4	3.5	0	-	n	-	n	clay grading up to silty fine sand, shell frag at aRPD at left, shell frag below aRPD at center, transected burrows at depth.
4500E REF	4	A	52.6	3.6	0	-	n	-	n	silt-clay, void below aRPD at left, polychaete in burrow below aRPD at right, shell frag below aRPD at left, bioturbation exceeds prism penetration depth
4500E REF	4	B	53.1	3.6	6	both	n	-	n	silt-clay, camera artifact mud clasts at SWI, shell frag below aRPD at center, evidence of subsurface burrowing throughout profile

Sediment-Profile Image Analysis Results

Location	Station	Replicate	RPD Area (sq.cm)	Mean RPD (cm)	Mud Clast Number	Mud Clast State	Methane?	Max bubble size above or below 5 mm diameter?	Low DO?	Comment
4500E REF	4	D	55.3	3.8	1	reduced	n	-	n	silt-clay, small reduced mud clast (camera artifact) at SWI, void below aRPD at left, evidence of med burrower below aRPD at center.
4500E REF	5	B	52.9	3.6	0	-	n	-	n	silt-clay, void below aRPD at center, polychaete in burrow below aRPD at center, burrow, evidence of large burrower below aRPD at left, burrows at SWI, small shell frag below aRPD at left
4500E REF	5	C	45.8	3.1	6	both	n	-	n	silt-clay, mud clasts (camera artifacts) at SWI, void at aRPD at right, small shell frag below aRPD at left
4500E REF	5	D	51.4	3.5	1	reduced	n	-	n	silt-clay, wiper blade mud clast at SWI, evidence of large burrower below aRPD at left, shell frag below aRPD at center, horizontal burrow above aRPD at left
CLIS REF	1	A	44.0	3.0	0	-	n	-	n	silt-clay, void above aRPD at center, void below aRPD at left, evidence of burrowing below aRPD at left
CLIS REF	1	B	38.8	2.7	0	-	n	-	n	silt-clay, evidence of burrowing below aRPD at center, bioturbation exceeds prism penetration depth
CLIS REF	1	C	52.8	3.6	3	oxidized	n	-	n	silt-clay, evidence of burrowing below aRPD at left and right void below aRPD
CLIS REF	2	A	47.3	3.2	0	-	n	-	n	silt-clay, voids below aRPD at right, bioturbation exceeds prism penetration depth
CLIS REF	2	B	51.2	3.5	10+	both	n	-	n	silt-clay, voids below aRPD at center and right, evidence of burrowing below aRPD at left, small to med reduced and ox mud clasts at SWI (camera artifacts)
CLIS REF	2	C	42.8	2.9	4	reduced	n	-	n	silt-clay, shell frag at SWI, evidence of burrowing below aRPD at right, transected burrows at depth
CLIS REF	3	B	45.4	3.1	10+	both	n	-	n	silt-clay, ox mud clasts at SWI from camera sled & wiper blade, portions of polychaetes visible against faceplate at depth
CLIS REF	3	C	20.9	1.4	0	-	n	-	n	silt-clay, voids below aRPD at right and left, evidence of subsurface burrowing throughout profile to depth

Sediment-Profile Image Analysis Results

Location	Station	Replicate	RPD Area (sq.cm)	Mean RPD (cm)	Mud Clast Number	Mud Clast State	Methane?	Max bubble size above or below 5 mm diameter?	Low DO?	Comment
CLIS REF	3	D	44.7	3.1	0	-	n	-	n	silt-clay, gastropod at SWI at right, shell frag at RPD at right, voids below aRPD at right and left, evidence of burrow below aRPD at left and right
CLIS REF	4	A	37.6	2.6	0	-	n	-	n	silt-clay, large void below aRPD at center
CLIS REF	4	B	53.7	3.7	1	reduced	n	-	n	silt-clay, wiper blade mud clast at SWI, evidence of burrowing below aRPD at left, evidence of burrowing above aRPD at center and right, transected burrows at depth
CLIS REF	4	D	34.8	2.4	0	-	n	-	n	silt-clay, evidence of burrowing below aRPD at left and center
CLIS REF	5	A	37.3	2.6	0	-	n	-	n	silt-clay, voids below aRPD at left, evidence of burrowing below aRPD at right
CLIS REF	5	B	49.2	3.4	2	reduced	n	-	n	silt-clay, reduced mud clasts from wiper blade at SWI, void at aRPD at left, evidence of burrowing below aRPD at left and at aRPD at right
CLIS REF	5	D	27.9	1.9	3	reduced	n	-	n	silt-clay, mud clasts from camera base sled at SWI, void below aRPD at right, evidence of burrowing below aRPD at left

Note: 1) "ind" indicates that the sample result was indeterminate
2) "mean" indicates the mean value across a single sediment profile image

Sediment-Profile Image Analysis Results

Location	Station	Replicate	# of Feeding Voids	Void Minimum Depth (cm)	Void Maximum Depth (cm)	Void Average Depth (cm)	Successional Stage
NHAV14-N	1	A	0	0.0	0.0	0.0	1
NHAV14-N	1	F	0	0.0	0.0	0.0	1 -> 2
NHAV14-N	1	G	1	1.4	2.3	1.8	1 -> 2
NHAV14-N	2	D	0	0.0	0.0	0.0	1 -> 2
NHAV14-N	2	E	0	0.0	0.0	0.0	1
NHAV14-N	2	F	0	0.0	0.0	0.0	1 -> 2
NHAV14-N	3	A	0	0.0	0.0	0.0	2 -> 3
NHAV14-N	3	B	4	2.8	6.5	4.7	1 on 3
NHAV14-N	3	C	2	1.7	2.3	2.0	1 on 3
NHAV14-N	4	B	1	1.3	1.8	1.6	2 -> 3
NHAV14-N	4	C	2	2.0	3.6	2.8	2 -> 3
NHAV14-N	4	D	0	0.0	0.0	0.0	2 -> 3
NHAV14-N	5	A	2	5.0	7.0	6.0	1 -> 2
NHAV14-N	5	B	0	0.0	0.0	0.0	1
NHAV14-N	5	D	2	3.3	4.2	3.7	1 -> 2
NHAV14-N	6	A	2	1.1	3.2	2.2	1 -> 2
NHAV14-N	6	B	0	0.0	0.0	0.0	1 -> 2
NHAV14-N	6	D	3	2.3	4.6	3.5	1 -> 2
NHAV14-N	7	B	2	1.1	1.7	1.4	Indeterminate
NHAV14-N	7	C	2	1.4	4.2	2.8	Indeterminate
NHAV14-N	7	D	0	0.0	0.0	0.0	Indeterminate
NHAV14-N	8	A	0	0.0	0.0	0.0	2
NHAV14-N	8	B	1	5.0	7.6	6.3	2 -> 3
NHAV14-N	8	F	0	0.0	0.0	0.0	2
NHAV14-N	9	A	0	0.0	0.0	0.0	1 on 3
NHAV14-N	9	B	0	0.0	0.0	0.0	1 on 3
NHAV14-N	9	C	1	8.4	9.8	9.1	1 on 3
NHAV14-N	10	A	0	0.0	0.0	0.0	1 -> 2
NHAV14-N	10	B	3	1.5	6.2	3.9	2 -> 3
NHAV14-N	10	D	2	1.5	8.5	5.0	2 -> 3
NHAV14-N	11	A	2	7.4	8.7	8.1	1 on 3
NHAV14-N	11	B	0	0.0	0.0	0.0	2
NHAV14-N	11	C	2	1.7	3.6	2.6	2 -> 3
NHAV14-N	12	A	2	5.4	8.1	6.8	2 -> 3
NHAV14-N	12	B	3	4.2	10.1	7.1	1 on 3
NHAV14-N	12	D	2	5.0	5.8	5.4	2 -> 3
NHAV14-N	13	A	1	5.0	5.4	5.2	2 -> 3
NHAV14-N	13	B	0	0.0	0.0	0.0	1 -> 2

Location	Station	Replicate	# of Feeding Voids	Void Minimum Depth (cm)	Void Maximum Depth (cm)	Void Average Depth (cm)	Successional Stage
NHAV14-N	13	D	0	0.0	0.0	0.0	1 on 2
NHAV14-N	14	B	0	0.0	0.0	0.0	1 on 2
NHAV14-N	14	C	0	0.0	0.0	0.0	1 on 2
NHAV14-N	14	D	2	3.3	7.8	5.6	1 on 2
NHAV14-N	15	A	1	1.4	2.5	2.0	2 -> 3
NHAV14-N	15	B	5	3.1	6.7	4.9	2 -> 3
NHAV14-N	15	D	0	0.0	0.0	0.0	2 -> 3
NHAV14-N	16	I	0	0.0	0.0	0.0	1 -> 2
NHAV14-N	16	K	0	0.0	0.0	0.0	1
NHAV14-N	16	L	0	0.0	0.0	0.0	1
NHAV14-N	17	A	1	1.6	7.8	4.7	1 on 2
NHAV14-N	17	B	2	3.1	8.5	5.8	1 on 2
NHAV14-N	17	D	0	0.0	0.0	0.0	Indeterminate
NHAV14-N	18	A	0	0.0	0.0	0.0	1
NHAV14-N	18	B	1	1.8	2.2	2.0	1 -> 2
NHAV14-N	18	C	0	0.0	0.0	0.0	1 -> 2
NHAV14-S	19	A	0	0.0	0.0	0.0	2 -> 3
NHAV14-S	19	C	1	4.2	5.9	5.0	1 on 3
NHAV14-S	19	D	1	3.1	3.8	3.5	2
NHAV14-S	20	E	0	0.0	0.0	0.0	1
NHAV14-S	20	F	0	0.0	0.0	0.0	1
NHAV14-S	20	G	1	7.4	9.3	8.4	2
NHAV14-S	21	I	0	0.0	0.0	0.0	1
NHAV14-S	21	J	0	0.0	0.0	0.0	1
NHAV14-S	21	K	0	0.0	0.0	0.0	1
NHAV14-S	22	A	0	0.0	0.0	0.0	1
NHAV14-S	22	B	0	0.0	0.0	0.0	1 -> 2
NHAV14-S	22	D	0	0.0	0.0	0.0	1 on 2
NHAV14-S	23	A	3	2.6	7.8	5.2	1 on 2
NHAV14-S	23	B	1	3.5	4.8	4.1	2 -> 3
NHAV14-S	23	D	0	0.0	0.0	0.0	1 on 2
NHAV14-S	24	A	1	3.7	4.7	4.2	2
NHAV14-S	24	C	0	0.0	4.1	2.0	2
NHAV14-S	24	D	4	4.1	6.0	5.1	2 -> 3
NHAV14-S	25	A	1	6.5	8.5	7.5	1 -> 2
NHAV14-S	25	B	2	1.7	6.1	3.9	1 -> 2
NHAV14-S	25	D	1	8.1	9.4	8.8	2 -> 3
NHAV14-S	26	A	0	0.0	0.0	0.0	2

Location	Station	Replicate	# of Feeding Voids	Void Minimum Depth (cm)	Void Maximum Depth (cm)	Void Average Depth (cm)	Successional Stage
NHAV14-S	26	B	1	3.2	5.2	4.2	3
NHAV14-S	26	C	1	3.1	6.5	4.8	3
MQR	1	A	0	0.0	0.0	0.0	1 on 3
MQR	1	C	0	0.0	0.0	0.0	1 on 3
MQR	1	D	3	8.1	16.9	12.5	3
MQR	2	A	1	9.2	12.9	11.1	3
MQR	2	B	1	8.7	9.7	9.2	1 on 3
MQR	2	C	1	5.4	6.8	6.1	2 -> 3
MQR	3	A	5	2.6	13.2	7.9	1 on 3
MQR	3	B	1	7.9	10.9	9.4	3
MQR	3	C	0	0.0	0.0	0.0	2 -> 3
MQR	4	A	0	0.0	0.0	0.0	1 on 3
MQR	4	C	0	0.0	0.0	0.0	2 -> 3
MQR	4	D	0	0.0	0.0	0.0	2 -> 3
CLIS-08	1	A	0	0.0	0.0	0.0	2 -> 3
CLIS-08	1	B	1	9.0	10.2	9.6	1 on 2
CLIS-08	1	C	0	0.0	0.0	0.0	2 -> 3
CLIS-08	2	A	4	3.8	12.5	8.1	3
CLIS-08	2	B	0	0.0	0.0	0.0	2 -> 3
CLIS-08	2	D	2	3.6	16.1	9.9	2 -> 3
CLIS-08	3	A	1	7.2	8.8	8.0	2 -> 3
CLIS-08	3	B	1	11.0	13.6	12.3	1 on 2
CLIS-08	3	C	1	5.1	13.8	9.5	1 on 3
CLIS-08	4	A	3	6.1	11.8	9.0	1 on 3
CLIS-08	4	C	0	0.0	0.0	0.0	2 -> 3
CLIS-08	4	D	0	0.0	0.0	0.0	2 -> 3
CLIS-08	5	A	2	10.7	14.1	12.4	2 -> 3
CLIS-08	5	B	0	0.0	0.0	0.0	1
CLIS-08	5	D	0	0.0	0.0	0.0	1
CLIS-09	1	A	0	0.0	0.0	0.0	2 -> 3
CLIS-09	1	B	1	5.6	5.9	5.8	2 -> 3
CLIS-09	1	D	1	0.0	3.7	1.8	Indeterminate
CLIS-09	2	B	1	0.8	1.3	1.1	3
CLIS-09	2	C	1	0.0	4.8	2.4	2 -> 3
CLIS-09	2	D	0	0.0	0.0	0.0	2 -> 3
CLIS-09	3	A	2	6.3	9.6	8.0	1 on 3
CLIS-09	3	B	3	6.6	17.2	11.9	3
CLIS-09	3	C	2	2.1	5.7	3.9	3

Sediment-Profile Image Analysis Results

Location	Station	Replicate	# of Feeding Voids	Void Minimum Depth (cm)	Void Maximum Depth (cm)	Void Average Depth (cm)	Successional Stage
CLIS-09	4	A	2	3.1	6.7	4.9	3
CLIS-09	4	B	0	0.0	0.0	0.0	Indeterminate
CLIS-09	4	C	8	1.2	7.4	4.3	3
CLIS-09	5	A	4	4.7	7.6	6.2	3
CLIS-09	5	B	3	1.3	7.1	4.2	3
CLIS-09	5	C	4	0.2	7.1	3.7	2 -> 3
CLIS-10	1	B	1	8.3	12.2	10.3	2 -> 3
CLIS-10	1	C	1	7.5	10.5	9.0	2 -> 3
CLIS-10	1	E	0	0.0	0.0	0.0	1
CLIS-10	2	B	1	17.0	17.5	17.3	2 -> 3
CLIS-10	2	C	2	4.6	8.4	6.5	2 -> 3
CLIS-10	2	D	0	0.0	0.0	0.0	Indeterminate
CLIS-10	3	A	0	0.0	0.0	0.0	2 -> 3
CLIS-10	3	C	0	0.0	0.0	0.0	2
CLIS-10	3	D	1	1.3	3.1	2.2	2 -> 3
CLIS-10	4	A	3	5.1	5.3	5.2	3
CLIS-10	4	B	2	4.4	5.8	5.1	2 -> 3
CLIS-10	4	D	4	11.7	15.4	13.6	1 on 3
CLIS-10	5	B	0	0.0	0.0	0.0	1
CLIS-10	5	C	2	5.0	7.2	6.1	2 -> 3
CLIS-10	5	D	0	0.0	0.0	0.0	1 -> 2
2500W REF	1	A	2	3.6	18.9	11.3	1 on 3
2500W REF	1	B	1	12.1	13.4	12.7	1 on 3
2500W REF	1	C	2	3.0	20.2	11.6	1 on 3
2500W REF	2	B	5	3.2	19.6	11.4	1 on 3
2500W REF	2	C	2	0.8	15.1	8.0	1 on 3
2500W REF	2	D	2	3.4	17.8	10.6	3
2500W REF	3	A	1	7.4	7.7	7.6	3
2500W REF	3	B	1	14.3	14.4	14.4	1 on 3
2500W REF	3	C	0	0.0	0.0	0.0	3
2500W REF	4	A	1	12.1	12.3	12.2	1 on 3
2500W REF	4	B	4	3.7	17.4	10.5	3
2500W REF	4	G	2	15.0	17.9	16.4	3
2500W REF	5	A	0	0.0	0.0	0.0	1 on 3
2500W REF	5	B	3	5.1	15.2	10.2	3
2500W REF	5	D	2	11.0	11.3	11.2	1 on 3
4500E REF	1	A	1	15.4	15.8	15.6	1 on 3
4500E REF	1	C	3	4.7	19.1	11.9	3

Sediment-Profile Image Analysis Results

Location	Station	Replicate	# of Feeding Voids	Void Minimum Depth (cm)	Void Maximum Depth (cm)	Void Average Depth (cm)	Successional Stage
4500E REF	1	D	2	12.5	17.7	15.1	3
4500E REF	2	A	1	14.7	17.8	16.3	3
4500E REF	2	B	3	6.4	14.7	10.6	3
4500E REF	2	C	1	6.0	6.2	6.1	3
4500E REF	3	A	0	0.0	0.0	0.0	3
4500E REF	3	B	1	10.2	12.6	11.4	3
4500E REF	3	D	0	0.0	0.0	0.0	3
4500E REF	4	A	2	15.9	17.5	16.7	3
4500E REF	4	B	0	0.0	0.0	0.0	3
4500E REF	4	D	1	11.2	12.1	11.6	3
4500E REF	5	B	3	0.3	15.4	7.8	3
4500E REF	5	C	2	0.2	9.1	4.7	3
4500E REF	5	D	1	11.9	15.7	13.8	3
CLIS REF	1	A	2	1.3	14.3	7.8	3
CLIS REF	1	B	0	0.0	0.0	0.0	3
CLIS REF	1	C	1	12.9	13.1	13.0	3
CLIS REF	2	A	2	6.5	14.6	10.5	3
CLIS REF	2	B	4	3.9	16.7	10.3	3
CLIS REF	2	C	1	6.9	7.1	7.0	3
CLIS REF	3	B	0				3
CLIS REF	3	C	3	7.0	13.6	10.3	3
CLIS REF	3	D	2	12.5	15.2	13.9	3
CLIS REF	4	A	1	13.5	16.5	15.0	3
CLIS REF	4	B	0	0.0	0.0	0.0	3
CLIS REF	4	D	0	0.0	0.0	0.0	3
CLIS REF	5	A	2	2.4	12.5	7.5	3
CLIS REF	5	B	1	2.2	2.4	2.3	3
CLIS REF	5	D	1	6.9	7.2	7.0	3

Note: 1) "ind" indicates that the sample result was indeterminate
2) "mean" indicates the mean value across a single sediment profile image

Plan-View Image Analysis Results

Location	Station	Replicate	Date	Time	Image Width (cm)	Image Height (cm)	Field of View imaged (sq m)	Sediment Type	Surface Ox
NHAV14-N	1	A	8/16/2014	11:59:00	37.03	24.53	0.09	silt	ox
NHAV14-N	1	B	8/16/2014	12:00:06	ind	ind	ind	.	.
NHAV14-N	1	C	8/16/2014	12:00:55	ind	ind	ind	.	.
NHAV14-N	1	E	8/16/2014	12:41:26	33.74	22.34	0.08	silt	ox
NHAV14-N	1	G	8/16/2014	12:43:05	ind	ind	ind	silt	ox
NHAV14-N	1	H	8/16/2014	12:43:51	ind	ind	ind	.	.
NHAV14-N	2	A	8/16/2014	12:05:46	43.42	28.66	0.12	silt	ox
NHAV14-N	2	B	8/16/2014	12:06:30	36.78	24.29	0.09	silt	ox
NHAV14-N	2	C	8/16/2014	12:07:47	44.32	29.38	0.13	silt	ox
NHAV14-N	2	D	8/16/2014	12:08:33	ind	ind	ind	.	.
NHAV14-N	2	E	8/16/2014	12:33:55	ind	ind	ind	.	.
NHAV14-N	2	G	8/16/2014	12:36:01	ind	ind	ind	.	.
NHAV14-N	3	A	8/16/2014	12:13:25	47.09	31.09	0.15	silt	ox
NHAV14-N	4	A	8/16/2014	12:19:08	37.16	24.70	0.09	silt	>50% ox
NHAV14-N	4	B	8/16/2014	12:19:59	ind	ind	ind	.	.
NHAV14-N	4	C	8/16/2014	12:20:47	34.25	22.70	0.08	silt	>50% ox
NHAV14-N	4	D	8/16/2014	12:21:40	35.05	16.79	0.06	silt	ox
NHAV14-N	5	A	8/16/2014	11:22:46	42.71	28.31	0.12	silt	ox
NHAV14-N	5	C	8/16/2014	11:24:25	35.32	23.47	0.08	silt	>50% ox
NHAV14-N	5	D	8/16/2014	11:25:14	44.81	29.51	0.13	silt	>50% ox
NHAV14-N	6	A	8/16/2014	11:28:29	43.46	28.83	0.13	silt	>50% ox
NHAV14-N	6	B	8/16/2014	11:29:19	42.26	28.02	0.12	silt	>50% ox
NHAV14-N	6	C	8/16/2014	11:30:04	34.20	22.77	0.08	silt	<50% ox
NHAV14-N	6	D	8/16/2014	11:31:09	ind	ind	ind	.	.
NHAV14-N	7	A	8/16/2014	11:34:15	36.46	24.13	0.09	silt	ox
NHAV14-N	7	B	8/16/2014	11:34:58	ind	ind	ind	.	.
NHAV14-N	7	C	8/16/2014	11:35:46	46.81	30.91	0.14	silt	ox
NHAV14-N	7	D	8/16/2014	11:36:37	ind	ind	ind	silt	>50% ox
NHAV14-N	8	A	8/16/2014	11:39:51	46.76	31.00	0.14	silt	ox
NHAV14-N	8	B	8/16/2014	11:40:33	45.94	30.31	0.14	silt	ox
NHAV14-N	8	C	8/16/2014	11:41:18	ind	ind	ind	.	.
NHAV14-N	8	D	8/16/2014	11:42:04	ind	ind	ind	.	.
NHAV14-N	8	E	8/16/2014	12:49:10	ind	ind	ind	.	.
NHAV14-N	8	F	8/16/2014	12:50:55	38.48	25.45	0.10	silt	>50% ox

Plan-View Image Analysis Results

Location	Station	Replicate	Date	Time	Image Width (cm)	Image Height (cm)	Field of View imaged (sq m)	Sediment Type	Surface Ox
NHAV14-N	9	A	8/16/2014	11:45:21	47.60	31.46	0.15	silt	ox
NHAV14-N	9	B	8/16/2014	11:46:07	39.63	26.22	0.10	silt	ox
NHAV14-N	9	C	8/16/2014	11:47:38	43.88	29.23	0.13	silt	ox
NHAV14-N	9	D	8/16/2014	11:48:26	ind	ind	ind	.	.
NHAV14-N	10	A	8/16/2014	10:51:55	ind	ind	ind	.	.
NHAV14-N	10	B	8/16/2014	10:52:38	ind	ind	ind	.	.
NHAV14-N	10	C	8/16/2014	10:53:20	37.51	24.73	0.09	silt	>50% ox
NHAV14-N	10	D	8/16/2014	10:54:05	ind	ind	ind	.	.
NHAV14-N	11	A	8/16/2014	10:57:49	37.65	24.95	0.09	silt	ox
NHAV14-N	11	B	8/16/2014	10:58:35	47.53	31.55	0.15	silt	>50% ox
NHAV14-N	11	C	8/16/2014	10:59:25	46.35	30.72	0.14	silt	>50% ox
NHAV14-N	11	D	8/16/2014	11:00:10	ind	ind	ind	.	.
NHAV14-N	12	A	8/16/2014	11:03:45	47.96	31.80	0.15	silt	ox
NHAV14-N	12	B	8/16/2014	11:04:30	48.83	32.41	0.16	silt	>50% ox
NHAV14-N	12	C	8/16/2014	11:05:16	ind	ind	ind	.	.
NHAV14-N	12	D	8/16/2014	11:06:03	48.41	32.16	0.16	silt	>50% ox
NHAV14-N	13	A	8/16/2014	11:10:05	48.01	31.96	0.15	silt	ox
NHAV14-N	13	B	8/16/2014	11:10:46	ind	ind	ind	.	.
NHAV14-N	13	C	8/16/2014	11:11:37	39.08	25.89	0.10	silt	ox
NHAV14-N	13	D	8/16/2014	11:13:02	44.11	29.26	0.13	silt	ox
NHAV14-N	14	A	8/16/2014	10:28:03	40.80	26.97	0.11	silt	ox
NHAV14-N	14	B	8/16/2014	10:28:44	42.57	28.25	0.12	silt	ox
NHAV14-N	14	C	8/16/2014	10:29:35	42.91	28.39	0.12	silt	>50% ox
NHAV14-N	14	D	8/16/2014	10:30:21	ind	ind	ind	.	.
NHAV14-N	15	A	8/16/2014	10:33:59	40.40	26.79	0.11	silt	ox
NHAV14-N	15	B	8/16/2014	10:34:46	ind	ind	ind	.	.
NHAV14-N	15	D	8/16/2014	10:36:24	33.64	22.25	0.07	silt	ox
NHAV14-N	16	A	8/15/2014	15:32:22	44.98	29.80	0.13	silt	ox
NHAV14-N	16	B	8/15/2014	15:33:15	38.22	25.33	0.10	silt	ox
NHAV14-N	16	C	8/15/2014	15:34:22	ind	ind	ind	.	.
NHAV14-N	16	D	8/15/2014	15:35:14	ind	ind	ind	.	.
NHAV14-N	16	E	8/16/2014	7:49:59	ind	ind	ind	.	.
NHAV14-N	16	F	8/16/2014	7:50:45	ind	ind	ind	.	.
NHAV14-N	16	G	8/16/2014	7:51:27	ind	ind	ind	.	.

Plan-View Image Analysis Results

Location	Station	Replicate	Date	Time	Image Width (cm)	Image Height (cm)	Field of View imaged (sq m)	Sediment Type	Surface Ox
NHAV14-N	16	H	8/16/2014	7:52:15	ind	ind	ind	.	.
NHAV14-N	16	I	8/16/2014	10:40:19	38.33	25.40	0.10	silt	ox
NHAV14-N	16	K	8/16/2014	10:41:54	ind	ind	ind	.	.
NHAV14-N	16	L	8/16/2014	10:42:39	ind	ind	ind	.	.
NHAV14-N	17	A	8/15/2014	15:19:43	49.10	32.53	0.16	silt	ox
NHAV14-N	17	B	8/15/2014	15:20:38	34.17	22.63	0.08	silt	ox
NHAV14-N	17	C	8/15/2014	15:21:31	ind	ind	ind	silt	ox
NHAV14-N	17	D	8/15/2014	15:22:28	ind	ind	ind	.	.
NHAV14-N	18	A	8/15/2014	15:25:05	44.63	29.60	0.13	silt	ox
NHAV14-N	18	B	8/15/2014	15:25:55	65.68	43.60	0.29	silt	ox
NHAV14-N	18	C	8/15/2014	15:26:41	ind	ind	ind	.	.
NHAV14-N	18	D	8/15/2014	15:27:37	32.05	21.27	0.07	silt	ox
NHAV14-S	19	A	8/15/2014	11:06:11	54.12	35.86	0.19	silt	ox
NHAV14-S	19	B	8/15/2014	11:07:23	41.06	27.18	0.11	silt	ox
NHAV14-S	19	C	8/15/2014	11:08:16	56.25	37.33	0.21	silt	ox
NHAV14-S	19	D	8/15/2014	11:09:02	ind	ind	ind	.	.
NHAV14-S	20	A	8/15/2014	11:12:02	ind	ind	ind	.	.
NHAV14-S	20	B	8/15/2014	11:12:42	ind	ind	ind	.	.
NHAV14-S	20	C	8/15/2014	11:13:23	ind	ind	ind	.	.
NHAV14-S	20	D	8/15/2014	11:15:22	ind	ind	ind	.	.
NHAV14-S	20	E	8/15/2014	11:41:02	36.98	24.57	0.09	silt	ox
NHAV14-S	20	F	8/15/2014	11:41:48	34.95	23.15	0.08	silt	ox
NHAV14-S	20	G	8/15/2014	11:42:31	ind	ind	ind	.	.
NHAV14-S	20	H	8/15/2014	11:43:15	32.64	21.59	0.07	silt	ox
NHAV14-S	21	A	8/15/2014	11:18:56	41.77	27.60	0.12	silt	ox
NHAV14-S	21	C	8/15/2014	11:21:28	ind	ind	ind	.	.
NHAV14-S	21	D	8/15/2014	11:22:15	ind	ind	ind	.	.
NHAV14-S	21	E	8/15/2014	11:46:20	42.32	27.98	0.12	silt	ox
NHAV14-S	21	F	8/15/2014	11:47:04	ind	ind	ind	.	.
NHAV14-S	21	H	8/15/2014	11:50:17	ind	ind	ind	.	.
NHAV14-S	21	I	8/16/2014	10:15:17	42.09	27.89	0.12	silt	ox
NHAV14-S	21	J	8/16/2014	10:16:01	ind	ind	ind	.	.
NHAV14-S	21	K	8/16/2014	10:16:47	ind	ind	ind	.	.
NHAV14-S	21	L	8/16/2014	10:17:30	ind	ind	ind	.	.

Plan-View Image Analysis Results

Location	Station	Replicate	Date	Time	Image Width (cm)	Image Height (cm)	Field of View imaged (sq m)	Sediment Type	Surface Ox
NHAV14-S	22	A	8/15/2014	11:25:51	44.88	29.74	0.13	silt	>50% ox
NHAV14-S	22	B	8/15/2014	11:26:35	ind	ind	ind	.	.
NHAV14-S	22	C	8/15/2014	11:27:42	33.48	22.23	0.07	silt	ox
NHAV14-S	22	D	8/15/2014	11:28:34	32.28	21.33	0.07	silt	ox
NHAV14-S	23	A	8/15/2014	11:01:00	44.97	29.75	0.13	silt	ox
NHAV14-S	23	B	8/15/2014	11:01:36	62.31	41.21	0.26	silt	ox
NHAV14-S	23	D	8/15/2014	11:02:59	ind	ind	ind	.	.
NHAV14-S	24	A	8/15/2014	10:56:12	51.63	34.13	0.18	silt	ox
NHAV14-S	24	B	8/15/2014	10:56:50	ind	ind	ind	silt	ox
NHAV14-S	24	C	8/15/2014	10:57:34	38.75	25.65	0.10	silt	ox
NHAV14-S	24	D	8/15/2014	10:58:20	ind	ind	ind	.	.
NHAV14-S	25	A	8/15/2014	10:50:08	ind	ind	ind	silt	ox
NHAV14-S	25	B	8/15/2014	10:50:53	ind	ind	ind	.	.
NHAV14-S	25	C	8/15/2014	10:51:56	49.41	32.80	0.16	silt	ox
NHAV14-S	25	D	8/15/2014	10:52:41	48.08	31.80	0.15	silt	ox
NHAV14-S	26	A	8/15/2014	10:42:08	43.71	28.93	0.13	silt	ox
NHAV14-S	26	B	8/15/2014	10:42:52	38.66	25.58	0.10	silt	ox
NHAV14-S	26	C	8/15/2014	10:43:39	ind	ind	ind		
NHAV14-S	26	D	8/15/2014	10:44:54	47.37	31.39	0.15	silt	ox
MQR	1	A	8/15/2014	13:25:13	42.07	27.85	0.12	silt	ox
MQR	1	B	8/15/2014	13:26:13	ind	ind	ind	.	.
MQR	1	C	8/15/2014	13:27:39	ind	ind	ind	.	.
MQR	1	D	8/15/2014	13:28:28	52.05	34.44	0.18	silt	ox
MQR	2	A	8/15/2014	13:35:53	66.25	43.97	0.29	silt	ox
MQR	2	B	8/15/2014	13:37:02	83.11	55.21	0.46	silt	ox
MQR	2	C	8/15/2014	13:38:11	ind	ind	ind	.	.
MQR	2	D	8/15/2014	13:39:03	69.91	46.39	0.32	silt	ox
MQR	3	A	8/15/2014	13:31:13	45.66	30.30	0.14	sily/clay	>50% ox
MQR	3	B	8/15/2014	13:32:01	39.26	25.86	0.10	silt	ox
MQR	3	C	8/15/2014	13:32:49	101.85	67.16	0.68	silt	>50% ox
MQR	3	D	8/15/2014	13:34:18	75.59	50.07	0.38	not visible	ox
MQR	4	A	8/15/2014	13:20:52	ind	ind	ind	.	.
MQR	4	B	8/15/2014	13:21:53	57.27	37.95	0.22	silt with pebbes	ox
MQR	4	C	8/15/2014	13:22:55	56.56	37.51	0.21	silt	ox

Location	Station	Replicate	Date	Time	Image Width (cm)	Image Height (cm)	Field of View imaged (sq m)	Sediment Type	Surface Ox
MQR	4	D	8/15/2014	13:24:05	ind	ind	ind	.	.
CLIS-08	1	A	8/15/2014	14:38:41	56.70	37.65	0.21	silt	ox
CLIS-08	1	B	8/15/2014	14:40:29	57.10	38.14	0.22	silt	ox
CLIS-08	1	C	8/15/2014	14:41:19	ind	ind	ind	.	.
CLIS-08	1	D	8/15/2014	14:42:19	55.72	37.35	0.21	silt	ox
CLIS-08	2	A	8/15/2014	14:53:42	44.94	29.82	0.13	silt	ox
CLIS-08	2	B	8/15/2014	14:54:46	49.52	33.00	0.16	silt	ox
CLIS-08	2	C	8/15/2014	14:55:35	46.04	30.66	0.14	silt	ox
CLIS-08	2	D	8/15/2014	14:56:25	ind	ind	ind	.	.
CLIS-08	3	A	8/15/2014	15:00:05	47.45	31.47	0.15	silt	ox
CLIS-08	3	B	8/15/2014	15:01:03	51.82	34.38	0.18	silt	ox
CLIS-08	3	C	8/15/2014	15:01:57	ind	ind	ind	.	.
CLIS-08	3	D	8/15/2014	15:02:48	ind	ind	ind	.	.
CLIS-08	4	A	8/15/2014	14:48:48	58.49	38.78	0.23	silt	ox
CLIS-08	4	B	8/15/2014	14:49:44	58.43	38.76	0.23	silt	ox
CLIS-08	4	C	8/15/2014	14:50:58	58.47	38.89	0.23	silt	ox
CLIS-08	4	D	8/15/2014	14:51:50	ind	ind	ind	.	.
CLIS-08	5	A	8/15/2014	14:33:33	ind	ind	ind	.	.
CLIS-08	5	B	8/15/2014	14:34:20	46.67	30.94	0.14	silt	ox
CLIS-08	5	D	8/15/2014	14:36:13	42.08	27.85	0.12	silt	ox
CLIS-09	1	A	8/15/2014	12:57:02	47.40	31.60	0.15	silt	ox
CLIS-09	1	B	8/15/2014	12:59:02	ind	ind	ind		
CLIS-09	1	C	8/15/2014	13:00:07	51.84	34.37	0.18	silt	ox
CLIS-09	1	D	8/15/2014	13:01:13	46.80	31.14	0.15	silt	ox
CLIS-09	2	A	8/15/2014	12:51:30	53.51	35.72	0.19	silt	ox
CLIS-09	2	B	8/15/2014	12:52:31	ind	ind	ind	.	.
CLIS-09	2	C	8/15/2014	12:53:42	ind	ind	ind	.	.
CLIS-09	2	D	8/15/2014	12:54:58	ind	ind	ind	.	.
CLIS-09	3	A	8/15/2014	12:33:15	61.31	40.83	0.25	silt	ox
CLIS-09	3	B	8/15/2014	12:35:04	ind	ind	ind	.	.
CLIS-09	3	D	8/15/2014	12:37:14	ind	ind	ind	.	.
CLIS-09	4	A	8/15/2014	12:46:30	ind	ind	ind	.	.
CLIS-09	4	B	8/15/2014	12:47:24	ind	ind	ind	.	.
CLIS-09	4	C	8/15/2014	12:48:36	ind	ind	ind	.	.

Plan-View Image Analysis Results

Location	Station	Replicate	Date	Time	Image Width (cm)	Image Height (cm)	Field of View imaged (sq m)	Sediment Type	Surface Ox
CLIS-09	4	D	8/15/2014	12:49:59	ind	ind	ind	.	.
CLIS-09	4	E	8/16/2014	9:37:12	51.18	33.99	0.17	silt	ox
CLIS-09	4	F	8/16/2014	9:37:54	48.92	32.58	0.16	silt	ox
CLIS-09	4	G	8/16/2014	9:39:02	46.11	30.60	0.14	silt	ox
CLIS-09	4	H	8/16/2014	9:39:44	ind	ind	ind	.	.
CLIS-09	5	A	8/15/2014	13:04:17	121.19	80.24	0.97	silt	ox
CLIS-09	5	B	8/15/2014	13:05:02	ind	ind	ind	.	.
CLIS-09	5	C	8/15/2014	13:06:16	ind	ind	ind	silt	ox
CLIS-09	5	D	8/15/2014	13:07:22	ind	ind	ind	.	.
CLIS-10	1	A	8/15/2014	14:10:47	ind	ind	ind	.	.
CLIS-10	1	C	8/15/2014	14:12:33	ind	ind	ind	.	.
CLIS-10	1	D	8/15/2014	14:13:49	45.27	30.19	0.14	silt	ox
CLIS-10	1	E	8/15/2014	15:51:50	42.35	28.04	0.12	silt	ox
CLIS-10	1	F	8/15/2014	15:52:39	37.79	25.07	0.09	silt	ox
CLIS-10	1	G	8/15/2014	15:53:43	ind	ind	ind	.	.
CLIS-10	2	A	8/15/2014	14:17:04	61.27	40.72	0.25	silt	ox
CLIS-10	2	B	8/15/2014	14:17:53	103.08	68.50	0.71	silt	ox
CLIS-10	2	C	8/15/2014	14:18:45	ind	ind	ind	.	.
CLIS-10	2	D	8/15/2014	14:19:40	ind	ind	ind	.	.
CLIS-10	3	A	8/15/2014	14:03:54	51.11	33.84	0.17	silt	ox
CLIS-10	3	B	8/15/2014	14:04:38	ind	ind	ind	.	.
CLIS-10	3	C	8/15/2014	14:05:41	98.41	65.36	0.64	silt	ox
CLIS-10	4	A	8/15/2014	13:52:23	40.60	26.93	0.11	silt	ox
CLIS-10	4	B	8/15/2014	13:53:14	ind	ind	ind	.	.
CLIS-10	4	C	8/15/2014	13:54:04	43.73	29.22	0.13	silt	ox
CLIS-10	4	D	8/15/2014	13:55:39	ind	ind	ind	.	.
CLIS-10	5	A	8/15/2014	13:58:43	44.10	29.24	0.13	silt	ox
CLIS-10	5	B	8/15/2014	13:59:29	38.91	25.86	0.10	silt	ox
CLIS-10	5	C	8/15/2014	14:00:33	ind	ind	ind	.	.
CLIS-10	5	D	8/15/2014	14:01:17	33.23	22.01	0.07	silt	ox
2500W REF	1	A	8/16/2014	8:18:15	51.64	34.12	0.18	silt	ox
2500W REF	1	B	8/16/2014	8:19:01	ind	ind	.	.	.
2500W REF	1	C	8/16/2014	8:19:48	ind	ind	.	.	.

Plan-View Image Analysis Results

Location	Station	Replicate	Date	Time	Image Width (cm)	Image Height (cm)	Field of View imaged (sq m)	Sediment Type	Surface Ox
2500W REF	1	D	8/16/2014	8:20:37	59.82	39.55	0.24	silt	ox
2500W REF	2	A	8/16/2014	8:33:28	48.28	31.97	0.15	silt	ox
2500W REF	2	B	8/16/2014	8:34:33	48.14	31.99	0.15	silt	ox
2500W REF	2	C	8/16/2014	8:35:25	.	.	.	.	.
2500W REF	2	D	8/16/2014	8:36:08	45.99	30.39	0.14	silt	ox
2500W REF	3	A	8/16/2014	8:56:50	48.42	32.37	0.16	silt	ox
2500W REF	3	B	8/16/2014	8:57:38	49.73	33.04	0.16	silt	ox
2500W REF	3	C	8/16/2014	8:58:30	ind	ind	.	.	.
2500W REF	3	D	8/16/2014	8:59:20	ind	ind	.	.	.
2500W REF	4	A	8/16/2014	8:41:55	51.70	34.63	0.18	silt	ox
2500W REF	4	B	8/16/2014	8:42:35	50.51	33.52	0.17	silt	ox
2500W REF	4	C	8/16/2014	8:43:21	ind	ind	.	.	.
2500W REF	4	D	8/16/2014	8:44:12	53.98	35.96	0.19	silt	ox
2500W REF	4	F	8/16/2014	9:13:31	ind	ind	ind		
2500W REF	4	G	8/16/2014	9:14:11	ind	ind	ind		
2500W REF	5	A	8/16/2014	9:03:56	52.99	35.40	0.19	silt	ox
2500W REF	5	B	8/16/2014	9:04:39	52.99	35.24	0.19	silt	ox
2500W REF	5	C	8/16/2014	9:05:30	51.68	34.64	0.18	silt	ox
2500W REF	5	D	8/16/2014	9:06:16	ind	ind	ind		
4500E REF	1	A	8/15/2014	8:41:45	48.57	32.17	0.16	silt	ox
4500E REF	1	B	8/15/2014	8:43:04	48.57	32.17	0.16	silt	ox
4500E REF	1	C	8/15/2014	8:43:46	48.57	32.17	0.16	silt	ox
4500E REF	2	A	8/15/2014	9:24:46	51.91	34.55	0.18	silt	ox
4500E REF	2	B	8/15/2014	9:25:27	ind	ind	ind	.	.
4500E REF	2	C	8/15/2014	9:26:21	49.42	32.94	0.16	silt	ox
4500E REF	2	D	8/15/2014	9:27:10	52.66	34.97	0.18	silt	ox
4500E REF	3	A	8/15/2014	9:03:21	53.04	35.04	0.19	silt	ox
4500E REF	3	B	8/15/2014	9:04:23	52.63	35.10	0.18	silt	ox
4500E REF	3	C	8/15/2014	9:05:14	48.25	32.26	0.16	silt	ox
4500E REF	4	A	8/15/2014	9:19:07	55.69	37.32	0.21	silt	ox
4500E REF	4	B	8/15/2014	9:20:00	51.08	33.94	0.17	silt	ox
4500E REF	4	C	8/15/2014	9:20:48	ind	ind	ind	.	.
4500E REF	4	D	8/15/2014	9:21:42	ind	ind	ind	.	.
4500E REF	5	A	8/15/2014	9:11:49	55.49	37.11	0.21	silt	ox

Plan-View Image Analysis Results

Location	Station	Replicate	Date	Time	Image Width (cm)	Image Height (cm)	Field of View imaged (sq m)	Sediment Type	Surface Ox
4500E REF	5	B	8/15/2014	9:12:35	56.03	37.49	0.21	silt	ox
4500E REF	5	C	8/15/2014	9:13:24	ind	ind	ind	.	.
4500E REF	5	D	8/15/2014	9:14:16	ind	ind	ind	.	.
CLIS REF	1	A	8/15/2014	9:45:07	ind	ind	ind	.	.
CLIS REF	1	B	8/15/2014	9:45:59	41.80	27.62	0.12	silt	ox
CLIS REF	1	C	8/15/2014	9:46:44	ind	ind	ind	silt	ox
CLIS REF	1	D	8/15/2014	9:47:34	50.27	33.26	0.17	silt	ox
CLIS REF	2	A	8/15/2014	10:12:51	49.57	32.83	0.16	silt	ox
CLIS REF	2	B	8/15/2014	10:13:53	ind	ind	ind	.	.
CLIS REF	2	C	8/15/2014	10:14:37	ind	ind	ind	.	.
CLIS REF	2	D	8/15/2014	10:15:26	ind	ind	ind	silt	ox
CLIS REF	3	A	8/15/2014	10:00:53	ind	ind	ind	silt	ox
CLIS REF	3	B	8/15/2014	10:01:43	ind	ind	ind	silt	ox
CLIS REF	3	C	8/15/2014	10:02:48	ind	ind	ind	.	.
CLIS REF	3	D	8/15/2014	10:03:35	43.48	28.82	0.13	silt	ox
CLIS REF	4	A	8/15/2014	9:56:05	ind	ind	ind	.	.
CLIS REF	4	B	8/15/2014	9:57:09	52.78	35.02	0.18	silt	ox
CLIS REF	4	C	8/15/2014	9:57:53	52.05	34.59	0.18	silt	ox
CLIS REF	4	D	8/15/2014	9:58:36	49.30	32.76	0.16	silt	ox
CLIS REF	5	A	8/15/2014	10:05:59	49.31	32.63	0.16	silt	ox
CLIS REF	5	B	8/15/2014	10:06:50	ind	ind	ind	.	.
CLIS REF	5	C	8/15/2014	10:07:39	49.84	33.05	0.16	silt	ox
CLIS REF	5	D	8/15/2014	10:08:23	45.26	30.00	0.14	silt	ox

Note: 1) “ind” indicates that the sample result was indeterminate

Plan-View Image Analysis Results

Location	Station	Replicate	Bedforms	Burrows	Tubes	Tracks	Epifauna	Debris	Flora	Number of Fish	Comment
NHAV14-N	1	A	flat	dense	none	n	n	n	n	0	silty mud, reduced mud clasts on the surface in the center bottom of image
NHAV14-N	1	B	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	1	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	1	E	flat	dense	none	n	n	n	n	0	silty mud, reduced mud clasts on the surface in the center bottom of image
NHAV14-N	1	G	flat	.	.	.	.	.	.	.	silty mud, image difficult to identify due to suspended sediment, could not determine location of laser dots
NHAV14-N	1	H	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	2	A	flat	none	none	n	n	n	n	0	silty mud
NHAV14-N	2	B	flat	none	none	y	n	n	n	0	silty mud, single track to right of image
NHAV14-N	2	C	flat	none	none	n	n	n	n	0	silty mud
NHAV14-N	2	D	.	.	.	.	.	.	.	.	image not used
NHAV14-N	2	E	.	.	.	.	.	.	.	.	image not used
NHAV14-N	2	G	.	.	.	.	.	.	.	.	image not used
NHAV14-N	3	A	flat	sparse	none	n	n	n	n	0	silty mud, burrows in upper right of image
NHAV14-N	4	A	flat	none	none	y	n	shell frag	n	0	silty mud, 3 med shell frag, reduced mud clast in left of image, large impression in center of image from a flatfish
NHAV14-N	4	B	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	4	C	flat	none	none	n	n	n	n	2	silty mud, reduced mud clasts on the surface in 40% of image, fish in center of image
NHAV14-N	4	D	flat	none	none	n	n	n	n	0	silty mud
NHAV14-N	5	A	flat	abundant	none	n	n	n	n	0	silty mud, burrows spread throughout image, reduced mud clasts in lower right corner of image
NHAV14-N	5	C	flat	none	none	n	n	n	n	0	silty mud, sediment surface heavily disturbed, reduced mud clasts on ~40% of surface
NHAV14-N	5	D	flat	none	none	n	isopod	n	n	0	silty mud, sediment surface heavily disturbed, reduced mud clasts on ~40% of surface

Location	Station	Replicate	Bedforms	Burrows	Tubes	Tracks	Epifauna	Debris	Flora	Number of Fish	Comment
NHAV14-N	6	A	ripples	sparse	none	n	clam	n	n	0	silty mud, large burrow in upper right of image, reduced mud clasts on the surface in 10% of lower right of image, 2 clams in lower center of image, ripples lightly visible running from lower right corner to upper left corner
NHAV14-N	6	B	flat	none	none	n	n	shell frag, glass, bivalve shell	n	1	silty mud, reduced mud clasts on surface in 20% of upper right of image, glass frag in upper center of image, a few small to med shell frags, bivavle shell frag to center right of image, fish in right of image near reduced mud
NHAV14-N	6	C	flat	none	none	y	gastropod	shell frag	n	0	silty mud, sediment surface heavily disturbed, gastropod in upper center at edge of image, reduced mud clasts in center and left of image, shell frag in lower right of image, track in upper left of image
NHAV14-N	6	D	.	.	.	.	.	.	.	.	image not used
NHAV14-N	7	A	flat	none	none	n	tunicate	n	n	0	silty mud, tunicate in cetner of image
NHAV14-N	7	B	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	7	C	flat	abundant	none	n	n	shell frag	n	1	silty mud, fish at right center of image, burrows more to right side of image, a few small shell frag at center right and center bottom of image
NHAV14-N	7	D	flat	.	.	.	.	.	.	.	silty mud, large reduced mud clasts at right of image, mud clasts dispersed throughout image, image difficult to identify due to suspended sediment, could not determine location of laser dots
NHAV14-N	8	A	flat	sparse	none	n	n	n	n	0	silty mud, large burrow in center right of image, a few small reduced mud clast to left and right edges of image
NHAV14-N	8	B	flat	none	none	n	cockle	n	n	0	silty mud, cockle in center right of image
NHAV14-N	8	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	8	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	8	E	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	8	F	flat	none	none	n	gastropod	shell frag, bottle	n	0	silty mud, reduced mud clasts concentrated to lower left and lower center of image, gastropod in center of image, small shell frag in center of image, med shell frag at top center of image, partially covered bottle (glass or plastic) at upper right of image
NHAV14-N	9	A	flat	sparse	none	n	clam	n	n	0	silty mud, burrow opening at center top of image, 2 clams at center right of image

Plan-View Image Analysis Results

Location	Station	Replicate	Bedforms	Burrows	Tubes	Tracks	Epifauna	Debris	Flora	Number of Fish	Comment
NHAV14-N	9	B	flat	none	none	n	n	n	n	0	silty mud
NHAV14-N	9	C	flat	none	none	n	n	shell frag	n	0	silty mud, tiny shell frags throughout image, a few small reduced mud clasts in upper right of image
NHAV14-N	9	D	.	.	.	.	.	.	.	.	image not used
NHAV14-N	10	A	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	10	B	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	10	C	flat	none	none	n	n	shell frag, bivalve shell	n	0	silty mud, reduced mud clasts in lower right of image ~25% of surface, shell frag and bivalve shell in center right of image
NHAV14-N	10	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	11	A	flat	dense	none	n	tunicate	n	n	0	silty mud, burrows spread throughout image, clear tunicates upper center of image
NHAV14-N	11	B	flat	dense	none	y	tunicate	shell frag	n	0	silty mud, reduced sediemnt right of image, tunicate right center of image, shell frag center bottom of image and top center of image, tracks all over image, burrows spread throughout image
NHAV14-N	11	C	flat	dense	none	y	clam	n	n	0	silty mud, reduced sediment at lower right of image, burrows throughout image, tracks on right side of image, clam near reduced sediment at lower right of image
NHAV14-N	11	D	.	.	.	.	.	.	.	.	image not used
NHAV14-N	12	A	flat	abundant	none	y	n	shell frag	n	1	silty mud, a few shell fragments in upper and lower part of image, two large burrows in upper right of image, small burrows disperesed throughout image, fish in upper center-left of image, multiple tracks in center right of image
NHAV14-N	12	B	flat	sparse	none	y	n	n	n	0	silty mud, medium reduced mud clasts in upper left and right of image, tracks in upper center of image, a few small burrows in lower part of image
NHAV14-N	12	C	.	.	.	.	.	.	.	.	image not used
NHAV14-N	12	D	flat	abundant	none	y	n	shell frag, bivalve shell	n	0	silty mud, small shell frags throughout image, bivavle shell in upper center of image surrounded by reduced mud clasts, reduced mud clasts in about 35% of image, small burrows throughout image, tracks in upper center, left and lower right of image,

Location	Station	Replicate	Bedforms	Burrows	Tubes	Tracks	Epifauna	Debris	Flora	Number of Fish	Comment
NHAV14-N	13	A	flat	dense	none	y	gastropod	n	n	0	silty mud, two gastropods in upper right edge of image, small burrows densely disperesed throughout image, one large burrow in upper center-right of image, a few small mud clasts in upper center and right of image, tracks throughout image
NHAV14-N	13	B	.	.	.	.	.	.	.	.	image not used
NHAV14-N	13	C	flat	abundant	none	y	n	n	n	0	silty mud, burrows dispersed throughout image, a few small shell frags in upper center and upper right of image, tracks in upper part of image
NHAV14-N	13	D	flat	abundant	none	n	nudibranch	shell frag	n	0	silty mud, burrowds throughout image, a few small reduced mud clasts in center of image, 2 shell frags, nudibranch in center right of image
NHAV14-N	14	A	flat	abundant	none	y	n	n	n	0	silty mud, small burrows dispersed throughout image, tracks to the right of image, single small mud clast in upper right of image
NHAV14-N	14	B	flat	abundant	none	n	n	shell frag	n	0	silty mud, small burrows dispersed throughout image, small shell frag in upper center of image, two large burrows to left of image partially out of image
NHAV14-N	14	C	flat	sparse	none	y	n	n	n	0	silty mud, reduced sediment at upper right of image, small reduced mud clasts at lower right of image, large track traverses center of image likely created by a holothurian
NHAV14-N	14	D	.	.	.	.	.	.	.	.	image not used
NHAV14-N	15	A	flat	abundant	none	y	n	shell frag, bivalve shell	n	0	silty mud, small burrows throughout image, a few tiny shell frags in center and lower right of image, bivalve shells in upper right o fimage, tracks in center and right of image, reduced mud clasts in right of image
NHAV14-N	15	B	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	15	D	flat	present	none	y	isopod	n	n	0	silty mud, tracks throughout image, small burrows dispersed throughout image, small isopod below left laser dot, sabellid visibly suspension feeding in upper right of image
NHAV14-N	16	A	flat	present	none	y	n	n	n	0	silty mud, a number of small burrows dispersed throughout image, tracks dispersed throughout image, reduced mud clast in center of image
NHAV14-N	16	B	flat	present	none	y	n	n	n	0	silty mud, a number of small burrows dispersed throughout image, three large burrows in the upper part of image, small tracks in center of image

Location	Station	Replicate	Bedforms	Burrows	Tubes	Tracks	Epifauna	Debris	Flora	Number of Fish	Comment
NHAV14-N	16	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	16	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	16	E	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	16	F	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	16	G	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	16	H	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	16	I	flat	abundant	none	y	gastropod	n	n	0	silty mud, gastropod in lower center of image, small burrows disperesed throughout image, small tracks in lower right and upper center-left of image
NHAV14-N	16	K	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	16	L	.	.	.	.	.	.	.	.	image not used
NHAV14-N	17	A	flat	dense	none	y	n	shell frag, bivalve shell	n	0	silty mud, tracks in upper right of image, small burrows dispersed throughout image, a few small mud clasts dispersed throughout image, bivalve shell in center and lower right of image
NHAV14-N	17	B	flat	present	none	y	n	shell frag	n	0	silty mud, tracks upper right of image, small burrows in right of image and center left of image, shell frag in center of image, difficult to fully identify image due to image quality
NHAV14-N	17	C	flat	none	none	n	n	shell frag, bivalve shell	n	0	silty mud, a few bivalve shells in the upper right of image, reduced mud clasts dispersed throughout image, image difficult to identify due to image quality
NHAV14-N	17	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-N	18	A	flat	abundant	none	y	gastropod	shell frag	n	0	silty mud, small burrows dispersed throughout image, reduced mud clasts at bottom of image, gastropod to the center right of image, a few shell fragments in the upper right and center bottom of image, tracks at bottom center of image around mud clasts
NHAV14-N	18	B	flat	none	none	y	gastropod	n	n	0	silty mud, tracks in upper right and center bottom of image, a few mud snails throughout image the culprit of tracks
NHAV14-N	18	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment

Plan-View Image Analysis Results

Location	Station	Replicate	Bedforms	Burrows	Tubes	Tracks	Epifauna	Debris	Flora	Number of Fish	Comment
NHAV14-N	18	D	flat	present	none	y	gastropod	n	n	0	silty mud, gastropod in lower center-left of image, tracks in the upper left and upper center o fimage, mud clasts in the upper center near image edge
NHAV14-S	19	A	flat	abundant	none	y	n	shell frag	n	0	silty mud, a few tiny shell frags dispersed around image, small burrows dispersed throughout image, tracks in center right and upper right of image
NHAV14-S	19	B	flat	abundant	none	n	n	shell frag, bivalve shell	n	0	silty mud, small burrows dispersed throughout image, small to med shell frags dispersed around image, bivalve shells in upper right and center of image, large depression in upper left of image, reduced mud clasts in right of image
NHAV14-S	19	C	flat	abundant	none	y	n	shell frag, bivalve shell	n	0	silty mud, large burrow in center top of image, small to med shell frags dispersed around image, bivavle shell in upper right of image,
NHAV14-S	19	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-S	20	A	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-S	20	B	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-S	20	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-S	20	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-S	20	E	flat	abundant	none	n	n	shell frag, bivalve shell	n	0	silty mud, burrows dispersed throughout image, shell frag in center of image, bivalve shells in upper center and upper right of image
NHAV14-S	20	F	flat	present	none	n	n	shell frag	n	0	silty mud, burrows dispersed throughout image, two shell frags in center and center right of image, likely a few gastropods in center top of image but uncertain due to image quality
NHAV14-S	20	G	.	.	.	.	.	.	.	.	image not used
NHAV14-S	20	H	flat	present	none	n	n	shell frag	n	0	silty mud, a few small burrows in the upper right of image have reduced sediment around them, mud clasts at bottom of image, small shell frags dispersed around image
NHAV14-S	21	A	flat	present	none	n	n	n	n	0	silty mud, a few small burrow opening, unidentified object (maybe a crab) in lower left corner, image quality poor
NHAV14-S	21	C	.	.	.	.	.	.	.	.	image not used
NHAV14-S	21	D	.	.	.	.	.	.	.	.	image not used
NHAV14-S	21	E	flat	present	none	n	n	n	n	0	silty mud, a few small burrow opening, image quality poor

Plan-View Image Analysis Results

Location	Station	Replicate	Bedforms	Burrows	Tubes	Tracks	Epifauna	Debris	Flora	Number of Fish	Comment
NHAV14-S	21	F	.	.	.	.	.	.	.	.	image not used
NHAV14-S	21	H	.	.	.	.	.	.	.	.	image not used
NHAV14-S	21	I	flat	present	none	y	n	n	n	0	silty mud, a few small burrow openings, tracks in center and center left of image
NHAV14-S	21	J	.	.	.	.	.	.	.	.	image not used
NHAV14-S	21	K	.	.	.	.	.	.	.	.	image not used
NHAV14-S	21	L	.	.	.	.	.	.	.	.	image not used
NHAV14-S	22	A	flat	none	none	n	n	n	n	0	silty mud, medium reduced mud clasts in left, center and upper right of image, image poor quality
NHAV14-S	22	B	.	.	.	.	.	.	.	.	image not used
NHAV14-S	22	C	rough	none	none	n	n	shell frag	n	0	silty mud, reduced mud clasts dispersed throughout image, small to med shell frags throughout image, unidentified object in center right of image (hydroid or brittle star [unlikely]), image poor quality
NHAV14-S	22	D	flat	sparse	none	n	n	n	n	0	silty mud, reduced mud clasts in upper right and lower part of image, image poor quality
NHAV14-S	23	A	flat	present	none	n	n	shell frag	n	0	silty mud, burrows dispersed through image, a few small shell frags throughout image
NHAV14-S	23	B	flat	none	none	n	n	shell frag	n	0	silty mud, burrows dispersed through image, a few small shell frags throughout image
NHAV14-S	23	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-S	24	A	flat	present	none	n	gastropod	shell frag, bivalve shell	n	0	silty mud, burrows dispersed throughout image, numerous small to med shell frags throughout image, med to large gastropod left of image, med bivavle shell upper right, a few small bivalve shells dispersed throughout image
NHAV14-S	24	B	flat	none	none	n	n	shell frag	n	0	silty mud, burrows dispersed through image, a few small shell frags throughout image, image poor quality
NHAV14-S	24	C	flat	none	none	n	n	shell frag	n	0	silty mud, burrows dispersed through image, a few small shell frags throughout image, bivalve shell upper right, image poor quality
NHAV14-S	24	D	.	.	.	.	.	.	.	.	image not used
NHAV14-S	25	A	flat	dense	none	n	n	shell frag	n	0	silty mud, dense burrows throughout image, a few small shell frags throughout image

Location	Station	Replicate	Bedforms	Burrows	Tubes	Tracks	Epifauna	Debris	Flora	Number of Fish	Comment
NHAV14-S	25	B	.	.	.	.	.	.	.	.	details obscured by suspended sediment
NHAV14-S	25	C	flat	abundant	none	n	gastropod	shell frag, bivalve shell	n	0	silty mud, large gastropod at center top image, small burrows throughout image, small to large shell frag throughout image, large bivalve shell in upper right of image
NHAV14-S	25	D	flat	present	none	n	n	shell frag	n	0	silty mud, small shell frag congregated in upper right of image, a few small to med reduced mud clasts In center of image, image quality poor
NHAV14-S	26	A	flat	abundant	none	n	n	shell frag, bivalve shell	n	0	silty mud, small shell frags throughout image, small bivialve shell center of image, small burrows throughout image
NHAV14-S	26	B	flat	abundant	none	n	n	shell frag	n	0	silty mud, a few tiny shell frags in upper right, small burrows throughout image, unidentified object in center of image
NHAV14-S	26	C									
NHAV14-S	26	D	flat	present	none	n	n	shell frag	n	0	silty mud, small shell frags throughout image, small burrows throughout image, small reduced mud clasts in center of image
MQR	1	A	flat	none	none	n	n	shell frag, bivalve shell	n	0	silty mud, lots of small to med shell fragments dispersed through image, unidentified object at center-right-top of image, image difficult to identify due to suspended sediment
MQR	1	B	.	.	.	.	.	.	.	.	details obscured by suspended sediment
MQR	1	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment
MQR	1	D	flat	none	none	y	n	shell frag	n	0	silty mud, a few small shell fragments dispersed through image, two large tracks through center-left of image,
MQR	2	A	mounds	none	none	n	n	shell frag, bivalve shell	brown algae	0	silty mud, small shell fragments dispersed through image, bivalve shell fragment in center of image, brown algae at top of image, mounds dispersed throughout image
MQR	2	B	flat, algae	none	none	n	n	shell frag, bivalve shell	brown algae	0	silty mud, small shell fragments dispersed through image, bivalve shell fragments throughout image, brown algae throughout image,
MQR	2	C	.	.	.	.	.	.	.	.	image not used
MQR	2	D	flat, algae	none	none	n	n	shell frag, bivalve shell, wood	brown algae	0	silty mud, lots of small shell fragments dispersed through image, bivalve shell fragments throughout image, brown algae throughout image, wood piece to the right of image,
MQR	3	A	mounds	present	none	n	n	shell frag, bivalve shell	n	0	silty/clay mud, a few small/med shell frag, bivalve shell frag in center of image, large area of reduced sediment in upper right of image, cockle shell frag to left of image and center bottom of image

Location	Station	Replicate	Bedforms	Burrows	Tubes	Tracks	Epifauna	Debris	Flora	Number of Fish	Comment
MQR	3	B	flat, algae	present	none	n	n	shell frag, bivalve shell, leaves	brown algae	0	silty mud, burrows in cetner of image, small/med shell frag throughout image, a few bivalve shell frag in center of image, gastropod at top center of image, leaf in uppr right of image, brown algae dispersed throughout image,
MQR	3	C	flat	sparse	none	n	n	shell frag, bivalve shells	brown algae	0	silty mud, small shell frag throughout image, large cockle shell partially burried in upper right of image, brown algae in uppe right of image, reduced sedient in upper right of image
MQR	3	D	flat	none	none	n	n	shell frag	n	0	silty mud, sediment predominantly covered by shell frag, image difficult to identify due to suspended sediment
MQR	4	A	.	.	.	.	.	.	.	.	details obscured by suspended sediment
MQR	4	B	flat	sparse	none	n	holothurian	shell frag, bivalve shell	brown algae	0	silty mud, small to med shell frag throughout image, bivavle shell frag in center of image, brown alage in center of image, pebbles in center of image, holothurian in lower left of image
MQR	4	C	flat	sparse	none	n	n	shell frag, bivalve shell	brown algae	0	silty mud, small med to large shell frag in right of image, bivavle shell frag in center of image, brown alage in center right of image
MQR	4	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-08	1	A	flat	none	none	n	n	n	n	0	silty mud, mud clasts on the surface
CLIS-08	1	B	flat	none	none	n	n	n	n	0	silty mud
CLIS-08	1	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-08	1	D	mounds	none	none	n	n	n	n	0	silty mud, lots of mounds of sediment
CLIS-08	2	A	flat	none	none	n	n	n	brown algae	0	silty mud, fragment of bivalve shell, mud clasts, brown algage in upper right
CLIS-08	2	B	flat	none	none	y	n	n	n	0	silty mud, tracks in lower center of image
CLIS-08	2	C	mounds	none	none	n	n	n	geen algae	0	silty mud, mud clasts, green algage center right of image
CLIS-08	2	D	.	.	.	.	.	.	.	.	image not used
CLIS-08	3	A	flat	sparse	none	n	n	n	n	0	silty mud, couple of small to med burrow opening, mud clasts
CLIS-08	3	B	flat	none	none	y	n	n	n	0	silty mud, mud clasts, tracks at top center of image
CLIS-08	3	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment

Location	Station	Replicate	Bedforms	Burrows	Tubes	Tracks	Epifauna	Debris	Flora	Number of Fish	Comment
CLIS-08	3	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-08	4	A	flat, algae	present	none	n	n	shell frag	brown algae	0	silty mud, small to med burrow openings, brown algae throughout image, surface littered with shell fragments
CLIS-08	4	B	flat, algae	none	none	n	n	shell frag	brown algae	0	silty mud, brown algae throughout image, surface littered with shell fragments, two large shell fragments in center of image partially burried
CLIS-08	4	C	flat, algae	none	none	n	n	shell frag	brown algae	0	silty mud, brown algae throughout image, surface littered with shell fragments
CLIS-08	4	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-08	5	A	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-08	5	B	flat	none	none	n	n	n	n	0	silty mud
CLIS-08	5	D	flat	none	none	n	n	n	n	0	silty mud
CLIS-09	1	A	mounds	none	none	y	n	n	n	0	silty mud, sediment mounds, tracks in center of image
CLIS-09	1	B									
CLIS-09	1	C	mounds	sparse	sparse	n	n	shell frag	n	0	silty mud, tube in upper right of image, shell fragments dispersed throughout
CLIS-09	1	D	flat	none	none	n	n	n	n	0	silty mud
CLIS-09	2	A	mounds	none	none	n	n	shell frag	n	0	silty mud, a few mounds, and some shell fragments
CLIS-09	2	B	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-09	2	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-09	2	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-09	3	A	flat	none	none	n	n	n	n	0	silty mud, image difficult to identify due to suspended sediment
CLIS-09	3	B	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-09	3	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-09	4	A	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-09	4	B	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-09	4	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment

Location	Station	Replicate	Bedforms	Burrows	Tubes	Tracks	Epifauna	Debris	Flora	Number of Fish	Comment
CLIS-09	4	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-09	4	E	flat	none	none	n	barnacle, gastropod	shell frag	n	0	silty mud, shell fragments dispersed throughout image, large shell like fragment in upper right of image with barnacles growing on it
CLIS-09	4	F	flat	none	none	y	gastropod, sponge	shell frag, gastropod shells, bivavle shells	n	0	silty mud, shell fragments dispersed throughout image, live gastropds in image, tracks in lower right of image, sponge in upper center of image
CLIS-09	4	G	flat	none	none	n	gastropod, barnacle	shell frag, gastropod shells, bivavle shells	n	0	silty mud, shell fragments dispersed throughout image, live barnacles in image attached to a rock in the center right of image, '
CLIS-09	4	H	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-09	5	A	flat	none	none	n	n	n	n	0	silty mud, image difficult to identify due to suspended sediment
CLIS-09	5	B	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-09	5	C	flat	none	none	n	n	n	n	0	silty mud, image difficult to identify due to suspended sediment
CLIS-09	5	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-10	1	A	.	.	.	.	.	.	.	.	image not used
CLIS-10	1	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-10	1	D	flat	none	none	n	n	shell frag	n	0	silty mud, large clump of reduced mud clasts in upper right of image, lots of fine shell fragments dispersed throughout image,
CLIS-10	1	E	flat	none	none	y	n	shell frag	n	0	silty mud, reduced mud clasts throughout image, some fine shell fragments dispersed throughout image, tracks in the center of image and upper center of image
CLIS-10	1	F	flat	none	none	n	n	shell frag	n	0	silty mud, reduced mud clasts throughout image, some fine shell fragments dispersed throughout image,
CLIS-10	1	G	.	.	.	.	.	.	.	.	image not used
CLIS-10	2	A	flat	none	none	n	n	shell frag	n	0	silty mud, mud clasts, fine shell fragments dispersed throughout image,

Plan-View Image Analysis Results

Location	Station	Replicate	Bedforms	Burrows	Tubes	Tracks	Epifauna	Debris	Flora	Number of Fish	Comment
CLIS-10	2	B	flat	none	none	n	n	shell frag, bivalve shell	n	0	silty mud, mud clasts, fine shell fragments dispersed throughout image, large bivavle shell in upper right of image
CLIS-10	2	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-10	2	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-10	3	A	flat	sparse	none	n	n	shell frag	brown algae	0	silty mud, fine shell fragments dispersed throughout image, borwn algae in upper center of image
CLIS-10	3	B	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-10	3	C	flat	.	.	.	.	shell frag, bivalve shell	.	.	silty mud, shell fragments dispersed through image, image difficult to identify due to suspended sediment
CLIS-10	4	A	flat, algae	present	none	n	n	shell frag, bivalve shell	brown algae	0	silty mud, shell fragments dispersed through image, brown algae present at top of image and in the upper riggt side of image, image difficult to identify due to being out of focus
CLIS-10	4	B	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-10	4	C	flat	none	none	n	n	shell frag, mud clasts	brown algae	0	silty mud, shell fragments dispersed through image, brown algae present at center and center-bottom of image, large reduced mud clasts to the right of image at center-bottom of image, and small reduced mud clasts at bottom right of image
CLIS-10	4	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-10	5	A	flat	none	none	n	n	shell frag, bivalve shell, mud clasts	n	0	silty mud, shell fragments dispersed through image, bivalve shell visibile in the center of image, large reduced mud clasts at the center top of image
CLIS-10	5	B	flat	none	none	n	n	shell frag	brown algae	0	silty mud, shell fragments dispersed through image, image difficult to define due to suspended sediment, unknown gelatinous animal appears on brown algae at upper right of image
CLIS-10	5	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS-10	5	D	flat	none	none	n	n	shell frag, gastropod shell, mud clasts	brown algae	0	silty mud, shell fragments dispersed through image, brown algae spread throughout image, gastropod shell visibile in the center-top of image, large reduced mud clasts at the center of image

Plan-View Image Analysis Results

Location	Station	Replicate	Bedforms	Burrows	Tubes	Tracks	Epifauna	Debris	Flora	Number of Fish	Comment
2500W REF	1	A	flat	sparse	none	y	n	n	n	0	silty mud, a few small to med burrow openings & some foraging tracks visible
2500W REF	1	B	.	.	.	.	.	.	.	.	details obscured by suspended sediment
2500W REF	1	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment
2500W REF	1	D	flat	sparse	none	y	n	n	n	0	silty mud, a few small to med burrow openings
2500W REF	2	A	flat	sparse	none	y	n	n	n	0	silty mud, a few small to med burrow openings
2500W REF	2	B	flat	sparse	none	n	n	n	n	0	silty mud, a couple med/large burrow openings
2500W REF	2	C	.	.	.	.	.	.	.	.	image obscured, screen blacked-out
2500W REF	2	D	flat	sparse	none	y	n	n	n	0	silty mud, a few small to med burrow openings at top of image, foraging tracks visible on the left of image
2500W REF	3	A	flat	sparse	none	n	n	n	n	0	silty mud, a few small to med burrow openings
2500W REF	3	B	flat	sparse	none	n	n	n	n	0	silty
2500W REF	3	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment
2500W REF	3	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
2500W REF	4	A	flat	sparse	none	n	n	n	n	0	silty mud, a few burrow openings
2500W REF	4	B	flat	sparse	none	y	n	n	n	0	silty mud, a few burrow openings, one long track through the center of image
2500W REF	4	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment
2500W REF	4	D	flat	sparse	none	n	n	n	n	0	silty mud
2500W REF	4	F									
2500W REF	4	G									
2500W REF	5	A	flat	sparse	none	n	n	n	n	0	silty mud, a few small to med burrow openings at top of image
2500W REF	5	B	flat	sparse	none	n	n	n	n	0	silty mud, a few small to med burrow openings
2500W REF	5	C	flat	sparse	none	n	n	n	brown algae	0	silty mud, a couple med burrow openings, brown algae in lower right image
2500W REF	5	D									

Plan-View Image Analysis Results

Location	Station	Replicate	Bedforms	Burrows	Tubes	Tracks	Epifauna	Debris	Flora	Number of Fish	Comment
4500E REF	1	A	flat	none	none	n	n	n	n	0	silty mud
4500E REF	1	B	flat	none	none	n	n	n	n	0	silty mud
4500E REF	1	C	flat	sparse	none	y	n	n	n	0	silty mud, a few small to med burrow openings, tracks faint in center of image and in the upper right of image
4500E REF	2	A	flat	sparse	none	y	n	n	n	0	silty mud, a few small to med burrow openings, tracks faint in upper right of image
4500E REF	2	B	.	.	.	.	.	.	.	.	details obscured by suspended sediment
4500E REF	2	C	flat	sparse	none	n	n	n	n	0	silty mud, a few small to med burrow openings
4500E REF	2	D	flat	sparse	sparse	y	n	n	brown algae	0	silty mud, a few burrow openings, tracks faint in center right of image
4500E REF	3	A	flat	sparse	none	y	n	n	n	0	silty mud, a few small to med burrow openings, one long track through the center of image
4500E REF	3	B	flat	none	none	y	n	n	n	0	silty mud, a number of tracks throughout image
4500E REF	3	C	flat	sparse	none	n	n	n	n	0	silty mud, a few small to med burrow openings
4500E REF	4	A	flat	none	none	y	n	n	n	0	silty mud, a number of tracks through center of image
4500E REF	4	B	flat	none	none	n	anemone	n	n	0	silty mud, burrowing anemone at top center of image
4500E REF	4	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment
4500E REF	4	D	.	.	.	.	.	.	.	.	image blacked out
4500E REF	5	A	flat	none	none	y	n	n	n	0	silty mud, a number of tracks through center of image
4500E REF	5	B	flat	sparse	none	y	n	n	n	0	silty mud, a few burrow openings
4500E REF	5	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment
4500E REF	5	D	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS REF	1	A	.	.	.	.	.	.	.	.	image not used
CLIS REF	1	B	flat	none	none	y	n	n	n	0	silty mud, tracks upper right of image
CLIS REF	1	C	flat	present	none	y	n	n	n	0	silty mud, small med and larger burrows loosely spread throughout image, small reduced mud clasts at lower center of image, tracks in center right and upper left of image

Plan-View Image Analysis Results

Location	Station	Replicate	Bedforms	Burrows	Tubes	Tracks	Epifauna	Debris	Flora	Number of Fish	Comment
CLIS REF	1	D	flat	sparse	n	y	n	n	n	0	silty mud, med burrow left of image, small to med large reduced mud clasts in upper rigt of image, tracks in upper right of image
CLIS REF	2	A	flat	sparse	none	y	n	n	n	0	silty mud, tracks in upper part of image, small to med burrows center of image
CLIS REF	2	B	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS REF	2	C	.	.	.	.	.	.	.	.	details obscured by suspended sediment
CLIS REF	2	D	flat	present	none	y	n	n	n	0	silty mud, small to med large burrows spread aroudn image, tracks in center of image
CLIS REF	3	A	flat	sparse	none	y	n	n	n	0	silty mud, tracks throughout image, med large reduced mud clasts in center and center right of image, small to med burrows loosely disperesed throughout image
CLIS REF	3	B	flat	sparse	none	y	n	n	n	0	silty mud, tracks in lower half of image, two med burrows in upper center and lower left of image, a few small burrows spread around image
CLIS REF	3	C	.	.	.	.	.	.	.	.	image not used
CLIS REF	3	D	flat	present	none	y	n	n	n	0	silty mud, 4 med burrows, a number of small burrows throughout image with many congregaed in lower right of image, tracks in center of image
CLIS REF	4	A	.	.	.	.	.	.	.	.	image not used
CLIS REF	4	B	flat	present	none	y	n	shell frag	n	0	silty mud, med burrows throughout image, tracks throughout image, small shell frag center of image, worm on surface upper center of image
CLIS REF	4	C	flat	present	none	y	n	shell frag	n	0	silty mud, med to large burrows throughout image, tracks upper center of image, mud clasts in upper left of image, 1 shell frag upper left of image
CLIS REF	4	D	flat	present	none	n	n	shell frag	n	0	silty mud, 1 shell frag center right of image, med burrows loosely disperesed around image, mud clasts lower left of image, polychaete on surface upper center of image
CLIS REF	5	A	flat	sparse	none	n	n	n	n	0	silty mud, two large burrows in lower centner of image, med burrows in upper part of image
CLIS REF	5	B	.	.	.	.	.	.	.	.	image not used

Plan-View Image Analysis Results

Location	Station	Replicate	Bedforms	Burrows	Tubes	Tracks	Epifauna	Debris	Flora	Number of Fish	Comment
CLIS REF	5	C	flat	sparse	none	y	n	n	n	0	silty mud, tracks in center of image, larger burrow partially out of image in lower right, a few small burrows loosely spread throughout image
CLIS REF	5	D	flat	sparse	none	y	n	n	brown algae	0	silty mud, tracks center left and center top of image, brown algae lower left of image, polychaete on surface center right of image, few med to small burrows loosely dispersed around image

Note: 1) "ind" indicates that the sample result was indeterminate

APPENDIX E

GRAIN SIZE SCALE FOR SEDIMENTS

APPENDIX E

GRAIN SIZE SCALE FOR SEDIMENTS

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 F

BENTHIC BIOLOGY RESULTS FOR CLDS AUGUST 2014 SURVEY

DISPOSAL AREA MONITORING SYSTEM (DAMOS) BENTHIC RESULTS FOR SAMPLES COLLECTED AT THE CENTRAL AND WESTERN LONG ISLAND SOUND DISPOSAL SITES

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September 9, 2015

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INTRODUCTION

This report provides the results for 24 benthic samples collected as part of the Disposal Area Monitoring System (DAMOS) program managed by New England District of the U.S. Army Corps of Engineers, Environmental Resources Section of the Engineering/Planning Division. These samples were collected from the Central and Western Long Island Sound (LIS) Disposal Areas as part of the DAMOS program's monitoring of offshore dredged material disposal sites.

METHODS

The ERG benthic contract laboratory received 12 samples collected from Central LIS (stations labeled as PAM) and 12 from Western LIS (stations labeled as PAN) for a total of 24 samples. For each sample, a highly qualified taxonomist recorded the taxonomic name and count for each taxon identified. When processing a sample, if a specimen could only be identified to a higher taxonomic level due to damage, size, etc., and the taxonomist believed it could belong to a species already identified within the sample, a skip was recorded on the data sheet and data base. If, on the other hand, the taxonomist believed the specimen could represent a different taxon than those identified in the sample, a skip was not indicated in the data. When tallying number of taxa for an individual station, when a skip was indicated for a taxon, the taxon was not included in total number of taxa count.

Data for the 24 processed benthic samples were entered from the laboratory bench sheets into an excel spreadsheet that was submitted to Battelle at project completion. Before submitting, every entry in this file was visually checked against the bench sheets for entry errors. All entry errors were corrected in the file and checked visually again until the data file matched the bench sheets. A QC check for the taxonomic identification process was conducted by a different qualified taxonomist on 3 randomly selected samples.

Several measures of macroinvertebrate community composition were calculated for each station. For summary purposes, counts of organisms are reported as abundance. When density of organisms is presented, the abundance was converted to numbers per square meter by multiplying the counts by 22.7, the conversion factor for a 0.04 m^2 of the Ted Young modified Van Veen sampling grab used for the collection.

Diversity measures examined included number of taxa, Shannon-Wiener Diversity Index, and Pielou's Evenness Index. The formula used for the Shannon-Wiener Index (*H*', Shannon and Weaver 1949) is:

$$H' = -\sum_{i=1}^{s} (p_i)(\log_2 p_i)$$

where

i = the i'th taxa in the sample
s = number of taxa in the sample

p_i = proportion of total sample belonging to ith species

The formula used for the calculation of Pielou's Evenness Index (J', Pielou 1966) is:

$$J' = H' / \log_2 s$$

where

H' = Shannon Index of Diversity
s = number of taxa in the sample

DATA SUMMARY

BENTHIC COMMUNITY CHARACTERIZATION

Benthic data collected from each station sampled at the two DAMOS locations in Long Island Sound in 2014 are presented in Appendix A. The taxonomic QC results conducted for this project are presented in Appendix B. No additional sample processing action was required based on the QC results since all samples passed both the percent disagreement in enumeration (PDE) and percent taxonomic disagreement (PTD) requirements.

Diversity

A total of 72 taxa where collected and identified from the 24 samples collected from the Central and Western Long Island Sound disposal sites sampled in 2014 (Table 1). Twenty-eight polychaete taxa were collected which comprised about 39% of the total number of taxa collected. The mean of about 5 polychaete taxa were collected per station (Table 1). The arthropod phylum (class Malacostraca) was the next highest taxonomic group with 17 taxa spread over the four taxonomic orders Amphipoda, Decapoda, Mysidae, and Squillidae.

A station by station listing of number of taxa and abundance by major phyla is presented in Table 2. The percent contribution of the phylum Annelida to the percent total number of taxa was highest or equal to the highest at 19 of the 24 stations. The number of Mollusca taxa was highest of all phyla at four stations (PAN-006FA, PAN-006FA, PAN-008FA and PAN-009FA) and number of Arthropoda taxa was highest at PAN-004FA (Table 2).

Total number of taxa collected from the 24 individual stations varied from a low of four at Station PAM-009FA to a high of 22 at PAM-007FA (Table 3). Mean number of taxa collected from the 12 Central LIS disposal area was 12.75/station while the mean for the Western LIS disposal area was 14.17/station (Table 3). Station PAM-009FA had the lowest Shannon Diversity Index (H' of 1.22) and Station PAN-012FA had the highest H' of 3.63 (Table 3). Station PAM-004FA had the lowest Evenness Index (J' of 0.40) while Station PAN-002FA had the highest J' of 0.93 (Table 3). Individual station plots for the three diversity measures provided in Figure 1 show the variation in these measures among stations.

Abundance

A total of 1757 individuals were collected and identified from the 24 samples collected from the DAMOS Long Island Sound Disposal Areas (Table 1). A total of 711 polychaete worms accounting for about 41% of the total abundance were collected from the 24 stations. Bivalve clams were the second most abundant taxonomic group with a total of 481 which accounted for about 27% of the total abundance (Table 1). Station PAN-006FA had the highest station abundance of 183 and Stations PAM-003FA and PAN-002FA had the lowest abundance of only 15 individuals (Table 3).

The mean count for the Central LIS area was 66.17 individuals which corresponds to a density of 1502/m^2. Mean count for the Western LIS samples was higher at 80.25 individuals, a density of 1821.7/m^2 (Table 3). A station by station plot of counts show that 3 stations (PAN-0006FA, PAN-0008FA, and PAN-0010FA) were the cause for the higher mean count in the western area (Figure 2).

Of the total 72 taxa collected, 28 were only collected from one of the 24 stations sampled, resulting in about 39% of the taxa being collected from only 1 station (Table 4). The most abundant species collected from the two sampling areas was the polychaete worm *Nepthys incisa* (Table 4). The 351 *Nepthys* collected comprised about 20% of the total abundance in the samples and was collected at all 24 stations (Table 4). This species was also one of the top five taxa contributing to the total abundance at 11 stations in the Central LIS disposal area (Table 5) and at all 12 stations in the Western LIS disposal area (Table 6)

The second most abundant taxon was the amphipod *Leptocheirus pinguis* with a total of 286 organisms collected comprising about 16% of the total abundance followed by the bivalve clam *Nucula proxima* where the 200 organisms accounted for about 11% of the total abundance (Table 2). Both of these species were collected in 13 of the 24 stations sampled at the two LIS disposal areas (Table 2). Interestingly, *Leptocheirus pinguis* was a top contributor to total abundance at 6 stations in the Central LIS area but at none of the stations in the Western LIS area (Tables 5 and 6). Although *Nucula proxima* was the third most abundant species overall, it was only a top contributor to total abundance at 4 of the 24 stations (Tables 5 and 6).

When the percentage contribution by count of the major taxonomic groupings was plotted several assemblage differences were evident among the stations. At several stations in the Central LIS disposal area Arthropoda dominated the benthic community composition (PAN-0004FA, PAN-0009FA, PAN-0010FA, and PAN-0011FA), while none of the western LIS disposal area stations had a higher percentage of Arthropoda (Figure 3). Also, in the western LIS disposal area, molluscs comprised a larger component of the benthic assemblage at many stations (i.e., PAN-0006FA and PAN-0009FA, Figure 3).

REFERENCES

Shannon, C. E. and W. Weaver. 1949. The Mathematical Theory of Communication. Urbana: University of Illinois Press.

Pielou, E. C. 1966. The measurement of diversity in different types of biological collections. Journal of Theoretical Biology 13:131-144.

Table 1. Number of taxa and abundance of the major benthic taxonomic categories collected from the 24 stations sampled at the Central and Western LIS disposal areas in 2014.

Phylum	**Class**	**# Taxa**	**% Total # Taxa**	**Total Count**	**% Total Count**	**Mean # Taxa**	**Mean Total Count**
Annelida	Clitellata	1	1.39%	8	0.46%	0.21	0.33
Annelida	Polychaeta	28	38.89%	711	40.47%	5.38	29.63
Arthropoda	Malacostraca	17	23.61%	352	20.03%	2.08	14.67
Mollusca	Bivalvia	8	11.11%	481	27.38%	2.96	20.04
Mollusca	Gastropoda	8	11.11%	135	7.68%	1.38	5.63
Other Taxa*		10	13.89%	70	3.98%	1.46	2.92
	Total	72		1757			
* includes Cnidaria, Hemichordata, Nemertea, Phoronida, Playhelminthes, and Sipuncula							

Table 2. Number of taxa and abundance summary of the major benthic taxonomic groups by station for the 24 stations sampled at the Central and Western LIS disposal areas in 2014.

Summary of Major Benthic Taxonomic Groups by Station

Project: DAMOS-Long Island Sound

Station: PAM-001FA

Phylum	Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida	6	40.0%	21	55.3%
Arthropoda	1	6.7%	1	2.6%
Mollusca	6	40.0%	12	31.6%
Other Taxa	2	13.3%	4	10.5%
Total	**15**		**38**	

Station: PAM-002FA

Phylum	Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida	4	44.4%	20	71.4%
Arthropoda	1	11.1%	1	3.6%
Mollusca	2	22.2%	5	17.9%
Other Taxa	2	22.2%	2	7.1%
Total	**9**		**28**	

Station: PAM-003FA

Phylum	Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida	3	42.9%	9	60.0%
Arthropoda	2	28.6%	3	20.0%
Mollusca	1	14.3%	1	6.7%
Other Taxa	1	14.3%	2	13.3%
Total	**7**		**15**	

Station: PAM-004FA

Phylum	Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida	5	45.5%	16	13.7%
Arthropoda	3	27.3%	96	82.1%
Mollusca	2	18.2%	3	2.6%
Other Taxa	1	9.1%	2	1.7%
Total	**11**		**117**	

Table 2. (Continued)

Summary of Major Benthic Taxonomic Groups by Station

Project: DAMOS-Long Island Sound

Station: PAM-005FA

Phylum	Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida	12	60.0%	67	54.0%
Arthropoda	2	10.0%	34	27.4%
Mollusca	2	10.0%	10	8.1%
Other Taxa	4	20.0%	13	10.5%
Total	**20**		**124**	

Station: PAM-006FA

Phylum	Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida	8	50.0%	24	51.1%
Arthropoda	3	18.8%	4	8.5%
Mollusca	4	25.0%	18	38.3%
Other Taxa	1	6.3%	1	2.1%
Total	**16**		**47**	

Station: PAM-007FA

Phylum	Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida	8	36.4%	42	51.9%
Arthropoda	6	27.3%	10	12.3%
Mollusca	6	27.3%	27	33.3%
Other Taxa	2	9.1%	2	2.5%
Total	**22**		**81**	

Station: PAM-008FA

Phylum	Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida	4	36.4%	18	36.7%
Arthropoda	1	9.1%	4	8.2%
Mollusca	4	36.4%	22	44.9%
Other Taxa	2	18.2%	5	10.2%
Total	**11**		**49**	

Table 2. (Continued)

Summary of Major Benthic Taxonomic Groups by Station

Project: DAMOS-Long Island Sound

Station: PAM-009FA

Phylum	Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida	2	50.0%	8	21.1%
Arthropoda	1	25.0%	28	73.7%
Other Taxa	1	25.0%	2	5.3%
Total	**4**		**38**	

Station: PAM-010FA

Phylum	Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida	9	50.0%	29	20.7%
Arthropoda	7	38.9%	108	77.1%
Mollusca	1	5.6%	1	0.7%
Other Taxa	1	5.6%	2	1.4%
Total	**18**		**140**	

Station: PAM-011FA

Phylum	Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida	3	37.5%	6	12.0%
Arthropoda	3	37.5%	38	76.0%
Mollusca	2	25.0%	6	12.0%
Total	**8**		**50**	

Station: PAM-012FA

Phylum	Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida	5	41.7%	48	71.6%
Mollusca	4	33.3%	14	20.9%
Other Taxa	3	25.0%	5	7.5%
Total	**12**		**67**	

Table 2. (Continued)

Summary of Major Benthic Taxonomic Groups by Station

Project: DAMOS-Long Island Sound

Station: PAN-001FA

Phylum		Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida		5	38.5%	20	51.3%
Arthropoda		1	7.7%	1	2.6%
Mollusca		5	38.5%	12	30.8%
Other Taxa		2	15.4%	6	15.4%
	Total	**13**		**39**	

Station: PAN-002FA

Phylum		Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida		6	75.0%	12	80.0%
Arthropoda		1	12.5%	1	6.7%
Mollusca		1	12.5%	2	13.3%
	Total	**8**		**15**	

Station: PAN-003FA

Phylum		Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida		3	60.0%	20	76.9%
Mollusca		2	40.0%	6	23.1%
	Total	**5**		**26**	

Station: PAN-004FA

Phylum		Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida		2	20.0%	21	63.6%
Arthropoda		7	70.0%	11	33.3%
Mollusca		1	10.0%	1	3.0%
	Total	**10**		**33**	

Table 2. (Continued)

Summary of Major Benthic Taxonomic Groups by Station

Project: DAMOS-Long Island Sound

Station: PAN-005FA

Phylum		Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida		3	20.0%	24	46.2%
Arthropoda		1	6.7%	1	1.9%
Mollusca		8	53.3%	24	46.2%
Other Taxa		3	20.0%	3	5.8%
	Total	**15**		**52**	

Station: PAN-006FA

Phylum		Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida		1	10.0%	18	9.8%
Arthropoda		1	10.0%	1	0.5%
Mollusca		8	80.0%	164	89.6%
	Total	**10**		**183**	

Station: PAN-007FA

Phylum		Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida		8	53.3%	44	65.7%
Mollusca		6	40.0%	17	25.4%
Other Taxa		1	6.7%	6	9.0%
	Total	**15**		**67**	

Station: PAN-008FA

Phylum		Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida		7	35.0%	81	54.0%
Arthropoda		3	15.0%	4	2.7%
Mollusca		8	40.0%	60	40.0%
Other Taxa		2	10.0%	5	3.3%
	Total	**20**		**150**	

Table 2. (Continued)

Summary of Major Benthic Taxonomic Groups by Station

Project: DAMOS-Long Island Sound

Station: PAN-009FA

Phylum	Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida	6	42.9%	36	36.0%
Mollusca	7	50.0%	63	63.0%
Other Taxa	1	7.1%	1	1.0%
Total	**14**		**100**	

Station: PAN-010FA

Phylum	Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida	8	42.1%	59	40.1%
Arthropoda	2	10.5%	2	1.4%
Mollusca	8	42.1%	85	57.8%
Other Taxa	1	5.3%	1	0.7%
Total	**19**		**147**	

Station: PAN-011FA

Phylum	Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida	8	40.0%	37	52.9%
Arthropoda	2	10.0%	2	2.9%
Mollusca	8	40.0%	27	38.6%
Other Taxa	2	10.0%	4	5.7%
Total	**20**		**70**	

Station: PAN-012FA

Phylum	Total No. Taxa	% Total No. Taxa	Total Abundance	% Total Abundance
Annelida	8	38.1%	39	48.1%
Arthropoda	2	9.5%	2	2.5%
Mollusca	8	38.1%	36	44.4%
Other Taxa	3	14.3%	4	4.9%
Total	**21**		**81**	

Table 3. Number of taxa, abundance, and diversity measures for the 24 stations sampled at the Central and Western LIS disposal areas in 2014

Station	No. Taxa	Abundance (count)	Density (#/m^2)	Shannon-Wiener Index *H'*	Pielou Evenness Index *J'*
PAM-001FA	15	38	862.6	3.12	0.80
PAM-002FA	9	28	635.6	2.21	0.70
PAM-003FA	7	15	340.5	2.55	0.91
PAM-004FA	11	117	2655.9	1.38	0.40
PAM-005FA	20	124	2814.8	3.20	0.74
PAM-006FA	16	47	1066.9	3.29	0.82
PAM-007FA	22	81	1838.7	3.46	0.77
PAM-008FA	11	49	1112.3	2.88	0.83
PAM-009FA	4	38	862.6	1.22	0.61
PAM-010FA	18	140	3178.0	2.43	0.58
PAM-011FA	8	50	1135.0	1.53	0.51
PAM-012FA	12	67	1520.9	2.95	0.82
Mean Central	**12.75**	**66.17**	**1502.0**	**2.52**	**0.71**
PAN-001FA	13	39	885.3	2.94	0.79
PAN-002FA	8	15	340.5	2.79	0.93
PAN-003FA	5	26	590.2	1.43	0.62
PAN-004FA	10	33	749.1	2.56	0.77
PAN-005FA	15	52	1180.4	3.01	0.77
PAN-006FA	10	183	4154.1	2.02	0.61
PAN-007FA	15	67	1520.9	3.27	0.84
PAN-008FA	20	150	3405.0	3.36	0.78
PAN-009FA	14	100	2270.0	2.92	0.77
PAN-010FA	19	147	3336.9	3.12	0.73
PAN-011FA	20	70	1589.0	3.49	0.81
PAN-012FA	21	81	1838.7	3.63	0.83
Mean Western	**14.17**	**80.25**	**1821.7**	**2.88**	**0.77**

Table 4. Abundance and station distribution of benthic taxa for the 24 stations sampled at the Central and Western LIS disposal areas in 2014

Taxon	Phylum	Class	Abundance	% Total	Cumulative %	Station Occurrence	% Station Occurrence
Nephtys incisa	Annelida	Polychaeta	351	19.98%	19.98%	24	100.00%
Leptocheirus pinguis	Arthropoda	Malacostraca	286	16.28%	36.25%	13	54.17%
Nucula proxima	Mollusca	Bivalvia	200	11.38%	47.64%	13	54.17%
Mediomastus ambiseta	Annelida	Polychaeta	138	7.85%	55.49%	13	54.17%
Pitar morrhuanus	Mollusca	Bivalvia	74	4.21%	59.70%	15	62.50%
Yoldia sapotilla	Mollusca	Bivalvia	70	3.98%	63.69%	13	54.17%
Macoma tenta	Mollusca	Bivalvia	66	3.76%	67.44%	11	45.83%
Turbonilla interrupta	Mollusca	Gastropoda	60	3.41%	70.86%	5	20.83%
Mulinia lateralis	Mollusca	Bivalvia	55	3.13%	73.99%	9	37.50%
Levinsenia gracilis	Annelida	Polychaeta	50	2.85%	76.84%	10	41.67%
Tubulanus pellucidus	Nemertea	Palaeonemertea	37	2.11%	78.94%	13	54.17%
Nassarius trivittatus	Mollusca	Gastropoda	34	1.94%	80.88%	12	50.00%
Sigambra tentaculata	Annelida	Polychaeta	34	1.94%	82.81%	10	41.67%
Loimia medusa	Annelida	Polychaeta	33	1.88%	84.69%	11	45.83%
Haminoea solitaria	Mollusca	Gastropoda	23	1.31%	86.00%	5	20.83%
Prionospio perkinsi	Annelida	Polychaeta	23	1.31%	87.31%	3	12.50%
Phoronis spp.	Phoronida	Phoronida	17	0.97%	88.28%	9	37.50%
Ampelisca abdita	Arthropoda	Malacostraca	15	0.85%	89.13%	7	29.17%
Unciola irrorata	Arthropoda	Malacostraca	15	0.85%	89.98%	5	20.83%
Acteocina canaliculata	Mollusca	Gastropoda	14	0.80%	90.78%	7	29.17%
Ampharete lindstroemi	Annelida	Polychaeta	11	0.63%	91.41%	4	16.67%
Pinnixa spp.	Arthropoda	Malacostraca	10	0.57%	91.97%	5	20.83%
Spiochaetopterus costarum	Annelida	Polychaeta	10	0.57%	92.54%	7	29.17%
Tharyx spp.	Annelida	Polychaeta	10	0.57%	93.11%	7	29.17%
Saccoglossus kowalevskii	Hemichordata	Enteropneusta	9	0.51%	93.63%	7	29.17%
Oligochaeta	Annelida	Clitellata	8	0.46%	94.08%	5	20.83%
Pectinaria gouldii	Annelida	Polychaeta	7	0.40%	94.48%	6	25.00%
Phyllodoce arenae	Annelida	Polychaeta	7	0.40%	94.88%	6	25.00%
Glyceridae	Annelida	Polychaeta	6	0.34%	95.22%	4	16.67%
Pandora gouldiana	Mollusca	Bivalvia	6	0.34%	95.56%	3	12.50%
Anadara transversa	Mollusca	Bivalvia	5	0.28%	95.85%	2	8.33%
Clymenella zonalis	Annelida	Polychaeta	5	0.28%	96.13%	3	12.50%
Lyonsia hyalina	Mollusca	Bivalvia	5	0.28%	96.41%	5	20.83%
Crangon septemspinosa	Arthropoda	Malacostraca	4	0.23%	96.64%	4	16.67%
Ericthonius brasiliensis	Arthropoda	Malacostraca	4	0.23%	96.87%	1	4.17%
Panopeidae	Arthropoda	Malacostraca	4	0.23%	97.10%	3	12.50%
Axiidea	Arthropoda	Malacostraca	3	0.17%	97.27%	2	8.33%
Maldanidae	Annelida	Polychaeta	3	0.17%	97.44%	3	12.50%

Table 4. Continued

Taxon	Phylum	Class	Abundance	% Total	Cumulative %	Station Occurrence	% Station Occurrence
Scolelepis bousfieldi	Annelida	Polychaeta	3	0.17%	97.61%	1	4.17%
Tharyx acutus	Annelida	Polychaeta	3	0.17%	97.78%	2	8.33%
Chaetopterus variopedatus	Annelida	Polychaeta	2	0.11%	97.89%	2	8.33%
Deutella incerta	Arthropoda	Malacostraca	2	0.11%	98.01%	2	8.33%
Goniadidae	Annelida	Polychaeta	2	0.11%	98.12%	2	8.33%
Heteromysis formosa	Arthropoda	Malacostraca	2	0.11%	98.24%	1	4.17%
Heteronemertea	Nemertea	Anopla	2	0.11%	98.35%	2	8.33%
Pherusa affinis	Annelida	Polychaeta	2	0.11%	98.46%	2	8.33%
Podarkeopsis levifuscina	Annelida	Polychaeta	2	0.11%	98.58%	2	8.33%
Polycirrus phosphoreus	Annelida	Polychaeta	2	0.11%	98.69%	1	4.17%
Stylochus ellipticus	Platyhelminthes	Rhabditophora	2	0.11%	98.80%	1	4.17%
Amphiporus bioculatus	Nemertea	Enopla	1	0.06%	98.86%	1	4.17%
Anthozoa	Cnidaria	Anthozoa	1	0.06%	98.92%	1	4.17%
Batea catharinensis	Arthropoda	Malacostraca	1	0.06%	98.98%	1	4.17%
Cerapus spp.	Arthropoda	Malacostraca	1	0.06%	99.03%	1	4.17%
Cratena pilata	Mollusca	Gastropoda	1	0.06%	99.09%	1	4.17%
Eupleura caudate	Mollusca	Gastropoda	1	0.06%	99.15%	1	4.17%
Gastropoda	Mollusca	Gastropoda	1	0.06%	99.20%	1	4.17%
Lumbrineridae	Annelida	Polychaeta	1	0.06%	99.26%	1	4.17%
Melinna maculata	Annelida	Polychaeta	1	0.06%	99.32%	1	4.17%
Mysidae	Arthropoda	Malacostraca	1	0.06%	99.37%	1	4.17%
Owenia artifex	Annelida	Polychaeta	1	0.06%	99.43%	1	4.17%
Pagurus spp.	Arthropoda	Malacostraca	1	0.06%	99.49%	1	4.17%
Paracaprella tenuis	Arthropoda	Malacostraca	1	0.06%	99.54%	1	4.17%
Parametopella cypris	Arthropoda	Malacostraca	1	0.06%	99.60%	1	4.17%
Phascolion strombus strombus	Sipuncula	Sipunculidea	1	0.06%	99.66%	1	4.17%
Polinices duplicatus	Mollusca	Gastropoda	1	0.06%	99.72%	1	4.17%
Polydora cornuta	Annelida	Polychaeta	1	0.06%	99.77%	1	4.17%
Polynoidae	Annelida	Polychaeta	1	0.06%	99.83%	1	4.17%
Sabaco elongates	Annelida	Polychaeta	1	0.06%	99.89%	1	4.17%
Spio setosa	Annelida	Polychaeta	1	0.06%	99.94%	1	4.17%
Squilla empusa	Arthropoda	Malacostraca	1	0.06%	100.00%	1	4.17%
		Total	1759				

Table 5 Percent contribution of the top 5 most abundant benthic taxa for each station sampled at the 12 stations sampled in the Central LIS disposal area in 2014.

Phylum	Class	Taxon	PAM-001FA	PAM-002FA	PAM-003FA	PAM-004FA	PAM-005FA	PAM-006FA	PAM-007FA	PAM-008FA	PAM-009FA	PAM-010FA	PAM-011FA	PAM-012FA	No. Stations as a top 5 Taxa
Annelida	Polychaeta	*Nephtys incisa*	36.84%	57.14%	33.33%	3.42%	5.65%	21.28%	13.58%	24.49%	13.16%		8.00%	25.37%	11
Annelida	Polychaeta	*Sigambra tentaculata*	5.26%	7.14%				6.38%	3.70%	8.16%				19.40%	6
Arthropoda	Malacostraca	*Leptocheirus pinguis*			13.33%	78.63%	25.00%				73.68%	60.00%	72.00%		6
Mollusca	Bivalvia	*Macoma tenta*	18.42%	10.71%				25.53%	22.22%	10.20%					5
Nemertea	Palaeonemertea	*Tubulanus pellucidus*	5.26%		13.33%	1.71%	8.06%				5.26%				5
Annelida	Polychaeta	*Loimia medusa*			20.00%						7.89%	5.71%		5.97%	4
Mollusca	Bivalvia	*Pitar morrhuanus*						8.51%		28.57%			2.00%		3
Annelida	Polychaeta	*Mediomastus ambiseta*				6.84%	30.65%								2
Mollusca	Gastropoda	*Nassarius trivittatus*					5.65%						10.00%		2
Arthropoda	Malacostraca	*Unciola irrorata*			6.67%							7.86%			2
Mollusca	Bivalvia	*Yoldia sapotilla*		7.14%											1
Annelida	Polychaeta	*Levinsenia gracilis*												19.40%	1
Mollusca	Bivalvia	*Nucula proxima*												11.94%	1
Annelida	Polychaeta	*Ampharete lindstroemi*						12.77%							1
Phoronida	Phoronida	*Phoronis* spp.								8.16%					1
Annelida	Polychaeta	Polynoidae											2.00%		1
Annelida	Polychaeta	*Prionospio perkinsi*							25.93%						1
Annelida	Polychaeta	*Tharyx acutus*		3.57%											1
Annelida	Polychaeta	*Tharyx* spp.										2.86%			1
Arthropoda	Malacostraca	*Ampelisca abdita*				2.56%									1
Arthropoda	Malacostraca	*Pinnixa* spp.										4.29%			1
Hemichordata	Enteropneusta	*Saccoglossus kowalevskii*	5.26%												1
Mollusca	Bivalvia	*Anadara transversa*							4.94%						1

Table 6 Percent contribution of the top 5 most abundant benthic taxa for each station sampled at the 12 stations sampled in the Western LIS disposal area in 2014.

Phylum	**Class**	**Taxon**	**PAN-001FA**	**PAN-002FA**	**PAN-003FA**	**PAN-004FA**	**PAN-005FA**	**PAN-006FA**	**PAN-007FA**	**PAN-008FA**	**PAN-009FA**	**PAN-010FA**	**PAN-011FA**	**PAN-012FA**	**No. Stations as a top 5 Taxa**
Annelida	Polychaeta	*Nephtys incisa*	41.03%	26.67%	69.23%	39.39%	42.31%	9.84%	25.37%	27.33%	28.00%	16.33%	34.29%	20.99%	12
Mollusca	Bivalvia	*Pitar morrhuanus*	7.69%		7.69%		9.62%	4.92%		6.67%			10.00%	8.64%	7
Annelida	Polychaeta	*Mediomastus ambiseta*				24.24%			17.91%	15.33%		16.33%	8.57%	9.88%	6
Mollusca	Bivalvia	*Yoldia sapotilla*	10.26%		15.38%		7.69%	8.74%			10.00%	5.44%			6
Annelida	Polychaeta	*Levinsenia gracilis*							11.94%	6.67%				9.88%	3
Mollusca	Bivalvia	*Nucula proxima*						59.56%			17.00%	29.93%			3
Mollusca	Bivalvia	*Mulinia lateralis*						9.29%	8.96%	16.00%					3
Mollusca	Gastropoda	*Turbonilla interrupta*									21.00%	12.24%		18.52%	3
Mollusca	Bivalvia	*Macoma tenta*	7.69%				7.69%								2
Mollusca	Gastropoda	*Nassarius trivittatus*		13.33%									5.71%		2
Mollusca	Gastropoda	*Haminoea solitaria*									9.00%		7.14%		2
Nemertea	Palaeonemertea	*Tubulanus pellucidus*							8.96%						1
Annelida	Polychaeta	*Loimia medusa*			3.85%										1
Annelida	Polychaeta	*Ampharete lindstroemi*		20.00%											1
Phoronida	Phoronida	*Phoronis* spp.	10.26%												1
Annelida	Polychaeta	*Phyllodoce arenae*		6.67%											1
Annelida	Polychaeta	*Polycirrus phosphoreus*		13.33%											1
Annelida	Polychaeta	*Spiochaetopterus costarum*			3.85%										1
Arthropoda	Malacostraca	*Ericthonius brasiliensis*				12.12%									1
Arthropoda	Malacostraca	Panopeidae				6.06%									1
Arthropoda	Malacostraca	*Squilla empusa*				3.03%									1
Mollusca	Bivalvia	*Pandora gouldiana*					7.69%								1

a

b

c

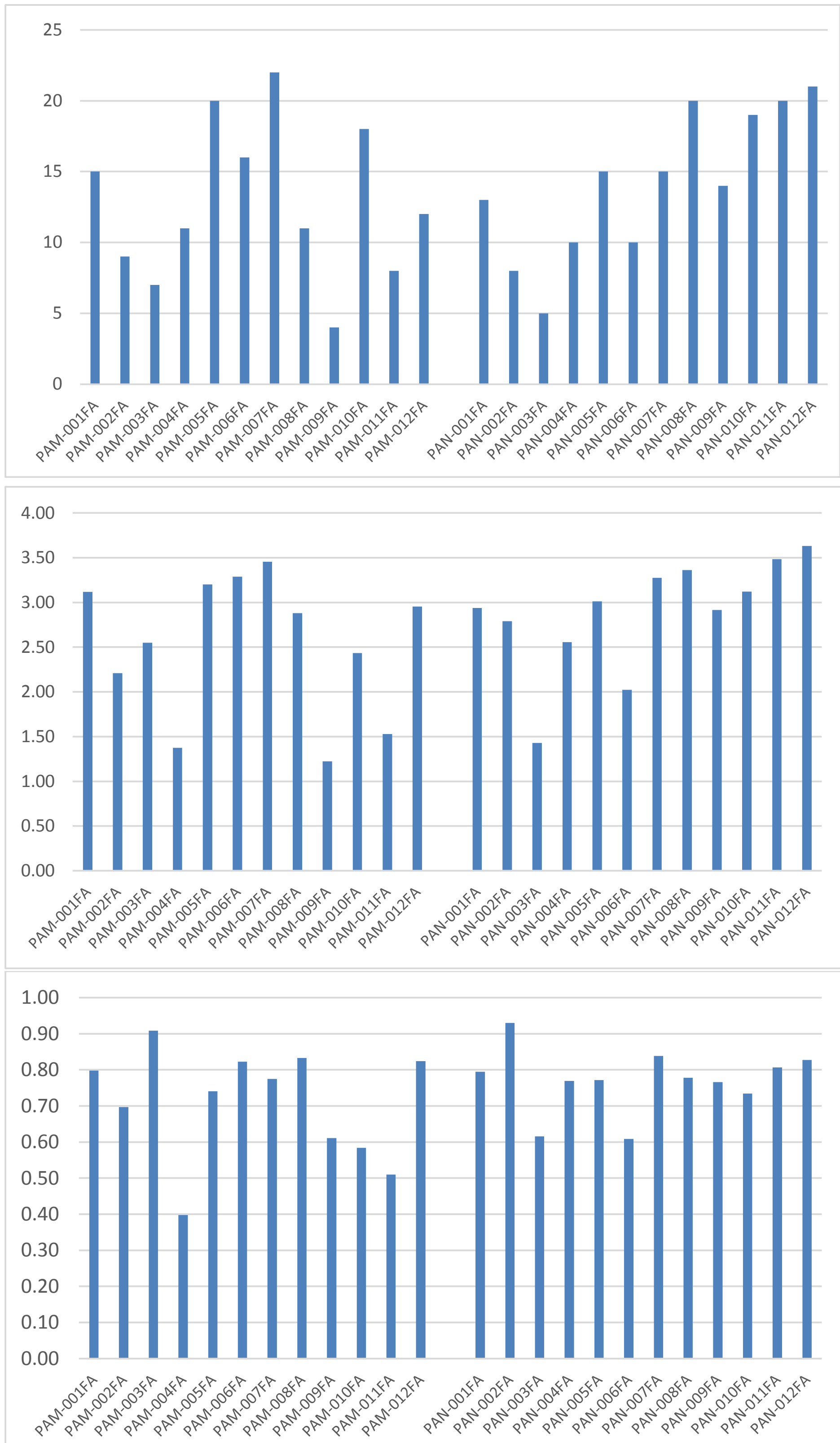

Figure 1. Means of several diversity measures (No. of taxa (a); H' (b); J' (c)) at the 24 stations sampled at the Central and Western LIS disposal areas in 2014

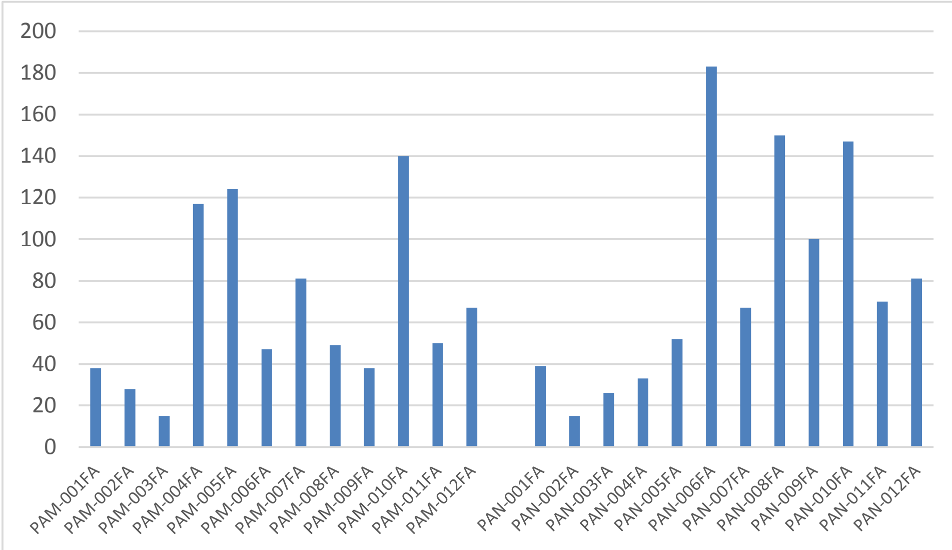

Figure 2. Mean abundance of benthic organisms collected at the 24 stations sampled at the Central and Western LIS disposal areas in 2014

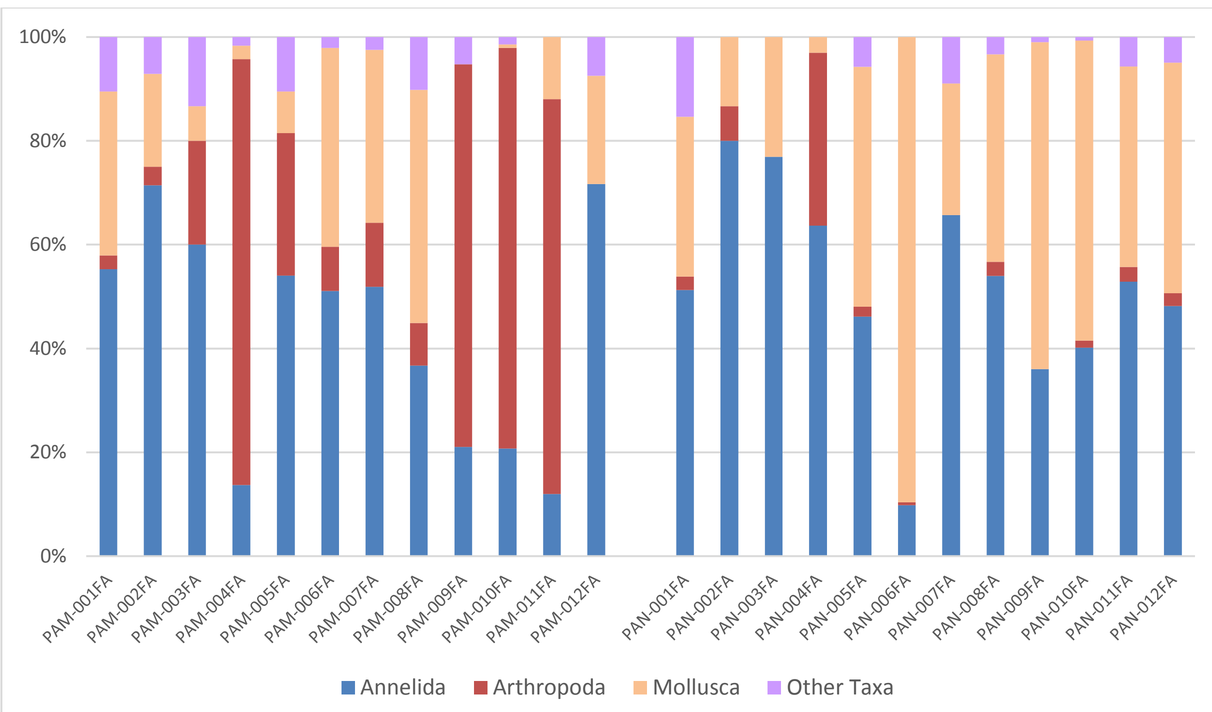

Figure 3. Percent contribution of major phyla to community composition at the 24 stations sampled at the Central and Western LIS disposal areas in 2014

APPENDIX A

STATION SPECIFIC BENTHIC ABUNDANCE SUMMARY FOR THE CENTRAL AND WESTERN LONG ISLAND SOUND DISPOSAL AREA SAMPLES COLLECTED IN 2014

DAMOS-Long Island Sound

Station: PAM-001FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Clitellata		Unidentified	Oligochaeta	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	14
Annelida	Polychaeta		Paraonidae	Levinsenia gracilis	2
Annelida	Polychaeta		Pilargidae	Sigambra tentaculata	2
Annelida	Polychaeta		Spionidae	Spio setosa	1
Annelida	Polychaeta		Terebellidae	Loimia medusa	1
Arthropoda	Malacostraca	Mysidacea	Mysidae	Mysidae	1
Hemichordata	Enteropneusta	Unidentified	Harrimaniidae	Saccoglossus kowalevskii	2
Mollusca	Bivalvia		Lyonsiidae	Lyonsia hyalina	1
Mollusca	Bivalvia		Mactridae	Mulinia lateralis	1
Mollusca	Bivalvia		Nuculanidae	Yoldia sapotilla	1
Mollusca	Bivalvia		Nuculidae	Nucula proxima	1
Mollusca	Bivalvia		Tellinidae	Macoma tenta	7
Mollusca	Bivalvia		Veneridae	Pitar morrhuanus	1
Nemertea	Palaeonemertea		Tubulanidae	Tubulanus pellucidus	2
				Total Count	38
				# Taxa	15

Station: PAM-002FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Cirratulidae	Tharyx acutus	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	16
Annelida	Polychaeta		Paraonidae	Levinsenia gracilis	1
Annelida	Polychaeta		Pilargidae	Sigambra tentaculata	2
Arthropoda	Malacostraca	Amphipoda	Aoridae	Leptocheirus pinguis	1
Hemichordata	Enteropneusta	Unidentified	Harrimaniidae	Saccoglossus kowalevskii	1
Mollusca	Bivalvia		Nuculanidae	Yoldia sapotilla	2
Mollusca	Bivalvia		Tellinidae	Macoma tenta	3
Phoronida	Phoronida	Phoronida	Phoronidae	Phoronis spp.	1
				Total Count	28
				# Taxa	9

Station: PAM-003FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Cirratulidae	Tharyx spp.	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	5
Annelida	Polychaeta		Terebellidae	Loimia medusa	3
Arthropoda	Malacostraca	Amphipoda	Aoridae	Leptocheirus pinguis	2
Arthropoda	Malacostraca	Amphipoda	Aoridae	Unciola irrorata	1
Mollusca	Gastropoda		Nassariidae	Nassarius trivittatus	1
Nemertea	Palaeonemertea		Tubulanidae	Tubulanus pellucidus	2
				Total Count	15
				# Taxa	7

* denotes not included in total number of taxa

DAMOS-Long Island Sound

Station: PAM-004FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Capitellidae	Mediomastus ambiseta	8
Annelida	Polychaeta		Glyceridae	Glyceridae	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	4
Annelida	Polychaeta		Phyllodocidae	Phyllodoce arenae	1
Annelida	Polychaeta		Terebellidae	Loimia medusa	2
Arthropoda	Malacostraca	Amphipoda	Ampeliscidae	Ampelisca abdita	3
Arthropoda	Malacostraca	Amphipoda	Aoridae	Leptocheirus pinguis	92
Arthropoda	Malacostraca	Amphipoda	Aoridae	Unciola irrorata	1
Mollusca	Bivalvia		Nuculidae	Nucula proxima	1
Mollusca	Gastropoda		Nassariidae	Nassarius trivittatus	2
Nemertea	Palaeonemertea		Tubulanidae	Tubulanus pellucidus	2
				Total Count	117
				# Taxa	11

Station: PAM-005FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Clitellata		Unidentified	Oligochaeta	4
Annelida	Polychaeta		Capitellidae	Mediomastus ambiseta	38
Annelida	Polychaeta		Chaetopteridae	Spiochaetopterus costarum	1
Annelida	Polychaeta		Cirratulidae	Tharyx acutus	2
Annelida	Polychaeta		Cirratulidae	Tharyx spp.	1*
Annelida	Polychaeta		Glyceridae	Glyceridae	3
Annelida	Polychaeta		Maldanidae	Clymenella zonalis	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	7
Annelida	Polychaeta		Oweniidae	Owenia artifex	1
Annelida	Polychaeta		Pectinariidae	Pectinaria gouldii	1
Annelida	Polychaeta		Phyllodocidae	Phyllodoce arenae	1
Annelida	Polychaeta		Spionidae	Prionospio perkinsi	1
Annelida	Polychaeta		Terebellidae	Loimia medusa	6
Arthropoda	Malacostraca	Amphipoda	Ampeliscidae	Ampelisca abdita	3
Arthropoda	Malacostraca	Amphipoda	Aoridae	Leptocheirus pinguis	31
Cnidaria	Anthozoa		Unidentified	Anthozoa	1
Mollusca	Bivalvia		Nuculidae	Nucula proxima	3
Mollusca	Gastropoda		Nassariidae	Nassarius trivittatus	7
Nemertea	Anopla	Heteronemertea		Heteronemertea	1
Nemertea	Palaeonemertea		Tubulanidae	Tubulanus pellucidus	10
Nemertina	Enopla	Monostillfera	Amphiporidae	Amphiporus bioculatus	1
				Total Count	124
				# Taxa	20

* denotes not included in total number of taxa

DAMOS-Long Island Sound

Station: PAM-006FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Ampharetidae	Ampharete lindstroemi	6
Annelida	Polychaeta		Chaetopteridae	Spiochaetopterus costarum	1
Annelida	Polychaeta		Flabelligeridae	Pherusa affinis	1
Annelida	Polychaeta		Maldanidae	Maldanidae	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	10
Annelida	Polychaeta		Phyllodocidae	Phyllodoce arenae	1
Annelida	Polychaeta		Pilargidae	Sigambra tentaculata	3
Annelida	Polychaeta		Terebellidae	Loimia medusa	1
Arthropoda	Malacostraca	Amphipoda	Ampeliscidae	Ampelisca abdita	2
Arthropoda	Malacostraca	Amphipoda	Aoridae	Leptocheirus pinguis	1
Arthropoda	Malacostraca	Decapoda		Axiidea	1
Mollusca	Bivalvia		Arcidae	Anadara transversa	1
Mollusca	Bivalvia		Pandoridae	Pandora gouldiana	1
Mollusca	Bivalvia		Tellinidae	Macoma tenta	12
Mollusca	Bivalvia		Veneridae	Pitar morrhuanus	4
Nemertea	Palaeonemertea		Tubulanidae	Tubulanus pellucidus	1
				Total Count	47
				# Taxa	16

Station: PAM-007FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Ampharetidae	Ampharete lindstroemi	1
Annelida	Polychaeta		Chaetopteridae	Chaetopterus variopedatus	1
Annelida	Polychaeta		Chaetopteridae	Spiochaetopterus costarum	1
Annelida	Polychaeta		Hesionidae	Podarkeopsis levifuscina	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	11
Annelida	Polychaeta		Pilargidae	Sigambra tentaculata	3
Annelida	Polychaeta		Spionidae	Prionospio perkinsi	21
Annelida	Polychaeta		Terebellidae	Loimia medusa	3
Arthropoda	Malacostraca	Amphipoda	Aoridae	Leptocheirus pinguis	3
Arthropoda	Malacostraca	Amphipoda	Aoridae	Unciola irrorata	1
Arthropoda	Malacostraca	Decapoda		Axiidea	2
Arthropoda	Malacostraca	Decapoda	Panopeidae	Panopeidae	1
Arthropoda	Malacostraca	Decapoda	Pinnotheridae	Pinnixa spp.	1
Arthropoda	Malacostraca	Mysidacea	Mysidae	Heteromysis formosa	2
Hemichordata	Enteropneusta	Unidentified	Harrimaniidae	Saccoglossus kowalevskii	1
Mollusca	Bivalvia		Arcidae	Anadara transversa	4
Mollusca	Bivalvia		Mactridae	Mulinia lateralis	1
Mollusca	Bivalvia		Pandoridae	Pandora gouldiana	1
Mollusca	Bivalvia		Tellinidae	Macoma tenta	18
Mollusca	Bivalvia		Veneridae	Pitar morrhuanus	2
Mollusca	Gastropoda		Naticidae	Polinices duplicatus	1
Nemertea	Anopla	Heteronemertea		Heteronemertea	1
				Total Count	81
				# Taxa	22

* denotes not included in total number of taxa

DAMOS-Long Island Sound

Station: PAM-008FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Maldanidae	Maldanidae	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	12
Annelida	Polychaeta		Phyllodocidae	Phyllodoce arenae	1
Annelida	Polychaeta		Pilargidae	Sigambra tentaculata	4
Arthropoda	Malacostraca	Amphipoda	Aoridae	Leptocheirus pinguis	4
Hemichordata	Enteropneusta	Unidentified	Harrimaniidae	Saccoglossus kowalevskii	1
Mollusca	Bivalvia		Lyonsiidae	Lyonsia hyalina	1
Mollusca	Bivalvia		Tellinidae	Macoma tenta	5
Mollusca	Bivalvia		Veneridae	Pitar morrhuanus	14
Mollusca	Gastropoda	Cephalaspidea	Acteoninidae	Acteocina canaliculata	2
Phoronida	Phoronida	Phoronida	Phoronidae	Phoronis spp.	4
				Total Count	49
				# Taxa	11

Station: PAM-009FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	5
Annelida	Polychaeta		Terebellidae	Loimia medusa	3
Arthropoda	Malacostraca	Amphipoda	Aoridae	Leptocheirus pinguis	28
Nemertea	Palaeonemertea		Tubulanidae	Tubulanus pellucidus	2
				Total Count	38
				# Taxa	4

Station: PAM-010FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Clitellata		Unidentified	Oligochaeta	1
Annelida	Polychaeta		Capitellidae	Mediomastus ambiseta	4
Annelida	Polychaeta		Cirratulidae	Tharyx spp.	4
Annelida	Polychaeta		Glyceridae	Glyceridae	1
Annelida	Polychaeta		Maldanidae	Clymenella zonalis	3
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	4
Annelida	Polychaeta		Pectinariidae	Pectinaria gouldii	2
Annelida	Polychaeta		Phyllodocidae	Phyllodoce arenae	2
Annelida	Polychaeta		Terebellidae	Loimia medusa	8
Arthropoda	Malacostraca	Amphipoda	Ampeliscidae	Ampelisca abdita	4
Arthropoda	Malacostraca	Amphipoda	Aoridae	Leptocheirus pinguis	84
Arthropoda	Malacostraca	Amphipoda	Aoridae	Unciola irrorata	11
Arthropoda	Malacostraca	Amphipoda	Ischyroceridae	Cerapus spp.	1
Arthropoda	Malacostraca	Decapoda	Paguridae	Pagurus spp.	1
Arthropoda	Malacostraca	Decapoda	Panopeidae	Panopeidae	1
Arthropoda	Malacostraca	Decapoda	Pinnotheridae	Pinnixa spp.	6
Mollusca	Gastropoda		Nassariidae	Nassarius trivittatus	1
Nemertea	Palaeonemertea		Tubulanidae	Tubulanus pellucidus	2
				Total Count	140
				# Taxa	18

* denotes not included in total number of taxa

DAMOS-Long Island Sound

Station: PAM-011FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	4
Annelida	Polychaeta		Polynoidae	Polynoidae	1
Annelida	Polychaeta		Terebellidae	Loimia medusa	1
Arthropoda	Malacostraca	Amphipoda	Ampeliscidae	Ampelisca abdita	1
Arthropoda	Malacostraca	Amphipoda	Aoridae	Leptocheirus pinguis	36
Arthropoda	Malacostraca	Decapoda	Pinnotheridae	Pinnixa spp.	1
Mollusca	Bivalvia		Veneridae	Pitar morrhuanus	1
Mollusca	Gastropoda		Nassariidae	Nassarius trivittatus	5
				Total Count	50
				# Taxa	8

Station: PAM-012FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Lumbrineridae	Lumbrineridae	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	17
Annelida	Polychaeta		Paraonidae	Levinsenia gracilis	13
Annelida	Polychaeta		Pilargidae	Sigambra tentaculata	13
Annelida	Polychaeta		Terebellidae	Loimia medusa	4
Hemichordata	Enteropneusta	Unidentified	Harrimaniidae	Saccoglossus kowalevskii	2
Mollusca	Bivalvia		Lyonsiidae	Lyonsia hyalina	1
Mollusca	Bivalvia		Nuculanidae	Yoldia sapotilla	3
Mollusca	Bivalvia		Nuculidae	Nucula proxima	8
Mollusca	Gastropoda		Nassariidae	Nassarius trivittatus	2
Nemertea	Palaeonemertea		Tubulanidae	Tubulanus pellucidus	2
Phoronida	Phoronida	Phoronida	Phoronidae	Phoronis spp.	1
				Total Count	67
				# Taxa	12

Station: PAN-001FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Capitellidae	Mediomastus ambiseta	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	16
Annelida	Polychaeta		Paraonidae	Levinsenia gracilis	1
Annelida	Polychaeta		Pectinariidae	Pectinaria gouldii	1
Annelida	Polychaeta		Pilargidae	Sigambra tentaculata	1
Arthropoda	Malacostraca	Amphipoda	Ampeliscidae	Ampelisca abdita	1
Mollusca	Bivalvia		Nuculanidae	Yoldia sapotilla	4
Mollusca	Bivalvia		Nuculidae	Nucula proxima	1
Mollusca	Bivalvia		Tellinidae	Macoma tenta	3
Mollusca	Bivalvia		Veneridae	Pitar morrhuanus	3
Mollusca	Gastropoda		Facelinidae	Cratena pilata	1
Phoronida	Phoronida	Phoronida	Phoronidae	Phoronis spp.	4
Platyhelminthes	Rhabditophora	Polycladida	Stylochidae	Stylochus ellipticus	2
				Total Count	39
				# Taxa	13

* denotes not included in total number of taxa

DAMOS-Long Island Sound

Station: PAN-002FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Ampharetidae	Ampharete lindstroemi	3
Annelida	Polychaeta		Capitellidae	Mediomastus ambiseta	1
Annelida	Polychaeta		Maldanidae	Clymenella zonalis	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	4
Annelida	Polychaeta		Phyllodocidae	Phyllodoce arenae	1
Annelida	Polychaeta		Terebellidae	Polycirrus phosphoreus	2
Arthropoda	Malacostraca	Amphipoda	Aoridae	Leptocheirus pinguis	1
Mollusca	Gastropoda		Nassariidae	Nassarius trivittatus	2
				Total Count	15
				# Taxa	8

Station: PAN-003FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Chaetopteridae	Spiochaetopterus costarum	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	18
Annelida	Polychaeta		Terebellidae	Loimia medusa	1
Mollusca	Bivalvia		Nuculanidae	Yoldia sapotilla	4
Mollusca	Bivalvia		Veneridae	Pitar morrhuanus	2
				Total Count	26
				# Taxa	5

Station: PAN-004FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Capitellidae	Mediomastus ambiseta	8
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	13
Arthropoda	Malacostraca	Amphipoda	Bateidae	Batea catharinensis	1
Arthropoda	Malacostraca	Amphipoda	Caprellidae	Deutella incerta	1
Arthropoda	Malacostraca	Amphipoda	Caprellidae	Paracaprella tenuis	1
Arthropoda	Malacostraca	Amphipoda	Ischyroceridae	Ericthonius brasiliensis	4
Arthropoda	Malacostraca	Amphipoda	Stenothoidae	Parametopella cypris	1
Arthropoda	Malacostraca	Decapoda	Panopeidae	Panopeidae	2
Arthropoda	Malacostraca	Stomatopoda	Squillidae	Squilla empusa	1
Mollusca	Bivalvia		Nuculidae	Nucula proxima	1
				Total Count	33
				# Taxa	10

* denotes not included in total number of taxa

DAMOS-Long Island Sound

Station: PAN-005FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Ampharetidae	Melinna maculata	1
Annelida	Polychaeta		Capitellidae	Mediomastus ambiseta	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	22
Arthropoda	Malacostraca	Decapoda	Crangonidae	Crangon septemspinosa	1
Hemichordata	Enteropneusta	Unidentified	Harrimaniidae	Saccoglossus kowalevskii	1
Mollusca	Bivalvia		Lyonsiidae	Lyonsia hyalina	1
Mollusca	Bivalvia		Mactridae	Mulinia lateralis	2
Mollusca	Bivalvia		Nuculanidae	Yoldia sapotilla	4
Mollusca	Bivalvia		Nuculidae	Nucula proxima	2
Mollusca	Bivalvia		Pandoridae	Pandora gouldiana	4
Mollusca	Bivalvia		Tellinidae	Macoma tenta	4
Mollusca	Bivalvia		Veneridae	Pitar morrhuanus	5
Mollusca	Gastropoda	Cephalaspidea	Acteoninidae	Acteocina canaliculata	2
Nemertea	Palaeonemertea		Tubulanidae	Tubulanus pellucidus	1
Phoronida	Phoronida	Phoronida	Phoronidae	Phoronis spp.	1
				Total Count	52
				# Taxa	15

Station: PAN-006FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	18
Arthropoda	Malacostraca	Decapoda	Crangonidae	Crangon septemspinosa	1
Mollusca	Bivalvia		Lyonsiidae	Lyonsia hyalina	1
Mollusca	Bivalvia		Mactridae	Mulinia lateralis	17
Mollusca	Bivalvia		Nuculanidae	Yoldia sapotilla	16
Mollusca	Bivalvia		Nuculidae	Nucula proxima	109
Mollusca	Bivalvia		Tellinidae	Macoma tenta	9
Mollusca	Bivalvia		Veneridae	Pitar morrhuanus	9
Mollusca	Gastropoda		Nassariidae	Nassarius trivittatus	2
Mollusca	Gastropoda		Unidentified	Gastropoda	1
				Total Count	183
				# Taxa	10

* denotes not included in total number of taxa

DAMOS-Long Island Sound

Station: PAN-007FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Clitellata		Unidentified	Oligochaeta	1
Annelida	Polychaeta		Capitellidae	Mediomastus ambiseta	12
Annelida	Polychaeta		Chaetopteridae	Spiochaetopterus costarum	3
Annelida	Polychaeta		Cirratulidae	Tharyx spp.	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	17
Annelida	Polychaeta		Paraonidae	Levinsenia gracilis	8
Annelida	Polychaeta		Pectinariidae	Pectinaria gouldii	1
Annelida	Polychaeta		Pilargidae	Sigambra tentaculata	1
Mollusca	Bivalvia		Mactridae	Mulinia lateralis	6
Mollusca	Bivalvia		Nuculanidae	Yoldia sapotilla	4
Mollusca	Bivalvia		Nuculidae	Nucula proxima	1
Mollusca	Bivalvia		Tellinidae	Macoma tenta	3
Mollusca	Bivalvia		Veneridae	Pitar morrhuanus	2
Mollusca	Gastropoda		Muricidae	Eupleura caudata	1
Nemertea	Palaeonemertea		Tubulanidae	Tubulanus pellucidus	6
				Total Count	67
				# Taxa	15

Station: PAN-008FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Capitellidae	Mediomastus ambiseta	23
Annelida	Polychaeta		Cirratulidae	Tharyx spp.	1
Annelida	Polychaeta		Glyceridae	Glyceridae	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	41
Annelida	Polychaeta		Paraonidae	Levinsenia gracilis	10
Annelida	Polychaeta		Pectinariidae	Pectinaria gouldii	1
Annelida	Polychaeta		Pilargidae	Sigambra tentaculata	4
Arthropoda	Malacostraca	Amphipoda	Aoridae	Leptocheirus pinguis	2
Arthropoda	Malacostraca	Decapoda	Crangonidae	Crangon septemspinosa	1
Arthropoda	Malacostraca	Decapoda	Pinnotheridae	Pinnixa spp.	1
Mollusca	Bivalvia		Mactridae	Mulinia lateralis	24
Mollusca	Bivalvia		Nuculanidae	Yoldia sapotilla	7
Mollusca	Bivalvia		Nuculidae	Nucula proxima	9
Mollusca	Bivalvia		Veneridae	Pitar morrhuanus	10
Mollusca	Gastropoda		Haminoeidae	Haminoea solitaria	3
Mollusca	Gastropoda		Nassariidae	Nassarius trivittatus	2
Mollusca	Gastropoda		Pyramidellidae	Turbonilla interrupta	3
Mollusca	Gastropoda	Cephalaspidea	Acteoninidae	Acteocina canaliculata	2
Nemertea	Palaeonemertea		Tubulanidae	Tubulanus pellucidus	4
Phoronida	Phoronida	Phoronida	Phoronidae	Phoronis spp.	1
				Total Count	150
				# Taxa	20

* denotes not included in total number of taxa

DAMOS-Long Island Sound

Station: PAN-009FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Capitellidae	Mediomastus ambiseta	4
Annelida	Polychaeta		Goniadidae	Goniadidae	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	28
Annelida	Polychaeta		Paraonidae	Levinsenia gracilis	1
Annelida	Polychaeta		Pectinariidae	Pectinaria gouldii	1
Annelida	Polychaeta		Spionidae	Prionospio perkinsi	1
Mollusca	Bivalvia		Nuculanidae	Yoldia sapotilla	10
Mollusca	Bivalvia		Nuculidae	Nucula proxima	17
Mollusca	Bivalvia		Tellinidae	Macoma tenta	1
Mollusca	Bivalvia		Veneridae	Pitar morrhuanus	3
Mollusca	Gastropoda		Haminoeidae	Haminoea solitaria	9
Mollusca	Gastropoda		Pyramidellidae	Turbonilla interrupta	21
Mollusca	Gastropoda	Cephalaspidea	Acteoninidae	Acteocina canaliculata	2
Sipuncula	Sipunculidea	Golfingiida	Phascolionidae	Phascolion strombus strombus	1
				Total Count	100
				# Taxa	14

Station: PAN-010FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Capitellidae	Mediomastus ambiseta	24
Annelida	Polychaeta		Chaetopteridae	Chaetopterus variopedatus	1
Annelida	Polychaeta		Cirratulidae	Tharyx spp.	1
Annelida	Polychaeta		Goniadidae	Goniadidae	1
Annelida	Polychaeta		Maldanidae	Sabaco elongatus	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	24
Annelida	Polychaeta		Paraonidae	Levinsenia gracilis	4
Annelida	Polychaeta		Spionidae	Scolelepis bousfieldi	3
Arthropoda	Malacostraca	Amphipoda	Aoridae	Leptocheirus pinguis	1
Arthropoda	Malacostraca	Amphipoda	Aoridae	Unciola irrorata	1
Mollusca	Bivalvia		Mactridae	Mulinia lateralis	1
Mollusca	Bivalvia		Nuculanidae	Yoldia sapotilla	8
Mollusca	Bivalvia		Nuculidae	Nucula proxima	44
Mollusca	Bivalvia		Veneridae	Pitar morrhuanus	4
Mollusca	Gastropoda		Haminoeidae	Haminoea solitaria	5
Mollusca	Gastropoda		Nassariidae	Nassarius trivittatus	4
Mollusca	Gastropoda		Pyramidellidae	Turbonilla interrupta	18
Mollusca	Gastropoda	Cephalaspidea	Acteoninidae	Acteocina canaliculata	1
Phoronida	Phoronida	Phoronida	Phoronidae	Phoronis spp.	1
				Total Count	147
				# Taxa	19

* denotes not included in total number of taxa

DAMOS-Long Island Sound

Station: PAN-011FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Clitellata		Unidentified	Oligochaeta	1
Annelida	Polychaeta		Capitellidae	Mediomastus ambiseta	6
Annelida	Polychaeta		Chaetopteridae	Spiochaetopterus costarum	1
Annelida	Polychaeta		Hesionidae	Podarkeopsis levifuscina	1
Annelida	Polychaeta		Maldanidae	Maldanidae	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	24
Annelida	Polychaeta		Paraonidae	Levinsenia gracilis	2
Annelida	Polychaeta		Spionidae	Polydora cornuta	1
Arthropoda	Malacostraca	Amphipoda	Caprellidae	Deutella incerta	1
Arthropoda	Malacostraca	Decapoda	Crangonidae	Crangon septemspinosa	1
Mollusca	Bivalvia		Mactridae	Mulinia lateralis	2
Mollusca	Bivalvia		Nuculanidae	Yoldia sapotilla	3
Mollusca	Bivalvia		Tellinidae	Macoma tenta	1
Mollusca	Bivalvia		Veneridae	Pitar morrhuanus	7
Mollusca	Gastropoda		Haminoeidae	Haminoea solitaria	5
Mollusca	Gastropoda		Nassariidae	Nassarius trivittatus	4
Mollusca	Gastropoda		Pyramidellidae	Turbonilla interrupta	3
Mollusca	Gastropoda	Cephalaspidea	Acteoninidae	Acteocina canaliculata	2
Nemertea	Palaeonemertea		Tubulanidae	Tubulanus pellucidus	1
Phoronida	Phoronida	Phoronida	Phoronidae	Phoronis spp.	3
				Total Count	70
				# Taxa	20

Station: PAN-012FA

Phylum	Class	Order	Family	Taxon	Count
Annelida	Polychaeta		Ampharetidae	Ampharete lindstroemi	1
Annelida	Polychaeta		Capitellidae	Mediomastus ambiseta	8
Annelida	Polychaeta		Chaetopteridae	Spiochaetopterus costarum	2
Annelida	Polychaeta		Cirratulidae	Tharyx spp.	1
Annelida	Polychaeta		Flabelligeridae	Pherusa affinis	1
Annelida	Polychaeta		Nephtyidae	Nephtys incisa	17
Annelida	Polychaeta		Paraonidae	Levinsenia gracilis	8
Annelida	Polychaeta		Pilargidae	Sigambra tentaculata	1
Arthropoda	Malacostraca	Amphipoda	Ampeliscidae	Ampelisca abdita	1
Arthropoda	Malacostraca	Decapoda	Pinnotheridae	Pinnixa spp.	1
Hemichordata	Enteropneusta	Unidentified	Harrimaniidae	Saccoglossus kowalevskii	1
Mollusca	Bivalvia		Mactridae	Mulinia lateralis	1
Mollusca	Bivalvia		Nuculanidae	Yoldia sapotilla	4
Mollusca	Bivalvia		Nuculidae	Nucula proxima	3
Mollusca	Bivalvia		Veneridae	Pitar morrhuanus	7
Mollusca	Gastropoda		Haminoeidae	Haminoea solitaria	1
Mollusca	Gastropoda		Nassariidae	Nassarius trivittatus	2
Mollusca	Gastropoda		Pyramidellidae	Turbonilla interrupta	15
Mollusca	Gastropoda	Cephalaspidea	Acteoninidae	Acteocina canaliculata	3
Nemertea	Palaeonemertea		Tubulanidae	Tubulanus pellucidus	2
Phoronida	Phoronida	Phoronida	Phoronidae	Phoronis spp.	1
				Total Count	81
				# Taxa	21

* denotes not included in total number of taxa

APPENDIX B

QUALITY CONTROL RESULTS FOR THE TAXONOMIC IDENTIFICATION OF THE LONG ISLAND SOUND DISPOSAL AREA BENTHIC SAMPLES COLLECTED IN 2014

Table B-1. DAMOS Central and Western Long Island Sound benthic sample QC information						
Total number of samples identified =24						
Station ID	***n*1**	***n*2**	**PDE**	***a***	**N**	**PTD**
PAM-005FA	124	123	0.40%	123	123	0%
PAN-008FA	150	150	0%	149	150	0.67%
PAN-012FA	81	81	0%	81	81	0%
Average Error Rate			**0.13%**			**0.22%**
Number of taxonomic QC's = 3						

Formulas:

Percent disagreement in enumeration (PDE): $[(|n1 - n2|) / (n1 + n2)] \times 100$

Percent taxonomic disagreement (PTD): $[1- (a/N)] \times 100$

Where: *n*1 is number of organisms counted by taxonomist, *n*2 is number of organisms counted by QC taxonomist, *a* is the number of agreements between taxonomists, and *N* is the larger number of organisms counted by either taxonomist.

All summary statistics were generated using programs developed using an Access database and were checked for accuracy by the Laboratory Manager.

Signature Laboratory Manager