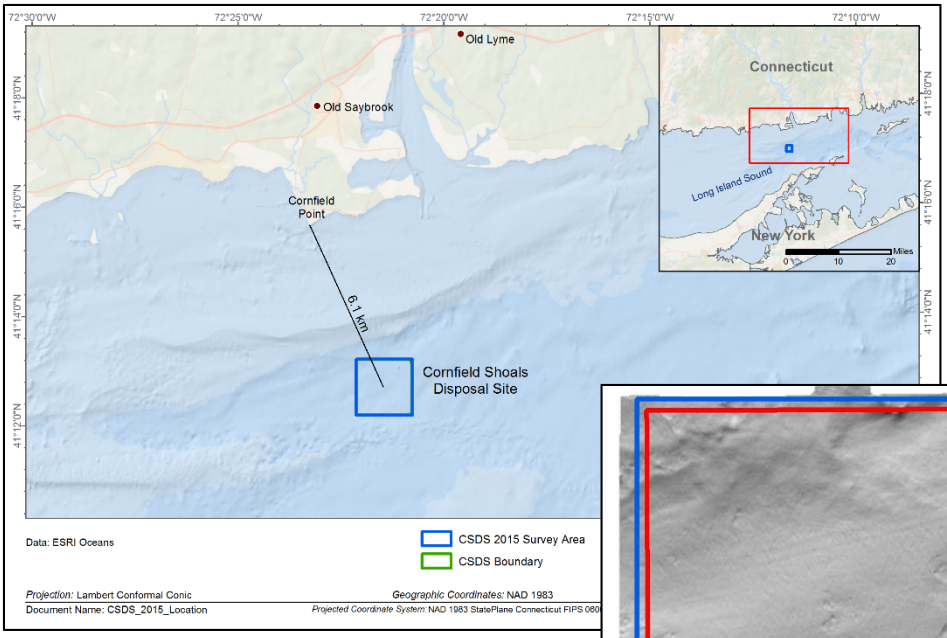
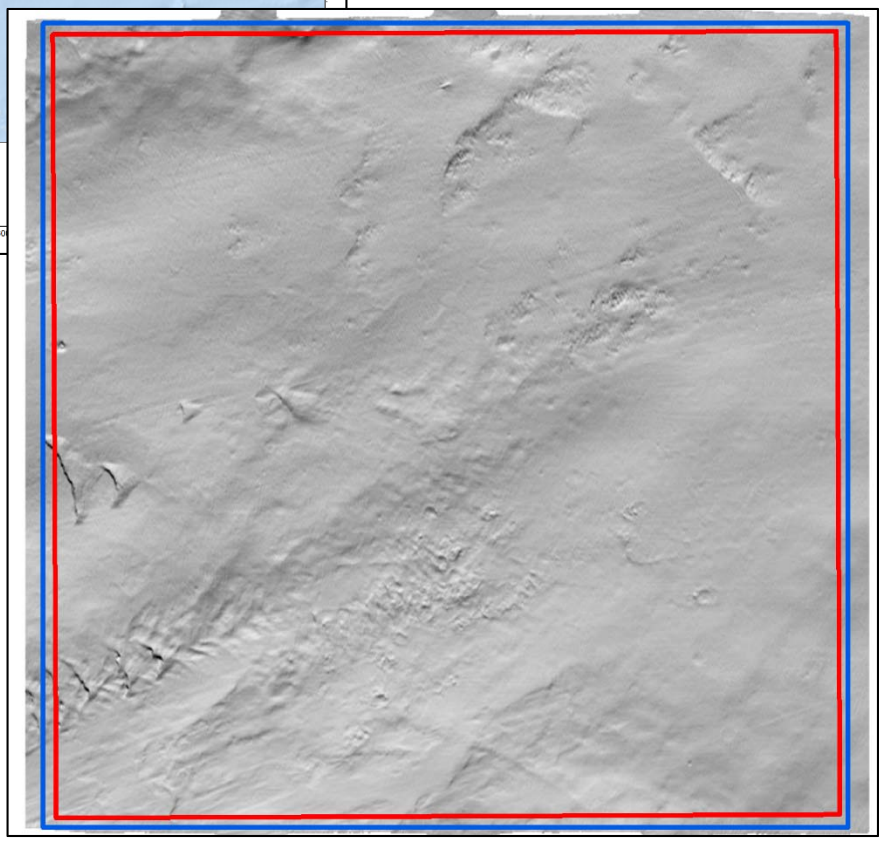
Data Summary Report for the Monitoring Survey at the Cornfield Shoals Disposal Site - October 2015

Disposal Area Monitoring System DAMOS





D A M O S

DISPOSAL AREA MONITORING SYSTEM

Data Summary Report

DR 2015-05

February 2017

US Army Corps of Engineers ®

New England District

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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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13. ABSTRACT

A monitoring survey was conducted at the Cornfield Shoals Disposal Site (CSDS) in October 2015 as part of the U.S. Army Corps of Engineers (USACE) New England District (NAE) Disposal Area Monitoring System (DAMOS) Program. The 2015 CSDS investigation was considered a confirmatory survey of the entire site given its periodic usage since the previous survey and given the consideration of this site for potential long-term designation as a formal Ocean Dredged Material Disposal Site by the U.S. Environmental Protection Agency (USEPA) under Section 103 of the Marine Protection Research and Sanctuaries Act (MPRSA).

CSDS is located in eastern Long Island Sound, approximately 6 km (3.2 nmi) southeast of Cornfield Point in Old Saybrook, Connecticut and centered at 41° 12.686' N, 72° 21.491' W (NAD 83). The disposal site occupies 3.43 km² (1.32 mi²) and is defined as a 1.85 × 1.85 km (1.0 ×1.0 nmi) area of the seafloor (Figure 1-1).

CSDS is one of two open water dredged material disposal sites historically managed by USACE NAE as a non-depositional site (CSDS is managed as a dispersive disposal site and Buzzards Bay Disposal Site [now closed] was managed as a semi-dispersive site); all other DAMOS disposal sites are containment sites where it is expected that dredged materials will remain on the seafloor at the site as a stable deposit.

The objective of the 2015 acoustic survey was to characterize the seafloor topography and surface features over the entire CSDS using high-resolution acoustic bathymetry.

14. SUBJECT TERMS DAMOS, Cornfield Shoals Disposal Site, CSDS, multibeam, MBES, dredged material

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LIST OF ACRONYMS

ASCII	American Standard Code for Information Interchange
CCOM	Center for Coastal and Ocean Mapping
CSDS	Cornfield Shoals Disposal Site
DAMOS	Disposal Area Monitoring System
DGPS	Differential global positioning system
GIS	Graphic information system
GPS	Global positioning system
MBES	Multibeam echo sounder
MLLW	Mean lower low water
MPRSA	Marine Protection Research and Sanctuaries Act
NAE	New England District
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NTRIP	Network transport of RTCM data over IP
RTCM	Radio Technical Commission for Maritime Services
RTK	Real time kinematic GPS
SHP	Shapefile or geospatial data file
SOP	Standard Operating Procedures
TIF	Tagged image file
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency

1.0 INTRODUCTION

A monitoring survey was conducted at the Cornfield Shoals Disposal Site (CSDS) in October 2015 as part of the U.S. Army Corps of Engineers (USACE) New England District (NAE) Disposal Area Monitoring System (DAMOS) Program. DAMOS is a comprehensive monitoring and management program designed and conducted to address environmental concerns surrounding the placement of dredged material at aquatic disposal sites throughout the New England region. An overview of the DAMOS Program and CSDS 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. 1994a). For over 39 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).

DAMOS monitoring surveys fall into two general categories: confirmatory studies and focused studies. The data collected and evaluated during these studies provide answers to strategic management questions in determining the next step in the disposal site management process to guide the management of disposal activities at existing sites, plan for use of future sites, and evaluate the long-term status of historic sites.

Confirmatory studies are designed to test hypotheses related to expected physical and ecological response patterns following placement of dredged material on the seafloor at established, active disposal sites. Two primary goals of DAMOS confirmatory 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 dredged material. Several survey techniques are employed in order to characterize these responses to dredged material placement. Sequential acoustic monitoring surveys (including bathymetric, acoustic backscatter, and side-scan sonar data collection) are performed to characterize the height and spread of discrete dredged material deposits or mounds created at open water sites as well as the accumulation/consolidation of dredged material into confined aquatic disposal cells.

Sediment-profile (SPI) and plan-view (PV) imaging surveys are performed in confirmatory studies to provide further physical characterization of the material and to support evaluation of seafloor (benthic) habitat conditions and recovery over time. Each type of data collection activity is conducted periodically at disposal sites and the conditions found after a defined period of disposal activity are compared with the long-term data set at specific sites to determine the next step in the disposal site management process (Germano et al. 1994a).

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. Focused DAMOS monitoring surveys may also feature additional types

of data collection activities as deemed appropriate to achieve specific survey objectives, such as subbottom profiling, towed video, sediment coring, or grab sampling.

The 2015 CSDS investigation was considered a confirmatory survey of the entire site given its periodic usage since the previous survey and given the consideration of this site for potential long-term designation as a formal Ocean Dredged Material Disposal Site by the U.S. Environmental Protection Agency (USEPA) under Section 103 of the Marine Protection Research and Sanctuaries Act (MPRSA).

1.2 Introduction to the Cornfield Shoals Disposal Site

CSDS is located in eastern Long Island Sound, approximately 6 km (3.2 nmi) southeast of Cornfield Point in Old Saybrook, Connecticut and centered at 41° 12.686' N, 72° 21.491' W (NAD 83). The disposal site occupies 3.43 km² (1.32 mi²) and is defined as a 1.85 × 1.85 km (1.0 ×1.0 nmi) area of the seafloor (Figure 1-1).

CSDS is one of two open water dredged material disposal sites historically managed by USACE NAE as a non-depositional site (CSDS is managed as a dispersive disposal site and Buzzards Bay Disposal Site [now closed] was managed as a semi-dispersive site); all other DAMOS disposal sites are containment sites where it is expected that dredged materials will remain on the seafloor at the site as a stable deposit. At dispersive sites, some or all of the placed material is expected to leave the site and no attempt is made to create stable mounds of dredged material on the site. With 50-meter (164 ft) depths and strong tidal currents present at the CSDS site, some material is likely to be dispersed following release during descent through the water column. Much of the sediment that does reach the bottom is subsequently remobilized and transported by strong tidal currents away from the specific placement location and potentially beyond the CSDS boundary, likely within a period of weeks to months following disposal (Wiley 1996a).

CSDS is situated near the mouth of Long Island Sound at a point where the Sound reaches its narrowest width (Figure 1-1). This constriction accelerates tidal currents in the area, and the very shallow, east-west trending shoal approximately 2 km north of CSDS further constricts tidal flow and focuses currents in an east-west direction (Signell 2004). There is an ebb (east) residual transport north of the shoal and flood (west) residual transport south of the shoal (Knebel and Poppe 2000). Near-bottom currents at CSDS have been reported at 80 cm sec^{-1} (1.6 knots) (Wiley 1996a). This high-energy environment limits accumulation of disposed material (ENSR 2005, O'Donnell et al. 2015).

There has not been a disposal buoy or beacon deployed at CSDS to identify the present disposal location within the site since 1992. Instead, barge operators are given specific coordinates within the disposal boundaries to navigate to and release the dredged material. The majority of disposal activity at CSDS has been targeted at the center of the site

A monitoring survey in 2004 showed that water depths at CSDS varied from 42 m (138 ft) to 58 m (190 ft). There was a gradual slope from approximately 45 m (148 ft) on the northeast boundary to 55 m (180 ft) in the southwestern portion of the site (Figure 1-2). A large

topographic low was present in the central southeast portion of the survey area. A small portion of a topographic high was present in the northeast corner of the site (Figure 1-2).

1.3 Historical Dredged Material Activity

Records show that CSDS has received dredged material since 1961 and has been monitored and used regularly as a regional disposal site since 1978. It has received over 700,000 m^3 (916,000 yd^3) through 2004, the time of the last full-site monitoring survey (ENSR 2005).

1.4 Previous Monitoring Events at CSDS

Monitoring surveys have been performed periodically since 1978 to characterize conditions at CSDS and track the placement of dredged material at the site (Table 1-1). The surveys conducted in the 1990s documented the dispersive nature of the site, and confirmed that sediment transport from the site was oriented in an east-west direction aligned with the predominant tidal currents (ENSR 2005).

The results of a bathymetric survey performed in 2004 found no distinct disposal mounds at CSDS, and the limited areas of accretion and scour were consistent with sediment transport patterns observed in earlier surveys, further documenting the dispersive nature of the site (ENSR 2005). Additional field data collection and modeling for the *Supplemental Environmental Impact Statement (SEIS) for the Designation of Dredged Material Disposal Site(s) in Eastern Long Island Sound* documented conditions favorable for bedload transport at the site (O'Donnell et al. 2015). Maximum bottom shear stress for simulated fair weather conditions in summer exceeded 1.3 Pa (0.027 lb/ft^2) at CSDS.

In 2008, the National Oceanic and Atmospheric Administration (NOAA) National Ocean Service (NOS) published bathymetric data for eastern Long Island Sound, an area that includes CSDS (Figure 1-3). These data were also used for comparison purposes.

1.5 Recent Dredged Material Disposal Activity

Since the June 2004 survey, approximately 176,000 m^3 (230,000 yd^3) of dredged material have been placed at the center of CSDS (Table 1-2). The dredged material originated from various channels, harbors, marinas, and boat yards along the eastern coast of Connecticut, primarily from the Connecticut River area, between October 2004 and February 2015 (Figure 1-4; Appendix B).

1.6 2015 Survey Objectives

The objective of the 2015 acoustic survey was to characterize the seafloor topography and surface features over the entire CSDS using high-resolution acoustic bathymetry.

Table 1-1.

Overview of Previous Monitoring Surveys at CSDS since 1978

Date	Purpose of Survey	Bathymetry Area (m × m)	No. SPI Stations	Additional Studies	Reference (Contribution No.)
January 1978	Monitoring	1800 × 1900	-	Current	NUSC 1979 (Annual Data Report Supplement G)
July 1978	Monitoring	1800 × 1900	-	Benthic	NUSC 1979 (Annual Report Supplement G)
July 1987	Monitoring	1000 × 1000	-	-	SAIC 1988 (C70)
July 1990	Deposit Delineation	1000 × 1000	13	-	Germano et. al 1994b (C90)
August, October, December 1991	Evaluation of bed transport	1200 × 1200	-	Current and turbidity	Wiley 1996a (C105)
May 1992	Evaluation of bed transport	1200 × 1200	45	Benthic	Wiley 1996a (C105)
August 1992	Deposit Delineation	1200 × 1200	25	Sediment Density	Wiley 1996b (C106)
July 1994	Deposit Delineation	1000 × 750		Acoustic subbottom	Wiley 1996c (C110)
June 2004	Monitoring	1400 × 1400	-	-	ENSR 2005 (C160)
2013-2014	Physical Oceanography	-	-	ADCP, CTD, Sediment	O'Donnell et al. (2015)

Table 1-2.

Estimated Volume of Dredged Material Placed at CSDS
from October 2004 to February 2015 (per disposal logs provided by USACE, March 2016; Appendix B)

Project Name	City/Town	State	Disposal Season	Load volume (m^3)	Load volume (yd^3)
Menunketesucket and Patchogue Rivers, Connecticut River, and Indian Town Harbor	Westbrook and Old Saybrook	CT	2004-2005	23,644	30,925
Patchogue and Hammonassett Rivers	Westbrook	CT	2005-2006	4,243	5,550
Clinton Harbor	Clinton	CT	2006-2007	4,373	5,720
Clinton and Indian Town Harbors, Saybrook and Clinton Harbor Marinas, Patchogue River	Clinton, Old Saybrook, and Westbrook	CT	2007-2008	23,537	30,785
Clinton Harbor, Saybrook and Clinton Harbor Marinas, Patchogue River	Clinton, Old Saybrook, and Westbrook	CT	2008-2009	8,850	11,575
Between the Bridges Marina	Old Saybrook	CT	2009-2010	4,518	5,909
Middletown Yacht Club, Indian Town Harbor, and Saybrook Marina	Chester and Old Saybrook	CT	2010-2011	23,652	30,935
Between the Bridges Marina, Patchogue River, Saybrook and Harbor One Marinas	Old Saybrook and Westbrook	CT	2011-2012	24,450	31,980
Patchogue River, Guilford Yacht Club, and Harbor One Marina	Westbrook, Stonington, Guilford, Old Saybrook	CT	2012-2013	56,013	73,262
Brewers Pilots Point Marina	Westbrook	CT	2014-2015	2,387	3,122
			TOTAL	**175,666**	**229,763**

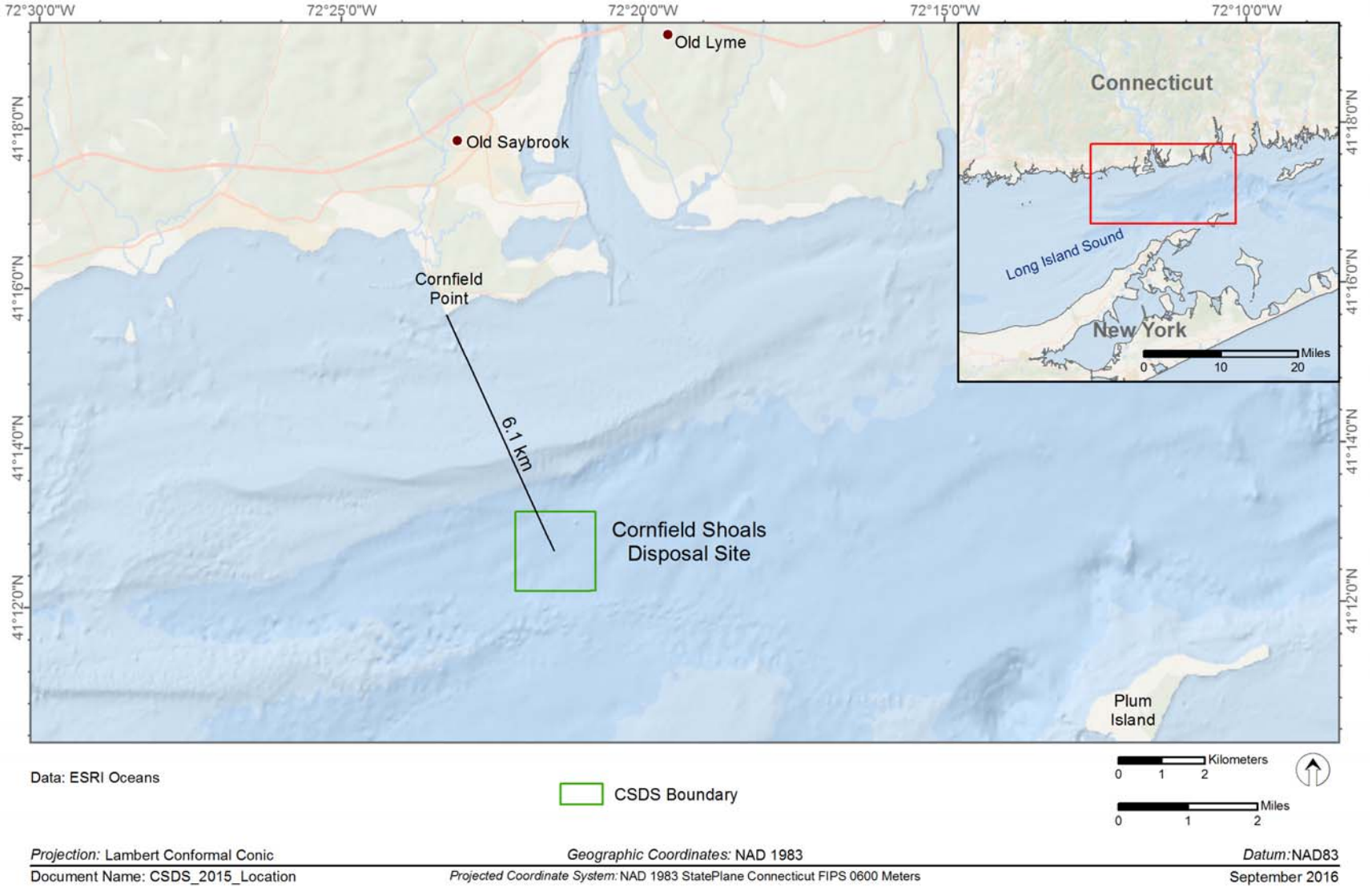

Figure 1-1. Location of the Cornfield Shoals Disposal Site (CSDS)

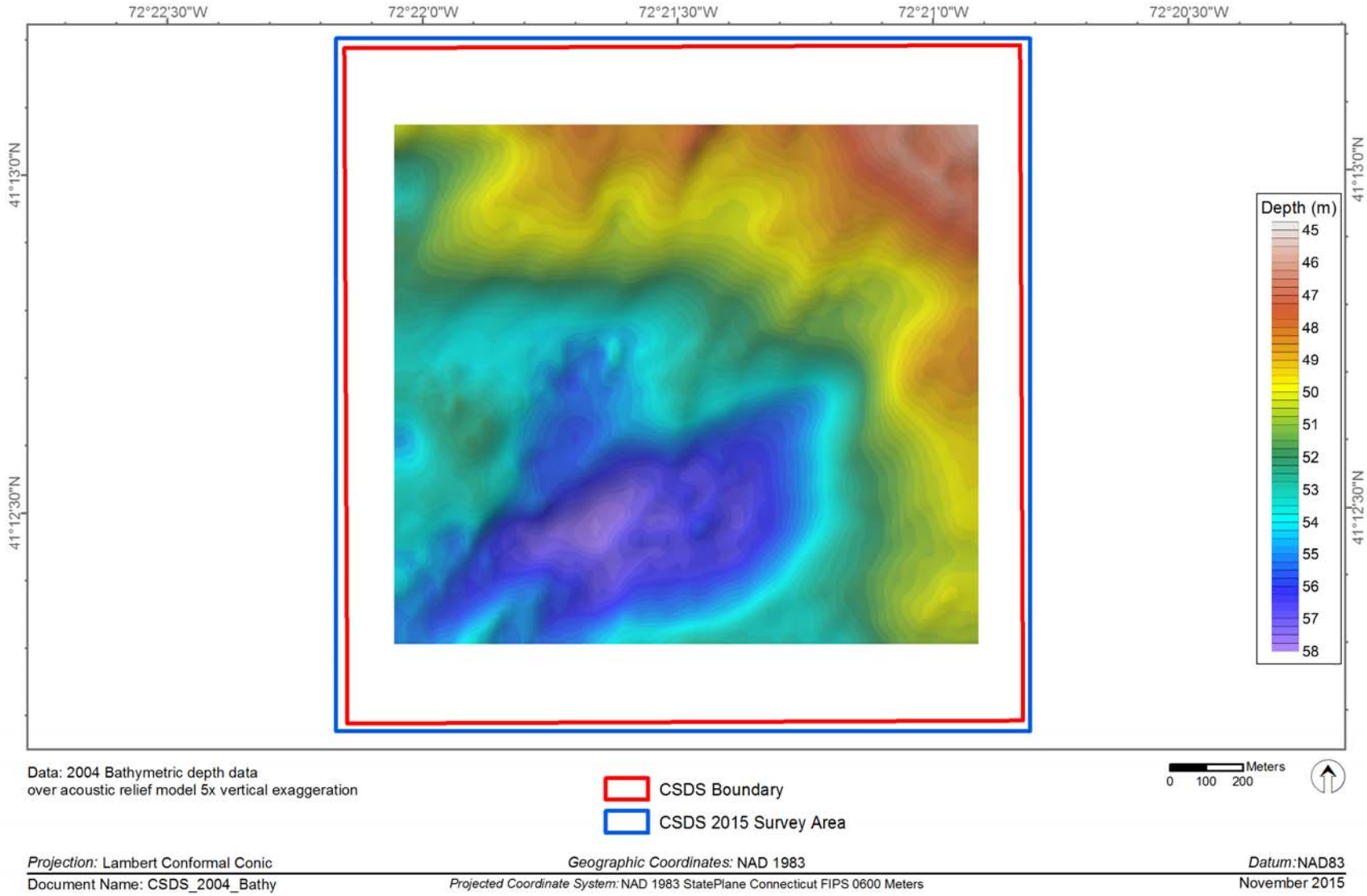

Figure 1-2. Bathymetric depth data over acoustic relief model of CSDS – June 2004

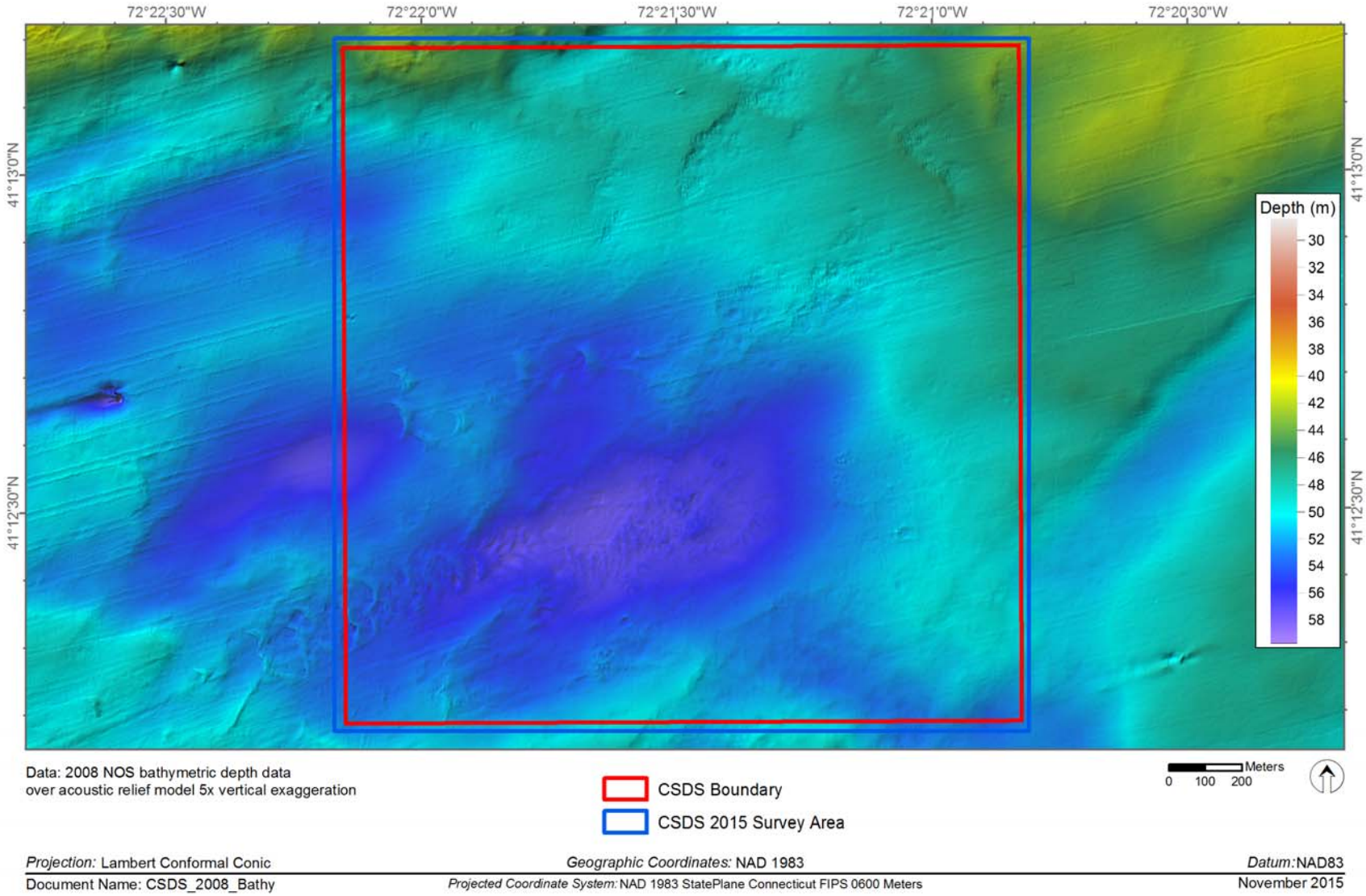

Figure 1-3. Bathymetric depth data over acoustic relief model of CSDS – 2008 National Ocean Service Surveys 11997 and 12012

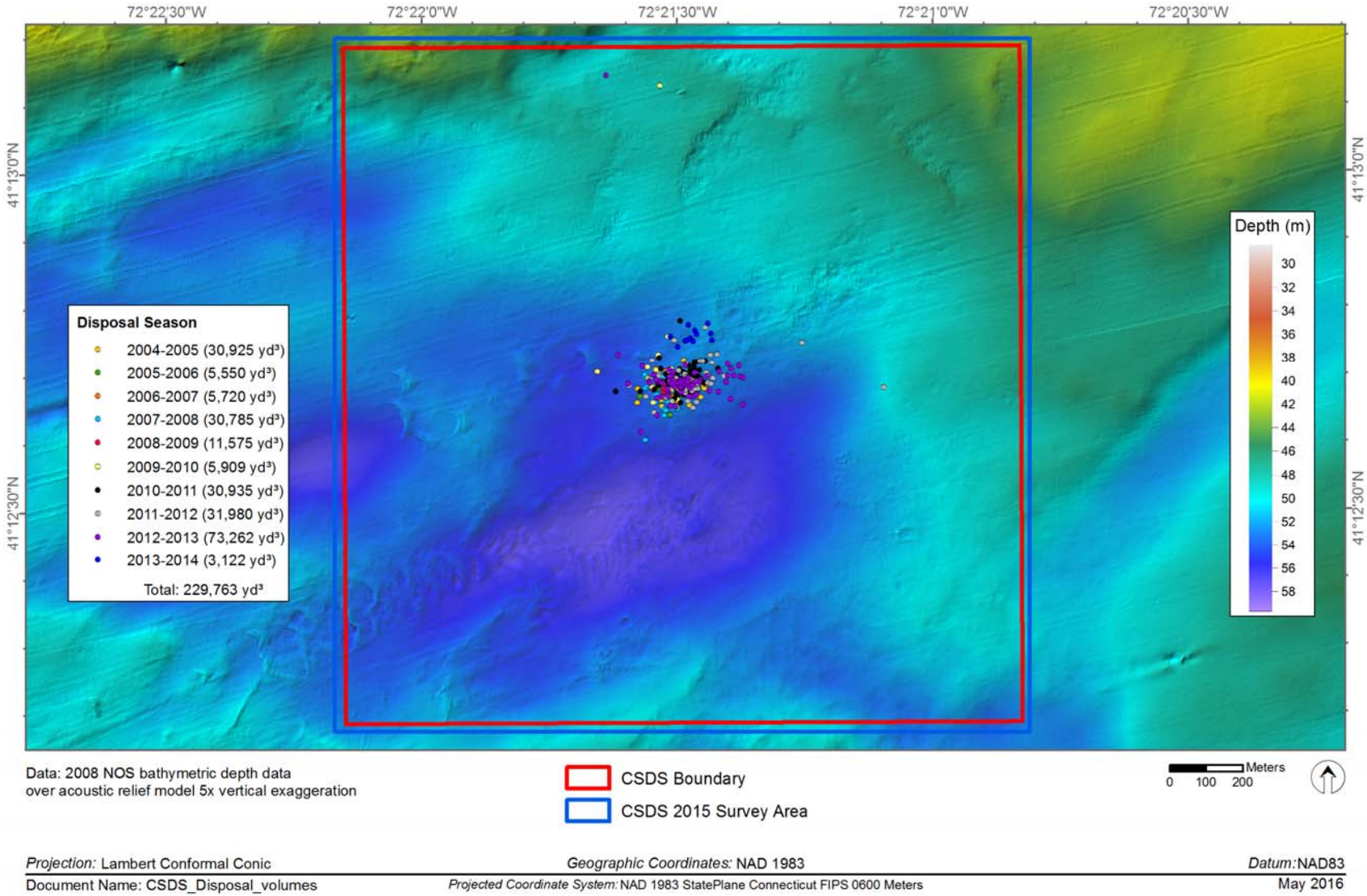

Figure 1-4. Location of reported disposal events at CSDS (October 2004 to February 2015)

2.0 METHODS

The October 2015 survey at CSDS was conducted by a team of investigators from DAMOSVision (CoastalVision and CR Environmental) aboard the 55-foot R/V *Jamie Hanna*. The acoustic survey was conducted on 22 October 2015. An overview of the methods used to collect, process, and analyze the survey data is provided below. Detailed Standard Operating Procedures (SOPs) for data collection and processing are available in the Quality Assurance Project Plan for the DAMOS Program (Battelle 2015).

2.1 Navigation and On-Board Data Acquisition

Navigation for the acoustic survey was accomplished using a Hemisphere VS-330 Real-time kinematic Global Positioning System (RTK GPS) which received base station correction through the Keynet NTRIP broadcast. Horizontal position accuracy in fixed RTK mode was approximately 2 cm. A dual-antennae Hemisphere VS110 differential GPS (DGPS) was available if necessary as a backup. The GPS system was interfaced to a desktop computer running HYPACK MAX® hydrographic survey software. HYPACK MAX® continually recorded vessel position and GPS satellite quality and provided a steering display for the vessel captain to accurately maintain the position of the vessel along pre-established survey transects. Vessel motion and heading measurements were provided by an IxBlue Octans III fiber optic gyrocompass.

2.2 Acoustic Survey

The acoustic survey included bathymetric, backscatter, and side-scan sonar data collection. The bathymetric data provided measurements of water depth that, when processed, were used to map the seafloor topography. Backscatter and side-scan sonar data provided images that supported the characterization of surface sediment texture and roughness. Each of these acoustic data types is useful for assessing dredged material placement and surface sediment features.

2.2.1 Acoustic Survey Planning

The acoustic survey featured a high spatial resolution survey of the entire CSDS. DAMOSVision hydrographers coordinated with USACE NAE scientists and reviewed alternative survey designs. For CSDS, a 1900 × 1900 m area was selected. Hydrographers obtained site coordinates, imported them to graphic information system (GIS) software, and created maps to aid planning. Base bathymetric data from previous DAMOS surveys were used to calculate the transect separation required to obtain full bottom coverage using an assumed beam angle limit of 90-degrees (45 degrees to port, 45 degrees to starboard). Transects spaced 85 m apart and cross-lines spaced 500 m apart were created to meet conservative beam angle constraints (Figure 2-1). The proposed survey area and design were then reviewed and approved by NAE scientists.

2.2.2 Acoustic Data Collection

Data layers generated by the survey included bathymetric, acoustic backscatter, and side-scan sonar and were collected using an R2Sonic 2022 broadband multibeam echo sounder (MBES). This 200-400 kHz system forms up to 256 1-2° beams (frequency dependent) distributed equiangularly or equidistantly across a 10 - 160° swath. The MBES system was operated using a transmit frequency of 249 kHz to facilitate comparisons with previous DAMOS survey data while maximizing bathymetric resolution. The MBES transducer was mounted amidships to the port rail of the survey vessel using a high strength adjustable boom. The primary GPS antenna was mounted on the transducer boom. The transducer depth below the water surface (draft) and antenna height were checked and recorded at the beginning and end of data acquisition, and the draft was confirmed using the "bar check" method.

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

The system was calibrated for local water mass speed of sound by performing sound velocity profile (SVP) casts at frequent intervals throughout the survey day using an AML, Inc. Minos-X profiling instrument.

2.2.3 Bathymetric Data Processing

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

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

Tidal adjustments were accomplished using RTK GPS. Water surface elevations derived using RTK were adjusted to Mean Lower Low Water (MLLW) elevations using NOAA's VDATUM Model. Processed RTK tide data were successfully ground-truthed against a data series acquired at NOAA's New London Tide Station (#8461490).

Correction of sounding depth and position (range and azimuth) for refraction due to water column stratification was conducted using a series of four sound-velocity profiles acquired by

the survey team. Data artifacts associated with refraction remain in the bathymetric surface model at a relatively fine scale (generally less than 5 to 10 cm) relative to the survey depth.

Data acquired in the disposal site portion of the survey area were filtered to accept only beams falling within an angular limit of 55° to minimize refraction artifacts. Spurious sounding solutions were rejected based on the careful examination of data on a sweep-specific basis.

The R2Sonics 2022 MBES system was operated at 249 kHz. At this frequency the system has a published beam width of 1.75°. Assuming an average depth of 51 m and a maximum beam angle of 55°, the maximum diameter of the beam footprint was calculated at approximately 2.7 × 4.7 m (12.9 m^2). Data were reduced to a cell (grid) size of 3.0 × 3.0 m, acknowledging the system's fine range resolution while accommodating beam position uncertainty. This data reduction was accomplished by calculating and exporting the average elevation for each cell in accordance with USACE recommendations (USACE 2013).

Statistical analysis of data as summarized on Table 2-1 showed negligible tide bias and vertical uncertainty substantially lower than values recommended by USACE (2013) or NOAA (2015). Note that the most stringent National Ocean Service (NOS) standard for this project depth (Special Order 1A) would call for a 95th percentile confidence interval (95% CI) of 0.50 m at the maximum site depth (57.8 m) and 0.46 m at the average site depth (51.2 m).

Reduced data were exported in ASCII text format with fields for Easting, Northing, and MLLW Elevation (meters). All data were projected to the Connecticut State Plane FIPS 0600, NAD83 (metric). A variety of data visualizations were generated using a combination of ESRI ArcMap (V.10.1) and Golden Software Surfer (V.13). Visualizations and data products included:

- ASCII data files of all processed soundings including MLLW depths and elevations
- Contours of seabed elevation (25-cm, 50-cm and 1.0-m intervals) in a geospatial data file (SHP) format suitable for plotting using 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
- An acoustic relief map of the survey area created using 5× vertical exaggeration, delivered in georeferenced TIF format.

2.2.4 Backscatter Data Processing

Backscatter data were extracted from cleaned MBES TruePix formatted files then used to provide an estimation of surface sediment texture based on seabed surface roughness. Mosaics of backscatter data were created using HYPACK®'s implementation of GeoCoder software developed by scientists at the University of New Hampshire's NOAA Center for Coastal and Ocean Mapping (UNH/NOAA CCOM). A seamless mosaic of unfiltered backscatter data was developed and exported in grayscale TIF format. Backscatter data were also exported in ASCII format with fields for Easting, Northing, and backscatter (dB). A Gaussian filter was applied to backscatter data to minimize nadir artifacts and the filtered data were used to develop backscatter

values on a 2.0-m grid. The grid was exported as ESRI binary GRD format to facilitate comparison with other data layers.

2.2.5 Side-Scan Sonar Data Processing

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

A seamless mosaic of side-scan sonar data was developed using GeoCoder and exported in grayscale TIF format using a resolution of 0.33 m per pixel. This mosaic optimized textural information but is less well suited for analysis of fine seabed structures due to blending of overlapping data. A mosaic of side-scan data was also created using SonarWiz to facilitate detailed inspection of sonar imagery using a resolution of 0.1 m × 0.1 m per pixel.

2.2.6 Acoustic Data Analysis

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

Table 2-1.

Accuracy and Uncertainty Analysis of Bathymetric Data

		Results (m)		
Survey Date(s)	**Quality Control Metric**	**Mean**	**95% Uncertainty**	**Range**
10/22/2015	Cross-Line Swath Comparisons	-0.02	0.17	
	Within Cell Uncertainty	0.07	0.16	0.00 - 2.03
	Beam Angle Uncertainty (0 – 55°)	0.02	0.14	0.13 - 0.17

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 (55-degree swath limit) with a reference surface created using mainstay transect data.
5. Swath and cell based comparisons were conducted using 3 m x 3 m cell averages. These analyses do not exclude sounding variability associated with terrain slopes.

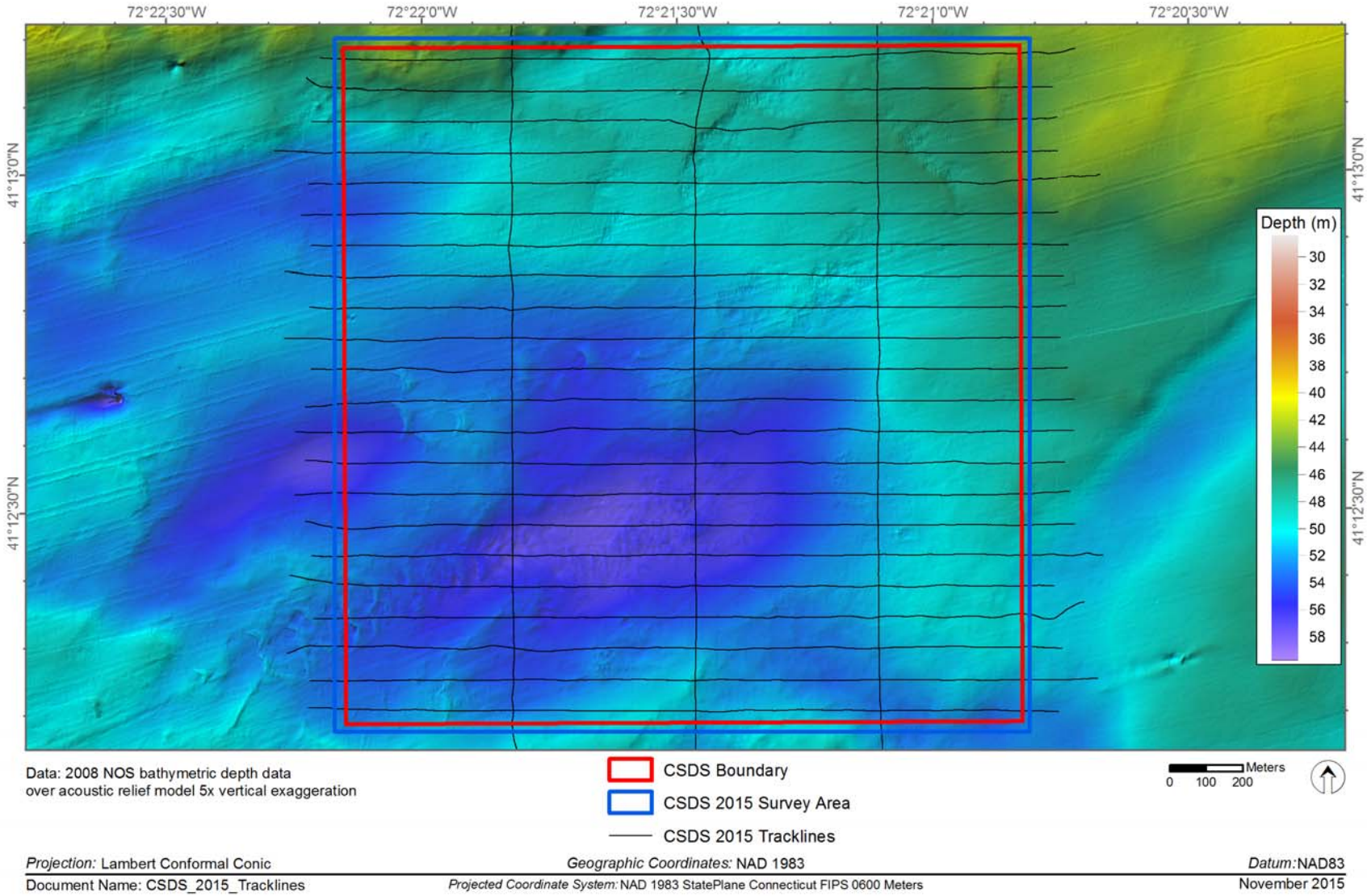

Figure 2-1. CSDS acoustic survey area and tracklines

3.0 RESULTS

3.1 Acoustic Survey

An acoustic survey was conducted in October 2015 to characterize seafloor topography and surface sediment characteristics over the entirety of CSDS. Survey results included bathymetry, backscatter mosaics, and side-scan sonar mosaics. Analysis of each type of acoustic data led to insights regarding the topography and surface sediment in the study area.

3.1.1 Bathymetry

The October 2015 bathymetric survey results for CSDS showed gentle sloping topography from approximately 43 m on the northeast boundary to 53 m in the southwestern portion of the survey area (Figure 3-1). The central southeast portion of the survey area was a depression with depths as great as 57 m. A small portion of a larger topographic high outside the survey area was present in the northwest corner of the site that rapidly increased in depth to the south.

Multibeam bathymetric data rendered as an acoustic relief model (grayscale with hill-shading) provided a more detailed representation of site topography (Figure 3-2). A color scale with hill-shading acoustic relief model provided additional detail on the relationship between depth and small-scale features (Figure 3-3). These data revealed mostly smooth sediment surfaces to the northwest and southeast. Several ridges with megaripples of approximately 10-m wavelength were present in the northeast continuing diagonally down to the center of the survey area. At the center of the site there was a small mound located in the area that received dredged material between 2004-2014. In the southern depression small mounds and circular features consistent with historical dredged material disposal covered the deepest area. In the west and southwest two rows of large sand waves (100-m wavelength) were observed. The steep faces of the sand waves are oriented southwest indicating net movement in that direction.

3.1.2 Acoustic Backscatter and Side-Scan Sonar

Acoustic backscatter data provided an estimate of surface sediment texture (hard, soft, rough, and smooth). A mosaic of unfiltered backscatter data for CSDS (Figure 3-4) revealed a generally uniform strong return in the northern half of the survey area indicating hard, rough sediments. Weaker returns were observed in the central western portion of the survey area. A band of weaker returns was observed that was coincident with the historical dredged material deposit and the backslope (stoss side) of the sand waves. Linear patterns in backscatter in the southwest corner are consistent with bedload transport to the southwest.

Filtered backscatter, which presents a quantitative assessment of surface characteristics independent of slope effects, more clearly showed broad patterns of weaker returns in the area that received historical dredged material (Figure 3-5). In this filtered and gridded display, the finer-scale details were less visible, but the relative intensity of backscatter returns were easier to discern.

Side-scan sonar results are more responsive to changes in slope than backscatter and can be processed with higher resolution. The details of the sand waves are more visible in detailed sections of the mosaic (Figure 3-6).

3.1.3 Comparison with Previous Bathymetry

Historic and recent bathymetric data were compared to evaluate any changes to the seafloor topography of the site. A single beam bathymetric survey was conducted in 2004 over the center of the study area in an area 1400 × 1400 m, approximately 1.96 km² (ENSR 2005). Subtraction of the bottom depths measured in the 2004 survey from the 2015 survey depths captured changes in bathymetry since the 2004 survey (Figure 3-7). The most significant differences were observed in the areas with sand waves (west and southwest). In these areas, pockets of both depth increases and depth decreases were interspersed and can be interpreted as net movement in the location of the sand waves. Changes in depth ranged from +2.0 m to -1.0 m. A depth decrease of ~ 0.7 m was observed in the center of CSDS likely associated with the placement of dredged material between 2004 and 2008. Similar results were also observed when the 2015 survey data was compared to NOAA NOS data collected in 2008 (Figure 3-8). Noticeably absent was any decrease in depth in the center of the study area that was observed when comparing 2004 data. These results reinforce the characterization of the site with minimal accumulation of dredged material and very dynamic sediment transport.

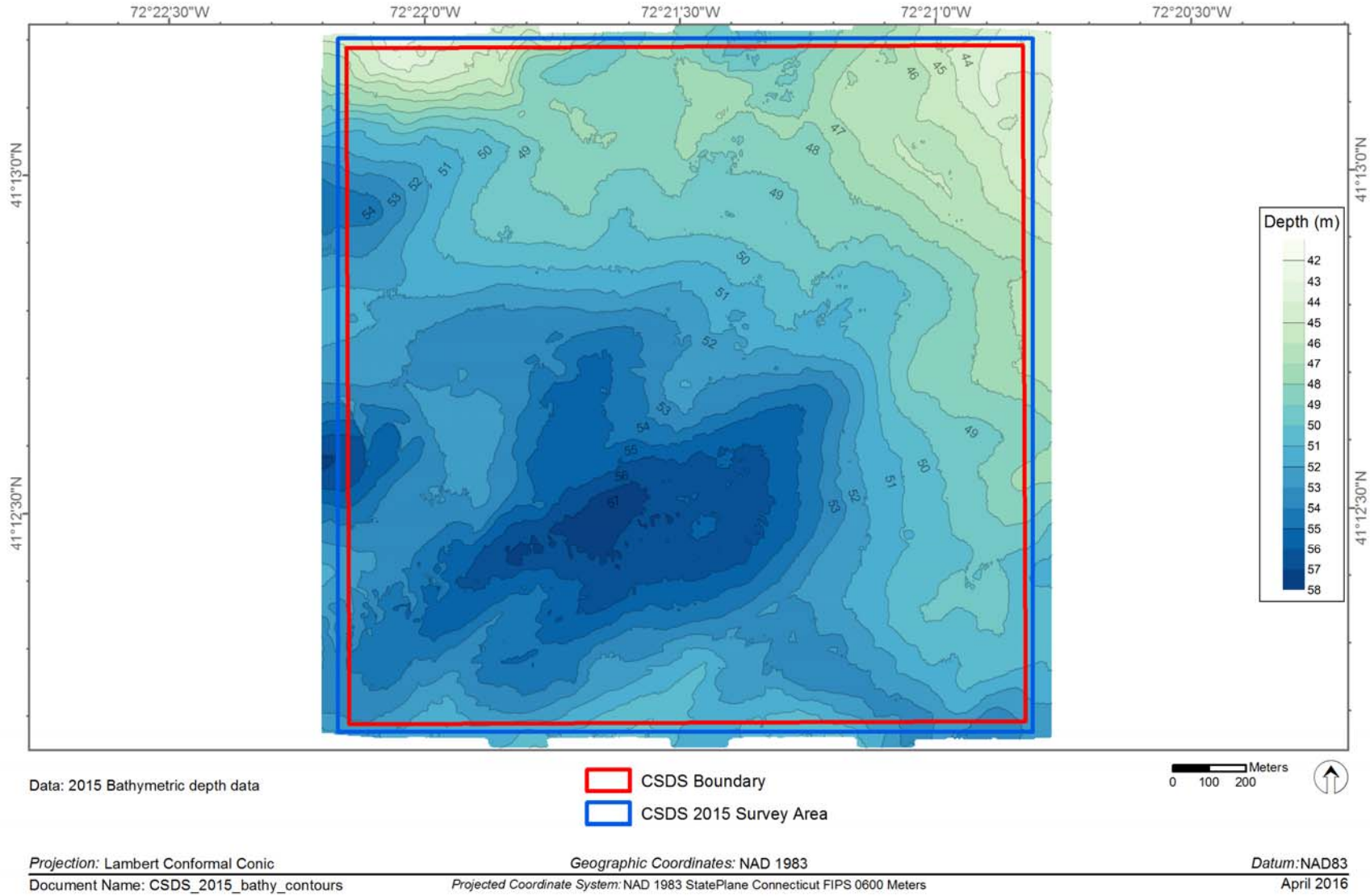

Figure 3-1. Bathymetric contour map of CSDS – October 2015

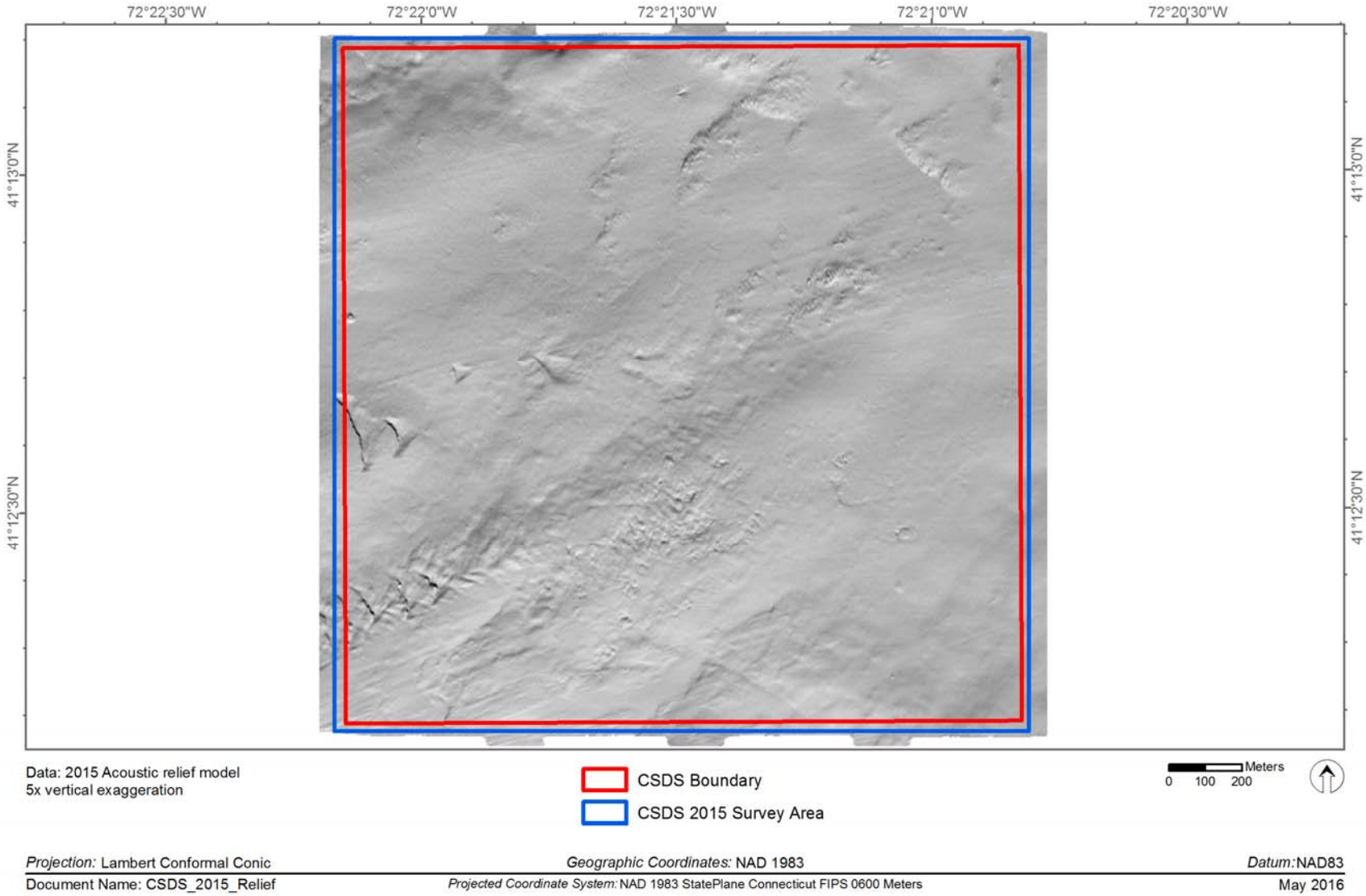

Figure 3-2. Acoustic relief map (hill-shaded grayscale) of CSDS – October 2015

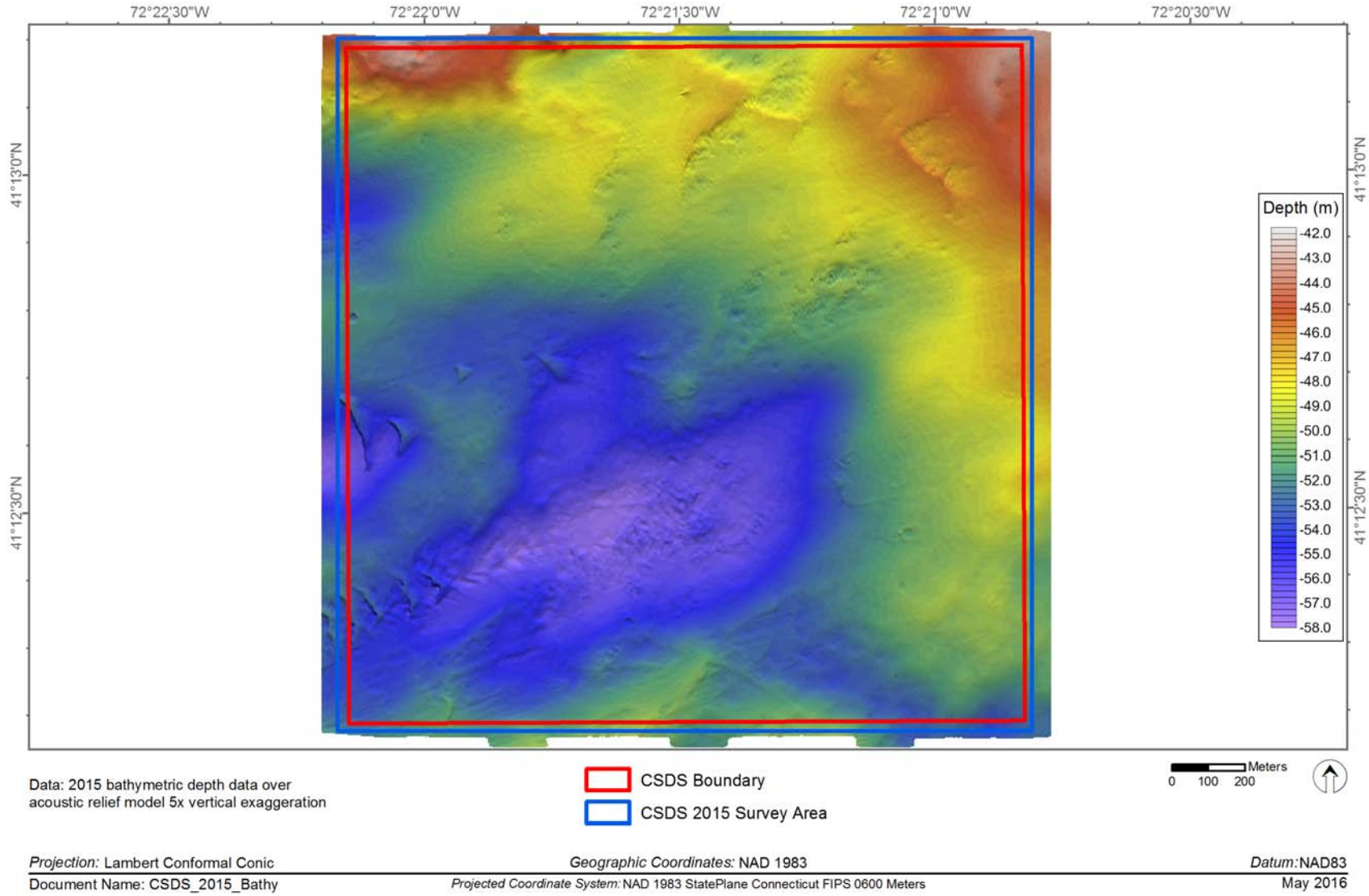

Figure 3-3. Bathymetric depth data over acoustic relief model of CSDS – October 2015

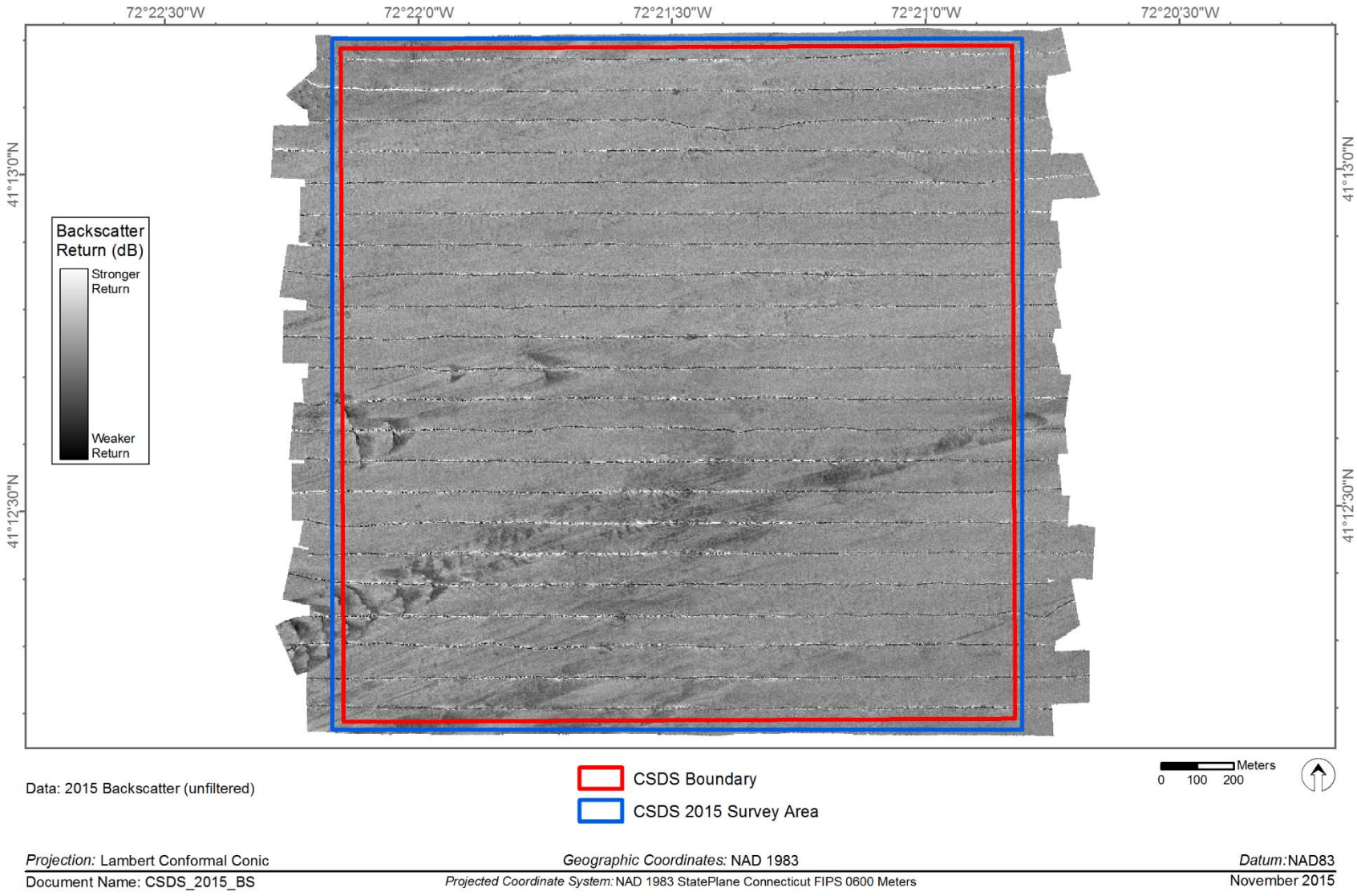

Figure 3-4. Mosaic of unfiltered backscatter data of CSDS – October 2015

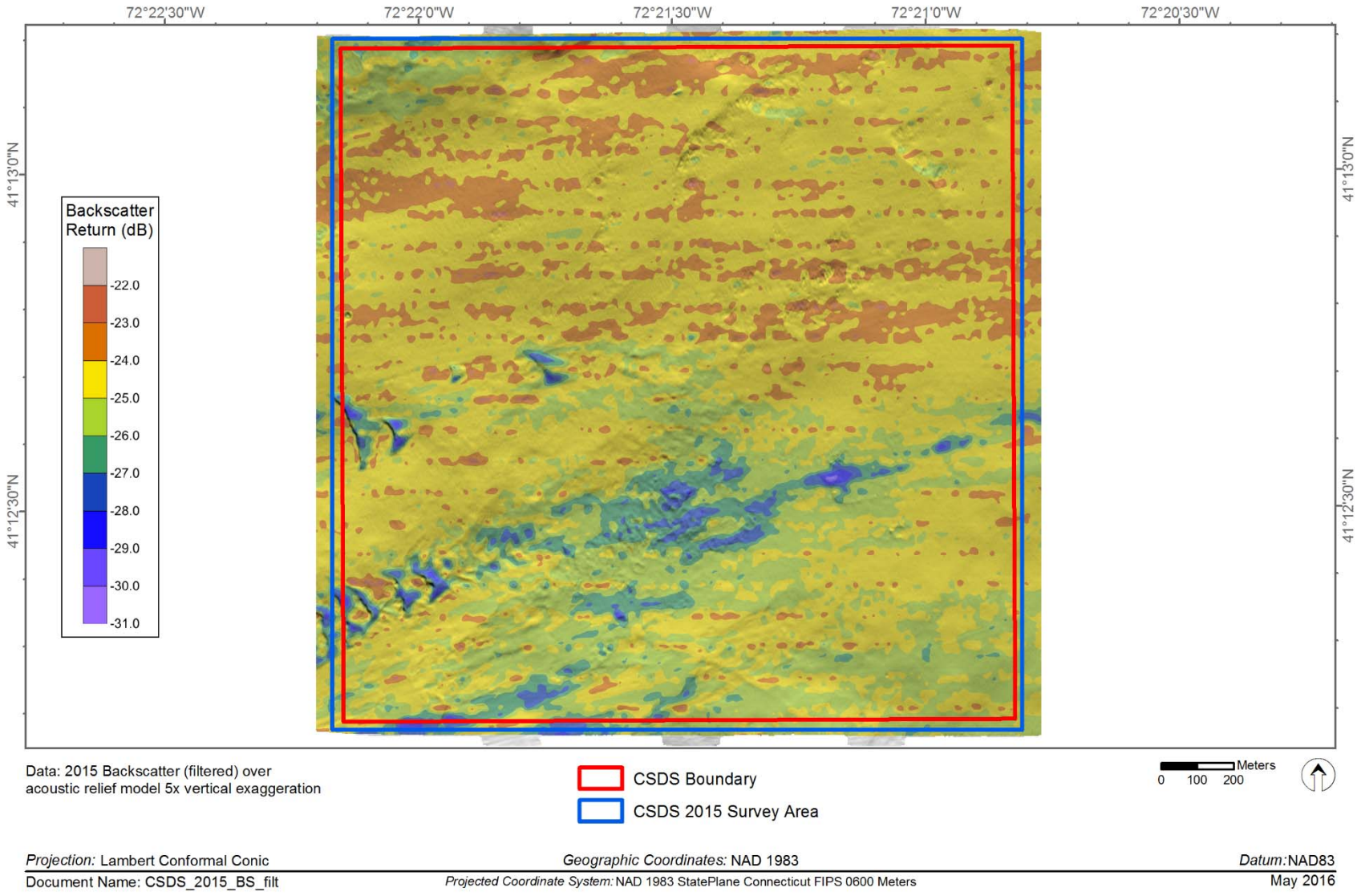

Figure 3-5. Filtered backscatter over acoustic relief model of CSDS – October 2015

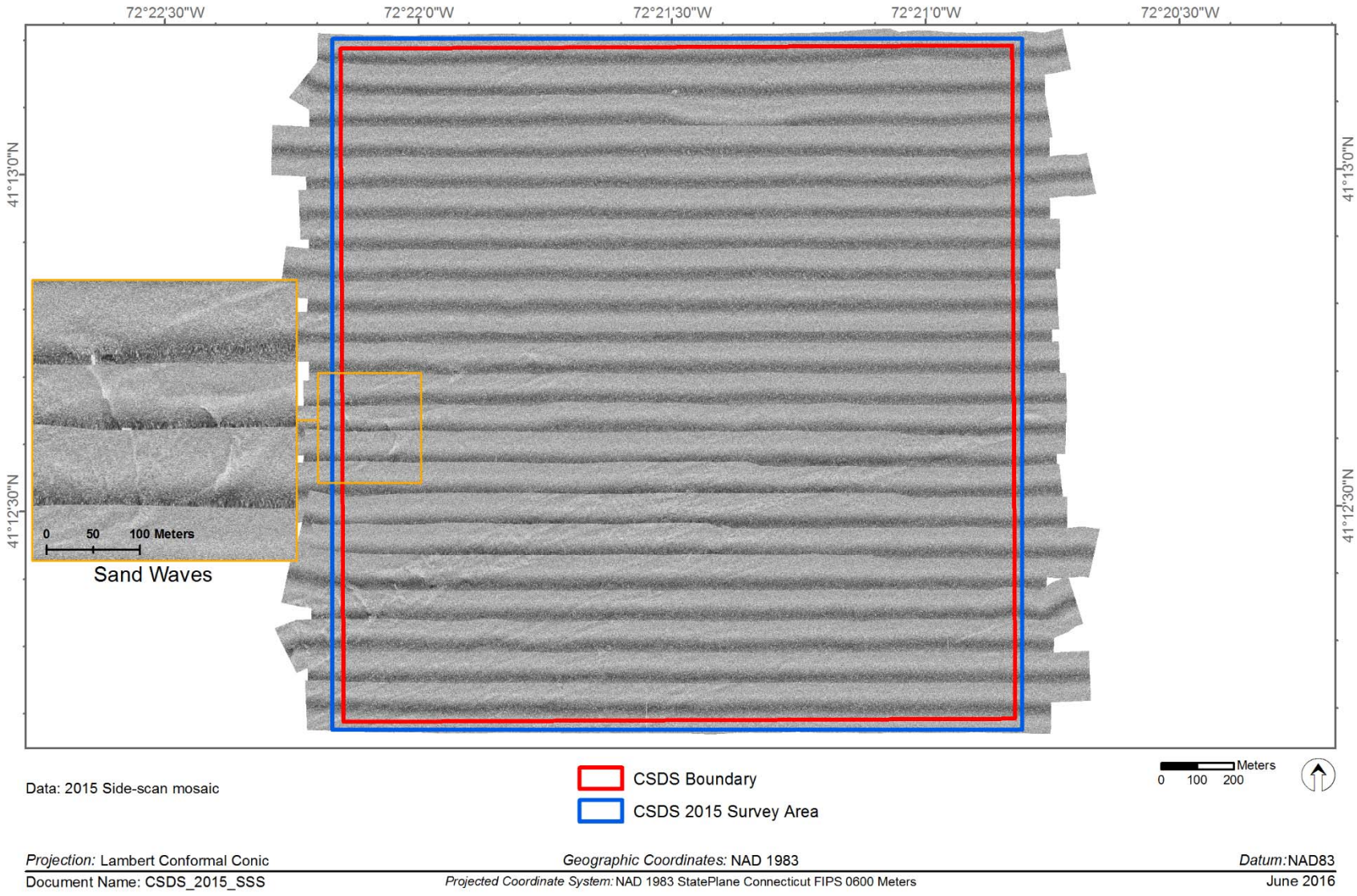

Figure 3-6. Side-scan mosaic of CSDS with close-up of sand waves – October 2015

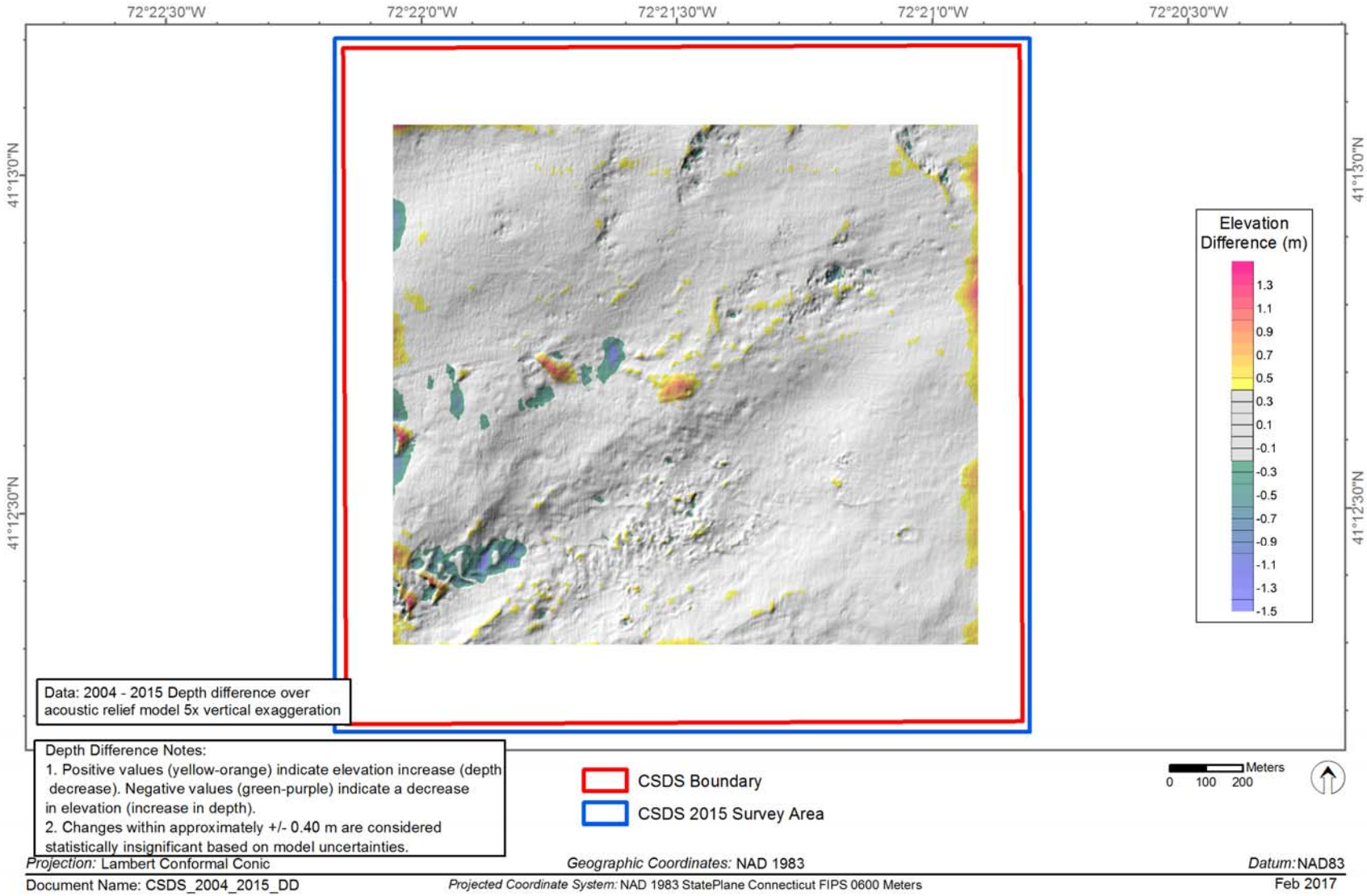

Figure 3-7. CSDS depth difference: 2015 vs. 2004

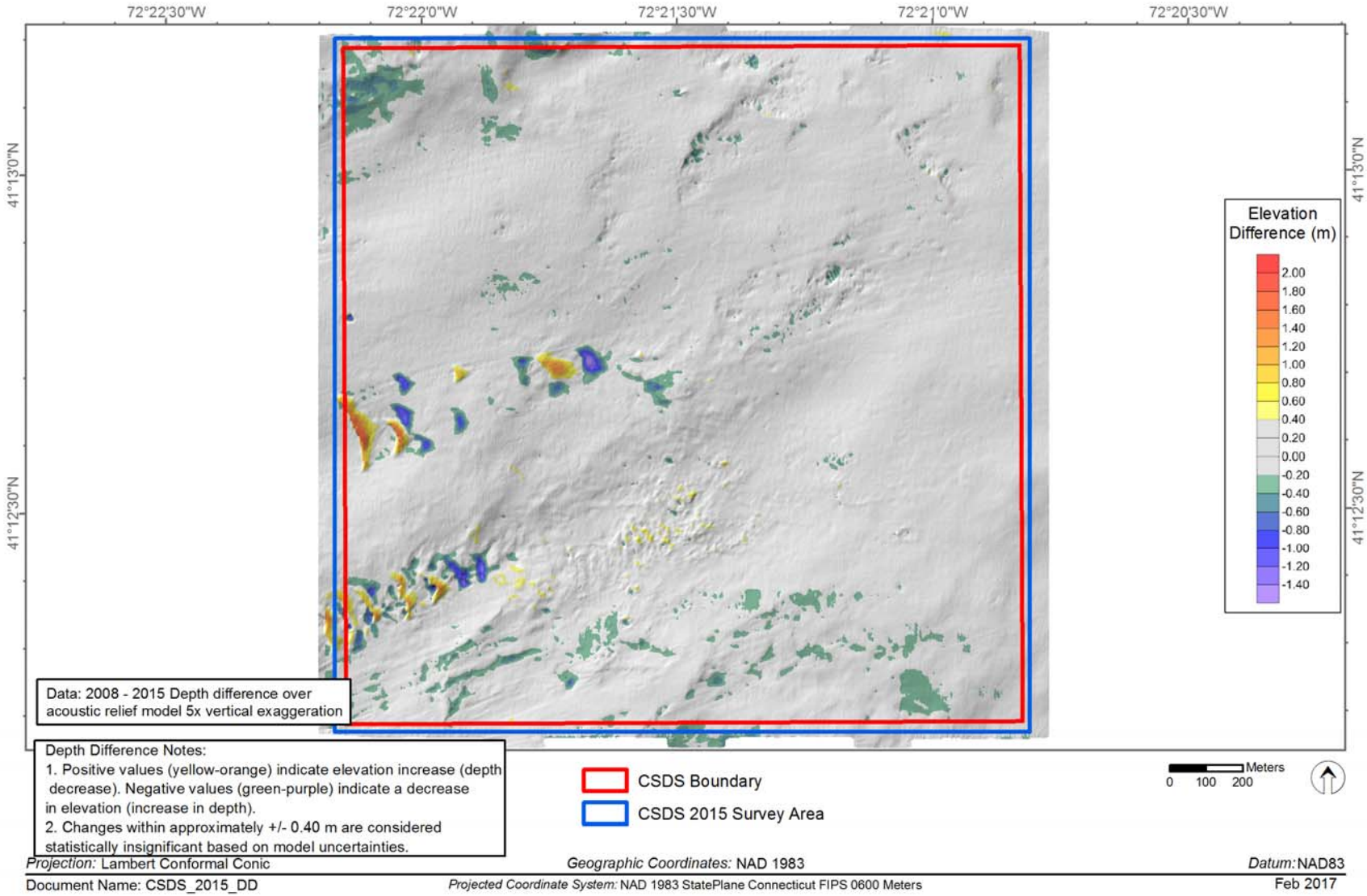

Figure 3-8. CSDS depth difference: 2015 vs. 2008 (NOS data)

4.0 SUMMARY

CSDS is managed as a dispersive dredged material disposal site under the DAMOS Program. Placement of material at this site began in 1978, and periodic monitoring surveys have been performed to evaluate changes in seafloor topography to characterize sediment transport patterns. The objective of the October 2015 survey at CSDS was to document the seafloor topography and surficial features of the site. This objective was accomplished by completing an acoustic survey with bathymetry, backscatter, and side-scan sonar. Topography of the site was compared with previous depth data collected at CSDS in 2004 and 2008.

The 2015 survey revealed that CSDS had a gradual slope from approximately 43 m on the northeast boundary to 53 m in the southwestern region with a topographic depression present in the central southeast portion of the survey area. Multibeam bathymetric data showed patterns consistent with the placement of dredged material in the south central region of the survey area and two rows of large sand waves. Filtered and unfiltered backscatter data revealed a band of weaker returns that coincided with areas that have received dredged material and active sand waves.

Since 2004, 176,000 m³ of dredged material has been disposed at the center of CSDS. Comparing 2015 survey results with survey results from 2004 and 2008 showed pockets of both accretion and scour in the western central and southwestern portions of the study area. The 2004 data comparison revealed that release of dredged material in the center of the study area did result in the formation of a small distinct mound in the center of the site. However, comparison with 2008 survey results did not show the formation of any distinct mounds. These comparisons suggest that there was an accumulation of dredged material between 2004 and 2008 but as of 2015 the material has dispersed. These results support the classification of CSDS as a dispersive disposal site.

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6.0 DATA TRANSMITTAL

Data transmittal to support this data summary report will be provided as a separate deliverable for inclusion in a Technical Support Notebook. The data submittal will include:

- Scope of Work
- Raw and processed acoustic survey data
- Survey field logs
- Report figures and associated files, including an ArcGIS geo-database
- Electronic copies of all data and final products

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

CSDS DISPOSAL LOG DATA FROM OCTOBER 2004 TO FEBRUARY 2014

Project name	City/town	State	Placement date/time	Disposal Season	Load volume (m^3)	Load volume (yd^3)	Placement latitude	Placement longitude	Permit number
Menunketesucket and Patchogue Rivers	Westbrook	CT	06-Oct-04	2004-2005	344	450	41.211333	-72.358667	200002514
Menunketesucket and Patchogue Rivers	Westbrook	CT	07-Oct-04	2004-2005	344	450	41.210983	-72.359683	200002514
Menunketesucket and Patchogue Rivers	Westbrook	CT	08-Oct-04	2004-2005	344	450	41.211333	-72.358667	200002514
Menunketesucket and Patchogue Rivers	Westbrook	CT	13-Oct-04	2004-2005	344	450	41.211333	-72.358667	200002514
Menunketesucket and Patchogue Rivers	Westbrook	CT	14-Oct-04	2004-2005	344	450	41.211333	-72.358667	200002514
Menunketesucket and Patchogue Rivers	Westbrook	CT	18-Oct-04	2004-2005	344	450	41.211333	-72.358667	200002514
Menunketesucket and Patchogue Rivers	Westbrook	CT	19-Oct-04	2004-2005	344	450	41.211333	-72.358667	200002514
Menunketesucket and Patchogue Rivers	Westbrook	CT	25-Oct-04	2004-2005	344	450	41.211333	-72.358667	200002514
Menunketesucket and Patchogue Rivers	Westbrook	CT	26-Oct-04	2004-2005	344	450	41.211333	-72.358667	200002514
Menunketesucket and Patchogue Rivers	Westbrook	CT	28-Oct-04	2004-2005	344	450	41.211333	-72.358667	200002514
Menunketesucket and Patchogue Rivers	Westbrook	CT	29-Oct-04	2004-2005	344	450	41.211333	-72.358667	200002514
Menunketesucket and Patchogue Rivers	Westbrook	CT	07-Mar-05	2004-2005	344	450	41.211333	-72.358667	200002514
Menunketesucket and Patchogue Rivers	Westbrook	CT	10-Mar-05	2004-2005	344	450	41.211333	-72.358667	200002514
Menunketesucket and Patchogue Rivers	Westbrook	CT	11-Mar-05	2004-2005	344	450	41.211333	-72.359667	200002514
Menunketesucket and Patchogue Rivers	Westbrook	CT	13-Mar-05	2004-2005	344	450	41.211333	-72.359667	200002514
Menunketesucket and Patchogue Rivers	Westbrook	CT	14-Mar-05	2004-2005	344	450	41.211333	-72.359667	200002514
Menunketesucket and Patchogue Rivers	Westbrook	CT	15-Mar-05	2004-2005	344	450	41.211333	-72.359667	200002514
Connecticut River			08-Feb-05	2004-2005	344	450	41.211333	-72.358667	200300334
Connecticut River			09-Feb-05	2004-2005	344	450	41.211333	-72.358667	200300334
Connecticut River			09-Feb-05	2004-2005	344	450	41.211333	-72.358667	200300334
Connecticut River			14-Feb-05	2004-2005	344	450	41.211333	-72.358667	200300334
Connecticut River			15-Feb-05	2004-2005	344	450	41.211333	-72.358667	200300334
Connecticut River			16-Feb-05	2004-2005	344	450	41.211333	-72.358667	200300334

Project name	City/town	State	Placement date/time	Disposal Season	Load volume (m^3)	Load volume (yd^3)	Placement latitude	Placement longitude	Permit number
Connecticut River			17-Feb-05	2004-2005	344	450	41.211333	-72.358667	200300334
Connecticut River			23-Feb-05	2004-2005	344	450	41.211333	-72.358667	200300334
Connecticut River			24-Feb-05	2004-2005	344	450	41.211333	-72.358667	200300334
Connecticut River			28-Feb-05	2004-2005	344	450	41.211333	-72.358667	200300334
Connecticut River			16-Mar-05	2004-2005	344	450	41.211333	-72.358667	200300334
Connecticut River			18-Mar-05	2004-2005	306	400	41.211333	-72.358667	200300334
Connecticut River			19-Mar-05	2004-2005	344	450	41.211333	-72.358667	200300334
Connecticut River			21-Mar-05	2004-2005	344	450	41.211333	-72.358667	200300334
Connecticut River			22-Mar-05	2004-2005	344	450	41.211333	-72.358667	200300334
Connecticut River			25-Mar-05	2004-2005	344	450	41.211333	-72.358667	200300334
Connecticut River			29-Mar-05	2004-2005	344	450	41.211350	-72.358667	200300334
Connecticut River			31-Mar-05	2004-2005	344	450	41.211333	-72.358667	200300334
Indian Town Harbor	Old Saybrook	CT	23-Apr-05	2004-2005	382	500	41.211467	-72.358550	200202839
Indian Town Harbor	Old Saybrook	CT	28-Apr-05	2004-2005	382	500	41.211033	-72.358317	200202839
Indian Town Harbor	Old Saybrook	CT	29-Apr-05	2004-2005	421	550	41.211817	-72.359067	200202839
Indian Town Harbor	Old Saybrook	CT	30-Apr-05	2004-2005	382	500	41.211383	-72.357500	200202839
Indian Town Harbor	Old Saybrook	CT	01-May-05	2004-2005	382	500	41.211333	-72.357833	200202839
Indian Town Harbor	Old Saybrook	CT	02-May-05	2004-2005	382	500	41.210950	-72.358400	200202839
Indian Town Harbor	Old Saybrook	CT	02-May-05	2004-2005	382	500	41.211117	-72.357617	200202839
Indian Town Harbor	Old Saybrook	CT	04-May-05	2004-2005	382	500	41.210983	-72.359683	200202839
Indian Town Harbor	Old Saybrook	CT	04-May-05	2004-2005	382	500	41.211583	-72.358517	200202839
Indian Town Harbor	Old Saybrook	CT	06-May-05	2004-2005	382	500	41.211383	-72.358367	200202839
Indian Town Harbor	Old Saybrook	CT	06-May-05	2004-2005	382	500	41.211083	-72.358700	200202839
Indian Town Harbor	Old Saybrook	CT	09-May-05	2004-2005	382	500	41.211433	-72.358667	200202839
Indian Town Harbor	Old Saybrook	CT	09-May-05	2004-2005	344	450	41.211567	-72.358500	200202839
Indian Town Harbor	Old Saybrook	CT	10-May-05	2004-2005	382	500	41.211467	-72.358350	200202839
Indian Town Harbor	Old Saybrook	CT	11-May-05	2004-2005	382	500	41.211083	-72.358400	200202839
Indian Town Harbor	Old Saybrook	CT	11-May-05	2004-2005	382	500	41.211433	-72.357450	200202839
Indian Town Harbor	Old Saybrook	CT	12-May-05	2004-2005	287	375	41.211783	-72.358983	200202839
Indian Town Harbor	Old Saybrook	CT	13-May-05	2004-2005	248	325	41.210800	-72.358750	200202839
Indian Town Harbor	Old Saybrook	CT	13-May-05	2004-2005	191	250	41.211300	-72.358617	200202839
Indian Town Harbor	Old Saybrook	CT	14-May-05	2004-2005	248	325	41.211117	-72.358383	200202839
Indian Town Harbor	Old Saybrook	CT	15-May-05	2004-2005	248	325	41.210917	-72.357983	200202839
Indian Town Harbor	Old Saybrook	CT	16-May-05	2004-2005	191	250	41.211217	-72.358333	200202839
Indian Town Harbor	Old Saybrook	CT	16-May-05	2004-2005	248	325	41.211333	-72.357483	200202839
Indian Town Harbor	Old Saybrook	CT	17-May-05	2004-2005	191	250	41.211500	-72.358583	200202839
Indian Town Harbor	Old Saybrook	CT	18-May-05	2004-2005	248	325	41.210900	-72.358883	200202839
Indian Town Harbor	Old Saybrook	CT	18-May-05	2004-2005	268	350	41.211683	-72.358000	200202839
Indian Town Harbor	Old Saybrook	CT	19-May-05	2004-2005	268	350	41.211433	-72.358450	200202839
Indian Town Harbor	Old Saybrook	CT	19-May-05	2004-2005	268	350	41.211467	-72.358717	200202839

Project name	City/town	State	Placement date/time	Disposal Season	Load volume (m^3)	Load volume (yd^3)	Placement latitude	Placement longitude	Permit number
Indian Town Harbor	Old Saybrook	CT	20-May-05	2004-2005	268	350	41.211017	-72.358417	200202839
Indian Town Harbor	Old Saybrook	CT	21-May-05	2004-2005	306	400	41.212033	-72.358150	200202839
Indian Town Harbor	Old Saybrook	CT	21-May-05	2004-2005	268	350	41.211250	-72.358167	200202839
Indian Town Harbor	Old Saybrook	CT	21-May-05	2004-2005	287	375	41.211283	-72.358117	200202839
Indian Town Harbor	Old Saybrook	CT	22-May-05	2004-2005	306	400	41.211583	-72.358167	200202839
Indian Town Harbor	Old Saybrook	CT	23-May-05	2004-2005	191	250	41.211433	-72.357433	200202839
Indian Town Harbor	Old Saybrook	CT	23-May-05	2004-2005	191	250	41.211133	-72.358550	200202839
Indian Town Harbor	Old Saybrook	CT	24-May-05	2004-2005	229	300	41.211233	-72.358533	200202839
Indian Town Harbor	Old Saybrook	CT	24-May-05	2004-2005	229	300	41.211433	-72.358400	200202839
Indian Town Harbor	Old Saybrook	CT	25-May-05	2004-2005	229	300	41.211050	-72.358883	200202839
Indian Town Harbor	Old Saybrook	CT	26-May-05	2004-2005	115	150	41.211033	-72.358483	200202839
Patchogue River	Westbrook	CT	17-Jan-06	2005-2006	344	450	41.211333	-72.358667	NAE20042807
Patchogue River	Westbrook	CT	20-Jan-06	2005-2006	344	450	41.211333	-72.358667	NAE20042807
Patchogue River	Westbrook	CT	24-Jan-06	2005-2006	344	450	41.211333	-72.358667	NAE20042807
Patchogue River	Westbrook	CT	27-Jan-06	2005-2006	344	450	41.211333	-72.358667	NAE20042807
Hammonassett River			02-Jun-06	2005-2006	287	375	41.211533	-72.358783	200000248
Hammonassett River			03-Jun-06	2005-2006	287	375	41.210683	-72.358617	200000248
Hammonassett River			04-Jun-06	2005-2006	287	375	41.211117	-72.358533	200000248
Hammonassett River			05-Jun-06	2005-2006	287	375	41.211133	-72.359583	200000248
Hammonassett River			06-Jun-06	2005-2006	306	400	41.211467	-72.358867	200000248
Hammonassett River			08-Jun-06	2005-2006	287	375	41.211417	-72.358650	200000248
Hammonassett River			09-Jun-06	2005-2006	268	350	41.211133	-72.358850	200000248
Hammonassett River			12-Jun-06	2005-2006	306	400	41.211383	-72.359083	200000248
Hammonassett River			13-Jun-06	2005-2006	287	375	41.211317	-72.359033	200000248
Hammonassett River			14-Jun-06	2005-2006	268	350	41.211500	-72.358867	200000248
Clinton Harbor	Clinton	CT	09-Nov-06	2006-2007	325	425	41.211333	-72.358500	NAE20061048
Clinton Harbor	Clinton	CT	10-Nov-06	2006-2007	306	400	41.211400	-72.358633	NAE20061048
Clinton Harbor	Clinton	CT	13-Nov-06	2006-2007	306	400	41.211467	-72.358817	NAE20061048
Clinton Harbor	Clinton	CT	14-Nov-06	2006-2007	306	400	41.211583	-72.358750	NAE20061048
Clinton Harbor	Clinton	CT	16-Nov-06	2006-2007	306	400	41.211317	-72.358750	NAE20061048
Clinton Harbor	Clinton	CT	18-Nov-06	2006-2007	306	400	41.211250	-72.358500	NAE20061048
Clinton Harbor	Clinton	CT	20-Nov-06	2006-2007	306	400	41.211433	-72.358500	NAE20061048
Clinton Harbor	Clinton	CT	20-Nov-06	2006-2007	398	520	41.211483	-72.358500	NAE20061048
Clinton Harbor	Clinton	CT	28-Nov-06	2006-2007	421	550	41.211167	-72.358500	NAE20061048
Clinton Harbor	Clinton	CT	28-Nov-06	2006-2007	325	425	41.211333	-72.358700	NAE20061048
Clinton Harbor	Clinton	CT	29-Nov-06	2006-2007	401	525	41.211467	-72.358650	NAE20061048
Clinton Harbor	Clinton	CT	29-Nov-06	2006-2007	344	450	41.211367	-72.358733	NAE20061048
Clinton Harbor	Clinton	CT	06-Dec-06	2006-2007	325	425	41.211767	-72.358733	NAE20061048
Clinton Harbor	Clinton	CT	18-Dec-07	2007-2008	344	450	41.211283	-72.358483	NAE20054021
Clinton Harbor	Clinton	CT	19-Dec-07	2007-2008	344	450	41.211850	-72.357933	NAE20054021

Project name	City/town	State	Placement date/time	Disposal Season	Load volume (m^3)	Load volume (yd^3)	Placement latitude	Placement longitude	Permit number
Clinton Harbor	Clinton	CT	19-Dec-07	2007-2008	248	325	41.211200	-72.359067	NAE20054021
Clinton Harbor	Clinton	CT	20-Dec-07	2007-2008	344	450	41.211250	-72.358567	NAE20054021
Clinton Harbor	Clinton	CT	21-Dec-07	2007-2008	325	425	41.211367	-72.358683	NAE20054021
Clinton Harbor	Clinton	CT	27-Dec-07	2007-2008	344	450	41.211533	-72.358583	NAE20054021
Clinton Harbor	Clinton	CT	28-Dec-07	2007-2008	321	420	41.210067	-72.359417	NAE20054021
Clinton Harbor	Clinton	CT	28-Dec-07	2007-2008	321	420	41.211350	-72.359417	NAE20054021
Clinton Harbor	Clinton	CT	30-Dec-07	2007-2008	325	425	41.211417	-72.358800	NAE20054021
Clinton Harbor	Clinton	CT	05-Jan-08	2007-2008	325	425	41.211567	-72.358800	NAE20054021
Clinton Harbor	Clinton	CT	05-Jan-08	2007-2008	321	420	41.211533	-72.358867	NAE20054021
Clinton Harbor	Clinton	CT	06-Jan-08	2007-2008	325	425	41.211033	-72.358750	NAE20054021
Clinton Harbor	Clinton	CT	07-Jan-08	2007-2008	344	450	41.211300	-72.358483	NAE20054021
Clinton Harbor	Clinton	CT	08-Jan-08	2007-2008	344	450	41.211600	-72.358867	NAE20054021
Clinton Harbor	Clinton	CT	09-Jan-08	2007-2008	344	450	41.211300	-72.358667	NAE20054021
Clinton Harbor	Clinton	CT	11-Jan-08	2007-2008	344	450	41.211133	-72.358850	NAE20054021
Clinton Harbor	Clinton	CT	12-Jan-08	2007-2008	382	500	41.211550	-72.358150	NAE20054021
Clinton Harbor	Clinton	CT	13-Jan-08	2007-2008	306	400	41.211433	-72.358600	NAE20054021
Clinton Harbor	Clinton	CT	13-Jan-08	2007-2008	306	400	41.211617	-72.359383	NAE20054021
Clinton Harbor	Clinton	CT	15-Jan-08	2007-2008	382	500	41.210833	-72.358800	NAE20054021
Clinton Harbor	Clinton	CT	16-Jan-08	2007-2008	306	400	41.211350	-72.358617	NAE20054021
Clinton Harbor	Clinton	CT	17-Jan-08	2007-2008	382	500	41.211350	-72.358417	NAE20054021
Clinton Harbor	Clinton	CT	17-Jan-08	2007-2008	325	425	41.211000	-72.359100	NAE20054021
Clinton Harbor	Clinton	CT	19-Jan-08	2007-2008	325	425	41.211450	-72.358467	NAE20054021
Clinton Harbor	Clinton	CT	29-Jan-08	2007-2008	382	500	41.211650	-72.358383	NAE20054021
Clinton Harbor	Clinton	CT	29-Jan-08	2007-2008	306	400	41.211283	-72.359100	NAE20054021
Clinton Harbor	Clinton	CT	04-Feb-08	2007-2008	191	250	41.211283	-72.358567	NAE20054021
Clinton Harbor	Clinton	CT	04-Feb-08	2007-2008	229	300	41.211433	-72.358517	NAE20054021
Clinton Harbor	Clinton	CT	15-Feb-08	2007-2008	306	400	41.211683	-72.359417	NAE20054021
Clinton Harbor	Clinton	CT	25-Mar-08	2007-2008	344	450	41.211000	-72.358667	NAE20054021
Saybrook Marina	Old Saybrook	CT	01-Feb-08	2007-2008	306	400	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	07-Feb-08	2007-2008	344	450	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	08-Feb-08	2007-2008	344	450	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	09-Feb-08	2007-2008	306	400	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	12-Feb-08	2007-2008	306	400	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	20-Feb-08	2007-2008	306	400	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	21-Feb-08	2007-2008	344	450	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	24-Feb-08	2007-2008	306	400	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	29-Feb-08	2007-2008	306	400	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	04-Mar-08	2007-2008	306	400	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	05-Mar-08	2007-2008	344	450	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	07-Mar-08	2007-2008	344	450	41.211333	-72.358667	NAE20072158

Project name	City/town	State	Placement date/time	Disposal Season	Load volume (m^3)	Load volume (yd^3)	Placement latitude	Placement longitude	Permit number
Saybrook Marina	Old Saybrook	CT	08-Mar-08	2007-2008	306	400	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	11-Mar-08	2007-2008	344	450	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	11-Mar-08	2007-2008	306	400	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	12-Mar-08	2007-2008	268	350	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	12-Mar-08	2007-2008	268	350	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	14-Mar-08	2007-2008	306	400	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	17-Mar-08	2007-2008	344	450	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	18-Mar-08	2007-2008	306	400	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	24-Mar-08	2007-2008	306	400	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	24-Mar-08	2007-2008	306	400	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	25-Mar-08	2007-2008	268	350	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	27-Mar-08	2007-2008	306	400	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	28-Mar-08	2007-2008	344	450	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	29-Mar-08	2007-2008	268	350	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	30-Mar-08	2007-2008	268	350	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	31-Mar-08	2007-2008	268	350	41.211333	-72.358667	NAE20072158
Indian Town Harbor	Old Saybrook	CT	01-May-08	2007-2008	96	125	41.211333	-72.358667	NAE20072665
Indian Town Harbor	Old Saybrook	CT	05-May-08	2007-2008	134	175	41.211417	-72.359333	NAE20072665
Indian Town Harbor	Old Saybrook	CT	06-May-08	2007-2008	134	175	41.211250	-72.358750	NAE20072665
Indian Town Harbor	Old Saybrook	CT	07-May-08	2007-2008	134	175	41.211300	-72.358750	NAE20072665
Indian Town Harbor	Old Saybrook	CT	09-May-08	2007-2008	153	200	41.211333	-72.358533	NAE20072665
Indian Town Harbor	Old Saybrook	CT	11-May-08	2007-2008	153	200	41.211300	-72.358833	NAE20072665
Indian Town Harbor	Old Saybrook	CT	05-Jun-08	2007-2008	191	250	41.211250	-72.358583	NAE20072665
Indian Town Harbor	Old Saybrook	CT	06-Jun-08	2007-2008	191	250	41.211417	-72.358583	NAE20072665
Clinton Harbor Marina	Clinton	CT	31-Jan-08	2007-2008	344	450	41.211300	-72.358567	NAE20062972
Clinton Harbor Marina	Clinton	CT	14-May-08	2007-2008	363	475	41.211125	-72.358667	NAE20062972
Clinton Harbor Marina	Clinton	CT	15-May-08	2007-2008	325	425	41.211317	-72.358650	NAE20062972
Clinton Harbor Marina	Clinton	CT	15-May-08	2007-2008	325	425	41.211317	-72.358683	NAE20062972
Clinton Harbor Marina	Clinton	CT	16-May-08	2007-2008	306	400	41.211250	-72.358583	NAE20062972
Clinton Harbor Marina	Clinton	CT	21-May-08	2007-2008	306	400	41.211250	-72.358633	NAE20062972
Clinton Harbor Marina	Clinton	CT	21-May-08	2007-2008	191	250	41.211350	-72.358750	NAE20062972
Patchogue River	Westbrook	CT	27-May-08	2007-2008	382	500	41.211100	-72.358783	NAE2008709
Patchogue River	Westbrook	CT	28-May-08	2007-2008	363	475	41.211633	-72.358833	NAE2008709
Patchogue River	Westbrook	CT	28-May-08	2007-2008	344	450	41.210667	-72.358800	NAE2008709
Patchogue River	Westbrook	CT	29-May-08	2007-2008	344	450	41.210800	-72.358750	NAE2008709
Patchogue River	Westbrook	CT	30-May-08	2007-2008	382	500	41.210833	-72.358367	NAE2008709
Saybrook Marina	Old Saybrook	CT	11-Nov-08	2008-2009	268	350	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	12-Nov-08	2008-2009	306	400	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	14-Nov-08	2008-2009	306	400	41.211250	-72.358833	NAE20072158
Saybrook Marina	Old Saybrook	CT	20-Nov-08	2008-2009	306	400	41.211333	-72.358667	NAE20072158

Project name	City/town	State	Placement date/time	Disposal Season	Load volume (m^3)	Load volume (yd^3)	Placement latitude	Placement longitude	Permit number
Clinton Harbor Marina	Clinton	CT	09-Dec-08	2008-2009	172	225	41.211317	-72.359167	NAE20062972
Saybrook Marina	Old Saybrook	CT	27-Jan-09	2008-2009	229	300	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	29-Jan-09	2008-2009	229	300	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	02-Feb-09	2008-2009	268	350	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	04-Feb-09	2008-2009	229	300	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	06-Feb-09	2008-2009	229	300	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	16-Feb-09	2008-2009	191	250	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	17-Feb-09	2008-2009	268	350	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	25-Feb-09	2008-2009	191	250	41.211333	-72.358667	NAE20072158
Saybrook Marina	Old Saybrook	CT	26-Feb-09	2008-2009	153	200	41.211333	-72.358667	NAE20072158
Patchogue River	Westbrook	CT	25-Apr-09	2008-2009	191	250	41.211300	-72.358750	NAE2008709
Patchogue River	Westbrook	CT	25-Apr-09	2008-2009	268	350	41.211400	-72.358500	NAE2008709
Patchogue River	Westbrook	CT	26-Apr-09	2008-2009	421	550	41.211483	-72.358833	NAE2008709
Patchogue River	Westbrook	CT	27-Apr-09	2008-2009	421	550	41.211350	-72.358500	NAE2008709
Patchogue River	Westbrook	CT	28-Apr-09	2008-2009	440	575	41.211317	-72.358683	NAE2008709
Patchogue River	Westbrook	CT	29-Apr-09	2008-2009	421	550	41.211467	-72.358650	NAE2008709
Patchogue River	Westbrook	CT	30-Apr-09	2008-2009	382	500	41.211317	-72.358583	NAE2008709
Clinton Harbor	Clinton	CT	09-Dec-08	2008-2009	210	275	41.211317	-72.359167	NAE20073392
Clinton Harbor	Clinton	CT	12-May-09	2008-2009	401	525	41.211300	-72.358650	NAE20073392
Clinton Harbor	Clinton	CT	13-May-09	2008-2009	401	525	41.211250	-72.358667	NAE20073392
Clinton Harbor	Clinton	CT	13-May-09	2008-2009	382	500	41.211250	-72.358650	NAE20073392
Clinton Harbor	Clinton	CT	15-May-09	2008-2009	401	525	41.211317	-72.358750	NAE20073392
Clinton Harbor	Clinton	CT	16-May-09	2008-2009	382	500	41.211350	-72.358817	NAE20073392
Clinton Harbor	Clinton	CT	18-May-09	2008-2009	382	500	41.211317	-72.358750	NAE20073392
Clinton Harbor	Clinton	CT	19-May-09	2008-2009	401	525	41.211300	-72.358600	NAE20073392
Between the Bridges Marina	Old Saybrook	CT	08-Apr-10	2009-2010	330	432	41.212172	-72.358993	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	09-Apr-10	2009-2010	347	454	41.211762	-72.360967	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	12-Apr-10	2009-2010	290	379	41.211318	-72.358553	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	13-Apr-10	2009-2010	323	423	41.211820	-72.358988	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	13-Apr-10	2009-2010	314	411	41.212623	-72.358660	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	14-Apr-10	2009-2010	323	422	41.211833	-72.358575	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	15-Apr-10	2009-2010	348	455	41.218800	-72.358900	NAE2006126

Project name	City/town	State	Placement date/time	Disposal Season	Load volume (m^3)	Load volume (yd^3)	Placement latitude	Placement longitude	Permit number
Between the Bridges Marina	Old Saybrook	CT	20-Apr-10	2009-2010	283	370	41.210982	-72.359167	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	21-Apr-10	2009-2010	333	436	41.211128	-72.358713	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	22-Apr-10	2009-2010	333	436	41.211592	-72.359305	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	23-Apr-10	2009-2010	317	414	41.211870	-72.359343	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	27-Apr-10	2009-2010	333	436	41.211383	-72.359185	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	01-May-10	2009-2010	309	404	41.211790	-72.359063	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	04-May-10	2009-2010	334	437	41.211065	-72.358378	NAE2006126
Middletown Yacht Club	Chester	CT	11-Nov-10	2010-2011	309	404	41.211088	-72.358452	NAE2008736
Middletown Yacht Club	Chester	CT	12-Nov-10	2010-2011	375	491	41.211293	-72.358358	NAE2008736
Indian Town Harbor	Old Saybrook	CT	06-Jan-11	2010-2011	106	138	41.211198	-72.357923	NAE20072665
Indian Town Harbor	Old Saybrook	CT	07-Jan-11	2010-2011	106	139	41.211495	-72.357548	NAE20072665
Indian Town Harbor	Old Saybrook	CT	12-Jan-11	2010-2011	217	284	41.211562	-72.357603	NAE20072665
Indian Town Harbor	Old Saybrook	CT	18-Jan-11	2010-2011	274	358	41.211525	-72.358698	NAE20072665
Indian Town Harbor	Old Saybrook	CT	20-Jan-11	2010-2011	336	440	41.211642	-72.357720	NAE20072665
Indian Town Harbor	Old Saybrook	CT	21-Jan-11	2010-2011	325	425	41.212008	-72.357452	NAE20072665
Indian Town Harbor	Old Saybrook	CT	26-Jan-11	2010-2011	325	425	41.211568	-72.358597	NAE20072665
Indian Town Harbor	Old Saybrook	CT	30-Jan-11	2010-2011	289	378	41.212098	-72.358957	NAE20072665
Indian Town Harbor	Old Saybrook	CT	01-Feb-11	2010-2011	333	436	41.211830	-72.357800	NAE20072665
Indian Town Harbor	Old Saybrook	CT	17-Feb-11	2010-2011	291	380	41.211365	-72.358080	NAE20072665
Indian Town Harbor	Old Saybrook	CT	18-Feb-11	2010-2011	342	447	41.211695	-72.358737	NAE20072665
Indian Town Harbor	Old Saybrook	CT	18-Feb-11	2010-2011	376	492	41.211312	-72.359107	NAE20072665
Indian Town Harbor	Old Saybrook	CT	22-Feb-11	2010-2011	368	481	41.211700	-72.357900	NAE20072665
Indian Town Harbor	Old Saybrook	CT	23-Feb-11	2010-2011	299	391	41.211995	-72.357810	NAE20072665
Indian Town Harbor	Old Saybrook	CT	27-Feb-11	2010-2011	317	415	41.211810	-72.358288	NAE20072665
Indian Town Harbor	Old Saybrook	CT	04-Mar-11	2010-2011	291	381	41.211775	-72.357940	NAE20072665
Indian Town Harbor	Old Saybrook	CT	04-Mar-11	2010-2011	284	371	41.213013	-72.358258	NAE20072665
Indian Town Harbor	Old Saybrook	CT	05-Mar-11	2010-2011	395	516	41.211828	-72.358912	NAE20072665
Indian Town Harbor	Old Saybrook	CT	08-Mar-11	2010-2011	395	516	41.211903	-72.357828	NAE20072665
Indian Town Harbor	Old Saybrook	CT	09-Mar-11	2010-2011	360	471	41.211198	-72.357912	NAE20072665
Indian Town Harbor	Old Saybrook	CT	11-Mar-11	2010-2011	385	504	41.211737	-72.358175	NAE20072665
Indian Town Harbor	Old Saybrook	CT	12-Mar-11	2010-2011	427	558	41.211460	-72.357473	NAE20072665
Indian Town Harbor	Old Saybrook	CT	15-Mar-11	2010-2011	369	482	41.211552	-72.358423	NAE20072665
Indian Town Harbor	Old Saybrook	CT	15-Mar-11	2010-2011	343	448	41.211368	-72.357918	NAE20072665

Project name	City/town	State	Placement date/time	Disposal Season	Load volume (m^3)	Load volume (yd^3)	Placement latitude	Placement longitude	Permit number
Indian Town Harbor	Old Saybrook	CT	16-Mar-11	2010-2011	343	448	41.211578	-72.358347	NAE20072665
Indian Town Harbor	Old Saybrook	CT	17-Mar-11	2010-2011	360	471	41.211353	-72.358213	NAE20072665
Indian Town Harbor	Old Saybrook	CT	18-Mar-11	2010-2011	326	426	41.211483	-72.358000	NAE20072665
Indian Town Harbor	Old Saybrook	CT	07-Apr-11	2010-2011	106	139	41.211173	-72.358158	NAE20072665
Indian Town Harbor	Old Saybrook	CT	08-Apr-11	2010-2011	284	371	41.211790	-72.357635	NAE20072665
Indian Town Harbor	Old Saybrook	CT	09-Apr-11	2010-2011	275	360	41.211822	-72.357032	NAE20072665
Indian Town Harbor	Old Saybrook	CT	09-Apr-11	2010-2011	300	392	41.211188	-72.358343	NAE20072665
Indian Town Harbor	Old Saybrook	CT	10-Apr-11	2010-2011	326	426	41.211718	-72.358122	NAE20072665
Indian Town Harbor	Old Saybrook	CT	10-Apr-11	2010-2011	309	404	41.211708	-72.358375	NAE20072665
Indian Town Harbor	Old Saybrook	CT	15-Apr-11	2010-2011	300	393	41.211348	-72.358220	NAE20072665
Indian Town Harbor	Old Saybrook	CT	15-Apr-11	2010-2011	249	326	41.211475	-72.357937	NAE20072665
Indian Town Harbor	Old Saybrook	CT	19-Apr-11	2010-2011	334	437	41.211427	-72.358365	NAE20072665
Indian Town Harbor	Old Saybrook	CT	19-Apr-11	2010-2011	232	304	41.211430	-72.358093	NAE20072665
Indian Town Harbor	Old Saybrook	CT	20-Apr-11	2010-2011	224	293	41.211668	-72.358572	NAE20072665
Indian Town Harbor	Old Saybrook	CT	22-Apr-11	2010-2011	309	404	41.211452	-72.358265	NAE20072665
Indian Town Harbor	Old Saybrook	CT	23-Apr-11	2010-2011	292	382	41.211653	-72.358595	NAE20072665
Indian Town Harbor	Old Saybrook	CT	25-Apr-11	2010-2011	300	393	41.211435	-72.358585	NAE20072665
Indian Town Harbor	Old Saybrook	CT	26-Apr-11	2010-2011	258	337	41.211402	-72.358393	NAE20072665
Indian Town Harbor	Old Saybrook	CT	27-Apr-11	2010-2011	343	449	41.211432	-72.358638	NAE20072665
Indian Town Harbor	Old Saybrook	CT	30-Apr-11	2010-2011	293	383	41.211483	-72.358453	NAE20072665
Indian Town Harbor	Old Saybrook	CT	30-Apr-11	2010-2011	258	338	41.211458	-72.358525	NAE20072665
Indian Town Harbor	Old Saybrook	CT	01-May-11	2010-2011	174	227	41.211283	-72.358192	NAE20072665
Indian Town Harbor	Old Saybrook	CT	01-May-11	2010-2011	249	326	41.211535	-72.358278	NAE20072665
Indian Town Harbor	Old Saybrook	CT	02-May-11	2010-2011	258	338	41.211463	-72.357947	NAE20072665
Indian Town Harbor	Old Saybrook	CT	02-May-11	2010-2011	250	327	41.211393	-72.358158	NAE20072665
Indian Town Harbor	Old Saybrook	CT	03-May-11	2010-2011	275	360	41.211488	-72.358593	NAE20072665
Indian Town Harbor	Old Saybrook	CT	03-May-11	2010-2011	319	417	41.211655	-72.358478	NAE20072665
Saybrook Marina	Old Saybrook	CT	18-Feb-11	2010-2011	78	102	41.211547	-72.357693	NAE20072158
Saybrook Marina	Old Saybrook	CT	18-Feb-11	2010-2011	242	317	41.211460	-72.357715	NAE20072158
Saybrook Marina	Old Saybrook	CT	22-Feb-11	2010-2011	280	366	41.211540	-72.358337	NAE20072158
Saybrook Marina	Old Saybrook	CT	23-Feb-11	2010-2011	267	349	41.211235	-72.358318	NAE20072158
Saybrook Marina	Old Saybrook	CT	23-Feb-11	2010-2011	268	350	41.211437	-72.358528	NAE20072158
Saybrook Marina	Old Saybrook	CT	24-Feb-11	2010-2011	248	324	41.211177	-72.358385	NAE20072158
Saybrook Marina	Old Saybrook	CT	24-Feb-11	2010-2011	267	349	41.211357	-72.358038	NAE20072158
Saybrook Marina	Old Saybrook	CT	25-Feb-11	2010-2011	188	246	41.211270	-72.359575	NAE20072158
Saybrook Marina	Old Saybrook	CT	27-Feb-11	2010-2011	255	334	41.211548	-72.358017	NAE20072158
Saybrook Marina	Old Saybrook	CT	02-Mar-11	2010-2011	285	373	41.211403	-72.358048	NAE20072158
Saybrook Marina	Old Saybrook	CT	04-Mar-11	2010-2011	274	358	41.210980	-72.358257	NAE20072158
Saybrook Marina	Old Saybrook	CT	05-Mar-11	2010-2011	262	343	41.211415	-72.358220	NAE20072158
Saybrook Marina	Old Saybrook	CT	05-Mar-11	2010-2011	177	232	41.211493	-72.357985	NAE20072158

Project name	City/town	State	Placement date/time	Disposal Season	Load volume (m^3)	Load volume (yd^3)	Placement latitude	Placement longitude	Permit number
Saybrook Marina	Old Saybrook	CT	08-Mar-11	2010-2011	257	336	41.212002	-72.357668	NAE20072158
Saybrook Marina	Old Saybrook	CT	15-Mar-11	2010-2011	252	329	41.211630	-72.357668	NAE20072158
Saybrook Marina	Old Saybrook	CT	16-Mar-11	2010-2011	245	320	41.211642	-72.358655	NAE20072158
Saybrook Marina	Old Saybrook	CT	18-Mar-11	2010-2011	263	344	41.211592	-72.357873	NAE20072158
Saybrook Marina	Old Saybrook	CT	19-Mar-11	2010-2011	257	336	41.211298	-72.357712	NAE20072158
Saybrook Marina	Old Saybrook	CT	20-Mar-11	2010-2011	251	328	41.211903	-72.357983	NAE20072158
Saybrook Marina	Old Saybrook	CT	21-Mar-11	2010-2011	263	344	41.211688	-72.357943	NAE20072158
Saybrook Marina	Old Saybrook	CT	23-Mar-11	2010-2011	283	370	41.211420	-72.358975	NAE20072158
Saybrook Marina	Old Saybrook	CT	23-Mar-11	2010-2011	252	330	41.211262	-72.360380	NAE20072158
Saybrook Marina	Old Saybrook	CT	25-Mar-11	2010-2011	265	346	41.211453	-72.358133	NAE20072158
Saybrook Marina	Old Saybrook	CT	30-Mar-11	2010-2011	265	347	41.211330	-72.358075	NAE20072158
Saybrook Marina	Old Saybrook	CT	31-Mar-11	2010-2011	252	330	41.211437	-72.358250	NAE20072158
Saybrook Marina	Old Saybrook	CT	31-Mar-11	2010-2011	283	370	41.211338	-72.358147	NAE20072158
Saybrook Marina	Old Saybrook	CT	07-Apr-11	2010-2011	203	266	41.211587	-72.357733	NAE20072158
Saybrook Marina	Old Saybrook	CT	07-Apr-11	2010-2011	272	356	41.211475	-72.357983	NAE20072158
Saybrook Marina	Old Saybrook	CT	08-Apr-11	2010-2011	253	331	41.211578	-72.358265	NAE20072158
Saybrook Marina	Old Saybrook	CT	08-Apr-11	2010-2011	247	323	41.211298	-72.357907	NAE20072158
Saybrook Marina	Old Saybrook	CT	09-Apr-11	2010-2011	266	348	41.211310	-72.358005	NAE20072158
Saybrook Marina	Old Saybrook	CT	09-Apr-11	2010-2011	150	196	41.211477	-72.358913	NAE20072158
Between the Bridges Marina	Old Saybrook	CT	03-Nov-11	2011-2012	382	500	41.211277	-72.358273	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	04-Nov-11	2011-2012	382	500	41.211665	-72.357393	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	05-Nov-11	2011-2012	382	500	41.211337	-72.351630	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	06-Nov-11	2011-2012	382	500	41.211510	-72.357802	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	07-Nov-11	2011-2012	382	500	41.211568	-72.357945	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	08-Nov-11	2011-2012	382	500	41.211730	-72.357423	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	10-Nov-11	2011-2012	382	500	41.211422	-72.358218	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	15-Nov-11	2011-2012	382	500	41.211523	-72.357840	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	15-Nov-11	2011-2012	382	500	41.212172	-72.357075	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	16-Nov-11	2011-2012	382	500	41.212010	-72.357628	NAE2006126

Project name	City/town	State	Placement date/time	Disposal Season	Load volume (m^3)	Load volume (yd^3)	Placement latitude	Placement longitude	Permit number
Between the Bridges Marina	Old Saybrook	CT	17-Nov-11	2011-2012	382	500	41.211363	-72.358427	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	17-Nov-11	2011-2012	382	500	41.212012	-72.357532	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	18-Nov-11	2011-2012	382	500	41.210997	-72.357738	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	26-Nov-11	2011-2012	382	500	41.211588	-72.358400	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	27-Nov-11	2011-2012	382	500	41.211268	-72.357897	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	27-Nov-11	2011-2012	382	500	41.211457	-72.357818	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	28-Nov-11	2011-2012	382	500	41.211317	-72.358658	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	29-Nov-11	2011-2012	382	500	41.211612	-72.358070	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	29-Nov-11	2011-2012	382	500	41.212455	-72.354300	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	01-Dec-11	2011-2012	382	500	41.211688	-72.358122	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	02-Dec-11	2011-2012	382	500	41.211025	-72.358025	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	04-Dec-11	2011-2012	382	500	41.211403	-72.358138	NAE2006126
Between the Bridges Marina	Old Saybrook	CT	05-Dec-11	2011-2012	382	500	41.211223	-72.358107	NAE2006126
Patchogue River 2012	Westbrook	CT	10-Jan-12	2011-2012	367	480	41.211420	-72.358280	W912WJ-12-C-0005
Saybrook Marina	Old Saybrook	CT	24-Jan-12	2011-2012	382	500	41.211027	-72.358540	NAE20082158
Saybrook Marina	Old Saybrook	CT	25-Jan-12	2011-2012	382	500	41.211475	-72.357378	NAE20082158
Saybrook Marina	Old Saybrook	CT	26-Jan-12	2011-2012	382	500	41.211317	-72.357713	NAE20082158
Saybrook Marina	Old Saybrook	CT	28-Jan-12	2011-2012	382	500	41.211635	-72.356835	NAE20082158
Saybrook Marina	Old Saybrook	CT	17-Feb-12	2011-2012	382	500	41.211510	-72.358608	NAE20082158
Saybrook Marina	Old Saybrook	CT	17-Feb-12	2011-2012	382	500	41.212530	-72.358462	NAE20082158
Saybrook Marina	Old Saybrook	CT	17-Feb-12	2011-2012	382	500	41.211502	-72.357725	NAE20082158
Saybrook Marina	Old Saybrook	CT	23-Feb-12	2011-2012	382	500	41.211442	-72.357268	NAE20082158
Saybrook Marina	Old Saybrook	CT	29-Feb-12	2011-2012	382	500	41.212842	-72.357445	NAE20082158
Saybrook Marina	Old Saybrook	CT	02-Mar-12	2011-2012	382	500	41.211353	-72.358373	NAE20082158
Saybrook Marina	Old Saybrook	CT	06-Mar-12	2011-2012	382	500	41.211138	-72.357870	NAE20082158
Saybrook Marina	Old Saybrook	CT	07-Mar-12	2011-2012	382	500	41.211927	-72.358135	NAE20082158
Saybrook Marina	Old Saybrook	CT	10-Mar-12	2011-2012	382	500	41.211448	-72.357683	NAE20082158

Project name	City/town	State	Placement date/time	Disposal Season	Load volume (m^3)	Load volume (yd^3)	Placement latitude	Placement longitude	Permit number
Saybrook Marina	Old Saybrook	CT	11-Mar-12	2011-2012	382	500	41.211580	-72.357208	NAE20082158
Saybrook Marina	Old Saybrook	CT	13-Mar-12	2011-2012	382	500	41.211432	-72.358050	NAE20082158
Saybrook Marina	Old Saybrook	CT	14-Mar-12	2011-2012	382	500	41.211612	-72.358105	NAE20082158
Saybrook Marina	Old Saybrook	CT	15-Mar-12	2011-2012	382	500	41.211762	-72.358622	NAE20082158
Saybrook Marina	Old Saybrook	CT	15-Mar-12	2011-2012	382	500	41.210852	-72.357853	NAE20082158
Saybrook Marina	Old Saybrook	CT	17-Mar-12	2011-2012	382	500	41.211523	-72.358090	NAE20082158
Saybrook Marina	Old Saybrook	CT	18-Mar-12	2011-2012	382	500	41.211407	-72.357992	NAE20082158
Saybrook Marina	Old Saybrook	CT	19-Mar-12	2011-2012	382	500	41.212027	-72.359187	NAE20082158
Harbor One Marina	Old Saybrook	CT	15-Mar-12	2011-2012	382	500	41.211407	-72.359935	NAE20044113
Harbor One Marina	Old Saybrook	CT	15-Mar-12	2011-2012	382	500	41.211405	-72.358223	NAE20044113
Harbor One Marina	Old Saybrook	CT	16-Mar-12	2011-2012	382	500	41.211688	-72.358968	NAE20044113
Harbor One Marina	Old Saybrook	CT	16-Mar-12	2011-2012	382	500	41.211777	-72.358323	NAE20044113
Harbor One Marina	Old Saybrook	CT	17-Mar-12	2011-2012	382	500	41.211573	-72.358987	NAE20044113
Harbor One Marina	Old Saybrook	CT	17-Mar-12	2011-2012	382	500	41.211520	-72.358488	NAE20044113
Harbor One Marina	Old Saybrook	CT	19-Mar-12	2011-2012	382	500	41.211308	-72.358090	NAE20044113
Harbor One Marina	Old Saybrook	CT	20-Mar-12	2011-2012	382	500	41.211563	-72.359265	NAE20044113
Harbor One Marina	Old Saybrook	CT	20-Mar-12	2011-2012	382	500	41.211637	-72.358993	NAE20044113
Harbor One Marina	Old Saybrook	CT	21-Mar-12	2011-2012	382	500	41.211135	-72.359388	NAE20044113
Harbor One Marina	Old Saybrook	CT	23-Mar-12	2011-2012	382	500	41.211960	-72.358087	NAE20044113
Harbor One Marina	Old Saybrook	CT	26-Mar-12	2011-2012	382	500	41.211492	-72.358387	NAE20044113
Harbor One Marina	Old Saybrook	CT	26-Mar-12	2011-2012	382	500	41.211320	-72.357802	NAE20044113
Harbor One Marina	Old Saybrook	CT	28-Mar-12	2011-2012	382	500	41.212163	-72.357278	NAE20044113
Harbor One Marina	Old Saybrook	CT	29-Mar-12	2011-2012	382	500	41.210878	-72.358387	NAE20044113
Harbor One Marina	Old Saybrook	CT	29-Mar-12	2011-2012	382	500	41.211302	-72.358115	NAE20044113
Harbor One Marina	Old Saybrook	CT	30-Mar-12	2011-2012	382	500	41.210748	-72.359122	NAE20044113
Harbor One Marina	Old Saybrook	CT	31-Mar-12	2011-2012	382	500	41.211980	-72.357238	NAE20044113
Harbor One Marina	Old Saybrook	CT	01-Apr-12	2011-2012	382	500	41.210860	-42.357808	NAE20044113
Patchogue River 2012	Westbrook	CT	15-Oct-12	2012-2013	367	480	41.211130	-72.357870	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	16-Oct-12	2012-2013	367	480	41.211520	-72.359270	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	17-Oct-12	2012-2013	367	480	41.211400	-72.358380	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	17-Oct-12	2012-2013	367	480	41.211330	-72.358220	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	18-Oct-12	2012-2013	367	480	41.211550	-72.358270	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	18-Oct-12	2012-2013	367	480	41.211430	-72.358220	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	20-Oct-12	2012-2013	367	480	41.211670	-72.358530	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	20-Oct-12	2012-2013	367	480	41.211900	-72.359500	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	21-Oct-12	2012-2013	367	480	41.211270	-72.357330	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	22-Oct-12	2012-2013	367	480	41.211950	-72.356720	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	22-Oct-12	2012-2013	367	480	41.211650	-72.356520	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	23-Oct-12	2012-2013	367	480	41.211180	-72.357750	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	23-Oct-12	2012-2013	367	480	41.211450	-72.358100	W912WJ-12-C-0005

Project name	City/town	State	Placement date/time	Disposal Season	Load volume (m^3)	Load volume (yd^3)	Placement latitude	Placement longitude	Permit number
Patchogue River 2012	Westbrook	CT	24-Oct-12	2012-2013	367	480	41.211520	-72.359020	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	24-Oct-12	2012-2013	367	480	41.211680	-72.359130	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	25-Oct-12	2012-2013	367	480	41.211400	-72.358150	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	25-Oct-12	2012-2013	367	480	41.211480	-72.358020	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	26-Oct-12	2012-2013	367	480	41.211370	-72.358300	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	26-Oct-12	2012-2013	367	480	41.211320	-72.358230	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	27-Oct-12	2012-2013	367	480	41.211500	-72.358920	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	31-Oct-12	2012-2013	367	480	41.211820	-72.356600	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	01-Nov-12	2012-2013	367	480	41.211270	-72.358670	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	02-Nov-12	2012-2013	367	480	41.211120	-72.358880	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	02-Nov-12	2012-2013	367	480	41.211580	-72.358070	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	04-Nov-12	2012-2013	367	480	41.211920	-72.358100	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	04-Nov-12	2012-2013	367	480	41.211800	-72.358620	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	05-Nov-12	2012-2013	367	480	41.211470	-72.359270	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	05-Nov-12	2012-2013	367	480	41.211550	-72.357620	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	06-Nov-12	2012-2013	367	480	41.211420	-72.358130	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	06-Nov-12	2012-2013	367	480	41.211450	-72.358280	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	09-Nov-12	2012-2013	367	480	41.211620	-72.356330	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	09-Nov-12	2012-2013	367	480	41.210270	-72.359570	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	10-Nov-12	2012-2013	367	480	41.211450	-72.359980	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	11-Nov-12	2012-2013	367	480	41.211300	-72.358220	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	11-Nov-12	2012-2013	367	480	41.211150	-72.358670	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	12-Nov-12	2012-2013	367	480	41.211480	-72.357650	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	12-Nov-12	2012-2013	367	480	41.211550	-72.358170	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	13-Nov-12	2012-2013	367	480	41.211470	-72.358850	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	13-Nov-12	2012-2013	367	480	41.211370	-72.358470	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	14-Nov-12	2012-2013	367	480	41.211530	-72.358530	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	14-Nov-12	2012-2013	367	480	41.211480	-72.357820	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	14-Nov-12	2012-2013	367	480	41.211470	-72.358370	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	15-Nov-12	2012-2013	367	480	41.211600	-72.358000	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	15-Nov-12	2012-2013	367	480	41.211320	-72.358700	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	16-Nov-12	2012-2013	367	480	41.211400	-72.357950	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	17-Nov-12	2012-2013	367	480	41.211380	-72.358280	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	17-Nov-12	2012-2013	367	480	41.211630	-72.358630	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	17-Nov-12	2012-2013	367	480	41.211550	-72.359050	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	18-Nov-12	2012-2013	367	480	41.211380	-72.358250	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	19-Nov-12	2012-2013	367	480	41.211100	-72.359020	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	19-Nov-12	2012-2013	367	480	41.211470	-72.358600	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	20-Nov-12	2012-2013	367	480	41.211330	-72.357950	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	20-Nov-12	2012-2013	367	480	41.211520	-72.358180	W912WJ-12-C-0005

Project name	City/town	State	Placement date/time	Disposal Season	Load volume (m^3)	Load volume (yd^3)	Placement latitude	Placement longitude	Permit number
Patchogue River 2012	Westbrook	CT	24-Nov-12	2012-2013	367	480	41.212170	-72.360280	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	26-Nov-12	2012-2013	367	480	41.211070	-72.356630	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	27-Nov-12	2012-2013	367	480	41.211450	-72.358200	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	27-Nov-12	2012-2013	367	480	41.211130	-72.358000	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	28-Nov-12	2012-2013	367	480	41.211230	-72.358250	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	28-Nov-12	2012-2013	367	480	41.210670	-72.359030	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	30-Nov-12	2012-2013	367	480	41.219050	-72.360650	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	30-Nov-12	2012-2013	367	480	41.211750	-72.357000	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	01-Dec-12	2012-2013	367	480	41.210930	-72.356230	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	01-Dec-12	2012-2013	367	480	41.211900	-72.356350	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	02-Dec-12	2012-2013	367	480	41.211650	-72.356720	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	02-Dec-12	2012-2013	367	480	41.211630	-72.357400	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	03-Dec-12	2012-2013	367	480	41.211600	-72.356230	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	04-Dec-12	2012-2013	367	480	41.211400	-72.357870	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	04-Dec-12	2012-2013	367	480	41.210900	-72.358420	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	05-Dec-12	2012-2013	367	480	41.211250	-72.357030	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	06-Dec-12	2012-2013	367	480	41.211480	-72.356770	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	07-Dec-12	2012-2013	367	480	41.211500	-72.358030	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	08-Dec-12	2012-2013	367	480	41.211500	-72.358250	W912WJ-12-C-0005
Patchogue River 2012	Westbrook	CT	12-Dec-12	2012-2013	367	480	41.211720	-72.357800	W912WJ-12-C-0005
Dodson Boat Yard 2012	Stonington	CT	18-Nov-12	2012-2013	1966	2571	41.142738	-72.893512	NAE-2006-2960
Dodson Boat Yard 2012	Stonington	CT	20-Nov-12	2012-2013	1966	2571	41.142800	-72.891833	NAE-2006-2960
Dodson Boat Yard 2012	Stonington	CT	27-Nov-12	2012-2013	1966	2571	41.143125	-72.891893	NAE-2006-2960
Dodson Boat Yard 2012	Stonington	CT	01-Dec-12	2012-2013	1966	2571	41.143338	-72.892382	NAE-2006-2960
Dodson Boat Yard 2012	Stonington	CT	04-Dec-12	2012-2013	1966	2571	41.143105	-72.891853	NAE-2006-2960
Guilford Yacht Club	Guilford	CT	13-Jan-13	2012-2013	685	896	41.143080	-72.892350	NAE-2007-1989
Harbor One Marina	Old Saybrook	CT	06-May-13	2012-2013	6236	8157	41.211448	-72.358540	NAE-2008-1521
Harbor One Marina	Old Saybrook	CT	07-May-13	2012-2013	6236	8157	41.211738	-72.358498	NAE-2008-1521
Harbor One Marina	Old Saybrook	CT	08-May-13	2012-2013	6236	8157	41.210905	-72.358613	NAE-2008-1521
Brewers Pilots Point Marina - 2012	Westbrook	CT	01-Feb-14	2013-2014	229	300	41.212523	-72.357230	NAE-2001-2437
Brewers Pilots Point Marina - 2012	Westbrook	CT	02-Feb-14	2013-2014	229	300	41.212772	-72.357777	NAE-2001-2437
Brewers Pilots Point Marina - 2012	Westbrook	CT	04-Feb-14	2013-2014	229	300	41.212695	-72.357273	NAE-2001-2437
Brewers Pilots Point Marina - 2012	Westbrook	CT	04-Feb-14	2013-2014	229	300	41.212943	-72.357358	NAE-2001-2437
Brewers Pilots Point Marina - 2012	Westbrook	CT	06-Feb-14	2013-2014	96	125	41.212677	-72.357737	NAE-2001-2437

Project name	City/town	State	Placement date/time	Disposal Season	Load volume (m^3)	Load volume (yd^3)	Placement latitude	Placement longitude	Permit number
Brewers Pilots Point Marina - 2012	Westbrook	CT	07-Feb-14	2013-2014	100	131	41.212518	-72.358098	NAE-2001-2437
Brewers Pilots Point Marina - 2012	Westbrook	CT	08-Feb-14	2013-2014	106	139	41.212908	-72.358003	NAE-2001-2437
Brewers Pilots Point Marina - 2012	Westbrook	CT	09-Feb-14	2013-2014	247	323	41.212583	-72.357942	NAE-2001-2437
Brewers Pilots Point Marina - 2012	Westbrook	CT	11-Feb-14	2013-2014	232	304	41.212373	-72.358355	NAE-2001-2437
Brewers Pilots Point Marina - 2012	Westbrook	CT	11-Feb-14	2013-2014	229	300	41.212507	-72.357858	NAE-2001-2437
Brewers Pilots Point Marina - 2012	Westbrook	CT	12-Feb-14	2013-2014	229	300	41.212622	-72.358588	NAE-2001-2437
Brewers Pilots Point Marina - 2012	Westbrook	CT	15-Feb-14	2013-2014	229	300	41.212538	-72.358053	NAE-2001-2437
			TOTAL		**175,666**	**229,763**			