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July 2005

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13. ABSTRACT

A monitoring survey was conducted in July 2005 at the Rhode Island Sound Disposal Site (RISDS) as part of the Disposal Area Monitoring System (DAMOS) program. The 2005 field effort consisted of sediment-profile and plan view imaging and the collection of benthic sediment grabs. The objective of the 2005 RISDS survey was to assess the benthic recolonization status within RISDS following placement of sediment from the Providence River and Harbor Maintenance Dredging Project (PRHMDP). The PRHMDP and related projects disposed dredged material at RISDS every month from April 2003 to January 2005.

Since the beginning of disposal in April 2003, approximately four million m^3 of dredged material was placed at RISDS with no interruption in disposal activity. Benthic conditions across RISDS indicated that the biological community was recovering relatively rapidly. Analysis of the grab samples indicate that dense populations of filter-feeding invertebrates (Stage II organisms) dominated the surficial sediments at RISDS and the reference stations. The SPI and plan view images showed evidence of Stage III infauna present both at the reference and the disposal site, although, as anticipated, their densities were much lower at the disposal site.

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EXECUTIVE SUMMARY

A monitoring survey was conducted in July 2005 at the Rhode Island Sound Disposal Site (RISDS) as part of the Disposal Area Monitoring System (DAMOS) program. The 2005 field effort consisted of sediment-profile and plan view imaging and the collection of benthic sediment grabs. The objective of the 2005 RISDS survey was to assess the benthic recolonization status within RISDS following placement of sediment from the Providence River and Harbor Maintenance Dredging Project (PRHMDP). The PRHMDP and related projects disposed dredged material at RISDS every month from April 2003 to January 2005.

Based on observed patterns of physical, chemical, and biological responses of seafloor environments to dredged material disposal activity it was expected that the benthic community within RISDS would be in an intermediate phase of recolonization (Phase II). Specifically, the community was expected to consist of small, tubicolous polychaetes and Ampeliscid amphipods or equivalent fauna.

Since the beginning of disposal in April 2003, approximately four million m^3 of dredged material was placed at RISDS with no interruption in disposal activity. Benthic conditions across RISDS indicated that the biological community was recovering relatively rapidly and the initial predictions of the benthic community being in at least a Stage II recolonization phase were not only met but exceeded. The SPI and plan view images showed evidence of Stage III infauna present both at the reference and the disposal site, although, as anticipated, their densities were much lower at the disposal site.

The presence of dense populations of filter-feeding invertebrates in the grab samples collected at RISDS suggested that Stage II organisms dominated the surficial sediments. At the reference stations sampled in Rhode Island Sound, an even greater diversity of filter feeding organisms were present, including dense populations of amphipods, bivalves, and polychaetes. There was no evidence of head-down deposit-feeding Stage III organisms at the disposal site; however, larger surface-deposit feeding polychaetes were present.

Results of the 2005 RISDS survey indicated that in the six months since disposal activities at RISDS had concluded, the biological community at RISDS was recovering relatively rapidly and Stage II and III infauna were present throughout the region. Recovery is expected to continue until the benthic community within RISDS begins to resemble that found in the surrounding ambient sediments.

1.0 INTRODUCTION

A monitoring survey was conducted at the Rhode Island Sound Disposal Site in July 2005 as part of the U.S. Army Corps of Engineers (USACE) New England District Disposal Area Monitoring System (DAMOS). DAMOS is a comprehensive monitoring and management program designed and conducted to address environmental concerns associated with use of open-water disposal sites throughout the New England region. An introduction to the DAMOS program and the Rhode Island Sound Disposal Site, 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 activities are promptly identified and addressed (Germano et al. 1994). For over 25 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 are designed to test hypotheses related to expected physical and ecological response patterns following placement of dredged material on the seafloor at established disposal sites. The data collected and evaluated during DAMOS monitoring surveys provide answers to strategic management questions in determining the next step in the disposal site environmental management process.

Two primary goals of DAMOS monitoring surveys are to document the physical location of dredged material placed on the seafloor and to evaluate the environmental impact of placement of the dredged material. Sequential bathymetric measurements are made to characterize the height and spread of discrete dredged material deposits or mounds created at disposal sites, and sediment-profile imaging (SPI) surveys are performed 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 data are evaluated to determine the next step in the disposal site management process. The conditions found after a defined period of disposal activity are compared with the long-term data set at a specific site (Germano et al. 1994). DAMOS monitoring surveys may also feature additional types of data collection activities, such as side-scan sonar, sediment coring, or grab sampling, as deemed appropriate to achieve specific survey objectives.

1.2 Introduction to the Rhode Island Sound Disposal Site

The Rhode Island Sound Disposal Site (RISDS), originally labeled as Site 69b, was one of three sites (Site 69b, Site 69a, and Site 18) considered as an open water disposal alternative in Rhode Island Sound for the Providence River and Harbor Maintenance Dredging Project (PRHMDP; USACE 2001) (Figure 1-1). In December 2004, Site 69b was officially designated the Rhode Island Sound Disposal Site (RISDS), an open water disposal site for dredged material from Rhode Island, southeastern Massachusetts, and surrounding harbors (40 CFR Part 228).

RISDS is located approximately 21 km south of the entrance to Narragansett Bay and 16.7 km south of Point Judith, Rhode Island, within the separation zone for the Narragansett Bay shipping lanes. The site is defined as an 1800 x 1800 m area on the seafloor centered at 41° 13.850' N, 71° 22.817' W (NAD 83) (Figure 1-1). RISDS is located in a topographic depression, with water depths within the disposal site ranging from 34 to 39 m prior to any dredged material disposal (Figure 1-2).

1.3 Dredged Material Disposal Activity

Prior to 2003, major dredging activity in Rhode Island waters had not occurred in almost 30 years. Over the past 25 years, significant shoaling of the Providence River shipping channel affected navigation safety, restricting access for large vessels in route to the Port of Providence.

The objective of the PRHMDP was to restore the depth and width of the Federal Navigation Channel, a 16.8 mile long channel that runs from Providence Harbor south along the Providence River to deeper waters near Prudence Island (USACE 2001). The channel has an authorized depth of 40 ft (12.2 m) and width of 600 ft (182.9 m). To restore the Federal channel to its authorized dimensions, an estimated 3.3 million m^3 of material needed to be removed. In conjunction with the federal maintenance project, a small group of private facilities, marine terminals, and other facilities were expected to use the active disposal site for additional non-federal maintenance and improvement dredging projects (USACE 2001). An estimated 382,000 m^3 of additional material was expected to be dredged from these smaller projects and deposited at RISDS.

Approximately 920,000 m^3 of material dredged from the channel was considered unsuitable for unconfined open water disposal. As a result, this material was placed into a series of Confined Aquatic Disposal (CAD) cells located in the upper portion of the Providence River in order to isolate the contaminants from the marine environment. To

create the CAD cells, an estimated 1.5 million m^3 of sediment was dredged within the river and deposited at the open water disposal site (SAIC 2004).

The total amount of material expected to be removed from all sources was approximately 5.2 million m^3. Approximately 4 million m^3 of material in total has been placed at RISDS to date (Table 1-1, Figure 1-3). The material resulting from the creation of the CAD cells was primarily used to develop a continuous ridge of sediment along the western boundary of RISDS (Figure 1-3) (SAIC 2004). The purpose of the ridge was to form an artificial berm to enhance the capacity of the natural bottom depression located in the southwestern quadrant of the disposal site and limit the lateral spread of disposed unconsolidated sediment. Additional material, including maintenance material from the channel, was directed to a series of disposal points across the site to create a relatively even deposit. The usage of particular disposal locations for disposal of some of this maintenance material depended on the stage of the tide and likely transport of the sediment plume through the water column. Disposal locations were selected to maximize the settlement of suspended material within the disposal site (SAIC 2004). This project was unusual because dredging and disposal activities were allowed to continue year-round, throughout two summers (Table 1-1). Most projects in Southern New England are required to complete dredging between October and May to avoid disturbance of spawning and migratory finfish, the PRHMDP was "sequenced" to avoid dredging in critical finfish habitat during the spawning and migration periods (SAIC 2004).

The disposal site boundaries of RISDS and other New England disposal sites have been established to provide a management objective for placement of dredged material on the seafloor. Barge operators are given specific coordinates (and often visible lighted buoys) within the disposal boundaries to navigate to and release their cargo of dredged material. In practice, it is expected that barge disposal will occur in a cluster around the designated disposal location and that some dredged material will be lost in the water column during release. The Clean Water Act Section 404 (b)(1) provides guidelines for the discharge of dredged material and defines the "discharge point" as the point within the disposal site (the bottom surface area and any overlying volume of water) at which the dredged material is released. The Marine Protection, Research and Sanctuaries Act Section 102 defines the release zone as a locus of points 100 m around the barge from beginning to end of the discharge. Monitoring surveys are designed with the recognition that the site boundary is a target area for release at the water's surface, and that during placement and descent some dredged material may extend across the boundary on the seafloor.

A detailed record of barge disposal activity at RISDS for the period from April 2003 to January 2005, including the origin of dredged material, the volume deposited, the disposal location, and the associated physical and chemical analysis data is provided in Appendix A.

1.4 RISDS Monitoring Events

RISDS was monitored several times throughout 2003 to 2005 to document the changes in seafloor topography and surficial sediment composition during the Providence River and Harbor Maintenance Dredging Project (Table 1-2). Surveys were conducted in February, July, September, and October 2003; February, May, and September 2004; and August 2005. Surveys consisted of multibeam or single-beam bathymetry, side-scan sonar, sediment-profile imaging, and/or underwater video. The February 2003 multibeam bathymetry survey served as a baseline survey to closely examine the seafloor topography in the area encompassing RISDS prior to deposition of dredged material (Figure 1-2). Subsequent sequential bathymetric surveys performed in July, and September 2003, February, May, and September 2004, and August 2005 documented changes in seafloor topography and tracked the development of an artificial berm within the confines of RISDS. Additional imaging surveys (side-scan sonar, SPI, and underwater video) were performed in September and October 2003 to further examine the distribution of sediment and determine the sediment composition of areas where disposal trails and deposits were observed.

The sequential bathymetric data collected between 2003 and 2005 were compared to the February 2003 baseline data to assess the distribution of recently disposed sediments and monitor the development of the berm along the western boundary of the disposal site. A side-scan sonar survey conducted in July 2003, in support of the site designation studies, revealed a variety of features on the seafloor both inside and outside the disposal site boundaries. Dredged material observed outside of the disposal site boundaries suggested that residual dredged material was being washed from open split-hull disposal barges as they began their transit back to Narragansett Bay following a disposal event. Following the July 2003 survey, an immediate change in disposal practices was implemented, requiring barges to be closed before leaving the site boundaries (SAIC 2004).

The September 2003 survey of RISDS, including bathymetry and side-scan sonar, was conducted to evaluate the distribution of dredged material in the area surrounding RISDS and further assess the features identified during the July 2003 surveys. The side-scan sonar data detailed several areas of interest, including the berm constructed within

RISDS, areas of concentrated trawl scars to the west of the disposal site, and a naturally occurring ridge of coarse sediment to the north of RISDS (Figure 3-6, SAIC 2004).

Sediment-profile imaging and underwater video surveys were performed in October 2003 to characterize sediment types in the areas where dredged material deposits were observed and further assess the features detected during the side-scan sonar survey. The results confirmed that the majority of the features detected on the seafloor bottom outside of RISDS were part of the ambient Rhode Island Sound seafloor (i.e. past and ongoing fishing activity adjacent to RISDS), although there was evidence of some dredged material outside the disposal site boundaries. Despite the presence of dredged material outside the disposal site boundaries and the related change in surface sediment composition, the deposition of dredged material resulted in minimal to unobservable impacts to the resident benthic community (SAIC 2004).

1.5 Survey Objectives

The July 2005 survey was designed to assess the benthic recolonization status within RISDS following placement of sediment from the PRHMDP using plan view and sediment-profile imaging and benthic biology grabs. Emphasis was directed toward monitoring the basin area in the east-southeast quadrant of the site with less emphasis on the berm feature located along the western boundary.

Approximately four million m^3 of material has been placed at RISDS since the beginning of disposal in April 2003 through January 2005 with no interruption in disposal activity throughout that time. Based on observed patterns of physical, chemical, and biological responses of seafloor environments to dredged material disposal activity it was expected that the benthic community within RISDS would be in an intermediate phase of recolonization (Phase II). The community was expected to consist of small, tubicuolous polychaetes and Ampeliscid amphipods. However, depending on the elapsed time between a given cluster of disposal events and the location of monitoring samples, a gradation of recolonization might be expected. In some locations, the gradual deposition of material in relatively thin layers could result in a more advanced colonization state (Stage III), consisting of infaunal deposit-feeders.

Table 1-1.

Overview of Recent Disposal Activity at RISDS (4/1/2003 – 1/31/2005)

	Estimated Barge Volume Disposed (m^3)		
	2003	**2004**	**2005**
January	--	143,400	33,200
February	--	349,700	--
March	--	338,000	--
April	65,900	242,300	--
May	135,400	199,700	--
June	94,000	2,900	--
July	191,400	111,700	NA
August	253,000	242,600	NA
September	166,100	268,400	NA
October	267,800	259,600	NA
November	247,500	313,300	NA
December	76,300	40,800	NA
Annual Total	**1,497,300**	**2,512,400**	**33,200**
Grand Total		**4,043,200**	

Table 1-2.

Overview of Survey Activities in Rhode Island Sound since 1997

Date	Purpose of Survey	Bathymetry Area	SPI Stations	Additional Studies	Reference
June 1997	Evaluation of potential disposal sites		Site 69a - 18 Site 69b - 18		SAIC 1997[a]
Nov 1999	Characterize benthic resources and sediment at potential dredged material disposal sites		Site 69a – 28 Site 69b - 35		SAIC 2000[b]
Sept 2001	Rhode Island region long-term dredged material disposal site evaluation		Site 16 – 5 (3 Ref) Site 18 – 9 (9 Ref) Site 69a – 6 (9 Ref) Site 69b – 9 (9 Ref)		Battelle 2002
Feb 2003	Baseline bathymetry survey in support of PRHMDP	Multi-beam 4000 x 3800 m			SAIC 2004
July 2003	First post-disposal monitoring survey	Single-beam 1900 x 1900 m			SAIC 2004
Sept 2003	Second post-disposal monitoring survey	Single-beam 1900 x 1900 m		Side-scan sonar 2900 x 2900 m	SAIC 2004
Oct 2003	Assessment of surface sediment composition within RISDS and surrounding Area W[c]		RISDS – 11 Area W – 23	Towed video 8 transects	SAIC 2004
Feb 2004 May 2004 Sept 2004 Aug 2005	Post-disposal monitoring in support of PRHMDP	Single-beam 1900 x 1900 m			Unpublished DAMOS data

Notes:
a – Dimensions of site 69b and 69a were different from current configuration
b – Dimensions of site 69b and 69a were consistent with current boundaries
c – Area W was 2900 x 2900 m, with RISDS in the southeast quadrant.

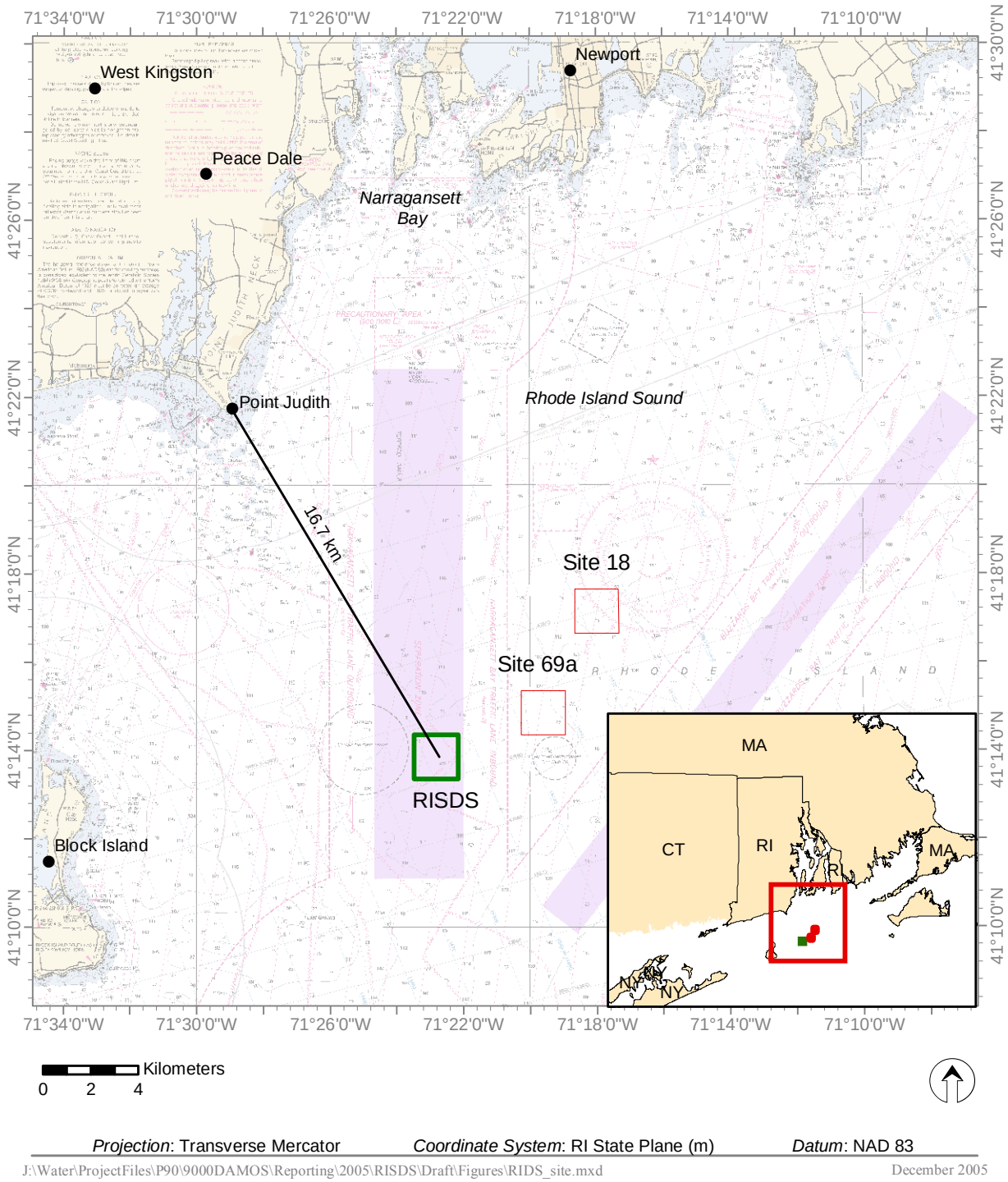

Figure 1-1. RISDS with open water disposal site alternatives in Rhode Island Sound

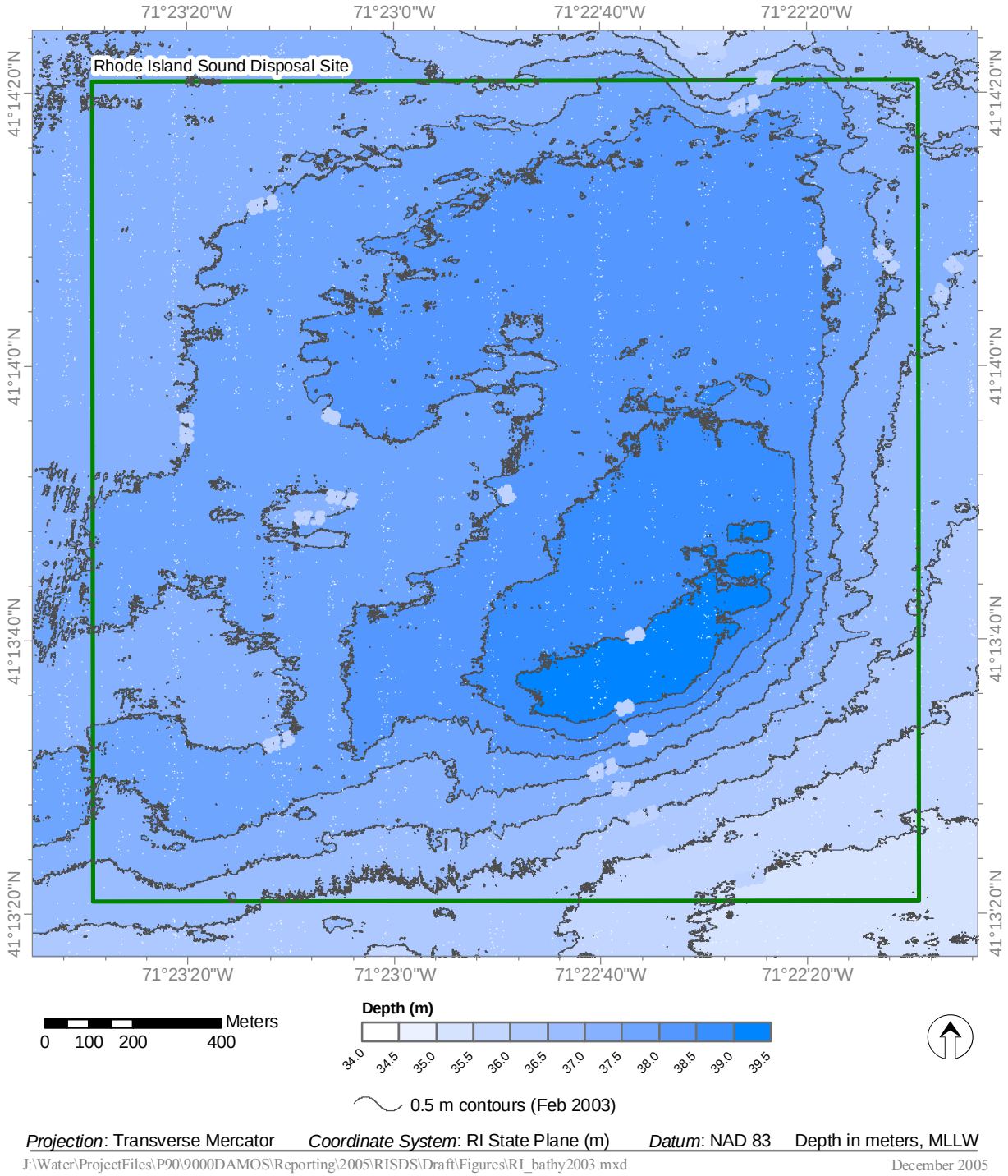

Figure 1-2. Bathymetric contour map of RISDS, February 2003

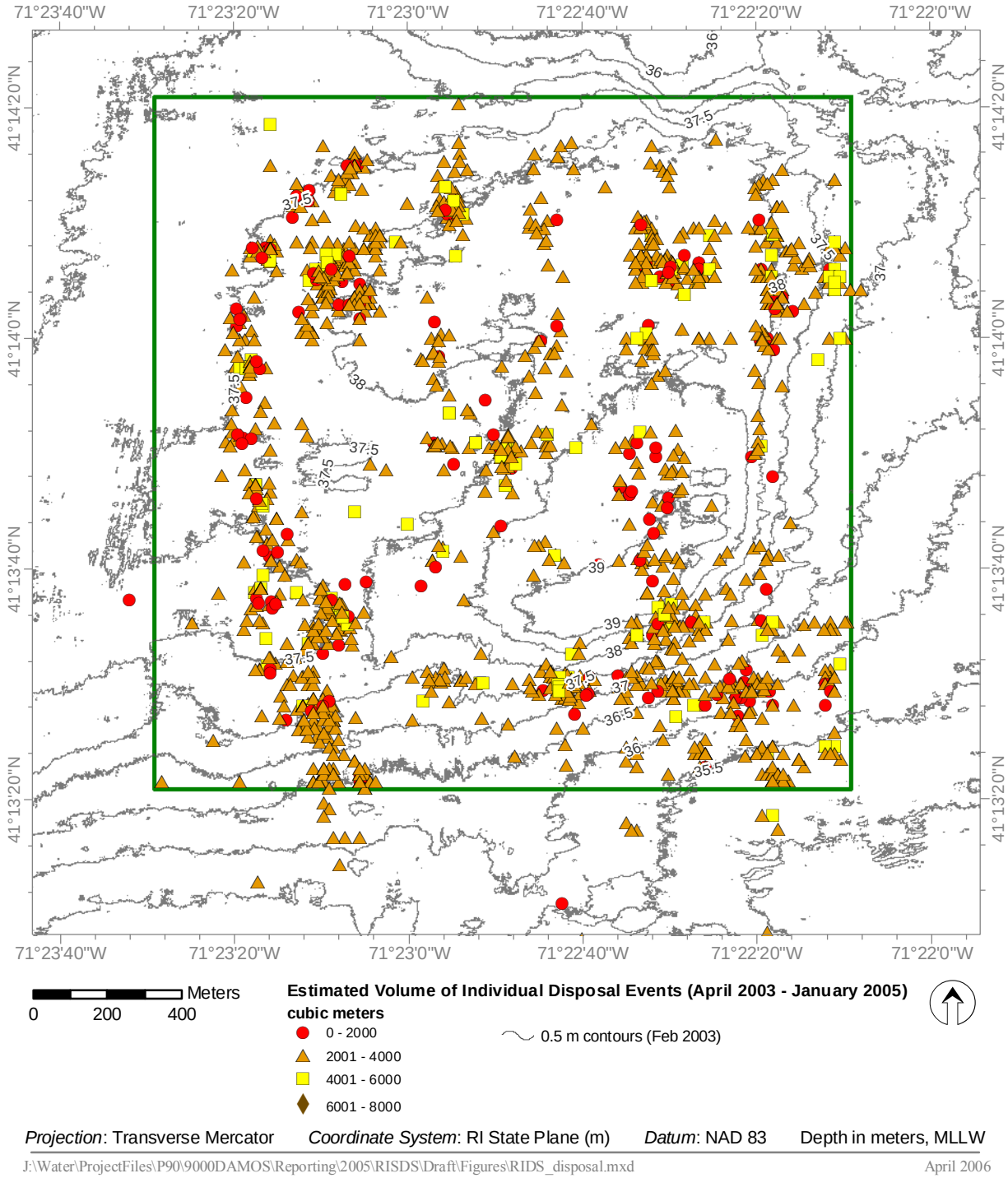

Figure 1-3. RISDS with reported 2003-2005 dredged material disposal locations indicated

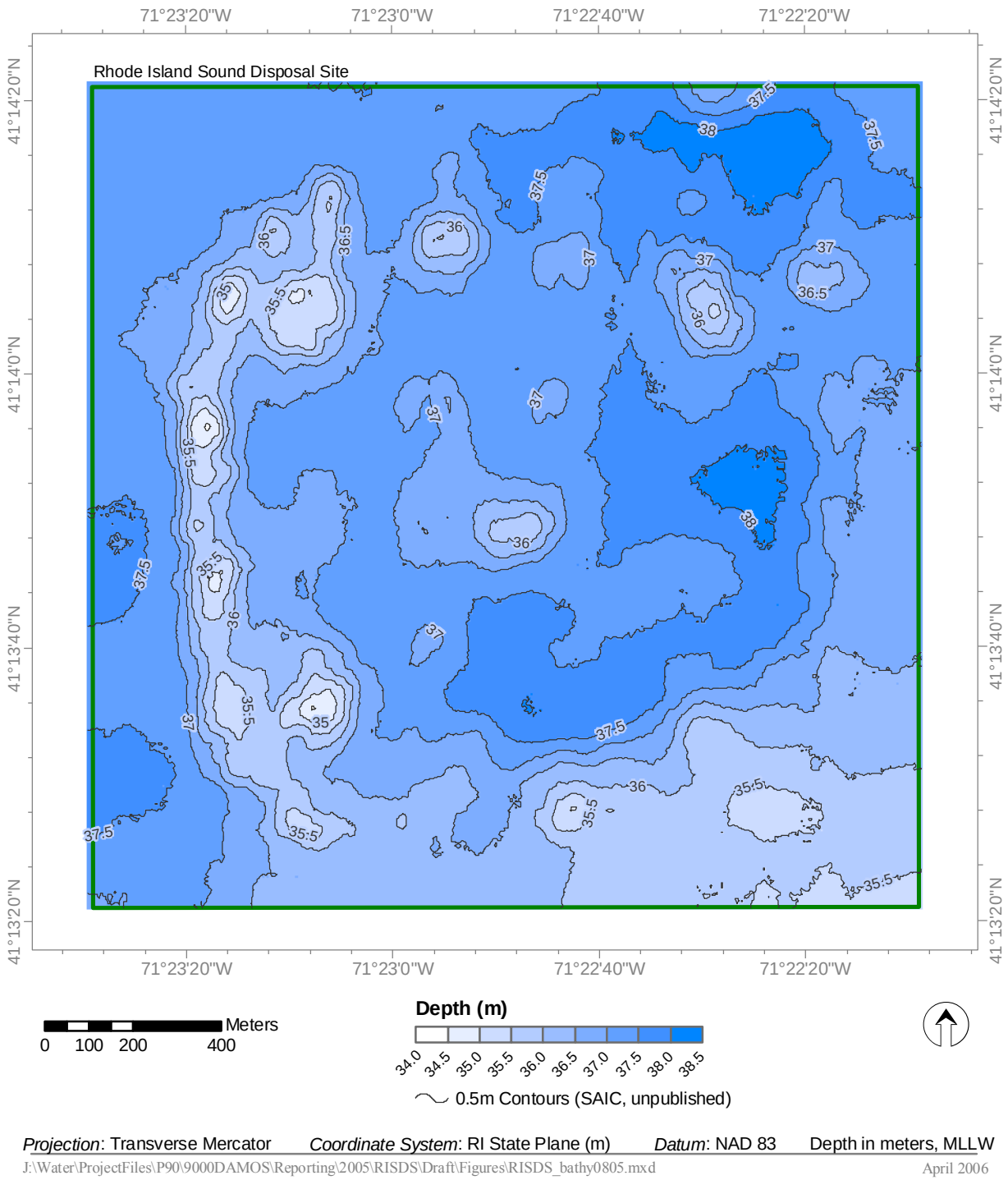

Figure 1-4. Bathymetric contour map of RISDS, August 2005

2.0 METHODS

A team of investigators from ENSR International, CR Environmental, and Germano and Associates performed the July 2005 survey at RISDS. The survey was conducted 30 June – 3 July 2005 aboard the *F/V Shanna Rose* to assess the benthic status of RISDS. Field activities included the collection of sediment-profile images, plan view images, and benthic biology grabs (Table 2-1). An overview of the methods used to collect the survey data is provided below. A more detailed description of methodology and the related terminology can be found in ENSR (2004).

2.1 Navigation and On-Board Data Acquisition

Positional data, comprised of horizontal positioning (x- and y-dimensional data) and time (t-dimensional data), were collected using a Trimble® AG-132 Differential Global Position System (DGPS) unit. This system received and processed satellite and land-based beacon data and provided real-time vessel position, typically to sub-meter accuracy. HYPACK® hydrographic survey software, developed by HYPACK, Inc. (formerly Coastal Oceanographics, Inc.), was used to acquire, integrate, and store all positional data from the DGPS as well as bathymetry and station data. The HYPACK® software also displayed real-time vessel position, bathymetry, and SPI stations over a background electronic chart of the study area, thus enabling survey scientists to review and evaluate survey data on a real-time basis.

2.2 Sediment-Profile and Plan View Imaging

2.2.1 Sediment-Profile Imaging

Sediment-profile imaging (SPI) was used to provide data on the physical characteristics of the seafloor as well as the status of the benthic biological community. The technique involved deploying an underwater camera system to photograph a cross section of the sediment-water interface. Acquisition of high-resolution SPI images was accomplished using a Nikon® D100 digital single-lens reflex camera mounted inside an Ocean Imaging Systems 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 to 20 cm of the sediment column (Figure 2-1). The camera remained on the seafloor for approximately 20 seconds to ensure that a successful image had been obtained.

Test exposures of the Kodak® Color Separation Guide (Publication No. Q-13) were made on deck at the beginning and end of each 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 re-named with the appropriate station name immediately after downloading as a further quality assurance step.

Computer-aided analysis of the resulting images provided a set of standard measurements that enabled comparison between different locations and different surveys. The DAMOS program has successfully used this technique for over 20 years to map the distribution of disposed dredged material and to monitor benthic recolonization at disposal sites. For a detailed discussion of SPI methodology, see ENSR (2004).

2.2.2 Plan View Imaging

Plan view underwater images were also collected at each station sampled with a second camera mounted on the sediment-profile camera frame. An Ocean Imaging Systems Model DSC6000 plan view underwater camera (PUC) system was attached to the Model 3731 camera frame and used to collect plan view photographs of the seafloor surface (Figure 2-1). The PUC system consisted of a Nikon® D-70 camera encased in a titanium housing, a 24 VDC autonomous power pack, a 500W strobe, and a bounce trigger. 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 camera. The length of the stainless steel trigger cable was adjusted for changing conditions in water clarity within the site. The field of view for the plan view images ranged from approximately 0.6 m^2 to 3.1 m^2, depending on the length of the

trigger wire. All PUC images were collected as 6 megapixel raw Nikon Exchange Format (*.nef) files and converted to jpegs after the survey.

2.2.3 SPI and PUC Data Collection

The ENSR field team collected SPI and PUC images at 30 stations within RISDS (Figure 2-2) and at 15 reference stations (Figure 2-3). Five groups (A, B, C, D and E) of five stations each were located within the basin area of the site and one group (BE) of five stations was spread along the berm formation (Table 2-2, Figure 2-2). The groups of stations located within the basin area were randomly selected within a 150 m radius of identified disposal activity (compare Figures 1-4 and 2-2). The five stations located on the berm were spaced approximately equidistant along the feature.

As part of the 2005 survey, three reference areas were surveyed, east of the disposal site (REF-E), southwest of the disposal site (REF-SW), and northeast of the disposal site (REF-NE), to provide a basis of comparison between RISDS sediment conditions and the ambient sediment conditions in Rhode Island Sound. The northeast reference site was located in the northwest corner of Site 69a, one of the alternative sites considered in the designation of RISDS for the PRHMDP. Five reference stations were selected randomly within a 300-m radius of the centers of each of the three references areas (Table 2-2, Figure 2-3).

At each station, the vessel was positioned at the target coordinates, and the frame was deployed within a defined station tolerance of 10 m. The SPI and plan view cameras were deployed simultaneously. At least three replicate SPI images were collected at each of the 45 stations. The collection of quality PUC images was more difficult to obtain due to changing water conditions; therefore, the collection of at least one quality replicate PUC image was considered adequate for further analysis.

2.2.4 SPI and PUC Data Analysis

SPI Data Analysis

Computer-aided 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 B. 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 substrates) to a maximum of 20 cm (full penetration on very soft substrates).

- *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 (RPD) Depth*— RPD 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 grey. As the particles are moved downwards by biological activity or buried, they are exposed to reduced oxygen concentrations in subsurface pore waters and their oxic coating slowly reduces, changing color to dark grey or black. When biological activity is high, the RPD depth increases; when it is low or absent, the RPD depth decreases. The RPD 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 three 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.

Additional components of the SPI analysis included calculation of means and ranges for the parameters listed above and mapping of station-averaged values.

PUC Image Data Analysis

Computer-aided analysis of each PUC image was performed to provide additional information about large-scale sedimentary features, density and patch size of surface fauna, density of infaunal burrowers, and occurrences and density of epifaunal foraging patterns on the seafloor of the disposal site and reference areas.

2.3 Benthic Biology Grabs

Sediment samples were collected for benthic community analysis and for characterization of two sedimentary parameters, total organic carbon (TOC) and grain-size.

2.3.1 Benthic Biology Data Collection

Benthic biology grabs were collected at seven stations located within RISDS and five stations located within the three reference areas on 1 July 2005 aboard the F/V *Shanna Rose*. Seven stations were randomly selected from the 25 SPI stations located within the depression of RISDS, resulting in one sample at Area E and two samples each at Areas B, C, and D. Five reference stations were also randomly selected from the 15 SPI reference stations (Figures 2-2 and 2-3, Table 2-2). One replicate was collected at each station selected for benthic biology analysis.

A 0.04-m^2 Ted Young-modified Van Veen grab was used to collect one grab sample at a random selection of 12 SPI stations (seven RISDS stations and five reference stations). At each station, the vessel was positioned at the target coordinates, and the equipment was deployed within a defined station tolerance of 10 m. The samples were checked for penetration depth (10 cm was the maximum and 7 cm was the minimum acceptable penetration depth), depth of the apparent redox potential discontinuity (RPD) layer, sediment color and texture, odor, and observed biota. Grain size and total organic carbon (TOC) samples were collected from the grab using a 2.5 cm diameter tube. An aliquot of sediment was placed into a 125 ml clear glass jar for the determination of TOC. Grain size samples were placed into a 118 ml plastic bag. The TOC and grain size samples were stored on ice and shipped overnight to the appropriate laboratories: Alpha Woods Hole for TOC and GEO/PLAN for grain size.

After the grain size and TOC samples were removed, all sediment remaining in the grab was washed into a clean 2.5-gallon 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 gallon, 1 liter, or 1 pint) and preserved with 10% formalin. After 48 hours, but within the holding time of 10 days, benthic samples were transferred out of the formalin, rinsed on a 500-micron sieve with freshwater and preserved in an 80% ethanol solution. To facilitate the sorting process, all samples were stained in a solution of Rose Bengal biological stain.

Benthic infaunal samples were sorted using a dissecting microscope to major taxonomic categories, such as polychaetes, arthropods, mollusks, and echinoderms. Following sorting, individual species were identified and enumerated. All specimens were identified to the lowest possible taxonomic category (usually species). Organisms such as planktonic fauna and colonial epifauna were not included in the raw data files. Data were recorded on project-specific datasheets and entered into an Excel spreadsheet.

The raw data were carefully inspected, and a final dataset was produced for analysis. The final dataset excluded infaunal taxa such as juveniles and indeterminate specimens that could not be identified to the species level, as well as epifauna, shell-borers, and parasites. However, indeterminate organisms of valid benthic infaunal species were included in calculations of total density.

2.3.2 Benthic Biology Data Analysis

Infaunal Community Analysis

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

A species-area curve was generated to evaluate the success of sampling the two areas (RISDS and reference) relative to the number of species collected per number of samples. The cumulative species count should increase with the number of samples collected. When the curve begins to plateau, it indicates that a sufficient number of samples have been collected to estimate the number of species in a given area. PRIMER was also used to calculate the Bray-Curtis Similarity Analysis and Principal Components Analysis (PCA). These multivariate analyses were used to identify patterns in the data, such as differences in faunal assemblages within RISDS compared to the references areas.

Infaunal Trophic Guilds

To further evaluate the species composition of RISDS relative to the reference areas, all species were assigned to one of six trophic guilds (feeding modes): omnivore/scavenger, subsurface deposit feeder, interface feeder, suspension feeder, surface deposit feeders, or predator (Appendix D). A list of major species included in each trophic guild is presented in Table 2-3.

Table 2-1.

July 2005 RISDS Field Activities Summary

Survey Type	Date	Summary
Sediment-Profile and Plan View Imaging	30 June – 3 July 2005	Stations: 45 RISDS: 30 Reference: 15
Benthic Biology Grabs	1 July 2005	Stations: 12 RISDS: 7 Reference: 5

Table 2-2.

RISDS Sediment-Profile and Plan View Image Target Sampling Locations with Benthic Biology Grab Stations Indicated

Station	Latitude (N)	Longitude	Station	Latitude (N)	Longitude
RISDS Site			Reference Area		
RISDS-A-01	41° 14.081'	71° 22.473'	REF-E-01*	41° 14.101'	71° 19.600'
RISDS-A-02	41° 14.125'	71° 22.643'	REF-E-02	41° 14.041'	71° 19.285'
RISDS-A-03	41° 13.992'	71° 22.579'	REF-E-03	41° 13.911'	71° 19.400'
RISDS-A-04	41° 13.985'	71° 22.543'	REF-E-04	41° 14.096'	71° 19.328'
RISDS-A-05	41° 14.011'	71° 22.537'	REF-E-05	41° 14.078'	71° 19.513'
RISDS-B-01*	41° 13.817'	71° 22.885'	REF-NE-01	41° 15.098'	71° 20.017'
RISDS-B-02	41° 13.893'	71° 22.722'	REF-NE-02	41° 15.328'	71° 19.987'
RISDS-B-03	41° 13.897'	71° 22.801'	REF-NE-03*	41° 15.133'	71° 19.883'
RISDS-B-04*	41° 13.781'	71° 22.691'	REF-NE-04	41° 15.147'	71° 20.086'
RISDS-B-05	41° 13.902'	71° 22.739'	REF-NE-05*	41° 15.134'	71° 20.021'
RISDS-C-01	41° 13.807'	71° 22.398'	REF-SW-01*	41° 12.902'	71° 24.918'
RISDS-C-02*	41° 13.869'	71° 22.395'	REF-SW-02*	41° 12.866'	71° 24.982'
RISDS-C-03*	41° 13.811'	71° 22.456'	REF-SW-03	41° 12.816'	71° 24.792'
RISDS-C-04	41° 13.826'	71° 22.476'	REF-SW-04	41° 12.762'	71° 25.159'
RISDS-C-05	41° 13.826'	71° 22.370'	REF-SW-05	41° 12.713'	71° 24.917'
RISDS-D-01	41° 13.594'	71° 22.525'			
RISDS-D-02	41° 13.428'	71° 22.437'	Notes: Coordinate system NAD83		
RISDS-D-03*	41° 13.452'	71° 22.593'	* Benthic biology station		
RISDS-D-04	41° 13.430'	71° 22.573'			
RISDS-D-05*	41° 13.54'	71° 22.555'			
RISDS-E-01	41° 13.553'	71° 22.959'			
RISDS-E-02	41° 13.664'	71° 23.130'			
RISDS-E-03	41° 13.678'	71° 23.035'			
RISDS-E-04	41° 13.658'	71° 23.024'			
RISDS-E-05*	41° 13.606'	71° 23.039'			
RISDS-BE-01	41° 13.454'	71° 23.175'			
RISDS-BE-02	41° 13.694'	71° 23.263'			
RISDS-BE-03	41° 13.879'	71° 23.313'			
RISDS-BE-04	41° 14.114'	71° 23.272'			
RISDS-BE-05	41° 14.240'	71° 23.114'			

Table 2-3.

List of Major Species in Trophic Faunal Groupings

Trophic Group	Taxonomic Group	Species
Suspension feeders	Sabellid polychaetes	*Chone* sp. *Euchone incolor*
	Amphipods	*Crassicorophium crassicorne* *Erichthonius fasciatus* *Dyopedos monacanthus*
	Anemones	
	Phoronids	
	Bivalves	*Cerastoderma pinnulatum* *Ensis directus*
Omnivore/scavengers	Nephtyid polychaetes	*Nephtys* sp.
	Lumbrinerid polychaetes	
	Syllid polychaetes	
	Isopods	*Ptilanthura tenuis* *Pleurogonium inerme*
	Amphipods	*Lysianassidae* *Oedicerotidae*
Subsurface deposit feeders	Bivalves	*Nucula annulata* *Nucula delphinodonta* *Yoldia sapotilla*
	Capitellid polychaetes	*Mediomastus ambiseta*
	Maldanid polychaetes	*Clymenella torquata* *Euclymene collaris*
	Scalibregmatid polychaetes	
Surface deposit feeders	Cirratulid polychaetes	*Aphelochaeta marioni* *Tharyx acutus*
	Terebelliform polychaetes	*Pherusa affinis* *Terebellides atlantis*
Interface feeders	Amphipods	*Ampelisca agassizi* *Leptocheirus pinguis* *Unciola irrorata*
	Spionid polychaetes	
Predators	Nemerteans	
	Polychaetes	*Harmothoe extenuata* *Phyllodoce maculata* *Pholoe minuta*
	Snails	*Fargoa bartschi*
	Starfish	*Henricia sanguinolenta*

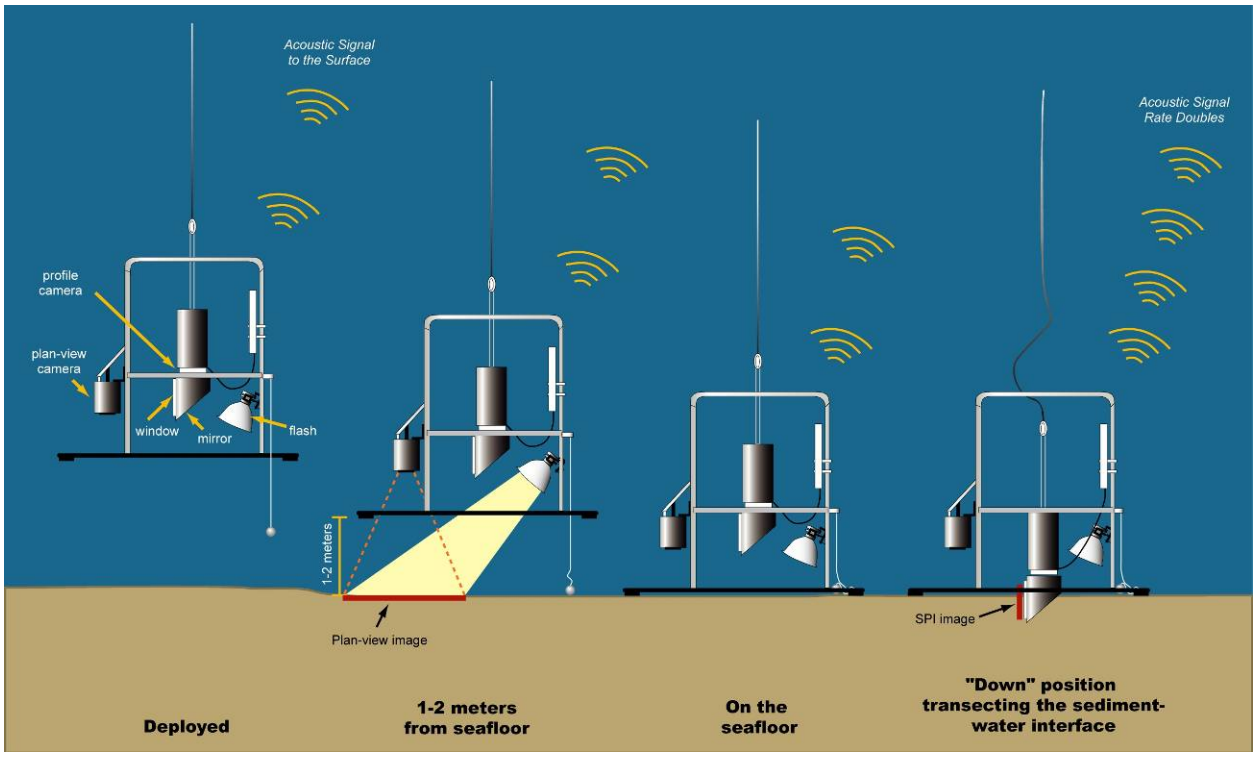

Figure 2-1. Operation of the combined Ocean Imaging Model 3731 sediment-profile and Model DSC-6000 plan view cameras

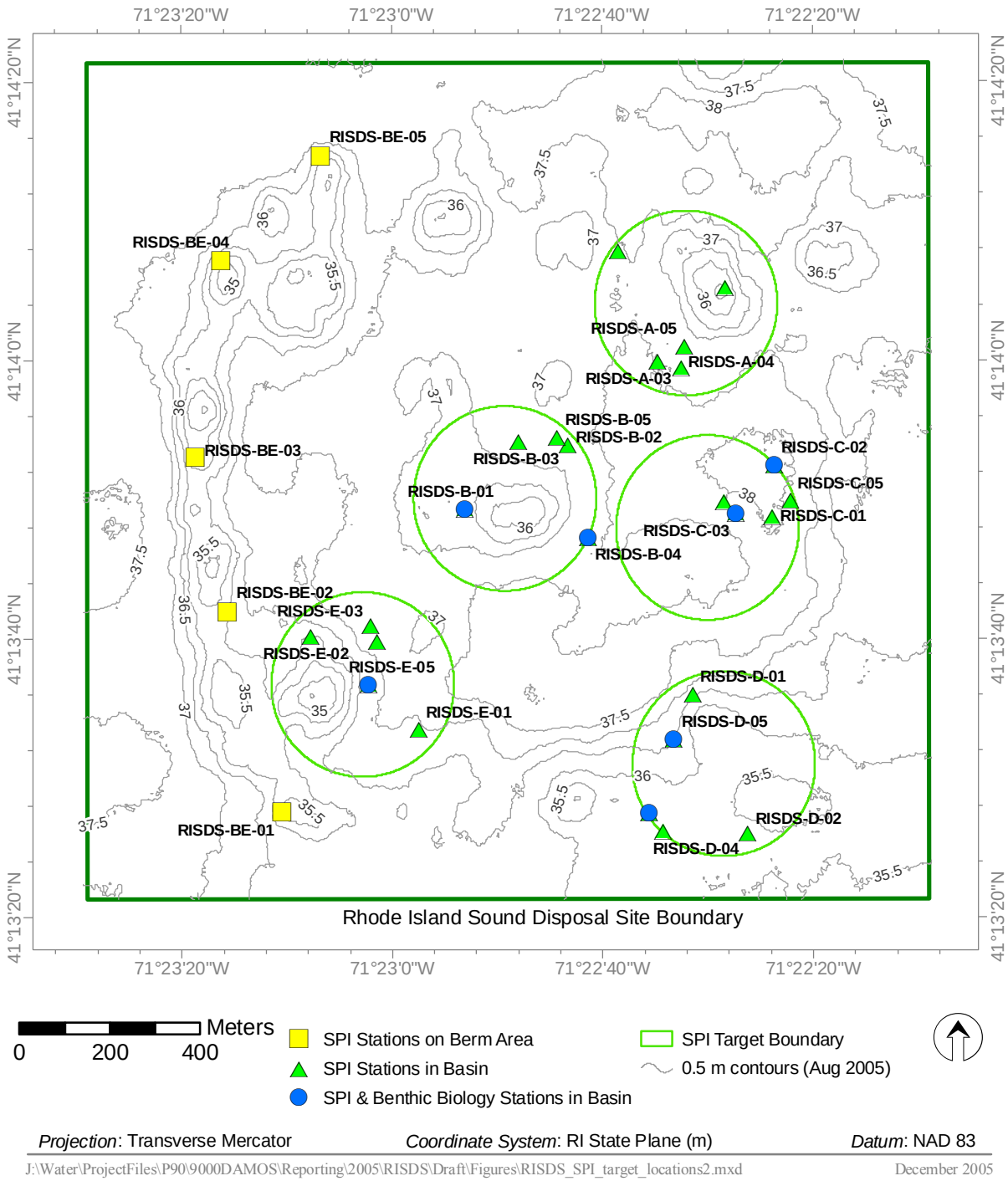

Figure 2-2. RISDS with target sediment-profile and plan view image stations and benthic biology stations indicated

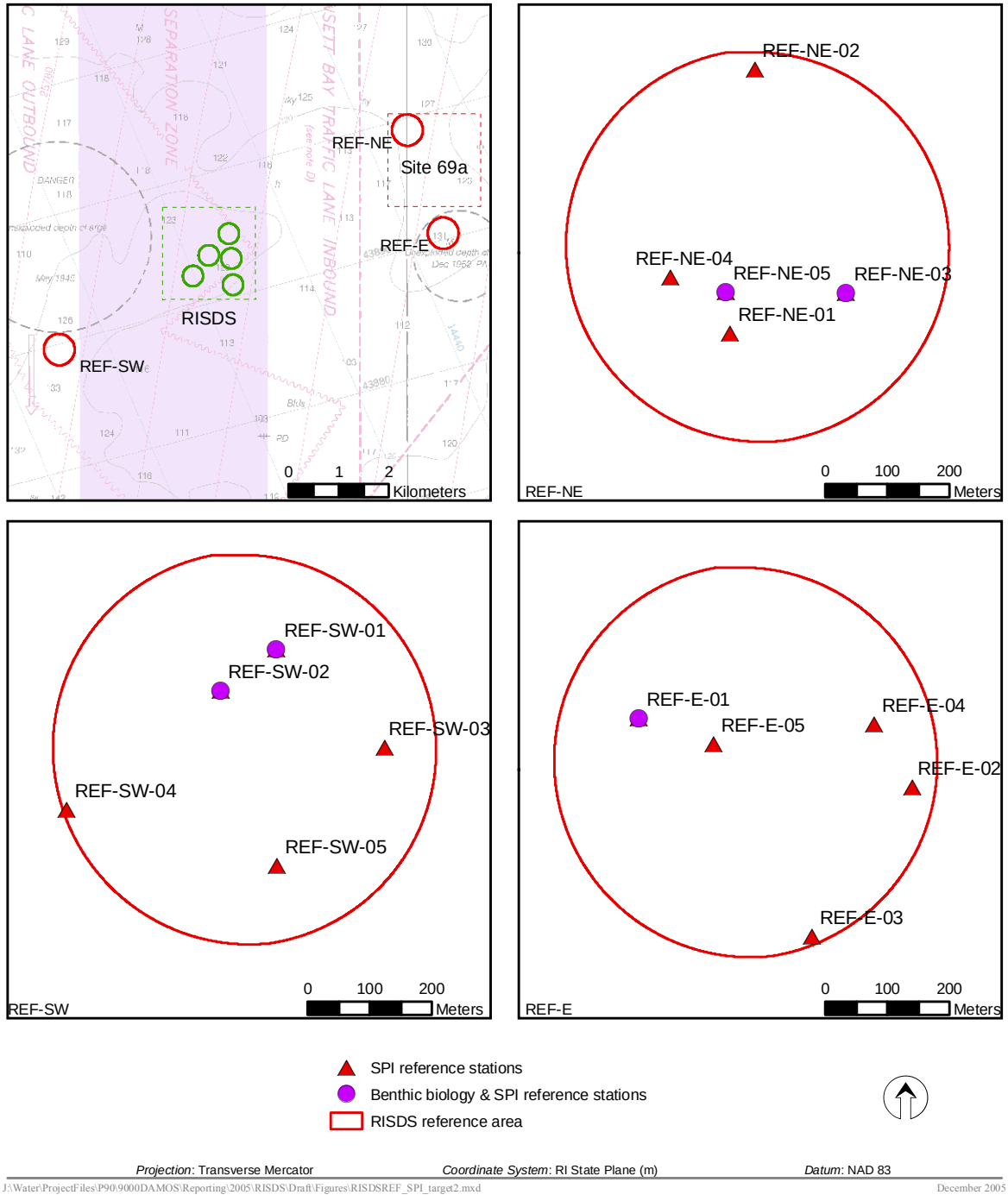

Figure 2-3. RISDS reference areas with target sediment-profile and plan view image stations and benthic biology stations indicated

3.0 RESULTS

The objective of the 2005 RISDS survey was to assess the recolonization status and benthic habitat characteristics of representative areas within the disposal site and at the reference areas. A complete set of all results can be found in Appendices B (SPI), C (PUC), and D (Benthic biology).

3.1 Rhode Island Sound Reference Areas

3.1.1 Sediment-Profile Image Results

Physical Sediment Characteristics

Previous investigations of the ambient sediments in and around Rhode Island Sound were performed as part of the site designation investigations (Battelle 2002, 2003; EPA/ACOE 2004). Results of these investigations showed the seafloor to be primarily silty-sand with patches of gravel. The grain size major mode at all three reference areas surveyed in 2005 was similar to that found in previous investigations; very-fine to fine sands with varying degrees of silt (Table 3-1, Figure 3-1). The sediments with the highest silt component were located in the REF-E area, those with the lowest silt and highest sand fraction were located in the REF-NE area, and those from the REF-SW area were intermediate in silt content (Figure 3-2). Some stations in the REF-NE area also had small rocks or shell hash at the sediment surface (Figure 3-3). There was no evidence of dredged material at any of the stations sampled in the reference areas, as well as no evidence of low dissolved oxygen or sedimentary methane (Appendix B).

Average prism penetration among stations at the three reference areas ranged from 2.6 to 12.1 cm (Table 3-1). The number of weights and camera penetration settings were kept constant during sampling at the reference areas, so the variation in prism penetration among the stations (Figure 3-4) was an indication of the relative bearing strength of the sediment and directly proportional to the changing silt content in the three areas. The highest penetration values occurred in the REF-E area and the lowest in the REF-NE area. Station-averaged small-scale boundary roughness ranged from 0.7 to 1.9 cm and was equally split between current-induced ripples (physical) and biogenic feeding pits or mounds (biological) (Table 3-1).

Biological Conditions

The average apparent RPD among stations at the reference areas ranged from 2.1 to 4.6 cm (Table 3-1), with an overall reference area average of 3.4 cm. Mean apparent

RPD depths were slightly greater at the REF-SW area (Figure 3-5) and consistent with values measured outside the disposal site in past surveys (Battelle 2003).

With the exception of some of the stations from the REF-NE area, where compact sands or larger cobble/shell hash prevented adequate prism penetration for infaunal successional stage determination, all replicate images from the reference areas showed evidence of Stage III taxa (Figure 3-6). In addition to the presence of large sub-surface burrows or feeding voids (Figure 3-7), there were also dense assemblages of tubicolous surface fauna and podocerid amphipods (Figure 3-8). There was no indication of any severe disturbance to benthic communities from trawling or other anthropogenic impacts.

3.1.2 Plan View Image Results

The presence of coarse sediment (Figure 3-9) and Stage III infauna (Figures 3-10 through 3-12), as detected in the sediment-profile images, was confirmed in the corresponding plan view images from the reference areas. Tubicolous assemblages of *Ampelisca agassizi* (Figure 3-10), cerianthid anemones (Figure 3-11), and podocerid amphipods (Figure 3-12) were also observed at stations across all three reference areas. Individual crab and shrimp were seen on the sediment surface at a handful of locations in the reference areas (Appendix B).

3.1.3 Benthic Biology Results

Examination of the benthic samples confirmed the presence of silty fine to medium sand at the five reference stations sampled. Animals and tubes were observed in all five grabs and included amphipod and worm tubes, and caprellid and ampeliscid amphipods (Table 3-2).

Overall, the reference stations were populated by a species-rich, dense benthic infauna with high species diversity typical of shallow water habitats in New England. For the five reference stations combined, a total of 11,747 individuals were collected representing 119 species (Appendix D). The number of species per sample ranged from 57 (REF-NE-03) to 68 (REF-E-01) while the number of individuals ranged from 1,494 (REF-NE-05) to 2,986 (REF-E-01). The dominant species was the protobranch bivalve *Nucula annulata*, followed by the amphipods, *Crassicorophium crassicorne, Erichthonius fasciatus, Ampelisca agassizi, Unciola irrorata*, and *Leptocheirus pinguis*. Results from the Bray-Curtis similarity analysis and principal components analysis showed that reference areas stations REF-SW-01, REF-SW-02 and REF-NE-03 were the most similar to each other and station REF-E-01 was distinctly different (Figures 3-13 and 3-14).

Amphipods, both suspension feeding and interface feeding, dominated the fauna at four of the five reference sites. Suspension feeders, including Ischyroceridae and Corophiidae amphipods, were the dominant organisms at three reference stations, REF-NE-03, REF-SW-01, and REF-SW-02. Interface feeders such as ampeliscid amphipods, cumaceans, and oweniid and spionid polychaetes were only slightly more abundant at Station REF-NE-05 than the suspension feeders. Subsurface deposit feeders, including bivalves belonging to the genus *Nucula,* predominated at Station REF-E-01 (Table 3-4, Figure 3-15).

Head-down (conveyor-belt) species were present, but in low densities, at all but one of the reference stations, accounting for less than or equal to 1% of the collected fauna (Table 3-4). These included the capitellid, *Mediomastus ambiseta*, and the maldanids, *Clymenella torquata* and *Euclymene collaris*. The reverse-conveyor belt species, *Scalibregma inflatum*, was found at all five reference stations (Appendix D).

3.2 Rhode Island Sound Disposal Site

3.2.1 Sediment-Profile Images

Physical Sediment Characteristics

The sediment at the majority of stations sampled within RISDS consisted of recently-deposited dredged material. The dredged material was composed primarily of fine-grained muds (Figure 3-16) with high water content and low-bearing strength. The SPI camera had to be outfitted with mud doors for sampling at many of the stations within the disposal site (Appendix B). The layer of dredged material was thicker than the camera prism penetration depth at all stations sampled within the disposal site. The dredged material consisted of deposited layers of primarily reduced silt-clay, with lighter-colored clay inclusions mixed within the sediment (Figure 3-17). Even though the deposited dredged material was very reduced (black in color below the surface oxidized layer), there was no evidence of low dissolved oxygen in the overlying water or subsurface methane generation at any of the locations sampled (Appendix B).

Three stations had a sediment grain-size major mode that was noticeably different than that found at the other stations surveyed (Table 3-5, Figure 3-16). Stations A-01 and E-04 had thin surface layers of very fine sand over the muds (Figure 3-18) and Station BE-03 on the western berm formation was covered with a layer of small rocks and cobble on the sediment surface (Figure 3-19).

Station-averaged camera prism penetration varied across the site, ranging from 2.2 cm (BE-03) to 17.3 cm (B-05) on the softer muds found in the site basin (Appendix B). Because the stop collars on the camera, the number of weights, and the presence of the mud doors were adjusted frequently during the course of the survey, the variation in penetration values was not an accurate reflection of the relative change in sediment shear strength. Station-averaged small-scale boundary roughness ranged from 0.5 to 2.9 cm across the site, with an overall site average of 1.6 cm. The origin of this small-scale topography was split approximately equally between physical and biological processes among the station replicates (Table 3-5). Physical roughness elements were caused by small-scale bedforms/ripples due to bottom currents (Figure 3-18) or mud clasts from deposited material (Figure 3-17), while biological roughness elements were due to feeding pits, burrow openings, or fecal mounds from infaunal bioturbation (Figure 3-20).

Biological Conditions and Benthic Recolonization

The mean apparent RPD values at the stations within RISDS ranged from 0.8 to 2.7 cm, with an overall site average of 1.5 cm (Table 3-5, Figure 3-21). The average RPD value at 80% of the stations within RISDS was between 1 and 2 cm, quite typical for a recently active disposal site. Three stations had average RPD values less than 1 cm, and three stations had average RPD values between 2 and 3 cm (Figure 3-21).

With the exception of Station BE-03, where shallow prism penetration prevented an accurate assessment of infaunal successional status, at least one replicate image at all the stations sampled showed evidence of Stage III infauna present (Table 3-5, Figure 3-22). Despite the deposition of dredged material in layers thicker than the camera prism, larger deposit-feeding infauna were able to establish themselves over most of the site (Figure 3-23). The proteinaceous “whips” of podocerid amphipods were also quite common on the sediment surface at many of the disposal site stations (Figure 3-24).

3.2.2 Plan View Images

The surface sediment texture in the plan view images from the disposal site was quite different from that in the reference areas. While the surface texture of the sediments at the disposal site confirmed the presence of mud, it was quite noticeable that bottom currents were strong enough to create ripples in the fine sediment surface (Figure 3-25). Occasional concentrations of oyster shells, likely transported to the site from inshore dredged sediments, were also found at the sediment surface within RISDS (Figure 3-26).

Consolidated clay clumps could be seen at the sediment surface at sampling stations located near an actual disposal point target (Figure 3-27), as opposed to those

stations offset from actual disposal point targets where the silt-clay dredged material arrived on location as a "mud wave" and took on the typical appearance and surface texture of a soft muddy bottom (Figure 3-28).

Although the density of burrows from large, infaunal deposit-feeders (Stage III) was lower at the RISDS stations (Figure 3-29), compared to the reference area stations, (Figure 3-30) the presence of structures consistent with Stage III infauna (burrows, feeding voids) detected in the sediment-profile images was confirmed in the corresponding plan view images from the disposal site stations. In addition, while the occasional individual crab and shrimp were seen on the sediment surface at a handful of locations (Appendix C), the foraging tracks of these epifaunal predators were quite common on the sediment surface of all the stations at RISDS (Figure 3-31).

One of the most fascinating discoveries from the plan view images was the observation of two specimens of Atlantic wolffish (*Anarhichas lupus*) buried in the mud (Figure 3-32).

3.2.3 Benthic Biology Results

Benthic biology grab samples were collected from seven stations located within RISDS (Table 3-2). Sediments at the seven disposal site stations were silty with a thin (1-2 mm) layer of olive green silt overlying black silt.

Overall, the infauna collected at RISDS was represented by fewer species, fewer individuals, and lower species diversity, compared to the reference stations (Table 3-3). A total of 1,710 individuals were collected from the seven RISDS stations, representing 60 species (Appendix D). The number of species per sample ranged from 17 (C-02) to 32 (D-03) while the number of individuals ranged from 85 (C-02) to 410 (D-05) (Table 3-3). The dominant species was the syllid polychaete, *Euchone incolor*, followed by the protobranch bivalve, *Nucula annulata*, a nephtyid polychaete, *Nephtys incisa*, and a member of the phylum Phoronida, *Phoronis architecta*.

Results from the Bray-Curtis similarity analysis and principal components analysis show that the seven disposal site stations form a very tight cluster (Figures 3-13 and 3-14), separate from the reference stations. Diversity, as measured by H', ranged from 1.78 at station C-02 to 4.12 at station C-03. All benthic parameters were low at station C-02, but diversities at the remaining six stations were approximately equivalent to those found at the reference stations (Table 3-3).

Suspension feeders, including anemones, sabellid polychaetes, phoronids, podocerid amphipods, and several species of bivalves, were the dominant organisms at stations B-01, B-04, D-03, D-05, and E-05 with more than 60% of the organisms collected being filter feeders (Figure 3-33). Animals belonging to the omnivore/scavenger guild (nephtyid, dorvilleid, and lumbrinerid polychaetes and several species of amphipods) were the second-most abundant group collected at these same five stations and the most abundant at station C-03 (Figure 3-33). Subsurface deposit feeders, a group that includes protobranch bivalves such as *Nucula* and *Yoldia*, the head-down deposit feeders capitellid and maldanid polychaetes, and opheliid polychaetes, dominated at Station C-02 and were the third-most abundant group at Station B-04, but were present in only low numbers at the remaining five stations (Table 3-4).

Table 3-1.

Summary of SPI Results for RISDS Reference Stations, July 2005

Station	Grain Size Major Mode (phi)	Mean Prism Penetration Depth (cm)	Mean Boundary Roughness (cm)	Boundary Roughness Type	Mean RPD Depth (cm)	Successional Stages present (no. of replicates)
REF-E-01	4-3	11.2	1.5	B	2.7	I on III (3)
REF-E-02	4-3	9.6	1.1	B & P	3.6	I on III (3)
REF-E-03	4-3/>4	11.9	0.8	B	3.3	I on III (3)
REF-E-04	4-3	9.1	1.6	B & P	3.8	I on III (3)
REF-E-05	4-3/>4	12.1	1.6	B & P	2.1	I on III (3)
REF-NE-01	3-2	4.9	1.1	B & P	3.0	I on III (2), IND (1)
REF-NE-02	4-3	4.0	1.0	B & P	2.8	I on III (3)
REF-NE-03	3-2	2.6	1.4	P	2.6	I on III (1), IND (2)
REF-NE-04	3-2	6.4	1.7	B & P	3.9	I on III (2), IND (1)
REF-NE-05	3-2	5.1	1.9	P	3.0	I on III (2), IND (1)
REF-SW-01	4-3	6.7	0.7	B & P	2.7	I on III (3)
REF-SW-02	4-3	9.5	1.4	B	4.2	I on III (3)
REF-SW-03	3-2	8.4	0.8	P	4.2	I on III (3)
REF-SW-04	4-3	9.7	1.0	B & P	4.6	I on III (3)
REF-SW-05	4-3	6.9	1.2	B	3.7	I on III (3)
Average	NA	7.9	1.2	NA	3.4	NA
Minimum	NA	2.6	0.7	NA	2.1	NA
Maximum	NA	12.1	1.9	NA	4.6	NA

NA = Not Applicable
Boundary roughness type:
B = Biological
P = Physical

Table 3-2.

Summary of Benthic Biology Results for Reference and RISDS Stations, July 2005

Station	Sediment Texture	Sediment Color*	Sediment Odor*	Biology Present*
Reference Stations				
REF-E-01	Sandy silt	Not recorded	Not recorded	Worm tubes, amphipods
REF-NE-03	Medium sand with some silt	Olive/ brown	No odor	Worm tube mat, caprellid amphipods, *Ampelisca*
REF-NE-05	Fine sand	Olive green/brown	No odor	Tubes and amphipods
REF-SW-01	Fine sand/silt	Olive green	No odor	Amphipod tube mat, amphipods, worm tubes
REF-SW-02	Silty fine sand	Olive green	No odor	Tube mat, amphipods
RISDS Stations				
B-01	Silty	Olive on black	Not recorded	None recorded
B-04	Silty	Olive on black	Slight	None recorded
C-02	Silty	Olive on black	No odor	None recorded from surface; many *Nucula* seen while sieving
C-03	Silty with fine sand on surface	Olive on black	No odor	None recorded
D-03	Silty	Olive on black	Slight	Amphipod (1)
D-05	Silty	Olive on black	No odor	None recorded
E-05	Silty	Olive on black	Not recorded	None seen

* - Not recorded or none recorded typically means that no odor/color/biology were present, and therefore no notes were logged

Table 3-3.

Summary of Benthic Biology Community Parameters for Reference and RISDS Stations, July 2005

Sample	No. of Species	No. of Individuals (0.04m²)	Shannon's H'	Pielou's J'	Fisher's alpha
Reference Stations					
REF-E-01	68	2986	3.06	0.50	12.39
REF-NE-03	57	1942	3.50	0.60	11.01
REF-NE-05	67	1494	4.53	0.75	14.40
REF-SW-01	59	2628	3.39	0.58	10.71
REF-SW-02	58	2697	3.26	0.56	10.43
Average	**62**	**2349**	**3.55**	**0.60**	**11.79**
Minimum	**57**	**1494**	**3.06**	**0.50**	**10.43**
Maximum	**68**	**2986**	**4.53**	**0.75**	**14.40**
RISDS Stations					
B-01	24	237	3.03	0.66	6.67
B-04	28	278	3.23	0.67	7.77
C-02	17	249	1.78	0.44	4.13
C-03	29	85	4.12	0.85	15.53
D-03	32	410	3.06	0.61	8.12
D-05	26	240	3.16	0.67	7.41
E-05	24	211	2.92	0.64	6.97
Average	**26**	**244**	**3.04**	**0.65**	**8.09**
Minimum	**17**	**85**	**1.78**	**0.44**	**4.13**
Maximum	**32**	**410**	**4.12**	**0.85**	**15.53**

Table 3-4.

Summary of Trophic Faunal Groupings at RISDS Reference Stations, July 2005

Station	Total No. of Organisms	Omnivores/ Scavengers	Subsurface Deposit Feeders	Interface Feeders	Suspension Feeders	Surface Deposit Feeders	Predators
Reference Stations							
REF-E-01	186	**1875**	164	646	53	62	186
REF-NE-03	208	109	553	**968**	86	18	208
REF-NE-05	188	151	**490**	445	193	27	188
REF-SW-01	147	698	781	**920**	17	65	147
REF-SW-02	115	297	845	**1325**	17	98	115
RISDS Stations							
B-01	237	42	31	9	**150**	1	4
B-04	278	82	59	8	**127**	1	1
C-02	249	16	**191**	1	41	0	0
C-03	85	**32**	6	10	**31**	1	5
D-03	410	69	26	17	**286**	8	4
D-05	240	72	11	5	**144**	2	6
E-05	211	37	8	6	**158**	1	1

Note: Most abundant faunal group shown in bold

Table 3-5.

Summary of SPI Results for RISDS Stations, July 2005

Station	Grain Size Major Mode (phi)	Mean Prism Penetration Depth (cm)	Mean Boundary Roughness (cm)	Boundary Roughness Type	Mean RPD Depth (cm)	Successional Stages Present (no. of replicates)
A-01	4-3/>4	8.7	2.3	B & P	1.2	I (1), Stage I-II (1), I on III (1)
A-02	>4	12.5	2.8	B & P	1.2	I on III (2), III (1)
A-03	>4	12.4	1.5	B & P	1.5	I on III (2), IND (1)
A-04	>4	8.1	1.4	B & P	1.4	I on III (2), IND (1)
A-05	>4	17.2	1.1	B	2.0	I on III (3)
B-01	>4	12	1.9	B & P	1.6	I-II (1), I on III (2)
B-02	>4	13.6	1.5	B & P	1.0	I (1), I on III (2)
B-03	>4	14.3	1.4	B & P	1.1	I on III (3)
B-04	>4	16.8	2.1	B	2.7	I-II (1), I on III (2)
B-05	>4	17.3	1.4	B & P	1.4	I-II (1), I on III (2)
BE-01	>4	9.8	2.4	B	0.8	I on III (3)
BE-02	>4	14	1.6	B	1.6	II (1), I on III (1), III (3)
BE-03	cobble	2.2	1.4	P	1.3	IND (3)
BE-04	>4	12.1	0.6	B & P	1.3	II-III (1), I on III (2)
BE-05	>4	15.3	2.5	B & P	1.4	I on III (3)
C-01	>4	13.6	0.9	B & P	1.3	II-III (2), I on III (1)
C-02	>4	15	1.9	B & P	1.7	I on III (3)
C-03	>4	10.1	1.1	B & P	1.3	I on III (3)
C-04	>4	13.1	1.4	B & P	1.3	II-III (1), I on III (1), III (1)
C-05	>4	16.3	1.3	B & P	1.3	II (1), II-III (1), III (1)

Table 3-5 cont.

Summary of SPI Results for RISDS Stations, July 2005

Station	Grain Size Major Mode (phi)	Mean Prism Penetration Depth (cm)	Mean Boundary Roughness (cm)	Boundary Roughness Type	Mean RPD Depth (cm)	Successional Stages Present (no. of replicates)
D-01	>4	12.9	1.1	B & P	1.0	I-II (1), II (1), II-III (1)
D-02	>4	14.8	1.1	B & P	1.5	I on III (3)
D-03	>4	13.2	2.0	B & P	2.2	I on III (3)
D-04	>4	12.1	1.6	P	1.9	II (1), I on III (2)
D-05	>4	11.2	1.5	P	1.5	I on III (3)
E-01	>4	16.1	2.0	B	1.8	I on III (3)
E-02	>4	14.4	2.9	B & P	1.1	I (1), I on III (2)
E-03	>4	12.7	0.5	B & P	1.9	I on III (3)
E-04	4-3/>4	13.0	0.8	B	2.0	I on III (3)
E-05	>4	14.6	0.7	B & P	1.3	I-II (1), I on III (1), IND
Average	NA	13.0	1.6	NA	1.5	NA
Minimum	NA	2.2	0.5	NA	0.8	NA
Maximum	NA	17.3	2.9	NA	2.7	NA

NA = Not Applicable
Boundary roughness type:
B = Biological
P = Physical

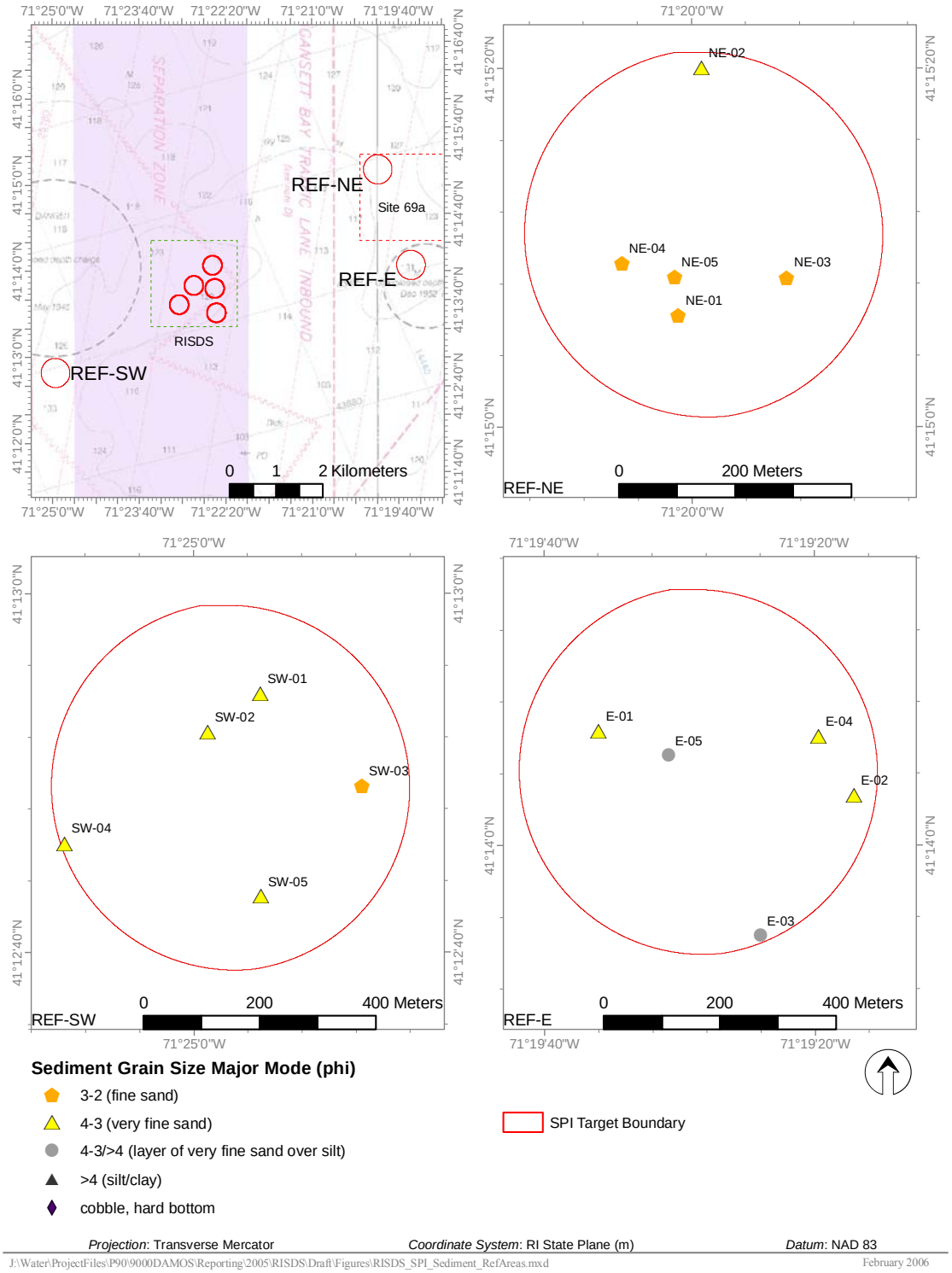

Figure 3-1. Sediment grain-size major mode at the RISDS reference stations, July 2005.

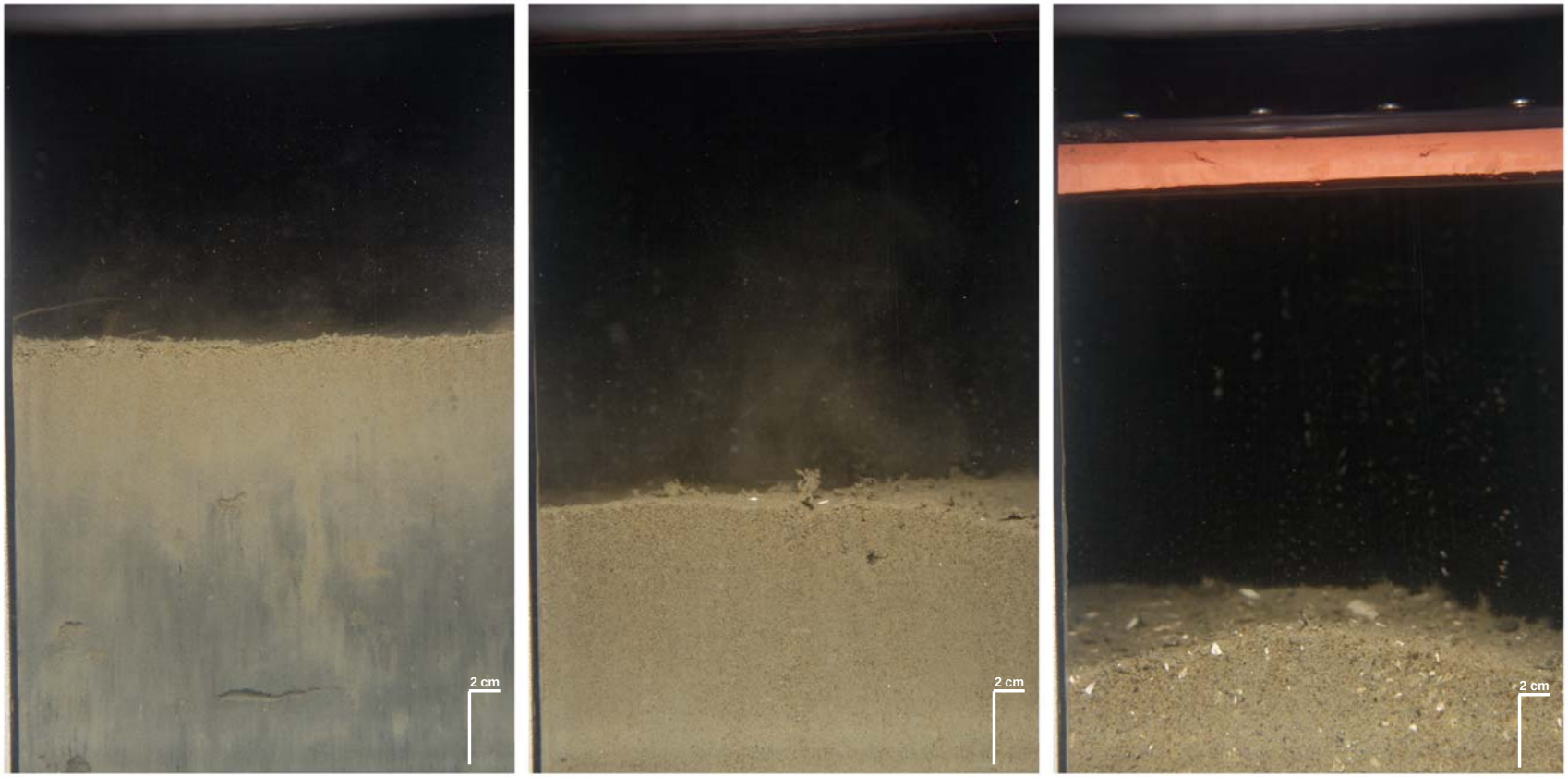

Figure 3-2. SPI images from three reference areas illustrate the sediment grain-size major mode in each area as well as the varying percentage of silt. Arranged from left to right in order of highest to lowest silt content: Station REF-E-01 (left), Station REF-SW-03 (middle), and Station REF-NE-03 (right).

Figure 3-3. SPI images from Station REF-NE-03 (left) and Station REF-NE-04 (right) show shell hash and small rocks on the surface of the sandy bottom, which limited camera prism penetration.

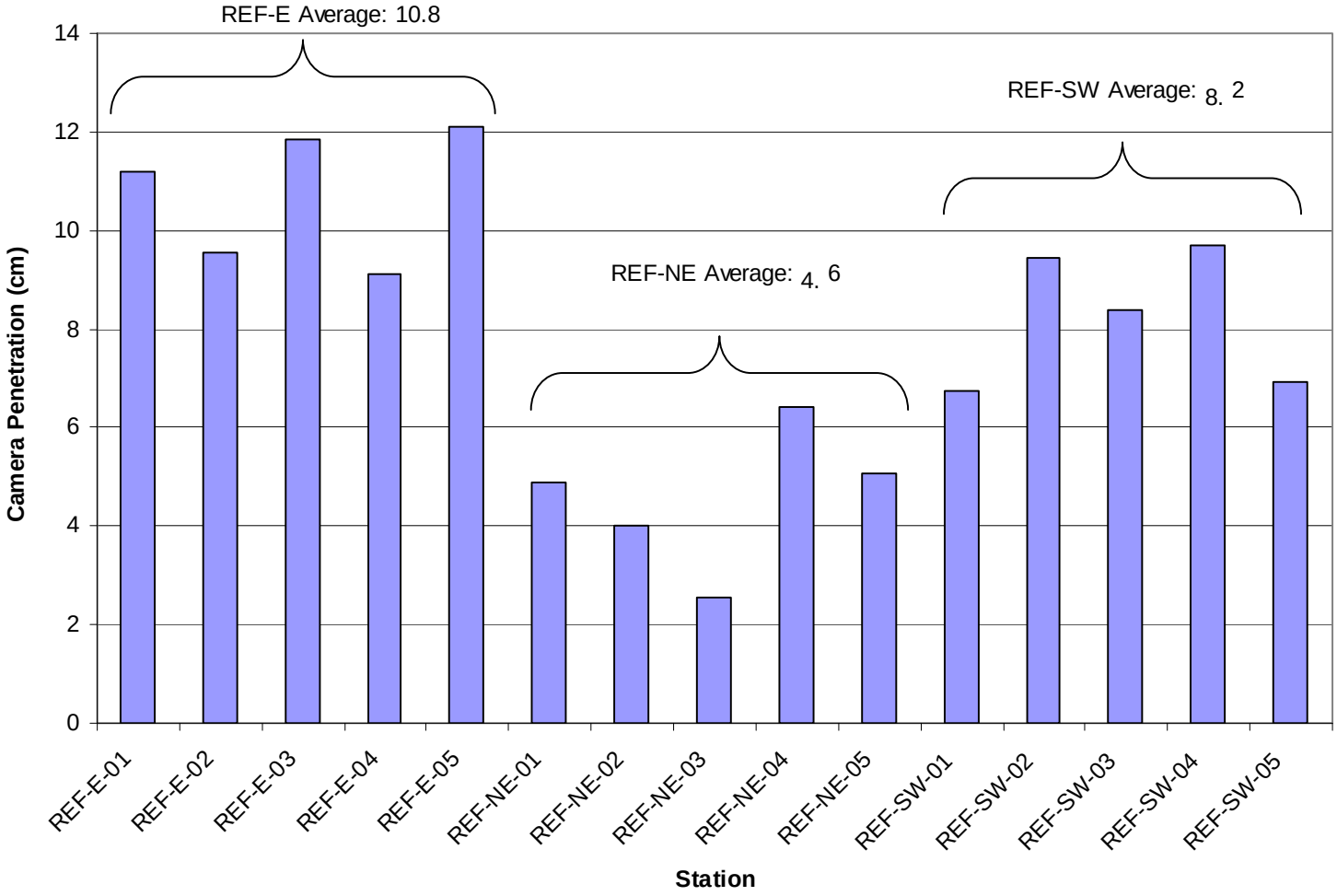

Figure 3-4. Distribution of station-averaged prism penetration values at the three RISDS reference areas, July 2005. Weights and camera penetration depths remained constant for all stations.

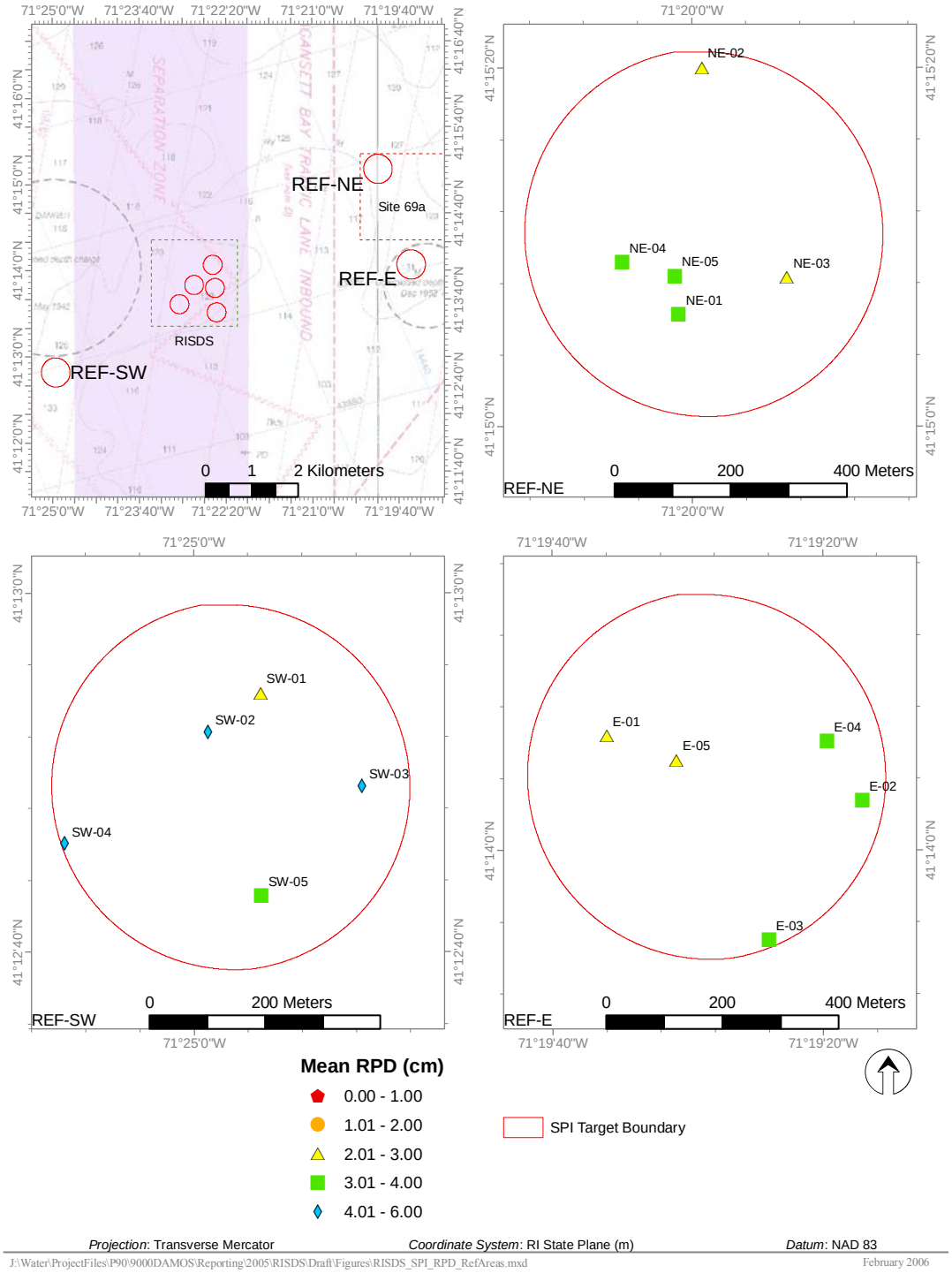

Figure 3-5. The distribution of station-averaged mean apparent RPD depth (cm) at the RISDS Reference areas, July 2005.

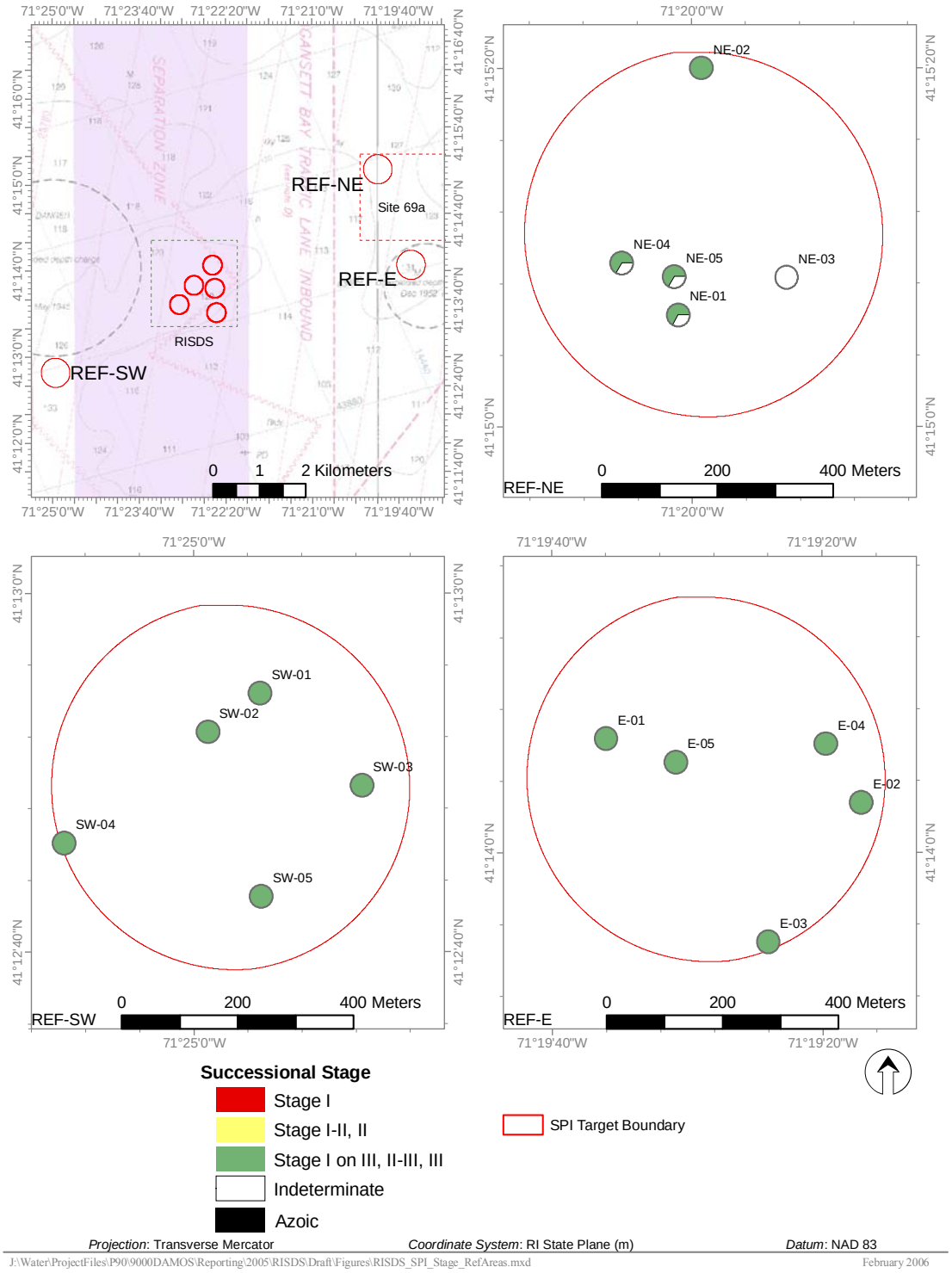

Figure 3-6. The distribution of infaunal successional stages at the RISDS Reference areas, July 2005.

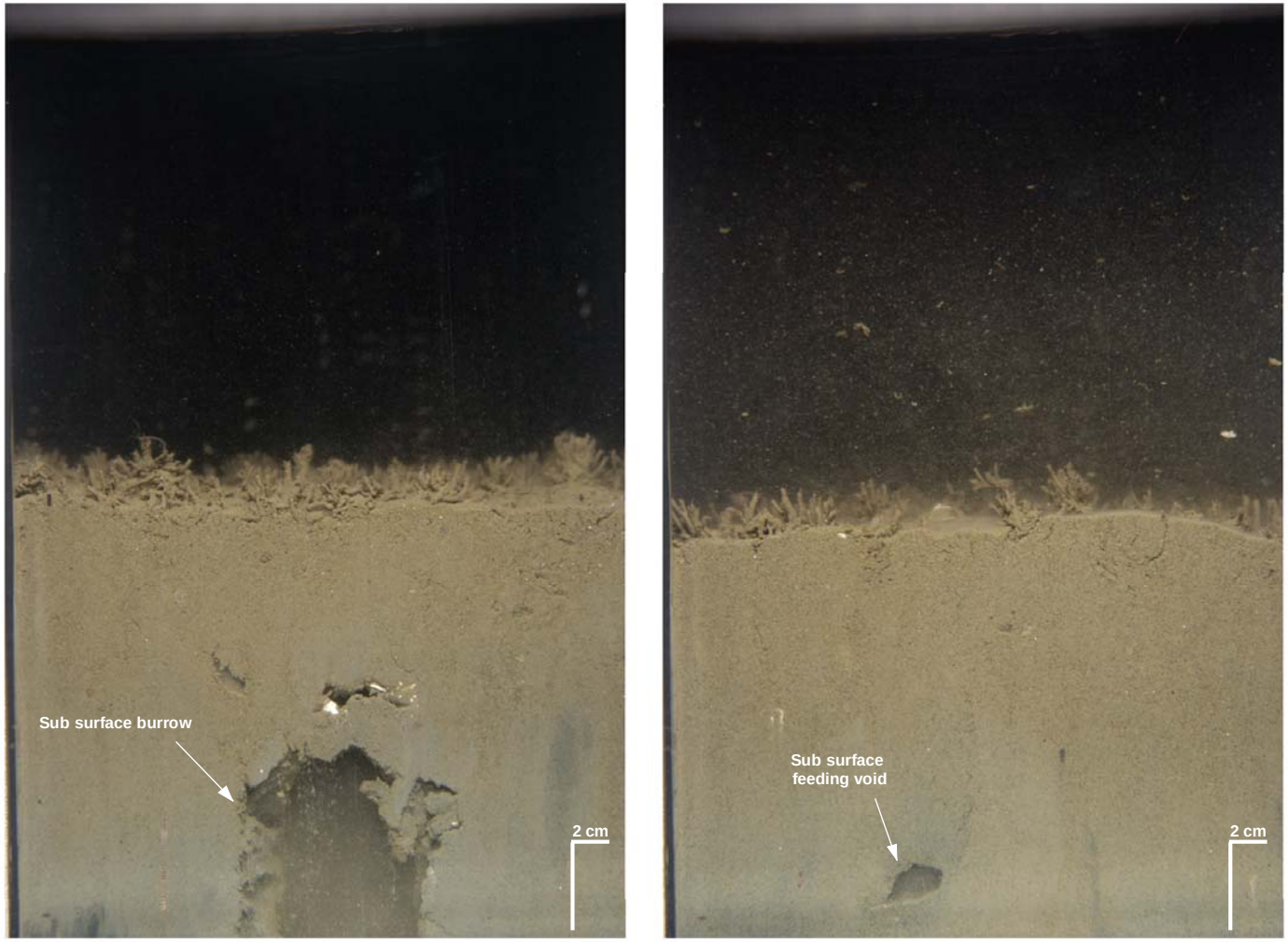

Figure 3-7. Large sub-surface burrow transected in the SPI image from Station REF-SW-04 (left) and the sub-surface feeding void at Station REF-SW-02 (right), indicative of the presence of Stage III taxa.

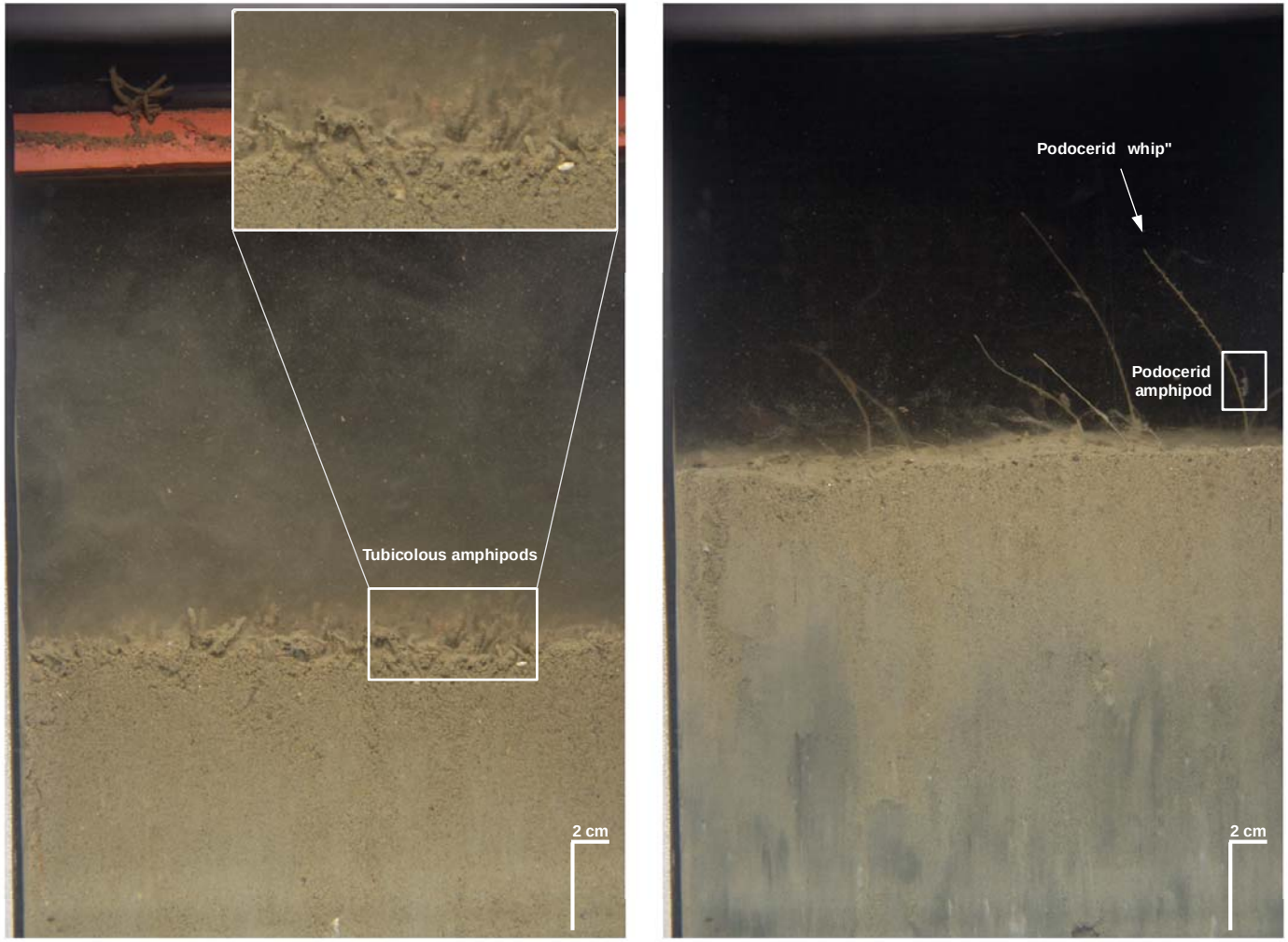

Figure 3-8. SPI images from Station REF-NE-02 (left) and Station REF-E-03 (right) showing dense assemblages of tubicolous and podocerid amphipods on the seafloor outside the disposal site.

Figure 3-9. Plan view image from Station REF-NE-04 shows a skate resting on this poorly-sorted, silty sand bottom.

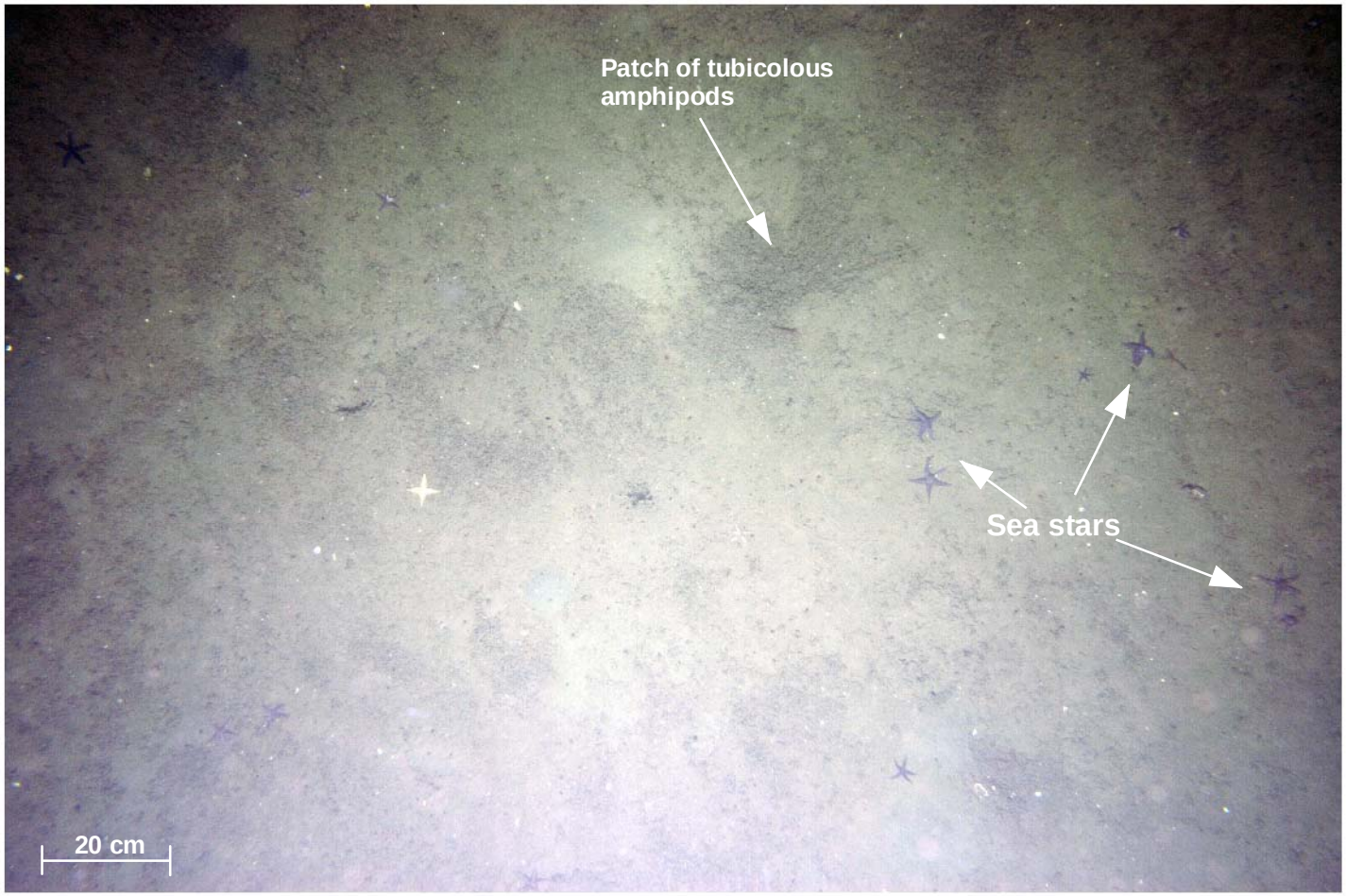

Figure 3-10. Plan view image from Station REF-SW-01 showing the dispersion of seastars and patches of tubicolous amphipods.

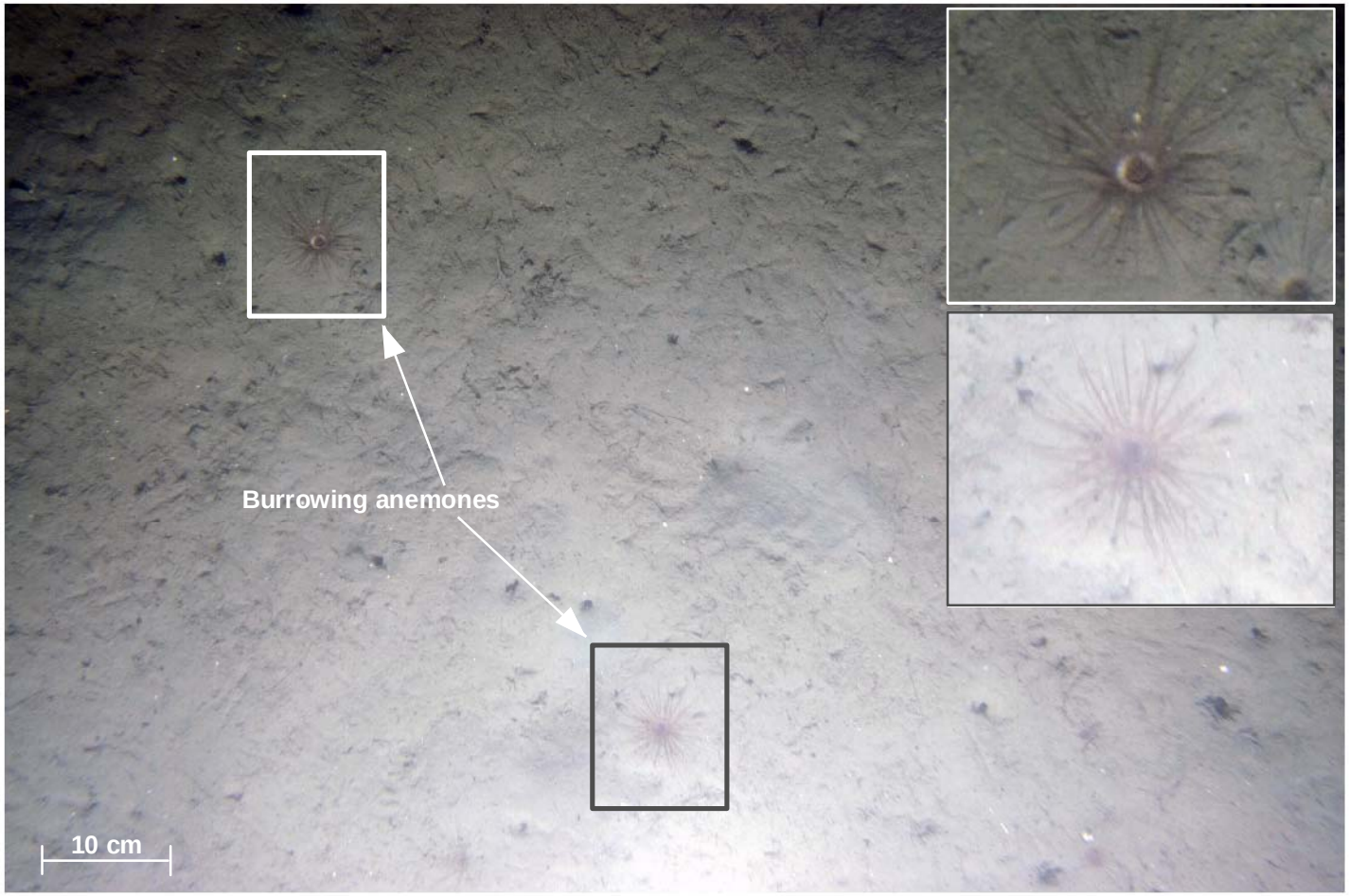

Figure 3-11. The extended tentacles of burrowing Cerianthid anemones can be seen on the sediment surface in this plan view image from Station REF-E-01.

Figure 3-12. The patches of the proteinaceous whips of podocerid amphipods can be seen bent over in the bottom currents at Station REF-E-03.

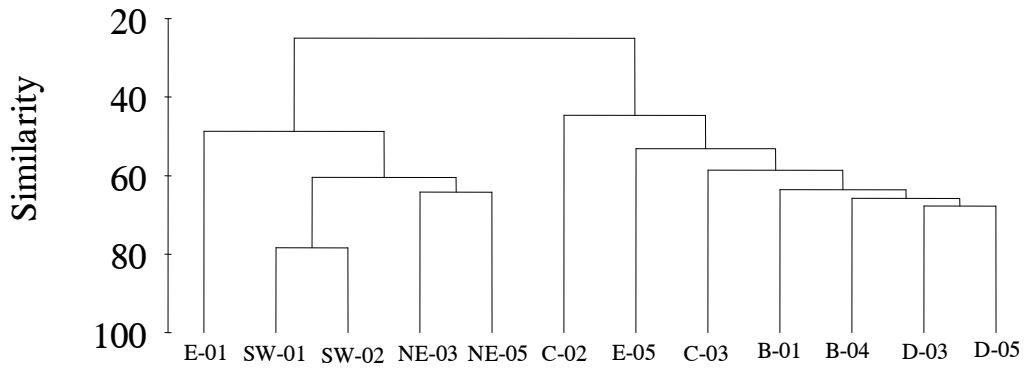

Figure 3-13. Cluster analysis of the reference and RISDS stations, July 2005. Data were transformed to the 4th root and group average sorting was implemented with the Bray-Curtis similarity analysis.

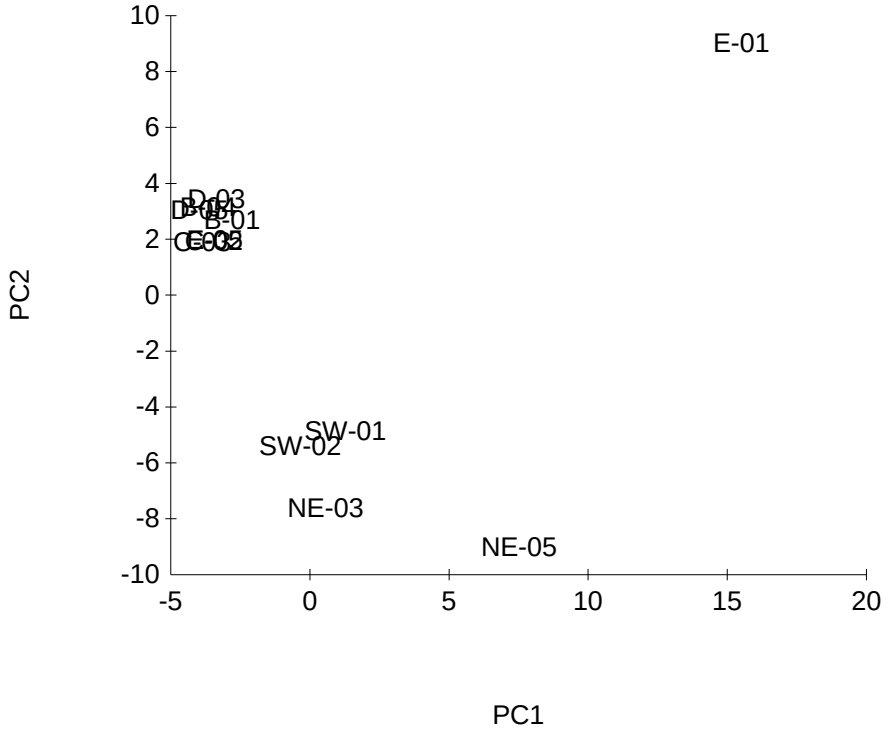

Figure 3-14. Principal components analysis of infaunal data from the reference and RISDS stations, July 2005.

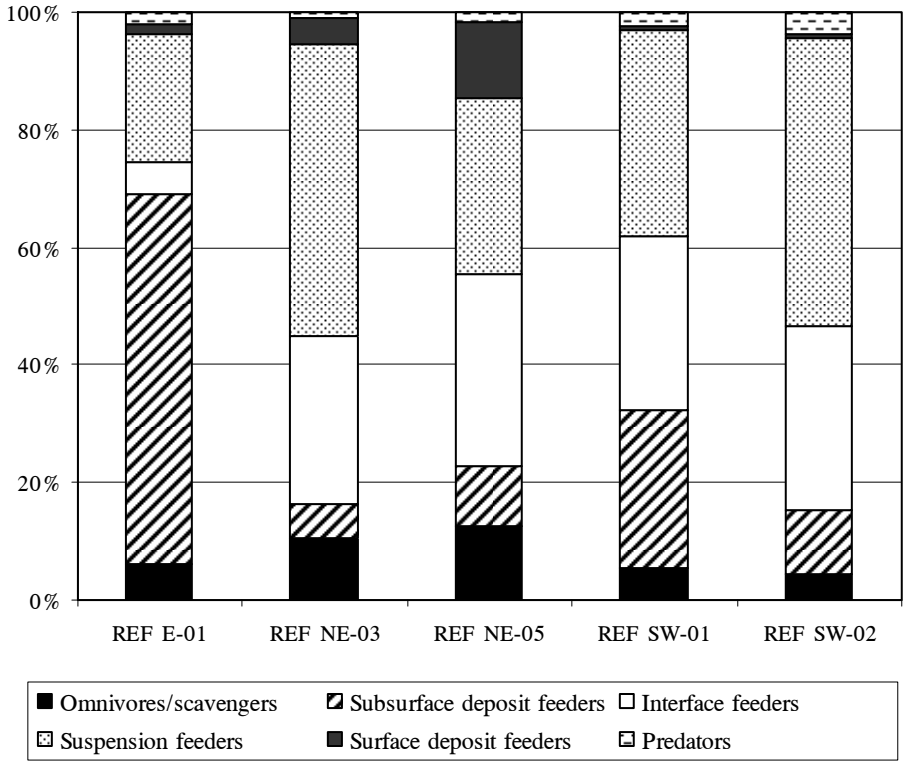

Figure 3-15. Percentage of individuals belonging to each trophic guild at RISDS reference stations, July 2005.

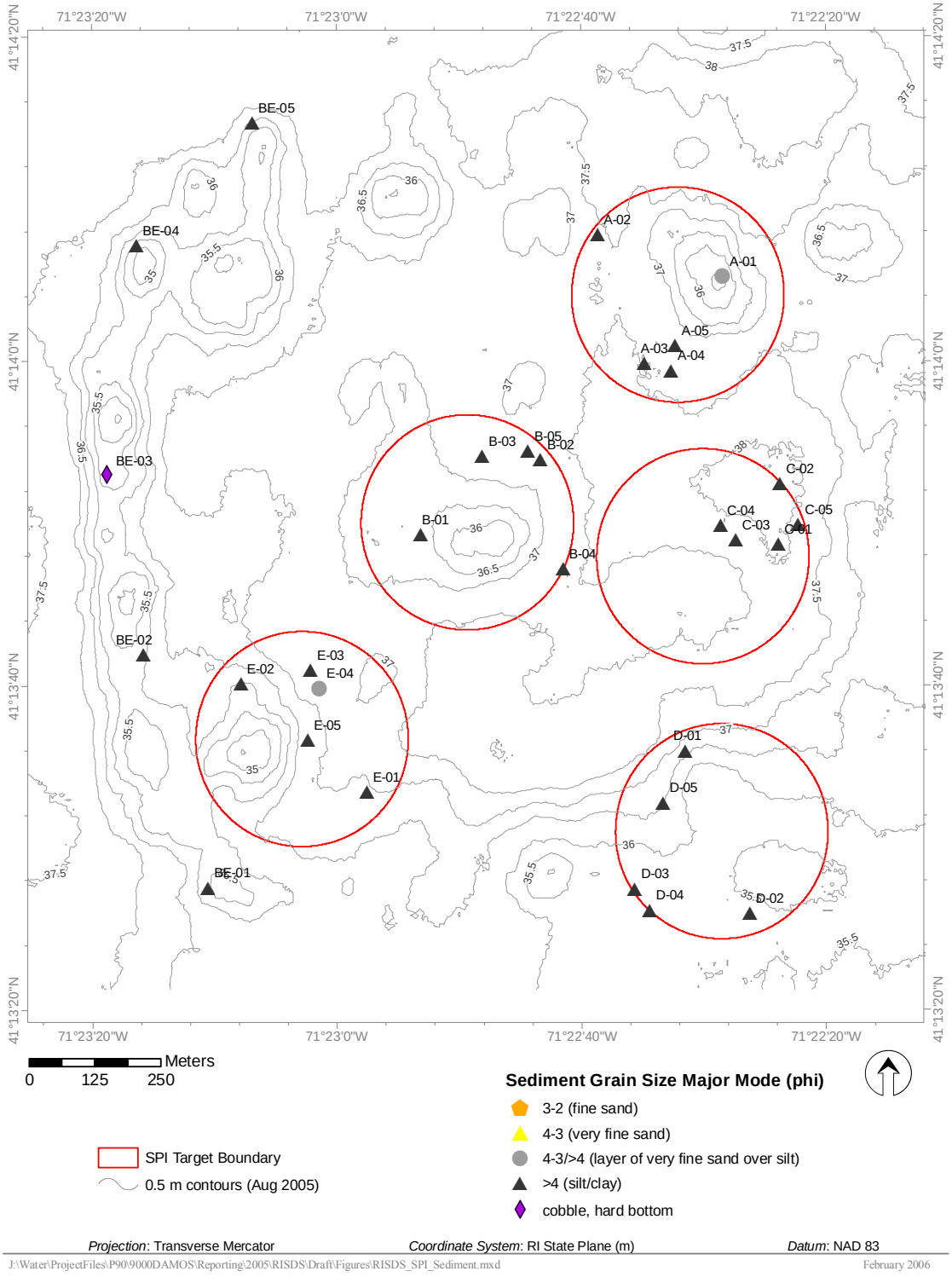

Figure 3-16. Sediment grain-size major mode at the stations sampled within RISDS, July 2005.

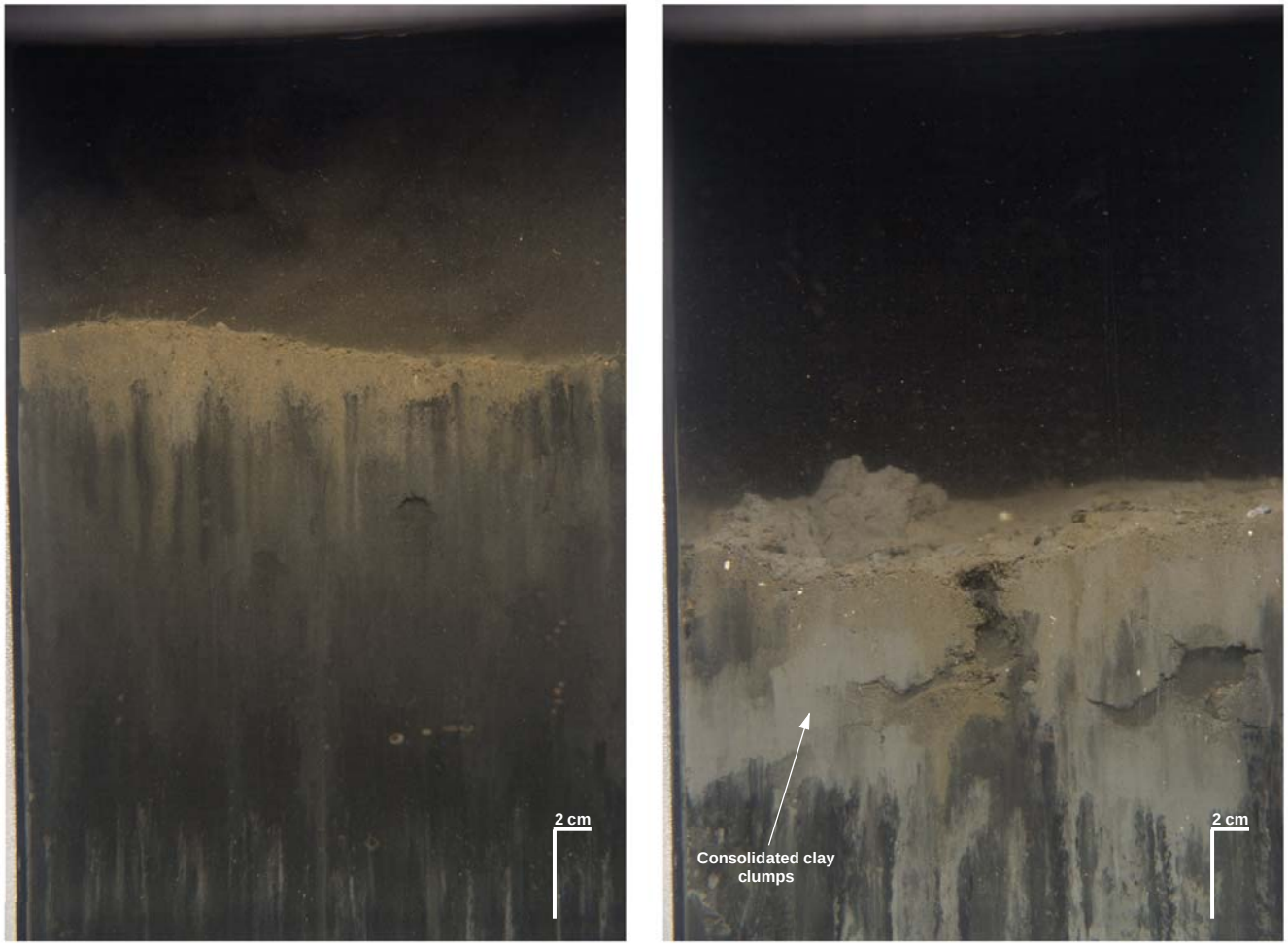

Figure 3-17. SPI images from Station B-03 (left) and Station A-04 (right) show the reduced silt-clay sediments found at the majority of the stations within the site; note the lighter-colored consolidated clay clumps included in the sedimentary fabric in the image on the right.

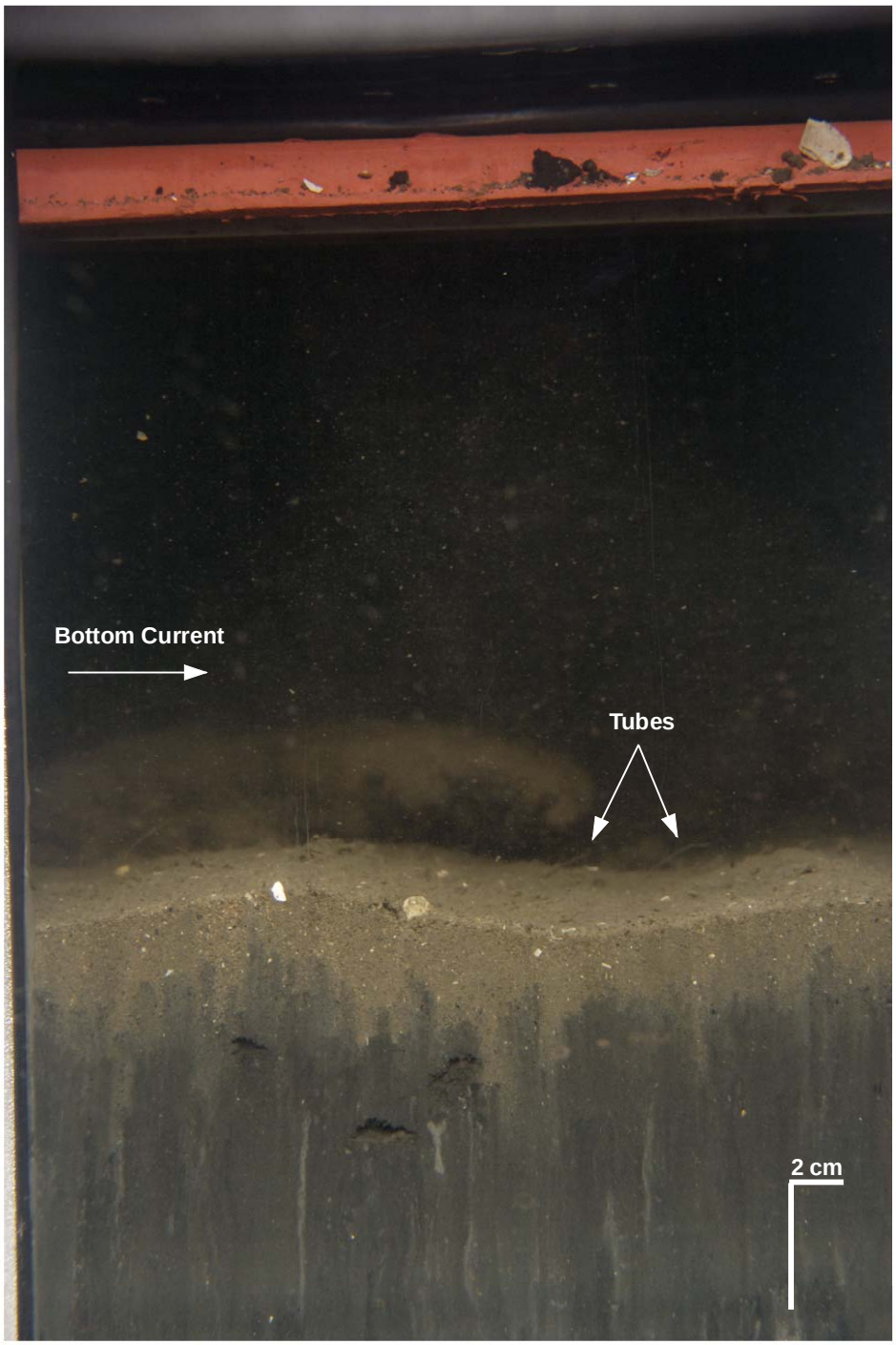

Figure 3-18. SPI image from Station A-01 showing a surface layer of very fine sand at the sediment water interface; note the small-scale ripples and bent tubes in the background indicating the direction of the bottom currents.

Figure 3-19. SPI and plan view images from Station BE-03 showing the sediment surface covered with small rocks and cobble from disposal operations.

Figure 3-20. The small-scale surface boundary roughness in this SPI image from Station BE-01 is due to burrowing activities of a large infaunal organism.

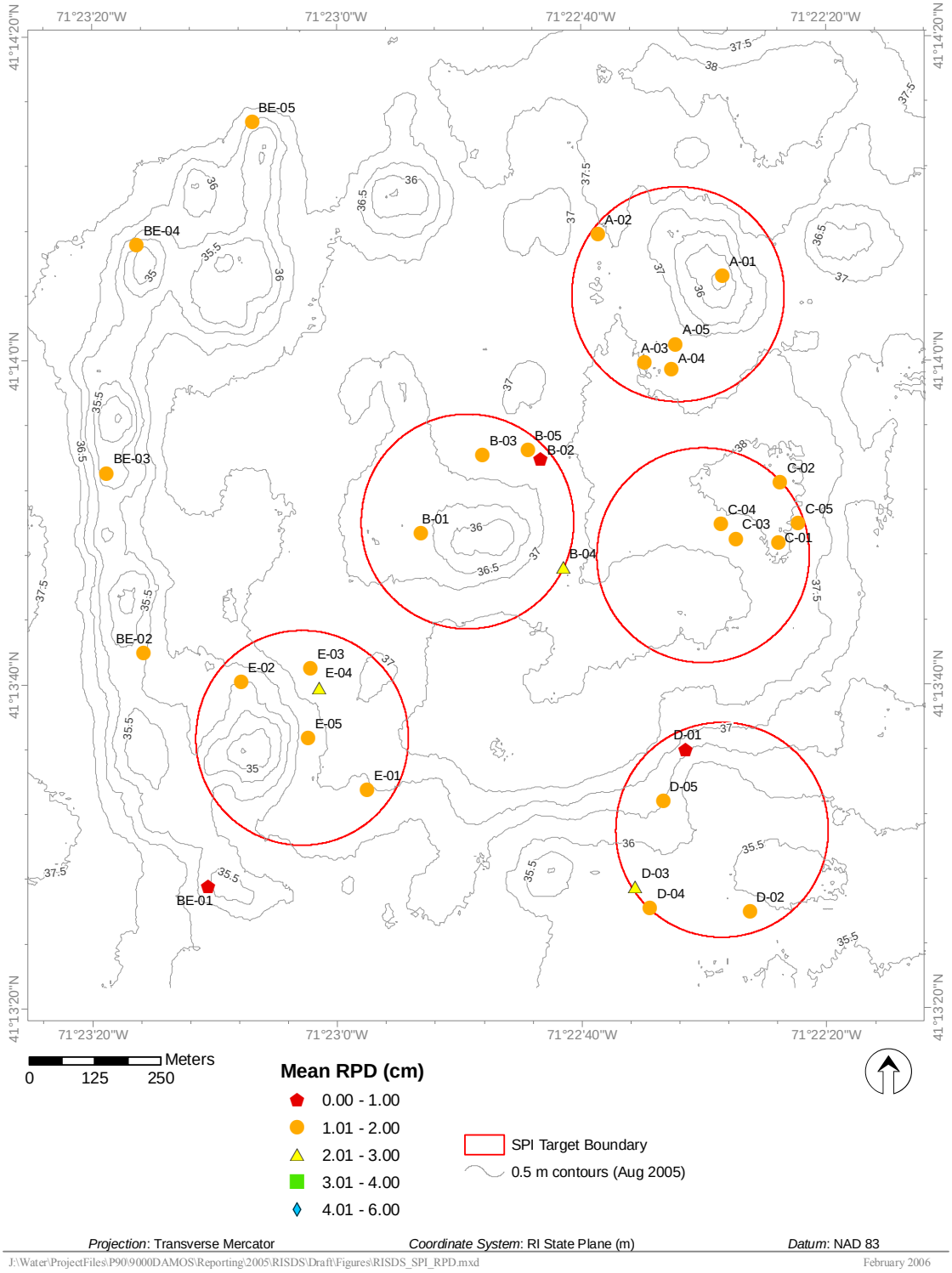

Figure 3-21. The distribution of station-averaged mean apparent RPD depth (cm) at RISDS, July 2005.

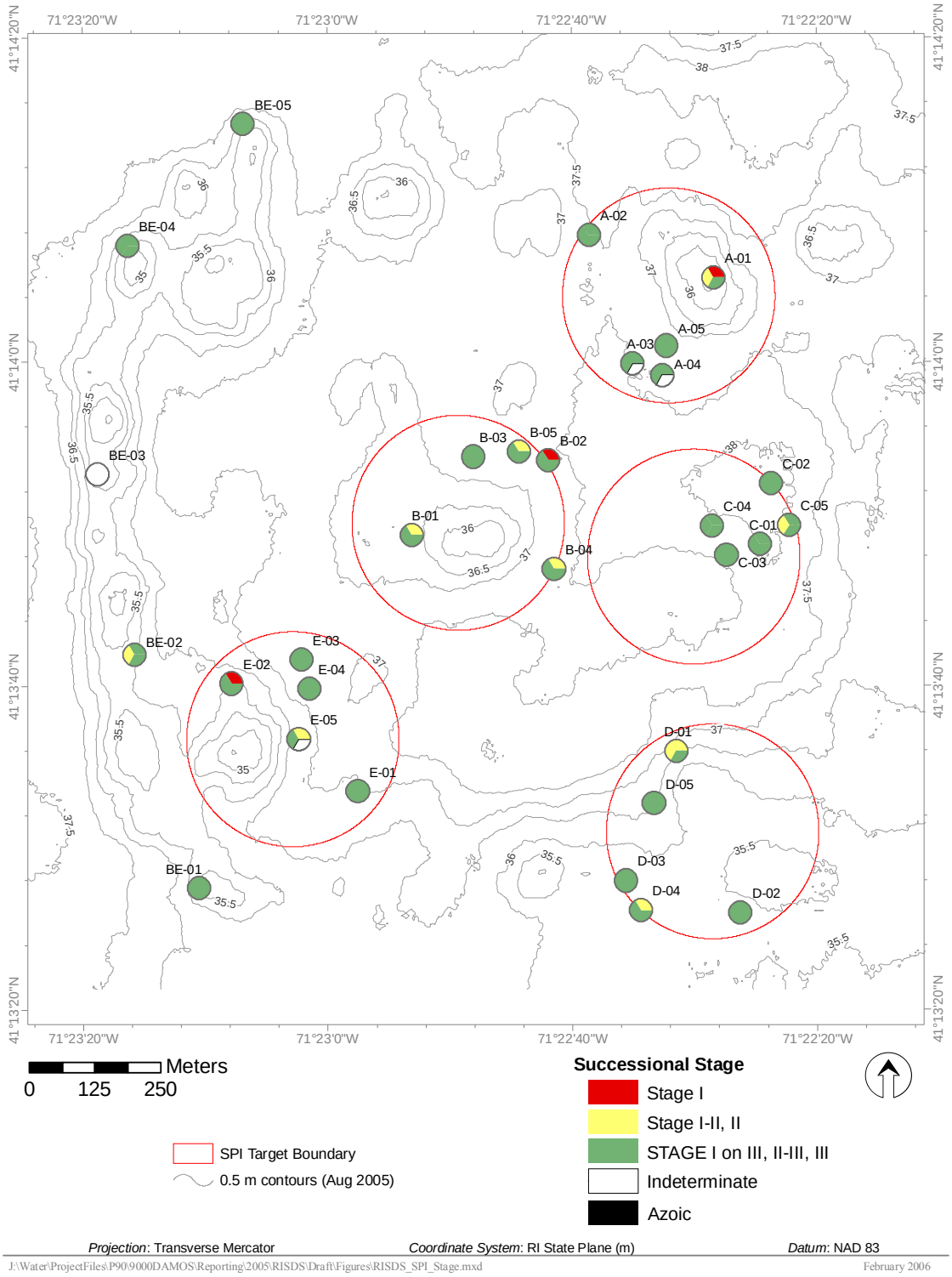

Figure 3-22. The distribution of infaunal successional stages at RISDS, July 2005.

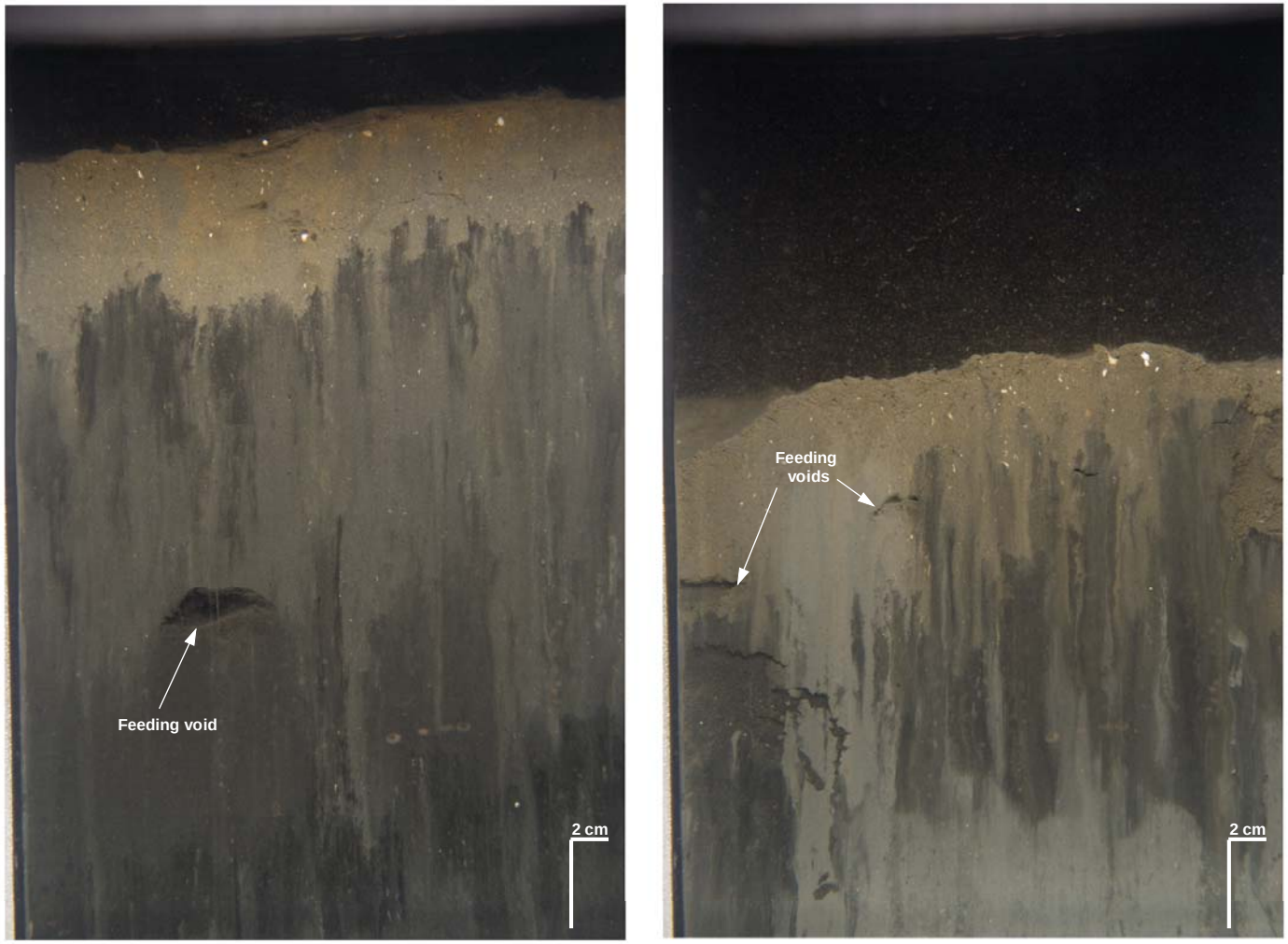

Figure 3-23. SPI images from Station A-05 (left) and Station E-01 (right) show subsurface feeding voids created by larger infaunal deposit-feeders.

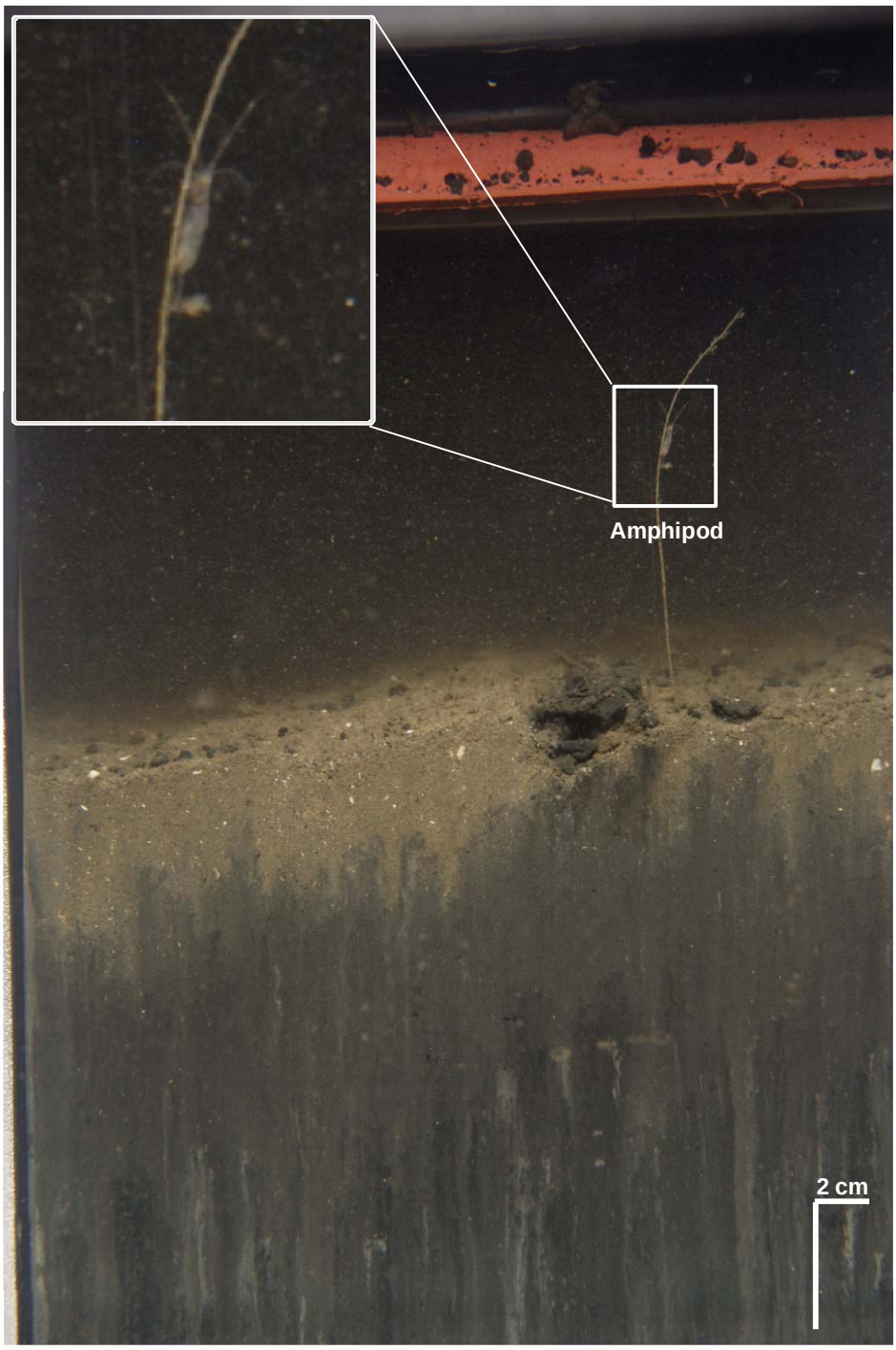

Figure 3-24. A specimen of the amphipod, *Dyopedos monacanthus*, can be seen on its stick (or whip) projecting above the sediment surface in this profile image from Station A-01.

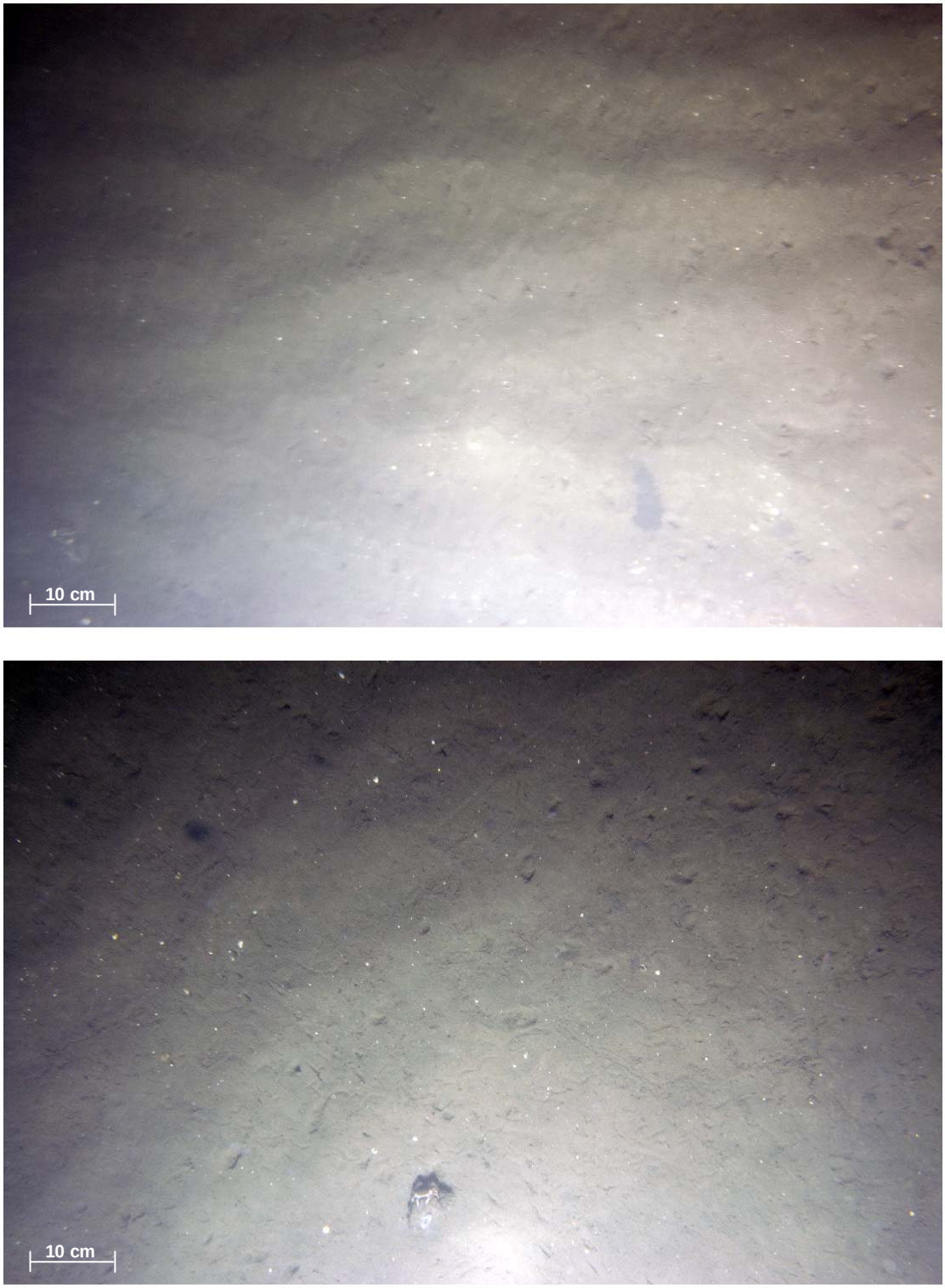

Figure 3-25. Plan view images from Station A-05 (top) and Station D-03 (bottom) show the formation of ripples from surface wave or bottom current energy.

Figure 3-26. Concentrated collections of disarticulated oyster shells can be seen at the sediment surface in this plan view image from Station E-02.

Figure 3-27. This plan view image from Station BE-04 shows the sediment surface littered with consolidated clay clumps from the recent disposal operations.

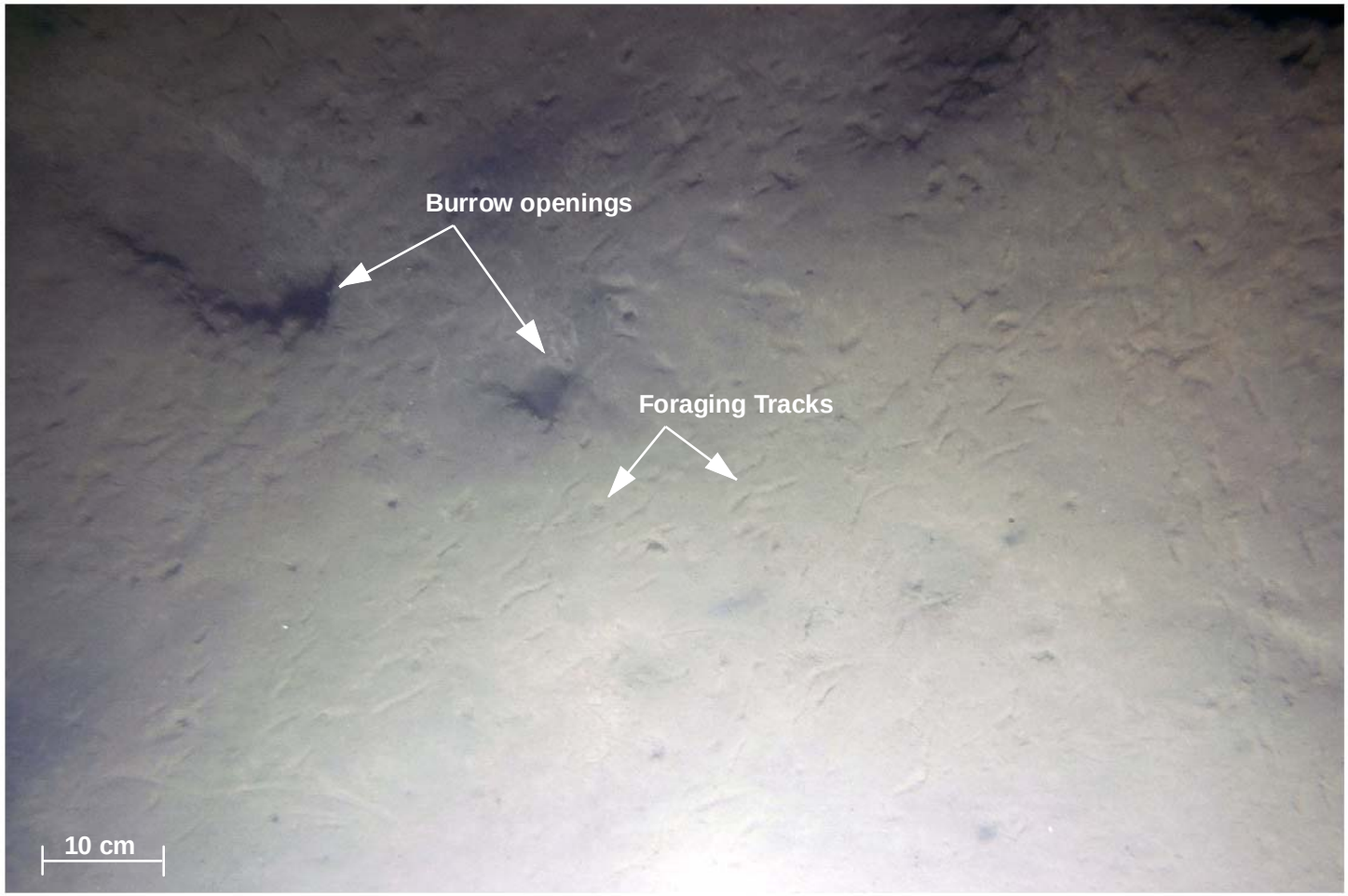

Figure 3-28. Plan view image from Station BE-02 showing the typical surface appearance of a soft, muddy bottom with a few large burrow openings and epifaunal foraging tracks.

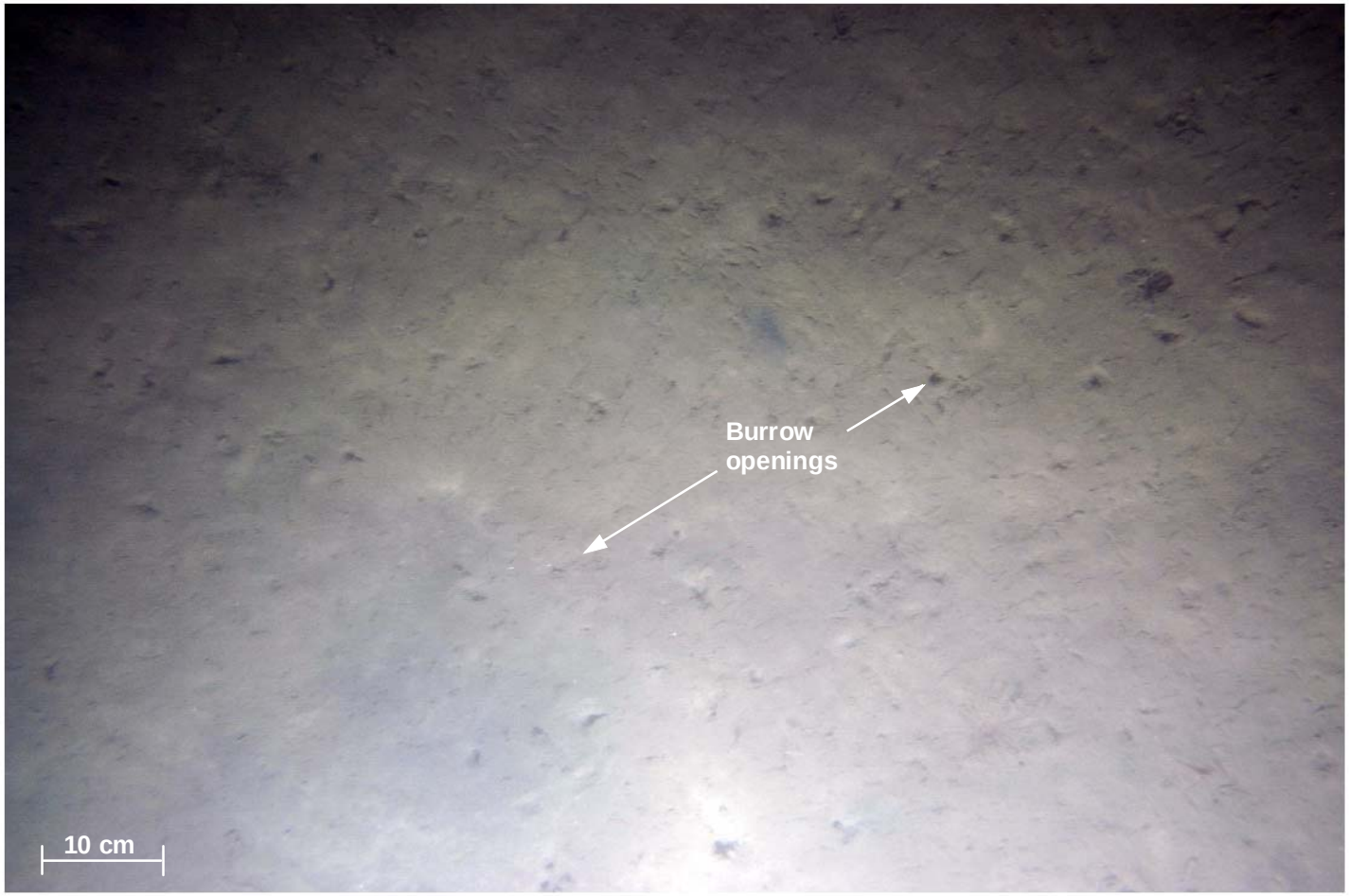

Figure 3-29. Only a few burrow openings of Stage III taxa are visible in this plan view image from Station E-03.

Figure 3-30. High densities of burrow openings from deposit-feeding infauna can be seen in this plan view image from Station REF-NE-05.

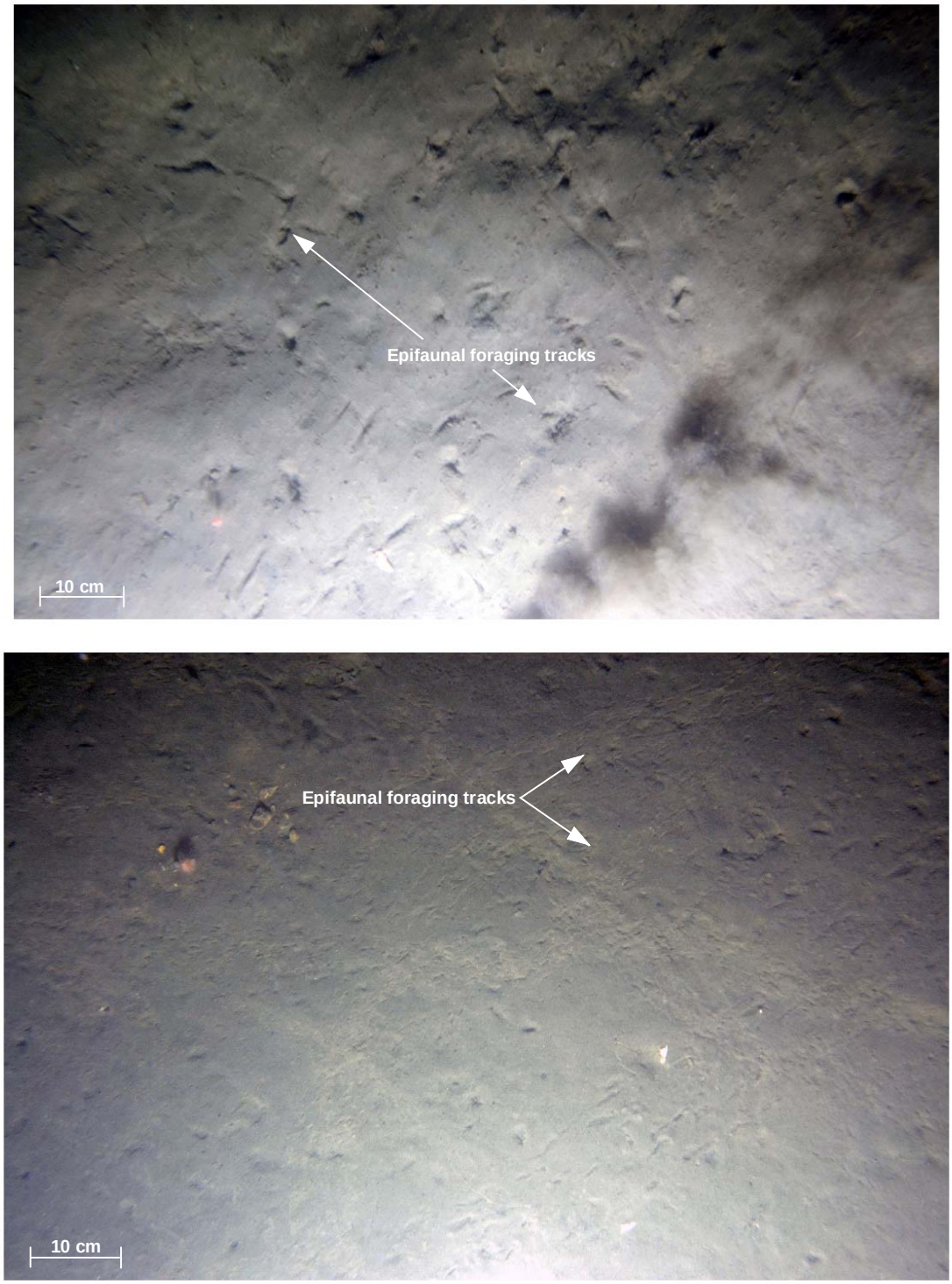

Figure 3-31. The foraging tracks of epifaunal crustaceans were very common on the muddy surface of the RISDS stations as can be seen in these plan view images from Station B-05 (top) and Station BE-04 (bottom).

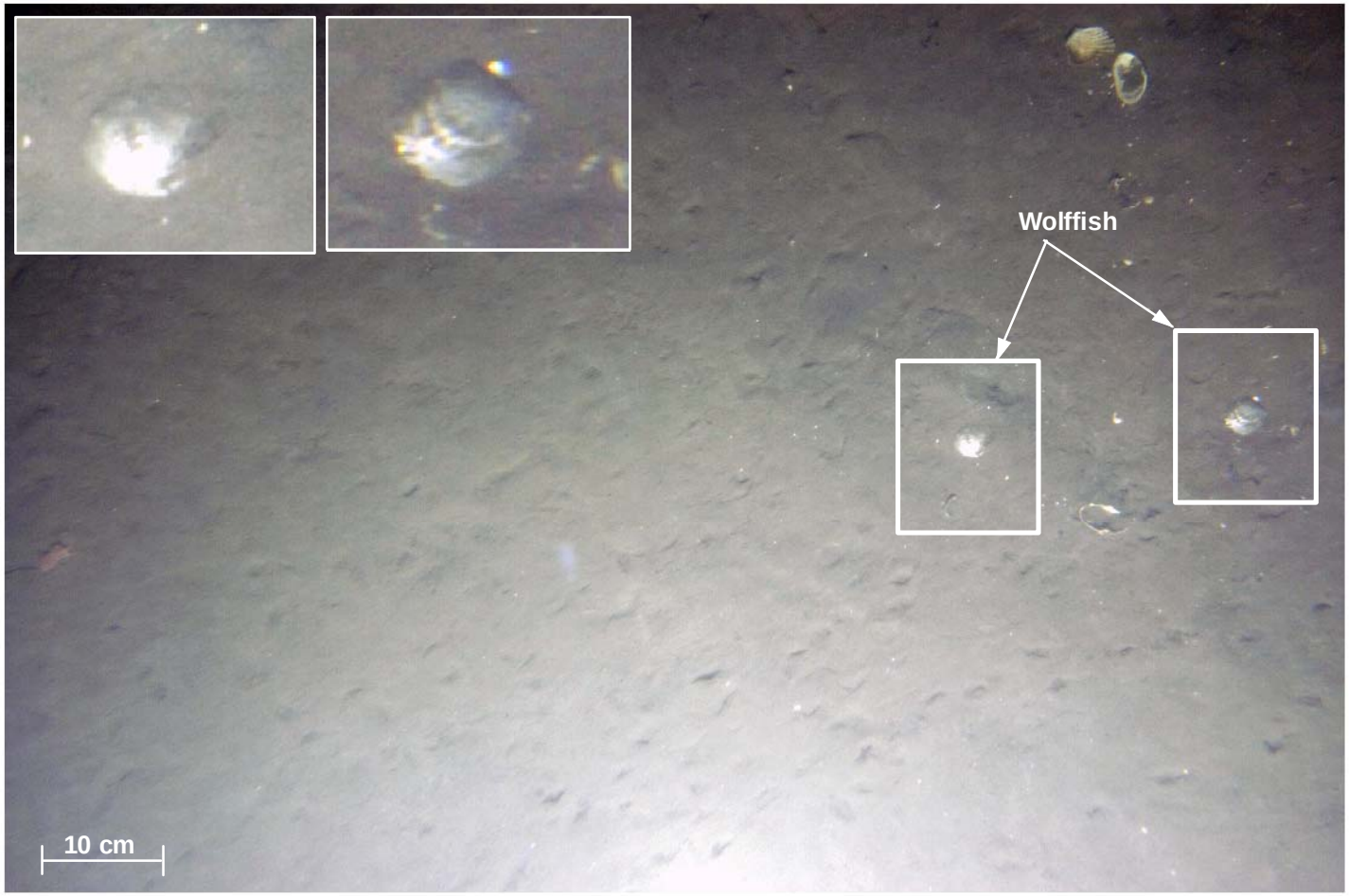

Figure 3-32. The heads of two specimens of wolffish with their predatory incisors can be seen poking out just above the sediment surface in this plan view image from Station C-04.

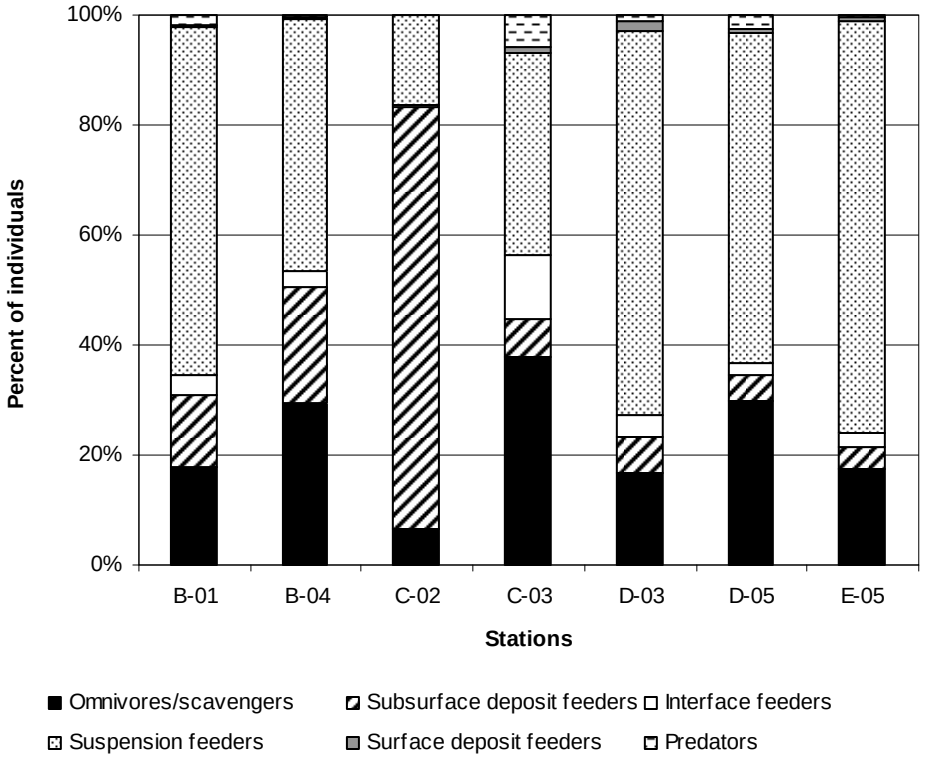

Figure 3-33. Percentage of individuals belonging to each trophic guild at RISDS stations, July 2005.

4.0 DISCUSSION

The objective of the July 2005 survey at RISDS was to assess the benthic recolonization status within RISDS following placement of sediment from the Providence River and Harbor Maintenance Dredging Project (PRHMDP). This objective was accomplished by collection and analysis of sediment-profile and plan view images and sediment grabs.

Physical Sediment Characteristics

The dredged material deposited at RISDS was primarily fine-grained sediments. Given the appearance of small-scale ripples on the sediment surface at the disposal site and the orientation of the podocerid fauna in the plan view images, it is apparent that bottom currents are capable of initiating bedload transport of the fine-grained sediments.

Biological Conditions

The biological community at RISDS is recovering relatively rapidly; and Stage II and III infauna are present throughout the region, meeting, if not exceeding, initial predictions. The SPI and plan view images showed evidence of Stage III infauna present at both the reference and the disposal sites, although as expected their densities were much lower at the disposal site. This was apparent not only from the lower overall RPD values at the disposal site (indicating lower overall bioturbation activity due to lower densities of burrowing and conveyor-belt species), but also the lower densities of burrow openings observed on the sediment surface of the plan view images from the disposal site (average of 12 per station) versus those from the references areas (more than 100 per station).

The collection of benthic grab samples aided in the interpretation of biological and recolonization processes at RISDS. The dominant organisms present in the grab samples were small filter-feeding sabellid polychaetes, phoronids, bivalve molluscs and burrowing, omnivorous nephtyid polychaetes. The presence of dense populations of filter-feeding invertebrates in the RISDS grab samples suggests that Stage II organisms dominate the surficial sediments. At the reference stations sampled in Rhode Island Sound, an even greater diversity of filter feeding organisms were present including dense populations of amphipods, bivalves, and polychaetes. There was no evidence of head-down deposit-feeding polychaetes, typical Stage III organisms, in the RISDS grab samples. Instead, larger surface-deposit feeding terebelliform polychaetes were present.

Although the benthic community analyses showed primarily Stage II organisms and few, if any, Stage III animals; only one grab was taken at each station to develop a list of representative species. Furthermore, the relatively rare occurrence of large burrow openings in the plan view images (Figure 3-29) demonstrates the unlikelihood of capturing one of these representative Stage III taxa in a 0.04 m^2 grab (approximately 1/23 the surface area of the plan view image). Differences in characterizing the vertical distribution of fauna within the sediment column are also likely to exist because the collection of benthic grab samples is limited to the top 10 cm of the sediment column, whereas the sediment-profile image allows for evaluation of the top 20 cm of the sediment column. For example the cerianthid anemones seen in plan view images, create large burrows visible in SPI images, but generally escape below the depth of the grab before a sample can be collected.

Grab samples provide demographic data about benthic community structure including a species list, abundance counts, species density, and derived metrics such as diversity. With SPI imagery, only limited identification of actual species inhabiting the site is possible. Sediment-profile image data, on the other hand, provides in situ information about dynamic processes such as bioturbation, trophic stratification, biogenic irrigation, and interspecies competition as manifested in small-scale spatial relationships. SPI technology provides for the preservation of animal-sediment relationships, allowing investigators to deduce dynamics from the animal-sediment structure (Germano et al. *in prep*).

The results of this survey suggest that the collection of benthic infaunal samples and sediment-profile and plan view images provided insight into understanding the recovery of RISDS following placement of sediment from the PRHMDP. Recolonization has proceeded as expected, if not better than expected, and is expected to continue with time.

5.0 CONCLUSIONS

The July 2005 survey provided a means to assess the benthic recolonization status within RISDS following placement of sediment from the Providence River and Harbor Maintenance Dredging Project. Based on observed patterns of physical, chemical, and biological responses of seafloor environments to dredged material disposal activity, it was expected that the benthic community within RISDS would be in an intermediate phase of recolonization (Phase II). Specifically, the community was expected to consist of small, tubicuolous polychaetes and Ampeliscid amphipods.

Following the continuous disposal of approximately four million m^3 of material since April 2003, benthic conditions across RISDS indicated that the biological community was recovering relatively rapidly and the initial predictions of the benthic community being in at least a Stage II recolonization phase were not only met but exceeded. The SPI and plan view images showed evidence of Stage III infauna present both at the reference and the disposal site, although their densities were much lower at the disposal site.

The presence of dense populations of filter-feeding invertebrates in the benthic grab samples collected at RISDS suggested that Stage II organisms dominated the surficial sediments. At the reference stations sampled in Rhode Island Sound, an even greater diversity of filter feeding organisms was present, including dense populations of amphipods, bivalves, and polychaetes. There were no head-down deposit-feeding Stage III organisms present in the grab samples collected at the disposal site; however, they were found in a few of the samples collected at the reference site.

Based on the findings of the 2005 RISDS survey, the following recommendations are proposed:

R1) Periodic bathymetric surveys should be continued to check the accuracy of the prediction that there will be a net transport of fine-grained material away from the site over time; and

R2) Periodic SPI surveys should be conducted over RISDS to confirm that a normal pattern of benthic recolonization is occurring.

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Appendix A

Disposal Barge Log Summary for RISDS
April 2003 to July 2005

Project Name: PROVIDENCE RIVER & HARBOR MAINTENANCE DREDGING
Permittee: COE-PROVIDENCE RIVER
Permit Number: 2003C0002

Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
11/1/2004	3,000	2,294	41.225000	-71.375833	Grid 8	
11/1/2004	3,000	2,294	41.226300	-71.375150	270 ft	E
4/13/2003	5,600	4,282	41.229167	-71.385000		
4/14/2003	4,200	3,211	41.234667	-71.375833		
4/15/2003	4,000	3,058	41.226606	-71.385245		
4/16/2003	4,100	3,135	41.234167	-71.371500		
4/16/2003	4,600	3,517	41.234333	-71.384833		
4/17/2003	4,000	3,058	41.235333	-71.375667		
4/18/2003	3,500	2,676	41.224764	-71.379137		
4/18/2003	3,000	2,294	41.234167	-71.385333		
4/19/2003	3,500	2,676	41.235000	-71.375667		
4/19/2003	3,500	2,676	41.234333	-71.371500		
4/20/2003	3,500	2,676	41.234333	-71.384833		
4/20/2003	3,500	2,676	41.234333	-71.384667		
4/21/2003	3,500	2,676	41.234333	-71.385000		
4/22/2003	3,500	2,676	41.234500	-71.384833		
4/23/2003	3,500	2,676	41.224798	-71.377814		
4/23/2003	3,000	2,294	41.222667	-71.384667		
4/24/2003	3,500	2,676	41.234333	-71.384833		
4/25/2003	3,500	2,676	41.224667	-71.376333	75 ft	S
4/25/2003	3,750	2,867	41.227065	-71.386116		
4/28/2003	3,500	2,676	41.235167	-71.375500		
4/28/2003	3,800	2,905	41.222667	-71.384667		
4/29/2003	1,800	1,376	41.224614	-71.372398		
4/30/2003	4,100	3,135	41.226910	-71.374106		
4/30/2003	1,800	1,376	41.235167	-71.375667		
5/1/2003	1,800	1,376	41.234333	-71.371333		
5/1/2003	1,200	917	41.234667	-71.384833		
5/3/2003	2,500	1,911	41.230667	-71.380333	100 ft	W
5/4/2003	4,200	3,211	41.235167	-71.374000		
5/4/2003	1,350	1,032	41.235167	-71.374000		
5/5/2003	4,300	3,288	41.235167	-71.385833		
5/6/2003	2,000	1,529	41.227054	-71.385738		
5/7/2003	5,000	3,823	41.226833	-71.385833		
5/8/2003	6,000	4,587	41.235167	-71.385833		
5/8/2003	4,500	3,440	41.235167	-71.374833		
5/9/2003	5,200	3,976	41.225000	-71.378333		
5/10/2003	5,000	3,823	41.225000	-71.378333		
5/11/2003	5,500	4,205	41.225000	-71.378333		
5/12/2003	5,800	4,434	41.226833	-71.385833		
5/13/2003	5,800	4,434	41.235167	-71.385833		
5/13/2003	5,400	4,129	41.226857	-71.375334		
5/14/2003	5,900	4,511	41.230667	-71.380333	100 ft	E
5/15/2003	5,400	4,129	41.237500	-71.385000		
5/16/2003	5,700	4,358	41.238500	-71.387667		
5/16/2003	5,500	4,205	41.228889	-71.383333		

Project Name: PROVIDENCE RIVER & HARBOR MAINTENANCE DREDGING
Permittee: COE-PROVIDENCE RIVER
Permit Number: 2003C0002

Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
5/17/2003	6,000	4,587	41.224222	-71.374750		
5/18/2003	5,500	4,205	41.226900	-71.385557		
5/19/2003	5,000	3,823	41.225089	-71.375103		
5/19/2003	5,400	4,129	41.230694	-71.377944		
5/19/2003	5,700	4,358	41.235333	-71.385333		
5/22/2003	5,800	4,434	41.236850	-71.385427		
5/23/2003	5,900	4,511	41.235458	-71.388217		
5/24/2003	5,600	4,282	41.232668	-71.388663		
5/24/2003	5,900	4,511	41.229312	-71.387917		
5/25/2003	5,200	3,976	41.226906	-71.388132		
5/26/2003	5,600	4,282	41.236833	-71.385425		
5/27/2003	5,700	4,358	41.235293	-71.387695		
5/28/2003	5,600	4,282	41.232614	-71.388439		
5/28/2003	5,000	3,823	41.229497	-71.387781		
5/29/2003	3,700	2,829	41.222667	-71.386000		
5/30/2003	3,700	2,829	41.223722	-71.386206		
5/31/2003	3,700	2,829	41.235500	-71.384667		
6/1/2003	3,700	2,829	41.234333	-71.386000		
6/2/2003	3,700	2,829	41.231595	-71.387999		
6/2/2003	3,700	2,829	41.224167	-71.385667		
6/7/2003	3,700	2,829	41.226546	-71.388444		
6/8/2003	3,700	2,829	41.223756	-71.386486		
6/8/2003	3,700	2,829	41.235500	-71.384333		
6/9/2003	3,700	2,829	41.234333	-71.384500		
6/10/2003	3,700	2,829	41.224000	-71.385833		
6/11/2003	3,700	2,829	41.226333	-71.386167		
6/11/2003	3,700	2,829	41.222833	-71.386000		
6/18/2003	5,500	4,205	41.237500	-71.385000		
6/19/2003	6,500	4,970	41.235500	-71.387667		
6/20/2003	6,000	4,587	41.232667	-71.388333		
6/21/2003	6,500	4,970	41.229833	-71.388167		
6/21/2003	6,200	4,740	41.227333	-71.388000		
6/22/2003	6,200	4,740	41.224500	-71.386667		
6/23/2003	6,200	4,740	41.237500	-71.385000		
6/24/2003	6,000	4,587	41.235500	-71.387667		
6/24/2003	6,500	4,970	41.232667	-71.388333		
6/25/2003	6,500	4,970	41.229833	-71.388167		
6/26/2003	3,700	2,829	41.226167	-71.386000		
6/27/2003	3,700	2,829	41.228000	-71.387667		
6/28/2003	3,700	2,829	41.235500	-71.384333		
6/29/2003	3,700	2,829	41.234167	-71.385500		
6/29/2003	3,000	2,294	41.225667	-71.383833		
6/30/2003	3,000	2,294	41.224333	-71.386333		
6/30/2003	3,000	2,294	41.227634	-71.387224		
7/1/2003	3,000	2,294	41.223626	-71.386108		
7/2/2003	4,000	3,058	41.235667	-71.384167		

Project Name: PROVIDENCE RIVER & HARBOR MAINTENANCE DREDGING
Permittee: COE-PROVIDENCE RIVER
Permit Number: 2003C0002

Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
7/3/2003	3,000	2,294	41.226167	-71.386333		
7/3/2003	4,000	3,058	41.223000	-71.386333		
7/3/2003	4,000	3,058	41.237500	-71.385000		
7/3/2003	3,000	2,294	41.222667	-71.386333		
7/4/2003	3,000	2,294	41.223975	-71.386598		
7/4/2003	4,000	3,058	41.235500	-71.387667		
7/5/2003	4,000	3,058	41.232667	-71.388333		
7/5/2003	3,000	2,294	41.236074	-71.384959		
7/6/2003	4,000	3,058	41.234500	-71.386000		
7/6/2003	2,500	1,911	41.230667	-71.380333	250 ft	S
7/6/2003	3,000	2,294	41.223667	-71.389500		
7/7/2003	4,000	3,058	41.224167	-71.386000		
7/7/2003	4,000	3,058	41.229833	-71.388167		
7/7/2003	3,000	2,294	41.222667	-71.386167		
7/8/2003	4,000	3,058	41.227333	-71.388167		
7/8/2003	3,000	2,294	41.223921	-71.386802		
7/8/2003	4,000	3,058	41.224500	-71.386667		
7/9/2003	3,000	2,294	41.235000	-71.384167		
7/9/2003	4,000	3,058	41.237500	-71.385000		
7/10/2003	3,000	2,294	41.234500	-71.386000		
7/10/2003	4,000	3,058	41.235500	-71.387667		
7/11/2003	3,500	2,676	41.231790	-71.387842		
7/11/2003	4,000	3,058	41.232667	-71.388333		
7/12/2003	3,500	2,676	41.224667	-71.386333		
7/12/2003	4,000	3,058	41.229833	-71.388167		
7/13/2003	3,500	2,676	41.222667	-71.386333		
7/13/2003	4,000	3,058	41.227333	-71.388000		
7/14/2003	3,500	2,676	41.224706	-71.387345		
7/15/2003	4,000	3,058	41.224500	-71.386667		
7/15/2003	3,500	2,676	41.236000	-71.384333		
7/16/2003	4,000	3,058	41.237500	-71.385000		
7/16/2003	4,700	3,593	41.235528	-71.388333		
7/16/2003	4,000	3,058	41.235500	-71.387667		
7/17/2003	5,000	3,823	41.232694	-71.388778		
7/17/2003	4,000	3,058	41.232667	-71.388333		
7/18/2003	6,100	4,664	41.229361	-71.387972		
7/18/2003	4,000	3,058	41.229833	-71.388167		
7/19/2003	4,000	3,058	41.227333	-71.388000		
7/20/2003	4,700	3,593	41.223972	-71.386278		
7/20/2003	4,000	3,058	41.224500	-71.386667		
7/21/2003	5,100	3,899	41.237361	-71.385222		
7/22/2003	4,000	3,058	41.237500	-71.385000		
7/22/2003	5,700	4,358	41.235222	-71.387667		
7/23/2003	4,000	3,058	41.235500	-71.387667		
7/23/2003	5,000	3,823	41.232778	-71.388333		
7/24/2003	4,000	3,058	41.232667	-71.388333		

Project Name: PROVIDENCE RIVER & HARBOR MAINTENANCE DREDGING
Permittee: COE-PROVIDENCE RIVER
Permit Number: 2003C0002

Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
7/25/2003	4,000	3,058	41.229833	-71.388167		
7/25/2003	4,000	3,058	41.230646	-71.387703		
7/25/2003	2,500	1,911	41.230667	-71.380333	100 ft	W
7/26/2003	4,000	3,058	41.222667	-71.386167		
7/26/2003	4,000	3,058	41.227333	-71.388000		
7/27/2003	4,000	3,058	41.224486	-71.387273		
7/27/2003	4,000	3,058	41.235667	-71.384333		
7/28/2003	2,500	1,911	41.230667	-71.380333	200 ft	E
7/28/2003	4,000	3,058	41.224500	-71.386667		
7/28/2003	3,000	2,294	41.231321	-71.387556		
7/29/2003	3,000	2,294	41.226000	-71.386333		
7/29/2003	4,000	3,058	41.237500	-71.385000		
7/30/2003	4,000	3,058	41.235500	-71.387667		
7/30/2003	3,000	2,294	41.222667	-71.386167		
7/31/2003	4,000	3,058	41.232667	-71.388333		
7/31/2003	3,000	2,294	41.235500	-71.384500		
7/31/2003	4,000	3,058	41.229833	-71.388333		
7/31/2003	3,000	2,294	41.234667	-71.386000		
8/1/2003	4,000	3,058	41.227333	-71.388000		
8/1/2003	4,000	3,058	41.224500	-71.386667		
8/2/2003	4,000	3,058	41.237500	-71.385000		
8/2/2003	3,000	2,294	41.224167	-71.386333		
8/2/2003	4,000	3,058	41.235500	-71.387667		
1/0/1900	0	0	0.000000	0.000000	50 ft	NE
8/2/2003	3,000	2,294	41.230700	-71.381317		
8/3/2003	4,000	3,058	41.232667	-71.388333		
8/3/2003	3,000	2,294	41.222667	-71.386167		
8/3/2003	4,000	3,058	41.229833	-71.388167		
8/4/2003	3,000	2,294	41.223926	-71.386522		
8/4/2003	4,000	3,058	41.227333	-71.388000		
8/4/2003	3,000	2,294	41.235833	-71.384167		
8/4/2003	4,000	3,058	41.224500	-71.386667		
8/5/2003	3,000	2,294	41.235245	-71.387731		
8/5/2003	4,000	3,058	41.237500	-71.385000		
8/5/2003	3,000	2,294	41.234971	-71.387484		
8/6/2003	4,000	3,058	41.237500	-71.387667		
8/6/2003	3,000	2,294	41.226000	-71.386500		
8/6/2003	4,000	3,058	41.232667	-71.388333		
8/6/2003	3,000	2,294	41.224667	-71.386000		
8/7/2003	4,000	3,058	41.229833	-71.388167		
8/7/2003	3,000	2,294	41.226557	-71.388040		
1/0/1900	0	0	41.226493	-71.387931		
8/7/2003	4,000	3,058	41.227333	-71.388000		
8/7/2003	3,000	2,294	41.237833	-71.385000		
8/8/2003	4,000	3,058	41.224500	-71.386667		
8/8/2003	3,000	2,294	41.237337	-71.385041	600'	SW

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Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
8/8/2003	2,500	1,911	41.237500	-71.385000		
8/9/2003	4,500	3,440	41.235833	-71.384500	1000'	SW
8/9/2003	2,500	1,911	41.235500	-71.387667		
8/9/2003	3,500	2,676	41.233333	-71.388167	1200'	SW
8/9/2003	2,600	1,988	41.231942	-71.388475		
8/9/2003	3,500	2,676	41.231303	-71.388941	1/4 mile	W
8/10/2003	2,400	1,835	41.228637	-71.387155		
8/10/2003	3,500	2,676	41.229479	-71.388021	1200'	W
8/10/2003	2,500	1,911	41.227067	-71.392180		
8/11/2003	3,500	2,676	41.224333	-71.385833	1/4 mile	W
8/11/2003	2,400	1,835	41.224608	-71.385808		
8/11/2003	3,000	2,294	41.222667	-71.391167	1/4 mile	NNE
8/11/2003	2,500	1,911	41.233970	-71.386762		
8/11/2003	3,500	2,676	41.224182	-71.387379	1/2 mile	W
8/12/2003	2,600	1,988	41.234053	-71.388765		
8/12/2003	3,000	2,294	41.235833	-71.384167	1200'	W
8/12/2003	2,400	1,835	41.231053	-71.388706		
8/13/2003	4,500	3,440	41.225352	-71.388183		
8/13/2003	3,000	2,294	41.234167	-71.386333	4/10 mile	W
8/13/2003	2,500	1,911	41.226978	-71.388047		
8/13/2003	3,000	2,294	41.223000	-71.385833	2000'	W
8/14/2003	3,000	2,294	41.224139	-71.385689	1400'	SW
8/14/2003	4,424	3,382	41.237463	-71.385117		
8/14/2003	2,000	1,529	41.235523	-71.388245		
8/15/2003	2,700	2,064	41.232918	-71.388745		
8/15/2003	4,700	3,593	41.229627	-71.388348		
8/16/2003	3,000	2,294	41.235333	-71.385333	900'	SW
8/16/2003	2,800	2,141	41.230865	-71.376144	50 ft	
8/17/2003	3,600	2,752	41.233833	-71.386667	1/4 mile	
8/17/2003	2,400	1,835	41.226959	-71.387513		
8/17/2003	3,000	2,294	41.230167	-71.388500	4/10 mile	W
8/17/2003	4,800	3,670	41.224156	-71.386629		
8/18/2003	3,000	2,294	41.222167	-71.386000	1/2 mile	SW
8/18/2003	2,700	2,064	41.216936	-71.380921	75 ft	
8/18/2003	3,600	2,752	41.224167	-71.383167	1/4 mile	W
8/19/2003	2,600	1,988	41.231867	-71.380817	45 ft	
8/20/2003	3,600	2,752	41.235667	-71.383500	.310	NW
8/20/2003	2,730	2,087	41.236510	-71.386686		
8/20/2003	3,300	2,523	41.235500	-71.385000	.285	SE
8/21/2003	4,910	3,754	41.233487	-71.388871		
8/22/2003	2,400	1,835	41.230820	-71.388581		
8/22/2003	3,200	2,447	41.224333	-71.386333	RISD #4	
8/22/2003	2,500	1,911	41.228188	-71.387444		
8/23/2003	2,300	1,758	41.225276	-71.387678		
8/23/2003	3,200	2,447	41.223000	-71.386000	RIS #6	
8/23/2003	3,200	2,447	41.235667	-71.385167	RISD #7	

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Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
8/24/2003	3,200	2,447	41.235667	-71.386333	RIS #8	
8/24/2003	1,800	1,376	41.232604	-71.388029		
8/24/2003	2,150	1,644	41.237503	-71.385225		
8/24/2003	3,000	2,294	41.225333	-71.386500	RISD #9	
8/24/2003	2,400	1,835	41.229482	-71.388129		
8/25/2003	2,300	1,758	41.235313	-71.387962		
8/25/2003	3,200	2,447	41.223833	-71.386000	RISD #10	
8/25/2003	1,700	1,300	41.226850	-71.387618		
8/25/2003	3,200	2,447	41.221833	-71.386000	RISD #11	
8/25/2003	2,400	1,835	41.224356	-71.386379		
8/26/2003	3,200	2,447	41.236000	-71.384667	RISD #1	
8/26/2003	2,400	1,835	41.236772	-71.386833		
8/26/2003	0	0	41.233814	-71.388646		
8/26/2003	3,200	2,447	41.234833	-71.385667	RISD #2	
8/27/2003	3,200	2,447	41.226333	-71.386333	RISD #3	
8/27/2003	2,100	1,606	41.230953	-71.388296		
8/27/2003	3,200	2,447	41.224667	-71.386333	RISD #4	
8/27/2003	2,300	1,758	41.228242	-71.387905		
8/28/2003	3,200	2,447	41.222833	-71.386000	RISD #5	
8/28/2003	2,000	1,529	41.225392	-71.387675		
8/28/2003	3,200	2,447	41.224204	-71.384994	RISD #6	
8/28/2003	2,500	1,911	41.237530	-71.384873		
8/29/2003	3,200	2,447	41.235500	-71.385333	RISD #7	
8/29/2003	2,400	1,835	41.235522	-71.387847		
8/30/2003	3,200	2,447	41.233500	-71.386333	RISD #8	
8/30/2003	3,200	2,447	41.225167	-71.386333	RISD #9	
8/30/2003	2,400	1,835	41.229646	-71.388215		
8/31/2003	2,400	1,835	41.227083	-71.388123		
8/31/2003	3,200	2,447	41.220667	-71.385500	RISD #10	
8/31/2003	2,800	2,141	41.224478	-71.385720		
8/31/2003	3,200	2,447	41.222000	-71.385833	RISD #11	
9/1/2003	2,400	1,835	41.236270	-71.386960		
9/1/2003	3,200	2,447	41.235333	-71.384333	RISD #1	
9/1/2003	2,000	1,529	41.233839	-71.388624		
9/1/2003	3,200	2,447	41.234667	-71.386167	RISD #2	
9/2/2003	2,400	1,835	41.230973	-71.388573		
9/2/2003	3,200	2,447	41.233333	-71.386333	RISD #3	
9/2/2003	2,500	1,911	41.228093	-71.387731		
9/2/2003	3,200	2,447	41.224500	-71.385667	RISD #4	
9/3/2003	3,200	2,447	41.222833	-71.385667	RISD #5	
9/3/2003	2,600	1,988	41.802798	-71.391440		
9/3/2003	3,200	2,447	41.221333	-71.385667	RISD #6	
9/4/2003	3,200	2,447	41.235333	-71.385500	RISD #7	
9/4/2003	2,400	1,835	41.235284	-71.387883		
9/4/2003	3,200	2,447	41.233667	-71.386500	RISD #8	
9/4/2003	2,600	1,988	41.232785	-71.388106		

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Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
9/5/2003	4,000	3,058	41.231083	-71.388889	RISDS #9	
9/5/2003	2,500	1,911	41.236680	-71.386467	RISDS #4	
9/5/2003	4,000	3,058	41.220250	-71.388111	RISD #10	
1/0/1900	0	0	41.228583	-71.388111	#10	
9/5/2003	2,500	1,911	41.227004	-71.387650	RISDS #5	
9/6/2003	5,400	4,129	41.225467	-71.387783	RISDS #11	
9/6/2003	2,400	1,835	41.224174	-71.387183	RISDS #6	
9/6/2003	2,500	1,911	41.236930	-71.386430	RISDS 7	
9/6/2003	5,100	3,899	41.237467	-71.384683	RISDS #1	
9/7/2003	1,700	1,300	41.233649	-71.388753	RISDS 8	
9/7/2003	5,030	3,846	41.238000	-71.386000	RISDS #2	
9/8/2003	4,700	3,593	41.232667	-71.380283	50 ft	
9/8/2003	4,700	3,593	41.231000	-71.386500	RISDS #3	
9/9/2003	4,850	3,708	(blank)	(blank)		
9/9/2003	4,500	3,440	41.224500	-71.386167	RISDS #4	
9/10/2003	2,800	2,141	41.229483	-71.396650	RISD #9	
9/11/2003	3,800	2,905	41.222500	-71.385833	RISDS #5	
9/14/2003	4,200	3,211	41.228747	-71.387817	RISD #10	
9/14/2003	2,800	2,141	41.226000	-71.387167	RISDS #11	
9/15/2003	5,200	3,976	41.225350	-71.388025	RISDS #11	
9/15/2003	2,800	2,141	41.224417	-71.386833	RISDS #6	
9/16/2003	3,200	2,447	41.235833	-71.384500	RISDS #1	
9/16/2003	2,800	2,141	41.237083	-71.386833	RISDS #7	
9/16/2003	3,200	2,447	41.234500	-71.385833	RISDS #2	
9/20/2003	3,200	2,447	41.226333	-71.386167	RISDS #3	
9/20/2003	2,800	2,141	41.233333	-71.388667	RISDS #8	
9/21/2003	3,200	2,447	41.224500	-71.386000	RISD #4	
9/21/2003	2,800	2,141	41.231167	-71.388167	RISDS #9	
9/22/2003	3,200	2,447	41.223000	-71.386000	RISD #5	
9/23/2003	2,800	2,141	41.228500	-71.387633	RISDS #10	
9/23/2003	3,300	2,523	41.234667	-71.385833	RISD#2	
9/24/2003	3,800	2,905	41.228583	-71.388100	RISDS #10	
9/24/2003	3,200	2,447	41.221333	-71.385333	RIS #6	
9/25/2003	3,800	2,905	41.237683	-71.385000	RISDS #1	
9/25/2003	2,500	1,911	41.235333	-71.385167	RISD #7	
9/25/2003	3,800	2,905	41.231300	-71.386667	RISDS #3	
9/26/2003	3,200	2,447	41.233500	-71.386333	RISDS #8	
9/26/2003	3,800	2,905	41.235600	-71.387550	RISDS #2	
9/26/2003	3,205	2,450	41.225333	-71.386333	RISD #9	
9/26/2003	3,800	2,905	41.230950	-71.380117	At buoy	
9/27/2003	1,500	1,147	41.224500	-71.386000	RISD #10	
1/0/1900	0	0	(blank)	(blank)	RISDS #10	
9/27/2003	3,000	2,294	41.225664	-71.387722	RISD #11	
9/27/2003	3,800	2,905	41.229167	-71.386667	RISDS #4	
9/27/2003	2,800	2,141	41.235833	-71.384333	RISD #1	
9/28/2003	3,200	2,447	41.234500	-71.385833	RISD #2	

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Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
9/29/2003	3,800	2,905	41.227000	-71.387500	RISDS #5	
9/29/2003	3,200	2,447	41.226167	-71.386167	RISD #3	
9/29/2003	3,800	2,905	41.224083	-71.386333	RISDS #6	
9/30/2003	3,200	2,447	41.224167	-71.385833	RISD #4	
9/30/2003	3,800	2,905	41.236680	-71.386467	RISDS #7	
10/1/2003	5,400	4,129	41.227241	-71.388184	RISDS #5	
10/1/2003	3,000	2,294	41.233517	-71.388305	RISDS #8	
10/2/2003	4,400	3,364	(blank)	(blank)	90 ft	
10/3/2003	4,500	3,440	41.224273	-71.385613		
10/3/2003	3,800	2,905	41.230750	-71.388967	RISDS #9	
10/3/2003	4,800	3,670	41.236683	-71.386391	RISDS 7	
10/4/2003	3,800	2,905	41.225000	-71.387167	RISDS #11	
10/4/2003	4,800	3,670	(blank)	(blank)	RISDS 8	
10/4/2003	4,600	3,517	(blank)	(blank)	RISDS 9	
10/5/2003	4,500	3,440	41.228504	-71.387125	RISDS 10	
10/5/2003	3,800	2,905	41.237167	-71.385500	RISDS #1	
10/5/2003	4,700	3,593	41.225532	-71.387799	RISDS 11	
10/5/2003	3,800	2,905	41.236667	-71.386333	RISDS #7	
10/6/2003	4,500	3,440	41.237652	-71.384583		
10/6/2003	3,800	2,905	41.235333	-71.388333	RISDS #2	
10/7/2003	4,500	3,440	41.235426	-71.387873		
10/7/2003	3,800	2,905	41.222667	-71.388667	RISDS #3	
10/7/2003	4,800	3,670	(blank)	(blank)	RISDS 3	
10/7/2003	3,800	2,905	41.233333	-71.388500	RISDS #8	
10/8/2003	4,850	3,708	41.229068	-71.388208	RISDS 4	
10/8/2003	3,800	2,905	41.230054	-71.389234	RISDS #9	
10/8/2003	5,100	3,899	41.227180	-71.387383	RISDS 5	
10/8/2003	3,800	2,905	41.229867	-71.387717	RISDS #4	
10/9/2003	5,200	3,976	41.236966	-71.386771	RISDS 7	
10/9/2003	3,800	2,905	41.226833	-71.388300	RISDS #5	
10/9/2003	5,300	4,052	41.232839	-71.388266	RISDS 8	
10/10/2003	3,800	2,905	41.224133	-71.386667	RISDS #6	
10/10/2003	4,800	3,670	41.230894	-71.388826	RISDS 9	
10/10/2003	3,000	2,294	41.225367	-71.388017	RISDS #11	
10/10/2003	5,300	4,052	41.227646	-71.387937	RISDS 10	
10/11/2003	3,800	2,905	41.235633	-71.385533	RISDS #1	
10/11/2003	4,400	3,364	41.225650	-71.387696	RISDS 11	
10/11/2003	4,400	3,364	41.237035	-71.385172	RISDS 1	
10/12/2003	3,800	2,905	41.235583	-71.388083	RISDS #2	
10/13/2003	5,000	3,823	41.235300	-71.387684	RISDS 2	
10/13/2003	3,800	2,905	41.229717	-71.388117	RISDS #4	
10/13/2003	3,800	2,905	41.232633	-71.387833	RISDS #3	
10/13/2003	5,300	4,052	41.712672	-71.337432	RISDS 3	
10/14/2003	5,150	3,937	41.229351	-71.388051	RISDS 4	
10/14/2003	3,800	2,905	41.227967	-71.388517	RISDS #5	
10/14/2003	3,800	2,905	41.236300	-71.385950	RISDS #7	

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Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
10/14/2003	5,300	4,052	41.227233	-71.386861	RISDS 5	
10/16/2003	3,200	2,447	41.221333	-71.384833	RISDS #6	
10/16/2003	3,200	2,447	41.235333	-71.385333	RISDS #7	
10/17/2003	3,800	2,905	41.224550	-71.386467	RISDS #6	
10/17/2003	3,800	2,905	41.224267	-71.387967	RISDS #9	
10/17/2003	3,200	2,447	41.233500	-71.386667	RISDS #8	
10/17/2003	3,800	2,905	41.233083	-71.389117	RISDS #8	
10/18/2003	3,200	2,447	41.225167	-71.386667	RISDS #9	
10/18/2003	3,800	2,905	41.228417	-71.387800	RISDS #10	
10/18/2003	3,200	2,447	41.223500	-71.385833	RISDS #10	
10/19/2003	3,800	2,905	41.236867	-71.385633	RISDS #1	
10/19/2003	3,200	2,447	41.225655	-71.386882	RISDS #11	
10/19/2003	3,800	2,905	41.225533	-71.387533	RISDS #11	
10/19/2003	3,200	2,447	41.235667	-71.384333	RISDS #1	
10/19/2003	3,800	2,905	41.235450	-71.387467	RISDS #2	
10/20/2003	3,200	2,447	41.234333	-71.386000	RISDS #2	
10/20/2003	3,800	2,905	41.229117	-71.388200	RISDS #3	
10/20/2003	3,200	2,447	41.226167	-71.386167	RISDS #3	
10/20/2003	3,800	2,905	41.229647	-71.387701	RISDS #4	
10/21/2003	3,200	2,447	41.224333	-71.386000	RISDS #4	
10/22/2003	3,200	2,447	41.222667	-71.385500	RISDS #5	
10/22/2003	3,800	2,905	41.237383	-71.381783	RISDS #13	
10/22/2003	3,200	2,447	41.223961	-71.385627	RISDS #6	
10/23/2003	3,800	2,905	41.237000	-71.385333	RISDS #12	
10/23/2003	3,200	2,447	41.235167	-71.385167	RISDS #7	
10/23/2003	3,800	2,905	41.237580	-71.375536	RISDS #14	
10/23/2003	3,200	2,447	41.233500	-71.386500	RISDS #8	
10/24/2003	3,800	2,905	41.236486	-71.371502	RISDS #15	
10/24/2003	3,200	2,447	41.225167	-71.386333	RISDS #9	
10/24/2003	3,200	2,447	41.223667	-71.385500	RISDS #10	
10/24/2003	3,800	2,905	41.235429	-71.371195	RISDS #16	
10/25/2003	3,200	2,447	41.224864	-71.385895	RISDS #11	
10/25/2003	3,800	2,905	41.237800	-71.381617	RISDS #12	
10/25/2003	3,200	2,447	41.235500	-71.384667	RISDS #12	
10/26/2003	3,800	2,905	41.237417	-71.378000	RISDS #13	
10/26/2003	3,200	2,447	41.235833	-71.375500	RISDS #13	
10/26/2003	3,800	2,905	41.237360	-71.375140	RISDS #14	
10/26/2003	3,200	2,447	41.235667	-71.371500	RISDS #14	
10/27/2003	3,200	2,447	41.235500	-71.369667	RISDS #15	
10/27/2003	3,800	2,905	41.237167	-71.371633	RISDS #15	
10/28/2003	3,000	2,294	41.234500	-71.368833	RISDS #16	
10/28/2003	3,800	2,905	41.234450	-71.370283	RISDS #16	
10/30/2003	3,800	2,905	41.236667	-71.381667	RISDS #12	
10/30/2003	4,200	3,211	41.236942	-71.384749	RISDS #1	
10/31/2003	3,800	2,905	41.238050	-71.378050	RISDS #13	
10/31/2003	5,100	3,899	41.235456	-71.388068	CAD 2	

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Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
10/31/2003	3,800	2,905	41.238133	-71.373450	RISDS #14	
10/31/2003	5,000	3,823	41.232567	-71.388308		
11/1/2003	3,800	2,905	41.235633	-71.370800	RISDS #16	
11/1/2003	5,100	3,899	41.229304	-71.388032	Cell 4	
11/2/2003	3,800	2,905	41.236950	-71.372217	RISDS #15	
11/2/2003	5,100	3,899	41.227427	-71.387553	Cell 5	
11/2/2003	3,800	2,905	41.238050	-71.381667	RISDS #12	
11/3/2003	4,800	3,670	41.224393	-71.386198	Cell 6	
11/3/2003	5,000	3,823	41.236536	-71.386940	Cell 7	
11/4/2003	4,800	3,670	41.233903	-71.388529	Cell 8	
11/4/2003	4,800	3,670	41.230870	-71.389083	Cell 9	
11/4/2003	3,800	2,905	41.237783	-71.379217	RISDS #13	
11/5/2003	4,800	3,670	41.227859	-71.387376	Cell 10	
11/5/2003	3,800	2,905	41.237283	-71.375000	RISDS #14	
11/5/2003	4,900	3,746	41.225853	-71.386569	Cell 11	
11/6/2003	3,800	2,905	41.236813	-71.372189	CAD 15	
11/6/2003	4,800	3,670	41.237610	-71.381618	Cell 12	
11/6/2003	3,800	2,905	41.234179	-71.370631	CAD 16	
11/6/2003	5,000	3,823	41.237743	-71.378407	Cell 13	
11/7/2003	3,800	2,905	41.236167	-71.375833	CAD 12	
11/7/2003	5,200	3,976	41.237496	-71.375236	Cell 14	
11/7/2003	4,900	3,746	41.237152	-71.371938	Cell 15	
11/7/2003	3,800	2,905	41.236000	-71.373167	CAD 13	
11/8/2003	4,600	3,517	41.235036	-71.370717	Cell 16	
11/8/2003	4,700	3,593	41.237272	-71.385728	Cell 1	
11/9/2003	3,800	2,905	41.237388	-71.371344	CAD 15	
11/9/2003	4,600	3,517	41.235460	-71.387744	Cell 2	
11/9/2003	3,700	2,829	41.232199	-71.371343	CAD 16	
11/9/2003	5,000	3,823	41.232194	-71.388609	Cell 3	
11/10/2003	4,700	3,593	41.229426	-71.388011	Cell 4	
11/10/2003	3,800	2,905	41.235667	-71.385833		
11/10/2003	4,900	3,746	41.226928	-71.387745	Cell 5	
11/10/2003	3,700	2,829	41.236167	-71.373500	CAD 16	
11/11/2003	4,800	3,670	41.224544	-71.386285	Cell 6	
11/11/2003	4,900	3,746	41.236224	-71.386319	Cell 7	
11/11/2003	3,700	2,829	41.236167	-71.375667	CAD 12	
11/12/2003	4,700	3,593	41.233738	-71.388670	Cell 8	
11/12/2003	3,800	2,905	41.234833	-71.378333	CAD 13	
11/12/2003	4,500	3,440	41.231615	-71.388880	Cell 9	
11/12/2003	3,800	2,905	41.234333	-71.382667	50 yds	E
11/15/2003	5,200	3,976	41.223333	-71.385667	RISD #10	
11/15/2003	3,700	2,829	41.235500	-71.369833	CAD 15	
11/16/2003	5,200	3,976	41.224986	-71.387036	RISD #11	
11/16/2003	3,800	2,905	41.225762	-71.380971	100 yds	S
11/16/2003	5,200	3,976	41.235667	-71.375500	RISD #12	
11/17/2003	3,800	2,905	41.234500	-71.369167	CAD 16	

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Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
11/17/2003	3,200	2,447	41.235833	-71.373500	RISD #13	
11/17/2003	3,800	2,905	41.236000	-71.375500	CAD 12	
11/18/2003	5,200	3,976	41.235833	-71.371500	RISD #14	
11/18/2003	5,200	3,976	41.235500	-71.369667	Cell 15	
11/18/2003	3,800	2,905	41.237989	-71.378386	CAD 13	
11/21/2003	5,200	3,976	41.235090	-71.370440	RISD #16	
11/21/2003	3,650	2,791	41.236000	-71.374000	CAD 13	
11/21/2003	5,200	3,976	41.235667	-71.384333	RISD #1	
11/22/2003	3,800	2,905	41.236500	-71.371500	CAD 14	
11/22/2003	5,200	3,976	41.234333	-71.385833	RISD #2	
11/22/2003	3,800	2,905	41.235667	-71.369667	CAD 15	
11/23/2003	5,200	3,976	41.226167	-71.386333	RISD #3	
11/23/2003	3,800	2,905	41.235464	-71.371072	CAD 16	
11/23/2003	5,100	3,899	41.235833	-71.371667	CAD 14	
11/23/2003	5,200	3,976	41.224333	-71.386000	RISD #4	
11/24/2003	3,700	2,829	41.235500	-71.369333	CAD 15	
11/24/2003	5,200	3,976	41.222833	-71.385667	RISD #5	
11/25/2003	5,200	3,976	41.223889	-71.225188	RISD #6	
11/25/2003	3,800	2,905	41.235667	-71.369667	CAD 15	
11/25/2003	5,200	3,976	41.235167	-71.385000	RISD #7	
11/25/2003	3,700	2,829	41.235833	-71.371667	CAD14	
11/26/2003	3,700	2,829	41.235266	-71.370483	CAD 16	
11/26/2003	5,200	3,976	41.225500	-71.373500	RISD #8	
11/26/2003	5,200	3,976	41.225000	-71.386500	RISD #9	
11/26/2003	3,700	2,829	41.239000	-71.381667	CAD 12	
11/27/2003	5,200	3,976	41.223833	-71.386000	RISD #10	
11/27/2003	3,700	2,829	41.235500	-71.373667	CAD 13	
11/27/2003	5,200	3,976	41.225188	-71.386654	RISD #11	
11/29/2003	3,700	2,829	41.235833	-71.371500	CAD 14	
12/3/2003	4,900	3,746	41.237390	-71.381388	Cell 12	
12/3/2003	3,900	2,982	41.236000	-71.376000	Cell #12	
12/3/2003	4,300	3,288	41.237985	-71.375522	Cell 14	
12/3/2003	4,700	3,593	41.237429	-71.379276	Cell 13	
12/5/2003	3,900	2,982	41.236000	-71.374167	Cell #13	
12/8/2003	4,700	3,593	41.237049	-71.371800	Cell 15	
12/8/2003	3,900	2,982	41.235667	-71.371833	Cell #14	
12/9/2003	3,900	2,982	41.235282	-71.370896	Cell 16	
12/9/2003	3,900	2,982	41.650667	-71.383667	420 ft	W
12/9/2003	3,900	2,982	41.237203	-71.385257	Cell 1	
12/10/2003	3,800	2,905	41.235000	-71.388889	No Buoy	
12/10/2003	5,000	3,823	41.231967	-71.381967	Buoy 200ft	
12/13/2003	5,200	3,976	41.226167	-71.386167	RISD #3	
12/14/2003	3,800	2,905	41.224500	-71.386000	CAD #4	
12/16/2003	3,800	2,905	41.222833	-71.385833	CAD #5	
12/17/2003	3,900	2,982	41.225167	-71.386500	Cell #9	
12/19/2003	3,400	2,599	41.224393	-71.386245	Cell 6	

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12/19/2003	4,300	3,288	41.236596	-71.386996	Cell 7	
12/21/2003	4,000	3,058	41.233852	-71.388955	Cell 8	
12/24/2003	3,900	2,982	41.233500	-71.386500	Cell #8	
12/29/2003	4,400	3,364	41.223500	-71.385667	Cell 10	
12/30/2003	5,800	4,434	41.235833	-71.375500	Cell #12	
12/31/2003	6,500	4,970	41.235833	-71.373667	Cell #13	
1/1/2004	6,500	4,970	41.235333	-71.371667	Cell #14	
1/2/2004	4,500	3,440	41.235333	-71.369500	Cell #15	
1/2/2004	5,300	4,052	41.232823	-71.370190	Cell #16	
1/3/2004	6,000	4,587	41.235667	-71.383667	Cell #1	
1/3/2004	6,000	4,587	41.234500	-71.385833	Cell #2	
1/4/2004	5,400	4,129	41.226000	-71.386500	Cell 3	
1/4/2004	4,500	3,440	41.224000	-71.386167	Cell #4	
1/5/2004	5,350	4,090	41.226117	-71.387816	Cell #5	
1/5/2004	3,800	2,905	41.223741	-71.385860	CAD #6	
1/6/2004	3,800	2,905	41.235000	-71.385000	CAD #7	
1/6/2004	3,800	2,905	41.233500	-71.386333	CAD #8	
1/9/2004	3,800	2,905	41.225000	-71.386333	CAD #9	
1/9/2004	3,800	2,905	41.226440	-71.386575	CAD #5	
1/10/2004	6,000	4,587	41.235167	-71.385833	100 ft	SW
1/10/2004	3,800	2,905	41.223333	-71.385333	CAD #10	
1/12/2004	3,800	2,905	41.225219	-71.386937	CAD #11	
1/12/2004	3,800	2,905	41.235667	-71.386833	CAD #1	
1/13/2004	3,800	2,905	41.234333	-71.386000	CAD #2	
1/14/2004	3,800	2,905	41.226000	-71.385833	CAD #3	
1/15/2004	3,800	2,905	41.224167	-71.385833	CAD #4	
1/17/2004	3,800	2,905	41.223000	-71.385667	CAD #5	
1/18/2004	3,800	2,905	41.224131	-71.385667	CAD #6	
1/18/2004	3,800	2,905	41.235000	-71.386500	CAD #7	
1/20/2004	3,900	2,982	41.232480	-71.388370	Cell 8	
1/21/2004	5,000	3,823	41.224667	-71.374833	100	W
1/21/2004	4,000	3,058	41.229002	-71.387489	Cell 9	
1/21/2004	5,000	3,823	41.224833	-71.375167	150	W
1/22/2004	4,000	3,058	41.228005	-71.386862	Cell 10	
1/24/2004	4,200	3,211	41.224500	-71.374000	200	E
1/24/2004	3,700	2,829	41.225558	-71.387150	Cell 11	
1/25/2004	5,500	4,205	41.224500	-71.374167	150	E
1/25/2004	3,800	2,905	41.237615	-71.382128	Cell 12	
1/26/2004	5,354	4,093	41.224833	-71.374500	100	E
1/26/2004	3,700	2,829	41.237735	-71.378504	Cell 13	
1/27/2004	4,000	3,058	41.237413	-71.374903	Cell 14	
1/27/2004	6,400	4,893	41.225000	-71.375167	150	W
1/27/2004	4,200	3,211	41.237041	-71.372080	Cell 15	
1/30/2004	3,600	2,752	41.235101	-71.370992	Cell 16	
1/30/2004	5,500	4,205	41.237500	-71.385000	0 ft	
1/31/2004	3,800	2,905	41.237053	-71.385534	Cell 1	

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Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
1/31/2004	5,100	3,899	41.235700	-71.387667	0ft from	#2
1/31/2004	4,000	3,058	41.235203	-71.387684	Cell 2	
2/1/2004	4,500	3,440	41.231017	-71.388633	50 ft	S
2/1/2004	3,600	2,752	41.226574	-71.374880	Cell D	
2/1/2004	5,353	4,093	41.230833	-71.381117	175 ft	W
2/2/2004	2,800	2,141	41.227117	-71.386083	Cell C	
2/2/2004	4,800	3,670	41.227167	-71.373800	250 ft	W
2/2/2004	2,900	2,217	41.224413	-71.372362	Cell G	
2/2/2004	5,563	4,253	41.226950	-71.385633	0 ft	
2/3/2004	3,900	2,982	41.230757	-71.382421	buoy	
2/3/2004	5,147	3,935	41.236633	-71.382133	35 ft	W
2/4/2004	3,800	2,905	41.224689	-71.373241	CAD G	
2/5/2004	4,450	3,402	41.236583	-71.383300	25 ft	W
2/5/2004	3,800	2,905	41.225000	-71.374167	# buoy	
2/5/2004	6,000	4,587	41.235100	-71.374517	50 ft	NE
2/5/2004	3,800	2,905	41.225246	-71.378646	CAD E	
2/6/2004	4,015	3,070	41.216289	-71.382042	see notes	
2/6/2004	3,800	2,905	41.222667	-71.371667	CAD D	
2/6/2004	6,900	5,275	41.231550	-71.381967	400 ft	W
2/9/2004	4,000	3,058	41.226367	-71.385133	145 ft	E
2/9/2004	3,800	2,905	41.234500	-71.371333	CAD B	
2/9/2004	6,000	4,587	41.225717	-71.378088	50 ft	S
2/9/2004	5,563	4,253	41.225050	-71.381000	195 ft	E
2/10/2004	3,800	2,905	41.228333	-71.382167	CAD #buoy	
2/10/2004	5,100	3,899	41.235217	-71.374883	0 ft	
2/10/2004	3,800	2,905	41.234167	-71.385000	CAD A	
2/11/2004	4,500	3,440	41.230833	-71.378883	320 ft	W
2/11/2004	3,800	2,905	41.234167	-71.384667	CAD A	
2/11/2004	5,353	4,093	41.226440	-71.385237	50 ft	E
2/11/2004	4,100	3,135	41.225050	-71.378250	0 ft	
2/11/2004	3,800	2,905	41.222833	-71.371667	CAD D	
2/12/2004	6,000	4,587	41.226492	-71.375042	25	E
2/12/2004	4,441	3,395	41.234550	-71.385750	100 ft	S
2/12/2004	5,300	4,052	41.234877	-71.385833		
2/12/2004	3,810	2,913	41.234167	-71.384500	A	
2/13/2004	4,600	3,517	41.230833	-71.379350	235 ft	W
2/13/2004	6,000	4,587	41.236336	-71.381507		
2/13/2004	4,600	3,517	41.230600	-71.378883	350 ft	E
2/13/2004	4,318	3,301	41.226344	-71.388537		
2/13/2004	3,800	2,905	41.234333	-71.384833	A	
2/14/2004	4,935	3,773	41.224546	-71.377840		
2/14/2004	4,600	3,517	41.226417	-71.374350	100 ft	E
2/14/2004	4,000	3,058	41.234167	-71.384500	A	
2/14/2004	6,000	4,587	41.226865	-71.385883		
2/14/2004	4,728	3,615	41.230750	-71.378867	340 ft	E
2/15/2004	3,800	2,905	41.224833	-71.374667		

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2/15/2004	4,728	3,615	41.230617	-71.379667	150 ft	E
2/15/2004	5,100	3,899	41.235881	-71.374513		
2/15/2004	3,800	2,905	41.222833	-71.372000	D	
2/15/2004	5,100	3,899	41.226925	-71.385811	0 ft	
2/16/2004	3,800	2,905	41.235000	-71.375667	F	
2/16/2004	4,728	3,615	41.226500	-71.369283	0 ft	
2/16/2004	6,000	4,587	41.225175	-71.378167		
2/16/2004	3,800	2,905	41.224833	-71.374500	buoy	
2/16/2004	4,728	3,615	41.235250	-71.385617	35 ft	E
2/17/2004	3,800	2,905	41.234167	-71.385000	A	
2/17/2004	3,912	2,991	41.225117	-71.378383	0 ft	
2/17/2004	6,000	4,587	41.227093	-71.385747		
2/17/2004	2,800	2,141	41.236090	-71.381950	Cell F	
2/17/2004	4,100	3,135	41.226117	-71.376250	300 ft	SW
2/18/2004	4,523	3,458	41.236532	-71.381746	Cell F	
2/18/2004	2,900	2,217	41.226415	-71.386313	Cell C	
2/18/2004	4,523	3,458	41.226337	-71.385514	100 ft	S
2/19/2004	5,000	3,823	41.230167	-71.384000	center	
2/20/2004	4,000	3,058	41.230217	-71.380217	0 ft	
2/20/2004	2,400	1,835	41.224874	-71.378984	Cell E	
2/20/2004	2,800	2,141	41.226542	-71.385453	Cell C	
2/20/2004	4,523	3,458	41.236765	-71.381704	0 ft	
2/20/2004	5,000	3,823	41.234960	-71.374938	Cell B	
2/20/2004	2,500	1,911	41.227494	-71.384642	Cell C	
2/21/2004	4,728	3,615	41.235227	-71.385844	0 ft	
2/21/2004	6,000	4,587	41.235015	-71.386237	Cell A	
2/21/2004	4,900	3,746	41.231033	-71.380083	35 ft	E
2/21/2004	2,800	2,141	41.235847	-71.381545	Cell F	
2/21/2004	4,103	3,137	41.226967	-71.375217	0 ft	
2/22/2004	1,850	1,414	41.235344	-71.374457	CAD B	
2/22/2004	2,800	2,141	41.236232	-71.381436	Cell F	
2/22/2004	4,100	3,135	41.224800	-71.378167	35 ft	W
2/22/2004	2,900	2,217	41.224902	-71.372375	CAD G	
2/22/2004	4,100	3,135	41.234917	-71.385250	135 ft	W
2/22/2004	2,900	2,217	41.227117	-71.385961	Cell C	
2/23/2004	4,000	3,058	41.234933	-71.375017	35 ft	W
2/23/2004	2,950	2,255	41.234044	-71.385497	CAD A	
2/23/2004	2,800	2,141	41.227242	-71.375113	Cell D	
2/23/2004	4,728	3,615	41.237283	-71.382333	175 ft	NW
2/24/2004	4,728	3,615	41.226700	-71.385750	0 ft	
2/24/2004	2,800	2,141	41.236256	-71.382032	Cell F	
2/24/2004	3,000	2,294	41.224977	-71.378399	CAD E	
2/24/2004	4,935	3,773	41.229917	-71.380167	0 ft	
2/24/2004	2,800	2,141	41.236688	-71.382284	Cell F	
2/25/2004	3,000	2,294	41.226582	-71.374946	CAD D	
2/25/2004	2,500	1,911	41.230226	-71.379992	Cell buoy	

Project Name: PROVIDENCE RIVER & HARBOR MAINTENANCE DREDGING
Permittee: COE-PROVIDENCE RIVER
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Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
2/25/2004	4,523	3,458	41.226750	-71.385917	0 ft	
2/25/2004	2,400	1,835	41.234712	-71.385862	Cell A	
2/25/2004	5,563	4,253	41.235333	-71.385467	35 ft	W
2/26/2004	2,700	2,064	41.234783	-71.375281	Cell B	
2/26/2004	4,935	3,773	41.226667	-71.374917	0 ft	
2/26/2004	2,500	1,911	41.236259	-71.381935	Cell F	
2/26/2004	4,114	3,145	41.230250	-71.380300	50 ft	S
2/27/2004	2,700	2,064	41.226315	-71.385427	Cell C	
2/27/2004	5,143	3,932	41.226550	-71.385700	0 ft	
2/27/2004	2,500	1,911	41.234820	-71.375231	Cell B	
2/27/2004	4,935	3,773	41.226333	-71.375083	100 ft	S
2/27/2004	2,500	1,911	41.236327	-71.382034	Cell F	
2/27/2004	4,114	3,145	41.230700	-71.380700	0 ft	
2/28/2004	2,600	1,988	41.225964	-71.385515	CAD C	
2/28/2004	2,500	1,911	41.227439	-71.385290	Cell C	
2/28/2004	4,935	3,773	41.235250	-71.375083	0 ft	
2/28/2004	2,900	2,217	41.230248	-71.380080	CAD buoy	
2/28/2004	2,500	1,911	41.234861	-71.385879	Cell A	
2/29/2004	5,774	4,415	41.226833	-71.385533	0 ft	
2/29/2004	2,800	2,141	41.226532	-71.374328	CAD D	
2/29/2004	5,143	3,932	41.236883	-71.381750	0 ft	
3/1/2004	3,000	2,294	41.235086	-71.385278	Cell A	
3/1/2004	3,100	2,370	41.224898	-71.378512	CAD E	
3/1/2004	4,935	3,773	41.235117	-71.374917	0 ft	
3/1/2004	2,600	1,988	41.230530	-71.379945	Cell buoy	
3/1/2004	2,700	2,064	41.227222	-71.389344	CAD buoy	
3/1/2004	4,935	3,773	41.224667	-71.378383	75 ft	N
3/2/2004	2,400	1,835	41.236384	-71.382053	Cell F	
3/2/2004	4,935	3,773	41.225300	-71.378717	75 ft	N
3/2/2004	2,900	2,217	41.225970	-71.375420	CAD D	
3/3/2004	3,800	2,905	41.224833	-71.374833	buoy	
3/3/2004	5,143	3,932	41.230600	-71.380367	0 ft	
3/3/2004	3,800	2,905	41.225000	-71.374667	buoy	
3/3/2004	5,143	3,932	41.230500	-71.380033	90 ft	W
3/3/2004	3,200	2,447	41.231542	-71.381310	CAD buoy	
3/4/2004	4,216	3,223	41.225200	-71.373000	90 ft	W
3/4/2004	2,600	1,988	41.234713	-71.385398	CAD A	
3/4/2004	3,000	2,294	41.230333	-71.376000	buoy	
3/4/2004	3,811	2,914	41.235050	-71.374833	0 ft	
3/5/2004	2,900	2,217	41.226497	-71.374964	CAD D	
3/5/2004	5,353	4,093	41.230667	-71.380000	125 ft	E
3/5/2004	3,800	2,905	41.230667	-71.374667	buoy	
3/5/2004	2,900	2,217	41.233971	-71.386348	CAD A	
3/6/2004	5,143	3,932	41.225200	-71.378767	45 ft	N
3/6/2004	3,800	2,905	41.225135	-71.379438	E	
3/6/2004	3,000	2,294	41.225086	-71.378006	CAD E	

Project Name: PROVIDENCE RIVER & HARBOR MAINTENANCE DREDGING
Permittee: COE-PROVIDENCE RIVER
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Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
3/7/2004	3,800	2,905	41.225329	-71.379067	E	
3/7/2004	5,353	4,093	41.230500	-71.380333	0 ft	
3/7/2004	3,500	2,676	41.230670	-71.380330	CAD buoy	
3/7/2004	3,800	2,905	41.234167	-71.371667	B	
3/7/2004	5,143	3,932	41.226883	-71.385533	0 ft	
3/8/2004	2,800	2,141	41.235326	-71.374991	CAD B	
3/8/2004	3,800	2,905	41.235167	-71.376000	F	
3/9/2004	4,831	3,694	41.224883	-71.378367	0 ft	
3/9/2004	3,800	2,905	41.224741	-71.378239	E	
3/9/2004	2,925	2,236	41.234453	-71.374531	CAD B	
3/9/2004	5,353	4,093	41.234750	-71.386433	200 ft	NW
3/9/2004	3,800	2,905	41.229667	-71.380833	Buoy #2	
3/10/2004	2,800	2,141	41.230482	-71.380323	CAD buoy	
3/10/2004	3,800	2,905	41.235333	-71.375833	F	
3/10/2004	2,775	2,122	41.227060	-71.386644	CAD C	
3/10/2004	2,800	2,141	41.224833	-71.378217	0 ft	
3/12/2004	4,318	3,301	41.235033	-71.374450	50 ft	E
3/12/2004	3,800	2,905	41.234167	-71.371500	B	
3/12/2004	2,950	2,255	41.226743	-71.384696	CAD C	
3/13/2004	3,800	2,905	41.235050	-71.386117	0 ft	
3/13/2004	3,800	2,905	41.234167	-71.384833	A	
3/13/2004	5,880	4,496	41.229800	-71.380200	150 ft	S
3/13/2004	2,875	2,198	41.229600	-71.379972	CAD buoy	
3/13/2004	3,800	2,905	41.222833	-71.371667	D	
3/14/2004	4,831	3,694	41.235191	-71.375141	50 ft	W
3/14/2004	3,800	2,905	41.234167	-71.371833	B	
3/14/2004	3,000	2,294	41.227977	-71.375747	CAD A	
3/14/2004	3,831	2,929	41.235000	-71.385867	0 ft	
3/14/2004	3,800	2,905	41.222667	-71.371500	D	
3/14/2004	2,925	2,236	41.227194	-71.375668	CAD D	
3/15/2004	5,563	4,253	41.226933	-71.374883	0 ft	
3/15/2004	3,800	2,905	41.223167	-71.385000	C	
3/15/2004	2,975	2,275	41.225059	-71.378122	CAD E	
3/15/2004	5,040	3,853	41.235133	-71.385417	75 ft	E
3/15/2004	3,800	2,905	41.235167	-71.375667	F	
3/15/2004	2,900	2,217	41.226425	-71.374517	CAD D	
3/15/2004	3,800	2,905	41.222667	-71.384500	C	
3/16/2004	3,800	2,905	41.230667	-71.380083	75 ft	E
3/16/2004	3,800	2,905	41.223000	-71.384833	C	
3/16/2004	3,000	2,294	41.225086	-71.382141	Cell C	
3/16/2004	5,040	3,853	41.234950	-71.385217	135 ft	E
3/16/2004	2,000	1,529	41.234766	-71.386212	Cell A	
3/16/2004	2,500	1,911	41.234915	-71.386308	Cell A	
3/18/2004	2,400	1,835	41.226638	-71.385206	Cell C	
3/18/2004	5,143	3,932	41.224717	-71.378133	65 ft	N
3/18/2004	2,800	2,141	41.226106	-71.385122	Cell C	

Project Name: PROVIDENCE RIVER & HARBOR MAINTENANCE DREDGING
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Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
3/18/2004	4,318	3,301	41.230167	-71.380783	150 ft	SW
3/19/2004	3,100	2,370	41.234647	-71.374684	Cell B	
3/19/2004	2,900	2,217	41.234333	-71.371833	Cell B	
3/19/2004	6,198	4,739	41.237000	-71.382100	35 ft	W
3/19/2004	2,900	2,217	41.226884	-71.385869	Cell C	
3/20/2004	5,353	4,093	41.225000	-71.378500	0 ft	
3/20/2004	2,800	2,141	41.224949	-71.378606	Cell E	
3/20/2004	2,800	2,141	41.224920	-71.378752	Cell E	
3/20/2004	5,458	4,173	41.230325	-71.379843	100 ft	W
3/22/2004	2,900	2,217	41.224974	-71.373222	Cell G	
3/22/2004	3,800	2,905	41.226717	-71.386083	0 ft	
3/22/2004	2,900	2,217	41.226254	-71.385568	Cell C	
3/22/2004	2,850	2,179	41.234314	-71.386471	Cell A	
3/22/2004	6,090	4,656	41.234717	-71.375500	400 ft	SW
3/23/2004	2,900	2,217	41.225316	-71.378759	Cell E	
3/23/2004	2,900	2,217	41.234768	-71.374371	Cell B	
3/23/2004	5,040	3,853	41.235183	-71.385750	0 ft	
3/23/2004	2,800	2,141	41.230722	-71.379841	Cell buoy	
3/23/2004	5,563	4,253	41.235367	-71.385600	35 ft	E
3/23/2004	3,000	2,294	41.236955	-71.381915	Cell F	
3/24/2004	2,900	2,217	41.236988	-71.382284	Cell F	
3/24/2004	3,100	2,370	41.233082	-71.376330	Cell B	
3/24/2004	3,800	2,905	41.235083	-71.374800	0 ft	
3/24/2004	2,800	2,141	41.236544	-71.381661	Cell F	
3/24/2004	2,875	2,198	41.235516	-71.386411	Cell A	
3/25/2004	5,040	3,853	41.230800	-71.380467	0 ft	
3/25/2004	2,800	2,141	41.224562	-71.372915	Cell G	
3/25/2004	2,900	2,217	41.234667	-71.375047	Cell B	
3/25/2004	4,523	3,458	41.235250	-71.375217	75 ft	W
3/25/2004	2,900	2,217	41.226646	-71.375018	Cell D	
3/25/2004	2,800	2,141	41.235307	-71.385804	Cell A	
3/25/2004	5,563	4,253	41.235367	-71.385883	0 ft	
3/26/2004	2,500	1,911	41.231033	-71.380567	Cell buoy	
3/26/2004	2,800	2,141	41.234690	-71.376021	Cell B	
3/26/2004	5,353	4,093	41.226700	-71.375133	0 ft	
3/26/2004	4,523	3,458	41.230667	-71.380333	0 ft	
3/26/2004	4,500	3,440	41.234980	-71.385825	-	
3/26/2004	1,700	1,300	41.226505	-71.374253	Cell D	
3/27/2004	5,562	4,252	41.226617	-71.385383	75 ft	NE
3/27/2004	2,900	2,217	41.230992	-71.380091	buoy	
3/27/2004	3,353	2,564	41.226867	-71.375000	0 ft	
3/27/2004	2,900	2,217	41.233720	-71.385883	Cell A	
3/30/2004	4,413	3,374	41.225033	-71.379950	300 ft	W
3/30/2004	2,800	2,141	41.225000	-71.372667	Cell G	
3/31/2004	5,353	4,093	41.236667	-71.381833	0 ft	
3/31/2004	2,600	1,988	41.224726	-71.377603	Cell E	

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Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
3/31/2004	6,300	4,817	41.234395	-71.374477	200 ft	S
4/2/2004	4,730	3,616	41.224767	-71.378600	20 ft	S
4/2/2004	2,900	2,217	(blank)	(blank)		
4/2/2004	5,449	4,166	41.235000	-71.374883	0 ft	
4/2/2004	2,800	2,141	41.223552	-71.378296	Cell E	
4/2/2004	5,449	4,166	41.224950	-71.378500	0 ft	
4/3/2004	2,800	2,141	41.223000	-71.374000	Cell D	
4/3/2004	5,353	4,093	41.224850	-71.378500	0 ft	
4/3/2004	2,900	2,217	41.225000	-71.374333		
4/3/2004	4,100	3,135	41.224750	-71.373833	200 ft	W
4/4/2004	2,850	2,179	41.234500	-71.384500	Cell A	
4/4/2004	5,143	3,932	41.224833	-71.378217	0 ft	
4/4/2004	2,500	1,911	41.225000	-71.370000	Cell E	
4/5/2004	5,143	3,932	41.234967	-71.386133	65 ft	W
4/6/2004	4,935	3,773	41.224833	-71.379333		
4/6/2004	5,353	4,093	41.235333	-71.381750	330 ft	S
4/6/2004	4,900	3,746	41.222667	-71.384333	Cell C	
4/6/2004	5,143	3,932	41.230500	-71.380000	55 ft	W
4/6/2004	5,300	4,052	41.225048	-71.380896	Cell E	
4/7/2004	5,143	3,932	41.236450	-71.381867	25 ft	S
4/7/2004	4,935	3,773	41.225167	-71.374667		
4/7/2004	5,143	3,932	41.225000	-71.377967	0 ft	
4/7/2004	4,114	3,145	41.234167	-71.385000	Cell A	
4/7/2004	5,033	3,848	41.226967	-71.385467	35 ft	E
4/8/2004	4,114	3,145	41.235167	-71.374833		
4/8/2004	5,353	4,093	41.235017	-71.374950	0 ft	
4/8/2004	4,728	3,615	41.234000	-71.371167	Cell B	
4/9/2004	5,353	4,093	41.225000	-71.378533	0 ft	
4/9/2004	3,000	2,294	41.224920	-71.379380	Cell E	
4/9/2004	5,243	4,009	41.235167	-71.385867	0 ft	
4/9/2004	4,114	3,145	41.226496	-71.384958	Cell C	
4/9/2004	2,800	2,141	41.236800	-71.381867	0 ft	
4/10/2004	4,728	3,615	41.223167	-71.385000	Cell C	
4/10/2004	5,143	3,932	41.224917	-71.372950	0 ft	
4/10/2004	3,000	2,294	41.234500	-71.371833	Cell B	
4/10/2004	5,353	4,093	41.225167	-71.378467	35 ft	N
4/10/2004	4,000	3,058	41.235167	-71.375667	Cell F	
4/11/2004	3,800	2,905	41.235200	-71.385700	0 ft	
4/11/2004	4,728	3,615	41.222833	-71.384833	Cell C	
4/11/2004	5,248	4,012	41.234850	-71.386100	35 ft	W
4/11/2004	5,774	4,415	41.223500	-71.369667	Cell D	
4/11/2004	5,248	4,012	41.230667	-71.380200	0 ft	
4/12/2004	4,318	3,301	41.223000	-71.384667	Cell C	
4/12/2004	5,563	4,253	41.235083	-71.385850	0 ft	
4/12/2004	4,600	3,517	41.225488	-71.378885	Cell E	
4/12/2004	4,943	3,779	41.236533	-71.382367	150 ft	W

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Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
4/14/2004	1,222	934	41.224833	-71.375333	250 ft	E
4/15/2004	3,511	2,684	41.227933	-71.374633	300	E
4/15/2004	3,100	2,370	41.232792	-71.382318	Grid 4	
4/16/2004	3,000	2,294	41.235598	-71.375576	Grid 2	
4/16/2004	5,038	3,852	41.236033	-71.375850	150 ft	W
4/16/2004	2,850	2,179	41.232541	-71.378250	Grid 5	
4/17/2004	3,800	2,905	41.236117	-71.371667	45 ft	E
4/17/2004	2,850	2,179	41.232579	-71.375087	Grid 5	
4/17/2004	4,831	3,694	41.233417	-71.381967	150 ft	E
4/17/2004	3,000	2,294	41.233080	-71.371789	Grid 7	
4/18/2004	3,000	2,294	41.231616	-71.381397	Grid 8	
4/18/2004	4,831	3,694	41.233283	-71.379100	50 ft	W
4/18/2004	3,000	2,294	41.231277	-71.377453	Grid 9	
4/18/2004	5,353	4,093	41.233450	-71.375667	0 ft	
4/19/2004	3,050	2,332	41.230687	-71.376665	Grid 10	
4/19/2004	3,800	2,905	41.233333	-71.371417	150 ft	E
4/19/2004	3,000	2,294	41.230558	-71.372241	Grid 11	
4/20/2004	7,058	5,396	41.228217	-71.382167	90 ft	E
4/20/2004	2,900	2,217	41.227040	-71.381509	Grid 12	
4/20/2004	3,500	2,676	41.230750	-71.382467	0 ft	
4/21/2004	2,900	2,217	41.228325	-71.379256	Grid 13	
4/21/2004	5,458	4,173	41.231017	-71.378850	0 ft	
4/21/2004	1,800	1,376	41.227490	-71.375492	Grid 14	
4/21/2004	5,248	4,012	41.231083	-71.375883	90 ft	W
4/21/2004	2,900	2,217	41.219033	-71.371841	Grid 15	
4/22/2004	3,700	2,829	41.230850	-71.372117	0 ft	
4/22/2004	5,563	4,253	41.228117	-71.378633	0 ft	
4/22/2004	3,700	2,829	41.228083	-71.375083	75 ft	E
4/23/2004	4,935	3,773	41.228333	-71.372050	0 ft	
4/24/2004	4,728	3,615	41.236017	-71.379417	135 ft	W
5/1/2004	3,100	2,370	41.225328	-71.382676	Grid 16	
5/1/2004	5,563	4,253	41.221833	-71.371667	Cell 17	
5/2/2004	2,900	2,217	41.226441	-71.370666	Grid 17	
5/2/2004	5,774	4,415	41.234667	-71.374000	Cell 17	
5/2/2004	3,000	2,294	41.236725	-71.379038	Grid 1	
5/3/2004	5,986	4,577	41.234833	-71.371667	Cell 2	
5/3/2004	3,511	2,684	41.235000	-71.371667	see notes	
5/5/2004	4,935	3,773	41.234500	-71.371833		
5/7/2004	2,950	2,255	41.234670	-71.369830	Grid 3	
5/8/2004	3,100	2,370	41.226500	-71.376000	Grid 4	
5/9/2004	3,200	2,447	41.226500	-71.374000	Grid 5	
5/10/2004	2,850	2,179	41.233330	-71.372000	Grid 6	
5/10/2004	2,900	2,217	41.226500	-71.369830	Grid 7	
5/11/2004	2,900	2,217	41.225170	-71.376330	Grid 8	
5/11/2004	2,700	2,064	41.225170	-71.373830	Grid 9	
5/12/2004	2,900	2,217	41.225000	-71.371830	Grid 10	

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Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
5/12/2004	3,200	2,447	41.225170	-71.370000	Grid 11	
5/13/2004	3,000	2,294	41.223170	-71.376330	Grid 12	
5/16/2004	2,875	2,198	41.223000	-71.373830	Grid 13	
5/16/2004	2,775	2,122	41.223330	-71.371830	Grid 14	
5/16/2004	2,700	2,064	41.223330	-71.369670	Grid 15	
5/17/2004	1,335	1,021	(blank)	(blank)	50 ft	E
5/17/2004	2,800	2,141	41.221500	-71.376000	Grid 16	
5/17/2004	5,000	3,823	41.236142	-71.379368	Cell #1	
5/17/2004	2,850	2,179	41.221830	-71.372000	Grid 17	
5/18/2004	3,596	2,749	(blank)	(blank)	Cell #2	
5/18/2004	2,600	1,988	41.236205	-71.378529	Grid 1	
5/18/2004	5,000	3,823	(blank)	(blank)	Cell #3	
5/19/2004	1,500	1,147	41.227300	-71.371867		
5/19/2004	5,000	3,823	41.232860	-71.382862	Cell #4	
5/19/2004	2,800	2,141	41.236142	-71.375751	Grid 2	
5/19/2004	5,000	3,823	41.232990	-71.378615	Cell #5	
5/19/2004	1,600	1,223	(blank)	(blank)	200 ft	
5/20/2004	4,000	3,058	41.236992	-71.376977	Cell #6	
5/20/2004	2,700	2,064	41.235959	-71.372171	Grid 3	
5/20/2004	2,900	2,217	41.232966	-71.382491	Grid 4	
5/20/2004	4,000	3,058	41.233625	-71.372193	Cell #7	
5/21/2004	2,900	2,217	41.233510	-71.378417	Grid 5	
5/21/2004	4,000	3,058	41.232804	-71.382817	Cell #8	
5/21/2004	2,800	2,141	41.249985	-71.375229	Grid 6	
5/21/2004	4,000	3,058	41.231109	-71.379158	Cell #9	
5/22/2004	3,500	2,676	41.244717	-71.372545	Grid 7	
5/22/2004	4,500	3,440	41.232951	-71.375449	Cell #10	
5/22/2004	2,900	2,217	41.230761	-71.381954	Grid 8	
5/22/2004	2,900	2,217	41.235500	-71.369670	Grid 11	
5/22/2004	3,600	2,752	41.230769	-71.378762	Grid 9	
5/23/2004	2,900	2,217	41.230672	-71.372141	Grid 11	
5/23/2004	3,000	2,294	41.223500	-71.374170	Grid 13	
5/23/2004	2,700	2,064	41.228348	-71.382310	Grid 12	
5/24/2004	3,100	2,370	41.223500	-71.371670	Grid 14	
5/24/2004	2,900	2,217	41.225000	-71.376000	Grid 12	
5/24/2004	2,900	2,217	41.228014	-71.378768	Grid 13	
5/24/2004	3,000	2,294	41.223830	-71.369670	Grid 15	
5/25/2004	3,500	2,676	41.228361	-71.375666	Grid 14	
5/25/2004	3,000	2,294	41.221500	-71.376170	Grid 16	
5/25/2004	2,800	2,141	41.228097	-71.371446	Grid 15	
5/25/2004	3,000	2,294	41.221500	-71.371500	Grid 17	
5/26/2004	2,900	2,217	41.225179	-71.382114	Grid 16	
5/26/2004	3,150	2,408	41.234830	-71.374000	Grid 1	
5/26/2004	2,000	1,529	41.224691	-71.375637	Grid 17	
5/26/2004	2,900	2,217	41.235000	-71.372170	Grid 2	
5/26/2004	2,800	2,141	41.235988	-71.378953	Grid 1	

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Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
5/26/2004	2,900	2,217	41.234830	-71.369830	Grid 3	
5/27/2004	2,800	2,141	41.235632	-71.375426	Grid 2	
5/27/2004	3,000	2,294	41.226500	-71.376170	Grid 4	
5/27/2004	2,000	1,529	41.236208	-71.372078	Grid 3	
5/27/2004	2,875	2,198	41.226500	-71.374000	Grid 5	
5/28/2004	3,100	2,370	41.249702	-71.382421	Grid 4	
5/28/2004	2,900	2,217	41.226500	-71.371830	Grid 6	
5/28/2004	3,000	2,294	41.249758	-71.378874	Grid 5	
5/28/2004	3,000	2,294	41.226330	-71.369830	Grid 7	
5/28/2004	2,900	2,217	41.233046	-71.375526	Grid 6	
5/29/2004	2,875	2,198	41.225170	-71.376170	Grid 8	
5/29/2004	2,800	2,141	41.233298	-71.371981	Grid 7	
5/29/2004	2,900	2,217	41.224830	-71.373500	Grid 9	
5/30/2004	3,500	2,676	41.225039	-71.375540	Grid 17	
5/30/2004	3,200	2,447	41.225000	-71.369830	Grid 11	
5/30/2004	3,000	2,294	41.230817	-71.382346	Grid 8	
5/30/2004	2,850	2,179	41.223000	-71.376000	Grid 12	
5/31/2004	3,100	2,370	41.231093	-71.378881	Grid 9	
5/31/2004	2,800	2,141	41.223330	-71.373830	Grid 13	
5/31/2004	2,600	1,988	41.227828	-71.382418	Grid 12	
6/1/2004	2,800	2,141	41.223170	-71.369500	Grid 15	
6/1/2004	1,000	765	41.227986	-71.375876	Grid 14	
7/21/2004	2,700	2,064	41.235631	-71.375916	Grid 2	
7/22/2004	5,774	4,415	41.235000	-71.373667	Cell 1	
7/22/2004	2,900	2,217	41.235575	-71.372181	Grid 3	
7/22/2004	5,143	3,932	41.232241	-71.375502	Cell 6	
7/23/2004	2,400	1,835	41.233758	-71.382447	Grid 4	
7/23/2004	5,986	4,577	41.226500	-71.371667	Cell 2	
7/23/2004	2,000	1,529	41.233643	-71.378545	Grid 5	
7/23/2004	5,563	4,253	41.234833	-71.369500	Cell 3	
7/23/2004	2,800	2,141	41.232796	-71.375808	Grid 6	
7/24/2004	2,800	2,141	41.232264	-71.372083	Grid 7	
7/24/2004	4,728	3,615	41.224667	-71.376500	Cell 11	
7/24/2004	1,100	841	41.230000	-71.371667	Grid 8	
7/24/2004	4,318	3,301	41.224833	-71.372333	Cell 10	
7/25/2004	2,153	1,646	41.224833	-71.369833	Cell 11	
7/25/2004	2,700	2,064	41.231073	-71.375544	Grid 10	
7/25/2004	3,912	2,991	41.234833	-71.374000	Cell 1	
7/25/2004	2,800	2,141	41.231162	-71.372075	Grid 11	
7/25/2004	5,563	4,253	41.234667	-71.369667	Cell 3	
7/26/2004	1,500	1,147	41.227380	-71.382869	Grid 12	
7/26/2004	4,728	3,615	41.223333	-71.371833	Cell 14	
7/26/2004	2,900	2,217	41.228138	-71.375063	Grid 14	
7/26/2004	2,900	2,217	41.235865	-71.379164	Cell 1	
7/27/2004	2,800	2,141	41.227934	-71.378297	Grid 13	
7/27/2004	4,935	3,773	41.233057	-71.375461	Cell 6	

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Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
7/27/2004	0	0	41.728365	-71.363432	Grid 15	
7/27/2004	3,711	2,837	41.232421	-71.379400	Cell 5	
7/27/2004	2,700	2,064	41.225111	-71.382613	Grid 16	
7/28/2004	5,353	4,093	41.235667	-71.369667	Cell 7	
7/28/2004	3,100	2,370	41.225393	-71.375584	Grid 17	
7/29/2004	2,900	2,217	41.235701	-71.378865	Grid 1	
7/29/2004	5,000	3,823	41.235000	-71.374167	Cell 1	
7/29/2004	2,400	1,835	41.236084	-71.375848	Grid 2	
7/29/2004	4,400	3,364	41.234833	-71.373500	Cell 1	
7/29/2004	2,900	2,217	41.236008	-71.372398	Grid 3	
7/30/2004	4,000	3,058	41.235762	-71.374601	Cell 2	
7/30/2004	2,900	2,217	41.232905	-71.382255	Grid 4	
7/30/2004	5,563	4,253	41.234833	-71.369833	Cell 3	
7/30/2004	2,900	2,217	41.236067	-71.379224	Grid 1	
7/31/2004	5,563	4,253	41.233333	-71.376000	Cell 4	
7/31/2004	3,000	2,294	41.232934	-71.379543	Grid 5	
7/31/2004	4,600	3,517	41.232621	-71.378912	Cell 5	
8/6/2004	2,800	2,141	41.227617	-71.379300	Cell 8	
8/6/2004	2,950	2,255	41.226333	-71.371833	Cell 6	
8/6/2004	2,800	2,141	41.225167	-71.371833	Cell 10	
8/6/2004	2,800	2,141	41.226333	-71.370000	Cell 7	
8/7/2004	3,000	2,294	41.225167	-71.369667	Cell 11	
8/7/2004	3,100	2,370	41.225317	-71.376167	Cell 8	
8/7/2004	3,000	2,294	41.223333	-71.373833	Cell 13	
8/7/2004	3,200	2,447	41.224833	-71.372500	Cell 10	
8/8/2004	3,300	2,523	41.224833	-71.369667	Cell 11	
8/8/2004	3,000	2,294	41.225133	-71.382300	Cell 12	
8/8/2004	3,000	2,294	41.223500	-71.372000	Cell 14	
8/9/2004	3,150	2,408	41.228017	-71.375433	Cell 13	
8/9/2004	2,850	2,179	41.223333	-71.369833	Cell 15	
8/9/2004	3,000	2,294	41.223333	-71.372167	Cell 14	
8/9/2004	3,000	2,294	41.222833	-71.375000	Cell 16	
8/10/2004	3,100	2,370	41.223333	-71.370000	Cell 15	
8/10/2004	3,100	2,370	41.225178	-71.381452	Cell 16	
8/10/2004	3,000	2,294	41.224841	-71.382569	Cell 16	
8/11/2004	3,100	2,370	41.227167	-71.373000	Cell 17	
8/11/2004	3,000	2,294	41.234833	-71.373833	Cell 1	
8/11/2004	3,100	2,370	41.234833	-71.373833	Cell 1	
8/11/2004	3,000	2,294	41.235735	-71.375489	Cell 2	
8/12/2004	3,100	2,370	41.234833	-71.371667	Cell 2	
8/12/2004	2,800	2,141	41.234833	-71.369667	Cell 3	
8/12/2004	3,100	2,370	41.236000	-71.372000	Cell 3	
8/12/2004	3,100	2,370	41.232216	-71.382377	Cell 4	
8/12/2004	3,250	2,485	41.233017	-71.382467	Cell 4	
8/13/2004	2,800	2,141	41.233952	-71.378513	Cell 5	
8/13/2004	3,000	2,294	41.226333	-71.373833	Cell 5	

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Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
8/13/2004	3,000	2,294	41.233095	-71.375701	Cell 6	
8/13/2004	3,200	2,447	41.233333	-71.375500	Cell 6	
8/13/2004	3,000	2,294	41.233333	-71.373000	Cell 7	
8/14/2004	3,100	2,370	41.232576	-71.372215	Cell 7	
8/14/2004	2,800	2,141	41.223000	-71.371667	Cell 10	
8/14/2004	3,000	2,294	41.230767	-71.382433	Cell 8	
8/14/2004	2,800	2,141	41.225000	-71.370000	Cell 11	
8/16/2004	3,150	2,408	41.230517	-71.374817	Cell 10	
8/16/2004	5,700	4,358	41.226167	-71.376000	Cell 4	
8/16/2004	3,100	2,370	41.225000	-71.369833	Cell 11	
8/16/2004	5,600	4,282	41.225500	-71.369500	Cell 11	
8/16/2004	3,175	2,427	41.223333	-71.376000	Cell 12	
8/17/2004	5,200	3,976	41.225000	-71.371500	Cell 10	
8/17/2004	3,000	2,294	41.223333	-71.373833	Cell 13	
8/17/2004	5,600	4,282	41.223333	-71.371833	Cell 14	
8/17/2004	2,950	2,255	41.228217	-71.375750	Cell 14	
8/17/2004	5,663	4,330	41.226500	-71.373833	Cell 5	
8/18/2004	3,100	2,370	41.228000	-71.371855	Cell 15	
8/18/2004	5,563	4,253	41.224619	-71.382813	Cell 16	
8/18/2004	3,100	2,370	41.225390	-71.382140	Cell 16	
8/18/2004	5,353	4,093	41.233333	-71.369500	Cell 7	
8/18/2004	2,900	2,217	41.225555	-71.375396	Cell 17	
8/19/2004	5,563	4,253	41.223500	-71.370000	Cell 15	
8/19/2004	5,143	3,932	41.225000	-71.372000	Cell 10	
8/19/2004	3,100	2,370	41.234667	-71.374000	Cell 1	
8/19/2004	5,400	4,129	41.235000	-71.369667	Cell 3	
8/20/2004	5,200	3,976	41.223500	-71.376333	Cell 12	
8/20/2004	2,700	2,064	41.226397	-71.374790	Cell D	
8/20/2004	4,400	3,364	41.234667	-71.371500	Cell 2	
8/21/2004	2,700	2,064	41.235068	-71.374460	Cell B	
8/21/2004	5,563	4,253	41.234500	-71.369667	Cell 3	
8/21/2004	1,700	1,300	41.235056	-71.374919	Cell B	
8/22/2004	5,143	3,932	41.223333	-71.372000	A buoy 170	
8/22/2004	2,990	2,286	41.224955	-71.373330	Cell G	
8/22/2004	3,000	2,294	41.226167	-71.374000	buoy E	
8/22/2004	2,990	2,286	41.226738	-71.385401	Cell C	
8/23/2004	2,995	2,290	41.226500	-71.370333	Buoy D	
8/23/2004	3,005	2,297	41.228192	-71.373120	Cell G	
8/23/2004	3,000	2,294	41.222833	-71.371333	Buoy D	
8/23/2004	2,995	2,290	41.229897	-71.376531	buoy	
8/24/2004	3,000	2,294	41.227188	-71.374540	Cell D	
8/24/2004	3,000	2,294	41.230333	-71.384500	Buoy C	
8/24/2004	2,995	2,290	41.234849	-71.386099	Cell A	
8/25/2004	2,950	2,255	41.234167	-71.384833	Buoy A	
8/25/2004	3,000	2,294	41.222667	-71.384833	Buoy C	
8/25/2004	2,995	2,290	41.224970	-71.373092	Cell G	

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8/26/2004	3,000	2,294	41.230081	-71.375905	buoy	
8/26/2004	2,990	2,286	41.226324	-71.385907	Buoy C	
8/27/2004	3,000	2,294	41.234167	-71.385167	Buoy A	
8/27/2004	2,600	1,988	41.225149	-71.373039	Cell G	
8/27/2004	3,000	2,294	41.234167	-71.371500	Buoy B	
8/27/2004	2,990	2,286	41.227011	-71.385896	Cell C	
8/27/2004	2,995	2,290	41.224500	-71.371667	buoy	
8/28/2004	3,000	2,294	41.229318	-71.375171	buoy	
8/28/2004	3,000	2,294	41.224798	-71.372394	Buoy G	
8/28/2004	2,500	1,911	41.229255	-71.375031	buoy	
8/28/2004	2,985	2,282	41.224333	-71.373000	buoy	
8/29/2004	2,400	1,835	41.234938	-71.374993	Cell B	
8/29/2004	3,000	2,294	41.223947	-71.377695	buoy E	
8/29/2004	2,400	1,835	41.235015	-71.385733	Cell A	
8/29/2004	2,995	2,290	41.222667	-71.371333	Buoy D	
8/30/2004	2,400	1,835	41.236448	-71.382094	Cell F	
8/30/2004	3,000	2,294	41.226456	-71.386165	Buoy C	
8/30/2004	3,000	2,294	41.236186	-71.381731	Cell F	
8/30/2004	2,995	2,290	41.234333	-71.371333	Buoy B	
8/31/2004	3,000	2,294	41.234803	-71.374826	Cell B	
8/31/2004	3,000	2,294	41.225057	-71.378140	Cell E	
9/1/2004	2,990	2,286	41.223940	-71.378572	Cell E	
9/1/2004	3,000	2,294	41.236415	-71.382336	Cell F	
9/1/2004	2,900	2,217	41.222667	-71.371667	Cell D	
9/1/2004	3,000	2,294	41.236379	-71.381651	Cell F	
9/1/2004	2,990	2,286	41.224326	-71.372420	Cell G	
9/2/2004	2,995	2,290	41.234816	-71.385979	Cell A	
9/2/2004	3,000	2,294	41.234333	-71.384833	Cell A	
9/2/2004	2,990	2,286	41.235167	-71.376000	Cell F	
9/2/2004	2,995	2,290	41.235167	-71.375667	Cell F	
9/3/2004	3,000	2,294	41.225753	-71.377863	Cell E	
9/3/2004	3,000	2,294	41.234333	-71.384667	Cell F	
9/3/2004	3,000	2,294	41.222833	-71.371500	Cell D	
9/3/2004	2,990	2,286	41.234333	-71.388167	Cell B	
9/3/2004	2,995	2,290	41.228047	-71.374714	Cell D	
9/4/2004	2,990	2,286	41.224689	-71.378279	Cell E	
9/4/2004	2,990	2,286	41.234000	-71.371500	Cell B	
9/4/2004	2,990	2,286	41.224115	-71.372791	Cell G	
9/4/2004	3,000	2,294	41.224167	-71.372000	buoy	
9/5/2004	3,000	2,294	41.226113	-71.375434	Cell D	
9/5/2004	2,990	2,286	41.235000	-71.376000	Cell F	
9/5/2004	3,000	2,294	41.224000	-71.372667	50 yds W	
9/6/2004	2,995	2,290	41.235000	-71.376000	Cell F	
9/6/2004	2,990	2,286	41.234333	-71.371833	Cell B	
9/6/2004	2,950	2,255	41.234167	-71.371667	Cell B	
9/6/2004	2,800	2,141	41.222833	-71.371667	Cell D	

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9/6/2004	2,200	1,682	41.234167	-71.385167	Cell A	
9/7/2004	2,570	1,965	41.234333	-71.371667	Cell B	
9/7/2004	2,700	2,064	41.225833	-71.371500	Cell D	
9/7/2004	2,600	1,988	41.234167	-71.385500	Cell A	
9/7/2004	2,850	2,179	41.234000	-71.384667	Cell A	
9/7/2004	2,950	2,255	41.234333	-71.371333	Cell B	
9/8/2004	2,750	2,103	41.226060	-71.374318	Cell G	
9/8/2004	2,650	2,026	41.234333	-71.384833	Cell A	
9/8/2004	2,600	1,988	41.225756	-71.385995	Cell C	
9/8/2004	2,600	1,988	41.222833	-71.384833	Cell C	
9/9/2004	2,700	2,064	41.234333	-71.371333	Cell B	
9/9/2004	2,500	1,911	41.225333	-71.372500	buoy	
9/9/2004	2,600	1,988	41.224500	-71.370000	Buoy25ydE	
9/9/2004	2,100	1,606	41.222833	-71.371667	DispPt D	
9/9/2004	2,600	1,988	41.234167	-71.385000	Cell A	
9/10/2004	2,500	1,911	41.226167	-71.375500	Buoy100'W	
9/10/2004	2,500	1,911	41.226515	-71.385278	DispPt C	
9/10/2004	1,700	1,300	41.235000	-71.375833	Cell F	
9/10/2004	3,000	2,294	41.225218	-71.377435	DispPt E	
9/11/2004	2,100	1,606	41.225049	-71.376432	Cell E	
9/11/2004	2,995	2,290	41.234333	-71.384833	DispPt A	
9/11/2004	2,200	1,682	41.222667	-71.384667	Cell C	
9/11/2004	2,995	2,290	41.223667	-71.372500	buoy	
9/12/2004	2,900	2,217	41.222667	-71.384667	Cell C	
9/12/2004	3,000	2,294	41.224955	-71.378053	DispPt E	
9/12/2004	3,000	2,294	41.224500	-71.371000	buoy	
9/12/2004	2,200	1,682	41.229745	-71.376496	BuoyW ft	
9/12/2004	2,990	2,286	41.234000	-71.384167	Cell A	
9/12/2004	3,000	2,294	41.234500	-71.371667	Cell B	
9/13/2004	2,100	1,606	41.226524	-71.372031	Cell D	
9/13/2004	2,995	2,290	41.234333	-71.385000	Cell A	
9/13/2004	2,800	2,141	41.222667	-71.371500	Cell D	
9/13/2004	2,990	2,286	41.222667	-71.371333	Cell D	
9/14/2004	2,100	1,606	41.224667	-71.372667	buoy	
9/14/2004	2,200	1,682	41.224769	-71.373463	Cell G	
9/14/2004	2,900	2,217	41.234333	-71.384833	Cell A	
9/14/2004	2,995	2,290	41.225057	-71.378497	Cell E	
9/15/2004	2,300	1,758	41.222667	-71.384667	Cell C	
9/15/2004	2,100	1,606	41.233833	-71.384833	A	
9/15/2004	2,900	2,217	41.234167	-71.384667	Cell A	
9/15/2004	2,990	2,286	41.222667	-71.384500	Cell C	
9/15/2004	2,800	2,141	41.233833	-71.384833	A	
9/15/2004	2,100	1,606	41.225053	-71.372561	Cell G	
9/16/2004	2,100	1,606	41.225214	-71.376613	Cell E	
9/16/2004	2,800	2,141	41.234333	-71.385000	A	
9/16/2004	2,800	2,141	41.225015	-71.381136	Cell E	

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9/16/2004	2,100	1,606	41.229748	-71.376537	Buoy150ft	
9/16/2004	2,900	2,217	41.233333	-71.384833	A	
9/17/2004	2,900	2,217	41.225174	-71.372277	Cell G	
9/17/2004	2,700	2,064	41.226961	-71.385414	Cell C	
9/17/2004	2,100	1,606	41.234167	-71.384833	A	
9/17/2004	2,995	2,290	41.226382	-71.375470	Cell D	
9/18/2004	2,700	2,064	41.226936	-71.374515	Cell D	
9/18/2004	2,700	2,064	41.235333	-71.375833	F	
9/19/2004	2,950	2,255	41.226608	-71.375387	Cell D	
9/19/2004	2,995	2,290	41.234333	-71.371333	DispPt B	
9/19/2004	2,200	1,682	41.234675	-71.374840	B	
9/20/2004	2,200	1,682	41.234333	-71.371500	DispPt B	
9/20/2004	2,995	2,290	41.222833	-71.384667	C	
9/20/2004	2,200	1,682	41.227866	-71.377215	buoy 175ft	
9/21/2004	2,700	2,064	41.225947	-71.385060	DispPt C	
9/21/2004	2,600	1,988	41.224792	-71.377556	Cell E	
9/21/2004	2,700	2,064	41.222833	-71.384833	C	
9/21/2004	2,200	1,682	41.224500	-71.373833	DispPtBuoy	
9/21/2004	2,800	2,141	41.230158	-71.374796	buoy 175ft	
9/22/2004	2,700	2,064	41.222500	-71.384667	DispPt C	
9/22/2004	2,700	2,064	41.226619	-71.374861	Cell D	
9/22/2004	2,200	1,682	41.219721	-71.378398	E	
9/22/2004	2,950	2,255	41.234333	-71.384833	DispPt A	
9/23/2004	2,800	2,141	41.234925	-71.374770	Cell B	
9/23/2004	2,800	2,141	41.235333	-71.376167	F	
9/23/2004	3,000	2,294	41.222667	-71.384833	C	
9/23/2004	2,800	2,141	41.234333	-71.384833	DispPt A	
9/23/2004	2,700	2,064	41.227303	-71.386081	Cell C	
9/23/2004	2,800	2,141	41.222833	-71.371500	D	
9/24/2004	2,700	2,064	41.234167	-71.371500	DispPt B	
9/24/2004	2,700	2,064	41.225248	-71.378219	Cell E	
9/24/2004	2,800	2,141	41.235333	-71.375667	F	
9/24/2004	2,800	2,141	41.222667	-71.384833	DispPt C	
9/25/2004	2,700	2,064	41.224833	-71.374833	buoy	
9/25/2004	2,700	2,064	41.225040	-71.377843	DispPt E	
9/25/2004	2,700	2,064	41.234873	-71.385536	Cell A	
9/25/2004	2,700	2,064	41.234677	-71.374106	Cell B	
9/25/2004	2,800	2,141	41.222833	-71.384667	C	
9/25/2004	2,700	2,064	41.222500	-71.384667	DispPt C	
9/26/2004	2,700	2,064	41.225255	-71.378273	Cell E	
9/26/2004	2,800	2,141	41.224642	-71.378156	E	
9/26/2004	2,800	2,141	41.234833	-71.375833	568ydW F	
9/26/2004	2,700	2,064	41.227403	-71.386007	Cell C	
9/27/2004	2,700	2,064	41.235333	-71.375833	F	
9/27/2004	2,800	2,141	41.224333	-71.373333	130yWbuoy	
9/27/2004	2,800	2,141	41.234973	-71.385647	Cell A	

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9/27/2004	2,700	2,064	41.234500	-71.371500	B	
9/27/2004	2,800	2,141	41.224815	-71.372826	DispPtG	
9/28/2004	2,700	2,064	41.234851	-71.385797	Cell A	
9/28/2004	2,600	1,988	41.224244	-71.372769	Cell G	
9/28/2004	2,800	2,141	41.225167	-71.374833	Buoy Cell	
9/28/2004	2,700	2,064	41.230063	-71.375023	buoy 150ft	
9/29/2004	2,800	2,141	41.222833	-71.371667	Cell D	
9/30/2004	2,700	2,064	41.236419	-71.381927	Cell F	
9/30/2004	2,800	2,141	41.235167	-71.375833	F	
9/30/2004	2,700	2,064	41.234500	-71.384833	DispPtA	
9/30/2004	2,800	2,141	41.225607	-71.374555	D	
9/30/2004	2,700	2,064	41.223000	-71.370667	20ydEBuoy	
10/1/2004	2,800	2,141	41.225167	-71.374833	buoy	
10/1/2004	2,700	2,064	41.226085	-71.375060	D	
10/1/2004	2,700	2,064	41.235167	-71.375667	F	
10/1/2004	2,700	2,064	(blank)	(blank)	504 ft	N
10/1/2004	2,800	2,141	41.234167	-71.384667	Cell A	
10/2/2004	2,800	2,141	41.234500	-71.384667	A	
10/2/2004	2,700	2,064	41.224949	-71.372859	Cell G	
10/2/2004	2,800	2,141	41.234167	-71.371500	Cell B	
10/2/2004	3,075	2,351	41.222667	-71.371500	D	
10/3/2004	3,200	2,447	41.222667	-71.371500	Cell D	
10/3/2004	4,000	3,058	41.234167	-71.385167	Cell A	
10/3/2004	4,100	3,135	41.225080	-71.374760	D	
10/3/2004	4,000	3,058	41.235333	-71.375833	F	
10/4/2004	3,950	3,020	41.226634	-71.374880	D	
10/4/2004	4,100	3,135	41.226576	-71.385852	C	
10/4/2004	3,800	2,905	41.225167	-71.371833	25 yds	E
10/5/2004	3,900	2,982	41.222667	-71.371167	D	
10/5/2004	4,000	3,058	41.226000	-71.374794	Cell D	
10/5/2004	4,000	3,058	41.225000	-71.375000	buoy	
10/5/2004	3,000	2,294	41.224046	-71.380087	Cell E	
10/5/2004	2,700	2,064	41.234198	-71.385897	A	
10/6/2004	2,800	2,141	41.234333	-71.371500	B	
10/6/2004	2,700	2,064	41.226833	-71.374833	Cell D	
10/6/2004	2,800	2,141	41.224833	-71.372000	Buoy 100 '	E
10/6/2004	2,700	2,064	41.222667	-71.384833	C	
10/6/2004	2,600	1,988	41.224500	-71.371667	buoy	
10/6/2004	2,700	2,064	41.226500	-71.371500	D	
10/7/2004	3,000	2,294	41.226066	-71.373082	C	
10/7/2004	2,700	2,064	41.225119	-71.377344	Cell E	
10/7/2004	2,600	1,988	41.234333	-71.384667	A	
10/7/2004	3,000	2,294	41.234167	-71.384833	Cell A	
10/7/2004	2,600	1,988	41.224268	-71.377971	E	
10/8/2004	2,700	2,064	41.235167	-71.375667	F	
10/8/2004	2,600	1,988	41.225165	-71.377519	Cell E	

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10/8/2004	3,000	2,294	41.224883	-71.378199	E	
10/8/2004	3,000	2,294	41.234167	-71.384833	A	
10/8/2004	2,600	1,988	41.222667	-71.384833	C	
10/8/2004	2,600	1,988	41.224824	-71.371754	Cell G	
10/9/2004	2,700	2,064	41.234167	-71.384667	A	
10/9/2004	2,600	1,988	41.229500	-71.375000	20 yds	E
10/9/2004	2,950	2,255	41.225223	-71.377831	Cell E	
10/9/2004	2,800	2,141	41.235076	-71.385863	B	
10/9/2004	2,900	2,217	41.235333	-71.375333	F	
10/9/2004	2,100	1,606	41.229583	-71.376233	buoy	
10/9/2004	2,900	2,217	41.225144	-71.378082	E	
10/10/2004	2,990	2,286	41.222667	-71.371333	D	
10/10/2004	2,900	2,217	41.226568	-71.372136	Cell G	
10/10/2004	2,100	1,606	41.228833	-71.380333	buoy	
10/10/2004	2,990	2,286	41.234333	-71.384833	A	
10/10/2004	2,700	2,064	41.234000	-71.371333	Cell B	
10/10/2004	2,750	2,103	41.224577	-71.381980	E	
10/10/2004	2,300	1,758	41.230333	-71.381833	25 yds	W
10/11/2004	2,750	2,103	41.224000	-71.372833	buoy	
10/11/2004	3,000	2,294	41.222833	-71.371500	D	
10/13/2004	2,300	1,758	41.229583	-71.376233	D	
10/13/2004	2,900	2,217	41.222833	-71.371500	Cell D	
10/13/2004	2,850	2,179	41.223061	-71.378239	E	
10/14/2004	2,900	2,217	41.222833	-71.371833	D	
10/14/2004	2,900	2,217	41.234167	-71.384833	Cell A	
10/14/2004	2,950	2,255	41.235000	-71.375667	F	
10/14/2004	2,900	2,217	41.224184	-71.380927	E	
10/14/2004	2,995	2,290	41.224870	-71.377513	Cell E	
10/14/2004	3,000	2,294	41.224667	-71.374833	buoy	
10/14/2004	2,995	2,290	41.225158	-71.378667	E	
10/15/2004	3,000	2,294	41.225128	-71.372155	Cell G	
10/15/2004	3,000	2,294	41.234333	-71.371667	B	
10/15/2004	2,900	2,217	41.234500	-71.371667	B	
10/15/2004	2,950	2,255	41.224969	-71.378008	Cell E	
10/18/2004	2,950	2,255	41.234755	-71.385646	Cell A	
10/19/2004	3,000	2,294	41.234167	-71.371667	B	
10/19/2004	2,900	2,217	41.222667	-71.371667	D	
10/19/2004	2,900	2,217	41.234856	-71.385985	Cell A	
10/19/2004	2,900	2,217	41.228709	-71.380580	buoy	
10/19/2004	2,900	2,217	41.224749	-71.378209	Cell E	
10/19/2004	2,800	2,141	41.235333	-71.375833	F	
10/26/2004	3,800	2,905	41.225583	-71.372636	Cell G	
10/27/2004	4,000	3,058	41.225167	-71.374833	410 yds	W
10/27/2004	4,000	3,058	41.230483	-71.380000	see notes	
10/28/2004	4,500	3,440	41.234833	-71.372133	CAD 2 Grid	
10/28/2004	3,600	2,752	41.225667	-71.371333	buoy	

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10/28/2004	4,000	3,058	41.226333	-71.374000	Grid 5	
10/28/2004	3,200	2,447	41.230833	-71.380200	323 yds	W
10/29/2004	4,600	3,517	41.234833	-71.373833	Grid 1	
10/29/2004	3,000	2,294	41.235000	-71.371667	Grid 2	
10/29/2004	5,500	4,205	41.235850	-71.371633	Grid 3	
10/29/2004	2,900	2,217	41.234833	-71.371667	Grid 2	
10/29/2004	3,700	2,829	41.222667	-71.371667	200 ft	W
10/29/2004	3,000	2,294	41.235167	-71.373500	Grid 1	
10/30/2004	4,100	3,135	41.233450	-71.382233	Grid 4	
10/30/2004	2,700	2,064	41.237167	-71.369667	Grid 3	
10/30/2004	4,500	3,440	41.233500	-71.372000	Grid 2	
10/30/2004	3,000	2,294	41.226000	-71.376167	Grid 4	
10/30/2004	3,300	2,523	41.233132	-71.379227	Grid 5	
10/30/2004	3,000	2,294	41.226333	-71.376000	Grid 4	
10/30/2004	3,000	2,294	41.232037	-71.379215	Grid 5	
10/30/2004	3,000	2,294	41.233433	-71.372133	Grid 6	
10/30/2004	5,100	3,899	41.233569	-71.374540	Grid 6	
10/31/2004	3,000	2,294	41.234667	-71.369500	Grid 3	
10/31/2004	3,000	2,294	41.226333	-71.371667	Grid 6	
10/31/2004	2,900	2,217	41.226000	-71.377833	buoy	
10/31/2004	4,900	3,746	41.233300	-71.371983	Grid 7	
10/31/2004	3,000	2,294	41.232372	-71.382479	Grid 4	
10/31/2004	3,600	2,752	41.226500	-71.369333	Grid 7	
10/31/2004	3,800	2,905	41.226333	-71.369667	Grid 7	
10/31/2004	2,700	2,064	41.230967	-71.382667	Grid 8	
10/31/2004	3,400	2,599	41.223167	-71.370833	buoy	
10/31/2004	2,900	2,217	41.225167	-71.376000	Grid 8	
11/1/2004	5,100	3,899	41.230833	-71.376350	Grid 10	
11/1/2004	2,900	2,217	41.233333	-71.373667	Grid 5	
11/1/2004	5,400	4,129	41.226167	-71.372000	Grid 10	
11/1/2004	2,900	2,217	41.225000	-71.372167	Grid 10	
11/1/2004	3,000	2,294	41.225167	-71.369833	Grid 11	
11/2/2004	2,900	2,217	41.225333	-71.370000	Grid 11	
11/2/2004	3,000	2,294	41.228000	-71.373333	400 ft	
11/2/2004	3,000	2,294	41.223667	-71.375167	Grid 12	
11/2/2004	3,000	2,294	41.223500	-71.376000	Grid 12	
11/2/2004	2,700	2,064	41.235478	-71.371028	Grid 3	
11/2/2004	0	0	41.233667	-71.375633	Grid 6	
11/2/2004	3,000	2,294	41.223333	-71.374000	Grid 13	
11/2/2004	3,000	2,294	41.233333	-71.369333	Grid 11	
11/3/2004	3,000	2,294	41.223500	-71.374000	Grid 13	
11/3/2004	3,000	2,294	41.233433	-71.371900	Grid 7	
11/3/2004	2,800	2,141	41.228000	-71.382500	Grid 12	
11/3/2004	3,000	2,294	41.223500	-71.371667	Grid 14	
11/3/2004	2,900	2,217	41.230700	-71.381883	Grid 8	
11/3/2004	3,000	2,294	41.223333	-71.373833	Grid 13	

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11/3/2004	2,400	1,835	41.223000	-71.373833	Grid 13	
11/3/2004	3,000	2,294	41.223500	-71.370000	Grid 15	
11/4/2004	0	0	41.228652	-71.375467	150 ft	E
11/4/2004	2,400	1,835	41.223333	-71.372000	Grid 14	
11/4/2004	3,000	2,294	41.223333	-71.372167	Grid 14	
11/4/2004	2,700	2,064	41.231125	-71.374740	Grid 10	
11/4/2004	2,900	2,217	41.229583	-71.376567	buoy	
11/4/2004	3,000	2,294	41.221667	-71.376333	Grid 16	
11/4/2004	3,000	2,294	41.235893	-71.371566	Grid 3	
11/6/2004	3,000	2,294	41.236500	-71.371333	Grid 2	
11/7/2004	3,000	2,294	41.235624	-71.378932	Grid 1	
11/7/2004	3,000	2,294	41.223333	-71.369833	Grid 15	
11/7/2004	5,300	4,052	41.230750	-71.372033	Grid 11	
11/7/2004	3,000	2,294	41.224013	-71.375256	Grid 17	
11/7/2004	3,000	2,294	41.236267	-71.375933	Grid 2	
11/8/2004	2,800	2,141	41.225098	-71.381612	Grid 16	
11/8/2004	3,000	2,294	41.223600	-71.376017	Grid 12	
11/8/2004	3,000	2,294	41.235000	-71.373667	Grid 1	
11/8/2004	2,700	2,064	41.232450	-71.375317	190 ft	E
11/8/2004	3,000	2,294	41.224928	-71.376574	Grid 17	
11/8/2004	3,000	2,294	41.228333	-71.379117	Grid 13	
11/8/2004	2,700	2,064	41.234833	-71.369833	Grid 3	
11/8/2004	2,800	2,141	41.233283	-71.382300	Cell 4	
11/8/2004	3,000	2,294	41.235167	-71.370500	Grid 1	
11/9/2004	3,000	2,294	41.227783	-71.375833	Cell 14	
11/9/2004	3,000	2,294	41.233333	-71.376333	Grid 4	
11/9/2004	2,600	1,988	41.233300	-71.379050	Grid 5	
11/9/2004	2,700	2,064	41.234833	-71.371833	Grid 2	
11/9/2004	3,000	2,294	41.233333	-71.374000	Grid 5	
11/9/2004	2,800	2,141	41.228283	-71.372250	Cell 15	
11/9/2004	2,700	2,064	41.233300	-71.375733	Grid 6	
11/9/2004	2,700	2,064	41.234667	-71.369833	Grid 3	
11/9/2004	3,000	2,294	41.233333	-71.371500	Grid 6	
11/9/2004	3,000	2,294	41.225083	-71.382250	Cell 16	
11/10/2004	3,000	2,294	41.226333	-71.376000	Grid 4	
11/10/2004	2,800	2,141	41.233150	-71.371933	Grid 7	
11/10/2004	2,500	1,911	41.234000	-71.371000	Grid 7	
11/10/2004	3,000	2,294	41.225217	-71.376000	Cell 17	
11/10/2004	2,995	2,290	41.226333	-71.373833	Grid 5	
11/10/2004	2,800	2,141	41.230800	-71.382217	Grid 7	
11/10/2004	2,800	2,141	41.236467	-71.379383	Cell 1	
11/10/2004	2,700	2,064	41.226500	-71.390167	Grid 6	
11/10/2004	2,900	2,217	41.224333	-71.376000	Grid 8	
11/11/2004	2,995	2,290	41.230133	-71.374533	150 ft	E
11/11/2004	2,990	2,286	41.237000	-71.374950	Cell 2	
11/11/2004	2,700	2,064	41.225833	-71.370833	Grid 10	

Project Name: PROVIDENCE RIVER & HARBOR MAINTENANCE DREDGING
Permittee: COE-PROVIDENCE RIVER
Permit Number: 2003C0002

Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
11/11/2004	2,600	1,988	41.233058	-71.371615	Grid 7	
11/11/2004	2,850	2,179	41.231483	-71.372117	Grid 11	
11/11/2004	2,995	2,290	41.234833	-71.370000	Grid 3	
11/11/2004	2,800	2,141	41.223500	-71.376000	Grid 12	
11/11/2004	2,800	2,141	41.230181	-71.382148	Grid 8	
11/11/2004	2,600	1,988	41.230700	-71.375367	Grid 10	
11/12/2004	2,995	2,290	41.226167	-71.376000	Grid 4	
11/12/2004	2,900	2,217	41.223333	-71.374167	Grid 13	
11/12/2004	2,600	1,988	41.230491	-71.375386	Grid 10	
11/12/2004	2,995	2,290	41.227667	-71.372083	Grid 15	
11/14/2004	2,600	1,988	41.230498	-71.372308	Grid 11	
11/15/2004	5,000	3,823	41.228083	-71.381600	Grid 12	
11/15/2004	4,900	3,746	41.223667	-71.373833	Grid 13	
11/15/2004	3,500	2,676	41.233333	-71.374000	Grid 5	
11/15/2004	3,700	2,829	41.228000	-71.382500	Grid 12	
11/15/2004	3,800	2,905	41.228450	-71.378917	Grid 13	
11/15/2004	3,300	2,523	41.223500	-71.372000	Grid 14	
11/15/2004	4,400	3,364	41.228148	-71.378576	Grid 13	
11/15/2004	4,600	3,517	41.223333	-71.369833	Grid 15	
11/15/2004	4,000	3,058	41.227917	-71.375844	Grid 14	
11/15/2004	4,900	3,746	41.233333	-71.371833	Grid 6	
11/16/2004	3,000	2,294	41.227983	-71.376583	Grid 14	
11/16/2004	4,100	3,135	41.225058	-71.382613	Grid 16	
11/16/2004	4,500	3,440	41.227530	-71.372494	Grid 15	
11/16/2004	3,800	2,905	41.233333	-71.369833	Grid 7	
11/16/2004	4,900	3,746	41.225176	-71.382426	Grid 16	
11/16/2004	4,600	3,517	41.225183	-71.383150	Grid 16	
11/16/2004	4,000	3,058	41.224833	-71.376333	Grid 8	
11/16/2004	3,700	2,829	41.225536	-71.375319	Grid 17	
11/17/2004	4,800	3,670	41.224833	-71.374833	Grid 17	
11/17/2004	4,500	3,440	41.225333	-71.369833	Grid 11	
11/17/2004	4,800	3,670	41.235000	-71.373833	Grid 1	
11/17/2004	3,200	2,447	41.225405	-71.375724	Grid 17	
11/17/2004	4,000	3,058	41.236167	-71.378833	Grid 1	
11/17/2004	3,500	2,676	41.223333	-71.372000	Grid 14	
11/18/2004	3,200	2,447	41.235123	-71.378806	Grid 1	
11/18/2004	4,000	3,058	41.235000	-71.372000	Grid 2	
11/18/2004	2,200	1,682	41.235000	-71.369833	Grid 3	
11/18/2004	3,000	2,294	41.223333	-71.371333	Grid 15	
11/18/2004	4,400	3,364	41.235746	-71.375335	Grid 2	
11/18/2004	3,000	2,294	41.236103	-71.375699	Grid 2	
11/18/2004	3,900	2,982	41.223274	-71.379885	Grid 4	
11/18/2004	4,000	3,058	41.225098	-71.381612	Grid 16	
11/18/2004	2,600	1,988	41.234045	-71.371586	Grid 3	
11/19/2004	2,500	1,911	41.229667	-71.376167	180 yds	S
11/19/2004	3,600	2,752	41.225029	-71.375218	Grid 17	

Project Name: PROVIDENCE RIVER & HARBOR MAINTENANCE DREDGING
Permittee: COE-PROVIDENCE RIVER
Permit Number: 2003C0002

Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
11/19/2004	2,600	1,988	41.232905	-71.382308	Grid 4	
11/19/2004	2,300	1,758	41.224667	-71.372833	Grid 3	
11/19/2004	3,300	2,523	41.235000	-71.373833	Grid 1	
11/19/2004	3,000	2,294	41.233146	-71.378530	Grid 5	
11/20/2004	2,500	1,911	41.235000	-71.372000	Grid 2	
11/20/2004	3,300	2,523	41.234500	-71.369667	Grid 3	
11/20/2004	2,700	2,064	41.233124	-71.375570	Grid 6	
11/20/2004	2,500	1,911	41.226450	-71.375324		
11/20/2004	3,100	2,370	41.234833	-71.372000	Grid 2	
11/21/2004	2,500	1,911	41.233310	-71.372047	Grid 6	
11/21/2004	2,200	1,682	41.233333	-71.371833	Grid 6	
11/21/2004	3,700	2,829	41.234833	-71.369667	Grid 3	
11/21/2004	2,200	1,682	41.230821	-71.382491	Grid 8	
11/21/2004	2,300	1,758	41.230833	-71.376000	10	
11/22/2004	3,600	2,752	41.233341	-71.382532	Grid 4	
11/22/2004	2,700	2,064	41.230141	-71.374889	Grid 10	
11/22/2004	2,400	1,835	41.230567	-71.376216	buoy	
11/22/2004	1,200	917	41.235000	-71.374000	Grid 1	
12/15/2004	3,000	2,294	41.224850	-71.374850	200 ft	
12/16/2004	3,000	2,294	41.223267	-71.372533	200 ft	
12/16/2004	3,000	2,294	41.231750	-71.378367	175 ft	
12/17/2004	2,850	2,179	41.228808	-71.375738	100 ft	
12/17/2004	3,000	2,294	41.232967	-71.378733	225 ft	
12/18/2004	2,800	2,141	41.226517	-71.373783	275 ft	
12/18/2004	3,000	2,294	41.227317	-71.373150	95 ft	
12/18/2004	2,800	2,141	41.226650	-71.374117	200 ft	
12/19/2004	3,000	2,294	41.228117	-71.371783	50 ft	
12/19/2004	3,000	2,294	41.227850	-71.375150	35 ft	
12/20/2004	3,000	2,294	41.227217	-71.375650	40 ft	
12/21/2004	3,000	2,294	41.229844	-71.376329	40 ft	
12/25/2004	3,000	2,294	41.228026	-71.375967	300 ft	
12/26/2004	3,000	2,294	41.230483	-71.374483	200 ft	
12/29/2004	2,997	2,291	41.226417	-71.374633	150 ft	
12/30/2004	2,997	2,291	41.224883	-71.371950	350 ft	
12/30/2004	2,900	2,217	41.225517	-71.372750	350 ft	
12/31/2004	2,990	2,286	41.226533	-71.372967	150 ft	
1/1/2005	3,000	2,294	41.225385	-71.377307	75 ft	
1/1/2005	3,000	2,294	41.229664	-71.374659	175 ft	
1/2/2005	2,950	2,255	41.228883	-71.371100	300 ft	
1/2/2005	3,000	2,294	41.228871	-71.376235	75 ft	
1/3/2005	3,000	2,294	41.225533	-71.375283	180 ft	
1/3/2005	3,000	2,294	41.228782	-71.375235	150 ft	
1/4/2005	3,000	2,294	41.227550	-71.374833	200 ft	
1/5/2005	2,000	1,529	41.228980	-71.375601	75 ft	
1/7/2005	2,997	2,291	41.230180	-71.375067	100 ft	
1/7/2005	2,650	2,026	41.225867	-71.374900	50 ft	

Project Name: PROVIDENCE RIVER & HARBOR MAINTENANCE DREDGING
Permittee: COE-PROVIDENCE RIVER
Permit Number: 2003C0002

Disposal Date	Volume (yd^3)	Volume (m^3)	Disposal Latitude	Disposal Longitude	Disposal Location/Distance from Buoy (ft)	Direction of Buoy
1/8/2005	2,990	2,286	41.229699	-71.374563	200 ft	
1/8/2005	2,990	2,286	41.225350	-71.374283	150 ft	
1/9/2005	2,900	2,217	41.229399	-71.375485	40 ft	
1/9/2005	2,995	2,290	41.225850	-71.374817	75 ft	
1/10/2005	2,997	2,291	41.229326	-71.373609	275 ft	
Total Dredged Material Volume	5,264,463	4,024,971				

Appendix B

Sediment-Profile Images Results for RISDS
July 2005 Survey

Appendix B-1
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 B-2
Sediment Profile Image Results for Reference Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
Ref E-01 A	7/1/2005	17:57:03	173.81	12.14	12.05	12.36	13	3	14.32	0.31	B	4-3	2	>4	>4 - 2	40.35	2.82	0	-	N	0.00	0	-	-	N	4	4.15	12.08	8.11	Stage 1 on 3	Light gray, bioturbated very silty very fine sand. Sediment column well-processed of organics. Oxidized active voids at left. Several polychaetes in sediment column. Numerous (>10) fine tubes at SWI and at least three tube types present. Nice pic.
Ref E-01 B	7/1/2005	17:58:20	175.73	12.27	11.15	13.17	13	3	14.32	2.02	B	4-3/>4	2	>4	>4 - 2	34.85	2.43	0	-	N	0.00	0	-	-	N	5	5.04	10.23	7.64	Stage 1 on 3	Light gray, bioturbated very silty very fine sand over very sandy silt. Grainsize transition may be an artifact of decreasing porosity with depth. Sediment column well-processed of organics. Oxidized active voids throughout sediment column. Polychaete in upper right of sediment column. Numerous (>10) fine tubes at SWI and at least two tube types present. Nice pic.
Ref E-01 C	7/1/2005	17:59:12	131.82	9.21	8.04	10.14	13	3	14.32	2.10	B	4-3	2	>4	>4 - 2	42.40	2.96	0	-	N	0.00	0	-	-	N	1	5.94	8.97	7.45	Stage 1 on 3	Light gray to tan, bioturbated very silty very fine sand. Sediment column well-processed of organics. Oxidized active void/burrow in lower left. Polychaete in center of SWI and several very thin polychaetes in sediment column. Penetration appears to be at an angle. Numerous (>10) fine tubes at SWI and at least three tube types present, including stick amphipods. Distinct large burrow at far left SWI.
Ref E-02 A	7/1/2005	18:28:20	122.54	8.56	7.73	9.30	13	3	14.32	1.57	P	4-3	2	>4	>4 - 2	47.75	3.33	0	-	N	0.00	0	-	-	N	0	-	-	-	Stage 1 on 3	Light gray to tan, bioturbated silty fine sand. Sediment column well-processed of organics. No voids in sediment column but numerous polychaetes distributed throughout. Distinctly sandier than E-01. Several sand/mud tubes at SWI. Mature feldspathic/quartzitic sand.
Ref E-02 B	7/1/2005	18:29:21	156.20	10.91	10.57	11.49	13	3	14.32	0.92	B	4-3	2	>4	>4 - 2	56.77	3.96	0	-	N	0.00	0	-	-	N	2	3.87	5.94	4.90	Stage 1 on 3	Light gray to tan, bioturbated silty fine sand. Sediment column well-processed of organics. Active oxidized void at left with distinct mound above void and large burrow at right. Stick amphipod at left SWI and numerous tubes of at least four types at SWI. Smeared polychaete in lower right. Very nice pic with robust biological activity.

Appendix B-2
Sediment Profile Image Results for Reference Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
Ref E-02 C	7/1/2005	18:30:20	132.10	9.22	8.94	9.58	13	3	14.32	0.65	B	4-3	2	>4	>4 - 2	49.19	3.44	0	-	N	0.00	0	-	-	N	1	0.79	2.47	1.63	Stage 1 on 3	Light gray to tan, bioturbated silty fine sand. Sediment column well-processed of organics. Active oxidized void (feeding "pit") at right SWI. Small bivalve around void. Numerous polychaetes of at least four different types throughout sediment column. A few very small tubes at SWI. Three reps at this station are very similar in terms of sediment type and all have robust to exceptionally robust biological features.
Ref E-03 A	7/1/2005	18:19:50	158.97	11.10	10.45	11.55	13	3	14.32	1.09	B	4-3/>4	2	>4	>4 - 2	42.46	2.96	0	-	N	0.00	0	-	-	N	3	3.70	11.27	7.48	Stage 1 on 3	Light gray to tan, bioturbated silty fine sand over very sandy silt with a few whitish clay clots at depth. Sediment column well-processed of organics. Grainsize transition may be a function of decreasing porosity with depth. Void in upper left, mid right and lower center. Dense assemblage of stick amphipods and tubes at SWI. Fleshy bit of an animal below right void.
Ref E-03 B	7/1/2005	18:20:48	187.08	13.06	12.78	13.31	13	3	14.32	0.53	B	4-3/>4	2	>4	>4 - 2	53.89	3.76	0	-	N	0.00	0	-	-	N	3	2.63	9.17	5.90	Stage 1 on 3	Light gray to tan, bioturbated silty fine sand over very sandy silt with a few whitish clay clots at depth. Sediment column well-processed of organics. Active, oxidized voids with two in upper right and one at far left. Numerous polychaetes of at least three types in sediment column. Biogenic mounds, a few mud tubes and several stick amphipod tubes at SWI. Nice pic.
Ref E-03 C	7/1/2005	18:21:58	163.45	11.41	10.90	11.77	13	3	14.32	0.87	B	4-3/>4	2	>4	>4 - 2	46.17	3.22	0	-	N	0.00	0	-	-	N	2	4.20	11.44	7.82	Stage 1 on 3	Light gray to tan, bioturbated silty fine sand over very sandy silt with a few whitish clay clots at depth. Sediment column well-processed of organics. Active, oxidized voids at lower left and far right. Two organisms in center of frame. Several stick amphipod tubes at SWI. Lovely shot of expert bounce trigger cable construction with dextral twist following lay of the strands. The three reps at this station showed a distinct silt component at depth within the sediment column relative to the previous two stations.
Ref E-04 A	7/1/2005	18:36:56	142.38	9.94	9.61	10.51	13	3	14.32	0.90	B	4-3	2	>4	>4 - 2	43.80	3.06	0	-	N	0.00	0	-	-	N	0	-	-	-	Stage 1 on 3	Light gray to tan, bioturbated silty fine sand. Sediment column well-processed of organics. No voids visible but large pink-orange polychaete at left and oxidized burrow trace to depth. A few sand-encrusted tubes at SWI and podocerid tubes in background.

Appendix B-2
Sediment Profile Image Results for Reference Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
Ref E-04 B	7/1/2005	18:37:48	138.73	9.69	9.28	10.34	13	3	14.32	1.06	B	4-3	2	>4	>4 - 2	51.18	3.57	2	O	N	0.00	0	-	-	N	0	-	-	-	Stage 1 on 3	Light gray to tan, bioturbated silty fine sand. Sediment column well-processed of organics. No voids visible but oxidized burrow trace to depth at lower left. Polychaete in lower right. Several sand-encrusted tubes at SWI. Biogenically aggregated oxidized mudclast at center SWI.
Ref E-04 C	7/1/2005	18:38:48	110.04	7.68	6.25	9.00	13	3	14.32	2.75	P	4-3	1	>4	>4 - 1	67.28	4.70	0	-	N	0.00	0	-	-	N	2	2.07	5.32	3.70	Stage 1 on 3	Light gray to tan, bioturbated silty fine sand. Sediment column well-processed of organics. Void/burrow at left and small void with polychaete in center. Sand crusted tubes at SWI. The three reps at this station are similar and are very slightly coarser than previous stations. Penetration at an angle.
Ref E-05 A	7/1/2005	18:07:57	149.36	10.43	9.42	12.41	13	3	14.32	3.00	P	4-3/>4	2	>4	>4 - 2	30.77	2.15	0	-	N	0.00	0	-	-	N	3	2.33	3.48	2.90	Stage 1 on 3	Light gray to tan, bioturbated silty fine sand. Gray silt at depth. Active small voids/burrow just under RPD. Stick amphipod tubes in background and are bent.
Ref E-05 B	7/1/2005	18:09:01	179.38	12.53	11.88	12.86	13	3	14.32	0.98	B	4-3/>4	2	>4	>4 - 2	31.16	2.18	0	-	N	0.00	0	-	-	N	4	1.21	11.52	6.36	Stage 1 on 3	Light gray to tan, bioturbated silty fine sand. Gray silt at depth. Active voids with oxidized sediment at depth within the sediment column. Organism in upper left. Numerous tubes at the SWI (>10) of at least three different types including stick amphipods tubes.
Ref E-05 C	7/1/2005	18:10:05	191.22	13.35	13.00	13.84	13	3	14.32	0.84	B	4-3/>4	2	>4	>4 - 2	29.89	2.09	0	-	N	0.00	0	-	-	N	4	5.63	10.01	7.82	Stage 1 on 3	Light gray to tan, bioturbated silty fine sand. Gray silt at depth. Active voids with oxidized sediment at depth within the sediment column. Polychaete in upper left. Numerous tubes at the SWI (>10) with numerous stick amphipod tubes. Patches of oxidized sediment at depth. RPD contrast at this station strong relative to other stations in this reference area. Biogenic mound at SWI. Three reps at this station similar and also similar to E-03.
Ref NE-01 A	7/1/2005	16:56:47	82.64	5.77	5.30	6.59	13	3	14.32	1.29	P	3-2	1	>4	>4 - 1	37.44	2.61	0	-	N	0.00	0	-	-	N	0	-	-	-	Stage 1 on 3	Tan, bioturbated silty fine to medium sand. Hard. Dense assemblage of sand encrusted tubes at SWI. Numerous polychaetes of at least three different species in the sediment column. Very subtle RPD contrast. Quartzitic/felspathic sand. Nice pic.
Ref NE-01 B	7/1/2005	16:57:46	37.30	2.60	2.30	3.05	13	3	14.32	0.76	P	4-3	-3	>4	>4 - -3	IND	IND	0	-	N	0.00	0	-	-	N	0	-	-	-	IND	Hard, tan, quartzitic/feldspathic slightly silty very fine sand. Ripples at SWI. Numerous small tubes at SWI and a larger tube in the background. Low penetration precludes ID of void (if present). RPD likely > than P but very little contrast in sediment column.

Appendix B-2
Sediment Profile Image Results for Reference Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
Ref NE-01 C	7/1/2005	16:58:46	89.71	6.26	5.38	6.67	13	3	14.32	1.29	B	3-2	1	>4	>4 - 1	48.94	3.42	0	-	N	0.00	0	-	-	N	2	1.18	3.95	2.57	Stage 1 on 3	Tan, bioturbated silty fine to medium sand. Hard. Dense assemblage of sand encrusted tubes at SWI. Shallow burrow at center SWI and small void in upper right. Thin polychaete at bottom of frame. Reps A and C are very similar.
Ref NE-02 A	7/1/2005	17:08:28	96.53	6.74	6.31	7.03	13	3	14.32	0.73	B	4-3	1	>4	>4 - 1	42.60	2.97	0	-	N	0.00	0	-	-	N	0	-	-	-	Stage 1 on 3	Tan, bioturbated silty fine to medium sand. Hard. Dense assemblage of sand encrusted tubes at SWI. Polychaete at left edge of frame. Very subtle RPD contrast. Quartzitic/feldspathic mature sand.
Ref NE-02 B	7/1/2005	17:09:31	36.59	2.56	1.79	3.62	13	3	14.32	1.82	P	4-3	1	>4	>4 - 1	36.59	2.56	0	-	N	0.00	0	-	-	N	0	-	-	-	Stage 1 on 3	Tan, hard silty fine sand. Dense assemblage of sand encrusted tubes at SWI. Two tube types present. Likely stage 1 on 3 but there is not enough penetration to see any burrowing organisms. Mature granitic sand. Stage 3 burrow openings evident in plan view image.
Ref NE-02 C	7/1/2005	17:10:40	39.80	2.78	2.47	2.94	13	3	14.32	0.48	B	4-3	1	>4	>4 - 1	39.80	2.78	0	-	N	0.00	0	-	-	N	0	-	-	-	Stage 1 on 3	Tan, hard silty fine sand. Dense assemblage of sand encrusted tubes at SWI. Red crustacean in SWI foreground. Likely stage 1 on 3 but there is not enough penetration to see any burrowing organisms. Mature granitic sand. Reps B and C are similar. RPD>P. Same range of sediment types seen in NE-01; plan view shows Stage 3 burrow openings
Ref NE-03 A	7/1/2005	16:23:36	48.63	3.40	2.49	4.01	13	3	14.32	1.51	P	3-2	0	>4	>4 - 0	48.63	3.40	0	-	N	0.00	0	-	-	N	0	-	-	-	IND	Tan, hard fine to medium sand. Bedform. Some reworked shell fragments. Numerous small sand encrusted tubes. Mature quartzitic/feldspathic sand that is moderately sorted. Hydrodynamically active. RPD>P.
Ref NE-03 B	7/1/2005	16:24:42	29.42	2.05	1.54	3.42	13	3	14.32	1.88	P	3-2	0	>4	>4 - 0	29.42	2.05	0	-	N	0.00	0	-	-	N	0	-	-	-	IND	Tan, hard fine to medium sand. Some reworked shell fragments. Numerous small sand encrusted tubes in the background. Mature quartzitic/feldspathic sand that is moderately sorted. Hydrodynamically active. RPD>P. Similar to rep A.
Ref NE-03 C	7/1/2005	16:25:38	32.35	2.26	1.77	2.61	13	3	14.32	0.84	P	3-2	-1	>4	>4 - -1	32.35	2.26	0	-	N	0.00	0	-	-	N	0	-	-	-	IND	Tan, hard fine to medium sand. Some reworked shell fragments. Tablate mud tubes at SWI that are similar in shape to ampelisca tubes. Three reps are sedimentologically similar.
Ref NE-04 A	7/1/2005	16:47:00	110.40	7.71	6.70	8.38	13	3	14.32	1.68	B	3-2	1	>4	>4 - 1	67.81	4.74	0	-	N	0.00	0	-	-	N	0	-	-	-	Stage 1 on 3	Tan, silty fine sand. Very dense assemblage of sand encrusted tubes at SWI. Deep, even RPD with very subtle contrast. Organism at bottom center, clearish polychaete at left. Nice pic.

Appendix B-2
Sediment Profile Image Results for Reference Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
Ref NE-04 B	7/1/2005	16:48:14	92.11	6.43	5.77	7.15	13	3	14.32	1.37	B	3-2	1	>4	>4 - 1	46.61	3.25	0	-	N	0.00	0	-	-	N	2	1.29	5.05	3.17	Stage 1 on 3	Tan, silty fine sand. A few sand encrusted tubes at the SWI. Quartzitic/feldspathic mature sand. Void in lower left center and burrow/void complex at right. Moderate sorting. Polychaete in upper center of sediment column. Very subtle RPD contrast.
Ref NE-04 C	7/1/2005	16:49:15	73.43	5.13	4.20	6.14	13	3	14.32	1.93	P	3-2	-4	>4	>4 - -4	54.06	3.78	0	-	N	0.00	0	-	-	N	0	-	-	-	IND	Tan, cobbly, silty fine sand. A few sand encrusted tubes at the SWI. Quartzitic/feldspathic mature sand. Epiphytes/epizoans encrusting large rounded cobbles. Starfish in center SWI. Three reps are generally similar although rep C is only rep with cobbles.
Ref NE-05 A	7/1/2005	16:39:07	76.57	5.35	5.07	5.86	13	3	14.32	0.78	P	3-2	1	>4	>4 - 1	38.47	2.69	0	-	N	0.00	0	-	-	N	0	-	-	-	Stage 1 on 3	Tan, hard fine to medium sand. Some reworked shell fragments. Numerous small sand encrusted tubes in the background. Mature quartzitic/feldspathic sand that is moderately sorted. Polychaete at bottom frame at left and mid-right.
Ref NE-05 B	7/1/2005	16:40:02	47.72	3.33	0.53	4.37	13	3	14.32	3.84	P	3-2	1	>4	>4 - 1	IND	IND	0	-	N	0.00	0	-	-	N	0	-	-	-	IND	Tan, hard fine to medium sand. Some reworked shell fragments. Mature quartzitic/feldspathic sand that is moderately sorted. A few sand encrusted tubes at SWI. Dragdown at right. RPD cannot be determined due to lack of contrast.
Ref NE-05 C	7/1/2005	16:41:05	92.68	6.47	5.83	6.95	13	3	14.32	1.12	P	3-2	1	>4	>4 - 1	48.56	3.39	0	-	N	0.00	0	-	-	N	0	-	-	-	Stage 1 on 3	Tan, hard fine to medium sand with minor shell fragments at SWI. Very subtle RPD contrast. Moderate sorting. Numerous small sand encrusted tubes in the background. Mature quartzitic/feldspathic sand. Three reps at this station are sedimentologically similar. Stage 3 burrow openings visible in plan-view image
SW-01 A	6/30/2005	14:49:11	82.20	5.74	5.49	5.88	13	3	14.32	0.39	B	4-3	0	>4	>4 - 0	28.16	1.97	0	-	N	0.00	0	-	-	N	1	2.24	2.63	2.44	Stage 1 on 3	Tan to very light gray, firm, silty very fine sand. Dense sand encrusted tubes at SWI. Numerous shallow burrows and very small burrow/void at far left. Fleshy, multi-armed/tentacled organism in left background. Mature granitic sand.
SW-01 B	6/30/2005	14:50:55	100.77	7.04	6.84	7.54	13	3	14.32	0.70	B	4-3	1	>4	>4 - 1	37.06	2.59	0	-	N	0.00	0	-	-	N	0	-	-	-	Stage 1 on 3	Tan to very light gray, firm, silty very fine sand. Dense sand encrusted tubes at SWI. Numerous shallow burrows with several oxidized burrow trace to depth. Very subtle RPD contrast. Mature granitic (quartzitic and feldspathic) sand. Stage 3 burrow openings visible in plan view image.

Appendix B-2
Sediment Profile Image Results for Reference Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
SW-01 C	6/30/2005	14:52:29	106.07	7.41	7.01	7.93	13	3	14.32	0.92	P	4-3	1	>4	>4 - 1	50.94	3.56	0	-	N	0.00	0	-	-	N	1	2.10	3.59	2.84	Stage 1 on 3	Tan, firm, moderately sorted very fine sand. Numerous sand encrusted tubes at SWI - usually in clusters. Burrow/void at left. Oxidized burrow trace at depth at far right. RPD estimated due to the very slight contrast. Three reps are sedimentologically similar.
SW-02 A	6/30/2005	15:46:19	159.00	11.10	9.98	12.19	13	3	14.32	2.21	B	4-3	1	>4	>4 - 1	68.38	4.77	0	-	N	0.00	0	-	-	N	1	7.12	7.82	7.47	Stage 1 on 3	Tan, bioturbated, slightly silty very fine sand. Prominent biogenic mound in left center with distinct shallow burrow. Dense mat of sand-encrusted tubes around biogenic mound. Small void in lower right center. Severed starfish arm at far right. Mature granitic sand. Subtle RPD contrast.
SW-02 B	6/30/2005	15:47:19	136.23	9.51	9.25	9.86	13	3	14.32	0.62	B	4-3	1	>4	>4 - 1	60.39	4.22	0	-	N	0.00	0	-	-	N	2	2.10	8.72	5.41	Stage 1 on 3	Tan, bioturbated, slightly silty very fine sand. Dense mat of sand-encrusted tubes with several polychaetes poking out of tube entrance. Mature granitic sand. Subtle RPD contrast. Shallow burrows in RPD. Void/burrow in lower left center and small void in upper center. A few polychaetes smeared out in sediment column.
SW-02 C	6/30/2005	15:48:18	111.06	7.76	7.01	8.27	13	3	14.32	1.26	B	4-3	1	>4	>4 - 1	49.58	3.46	0	-	N	0.00	0	-	-	N	1	2.58	2.75	2.66	Stage 1 on 3	Tan, bioturbated, slightly silty very fine sand. Dense mat of sand-encrusted tubes with several polychaetes poking out of tube entrance. Mature granitic sand. Subtle RPD contrast. Shallow burrows in RPD. Void/burrow in upper left. A few polychaetes smeared out in sediment column. Three reps are generally similar.
SW-03 A	6/30/2005	15:59:36	107.01	7.47	6.92	7.59	13	3	14.32	0.67	P	3-2	1	>4	>4 - 1	46.60	3.25	0	-	N	0.00	0	-	-	N	1	1.46	1.71	1.58	Stage 1 on 3	Tan, firm, well-sorted, slightly silty fine sand. Several clusters of sand encrusted tubes at the SWI. Small void/burrow in upper right. Very subtle RPD contrast. Appears physically reworked. Mature granitic sand.
SW-03 B	6/30/2005	16:01:08	139.75	9.76	9.33	10.23	13	3	14.32	0.90	P	3-2	1	>4	>4 - 1	66.63	4.65	0	-	N	0.00	0	-	-	N	0	-	-	-	Stage 1 on 3	Tan, firm, well-sorted, slightly silty fine sand. Several clusters of sand encrusted tubes at the SWI. Several distinct brachiated burrows with commutation to the SWI. Polychaete at depth in left center. Mature granitic sand with very subtle RPD contrast.
SW-03 C	6/30/2005	16:02:33	113.24	7.91	7.43	8.30	13	3	14.32	0.87	P	3-2	1	>4	>4 - 1	68.51	4.78	0	-	N	0.00	0	-	-	N	0	-	-	-	Stage 1 on 3	Tan, firm, well-sorted, slightly silty fine sand. Very subtle RPD contrast. Broken sand tubes at SWI and appears to be recently physically disturbed. Large polychaete at right and several small polychaetes throughout the sediment column. Three reps are similar. Mature granitic sand.

Appendix B-2
Sediment Profile Image Results for Reference Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
SW-04 A	6/30/2005	16:54:41	138.05	9.64	8.94	10.40	13	3	14.32	1.46	B	4-3	1	>4	>4 - 1	77.57	5.42	0	-	N	0.00	0	-	-	N	3	1.51	9.02	5.27	Stage 1 on 3	Tan, moderately firm, very fine sand. Large archetypal void in lower center. Very dense mat of sand encrusted tubes at the SWI. Numerous well defined shallow burrows. Red polychaete at SWI. Mature granitic sand. Very subtle RPD contrast.
SW-04 B	6/30/2005	16:55:33	144.22	10.07	9.81	10.23	13	3	14.32	0.42	B	4-3	1	>4	>4 - 1	62.42	4.36	0	-	N	0.00	0	-	-	N	2	3.36	9.95	6.66	Stage 1 on 3	Tan, firm, silty very fine sand. Prominent burrow at bottom of frame with some oxidized sediment on walls in background. Small void to upper left of large burrow. Dense mat of sand encrusted tubes at SWI. Several worms poking out of tubes. Organism at left. Great pic.
SW-04 C	6/30/2005	16:56:44	134.99	9.43	8.88	9.89	13	3	14.32	1.01	P	4-3	2	>4	>4 - 2	58.49	4.08	0	-	N	0.00	0	-	-	N	3	2.41	6.22	4.32	Stage 1 on 3	Tan to light gray, firm, very fine sand. Large void at right and related patch of small voids in center. Subtle RPD contrast and RPD goes to bottom of right hand void in that area. A few small polychaete in sediment column. Dense aggregates of sand encrusted tubes at SWI. Three reps are similar.
SW-05 A	6/30/2005	16:13:14	65.48	4.57	3.33	5.16	13	3	14.32	1.82	B	4-3	2	>4	>4 - 2	37.26	2.60	0	-	N	0.00	0	-	-	N	1	-	-	-	Stage 1 on 3	Hard, tan, very fine sand. Some intact sand-encrusted tubes at SWI and many broken or recumbent tubes at SWI. Very subtle RPD contrast. Oxidized burrow at left. Mature granitic sand. Numerous Stage 3 burrow openings in plan view image
SW-05 B	6/30/2005	16:14:03	98.63	6.89	6.64	7.15	13	3	14.32	0.50	B	4-3	1	>4	>4 - 1	63.52	4.44	0	-	N	0.00	0	-	-	N	3	2.55	6.28	4.41	Stage 1 on 3	Tan fine to very fine sand. Numerous subsurface burrows and some with small voids. RPD is an estimate due to minimal contrast between blond sand and oxidized sediment. Mature granitic sand. Several clusters of sand encrusted tubes at SWI. Organisms in burrows at lower right.
SW-05 C	6/30/2005	16:15:27	133.44	9.32	8.49	9.64	13	3	14.32	1.15	Ind	4-3	1	>4	>4 - 1	58.80	4.11	0	-	N	0.00	0	-	-	N	0	-	-	-	Stage 1 on 3	Tan fine to very fine sand. Exceptionally subtle RPD contrast. Mature granitic sand. Numerous sand encrusted tubes of two types at SWI. Organism at bottom of frame in left. Several deep burrow trace with oxidized trace. Three reps from this station are generally similar although penetration is least at A.

Appendix B-3
Sediment Profile Image Results for Disposal Site Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
A-01 A	7/2/2005	13:04:33	99.46	6.95	6.59	7.26	10.5	0 + doors	14.32	0.67	P	4-3/>4	0	>4	>4 - 0	17.58	1.23	0	-	N	99.46	> 6.9	> 6.59	> 7.26	N	3	2.27	3.92	3.10	Stage 1 on 3	DM>P. Dark gray sandy silt/clay with tan RPD. Upper 1-2 cm of sediment column distinctly sandier than lower portion. Bedforms at SWI. Three voids with oxidized sediment in upper left. Tubes in SWI background. Stick amphipods in background. Appears to be some winnowing in upper sediment column.
A-01 B	7/2/2005	13:05:40	143.18	10.00	9.16	10.68	10.5	0 + doors	14.32	1.51	P	4-3/>4	0	>4	>4 - 0	19.05	1.33	>10	R	N	143.18	> 10.0	> 9.16	> 10.68	N	0	-	-	-	Stage 1	DM>P. Dark gray sandy silt/clay with tan RPD. A few smears of light colored clay in subsurface. Upper 1-2 cm of sediment column distinctly sandier than lower portion. Small mud tubes in SWI background and large occupied stick amphipod tube in foreground. Reduced mudclasts are artifacts (look at wiper blade). Appears to be some winnowing in upper sediment column.
A-01 C	7/2/2005	13:06:39	132.59	9.26	8.72	9.67	10.5	0 + doors	14.32	0.95	B	4-3/>4	0	>4	>4 - 0	16.46	1.15	>10	R	N	132.59	> 9.3	> 8.72	> 9.67	N	0	-	-	-	Stage 1 -> 2	DM>P. Dark gray sandy silt/clay with tan RPD. A few smears of light colored clay in subsurface. Upper 1 cm of sediment column distinctly sandier than lower portion. Reduced mudclasts are artifactual (look at wiper blade). 3.5 cm burrow at left. Three layers of DM represented. Appears to be some winnowing in upper sediment column. The three reps are sedimentologically similar.
A-02 B	7/2/2005	12:02:42	254.29	17.76	17.21	18.41	11	0	14.32	1.21	B	4-3/>4	1	>4	>4 - 1	20.34	1.42	0	-	N	254.29	> 17.8	> 17.21	> 18.41	N	2	3.14	6.62	4.88	Stage 1 on 3	DM>P. Medium to dark gray silty DM with thin 1 cm of silty sand at SWI. Small sediment filled void in upper left and active void at upper right. Several tubes at SWI. Some light colored clays in DM. Soft sediment.
A-02 D	7/3/2005	11:00:39	144.00	10.06	9.86	10.31	11.5	0 + doors	14.32	0.45	B	>4	1	>4	>4 - 1	17.22	1.20	2	R	N	144.00	> 10.1	> 9.86	> 10.31	N	2	3.06	4.60	3.83	Stage 1 on 3	DM>P. Medium to dark gray silty DM with thin 1 cm of silty sand at SWI. Some light colored clays in DM. Two active voids in upper center of sediment column. Several fine mud tubes at the SWI and a few stick amphipod tubes in background. Biogenic depression in right background.
A-02 F	7/3/2005	11:02:30	139.08	9.71	9.42	10.17	11.5	0 + doors	14.32	0.76	P	>4	1	>4	>4 - 1	14.56	1.02	>10	R	N	139.08	> 9.7	> 9.42	> 10.17	N	1	4.90	5.32	5.11	Stage 3	DM>P. Medium to dark gray silty DM with thin <1 cm of silty sand at SWI. Some light colored clays in DM. SWI dominated by black, reduced mudclasts that are artifacts. Small void in right center of sediment column. A few tubes at SWI. The three reps at this station are similar.
A-03 A	7/2/2005	13:47:51	222.92	15.57	14.54	19.76	11.5	0 + doors	14.32	5.21	P	>4	2	>4	>4 - 2	IND	IND	>10	R	N	222.92	> 15.6	> 14.54	> 19.76	N	0	-	-	-	IND	DM>P. Medium to dark gray silty DM with a few lighter colored clay smears. SWI is disturbed from sampling. RPD is indeterminate due to disturbance. A few tubes in background. DM is uniformly dark in hue.

Appendix B-3
Sediment Profile Image Results for Disposal Site Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
A-03 B	7/2/2005	13:48:43	148.72	10.39	9.81	10.82	11.5	0 + doors	14.32	1.01	B	4-3/>4	2	>4	>4 - 2	15.98	1.12	0	-	N	148.72	> 10.4	> 9.81	> 10.82	N	3	2.38	3.56	2.97	Stage 1 on 3	DM>P. Medium to dark gray silty DM with a thin band (1-2 cm) of silty very fine sand at SWI. Appears to be physically/sampling disturbed at far right SWI. Two large active voids in upper-mid sediment column. Several mud tubes at left SWI. High relief, most of which is related to sampling. The three reps at this station are generally similar although rep C has the deepest and largest active voids as well as the deepest RPD. Transition from sandy RPD to silty underlying material is abrupt at this station.
A-03 C	7/2/2005	13:49:41	159.01	11.10	7.79	13.23	11.5	0 + doors	14.32	5.44	P	>4	2	>4	>4 - 2	27.40	1.91	9	O	N	159.01	> 11.1	> 7.79	> 13.23	N	2	4.09	7.62	5.86	Stage 1 on 3	DM>P. Medium to dark gray silty DM with a thin band (<1 cm) of silty very fine sand at SWI. Three small voids in upper sediment column. Several fine mud tubes at SWI and stick amphipod tubes in background. SWI appears washed.
A-04 A	7/2/2005	13:39:55	84.96	5.93	5.21	6.81	11.5	0 + doors	14.32	1.60	P	>4	0	>4	>4 - 0	IND	IND	1	R	N	84.96	> 5.9	> 5.21	> 6.81	N	0	-	-	-	IND	DM>P. Medium gray Silt/clay with some lighter colored clay in matrix. Thin veneer of tan sand at SWI. Sediment column disturbed from drag down. Large mussel shell with barnacle encrustations at right SWI. Shell fragments at SWI.
A-04 B	7/2/2005	13:41:01	128.95	9.00	8.52	9.86	11.5	0 + doors	14.32	1.35	P	>4	1	>4	>4 - 1	21.17	1.48	4	O	N	128.95	> 9.0	> 8.52	> 9.86	N	2	0.34	4.60	2.47	Stage 1 on 3	DM>P. Medium gray silt/clay with some light gray clots of formerly oxidized silt/clay throughout the sediment column. Two active voids on at center SWI and one at right, possibly part of same gallery. Cohesive mudclasts in left background which are not related to sampling. A few small tubes in background. Organism in far upper left.
A-04 C	7/2/2005	13:41:55	132.53	9.25	8.58	9.84	11.5	0 + doors	14.32	1.26	B	>4	1	>4	>4 - 1	17.37	1.21	2	R	N	132.53	> 9.3	> 8.58	> 9.84	N	1	2.89	3.48	3.18	Stage 1 on 3	DM>P. Medium to dark gray silt/clay with thin band of tan silty sand at SWI. Active void in upper center and a patch of oxidized sediment bellow void. Shall fragments at SWI and a couple of small mud tubes in background. DM appears relatively homogeneous. Three reps all show DM but slightly different character to DM.
A-05 B	7/2/2005	13:20:52	279.76	19.54	18.69	20.46	11.5	0 + doors	14.32	1.77	B	>4	1	>4	>4 - 1	25.32	1.77	0	-	N	279.76	> 19.5	> 18.69	> 20.46	N	3	11.43	14.16	12.80	Stage 1 on 3	DM>P. Medium to dark gray, soft silt/clay. Three reduced sediment filled void in center of sediment column - possibly relict. A few small mud tubes at SWI. A few shallow oxidized burrows at SWI. Active Stage 3 burrow openings in plan view image

Appendix B-3
Sediment Profile Image Results for Disposal Site Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
A-05 C	7/2/2005	13:21:57	190.81	13.32	12.41	13.98	11.5	0 + doors	14.32	1.57	B	> 4	1	> 4	> 4 - 1	19.54	1.36	0	-	N	190.81	> 13.3	> 12.41	> 13.98	N	0	-	-	-	Stage 1 on 3	DM > P. Medium to dark gray, silt/clay with thin tan 1 cm band of silty sand at SWI. No distinct feeding voids but patch of oxidized sediment at lower left that is obviously associated with subsurface feeding/burrowing. Numerous fine mud tubes in background. Interesting shot of reduced sediment at SWI in ba ckground that is from conveyoring of subsurface to the SWI (a type image for such process). Biogenic depression at right and far left.
A-05 D	7/2/2005	13:24:10	267.60	18.69	17.94	19.45	11.5	0 + doors	14.32	1.51	B	> 4	1	> 4	> 4 - 1	41.06	2.87	0	-	N	267.60	> 18.7	> 17.94	> 19.45	N	1	10.03	11.10	10.57	Stage 1 on 3	DM > P. Medium to dark gray, soft, silt/clay with thin tan 2-3 cm band of silty sand at SWI. Prominent active feeding void in center of sediment column. Thick physically influenced RPD with distinct black zone of intense sulphate reduction immediate below RPD. Fe/Mn complexation and chelation to organics in RPD - very cool image in terms of ferrigenous cation cycling. A few recumbent tubes at SWI.
B-01 D	7/3/2005	9:45:27	218.70	15.27	14.35	15.81	11.5	0 + doors	14.32	1.46	P	> 4	1	> 4	> 4 - 1	23.49	1.64	0	-	N	218.70	> 15.3	> 14.35	> 15.81	N	0	-	-	-	Stage 1 -> 2	DM > P. Light to dark gray very soft silt/clay. Shell debris at SWI. High pore water content/unconsolidated based on "cake-batter" texture of subsurface sediment. Bands of lighter colored clay with at least two distinct layers of DM present.
B-01 F	7/3/2005	9:55:48	155.43	10.85	9.98	11.21	11.5	0 + doors	14.32	1.23	P	> 4	1	> 4	> 4 - 1	21.22	1.48	2	R	N	155.43	> 10.9	> 9.98	> 11.21	N	1	2.35	2.61	2.48	Stage 1 on 3	DM > P. Light to dark gray soft silt/clay. Shell debris at SWI. High pore water content/unconsolidated based on "cake-batter" texture of subsurface sediment. Bands of lighter colored clay with at least two distinct layers of DM present. Small active void in far upper left. Recolonization downward is in process. Mudclasts are artifacts.
B-01 G	7/3/2005	9:57:41	143.17	10.00	9.67	10.31	11.5	0 + doors	14.32	0.64	B	> 4	1	> 4	> 4 - 1	21.92	1.53	1	R	N	143.17	> 10.0	> 9.67	> 10.31	N	2	1.93	2.97	2.45	Stage 1 on 3	DM > P. Light to dark gray soft silt/clay. Shell debris at SWI. High pore water content/unconsolidated based on "cake-batter" texture of subsurface sediment. Two active voids, one in upper right and one in far upper left. A few small mud tubes at SWI. Three reps at this station are very similar.
B-02 D	7/3/2005	10:50:11	138.59	9.68	9.33	10.29	11.5	0 + doors	14.32	0.95	B	> 4	1	> 4	> 4 - 1	18.24	1.27	0	-	N	138.59	> 9.7	> 9.33	> 10.29	N	4	2.13	7.26	4.69	Stage 1 on 3	DM > P. Light to dark gray silt/clay. Thin, distinct high contrast RPD. Zone of intense sulphate reduction immediately below RPD. Multi-void gallery in right center with reduced sediment being conveyored to the SWI. Several very fine mud tubes at SWI and stick amphipod+tube. Nice pic.

Appendix B-3
Sediment Profile Image Results for Disposal Site Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
B-02 E	7/3/2005	10:51:23	266.99	18.64	17.68	19.39	11.5	0 + doors	14.32	1.71	B	> 4	1	> 4	> 4 - 1	13.11	0.92	0	-	N	266.99	> 18.6	> 17.68	> 19.39	N	1	16.06	16.81	16.44	Stage 1 on 3	DM > P. Light to dark gray silt/clay. Thin, distinct high contrast RPD with zone of intense sulphate reduction immediately below RPD. Void with oxidized sediment trace in lower left corner. Several small mud tubes at SWI. Some FeO-OH complexation in sediment column. Very soft.
B-02 F	7/3/2005	10:52:25	177.73	12.41	10.31	13.28	11.5	0 + doors	14.32	2.97	P	> 4	1	> 4	> 4 - 1	9.50	0.66	0	-	N	177.73	> 12.4	> 10.31	> 13.28	N	0	-	-	-	Stage 1	DM > P. Light to dark gray silt/clay. RPD not continuous over entire width of frame, possibly due to trash (plastic bag?) covering the SWI. Based on the reduced RPD by the bag, it is likely that there is a moderate SOD. A few tubes at SWI and tube at left has is orange because of complexed iron.
B-03 D	7/3/2005	10:04:25	170.52	11.91	11.10	12.81	11.5	0 + doors	14.32	1.71	P	> 4	1	> 4	> 4 - 1	11.33	0.79	3	R	N	170.52	> 11.9	> 11.10	> 12.81	N	1	3.64	3.76	3.70	Stage 1 on 3	DM > P. Light to dark gray silt/clay. Irregular, thinly developed RPD. Very small void/burrow in upper left-center. Burrow trace at right. Weakly developed 1 on 3. Numerous fine mud tubes at SWI. Mudclasts at SWI are artifacts.
B-03 F	7/3/2005	10:07:23	197.82	13.81	13.28	14.35	11.5	0 + doors	14.32	1.06	B	> 4	1	> 4	> 4 - 1	14.22	0.99	0	-	N	197.82	> 13.8	> 13.28	> 14.35	N	2	3.17	5.91	4.54	Stage 1 on 3	DM > P. Light to dark gray silt/clay. Biogenic mound at left SWI with RPD thickened across mound. Two small reduced voids in upper sediment column. Numerous small mud tubes at SWI which are concentrated in two clusters. Clots of light colored clay present in a band across the bottom of the frame.
B-03 G	7/3/2005	10:08:41	245.04	17.11	15.92	18.02	11.5	0 + doors	14.32	2.10	B	> 4	1	> 4	> 4 - 1	19.69	1.37	0	-	N	245.04	> 17.1	> 15.92	> 18.02	N	2	5.72	7.06	6.39	Stage 1 on 3	DM > P. Light to dark gray silt/clay. Biogenic mound at left SWI . Several fine mud tubes in SWI background. Prominent active void beneath and slightly to left of biogenic mound. Thin band of light colored clay clots at bottom of frame. Strata of the three reps at this station appear similar although Rep G is the most biologically advanced of the three reps.
B-04 D	7/3/2005	9:36:21	164.25	11.47	10.76	12.08	11.5	0 + doors	14.32	1.32	B	> 4	1	> 4	> 4 - 1	15.56	1.09	0	-	N	164.25	> 11.5	> 10.76	> 12.08	N	0	-	-	-	Stage 1 -> 2	DM > P. Light to dark gray silt/clay. Biogenic depression at left with mound at right. Numerous thin tubes at SWI as well as a stick amphipod tube. Numerous shallow burrows in the RPD and sediment filled burrow below RPD at left. FeO-OH complexation at SWI.
B-04 E	7/3/2005	9:37:42	268.16	18.73	18.05	19.14	11.5	0 + doors	14.32	1.09	B	> 4	1	> 4	> 4 - 1	59.64	4.16	0	-	N	268.16	> 18.7	> 18.05	> 19.14	N	0	-	-	-	Stage 1 on 3	DM > P. Light to dark gray very soft silt/clay. FeO-OH complexation at SWI. Large oxidized burrow halo at left . Numerous stick amphipod tubes at SWI and thick mud tube in left background with an orange tipped opening from the chelation of FeO-OH. Instantaneous BMZ well defined.
B-04 F	7/3/2005	9:39:20	287.79	20.10	19.50	20.43	11.5	0 + doors	14.32	0.92	B	> 4	1	> 4	> 4 - 1	41.29	2.88	0	-	N	287.79	> 20.1	> 19.50	> 20.43	N	1	4.99	5.38	5.18	Stage 1 on 3	DM > P. Light to dark gray very soft silt/clay. FeO-OH complexation at SWI and deep defined RPD. Instantaneous BMZ well defined. Sediment-filled void at upper right. Several oxidized burrow traces in RPD. Reps E and F are very similar.

Appendix B-3
Sediment Profile Image Results for Disposal Site Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
B-05 B	7/2/2005	11:45:08	260.40	18.18	16.79	19.25	11	0	14.32	2.47	P	> 4	1	> 4	> 4 - 1	25.98	1.81	0	-	N	260.40	> 18.2	> 16.79	> 19.25	N	3	5.49	12.19	8.84	Stage 1 on 3	DM > P. Light to dark gray, banded, very soft silt/clay. Active multi-void gallery at right. Penetration at an angle based on high angle of strata in the sediment column. A few fine mud tubes and a stick amphipod tube. Band of light colored clay clots at bottom of frame.
B-05 C	7/2/2005	11:45:57	257.03	17.95	17.60	18.41	11	0	14.32	0.81	B	> 4	1	> 4	> 4 - 1	18.01	1.26	1	R	N	257.03	> 17.9	> 17.60	> 18.41	N	2	3.34	13.96	8.65	Stage 1 on 3	DM > P. Light to dark gray, banded, very soft silt/clay. Band of light colored clay clots at bottom of frame. Small void in upper left and void in lower right, just above white-gray clay clot layer. Upper portion of the sediment column has been depleted of organics relative to the rest of the sediment column.
B-05 E	7/3/2005	10:17:41	225.59	15.75	13.42	16.93	11.5	0 + doors	14.32	3.50	P	> 4	1	> 4	> 4 - 1	14.00	0.98	3	B	N	225.59	> 15.8	> 13.42	> 16.93	N	0	-	-	-	Stage 1 -> 2	DM > P. Light to dark gray, banded, very soft silt/clay. Thinly developed high contrast RPD > A few tubes at SWI. Oxidized mudclasts at right SWI background and reduced, mudclasts at left are artifacts. Clay layer at depth is absent. Very dark and apparent high SOD. Reps B and C are similar and E is different both in terms of strata and biogenic reworking.
BE-01 A	7/2/2005	9:17:43	133.37	9.31	8.83	10.00	13	3	14.32	1.18	B	> 4	1	> 4	> 4 - 1	12.84	0.90	0	-	N	133.37	> 9.3	> 8.83	> 10.00	N	1	9.87	10.00	-	Stage 1 on 3	DM > P. Light to dark gray, banded silt/clay. Thinly developed high contrast RPD. Several shallow burrows in RPD and possible biogenic depression in background. Void at very bottom of frame . SWI appears slightly washed.
BE-01 B	7/2/2005	9:18:47	162.51	11.35	10.48	11.97	13	3	14.32	1.49	B	> 4	1	> 4	> 4 - 1	15.16	1.06	3	R	N	162.51	> 11.3	> 10.48	> 11.97	N	5	2.58	10.93	6.76	Stage 1 on 3	DM > P. Light to dark gray, banded silt/clay. Thinly developed high contrast RPD. Multi-void complex in upper left and cloudy void at bottom left - all are likely part of the same gallery. Reduced mudclasts at upper left SWI are artifacts. Upper 1-2 cm of sediment column appears slightly sandier,
BE-01 C	7/2/2005	9:20:10	126.68	8.85	7.87	9.50	13	3	14.32	1.63	B	> 4	1	> 4	> 4 - 1	6.67	0.47	0	-	N	126.68	> 8.8	> 7.87	> 9.50	N	2	0.00	8.21	4.11	Stage 1 on 3	DM > P. Light to dark gray, banded silt/clay. Thinly developed high contrast RPD. Cloudy void in lower left and prominent burrow in center that reaches SWI. RPD appears to be removed from SWI at right. Interesting photo.
BE-02 A	7/2/2005	8:54:47	193.68	13.53	13.09	14.40	13	3	14.32	1.32	B	> 4	0	> 4	> 4 - 0	23.01	1.61	0	-	N	193.68	> 13.5	> 13.09	> 14.40	N	5	3.53	8.63	6.08	Stage 3	DM > P. Light to dark gray, banded silt/clay. Active voids, some with oxidized sediment in upper half of sediment column. RPD distinctly sandier than underlying sediment. Layer of cohesive clay/clay clots at bottom of frame. Clay filled tear at bottom of frame.

Appendix B-3
Sediment Profile Image Results for Disposal Site Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
BE-02 E	7/3/2005	9:06:43	187.77	13.11	12.64	13.76	11.5	0 + doors	14.32	1.12	B	> 4	1	> 4	> 4 - 1	16.91	1.18	1	R	N	187.77	> 13.1	> 12.64	> 13.76	N	0	-	-	-	Stage 2	DM > P. Light to dark gray, banded silt/clay. Irregular surface morphology - possible recent physical disturbance. RPD thicker at right and very thin at left. Very distinct couplets of layers and to be preserved there must be minimal deep bioturbation. Numerous small mud tubes at SWI with shallow burrowing bivalves. Iron complexation at right SWI.
BE-02 F	7/3/2005	9:07:42	219.78	15.35	14.71	15.92	11.5	0 + doors	14.32	1.21	B	> 4	1	> 4	> 4 - 1	29.09	2.03	0	-	N	219.78	> 15.3	> 14.71	> 15.92	N	2	5.35	7.01	6.18	Stage 1 on 3	DM > P. Light to dark gray, banded silt/clay. Distinct layering from DM. Dense mud tubes at SWI and two void in upper center of the sediment column. Three reps at this station are stratigraphically similar but with varying degrees of bioturbation.
BE-03 A	7/2/2005	8:32:37	42.15	2.94	0.62	4.99	13	3	14.32	4.37	P	-4 - -5	-5	> 4	> 4 - -5	IND	IND	0	-	N	42.15	> 2.9	> 0.62	> 4.99	N	0	-	-	-	IND	DM > P. Cobbles and light gray clay. Cobble are washed, have encrusting fauna and cohesive gray clay at bottom center of frame. Coble at left is a rounded piece of red brick.
BE-03 B	7/2/2005	8:33:31	35.37	2.47	1.68	3.25	13	3	14.32	1.57	P	4-3	-1	> 4	> 4 - -1	18.15	1.27	0	-	N	35.37	> 2.5	> 1.68	> 3.25	N	0	-	-	-	IND	DM > P. Light gray very silty-clayey very fine sand. Minimal penetration. Defined RPD. Possible small scale ripple at right.
BE-03 C	7/2/2005	8:34:38	18.66	1.30	0.00	2.27	13	3	14.32	2.27	P	-3 - -4	-4	> 4	> 4 - -4	IND	IND	0	-	N	18.66	> 1.3	> 0.00	> 2.27	N	0	-	-	-	IND	DM > P. Cobbles and gravel. Cobbles are washed and some have encrusting fauna. Cobble at lower left is a worn piece of concrete. Minor small brick pieces scattered at SWI. Reps A and C are similar.
BE-04 C	7/2/2005	7:52:53	149.09	10.41	10.12	10.68	13	3	14.32	0.56	B	> 4	1	> 4	> 4 - 1	13.35	0.93	1	O	N	149.09	> 10.4	> 10.12	> 10.68	N	1	7.01	7.85	7.43	Stage 1 on 3	DM > P. Light to dark gray, banded silt/clay. Layer of light gray cohesive clay clots at bottom of frame. Active void in lower center of frame with biogenic depression and flanking mound above void. Several shallow burrows in upper sediment column. A few fine mud tubes at SWI.
BE-04 E	7/3/2005	11:12:57	188.88	13.19	12.30	14.40	11.5	0 + doors	14.32	2.10	P	> 4	1	> 4	> 4 - 1	25.28	1.77	0	-	N	188.88	> 13.2	> 12.30	> 14.40	N	0	-	-	-	Stage 2 -> 3	DM > P. Light to dark gray, silt/clay. Slight banding of sediment and upper sediment column shows some mixing. No voids but comet-shaped burrow trace at right of frame. Many (> 10) fine mud tubes at the SWI. Iron complexation at the SWI. Several shallow burrows at the SWI.
BE-04 F	7/3/2005	11:14:09	181.82	12.70	12.39	13.00	11.5	0 + doors	14.32	0.62	B	> 4	1	> 4	> 4 - 1	15.19	1.06	0	-	N	181.82	> 12.7	> 12.39	> 13.00	N	1	7.60	7.79	7.70	Stage 1 on 3	DM > P. Medium to dark gray silt/clay. Slight banding of sediment and upper sediment column shows some mixing. Small reduced void at right and burrow trace in lower part of frame. A few thin polychaetes in upper left. Numerous fine mud tubes at the SWI. Three reps are generally similar although Rep C is only rep to show cohesive clay layer.

Appendix B-3
Sediment Profile Image Results for Disposal Site Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
BE-05 A	7/2/2005	7:28:29	134.86	9.42	8.10	10.37	13	3	14.32	2.27	P	>4	1	>4	>4 - 1	19.42	1.36	0	-	N	134.86	> 9.4	> 8.10	> 10.37	N	1	3.67	4.01	3.84	Stage 1 on 3	DM>P. Light to medium gray silt/clay with light gray/white clots of cohesive clay at left. DM has chaotic fabric but appears older. Void in upper center and void remnants at right. Numerous tubes, many prone or recumbent at SWI. SWI appears washed. Nice pic.
BE-05 B	7/2/2005	7:29:59	275.60	19.25	18.66	20.07	13	3	14.32	1.40	B	>4	1	>4	>4 - 1	18.95	1.32	0	-	N	275.60	> 19.2	> 18.66	> 20.07	N	2	9.44	19.76	14.60	Stage 1 on 3	DM>P. Medium to dark gray silt/clay. Several layers visible. Zone of intense reduction immediately under RPD and unclear whether a relict RPD is 2 cm below the SWI. Small void in center of sediment column and another void in the lower left hand corner. Several fine mud tubes at the SWI. Patches of oxidized sediment in the subsurface sediment. Appears to dominantly be older DM.
BE-05 C	7/2/2005	7:30:57	247.52	17.28	16.93	17.32	13	3	14.32	0.39	B	>4	1	>4	>4 - 1	22.93	1.60	0	-	N	247.52	> 17.3	> 16.93	> 17.32	N	2	2.61	8.24	5.42	Stage 1 on 3	DM>P. Medium to dark gray silt/clay with some layering. Large void in upper center of the sediment column and RPD is thickened above void; smaller void in mid left. A few fine tubes at the SWI. Appears to be older DM. Reps B and C are similar whereas rep A shows a slightly different sediment composition.
C-01 A	7/2/2005	14:40:06	172.50	12.05	11.66	12.50	11.5	0 + doors	14.32	0.84	B	>4	1	>4	>4 - 1	20.32	1.42	0	-	N	172.50	> 12.0	> 11.66	> 12.50	N	1	6.67	7.06	6.87	Stage 1 on 3	DM>P. Medium to dark gray, layered silt/clay. At least three layers visible. Active void in the mid-left of the sediment column. A proteinaceous tube at right SWI and several small mud tubes in SWI background. Several shallow burrows in the upper sediment column. DM appears to older.
C-01 B	7/2/2005	14:41:06	186.65	13.03	12.72	13.20	11.5	0 + doors	14.32	0.48	B	>4	1	>4	>4 - 1	16.82	1.17	11	R	N	186.65	> 13.0	> 12.72	> 13.20	N	1	3.20	3.78	3.49	Stage 2 -> 3	DM>P. Medium to dark gray, layered silt/clay. 2+ layers are visible. Small void in upper left. Minor streaking of light-hued clay. Numerous mudclasts at SWI are artifacts. A few small mud tubes at SWI. DM appears older. Deep bioturbation appears to be minimal.
C-01 C	7/2/2005	14:42:06	223.99	15.64	15.13	17.09	11.5	0 + doors	14.32	1.96	P	>4	1	>4	>4 - 1	19.07	1.33	>10	R	N	223.99	> 15.6	> 15.13	> 17.09	N	1	6.19	6.64	6.42	Stage 2 -> 3	DM>P. Medium to dark gray, layered silt/clay. Small void in upper left patch of subsurface oxidized sediment at right as well as a relict void. RPD is disturbed from mudclast artifacts and is estimated. Minor streaking of light-hued clay. Numerous mudclasts at SWI are all artifacts.Two stick amphipods and tubes at SWI. DM appears older. Three reps from this station are similar.
C-02 A	7/2/2005	13:57:31	204.83	14.30	14.01	14.52	11.5	0 + doors	14.32	0.50	B	>4	1	>4	>4 - 1	20.31	1.42	3	R	N	204.83	> 14.3	> 14.01	> 14.52	N	1	5.66	7.34	6.50	Stage 1 on 3	DM>P. Medium to dark gray silt/clay. Large, active void in right center of frame. RPD deepest immediately above void. Several thin mud tubes at SWI. Relict voids in upper left. Appears to be older DM an top 3-5 cm of sediment column shows archetypal mixing and reduction of organic content.

Appendix B-3
Sediment Profile Image Results for Disposal Site Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
C-02 B	7/2/2005	13:58:36	220.44	15.39	13.76	18.75	11.5	0 + doors	14.32	4.99	P	> 4	1	> 4	> 4 - 1	21.74	1.52	0	-	N	220.44	> 15.4	> 13.76	> 18.75	N	0	-	-	-	Stage 1 on 3	DM > P. Light to dark gray silt/clay. Extreme surface relief. Numerous shallow burrows at SWI and several oxidized burrow traces to 7-8 cm below the SWI. Top 2-3 cm of sediment column appears reworked and slightly sandier than underlying sediment. At least 2 dm deposits present/ Interesting photo.
C-02 C	7/2/2005	13:59:40	218.00	15.22	14.82	15.55	11.5	0 + doors	14.32	0.73	B	> 4	1	> 4	> 4 - 1	29.32	2.05	2	R	N	218.00	> 15.2	> 14.82	> 15.55	N	3	3.14	7.23	5.19	Stage 1 on 3	DM > P. Light to dark gray silt/clay. Small void in upper left and two larger voids in right center. Polychaete in mid-left and a few small mud tubes at the SWI. Distinct light to medium gray biologically mixed zone in the upper sediment column. Three reps are generally similar.
C-03 A	7/2/2005	14:48:15	144.06	10.06	9.58	10.40	11.5	0 + doors	14.32	0.81	P	> 4	0	> 4	> 4 - 0	15.81	1.10	9	R	N	144.06	> 10.1	> 9.58	> 10.40	N	1	2.11	3.64	2.87	Stage 1 on 3	DM > P. Light to dark gray sandy silt/clay. Band of light gray/whitish clay clots at bottom of frame. Active void in upper center of frame. Reduced mudclasts at SWI are rounded. Shell fragments in upper 2 cm of sediment column - possibly some winnowing.
C-03 B	7/2/2005	14:49:24	145.37	10.15	9.58	10.68	11.5	0 + doors	14.32	1.09	B	> 4	0	> 4	> 4 - 0	15.50	1.08	0	-	N	145.37	> 10.2	> 9.58	> 10.68	N	0	-	-	-	Stage 1 on 3	DM > P. Light to dark gray sandy silt/clay. SWI appears mildly washed. Burrow/biogenic depression with reduced sediment being brought to SWI in background and is basis for Stage 3 designation. DM appears older and rather non-descript other than high organic content.
C-03 C	7/2/2005	14:50:20	145.54	10.16	9.92	10.51	11.5	0 + doors	14.32	0.59	P	> 4	0	> 4	> 4 - 0	25.92	1.81	3	R	N	145.54	> 10.2	> 9.92	> 10.51	N	5	2.02	5.24	3.63	Stage 1 on 3	DM > P. Light to dark gray sandy silt/clay with distinct band of sand and high shell fragment in RPD. SWI appears washed and RPD is influenced by hydrodynamics. Numerous small to medium void in upper sediment column and may be part of the same gallery. Band of light gray/white cohesive clay clots at depth. At least two layers of DM visible. Three reps are generally similar and show evidence of washing at SWI.
C-04 A	7/2/2005	14:56:09	129.61	9.05	6.98	11.32	11.5	0 + doors	14.32	4.34	P	> 4	0	> 4	> 4 - 0	19.12	1.34	6	R	N	129.61	> 9.1	> 6.98	> 11.32	N	1	4.43	5.10	4.77	Stage 3	DM > P. Medium to dark gray slightly sandy silt clay with distinct large clast of cohesive light gray/white clay at right. Chaotic fabric. Tear in sediment surface at center SWI. Small void in lower left under clay clast. Oxidized burrow trace leads to void. Older DM and SWI appears periodically washed. Plan view has wolf fish buried
C-04 B	7/2/2005	14:57:18	197.17	13.77	13.40	14.04	11.5	0 + doors	14.32	0.64	B	> 4	1	> 4	> 4 - 1	18.12	1.27	2	R	N	197.17	> 13.8	> 13.40	> 14.04	N	5	1.65	7.68	4.67	Stage 1 on 3	DM > P. Medium to dark gray silt clay. SWI appears periodically washed. Chain of void in upper right and a couple of small voids/burrows in center of frame. At least two layers of DM present. Biogenic mound in center of SWI with secondary tubes colonization on flank. Very different from Rep A >

Appendix B-3
Sediment Profile Image Results for Disposal Site Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
C-04 C	7/2/2005	14:58:25	235.35	16.44	15.89	17.29	11.5	0 + doors	14.32	1.40	P	> 4	0	> 4	> 4 - 0	19.91	1.39	> 10	R	N	235.35	> 16.4	> 15.89	> 17.29	N	0	-	-	-	Stage 2 -> 3	DM > P. Medium to dark gray slightly sandy silt/clay. Numerous mudclasts at the SWI that partially obscures RPD and are artifacts. Patch of organic detritus at depth at right - mimics voids. Band of white/light gray cohesive clays clots near bottom of frame. 2+ DM layers are visible. Several shallow burrows with oxidized traces. Upper 3-4 cm of sediment column has biogenically mixed. Three reps show some dissimilarities.
C-05 A	7/2/2005	14:07:10	210.45	14.70	14.07	15.58	11.5	0 + doors	14.32	1.51	P	> 4	1	> 4	> 4 - 1	13.43	0.94	> 10	R	N	210.45	> 14.7	> 14.07	> 15.58	N	2	2.16	3.11	2.63	Stage 3	DM > P. Medium to dark gray, layered, slightly sandy silt/clay. Surface is coated with reduced mudclasts that are artifacts from prism (none in plan view shot). Thin RPD. Void ion upper center and upper far right. At least two layers of DM present. Soft.
C-05 B	7/2/2005	14:08:14	206.50	14.42	14.18	14.60	11.5	0 + doors	14.32	0.42	P	> 4	1	> 4	> 4 - 1	18.10	1.26	> 10	R	N	206.50	> 14.4	> 14.18	> 14.60	N	1	6.36	6.81	6.59	Stage 2 -> 3	DM > P. Medium to dark gray, layered, slightly sandy silt/clay. Surface is coated with reduced mudclast artifacts. Void in left-center of frame and several small mud tubes at SWI amongst mudclasts. Similar strata to Rep A.
C-05 C	7/2/2005	14:09:11	282.41	19.72	19.08	20.07	11.5	0 + doors	14.32	0.98	B	> 4	1	> 4	> 4 - 1	25.81	1.80	5	R	N	282.41	> 19.7	> 19.08	> 20.07	N	0	-	-	-	Stage 2	DM > P. Medium to dark gray, layered, slightly sandy silt/clay. Some artifactual mudclasts at SWI/ Several shallow burrows that extend beyond RPD. No voids present but upper 3-4 cm of sediment shows evidence of reworking. Zone of intense reduction immediately below SWI. Stratigraphically similar to Reps A and B.
D-01 A	7/2/2005	15:05:34	156.68	10.94	9.86	12.16	11.5	0 + doors	14.32	2.30	P	> 4	1	> 4	> 4 - 1	14.20	0.99	5	R	N	156.68	> 10.9	> 9.86	> 12.16	N	3	2.16	3.48	2.82	Stage 2 -> 3	DM > P. Medium to dark gray, slightly sandy, silt/clay. Thin band of dark gray/black silt/clay 2-3 cm below SWI otherwise DM appears uniform. Small voids/burrows with oxidized halo in upper left and upper right. Several small mud tubes at the SWI along with a couple of stick amphipod tubes. Mudclasts appear to be artifacts.
D-01 B	7/2/2005	15:06:31	224.75	15.69	15.50	16.25	11.5	0 + doors	14.32	0.76	B	> 4	1	> 4	> 4 - 1	13.84	0.97	3	R	N	224.75	> 15.7	> 15.50	> 16.25	N	0	-	-	-	Stage 1 -> 2	DM > P. Medium to dark gray, slightly sandy, silt/clay. Thin band of dark gray/black silt/clay 4-5 cm below SWI otherwise DM appears uniform. Several small mud tubes at SWI along with a few stick amphipod tubes. A few shallow burrows. Strong RPD contrast.
D-01 C	7/2/2005	15:07:33	172.17	12.02	11.69	12.44	11.5	0 + doors	14.32	0.76	B	> 4	1	> 4	> 4 - 1	14.19	0.99	2	R	N	172.17	> 12.0	> 11.69	> 12.44	N	0	-	-	-	Stage 2	DM > P. Medium to dark gray, slightly sandy, silt/clay. Thin band of dark gray/black silt/clay 4-5 cm below SWI otherwise DM appears uniform. Several small mud tubes at SWI along with a few stick amphipod tubes. A few shallow burrows and reduced burrow in upper left. Strong RPD contrast. Three reps very similar.

Appendix B-3
Sediment Profile Image Results for Disposal Site Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
D-02 A	7/3/2005	8:00:05	226.41	15.81	14.54	17.04	11.5	0 + doors	14.32	2.49	P	> 4	1	> 4	> 4 - 1	24.31	1.70	0	-	N	226.41	> 15.8	> 14.54	> 17.04	N	3	7.93	14.29	11.11	Stage 1 on 3	DM > P. Medium to dark gray slightly sandy silt/clay. Large variance in RPD with RPD thickest at right. Distinct change in grainsize to silty fine sand at right RPD; RPD both biologically and physically influenced at right. Very interesting. Dense (> 30) assemblage of fine mud tubes at SWI, Two small voids in left center and sediment-filled void in lower right. Top 4-5 cm show evidence of biogenic mixing. Nice pic.
D-02 B	7/3/2005	8:01:28	160.25	11.19	10.87	11.55	11.5	0 + doors	14.32	0.67	B	> 4	1	> 4	> 4 - 1	19.41	1.36	0	-	N	160.25	> 11.2	> 10.87	> 11.55	N	3	2.66	7.09	4.88	Stage 1 on 3	DM > P. Medium to dark gray slightly sandy silt/clay. Three void at right and center. Biogenic mound above upper right void with reduced sediment being conveyored to SWI. Top 3-4 cm show evidence of biogenic mixing and utilization of labile carbon. Numerous (10-15) small mud tubes at SWI and Stick amphipod plus tubes present at SWI. Nice pic.
D-02 C	7/3/2005	8:02:54	250.33	17.48	16.39	18.19	11.5	0 + doors	14.32	1.79	P	> 4	1	> 4	> 4 - 1	21.72	1.52	> 10	R	N	250.33	> 17.5	> 16.39	> 18.19	N	1	2.21	3.56	2.89	Stage 1 on 3	DM > P. Medium to dark gray slightly sandy silt/clay. SWI covered with mudclast artifacts. Numerous mud tubes at SWI. Sediment filled void/burrow in upper center and polychaete at left. Top 4-5 cm of sediment column show evidence of biogenic mixing. Three reps are similar at this station.
D-03 A	7/3/2005	7:38:41	168.35	11.76	11.38	12.08	11.5	0 + doors	14.32	0.70	P	> 4	1	> 4	> 4 - 1	31.79	2.22	6	R	N	168.35	> 11.8	> 11.38	> 12.08	N	3	5.41	8.38	6.90	Stage 1 on 3	DM > P. Medium to dark gray slightly sandy silt/clay with some small colts of light gray/blueish-white clay in subsurface sediment. Thick, physically influenced RPD with some FeO-OH complexation. Group of three related active void in center and left center. A few recumbent thin tubes at SWI. DM appears older.
D-03 B	7/3/2005	7:40:08	141.35	9.87	9.56	10.20	11.5	0 + doors	14.32	0.64	P	> 4	0	> 4	> 4 - 0	23.78	1.66	0	-	N	141.35	> 9.9	> 9.56	> 10.20	N	2	2.52	7.01	4.76	Stage 1 on 3	DM > P. Medium to dark gray slightly sandy silt/clay with some small colts of light gray/blueish-white clay in subsurface sediment. RPD appears slightly sandier than underlying sediment with some minor physical influence on RPD superimposed on the dominantly biological origin of the RPD. Nice burrow and void at right and RPD thickens above void. A few small tubes at SWI.
D-03 C	7/3/2005	7:42:26	256.54	17.91	17.37	18.41	11.5	0 + doors	14.32	1.04	B	> 4	1	> 4	> 4 - 1	37.05	2.59	0	-	N	256.54	> 17.9	> 17.37	> 18.41	N	2	4.91	6.98	5.94	Stage 1 on 3	DM > P. Soft medium to dark gray, layered slightly sandy silt/clay. Two prominent voids in upper center. Numerous (< 10) mud tubes at SWI. Subtle RPD contrast with some iron complexation. Upper 5-6 cm of sediment column show mixing. Different from Reps A and B (which are similar).

Appendix B-3
Sediment Profile Image Results for Disposal Site Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
D-04 A	7/3/2005	7:49:21	180.89	12.63	11.69	13.45	11.5	0 + doors	14.32	1.77	P	> 4	-1	> 4	> 4 - -1	27.52	1.92	> 10	R	N	180.89	> 12.6	> 11.69	> 13.45	N	0	-	-	-	Stage 2	DM > P. Light to dark gray mottled sandy silt/clay. RPD and upper sediment column distinctly sandier than underlying sediment. Bo voids but several shallow burrows extending beyond the RPD. SWI is washed with some shell lag. Possible layer of very dark gray DM at depth.
D-04 B	7/3/2005	7:50:43	165.17	11.53	11.24	11.63	11.5	0 + doors	14.32	0.39	P	> 4	-1	> 4	> 4 - -1	22.36	1.56	0	-	N	165.17	> 11.5	> 11.24	> 11.63	N	2	2.66	4.82	3.74	Stage 1 on 3	DM > P. Light to dark gray mottled sandy silt/clay. RPD and upper sediment column distinctly sandier than underlying sediment. Reduced sediment being brought to SWI at left.Void in upper right and void/burrow in upper left. SWI is washed with some shell lag and a few recumbent tubes. Layer of very dark gray DM at depth.
D-04 C	7/3/2005	7:52:04	174.12	12.16	11.24	13.56	11.5	0 + doors	14.32	2.33	P	3-2/ > 4	-1	> 4	> 4 - -1	32.54	2.27	1	O	N	174.12	> 12.2	> 11.24	> 13.56	N	1	5.13	7.17	6.15	Stage 1 on 3	DM > P. Tan slightly silty, shelly fine to medium sand over mottled and layered medium to dark gray silt/clay. RPD both biologically and physically influenced. Sorting and washing at SWI. Dense sand/mud tubes, mostly recumbent, at SWI. Oxidized sediment gallery at upper right. Three reps at this station are similar and all show increased sand and evidence of washing at the SWI.
D-05 A	7/3/2005	7:11:28	158.02	11.03	10.34	11.55	11.5	0 + doors	14.32	1.20	P	> 4	1	> 4	> 4 - 1	22.62	1.58	7	R	N	158.02	> 11.0	> 10.34	> 11.55	N	2	2.16	4.76	3.46	Stage 1 on 3	DM > P. Light gray slightly sandy silt/clay with mottling and streaking of light gray-blue clay and a couple of clots of dark gray reduced sediment. SWI appears washed. Voids in upper center and upper left. A few small tubes at SWI. Reduced mudclasts at SWI are rounded and do not appear artifactual. Looks to be older DM.
D-05 B	7/3/2005	7:13:20	165.26	11.54	9.95	12.47	11.5	0 + doors	14.32	2.52	P	> 4	-1	> 4	> 4 - -1	21.32	1.49	0	-	N	165.26	> 11.5	> 9.95	> 12.47	N	2	2.77	4.48	3.63	Stage 1 on 3	DM > P. Light gray slightly sandy silt/clay with mottling and streaking of light gray-blue clay and a couple of clots of dark gray reduced sediment. SWI is washed with shell lag at SWI. RPD distinctly sandier than underlying sediment. Voids in upper center and upper right. A couple of small tubes at right SWI. Looks to be older DM.
D-05 C	7/3/2005	7:14:17	156.15	10.90	10.45	11.41	11.5	0 + doors	14.32	0.95	P	> 4	1	> 4	> 4 - 1	19.79	1.38	> 10	R	N	156.15	> 10.9	> 10.45	> 11.41	N	1	5.63	6.28	5.96	Stage 1 on 3	DM > P. Light gray slightly sandy silt/clay with mottling and streaking of light gray-blue clay and a couple of clots of dark gray reduced sediment. RPD distinctly sandier than underlying sediment. Void at far left. SWI covered with reduced mudclast artifacts. A couple of small tubes at SWI in between mudclasts. Three reps at this station are all very similar. Older DM.
E-01 A	7/2/2005	9:40:40	255.41	17.84	17.15	18.10	13	3	14.32	0.95	B	> 4	1	> 4	> 4 - 1	18.14	1.27	0	-	N	255.41	> 17.8	> 17.15	> 18.10	N	2	5.38	8.32	6.85	Stage 1 on 3	DM > P. Soft, light to dark gray silt/clay with distinct mottling, layering and chaotic fabric. Archetypal DM. A few small tubes at SWI and active, sediment-filled void at upper right. Clayey at depth.

Appendix B-3
Sediment Profile Image Results for Disposal Site Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
E-01 B	7/2/2005	9:41:32	185.25	12.94	10.99	13.73	13	3	14.32	2.75	B	>4	1	>4	>4 - 1	33.88	2.37	0	-	N	185.25	> 12.9	> 10.99	> 13.73	N	5	0.87	9.19	5.03	Stage 1 on 3	DM>P. Soft, light to dark gray silt/clay with distinct mottling, layering and chaotic fabric. Archetypal DM. Upper sediment column riddled with active voids. SWI has more shell fragments in sediment than at depth. Sediment type similar to Rep A.
E-01 C	7/2/2005	9:42:59	250.09	17.46	16.93	18.13	13	3	14.32	1.21	B	>4	0	>4	>4 - 0	26.04	1.82	0	-	N	250.09	> 17.5	> 16.93	> 18.13	N	1	5.05	5.52	5.28	Stage 1 on 3	DM>P. Soft, light to dark gray silt/clay with distinct mottling, layering and chaotic fabric. Archetypal DM. Small void in upper left. Biogenic mound at right SWI. Three reps at this station are very are very similar.
E-02 A	7/2/2005	10:37:28	196.96	13.75	13.23	14.63	13	2	14.32	1.40	B	>4	2	>4	>4 - 2	17.07	1.19	0	-	N	196.96	> 13.8	> 13.23	> 14.63	N	0	-	-	-	Stage 1 on 3	DM>P. Dark gray silt/clay with clots of cohesive light gray/blue clay throughout sediment column. Recently deposited DM. Thinly developed RPD. Pocket of disrupted sediment at mid left that appears related to potential edge of deposit-feeding gallery. Chaotic fabric.
E-02 B	7/2/2005	10:38:18	209.47	14.63	13.26	15.22	13	2	14.32	1.96	P	>4	2	>4	>4 - 2		1.04	2	R	N	209.47	> 14.6	> 13.26	> 15.22	N	0	-	-	-	Stage 1	DM>P. Dark gray silt/clay with clots of cohesive light gray/blue clay throughout sediment column. Recently deposited DM. Thinly developed RPD. Mudclasts at SWI are artifacts. Right SWI is disturbed and RPD determined from linear measurements of undisturbed portion of the SWI. A few fine mud tubes at left SWI. Similar to Rep A.
E-02 C	7/2/2005	10:39:12	210.78	14.72	12.67	15.75	13	2	14.32	3.08	P	>4	1	>4	>4 - 1		1.07	0	-	N	210.78	> 14.7	> 12.67	> 15.75	N	1	6.31	7.48	6.89	Stage 1 on 3	DM>P. Dark gray silt/clay with clots of cohesive light gray/blue clay throughout sediment column. Recently deposited DM. Thinly developed RPD. Right SWI is disturbed from dragdown of large oyster shell fragment and RPD determined from linear measurements of undisturbed portion of the SWI. Sediment-filled void at upper left. A few fine mud tubes at left SWI. Similar to Reps A and B.
E-03 D	7/3/2005	8:55:52	188.22	13.14	12.81	13.40	11.5	0 + doors	14.32	0.59	B	>4	2	>4	>4 - 2	29.86	2.09	>10	R	N	188.22	> 13.1	> 12.81	> 13.40	N	5	3.00	6.25	4.62	Stage 1 on 3	DM>P. Medium to dark gray slightly sandy silt/clay. SWI washed with numerous recumbent tubes at SWI, possible partially buried small bivalves in background. Distinct biologically mixed zone extending 2-3 cm below SWI. Burrow/void at right. Several burrows extending down from RPD.
E-03 E	7/3/2005	8:57:12	161.88	11.30	10.82	13.09	11.5	0 + doors	14.32	2.27	B	>4	2	>4	>4 - 2	23.70	1.66	0	-	N	161.88	> 11.3	> 10.82	> 13.09	N	1	2.69	4.37	3.53	Stage 1 on 3	DM >P; dense surface covering of tubes & stick amphipods with burrow/void at right. At least 2 layers of DM
E-03 F	7/3/2005	8:58:11	194.89	13.61	10.51	16.28	11.5	0 + doors	14.32	5.77	P	>4	2	>4	>4 - 2	IND	IND	>10	R	N	194.89	> 13.6	> 10.51	> 16.28	N	0	-	-	-	Stage 1 on 3	DM>P. Medium to dark gray slightly sandy silt/clay. Giant mudclast covering SWI. SWI intact at left but RPD determination would be meaningless due to the high proportion of the SWI that is disturbed. Polychaete in left-center as two sediment-filled relict voids at far left. Three reps are generally similar at this station.

Appendix B-3
Sediment Profile Image Results for Disposal Site Stations at RISDS

Station	Date	Time	Penetration Area (Sq.Cm)	Penetration Mean (Cm)	Penetration Minimum (Cm)	Penetration Maximum (Cm)	Stop Collar Setting (In)	# Of Lead Weights Per Carriage	Calibration Constant	Boundary Roughness (Cm)	Boundary Roughness Type (B-Biological, P-Physical)	Grain Size Major Mode (Phi)	Grain Size Maximum (Phi)	Grain Size Minimum (Phi)	Grainsize Range	Rpd Area (Sq.Cm)	Mean Rpd (Cm) (Ind - Indeterminate)	Mud Clast Number	Mud Clast State (O-Oxidized, R-Reduced, B-Both)	Methane (N - No)	Total Dm Area	Total Dm Mean	Total Dm Min	Total Dm Max	Low Do?	Feeding Void #	Void Minimum Depth (Cm)	Void Maximum Depth (Cm)	Void Average Depth (Cm)	Successional Stage (IND - Indeterminate)	Comment
E-04 D	7/3/2005	8:46:12	218.90	15.29	14.71	15.89	11.5	0 + doors	14.32	1.18	B	4-3/>4	2	>4	>4 - 2	33.77	2.36	1	R	N	218.90	> 15.3	> 14.71	> 15.89	N	1	5.61	6.11	5.86	Stage 1 on 3	DM>P. Medium to dark gray silt clay with a thin band of silty fine sand at SWI. Active void at left and several wispy mud tubes at SWI. Distinct biologically mixed zone that extends to 6 cm below the SWI.
E-04 E	7/3/2005	8:47:36	186.65	13.03	12.13	13.73	11.5	0 + doors	14.32	1.60	B	4-3/>4	2	>4	>4 - 2	31.47	2.20	5	R	N	186.65	> 13.0	> 12.13	> 13.73	N	3	2.61	6.03	4.32	Stage 1 on 3	DM>P. Medium to dark gray silt clay with a thin band of silty fine sand at SWI. Distinct biologically mixed zone that extends to 6 cm below the SWI. Mudclasts at SWI appear to be artifacts. A few tubes at SWI. Distinct grain size shift (sorting?) at SWI and RPD appears to be influenced by physical as well as biological processes.
E-04 F	7/3/2005	8:48:34	154.59	10.80	10.57	11.24	11.5	0 + doors	14.32	0.67	B	>4	2	>4	>4 - 2	22.10	1.54	1	R	N	154.59	> 10.8	> 10.57	> 11.24	N	3	2.66	4.82	3.74	Stage 1 on 3	DM>P. Medium to dark gray silt clay. Voids at right and center. Large tear in sediment in center of frame. Numerous fine mud tubes at SWI as well as a few Stick amphipod tubes. Different from Reps A and B.
E-05 F	7/3/2005	8:39:47	183.59	12.82	12.55	12.98	11.5	0 + doors	14.32	0.42	B	>4	2	>4	>4 - 2	22.32	1.56	4	R	N	183.59	> 12.8	> 12.55	> 12.98	N	0	-	-	-	Stage 1 -> 2	DM>P. Medium to dark layered gray silt clay. Reduced mudclasts at SWI are artifacts. Stick amphipod tubes at SWI and shallow burrow transection at right SWI.
E-05 G	7/3/2005	11:26:59	261.38	18.25	17.96	18.41	11.5	0 + doors	14.32	0.45	P	>4	2	>4	>4 - 2	13.89	0.97	>10	R	N	261.38	> 18.3	> 17.96	> 18.41	N	1	3.50	4.04	3.77	Stage 1 on 3	DM>P. Medium to dark layered gray silt clay. Reduced mudclasts at SWI are artifacts. Small void in upper right. RPD estimated in places due to smearing of mudclasts. A few small tubes at left SWI. Recent DM over older DM.
E-05 H	7/3/2005	11:27:56	182.93	12.77	12.16	13.14	11.5	0 + doors	14.32	0.98	P	>4	2	>4	>4 - 2	IND	IND	>10	R	N	182.93	> 12.8	> 12.16	> 13.14	N	0	-	-	-	IND	DM>P. Dark gray mottled silt/clay. SWI is disturbed and RPD along with biological information missing. First 4 reps were either overpenetrated or disturbed too.

Appendix C

Plan View Image Results for RISDS
July 2005 Survey

Appendix C-1
Plan View Image Results for Reference Stations at RISDS

Station	Rep	Field of View imaged (m^2)	Sediment Type	Bedforms	Infauna	Burrows	Tubes	Tracks	Epifauna	Mudclasts	Debris	Comment
Ref E-01	D	0.8	silty sand	Small	8 Cerianthids	> 100	> 100	Yes	No	No	No	Silty sand surface with infaunal tracks across entire sediment surface. 15-20 distinct large burrow openings many smaller ones. Nice pic.
Ref E-01	E	0.8	silty sand	Ind	5 Cerianthids	Yes	Yes	Yes	No	No	No	Silty fine sand. Several burrowing anenomes/ampharetids. > 100 small tubes visible. Lower half of picture cloudy due to frame hitting.
Ref E-02	D	0.8	silty sand	Yes - small	Ind	> 100	> 100	Yes	No	No	No	Silty fine sand with several small reworked shell fragments at SWI. SWI is faintly rippled and infaunal tubes are dominantly clustered in troughs. > 20 large circular burrow openings and many more small ones. Fish (?) in circular burrow in upper left.
Ref E-02	E	0.8	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Cloudy from frame contact.
Ref E-02	F	0.8	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Cloudy from frame contact.
Ref E-02	G	0.8	silty sand	Small	Ind	Yes	Yes	Yes	Ind	No	No	Most of image is cloudy from frame contact. Small patch of sediment visible at right and it looks similar to rep G.
Ref E-03	D	0.8	silty sand	Small	1 Cerianthid	> 100	> 100	Yes	No	No	No	Hummocked/slightly rippled silty fine sand. Numerous organism tracks across seafloor. Elongate tubes visible. Several burrow openings visible and at least two types present.
Ref E-03	E	0.8	silty sand		1 Cerianthid, bivalves							Similar to D. Nice mound with central burrow at left.
Ref E-03	F	0.8	silty sand	No	1 Cerianthid, bivalves	> 20	> 50	Yes	Shrimp	No	No	Hummocked silty fine sand. Tracks, burrows and tubes evenly distributed across field of view. Cerianthid bottom right. Bivalve siphon bottom right. Shrimp upper right.
Ref E-04	D	0.8	silty sand	No	Bivalves	> 100	> 100	Yes	No	No	No	Hummocked from biota. Nice pic.
Ref E-04	E	0.8	silty sand	No	Bivalves	> 100	> 100	Yes	Shrimp	No	No	Hummocked from biota. Shrimp at right. Nice pic.
Ref E-04	F	0.8	silty sand	No	Bivalves	> 100	> 100	Yes	No	No	No	Hummocked from biota. Same shell as Rep E. Nice pic.
Ref E-04	G	0.8	silty sand	No	Bivalves	> 100	> 100	Yes	No	No	No	Hummocked from biota.
Ref E-04	H	0.8	silty sand	No	Bivalves	> 100	> 100	Yes	No	No	No	Hummocked from biota.
Ref E-05	D	0.8	silty sand	No	Bivalves	> 100	> 100	Yes	Yes	No	No	Hummocked from biota. Large epifaunal burrow at upper right.
Ref E-05	F	0.8	silty sand	Ind	Ind	Yes	Yes	Yes	Ind	Ind	Ind	Mostly cloudy from contact. Sediment visible at right and appears similar to Rep D.
Ref NE-01	D	0.8	silty sand	small	Yes, bivalve	> 100	> 100	Yes	2 Starfish	No	Shell	Surface washed. Orange-tinted infaunal organism in many burrows. Washed shell debris at SWI. Gravel in right center of frame.
Ref NE-01	E	0.8	silty sand	Ind	Yes, bivalve	> 100	> 100	Yes	1 Starfish	No	Shell	Surface washed. Frame print from previous replicate and some suspended sediment. Shell debris. A few bivalve siphons. Gravel present at bottom of frame.
Ref NE-01	F	0.8	silty sand	Ind	Bivalves	> 100	> 100	Yes	No	No	Shell	Sediment is disturbed from previous camera drops as frame imprint is clearly visible. Otherwise similar to previous reps.

Appendix C-1
Plan View Image Results for Reference Stations at RISDS

Station	Rep	Field of View imaged (m^2)	Sediment Type	Bedforms	Infauna	Burrows	Tubes	Tracks	Epifauna	Mudclasts	Debris	Comment
Ref NE-02	D	0.8	silty sand	Small	Bivalves	> 100	> 100	Yes	1 Starfish	No	Shell	Dense tubes and burrows. Starfish lower frame. Camera frame imprint on bottom. Three reps similar.
Ref NE-03	D	0.8	silty sand	Small	Yes, bivalve	100	100	Yes	2 Starfish	No	Shell	SWI washed. Ripples with shell fragments. Appears sandier. Two starfish upper right. Reps appear similar. Much of shell debris is fragmented and washed.
Ref NE-04	E	0.8	silty sand	No	Bivalves	> 100	> 100	Yes	2 Shrimp	No	Shell	SWI washed. Shrimp lower right. Dense burrows, tubes and tracks. A few pieces of gravel.
Ref NE-04	F	0.8	gravelly sand	No	Yes	> 100	> 100	Yes	Skate, 2 shrimp, 2 starfish, crab	No	Shell	Washed, gravels at surface. Abundant epifauna..
Ref NE-05	G	0.8	silty sand	Small	Bivalves	> 100	> 100	Yes	Starfish, snail	No	Shell	Silty sand surface that appears periodically washed. A couple of pieces of gravel. Dense burrows and tubes. All reps from this station are very similar.
SW-01	D	3.1	silty sand	Small	Bivalves	> 100	> 100	Yes	15 Starfish, shrimp	No	No	Very large field of view. Ripples evident, SWI washed. Three reps are similar. Very dense tubes in spots.
SW-02	A	3.1	silty sand	Ind	Yes	> 100	> 100	Yes	9 Starfish, fish(sculpin?)	No	Oak Leaf	Washed. Large field of view. Dense tubes in spots/ Three reps are similar.
SW-03	D	3.1	silty sand	Ind	Yes	> 100	< 100	No	10 Starfish, 1 shrimp	No	Shell	Washed. Very firm surface. Large field of view.
SW-03	G	3.1	silty sand	Ind	Yes	> 100	> 100	Yes	2 Starfish	No	No	Camera frame print in sediment. More tubes and silt than in rep D.
SW-04	A	3.1	silty sand	Small	Yes	> 100	> 100	Yes	6 starfish	No	No	Firm surface, large field of view, dense patches of tubicolous fauna with evidence of numerous burrows
SW-05	A	3.1	silty sand	Small	Yes	> 100	> 100	Yes	11 Starfish, flatfish, crab	No	No	Washed, firm bottom. High density of several types of burrows. Flatfish at bottom of pic.
SW-05	D	3.1	silty sand	No	Yes	> 100	> 100	Yes	17 Starfish, 1 crab	No	No	Surface washed, bivalve shells present. High density of burrows. Similar to A. Reps B and C were cloudy.

Appendix C-2
Plan View Image Results for Disposal Site Stations at RISDS

Station	Rep	Field of View imaged (m^2)	Sediment Type	Bedforms	Infauna	Burrows	Tubes	Tracks	Epifauna	Mudclasts	Debris	Comment
A-01	A	0.9	Sandy silt	Yes - distinct	Yes	< 100	< 100	Yes	No	No	No	Distinct ripples at left. Some tubes and tracks and low density of burrows. Reps B and C were cloudy. Minor shell fragments at SWI.
A-02	A	0.9	Silt	Yes - distinct	Yes	< 100	< 100	No	No	No	No	Distinct ripples. Slightly cloudy. Mounds with reduced sediment. Low density of burrows and tubes.
A-02	B	0.9	Sandy silt	Yes - distinct	Yes	> 100	< 100	Yes	No	No	No	Distinct ripples. Several burrow types present but at low-moderate densities. Some shell fragments at SWI. Slightly cloudy.
A-03	A	0.9	Sandy silt	Yes - distinct	Yes	> 100	> 100	Yes	No	No	No	Distinct ripples. Slightly cloudy. podocerid tunes. Minor shell fragments at SWI. Low to moderate densities of burrows and tubes. Rep B is cloudy from frame contact.
A-04	A	0.9	Sandy silt	Small	Yes	> 100	< 100	Yes	1 Crab	Yes	Shell	Faint ripples. Muddy bottom. Shell fragments at SWI. Medium-low density of burrows and low density of tubes. Rep B cloudy.
A-05	A	0.9	silty sand	Yes - distinct	Yes	< 100	< 100	Yes	No	No	Shell	Distinct ripples and shell fragments at SWI. Mussel shell upper left. Stick amphipod tubes and some mud tubes. Rep B similar but with fewer biological features. All other reps cloudy.
B-01	A	0.9	Sandy silt	Yes - distinct	Yes	> 100	> 100	Yes	Dead crab, hermit crab	Yes	Shell	Distinct muddy ripples. Abundant tracks on SWI. Most burrows and tubes are in upper frame/low to moderate densities. Reps B,C and D are similar and rep B has expression of buried cohesive clay clots at SWI. Reps E and F cloudy.
B-02	A	0.9	Silt	Ind	Yes	> 100	< 100	Yes	Hermit crab	Yes	No	Muddy seafloor with low-moderate burrow density and low tube density. Mound in center of frame related to buried object/clast.
B-02	C	0.9	Silt	Yes-distinct	Yes	< 100	< 100	Yes	No	No	No	Muddy, rippled seafloor with low density of burrows and tubes. Some stick amphipod tubes.
B-03	A	0.9	Silt	Small	Yes	< 100	> 100	Yes	No	No	Shell	Muddy seafloor with faint ripples. Thin wispy tubes (podocerid) at SWI. Shell fragments at SWI. Low densities. Clear epifaunal track running across frame. All reps similar.
B-04	D	0.9	Silt	Yes-distinct	Yes	< 100	> 100	Yes	No	No	No	Muddy seafloor with ripples. Low density of burrows medium low density of tubes. Reps are similar. Good illustration of reduced sediment brought to surface by conveyor belt feeders
B-05	A	0.9	Silt	Ind	Yes	< 100	< 100	Yes	No	No	No	Hummocked muddy seafloor with low density of tubes and burrows. Reduced halos around a couple of the larger burrows. Abundant tracks.
B-05	G	0.9	Silt	Ind	Yes	< 100	< 100	Yes	No	No	No	Similar to A but surface expression of buried clay clots.

Appendix C-2
Plan View Image Results for Disposal Site Stations at RISDS

Station	Rep	Field of View imaged (m^2)	Sediment Type	Bedforms	Infauna	Burrows	Tubes	Tracks	Epifauna	Mudclasts	Debris	Comment
BE-01	C	1.0	Silt	Small	Yes	< 100	< 100	Yes	Crab	No	Shell	Rippled muddy seafloor with several large burrows with reduced halos. Two types of DM visible in halos. Crab. Scallop shells at SWI. Other reps cloudy. Nice pic.
BE-02	B	0.8	Gravelly silt	Ind	Yes	< 100	< 100	Yes	Fish(gunnel)	Yes	Shell	Gravel and clot of light clay dominate lower half of frame. Gunnel among gravels. DM.
BE-02	D	0.9	Silt	Small	Yes	> 100	< 100	Yes	No	No	No	Relatively featureless muddy seafloor with low densities of burrows and tubes. Abundant crab tracks.
BE-03	A	0.6	Gravelly silt	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Cloudy; fine scaled feature indistinguishable. Gravels and silts.
BE-03	C	0.6	Gravel	Ind	No	< 100	< 100	No	No	No	No	Sorted, rounded washed gravel.
BE-04	G	0.8	Clay and silt	Ind	Yes	< 100	< 100	No	No	Yes	No	Irregular surface textures from buried cohesive clay clasts. Clearly DM. Little faunal activity observed in this PV image. Archetype picture for allochthonous clays.
BE-04	H	0.8	Silt	No	Yes	> 100	< 100	Yes	No	No	Shell	Flat muddy seafloor with abundant epifaunal tracks. Minor shell debris at SWI. Possible ripples but very indistinct. Very different from Rep G.
BE-04	I	0.8	Silt	No	Yes	> 100	< 100	Yes	No	Yes	No	Intermediate between reps G and H with muddy seafloor exhibiting dissociated mudclasts. These three reps are a very nice series on the dispersion of cohesive clay clots.
BE-05	D	1.9	Silt	Ind	Ind	Ind	Ind	Ind	1 crab	Ind	No	Very cloudy turbid water. Clearest of the four reps.
C-01	A	0.9	Silt	Small	Yes	> 100	< 100	Yes	No	No	No	Slightly rippled muddy seafloor with low moderate density of burrow and tubes. The majority of tubes visible are podocerid tubes.
C-02	A	0.9	Silt	No	Yes	> 100	> 100	Yes	No	No	No	Muddy seafloor pocked with low-medium density of burrows. Majority of tubes at SWI are podocerid tubes. Slightly cloudy. Clearest of three reps.
C-03	A	0.9	Sandy silt	Yes	Yes	< 100	< 100	Yes	No	No	Shell	Rippled slightly sandy silt seafloor with minor shell debris present. SWI is washed. Abundant epifaunal tracks.
C-04	A	0.9	Silt	No	Yes	> 100	> 100	Yes	No	No	Shell	Washed, slightly sandy mud. Moderate to low density of burrows and low density of tubes. Most tubes are podocerids. Minor shell debris at SWI. Clearest of three reps. Heads of 2 buried wolf fish visible just poking out above SWI.
C-05	A	0.9	Silt	No	Yes	> 100	> 100	Yes	No	No	No	Muddy, hummocked seafloor. Moderate densities of burrows and podocerid tubes. DM. Possible rippling but very indistinct. One clear rep.
D-01	B	0.9	Silt	No	Yes	< 100	> 100	Yes	No	No	No	Muddy seafloor with a low density of burrows and moderate density of podocerid tubes. Only clear rep. Abundant epifaunal tracks.

Appendix C-2
Plan View Image Results for Disposal Site Stations at RISDS

Station	Rep	Field of View imaged (m^2)	Sediment Type	Bedforms	Infauna	Burrows	Tubes	Tracks	Epifauna	Mudclasts	Debris	Comment
D-02	A	0.9	Silt	Yes	Yes	> 100	> 100	Yes	No	No	No	Rippled muddy seafloor with very nice podocerid tubes evenly distributed throughout frame. Low-moderate densities of tubes and burrows. Very nice pic. Only clear rep.
D-03	A	0.9	Sandy silt	Yes	Yes	> 100	> 100	Yes	1 Crab	Yes	No	Rippled, slightly sandy muddy seafloor with minor reworked shell fragments. Mudclast and crab at bottom of frame. Podocerid tubes. Reduced sediment in mounded burrows. Only clear rep. Nice pic.
D-04	B	0.9	Sandy silt	Small	Yes	> 100	> 100	Yes	No	No	Shell	Faintly rippled, slightly sandy, shelly silt. Moderate densities of burrow and podocerid tubes. Washed. Reps and B similar. Reduced sediment around some burrows.
D-05	A	0.9	Sandy silt	Ind	Yes	> 100	< 100	Yes	No	Yes	Shell	Slightly sandy muddy seafloor with some shell residue. Large clot of cohesive clay poking up in upper right with prominent epifaunal burrow. Only useable pic. Nice pic.
E-01	C	1.2	Silt	Small	Yes	< 100	< 100	Yes	No	Yes	Shell	Muddy, slightly rippled seafloor with some shell fragments. Clots of cohesive clay DM poking up and getting dispersed. Nice pic of chaotic fabric.
E-01	D	1.2	Silt	Small	Yes	< 100	< 100	Yes	1 snail. 1 hermit crab	Yes	Shell	Similar to C but less mudclasts. Other reps similar.
E-02	A	0.9	Silt	Small	Yes	< 100	< 100	Yes	1 Crab	Yes	Shell	Muddy seafloor with clots of clay protruding from silt mantle. Archetypal DM shot. Minor burrows and podocerid tubes. Crab at left.
E-02	C	0.9	Silt	Small	Yes	< 100	< 100	Yes	4 fish (at least 3 species), 1 crab	Yes	Shell	Muddy seafloor with cohesive clay protruding or expressed at SWI. Large pile of oyster shell at right and all epifauna is associated with shell pile. No detritus mantling shells. Very nice pic.
E-03	E	0.9	Silt	No	Yes	> 100	> 100	Yes	No	No	No	Flat muddy seafloor with moderate densities of burrows and podocerid tubes. Abundant epifaunal track at SWI. All clear reps are very similar.
E-04	C	0.8	Silt	No	Yes	< 100	> 100	Yes	No	No	No	Muddy seafloor with low densities of burrows and moderate density of podocerid tubes. All reps are similar although rep A show rippling.
E-05	A	0.9	Silt	Yes	Yes	> 100	> 100	Yes	No	No	No	Rippled muddy seafloor with low-moderate densities of burrows and podocerid tubes. All reps are similar, when clear.

Appendix D

Benthic Biology Results for RISDS
July 2005 Survey

Table D-1. Species counts for the disposal site stations sampled during the RISDS survey, July 2005

Taxon	Disposal Site Stations							Total
	B-01	B-04	C-02	C-03	D-03	D-05	E-05	
Euchone incolor	101	83	14	2	186	81	102	569
Nucula annulata	22	43	182	3	14	11	3	278
Nephtys incisa	34	66	11	23	58	59	19	270
Phoronis architecta	6	5	8	3	37	25	19	103
Chone infundibulgriformis	20	3			19	9	1	52
Cossura longocirrata	8	14	5	1	9		5	42
Cerastoderma pinnulatum	1	11		5	20	1	2	40
Nephtys spp.	6	7	3	3	8	5	2	34
Edwardsia elegans	5	6	6	5	3	3	5	33
Cerianthidae spp. indet.	9	3	4	3	5	6		30
Ensis directus	4	5		7	2	5		23
Erichthonius fasciatus							16	16
Arctica islandica	2	1		1	4	5	1	14
Dyopedos monacanthus		1	2	2	4	2	1	12
Scoletoma fragilis							12	12
Mulinia lateralis		3			3	6		12
Phyllodoce maculata				4	2	5		11
Diastylis quadrispinosa		3		1	3		4	11
Prionospio steenstrupi	2	3		4	2			11
Ceriantheopsis americana		3		2		1	5	11
Ampelisca agassizi	4			1	2	2	1	10
Polycirrus haematoides		1			9			10
Ameroculodes sp. 1		3	1	1	1	3		9
Nephtys caeca		5		1	1	2		9
Tharyx acutus					5	2	1	8
Scoletoma hebes			3	15		1		
Diastylis sculpta		1 5		3		1		
Sabellidae spp.	1		4					5
Ophelina acuminata	1				3			4
Pitar morrhuana					1		3	4
Micrura spp.	2			1			1	4
Sthenelais limicola	1				2	1		4
3 *Nucula delphinodonta*								3
Yoldia sapotilla				1				3
Byblis serrata			1	2				3
Parougia caeca	2					1		3
Spiophanes bombyx	2					1		3
Crassicorophium							2	2
Eudorella pusilla		2		1		1		
2 *Periploma papyratium*								2
Harmothoe extenuata	1	1						2
Argissa hamatipes		1				1		
Anthozoa spp. indet.		1					1	2
Ampharetidae spp.	1	1						2
Echinarachnius parma	1				1			2
Deflexilodes tuberculatus					1		1	2
Pseudopotamilla	1				1			2
Pythinella cuneata				1				2
Leptocheirus pinguis							1	1
1 *Levinsenia gracilis*								1
Terebellides atlantis					1			1
Photis pollex				1				1
1 *Lucinoma filosa*								1
Flabelligera affinis					1			1
Aphelochaeta marioni				1				1

Taxon	Disposal Site Stations							Total
	B-01	B-04	C-02	C-03	D-03	D-05	E-05	
Hiatella arctica								1
Brada villosa					1			1
Apistobranchus typicus								1
Mediomastus ambiseta				1				1
Mya arenaria					1			1
Grand Total	237	278	249	85	410	240	211	1710

Table D-2. Species counts for the reference stations sampled during the RISDS survey, July 2005

Taxon	Reference Stations					Total
	E-01	NE-03	NE-05	SW-01	SW-02	
Nucula annulata	1679	8	10	567	238	2502
Crassicorophium crassicorne		682	173	511	668	2034
Erichthonius fasciatus	16	261	45	371	635	1328
Ampelisca agassizi	114	95	98	558	313	1178
Unciola irrorata		192	129	123	394	838
Leptocheirus pinguis	1	183	140	33	83	440
Euchone incolor	221		164	10	7	402
Scalibregma inflatum	7	81	97	18	19	222
Scoletoma hebes	54	49	90	4	7	204
Ninoe nigripes	86	8	46	9	11	160
Tharyx acutus	9	23	103	8	8	151
Eudorella pusilla	24	25	21	30	31	131
Chone infundibulariformis	93	8	25	2	1	129
Nucula delphinodonta	23		2	80	22	127
Periploma papyratium	86	4	14	6	8	118
Phyllodoce maculata	7	8		31	57	103
Polygordius sp. A		50	48			98
Levinsenia gracilis	54		21	3	14	92
Aricidea catherinae		39	46	2	5	92
Exogone hebes		68	4	7	8	87
Cerastoderma pinnulatum	76	2	2	2	3	85
Cossura longocirrata	48		4	1		53
Terebellides atlantis	13	12	22	3	3	53
Photis pollex	16	7	6	10	13	52
Orchomene minuta		1	8	17	23	49
Harpinia propinqua				29	19	48
Dyopedos monacanthus	46					46
Diastylis quadrispinosa	11	2	3	20	9	45
Lucinoma filosa	35			4	1	40
Stenopleustes inermis	16		1	18	3	38
Nephtys incisa	17	9		6	5	37
Harmothoe extenuata	3		10	6	17	36
Exogone cf. verugera		35			1	36
Yoldia sapotilla	26		3	1	2	32
Diastylis sculpta	2	6	14	5	4	31
Oligochaeta spp.	18	5	8			31
Euclymene collaris	4	4		18		26
Prionospio steenstrupi			16	1	7	24
Photis dentata				20	4	24
Phoxocephalus holbolli		4		14	6	24
Ampharete finmarchica	6	4	7	4	1	22
Pholoe minuta	9	4	7		1	21
Aeginina longicornis		2	2	10	6	20
Byblis serrata		4	12	1	2	19
Ampelisca abdita	9		9			18
Clymenella torquata	3	5	1	9		18
Astarte undata	2	7	5	2	1	17
Cerianthidae spp. indet.	9		2	4		15
Ophelina acuminata	1	6	5	1	2	15

Taxon	Reference Stations					Total
	E-01	NE-03	NE-05	SW-01	SW-02	
Anonyx liljeborgi	1	1		5	8	15
Owenia sp. 1	15					15
Parougia caeca	4	2	7		1	14
Spiophanes bombyx	2		11		1	14
Sabellidae spp.	5		8			13
Amphiporus caecus				9	4	13
Crenella decussata	2		4	7		13
Flabelligera affinis	12					12
Retusa obtusa	12					12
Mediomastus californiensis	11					11
Polycirrus haematoides	10					10
Pitar morrhuana	10					10
Monticellina dorsobranchialis	1	1	8			10
Micrura spp.	5		2	1	1	9
Galathowenia oculata				8	1	9
Pleurogonium inerme		1	5		3	9
Scoletoma fragilis		8				8
Onoba pelagica	8					8
Ptilanthura tenuis		5	2	1		8
Arctica islandica	7					7
Argissa hamatipes	7					7
Casco bigelowi		1	4	1	1	7
Hartmania moorei	6					6
Henricia sanguinolenta			1	4	1	6
Scoloplos armiger					6	6
Edotia montosa				5		5
Mitrella nr. *dissimilis*		3		1	1	5
Anthozoa spp. indet.	1	1	1	1		4
Thyasira gouldii	4					4
Edwardsia elegans	3					3
Ameroculodes sp. 1		2	1			3
Ampharetidae spp.	2		1			3
Aphelochaeta marioni		2	1			3
Hiatella arctica	2		1			3
Drilonereis longa	1		1	1		3
Phyllodoce mucosa			2		1	3
Sphaerodoridium claparedii	2		1			3
Echinarachnius parma				2		2
Chaetozone cf. *setosa*		1	1			2
Cirratulidae spp.		2				2
Dipolydora socialis			1		1	2
Lyonsia spp. indet.	2					2
Mitrella rosacea					2	2
Paranaitis speciosa	1			1		2
Thracia conradi	1	1				2
Trichobranchidae spp.			2			2
Nephtys spp.	1					1
Nephtys caeca		1				1
Sthenelais limicola	1					1
Deflexilodes tuberculatus		1				1
Pseudopotamilla reniformis			1			1
Brada villosa		1				1
Axiognathus squamatus					1	1

Taxon	Reference Stations					Total
	E-01	NE-03	NE-05	SW-01	SW-02	
Axius serratus		1				1
Cerebratulus lacteus					1	1
Crenella glandula		1				1
Cyclocardia borealis		1				1
Euchone elegans	1					1
Fargoa bartschi			1			1
Glycera dibranchiata	1					1
Goniada maculata		1				1
Melitidae sp. 1			1			1
Monticellina baptisteae			1			1
Nereis procera			1			1
Odostomia nr. *sulcosa*				1		1
Pherusa affinis		1				1
Polydora cornuta				1		1
Sphaerosyllis brevifrons			1			1
Spiochaetopterus oculatus					1	1
Sternaspis scutata	1					1
Grand Total	2986	1942	1494	2628	2697	11747

Table D-3. Community parameters for the benthic infaunal samples collected during the RISDS survey, July 2005.

Sample	No. of Species	No. of Individuals ($0.04m^2$)	H′ (log_2)	Pielou's J′	Fisher's *alpha*	ESn(50)	ESn(100)	ESn(200)	ESn(500)	ESn(1000)
Disposal Site Stations										
B-01	24	237	3.03	0.66	6.67	12.76	17.34	22.63	24.00	-
B-04	28	278	3.23	0.67	7.77	13.46	18.93	24.96	28.00	-
C-02	17	249	1.78	0.44	4.13	9.04	12.48	15.92	17.00	-
C-03	29	85	4.12	0.85	15.53	22.16	29.00	29.00	29.00	-
D-03	32	410	3.06	0.61	8.12	13.16	18.43	24.82	32.00	-
D-05	26	240	3.16	0.67	7.41	13.48	18.65	24.38	26.00	-
E-05	24	211	2.92	0.64	6.97	12.91	17.82	23.52	24.00	-
Reference Stations										
E-01	68	2986	3.06	0.50	12.39	14.66	21.71	30.38	43.65	53.46
NE-03	57	1942	3.50	0.60	11.01	14.12	19.23	25.77	37.21	47.01
NE-05	67	1494	4.53	0.75	14.40	19.92	27.14	35.96	49.23	60.04
SW-01	59	2628	3.39	0.58	10.71	12.60	18.10	25.59	37.47	46.58
SW-02	58	2697	3.26	0.56	10.43	11.57	16.12	22.56	33.64	43.00

Table D-4. Species counts with trophic guild associations for benthic infaunal samples collected during RISDS survey, July 2005.

Station B-01		No. of	Trophic
Taxon	NODC Code	Individuals	Guild
Cerianthidae spp. indet.	374301SPP	9	1
Edwardsia elegans	3759010101	5	1
Chone infundibulariformis	5001700102	20	1
Euchone incolor	5001700204	101	1
Pseudopotamilla reniformis	5001700609	1	1
Sabellidae spp.	500170SPP	1	1
Cerastoderma pinnulatum	5515220601	1	1
Ensis directus	5515290301	4	1
Arctica islandica	5515390101	2	1
Phoronis architecta	7700010203	6	1
Prionospio steenstrupi	5001430506	2	2
Spiophanes bombyx	5001431001	2	2
Ampelisca agassizi	6169020111	4	2
Echinarachnius parma	8155020101	1	2
Ampharetidae spp.	500167SPP	1	3
Nephtys incisa	5001250115	34	6
Nephtys spp.	50012501SPP	6	6
Parougia caeca	50013614CAEC	2	6
Micrura spp.	43030205SPP	2	7
Harmothoe extenuata	5001020803	1	7
Sthenelais limicola	5001060303	1	7
Cossura longocirrata	5001520101	8	8
Ophelina acuminata	5001580607	1	8
Nucula annulata	5502020205	22	8
	Total #	237	

Station B-04		No. of	Trophic
Taxon	NODC Code	Individuals	Guild
Anthozoa spp. indet.	3740SPP	1	1
Ceriantheopsis americana	3743010201	3	1
Cerianthidae spp. indet.	374301SPP	3	1
Edwardsia elegans	3759010101	6	1
Chone infundibulariformis	5001700102	3	1
Euchone incolor	5001700204	83	1
Pythinella cuneata	5515090301	1	1
Cerastoderma pinnulatum	5515220601	11	1
Mulinia lateralis	5515250301	3	1
Ensis directus	5515290301	5	1
Arctica islandica	5515390101	1	1
Hiatella arctica	5517060201	1	1
Dyopedos monacanthus	6169440104	1	1
Phoronis architecta	7700010203	5	1
Prionospio steenstrupi	5001430506	3	2
Polycirrus haematoides	5001680805	1	2
Diastylis quadrispinosa	6154050126	3	2
Diastylis sculpta	6154050127	1	2
Ampharetidae spp.	500167SPP	1	3
Nephtys caeca	5001250103	5	6
Nephtys incisa	5001250115	66	6
Nephtys spp.	50012501SPP	7	6
Argissa hamatipes	6169070101	1	6
Ameroculodes sp. 1	616937AMSP01	3	6
Harmothoe extenuata	5001020803	1	7
Cossura longocirrata	5001520101	14	8
Nucula annulata	5502020205	43	8
Yoldia sapotilla	5502040513	2	8
	Total #	278	

Station C-02		No. of	Trophic
Taxon	NODC Code	Individuals	Guild
Cerianthidae spp. indet.	374301SPP	4	1
Edwardsia elegans	3759010101	6	1
Euchone incolor	5001700204	14	1
Sabellidae spp.	500170SPP	4	1
Lucinoma filosa	5515010202	1	1
Periploma papyratium	5520070104	2	1
Dyopedos monacanthus	6169440104	2	1
Phoronis architecta	7700010203	8	1
Apistobranchus typicus	5001420103	1	2
Nephtys incisa	5001250115	11	6
Nephtys spp.	50012501SPP	3	6
Byblis serrata	6169020203	1	6
Ameroculodes sp. 1	616937AMSP01	1	6
Levinsenia gracilis	5001410801	1	8
Cossura longocirrata	5001520101	5	8
Nucula annulata	5502020205	182	8
Nucula delphinodonta	5502020206	3	8
	Total #	249	

Station C-03		No. of	Trophic
Taxon	NODC Code	Individuals	Guild
Ceriantheopsis americana	3743010201	2	1
Cerianthidae spp. indet.	374301SPP	3	1
Edwardsia elegans	3759010101	5	1
Euchone incolor	5001700204	2	1
Pythinella cuneata	5515090301	1	1
Cerastoderma pinnulatum	5515220601	5	1
Ensis directus	5515290301	7	1
Arctica islandica	5515390101	1	1
Dyopedos monacanthus	6169440104	2	1
Phoronis architecta	7700010203	3	1
Prionospio steenstrupi	5001430506	4	2
Eudorella pusilla	6154040211	1	2
Diastylis quadrispinosa	6154050126	1	2
Diastylis sculpta	6154050127	3	2
Ampelisca agassizi	6169020111	1	2
Aphelochaeta marioni	5001500307	1	3
Nephtys caeca	5001250103	1	6
Nephtys incisa	5001250115	23	6
Nephtys spp.	50012501SPP	3	6
Scoletoma hebes	5001310140	1	6
Byblis serrata	6169020203	2	6
Photis pollex	6169260217	1	6
Ameroculodes sp. 1	616937AMSP01	1	6
Micrura spp.	43030205SPP	1	7
Phyllodoce maculata	5001130106	4	7
Cossura longocirrata	5001520101	1	8
Mediomastus ambiseta	**5001600401**	**1**	**8**
Nucula annulata	5502020205	3	8
Yoldia sapotilla	5502040513	1	8
	Total #	85	

Station D-03		No. of	Trophic
Taxon	NODC Code	Individuals	Guild
Cerianthidae spp. indet.	374301SPP	5	1
Edwardsia elegans	3759010101	3	1
Chone infundibulariformis	5001700102	19	1
Euchone incolor	5001700204	186	1
Pseudopotamilla reniformis	5001700609	1	1
Cerastoderma pinnulatum	5515220601	20	1
Mulinia lateralis	5515250301	3	1
Ensis directus	5515290301	2	1
Arctica islandica	5515390101	4	1
Pitar morrhuana	5515471201	1	1
Mya arenaria	5517010201	1	1
Dyopedos monacanthus	6169440104	4	1
Phoronis architecta	7700010203	37	1
Prionospio steenstrupi	5001430506	2	2
Polycirrus haematoides	5001680805	9	2
Diastylis quadrispinosa	6154050126	3	2
Ampelisca agassizi	6169020111	2	2
Echinarachnius parma	8155020101	1	2
Tharyx acutus	5001500305	5	3
Brada villosa	5001540102	1	3
Flabelligera affinis	5001540202	1	3
Terebellides atlantis	5001690105	1	3
Nephtys caeca	5001250103	1	6
Nephtys incisa	5001250115	58	6
Nephtys spp.	50012501SPP	8	6
Deflexilodes tuberculatus	6169370815	1	6
Ameroculodes sp. 1	616937AMSP01	1	6
Sthenelais limicola	5001060303	2	7
Phyllodoce maculata	5001130106	2	7
Cossura longocirrata	5001520101	9	8
Ophelina acuminate	5001580607	3	8
Nucula annulata	5502020205	14	8
	Total #	410	

Station D-05		No. of	Trophic
Taxon	NODC Code	Individuals	Guild
Ceriantheopsis americana	3743010201	1	1
Cerianthidae spp. indet.	374301SPP	6	1
Edwardsia elegans	3759010101	3	1
Chone infundibulariformis	5001700102	9	1
Euchone incolor	5001700204	81	1
Cerastoderma pinnulatum	5515220601	1	1
Mulinia lateralis	5515250301	6	1
Ensis directus	5515290301	5	1
Arctica islandica	5515390101	5	1
Dyopedos monacanthus	6169440104	2	1
Phoronis architecta	7700010203	25	1
Spiophanes bombyx	5001431001	1	2
Eudorella pusilla	6154040211	1	2
Diastylis sculpta	6154050127	1	2
Ampelisca agassizi	6169020111	2	2
Tharyx acutus	5001500305	2	3
Nephtys caeca	5001250103	2	6
Nephtys incisa	5001250115	59	6
Nephtys spp.	50012501SPP	5	6
Scoletoma hebes	5001310140	1	6
Parougia caeca	50013614CAEC	1	6
Argissa hamatipes	6169070101	1	6
Ameroculodes sp. 1	616937AMSP01	3	6
Sthenelais limicola	5001060303	1	7
Phyllodoce maculata	5001130106	5	7
Nucula annulata	5502020205	11	8
	Total #	240	

Station E-05		No. of	Trophic
Taxon	NODC Code	Individuals	Guild
Anthozoa spp. indet.	3740SPP	1	1
Ceriantheopsis americana	3743010201	5	1
Edwardsia elegans	3759010101	5	1
Chone infundibulariformis	5001700102	1	1
Euchone incolor	5001700204	102	1
Cerastoderma pinnulatum	5515220601	2	1
Arctica islandica	5515390101	1	1
Pitar morrhuana	5515471201	3	1
Crassicorophium crassicorne	6169150203	2	1
Erichthonius fasciatus	6169150308	16	1
Dyopedos monacanthus	6169440104	1	1
Phoronis architecta	7700010203	19	1
Diastylis quadrispinosa	6154050126	4	2
Ampelisca agassizi	6169020111	1	2
Leptocheirus pinguis	6169060702	1	2
Tharyx acutus	5001500305	1	3
Nephtys incisa	5001250115	19	6
Nephtys spp.	50012501SPP	2	6
Scoletoma fragilis	5001310102	12	6
Scoletoma hebes	5001310140	3	6
Deflexilodes tuberculatus	6169370815	1	6
Micrura spp.	43030205SPP	1	7
Cossura longocirrata	5001520101	5	8
Nucula annulata	5502020205	3	8
	Total #	211	

Station E-01		No. of	Trophic
Taxon	NODC Code	Individuals	Guild
Anthozoa spp. indet.	3740SPP	1	1
Cerianthidae spp. indet.	374301SPP	9	1
Edwardsia elegans	3759010101	3	1
Chone infundibulariformis	5001700102	93	1
Euchone incolor	5001700204	221	1
Euchone elegans	5001700205	1	1
Sabellidae spp.	500170SPP	5	1
Crenella decussata	5507010201	2	1
Lucinoma filosa	5515010202	35	1
Thyasira gouldi	5515020301	4	1
Astarte undata	5515190113	2	1
Cerastoderma pinnulatum	5515220601	76	1
Arctica islandica	5515390101	7	1
Pitar morrhuana	5515471201	10	1
Hiatella arctica	5517060201	2	1
Lyonsia spp. indet.	55200502SPP	2	1
Periploma papyratium	5520070104	86	1
Thracia conradi	5520080209	1	1
Eudorella pusilla	6154040211	24	1
Erichthonius fasciatus	6169150308	16	1
Dyopedos monacanthus	6169440104	46	1
Spiophanes bombyx	5001431001	2	2
Owenia sp. 1	50016401SP01	15	2
Polycirrus haematoides	5001680805	10	2
Diastylis quadrispinosa	6154050126	11	2
Diastylis sculpta	6154050127	2	2
Ampelisca abdita	6169020108	9	2
Ampelisca agassizi	6169020111	114	2
Leptocheirus pinguis	6169060702	1	2
Sphaerodoridium claparedii	5001260401	2	3
Tharyx acutus	5001500305	9	3
Monticellina dorsobranchialis	5001500310	1	3
Flabelligera affinis	5001540202	12	3
Ampharete finmarchica	5001670214	6	3

Station E-01 (con.)		No. of	Trophic
Taxon	NODC Code	Individuals	Guild
Ampharetidae spp.	500167SPP	2	3
Terebellides atlantis	5001690105	13	3
Onoba pelagica	5103202113	8	3
Nephtys incisa	5001250115	17	6
Nephtys spp.	50012501SPP	1	6
Scoletoma hebes	5001310140	54	6
Ninoe nigripes	5001310204	86	6
Parougia caeca	50013614CAEC	4	6
Argissa hamatipes	6169070101	7	6
Anonyx liljeborgi	6169340303	1	6
Stenopleustes inermis	6169430610	16	6
Micrura spp.	43030205SPP	5	7
Harmothoe extenuata	5001020803	3	7
Hartmania moorei	5001022001	6	7
Pholoe minuta	5001060101	9	7
Sthenelais limicola	5001060303	1	7
Phyllodoce maculata	5001130106	7	7
Paranaitis speciosa	5001130801	1	7
Glycera dibranchiata	5001270105	1	7
Drilonereis longa	5001330103	1	7
Retusa obtusa	5110130101	12	7
Photis pollex	6169260217	16	7
Levinsenia gracilis	5001410801	54	8
Cossura longocirrata	5001520101	48	8
Scalibregma inflatum	5001570101	7	8
Ophelina acuminata	5001580607	1	8
Sternaspis scutata	5001590101	1	8
Mediomastus californiensis	5001600401	11	8
Clymenella torquata	5001630202	3	8
Euclymene collaris	5001631102	4	8
Oligochaeta spp.	5003SPP	18	8
Nucula annulata	5502020205	1679	8
Nucula delphinodonta	5502020206	23	8
Yoldia sapotilla	5502040513	26	8
	Total #	2986	

Station NE-03			Trophic
Taxon	NODC Code	No.	Guild
Anthozoa spp. indet.	3740SPP	1	1
Chone infundibulariformis	5001700102	8	1
Crenella glandula	5507010203	1	1
Cyclocardia borealis	5515170106	1	1
Astarte undata	5515190113	7	1
Cerastoderma pinnulatum	5515220601	2	1
Periploma papyratium	5520070104	4	1
Thracia conradi	5520080209	1	1
Crassicorophium crassicorne	6169150203	682	1
Erichthonius fasciatus	6169150308	261	1
Polygordius sp. A	50020501SP01	50	2
Eudorella pusilla	6154040211	25	2
Diastylis quadrispinosa	6154050126	2	2
Diastylis sculpta	6154050127	6	2
Ampelisca agassizi	6169020111	95	2
Leptocheirus pinguis	6169060702	183	2
Unciola irrorata	6169150703	192	2
Aricidea catherinae	5001410208	39	3
Tharyx acutus	5001500305	23	3
Aphelochaeta marioni	5001500307	2	3
Monticellina dorsobranchialis	5001500310	1	3
Chaetozone cf. setosa	50015004CF	1	3
Cirratulidae spp.	500150SPP	2	3
Brada villosa	5001540102	1	3
Pherusa affinis	5001540304	1	3
Ampharete finmarchica	5001670214	4	3
Terebellides atlantis	5001690105	12	3
Exogone cf. verugera	5001230706CF	35	6
Exogone hebes	5001230707	68	6
Nephtys caeca	5001250103	1	6
Nephtys incisa	5001250115	9	6
Scoletoma fragilis	5001310102	8	6
Scoletoma hebes	5001310140	49	6
Ninoe nigripes	5001310204	8	6

Station NE-03 (con.)		No. of	Trophic
Taxon	NODC Code	Individuals	Guild
Parougia caeca	50013614CAEC	2	6
Ptilanthura tenuis	6160010301	5	6
Pleurogonium inerme	6163120204	1	6
Byblis serrata	6169020203	4	6
Casco bigelowi	6169211601	1	6
Photis pollex	6169260217	7	6
Anonyx liljeborgi	6169340303	1	6
Orchomene minuta	6169345201	1	6
Deflexilodes tuberculatus	6169370815	1	6
Ameroculodes sp. 1	616937AMSP01	2	6
Phoxocephalus holbolli	6169420702	4	6
Axius serratus	6183020301	1	6
Pholoe minuta	5001060101	4	7
Phyllodoce maculata	5001130106	8	7
Goniada maculata	5001280202	1	7
Mitrella nr. dissimilis	5105030208CF	3	7
Aeginina longicornis	6171010801	2	7
Scalibregma inflatum	5001570101	81	8
Ophelina acuminata	5001580607	6	8
Clymenella torquata	5001630202	5	8
Euclymene collaris	5001631102	4	8
Oligochaeta spp.	5003SPP	5	8
Nucula annulata	5502020205	8	8
	Total	1942	

Station NE-05			Trophic
Taxon	NODC Code	No.	Guild
Anthozoa spp. indet.	3740SPP	1	1
Cerianthidae spp. indet.	374301SPP	2	1
Chone infundibulariformis	5001700102	25	1
Euchone incolor	5001700204	164	1
Pseudopotamilla reniformis	5001700609	1	1
Sabellidae spp.	500170SPP	8	1
Crenella decussata	5507010201	4	1
Astarte undata	5515190113	5	1
Cerastoderma pinnulatum	5515220601	2	1
Hiatella arctica	5517060201	1	1
Periploma papyratium	5520070104	14	1
Crassicorophium crassicorne	6169150203	173	1
Erichthonius fasciatus	6169150308	45	1
Dipolydora socialis	5001430402	1	2
Prionospio steenstrupi	5001430506	16	2
Spiophanes bombyx	5001431001	11	2
Polygordius sp. A	50020501SP01	48	2
Eudorella pusilla	6154040211	21	2
Diastylis quadrispinosa	6154050126	3	2
Diastylis sculpta	6154050127	14	2
Ampelisca abdita	6169020108	9	2
Ampelisca agassizi	6169020111	98	2
Leptocheirus pinguis	6169060702	140	2
Unciola irrorata	6169150703	129	2
Sphaerodoridium claparedii	5001260401	1	3
Aricidea catherinae	5001410208	46	3
Tharyx acutus	5001500305	103	3
Aphelochaeta marioni	5001500307	1	3
Monticellina dorsobranchialis	5001500310	8	3
Monticellina baptisteae	50015003BAPT	1	3
Chaetozone cf. setosa	50015004CF	1	3
Ampharete finmarchica	5001670214	7	3
Ampharetidae spp.	500167SPP	1	3
Terebellides atlantis	5001690105	22	3

Station NE-05 (con.)		No. of	Trophic
Taxon	NODC Code	Individuals	Guild
Trichobranchidae spp.	500169SPP	2	3
Exogone hebes	5001230707	4	6
Sphaerosyllis brevifrons	50012308BRE	1	6
Scoletoma hebes	5001310140	90	6
Ninoe nigripes	5001310204	46	6
Parougia caeca	50013614CAEC	7	6
Ptilanthura tenuis	6160010301	2	6
Pleurogonium inerme	6163120204	5	6
Byblis serrata	6169020203	12	6
Casco bigelowi	6169211601	4	6
Melitidae sp. 1	616921MESP01	1	6
Photis pollex	6169260217	6	6
Orchomene minuta	6169345201	8	6
Ameroculodes sp. 1	616937AMSP01	1	6
Stenopleustes inermis	6169430610	1	6
Micrura spp.	43030205SPP	2	7
Harmothoe extenuata	5001020803	10	7
Pholoe minuta	5001060101	7	7
Phyllodoce mucosa	5001130104	2	7
Nereis procera	5001240404	1	7
Drilonereis longa	5001330103	1	7
Fargoa bartschi	5108011501	1	7
Aeginina longicornis	6171010801	2	7
Henricia sanguinolenta	8114040111	1	7
Levinsenia gracilis	5001410801	21	8
Cossura longocirrata	5001520101	4	8
Scalibregma inflatum	5001570101	97	8
Ophelina acuminata	5001580607	5	8
Clymenella torquata	5001630202	1	8
Oligochaeta spp.	5003SPP	8	8
Nucula annulata	5502020205	10	8
Nucula delphinodonta	5502020206	2	8
Yoldia sapotilla	5502040513	3	8
	Total	1494	

Station SW-01			Trophic
Taxon	NODC Code	No.	Guild
Anthozoa spp. indet.	3740SPP	1	1
Cerianthidae spp. indet.	374301SPP	4	1
Chone infundibulariformis	5001700102	2	1
Euchone incolor	5001700204	10	1
Crenella decussata	5507010201	7	1
Lucinoma filosa	5515010202	4	1
Astarte undata	5515190113	2	1
Cerastoderma pinnulatum	5515220601	2	1
Periploma papyratium	5520070104	6	1
Crassicorophium crassicorne	6169150203	511	1
Erichthonius fasciatus	6169150308	371	1
Polydora cornuta	5001430448	1	2
Prionospio steenstrupi	5001430506	1	2
Galathowenia oculata	5001640402	8	2
Eudorella pusilla	6154040211	30	2
Diastylis quadrispinosa	6154050126	20	2
Diastylis sculpta	6154050127	5	2
Ampelisca agassizi	6169020111	558	2
Leptocheirus pinguis	6169060702	33	2
Unciola irrorata	6169150703	123	2
Echinarachnius parma	8155020101	2	2
Aricidea catherinae	5001410208	2	3
Tharyx acutus	5001500305	8	3
Ampharete finmarchica	5001670214	4	3
Terebellides atlantis	5001690105	3	3
Exogone hebes	5001230707	7	6
Nephtys incisa	5001250115	6	6
Scoletoma hebes	5001310140	4	6
Ninoe nigripes	5001310204	9	6
Ptilanthura tenuis	6160010301	1	6
Edotia montosa	6162020701	5	6
Byblis serrata	6169020203	1	6
Casco bigelowi	6169211601	1	6
Photis dentate	6169260207	20	6

Station SW-01 (con.)		No. of	Trophic
Taxon	NODC Code	Individuals	Guild
Photis pollex	6169260217	10	6
Anonyx liljeborgi	6169340303	5	6
Orchomene minuta	6169345201	17	6
Harpinia propinqua	6169420116	29	6
Phoxocephalus holbolli	6169420702	14	6
Stenopleustes inermis	6169430610	18	6
Micrura spp.	43030205SPP	1	7
Amphiporus caecus	4306050111	9	7
Harmothoe extenuata	5001020803	6	7
Phyllodoce maculata	5001130106	31	7
Paranaitis speciosa	5001130801	1	7
Drilonereis longa	5001330103	1	7
Mitrella nr. dissimilis	5105030208CF	1	7
Odostomia nr. sulcosa	5108010133CF	1	7
Aeginina longicornis	6171010801	10	7
Henricia sanguinolenta	8114040111	4	7
Levinsenia gracilis	5001410801	3	8
Cossura longocirrata	5001520101	1	8
Scalibregma inflatum	5001570101	18	8
Ophelina acuminata	5001580607	1	8
Clymenella torquata	5001630202	9	8
Euclymene collaris	5001631102	18	8
Nucula annulata	5502020205	567	8
Nucula delphinodonta	5502020206	80	8
Yoldia sapotilla	5502040513	1	8
	Total	2628	

Station SW-02			Trophic
Taxon	NODC Code	No.	Guild
Spiochaetopterus oculatus	5001490303	1	1
Chone infundibulariformis	5001700102	1	1
Euchone incolor	5001700204	7	1
Lucinoma filosa	5515010202	1	1
Astarte undata	5515190113	1	1
Cerastoderma pinnulatum	5515220601	3	1
Periploma papyratium	5520070104	8	1
Crassicorophium crassicorne	6169150203	668	1
Erichthonius fasciatus	6169150308	635	1
Dipolydora socialis	5001430402	1	2
Prionospio steenstrupi	5001430506	7	2
Spiophanes bombyx	5001431001	1	2
Galathowenia oculata	5001640402	1	2
Eudorella pusilla	6154040211	31	2
Diastylis quadrispinosa	6154050126	9	2
Diastylis sculpta	6154050127	4	2
Ampelisca agassizi	6169020111	313	2
Leptocheirus pinguis	6169060702	83	2
Unciola irrorata	6169150703	394	2
Axiognathus squamatus	8129030202	1	2
Aricidea catherinae	5001410208	5	3
Tharyx acutus	5001500305	8	3
Ampharete finmarchica	5001670214	1	3
Terebellides atlantis	5001690105	3	3
Exogone cf. verugera	5001230706CF	1	6
Exogone hebes	5001230707	8	6
Nephtys incisa	5001250115	5	6
Scoletoma hebes	5001310140	7	6
Ninoe nigripes	5001310204	11	6
Parougia caeca	50013614CAEC	1	6
Pleurogonium inerme	6163120204	3	6
Byblis serrata	6169020203	2	6
Casco bigelowi	6169211601	1	6
Photis dentata	6169260207	4	6

Station SW-02 (con.)		No. of	Trophic
Taxon	NODC Code	Individuals	Guild
Photis pollex	6169260217	13	6
Anonyx liljeborgi	6169340303	8	6
Orchomene minuta	6169345201	23	6
Harpinia propinqua	6169420116	19	6
Phoxocephalus holbolli	6169420702	6	6
Stenopleustes inermis	6169430610	3	6
Cerebratulus lacteus	4303020209	1	7
Micrura spp.	43030205SPP	1	7
Amphiporus caecus	4306050111	4	7
Harmothoe extenuata	5001020803	17	7
Pholoe minuta	5001060101	1	7
Phyllodoce mucosa	5001130104	1	7
Phyllodoce maculata	5001130106	57	7
Scoloplos armiger	5001400301	6	7
Mitrella nr. dissimilis	5105030208CF	1	7
Mitrella rosacea	5105031101	2	7
Aeginina longicornis	6171010801	6	7
Henricia sanguinolenta	8114040111	1	7
Levinsenia gracilis	5001410801	14	8
Scalibregma inflatum	5001570101	19	8
Ophelina acuminata	5001580607	2	8
Nucula annulata	5502020205	238	8
Nucula delphinodonta	5502020206	22	8
Yoldia sapotilla	5502040513	2	8
	Total	2697	

Notes:
Faunal species, listed by trophic category, found at Rhode Island Sound Disposal Site Reference station SW-02 in July 2005. Trophic modes as follows: 1) suspension feeder; 2) interface feeder; 3) surface deposit feeder; 6) omnivore/scavenger; 7) predator; 8) subsurface deposit feeder including conveyor-belt species.