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SEDIMENTOLOGY OF THE LOWER GREAT BAY/PISCATAQUA RIVER ESTUARY

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ABSTRACT

The lower Great Bay/Piscataqua River Estuary is complex and diverse system that is heavily influenced by bedrock, glacial processes, and estuarine processes. The sedimentological characteristics and controlling processes of this complex environment have a major impact on the location and concentrations of contaminants in the lower Estuary. Numerous contaminants are absorbed onto fine-grained sediments and ultimately deposited with the sediments. In addition, the transport and fate of contaminants is controlled by many of the same processes directing sediment transport and deposition. This report describes the results of an intensive study of the lower Great Bay/Piscataqua River Estuary which includes: 1. a detailed bottom sediment distribution map, 2. textural characteristics of the bottom sediments including grain size, moisture content, total organic matter content, total organic carbon content, and bulk density, 3. descriptions of the major depositional systems in the lower Estuary, 4. sedimentation rates and geochronolgy of two selected sites, 5. substrate sediment mixing depths, 6. a pilot study of water column sediment fluxes, 7. and a preliminary review of the total suspended sediment distribution.

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INTRODUCTION

A description of the sedimentary environments and the processes leading to and controlling the formation of sediment deposits in the lower Great Bay/Piscataqua River Estuary (Fig. 1) is needed in order to help understand and predict contaminant distributions, benthic organisms distributions and possible exchanges of materials between the substrate and water column. A number of chemical contaminants tend to become absorbed on fine-grained sediments or settle from the water column in areas were muddy sediments are deposited. Therefore, it is important in all ecological assessments of marine systems, especially estuarine, to identify bottom sediment types, to locate fine-grained sediment depositional environments, to understand transport pathways and to assess sedimentation processes. At the outset of this study, a review of the literature and other data sources available indicated the previously collected bottom sediment information (e.g. Mills 1977) was inadequate to describe, even in general terms, the sediment distribution of the Portsmouth Naval Shipyard (PNS) area. In addition, with the exception of tidal flat sediment dynamics, little was known concerning the controlling sedimentation processes. Consequently, prior to the research undertaken during the present study, very little information was available concerning the depositional environments and sedimentation processes in the lower estuary and no synthesis of the limited amount of data was available.

The objectives of the present study were to determine the textural characteristics of the sediments of the lower Great Bay/Piscataqua River Estuary, to develop a surficial sediment distribution map, and to develop an understanding of the controlling sedimentation processes. To accomplish these objectives, various tasks were undertaken as part of the Portsmouth Naval Shipyard (PNS) Ecological Risk Assessment between approximately August 1991 to December 1994, including collecting and analyzing sediment samples from approximately 218 locations, collecting ~30 gravity cores up to ~1.5 m in length, conducting a geophysical survey, and reviewing all available data sources. In total, over 406 sediment samples were collected and analyzed from the surficial sediment and coring stations, ~40 km of subbottom seismics and side scan sonar records were collected and interpreted, and color infrared photographs of the lower estuary (which were available through UNH JEL) reviewed. This information has been synthesized and incorporated into two major reports: 1. a surficial sediment distribution map of the harbor area which was previously submitted (Ward 1994), and 2. the present report which incorporates the earlier information, as well as adds the results of the work concerned with the shallow subsurface, sedimentation processes and water column sediment dynamics.

GEOLOGIC SETTING

Bedrock Geology

The lower Great Bay/Piscataqua River Estuary is eroded into a complex assemblage of metasedimentary, metavolcanic and plutonic rocks ranging in age from 345 to 600 million years which belong to three geologic formations, the Kittery, the Eliot and the Rye (Billings 1956, Notovny 1969). The Eliot Formation, which composes the shoreline of the upper Piscataqua River in the vicinity of Newington, is composed of argillaceous sediments that were metamorphosed into slate, schists, phyllite and pyritic quartzite. The Kittery Formation outcrops

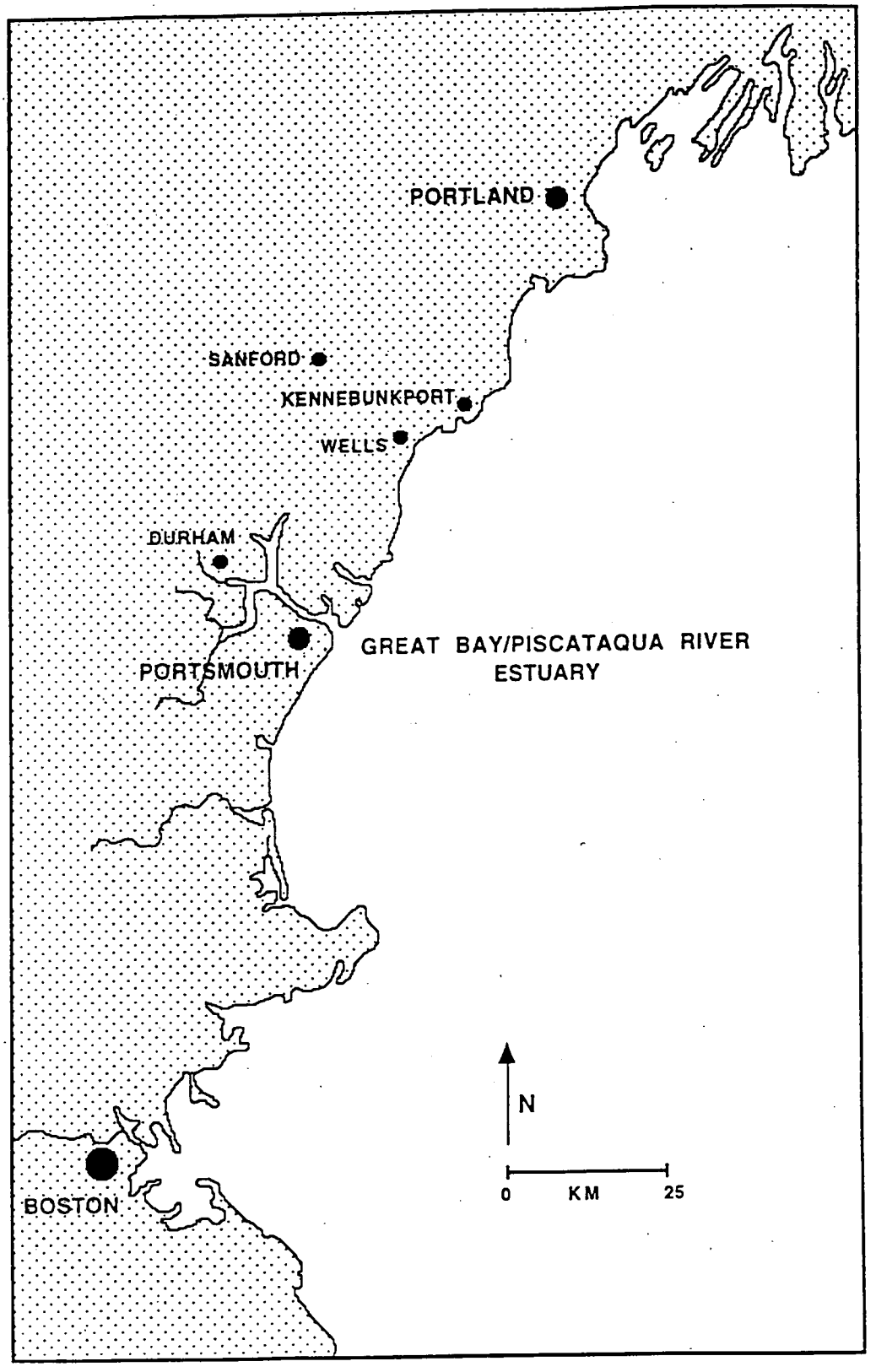


Figure 1. Location map of the Great Bay/Piscataqua River Estuary.

from Newington to PNS and is composed of impure quartzite, slate, phyllite, and schists. The Rye Formation forms the lower estuary in the vicinity of the mouth of the harbor and is dominantly metasedimentary and metavolcanic rocks. Bedrock outcrops occur extensively along the shores of the lower estuary, as well as subtidally. Along the perimeter of the estuary, the outcrops are highly jointed in a criss-cross pattern and produce highly angular rock fragments which form narrow shingle beaches.

The location of the Estuary is at least partially structurally controlled. The axis of the Great Bay syncline coincides with the axis of Great Bay and Little Bay (Billings 1956, Notovny 1969). Birch (1984) speculated from geophysical evidence that the Piscataqua River lies in the northwest extension of a fault located on the inner continental shelf of New Hampshire. Although, the effects of these structural elements are speculative at present, frequently rocks located at the axis of an syncline or in a faulted zone are weakened and more susceptible to erosion. The actual effect of the bedrock and structure and the formation of the Estuary is yet to be determined.

Sea Level History of the Region

A detailed sea level curve developed for the coast of Maine (Belknap et al. 1987) shows that relative sea level has undergone a major marine transgression, regression, followed by another transgression during the last 12,500 years since the retreat of the Wisconsin ice sheet. At the maximum extent of the marine transgression, sea level was ~75 m higher than at present, some 12,000 to 14,000 years ago (Belknap et al. 1987). The coastline at this time was located ~ 40 to 50 km further inland than today. This transgression, which was caused by the depression of the crust (isostatic adjustment) by the Wisconsin ice sheet, was followed by a rapid regression of the sea due to crustal rebound. At this time (approximately 9,500 years ago), sea level dropped up to ~65 m below present mean water level and was probably located ~ 10 to 15 km further seaward (near the Isles of Shoals) than today. Since this lowstand, the sea has been rising as the glaciers continued to melt, causing a landward transgression. The coastline probably was near its present location at least ~2,000 years and may have reached its location even earlier, when sea level rise slowed some 4,000 years ago. The present rate of sea level rise based on tide gauge records recorded at the PNS from 1940 to 1980 is 1.5 to 2.0 mm/yr (Hicks et al. 1983).

Origin of the Great Bay/Piscataqua River Estuary

At present, the mechanism and timing of the formation of the Great Bay/Piscataqua River Estuary is unclear. The Estuary may have formed during and/or following the latest glacial advance, the Wisconsin Glaciation. During the period the ice sheet covered the region, the valley may have been eroded by ice plucking, subglacial stream erosion, etc. Structural features including the synclinal axis along the Great and Little Bay, as well as a possible fault near the lower estuary axis may have provided weaker rocks to remove. Following the retreat of the Wisconsin ice sheet from the region, fluvial processes may have eroded the valley deeper (or even formed the valley) during the period when the land was rebounding and sea level was dropping. This hypothesis would include the valley being eroded below the present base level (sea level) and extending seaward onto the inner shelf of New Hampshire. Conversely, the

valley system may have been in place prior to the Wisconsin Glaciation and only modified during the latest glaciation (Pleistocene). Thus, the present valley system may be a relict that has been only modified since the retreat of the Wisconsin glaciation. However, the two hypotheses are not mutually exclusive and could work in concert. The original Great Bay/Piscataqua River valley may have been formed prior to the Wisconsin Glaciation, but extensively modified during the last ice advance by glacial processes, then further modified by fluvial processes.

Impact of Glaciation on the Great Bay/Piscataqua River Estuary

Irregardless of the actual mechanism and timing of the formation of the Great Bay/Piscataqua River Estuary, the influence of the last glaciation on the sedimentology and stratigraphy cannot be overemphasized. Although the estuary is eroded into crystalline bedrock, much of the bedrock is covered with glacial materials including tills, stratified deposits (outwash or delta) and glacial marine sediments. All of these deposits are important sediment sources to the estuary. The glacial tills and stratified sediments, which were deposited in contact with the ice sheet, provide coarse sediments to the estuary. The glacial marine sediments, termed the Presumpscot Formation, were deposited as the glaciers receded and the ocean followed the ice margin inland. The glacial streams carried abundant fine grained-sediments (glacial flour), which was transported and deposited in the marine environment. The Presumpscot Formation typically drapes over the underlying bedrock or till deposits and is composed of a blue-grey, very cohesive, silt and clay with varying amounts of sand. The Presumpscot Formation, which is usually very distinctive and easily identified, covers much of the lower estuary and extends both in a seaward direction past the Isles of Shoals and in a landward direction to Barrington and Rochester. These glacial marine sediments are now being eroded, providing a source of fine-grained sediments to the lower estuary.

METHODS

Bottom Sediment Sampling

The methodologies of the surficial sampling program is discussed in earlier reports (Ward 1993, 1994). However, because the sediment distribution maps are included here and the textural data is incorporated into the present report, these methods are repeated. During the initial phases of the Portsmouth Naval Shipyard Ecological Risk Assessment, Normadeau Associates Inc. collected replica (4) surficial sediment samples at 21 station in lower Portsmouth Harbor designated PH 1 - PH 21 and two stations in York River, YR 22 and YR 23 (Fig. 2). Splits of these samples, which were collected with a Shipek Grab Sampler, were obtained for textural analysis including grain size, moisture and loss on ignition (LOI) (analytical methods described in below). These samples provided textural information about the bottom sediments for the primary sampling sites in Phase 1 of this project. The PH stations were chosen to represent sediment deposition sites in and around the PNS. Consequently, the stations were limited in their areal distribution. In order to provide adequate coverage of the entire lower estuary, bottom sediments were collected at an additional 197 stations (designated SS series, NHPA series and MS series) utilizing the R/V Jere A. Chase and smaller boats. Station locations were

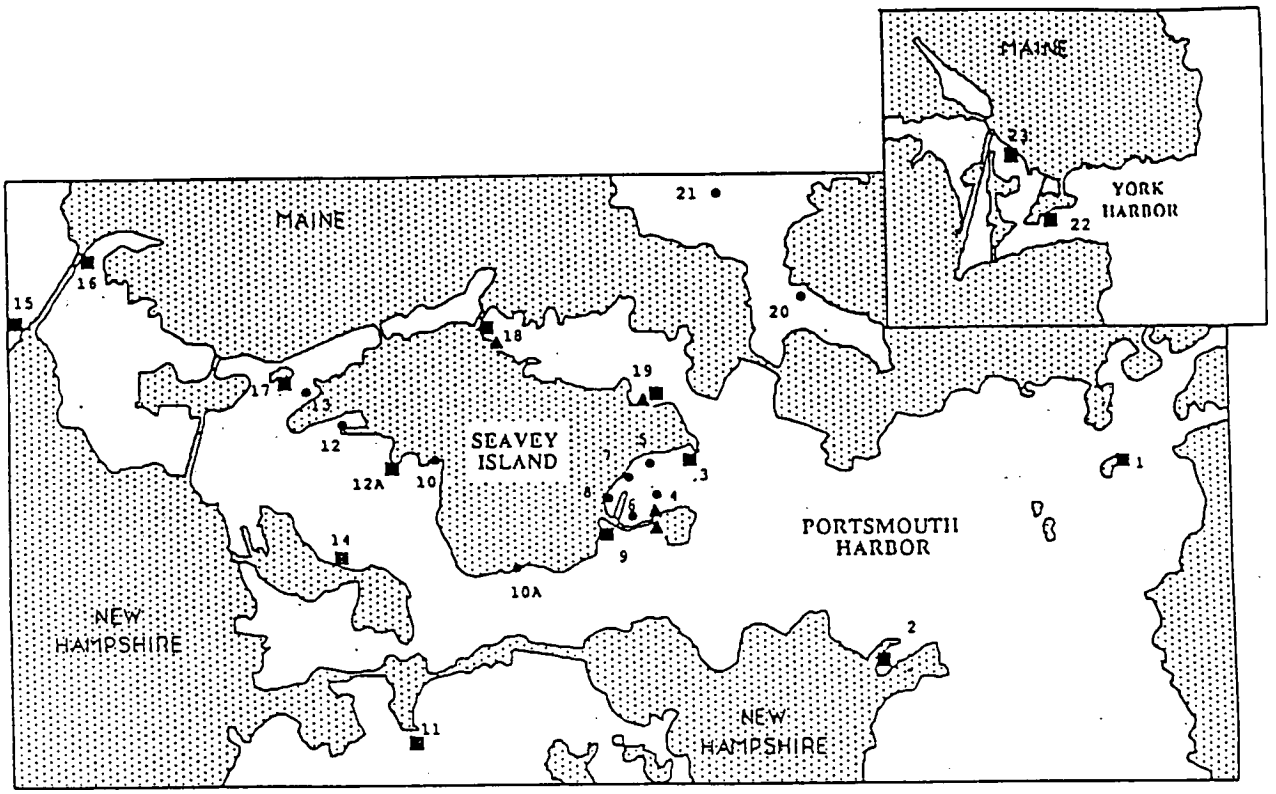


Figure 2. Location map of PH (in Portsmouth Harbor) and YR (in York Harbor) stations.

determined with Loran and surficial sediment samples were collected with a Shipek Grab Sampler. The additional samples provided a greater density of stations, which cover all of the sedimentary environments in the lower estuary. The NHPA series was collected as part of a study funded by the New Hampshire Port Authority, but are included here to improve the coverage of the surficial sediment map. Most of the sampling stations which were used to construct the latest edition of the surficial sediment distribution map are shown in Figure 3. The locations (longitude and latitude) of the stations are given in Appendix 1.

Gravity Coring

The coring program in the lower Piscataqua River was conducted during two periods. During Phase 1 of the study, cores were collected in order to obtain sediment samples from the shallow subsurface (~ 1 m or so) for sediment, microbial and contaminant analyses. Coring was attempted at all 23 PH and YR stations (Fig. 2), and cores recovered successfully at 19 stations. However, the bottom sediments at stations PH 8, PH 18, YR 22 and YR 23 were too coarse to allow penetration by the gravity corer, despite repeated attempts. Gravity cores were also collected during Phase II at stations PH 2, PH 3, PH 7, PH 15, PH 17, PH 19, SS 51 and site 100 in order to assess sedimentation rates in the lower estuary, determine the age-depth relationships (geochronolgy) of the sediment columns and determine the subsurface concentrations and if possible, time histories, of contaminants (chemicals and microbes). These locations represent most of the major depositional sites around the lower Piscataqua River area, with the exception of the Sagamore Creek/New Castle and Spruce Creek Embayments. Core PH 2 is from a small embayment on the south side of the estuary, PH 3 and PH 7 are from the Clark Cove system, PH 15 is from Outer Cutts Cove embayment, PH 17 is from a subtidal flat on the westerns end of Seavey Island adjacent to Badgers Island (small embayment), PH 19 is from a subtidal flat in the Back Channel behind Seavey Island adjacent to the Jamaica Island landfill area (small embayment), and SS 51 and 100 are from coves in the back of Pepperrell Cove Embayment.

The cores were collected with a Benthos gravity corer using the R/V Jere A. Chase. The gravity corer is ~ 3 m in length and can retrieve up to 2.4 m long sediment cores (~6 cm diameter), but normally ~1.5 m is the upward limit. During this study, the cores were relatively short, normally less than ~1 m, due to the coarseness of the substrate. Prior to use in the field, the core liners were thoroughly washed with laboratory detergent and rinsed with tap water. In the field, the core liners were flushed with ambient water from the sampling site just before coring was done. During shipboard operations, the gravity core was first carefully lowered to the bottom and penetration into the substrate controlled to avoid disrupting the bottom sediment. This procedure worked well in muddy bottoms and allowed recovery of adequate sediment cores. However, in sandier substrates, a more aggressive approach was required to obtain any penetration into the bottom. At some sites, the gravity corer was lifted with the shipboard winch approximately a meter out of the water and allowed to free-fall to the bottom. In all instances, the sediment core was carefully inspected inside the liner in the field to assure an undisturbed core was obtained. Great care was taken to avoid contamination or disruption of the recovered core. This necessarily sacrificed some of the ability to penetrate the subsurface, but provided more reliable samples. The core was kept cool in the field during warmer cruise days by placing the base of the core in ice and covering the rest of the core with opaque materials. The core liner was extruded from the core barrel, as well as transported to the laboratory and stored until analysis, in a vertical or near vertical position to avoid any slumping.

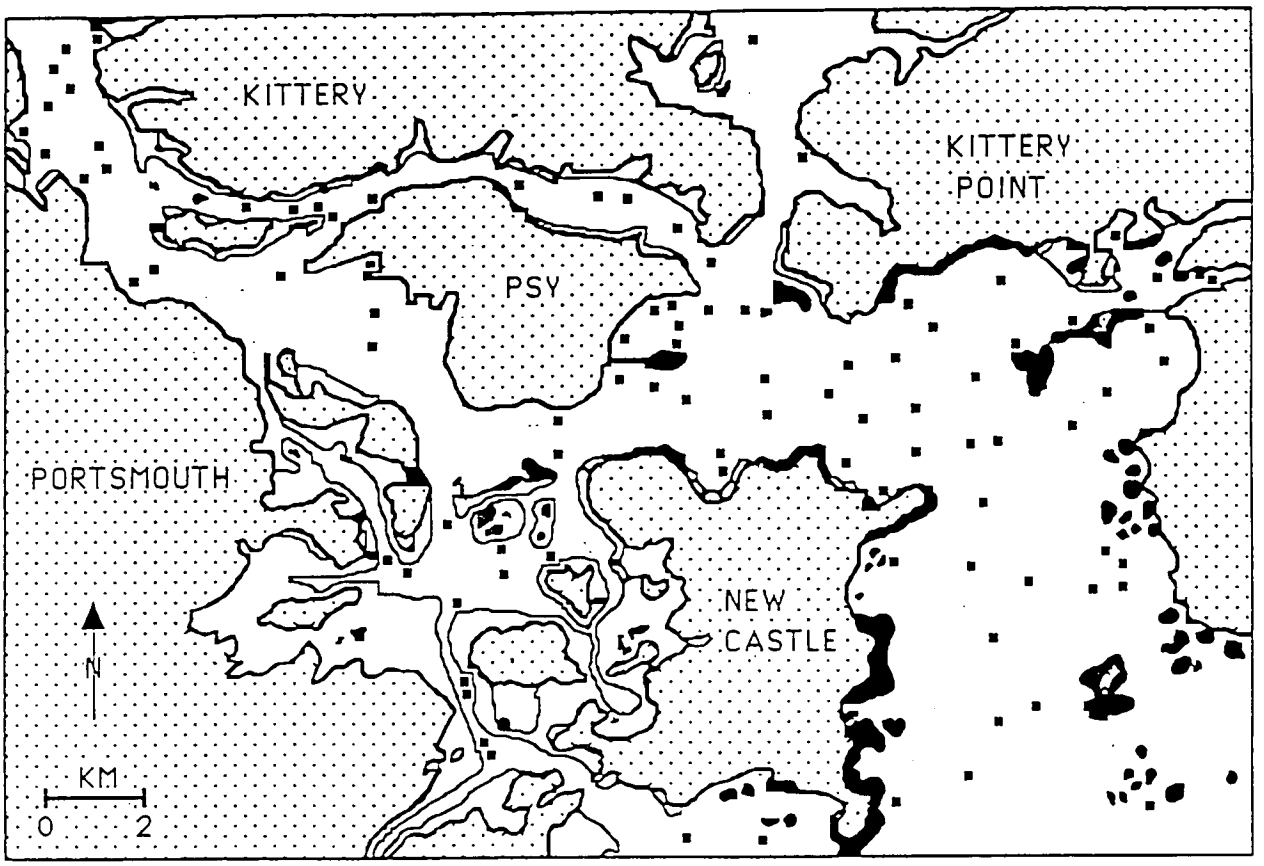


Figure 3. Location map of many of the sampling stations in the lower Great Bay/Piscataqua River Estuary.

The cores was kept at ~ 5° C until opened and subsampled.

In the laboratory, the sediment core was extruded from the liner with a piston (with the end touching the sediment covered with aluminum foil). Prior to and directly following extrusion, the length of the sediment core was measured to determine if any compaction occurred during the extrusion process. The length of the core was measured directly after recovery in the field as well. In most cases, the cores did not compact during the extrusion procedure. However, the cores did settle a small amount (normally <1 or 2 cm) while in storage prior to extrusion, probably due to dewatering. No adjustments were made for this settlement, as it was considered minor and did not affect the results of the analyses. The core was extruded onto aluminum foil in a sediment core tray. Subsequently, the outside layer (usually < 1 cm) was scrapped away with plastic knives, which had been cleaned with laboratory detergent, as well as rinsed with alcohol and deionized water. Samples for contaminant analysis were stored in whirl-pak baggies and frozen until sent for chemical analysis. The core was then subsampled for textural and microbial analyses.

Textural Analysis

Textural analyses were conducted on ~100 to ~150 g (wet weight) of sediment. Immediately after removing the sediment from the sample bag, a ~1 to ~3 cc subsample was placed in an aluminum drying dish and the moisture and LOI content determined by weight loss on drying at less than 50° C and ignition at 450° C, respectively (UNH-JEL SOP 1.11, in Mueller et al. 1992). The % LOI is a simple measure of the total organic matter content. However, the method only provides an estimate of the total organic carbon (TOC) content of the sample. In order to be able to predict more accurately the TOC content based on the LOI, the % TOC and % LOI were determined on 43 subsamples that were representative of the sediment types encountered in the lower estuary. TOC was determined by gas chromatography with a Carlo Erba Nitrogen Analyzer. A least squares regression was then established between the LOI and the TOC.

The grain size analysis followed the well established methodology outlined in Folk 1980 and described in detail in UNH JEL SOP 1.11 in Mueller et al. (1992). Briefly, the sediment sample being analyzed was normally placed in a large beaker and treated with H_2O_2 to remove the readily oxidizable organics, washed in deionized water to remove any salts, placed in a dispersant and subsequently wet sieved through a 63 micron sieve. Some samples were analyzed using modifications of this procedure. The sand and gravel fractions (>63 microns and 2.00 mm, respectively) were removed, dried and the weight determined. If the sand or gravel fraction (by weight) was greater than 5% of the total sample, then the grain size of this fraction was determined via standard sieve analysis. If the weight of the sand and gravel fraction was less than 5%, then sieve analysis was not done. The grain size of the mud fraction (silt and clay) was determined via complete pipette analysis if it composed more than 5% of the sample. The results of the two analysis were merged together to determine the grain size statistics (% gravel, % sand, % silt, % clay, mean size, sorting, skewness, and kurtosis) of the entire sample.

Bulk densities of the cores were determined by removing a small sample from the core with a scalpel (1 to 5 cc), weighing the wet sample, measuring the volume by displacement in water and determining the dry weight by recovering the sediment by filtration and drying. Bulk

densities of estuarine sediments are difficult to determine accurately due to inherent problems with altering the sediment while sampling. Almost all methods used can be problematic due to compaction of fine-grained sediments and lack of cohesion of coarser-grained sediments. In addition, the method determines the bulk density of a relatively small sample (1 to 3 cc) and estuarine sediments are often somewhat heterogeneous.

Geophysical Survey

The subbottom seismics and side scan sonar survey was carried out during April 1992 to provide more detailed information concerning the bottom types in Portsmouth Harbor. The survey, which was conducted by Woods Hole Oceanographic Institute and Jackson Estuarine Laboratory (JEL), extended from the Interstate Bridge to the mouth of the estuary (Fig 4). Navigation was provided by a UHF navigation system with a master transponder and a digital distance measuring unit on the vessel and remote transponders placed at surveyed shore stations around the perimeter of the estuary. Positions were determined with a resolution of 0.5 to 1 m. The side scan sonar unit consisted of a state-of-the-art, dual frequency, Klein digital side scan recorder (model 595) and a Klein dual frequency (100 and 500 kHz) tow fish (model 4225-101HF). The side scan sonar record was annotated by the computer with time and position. The subbottom seismic system utilized an ORE 3.5 kHz. The seismic records were hand annotated and referenced to the side scan sonar records.

Sedimentation Rates

The last century of deposition to the bottom was determined from Pb-210 analysis, while the more recent rates (since the 1950s) was assessed from Cs-137 analysis. Pb-210 technique is based on the decay of naturally occurring, unsupported or excess Pb-210 activity with depth in the sediments. Several assumptions are necessary in the Pb-210 method including sediment accumulates at a steady rate over the time of interest, the input of excess Pb-210 is constant, and the sediment column has not been vertically mixed (e.g. through bioturbation or physically disruptions) since deposition. Usually, the impacts of mixing can be recognized. The Cs-137 based dating technique matches the Cs-137 activity in the sediment profile with the known input functions from the atmospheric testing of thermonuclear bombs (the first inputs occurred in early 1953 or 1954 and peaked in 1963). The assumptions for use of the Cs-137 approach include sediment accumulates at a steady rate over the time of interest and the sediment column has not been vertically mixed.

The activities of the Pb-210 and Cs-137 profiles were determined by non-destructive gamma spectrometry. Subsamples from 2 cm intervals from the cores were dried at 70 to 80° C, ground to break up aggregates, then accurately weighed into 4 ml polyethylene vials for counting at the gamma spectrometry system in the Earth Ocean and Space Institute Glacier Research Group's Keck Radionuclide Counting Laboratory at the University of New Hampshire. The counter consists of a germanium well detector coupled to a computer based multichannel analyzer (using 4K channels for the collection of the gamma spectra). Calibration of the system and the calculation of detector efficiency and sample activities follow the procedures outlined by Larson and Cutshall (1981), using low level sediment standards traceable to the NIST.

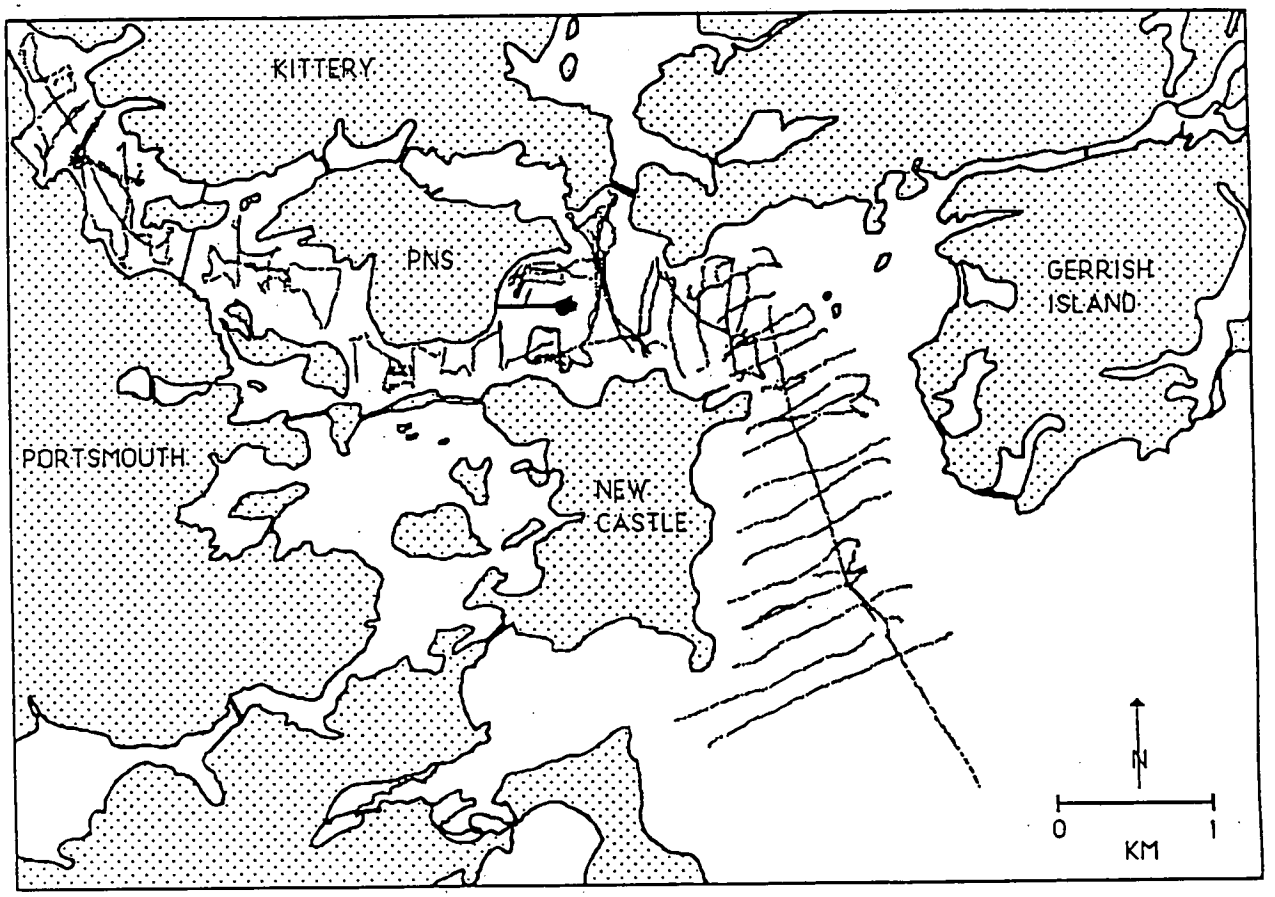


Figure 4. Shiptracks from the seismic survey.

Settling Traps

A sediment trap array consisted of four individual traps attached to a taught mooring at two depths: 2 m (lower) off the bottom and 5 m (upper) off the bottom. The upper traps were beneath the water at all stages of the tide. Each individual sediment trap was made of PVC and was 33 cm long and 10 cm in diameter (internal) for an aspect ratio of 3.3. The sediment traps were capped *in situ* by divers prior to being recovered. Both the deployment and the recovery of the sediment traps were done using the R/V Gulf Challenger.

Suspended Sediments

Water samples for the determination of the concentrations of total suspended sediments were collected via submersible pumping systems (either part of the R/V ECOS sampling equipment or a portable battery operated submersible water pump brought on board). Normally ~0.5 to 2.0 liter water samples were filtered through pre-weighed, precombusted, 47 mm diameter, 0.33 micron pore size Gelman glass fiber filters using a modification of the method described by Banse et al. (1963) and described in detail in UNH-JEL SOP 1.16 (Mueller et al. 1992). The filtering process consisted of filtering the sample through the preweighed filter, rinsing the filter with deionized water, and subsequently drying at less than 50° C. The water samples were filtered soon after collection aboard the R/V ECOS to avoid storage and transportation problems.

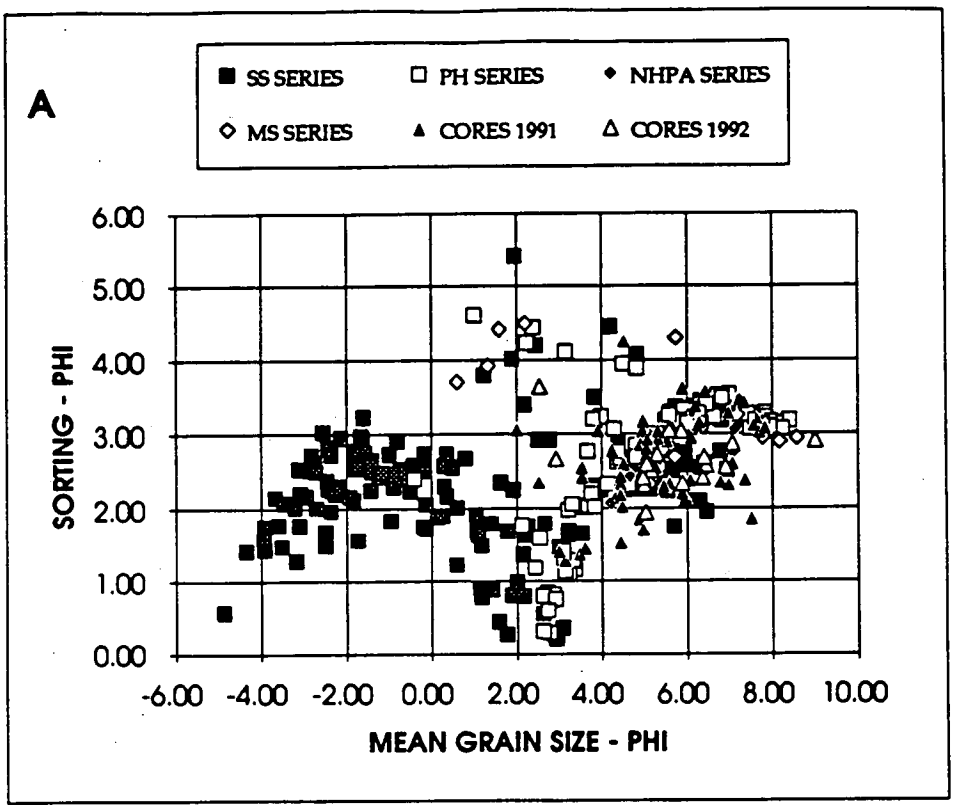
RESULTS AND DISCUSSION

General Textural Characteristics of the Estuarine Deposits

Grain Size Characteristics

Typical of previously glaciated environments, the grain size of the bottom sediments in the lower Great Bay/Piscataqua River Estuary range from large gravel size clasts to very fine-grained clays. The characteristics of the surficial sediments were described by Ward (1994) in an earlier report concerning the sediment distribution in the lower Estuary. In this report, the results of the textural analyses of the samples collected from the coring program have been included. However, the inclusion of the subsurface samples does not change the overall characteristics of the sediments from the lower Estuary. The gravity cores obtained during the present research are relatively shallow (less than 2 m) and are composed of the same sediment populations. Therefore, parts of the discussion from the earlier report (Ward 1994) are repeated here.

The mean grain sizes (Fig. 5) of the sediment samples range from -4.87 phi (gravel) from a channel deposit to 9.00 phi (clay) from a core (~93 cm depth) taken in Clark Cove (PH 7). Appendix 2 contains the grain size statistics, as well as the moisture and LOI contents, of all samples analyzed. The definition of phi units, the conversions to millimeters, and the associated sediment sizes are given in Table 1. The sorting of the sediments (Fig. 6) is extremely variable ranging from 0.20 (very well sorted) to 5.41 phi (extremely poorly sorted). Some of the best



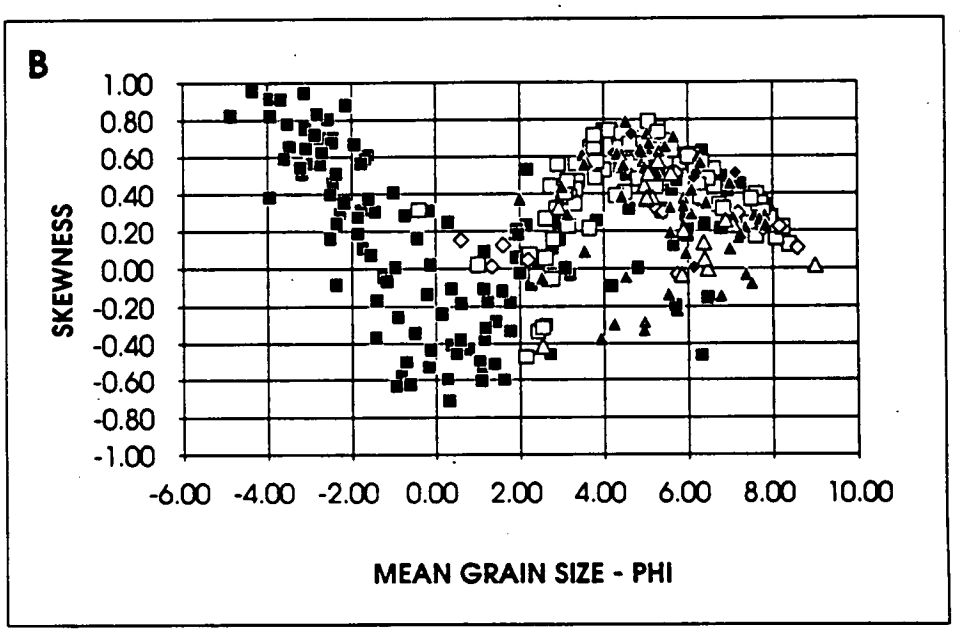


Figure 5. Binary plots of mean grain size and sorting (A) and mean grain size and skewness (B) of all sediment samples from the lower Great Bay/Piscataqua River Estuary.

TABLE 1. GRAIN SIZE SCALES

Size - PHI*	Size - Millimeters	Wentworth size class
-8.0	256	Gravel (boulder)
-6.0	64	Gravel (cobble)
-2.0	4	Gravel (pebble)
-1.0	2	Gravel (granule)
0.0	1	Sand (very coarse)
1.0	0.5	Sand (coarse)
2.0	0.25	Sand (medium)
3.0	0.125	Sand (fine)
4.0	0.0625	Sand (very fine)
5.0	0.031	Silt (coarse)
6.0	0.0156	Silt (medium)
7.0	0.0078	Silt (fine)
8.0	0.0039	Silt (very fine)
9.0	0.0020	Clay
10.0	0.0098	Clay
11.0	0.00049	Clay
12.0	0.00024	Clay

* PHI = $-\log_2$ (diameter of the particle in millimeters)

sorted sediments are the sandy deposits found in Pepperrell Cove, Little Harbor and in York River; conversely, some of the poorest sorted sediments are from the gravelly or sandy gravelly deposits in the Back Channel behind the PNS or from the main channel in front of PNS. Skewness values range from strongly fine-skewed (0.95) to strongly coarse-skewed (-0.71). The coarser sediments (larger than -2 phi) and the finer sediments (smaller than 3 phi) tend to be positively skewed, indicating the poor sorting of these sediments is due to finer-grained sediments. Conversely, the sediments in the intermediate sizes (-3 phi to 3 phi) tend to be negatively skewed or close to zero. The negative skewness indicates that any poor sorting is due to the inclusion of coarser-grained sediments.

The binary plot of mean grain size versus sorting has a sinusoidal pattern which is characteristic of environments which have three main sizes of sediments composing the deposits (Fig. 5). Folk (1980) indicated that most natural sediment particles fall within three size groupings: gravel between -3 to -5 phi, fine sand between 2 to 3 phi, and clay around 10 phi. Sediment populations tend to be composed of one of these size groupings or are a mixture of the sizes. Although this natural grouping of sediments is debated (Royse 1970), it is interesting to note that the sediments of the lower estuary indicate the existence of these three main populations of sediments. The size analyses of the sediment samples from the lower Estuary show that the sorting (standard deviation) improves for mean grain sizes around -3 to -5 phi and around 2 to 3 phi. Although no samples plot around 10 phi with a low sorting coefficient, it appears that very-fine grained sediments in that range are contributing to the samples as indicated by the positive skewness for samples with means from 6 to 8 phi. These results indicate that the sediments in the lower estuary are composed of the three sediment populations described by Folk (1980).

Moisture, Total Organic Matter, and Total Organic Carbon

Moisture and total organic matter (TOM) were measured on most of the samples collected during this study for both the surficial and subsurface samples. Similar to the grain size analyses discussed above, the results of the moisture and TOM analyses for the surficial sediment samples collected in the lower estuary have been reported previously in Ward (1994). In this report, the results for the surficial, as well as the core, samples are included. However, the overall trends in moisture and TOM given for the surficial samples in the earlier report are true for the subsurface samples as well. Therefore, relevant portions of the earlier discussion from Ward (1994) are included here. In addition, the results of the total organic carbon (TOC) analyses were discussed for both the surface and subsurface samples in the earlier report. This discussion is important to the data presented here and is repeated as well.

Moisture and total organic matter (TOM), as measured by loss on ignition (LOI), were determined on splits of the samples collected for grain size analyses at all of the PH, YR and NHPA series of stations and most of the SS series. The moisture and LOI content were not measured on splits of the samples taken for grain size analyses from the salt marsh stations (MS series). Instead, moisture and LOI were determined at 4 cm intervals in short cores (10 to 20 cm) taken in the marshes and the means for the entire core used to obtain a representative LOI for the station. The samples for grain size analyses were taken from the surfaces of these cores (Appendix 2).

It should be noted that determinations of moisture content of coarser sediments can be problematic due to sampling techniques. Grab samplers collect both the bottom sediments and the overlying water, which often mix when removed. Conversely, coarser sediments do not hold water well, allowing moisture content to be reduced while stored in the sample bag, etc. Similarly, determinations of %LOI can be difficult to measure accurately for coarser grained sediments due to the heterogeneity of the organic debris in many samples. Care was taken to avoid these problems, however, moisture and LOI results of the sediments greater than coarse silt should be viewed with caution.

The moisture content of the samples ranged from 0.3 to 78.8% and varied directly with mean grain size, with the finer sediment sizes having higher moisture contents (Fig. 6). The LOI contents range from 0.3 to 42.6%, also varying directly with grain size (finer sediments having higher LOI or total organic matter). For both moisture and LOI, the highest values occur in the marshes, while the lowest in the coarse grained channels. Finer grained sediments tend to have higher moisture contents because of the ability of clay particles to hold water (Grim 1968). Finer grained sediments tend to have higher LOI concentrations because the substrate is typically anoxic below a few millimeters, decreasing the rates of oxidation of the organic matter. Consequently, moisture and LOI tend to covary with each other (Fig. 7).

The binary plot of LOI and mean grain size indicates a positive, linear relationship at mean grain sizes from approximately 2 phi to 9 phi for subtidal sediments (SS, PH, and the NHPA series). At larger grain sizes (~-5 to 2 phi), the %LOI is low, normally less than 2%. A small number of coarse-grained sites have LOI values reaching upward towards 5%. The higher values are probably due to the analytical problems discussed previously. The LOI values for the marshes (MS series) in the lower estuary depart from the subtidal sediments as expected and range from 9.1 to 42.6%. The %LOI of the marsh sediments does increase with smaller sediments (larger phi sizes), however, there is a great deal of scatter in the data. This is somewhat puzzling, but probably results from different depositional environments within the marshes being sampled (e.g. high marshes may have higher %LOI contents than low marshes, but the grain sizes may be similar).

Although the % LOI provides useful information concerning the TOM, it is not as precise a measurement as often is desired (as discussed previously in Methods). Also, it is not a measurement of % total organic carbon (TOC). Analysis of sediment samples via gas chromatography is a much more accurate measure of TOC, albeit far more time consuming and expensive. Therefore, 43 samples from the PH surficial sediments and cores were selected and analyzed using both gas chromatography and simple weight loss on ignition in order to determine the relationship between % LOI content and % TOC (Fig. 8A and Appendix 3). The relationship between these parameters has to be determined for each system being studied due to variations in the effects of diagenesis and grain size, as well as analytical procedures (Craft et al. 1991).

Results of a least squares analysis of the two variables showed that:

$$\%TOC = (0.245 \pm 0.168)(\%LOI) + (0.244 \pm 0.019) \qquad (1)$$

with a $r^2 = 0.807$.

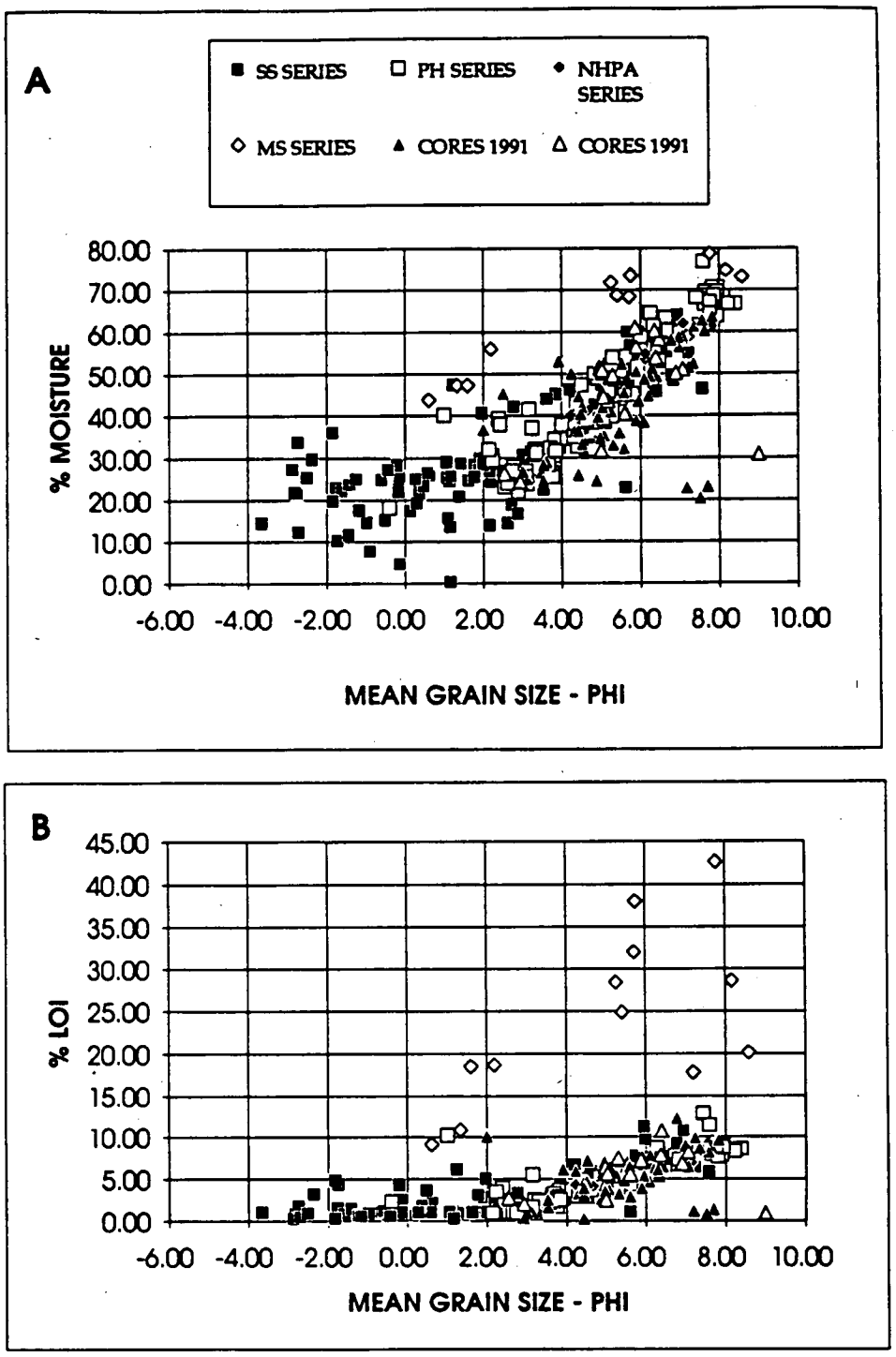


Figure 6. Binary plots of mean grain size and % moisture (A) and mean grain size and %LOI (B) of surficial sediment samples from the lower Great Bay/ Piscataqua River Estuary.

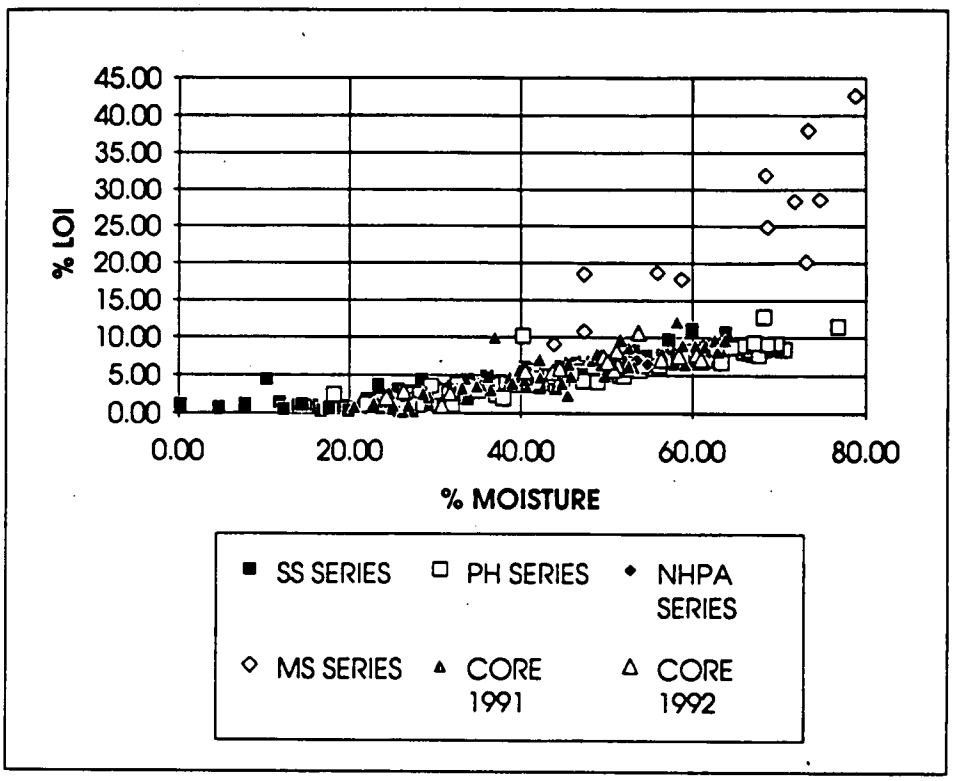
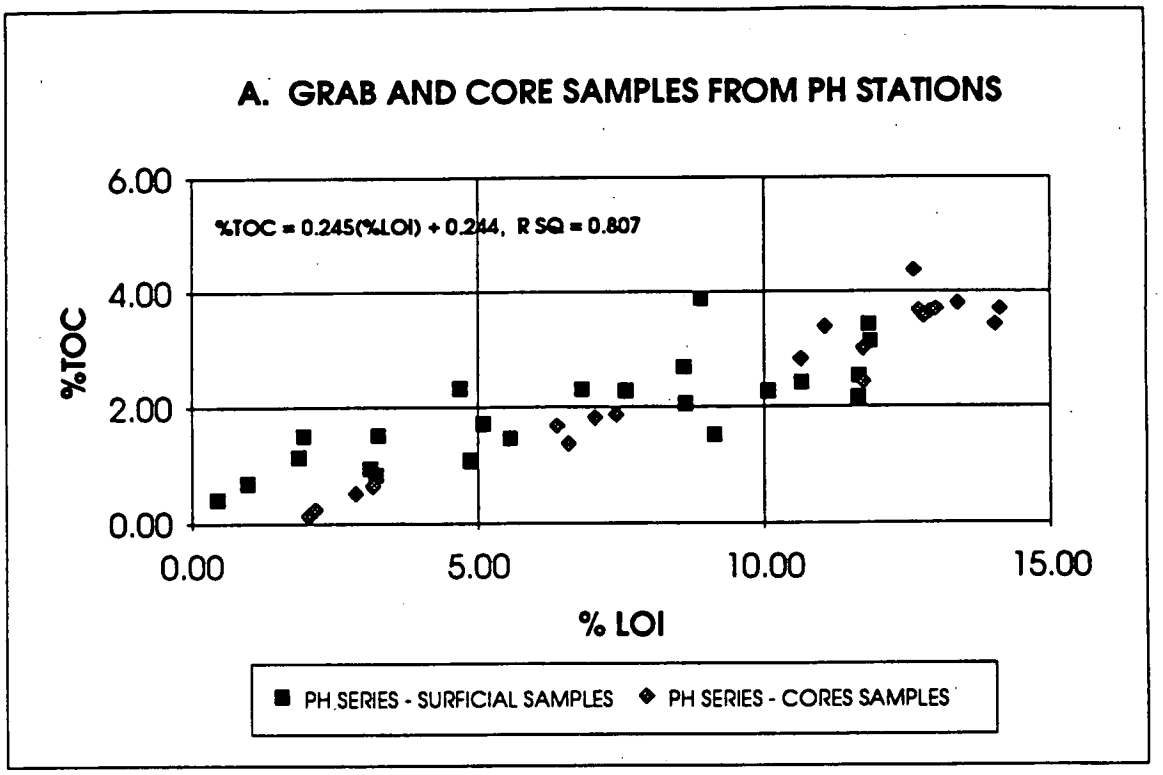


Figure 7. Binary plot of % moisture and % LOI of surficial sediment samples and cores from the lower .Great Bay/Piscataqua River Estuary.



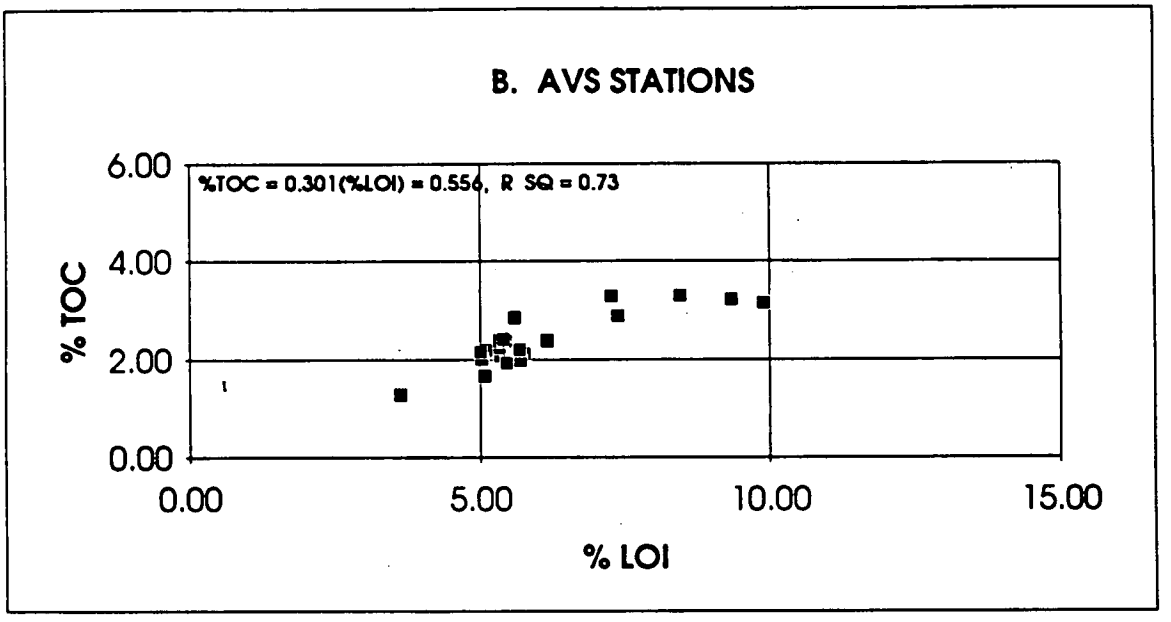


Figure 8. Total organic carbon (TOC) and % LOI content of surficial sediment samples and of cores (A) from PH stations and from AVS stations (B) taken in the lower Great Bay/ Pisacataqua River Estuary.

The results of equation (1) indicates the TOC composes ~25% of the LOI or TOM. The total organic carbon (TOC) content is normally considered to be on the order of 45% of the total organic pool, as measured by LOI (Nixon 1980, Craft et al. 1991, Zhang et al. 1993). However, Craft et al. (1991) cited factors (defined as TOC/LOI) ranging from 0.22 to 0.52 have been used to estimate the TOC content of the LOI concentrations. The slope of the regression line (Equation 1) indicates the TOC content is considerably less than expected, based on the molecular composition of organic matter (e.g. emergent marsh vegetation TOM is ~42 to 45 % organic carbon, Craft et al. 1991).

In order to assess whether the unexpectedly low slope or factor is a result of analytical errors, two additional experiments were conducted. First, an interlab calibration between Jackson Estuarine Laboratory (JEL) and the Environmental Research Laboratory Narragansett (ERLN) was conducted where splits of samples collected for acid volatile sulphur (AVS) determinations were analyzed for TOC (both labs using a Carlo Erba). Secondly, 21 AVS samples had % LOI and % TOC determined on the same splits and a regression analysis conducted. The % TOC was determined on 2 to 3 replicas of each sample by ERLN, % LOI was determined by JEL.

Results of the interlab calibration show relatively good agreement between analyses run at JEL and at ERLN (Fig. 9). The least squares analysis of the data using the ERLN values as the dependent variable yields the following equation:

$$\% \, TOC_{ERLN} = (1.122 \pm 0.252)(\%TOC_{JEL}) - (0.440 \pm 0.684) \qquad (2)$$

with a R^2 of 0.711. The slope of the regression line is close to one, indicating the analyses are nearly identical. The scatter in the data, as indicated by the lower than expected R^2 value, results from the small range of TOC analyzed.

The least squares analyses of the AVS samples (Fig. 8B) to determine the relationship between % LOI and % TOC yields the following equation:

$$\% \, TOC = (0.301 \pm 0.041)(\%LOI) - (0.556 \pm 0.260) \qquad (3)$$

with a R^2 of 0.734. The mean of the 2 to 3 replicas for each sample was used in the least squares analysis, however, using all the values gave very similar results. The slope of the regression line is again lower than expected (as in equation 1), verifying the original analyses. Therefore, the low factor for these samples appear to be consistent.

The regressions for the lower Great Bay/Piscataqua River Estuary samples (equation 1 and 3) indicate that between 25 to 30% of the LOI is organic carbon (based on the slopes or factors of 0.245 and 0.301). The lower slope of the regression indicates a smaller fraction of the TOM pool was composed of organic carbon, perhaps due to diagenetic alterations. However, the lower slope may be an artifact of the analytical procedures used during the present study. The samples were not leached with acid prior to TOC analysis to remove any inorganic carbon. However, the inorganic carbon content of most of the samples was low and not likely a problem (although this can not be discounted entirely). More likely, the lower slope represents an inherent problem with determining LOI of sediments with high clay contents. Combusting clay rich samples causes structural water loss, mistakenly increasing LOI values (Mook and Hoskin

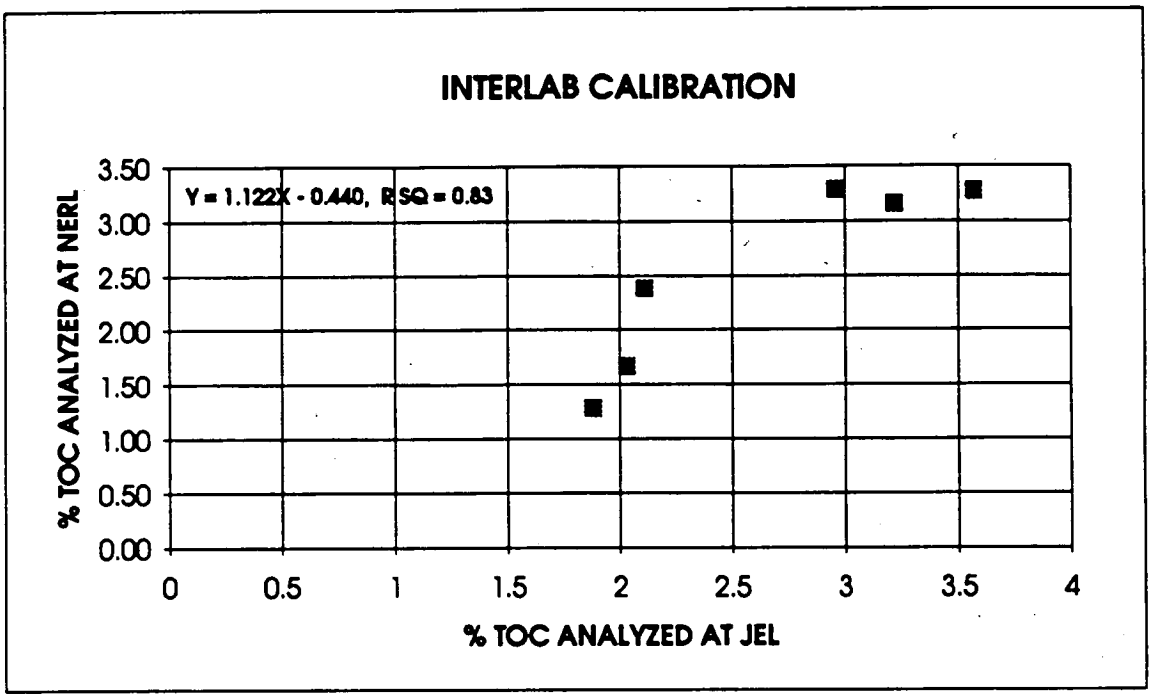


Figure 9. Results of the interlab calibration conducted at JEL and ERLN on samples from the AVS stations in the lower Great Bay/Piscataqua River Estuary.

1982). This analytical problem may partially explain why the intercept is not zero in the regression analyses.

Therefore, the results of this work shows that the TOC content of estuarine sediments has to be determined for the area under study. Using previously reported factors from the literature may introduce errors when predicting TOC from LOI. However, if a regression formula is established for the study area, then the TOC can be reasonably predicted from the LOI analysis.

Depositional Systems in the Lower Great Bay/Piscataqua River Estuary

The lower Great Bay/Piscataqua River Estuary in the vicinity of the PNS is composed of several large depositional systems and a number of smaller areas where sediments have accumulated. Large depositional systems include: 1. Clark Island Embayment, 2. Spruce Creek Embayment, 3. Pepperrell Cove Embayment, 4. Sagamore Creek/New Castle Embayment and 5. Outer Cutts and Inner Cutts Cove Embayments. Smaller depositional systems are found along the coves that border the main channels including the Piscataqua River and the Back Channel.

The main sources of information concerning the depositional systems in the lower estuary are the seismic survey, the surficial sediment samples and the gravity cores collected during this study, as well as a few scattered well logs from bridge borings. For the most part, these logs are confined to the perimeter of the estuary and are not very detailed, limiting their value. An exception to this is a tightly spaced grid of cores taken in Outer Cuts Cove for the New Hampshire Port Authority for their port expansion project (Macguire Group Inc. 1992). These cores provide details which can be used as a model for the fine-grained embayments. Based on this information, the sedimentological characteristics of each of these depositional systems are described in the following sections.

Clark Island Embayment or Clark Cove

Results of the surficial sediment mapping program has shown that some of the finest grained sediments found in the Great Bay/Piscataqua River Estuary occur in the embayment which was created by construction of the causeway between Clark Island and Seavey Island in the early 1960s (Fig. 10 and 11) referred to in this study as either clark Island Embayment or Clark Cove. In addition, filling of the tidal flats during this same period behind and adjacent to Jamaica Island enclosed three sides of the embayment. Prior to the man made alterations to the system, it is likely the embayment was subjected to much more rapid flushing and sedimentation rates were lower.

The surficial sediments in the embayment are composed of muds which appear to form a subparallel belt around the shoreline, enclosing sandy muds towards the interior of the cove (Fig. 11). These coarser sediments (sandy muds) towards the interior may be an artifact of the dredging of the central channel in the early 1960s. Mean grain sizes of the surficial sediments range from 4.90 phi near the entrance to the embayment on the northern side (station PH 3) to 8.40 phi nearer to Clark Island on the south side at station PH 4. Most of the surficial sediments have a mean grain size between 7.5 to 8.0 phi. The %LOI for Clark Cove ranges from ~4 to ~9%.

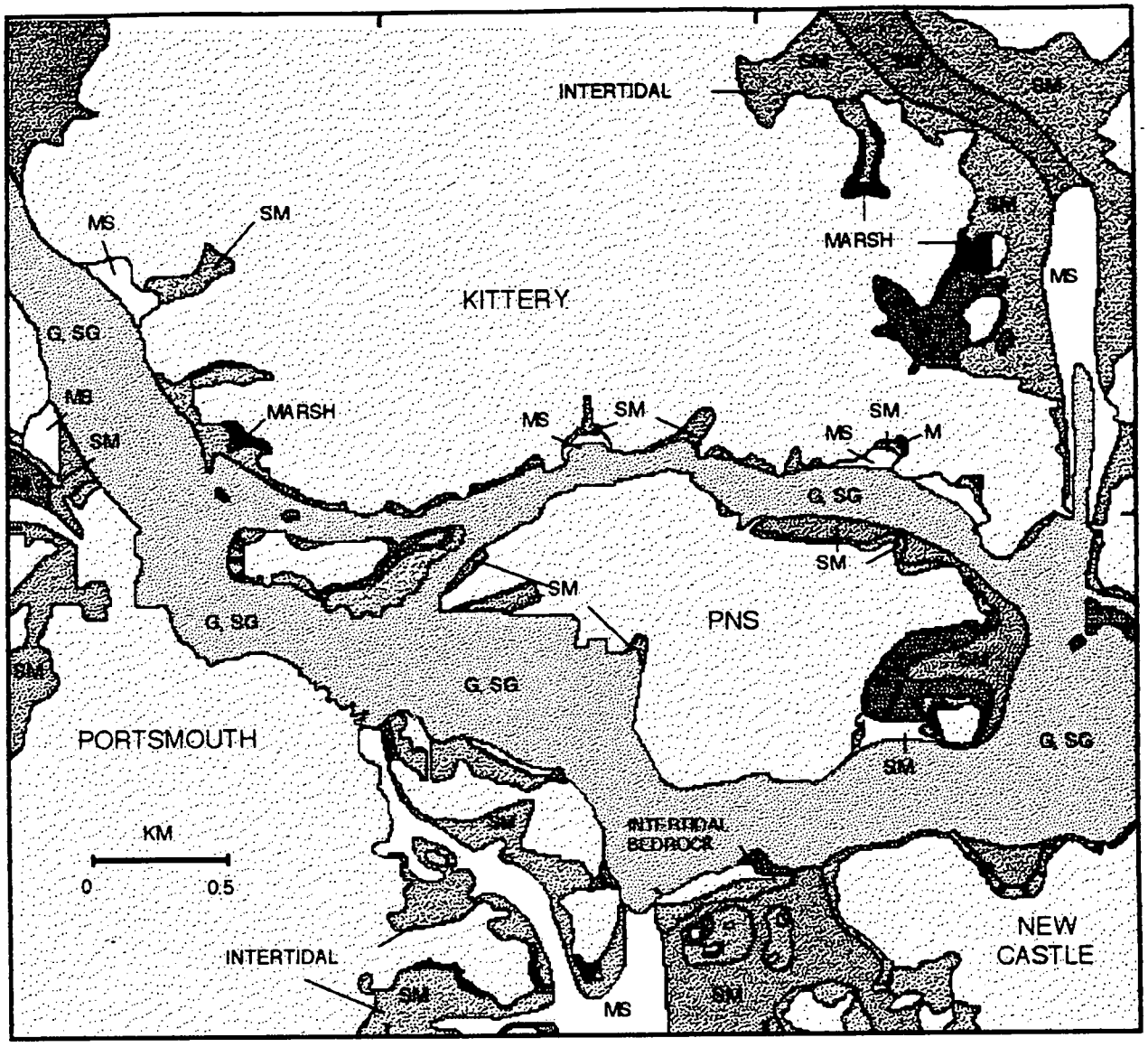


Figure 10. Surficial sediment distribution map for the lower Great Bay/Piscataqua River Estuary. The grain size classification is based on Folk (1954). Abbreviations used on the map include G (gravel), SG (sandy gravel), MS (muddy sand), SM (sandy mud), and M (mud). Marshes are shown in green. Intertidal areas are slightly lighter in color or have more texture than adjacent colors. The seaward boundaries of the intertidal areas are shown by solid black lines.

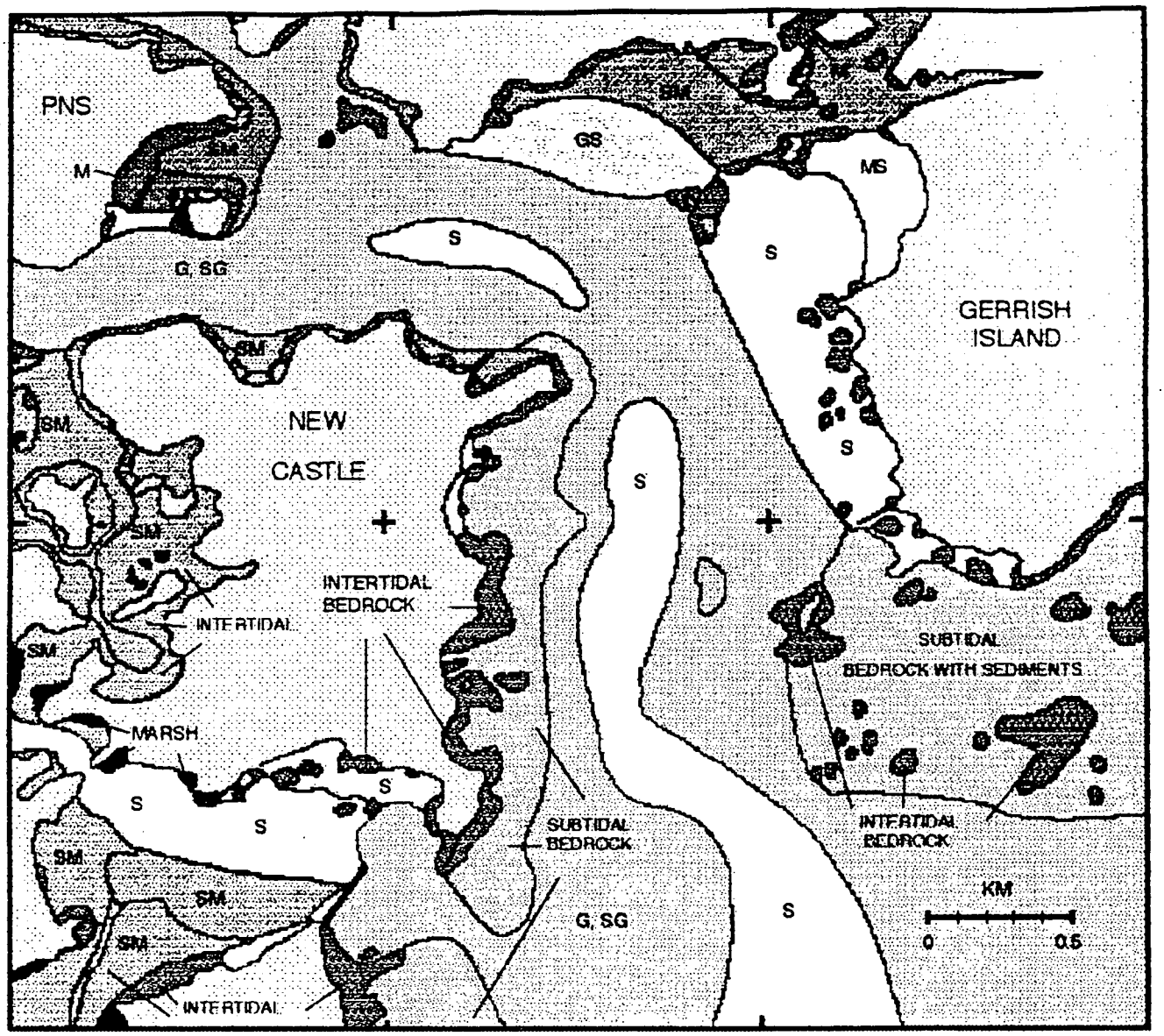


Figure 11. Surficial sediment distribution map for the lower Great Bay/Piscataqua River Estuary. The grain size classification is based on Folk (1954). Abbreviations used on the map include G (gravel), SG (sandy gravel), S (sand), MS (muddy sand), SM (sandy mud), and M (mud). Marshes are shown in green. Most intertidal areas are slightly lighter in color or have more texture than adjacent areas. The seaward boundaries of the intertidal areas are shown by solid black lines. Intertidal bedrock is shown as black. Subtidal bedrock with a thin veneer of scattered sediment is shown as grey.

The side scan sonar survey of Clark Cove shows the surficial materials are generally fine-grained, as indicated by the very light color and the smooth texture of the sonagraphs. The exception to this occurs at the entrance where the sonagraph color darkens and the texture becomes rougher, indicating coarser sediments. Just seaward of the entrance the estuary floor is composed of bedrock or gravelly material, reflecting the extremely strong tidal currents that flow just offshore of the entrance to the embayment.

The subbottom seismic profiles of Clark Cove Embayment confirm the existence of a central basin that is presently filled with sediments. The seismic record indicates a strong reflector forming the base at a depth of ~16 m below present sea level, which is probably either bedrock or perhaps till. Directly overlying the basal unit is a layered deposit that is approximately 5 m thick, truncating at ~11 m below present sea level and composed of subparallel reflectors that drape over the underlying bedrock or till. This deposit is interpreted as the Presumpscot Formation (a glacial marine deposit composed of dominantly muddy to sandy muds between ~13,000 to 8,000 years in age). This unit, along with basal till or bedrock, is used in this study to define the boundary between the older Pleistocene deposits and the more recent Holocene sediments. Based on the interpretation of the subbottom seismic record, the top of the Presumpscot Formation is at ~11 m below present sea level. In the early 1960s, Clark Cove embayment was dredged to ~ 11 m to create a sounding basin for the Navy. The Presumpscot originally may have been thicker, but was truncated during these dredging operations. During the present geophysical survey, a seismically translucent deposit with no internal reflectors was found lying directly on top of the Presumpscot deposit. This translucent layer, which is ~ 4 to 5 m thick near the center of the basin, is interpreted as recent estuarine fine-grained sediment deposition. If Clark Cove was dredged to a depth of 11 m in 1963 and 4 to 5 m of fine-grained sediments have been deposited since dredging, then the sedimentation rates would be on the order of 13 to 16 cm/yr for the last 30 years. This rate seems unrealistically high, and may reflect other processes such as slumping. The sedimentation rates and processes warrant further investigation.

A series of short gravity cores at the PH stations around the perimeter of Clark Cove provide information concerning the shallow stratigraphy. Core PH 3, which was taken at the entrance to the embayment on the north side, is composed of a shallow veneer of sandy mud to muddy sand ~ 17 cm thick. Penetration of the gravity corer was limited to 17 cm, indicating the underlying sediments were very dense and were composed of either sands and gravels or the Presumpscot Formation. The sediments adhering to the nose cone of the core appeared to be of the Presumpscot. A core taken at station PH 7 at the western side of the cove was composed of ~35 cm of mud overlying the Presumpscot Formation. Core PH 6 was composed of 5 cm of mud over the Presumpscot. The other 3 cores collected in Clark Cove did not contain Presumpscot sediments at the base and were primarily composed of muds or muddy sands. However, the muddy sediments may have been overlooked on the nose cone in the field. Based on these gravity cores, which were taken in less than ~ 8 m of water around the perimeter of Clark Cove, it appears that a thin veneer of fine-grained sediments (muds to muddy sands) overlie the Presumpscot Formation at the edge of the embayment. Towards the center of Clark Cove, the Holocene muds and the Presumpscot Formation thickens appreciably to over 4 to 5 m for each unit.

Unfortunately, the seismic equipment used during the present study was not powerful enough to penetrate coarser sediments. Also, the rapidly changing and shallow water depths

within the embayment made seismic work difficult, decreasing the quality of the records and our ability to interpret the subbottom structure of the basin. The boundary of the basin on the southern side is ambiguous as the seismic record does not clearly indicate whether the bottom is extremely hard and composed of bedrock or the deeper central basin extends to the causeway. Additional problems with the seismic record may be caused by gas in the sediments, which is common for estuarine deposits. Resolution of detailed stratigraphy of the basin will require obtaining longer cores which will penetrate the Holocene sediments and the Presumpscot Formation at several locations.

Spruce Creek Embayment

Spruce Creek is a relatively large embayment stretching ~4 1/2 km along a north-south axis located just north of the PNS. However, the maximum width of Spruce Creek is just over 1 km. The entrance to Spruce Creek is narrow (less than ~0.15 km) and the entire tidal prism is transported through this narrow opening. Consequently, Spruce Creek appears to trap most of the material introduced into it. The surficial sediments in Spruce Creek are dominated by sandy muds to muds reflecting the relatively low wave and tidal energies. The exception to this occurs at the entrance to Spruce Creek where a gravelly to sandy gravel channel continues from the Piscataqua River into lower Spruce Creek. A muddy sand extends from the coarser channel deposits; however, the coarser sediments are confined to a central channel. In the upper half of the embayment and in the coves which line the perimeter of Spruce Creek, the sediments are dominated by a sandy mud to mud. Several small marsh systems are found within the embayment. The grain size of the subtidal sediments range from -0.43 phi in the lower to channel to 7.57 phi in the upper embayment. The sediments sampled at three sites in a marsh near Admiralty Village in the lower embayment are the expected fine muds, ranging in size from 7.77 phi to 8.17 phi. The % LOI of the subtidal sediments are between ~4 to ~7%, with the exception of the coarse channel which is less than 1%. The marshes LOI range from 12 to 59 %, increasing in a landward direction as the depositional environment changes from low to high marsh.

Very little subsurface information exist for Spruce Creek. A seismic survey was not possible during this study because of the shallow depths found in the embayment. However, two gravity cores (PH 20 and PH 21) in lower Spruce Creek indicate the fine grained sediments extend to a depth of at least 1 m. PH 20 has 40 cm of muddy sand overlying sandy mud. The mean grain size, however, varies little, ranging from 5.08 to 4.88 phi. LOI ranges from ~2 to ~4%. Core PH 21 is a sandy mud throughout ranging from 4.98 to 5.89 phi in grain size and ~2 to ~5% LOI.

Pepperrell Cove Embayment

The area referred to in this report as Pepperrell Cove includes the area from Kittery Point to Gerrish Island. The area can conveniently be divided into three large embayments; an western and eastern embayment at the entrance, separated by a series of bedrock islands (Gooseberry and Fishing Islands) and an embayment in the rear of the system which leads into Chauncey Creek. Two smaller coves are located in the back near the entrance to Chauncey Creek.

The western embayment is diverse sedimentologically grading from gravelly sands at the entrance to sandy muds closer to land. Mean grain sizes range from 0.6 phi at the entrance to 7.0 phi closer to Gooseberry Island. A cove situated at the northeast corner of the western embayment was not sampled, but is presumed to be composed of sandy muds. The total organic matter (LOI) ranges from less than ~2% to ~8.2%, increasing as the sediments become finer in a landward direction. Unlike the eastern embayment, which is largely intertidal, the water depths are deeper in the western embayment. Although seismic information is limited for Pepperrell Cove because of the overall shallow depths, a survey line located near the entrance to the western embayment indicated a channel shaped cut, filled with ~6.5 m of sediments. A preliminary interpretation of the present bathymetry, the geomorphology of the entire cove and surrounding area and the very limited seismic information indicates the western embayment is a small stream valley, Pleistocene (or earlier) in age. The valley was partially filled as sea level rose either with glacial marine sediments associated with the Presumpscot Formation or more recent estuarine fill. However, deeper water depths still exist. This hypothesis needs to be verified.

The eastern embayment is composed of sandy sediments towards the entrance, but fines landward to sandy muds and has a large eelgrass bed covering the central portion. The eastern embayment is largely intertidal, exposing large muddy sand flats at low tide. The mean grain sizes of the sediments near the entrance to the western embayment range from 1.6 phi to 3.0 phi (near the middle of the embayment). LOI values in this area are low, as expected, in sandy sediments, remaining below ~1 %. A short gravity core (25 cm) taken within the eelgrass bed at station PH 1 in the eastern embayment indicates the sediments are composed of sandy muds at least to the bottom of the core.

The relatively clean sands located at the entrance to the eastern embayment reflect the high energy conditions that exist in this area. Extremely strong tidal currents occur in the main channel of the Piscataqua River, winnowing all the finer grained sediments. In addition, the location and orientation of the eastern embayment allows more wave energy originating on the inner shelf to impact the entrance area.

The area close to the entrance to Chauncey Creek in the rear of Pepperrell Cove is dominated by sandy muds, with the exception of a sandy gravel bottom in the channel at the entrance to Chauncey Creek and a muddy cove located to the west of Phillips Island. The bottom sediments at station SS 53 in the cove on the western side are muddy with a mean grain size of 6.5 phi. LOI content is 7.6%. Although grain size data is not available, a 94 cm long gravity core (Core 100) taken near the entrance of the cove indicates the fine grained sediments are at least a meter thick in this area. Conversely, a gravity core taken within the cove (Core 101) indicates the muddy Holocene sediments are thin (~ 20 cm thick), overlying shelly sandy material of unknown age and origin.

The cove on the northeastern side of the embayment is apparently composed of sandy muds, although the number of stations sampled is small (2). The mean grain size of station SS 51 is 5.4 phi and the LOI is 6.0 %. A 41 cm gravity core (Core 51) taken near the entrance of the cove has similar grain size statistics, however, initial examination of the core indicates the grain size decreased with depth, becoming muddier.

Sagamore Creek/New Castle Embayment

The embayment formed by Portsmouth, Pierces Island, Goat Island, New Castle, and Little Harbor is one of the largest depositional systems in the lower estuary, extending ~4 km from the entrance at Little Harbor to the main stem of the Piscataqua River. Although there are some coarse sediments in the embayment, the bulk of the substrate is composed of sandy muds to muds, indicating tidal and wave energy is low. The coarser sediments are found on the middle and north side of Little Harbor, where sands dominate, and along the channel that extends between Portsmouth and New Castle and into the Piscataqua River. The mean grain sizes of the sediment samples from sampling stations located in the channels range from 0.4 phi to 4.6 phi. Some sandy gravels occur near bedrock outcrops and in the channel extending between the jetties extending from Little Harbor and between Pierces and Goat Islands (mean grain sizes range from -3.7 to 3.8 phi in these areas). The rest of the subtidal and intertidal areas appear to be composed of sandy muds and, in a few isolated areas, muds. Mean grain sizes range from 4.2 phi to 6.9 phi. The LOI of the finer grained subtidal deposits range from 1.1% to 11.2%, but are mostly over 6%. In addition to the extensive subtidal to intertidal fine-grained deposits, several salt marshes are located within the embayment. The marsh on the southern tip of Shapleigh Island was sampled in three locations along a transect. The grain size ranged from 1.6 to 5.8 phi and had from 24% to 42% sand and from 0% to 30% gravel. The average LOI of the marshes varied from 18.5% to 24.9%. The relative coarseness of these marsh deposits betrays the influence of local sources of coarse-grained sediments and wave action, presumably during storms.

In general, Sagamore Creek/New Castle Embayment appears to be trapping fine-grained sediments that are transported into the system. However, no information is presently available concerning the thickness of these deposits. The system was to shallow for a seismic survey to be conducted during the present study and only one shallow core was taken in the embayment. Gravity core PH 11 was taken in a eelgrass bed just off the southern end of Shapleigh Island, in a channel extending behind Pierces Island to the Piscataqua River. The sediments are coarser-grained at this site, consisting of muddy sands from the surface down to at least to 70 cm (maximum penetration of the core). The mean grain sizes of three samples taken near the surface, from 20 to 28 cm and at 50 to 58 cm were 4.5 phi, 3.5 phi and 4.4 phi, respectively.

This embayment, because of its proximity to the industries in the lower estuary and the potential for fine-grained sediment deposition, warrants further study.

Cutts Cove Embayment

Outter Cutts Cove, Inner Cutts Cove and the North Mill Pond composes a system which is characterized by fine-grained deposits that is referred to as the Cutts Cove Embayment in this report. This embayment has been extensively altered during the last century by anthropogenic activities including the following: 1. the construction of a railroad bridge/causeway which separated the outer portion of the embayment from the middle section (now referred to as Outer and Inner Cutts Cove, respectively) with only a small opening (~20 m) to allow for the exchange of the tidal prism, 2. the construction of a roadway with a small culvert between the North Mill Pond or landward most section from Inner Cutts cove, again allowing only a small opening to allow for tidal exchange and 3. the dredging of a channel to allow a submarine (USS Albacore)

to be moved to a site where it has become a museum. Consequently, the system has been dramatically altered by past activities. Furthermore, work is presently underway to extensively alter the Outer Cutts Cove area to allow for the expansion of the New Hampshire Port Authority. This will include dredging and filling operations to build new docking and associated facilities. As a result of these activities, the area will undergo extensive changes during the next several years, altering the findings presented here.

Surficial sediment sampling has been concentrated in Outer Cutts Cove, although several samples have been taken in Inner Cutts Cove and North Mill Pond. Textural data from seven of the stations in this embayment was provided by curtesy of the New Hampshire Port Authority. The surficial sediments in Outer Cutts Cove are composed of muddy sands to sandy muds. The two stations located on the north side of the cove are muddy sands (3.5 phi and 4.2 phi), while the stations more in the central area of the cove are the sandy muds (5.7 phi and 6.1 phi). The stations located in Inner Cutts Cove are slightly finer, reflecting lower tidal and wave energies, and range from a sandy mud to a mud (6.1 phi to 7.1 phi). The %LOI range from 2.0% to 7.9%, with the finest sediments having the highest LOI values. Seaward of Outer Cutts Cove, the surficial sediments increase in size rapidly and are composed of sandy gravels to gravels. Essentially, Outer Cutts Cove is a large wedge of fine grained sediments that have been deposited within the more sheltered areas.

During this study, gravity cores were collected and analyzed from one location (PH 15). This station indicates the shallow subsurface sediments in Outer Cutts Cove are muddy sands to sandy muds to at least a depth of 110 cm (maximum depth of penetration). Textural analyses of four samples spaced relatively evenly down a core from PH 15 ranged from 4.9 phi to 7.2 phi and were coarser towards the surface. This coarsening upward sequence depicts the influence of wave and tidal action on the surficial sediments, as the finer sediments have likely been winnowed out. Visual observations and radionuclide analyses indicate the cores are heavily bioturbated by polychaetes.

Although the subsurface information obtained during the present study is limited, Outer Cutts Cove has been extensively cored to bedrock and the geotechnical properties of the sediments described in preparation for the New Hampshire Port Authority expansion project (Maguire Group Inc. 1993). According to this report, the subsurface at Outer Cutts Cove consists of bedrock, frequently overlain by glacial till and /or outwash or stratified sands, silts and clays). Above this base, estuarine fill sediments occur that can exceed 10 m in thickness and are composed of mixtures of fine sands, silts and clays (referred to as organic silts or organic soils in the report). Cross sections provided in this report indicate a shore normal transect running from the railroad tracks seaward across the cove into the Piscataqua River consists of a landward thickening wedge (maximum of 10 m) of estuarine sediments (described as loose gray organic silt with traces of fine sand, clay and shells), overlying stratified deposits (described as medium dense/very dense silty fine/coarse sand, with trace gravel), with till (described as medium dense/very dense silty fine/coarse sand and gravel with a trace of clay) and bedrock at the base. Although not always present, a stiff/very stiff gray silty clay is described in the report in several of the cores lying directly below the estuarine fill sequence. This grey clay is likely the Presumpscot Formation.

The entire sedimentary sequence (sediments above bedrock) is less than 15 m thick. The till and dense sands directly overlying the bedrock, as well as the Presumpscot Formation, are

Pleistocene glacial deposits. The Presumpscot Formation is on the order of 8,000 to 9,000 years old (Belknap et al. 1987). The Holocene or recent estuarine fill sediments overlying the Pleistocene have been deposited since the last transgression of the sea, presumably within the last few thousand years. Although presently there is not enough information available to determine if this sequence of sediments is representative of most of the coves and embayments in the Great Bay/Piscataqua River Estuary, it contains the basic elements described elsewhere and will serve as a conceptual model to be tested in future studies for the Pleistocene/Holocene deposits in the estuary.

Small Embayments Adjacent to Channels

Bordering the channels around the lower estuary are numerous small embayments or coves which are characterized by fine-grained subtidal to intertidal flats. These coves, collectively, represent a substantial area where fine-grained deposits are located. For example, the northern side of the Back Channel running behind the PNS is lined with small coves. When considering locations of muddy sediments and possible sites of contaminant deposition, these coves should not be overlooked. During the present study, many of these embayments were sampled and consistent similarities occurred. From this patten, a conceptual model of these small embayments has been developed. Typically, the surficial sediments become finer in a landward direction from coarse channel deposits (gravels to sandy gravels) outside the cove, to muddy sands, then sandy muds and in some cases to mud nearest shore. This sequence can, and frequently does vary, due to local sources of sediments (e.g. till).

To date, these coves have not been cored to determine the thicknesses of the sediments or the underlying materials. Based on geomorphic evidence, these coves are likely thin veneers of sediments overlying bedrock, glacial tills or stratified sediments or the Presumpscot Formation.

Sedimentation Rates

Sedimentation or accretion rates were determined on four cores collected during Phase 2 of this study using Pb-210 and Cs-137 analyses. The Pb-210 model for dating sediments (Faure 1977) calls for the influx of excess Pb-210 from the atmosphere to be constant, at least over the period of time the accretion rate is being determined, the sedimentation rate to be constant, and the sediment profile unmixed (by physical or biological processes). If these criteria are meet, then the natural logarithm of the Pb-210 activity will decrease linearly with depth and the slope of this line depends on the accretion rate. The accretion rate can be calculated from the slope of the regression line via the equation:

$$m = -\lambda/a \quad \text{or} \quad a = -\lambda/m \qquad (1)$$

where m is the slope of the regression line of the natural log of the Pb-210 activity (dependant variable) in decays per minute/gram dry weight of sediment (dpm/gdw), λ is the decay constant of Pb-210 (0.0311/year), and a is the accretion rate of the sediment profile over the sample interval.

The accretion rate, as well as the age of any sediment sample from depth z, can also be calculated from the Pb-210 profile without establishing a regression by using the following formulas:

$$t_z = (1/\lambda) \ln(\text{Pb-210}^0/\text{Pb-210}^z) \qquad (2)$$

where t is the age in years of the sample from depth z, Pb-210° is the activity of Pb-210 at the surface (or some location above Pb-210^z) in dpm/gdw, and Pb-210^z is the activity of Pb-210 at some depth z below the sediment surface. The accretion rate can be computed by from (2) by:

$$a = h/t \qquad (3)$$

where h (in this case) is the distance between measurements.

The Pb-210 profile of a core taken at station Ph-17, located on Badgers Island close to the western end of PNS, indicates the upper 4 to 5 cm of the sediment column is vertically mixed, as indicated by the increase in Pb-210 with depth (Fig. 12). However, core Ph-17 shows a linear decrease in the natural log of the activity below 5 cm to a depth of 15 cm (R^2 = 0.89). Using either equation (1) or (3), the accretion rate based on the Pb-210 profile is 0.28 cm/yr.

The Cs-137 activity profile for core PH 17 has a clear peak at 11 cm (Fig. 12): assuming this peak was caused by the 1963 maximum in atmospheric testing of nuclear bombs, then an accretion rate of 0.37 cm/yr is computed from:

$$a = h/t \qquad (4)$$

where h is the depth of the peak in Cs-137 activity in cm and t is the time in years between when the core was taken (1992) and 1963 (29 years).

Core 51 has a linear decrease in the natural log of the Pb-210 activity between 3 and 11 cm, below 15 cm the PB-210 activity essentially goes to zero (Fig. 13). The accretion rate of this location based on the Pb-210 is 0.13 cm/yr. The Cs-137 profile shows a distinct peak at 5 cm, giving an accretion rate of 0.17 cm/yr (Fig. 13), which is in good agreement with the rate derived from the Pb-210 profile. This rate of deposition is also in excellent agreement with local sea level rise, which is 0.15 to 0.20 cm/yr (Hicks et al 1983).

Core Ph-19, taken from an eelgrass bed on the northwestern end of PNS in the Back Channel, shows a considerable amount of scatter in the Pb-210 profile (Fig. 15), indicating the sediment column has been disturbed (e.g. bioturbation or physical mixing). The accretion rate calculated from the slope of the regression line is 0.55 cm/yr: however, the regression line has a weak correlation coefficient (r^2 = 0.54). The Cs-137 profile has two peaks, one at 7 cm, the other at 15 cm/yr. It is not clear how to interpret the Cs-137 profile; nether peak is clearly the 1963 maximum. If the deeper peak is related to the 1963 event, then the accretion rate is on the order of 0.52 cm/yr. In this case, there is good agreement between the Pb-210 and Cs-137 rates. However, if the 5 cm peak was caused by the 1963 maximum, then the calculated accretion rate is 0.17 cm/yr. In view of the very weak regression line fit for the Pb-210 data and the ambiguity of the Cs-137 profile, the accretion rate for this site (0.5 cm/yr) is uncertain and should not be used without further verification.

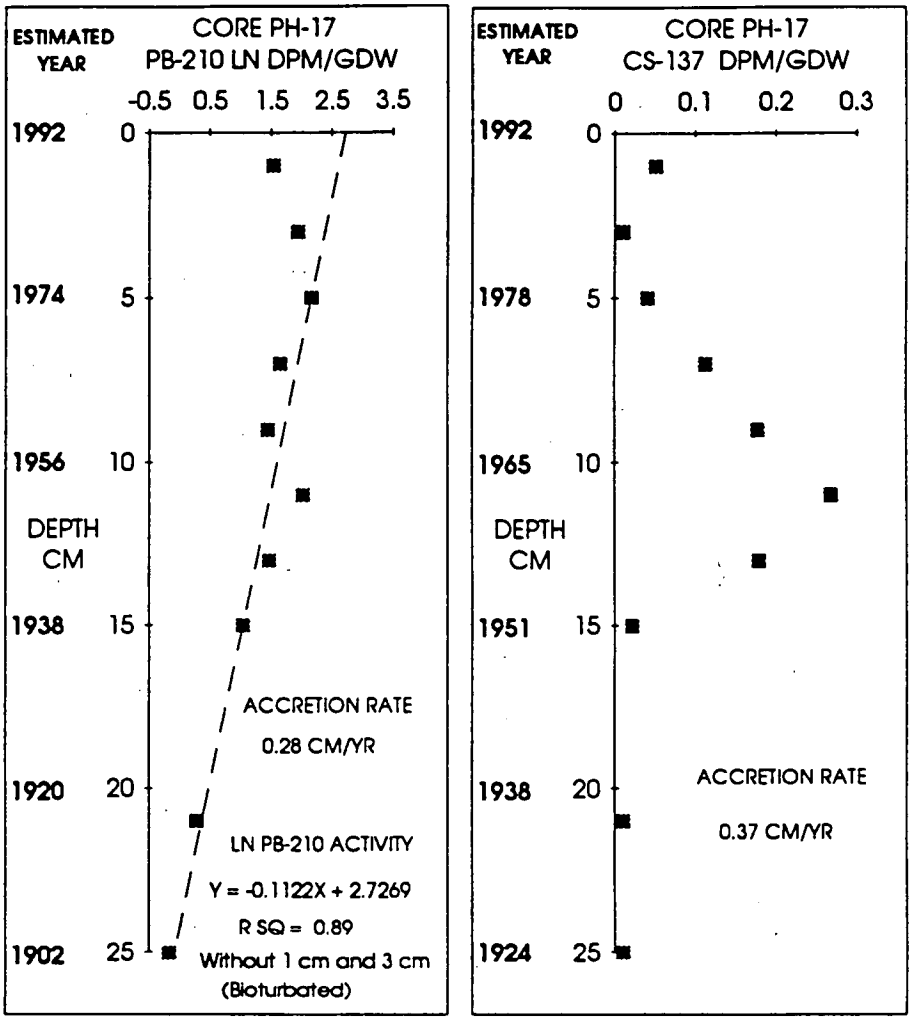


Figure 12. Pb-210 and Cs-137 profiles for core PH 17.

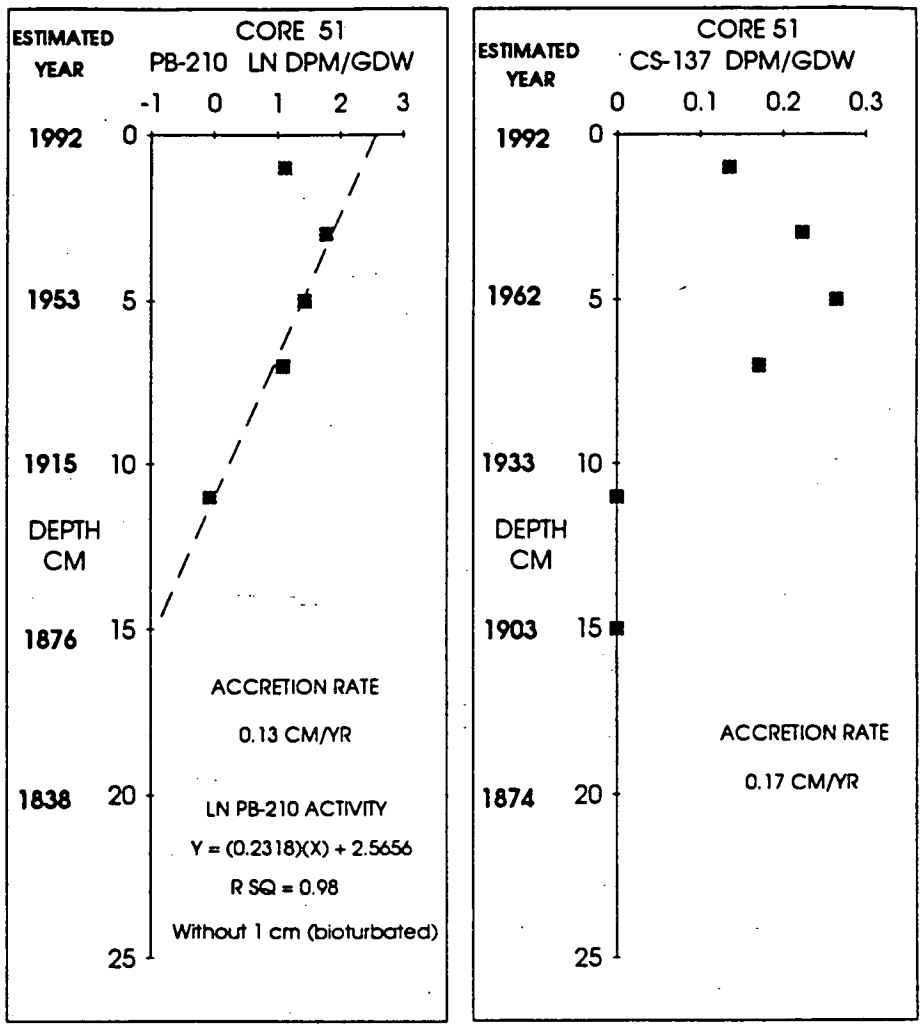


Figure 13. Pb-210 and Cs-137 profiles for core 51.

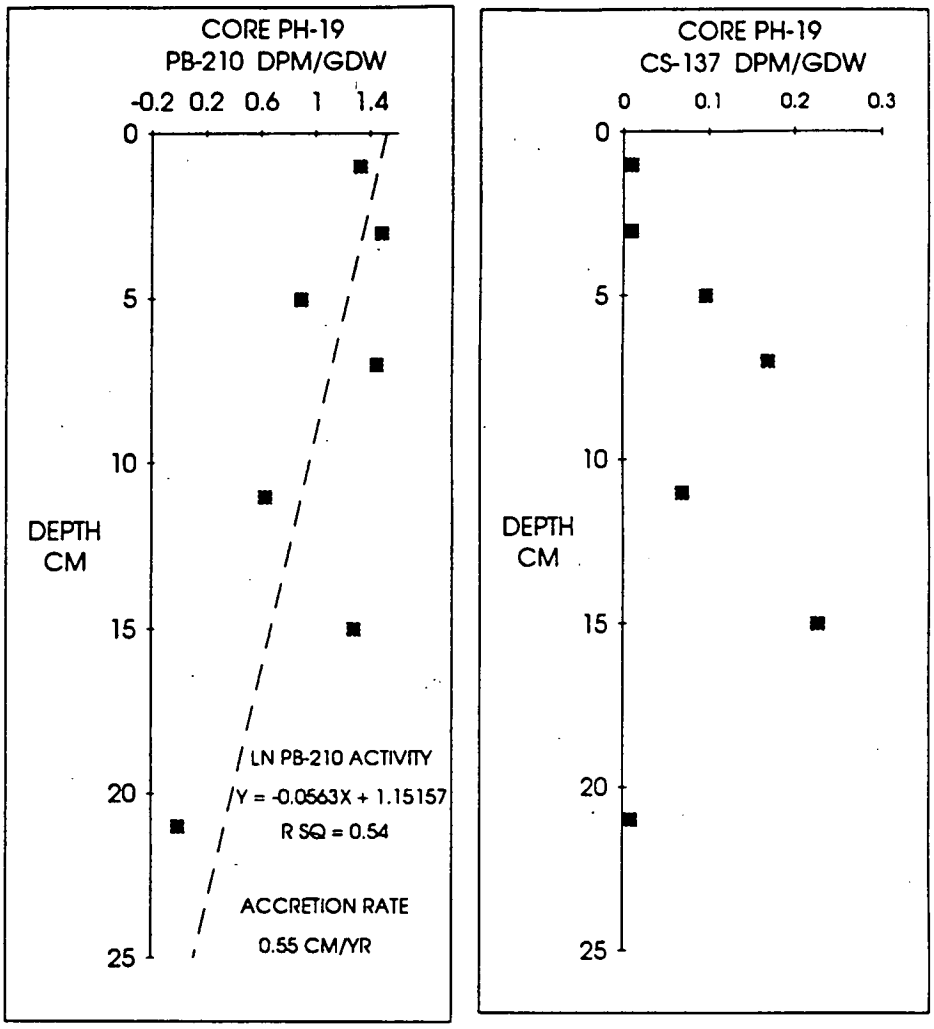


Figure 14. Pb-210 and Cs-137 profiles for core PH 19.

Similar to PH-19, the core taken at PH-2 (located near the U.S. Coast Guard Station in New Castle) has an interpretable Pb-210 profile, but a Cs-137 profile that indicates the sediment column is mixed (Fig. 15). The regression of the Pb-210 profile ($r^2 = 0.80$) yields an accretion rate of 0.24 cm/yr, the Cs-137 profile is scattered with no trends or peaks. The accretion rate based on the Pb-210 alone is reasonable; however, in view of the strong evidence of extensive mixing in the sediment column down at least of 30 cm, this accretion rate should only be considered tentative.

Sediment Mixing Depths

The Pb-210 and Cs-137 activity in the cores from Clark Cove embayment (PH 3 and PH 7) changed little from the surface to 40 cm and 25 cm depths (respectively), indicating the sediment columns were extremely vertically mixed (Fig. 16 for PH 3, Fig. 17 for PH 7). The benthic survey, conducted as part of this project, indicated the numbers of benthic infauna (largely polychaetes) were extremely high. Therefore, it is likely the sediment column was well mixed due to the burrowing activities of these organisms. Consequently, it is impossible to determine the 1963 horizon associated with the peak in atmospheric thermonuclear bomb testing in the sediment profile from the Cs-137 record, nor is it possible to determine the slope of the Pb-210 activity in the sediment profile due solely to radioactive decay (which is needed to determine the sedimentation rate). Therefore, no sedimentation rate or geochronolgy is available from the radionuclide analyses of these cores. Nevertheless, it is clear that the sediment column is vertically mixed to at least to 40 cm at site PH 3 and 25 cm at PH 7, and well may be mixed substantially deeper. Therefore, contaminants introduced into Clark Cove and deposited to the sediments can be mixed downward at least to the depth of mixing.

The Pb-210 and the Cs-137 activities in core PH-15 taken in Outer Cutts Cove was uniform to 60 cm, again indicating the sediment profile was very well mixed (Fig. 18). This site has abnormally large numbers of polychaetes, which have apparently mixed the sediment column down to a depth of at least 60 cm. The Pb-210 activity profile for Core 100, taken in the flats just west of the entrance to Chauncy Creek, is vertical down to a depth ~8 cm, then decreases very rapidly and is vertical again below 10 cm (Fig. 19). It appears the sediment profile is mixed to a depth of ~ 10 cm. The Cs-137 indicates two peaks occur, one at 5 cm and one at 9 cm. However, it is not clear if these peaks are related to known events or are the results of bioturbation and diagenetic processes. Therefore, in view of the evidence from the Pb-210 profile that this location is vertically mixed, no accretion rate was determined.

Geochronology

Based on the results of the radionuclide dating, the age-depth relationship or the sediment column geochronology was determined. Interpretation of the radionuclide profiles at stations PH 17 and 51 indicate the sediment column has not been bioturbated or physically mixed to the extent a reasonable chronology is unavailable. The primary criteria utilized in this decision includes a relatively linear decrease in the natural log of the Pb-210 activity with depth and a recognizable peak in the Cs-137 profile that can be associated with the 1963 maximum in atmospheric testing of thermonuclear weapons. These criteria were meet at stations PH 17 and 51.

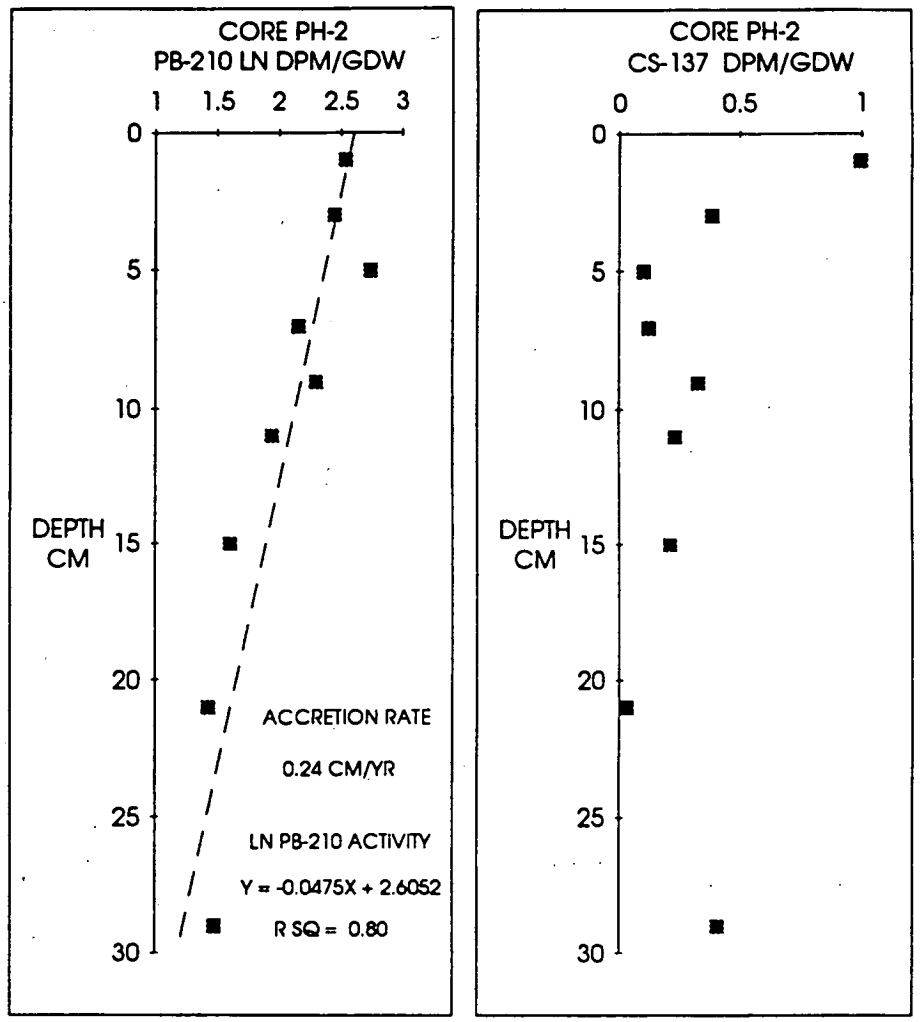


Figure 15. Pb-210 and Cs-137 profiles for core PH 2.

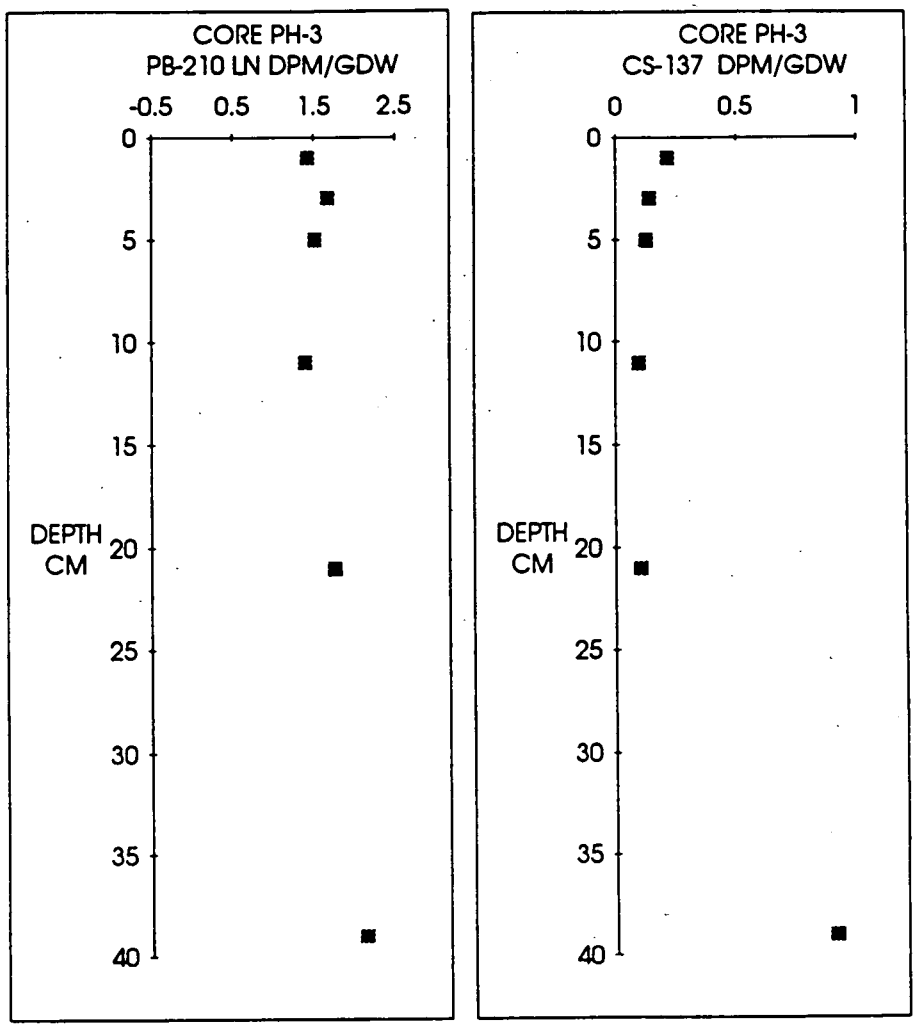


Figure 16. Pb-210 and Cs-137 profiles for core PH 3.

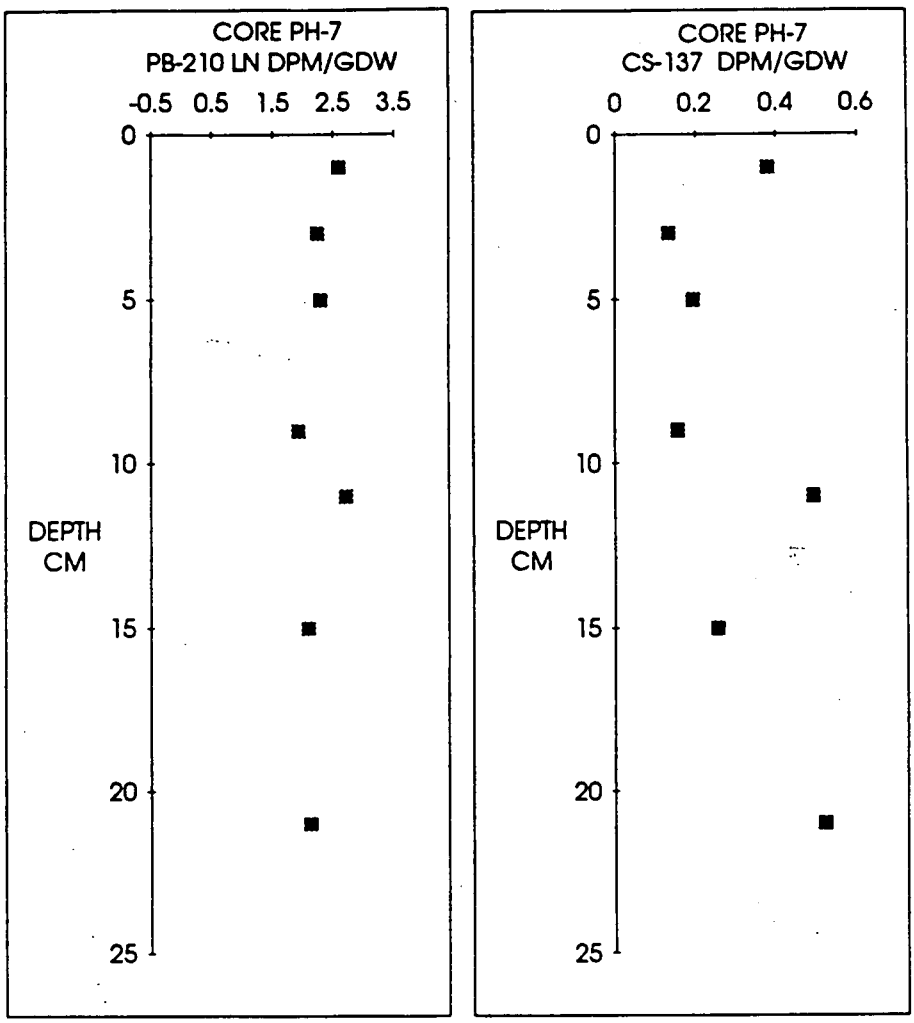


Figure 17. Pb-210 and Cs-137 profiles for core PH 7.

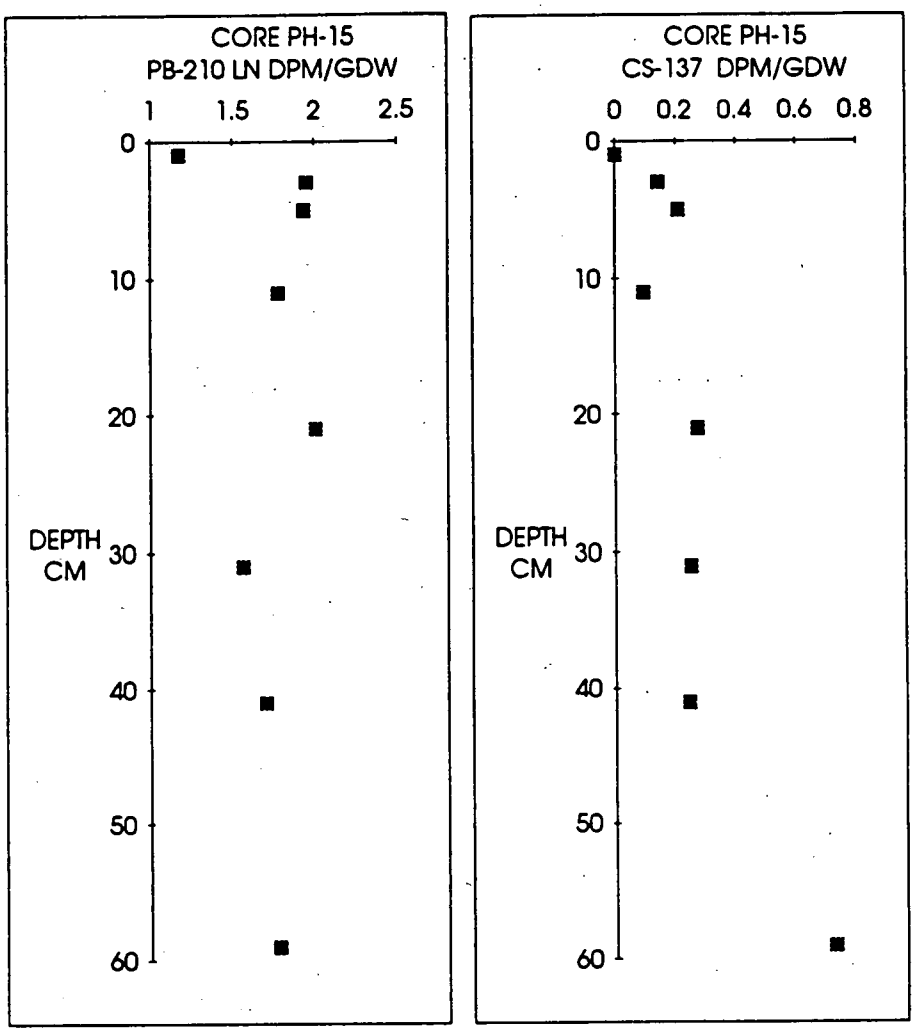


Figure 18. Pb-210 and Cs-137 profiles for core PH 15.

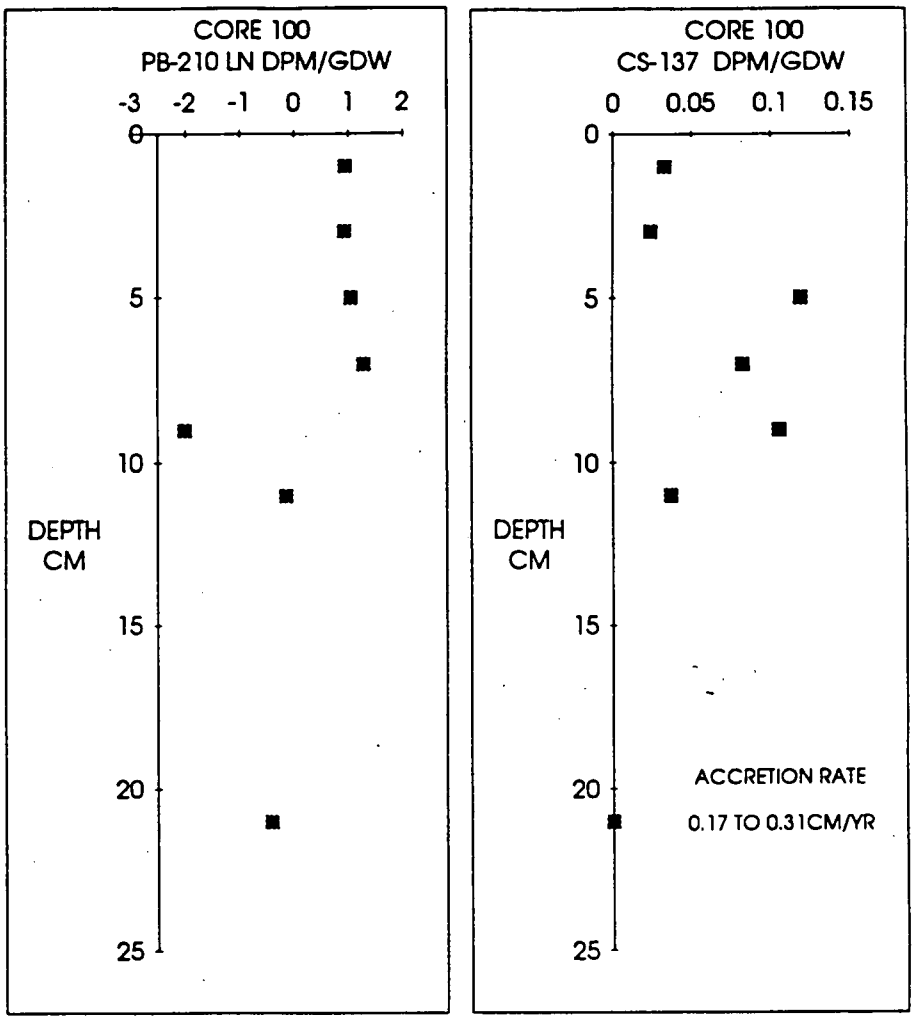


Figure 19. Pb-210 and Cs-137 profiles for core 100.

The age-depth relationships of the sediment columns for PH 17 and 51 are shown in Figures 12 and 13, respectively. The differences in the accretion rates between the Pb-210 and Cs-137 techniques (0.28 to 0.37 cm/yr for PH 17 and 0.13 to 0.17 cm/yr for core 51) causes different geochronologies to exist within a core, however, these are small. Larger differences occur between stations due actual differences in sedimentation rates. However, this variability is not surprising in estuarine environments and the rates are within the range expected, given present sea level rise rates and sediment infilling characteristics of the system.

Water Column Sediment Fluxes (Sediment Traps)

During summer, 1992 sediment traps were deployed in Clark Cove to determine if the flux of suspended sediments through the water column could be reliably measured with standard trapping techniques in the lower estuary. In addition, if the standard trapping methods were successful, would adequate sediment be recovered to conduct chemical analyses. Although chemical analyses of captured sediment was not planned for Phase 2 of this project, deployment of sediment traps allowed us to determine the potential for this approach for future studies of contaminant transport.

Two sediment trap arrays were deployed, one near the back of the Clark Cove near the pier, the other nearer the center of the cove. Both traps were in ~9 m of water at low tide. Both traps were deployed on July 1, 1992; trap 1 was retrieved on September 1, while trap 2 was retrieved on September 17, 1992. The results of the deployments are expresses as the average of the four individual traps from each depth (upper and lower) for each array. There is some variability between individual traps at each depth, however, the average is likely the best representation of the sediment flux.

The upper traps had lower suspended sediment fluxes than the lower traps at each station, and the station closer to the center of Clark Cove (station 2) had higher fluxes than the more landward station (station 1) (Fig. 20). The average fluxes at station 1 was 0.06 and 0.13 gm/day for the upper and lower array, respectively. Trap 2 average fluxes were 0.08 and 0.16 gm/day for the upper and lower traps, respectively. Organic matter as indicated by LOI measurements was consistently ~9 to 10% for all the samples. Although several problems were encountered during this pilot study, the overall results indicate utilizing sediment traps is feasible within selected areas in the lower estuary, like Clark Cove.

Total Suspended Sediments in the Lower Estuary

In order to provide baseline data for input into the computer models associated with this project, as well as assess the turbidity levels in the lower estuary, the spatial distribution of the total suspended sediment concentrations were determined in the Great Bay/Piscataqua River Estuary in July, 1992. Water samples were collected from several locations and depths over 12 hour periods (~1 tidal cycle) at a cross-section across the mouth of the Piscataqua River, a cross-section across the river just east of Seavy Island and at three cross-sections at the confluence of Little Bay and the Piscataqua River. In addition, water samples were taken from several depths at 15 stations along the axis of the Great Bay/Piscataqua River Estuary from the mouth to the confluence with the Squamscott River in Great Bay during a high tide and a low tide period,

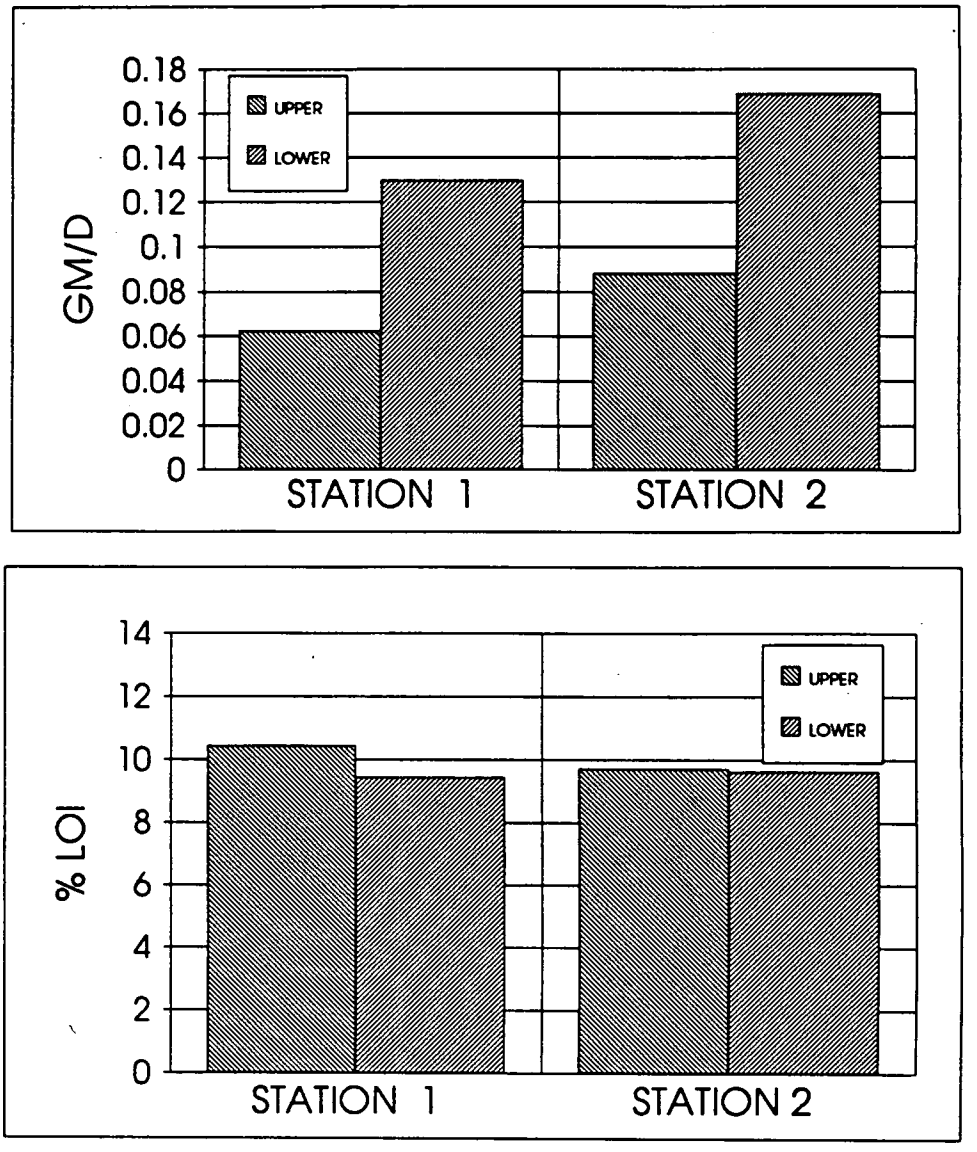


Figure 20. Total suspended sediment fluxes in Clark Cove. Station 1 was close to the end of the Pier, station 2 was near the center of the embayment. The traps were deployed for approximately two months (July and August, 1992). The upper and lower values for each station are the means of four traps.

making an effort to follow the tidal wave up the estuary. In total, 439 water samples were collected and analyzed for TSS. The results of the TSS analysis are given in Appendix 5.

In general, the TSS concentrations were low and varied little at a channel cross-section, both across the estuary and with depth. However, there was a general increase up the estuary from the mouth cross-section to the Dover Point cross-section. The TSS concentrations ranged from 1.1 to 3.7 mg/l over the tidal cycle at the mouth cross-section, from 1.5 to 5.9 mg/l at the cross-section just east of Seavey Island, and from 2.4 to 12.7 mg/l at Dover Point. The TSS concentrations at the Dover Point cross-section had a strong tidal signature. The TSS concentrations ranged from 2.4 mg/l to 5.8 mg/l on the flood tide, however, the concentrations increased to 4.5 to 12.7 mg/l on the ebb tide, reflecting the strong influence of the riverine sediment inputs coming down the upper Piscataqua River.

The upstream gradient in the TSS concentrations that occurs in the channel cross-sections also occurs in the longitudinal transects. The TSS concentrations during the high tide period ranged from 1.3 mg/l at the mouth of the Piscataqua River and increased to 17.7 mg/l at the entrance of the Squamscott River; the concentrations measured at low tide ranged from 2.4 mg/l at the mouth to 92.3 mg/l at the Squamscott River (Fig. 21). The high tide measurements largely reflect the conditions of the flood waters, which typically have lower TSS concentrations because of oceanic influences. Conversely, the low tide values reflect conditions of the ebb waters which typically have higher concentrations because of the influences of the rivers debouching into the Great Bay/Piscataqua River Estuary.

CONCLUSIONS

Based on the research conducted in the lower Great Bay/Piscataqua River Estuary as part of the Estuarine Ecological Risk Assessment of Naval Station Portsmouth, the following conclusions are offered.

1. The Estuary is typical of glaciated embayments with bottom sediments ranging from gravel down to clays (mean grain sizes range from -4.87 to 9.00 phi).

2. The bottom sediments in the Estuary composed of mixtures of three sediment populations (gravel from -3 to-5 phi, fine sand from 2 to 3 phi and clay around 10 phi).

3. Moisture contents range from 0.3 to 78.8% and covary with LOI (loss on ignition) which ranges from 0.3 to 42.6% (the moisture and LOI values include local salt marshes). Both moisture and LOI covary with mean grain size, with the finest sediments having the highest moisture and LOI contents.

4. Total organic carbon (TOC) makes up ~25 to 30% of the total organic matter as determined by LOI. The %TOC can be calculated for the bottom sediments in the lower Estuary from the following regression equation ($r^2 = 0.807$):

$$\%TOC = (0.245 \pm 0.168)(\%LOI) + (0.244 \pm 0.019).$$

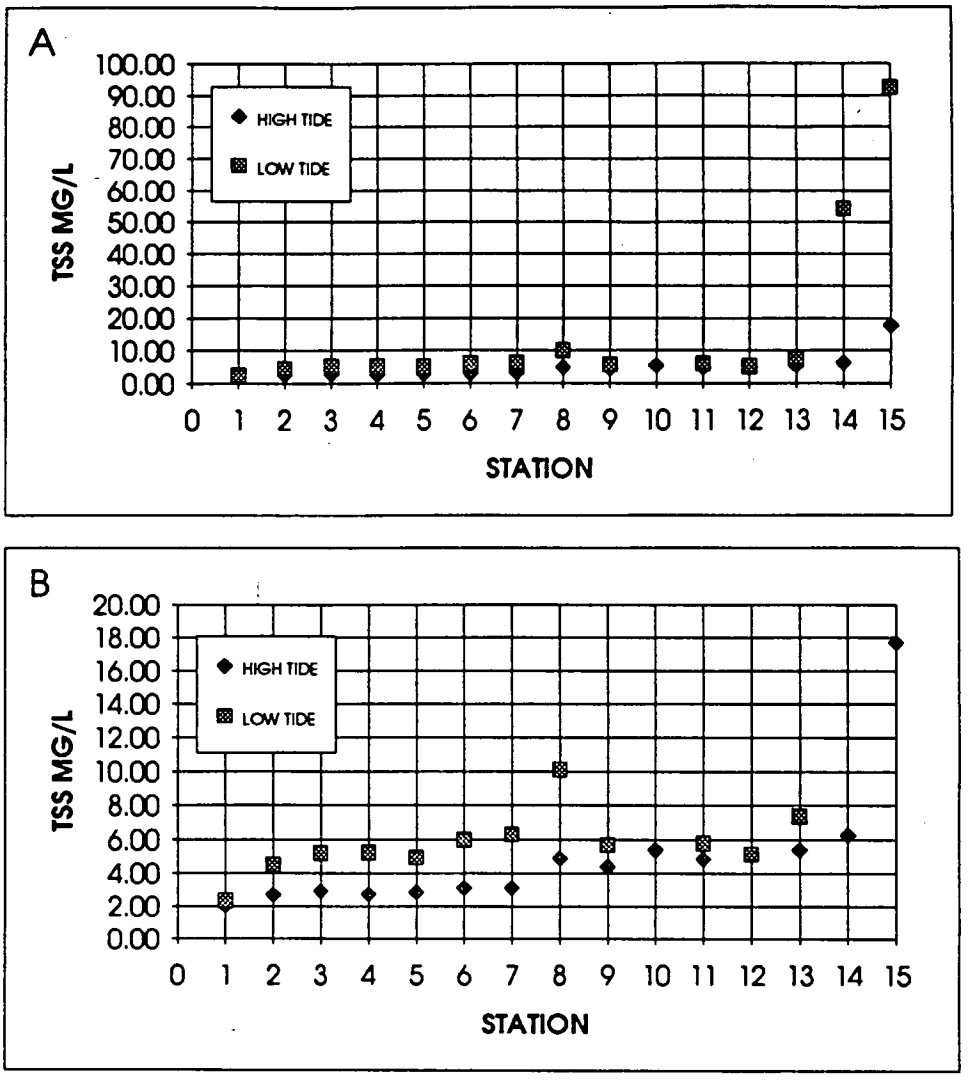


Figure 21. Total suspended sediment (TSS) concentrations along a transect from the mouth of the Great Bay/Piscatiqua River Estuary in Portsmouth Harbor to the entrance to the Squamscott River in Great Bay. The high tide sampling was done on July 15, 1992 starting at ~1212 in Portsmouth Harbor and took ~ 4 1/2 hours. Although an attempt was made to progress with the tidal wave up the estuary, sampling in the upper Piscatiqua River and Great Bay occurred after high tide. The low tide sampling started at the mouth of the Piscatiqua River on July 16, 1992 at 0719 and took ~ 4 hours, again falling behind the tide in the upper estuary. Both Figure A and B show the same data set, however, the scale has been expanded in B to show the generally higher concentrations at low tide. The low tide concentration at station 15 is off scale in B.

5. The major depositional systems in the lower estuary include: 1. Clark Island Embayment or Clark Cove, 2. Spruce Creek Embayment, 3. Pepperrell Cove Embayment, 4. Sagamore Creek/New Castle Embayment, 5. Cutts Cove Embayment, and 6. the Small Embayments Adjacent to Channels.

6. Sedimentation rates measured in the lower estuary at two sites vary from 0.28 to 0.37 cm/yr for PH 17 (just west of PNS) and 0.13 to 0.17 cm/yr for core 51 (taken in a cove in the northeastern corner of Pepperrell Cove).

7. Estimated sediment mixing depths, probably due to bioturbation, range from 25 to 60 cm. Actual depths may exceed these values in some locations.

8. Water column sediment traps deployed in Clark Cove indicate standard sediment traps can be used to estimate suspended sediments (TSS) fluxes. TSS flux rates ranged from 0.06 to 0.16 gm/day with LOI content consistently ~9 to 10%.

9. The TSS concentrations measured over tidal cycles at channel cross-sections varied from 1.5 to 5.9 mg/l at the mouth of the Estuary to 2.4 to 12.7 mg/l at Dover Point. A survey conducted longitudinally up the Estuary from the mouth to the confluence with the Squamscott River also shows the TSS concentrations increase upestuary, peaking at 92.3 mg/l. In addition, the TSS concentrations are higher near low tide (reflecting more riverine influences), than at high tide (reflecting more oceanic influences).

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APPENDIX 1

APPENDIX 1. STATION LOCATIONS.

Station	Year	Navigation method	Latitude	Longitude	Corrected Latitude	Corrected Longitude	Basic Location
PH and YR SERIES GRAB SAMPLES							
Note: PH stations were located visually on the navigational chart. Coordinates were read from the chart. No instrum nt correction of coordinates were possible. Any corrections were done by visual examination of the location map and replotting.							
PH-1	1990	Chart			43 04 42.5	70 41 46.8	E of Gooseberry Island, in eelgrass bed
PH-2	1990	Chart			43 04 18.8	70 42 40.1	SSE of pier at USCG station; in eelgrass bed
PH-3	1990	Chart			43 04 45.5	70 43 22.0	Between Jamaica Isl. and Hick Rocks, in eelgrass
PH-4	1990	Chart			43 04 41.2	70 43 26.9	N of Clark Island, 11' deep mud bottom
PH-5	1990	Chart			43 04 45.5	70 43 28.6	S of Jamaica Island, 13' deep mud bottom
PH-6	1990	Chart			43 04 38.0	70 43 35.0	N of Clark Island causeway, 11' deep mud bottom
PH-7	1990	Chart			43 04 44.2	70 43 34.5	Clark Cove, near Norway ball #17
PH-8	1990	Chart			43 04 40.0	70 43 38.2	W of Clark Island pier, 8' deep mud bottom
PH-9	1990	Chart			43 04 34.0	70 43 41.5	S of Clark Island causeway, in eelgrass bed
PH-10	1990	Chart			43 04 43.5	70 44 17.2	S of dry dock 2 at PNSY, 3'+ of sediment
PH-10A	1990	Chart			43 04 28.7	70 44 06.5	Between Henderson Point and Sullivan Point
PH-11	1990	Chart			43 04 05.5	70 44 29.5	S of Shapleigh Island, in eelgrass bed
PH-12	1990	Chart			43 04 50.5	70 44 37.0	SE of dry dock 1 at PNSY, 75' from pier, 3.5' of sed.
PH-12A	1990	Chart			43 04 45.5	70 44 24.3	SW of berth 3 at PNSY
PH-13	1990	Chart			43 04 56.3	70 44 42.2	Off dry dock 3 at PNSY, 60' from pier, 40"+ of sed.
PH-14	1990	Chart			43 04 33.7	70 44 38.4	N of Pierce Island, in eelgrass bed
PH-15	1990	Chart			43 05 08.1	70 45 50.5	In Piscataqua R., NE of Outer Cutt's Cove, eelgrass
PH-16	1990	Chart			43 05 12.4	70 45 33.0	E of Freeman's Pt., near mouth of inlet , in eelgrass
PH-17	1990	Chart			43 04 57.6	70 44 49.5	Just S of Wattlebury Island, in eelgrass bed
PH-18	1990	Chart			43 05 04.8	70 44 08.2	E side of back gate entr. to PNSY, in eelgrass bed
PH-19	1990	Chart			43 04 55.4	70 43 29.0	W of Jamaica Isl. in back channel of PNSY, eelgrass
PH-20	1990	Chart			43 05 10.4	70 43 01.2	Near N shore of entrance to Barters Creek
PH-21	1990	Chart			43 05 28.5	70 43 14.0	E of Admiralty Village
YR-22	1990	Chart			43 07 46.0	70 38 27.5	York Harbor
YR-23	1990	Chart			43 08 04.7	70 38 46.0	York Harbor
SS SERIES GRAB SAMPLES							
Note: SS stations were located using RV Jere Chase navigation systems (Voyager and Internav). Internav was primarily used in later sampling as it was considered more accurate. Instrument readings were used for original placement of stations on location map. However, locations were adjusted based on field notes and visually moved to what was considered a more accurat position.							
SS1	1991	Voyager			43 02 37.8	70 42 33.6	Odiorne Point - White Island, no sampl
SS2	1991	Voyager			43 02 51.0	70 42 17.4	Odiorne Point - White Island
SS3	1991	Voyager			43 03 04.2	70 42 00.0	Odiorne Point - White Island
SS4	1991	Voyager			43 03 09.0	70 41 52.2	Odiorne Point - White Island
SS5	1991	Voyager			43 03 19.8	70 41 40.8	Odiorne Point - White Island
SS6	1991	Voyager			43 03 29.5	70 42 39.0	Jaffrey Point - Wood Island
SS7	1991	Voyager			43 03 33.6	70 42 24.6	Jaffrey Point - Wood Island
SS8	1991	Voyager			43 03 44.4	70 42 08.4	Jaffrey Point - Wood Island
SS9	1991	Voyager			43 04 06.6	70 42 40.8	Cove S of USCG station - Gerrish Island
SS10	1991	Voyager			43 04 16.2	70 42 21.6	Cove S of USCG station - Gerrish Island
SS11	1991	Voyager			43 04 22.8	70 42 04.2	Cove S of USCG station - Gerrish Island
SS12	1991	Voyager			43 04 28.8	70 42 46.8	Salamander Point - Ft. McClary
SS13	1991	Voyager			43 04 38.4	70 42 40.8	Salamander Point - Ft. McClary
SS14	1991	Voyager			43 04 46.8	70 42 38.4	Salamander Point - Ft. McClary
SS15	1991	Voyager			43 04 28.5?	70 43 20.0?	Cove on Newcastle (south of Clark Island (PNSY))
SS16	1991	Voyager			43 04 31.2	70 43 27.0	S of Clark Island
SS17	1991	Voyager			43 04 32.0	70 43 29.0	S of Clark Island
SS18	1991	Voyager			43 04 22.8	70 43 55.2	Goat Island - Henderson Point (PNSY)
SS19	1991	Voyager			43 04 27.6	70 43 55.2	Goat Island - Henderson Point (PNSY)
SS21	1991	Voyager			43 04 33.6	70 43 33.6	S of Clark Island
SS22	1991	Voyager			43 04 37.8	70 44 36.6	Pierce Island - PNSY (blue drydock building)
SS23	1991	Voyager			43 04 43.8	70 44 35.4	Pierce Island - PNSY (blue drydock building)
SS24	1991	Voyager			43 04 47.4	70 45 27.0	N side of Memorial bridge - no sampl
SS25	1991	Voyager			43 04 49.8	70 45 24.0	N side of Memorial bridge - no sample
SS26	1991	Voyager			43 04 52.8	70 45 21.0	N sid of Memorial Br., contaminates, no sampl

APPENDIX 1. STATION LOCATIONS.

Station	Year	Navigation method	Latitude	Longitude	Corrected Latitude	Corrected Longitude	Basic Location
SS27	1991	Voyager			43 05 10.8	70 45 56.4	N side of Interstate Rte. 1B bridge
SS28	1991	Voyager			43 05 14.4	70 45 48.6	N side of Interstate Rte. 1B bridge
SS29	1991	Voyager			43 05 18.6	70 45 43.8	N side of Interstate Rte. 1B bridge
SS30	1991	Voyager			43 05 36.6	70 46 14.4	N of I95 bridge - Spinney Creek, no sample
SS31	1991	Voyager			43 05 39.6	70 46 00.9	N of I95 bridge - Spinney Creek
SS32	1991	Voyager			43 05 42.6	70 46 04.2	N of I95 bridge - Spinney Creek
SS33	1991	Voyager			43 05 46.8	70 46 58.8	N of I95 bridge - Spinney Creek, no sample
SS34	1991	Voyager			43 05 47.4	70 46 52.8	PSNH plant - Eliot, ME
SS35	1991	Voyager			43 05 48.6	70 46 50.4	PSNH plant - Eliot, ME, no sampl
SS36	1991	Voyager			43 05 52.8	70 46 52.8	PSNH plant - Eliot, ME, no sample
SS37	1991	Voyager			43 06 01.2	70 47 13.8	Fuel Tanks - Eliot town landing
SS38	1991	Voyager			43 06 05.4	70 47 07.2	Fuel Tanks - Eliot town landing
SS39	1991	Voyager			43 06 12.6	70 47 03.6	Fuel Tanks - Eliot town landing
SS40	1991	Voyager			43 05 25.2	70 45 44.4	N of Interstate Rte. 1B bridge
SS50	1991	Internav			43 04 51.5	70 41 44.4	E of Phillips Island
SS51	1991	Internav			43 04 51.8	70 41 32.9	Cove E of Phillips Island
SS52	1991	Internav			43 05 02.0	70 41 33.2	Chauncey Creek
SS53	1991	Internav			43 04 58.3	70 41 53.4	Cove N of Phillips Island
SS54	1991	Internav			43 04 38.5	70 41 42.4	E of Gooseberry Island
SS55	1991	Internav			43 04 33.3	70 41 54.5	E of Fishing Island
SS56	1991	Internav			43 04 28.4	70 42 01.7	SE of Fishing Island
SS57	1991	Internav			43 04 40.3	70 42 15.0	SE corner of Pepperrell Cove, NNW of Fishing Isl.
SS58	1991	Internav			43 04 44.4	70 42 02.3	E corner of Pepperrell Cove, W of Gooseberry Isl.
SS59	1991	Internav			43 04 50.5	70 42 18.6	NW corner of Pepperrell Cove, W of Phillips Isl.
SS60	1991	Internav			43 04 42.9	70 42 32.9	SW corner of Pepperrell Cove
SS61	1991	Internav			43 04 41.3	70 43 29.0	Middle of Clark Cove
SS62	1991	Internav			43 04 45.8	70 43 14.0	Half way between Jamaica Isl. and Hick Rocks
SS63	1991	Internav			43 04 53.0	70 43 22.5	Entrance to back channel (Jamaica Isl. side)
SS64	1991	Internav			43 05 02.7	70 43 40.9	Half way up back channel (Jamaica Isl. side)
SS65	1991	Internav			43 05 04.6	70 44 05.2	Bridge in back channel (Jamaica Island side)
SS66	1991	Internav			43 05 04.4	70 43 38.5	In cove of back channel (Jamaica Island side)
SS67	1991	Internav			43 05 00.3	70 43 25.9	In cove at E end of back channel
SS68	1991	Internav			43 04 21.3	70 42 50.8	Cove between USCG station and Salamander Pt.
SS69	1991	Internav			43 04 21.0	70 43 18.1	Cove W of Salamander Point, E sid of cov
SS70	1991	Internav			43 04 22.1	70 43 19.1	Cove W of Salamander Pt., outsid edge of cove
SS71	1991	Internav			43 05 02.6	70 44 36.5	Back channel - midchannel by east end bridge
SS72	1991	Internav			43 04 59.4	70 44 54.1	Behind Wattlebury Island
SS73	1991	Internav			43 05 00.7	70 44 49.0	Close to shore by small cove behind Watt bury Isl.
SS74	1991	Internav			43 04 59.0	70 44 46.0	Between Wattlebury Island and PNSY
SS75	1991	Internav			43 04 49.6	70 44 56.9	Tip of PNSY (off of pier 2)
SS76	1991	Internav			43 05 04.1	70 45 40.7	Next to scrap yard pier
SS77	1991	Internav			43 05 05.8	70 45 35.3	Midway between Interstate Rte. 1B bridge
SS78	1991	Internav			43 05 04.0	70 45 23.7	Near entrance to W side of Badgers Island
SS79*	1991		43 04 53.4	70 45 21.6	43 06 15.0	70 45 37.0	Under Interstate Rte. 1B bridge, Badgers Island side
SS80	1991	Internav			43 05 15.3	70 45 49.1	Off Freeman's Point
SS81	1991	Internav			43 05 21.4	70 45 47.9	Mid-channel off Freeman's Point
SS82	1991	Internav			43 05 23.7	70 45 42.2	N side of channel, off cove by FEA's house
SS83	1991	Internav			43 05 25.7	70 45 37.0	Cove by FEA's house
SS91*	1991	Voyager	43 05 09.6	70 45 42.6	43 05 09.0	70 45 37.0	Middle of Interstate Rte. 1B bridge
SS92*	1991	Voyager	43 05 06.0	70 45 46.8	43 05 03.0	70 45 40.0	Scrapyard pier (Lat Long?)
SS93	1991	Voyager			43 05 03.0	70 45 32.4	W entrance to Badgers Island (mid-channel)
SS94*	1991	Voyager	43 05 01.8	70 45 08.4	43 04 59.5	70 45 04.0	Warrens Lobster House (behind Badgers Isl.)
SS95*	1991	Voyager	43 04 38.4	70 45 07.2	43 04 37.0	70 45 01.5	Commercial fish pier (Lat-Long?)
SS110	1991	Internav			43 04 11.5	70 44 19.1	Channel between Shapleigh Isl. and Goat Isl.
SS111	1991	Internav			43 04 05.1	70 44 30.6	Channel between Frame Pt. and Goat Isl.
SS112	1991	Internav			43 04 07.2	70 44 07.1	South of Goat Island
SS113	1991	Internav			43 04 07.6	70 43 57.7	North of Pest Island
SS114	1991	Internav			43 04 02.6	70 44 06.7	West of Pest Island
SS115	1991	Internav			43 03 58.7	70 44 16.4	Channel NE off Leach Island
SS116	1991	Internav			43 03 58.5	70 44 22.9	NE of Leach Island

APPENDIX 1. STATION LOCATIONS.

Station	Year	Navigation method	Latitude	Longitude	Corrected Latitude	Corrected Longitude	Basic Location
SS117	1991	Internav			43 03 47.0	70 44 14.4	Channel between Portsmouth shore and Leach Isl.
SS118	1991	Internav			43 03 46.1	70 44 13.8	Channel between Portsmouth shore and Leach Isl.
SS119	1991	Internav			43 03 37.0	70 44 09.7	SW of Clampit Island
SS120	1991	Internav			43 03 34.8	70 44 09.3	SW of Clampit Island
SS121	1991	Internav			43 03 37.0	70 44 00.0	SE of Clampit Island - N of Blunts Island
SS122	1991	Internav			43 03 22.8	70 43 25.2	Transect-Little Harbor Yacht Club to Witches Creek
SS123	1991	Internav			43 03 17.1	70 43 26.2	Transect-Little Harbor Yacht Club to Witches Creek
SS124	1991	Internav			43 03 12.4	70 43 39.5	Transect-Little Harbor Yacht Club to Witches Creek
SS125	1991	Internav			43 03 22.7	70 43 05.6	Transect -Jaffrey Point to Frost Point
SS126	1991	Internav			43 03 22.0	70 43 07.7	Transect -Jaffrey Point to Frost Point
SS127	1991	Internav			43 03 15.1	70 43 10.5	Transect -Jaffrey Point to Frost Point
SS128*	1991	Internav	43 03 12.6	70 42 50.7	43 03 12.6	70 42 57.6	Transect - Jaffrey Point to Ordiorne Point
SS129*	1991	Internav	43 03 09.3	70 42 52.1	43 03 09.3	70 42 58.8	Transect - Jaffrey Point to Ordiorne Point
SS130	1991	Internav			43 03 28.3	70 41 43.4	East of Whaleback Light
SS131	1991	Internav			43 03 27.7	70 41 21.9	South of White Island, East of Whaleback
SS132	1991	Internav			43 03 18.7	70 41 30.1	SE of Whaleback Light
SS133	1991	Internav			43 03 15.8	70 41 06.0	Transect -Bouy 2KR to Gerrish Isl. (Sewards Cove)
SS134	1991	Internav			43 03 32.6	70 40 56.4	Transect -Bouy 2KR to Gerrish Isl. (Sewards Cove)
SS135	1991	Internav			43 03 42.8	70 40 53.1	Transect -Bouy 2KR to Gerrish Isl. (Sewards Cove)
SS136	1991	Internav			43 03 55.5	70 42 18.0	Transect -Newcastle to Gerrish Island
SS137	1991	Internav			43 04 03.8	70 42 11.2	Transect -Newcastle to Gerrish Island
SS138	1991	Internav			43 04 03.0	70 41 57.3	North of Wood Island, West of Gerrish Island
SS139	1991	Internav			43 04 02.7	70 41 51.1	North of Wood Island, West of Gerrish Island
SS140	1991	Internav			43 04 07.9	70 41 50.8	North of Wood Island, West of Gerrish Island
SS141	1991	Internav			43 04 08.7	70 41 56.6	North of Wood Island, West of Gerrish Island
SS142	1991	Internav			43 04 25.7	70 42 18.7	Area between USCG Station and Fishing Island
SS143	1991	Internav			43 04 24.8	70 42 25.5	Area between USCG Station and Fishing Island
SS144	1991	Internav			43 04 35.5	70 42 22.3	Area between USCG Station and Fishing Island
SS145	1991	Internav			43 04 31.3	70 42 34.9	Area between USCG Station and Fishing Island
SS146	1991	Internav			43 04 36.8	70 42 51.2	Area North of Salamander Pt , Newcastle
SS147	1991	Internav			43 04 32.3	70 42 55.5	Area North of Salamander Pt , Newcastle
SS148	1991	Internav			43 04 29.4	70 43 08.7	Area North of Salamander Pt , Newcastl
SS149	1991	Internav			43 04 34.4	70 43 09.5	Area North of Salamander Pt , Newcastl
SS150	1991	Internav			43 04 57.5	70 43 29.7	Backchannel PNSY -N of Jamaica Island
SS151	1991	Internav			43 05 02.2	70 43 4836	Backchannel PNSY
SS152	1991	Internav			43 04 25.1	70 44 08.2	Off Henderson Pt PNSY (Pull and Be Damned Point)
SS 170	1992	GPS - ECOS	43 04.71	70 43.49	43 04 42.6	70 43 29.4	NEAR ENTRANCE TO CLARK COVE
SS 171	1992	GPS - ECOS	43 04.58	70 43.73	43 04 34.8	70 43 43.8	NEAR POLICE DOCK BY CAUSEWAY TO CLARK IS.
SS200	1991	Internav			43 04 39.3	70 42 29.2	NW of Fishing Island
SS201	1991	Internav			43 04 42.6	70 42 12.8	NW of Fishing Island
SS202	1991	Internav			43 04 52.5	70 42 02.4	Area W of Fishing Island
SS203	1991	Internav			43 04 30.0	70 42 38.4	Area NE of Salamander Pt., Newcastl
SS204	1991	Internav			43 04 58.8	70 43 28.5	Back channel of PNSY - N of Jamaica Island
SS205	1991	Internav			43 05 02.0	70 43 38.1	Back channel of PNSY
SS206	1991	Internav			43 05 03.1	70 43 38.8	Back channel of PNSY
SS207	1991	Internav			43 04 58.2	70 43 41.4	Back channel of PNSY
SS208	1991	Internav			43 04 57.8	70 43 51.7	Back channel of PNSY
SS209	1991	Internav			43 04 58.3	70 43 47.6	Back channel of PNSY
SS210	1991	Internav			43 04 55.2	70 43 32.1	Back channel of PNSY - N of Jamaica Island
SS211	1991	Internav			43 04 30.8	70 43 10.6	Area between Salamander Point, Newcastle and Clark Island
SS212	1991	Internav			43 04 43.4	70 44 19.9	Off dry dock 9 at PNSY
SS213	1991	Internav			43 04 42.0	70 44 25.0	Area SW of dry dock 9 at PNSY
SS214	1991	Internav			43 04 46.5	70 44 30.8	Off berth 3 at PNSY
SS215	1991	Internav			43 04 50.2	70 44 38.2	S of pier 2 at PNSY
SS216	1991	Internav			43 04 50.8	70 44 36.5	S of pier 2 at PNSY
SS217	1991	Internav			43 04 19.9	70 43 52.0	N of causeway between Goat Isl. and Newcastl
SS218	1991	Internav			43 04 21.0	70 44 15.1	Area N of Goat Island
SS219	1991	Internav			43 04 18.9	70 44 12.7	Area N of Goat Island
SS220	1991	Internav			43 04 19.6	70 44 21.9	Area N of causeway betwe n Shapleigh Island

APPENDIX 1. STATION LOCATIONS.

Station	Year	Navigation method	Latitude	Longitude	Corrected Latitude	Corrected Longitude	Basic Location
							and Goat Island
SS221	1991	Internav			43 04 18.0	70 44 14.0	Area N of Goat Island
SS222	1991	Internav			43 04 25.2	70 44 15.1	Just S of Goat Island
SS223	1991	Internav			43 04 34.7	70 42 14.3	W of Fishing Island
SS224	1991	Internav			43 04 32.5	70 42 18.0	W of Fishing Island
SS225	1991	Internav			43 04 21.1	70 42 27.2	Area NE of USCG station
SS226	1991	Internav			43 04 25.0	70 42 08.0	NE of Fort Pt. light
SS227	1991	Internav			43 04 26.2	70 42 11.2	Area NE of USCG station
SS228	1991	Internav			43 04 24.2	70 42 15.9	Area NE of USCG station
SS229	1991	Internav			43 04 23.8	70 42 19.7	Area NE of USCG station
SS 250*	1993	Hand voy.	43 05 16.8	70 45 28.2	43 05 17.5	70 45 24.5	Halfway across cove by Simply Italian restaurant
SS251*	1993	Hand voy.	43 05 14.4	70 45 35.4	43 05 15.5	70 45 31.7	Near front of cove by Simply Italian restaurant
SS252*	1993	Hand voy.	43 05 07.8	70 44 32.4	43 05 09.4	70 44 28.5	Halfway into cove by Traip Academy
SS253*	1993	Hand voy.	43 05 05.4	70 44 28.2	43 05 06.6	70 44 22.2	In back channel between bridges, water depth 19'
SS254*	1993	Hand voy.	43 05 05.4	70 44 28.2	43 05 06.6	70 44 22.2	In back channel between bridges, wat r depth 19'
SS255*	1993	Hand voy.	43 06 23.4	70 43 52.2	43 06 26.1	70 43 47.4	Upper Spruce Creek, water depth 1'-2'
SS256*	1993	Hand voy.	43 06 07.8	70 43 41.4	43 06 08.3	70 43 34.4	Ent. to cove in Upper Spruce Cr., water depth 2'
SS257	1993	Hand voy.			43 06 06.6	70 43 46.8	Across from cove for SS256, water depth 5'
SS258	1993	Hand voy.			43 05 54.6	70 43 47.4	Ent. to cove in Upper Spruce Cr., water depth 6'
SS259*	1993	Hand voy.	43 05 52.8	70 43 31.2	43 05 48.1	70 43 23.5	Mid-Spruce Creek, just up from Eagle Pt.
SS260*	1993	Hand voy.	43 05 44.4	70 43 12.6	43 05 46.5	70 43 07.7	Cove opp. Eagle Pt., adj. (75'?) to mussel bar
SS261	1993	Hand voy.			43 05 32.4	70 43 16.2	Off island by Admiralty Village, wat r depth 1'
SS262*	1993	Hand voy.	43 05 30.0	70 43 12.6	43 05 27.4	70 43 08.5	Off Admiralty Vil., mid-channel, water depth 16'
SS263*	1993	Hand voy.	43 05 27.0	70 43 04.2	43 05 24.9	70 43 01.7	Lower Spruce Cr., by PH stn., water depth 2'-3'
SS264	1993	Hand voy.			43 05 19.2	70 43 31.8	South of island in cove by Admiralty Village
SS265*	1993	Hand voy.	43 05 10.2	70 43 11.4	43 05 12.5	70 43 08.6	Halfway across rr. trestle in Lower Spruce Cr.
SS266*	1993	Hand voy.	43 05 05.4	70 43 01.8	43 05 06.9	70 42 56.8	In cove just north of rr. trestle in Spruc Cr.
SS267*	1993	Hand voy.	43 05 09.6	70 44 13.2	43 05 10.9	70 44 11.3	Halfway across cove by bridge to PNS
SUBTIDAL CORE SERIES - PH AND SS STATIONS							
PH-2	1992	Chart			43 04 18.8	70 42 40.1	SSE of pier at USCG station, in eelgrass bed
PH-3A	1992	Chart			43 04 45.6	70 43 31.2	S of Jamaica Island
PH-7A	1992	Chart			43 04 45.0	70 43 39.0	Just off Seavey Island in Clark Cov
PH-15	1992	Chart			43 05 08.1	70 45 50.5	In Piscataqua R., NE of Outer Cutt's Cov , eelgrass
PH-17	1992	Chart			43 04 57.6	70 44 49.5	Just S of Wattlebury Island, in eelgrass bed
PH-19	1992	Chart			43 04 55.4	70 43 29.0	W of Jamaica I. in back channel of PNSY, eelgrass
51	1992	Chart			43 04 50.9	70 41 35.5	E of Phillips Island in inlet of Gerrish Island
100	1992	Chart			43 04 56.0	70 41 50.0	E of N end of Phillips Island
101	1992	Chart			43 05 01.0	70 41 50.7	Cove N of Phillips Island, N corner of cove
PH-1	1991	Chart			43 04 42.5	70 41 46.8	E of Gooseberry Island
PH-2	1991	Chart			43 04 18.8	70 42 40.1	SSE of pier at USCG station, in eelgrass bed
PH-3	1991	Chart			43 04 45.5	70 43 22.0	Between Jamaica I. and Hick Rocks, in eelgrass
PH-4	1991	Chart			43 04 41.2	70 43 26.9	N of Clark Island, 11' deep mud bottom
PH-5	1991	Chart			43 04 45.5	70 43 28.6	S of Jamaica Island, 13' deep mud bottom
PH-6	1991	Chart			43 04 38.0	70 43 35.0	N of Clark Island causeway, 11' deep mud bottom
PH-7	1991	Chart			43 04 44.2	70 43 34.5	Clark Cove, near Norway ball #17
PH-8	1991	Chart			43 04 40.0	70 43 38.2	W of Clark Island pier, 8' deep mud bottom
PH-10	1991	Chart			43 04 43.5	70 44 17.2	S of dry dock 2 at PNSY, 3'+ of sedim nt
PH-11	1991	Chart			43 04 05.5	70 44 29.5	S of Shapleigh Island, in eelgrass bed
PH-12	1991	Chart			43 04 50.5	70 44 37.0	SE of dry dock 1 at PNSY, 75' from pier, 3.5' of sed.
PH-13	1991	Chart			43 04 56.3	70 44 42.2	Off dry dock 3 at PNSY, 60' from pier, 40" of sed.
PH-14	1991	Chart			43 04 33.7	70 44 38.4	N of Pierce Island, in eelgrass bed
PH-15	1991	Chart			43 05 08.1	70 45 50.5	In Piscataqua R., NE of Outer Cutt's Cov , eelgrass
PH-16	1991	Chart			43 05 12.4	70 45 33.0	E of Freeman's Pt., near mouth of inlet, in eelgrass
PH-17	1991	Chart			43 04 57.6	70 44 49.5	Just S of Wattlebury Island, in eelgrass bed
PH-19	1991	Chart			43 04 55.4	70 43 29.0	W of Jamaica I. in back channel f PNSY, eelgrass
PH-20	1991	Chart			43 05 10.4	70 43 01.2	Near N shore of entrance to Bart rs Creek
PH-21	1991	Chart			43 05 28.5	70 43 14.0	E of Admiralty Village

APPENDIX 1. STATION LOCATIONS.

Station	Year	Navigation method	Latitude	Longitude	Corrected Latitude	Corrected Longitude	Basic Location
MARSH CORE SERIES							
Note: + samples are composites of a number of cores along a transect running across the marsh through a given vegetation type.							
MS1	1992	Chart			43 05 32.8	70 43 23.5	Admiralty Vil. north, same loc. as ADVMSAT/SP stns.
MS 2	1992	Chart			43 05 31.0	70 43 25.0	Admiralty Village middle
MS 3	1992	Chart			43 05 30.2	70 43 26.5	Admiralty Village south
MS 4	1992	Chart			43 04 38.1	70 43 31.5	Clark Cove high marsh, same loc. as CIEM stations
MS 5	1992	Chart			43 04 38.0	70 43 33.0	Clark Cove low marsh, same loc. as CIEM stations
MS 6	1992	Chart			43 04 35.4	70 43 31.0	Clark River high marsh, same loc. as CIPR stations
MS 7	1992	Chart			43 04 35.0	70 43 32.4	Clark River low marsh, same loc. as CIPR stations
MS 8	1992	Chart			43 05 04.9	70 43 24.5	Dions yacht yard, same location as BNBC station
MS 9	1992	Chart			43 05 00.9	70 44 03.8	Fr. marsh at backgate to PNSY, sam loc. as BGBC
MS 10	1992	Chart			43 04 53.9	70 43 35.1	Jamaica Island, same location as JIBC station
MS 11	1992	Chart			43 04 07.8	70 44 29.6	Station 11 west, low marsh
MS 12	1992	Chart			43 04 08.0	70 44 28.0	Station 11 middle, high marsh
MS 13	1992	Chart			43 04 08.8	70 44 24.2	Station 11 east, low marsh, sam loc. as SHIM stns.
NHPA SERIES							
NHPA 1	1993	Chart					Fishing Island
NHPA 2	1993	Chart			43 05 05.8	70 45 58.8	Inner Cutt's Cove
NHPA 3	1993	Chart			43 04 53.5	70 45 50.5	Outer North Mill Pond
NHPA 4	1993	Chart			43 05 08.0	70 45 52.1	Cutt's Cove eelgrass bed
NHPA 5	1993	Chart			43 05 08.8	70 45 54.6	Cutt's Cove mud flat
NHPA 6	1993	Chart			43 05 08.8	70 45 54.6	Cutt's Cove mud flat, duplicate of NHPA 5
NHPA 7	1993	Chart					North of Schiller plant
NHPA 8	1993	Chart					South of fish pier
NHPA 9	1993	Chart					North of defense fuel tanks
NHPA 10	1993	Chart					North of Sprague, unvegetated control
NHPA 11	1993	Chart					North of Sprague, eelgrass bed
NHPA 12	1993	Chart					North of Sprague
NHPA 13	1993	Chart					North of Sprague, duplicate of NHPA 12
NHPA 14	1993	Chart					Broad Cove
NHPA 15	1993	Chart					Broad Cove, eelgrass bed by NH Rte. 4
NHPA 16	1993	Chart			43 05 00	70 45 56.6	Inner inner Cutt's Cove

APPENDIX 2

	APPENDIX 2. TEXTURE OF SEDIMENT SAMPLES																		
	SURFICIAL SEDIMENT SAMPLES							/S/M			S/Slt/C								
DATE	STATION	DEPTH	EPA ID	REP	CLASSIFICATION		%G	%S	%M	%S	%Slt	%C	MEAN	SORT.	SKEW.	KURT.	MOIST.	LOI
COLLECTED	LABEL	CM	#		G/S/M	S/S/C							PHI	PHI			%	%
	SS SERIES																		
3/2/92	SS 1	0 to 10	111501	A	CNGS														
3/2/92	SS 2	0 to 10	111502	A	GS		12	87	01				1.17	1.49	-0.38	1.62	0.29	1.11
3/2/92	SS 3	0 to 10	111503	A	S		04	94	02				2.73	0.84	-0.46	3.32	18.82	0.68
3/2/92	SS 4	0 to 10	111504	A	S		01	97	02				2.63	0.55	-0.30	1.20	14.54	0.60
3/2/92	SS 5	0 to 10	111505	A	SG		64	35	01				-1.73	1.56	0.11	0.72	10.26	4.40
3/2/92	SS 6	0 to 10	111506	A	SG		58	40	02				-1.62	2.94	0.61	0.51		
3/2/92	SS 6	0 to 10	111506	B	SG		58	40	02				-1.67	2.98	0.59	0.51		
3/2/92	SS 7	0 to 10	111507	A	GS		14	83	03				1.10	1.63	-0.55	1.49	15.64	0.96
3/2/92	SS 8	0 to 10	111508	A	SG		67	33	00				-2.43	2.82	0.71	0.52		
3/2/92	SS 9	0 to 10	111509	A	S		01	97	02				1.15	0.83	0.09	1.59	13.59	0.58
3/2/92	SS 10	0 to 10	111510	A	SG		53	47	00				-1.55	2.75	0.07	0.53		
3/2/92	SS 11	0 to 10	111511	A	S		01	97	02				2.88	0.27	0.21	1.15	16.63	0.37
3/2/92	SS 12	0 to 10	111512	A	SG		42	57	01				-0.72	2.53	-0.50	0.62		
3/2/92	SS 13	0 to 10	111513	A	SG		39	60	01				-0.82	2.91	-0.58	0.53		
3/2/92	SS 14	0 to 10	111514	A	GMS		06	78	16				3.20	1.64	-0.03	4.28	31.48	1.68
3/2/92	SS 15	0 to 10	111515	A	MS	MS	00	53	47	53	31	16	4.97	2.30	0.66	1.30	33.81	4.44
3/2/92	SS 16	0 to 10	111516	A	SG		50	49	01				-1.41	2.50	-0.17	0.61		
3/2/92	SS 17	0 to 10	111517	A	G		85	14	01				-3.47	2.07	0.66	1.44		
3/3/92	SS 18	0 to 10	111518	A	GS		28	67	05				0.13	1.87	-0.24	0.88	17.45	0.67
3/3/92	SS 19	0 to 10	111519	A	CNGS													
3/2/92	SS 21	0 to 10	111521	A	MS	MS	00	60	40	60	25	15	4.68	2.58	0.70	2.09	33.07	3.94
3/2/92	SS 22	0 to 10	111522	A	SG		73	27	00				-2.27	2.19	0.29	0.75		
3/2/92	SS 23	0 to 10	111523	A	SG		37	63	00				-0.13	2.05	-0.43	0.71	4.69	0.61
3/3/92	SS 24	0 to 10	111524	A	CNGS													
3/3/92	SS 25	0 to 10	111525	A	CNGS													
3/3/92	SS 26	0 to 10	111526	A	CNGS													
3/3/92	SS 27	0 to 10	111527	A	MS	SltS	00	77	23	78	21	01	3.53	1.65	0.56	1.26	22.30	2.00
3/3/92	SS 28	0 to 10	111528	A	SG		73	27	00				-2.37	1.96	-0.08	0.73		
3/3/92	SS 29	0 to 10	111529	A	G		87	12	01				-3.60	1.78	0.59	1.59		
3/3/92	SS 30	0 to 10	111530	A	CNGS		87	13	00									
3/3/92	SS 31	0 to 10	111531	A	G		87	13	00				-3.93	1.75	0.82	1.76		
3/3/92	SS 32	0 to 10	111532	A	SG		56	43	01				-0.90	2.29	-0.26	0.70	7.77	1.06
3/3/92	SS 33	0 to 10	111533	A	CNGS													
3/3/92	SS 34	0 to 10	111534	A	SG		37	63	00				-0.95	1.83	-0.63	0.89		
3/3/92	SS 37	0 to 10	111537	A	SG		65	33	02				-1.43	2.25	0.31	0.71	11.75	1.36
3/3/92	SS 38	0 to 10	111538	A	G		98	02	00				-4.87	0.57	0.82	6.12		
3/3/92	SS 39	0 to 10	111539	A	MS	S/SltS	05	85	10	90	09	01	2.15	1.37	0.23	3.77	13.95	0.91
3/3/92	SS 40	0 to 10	111540	A	SG		68	30	02				-0.73	2.41	0.28	0.50		
11/24/92	SS 50	0 to 10	111550	A	SM	SSlt	00	35	65	35	46	19	5.55	2.78	0.44	1.10	44.71	6.16
11/24/92	SS 51	0 to 10	111551	A	SM	SSlt	00	33	67	33	49	18	5.43	2.31	0.32	0.79	50.93	5.99
11/24/92	SS 52	0 to 10	111552	A	SG		59	38	03				-1.77	2.61	0.57	0.56	23.03	1.59
11/24/92	SS 53	0 to 10	111553	A	M	Slt	00	09	91	09	74	17	6.47	1.96	-0.15	1.25	59.41	7.62
11/24/92	SS 54	0 to 10	111554	A	MS	MS	01	84	15	85	09	06	3.00	1.47	0.37	3.10	30.74	1.82
11/24/92	SS 55	0 to 10	111555	A	S	S	00	97	03	97	01	02	2.95	0.25	0.15	1.37	25.82	0.74
11/24/92	SS 56	0 to 10	111556	A	S		00	98	02				2.92	0.20	0.24	1.23	27.45	0.44
11/24/92	SS 57	0 to 10	111557	A	GMS		27	45	28				1.90	4.01	0.06	0.92	29.67	2.84
11/24/92	SS 58	0 to 10	111558	A	GMS	SM	00	19	81	19	49	32	6.95	3.33	0.41	0.88	58.32	8.19
11/24/92	SS 59	0 to 10	111559	A	SM	SSlt	00	28	72	28	54	18	5.55	2.23	0.53	0.84	50.05	5.21
11/24/92	SS 60	0 to 10	111560	A	GS		26	71	03				0.60	2.01	-0.18	0.80	25.86	2.13
11/24/92	SS 61	0 to 10	111561	A	SM	SSlt	00	49	51	49	36	15	5.03	2.45	0.58	1.07	47.14	4.32
11/24/92	SS 62	0 to 10	111562	A	SG		31	64	05				0.37	2.16	-0.11	0.80	22.05	1.81
11/24/92	SS 63	0 to 10	111563	A	SG		32	65	03				-0.13	1.73	0.02	1.07	25.69	2.57
11/24/92	SS 64	0 to 10	111564	A	GMS		06	84	10				2.67	1.79	-0.06	4.06	25.29	1.60
11/24/92	SS 65	0 to 10	111565	A	G		90	10	00				-4.36	1.43	0.95	2.65		
11/24/92	SS 66	0 to 10	111566	A	SM	SSlt	00	45	55	45	40	15	5.07	2.40	0.53	1.21	45.67	5.71
11/24/92	SS 67	0 to 10	111567	A	GM		09	21	70				5.73	3.36	-0.23	1.07	56.53	7.73
11/24/92	SS 68	0 to 10	111568	A	SG/MSG		56	39	05				-1.00	2.74	0.41	0.63		
11/24/92	SS 69	0 to 10	111569	A	SM	SM	00	40	60	40	39	21	5.65	2.77	0.62	1.05	47.90	5.55
11/24/92	SS 70	0 to 10	111570	A	MSG	Slt	00	53	47	53	40	07	4.82	2.26	0.64	0.88	38.09	3.54
11/24/92	SS 71	0 to 10	111571	A	GS		29	66	05				-0.20	1.75	-0.13	1.26	28.37	4.37
11/24/92	SS 72	0 to 10	111572	A	G		92	06	02				-3.95	1.57	0.38	1.50		
11/24/92	SS 73	0 to 10	111573	A	G		92	06	02				-3.18	1.28	0.51	3.42		
11/24/92	SS 74	0 to 10	111574	A	GMS		19	56	25				2.18	3.39	0.03	0.94	24.24	1.96
11/24/92	SS 75	0 to 10	111575	A	SG		46	53	01				-0.50	2.23	-0.34	0.58	15.23	0.69
11/24/92	SS 76	0 to 10	111576	A	SG		77	22	01				-2.95	2.17	0.57	0.59		
11/24/92	SS 77	0 to 10	111577	A	SG		76	24	00				-3.08	2.20	0.65	0.58		

APPENDIX 2. TEXTURE OF SEDIMENT SAMPLES

	SURFICIAL SEDIMENT SAMPLES						G/S/M			S/Slt/C								
DATE	STATION	DEPTH	EPA ID	REP	CLASSIFICATION		%G	%S	%M	%S	%Slt	%C	MEAN	SORT.	SKEW.	KURT.	MOIST.	LOI
COLLECTED	LABEL	CM	#		G/S/M	S/S/C							PHI	PHI			%	%
11/24/92	SS 78	0 to 10	111578	A	MSG		31	61	08				0.28	2.58	0.25	1.26		
11/24/92	SS 79	0 to 10	111579	A	MS		01	87	12	88	07	15	2.20	1.64	0.53	2.57		
11/25/92	SS 80	0 to 10	111580	A	SG		58	42	00				-1.78	2.54	0.31	0.53		
11/25/92	SS 81	0 to 10	111581	A	SG		72	28	00				-1.92	2.17	0.67	0.55		
11/25/92	SS 82	0 to 10	111582	A	G		83	16	01				-3.22	2.01	0.54	1.18		
11/25/92	SS 83	0 to 10	111583	A	GMS		12	68	20				2.50	2.93	0.05	2.20	26.77	2.21
12/8/92	SS 91	0 to 10	111591	A	G/SG		80	20	00				-2.50	1.67	0.16	0.86		
12/8/92	SS 92	0 to 10	111592	A	SG		64	36	00				-1.83	2.12	0.27	0.56	36.10	4.86
12/8/92	SS 93	0 to 10	111593	A	GS		15	83	02				1.40	1.78	-0.51	2.17	20.76	0.79
12/8/92	SS 94	0 to 10	111594	A	SG		73	25	02				-2.35	2.25	0.24	0.75		
12/8/92	SS 95	0 to 10	111595	A	SM	SM	01	39	60	40	39	21	5.62	3.28	0.42	1.11	22.84	1.07
3/23/93	SS 110	0 to 10	111610	A	GMS	Slt	11	49	40	60	28	12	3.83	3.49	0.25	1.14	45.02	4.31
3/23/93	SS 111	0 to 10	111611	A	MS	MS	00	65	35	65	20	15	4.62	2.61	0.71	1.60	40.42	5.97
3/23/93	SS 112	0 to 10	111612	A	SM	SM	00	13	87	13	55	32	6.78	2.76	0.21	1.00	63.68	9.24
3/23/93	SS 113	0 to 10	111613	A	M	M	00	07	93	07	60	33	6.94	2.51	0.23	0.98	63.87	10.70
3/23/93	SS114	0 to 10	111614	A	SM	SSlt	00	15	85	15	70	15	5.99	2.09	0.17	1.05	57.17	9.68
3/23/93	SS 115	0 to 10	111615	A	SM	SM	00	28	72	28	44	28	5.98	2.57	0.22	0.75	54.53	7.64
3/23/93	SS 116	0 to 10	111616	A	GM	SM	16	29	55	45	32	23	4.20	4.45	-0.09	1.10	46.21	6.66
3/23/93	SS 117	0 to 10	111617	A	S		00	98	02				1.77	0.27	-0.18	1.30	28.22	1.04
3/23/93	SS118	0 to 10	111618	A	GS	S	10	83	07	93	04	03	2.27	1.75	-0.09	5.56	30.92	1.31
3/23/93	SS 119	0 to 10	111619	A	S		00	98	02				1.43	0.88	-0.28	1.17	28.75	1.00
3/23/93	SS 120	0 to 10	111620	A	S		02	92	05				1.88	0.81	0.18	1.83	27.24	1.20
3/23/93	SS 121	0 to 10	111621	A	GMS	S	29	63	08	92	05	03	0.37	2.74	-0.41	1.17	21.46	0.98
3/23/93	SS 122	0 to 10	111622	A	S		01	95	04				2.17	0.79	0.05	1.41	26.88	1.10
3/23/93	SS 123	0 to 10	111623	A	SM	SM/SSlt	00	45	55	45	38	17	5.23	2.68	0.53	1.05	49.29	6.24
3/23/93	SS 124	0 to 10	111624	A	GMS	MS	20	62	18	82	12	06	1.23	3.79	-0.17	1.97	47.46	6.16
3/23/93	SS 125	0 to 10	111625	A	MSG/SG	S	66	30	04	96	01	03	-2.13	2.95	0.88	0.51		
3/23/93	SS 126	0 to 10	111626	A	S		03	95	02				1.13	0.90	-0.11	1.23	24.41	1.36
3/23/93	SS 127	0 to 10	111627	A	SM	SSlt	00	24	76	24	54	22	5.95	2.74	0.28	1.11	59.96	11.17
3/23/93	SS 128	0 to 10	111628	A	SG		77	22	01				-3.12	2.53	0.95	0.79		
3/23/93	SS 129	0 to 10	111629	A	SG		67	31	02				-2.18	2.30	0.35	0.57		
3/23/93	SS 130	0 to 10	111630	A	GS		29	64	07				0.78	2.68	-0.43	0.63		
3/23/93	SS 131	0 to 10	111631	A	GS		15	83	02				1.07	1.69	-0.60	3.94	25.51	1.15
3/23/93	SS 132	0 to 10	111632	A	G		83	15	02				-3.10	1.76	0.76	1.19		
3/23/93	SS 133	0 to 10	111633	A	G		89	10	01				-3.53	1.48	0.78	1.19		
3/23/93	SS 134	0 to 10	111634	A	SG		76	22	02				-2.43	2.27	0.46	0.98		
3/23/93	SS 135	0 to 10	111635	A	SG		75	23	02				-2.57	3.02	0.81	0.77		
3/23/93	SS 136	0 to 10	111636	A	S		00	99	01				1.58	0.45	-0.12	1.39	24.93	1.19
3/23/93	SS 137	0 to 10	111637	A	GS		13	86	01				0.58	1.22	-0.38	1.23	26.49	1.09
3/23/93	SS 138	0 to 10	111638	A	SG	S	59	38	03	96	03	01	-1.60	3.23	0.37	0.51	22.16	0.86
3/23/93	SS 139	0 to 10	111639	A	S		00	97	03				3.08	0.36	0.00	1.33	24.57	0.58
3/23/93	SS 140	0 to 10	111640	A	CNGS													
3/23/93	SS 141	0 to 10	111641	A	MS	CS	00	87	13	87	04	09	3.23	1.68	0.46	6.35	28.75	0.82
3/23/93	SS 142	0 to 10	111642	A	GS		26	73	01				0.30	2.30	-0.71	1.00	19.29	0.86
3/23/93	SS 143	0 to 10	111643	A	SG		66	33	01				-2.75	2.62	0.71	0.51	21.42	0.80
3/23/93	SS 144	0 to 10	111644	A	GS		16	80	04				1.05	1.90	-0.49	2.06	29.06	1.10
3/23/93	SS 145	0 to 10	111645	A	SG		76	23	01				-2.82	2.72	0.83	0.77	21.67	0.91
3/23/93	SS 146	0 to 10	111646	A	G		91	06	03				-3.93	1.43	0.92	2.00		
3/23/93	SS 147	0 to 10	111647	A	SG		67	32	01				-2.37	2.74	0.51	0.57	29.89	3.27
3/23/93	SS 148	0 to 10	111648	A	SG		47	50	03				-1.42	2.66	-0.37	0.56	23.76	1.51
3/23/93	SS 149	0 to 10	111649	A	SG		32	67	01				-0.60	2.49	-0.62	0.68	24.94	1.23
3/23/93	SS 150	0 to 10	111650	A	MSG/SG		78	19	03				-2.46	2.39	0.68	1.10		
3/23/93	SS 151	0 to 10	111651	A	S		03	92	05				2.00	0.99	-0.02	1.91	28.51	1.13
3/23/93	SS 170	0 to 10	111670	A	GMS		20	50	30				2.45	4.20	0.02	1.18		
3/23/93	SS 171	0 to 10	111671	A	GMS	MS	06	71	23	77	14	09	1.92	2.25	0.21	1.54		
7/1/93	SS 200	0 to 10	111700	A	SG		38	59	03				0.48	2.55	-0.45	0.61	23.38	3.71
7/1/93	SS 201	0 to 10	111701	A	SM	SM	00	49	51	49	32	19	5.51	2.87	0.61	1.17	50.46	4.79
7/1/93	SS 202	0 to 10	111702	A	SM	SSlt	01	40	59	40	46	14	4.97	2.27	0.66	1.92	39.40	3.99
7/1/93	SS 203	0 to 10	111703	A	S		03	96	01				1.17	0.77	-0.32	1.25	25.80	0.33
7/1/93	SS 204	0 to 10	111704	A	MS	MS	00	78	22	78	13	09	3.60	2.01	0.57	2.94	43.98	3.20
7/1/93	SS 205	0 to 10	111705	A	MS	MS	02	61	37	62	23	15	4.40	2.90	0.54	1.61	40.56	3.45
7/1/93	SS 206	0 to 10	111706	A	MS	SltS	01	60	39	61	30	09	4.53	2.24	0.50	1.02	36.95	3.44
7/1/93	SS 207	0 to 10	111707	A	SM	SM	00	33	67	33	45	22	5.67	2.50	0.53	0.90	59.96	6.91
7/1/93	SS 208	0 to 10	111708	A	SM	SM	00	28	72	28	41	31	6.67	3.34	0.49	0.80	55.28	6.42
7/1/93	SS 209	0 to 10	111709	A	GM		14	32	54				4.82	4.07	0.00	1.20	42.69	3.71
7/1/93	SS 210	0 to 10	111710	A	SM	SM	00	46	54	46	31	23	5.63	3.24	0.64	0.97	51.27	6.65
7/1/93	SS 211	0 to 10	111711	A	SG		74	25	01				-2.87	2.52	0.72	0.80	27.40	0.36

	APPENDIX 2.	TEXTURE OF SEDIMENT SAMPLES																	
	SURFICIAL SEDIMENT SAMPLES							G/S/M			S/Slt/C								
DATE	STATION	DEPTH	EPA ID	REP	CLASSIFICATION			%G	%S	%M	%S	%Slt	%C	MEAN	SORT.	SKEW.	KURT.	MOIST.	LOI
COLLECTED	LABEL	CM	#		G/S/M	S/S/C								PHI	PHI			%	%
7/1/93	SS 211	0 to 10	111711	B	SG			51	47	02				-1.23	2.43	-0.04	0.49	25.07	0.72
7/1/93	SS 212	0 to 10	111712	A	SM	SM		00	38	62	37	35	28	6.17	3.37	0.43	0.86	58.04	6.49
7/1/93	SS 213	0 to 10	111713	A	SG			74	24	02				-2.73	2.50	0.56	0.76	33.78	1.80
7/1/93	SS 214	0 to 10	111714	A	MSG			33	37	30				1.97	5.41	0.18	0.92	40.58	5.08
7/1/93	SS 215	0 to 10	111715	A	SM	SM		00	35	65	35	35	30	6.33	3.44	0.46	0.80	53.15	8.31
7/1/93	SS 216	0 to 10	111716	A	SM	SM		02	33	65	35	40	25	5.73	3.11	0.47	0.98	56.58	7.48
7/1/93	SS 217	0 to 10	111717	A	GMS			10	72	18				2.77	2.92	0.10	3.07	42.16	3.34
7/1/93	SS 218	0 to 10	111718	A	SG			51	49	00				-0.97	2.47	0.01	0.69	14.75	0.94
7/1/93	SS 219	0 to 10	111719	A	SG			50	48	02				-1.17	2.49	-0.06	0.58	17.60	0.59
7/1/93	SS 220	0 to 10	111720	A	G			84	16	00				-3.67	2.15	0.91	1.29	14.44	1.13
7/1/93	SS 221	0 to 10	111721	A	G			83	17	00				-2.70	2.00	0.63	1.13	12.31	0.55
7/1/93	SS 223	0 to 10	111723	A	MSG			47	47	06				-0.17	2.74	0.31	0.73	22.52	1.20
7/1/93	SS 224	0 to 10	111724	A	SG			34	66	00				-0.17	2.51	-0.53	0.73	21.94	1.09
7/1/93	SS 226	0 to 10	111726	A	GS			16	79	05				1.63	2.35	-0.60	3.83	24.71	1.04
7/1/93	SS 227	0 to 10	111727	A	GS			10	86	04				1.78	1.68	-0.33	2.33	25.62	3.14
7/1/93	SS 228	0 to 10	111728	A	SG			55	44	01				-1.83	2.78	0.18	0.52	19.85	0.35
7/1/93	SS 229	0 to 10	111729	A	GS			24	76	00				0.27	1.89	-0.60	0.91	25.05	1.04
8/13/93	SS 250	0 to 10	111750	A	SM	SM		02	13	85	15	57	28	6.40	2.61	0.24	0.97	45.77	6.60
8/13/93	SS 251	0 to 10	111751	A	SM	SSlt		01	44	55	45	39	16	5.13	2.26	0.55	1.25	38.08	3.80
8/13/93	SS 252	0 to 10	111752	A	MS	SltS		04	57	39	61	29	10	4.60	2.60	0.32	1.54	31.29	2.78
8/13/93	SS 253	0 to 10	111753	A	G														
8/13/93	SS 254	0 to 10	111754	A	G			83	15	02				-2.50	1.48	0.40	0.98	25.50	0.99
8/13/93	SS 255	0 to 10	111755	A	SM	SM		00	16	84	16	54	30	6.83	3.18	0.49	0.89	48.35	6.67
8/13/93	SS 256	0 to 10	111756	A	M	M		00	07	93	07	56	37	7.57	3.15	0.37	0.80	46.24	5.84
8/13/93	SS 257	0 to 10	111757	A	SM	SM		00	20	80	20	50	30	6.33	2.54	0.36	0.70	46.74	5.69
8/13/93	SS 258	0 to 10	111758	A	SM	SS		03	15	82	17	66	17	6.32	2.10	-0.46	0.99	53.47	6.72
8/13/93	SS 259	0 to 10	111759	A	SM	SSlt		02	36	62	38	44	18	5.37	2.41	0.30	0.86	47.28	5.27
8/13/93	SS 260	0 to 10	111760	A	SM	SM		00	31	69	31	42	27	6.33	3.23	0.63	0.88	46.28	5.26
8/13/93	SS 261	0 to 10	111761	A	SM	SM		02	42	56	44	35	21	5.37	2.28	0.50	0.80	45.19	4.65
8/13/93	SS 262	0 to 10	111762	A	MS	MS		00	74	26	74	15	11	3.97	2.25	0.75	2.61	32.33	2.53
8/13/93	SS 263	0 to 10	111763	A	SM	SSlt		01	21	78	22	74	04	5.70	1.74	-0.19	0.67	47.19	5.06
8/13/93	SS 264	0 to 10	111764	A	M	M		00	09	91	09	57	34	7.23	3.16	0.45	0.81	54.95	6.38
8/13/93	SS 265	0 to 10	111765	A	SG			44	50	06				-0.43	2.59	0.16	1.00	27.27	0.61
8/13/93	SS 266	0 to 10	111766	A	SM	SM		00	20	80	20	50	30	6.80	3.19	0.49	0.83	49.68	6.62
8/13/93	SS 267	0 to 10	111767	A	SM	SM		02	29	69	31	45	24	5.67	2.52	0.13	0.82	50.10	5.91
	PH SERIES																		
9/16/91	PH 1	0 to 10	110221	A	MS	MS		00	85	15	85	10	05	3.33	1.28	0.56	5.33	31.89	2.38
9/16/91	PH 1	0 to 10	110221	B	MS	MS		00	85	15	85	09	06	3.37	1.16	0.47	4.92	31.31	2.24
9/16/91	PH 1	0 to 10	110221	C	MS	MS		00	87	13	87	08	05	3.23	1.09	0.40	3.69	37.13	2.39
9/16/91	PH 1	0 to 10	110221	D	MS	MS		00	87	13	87	08	05	3.33	1.28	0.42	5.41	26.45	1.99
9/16/91	PH 2	0 to 10	110230	A	SM	SM		00	25	75	25	46	29	6.60	3.22	0.53	0.80	61.06	6.83
9/16/91	PH 2	0 to 10	110230	B	SM	SM		00	23	77	23	46	31	6.63	3.23	0.43	0.80	63.36	6.78
9/16/91	PH 2	0 to 10	110230	C	SM	SM		00	33	67	33	41	26	6.10	3.16	0.61	0.89	56.18	6.28
9/16/91	PH 2	0 to 10	110230	D	SM	SM		00	27	73	27	46	27	6.33	3.14	0.57	0.86	61.39	7.03
9/16/91	PH 3	0 to 10	110231	A	SM	SM		00	48	52	48	34	18	5.50	2.86	0.68	1.39	50.59	5.09
9/16/91	PH 3	0 to 10	110231	B	SM	SSlt		00	47	53	47	37	16	5.23	2.76	0.62	1.50	51.92	4.82
9/16/91	PH 3	0 to 10	110231	C	MS	MS		00	55	45	55	29	16	4.90	2.77	0.62	1.71	48.89	4.18
9/16/91	PH 3	0 to 10	110231	D	SM	SSlt		00	41	59	41	41	18	5.30	2.74	0.63	1.39	53.94	5.65
9/11/91	PH 4	0 to 10	110222	A	M	M		00	07	93	07	51	42	7.77	3.10	0.33	0.73	65.99	8.17
9/11/91	PH 4	0 to 10	110222	B	M	M		00	06	94	06	51	43	7.97	3.14	0.27	0.73	70.47	8.39
9/11/91	PH 4	0 to 10	110222	C	M	M		00	09	91	09	42	49	8.40	3.17	0.13	0.73	66.65	8.52
9/11/91	PH 4	0 to 10	110222	D	M	M		00	07	93	07	46	47	8.10	3.12	0.16	0.79	68.24	8.42
9/17/91	PH 5	0 to 10	110232	A	SM	SM		00	12	88	12	45	43	7.83	3.27	0.23	0.76	70.64	8.43
9/17/91	PH 5	0 to 10	110232	B	M	M		00	08	92	08	51	41	7.70	3.18	0.30	0.71	67.58	8.46
9/17/91	PH 5	0 to 10	110232	C	M	M		00	08	92	08	51	41	7.67	3.18	0.33	0.72	69.65	8.84
9/17/91	PH 5	0 to 10	110232	D	M	M		00	07	93	07	51	42	7.73	3.17	0.31	0.73	68.75	8.62
9/12/91	PH 6	0 to 10	110224	A	M	M		00	06	94	06	52	42	7.90	3.11	0.26	0.78	67.10	7.80
9/12/91	PH 6	0 to 10	110224	B	M	M		00	07	93	07	54	39	7.63	3.14	0.40	0.74	66.51	7.97
9/12/91	PH 6	0 to 10	110224	C	M	M		00	05	95	05	49	46	8.23	3.06	0.22	0.74	66.76	8.29
9/12/91	PH 6	0 to 10	110224	D	M	M		00	06	94	06	53	41	7.80	3.12	0.30	0.74	67.67	7.69
9/12/91	PH 7	0 to 10	110226	A	M	M		00	07	93	07	50	43	7.83	3.22	0.29	0.71	66.13	9.02
9/12/91	PH 7	0 to 10	110226	B	M	M		00	07	93	07	49	44	7.93	3.16	0.23	0.73	69.68	9.17
9/12/91	PH 7	0 to 10	110226	C	M	M		00	07	93	07	51	42	7.87	3.09	0.29	0.74	68.71	9.12
9/12/91	PH 7	0 to 10	110226	D	M	M		00	07	93	07	51	42	7.77	3.12	0.33	0.74	67.13	9.25
9/12/91	PH 8	0 to 10	110225	A	M	M		00	07	93	07	52	41	7.73	3.13	0.35	0.76	62.05	8.88

APPENDIX 2. TEXTURE OF SEDIMENT SAMPLES

	SURFICIAL SEDIMENT SAMPLES						/S/M			S/Sil/C								
DATE COLLECTED	STATION LABEL	DEPTH CM	EPA ID #	REP	CLASSIFICATION G/S/M	S/S/C	%G	%S	%M	%S	%Sil	%C	MEAN PHI	SORT. PHI	SKEW.	KURT.	MOIST. %	LOI %
9/12/91	PH 8	0 to 10	110225	B	M	M	00	06	94	06	50	44	7.93	3.08	0.27	0.79	63.85	8.79
9/12/91	PH 8	0 to 10	110225	C	M	M	00	06	94	06	53	41	7.77	3.09	0.30	0.75	64.35	8.85
9/12/91	PH 8	0 to 10	110225	D	M	M	00	08	92				7.50	3.06	0.37	0.81	61.64	8.55
9/16/91	PH 9	0 to 10	110229	A	GMS		08	52	40				4.50	3.95	0.40	1.30	47.24	4.26
9/16/91	PH 9	0 to 10	110229	B	MS	MS	00	58	42	58	22	20	4.83	3.89	0.48	1.29	49.90	5.23
9/16/91	PH 9	0 to 10	110229	C	MS	MS	00	69	31	69	17	14	4.00	3.23	0.53	1.74	37.69	3.76
9/16/91	PH 9	0 to 10	110229	D	MS	MS	00	72	28	72	15	13	3.80	3.20	0.48	2.27	34.38	3.59
9/11/91	PH 10	0 to 10	110220	A	SM	SM	00	29	71	29	37	34	6.73	3.52	0.34	0.78	60.31	7.77
9/11/91	PH 10	0 to 10	110220	B	SM	SM	00	31	69	31	38	31	6.47	3.40	0.48	0.77	53.10	6.61
9/11/91	PH 10	0 to 10	110220	C	SM	SM	00	25	75	25	38	37	7.00	3.53	0.26	0.76	59.81	8.25
9/11/91	PH 10	0 to 10	110220	D	SM	SM,	00	26	74	26	39	35	6.83	3.48	0.32	0.79	56.62	7.30
9/10/91	PH 11	0 to 10	110216	A	MS	MS	00	66	34	66	20	14	4.37	2.62	0.72	1.81	42.96	4.89
9/10/91	PH 11	0 to 10	110216	B	GMS		17	54	29				2.40	4.44	-0.04	2.81	39.23	3.94
9/10/91	PH 11	0 to 10	110216	C	MS	MS	00	75	25	75	15	10	3.70	2.03	0.65	2.37	32.30	3.31
9/10/91	PH 11	0 to 10	110216	D	MS	MS	00	68	32	68	19	13	4.13	2.32	0.74	2.22	34.45	3.59
9/11/91	PH 12	0 to 10	110218	A	MS	MS	00	73	27	73	17	10	3.80	2.29	0.59	2.29	30.59	2.86
9/11/91	PH 12	0 to 10	110218	B	MS	MS	00	75	25	75	15	10	3.77	2.26	0.65	2.72	26.55	2.67
9/11/91	PH 12	0 to 10	110218	C	MS	MS	00	66	34	66	20	14	4.43	2.67	0.72	1.99	35.42	3.54
9/11/91	PH 12	0 to 10	110218	D	MS	MS	00	64	36	64	22	14	4.40	2.77	0.65	1.86	32.64	3.78
9/11/91	PH 13	0 to 10	110219	A	SM	SM	00	32	68	32	38	30	6.27	3.27	0.45	0.84	64.52	8.63
9/11/91	PH 13	0 to 10	110219	B	SM	SM	00	16	84	16	44	40	7.43	3.27	0.24	0.80	68.22	12.85
9/11/91	PH 13	0 to 10	110219	C	SM	SM	00	13	87	13	44	43	7.60	3.18	0.17	0.82	76.79	11.40
9/11/91	PH 13	0 to 10	110219	D	SM	SM	00	36	64	36	38	26	6.30	3.13	0.38	0.70	48.62	6.13
9/10/91	PH 14	0 to 10	110214	A	MS	MS	00	81	19	81	12	07	3.20	1.97	0.38	3.85	27.42	2.50
9/10/91	PH 14	0 to 10	110214	B	MS	MS	00	80	20	80	12	08	3.30	2.05	0.34	3.69	27.54	2.43
9/10/91	PH 14	0 to 10	110214	C	MS	MS	00	86	14	86	09	05	3.10	1.31	0.41	2.82	26.85	1.61
9/10/91	PH 14	0 to 10	110214	D	MS	MS	00	93	07	93	05	02	2.80	0.74	0.16	1.49	24.28	1.33
9/10/91	PH 15	0 to 10	110215	A	SM	SM	00	41	59	41	35	24	5.63	3.12	0.51	0.97	54.08	6.21
9/10/91	PH 15	0 to 10	110215	B	SM	SM	00	41	59	41	34	25	5.93	3.32	0.61	0.93	51.72	5.87
9/10/91	PH 15	0 to 10	110215	C	SM	SM	00	42	58	42	35	23	5.55	3.05	0.58	1.00	45.02	5.88
9/10/91	PH 15	0 to 10	110215	D	SM	SM	00	40	60	40	35	25	5.80	3.18	0.56	0.90	45.11	5.81
9/10/91	PH 16	0 to 10	110212	A	MS	MS	00	86	14	86	08	06	3.10	1.41	0.44	3.10	25.58	1.72
9/10/91	PH 16	0 to 10	110212	B	MS	MS	00	73	27	73	16	11	3.77	2.19	0.71	2.23	25.67	1.73
9/10/91	PH 16	0 to 10	110212	C	S	S	00	91	09	91	06	03	2.87	0.82	0.32	1.55	23.37	1.29
9/10/91	PH 16	0 to 10	110212	D	MS	MS	00	85	15	85	11	04	3.13	1.12	0.47	2.32	23.72	1.66
9/10/91	PH 17	0 to 10	110217	A	MS	MS	00	53	47	53	30	17	5.03	2.88	0.64	1.30	40.08	4.24
9/10/91	PH 17	0 to 10	110217	B	MS	MS	00	57	43	57	27	16	4.80	2.84	0.65	1.58	38.33	3.95
9/10/91	PH 17	0 to 10	110217	C	SM	SM	00	46	54	46	32	22	5.50	3.18	0.57	0.99	43.93	4.79
9/10/91	PH 17	0 to 10	110217	D	SM	SM	00	47	53	47	30	23	5.60	3.25	0.63	0.95	44.80	4.40
9/9/91	PH 18	0 to 10	110211	A	GMS		15	48	37				3.17	4.11	0.23	0.99	41.35	5.53
9/9/91	PH 18	0 to 10	110211	B	MSG		41	51	08				-0.40	2.40	0.31	1.35	18.12	2.33
9/9/91	PH 18	0 to 10	110211	C	GMS		26	53	21				1.00	4.61	0.02	1.36	40.17	10.21
9/9/91	PH 18	0 to 10	110211	D	GMS		27	41	32				2.23	4.23	0.07	0.81	29.48	3.51
9/9/91	PH 19	0 to 10	110210	A	SM	SM	00	33	67	33	45	22	6.00	3.13	0.60	1.04	56.70	6.89
9/9/91	PH 19	0 to 10	110210	B	SM	SM	00	35	65	35	42	23	6.00	3.14	0.60	0.95	58.67	7.24
9/9/91	PH 19	0 to 10	110210	C	SM	SM	00	49	51	49	34	17	5.20	2.79	0.64	1.59	45.79	4.92
9/9/91	PH 19	0 to 10	110210	D	SM	SM	00	50	50	50	33	17	5.10	2.37	0.62	1.09	41.86	4.48
9/12/91	PH 20	0 to 10	110223	A	GMS		08	64	28				3.67	2.76	0.21	3.28	28.25	2.33
9/12/91	PH 20	0 to 10	110223	B	MS	MS	00	60	40	60	26	14	4.83	2.69	0.67	1.50	31.93	2.86
9/12/91	PH 20	0 to 10	110223	C	MS	MS	00	70	30	70	20	10	3.83	2.01	0.57	2.32	31.67	2.47
9/12/91	PH 20	0 to 10	110223	D	MS	MS	00	63	37	63	25	12	4.30	3.06	0.38	2.29	35.06	2.97
9/10/91	PH 21	0 to 10	110213	A	MS	MS	00	58	42	58	30	12	4.63	2.31	0.67	1.37	38.89	3.73
9/10/91	PH 21	0 to 10	110213	B	MS	MS	00	52	48	52	29	19	5.30	2.99	0.76	1.10	39.82	4.10
9/10/91	PH 21	0 to 10	110213	C	MS	MS	00	56	44	56	27	17	5.07	2.85	0.79	1.41	39.28	3.62
9/10/91	PH 21	0 to 10	110213	D	MS	MS	00	53	47	53	28	19	5.30	2.93	0.73	1.26	41.53	3.96
	YR SERIES																	
9/13/91	YR 22	0 to 10	110228	A	S	S	00	94	06	94	04	02	2.43	1.17	-0.34	2.87	38.00	2.00
9/13/91	YR 22	0 to 10	110228	B	S	S	00	94	06	94	03	03	2.63	0.80	0.05	2.25	24.00	1.00
9/13/91	YR 22	0 to 10	110228	C	GS		07	86	07				2.53	1.59	-0.32	4.68	23.00	1.00
9/13/91	YR 22	0 to 10	110228	D	GS		10	85	05				2.13	1.76	-0.47	3.48	32.00	1.00
9/13/91	YR 23	0 to 10	110227	A	S	S	00	92	08	92	05	03	2.90	0.75	0.56	5.19	22.00	1.00
9/13/91	YR 23	0 to 10	110227	B	S	S	00	98	02	98	01	01	2.77	0.29	-0.05	1.50	28.00	1.00
9/13/91	YR 23	0 to 10	110227	C	S	S	00	98	02	98	01	01	2.63	0.31	0.27	1.64	24.00	1.00
9/13/91	YR 23	0 to 10	110227	D	S	S	00	93	07	93	04	03	2.73	0.59	0.44	4.23	27.00	1.00

APPENDIX 2. TEXTURE OF SEDIMENT SAMPLES

	SURFICIAL SEDIMENT SAMPLES						G/S/M			S/Slt/C								
DATE	STATION	DEPTH	EPA ID	REP	CLASSIFICATION		%G	%S	%M	%S	%Slt	%C	MEAN	SORT.	SKEW.	KURT.	MOIST.	LOI
COLLECTED	LABEL	CM	#		/S/M	S/S/C							PHI	PHI			%	%
	NHPA SERIES																	
JULY, 1993	NHPA 2	0 to 5	111802		M	M	00	08	92	08	61	31	7.13	3.06	0.51	0.91	50.97	6.92
JULY, 1993	NHPA 3	0 to 5	111803		SM	SM	03	27	70	30	38	32	6.13	3.01	0.01	0.82	53.50	7.05
JULY, 1993	NHPA 4	0 to 5	111804		SM	SM	00	36	64	36	36	28	6.13	3.30	0.49	0.85	54.72	6.53
JULY, 1993	NHPA 5	0 to 5	111805		MS	MS/SltS	00	64	36	64	25	11	4.23	2.07	0.62	2.38	39.89	4.32
JULY, 1993	NHPA 6	0 to 5	111806		MS	MS	00	58	42	58	28	14	4.67	2.43	0.72	2.24	41.24	4.14
JULY, 1993	NHPA 16	0 to 5	111816		M/SM	M/SM	00	10	90	10	56	34	7.08	2.76	0.22	1.01	62.07	7.90
	MS SERIES*																	
10/16/92	MS 1	0 to 5	111401		M	M	00	06	94	06	41	53	8.58	2.94	0.11	0.89	73.10	20.10
10/16/92	MS 2	0 to 5	111402		M	M	00	07	93	07	53	40	7.77	2.95	0.21	0.96	78.80	42.60
10/16/92	MS 3	0 to 5	111403		M	M	00	05	95	05	49	46	8.17	2.90	0.22	0.81	74.70	28.60
10/1/92	MS 4	0 to 5	111404		GMS		23	44	33				2.20	4.50	0.05	1.08	55.90	18.70
10/1/92	MS 5	0 to 5	111405		GMS		27	55	18				1.33	3.92	0.01	1.13	47.30	10.80
10/1/92	MS 6	0 to 5	111406		SM	SSlt	00	22	78	22	60	18	5.72	2.69	0.51	1.36	68.50	32.00
10/1/92	MS 7	0 to 5	111407		SM	SSlt	00	38	62	38	45	17	5.27	2.44	0.32	1.03	71.80	28.40
10/1/92	MS 9	0 to 5	111409		SM	SM	00	14	86	14	50	36	7.18	3.25	0.29	0.87	58.70	17.80
10/1/92	MS 10	0 to 5	111410		MSG/GMS		30	52	18				0.60	3.70	0.15	1.43	43.80	9.10
10/16/92	MS 11	0 to 5	111411		SM	SSlt	00	36	64	36	45	19	5.42	2.78	0.30	1.04	68.70	24.90
10/16/92	MS 12	0 to 5	111412		MSG/GMS		30	42	28				1.60	4.42	0.12	0.96	47.30	18.50
10/16/92	MS 13	0 to 5	111413		GM		07	24	69				5.75	4.29	-0.03	1.13	73.40	38.00

* FOR THE MS SERIES ONLY - T HE % MOISTURE AND % LOI WAS NOT MEASURED
A SPLIT OF THE SAMPLE USED FOR THE GRAIN SIZE ANALYSIS.
THE VALUES ARE THE MEANS FOR THE MOIST/LOI MEASURED AT
SEVERAL DEPTHS DOWN THE CORE THE GRAIN SIZE SAMPLE CAME FROM.

	SUBSURFACE SEDIMENT SAMPLES																	
	1991 GRAVITY CORE SAMPLES - PHASE 1 CORES																	
9/19/91	PH 1	0 to 10	110001	A	MS	MS	00	82	18	82	11	7	3.48	1.38	0.61	4.55	26.62	2.33
9/19/91	PH 1	10 to 20	110001	B	MS	MS	00	80	20	80	13	7	3.60	1.46	0.57	3.59	29.29	2.15
9/18/91	PH 2	0 to 8	110002	A	SM	SM	00	17	83	17	48	35	6.98	3.29	0.45	0.76	56.45	7.87
9/18/91	PH 2	30 to 38	110002	B	SM	SSlt	00	36	64	36	47	17	5.27	2.55	0.52	1.28	41.03	5.36
9/18/91	PH 2	70 to 78	110002	C	SM	SM	00	32	68	32	43	25	6.20	3.37	0.54	0.98	44.86	6.25
9/18/91	PH 3	0 to 8	110003	A	MS	SltS	00	59	41	59	28	13	4.43	2.34	0.61	2.34	41.27	4.56
9/18/91	PH 3	8 to 16	110003	B	MS	SltS	00	56	44	56	29	15	5.03	2.71	0.73	1.85	45.81	4.93
9/16/91	PH 4	0 to 10	110004	A	M	M	00	06	94	65	24	2	7.77	3.18	0.28	0.72	63.09	9.58
9/16/91	PH 4	10 to 20	110004	B	M	M	00	04	96	44	94	7	7.37	2.39	-0.03	0.82	61.46	9.04
9/18/91	PH 5	0 to 10	110005	A	M	M	00	06	94	6	49	45	7.82	3.08	0.29	0.83	62.57	9.67
9/18/91	PH 5	10 to 20	110005	B	SM	SM	00	11	89	11	48	41	7.63	3.20	0.28	0.86	60.28	9.04
9/18/91	PH 5	20 to 30	110005	C	M	M	00	09	91	9	50	41	7.57	3.11	0.29	0.78	62.89	8.19
9/18/91	PH 6	0 to 7	110006	A	M	Slt	00	06	94	6	60	34	7.07	2.62	0.27	0.98	59.08	6.46
9/18/91	PH 6	20 to 27	110006	B	M	M	00	05	95	5	54	41	7.70	3.03	0.26	0.82	23.28	1.37
9/18/91	PH 7	0 to 8	110007	A	M	M	00	06	94	6	50	44	7.83	3.09	0.24	0.79	63.76	9.66
9/18/91	PH 7	25 to 33	110007	B	GMS	SSlt	05	28	67	34	54	12	4.98	3.17	-0.28	1.04	49.75	5.14
9/18/91	PH 7	42 to 50	110007	C	SM	SM	01	14	85	15	49	36	7.18	3.45	0.17	1.02	22.81	1.27
9/18/91	PH 8	0 to 8	110008	A	M	M	00	05	95	5	58	37	6.98	2.33	0.11	0.96	58.81	9.06
9/18/91	PH 8	16 to 24	110008	B	SM	SM	01	10	89	11	52	37	6.78	2.36	-0.14	1.09	58.14	12.24
9/26/91	PH 10	0 to 8	110010	A	SM	SSlt	01	38	61	39	56	5	4.24	2.79	-0.30	0.93	50.13	5.97
9/26/91	PH 10	29 to 30		F	GM	SltS	05	67	28				2.52	2.36	-0.04	0.68	45.46	2.50
9/26/91	PH 10	30 to 38	110010	B	SM	SSlt	03	29	68	32	56	12	4.95	3.04	-0.32	1.18	52.21	7.03

APPENDIX 2. TEXTURE OF SEDIMENT SAMPLES

DATE COLLECTED	STATION LABEL	DEPTH CM	EPA ID #	REP	CLASSIFICATION /S/M	CLASSIFICATION S/S/C	%G	/S/M %S	/S/M %M	S/Slt/C %S	S/Slt/C %Slt	S/Slt/C %C	MEAN PHI	SORT. PHI	SKEW.	KURT.	MOIST. %	LOI %
	SURFICIAL SEDIMENT SAMPLES																	
9/26/91	PH 10	60 to 68	110010	C	SM	SSlt	02	41	57	43	52	5	3.92	3.06	-0.37	0.64	53.14	6.15
9/26/91	PH 10	90 to 98	110010	D	SM	SSlt	01	30	69	31	52	17	5.53	2.91	-0.13	1.08	52.52	6.25
9/26/91	PH 10	132 to 138	110010	E	GMS		07	39	54				4.52	4.26	-0.04	0.76	42.17	7.18
9/26/91	PH 10	130 to 132		G	GM		13	52	35				2.00	3.06	0.37	0.68	36.91	10.06
9/19/91	PH 11	0 to 8	110011	A	MS	MS	00	65	35	65	20	15	4.52	2.60	0.80	1.45	33.51	4.71
9/19/91	PH 11	20 to 28	110011	B	GMS		09	61	30				3.53	2.42	0.10	4.37	24.65	1.66
9/19/91	PH 11	50 to 58	110011	C	MS	CS	00	53	47	53	43	4	4.43	1.53	0.54	1.32	26.24	0.34
9/26/91	PH 12	0 to 8	110012	A	MS	CS	00	69	31	69	23	8	4.32	2.15	0.62	1.43	36.23	3.36
9/26/91	PH 12	10 to 18	110012	B	MS	MS	01	63	36	64	22	14	4.43	2.44	0.56	1.24	36.50	3.15
9/26/91	PH 12	20 to 28	110012	C	SM	SM	00	39	61	39	34	27	5.58	3.04	0.33	0.80	45.60	6.54
9/26/91	PH 13	0 to 8	110013	A	MS	SSlt	01	59	40	60	34	6	4.48	2.03	0.56	0.97	40.49	3.99
9/26/91	PH 13	20 to 28	110013	B	MS	SSlt	01	53	46	54	39	7	4.43	2.19	0.39	0.81	44.77	3.94
9/26/91	PH 13	40 to 48	110013	C	M	M	00	01	99				7.52	1.87	-0.08	0.82	20.55	0.89
9/16/91	PH 14	0 to 8	110014	A	MS	MS	00	77	23	77	14	9	3.53	2.55	0.56	2.91	28.58	2.62
9/16/91	PH 14	20 to 28	110014	B	MS	MS	01	54	45	55	27	18	4.93	2.49	0.58	0.86	40.39	4.28
9/16/91	PH 14	40 to 48	110014	C	SM	SM	00	36	64	36	38	26	5.59	2.33	0.19	0.60	32.35	2.96
9/16/91	PH 15	0 to 8	110015	A	MS	MS	00	56	44	56	27	17	4.92	2.86	0.63	1.46	39.83	5.75
9/16/91	PH 15	30 to 38	110015	B	SM	SM	00	48	52	48	33	19	5.32	2.94	0.65	1.17	48.34	7.11
9/16/91	PH 15	60 to 68	110015	C	SM	SM	00	18	82	18	42	40	7.35	3.43	0.22	0.77	52.58	8.76
9/16/91	PH 15	100 to 108	110015	D	SM	SM	00	22	78	22	39	39	7.23	3.47	0.19	0.80	51.59	9.89
9/16/91	PH 16	0 to 8	110016	A	MS	MS	00	87	13	87	8	5	3.13	1.29	0.29	2.86	25.05	1.09
9/16/91	PH 16	20 to 28	110016	B	MS	MS	00	86	14	86	9	5	3.00	1.42	0.44	2.62	26.87	1.06
9/16/91	PH 16	50 to 58	110016	C	SM	SM	00	27	73	27	41	32	6.08	2.38	0.30	0.60	38.67	4.80
9/16/91	PH 16	100 to 108	110016	D	SM	SM	00	26	74	26	43	31	5.96	2.13	0.09	0.58	43.58	5.46
9/16/91	PH 17	0 to 8	110017	A	MS	MS	01	51	48	52	31	17	5.05	2.81	0.65	1.48	42.22	4.74
9/16/91	PH 17	30 to 38	110017	B	SM	SM	04	38	58				5.90	3.61	0.38	0.85	50.66	7.72
9/16/91	PH 17	70 to 78	110017	C	SM	SM	00	34	66	34	33	33	6.43	3.57	0.35	0.78	49.35	6.47
9/16/91	PH 19	0 to 8	110019	A	SM	SM	00	28	72	28	45	27	6.23	3.13	0.60	0.90	49.38	7.76
9/16/91	PH 19	20 to 28	110019	B	SM	SM	00	29	71	29	43	28	6.29	3.16	0.57	0.83	51.38	6.08
9/16/91	PH 19	50 to 58	110019	C	SM	SM	00	34	66	34	34	32	6.10	2.96	0.42	0.73	48.86	7.86
11/15/91	PH 20	0 to 8	110020	A	MS	MS	01	54	45	55	28	17	5.08	2.93	0.68	1.37	35.36	3.79
11/15/91	PH 20	20 to 28	110020	B	SM	MS	01	49	50	50	30	20	5.32	3.04	0.63	1.13	33.13	3.38
11/15/91	PH 20	50 to 58	110020	C	SM	SC	00	44	56	44	42	14	4.88	1.86	0.65	2.13	24.57	2.67
11/15/91	PH 21	0 to 8	110021	A	SM	SM	00	47	53	47	31	22	5.66	3.08	0.71	1.00	40.72	5.33
11/15/91	PH 21	20 to 28	110021	B	SM	SSlt	00	44	56	44	36	20	5.46	2.30	0.66	0.92	36.16	4.87
11/15/91	PH 21	50 to 58	110021	C	SM	SM	00	29	71	29	44	27	5.89	2.21	0.34	0.57	38.96	3.96
11/15/91	PH 21	85 to 89	110021	D	SM	SC	00	45	55	45	51	4	4.98	1.71	0.55	0.90	34.83	3.56
	1992 GRAVITY CORE SAMPLES - PHASE 2 CORES																	
11/25/92	PH 2	4 to 6	111952	A	SM	SSlt	00	20	80	20	67	13	5.90	2.33	0.20	1.13	56.32	7.12
11/25/92	PH 2	68 to 70	111952	B	SM	SSlt	03	39	58	42	45	13	5.00	2.31	0.37	1.51	31.74	2.57
12/8/92	PH 3A	4 to 6	111953	A	SM	SSlt	01	15	19	16	66	18	6.47	2.57	0.00	1.24	58.41	7.53
12/8/92	PH 3A	40 to 42	111953	B	SM	SSlt	00	14	86	14	67	19	6.37	2.41	0.14	1.90	60.44	7.82
12/8/92	PH 7A	4 to 6	111957	A	SM	SSlt	04	21	75	25	58	17	5.87	3.03	-0.03	1.38	60.99	7.16
12/8/92	PH 7A	92 to 94	111957	B	M	M	00	04	96	04	38	58	9.00	2.91	0.02	0.71	30.80	0.99
11/25/92	PH 15A	4 to 6	111965	A	SM	SSlt	01	39	60	39	50	11	5.17	2.51	0.38	0.94	43.70	5.40
11/25/92	PH 15A	100 to 102	111965	B	SM	SSlt	01	14	85	15	67	18	6.40	2.69	0.05	1.41	53.69	10.70
12/7/92	PH 15B	4 to 6	111965	A	SM	SSlt	01	44	55	44	44	12	4.97	2.41	0.45	0.84	51.24	6.36
11/25/92	PH 17	4 to 6	111967	A	SM	SSlt	01	44	55	43	45	12	5.07	2.60	0.51	1.04	44.49	5.95

APPENDIX 2. TEXTURE OF SEDIMENT SAMPLES

	SURFICIAL SEDIMENT SAMPLES						G/S/M			S/Slt/C								
DATE	STATION	DEPTH	EPA ID	REP	CLASSIFICATION		%G	%S	%M	%S	%Slt	%C	MEAN	SORT.	SKEW.	KURT.	MOIST.	LOI
COLLECTED	LABEL	CM	#		G/S/M	S/S/C							PHI	PHI			%	%
11/25/92	PH 17	60 to 62	111967	B	MS	MS	01	49	50	50	28	22	5.30	2.73	0.57	0.71	49.60	7.46
12/8/92	PH 19	4 to 6	111969	A	SM	SSlt	00	33	67	34	54	12	5.03	1.95	0.38	1.01	50.86	5.68
12/8/92	PH 19	86 to 89	111969	B	MS	MS	05	69	26	74	21	05	2.93	2.67	0.33	1.22	24.27	2.08
12/8/92	SS 51	4 to 6	111951	A	SM	SM	00	39	61	39	40	21	5.60	3.05	0.51	1.04	40.52	5.56
12/8/92	100	92 to 94	111980	A	M	M	02	8	99	10	53	37	7.07	2.88	0.23	0.93	51.13	8.18
12/8/92	101	4 to 6	111981	A	M	M	01	6	99	07	57	36	6.90	2.57	0.25	1.04	50.07	6.86
12/8/92	101	36 to 38	111981	B	GM		18	38	44				2.53	3.64	-0.41	1.21	26.36	2.75

APPENDIX 3

APPENDIX 3. LOI AND TOC FOR SELECTED SAMPLES COLLECTED AT PH AND AVS STATIONS.						
STATION	TYPE	DEPTH CM	EPA ID #	REP	%LOI	%TOC
PH 1	GRAB	SURFACE	110221	A	3.12	0.94
PH 2	GRAB	SURFACE	110230	A	8.64	2.06
PH 3	GRAB	SURFACE	110231	A	6.82	2.30
PH 4	GRAB	SURFACE	110222	A	10.66	2.42
PH 5	GRAB	SURFACE	110232	A	11.86	3.13
PH 6	GRAB	SURFACE	110224	A	11.67	2.53
PH 7	GRAB	SURFACE	110226	A	11.84	3.43
PH 8	GRAB	SURFACE	110225	A	11.65	2.16
PH 9	GRAB	SURFACE	110229	A	5.09	1.72
PH 10	GRAB	SURFACE	110220	A	8.61	2.68
PH 11	GRAB	SURFACE	110216	A	4.87	1.08
PH 12	GRAB	SURFACE	110218	A	1.96	1.51
PH 13	GRAB	SURFACE	110219	A	10.08	2.27
PH 14	GRAB	SURFACE	110214	A	3.21	0.83
PH 15	GRAB	SURFACE	110215	A	7.59	2.28
PH 16	GRAB	SURFACE	110212	A	0.98	0.69
PH 17	GRAB	SURFACE	110217	A	4.68	2.31
PH 18	GRAB	SURFACE	110211	A	8.91	3.88
PH 19	GRAB	SURFACE	110210	A	9.15	1.52
PH 20	GRAB	SURFACE	110223	A	3.26	1.52
PH 21	GRAB	SURFACE	110213	A	5.56	1.46
YR 22	GRAB	SURFACE	110228	A	1.87	1.14
YR 23	GRAB	SURFACE	110227	A	0.45	0.41
PH 1	CORES	0 TO 10	110001	A	3.16	0.65
PH 1	CORES	10 TO 20	110001	B	2.86	0.52
PH 2	CORES	0 TO 8	110002	A	11.07	3.39
PH 2	CORES	70 TO 78	110002	C	7.42	1.87
PH 3	CORES	0 TO 8	110003	A	6.59	1.37
PH 3	CORES	8 TO 16	110003	B	6.38	1.67
PH 4	CORES	0 TO 10	110004	A	12.71	3.67
PH 4	CORES	10 TO 20	110004	B	14.04	3.42
PH 5	CORES	0 TO 10	110005	A	14.13	3.70
PH 5	CORES	20 TO 30	110005	C	12.90	3.65
PH 6	CORES	0 TO 7	110006	A	11.74	2.43
PH 6	CORES	20 TO 27	110006	B	2.03	0.14
PH 7	CORES	0 TO 8	110007	A	13.39	3.79
PH 7	CORES	42 TO 50	110007	C	2.16	0.25
PH 8	CORES	0 TO 8	110008	A	13.00	3.70
PH 8	CORES	16 TO 24	110008	B	12.79	3.57
PH 10	CORES	0 TO 8	110010	A	10.65	2.83
PH 10	CORES	132 TO 138	110010	E	11.74	3.01
PH 15	CORES	0 TO 8	110015	A	7.05	1.82

APPENDIX 3. LOI AND TOC FOR SELECTED SAMPLES COLLECTED AT PH AND AVS STATIONS.						
STATION	TYPE	DEPTH CM	EPA ID #	REP	%LOI	%TOC
PH 15	CORES	100 TO 108	110015	D	12.62	4.37
AVS	GRAB	SURFACE	112755	C	5.35	2.07
AVS	GRAB	SURFACE	112756	C	5.10	2.20
AVS	GRAB	SURFACE	112757	C	5.03	2.00
AVS	GRAB	SURFACE	112760	C	9.90	3.15
AVS	GRAB	SURFACE	112762	C	9.33	3.21
AVS	GRAB	SURFACE	112763	C	3.62	1.28
AVS	GRAB	SURFACE	112764	C	7.26	3.28
AVS	GRAB	SURFACE	112765	C	5.75	2.12
AVS	GRAB	SURFACE	112766	C	5.70	1.98
AVS	GRAB	SURFACE	112768	C	5.47	1.93
AVS	GRAB	SURFACE	112771	C	5.44	2.38
AVS	GRAB	SURFACE	112772	C	5.02	2.15
AVS	GRAB	SURFACE	112773	C	5.34	2.26
AVS	GRAB	SURFACE	112775	C	5.69	2.21
AVS	GRAB	SURFACE	112776	C	8.45	3.29
AVS	GRAB	SURFACE	112777	C	7.38	2.88
AVS	GRAB	SURFACE	112778	C	5.08	1.67
AVS	GRAB	SURFACE	112779	C	5.34	2.40
AVS	GRAB	SURFACE	112780	C	6.16	2.39
AVS	GRAB	SURFACE	112781	C	5.41	2.42
AVS	GRAB	SURFACE	112782	C	5.60	2.86

INTERLAB CALIBATION OF % TOC USING AVS SAMPLES						
STATION	SAMPLE				JEL % TOC	NERL % TOC MEAN
AVS	GRAB	SURFACE	112760	C	3.22	3.15
AVS	GRAB	SURFACE	112763	C	1.88	1.28
AVS	GRAB	SURFACE	112764	C	3.57	3.28
AVS	GRAB	SURFACE	112776	C	2.96	3.29
AVS	GRAB	SURFACE	112778	C	2.03	1.67
AVS	GRAB	SURFACE	112780	C	2.11	2.39

APPENDIX 4

GRAVITY CORE PH 1 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE																						
	(SM)	5	82/11/07	3.48	1.38	26.6	2.3	3000	0	832	19.16	14.09	31300	2.2	0.15 B	48.3	0.64 U	11100	19.8	160.00 N	0.21 UN	11.1	0.19 U	36.1
10																								
		15	80/13/07	3.6	1.46	29.3	2.2	800	707	1136	25.89	17.4	30500	3.10 S	0.16 B	50.2	0.46 U	11400	20.9	154.00 N	0.15 UN	12.8	0.14 U	33.4
20																								
25																								

CORE LEGEND - SEDIMENT TYPE

MUD	(M)
SANDY MUD	(SM)
MUDDY SAND	(MS)
SAND	(S)
PRESUMPSCOTT	(P)

GRAVITY CORE PH 2 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE																						
		0 TO 8	17/48/35	6.98	3.29	56.5	7.9	9000	0															
10		5				55.3	6.4																	
20	(SM)	20				55.3	6.4																	
30		30				53.9	6.2																	
		30 TO 38	36/47/17	5.27	2.55	41	5.4	7000	2828															
40																								
50		50				48.9	6.6																	
60																								
		60 TO 68	32/43/25	6.2	3.37	44.9	6.3	550	354															
70		68				32.1	2.9																	

CORE LEGEND - SEDIMENT TYPE

	MUD	(M)
	SANDY MUD	(SM)
	MUDDY SAND	(MS)
	SAND	(S)
	PRESUMPSCOTT	(P)

GRAVITY CORE PH 3 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE				43.1	3.7																	
		0 TO 8	59/28/13	4.43	2.34	41.3	4.6	9750	9546	5120	22.76	34.76	47500	5.90 S	0.35 B	81.6	0.63 U	18600	43.5	327.00 N	0.28 UN	19.8	0.34 BW	77.2
10	(MS)					51	4.9																	
		8 TO 16	56/29/15	5.03	2.71	45.8	4.9	7000	2828	4972	37.51	100.28	54200	4.5 B+	0.30 B	91.8	0.67 U	20600	48.8	382 N	0.22	23.5	0.39 B	78.8
17																								
		SEDIMENTS IN NOSE CONE LOOK LIKE THE PRESUMPSCOTT FORMATION																						

CORE LEGEND - SEDIMENT TYPE

MUD	(M)
SANDY MUD	(SM)
MUDDY SAND	(MS)
SAND	(S)
PRESUMPSCOTT	(P)

GRAVITY CORE PH 4 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE				65.8	9																	
	(M)	0 to 10	06/52/42	7.77	3.18	63.1	9.6	5000	0	4072	32.24	15.9	72700	17.00 S	0.62 B	186	1.30 U	39300	65.5	519.00 N	0.43 UN	38	1.00 BW	150
10		10				66.3	9.2																	
		10 to 20	04/49/47	7.37	2.39	61.5	9	10500	7778	3898	46.46	26.7	38600	18.30 NS	0.83 *	208	42.00 *	36500	87.6	327.00 N	0.31 UN	40.5	0.86 B	300.00*
20		18				65.2	9.1																	

CORE LEGEND - SEDIMENT TYPE

	MUD (M)
	SANDY MUD (SM)
	MUDDY SAND (MS)
	SAND (S)
	PRESUMPSCOTT (P)

GRAVITY CORE PH 5 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB	PCBs PPB	PESTs PPB	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE				63.7	9.9																	
	(M)	0 TO 10	06/49/45	7.82	3.08	62.6	9.7	9500	9192	4151	51.61	52.49	45000	12.30 N	0.79 *	189	57.10 *	34700	84.2	337.00 N	0.32 UN	44.5	0.93 B	149.00 *
10		10				64.2	7.6																	
	(SM)	10 TO 20	11/48/41	7.63	3.2	60.3	9	16250	354	4382	50.27	24.12	31700	9.1 N	0.88 *	242	54.20 *	33400	105	331.00 N	0.26 UN	38.4	0.89	163.00*
20		20				66.3	9																	
	(M)	20 TO 30	09/50/41	7.57	3.11	62.9	8.2	7000	2828	5461	187.14	180.56	40100	9.70 N	1.10 *	335	82.70 *	35700	123	332.00 N	0.41 UN	45.7	1.20 B	164.00 *
30		30				65	8.6																	

CORE LEGEND - SEDIMENT TYPE

MUD	(M)
SANDY MUD	(SM)
MUDDY SAND	(MS)
SAND	(S)
PRESUMPSCOTT	(P)

GRAVITY CORE PH 6 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE				53.9	4.7																	
	SM/M	0 TO 7	06/60/34	7.07	2.62	59.1	6.5	6000	4243	3622	44.05	21.25	37000	17.10 NS	0.71 *	192	44.10 *	38100	84.1	413.00 N	0.23 UN	44.1	0.65 B	155.00 *
10		10				29.1	1.4																	
20		20				27.8	1.3																	
	SM/M	20 TO 27	05/54/41	7.7	3.03	23.3	1.4	162	195	129	8.99	5.25	19900	7.50 N	0.08 U*	79	20.90 *	29400	22	204.00 N	0.16 UN	39	0.15 U	74.60 *
30		30				27.8	1.3			122 R	8.68 R	4.04 R												

CORE LEGEND - SEDIMENT TYPE

MUD	(M)	
SANDY MUD	(SM)	
MUDDY SAND	(MS)	
SAND	(S)	
PRESUMPSCOTT	(P)	

GRAVITY CORE PH 7 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICRO MPN	MICRO SD	PAH PPB SUM	PCB PPB SUM	PEST PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE				66.6	11.3																	
		0 TO 8	06/50/44	7.83	3.09	63.8	9.7	9000	0	4650	46.88	27.71	31300 *	12.20 N	0.85	168	43.30 *	32100 *	54	261.00 *	0.28 UaN	33.7	0.50 BN	133.00*
10		10				66.2	10.5																	
20																								
		25 TO 33	34/54/12	4.98	3.17	49.8	5.1	7000	2828	4420	149.7	222.41	31800 *	8.70 N	0.82	241	65.60 *	31800 *	68	305.00 *	022 UaN	38.2	1.00 N	172.00 *
30		30				44.2	4.5																	
		STORM LAG / SCOUR SURFACE																						
40		40				21.4	1.3																	
		42 TO 50	15/49/36	7.18	3.45	22.8	1.3	650	212	114	17.76	22.33	17900	6.80 BN	.07 UaW	47.8	11.60*	21800 *	14.30 B	199.00 *	0.14 UaN	24.9	0.13 UaN	64.2 *
50																								
60		60				21.1	1.1																	
70																								
80		80				25.1	1.2																	

CORE LEGEND - SEDIMENT TYPE

MUD	(M)
SANDY MUD	(SM)
MUDDY SAND	(MS)
SAND	(S)
PRESUMPSCOTT	(P)

GRAVITY CORE PH 8 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE																						
	(M)	0 TO 8	05/58/37	6.98	2.33	58.8	9.1	4000	1414	5357	51..57	29.08	11000 *	13.80 N	0.98	165	67.00 *	29200*	73.4	163.00*	0.24 UaN	36.4	0.67 BN	149.00 *
10																								
20	(SM)	16 TO 24	11/52/37	6.78	2.36	58.1	12.2	6000	4243	3180	139.69	234.58	18000 *	9.40 N	1.1	199	82.20 *	30700 *	98.4	182.00 *	0.23 UaN	36	0.46 BN	159.00 *
25																								

CORE LEGEND - SEDIMENT TYPE

MUD	(M)
SANDY MUD	(SM)
MUDDY SAND	(MS)
SAND	(S)
PRESUMPSCOTT	(P)

GRAVITY CORE PH 10 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE				53.7	5.8																	
	(SM)	0 TO 8	39/56/05	4.24	2.79	50.1	6	7000	2828	5451	46.99	132.27	21600 *	10.00 N	0.73 W	151	99.20 *	50300 *	45.7	187.00 *	0.27 UaN	91.2	0.45 BN	148.00 *
10		10				55.5	5.6																	
20		20				51.2	5.2																	
30		30	72/26/2	2.52	2.36	45.5	2.5																	
	(SM)	30 TO 38	32/56/12	4.95	3.04	52.2	7	9000	0	54001	138.68	118.67	16700*	14.30 N	0.72	154	474.00 *	34000 *	96.2	159.00 *	0.22 UaN	39.5	0.23 BN	163.00 *
40		40				57.8	6.5																	
50		50				61.4	7.7																	
60		60				49.9	6.4																	
	(SM)	60 TO 68	43/52/05	3.92	3.06	53.1	6.2	3000	0	6280	63.12	13.79	56300	16.60 B	0.56 B	149	160	55000	84.3	465	0.19 Ua	53.9	.84 UaW	167
70		70				57.8	5.8																	
80		80				56.3	6.8																	
90		90				56.9	4.3																	
		90 TO 98	31/52/17	5.53	2.91	52.5	6.3	16250	354	16110	85.78	131.05	37200	12.30 B	0.83 B	183	111	47600	105	428	0.34 B	48.1	0.49 B	175
100		100				53.2	6.7																	
110		110				56.5	7.8																	
120	(SM)	120				49.8	7.7																	
130		130	65/32/03	2	3.06	36.9	10.1																	
	(SM)	132 TO 13	46/31/23	4.52	4.26	42.2	7.2	10500	7778	17970	195.52	71.03	52100	11.40 B	0.90 BW	288	531	80700	422	421	0.16 Ua	88.1	0.73 UaW	1950
140		140				46.7	10.3																	

CORE LEGEND - SEDIMENT TYPE

	MUD	(M)
	SANDY MUD	(SM)
	MUDDY SAND	(MS)
	SAND	(S)
	COARSE LAG, GRANULE OR LARGER	(CL)
	PRESUMPSCOTT	(P)

GRAVITY CORE PH 11 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE				38.9	4.6																	
	(MS)	0 TO 8	65/20/15	4.52	2.6	33.5	4.7	12500	4950															
10		10				42.2	4.9																	
20		20				36.5	3.4																	
	(MS)	20 TO 28	70/23/07	3.53	2.42	24.7	1.7	2	1															
30		30				23.3	1.4																	
40		40				24.3	1.4																	
50		50				33.7	3.3																	
	(MS)	50 TO 58	53/43/04	4.43	1.53	26.2	0.3	1	0															
60		60				24.9	1.4																	
70		70				26.8	1.9																	

CORE LEGEND - SEDIMENT TYPE

MUD	(M)
SANDY MUD	(SM)
MUDDY SAND	(MS)
SAND	(S)
PRESUMPSCOTT	(P)

GRAVITY CORE PH 12 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE				36	3.3																	
	(MS)	0 TO 8	69/23/08	4.32	2.15	36.2	3.4	3000	0	9091	173.76	42.17	30000	9.90 B	0.35 U W	87.3	105	17900	124	304	0.19 B	24.5	0.34 B W	530
10		10				44	4.5																	
	(MS)	10 TO 18	64/22/14	4.43	2.44	36.5	3.15	4900	5798	4099	58.58	20.75	35500	10.70 B	0.45 B W	144	161	22500	235	364	0.51 B	44.4	0.62 UaW	728
20		20				31.5	5.8																	
	(SM)	20 TO 28	39/34/27	5.58	3.04	45.6	6.5	10750	8132	15443	62.2	39.1	47300	17.30 B	0.92 B W	186	265	33800	355	395	1.9	34.5	1.3	471
30		30				49.4	3.5				113.48 R	259.31 R												

CORE LEGEND - SEDIMENT TYPE

	MUD	(M)
	SANDY MUD	(SM)
	MUDDY SAND	(MS)
	SAND	(S)
	PRESUMPSCOTT	(P)

GRAVITY CORE PH 13 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE				41.4	4.2																	
	(MS)	0 TO 8	60/34/06	4.48	2.03	40.5	4	2580	3422															
10		10				29	1.8																	
20		20				46.6	4.7																	
	(MS)	20 TO 28	64/39/07	4.43	2.19	44.8	3.9	12500	4950															
30		30				38.1	3.6																	
40		40				29.8	1.7																	
	(M)	40 TO 48	01/52/47	7.52	1.87	20.6	0.9	24	9															
50		50				18.1	0.7																	
60		60				26.9	1.6																	
70		70				24.8	1.5																	
80		80				31.5	2.2																	
90		90				29.7	2																	
100		100				23.2	1.4																	
110		110				29.2	1.8																	

CORE LEGEND - SEDIMENT TYPE

	MUD	(M)
	SANDY MUD	(SM)
	MUDDY SAND	(MS)
	SAND	(S)
	COARSE LAG, GRANULE OR LARGER	(CL)
	PRESUMPSCOTT	(P)

GRAVITY CORE PH 14 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE				35.4	2.6																	
	(MS)	0 TO 8	77/14/09	3.53	2.55	28.6	2.6	1400	424	10300	69.26	17.29	21800	6.90 B MW	0.3 U W	37.54	6.70 B	12800	27.4	306	0.12 Ua	11.1	0.89 B W	41.2
10		10				27.5	3																	
20		20				42.5	4.6																	
	(MS)	20 TO 28	55/27/18	4.93	2.49	40.4	4.3	270	42	561	94.85	38.81	24000	3.50 B	0.18 BW	32.4	4.30 B	13300	16.9	260.00 *	0.13 Ua	15.9	0.12 Ua	60
30		30				29.9	2.2																	
40		40				43.4	4.4																	
		40 TO 48	36/38/26	5.59	2.33	32.4	3	37	19	134	10.27	17.22	19800	7.00 B	0.20 BW	37.5	6.40 B	16800	15.9	194.00 *	0.14 Ua	19.6	0.13 UaW	41.9
50	(P)	50				26.4	2																	
60		60				25.3	1.9																	
		60				26.3	0.9																	

CORE LEGEND - SEDIMENT TYPE

MUD	(M)
SANDY MUD	(SM)
MUDDY SAND	(MS)
SAND	(S)
PRESUMPSCOTT	(P)

GRAVITY CORE PH 15 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAH PPB SUM	PCB PPB SUM	PEST PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE				38.4	3.6																	
	(MS)	0 TO 8	56/27/17	4.92	2.86	39.8	5.8	7000	2828	7018	98.21	106.17												
10		10				41.6	5.7																	
20		20				46.9	6.9																	
30		30				44	3.9																	
	(SM)	30 TO 38	48/33/19	5.32	2.94	48.3	7.1	1	0	4167	22.09	93.15	30100	5.50 B	0.55	111	21.5	19900	49	308.00 *	0.14 B	27.6	0.61 W	79.4
40		40				55.8	7.2																	
50		50				56.5	8.9																	
60		60				53	8.7																	
	(SM)	60 TO 68	18/42/40	7.35	3.43	52.6	8.8	1600	0	20256	36.02	26.71	26800	9.00 B	0.8	129	27.9	21800	88	212.00 *	0.54 B	23.2	0.71 W	104
70		70				47.3	7.1																	
80	(MS)	80				37.1	5																	
90		90				55.7	10.1																	
100		100				54.4	10.7																	
	(SM)	100 TO 10	22/39/39	7.23	3.47	51.6	9.9	16250	354	14370	10.56	63.5	22600	11.00 B	0.67 W	66.1	22.2	21300	96.4	191.00 *	0.22 Ua	23.7	0.60 BW	97.9
110		110				53.1	10.1																	

CORE LEGEND - SEDIMENT TYPE

	MUD	(M)
	SANDY MUD	(SM)
	MUDDY SAND	(MS)
	SAND	(S)
	PRESUMPSCOTT	(P)

GRAVITY CORE PH 16 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE				31.1	2.7																	
	(MS)	0 TO 8	87/08/05	3.13	1.29	25.1	1.1	2350	919															
10						26.9	1.7																	
20						25	1.6																	
	(MS)	20 TO 28	86/09/05	3	1.42	26.9	1.1	4000	1414															
30						25	1.4																	
40						31.5	3.5																	
50						43.8	6.4																	
	(SM)	50 TO 58	27/41/32	6.08	2.38	38.7	4.8	3	1															
60						42.5	5.7																	
70	(P)					38.3	5																	
80						40.8	5.5																	
90						41.1	5.4																	
100						38	4.5																	
	(SM)	100 TO 10	26/43/31	5.96	2.13	43.6	5.5	1	0															
110						40.1	4.6																	

CORE LEGEND - SEDIMENT TYPE

MUD	(M)
SANDY MUD	(SM)
MUDDY SAND	(MS)
SAND	(S)
PRESUMPSCOTT	(P)

GRAVITY CORE PH 17 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE				45.8	5.4																	
	(MS)	0 TO 8	52/31/17	5.05	2.81	42.2	4.7	16250	354	4327	12.97	8.97	18600	10.70 B	0.42	73.9	25.6	16600	48	232.00 *	0.16 B	19	0.32 BW	90.8
10		10				45.2	4.8																	
20		20				60	9.4																	
30		30				49	6.7																	
	(SM)	30 TO 38	42/30/28	5.9	3.61	50.7	7.7	5000	0	30020	13.18	141.91	29800	9.80 B	0.36 W	58.8	20.7	18900	67.4	256.00 *	0.15 Ua	18.4	0.30 BW	82.4
40		40				48.7	6.8																	
50		50				53.4	7.9																	
60		60				51.3	6.9																	
70		70				54.5	9.9																	
	(SM)	70 TO 78	34/33/33	6.43	3.57	49.4	6.5	1400	424	4452	14.11	28.52	24800	5.60 B*	0.18 BN	57.6	15.00 B	23300	45.4	256.00 N*	0.39 UaN	23.3	0.19 UaW	62.1
80		80				37.3	4.7																	
90	KB	90				26	2.8																	
95																								

CORE LEGEND - SEDIMENT TYPE

	MUD	(M)
	SANDY MUD	(SM)
	MUDDY SAND	(MS)
	SAND	(S)
	PRESUMPSCOTT	(P)

GRAVITY CORE PH 19 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	A PPM	ZN PPM
SURFACE		SURFACE				52.1	8.0																	
	(SM)	4	28/45/27	6.23	3.13	49.4	7.8	7000	2828	6488	17.61	65.88	27400	9.5 B*	0.5 N	113	30	26800	46.3	310.00 N*	0.20 UaN	29	0.61 W	112
10		10				55.3	8.8			7078 R	27.18 R	57.51 R												
20		20				55.2	7.6																	
	(SM)	24	29/43/28	6.29	3.16	51.4	6.1	9200	9617	7023	41.28	124.24	32500	7.70 B*	0.65 N	163	32.3	25700	51	326.00 N*	0.22 UaN	28.8	0.8	113
30		30				55.8	7.8																	
40		40				57.1	9.1																	
50		50				54.7	8.3																	
	(SM)	54	34/34/32	6.1	2.96	48.9	7.9	1500	283	2642	63.78	195.55	15500	5.1 B*	0.26 BNW	56.6	13.9	23000	34.7	254.00 N*	0.19 UaN	25.9	0.19 BW	66.9
60		60				52.6	8.3																	
65																								

CORE LEGEND - SEDIMENT TYPE

	MUD	(M)
	SANDY MUD	(SM)
	MUDDY SAND	(MS)
	SAND	(S)
	PRESUMPSCOTT	(P)

GRAVITY CORE PH 20 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE				35.8	3																	
	(MS)	0 TO 8	55/28/17	5.08	2.93	35.4	3.8	1200	141															
10		10				38.9	3.6																	
20		20				39.7	4.1																	
	(MS)	20 TO 28	50/30/20	5.32	3.04	33.1	3.38	14	8															
30		30				28.2	2																	
40		40				29.2	2.3																	
50		50				29.4	2.7																	
	(SM)	50 TO 58	44/42/14	4.88	1.86	24.6	2.7	1	0															
60		60				26.2	2.4																	

CORE LEGEND - SEDIMENT TYPE

MUD	(M)
SANDY MUD	(SM)
MUDDY SAND	(MS)
SAND	(S)
PRESUMPSCOTT	(P)

GRAVITY CORE PH 21 - PHASE 1

TOTAL DEPTH CM	CORE	SAMPLE DEPTH CM	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		SURFACE				52.8	5.1																	
	(SM)	0 TO 8	47/31/22	5.66	3.08	40.7	5.3	2600	566	2888	38.09	17.22	34600	8.00 B	0.25 B	121	17.10 B	21200	46.8	228.00 N	0.25 UaN	21.9	0.43 B	76.6
10		10				41.4	4.7																	
20		20				40.6	5																	
	(SM)	20 TO 28	44/36/20	5.46	2.3	36.2	4.9	1000	990	911	13.11	11.78	28300	3.70 B	0.19 B	47.8	6.50 B	18000	31	208.00 N	0.15 UaN	17	0.14 Ua	47.6
30		30				34.7	3.4			819 R	15.71 R	17.21 R												
40		40				35.4	3.7																	
50		50				41.7	4.4																	
	(SM)	50 TO 58	29/44/27	5.89	2.21	39	4	400	141	175	8.91	8.41	33100	4.8	0.12 B	48.6	0.64 U	20400	11.5	249.00 N	0.21 UN	18.2	0.19 U	52
60		60				40.2	4.1																	
70		70				37.8	3.7																	
80		80				38	3.6																	
	(SM)	85 TO 92	45/51/04	4.98	1.71	34.83	3.6	1	0	178	14.71	13.08	31000	5	0.12 B	46.6	0.62 U	18900	12.5	278.00 N	0.21 UN	15	0.19 U	43.7
90		90				33.3	2.7																	
95																								

CORE LEGEND - SEDIMENT TYPE

	MUD	(M)
	SANDY MUD	(SM)
	MUDDY SAND	(MS)
	SAND	(S)
	PRESUMPSCOTT	(P)

GRAVITY CORE PH3a - PHASE 2

TOTAL DEPTH CM	CORE	SAMPLE DEPTH or YEAR	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE						59.4	7.2																	
	(SM)		16/66/18	6.5	2.57	58.4	7.5						41.563			121.6	25.1	34.040	37.5	413		26.5		126.3
10	root					58.2	6.8																	
	hairs					58.4	6.8																	
20						58.9	6.6																	
						62.1	7.5																	
30						61.9	7.7																	
						61.3	7.4																	
40	(SM)		14/67/19	6.4	2.41	60.4	7.8						7.972			233.2	33.8	23.270	72.3	298		30.1		137.6

CORE LEGEND - SEDIMENT TYPE

MUD	(M)
SANDY MUD	(SM)
MUDDY SAND	(MS)
SAND	(S)
COARSE LAG, GRANULE OR LARGER	(CL)
PRESUMPSCOTT	(P)

GRAVITY CORE PH 17 - PHASE 2

TOTAL DEPTH CM	CORE	SAMPLE DEPTH or YEAR	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE	eelgrass	1992				42.3	4.3						31,100			67.6	28.4	21,232	28.1	376		19.8		104.3
			43/45/12	5.07	2.6	44.5	6																	
10	rooting	1956 to 1965				49.6	6.2						28,420			86.6	20.8	18,817	35.5	304		15.3		100.6
						49.5	7																	
20		1920 to 1938				48.9	6.6						14,911			84.4	16.1	20,156	85.9	434		20.4		97.1
						46.7	6.7																	
30		1885 to 1910				43.3	6																	
						47.9	4.6																	
40						43.3	4.6						29,353			52.1	7.3	22,923	20.1	422		19.6		68
						46.3	6.1						17,255 R			46 R	7.2 R	20,130 R	25.6 R	391 R		19.6 R		65 R
50	rooting					39.6	4.8																	
						45.8	6.3																	
60			50/28/22	5.3	2.73	49.6	7.5																	
65																								

CORE LEGEND - SEDIMENT TYPE

	MUD	(M)
	SANDY MUD	(SM)
	MUDDY SAND	(MS)
	SAND	(S)
	COARSE LAG, GRANULE OR LARGER	(CL)
	PRESUMPSCOTT	(P)

GRAVITY CORE PH 19 - PHASE 2

TOTAL DEPTH CM	CORE	SAMPLE DEPTH or YEAR	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE						47.5	4.8																	
	(SM)		34/54/12	5	1.95	50.9	5.7						11,032			98.5	23.6	18,678	56	306		21.1		107.5
10	root					47.3	5.8																	
	hairs					48.2	5.8																	
20						59.2	7.2																	
						58.1	8.6																	
30						63.1	11																	
						56.5	6.9																	
40						57.6	7.8																	
						50	6.1																	
50						53.7	7.1																	
						66.6	6.5																	
60						48.4	5.8																	
						52.2	6.6																	
70						50.4	6						12,259			44.1	5	19,419	10.4	288		19.4		62.7
						51.6	6.5																	
80						43.7	4.9																	
						23.1	1.2																	
90	(MS)		74/21/5	2.93	2.67	25.4	3.0																	
			5% gravel																					

CORE LEGEND - SEDIMENT TYPE

	MUD (M)
	SANDY MUD (SM)
	MUDDY SAND (MS)
	SAND (S)
	PRESUMPSCOTT (P)

GRAVITY CORE 51 - PHASE 2

TOTAL DEPTH CM	CORE	SAMPLE DEPTH or YEAR	S/S/C	MEAN PHI	SORT PHI	MOIST %	LOI %	MICROs MPN	MICROs SD	PAHs PPB SUM	PCBs PPB SUM	PESTs PPB SUM	AL PPM	AS PPM	CD PPM	CR PPM	CU PPM	FE PPM	PB PPM	MN PPM	HG PPM	NI PPM	AG PPM	ZN PPM
SURFACE		1992				43.3	6																	
			39/40/21	5.6	3.05	40.5	5.6						10,457			90.3	11.2	16,188	31.7	252		15.5		77.9
10	(SM)	1915 to 1933				39.1	5.4						35,346			101.1	10.2	17,289	15.9	331		16.3		82.5
						31.6	4						6,764			44.2	2.4	13,102	18.6	282		14.6		47.9
20		1838 to 1874				32.6	3.6																	
						33.7	4																	
30		1761 to 1815				33.7	3.8						31,650			43.3	1.8	16,258	6.6	347		14.8		51.6
	wood					38.7	4.6																	
40	wood					32.5	3																	

CORE LEGEND - SEDIMENT TYPE

MUD	(M)	
SANDY MUD	(SM)	
MUDDY SAND	(MS)	
SAND	(S)	
COARSE LAG. GRANULE OR LARGER		(CL)
PRESUMPSCOTT	(P)	

APPENDIX 5

PNSY Mouth Cross section (NH-ME) July 8, 1992

Sample	Petri	Time	Volume	Tss + Filt	Filt	TSS	Notes	
	Dish (PH)	Tide	L	mg	mg	mg/L		
Transect 3	1	8:01:47	0.960	133.0	131.7	1.35	Tow Sample	
	2	8:04:43	1.000	131.2	129.9	1.30	3 minute delay	
	3	8:07:30	0.990	132.8	132.7	0.10		
	4	8:09:00	0.970	132.8	131.7	1.13		
	5	8:13:00	1.010	131.8	130.2	1.58		
Transect 7	6	9:06:08	1.920	136.7	131.8	2.55	Hull Mount	
	7	9:09:10	1.970	135.1	131.6	1.78	1.5 minute delay	
	8	9:13:15	1.940	135.7	132.9	1.44		
	9	9:17:35	1.940	133.7	129.3	2.27		
Control	10	c	1.000	130.8	131.3	-0.50		
Transect 11	11	10:00:22	1.990	133.2	129.0	2.11	Hull Mount	
	12	10:03:43	1.960	135.3	131.9	1.73		
	13	10::11:15	1.970	134.9	130.0	2.49		
	14	10:12:43	1.940	135.8	132.7	1.60		
Control	15	c	1.000	131.5	131.6	-0.10		
Transect 13	16	10:47:10	1.960	136.8	132.4	2.24	Deep Tow @ 08:25	
	17	10:53:00	2.010	125.0	119.4	2.79		
	18	11:01:00	2.020	133.8	128.5	2.62		
Control	19	c	1.000	128.1	127.8	0.30		
Control	20	c	1.000	128.9	129.0	-0.10		
Trans 15	21	11:37:52	1.920	134.2	128.4	3.02	Hull Mount	
	22	11:41:30	1.930	133.8	128.9	2.54		
	23	11:46:00	1.940	135.4	130.3	2.63		
	24	11:50:29	1.970	136.3	131.2	2.59		
Control	25	c	1.000	129.2	129.2	0.00		
Trans 17	26	12:06:14	1.830	137.2	130.6	3.61	Hull Mount	
	27	12:10:30	1.930	133.2	128.4	2.49		
	28	12:13:37	1.920	134.3	129.3	2.60		
	29	12:19:40	1.980	131.0	128.4	1.31		
Control	30	c	1.000	130.0	130.1	-0.10		
Trans 21	31	13:20:00	1.930	135.4	129.3	3.16	Deep Tow	
	32	13:27:30	1.950	135.0	129.7	2.72		
	33	13:33:20	1.970	131.7	127.7	2.03		
Control	34	c	1.000	127.4	127.5	-0.10		
Control	35	c	1.000	132.3	132.3	0.00		
Trans 23	36	13:58:00	1.910	135.6	128.6	3.66	Hull Mount	
	37	14:01:44	1.960	136.7	129.5	3.67		
	38	14:05:15	1.890	136.7	132.2	2.38		
	39	14:09:53	1.990	137.1	132.7	2.21	<10ml lost from cup	

Sample	Petri	Time	Volume	Tss + Filt	Filt	TSS	Notes	
	Dish (PH)	Tide	L	mg	mg	mg/L		
Control	40	c	1.000	130.0	129.7	0.30		
	41	14:56:25	1.980	134.6	128.4	3.13	Hull Mount	
Slack Water	42	15:00:14	1.930	134.8	129.0	3.01		
Tide Turning	43	15:03:50	1.970	137.3	132.3	2.54	<10ml lost from cup	
	44	15:08:18	1.950	137.0	133.5	1.79		
Control	45	c	1.000	131.8	131.8	0.00		
Trans 31	46	15:56:09	1.930	123.7	119.0	2.44	Tow - 8.3 meters	
	47	16:03:16	2.040	135.0	129.2	2.84		
	48	16:07:40	2.030	133.2	128.9	2.12		
Control	49	c	1.000	127.8	127.5	0.30		
Trans 33	50	16:38:50	1.880	133.4	128.0	2.87	Hull Mount <10ml cup	
	51	16:34:28	1.930	134.5	130.4	2.12		
	53	16:41:20	1.950	135.5	130.5	2.56		
	54	16:45:53	1.910	132.9	128.5	2.30		
Control	55	c	1.000	132.0	131.6	0.40		
Trans 37	56	17:34:30	1.950	137.7	132.5	2.67	Hull Mount	
	57	17:39:04	1.930	135.9	132.5	1.76		
	58	no time	1.960	135.0	130.0	2.55	<10ml lost from cup	
	59	no time	1.920	136.3	131.8	2.34		
Control	60	c	1.000	130.0	129.7	0.30		
Trans 41	61	18:31:53	1.900	136.0	129.9	3.21	Hull Mount	
	62	18:35:45	2.000	136.1	131.7	2.20		
	63	18:39:13	1.960	133.6	129.7	1.99		
	64	18:41:52	1.930	136.0	131.4	2.38		
Control	65	c	1.000	128.8	128.7	0.10		
Trans 43	66	19:05:00	1.960	135.7	131.6	2.09	Deep Tow	
	67	19:11:01	1.970	137.7	132.9	2.44		
	68	19:16:32	1.960	132.4	128.8	1.84		
Control	69	c	1.000	133.1	132.9	0.20		

Fixed Station - Fort Foster July 9, 1992

	70	10:08:00	1.860	134.1	130.0	2.20	Fish 3.9m Water 4.1m	
	71	10:15:00	1.920	132.7	129.3	1.77	Fish 2.8m Water 4.1m	
							(4 minute delay)	

Dover Point Cross Section July 10, 1992

Trans 2	72	7:59:03	0.990	132.7	129.8	2.93	Eliot Pier A	
	73	8:00:25	0.987	131.1	128.7	2.43	Green Can #13 B	
	74	8:02:00	0.970	132.9	128.4	4.64	Sprague C	
Trans 1	75	8:11:04	0.970	135.2	131.1	4.23	Sailboats A	

Sample	Petri	Time	Volume	Tss + Filt	Filt	TSS	Notes	
	Dish (PH)	Tide	L	mg	mg	mg/L		
	76	8:12:00	0.990	139.4	132.9	6.57	Green Can B	
Trans 3	77	8:19:25	0.980	134.3	128.9	5.51	Newington A	
	78	8:20:45	0.980	137.6	133.5	4.18	Midchannel B	
	79	8:22:20	1.040	130.3	127.8	2.40	Hilton Park C	
Trans 2	80	8:33:30	0.970	132.0	127.3	4.85	Pier A	
	81	8:34:10	0.960	134.8	130.5	4.48	Can #13 B	
	82	8:35:54	0.960	135.4	130.3	5.31	Sprague C	
Control	83	c	1.000	130.6	130.4	0.20		
Trans 1	84	8:45:21	0.950	135.5	130.4	5.37	Boats A	
	85	8:46:46	1.060	137.9	131.9	5.66	Can B	
Control	86	c	1.000	130.3	130.0	0.30		
Trans 3	87	8:54:28	0.980	131.9	129.0	2.96	A	
	88	8:55:25	1.790	140.5	131.2	5.20	B	
	89	8:57:00	1.870	140.8	130.2	5.67	C	
Trans 2	90	9:07:56	1.570	137.0	129.3	4.90	Pier A	
	91	9:08:32	1.720	138.7	132.0	3.90	Can B	
	92	9:10:20	1.650	138.6	129.6	5.45	C	
Trans 1	93	9:20:35	2.000	139.8	129.9	4.95	A	
	94	9:21:36	2.010	143.0	131.7	5.62	Can B	
Trans 3	95	9:28:45	1.910	140.2	132.4	4.08	Bloody Pt A	
	96	9:30:00	1.780	141.0	132.8	4.61	Mid B	
	97	9:31:50	1.260	138.3	131.3	5.56	Hilton Hd C	
Trans 2	98	9:41:54	1.050	137.4	131.8	5.33	A	
	99	9:42:30	1.060	136.7	132.0	4.43	B	
	100	9:44:06	1.030	129.0	123.1	5.73	C	
Trans 1	101	9:55:00	1.060	133.2	127.2	5.66	A	
	102	9:56:10	1.030	131.5	127.6	3.79	Bouy B	
Trans 3	103	10:03:49	1.030	127.6	122.6	4.85	A	
Yo-Yo	104	10:05:50	1.040	128.2	126.7	1.44	B	
	105	10:08:20	0.990	133.0	126.0	7.07	C	
Trans 2	106	10:17:12	0.990	128.7	124.9	3.84	surface ? A	
Yo-Yo	107	10:19:30	0.990	128.8	125.8	3.03	bottom bouy 13 B	
	108	10:20:50	1.050	130.9	127.0	3.71	Surface C	
Trans 1	111	10:33:42	1.050	132.5	127.0	5.24	surface, boats A	
Yo-Yo	112	10:36:31	1.050	132.6	127.5	4.86	deepest part of turn B	

Sample	Petri	Time	Volume	Tss + Filt	Filt	TSS	Notes	
	Dish (PH)	Tide	L	mg	mg	mg/L		
Trans 3	113	10:43:10	1.010	129.1	124.4	4.65	A	
	114	10:44:20	1.020	132.8	127.5	5.20	Nuts B	
	115	10:46:00	1.060	133.7	127.9	5.47	C	
Control	116	c	1.000	125.7	126.0	-0.30		
Trans 2	117	10:53:10	1.020	130.8	125.5	5.20	Pier A	
	118	10:54:00	1.040	130.4	124.4	5.77	Nuts Bouy 13 B	
	119	10:54:41	1.030	128.8	124.9	3.79	Shiler C	
Trans 1	120	11:10:40	1.000	130.7	127.7	3.00	Boat A	
	121	11:11:40	0.990	128.1	122.5	5.66	Nuts Bouy B	
Control	122	control	1.000	122.5	122.5	0.00	missed A	
Trans 3	123	11:19:30	0.990	128.7	124.8	3.94	B	
	124	11:20:48	1.050	130.4	125.1	5.05	C	
Control	125	c	1.000	127.0	127.2	-0.20		
Trans 1	126	12:17:22	0.960	127.6	123.4	4.37	A	
	127	12:18:30	1.880	134.8	127.5	3.88	Can B	
Trans 3	128	12:23:57	1.840	133.9	126.4	4.08	BP A	
	129	12:56:05	1.970	135.2	128.3	3.50	Mid B	
	130	12:28:00	1.660	131.0	126.9	2.47	HH C	
Trans 2	131	12:35:45	1.580	131.1	125.0	3.86	C	
	132	12:34:07	1.530	132.0	124.2	5.10	Pier A	
	133	12:34:55	1.510	131.7	125.5	4.11	Can B	
Trans 1	134	12:52:12	1.425	131.2	124.8	4.49	Boats A	
	135	12:53:24	1.580	135.7	126.4	5.89	Can B	
Trans 3	136	12:59:00	1.440	131.1	123.7	5.14	BP A	
	137	13:00:15	1.500	128.7	124.1	3.07	Mid B	
	138	13:02:00	1.390	130.6	125.9	3.38	HH C	
Trans 2	139	13:09:09	0.680	130.7	126.9	5.59	Pier A	
	140	13:09:45	1.000	130.7	126.7	4.00	Can B	
	141	13:10:30	0.960	130.1	125.9	4.37	C	
Control	142	c	1.000	127.7	127.7	0.00		
Trans 1		13:26:26	no sample tow caught on mooring line - hull mount for rest of day					
				no delay in sample - hull mount				
Trans 2	143	14:19:30	0.990	134.0	127.2	6.87	Pier A	
	144	14:20:00	0.970	133.2	128.2	5.15	Can B	
	145	14:20:46	0.980	131.4	127.0	4.49	C	
Trans 1	missed channel edge sample							
	146	14:35:23	0.970	134.4	125.3	9.38	midchannel	

Sample	Petri	Time	Volume	Tss + Filt	Filt	TSS	Notes	
	Dish (PH)	Tide	L	mg	mg	mg/L		
Trans 3	147	14:40:47	0.990	132.0	127.2	4.85	BP A	
	148	14:43:17	0.980	131.8	124.5	7.45	Mid B	
	149	14:44:30	0.970	132.7	125.9	7.01	HH C	
Trans 2	150	14:51:55	0.970	129.5	123.0	6.70	Pier A	
	151	14:52:18	0.940	132.2	125.9	6.70	B	
	152	14:53:06	0.990	132.8	124.4	8.48	C	
Trans 1	153	14:05:35	0.990	133.3	125.2	8.18	Boats A	
	154	15:06:19	0.960	128.1	120.9	7.50	Can B	
Trans 3	155	15:11:38	0.820	130.1	124.3	7.07	BP A	
	156	15:15:10	0.970	130.4	123.4	7.22	HH C	
	157	15:14:14	0.980	132.7	125.3	7.55	Mid B	
Control	158	c	1.000	125.4	125.8	-0.40		
Trans 2	159	15:21:39	0.960	130.8	125.7	5.31	Hull Mt Pier A	
	160	15:22:18	0.970	131.8	126.7	5.26	Mid B	
	161	15:23:00	0.930	131.1	125.8	5.70	C	
Trans 1	162	15:35:00	0.960	131.9	123.5	8.75	Boats A	
	163	15:35:40	1.000	137.6	127.3	10.30	Can B	
Trans 3	164	15:41:39	0.970	130.0	123.9	6.29	BP A	
	165	15:42:23	0.960	134.5	125.7	9.17	Mib B	
	166	15:43:32	0.970	132.4	124.0	8.66	HH C	
Trans 2	167	16:18:05	0.990	133.7	125.9	7.88	Pier A	
	168	16:18:52	0.990	134.3	124.0	10.40	Mid B	
	169	16:19:53	1.000	135.2	122.5	12.70	C	
Trans 1	170	16:29:29	0.970	133.0	124.4	8.87	Boat A	
	171	16:30:25	0.960	132.0	124.6	7.71	Can B	
Trans 3	172	16:35:44	0.940	133.1	127.3	6.17	BP A	
	173	16:36:49	0.860	131.7	125.0	7.79	Mid B	
	174	16:37:59	0.950	133.5	125.2	8.74	HH C	
Control	175	c	1.000	119.1	118.7	0.40		
Trans 2	176	16:45:10	0.970	127.0	119.3	7.94	Pier A	
	177	16:46:00	0.950	125.7	118.2	7.89	can B	
	178	16:47:00	0.970	126.3	119.8	6.70	C	
Trans 1	179	17:06:42	1.050	127.4	119.2	7.81	Boats A	
	180	17:07:30	1.000	125.2	119.6	5.60	Can B	
Trans 3	181	17:13:10	0.960	125.3	119.0	6.56	BP A	

Sample	Petri	Time	Volume	Tss + Filt	Filt	TSS	Notes	
	Dish (PH)	Tide	L	mg	mg	mg/L		
	182	17:14:00	0.970	126.9	119.2	7.94	Mid B	
	183	17:15:00	0.950	124.6	118.4	6.53	HH C	
Trans 2	184	17:22:45	1.050	126.1	117.8	7.90		
	185	17:23:20	1.040	126.8	119.1	7.40		
	186	17:24:45	1.050	127.0	119.5	7.14		
Trans 1	187	17:32:10	1.010	126.9	119.2	7.62		
	188	17:32:45	1.040	127.4	119.5	7.60		
Control	189	c	1.000	119.5	119.2	0.30		
Trans 3	190	17:39:10	0.970	125.6	118.7	7.11		
	191	17:40:00	0.960	127.0	119.9	7.40		
	192	17:41:00	1.000	128.2	119.8	8.40		
Control	193	c	1.000	119.8	119.8	0.00		
Trans 2	194	17:49:00	1.050	125.8	119.7	5.81	Pier A	
	195	17:49:30	1.060	124.6	118.0	6.23	Bouy B	
	196	17:50:45	1.050	128.1	119.2	8.48	Shiler C	
Trans 1	197	17:58:30	1.020	128.4	120.7	7.55	Boata A	
	198	17:59:10	1.050	127.0	118.5	8.10	Bouy B	
Trans 3	199	18:05:30	1.040	124.3	119.0	5.10	Newington A	
	200	18:06:25	1.040	126.1	119.0	6.83	B	
	201	18:07:30	1.050	127.5	119.8	7.33	Hilton C	
Trans 1	202	18:25:30	1.050	128.3	119.3	8.57	Boats A	
	203	18:26:15	1.050	127.0	119.3	7.33	Bouy B	
Trans 3	204	18:32:20	1.060	127.2	118.7	8.02	Newington A	
	206	18:33:30	1.060	126.1	119.0	6.70	Mid B	
	207	18:35:20	1.057	124.9	119.0	5.58	Hilton C	
Trans 2	208	18:44:15	1.038	124.6	119.3	5.11	A	
	209	18:44:50	1.052	125.8	119.2	6.27	B	
	210	18:46:35	1.048	124.4	117.9	6.20	C	
Trans 1	211	18:54:06	1.020	127.8	119.3	8.33	Boats A	
	212	18:54:45	1.058	128.0	119.4	8.13	Bouy B	
Trans 3	213	19:01:00	0.980	127.2	119.4	7.96	Newington A	
	214	19:02:00	1.026	128.9	119.8	8.87	Mid Bridge B	
	215	19:03:20	1.080	125.3	119.7	5.19	Hilton C	
Control	216	c	1.000	120.0	120.0	0.00		

Sample	Petri	Time	Volume	Tss + Filt	Filt	TSS	Notes	
	Dish (PH)	Tide	L	mg	mg	mg/L		
Fixed Station - Police Dock PNSY 7-11-92				Vertical profiles (hand pump)				
vertical(hand)	218	9:00:00	1.082	121.2	119.0	2.03	.5m off	
water 4.9m	219		1.059	125.3	119.9	5.10	1m	
	220		1.023	121.8	118.9	2.83	2m	
	221		1.068	122.7	119.3	3.18	3m	
	222	9:10:00	1.083	124.6	119.3	4.89	4m	
vertical(hand)	225	10:00:00	1.770	122.9	118.4	2.54	.5m off	
water 4.9 m	226		1.780	124.1	119.9	2.36	1m	
	227		1.760	124.5	119.9	2.61	2m	
	228		1.630	122.8	118.5	2.64	3m	
	229	10:09:00	1.690	124.6	119.5	3.02	4m	
vertical(hand)	232	11:00:00	1.980	126.1	119.2	3.48	.5m off	
water 4.5m	233		1.948	124.7	119.2	2.82	1m	
	234		1.935	125.9	120.1	3.00	2m	
	235		1.930	125.6	119.1	3.37	3m	
	236	11:09:00	1.956	125.9	119.8	3.12	4m	
vertical (hand)	239	12:00:00	1.695	123.4	119.5	2.30	.5 m off	
depth 4.8m	242		1.758	121.4	119.4	1.14	1m	
	241		1.772	122.1	119.4	1.52	2m	
	243		1.725	121.4	119.5	1.10	3m	
	244	12:09:00	1.775	122.1	119.7	1.35	4m	
vertical (hand)	248	13:00:00	1.885	125.5	119.2	3.34		
depth 3.6m	249		1.930	125.4	119.3	3.16		
	250		1.940	124.2	119.4	2.47		
	251		1.945	122.9	119.6	1.70		
Control	252	c	1.000	118.4	118.5	-0.10		
Vertical (hand)	255	14:00:00	1.935	124.1	120.4	1.91	.5m off	
	256		1.863	127.9	120.3	4.08	1m	
	257		1.755	122.7	119.2	1.99	2m	

Fixed Station - Police Dock PNSY near bottom and surface CTD 7-11-92

	217	9:07:00	0.950	122.5	119.3	3.37		
	223	9:30:00	1.770	124.2	119.4	2.71		
	224	10:00:00	1.900	124.7	119.4	2.79		
	230	10:30:34	2.050	125.1	119.6	2.68	Bottom	
	231	10:32:00	1.750	126.7	119.8	3.94	Surface	
	237	11:30:24	1.980	125.0	119.3	2.88	Bottom	
	238	11:32:30	1.900	126.0	118.8	3.79	Surface	
	240	12:05:05	2.015	123.2	118.5	2.33		

Sample	Petri	Time	Volume	Tss + Filt	Filt	TSS	Notes	
	Dish (PH)	Tide	L	mg	mg	mg/L		
	245	12:31:00	1.775	122.1	118.8	1.86	Bottom	
	246	12:33:30	1.900	122.2	119.8	1.26	Surface	
	247	13:03:45	1.920	122.5	119.9	1.35		
	253	13:30:20	1.955	123.9	119.5	2.25	Bottom	
	254	13:32:20	1.880	124.9	119.7	2.77	Surface	

Fixed Station- Clark Cove PNSY Vertical Profiles 7-13-92

Vertical(hand)	258	9:05:00	1.685	125.5	119.8	3.38	.5m off	
	259		1.858	128.9	119.8	4.90	1m	
	260		1.927	126.2	119.4	3.53	2m	
	261		1.882	124.3	119.6	2.50	3m	
	262		1.918	123.7	119.5	2.19	5m	
	263	9:16:00	1.850	124.5	119.5	2.70	7m	
Vertical (hand)	265	10:01:00	1.870	124.3	119.7	2.46	.5m	
	266		1.875	123.4	119.0	2.35	1m	
	267		1.880	121.7	117.8	2.07	2m	
	268		1.835	124.2	119.3	2.67	3m	
	269		1.910	124.9	119.7	2.72	5m	
	270	10:17:00	1.885	121.5	116.2	2.81	7m	
	275	11:00:00	1.810	124.2	119.5	2.60	.5m off (est. volume)	
	274		1.770	122.8	119.8	1.69	1m	
	273		1.922	121.7	118.4	1.72	2m	
	276		1.907	123.5	119.5	2.10	3m	
	277		1.905	123.1	119.8	1.73	5m	
	278		1.855	121.1	116.8	2.32	7m	
Vertical(hand)	283	12:00:00	1.878	122.1	118.3	2.02	.5m off	
	284		1.833	123.4	119.7	2.02	1m	
	285		1.892	123.7	119.4	2.27	2m	
	286		1.942	122.5	117.8	2.42	3m	
	287		1.850	124.9	119.0	3.19	5m	
	288	12:15:00	1.980	124.1	118.5	2.83	7m	
Vertical(hand)	292	13:00:00	1.820	124.4	118.5	3.24	.5m off	
	293		1.915	124.8	118.6	3.24	1m	
	294		1.940	124.9	118.8	3.14	2m	
	295		1.960	126.8	119.1	3.93	3m	
	296		2.005	126.0	118.8	3.59	5m	
	282		1.865	124.2	118.3	3.16	7m	
Vertical(hand)	298	14:00:00	1.855	124.1	119.3	2.59	.5m off	
7.9m depth	299		1.890	123.2	118.9	2.28	2m	
	300		1.906	124.5	119.7	2.52	1m	

Sample	Petri	Time	Volume	Tss + Filt	Filt	TSS	Notes	
	Dish (PH)	Tide	L	mg	mg	mg/L		
	301		1.875	122.4	118.1	2.29	3m	
	302		1.895	125.3	119.5	3.06	5m	
	303	14:09:00	1.905	125.6	118.5	3.73	7m	
Vertical(hand)	307		1.865	128.7	119.1	5.15	.5m off	
	308		1.895	126.2	119.0	3.80	1m	
	309		1.903	125.5	118.8	3.52	2m	
	310		1.903	123.2	117.5	3.00	3m	
	311		1.922	124.3	119.0	2.76	5m	
	312		1.875	124.1	119.5	2.45	7m	
Control	313	c	1.000	120.2	119.3	0.90		

Fixed Station- Clark Cove PNSY CTD system 7-13-92

	264	9:30:02	1.860	124.3	120.6	1.99		
8.4 depth	271	10:30:30	1.815	123.8	118.4	2.98		
	272	10:32:45	1.850	127.2	120.3	3.73		
8.2 depth	280	11:31:00	1.952	121.9	118.7	1.64		
	281	11:34:00	1.992	123.8	118.6	2.61		
8m depth	289	12:30:30	1.893	124.8	118.1	3.54		
	290	12:33:10	1.893	123.0	117.7	2.80		
8m depth	291	13:30:04	1.845	126.8	119.7	3.85		
	297	13:32:30	1.870	125.1	119.2	3.16		
7m depth	304	14:29:00	1.950	125.9	119.7	3.18		
	305	14:31:00	1.975	123.4	118.4	2.53		
Control	306	c	1.000	118.6	118.3	0.30		

PNSY X-section East Seavey Island 7-14-92

T-1	314	7:06:30	1.815	126.7	117.4	5.12	surface tow A	
track #1	315	7:08:13	1.900	130.6	119.8	5.68	B	
	316	7:10:20	1.875	128.0	119.0	4.80	C	
T-2	317	7:13:30	1.875	125.8	118.6	3.84	D	
T-3	318	7:15:11	1.960	128.2	119.1	4.64	E	
T-4	320	7:19:20	1.940	127.7	118.5	4.74	F	
Control	319	c	1.000	120.3	119.7	0.60		
T -1	321	8:01:10	1.825	130.0	120.0	5.48	A	
Track #4	322	8:03:30	1.885	129.3	118.5	5.73	B	
	323	8:05:15	1.945	130.5	119.7	5.55	C	
T-2	324	8:23:20	1.915	129.9	119.3	5.54	D	
T-3	325	8:11:07	1.925	130.1	119.7	5.40	E	
T-4	327	8:13:58	1.990	128.2	118.0	5.13	F	

Sample	Petri	Time	Volume	Tss + Filt	Filt	TSS	Notes	
	Dish (PH)	Tide	L	mg	mg	mg/L		
T-1 Yo-Yo	326	8:20:00	1.900	129.8	118.8	5.79	A surface	
Track #5	328	8:23:06	1.915	129.1	119.1	5.22	B bottom	
	329	8:25:45	1.850	130.6	119.7	5.89	C 6.1m down	
T-2	330	8:38:49	1.985	129.4	118.8	5.34	D surface	
	331	8:33:50	1.885	124.8	118.7	3.24	D bottom 7.2m	
T-3	332	8:40:00	2.025	127.4	119.1	4.10	E surface	
	333	8:43:30	1.920	129.9	120.3	5.00	E 7.8m	
T-4	334	8:54:30	1.940	129.0	119.5	4.90	F surface	
	335	8:58:00	1.860	127.9	119.0	4.78	F	
T-1 Tow	337	9:05:25	1.925	128.0	118.5	4.94	A Tow	
Track #6	338	9:07:45	1.885	126.8	118.1	4.62	B Tow	
	339	9:09:13	1.840	125.5	119.0	3.53	C Tow	
T-2	340	9:12:40	1.825	126.7	119.9	3.73	D Tow	
T-3	341	9:14:47	1.855	125.2	119.1	3.29	E Tow	
T-4	342	9:18:00	1.775	124.8	117.9	3.89	F Tow	
T-1	343	10:04:30	1.935	128.1	119.4	4.50	A Tow	
Track #9	344	10:06:00	1.840	128.3	119.4	4.84	B Tow	
	345	10:08:00	1.835	128.1	119.3	4.80	C Tow	
T-2	346	10:11:25	1.850	126.2	118.3	4.27	D Tow	
T-3	347	10:13:25	1.860	124.7	119.0	3.06	E Tow	
T-4	348	10:16:30	1.865	126.3	119.6	3.59	F Tow	
Control	349	c	1.000	118.8	118.1	0.70		
T-1 Tow	350	11:01:30	1.840	127.0	118.5	4.62	A Tow	
Track #12	351	11:03:25	1.860	125.5	119.7	3.12	B Tow	
	352	11:05:37	1.940	126.2	119.8	3.30	C Tow	
T-2	353	11:08:30	1.810	128.4	119.7	4.81	D Tow	
T-3	354	11:11:03	1.960	126.1	118.2	4.03	E Tow	
T-4	355	11:14:24	1.970	126.7	118.1	4.37	F Tow	
T-1 Yo-Yo	356	11:21:50	1.870	127.2	118.1	4.87	A Yo-Yo surface	
Track #13	357	11:25:35	1.840	123.5	117.9	3.04	B 19.4m down	
	358	11:28:30	1.810	125.7	119.6	3.37	C Yo-Yo surface	
T-2	359	11:35:10	1.855	124.9	118.2	3.61	D surface	
	360	11:38:20	1.880	125.7	119.1	3.51	D bottom 9m down	
T-3	366	11:45:15	1.605	126.8	119.3	4.67	E surface	
	362	11:47:36	1.840	126.6	119.9	3.64	E bottom	
T-4	363	11:54:45	1.895	124.9	118.4	3.43	F surface	
	364	11:57:12	1.925	126.5	119.9	3.43	F bottom	
T-1 Tow	365	12:05:10	1.765	124.6	119.6	2.83	A Tow	
Track #14	367	12:07:00	1.890	126.3	119.0	3.86	B Tow	
	368	12:09:07	1.890	125.6	119.0	3.49	C Tow	
T-2	369	12:12:20	1.985	127.2	119.6	3.83	D Tow	
T-3	370	12:15:10	1.945	126.7	118.9	4.01	E Tow	

Sample	Petri	Time	Volume	Tss + Filt	Filt	TSS	Not s	
	Dish (PH)	Tide	L	mg	mg	mg/L		
T-4	371	12:17:46	1.925	122.7	118.3	2.29	F Tow	
T-1	373	12:58:46	1.840	123.6	119.1	2.45	A Tow	
Track #17	374	13:00:14	1.927	121.6	117.5	2.13	B Tow	
missed sample							missed C	
T-2	372	13:06:12	1.885	125.3	119.7	2.97	D Tow	
T-3	375	13:09:41	1.820	122.1	118.1	2.20	E Tow	
T-4	376	13:12:23	1.978	122.7	118.9	1.92	F Tow	
Control	377	c	1.000	120.1	119.4	0.70		
T-1	378	13:56:36	1.958	120.9	117.5	1.74	A Tow	
Track #20	379	13:58:37	0.950	124.5	119.5	5.26	B Tow	
	380	14:01:00	1.537	119.9	115.7	2.73	C Tow	
	381	14:04:21	1.965	123.9	117.6	3.21	D Tow	
	382	14:06:45	1.983	122.5	115.9	3.33	E Bouy 13 Tow	
	383	14:08:58	1.940	121.3	115.5	2.99	F Tow	
T-1	386	14:49:40	1.955	115.0	112.0	1.53	A Tow	
Track #23	385	14:51:30	1.840	119.8	114.3	2.99	B Tow	
	384	14:53:30	1.962	121.8	116.8	2.55	C Tow	
T-2	387	14:58:40	1.910	121.6	115.1	3.40	D Tow	
T-3	388	15:00:40	1.884	122.4	114.5	4.19	E Tow	
T-4	389	15:03:08	1.955	122.6	118.2	2.25	F Tow	
Control	390	c	1.000	116.7	115.7	1.00		
T-1 Yo-Yo	391	15:09:45	1.932	122.1	117.7	2.28	A Yo-Yo surface	
Track# 24	392	15:15:35	1.880	121.2	118.1	1.65	B bottom 10-13m	
	393	15:18:30	1.868	122.6	117.5	2.73	C 6.1m	
T-2	394	15:25:20	1.935	124.8	117.6	3.72	D surface	
	396	15:27:40	1.952	123.9	117.8	3.13	7.7m down	
T-3	395	15:32:20	1.865	121.9	117.1	2.57	E surface	
	397	15:35:00	1.978	121.5	114.8	3.39	E 6.6m down	
T-4	398	15:41:37	1.987	123.2	118.0	2.62	F surface	
	399	15:44:18	1.985	124.0	118.2	2.92	F 6.6m down	
T-1 Tow	400	16:10:30	1.958	120.3	114.4	3.01	A Tow	
Track#26	401	16:13:00	2.010	123.2	118.6	2.29	B Tow	
	402	16:14:50	1.988	121.5	115.8	2.87	C Tow	
T-2	403	16:19:00	1.968	127.9	120.5	3.76	D Tow	
T-3	404	16:22:00	1.892	123.5	118.1	2.85	E Tow	
T-4	405	16:23:27	2.020	120.5	115.8	2.33	F Tow	
T-1	406406	17:12:00	1.543	126.8	119.8	4.54	A Tow	
Track #29	407	17:14:15	1.990	118.7	112.1	3.32	B Tow	
	408	17:17:30	2.028	125.4	118.5	3.40	C Tow	
T-2	409	17:22:20	2.025	126.8	119.2	3.75	D Tow	
T-3	410	17:24:45	2.100	126.7	118.8	3.76	E Tow	
T-4	411	17:27:30	1.955	125.3	120.5	2.46	F Tow	

Sample	Petri	Time	Volume	Tss + Filt	Filt	TSS	Not s	
	Dish (PH)	Tide	L	mg	mg	mg/L		
T-1	412	17:53:30	1.990	123.4	115.5	3.97	A Tow	
Track #31	413	17:56:15	1.982	123.6	117.0	3.33	B Tow	
	414	17:58:30	2.033	124.9	118.5	3.15	C Tow	
T-2	415	18:02:45	2.065	123.8	117.5	3.05	D Tow	
T-3	416	18:04:40	1.969	127.0	120.5	3.30	E Tow poor seat lost 25ml	
T-4	417	18:07:15	1.996	121.9	115.4	3.26	F Tow	
Control	418	c	1.000	116.9	117.0	-0.10		
T-1 Yo-Yo	419	18:34:52	2.000	122.5	114.7	3.90	A Yo-Yo surface	
	420	18:40:00	1.990	122.8	117.1	2.86	B 17.7m bottm	
	421	18:43:00	1.925	127.2	120.0	3.74	7m down	
T-2	422	18:50:50	2.008	124.0	116.5	3.74	D surface	
	423	18:54:00	2.035	123.0	116.7	3.10	D 7.2m down bottom	
T-3	424	18:59:15	1.993	125.0	118.4	3.31	E surface	
	425	19:02:32	2.098	123.9	117.5	3.05	E 7.1m down bottom	
	426	19:09:45	2.038	122.3	117.5	2.36	F surface	
	427	19:12:30	2.058	125.4	119.0	3.11	F 6.3m down	

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Station 1	428	12:12:30	2.025	120.7	118.0	1.33	surface 1m	
depth 16.4m	429	12:17:45	1.930	121.2	116.5	2.44	mid 7.9m	
	430	12:21:38	2.040	118.8	114.1	2.30	bottom 14.7m	
Station 2	431	12:42:15	2.045	125.0	119.5	2.69		
Station 3	432	12:56:00	2.045	123.1	116.3	3.33	surface 1m	
depth 14.6m	433	13:03:30	2.045	124.9	119.0	2.89	mid 6,9m	
	434	13:01:00	1.980	125.0	120.0	2.53	bottom 13.6m	
Station 4	435	13:18:30	2.030	122.1	116.6	2.71		
Station 5	436	13:26:30	2.040	121.8	116.0	2.84		
Control	437	c	1.000	120.6	120.3	0.30		
Station 6	438	13:36:00	2.065	125.8	119.4	3.10		
Station 7	439	14:05:00	1.965	125.0	117.7	3.72	surface 1m	
depth 15m	440	14:15:00	1.980	123.4	117.9	2.78	mid 8m	
	441	14:12:00	2.080	124.4	118.5	2.84	bottom 12m	
Station 8	442	14:36:15	2.000	122.0	112.9	4.55	surface 1m	
depth ?	443	14:43:45	2.035	121.0	111.6	4.62	mid 4m	
	444	14:41:45	1.965	127.3	116.5	5.50	bottom 6.7m	
Control	445	c	1.000	120.3	120.1	0.20		
Station 9	446	15:03:49	1.990	126.7	118.1	4.32	surface 1m	
depth 10m	448	15:10:40	2.050	126.4	117.9	4.15	mid	

Sample	Petri	Time	Volume	Tss + Filt	Filt	TSS	Notes	
	Dish (PH)	Tide	L	mg	mg	mg/L		
	447	15:08:10	2.130	128.4	118.2	4.79	bottom 7m	
Station 10	449	15:27:00	2.020	130.8	119.9	5.40	surface	
Station 11	450	15:41:00	2.040	128.2	118.3	4.85	surface	
Control	451	c	1.000	115.1	114.3	0.80		
Station 12	452	16:08:30	1.595	126.6	118.5	5.08	surface	
Station 13	453	16:21:00	1.000	120.5	115.1	5.40	surface	
Station 14	454	16:37:00	1.370	126.3	117.7	6.28	surface	
Station 15	455	16:49:00	1.000	136.9	119.2	17.70	surface	
Control	456	c	1.000	115.3	114.9	0.40		

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Station 1	457	7:19:30	2.120	123.8	118.7	2.41	surface 1m	
depth 13.4m	458	7:29:00	2.115	120.0	114.4	2.65	mid	
	459	7:26:45	2.035	122.5	118.4	2.01	bottom 13m	
Station 2	460	7:53:30	2.065	121.5	112.2	4.50	surface	
Station 3	461	8:06:40	2.035	128.4	117.0	5.60	surface	
depth 22.2m	462	8:16:45	2.070	128.1	117.0	5.36	mid 10m	
	463	8:13:55	2.035	127.7	118.4	4.57	bottom 19m	
Station 4	464	8:42:00	2.040	128.1	117.4	5.25		
Station 5	466	8:47:30	2.100	128.6	118.2	4.95		
Station 6	467	8:58:30	2.020	130.5	118.5	5.94		
Station 7	468	9:20:30	2.070	127.2	114.6	6.09	surface 1m	
depth 12.4m	469	9:29:00	1.455	128.1	118.1	6.87	mid 5.1 m	
	470	9:26:30	2.050	129.5	117.4	5.90	bottom	
Control	471	c	1.000	119.1	118.9	0.20		
Station 8	472	9:50:15	1.000	130.1	118.5	11.60	surface 1m	
depth 8.6m	473	9:56:00	1.340	128.7	117.7	8.21	mid 4.1m	
	474	9:54:00	1.490	133.3	117.7	10.47	bottom 5.9m	
Station 9	475	10:10:15	1.980	126.5	115.3	5.66	surface	
depth 8m	476	10:17:00	1.970	127.1	117.6	4.82	mid	
	477	10:15:14	1.970	129.4	116.4	6.60	bottom	
Station 11	478	10:30:00	1.955	129.3	118.0	5.78		

Sample	Petri	Time	Volume	Tss + Filt	Filt	TSS	Notes	
	Dish (PH)	Tide	L	mg	mg	mg/L		
Control	479	c	1.000	116.9	116.3	0.60		
Station 12	481	10:48:00	1.970	128.1	118.0	5.13		
Station 13	482	11:00:00	1.530	130.6	119.3	7.39		
Station 14	483	11:20:30	0.480	141.1	115.1	54.17		
Station 15	484	11:32:45	0.350	147.9	115.6	92.29		
Control	485	c	1.000	113.4	113.1	0.30		