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LONG ISLAND SOUND
ASHAROKEN BORROW AREA INVESTIGATION

FINAL FINFISH/BENTHIC INVERTEBRATE SUMMARY REPORT

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EXECUTIVE SUMMARY

This study was conducted by the U.S. Army Corps of Engineers, New York District, as part of a beach erosion control, storm damage reduction, and related purposes project along the north shore of Long Island, in and adjacent to the community of Asharoken, New York. Monitoring of biological resources within the two proposed offshore sand borrow areas was designed to assess the potential biological impacts of dredging. This report describes the results of a bottom trawl survey of demersal finfish and epibenthic macroinvertebrate resources, benthic infaunal survey, and studies of water quality, sediment chemical-constituents, and grain size in the proposed borrow areas in September 2003 and February, May, and June of 2004.

A total of 43 fish and invertebrate species (33 finfish and 10 invertebrates) were collected during the trawl net survey in the two borrow areas during the September 2003 and February, May, and July 2004 sampling events. Species diversity was the highest for the May 2004 sampling with 25 species, followed by September 2003 with 23 species, July 2004 with 22 species, and February 2004 with 10 species (Figure 10). Finfish abundance accounted for approximately 87% of the total catch versus invertebrates that accounted for 13% (Table 6). Aside from the large number of bay anchovy (*Anchoa mitchilli*) collected in September and July (45,606 and 2,443, respectively), scup (*Stenotomus chrysops*) was the dominant finfish species, accounting for 60.7% of the total catch (Figure 12). Other common species collected were winter flounder (*Pseudopleuronectes americanus*), spider crab (*Libinia dubia*), weakfish (*Cynoscion regalis*) and Atlantic butterfish (*Peprilus triacanthus*). Long-finned squid (*Loligo pealei*) accounted for an additional 2%. Together these six species composed 89% of the total catch in terms of overall abundance. Biomass was dominated by horseshoe crab (*Limulus polyphemus*), spider crab, scup, winter flounder, summer flounder (*Paralichthys dentatus*), and tautog (*Tautoga onitis*). These six species comprised 81% of the total biomass (Figure 15).

Nematode and the oligochaete worms were the first and second most abundant benthic invertebrates collected by benthic grab from the Asharoken borrow areas during both the September 2003 and May 2004 sampling events (Figure17 and 18). Results of both September 2003 and May 2004 benthic grabs showed that gastropods (e.g., snails) and pelecypods (bivalve species) were fairly abundant (over 100 individuals) at Borrow Area A, but rare in Borrow Area B. Other common benthic invertebrates collected in the borrow areas included polychaete worms, copepods and amphipods [e.g., small crustaceans and shrimp-like crustaceans, respectively (Tables 17 nd 18)].

Based on the results of the survey, it was noted that common finfish and invertebrate species such as bluefish (*Pomatomus saltatrix*), weakfish, and blue crab (*Calinectes sapidus*), were not found during the May and July 2004 sampling efforts. Although unexpected, the absence of these individuals is likely the result of the limitations of discreet or point-in-time sampling rather than the complete absence of these species from the project area. Based on the depth, sediment grain size and the length of the winter flounders captured, the borrow areas may potentially be utilized by this species as spawning grounds. Young-of-the year scup were also collected in great abundance in Borrow Area B, which suggests that the borrow area was may potentially serve as nursery ground by both scup and winter flounder, but additional sampling would be needed to confirm this supposition.

The presence of American lobster (*Homarus americanus*) and black sea bass (*Centropristis striata*) in Borrow Area B implies the presence of hard surface or structures (i.e., rock outcroppings) as both of those species are commonly associated with bottom structures. Although no American lobster were caught in Borrow Area A, black sea bass were, and the constant snagging of sampling net in this area suggests that the bottom composition was rocky and intermixed with areas of sand deposits that may provide additional habitat.

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ABBREVIATIONS AND ACRONYMS

°C	degrees Celsius (temperature)
DDT	dichlorodiphenyltrichloroethane
DO	dissolved oxygen
EFH	essential fish habitat
g	gram
Investigation	Asharoken Borrow Area Field Investigation
LPIL	lowest possible identification level
mg/l	milligrams per liter (dissolved oxygen)
Max	maximum
Mean	average
Min	minimum
mm	millimeter
N	number measured
NYSDEC	New York State Department of Environmental Conservation
PAH	polyaromatic hydrocarbon
PCB	polychlorinated biphenyl
ppt	parts per thousand (salinity)
SD	standard deviation
Study	Asharoken Hurricane and Storm Damage Reduction Feasibility Study
TL	total length
USACE	U.S. Army Corps of Engineers
YOY	young-of-the-year

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1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE), New York District, in partnership with the project's non-Federal sponsors, the New York State Department of Environmental Conservation (NYSDEC) and the Village of Asharoken, is initiating the Asharoken Hurricane and Storm Damage Reduction Feasibility Study (Study) to evaluate the feasibility of beach erosion control, storm damage reduction and related purposes on the north shore of Long Island in and adjacent to the community of Asharoken, New York (USACE 2002).

The Long Island northern shoreline has historically experienced coastal erosion and storm damage. Asharoken Beach is a narrow section of land in the Village of Asharoken within the Town of Huntington, Suffolk County, New York. Asharoken Beach connects Eaton's Neck with the mainland area of the Village of Asharoken. The length of Asharoken Beach is approximately 2.5 miles, while the width varies from 100 feet at the northwestern section near Eaton's Neck to 1,000 feet at the southeastern limit near the Northport Power Station. Asharoken Avenue is the only vehicular access to Eaton's Neck along Asharoken Beach (USACE 2002).

2.0 OBJECTIVES

One of the proposed alternatives being evaluated for the Study is to utilize sand from locations within Long Island Sound for use as potential beach nourishment and other dune or protection structures. To assess environmental impacts of the proposed Federal action, the District conducted the Asharoken Borrow Area Field Investigation (Investigation) to gather information on the baseline biological conditions of two potential sand source areas in Long Island Sound. Data collected for the Investigation characterize existing fish and benthic communities that utilize the borrow locations, as well as the existing water quality, grain size, and chemical constituents of the sand found within the borrow locations. These data will also be used as a basis to evaluate the potential environmental impacts of the considered Study alternatives.

The USACE has analyzed three potential borrow locations based on sediment type and has limited consideration to two borrow locations based on sediment type and other environmental factors (shellfisheries areas, etc.). These borrow areas are referred to as Borrow Area A and Borrow Area B (Figure 1). The approximate area of Borrow Area A is 8,270,150 square feet or 0.224 square nautical miles (0.29 square miles). The approximate area of Borrow Area B is 4,375,000 square feet or 0.1185 square nautical miles (0.1569 square miles).

3.0 METHODOLOGY

Finfish, benthic invertebrates, sediment grain size and chemistry, and water quality data were collected in the two proposed Investigation areas during September 22–26, 2003 and May 11–14, 2004 aboard the R/V Walford, a research vessel owned by the New Jersey Marine Science Consortium. Sediment samples collected for grain size and soil chemical analyses were taken from the borrow areas on September 22–23, 2003. Additional finfish survey and water quality data were collected in the same Investigation areas during February 18–19 and July 7–8, 2004 aboard the R/V Walford. Northern Ecological Associates, Inc. assisted USACE with field data collection and analysis.

3.1 FISH

Finfish sampling was conducted using a 30-foot otter trawl fitted with a 1/2 inch cod end. The trawls were towed along pre-determined transects at a speed of 1 to 3 knots for a distance of 0.25 nautical miles or an approximate bottom tow time of 8 to 10 minutes. During each sampling effort, trawling was performed for two consecutive days to ensure that each borrow area was sampled during different tidal periods. Thirteen (13) pre-determined transects were selected for the Borrow Area A September 2003 sampling event (Figure 2) and seven pre-determined transects were selected for the Borrow Area B February 2004 sampling event (Figure 3). Bottom trawl coordinates for the September 2003 event are presented in Table 1 and bottom trawl coordinates for the February 2004 event are presented in Table 2. The same trawl coordinates were used for Borrow Area A and B during the May and July 2004 sampling efforts, which are presented in Table 3. Trawl transect coordinates for the May and July 2004 sampling events were the same as previous efforts in Borrow Areas A and B and presented in Figures 4 and 5, respectively.

All catch were processed on the boat and separated by species and identified to the lowest possible identification level (LPIL) taxa. All species were weighed and enumerated. Length measurements were taken using a measuring board consisting of a linear metric scale on a flat wooden base with a rigid headpiece. Total length (TL) measurements (the distance from the closed mouth to the extreme tip of the caudal fin) were recorded to the nearest millimeter. Weight measurements were measured to the nearest gram using Pesola® spring scales. When large numbers of individuals were encountered, a random subsample of 50 individuals per species was collected as a method of estimating total capture.

3.2 BENTHIC INVERTEBRATES

Benthic sampling was only conducted during the September 2003 and May 2004 sampling events. Benthic grabs were collected using a Smith-McIntyre grab (0.1 square meter) at each pre-determined sample station. Each sample was sieved in the field with a 0.5 millimeter (mm) mesh sieve bucket, and preserved in a buffered 10% formalin solution for laboratory analysis. In the laboratory, benthic samples were sieved again, stained with 1% Rose Bengal, and transferred to 70% ethanol for taxonomic analysis. Organisms were sorted from the sediments and enumerated by LPIL taxa. Wet-weight biomass was also determined after combining LPIL taxa

into higher-order taxa. For the September 2003 sampling event, 35 pre-determined grab stations were selected for Borrow Area A (Figure 6) and 15 pre-determined grab stations were selected for Borrow Area B (Figure 7). Grab stations for the May 2004 Borrow Area A are presented in Figure 8 and for Borrow Area B in Figure 9. Grab station coordinates of all sampling events are presented in Table 4.

3.3 GRAIN SIZE AND SEDIMENT CHEMISTRY

Each benthic grab also was subsampled in the field for approximately 150 to 250 grams of material for grain size characterization (total of 50). Subsampled materials were collected and stored in a whirlpak to be shipped to the laboratory for analysis. Grain-size distribution was determined in the laboratory using a wet-sieve method. Grain-size analyses were conducted for the following components: pebble, coarse gravel, fine gravel, coarse sand, medium sand, fine sand, and silt or clay.

For the September 2003 sampling event, a select number of grab samples of sediment were subsampled to test the chemical constituents in the sediment. Subsamples were collected and stored in pre-prepared laboratory containers and stored in coolers to be shipped to the laboratory for analysis. Each sediment sample was screened in the laboratory for the following chemical parameters: polyaromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), volatiles, pesticides (dichlorodiphenyltrichloroethane [DDT], Mirex, and Chlordane), and priority pollutant metals (antimony, arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc). For Borrow Area A, subsample collection was conducted at every third grab station, starting at grab station #1, for a total of 12 grabs (grab stations #1, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, and 33). For Borrow Area B, subsample collection was conducted at every other grab station, starting at grab station #2, for a total of six grabs (grab stations #2, 4, 6, 8, 10, and 12).

3.4 WATER QUALITY

During all fish and benthic sampling events, water quality measurements were collected at the beginning and end of each event. Water quality parameters such as temperature, dissolved oxygen (DO), salinity and conductivity, pH, and turbidity were collected from the surface, mid-depth, and bottom of the water column using an YSI© 6920 datasonde. In cases where the turbidity parameter was not available on the YSI datasonde, a Secchi disc was deployed to measure (to the nearest 0.5 meter) the light transmission at the sample location.

3.5 STATISTICAL ANALYSIS

Three variables were used to examine the fish data; overall species richness, essential fish habitat (EFH) species richness, and EFH species count. Overall species richness is the count of the number of each unique species found within each trawl. EFH species richness is the count of the number of each unique species found within each trawl that are EFH-designated and special interest species. The representative EFH and special interest species in this variable include the following species; red hake (*Urophycis chuss*), scup, summer flounder, windowpane (*Scophthalmus aquosus*), winter flounder, bluefish, Atlantic herring (*Clupea harengus*), and

black sea bass. The EFH species count is the total number of individuals captured within each trawl that are representative EFH and special interest species. Because of the apparent temporal effects on the fish assemblages, each sampling period was examined separately. A two-sample unpaired t-test was used to compare fish variable differences between Borrow Areas A and B.

Similar to the fish variable statistical analysis, overall species richness among benthic invertebrates, defined as the count of the number of each unique species found within each sample, was compared between the borrow areas using a two-sample unpaired t-test.

Grain size data for 2003 and 2004 were pooled and percent compositions for each grain size class were compared between the two borrow areas using a two-sample unpaired t-test (e.g., mean percent fine sand for Borrow Area A vs. mean percent fine sand for Borrow Area B).

4.0 TRAWL RESULTS (FINFISH AND EPIBENTHIC MACROINVERTEBRATES)

Sixty-eight (68) otter-trawls (tows) were conducted in water depths of 29–47 feet and for durations of 8–10 minutes during the September 2003, February 2004, May 2004, and July 2004 sampling events. As a result, a total of 33 finfish species and 10 macroinvertebrate species (including squid) were collected in both Borrow Area A and Borrow Area B (Table 5 and Figure 10). It is important to note that bay anchovy were extremely abundant (in excess of 13,000 individuals in Borrow Area A and more than 31,000 individuals in Borrow Area B) during the September 2003 sampling event. Bay anchovy often form large schools that may become entrained in the trawl net and inadvertently prevent or deter the capture of other species. Additionally, when large numbers of individuals are caught, separating and accounting for similar sized species becomes difficult and less accurate as many non-anchovy species are easily camouflaged and possibly overlooked. Because of this, bay anchovy were excluded from the September 2003 analysis of species composition in order to obtain a more accurate representation of species proportions for commercial and recreational purposes and to make comparisons of species composition data between borrow areas more relative. However, it is important to note that although anchovies are excluded in certain statistical instances, their value as a prey species and as an essential component of the food chain should not be underestimated. Bay anchovy data is included in Appendix A. Scup was the dominant species, accounting for over half or 60.7% of the overall catch (Table 6). This excludes bay anchovy, which if counted, would be 90.0% of the total abundance. The second most abundant species was winter flounder (9.8%), followed by spider crab (9.5%), weakfish (4.2%), long-finned squid (2.3%), and Atlantic butterfish [2.0% (Figure 12)]. The remaining 11.5% was comprised of all other species. Cunner (*Tautogolabrus adspersus*) and winter flounder were the only two species of finfish collected during each of the four sampling events. The asteriid sea star (*Asterias forbesi*), rock crab (*Cancer irroratus*), and spider crab, were the only macroinvertebrates present during every sampling effort. Rocky substrate made bottom fishing extremely difficult and multiple nets were damaged during the process resulting in lost catches and additional attempts.

Differences in species abundance were evident between Borrow Areas A and B (Figure 11) although a low sampling frequency combined with migratory fish patterns allows only for a qualitative observation regarding differences in fish populations between these locales to be made. While scup was clearly the dominant species in Borrow Area B, representing 80 percent of the species abundance, it was only the fourth most common species (11.4%) in Borrow Area A. A quick comparison of the top five species from Borrow Areas A and B shows that winter flounder and spider crab were among the most abundant species in both borrow areas (Figures 13 and 14). Weakfish was among the most common species in Borrow Area A, but not in Borrow Area B.

For all of the sampling events combined, a total of eight (8) EFH-designated species were collected in both borrow areas [i.e., Atlantic herring, black sea bass, bluefish, red hake, scup, windowpane, and winter flounder (Table 6)].

4.1 MONTHLY TRAWL RESULTS

The following section describes the finfish species composition, abundance, and biomass for successful tows completed during each monthly effort. Data for both borrow areas are presented along with information pertaining to EFH species designations. A general description of the relative abundance and frequency of the dominant macroinvertebrate species is also given for each effort.

4.1.1 September 2003: Borrow Areas A/B

A total of 17 finfish species, 5 of which are EFH-designated, and 6 macroinvertebrate species were collected in September 2003 at both borrow areas (Table 6). Anchovy dominated the catch accounting for 92.5%, followed by scup, an EFH-designated species, which represented 6.5% of the catch. With anchovy excluded from the analysis scup was the dominant species, accounting for 87.8% of the catch. Other common species collected during the September 2003 sampling event were weakfish, Atlantic butterfish and long-finned squid. The total catch of all species combined for the September 2003 sampling event was 49,283 with anchovy representing 45,606 individuals. When anchovy are excluded, total catch drops to 3,677 individuals; of which 3,585 were fish, 83 were squid, and the remaining 9 individuals were benthic macroinvertebrates. Besides scup, other EFH-designated species captured included bluefish, winter flounder, Atlantic herring, and black sea bass. However, these accounted for only a small percentage of the catch. Rock crab was the most abundant macroinvertebrate collected, but only 3 individuals were caught.

A total of 13 finfish species, 5 of which are EFH-designated, and 4 macroinvertebrate species were collected in Borrow Area A during the September 2003 sampling event (Table 7). Anchovy dominated the catch of Borrow Area A by 96.6%, due to anchovy representing 13,812 individuals of the total 14,293 finfish and macroinvertebrates that were caught. With bay anchovy eliminated from the analysis, weakfish was the dominant species accounting for 45.5%, and scup was the second most abundant species, accounting for 34.5% of the catch. Other common species collected in Borrow Area A during the September 2003 sampling event were long-finned squid, Atlantic butterfish, winter flounder, and bluefish. With anchovy excluded the total catch of all species combined in Borrow Area A during the September 2003 sampling event was 481 individuals; of which 433 were fish, 44 were squid, and the remaining 4 individuals were benthic macroinvertebrates.

A total of 11 finfish species, 4 of which are EFH-designated species and 4 macroinvertebrate species were collected in Borrow Area B during the September 2003 sampling event (Table 8). Anchovy dominated the catch of Borrow Area B by 90.9%, due to anchovy representing 31,794 individuals of the total 34,990 finfish and macroinvertebrates that were caught. With bay anchovy eliminated from the analysis, scup was the dominant species accounting for 95.8% of the catch. Other common species collected in Borrow Area B during the September 2003 sampling event were Atlantic butterfish and long-finned squid. With anchovy excluded, the total catch of all species combined in Borrow Area B during the September 2003 sampling event was 3,196 individuals; of which 3,152 were fish, 39 were squid, and the remaining 5 individuals were benthic macroinvertebrates.

Length statistic data of the EFH-designated species collected at both borrow areas are presented in Table 9.

4.1.2 February 2004: Borrow Areas A/B

A total of 10 taxa were collected in February 2004 at both borrow areas – less than one half of all other sampling events (Table 6). Of these, 3 were EFH-designated species, and 3 were macroinvertebrates. Grubby (*Myoxocephalus aenaeus*) was the dominant species, accounting for 52.9% of the catch. Cunner was the second most abundant species, accounting for 15.5% of the catch. Other common species collected during the February 2004 sampling event were winter flounder and asteriid sea star. February had the smallest total catch of any sampling event, with only 155 individuals caught compared to over 3,600 collected in September 2003. Of these, 20 individuals were macroinvertebrates. This was also the only month that no squid were collected.

A total of eight species were collected in Borrow Area A during the February 2004 sampling event (Table 7). Grubby was the dominant species, accounting for 54.7% of the catch in Borrow Area A. Other common species collected in Borrow Area A were cunner and winter flounder. The total catch for all species collected from Borrow Area A during the February 2004 sampling event was 95 individuals including 10 EFH-designated winter flounder and 9 benthic macroinvertebrates.

A total of seven species were collected in Borrow Area B during the February 2004 sampling event (Table 8). Similar to Borrow Area A, grubby was the dominant species, accounting for 48.3% of the catch in this borrow area. Of these, three EFH-designated species were collected in February. Other common species collected in Borrow Area B during the February 2004 sampling event were asteriid sea star, Atlantic herring, and winter flounder. The total catch of all species in Borrow Area B during the February 2004 sampling event was 58 individuals, of which 11 were macroinvertebrates.

Length statistic data of the EFH-designated species collected at both borrow areas are presented in Table 9.

4.1.3 May 2004: Borrow Areas A/B

A total of 25 taxa were collected from both borrow areas in May 2004 – the highest diversity of all the sampling events (Table 6). This included 5 EFH-designated species and 7 benthic macroinvertebrate species. Spider crab was the dominant species, accounting for 39.2% of the catch, followed by winter flounder, which accounted for 34.0% of the total collected. During the May 2004 sampling event, 1,167 individual organisms were collected, of which 31 were squid and 517 were macroinvertebrates (457 of which were spider crabs).

A total of 23 species were collected in Borrow Area A (Table 7). Spider crab was the dominant species, accounting for 40.9% of the catch. Winter flounder was the second most abundant species, accounting for 34.1% of the catch. The total catch of all species combined in Borrow

Area A during the May 2004 sampling event was 817 individuals; of which 429 were fish, 25 were squid, and 363 individuals were benthic macroinvertebrates (including 334 spider crabs).

A total of 17 species were collected in Borrow Area B during the May 2004 sampling event (Table 8). Similar to Borrow Area A, spider crab was the dominant species, accounting for 35.1% of the catch, while winter flounder was the second most abundant species, accounting for 33.7% of the catch. The total catch of all species combined in Borrow Area B during the May 2004 sampling event was 350 individuals; of which 190 were fish, 6 were squid, and 154 individuals were benthic macroinvertebrates (including 123 spider crabs).

Length statistic data of the EFH-designated species collected at both borrow areas are presented in Table 9.

4.1.4 July 2004: Borrow Areas A/B

A total of 22 taxa were collected in July 2004 at both borrow areas (Table 6). This included 4 EFH-designated species and 6 macroinvertebrate species. Anchovy dominated the catch by 87.3%, due to anchovy representing 2,443 individuals of the total 2,800 finfish and macroinvertebrates that were caught. With anchovy excluded, winter flounder was the dominant species, accounting for 28.0%, and blueback herring (*Alosa aestivalis*) was the second most abundant species, accounting for 16.8% of the catch. Other common species collected during the July 2004 sampling event were spider crab, windowpane, and horseshoe crab. With anchovy excluded, 357 individuals were collected, of which 254 were finfish, 9 were squid, and 94 were macroinvertebrates.

A total of 18 species were collected in Borrow Area A during the July 2004 sampling event (Table 7). Winter flounder was the dominant species, accounting for 35.4% of the catch. Spider crab was the second most abundant species, accounting for 10.9% of the catch. Other common species collected in Borrow Area A during the July 2004 sampling event were windowpane, horseshoe crab, scup, and spotted hake (*Urophycis regia*). The total catch of all species combined in Borrow Area A was 147 individuals (excluding 4 bay anchovy); of which 99 were fish, 5 were squid, and 43 individuals were benthic macroinvertebrates. Only four anchovy were caught in Borrow Area A during the July 2004 sampling event.

A total of 17 species were collected in Borrow Area B during the July 2004 sampling event (Table 8). Anchovy dominated the Borrow Area B catch by 92.1% due to anchovy representing 2,439 individuals of the total 2,649 finfish and macroinvertebrates that were caught. With anchovy excluded, blueback herring was the dominant species, accounting for 28.6%, and winter flounder was the second most abundant species, accounting for 22.9% of the catch. Other common species collected in July from Borrow Area B were spider crab, cunner, and scup. With anchovy excluded, a total of 210 individual organisms were collected in July, of which 156 were finfish, 4 were squid, and 50 were benthic macroinvertebrates.

Length statistic data of the EFH-designated species collected at both borrow areas are presented in Table 9.

4.2 DISTRIBUTION AND LENGTH OF ESSENTIAL FISH HABITAT DESIGNATED SPECIES BY BORROW AREA

For all of the sampling events, a total of eight different EFH-designated species were collected in both borrow areas. The same EFH-designated species were captured in both borrow areas and consist of Atlantic herring, black sea bass, bluefish, red hake, scup, summer flounder, windowpane, and winter flounder (Table 6). Length statistic data of the EFH-designated species collected at both borrow areas are presented in Table 9.

4.2.1 Borrow Area A

For the four combined sampling events, eight EFH-designated species, including Atlantic herring, black sea bass, bluefish, red hake, scup, summer flounder, windowpane, and winter flounder, were collected in Borrow Area A. Winter flounder was the only EFH-designated species collected during all four sampling events (Table 9). Winter flounder was also the most abundant EFH-designated species collected in Borrow Area A accounting for 22.6% of the total catch. The next most abundant EFH-designated species was scup, accounting for 11.4% of the total catch. Other EFH-designated species of significant value were red hake, accounting for 3.4% of the total catch and windowpane, accounting for 3.2% of the total catch (Table 7).

4.2.1.1 September 2003

The September 2003 sampling event captured the most EFH-designated species (five species) from Borrow Area A. Scup was the most abundant EFH species, accounting for 34.5% of the catch. Winter flounder was the next most abundant species, accounting for 1.5% of the catch and bluefish was third most abundant, accounting for 1.2% of the catch. Only one individual was collected for both Atlantic herring and black sea bass, accounting for 0.2% of the catch (Table 7).

Analysis of length data for the September 2003 sampling event revealed that six bluefish were measured with the smallest at 135 mm and largest at 249 mm, with an average size of 209.33 mm. One hundred three (103) scup were measured with the smallest at 49 mm, largest at 325 mm, and an average size of 83.01 mm. Seven winter flounder were captured with the smallest at 157 mm, largest at 270 mm, and an average size of 192.57 mm. Only one each of Atlantic herring, 105 mm, and black sea bass, 412 mm, were collected during this sampling event (Table 9).

4.2.1.2 February 2004

For the February 2004 sampling event, winter flounder was the only EFH-designated species collected, accounting for 10.5% of the catch (Table 7). Length statistics showed that 10 winter flounder were measured with the smallest at 47 mm, largest at 125 mm, and an average size of 77.10 mm (Table 9).

4.2.1.3 May 2004

For the May 2004 sampling event, winter flounder was the most abundant EFH species, accounting for 34.1% of the catch. Red hake was the next most abundant EFH species, accounting for 6.5% of the catch. These were followed by windowpane, accounting for 4.3% of the catch, summer flounder, accounting for 1.1% of the catch, and scup, accounting for 0.1% of the catch (Table 7).

Analysis of length data from the Borrow Area A May 2004 sampling event revealed that 53 red hake were captured with the smallest at 30 mm, largest at 321 mm, and an average size of 100.19 mm. Nine summer flounder were measured with the smallest at 267 mm, largest at 600 mm, and an average size of 464.44 mm. Thirty-five (35) windowpane were measured with the smallest at 60 mm, largest at 295 mm, and an average size of 174.80 mm. Two hundred seventy-nine (279) winter flounder were measured with the smallest at 45 mm, largest at 321 mm, and an average size of 107.70 mm. Only one scup (322 mm) was collected during this sampling event (Table 9).

4.2.1.4 July 2004

For the July 2004 sampling event, winter flounder was again the most abundant EFH species, accounting for 35.4% of the catch. Windowpane was the second most abundant EFH species, accounting for 10.2% of the catch. These were followed by scup, accounting for 6.1% of the catch and summer flounder, accounting for 2.0% of the catch (Table 7).

Analysis of length data for the Borrow Area A July 2004 sampling event revealed that nine scup were measured with the smallest at 186 mm, largest at 327 mm, and an average size of 257.44 mm. Three summer flounder were measured with the smallest at 290 mm, largest at 485 mm, and an average size of 403.33 mm. Fifteen (15) windowpane were measured with the smallest at 61 mm, largest at 220 mm, and an average size of 152.47 mm. Fifty-two (52) winter flounder were measured with the smallest at 41 mm, largest at 274 mm, and an average of 105.13 mm (Table 9).

4.2.2 Borrow Area B

For the four combined sampling events, eight EFH-designated species, including Atlantic herring, black sea bass, bluefish, red hake, scup, summer flounder, windowpane, and winter flounder, were collected in Borrow Area B. Similar to Borrow Area A, winter flounder was the only EFH-designated species collected during all four sampling events (Table 9). Scup was the most abundant EFH-designated species collected in Borrow Area B, accounting for 80.6% of the total catch. The next most abundant EFH-designated species was winter flounder, accounting for 4.6% of the total catch. Other EFH-designated species of significant value were red hake, accounting for 0.9% of the total catch and windowpane, accounting for 0.7% of the total catch (Table 8).

4.2.2.1 September 2003

Similar to Borrow Area A, the September 2003 and July 2004 sampling events captured the most EFH-designated species (four species). Scup was the most abundant EFH species, accounting for 95.8% of the catch. Winter flounder was the next most abundant, accounting for 0.1% of the catch. Only one individual was collected for both black sea bass and bluefish, accounting for less than 0.1% of the catch (Table 8).

Length statistics for the Borrow Area B September 2003 sampling event showed 62 scup measured with the smallest at 45 mm, largest at 370 mm, and an average size of 65.3 mm. Two winter flounder were measured with the smallest at 95 mm and the largest at 240 mm. Only one each of black sea bass, 428 mm and bluefish, 212 mm were collected during this sampling event (Table 9).

4.2.2.2 February 2004

Three EFH-designated species were collected during the February 2004 sampling event. Atlantic herring was the most abundant, accounting for 13.8% of the catch. Winter flounder was the next most abundant, accounting for 12.1% of the catch. Only one black sea bass was collected, accounting for 1.7% of the catch (Table 8).

Length statistics for the February 2004 sampling event showed eight Atlantic herring measured with the smallest at 195 mm, largest at 265 mm, and an average size of 225.38 mm. Seven winter flounder were measured with the smallest at 52 mm, largest at 300 mm, and an average size of 103.00 mm. Only one black sea bass, 110 mm was collected during this sampling event (Table 9).

4.2.2.3 May 2004

For the May 2004 sampling event in Borrow Area B, winter flounder was the most abundant EFH species, accounting for 33.7% of the catch. Red hake was the second most abundant EFH species, accounting for 9.4% of the catch. Windowpane was the third EFH species, accounting for 5.1% of the catch (Table 8).

Analysis of length data for the May 2004 sampling event revealed that 33 red hake were measured with the smallest at 70 mm, largest at 151 mm, and an average size of 99.21 mm. Eighteen (18) windowpane were measured with the smallest at 64 mm, largest at 300 mm, and an average size of 166.33 mm. One hundred eighteen (118) winter flounder were measured with the smallest at 54 mm, largest 360 mm, and an average size of 99.76 mm (Table 9).

4.2.2.4 July 2004

For the July 2004 sampling event, winter flounder was the most abundant species captured, accounting for 22.9% of the catch. Scup was the second most abundant EFH species, accounting for 5.7% of the catch. Windowpane was the third most abundant EFH species, accounting for

3.8% of the catch. Only one summer flounder was collected, accounting for less than 0.5% of the catch (Table 8).

Analysis of length data for the July 2004 sampling event revealed 12 scup were measured with the smallest at 186 mm, largest at 285 mm, and an average size of 242.25 mm. Eight windowpane were measured with the smallest at 184 mm, largest at 287 mm, and an average size of 222.38 mm. Forty-eight (48) winter flounder were measured with the smallest at 34 mm, largest at 184 mm, and an average size of 71.67 mm. Only one summer flounder, at 281 mm was collected during this sampling event (Table 9).

4.3 BIOMASS

Biomass in the borrow areas from all four surveys was dominated by a relatively small number of species, including: horseshoe crab, spider crab, scup, winter flounder, summer flounder, windowpane, tautog, and clearnose skate [*Raja eglanteria* (Figure 15 and Table 10)]. Six species accounted for more than 80 percent of the total biomass. The capture of large schools of bay anchovy in September 2003 and July 2004 represented more than 71 kg, or 22% of the total biomass captured during the sampling events. With anchovy biomass included, anchovy represents the second most dominant species in terms of total biomass for the entire study, with the most dominant species represented by horseshoe crab, which accounted for 23.6% of total biomass. Spider crab was the third most dominant species in terms of biomass (20.4%), followed by scup (7.0%), winter flounder (4.9%), and summer flounder (4.4%). It should be noted that horseshoe and spider crabs accounted for the highest biomass although they only represented only 0.8% and 9.5% of species abundance (Table 6); a finding that can be attributed to their heavy exoskeletons.

Three EFH-designated species: scup and winter and summer flounder, comprised a significant proportion of the total biomass. They were the three most dominant finfish species collected in terms of biomass. Scup represented 9.0% of total biomass, w inter flounder accounted for 6.3% of total biomass, while summer flounder accounted for 5.7% (Table 10).

4.3.1 September 2003 Sampling Event

Six species accounted for 86.8% of the biomass during the September 2003 sampling event (Table 10 and Figure 16A). With bay anchovy data included in the analysis for September, this species represents 68.1% of the total biomass, followed by scup, which comprised 16.6% of the total biomass. With anchovy excluded, scup was the most dominant species captured in terms of biomass (as well as abundance), accounting for 52.1% of the total weight, black sea bass was the second most dominant species accounting for 11.5% of the weight, and long-finned squid was the third most dominant species accounting for 8.5% of the weight. Three EFH-designated species (scup, black sea bass, and winter flounder) were among the top 6 species in terms of biomass dominance during September's sampling event.

4.3.2 February 2004 Sampling Event

Six species accounted for 99.2% of the biomass during the February 2004 sampling event (Table 10 and Figure 16B). Asteriid sea star was the dominant species captured in terms of biomass (but not the dominant species in terms of abundance) during the February 2004 sampling event, accounting for 44.1% of the total biomass. Grubby was second most dominant species, accounting for 14.6% of the total weight. Spider crab and Atlantic herring were closely matched as the third and fourth dominant species, accounting for 14.0% and 13.9% of the biomass, respectively. Two EFH-designated species were among the top 6 species in terms of biomass dominance during February's sampling event: Atlantic herring (13.9%) and winter flounder (11.3%).

4.3.3 May 2004 Sampling Event

Six species accounted for 88.5% of the biomass during the May 2004 sampling event (Table 10 and Figure 16C). Spider crab was the dominant species, accounting for 38.8% of the weight, while horseshoe crab was the second most dominant species, accounting for 23.0% of the sample weight. Winter and summer flounder were equivalent, each representing 8% of the total biomass. Three EFH-designated species were among the top 6 species in terms of biomass dominance during May's sampling event: winter and summer flounder (each 8%), and windowpane (4.4%).

4.3.4 July 2004 Sampling Event

Finally, total biomass collected in July 2004 was dominated by six species, which accounted for 91.8% of biomass. Horseshoe crab was the dominant species, accounting for 57.1% of the total weight, followed by spider crab (12.5%) and scup [9.6% (Table 10 and Figure 16D)]. Three EFH-designated species were among the top 6 species in terms of biomass dominance during July's sampling event: scup (9.6%), windowpane (4.2%), and summer flounder (3.7%).

Anchovy were less dominant in the July 2004 sampling event, and with this species included horseshoe crab still represents the most dominant species (50.1%) in terms of biomass. However anchovy replaces spider crab as the second most dominant species (12.3%), with spider crab being the third most dominant (11%) biomass species.

5.0 BENTHIC SAMPLING RESULTS

The list of benthic invertebrate species represented in Tables 11 and 12 only include those species for which over 100 individuals were collected. Elimination of other benthic invertebrate species produced results that allowed the focus to be placed on the species that represented a majority of the benthic community sampled and made it easier to compare species composition data between borrow areas. The following results summarize species richness, abundance, and biomass data. They are presented by sampling event and borrow area.

5.1 SEPTEMBER 2003

For the September 2003 benthic sampling survey, a total of 86 taxa, consisting of a minimum of 26,690 individuals were collected in both borrow areas. Results of the benthic sampling events are provided in Appendix B. The total number of individuals collected in Borrow Area A was approximately twice as much as those collected in Borrow Area B (Table 11). Species diversity was much higher in Borrow Area A (83 taxa) than in Borrow Area B (51 taxa). Results of the September 2003 survey showed that Nematoda, Annelida, and Oligochaeta were present in great abundance at both borrow areas, but were only able to be identified to the Lowest Possible Identification Level (LPIL). Abundant polychaete worms collected at both borrow areas included *Ampharete spp.* (LPIL), *Ampharete lindstroemi*, *Cossura longocirrata*, *Cirratulidae spp.* (LPIL), *Nephtys spp.* (LPIL), *Scalibregma inflatum*, and *Polydora cornuta*. Additionally, molluscs and arthropods were found in both borrow areas but in most cases less than 100 individuals were present for each taxon identified (Table 11).

Biomass in both borrow areas was dominated by bivalves. This was as expected because bivalves (e.g., clams and mussels) possess a hard outer shell that contributes to higher biomass relative to other benthic invertebrate species (Table 13). Dominant taxa included the molluscan orders Pelecypoda and Gastropoda, as well as polychaetes. For the September 2003 benthic survey, the total biomass weight of the benthic invertebrates collected in Borrow Area B was nearly twice the weight of the benthic invertebrate species collected in Borrow Area A. Additionally, Sipuncula, Ostracoda, and Pisces were only collected in Borrow Area A (Table 13).

A minimum of 17,384 individuals across 83 taxa were collected in Borrow Area A (Appendix B). Nematoda (LPIL) was the dominant taxon, accounting for 49.9% of the catch (Table 11). Polychaetes of the family Cirratulidae (LPIL) and Oligochaeta (LPIL) were the next two most dominant taxa, each representing 13.3% of the taxa collected. Two additional polychaete worms, *Polydora cornuta* and *Cossura longocirrata*, accounted for 5.3% and 2.4% of the catch, respectively, and all other taxa individually represented less than 1.9% of the total catch for Borrow Area A.

Bivalves, polychaetes, and gastropods represented 98.9% of the total benthic invertebrate biomass collected in Borrow Area A (Figure 17). The molluscan class Pelecypoda had the highest biomass with a catch weight of 261.736 g (81.2%). Polychaetes recorded the second highest biomass with a total catch weight of 34.406 g (10.7%). This was followed by

Gastropoda (LPIL) with a catch weight of 22.687 g (7.0%). Figure 17 illustrates the biomass distribution in Borrow Area A by taxonomic class.

A minimum 9,306 individuals across 51 taxa were collected in Borrow Area B (Appendix B). As found in Borrow Area A, Nematoda (LPIL) was the dominant taxon, accounting for 70.5% of the catch (Table 11). Oligochaeta (LPIL) and Cirratulidae (LPIL) of the Polychaeta family were the next two most dominant taxa representing 9.4% and 8.5% of the taxa collected. Additionally, the amphipod *Ampelisca abdita* accounted for 2.5% of the catch. All other taxa individually represented less than 1.9% of the total catch for Borrow Area B.

Similar to the biomass distribution found in Borrow Area A, bivalves, gastropods, and polychaetes represented 99.8% of the total benthic invertebrate biomass collected in Borrow Area B. The molluscan class Bivalvia had the highest biomass with a catch weight of 441.358 g (80.4%). Gastropoda (LPIL) recorded the second highest biomass with a total catch weight of 93.806 g (17.1%). This was followed by Polychaetes with a catch weight of 12.899 g (2.3%). Figure 20 and Table 13 illustrates biomass distribution in Borrow Area B by taxonomic class.

5.2 MAY 2004

For the May 2004 benthic sampling survey, a total of 88 taxa, consisting of at least 26,897 individuals, were collected in both borrow areas. Results of the benthic grab analysis are presented in Appendix B. The total number of individuals collected in Borrow Area A nearly doubled the total number of individuals collected in Borrow Area B (Table 12). As in September 2003, species diversity was much higher in Borrow Area A (85 taxa) than in Borrow Area B (67 taxa); however, the number of benthic grabs conducted in Borrow Area A greatly outweighed the number of benthic grabs conducted in Borrow Area B (35 vs. 15) — a fact that likely contributed to the overall difference. Similar to the September 2003 survey, results of the May 2004 survey showed that a large number of nematode and oligochaete worms were collected at both borrow areas, but could only be identified to the LPIL. Abundant polychaete worms collected at both borrow areas included *Ampharete finmarchica, A. acutifrons, Streblospio benedicti*, *Nephtys picta*, *Capitella capitata, Spionids* spp. (LPIL), *Tharyx acutus*, *Glycera* spp. (LPIL), and *Polydora ligni*. Although gastropods and bivalves were collected in both borrow areas, none of either taxa collected in Borrow Area B numbered over 100 individuals. Abundant arthropods collected in both borrow areas included the copepod, *Temora longicornis*, and the amphipod, *Ampelisca abdita* (Table 12).

Similar to the September 2003 effort, biomass in both borrow areas was dominated by bivalves (Table 13). Dominant species included the molluscan orders Pelecypoda and Gastropoda, as well as polychaete annelids. For the May 2004 benthic survey, the total biomass of the benthic invertebrates collected in Borrow Area A was nearly twice the weight of the benthic invertebrate species collected in Borrow Area B. Only the presence or absence of bryozoan colonies was noted and no weight measurements were taken. Additionally, ostracods were identified to the LPIL but no weight measurements were obtained.

A minimum of 17,606 individuals across 85 taxa were collected in Borrow Area A (Appendix B). Nematoda (LPIL) was the dominant taxon, accounting for 50.9% of the catch (Table 12).

Oligochaeta (LPIL) was the next most abundant taxon representing 7.7% of the taxa collected. Other abundant species included *Temora longicornis* (4.4%), *Ampharete finmarchica* (4.1%), *Streblospio benedicti* (3.6%), and *Ampelisca abdita* (3.3%). All of the remaining taxa individually represented less than 3.0% of the total catch for Borrow Area A.

Pelecypods, polychaetes, and gastropods represented 93.1% of the total benthic invertebrate biomass collected in Borrow Area A (Figure 18). The molluscan class Pelecypoda had the highest biomass with a catch weight of 1,026.994 g (55.2%). Polychaetes recorded the second highest biomass with a total catch weight of 441.168 g (23.7%). This was followed by Gastropoda (LPIL) with a catch weight of 261.765 g (14.1%). Additionally, arthropodan amphipods and decapods represented 6.9% of the total biomass when combined together. Figure 18 illustrates the biomass distribution in Borrow Area A by taxonomic class.

A minimum of 9,291 individuals across 67 taxa were collected in Borrow Area B (Appendix B). As seen previously, Nematoda (LPIL) was the dominant taxon, accounting for 62.5% of the catch (Table 12). Oligochaeta (LPIL) was the next most abundant taxon representing 6.2% of the taxa collected. Other abundant taxa included the polychaetes *Streblospio benedicti* and *Capitella capitata* (each with 5.5%), and *Ampharete finmarchica* (3.8%). All of the remaining taxa individually represented less than 2.5% of the total catch for Borrow Area B.

Bivalves, polychaetes, and gastropods represented 97.7% of the total benthic invertebrate biomass collected in Borrow Area B (Figure 18). The molluscan class Pelecypoda had the highest biomass with a catch weight of 672.349 g (65.7%). Polychaetes recorded the second highest biomass with a total catch weight of 271.619 g (26.6%). This was followed by Gastropoda (LPIL) with a catch weight of 55.303 g (5.4%). Amphipods and decapods were present at Borrow Area B but their combined biomass represented less than one-third (2.2%) of what was found in Borrow Area A. Figure 18 and Table 13 illustrate and summarize biomass distribution in Borrow Area B by taxonomic class.

5.3 GRAIN SIZE ANALYSIS

Grain size samples were collected from both borrow areas in September 2003 and May 2004. Samples were taken at 34 sites from Borrow Area A, and from 15 sites in Borrow Area B. The percentage of dry weight was measured to assess the relative amounts of different grain sizes in each sample (see Appendix C). Medium grain size sands were the dominant sediment size collected in both Borrow Areas A and B (comprising 45% in each borrow area). Fine sand was the second most abundant grain size, particularly in Borrow Area B. No pebble-sized (or larger) sediments were collected, and only small amounts (less than 9 g) of silts or clays were collected from either site (see Figure 19). Some amounts of gravels and coarse sand, as well as silts or clays, were found in every sample.

Overall, Borrow Area A had more coarse material than Borrow Area B, but less fine sands (Figures 19). Generally, only small differences were observed between samples collected in September 2003 and May 2004 (see Figures 20 and 21). In May, there was a higher average amount of medium sands, but samples collected in September of the previous year had more fine

gravel and silt or clay than the May samples. Borrow Area A also had more coarse gravel in September than in May.

5.4 SEDIMENT CHEMICAL ANALYSIS

Chemical analysis of the sediments in the borrow areas were collected during September 22-23, 2003. Results of the sediment chemical analysis are provided in Appendix D.

5.4.1 Borrow Area A

A total of 12 subsamples were collected for analysis of chemical constituents from the 35 available benthic grabs collected at Borrow Area A. The only chemical found to be above the New York State Technical and Administrative Guidance Memorandum cleanup objective criteria is the semivolatile compound Chrysene. Chrysene is a polycyclic aromatic hydrocarbon (PAH) that is typically found in cigarette smoke, coal tar pitch volatiles, coke oven emissions and diesel exhaust. The high reading occurred in two out of the 12 possible grabs.

5.4.2 Borrow Area B

From the 15 available benthic grabs collected at Borrow Area B, a total of six subsamples were collected for analysis of chemical constituents. As with Borrow Area A, the only chemical found to be above the New York State Technical and Administrative Guidance Memorandum cleanup objective criteria is the semivolatile compound Chrysene. The higher reading occurred in four out of the six possible grabs in Borrow Area B.

6.0 WATER QUALITY MEASUREMENTS

Water quality measurements were taken during fish sampling events in September 2003 and in February, May, and July of 2004 (Tables 17, 18, 20, and 21). In addition, water quality was measured during benthic sampling events in September 2003 and May 2004 (Tables 16 and 19). Measurements were taken at three depths: at the bottom, middle, and surface of the water column. The results reflect seasonal changes in temperature, including a lag time for water temperatures to adjust to seasonal air temperatures, and inverse changes in dissolved oxygen levels, as expected. Mean temperatures climbed from a low of minus 0.33°C recorded in February to a high of 23.02°C in September. Conversely, the lowest mean level of dissolved oxygen was recorded in September (7.10 mg/l), while the highest mean level (12.54 mg/l) was recorded in May. Borrow Area B generally had higher mean temperatures and higher levels of dissolved oxygen than Borrow Area A. Mean salinity levels ranged from a minimum of 13.38 ppt in February to a maximum of 24.42 ppt in September. There did not appear to be any clear pattern in the difference in salinity between the two sites. Mean pH was lowest in September and July (7.57) and highest (8.22) in February.

7.0 STATISTICAL ANALYSIS

7.1 FISH RESULTS

The differences for the three fish variables were investigated between borrow areas A and B for each sample period. The results of these t-tests are summarized in Table 22. For the most part, no differences between the borrow areas for these variables were detected. In January 2004, Borrow Area A had a significantly higher EFH species richness than Borrow Area B. However, the reverse was observed in May 2004 when EFH species richness in Borrow Area B was significantly higher than Borrow Area A. It should be noted that due to the low sample sizes and high variability with some of the trawl data, the power to detect a difference would be considered to be low.

7.2 BENTHIC RESULTS

The difference between benthic invertebrate species richness was investigated between Borrow Areas A and B for each year and the 2003/2004 combined data. The results of these t-tests are summarized in Table 23. No differences between benthic invertebrate species richness was detected in 2003, 2004, or for the combined 2003/2004 data set ($P = > 0.64$).

7.3 GRAIN SIZE RESULTS

T-tests performed on the combined 2003 and 2004 grain size data indicated that the percent compositions between Borrow Areas A and B was significantly different for fine gravel ($P < 0.001$), coarse sand ($P = 0.002$), and fine sand ($P < 0.001$). Fine gravel and coarse sand were found to be significantly less predominant in Borrow Area B than in Borrow Area A (Figure 19). Fine sand was found to be significantly more predominant in Borrow Area B than Borrow Area A [$P = 0.001$ (Figure 10)]. Overall, Borrow Area A appears to have a substrate comprised of more course materials than Borrow Area B.

8.0 DISCUSSION

The results presented in this report characterize the finfish and benthic invertebrate community present in the two proposed sand borrow areas (i.e., A and B) located offshore of Asharoken, New York, as observed in September 2003, and February, May, and July 2004. This characterization of physical and biological resources provides a baseline for future finfish and benthic macroinvertebrate monitoring efforts in the borrow areas during and after sand removal for beach nourishment purposes. The results of this survey were based on seasonal low-frequency sampling of each borrow area and reveal a discrete temporal picture of finfish and benthic community assemblages, species size distributions, abundance of EFH-designated finfish species, and biomass estimates and distributions. Additionally, this report characterizes the sediment profiles and the water quality characteristics of both borrow areas.

The sampling event with the highest diversity of fish and benthic species captured (25) was May 2004. This was closely followed by the September 2003 sampling event with 23 fish and benthic invertebrate species, the July 2004 sampling event with 22 fish and benthic invertebrate species, and February 2004 sampling event with 10 fish and benthic invertebrate species (Figure 10). Out of the 43 fish and benthic invertebrate species captured, only five species were captured during all sampling events (Table 6). From the five duplicate species, winter flounder and cunner were the fish species, while the other three duplicated species consist of asteriid sea star, rock crab, and spider crab. Five duplicate species were also captured during three out of the four sampling events. This group consists of 3 fish species (grubby, scup, and tautog) and two invertebrate species (horseshoe crab and long-finned squid).

Overall, fish and invertebrate species captured during February were lowest in terms of abundance and diversity. The occurrence is typical as many of the fish and invertebrate species collected during the spring and fall events migrate into deeper water to avoid frigid winter water temperatures. Grubby was the dominant fish species collected during the February 2004 sampling event. This was not unexpected as the grubby is a coldwater sculpin with an upper temperature limit of approximately 20.5°C and capable of surviving in water temperatures below 0°C (Bigelow and Schroeder 1953).

Notable fish species captured during the September sampling event included bay anchovy, scup, and weakfish. These species were captured in great abundance, and the size of the individuals captured (Appendix A) showed that these young-of-the-year (YOY) species were presumably utilizing the nearshore waters in Long Island Sound as nursery grounds. Fish and benthic invertebrate species of importance captured during the May 2004 sampling event include American lobster, grubby, red and silver hake, and Atlantic tomcod (*Microgadus tomcod)*. These species are known to migrate into shallow waters during winter and spring seasons and migrate back into the deeper waters as conditions become less ideal (i.e., increase in water temperature). This was evident as the recorded water temperatures of the July 2004 sampling event were substantially higher compared to the May 2004 sampling event, and was confirmed by the lack of referenced species captured during the July 2004 sampling event.

The species with the highest biomass were horseshoe and spider crabs (Table 10 and Figure 15). Together, these two species accounted for 56.6% of the total biomass. Scup was the dominant finfish species captured, accounting for 9.0% of the total biomass. This was followed by winter flounder at 6.3% of the total biomass and summer flounder at 5.7% of the total biomass to round out the top three finfish species. Approximately 3,250 scup were captured compared to 523 winter flounder and 13 summer flounder (Table 6).

For both borrow areas, a total of eight different EFH-designated species were captured during all sampling events combined, with winter flounder being the only species captured during each event (Table 6). The September 2003 sampling event caught the most number of EFH-designated species with five different species. This was followed by May and July 2004, with four different species, and then February 2004, with three different species. Summer flounder were captured in Borrow Area A during two sampling events and in Borrow Area B only during the July 2004 sampling event (Table 9). Both Atlantic herring and bluefish are predominantly mid-water species; therefore the low number of individuals collected was not unexpected. Black sea bass are known to be associated with structures, and since the sampling areas are sand it is not surprising to catch a low number of individuals of this species.

Nematodes and oligochaetes were identified to the LPIL. These benthic invertebrates were abundant and accounted for the dominant and second most dominant species collected in both borrow areas during the September 2003 and May 2004 sampling events. Results of both September 2003 and May 2004 benthic grabs showed that gastropods and pelecypods were fairly abundant (over 100 individuals) at Borrow Area A, while very few were caught in Borrow Area B. For the May 2004 sampling event, other common benthic invertebrates collected in both borrow areas include the polychaete worms, copepods, and amphipods (Tables 11 and 12).

Results of the September 2003 and May 2004 grain size analyses showed that medium grain sized sands was the dominant type of sediment at both borrow areas, followed by fine grain size sands (Tables 14 and 15). No pebble size sediment were collected at either borrow areas. Coarse gravel size sediment was collected from only one grab location in Borrow Area B, while being present in 12 out of 35 grab sites in Borrow Area A. Silt and clay were present in all grab sites; however, the silt/clay component never comprised more than 12% of dry weight and was generally less than 5% of the total sample weight.

Water quality parameters at both borrow areas throughout the sampling events were as expected (Tables 16 to 21). Results of the water quality parameters collected showed a drop in water temperature from September 2003 to February 2004, and an increase in temperature from February to July 2004. Oxygen availability is directly correlated to water temperature where an increase in water temperature will cause a decrease in available oxygen. Lower water temperatures in February correlated to higher levels of dissolved oxygen compared with other sampling events. This was evident during the May and July 2004 surveys, as well. As water temperature in July increased, the amount of available DO decreased when compared to the May 2004 sampling event.

9.0 SUMMARY

Data collected for this investigation characterized existing fish and benthic communities that use two potential sand borrow area locations in nearshore waters off of Asharoken Beach. Water quality, grain size, and chemical constituents of the sand found within the borrow locations were also analyzed. These borrow areas are referred to as Borrow Area A and Borrow Area B (Figure 1). The approximate area of Borrow Area A is 8,270,150 square feet or 0.224 square nautical miles (0.29 square miles). The approximate area of Borrow Area B is 4,375,000 square feet or 0.1185 square nautical miles (0.1569 square miles).

Finfish

Thirteen (13) pre-determined transects were selected for the borrow area and seven predetermined transects were selected for the Borrow Area B. Trawls were conducted during September 2003, and February, May, July 2004 sampling. Benthic sampling was conducted during September 2003 and May 2004. Grain size analysis was conducted via sub-samples from the benthic grabs. Water quality measurements were taken during both trawls and grabs.

Sixty-eight (68) otter-trawls (tows) were conducted in water depths of 29–47 feet and for durations of 8–10 minutes during the September 2003, February 2004, May 2004, and July 2004 sampling events. As a result, a total of 33 finfish species and 10 macroinvertebrate species (including squid) were collected in both Borrow Area A and Borrow Area B. Large, seasonal (September), schools of bay anchovy precluded this species from inclusion in total abundance enumeration. The most abundant species of economic importance were scup, which was the dominant species; accounting for over half or 60.7% of the overall catch (this excludes bay anchovy, which if counted, would be 90.0% of the total abundance). The second most abundant species was winter flounder (9.8%), weakfish (4.2%), long-finned squid (2.3%), and Atlantic butterfish (2.0%). Cunner (*Tautogolabrus adspersus*) and winter flounder were the only two species of finfish collected during each of the four seasonal sampling events.

For all of the sampling events combined, a total of eight EFH-designated species were collected in both borrow areas (i.e., Atlantic herring, black sea bass, bluefish, red hake, scup, summer flounder, windowpane, and winter flounder). Scup, winter and summer flounder were the three most abundant EFH species and made up a significant portion of the total biomass.

Differences in trawl results (abundance and diversity) were evident between Borrow Areas A and B. A comparison of the top five species from Borrow Areas A and B shows that winter flounder and spider crab were among the most abundant species in both borrow areas. Scup was clearly the dominant species in Borrow Area B, representing approximately 80% of the species abundance; however, it was only the fourth most common species (11%) in Borrow Area A. Weakfish was among the most common species in Borrow Area A, but not in Borrow Area B. However, without a data set capable of higher resolution including greater frequency of trawls and longer seasonal duration, correlating differences in captured species (abundance and diversity) to potential differences in location and/or habitat between the two borrow areas can only be speculative. Most finfish populations, juveniles through adults, are highly mobile and

patchy in nature, and, the effectiveness of fishing the net was almost certainly different between the two sites because of "hangs" associated with area A. Generally speaking (under the limitations of the study's sampling program) comparison of the two sites showed no statistical differences among the fishery (capture) variables tested.

Benthos

Benthic sampling was conducted during the September 2003 and May 2004. Benthic grabs were collected using a Smith-McIntyre grab (0.1 square meters) at each pre-determined sample station. Thirty-five pre-determined grab stations were selected for Borrow Area A and 15 pre-determined grab stations were selected for Borrow Area B. A combined total of 88 taxa were represented. Marine worms showed the greatest abundance at about 71% of the organisms present. Bivalves, gastropods and polychaetes represented about 98% of the biomass. Abundance, diversity and biomass were much greater in Borrow Area A than at Borrow Area B. This may be related to a larger percentage of course sediment types found in Borrow Area A, but is probably also be an artifact of the different sample sizes collected at each borrow site. (A had about twice as many grabs as B) Comparison of species richness between the two borrow areas showed no statistical differences. Grain size at both sites was dominated by medium and fine sands. Area A displayed a higher percentage of course materials that area B. Area B had a greater percentage of fine sands than A.

Chemical Analysis.

In Borrow Area A, two of 12 sediment samples were flagged for high levels of PAHs in Borrow Area B, four of 6 samples showed similar levels of the same compound (chrysene). These compounds and their levels are probably related to internal combustion engine exhaust by-products.

Water Quality

Seasonal water quality measurements were typical for the region. No anomalous trends were observed.

Discussion of Results

Based on the results of all the monitoring Site A may have greater diversity and abundance of benthic organisms thus making it a more "valuable" habitat to both benthic organisms and the fish that forage on them. Site A also showed a propensity to hang up the net possibly suggesting problems for dredging too. Site B had a slightly greater percentage of medium and find sands. As a sand source Site B appears to offer the least impact to marine species as well as the borrow area with fewer obstructions, making dredging there more efficient and safer. Since some monitoring results showed that structured areas of Site B may include favorable habitat for lobster and possibly juvenile scup, areas impacted by dredging can be enhanced to provide more habitat for these species. Since some monitoring results showed that structured areas of site B may include favorable habitat for lobster and possibly juvenile scup, it is recommended that if

this area was used for beach fill that those areas impacted by dredging be enhanced to provide more habitat for species such as lobster and scup.

10.0 REFERENCES

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Table 1. Asharoken Borrow Area A and B Bottom Trawl Coordinates, September 24–26, 2003.

Tow #	Date	Start			End			Duration
		Time	Latitude	Longitude	Time	Latitude	Longitude	
Area A								
Tow #1	24-Sep	1316	40° 57.590	73° 22.681	1327	40° 57.530	73° 22.354	11 minutes
Tow #2	24-Sep	1343	40° 57.414	73° 22.679	1353	40° 57.380	73° 23.007	10 minutes
Tow #3	24-Sep	1407	40° 57.313	73° 22.655	1417	40° 57.279	73° 22.982	10 minutes
Tow #4	24-Sep	1435	40° 57.257	73° 22.584	1445	40° 57.291	73° 22.256	10 minutes
Tow #5	24-Sep	1500	40° 57.227	73° 22.469	1510	40° 57.194	73° 22.796	10 minutes
Tow #6	25-Sep	1025	40° 57.182	73° 22.508	1035	40° 57.215	73° 22.180	10 minutes
Tow #7	25-Sep	1055	40° 57.117	73° 22.742	1105	40° 57.150	73° 22.414	10 minutes
Tow #8[1]	25-Sep	- -	40° 57.103	73° 22.470	- -	40° 57.136	73° 22.143	- -
Tow #9	26-Sep	0916	40° 57.042	73° 22.682	0926	40° 57.073	73° 22.360	10 minutes
Tow #10	26-Sep	0941	40° 56.962	73° 22.633	0949	40° 56.995	73° 22.306	8 minutes
Tow #11	26-Sep	1004	40° 56.875	73° 22.460	1012	40° 56.909	73° 22.133	8 minutes
Tow #12	26-Sep	1052	40° 56.837	73° 22.361	1102	40° 56.806	73° 22.128	10 minutes
Tow #13	26-Sep	1114	40° 56.663	73° 22.507	1124	40° 56.696	73° 22.180	10 minutes
Ref Tow #1	24-Sep	1527	40° 57.878	73° 23.352	1535	40° 58.061	73° 23.573	8 Minutes
Area B								
Tow #1	24-Sep	1023	40° 56.422	73° 16.777	1031	40° 56.437	73° 16.447	8 minutes
Tow #2	24-Sep	1051	40° 56.379	73° 16.807	1059	40° 56.394	73° 16.477	8 minutes
Tow #3	24-Sep	1116	40° 56.345	73° 16.646	1125	40° 56.360	73° 16.316	9 minutes
Tow #4	24-Sep	1134	40° 56.297	73° 16.796	1144	40° 56.312	73° 16.466	10 minutes
Tow #5	24-Sep	1203	40° 56.260	73° 16.697	1213	40° 56.275	73° 16.369	10 minutes
Tow #6	26-Sep	1216	40° 56.213	73° 16.820	1226	40° 56.228	73° 16.490	10 minutes
Tow #7	26-Sep	1245	40° 56.177	73° 16.719	1255	40° 56.192	73° 16.390	10 minutes

Key:
[1] = Net was deployed, but got hung up and tore off (lost net and door).

Table 2. Asharoken Borrow Area A and B Bottom Trawl Coordinates, February 18–19, 2004.

Tow #	Date	Start			End			Duration
		Time	Latitude	Longitude	Time	Latitude	Longitude	
Area A								
Tow #1	18-Feb	1005	40° 57.500	73° 22.682	1015	40° 57.538	73° 22.339	10 minutes
Tow #2	18-Feb	1030	40° 57.379	73° 23.002	1040	40° 57.416	73° 22.685	10 minutes
Tow #3	18-Feb	1058	40° 57.283	73° 22.982	1108	40° 57.314	73° 22.648	10 minutes
Tow #4	18-Feb	1120	40° 57.251	73° 22.583	1130	40° 57.286	73° 22.259	10 minutes
Tow #5	18-Feb	1145	40° 57.207	73° 22.807	1155	40° 57.238	73° 22.490	10 minutes[1]
Tow #6	18-Feb	1233	40° 57.183	73° 22.498	1243	40° 57.216	73° 22.188	10 minutes
Tow #7	19-Feb	1110	40° 57.111	73° 22.696	1120	40° 57.150	73° 22.417	10 minutes
Tow #8	19-Feb	1208	40° 57.099	73° 22.487	1218	40° 57.084	73° 22.143	10 minutes[2]
Tow #9	19-Feb	1228	40° 57.066	73° 22.370	1238	40° 57.040	73° 22.712	10 minutes
Tow #10	19-Feb	1309	40° 57.019	73° 22.289	1313	40° 56.982	73° 22.494	4 minutes[3]
Tow #11	19-Feb	1335	40° 56.924	73° 22.298	1345	40° 56.992	73° 22.970	10 minutes[4]
Tow #12	19-Feb	1403	40° 56.825	73° 22.347	1411	40° 57.036	73° 22.096	10 minutes[5]
Tow #13	19-Feb	1505	40° 57.111	73° 22.696	1515	40° 57.416	73° 22.685	10 minutes[6]
Area B								
Tow #1	18-Feb	1316	40° 56.420	73° 16.777	1326	40° 56.448	73° 16.432	10 minutes
Tow #2	18-Feb	1342	40° 56.394	73° 16.481	1352	40° 56.390	73° 16.805	10 minutes
Tow #3	18-Feb	1405	40° 56.351	73° 16.656	1415	40° 56.361	73° 16.335	10 minutes
Tow #4	18-Feb	1425	40° 56.312	73° 16.466	1435	40° 56.297	73° 16.803	10 minutes
Tow #5	19-Feb	0919	40° 56.265	73° 16.721	0929	40° 56.260	73° 16.342	10 minutes
Tow #6	19-Feb	0940	40° 56.236	73° 16.489	0950	40° 56.206	73° 16.789	10 minutes
Tow #7	19-Feb	1006	40° 56.228	73° 16.104	1016	40° 56.191	73° 16.379	10 minutes

Key:
[1] = Net was torn and needed to be repaired before deploying.
[2] = Very rocky area. Tore up the net in both attempts. Moved 8B (end position) to avoid hang up.
[3] = Very rocky area and hung up the net twice. Moved 10A and 10B locations to avoid hang up.
[4] = Rocky area and net got hung up.
[5] = Very rocky area and hung up net twice. Moved 12A and 12B locations to avoid hang up.
[6] = Very rocky area and hung up net three times. Moved transect from 7A and 2B to avoid hang up.

Table 3. Asharoken Borrow Area A and B Bottom Trawl Coordinates, May 11–12 and July 7–8, 2004.

Tow #	Date	Start			End			Duration
		Time	Latitude	Longitude	Time	Latitude	Longitude	
Area A								
Tow #1	11-May, 7-Jul	1000, 1038	40° 57.354	73° 22.496	1010, 1048	40° 57.560	73° 22.712	10, 10[3] minutes
Tow #2	11-May, 7-Jul	1122, 1115	40° 57.033	73° 23.670	1132, 1125	40° 57.241	73° 22.920	10[1], 10[3] minutes
Tow #3	11-May, 7-Jul	1203, 1135	40° 57.130	73° 22.635	1210, 1144	40° 57.329	73° 22.790	7[2], 9[6] minutes
Tow #4	11-May, 7-Jul	1225, 1242	40° 57.253	73° 22.582	1235, 1252	40° 57.465	73° 22.860	10, 10 minutes
Tow #5	11-May, 7-Jul	1250, 1303	40° 57.529	73° 22.793	1300, 1313	40° 57.291	73° 22.537	10, 10 minutes
Tow #6	11-May, 7-Jul	1316, 1324	40° 57.463	73° 22.737	1326, 1334	40° 57.317	73° 22.482	10, 10 minutes
Tow #7	11-May, 7-Jul	1345, 1344	40° 57.387	73° 22.712	1355, 1354	40° 57.337	73° 22.417	10, 10 minutes
Tow #8	12-May, 8-Jul	1227, 1143	40° 57.055	73° 22.437	1237, 1150	40° 57.897	73° 22.268	10[3], 7[4] minutes
Tow #9	12-May, 8-Jul	1251, 1337	40° 57.127	73° 22.346	1300, 1345	40° 57.011	73° 22.254	9[4], 8[7] minutes
Tow #10	12-May	1345	40° 57.555	73° 22.004	1355	40° 56.794	73° 22.110	10[3] minutes
Tow #11	12-May	1405	40° 56.155	73° 22.918	- -	- -	- -	- - minutes[5]
Area B								
Tow #1	12-May, 7-Jul	0918, 1440	40° 56.448	73° 16.432	0928, 1450	40° 56.421	73° 16.763	10, 10 minutes
Tow #2	12-May, 7-Jul	0955, 1517	40° 56.394	73° 16.481	1005, 1527	40° 56.392	73° 16.815	10, 10 minutes
Tow #3	12-May, 7-Jul	1025, 1550	40° 56.359	73° 16.335	1035, 1600	40° 56.350	73° 16.650	10, 10 minutes
Tow #4	12-May, 8-Jul	1107, 0923	40° 56.297	73° 16.465	1117, 0933	40° 56.284	73° 16.773	10, 10 minutes
Tow #5	11-May, 8-Jul	1500, 0947	40° 56.276	73° 16.370	1510, 0957	40° 56.259	73° 16.732	10, 10 minutes
Tow #6	11-May, 8-Jul	1520, 1016	40° 56.213	73° 16.823	1530, 1026	40° 56.230	73° 16.491	10, 10 minutes
Tow #7	11-May, 8-Jul	1544, 1041	40° 56.196	73° 16.388	1554, 1051	40° 56.174	73° 16.718	10, 10 minutes

Key:
[1] = Net was hung and torn. Net was replaced and transect was re-towed.
[2] = Rocky area. Net was hung, but contained a decent haul.
[3] = Rocky area. Net was hung and transect re-towed.
[4] = Rocky area. Net was hung and ripped, but contained decent haul. Needed to repair net before next trawl.
[5] = Rocky area. Net was hung and ripped in half. Second ripped net of the May sampling event.
[6] = Rocky area. Net was hung, ripped at the chain and could not be repaired. Needed to replace net before next trawl.
[7] = Tow was conducted, but net contained nothing (potentially not sitting on the bottom). Blew the hydraulics during retrieval and could not complete tow.

Table 4. Asharoken Benthic Sampling Coordinates, September 2003 and May 2004 Sampling Events.

Grab #	Latitude	Longitude	Depth (feet)
September 2003			
Area A			
Grab #1	40º 57.601	73º 22.566	44
Grab #2	40º 57.489	73º 22.441	42
Grab #3	40º 57.423	73º 22.621	37
Grab #4	40º 57.242	73º 22.384	34
Grab #5	40º 57.304	73º 22.260	33
Grab #6	40º 57.243	73º 22.199	29
Grab #7	40º 57.120	73º 22.208	35
Grab #8	40º 57.061	73º 22.137	38
Grab #9	40º 57.068	73º 22.268	35
Grab #10	40º 56.941	73º 22.199	38
Grab #11	40º 56.945	73º 22.265	36
Grab #12	40º 56.947	73º 22.381	33
Grab #13	40º 56.881	73º 22.206	37
Grab #14	40º 56.885	73º 22.325	35
Grab #15	40º 56.881	73º 22.381	34
Grab #16	40º 56.822	73º 22.263	39
Grab #17	40º 56.824	73º 22.388	37
Grab #18	40º 56.766	73º 22.263	38
Grab #19	40º 56.762	73º 22.383	39
Grab #20	40º 57.000	73º 22.506	39
Grab #21	40º 57.000	73º 22.623	38
Grab #22	40º 57.003	73º 22.628	36
Grab #23	40º 57.063	73º 22.509	39
Grab #24	40º 57.120	73º 22.687	37
Grab #25	40º 57.124	73º 22.563	40
Grab #26	40º 57.187	73º 22.628	39
Grab #27	40º 57.184	73º 22.741	35
Grab #28	40º 57.246	73º 22.562	42
Grab #29	40º 57.244	73º 22.627	36
Grab #30	40º 57.244	73º 22.749	40
Grab #31	40º 57.249	73º 22.803	36
Grab #32	40º 57.361	73º 22.804	39
Grab #33	40º 57.368	73º 22.808	36
Grab #34	40º 57.428	73º 22.868	37
Grab #35	40º 57.421	73º 22.927	35
Area B			
Grab #1	40º 56.468	73º 16.688	46
Grab #2	40º 56.402	73º 16.622	43

Table 4. Asharoken Benthic Sampling Coordinates, September 2003 and May 2004 Sampling Events (continued).

Grab #	Latitude	Longitude	Depth (feet)
September 2003			
Area B (continued)			
Grab #3	40º 56.344	73º 16.668	42
Grab #4	40º 56.344	73º 16.441	42
Grab #5	40º 56.286	73º 16.387	41
Grab #6	40º 56.342	73º 16.743	39
Grab #7	40º 56.341	73º 16.681	39
Grab #8	40º 56.281	73º 16.562	32
Grab #9	40º 56.289	73º 16.499	34
Grab #10	40º 56.224	73º 16.381	39
Grab #11	40º 56.286	73º 16.800	34
Grab #12	40º 56.280	73º 16.679	34
Grab #13	40º 56.221	73º 16.622	35
Grab #14	40º 56.221	73º 16.559	36
Grab #15	40º 56.164	73º 16.443	36
May 2004			
Area A			
Grab #1	40º 57.583	73º 22.550	47
Grab #2	40º 57.483	73º 22.450	47
Grab #3	40º 57.433	73º 22.633	37
Grab #4	40º 57.217	73º 22.367	35
Grab #5	40º 57.267	73º 22.267	47
Grab #6	40º 57.217	73º 22.217	26
Grab #7	40º 57.133	73º 22.183	40
Grab #8	40º 57.067	73º 22.150	34
Grab #9	40º 57.033	73º 22.233	37
Grab #10	40º 56.950	73º 22.200	38
Grab #11	40º 56.950	73º 22.283	37
Grab #12	40º 56.950	73º 22.367	34
Grab #13	40º 56.883	73º 22.233	38
Grab #14	40º 56.883	73º 22.300	37
Grab #15	40º 56.883	73º 22.383	33
Grab #16	40º 56.800	73º 22.250	33
Grab #17	40º 56.800	73º 22.350	33
Grab #18	40º 56.733	73º 22.267	30
Grab #19	40º 56.733	73º 22.350	33
Grab #20	40º 56.983	73º 22.517	34
Grab #21	40º 57.000	73º 22.617	31
Grab #22	40º 57.067	73º 22.517	36
Grab #23	40º 57.083	73º 22.600	33

Table 4. Asharoken Benthic Sampling Coordinates, September 2003 and May 2004 Sampling Events (continued).

Grab #	Latitude	Longitude	Depth (feet)
May 2004			
Area A (continued)			
Grab #24	40º 57.100	73º 22.683	34
Grab #25	40º 57.150	73º 22.550	37
Grab #26	40º 57.167	73º 22.633	35
Grab #27	40º 57.183	73º 22.733	34
Grab #28	40º 57.233	73º 22.550	39
Grab #29	40º 57.233	73º 22.633	37
Grab #30	40º 57.250	73º 22.733	37
Grab #31	40º 57.267	73º 22.817	34
Grab #32	40º 57.350	73º 22.783	37
Grab #33	40º 57.367	73º 22.867	34
Grab #34	40º 57.433	73º 22.850	37
Grab #35	40º 57.433	73º 22.933	35
Area B			
Grab #1	40º 56.433	73º 16.717	44
Grab #2	40º 56.400	73º 16.617	43
Grab #3	40º 56.367	73º 16.533	43
Grab #4	40º 56.333	73º 16.450	43
Grab #5	40º 56.300	73º 16.367	43
Grab #6	40º 56.367	73º 16.750	42
Grab #7	40º 56.333	73º 16.667	41
Grab #8	40º 56.300	73º 16.583	40
Grab #9	40º 56.267	73º 16.500	40
Grab #10	40º 56.233	73º 16.400	42
Grab #11	40º 56.300	73º 16.800	38
Grab #12	40º 56.267	73º 16.717	38
Grab #13	40º 56.233	73º 16.617	39
Grab #14	40º 56.200	73º 16.533	40
Grab #15	40º 56.150	73º 16.450	39

Table 5. Species Collected from All Asharoken Bottom Trawl Surveys.

Family	Scientific Name	Common Name
September 2003		
Finfish		
Atherinidae (silversides)	*Menidia menidia*	Atlantic Silverside
Batrachoididae (toadfishes)	*Opsanus tau*	Oyster Toadfish
Carangidae (pompanos and jacks)	*Selene vomer*	Lookdown
Clupeidae (herring)	*Clupea harengus*	Atlantic Herring
	Brevoortia tyrannus	Menhaden
	Alosa pseudoharengus	Alewife
	Alosa aestivalis	Blueback Herring
Engraulidae (anchovies)	*Anchoa mitchilli*	Bay Anchovy
Labridae (wrasses)	*Tautogolabrus adspersus*	Cunner
Pleuronectidae (righteye flounders)	*Pseudopleuronectes americanus*	Winter Flounder
Pomatomidae (bluefishes)	*Pomatomus saltatrix*	Bluefish
Sciaenidae (drums)	*Cynoscion regalis*	Weakfish
Serranidae (sea basses)	*Centropristis striata*	Black Sea Bass
Sparidae (porgies)	*Stenotomus chrysops*	Scup
Stromateidae (butterfishes)	*Peprilus triacanthus*	Atlantic Butterfish
Tetradontidae (puffers)	*Sphoeroides maculatus*	Northern Puffer
Triglidae (searobins)	*Prionotus carolinus*	Northern Searobin
Invertebrates		
Asteriidae (sea stars)	*Asterias forbesi*	Asteriid Sea Star
Cancridae (rock crabs)	*Cancer irroratus*	Rock Crab
Limulidae (horseshoe crabs)	*Limulus polyphemus*	Atlantic Horseshoe Crab
Loliginidae (squids)	*Loligo pealei*	Long-finned Squid
Majidae (spider crabs)	*Libinia emarginata*	Common Spider Crab
Melongenidae (whelks)	*Busycon canaliculatum*	Channeled Whelk
February 2004		
Finfish		
Clupeidae (herring)	*Clupea harengus*	Atlantic Herring
Cottidae (sculpins)	*Myoxocephalus aenaeus*	Grubby
Labridae (wrasses)	*Tautoga onitis*	Tautog
	Tautogolabrus adspersus	Cunner
Pholidae (blenny-like fishes)	*Pholis gunnellus*	Rock Gunnel
Pleuronectidae (righteye flounders)	*Pseudopleuronectes americanus*	Winter Flounder
Invertebrates		
Asteriidae (sea stars)	*Asterias forbesi*	Asteriid Sea Star
Cancridae (rock crabs)	*Cancer irroratus*	Rock Crab
Majidae (spider crabs)	*Libinia emarginata*	Common Spider Crab

Table 5. Species Collected from All Asharoken Bottom Trawl Surveys (continued).

Family	Scientific Name	Common Name
May 2004		
Finfish		
Blenniidae (blennies)	*Hypsoblennius hentz*	Feather Blenny
Bothidae (lefteye flounders)	*Etropus microstomus*	Smallmouth Flounder
	Paralichthys dentatus	Summer Flounder
	Scophthalmus aquosus	Windowpane
Clupeidae (herring)	*Alosa pseudoharengus*	Alewife
	Etrumeus teres	Round Herring
Cottidae (sculpins)	*Myoxocephalus aenaeus*	Grubby
Gadidae (codfishes)	*Urophycis chuss*	Red Hake
	Merluccius bilinearis	Silver Hake
	Microgadus tomcod	Atlantic Tomcod
Labridae (wrasses)	*Tautoga onitis*	Tautog
	Tautogolabrus adspersus	Cunner
Pholidae (gunnels)	*Pholis fasciata*	Banded Gunnel
	Pholis gunnellus	Rock Gunnel
Pleuronectidae (righteye flounders)	*Pseudopleuronectes americanus*	Winter Flounder
Rajidae (skates)	*Raja eglanteria*	Clearnose Skate
Soleidate (soles)	*Trinectes maculatus*	Hogchoker
Sparidae (porgies)	*Stenotomus chrysops*	Scup
Invertebrates		
Anthidae (mud crabs)	*Menippe mercenaria*	Stone Crab
Asteriidae (sea stars)	*Asterias forbesi*	Asteriid Sea Star
Cancridae (rock crabs)	*Cancer irroratus*	Rock Crab
Limulidae (horseshoe crabs)	*Limulus polyphemus*	Atlantic Horseshoe Crab
Loliginidae (squids)	*Loligo pealei*	Long-finned Squid
Majidae (spider crabs)	*Libinia emarginata*	Common Spider Crab
Nephropsidae (lobsters)	*Homarus americanus*	American Lobster
July 2004		
Finfish		
Bothidae (lefteye flounders)	*Etropus microstomus*	Smallmouth Flounder
	Paralichthys dentatus	Summer Flounder
	Scophthalmus aquosus	Windowpane
Clupeidae (herring)	*Alosa aestivalis*	Blueback Herring
Cottidae (sculpins)	*Myoxocephalus aenaeus*	Grubby
Engraulidae (anchovies)	*Anchoa mitchilli*	Bay Anchovy
Gadidae (codfishes)	*Urophycis regia*	Spotted Hake
Labridae (wrasses)	*Tautoga onitis*	Tautog
	Tautogolabrus adspersus	Cunner
Pleuronectidae (righteye flounders)	*Pseudopleuronectes americanus*	Winter Flounder

Table 5. Species Collected from All Asharoken Borrow Area A and B Bottom Trawl Surveys (continued).

Family	Scientific Name	Common Name
July 2004		
Finfish		
Rajidae (skates)	*Raja eglanteria*	Clearnose Skate
Soleidate (soles)	*Trinectes maculatus*	Hogchoker
Sparidae (porgies)	*Stenotomus chrysops*	Scup
Stromateidae (butterfishes)	*Peprilus triacanthus*	Atlantic Butterfish
Triglidae (searobins)	*Prionotus evolans*	Striped Searobin
Invertebrates		
Asteriidae (sea stars)	*Asterias forbesi*	Asteriid Sea Star
Cancridae (rock crabs)	*Cancer irroratus*	Rock Crab
Limulidae (horseshoe crabs)	*Limulus polyphemus*	Horseshoe Crab
Loliginidae (squids)	*Loligo pealei*	Long-finned Squid
Majidae (spider crabs)	*Libinia emarginata*	Common Spider Crab
Portunidae (true crabs)	*Ovalipes ocellatus*	Lady Crab
Squillidae (mantis shrimp)	*Squilla empusa*	Mantis Shrimp

Table 6. Species Composition and Abundance at All Asharoken Borrow Areas.

Taxa	Total Catch					Percent of Total Catch Excluding Bay Anchovy					Percent of Total Catch Including Bay Anchovy				
	9/03	2/04	5/04	7/04	Total	9/03	2/04	5/04	7/04	Total	9/03	2/04	5/04	7/04	Total
Alewife (*Alosa pseudoharengus*)	1	- -	1	- -	2	<0.1	- -	0.1	- -	<0.1	<0.1	- -	0.1	- -	<0.1
American lobster (*Homarus americanus*)	- -	- -	2	- -	2	- -	- -	0.2	- -	<0.1	- -	- -	0.2	- -	<0.1
Asteriid Sea Star (*Asterias forbesi*)	2	15	16	6	39	0.1	9.7	1.4	1.7	0.7	<0.1	9.7	1.4	0.2	0.1
Atlantic Butterfish (*Peprilus triacanthus*)	93	- -	- -	16	109	2.5	- -	- -	4.5	2.0	0.2	- -	- -	0.6	0.2
Atlantic Herring (*Clupea harengus*)	1	8	- -	- -	9	<0.1	5.2	- -	- -	0.2	<0.1	5.2	- -	- -	<0.1
Atlantic Menhaden (*Brevoortia tyrannus*)	1	- -	- -	- -	1	<0.1	- -	- -	- -	<0.1	<0.1	- -	- -	- -	<0.1
Atlantic Silverside (*Menidia menidia*)	1	- -	- -	- -	1	<0.1	- -	- -	- -	<0.1	<0.1	- -	- -	- -	<0.1
Atlantic Tomcod (*Microgadus tomcod*)	- -	- -	5	- -	5	- -	- -	0.4	- -	0.1	- -	- -	0.4	- -	<0.1
Banded Gunnel (*Pholis fasciata*)	- -	- -	1	- -	1	- -	- -	0.1	- -	<0.1	- -	- -	0.1	- -	<0.1
Bay Anchovy (*Anchoa mitchilli*)	**45606**	- -	- -	**2443**	**48049**	* *	- -	- -	* *	* *	**92.5**	- -	- -	**87.3**	**90.0**
Black Sea Bass (*Centropristis striata*)	2	1	- -	- -	3	0.1	0.6	- -	- -	0.1	<0.1	0.6	- -	- -	<0.1
Blueback Herring (*Alosa aestivalis*)	1	- -	- -	60	61	<0.1	- -	- -	16.8	1.1	<0.1	- -	- -	2.1	0.1
Bluefish (*Pomatomus saltatrix*)	16	- -	- -	- -	16	0.4	- -	- -	- -	0.3	<0.1	- -	- -	- -	<0.1
Channeled Whelk (*Busycon canaliculatum*)	2	- -	- -	- -	2	0.1	- -	- -	- -	<0.1	<0.1	- -	- -	- -	<0.1
Clearnose Skate (*Raja eglanteria*)	- -	- -	18	1	19	- -	- -	1.5	0.3	0.4	- -	- -	1.5	<0.1	<0.1
Cunner (*Tautogolabrus adspersus*)	2	24	10	16	52	0.1	15.5	0.9	4.5	1.0	<0.1	15.5	0.9	0.6	0.1
Feather Blenny (*Hypsoblennius hentz*	- -	- -	1	- -	1	- -	- -	0.1	- -	<0.1	- -	- -	0.1	- -	<0.1
Grubby (*Myoxocephalus aenaeus*)	- -	82	13	1	96	- -	52.9	1.1	0.3	1.8	- -	52.9	1.1	<0.1	0.2
Hogchoker (*Trinectes maculatus*)	- -	- -	1	1	2	- -	- -	0.1	0.3	<0.1	- -	- -	0.1	<0.1	<0.1
Horseshoe Crab (*Limulus polyphemus*)	1	- -	22	22	45	<0.1	- -	1.9	6.2	0.8	<0.1	- -	1.9	0.8	0.1
Lady Crab (*Ovalipes ocellatus*)	- -	- -	- -	5	5	- -	- -	- -	1.4	0.1	- -	- -	- -	0.2	<0.1
Long-finned Squid (*Loligo pealei*)	83	- -	31	9	123	2.3	- -	2.7	2.5	2.3	0.2	- -	2.7	0.3	0.2
Lookdown (*Selene vomer*)	1	- -	- -	- -	1	<0.1	- -	- -	- -	<0.1	<0.1	- -	- -	- -	<0.1
Mantis Shrimp (*Squilla empusa*)	- -	- -	- -	3	3	- -	- -	- -	0.8	0.1	- -	- -	- -	0.1	<0.1
Northern Puffer (*Sphoeroides maculatus*)	1	- -	- -	- -	1	<0.1	- -	- -	- -	<0.1	<0.1	- -	- -	- -	<0.1
Northern Searobin (*Prionotus carolinus*)	1	- -	- -	- -	1	<0.1	- -	- -	- -	<0.1	<0.1	- -	- -	- -	<0.1
Oyster Toadfish (*Opsanus tau*)	1	- -	- -	- -	1	<0.1	- -	- -	- -	<0.1	<0.1	- -	- -	- -	<0.1
Red Hake (*Urophycis chuss*)	- -	- -	86	- -	86	- -	- -	7.4	- -	1.6	- -	- -	7.4	- -	0.2

Table 6. Species Composition and Abundance at All Asharoken Borrow Areas (continued).

Taxa	Total Catch					Percent of Total Catch Excluding Bay Anchovy					Percent of Total Catch Including Bay Anchovy				
	9/03	2/04	5/04	7/04	Total	9/03	2/04	5/04	7/04	Total	9/03	2/04	5/04	7/04	Total
Rock Crab (*Cancer irroratus*)	3	1	18	8	30	0.1	0.6	1.5	2.2	0.6	<0.1	0.6	1.5	0.3	0.1
Rock Gunnel (*Pholis gunnellus*)	- -	2	3	- -	5	- -	1.3	0.3	- -	0.1	- -	1.3	0.3	- -	<0.1
Round Herring (*Etrumeus teres*)	- -	- -	1	- -	1	- -	- -	0.1	- -	<0.1	- -	- -	0.1	- -	<0.1
Scup (*Stenotomus chrysops*)	3,228	- -	1	21	3,250	87.8	- -	0.1	5.9	60.7	6.5	- -	0.1	0.8	6.1
Silver Hake (*Merluccius bilinearis*)	- -	- -	4	- -	4	- -	- -	0.3	- -	0.1	- -	- -	0.3	- -	<0.1
Smallmouth Flounder (*Etropus microstomus*)	- -	- -	10	1	11	- -	- -	0.9	0.3	0.2	- -	- -	0.9	<0.1	<0.1
Spider Crab (*Libinia dubia*)	1	4	457	49	511	<0.1	2.6	39.2	13.7	9.5	<0.1	2.6	39.2	1.8	1.0
Spotted Hake (*Urophycis regia*)	- -	- -	- -	8	8	- -	- -	- -	2.2	0.2	- -	- -	- -	0.3	<0.1
Stone Crab (*Menippe mercenaria*)	- -	- -	2	- -	2	- -	- -	0.2	- -	<0.1	- -	- -	0.2	- -	<0.1
Striped Searobin (*Prionotus evolans*)	- -	- -	- -	1	1	- -	- -	- -	0.3	<0.1	- -	- -	- -	<0.1	<0.1
Summer Flounder (*Paralichthys dentatus*)	- -	- -	9	4	13	- -	- -	0.8	1.1	0.2	- -	- -	0.8	0.1	<0.1
Tautog (*Tautoga onitis*)	- -	1	5	2	8	- -	0.6	0.4	0.6	0.2	- -	0.6	0.4	0.1	<0.1
Weakfish (*Cynoscion regalis*)	226	- -	- -	- -	226	6.1	- -	- -	- -	4.2	0.5	- -	- -	- -	0.4
Windowpane (*Scophthalmus aquosis*)	- -	- -	53	23	76	- -	- -	4.5	6.4	1.4	- -	- -	4.5	0.8	0.1
Winter Flounder (*Pseudopleuronectes americanus*)	9	17	397	100	523	0.2	11.0	34.0	28.0	9.8	<0.1	11.0	34.0	3.6	1.0
Total Number of Organisms Collected	**49,283**	**155**	**1,167**	**2,800**	**53,405**										
Total Number Excluding Bay Anchovy	**3,677**	**155**	**1,167**	**357**	**5,356**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Total Number of Taxa Collected	**23**	**10**	**25**	**22**	**43**										

Notes:

- September 2003 event – 20 tows total, includes 1 reference tow and does not include lost net tow.
- February 2004 event – 16 tows with one tow being 8 minutes instead of 10 minutes.
- May 2004 event – 17 tows total (10 in Borrow Area A and 7 in Borrow Area B).
- July 2004 event – 15 tows total (8 in Borrow Area A and 7 in Borrow Area B).
- Shaded cells indicate essential fish habitat (EFH) designated species.

Table 7. Species Composition and Abundance at Asharoken Borrow Area A.

Taxa	Total Catch					Percent of Total Catch Excluding Bay Anchovy					Percent of Total Catch Including Bay Anchovy				
	9/03	2/04	5/04	7/04	Total	9/03	2/04	5/04	7/04	Total	9/03	2/04	5/04	7/04	Total
Alewife (*Alosa pseudoharengus*)	1	- -	1	- -	2	0.2	- -	0.1	- -	0.1	<0.1	- -	0.12	- -	<0.1
Asteriid Sea Star (*Asterias forbesi*)	2	5	6	2	15	0.4	5.3	0.7	1.4	1.0	<0.1	5.26	0.73	1.32	0.10
Atlantic Butterfish (*Peprilus triacanthus*)	27	- -	- -	4	31	5.6	- -	- -	2.7	2.0	0.19	- -	- -	2.65	0.20
Atlantic Herring (*Clupea harengus*)	1	- -	- -	- -	1	0.2	- -	- -	- -	0.1	0.01	- -	- -	- -	<0.1
Atlantic Menhaden (*Brevoortia tyrannus*)	1	- -	- -	- -	1	0.2	- -	- -	- -	0.1	<0.1	- -	- -	- -	<0.1
Banded Gunnel (*Pholis fasciata*)	- -	- -	1	- -	1	- -	- -	0.1	- -	0.1	- -	- -	0.12	- -	<0.1
Bay Anchovy (*Anchoa mitchilli*)	**13812**	**- -**	**- -**	**4**	**13816**	*** ***	**- -**	**- -**	*** ***	*** ***	**96.63**	**- -**	**- -**	**2.65**	**89.97**
Black Sea Bass (*Centropristis striata*)	1	- -	- -	- -	1	0.2	- -	- -	- -	0.1	<0.1	- -	- -	- -	<0.1
Bluefish (*Pomatomus saltatrix*)	6	- -	- -	- -	6	1.2	- -	- -	- -	0.4	<0.1	- -	- -	- -	<0.1
Channeled Whelk (*Busycon canaliculatum*)	1	- -	- -	- -	1	0.2	- -	- -	- -	0.1	<0.1	- -	- -	- -	<0.1
Clearnose Skate (*Raja eglanteria*)	- -	- -	13	- -	13	- -	- -	1.6	- -	0.8	- -	- -	1.59	- -	0.08
Cunner (*Tautogolabrus adspersus*)	2	21	8	3	34	0.4	22.1	1	2.0	2.2	<0.1	22.11	0.98	1.99	0.22
Feather Blenny (*Hypsoblennius hentz*)	- -	- -	1	- -	1	- -	- -	0.1	- -	0.1	- -	- -	0.12	- -	<0.1
Grubby (*Myoxocephalus aenaeus*)	- -	52	9	1	62	- -	54.7	1.1	0.7	4.0	- -	54.74	1.10	0.66	0.40
Hogchoker (*Trinectes maculatus*)	- -	- -	1	- -	1	- -	- -	0.1	- -	0.1	- -	- -	0.12	- -	<0.1
Horseshoe Crab (*Limulus polyphemus*)	1	- -	11	15	27	0.2	- -	1.3	10.2	1.8	<0.1	- -	1.35	9.93	0.18
Lady Crab (*Ovalipes ocellatus*)	- -	- -	- -	4	4	- -	- -	- -	2.7	0.3	- -	- -	- -	2.65	<0.1
Long-finned Squid (*Loligo pealei*)	44	- -	25	5	74	9.1	- -	3.1	3.4	4.8	0.31	- -	3.06	3.31	0.48
Lookdown (*Selene vomer*)	1	- -	- -	- -	1	0.2	- -	- -	- -	0.1	<0.1	- -	- -	- -	<0.1
Northern Searobin (*Prionotus carolinus*)	1	- -	- -	- -	1	0.2	- -	- -	- -	0.1	<0.1	- -	- -	- -	<0.1
Red Hake (*Urophycis chuss*)	- -	- -	53	- -	53	- -	- -	6.5	- -	3.4	- -	- -	6.49	- -	0.35
Rock Crab (*Cancer irroratus*)	- -	1	12	6	19	- -	1.1	1.5	4.1	1.2	- -	1.05	1.47	3.97	0.12
Rock Gunnel (*Pholis gunnellus*)	- -	2	2	- -	4	- -	2.1	0.2	- -	0.3	- -	2.11	0.24	- -	<0.1
Round Herring (*Etrumeus teres*)	- -	- -	1	- -	1	- -	- -	0.1	- -	0.1	- -	- -	0.12	- -	<0.1
Scup (*Stenotomus chrysops*)	166	- -	1	9	176	34.5	- -	0.1	6.1	11.4	1.16	- -	0.12	5.96	1.15
Silver Hake (*Merluccius bilinearis*)	- -	- -	4	- -	4	- -	- -	0.5	- -	0.3	- -	- -	0.49	- -	<0.1
Smallmouth Flounder (*Etropus microstomus*)	- -	- -	5	1	6	- -	- -	0.6	0.7	0.4	- -	- -	0.61	0.66	<0.1
Spider Crab (*Libinia dubia*)	- -	3	334	16	353	- -	3.2	40.9	10.9	22.9	- -	3.16	40.88	10.60	2.30

Table 7. Species Composition and Abundance at Asharoken Borrow Area A (continued).

Taxa	Total Catch					Percent of Total Catch Excluding Bay Anchovy					Percent of Total Catch Including Bay Anchovy				
	9/03	2/04	5/04	7/04	Total	9/03	2/04	5/04	7/04	Total	9/03	2/04	5/04	7/04	Total
Spotted Hake (*Urophycis regia*)	- -	- -	- -	8	8	- -	- -	- -	5.4	0.5	- -	- -	- -	5.30	0.05
Striped Searobin (*Prionotus evolans*)	- -	- -	- -	1	1	- -	- -	- -	0.7	0.1	- -	- -	- -	0.66	<0.1
Summer Flounder (*Paralichthys dentatus*)	- -	- -	9	3	12	- -	0	1.1	2.0	0.8	- -	- -	1.10	1.99	0.08
Tautog (*Tautoga onitis*)	- -	1	3	2	6	- -	1.1	0.4	1.4	0.4	- -	1.05	0.37	1.32	<0.1
Tomcod (*Microgadus tomcod*)	- -	- -	3	- -	3	- -	- -	0.4	- -	0.2	- -	- -	0.37	- -	<0.1
Weakfish (*Cynoscion regalis*)	219	- -	- -	- -	219	45.5	- -	- -	- -	14.2	1.53	- -	- -	- -	1.43
Windowpane (*Scophthalmus aquosis*)	- -	- -	35	15	50	- -	- -	4.3	10.2	3.2	- -	- -	4.28	9.93	0.33
Winter Flounder (*Pseudopleuronectes americanus*)	7	10	279	52	348	1.5	10.5	34.1	35.4	22.6	0.05	10.53	34.15	34.44	2.27
Total Biomass of Organisms Collected	**14,293**	**95**	**817**	**151**	**15,356**										
Total Biomass Excluding Bay Anchovy	**481**	**95**	**817**	**147**	**1,540**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Total Number of Taxa Collected	**17**	**8**	**23**	**18**	**36**										

Notes:

- September 2003 event – 13 tows total, includes 1 reference tow (does not include lost net tow).
- February 2004 event – 9 tows with one tow being 8 minutes instead of 10 minutes.
- May 2004 event – 10 tows total.
- July 2004 event – 8 tows total.
- Shaded cells indicate essential fish habitat (EFH) designated species.

Table 8. Species Composition and Abundance at Asharoken Borrow Area B.

Taxa	Total Catch					Percent of Total Catch Excluding Bay Anchovy					Percent of Total Catch Including Bay Anchovy				
	9/03	2/04	5/04	7/04	Total	9/03	2/04	5/04	7/04	Total	9/03	2/04	5/04	7/04	Total
American Lobster (*Homarus americanus*)	- -	- -	2	- -	2	- -	- -	0.6	- -	0.1	- -	- -	0.57	- -	<0.1
Asteriid Sea Star (*Asterias forbesi*)	- -	10	10	4	24	- -	17.2	2.9	1.9	0.6	- -	17.24	2.86	0.15	0.06
Atlantic Butterfish (*Peprilus triacanthus*)	75	- -	- -	12	87	2.4	- -	- -	5.7	2.3	0.21	- -	- -	0.45	0.23
Atlantic Herring (*Clupea harengus*)	- -	8	- -	0	8	- -	13.8	- -	- -	0.2	- -	13.79	- -	- -	<0.1
Atlantic Silverside (*Menidia menidia*)	1	- -	- -	0	1	<0.1	0	- -	- -	<0.1	<0.1	- -	- -	- -	<0.1
Bay Anchovy (*Anchoa mitchilli*)	**31794**	- -	- -	**2439**	**34233**	* *	0	- -	* *	* *	**90.87**	- -	- -	**92.07**	**89.98**
Black Sea Bass (*Centropristis striata*)	1	1	- -	0	2	<0.1	1.7	- -	- -	0.1	<0.1	1.72	- -	- -	<0.1
Blueback Herring (*Alosa aestivalis*)	1	- -	- -	60	61	<0.1	- -	- -	28.6	1.6	<0.1	- -	- -	2.27	0.16
Bluefish (*Pomatomus saltatrix*)	1	- -	- -	0	1	<0.1	- -	- -	- -	<0.1	<0.1	- -	- -	- -	<0.1
Channeled Whelk (*Busycon canaliculatum*)	1	- -	0	0	1	<0.1	- -	- -	- -	<0.1	<0.1	- -	- -	- -	<0.1
Clearnose Skate (*Raja eglanteria*)	- -	- -	5	1	6	- -	- -	1.4	0.5	0.2	- -	- -	1.43	<0.1	<0.1
Cunner (*Tautogolabrus adspersus*)	- -	3	2	13	18	- -	5.2	0.6	6.2	0.5	- -	5.17	0.57	0.49	0.05
Grubby (*Myoxocephalus aenaeus*)	- -	28	4	0	32	- -	48.3	1.1	- -	0.8	- -	48.28	1.14	- -	0.08
Hogchoker (*Trinectes maculatus*)	- -	- -	0	1	1	- -	- -	- -	0.5	<0.1	- -	- -	- -	<0.1	<0.1
Horseshoe Crab (*Limulus polyphemus*)	- -	- -	11	7	18	- -	- -	3.1	3.3	0.5	- -	- -	3.14	0.26	0.05
Lady Crab (*Ovalipes ocellatus*)	- -	- -	0	1	1	- -	- -	- -	0.5	0.0	- -	- -	- -	<0.1	<0.1
Long-finned Squid (*Loligo pealei*)	39	- -	6	4	49	1.2	- -	1.7	1.9	1.3	0.11	- -	1.71	0.15	0.13
Mantis Shrimp (*Squilla empusa*)	- -	- -	- -	3	3	- -	- -	- -	1.4	0.1	- -	- -	- -	0.11	<0.1
Northern Puffer (*Sphoeroides maculatus*)	1	- -	- -	- -	1	<0.1	- -	- -	- -	<0.1	<0.1	- -	- -	- -	<0.1
Oyster Toadfish (*Opsanus tau*)	1	- -	- -	- -	1	<0.1	- -	- -	- -	<0.1	<0.1	- -	- -	- -	<0.1
Red Hake (*Urophycis chuss*)	- -	- -	33	- -	33	- -	- -	9.4	- -	0.9	- -	- -	9.43	- -	0.09
Rock Crab (*Cancer irroratus*)	3	- -	6	2	11	0.1	- -	1.7	1.0	0.3	<0.1	- -	1.71	0.08	<0.1
Rock Gunnel (*Pholis gunnellus*)	- -	- -	1	0	1	- -	- -	0.3	- -	<0.1	- -	- -	0.29	- -	<0.1
Scup (*Stenotomus chrysops*)	3062	- -	0	12	3074	95.8	- -	- -	5.7	80.6	8.75	- -	- -	0.45	8.08
Smallmouth Flounder (*Etropus microstomus*)	- -	- -	5	0	5	- -	- -	1.4	- -	0.1	- -	- -	1.43	- -	<0.1
Spider Crab (*Libinia dubia*)	1	1	123	33	158	<0.1	1.7	35.1	15.7	4.1	<0.1	1.72	35.14	1.25	0.42
Stone Crab (*Menippe mercenaria*)	- -	- -	2	0	2	- -	- -	0.6	- -	0.1	- -	- -	0.57	- -	<0.1
Summer Flounder (*Paralichthys dentatus*)	- -	- -	0	1	1	- -	- -	- -	0.5	<0.1	- -	- -	- -	<0.1	<0.1

Table 8. Species Composition and Abundance at Asharoken Borrow Area B (continued).

Taxa	Total Catch					Percent of Total Catch Excluding Bay Anchovy					Percent of Total Catch Including Bay Anchovy				
	9/03	2/04	5/04	7/04	Total	9/03	2/04	5/04	7/04	Total	9/03	2/04	5/04	7/04	Total
Tautog (*Tautoga onitis*)	- -	- -	2	0	2	- -	- -	0.6	- -	0.1	- -	- -	0.57	- -	<0.1
Tomcod (*Microgadus tomcod*)	- -	- -	2	- -	2	- -	- -	0.6	- -	0.1	- -	- -	0.57	- -	<0.1
Weakfish (*Cynoscion regalis*)	7	- -	- -	- -	7	0.2	- -	- -	- -	0.2	<0.1	- -	- -	- -	<0.1
Windowpane (*Scophthalmus aquosus*)	- -	- -	18	8	26	- -	- -	5.1	3.8	0.7	- -	- -	5.14	0.30	0.07
Winter Flounder (*Pseudopleuronectes americanus*)	2	7	118	48	175	0.1	12.1	33.7	22.9	4.6	<0.1	12.07	33.71	1.81	0.46
Total Biomass of Organisms Collected	**34,990**	**58**	**350**	**2,649**	**38,047**										
Total Biomass Excluding Bay Anchovy	**3,196**	**58**	**350**	**210**	**3,814**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Total Number of Taxa Collected	**15**	**7**	**17**	**17**	**33**										

Notes:

- September 2003 event – 8 tows total.
- February 2004 event – 8 tows total.
- May 2004 event – 7 tows total
- July 2004 event – 7 tows total
- Shaded cells indicate essential fish habitat (EFH) designated species.

Table 9. Length Statistics for EFH Species for Asharoken Borrow Area.

Common Name	Scientific Name	Date	N	Min	Max	Mean	SD
Borrow Area A							
Atlantic Herring	*Clupea harengus*	Sept/03	1	105	- -	- -	- -
Black Sea Bass	*Centropristis striata*	Sept/03	1	412	- -	- -	- -
Bluefish	*Pomatomus saltatrix*	Sept/03	6	135	249	209.33	41.54
Red Hake	*Urophycis chuss*	May/04	53	30	321	100.19	36.70
Scup	*Stenotomus chrysops*	Sept/03	103	49	325	83.01	60.72
		May/04	1	322	- -	- -	- -
		July/04	9	186	327	257.44	48.98
Summer Flounder	*Paralichthys dentatus*	May/04	9	267	600	464.44	118.73
		July/04	3	290	485	403.33	101.28
Windowpane	*Scophthalmus aquosus*	May/04	35	60	295	174.80	78.66
		July/04	15	61	220	152.47	48.97
Winter Flounder	*Pseudopleuronectes americanus*	Sept/03	7	157	270	192.57	42.03
		Feb/04	10	47	125	77.10	27.85
		May/04	279	45	321	107.70	49.24
		July/04	52	41	274	105.13	46.91
Borrow Area B							
Atlantic Herring	*Clupea harengus*	Feb/04	8	195	265	225.38	21.69
Black Sea Bass	*Centropristis striata*	Sept/03	1	428	- -	- -	- -
		Feb/04	1	110	- -	- -	- -
Bluefish	*Pomatomus saltatrix*	Sept/03	1	212	- -	- -	- -
Red Hake	*Urophycis chuss*	May/04	33	70	151	99.21	14.09
Scup	*Stenotomus chrysops*	Sept/03	62	45	370	65.29	43.43
		July/04	12	186	285	242.25	30.34
Summer Flounder	*Paralichthys dentatus*	July/04	1	281	- -	- -	- -
Windowpane	*Scophthalmus aquosus*	May/04	18	64	300	166.33	80.67
		July/04	8	184	287	99.76	37.20
Winter Flounder	*Pseudopleuronectes americanus*	Sept/03	2	95	240	167.50	102.53
		Feb/04	7	52	300	103.00	87.66
		May/04	118	54	360	99.76	37.20
		July/04	48	34	184	71.67	35.59

Key:
N = Number measured.
Min = Minimum length (millimeter).
Max = Maximum length (millimeter).
Mean = Average length (millimeter).
SD = Standard deviation.

Table 10. Species Biomass of All Asharoken Borrow Areas.

Taxa	Biomass (g)					Percent of Total Biomass Excluding Bay Anchovy					Percent of Total Biomass Including Bay Anchovy				
	9/03	2/04	5/04	7/04	Total	9/03	2/04	5/04	7/04	Total	9/03	2/04	5/04	7/04	Total
Alewife (*Alosa pseudoharengus*)	1	0	5	0	6	<0.1	0	<0.1	0	<0.1	<0.1	0	<0.1	0	<0.1
American Lobster (*Homarus americanus*)	0	0	1000	0	1000	0	0	0.7	0	0.4	0	0	0.7	0	0.3
Asteriid Sea Star (*Asterias forbesi*)	750	1950	2140	470	5310	2.6	44.1	1.5	0.6	2.1	0.8	44.1	1.5	0.6	1.7
Atlantic Butterfish (*Peprilus triacanthus*)	1899	0	0	630	2529	6.6	0.0	0	0.9	1.0	2.1	0	0	0.8	0.8
Atlantic Herring (*Clupea harengus*)	7	615	0	0	622	<0.1	13.9	0	0	0.2	<0.1	13.9	0	0	0.2
Atlantic Menhaden (*Brevoortia tyrannus*)	500	0	0	0	500	1.7	0	0	0	0.2	0.6	0	0	0	0.2
Atlantic Silverside (*Menidia menidia*)	10	0	0	0	10	<0.1	0	0	0	<0.1	<0.1	0	0	0	<0.1
Atlantic Tomcod (*Microgadus tomcod*)	0	0	70	0	70	0	0	<0.1	0	<0.1	0	0	<0.1	0	<0.1
Banded Gunnel (*Pholis fasciata*)	0	0	7	0	7	0	0	<0.1	0	<0.1	0	0	<0.1	0	<0.1
Bay Anchovy (*Anchoa mitchilli*)	**61060**	**0**	**0**	**10172**	**71232**	*** ***	**0**	**0**	*** ***	*** ***	**68.1**	**0**	**0**	**12.3**	**22.2**
Black Sea Bass (*Centropristis striata*)	3300	15	0	0	3315	11.5	0.3	0	0	1.3	3.7	0.3	0	0	1.0
Blueback Herring (*Alosa aestivalis*)	15	0	0	445	460	0.1	0	0	0.6	0.2	<0.1	0	0	0.5	0.1
Bluefish (*Pomatomus saltatrix*)	770	0	0	0	770	2.7	0	0	0	0.3	0.9	0	0	0	0.2
Channel Whelk (*Busycon canaliculatum*)	325	0	0	0	325	1.1	0	0	0	0.1	0.4	0	0	0	0.1
Clearnose Skate (*Raja eglanteria*)	0	0	8800	500	9300	0	0	6.1	0.7	3.7	0	0	6.1	0.6	2.9
Cunner (*Tautogolabrus adspersus*)	180	56	86	172	494	0.6	1.3	0.1	0.2	0.2	0.2	1.3	0.1	0.2	0.2
Feather Blenny (*Hypsoblennius hentzi*)	0	0	20	0	20	0	0	<0.1	0	<0.1	0	0	<0.1	0	<0.1
Grubby (*Myoxocephalus aenaeus*)	0	644	122	3	769	0	14.6	0.1	<0.1	0.3	0	14.6	0.1	<0.1	0.2
Hogchoker (*Trinectes maculatus*)	0	0	115	110	225	0	0	0.1	0.2	0.1	0	0	0.1	0.1	0.1
Horseshoe Crab (*Limulus polyphemus*)	1000	0	33000	41600	75600	3.5	0	23.0	57.1	30.3	1.1	0	23.0	50.1	23.6
Lady Crab (*Ovalipes ocellatus*)	0	0	0	107	107	0	0	0	0.1	<0.1	0	0	0	0.1	<0.1
Long-finned Squid (*Loligo pealei*)	2420	0	5090	252	7762	8.5	0	3.5	0.3	3.1	2.7	0	3.5	0.3	2.4
Lookdown (*Selene vomer*)	5	0	0	0	5	<0.1	0	0	0	<0.1	<0.1	0	0	0	<0.1
Mantis Shrimp (*Squilla empusa*)	0	0	0	170	170	0	0	0	0.2	0.1	0	0	0	0.2	0.1
Northern Puffer (*Sphoeroides maculatus*)	16	0	0	0	16	0.1	0	0	0	<0.1	<0.1	0	0	0	<0.1
Northern Searobin (*Prionotus carolinus*)	20	0	0	0	20	0.1	0	0	0	<0.1	<0.1	0	0	0	<0.1
Oyster Toadfish (*Opsanus tau*)	45	0	0	0	45	0.2	0	0	0	<0.1	0.1	0	0	0	<0.1
Red Hake (*Urophycis chuss*)	0	0	845	0	845	0	0	0.6	0	0.3	0	0	0.6	0	0.3

Table 10. Species Biomass of All Asharoken Borrow Areas (continued).

Taxa	Biomass (g)					Percent of Total Biomass					Percent of Total Biomass Including Bay Anchovy				
	9/03	2/04	5/04	7/04	Total	9/03	2/04	5/04	7/04	Total	9/03	2/04	5/04	7/04	Total
Rock Crab (*Cancer irroratus*)	20	9	249	14	292	0.1	0.2	0.2	<0.1	0.1	<0.1	0.2	0.2	<0.1	0.1
Rock Gunnel (*Pholis gunnellus*)	0	7	10	0	17	0	0.2	<0.1	0	<0.1	0	0.2	<0.1	0	<0.1
Round Herring (*Etrumeus sadina*)	0	0	3	0	3	0	0	<0.1	0	<0.1	0	0	0	0	<0.1
Scup (*Stenotomus chrysops*)	14899	0	500	6980	22379	52.1	0	0.3	9.6	9.0	16.6	0	0.3	8.4	7.0
Silver Hake (*Merluccius bilinearis*)	0	0	50	0	50	0	0	<0.1	0	<0.1	0	0	<0.1	0	<0.1
Smallmouth Flounder (*Etropus microstomus*)	0	0	92	8	100	0	0	0.1	<0.1	<0.1	0	0	0.1	<0.1	<0.1
Spider Crab (*Libinia dubia*)	70	620	55790	9100	65580	0.2	14.0	38.8	12.5	26.3	0.1	14.0	38.8	11.0	20.4
Spotted Hake (*Urophycis regius*)	0	0	0	365	365	0	0	0	0.5	0.1	0	0	0	0.4	0.1
Stone Crab (*Menippe mercenaria*)	0	0	3	0	3	0	0	<0.1	0	<0.1	0	0	<0.1	0	<0.1
Striped Searobin (*Prionotus evolans*)	0	0	0	500	500	0	0	0	0.7	0.2	0	0	0	0.6	0.2
Summer Flounder (*Paralichthys dentatus*)	0	0	11420	2725	14145	0	0	7.9	3.7	5.7	0	0	7.9	3.3	4.4
Tautog (*Tautoga onitis*)	0	5	6055	3400	9460	0	0.1	4.2	4.7	3.8	0	0.1	4.2	4.1	2.9
Weakfish (*Cynoscion regalis*)	1240	0	0	0	1240	4.3	0	0	0	0.5	1.4	0	0	0	0.4
Windowpane (*Scophthalmus aquosis*)	0	0	6275	3075	9350	0	0	4.4	4.2	3.7	0	0	4.4	3.7	2.9
Winter Flounder (*Pseudopleuronectes americanus*)	1100	501	11905	2228	15734	3.8	11.3	8.3	3.1	6.3	1.2	11.3	8.3	2.7	4.9
Total Biomass of Organisms Collected	**89652**	**4422**	**143652**	**83026**	**320752**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Total Biomass Excluding Bay Anchovy	**28592**	**4422**	**143652**	**72854**	**249520**										

Notes:

- September 2003 event - 20 tows total.
- February 2004 event – 16 tows total.
- May 2004 event – 17 tows total.
- July 2004 event – 15 tows total.
- Shaded cells indicate essential fish habitat (EFH) designated species.

** Bay anchovy were excluded from the first set of "Percent of Total Biomass" columns, but are included in the second set of "Percent of Total Biomass" calculations in the table above.

Table 11. Benthic Invertebrates Collected at Asharoken Borrow Areas A and B, September 2003.

Taxa	Borrow Area A		Borrow Area B	
	Total Catch	Percent Composition	Total Catch	Percent Composition
Nematoda (LPIL)	7,995	49.9	5,863	70.5
Annelida: Oligochaeta (LPIL)	2,133	13.3	781	9.4
Annelida: Polychaeta				
Ampharete (LPIL)	187	1.2	134	1.6
Ampharete lindstroemi	158	1.0	132	1.6
Cossura longocirrata	388	2.4	102	1.2
Cirratulidae (LPIL)	2,131	13.3	710	8.5
Tharyx (LPIL)	243	1.5	- -	- -
Nephtys (LPIL)	149	0.9	124	1.5
Nephtys incisa	134	0.8	- -	- -
Aricidae (LPIL)	117	0.7	- -	- -
Cistenides (=*Pectinaria*) *hyperborea*	298	1.9	- -	- -
Scalibregma inflatum	101	0.6	109	1.3
Polydora cornuta	854	5.3	155	1.9
Streblospio benedicti	176	1.1	- -	- -
Mollusca: Gastropoda				
Crepidula fornicata	112	0.7	- -	- -
Turbonilla (LPIL)	116	0.7	- -	- -
Mollusca: Pelecypoda (LPIL)	194	1.2	- -	- -
Tellina agilis	144	0.9	- -	- -
Thracia (LPIL)	197	1.2	- -	- -
Nucula proxima	212	1.3	- -	- -
Ampelisca abdita	- -	- -	212	2.5
Total	**16,039**	**100.0%**	**8,322**	**100.0%**

Key:

- LPIL – Lowest Possible Identification Level.

Notes:

- Total species of all samples only include samples where over 100 individuals were collected.
- 35 benthic grabs conducted in Borrow Area A and 15 benthic grabs conducted in Borrow Area B.

Table 12. Benthic Invertebrates Collected at Asharoken Borrow Areas A and B, May 2004.

Taxa	Borrow Area A		Borrow Area B	
	Total Catch	Percent Composition	Total Catch	Percent Composition
Nematoda (LPIL)	8,250	50.9	5,100	62.5
Annelida: Oligochaeta (LPIL)	1,241	7.7	505	6.2
Annelida: Polychaeta				
Ampharete finmarchica	659	4.1	312	3.8
Streblospio benedicti	582	3.6	448	5.5
Clymenella torquata	441	2.7	- -	- -
Nephtys picta	341	2.1	106	1.3
Ampharete acutifrons	327	2.0	156	1.9
Cirriformia (Cirratulus) grandis	313	1.9	- -	- -
Drilonereis longa	247	1.5	- -	- -
Spionids spp. (LPIL)	231	1.4	135	1.7
Capitella capitata	228	1.4	452	5.5
Glycera dibranchiata	205	1.3	- -	- -
Polydora spp. (LPIL)	204	1.3	- -	- -
Tharyx acutus	196	1.2	170	2.1
Polydora ligni	148	0.9	198	2.4
Leitoscoloplos (Scoloplos) fragilis	138	0.9	- -	- -
Nephtys bucea	133	0.8	- -	- -
Asychis elongata	132	0.8	- -	- -
Eteone lactea	123	0.8	- -	- -
polytroch larvae	111	0.7	- -	- -
Glycera spp. (LPIL)	111	0.7	104	1.3
Scolecolepides viridis	- -	- -	117	1.4
Mollusca: Gastropoda				
Crepidula fornicata	156	1.0	- -	- -
Mollusca: Pelecypoda				
Nucula proxima	156	1.0	- -	- -
Pitar morrhuanus	130	0.8	- -	- -
Arthropoda: Copepoda				
Temora longicornis	706	4.4	164	2.0
Arthropoda: Amphipoda				
Ampelisca abdita	539	3.3	187	2.3
Leptocheirus pinguis	157	1.0	- -	- -
Total	**16,205**	**100.0**	**8,154**	**100.0**

Notes:

- LPIL – Lowest Possible Identification Level.
- Total species of all samples only include samples where over 100 individuals were collected.
- 35 benthic grabs conducted in Borrow Area A and 15 benthic grabs conducted in Borrow Area B.

Table 13. Benthic Invertebrate Biomass at Asharoken Borrow Areas A and B, September 2003 and May 2004.

Taxa	Area A		Area B	
	Total Weight (gram)	Percent of Total	Total Weight (gram)	Percent of Total
September 2003				
Nematoda	0.035	< 0.1	0.015	< 0.1
Annelida: Oligochaeta	0.034	< 0.1	0.016	< 0.1
Annelida: Polychaeta	34.406	10.7	12.899	2.3
Mollusca: Gastropoda	22.687	7.0	93.806	17.1
Mollusca: Pelecypoda	261.736	81.2	441.358	80.4
Sipuncula	0.406	0.1	- -	- -
Arthropoda: Ostracoda	0.005	< 0.1	- -	- -
Arthropoda: Amphipoda	0.551	0.2	0.126	< 0.1
Arthropoda: Mysida: Mysidae	0.013	< 0.1	0.01	< 0.1
Arthropoda: Decapoda: Anomura	0.028	< 0.1	0.646	0.1
Arthropoda: Decapoda: Brachyura	2.509	0.8	0.182	< 0.1
Pisces	0.078	< 0.1	- -	- -
Total	**322.488**	**100.0**	**549.058**	**100.0**
May 2004				
Bryozoa	- -	- -	- -	- -
Nematoda	< 0.001	< 0.1	0.001	< 0.1
Annelida: Oligochaeta	0.029	< 0.1	1.024	0.1
Annelida: Polychaeta	441.168	23.7	271.619	26.6
Mollusca: Gastropoda	261.765	14.1	55.303	5.4
Mollusca: Pelecypoda	1026.994	55.2	672.349	65.7
Arthropoda: Ostracoda	- -	- -	- -	- -
Arthropoda: Amphipoda	61.862	3.3	9.485	0.9
Arthropoda: Copepoda	0.029	< 0.1	0.002	< 0.1
Arthropoda: Decapoda	67.253	3.6	12.894	1.3
Total	**1,859.101**	**100.0**	**1,022.677**	**100.0**

Notes:

- 35 benthic grabs conducted in Borrow Area A and 15 benthic grabs conducted in Borrow Area B.
- Only presence/absence determinations were made for bryozoan or ostracod species and no weight measurements were obtained.

Table 14. Grain Size Analysis for Asharoken Borrow Area A (% of Dry Weight), September 2003 and May 2004.

Sample Number	Sieve Size						
		Gravel		Sand			
	Pebble	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
September 2003							
A1	- -	- -	- -	18.50	26.70	49.05	5.75
A2	- -	- -	13.60	13.15	16.70	48.20	8.30
A3	- -	- -	2.30	3.40	58.95	33.75	1.60
A4	- -	7.60	29.35	10.10	33.10	19.40	0.45
A5	- -	- -	1.90	2.30	32.00	59.40	4.40
A6	- -	41.65	13.85	7.15	19.00	14.25	4.10
A7	- -	- -	4.55	9.55	43.15	41.10	1.65
A8	- -	- -	4.45	3.90	42.05	38.35	11.25
A9	- -	21.57	17.28	8.00	34.20	16.80	2.15
A10	- -	- -	10.30	6.35	49.90	27.50	5.95
A11	- -	- -	13.35	9.15	51.85	23.55	2.10
A12	- -	- -	7.80	6.50	71.40	13.90	0.40
A13	- -	22.05	8.05	5.60	45.05	15.95	3.30
A14	- -	6.00	37.80	11.35	28.85	14.95	1.05
A15	- -	13.85	16.75	10.05	46.35	11.80	1.20
A16	- -	- -	15.60	8.80	52.80	18.00	4.80
A17	- -	6.90	20.90	15.10	38.55	16.20	2.35
A18	- -	- -	28.95	8.50	45.20	11.00	6.35
A19	- -	- -	13.65	8.10	41.15	32.65	4.45
A20	- -	10.90	19.30	7.00	40.65	21.40	0.75
A21	- -	7.15	17.55	7.90	47.10	18.20	2.10
A22	- -	- -	17.10	6.05	44.05	30.55	2.25
A23	- -	46.35	13.60	6.28	28.07	4.68	1.02
A24	- -	- -	28.40	11.65	46.80	12.60	0.55
A25	- -	0.15	37.38	12.20	30.63	8.78	10.86
A26	- -	- -	30.00	18.25	44.80	6.10	0.85
A27	- -	- -	9.40	6.35	40.50	42.85	0.90
A28	- -	16.60	19.90	6.40	35.05	19.20	2.85
A28	- -	- -	35.35	13.25	44.45	6.75	0.20
A30	- -	- -	5.50	4.95	43.75	44.35	1.45
A31	- -	- -	11.95	6.65	43.05	32.65	5.70
A32	- -	- -	36.10	10.35	40.35	11.65	1.55
A33	- -	- -	14.30	11.85	53.05	19.70	1.10
A34	- -	- -	13.45	7.20	40.65	37.50	1.20
A35	- -	- -	10.50	10.70	56.75	21.00	1.05
May 2004							
A1	- -	- -	7.39	8.19	43.74	38.03	2.65
A2	- -	- -	13.27	18.80	31.04	33.31	3.57
A3	- -	- -	14.50	7.35	38.94	38.21	1.00
A4	- -	- -	9.38	11.32	41.99	36.12	1.19
A5	- -	- -	0.08	0.76	67.55	31.30	0.31

Table 14. Grain Size Analysis of Asharoken Borrow Area A (% of Dry Weight), September 2003 and May 2004 (continued).

Sample Number	Sieve Size						
		Gravel		Sand			
	Pebble	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
May 2004							
A6	- -	- -	5.73	3.65	49.68	40.66	0.27
A7	- -	- -	19.03	13.75	49.16	15.96	2.10
A8	- -	- -	5.53	12.02	55.68	24.62	2.15
A9	- -	11.23	31.39	6.95	31.45	18.22	0.75
A10	- -	- -	11.52	7.07	59.24	19.95	2.21
A11	- -	5.35	31.24	6.89	35.99	19.72	0.81
A12	- -	1.99	13.42	10.57	54.84	18.66	0.52
A13	- -	- -	13.78	13.74	54.85	16.29	1.34
A14	- -	1.98	19.77	9.32	40.12	27.85	0.97
A15	- -	3.52	18.23	16.05	52.65	8.30	1.25
A16	- -	- -	30.59	9.54	45.44	13.52	0.91
A17	- -	- -	15.86	8.59	54.73	19.78	1.04
A18	- -	2.06	1.83	38.12	47.54	9.48	0.97
A19	- -	- -	5.61	9.56	50.35	31.97	2.50
A20	- -	- -	5.45	4.15	51.87	38.03	0.50
A21	- -	- -	17.12	8.78	53.62	19.98	0.49
A22	- -	- -	11.80	7.83	58.99	20.66	0.72
A23	- -	2.33	27.90	9.75	48.45	11.04	0.52
A24	- -	7.61	26.87	9.67	40.14	15.29	0.42
A25	- -	3.25	31.58	15.59	44.14	4.95	0.48
A26	- -	2.79	18.21	10.09	54.71	13.55	0.65
A27	- -	- -	20.16	7.22	31.65	40.60	0.37
A28	- -	- -	3.37	4.07	39.39	51.06	2.11
A29	- -	8.36	10.24	11.29	50.42	18.80	0.89
A30	- -	- -	8.23	8.73	62.32	20.06	0.65
A31	- -	- -	14.94	8.06	54.04	21.51	1.45
A32	- -	2.18	11.34	7.09	59.91	18.91	0.58
A33	- -	- -	11.56	5.92	44.48	37.34	0.70
A34	- -	- -	2.77	4.40	60.54	31.72	0.58
A35	- -	- -	22.73	14.81	50.23	11.41	0.82

Table 15. Grain Size Analysis of Asharoken Borrow Area B (% of Dry Weight), September 2003 and May 2004.

Sample Number	Sieve Size						
		Gravel		Sand			
	Pebble	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
September 2003							
B1	- -	- -	0.40	0.95	44.30	46.00	8.35
B2	- -	- -	0.95	7.45	37.10	53.20	1.30
B3	- -	- -	7.35	9.30	35.25	43.75	4.35
B4	- -	- -	0.70	3.95	28.05	62.90	4.40
B5	- -	- -	5.60	8.45	36.15	45.25	4.55
B6	- -	- -	0.45	2.00	19.65	76.50	1.40
B7	- -	- -	5.00	5.00	36.20	48.80	5.00
B8	- -	- -	2.35	6.85	44.05	44.35	2.40
B9	- -	- -	1.90	9.40	57.30	30.50	0.90
B10	- -	- -	3.20	8.65	53.90	33.25	1.00
B11	- -	- -	5.70	2.85	46.45	44.50	0.50
B12	- -	- -	9.50	7.35	52.85	29.35	0.95
B13	- -	- -	34.35	10.20	36.90	15.55	3.00
B14	- -	- -	10.90	9.75	55.75	22.40	1.20
B15	- -	- -	7.20	6.80	46.65	38.05	1.30
May 2004							
B1	- -	- -	1.63	5.60	53.80	37.42	1.55
B2	- -	3.51	2.17	6.31	41.49	45.90	0.61
B3	- -	- -	2.49	5.69	48.59	41.69	1.55
B4	- -	- -	2.39	5.83	36.35	53.42	2.00
B5	- -	- -	2.24	5.84	44.86	45.86	1.20
B6	- -	- -	1.76	5.69	29.05	62.46	1.03
B7	- -	- -	0.84	5.08	43.54	50.23	0.30
B8	- -	- -	3.88	7.44	44.60	43.20	0.87
B9	- -	- -	1.79	7.01	55.61	35.24	0.34
B10	- -	- -	4.27	10.41	55.62	29.15	0.55
B11	- -	- -	0.07	3.21	62.53	33.88	0.31
B12	- -	- -	2.75	6.29	53.15	37.53	0.27
B13	- -	- -	1.78	5.13	58.79	33.97	0.33
B14	- -	- -	3.48	6.05	55.20	34.54	0.74
B15	- -	- -	1.48	3.59	51.30	43.27	0.37

Table 16. Asharoken Benthic Sampling Water Quality Observations, September 2003.

Station	Date MMDDYY	Time HH:MM	Depth Meters	Temp degC	pH units	SpCond mS/cm	Sal ppt	DO mg/l	Redox mV	Turb NTU
Benthic Sampling September 2003										
A1 (b)	092203	13:06	46.24	21.99	7.74	38.25	24.32	7.47	157.70	
A1 (m)	092203	13:07	24.69	22.03	7.71	38.32	24.37	7.29	168.20	
A1 (s)	092203	13:08	3.34	22.06	7.73	38.38	24.41	7.20	173.20	1.50*
A7 (b)	092203	13:58	39.38	21.81	7.71	37.70	23.93	5.45	209.40	
A7 (m)	092203		22.61	21.91	7.73	38.27	24.33	6.23	145.90	
A7 (s)	092203	14:00	2.92	21.92	7.74	38.31	24.36	7.30	150.70	1.50*
A15 (b)	092203	15:08	36.98	21.81	7.74	38.09	24.21	7.53	187.00	
A15 (m)	092203		23.38	21.82	7.74	38.28	24.34	7.39	188.20	
A15 (s)	092203	15:11	2.91	21.98	7.82	38.51	24.50	7.69	191.50	2.00*
A16 (b)	092303	8:54	37.63	21.60	7.59	38.29	24.35	7.13	251.40	
A16 (m)	092303		14.97	21.62	7.63	38.29	24.35	7.19	246.30	
A16 (s)	092303	8:56	2.92	21.61	7.64	38.29	24.35	7.19	244.50	1.50*
A35 (b)	092303	11:52	38.93	21.47	7.60	38.18	24.27	7.21	286.10	
A35 (m)	092303		19.98	21.48	7.64	38.16	24.26	7.21	279.90	
A35 (s)	092303	11:53	2.34	21.52	7.65	38.17	24.26	7.28	278.10	2.00*
Min				**21.47**	**7.59**	**37.70**	**23.93**	**5.45**	**145.90**	**1.50**
Max				**22.06**	**7.82**	**38.51**	**24.50**	**7.69**	**286.10**	**2.00**
Mean				**21.78**	**7.69**	**38.23**	**24.31**	**7.10**	**210.54**	**1.70**
SD				**0.21**	**0.06**	**0.18**	**0.13**	**0.60**	**49.53**	**0.27**
B1 (b)	092203	9:57	48.89	21.71	7.68	38.28	24.34	7.40	142.80	
B1 (m)	092203		20.49	21.81	7.75	38.39	24.42	7.56	140.70	
B1 (s)	092203		3.41	21.88	7.87	38.45	24.46	7.81	146.70	2.00*
B6 (b)	092203	10:54	45.32	21.97	7.74	38.35	24.39	7.23	197.30	
B6 (m)	092203		20.20	22.01	7.76	38.39	24.42	7.18	197.30	
B6 (s)	092203	10:56	3.52	21.99	7.80	38.44	24.45	7.41	202.50	1.75*
B12 (b)	092203	11:50	38.69	21.94	7.81	38.37	24.41	7.91	192.80	
B12 (m)	092203	11:51	16.36	31.93	7.82	38.40	24.43	7.88	200.20	
B12 (s)	092203	11:52	2.84	21.96	7.85	38.47	24.48	8.16	204.00	1.50*
Min				**21.71**	**7.68**	**38.28**	**24.34**	**7.18**	**140.70**	**1.50**
Max				**31.93**	**7.87**	**38.47**	**24.48**	**8.16**	**204.00**	**2.00**
Mean				**23.02**	**7.79**	**38.39**	**24.42**	**7.62**	**180.48**	**1.75**
SD				**3.34**	**0.06**	**0.06**	**0.04**	**0.34**	**28.04**	**0.25**

Key:

Depth = meters
Specific Conductivity = milliSiemens per centimeter
Dissolved Oxygen = milligram per liter
Turbidity = Nephelometric turbidity unit
Max = maximum
SD = Standard deviation
Temp = Degree Celsius
Salinity = parts per thousand
Redox = millivolt
Min = minimum
Mean = Average
* = reading taken from Secchi disc

Table 17. Asharoken Fish Sampling Water Quality Observations, September 2003.

Station	Date MMDDYY	Time HH:MM	Depth Meters	Temp degC	pH units	SpCond mS/cm	Sal ppt	DO mg/l	Redox mV	Turb NTU
Fish Sampling September 2003										
A1 (b)	092403	13:29	50.45	21.21	7.71	37.78	23.99	7.34	188.50	
A1 (m)	092403		24.61	21.26	7.70	37.93	24.09	6.53	175.00	
A1 (s)	092403		3.15	21.32	7.69	38.01	24.15	7.03	177.00	2.50*
A2 (b)	092403	15:19	29.51	21.23	7.75	38.07	24.19	8.33	152.40	
A2 (m)	092403		15.33	21.43	7.75	38.10	24.21	7.92	158.30	
A2 (s)	092403		1.39	21.47	7.75	38.17	24.26	7.68	162.20	2.50*
A6 (b)	092503	10:15	43.53	21.04	7.63	38.03	24.16	7.61	242.40	
A6 (m)	092503		21.84	21.07	7.63	37.99	24.14	7.64	243.60	
A6 (s)	092503		1.52	21.05	7.65	38.06	24.19	7.50	244.60	1.75*
A9 (b)	092603	9:26	36.44	20.95	7.57	38.06	24.19	8.23	170.00	
A9 (m)	092603		19.56	21.07	7.61	38.06	24.19	7.98	171.50	
A9 (s)	092603		2.31	21.06	7.64	38.06	24.19	7.85	172.80	1.75*
A13 (b)	092603	11:24	47.97	21.12	7.67	37.90	24.07	8.09	188.60	
A13 (m)	092603		22.10	21.24	7.69	38.07	24.19	7.60	191.90	
A13 (s)	092603		1.67	21.24	7.69	38.03	24.16	7.82	195.50	2.00*
Min				**20.95**	**7.57**	**37.78**	**23.99**	**6.53**	**152.40**	**1.75**
Max				**21.47**	**7.75**	**38.17**	**24.26**	**8.33**	**244.60**	**2.50**
Mean				**21.18**	**7.68**	**38.02**	**24.16**	**7.68**	**188.95**	**2.10**
SD				**0.15**	**0.05**	**0.09**	**0.07**	**0.46**	**30.76**	**0.38**
B1 (b)	092403	10:10	42.63	21.11	7.66	38.20	24.28	7.29	332.70	
B1 (s)	092403		1.18	20.96	7.68	38.24	24.31	7.60	330.10	2.00*
B6 (b)	092603	12:26	40.38	21.28	7.70	38.14	24.24	8.33	193.60	
B6 (m)	092603		15.20	21.31	7.70	38.18	24.27	8.10	197.30	
B6 (s)	092603		2.80	21.35	7.70	38.21	24.29	8.17	199.40	2.00*
B7 (b)	092603	12:55	45.68	21.23	7.69	38.17	24.26	9.08	195.50	
B7 (m)	092603		26.90	21.35	7.69	38.19	24.28	8.53	199.70	
B7 (s)	092603		1.77	21.39	7.70	38.27	24.33	8.95	202.70	2.00*
Min				**20.96**	**7.66**	**38.14**	**24.24**	**7.29**	**193.60**	**2.00**
Max				**21.39**	**7.70**	**38.27**	**24.33**	**9.08**	**332.70**	**2.00**
Mean				**21.25**	**7.69**	**38.20**	**24.28**	**8.26**	**231.38**	**2.00**
SD				**0.15**	**0.01**	**0.04**	**0.03**	**0.61**	**61.80**	**0.00**

Key:

Depth = meters
Specific Conductivity = milliSiemens per centimeter
Dissolved Oxygen = milligram per liter
Turbidity = Nephelometric turbidity unit
Max = maximum
SD = Standard deviation
Temp = Degree Celsius
Salinity = parts per thousand
Redox = millivolt
Min = minimum
Mean = Average
* = reading taken from Secchi disc

Table 18. Asharoken Fish Sampling Water Quality Observations, February 2004.

Station	Date MMDDYY	Time HH:MM	Depth Meters	Temp degC	pH units	SpCond mS/cm	Sal ppt	DO mg/l	Redox mV	Turb NTU
Fish Sampling February 2004										
A7 (b)	021904	11:00	42.15	-0.16	8.09	24.37	14.76	11.07	152.40	15.20
A7 (m)	021904		19.91	-0.16	8.18	24.41	14.78	10.82	150.70	12.10
A7 (s)	021904		2.25	-0.11	8.20	24.40	14.78	11.08	150.20	12.20
A13 (b)	021904	15:15	38.67	-0.13	8.21	24.16	14.62	7.48	241.60	15.20
A13 (m)	021904		20.87	-0.12	8.30	24.21	14.65	9.33	235.10	12.00
A13 (s)	021904		2.38	-0.10	8.31	24.26	14.68	8.34	231.40	11.70
Min				**-0.16**	**8.09**	**24.16**	**14.62**	**7.48**	**150.20**	**11.70**
Max				**-0.10**	**8.31**	**24.41**	**14.78**	**11.08**	**241.60**	**15.20**
Mean				**-0.13**	**8.22**	**24.30**	**14.71**	**9.69**	**193.57**	**13.07**
SD				**0.03**	**0.08**	**0.11**	**0.07**	**1.55**	**46.64**	**1.66**
B5 (b)	021904	9:09	37.91	-0.35	8.01	20.09	11.95	13.62	252.40	11.20
B5 (m)	021904		14.81	-0.33	8.07	20.49	12.21	11.95	248.00	11.90
B5 (s)	021904		2.86	-0.31	8.10	20.73	12.36	11.36	245.80	12.10
B7 (b)	021904	10:18	36.01	-0.34	8.13	24.12	14.59	10.70	174.80	10.10
B7 (m)	021904		20.02	-0.33	8.18	24.13	14.60	10.95	171.90	10.40
B7 (s)	021904		1.60	-0.30	8.20	24.12	14.59	11.64	169.90	10.60
Min				**-0.35**	**8.01**	**20.09**	**11.95**	**10.70**	**169.90**	**10.10**
Max				**-0.30**	**8.20**	**24.13**	**14.60**	**13.62**	**252.40**	**12.10**
Mean				**-0.33**	**8.12**	**22.28**	**13.38**	**11.70**	**210.47**	**11.05**
SD				**0.02**	**0.07**	**2.03**	**1.33**	**1.04**	**42.00**	**0.82**

Key:

Depth = meters
Specific Conductivity = milliSiemens per centimeter
Dissolved Oxygen = milligram per liter
Turbidity = Nephelometric turbidity unit
Max = maximum
SD = Standard deviation
Temp = Degree Celsius
Salinity = parts per thousand
Redox = millivolt
Min = minimum
Mean = Average

Note:

- Water quality was not collected on February 18, 2004 because of a faulty meter that could not be replaced until the following day.

Table 19. Asharoken Benthic Sampling Water Quality Observations, May 2004.

Station	Date MMDDYY	Time HHMMSS	Depth Meters	Temp degC	pH units	SpCond mS/cm	Sal ppt	DO mg/l	Redox mV	Turb NTU
A1 (b)	051304	9:38	14.33	11.20	8.16	29.68	18.34	12.41	131.00	3.10
A1 (m)	051304			11.37	8.20	30.11	18.63	11.95	123.20	2.40
A1 (s)	051304			11.99	8.21	30.26	18.74	12.01	120.00	2.30
A20 (b)	051304	11:48	10.36	10.27	8.20	29.23	18.03	12.51	156.00	3.00
A20 (m)	051304			10.87	8.23	29.91	18.50	11.85	155.60	2.30
A20 (s)	051304			12.23	8.23	30.57	18.95	11.76	155.30	2.20
A18 (b)	051304	13:05	9.14	10.98	8.20	29.16	17.98	12.53	197.10	3.90
A18 (m)	051304			11.47	8.25	30.12	18.64	11.15	192.00	2.40
A18 (s)	051304			12.05	8.25	30.98	19.23	11.55	189.70	2.00
Min				**10.27**	**8.16**	**29.16**	**17.98**	**11.15**	**120.00**	**2.00**
Max				**12.23**	**8.25**	**30.98**	**19.23**	**12.53**	**197.10**	**3.90**
Mean				**11.38**	**8.21**	**30.00**	**18.56**	**11.97**	**157.77**	**2.62**
SD				**0.64**	**0.03**	**0.59**	**0.40**	**0.46**	**29.77**	**0.60**
B11 (b)	051404	9:00	11.58	9.51	8.09	28.45	17.50	12.04	150.70	3.00
B11 (m)	051404			9.66	8.18	29.14	17.97	10.81	146.10	2.70
B11 (s)	051404			11.07	8.20	29.88	18.48	11.07	143.40	2.30
B2 (b)	051404	10:52	13.11	9.26	8.14	28.40	17.47	12.67	140.20	3.70
B2 (m)	051404			9.19	8.18	28.78	17.73	11.07	132.20	2.70
B2 (s)	051404			11.45	8.22	29.83	18.44	10.78	128.00	2.70
Min				**9.19**	**8.09**	**28.40**	**17.47**	**10.78**	**128.00**	**2.30**
Max				**11.45**	**8.22**	**29.88**	**18.48**	**12.67**	**150.70**	**3.70**
Mean				**10.02**	**8.17**	**29.08**	**17.93**	**11.41**	**140.10**	**2.85**
SD				**0.98**	**0.05**	**0.66**	**0.45**	**0.77**	**8.58**	**0.47**

Key:

Depth = meters
Specific Conductivity = milliSiemens per centimeter
Dissolved Oxygen = milligram per liter
Turbidity = Nephelometric turbidity unit
Max = maximum
SD = Standard deviation
Temp = Degree Celsius
Salinity = parts per thousand
Redox = millivolt
Min = minimum
Mean = Average

Table 20. Asharoken Fish Sampling Water Quality Observations, May 2004.

Station	Date MMDDYY	Time HHMMSS	Depth Meters	Temp degC	pH units	SpCond mS/cm	Sal ppt	DO mg/l	Redox mV	Turb NTU
A1 (b)	051104	9:55	11.89	9.09	8.07	28.54	17.56	11.51	151.30	52.90
A1 (m)	051104			9.40	8.12	28.77	17.72	11.20	144.70	4.90
A1 (s)	051104			10.05	8.15	29.18	18.00	11.29	140.90	3.50
A7 (b)	051104	13:59	12.19	9.01	8.11	28.50	17.54	12.78	120.50	1072.10
A7 (m)	051104			9.03	8.10	28.53	17.56	11.30	118.10	3.40
A7 (s)	051104			11.82	8.17	30.73	19.06	11.05	115.50	3.50
A8 (b)	051204	11:59	12.19	9.50	8.18	28.89	17.80	13.61	147.20	3.20
A8 (m)	051204			10.25	8.20	29.15	17.98	12.03	141.70	2.60
A8 (s)	051204			12.89	8.24	31.09	19.31	11.62	138.00	2.00
A11 (b)	051204	14:35	11.28	9.39	8.17	28.81	17.75	11.92	169.40	22.80
A11 (m)	051204			9.45	8.16	28.75	17.71	11.28	164.40	4.90
A11 (s)	051204			12.13	8.26	30.69	19.03	11.59	159.30	2.00
Min				**9.01**	**8.07**	**28.50**	**17.54**	**11.05**	**115.50**	**2.00**
Max				**12.89**	**8.26**	**31.09**	**19.31**	**13.61**	**169.40**	**1072.10**
Mean				**10.17**	**8.16**	**29.30**	**18.08**	**11.77**	**142.58**	**98.15**
SD				**1.35**	**0.06**	**0.95**	**0.65**	**0.75**	**17.64**	**307.07**
B5 (b)	051104	14:52	11.58	9.95	8.15	28.92	17.82	12.91	179.70	2.10
B5 (m)	051104			11.24	8.26	29.99	18.55	11.76	173.10	1.90
B5 (s)	051104			11.85	8.26	30.40	18.83	12.52	170.70	2.10
B7 (b)	051104	15:56	9.14	9.33	8.15	28.84	17.77	15.05	152.00	4.00
B7 (m)	051104			10.29	8.12	28.76	17.71	12.72	142.30	2.50
B7 (s)	051104			12.66	8.26	30.75	19.07	12.03	136.30	2.00
B1 (b)	051204	9:12	14.02	8.74	8.06	28.34	17.43	11.93	159.60	3.00
B1 (m)	051204			10.47	8.24	29.78	18.41	11.03	148.10	2.20
B1 (s)	051204			13.94	8.25	32.02	19.95	11.43	141.90	1.40
B4 (b)	051204	11:23	9.75	8.92	8.13	28.57	17.58	16.30	129.70	16.00
B4 (m)	051204			9.07	8.14	28.47	17.51	11.96	121.90	5.60
B4 (s)	051204			12.06	8.26	31.08	19.30	10.86	115.80	2.10
Min				**8.74**	**8.06**	**28.34**	**17.43**	**10.86**	**115.80**	**1.40**
Max				**13.94**	**8.26**	**32.02**	**19.95**	**16.30**	**179.70**	**16.00**
Mean				**10.71**	**8.19**	**29.66**	**18.33**	**12.54**	**147.59**	**3.74**
SD				**1.65**	**0.07**	**1.20**	**0.82**	**1.61**	**20.36**	**4.03**

Key:

Depth = meters
Specific Conductivity = milliSiemens per centimeter
Dissolved Oxygen = milligram per liter
Turbidity = Nephelometric turbidity unit
Max = maximum
SD = Standard deviation
Temp = Degree Celsius
Salinity = parts per thousand
Redox = millivolt
Min = minimum
Mean = Average

Table 21. Asharoken Fish Sampling Water Quality Observations, July 2004.

Station	Date MMDDYY	Time HHMMSS	Depth Meters	Temp degC	pH units	SpCond mS/cm	Sal ppt	DO mg/l	Redox mV	Turb NTU
A1 (b)	070704	10:11	5.12	17.75	7.77	34.35	21.57	9.51	338.40	1.20
A1 (m)	070704		2.19	18.42	7.86	35.01	22.03	8.82	337.10	0.70
A1 (s)	070704	10:13	0.46	19.19	7.91	35.74	22.55	10.33	337.10	0.50
A7 (b)	070704	13:57	12.86	17.15	7.07	35.06	22.07	8.17	312.00	11.10
A7 (m)	070704		6.58	17.26	7.03	35.06	22.07	7.39	345.80	2.40
A7 (s)	070704	13:59	0.83	19.90	7.32	36.81	23.30	7.45	358.20	0.70
A8 (b)	070804	11:29	7.06	16.87	7.68	34.54	21.70	9.06	249.60	2.30
A8 (m)	070804		4.30	17.01	7.64	34.53	21.70	8.01	253.00	2.20
A8 (s)	070804	11:29	0.77	19.25	7.81	35.43	22.33	7.36	259.60	0.80
Min				**16.87**	**7.03**	**34.35**	**21.57**	**7.36**	**249.60**	**0.50**
Max				**19.90**	**7.91**	**36.81**	**23.30**	**10.33**	**358.20**	**11.10**
Mean				**18.09**	**7.57**	**35.17**	**22.15**	**8.46**	**310.09**	**2.43**
SD				**1.13**	**0.34**	**0.76**	**0.53**	**1.05**	**43.76**	**3.34**
B1 (b)	070704	14:33	14.35	19.95	7.99	36.40	23.01	11.28	182.90	10.80
B1 (m)	070704		6.72	20.38	7.99	36.61	23.16	10.86	200.20	3.60
B1 (s)	070704	14:35	0.42	20.82	8.00	37.17	23.55	10.50	212.20	0.20
B3 (b)	070704	16:03	10.08	16.82	7.73	34.34	21.56	8.69	294.30	0.70
B3 (m)	070704		4.82	17.71	7.86	35.30	22.24	7.82	301.30	0.60
B3 (s)	070704	16:05	1.42	21.02	7.98	37.67	23.91	8.37	304.10	0.20
B4 (b)	070804	9:16	9.25	17.10	7.69	33.92	21.27	11.43	280.00	1.80
B4 (m)	070804		4.62	18.37	7.75	34.46	21.65	10.74	284.50	1.00
B4 (s)	070804	9:17	0.52	19.53	7.84	35.94	22.69	9.25	285.70	0.80
B7 (b)	070804	10:53	9.57	16.84	7.67	34.41	21.61	8.21	226.60	3.10
B7 (m)	070804		5.80	17.19	7.65	34.55	21.71	7.49	235.80	1.90
B7 (s)	070804	10:55	0.86	19.33	7.88	35.92	22.67	8.46	236.80	0.70
Min				**16.82**	**7.65**	**33.92**	**21.27**	**7.49**	**182.90**	**0.20**
Max				**21.02**	**8.00**	**37.67**	**23.91**	**11.43**	**304.10**	**10.80**
Mean				**18.76**	**7.84**	**35.56**	**22.42**	**9.43**	**253.70**	**2.12**
SD				**1.60**	**0.13**	**1.24**	**0.87**	**1.44**	**42.70**	**2.94**

Key:

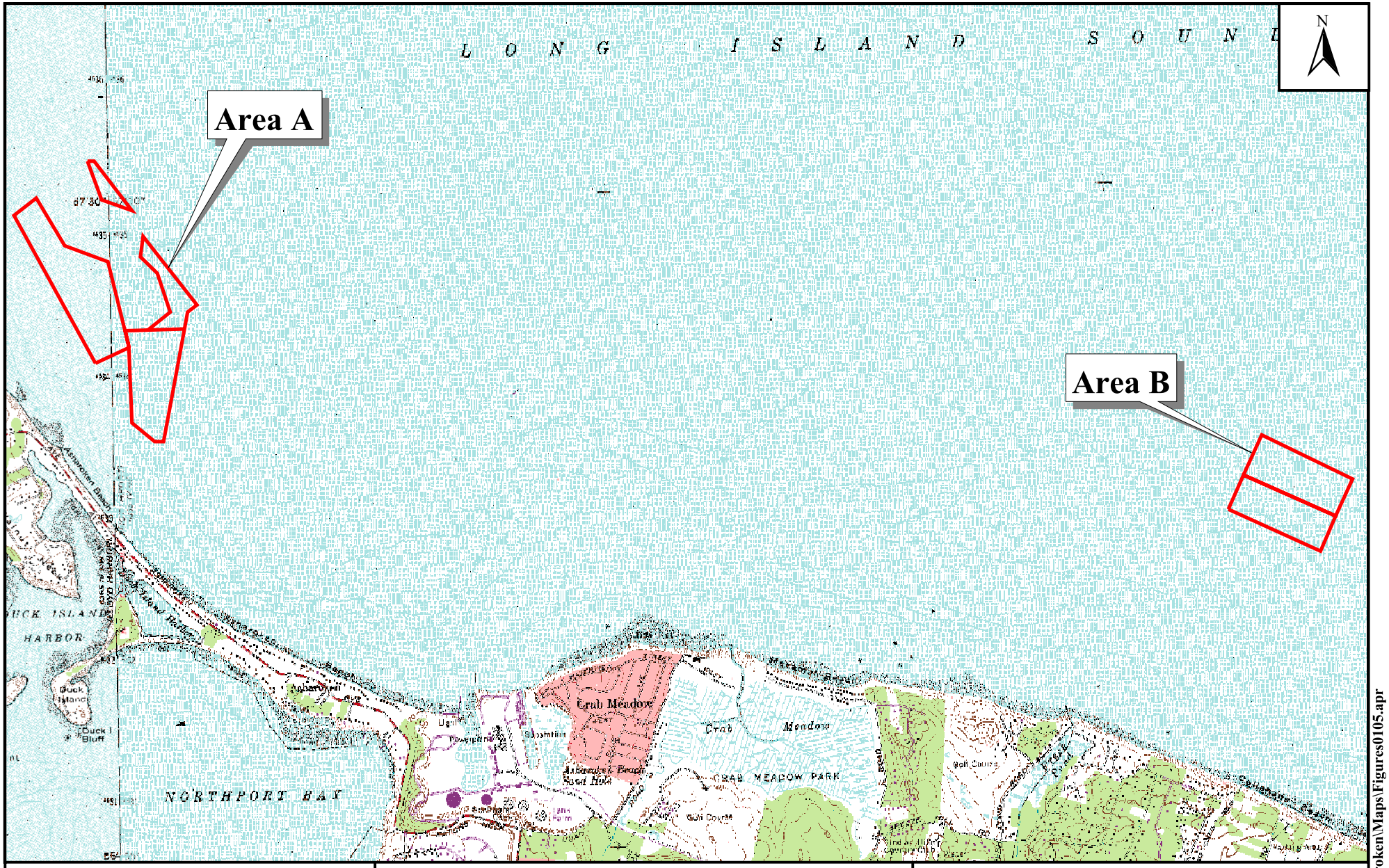
Depth = meters
Temp = Degree Celsius
Specific Conductivity = milliSiemens per centimeter
Salinity = parts per thousand
Dissolved Oxygen = milligram per liter
Redox = millivolt
Turbidity = Nephelometric turbidity unit
Min = minimum
Max = maximum
Mean = Average
SD = Standard deviation

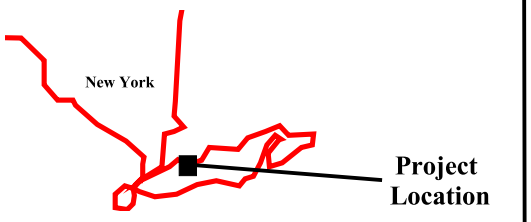
Table 22. Statistical Analysis for Fish Variable Comparisons at Asharoken.

September 2003	**Overall Species Richness**				
	Area	n	x	SD	P-Value
	A	12	4.75	2.14	0.58
	B	7	5.42	3.05	
	EFH Species Richness				
	Area	n	x	SD	P-Value
	A	12	1.00	0.85	1.00
	B	7	1.00	1.15	
	EFH Species Count				
	Area	n	x	SD	P-Value
	A	12	15	32.52	0.32
	B	7	2.28	3.59	
February 2004	**Overall Species Richness**				
	Area	n	x	SD	P-Value
	A	9	2.56	1.24	0.26
	B	7	3.43	1.72	
	EFH Species Richness				
	Area	n	x	SD	P-Value
	A	9	0.44	0.53	0.01
	B	7	1.43	0.79	
	EFH Species Count				
	Area	n	x	SD	P-Value
	A	9	1.11	1.54	0.33
	B	7	1.86	1.35	
May 2004	**Overall Species Richness**				
	Area	n	x	SD	P-Value
	A	10	9.80	1.75	0.16
	B	7	8.14	2.85	
	EFH Species Richness				
	Area	n	x	SD	P-Value
	A	10	3.50	0.53	0.02
	B	7	2.71	0.76	
	EFH Species Count				
	Area	n	x	SD	P-Value
	A	10	36.30	17.71	0.16
	B	7	24.29	15.37	
July 2004	**Overall Species Richness**				
	Area	n	x	SD	P-Value
	A	8	7.13	2.23	0.57
	B	7	8.00	3.56	
	EFH Species Richness				
	Area	n	x	SD	P-Value
	A	8	2.25	0.87	0.72
	B	7	2.43	0.99	
	EFH Species Count				
	Area	n	x	SD	P-Value
	A	8	9.88	5.61	0.99
	B	7	9.86	9.59	

Table 23. Statistical Analysis for Benthic Invertebrate Richness at Asharoken.

Benthic Invertebrate Richness	**2003**				
	Area	n	x	SD	P-Value
	A	35	17.14	4.45	0.65
	B	15	17.87	6.49	
	2004				
	Area	n	x	SD	P-Value
	A	35	20.54	5.74	0.75
	B	15	19.93	6.83	
	2003/2004				
	Area	n	x	SD	P-Value
	A	70	18.84	5.61	0.97
	B	30	18.90	9.59	





Source: USGS 7.5 Minute Topographic Quadrangles, Lloyd Harbor, 1967, and Northport, 1967, Photorevised 1979.

1000 0 1000 2000 Meters

3000 0 3000 6000 Feet

Figure 1. Borrow Area Locations (2003/2004) for the Asharoken Borrow Area Investigation, Asharoken, New York.

Prepared By: U. S. Army Corps of Engineers, New York District

Date: 09/05

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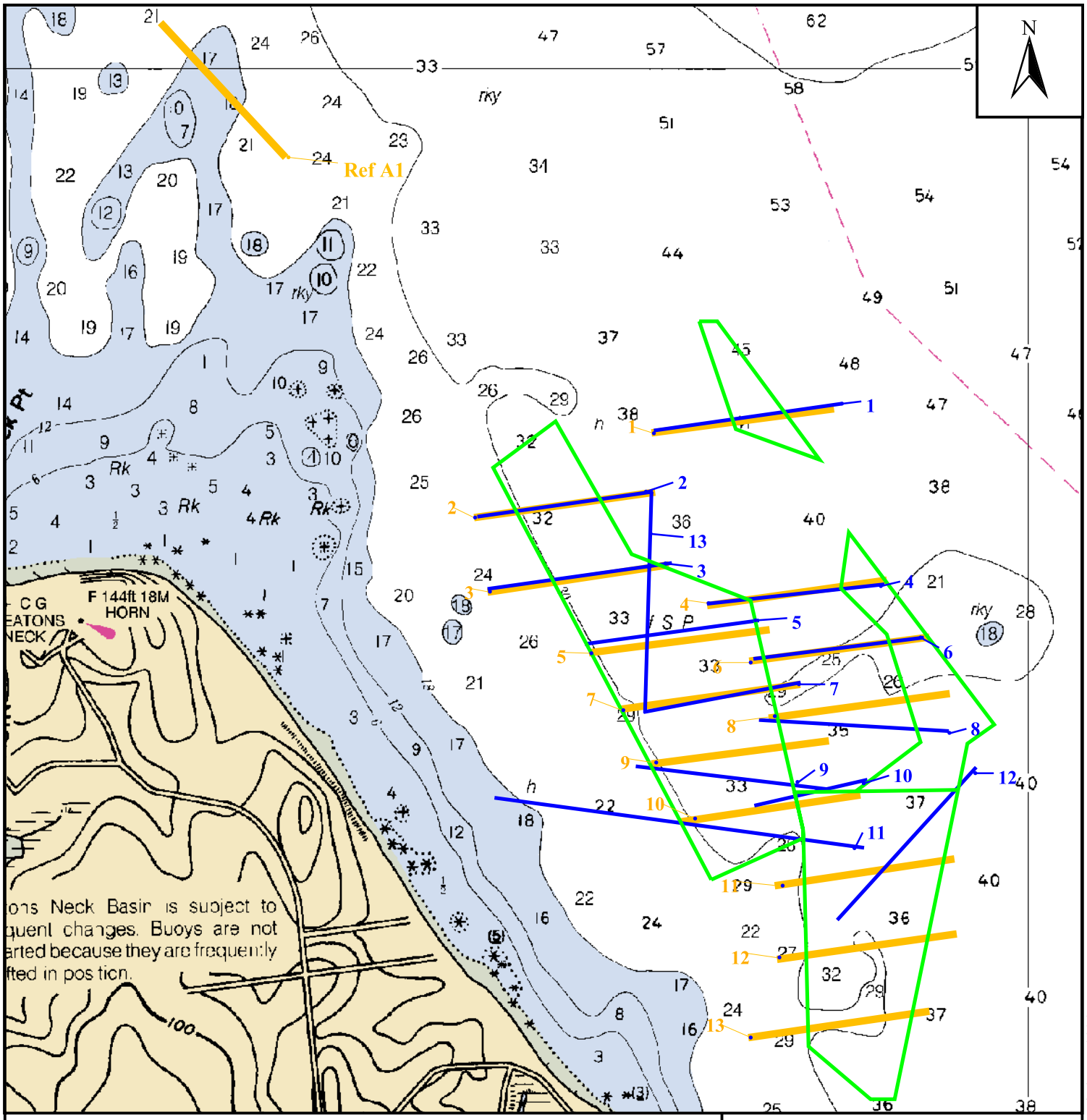

300 0 300 600 Meters

900 0 900 1800 Feet

LEGEND

Area A Boundary

Event 1 Trawl - September 2003

Event 2 Trawl - February 2004

Figure 2. Trawl Locations in Borrow Area A of the Asharoken Borrow Area Investigation (2003), Asharoken, New York.

Source: NOAA Charts 12364_20, 12364_21, and 12365_1, Maptech, Inc., 1998.

Prepared By: U. S. Army Corps of Engineers, New York District

Date: 09/05

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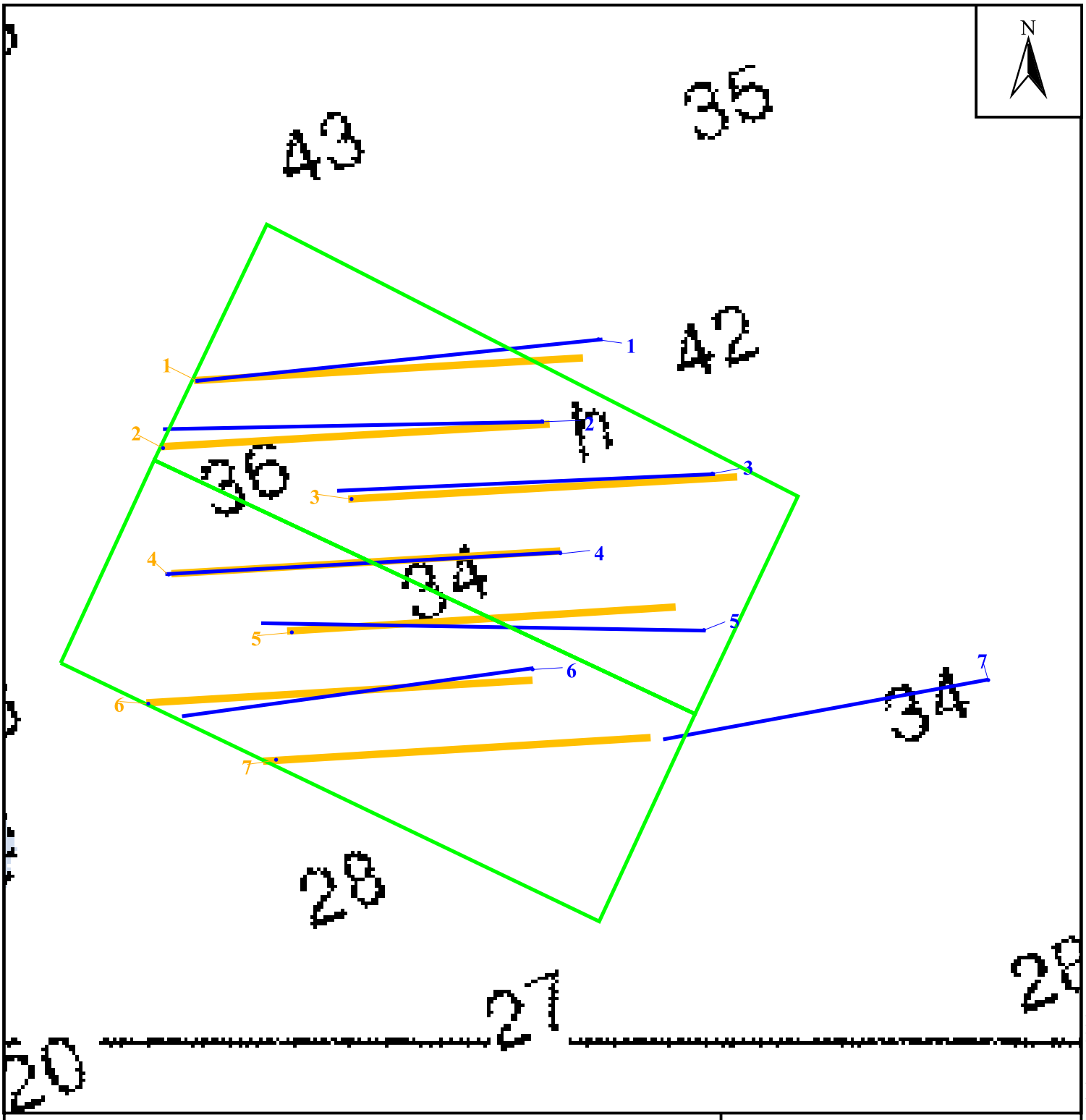

100 0 100 200 300 Meters

400 0 400 800 Feet

LEGEND

Area B Boundary

Event 1 Trawl - September 2003

Event 2 Trawl - February 2004

Source: NOAA Charts 12364_20, 12364_21, and 12365_1, Maptech, Inc., 1998.

Figure 3. Trawl Locations in Borrow Area B of the Asharoken Borrow Area Investigation (2003), Asharoken, New York.

Prepared By: U. S. Army Corps of Engineers, New York District

Date: 09/05

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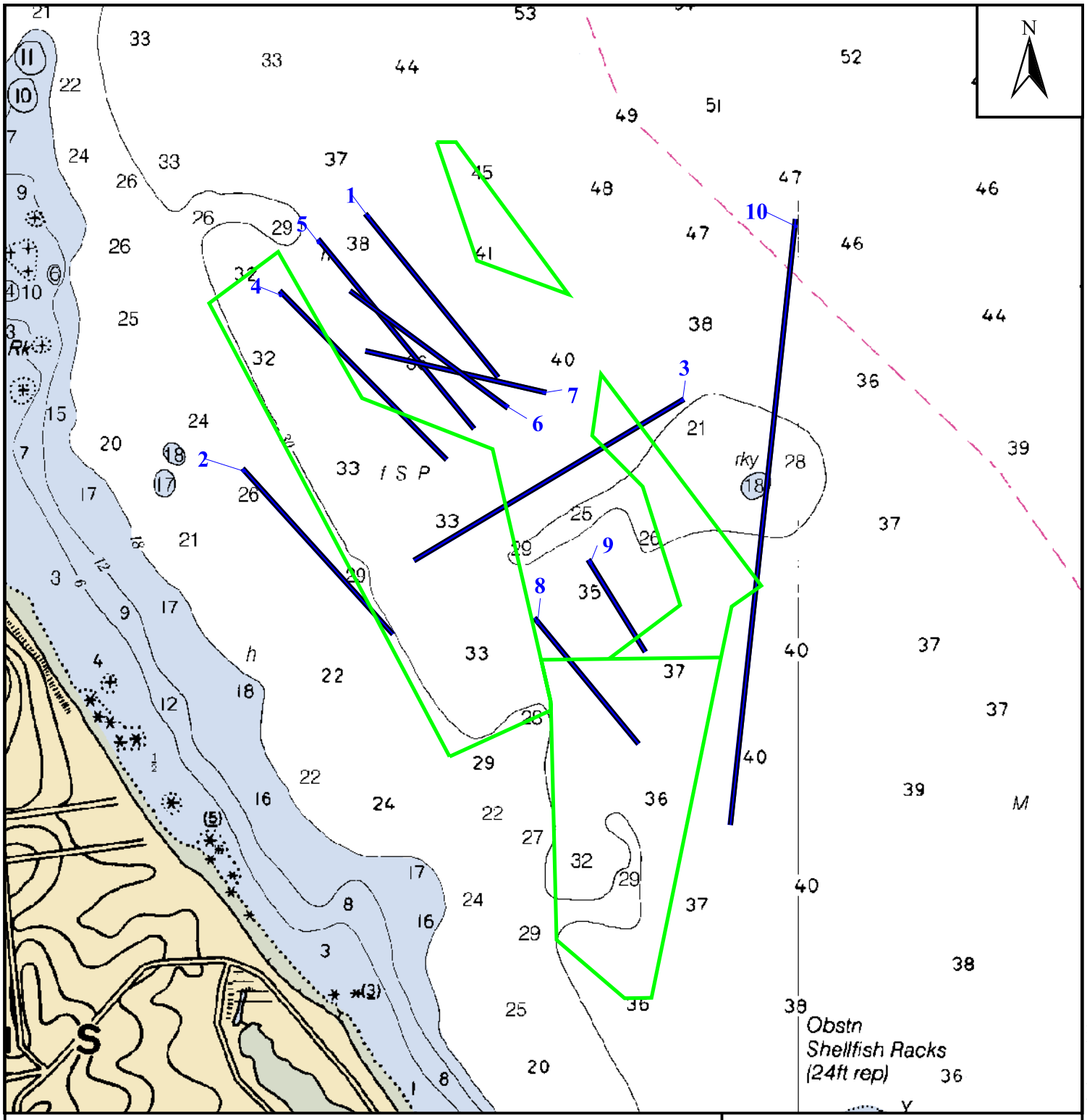

300 0 300 600 Meters

900 0 900 1800 Feet

LEGEND

Area A Boundary

Event 1 and 2 Trawl - May and July 2004

Figure 4. Trawl Locations in Borrow Area A of the Asharoken Borrow Area Investigation (2004), Asharoken, New York.

Source: NOAA Charts 12364_20, 12364_21, and 12365_1, Maptech, Inc., 1998.

Prepared By: U. S. Army Corps of Engineers, New York District

Date: 09/05

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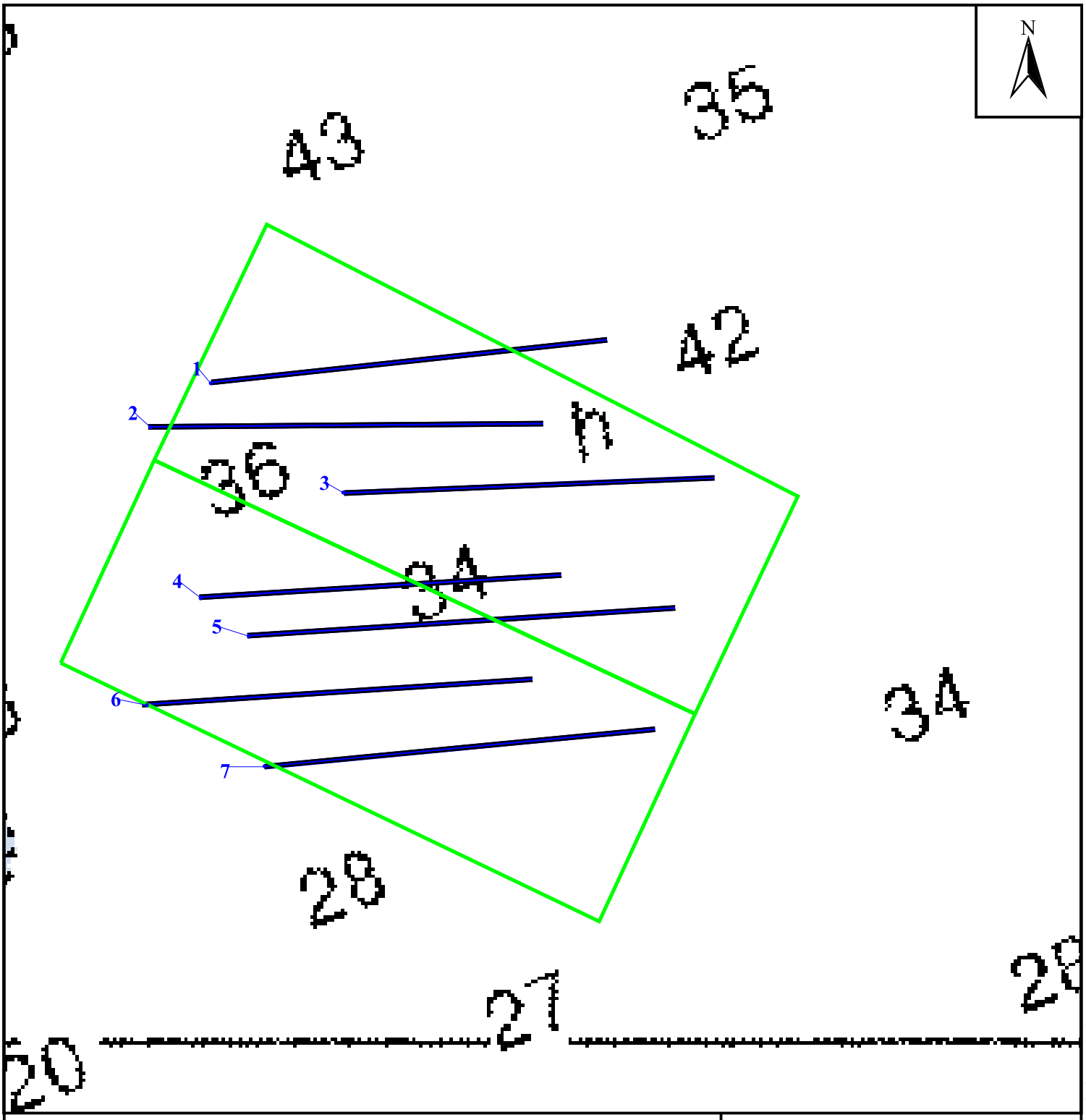

100 0 100 200 300 Meters

400 0 400 800 Feet

LEGEND

Area B Boundary

Event 1 and 2 Trawl - May and July 2004

Figure 5. Trawl Locations in Borrow Area B of the Asharoken Borrow Area Investigation (2004), Asharoken, New York.

Source: NOAA Charts 12364_20, 12364_21, and 12365_1, Maptech, Inc., 1998.

Prepared By: U. S. Army Corps of Engineers, New York District

Date: 09/05

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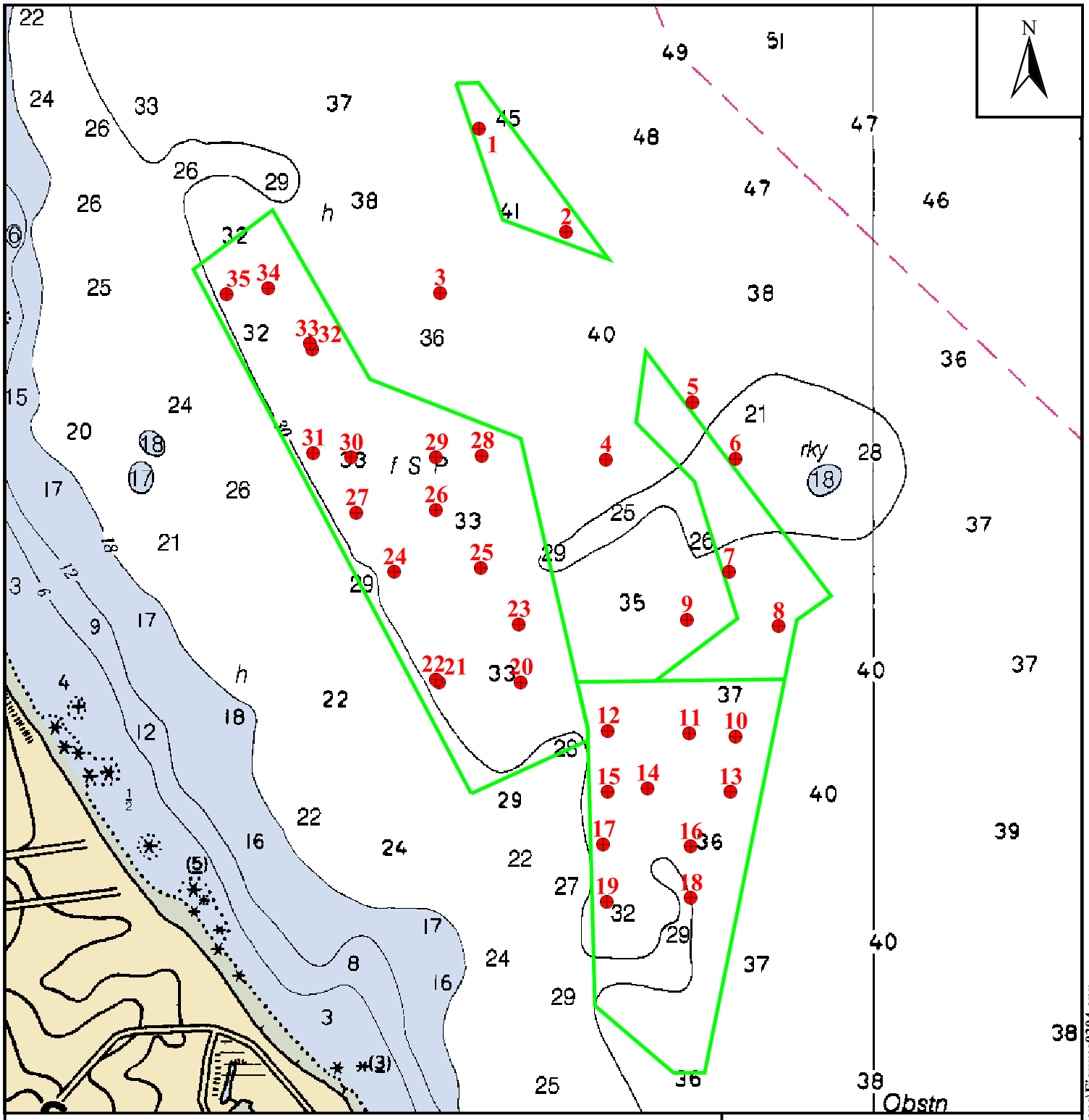

200 0 200 400 Meters

600 0 600 1200 Feet

LEGEND

Area A Boundary

Grab Locations - September 2003

Source: NOAA Charts 12364_20, 12364_21, and 12365_1, Maptech, Inc., 1998.

Figure 6. Benthic Grab Locations in Borrow Area A of the Asharoken Borrow Area Investigation (2003), Asharoken, New York.

Prepared By: U. S. Army Corps of Engineers, New York District

Date: 09/05

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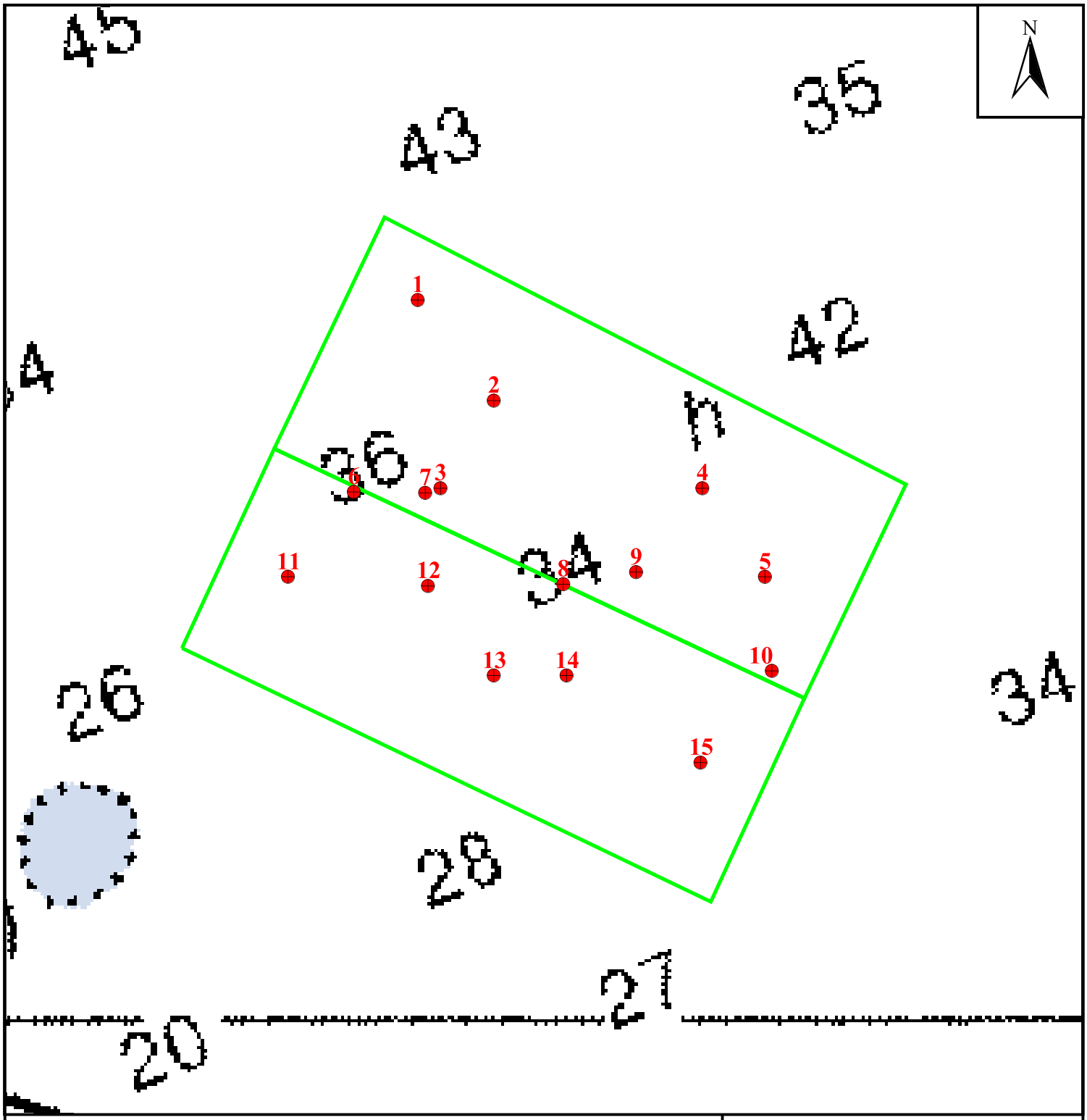

Figure 7. Benthic Grab Locations in Borrow Area B of the Asharoken Borrow Area Investigation (2003), Asharoken, New York.

Source: NOAA Charts 12364_20, 12364_21, and 12365_1, Maptech, Inc., 1998.

Prepared By: U. S. Army Corps of Engineers, New York District

Date: 09/05

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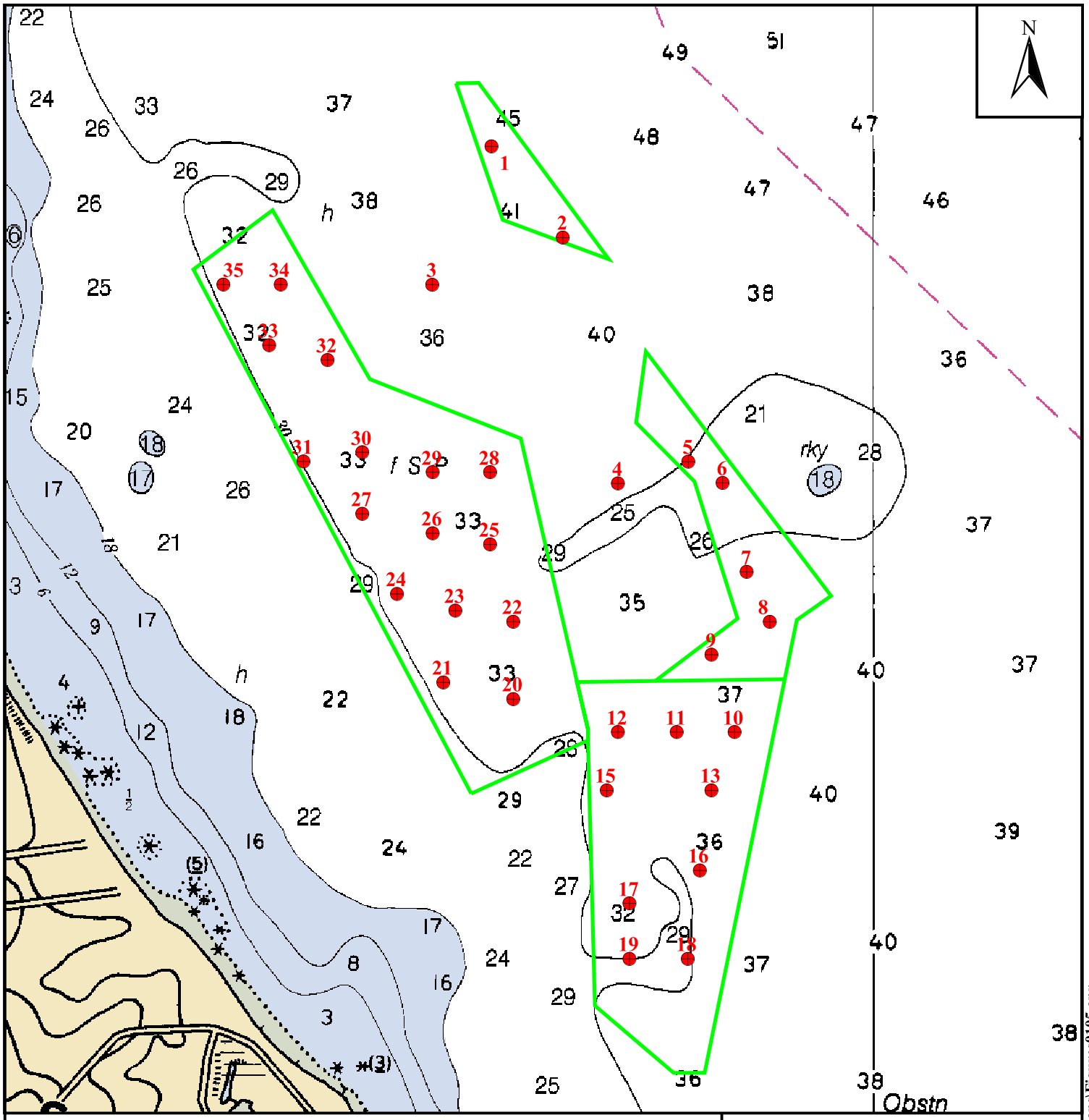

Figure 8. Benthic Grab Locations in Borrow Area A of the Asharoken Borrow Area Investigation (2004), Asharoken, New York.

Source: NOAA Charts 12364_20, 12364_21, and 12365_1, Maptech, Inc., 1998.

Prepared By: U. S. Army Corps of Engineers, New York District

Date: 09/05

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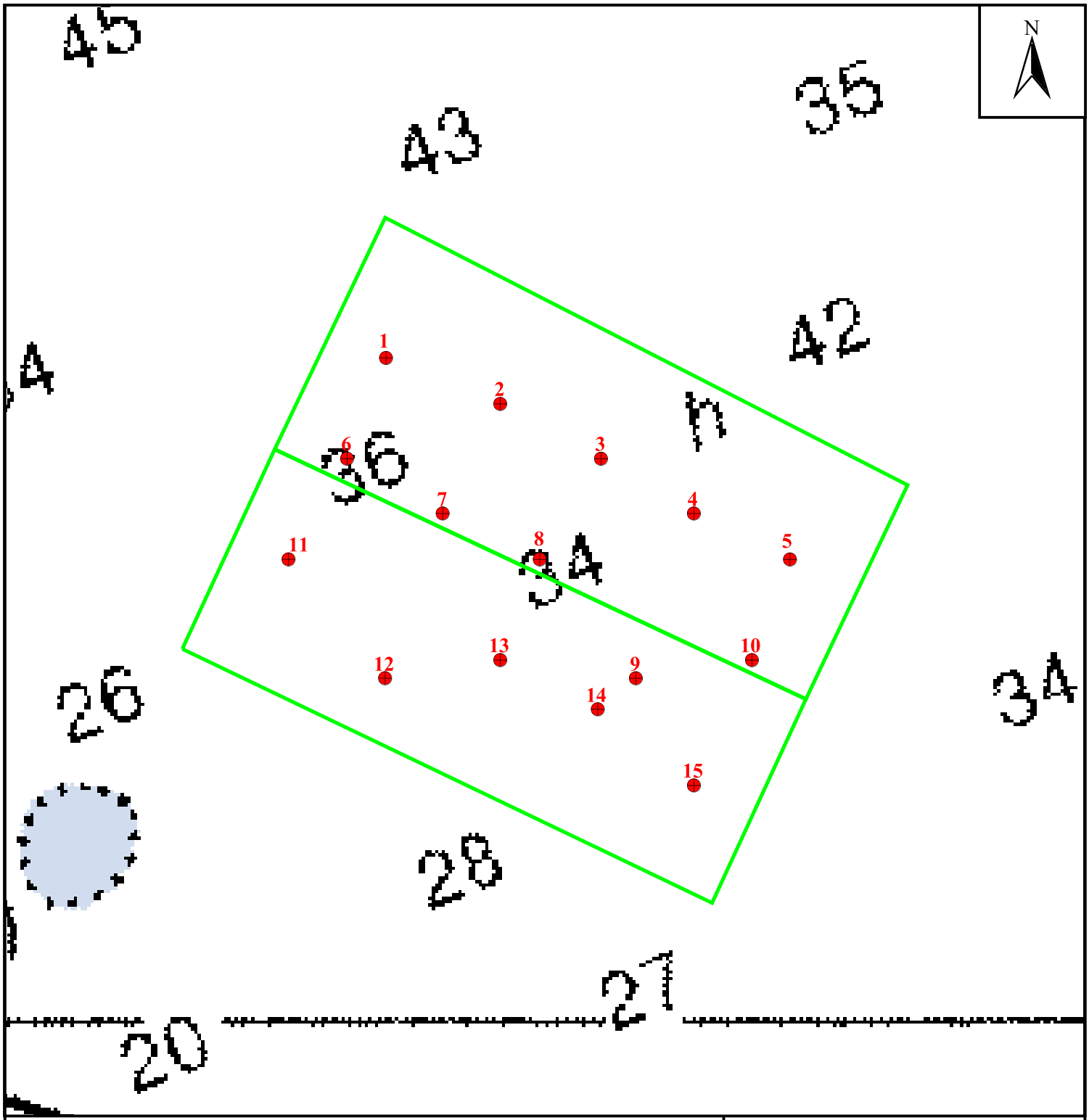


100 0 100 200 300 Meters

300 0 300 600 900 Feet

LEGEND

Area A Boundary

Grab Location - May 2004

Source: NOAA Charts 12364_20, 12364_21, and 12365_1, Maptech, Inc., 1998.

Figure 9. Benthic Grab Locations in Borrow Area B of the Asharoken Borrow Area Investigation (2004), Asharoken, New York.

Prepared By: U. S. Army Corps of Engineers, New York District

Date: 09/05

Z:\projects\CU-400-DO52Asharoken\Maps\Figures0105.apr

Figure 10. Species Diversity at Both Asharoken Borrow Areas Combined by Month.

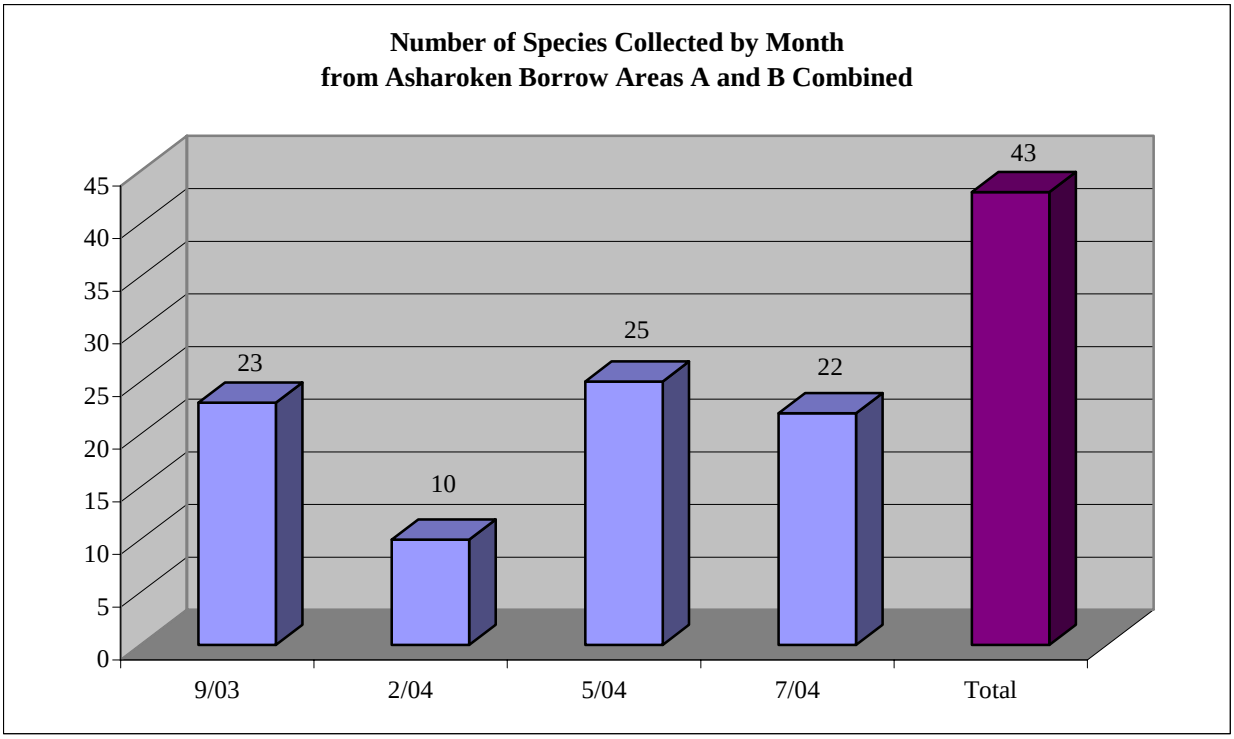


Figure 11. Comparison of Species Diversity Between Asharoken Borrow Areas A and B by Month.

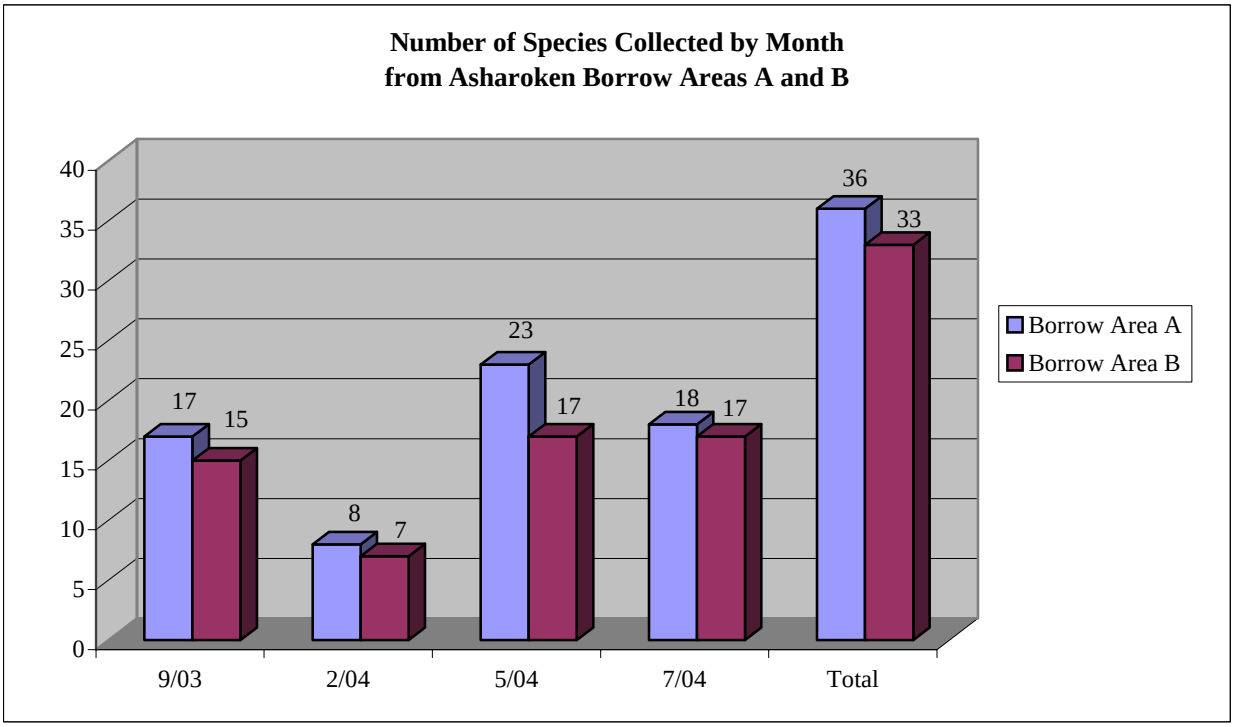
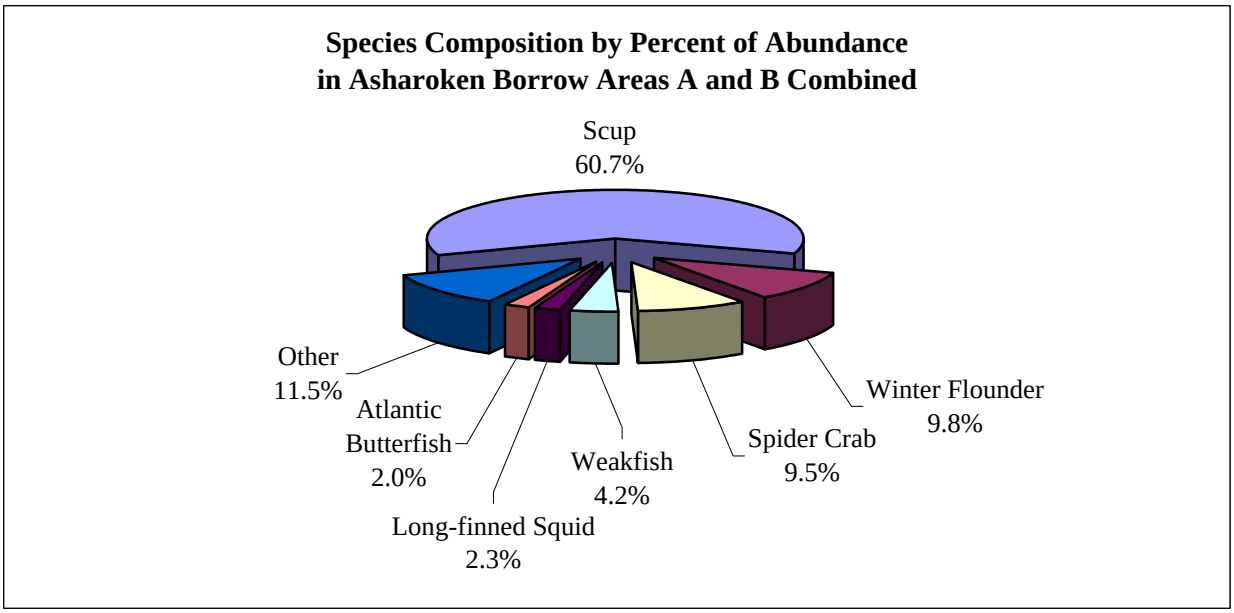


Figure 12. Species Composition by Percent of Abundance in Both Asharoken Borrow Areas Combined.



Note:

- Though not included in the analysis, bay anchovy accounted for 90.0% of the total number of individual organisms collected.

Figure 13. Species Composition by Percent of Abundance in Asharoken Borrow Area A.

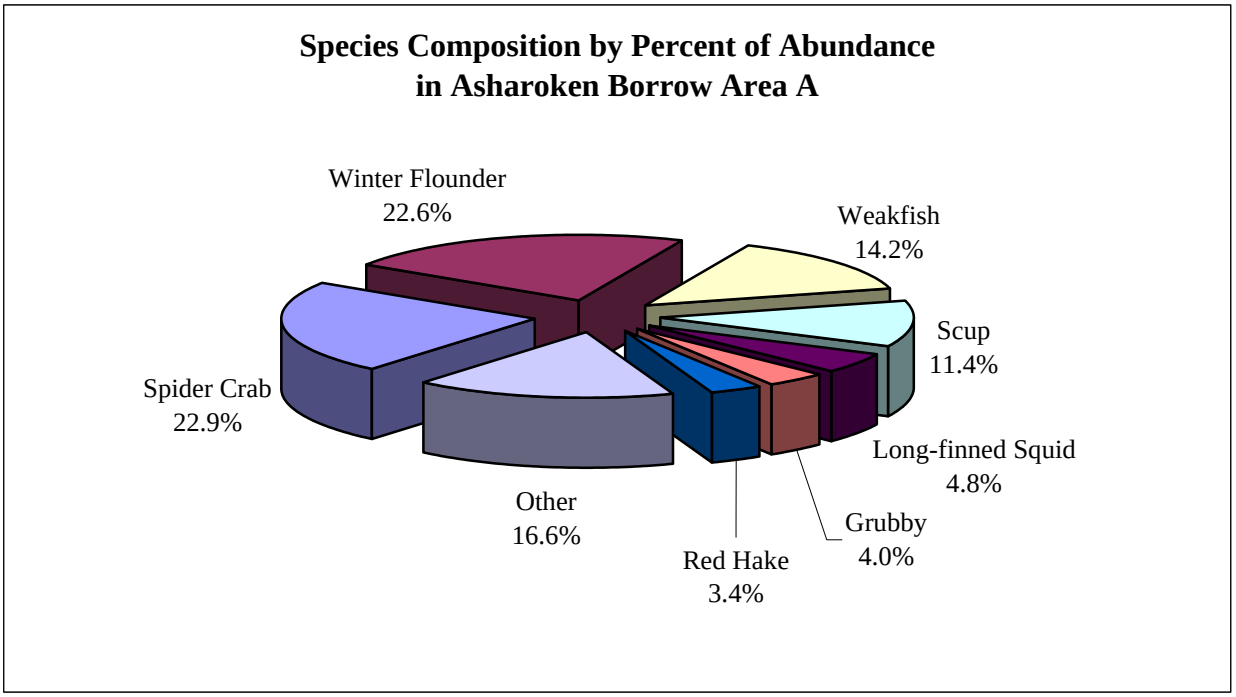


Figure 14. Species Composition by Percent of Abundance in Asharoken Borrow Area B.

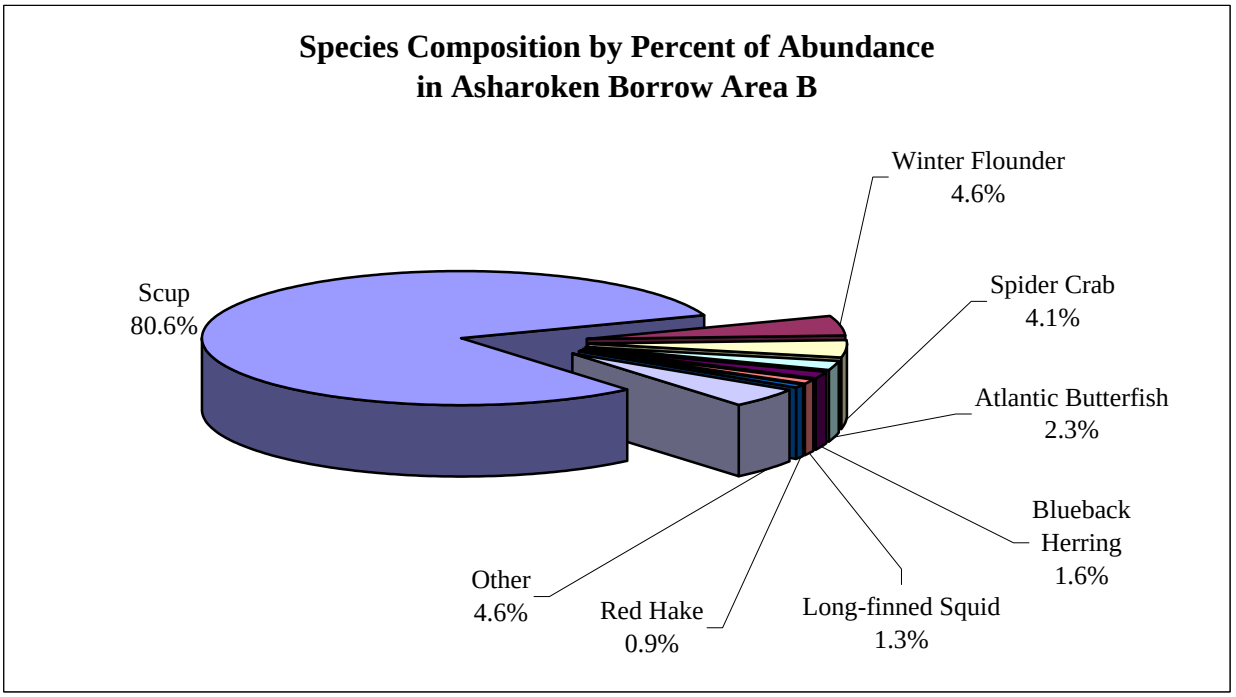


Figure 15. Percent of Total Biomass by Species During All Sampling Events.

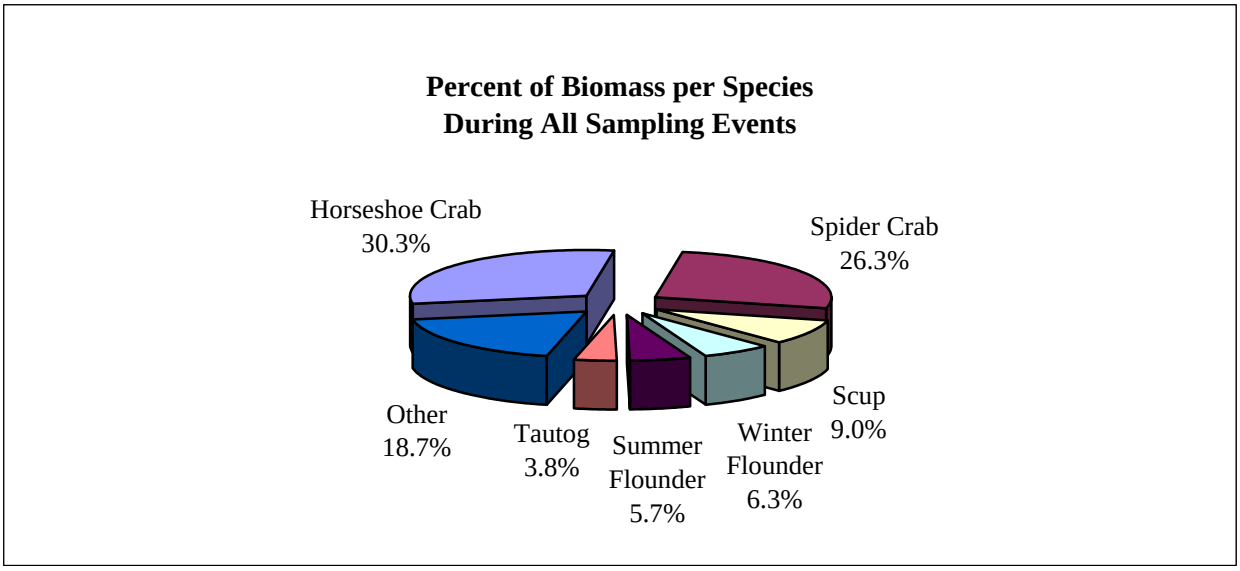


Figure 16A. Percent of Total Biomass by Species During the September 2003 Sampling Event.

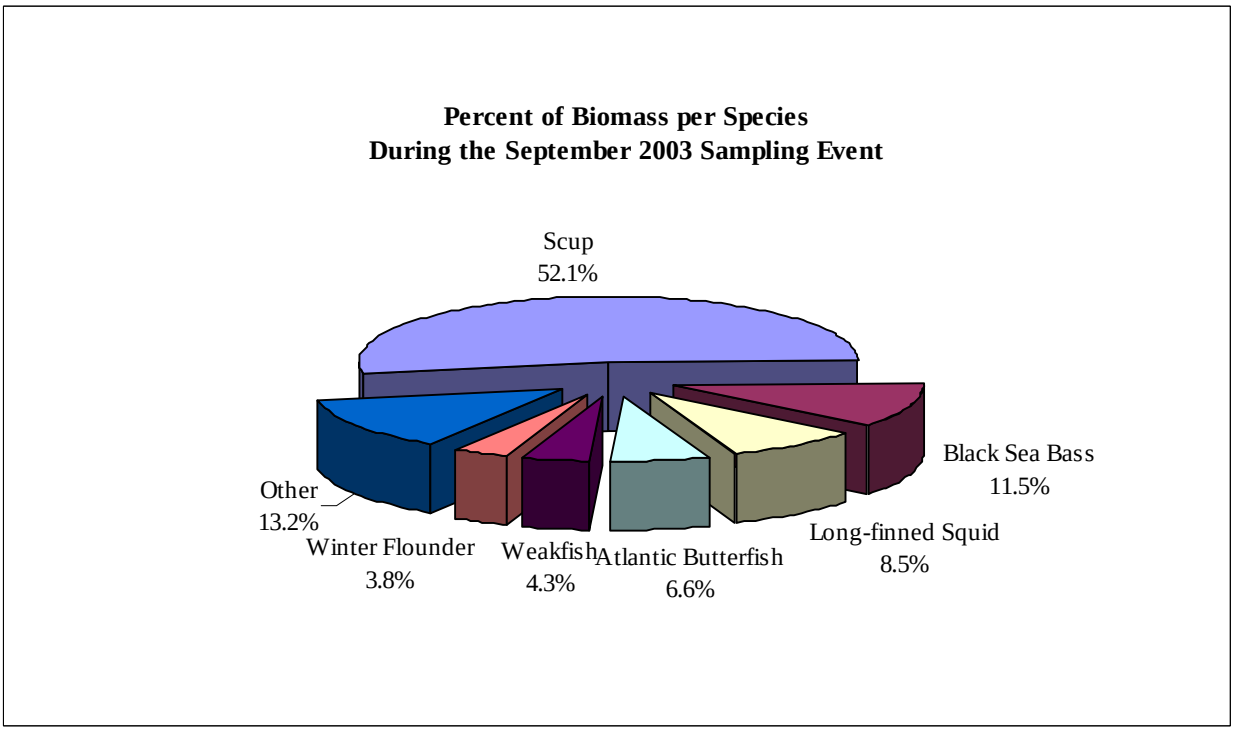


Figure 16B. Percent of Total Biomass by Species During the February 2004 Sampling Event.

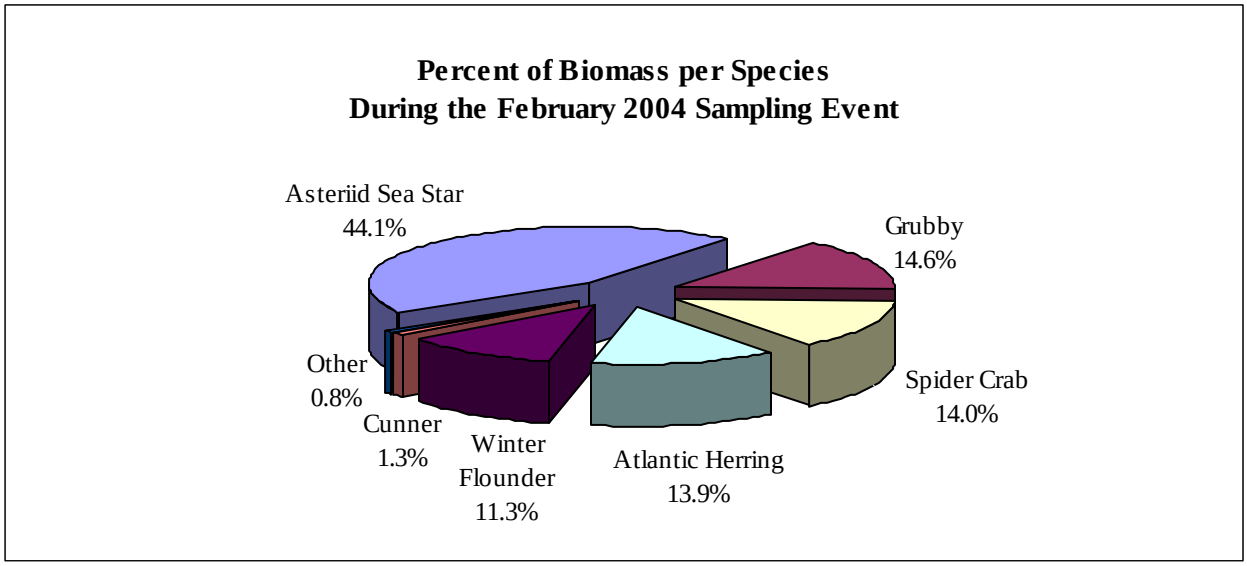


Figure 16C. Percent of Total Biomass by Species During the May 2004 Sampling Event..

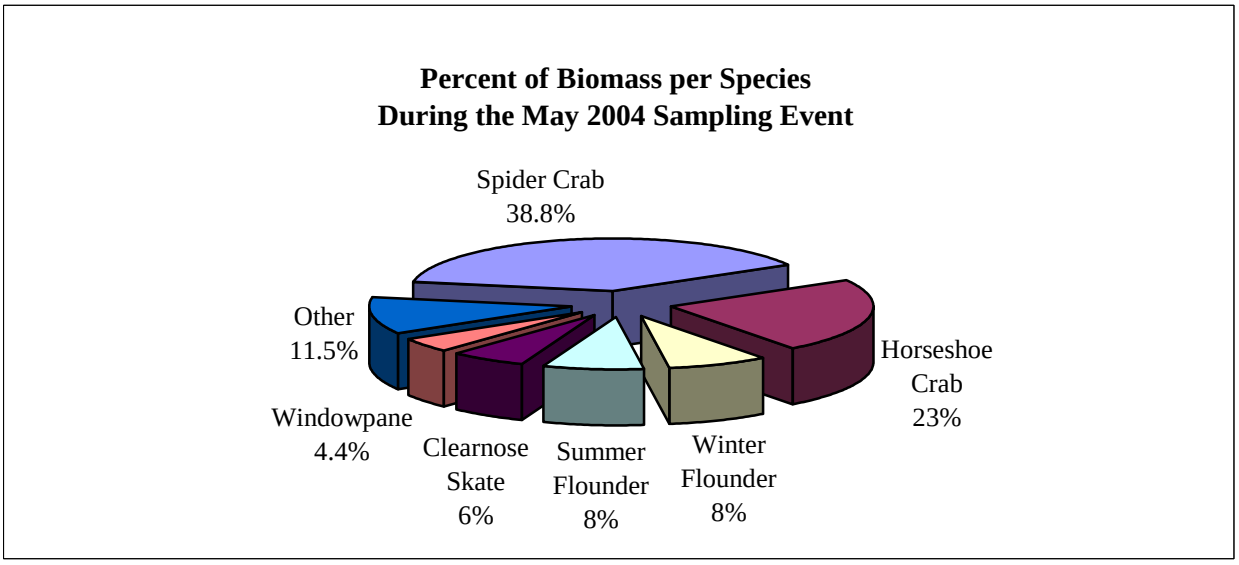


Figure 16D. Percent of Total Biomass by Species During the July 2004 Sampling Event.

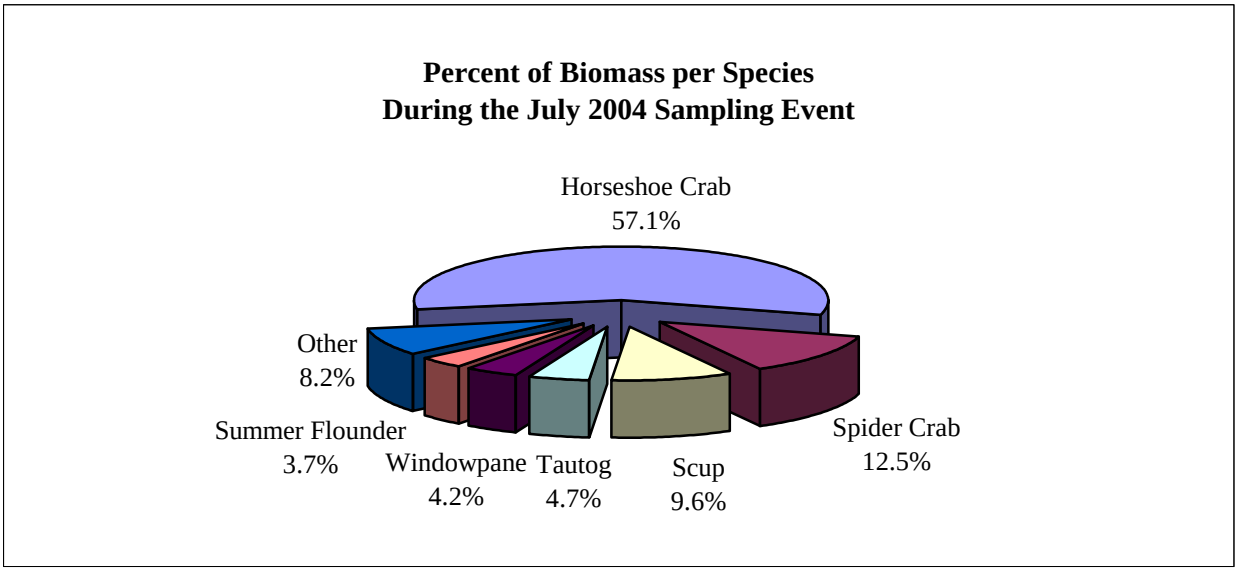


Figure 17. Relative Abundance of the Dominant Benthic Invertebrate Taxa Collected During the September 2003 Sampling Event.

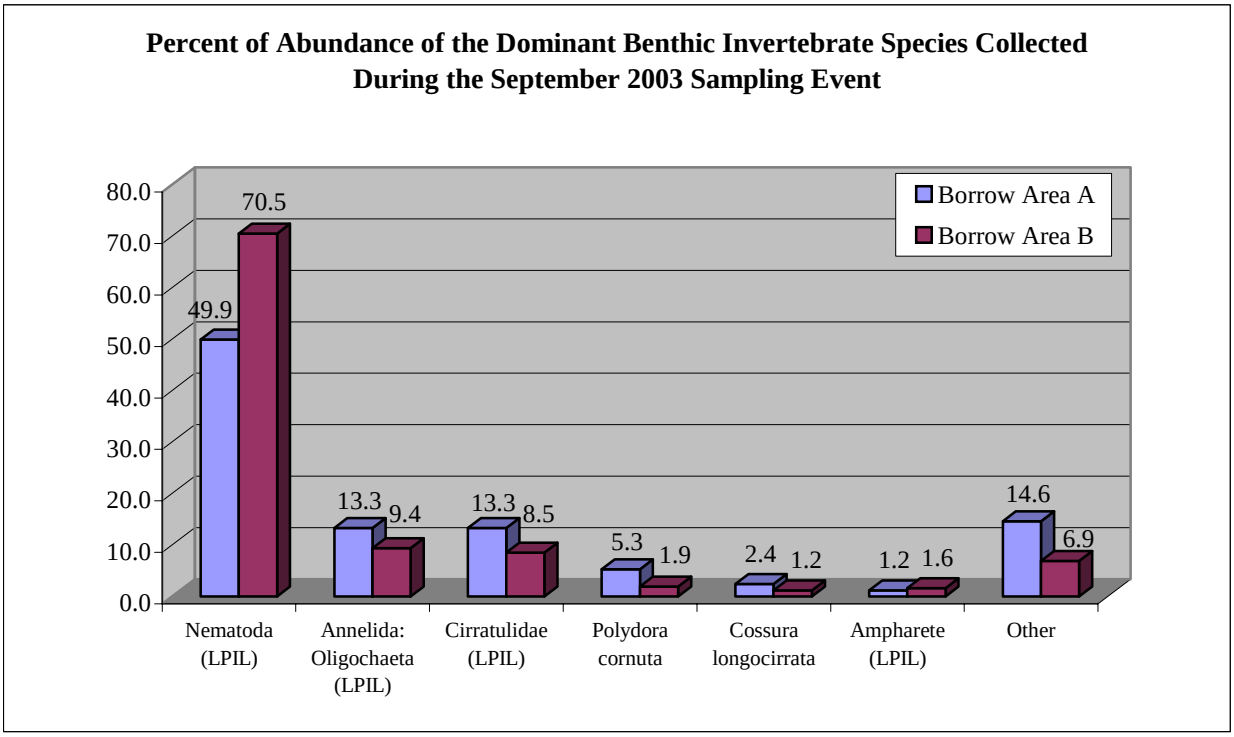


Figure 18. Percent of Abundance of the Dominant Benthic Invertebrate Species Collected During the May 2004 Sampling Event.

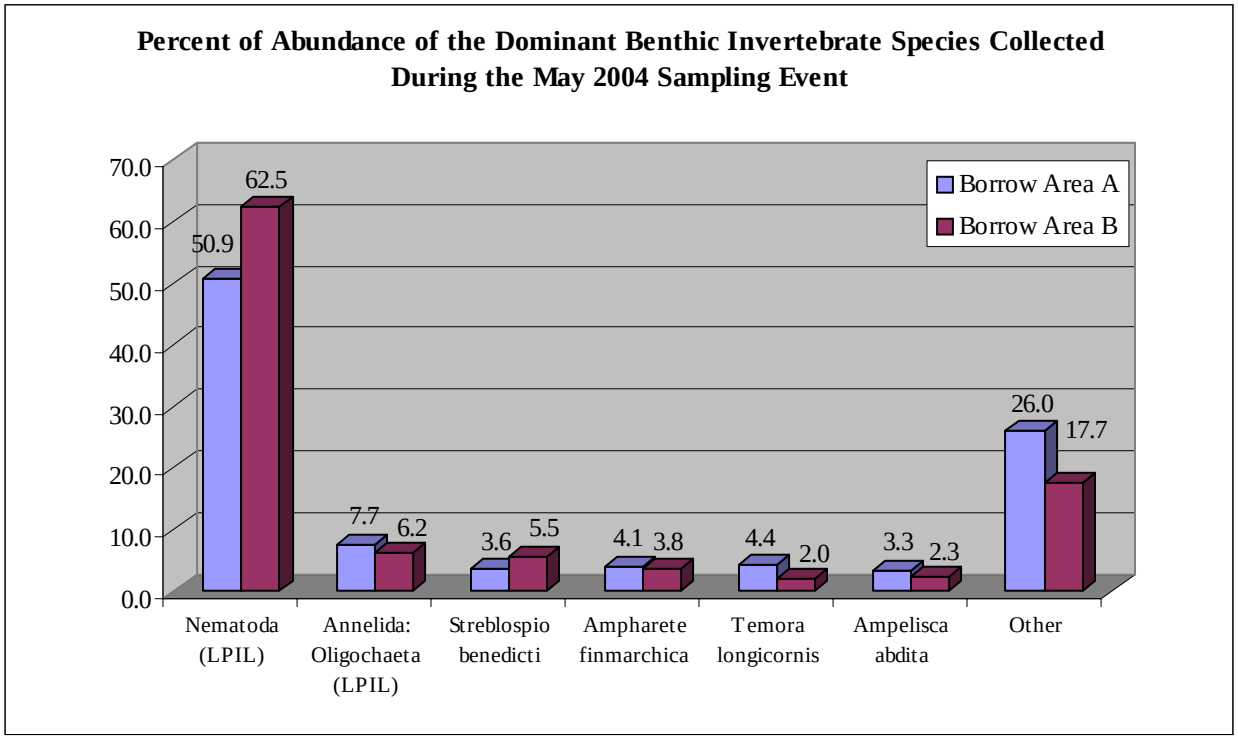


Figure 19. Biomass (Wet Weight) of Dominant Benthic Invertebrate Taxa During All Sampling Events.

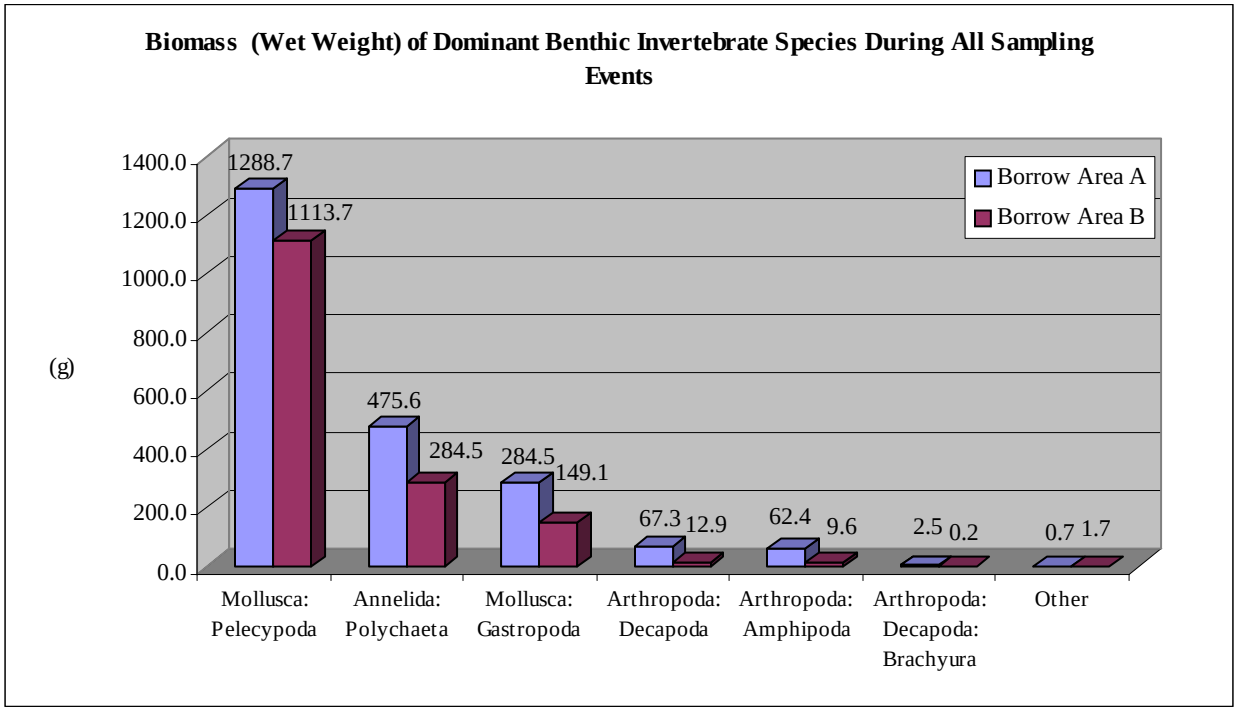


Figure 20. Percent of Benthic Invertebrate Biomass by Taxonomic Class During the September 2003 Sampling Event.

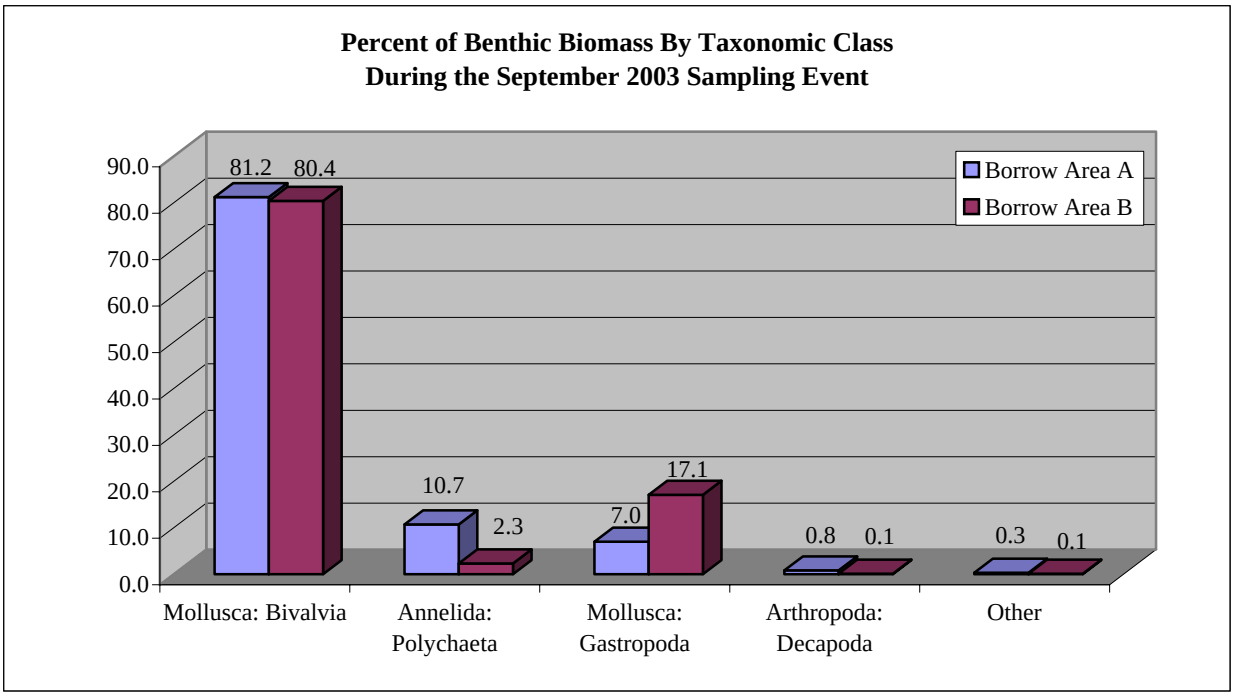


Figure 21. Percent of Benthic Invertebrate Biomass by Taxonomic Class During the May 2004 Sampling Event.

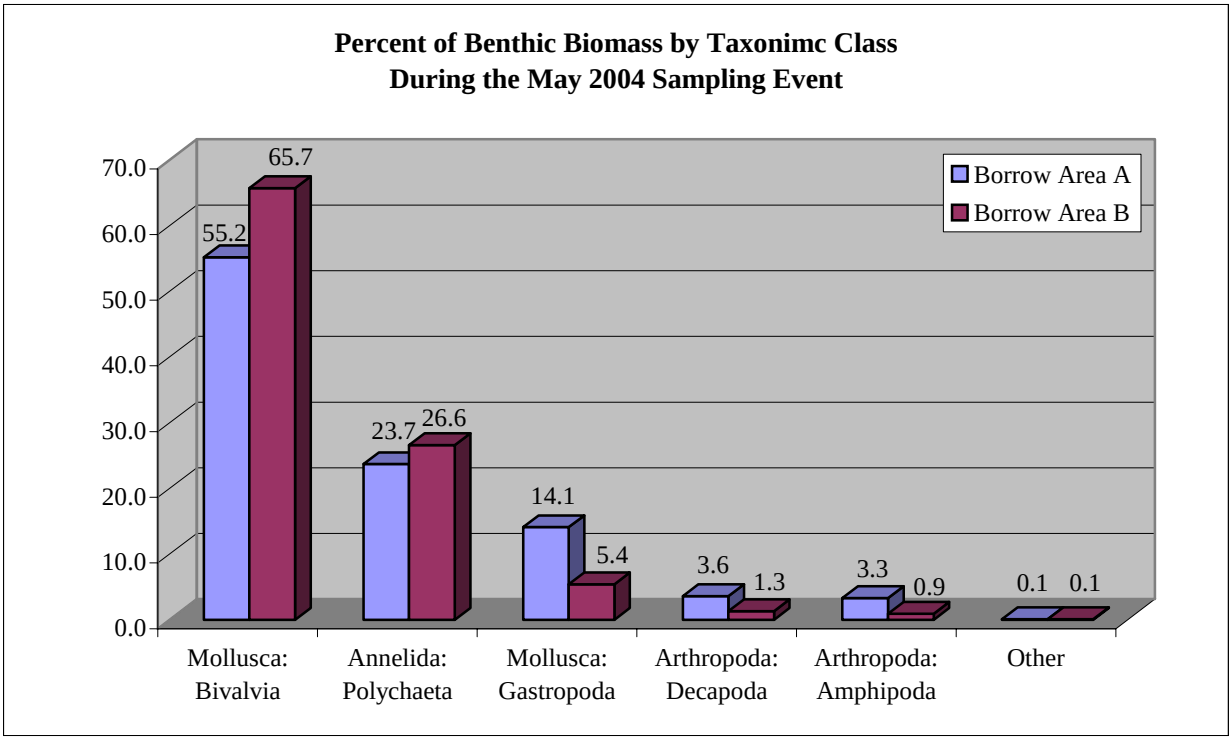


Figure 22. Comparison of Average Grain Size (% by Weight) Between Asharoken Borrow Areas A and B.

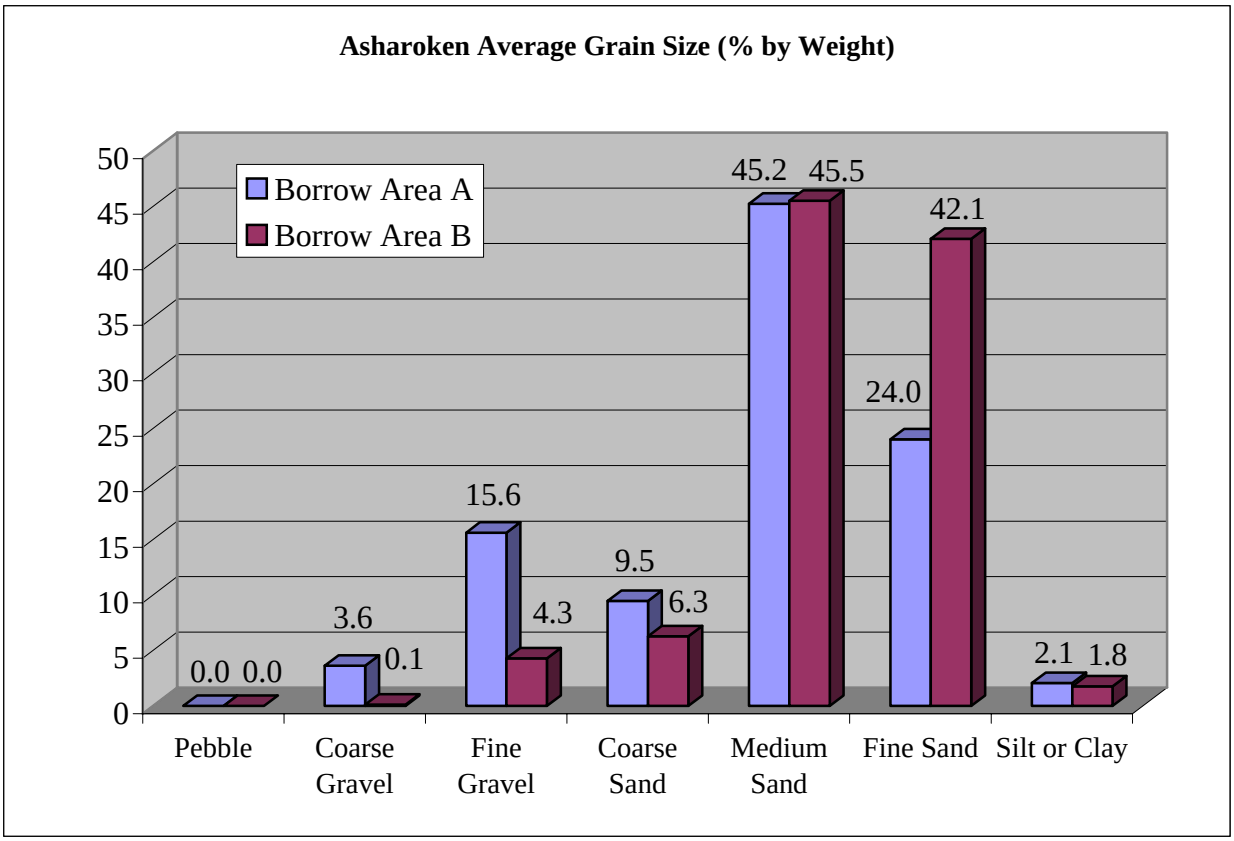


Figure 23. Comparison of Average Grain Size in Asharoken Borrow Area A Between September 2003 and May 2004.

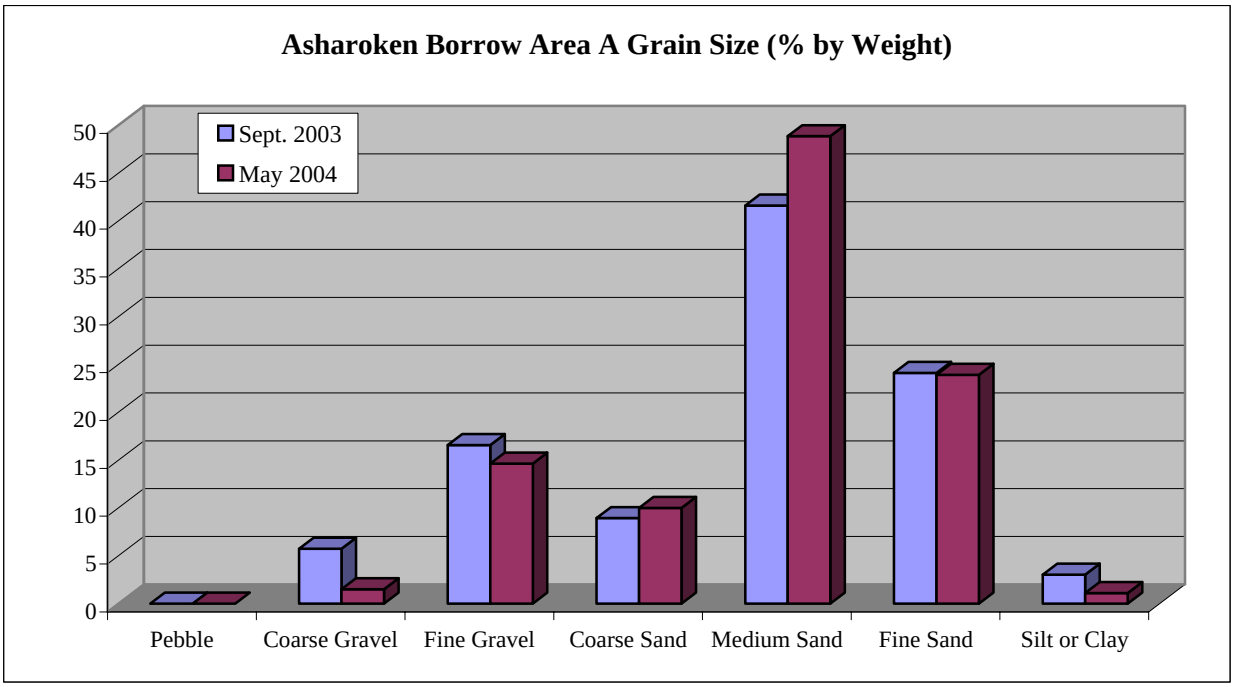
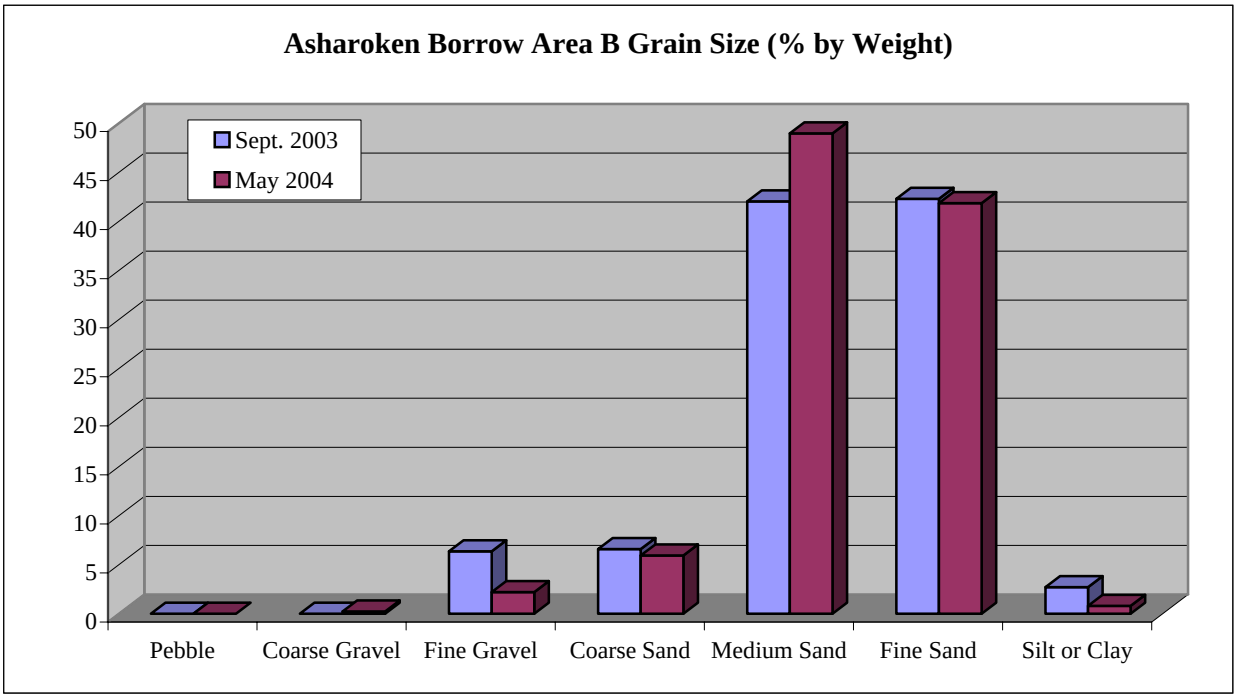


Figure 24. Comparison of Average Grain Size in Asharoken Borrow Area B Between September 2003 and May 2004.



Appendix A

Fish and Invertebrate Data

September 2003	Alewife	Atlantic Herring	Bay Anchovy	Black Sea Bass	Blueback Herring	Bluefish	Butterfish	Cunner	Channel Whelk	Horseshoe Crab	Long-finned Squid	Lookdown
Total Catch	*Alosa pseudoharengus*	*Clupea harengus*	*Anchoa mitchilli*	*Centropristis striata*	*Alosa aestivalis*	*Pomatomus saltatrix*	*Peprilus triacanthus*	*Tautogolabrus adspersus*	*Busycon canaliculatum*	*Limulus polyphemus*	*Loligo pealei*	*Selene vomer*
	38	105	94	412	86	249	107	132	111	195	150	59
			100	428		236	105	170	53		120	
			95			195	97				125	
			90			207	109				130	
			33			234	100				120	
			57			135	122				95	
			41			212	71				90	
			40				82				125	
			40				110				100	
			31				80				86	
			39				81				80	
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			34				83				140	
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			48				110				114	
			35				118				84	
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			41				84				131	
			40				94				115	
			40				97				104	
			36				95				150	
			41				85				125	
			37				97				151	
			34				86				110	
			38				90				90	
			39				90				145	
			37				94				86	
			45				93				116	
			40				91				111	
			41				81				117	
			54				88				124	
			40				90				122	
			41				84				115	
			34				86				113	
			39				94				77	
			38				95				162	
			40				97				71	
			36				85				130	
			34				81				155	
			40				93				100	
			35				89				130	
			35				87				62	
			35				90				95	
			31				94				90	
			36				87				177	
			37				93				114	
			36				95				93	
			39				87				90	
			36				92				165	
			37				93				120	
			39				96				135	
			38				80				130	
			36				91				123	
			34				90				120	
			34				88				71	
			35				71				80	
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			36				85				115	
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September 2003	Alewife	Atlantic Herring	Bay Anchovy	Black Sea Bass	Blueback Herring	Bluefish	Butterfish	Cunner	Channel Whelk	Horseshoe Crab	Long-finned Squid	Lookdown
Total Catch	*Alosa pseudoharengus*	*Clupea harengus*	*Anchoa mitchilli*	*Centropristis striata*	*Alosa aestivalis*	*Pomatomus saltatrix*	*Peprilus triacanthus*	*Tautogolabrus adspersus*	*Busycon canaliculatum*	*Limulus polyphemus*	*Loligo pealei*	*Selene vomer*
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September 2003	Alewife	Atlantic Herring	Bay Anchovy	Black Sea Bass	Blueback Herring	Bluefish	Butterfish	Cunner	Channel Whelk	Horseshoe Crab	Long-finned Squid	Lookdown
Total Catch	*Alosa pseudoharengus*	*Clupea harengus*	*Anchoa mitchilli*	*Centropristis striata*	*Alosa aestivalis*	*Pomatomus saltatrix*	*Peprilus triacanthus*	*Tautogolabrus adspersus*	*Busycon canaliculatum*	*Limulus polyphemus*	*Loligo pealei*	*Selene vomer*
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September 2003	Alewife	Atlantic Herring	Bay Anchovy	Black Sea Bass	Blueback Herring	Bluefish	Butterfish	Cunner	Channel Whelk	Horseshoe Crab	Long-finned Squid	Lookdown
Total Catch	*Alosa pseudoharengus*	*Clupea harengus*	*Anchoa mitchilli*	*Centropristis striata*	*Alosa aestivalis*	*Pomatomus saltatrix*	*Peprilus triacanthus*	*Tautogolabrus adspersus*	*Busycon canaliculatum*	*Limulus polyphemus*	*Loligo pealei*	*Selene vomer*
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September 2003	Alewife	Atlantic Herring	Bay Anchovy	Black Sea Bass	Blueback Herring	Bluefish	Butterfish	Cunner	Channel Whelk	Horseshoe Crab	Long-finned Squid	Lookdown
Total Catch	*Alosa pseudoharengus*	*Clupea harengus*	*Anchoa mitchilli*	*Centropristis striata*	*Alosa aestivalis*	*Pomatomus saltatrix*	*Peprilus triacanthus*	*Tautogolabrus adspersus*	*Busycon canaliculatum*	*Limulus polyphemus*	*Loligo pealei*	*Selene vomer*
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September 2003	Alewife	Atlantic Herring	Bay Anchovy	Black Sea Bass	Blueback Herring	Bluefish	Butterfish	Cunner	Channel Whelk	Horseshoe Crab	Long-finned Squid	Lookdown
Total Catch	*Alosa pseudoharengus*	*Clupea harengus*	*Anchoa mitchilli*	*Centropristis striata*	*Alosa aestivalis*	*Pomatomus saltatrix*	*Peprilus triacanthus*	*Tautogolabrus adspersus*	*Busycon canaliculatum*	*Limulus polyphemus*	*Loligo pealei*	*Selene vomer*
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September 2003	Alewife	Atlantic Herring	Bay Anchovy	Black Sea Bass	Blueback Herring	Bluefish	Butterfish	Cunner	Channel Whelk	Horseshoe Crab	Long-finned Squid	Lookdown
Total Catch	*Alosa pseudoharengus*	*Clupea harengus*	*Anchoa mitchilli*	*Centropristis striata*	*Alosa aestivalis*	*Pomatomus saltatrix*	*Peprilus triacanthus*	*Tautogolabrus adspersus*	*Busycon canaliculatum*	*Limulus polyphemus*	*Loligo pealei*	*Selene vomer*
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September 2003	Alewife	Atlantic Herring	Bay Anchovy	Black Sea Bass	Blueback Herring	Bluefish	Butterfish	Cunner	Channel Whelk	Horseshoe Crab	Long-finned Squid	Lookdown
Total Catch	*Alosa pseudoharengus*	*Clupea harengus*	*Anchoa mitchilli*	*Centropristis striata*	*Alosa aestivalis*	*Pomatomus saltatrix*	*Peprilus triacanthus*	*Tautogolabrus adspersus*	*Busycon canaliculatum*	*Limulus polyphemus*	*Loligo pealei*	*Selene vomer*
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September 2003	Alewife	Atlantic Herring	Bay Anchovy	Black Sea Bass	Blueback Herring	Bluefish	Butterfish	Cunner	Channel Whelk	Horseshoe Crab	Long-finned Squid	Lookdown
Total Catch	*Alosa pseudoharengus*	*Clupea harengus*	*Anchoa mitchilli*	*Centropristis striata*	*Alosa aestivalis*	*Pomatomus saltatrix*	*Peprilus triacanthus*	*Tautogolabrus adspersus*	*Busycon canaliculatum*	*Limulus polyphemus*	*Loligo pealei*	*Selene vomer*
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September 2003	Alewife	Atlantic Herring	Bay Anchovy	Black Sea Bass	Blueback Herring	Bluefish	Butterfish	Cunner	Channel Whelk	Horseshoe Crab	Long-finned Squid	Lookdown
Total Catch	*Alosa pseudoharengus*	*Clupea harengus*	*Anchoa mitchilli*	*Centropristis striata*	*Alosa aestivalis*	*Pomatomus saltatrix*	*Peprilus triacanthus*	*Tautogolabrus adspersus*	*Busycon canaliculatum*	*Limulus polyphemus*	*Loligo pealei*	*Selene vomer*
			46									
			52									
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			62									
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			30									
			36									
			40									
			35									
			32									
			30									
			36									
Total Count	1	1	45,606	2	1	7	102	2	2	1	83	1
LENGTH (TL mm)												
Mean	38.00	105.00	38.57	420.00	86.00	209.71	92.1	151.0	82.0	195.0	109.4	59.0
Smallest	38	105	27	412	86	135	69	132	53	195	62	59
Largest	38	105	100	428	86	249	135	170	111	195	177	59
SD	0.00	0.00	10.66	11.31	0.00	37.94	10.93	26.87	41.01	0.00	24.18	0.00
BIOMASS (g)												
Total	1	7	61,060	3,300	15	770	1,899	180	325	1,000	2,420	5
Mean	1.00	7.00	1.34	1650.00	15.00	110.00	18.6	90.0	162.5	1000.0	29.2	5.0
			N=1018									

September 2003	Menhaden	Norther Puffer	Northern Searobin	Oyster Toadfish	Rock Crab	Scup	Silverside	Spider Crab	Weakfish	Asteriid Sea Star	Winter Flounder
Total Catch	*Brevoortia tyrannus*	*Sphoeroides maculatus*	*Prionotus carolinus*	*Opsanus tau*	*Cancer irroratus*	*Stenotomus chrysops*	*Menidia menidia*	*Libinia dubia*	*Cynoscion regalis*	*Asterias forbesi*	*Pseudopleuronectes americanus*
	375	65	92	107	23	310	96	50	135	125	270
					21	281			69	200	170
					14	293			83		157
						325			84		173
						312			84		171
						97			84		174
						64			74		233
						67			115		240
						274			92		95
						55			35		
						81			31		
						60			94		
						68			128		
						70			95		
						68			78		
						60			74		
						67			136		
						87			187		
						90			168		
						55			190		
						65			182		
						64			64		
						60			67		
						68			68		
						64			76		
						75			80		
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						59			73		
						57			75		
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						89			87		
						80			91		
						70			97		
						67			86		
						67			72		
						54			87		
						66			102		
						61			76		
						67			71		
						77			81		
						66			81		
						50			87		
						64			87		
						55			83		
						67			75		
						61			105		
						320			70		
						55			111		
						51			90		
						71			80		
						69			76		
						67			89		
						90			83		
						85			100		
						70			104		
						76			74		
						71			83		
						69			73		
						87			91		
						87			140		
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						79			87		
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						62			93		
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						51			78		
						56			95		
						59			80		
						50			84		
						56			84		
						81			87		
						53			25		
						80			85		
						64			55		
						55					
						58					
						370					
						84					

September 2003	Menhaden	Norther Puffer	Northern Searobin	Oyster Toadfish	Rock Crab	Scup	Silverside	Spider Crab	Weakfish	Asteriid Sea Star	Winter Flounder
Total Catch	*Brevoortia tyrannus*	*Sphoeroides maculatus*	*Prionotus carolinus*	*Opsanus tau*	*Cancer irroratus*	*Stenotomus chrysops*	*Menidia menidia*	*Libinia dubia*	*Cynoscion regalis*	*Asterias forbesi*	*Pseudopleuronectes americanus*
						178					
						82					
						71					
						61					
						52					
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						54					
						87					
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September 2003	Menhaden	Norther Puffer	Northern Searobin	Oyster Toadfish	Rock Crab	Scup	Silverside	Spider Crab	Weakfish	Asteriid Sea Star	Winter Flounder
Total Catch	*Brevoortia tyrannus*	*Sphoeroides maculatus*	*Prionotus carolinus*	*Opsanus tau*	*Cancer irroratus*	*Stenotomus chrysops*	*Menidia menidia*	*Libinia dubia*	*Cynoscion regalis*	*Asterias forbesi*	*Pseudopleuronectes americanus*
Total Count	1	1	1	1	3	3228	1	1	219	2	9
LENGTH (TL mm)											
Mean	375.0	65.0	92.0	107.0	19.3	78.4	96.0	50.0	87.8	162.5	187.0
Smallest	375	65	92	107	14	45	96	50	25	125	95
Largest	375	65	92	107	23	370	96	50	190	200	270
SD	0.0	0.00	0.00	0.00	4.73	57.70	0.00	0.00	25.80	53.03	0.00
BIOMASS (g)											
Total	500	16	20	45	20	14,899	10	70	1,240	750	1,100
Mean	500.0	16.0	20.0	45.0	6.7	4.6	10.0	70.0	5.7	375.0	122.2
						N=165			N=101		

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February 2004	Atlantic Herring	Black Sea Bass	Grubby	Cunner	Rock Crab	Rock Gunnel	Asteriid Sea Star	Spider Crab	Tautog	Winter Flounder
Total Catch	*Clupea harengus*	*Centropristis striata*	*Myoxocephalus aenaeus*	*Tautogolabrus adspersus*	*Cancer irroratus*	*Pholis gunnellus*	*Asterias forbsei*	*Libinia dubia*	*Tautoga onitis*	*Pseudopleuronectes americanus*
	230	110	104	48	42	125	150	70	76	50
	231		70	50		74	216	80		66
	265		58	57			185	35		58
	225		82	61			194	72		47
	222		96	42			175			72
	200		72	48			128			52
	195		77	47			221			125
	235		62	52			200			87
			84	48			190			110
			92	37			194			104
			68	38			215			52
			66	46			175			300
			62	47			176			80
			58	43			200			62
			62	51			208			87
			65	42						75
			58	45						65
			72	42						
			87	53						
			58	38						
			57	28						
			65	33						
			62	41						
			52	31						
			62							
			103							
			55							
			80							
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			76							
			82							
			101							
			72							
			85							
			53							
			65							
			100							
			72							
			67							
			65							

February 2004	Atlantic Herring	Black Sea Bass	Grubby	Cunner	Rock Crab	Rock Gunnel	Asteriid Sea Star	Spider Crab	Tautog	Winter Flounder
Total Catch	*Clupea harengus*	*Centropristis striata*	*Myoxocephalus aenaeus*	*Tautogolabrus adspersus*	*Cancer irroratus*	*Pholis gunnellus*	*Asterias forbsei*	*Libinia dubia*	*Tautoga onitis*	*Pseudopleuronectes americanus*
			82							
			65							
			78							
			62							
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			67							
			94							
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			74							
			66							
			70							
			72							
			61							
Total Count	8	1	80	24	1	2	15	4	1	17
LENGTH (TL mm)										
Mean	225.38	110.00	72.64	44.5	42.0	99.50	188.47	64.25	76.00	87.8
Smallest	195	110	52	28	42	74	128	35	76	47
Largest	265	110	104	61	42	125	221	80	76	300
SD	21.69	0.00	13.30	7.92	0.00	36.06	25.21	19.97	0.00	59.08
BIOMASS (g)										
Total	615	15	644	56	9	7	1,950	620	5	501
Mean	76.88	15.00	8.05	2.3	9.0	3.25	130.00	155.00	5.0	29.4

May 2004 **Total Catch**	Alewife *Alosa pseudoharengus*	American Lobster *Homarus americanus*	Asteriid Sea Star *Asterias forbesi*	Banded Gunnel *Pholis fasciata*	Clearnose Skate *Raja eglanteria*	Cunner *Tautogolabrus adspersus*	Feather Blenny *Hypsoblennius hentzi*	Grubby *Myoxocephalus aenaeus*	Hogchocker *Trinectes maculatus*	Horseshoe Crab *Limulus polyphemus*	Long-finned Squid *Loligo pealei*	Red Hake *Urophycis chuss*
	68	110	140	125	409	70	165	83	61	220	275	79
		100	230		432	142		70		177	235	105
			162		510	65		72		156	175	87
			195		410	55		65		125	170	92
			218		400	39		85		245	240	77
			169		440	20		68		190	337	82
			190		455	58		84		125	322	91
			224		420	63		70		198	340	101
			130		400	59		75		210	290	89
			183		85	52		107		198	335	101
			210		422			81		270	195	88
			189		130			80		180	202	92
			72		452			62		175	180	79
			220		400					220	145	93
			248		459					222	195	95
			205		441					146	210	90
					352					174	225	90
					368					229	165	90
										253	170	30
										240	193	98
										145	175	111
										150	195	147
											135	146
											180	121
											145	126
											155	95
											300	84
											170	89
											145	321
											160	100
											175	98
												108
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May 2004	Alewife	American Lobster	Asteriid Sea Star	Banded Gunnel	Clearnose Skate	Cunner	Feather Blenny	Grubby	Hogchocker	Horseshoe Crab	Long-finned Squid	Red Hake
Total Catch	*Alosa pseudoharengus*	*Homarus americanus*	*Asterias forbesi*	*Pholis fasciata*	*Raja eglanteria*	*Tautogolabrus adspersus*	*Hypsoblennius hentzi*	*Myoxocephalus aenaeus*	*Trinectes maculatus*	*Limulus polyphemus*	*Loligo pealei*	*Urophycis chuss*
Total Count	1	2	16	1	18	10	1	13	1	22	31	86
LENGTH (TL mm)												
Mean	68.00	105.00	186.56	125.00	388.06	62.30	165.00	77.08	61.00	193.09	210.77	99.81
Smallest	68	100	72	125	85	20	165	62	61	125	135	30
Largest	68	110	248	125	510	142	165	107	61	270	340	321
SD	0.00	7.07	44.40	0.00	108.35	31.52	0.00	11.73	0.00	41.68	62.93	29.98
BIOMASS (g)												
Total	5	1,000	2,140	7	8,800	86	20	122	115	33,000	5,090	845
Mean	5.00	500.00	133.75	7.00	488.89	8.60	20.00	9.38	115.00	1500.00	164.19	9.83

May 2004	Rock Crab	Rock Gunnel	Round Herring	Scup	Silver Hake	Smallmouth Flounder	Spider Crab	Stone Crab	Summer Flounder	Tautog	Tomcod	Windowpane	Winter Flounder
	Cancer	*Pholis*	*Estrumeus*	*Stenotomus*	*Merluccius*	*Etropus*	*Libinia*	*Menippe*	*Paralichthys*	*Tautoga*	*Microgadus*	*Scophthalmus*	*Pseudopleuronectes*
Total Catch	*irroratus*	*gunnellus*	*sadina*	*chrysops*	*bilinearis*	*microstomus*	*dubia*	*mercenaria*	*dentatus*	*onitis*	*tomcod*	*aquosus*	*americanus*
	90	78	64	322	127	120	95	18	400	124	93	243	215
	82	62			104	114	84	10	600	510	151	255	196
	97	75			78	100	80		600	150	191	283	86
	15				91	62	82		600	480	52	174	116
	22					70	88		365	407	56	272	215
	17					105	81		462			260	100
	14					66	75		400			270	90
	14					104	75		267			97	100
	20					126	78		486			68	90
	18					100	80					240	85
	23						75					295	97
	14						69					75	210
	15						42					60	117
	23						45					120	87
	22						65					135	119
	17						50					125	120
	12						80					195	130
	14						58					172	85
							72					265	100
							49					171	115
							60					80	83
							85					186	100
							87					115	81
							42					149	116
							87					74	87
							60					62	74
							87					186	90
							40					265	88
							32					257	82
							65					192	116
							71					274	185
							53					215	99
							50					155	97
							53					69	73
							72					64	86
							65					281	86
							55					225	82
							42					128	79
							42					145	65
							60					141	81
							62					161	82
							90					90	65
							64					145	78
							53					89	260
							47					64	90
							63					73	76
							61					300	78
							70					134	65
							43					129	75
							60					84	65
							42					296	92
							54					271	65
							48					238	68
							66						80
							53						69
							48						86
							59						71
							50						98
							48						65
							45						104
							62						74
							81						178
							65						120
							58						72
							83						100
							95						95
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							42						115
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							70						231
							70						264
							70						195
							53						128
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							58						96
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							73						260
							67						105
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							60						126
							78						89
							59						70
							66						75
							55						107
							64						87
							45						83

May 2004	Rock Crab	Rock Gunnel	Round Herring	Scup	Silver Hake	Smallmouth Flounder	Spider Crab	Stone Crab	Summer Flounder	Tautog	Tomcod	Windowpane	Winter Flounder
	Cancer	*Pholis*	*Estrumeus*	*Stenotomus*	*Merluccius*	*Etropus*	*Libinia*	*Menippe*	*Paralichthys*	*Tautoga*	*Microgadus*	*Scophthalmus*	*Pseudopleuronectes*
Total Catch	*irroratus*	*gunnellus*	*sadina*	*chrysops*	*bilinearis*	*microstomus*	*dubia*	*mercenaria*	*dentatus*	*onitis*	*tomcod*	*aquosus*	*americanus*
							50						79
							60						96
							77						76
							78						84
							60						128
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							48						74
							48						84
							53						263
							54						137
							54						72
							50						140
							85						145
							85						133
							30						82
							65						84
							52						67
							35						98
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							52						86
							94						102
							81						78
							62						137
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							52						89
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							53						263
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							50						77
							50						82
							43						83
							55						80
							48						94
							32						134
							41						75

May 2004	Rock Crab	Rock Gunnel	Round Herring	Scup	Silver Hake	Smallmouth Flounder	Spider Crab	Stone Crab	Summer Flounder	Tautog	Tomcod	Windowpane	Winter Flounder
	Cancer	*Pholis*	*Estrumeus*	*Stenotomus*	*Merluccius*	*Etropus*	*Libinia*	*Menippe*	*Paralichthys*	*Tautoga*	*Microgadus*	*Scophthalmus*	*Pseudopleuronectes*
Total Catch	*irroratus*	*gunnellus*	*sadina*	*chrysops*	*bilinearis*	*microstomus*	*dubia*	*mercenaria*	*dentatus*	*onitis*	*tomcod*	*aquosus*	*americanus*
							37						296
							31						219
							51						77
							50						77
							58						84
							44						321
							81						68
							48						96
							50						89
							52						251
							71						76
							47						81
							53						71
							54						135
							76						85
							91						196
							91						77
							85						143
							68						225
							72						87
							74						130
							85						85
							51						74
							47						75
							52						204
							64						87
							50						103
							51						87
							53						196
							71						80
							60						200
							54						182
							56						201
							62						98
							68						202
							71						188
							57						186
							48						173
							55						77
							57						86
							52						69
							80						135
							81						76
							85						90
							42						92
							56						146
							78						125
							58						96
							84						89
							58						80
							57						79
							78						82
							65						74
							72						79
							58						95
							68						76
							50						97
							73						92
							44						88
							53						75
							82						82
							73						89
							52						65
							51						86
							70						92
							60						66
							42						148
							50						88
							51						80
							75						84
							72						69
							85						45
							92						125
							80						115
							49						186
							68						82
							85						360
							49						76
							45						85
							52						109
							60						96
							68						200
							39						90
							50						85
							52						101
							54						89
							55						68
							72						85
							83						102
							49						81
							72						113
							57						94
							48						90
							60						115
							49						146
							35						119
							58						91
							62						94
							50						140
							71						141
							42						55
							48						188

May 2004	Rock Crab	Rock Gunnel	Round Herring	Scup	Silver Hake	Smallmouth Flounder	Spider Crab	Stone Crab	Summer Flounder	Tautog	Tomcod	Windowpane	Winter Flounder
	Cancer	*Pholis*	*Estrumeus*	*Stenotomus*	*Merluccius*	*Etropus*	*Libinia*	*Menippe*	*Paralichthys*	*Tautoga*	*Microgadus*	*Scophthalmus*	*Pseudopleuronectes*
Total Catch	*irroratus*	*gunnellus*	*sadina*	*chrysops*	*bilinearis*	*microstomus*	*dubia*	*mercenaria*	*dentatus*	*onitis*	*tomcod*	*aquosus*	*americanus*
							64						137
							58						88
							60						155
							42						93
							48						83
							46						100
							45						85
							60						104
							70						94
							67						112
							55						91
							58						76
							55						88
							54						84
							85						74
							59						109
							78						138
							50						101
							75						131
							55						54
							52						134
							94						61
							68						110
							65						81
							72						64
							72						73
							50						69
							61						95
							64						131
							90						140
							105						91
							67						88
							55						66
							52						125
							50						98
							51						145
							48						131
							60						102
							45						90
							60						75
							50						93
							68						109
							52						123
							58						154
							52						93
							61						84
							68						101
							60						92
							94						100
							58						105
							85						87
							58						90
							50						78
							52						87
							54						91
							60						77
							55						149
							45						75
							42						61
							60						95
							58						97
							78						100
							52						74
							75						73
							85						97
							50						94
							60						82
							95						101
							58						72
							90						104
							56						74
							78						90
							50						72
							50						86
							55						77
							61						101
							60						95
							72						90
							58						95
							71						70
							50						121
							50						65
							55						83
							50						225
							48						71
							65						65
							72						103
							40						71
							92						80
							82						72
							51						67
							45						
							60						
							82						
							60						
							48						
							76						
							61						
							65						
							51						
							75						
							57						

May 2004	Rock Crab	Rock Gunnel	Round Herring	Scup	Silver Hake	Smallmouth Flounder	Spider Crab	Stone Crab	Summer Flounder	Tautog	Tomcod	Windowpane	Winter Flounder
Total Catch	*Cancer irroratus*	*Pholis gunnellus*	*Estrumeus sadina*	*Stenotomus chrysops*	*Merluccius bilinearis*	*Etropus microstomus*	*Libinia dubia*	*Menippe mercenaria*	*Paralichthys dentatus*	*Tautoga onitis*	*Microgadus tomcod*	*Scophthalmus aquosus*	*Pseudopleuronectes americanus*
							55						
							42						
							90						
							65						
							44						
							55						
							84						
							57						
							56						
							55						
							50						
							68						
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							53						
							42						
							47						
							67						
							58						
							50						
							55						
							50						
							42						
							85						
							55						
							52						
							55						
							88						
							56						
							47						
Total Count	18	3	1	1	4	10	457	2	9	5	5	53	397
LENGTH (TL mm)													
Mean	29.39	71.67	64.00	322.00	100.00	96.70	62.01	14.00	464.44	334.20	108.60	171.92	105.34
Smallest	12	62	64	322	78	62	30	10	267	124	52	60	45
Largest	97	78	64	322	127	126	105	18	600	510	191	300	360
SD	28.07	8.50	0.00	0.00	20.90	22.86	14.50	5.66	118.73	184.10	60.83	78.67	46.09
BIOMASS (g)													
Total	249	10	3	500	50	92	55,790	3	11,420	6,055	70	6,275	11,905
Mean	13.83	3.33	3.00	500.00	12.50	9.20	122.08	1.50	1268.89	1211.00	14.00	118.40	29.99

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July 2004	Asteriid Se	Bay Ancho	Blueback H	Butterfish	Clearnose S	Cunner	Grubby	Hogchocker	Horseshoe Cr	Lady Crab
Total Catch	Asterias fo	Anchoa mit	Alosa aestiv	Poronotus tria	Raja eglante	Tautogolabrus ad	Myoxocephalus ae	Trinectes mac	Limulus polyp	Ovalipes o
	182	62	75	135	435	102	42	167	200	11
	150	85	82	102		85			205	61
	215	78	77	105		78			245	74
	171	82	100	122		72			215	8
	172	87	78	143		95			218	4
	172	84	92	132		61			250	
		81	94	141		52			158	
		65	90	114		66			160	
		62	82	138		71			145	
		74	95	129		52			250	
		69	87	134		49			235	
		60	85	120		76			128	
		58	82	136		77			205	
		92	95	107		103			172	
		72	91	126		60			191	
		92	84	99		106			157	
		70	90						204	
		65	89						182	
		62	88						147	
		85	90						222	
		90	94						200	
		94	87						205	
		74	85							
		72	92							
		90	86							
		79	80							
		84	94							
		72	94							
		91	78							
		70	76							
		80	94							
		93	86							
		96	86							
		70	78							
		84	83							
		92	82							
		90	83							
		68	86							
		75	84							
		94	91							
		87	83							
		64	85							
		72	87							
		91	82							
		90	94							
		67	79							
		71	86							
		90	97							
		85	87							
		72	87							
		95	100							
		98	81							
		92	90							
		90	88							
		97	89							
		72	65							
		74	77							
		68	97							
		72	96							
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		72								
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		90								
		84								
		75								
		80								
		98								
		90								
		82								

July 2004	Asteriid Se	Bay Ancho	Blueback H	Butterfish	Clearnose S	Cunner	Grubby	Hogchocker	Horseshoe Cr	Lady Crab
Total Catch	Asterias fo	Anchoa mit	Alosa aestiv	Poronotus tria	Raja eglante	Tautogolabrus ad	Myoxocephalus ae	Trinectes mac	Limulus polyp	Ovalipes o
		72								
		75								
		80								
		68								
		50								
		76								
		91								
		71								
		82								
		78								
		72								
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		84								
		83								
		75								

July 2004	Asteriid Se	Bay Ancho	Blueback H	Butterfish	Clearnose S	Cunner	Grubby	Hogchocker	Horseshoe Cr	Lady Crab
Total Catch	Asterias fo	Anchoa mit	Alosa aesti	Poronotus tria	Raja eglante	Tautogolabrus ad	Myoxocephalus ae	Trinectes mac	Limulus polyp	Ovalipes o
		82								
		81								
		72								
		80								
		72								
		80								
		84								
		81								
		83								
		75								
		76								
		84								
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		78								
		70								
		80								

July 2004	Asteriid Se	Bay Ancho	Blueback H	Butterfish	Clearnose S	Cunner	Grubby	Hogchocker	Horseshoe Cr	Lady Crab
Total Catch	Asterias fo	Anchoa mit	Alosa aesti	Poronotus tria	Raja eglante	Tautogolabrus ad	Myoxocephalus ae	Trinectes mac	Limulus polyp	Ovalipes o
		70								
		82								
		79								
		80								
		77								
		64								
		62								
		85								
		75								
		76								
		91								
		68								
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		89								
		82								
		70								
		75								
		70								
		77								
		80								
		75								
		69								
		94								
		61								
		84								
		83								
Total Count	6	304	60	16	1	16	1	1	22	5
LENGTH (TL mm)										
Mean	177	78.45724	86.583333	123.9375	435	75.3125	42	167	195.1818182	31.6
Smallest	150	50	65	99	435	49	42	167	128	4
Largest	215	98	100	143	435	106	42	167	250	74
SD	21.37288	8.696846	6.8353311	14.5669432	0	18.70372066	0	0	35.37773898	33.18584
BIOMASS (g)										
Total	470	10172	445	630	500	172	3	110	41600	107
Mean	78.33333	#DIV/0!	7.4166667	39.375	500	10.75	3	110	1890.909091	21.4

July 2004	Long-finned S	Mantis Shri	Rock Crab	Scup	Smallmouth Flo	Spider Cr	Spotted Hal	Striped Sea	Summer Flour	Tautog	Windowpane	Winter Flounder
Total Catch	Loligo pealei	Squilla emp	Cancer irro	Stenotomus ch	Etropus microst	Libinia du	Urophycis r	Prionotus e	Paralichthys d	Tautoga or	Scophthalmus a	Pseudopleuronectes a
	83	142	11	262	83	65	201	315	281	372	252	46
	56	139	18	285		82	162		435	426	184	42
	70	138	140	271		62	158		485		191	50
	86		12	242		90	182		290		186	54
	120		16	251		57	172				287	58
	104		12	240		92	161				195	49
	95		10	186		65	158				279	53
	84		12	196		72	182				205	51
	90			248		60					182	60
				211		92					152	66
				268		84					182	58
				247		62					80	50
				200		70					91	56
				327		65					148	52
				285		54					120	105
				207		71					179	98
				186		65					197	52
				255		82					220	47
				273		63					61	103
				294		82					189	58
				290		84					143	56
						95					127	49
						85					216	52
						65						172
						84						184
						61						36
						79						38
						86						37
						83						52
						73						34
						84						50
						86						110
						70						109
						62						52
						72						51
						90						48
						84						52
						60						107
						92						110
						47						127
						31						109
						65						119
						69						110
						65						115
						60						45
						52						110
						75						46
						87						52
						72						242
												127
												106
												59
												103
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												41
												138
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												274
												180
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												115
												120
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												125
												123
												132
												108
												58
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												144
												117
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												127
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												105
												100
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												52
												59
												117
												64
												122

July 2004	Long-finned S	Mantis Shri	Rock Crab	Scup	Smallmouth Flo	Spider Cr	Spotted Hal	Striped Sea	Summer Flour	Tautog	Windowpane	Winter Flounder
Total Catch	Loligo pealei	Squilla emp	Cancer irro	Stenotomus ch	Etropus microst	Libinia du	Urophycis r	Prionotus e	Paralichthys d	Tautoga or	Scophthalmus a	Pseudopleuronectes a
												63
												147
												113
												56
												127
												162
												118
												42

July 2004	Long-finned S	Mantis Shri	Rock Crab	Scup	Smallmouth Flo	Spider Cr	Spotted Hal	Striped Sea	Summer Flour	Tautog	Windowpane	Winter Flounder
Total Catch	Loligo pealei	Squilla emp	Cancer irro	Stenotomus ch	Etropus microst	Libinia du	Urophycis r	Prionotus e	Paralichthys d	Tautoga or	Scophthalmus a	Pseudopleuronectes a
Total Count	9	3	8	21	1	49	8	1	4	2	23	100
LENGTH (TL mm)												
Mean	87.5555556	139.6667	28.875	248.7619048	83	72.5102	172	315	372.75	399	176.7826087	89.07
Smallest	56	138	10	186	83	31	158	315	281	372	61	34
Largest	120	142	140	327	83	95	201	315	485	426	287	274
SD	18.4533947	2.081666	44.98075	39.05240679	0	13.617	15.371588	0	102.8603422	38.18377	57.27204341	44.91838952
BIOMASS (g)												
Total	252	170	14	6980	8	9100	365	500	2725	3400	3075	2228
Mean	28	56.66667	1.75	332.3809524	8	185.714	45.625	500	681.25	1700	133.6956522	22.28

Appendix B

Benthic Macroinvertebrate Data

Taxon/Sample Abundance	A1	B1	A2	B2	A3	B3	A4	B4	A5	B5	A6	B6	A7	B7	A8	B8	A9	B9	A10	B10	A11	B11	A12	B12	A13	B13	A14	B14	A15	B15	A16	A17	A18	A19	A20	A21
Nematoda (LPIL)	120	96	8	168	204	1352	76	320	368	104	130	63	42	448	136	56	98	208	20	1092	76	384	35	204	196	444	152	652	396	272	348	172	1036	668	72	160
Annelida: Oligochaeta (LPIL)	16	52		21	8	184	32	24	80	16	102	4	20	88	8	4	30	40	4	48	12	64	19	64	64	108	12	20	96	44	80	24	130	280	28	60
Annelida: Polychaeta (LPIL):												1																								
Ampharetidae (LPIL)								4				13						4						10												
Ampharete (LPIL)	12			12	20	8			12		8			32	8		8			32				2		8		4	16	36	20	8	14	16	4	4
Ampharete lindstroemi	4				4			4			2			8		4	4			20	12	12		8		52	24	12		12			6	4		
Asabellides oculata					8	4					4																									
Melinna (LPIL)																																		4		
Arabellidae (LPIL):																																			4	
Drilonereis longa																																				
Capitellidae:																																				
Mediomastus (LPIL)				9	12							1									12	8														
Cossuridae:																																				
Cossura longocirrata				12	12	16	16		28				8	8	20	10	24					12		4	4	4	8	28	24	8	56	8	16	4		
Cirratulidae (LPIL)	12	8			24	12	112	4	28	24	72	26	12	48	20	26	34	36		56	68	36	104	138	4	180	56	80	244	36	32	96	38	156	48	64
Chaetozone sp. A																	2																			
Tharyx (LPIL)							4	4		8							4	4		20		12		2		8	20		16			28				
Eunicidae:																																				
Marphysa (LPIL)																																4				
Flabelligeridae (LPIL):											2																									
Pherusa plumosa																			2		4													8		
Glyceridae:																																				
Glycera (LPIL):	4							4	8			1								4				10		8			12						4	
Glycera americana	4											1												2												
Hesionidae (LPIL)											2																				4					
Maldanidae (LPIL):						8												4												4		4				
Asychis (=Sabaco) elongata	12	12			8	8				8		1	8		4				2						4	4									
Euclymene zonalis								4				1																		4	4		8		
Praxillella praetermissa					8						2	4					2							4					20						
Nephtyidae:																																				
Nephtys (LPIL)	4	16		21	36	8	4		12	16		9		16				8	6				8	6	4	20			4	4		12	10	28		
Nephtys incisa			4					8	8		4		12		12		6		6		8						12				8				4
Nephtys picta																6				8		16		4		8			8	4			4			
Nereididae (LPIL)																																				
Neanthes (Nereis) succinea							4																													
Orbiniidae:																																				
Scoloplos (=Leitoscoloplos) robustus												1																				4				

Taxon/Sample Abundance	A1	B1	A2	B2	A3	B3	A4	B4	A5	B5	A6	B6	A7	B7	A8	B8	A9	B9	A10	B10	A11	B11	A12	B12	A13	B13	A14	B14	A15	B15	A16	A17	A18	A19	A20	A21
Paraonidae:																																				
Aricidea (LPIL)																				12				8		20				4				4		4
Levinsenia gracilis																																				
Paraonis fulgens																																				
Pectinariidae:																																				
Cistenides (=Pectinaria) hyperborea	4				12	20		4	24	8	4	1	8	4	8		18		4	4	16				36	4	8	12	12	4	20	4	18	16	4	4
Polynoidae (LPIL):																							4													
Eunoe nodosa																																				
Harmothoe extenuata											2													2												
Sabellariidae:																																				
Sabellaria vulgaris																							4													
Sabellidae:																																				
Pseudopotamilla (=Potamilla) reniformis																																				
Demonax (=Sabella) microphthalma																																				
Scalibregmidae:																																				4
Scalibregma inflatum					16			8		8		3		4		2	2			8		12		12		32		8	8	12		16	2	12	8	
Sigalionidae:																																				
Sthenelais boa																																			4	
Spionidae (LPIL):						4																		6											4	
Polydora cornuta	40			6	8	4	16	16		16	4	31		12	16	8	12	4		8	48	16	16	10		20	56		316	4	4	16				
Spiophanes bombyx					4							4		4		2						12				8				8						

Taxon/Sample Abundance	A1	B1	A2	B2	A3	B3	A4	B4	A5	B5	A6	B6	A7	B7	A8	B8	A9	B9	A10	B10	A11	B11	A12	B12	A13	B13	A14	B14	A15	B15	A16	A17	A18	A19	A20	A21
Streblospio benedicti	44					4						1					2							6			8		8	4			2			
Syllidae (LPIL):											2	1																								
Brania wellfleetensis																		4					12					4	16							
Syllides (LPIL)											2																									
Phyllodocidae (LPIL):																																				
Eteone (LPIL)																																				
Anaitides (=Phyllodoce) mucosa					4						2							4			4			4		4	8		4	8					8	
Mollusca:																																				
Gastropoda (LPIL):							4		4																4						4					
Calyptraeidae:																																				
Crepidula fornicata								4			8	39		8			4							36		8								4	20
Crepidula plana												11												6		4	12								4
Muricidae:																																				
Eupleura caudata																	2																			
Nassariidae:																																				
Nassarius (=Ilyanassa) trivittatus		4	4	3	8	4			8	8			16		8	2	2		4					2	4	4	4		4	4		4	10	8		
Retusidae:																																				
Acteocina canaliculata															4				2		8															
Pyramidellidae:																																				
Turbonilla (LPIL)	32	16		3	4				8			4	12	8		2	2		2	4	4				12	12	8			4	4				4	
Bivalvia (LPIL):	12	32	4				4		8	8	4	3	4	8	8	4	10		4			12		2	28	8		4	32				4	8		
Arcidae:																																				
Anadara transversa												1												4				4								
Pandoridae:																																				
Pandora gouldiana		8		6		12				8		6		4								4				12										
Tellinidae:																																				
Tellina agilis	4		4	6			4		16	8	2	3									12						4	4	4		4					4
Thraciidae:																																				
Thracia (LPIL)	4		4						12		4						6		2	8	28				12		16		12		8		8		4	
Lyonsiidae																																				
Lyonsia hyalina											2		4														4	4	4		8		8		12	4
Nuculidae:																																				
Nucula proxima			204																2														2			
Veneridae:																																				
Pitar morrhuanus		8	4		4			8		16				4						4		4		2		4									4
Yoldiidae:																																				
Yoldia (LPIL)	4																																			

Taxon/Sample Abundance	A1	B1	A2	B2	A3	B3	A4	B4	A5	B5	A6	B6	A7	B7	A8	B8	A9	B9	A10	B10	A11	B11	A12	B12	A13	B13	A14	B14	A15	B15	A16	A17	A18	A19	A20	A21
Sipuncula																																				
Phascolion strombus													8						4												4					
Crustacea:																																				
Ostracoda (LPIL)											10						2		2														4			
Amphipoda (LPIL):																																				4
Ampeliscidae:																																				
Ampelisca abdita					12	8		4		16	6	6		16		4		4		12				38		28		16		60				12	4	
Aoridae (LPIL):																																				
Leptocheirus pinguis											2		4																4			4	4	12		
Unciola (LPIL)												1												4						4				4		
Unciola irrorata	12	4											8																							
Corophiidae:																																				
Corophium (LPIL)																						8				4			8				2			
Mysida: Mysidae (LPIL)																								2							4					
Heteromysis formosa																																				
Decapoda:																																				
Crangon septemspinosa																										4										
Anomura: *Pagurus longicarpus*												1						4												4						
Porcellanidae (LPIL)	4																																			
Brachyura: Xanthidae (LPIL):					4		4	8	4		2	3					2			8			4	6	4		4	4		4	8	4	2			
Dyspanopeus (=Neopanope) sayi																					4								8						4	
Pisces: Gobiidae (LPIL)																																				
Total sample abundance	348	256	236	267	420	1656	280	428	628	272	384	245	166	720	252	130	276	324	66	1348	316	612	206	608	376	1020	416	856	1256	564	620	412	1320	1252	220	344
Sample ID A = Borrow Area A																																				
Sample ID B = Borrow Area B																																				

Taxon/Sample Abundance	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	Total/species, all samples
Nematoda (LPIL)	408	38	368	408	416	276	252	80	104	212	212	164	304	240	13858
Annelida: Oligochaeta (LPIL)	120	28	168	116	88	108	76	44	56	28	16	48	40	92	2914
Annelida: Polychaeta (LPIL):															1
Ampharetidae (LPIL)	8			28											67
Ampharete (LPIL)	16	1	12				8								321
Ampharete lindstroemi	4						8	10	12	16	8	4	12	24	290
Asabellides oculata															16
Melinna (LPIL)															4
Arabellidae (LPIL):															4
Drilonereis longa									4						4
Capitellidae:															
Mediomastus (LPIL)								8							50
Cossuridae:															
Cossura longocirrata				4			68		52		12	8	16		490
Cirratulidae (LPIL)	60	33		96	256	40	56	26	72	32	64	52	56	64	2841
Chaetozone sp. A															2
Tharyx (LPIL)	4	3		4	8		4	4	4	20	80	12	12	16	301
Eunicidae:															
Marphysa (LPIL)															4
Flabelligeridae (LPIL):															2
Pherusa plumosa					8										22
Glyceridae:															
Glycera (LPIL):	12	1													68
Glycera americana															7
Hesionidae (LPIL)															6
Maldanidae (LPIL):		1													21
Asychis (=Sabaco) elongata															71
Euclymene zonalis							24	2	12		4		4	4	71
Praxillella praetermissa															40
Nephtyidae:															
Nephtys (LPIL)	4	1		4	8					4					273
Nephtys incisa							12	6	8		8		8	8	142
Nephtys picta	4				8										70
Nereididae (LPIL)						4		2							6
Neanthes (Nereis) succinea													4		8
Orbiniidae:															
Scoloplos (=Leitoscoloplos) robustus															5

Taxon/Sample Abundance	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	Total/species, all samples
Paraonidae:															
Aricidea (LPIL)		3	4		8	4		14	12	12	12	12	12	16	161
Levinsenia gracilis										8					8
Paraonis fulgens								2							2
Pectinariidae:															
Cistenides (=Pectinaria) hyperborea		2					76								359
Polynoidae (LPIL):	8		8												20
Eunoe nodosa				4											4
Harmothoe extenuata	4														8
Sabellariidae:															
Sabellaria vulgaris		2	12	4	8						8	12	4	4	58
Sabellidae:															
Pseudopotamilla (=Potamilla) reniformis									4						4
Demonax (=Sabella) microphthalma	4														4
Scalibregmidae:															4
Scalibregma inflatum	4	1		4	8				4	8	4	4			210
Sigalionidae:															
Sthenelais boa						4									8
Spionidae (LPIL):	4		12	8		12	20								70
Polydora cornuta	4	4	12	16	16		40	18	36		44	44	20	48	1009
Spiophanes bombyx													12		54

Taxon/Sample Abundance	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	Total/species, all samples
Streblospio benedicti	4	2	4	16	8	4	56	6			4			8	191
Syllidae (LPIL):					8									4	15
Brania wellfleetensis	16	1				12	4		8			4			81
Syllides (LPIL)															2
Phyllodocidae (LPIL):			4												4
Eteone (LPIL)			4												4
Anaitides (=Phyllodoce) mucosa		4					8		4	4		4	8	4	86
Mollusca:															
Gastropoda (LPIL):				4	8	4									32
Calyptraeidae:															
Crepidula fornicata	36			4					28		8				207
Crepidula plana											4	12			53
Muricidae:															
Eupleura caudata															2
Nassariidae:															
Nassarius (=Ilyanassa) trivittatus							4						4		123
Retusidae:															0
Acteocina canaliculata															14
Pyramidellidae:															
Turbonilla (LPIL)							12						8	4	169
Bivalvia (LPIL):			4			4	40						16		275
Arcidae:															
Anadara transversa															9
Pandoridae:															
Pandora gouldiana														4	64
Tellinidae:															
Tellina agilis	4		12	4			8	6	8		8	12	12	12	165
Thraciidae:															
Thracia (LPIL)		1		4			68		4						205
Lyonsiidae															
Lyonsia hyalina	12		4	8			4	2				4		8	92
Nuculidae:															
Nucula proxima							4								212
Veneridae:															
Pitar morrhuanus				4					4	4		4			78
Yoldiidae:															
Yoldia (LPIL)															4

Taxon/Sample Abundance	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	Total/species, all samples
Sipuncula															
Phascolion strombus															16
Crustacea:															
Ostracoda (LPIL)							4								22
Amphipoda (LPIL):			4												8
Ampeliscidae:															
Ampelisca abdita	16				8	8	4	4			2			12	300
Aoridae (LPIL):							4								4
Leptocheirus pinguis															30
Unciola (LPIL)	8														21
Unciola irrorata															24
Corophiidae:															
Corophium (LPIL)							8								30
Mysida: Mysidae (LPIL)											4				10
Heteromysis formosa							4								4
Decapoda:															
Crangon septemspinosa															4
Anomura: *Pagurus longicarpus*				8											17
Porcellanidae (LPIL)															4
Brachyura: Xanthidae (LPIL):	4		4	4			8	4	12					4	115
Dyspanopeus (=Neopanope) sayi				12											28
Pisces: Gobiidae (LPIL)											4				4
Total sample abundance	768	126	636	764	864	480	884	238	448	348	506	400	552	576	26690
Sample ID A = Borrow Area A															
Sample ID B = Borrow Area B															

Asharoken Borrow Area Investigation
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Name/Site: wet weight (g)	1A	ww	2A	ww	3A	ww	4A	ww	5A	ww	6A	ww	7A	ww	8A	ww	9A	ww	10A
BRYOZOZA																			
*Bowerbankia gracilis**			1		1						1		1				1		
*Bowerbankia imbricata**			1		1						1		1				1		
MOLLUSCA/Pelecypoda																			
Anadara transversa													1	0.0011					
Gemma gemma	1	0.0001			2	0.0001			4	0.0003									
Ensis directus					1	0.0835													
Hiatella spp.																			
Mercenaria mercenaria	2	5.7782	56	42.6755	1	5.4212			6	8.0009					1	0.245			1
Mulinia lateralis			3	1.8891							6	0.0043					2	0.0021	
Mya arenaria																			
Nucula proxima	1	0.0001	55	2.4375					5	0.0006					2	0.0056			
Pandora gouldiana			5	2.7657			18	8.8667							1	0.0089	2	0.0034	2
Pitar morrhuanus					1	12.0665	39	98.4495							3	67.9221	1	9.0008	16
Tellina agilis	1	0.0002							10	0.0023	10	0.0678	1	0.0006					
Yoldia limatula																			
MOLLUSCA/Gastropoda																			
Acteocina canaliculata (Retusa c.)													3	0.0019					
Boonea bisuturalis (Odostomia b.)													2	0.0049					
Crepidula convexa																	1	0.0005	
Crepidula fornicata							3	4.4493											
Crepidula plana																			
Illyanassa obsoleta					1	0.1899	1	0.6774					3	0.3827					8
Urosalpinx cinerea																			
ANNELIDA																			
polytroch larvae***			>100								3								8
Ampharete acutifrons			2	0.0007			4	0.0045			10	0.0022			4	0.0068			9
Ampharete finmarchica	23	0.2389	1	0.0001	21	0.6756	23	0.08989	7	0.0098	12	0.0135			3	0.0021	23	0.0301	18
Amphicteis gunneri					9	0.0124							13	0.0199					
Amphitrite ornata											4	0.0067							
Arenicola marina																			
Asychis elongata	4	0.1099							19	0.10977							13	7.8809	23
Asychis elongata (juveniles)			2																51
Autolytus cornutus															3	0.0006			
Capitella capitata	2	0.0003	17	0.0034			12	0.0067	56	0.0067			26	0.0031	5	0.0091			58

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Name/Site: wet weight (g)	ww	11A	ww	12A	ww	13A	ww	14A	ww	15A	ww	16A	ww	17A	ww	18A	ww	19A	ww
BRYOZOZA																			
*Bowerbankia gracilis**				1				1				1		1		1			
*Bowerbankia imbricata**				1				1				1		1		1			
MOLLUSCA/Pelecypoda																			
Anadara transversa										7	4.5298								
Gemma gemma		59	0.59945					3	0.0002										
Ensis directus														1	0.0056				
Hiatella spp.																			
Mercenaria mercenaria	13.7785	5	7.8894																
Mulinia lateralis						2	0.0442	6	0.0199			2	0.0051	2	0.0068				
Mya arenaria		4	0.0201																
Nucula proxima				23	1.3344											4	0.0017	1	0.0002
Pandora gouldiana	1.4539	34	10.8867																
Pitar morrhuanus	216.0095					3	2.1449			1	7.7509							3	8.1127
Tellina agilis				8	0.8864							1	0.0002						
Yoldia limatula																		1	0.3294
MOLLUSCA/Gastropoda																			
Acteocina canaliculata (Retusa c.)																			
Boonea bisuturalis (Odostomia b.)																			
Crepidula convexa																			
Crepidula fornicata				17	18.2231					43	45.1283								
Crepidula plana				6	0.7591					5	3.2157								
Illyanassa obsoleta	4.9952					3	0.2875											1	0.0912
Urosalpinx cinerea										2	0.5651								
ANNELIDA																			
polytroch larvae***																			
Ampharete acutifrons	0.3378					29	1.7786					41	4.5561	4	0.0774	46	1.0272		
Ampharete finmarchica	0.0893					14	1.9988	56	3.0056	12	0.9224	33	6.9911	9	0.1877	31	0.8911	19	2.0009
Amphicteis gunneri																		5	0.0101
Amphitrite ornata																			
Arenicola marina																			
Asychis elongata	3.7786																		
Asychis elongata (juveniles)																			
Autolytus cornutus																			
Capitella capitata	5.5539							3	0.0009										

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Name/Site: wet weight (g)	20A	ww	21A	ww	22A	ww	23A	ww	24A	ww	25A	ww	26A	ww	27A	ww	28A	ww	29A
BRYOZOZA																			
*Bowerbankia gracilis**	1		1				1						1				1		1
*Bowerbankia imbricata**	1		1		1		1						1				1		1
MOLLUSCA/Pelecypoda																			
Anadara transversa			1	0.0011															
Gemma gemma																			
Ensis directus																			
Hiatella spp.													6	2.0334					
Mercenaria mercenaria					1	5.667			1	25.6019					1	2.6679			2
Mulinia lateralis					2	0.0619			3	0.0039									
Mya arenaria																			
Nucula proxima																			
Pandora gouldiana	1	1.3609			1	1.3412			1	0.7942			1	0.0897	1	0.0045	9	6.7702	
Pitar morrhuanus			2	0.0445	1	4.6671											34	146.8874	1
Tellina agilis			4	0.0056	1	0.0022					4	0.0039	4	0.0284					3
Yoldia limatula													1	0.0023					
MOLLUSCA/Gastropoda																			
Acteocina canaliculata (Retusa c.)																			
Boonea bisuturalis (Odostomia b.)																			
Crepidula convexa																			
Crepidula fornicata	1	0.0087	7	3.7774	1	0.0751					1	0.0076					5	7.0933	2
Crepidula plana					1	0.0087													6
Illyanassa obsoleta																			
Urosalpinx cinerea																			
ANNELIDA																			
polytroch larvae***																			
Ampharete acutifrons	4	0.0077	16	0.0093	37	0.0304					49	4.0056	8	0.0092			10	0.0891	33
Ampharete finmarchica	29	1.5538	45	4.9987	19	0.0023	32	3.0112	36	2.9988	32	2.884	2	0.0067	78	2.9974	12	0.0782	12
Amphicteis gunneri							5	0.0089											
Amphitrite ornata			3	0.1098															
Arenicola marina																			
Asychis elongata																			
Asychis elongata (juveniles)																			
Autolytus cornutus			6	0.0128									69	2.6675					
Capitella capitata													23	2.6691			4	0.0011	

Asharoken Borrow Area Investigation
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Name/Site: wet weight (g)	ww	30A	ww	31A	ww	32A	ww	33A	ww	34A	ww	35A	ww	Total number of occupied sites (A Sites)	Percent site occupation (A Sites)
BRYOZOZA															
*Bowerbankia gracilis**										1		1		**19**	**0.54**
*Bowerbankia imbricata**										1		1		**20**	**0.57**
MOLLUSCA/Pelecypoda															
Anadara transversa				9	14.9964									**5**	**0.14**
Gemma gemma		1	,0001											**7**	**0.20**
Ensis directus		1	0.0665											**4**	**0.11**
Hiatella spp.														**2**	**0.06**
Mercenaria mercenaria	6.772	1	2.6755									4	54.9871	**13**	**0.37**
Mulinia lateralis										3	0.0072			**11**	**0.31**
Mya arenaria														**2**	**0.06**
Nucula proxima				3	0.0002	17	0.8876	45	2.8776					**11**	**0.31**
Pandora gouldiana														**12**	**0.34**
Pitar morrhuanus	8.9956	11	67.4432	8	78.1241							6	39.9932	**16**	**0.46**
Tellina agilis	0.0078	23	8.5543			4	0.3772	6	0.6744	5	0.0056			**16**	**0.46**
Yoldia limatula														**3**	**0.09**
MOLLUSCA/Gastropoda															
Acteocina canaliculata (Retusa c.)														**2**	**0.06**
Boonea bisuturalis (Odostomia b.)														**2**	**0.06**
Crepidula convexa												6	19.0087	**3**	**0.09**
Crepidula fornicata	0.0666			23	102.7851	34	39.0015	19	7.0334					**13**	**0.37**
Crepidula plana	0.0209			2	1.9932	6	0.6689	2	0.8876					**8**	**0.23**
Illyanassa obsoleta														**7**	**0.20**
Urosalpinx cinerea		1	0.437	1	0.1095									**4**	**0.11**
ANNELIDA															
polytroch larvae***														**4**	**0.11**
Ampharete acutifrons	0.0298									21	3.0012			**18**	**0.51**
Ampharete finmarchica	0.0178			5	0.0733			14	0.6675	21	2.9987	17	0.00176	**30**	**0.86**
Amphicteis gunneri														**5**	**0.14**
Amphitrite ornata														**3**	**0.09**
Arenicola marina										12	2.4451			**2**	**0.06**
Asychis elongata		1	0.0023									19	9.2245	**7**	**0.20**
Asychis elongata (juveniles)														**3**	**0.09**
Autolytus cornutus														**4**	**0.11**
Capitella capitata		22	0.03329											**12**	**0.34**

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Name/Site: wet weight (g)	Total number of individuals (A Sites)		1B	ww	2B	ww	3B	ww	4B	ww	5B	ww	6B	ww	7B	ww	8B
BRYOZOZA																	
*Bowerbankia gracilis**	**18**						1										
*Bowerbankia imbricata**	**19**				1		1				1						
MOLLUSCA/Pelecypoda	**0**																
Anadara transversa	**18**																
Gemma gemma	**70**																
Ensis directus	**3**						2	0.19978			1	0.0056					
Hiatella spp.	**6**																
Mercenaria mercenaria	**82**		1	0.0002	1	12.2076	3	6.77823	7	125.0097			2	0.6751	1	12.0077	
Mulinia lateralis	**31**																
Mya arenaria	**4**				4	2.6588							1	0.4599			
Nucula proxima	**156**																
Pandora gouldiana	**76**								2	1.4539	1	1.7685			12	21.2231	
Pitar morrhuanus	**130**						5	67.8977	16	216.0095	2	13.6661			7	154.9005	5
Tellina agilis	**85**												7	0.0558	15	0.0066	9
Yoldia limatula	**2**																
MOLLUSCA/Gastropoda	**0**																
Acteocina canaliculata (Retusa c.)	**3**																
Boonea bisuturalis (Odostomia b.)	**2**																
Crepidula convexa	**7**																
Crepidula fornicata	**156**																
Crepidula plana	**28**																
Illyanassa obsoleta	**17**						5	0.6509	2	2.0074							5
Urosalpinx cinerea	**4**																
ANNELIDA	**0**																
polytroch larvae***	**111**								5						67		
Ampharete acutifrons	**327**								12	1.8001	48	6.3302	3	0.0003	1	0.0031	1
Ampharete finmarchica	**659**		34	0.2877	5	0.0021			4	0.3329	62	15.8091	45	0.8091	34	0.0298	5
Amphicteis gunneri	**32**																
Amphitrite ornata	**7**												1	0.0001			
Arenicola marina	**12**																
Asychis elongata	**79**																
Asychis elongata (juveniles)	**53**		10	0.0004	5												
Autolytus cornutus	**78**																
Capitella capitata	**228**		1	0.0001	21	0.0056			58	5.5539							

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Name/Site: wet weight (g)	ww	9B	ww	10B	ww	11B	ww	12B	ww	13B	ww	14B	ww	15B	ww	Total number of occupied sites (B Sites)	Percent site occupation (B Sites)
BRYOZOZA																	
*Bowerbankia gracilis**				1		1		1								**4**	**0.27**
*Bowerbankia imbricata**				1		1		1		1						**7**	**0.47**
MOLLUSCA/Pelecypoda																	
Anadara transversa		2	0.0076													**1**	**0.07**
Gemma gemma												6	0.0023	10	0.0045	**2**	**0.13**
Ensis directus										3	0.0092					**3**	**0.20**
Hiatella spp.																**0**	**0.00**
Mercenaria mercenaria										1	2.009					**7**	**0.47**
Mulinia lateralis																**0**	**0.00**
Mya arenaria																**2**	**0.13**
Nucula proxima																**0**	**0.00**
Pandora gouldiana				29	7.9924	12	5.8862	3	2.001	3	2.9967					**7**	**0.47**
Pitar morrhuanus	2.6671									1	4.9967					**6**	**0.40**
Tellina agilis	6.7833									1	0.0005	7	0.0067	2	0.0011	**6**	**0.40**
Yoldia limatula																**0**	**0.00**
MOLLUSCA/Gastropoda																	
Acteocina canaliculata (Retusa c.)																**0**	**0.00**
Boonea bisuturalis (Odostomia b.)																**0**	**0.00**
Crepidula convexa																**0**	**0.00**
Crepidula fornicata		6	19.0087			5	2.7761	3	2.001			3	0.023	7	0.0082	**5**	**0.33**
Crepidula plana				27	15.9972	2	0.0067	7	0.0123							**3**	**0.20**
Illyanassa obsoleta	6.9982			3	0.9927							8	2.0089	9	2.8117	**6**	**0.40**
Urosalpinx cinerea																**0**	**0.00**
ANNELIDA																	
polytroch larvae***																**2**	**0.13**
Ampharete acutifrons	0.0001	4	0.0019	23	0.0187	12	0.0132	31	1.7893	21	1.0334					**10**	**0.67**
Ampharete finmarchica	0.0076	19	0.0234	14	0.9773	8	0.0089	4	0.0023	78	8.2267					**12**	**0.80**
Amphicteis gunneri																**0**	**0.00**
Amphitrite ornata																**1**	**0.07**
Arenicola marina												1	0.3005	5	0.9445	**2**	**0.13**
Asychis elongata				1	0.0067											**1**	**0.07**
Asychis elongata (juveniles)																**2**	**0.13**
Autolytus cornutus																**0**	**0.00**
Capitella capitata		29	0.0056	12	0.9987	34	1.2311	4	0.0201	104	6.0056	88	6.0098	101	7.9908	**10**	**0.67**

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Name/Site: wet weight (g)	Total number of individuals (B Sites)		Total of occupied sites (A + B Sites)	Percent site Percent site occupation (A + B Sites)	Total number of individuals (A + B Sites)
BRYOZOZA					
*Bowerbankia gracilis**	4		23	0.46	22
*Bowerbankia imbricata**	7		27	0.54	26
MOLLUSCA/Pelecypoda					
Anadara transversa	2		6	0.12	20
Gemma gemma	16		9	0.18	86
Ensis directus	6		7	0.14	9
Hiatella spp.	0		2	0.04	6
Mercenaria mercenaria	16		20	0.4	98
Mulinia lateralis	0		11	0.22	31
Mya arenaria	5		4	0.08	9
Nucula proxima	0		11	0.22	156
Pandora gouldiana	62		19	0.38	138
Pitar morrhuanus	36		22	0.44	166
Tellina agilis	41		22	0.44	126
Yoldia limatula	0		3	0.06	2
MOLLUSCA/Gastropoda					
Acteocina canaliculata (Retusa c.)	0		2	0.04	3
Boonea bisuturalis (Odostomia b.)	0		2	0.04	2
Crepidula convexa	0		3	0.06	7
Crepidula fornicata	24		18	0.36	180
Crepidula plana	36		11	0.22	64
Illyanassa obsoleta	32		13	0.26	49
Urosalpinx cinerea	0		4	0.08	4
ANNELIDA					
polytroch larvae***	72		6	0.12	>183
Ampharete acutifrons	156		28	0.56	483
Ampharete finmarchica	312		42	0.84	971
Amphicteis gunneri	0		5	0.1	32
Amphitrite ornata	1		4	0.08	8
Arenicola marina	6		4	0.08	18
Asychis elongata	1		8	0.16	80
Asychis elongata (juveniles)	15		5	0.1	68
Autolytus cornutus	0		4	0.08	78
Capitella capitata	452		22	0.44	680

Name/Site: wet weight (g)	1A	ww	2A	ww	3A	ww	4A	ww	5A	ww	6A	ww	7A	ww	8A	ww	9A	ww	10A
Cirriformia grandis (Cirratulus g.)																			
Cirriformia grandis (Cirratulus g.) (juveniles)			32	0.0078	78	0.9877			1						4				
Clymenella torquata			2	0.0327									7	0.7883					56
Clymenella torquata (juveniles)									77	4.889			10	0.0478					
Cossura longocirrata															1	0.0073			
Drilonereis longa											36	7.7731							
Eteone lactea															2	0.0001			
Eteone lactea (juveniles)															23	0.0002			
Eteone longa															1				
Eumida sanguinea															2	0.0078			
Glycera americana	1	0.8976							5	2.0808									2
Glycera dibranchiata									1	0.0043					3	0.6652			
*Glycera spp. (heads)***															6				
Glycera spp. (juveniles)													12	0.0003					
Glycinde solitaria			1	0.1784											5	0.0078			
*Glycinde solitaria (heads)***													4		3				
Haploscoloplos robustus (Scoloplos r.)			2	0.0001	26	3.3309	21	2.7743							7	2.5541			6
Harmothoe imbricata																			
Heteromastus filiformis																			
Hydroides dianthus																			
Leitoscoloplos fragilis (Scoloplos f.)							3	0.0853											
Lumbrinereis tenuis																			
Maldane sarsi									5	9.0056									14
Maldane sarsi (juveniles)									44	8.0001									3
Nephtys bucea	6	2.5655							6	1.667			9	7.779					
Nephtys picta			4		9	0.4567	5	2.7864			24	15.0078	11	3.5507			6	0.8977	
*Nephtys picta (heads)***							13		3		23		20				20		9
Nereis spp. (juveniles)											5	0.0031							20
Nereis succinea					1	1.1189			1	0.0009									12
Nereis virens							5	4.7785									2	4.0073	3
Notomastus latericeus																0.0002			
Paranaitis speciosa							4	0.2113											
Paraonis gracilis																			
Pectinaria gouldii					3	0.1546	1	0.2377			1	0.0089	3	0.1346			2	0.1002	4
Pherusa affinis			1	1.002															
Polydora ligni					1		56	0.2298	12	0.0005	1	0.0001			6	0.0008	3	0.0002	45
Polydora spp. (juveniles)									>100						4				
Potamilla reniformis																			

Name/Site: wet weight (g)	ww	11A	ww	12A	ww	13A	ww	14A	ww	15A	ww	16A	ww	17A	ww	18A	ww	19A	ww
Cirriformia grandis (Cirratulus g.)						15	1.7749	30	2.0077			39	0.9927					3	0.1156
Cirriformia grandis (Cirratulus g.) (juvenile																			
Clymenella torquata	13.6729	12	4.8871			42	23.2289	5	3.885	2	0.3771	27	3.9956			12	0.5615	11	9.0023
Clymenella torquata (juveniles)		12	0.0331							4	0.0002					56	0.1886		
Cossura longocirrata						1	0.0073												
Drilonereis longa						17	0.0069			19	0.0099	21	0.4452	56	0.6001				
Eteone lactea																			
Eteone lactea (juveniles)																			
Eteone longa																			
Eumida sanguinea																			
Glycera americana	0.7839																	1	0.0056
Glycera dibranchiata		1	0.8956			2	0.0299	3	0.0203			35	3.7781					3	0.0223
*Glycera spp. (heads)***																		10	
Glycera spp. (juveniles)																46	0.1008		
Glycinde solitaria		5	2.5562					6	0.01556										
*Glycinde solitaria (heads)***																			
Haploscoloplos robustus (Scoloplos r.)	0.0078																		
Harmothoe imbricata																			
Heteromastus filiformis								2	0.0023										
Hydroides dianthus																1	0.0517		
Leitoscoloplos fragilis (Scoloplos f.)												18	0.0188						
Lumbrinereis tenuis																			
Maldane sarsi	5.7731	4	2.8967			9	6.8873												
Maldane sarsi (juveniles)	0.0034	1	0.0001																
Nephtys bucea						8	2.0062	1	0.0034			29	1.9956			6	1.7739	17	9.3326
Nephtys picta		2	0.08443					4	3.1145			11	1.4432	1	0.0288	4	0.1089	12	9.0777
*Nephtys picta (heads)***		4										34		8					
Nereis spp. (juveniles)																			
Nereis succinea	4.7762							3	1.2366										
Nereis virens	3.7781																		
Notomastus latericeus																			
Paranaitis speciosa						6	0.0663												
Paraonis gracilis																			
Pectinaria gouldii	0.0107	29	2.7892			2	0.1332							2	0.0188			3	0.155
Pherusa affinis								1	0.3288										
Polydora ligni	2.9945													10	0.00005				
Polydora spp. (juveniles)														41					
Potamilla reniformis										16	0.1339								

Name/Site: wet weight (g)	20A	ww	21A	ww	22A	ww	23A	ww	24A	ww	25A	ww	26A	ww	27A	ww	28A	ww	29A
Cirriformia grandis (Cirratulus g.)					31	0.8769			19	2.9988	20	0.3444							2
Cirriformia grandis (Cirratulus g.) (juvenile																			
Clymenella torquata									6	8.0097	6	1.0042							
Clymenella torquata (juveniles)			29	0.5644															
Cossura longocirrata																			
Drilonereis longa			6	0.0231	14	0.0665	12	0.00299	7	0.0023	12	0.0078							6
Eteone lactea															98	0.3981			
Eteone lactea (juveniles)																			
Eteone longa																			
Eumida sanguinea					16	0.0783													10
Glycera americana																			
Glycera dibranchiata	18	8.1125			9	1.0897	2	0.7611			31	2.4437	16	8.4322	56	7.3218			2
*Glycera spp. (heads)***							6						17						
Glycera spp. (juveniles)													4						
Glycinde solitaria							4	0.0083											
*Glycinde solitaria (heads)***																			
Haploscoloplos robustus (Scoloplos r.)																			
Harmothoe imbricata			3	0.4223															
Heteromastus filiformis																			
Hydroides dianthus																			
Leitoscoloplos fragilis (Scoloplos f.)			10	0.9987	12	1.0776	16	0.0896							66	0.0301			4
Lumbrinereis tenuis																			
Maldane sarsi																			
Maldane sarsi (juveniles)																			
Nephtys bucea	6	0.7998	2	1.0067	6	7.1121													3
Nephtys picta							3	5.0021	9	7.0022			8	6.9982			9	3.0021	
*Nephtys picta (heads)***													4				23		
Nereis spp. (juveniles)																			
Nereis succinea	2	1.0041							4	3.7764	1	0.4522							
Nereis virens																			
Notomastus latericeus																			
Paranaitis speciosa																	1		
Paraonis gracilis																			
Pectinaria gouldii																	2	0.0337	
Pherusa affinis																			
Polydora ligni											10	0.0009					1		
Polydora spp. (juveniles)											34						23		
Potamilla reniformis			6	3.7761															

Name/Site: wet weight (g)	ww	30A	ww	31A	ww	32A	ww	33A	ww	34A	ww	35A	ww	Total number of occupied sites (A Sites)	Percent site occupation (A Sites)
Cirriformia grandis (Cirratulus g.)	0.0001									31	0.8879			**10**	**0.29**
Cirriformia grandis (Cirratulus g.) (juvenile		8												**6**	**0.17**
Clymenella torquata				1	1.0002			5	2.6654	12	2.0041			**16**	**0.46**
Clymenella torquata (juveniles)		34	2.0071	10	0.0012			3	0.0001					**10**	**0.29**
Cossura longocirrata														**3**	**0.09**
Drilonereis longa	0.0189			27	0.0144			7	0.0045	7	0.0322			**15**	**0.43**
Eteone lactea														**2**	**0.06**
Eteone lactea (juveniles)														**2**	**0.06**
Eteone longa														**2**	**0.06**
Eumida sanguinea	0.0443													**4**	**0.11**
Glycera americana														**5**	**0.14**
Glycera dibranchiata	0.9978	2	0.8776							21	2.0089			**16**	**0.46**
*Glycera spp. (heads)***														**5**	**0.14**
Glycera spp. (juveniles)														**4**	**0.11**
Glycinde solitaria														**6**	**0.17**
*Glycinde solitaria (heads)***														**3**	**0.09**
Haploscoloplos robustus (Scoloplos r.)														**6**	**0.17**
Harmothoe imbricata														**2**	**0.06**
Heteromastus filiformis														**2**	**0.06**
Hydroides dianthus														**2**	**0.06**
Leitoscoloplos fragilis (Scoloplos f.)	0.0776									9	0.0076			**8**	**0.23**
Lumbrinereis tenuis														**1**	**0.03**
Maldane sarsi														**5**	**0.14**
Maldane sarsi (juveniles)														**4**	**0.11**
Nephtys bucea	2.0008									34	2.0452			**14**	**0.40**
Nephtys picta										10	0.4429	11	2.8966	**19**	**0.54**
*Nephtys picta (heads)***										35		2		**14**	**0.40**
Nereis spp. (juveniles)														**3**	**0.09**
Nereis succinea		4	0.3009											**9**	**0.26**
Nereis virens														**4**	**0.11**
Notomastus latericeus														**1**	**0.03**
Paranaitis speciosa														**4**	**0.11**
Paraonis gracilis														**1**	**0.03**
Pectinaria gouldii												4	3.1156	**13**	**0.37**
Pherusa affinis														**3**	**0.09**
Polydora ligni		2										1		**13**	**0.37**
Polydora spp. (juveniles)		2												**7**	**0.20**
Potamilla reniformis				38	1.3399			19	0.4008					**5**	**0.14**

Name/Site: wet weight (g)	Total number of individuals (A Sites)		1B	ww	2B	ww	3B	ww	4B	ww	5B	ww	6B	ww	7B	ww	8B
Cirriformia grandis (Cirratulus g.)	**190**				3	0.0002											
Cirriformia grandis (Cirratulus g.) (juvenile	**123**						6	0.0878									
Clymenella torquata	**206**										16	2.5652					
Clymenella torquata (juveniles)	**235**																
Cossura longocirrata	**2**																
Drilonereis longa	**247**												6	0.0104			
Eteone lactea	**100**																
Eteone lactea (juveniles)	**23**																
Eteone longa	**1**																
Eumida sanguinea	**28**																
Glycera americana	**9**																
Glycera dibranchiata	**205**										18	8.0932					
*Glycera spp. (heads)***	**39**				3						4						
Glycera spp. (juveniles)	**62**				34						23						
Glycinde solitaria	**21**																
*Glycinde solitaria (heads)***	**7**																
Haploscoloplos robustus (Scoloplos r.)	**62**						69	8.0016	3	0.0056							
Harmothoe imbricata	**3**																
Heteromastus filiformis	**2**								1	0.0001							
Hydroides dianthus	**1**																
Leitoscoloplos fragilis (Scoloplos f.)	**138**																
Lumbrinereis tenuis	**0**																
Maldane sarsi	**32**										7	8.0662					
Maldane sarsi (juveniles)	**48**										14	14.0044					
Nephtys bucea	**133**		1	0.0001											9	0.03488	
Nephtys picta	**143**										20	1.0601					
*Nephtys picta (heads)***	**198**		45						6		23						
Nereis spp. (juveniles)	**25**								10		9	0.0001					
Nereis succinea	**28**						2	3.0001							34	9.7714	
Nereis virens	**10**								2	3.2887					2	0.7784	
Notomastus latericeus	**0**						1	0.0001							1	0.0052	
Paranaitis speciosa	**11**								23	4.0981							
Paraonis gracilis	**0**																
Pectinaria gouldii	**56**						10	3.7789	1	0.0078							
Pherusa affinis	**2**																
Polydora ligni	**148**						3	0.0002	67	4.9917	22	0.0034					
Polydora spp. (juveniles)	**204**																
Potamilla reniformis	**79**																

Name/Site: wet weight (g)	ww	9B	ww	10B	ww	11B	ww	12B	ww	13B	ww	14B	ww	15B	ww	Total number of occupied sites (B Sites)	Percent site occupation (B Sites)
Cirriformia grandis (Cirratulus g.)																**1**	**0.07**
Cirriformia grandis (Cirratulus g.) (juvenile																**1**	**0.07**
Clymenella torquata		34	19.6755							19	3.9973					**3**	**0.20**
Clymenella torquata (juveniles)		2	0.0034							3	0.0005					**2**	**0.13**
Cossura longocirrata																**0**	**0.00**
Drilonereis longa				5	0.0034	9	0.0067	17	0.0091			23	0.02003	29	0.03	**6**	**0.40**
Eteone lactea												2	0.0012	8	0.004	**2**	**0.13**
Eteone lactea (juveniles)												2				**1**	**0.07**
Eteone longa												7	0.0034	2	0.003	**2**	**0.13**
Eumida sanguinea												2	0.0023	1	0.0011	**2**	**0.13**
Glycera americana						3	2.003									**1**	**0.07**
Glycera dibranchiata				1	0.8732			1	0.1761	8	2.4453					**4**	**0.27**
*Glycera spp. (heads)***				3		1		4								**5**	**0.33**
Glycera spp. (juveniles)										32						**3**	**0.20**
Glycinde solitaria						1	0.6011									**1**	**0.07**
*Glycinde solitaria (heads)***																**0**	**0.00**
Haploscoloplos robustus (Scoloplos r.)																**2**	**0.13**
Harmothoe imbricata																**0**	**0.00**
Heteromastus filiformis																**1**	**0.07**
Hydroides dianthus																**0**	**0.00**
Leitoscoloplos fragilis (Scoloplos f.)																**0**	**0.00**
Lumbrinereis tenuis												1	0.0561	4	0.2009	**2**	**0.13**
Maldane sarsi		3	5.8977	2	0.7762	6	2.0001	3	1.9987	2	2.9987					**6**	**0.40**
Maldane sarsi (juveniles)		1	0.09987													**2**	**0.13**
Nephtys bucea																**2**	**0.13**
Nephtys picta		5	0.7676													**2**	**0.13**
*Nephtys picta (heads)***										7						**4**	**0.27**
Nereis spp. (juveniles)		17	0.0966	20												**4**	**0.27**
Nereis succinea				4	1.9945	1	0.9365	1	0.3342	5	0.1998					**6**	**0.40**
Nereis virens		4	3.3342													**3**	**0.20**
Notomastus latericeus																**2**	**0.13**
Paranaitis speciosa																**1**	**0.07**
Paraonis gracilis												3	0.0023	8	0.0098	**2**	**0.13**
Pectinaria gouldii												4	0.0031	1	0.0012	**4**	**0.27**
Pherusa affinis																**0**	**0.00**
Polydora ligni		79	0.0379							24	0.0034	1		2		**7**	**0.47**
Polydora spp. (juveniles)																**0**	**0.00**
Potamilla reniformis																**0**	**0.00**

Name/Site: wet weight (g)	Total number of individuals (B Sites)		of occupied sites (A + B Sites)	Percent site occupation (A + B Sites)	Total number of individuals (A + B Sites)
Cirriformia grandis (Cirratulus g.)	3		11	0.22	193
Cirriformia grandis (Cirratulus g.) (juvenile	6		7	0.14	129
Clymenella torquata	69		19	0.38	275
Clymenella torquata (juveniles)	5		12	0.24	240
Cossura longocirrata	0		3	0.06	2
Drilonereis longa	89		21	0.42	336
Eteone lactea	10		4	0.08	110
Eteone lactea (juveniles)	2		3	0.06	25
Eteone longa	9		4	0.08	10
Eumida sanguinea	3		6	0.12	31
Glycera americana	3		6	0.12	12
Glycera dibranchiata	28		20	0.4	233
*Glycera spp. (heads)***	15		10	0.2	54
Glycera spp. (juveniles)	89		7	0.14	151
Glycinde solitaria	1		7	0.14	22
*Glycinde solitaria (heads)***	0		3	0.06	7
Haploscoloplos robustus (Scoloplos r.)	72		8	0.16	134
Harmothoe imbricata	0		2	0.04	3
Heteromastus filiformis	1		3	0.06	3
Hydroides dianthus	0		2	0.04	1
Leitoscoloplos fragilis (Scoloplos f.)	0		8	0.16	138
Lumbrinereis tenuis	5		3	0.06	5
Maldane sarsi	23		11	0.22	55
Maldane sarsi (juveniles)	15		6	0.12	63
Nephtys bucea	10		16	0.32	143
Nephtys picta	25		21	0.42	168
*Nephtys picta (heads)***	81		18	0.36	279
Nereis spp. (juveniles)	56		7	0.14	81
Nereis succinea	47		15	0.3	75
Nereis virens	8		7	0.14	18
Notomastus latericeus	2		3	0.06	2
Paranaitis speciosa	23		5	0.1	34
Paraonis gracilis	11		3	0.06	11
Pectinaria gouldii	16		17	0.34	72
Pherusa affinis	0		3	0.06	2
Polydora ligni	198		20	0.4	346
Polydora spp. (juveniles)	0		7	0.14	204
Potamilla reniformis	0		5	0.1	79

Name/Site: wet weight (g)	1A	ww	2A	ww	3A	ww	4A	ww	5A	ww	6A	ww	7A	ww	8A	ww	9A	ww	10A
Sabella crassicornis																			
Sabellaria vulgaris																			
Scalibregma inflatum					1	0.0207													
Scolecolepides viridis					6	0.0677													
Sigambra tentaculata																	3	0.0028	
*Spionids****					>100	0.2554					>100								
Spiophanes bombyx																			
Streblospio benedicti	56	0.0067	12	0.006	4	0.0001	11	0.0025	156	0.1778	49	0.0459	7	0.0002		0.0008	46	0.0376	
Syllis gracilis					1	0.0023													
Tharyx acutus					38	0.0034	43	0.0045	5	0.0003						0.0039	4	0.0002	7
Tharyx acutus (juveniles)	1				53	0.0067													34
*Oligochaeta****	>100	0.0002	45	0.0231	42	0.0012	9	0.0002	>300	0.0002	>200		10		23		43		30
*Nematoda****	>300		>200	0.0002	>200	0.0002	>400		>300		>900		>200				>250		>500
ARTHROPODA/Copepoda																			
Temora longicornis	45	0.0002	10	0.0001	67	0.0089	2		78	0.0003	36	0.0021	57	0.0089	19	0.0009	4		39
Halicyclops magniceps	10		1		1		2		3		2								3
Tachidius discipes	1		1				1		4						2				3
Alteutha depressa																			
ARTHROPODA/Ostracoda																			
Ostracod spp.	1		3				2		1		2		1						
ARTHROPODA/Amphipoda																			
Ampelisca abdita	1	0.0002			6	0.0023			6	0.0199			1	0.0001	89	7.0934	2	0.0004	67
Corophium insidiosum	1	0.0001							4	0.0002					6	0.0002	2	0.0002	
Corophium tuberculatum																			
Gammarus mucronatus							2	0.01564			1	0.0001							2
Melita nitida											2	0.0003					2	0.0002	
Leptocheirus pinguis											4	2.0009							
Unciola irrorata			3	0.0089															
ARTHROPODA/Decapoda																			
Crangon septemspinosa																			
Pagurus longicarpus							3	34.7768			1	0.2377							
Panopeus herbstii																			
Total taxa present per sample	**19**		**25**		**27**		**25**		**28**		**25**		**23**		**26**		**22**		**30**

Name/Site: wet weight (g)	ww	11A	ww	12A	ww	13A	ww	14A	ww	15A	ww	16A	ww	17A	ww	18A	ww	19A	ww
Sabella crassicornis																			
Sabellaria vulgaris																			
Scalibregma inflatum						1	0.0788							12	1.5563				
Scolecolepides viridis																			
Sigambra tentaculata																			
*Spionids****																			
Spiophanes bombyx		2	0.0562																
Streblospio benedicti		23						113	0.0176	12								4	
Syllis gracilis						6	0.0111					6	0.0056						
Tharyx acutus	0.0031	3						3	0.0001										
Tharyx acutus (juveniles)																			
*Oligochaeta****		7				33		22		5		34		23		4		20	
*Nematoda****		>400				>200		>300		>100		>200		>400		>100		>100	
ARTHROPODA/Copepoda																			
Temora longicornis		3				29		6		40		61	0.0056	10		9		16	
Halicyclops magniceps		8				1		3											
Tachidius discipes		21				1		3						1					
Alteutha depressa								7		3									
ARTHROPODA/Ostracoda																			
Ostracod spp.								3				2		12		10			
ARTHROPODA/Amphipoda																			
Ampelisca abdita	3.7651	5	0.0403					1	0.0134			21	3.0999	9	0.9989	129	5.0094	9	0.0155
Corophium insidiosum												4	0.0258					1	0.0001
Corophium tuberculatum																			
Gammarus mucronatus	0.0056																		
Melita nitida																			
Leptocheirus pinguis												27	4.6671	18	1.3352	36	3.1167	15	2.1167
Unciola irrorata																			
ARTHROPODA/Decapoda																			
Crangon septemspinosa												2	1.0002						
Pagurus longicarpus								1	0.0335							2	1.0034		
Panopeus herbstii										2	0.6232								
Total taxa present per sample		**22**		**6**		**21**		**26**		**16**		**23**		**20**		**18**		**21**	

Name/Site: wet weight (g)	20A	ww	21A	ww	22A	ww	23A	ww	24A	ww	25A	ww	26A	ww	27A	ww	28A	ww	29A
Sabella crassicornis			5	0.0045															
Sabellaria vulgaris			7	0.3342															
Scalibregma inflatum	10	2.5561			2	0.4734	3	1.0998			2	0.9978							5
Scolecolepides viridis																			
Sigambra tentaculata																			
*Spionids****																			
Spiophanes bombyx																			
Streblospio benedicti							13				37	0.0011					2		
Syllis gracilis	47	0.00277	3	0.0045	10	0.0099					18	0.0189							2
Tharyx acutus													3						
Tharyx acutus (juveniles)																			
*Oligochaeta****	2		12		10		43		45	0.0002	8		61	0.0034	1				3
*Nematoda****	>200		>100		>100		>200		>200		>200		>200		>500		>200		>100
ARTHROPODA/Copepoda																			
Temora longicornis	5		16	0.0002	5		12		20		3		3		23		1		29
Halicyclops magniceps																	1		
Tachidius discipes																			
Alteutha depressa																			
ARTHROPODA/Ostracoda																			
Ostracod spp.	4						5				4		3				3		
ARTHROPODA/Amphipoda																			
Ampelisca abdita			23	3.0081	15	1.8973			16	0.1046	8	0.3321							26
Corophium insidiosum									2	0.0032									
Corophium tuberculatum									1	0.0039									
Gammarus mucronatus																	1	0.0001	
Melita nitida					1	0.0006													
Leptocheirus pinguis			2	3.886							12	1.1332							9
Unciola irrorata			2	0.0023															
ARTHROPODA/Decapoda																			
Crangon septemspinosa													1	16.8843					
Pagurus longicarpus					1	0.5286			2	0.9447	1	0.5563	2	1.0897			1	0.3421	3
Panopeus herbstii																			
Total taxa present per sample	**15**		**25**		**24**		**16**		**16**		**21**		**22**		**9**		**21**		**23**

Name/Site: wet weight (g)	ww	30A	ww	31A	ww	32A	ww	33A	ww	34A	ww	35A	ww	Total number of occupied sites (A Sites)	Percent site occupation (A Sites)
Sabella crassicornis														**2**	**0.06**
Sabellaria vulgaris														**2**	**0.06**
Scalibregma inflatum	7.9983													**9**	**0.26**
Scolecolepides viridis														**2**	**0.06**
Sigambra tentaculata												1	0.0002	**3**	**0.09**
*Spionids****										31				**4**	**0.11**
Spiophanes bombyx														**2**	**0.06**
Streblospio benedicti				2				23	0.0041			12		**19**	**0.54**
Syllis gracilis	0.0031									4	0.0034			**10**	**0.29**
Tharyx acutus				1								1		**11**	**0.31**
Tharyx acutus (juveniles)														**4**	**0.11**
*Oligochaeta****		21		9				20		56				**31**	**0.89**
*Nematoda****		>300		>200				>300		>100		>300		**32**	**0.91**
ARTHROPODA/Copepoda															
Temora longicornis	0.0019	2		31				3		20		2		**33**	**0.94**
Halicyclops magniceps								1						**13**	**0.37**
Tachidius discipes								1						**12**	**0.34**
Alteutha depressa				1				1						**5**	**0.14**
ARTHROPODA/Ostracoda														**1**	**0.03**
Ostracod spp.		3						6		1				**19**	**0.54**
ARTHROPODA/Amphipoda															
Ampelisca abdita	2.9987	29	0.1288					47	0.5623	23	2.9987	6	0.0023	**23**	**0.66**
Corophium insidiosum		1	0.0001					1	0.0023	2	0.0067			**11**	**0.31**
Corophium tuberculatum														**2**	**0.06**
Gammarus mucronatus														**5**	**0.14**
Melita nitida												1	0.0002	**5**	**0.14**
Leptocheirus pinguis	5.6659									34	5.7721			**10**	**0.29**
Unciola irrorata														**3**	**0.09**
ARTHROPODA/Decapoda															
Crangon septemspinosa										1	0.2341			**4**	**0.11**
Pagurus longicarpus	7.9981													**11**	**0.31**
Panopeus herbstii								5	1.0002					**3**	**0.09**
Total taxa present per sample		**20**		**17**		**4**		**20**		**25**		**18**			**Total A Individuals**

Name/Site: wet weight (g)	Total number of individuals (A Sites)		1B	ww	2B	ww	3B	ww	4B	ww	5B	ww	6B	ww	7B	ww	8B
Sabella crassicornis	**5**																
Sabellaria vulgaris	**7**																
Scalibregma inflatum	**36**										9	16.5509			11	3.7789	
Scolecolepides viridis	**6**						111	10.8977			3	0.0045					
Sigambra tentaculata	**4**																
*Spionids****	**231**		45				90	0.2006									
Spiophanes bombyx	**2**																
Streblospio benedicti	**582**		102	0.0144	39	0.0098	152	4.5509			2		25	0.00553	34	0.1085	
Syllis gracilis	**97**																
Tharyx acutus	**108**						7	0.0002	7	0.0021	23	0.0061			5		
Tharyx acutus (juveniles)	**88**		2				2		19								
*Oligochaeta****	**1241**		>100		122	0.9899	4		45	0.0342	>100				12		
*Nematoda****	**8250**		>300		>200	0.0002	>300	0.0004	>500		>100				>900		
ARTHROPODA/Copepoda	**0**																
Temora longicornis	**706**		3		19	0.0001	56	0.0012	1		1		1		31	0.0011	
Halicyclops magniceps	**36**				23		4		5		1						
Tachidius discipes	**39**		1		4		1		7		1				6		
Alteutha depressa	**12**																
ARTHROPODA/Ostracoda	**0**																
Ostracod spp.	**66**				3				4		1						
ARTHROPODA/Amphipoda	**0**																
Ampelisca abdita	**539**								9	0.00124	1	0.0001	6	0.0052	67	7.0934	
Corophium insidiosum	**24**						1	0.0001	1	0.0001	9	0.0004					
Corophium tuberculatum	**1**																
Gammarus mucronatus	**6**				2	0.0234			1	0.001							
Melita nitida	**6**																
Leptocheirus pinguis	**157**																
Unciola irrorata	**5**																
ARTHROPODA/Decapoda	**0**																
Crangon septemspinosa	**4**																
Pagurus longicarpus	**17**								6	6.1051	1	4.0003					
Panopeus herbstii	**7**																
Total taxa present per sample	**>17606**		**13**		**17**		**23**		**28**		**29**		**10**		**19**		**5**

Name/Site: wet weight (g)	ww	9B	ww	10B	ww	11B	ww	12B	ww	13B	ww	14B	ww	15B	ww	Total number of occupied sites (B Sites)	Percent site occupation (B Sites)
Sabella crassicornis																**0**	**0.00**
Sabellaria vulgaris																**0**	**0.00**
Scalibregma inflatum		16	28.9897							9	16.5509					**4**	**0.27**
Scolecolepides viridis										3	0.0045					**3**	**0.20**
Sigambra tentaculata																**0**	**0.00**
*Spionids****																**2**	**0.13**
Spiophanes bombyx																**0**	**0.00**
Streblospio benedicti		23	0.00192									50	0.004	21	0.0023	**9**	**0.60**
Syllis gracilis																**0**	**0.00**
Tharyx acutus		2		36	0.0491	44	0.03342	23	0.0098							**8**	**0.53**
Tharyx acutus (juveniles)																**3**	**0.20**
*Oligochaeta****		34		45		21		3		7		4		8		**13**	**0.87**
*Nematoda****		>500		>400		>300		>300		>300		>500		>500		**13**	**0.87**
ARTHROPODA/Copepoda																	
Temora longicornis		1		2		2		7		34		3		3		**14**	**0.93**
Halicyclops magniceps										1		2		2		**7**	**0.47**
Tachidius discipes		3								1		34		23		**10**	**0.67**
Alteutha depressa																**0**	**0.00**
ARTHROPODA/Ostracoda																	
Ostracod spp.				3				2		1		6		9		**8**	**0.53**
ARTHROPODA/Amphipoda																**0**	
Ampelisca abdita										3	0.0098	67	1.0564	34	0.9923	**7**	**0.47**
Corophium insidiosum										9	0.0099					**4**	**0.27**
Corophium tuberculatum																**0**	**0.00**
Gammarus mucronatus		5	0.2887									1	0.0003	4	0.0026	**5**	**0.33**
Melita nitida																**0**	**0.00**
Leptocheirus pinguis																**0**	**0.00**
Unciola irrorata																**0**	**0.00**
ARTHROPODA/Decapoda																	
Crangon septemspinosa																**0**	**0.00**
Pagurus longicarpus		2	2.6755							1	0.09981	1	0.0056	1	0.0079	**6**	**0.40**
Panopeus herbstii																	
Total taxa present per sample		**22**		**20**		**18**		**18**		**28**		**25**		**24**			**Total B Individuals**

Name/Site: wet weight (g)	Total number of individuals (B Sites)		of occupied sites (A + B Sites)	Percent site occupation (A + B Sites)	Total number of individuals (A + B Sites)
Sabella crassicornis	0		2	0.04	5
Sabellaria vulgaris	0		2	0.04	7
Scalibregma inflatum	45		13	0.26	81
Scolecolepides viridis	117		5	0.1	123
Sigambra tentaculata	0		3	0.06	4
*Spionids****	135		6	0.12	366
Spiophanes bombyx	0		2	0.04	2
Streblospio benedicti	448		28	0.56	1030
Syllis gracilis	0		10	0.2	97
Tharyx acutus	147		19	0.38	255
Tharyx acutus (juveniles)	23		7	0.14	111
*Oligochaeta****	>505		44	0.88	>1746
*Nematoda****	>5100		45	0.9	>13350
ARTHROPODA/Copepoda					
Temora longicornis	164		47	0.94	870
Halicyclops magniceps	38		20	0.4	74
Tachidius discipes	81		22	0.44	120
Alteutha depressa	0		5	0.1	12
ARTHROPODA/Ostracoda					
Ostracod spp.	29		27	0.54	95
ARTHROPODA/Amphipoda					
Ampelisca abdita	187		30	0.6	726
Corophium insidiosum	20		15	0.3	44
Corophium tuberculatum	0		2	0.04	1
Gammarus mucronatus	13		10	0.2	19
Melita nitida	0		5	0.1	6
Leptocheirus pinguis	0		10	0.2	157
Unciola irrorata	0		3	0.06	5
ARTHROPODA/Decapoda					
Crangon septemspinosa	0		4	0.08	4
Pagurus longicarpus	12		17	0.34	29
Panopeus herbstii			3	0.06	7
Total taxa present per sample	>9291			**Total A + B Individuals**	>26897

Notes

* Only presence/absence of colonies determined.
** Biomass could not be determined for species of which only the heads were recovered.
*** Values accompanied by ">" indicate a quantified measurement of sub-sampled individuals.

Summary:

1. A minimum of 25997 individuals were identified across 97 taxa.
2. The most commonly occurring taxa across all of the samples are *Temora longicornis* (94%); Nematoda (88%); Oligochaeta (88%) and *Ampharete finmarchica* (84%).
3. The median number of taxa representing each site is 21 with the greatest diversity at site 10A (30 taxa), and the least diversity at site 32A (4 taxa).
4. *Tharyx acutus* was found in 36% of the samples and its presence usually indicates a disturbed or polluted area
5. *Nephtys bucea* was present in 30% of the sample sites indicating that those sample areas contained very "clean" sand containing little organics.

Appendix C

Grain Size Analysis

Sample Number	Sieve Size						
	Pebble	Gravel		Sand			Silt or Clay
		Coarse	Fine	Coarse	Medium	Fine	
September 2003 – Borrow Area A							
A1	0	0	0	18.5	26.7	49.05	5.75
A2	0	0	13.6	13.15	16.7	48.2	8.3
A3	0	0	2.3	3.4	58.95	33.75	1.6
A4	0	7.6	29.35	10.1	33.1	19.4	0.45
A5	0	0	1.9	2.3	32	59.4	4.4
A6	0	41.65	13.85	7.15	19	14.25	4.1
A7	0	0	4.55	9.55	43.15	41.1	1.65
A8	0	0	4.45	3.9	42.05	38.35	11.25
A9	0	21.57	17.28	8	34.2	16.8	2.15
A10	0	0	10.3	6.35	49.9	27.5	5.95
A11	0	0	13.35	9.15	51.85	23.55	2.1
A12	0	0	7.8	6.5	71.4	13.9	0.4
A13	0	22.05	8.05	5.6	45.05	15.95	3.3
A14	0	6	37.8	11.35	28.85	14.95	1.05
A15	0	13.85	16.75	10.05	46.35	11.8	1.2
A16	0	0	15.6	8.8	52.8	18	4.8
A17	0	6.9	20.9	15.1	38.55	16.2	2.35
A18	0	0	28.95	8.5	45.2	11	6.35
A19	0	0	13.65	8.1	41.15	32.65	4.45
A20	0	10.9	19.3	7	40.65	21.4	0.75
A21	0	7.15	17.55	7.9	47.1	18.2	2.1
A22	0	0	17.1	6.05	44.05	30.55	2.25
A23	0	46.35	13.6	6.28	28.07	4.68	1.02
A24	0	0	28.4	11.65	46.8	12.6	0.55
A25	0	0.15	37.38	12.2	30.63	8.78	10.86
A26	0	0	30	18.25	44.8	6.1	0.85
A27	0	0	9.4	6.35	40.5	42.85	0.9
A28	0	16.6	19.9	6.4	35.05	19.2	2.85
A28	0	0	35.35	13.25	44.45	6.75	0.2
A30	0	0	5.5	4.95	43.75	44.35	1.45
A31	0	0	11.95	6.65	43.05	32.65	5.7
A32	0	0	36.1	10.35	40.35	11.65	1.55
A33	0	0	14.3	11.85	53.05	19.7	1.1
A34	0	0	13.45	7.2	40.65	37.5	1.2
A35	0	0	10.5	10.7	56.75	21	1.05

May 2004 – Borrow Area A							
A1	0	0	7.39	8.19	43.74	38.03	2.65
A2	0	0	13.27	18.8	31.04	33.31	3.57
A3	0	0	14.5	7.35	38.94	38.21	1
A4	0	0	9.38	11.32	41.99	36.12	1.19
A5	0	0	0.08	0.76	67.55	31.3	0.31
A6	0	0	5.73	3.65	49.68	40.66	0.27
A7	0	0	19.03	13.75	49.16	15.96	2.1
A8	0	0	5.53	12.02	55.68	24.62	2.15
A9	0	11.23	31.39	6.95	31.45	18.22	0.75
A10	0	0	11.52	7.07	59.24	19.95	2.21
A11	0	5.35	31.24	6.89	35.99	19.72	0.81
A12	0	1.99	13.42	10.57	54.84	18.66	0.52
A13	0	0	13.78	13.74	54.85	16.29	1.34
A14	0	1.98	19.77	9.32	40.12	27.85	0.97
A15	0	3.52	18.23	16.05	52.65	8.3	1.25
A16	0	0	30.59	9.54	45.44	13.52	0.91
A17	0	0	15.86	8.59	54.73	19.78	1.04
A18	0	2.06	1.83	38.12	47.54	9.48	0.97
A19	0	0	5.61	9.56	50.35	31.97	2.5
A20	0	0	5.45	4.15	51.87	38.03	0.5
A21	0	0	17.12	8.78	53.62	19.98	0.49
A22	0	0	11.8	7.83	58.99	20.66	0.72
A23	0	2.33	27.9	9.75	48.45	11.04	0.52
A24	0	7.61	26.87	9.67	40.14	15.29	0.42
A25	0	3.25	31.58	15.59	44.14	4.95	0.48
A26	0	2.79	18.21	10.09	54.71	13.55	0.65
A27	0	0	20.16	7.22	31.65	40.6	0.37
A28	0	0	3.37	4.07	39.39	51.06	2.11
A29	0	8.36	10.24	11.29	50.42	18.8	0.89
A30	0	0	8.23	8.73	62.32	20.06	0.65
A31	0	0	14.94	8.06	54.04	21.51	1.45
A32	0	2.18	11.34	7.09	59.91	18.91	0.58
A33	0	0	11.56	5.92	44.48	37.34	0.7
A34	0	0	2.77	4.4	60.54	31.72	0.58
A35	0	0	22.73	14.81	50.23	11.41	0.82

Sample Number	Sieve Size						
	Pebble	Gravel		Sand			Silt or Clay
		Coarse	Fine	Coarse	Medium	Fine	
September 2003 - Borrow Area B							
B1	0	0	0.4	0.95	44.3	46	8.35
B2	0	0	0.95	7.45	37.1	53.2	1.3
B3	0	0	7.35	9.3	35.25	43.75	4.35
B4	0	0	0.7	3.95	28.05	62.9	4.4
B5	0	0	5.6	8.45	36.15	45.25	4.55
B6	0	0	0.45	2	19.65	76.5	1.4
B7	0	0	5	5	36.2	48.8	5
B8	0	0	2.35	6.85	44.05	44.35	2.4
B9	0	0	1.9	9.4	57.3	30.5	0.9
B10	0	0	3.2	8.65	53.9	33.25	1
B11	0	0	5.7	2.85	46.45	44.5	0.5
B12	0	0	9.5	7.35	52.85	29.35	0.95
B13	0	0	34.35	10.2	36.9	15.55	3
B14	0	0	10.9	9.75	55.75	22.4	1.2
B15	0	0	7.2	6.8	46.65	38.05	1.3
May 2004 - Borrow Area B							
B1	0	0	1.63	5.6	53.8	37.42	1.55
B2	0	3.51	2.17	6.31	41.49	45.9	0.61
B3	0	0	2.49	5.69	48.59	41.69	1.55
B4	0	0	2.39	5.83	36.35	53.42	2
B5	0	0	2.24	5.84	44.86	45.86	1.2
B6	0	0	1.76	5.69	29.05	62.46	1.03
B7	0	0	0.84	5.08	43.54	50.23	0.3
B8	0	0	3.88	7.44	44.6	43.2	0.87
B9	0	0	1.79	7.01	55.61	35.24	0.34
B10	0	0	4.27	10.41	55.62	29.15	0.55
B11	0	0	0.07	3.21	62.53	33.88	0.31
B12	0	0	2.75	6.29	53.15	37.53	0.27
B13	0	0	1.78	5.13	58.79	33.97	0.33
B14	0	0	3.48	6.05	55.2	34.54	0.74
B15	0	0	1.48	3.59	51.3	43.27	0.37

Appendix D

Sediment Chemical Analysis

Volatile Compounds

SUMMARY OF ANALYTICAL RESULTS: P882

VOAMS-SW8260-SOLID

Sample ID	New York TAGM	B2		B4		B6		B8		B10	
Lab Sample No.	Rec. Soil	465454		465455		465456		465457		465458	
Sampling Date	Cleanup Objective	09/22/03		09/22/03		09/22/03		09/22/03		09/22/03	
Matrix	Criteria*	SOLID		SOLID		SOLID		SOLID		SOLID	
Dilution Factor		1		1		1		1		1	
Units	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
VOLATILE COMPOUNDS (GC/MS)											
Chloromethane	NA	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
Bromomethane	NA	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
Vinyl Chloride	0.12	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
Chloroethane	1.9	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
Methylene Chloride	0.1	0.0037	U	0.0013	JB	0.0037	U	0.0021	JB	0.0023	JB
Acetone	0.11	0.028		0.041		0.026		0.022		0.0055	U
Carbon Disulfide	2.7	0.001	J	0.0026	J	0.0011	J	0.0036	J	0.0011	J
1,1-Dichloroethene	0.4	0.0025	U	0.0027	U	0.0024	U	0.0025	U	0.0022	U
1,1-Dichloroethane	0.2	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
trans-1,2-Dichloroethene	0.3	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
cis-1,2-Dichloroethene	NA	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
Chloroform	0.3	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
1,2-Dichloroethane	0.1	0.0025	U	0.0027	U	0.0024	U	0.0025	U	0.0022	U
2-Butanone	0.3	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
1,1,1-Trichloroethane	0.76	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
Carbon Tetrachloride	0.6	0.0025	U	0.0027	U	0.0024	U	0.0025	U	0.0022	U
Bromodichloromethane	NA	0.0012	U	0.0013	U	0.0012	U	0.0013	U	0.0011	U
1,2-Dichloropropane	NA	0.0012	U	0.0013	U	0.0012	U	0.0013	U	0.0011	U
cis-1,3-Dichloropropene	NA	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
Trichloroethene	0.7	0.0012	U	0.0013	U	0.0012	U	0.0013	U	0.0011	U
Dibromochloromethane	NA	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
1,1,2-Trichloroethane	NA	0.0037	U	0.004	U	0.0037	U	0.0038	U	0.0033	U
Benzene	0.06	0.0012	U	0.0013	U	0.0012	U	0.0013	U	0.0011	U
trans-1,3-Dichloropropene	NA	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
Bromoform	NA	0.005	U	0.0053	U	0.0049	U	0.0051	U	0.0044	U
4-Methyl-2-Pentanone	1	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
2-Hexanone	NA	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
Tetrachloroethene	1.4	0.0011	J	0.0018		0.002		0.0025		0.0018	
1,1,2,2-Tetrachloroethane	0.6	0.0012	U	0.0013	U	0.0012	U	0.0013	U	0.0011	U
Toluene	1.5	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
Chlorobenzene	1.7	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
Ethylbenzene	5.5	0.005	U	0.0053	U	0.0049	U	0.0051	U	0.0044	U
Styrene	NA	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
Xylene (Total)	1.2	0.0062	U	0.0067	U	0.0061	U	0.0064	U	0.0055	U
Total Confident Conc.		0.028		0.0428		0.028		0.0245		0.0018	
Total Estimated Conc. (TICs)		0		0		0		0		0	

Volatile Compounds (continued)

Sample ID	New York TAGM	B12		A1		A3		A6		A9	
Lab Sample No.	Rec. Soil	465459		465460		465461		465462		465463	
Sampling Date	Cleanup Objective	09/22/03		09/22/03		09/22/03		09/22/03		09/22/03	
Matrix	Criteria*	SOLID		SOLID		SOLID		SOLID		SOLID	
Dilution Factor		1		1		1		1		1	
Units	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
VOLATILE COMPOUNDS (GC/MS)											
Chloromethane	NA	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
Bromomethane	NA	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
Vinyl Chloride	0.12	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
Chloroethane	1.9	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
Methylene Chloride	0.1	0.0037	U	0.0007	JB	0.0008	JB	0.019	B	0.0094	B
Acetone	0.11	0.03		0.0068	U	0.0058	U	0.0066	U	0.0062	U
Carbon Disulfide	2.7	0.0017	J	0.0068	U	0.0015	J	0.0014	J	0.0018	J
1,1-Dichloroethene	0.4	0.0025	U	0.0027	U	0.0023	U	0.0027	U	0.0025	U
1,1-Dichloroethane	0.2	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
trans-1,2-Dichloroethene	0.3	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
cis-1,2-Dichloroethene	NA	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
Chloroform	0.3	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
1,2-Dichloroethane	0.1	0.0025	U	0.0027	U	0.0023	U	0.0027	U	0.0025	U
2-Butanone	0.3	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
1,1,1-Trichloroethane	0.76	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
Carbon Tetrachloride	0.6	0.0025	U	0.0027	U	0.0023	U	0.0027	U	0.0025	U
Bromodichloromethane	NA	0.0012	U	0.0014	U	0.0012	U	0.0013	U	0.0012	U
1,2-Dichloropropane	NA	0.0012	U	0.0014	U	0.0012	U	0.0013	U	0.0012	U
cis-1,3-Dichloropropene	NA	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
Trichloroethene	0.7	0.0012	U	0.0014	U	0.0012	U	0.0013	U	0.0012	U
Dibromochloromethane	NA	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
1,1,2-Trichloroethane	NA	0.0037	U	0.0041	U	0.0035	U	0.004	U	0.0037	U
Benzene	0.06	0.0012	U	0.0014	U	0.0012	U	0.0013	U	0.0012	U
trans-1,3-Dichloropropene	NA	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
Bromoform	NA	0.005	U	0.0054	U	0.0047	U	0.0053	U	0.005	U
4-Methyl-2-Pentanone	1	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
2-Hexanone	NA	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
Tetrachloroethene	1.4	0.0035		0.0012	J	0.0018		0.0012	J	0.0015	
1,1,2,2-Tetrachloroethane	0.6	0.0012	U	0.0014	U	0.0012	U	0.0013	U	0.0012	U
Toluene	1.5	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
Chlorobenzene	1.7	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
Ethylbenzene	5.5	0.005	U	0.0054	U	0.0047	U	0.0053	U	0.005	U
Styrene	NA	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
Xylene (Total)	1.2	0.0062	U	0.0068	U	0.0058	U	0.0066	U	0.0062	U
Total Confident Conc.		0.0335		0		0.0018		0		0.0015	
Total Estimated Conc. (TICs)		0.021		0		0		0		0	

Volatile Compounds (continued)

Sample ID	New York TAGM	A12		A15		A18		A21		A24	
Lab Sample No.	Rec. Soil	465464		465465		465466		465467		465468	
Sampling Date	Cleanup Objective	09/22/03		09/22/03		09/23/03		09/23/03		09/23/03	
Matrix	Criteria*	SOLID		SOLID		SOLID		SOLID		SOLID	
Dilution Factor		1		1		1		1		1	
Units	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
VOLATILE COMPOUNDS (GC/MS)											
Chloromethane	NA	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
Bromomethane	NA	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
Vinyl Chloride	0.12	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
Chloroethane	1.9	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
Methylene Chloride	0.1	0.0065	B	0.0031	U	0.0014	JB	0.0036	U	0.0011	JB
Acetone	0.11	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.043	
Carbon Disulfide	2.7	0.0011	J	0.0052	U	0.0017	J	0.006	U	0.011	
1,1-Dichloroethene	0.4	0.0023	U	0.0021	U	0.0026	U	0.0024	U	0.0021	U
1,1-Dichloroethane	0.2	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
trans-1,2-Dichloroethene	0.3	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
cis-1,2-Dichloroethene	NA	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
Chloroform	0.3	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
1,2-Dichloroethane	0.1	0.0023	U	0.0021	U	0.0026	U	0.0024	U	0.0021	U
2-Butanone	0.3	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
1,1,1-Trichloroethane	0.76	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
Carbon Tetrachloride	0.6	0.0023	U	0.0021	U	0.0026	U	0.0024	U	0.0021	U
Bromodichloromethane	NA	0.0012	U	0.001	U	0.0013	U	0.0012	U	0.0011	U
1,2-Dichloropropane	NA	0.0012	U	0.001	U	0.0013	U	0.0012	U	0.0011	U
cis-1,3-Dichloropropene	NA	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
Trichloroethene	0.7	0.0012	U	0.001	U	0.0013	U	0.0012	U	0.0011	U
Dibromochloromethane	NA	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
1,1,2-Trichloroethane	NA	0.0035	U	0.0031	U	0.0039	U	0.0036	U	0.0032	U
Benzene	0.06	0.0012	U	0.001	U	0.0013	U	0.0012	U	0.0011	U
trans-1,3-Dichloropropene	NA	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
Bromoform	NA	0.0046	U	0.0042	U	0.0052	U	0.0048	U	0.0043	U
4-Methyl-2-Pentanone	1	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
2-Hexanone	NA	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
Tetrachloroethene	1.4	0.002		0.0022		0.0011	J	0.002		0.0011	U
1,1,2,2-Tetrachloroethane	0.6	0.0012	U	0.001	U	0.0013	U	0.0012	U	0.0011	U
Toluene	1.5	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
Chlorobenzene	1.7	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
Ethylbenzene	5.5	0.0046	U	0.0042	U	0.0052	U	0.0048	U	0.0043	U
Styrene	NA	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
Xylene (Total)	1.2	0.0058	U	0.0052	U	0.0065	U	0.006	U	0.0054	U
Total Confident Conc.		0.002		0.0022		0		0.002		0.054	
Total Estimated Conc. (TICs)		0		0		0		0		0	

Volatile Compounds (continued)

Sample ID	New York TAGM	A27		A30		A33	
Lab Sample No.	Rec. Soil	465469		465470		465471	
Sampling Date	Cleanup Objective	09/23/03		09/23/03		09/23/03	
Matrix	Criteria*	SOLID		SOLID		SOLID	
Dilution Factor		1		1		1	
Units	mg/kg	mg/kg		mg/kg		mg/kg	
VOLATILE COMPOUNDS (GC/MS)							
Chloromethane	NA	0.0056	U	0.0062	U	0.0058	U
Bromomethane	NA	0.0056	U	0.0062	U	0.0058	U
Vinyl Chloride	0.12	0.0056	U	0.0062	U	0.0058	U
Chloroethane	1.9	0.0056	U	0.0062	U	0.0058	U
Methylene Chloride	0.1	0.0016	JB	0.0006	JB	0.0014	JB
Acetone	0.11	0.0056	U	0.0062	U	0.0058	U
Carbon Disulfide	2.7	0.0014	J	0.0021	J	0.0016	J
1,1-Dichloroethene	0.4	0.0023	U	0.0025	U	0.0023	U
1,1-Dichloroethane	0.2	0.0056	U	0.0062	U	0.0058	U
trans-1,2-Dichloroethene	0.3	0.0056	U	0.0062	U	0.0058	U
cis-1,2-Dichloroethene	NA	0.0056	U	0.0062	U	0.0058	U
Chloroform	0.3	0.0056	U	0.0062	U	0.0058	U
1,2-Dichloroethane	0.1	0.0023	U	0.0025	U	0.0023	U
2-Butanone	0.3	0.0056	U	0.0062	U	0.0058	U
1,1,1-Trichloroethane	0.76	0.0056	U	0.0062	U	0.0058	U
Carbon Tetrachloride	0.6	0.0023	U	0.0025	U	0.0023	U
Bromodichloromethane	NA	0.0011	U	0.0012	U	0.0012	U
1,2-Dichloropropane	NA	0.0011	U	0.0012	U	0.0012	U
cis-1,3-Dichloropropene	NA	0.0056	U	0.0062	U	0.0058	U
Trichloroethene	0.7	0.0011	U	0.0012	U	0.0012	U
Dibromochloromethane	NA	0.0056	U	0.0062	U	0.0058	U
1,1,2-Trichloroethane	NA	0.0034	U	0.0037	U	0.0035	U
Benzene	0.06	0.0011	U	0.0012	U	0.0012	U
trans-1,3-Dichloropropene	NA	0.0056	U	0.0062	U	0.0058	U
Bromoform	NA	0.0045	U	0.005	U	0.0046	U
4-Methyl-2-Pentanone	1	0.0056	U	0.0062	U	0.0058	U
2-Hexanone	NA	0.0056	U	0.0062	U	0.0058	U
Tetrachloroethene	1.4	0.002		0.0024		0.0032	
1,1,2,2-Tetrachloroethane	0.6	0.0011	U	0.0012	U	0.0012	U
Toluene	1.5	0.0056	U	0.0062	U	0.0058	U
Chlorobenzene	1.7	0.0056	U	0.0062	U	0.0058	U
Ethylbenzene	5.5	0.0045	U	0.005	U	0.0046	U
Styrene	NA	0.0056	U	0.0062	U	0.0058	U
Xylene (Total)	1.2	0.0056	U	0.0062	U	0.0058	U
Total Confident Conc.		0.002		0.0024		0.0032	
Total Estimated Conc. (TICs)		0		0		0	

Volatile Compounds (continued)

NR - Not analyzed.

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the sample.

Sample ID B = Borrow Area B

Sample ID A = Borrow Area A

TAGM = Technical and Administrative Guidance Memorandum

***The Action Levels listed reflect current knowledge of New York State standards and are intended as general guidance for the user.**

Generated on 11/22/2003 12:24:01 PM

Semi-volatile Compounds

SUMMARY OF ANALYTICAL RESULTS: P882

BNAMS-SW8270-SOLID

Sample ID	New York TAGM	B2		B4		B6		B8		B10		B12	
Lab Sample No.	Rec. Soil	465454		465455		465456		465457		465458		465459	
Sampling Date	Cleanup Objective	09/22/03		09/22/03		09/22/03		09/22/03		09/22/03		09/22/03	
Matrix	Criteria*	SOLID		SOLID		SOLID		SOLID		SOLID		SOLID	
Dilution Factor		1		1		1		1		1		1	
Units	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
SEMIVOLATILE COMPOUNDS (GC/MS)													
Naphthalene	13	0.43	U	0.46	U	0.43	U	0.44	U	0.39	U	0.42	U
Acenaphthylene	41	0.43	U	0.46	U	0.43	U	0.44	U	0.39	U	0.42	U
Acenaphthene	90	0.43	U	0.46	U	0.43	U	0.44	U	0.39	U	0.42	U
Fluorene	350	0.43	U	0.46	U	0.43	U	0.44	U	0.39	U	0.42	U
Phenanthrene	220	0.43	U	0.46	U	0.43	U	0.44	U	0.39	U	0.42	U
Anthracene	700	0.43	U	0.46	U	0.43	U	0.44	U	0.39	U	0.42	U
Fluoranthene	1900	0.43	U	0.018	J	0.43	U	0.44	U	0.39	U	0.42	U
Pyrene	665	0.43	U	0.022	J	0.43	U	0.44	U	0.39	U	0.011	J
Benzo(a)anthracene	3	0.043	U	0.046	U	0.043	U	0.044	U	0.039	U	0.042	U
Chrysene	0.4	0.43	U	0.014	J	0.43	U	0.44	U	0.39	U	0.42	U
Benzo(b)fluoranthene	1.1	0.043	U	0.046	U	0.043	U	0.044	U	0.039	U	0.042	U
Benzo(k)fluoranthene	1.1	0.043	U	0.046	U	0.043	U	0.044	U	0.039	U	0.042	U
Benzo(a)pyrene	11	0.043	U	0.046	U	0.043	U	0.044	U	0.039	U	0.042	U
Indeno(1,2,3-cd)pyrene	3.2	0.043	U	0.046	U	0.043	U	0.044	U	0.039	U	0.042	U
Dibenz(a,h)anthracene	165000	0.043	U	0.046	U	0.043	U	0.044	U	0.039	U	0.042	U
Benzo(g,h,i)perylene	800	0.43	U	0.46	U	0.43	U	0.44	U	0.39	U	0.42	U
Total Confident Conc.		0		0		0		0		0		0	
Total Estimated Conc. (TICs)		NA		NA		NA		NA		NA		NA	

Semi-volatile Compounds (continued)

Sample ID	New York TAGM	A1		A3		A6		A9		A12	
Lab Sample No.	Rec. Soil	465460		465461		465462		465463		465464	
Sampling Date	Cleanup Objective	09/22/03		09/22/03		09/22/03		09/22/03		09/22/03	
Matrix	Criteria*	SOLID		SOLID		SOLID		SOLID		SOLID	
Dilution Factor		1		1		1		1		1	
Units	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
SEMIVOLATILE COMPOUNDS (GC/MS)											
Naphthalene	13	0.46	U	0.4	U	0.46	U	0.43	U	0.41	U
Acenaphthylene	41	0.46	U	0.4	U	0.46	U	0.43	U	0.41	U
Acenaphthene	90	0.46	U	0.4	U	0.46	U	0.43	U	0.41	U
Fluorene	350	0.46	U	0.4	U	0.46	U	0.43	U	0.41	U
Phenanthrene	220	0.02	J	0.4	U	0.015	J	0.43	U	0.41	U
Anthracene	700	0.46	U	0.4	U	0.46	U	0.43	U	0.41	U
Fluoranthene	1900	0.025	J	0.4	U	0.033	J	0.43	U	0.41	U
Pyrene	665	0.035	J	0.4	U	0.04	J	0.43	U	0.41	U
Benzo(a)anthracene	3	0.012	J	0.04	U	0.015	J	0.043	U	0.041	U
Chrysene	0.4	0.021	J	0.4	U	0.023	J	0.012	J	0.41	U
Benzo(b)fluoranthene	1.1	0.021	J	0.04	U	0.026	J	0.014	J	0.041	U
Benzo(k)fluoranthene	1.1	0.024	J	0.04	U	0.032	J	0.016	J	0.041	U
Benzo(a)pyrene	11	0.046	U	0.04	U	0.029	J	0.043	U	0.041	U
Indeno(1,2,3-cd)pyrene	3.2	0.046	U	0.04	U	0.046	U	0.043	U	0.041	U
Dibenz(a,h)anthracene	165000	0.046	U	0.04	U	0.046	U	0.043	U	0.041	U
Benzo(g,h,i)perylene	800	0.46	U	0.4	U	0.46	U	0.43	U	0.41	U
Total Confident Conc.		0		0		0		0		0	
Total Estimated Conc. (TICs)		NA		NA		NA		NA		NA	

Semi-volatile Compounds (continued)

NR - Not analyzed.

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the sample.

Sample ID B = Borrow Area B

Sample ID A = Borrow Area A

TAGM = Technical and Administrative Guidance Memorandum

Shaded cell indicate analyzed samples exceeding the New York TAGM criteria

***The Action Levels listed reflect current knowledge of New York State standards and are intended as general guidance for the user.**

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Pesticides / PCBs 8081

SUMMARY OF ANALYTICAL RESULTS: P882

PESTGC-SW8081-SOLID

Sample ID	New York TAGM	B2		B4		B6		B8		B10		B12	
Lab Sample No.	Rec. Soil	465454		465455		465456		465457		465458		465459	
Sampling Date	Cleanup Objective	09/22/03		09/22/03		09/22/03		09/22/03		09/22/03		09/22/03	
Matrix	Criteria*	SOLID		SOLID		SOLID		SOLID		SOLID		SOLID	
Dilution Factor		1		1		1		1		1		1	
Units	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
PESTICIDES/PCBs													
Aldrin	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
alpha-BHC	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
beta-BHC	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
delta-BHC	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
gamma-BHC (Lindane)	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
Chlordane	NA	0.086	U	0.092	U	0.086	U	0.088	U	0.078	U	0.085	U
4,4'-DDD	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
4,4'-DDE	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
4,4'-DDT	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
Dieldrin	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
Endosulfan I	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
Endosulfan II	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
Endosulfan sulfate	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
Endrin	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
Endrin aldehyde	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
Endrin ketone	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
Heptachlor	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
Heptachlor epoxide	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
Methoxychlor	NA	0.0086	U	0.0092	U	0.0086	U	0.0088	U	0.0078	U	0.0085	U
Toxaphene	NA	0.086	U	0.092	U	0.086	U	0.088	U	0.078	U	0.085	U

Pesticides / PCBs 8081 (continued)

Sample ID	New York TAGM	A1		A3		A6		A9		A12		A15	
Lab Sample No.	Rec. Soil	465460		465461		465462		465463		465464		465465	
Sampling Date	Cleanup Objective	09/22/03		09/22/03		09/22/03		09/22/03		09/22/03		09/22/03	
Matrix	Criteria*	SOLID		SOLID		SOLID		SOLID		SOLID		SOLID	
Dilution Factor		1		1		1		1		1		1	
Units	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
PESTICIDES/PCBs													
Aldrin	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
alpha-BHC	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
beta-BHC	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
delta-BHC	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
gamma-BHC (Lindane)	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
Chlordane	NA	0.093	U	0.08	U	0.093	U	0.086	U	0.083	U	0.072	U
4,4'-DDD	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
4,4'-DDE	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
4,4'-DDT	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
Dieldrin	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
Endosulfan I	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
Endosulfan II	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
Endosulfan sulfate	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
Endrin	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
Endrin aldehyde	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
Endrin ketone	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
Heptachlor	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
Heptachlor epoxide	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
Methoxychlor	NA	0.0093	U	0.008	U	0.0093	U	0.0086	U	0.0083	U	0.0072	U
Toxaphene	NA	0.093	U	0.08	U	0.093	U	0.086	U	0.083	U	0.072	U

Pesticides / PCBs 8081 (continued)

Sample ID	New York TAGM	A18		A21		A24		A27		A30		A33	
Lab Sample No.	Rec. Soil	465466		465467		465468		465469		465470		465471	
Sampling Date	Cleanup Objective	09/23/03		09/23/03		09/23/03		09/23/03		09/23/03		09/23/03	
Matrix	Criteria*	SOLID		SOLID		SOLID		SOLID		SOLID		SOLID	
Dilution Factor		1		1		1		1		1		1	
Units	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
PESTICIDES/PCBs													
Aldrin	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
alpha-BHC	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
beta-BHC	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
delta-BHC	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
gamma-BHC (Lindane)	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
Chlordane	NA	0.089	U	0.083	U	0.074	U	0.078	U	0.085	U	0.079	U
4,4'-DDD	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
4,4'-DDE	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
4,4'-DDT	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
Dieldrin	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
Endosulfan I	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
Endosulfan II	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
Endosulfan sulfate	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
Endrin	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
Endrin aldehyde	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
Endrin ketone	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
Heptachlor	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
Heptachlor epoxide	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
Methoxychlor	NA	0.0089	U	0.0083	U	0.0074	U	0.0078	U	0.0085	U	0.0079	U
Toxaphene	NA	0.089	U	0.083	U	0.074	U	0.078	U	0.085	U	0.079	U

NR - Not analyzed.

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantification limit but greater than zero. The concentration given is an approximate value.

Sample ID B = Borrow Area B

Sample ID A = Borrow Area A

TAGM = Technical and Administrative Guidance Memorandum

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the sample.

***The Action Levels listed reflect current knowledge of New York State standards and are intended as general guidance for the user.**

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Pesticides / PCBs 8082

SUMMARY OF ANALYTICAL RESULTS: P882

PESTGC-SW8082-SOLID

Sample ID	New York TAGM	B2		B4		B6		B8		B10		B12		A1		A3		A6	
Lab Sample No.	Rec. Soil	465454		465455		465456		465457		465458		465459		465460		465461		465462	
Sampling Date	Cleanup Objective	09/22/03		09/22/03		09/22/03		09/22/03		09/22/03		09/22/03		09/22/03		09/22/03		09/22/03	
Matrix	Criteria	SOLID		SOLID		SOLID		SOLID		SOLID		SOLID		SOLID		SOLID		SOLID	
Dilution Factor		1		1		1		1		1		1		1		1		1	
Units	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
PESTICIDES/PCBs																			
Aroclor-1016	NA	0.086	U	0.092	U	0.086	U	0.088	U	0.078	U	0.085	U	0.093	U	0.08	U	0.093	U
Aroclor-1221	NA	0.086	U	0.092	U	0.086	U	0.088	U	0.078	U	0.085	U	0.093	U	0.08	U	0.093	U
Aroclor-1232	NA	0.086	U	0.092	U	0.086	U	0.088	U	0.078	U	0.085	U	0.093	U	0.08	U	0.093	U
Aroclor-1242	NA	0.086	U	0.092	U	0.086	U	0.088	U	0.078	U	0.085	U	0.093	U	0.08	U	0.093	U
Aroclor-1248	NA	0.086	U	0.092	U	0.086	U	0.088	U	0.078	U	0.085	U	0.093	U	0.08	U	0.093	U
Aroclor-1254	NA	0.086	U	0.092	U	0.086	U	0.088	U	0.078	U	0.085	U	0.093	U	0.08	U	0.093	U
Aroclor-1260	NA	0.086	U	0.092	U	0.086	U	0.088	U	0.078	U	0.085	U	0.093	U	0.08	U	0.093	U
Aroclor-1262	NA	0.086	U	0.092	U	0.086	U	0.088	U	0.078	U	0.085	U	0.093	U	0.08	U	0.093	U
Aroclor-1268	NA	0.086	U	0.092	U	0.086	U	0.088	U	0.078	U	0.085	U	0.093	U	0.08	U	0.093	U

Pesticides / PCBs 8082 (continued)

Sample ID	New York TAGM	A9		A12		A15		A18		A21		A24		A27		A30		A33	
Lab Sample No.	Rec. Soil	465463		465464		465465		465466		465467		465468		465469		465470		465471	
Sampling Date	Cleanup Objective	09/22/03		09/22/03		09/22/03		09/23/03		09/23/03		09/23/03		09/23/03		09/23/03		09/23/03	
Matrix	Criteria	SOLID		SOLID		SOLID		SOLID		SOLID		SOLID		SOLID		SOLID		SOLID	
Dilution Factor		1		1		1		1		1		1		1		1		1	
Units	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
PESTICIDES/PCBs																			
Aroclor-1016	NA	0.086	U	0.083	U	0.072	U	0.089	U	0.083	U	0.074	U	0.078	U	0.085	U	0.079	U
Aroclor-1221	NA	0.086	U	0.083	U	0.072	U	0.089	U	0.083	U	0.074	U	0.078	U	0.085	U	0.079	U
Aroclor-1232	NA	0.086	U	0.083	U	0.072	U	0.089	U	0.083	U	0.074	U	0.078	U	0.085	U	0.079	U
Aroclor-1242	NA	0.086	U	0.083	U	0.072	U	0.089	U	0.083	U	0.074	U	0.078	U	0.085	U	0.079	U
Aroclor-1248	NA	0.086	U	0.083	U	0.072	U	0.089	U	0.083	U	0.074	U	0.078	U	0.085	U	0.079	U
Aroclor-1254	NA	0.086	U	0.083	U	0.072	U	0.089	U	0.083	U	0.074	U	0.078	U	0.085	U	0.079	U
Aroclor-1260	NA	0.086	U	0.083	U	0.072	U	0.089	U	0.083	U	0.074	U	0.078	U	0.085	U	0.079	U
Aroclor-1262	NA	0.086	U	0.083	U	0.072	U	0.089	U	0.083	U	0.074	U	0.078	U	0.085	U	0.079	U
Aroclor-1268	NA	0.086	U	0.083	U	0.072	U	0.089	U	0.083	U	0.074	U	0.078	U	0.085	U	0.079	U

NR - Not analyzed.

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration is an approximate value.

B - The analyte was found in the laboratory blank as well as the sample. sample. This indicates possible laboratory contamination of the sample.

Sample ID B = Borrow Area B

Sample ID A = Borrow Area A

TAGM = Technical and Administrative Guidance Memorandum

***The Action Levels listed reflect current knowledge of New York State standards and are intended as general guidance for the user.**

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Metals - Solid

SUMMARY OF ANALYTICAL RESULTS: P882

METALS-SOLID

Sample ID	New York TAGM	B2		B4		B6		B8		B10		B12		A1		A3		A6	
Lab Sample No.	Rec. Soil	465454		465455		465456		465457		465458		465459		465460		465461		465462	
Sampling Date	Cleanup Objective	09/22/03		09/22/03		09/22/03		09/22/03		09/22/03		09/22/03		09/22/03		09/22/03		09/22/03	
Matrix	Criteria*	SOLID		SOLID		SOLID		SOLID		SOLID		SOLID		SOLID		SOLID		SOLID	
Units	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Antimony	NA	1	U	1.1	U	1	U	1	U	0.9	U	0.99	U	1.1	U	0.93	U	1.1	U
Arsenic	NA	0.9	B	1.8		1.4		1	B	1.7		0.86	U	1.9		1.1	B	3	
Beryllium	NA	0.08	B	0.18	B	0.09	B	0.08	B	0.07	B	0.08	B	0.17	B	0.06	B	0.24	B
Cadmium	NA	0.1	U	0.11	U	0.1	U	0.1	U	0.093	U	0.1	U	0.11	U	0.096	U	0.11	U
Chromium	NA	4.4		14.4		8.5		5.6		6.1		7.4		14.7		5		22.4	
Copper	NA	4.9	B	16.1		8.3		6	B	6.8		7.6		18.3		6		25.6	
Lead	NA	4		11.5		6.8		5.2		5.2		5.5		12.5		3.8		18.6	
Mercury	NA	0.021	U	0.04	B	0.03	B	0.03	B	0.02	B	0.03	B	0.06		0.02	B	0.06	
Nickel	NA	1.8	B	5.7	B	2.9	B	2.3	B	2.7	B	2.7	B	5.8	B	2.3	B	8.7	B
Selenium	NA	1	U	1.1	U	1	U	1	U	0.9	U	0.99	U	1.1	U	0.93	U	1.1	U
Silver	NA	0.18	U	0.19	U	0.22	B	0.18	U	0.16	U	0.18	U	0.19	U	0.17	U	0.28	B
Thallium	NA	1.1	U	1.2	U	1.1	U	1.2	U	1	U	1.1	U	1.2	U	1.1	U	1.2	U
Zinc	NA	18		45.4		29.2		21.6		22.5		23.4		48.6		18.2		64.7	

Metals – Solid (continued)

Sample ID	New York TAGM	A9		A12		A15		A18		A21		A24		A27		A30		A33	
Lab Sample No.	Rec. Soil	465463		465464		465465		465466		465467		465468		465469		465470		465471	
Sampling Date	Cleanup Objective	09/22/03		09/22/03		09/22/03		09/23/03		09/23/03		09/23/03		09/23/03		09/23/03		09/23/03	
Matrix	Criteria*	SOLID		SOLID		SOLID		SOLID		SOLID		SOLID		SOLID		SOLID		SOLID	
Units	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Antimony	NA	1	U	0.96	U	0.83	U	1	U	0.96	U	0.87	U	0.91	U	0.99	U	0.92	U
Arsenic	NA	1.8		0.84	U	0.98	B	0.95	B	2.2		0.75	U	0.8	U	1.1	B	0.8	U
Beryllium	NA	0.12	B	0.02	B	0.04	B	0.13	B	0.15	B	0.03	B	0.023	U	0.06	B	0.04	B
Cadmium	NA	0.1	U	0.099	U	0.085	U	0.11	U	0.099	U	0.089	U	0.094	U	0.1	U	0.094	U
Chromium	NA	10.1		3.2		2.9		10.4		13.4		6.1		2.2		6.1		4.1	
Copper	NA	12.5		4	B	3.5	B	11.7		15		3.2	B	2.7	B	6.6		4.7	B
Lead	NA	8.3		3.2		2.6		8.8		11		2.8		2.6		4.7		3.5	
Mercury	NA	0.05		0.021	U	0.018	U	0.04		0.04	B	0.018	U	0.019	U	0.03	B	0.02	B
Nickel	NA	4.1	B	1.4	B	1.3	B	4.1	B	5.3	B	4.6	B	0.9	B	2	B	1.5	B
Selenium	NA	1	U	0.96	U	0.83	U	1	U	0.96	U	0.87	U	0.91	U	0.99	U	0.92	U
Silver	NA	0.19	B	0.17	U	0.15	U	0.19	U	0.26	B	0.16	U	0.16	U	0.18	U	0.17	U
Thallium	NA	1.1	U	1.1	U	1.4	U	1.2	U	1.1	U	0.98	U	1	U	1.1	U	1	U
Zinc	NA	32.8		12.2		11.3		31.5		39.3		11		10.5		20.6		16.4	

NR - Not analyzed.

U - The compound was not detected at the indicated concentration.

B - Reported value is less than the Reporting Limit but greater than the Instrument Detection Limit.

N - The spiked sample recovery is not within control limits.

Sample ID B = Borrow Area B

Sample ID A = Borrow Area A

TAGM = Technical and Administrative Guidance Memorandum

***The Action Levels listed reflect current knowledge of New York State standards and are intended as general guidance for the user.**

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Appendix E

Photographic Documentation

NORTHERN ECOLOGICAL ASSOCIATES, INC.

PHOTOGRAPHIC RECORD

Company: USACE - New York District
Project: Asharoken Burrow Area Investigation

Photographer: D. Santillo
Date: 9/22/04
Photo No.: 1
Direction:

Comments:

Deployment of Smith-McIntyre benthic grab.

Photographer: D. Santillo
Date: 9/22/04
Photo No.: 2
Direction:

Comments:

Retrieving the Smith-McIntyre benthic grab.

NORTHERN ECOLOGICAL ASSOCIATES, INC.

PHOTOGRAPHIC RECORD

Company: USACE - New York District
Project: Asharoken Burrow Area Investigation

Photographer: J. Wu
Date: 9/22/04
Photo No.: 3
Direction:

Comments:

Retrieving the Smith-McIntyre benthic grab.

Photographer: D. Santillo
Date: 9/23/04
Photo No.: 4
Direction:

Comments:

Waiting to deploy the Smith-McIntyre benthic grab. Strong wind and heavy rain conditions throughout the entire sampling.

NORTHERN ECOLOGICAL ASSOCIATES, INC.

PHOTOGRAPHIC RECORD

Company: USACE - New York District
Project: Asharoken Burrow Area Investigation

Photographer: P. Fellion
Date: 9/24/04
Photo No.: 5
Direction:

Comments:
Deployment of trawl net.

Photographer: P. Fellion
Date: 9/24/04
Photo No.: 6
Direction:

Comments:
Retrieving of trawl net.

NORTHERN ECOLOGICAL ASSOCIATES, INC.

PHOTOGRAPHIC RECORD

Company: USACE - New York District
Project: Asharoken Burrow Area Investigation

Photographer: P. Fellion
Date: 9/24/04
Photo No.: 7
Direction:

Comments:
Emptying content of the net. Note the abundance of bay anchovy in the tote.

Photographer: P. Fellion
Date: 9/24/04
Photo No.: 8
Direction:

Comments:
Tote with contents from a trawl.

NORTHERN ECOLOGICAL ASSOCIATES, INC.

PHOTOGRAPHIC RECORD

Company: USACE - New York District
Project: Asharoken Burrow Area Investigation

Photographer: P. Fellion
Date: 9/24/04
Photo No.: 9
Direction:

Comments:
Deployment of trawl net.

Photographer: P. Fellion
Date: 9/24/04
Photo No.: 10
Direction:

Comments:
Blackfish caught from the trawl net.

NORTHERN ECOLOGICAL ASSOCIATES, INC.

PHOTOGRAPHIC RECORD

Company: USACE - New York District
Project: Asharoken Burrow Area Investigation

Photographer: P. Fellion
Date: 9/24/04
Photo No.: 11
Direction:

Comments:
Scup caught from the trawl net.

Photographer: P. Fellion
Date: 9/24/04
Photo No.: 12
Direction:

Comments:
Juvenile scup caught from the trawl net.

NORTHERN ECOLOGICAL ASSOCIATES, INC.

PHOTOGRAPHIC RECORD

Company: USACE - New York District
Project: Asharoken Burrow Area Investigation

Photographer: P. Fellion
Date: 9/24/04
Photo No.: 13
Direction:

Comments:
Black sea bass caught from the trawl net.