

USACE Borrow Area Compilation Database

User's Guide

I. Description of Data

Project Overview

The Atlantic Coast of Long Island, Fire Island Inlet to Montauk Point, New York, Storm Damage Reduction Reformulation Study (FIMP) seeks to evaluate long-term solutions for storm damage reduction along the southern shore of Suffolk County, Long Island. As part of this federally authorized effort, the US Army Corps of Engineers, NY District, is conducting a number of environmental studies to understand ecosystem function in the study area. One aspect of the studies is the collection and analysis of baseline data concerning potentially affected environments.

As part of the reformulation study, the Corps is evaluating the potential placement of sand on the barrier island and mainland beaches to restore sediment transport and to reduce storm damage associated with breaching and overwash. Potential offshore sand sources, or "borrow areas", have been identified. (See Potential Borrow Area Map for locations.) From 1999 to 2002, seven environmental studies were conducted to develop an understanding of the physical and biological characteristics of these sites. This information will be used in later phases of the analysis to evaluate the impacts of sand removal to the biological and physical resources in the borrow areas.

A total of 1400 samples were collected including finfish, megainvertebrates, and macroinvertebrates. In addition, water quality was recorded for each sample and sediment grain size was collected during the three benthic studies (Table 1).

Data from these studies have been assembled into an MS Access database for ease of use, analysis, and distribution. The data will be used to characterize the physical and biological resources of each borrow area, and comparative analyses will be performed between and among borrow sites. The database will be made available to researchers interested in the biological and physical resources present in the potential borrow areas.

For more information about this database, please contact Howard Ruben, at the US Army Corps of Engineers, New York District, Environmental Analysis Branch (e-mail: Howard.Ruben@nan02.usace.army.mil)

A. Trawls

Finfish, squid, and other megainvertebrates were collected using a 30-foot otter trawl with 1/2" mesh cod end, which was towed at a speed of 2-3 kt for 0.25 nautical miles.

Transects were located at the 30, 40, 50, and 60-foot contours within and adjacent to the borrow areas (See Station Map). Sampling was performed once per month for the duration of each study. Finfish and squid were weighed, counted, measured, and identified to species. Finfish and squid length and total weight by species was recorded for up to 30 individuals per station. In cases where more than 30 individuals were collected, the total number was recorded. Therefore, the weight indicated is always the weight of 30 or fewer organisms. When the finfish weight was less than 10 g, the limit of the scale, the database entry is indicated by -9999. Megainvertebrates collected during trawls were enumerated only.

See Table 2 for a list of all units of measure used in the database.

B. Benthic Grabs

Benthic grabs were collected using a 0.025-meter square modified Young grab. Macroinvertebrates were identified to the lowest practical identification level, which in most cases was to the species level. Exceptions include those organisms which were too difficult to differentiate (such as nemerteans), organisms which were damaged, or those that were too scarce for positive identification. The wet weight of organisms was determined for the major taxonomic groups identified. Organisms not falling under the four major taxonomic groups of Annelida, Echinodermata, Arthropoda, and Mollusca, are included under the heading of "Other." In cases where the weight was below the limit of the scale (0.01g) the value in the database is indicated by -9999.

Grain size is indicated by percent type, using size classes of silt, sand, and gravel. The sediment was analyzed using a hydrometer based on ASTM methods D 422 and D 2487. Grain sizes and corresponding U.S. Standard Sieve Sizes are listed in Table 2.

C. Water Quality

Water quality measurements, including salinity, temperature, and dissolved oxygen were made with a Yellow Springs Instruments (YSI) model R85-10. pH was recorded using the YSI or an Oakton Waterproof pH tester. A Secchi disk was used to determine the depth of light penetration. Water quality, with the exception of Secchi depth, was measured at the beginning and end of each trawl. In cases where there was instrument malfunction or measurements were not made per the sampling protocol (e.g. at benthic stations only bottom water quality was recorded), water quality measurements are indicated by 9999 in the database.

D. Station Information

Geographic location was recorded from a Garmin 45 XL and/or Garmin 185 interfaced with a Garmin GBR-21 differential receiver. Although every effort was made to ensure accurate positioning, inherent errors in GPS measurements were unavoidable. In the case of the Clam Survey, a commercial clam vessel was retained and station position was recorded with their shipboard navigation (LORAN C).

When applicable, stations are also identified by the borrow area in which they occur. Since borrow areas are subject to change, this is meant only as a guideline. Table 4 lists borrow area and the corresponding notation used in benthic sampling. See the map included with the database for station locations of grabs, trawl start and end, and surf clam survey.

Note that although Shinnecock (SH) benthic stations were sampled as part of Work Order 13, they are included with the rest of Benthos I in Work Order 10.

For more information on sampling protocols contact Howard Ruben, Project Biologist, at the USACE, New York District, Environmental Analysis Branch, (e-mail: Howard.Ruben@nan02.usace.army.mil)

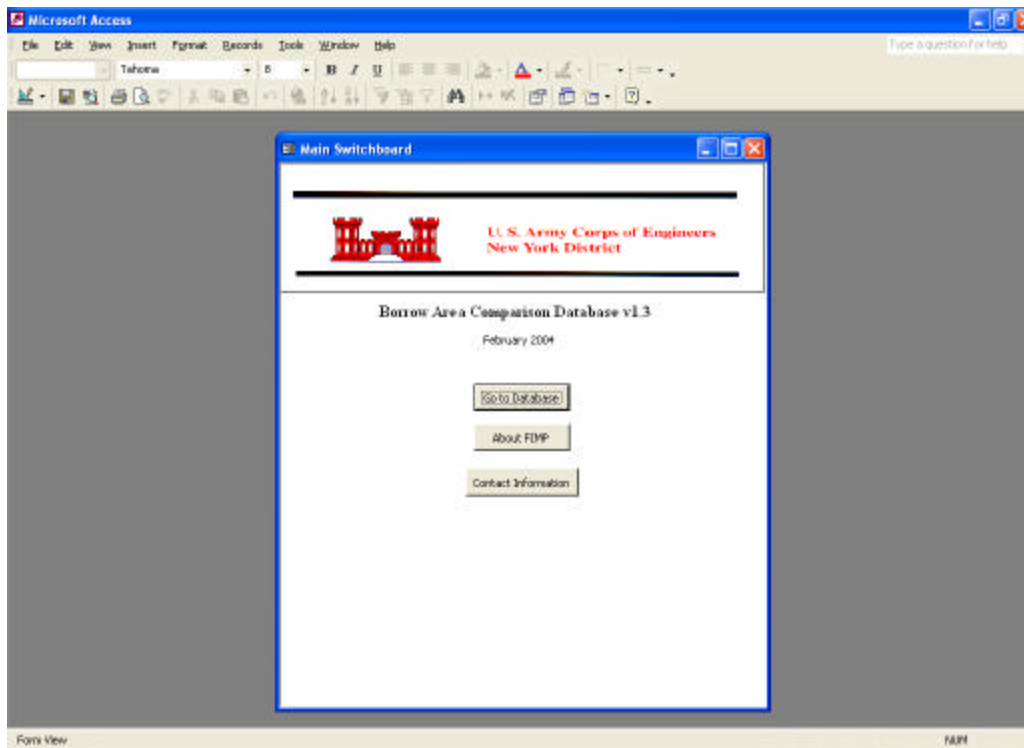
II. Database

The database was constructed using Microsoft Access 2000, which was chosen because it is commonly used database software. MS Access comes as part of the Microsoft Office Professional Edition bundle or can be purchased separately. It is also used by other state and federal agencies for distribution of data. The appearance is similar to that of MS Excel, which most data users are familiar with. MS Access is also compatible with MS Excel and tables can be exported or copied and pasted from the Access database directly into an Excel spreadsheet. Access will perform simple descriptive statistics such as sum, average, minimum, and maximum. Data can also be filtered and sorted within each of the tables before exporting the data for analysis.

In the USACE Borrow Area Compilation Database, data tables are organized by the type of data collected (e.g. invertebrates, finfish, water quality) and the measurement made (total catch, length, salinity, etc.). Also included are species lists providing common and scientific names of finfish and macroinvertebrates.

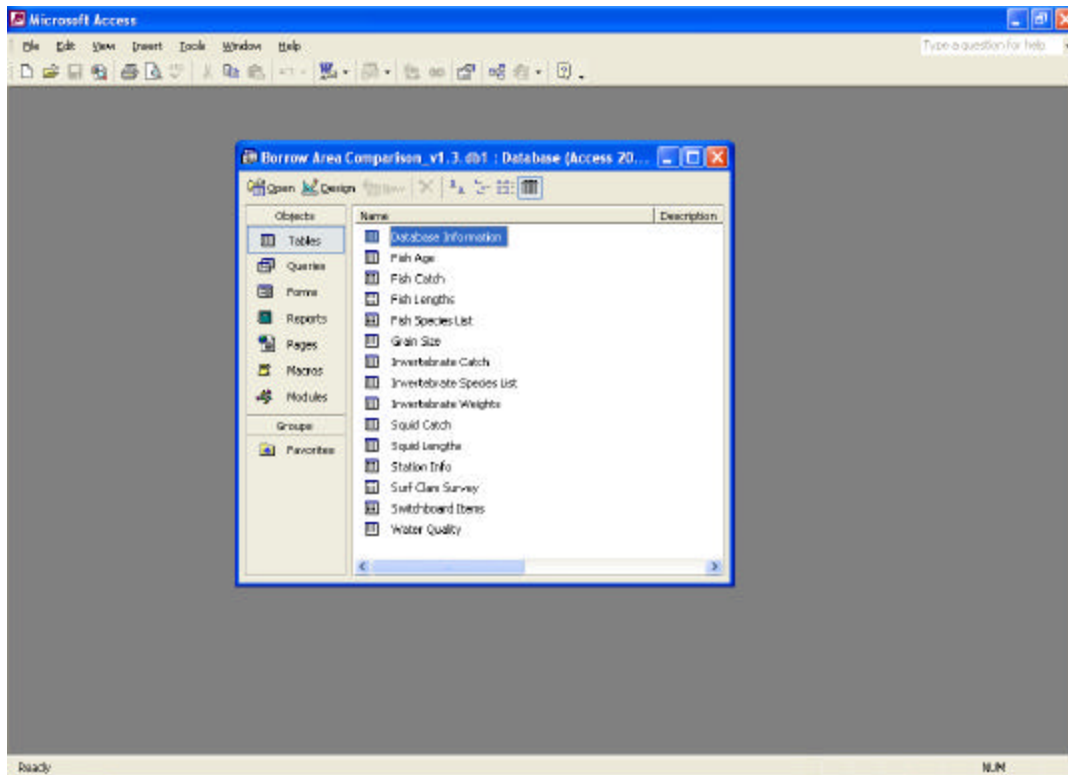
A. General Overview

Upon opening the database the user is presented with a switchboard offering several options including *Go to Database*, *About FIMP*, and *Contact Information*.



Welcome window

Choosing *Go to Database* brings the user to the *Database Window* which shows all tables included in the database:



Database Window

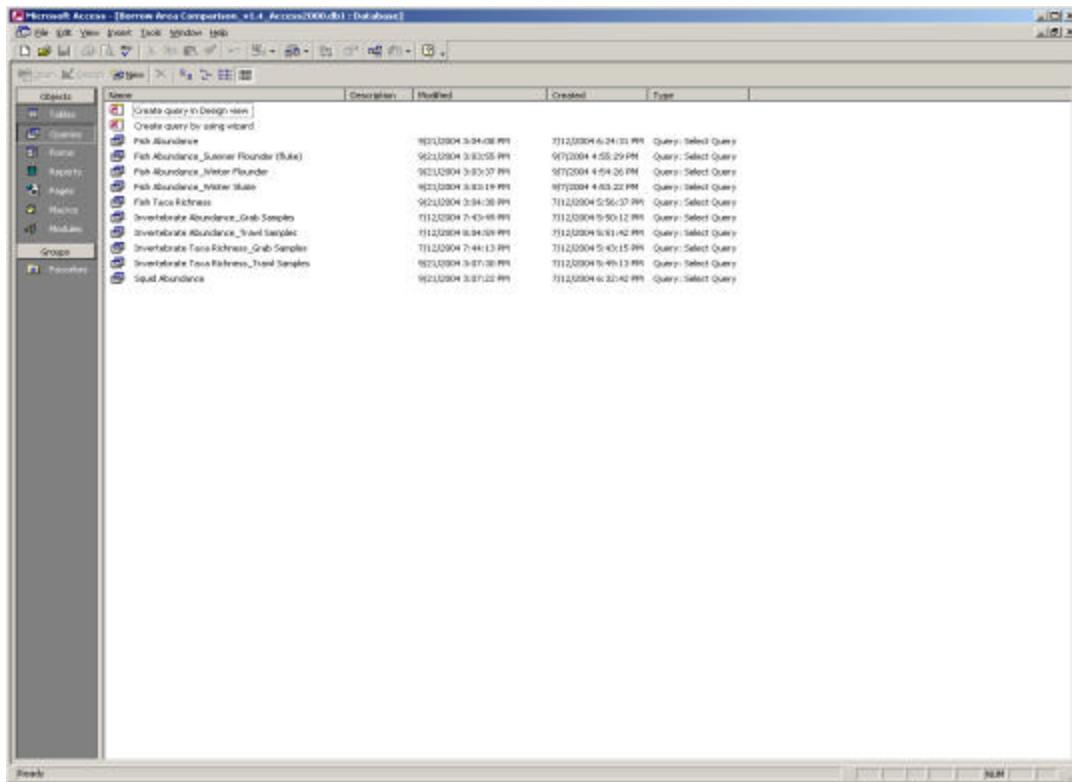
Opening the *Fish Catch* table:

Project#	Month	Day	Year	Lat	Len	Station	Area	Species	Total Number	Weight	Comments
12	2	22	2000	40.839993	-72.4454	T-40-A	outside SH	Anchoa hepsetus	6	16	
13	2	22	2000	40.856833	-72.37328	T-40-D	outside SH	Anchoa hepsetus	4	15	
13	2	22	2000	40.830633	-72.42328	T-60-B	SH	Bravoortia tyrannus	2	16	
13	2	22	2000	40.856917	-72.37689	T-30-D	outside SH	Anchoa hepsetus	8	20	
13	2	22	2000	40.832917	-72.4476	T-50-A	outside SH	Anchoa hepsetus	10	26	
13	2	22	2000	40.830633	-72.42328	T-60-B	SH	Anchoa hepsetus	18	56	
13	2	22	2000	40.850667	-72.39482	T-50-C	SH	Anchoa hepsetus	3	100	
13	2	22	2000	40.857833	-72.38495	T-60-D	outside SH	Bravoortia tyrannus	1	100	
13	2	22	2000	40.8436	-72.39842	T-60-C	SH	Anchoa hepsetus	20	115	
13	2	22	2000	40.846467	-72.42758	T-40-B	SH	Anchoa hepsetus	23	160	
13	2	22	2000	40.846467	-72.42758	T-40-B	SH	Pseudopleuronectes ar	1	326	
13	2	22	2000	40.8436	-72.39842	T-60-C	SH	Pseudopleuronectes ar	1	400	
13	2	22	2000	40.839993	-72.4454	T-40-A	outside SH	Pseudopleuronectes ar	1	500	
13	2	22	2000	40.84685	-72.43573	T-30-B	SH	Raja erinacea	1	530	
13	2	22	2000	40.8672	-72.3956	T-40-C	SH	Pseudopleuronectes ar	1	550	
13	2	22	2000	40.839993	-72.4454	T-40-A	outside SH	Raja ocellata	1	600	
13	2	22	2000	40.858333	-72.40092	T-30-C	SH	Raja ocellata	1	620	
13	2	22	2000	40.832917	-72.4476	T-50-A	outside SH	Raja ocellata	1	650	
13	2	22	2000	40.840667	-72.42863	T-50-B	SH	Raja erinacea	1	650	
13	2	22	2000	40.824717	-72.44385	T-60-A	outside SH	Pseudopleuronectes ar	3	676	
13	2	22	2000	40.8672	-72.3956	T-40-C	SH	Raja ocellata	3	700	
13	2	22	2000	40.846467	-72.42758	T-40-B	SH	Raja erinacea	2	1000	
13	2	22	2000	40.85915	-72.37167	T-50-D	outside SH	Pseudopleuronectes ar	2	1000	
13	2	22	2000	40.824717	-72.44385	T-60-A	outside SH	Raja erinacea	2	1100	
13	2	22	2000	40.840667	-72.42863	T-50-B	SH	Raja ocellata	3	1200	
13	2	22	2000	40.850667	-72.39482	T-50-C	SH	Pseudopleuronectes ar	5	1450	
13	2	22	2000	40.856833	-72.37328	T-40-D	outside SH	Pseudopleuronectes ar	5	1500	
13	2	22	2000	40.830633	-72.42328	T-60-B	SH	Pseudopleuronectes ar	4	1500	
13	2	22	2000	40.8436	-72.39842	T-60-C	SH	Raja ocellata	2	1500	
13	2	22	2000	40.857833	-72.38495	T-60-D	outside SH	Pseudopleuronectes ar	5	1650	

Fish Catch Table

Each table contains the latitude, longitude, and date of the sample in M/D/YYYY. In this way, each table could be exported and analyzed without requiring a query to be performed to extract sample information from the *Station Info* table. A comments column is included with each table for field notes.

A limited number of queries have been built into the database to provide summary information for selected data tables. The queries provide summaries of abundance and taxa richness¹ for fish, invertebrate, and squid data tables. To access these queries, select *Queries* from the list of objects in the *Database Window*.



To run the query, double-click on the selected query and the results will automatically be displayed.

¹ Richness calculations assume that all identified organisms represent distinct taxa. This assumption may introduce limited error into the calculations (inflated estimates) if these organisms actually belong to lower taxonomic levels identified within the same sample.

III. Other Documentation

There are several other documents included with the Database. They are:

Map of Potential Borrow Areas: indicating approximate location of borrow areas.

Benthic Grab and Trawl Sample Locations: showing the location of trawl transects and benthic grabs

Surf Clam Survey Sample Locations: which shows the location of the stations sampled during the surf clam survey.

Summary of Database Tables and Parameters: listing all tables included in the database and the parameters and projects in each.

Table 1. Studies Included in Database

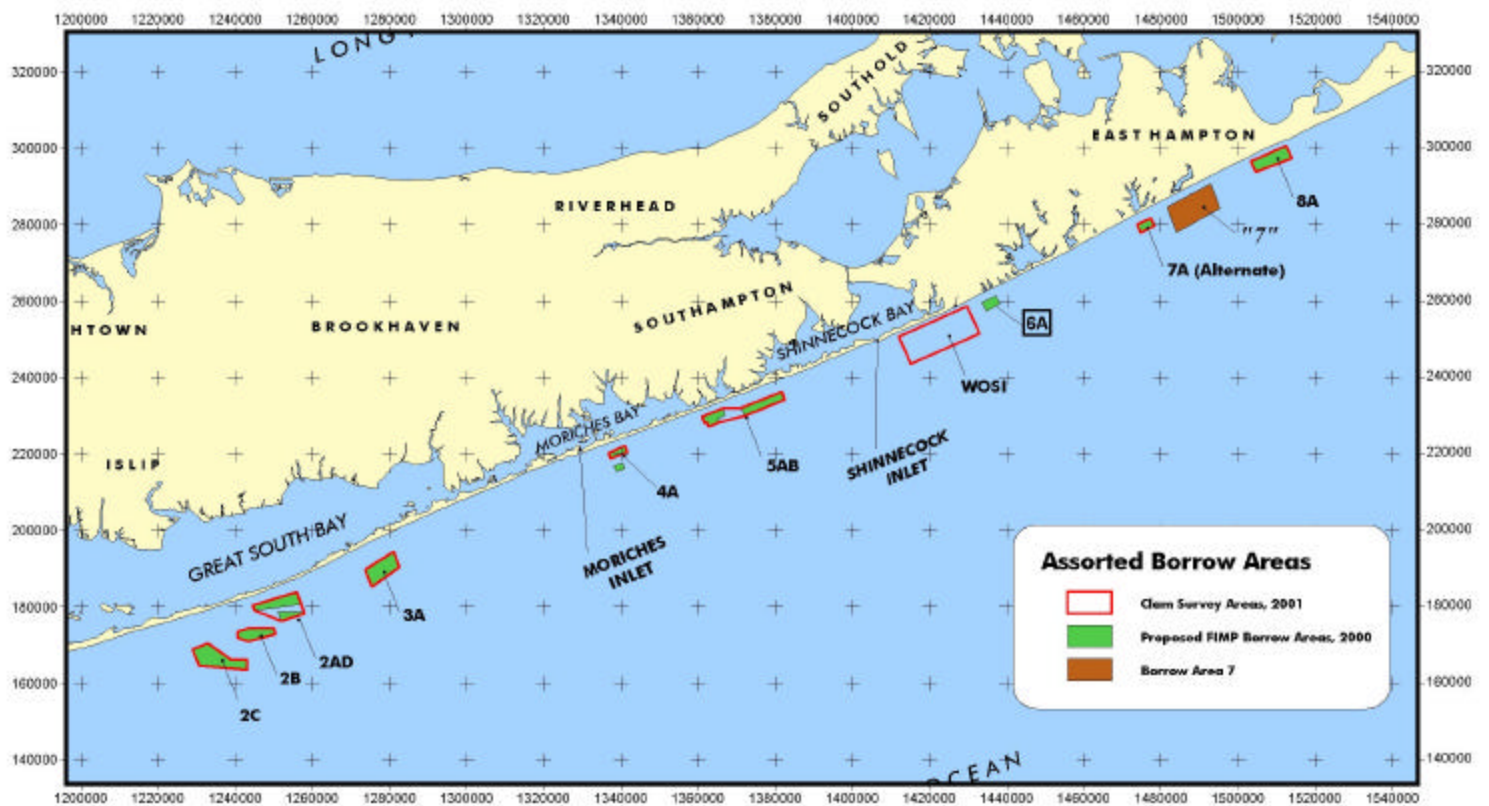
Studies included in the USACE Database Compilation and sampling conducted during each effort

Study Title	Work Order #	# Samples	Dates Sampled	Data Type
Reformulation Benthos I Macrobenthic Invertebrate Analysis Napeague to East of Fire Island Inlet	10	275	July - August 1999	invertebrate abundance, biomass water quality grain size
West of Shinnecock Inlet: Offshore Borrow Area Multi-Species Sampling	13	192	April 1999 - April 2000 (no sample Jan. 2000)	finfish abundance, biomass, age, length invertebrate abundance water quality
Reformulation Benthos II Napeague to East of Fire Island Inlet Benthic Invertebrate Survey	17	275	November - December 1999	invertebrate abundance, biomass water quality grain size
Reformulation Benthos III WOSI to East of Fire Island Inlet Benthic Invertebrate Survey	22	130260	November 2000 & June 2001	invertebrate abundance, biomass water quality grain size
WOSI and Cherry Grove: Multispecies Sampling	23	192	May 2000 - April 2001	finfish abundance, biomass, age, length invertebrate abundance water quality
Surf Clam Survey	24	240	August - Sept 2001	surf clam abundance (bushels), width
Cherry Grove Offshore Borrow Area Finfish Sampling Year 3	25	96	May 2001 - April 2002	finfish abundance, biomass, age, length invertebrate abundance water quality

Table 2: Database Parameters and Units of Measurement	
Parameter	Units
Salinity	ppt
Temperature	° Celsius
Secchi	feet
Station Depth	feet
Length	millimeters
Weight	grams
Position	Decimal Degrees
Sample Volume	milliliters
Dissolved Oxygen	milligrams/Liter
Fish Age	Year class
Clam Width	millimeters

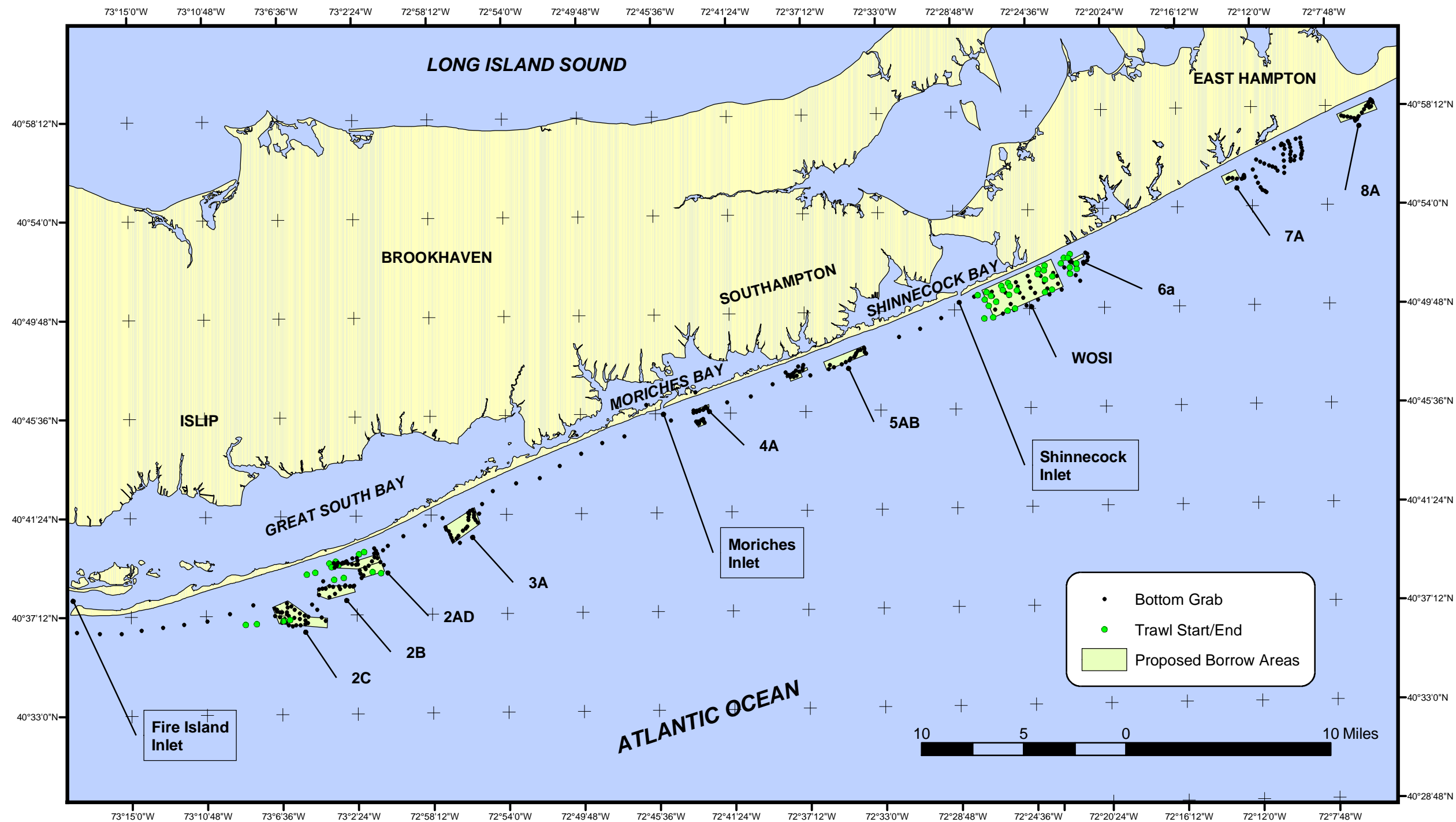
Table 3: Grain Sizes Grain size according to ASTM method D 422.		
U.S. Standard Sieve Size	Grain Size	Classification
4"		Gravel
3"	75.00 mm	
1 ½"	37.50 mm	
¾"	19.00 mm	
⅜"	9.50 mm	
#4	4.75 mm	
#10	2.00 mm	Sand
#20	850 µm	
#40	425 µm	
#60	250 µm	
#100	150 µm	
#200	75 µm	
	<75 µm	Silt or Clay

Table 4: Borrow Areas, Location, and Benthic Station Identification		
Borrow Area	Location	Benthic Station ID
2a	Water Island	WI
2b	Fire Island Pines	FIP
2c	Cherry Grove	CG
3a	Bayberry Dunes	BD
4a & 4b	Westhampton West	WHW
5a & 5b	West Hampton	WH
6a	Agawam Lake	AL
7	Hook Pond	HP
7a	Georgica Pond	GP
8a	Beach Hampton	BH
SH	Shinnecock	SH
IB	Inter- Borrow Area	IB

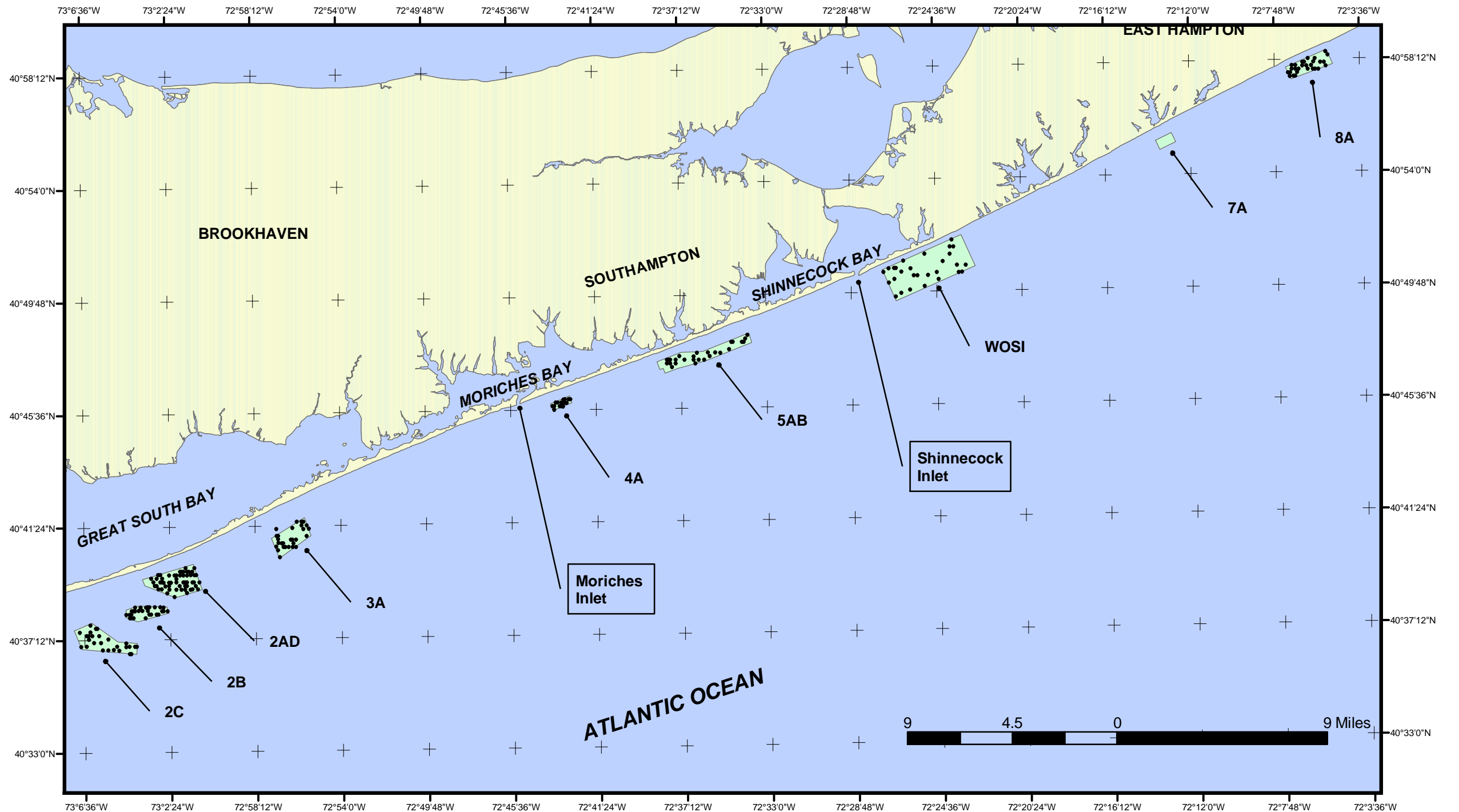


Coordinate System: New York State Plane, Long Island Zone, NAD83. Units: feet

BENTHIC GRAB AND TRAWL SAMPLE LOCATIONS



SURFCLAM SURVEY SAMPLE LOCATIONS



Summary of Tables and Parameters Included in Database

[illegible][illegible][illegible]

INVERTEBRATE WEIGHT

[illegible]**STATION INFO**[illegible]

WATER QUALITY

[illegible]

SQUID CATCH

[illegible]

SQUID LENGTH

Project #	Day	Month	Year	Latitude	Longitude	Station	Species	Length
13	X	X	X	X	X	X	X	X
23	X	X	X	X	X	X	X	X
25	X	X	X	X	X	X	X	X

FISH AGE[illegible]

SURF CLAM SURVEY

[illegible]

[illegible][illegible]