APPENDIX A

Field Sampling & Analysis Management Plan

EEA, Inc.
Fisheries Study:
Field Sampling & Analysis Management Plan For The New York City Department of Sanitation Marine Transfer Station Facilities

January 7, 2003

1.0 INTRODUCTION

1.1 Project Overview and Goals. This document is a Field Sampling and Analysis Management Plan (FSAMP) for a fisheries and marine ecology study to be conducted for the New York City Department of Sanitation through the prime contractor, HDR Engineering, Inc., and subcontractor, EEA, Inc. The Department is planning to restore and modify solid waste transfer operations at all eight of the marine Transfer Stations (MTS's). Locations of the MTS's are shown in Figure 1. Because the new operations planned for the MTS's will require varying degrees of in water (and on shore) construction, the following field studies have been designed to supplement the data bases and satisfy regulatory requirements. The goals of the Fisheries Study are to:

- Provide site specific habitat data including finfish (adult and larval) meiofaunal invertebrates, macrofaunal invertebrates, sediment quality, and water quality over a 12 month period;

- Satisfy the regulatory requirements for permit applications to the US Army Corps of Engineers (COE) and the New York State Department of Environmental Conservation (DEC);

- Satisfy data requirements for preparation of an Essential Fish Habitat Filing (EFH) as defined by the National Marine Fisheries Service (NMFS);

- Provide on site data needed for the preparation of a Natural Resources Section of a planned Environmental Impact Statement (EIS) for the proposed MTS modifications;

- In general, provide the technical and scientific bases to support the regulatory process needed to define ecological baseline and impact evaluations so as to minimize natural resource impacts to the greatest extent attainable.

Table 1 presents an overview of all the sampling activities and the planned schedule. Inspection of the Table shows that some MTS's are sampled more intensively than others. This variation was intentional and reflects the amount of construction activity described in the conceptual plans. MTS's that will have significant expansion or other in water construction activities are more heavily sampled than MTS's with only minimal expected impacts.

1.2 Sampling Plan Design Considerations.

In the development of this initial scope a variety of factors were considered including the following:

- SEQRA requirements for EIS's
- COE and DEC requirements
- National Marine Fisheries Service EFH requirements
- Size and reliability of the existing data base
- Agency requirements on prior, similar projects
- Importance of various aquatic habitats
- Sensitivity of aquatic habitats and resources to presumptive impacts of construction
- Data requirements for permit applications
- Scheduling and cost implications
- Feasibility of field data acquisition programs

1.3 Guidance Documents. This FSAMP will be followed by a program-specific Quality Assurance Project Plan (QAPP). A QAPP provides all team members with an understanding of the project organization, data quality objectives, measurement criteria, and specific Quality Assurance (QA) and Quality Control (QC) standards.

This FSAMP has been developed to be consistent with the following guidance documents and recommended examples thereof;

- Guidance for Quality Assurance project plans. EPA QA/G-5, February 1998.

- Guidance for the Preparation of Standard Operating Procedures (SOPs) for Quality-Related Documents. EPA QA/G-6, November 1995.

- Coastal 2000 Environmental Monitoring and Assessment Program (EMAP), Northeast Component, Field Operations Manual. EPA/600/R-00/002, April 2000.

- Generic Quality Assurance Project Plan Guidance for Programs Using Community Level Biological Assessment in Wadeable Streams and Rivers. EPA 841-B-95, July 1995.

- Guidance for the Data Quality Objectives Process. EPA QA/G-4. EPA/600/R-96/055, August 2000.

- EPA Requirements for Quality Management Plans. EPA QA/R-2. November 1999.

- Guidance on Technical Audits and Related Assessments for Environmental Data Operations. EPA QA/G-7, January 2000.

- Guidance for Data Quality Assessment – Practical Methods for Data Analysis. EPA QA/G-9, July 2000.

The FSAMP and QAPP) will be updated as new programs are added, or new techniques are advanced, and will be maintained in all facilities (offices, vessels, labs) involved in performance of the Fisheries project.

1.4 Review of the Literature. Prior to designing this FSAMP a detailed review of the literature was conducted to determine whether existing data bases could offset some of the sampling activities. Additionally, in preparation for an Essential Fish Habitat (EFH) study at the eight MTS's, a literature search was conducted on fish utilizing the waters of the New York Harbor Complex. A great amount of effort has been made and 66 different reference documents have been compiled relating to most of the 16 species of concern listed on the NMFS EFH form for these MTS's. The research is ongoing and the list of references will continue to grow. In addition, personal communications have been conducted with scientists and researchers in NMFS, Stony Brook Marine Sciences Research Center (MSRC), New York State Department of Environmental Conservation (DEC), and Rutgers University resulting in further insights to finfish utilization of these sites and have lead to additional sources of information.

Specific documents collected thus far includes information for 13 of the 16 species of concern listed by NMFS. There are presently 11 references about recent winter flounder studies conducted in NY and NJ waters (9 of which are from 1999 to 2002). It is expected that this species will be of greatest concern to NMFS. Information for all species has been compiled covering all those listed as having EFH for the project areas.

Current information pertaining to the newest developments and Final Rules regarding EFH have been downloaded from the NMFS web site and are currently

being reviewed. Information requests were sent to the NYSDEC Natural Heritage Program and the U S Fish and Wildlife Service and response from DEC has been received indicating that no threatened or endangered species are present on the sites.

The database continues to grow and follow-ups to personal communications that often lead to new sources of information are ongoing. Recently, at a conference in Rhode Island, several contacts at NMFS and the Mid-Atlantic Fishery Management Council were made that hold promise for gaining insight and understanding to completing the EFH process and approaches to finfish species covered under State and Federal regulations.

1.5 Regulatory Agency Review. During the program design phase of this project, contact was maintained with the COE, DEC and NMFS. Specifically, a detailed outline of the planned field and laboratory activities was presented in a meeting to relevant COE scientist and engineers and in two meetings to DEC scientists. The COE provided verbal agreement to the planned study. The DEC requested (minor) modifications which were subsequently made. As of this date, NMFS has yet to provide comments.

2.0 SPECIFIC STUDY ELEMENTS.

2.1 Water Quality. Water quality data including surface and bottom dissolved oxygen levels, salinity, and temperature will be collected at all of the sampling events listed below using a Yellow Springs Instrument (YSI) model R-85-10 Meter. Light transmission through the water column will be measured using a Secchi disc.

2.2 Ichthyoplankton Sampling

2.2.2 Sampling Schedule. Sampling will be conducted once monthly beginning in January and continuing through the end of September.

2.2.3 Sample Station Locations. Ichthyoplankton sampling will be conducted at three stations at each MTS. Station location will be recorded by use of a Garmin 185 Global Positioning System (GPS) receiver. Each station will be assigned a specific designation and the latitude and longitude will be recorded from the GPS receiver. While on station, the position will be saved in the memory of the GPS for reference and follow-up sampling events.

2.2.4 Field Sampling. Ichthyoplankton will be collected at each station utilizing a 0.75 meter diameter ring net, 5 to 1 length to open end ratio. Mesh size will be 363 micron. Each net will be equipped with a factory calibrated General Oceanics flow meter. One tow will be made at each of the

three stations. The net will be lowered through the water column as it is being towed behind the research vessel until the depressor plate contacts bottom and then slowly retrieved. Each tow will proceed until approximately 100 cubic meters of water have been entrained per tow. In the field the retrieved nets will be washed down and collected organisms will be poured from the cod end bottle and preserved with 10% formalin. Sample containers will have both inside and outside labels to identify the sample. The samples will be returned to the laboratory at the end of the day.

2.2.5 Laboratory Analyses. In the laboratory, all samples will be sorted under a dissecting microscope. Ichthyoplankton will be removed and placed in labeled vials according to gross taxonomic groups. Subsampling will be carried out when abundances are high. Samples will be subsampled either volumetrically using a Folsom plankton splitter or with a Stemple Pipette. Using the Stemple Pipette, 10 milliliter subsamples will be taken from a sample of known volume until a minimum of 100 fish larvae are removed. All organisms in the aliquot will be identified to the lowest practical taxa. The Average Outgoing Quality Limit (AOQL) criteria for laboratory identification and counts shall be 90%.

2.2.6 Quantitative Data Analysis. All data generated as a result of laboratory analysis of ichthyoplankton samples will be recorded in EXCEL spreadsheet format. The data will then be evaluated for taxa diversity, composition, and abundance. These analyses will be used to compare sampling locations to each other.

2.3 Adult Finfish.

2.3.1 Sampling Schedule. Fish sampling will be conducted in conjunction with the ichthyoplankton collections during the sampling periods; monthly from January through December 2003. Trawling operations will be duplicated on successive days, while gill nets will be set once (overnight) during the first trawl day and retrieved on the second day.

2.3.2 Sample Station Locations. Fish sampling will be conducted at five stations at each MTS. Station location will be recorded by use of a Garmin 185 Global Positioning System (GPS) receiver. Each station will be assigned a specific designation and the latitude and longitude will be recorded from the GPS receiver. While on station, the position will be saved in the memory of the GPS for reference and follow-up sampling events.

2.3.3 Field Sampling Using Trawls. One trawl per station will be conducted. Each MTS will have five stations to be located adjacent to and/or

in front of the present MTS structure. The exact location of the trawl station will be dependent on field conditions. Since MTS structures are located in restricted basins and along open water, slight alterations in the trawling process are adapted for the different locations. Trawling operations in restricted areas require the boat to be backed to the head end of the channel or basin and the net and wings are lowered over the stern to approximately half the water depth. In open water, the boat is positioned on the starting point of the station and the net is lowered over the stern to approximately half the water depth. The boat is slowly run ahead and the trawl paid out to an appropriate length. The amount of line (warp) let out depends on the depth of the water (a ratio of 5 to 1, warp length to water depth, is considered optimal). Trawling speed is standardized at 2.5 knots. Each tow is approximately 500-800 feet in length, physical constraints permitting. A 32-foot semi balloon otter trawl will be used with a 3.0" mesh and a 0.5" mesh cod end net liner.

Contents of each trawl will be emptied into a container, sorted and identified to species. Scales will be removed and placed into envelopes labeled with the date, station and species for later aging analysis. Each species will be identified, measured and weighed before being returned to the water, if alive. If large numbers of an individual species are encountered (e.g., more than 30), the first 30 of that species will be analyzed and the remainder counted or weighed in mass. Fish will be examined for general condition including fin rot, external parasites and similar items. Observations will be made on adult fish in order to determine if fish are gravid. In addition, scales will be removed from species identified on the EFH tables for each site, in order to conduct an age analysis.

2.3.4 Field Sampling Using Gillnets. Gill nets will be set at one station at each MTS location during the first day of trawling, left overnight, and retrieved the next day during the course of the sampling event. A 100-foot gillnet consisting of four panels ranging from one-inch to four inches in size will be anchored in place.

Contents of the panels of each gillnet will be emptied into separate tubs, placed on a sorting table and identified by species. Scales will be removed and placed into envelopes labeled with the date, station and species for later aging analysis. Collected finfish will be identified, measured and weighed before being returned to the water, if alive. If large numbers of an individual species are encountered (e.g., more than 30), the first 30 of that species will be analyzed and the remainder counted or weighed in mass. Fish will be examined for general condition including fin rot, external parasites and similar items. Observations will be made on adult fish in order to determine if fish are gravid. In addition, scales will be removed from species identified on the EFH tables for each site, in order to conduct an age analysis.

2.3.5 Lab Analyses. In the laboratory, scales removed from the fish caught in trawl and gillnets that are identified on the EFH tables for the site will be examined under a stereomicroscope to determine the age of the fish.

2.3.6 Quantitative Data Analysis. Data collected in the field and generated in the laboratory will be analyzed. Data will be evaluated for taxa diversity, composition, and abundance. Spatial and temporal analysis will be conducted on adult finfish collected in both trawls and gillnets in order to compare sampling locations to one another.

2.4 Colonization Plate Sampling

2.4.1 Overview. .Artificial substrate panel arrays will be deployed in January and retrieved every 3 months. Panel arrays will be examined monthly for physical presence. Individual panels will be retrieved every three months for analysis and the arrays will be removed completely in January of the following year.

2.4.2 Sample Station Locations. Two artificial panel arrays will be deployed at the each MTS location. One array will be deployed at 3 feet below mean low water and the second will be deployed at 7 feet below mean low water.

2.4.3 Field Sampling. Epibenthic recruitment studies will be performed using a eight-plate array. Artificial panel arrays will be deployed in January, 2003, and examined once per month for physical presence. After three months (April) the entire array will be removed from the water, weighed, photographed, and checked for the presence of crabs and fish. Crabs will be identified and counted. Fish will be identified, counted, weighed, and measured. The lower two plates will be removed and the array will be returned to the water. Each individual plate will be placed in a container and preserved in 95% ethanol. Rose Bengal stain will be added to the ethanol to aid in later sorting of the organisms. The sample container will have both inside and outside labels to identify the sample. Concurrent with panel retrieval, water quality parameters will be measured. Six months after deployment (July) the lowest two plates will be removed and analyzed. The process will be repeated again in October. After one year, in January, the array will be retrieved and the remaining two plates will be analyzed.

2.4.4 Lab Analyses. Artificial colonization plates will be scraped of all organisms. Identification of organisms will be made with the aid of a dissecting microscope. Major taxonomic groupings will be counted and weighed. Total weights of each species will be recorded to the nearest

milligram. The AOQL criteria for laboratory identifications and counts shall by 90%.

2.4.5 Quantitative Data Analysis. All data generated as a result of laboratory analysis of epibenthic samples will be recorded in EXCEL spreadsheet format. The data will then be evaluated for taxa diversity, composition, and abundance. These evaluations will enable the comparisons of the epibenthic communities at each sampling location.

2.5. Benthic Invertebrate Sampling.

2.5.1 Overview. Benthic invertebrates will be sampled at each of the MTS structures. Benthic sampling will be scheduled to coincide with the panel collection every three months for one year.

2.5.2 Sample Station Locations. A total of 15 benthic grabs will be collected at each of the MTS structures. Three stations will be chosen around the perimeter of the MTS and five replicate grabs will be collected at each station (15 grabs total). The coordinates of each grab will be recorded using the differential GPS navigation system of the survey vessel (RV Kingfisher).

2.5.3 Field Sampling. The grab that will be used for the collections is a 0.025 meter square modified Young grab sampler. Individual samples (entire contents of the Young grab) will be washed through a 0.5 millimeter mesh sieve to remove fine particles. Contents will then be transferred to a wide mouth one-liter sample jar that contains both an external and an internal label identifying the sample. The samples will then be fixed with a buffered 10 percent formalin solution. Only full grab samples will be utilized. Rose bengal stain will be added to the formalin to aid in later sorting of the organisms.

2.5.4 Lab Analyses. In the laboratory, all grab samples will be rinsed gently with tap water through a 0.5-mm mesh sieve to remove preservatives and sediment, stained with Rose Bengal, and stored in 95% ethanol solution until processing. Subsequently, the organisms will be carefully removed with forceps and placed in labeled plastic vials containing 90% ethanol. After sorting, macroinvertebrates will be identified to the lowest practical identification level (LPIL), which in most cases will be to the species level unless the organism is a juvenile, damaged, or otherwise unidentifiable. The number of individuals for each taxa and the total weight for that taxa will be recorded. The AOQL criteria for laboratory identifications and counts shall be 90%.

2.5.5 Biomass Analysis. Each sample will be weighed for wet weight biomass (standing stock biomass in g/square meter) for the major taxonomic groups identified. In the laboratory, the organisms will be removed from the vials and placed on a filter paper pad, gently blotted with a paper towel to remove moisture, placed in a tarred weighing pan, and weighed to the nearest 0.01 g.

2.5.6 Quantitative Data Analysis. All data generated as a result of laboratory analysis of meioinvertebrate samples will be recorded in EXCEL spreadsheet format. The data will then be evaluated for taxa diversity, composition, and abundance. The 15 stations within the project location will be compared to each other to analyze similarities and differences between the observed data. Water quality, sample depth, and spatial differences will be analyzed to find any correlations between these variables and the similarities or differences in the data among the stations.

Data will be standardized to abundance by calculating the number of organisms per square meter. This will be calculated by dividing the total number of each species by the number of samples taken from the proposed project area. This number will then be multiplied by 40 to calculate the abundance per square meter (since the grab sample is .025 square meters). This analysis enables the estimation of species abundance within the project site.

2.5.7 Statistical Data Analysis. Statistical tests will be utilized to determine how representative the stations are within the grid of the project area. As the data set is complex, three representative statistical measures will be used to compare the sampling stations. These measures are: abundance within the project area, Jaccard's Indices, and biological diversity indices(H').

2.6 Sediment Quality Sampling.

2.6.1 Overview. Sediment quality will be sampled at each of the MTS structures. Sediment quality sampling will be scheduled quarterly starting in January.

2.6.2 Sample Station Locations. Three sediment grabs will be collected at each of the MTS structures. The stations will be chosen around the perimeter of the MTS. The coordinates of each grab will be recorded using the differential GPS navigation system of the survey vessel.

2.6.3 Lab Analyses. Sediment samples will be analyzed for grain size, moisture content, TOC and RCRA metals.

2.6.4 Quantitative Data Analysis. All data generated as a result of laboratory analysis of sediment samples will be recorded in EXCEL spreadsheet format. These results of the laboratory analysis will enable the comparisons of the sediment type at each sampling location.

3.0 REPORTS, IMPACT ANALYSIS AND DELIVERABLES.

3.1 Monthly Reports. At the end of each month the EEA Project Manager will submit a report listing all the sampling activities conducted during the month. If any discrepancies occurred (e.g., variations from the FSAMP), the reasons will be presented and corrective measures described.

3.2 Quarterly Reports. Every three months a quarterly summary will take the place of the normal monthly report. This summary will list all the activities during the quarter and also present any field and laboratory data that has been reviewed, undergone QA/QC checks and is ready for transmittal.

3.3 Final Report and Impact Analysis. At the conclusion of the program a comprehensive final report will be prepared. This report will document the results of the literature survey, the baseline conditions on each site, and a habitat assessment for each site. In addition the report will compare and contrast habitat conditions among all eight of the MTS's and rate the sites in relation to each other.

An impact analysis will include a definition of the expected acreage loss (or gain) for each major habitat type for both finfish and invertebrates communities. Impacts to be addressed include:

- Removal of large quantities of hard or soft surface substrate
- Discussion of on-site habitat requirements for wildlife identified on site, as well as potential species and discussion of both short- and long-term impacts of habitat loss.
- Substantial interference with the movement of any resident or migratory fish or wildlife species.
- Impacts on areas of significant habitat, if any.
- Adverse effects on any threatened, endangered or rare plant or animal species and/or the habitat of such species, pursuant to the Endangered Species Act and NYSDEC guidelines.
- Other significant impacts to natural resources.

FIGURE 1
Marine Transfer Station Locations

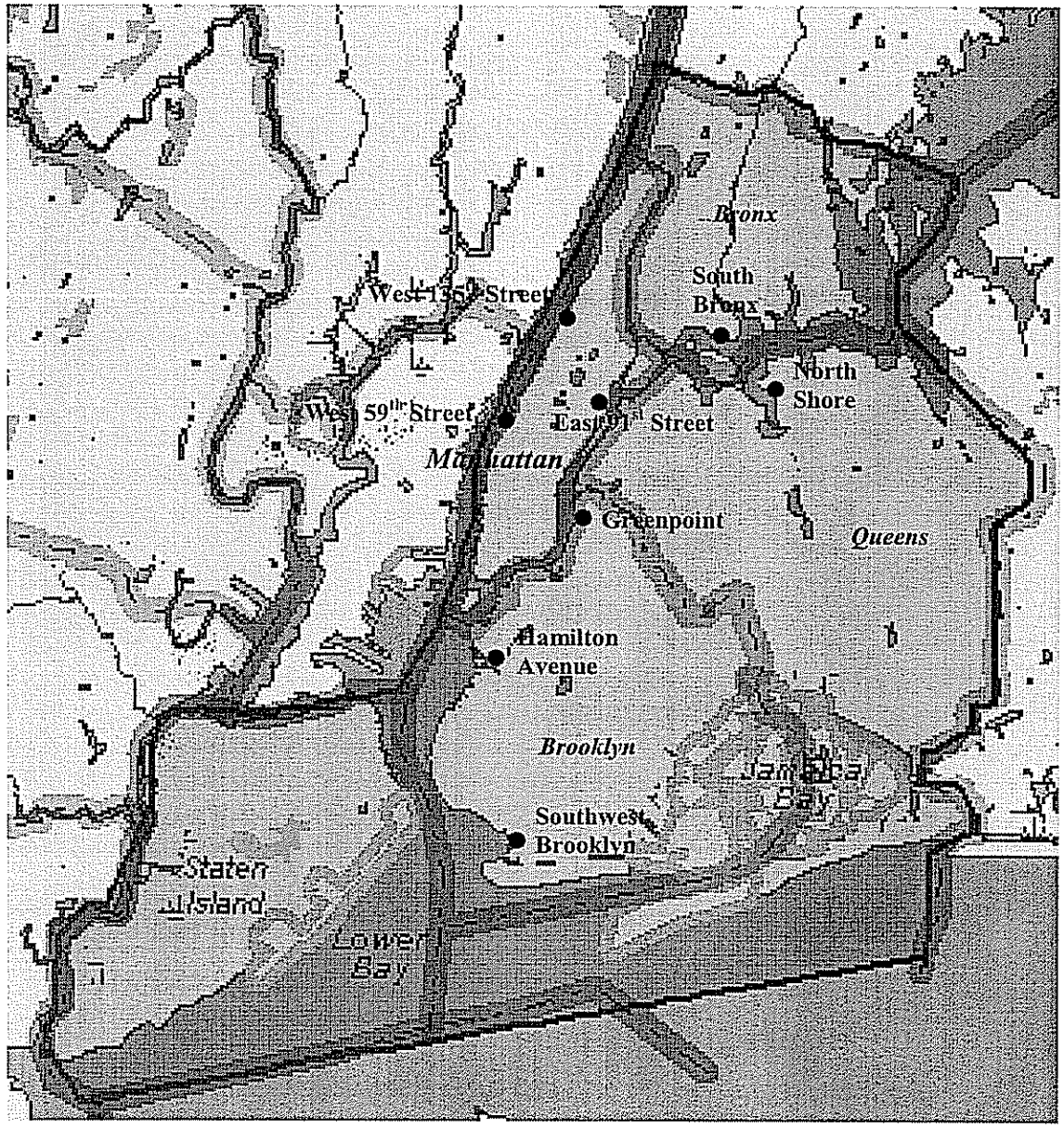

Table 1
Field Sampling and Analysis Management Plan for New York City
Department of Sanitation MTS Facilities

Permit and EFH Studies: Preliminary Ecological Sampling Activities and Schedule

	Months												
Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
North Shore	TGBISP	I	I	TGBISP	I	I	TGBISP	I	I	TGBSP	N	N	P	
Greenpoint	TGBISP	TGI	TGI	TGBISP	TGI	TGI	TGBISP	TGI	TGI	TGBSP	TG	TG	P	
South Bronx	TGBISP	TGI	TGI	TGBISP	TGI	TGI	TGBISP	TGI	TGI	TGBSP	TG	TG	P	
East 91st Street	PBIS	I	I	PBIS	I	I	PBIS	I	I	PBS	N	N	P	
West 135th Street	TGBISP	I	I	TGBISP	I	I	TGBISP	I	I	TGBSP	N	N	P	
West 59th Street	TGBISP	TGI	TGI	TGBISP	TGI	TGI	TGBISP	TGI	TGI	TGBSP	TG	TG	P	
Hamilton Avenue	PBIS	I	I	PBIS	I	I	PBIS	I	I	PBS	N	N	P	
Southwest Brooklyn	TGBISP	TGI	TGI	TGBISP	TGI	TGI	TGBISP	TGI	TGI	TGBSP	TG	TG	P	

Notes:
T=Fisheries Trawls (5 replicate trawls, 2 days per month)
G=Fisheries Gill Nets (1-100' gill net set overnight on trawl periods)
B=Benthic Invertebrates (3 stations, 5 replicates each)
I=Ichthyoplankton (3 tows with a 363u, 0.75m plankton net)
S=Sediment Quality (grain size, % moisture, TOC, RCRA metals)
P=Colonization Plates (2 arrays of 8 plates set in Jan, two removed from each array quarterly for analysis)

Lab Notes:
B= 15 samples taken every three months at 8 MTSs (3 samples from each of the 3 stations will be analyzed initially and 2 samples will be archived).
I= 3 samples taken per month at 8 MTSs.
S= 3 samples taken every three months at 8 MTSs.
P= 2 plates analyzed from 8 MTSs at 2 depths every three months.
T & G = age analysis of subsample of fish collected in trawls and gill nets.