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US ARMY CORPS
OF ENGINEERS
New England District

Contract No. DACW33-03-D-0004

Delivery Order No. 22

May 2007

FINAL
Water Quality Monitoring Summary Report

2006 Remedial Dredging

Environmental Monitoring, Sampling, and Analysis

New Bedford Harbor Superfund Site

New Bedford Harbor, MA

SDMS DocID 272423

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Submitted to:

Department of the Army
U.S. Army Corps of Engineers
North Atlantic Division
New England District

Contract Number: DACW33-03-D-0004
Delivery Order Number: DO#22

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May 2007

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EXECUTIVE SUMMARY

Remediation dredging was performed in New Bedford Harbor from August through October 2006. Dredge activities occurred primarily in two areas: 'Area A' encompassing southern sections of DMU-1 and DMU-102, and 'Area B' encompassing sections of DMU-2 and DMU-3. Additional dredging activities were conducted in Areas 'C' and 'D' located in DMU-2 (Figure 3). The primary objective of the water quality monitoring program is to conduct boat-based field monitoring to provide field reconnaissance information to the United States Army Corps of Engineers (USACE), United States Environmental Protection Agency (USEPA), and dredging operators, to gauge the extent of water quality impacts resulting from dredging operations. This data is used to guide project operations as necessary in order to minimize environmental impacts, limit recontamination of previously dredged areas, ensure that the dredging activities are conducted in a manner which does not hinder the seasonal migration of anadromous fish to and from the Acushnet River, and to determine the degree and extent of sediment plumes advecting away from the site during dredging operations.

Water quality monitoring started prior to the dredge operations to establish background readings, and continued throughout November, approximately 2 weeks after dredging stopped. Monitoring activities utilized YSI sondes to collect instantaneous real time data on the monitoring vessel. Additional YSI sondes were deployed on moorings to collect longer term data. Each YSI was equipped to measure turbidity, salinity, temperature, depth and dissolved oxygen. The upper level turbidity criterion, defined as a "reportable event" is set at 50 Nephelometric Turbidity Units (NTU) above background measured 600 ft downstream of the dredging and associated activities. A warning criteria was established for an exceedance of 50 NTU above background at 300 ft downstream of the dredging and associated activities. If the warning criteria was exceeded, the USACE was contacted immediately to determine what, if any, operational modifications might be warranted to abate the condition and to reduce the potential for a criteria exceedance at the 600-foot transect. Neither the warning, nor the reportable criteria were exceeded at any time during the 2006 monitoring.

Based on a criteria-driven sampling program, water samples were collected for turbidity, TSS and PCB analyses on seven occasions during the dredge program. Samples from four of these events were also collected for toxicity testing. Metals samples were collected during three of the sampling events and were archived for potential analysis. Samples were collected either to establish baseline conditions and/or re-establish relationships between field measurements (i.e. turbidity) and toxicity results to verify the protectiveness of the +50 NTU criteria. No samples were collected in response to an exceedance of the +50 NTU turbidity criteria.

The deployment of the continuously recording water quality sensors provided additional information that complimented the adaptive monitoring approach discussed above. The location of sensors both north and south of the dredge areas provided information about tidal influences on sediment suspension and transport. Continuous readings provided water quality data for periods when adaptive sampling was not underway. This included inactive dredge periods such as nights and weekends, providing a reasonable background condition for comparison.

As expected, turbidity and TSS results showed a strong correlation ($R^2 = 0.9695$). Total PCB (as SUM 18 CONG) concentrations also correlated well with TSS and thus with elevated turbidity. However, dissolved PCBs, which are considered as a direct indicator of water quality, do not demonstrate a similar correlation with TSS. For example, the total to dissolved PCB ratio increased from approximately 2:1 in low TSS samples to 40:1 in the highest TSS sample. *In situ* turbidity measurements indicated that these turbidity plumes, representing high suspended solid loads and elevated total PCB concentrations, were isolated to the area immediately adjacent to dredging and debris removal and were also relatively short lived. Dissolved PCBs in the water column are thought to be the fraction that causes direct toxicity to marine organisms and may be subjected to long range transport. Dissolved PCB concentrations were generally low and did not correlate well with TSS.

1.0 INTRODUCTION

1.1 Site Description

The New Bedford Harbor Superfund Site (Site), located in Bristol County, Massachusetts, extends from the shallow northern reaches of the Acushnet River estuary south through the commercial harbor of New Bedford and into 17,000 adjacent acres of Buzzards Bay (Figure 1). Industrial and urban development surrounding the harbor has resulted in sediments becoming contaminated with high concentrations of many pollutants, notably polychlorinated biphenyls (PCBs) and heavy metals. At least two manufacturers in the area used PCBs while producing electronic devices from 1940 to the late 1970s, when the use of PCBs was banned by the EPA. Based on human health concerns and ecological risk assessments, the U.S. Environmental Protection Agency (USEPA) added New Bedford Harbor to the National Priorities List in 1982 as a designated Superfund Site. Through an Interagency Agreement between the USEPA and the U.S. Army Corps of Engineers, New England District (USACE NAE), the USACE is responsible for carrying out the design and implementation of the remedial measures at the site. The Site has been divided into three areas – the upper, lower and outer harbors – consistent with geographical features of the area and gradients of contamination (Figure 2). All of the activities conducted under the Water Quality Monitoring occurred in the upper Harbor.

Aerovox Inc. in New Bedford, MA used PCBs from c. 1940 to c. 1977 in the manufacture of electrical capacitors and transformers. This facility is considered one of the major sources of historic PCB contamination to New Bedford Harbor. The highest concentrations of PCBs were found in sediments in a 5-acre area in the northern portion of the Acushnet River Estuary adjacent to the Aerovox facility. These 'hot spot' sediments, which contained PCBs upwards of 100,000 mg/kg, were removed between 1994 and 1995 as part of USEPA's first clean-up phase. Full scale remediation dredging was initiated in 1994 and continued in 2005 and 2006. To a lesser extent, PCB contamination in New Bedford Harbor is related to activities at the Cornell-Dubilier mill on the western shore of the outer harbor. In 2005 a 15 acre underwater cap pilot project was implemented near Cornell-Dubilier to cap PCB contaminated sediments (Figure 2).

The Site is divided into a series of Dredge Management Units (DMU) based on contamination levels, contamination sources, topography, and other factors. In 2006, dredge activities were planned for two areas (1) 'Area A' located in the southern sections of DMU-1 and DMU-102, and (2) 'Area B' located along the boundary of DMU-2 and DMU-3 and DMU-4. In addition, dredging was conducted in Areas 'C' and 'D' of DMU-2 (Figure 3).

The remediation of this site involves the excavation and dredging of approximately 880,000 cubic yards of PCB contaminated sediment. The majority of contaminated material is being removed utilizing a hydraulic dredge that will pump dredge slurry to the project's Sawyer Street facility where it will be mechanically processed to remove all sand, gravel, and debris material. The silt and clay size materials will then be pumped to the Area D Dewatering Facility located on Herman Melville Boulevard where it will be mechanically dewatered and transported off-site for disposal.

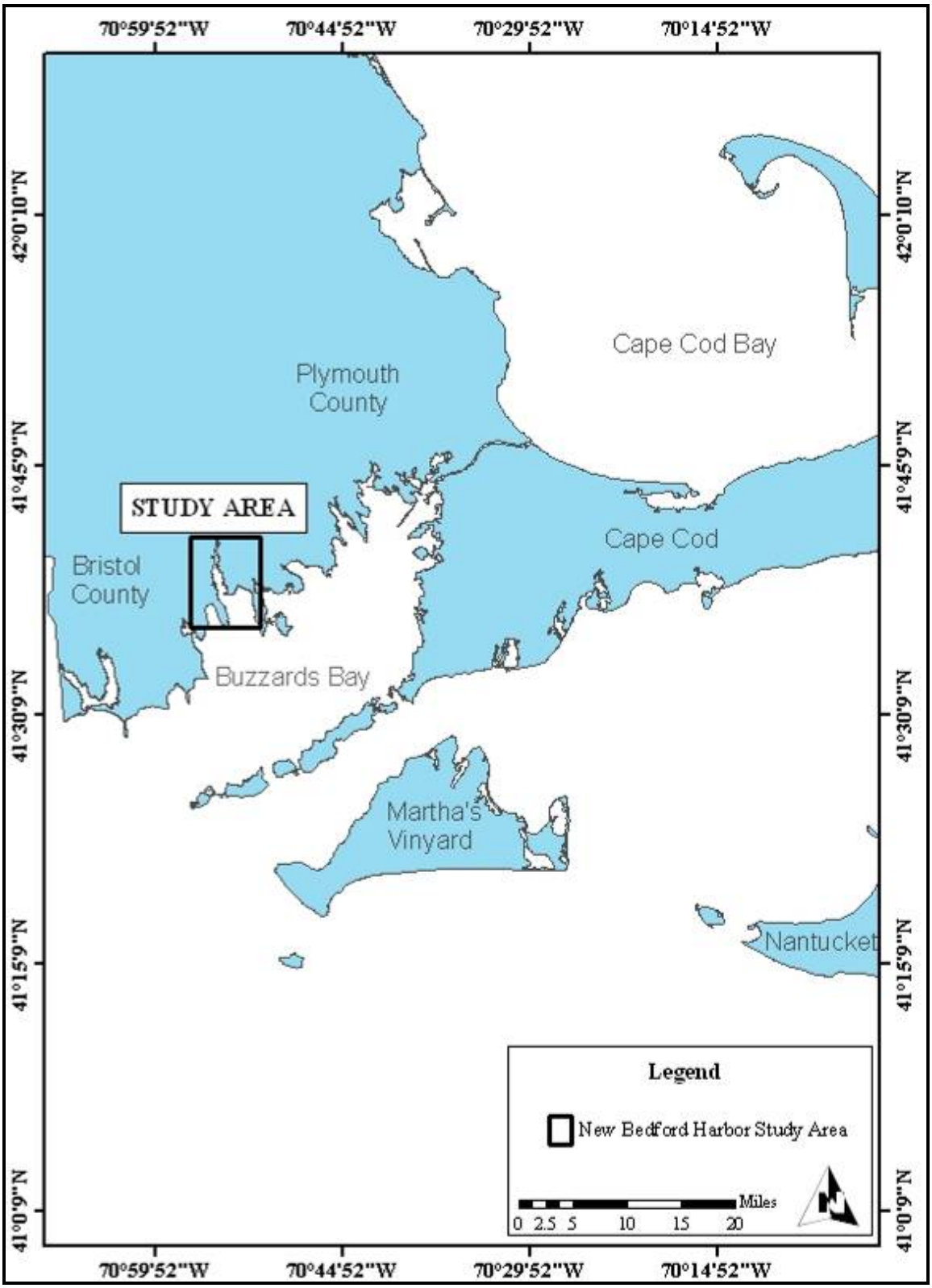


Figure 1. Location of the Site in Southeastern MA.

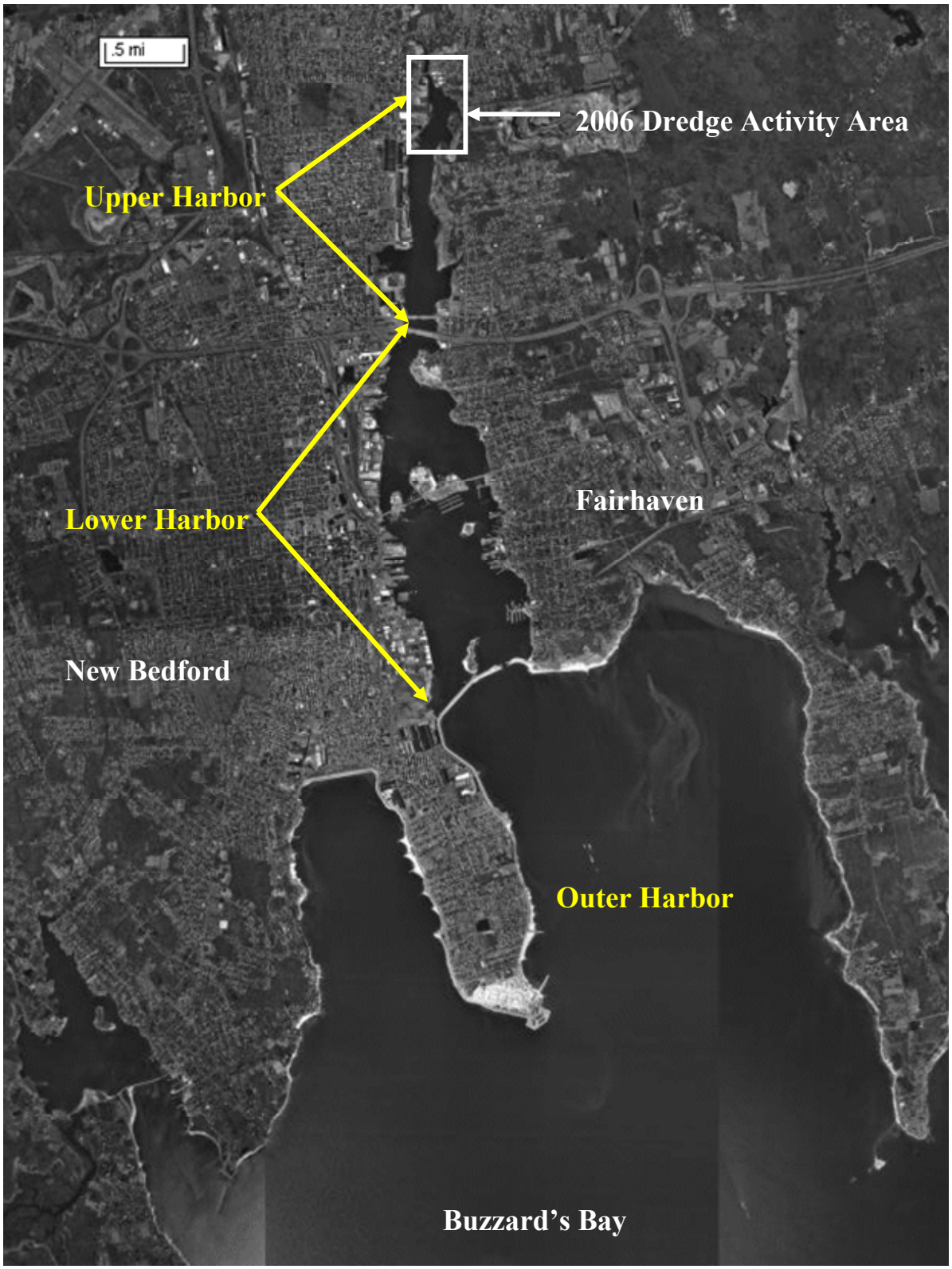


Figure 2. Location of the 2006 Dredge Activity Area within New Bedford Harbor.

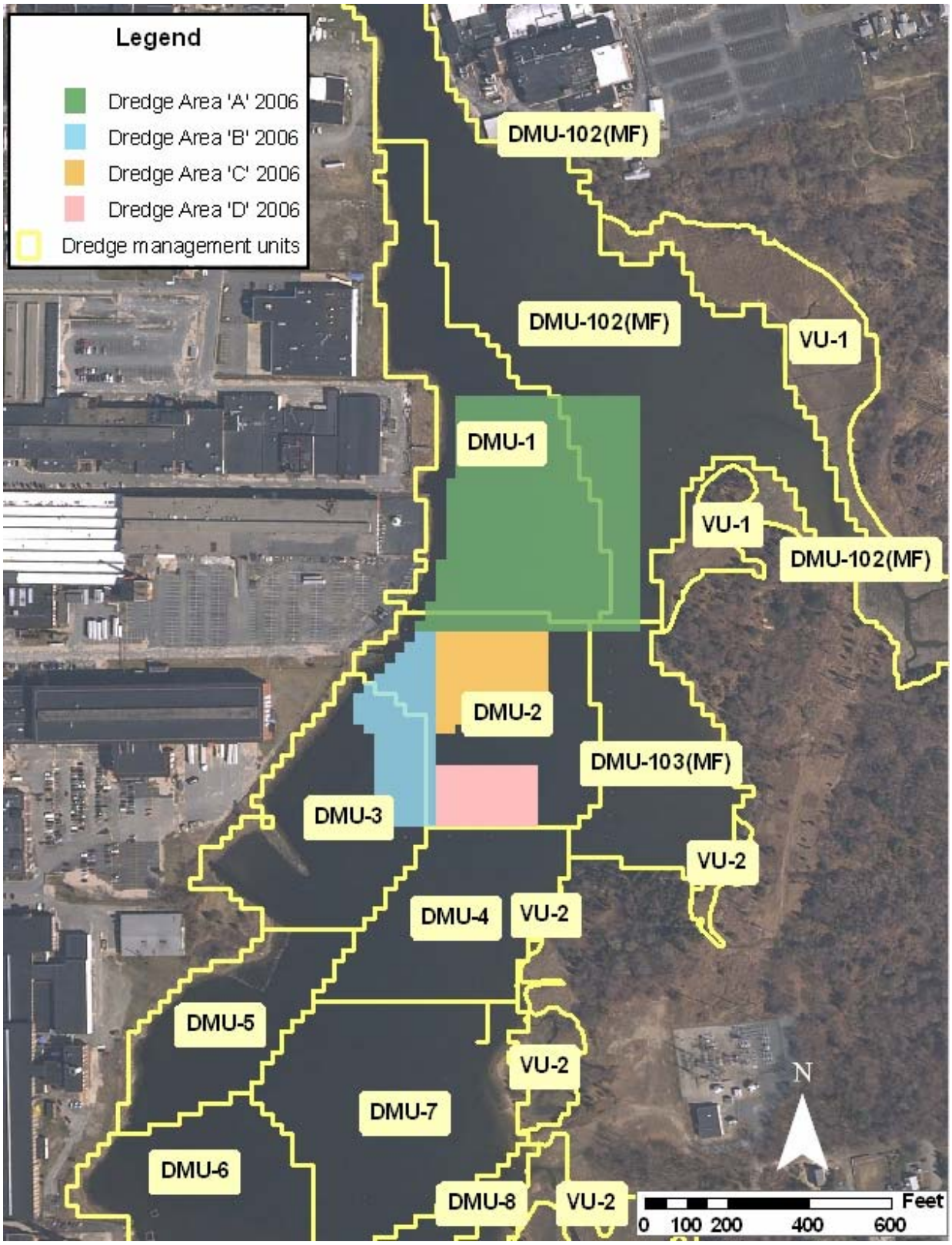


Figure 3. 2006 Dredge Areas

1.2 Project Objectives and Field Activity Summary

The resuspension of sediments during dredging, and dredging related activities, can transport contaminated sediments away from the dredge area. Additionally, contaminated sediments suspended in the water column present a concern for potential toxicity to aquatic organisms in the project area. The primary objective of this monitoring effort was to conduct boat-based field monitoring to provide field reconnaissance information to the United States Army Corps of Engineers (USACE), United States Environmental Protection Agency (USEPA) and dredging operators, to gauge the extent of water quality impacts resulting from dredging operations. This information may be used to make operational adjustments as needed to limit the dispersal of suspended sediments and their associated contaminants as well as limit the extent of biological impacts to the water column. An additional objective was to ensure that the dredging activities were conducted in a manner which did not hinder the seasonal migration of anadromous fish in the Acushnet River (i.e. fish are able to successfully navigate past dredging operations).

The upper level turbidity criterion, defined as a "reportable event" is set at 50 Nephelometric Turbidity Units (NTU) above background measured 600 ft downstream of the dredging and associated activities. A warning criteria was established for an exceedance of 50 NTU above background at 300 ft downstream of the dredging and associated activities. If the warning criteria was exceeded, the USACE was contacted immediately to determine what, if any, operational modifications may be warranted to abate the condition and to reduce the potential for a criteria exceedance at the 600-foot transect.

1.3 Water Quality Monitoring Program

The focus of the 2006 water quality monitoring program was on near-field water column impacts as well as assessment of the extent of sediment resuspension and transport away from the dredging operation. This data is used to guide project operations as necessary in order to minimize environmental impacts, limit recontamination of previously dredged areas, ensure that the dredging activities are conducted in a manner which does not hinder the seasonal migration of anadromous fish to and from the Acushnet River, and to determine the degree and extent of sediment plumes advecting away from the site during dredging operations. To meet this objective, a tiered monitoring approach was employed which incorporated field measurements of turbidity and water quality parameters and water sampling for toxicity testing and laboratory analysis on a periodic basis as needed. Water column measurements were conducted along four key transects for each of the dredge areas. The locations are described here and illustrated for dredge Area A, in Figure 4. As dredging operations moved throughout the dredge areas, the monitoring locations moved relative to those activities as follows:

- **Reference:** A reference station 1,000 ft up-current of dredging operations to provide background conditions.
- **Dredge Boundary:** Measurements were made at the edge of the dredge area. This is defined as a down-current location as close as practicable and as safety allows.
- **300 ft Downstream:** Defined as a transect set, 300 ft down-current from the dredging operation.
- **600 ft Downstream:** Defined as a transect set, 600 ft down-current from the dredging operation.

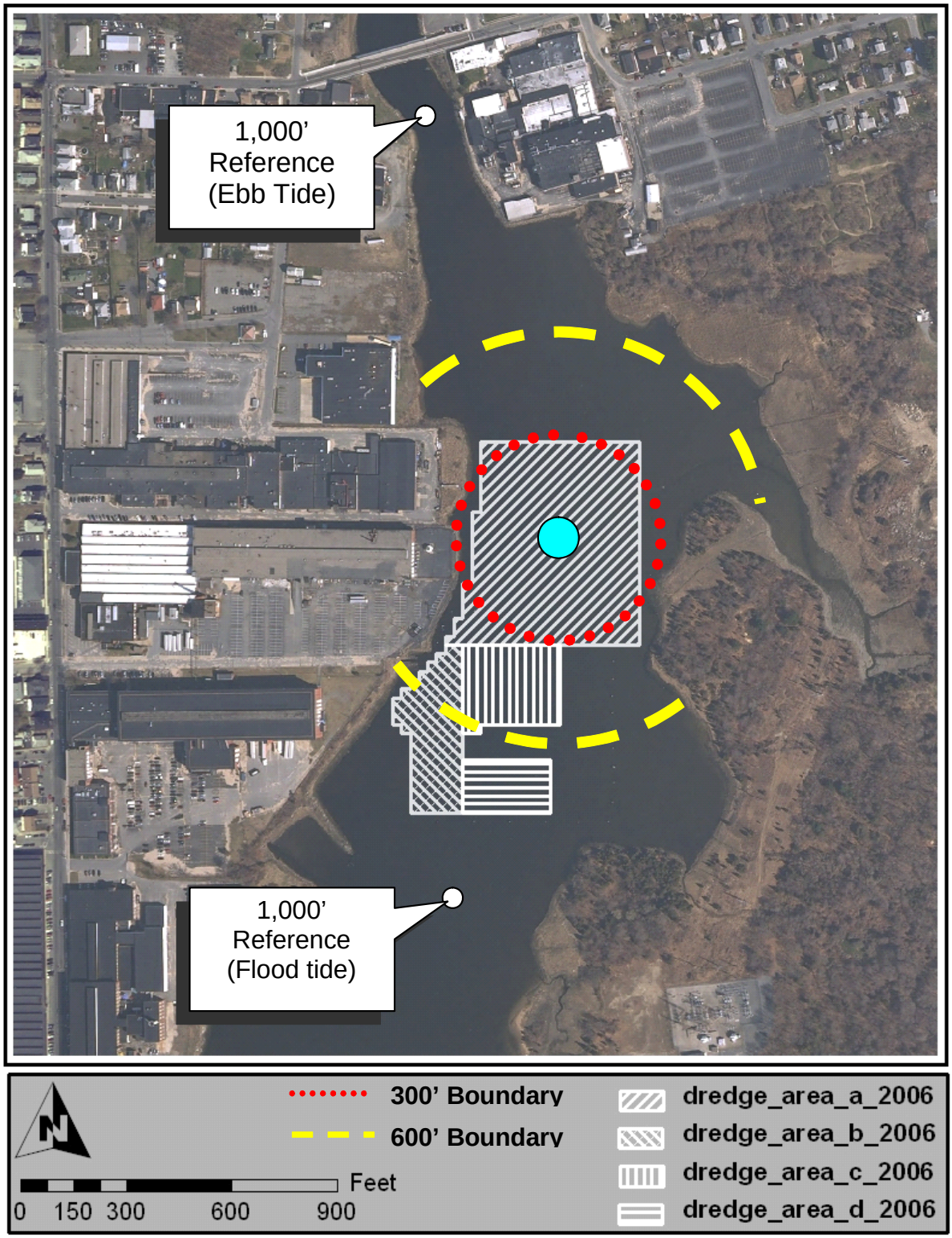


Figure 4. Example of Monitoring/Sampling Locations (Relative to Dredge Area A).

2.0 METHODS

The Battelle QAPP (Battelle, June 2006a) and the Water Quality Field Sampling Plan (FSP) (Battelle, July 2006b) contain additional details on survey/sampling methods.

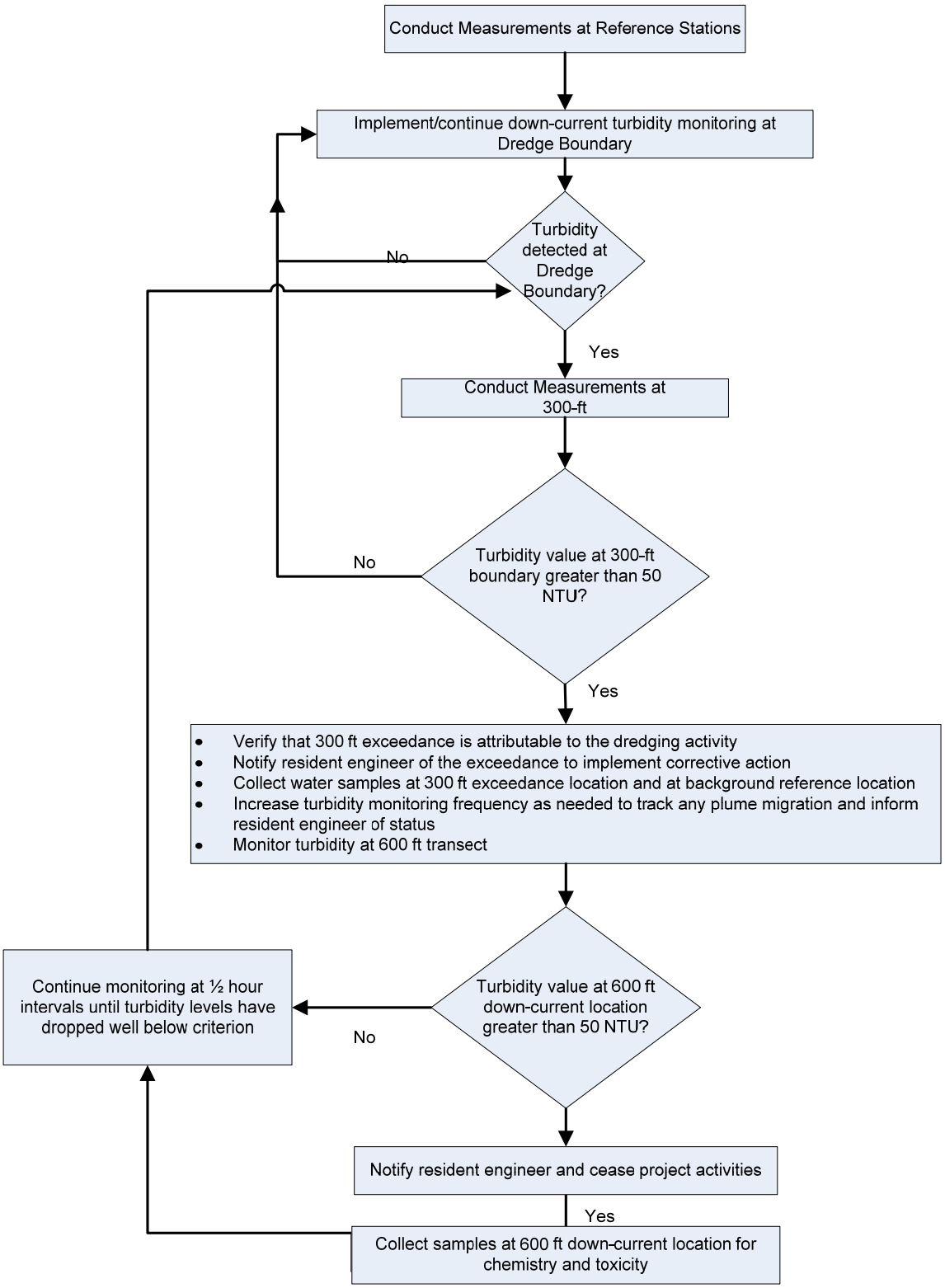
2.1 Sampling Rationale

The established sampling approach for this program employs a variety of sampling methods to characterize sediment resuspension, sediment transport, and its impact on water quality. The overall approach utilizes an adaptive, criteria-based sampling scheme to monitor project-related water quality impacts. This is broken up into a series of sampling 'levels' which vary in the degree to which analytical samples are collected. The more intensive levels were utilized when there was greater potential for a specific dredging activity to have an impact on water quality. This was particularly true for new activities or activities in new areas. Based on information from these sampling levels, sampling was reduced to the lower intensity levels when appropriate. Sampling Levels I, II, and III are designed to collect water samples at designated distances away from the dredge operation to limit the extent of impact (Boundary, 300 ft, and 600 ft). Based on results acquired throughout the monitoring season, a second type of sampling was added to the design. Under this approach, specific levels of turbidity were targeted for sampling regardless of their location relative to dredging. This approach was added in order to evaluate turbidity/PCB/toxicity relationships and confirm that current criteria are adequately protective of the aquatic environment. These approaches are discussed below and the criteria based sampling following the decision sequence in Figure 5. Table 1 lists all sample collection information.

- **Level I:** Level I represents a sampling approach for discrete samples and was conducted for those activities having the greatest potential to impact water quality or when new conditions were encountered. Initially discrete samples were collected at designated locations: Reference, Dredge Boundary, 300 ft downstream, and 600 ft downstream. At each station discrete water samples were collected for all parameters from the depth of highest turbidity, based on the *in situ* readings. During the monitoring season it was observed that sampling under Level I, while achieving its objectives, was not capturing elevated turbidity levels. As a result there was limited data regarding the water quality impacts associated with elevated turbidity. As a result, Level I sampling was modified to include additional discreet sample collections at locations having a full range of turbidities (25-100 NTU) to be used in evaluating the protectiveness of the threshold criteria. In all cases it was necessary to sample in fairly close proximity (<300 ft) from debris removal operations in order to collect high turbidity samples. Often times samples were collected <75 ft from operations. These samples were obtained to evaluate turbidity/PCB/toxicity relationships and did not represent exceedances of water quality criteria.
- **Level II:** Level II represents a lower level of monitoring intensity (from Level I) given a decreased concern for water quality impacts from an activity. Similar to Level I, Level II was designed to collect samples based on distance from dredge activities although no 600 ft sample was required due to the decreased concern for far-field impact(s). Similar to Level I, modifications were made during the dredge season in order to adequately characterize the sediment plume which was rarely found near the pre-established

transects. Table 1 lists the samples which were submitted for analysis under Level II sampling.

- **Level III**: The sampling was conditional based on results of turbidity monitoring. Furthermore, a Level III monitoring effort was contingent upon any exceedance of the project-based criterion or based on detection of sheens or plumes emanating from the project area. It should be noted that at no point during the 2006 season were any of the Level III criteria exceeded. As a result no samples were analyzed under the Level III design.



Notes: 1:50 NTU value was defined as 50 NTU above background turbidity level

Figure 5. Decision Sequence for Water Quality Monitoring.

Table 1. Number of Samples Collected During Each Level of Required Monitoring.

Week	Date	Monitoring Level	Sample Description[1]	Sample ID	Parameters[2]
-1	8/10/06	Background	NA	NA	NA
1	8/14/06	Level I (Background)	Reference	WQ-XXX-001-081406	DPC, TPC, TSS, TUR, TOX, MET
			Boundary	WQ-XXX-002-081406	DPC, TPC, TSS, TUR, TOX, MET
			300 ft	WQ-XXX-003-081406	DPC, TPC, TSS, TUR, TOX, MET
			600 ft	WQ-XXX-004-081406	DPC, TPC, TSS, TUR, TOX, MET
	8/15/06	III	NA	NA	NA
	8/16/06	I	Reference	WQ-XXX-001-081606	DPC, TPC, TSS, TUR, TOX
			Boundary	WQ-XXX-002-081606	DPC, TPC, TSS, TUR, TOX
			300 ft	WQ-XXX-003-081606	DPC, TPC, TSS, TUR, TOX
	8/17/06	III	NA	NA	NA
	8/18/06	III	NA	NA	NA
2	8/21/06	III	NA	NA	NA
	8/22/06	III	NA	NA	NA
	8/23/06	III	NA	NA	NA
3	8/28/06	I	Reference	WQ-XXX-001-082806	DPC, TPC, TSS, TUR, TOX
			50 NTU	WQ-XXX-002-082806	DPC, TPC, TSS, TUR, TOX
			25 NTU	WQ-XXX-003-082806	DPC, TPC, TSS, TUR, TOX
	8/29/06	III	NA	NA	NA
	8/30/06	III	NA	NA	NA
4	9/6/06	II	0 NTU	WQ-XXX-001-090606	TSS, TUR
			15 NTU	WQ-XXX-002-090606	TSS, TUR
			20 NTU	WQ-XXX-003-090606	TSS, TUR
			35 NTU	WQ-XXX-004-090606	TSS, TUR
			135 NTU	WQ-XXX-005-090606	TSS, TUR
			75 NTU	WQ-XXX-006-090606	TSS, TUR
			50 NTU	WQ-XXX-007-090606	TSS, TUR
	9/7/06	III	NA	NA	NA
5	9/11/06	III	NA	NA	NA
	9/12/06	III	NA	NA	NA
6	9/18/06	III	NA	NA	NA
	9/19/06	I	1 NTU	WQ-XXX-001-091906	DPC, TPC, TSS, TUR, TOX, MET
			50 NTU	WQ-XXX-002-091906	DPC, TPC, TSS, TUR, TOX, MET
			25 NTU	WQ-XXX-003-091906	DPC, TPC, TSS, TUR, TOX, MET
			75 NTU	WQ-XXX-004-091906	DPC, TPC, TSS, TUR, TOX, MET
	9/20/06	III	NA	NA	NA
7	9/25/06	III	NA	NA	NA
8	10/4/06	III	NA	NA	NA
9	10/9/06	II	75 ft N (flood tide) of Debris Removal	WQ-XXX-001-100906	DPC, TPC, TSS, TUR
			25 ft S (ebb tide) of Debris Removal	WQ-XXX-002-100906	DPC, TPC, TSS, TUR
			25 ft S (ebb tide, 30 min after previous sample) of Debris Removal	WQ-XXX-003-100906	DPC, TPC, TSS, TUR
			200 ft S of Debris Removal	WQ-XXX-004-100906	DPC, TPC, TSS, TUR
	10/11/06	III	NA	NA	NA
10	10/16/06	II	South Reference	WQ-XXX-001-101606	DPC, TPC, TSS, TUR, MET
			25 NTU	WQ-XXX-002-101606	DPC, TPC, TSS, TUR, MET
	10/17/06	III	NA	NA	NA

[1] – Samples are collected either based on distance (i.e., 300 ft, 600 ft) or Turbidity levels (i.e., 25, 50 NTU), see Section 2.1 for further discussion on Sample Location.
[2] – Parameters listed in the Table are the following: DPC =Dissolved PCB, TPC =Total PCB, TSS =Total Suspended Solids, TUR =Turbidity, TOX =Toxicity, MET =Metals
NA – Not Applicable

2.2 In Situ Measurements

In situ measurements of depth, turbidity, temperature, salinity, and dissolved oxygen were acquired using a YSI 6920 water quality probe with real-time display and data logging. Monitoring combined preplanned measurements to support discrete sampling as described below, and criteria based sampling following the decision sequence in Figure 5.

It should be noted that since the Acushnet River is tidally influenced, the definitions of upstream and downstream are generally dependent upon tide. On ebb tides, "downstream" is always to the south of dredging activities. However, during flood tides flow is often predominately to the north. Variability in freshwater flow also impacts dominant current direction and its influence on transport of suspended sediments. Several times throughout the 2006 monitoring program a clear stratification of the water column was observed. In these cases lower density freshwater sat on top of higher density, more saline tidal waters. Frequently the incoming tidal water was moving north, while the freshwater lens was flowing south. These physical water properties were closely monitored throughout the day, and adjustments were made in the sampling design in order to accurately assess sediment resuspension and its transport in all directions. Throughout this report the terms "downstream" and "down-current" always refer to the direction of water movement relative to the dredging operations at that point in time regardless of physical direction (north versus south).

The following describes field activities by location:

Reference Station: At the start of each sampling day the vessel transited to the reference location 1,000 ft upcurrent (based on tidal stage) from the active dredge area. This location was outside the influence of any localized turbidity sources (ex. CSO discharges or storm water drains), but still representative of the water flowing through the deeper channel areas up current of the dredge area. Water depth was measured with a lead-line and the result recorded on the field log. The i*n situ* sensors were lowered slowly (~5sec/foot) through the water column with care taken to avoid placing the instruments on the bottom. As the sensors were lowered, the sampling personnel observed the turbidity readings and identified the depth of the highest turbidity values. After the full "downcast" was conducted, the sensors were pulled back up through the water column and held at the location of highest turbidity. The *in situ* readings for all parameters at this depth were recorded on the Field Log Sheet. This reading served as the background value for subsequent turbidity readings taken throughout the day (i.e. this value was subtracted from subsequent readings to determine if the 50 NTU above background criterion was exceeded). Discrete samples were collected as required (see Section 2.1). Reference locations were resampled if conditions changed. Examples of relevant changes include change in tidal flow; change in dredge operations; and changing weather conditions such as rain events which can dramatically alter ambient water quality conditions. Resampling of the reference location was conducted at the field team's discretion based on real-time data feedback and field observations.

Dredge Boundary: Following the collection of *in situ* and discrete samples at the reference location, the sampling team transited down-current of dredging operations. *In situ* readings were collected as close to the dredge, or other operation, as safety allowed in the same manner described for the reference location. Based on the sampling requirements for that survey day (i.e. Levels I, II, and III) discrete samples were or were not collected (Section 2.1).

300 ft Downstream: 300 ft downstream from the dredge operations, the vessel operated along a transect across the width of the river while collecting *in situ* readings. Real-time data feedback was used to identify any suspended sediment plumes. The focus was on identifying the centroid of the plume (highest turbidity readings) as well as the plume boundaries (lowest turbidity readings above background). High and low readings along the transect were recorded to show the relative intensity of the plume as well as its spatial dimensions. Once the centroid was identified, subsequent readings were concentrated at this location in order to identify fluctuations in the plume intensity and potential exceedances of the caution threshold. Based on the sampling requirements for that survey day (i.e. Levels I, II, and III) discrete samples were or were not collected (Section 2.1).

600 ft Downstream: 600 ft downstream from the dredge operations, *in situ* transects were conducted as described above for the 300 ft downstream transect. Based on the sampling requirements for that survey day (i.e. Levels I, II, and III) discrete samples were or were not collected (Section 2.1).

Fixed point *in situ* sensors: In addition to the boat-based monitoring *in situ* data were collected using YSI 6920 water quality meters with internal data logging capabilities which were deployed at fixed locations for extended periods of time. The sensors internally recorded water temperature, salinity, dissolved oxygen, and turbidity. The sensors were deployed on August 15 during the first week of dredging and remained in use until November 15, approximately 3 weeks after the cessation of dredge related activities. Their location (horizontal and vertical) was based on data acquired during the first week of monitoring. The objective of sensor placement was to supplement the boat-based monitoring. Locations included one upstream and one downstream location just beyond the dredge area. The upstream sensor was located in the main river channel, 100 ft north of the northwest corner of the active dredge area. The downstream sensor was originally located 200 ft south of the southwest corner of the dredge area. The downstream sensor was relocated on September 19 (week 6) to avoid interference with dredge operations and the movement of equipment. The new location was 200 ft south of the dredge area, in the middle of the main channel. These locations are shown on Figure 6. The sensors were deployed on moorings with a surface marking buoy and a subsurface buoy from which the sensor was suspended. With tidal fluctuations, the water depths at the mooring locations ranged from approximately two to seven feet. Due to the relatively shallow water at the deployment locations and the large tidal fluctuation, a sampling configuration was designed which maximized characterization of the entire water column while keeping the sensors from resting on the bottom sediments. A depiction of the deployment configuration is shown in Figure 7. At lower tides the sensors floated within one foot of the surface. At higher tides, the sensors were maintained approximately three feet off the bottom.

The YSI internal sampling rate was set to 15 minutes. The sensors were retrieved and deployed as part of the boat-based monitoring program. The sensors were retrieved for routine maintenance as needed. Between each deployment, the sensors were cleaned, recalibrated, the data were downloaded, and the batteries were replaced as needed to ensure a minimum of two weeks battery life.

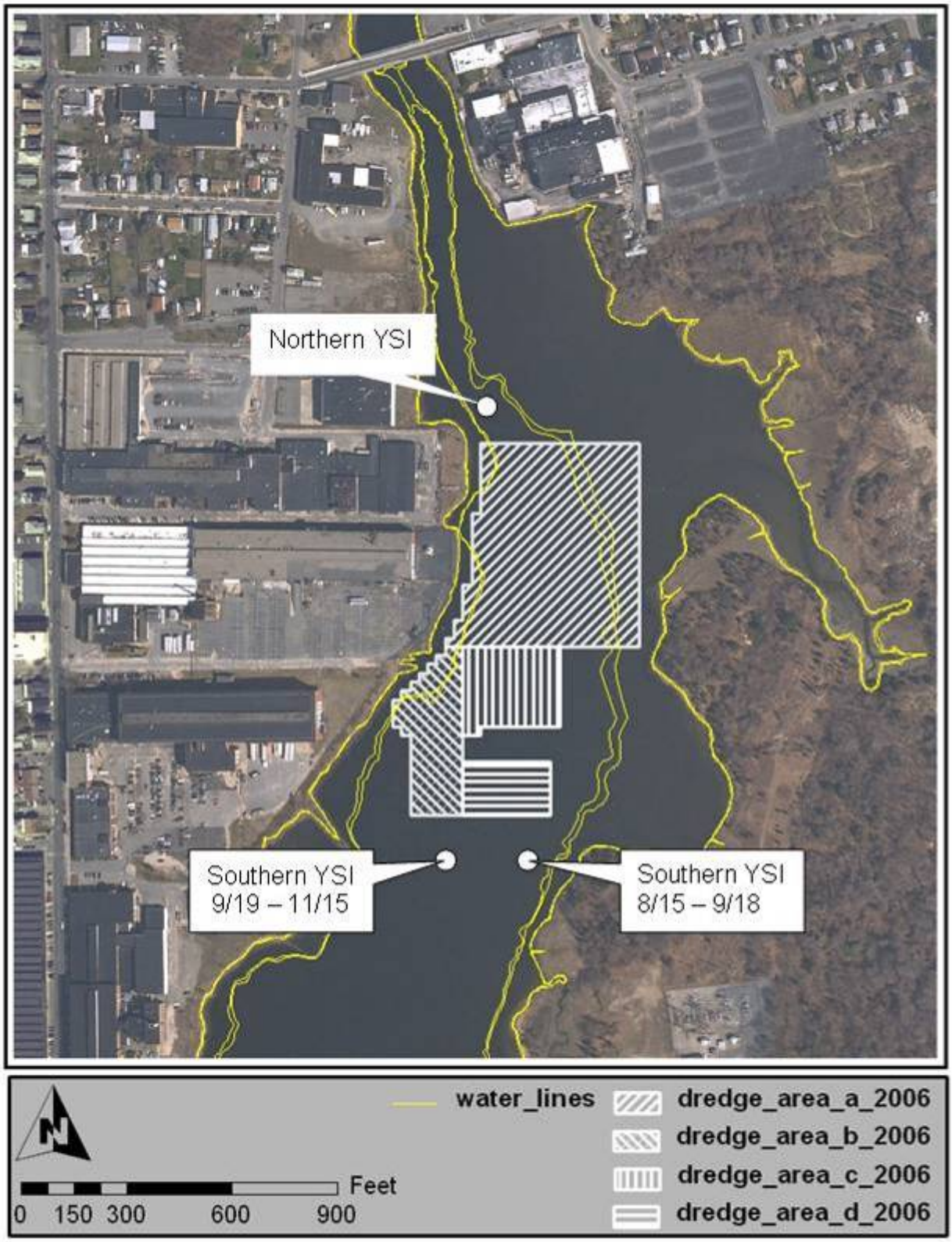


Figure 6. Location of Continuous *In Situ* Sensor (YSI) Deployments

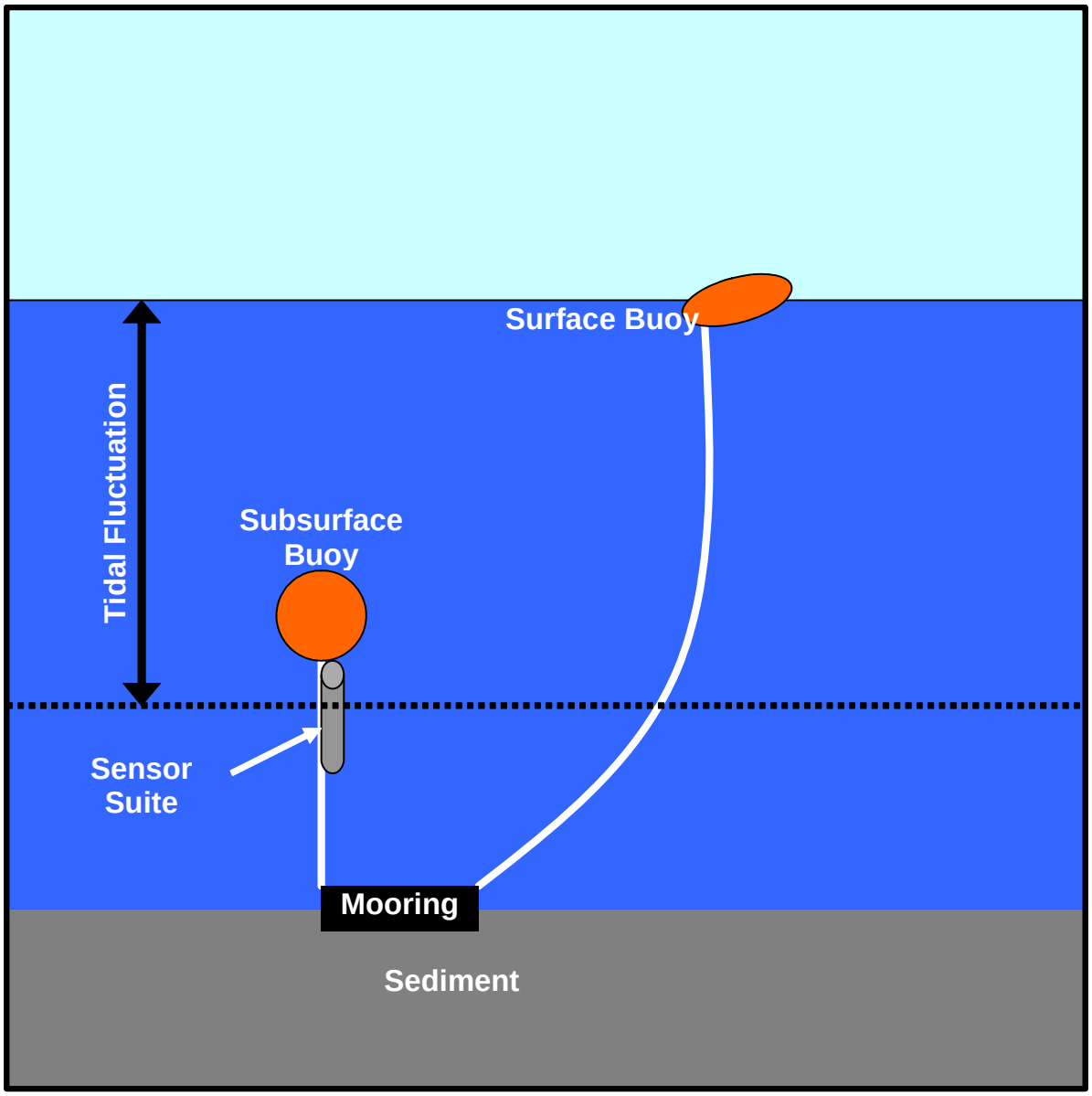


Figure 7. Depiction of the Continuous *In Situ* Sensor Deployment Configuration

2.3 Discrete Water Samples

The collection of discrete water quality samples was conducted using a 12-volt Teflon diaphragm pump and the appropriate length of Teflon® tubing. The inlet of the tubing was attached to the body of the YSI *in situ* sensors to ensure that the sensor measurements and the analytical results are representative of the same parcel of water. Prior to collecting samples at each location sample water was pumped continuously through the system for several minutes to purge the system. This purging ensured that the system was cleared prior to actual sample collection to avoid site to site cross-contamination.

Following purging, water from the pump outlet was collected directly into the appropriate sample containers for each analysis (Table 2). Table 2 also provides the sample volume, preservation, and analytical lab information. The samples were labeled as described in Table 2. All samples collected in the field were placed in coolers on ice until transport to the field trailer. At the field trailer samples were stored cold (4 $\pm$ 2 ^{o}C) in the sample refrigerator or on ice in the coolers until packaged for shipment to the laboratories. Samples were packaged in wet or blue ice and were hand delivered or shipped overnight to the appropriate laboratories. Table 1 details the sample collection for each Station during each Level of activity.

Table 2. Sample Volumes, Containers, and Processing for Field Samples.

Parameter	Sample Volume	Sample Container	Preservation	Storage Condition	Holding Times[1]	Analytical Lab
TSS	1L	HDPE Bottle	Ice	4 $\pm$ 2 ^{o}C	7 Days	**Alpha Woods Hole Lab** 375 Paramount Drive Suite 2 Raynham, MA 02767 Ph:508-822-9300
Turbidity	1L	HDPE Bottle	Ice	4 $\pm$ 2 ^{o}C	48 Hours	
Aqueous Total PCB	1 L	Wide-mouth Amber Glass Bottle	Ice	4 $\pm$ 2 ^{o}C	7 Days	**Battelle Duxbury[2]** 397 Washington Street Duxbury, MA 02332 Ph: 781-952-5200
Aqueous Dissolved PCB	2 L	Wide-mouth Amber Glass Bottle	Ice	4 $\pm$ 2 ^{o}C	7 Days	
Total Metals	500 ml	HDPE Bottle	HN03	4 $\pm$ 2 ^{o}C	6 Months	
Toxicity (all samples for toxicological analysis collected into one container)	5 gallons	Cubitainer	Ice	4 $\pm$ 2 ^{o}C	24 Hours	**EnviroSystems, Inc** One Lafayette Road P.O. Box 778 Hampton, NH 03843 Ph: 603-926-3345

[1] – Holding time to initial Lab preparation.

[2] – All metals samples were archived at Battelle, Duxbury. If analysis is required, samples will be analyzed by Battelle Marine Sciences Lab in Sequim, Washington.

2.4 Sample Analysis

Like the field sampling, sample analysis includes both predefined samples and contingency based samples. Figure 8 shows the laboratory based decision sequence for analysis of samples. All samples were delivered to the respective laboratories (Table 2).

Requirements for chemical and biological testing can be found in the QAPP Addendum *Environmental Monitoring, Sampling, and Analysis at the New Bedford Harbor Superfund Site, New Bedford, MA* for detailed analytical requirements (Battelle, 2006a). An overview of the methods used is provided below.

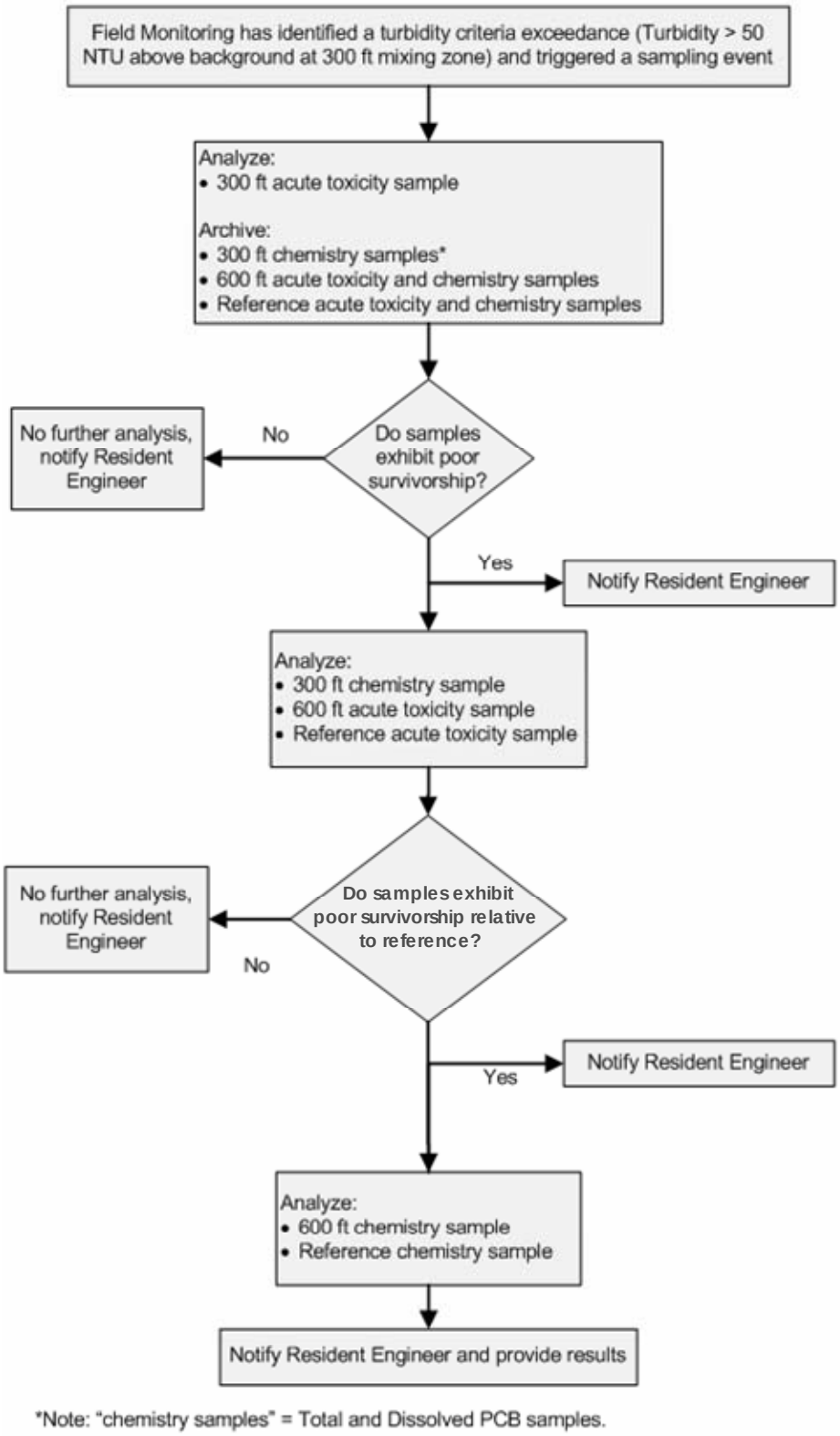


Figure 8. Decision Sequence for Sample Analysis

2.4.1 TSS/Turbidity Analyses

Total suspended solid (TSS) and turbidity in the water samples were analyzed by Alpha Woods Hole Group (AWHG). TSS was analyzed following AWHG SOP Total Suspended Solids (TSS) Non-Filterable Residue, Rev. 5.0 which was based on EPA Method 160.2; turbidity was analyzed following AWHG SOP Turbidity 180.1, Rev. 2.2, which was based on EPA Method 180.1.

2.4.2 PCB Analyses

The analysis of 18 NOAA PCB congeners in water samples was conducted by Battelle Duxbury laboratory. Water samples were extracted following modified EPA Method 3510C (Battelle SOP 5-200). Prior to extraction, water samples that were designated for dissolved PCB analysis were filtered through pre-baked glass fiber filters (1 µm pore size). The sample filtration and extraction were usually conducted within 24 hours of sample collection. Total (or whole water) PCB samples involved extraction of approximately 1 liter of unfiltered water. Both dissolved (filtered) and whole water samples were spiked with surrogates and extracted three times with dichloromethane using separatory funnel techniques. The combined extract was dried over anhydrous sodium sulfate, concentrated, and processed through an alumina column. Depending on the color of the extract, it was further cleaned using gel-permeation chromatograph/high performance liquid chromatography (GPC/HPLC). Samples in batches 06-0286 (collected on 8/14), 06-0306 (collected on 8/28), 06-0328 (collected on 9/19), and 06-0349 (collected on 10/9) received both alumina column and GPC/HPLC clean-ups, while samples in batch 06-0290 (collected on 8/16) only received alumina clean-up. In addition, sample extracts in batch 06-0359 (collected on 10/16) were cleaned first using sulfuric acid, and then processed through disposable Florisil columns for further clean-up. Analytical results of these water samples indicated that samples processed through different clean-up procedures did not show significant differences in surrogate recoveries and matrix interference, suggesting that all clean-up combinations were sufficient and effective.

The post alumina, GPC/HPLC, or Florisil extract was concentrated, fortified with internal standards (IS), and then analyzed for 18 NOAA PCB congeners using gas chromatography/electron capture detector (GC/ECD), following modified EPA Method 8082 (Battelle SOP 5-128). Sample data were quantified by the method of internal standards, using the spiked internal standards (IS) compounds. Due to the highly-contaminated nature of the samples, most of the water sample extracts were diluted and analyzed again to resolve concentrations of compounds that exceeded the calibration range during the initial GC/ECD runs.

2.4.3 Toxicity Analyses

Acute and chronic (sub-lethal) exposure screening assays evaluating surface water samples collected from New Bedford Harbor were performed to evaluate the potential toxicity of surface water samples collected in New Bedford Harbor associated with dredging activities. Assay design included a laboratory control treatment and one or more surface water samples, generally including a site reference sample. Samples were evaluated “As Received” without dilutions. Testing was based on programs and protocols developed by the US EPA (2002) primarily designed by the EPA to provide standard approaches for the evaluation of toxicological effects of discharges on aquatic organisms, and for the analysis of water samples. Testing included the

following assays; modified 2 day acute and 7 day chronic assays conducted with the mysid shrimp, *Americamysis bahia*, and the red macro alga, *Champia parvula*, and 60 minute chronic fertilization assays conducted with the purple sea urchin, *Arbacia punctulata*. All mysid and urchin fertilization assays and a portion of the algal assays were conducted by Envirosystems, Inc. (ESI) at its Hampton, New Hampshire facility. Additionally, the algal assays were conducted by the Saskatchewan Research Council, SRC, Saskatoon, Saskatchewan, Canada. Supporting data including laboratory bench sheets, full statistical reports, custody forms, sample receipt forms and water quality data are provided in Appendix D.

2.4.3.1 Test Species

A. bahia, ≤ 5 days old, were obtained from cultures maintained by Aquatic Research Organisms (ARO), Hampton, New Hampshire. Juvenile shrimp were collected daily, isolated, and placed in a rearing tank for up to 6 days. Holding tanks were maintained in a flow-through culture mode at a temperature of 25±2°C. At the start of the assays the mysids were 7 days old. Juveniles were fed ≤24 hour old brine shrimp on a daily basis. Water temperature, salinity, and pH were monitored on a daily basis. Prior to testing organisms were siphoned from the rearing tanks to a holding vessel, and then transferred to test chambers using a large bore pipet, minimizing the amount of water added to test solutions.

A. punctulata adults were from cultures maintained by ESI. Original stock was obtained from commercial supply. Male and female urchins were maintained in separate chambers as recommended by protocol (USEPA 2002) and ESI. Adult urchins were induced to spawn by the injection of a potassium chloride solution. The viability of gametes obtained was determined prior to their addition to the test solutions. Eggs and/or sperm that would not result in a fertilized egg were rejected from the pool of gametes used in the assay.

C. parvula biomass was obtained from stock cultures maintained by the Saskatchewan Research Council. Original stocks were obtained from the University of Texas algal collection. The male and female plants are maintained in separate culture vessels under sterile conditions. Algal cultures were maintained on an orbital shaker (100 rpm) at 23±2°C under 16 hour light : 8 hours dark at 40 to 75 foot candles light intensity. Cultures are “cropped” and transferred to fresh nutrient solutions on a weekly basis.

2.4.3.2 Surface Water Samples and Laboratory Control Water

Grab surface water samples were collected by Battelle staff on each of the four Level I surveys in the Harbor; (see Toxicity in Table 2). Samples were placed in polyethylene cubitainers for shipment to the laboratory. Two, 2.5 gallon cubitainers were collected for each of the chronic assays. Prior to testing in the lab, samples were evaluated to document salinity, conductivity, and total residual chlorine. Total residual chlorine was measured by amperometric titration (MDL 0.05 mg/L). Prior to use in the assays the salinity of the samples was adjusted, if necessary, to predetermined levels using artificial sea salts for *A. bahia* and *A. punctulata* assays, and GP-2 salts (USEPA 2002) for the *C. parvula* assays. The salinity of samples for the *A. bahia* acute and chronic exposure assays was adjusted to 25±2‰ while the salinity for samples used for the *A. punctulata* and *C. parvula* assays was adjusted to 30±2‰. Samples with initial salinity measurements above these levels were not adjusted.

Laboratory control water used for mysid and sea urchin assays was collected from the Hampton/Seabrook Estuary. This water is classified as SA-1 and has been used to culture marine test organisms since 1981. The laboratory control water used in the algal assay, collected from Rye, New Hampshire, is the same water used in culture maintenance. Prior to use, seawater used in the algal assays was filtered through glass fiber filters and sterilized. Dilution water used in the algal assays conducted by SRC was natural seawater collected from the West Coast of Canada. Salinity of the surface water samples was adjusted using commercial sea salts.

2.4.3.3 Bioassays

***Americamysis bahia* Modified Acute and Chronic Exposure Bioassays**

Modified acute and chronic exposure screening assays were conducted in a static renewal test mode with renewals made at 24-hour intervals. The 7 day assays were conducted at a temperature of 26±1°C with a photoperiod of 16:8 hours light:dark. Mysids were maintained in 250 mL beakers containing 150 mL of test solution. Approximately 100 mL of the test solution were replaced each day. The assay incorporated 8 replicates with 5 organisms/replicate. Survival and dissolved oxygen were measured daily in each replicate prior to test solution renewal. Salinity, temperature and pH were recorded in a composite sample of the "old" test solution and in the "new" test solution prior to being added to the test chamber. Incubator temperatures were also recorded on a daily basis.

During the test, mysids were fed 24 hour old *Artemia* nauplii. On Day 7 of the assay, surviving mysids were removed from test solutions, rinsed to remove any surface detritus and salts, and transferred to tared foils and dried for 24 hours at 103°C. Foils were weighed to the nearest 0.01 mg. Mean dry weights per individual were obtained by dividing the net dry weight of all surviving organisms by the number of organisms added at the start of the assay.

***Arbacia punctulata* Chronic Exposure Fertilization Assays**

Gametes were obtained by potassium chloride injection to induce spawning. Sperm were collected dry, diluted to achieve a concentration of approximately 5.0×10^7 sperm/mL in the surface water treatments. Actual sperm concentrations are provided on laboratory bench sheets in Appendix D. Sperm solutions were added to 5 mL aliquots of each sample being evaluated and allowed to remain in the test solutions for 60 minutes before the addition of unfertilized eggs.

Each treatment incorporated a total of four replicates. After 20 minutes of exposure the assay was terminated by the addition of 0.2 mL of preservative. Aliquots of preserved solution were counted to determine numbers of fertilized and unfertilized eggs. Fertilization was accepted based on the presence or absence of a fertilization membrane around the egg.

***Champia parvula* Modified Acute and Chronic Exposure Assays**

The 7 day red algae assay was conducted with a 2 day exposure period to the surface waters and laboratory control treatments. Each treatment used four replicates with five female branches and one male branch per replicate. Temperature was maintained at 23±1°C. The light source was cool white and fluorescent bulbs set on a 16:8 hours light:dark cycle, with a light intensity of 40 to 75 foot candles. Light intensity was checked at the start of each assay. Temperatures were monitored on a daily basis. Test chambers were 200 mL borosilicate glass fleakers. After 2 days exposure, female branch tips were transferred to approximately 100 mL of recovery medium

with added nutrients and allowed to recover and mature for 5 days. During transfer, plants were examined to determine the physical condition of the individual branches. Branches showing signs of degeneration were noted and used to establish an acute endpoint. After the recovery period, the number of cystocarps (reproductive bodies) on each female branch were counted.

2.4.3.4 Data Analysis

Statistical analysis of acute and chronic exposure data was completed using CETIS, (Comprehensive Environmental Toxicity Testing System), software. The program computes acute and chronic exposure endpoints based on EPA decision tree guidelines specified in individual test methods. For chronic exposure endpoints statistical significance was accepted at <0.05.

2.4.3.5 Quality Control

As part of the toxicity testing laboratory quality control program, standard reference toxicant assays are conducted on a regular basis for each test species. These results, summarized in Table 5 of Section 4.4.3, provide relative health and response data while allowing for comparison with historic data sets. Review of reference toxicant data associated with the August and September 2006 (*Arbacia punctulata)* test documents that the fertilization C-NOEC, 5.0 mg/L copper, was outside the acceptable range of 20 to 80 mg/L copper. The acceptable NOEC range for this assay is defined as $\pm$ the mean concentration of the central tendency. For the same series of assays the fertilization IC-25 was within the acceptable range of for the endpoint. A review of the data collected with the urchin development assays documented no deviation from protocol and no changes in the analysis technique used in the assessment of fertilization.

3.0 SURVEY CHRONOLOGY AND DAILY OBSERVATIONS

Week of August 10, 2006 (week 1)

August 10, 2006:

- **Dredge activity:** Mobilization, running dredge pipe, stringing cable.
- **Monitoring activity**: First day of water quality monitoring. Monitored high water and ebb tide. Shakedown of equipment, identifying sample locations, and site access.
- **Fish Passage:** Bait fish and bluefish breaking surface from Sawyer St. to Wood St.
- **Results summary:** No dredge activity generating turbidity plumes. Took readings at reference locations, values 0.2 to 2.8 NTU. No samples collected.

August 14, 2006:

- **Dredge activity:** Testing of dredge lines. Initiated debris removal in Area A.
- **Monitoring activity:** Level I monitoring in Area A. Monitored flooding tide, high water, 1.5 hours of ebb.
- **Fish Passage:** Small bait fish, bluefish, pogies, and birds working surface throughout entire area.
- **Results summary:** No significant turbidity plumes identified.
- **Exceedances and sample collections:** Collected planned samples under Level I monitoring. Given low turbidity values, samples will serve as background/reference results. No exceedances occurred.

August 15, 2006:

- **Dredge activity:** Testing dredge lines. Debris removal in Area A.
- **Monitoring activity:** Level III monitoring, flood tide to high water and 1.5 hours of ebb. Deployed moored YSI data loggers north and south of dredge area.
- **Fish Passage:** Baitfish and bluefish with birds working entire area.
- **Results summary:** Turbidity plumes identified coming from debris removal operations. Plume of 50-100 NTU moving north of flood tide. Beyond 100 ft turbidity values dropped off sharply. During slack water the turbidity plume was isolated to <30 ft from barge. Some oil sheen seen coming up around debris removal operations. Northwest wind pushing sheen to Southeast (disassociated from turbidity plume).
- **Exceedances and sample collections:** None.

August 16, 2006:

- **Dredge activity:** First day of dredging in Area A. Debris removal Area A.
- **Monitoring activity:** Level I monitoring flood tide.
- **Fish Passage:** Bait and bluefish with birds working throughout area.
- **Results summary:** Some initial turbidity plumes seen coming at dredge startup. Plumes were short-lived spatially and temporally. Higher turbidity values seen around debris removal. Values up to 200 NTU, but plume dissipated within 100 ft and 20 minutes. Level I samples collected.
- **Exceedances and sample collections:** No exceedances. Collected planned samples under Level I monitoring.

August 17, 2006:

- **Dredge activity:** Dredging and debris removal in Area A.
- **Monitoring activity:** Level III monitoring during flood tide.
- **Fish Passage:** Fish seen throughout area.
- **Results summary:** Limited turbidity around dredge area. Elevated turbidity (up to 150 NTU) seen around debris removal activities, especially when moving the barge. Large oil sheen seen south of debris removal. Sheen covered the majority of Area B/C. Oil booms contained majority of sheen.
- **Exceedances and sample collections:** None.

August 18, 2006:

- **Dredge activity:** First day of dredging in Area B/C. Continued dredging and debris removal in Area A.
- **Monitoring activity:** Level III monitoring on flood tide in all areas.
- **Fish Passage:** Snapper blues and bait fish throughout area.
- **Results summary:** Low level turbidity values (30-50 NTU) seen near barge, but beyond 100 ft values were <30 NTU. Oil sheen coming off of debris removal activity moving to North. Some of the sheen was escaping gap in oil boom. Repaired boom to contain sheen.
- **Exceedances and sample collections:** None.

Week of August 21, 2006 (week 2)

August 21, 2006:

- **Dredge activity:** Dredging in Area A and Area B/C. Switched back and forth as needed since Area A dredge was down several times due to debris. Debris removal active in Area A until water too low (~1030).
- **Monitoring activity:** Level III monitoring ebb tide.
- **Fish Passage:** Bait and bluefish with birds working throughout entire area.
- **Results summary:** No significant turbidity plumes around dredge activities. Elevated turbidity values seen around debris removal, but limited to <100 ft. Prop wash from support boats at debris removal generated most of the turbidity. Oil sheen seen downstream of debris removal. Largely contained by oil booms but some seen escaping on southeast side.
- **Exceedances and sample collections:** None.

August 22, 2006:

- **Dredge activity:** Dredging and debris removal in Area A.
- **Monitoring activity:** Level III monitoring during ebb tide.
- **Fish Passage:** Baitfish with birds working throughout entire area.
- **Results summary:** Limited turbidity around dredge area. Elevated turbidity (exceeding 100-150 NTU) seen around debris removal activities. Primarily generated by prop wash when moving the barge. Beyond 100 ft turbidity still detectable but values between 30-60 NTU. The plume is isolated vertically to a fairly narrow band just above the halocline (confined to the freshwater lens on top of more saline tidal water). Spotty and short-lived turbidity peaks of ~35 NTU were found as much as 1,000 ft downstream. These were very ephemeral patches and no samples were collected.

- **Exceedances and sample collections:** None.

August 23, 2006:

- **Dredge activity:** Dredging and debris removal in Area A.
- **Monitoring activity:** Level III monitoring during ebb tide.
- **Fish Passage:** Baitfish seen throughout entire area. Fewer big fish and birds than seen during the previous week. Lots of birds working the baitfish between north end of dredge area and Wood St.
- **Results summary:** Very little turbidity seen near the operations. No signal seen near the dredge. Low level plume (20-50 NTU) seen within 100 ft of debris removal, with lower values beyond 100 ft.
- **Exceedances and sample collections:** None.

Week of August 28, 2006 (week 3)

August 28, 2006:

- **Dredge activity:** Dredging and debris removal in Area A.
- **Monitoring activity:** Level I monitoring flood tide.
- **Fish Passage:** Some baitfish seen, although in lower numbers than seen in previous weeks. Large numbers of predatory wading birds (i.e. Egret, Heron) on eastern side of river suggesting presence of baitfish. Some bass and bluefish seen, although again in lower numbers than in the previous weeks. Fish and birds more concentrated north of dredge area as compared to anywhere else.
- **Results summary:** No significant turbidity plumes around dredge activities. Turbidity plumes identified near debris removal activities. Turbidity was <50 NTU above background at ~100 ft from debris removal. Heavy rainfall and runoff from 8/26 – 8/28 resulted in elevated stream flow. Freshwater was moving quickly downstream (south) along the surface even as tidal waters were moving north underneath. Monitoring occurred both north and south of work activities. Suspended sediment tended to be transported in the surface waters (downstream) rather than in the flooding tidal water. Again, the extent of the transport was limited to <50 NTU at >100 ft. Moderate oil sheens as well as petroleum and H_2S odors were also associated with debris removal. Oil sheens were mostly captured by oil booms in the northern dredge area. Sheens that transited beyond this appeared to be contained in the southern area.
- **Exceedances and sample collections:** Under Level I sampling samples were collected for analysis. Based on conversations with Jay Mackay the previous week, sample collections targeted a range of turbidity values (rather than set distances). Samples were collected at a reference location (10.5 NTU), an elevated turbidity location near the debris barge (50-70 NTU), and an intermediate turbidity location ~200 ft downstream (20-30 NTU). No exceedances occurred.

August 29, 2006:

- **Dredge activity:** Dredging and debris removal in Area A. Dredging in area B.
- **Monitoring activity:** Level III monitoring during flood tide.
- **Fish Passage:** No observations made.
- **Results summary:** Limited turbidity around dredge area. Elevated turbidity (40-80 NTU above background) seen within 125 ft of debris removal activities. Primarily generated by

prop wash when moving the barge. Beyond 100 ft turbidity still detectable but values between 20-30 NTU. Turbidity plumes moving north on incoming tide and south driven by wind and elevated streamflows. Thick oil sheen coming from debris removal activities (working in hot area just off Areovox). Oil sheen being contained by booms. New booms placed in afternoon.

- **Exceedances and sample collections:** None.

August 30, 2006:

- **Dredge activity:** Dredging and debris removal in Area A. Dredging in area B.
- **Monitoring activity:** Level III monitoring during flood tide.
- **Fish Passage:** No fish observed.
- **Results summary:** Elevated turbidity associated with dredge in Area A. Dredge was at Northeast corner in the shallow (intertidal) areas. Support skiffs were being used to move the dredge and were creating sediment plumes with prop wash. Readings reached 100 NTU over background approximately 300 ft north of the dredge itself. Monitoring could not be conducted north of the dredge area because the tidal height made the dredge wire impassable. The elevated turbidity was observed for ~15minutes. Once the skiff ceased activity, the turbidity levels quickly diminished. No similar levels were seen again. Oil sheens were also observed in conjunction with this prop wash but were well contained in the dredge area. Only low level turbidity readings and oil sheens were associated with the debris removal and the dredge in Area B.
- **Exceedances and sample collections:** The elevated turbidity values discussed above were short lived. By the time the sampling crew set up for sample collections turbidity levels had declined below warning levels (~15min). No samples were collected.

Week of September 4, 2006 (week 4)

September 4, 2006:

- Labor Day, no dredging/ no monitoring.

September 5, 2006:

- Dredge crews not returning from holiday until afternoon. Afternoon activities primarily resetting of equipment following bathymetric surveys. Water quality activities consisted of retrieval, download, cleaning, and redeployment of moored sensors.

September 6, 2006:

- **Dredge activity:** Dredging and debris removal in Area A.
- **Monitoring activity:** Level II monitoring during ebb tide.
- **Fish Passage:** Small number of fish seen moving throughout area.
- **Results summary:** Limited turbidity around dredge activity. Limited turbidity generated by debris removal, although values exceeded 100 NTU above background in very close proximity (<100 ft) to activities. Fairly large area of oil sheen seen associated with debris removal. Sheen was generally contained by oil booms.
- **Exceedances and sample collections:** Collected a suite of discrete TSS and turbidity samples under Level II sampling for analysis. Samples were selected across a range of turbidity levels to generate a correlation curve of *in situ* turbidity readings to TSS values. No exceedances occurred.

September 7, 2006:

- **Dredge activity:** Clean-up passes on east side of Area A. Debris removal in Area A.
- **Monitoring activity:** Level III monitoring during ebb tide.
- **Fish Passage:** Small number of bluefish seen in area, mostly feeding on small pogies.
- **Results summary:** Limited turbidity around dredge activity. Elevated turbidity values associated with debris removal. Values >100 NTU above background within 100 ft of barge, and dropping 20 NTU with every 100-150 ft
- **Exceedances and sample collections:** None.

Week of September 11, 2006 (week 5)

September 11, 2006:

- **Dredge activity:** Dredging and debris removal in Area A.
- **Monitoring activity:** Level III monitoring during flood tide, through high tide, and into ebb tide.
- **Fish Passage:** Few, if any fish seen in the area.
- **Results summary:** Limited turbidity around dredge activity. Limited turbidity generated by debris removal. Fairly large area of oil sheen seen associated with debris removal. Sheen was pushed southward by the wind but was generally contained by oil booms.
- **Exceedances and sample collections:** None.

September 12, 2006:

- **Dredge activity:** Limited activity. Debris removal equipment was not in operation. Dredge was inactive much of the time because holding tanks were full.
- **Monitoring activity:** Level III monitoring during flood tide.
- **Fish Passage:** Baitfish seen passing through area.
- **Results summary:** With very little activity in the dredge area, there was very little turbidity. Moored sensors were retrieved, downloaded, and redeployed.
- **Exceedances and sample collections:** None.

Week of September 18, 2006 (week 6)

September 18, 2006:

- **Dredge activity:** Dredging and debris removal in Area A.
- **Monitoring activity:** Level III monitoring during ebb tide.
- **Fish Passage:** High numbers of bait fish and feeding birds seen north of the dredge area. Lower numbers of fish seen throughout other areas. It did not appear that dredge activities related to fish presence/absence, as abundance near Sawyer St. (no activity) was similar to that near the dredging.
- **Results summary:** Limited turbidity around dredge activity. Debris removal activities were on the west side of Area A near Areovox. Sediment type is very fine and oily. Some of the largest turbidity plumes of the season were seen, although still no exceedances were observed. At peak ebb current the plume could be tracked 500-600 ft away from debris barge. However, at this distance values were only ~15 NTU above the 5 NTU background. Large oil sheens were seen extending away from debris removal, primary

downstream on the ebbing tide. Crews have doubled and tripled the oil booms and containment was good.

- **Exceedances and sample collections:** None.

September 19, 2006:

- **Dredge activity:** Dredging and debris removal in Area A.
- **Monitoring activity:** Level I monitoring during flood tide and Level III monitoring during flood tide.
- **Fish Passage:** High numbers of bait fish and feeding birds seen north of the dredge area. Striped Bass seen everywhere in moderate numbers. High numbers of stripers seen around Sawyer St. docks.
- **Results summary:** Level I monitoring targeted range of turbidities (Ref, 25, 50, 75 NTU) to re-evaluate turbidity/toxicity relationship and levels of protection. Turbidity plumes were minimal this day, and 75 NTU samples were collected within 50 ft of debris removal barge. A quick review of the results shows that fertilization rates in the laboratory control and New Bedford Harbor Reference Site treatments met/exceeded minimum criteria for the assay. Results of the statistical analysis showed that fertilization rates in all New Bedford Harbor samples were statistically less than that observed in the laboratory control treatment (this includes the reference sample). However, statistical comparisons made against the New Bedford Harbor Reference Site sample documented no statistical reduction in fertilization rates for any of the three monitoring points (25, 50, and 75 NTU).
- **Exceedances and sample collections:** Collection of four planned samples under Level I sampling. No exceedances were noted.

September 20, 2006:

- **Dredge activity:** Dredging and debris removal in Area A. Both activities had frequent shut-downs due to debris (oyster shells).
- **Monitoring activity:** Level III monitoring during ebb tide.
- **Fish Passage:** Moderate numbers of bait fish and feeding birds seen north of the dredge area. Lower numbers of fish seen throughout other areas. It did not appear that dredge activities related to fish presence/absence, as abundance near Sawyer St. (no activity) was similar to that near the dredging.
- **Results summary:** Limited turbidity around dredge activity and debris removal. Activity was limited due to problems with debris. Small, pulsed turbidity plumes and oil sheens were seen when debris removal was active, but levels and frequency were very low.
- **Exceedances and sample collections:** None.

Week of September 25, 2006 (week 7)

Limited dredge activity this week due to breakdown associated with shells, and slow downs associated with elevated VOC values in processing areas. One day of water quality monitoring conducted.

September 25, 2006:

- **Dredge activity:** Dredging and debris removal in Area A.

- **Monitoring activity:** Level III monitoring during ebb tide.
- **Fish Passage:** Some fish seen in the area. Large amount of bird activity (i.e. bait fish) seen on east side of river. No apparent impact of dredging on fish passage.
- **Results summary:** Both dredging and debris removal are stop-and-start. Limited turbidity around dredge activity. Peak turbidity values were associated with debris removal activities on the west side of Area A near Areovox. Turbidity elevated (90-100 NTU) with 100 ft of debris removal, but levels <25 NTU beyond that. Sporadic oil sheens seen associated with debris removal. Oil booms are containing sheens well.
- **Exceedances and sample collections:** None.

Week of October 2, 2006 (week 8)

Limited dredge activity this week due to breakdown associated with shells, and slow downs associated with elevated VOC values in processing areas. One day of water quality monitoring conducted.

October 4, 2006:

- **Dredge activity:** East-west dredging in Dredging Area A. Debris removal in Area B.
- **Monitoring activity:** Level III monitoring during ebb tide, through slack low, and into flood tide.
- **Fish Passage:** There are very few fish remaining in the river as compared to earlier in the dredge season. This is noticeable throughout the harbor and is a seasonal effect. No apparent impact of dredging was seen on fish passage.
- **Results summary:** Dredging has been stop-and-start. The presence of high volumes of oyster shells has reduced the dredge production. Limited turbidity around dredge activity. Peak turbidity values continue to be associated with debris removal activities. Turbidity was elevated only within very close proximity to debris removal (50-100 NTU at <75 ft). Beyond 75-100 ft turbidity dropped to <20 NTU above background. Oil sheens were seen drifting away from the debris removal activities but were well contained by the oil booms.
- **Exceedances and sample collections:** None.

Week of October 9, 2006 (week 9)

October 9, 2006:

- **Dredge activity:** East-west dredging in Dredging Area A. Debris removal in Area B.
- **Monitoring activity:** Level II monitoring during flood tide, through slack high, and into ebb tide.
- **Fish Passage:** There are very few fish remaining in the river as compared to earlier in the dredge season. This is noticeable throughout the harbor and is a seasonal effect. No apparent impact of dredging was seen on fish passage.
- **Results summary:** No elevated turbidity associated with dredging. Elevated turbidity seen in immediate area (<25 ft) of debris removal activities in Area B. Followed turbidity peaks and movement with changing tidal flows.
- **Exceedances and sample collections:** Samples collected under planned Level II sampling. No exceedances were noted.

October 11, 2006:

- **Dredge activity:** Dredging west side of Area A. Debris removal in southwest corner of Area B.
- **Monitoring activity:** Level III monitoring during flood tide, through slack high, and into ebb tide.
- **Fish Passage:** There are very few fish remaining in the river as compared to earlier in the dredge season. This is noticeable throughout the harbor and is a seasonal effect. No apparent impact of dredging was seen on fish passage.
- **Results summary:** No elevated turbidity associated with dredging. Small patch of oil seen near dredging activity. All oil appeared to be contained by oil booms. Only minimal amount of debris removal was conducted. Very limited turbidity was associated with this activity.
- **Exceedances and sample collections:** None.

Week of October 16, 2006 (week 10)

October 16, 2006:

- **Dredge activity:** Dredging west side of Area B.
- **Monitoring activity:** Level II monitoring during ebb tide and into low tide.
- **Fish Passage:** There are very few fish remaining in the river as compared to earlier in the dredge season. This is noticeable throughout the harbor and is a seasonal effect. No apparent impact of dredging was seen on fish passage.
- **Results summary:** The dredge itself did not appear to be creating suspended sediment plumes. However, the boats supporting the dredge created the largest turbidity plumes seen throughout the dredge season. A fairly steady northwest wind required that boats push against the dredge to keep it on its targeted path. As the tide dropped (low at 11:05) prop wash from these support boats kicked up fairly large amounts of sediment. Very close to these boats turbidity as high as 250 NTU was measured. However, lack of current around this slack tide kept the elevated turbidity fairly close to the operations. In general turbidity was <25 NTU throughout the dredge area. Dredging was suspended several hours around following low tide. In addition to the elevated turbidity, large oil slicks were generated by the prop wash. Most of the slick was contained by the oil booms, but some escaped the booms and was pushed by the wind south of the dredge area. Operators also towed booms behind support boats in an effort to contain the oil.
- **Exceedances and sample collections:** Despite elevated turbidity in the immediate area of operations, no exceedances were measured. However, planned Level II sampling was conducted.

October 17, 2006:

- **Dredge activity:** Dredging west side of Area B.
- **Monitoring activity:** Level III monitoring during ebb tide and into low tide.
- **Fish Passage:** Fish seen actively feeding south of the dredge area.
- **Results summary:** Similar to 10/16 dredge support boats created the majority of the turbidity plumes, although values were much lower than the previous day. Turbidities remained <25 NTU throughout the area. Oil sheens were the predominant feature of the day. Sheens were seen around the active dredge area. The oil sheens were dispersed by

both the wind (towards the north) and the ebbing tide (towards the south) creating a fairly large surface area. In general the sheen was contained by the oil booms, although some portions did escape up to 200 ft to the south.

- **Exceedances and sample collections:** None.

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4.0 RESULTS

4.1 Dredging and Field Monitoring Summary

Dredging was conducted from mid-August to mid-October. Dredging was initiated in Area A, which is located in the southern sections of DMU-1 and DMU-102. The eastern portion of Area A (in DMU-102) is intertidal. As a result, dredging could not always be conducted during lower tides. To maintain efficiency a second dredge was set up on stand-by in Area B (located along the boundary of DMU-2 and DMU-3 and DMU-4) or in Areas C and D of DMU-2 (Figure 3). When low water prevented dredging in Area A, dredge crews moved over to the second dredge. This approach meant that the dredging location was variable from day to day and even within days. Also, weekly bathymetric data and sediment core samples were collected to provide feedback to the dredge operators in areas that dredging had been conducted. Based on this data, dredgers returned to previously dredged areas to perform clean up passes. Dredging in Areas A and B were conducted in a North-South orientation, while dredging in Areas C and D were conducted East-West.

Once the dredge areas were determined, sheet piling was placed around the perimeter, at approximately 50 ft spacing. A perimeter cable was run around the sheet piles at approximately the high tide mark. Also along the perimeter, floating, absorbent oil booms were placed to contain any surface oil slicks. A 'gate' in the south end of the dredge area was used for all vessels entering or leaving the operation. Unlike the 2004 dredging operation, silt curtains were not used for 2006 dredging.

Dredging was performed using a Mud Cat™ hydraulic dredge equipped with a horizontal auger (Figure 9). The dredge was propelled by winching itself along a transverse cable which spans the dredge area to opposite sides of the perimeter cable. As a pass is completed, support crews relocated the cable to position for the next pass. Dredge material was pumped through a pipeline to a booster pump, then to the desanding facility at Sawyer Street. Following desanding, the remaining fine material was pumped via a separate pipeline to the dewatering, treatment, and handling facility in the Lower Harbor. In total, the 2006 dredging removed over 20,000 cubic yards of material.

Figure 9. Mud CatTM Hydraulic Dredge

The hydraulic dredge can not handle large debris which is common in this portion of the harbor. Debris removal was accomplished by 'raking' the bottom with a barge-mounted excavator (Figure 10). The end of the excavator has two grated jaws that open and close. The jaws are deployed to the bottom, once on the bottom the two jaws scrape the bottom and then close into each other and capture the debris. Barges secured to the side of the debris removal platform

stored the debris and were moved offsite as needed. Support boats were used throughout the operation to transport crews, maintain dredges, handle the pipeline, and move barges.

Water quality monitoring was conducted in an adaptive manner in response to changing operational and weather related conditions. The monitoring approach was modified as tides and winds changed; as dredges changed areas; as debris removal activities changed; and as warranted based on support activities. The monitoring activities were also largely influenced by tidal conditions and safety. The dredge areas and the associated perimeter cable spanned most of the width of the river limiting unrestricted access to northern portions of the river, including potential reference locations. Only at high tide was the east side of the river passable. At low tides it was often possible to pass under the perimeter cable, but sampling time was limited. All of these activities (dredging, debris removal, and support activities) had the potential to impact water quality. The monitoring program incorporated assessment of the entire operation.

Figure 10. Debris Removal Excavator

4.2 Boat-Based Measurements and Sample Collection

Boat-based monitoring followed the protocols outlined in Sections 2.1 and 2.2. Under these protocols the sampling teams functioned in an adaptive sampling mode, utilizing real-time *in situ* data to guide monitoring and sample collection. Depending on the objectives for each survey day, the real-time data either supported a criteria-based sampling approach or guided the planned collection of water samples. Because no water quality exceedances were identified throughout the entire 2006 dredge season, no criteria-based samples were collected. However, even non-exceedance data gathered during the monitoring program provides valuable information as to the effects of dredging on water quality during dredge operations. This is discussed further in Section 5. The results below describe the discrete sampling activities by collection date. Results of chemical and biological testing are provided later in this section.

Water samples were collected for turbidity, TSS and PCB analyses on seven occasions during the dredge program. Samples from four of these events were also collected for toxicity testing (Table 1). Metals samples were collected during three of the sampling events and were archived for potential analysis. Based on results of the other parameters, none of the metals samples have been analyzed. Samples were collected either to establish baseline conditions and/or re-establish relationships between field measurements (i.e. turbidity) and toxicity results to verify the protectiveness of the +50 NTU criteria. No samples were collected in response to an exceedance of the +50 NTU turbidity criteria.

8/14/06: The first set of four samples was collected following Level I protocol (turbidity, TSS, PCBs and toxicity testing) prior to initiation of dredging activities. Samples were collected at the upstream reference location, at the dredging boundary (~30 ft from dredging operations) and 300 and 600 ft downstream from dredging activities during HWS. Turbidity levels in all samples collected on this date were low.

8/16/06: Three samples were collected in response to observance of elevated turbidity plumes (though below the +50NTU at 300 ft criteria). Level I protocols were followed and samples were collected for turbidity, TSS, PCB and toxicity testing. Sample collection occurred during flood tide therefore the reference sample was collected south of the dredging activities and the boundary sample and 300 foot samples were collected north of dredging operations. Relatively low turbidity was measured in actual samples collected both at the boundary of dredging activities and at the 300 ft location.

8/28/06: Level I protocols were followed and samples were collected for turbidity, TSS, PCB and toxicity testing. However, based on conversations with USACE NAE, specific turbidity ranges, rather than distances from the dredging operations, were targeted. The goal of this sampling was to reconfirm the validity of the +50 NTU turbidity criteria as an environmentally protective threshold. Because elevated turbidities were not generally seen at the predefined distances, it was necessary to sample much closer to the source of the sediment plumes (typically debris removal) in order to acquire high turbidity samples. Three samples were collected: a reference sample, collected ~1000 ft south of the dredging operations, a sample targeting the 50-75 NTU range, collected adjacent to debris removal activity occurring on-site, and a sample targeting an intermediate turbidity (20-30 NTU), collected approximately 300 ft south of dredging activity. Samples were collected during a flood tide, however, surface water was flowing south due to recent heavy rainfall and runoff.

9/6/06: Seven samples were collected for analysis of turbidity and TSS only, across a range of turbidity levels to generate a correlation curve of *in situ* turbidity readings to TSS values.

9/19/06: Four samples were collected for the full suite of analyses. Again, no elevated turbidity levels were seen in the predefined boundary locations, so the sampling team targeted high turbidity close to the operations in order to re-evaluate turbidity/toxicity relationships and levels of protection and therefore targeted a reference sample and three turbidity ranges (25, 50 and 75 NTU). The reference sample was collected ~ 1000 ft downstream (South) of dredging activities. The other three samples were collected within 300 ft of dredging and debris removal activities.

10/9/06: Both dredging and debris removal activities were occurring on this date. Samples related to debris removal activities were collected in Area B. Four samples were collected; One sample was collected 75 ft north of the debris removal activities during the flood tide, two samples were collected 25 ft south of debris removal as the tide turned to ebb (south now being downcurrent). The two samples were collected approximately 30 minutes apart at represent considerably different turbidity conditions. The fourth sample was collected ~ 200 ft south of debris removal was collected on the ebb tide.

10/16/06: Two samples were collected associated with dredging activities. One reference sample was collected approximately 400 ft south of dredging activities on the ebb tide. One sample was collected within 50 ft south of dredging activities. Both samples were analyzed for turbidity, TSS and PCBs.

4.3 Continuous In Situ Data

The deployment of the continuously recording water quality sensors provided additional information that complimented the adaptive monitoring approach discussed above. The location of sensors both north and south of the dredge areas provides information about tidal influences on sediment suspension and transport. Continuous readings provided water quality data for periods when adaptive sampling was not underway. This includes inactive dredge periods such as nights and weekends providing a reasonable background condition for comparison. Dredging operations frequently stopped and started due to mechanical or physical issues and the location of activities was highly variable. As a result it is often difficult to ascertain how specific time periods in the continuous record relate to dredge activity. However, since no dredging took place on nights or weekends it is appropriate to use these time periods to define 'inactivity' and to use daytime to define 'activity' of the dredging operation. Using these definitions, it is possible to distinguish dredging related water characteristics from background conditions. Appendix B provides plots of turbidity at both locations for the entire monitoring period. Additionally, these figures indicate tidal cycles and highlight nighttime and weekend periods. Individual examples are provided along with the results below.

In the discussion below and in the plots provided in Appendix B a red line is indicated on each plot representing 50 NTU. A water quality criterion for the New Bedford Harbor Environmental Monitoring program has been established at 50 NTU above background, or natural, turbidity. The background turbidity signal in the river is influenced by tidal conditions, stream flow, wind, and other factors. As a result the background turbidity signal can fluctuate on scales from minutes to days. In general, the background turbidity signal was between 3 and 10 NTU. The continuous data presented in the following plots does not subtract out background values. As a result, the 50 NTU line should be viewed strictly as a guideline. For example, a value of 50 NTU represents a turbidity reading that is typically 40-47 NTU above background.

Turbidity signals related to dredge activity were clearly seen in the continuous *in situ* data. These signals manifest as peaks in turbidity above background values. The influence of tidal height and direction on sediment plume transport can also be clearly seen. Figure 11 through Figure 15 in this section provide a good example of how these effects can be seen in the data. The same assessments may also be applied to all of the data plots provided in Appendix B. Figure 11 shows the turbidity data from both moorings for Week 1 of dredging, including the following weekend. Nights and weekends are shaded on the figure to indicate periods of inactivity in the dredging operation. The following describes individual water quality characteristics identified during this first week of dredging. The letters below correspond to letters on Figure 11.

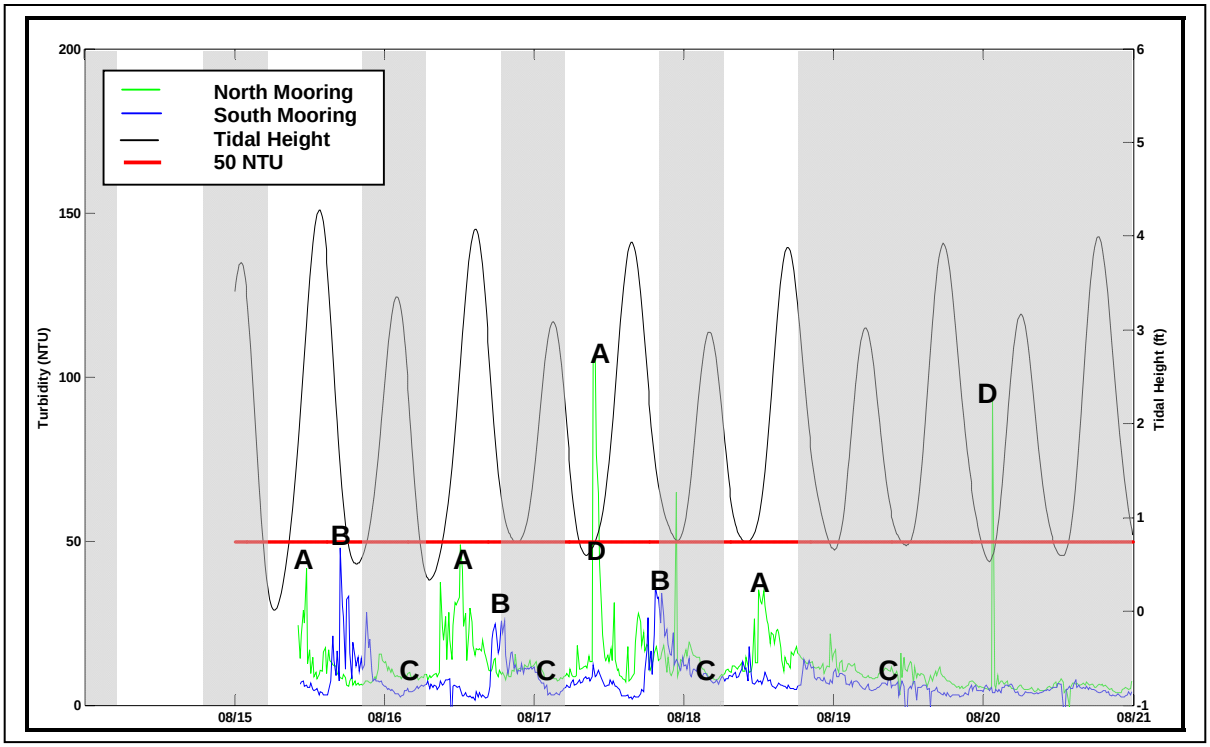
A. On an incoming tide current flow is predominately towards the north. As a result, any suspended sediment plumes related to dredging would be expected to show up in the northern mooring data and would not be expected in the southern mooring data. This can be seen in all four of the active dredge periods during this week (labeled 'A'). Note that the YSI was set to take a thirty second sample every 15 minutes. Data peaks such as those

seen on 8/17 and 8/20 are indicative of very short lived turbidity pulses, which could be attributed to low tide, wind, river flow, or other natural influences.

B. The effect seen in 'A' is reversed on an outgoing tide, so that the southern mooring picks up any dredge related turbidity signal.

C. During periods when there was no known dredge activity (nights and weekends) turbidity values tended to be lower, with few distinct peaks.

D. Particularly low tides reduce water depths in the river considerably. At the northern mooring, water depth was often <2 ft at low tide. During these periods, resuspension of sediments from river flow, wind, or other natural influences could be seen.



* Letters Correspond to Text.

Figure 11. Example of Turbidity Signals Related to Dredging and Tidal Direction.

As indicated in point 'D' the effect of low tides on the turbidity regimes in the river were often very strong. This is particularly true during extreme astronomical tides. The week of September 9/4 had strong spring tides. Figure 12 shows the effect of the exceptionally low tides on the turbidity signal at each mooring. Note that even during periods of no dredge activity (nights of 9/7, 9/8, and weekend) large turbidity signals were observed during the low tides. Available weather data was also reviewed for these time periods. However, no apparent correlations existed between wind or precipitation and turbidity.

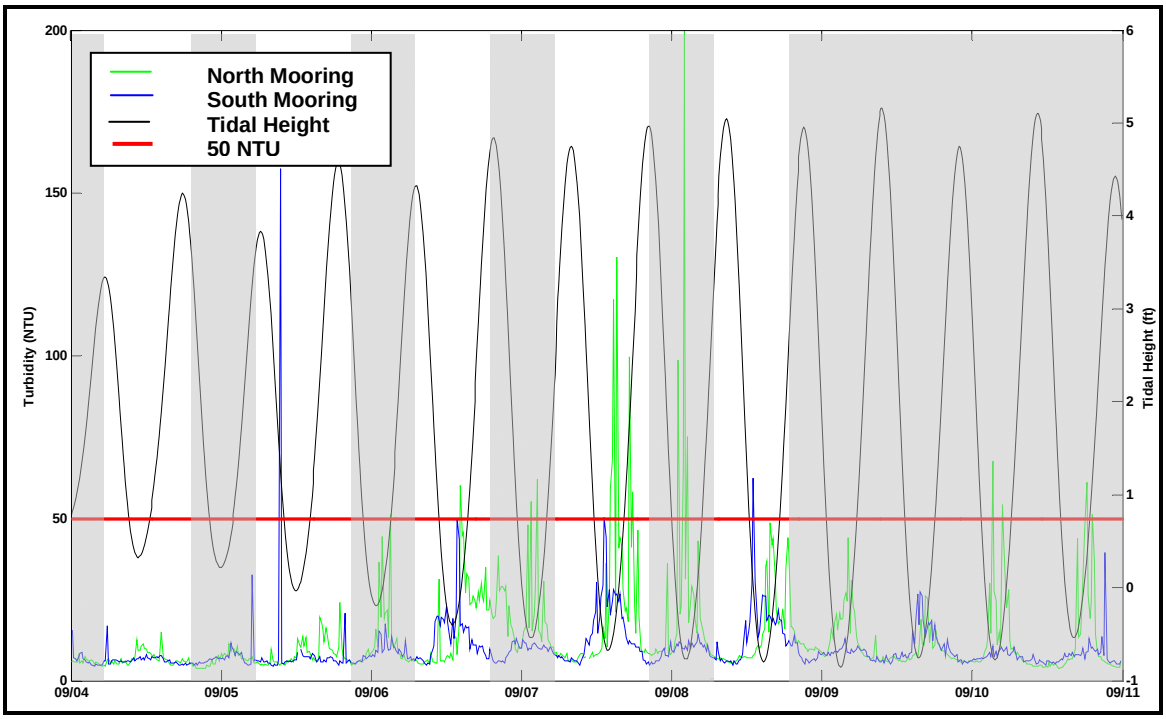


Figure 12. Example of Turbidity Signals Related to Extreme Low Tides.

As seen in Figure 11 the direction of tidal flow had a strong influence on sediment transport and helped distinguish between background and dredge-related turbidity signals. Tidal height is also an import factor in both the physical processes and in interpretation of the data. As discussed in Section 2.1 and shown in Figure 7, the mooring configurations were designed to best characterize the entire water column. In an estuarine system such as the Acushnet River tidal waters typically have much different properties than the river's own fresh water flow and large differences can be seen from the surface to the bottom. The mooring was designed such that the sensors would pass through the surface waters and into the deeper tidal waters with the rising and falling tides. This oscillation between water masses can be seen in Figure 13 where tidal height, sensor depth, and salinity are shown for the week of September 4. Due to the large tidal fluctuations, this week provides a strong example these processes. Sensor depth fluctuates with the rising and falling tide. The small 'shoulders' in the sensor depth plots represent the time periods during lower tides where the sensor buoy rises and falls with the tide. The salinity data shows a strong correlation with depth. As the sensor is allowed to move into the surface waters during lower tides the lower salinity freshwater water flow is measured. As the tide rises and the sensor is therefore deeper in the water column, the increase in salinity is characteristic of the tidal waters moving in along the bottom from the Outer Harbor and Buzzards Bay.

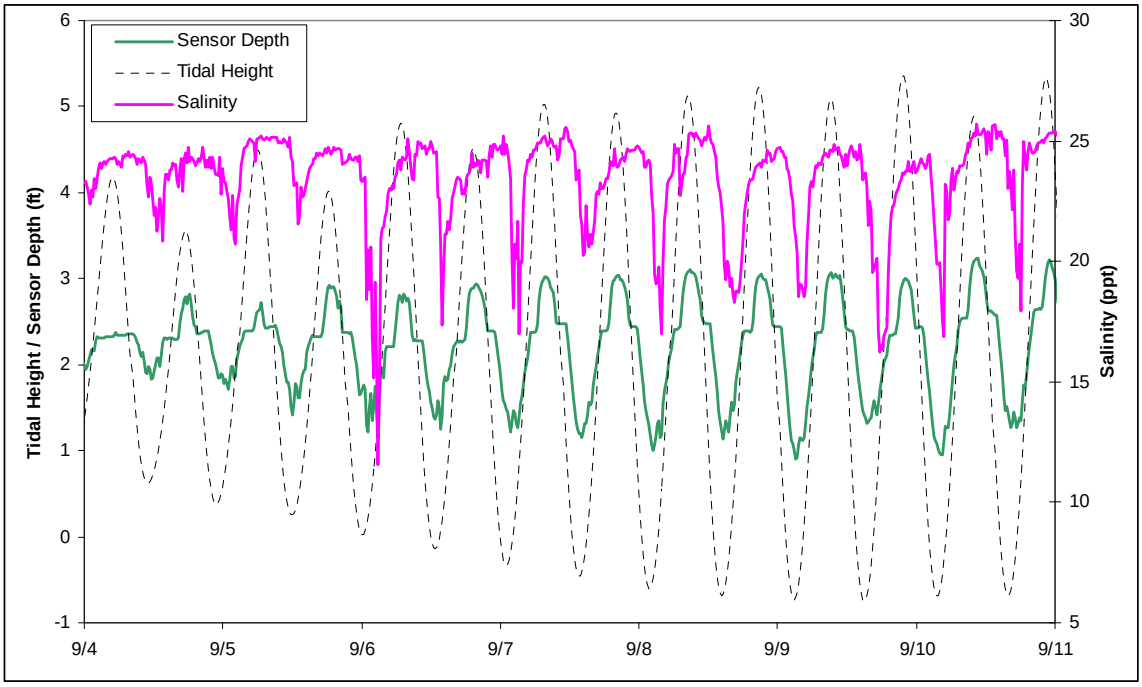


Figure 13. Example of Relationship Between Tidal Height, Sensor Depth, and Salinity at the Northern Mooring.

When interpreting the turbidity data provided in Appendix B it is important to keep in mind that both direction of the tidal flow and the depth of the sensor relative to the distinct water masses can influence the turbidity readings. The horizontal distribution of the two sensors at either end of the dredge area provides information regarding turbidity plume movement with tidal flows. (i.e. the northern sensor picks up dredge related turbidity on flood tides and the southern sensor picks up dredge related turbidity on ebb tides). Salinity readings provide a good indicator of which water mass was being characterized by the sensor at any given time (i.e. river water vs. tidal water). Observations in the field suggested that fine sediments tended to remain in the surface layer and were slow to settle through the halocline. The continuous *in situ* data supports this observation. Figure 14 and Figure 15 show salinity versus turbidity data at the northern and southern moorings (respectively). In each case elevated turbidity is seen almost exclusively in the lower salinity waters. The effect is more pronounced at the northern mooring where water depths are shallower and river flow is a more predominant feature of the water column. The effect of the halocline on turbidity measurements and sediment transport is discussed further in Section 5.

Figure 14. Example of Relationship Between Turbidity and Salinity at the Northern Mooring.

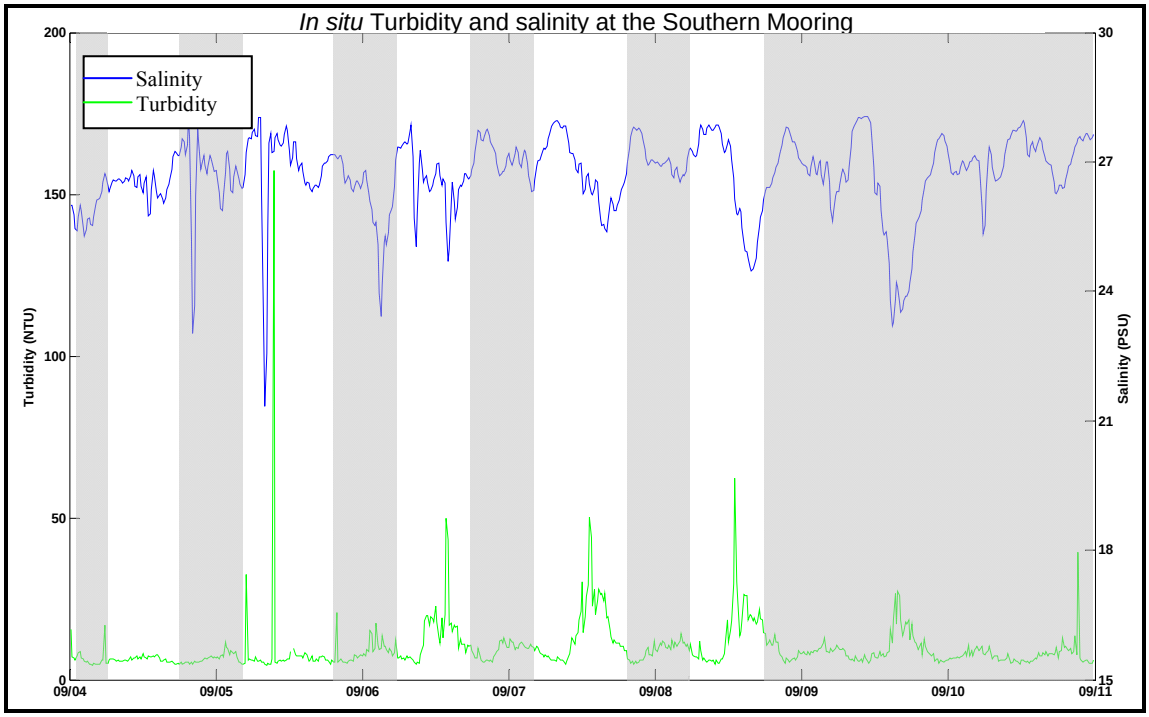


Figure 15. Example of Relationship Between Turbidity and Salinity at the Southern Mooring.

The 2006 dredge plan encompassed several different areas. These areas were active at various times during any given week as tides and other factors dictated. As a result it is somewhat difficult to assess the location of dredging activities relative to particular data points in the continuous record. However, some general observations can be made. All of the debris removal activities were in area A (northern area) until September 25. During this time period, the northern mooring generally showed higher turbidity readings than the southern mooring. In early October, this changed. On 10/3 and 10/4 the readings were as high if not higher at the southern mooring. During this time the dredging and debris removal had moved to the south west corner of Area B (near the southern mooring). As might be expected these general trends tend to show that elevated turbidity signals are seen in closer proximity to the operations – particularly debris removal.

4.4 Analytical

4.4.1 TSS/Turbidity Analyses

TSS results and turbidity results are presented in Table 3. As shown in Table 3, TSS results ranged from 1 mg/L to 330 mg/L and turbidity results ranged from 4 NTU to 150 NTU. TSS and turbidity samples collected were associated with sampling based on locations generally showed relatively low TSS and turbidity measurements. Additional samples collected to target specific turbidity ranges were collected to afford an opportunity to confirm relationship between turbidity, TSS, PCB, and toxicity as described in Section 5.0.

Table 3. Summary of TSS/Turbidity Results

Date	Sample ID	Station	Sample Description[1]	Total Suspended Solids (TSS) mg/L	Turbidity NTU
08/14/2006	WQ-TSS/TUR-001-081406	REF081406	Reference	5.7	8.6
08/14/2006	WQ-TSS/TUR-001-081406-REP	REF081406	Reference	9.3	9
08/14/2006	WQ-TSS/TUR-002-081406	BOUND081406	Boundary	13	6.5
08/14/2006	WQ-TSS/TUR-002-081406-REP	BOUND081406	Boundary	1	8.3
08/14/2006	WQ-TSS/TUR-003-081406	300081406	300 ft	1	5.3
08/14/2006	WQ-TSS/TUR-003-081406-REP	300081406	300 ft	4.3	4.8
08/14/2006	WQ-TSS/TUR-004-081406	600081406	600 ft	2.3	4.6
08/14/2006	WQ-TSS/TUR-004-081406-REP	600081406	600 ft	1	4.7
08/16/2006	WQ-TSS/TUR-001-081606	REF081606	Reference	9.4	5.6
08/16/2006	WQ-TSS/TUR-001-081606-REP	REF081606	Reference	11	4.4
08/16/2006	WQ-TSS/TUR-002-081606	BOUND081606	Boundary	28	16
08/16/2006	WQ-TSS/TUR-002-081606-REP	BOUND081606	Boundary	22	15
08/16/2006	WQ-TSS/TUR-003-081606	300081606	300 Ft	11	14
08/16/2006	WQ-TSS/TUR-003-081606-REP	300081606	300 ft	7	14
08/28/2006	WQ-TSS/TUR-001-082806	SOUTHR082806	Reference	18	7.7
08/28/2006	WQ-TSS/TUR-001-082806-REP	SOUTHR082806	Reference	18	10
08/28/2006	WQ-TSS/TUR-002-082806	50NTU082806	50 NTU	110	63
08/28/2006	WQ-TSS/TUR-002-082806-REP	50NTU082806	50 NTU	110	65
08/28/2006	WQ-TSS/TUR-003-082806	25NTU082806	25 NTU	91	56
08/28/2006	WQ-TSS/TUR-003-082806-REP	25NTU082806	25 NTU	55	30
09/06/2006	WQ-TSS/TUR-001-090606	0NTU090606	0 NTU	10	6.8

Date	Sample ID	Station	Sample Description[1]	Total Suspended Solids (TSS) mg/L	Turbidity NTU
09/06/2006	WQ-TSS/TUR-002-090606	15NTU090606	15 NTU	75	30
09/06/2006	WQ-TSS/TUR-003-090606	20NTU090606	20 NTU	63	24
09/06/2006	WQ-TSS/TUR-004-090606	35NTU090606	35 NTU	85	47
09/06/2006	WQ-TSS/TUR-005-090606	135NTU090606	135 NTU	310	150
09/06/2006	WQ-TSS/TUR-006-090606	75NTU090606	75 NTU	100	58
09/06/2006	WQ-TSS/TUR-007-090606	50NTU090606	50 NTU	80	40
09/19/2006	WQ-TSS/TUR-001-091906	1NTU091906	1 NTU	1	5.2
09/19/2006	WQ-TSS/TUR-002-091906	50NTU091906	50 NTU	86	56
09/19/2006	WQ-TSS/TUR-003-091906	25NTU091906	25 NTU	43	35
09/19/2006	WQ-TSS/TUR-004-091906	75NTU091906	75 NTU	330	140
10/09/2006	WQ-TSS/TUR-001-100906	75N100906	75 ft N (flood tide) of Debris Removal	85	54
10/09/2006	WQ-TSS/TUR-002-100906	25S100906	25 ft S (ebb tide) of Debris Removal	180	85
10/09/2006	WQ-TSS/TUR-003-100906	25S2100906	25 ft S (ebb tide, 30 min after previous sample) of Debris Removal	16	10
10/09/2006	WQ-TSS/TUR-004-100906	200S1090906	200 ft S of Debris Removal	11	8
10/16/2006	WQ-TSS/TUR-001-101606	SOUTHR101606	South Reference	19	7.2
10/16/2006	WQ-TSS/TUR-001-101606-DUP	SOUTHR101606	South Reference	15	6.6
10/16/2006	WQ-TSS/TUR-002-101606	25NTU101606	25 NTU	53	24

[1] – Samples are collected either based on distance (i.e., 300 ft, 600 ft) or Turbidity levels (i.e., 25, 50 NTU), see Section 2.1 for further discussion on Sample Location.

4.4.2 PCB Analyses

Water samples for PCB analysis were collected six of the seven sample collection dates. Twenty water samples, plus two field duplicates were analyzed for total (dissolved + particulate) PCBs and dissolved PCBs.

The sum of 18 NOAA congeners (referred to as "SUM 18 CONG" in the text) for all the collected water samples are presented in Table 4. Because no appropriate multiplier is available from previous studies to correlate SUM 18 CONG to total PCB concentration in the water samples of the New Bedford Harbor, SUM 18 CONG is used in this report as an indicator of the relative level of PCB contamination in the water samples. Note that SUM 18 CONG only represents a fraction of the total PCB concentration in the water samples. The detailed analytical results of the water samples, including the concentrations for individual 18 NOAA congeners, as well as SUM 18 CONG, are presented in Appendix C. For each sample station, results from total (sample ID with prefix "WQ-TPC") and dissolved (sample ID with prefix "WQ-DPC") PCB analyses are presented side-by-side for easy comparison. As shown in Table 4, SUM 18 CONG ranges from 0.80 µg/L (WQ-TPC-003-081406) to 230 µg/L (WQ-TPC-004-091906) for total PCBs, and from 0.33 µg/L (WQ-DPC-003-081406) to 7.4 µg/L (WQ-DPC-002-101606) for dissolved PCBs.

Table 4. Summary of PCB Results

Date	Sample ID	Station	Sample Description[1]	Total Aqueous PCB (µg/L)	Dissolved PCB (µg/L)
08/14/2006	WQ-TPC/DPC-001-081406	REF081406	Reference	3.1	1.8
08/14/2006	WQ-TPC/DPC-002-081406	BOUND081406	Boundary	0.99	0.34
08/14/2006	WQ-TPC/DPC-003-081406	300081406	300 ft	0.80	0.33
08/14/2006	WQ-TPC/DPC-004-081406	600081406	600 ft	1.1	0.44
08/16/2006	WQ-TPC/DPC-001-081606	REF081606	Reference	1.4	0.48
08/16/2006	WQ-TPC/DPC-002-081606	BOUND081606	Boundary	4.9	1.3
08/16/2006	WQ-TPC/DPC-003-081606	300081606	300 ft	5.1	1.3
08/16/2006	WQ-TPC/DPC-003-081606-DUP	300081606	300 ft	4.5	1.9
08/28/2006	WQ-TPC/DPC-001-082806	SOUTHR082806	Reference	2.5	1.2
08/28/2006	WQ-TPC/DPC-002-082806	50NTU082806	50 NTU	19	2.1
08/28/2006	WQ-TPC/DPC-003-082806	25NTU082806	25 NTU	4.9	1.1
09/19/2006	WQ-TPC/DPC-001-091906	1NTU091906	1 NTU	1.9	0.88
09/19/2006	WQ-TPC/DPC-002-091906	50NTU091906	50 NTU	37	4.1
09/19/2006	WQ-TPC/DPC-003-091906	25NTU091906	25 NTU	14	2.4
09/19/2006	WQ-TPC/DPC-004-091906	75NTU091906	75 NTU	230	5.7
10/09/2006	WQ-TPC/DPC-001-100906	75N100906	75 ft N (flood tide) of Debris Removal	20	5.2
10/09/2006	WQ-TPC/DPC-002-100906	25S100906	25 ft S (ebb tide) of Debris Removal	62	0.56
10/09/2006	WQ-TPC/DPC-003-100906	25S2100906	25 ft S (ebb tide, 30 min after previous sample) of Debris Removal	11	5.7
10/09/2006	WQ-TPC/DPC-004-100906	200S1090906	200 ft S of Debris Removal	9.2	2.2
10/16/2006	WQ-TPC/DPC-001-101606	SOUTHR101606	South Reference	2.4	1.2
10/16/2006	WQ-TPC/DPC-001-101606-DUP	SOUTHR101606	South Reference	2.9	2.5
10/16/2006	WQ-TPC/DPC-002-101606	25NTU101606	25 NTU	27	7.4

[1] – Samples are collected either based on distance (i.e., 300 ft, 600 ft) or Turbidity levels (i.e., 25, 50 NTU), see Section 2.1 for further discussion on Sample Location.

4.4.3 Toxicity Analyses

Toxicity samples were collected on four of the seven dates noted above and 14 samples were submitted for biological testing. Three of the sampling events were performed as part of the planned monitoring program. The final set of toxicity samples (collected 9/19) were collected to re-evaluate the turbidity/toxicity relationship and targeted samples representing a range of turbidity levels. Each sampling event included an upstream reference sample and testing included a laboratory control sample. Results for test endpoints for each sample were statistically compared to those from both the event-specific site reference sample and the laboratory control. Table 5 provides a summary of survival, growth, development and reproduction endpoints and associated statistical analyses for all tests conducted. Supporting data, including laboratory bench sheets, water quality data, statistical analyses and custody forms are provided in Appendix D.

Table 5. Summary of Toxicity Results

Sample Date	Sample ID	Sample Description[1]	Sea Urchin (*Arbacia punctalata*)	Mysid (*Americamysis bahia*)			Red alga (*Champia parvula*)	
			mean fertilization (%)	48-hr mean survival (%)	7-day mean survival (%)	7-day mean growth (mg/mysid)	48-hr mean survival (%)	7-day mean reproduction (cystocarp/tip)
8/14/2006	NA	NA	96.2	100	100	0.330	100	21.7
	-001	Reference	**91.7** [2]	100	95	0.427	100	28.0
	-002	Boundary	**94.2** [2]	100	100	0.465	100	28.7
	-003	300 ft	**87.3** [2,3]	100	100	0.474	100	24.7
	-004	600 ft	**90.9** [2]	100	100	0.436	100	**15.4** [2,3]
8/16/2006	NA	NA	97.6	97.5	95	0.429	100	80.3
	-001	Reference	**93.1** [2]	100	100	0.448	100	85.2
	-002	Boundary	**91.5** [2,3]	100	100	0.465	100	86.4
	-003	300 ft	**90.2** [2,3]	100	97.5	0.456	100	82.8
8/28/2006	NA	NA	90.3	100	100	0.284	100	25.1
	-001	Reference	91.0	100	100	0.319	100	29.4
	-003	25 NTU	86.7	100	100	0.398	100	29.4
	-002	50 NTU	**85.3** [2]	97.5	97.5	0.325	100	27.4
9/19/2006	NA	NA	99.3	100	92.5	0.241	100	23.9
	-001	Reference	**94.0** [2]	100	97.5	0.511	100	24.5
	-002	50 NTU	**95.6** [2]	97.5	95	0.462	100	**0.8** [2,3]
	-003	25 NTU	**94.0**[2]	100	100	0.623	100	**0.2**[2,3]
	-004	75 NTU	**92.7**[2]	95	**75** [2,3]	0.696	100	**0.2 2**[2,3]

NA – Not Applicable
[1] – Samples are collected either based on distance (i.e., 300 ft, 600 ft) or Turbidity levels (i.e., 25, 50 NTU), see Section 2.1 for further discussion on Sample Location.
[2] – Significantly different from associated laboratory control sample
[3] – Significantly different from associated reference sample

Sea Urchin (*Arbacia punctalata*) 1-hr sperm cell fertilization - Percent fertilization was greater than 90% for all but three samples. Statistically, % fertilization was significantly lower than the laboratory control sample for all but two samples tested and statistically significantly lower than the site-specific reference sample for three samples. However, mean fertilization was greater than 85% in all samples, indicating that while some impact relative to control and reference samples was observed, the impact was relatively small.

Mysid (*Americamysis bahia*) 48-hr survival – All 14 samples tested for mysid 48-hr survival were within 5% of the laboratory controls and overall survival was excellent.

Mysid (*Americamysis bahia*) 7-day mean survival - All but one of the samples tested for mysid 7-day survival were within 5 % of the laboratory controls. Only one sample, the 75 NTU sample

collected on 9/19, showed significant reduction in survival compared to both the laboratory control and the site reference sample. This sample contained the highest dissolved and whole water PCB concentrations collected during the program.

Mysid (*Americamysis bahia*) 7-day mean growth – mean growth ranged from 0.24 to 0.67 mg/mysid. Growth was similar to/or greater than the laboratory control and site reference for all samples tested indicating no negative effect on mysid growth.

Red alga (*Champia parvula*) 48-hr mean survival – All samples showed 100% survival indicating no acute impact to the alga.

Red alga (*Champia parvula*) 7-day mean reproduction – Champia reproduction, measured as the number of cystocarps produced, was generally found to be similar or higher in site samples relative to the laboratory control. One sample, collected at 600 ft on 8/14, showed significant reduction in mean reproduction compared to both the control and site reference, however, number of cystocarps was still greater than 50% of those observed in the control and reference. Cystocarp production in site samples collected on 9/19, however, was not only significantly lower than both the control and reference in all three samples, the number of cystocarps produced was less than 1% of those produced in the control and site reference.

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5.0 DISCUSSION

The field monitoring program was designed to assess the impacts of dredging on water quality with an ultimate goal of minimizing harm to biological components of the system. To achieve that goal the monitoring was carried out in several ways;

- Adaptive *in situ* monitoring was used to track sediment plumes in real-time. This design allowed for immediate feedback to the dredging operation so that potential issues could be addressed before ecological harm was incurred.
- Pre-defined sampling provided guidelines for collection of analytical samples. The results of these analyses provide critical data regarding the chemical and biological impacts of dredging related activities on the system.
- Continuous data collection provided long-term information during periods when human-based sampling was not possible and when potential threats to the systems were minimal.
- Observational monitoring was conducted during all aspects of the program. This included anecdotal observations of fish passage and behavior, and observations of non-targeted parameters such as oil sheens and air quality. Like the adaptive *in situ* monitoring, observational monitoring provides rapid feedback to managers and operators can help to minimize ecological risk.

5.1 Fish Passage

A large part of the observational monitoring was geared towards fish passage and behavior. Although no defined fish monitoring program is in place, the weekly presence of field crews provided anecdotal information. Early in the dredge season (mid to late August) large numbers of fish were seen in the area. Lower trophic level baitfish were consistently seen in large schools moving throughout the river from Sawyer St. to Wood Street. Larger predatory fish such as striped bass and bluefish were also seen in large numbers chasing bait. Heron, egret, and other wading birds were seen feeding along the shoreline during these weeks. Terns, cormorants, and gulls were seen in fairly large numbers as well. During this time period, when fish were most abundant, there appeared to be no restriction of movement past the dredge area.

Figure 16. A Flock of Terns Competes with a School of Bluefish for Food

By late August fish abundance declined throughout the harbor. Baitfish, predatory fish, and birds appeared to decline in approximately proportionate numbers. The decline in fish abundance appeared to be seasonal and universal rather than related to dredging activity. Lower numbers of fish were also seen near Sawyer St. where activities were less intense. As the dredging season continued, fish abundance increased for short intervals throughout September but generally remained lower than in mid August. Based on anecdotal observations dredging operations did not appear to impact fish passage.

5.2 Suspended Sediment and Sediment Transport from Dredging Activities

As in previous years a project-specific warning level of 50 NTUs above background 300 ft down current of dredging operations was set as a threshold for sample collection and assessment of operations. A project criterion of 50 NTUs above background at 600 ft down current was set as a threshold for immediate cessation of operations related to the exceedance. In 2005 there were five exceedances of the turbidity warning level and one exceedance of the project turbidity criterion. During the 2006 dredge season there were no exceedances of either the warning level or the project turbidity criterion.

During operations there were three general activities with potential to generate suspended sediment plumes; 1) dredging, 2) debris removal, and 3) support activities. Dredging itself created virtually no measurable sediment plumes. When safety allowed, the monitoring team transited in tight radiuses (<30 ft) around the active dredges. Even at these distances elevated turbidity was rarely measured. Debris removal generated the most consistent suspended sediment plumes. The act of 'raking' the bottom generated smaller plumes that tended to settle quickly. The largest impacts were associated with pulling the equipment (with or without debris) up through the water column. As sediment cascaded off of the equipment sediment plumes traveled down current. This was particularly true for the very fine sediment fractions which often remained in the upper water column for extended periods and distances. The majority of water quality monitoring was focused around debris removal activities. Support activities included transport of people and gear, dredge maintenance, and occasional pushing of dredge or debris removal gear when winds or currents impacted operations. This last activity required greater propeller power from the larger boats and was the only support activity which tended to resuspended sediments. This was generally only a problem at low tide when prop wash reached the bottom. While this was an infrequent problem it tended to generate the largest, most sustained turbidity plumes.

Turbidity plumes generated by all activities tended to be extremely short lived, both spatially and temporally. Suspended sediment plumes related to debris removal tended to be pulsed in nature. For example, monitoring crews would conduct radial transects around the operation at approximately 100 ft. When the debris removal bucket would come up through the water column turbidity would quickly begin to increase. Using real-time readings from the *in situ* sensors, the team would attempt to track movement of the plume away from the source towards the criterion boundaries. In general, turbidity would drop back down to background levels well before the 300 ft mark was reached. In cases where elevated turbidity persisted out towards the boundary, the readings would generally persist for less than 5-10 minutes. Even within close proximity to operations, the plumes tended to be fleeting. A good example of this was seen on October 9. On this date, sampling crews targeted elevated turbidity for sample collection, and operated in close

proximity to the debris removal barge to find these values. As the tide switched from flood to ebb the turbidity plume moved from north of the operation to south of the operation. Two samples were collected 25 ft south of debris removal barge. The first sample was collected in a high turbidity condition with final TSS concentrations of 180mg/L. Thirty minutes later a second sample was collected in the same location. The plume had dispersed by this time and TSS values were an order of magnitude less (16mg/L). In an effort to characterize the toxicity effect of elevated turbidity (discussed previously) high NTU samples were targeted. This sampling effort proved to be fairly difficult as turbidity plumes did not usually persist on long enough time scales to collect a full suite of discrete samples.

Figure 17. Debris Removal Generated the Majority of Turbidity Plumes

The short term, pulsed nature of the suspended sediment plumes is also seen in the continuous *in situ* data record. Clear spikes can be seen where turbidity exceeds 50 NTU above background. In most cases these spikes represent one data point. The only extended periods of elevated turbidity occurred during extreme low tides. However, comparable signals were seen during inactive dredge periods.

One of the more subtle characteristics of sediment transport observed during the monitoring period was the tendency for very fine sediments to become entrained in the upper water column. This was first observed visually during the monitoring program. Sampling crews observed 'clouds' of fine sediment and targeted these features for *in situ* readings. This revealed a thin layer of elevated turbidity associated with the low salinity surface water. Immediately below this layer turbidity declined to background levels. The lighter surface layer usually only represented about the upper one foot of the water column. The elevated turbidity associated with this layer was often even thinner, comprising only a few inches resting on top of the sharp density gradient. The estuarine turbidity maximum (ETM) is a common property of estuaries resulting as tidal water moves upriver creating turbulence and resuspending sediments from the bottom while

particulates in the outflowing river are trapped against the density gradient, adding to the turbidity levels. Additionally, as the freshwater contacts the more saline water dissolved material can flocculate creating more particulates which add to the turbidity levels. While this appears to be the general mechanism behind the thin surface turbidity peaks that were observed, suspended sediments from debris removal activities clearly contributed to the turbidity values. Turbidity readings in these surface layers were generally only about 15-30 NTU, well below the threshold criterion, but at times these levels persisted for several hundred feet away from the source.

5.3 Impacts to the Water Column

As expected, turbidity and TSS results showed a strong correlation ($R^2 = 0.9695$) (Figure 18). Total PCB (as SUM 18 CONG) concentrations also correlated well with TSS and thus with elevated turbidity (Figure 19). However, dissolved PCB, which is considered as a direct indicator of water quality, do not demonstrate a similar correlation with TSS (Figure 20). For example, the total to dissolved PCB ratio increases from approximately 2:1 in low TSS samples to 40:1 in the highest TSS sample. As noted previously, *in situ* turbidity measurements indicated that these turbidity plumes, representing high suspended solids loads and elevated total PCB concentrations, were isolated to the area immediately adjacent to dredging and debris removal and were also relatively short lived. Total PCB concentrations remained relatively low at the dredge boundary and beyond. Dissolved PCBs in the water column are thought to be the fraction that causes direct toxicity to marine organisms and may be subjected to long range transport. Dissolved PCB concentrations were generally low and did not correlate well with TSS (Figure 20).

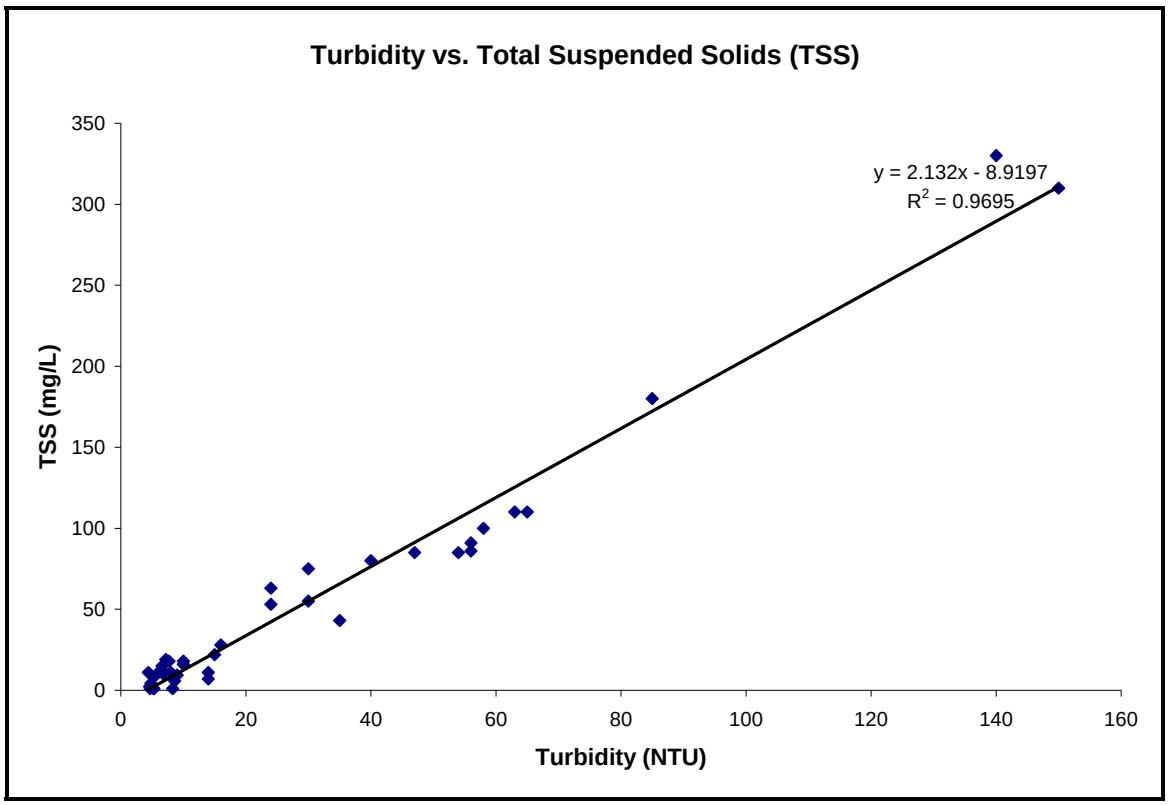

Figure 18. Turbidity vs. TSS Plot

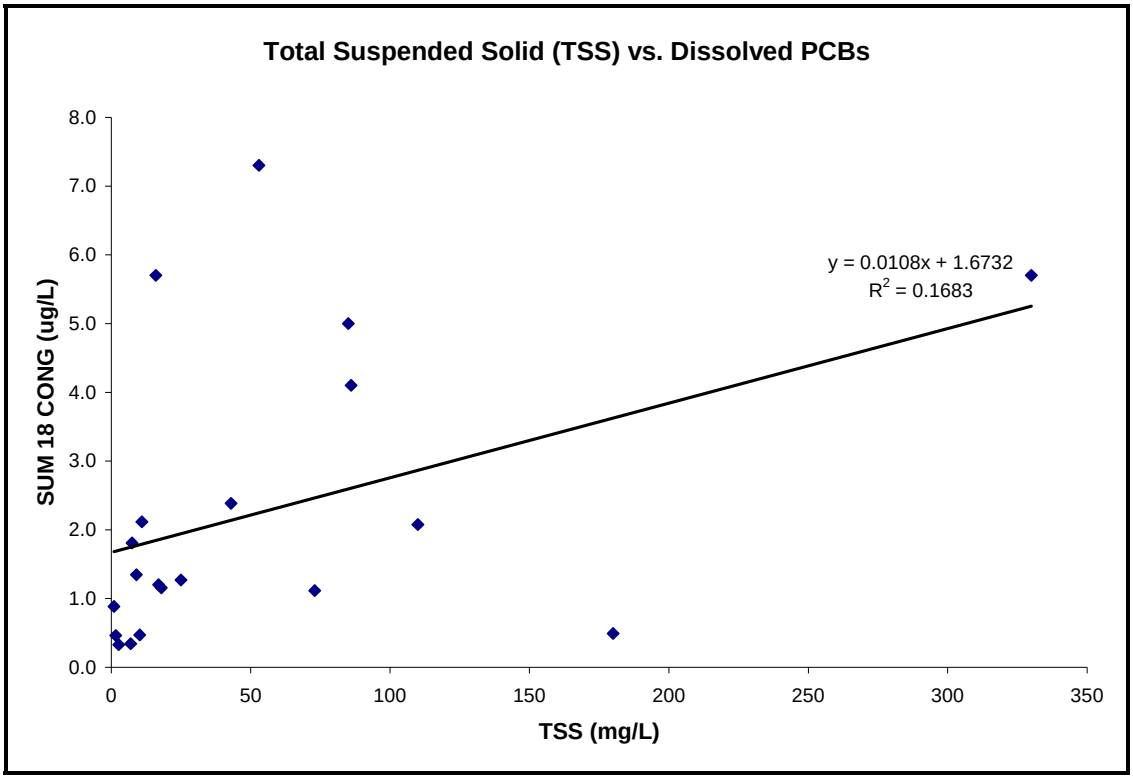

Figure 19. TSS vs. Total PCB Plot

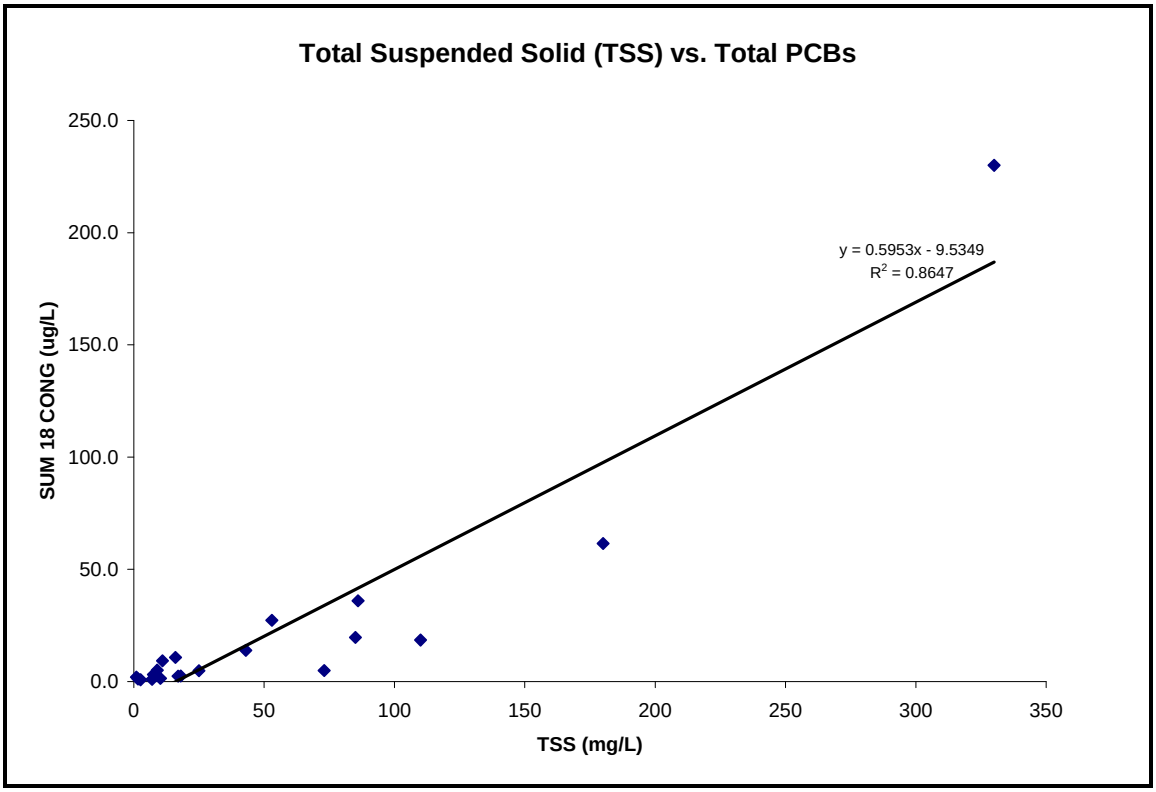

Figure 20. TSS vs. Dissolved PCB Plot

Toxicity testing showed some significant reduction in endpoints for all species (Table 5). Acute tests showed little impact from elevated turbidity, TSS or PCBs, with the only significant reduction in mean-survival observed in the 7-day Mysid test in the sample collected on 9/19 representing the highest turbidity, TSS and PCB concentrations measured during the program. Sublethal effects were measured in a number of samples. While Arbacia fertilization appeared significantly lower than control and reference samples in a number of cases, the magnitude of the reductions were slight. The other test used to assess sub-lethal effects, the Champia reproduction test, had the lowest cystocarp production in the three samples collected on 9/19, which also contained the highest dissolved and whole water PCB concentrations measured during the program. While there does appear to be measurable water column impacts, they appear to be limited to samples containing elevated turbidity, TSS and PCBs.

Overall, occurrences of turbidity plumes appeared to be limited to the areas immediately adjacent to dredging and debris removal, and these plumes were observed to be relatively short lived and isolated to the surface of the water column. No exceedances of the turbidity criteria of +50 NTU above background were observed outside of the 300 ft boundary. And while measurable water column impacts were observed based on toxicity testing, these were isolated to samples collected well within the project boundaries. Data collected confirmed that the +50 NTU criterion continues to be ecologically protective, while still allowing remediation efforts to progress.

6.0 REFERENCES

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US EPA. 2002. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*. Fourth Edition. EPA-821-R-02-012.

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Appendix A

Water Quality Monitoring Field Logs

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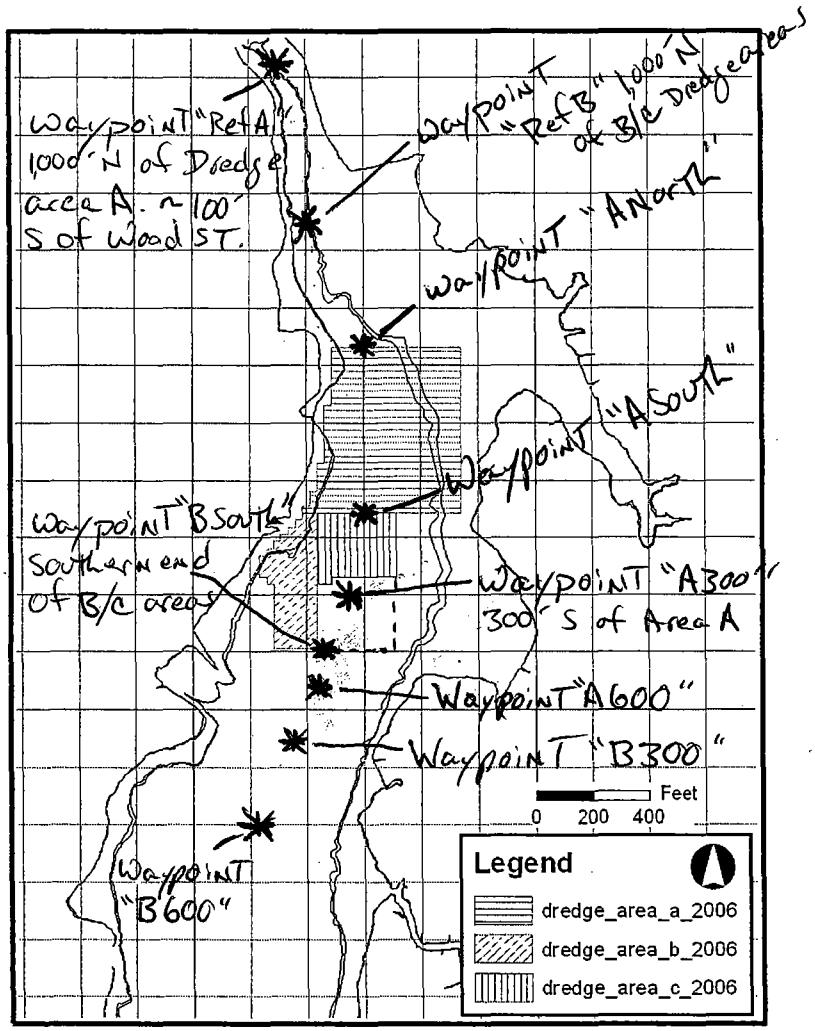
Battelle **Daily Field Summary Sheet for Water Quality Monitoring**

Date: 8-10-06
Weather: OC, 80s, SW5-10
Tides:
L -0.5 @ 0244
H +4.8 @ 0912
L -0.5 @ 1457

Monitoring Period:
From: 0855 **To:** 1100

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
mobilization:
- Running dredge pipe
- Stringing cable



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
Ref A	2.8	6'/8'
Ref B	2.2	5'/4'
B South	0.9	8.5'/7'
B600	0.2	6.5'/5'

Oil sheen/ Debris:
None

Fish Passage: Bait fish and Bluefish breaking surface from Sawyer ST to Wood ST.

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) _____ **Turbidity (500ml)** _____
Total PCB (1L) No Samples **Dissolved PCB (2x1L)** No Samples
Toxicity (21L) _____ **Metals (500ml)** _____

Notes: Conducted 'Shakedown' survey to test gear, mark locations, and assess navigation around dredge areas. Marked waypoints are identified on map above.

Sampling Crew: A. Mansfield, T. Beagley, S. Densmore
Chief Scientist Signature: [signature]

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	Mob in A, B, and C
Dredging Description	Mobilization.
Survey Vessel	CR Env. Skiff
Chief Scientist	Alex Mansfield
Sampling Technician	Tad Beagley
Vessel Captain	Ship Dansmole
Other Personnel	NA
Weather conditions	Overcast, 80°, SW 5-10

Date	8-10-06
Page	1 of 1

Tide information	
High	~~0911~~ AM WO 8/10
Low	0244
High	0912
Low	1457

Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity NTU	Salinity	DO mg/L	Temp	Notes
Ref A	0912	40°40.674'	70°54.990'	8'	6'	2.8		5.31	25.23	
Ref B	0934	41°40.597'	70°54.967'	5'	4'	2.2		8.31	25.19	
B SOUTH	0956	41°40.341'	70°54.977'	8.5'	7'	0.9		7.98	24.73	
B600	1005	41°40.252'	70°55.044'	6.5'	5'	0.2		8.01	24.81	

Battelle **Daily Field Summary Sheet for Water Quality Monitoring**

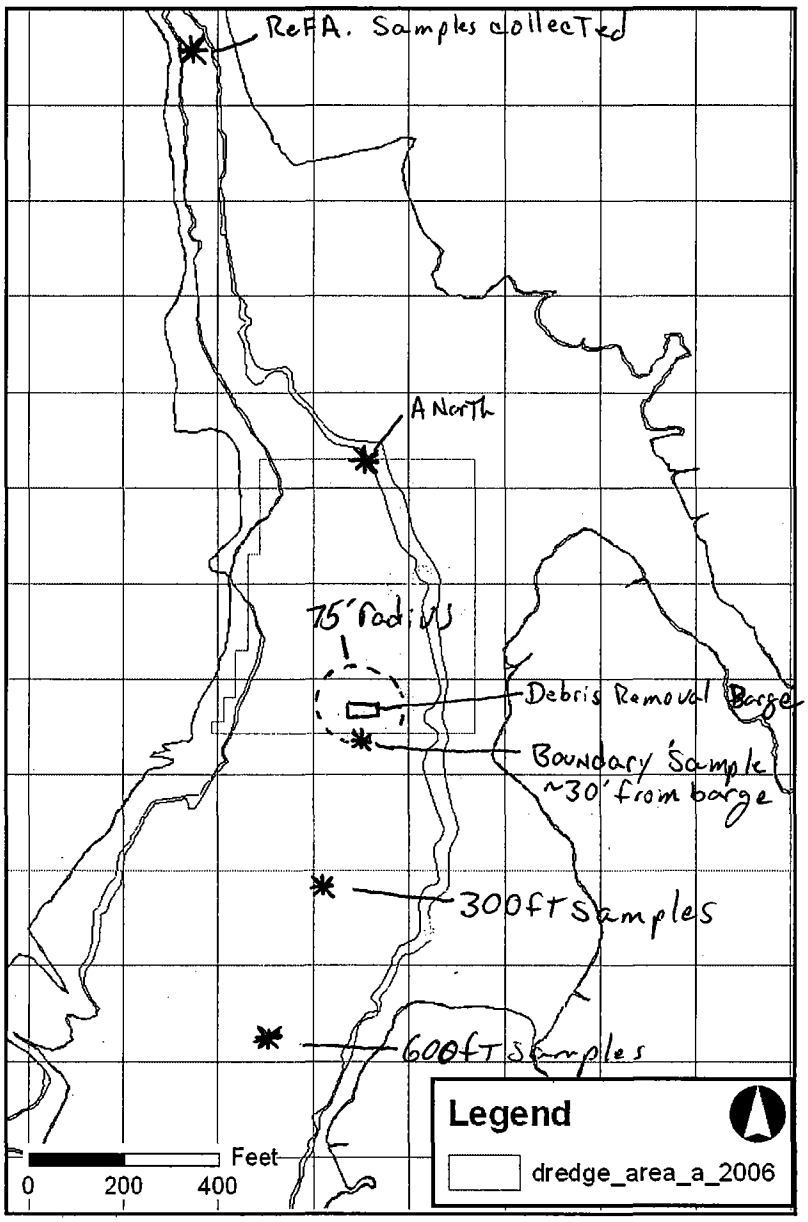
Date: August 14, 2006
Weather: Clear, 80°, SW~5/SW20 in PM
Tides:
L -0.2' @ 0545
H +4.8' @ 1236
L +0.2' @ 1833

Monitoring Period:
From: 0835 **To:** 1400

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Testing Dredge Lines

Debris Removal - Started at 1100. Stopped at 1145. Resumed at 1300



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
REF A	4.8'	5.2'/4.0'
A North	5.5'	2.6'/2.1'
Boundary	5.3'	6.0'/5.0'
75' radius	~5.0	variable
Boundary Sample	4.5	7.5/4.6
300ft Sample	0.9	8.0/6.7
600ft Sample	0.6	7.9/5.7

Oil sheen/ Debris:
No sheen observed

Fish Passage: Snapper blues, pogies, and bait w/birds working throughout entire area

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) _____ **Turbidity (500ml)** _____
Total PCB (1L) See Attached Data Sheet **Dissolved PCB (2x1L)** See Attached Data sheet
Toxicity (21L) _____ **Metals (500ml)** _____

Notes: Level I Sampling: Planned samples at Ref, boundary, 300', 600'.
Took Background readings at A North and boundary prior to Debris removal startup.
Ran circles around barge during debris removal. No plume detected
Took planned samples despite low Turbidity values

Sampling Crew: Alex Mansfield, Matt Fitzpatrick, Shy Dorimare
Chief Scientist Signature: [signature]

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	AREA A
Dredging Description	Testing Dredge Pipe. Debris Removal
Survey Vessel	CR ENV SKIFF
Chief Scientist	Alex Mansfield
Sampling Technician	MATT Fitzpatrick
Vessel Captain	Ship Densmore
Other Personnel	NA
Weather conditions	Clear, 80°, SW 5 KNTS - Picked up TO 25 in PM

Date	8-14-06
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Tide information	
High	—
Low	0545
High	1236
Low	1833

Station ID	Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity NTU	Salinity PPT	DO mg/L	Temp °C	Notes Sample ID
REF081406	REF A	0849	41°40.676	70°55.003'	5.2'	4.0'	4.8	24.6	5.5	22.8	WQ-XXX-001-081406
	A North	0935	41°40.529'	70°54.946'	2.6'	2.1'	5.5	25.5	6.5	23.3	No samples
	Boundary	1000	41°40.427'	70°54.922'	6.0	5.0'	5.3	25.9	8.9	23.4	No Samples
	~75' Radius	1030	Ran a circle around barge.		Variable		~5	~26.5	Variable	~23.5	No Plume observed
Bound081406	Boundary Samp	1305	41°40.427'	70°54.922'	7.5'	2.5'/4.6'	3.3'/4.5'	26.9	10.7	24.3	WQ-XXX-002-081406
300081406	300' Sample	1320	41°40.362'	70°54.957'	8.0'	6.7	0.9	27.1	8.6	23.9	WQ-XXX-003-081406
600081406	600' Sample	1345	41°40.273°	70°54.996'	7.9'	5.7'	0.6	21.1	8.1	23.9	WQ-XXX-004-081406

Battelle **Daily Field Summary Sheet for Water Quality Monitoring**

Date: 8-15-06

Weather: light rain, SW 15-20, NW ~10 Heavy rain in PM

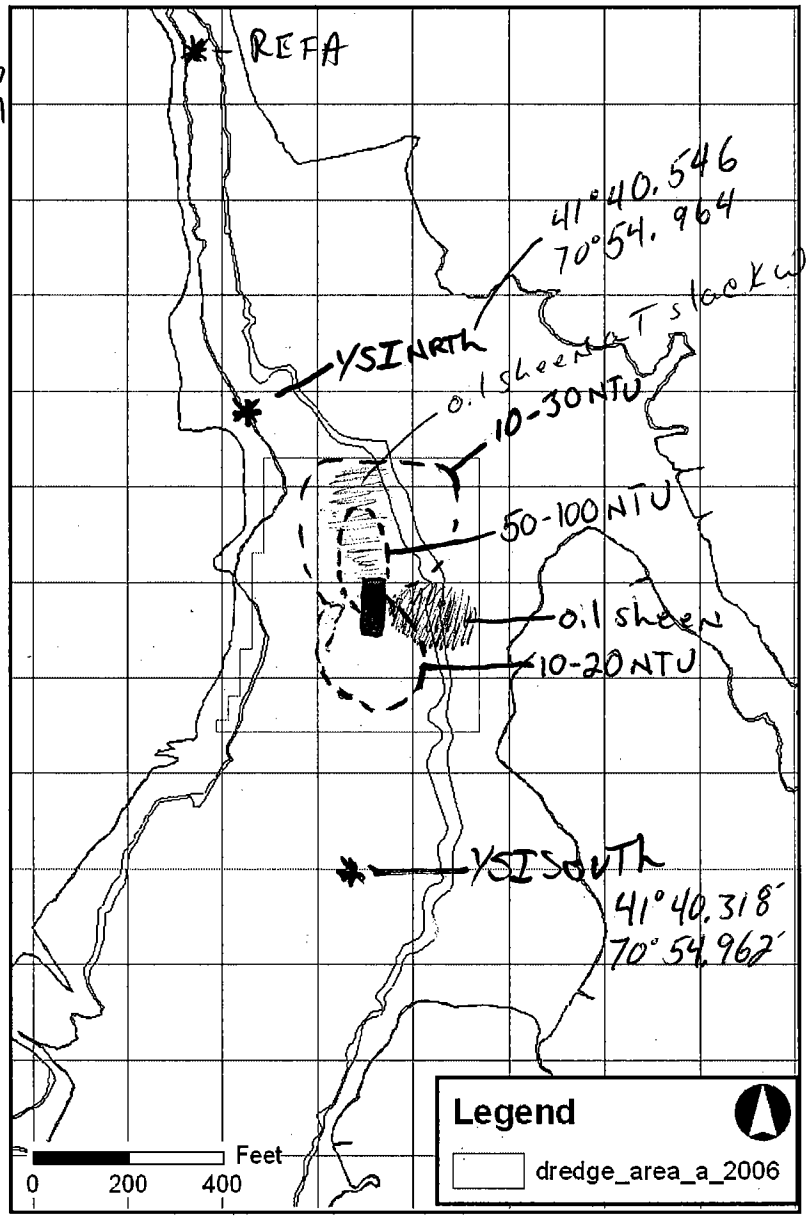
Tides:

L	+0.1	@	0634
H	+4.6	@	1334
L	+0.5	@	1939

Monitoring Period:
From: 0930 **To:** 1500

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Testing Dredge lines
Debris Removal AREA A



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
REF A	9.5	5.9'/50'
See Diagram		

Oil sheen/ Debris:
light Surface sheen being blown to SE away from barge. AT slack water sheen seen to N

Fish Passage: Bait fish and bluefish w/birds working entire area

Samples Collected for Laboratory Analysis – Sample IDs:

TSS (1L) _____ **Turbidity (500ml)** _____
Total PCB (1L) No Samples **Dissolved PCB (2x1L)** No samples
Toxicity (21L) _____ **Metals (500ml)** _____

Notes: Deployed YSIs North and South of Dredge area. NRTH @1955, SOUTH @ 1015. Ran continuous radius around barge. Current pushing Turbidity plume ~100' to North. Wind pushing oil sheen to SE. AT slack water Turbidity plume was isolated to the immediate barge area (<30'). Oil sheens present.

Sampling Crew: Alex Mansfield, Mike Walsh, Ship Dens crew
Chief Scientist Signature: [signature]

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	AREA A
Dredging Description	Debris removal. Testing Dredge pipe
Survey Vessel	CR ENV Skiff
Chief Scientist	A. Mansfield
Sampling Technician	Mike Walsh
Vessel Captain	Ship Dennsmore
Other Personnel	NA –
Weather conditions	Rain, 70°, SW 15-20

Date	8-15-06
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Tide information	
High	———
Low	+0.1 @ 0634
High	+4.6 @ 1334
Low	+0.5 @ 1936

Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity NTU	Salinity PSU	DO	Temp	Notes
REFA	1040	41°40.677'	70°55.003'	5.9'	5.0'	9.5	21.66	2.48	23.34	Sampled under bridge due to rain

Battelle **Daily Field Summary Sheet for Water Quality Monitoring**

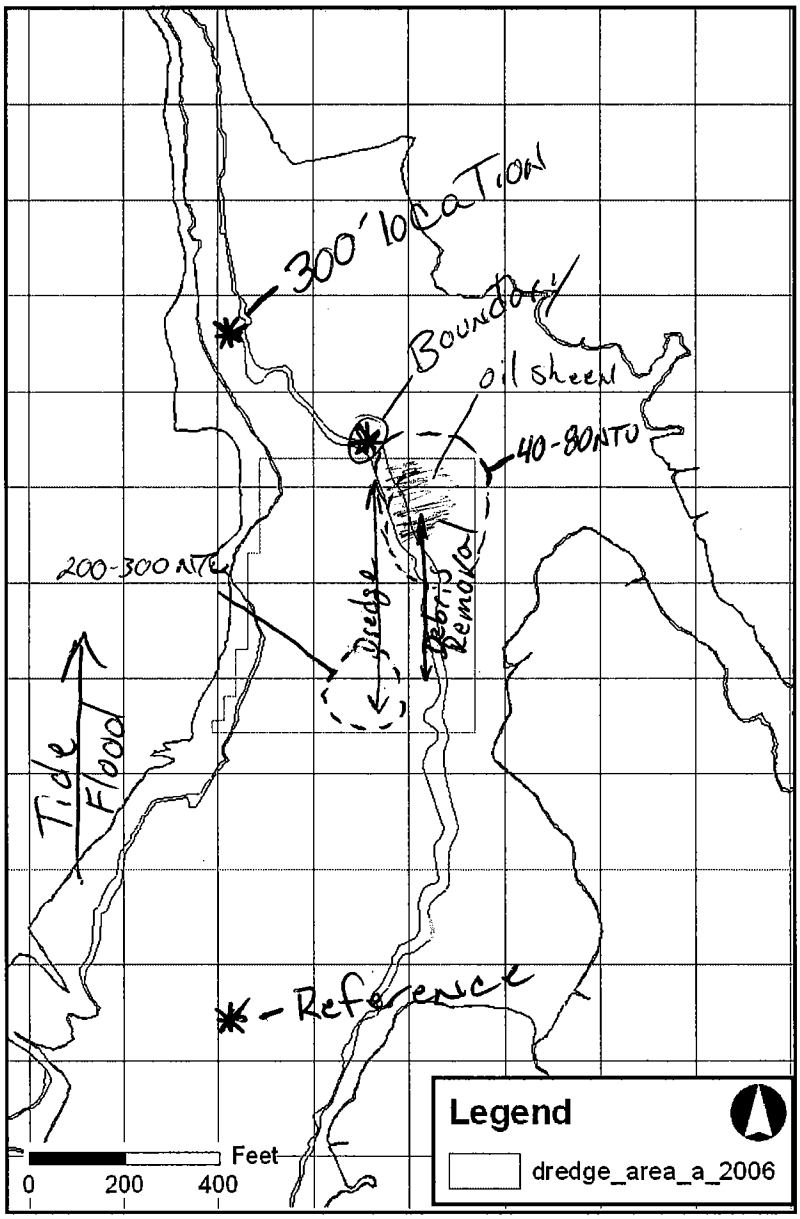
Date: 8-16-06
Weather:
Tides:
L +0.4 @ 0730
H +4.4 @ 1435
L +0.8 @ 2103

Monitoring Period:
From: 1030 **To:** 1500

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
1ST Day of Dredging in AREA A. Started in center and are working to East.

Debris Removal East of Dredge.



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
Reference	4.5	3.5/2.5
150' S	300 NTU	5.5/4.2
①		5.9/4.5
Refrence	3.7	5.8'/4.5
Sample < Boundary ①	14.8	4.4'/2.0'
300'	24.0	3.8'/2.3

Oil sheen/ Debris:
Some oil sheen when Debris barge being moved.

Fish Passage: Bluefish and bait w/birds working entire length of river

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) **Turbidity (500ml)**
Total PCB (1L) See Data Sheet **Dissolved PCB (2x1L)** See Data Sheet
Toxicity (21L) **Metals (500ml)**

Notes: Saw an initial plume 0-100' South of dredge w/ Turbidity 200-300NTU. Settled out at ~200' South. Plume gone in ~40 minutes. Although current running N, the dredge pipe appear to be containing plume to the south. Highest Turbidity values and oil sheens seen when moving debris removal barge. Values >200 NTU. These plumes tended to be short-lived (<100', <20 min)

Sampling Crew: Alex Mansfield, Tad Beagley, Skip Densmore
Chief Scientist Signature:

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	AREA A
Dredging Description	Debris Removal, 1ST Day Dredging
Survey Vessel	CR ENV Skiff
Chief Scientist	Alex Mansfield
Sampling Technician	Tad Beagley
Vessel Captain	Ship Densmore
Other Personnel	—
Weather conditions	Clear, 80, No breeze.

Date	8-16-06
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Tide information	
High	—
Low	0730
High	1435
Low	2103

Station ID	Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity NTU	Salinity PPT	DO	Temp	Notes
	Reference	1036	41° 40.269'	70° 54.998'	3.5'	2.5'	4.5	23.73	10.25	23.77	South of Dredge area 1000'
	~~1~~	~~1145~~			2.3'	1.67'	84.9	22.7	7.00	24.7	At North edge of Area A
REF081606	Reference	1330	41° 40.269'	70° 54.998'	5.8'	4.5'	3.7	25.11	9.29	23.73	WQ-XXX-001-081606
BOUND081606	Boundary	1400	41° 40.523'	70° 54.914'	4.4'	2.0'	14.8	23.8	13.45	25.56	WQ-XXX-002-081606
300081606	300'	1415	41° 40.579'	70° 54.968'	3.8'	2.3'	24.0	25.5	12.23	25.14	WQ-XXX-003-081606
											Also MS/MSD
											and Field Dups
											for PCB

Battelle **Daily Field Summary Sheet for Water Quality Monitoring**

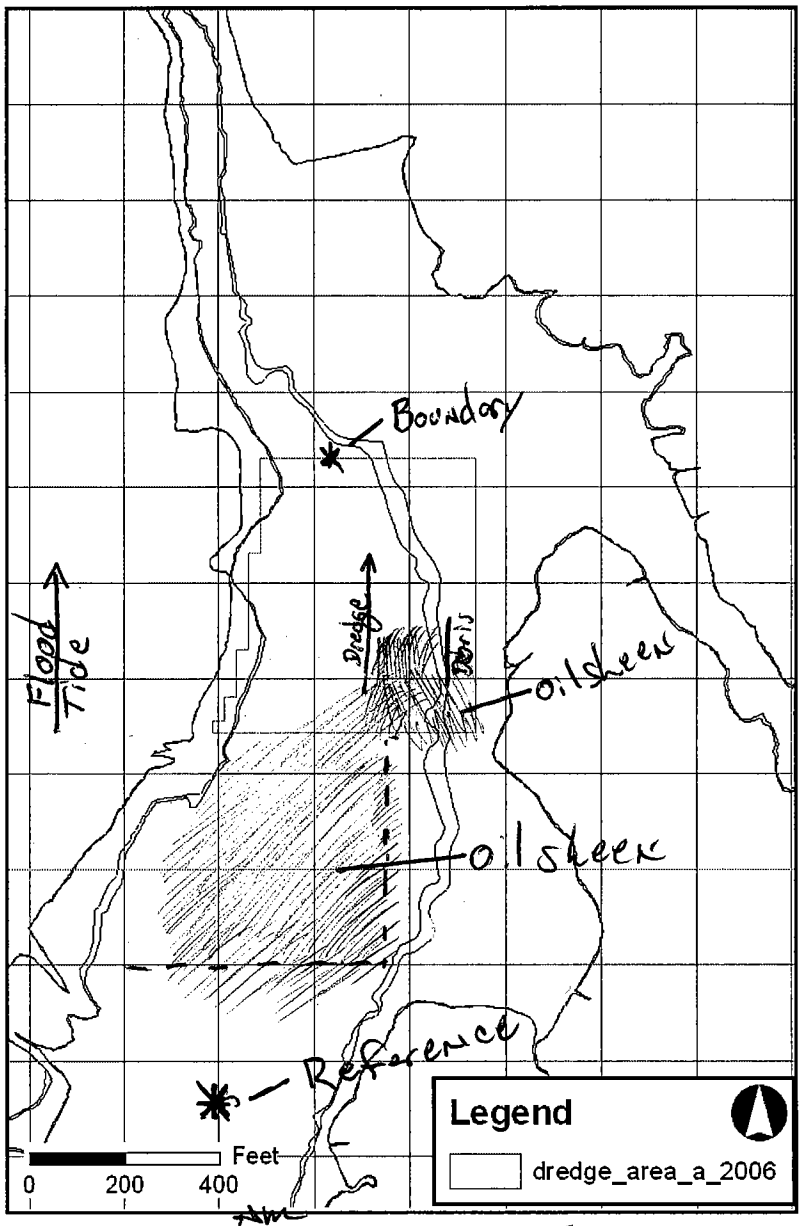
Date: 8-17-06
Weather: Clear, 80s,
Tides:
L +0.6 @ 0836
H +4.3 @ 1539
L +0.8 @ 2236

Monitoring Period:
From: 1100 **To:** 1500

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Dredging AREA A Started at 1145

Debris Removal Started ~1300



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
Reference	8.5	3.7/25'

Oil sheen/ Debris:
Heavy sheens generated when moving debris barge. ~~Not~~ Seen leaving box at South end through gaps in oil boom

Fish Passage:

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) _____ **Turbidity (500ml)** _____
Total PCB (1L) No Samples **Dissolved PCB (2x1L)** No Samples
Toxicity (21L) _____ **Metals (500ml)** _____

Notes: Elevated Turbidity only seen when moving debris barge (<150 NTU). plume was short-lived (~100',
Turbidity in immediate dredge area (<50') never exceeded 30 NTU

Sampling Crew: Alex Mansfield, Tad Beagley, Ship Densmore
Chief Scientist Signature: [signature]

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	AREA A
Dredging Description	Dredging
Survey Vessel	CR ENV Skiff
Chief Scientist	Alex Mansfield
Sampling Technician	Tad Beagley
Vessel Captain	Skip Densmore
Other Personnel	—
Weather conditions	Clear, 80's, No breeze

Date	8-17-06
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Tide information	
High	—
Low	L+06 0836
High	H+4.3 1539
Low	L+0.8 2236

Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity NTU	Salinity* PPT	DO	Temp	Notes
Reference	1130	41°40.269'	70°55.000'	3.7'	2.5'	8.5	32.47	8.43	24.94	
Boundary	1150	41°40.527'	70°54.933'	1.8'	1.5'	26.8	30.21	10.26	27.5	
Wood ST	1300	41°40.707'	70°55.019'	3.5'	3.2'	11.8	32.5	6.49	25.10	

*Much higher readings than previously seen. Suspect values, although cal was OK.

Battelle **Daily Field Summary Sheet for Water Quality Monitoring**

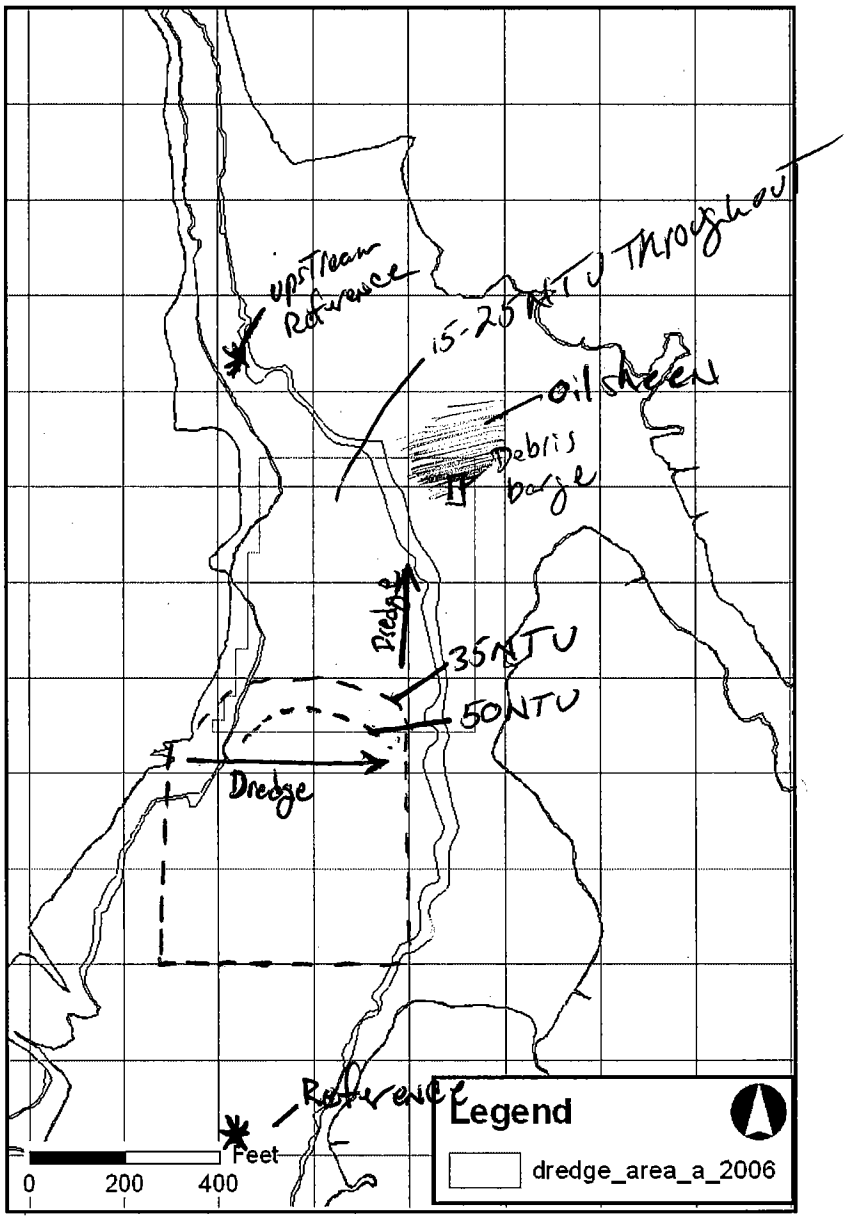
Date: 8-18-06
Weather: OC, 70s, SSW ~5
Tides:
L +0.7 @ 0946
H +4.3 @ 1641
L +0.8 @ 2348

Monitoring Period:
From: 1130 **To:** 1500

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
1st day of dredging in Area B/C
1130 → 1245

AREA A
1300 →
Debris removal operated for ~5min
@ 1410 (no plume seen)



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
Reference	11.1 NTU	3.1/2.9'
50' N. of Dredge	55 NTU	3.0'/1.7'
Northw Ref	24.3 NTU	

Oil sheen/ Debris:
Oil sheen blowing north of dredge

Fish Passage: Snapper blues and bait throughout River

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) _____ **Turbidity (500ml)** _____
Total PCB (1L) No Samples **Dissolved PCB (2x1L)** No Samples
Toxicity (21L) _____ **Metals (500ml)** _____

Notes: ~2 passes at area B/C (East-West) then moved to AREA A at higher water low level (<60NTU) plume seen in immediate area, but diminished at <100'. Replacing booms around debris removal released fairly large sheen. Sheen blown beyond box until outside boom repaired

Sampling Crew: Alex Mansfield, Tod Beagley, Chip Ryther
Chief Scientist Signature: [signature]

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	AREA B/C
Dredging Description	1st Day of dredging in B/C
Survey Vessel	CR ENV. Skiff
Chief Scientist	Alex Mansfield
Sampling Technician	Tod Beagley
Vessel Captain	Chip Rytha
Other Personnel	—
Weather conditions	OC, 70s

Date	8-18-06
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Tide information	
High	—
Low	0956
High	1641
Low	2348

Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity NTU (1)	Salinity	DO mg/L	Temp °C	Notes
Reference	1145	41°40.269'	70°55.000'	3.1'	2.9'	~~23.0~~ 11.1	27.09	7.09	25.2	
50'-Dredge	1230			3.0'	1.7'	55	26.74	6.76	25.4	
Upstream Ref	1345			2.4'	1.1	24.3	25.7	5.92	26.8	

(1) Readings Dropped off after initial.

Battelle **Daily Field Summary Sheet for Water Quality Monitoring**

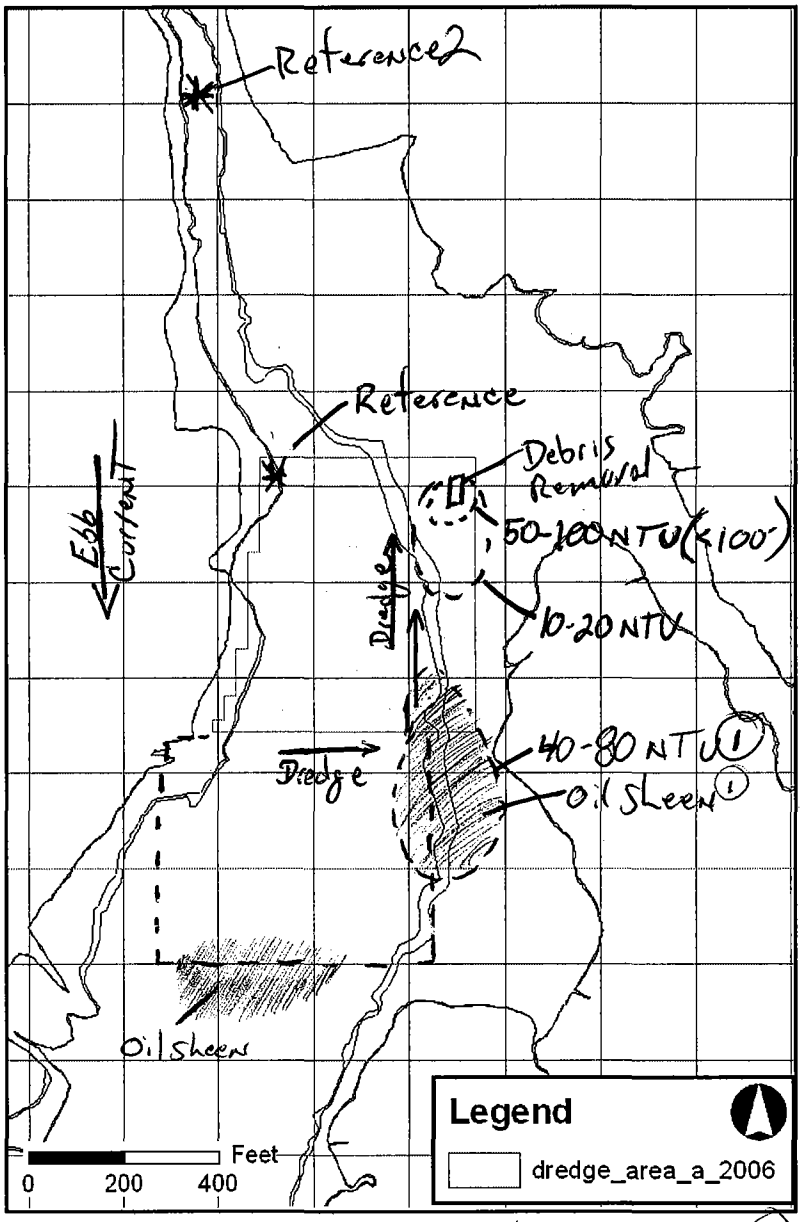
Date: 08-21-06
Weather: PC, 70°, NW~15
Tides:

H	+3.7	@	0651
L	+0.5	@	1305
H	+4.4	@	1914

Monitoring Period:
From: 0725 **To:** 1300

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Dredging and Debris Removal in AREA A started at 0755. Several shut downs w/ debris in dredge. Switched to dredging in Area B/C at 0945. Debris Removal High and dry stopped at ~1030



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
Reference	2.5	4.4'/3.5'
Reference2	4.8	4.5'/3.5'

Oil sheen/ Debris:
Oil sheen seen bubbling up at south end of B/C, appeared unrelated to any dredge activity. (1) Also, sheen associated w/ prop wash

Fish Passage: Bait fish w/birds thick throughout entire area

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) _____ **Turbidity (500ml)** _____
Total PCB (1L) No Samples **Dissolved PCB (2x1L)** No Samples
Toxicity (21L) _____ **Metals (500ml)** _____

Notes: Could not get N of dredge unit due to tide and wire height. Took reference in NW corner of box before dredging started. No significant plume around dredge (<25 NTU). Elevated turbidity around debris removal, but limited to ~100'. Downloaded data from moorings. (1) Prop wash generated fairly high but short-lived plume

Sampling Crew: Alex Mansfield, Theresa Himmw, Ship Dennsmore
Chief Scientist Signature: [signature]

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	Dredging and Debris Removal AREA A ~0800-1000, Then Dredge B/C 1000-1030
Dredging Description	Dredge in Area A on bottom 10:30-1245 stopped ~1245
Survey Vessel	CR Env. Skiff
Chief Scientist	Alex Mansfield
Sampling Technician	Theresa Himmer
Vessel Captain	Ship Denismore
Other Personnel	—
Weather conditions	PC, 70s, NW <15

Date	08-21-06
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Tide information	
High	0651
Low	1305
High	1914
Low	—

Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity NTU	Salinity PPT	DO* mg/L	Temp	Notes
Reference	0745	41°40.518'	70°54.964'	4.4'	3.5'	2.5	23.1		24.6	
Ref. 2	1035	41°40.683'	70°55.016'	4.5'	3.5'	4.8	23.1		24.9	

*DO readings sporadic, suspect torn membrane, or oil on surface of membrane

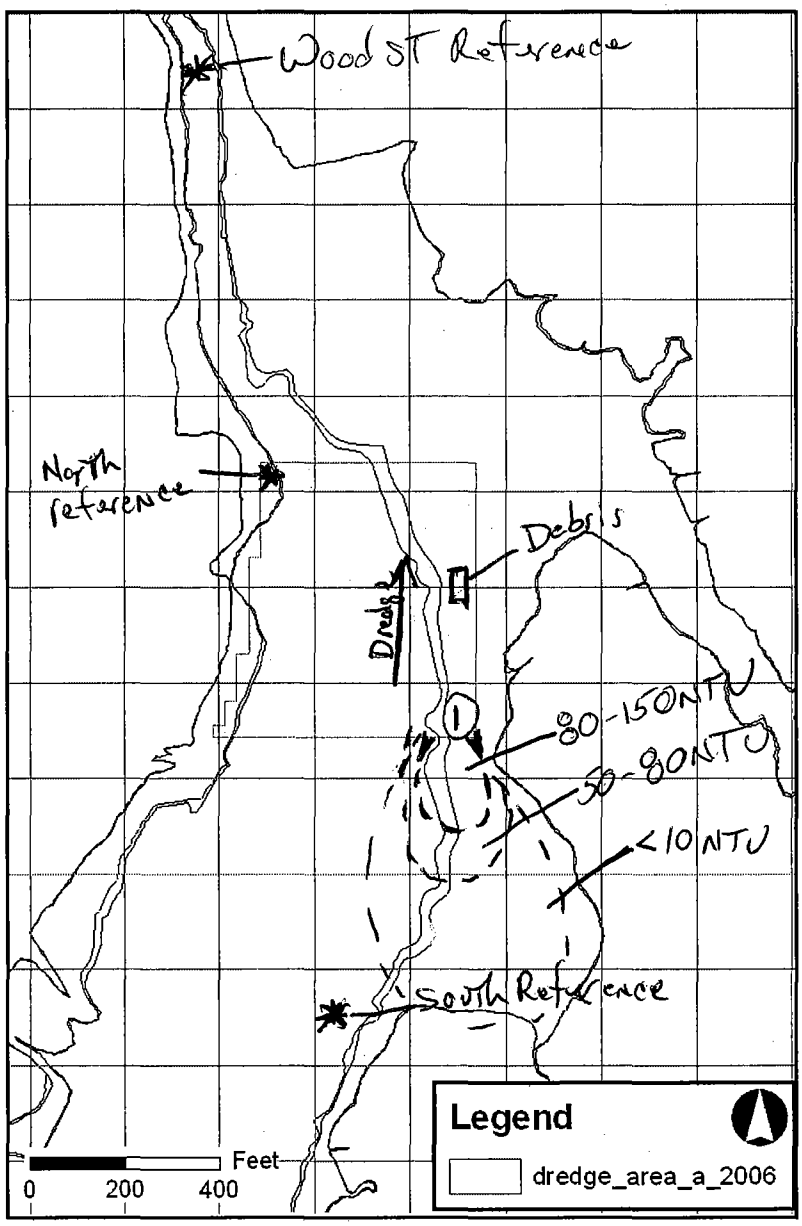
Battelle **Daily Field Summary Sheet for Water Quality Monitoring**

Date: 8-22-06
Weather: pc, 70's,
Tides:
H +3.9 @ 0735
L +0.4 @ 1343
H +4.4 @ 1956

Monitoring Period:
From: 0800 **To:** 1300

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
AREA A Dredge (start 0830)
AREA A Debris removal



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
South Refrence	2.3	6.3'/4.4'
North Refrence	5.9	4.1'/1.2'
1	23.1	3.8'/2.8'
Wood ST	3.1	4.0'/2.7

Oil sheen/ Debris:
light oil sheen seen drifting South of Debris Removal

Fish Passage: Bait fish w/ birds working seen throughout area

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) _____ **Turbidity (500ml)** _____
Total PCB (1L) No Samples **Dissolved PCB (2x1L)** No Samples
Toxicity (21L) _____ **Metals (500ml)** _____

Notes: Largest turbidity plumes seen when moving the debris removal barge (prop wash) at <100' turbidity often exceeds 100-150NTU. Beyond 100' drops to 30-60NTU. Turbidity plume isolated to top 1' (on top of halocline). Short lived (~20 min plume) of ~35 NTU at ~1,000' downstream. No samples collected due to ephemeral nature of plume

Sampling Crew: Alex Mansfield, Jessica Fahey, Skip Densmore
Chief Scientist Signature: [signature]

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	Area A
Dredging Description	Dredging Easter Half, Debris removal
Survey Vessel	CR ENV Skiff
Chief Scientist	Alex Mansfield
Sampling Technician	Jessica Fahey
Vessel Captain	Skip Dennsmore
Other Personnel	—
Weather conditions	PC, 70°

Date	8-22-06
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Tide information	
High	0735
Low	1343
High	1956
Low	—

	Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity NTU	Salinity PPT	DO* mg/L	Temp °C	Notes
South	Reference	0818	41°40.306	70°54.961	6.3'	4.4'	2.3	27.2	4.2	23.6	Prior To dredge STarTup
North	Reference	0825	41°40.523'	70°54.964	4.1'	1.2'	5.9	24.3	5.1	23.9	"
	1	0835	41°40.427'	70°54.878	3.8'	2.0'	23.1	22.0	3.25	23.3	
Wood	ST	1150	41°40.678'	70°55.007'	4.0'	2.7'	3.1	26.7	3.43	24.77	Checked at low Water

*New membrane, readings lower than expected, %sat at surface only ~50% suspect that membrane is being fouled when passing through surface sheen.

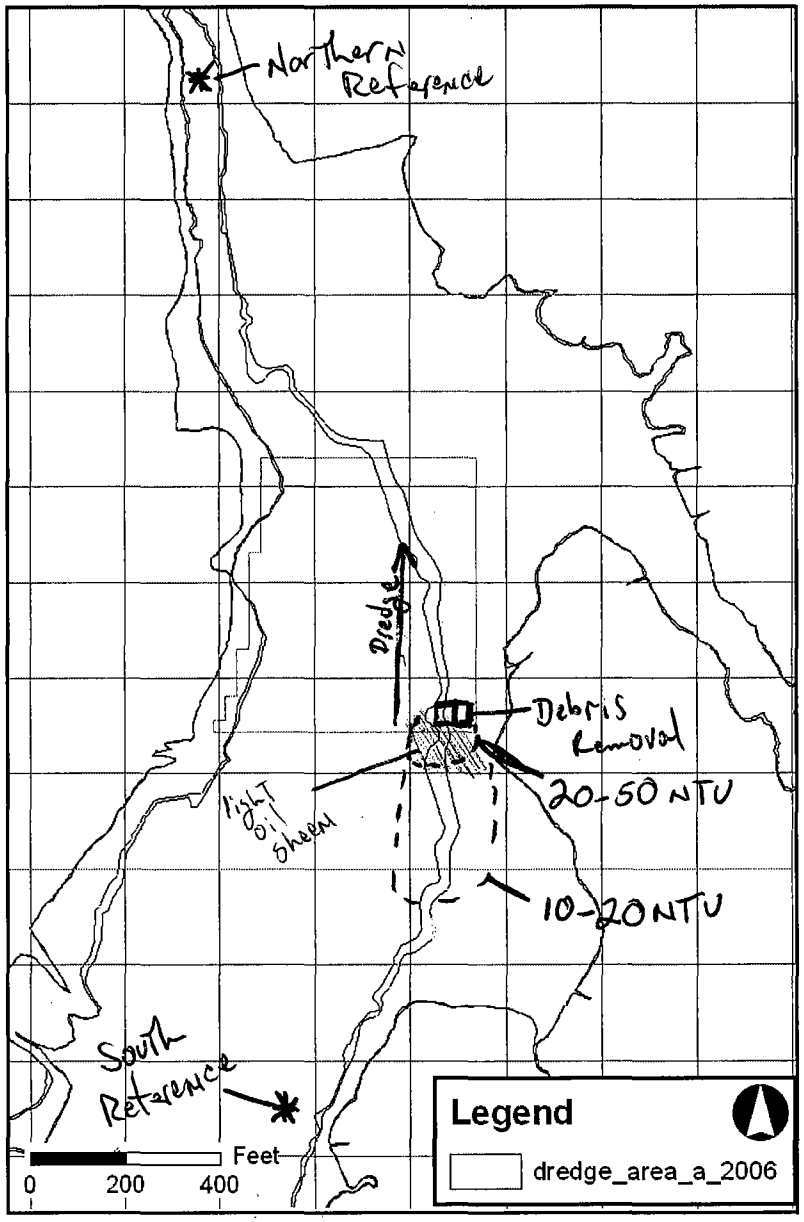
Battelle **Daily Field Summary Sheet for Water Quality Monitoring**

Date: 8-23-06
Weather: Clear, 80°, No breeze
Tides:
H +4.1 @ 0817
L +0.3 @ 1415
H +4.4 @ 2035

Monitoring Period:
From: 0945 **To:** 1300

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Dredging AREA A
Debris Removal AREA A



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
South Reference	(0950) 3.6	5.7'/1.2'
North Reference	3.9'	4.5/3.1'

Oil sheen/ Debris:
light sheen S of Dredge + Debris barge. Mostly contained by boom w/ Trickles at Gaps

Fish Passage: bait fish seen Throughout, less big fish and birds as compared To previous week
Lots of birds between Area A and Wood ST.

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) _____ **Turbidity (500ml)** _____
Total PCB (1L) No Samples **Dissolved PCB (2x1L)** No Samples
Toxicity (21L) _____ **Metals (500ml)** _____

Notes: Very little Turbidity seen near the operations. No Signal seen near dredge low level Turbidity plume (20-50) seen within 100' of debris removal. lower values seen beyond 100'

Sampling Crew: Alex Mansfield, Theresa Himmer, Skip Densmore
Chief Scientist Signature: [signature]

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	Dredging and debris removal in AREA A
Dredging Description	—
Survey Vessel	CR Env Skiff
Chief Scientist	Alex Mansfield
Sampling Technician	Theresa Himmer
Vessel Captain	Skip Dansmore
Other Personnel	Jay MacKay aboard for ~30 min
Weather conditions	clear, 80°, no breeze

Date	8-23-06
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Tide information	
High	0817
Low	1415
High	2035
Low	—

Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity NTU	Salinity PPT	DO mg/L	Temp °C	Notes
South Ref	0950	41°40.306′	70°54.961′	5.7′	1.2′	3.6′	25.1	7.3	24.7	
North Ref	1655			4.5′	3.1′	3.9′	26.9	2.0*	25.3	

* membrane possibly fouled from oil sheen

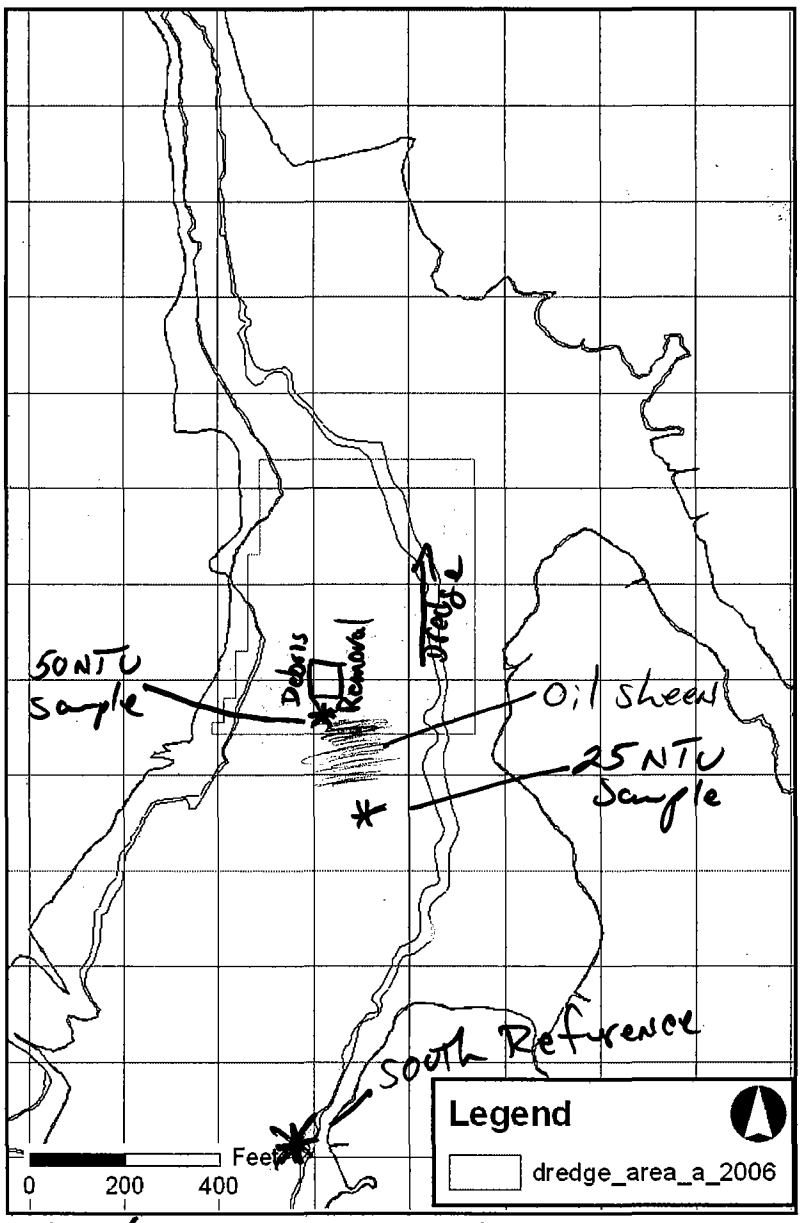
Battelle **Daily Field Summary Sheet for Water Quality Monitoring**

Date: 8-28-06
Weather: rain, 80, No Wind
Tides:
L +0.3' @ 0426
H +4.0' @ 1129
L +0.6' @ 1654

Monitoring Period:
From: 0910 **To:** 1030

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Dredging and Debris in AREA A



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)

Oil sheen/ Debris: Some Sheen and H_2S smell w/ Debris Removal

Fish Passage: limited number of fish seen, Many Egrets, Heron on shoreline feeding.

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) _____ **Turbidity (500ml)** _____
Total PCB (1L) SEE Data Sheet **Dissolved PCB (2x1L)** See Data sheet
Toxicity (21L) _____ **Metals (500ml)** _____

Notes: Planned Sample collections Targeted 50NTU and 25NTU

Flood Tide stage, but surface water flowing south due to heavy rainfall/ runoff over past few days

Sampling Crew: Alex Mansfield, Jessica Fahey, Skip Densmore
Chief Scientist Signature: [signature]

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	AREA A
Dredging Description	Dredging and Debris Removal
Survey Vessel	CR ENV. SKiff
Chief Scientist	Alex Mansfield
Sampling Technician	Jessica Fahey
Vessel Captain	Ship Demsmore
Other Personnel	—
Weather conditions	rain, 80s, no breeze

Date	8-28-06
Page	of

Tide information	
High	—
Low	0426
High	1129
Low	1654

Station ID

Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity NTU	Salinity	DO	Temp	Notes	Station ID
South Ref	0930	41° 40.313'	70° 54.954'	6.7'	5.8'	10.5	21.7	*	21.4°	WQ-XXX-001-082806	SOUTHREF082806
50NTU	0950	41° 40.429'	70° 54.936'	5.8'	2.7'	50-70				WQ-XXX-002-082806	50NTU082806
25NTU	1015	41° 40.394'	70° 54.918'	6.1'	2.5'	20-30				WQ-XXX-003-082806	25NTU082806

*Readings No good

① w.d. LS. 10/20/06

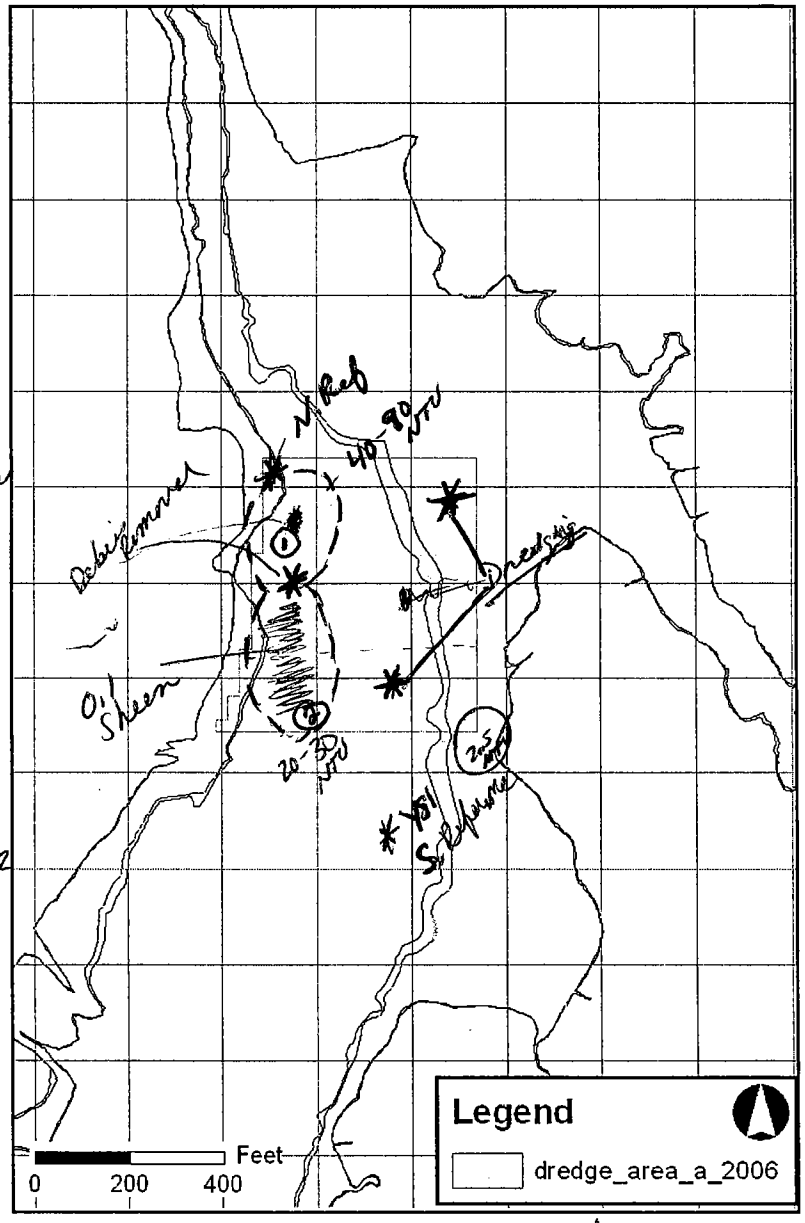
Battelle Daily Field Summary Sheet for Water Quality Monitoring

Date: 8/29/06
Weather: Cloudy, Drizzle, 5-10 mph wind
Tides:
L +0.4 @ 0459
H + 3.8 @ 1210
L + 0.8 @ 1734

Monitoring Period:
From: 1010 **To:** 1340

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
2 dredges going w/ 1 debris removal (S in morning, N around 1045)
• 40-80 NTU N of debris removal
lower @ surface, higher @ lower depth
100-125 ft away from barge (N)



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
100' N of Debris removal	81.5	2.7 @ 1052
100 NE debris removal	25.0	1.4 @ 1114
S of Dredge	~~7.6~~ 5.5	1.6 @ 1133

Oil sheen/ Debris:
thick Oil sheen @ S. entrance - wind blowing NORTH (all morning), sm oil sheen outside of boom area (1) see data sheet (2) ~~see data sheet~~

Fish Passage:

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) ~~____~~ **Turbidity (500ml)** ~~____~~
Total PCB (1L) ~~____~~ **Dissolved PCB (2x1L)** ~~____~~
Toxicity (21L) ~~____~~ **Metals (500ml)** ~~____~~

Notes: Took a break around 1215pm - No dredging or debris material being completed. Returned @ 1:15pm - No dredging or debris removal happening. Placing new booms in because debris removal is in the hot spot. Also, refueling.

Sampling Crew: Mike Walsh, Jessica Fahey, Skip Densmore
Chief Scientist Signature: [signature]

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	Area A
Dredging Description	Debris Removal
Survey Vessel	CR ENV. SKIFF
Chief Scientist	Jessica Fahey
Sampling Technician	Mike Walsh
Vessel Captain	Ship Densmore
Other Personnel	–
Weather conditions	Cloudy w/ light rain, breezy, N-NE [illegible]

Date	8-29-06
Page	1 of 1

Tide information	
High	–
Low	0459
High	1210
Low	1734

Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity	Salinity	DO	Temp	Notes
S. Reference	1016	41°40.305'	-070°54.966	5.9'	~~4.9~~ 1.5	5.8	17.35	6.58	20.11	S. Reference – [illegible] H2O upper layer
S. Ref.	1020	"	"	5.9'	2.9	1.2	20.55	5.58	20.98	
N. Ref	10:39	41°40.519	070°54.960	4.8'	4	30.0	21.04	2.57	21.15	
N. Ref	"	"	"	"	1.4	20.9	16.08	4.51	20.30	
(1) Area A	1052	41.40 474	070 54.958	4.3	2.7	81.5	19.41	3.28	20.68	N. of debris removal
2 Area A	1124	41°40.369	070°54.974	6.0'	4.0	3.5	22.37	5.64	21.52	@ 250' S. of debris removal
	1125	"	"	6.0	1.3	21.2	17.37	5.51	~~17.37~~	20.39 @ 300' S of debris removal

* Conductivity would not calibrate "Out of Range"
values were 1.004 - 1.016 for all trys
last try reading was .999 – "Out of Range" was still occuring

Battelle Daily Field Summary Sheet for Water Quality Monitoring

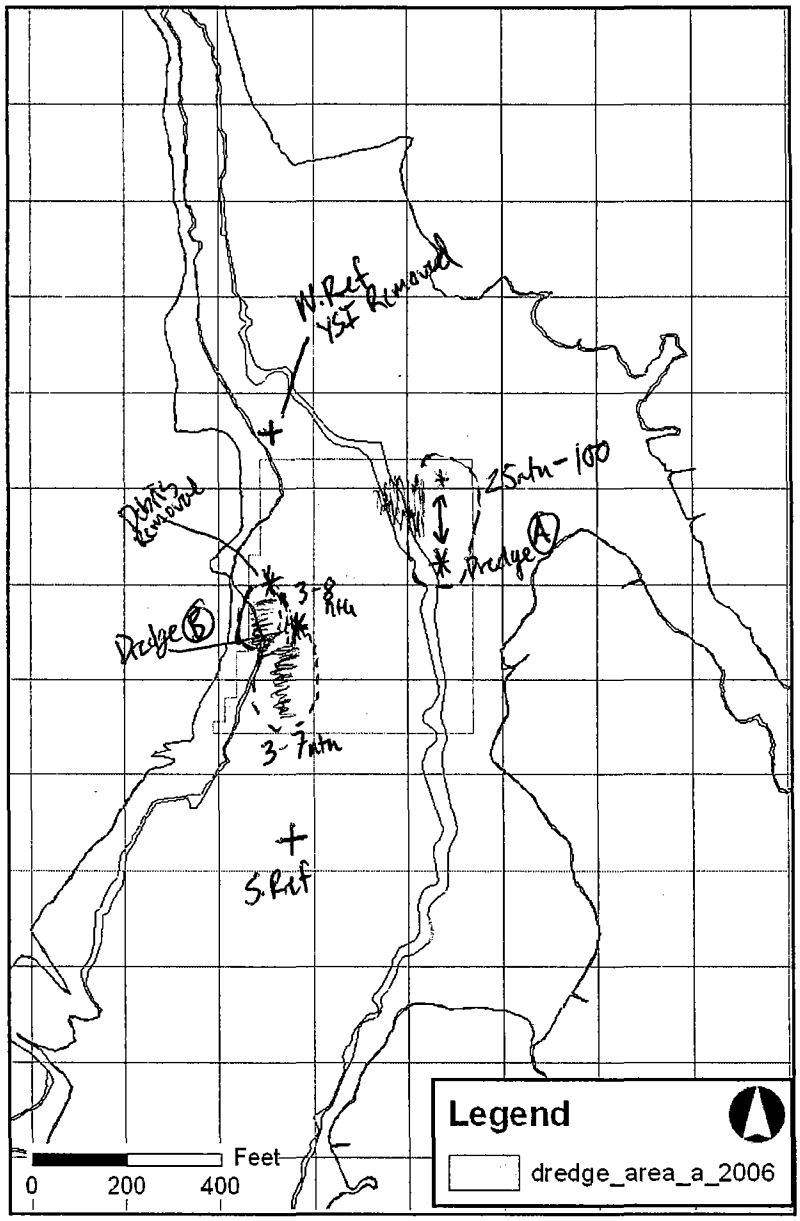
Date: 8/30/06
Weather: Mostly Cloudy/N-5kts
Tides:

L	0.5	@	0537
H	3.7	@	1257
L	0.9	@	1820

Monitoring Period:
From: 0840 **To:** 1215

Tidal Stage: HWS Ebb LWS (Flood)

Dredging Activity:
- Morning - 100 Debris removal due to pipe maintenance.
- Dredging in Northern section of Southern dredge



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)

Oil sheen/ Debris:
Sheen south of Debris Removal; Sheen west of outboard pushing Dredge (A)

Fish Passage: None

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) _____ **Turbidity (500ml)** _____
Total PCB (1L) No Samples **Dissolved PCB (2x1L)** No Samples
Toxicity (21L) _____ **Metals (500ml)** _____

Notes: USED Morning YSI for WQ monitoring → O-Ring fell off WQ YSI typically used.
- High Counts observed north of Dredge (A) 25-100ntu (shortly) while skiff with outboard running was Keeping Dredge on track

Sampling Crew: M. Walsh, J. Fahey, Ship
Chief Scientist Signature: Michael Walsh

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	Area A
Dredging Description	Debris Removal / Dredging
Survey Vessel	CR Eno. Skiff
Chief Scientist	Mike Walsh
Sampling Technician	Jessica Fahey
Vessel Captain	Ship Densmore
Other Personnel	—
Weather conditions	Mostly Cloudy / winds NNE 5

Date	8/30/06
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Tide information	
High	—
Low	0537
High	1257
Low	1820

Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity	Salinity	DO	Temp	Notes
Ref south	0841	41° 40.276	070°54.999	4.5 ft	3.5 ft	3.8 ntu	22.36	4.32 ①	21.38	O-Ring on DO sensor fell off (suspect)
Ref North	0903	41° 40.542	070°54.962	4.5 ft	2.7	9.3 ntu	21.4	2.84	21.3	" "
40 ft from Debris Remov.	10:08			3.8 ft	1.8 ft	98 ntu	26.9	1.91	21.3	
175 ft North of Debris R.	10:11			3.8 ft	1.8 ft	51.7 ntu	26.37	2.38	21.2	
175' south of Debris R.	10:20			4.5 ft.	1.7 ft	3.8	28.42	3.63	21.4	
175' north Dredge A	10:35			4.8 ft	1.8 ft	95 ntu	27.1	2.56	21.38	Skiff pushing against Dredge
100' NW of Dredge A	10:40			4.5 ft	2.0 ft	150 ntu	26.8	3.63	21.33	
40-50 N of Dredge A	10:55			4.5 ft	2.0 ft	53 ntu				Skiff stopped
Dredge A										

① suspect DO Reading 8/30/06 MW

Battelle Daily Field Summary Sheet for Water Quality Monitoring

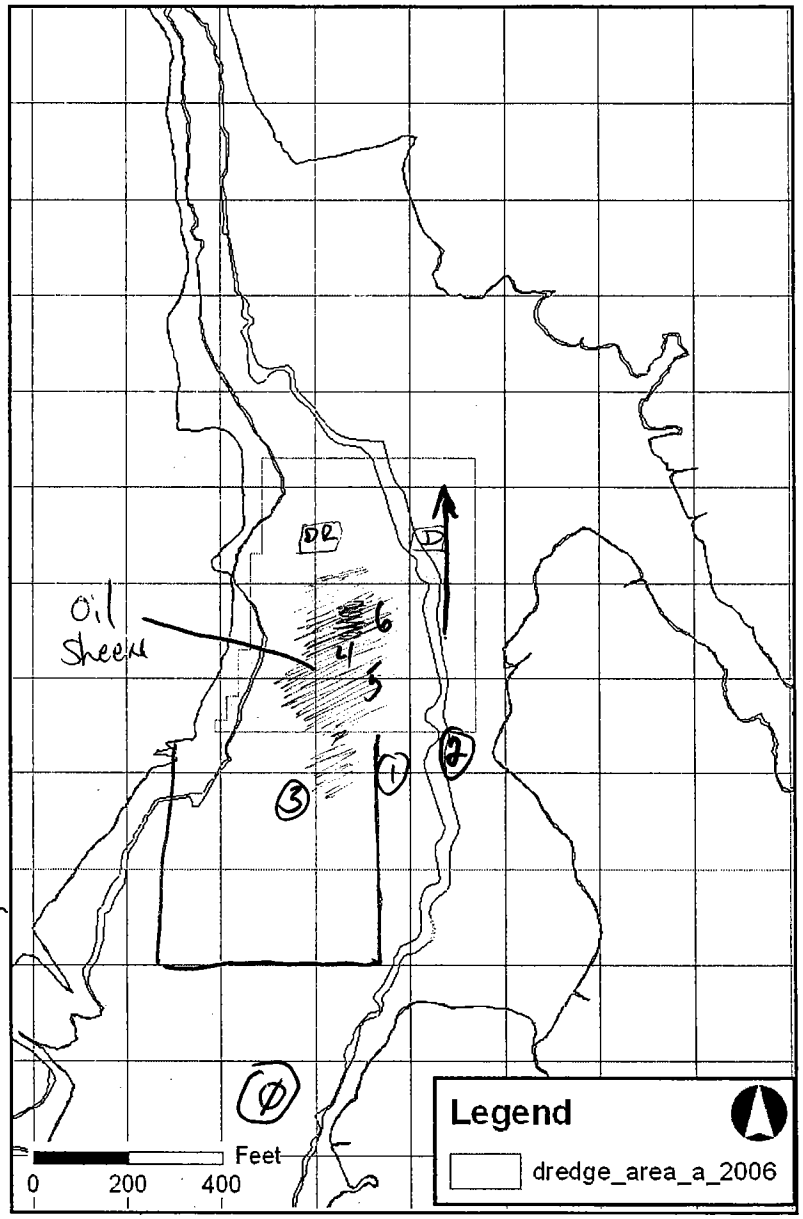
Date: 9/6/06
Weather: Cloudy (100% cover)
Tides:
H +4.5' @ 0712
L -0.3 @ 1259
H +5.0 @ 1935

Monitoring Period:
From: 850 **To:** 1230

Tidal Stage: HWS (Ebb) LWS Flood

Dredging Activity:
debris removal + dredging in Northern section (AREA A)

DR - Debris Removal
D - Dredging



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
S.E corner dredge area	18.5	1.5
Just S. of dredge	29.5	2.1 - oil sheen
Middle of S section	5.8	2.8

Oil sheen/ Debris:
between S + N area's - boom open in middle of 2 area's

Fish Passage: few (but some) fish seen in all areas

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) See Data Sheet **Turbidity (500ml)** See Data sheet
Total PCB (1L) \ **Dissolved PCB (2x1L)** \
Toxicity (21L) \ **Metals (500ml)** \

Notes: Collected Suite of Turbidity and TSS Samples to generate calibration Curve.

Sampling Crew: A. Mansfield, J. Fahey, S. Demsmore
Chief Scientist Signature: [signature]

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	AREA A
Dredging Description	Dredging + Debris Removal
Survey Vessel	CR. Skiff
Chief Scientist	Alex Mansfield
Sampling Technician	Jessica Fahey
Vessel Captain	Skip Dewsmore
Other Personnel	
Weather conditions	OC, 70°, No breeze

Date	09-06-06
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Tide information	
High	0712 +4.5
Low	1259 -0.3
High	1935 +5.0
Low	—

Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity **	Salinity	DO	Temp	Notes	Station ID
S. Mooring	0900			5.8	1.6	3	21.9	5.52	21		
N. Corner	0908			4	2.2	7.2	22.6	4.35	21.25		
* 0 ONTU	1023	815550 ↔	2705750	4.5'	2.9	3.7	23.6	5.01	20.98	WQ-XXX-001-090606	ONTU090606
1 15NTU	1055	2704659	815782	5.5'	2.2	15.4	22.4	5.82	21.57	WQ-XXX-002-090606	15NTU090606
2 20NTU	1102	~~2704659~~	~~81~~ ①	4.5'	2.5	22.1	22.8	4.19	21.39	WQ-XXX-003-090606	20NTU090606
		2706636	816047								
3 35NTU	1123	2706449	815684	5.0'	2.2	35.0	21.96	4.02	21.47	WQ-XXX-004-090606	35NTU090606
4 135NTU	1150	2707000	815909	2.5	1.7	135.0	20.9	5.4	21.83	WQ-XXX-005-090606	135NTU090606
5 75NTU	1158	2706929	815941	2.5'	1.5'	60-90	19.01	7.77	21.36	WQ-XXX-006-090606	75NTU090606
6 50NTU	1207	2706985	815926	2.4'	1.6'	50.1	18.53	7.68	21.89	WQ-XXX-007-090606	50NTU090606

*Collected Range of Tss/Turbidy values for calibration. Filename on YSI = 090606

** Files stored during collection to get average values

① old reading was stored.

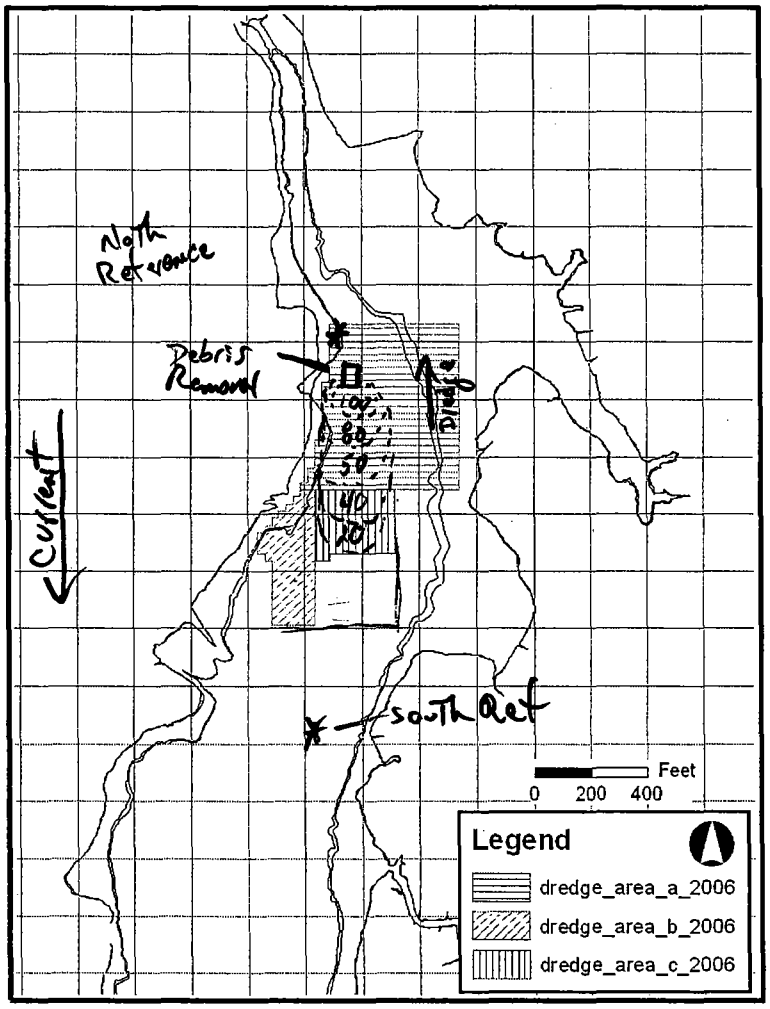
Battelle Daily Field Summary Sheet for Water Quality Monitoring

Date: 9-7-06
Weather: Clear, 70s
Tides:
H 4.9 @ 08:06
L -0.6 @ 13:53
H 5.1 @ 20:23

Monitoring Period:
From: 0830 To:

Tidal Stage: HWS (Ebb) LWS Flood

Dredging Activity:
Clean-up passes + Debris Removal in Area A



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
South Ref	0.0	6.7'/1.3'
North Ref	~4.8 (bot)	5.0'/0.5 4.0'
North Ref	4.1 surf	5.0/0.5

Oil sheen/ Debris:
Very little oil sheen coming primarily from debris removal

Fish Passage: bluefish seen in low numbers throughout area, mostly feeding on small pogies

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) Turbidity (500ml)
Total PCB (1L) None Dissolved PCB (2x1L) None
Toxicity (21L) Metals (500ml)

Notes: Suspended sediment confined to thin layer riding on top of pycnocline, at ~ 1' deep. Debris removal causing the only significant plumes

Sampling Crew: A. Mansfield, M. Fitzpatrick, S. Densmore.
Chief Scientist Signature:

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	AREA A
Dredging Description	Clean-up passes + Debris Removal
Survey Vessel	CR Skiff
Chief Scientist	A. Mansfield
Sampling Technician	M. FitzPatrick
Vessel Captain	S. Dearmore
Other Personnel	—
Weather conditions	Clear, 70°, No breeze

Date	9-7-06
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Tide information	
High	0800
Low	1533
High	2023
Low	—

	Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity	Salinity	DO	Temp	Notes
	South Ref	0909	2705751	815520	6.6'	1.27'	0.0	26.84	5.09	20.85	
(Surf)	North Ref	0931	2707266	815699	5.0'	0.5'	4.1	25.2	6.51	21.39	Surface sample
(bot)	North Ref	0932	"	"	5.0'	4.0'	4.8'	27.09	4.1	21.09	Bottom sample

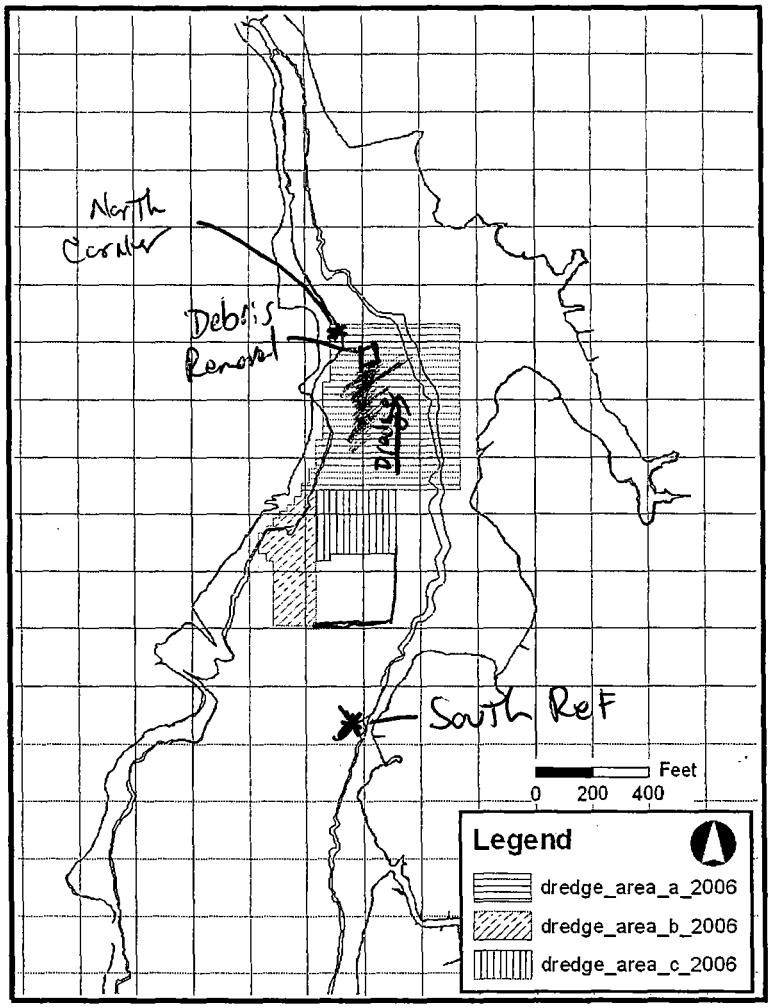
Battelle **Daily Field Summary Sheet for Water Quality Monitoring**

Date: 9-11-06
Weather: Clear, 70, NE 10-15
Tides:
Low -0.5 @ 0430
High 5.1 @ 1116
Low -0.2 @ 1715

Monitoring Period:
From: 0930 **To:** 1330

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
AREA - Dredging + Debris Removal



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
South Ref	2.6	5.9/5.0
North Corner	36.6	4.9/2.3

Oil sheen/ Debris:
Heavy sheen + odor from debris removal, sheen pushed south on the wind.

Fish Passage: None

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) No Samples **Turbidity (500ml)**
Total PCB (1L) **Dissolved PCB (2x1L)** No Samples
Toxicity (21L) **Metals (500ml)**

Notes: Debris removal near North West corner, can not transit further North because of cabling.
1115 - Sediment trap deployed at North mooring site
1135 - Sediment trap deployed at South mooring site

Sampling Crew: A. Mansfield, J. Fehey, S. Dewmore, M. Walsh
Chief Scientist Signature:

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	AREA A
Dredging Description	Dredging and Debris Removal
Survey Vessel	CR SKiff
Chief Scientist	A Mansfeld
Sampling Technician	S. Fahey
Vessel Captain	S. Densmore
Other Personnel	
Weather conditions	Clear, 70°, NE 10-15

Date	9-11-06
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Tide information	
High	—
Low	0430
High	1116
Low	1115

Station Number	Time	Latitude Northing	Longitude Easting	Water depth	Sample Depth	Turbidity NTU	Salinity PPT	DO mg/L	Temp °C	Notes
South Ref	0935	2705782.5	815343.6	5.9'	5.0'	2.6	25.79	7.44	20.39	South Reference location
* North ~~Ref~~	1005	2707227.1	815713.5	4.9'	2.27	36.6	23.41	6.95	19.77°	North Corner of Area A

* Tide height does NOT allow passage further North
Location is only ~100' from Debris removal.

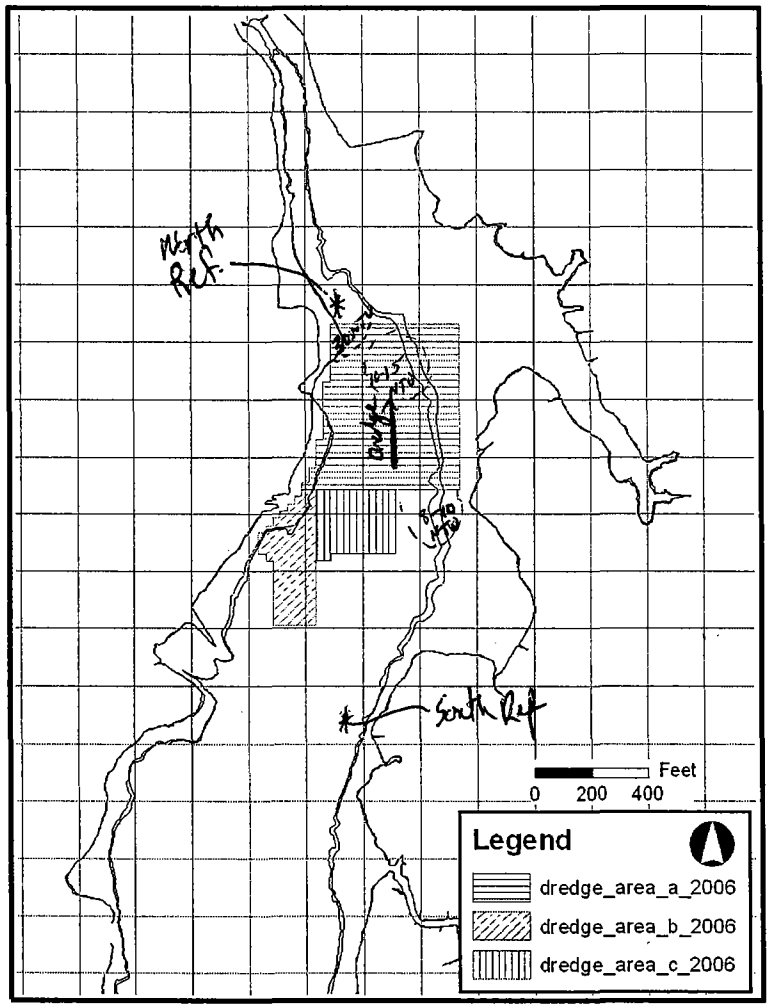
Battelle **Daily Field Summary Sheet for Water Quality Monitoring**

Date: 9/12/06
Weather: Sunny, Clear, breezy
Tides:
High @ 1210 4.8
Low 1811 @ 1811 0.2
NW Low 0516 @ 0516 -0.2

Monitoring Period:
From: 0921 **To:** 1140

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
NO A.M. Debris Removal Area A①
minimal Dredge Activity Area A
because holding tanks were full



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
N.Ref	25.5	1.7'/4.9'
S.Ref	7.3	4.0'/5.0'

Oil sheen/ Debris:

Fish Passage: bait fish were seen passing through

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) ~~_____~~ **Turbidity (500ml)** ~~_____~~
Total PCB (1L) ~~_____~~ **Dissolved PCB (2x1L)** ~~_____~~
Toxicity (21L) ~~_____~~ **Metals (500ml)** _____

Notes: 0930 Download data from Northern Mooring – 0940 Mooring re-deployed
0950 Download data from Southern Mooring – 0958 mooring re-deployed

Sampling Crew: J. Fahey, M. Walsh, S. Dunsmore
Chief Scientist Signature: Michael Walsh

① fixing pipe leak near dock; was not fixed by 11:30 AM

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	Area A - Northern
Dredging Description	Dredging
Survey Vessel	CR Skiff
Chief Scientist	M. Walsh
Sampling Technician	J. Fahey
Vessel Captain	S. Desmarais
Other Personnel	
Weather conditions	Sunny Clear 70°, NNE 10-15

Date	9/12/06
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Tide information	
High	—
Low	0516
High	1210
Low	1811

Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity	Salinity	DO	Temp	Notes
N. Moccasins N. Ref.	0930	70°7382.070	81°5713.5	4.9	1.7	25.5	23.7	6.26	17.98	Mooring Data retrieval
S. Ref.	0942	70°5760.7	81°5565.6	5.0	4.0	7.3	26.9	7.7	18.8	mooring Data retrieval

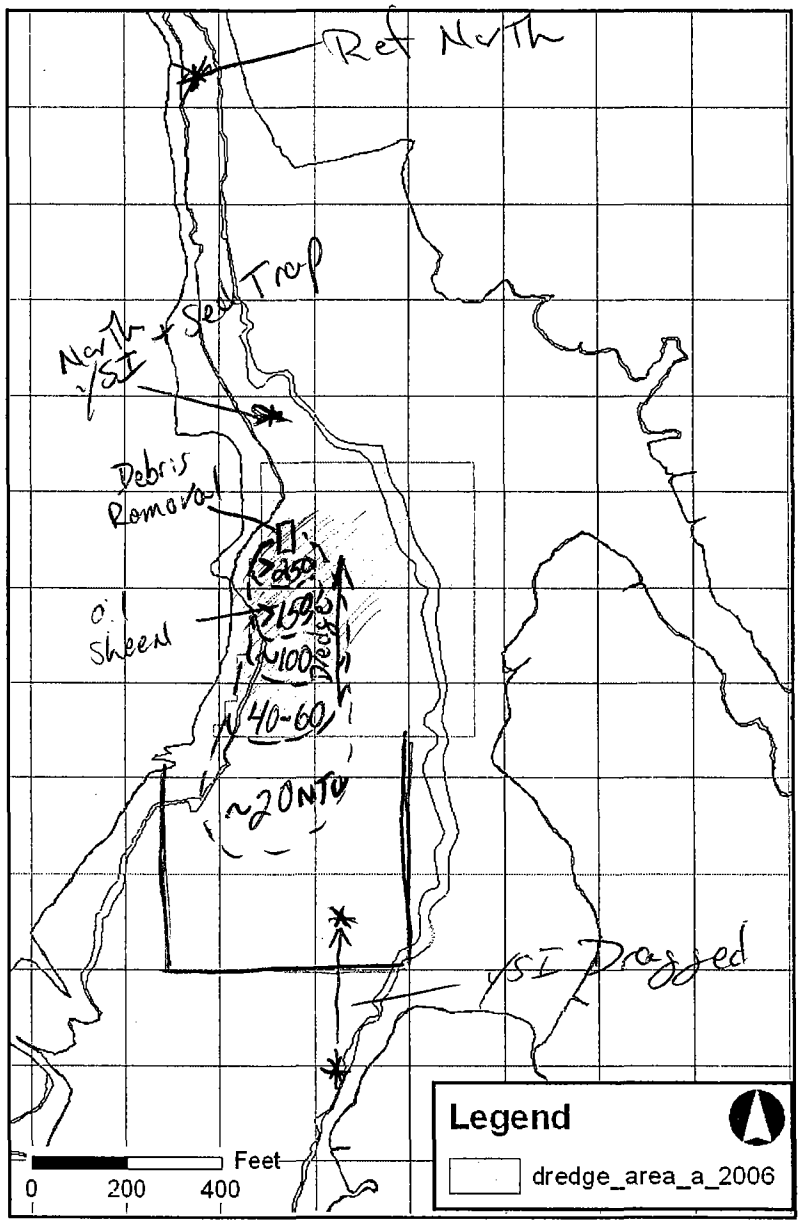
Battelle **Daily Field Summary Sheet for Water Quality Monitoring**

Date: 9-18-06
Weather: OC, 80, No Breeze
Tides:
H +3.5 @ 0541
L +0.7 @ 1215
H -4.0' @ 1805

Monitoring Period:
From: 0910 **To:** 1215

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Debris removal And dredging in AREA A.



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
North Ref	5.0	4.5'/1.9'
350' south of Debris Barge	40-60	1.3'/0.6'

Oil sheen/ Debris:
Major Oil sheen associated with debris Removal

Fish Passage: lots of bait fish North of area To West

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) _____ **Turbidity (500ml)** _____
Total PCB (1L) NA **Dissolved PCB (2x1L)** NA
Toxicity (21L) _____ **Metals (500ml)** _____

Notes: YSI South + South Sed Trap (Test) Had both been dragged by the barge and pulled up into the dredge area. Sed Trap was overfull w/mud. YSI seems in OK shape. Pulled both North and South YSIs for cleaning. Collected sediment from North Trap
Extremely strong smell - Hydrocarbons + putrified sediment. Very high Turbidity (>300) imediately @ Debris removal. Drops To ~50 @ ~350'.

Sampling Crew: A. Mansfield, J. Fahey, S. Dearsmore
Chief Scientist Signature: [signature]

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	AREA A
Dredging Description	Debris Removal + Dredging
Survey Vessel	CR Skiff
Chief Scientist	Alex Mansfield
Sampling Technician	Jessica Fahey
Vessel Captain	Ship Densmore
Other Personnel	—
Weather conditions	OC, 80, No breeze

Date	9-18-06
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Tide information	
High	0521
Low	1215
High	~~2232~~ 1805 misread Tide AM 9/18
Low	—

Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity NTU	Salinity PPT	DO mg/L	Temp °C	Notes
North Reference	0949	270888	815446	4.5'	1.9'	5.0	25.24	3.67	22.47	
South end Area A	1022			1.2	0.5'	35.6	24.35	5.14	22.25	@South end of AREA A ~350 from Debris Removal

Battelle Daily Field Summary Sheet for Water Quality Monitoring

Date: 9/19/06
Weather:
Tides:
H @ 0628
L @ 1254
@

Monitoring Period:
From: 0830 – 1300 **To:** 1030 – 1500
Tidal Stage: HWS Ebb LWS Flood

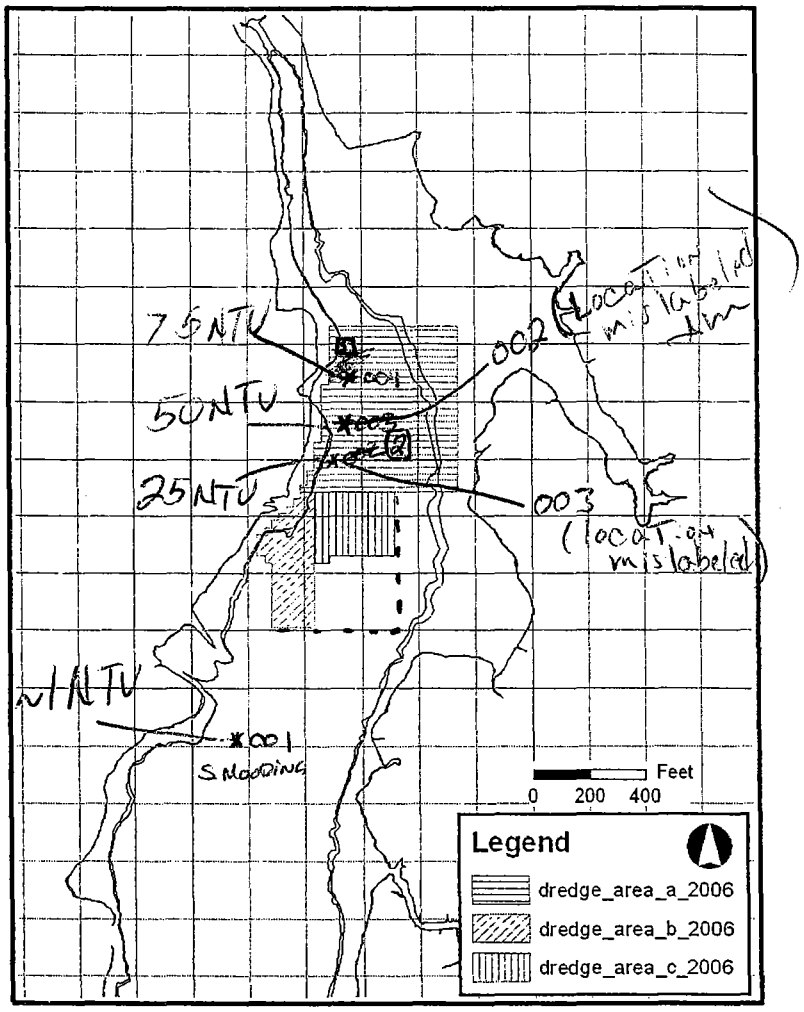
Dredging Activity:
Debris Removal + Dredging in Area A

1) - debris removal - N. corner
2 - dredging - south/middle section

* sample locations

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
001	1.7	2.72
002	53.8	0.96
003	24.2	0.27
004	1.05	108.0
	Depth	NTU



Oil sheen/ Debris:
sm. oil sheen around the dredge

Fish Passage: Bait fish seen in High numbers North of dred area. Stripers seen Everywhere, Many stripers at sampler at Dock

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) WQ-TSS-(001-004)-091906 **Turbidity (500ml)** WQ-TUR-(001-004)-091906
Total PCB (1L) WQ-TPC-(001-004)-091906 **Dissolved PCB (2x1L)** WQ-DPC-(001-004)-091906
Toxicity (21L) WQ-TOX-(001-004)-091906 **Metals (500ml)** WQ-MET-(001-004)-091906

Notes: Collected samples To look at Range of Turbidity values from reference To ~75 NTU

Sampling Crew: M. Walsh, J. Foley, Ship Deckmen, Alex Mansfield
Chief Scientist Signature:

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	Area A
Dredging Description	Dredging and Debris Remo
Survey Vessel	CR Skiff
Chief Scientist	A. Mansfield
Sampling Technician	M. Walsh, J. Fahey
Vessel Captain	S. Desmore
Other Personnel	
Weather conditions	partly Sunny

Date	9/19/06
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Tide information		
High	0628	+7.8
Low	1254	+0.5
High	1849	+4.1
Low		

Station Number	Time	Latitude 2705772.5	Longitude	Water depth	Sample Depth	Turbidity	Salinity	DO	Temp	Notes
S. moorings	0855	~~815556.7~~	815556.7	5.1	4.07	4.0	27.33	8.06	21.35	Reference
001/INTU	0900	2705768.7	815558.7	5.1	2.72	1.7	26.96	8.62	21.42	INTU091906
003/25NTU	1000	2706769.2	815720.7	3.1	0.96	53.8	23.81	7.33	22.41	25NTU091906
002/50NTU	1007	2706918.6	815716.8	3.1	0.27	24.2	22.27	8.55	22.68	50NTU091906
004/75NTU	1022	2707085.7	815740.7	2.8	1.05	108.0	23.01	7.58	22.66	75NTU091906

Station IDs

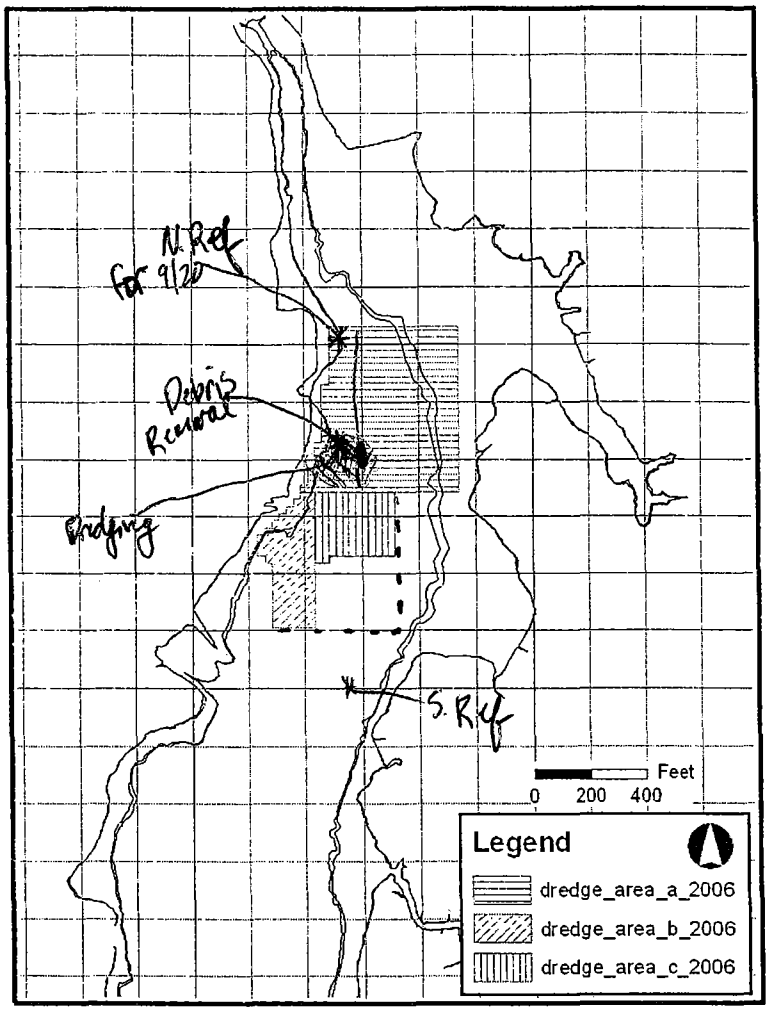
Battelle Daily Field Summary Sheet for Water Quality Monitoring

Date: 9/20/2006
Weather: Prtly Cloudy / WNW 10-15
Tides:
High @ 0709 - 4.0
Low @ 1324 - 0.4
High @ 1928 - 4.2

Monitoring Period:
From: 0915 To: 11 40

Tidal Stage: HWS (Ebb) LWS Flood

Dredging Activity:
Dredging and Debris Removal Area A
Dredge Activity stopped ~ 1000
Dredge Activity resumed ~ 1120



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
N. Ref in Area A	14.9	3.3 / 2.6
50ft South of Debris Removal	21.2	3.7 / .02
True N. Ref	8.7	3.1 / 2.4
	3.2	4.0 / .5

Oil sheen/ Debris:
Heavy Sheen and Strong Odor around Dredging + Debris Removal concentrated in S. West corner of Area A

Fish Passage: A few Fish north of area a

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) _____ Turbidity (500ml) _____
Total PCB (1L) None Dissolved PCB (2x1L) None
Toxicity (21L) _____ Metals (500ml) _____

Notes:

Sampling Crew: M. Walsh, M. Fitzpatrick, Skip Dunsmore
Chief Scientist Signature: [signature]

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	Area A
Dredging Description	Dredging and Debris Removal
Survey Vessel	CR Staff
Chief Scientist	Mike Walsh
Sampling Technician	Matt Fitzpatrick
Vessel Captain	Ship Personnel
Other Personnel	
Weather conditions	Partly Cloudy / WNW 10-15

Date	9/20/06
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Tide information	
High	0709
Low	1326
High	1928
Low	

	Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity	Salinity	DO	Temp	Notes
South mooring/ sediment trap	~~Ref South~~ ①	0920	706057.95	815482.08	7.4	6.7	2.4	25.76	6.0	22.05	Bottom Readings
	surface	0923	"	"	7.4	0.2	3.0	23.0	7.25	22.65	Surface Readings
	N. Ref	0929	707299.90	815699.06	3.3	2.6	14.9 ~~40.0~~	25.58	4.65	22.58	NWest Corner of Area A
			~~706767.65~~	~~815690.34~~ ② mw							
Swest	Corner of Area A	0952	706767.65	815690.34	3.7	.2 ~~0.2~~ ③ mw	21.2	22.58	6.28	22.37	50 ft from Debris Removal
True	N. Ref	1040	707378.93	815555.65	3.1	2.4	8.7	25.73	5.1	22.64	
middle North	Sediment Trap	1043	707496.76	815629.42	3.8	.2	4.4	19.8	6.61	23.1	Surface
		1045	"	"	3.8	2.9	4.9	25.91	5.88	22.65	Bottom
	South Ref	1103	705776.77	815519.58	4.0	.5	3.2	23.3	7.1	22.6	
South mooring		1133	706057.95	815482.08	5.3	.1	8.0	22.5	8.17	23.3	Surface
and sediment TRAP		1135	"	"	5.3	4.5	3.8	26.26	6.23	22.14	Bottom

① wrong line

② wrong line

③ WN

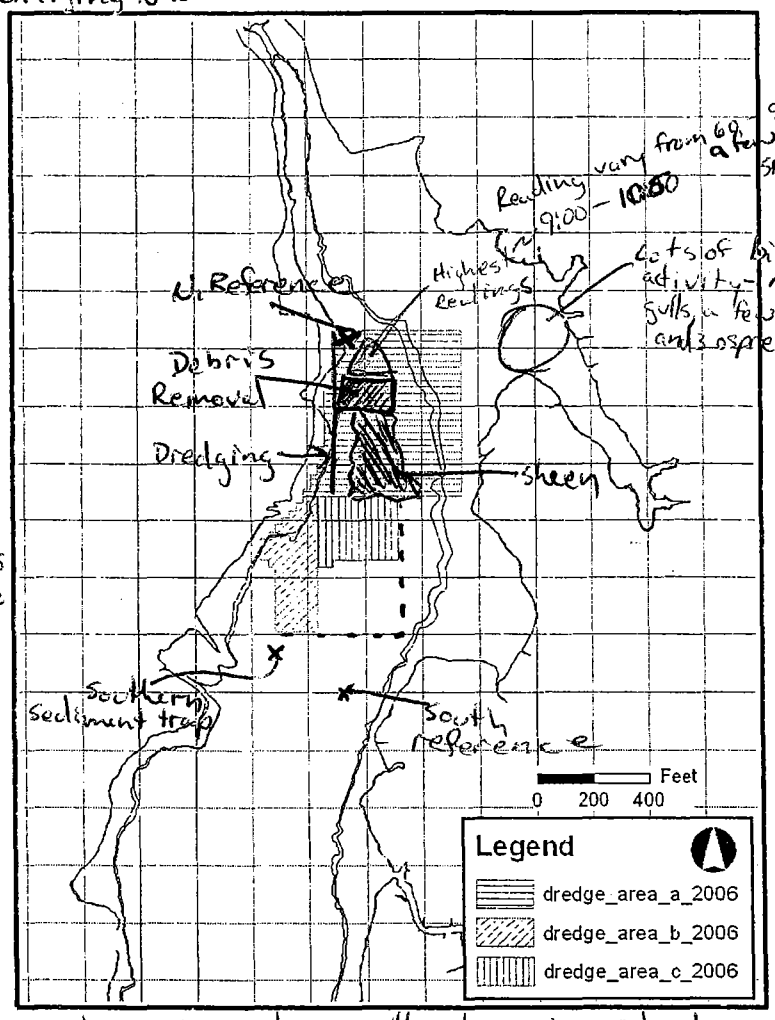
Battelle Daily Field Summary Sheet for Water Quality Monitoring

Date: 9/25/06
Weather: Sunny ~65° Light W changing N 10-15
Tides:
High @ 1016
Low @ 1551
High @ 2232

Monitoring Period:
From: 0828 **To:** 1050

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Debris Removal + Dredging Area A
Dredging stop ~0900
Debris Barge moves ~0930 ~20' south
Debris removal stops ~1000 resume 1015



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
South Ref.	2.6	3.32/5.7*
N. Ref.	23.1	.81/4.7 *
50-100' N of Barge: Just N of Debris	60-90	2.5/~6.6 *
50-100' S of Barge: Just S of Debris	20-30	2.2/6.0 *

* Turbidity is highest near the change in Salinity

Oil sheen/ Debris:
Oil sheen throughout most of area A - sheen broke up with the North wind; seems mostly clear by 1015

Fish Passage:

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) **Turbidity (500ml)**
Total PCB (1L) No Samples **Dissolved PCB (2x1L)** No Samples
Toxicity (21L) **Metals (500ml)**

Notes: Reading are as high a 25 NTU around the S + E sides of the ~~dredge~~ debris barge. ~0900 - higher North and west tide prevents us from getting North of Area A

Sampling Crew: Mike Walsh, Matt Fitzpatrick, Skip Densmore
Chief Scientist Signature: Matthew R. Fitzpatrick

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	Area A
Dredging Description	Debris Removal + Dredging
Survey Vessel	CR Skiff
Chief Scientist	Matt Kirpatrick
Sampling Technician	Mike Walsh
Vessel Captain	Skip Densmore
Other Personnel	None
Weather conditions	Sunny, Clear, ~65°, Lite west wind

Date	9/25/06
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Tide information	
High	1016
Low	1551
High	2232
Low	

	Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity	Salinity	DO	Temp	Notes
S, Sed. traps —	001	0828	2706066.7	815480.3	7.0	0.77	2.2	19.95	6.75	19.46	surface
	001	0832	"	"	"	5.5	3.4	23.08	5.42	20.12	bottom
S, reference	002	0837	2705760.0	815547.7	5.7	3.32	2.6	23.18	5.55	20.09	max turb. reading
J reference —	003	0845	2707255.0	815762.7	4.7	0.81	23.1	19.89	4.01	19.77	~100' from Debris barge
	004	0910	2707178.9	815784.2	1.5	1.5	90	21.0	4.24	20.0	~50' N of "
	005	0942	2707240.0	815847.3	6.6	2.54	~~75~~70	21.48	4.13	20.17	very variable turbidity ~120 – 60

Battelle Daily Field Summary Sheet for Water Quality Monitoring

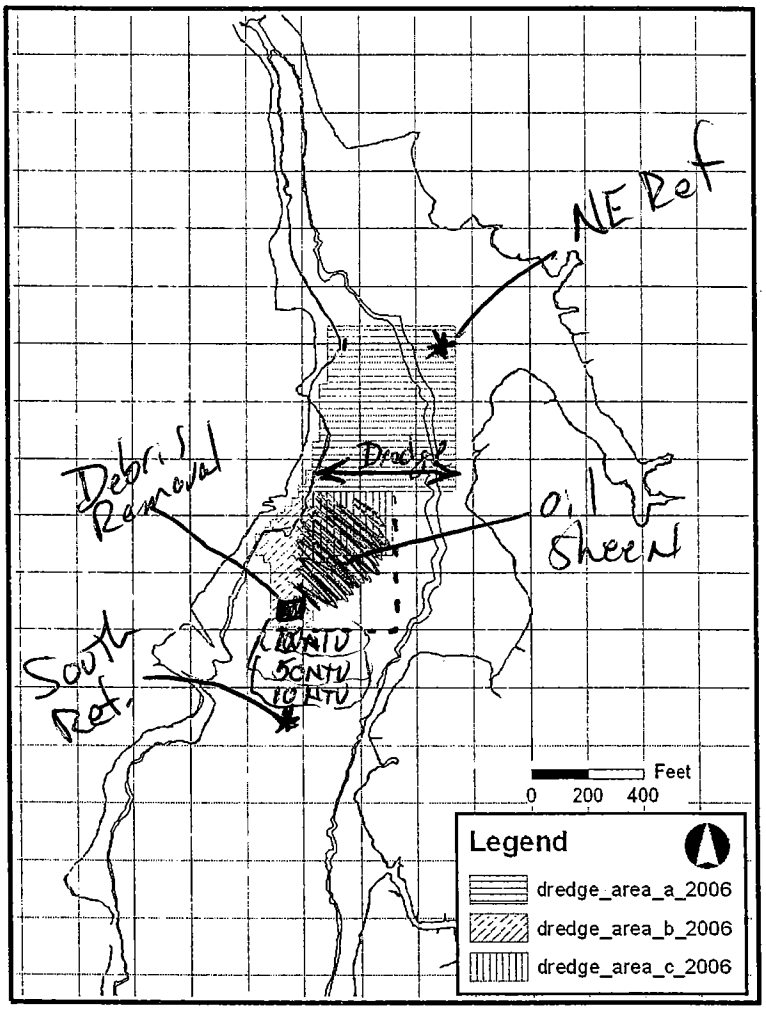
Date: 10/4/2006
Weather: Foggy, light SW
Tides:
H +4.5' @ 05:58
L -0.1' @ 11:50
H +4.6 @ 18:23

Monitoring Period:
From: 0900 **To:** 1330

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Debris Removal in SW corner of AREA B

Minimal Dredging on E-W Transect at South end of Area A



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
South Ref	7.2	1.5/4.0
NE Ref	6.8	1.6/2.3

Oil sheen/ Debris: Heavy Oil Sheen Drifting NE away from Debris Removal

Fish Passage: Very few fish remaining in harbor, No dredging impacts seen

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) _____ **Turbidity (500ml)** _____
Total PCB (1L) None **Dissolved PCB (2x1L)** None
Toxicity (21L) _____ **Metals (500ml)** _____

Notes: Elevated Turbidity only seen in close proximity to debris removal (<50'). Turbidity levels quickly drop off away from activities

Sampling Crew: Alex Mansfield, Mike Walsh, Skip Densmore
Chief Scientist Signature: [signature]

Battelle Daily Field Summary Sheet for Water Quality Monitoring

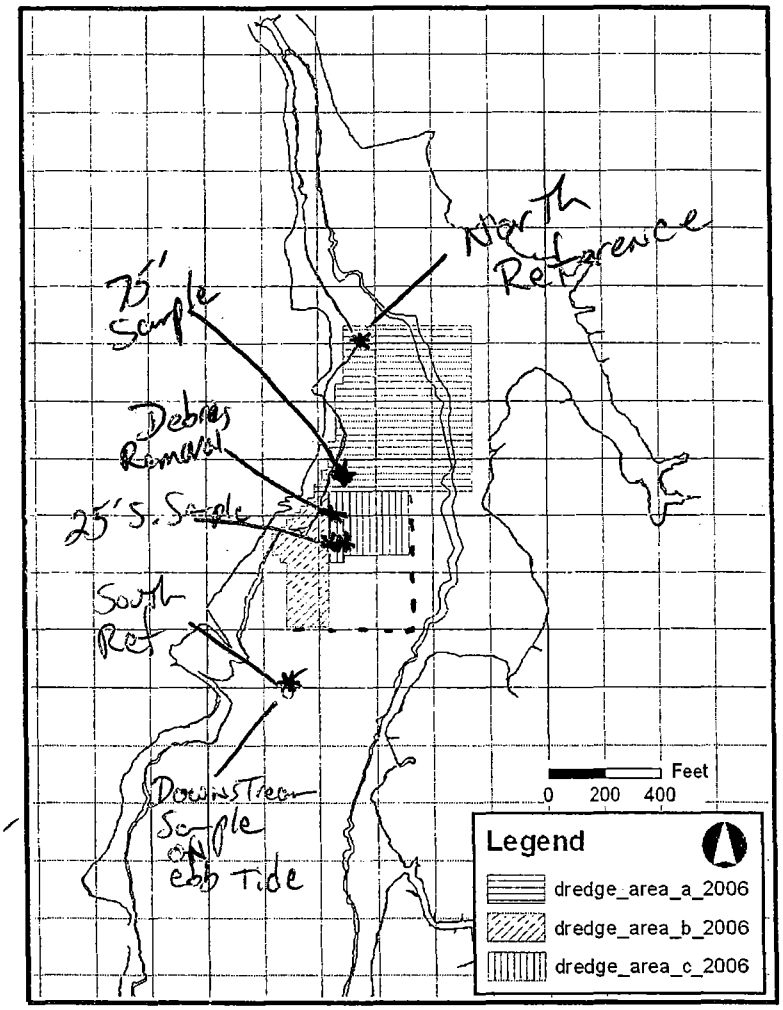
Date: 10/9/06
Weather: Clear, 70°
Tides:
L -0.7 @ 0319
H +5.4 @ 1001
L -0.5 @ 1606

Monitoring Period:
From: 0815 **To:** 1430

Tidal Stage: HWS (Ebb) LWS (Flood)
(2) (3) (1)

Dredging Activity:
Debris Removal Area B.

Dredging area A.



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
South Ref	2.1	6.3'/4.4'
North Ref	2-4	6.5/2'-0.5'
75' Sample	46-63	2.1'
25' S Sample	70-75	2.5'

Oil sheen/ Debris:

Fish Passage: No fish seen in river. Dredging not having notiable impact

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) _____ **Turbidity (500ml)** _____
Total PCB (1L) See Data Sheet **Dissolved PCB (2x1L)** See Data Sheet
Toxicity (21L) _____ **Metals (500ml)** _____

Notes: Elevated Turbidity 50-75' North of Debris Removal (on flood tide). Collected PCB + Turbidity samples related to Area B activities. Collected TSS, Turb, Tot PCB, Dissolved PCB
Collected Downstream sample @ Sed. Trap location

Sampling Crew: A. Mansfield J. Fahey S. Densmore
Chief Scientist Signature: [signature]

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	Debris Removal AREA B, Dredging Area A
Dredging Description	
Survey Vessel	CR skiff
Chief Scientist	A. Mansfield
Sampling Technician	J. Fuller
Vessel Captain	S. Densmore
Other Personnel	—
Weather conditions	Clear, 70, light West wind

Date	10/9/06
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Tide information	
High	—
Low	0319
High	1001
Low	1606

	Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity	Salinity	DO	Temp	Notes	Station ID
	South Ref	0830	2705789	815574	6.3'	4.4'	2.1	26.5	7.05	16.9		
Mid	North Ref	0840	2707235	815688	6.5	2.03	4.9	25.5	6.15	16.8		
SRF	North Ref	0841	"	"	6.5	0.93	4.7	24.8	6.01	16.8		
100' North of Debris		0900	2706718	815629	5.5	2.4	50.	26.3	5.8	17.0		
75' North of Debris		0940	2706714	815592	~~4.6~~ 5.5	4.4	64	"	"	"		75N100906
						2.1	46-63	25.60	6.5	16.6	WQ-XXX-001-100906	25S100906
25' South of Debris		1115	2706576	815652	5.5'	2.5	70-75	26.04	6.4	16.9	WQ-XXX-002-100906	25S2100906
25' South of Debris		1145	2706568	815660	5.0'	2.2'	~15	26.17	7.2	16.9	WQ-XXX-003-100906	
200' South of Debris		1200	2706061	815495	8.2'	1.34	6.5-8.5	25.65	7.6	17.2	WQ-XXX-004-100906	200S100906

Battelle Daily Field Summary Sheet for Water Quality Monitoring

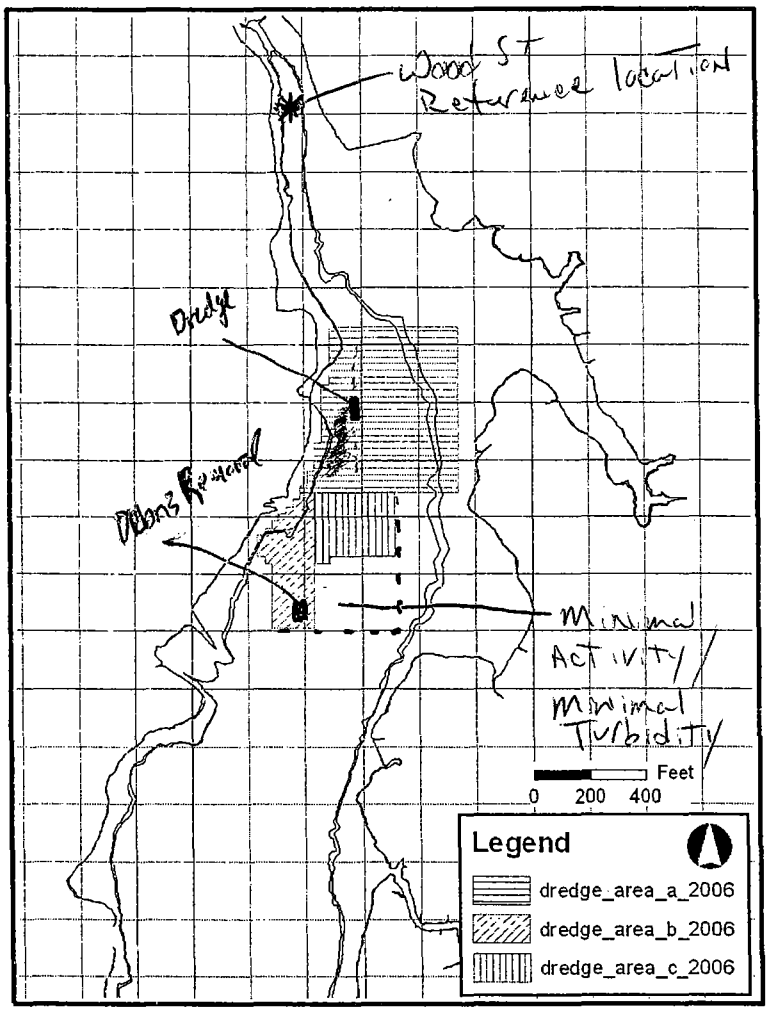
Date: 10/11/06
Weather: Sunny / NE 5
Tides:

Low	@	0403	-0.1
High	@	1145	4.7
Low	@	1749	0.3

Monitoring Period:
From: 0835 **To:** 1400

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
- Debris Removal SW corner of area B
- Dredging Area A west side



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
S.Ref	1.5	3.9/4.5
NRd at Northern area	22.4	1.2/ 2.8
Wood ST	7.5	3.2/7.0

Oil sheen/ Debris: Slight oil sheen near dredge on ebb Tide

Fish Passage: No fish seen anywhere on River

Samples Collected for Laboratory Analysis – Sample IDs:

TSS (1L)		Turbidity (500ml)	
Total PCB (1L)	None	Dissolved PCB (2x1L)	None
Toxicity (21L)		Metals (500ml)	

Notes: Recovered Sediment Traps, YSIs, and PE samples

Sampling Crew: M. Walsh, Alex Mansfield, S. Bramore
Chief Scientist Signature: [signature]

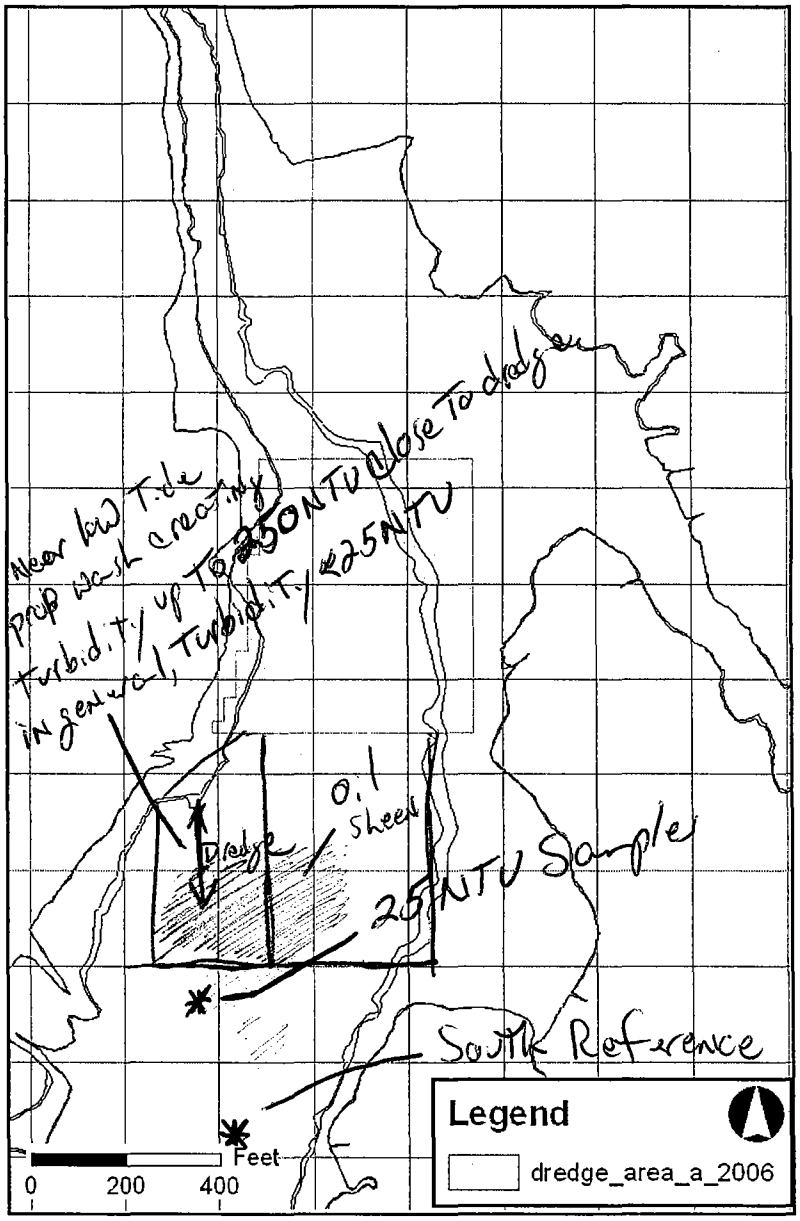
Battelle **Daily Field Summary Sheet for Water Quality Monitoring**

Date: 10/16/06
Weather: Sunny, NNW ~15
Tides:
~~High~~ NW @ 0421 - 3.3
~~High~~ LOW @ 1105 - 0.9
High @ 1645 - 3.6

Monitoring Period:
From: 0930 **To:** 1130

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
No debris Removal.
Dredging AREA B



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
South Ref	3.5	1.3/3.2

Oil sheen/ Debris:
Dredge Hitting sporadic pockets that kick up large oil sheens.

Fish Passage: Only a few fish seen in river. No obvious dredge-related obstacles

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) _____ **Turbidity (500ml)** See Data Sheet
Total PCB (1L) See Data Sheet **Dissolved PCB (2x1L)** See Data Sheet
Toxicity (21L) — **Metals (500ml)** _____

Notes: Collected Background Samples and Area B related Samples
Very green water (Phyto bloom). Near low Tide Turbidity plumes seen associated w/ prop wash (Boats keeping dredge in line against wind). Activity ceased at low Tide

Sampling Crew: A Mansfield, M. Walsh, S. Demmore
Chief Scientist Signature: [signature]

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	
Dredging Description	
Survey Vessel	CR Skiff
Chief Scientist	Alex Mansfield
Sampling Technician	Mike Walsh
Vessel Captain	Skip Densmore
Other Personnel	—
Weather conditions	Clear / Sunny

Date	10/16/06
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Tide information	
High	0421
Low	1105
High	1645
Low	

STATIONID

OUTHR101606

5NTU101606

Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity	Salinity	DO mg/L	Temp	Notes
South Ref	0852	2705747	815539	3.2'	1.3'	3.5	25.45	8.22	16.2	WQ-XXX-001-101606 — TSS, TUR, TPC, DPC, MET, MS, MSD, DUP
25NTU	1041	2706027	815489	5.0	0.5' 21-24.0		26.16	7.21	15.95	WQ-XXX-002-101606 — TSS, TUR, TPC, DPC, MET

Battelle

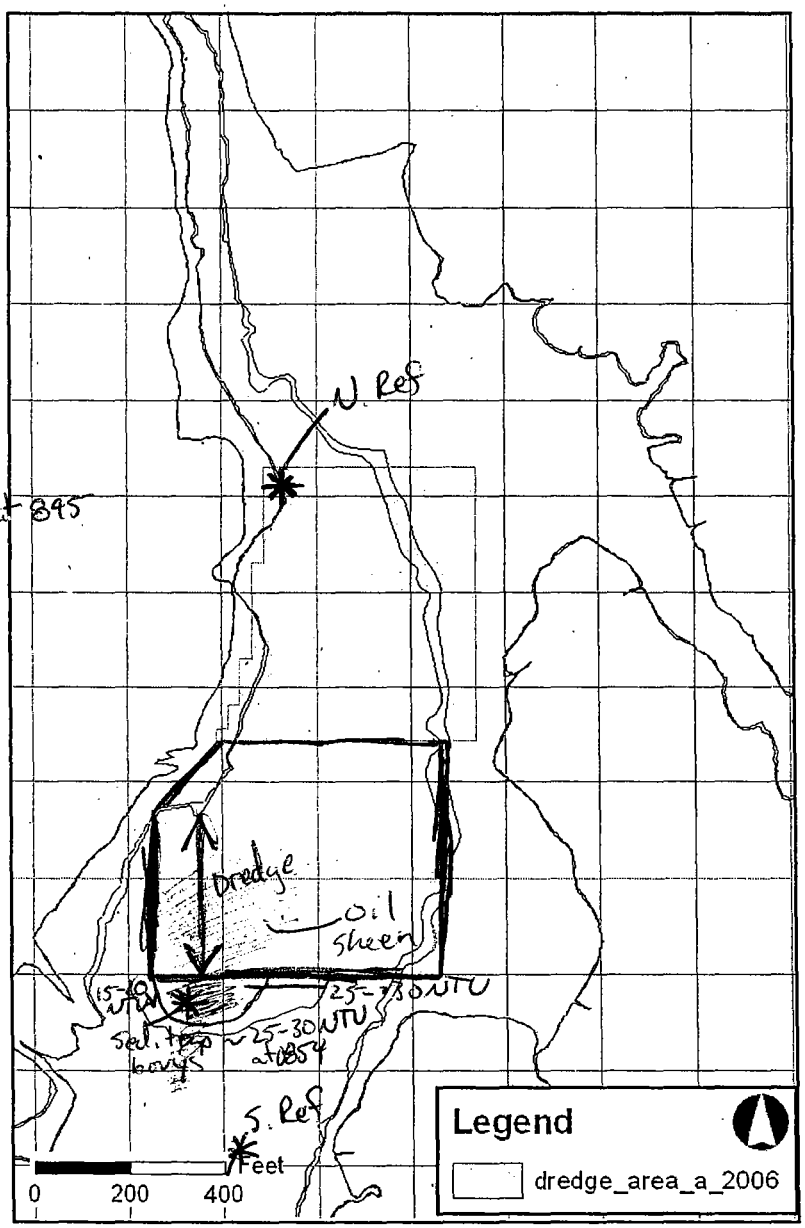
Daily Field Summary Sheet for Water Quality Monitoring

Date: 10/17/06
Weather: Partly Cloudy
Tides:
High @ 0512 → 3.5'
Low @ 1154 → 0.7'
High @ 1734 → 3.7'

Monitoring Period:
From: 0830 **To:** 1230

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
No Debris Removal ~2 1/2
Dredging stopped for ~~[illegible]~~ hours @ 0845
back up @ 1125



Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
S. Ref	5.6	.91/4.0
N Ref	7.7	1.2/4.6

Oil sheen/ Debris:
Heavy Oil Sheen inside and outside dredge area until the pump broke

Fish Passage: Fish actively feeding S of work area ~ 0900

Samples Collected for Laboratory Analysis – Sample IDs:
TSS (1L) None **Turbidity (500ml)** None
Total PCB (1L) ↓ **Dissolved PCB (2x1L)** ↓
Toxicity (21L) **Metals (500ml)**

Notes: Dredging activities started back up around slack tide w/ SE wind. no visible sheen and turbidity values remained ~10. 50' from the dredge values increase to ~25 NTU slight sheen

Sampling Crew: M. Walsh, M. Fitzpatrick, Ken Thomson
Chief Scientist Signature: Matt Mystrick

Battelle

Water Quality Monitoring
In situ Data Field Form

Dredging Location	
Dredging Description	
Survey Vessel	CR Skiff
Chief Scientist	Matt Fitzpatrick
Sampling Technician	Mike Walsh
Vessel Captain	Ken Thomson
Other Personnel	—
Weather conditions	Partly Cloudy

Date	10/17/06
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Tide information	
High	0512
Low	1154
High	1734
Low	

Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity	Salinity	DO mg/L	Temp	DO % Sat	Notes
S. Ref	0833	2705740.7	815546.3	4.0	0.91	5.6	21.01	9.0	15.11	101.6	
N. Ref	0840	2707215.5	815723.5	4.6	1.2	7.7	21.55	7.12	15.98	82.6	

Appendix B

Continuous *In Situ* Water Quality Data

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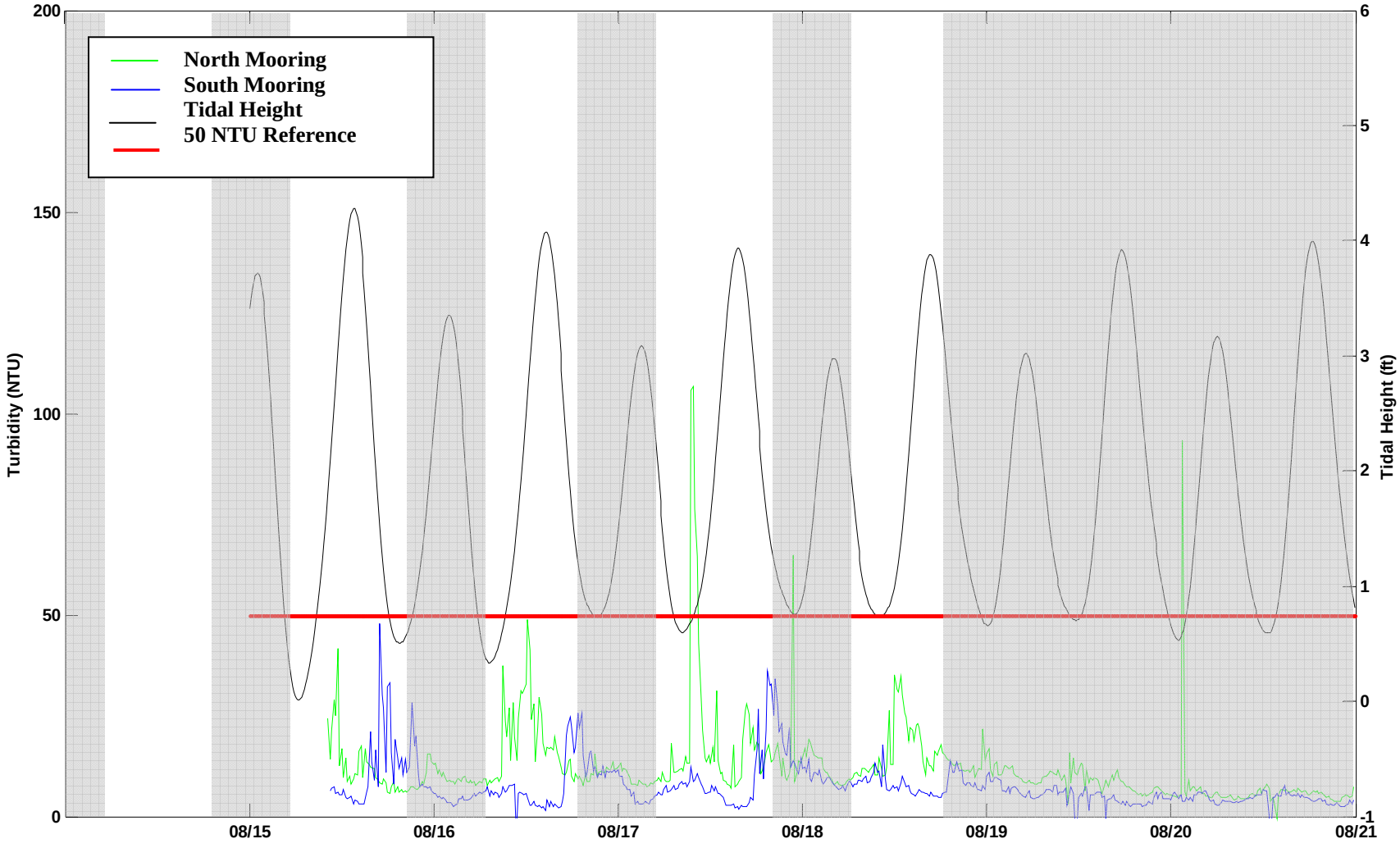
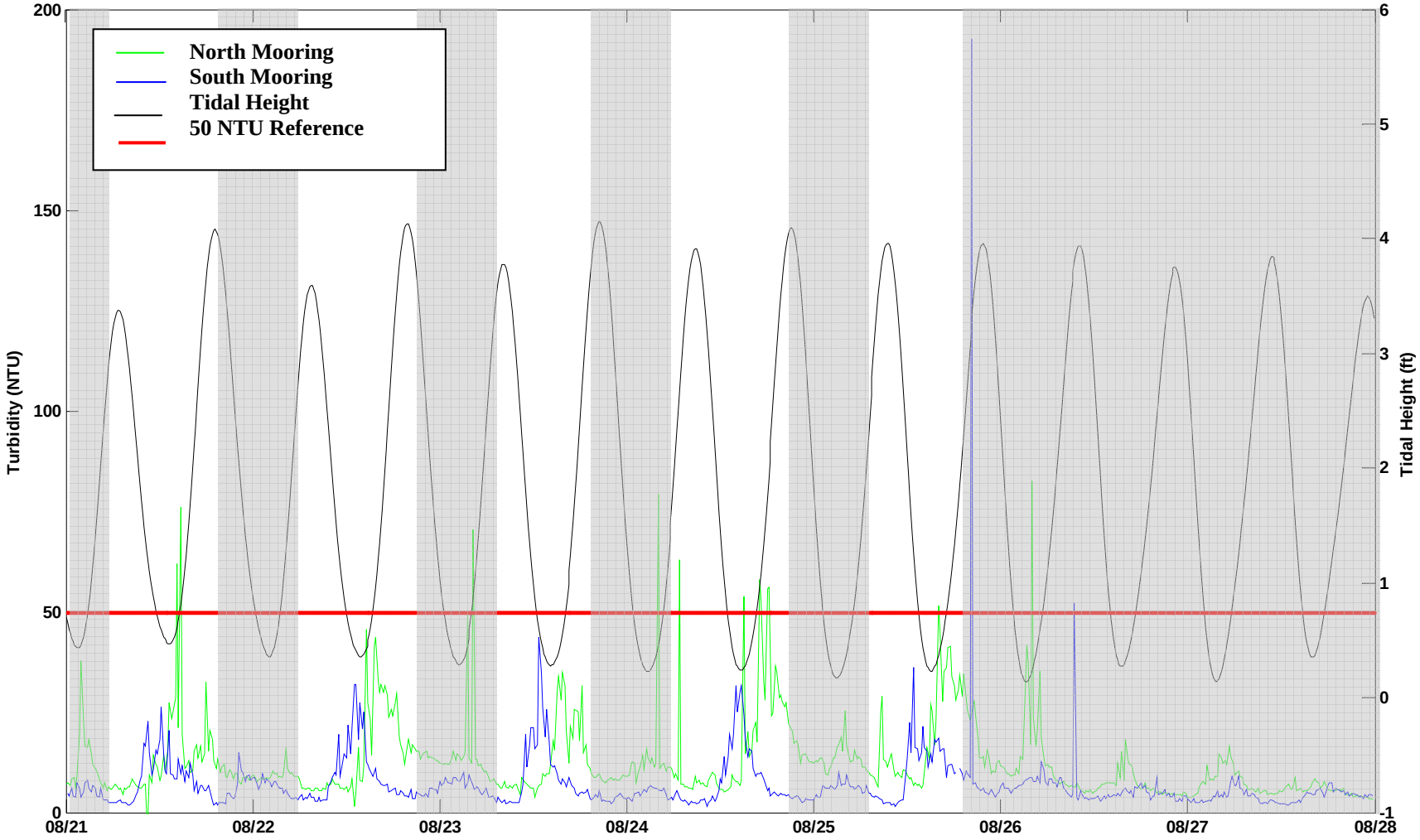
Note:
A red line is indicated on each plot representing 50 NTU. The water quality criteria for the New Bedford Harbor Environmental Monitoring program has been established at 50NTU above background, or natural, turbidity. The background turbidity signal in the river is influenced by tidal conditions, stream flow, wind, and other factors. As a result the background turbidity signal can fluctuate on scales from minutes to days. In general, the background turbidity signal was between 3 and 10 NTU. The continuous data presented in the following plots does not subtract out background values. As a result, the 50NTU line should be viewed strictly as a guideline. For example, a value of 50 NTU represents a turbidity reading that is approximately 40-47 NTU above background.



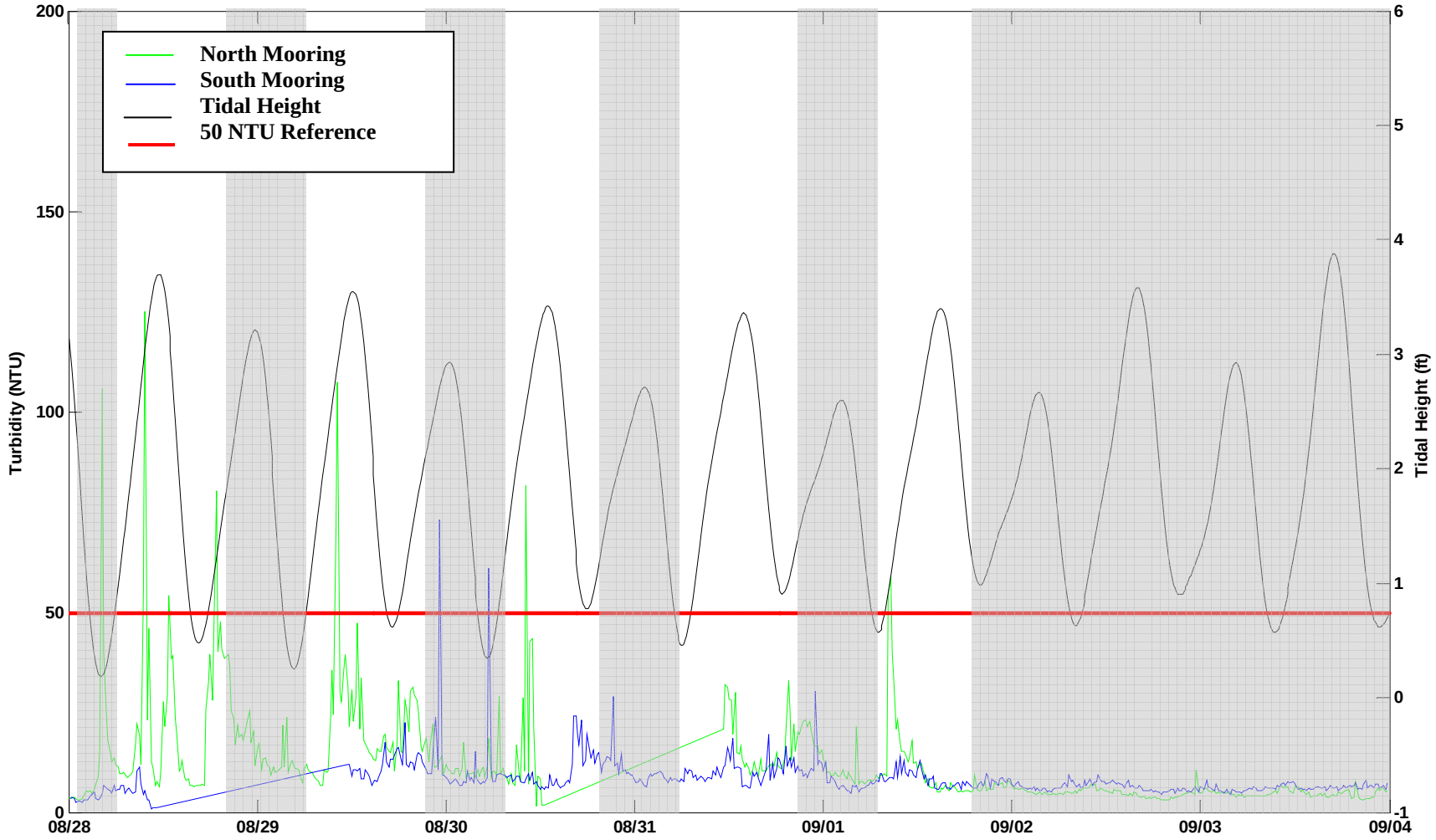
*Shaded areas represent nights and weekends.

Figure B-1. Turbidity Monitoring at New Bedford Harbor Superfund Site 8/14/2006 to 8/21/2006.



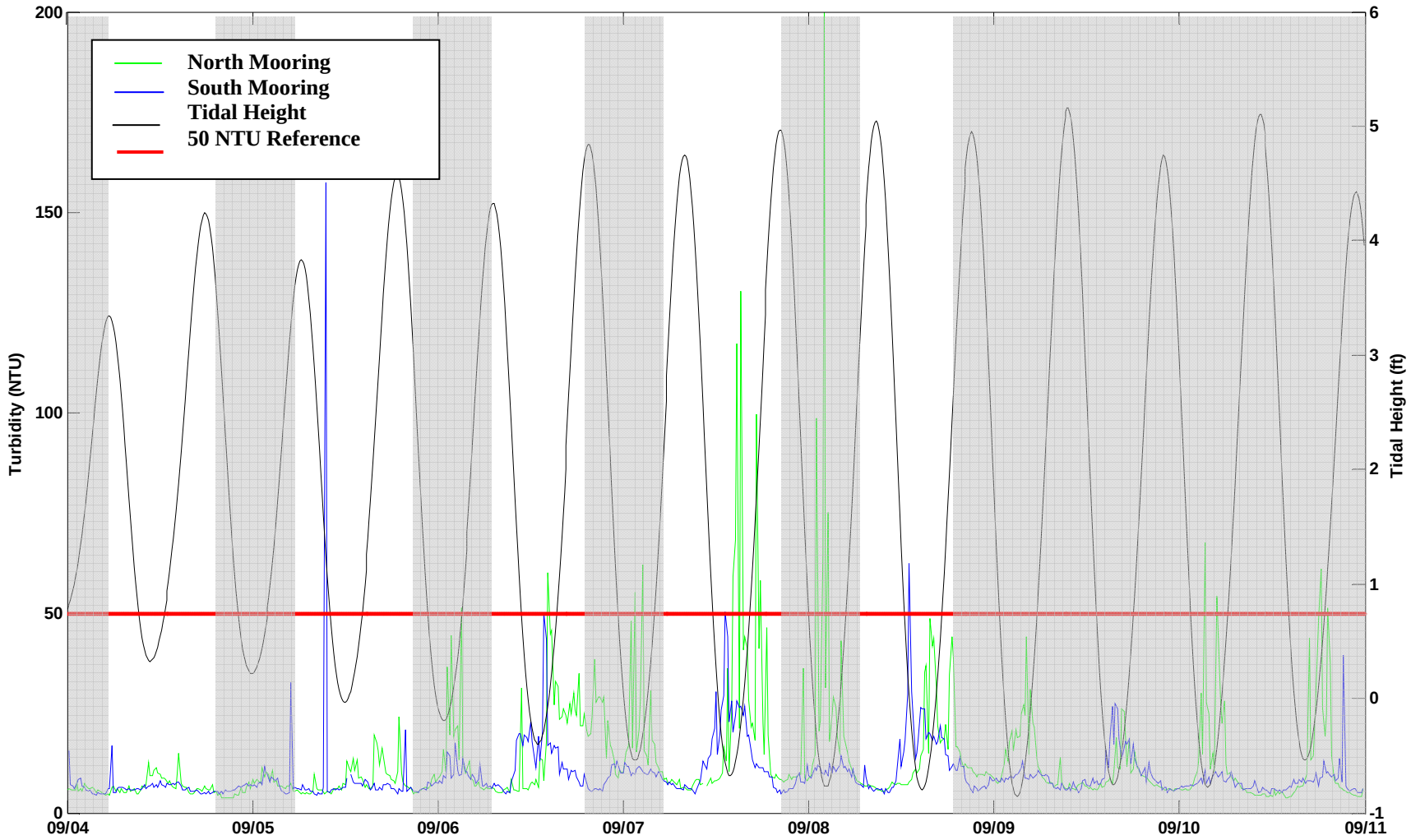
*Shaded areas represent nights and weekends.

Figure B-2. Turbidity Monitoring at New Bedford Harbor Superfund Site 8/21/2006 to 8/28/2006.



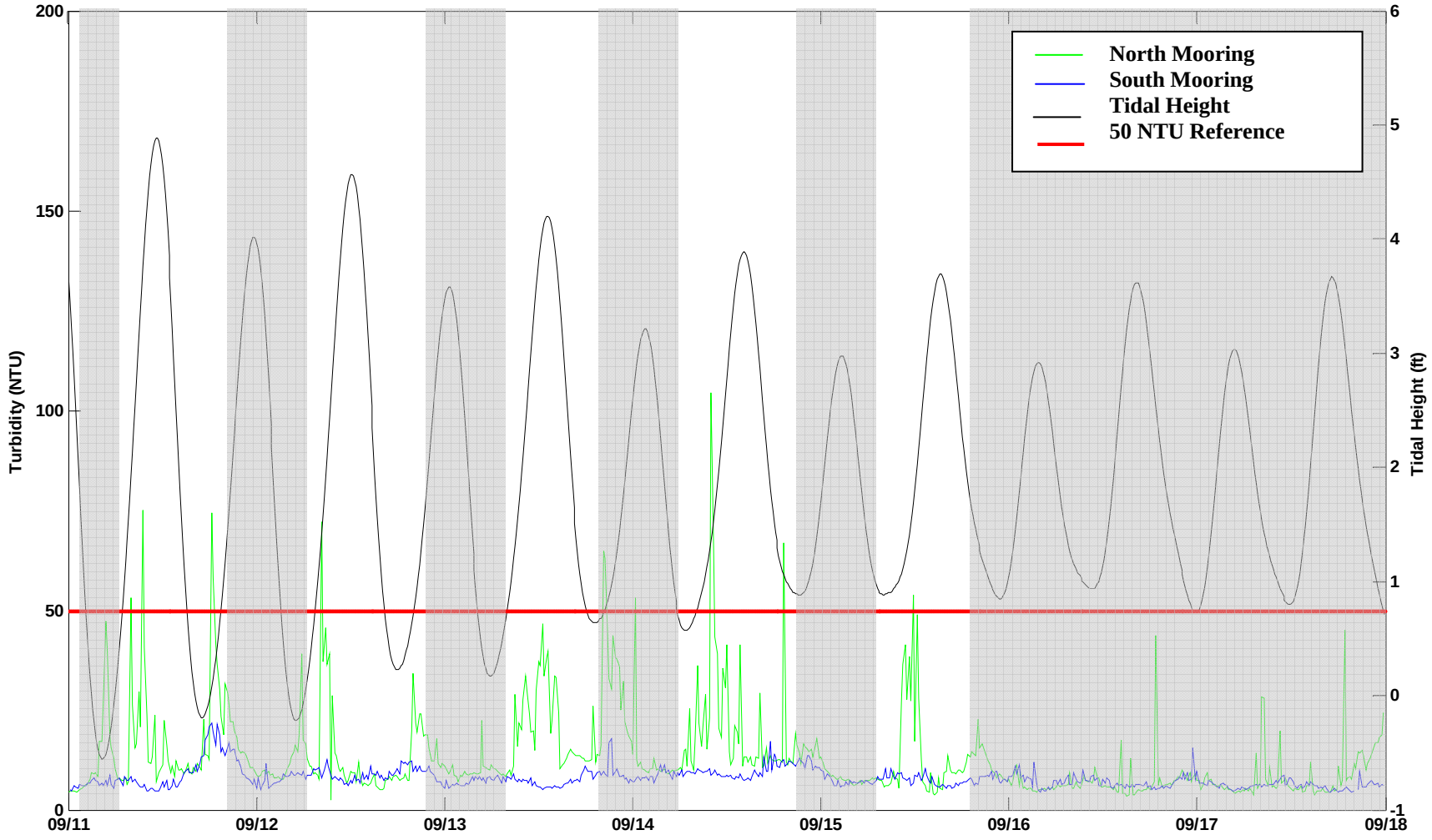
*Shaded areas represent nights and weekends.

Figure B-3. Turbidity Monitoring at New Bedford Harbor Superfund Site 8/28/2006 to 9/4/2006.



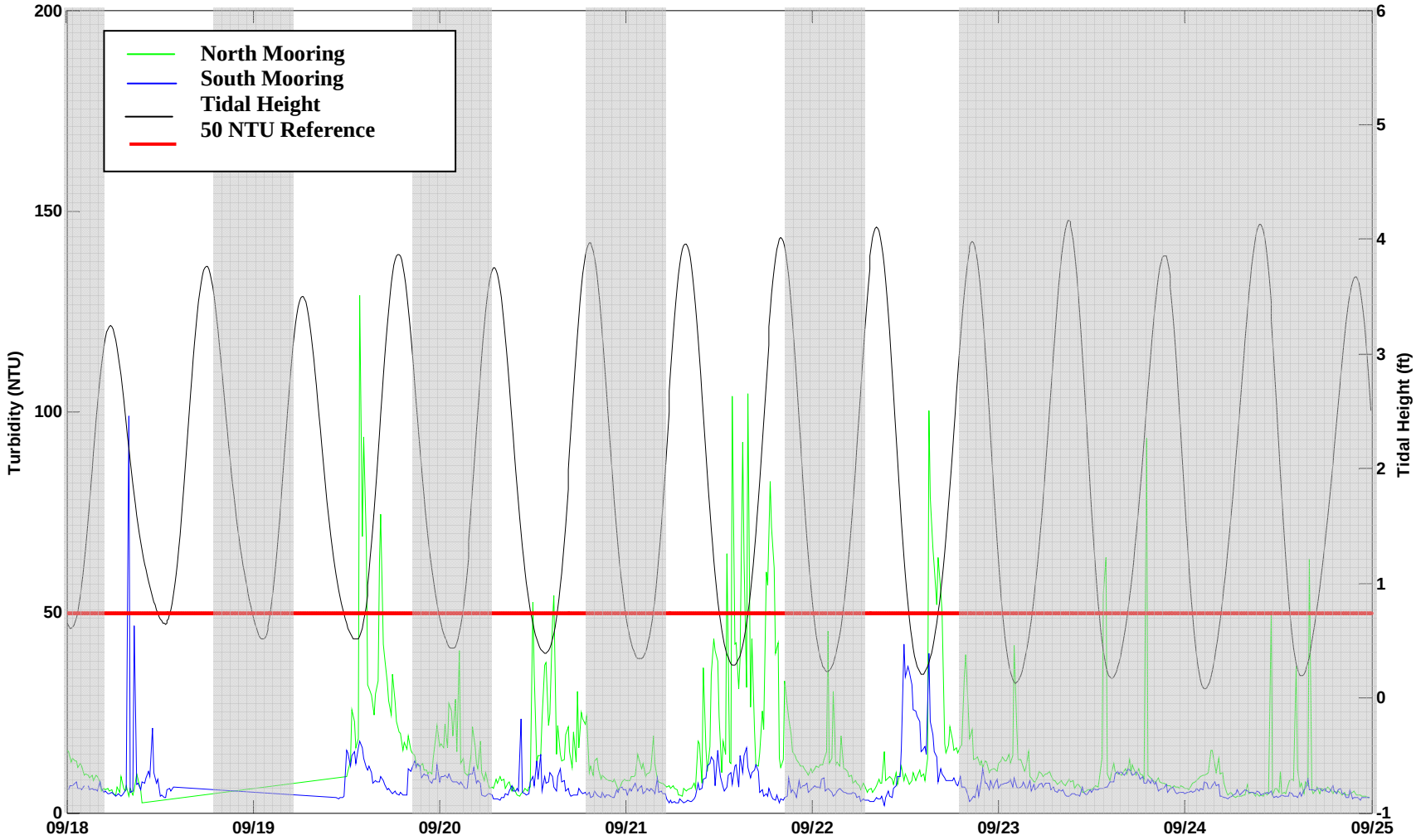
*Shaded areas represent nights and weekends.

Figure B-4. Turbidity Monitoring at New Bedford Harbor Superfund Site 9/4/2006 to 9/11/2006.



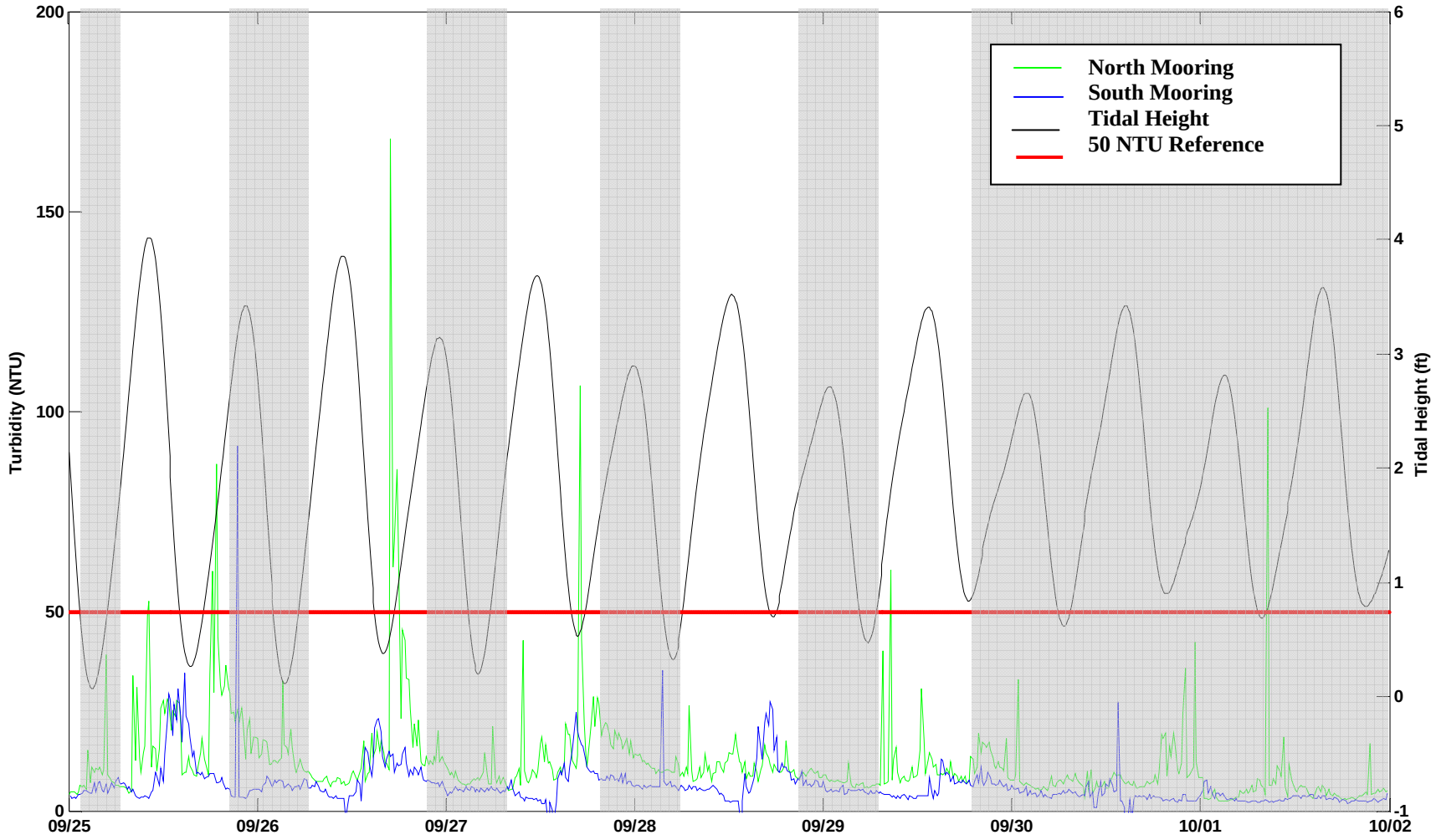
*Shaded areas represent nights and weekends.

Figure B-5. Turbidity Monitoring at New Bedford Harbor Superfund Site 9/11/2006 to 9/18/2006.



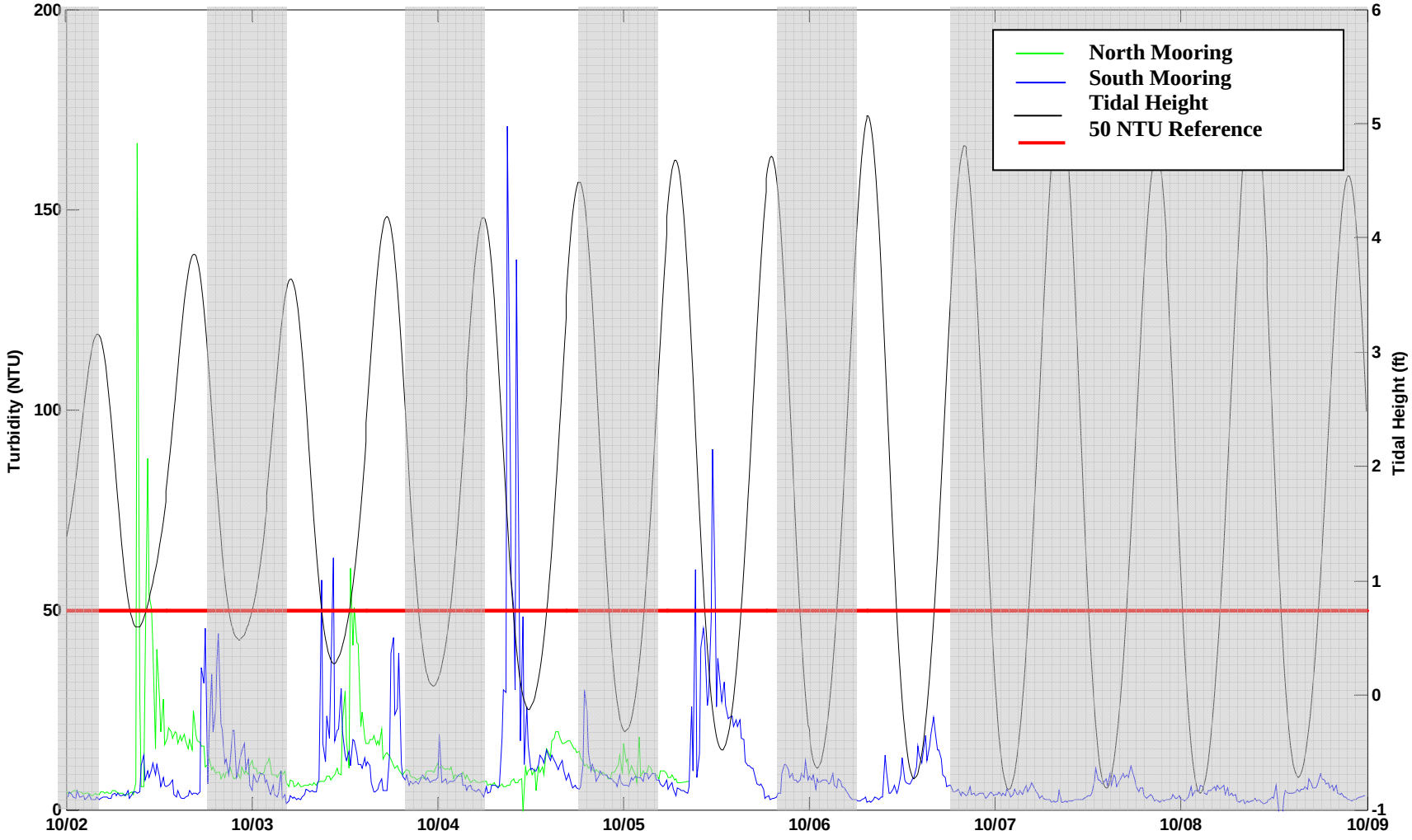
*Shaded areas represent nights and weekends.

Figure B-6. Turbidity Monitoring at New Bedford Harbor Superfund Site 9/18/2006 to 9/25/2006.



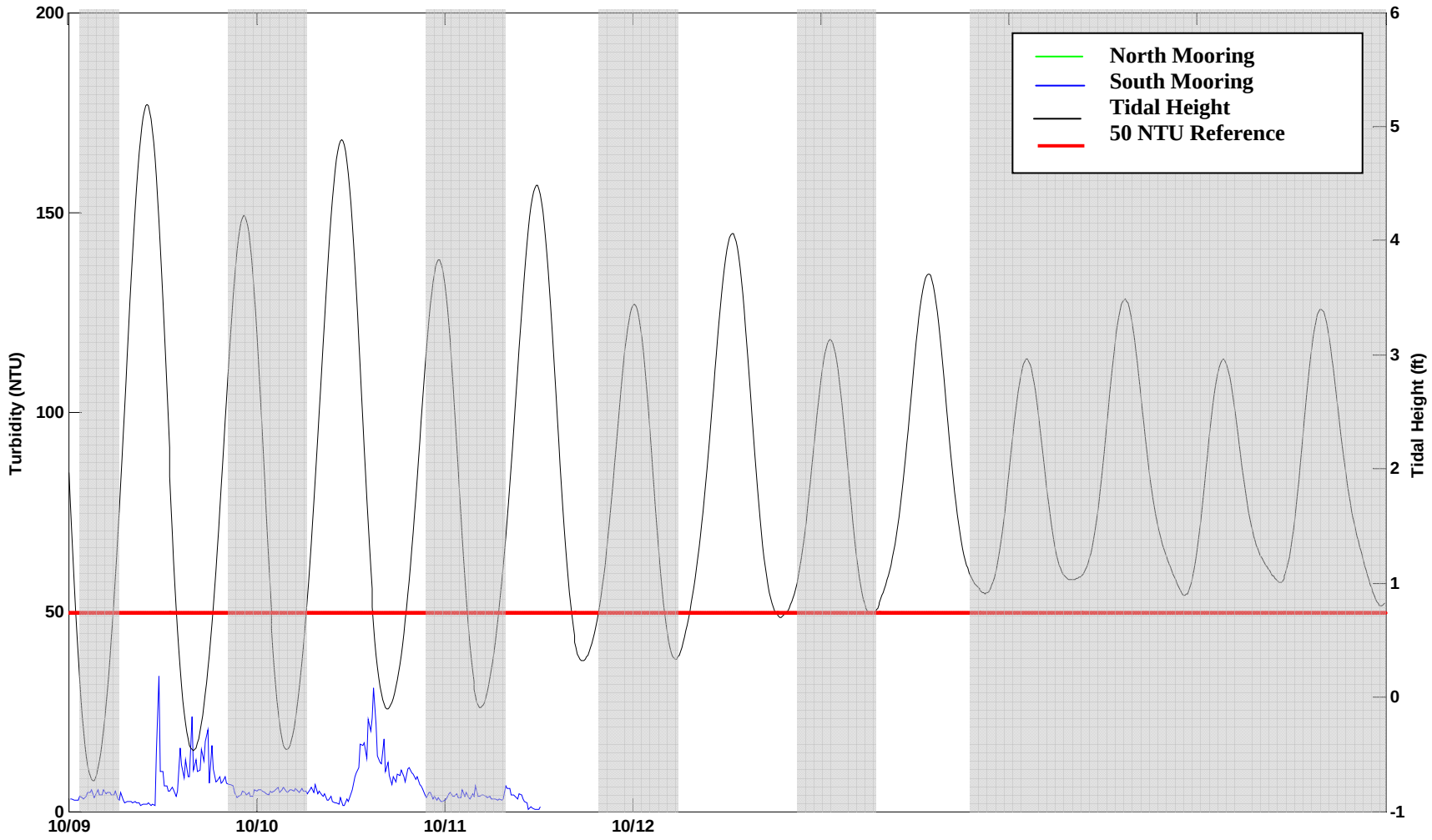
*Shaded areas represent nights and weekends.

Figure B-7. Turbidity Monitoring at New Bedford Harbor Superfund Site 9/25/2006 to 10/2/2006.



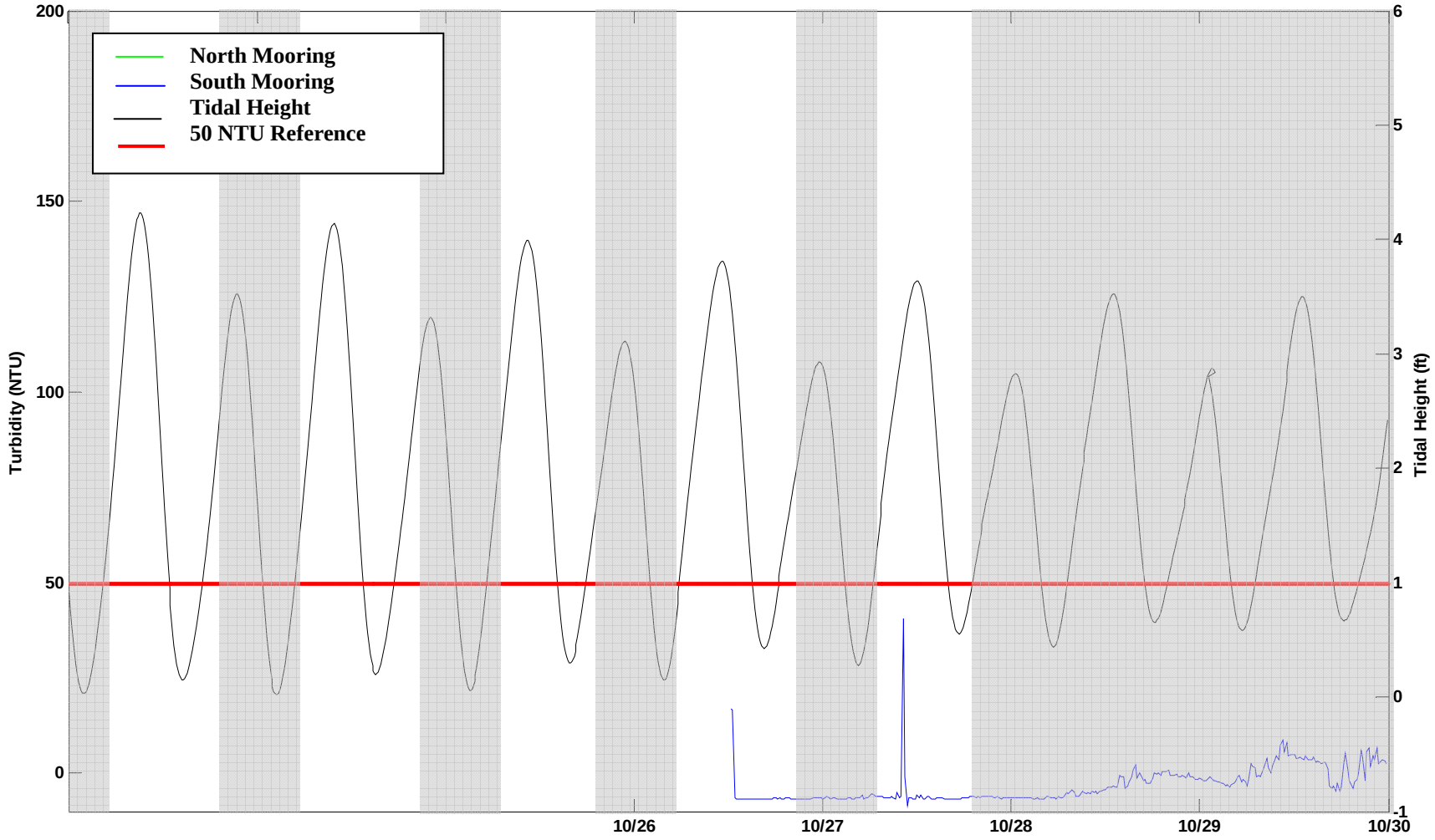
*Shaded areas represent nights and weekends.

Figure B-8. Turbidity Monitoring at New Bedford Harbor Superfund Site 10/2/2006 to 10/9/2006.



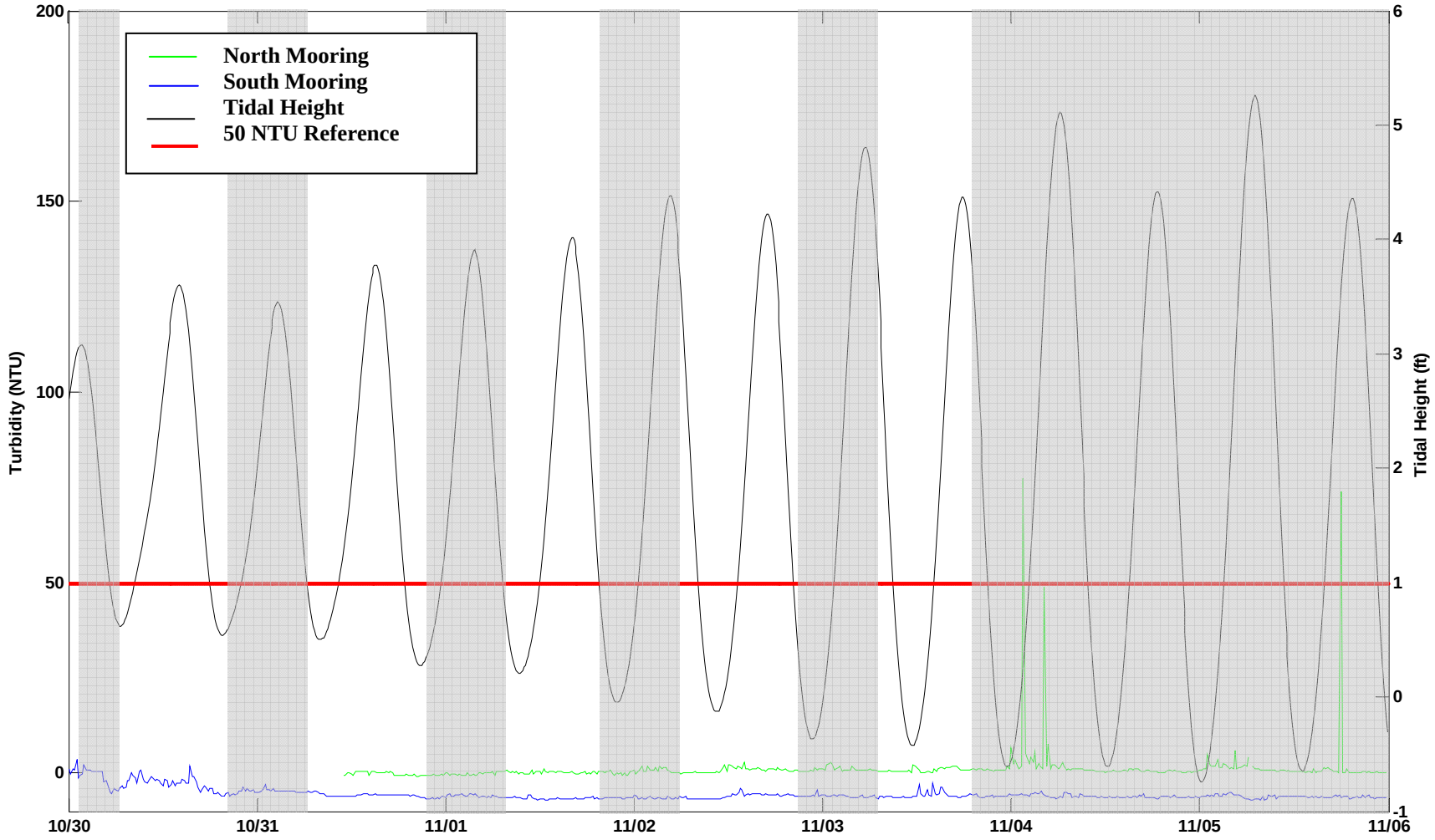
*Shaded areas represent nights and weekends.

Figure B-9. Turbidity Monitoring at New Bedford Harbor Superfund Site 10/9/2006 to 10/16/2006.



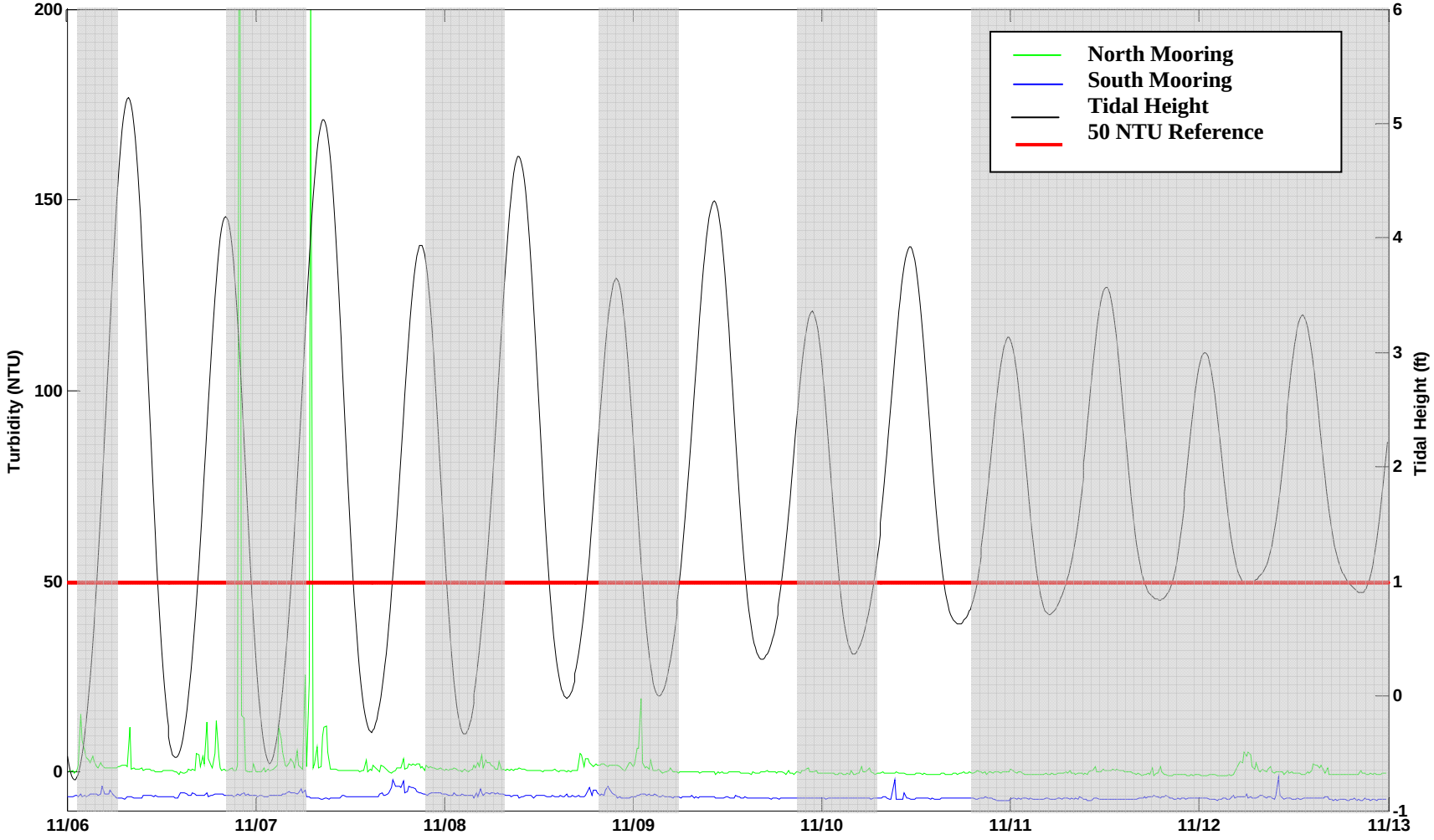
*Shaded areas represent nights and weekends.

Figure B-10. Turbidity Monitoring at New Bedford Harbor Superfund Site 10/23/2006 to 10/30/2006.



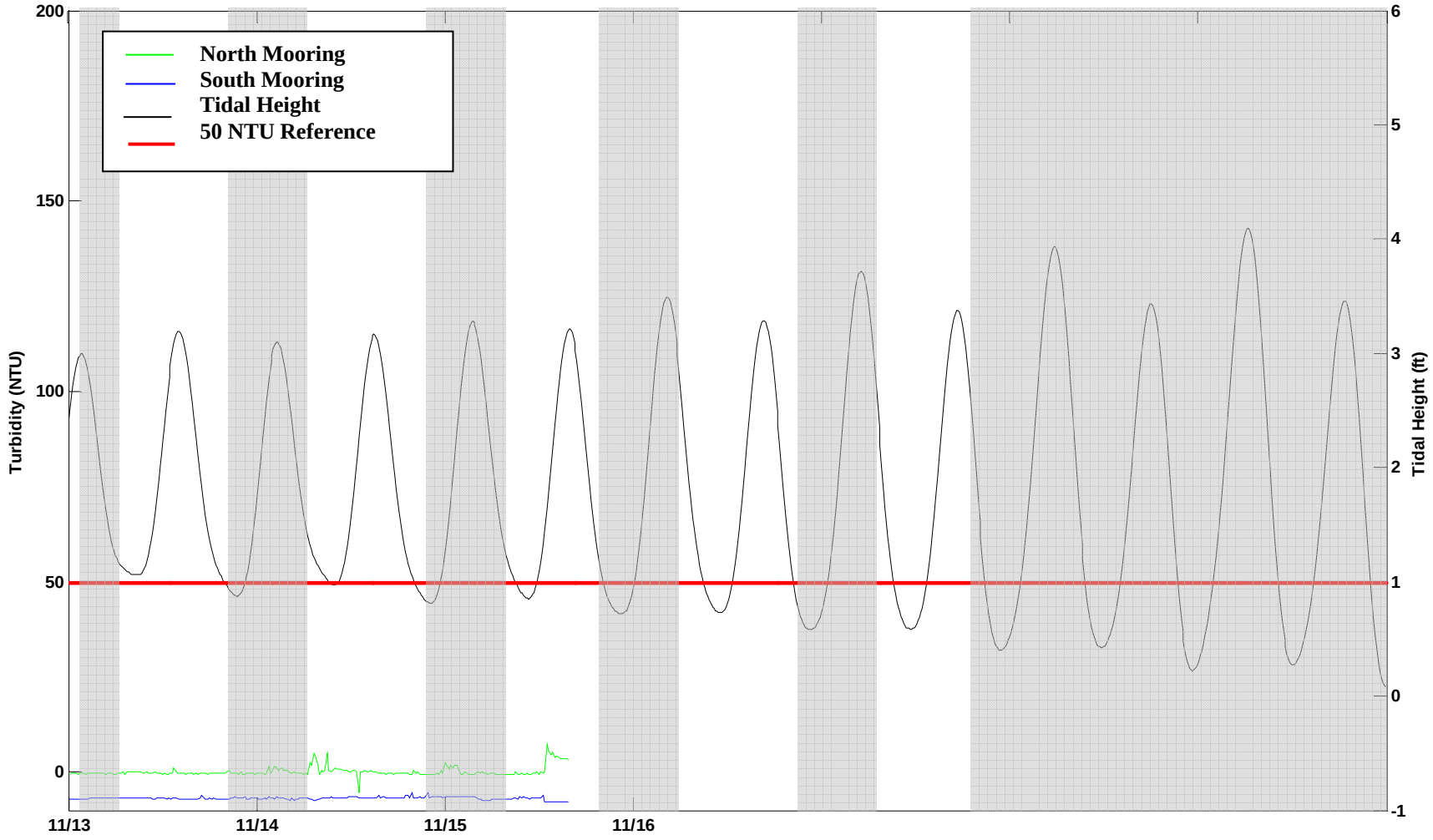
*Shaded areas represent nights and weekends.

Figure B-11. Turbidity Monitoring at New Bedford Harbor Superfund Site 10/30/2006 to 11/6/2006.



*Shaded areas represent nights and weekends.

Figure B-12. Turbidity Monitoring at New Bedford Harbor Superfund Site 11/6/2006 to 11/13/2006.



*Shaded areas represent nights and weekends.

Figure B-13. Turbidity Monitoring at New Bedford Harbor Superfund Site 11/13/2006 to 11/20/2006.

Appendix C

Total and Dissolved PCB Analytical Data

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Individual Congener and Sum of Congeners Results

Station ID	Station ID	REF081406			REF081406				BOUND081406			BOUND081406			
Collected	Collected	8/14/2006			8/14/2006				8/14/2006			8/14/2006			
Fraction	Fraction	TOTAL			DISS				TOTAL			DISS			
QC Code	QC Code	SA			SA				SA			SA			
Sample ID	Sample ID	WQ-TPC-001-081406			WQ-DPC-001-081406				WQ-TPC-002-081406			WQ-DPC-002-081406			
Param Name	Param Code	Result	Unit	FinQ	Result	Unit	FinQ		Result	Unit	FinQ	Result	Unit	FinQ	
2,4'-Dicb (PCB 8)	34883-43-7	0.5186	UG/L	D	0.2746	UG/L	D		0.1518	UG/L	D	0.0935	UG/L	D	
2,2',5-Tricb (PCB 18)	37680-65-2	0.7721	UG/L	D	0.4583	UG/L	D		0.2214	UG/L	D	0.1046	UG/L	D	
2,4,4'-Tricb (PCB 28)	7012-37-5	0.6152	UG/L	D	0.3721	UG/L	D		0.2125	UG/L	D	0.0638	UG/L	D	
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	0.1925	UG/L	D	0.1217	UG/L	D		0.0657	UG/L	D	0.0175	UG/L	D	
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	0.6703	UG/L	D	0.4013	UG/L	D		0.2037	UG/L	D	0.05	UG/L	D	
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	0.0443	UG/L	D	0.0245	UG/L	D		0.0159	UG/L	D	0.0009	UG/L	D	
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	0.0977	UG/L	D	0.0534	UG/L	D		0.0365	UG/L	D	0.0028	UG/L	D	
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	0.0035	UG/L	Dp	0.0029	UG/L	Dp		0.0027	UG/L	Dp	0.0009	UG/L	DU	
2,3',4,4',5-Pentacb (PCB 118)	31508-00-6	0.0438	UG/L	D	0.0292	UG/L	D		0.022	UG/L	D	0.0031	UG/L	D	
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.0035	UG/L	D	0.0028	UG/L	D		0.0025	UG/L	D	0.0009	UG/L	DU	
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	0.0279	UG/L	D	0.0178	UG/L	D		0.0138	UG/L	D	0.0021	UG/L	D	
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	0.0544	UG/L	D	0.0327	UG/L	D		0.0243	UG/L	D	0.0022	UG/L	D	
2,2',3,3',4,4',5-Heptacb (PCB 170)	35065-30-6	0.0045	UG/L	D	0.0039	UG/L	Dp		0.0031	UG/L	Dp	0.0009	UG/L	DU	
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.0056	UG/L	Dp	0.0037	UG/L	Dp		0.003	UG/L	Dp	0.0005	UG/L	DpJ	
2,2',3,4',5,5',6-Heptacb (PCB 187)	52663-68-0	0.0078	UG/L	D	0.004	UG/L	Dp		0.0027	UG/L	Dp	0.0009	UG/L	DU	
2,2',3,3',4,4',5,6-Octacb (PCB 195)	52663-78-2	0.0021	UG/L	Dp	0.0021	UG/L	Dp		0.0017	UG/L	Dp	0.0009	UG/L	DU	
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	40186-72-9	0.0028	UG/L	Dp	0.0028	UG/L	Dp		0.0023	UG/L	Dp	0.0009	UG/L	DU	
DecaCB (PCB 209)	2051-24-3	0.0022	UG/L	Dp	0.0024	UG/L	Dp		0.0008	UG/L	DU	0.0009	UG/L	DU	
Sum of 18 NOAA Congeners (SUM 18 CONG)		3.1	UG/L		1.8	UG/L			0.99	UG/L		0.34	UG/L		

Individual Congener and Sum of Congeners Results

Station ID	Station ID	300081406			300081406				600081406			600081406			
Collected	Collected	8/14/2006			8/14/2006				8/14/2006			8/14/2006			
Fraction	Fraction	TOTAL			DISS				TOTAL			DISS			
QC Code	QC Code	SA			SA				SA			SA			
Sample ID	Sample ID	WQ-TPC-003-081406			WQ-DPC-003-081406				WQ-TPC-004-081406			WQ-DPC-004-081406			
Param Name	Param Code	Result	Unit	FinQ	Result	Unit	FinQ		Result	Unit	FinQ	Result	Unit	FinQ	
2,4'-Dicb (PCB 8)	34883-43-7	0.1084	UG/L	D	0.0798	UG/L	D		0.1472	UG/L	D	0.1047	UG/L	D	
2,2',5-Tricb (PCB 18)	37680-65-2	0.1638	UG/L	D	0.1007	UG/L	D		0.1693	UG/L	D	0.128	UG/L	D	
2,4,4'-Tricb (PCB 28)	7012-37-5	0.1684	UG/L	D	0.0673	UG/L	D		0.2047	UG/L	D	0.0957	UG/L	D	
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	0.0576	UG/L	D	0.0177	UG/L	D		0.0887	UG/L	D	0.0251	UG/L	D	
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	0.1697	UG/L	D	0.0513	UG/L	D		0.2584	UG/L	D	0.0729	UG/L	D	
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	0.0165	UG/L	D	0.0015	UG/L	D		0.0307	UG/L	D	0.0027	UG/L	D	
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	0.0351	UG/L	D	0.0024	UG/L	D		0.0694	UG/L	D	0.0045	UG/L	D	
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	0.0027	UG/L	Dp	0.0008	UG/L	DU		0.0038	UG/L	Dp	0.0013	UG/L	Dp	
2,3',4,4',5-Pentacb (PCB 118)	31508-00-6	0.0233	UG/L	D	0.0025	UG/L	D		0.0436	UG/L	D	0.0034	UG/L	D	
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.0025	UG/L	D	0.0008	UG/L	DU		0.0036	UG/L	D	0.0008	UG/L	DU	
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	0.014	UG/L	D	0.0016	UG/L	D		0.023	UG/L	D	0.0021	UG/L	D	
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	0.0245	UG/L	D	0.0014	UG/L	D		0.0431	UG/L	D	0.0018	UG/L	D	
2,2',3,3',4,4',5-Heptacb (PCB 170)	35065-30-6	0.0025	UG/L	Dp	0.0008	UG/L	DU		0.0048	UG/L	D	0.0008	UG/L	DU	
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.0031	UG/L	Dp	0.0008	UG/L	DU		0.0052	UG/L	D	0.0008	UG/L	DU	
2,2',3,4',5,5',6-Heptacb (PCB 187)	52663-68-0	0.0028	UG/L	Dp	0.0008	UG/L	DU		0.0051	UG/L	D	0.0008	UG/L	DU	
2,2',3,3',4,4',5,6-Octacb (PCB 195)	52663-78-2	0.0016	UG/L	Dp	0.0008	UG/L	DU		0.0019	UG/L	Dp	0.0008	UG/L	DU	
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	40186-72-9	0.0022	UG/L	Dp	0.0008	UG/L	DU		0.0025	UG/L	Dp	0.0008	UG/L	DU	
DecaCB (PCB 209)	2051-24-3	0.0007	UG/L	DU	0.0008	UG/L	DU		0.002	UG/L	Dp	0.0008	UG/L	DU	
Sum of 18 NOAA Congeners (SUM 18 CONG)		0.8	UG/L		0.33	UG/L			1.1	UG/L		0.44	UG/L		

Individual Congener and Sum of Congeners Results

Station ID	Station ID	REF081606			REF081606				BOUND081606			BOUND081606			
Collected	Collected	8/16/2006			8/16/2006				8/16/2006			8/16/2006			
Fraction	Fraction	TOTAL			DISS				TOTAL			DISS			
QC Code	QC Code	SA			SA				SA			SA			
Sample ID	Sample ID	WQ-TPC-001-081606			WQ-DPC-001-081606				WQ-TPC-002-081606			WQ-DPC-002-081606			
Param Name	Param Code	Result	Unit	FinQ	Result	Unit	FinQ		Result	Unit	FinQ	Result	Unit	FinQ	
2,4'-Dicb (PCB 8)	34883-43-7	0.1219	UG/L	D	0.0968	UG/L	D		0.7968	UG/L	D	0.2529	UG/L	D	
2,2',5-Tricb (PCB 18)	37680-65-2	0.222	UG/L	D	0.1297	UG/L	D		1.0222	UG/L	D	0.3585	UG/L	D	
2,4,4'-Tricb (PCB 28)	7012-37-5	0.3039	UG/L	D	0.1075	UG/L	D		0.8767	UG/L	D	0.2701	UG/L	D	
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	0.1005	UG/L	D	0.0325	UG/L	D		0.4422	UG/L	D	0.0735	UG/L	D	
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	0.3595	UG/L	D	0.0884	UG/L	D		1.1146	UG/L	D	0.2517	UG/L	D	
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	0.0305	UG/L	D	0.0051	UG/L	D		0.0715	UG/L	D	0.0083	UG/L	D	
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	0.0675	UG/L	D	0.0065	UG/L	D		0.1441	UG/L	D	0.0173	UG/L	D	
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	0.0053	UG/L	Dp	0.0012	UG/L	Dp		0.0071	UG/L	Dp	0.0012	UG/L	DU	
2,3',4,4',5-Pentacb (PCB 118)	31508-00-6	0.0429	UG/L	D	0.0045	UG/L	D		0.0917	UG/L	D	0.0099	UG/L	D	
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.0046	UG/L	D	0.0012	UG/L	DU		0.0138	UG/L	Dp	0.0012	UG/L	DU	
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	0.0314	UG/L	D	0.0054	UG/L	Dp		0.0727	UG/L	D	0.0094	UG/L	Dp	
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	0.0523	UG/L	D	0.0031	UG/L	D		0.1273	UG/L	D	0.0089	UG/L	D	
2,2',3,3',4,4',5-Heptacb (PCB 170)	35065-30-6	0.0062	UG/L	D	0.0012	UG/L	DU		0.0264	UG/L	Dp	0.0012	UG/L	DU	
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.0065	UG/L	D	0.0012	UG/L	DU		0.0142	UG/L	D	0.001	UG/L	DpJ	
2,2',3,4',5,5',6-Heptacb (PCB 187)	52663-68-0	0.0068	UG/L	D	0.0012	UG/L	DU		0.0226	UG/L	Dp	0.0009	UG/L	DpJ	
2,2',3,3',4,4',5,6-Octacb (PCB 195)	52663-78-2	0.0017	UG/L	Dp	0.0012	UG/L	DU		0.0038	UG/L	D	0.0012	UG/L	DU	
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	40186-72-9	0.0022	UG/L	Dp	0.0012	UG/L	DU		0.0087	UG/L	Dp	0.0012	UG/L	DU	
DecaCB (PCB 209)	2051-24-3	0.0017	UG/L	Dp	0.0012	UG/L	DU		0.0104	UG/L	Dp	0.0012	UG/L	DU	
Sum of 18 NOAA Congeners (SUM 18 CONG)		1.4	UG/L		0.48	UG/L			4.9	UG/L		1.3	UG/L		

Individual Congener and Sum of Congeners Results

Station ID	Station ID	300081606			300081606				300081606			300081606			
Collected	Collected	8/16/2006			8/16/2006				8/16/2006			8/16/2006			
Fraction	Fraction	TOTAL			DISS				TOTAL			DISS			
QC Code	QC Code	SA			SA				REP			REP			
Sample ID	Sample ID	WQ-TPC-003-081606			WQ-DPC-003-081606				WQ-TPC-003-081606-DUP			WQ-DPC-003-081606-DUP			
Param Name	Param Code	Result	Unit	FinQ	Result	Unit	Fin Q		Result	Unit	FinQ	Result	Unit	FinQ	
2,4'-Dicb (PCB 8)	34883-43-7	0.8506	UG/L	D	0.1115	UG/L	D		0.8006	UG/L	D	0.4909	UG/L	D	
2,2',5-Tricb (PCB 18)	37680-65-2	1.0718	UG/L	D	0.2785	UG/L	D		0.603	UG/L	D	0.5655	UG/L	D	
2,4,4'-Tricb (PCB 28)	7012-37-5	0.8783	UG/L	D	0.3556	UG/L	D		0.8518	UG/L	D	0.2736	UG/L	D	
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	0.3448	UG/L	D	0.0912	UG/L	D		0.4383	UG/L	Dp	0.1106	UG/L	D	
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	1.3161	UG/L	D	0.4401	UG/L	D		1.1592	UG/L	D	0.327	UG/L	D	
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	0.0675	UG/L	D	0.0095	UG/L	D		0.0683	UG/L	D	0.0129	UG/L	D	
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	0.1844	UG/L	D	0.0181	UG/L	D		0.1833	UG/L	D	0.0289	UG/L	D	
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	0.0079	UG/L	Dp	0.0013	UG/L	Dp		0.0068	UG/L	Dp	0.0014	UG/L	Dp	
2,3',4,4',5-Pentacb (PCB 118)	31508-00-6	0.0896	UG/L	D	0.0103	UG/L	D		0.0903	UG/L	D	0.015	UG/L	D	
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.0076	UG/L	D	0.0011	UG/L	DU		0.007	UG/L	D	0.0015	UG/L	D	
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	0.0816	UG/L	D	0.0107	UG/L	Dp		0.0762	UG/L	D	0.0129	UG/L	D	
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	0.1412	UG/L	D	0.0104	UG/L	D		0.1366	UG/L	D	0.0167	UG/L	D	
2,2',3,3',4,4',5-Heptacb (PCB 170)	35065-30-6	0.0122	UG/L	D	0.0011	UG/L	DU		0.013	UG/L	D	0.0018	UG/L	Dp	
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.0153	UG/L	D	0.0012	UG/L	Dp		0.0164	UG/L	D	0.0019	UG/L	Dp	
2,2',3,4',5,5',6-Heptacb (PCB 187)	52663-68-0	0.0233	UG/L	D	0.0013	UG/L	Dp		0.0222	UG/L	D	0.0028	UG/L	Dp	
2,2',3,3',4,4',5,6-Octacb (PCB 195)	52663-78-2	0.003	UG/L	D	0.0011	UG/L	DU		0.0031	UG/L	D	0.0011	UG/L	Dp	
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	40186-72-9	0.0039	UG/L	Dp	0.0011	UG/L	DU		0.0054	UG/L	Dp	0.0015	UG/L	Dp	
DecaCB (PCB 209)	2051-24-3	0.0021	UG/L	Dp	0.0011	UG/L	DU		0.0023	UG/L	Dp	0.001	UG/L	DU	
Sum of 18 NOAA Congeners (SUM 18 CONG)		5.1	UG/L		1.3	UG/L			4.5	UG/L		1.9	UG/L		

Individual Congener and Sum of Congeners Results

Station ID	Station ID	SOUTHR082806			SOUTHR082806				50NTU082806			50NTU082806			
Collected	Collected	8/28/2006			8/28/2006				8/28/2006			8/28/2006			
Fraction	Fraction	TOTAL			DISS				TOTAL			DISS			
QC Code	QC Code	SA			SA				SA			SA			
Sample ID	Sample ID	WQ-TPC-001-082806			WQ-DPC-001-082806				WQ-TPC-002-082806			WQ-DPC-002-082806			
Param Name	Param Code	Result	Unit	FinQ	Result	Unit	FinQ		Result	Unit	FinQ	Result	Unit	FinQ	
2,4'-Dicb (PCB 8)	34883-43-7	0.3222	UG/L	D	0.306	UG/L	D		2.0772	UG/L	D	0.556	UG/L	D	
2,2',5-Tricb (PCB 18)	37680-65-2	0.4909	UG/L	D	0.3791	UG/L	D		3.3159	UG/L	D	0.602	UG/L	D	
2,4,4'-Tricb (PCB 28)	7012-37-5	0.5114	UG/L	D	0.211	UG/L	D		3.3881	UG/L	D	0.3413	UG/L	D	
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	0.1821	UG/L	D	0.0574	UG/L			1.4127	UG/L	D	0.1057	UG/L	D	
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	0.5862	UG/L	D	0.166	UG/L	D		5.5406	UG/L	D	0.3742	UG/L	D	
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	0.0471	UG/L		0.0073	UG/L			0.2813	UG/L	D	0.0141	UG/L		
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	0.1092	UG/L	D	0.0122	UG/L			0.8239	UG/L	D	0.0355	UG/L		
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	0.0056	UG/L	p	0.0007	UG/L	p		0.0262	UG/L	p	0.001	UG/L	p	
2,3',4,4',5-Pentacb (PCB 118)	31508-00-6	0.0609	UG/L		0.0063	UG/L			0.5416	UG/L	D	0.0173	UG/L		
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.0048	UG/L		0.0007	UG/L	p		0.0275	UG/L	p	0.0016	UG/L		
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	0.0445	UG/L		0.0034	UG/L			0.3447	UG/L	D	0.013	UG/L		
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	0.085	UG/L		0.0049	UG/L			0.6257	UG/L	D	0.0197	UG/L		
2,2',3,3',4,4',5-Heptacb (PCB 170)	35065-30-6	0.0079	UG/L		0.0007	UG/L	p		0.0614	UG/L	p	0.0015	UG/L		
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.0093	UG/L		0.0004	UG/L	pJ		0.0787	UG/L	p	0.0018	UG/L		
2,2',3,4',5,5',6-Heptacb (PCB 187)	52663-68-0	0.0114	UG/L		0.0004	UG/L	pJ		0.078	UG/L	D	0.0025	UG/L		
2,2',3,3',4,4',5,6-Octacb (PCB 195)	52663-78-2	0.0018	UG/L		0.0005	UG/L	U		0.0104	UG/L	p	0.0011	UG/L	p	
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	40186-72-9	0.0018	UG/L	p	0.0005	UG/L	U		0.0133	UG/L	p	0.001	UG/L	p	
DecaCB (PCB 209)	2051-24-3	0.0009	UG/L	p	0.0005	UG/L	U		0.0043	UG/L	p	0.0007	UG/L	p	
Sum of 18 NOAA Congeners (SUM 18 CONG)		2.5	UG/L		1.2	UG/L			19	UG/L		2.1	UG/L		

Individual Congener and Sum of Congeners Results

Station ID	Station ID	25NTU082806			25NTU082806				1NTU091906			1NTU091906			
Collected	Collected	8/28/2006			8/28/2006				9/19/2006			9/19/2006			
Fraction	Fraction	TOTAL			DISS				TOTAL			DISS			
QC Code	QC Code	SA			SA				SA			SA			
Sample ID	Sample ID	WQ-TPC-003-082806			WQ-DPC-003-082806				WQ-TPC-001-091906			WQ-DPC-001-091906			
Param Name	Param Code	Result	Unit	FinQ	Result	Unit	FinQ		Result	Unit	FinQ	Result	Unit	FinQ	
2,4'-Dicb (PCB 8)	34883-43-7	0.5903	UG/L	D	0.3223	UG/L	D		0.3954	UG/L	D	0.2056	UG/L	D	
2,2',5-Tricb (PCB 18)	37680-65-2	0.9557	UG/L	D	0.3523	UG/L	D		0.4392	UG/L	D	0.2108	UG/L	D	
2,4,4'-Tricb (PCB 28)	7012-37-5	0.882	UG/L	D	0.1805	UG/L	D		0.3703	UG/L	D	0.163	UG/L	D	
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	0.3763	UG/L	D	0.0615	UG/L			0.1139	UG/L	D	0.0561	UG/L	D	
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	1.3136	UG/L	D	0.1666	UG/L	D		0.3651	UG/L	D	0.1555	UG/L	D	
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	0.0688	UG/L		0.0083	UG/L			0.0343	UG/L	D	0.0149	UG/L	D	
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	0.202	UG/L	D	0.0134	UG/L			0.0603	UG/L	D	0.0235	UG/L	D	
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	0.0079	UG/L	p	0.0007	UG/L	p		0.0056	UG/L	Dp	0.0021	UG/L	Dp	
2,3',4,4',5-Pentacb (PCB 118)	31508-00-6	0.1387	UG/L	D	0.0075	UG/L			0.0401	UG/L	D	0.0163	UG/L	D	
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.0073	UG/L		0.0007	UG/L	p		0.004	UG/L	D	0.0017	UG/L	D	
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	0.0945	UG/L	p	0.0069	UG/L	p		0.0241	UG/L	D	0.0091	UG/L	D	
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	0.1589	UG/L	D	0.0056	UG/L			0.0413	UG/L	D	0.0155	UG/L	D	
2,2',3,3',4,4',5-Heptacb (PCB 170)	35065-30-6	0.0149	UG/L	p	0.0009	UG/L	p		0.0034	UG/L	D	0.0015	UG/L	Dp	
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.0183	UG/L	p	0.0006	UG/L	p		0.0048	UG/L	D	0.0018	UG/L	Dp	
2,2',3,4',5,5',6-Heptacb (PCB 187)	52663-68-0	0.0243	UG/L	p	0.0004	UG/L	J		0.0047	UG/L	D	0.0015	UG/L	D	
2,2',3,3',4,4',5,6-Octacb (PCB 195)	52663-78-2	0.0046	UG/L	p	0.0006	UG/L	U		0.0014	UG/L	Dp	0.0009	UG/L	Dp	
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	40186-72-9	0.0048	UG/L	p	0.0006	UG/L	U		0.0018	UG/L	Dp	0.0013	UG/L	Dp	
DecaCB (PCB 209)	2051-24-3	0.0015	UG/L		0.0006	UG/L	U		0.0013	UG/L	Dp	0.0011	UG/L	Dp	
Sum of 18 NOAA Congeners (SUM 18 CONG)		4.9	UG/L		1.1	UG/L			1.9	UG/L		0.88	UG/L		

Individual Congener and Sum of Congeners Results

Station ID	Station ID	50NTU091906			50NTU091906				25NTU091906			25NTU091906			
Collected	Collected	9/19/2006			9/19/2006				9/19/2006			9/19/2006			
Fraction	Fraction	TOTAL			DISS				TOTAL			DISS			
QC Code	QC Code	SA			SA				SA			SA			
Sample ID	Sample ID	WQ-TPC-002-091906			WQ-DPC-002-091906				WQ-TPC-003-091906			WQ-DPC-003-091906			
Param Name	Param Code	Result	Unit	FinQ	Result	Unit	FinQ		Result	Unit	FinQ	Result	Unit	FinQ	
2,4'-Dicb (PCB 8)	34883-43-7	5.4142	UG/L	D	1.8178	UG/L	D		2.4142	UG/L	D	0.9705	UG/L	D	
2,2',5-Tricb (PCB 18)	37680-65-2	6.8231	UG/L	D	1.171	UG/L	D		2.8582	UG/L	D	0.6774	UG/L	D	
2,4,4'-Tricb (PCB 28)	7012-37-5	6.5643	UG/L	D	0.4751	UG/L	D		2.2552	UG/L	D	0.2694	UG/L	D	
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	2.7497	UG/L	D	0.1124	UG/L	D		0.9307	UG/L	D	0.0775	UG/L	D	
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	8.2866	UG/L	D	0.4137	UG/L	D		3.601	UG/L	D	0.3242	UG/L	D	
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	1.4684	UG/L	D	0.022	UG/L	D		0.3055	UG/L	D	0.0139	UG/L	D	
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	1.6581	UG/L	D	0.0162	UG/L	D		0.4496	UG/L	D	0.0139	UG/L	D	
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	0.2543	UG/L	Dp	0.0018	UG/L	Dp		0.0449	UG/L	Dp	0.0016	UG/L	Dp	
2,3',4,4',5-Pentacb (PCB 118)	31508-00-6	1.2353	UG/L	D	0.0099	UG/L	D		0.3144	UG/L	D	0.0087	UG/L	D	
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.0799	UG/L	Dp	0.0012	UG/L	D		0.0229	UG/L	Dp	0.0011	UG/L	D	
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	0.7576	UG/L	D	0.0046	UG/L	D		0.1958	UG/L	D	0.0053	UG/L	D	
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	1.2104	UG/L	D	0.0065	UG/L	D		0.3311	UG/L	D	0.0075	UG/L	D	
2,2',3,3',4,4',5-Heptacb (PCB 170)	35065-30-6	0.0887	UG/L	Dp	0.0013	UG/L	Dp		0.0292	UG/L	Dp	0.0011	UG/L	Dp	
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.1347	UG/L	Dp	0.0008	UG/L	DpJ		0.043	UG/L	Dp	0.0009	UG/L	DpJ	
2,2',3,4',5,5',6-Heptacb (PCB 187)	52663-68-0	0.1389	UG/L	Dp	0.0005	UG/L	DpJ		0.0593	UG/L	Dp	0.0007	UG/L	DpJ	
2,2',3,3',4,4',5,6-Octacb (PCB 195)	52663-78-2	0.0148	UG/L	Dp	0.0011	UG/L	DU		0.0061	UG/L	D	0.001	UG/L	DU	
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	40186-72-9	0.0181	UG/L	Dp	0.0015	UG/L	Dp		0.0082	UG/L	Dp	0.0014	UG/L	Dp	
DecaCB (PCB 209)	2051-24-3	0.0074	UG/L	Dp	0.0011	UG/L	DU		0.0043	UG/L	Dp	0.001	UG/L	DU	
Sum of 18 NOAA Congeners (SUM 18 CONG)		37	UG/L		4.1	UG/L			14	UG/L		2.4	UG/L		

Individual Congener and Sum of Congeners Results

Station ID	Station ID	75NTU091906			75NTU091906				75N100906			75N100906			
Collected	Collected	9/19/2006			9/19/2006				10/9/2006			10/9/2006			
Fraction	Fraction	TOTAL			DISS				TOTAL			DISS			
QC Code	QC Code	SA			SA				SA			SA			
Sample ID	Sample ID	WQ-TPC-004-091906			WQ-DPC-004-091906				WQ-TPC-001-100906			WQ-DPC-001-100906			
Param Name	Param Code	Result	Unit	FinQ	Result	Unit	FinQ		Result	Unit	FinQ	Result	Unit	FinQ	
2,4'-Dicb (PCB 8)	34883-43-7	36.5802	UG/L	D	2.4943	UG/L	D		3.4626	UG/L	D	2.0431	UG/L	D	
2,2',5-Tricb (PCB 18)	37680-65-2	48.4419	UG/L	D	1.6969	UG/L	D		4.7199	UG/L	D	1.6811	UG/L	D	
2,4,4'-Tricb (PCB 28)	7012-37-5	40.2884	UG/L	D	0.6812	UG/L	D		3.9345	UG/L	D	0.716	UG/L	D	
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	14.4464	UG/L	D	0.1328	UG/L	D		1.3607	UG/L	D	0.1747	UG/L	D	
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	53.0245	UG/L	D	0.619	UG/L	D		4.4809	UG/L	D	0.5314	UG/L	D	
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	6.6374	UG/L	D	0.0194	UG/L	D		0.3325	UG/L	Dp	0.0342	UG/L	Dp	
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	8.5996	UG/L	D	0.0178	UG/L	D		0.5182	UG/L	D	0.0095	UG/L	DJ	
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	1.3748	UG/L	Dp	0.0015	UG/L	Dp		0.0952	UG/L	DU	0.019	UG/L	DU	
2,3',4,4',5-Pentacb (PCB 118)	31508-00-6	6.6537	UG/L	D	0.0108	UG/L	D		0.2979	UG/L	D	0.0192	UG/L	DU	
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.1272	UG/L	Dp	0.0013	UG/L	D		0.0962	UG/L	DU	0.0192	UG/L	DU	
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	4.355	UG/L	D	0.0059	UG/L	D		0.2161	UG/L	D	0.0192	UG/L	DU	
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	6.9396	UG/L	D	0.0088	UG/L	D		0.3467	UG/L	D	0.0192	UG/L	DU	
2,2',3,3',4,4',5-Heptacb (PCB 170)	35065-30-6	0.2688	UG/L	Dp	0.0014	UG/L	Dp		0.0962	UG/L	DU	0.0192	UG/L	DU	
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.5985	UG/L	D	0.0009	UG/L	DpJ		0.024	UG/L	DpJ	0.0192	UG/L	DU	
2,2',3,4',5,5',6-Heptacb (PCB 187)	52663-68-0	0.6339	UG/L	D	0.0009	UG/L	DpJ		0.0952	UG/L	DU	0.019	UG/L	DU	
2,2',3,3',4,4',5,6-Octacb (PCB 195)	52663-78-2	0.1248	UG/L	Dp	0.0011	UG/L	DU		0.0962	UG/L	DU	0.0192	UG/L	DU	
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	40186-72-9	0.1807	UG/L	Dp	0.0015	UG/L	Dp		0.0952	UG/L	DU	0.019	UG/L	DU	
DecaCB (PCB 209)	2051-24-3	0.0401	UG/L	Dp	0.0011	UG/L	DU		0.0952	UG/L	DU	0.019	UG/L	DU	
Sum of 18 NOAA Congeners (SUM 18 CONG)		230	UG/L		5.7	UG/L			20	UG/L		5.2	UG/L		

Individual Congener and Sum of Congeners Results

Station ID	Station ID	25S100906			25S100906				25S2100906			25S2100906			
Collected	Collected	10/9/2006			10/9/2006				10/9/2006			10/9/2006			
Fraction	Fraction	TOTAL			DISS				TOTAL			DISS			
QC Code	QC Code	SA			SA				SA			SA			
Sample ID	Sample ID	WQ-TPC-002-100906			WQ-DPC-002-100906				WQ-TPC-003-100906			WQ-DPC-003-100906			
Param Name	Param Code	Result	Unit	FinQ	Result	Unit	FinQ		Result	Unit	FinQ	Result	Unit	FinQ	
2,4'-Dicb (PCB 8)	34883-43-7	3.3734	UG/L	D	0.0219	UG/L	DU		1.8391	UG/L	D	2.1899	UG/L	D	
2,2',5-Tricb (PCB 18)	37680-65-2	8.2917	UG/L	D	0.0666	UG/L	Dp		2.3361	UG/L	D	1.7964	UG/L	D	
2,4,4'-Tricb (PCB 28)	7012-37-5	11.3165	UG/L	D	0.0595	UG/L	D		2.1193	UG/L	D	0.8596	UG/L	D	
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	6.7228	UG/L	D	0.0912	UG/L	D		0.8119	UG/L	D	0.2085	UG/L	D	
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	16.0066	UG/L	D	0.2387	UG/L	D		1.9352	UG/L	D	0.5585	UG/L	D	
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	3.6724	UG/L	D	0.096	UG/L	Dp		0.4905	UG/L	D	0.0395	UG/L	Dp	
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	4.6752	UG/L	D	0.0122	UG/L	DpJ		0.4637	UG/L	D	0.0187	UG/L	DJ	
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	0.4717	UG/L	DU	0.0216	UG/L	DU		0.0962	UG/L	DU	0.0192	UG/L	DU	
2,3',4,4',5-Pentacb (PCB 118)	31508-00-6	3.2407	UG/L	D	0.0219	UG/L	DU		0.3213	UG/L	D	0.0037	UG/L	DpJ	
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.4764	UG/L	DU	0.0219	UG/L	DU		0.0971	UG/L	DU	0.0194	UG/L	DU	
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	1.2473	UG/L	D	0.0219	UG/L	DU		0.1181	UG/L	D	0.0194	UG/L	DU	
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	3.1812	UG/L	D	0.0219	UG/L	DU		0.2263	UG/L	D	0.0194	UG/L	DU	
2,2',3,3',4,4',5-Heptacb (PCB 170)	35065-30-6	0.4764	UG/L	DU	0.0219	UG/L	DU		0.0971	UG/L	DU	0.0194	UG/L	DU	
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.4764	UG/L	DU	0.0219	UG/L	DU		0.0117	UG/L	DpJ	0.0194	UG/L	DU	
2,2',3,4',5,5',6-Heptacb (PCB 187)	52663-68-0	0.4717	UG/L	DU	0.0216	UG/L	DU		0.0962	UG/L	DU	0.0192	UG/L	DU	
2,2',3,3',4,4',5,6-Octacb (PCB 195)	52663-78-2	0.4764	UG/L	DU	0.0219	UG/L	DU		0.0971	UG/L	DU	0.0194	UG/L	DU	
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	40186-72-9	0.4717	UG/L	DU	0.0216	UG/L	DU		0.0962	UG/L	DU	0.0192	UG/L	DU	
DecaCB (PCB 209)	2051-24-3	0.4717	UG/L	DU	0.0216	UG/L	DU		0.0962	UG/L	DU	0.0192	UG/L	DU	
Sum of 18 NOAA Congeners (SUM 18 CONG)		62	UG/L		0.56	UG/L			11	UG/L		5.7	UG/L		

Individual Congener and Sum of Congeners Results

Station ID	Station ID	200S1090906			200S1090906				SOUTHR101606			SOUTHR101606			
Collected	Collected	10/9/2006			10/9/2006				10/16/2006			10/16/2006			
Fraction	Fraction	TOTAL			DISS				TOTAL			DISS			
QC Code	QC Code	SA			SA				SA			SA			
Sample ID	Sample ID	WQ-TPC-004-100906			WQ-DPC-004-100906				WQ-TPC-001-101606			WQ-DPC-001-101606			
Param Name	Param Code	Result	Unit	FinQ	Result	Unit	FinQ		Result	Unit	FinQ	Result	Unit	FinQ	
2,4'-Dicb (PCB 8)	34883-43-7	1.8628	UG/L	D	0.685	UG/L	D		0.5227	UG/L	D	0.341	UG/L	D	
2,2',5-Tricb (PCB 18)	37680-65-2	2.2523	UG/L	D	0.6924	UG/L	D		0.6257	UG/L	D	0.3809	UG/L	D	
2,4,4'-Tricb (PCB 28)	7012-37-5	1.8874	UG/L	D	0.3867	UG/L	D		0.4527	UG/L	D	0.2061	UG/L	D	
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	0.6284	UG/L	D	0.0928	UG/L	D		0.1619	UG/L	D	0.0718	UG/L	D	
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	1.7	UG/L	D	0.2652	UG/L	D		0.3688	UG/L	D	0.1584	UG/L	D	
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	0.2476	UG/L	Dp	0.0313	UG/L	Dp		0.0654	UG/L	D	0.0254	UG/L	Dp	
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	0.2764	UG/L	D	0.0066	UG/L	DJ		0.0944	UG/L	D	0.0217	UG/L	D	
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	0.0952	UG/L	DU	0.0192	UG/L	DU		0.0007	UG/L	DpJ	0.0098	UG/L	DU	
2,3',4,4',5-Pentacb (PCB 118)	31508-00-6	0.1672	UG/L	D	0.0194	UG/L	DU		0.0612	UG/L	D	0.0091	UG/L	DpJ	
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.0962	UG/L	DU	0.0194	UG/L	DU		0.0124	UG/L	DU	0.0099	UG/L	DU	
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	0.0645	UG/L	DpJ	0.0194	UG/L	DU		0.0263	UG/L	D	0.0025	UG/L	DpJ	
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	0.1324	UG/L	D	0.0194	UG/L	DU		0.0549	UG/L	D	0.0089	UG/L	DpJ	
2,2',3,3',4,4',5-Heptacb (PCB 170)	35065-30-6	0.0962	UG/L	DU	0.0194	UG/L	DU		0.0006	UG/L	DpJ	0.0099	UG/L	DU	
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.0962	UG/L	DU	0.0194	UG/L	DU		0.0039	UG/L	DpJ	0.0099	UG/L	DU	
2,2',3,4',5,5',6-Heptacb (PCB 187)	52663-68-0	0.0952	UG/L	DU	0.0192	UG/L	DU		0.0016	UG/L	DpJ	0.0098	UG/L	DU	
2,2',3,3',4,4',5,6-Octacb (PCB 195)	52663-78-2	0.0962	UG/L	DU	0.0194	UG/L	DU		0.0124	UG/L	DU	0.0099	UG/L	DU	
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	40186-72-9	0.0952	UG/L	DU	0.0192	UG/L	DU		0.0123	UG/L	DU	0.0098	UG/L	DU	
DecaCB (PCB 209)	2051-24-3	0.0952	UG/L	DU	0.0192	UG/L	DU		0.0123	UG/L	DU	0.0098	UG/L	DU	
Sum of 18 NOAA Congeners (SUM 18 CONG)		9.2	UG/L		2.2	UG/L			2.4	UG/L		1.2	UG/L		

Individual Congener and Sum of Congeners Results

Station ID	Station ID	SOUTHR101606			SOUTHR101606				25NTU101606			25NTU101606		
Collected	Collected	10/16/2006			10/16/2006				10/16/2006			10/16/2006		
Fraction	Fraction	TOTAL			DISS				TOTAL			DISS		
QC Code	QC Code	REP			REP				SA			SA		
Sample ID	Sample ID	WQ-TPC-001-101606-DUP			WQ-DPC-001-101606-DUP				WQ-TPC-002-101606			WQ-DPC-002-101606		
Param Name	Param Code	Result	Unit	FinQ	Result	Unit	FinQ		Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	34883-43-7	0.6205	UG/L	D	0.4977	UG/L	D		4.8438	UG/L	D	2.1941	UG/L	D
2,2',5-Tricb (PCB 18)	37680-65-2	0.7272	UG/L	D	0.7622	UG/L	D		6.0945	UG/L	D	1.9325	UG/L	D
2,4,4'-Tricb (PCB 28)	7012-37-5	0.5453	UG/L	D	0.4004	UG/L	D		4.9166	UG/L	D	1.1539	UG/L	D
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	0.1998	UG/L	D	0.204	UG/L	D		2.0637	UG/L	D	0.4359	UG/L	D
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	0.4389	UG/L	D	0.4254	UG/L	D		4.2743	UG/L	D	0.9946	UG/L	D
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	0.0877	UG/L	D	0.0499	UG/L	D		1.166	UG/L	D	0.2421	UG/L	D
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	0.1128	UG/L	D	0.0794	UG/L	D		1.4782	UG/L	D	0.2109	UG/L	D
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	0.0012	UG/L	DpJ	0.0003	UG/L	DpJ		0.017	UG/L	DpJ	0.0495	UG/L	DU
2,3',4,4',5-Pentacb (PCB 118)	31508-00-6	0.0739	UG/L	D	0.0349	UG/L	D		1.0401	UG/L	D	0.0971	UG/L	D
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.0123	UG/L	DU	0.0099	UG/L	DU		0.0097	UG/L	DpJ	0.05	UG/L	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	0.0335	UG/L	D	0.017	UG/L	D		0.5056	UG/L	D	0.0067	UG/L	DpJ
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	0.0639	UG/L	D	0.0466	UG/L	D		0.8415	UG/L	D	0.079	UG/L	D
2,2',3,3',4,4',5-Heptacb (PCB 170)	35065-30-6	0.001	UG/L	DpJ	0.0099	UG/L	DU		0.0481	UG/L	DpJ	0.05	UG/L	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.0052	UG/L	DpJ	0.003	UG/L	DpJ		0.08	UG/L	Dp	0.05	UG/L	DU
2,2',3,4',5,5',6-Heptacb (PCB 187)	52663-68-0	0.003	UG/L	DpJ	0.0022	UG/L	DpJ		0.0658	UG/L	Dp	0.0495	UG/L	DU
2,2',3,3',4,4',5,6-Octacb (PCB 195)	52663-78-2	0.0123	UG/L	DU	0.0099	UG/L	DU		0.0486	UG/L	DU	0.05	UG/L	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	40186-72-9	0.0121	UG/L	DU	0.0098	UG/L	DU		0.0481	UG/L	DU	0.0495	UG/L	DU
DecaCB (PCB 209)	2051-24-3	0.0121	UG/L	DU	0.0098	UG/L	DU		0.0481	UG/L	DU	0.0495	UG/L	DU
Sum of 18 NOAA Congeners (SUM 18 CONG)		2.9	UG/L		2.5	UG/L			27	UG/L		7.4	UG/L	

Qualifiers:

D	Dilution run. Initial run outside linear range of instrument
J	Analyte detected below the sample specific reporting limit
p	The relative percent difference (RPD) between the values obtained from the dual columns is >40%.
U	Analyte not detected at 3:1 signal:noise ratio. Reporting limit is reported.

Appendix D

Toxicity Analytical Data

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Biomonitoring of Surface Water Samples
New Bedford Harbor
New Bedford, Massachusetts

Fall 2006

Prepared for

Battelle
397 Washington Street
Duxbury, Massachusetts 02332

Prepared by

EnviroSystems, Incorporated
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August-September 2006
Reference Number:Battele14877,14886,14925,15007

Biomonitoring of Surface Water Samples
New Bedford Harbor, New Bedford, Massachusetts

Fall 2006

1.0 INTRODUCTION

This report provides a summarization of data generated from a series of acute and chronic exposure screening assays evaluating surface water samples collected from New Bedford Harbor. Toxicity tests were conducted on grab surface water samples collected from the specified areas in the harbor. Assay design included a laboratory control treatment and one or more surface water samples. Samples were evaluated "As Received" without dilutions. Assays were conducted based on water quality levels in the vicinity of dredging operations. Samples were collected by Battelle personnel from the Duxbury, Massachusetts office. Testing was based on programs and protocols developed by the US EPA (2002) and included the following assays; modified 2 day acute and 7 day chronic assays conducted with the mysid shrimp, *Americamysis bahia*, and the red macro alga, *Champia parvula*, and 60 minute chronic fertilization assays conducted with the purple sea urchin, *Arbacia punctulata*. All mysid and urchin fertilization assays and a portion of the algal assays were conducted by ESI at its Hampton, New Hampshire facility. Additionally, the algal assays were conducted by the Saskatchewan Research Council, SRC, Saskatoon, Saskatchewan, Canada.

2.0 MATERIALS AND METHODS

2.1 General Methods

Toxicological and analytical protocols used in this program followed procedures primarily designed by the EPA to provide standard approaches for the evaluation of toxicological effects of discharges on aquatic organisms, and for the analysis of water samples.

2.2 Test Species

A. bahia, ≤5 days, were obtained from cultures maintained by Aquatic Research Organisms (ARO), Hampton, New Hampshire. Juvenile shrimp were collected daily, isolated, and placed in a rearing tank for up to 6 days. Holding tanks were maintained in a flow-through culture mode at a temperature of 25±2°C. At the start of the assays the mysids were 7 days old. Juveniles were fed ≤24 hour old brine shrimp on a daily basis. Water temperature, salinity, and pH were monitored on a daily basis. Prior to testing organisms were siphoned from the rearing tanks to a holding vessel, and then transferred to test chambers using a large bore pipet, minimizing the amount of water added to test solutions.

A. punctulata adults were from cultures maintained by ESI. Original stock was obtained from commercial supply. Male and female urchins are maintained in separate chambers as recommended by protocol (EPA 2002) and ESI. Adult urchins were induced to spawn by the injection of a potassium chloride solution. The viability of gametes obtained was determined prior to their addition to the test solutions. Eggs and/or sperm that would not result in a fertilized egg were rejected from the pool of gametes used in the assay.

C. parvula biomass was obtained from stock cultures maintained by the Saskatchewan Research Council. Original stocks were obtained from the University of Texas algal collection. The male and female plants are maintained in separate culture vessels under sterile conditions. Algal cultures were maintained on an orbital shaker (100 rpm) at 23±2°C under 16 hour light : 8 hours dark at 40 to 75 foot candles light intensity. Cultures are "cropped" and transferred to fresh nutrient solutions on a weekly basis.

2.3 Surface Water Samples and Laboratory Control Water

Grab surface water samples were collected by Battelle staff on four occasions in the Harbor, Table 1. Samples were placed in polyethylene cubitainers for shipment to the laboratory. Two, 2.5 gallon cubitainers were collected for each of the chronic assays. Prior to testing, samples were evaluated to document salinity, conductivity, and total residual chlorine. Total residual chlorine was measured by amperometric titration (MDL

0.05 mg/L). Prior to use in the assays the salinity of the samples was adjusted, if necessary, to predetermined levels using artificial sea salts for *A. bahia* and *A. punctulata* assays, and GP-2 salts (EPA 2002) for the *C. parvula* assays. The salinity of samples for the *A. bahia* acute and chronic exposure assays were adjusted to 25±2‰ while samples used for the *A. punctulata* and *C. parvula* assays were adjusted to 30±2‰. Samples with as received salinity above these levels were not adjusted.

Laboratory control water used for mysid and sea urchin assays was collected from the Hampton/Seabrook Estuary. This water is classified as SA-1 and has been used to culture marine test organisms since 1981. The laboratory control water used in the algal assay, collected from Rye, New Hampshire, is the same water used in culture maintenance. Prior to use, seawater used in the algal assays was filtered through glass fiber filters and sterilized. Dilution water used in the algal assays conducted by SRC was natural seawater collected from the West Coast of Canada. Salinity of the surface water samples was adjusted using commercial sea salts.

2.4 Bioassays

2.4.1 *Americamysis bahia* Modified Acute and Chronic Exposure Bioassays

Modified acute and chronic exposure screening assays were conducted in a static renewal test mode with renewals made at 24-hour intervals. The 7 day assays were conducted at a temperature of 26±1°C with a photoperiod of 16:8 hours light:dark. Mysids were maintained in 250 mL beakers containing 150 mL of test solution. Approximately 100 mL of the test solution were replaced each day. The assay incorporated 8 replicates with 5 organisms/replicate. Survival and dissolved oxygen were measured daily in each replicate prior to test solution renewal. Salinity, temperature and pH were recorded in a composite sample of the “old” test solution and in the “new” test solution prior to being added to the test chamber. Incubator temperatures were also recorded on a daily basis.

During the test, mysids were fed ≤24 hour old *Artemia* nauplii. On Day 7 of the assay, surviving mysids were removed from test solutions, rinsed to remove any surface detritus and salts, and transferred to tared foils and dried for 24 hours at 103°C. Foils were weighed to the nearest 0.01 mg. Mean dry weights per individual were obtained by dividing the net dry weight of all surviving organisms by the number of organisms added at the start of the assay.

2.4.2 *Arbacia punctulata* Chronic Exposure Fertilization Assays

Gametes were obtained by potassium chloride injection to induce spawning. Sperm were collected dry, diluted to achieve a concentration of approximately 5.0×10^7 sperm/mL in the surface water treatments. Actual sperm concentrations are provided on laboratory bench sheets in Appendix A. Sperm solutions were added to 5 mL aliquots of each sample being evaluated and allowed to remain in the test solutions for 60 minutes before the addition of unfertilized eggs. Each treatment incorporated a total of four (4) replicates. After 20 minutes exposure the assay was terminated by the addition of 0.2 mL of preservative. Aliquots of preserved solution were counted to determine numbers of fertilized and unfertilized eggs. Fertilization was accepted based on the presence or absence of a fertilization membrane around the egg.

2.4.3 *Champia parvula* Modified Acute and Chronic Exposure Assays

The 7 day red algae assay was conducted with a 2 day exposure period to the surface waters and laboratory control treatments. Each treatment used four replicates with five female branches and one male branch per replicate. Temperature was maintained at 23±1°C. The light source was cool white and fluorescent bulbs set on a 16:8 hours light:dark cycle, with a light intensity of 40 to 75 foot candles. Light intensity was checked at the start of each assay. Temperatures were monitored on a daily basis. Test chambers were 200 mL borosilicate glass fleakers. After 2 days exposure, female branch tips were transferred to approximately 100 mL of recovery medium with added nutrients and allowed to recover and mature for 5 days. During transfer, plants were examined to determine the physical condition of the individual branches. Branches showing signs of degeneration were noted and used to establish an acute endpoint. After the recovery period, the number of cystocarps (reproductive bodies) on each female branch were counted.

2.5 Data Analysis

Statistical analysis of acute and chronic exposure data was completed using CETIS, Comprehensive Environmental Toxicity Testing System, software. The program computes acute and chronic exposure endpoints based on EPA decision tree guidelines specified in individual test methods. For chronic exposure endpoints statistical significance was accepted at $\propto$ <0.05.

2.6 Quality Control

As part of the laboratory quality control program, standard reference toxicant assays are conducted on a regular basis for each test species. These results, summarized in Table 10, provide relative health and response data while allowing for comparison with historic data sets. Review of reference toxicant data associated with the August and September 2006 Arbacia punctulata test documents that the fertilization C-NOEC, 5.0 mg/L copper, was outside the acceptable range of 20 to 80 mg/L copper. The acceptable NOEC range for this assay is defined as ±1 concentration of the central tendency. For the same series of assays the fertilization IC-25 was within the acceptable range of for the endpoint. A review of the data collected with the urchin development assays documented no deviation from protocol and no changes in the analysis technique used in the assessment of fertilization.

2.7 Protocol Deviations and Unacceptable Assays

Review of data collected from the four sets of assays conducted during the monitoring period documented no protocol deviations.

3.0 RESULTS SUMMARY

Table 2 provides a summary of test acceptability for the six rounds of assays conducted during this monitoring period. Tables 3-8 provide summaries of survival, growth, development and reproduction endpoints and associated statistical analyses. Table 9 provides a summary of basic water quality data associated with the assays. Support data, including laboratory bench sheets, are provided in Appendix A.

4.0 REFERENCES

APHA. 1998. *Standard Methods for the Examination of Water and Wastewater*, 20th edition. Washington D.C.

US EPA. 2002. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*. Fourth Edition. EPA-821-R-02-012.

US EPA. 2002. *Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*. Fourth Edition. EPA-821-R-02-013.

Table 1. Summary of Sample Collection Data. New Bedford Harbor Surface Water Monitoring Program. Fall 2006.

Sample ID	Lab Code	Collected		Received		Temperature °C
WQ-TOX-001-081406	14877-001	08/14/06	0849	08/14/06	1510	4
WQ-TOX-002-081406	14877-002	08/14/06	1305	08/14/06	1510	4
WQ-TOX-003-081406	14877-003	08/14/06	1320	08/14/06	1510	4
WQ-TOX-004-081406	14877-004	08/14/06	1345	08/14/06	1510	4
WQ-TOX-001-081606	14886-001	08/16/06	1330	08/17/06	0825	4
WQ-TOX-002-081606	14886-002	08/16/06	1400	08/17/06	0825	4
WQ-TOX-003-081606	14886-003	08/16/06	1415	08/17/06	0825	4
WQ-TOX-001-082806	14925-001	08/28/06	0930	08/28/06	1600	4
WQ-TOX-002-082806	14925-002	08/28/06	0950	08/28/06	1600	4
WQ-TOX-003-082806	14925-003	08/28/06	1015	08/28/06	1600	4
WQ-TOX-001-091906	15007-001	09/19/06	0900	09/19/05	1415	4
WQ-TOX-002-091906	15007-002	09/19/06	1000	09/19/05	1415	4
WQ-TOX-003-091906	15007-003	09/19/06	1007	09/19/05	1415	4
WQ-TOX-004-091906	15007-004	09/19/06	1022	09/19/05	1415	4

Table 2. Summary of Assay Acceptability. New Bedford Harbor Surface Water Monitoring Program. Fall 2006.

	Americamysis bahia		*Champia parvula*		*Arbacia punctulata*
Lab Code	Acute Exposure	Chronic Exposure	Acute Exposure	Chronic Exposure	Chronic Exposure
14877-001	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
14877-002	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
14877-003	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
14877-004	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
14886-001	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
14886-002	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
14886-003	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
14925-001	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
14925-002	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
14925-003	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
15007-001	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
15007-002	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
15007-003	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
15007-004	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Table 3. Endpoint Summary Table - New Bedford Harbor Water Quality Monitoring August 14, 2006 Sampling Event. New Bedford Harbor Surface Water Monitoring Program. Fall 2006.

Sample ID	Reps	Mean	Min	Max	CV	Significant Difference vs			
						p Value	Lab	p Value	Ref
Arbacia punctulata			Portion Fertilized						
Lab Control		96.2%	94.5%	99.0%	2.05%	-	-	-	-
TOX-001-081406		91.7%	89.3%	94.6%	2.63%	0.0178	YES	-	-
TOX-002-081406	4	94.2%	92.6%	95.3%	1.21%	0.0074	YES	0.9457	NO
TOX-003-081406		87.3%	86.2%	89.3%	1.61%	0.0008	YES	0.0126	YES
TOX-004-081406		90.9%	85.5%	93.8%	4.10%	0.0199	YES	0.3898	NO
Americamysis bahia									
			Day 2 Survival						
Lab Control		100.0%	100.0%	100.0%	0.00%	-	-	-	-
TOX-001-081406		100.0%	100.0%	100.0%	0.00%	0.4796	NO	-	-
TOX-002-081406	8	100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
TOX-003-081406		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
TOX-004-081406		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
			Day 7 Survival						
Lab Control		100.0%	100.0%	100.0%	0.00%	-	-	-	-
TOX-001-081406		95.0%	80.0%	100.0%	9.75%	0.2209	NO	-	-
TOX-002-081406	8	100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.7791	NO
TOX-003-081406		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.7791	NO
TOX-004-081406		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.7791	NO
			Day 7 Dry Weight Biomass - mg						
Lab Control		0.330	0.278	0.372	8.76%	-	-	-	-
TOX-001-081406		0.427	0.334	0.496	12.96%	0.9997	NO	-	-
TOX-002-081406	8	0.465	0.404	0.504	7.69%	1.0000	NO	0.9376	NO
TOX-003-081406		0.474	0.452	0.504	3.37%	1.0000	NO	0.9756	NO
TOX-004-081406		0.436	0.386	0.502	9.70%	1.0000	NO	0.6326	NO
Champia parvula									
				Day 2 Survival					
Lab Control		100.0%	100.0%	100.0%	0.00%	-	-	-	-
TOX-001-081406		100.0%	100.0%	100.0%	0.00%	0.4796	NO	-	-
TOX-002-081406	4	100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
TOX-003-081406		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
TOX-004-081406		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
			Day 7 Mean # Cystocarps						
Lab Control		21.73	17.00	25.80	20.42%	-	-	-	-
TOX-001-081406		28.00	27.20	29.00	2.80%	0.9822	NO	-	-
TOX-002-081406	4	28.70	24.20	32.60	13.06%	0.9633	NO	0.6364	NO
TOX-003-081406		24.70	20.20	32.20	22.73%	0.7566	NO	0.1642	NO
TOX-004-081406		15.35	11.00	20.00	24.80%	0.0476	YES	0.0003	YES

Table 4. Endpoint Summary Table - New Bedford Harbor Water Quality Monitoring August 16, 2006 Sampling Event. New Bedford Harbor Surface Water Monitoring Program. Fall 2006.

Sample ID	Reps	Mean	Min	Max	CV	Significant Difference vs			
						p Value	Lab	p Value	Ref
Arbacia punctulata			Portion Fertilized						
Lab Control		97.6%	96.2%	98.1%	0.98%	-	-	-	-
TOX-001-081606		93.1%	91.7%	94.3%	1.18%	0.0004	YES	-	-
TOX-002-081606	4	91.5%	90.1%	92.6%	1.24%	0.0001	YES	0.0202	YES
TOX-003-081606		90.2%	87.0%	92.9%	2.72%	0.0003	YES	0.0370	YES
Americamysis bahia									
			Day 2 Survival						
Lab Control		97.5%	80.0%	100.0%	7.25%	-	-	-	-
TOX-001-081606		100.0%	100.0%	100.0%	0.00%	0.7791	NO	-	-
TOX-002-081606	8	100.0%	100.0%	100.0%	0.00%	0.7791	NO	0.4796	NO
TOX-003-081606		100.0%	100.0%	100.0%	0.00%	0.7790	NO	0.4796	NO
			Day 7 Survival						
Lab Control		95.0%	80.0%	100.0%	9.75%	-	-	-	-
TOX-001-081606		100.0%	100.0%	100.0%	0.00%	0.7791	NO	-	-
TOX-002-081606	8	100.0%	100.0%	100.0%	0.00%	0.7791	NO	0.4796	NO
TOX-003-081606		97.5%	80.0%	100.0%	7.25%	0.6395	NO	0.3605	NO
			Day 7 Dry Weight Biomass - mg						
Lab Control		0.429	0.322	0.966	50.74%	-	-	-	-
TOX-001-081606		0.448	0.406	0.552	10.93%	0.9948	NO	-	-
TOX-002-081606	8	0.465	0.136	0.984	56.97%	0.8016	NO	0.6106	NO
TOX-003-081606		0.456	0.378	0.648	18.70%	0.9948	NO	0.4796	NO
Champia parvula									
			Day 2 Survival						
Lab Control		100.0%	100.0%	100.0%	0.00%	-	-	-	-
TOX-001-081606		100.0%	100.0%	100.0%	0.00%	0.4796	NO	-	-
TOX-002-081606	4	100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
TOX-003-081606		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
			Day 7 Mean # Cystocarps						
Lab Control		80.27	76.20	84.80	5.38%	-	-	-	-
TOX-001-081606		85.15	70.80	95.20	12.19%	0.7573	NO	-	-
TOX-002-081606	4	86.40	80.00	98.20	9.36%	0.8535	NO	0.5722	NO
TOX-003-081606		82.75	62.40	102.20	19.67%	0.5945	NO	0.4060	NO

Table 5. Endpoint Summary Table - New Bedford Harbor Water Quality Monitoring August 28, 2006 Sampling Event. New Bedford Harbor Surface Water Monitoring Program. Fall 2006.

Sample ID	Reps	Mean	Min	Max	CV	Significant Difference vs			
						p Value	Lab	p Value	Ref
Arbacia punctulata			Portion Fertilized						
Lab Control		90.3%	88.5%	93.5%	2.42%	-	-	-	-
TOX-001-082806		91.0%	87.0%	94.3%	3.53%	0.6442	NO	-	-
TOX-002-082806	4	85.3%	81.3%	90.9%	4.85%	0.0392	YES	0.0633	NO
TOX-003-082806		86.7%	83.3%	90.1%	4.03%	0.0650	NO	0.0582	NO
Americamysis bahia									
			Day 2 Survival						
Lab Control		100.0%	100.0%	100.0%	0.00%	-	-	-	-
TOX-001-082806		100.0%	100.0%	100.0%	0.00%	0.4796	NO	-	-
TOX-002-082806	8	97.5%	80.0%	100.0%	7.25%	0.3605	NO	0.3605	NO
TOX-003-082806		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
			Day 7 Survival						
Lab Control		100.0%	100.0%	100.0%	0.00%	-	-	-	-
TOX-001-082806		100.0%	100.0%	100.0%	0.00%	0.4796	NO	-	-
TOX-002-082806	8	97.5%	80.0%	100.0%	7.25%	0.3605	NO	0.3605	NO
TOX-003-082806		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
			Day 7 Dry Weight Biomass - mg						
Lab Control		0.284	0.248	0.318	8.14%	-	-	-	-
TOX-001-082806		0.319	0.254	0.380	14.37%	0.9629	NO	-	-
TOX-002-082806	8	0.325	0.280	0.378	11.62%	0.9905	NO	0.9991	NO
TOX-003-082806		0.398	0.354	0.452	9.12%	1.0000	NO	0.6193	NO
Champia parvula									
				Day 2 Survival					
Lab Control		100.0%	100.0%	100.0%	0.00%	-	-	-	-
TOX-001-082806		100.0%	100.0%	100.0%	0.00%	0.4796	NO	-	-
TOX-002-082806	4	100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
TOX-003-082806		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
			Day 7 Mean # Cystocarps						
Lab Control		25.07	17.80	37.60	43.48%	-	-	-	-
TOX-001-082806		29.40	23.00	37.80	21.96%	0.7326	NO	-	-
TOX-002-082806	4	27.35	20.80	35.80	23.85%	0.6296	NO	0.3354	NO
TOX-003-082806		29.35	19.60	40.80	35.65%	0.6897	NO	0.4969	NO

Table 6. Endpoint Summary Table - New Bedford Harbor Water Quality Monitoring September 19, 2006 Sampling Event. New Bedford Harbor Surface Water Monitoring Program. Fall 2006.

Sample ID	Reps	Mean	Min	Max	CV	Significant Difference vs			
						p Value	Lab	p Value	Ref
Arbacia punctulata		Portion Fertilized							
Lab Control		99.3%	98.0%	100.0%	0.95%	-	-	-	-
TOX-001-091906		94.0%	91.0%	98.0%	3.22%	0.0050	YES	-	-
TOX-002-091906	4	95.6%	92.9%	97.1%	1.96%	0.0035	YES	0.7624	NO
TOX-003-091906		94.0%	92.7%	95.2%	1.20%	0.0003	YES	0.4252	NO
TOX-004-091906		92.7%	91.8%	93.5%	0.73%	0.0001	YES	0.1926	NO
Americamysis bahia									
		Day 2 Survival							
Lab Control		100.0%	100.0%	100.0%	0.00%	-	-	-	-
TOX-001-091906		100.0%	100.0%	100.0%	0.00%	0.4796	NO	-	-
TOX-002-091906	8	97.5%	80.0%	100.0%	7.25%	0.3605	NO	0.3605	NO
TOX-003-091906		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
TOX-004-091906		95.0%	80.0%	100.0%	9.75%	0.2209	NO	0.2209	NO
		Day 7 Survival							
Lab Control		92.5%	80.0%	100.0%	11.19%	-	-	-	-
TOX-001-091906		97.5%	80.0%	100.0%	7.25%	0.7791	NO	-	-
TOX-002-091906	8	95.0%	80.0%	100.0%	9.75%	0.6395	NO	0.3605	NO
TOX-003-091906		100.0%	100.0%	100.0%	0.00%	0.8828	NO	0.6395	NO
TOX-004-091906		75.0%	60.0%	80.0%	12.34%	0.0074	YES	0.0005	YES
		Day 7 Dry Weight Biomass - mg							
Lab Control		0.241	0.180	0.272	14.06%	-	-	-	-
TOX-001-091906		0.511	0.416	0.586	11.23%	1.0000	NO	-	-
TOX-002-091906	8	0.462	0.320	0.516	14.78%	0.9999	NO	0.0684	NO
TOX-003-091906		0.623	0.452	0.944	25.42%	0.9999	NO	0.9589	NO
TOX-004-091906		0.696	0.200	2.174	100.49%	0.9476	NO	0.2209	NO
Champia parvula									
		Day 2 Survival							
Lab Control		100.0%	100.0%	100.0%	0.00%	-	-	-	-
TOX-001-091906		100.0%	100.0%	100.0%	0.00%	0.4796	NO	-	-
TOX-002-091906	4	100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
TOX-003-091906		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
TOX-004-091906		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
		Day 7 Mean # Cystocarps							
Lab Control		23.93	14.60	34.00	40.62%	-	-	-	-
TOX-001-091906		24.50	17.60	36.20	33.20%	0.5320	NO	-	-
TOX-002-091906	4	0.80	0.40	1.80	84.16%	0.0272	YES	0.0051	YES
TOX-003-091906		0.20	0.00	0.40	81.65%	0.0258	YES	0.0047	YES
TOX-004-091906		0.15	0.00	0.60	200.00%	0.0257	YES	0.0047	YES

Table 7. Summary of "As Received" Sample Physical and Chemical Characteristics. New Bedford Harbor Surface Water Monitoring Program. Fall 2005.

Sample ID	Lab Code	Ammonia (mg/L)	pH (SU)	Salinity (‰)	Specific Conductance (µmhos/cm)	Total Residual Chlorine (mg/L)
WQ-TOX-001-081406	14877-001	<0.1	7.42	24	31700	<0.05
WQ-TOX-002-081406	14877-002	<0.1	8.00	25	37700	<0.05
WQ-TOX-003-081406	14877-003	<0.1	7.89	25	37000	<0.05
WQ-TOX-004-081406	14877-004	<0.1	7.86	25	36500	<0.05
WQ-TOX-001-081606	14886-001	<0.1	7.60	30	36400	<0.05
WQ-TOX-002-081606	14886-002	<0.1	7.91	30	35100	<0.05
WQ-TOX-003-081606	14886-003	<0.1	7.85	30	35400	<0.05
WQ-TOX-001-082806	14925-001	<0.1	7.53	27	42210	<0.05
WQ-TOX-002-082806	14925-002	0.14	7.33	16	26200	<0.05
WQ-TOX-003-082806	14925-003	<0.1	7.35	18	28750	<0.05
WQ-TOX-001-091906	15007-001	<0.1	7.89	28	42790	0.05
WQ-TOX-002-091906	15007-002	<0.1	7.79	24	37390	<0.05
WQ-TOX-003-091906	15007-003	0.20	7.89	23	36050	<0.05
WQ-TOX-004-091906	15007-004	0.17	7.80	23	36190	<0.05

Table 8. Reference Toxicant Summary. New Bedford Harbor Surface Water Monitoring Program. Fall 2006.

Date	Endpoint		Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
A. bahia						
08/30/06	Survival	LC-50	20.8	20.4	15.2 - 25.7	SDS (mg/L)
08/24/06	Survival	C-NOEC	15.0	10.0	5.0 - 15.0	SDS (mg/L)
08/24/06	Growth	C-NOEC	15.0	10.0	5.0 - 15.0	SDS (mg/L)
09/28/06	Survival	LC-50	21.1	20.4	15.2 - 25.5	SDS (mg/L)
09/28/06	Survival	C-NOEC	15.0	15.0	10.0 - 25.0	SDS (mg/L)
09/28/06	Growth	C-NOEC	15.0	10.0	5.0 - 15.0	SDS (mg/L)
A. Punctulata						
08/10/06	Fertilization	C-NOEC	5.0	40.0	20.0 - 80.0	Copper (µg/L)
08/10/06	Fertilization	IC-25	52.2	71.4	0.0 - 153.9	Copper (µg/L)
09/28/06	Fertilization	C-NOEC	5.0	40.0	20.0 - 80.0	Copper (µg/L)
09/28/06	Fertilization	IC-25	10.1	67.0	0.0 - 152.9	Copper (µg/L)

Mean and Acceptable Ranges based on most recent 20 reference toxicant assays (NELAP standard)

APPENDIX A
SUPPORT DATA

Contents	# Pages
Methods Summary	1
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A. bahia Bench Sheets & Statistical Analysis Report	16
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C. parvula Bench Sheets and Statistical Analysis Report	7
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A. bahia Bench Sheets & Statistical Analysis Report	10
A. punctulata Bench Sheets and Statistical Analysis Report	9
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A. bahia Bench Sheets & Statistical Analysis Report	26
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“As Received” Ammonia Data Report	1
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Chain of Custody	4
Total Appendix Pages	153

METHODS USED IN NPDES PERMIT BIOMONITORING TESTING

Parameter	Method
Acute Exposure Bioassays:	
Ceriodaphnia dubia, Daphnia pulex	EPA-821-R-02-012
Pimephales promelas	EPA-821-R-02-012
Americamysis bahia	EPA-821-R-02-012
Menidia beryllina, Cyprinodon variegatus	EPA-821-R-02-012
Chronic Exposure Bioassays:	
Ceriodaphnia dubia	EPA-821-R-02-013 1002.0
Pimephales promelas	EPA-821-R-02-013 1000.0
Cyprinodon variegatus	EPA-821-R-02-014 1004.0
Menidia beryllina	EPA-821-R-02-014 1006.0
Arbacia punctulata	EPA-821-R-02-014 1008.0
Champia parvula	EPA-821-R-02-014 1009.0
Trace Metals:	
ICP Metals	EPA 200.7/SW 6010
Hardness	Standard Methods 20th Edition - Method 2340 B
Wet Chemistries:	
Alkalinity	EPA 310.2
Chlorine, Residual	Standard Methods 20th Edition - Method 4500CLD
Total Organic Carbon	Standard Methods 20th Edition - Method 5310C
Specific Conductance	Standard Methods 20th Edition - Method 2510B
Nitrogen - Ammonia	Standard Methods 20th Edition - Method 4500NH3G
pH	Standard Methods 20th Edition - Method 4500H+B
Solids, Total (TS)	Standard Methods 20th Edition - Method 2540.B
Solids, Total Suspended (TSS)	Standard Methods 20th Edition - Method 2540D
Dissolved Oxygen	Standard Methods 20th Edition - Method 4500-O G

Americamysis bahia 7 DAY CHRONIC ASSAY
SURVIVAL & OLD WATER QUALITIES

STUDY: 14877	CLIENT: Battelle	LOCATION: NEW BEDFORD	LAB CONTROL: HAMPTON ESTUARY	ORGANISM BATCH/LOT#

		NUMBER OF SURVIVORS								OLD DISSOLVED OXYGEN (mg/L)						
SAMPLE	Rep	0	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Lab Control	A	5	5	5	5	5	5	5	5	6.1	5.4	5.9	5.8	6.3	6.2	5.9
	B	5	5	5	5	5	5	5	5	6.2	5.8	6.4	6.0	6.3	6.2	6.1
	C	5	5	5	5	5	5	5	5	6.4	6.0	6.4	6.0	6.3	6.2	6.1
	D	5	5	5	5	5	5	5	5	6.5	6.0	6.4	6.0	6.2	6.0	6.0
	E	5	5	5	5	5	5	5	5	6.4	5.8	6.4	6.2	6.4	6.3	6.1
	F	5	5	5	5	5	5	5	5	6.1	6.0	6.3	6.1	6.2	6.0	6.2
	G	5	5	5	5	5	5	5	5	6.1	5.9	6.3	6.0	6.2	6.1	6.1
	H	5	5	5	5	5	5	5	5	6.1	5.9	6.3	6.0	6.2	6.3	6.1
-001	A	5	5	5	5	4	4	4	4	5.5	5.4	5.8	5.9	5.7	6.0	6.7
	B	5	5	5	5	5	5	5	5	5.1	5.1	5.5	5.6	5.6	5.7	6.1
	C	5	5	5	5	5	5	5	5	5.1	5.0	5.4	5.3	5.2	5.4	5.5
	D	5	5	5	5	5	5	5	5	5.2	5.0	5.5	5.4	5.2	5.2	5.4
	E	5	5	5	5	5	5	5	5	5.1	5.0	5.2	5.4	5.3	5.5	6.3
	F	5	5	5	5	5	5	5	5	5.3	5.2	5.3	5.4	5.3	5.6	6.0
	G	5	5	5	5	5	5	5	4	5.1	5.1	5.3	5.3	5.4	5.3	5.4
	H	5	5	5	5	5	5	5	5	5.4	5.3	5.3	5.4	5.1	5.4	5.5
-002	A	5	5	5	5	5	5	5	5	5.1	4.9	5.5	5.4	5.3	4.9	5.1
	B	5	5	5	5	5	5	5	5	5.2	4.9	5.6	5.3	4.7	4.7	5.0
	C	5	5	5	5	5	5	5	5	5.4	4.9	5.5	5.3	5.1	5.0	4.9
	D	5	5	5	5	5	5	5	5	5.5	4.9	5.6	5.3	5.2	5.2	5.1
	E	5	5	5	5	5	5	5	5	5.3	4.8	5.3	5.4	5.2	5.0	5.2
	F	5	5	5	5	5	5	5	5	5.4	4.9	5.4	5.0	5.0	4.7	5.1
	G	5	5	5	5	5	5	5	5	5.5	4.9	5.4	5.2	4.9	5.0	5.1
	H	5	5	5	5	5	5	5	5	5.5	5.0	5.4	5.3	4.9	4.9	5.1
INC TEMP:		25	25	25	25	25	25	25	25							
DATE:		8/15	8/16	8/17	8/18	8/19	8/20	8/21	8/22							
TIME:		1630	1040	1030	1100	1110	1305	1235	1250							
INITIALS:		m	m	EG	Yh	EG	SJ	SJ	CP							

Americamysis bahia 7 DAY CHRONIC ASSAY
SURVIVAL & OLD WATER QUALITIES

CLIENT: Battelle	LOCATION: NEW BEDFORD	LAB CONTROL: HAMPTON ESTUARY	ORGANISM BATCH/LOT#

		NUMBER OF SURVIVORS								OLD DISSOLVED OXYGEN (mg/L)						
SAMPLE	Rep	0	1	2	3	4	5	6	7	1	2	3	4	5	6	7
-003	A	5	5	5	5	5	5	5	5	6.4	6.1	6.3	6.1	6.0	5.8	5.8
	B	5	5	5	5	5	5	5	5	6.4	6.1	6.3	5.8	5.8	~~4.7~~ 5.7	5.8
	C	5	5	5	5	5	5	5	5	6.4	6.0	6.0	5.8	5.8	5.7	5.8
	D	5	5	5	5	5	5	5	5	6.4	5.9	6.2	5.9	5.7	5.7	5.7
	E	5	5	5	5	5	5	5	5	6.4	5.9	5.9	5.9	5.8	5.8	5.8
	F	5	5	5	5	5	5	5	5	6.4	6.0	6.0	5.8	5.8	5.5	5.9
	G	5	5	5	5	5	5	5	5	6.3	6.0	6.0	5.8	5.8	5.6	5.7
	H	5	5	5	5	5	5	5	5	6.4	5.9	5.8	5.8	5.6	5.7	5.7
-004	A	5	5	5	5	5	5	5	5	6.4	6.0	6.2	6.0	6.0	6.0	6.0
	B	5	5	5	5	5	5	5	5	6.4	6.1	6.1	6.0	6.0	5.9	6.1
	C	5	5	5	5	5	5	5	5	6.4	6.1	6.1	6.0	6.2	6.4	6.1
	D	5	5	5	5	5	5	5	5	6.3	6.0	6.0	6.0	6.2	5.1	5.7
	E	5	5	5	5	5	5	5	5	6.4	6.1	6.0	6.1	6.3	6.2	6.3
	F	5	5	5	5	5	5	5	5	6.4	6.0	6.0	6.0	6.0	6.1	6.3
	G	5	5	5	5	5	5	5	5	6.4	5.6	5.6	5.9	5.9	6.0	6.0
	H	5	5	5	5	5	5	5	5	6.4	5.9	6.0	6.0	6.0	5.9	5.7
INC TEMP:		25	25	25	25	25	25	25	25							
DATE:		8/15	8/16	8/17	8/18	8/19	8/20	8/21	8/22							
TIME:		1630	1040	1030	1105	1110	1305	1235	1250							
INITIALS:		m	m	CO	yn	QG	SJ	SJ	CP							

Americamysis bahia 7 DAY CHRONIC ASSAY
ORGANISM WEIGHTS

CLIENT: BATTELLE - NEW BEDFORD				TEST DATES:				
STUDY #: 14877				SPECIES: *A. bahia*				
CONC	REP	TARE WEIGHT (g)	SHRIMP + FOIL (g)	NET WEIGHT (mg)	# SHRIMP DAY 0	MEAN WEIGHT (mg) DAY 0	# SHRIMP DAY 7	MEAN WEIGHT (mg) DAY 7
lab	A	206.05	207.68					
	B	206.81	208.20					
	C	207.80	209.34					
	D	207.82	209.68					
	E	205.16	206.90					
	F	210.49	212.08					
	G	208.14	209.87					
	H	205.80	207.51					
-001	A	208.10	209.90					
	B	212.43	214.61					
	C	207.69	210.17					
	D	205.68	207.87					
	E	206.68	209.00					
	F	213.62	215.71					
	G	208.03	209.70					
	H	207.43	209.78					
-002	A	210.06	212.18					
	B	209.32	211.60					
	C	207.73	209.75					
	D	203.98	206.50					
	E	209.99	212.46					
	F	208.97	211.28					
	G	206.84	209.30					
	H	209.32	211.74					
DATE 8/22/06			8/23/06					
TIME 12:55			1340					
INITIALS GL			NJ					

Americamysis bahia 7 DAY CHRONIC ASSAY
ORGANISM WEIGHTS

CLIENT: BATTELLE - NEW BEDFORD	TEST DATES:
STUDY #: 14877	SPECIES: *A. bahia*

CONC	REP	TARE WEIGHT (g)	SHRIMP + FOIL (g)	NET WEIGHT (mg)	# SHRIMP DAY 0	MEAN WEIGHT (mg) DAY 0	# SHRIMP DAY 7	MEAN WEIGHT (mg) DAY 7
-003	A	208.27	210.58					
	B	207.38	209.77					
	C	210.94	213.29					
	D	208.73	210.99					
	E	207.99	210.31					
	F	208.43	210.84					
	G	209.91	212.32					
	H	212.17	214.69					
-004	A	210.01	212.39					
	B	208.53	210.89					
	C	207.79	209.77					
	D	209.49	212.00					
	E	208.64	210.57					
	F (E3)	206.83	208.78					
	G	212.07	214.19					
	H	207.81	209.90					
	A							
	B							
	C							
	D							
	E							
	F							
	G							
	H							
DATE 8/22/06			8/23/06					
TIME 12:55			1340					
INITIALS GL			NT					

CETIS Test Summary

Report Date: 24 Aug-06 3:05 PM
Link: 03-1434-2699

Mysidopsis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	09-3630-1743	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 20h
Start Date:	15 Aug-06 04:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	22 Aug-06 12:50 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	15 Aug-06 04:30 PM	**Brine:**	Not Applicable		

Sample No:	07-8329-2830	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	15 Aug-06 10:00 AM	**Code:**	14877-000	**Project:**	Ecological Risk Assessment
Receive Date:	15 Aug-06 10:00 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	7h	**Station:**	WQ-TOX-Lab Control		
Sample No:	17-9585-5914	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	14 Aug-06 08:49 AM	**Code:**	14877-001	**Project:**	Ecological Risk Assessment
Receive Date:	14 Aug-06 03:10 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	32h	**Station:**	WQ-TOX-001		
Sample No:	18-0466-2689	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	14 Aug-06 01:05 PM	**Code:**	14877-002	**Project:**	Ecological Risk Assessment
Receive Date:	14 Aug-06 03:10 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	27h	**Station:**	WQ-TOX-002		
Sample No:	09-3579-7416	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	14 Aug-06 01:20 PM	**Code:**	14877-003	**Project:**	Ecological Risk Assessment
Receive Date:	14 Aug-06 03:10 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	27h	**Station:**	WQ-TOX-003		
Sample No:	18-0725-4579	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	14 Aug-06 01:45 PM	**Code:**	14877-004	**Project:**	Ecological Risk Assessment
Receive Date:	14 Aug-06 03:10 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	27h	**Station:**	WQ-TOX-004		

7d Proportion Survived Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
14877-000	8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
14877-001	8	0.95000	0.80000	1.00000	0.03273	0.09258	9.75%
14877-002	8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
14877-003	8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
14877-004	8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%

Mean Dry Biomass-mg Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
14877-000	8	0.32975	0.27800	0.37200	0.01021	0.02887	8.76%
14877-001	8	0.42700	0.33400	0.49600	0.01955	0.05529	12.95%
14877-002	8	0.46500	0.40400	0.50400	0.01264	0.03575	7.69%
14877-003	8	0.47425	0.45200	0.50400	0.00565	0.01598	3.37%
14877-004	8	0.43550	0.38600	0.50200	0.01494	0.04225	9.70%

CETIS Test Summary

Report Date: 24 Aug-06 3:05 PM
Link: 03-1434-2699

7d Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
14877-000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
14877-001	0.80000	1.00000	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000
14877-002	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
14877-003	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
14877-004	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
14877-000	0.32600	0.27800	0.30800	0.37200	0.34800	0.31800	0.34600	0.34200
14877-001	0.36000	0.43600	0.49600	0.43800	0.46400	0.41800	0.33400	0.47000
14877-002	0.42400	0.45600	0.40400	0.50400	0.49400	0.46200	0.49200	0.48400
14877-003	0.46200	0.47800	0.47000	0.45200	0.46400	0.48200	0.48200	0.50400
14877-004	0.47600	0.47200	0.39600	0.50200	0.38600	0.41000	0.42400	0.41800

CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	09-3630-1743	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 20h
Start Date:	15 Aug-06 04:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	22 Aug-06 12:50 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	15 Aug-06 04:30 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	03-1434-2699	03-1434-2699	24 Aug-06 3:04 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	3.66747	8.88539	0.10793	Equal Variances
Distribution	Shapiro-Wilk W	0.95236	0.84420	0.50601	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0378317	0.0378317	1	19.45	0.00059	Significant Effect
Error	0.0272357	0.0019454	14			
Total	0.06506743	0.0397771	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14877-000		14877-001	-4.4098	1.76131	0.9997	0.03884	Non-Significant Effect

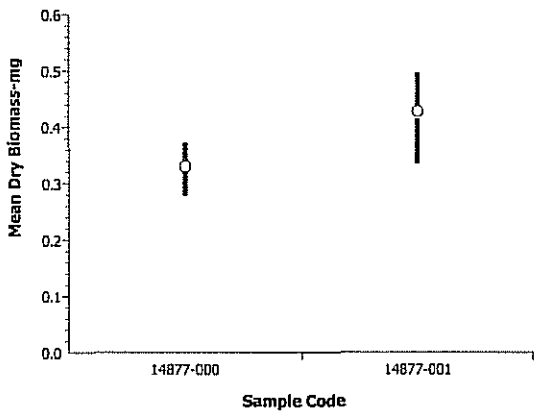
Data Summary

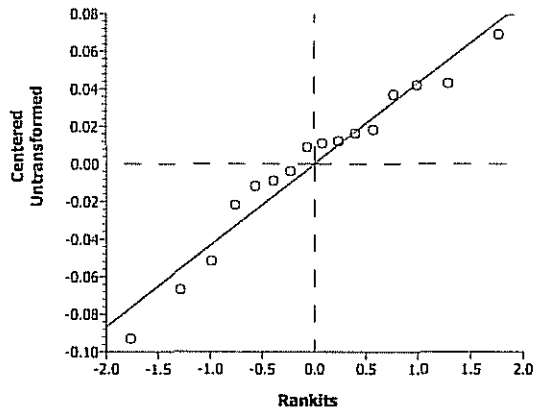
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14877-000	8	0.32975	0.27800	0.37200	0.02887				
14877-001	8	0.42700	0.33400	0.49600	0.05529				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14877-000	0.32600	0.27800	0.30800	0.37200	0.34800	0.31800	0.34600	0.34200		
14877-001	0.36000	0.43600	0.49600	0.43800	0.46400	0.41800	0.33400	0.47000		

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	09-3630-1743	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 20h
Start Date:	15 Aug-06 04:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	22 Aug-06 12:50 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	15 Aug-06 04:30 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	03-1434-2699	03-1434-2699	24 Aug-06 3:04 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.53278	8.88539	0.58696	Equal Variances
Distribution	Shapiro-Wilk W	0.93944	0.84420	0.33305	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.073172	0.073172	1	69.31	0.00000	Significant Effect
Error	0.0147793	0.0010557	14			
Total	0.08795134	0.0742277	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14877-000		14877-002	-8.3255	1.76131	1.0000	0.02861	Non-Significant Effect

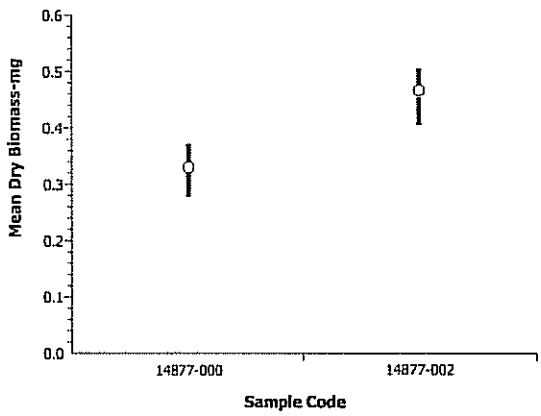
Data Summary

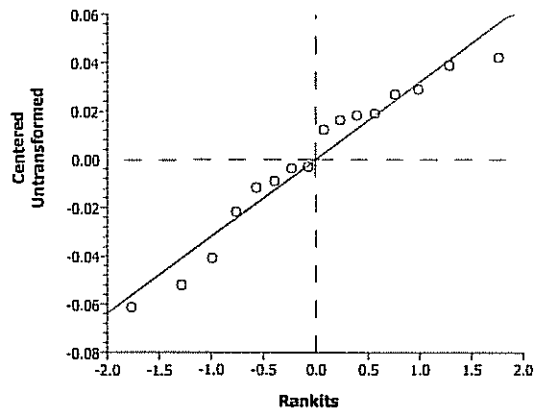
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14877-000	8	0.32975	0.27800	0.37200	0.02887				
14877-002	8	0.46500	0.40400	0.50400	0.03575				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14877-000	0.32600	0.27800	0.30800	0.37200	0.34800	0.31800	0.34600	0.34200		
14877-002	0.42400	0.45600	0.40400	0.50400	0.49400	0.46200	0.49200	0.48400		

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	09-3630-1743	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 20h
Start Date:	15 Aug-06 04:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	22 Aug-06 12:50 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	15 Aug-06 04:30 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	03-1434-2699	03-1434-2699	24 Aug-06 3:04 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	3.26437	8.88539	0.14130	Equal Variances
Distribution	Shapiro-Wilk W	0.97892	0.84420	0.93154	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0835227	0.0835227	1	153.40	0.00000	Significant Effect
Error	0.0076228	0.0005445	14			
Total	0.09114549	0.0840672	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14877-000		14877-003	-12.385	1.76131	1.0000	0.02055	Non-Significant Effect

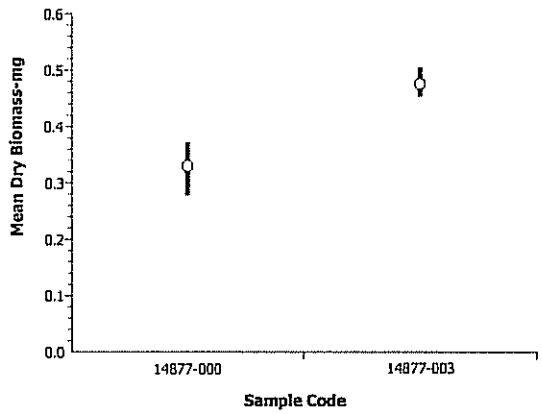
Data Summary

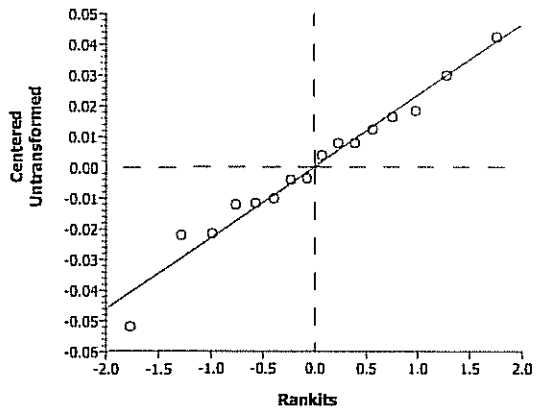
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14877-000	8	0.32975	0.27800	0.37200	0.02887				
14877-003	8	0.47425	0.45200	0.50400	0.01598				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14877-000	0.32600	0.27800	0.30800	0.37200	0.34800	0.31800	0.34600	0.34200		
14877-003	0.46200	0.47800	0.47000	0.45200	0.46400	0.48200	0.48200	0.50400		

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	09-3630-1743	Test Type:	Growth-Survival (7d)	Duration:	6d 20h
Start Date:	15 Aug-06 04:30 PM	Protocol:	EPA/821/R-02-014 (2002)	Species:	Mysidopsis bahia
Ending Date:	22 Aug-06 12:50 PM	Dil Water:	Not Applicable	Source:	ARO - Aquatic Research Organisms, N
Setup Date:	15 Aug-06 04:30 PM	Brine:	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	03-1434-2699	03-1434-2699	24 Aug-06 3:04 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.14107	8.88539	0.33657	Equal Variances
Distribution	Shapiro-Wilk W	0.96386	0.84420	0.69861	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0447338	0.0447338	1	34.17	0.00004	Significant Effect
Error	0.0183288	0.0013092	14			
Total	0.06306261	0.046043	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14877-000		14877-004	-5.8454	1.76131	1.0000	0.03186	Non-Significant Effect

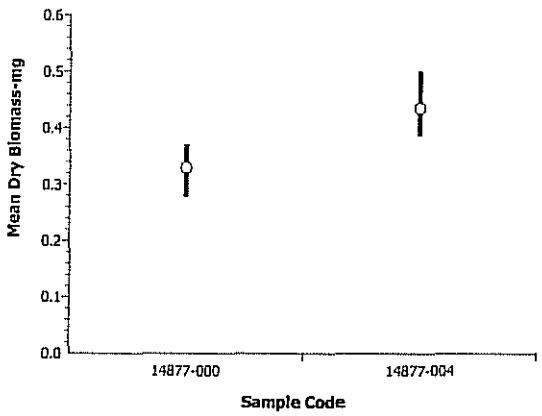
Data Summary

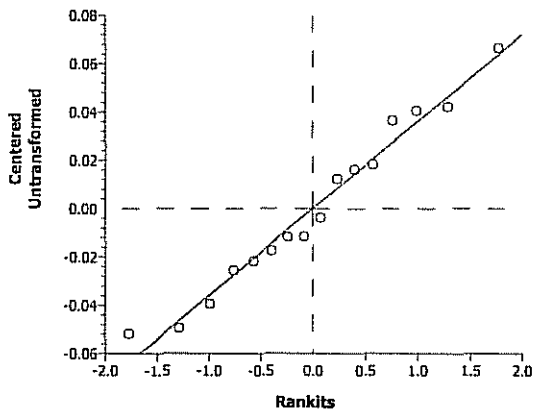
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14877-000	8	0.32975	0.27800	0.37200	0.02887				
14877-004	8	0.43550	0.38600	0.50200	0.04225				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14877-000	0.32600	0.27800	0.30800	0.37200	0.34800	0.31800	0.34600	0.34200		
14877-004	0.47600	0.47200	0.39600	0.50200	0.38600	0.41000	0.42400	0.41800		

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	09-3630-1743	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 20h
Start Date:	15 Aug-06 04:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	22 Aug-06 12:50 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	15 Aug-06 04:30 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	03-1434-2699	03-1434-2699	24 Aug-06 3:05 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.39269	8.88539	0.27245	Equal Variances
Distribution	Shapiro-Wilk W	0.94003	0.84420	0.33978	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0057759	0.0057759	1	2.66	0.12487	Non-Significant Effect
Error	0.0303446	0.0021675	14			
Total	0.03612053	0.0079434	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14877-001		14877-002	-1.6324	1.76131	0.9376	0.041	Non-Significant Effect

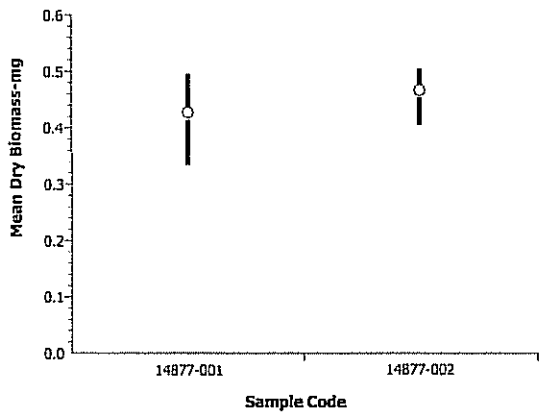
Data Summary

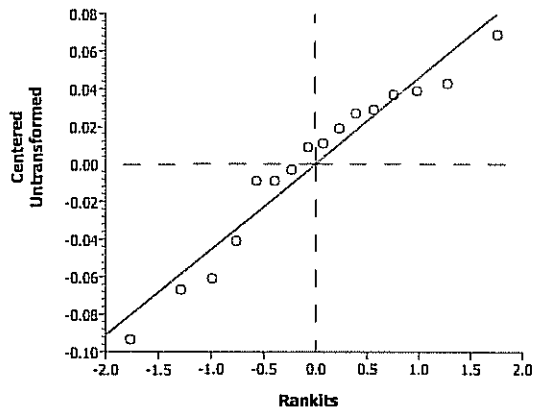
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14877-001	8	0.42700	0.33400	0.49600	0.05529				
14877-002	8	0.46500	0.40400	0.50400	0.03575				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14877-001	0.36000	0.43600	0.49600	0.43800	0.46400	0.41800	0.33400	0.47000		
14877-002	0.42400	0.45600	0.40400	0.50400	0.49400	0.46200	0.49200	0.48400		

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	09-3630-1743	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 20h
Start Date:	15 Aug-06 04:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	22 Aug-06 12:50 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	15 Aug-06 04:30 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	03-1434-2699	03-1434-2699	24 Aug-06 3:05 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	11.97200	8.88539	0.00406	Unequal Variances
Distribution	Shapiro-Wilk W	0.93004	0.84420	0.24050	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0089301	0.0089301	1	5.39	0.03582	Significant Effect
Error	0.0231880	0.0016563	14			
Total	0.03211813	0.0105864	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14877-001		14877-003	-2.322	1.85955	0.9756	0.03784	Non-Significant Effect

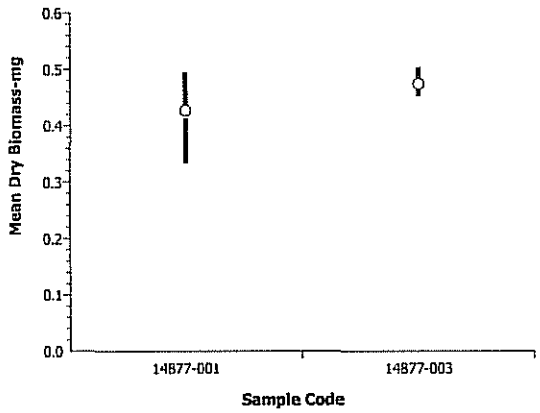
Data Summary

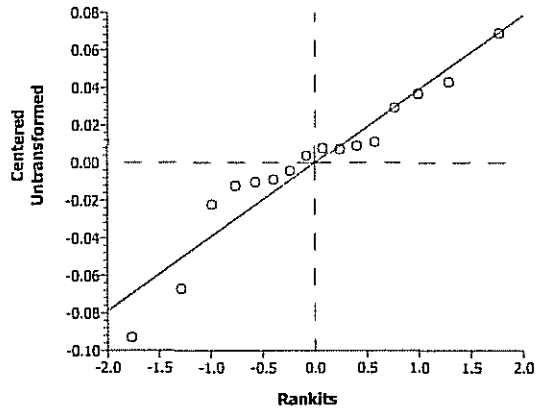
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14877-001	8	0.42700	0.33400	0.49600	0.05529				
14877-003	8	0.47425	0.45200	0.50400	0.01598				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14877-001	0.36000	0.43600	0.49600	0.43800	0.46400	0.41800	0.33400	0.47000		
14877-003	0.46200	0.47800	0.47000	0.45200	0.46400	0.48200	0.48200	0.50400		

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	09-3630-1743	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 20h
Start Date:	15 Aug-06 04:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	22 Aug-06 12:50 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	15 Aug-06 04:30 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	03-1434-2699	03-1434-2699	24 Aug-06 3:05 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.71291	8.88539	0.49452	Equal Variances
Distribution	Shapiro-Wilk W	0.96462	0.84420	0.71201	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.000289	0.000289	1	0.12	0.73486	Non-Significant Effect
Error	0.0338941	0.0024210	14			
Total	0.03418311	0.0027100	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14877-001		14877-004	-0.3455	1.76131	0.6326	0.04333	Non-Significant Effect

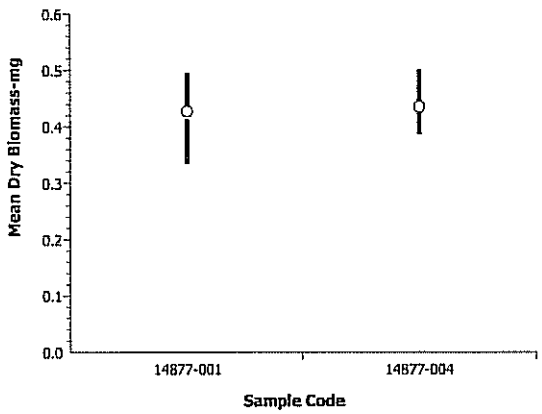
Data Summary

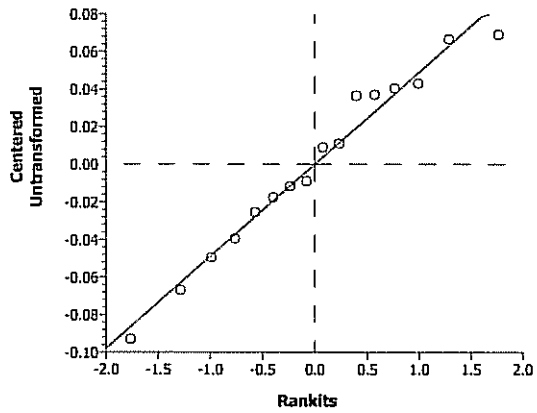
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14877-001	8	0.42700	0.33400	0.49600	0.05529				
14877-004	8	0.43550	0.38600	0.50200	0.04225				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14877-001	0.36000	0.43600	0.49600	0.43800	0.46400	0.41800	0.33400	0.47000		
14877-004	0.47600	0.47200	0.39600	0.50200	0.38600	0.41000	0.42400	0.41800		

Graphics





Rec: 8/15/06

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species: AMERICAMYSIS bahia

Source: Lab reared ✓ Hatchery reared _____ Field collected _____

Hatch date 8-12-06 Receipt date _____

Lot number 081206MS Strain _____

Brood Origination FLORIDA

II. Water Quality

Temperature 25 °C Salinity ≈30 ppt DO _____

pH 7.8 Hardness _____ ppm

III. Culture Conditions

System: RECIRC

Diet: Flake Food ✓ Phytoplankton _____ Trout Chow ✓

Brine Shrimp ✓ Rotifers _____ Other ENCAP. Shrimp Diet™

Prophylactic Treatments: _____

Comments: _____

IV. Shipping Information

Client: ESI # of Organisms: 3201

Carrier: _____ Date Shipped: 8-15-06

Biologist: Mark Vocenzuro

1 - 800 - 927 - 1650

PO Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650

Arbacia punctulata Chronic Fertilization Assay
Water Quality and Gamete Preparation Data

STUDY: 14877	CLIENT: BATTELLE	LOCATION: New Bedford	DATE: 8/15/06 INITIALS: SJ

SALINITY ADJUSTMENT RECORD: 200 mL -001 + 14 g SALT 200 mL - 004 + 12 g Salt

SALINITY ADJUSTMENT RECORD: 200 mL -002 + 12 g SALT

SALINITY ADJUSTMENT RECORD: 200 mL -003 + 12 g SALT

SALINITY ADJUSTED SAMPLE	D.O. (mg/L)	pH (SU)	SPEC COND (µmhos)	TEMP (°C)	SALINITY (ppt)
Lab Control	6.8	8.07	39200	20	31
-001	7.6	7.63	36000	20	31
-002	8.6	8.03	38600	20	31
-003	7.7	7.93	39300	20	31
-004	7.4	7.88	40400	20	30

METERS USED

DO meter # 19 DO probe # 12 pH meter # 470 pH probe # 48 S/C meter # 330iB S/C probe # 330iB

SALINITY meter # 330iB

DATE & INITIALS FOR GAMETE PREPARATION: 8/15/06 SJ

SPERM DILUTIONS:

HEMACYTOMETER COUNT, E: 111 X 10^4= SPM SOLUTION E = 1.11×10^7

SPERM CONCENTRATIONS:
SOLUTION E X 40 = SOLUTION A = 4.44×10^7 SPM
SOLUTION E X 20 = SOLUTION B = 2.22×10^7 SPM
SOLUTION E X 5 = SOLUTION C = 5.55×10^6 SPM

FINAL COUNTS:

FINAL SPERM COUNT: 111
FINAL EGG COUNT: 24

TEST TIMES:

SPERM COLLECTED: 1050
EGGS COLLECTED: 1050
SPERM ADDED: 1115
EGGS ADDED: 1215
FIXATIVE ADDED: 1235

See ESI SOP #1412 for additional information

Arbacia punctulata Chronic Fertilization Assay

SAMPLE USE RECORD

STUDY: 14877	CLIENT: Battelle - New Bedford
SPECIES: *A. punctulata*	

	Day: 0	
SAMPLE	Volume Used (mL)	ESI Cube ID
Lab Control	200mL	—
-001	↓	14877-001
-002		14877-002
-003		14877-003
-004		14877-004
INITIALS:	SJ	
TIME:	1005	
DATE:	8/15/06	

FERTILIZATION COUNTS

STUDY 14877	CLIENT BATTELLE	LOCATION New Bedford	DATE 8/15/06 INITIALS SJ

	REPLICATE VIAL			
	1	2	3	4
SAMPLE	FERT/TOTAL	FERT/TOTAL	FERT/TOTAL	FERT/TOTAL
Lab Control	100/105	100/101	103/109	100/104
-001	101/109	100/111	100/112	104/110
-002	100/106	102/107	100/108	101/107
-003	102/117	100/116	102/118	100/112
-004	105/112	102/110	100/109	100/117

CETIS Test Summary

Report Date: 16 Aug-06 10:49 AM
Link: 07-4932-2517

Echinoid Sperm Cell Fertilization Test — EnviroSystems, Inc.

Test No:	03-1122-1664	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	15 Aug-06 11:15 AM	**Protocol:**	EPA/600/R-95/136 (1995)	**Species:**	Arbacia punctulata
Ending Date:	15 Aug-06 12:35 PM	**Dil Water:**	Receiving Water	**Source:**	In-House Culture
Setup Date:	15 Aug-06 11:15 AM	**Brine:**	Generic commercial salts		

Sample No:	07-8329-2830	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	15 Aug-06 10:00 AM	**Code:**	14877-000	**Project:**	Ecological Risk Assessment
Receive Date:	15 Aug-06 10:00 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	75m	**Station:**	WQ-TOX-Lab Control 081506		

Sample No:	17-9585-5914	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	14 Aug-06 08:49 AM	**Code:**	14877-001	**Project:**	Ecological Risk Assessment
Receive Date:	14 Aug-06 03:10 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	26h	**Station:**	WQ-TOX-001 081406		

Sample No:	18-0466-2689	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	14 Aug-06 01:05 PM	**Code:**	14877-002	**Project:**	Ecological Risk Assessment
Receive Date:	14 Aug-06 03:10 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	22h	**Station:**	WQ-TOX-002 081406		

Sample No:	09-3579-7416	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	14 Aug-06 01:20 PM	**Code:**	14877-003	**Project:**	Ecological Risk Assessment
Receive Date:	14 Aug-06 03:10 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	22h	**Station:**	WQ-TOX-003 081406		

Sample No:	18-0725-4579	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	14 Aug-06 01:45 PM	**Code:**	14877-004	**Project:**	Ecological Risk Assessment
Receive Date:	14 Aug-06 03:10 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	22h	**Station:**	WQ-TOX-004 081406		

Proportion Fertilized Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
14877-000	4	0.96224	0.94495	0.99010	0.00989	0.01977	2.05%
14877-001	4	0.91645	0.89286	0.94545	0.01205	0.02410	2.63%
14877-002	4	0.94163	0.92593	0.95327	0.00570	0.01141	1.21%
14877-003	4	0.87278	0.86207	0.89286	0.00701	0.01401	1.61%
14877-004	4	0.90923	0.85470	0.93750	0.01863	0.03726	4.10%

Proportion Fertilized Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
14877-000	0.95238	0.99010	0.94495	0.96154
14877-001	0.92661	0.90090	0.89286	0.94545
14877-002	0.94340	0.95327	0.92593	0.94393
14877-003	0.87179	0.86207	0.86441	0.89286
14877-004	0.93750	0.92727	0.91743	0.85470

CETIS Analysis Detail

Echinoid Sperm Cell Fertilization Test — **EnviroSystems, Inc.**

Test No:	03-1122-1664	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	15 Aug-06 11:15 AM	**Protocol:**	EPA/600/R-95/136 (1995)	**Species:**	Arbacia punctulata
Ending Date:	15 Aug-06 12:35 PM	**Dil Water:**	Receiving Water	**Source:**	In-House Culture
Setup Date:	15 Aug-06 11:15 AM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	07-4932-2517	07-4932-2517	16 Aug-06 10:49 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	3.48544	47.46723	0.33246	Equal Variances
Distribution	Shapiro-Wilk W	0.94791	0.74935	0.65350	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0045585	0.0045585	1	3.55	0.10865	Non-Significant Effect
Error	0.0077110	0.0012852	6			
Total	0.01226950	0.0058437	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14877-001		14877-002	-1.8833	1.94318	0.9457	0.04926	Non-Significant Effect

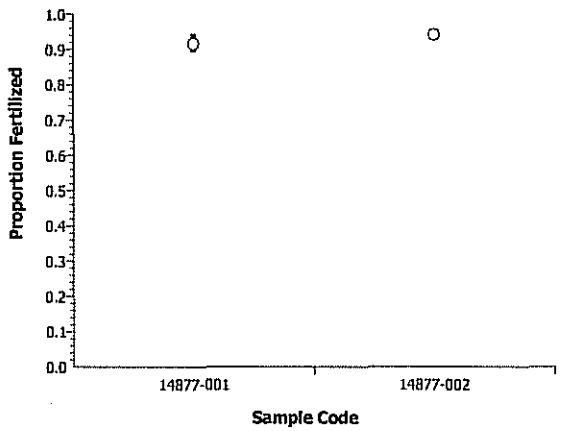
Data Summary

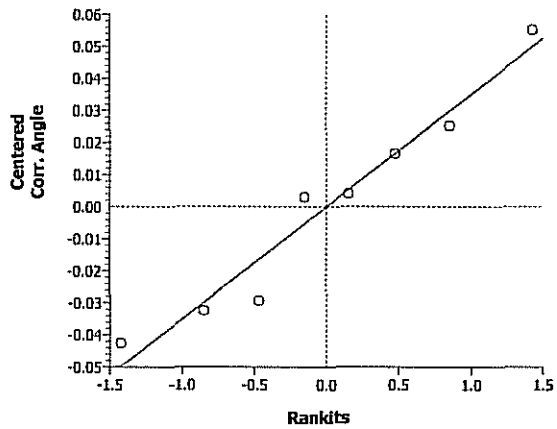
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14877-001	4	0.91645	0.89286	0.94545	0.02410	1.27985	1.23732	1.33507	0.04469
14877-002	4	0.94163	0.92593	0.95327	0.01141	1.32759	1.29515	1.35291	0.02394

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14877-001	0.92661	0.90090	0.89286	0.94545						
14877-002	0.94340	0.95327	0.92593	0.94393						

Graphics





CETIS Analysis Detail

Echinoid Sperm Cell Fertilization Test — **EnviroSystems, Inc.**

Test No:	03-1122-1664	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	15 Aug-06 11:15 AM	**Protocol:**	EPA/600/R-95/136 (1995)	**Species:**	Arbacia punctulata
Ending Date:	15 Aug-06 12:35 PM	**Dil Water:**	Receiving Water	**Source:**	In-House Culture
Setup Date:	15 Aug-06 11:15 AM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	07-4932-2517	07-4932-2517	16 Aug-06 10:49 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	4.34054	47.46723	0.25909	Equal Variances
Distribution	Shapiro-Wilk W	0.96884	0.74935	0.87101	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0107665	0.0107665	1	8.76	0.02528	Significant Effect
Error	0.0073723	0.0012287	6			
Total	0.01813880	0.0119952	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14877-001		14877-003	2.96012	1.94318	0.0126	0.04816	Significant Effect

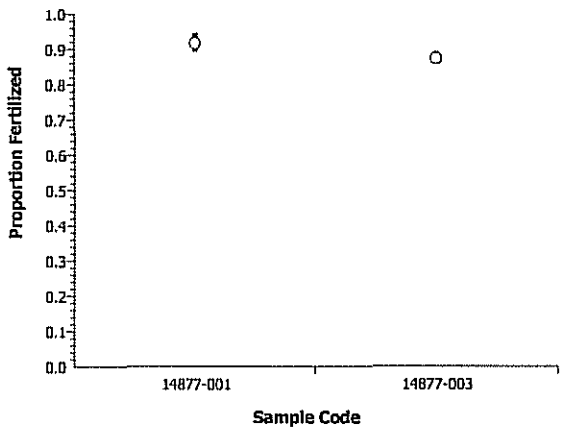
Data Summary

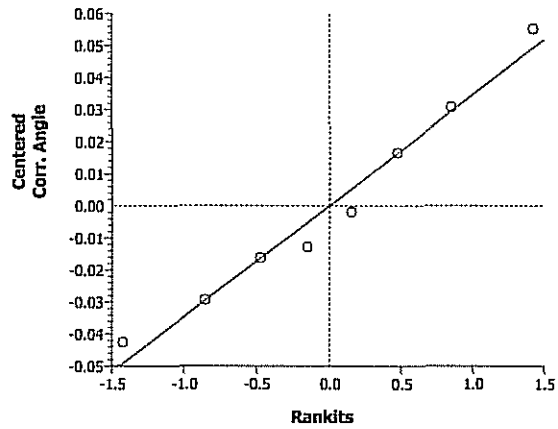
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14877-001	4	0.91645	0.89286	0.94545	0.02410	1.27985	1.23732	1.33507	0.04469
14877-003	4	0.87278	0.86207	0.89286	0.01401	1.20648	1.19029	1.23732	0.02145

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14877-001	0.92661	0.90090	0.89286	0.94545						
14877-003	0.87179	0.86207	0.86441	0.89286						

Graphics





CETIS Analysis Detail

Echinoid Sperm Cell Fertilization Test — **EnviroSystems, Inc.**

Test No:	03-1122-1664	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	15 Aug-06 11:15 AM	**Protocol:**	EPA/600/R-95/136 (1995)	**Species:**	Arbacia punctulata
Ending Date:	15 Aug-06 12:35 PM	**Dil Water:**	Receiving Water	**Source:**	In-House Culture
Setup Date:	15 Aug-06 11:15 AM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	07-4932-2517	07-4932-2517	16 Aug-06 10:49 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.88842	47.46723	0.61464	Equal Variances
Distribution	Shapiro-Wilk W	0.92997	0.74935	0.48173	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0002473	0.0002473	1	0.09	0.77952	Non-Significant Effect
Error	0.0173071	0.0028845	6			
Total	0.01755442	0.0031319	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14877-001		14877-004	0.29283	1.94318	0.3898	0.0738	Non-Significant Effect

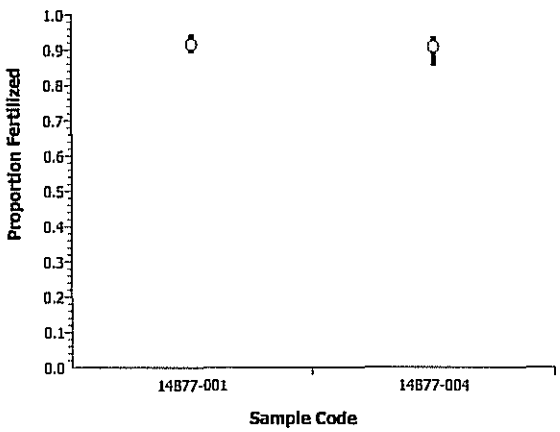
Data Summary

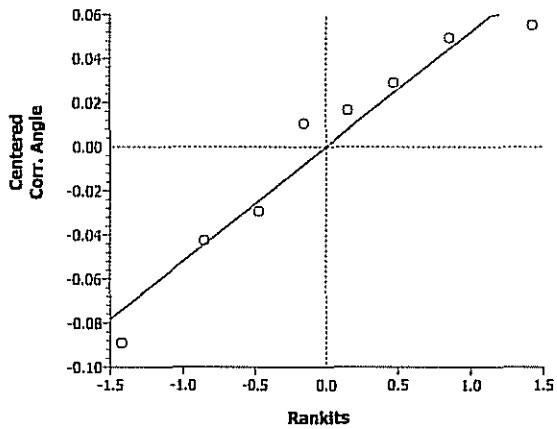
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14877-001	4	0.91645	0.89286	0.94545	0.02410	1.27985	1.23732	1.33507	0.04469
14877-004	4	0.90923	0.85470	0.93750	0.03726	1.26873	1.17972	1.31812	0.06141

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14877-001	0.92661	0.90090	0.89286	0.94545						
14877-004	0.93750	0.92727	0.91743	0.85470						

Graphics





CETIS Test Summary

Report Date: 25 Aug-06 11:45 AM
Link: 08-3041-0233

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	10-1428-4432	**Test Type:**	Champia	**Duration:**	5d 0h
Start Date:	17 Aug-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	22 Aug-06 12:00 PM	**Dil Water:**	Laboratory Seawater	**Source:**	In-House Culture
Setup Date:	17 Aug-06 12:00 PM	**Brine:**	Generic commercial salts		

Sample No:	07-8329-2830	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	15 Aug-06 10:00 AM	**Code:**	14877-000	**Project:**	Ecological Risk Assessment
Receive Date:	15 Aug-06 10:00 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	50h	**Station:**	WQ-TOX-Lab Control		
Sample No:	17-9585-5914	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	14 Aug-06 08:49 AM	**Code:**	14877-001	**Project:**	Ecological Risk Assessment
Receive Date:	14 Aug-06 03:10 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	75h	**Station:**	WQ-TOX-001		
Sample No:	18-0466-2689	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	14 Aug-06 01:05 PM	**Code:**	14877-002	**Project:**	Ecological Risk Assessment
Receive Date:	14 Aug-06 03:10 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	71h	**Station:**	WQ-TOX-002		
Sample No:	09-3579-7416	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	14 Aug-06 01:20 PM	**Code:**	14877-003	**Project:**	Ecological Risk Assessment
Receive Date:	14 Aug-06 03:10 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	71h	**Station:**	WQ-TOX-003		
Sample No:	18-0725-4579	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	14 Aug-06 01:45 PM	**Code:**	14877-004	**Project:**	Ecological Risk Assessment
Receive Date:	14 Aug-06 03:10 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	70h	**Station:**	WQ-TOX-004		

Mean Cystocarps Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
14877-000	3	21.733	17	25.8	2.5621	4.4377	20.42%
14877-001	4	28	27.2	29	0.3916	0.7832	2.80%
14877-002	4	28.7	24.2	32.6	1.8735	3.747	13.06%
14877-003	4	24.7	20.2	32.2	2.8065	5.6131	22.73%
14877-004	4	15.35	11	20	1.9033	3.8066	24.80%

Mean Cystocarps Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
14877-000	17	25.8	22.4	
14877-001	29	28.2	27.6	27.2
14877-002	30.8	24.2	32.6	27.2
14877-003	32.2	25.8	20.6	20.2
14877-004	16.4	20	11	14

CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	10-1428-4432	**Test Type:**	Champia	**Duration:**	5d 0h
Start Date:	17 Aug-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	22 Aug-06 12:00 PM	**Dil Water:**	Laboratory Seawater	**Source:**	In-House Culture
Setup Date:	17 Aug-06 12:00 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	08-3041-0233	08-3041-0233	25 Aug-06 11:44 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	32.10870	49.79928	0.01886	Equal Variances
Distribution	Shapiro-Wilk W	0.92642	0.72991	0.48440	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	67.32191	67.32191	1	8.16	0.03551	Significant Effect
Error	41.22667	8.245334	5			
Total	108.548573	75.567241	6			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14877-000		14877-001	-2.8574	2.01505	0.9822	4.41924	Non-Significant Effect

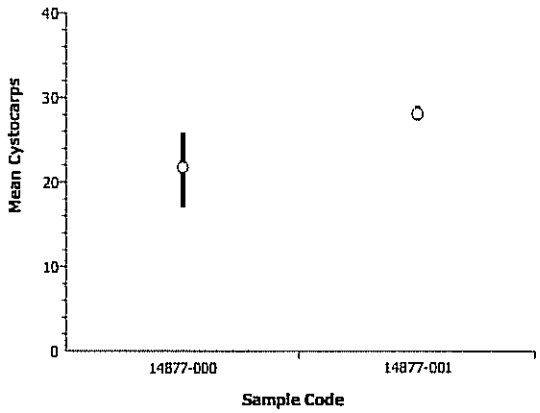
Data Summary

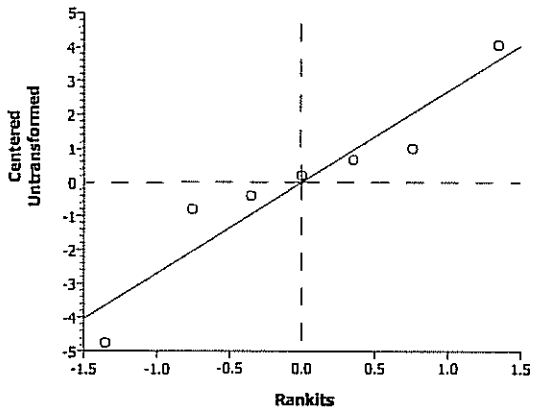
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14877-000	3	21.733	17	25.8	4.4377				
14877-001	4	28.000	27.2	29	0.7832				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14877-000	17	25.8	22.4							
14877-001	29	28.2	27.6	27.2						

Graphics





CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	10-1428-4432	**Test Type:**	Champia	**Duration:**	5d 0h
Start Date:	17 Aug-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	22 Aug-06 12:00 PM	**Dil Water:**	Laboratory Seawater	**Source:**	In-House Culture
Setup Date:	17 Aug-06 12:00 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	08-3041-0233	08-3041-0233	25 Aug-06 11:45 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.40266	49.79928	0.74297	Equal Variances
Distribution	Shapiro-Wilk W	0.89384	0.72991	0.27950	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	83.2019	83.2019	1	5.10	0.07343	Non-Significant Effect
Error	81.50667	16.30133	5			
Total	164.708572	99.503237	6			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14877-000		14877-002	-2.2592	2.01505	0.9633	6.21377	Non-Significant Effect

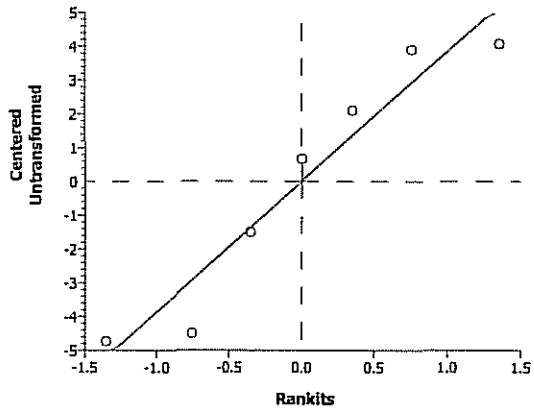
Data Summary

		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14877-000	3	21.733	17	25.8	4.4377				
14877-002	4	28.7	24.2	32.6	3.747				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14877-000	17	25.8	22.4							
14877-002	30.8	24.2	32.6	27.2						

Graphics



CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	10-1428-4432	**Test Type:**	Champia	**Duration:**	5d 0h
Start Date:	17 Aug-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	22 Aug-06 12:00 PM	**Dil Water:**	Laboratory Seawater	**Source:**	In-House Culture
Setup Date:	17 Aug-06 12:00 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	08-3041-0233	08-3041-0233	25 Aug-06 11:45 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.59986	199.16640	0.81392	Equal Variances
Distribution	Shapiro-Wilk W	0.89544	0.72991	0.28743	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	15.08762	15.08762	1	0.56	0.48671	Non-Significant Effect
Error	133.9067	26.78133	5			
Total	148.994281	41.868953	6			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14877-000		14877-003	-0.7506	2.01505	0.7566	7.96453	Non-Significant Effect

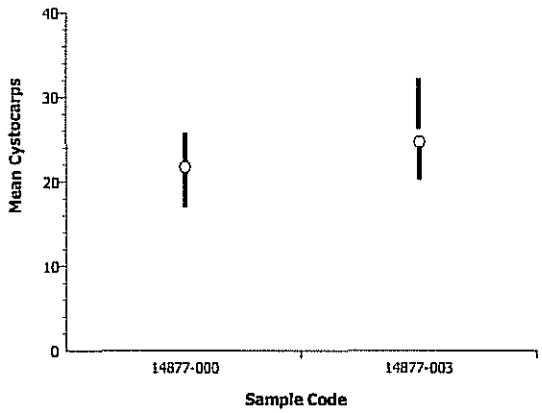
Data Summary

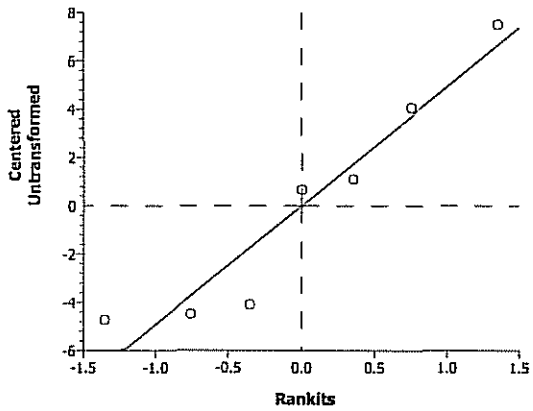
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14877-000	3	21.733	17	25.8	4.4377				
14877-003	4	24.700	20.2	32.2	5.6131				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14877-000	17	25.8	22.4							
14877-003	32.2	25.8	20.6	20.2						

Graphics





CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	10-1428-4432	**Test Type:**	Champia	**Duration:**	5d 0h
Start Date:	17 Aug-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	22 Aug-06 12:00 PM	**Dil Water:**	Laboratory Seawater	**Source:**	In-House Culture
Setup Date:	17 Aug-06 12:00 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	08-3041-0233	08-3041-0233	25 Aug-06 11:45 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.35910	49.79928	0.76002	Equal Variances
Distribution	Shapiro-Wilk W	0.92107	0.72991	0.44411	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	69.85191	69.85191	1	4.22	0.09527	Non-Significant Effect
Error	82.85667	16.57133	5			
Total	152.708572	86.423239	6			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14877-000		14877-004	2.05310	2.01505	0.0476	6.26502	Significant Effect

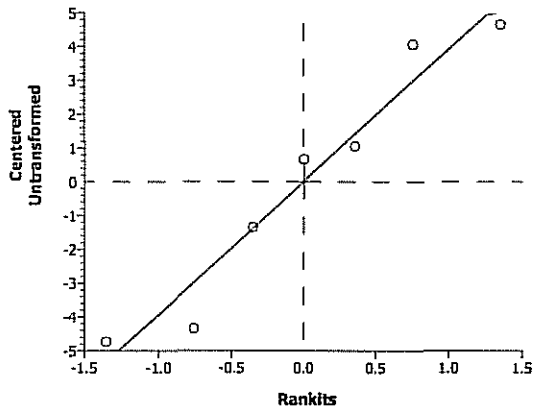
Data Summary

		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14877-000	3	21.733	17	25.8	4.4377				
14877-004	4	15.35	11	20	3.8066				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14877-000	17	25.8	22.4							
14877-004	16.4	20	11	14						

Graphics



CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	10-1428-4432	**Test Type:**	Champia	**Duration:**	5d 0h
Start Date:	17 Aug-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	22 Aug-06 12:00 PM	**Dil Water:**	Laboratory Seawater	**Source:**	In-House Culture
Setup Date:	17 Aug-06 12:00 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	08-3041-0233	08-3041-0233	25 Aug-06 11:45 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	22.89130	47.46723	0.02871	Equal Variances
Distribution	Shapiro-Wilk W	0.98195	0.74935	0.97065	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.98	0.98	1	0.13	0.72712	Non-Significant Effect
Error	43.96	7.326667	6			
Total	44.9399991	8.3066669	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14877-001		14877-002	-0.3657	1.94318	0.6364	3.71922	Non-Significant Effect

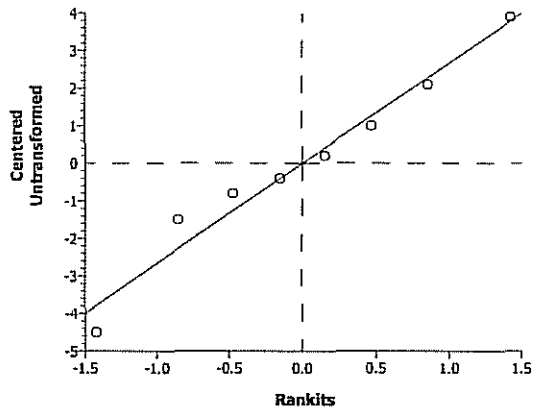
Data Summary

		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14877-001	4	28.000	27.2	29	0.7832				
14877-002	4	28.7	24.2	32.6	3.747				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14877-001	29	28.2	27.6	27.2						
14877-002	30.8	24.2	32.6	27.2						

Graphics



CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	10-1428-4432	**Test Type:**	Champia	**Duration:**	5d 0h
Start Date:	17 Aug-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	22 Aug-06 12:00 PM	**Dil Water:**	Laboratory Seawater	**Source:**	In-House Culture
Setup Date:	17 Aug-06 12:00 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	08-3041-0233	08-3041-0233	25 Aug-06 11:45 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	51.36956	47.46723	0.00891	Unequal Variances
Distribution	Shapiro-Wilk W	0.88892	0.74935	0.21999	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	21.78	21.78	1	1.36	0.28841	Non-Significant Effect
Error	96.36	16.06	6			
Total	118.140001	37.840000	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14877-001		14877-003	1.16455	2.35336	0.1642	6.66879	Non-Significant Effect

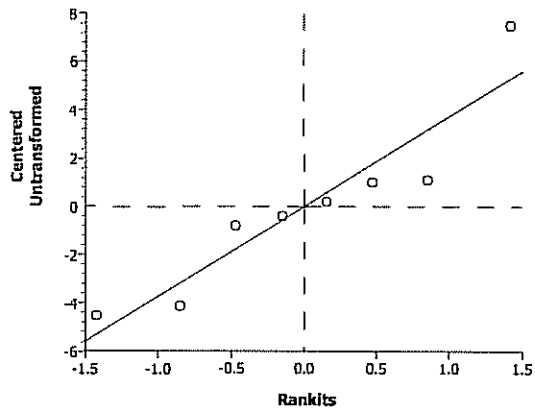
Data Summary

		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14877-001	4	28.000	27.2	29	0.7832				
14877-003	4	24.700	20.2	32.2	5.6131				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14877-001	29	28.2	27.6	27.2						
14877-003	32.2	25.8	20.6	20.2						

Graphics



CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	10-1428-4432	**Test Type:**	Champia	**Duration:**	5d 0h
Start Date:	17 Aug-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	22 Aug-06 12:00 PM	**Dil Water:**	Laboratory Seawater	**Source:**	In-House Culture
Setup Date:	17 Aug-06 12:00 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	08-3041-0233	08-3041-0233	25 Aug-06 11:45 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	23.62500	47.46723	0.02744	Equal Variances
Distribution	Shapiro-Wilk W	0.94790	0.74935	0.65332	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	320.045	320.045	1	42.38	0.00063	Significant Effect
Error	45.31	7.551667	6			
Total	365.355015	327.59668	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14877-001		14877-004	6.51005	1.94318	0.0003	3.77589	Significant Effect

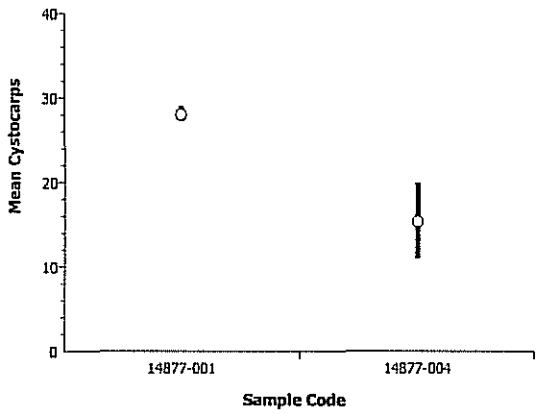
Data Summary

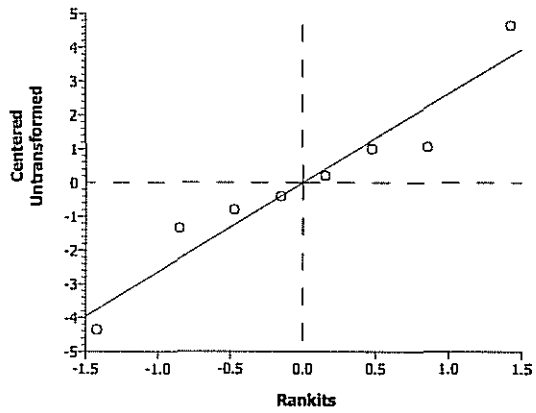
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14877-001	4	28.000	27.2	29	0.7832				
14877-004	4	15.35	11	20	3.8066				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14877-001	29	28.2	27.6	27.2						
14877-004	16.4	20	11	14						

Graphics





SALTWATER ASSAYS

A. bahia, A. punctulata, C. parvula

STUDY: 14877	LOCATION: New Bedford Harbor				
CHEMISTRY	Lab Salt Control	-001	-002	-003	-004
AMMONIA	14826 -025	-005	-006	-007	-008
AS RECEIVED WATER QUALITIES	Lab Salt Control	-001	-002	-003	-004
SALINITY (ppt)	26	24	25	25	25
pH (SU)	8.00	7.42	8.00	7.89	7.86
TRC (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
DO (mg/L)	7.0	7.0	7.0	7.3	7.1
S/C (µmhos/cm)	22700	31700	37700	37000	36500
WQ STATION USED	2	1	1	1	1
INITIALS	m	m	m	m	m
A. bahia SALINITY ADJUSTMENT RECORD	Lab Salt Control	-001	-002	-003	-004
SAMPLE (mLs)					
SEA SALT (g)					
DATE:					
TIME:					
INITIALS:					

Sample ID	ESI Cube ID
-001	-001
-002	-002
-003	-003
-004	-004

Americamysis bahia 7 DAY CHRONIC ASSAY
NEW WATER QUALITIES

STUDY: 14877	CLIENT: BATTELLE	LOCATION: NEW BEDFORD	LAB CONTROL: HAMPTON ESTUARY

		NEW DISSOLVED OXYGEN (mg/L)							NEW SALINITY (ppt)						
CONC	REP	0	1	2	3	4	5	6	0	1	2	3	4	5	6
LAB	A	7.0	6.9	6.8	7.0	6.9	6.9	6.5	26	26	26	25	25	25	
-001	A	7.0	4.7	6.4	6.0	5.6	6.2	6.0	24	26	26	26	26	26	
-002	A	7.0	5.3	6.5	6.0	5.6	5.5	6.1	25	26	26	26	26	26	
-003	A	7.3	6.0	7.0	6.9	7.0	7.2	6.7	25	26	26	26	26	26	
-004	A	7.1	6.4	7.1	7.1	7.2	7.4	6.8	25	26	26	26	26	26	

		NEW pH (SU)							NEW TEMPERATURE (°C)						
CONC	REP	0	1	2	3	4	5	6	0	1	2	3	4	5	6
LAB	A	8.00	7.89	7.85	7.94	7.74	7.93	7.93	24	25	24	24	24	25	25
-001	A	7.45	7.15	7.03	7.25	6.91	7.06	7.23	24	25	24	24	24	25	25
-002	A	7.97	7.32	7.23	7.41	7.11	7.28	7.40	24	25	24	24	24	25	25
-003	A	7.87	7.51	7.39	7.61	7.40	7.60	7.59	24	25	24	24	24	25	25
-004	A	7.87	7.49	7.41	7.64	7.47	7.69	7.64	24	25	24	24	24	25	25
INC TEMP:		25	25	25	25	25	25	25							
DATE:		8/15	8/16	8/17	8/18	8/19	8/20	8/21							
TIME:		1230	1145	1100	1115	1130	1345	1345							
INIT:		m	m	EG	m	EG	SJ	SJ							

WATER QUALITY METERS USED NEW WATER QUALITIES								
	0	1	2	3	4	5	6	7
Water Quality Station #	2	1	1	2	1	2	2	
Initials	m	m	EG	m	EG	SJ	SJ	
Date	8/15/06	8/16	8/17	8/18	8/19	8/20	8/21	

Americamysis bahia 7 DAY CHRONIC ASSAY
OLD WATER QUALITIES

STUDY:	CLIENT:	LOCATION:	LAB CONTROL:
14877	BATTELLE	NEW BEDFORD	HAMPTON ESTUARY

OLD SALINITY (ppt)									OLD pH (SU)						
Conc	Rep	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Control	A	26	26	26	26	26	26	26	7.88	7.66	7.83	7.67	7.81	7.79	7.72
-001	A	26	26	26	26	26	26	26	7.64	7.57	7.67	7.61	7.62	7.69	7.86
-002	A	26	26	26	26	26	26	26	7.64	7.52	7.67	7.63	7.58	7.62	7.54
-003	A	26	26	26	26	26	26	26	7.90	7.73	7.82	7.72	7.78	7.84	7.73
-004	A	26	26	26	26	26	26	26	7.90	7.74	7.82	7.73	7.82	7.90	7.76
OLD TEMPERATURE (°C)															
Conc	Rep	1	2	3	4	5	6	7							
Control	A	24	24	24	24	24	25	24							
-001	A	24	24	24	24	24	25	24							
-002	A	24	24	24	24	24	25	24							
-003	A	24	24	25	24	25	25	24							
-004	A	24	24	25	24	25	25	24							
INC TEMP:		25	25	25	25	25	25	25							
DATE:		8/16	8/17	8/18	8/19	8/20	8/21	8/22							
TIME:		1040	1020	1030	1055	1305	1235	1220							
INITIALS:		m	EG	yr	EG	SJ	SJ	CP							

GENERAL NOTES - for additional information refer to SOP #1411 or EPA manual 600/4-91/003

- Test vessels will be 250 mL glass beakers containing a minimum of 150 mL of solution
- 8 replicates per site with 5 organisms each

- Test Temperature: 26±1°C
- Salinity: 25 ±2ppt
- Dissolved Oxygen: >4.3 mg/L

- Photoperiod will be 16 hours light and 8 hours dark.
- Passing criteria require ≥80% survival and average dry weight of ≥0.20 mg/organism in the control vessels.

WATER QUALITY METERS USED
OLD WATER QUALITIES

	0	1	2	3	4	5	6	7
Water Quality Station #		2	1	2	1	2	1	2
Initials		m	EG	yr	EG	SJ	SJ	CP
Date	8.15.06	8.16	8/17	8/18/06	8/19	8/20	8/21	8/22

Americamysis bahia 7 DAY CHRONIC ASSAY
SAMPLE USE RECORD

STUDY: 14877	CLIENT: BATTELLE - New Bedford
SPECIES: *A. bahia*	TEST: chronic renewal

Sample	Day: 0		Day: 1		Day: 2	
	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID
Lab Control	1600	n/a	1200	n/a	1200	n/a
-001	↓	-001	↓	-001	↓	-001
-002	↓	-002	↓	-002	↓	-002
-003	↓	-003	↓	-003	↓	-003
-004	↓	-004	↓	-004	↓	-004

Day	Date	Time	Init
0	8/15	1100	m
1	8/16	1130	m
2	8/17	1045	EG
3	8/18	1110	yr
4	8/19	1120	EG
5	8/20	1340	SJ
6	8/21	1345	SJ

Sample	Day: 3		Day: 4		Day: 5	
	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID
Lab Control	1200	n/a	1200	n/a	1200	n/a
-001	↓	-001	↓	-001	↓	-001
-002	↓	-002	↓	-002	↓	-002
-003	↓	-003	↓	-003	↓	-003
-004	↓	-004	↓	-004	↓	-004

Sample	Day: 6	
	Volume Used (mL)	ESI Cube ID
Lab Control	1200	n/a
-001	↓	-001
-002	↓	-002
-003	↓	-003
-004	↓	-004

Americamysis bahia 7 DAY CHRONIC ASSAY
SURVIVAL & OLD WATER QUALITIES

STUDY:	CLIENT:	LOCATION:	LAB CONTROL:	ORGANISM BATCH/LOT#
14886	Battelle	NEW BEDFORD	HAMPTON ESTUARY	

		NUMBER OF SURVIVORS								OLD DISSOLVED OXYGEN (mg/L)						
SAMPLE	Rep	0	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Lab Control	A	5	5	5	5	5	5	5	5	5.9	5.9	5.9	5.9	6.1	5.0	4.8
	B	5	5	5	5	5	5	5	5	6.0	5.9	5.9	5.8	6.0	4.8	4.1
	C	5	5	5	5	4	4	4	4	5.9	6.0	6.0	5.8	5.9	4.6	3.9
	D	5	5	5	5	5	5	5	5	5.9	5.9	6.0	6.0	6.0	4.9	4.2
	E	5	5	5	5	5	5	5	5	5.9	5.9	6.2	5.6	6.0	5.0	4.1
	F	5	5	5	5	5	5	5	5	5.9	5.9	6.1	6.0	6.0	5.1	4.1
	G	5	4	4	4	4	4	4	4	5.9	6.0	6.1	6.0	5.9	5.0	3.7
	H	5	5	5	5	5	5	5	5	5.9	6.0	6.2	6.0	6.0	5.0	4.0
-001	A	5	5	5	5	5	5	5	5	5.5	6.0	6.6	6.0	6.3	5.5	4.5
	B	5	5	5	5	5	5	5	5	5.6	5.6	6.5	6.0	6.0	5.5	4.6
	C	5	5	5	5	5	5	5	5	5.8	5.9	6.4	6.0	6.0	5.7	5.1
	D	5	5	5	5	5	5	5	5	5.9	5.9	6.1	6.0	6.0	5.8	5.2
	E	5	5	5	5	5	5	5	5	6.0	6.0	6.2	6.0	6.0	5.7	4.9
	F	5	5	5	5	5	5	5	5	6.0	6.0	6.3	5.9	6.1	5.8	5.2
	G	5	5	5	5	5	5	5	5	6.0	6.0	6.2	6.0	6.0	5.9	5.3
	H	5	5	5	5	5	5	5	5	5.9	6.0	6.2	6.0	5.9	5.9	5.4
-002	A	5	5	5	5	5	5	5	5	5.5	6.0	6.2	6.0	6.0	5.4	5.2
	B	5	5	5	5	5	5	5	5	5.5	5.9	5.9	6.0	6.0	5.4	5.3
	C	5	5	5	5	5	5	5	5	5.5	5.6	5.8	5.9	5.5	5.0	5.3
	D	5	5	5	5	5	5	5	5	5.5	5.6	5.7	5.9	5.5	5.0	5.3
	E	5	5	5	5	5	5	5	5	5.5	5.6	6.0	5.6	5.6	5.6	5.6
	F	5	5	5	5	5	5	5	5	5.5	5.6	6.0	5.7	5.6	5.5	5.4
	G	5	5	5	5	5	5	5	5	5.5	5.6	5.7	5.7	5.3	5.0	5.3
	H	5	5	5	5	5	5	5	5	5.5	5.6	5.8	5.5	5.4	5.0	5.3
INC TEMP:		25	25	25	25	25	25	25	25							
DATE:		8/17	8/18	8/19	8/20	8/21	8/22	8/23	8/24							
TIME:		1530	1000	1030	1350	1110	1135	1200	1330							
INITIALS:		m	m	m	SJ	m	m	m	CP							

Americamysis bahia 7 DAY CHRONIC ASSAY
SURVIVAL & OLD WATER QUALITIES

STUDY:	CLIENT:	LOCATION:	LAB CONTROL:	ORGANISM BATCH/LOT#
14886	Battelle	NEW BEDFORD	HAMPTON ESTUARY	

		NUMBER OF SURVIVORS								OLD DISSOLVED OXYGEN (mg/L)						
SAMPLE	Rep	0	1	2	3	4	5	6	7	1	2	3	4	5	6	7
-003	A	5	5	5	5	4	4	4	4	5.6	5.5	5.9	5.7	6.0	5.7	6.0
	B	5	5	5	5	5	5	5	5	5.6	5.6	6.1	5.5	5.4	5.6	5.6
	C	5	5	5	5	5	5	5	5	5.7	5.7	5.9	5.5	5.0	5.2	5.6
	D	5	5	5	5	5	5	5	5	5.9	5.8	5.9	5.4	5.2	5.2	5.6
	E	5	5	5	5	5	5	5	5	6.0	6.0	6.1	5.7	5.5	5.7	6.1
	F	5	5	5	5	5	5	5	5	6.0	6.0	6.2	5.8	5.1	5.6	6.0
	G	5	5	5	5	5	5	5	5	5.9	5.8	6.1	5.6	5.1	5.5	5.7
	H	5	5	5	5	5	5	5	5	5.9	5.8	6.1	5.6	5.6	5.6	5.8
-004	A															
	B															
	C															
	D															
	E															
	F															
	G															
	H															
INC TEMP:		25	25	25	25	25	25	25	25							
DATE:		8/17	8/18	8/19	8/20	8/21	8/22	8/23	8/24							
TIME:		1530	1000	1030	1350	1110	1135	1200	1330							
INITIALS:		[illegible]	[illegible]	[illegible]	SJ	[illegible]	[illegible]	[illegible]	CP							

Americamysis bahia 7 DAY CHRONIC ASSAY
ORGANISM WEIGHTS

CLIENT: BATTELLE - NEW BEDFORD				TEST DATES:				
STUDY #: 14886				SPECIES: *A. bahia*				
CONC	REP	TARE WEIGHT (g)	SHRIMP + FOIL (g)	NET WEIGHT (mg)	# SHRIMP DAY 0	MEAN WEIGHT (mg) DAY 0	# SHRIMP DAY 7	MEAN WEIGHT (mg) DAY 7
Lab	A	206.59	~~211.97~~ 208.44					
	B	209.86	211.54					
	C	210.42	212.03					
	D	207.14	211.97					
	E	208.60	210.46					
	F	204.79	206.45					
	G	208.74	210.56					
	H	206.56	208.42					
-001	A	211.65	214.41					
	B	207.44	209.63					
	C	207.30	209.70					
	D	206.36	208.39					
	E	208.08	210.22					
	F	208.98	211.27					
	G	209.12	211.18					
	H	206.62	208.68					
-002	A	210.26	212.47					
	B	207.60	208.28					
	C	210.89	209.82					
	D	208.33	213.25					
	E	208.77	211.17					
	F	209.53	210.84					
	G	209.32	211.61					
	H	208.99	211.44					
DATE		8/24/06	8/25/06					
TIME		1050	13:23					
INITIALS		NT	GL					

Americamysis bahia 7 DAY CHRONIC ASSAY
ORGANISM WEIGHTS

CLIENT: BATTELLE - NEW BEDFORD				TEST DATES:				
STUDY #: 101886				SPECIES: *A. bahia*				
CONC	REP	TARE WEIGHT (g)	SHRIMP + FOIL (g)	NET WEIGHT (mg)	# SHRIMP DAY 0	MEAN WEIGHT (mg) DAY 0	# SHRIMP DAY 7	MEAN WEIGHT (mg) DAY 7
-003	A	207.02	210.26					
	B	208.23	210.32					
	C	208.60	210.67					
	D	212.01	214.26					
	E	210.52	212.87					
	F	208.74	210.70					
	G	211.91	213.80					
	H	208.73	211.10					
	A							
	B							
	C							
	D							
	E							
	F							
	G							
	H							
	A							
	B							
	C							
	D							
	E							
	F							
	G							
	H							
DATE		8/24/06	8/25/06					
TIME		1050	13:23					
INITIALS		NT	GL					

CETIS Test Summary

Report Date: 25 Aug-06 3:08 PM
Link: 06-9147-1245

Mysidopsis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	10-9546-2606	**Test Type:**	Growth-Survival (7d)	**Duration:**	7d 0h
Start Date:	17 Aug-06 03:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	24 Aug-06 03:45 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	17 Aug-06 03:30 PM	**Brine:**	Not Applicable		

Sample No:	10-7795-7304	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	17 Aug-06 12:00 PM	**Code:**	14886-000	**Project:**	Ecological Risk Assessment
Receive Date:	17 Aug-06 12:00 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	4h	**Station:**	WQ-TOX-Lab Control		

Sample No:	06-5244-5492	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	16 Aug-06 01:30 PM	**Code:**	14886-001	**Project:**	Ecological Risk Assessment
Receive Date:	17 Aug-06 08:25 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	26h	**Station:**	WQ-TOX-001		

Sample No:	18-8134-1954	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	16 Aug-06 02:00 PM	**Code:**	14886-002	**Project:**	Ecological Risk Assessment
Receive Date:	17 Aug-06 08:25 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	26h	**Station:**	WQ-TOX-002		

Sample No:	15-5951-2491	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	16 Aug-06 02:15 PM	**Code:**	14886-003	**Project:**	Ecological Risk Assessment
Receive Date:	17 Aug-06 08:25 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	25h	**Station:**	WQ-TOX-003		

7d Proportion Survived Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
14886-000	8	0.95000	0.80000	1.00000	0.03273	0.09258	9.75%
14886-001	8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
14886-002	8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
14886-003	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%

Mean Dry Biomass-mg Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
14886-000	8	0.42925	0.32200	0.96600	0.07701	0.21781	50.74%
14886-001	8	0.44825	0.40600	0.55200	0.01732	0.04898	10.93%
14886-002	8	0.46457	0.13600	0.98400	0.10003	0.26465	56.97%
14886-003	8	0.45550	0.37800	0.64800	0.03012	0.08519	18.70%

7d Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
14886-000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	0.80000	1.00000
14886-001	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
14886-002	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
14886-003	0.80000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
14886-000	0.37000	0.33600	0.32200	0.96600	0.37200	0.33200	0.36400	0.37200
14886-001	0.55200	0.43800	0.48000	0.40600	0.42800	0.45800	0.41200	0.41200
14886-002	0.44200	0.13600	N/A	0.98400	0.48000	0.26200	0.45800	0.49000
14886-003	0.64800	0.41800	0.41400	0.45000	0.47000	0.39200	0.37800	0.47400

CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	10-9546-2606	**Test Type:**	Growth-Survival (7d)	**Duration:**	7d 0h
Start Date:	17 Aug-06 03:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	24 Aug-06 03:45 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	17 Aug-06 03:30 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	06-9147-1245	06-9147-1245	25 Aug-06 3:07 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	19.77144	8.88539	0.00083	Unequal Variances
Distribution	Shapiro-Wilk W	0.58034	0.84420	0.00000	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0014440	0.0014440	1	0.06	0.81326	Non-Significant Effect
Error	0.348876	0.0249197	14			
Total	0.35032004	0.0263637	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
14886-000		14886-001	8		0.9948	2	Non-Significant Effect

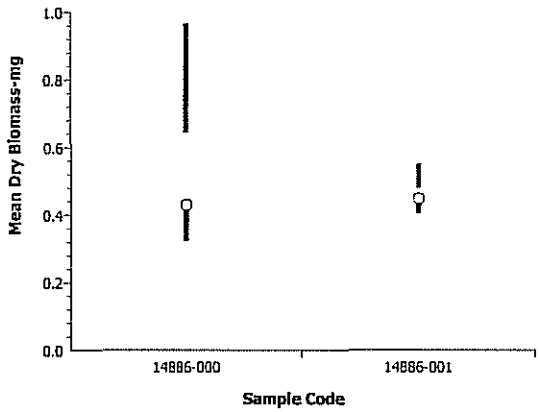
Data Summary

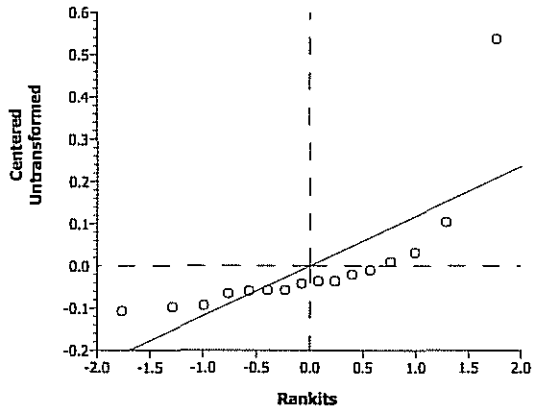
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-000	8	0.42925	0.32200	0.96600	0.21781				
14886-001	8	0.44825	0.40600	0.55200	0.04898				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-000	0.37000	0.33600	0.32200	0.96600	0.37200	0.33200	0.36400	0.37200		
14886-001	0.55200	0.43800	0.48000	0.40600	0.42800	0.45800	0.41200	0.41200		

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	10-9546-2606	**Test Type:**	Growth-Survival (7d)	**Duration:**	7d 0h
Start Date:	17 Aug-06 03:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	24 Aug-06 03:45 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	17 Aug-06 03:30 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	06-9147-1245	06-9147-1245	25 Aug-06 3:07 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.47639	9.15534	0.61852	Equal Variances
Distribution	Shapiro-Wilk W	0.75602	0.83526	0.00057	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0046576	0.0046576	1	0.08	0.78111	Non-Significant Effect
Error	0.7523184	0.0578707	13			
Total	0.75697595	0.0625282	14			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
14886-000		14886-002	20		0.8016	1	Non-Significant Effect

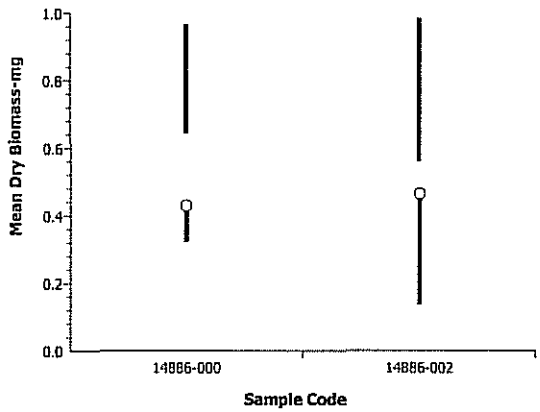
Data Summary

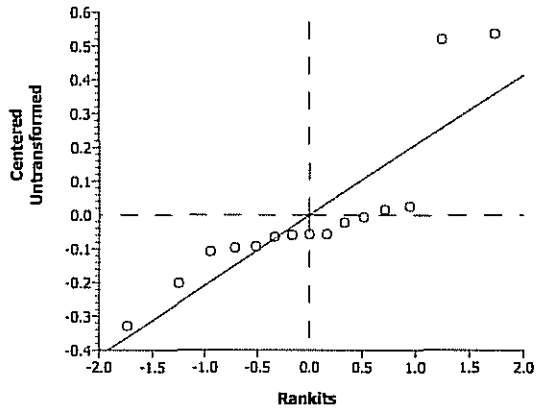
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-000	8	0.42925	0.32200	0.96600	0.21781				
14886-002	7	0.46457	0.13600	0.98400	0.26465				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-000	0.37000	0.33600	0.32200	0.96600	0.37200	0.33200	0.36400	0.37200		
14886-002	0.44200	0.13600	0.98400	0.48000	0.26200	0.45800	0.49000			

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	10-9546-2606	**Test Type:**	Growth-Survival (7d)	**Duration:**	7d 0h
Start Date:	17 Aug-06 03:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	24 Aug-06 03:45 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	17 Aug-06 03:30 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	06-9147-1245	06-9147-1245	25 Aug-06 3:07 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	6.53631	8.88539	0.02418	Equal Variances
Distribution	Shapiro-Wilk W	0.59989	0.84420	0.00000	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0027562	0.0027562	1	0.10	0.75558	Non-Significant Effect
Error	0.3828855	0.027349	14			
Total	0.38564170	0.0301051	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
14886-000		14886-003	8		0.9948	1	Non-Significant Effect

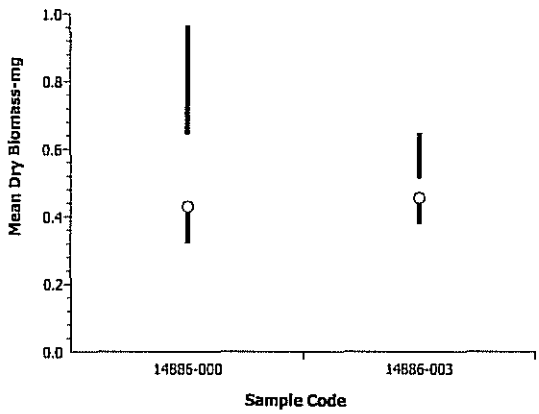
Data Summary

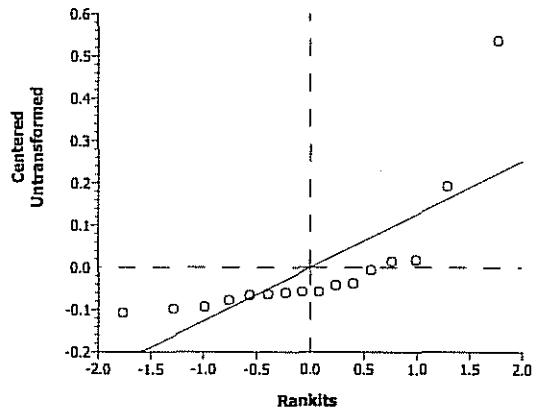
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-000	8	0.42925	0.32200	0.96600	0.21781				
14886-003	8	0.45550	0.37800	0.64800	0.08519				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-000	0.37000	0.33600	0.32200	0.96600	0.37200	0.33200	0.36400	0.37200		
14886-003	0.64800	0.41800	0.41400	0.45000	0.47000	0.39200	0.37800	0.47400		

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	10-9546-2606	**Test Type:**	Growth-Survival (7d)	**Duration:**	7d 0h
Start Date:	17 Aug-06 03:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	24 Aug-06 03:45 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	17 Aug-06 03:30 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	06-9147-1245	06-9147-1245	25 Aug-06 3:08 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	29.19027	9.15534	0.00026	Unequal Variances
Distribution	Shapiro-Wilk W	0.76567	0.83526	0.00081	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0009944	0.0009944	1	0.03	0.86610	Non-Significant Effect
Error	0.4370343	0.0336180	13			
Total	0.43802873	0.0346124	14			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
14886-001		14886-002	24.5		0.6106	2	Non-Significant Effect

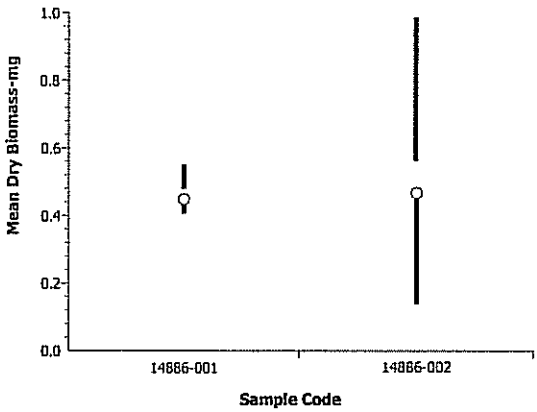
Data Summary

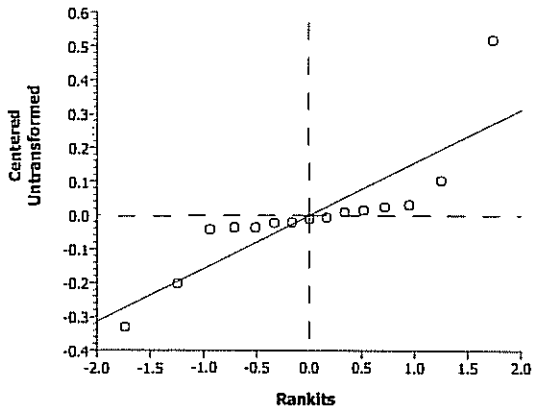
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-001	8	0.44825	0.40600	0.55200	0.04898				
14886-002	7	0.46457	0.13600	0.98400	0.26465				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-001	0.55200	0.43800	0.48000	0.40600	0.42800	0.45800	0.41200	0.41200		
14886-002	0.44200	0.13600	0.98400	0.48000	0.26200	0.45800	0.49000			

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	10-9546-2606	**Test Type:**	Growth-Survival (7d)	**Duration:**	7d 0h
Start Date:	17 Aug-06 03:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	24 Aug-06 03:45 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	17 Aug-06 03:30 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	06-9147-1245	06-9147-1245	25 Aug-06 3:07 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	3.02486	8.88539	0.16742	Equal Variances
Distribution	Shapiro-Wilk W	0.82384	0.84420	0.00465	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0002102	0.0002102	1	0.04	0.83773	Non-Significant Effect
Error	0.0676014	0.0048287	14			
Total	0.06781162	0.0050389	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
14886-001		14886-003	33		0.4796	1	Non-Significant Effect

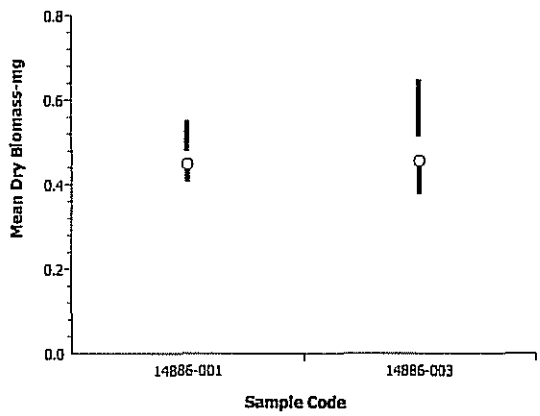
Data Summary

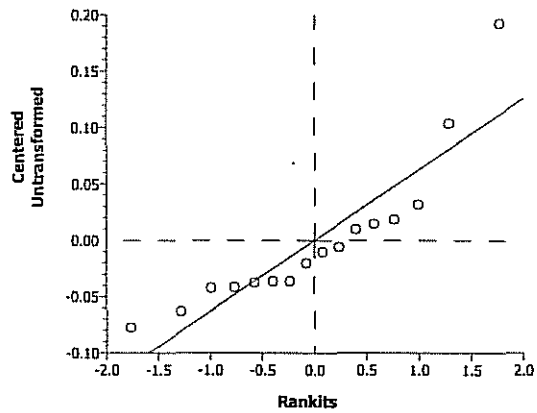
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-001	8	0.44825	0.40600	0.55200	0.04898				
14886-003	8	0.45550	0.37800	0.64800	0.08519				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-001	0.55200	0.43800	0.48000	0.40600	0.42800	0.45800	0.41200	0.41200		
14886-003	0.64800	0.41800	0.41400	0.45000	0.47000	0.39200	0.37800	0.47400		

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	10-9546-2606	**Test Type:**	Growth-Survival (7d)	**Duration:**	7d 0h
Start Date:	17 Aug-06 03:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	24 Aug-06 03:45 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	17 Aug-06 03:30 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	06-9147-1245	06-9147-1245	24 Aug-06 4:22 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	2.33333	8.86159	0.14890	Equal Variances
Distribution	Shapiro-Wilk W	0.67657	0.84420	0.00001	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.014177	0.014177	1	2.33	0.14890	Non-Significant Effect
Error	0.0850619	0.0060758	14			
Total	0.09923882	0.0202528	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
14886-000		14886-001	24		0.7791	2	Non-Significant Effect

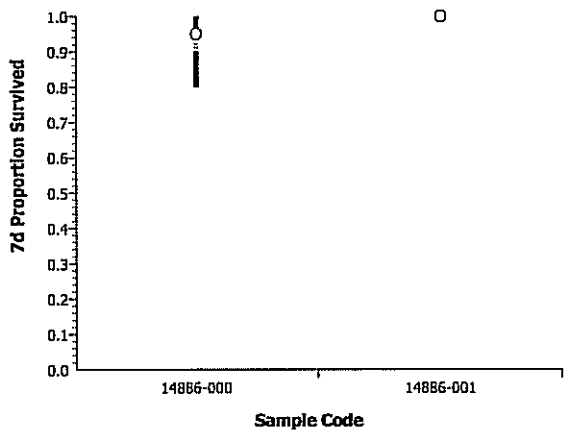
Data Summary

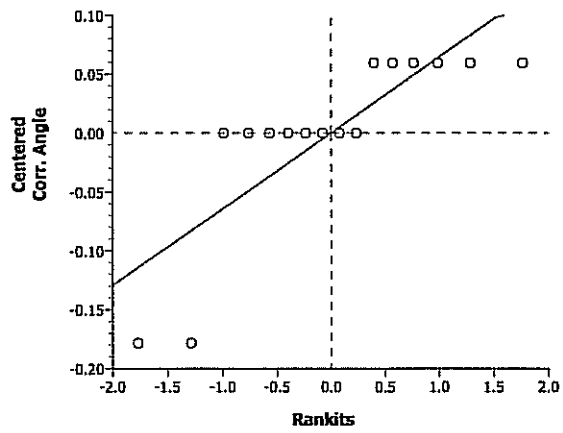
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-000	8	0.95000	0.80000	1.00000	0.09258	1.28575	1.10715	1.34528	0.11023
14886-001	8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	0.80000	1.00000		
14886-001	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	10-9546-2606	**Test Type:**	Growth-Survival (7d)	**Duration:**	7d 0h
Start Date:	17 Aug-06 03:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	24 Aug-06 03:45 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	17 Aug-06 03:30 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	06-9147-1245	06-9147-1245	24 Aug-06 4:22 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	2.33333	8.86159	0.14890	Equal Variances
Distribution	Shapiro-Wilk W	0.67657	0.84420	0.00001	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.014177	0.014177	1	2.33	0.14890	Non-Significant Effect
Error	0.0850619	0.0060758	14			
Total	0.09923882	0.0202528	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
14886-000		14886-002	24		0.7791	2	Non-Significant Effect

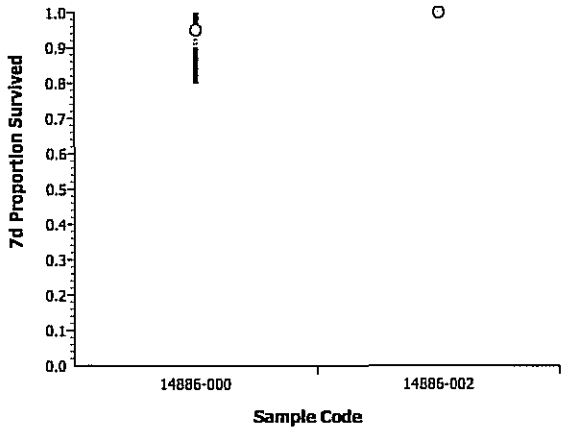
Data Summary

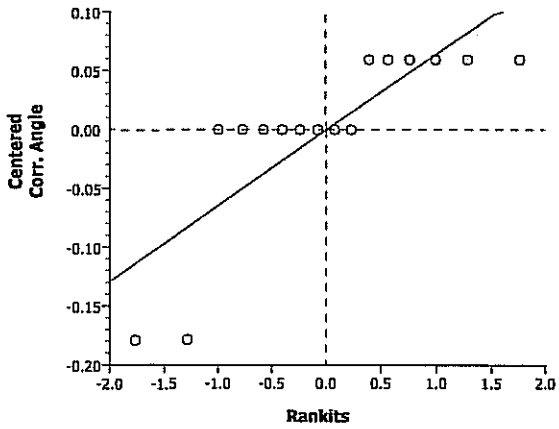
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-000	8	0.95000	0.80000	1.00000	0.09258	1.28575	1.10715	1.34528	0.11023
14886-002	8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	0.80000	1.00000		
14886-002	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	10-9546-2606	**Test Type:**	Growth-Survival (7d)	**Duration:**	7d 0h
Start Date:	17 Aug-06 03:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	24 Aug-06 03:45 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	17 Aug-06 03:30 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	06-9147-1245	06-9147-1245	24 Aug-06 4:22 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.71429	8.88539	0.49388	Equal Variances
Distribution	Shapiro-Wilk W	0.61116	0.84420	0.00000	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0035442	0.0035442	1	0.37	0.55358	Non-Significant Effect
Error	0.1346813	0.0096201	14			
Total	0.1382255	0.0131643	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
14886-000		14886-003	28		0.6395	2	Non-Significant Effect

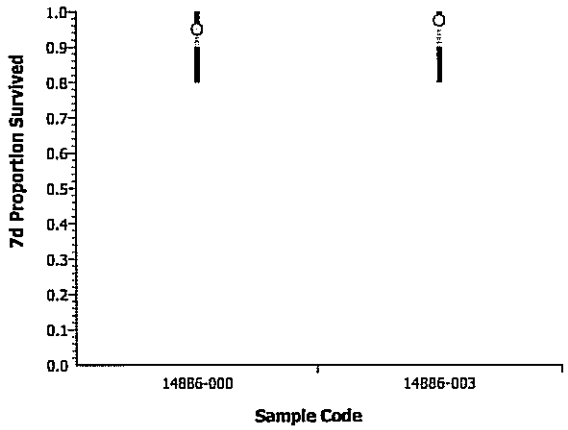
Data Summary

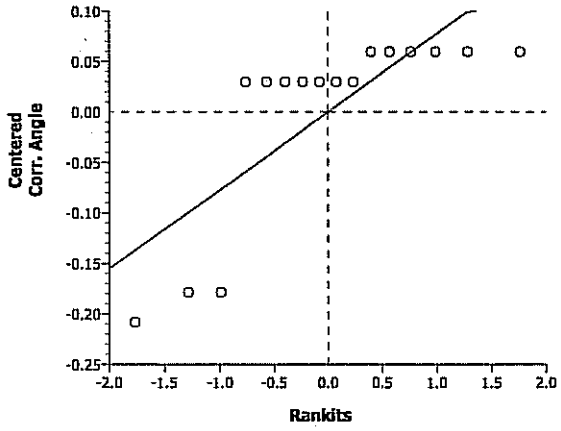
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-000	8	0.95000	0.80000	1.00000	0.09258	1.28575	1.10715	1.34528	0.11023
14886-003	8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	0.80000	1.00000		
14886-003	0.80000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	10-9546-2606	**Test Type:**	Growth-Survival (7d)	**Duration:**	7d 0h
Start Date:	17 Aug-06 03:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	24 Aug-06 03:45 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	17 Aug-06 03:30 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	06-9147-1245	06-9147-1245	27 Dec-06 2:49 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	65535.00000	8.86159	0.00000	Unequal Variances

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0	0	1	65535.0	0.00000	Significant Effect
Error	0	0	14			
Total	0	0	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
14886-001		14886-002	32		0.4796	1	Non-Significant Effect

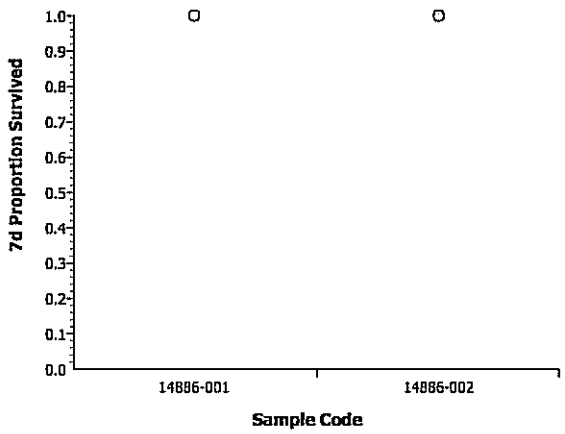
Data Summary

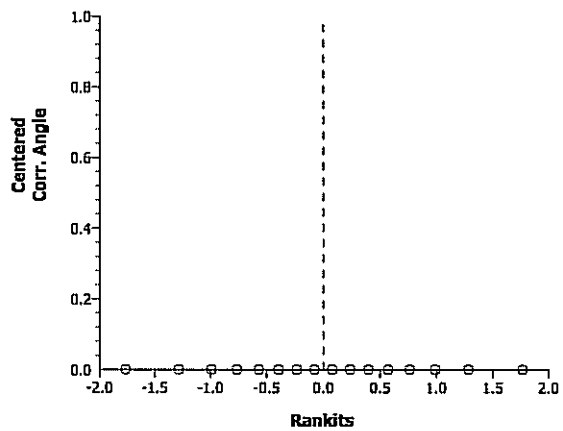
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-001	8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019
14886-002	8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-001	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		
14886-002	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	10-9546-2606	**Test Type:**	Growth-Survival (7d)	**Duration:**	7d 0h
Start Date:	17 Aug-06 03:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	24 Aug-06 03:45 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	17 Aug-06 03:30 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	06-9147-1245	06-9147-1245	24 Aug-06 4:22 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	1.00000	8.86159	0.33428	Equal Variances
Distribution	Shapiro-Wilk W	0.46890	0.84420	0.00000	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0035442	0.0035442	1	1.00	0.33428	Non-Significant Effect
Error	0.0496194	0.0035442	14			
Total	0.05316365	0.0070885	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
14886-001		14886-003	36		0.3605	1	Non-Significant Effect

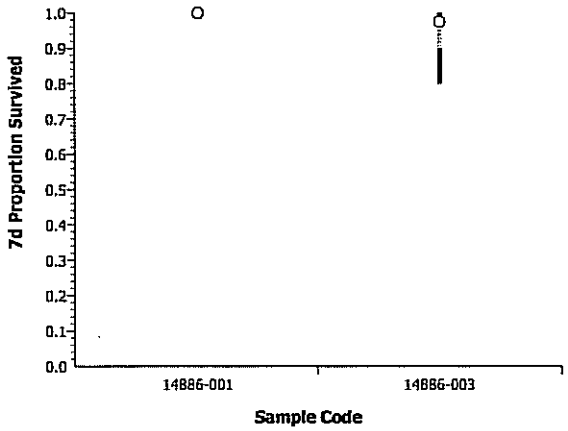
Data Summary

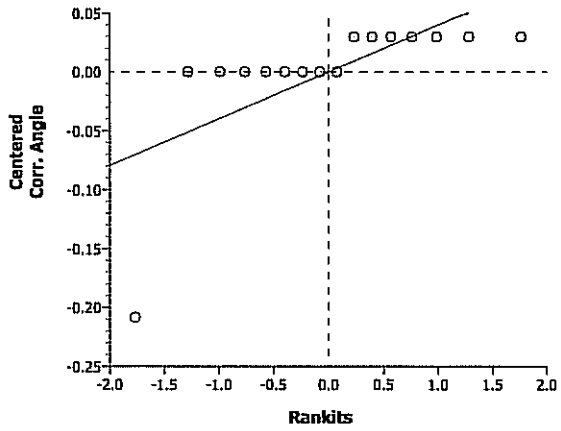
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-001	8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019
14886-003	8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-001	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		
14886-003	0.80000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		

Graphics





Aquatic Research Organisms

DATA SHEET

I. Organism History

Species: AMERICAMYSIS BAHIA

Source: Lab reared ✓ Hatchery reared ____ Field collected ____

Hatch date 8-10-06 Receipt date ____

Lot number 081006MS Strain ____

Brood Origination FLORIDA

II. Water Quality

Temperature 25 °C Salinity ≈30 ppt DO —

pH 7.8 Hardness — ppm

III. Culture Conditions

System: RECIRC

Diet: Flake Food ✓ Phytoplankton ____ Trout Chow ✓

Brine Shrimp ✓ Rotifers ____ Other EUCAP. SHRIMP DIET

Prophylactic Treatments: ____

Comments: ____

IV. Shipping Information

Client: EST # of Organisms: 180+

Carrier: ____ Date Shipped: 8-17-06

Biologist: Mark Rosengrant

1 - 800 - 927 - 1650

PO Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650

Arbacia punctulata Chronic Fertilization Assay
Water Quality and Gamete Preparation Data

STUDY: 14886	CLIENT: BATTELLE	LOCATION: New Bedford	DATE: 8/17/06 INITIALS: SJ

SALINITY ADJUSTMENT RECORD: _____ mL -001 + _____g SALT

SALINITY ADJUSTMENT RECORD: _____ mL -002 + _____g SALT

SALINITY ADJUSTMENT RECORD: _____ mL -003 + _____g SALT

SALINITY ADJUSTED SAMPLE	D.O. (mg/L)	pH (SU)	SPEC COND (µmhos)	TEMP (°C)	SALINITY (ppt)
Lab Control	6.9	7.88	39000	20	30
-001	8.3	7.60	36400	20	30
-002	8.7	7.91	35100	20	30
-003	8.7	7.82	35400	20	30
-004					

METERS USED

DO meter # 3 DO probe # 13 pH meter # 1097 pH probe # 44 S/C meter # 330iB S/C probe # 330iB

SALINITY meter # 330iB

DATE & INITIALS FOR GAMETE PREPARATION: 8/17/06 SJ

SPERM DILUTIONS:

HEMACYTOMETER COUNT, E: 128 X 10^4= SPM SOLUTION E = 1.28×10^7

SPERM CONCENTRATIONS:
SOLUTION E X 40 = SOLUTION A = 5.12×10^7 SPM
SOLUTION E X 20 = SOLUTION B = 2.56×10^7 SPM
SOLUTION E X 5 = SOLUTION C = 6.4×10^7 SPM

FINAL COUNTS:

FINAL SPERM COUNT: (FB) 1240 128
FINAL EGG COUNT: 1240 30

TEST TIMES:

SPERM COLLECTED: 1240
EGGS COLLECTED: 1240
SPERM ADDED: 1325
EGGS ADDED: 1425
FIXATIVE ADDED: 1445

See ESI SOP #1412 for additional information

Arbacia punctulata Chronic Fertilization Assay

SAMPLE USE RECORD

STUDY: 14886	CLIENT: Battelle - New Bedford	
SPECIES: *A. punctulata*		
	Day: 0	
SAMPLE	Volume Used (mL)	ESI Cube ID
Lab Control	200 mL	—
-001	↓	14886-001
-002		14886-002
-003		14886-003
-004		
INITIALS:		
TIME:		
DATE:		

FERTILIZATION COUNTS

STUDY	CLIENT BATTELLE	LOCATION New Bedford		DATE 8/17/06 INITIALS SJ
	REPLICATE VIAL			
	1	2	3	4
SAMPLE	FERT/TOTAL	FERT/TOTAL	FERT/TOTAL	FERT/TOTAL
Lab Control	100/104	100/102	100/102	103/105
-001	100/109	100/106	102/110	100/107
-002	100/108	100/111	103/115	101/111
-003	102/113	100/115	100/110	104/112
-004				

CETIS Test Summary

Report Date: 27 Dec-06 2:37 PM
Link: 09-1277-6133

Echinoid Sperm Cell Fertilization Test — **EnviroSystems, Inc.**

Test No:	14-3537-6163	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	17 Aug-06 01:25 PM	**Protocol:**	EPA/600/R-95/136 (1995)	**Species:**	Arbacia punctulata
Ending Date:	17 Aug-06 02:45 PM	**Dil Water:**	Receiving Water	**Source:**	In-House Culture
Setup Date:	17 Aug-06 01:25 PM	**Brine:**	Generic commercial salts		

Sample No:	10-7795-7304	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	17 Aug-06 12:00 PM	**Code:**	14886-000	**Project:**	Ecological Risk Assessment
Receive Date:	17 Aug-06 12:00 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	85m	**Station:**	WQ-TOX-Lab Control		

Sample No:	06-5244-5492	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	16 Aug-06 01:30 PM	**Code:**	14886-001	**Project:**	Ecological Risk Assessment
Receive Date:	17 Aug-06 08:25 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	24h	**Station:**	WQ-TOX-001		

Sample No:	18-8134-1954	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	16 Aug-06 02:00 PM	**Code:**	14886-002	**Project:**	Ecological Risk Assessment
Receive Date:	17 Aug-06 08:25 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	23h	**Station:**	WQ-TOX-002		

Sample No:	15-5951-2491	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	16 Aug-06 02:15 PM	**Code:**	14886-003	**Project:**	Ecological Risk Assessment
Receive Date:	17 Aug-06 08:25 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	23h	**Station:**	WQ-TOX-003		

Proportion Fertilized Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
14886-000	4	0.97582	0.96154	0.98095	0.00476	0.00952	0.98%
14886-001	4	0.93067	0.91743	0.94340	0.00551	0.01102	1.18%
14886-002	4	0.90810	0.89565	0.92593	0.00663	0.01326	1.46%
14886-003	4	0.90247	0.86957	0.92857	0.01227	0.02455	2.72%

Proportion Fertilized Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
14886-000	0.96154	0.98039	0.98039	0.98095
14886-001	0.91743	0.94340	0.92727	0.93458
14886-002	0.92593	0.90090	0.89565	0.90991
14886-003	0.90265	0.86957	0.90909	0.92857

CETIS Analysis Detail

Echinoid Sperm Cell Fertilization Test — **EnviroSystems, Inc.**

Test No:	14-3537-6163	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	17 Aug-06 01:25 PM	**Protocol:**	EPA/600/R-95/136 (1995)	**Species:**	Arbacia punctulata
Ending Date:	17 Aug-06 02:45 PM	**Dil Water:**	Receiving Water	**Source:**	In-House Culture
Setup Date:	17 Aug-06 01:25 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	09-1277-6133	09-1277-6133	27 Dec-06 2:36 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.75765	47.46723	0.65464	Equal Variances
Distribution	Shapiro-Wilk W	0.88356	0.74935	0.19758	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0249265	0.0249265	1	38.29	0.00082	Significant Effect
Error	0.0039062	0.0006510	6			
Total	0.02883266	0.0255775	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14886-000		14886-001	6.18768	1.94318	0.0004	0.03506	Significant Effect

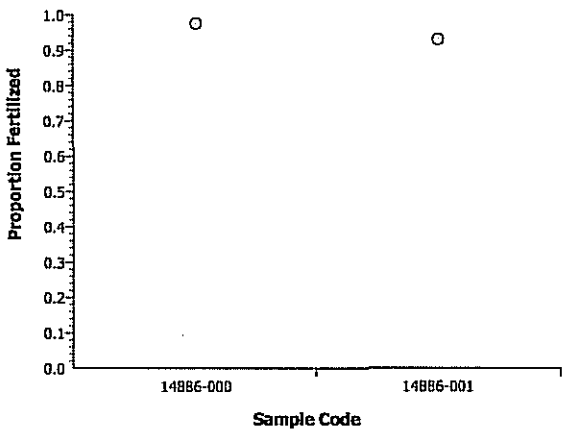
Data Summary

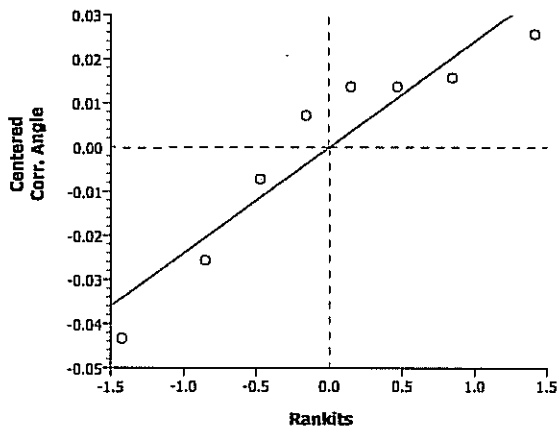
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-000	4	0.97582	0.96154	0.98095	0.00952	1.41659	1.37340	1.43234	0.02881
14886-001	4	0.93067	0.91743	0.94340	0.01102	1.30495	1.27934	1.33058	0.02173

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-000	0.96154	0.98039	0.98039	0.98095						
14886-001	0.91743	0.94340	0.92727	0.93458						

Graphics





CETIS Analysis Detail

Echinoid Sperm Cell Fertilization Test — **EnviroSystems, Inc.**

Test No:	14-3537-6163	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	17 Aug-06 01:25 PM	**Protocol:**	EPA/600/R-95/136 (1995)	**Species:**	Arbacia punctulata
Ending Date:	17 Aug-06 02:45 PM	**Dil Water:**	Receiving Water	**Source:**	In-House Culture
Setup Date:	17 Aug-06 01:25 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	09-1277-6133	09-1277-6133	27 Dec-06 2:36 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.51487	47.46723	0.74116	Equal Variances
Distribution	Shapiro-Wilk W	0.94237	0.74935	0.59714	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0469462	0.0469462	1	68.15	0.00017	Significant Effect
Error	0.0041332	0.0006889	6			
Total	0.05107942	0.0476351	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14886-000		14886-002	8.25527	1.94318	0.0001	0.03606	Significant Effect

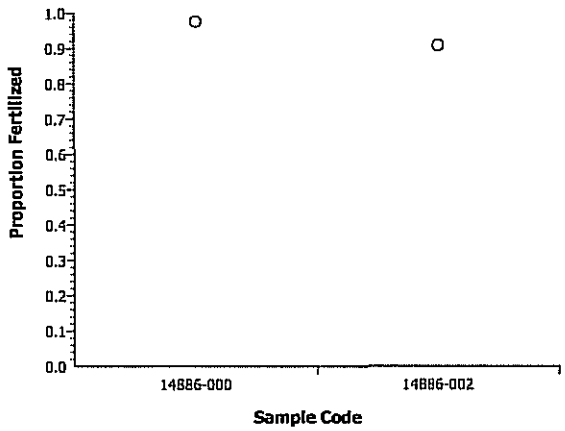
Data Summary

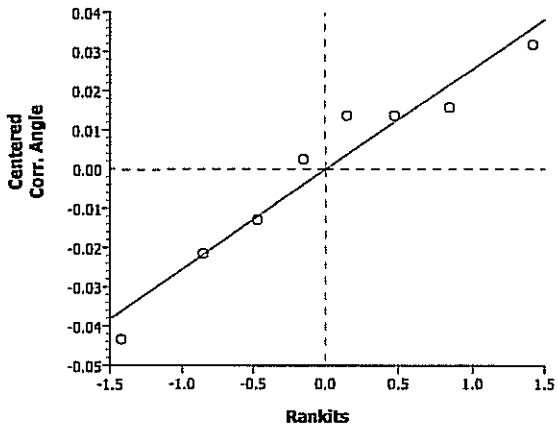
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-000	4	0.97582	0.96154	0.98095	0.00952	1.41659	1.37340	1.43234	0.02881
14886-002	4	0.90810	0.89565	0.92593	0.01326	1.26338	1.24187	1.29515	0.02341

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-000	0.96154	0.98039	0.98039	0.98095						
14886-002	0.92593	0.90090	0.89565	0.90991						

Graphics





CETIS Analysis Detail

Echinoid Sperm Cell Fertilization Test — **EnviroSystems, Inc.**

Test No:	14-3537-6163	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	17 Aug-06 01:25 PM	**Protocol:**	EPA/600/R-95/136 (1995)	**Species:**	Arbacia punctulata
Ending Date:	17 Aug-06 02:45 PM	**Dil Water:**	Receiving Water	**Source:**	In-House Culture
Setup Date:	17 Aug-06 01:25 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	09-1277-6133	09-1277-6133	27 Dec-06 2:36 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.01835	47.46723	0.57872	Equal Variances
Distribution	Shapiro-Wilk W	0.88175	0.74935	0.19048	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0522946	0.0522946	1	41.75	0.00065	Significant Effect
Error	0.0075148	0.0012525	6			
Total	0.05980946	0.0535471	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14886-000		14886-003	6.46167	1.94318	0.0003	0.04863	Significant Effect

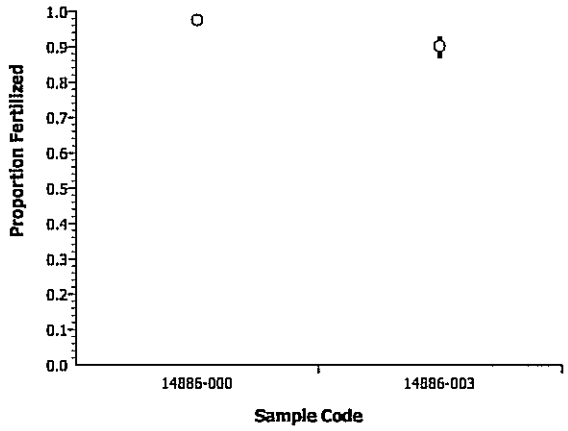
Data Summary

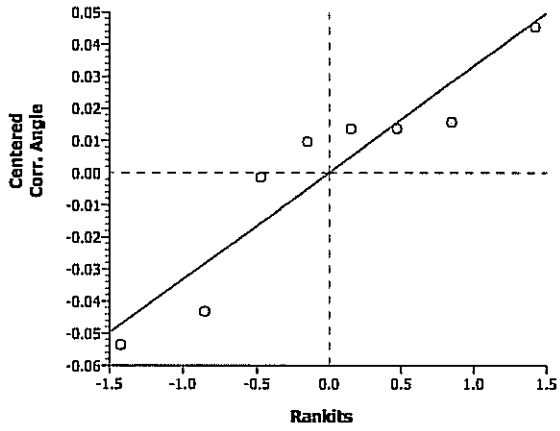
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-000	4	0.97582	0.96154	0.98095	0.00952	1.41659	1.37340	1.43234	0.02881
14886-003	4	0.90247	0.86957	0.92857	0.02455	1.25489	1.20129	1.30025	0.04093

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-000	0.96154	0.98039	0.98039	0.98095						
14886-003	0.90265	0.86957	0.90909	0.92857						

Graphics





CETIS Analysis Detail

Echinoid Sperm Cell Fertilization Test — **EnviroSystems, Inc.**

Test No:	14-3537-6163	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	17 Aug-06 01:25 PM	**Protocol:**	EPA/600/R-95/136 (1995)	**Species:**	Arbacia punctulata
Ending Date:	17 Aug-06 02:45 PM	**Dil Water:**	Receiving Water	**Source:**	In-House Culture
Setup Date:	17 Aug-06 01:25 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	09-1277-6133	09-1277-6133	27 Dec-06 2:37 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.16026	47.46723	0.90563	Equal Variances
Distribution	Shapiro-Wilk W	0.94179	0.74935	0.59137	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0034562	0.0034562	1	6.78	0.04049	Significant Effect
Error	0.0030600	0.0005100	6			
Total	0.00651623	0.0039662	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14886-001		14886-002	2.60324	1.94318	0.0202	0.03103	Significant Effect

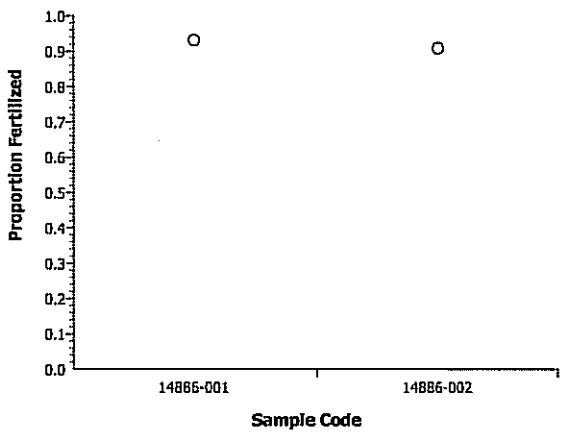
Data Summary

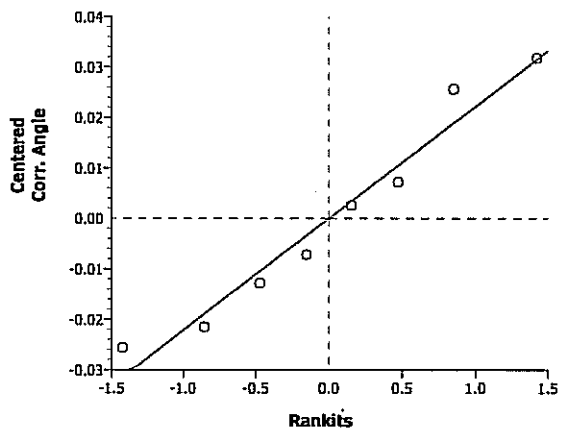
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-001	4	0.93067	0.91743	0.94340	0.01102	1.30495	1.27934	1.33058	0.02173
14886-002	4	0.90810	0.89565	0.92593	0.01326	1.26338	1.24187	1.29515	0.02341

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-001	0.91743	0.94340	0.92727	0.93458						
14886-002	0.92593	0.90090	0.89565	0.90991						

Graphics





CETIS Analysis Detail

Echinoid Sperm Cell Fertilization Test — **EnviroSystems, Inc.**

Test No:	14-3537-6163	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	17 Aug-06 01:25 PM	**Protocol:**	EPA/600/R-95/136 (1995)	**Species:**	Arbacia punctulata
Ending Date:	17 Aug-06 02:45 PM	**Dil Water:**	Receiving Water	**Source:**	In-House Culture
Setup Date:	17 Aug-06 01:25 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	09-1277-6133	09-1277-6133	27 Dec-06 2:37 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	3.54756	47.46723	0.32602	Equal Variances
Distribution	Shapiro-Wilk W	0.98165	0.74935	0.96908	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0050125	0.0050125	1	4.67	0.07400	Non-Significant Effect
Error	0.0064416	0.0010736	6			
Total	0.01145413	0.0060861	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14886-001		14886-003	2.16076	1.94318	0.0370	0.04502	Significant Effect

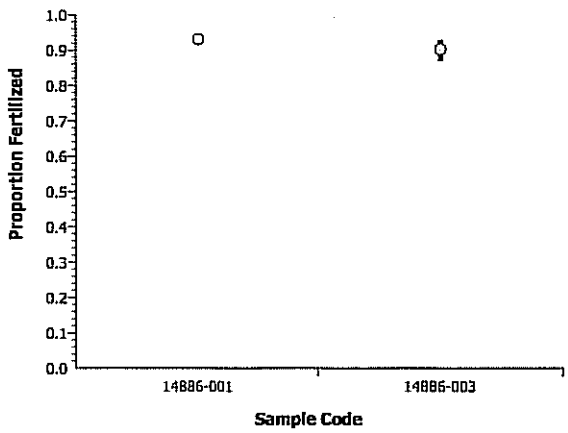
Data Summary

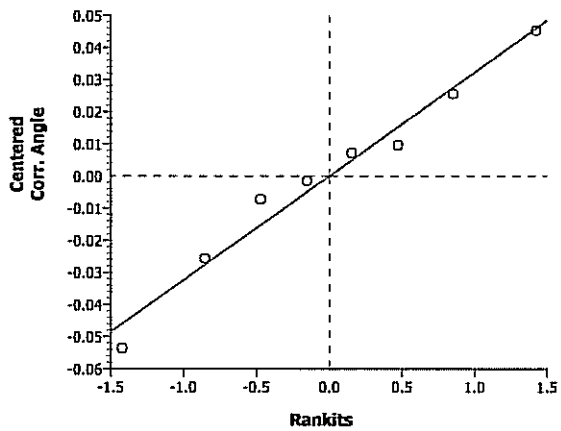
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-001	4	0.93067	0.91743	0.94340	0.01102	1.30495	1.27934	1.33058	0.02173
14886-003	4	0.90247	0.86957	0.92857	0.02455	1.25489	1.20129	1.30025	0.04093

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-001	0.91743	0.94340	0.92727	0.93458						
14886-003	0.90265	0.86957	0.90909	0.92857						

Graphics





CETIS Test Summary

Report Date: 28 Aug-06 8:14 PM
Link: 04-1112-4602

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	10-5436-8989	**Test Type:**	Champia	**Duration:**	7d 0h
Start Date:	21 Aug-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	28 Aug-06 12:00 PM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	21 Aug-06 12:00 PM	**Brine:**	Generic commercial salts		

Sample No:	10-7795-7304	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	17 Aug-06 12:00 PM	**Code:**	14886-000	**Project:**	Ecological Risk Assessment
Receive Date:	17 Aug-06 12:00 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	96h	**Station:**	WQ-TOX-Lab Control		
Sample No:	06-5244-5492	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	16 Aug-06 01:30 PM	**Code:**	14886-001	**Project:**	Ecological Risk Assessment
Receive Date:	17 Aug-06 08:25 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	4d 22h	**Station:**	WQ-TOX-001		
Sample No:	18-8134-1954	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	16 Aug-06 02:00 PM	**Code:**	14886-002	**Project:**	Ecological Risk Assessment
Receive Date:	17 Aug-06 08:25 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	4d 22h	**Station:**	WQ-TOX-002		
Sample No:	15-5951-2491	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	16 Aug-06 02:15 PM	**Code:**	14886-003	**Project:**	Ecological Risk Assessment
Receive Date:	17 Aug-06 08:25 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	4d 21h	**Station:**	WQ-TOX-003		

Mean Cystocarps Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
14886-000	3	80.2667	76.2	84.8	2.49355	4.31895	5.38%
14886-001	4	85.15	70.8	95.2	5.19126	10.3825	12.19%
14886-002	4	86.4	80	98.2	4.04557	8.09115	9.36%
14886-003	4	82.75	62.4	102.2	8.13854	16.2771	19.67%

Mean Cystocarps Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
14886-000	79.8	76.2	84.8	
14886-001	85.4	70.8	95.2	89.2
14886-002	82.8	98.2	84.6	80
14886-003	62.4	82.2	84.2	102.2

CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-1112-4602	04-1112-4602	28 Aug-06 8:13 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	14.20354	199.16640	0.13298	Equal Variances
Distribution	Shapiro-Wilk W	0.92169	0.72991	0.44859	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	10.57191	10.57191	1	0.06	0.81104	Non-Significant Effect
Error	832.1367	166.4273	5			
Total	842.708563	176.99924	6			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14886-000		14886-003	-0.2520	2.01505	0.5945	19.8544	Non-Significant Effect

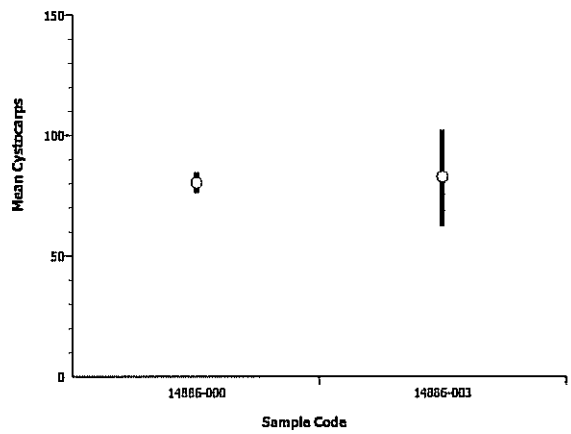
Data Summary

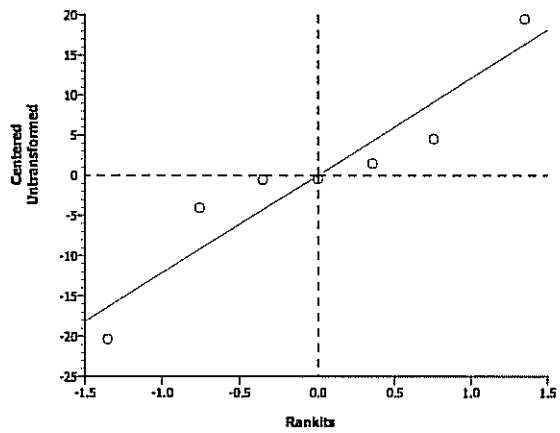
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-000	3	80.2667	76.2	84.8	4.31895				
14886-003	4	82.75	62.4	102.2	16.2771				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-000	79.8	76.2	84.8							
14886-003	62.4	82.2	84.2	102.2						

Graphics





CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-1112-4602	04-1112-4602	28 Aug-06 8:13 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	5.77895	199.16640	0.30212	Equal Variances
Distribution	Shapiro-Wilk W	0.94353	0.72991	0.63104	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	40.88048	40.88048	1	0.57	0.48549	Non-Significant Effect
Error	360.6967	72.13934	5			
Total	401.577133	113.01981	6			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14886-000		14886-001	-0.7528	2.01505	0.7573	13.0716	Non-Significant Effect

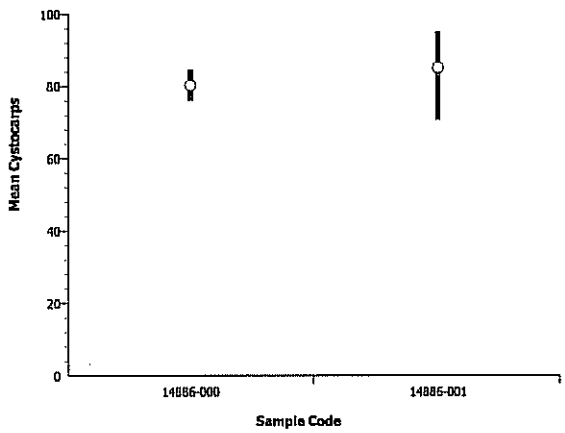
Data Summary

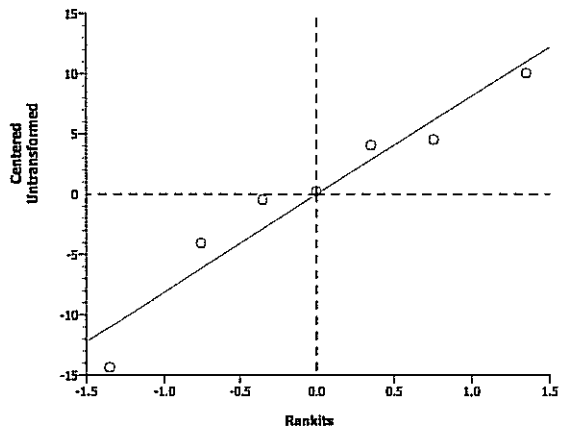
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-000	3	80.2667	76.2	84.8	4.31895				
14886-001	4	85.15	70.8	95.2	10.3825				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-000	79.8	76.2	84.8							
14886-001	85.4	70.8	95.2	89.2						

Graphics





CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-1112-4602	04-1112-4602	28 Aug-06 8:14 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.45781	47.46723	0.47956	Equal Variances
Distribution	Shapiro-Wilk W	0.95485	0.74935	0.72666	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	11.52	11.52	1	0.06	0.81194	Non-Significant Effect
Error	1118.22	186.37	6			
Total	1129.73997	197.89	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14886-001		14886-003	0.24862	1.94318	0.4060	18.758	Non-Significant Effect

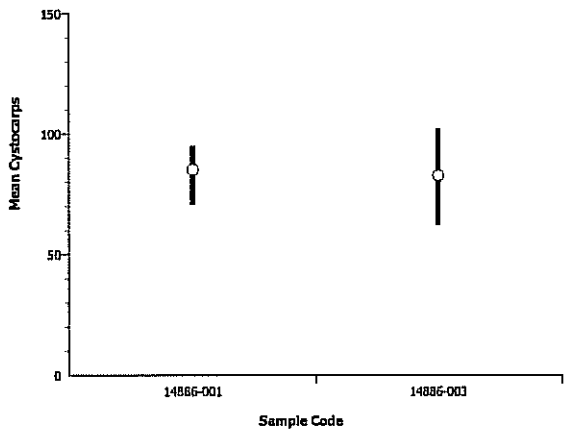
Data Summary

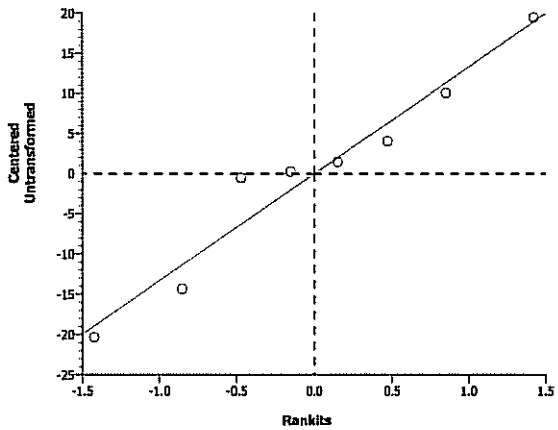
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-001	4	85.15	70.8	95.2	10.3825				
14886-003	4	82.75	62.4	102.2	16.2771				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-001	85.4	70.8	95.2	89.2						
14886-003	62.4	82.2	84.2	102.2						

Graphics





CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-1112-4602	04-1112-4602	28 Aug-06 8:13 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	3.50965	199.16640	0.45924	Equal Variances
Distribution	Shapiro-Wilk W	0.88600	0.72991	0.24340	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	64.48762	64.48762	1	1.38	0.29305	Non-Significant Effect
Error	233.7067	46.74133	5			
Total	298.194283	111.22895	6			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14886-000		14886-002	-1.1746	2.01505	0.8535	10.5219	Non-Significant Effect

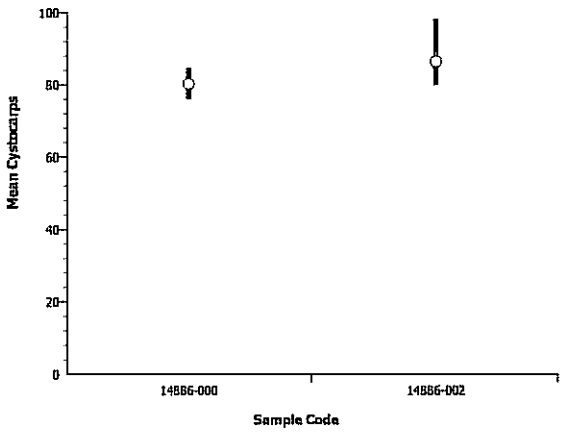
Data Summary

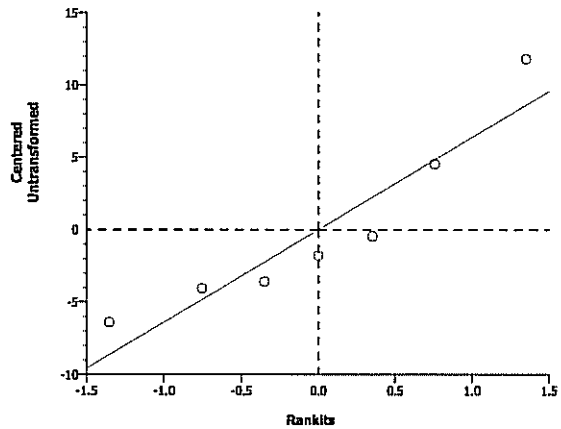
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-000	3	80.2667	76.2	84.8	4.31895				
14886-002	4	86.4	80	98.2	8.09114				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-000	79.8	76.2	84.8							
14886-002	82.8	98.2	84.6	80						

Graphics





CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-1112-4602	04-1112-4602	28 Aug-06 8:14 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.64659	47.46723	0.69206	Equal Variances
Distribution	Shapiro-Wilk W	0.97215	0.74935	0.90129	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	3.125	3.125	1	0.04	0.85563	Non-Significant Effect
Error	519.79	86.63167	6			
Total	522.914978	89.756668	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14886-001		14886-002	-0.1899	1.94318	0.5722	12.789	Non-Significant Effect

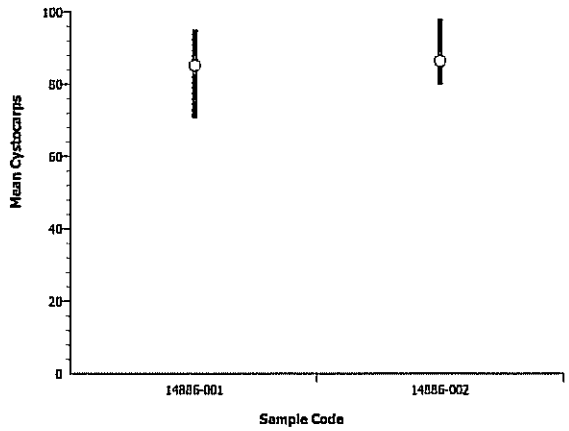
Data Summary

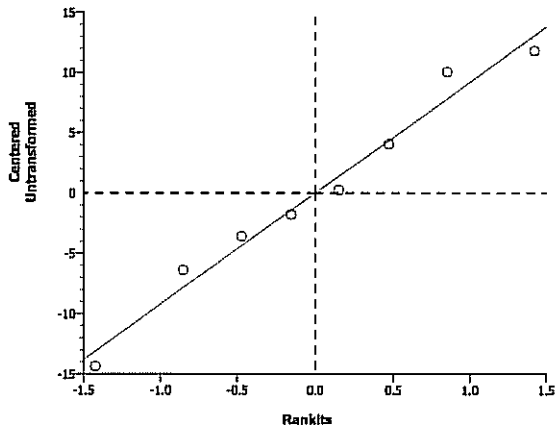
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14886-001	4	85.15	70.8	95.2	10.3825				
14886-002	4	86.4	80	98.2	8.09114				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14886-001	85.4	70.8	95.2	89.2						
14886-002	82.8	98.2	84.6	80						

Graphics





SALTWATER ASSAYS

A. bahia, A. punctulata, C. parvula

STUDY: 14886	LOCATION: New Bedford Harbor				
CHEMISTRY 14826	Lab Salt Control	-001	-002	-003	-004
AMMONIA	-027	-004	-005	-006	
AS RECEIVED WATER QUALITIES	Lab Salt Control	-001	-002	-003	-004
SALINITY (ppt)	30	30	30	30	
pH (SU)	7.88	7.60	7.91	7.85	
TRC (mg/L)	<0.05	<0.05	<0.05	<0.05	
DO (mg/L)	6.9	8.3	8.7	8.7	
S/C (µmhos/cm)	39000	36400	35100	35400	
WQ STATION USED	1	1	1	1	
INITIALS	SJ	SJ	SJ	SJ	
A. bahia SALINITY ADJUSTMENT RECORD	Lab Salt Control	-001	-002	-003	-004
SAMPLE (mLs)					
SEA SALT (g)					
DATE:					
TIME:					
INITIALS:					

Sample ID	ESI Cube ID
-001	-001
-002	-002
-003	-003
-004	-004

Americamysis bahia 7 DAY CHRONIC ASSAY
NEW WATER QUALITIES

STUDY: 14886	CLIENT: BATTELLE	LOCATION: NEW BEDFORD	LAB CONTROL: HAMPTON ESTUARY

		NEW DISSOLVED OXYGEN (mg/L)							NEW SALINITY (ppt)						
CONC	REP	0	1	2	3	4	5	6	0	1	2	3	4	5	6
LAB	A	7.0	6.5	6.7	6.6	6.6	6.5	6.0	29	30	29	29	30	30	31
-001	A	6.3	6.5	7.0	6.9	5.0	6.6	6.4	29	30	29	29	30	29	29
-002	A	7.1	6.5	6.9	6.8	5.4	6.2	6.0	29	29	29	29	29	29	29
-003	A	7.0	6.4	6.8	6.8	6.1	6.6	6.4	29	29	29	29	31	29	29
-004	A														

		NEW pH (SU)							NEW TEMPERATURE (°C)						
CONC	REP	0	1	2	3	4	5	6	0	1	2	3	4	5	6
LAB	A	7.73	7.81	7.94	7.95	7.85	7.95	7.78	25	25	25	25	25	25	25
-001	A	7.22	7.51	7.59	7.58	7.59	7.68	7.55	25	25	25	25	25	25	25
-002	A	7.48	7.60	7.54	7.50	7.37	7.35	7.24	25	25	25	25	25	25	25
-003	A	7.47	7.65	7.63	7.62	7.54	7.56	7.44	25	25	25	25	25	25	25
-004	A								~~25~~						
INC TEMP:		25	25	25	25	25	25	25							
DATE:		8/17	8/18	8/19	8/20	8/21	8/22	8/23							
TIME:		1320	1100	1055	1520	1150	1200	1240							
INIT:		m	m	m	SJ	m	m	m							

WATER QUALITY METERS USED NEW WATER QUALITIES								
	0	1	2	3	4	5	6	7
Water Quality Station #		2	2	2	1	2	1	
Initials	m	m	m	SJ	m	m	m	
Date	8/17	8/18	8/19	8/20	8/21	8/22	8/23	

Americamysis bahia 7 DAY CHRONIC ASSAY
SAMPLE USE RECORD

STUDY: 14886	CLIENT: BATTELLE - New Bedford
SPECIES: *A. bahia*	TEST: chronic renewal

Sample	Day: 0		Day: 1		Day: 2	
	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID
Lab Control	1600	n/a	1200	n/a	1200	n/a
-001	↓	-001	↓	-001	↓	-001
-002	↓	-002	↓	-002	↓	-002
-003	↓	-003	↓	-003	↓	-003
-004						

Day	Date	Time	Init
0	8/17	1315	m
1	8/18	1025	m
2	8/19	1050	m
3	8/20	1415	SJ
4	8/21	1140	m
5	8/22	1155	m
6	8/23	1225	m

Sample	Day: 3		Day: 4		Day: 5	
	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID
Lab Control	1200	n/a	1200	n/a	1200	n/a
-001	↓	-001	↓	-001	↓	-001
-002	↓	-002	↓	-002	↓	-002
-003	↓	-003	↓	-003	↓	-003
-004						

Sample	Day: 6	
	Volume Used (mL)	ESI Cube ID
Lab Control	1200	n/a
-001	↓	-001
-002	↓	-002
-003	↓	-003

Americamysis bahia 7 DAY CHRONIC ASSAY
OLD WATER QUALITIES

STUDY: 14886	CLIENT: BATTELLE	LOCATION: NEW BEDFORD	LAB CONTROL: HAMPTON ESTUARY

OLD SALINITY (ppt)									OLD pH (SU)						
Conc	Rep	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Control	A	30	30	30	29	29	30	31	7.64	7.74	7.78	7.76	7.87	7.75	7.73
-001	A	30	30	30	30	30	30	30	7.56	7.68	7.84	7.73	7.87	7.79	7.64
-002	A	29	29	29	29	29	29	28	7.57	7.63	7.77	7.73	7.80	7.67	7.57
-003	A	29	29	29	29	29	29	28	7.64	7.68	7.79	7.78	7.83	7.81	7.70
-004	A														

OLD TEMPERATURE (°C)															
Conc	Rep	1	2	3	4	5	6	7							
Control	A	25	25	25	25	25	25	25							
-001	A	25	25	25	25	25	25	25							
-002	A	25	25	25	25	25	25	25							
-003	A	25	25	25	25	25	25	25							
-004	A														
INC TEMP:		25	25	25	25	25	25	25							
DATE:		8/18	8/19	8/20	8/21	8/22	8/23	8/24							
TIME:		1000	1030	1350	1110	1135	1200	1340							
INITIALS:		m	m	SJ	m	m	m	CP							

GENERAL NOTES - for additional information refer to SOP #1411 or EPA manual 600/4-91/003

- Test vessels will be 250 mL glass beakers containing a minimum of 150 mL of solution
- 8 replicates per site with 5 organisms each

- Test Temperature: 26±1°C
- Salinity: 25 ±2ppt
- Dissolved Oxygen: >4.3 mg/L

- Photoperiod will be 16 hours light and 8 hours dark.
- Passing criteria require ≥80% survival and average dry weight of ≥0.20 mg/organism in the control vessels.

WATER QUALITY METERS USED OLD WATER QUALITIES								
	0	1	2	3	4	5	6	7
Water Quality Station #		1	1	2	2	2	2	2
Initials		m	m	SJ	m	m	m	CP
Date	8/17	8/18	8/19	8/20	8/21	8/22	8/23	8/24

Americamysis bahia 7 DAY CHRONIC ASSAY
SURVIVAL & OLD WATER QUALITIES

STUDY: 14925	CLIENT: Battelle	LOCATION: NEW BEDFORD	LAB CONTROL: HAMPTON ESTUARY	ORGANISM BATCH/LOT#

		NUMBER OF SURVIVORS								OLD DISSOLVED OXYGEN (mg/L)						
SAMPLE	Rep	0	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Lab Control	A	5	5	5	5	5	5		5	6.1	6.2	6.0	6.0	5.9		6.3
	B	5	5	5	5	5	5		5	6.0	6.2	6.0	5.7	5.9		6.3
	C	5	5	5	5	5	5		5	6.0	5.9	5.7	5.7	5.8		6.3
	D	5	5	5	5	5	5		5	6.0	6.0	5.7	5.7	5.9		6.2
	E	5	5	5	5	5	5		5	6.1	6.1	5.9	5.7	5.8		6.2
	F	5	5	5	5	5	5		5	6.2	6.0	5.4	5.3	6.0		6.1
	G	5	5	5	5	5	5		5	6.0	5.8	5.4	5.3	5.0		6.1
	H	5	5	5	5	5	5		5	6.0	5.9	5.5	5.6	5.1		6.1
-001	A	5	5	5	5	5	5		5	6.3	6.0	6.0	6.1	6.1		6.0
	B	5	5	5	5	5	5		5	6.4	6.1	6.0	6.1	6.0		6.1
	C	5	5	5	5	5	5		5	6.1	6.1	6.1	6.1	6.0		6.0
	D	5	5	5	5	5	5		5	6.2	6.0	6.1	6.1	6.1		6.0
	E	5	5	5	5	5	5		5	6.4	6.0	6.0	6.1	6.2		6.0
	F	5	5	5	5	5	5		5	6.3	6.1	6.0	6.1	6.0		6.0
	G	5	5	5	5	5	5		5	6.3	6.0	6.1	6.1	6.1		5.9
	H	5	5	5	5	5	5		5	6.3	6.0	6.0	6.1	6.0		5.9
-002	A	5	5	5	5	5	5		5	6.2	5.9	6.0	6.0	6.0		5.6
	B	5	4	4	4	4	4		4	6.0	6.0	6.0	6.0	6.0		5.8
	C	5	5	5	5	5	5		5	6.0	5.9	6.0	6.1	6.0		5.5
	D	5	5	5	5	5	5		5	6.0	5.9	6.1	6.1	6.0		5.3
	E	5	5	5	5	5	5		5	6.0	6.0	6.0	6.0	6.0		5.5
	F	5	5	5	5	5	5		5	6.1	5.9	6.0	6.0	6.0		5.1
	G	5	5	5	5	5	5		5	6.0	5.9	6.0	6.0	6.0		5.3
	H	5	5	5	5	5	5		5	6.0	5.9	6.0	5.9	6.0		5.1
INC TEMP:		25	25	25	25	25	25		25							
DATE:		8/29	8/30	8/31	9/1	9/2	9/3		9/5							
TIME:		1410	1005	1100	1145	1230	1340		0915							
INITIALS:		EG	m	EG	EG	yc	CP		m							

Americamysis bahia 7 DAY CHRONIC ASSAY
SURVIVAL & OLD WATER QUALITIES

STUDY:	CLIENT:	LOCATION:	LAB CONTROL:	ORGANISM
14925	Battelle	NEW BEDFORD	HAMPTON ESTUARY	BATCH/LOT#

		NUMBER OF SURVIVORS								OLD DISSOLVED OXYGEN (mg/L)						
SAMPLE	Rep	0	1	2	3	4	5	6	7	1	2	3	4	5	6	7
-003	A	5	5	5	5	5	5		5	6.0	5.6	5.7	5.7	5.8		5.8
	B	5	5	5	5	5	5		5	5.8	5.6	5.5	5.6	5.8		5.4
	C	5	5	5	5	5	5		5	5.8	5.5	5.3	5.4	5.5		5.5
	D	5	5	5	5	5	5		5	5.8	5.7	5.3	5.4	5.5		5.7
	E	5	5	5	5	5	5		5	5.9	5.4	5.4	5.4	5.3		5.6
	F	5	5	5	5	5	5		5	5.8	5.5	5.4	5.4	5.0		5.6
	G	5	5	5	5	5	5		5	5.8	5.6	5.4	5.4	5.1		5.5
	H	5	5	5	5	5	5		5	5.6	5.6	5.3	5.4	5.3		5.5
	A															
	B															
	C															
	D															
	E															
	F															
	G															
	H															
INC TEMP:		25	25	25	25	25	25		25							
DATE:		8/29	8/30	8/31	9/1	9/2	9/3		9/5							
TIME:		1410	1005	1100	1145	1230	1340		0915							
INITIALS:		EG	[illegible]	EG	EG	[illegible]	CP		[illegible]							

Americamysis bahia 7 DAY CHRONIC ASSAY
ORGANISM WEIGHTS

CLIENT: BATTELLE - NEW BEDFORD				TEST DATES:				
STUDY #: 14925				SPECIES: *A. bahia*				
CONC	REP	TARE WEIGHT (~~g~~ mg)	SHRIMP + FOIL (g)	NET WEIGHT (mg)	# SHRIMP DAY 0	MEAN WEIGHT (mg) DAY 0	# SHRIMP DAY 7	MEAN WEIGHT (mg) DAY 7
lab	A	210.13	211.43					
	B	207.17	208.56					
	C	210.97	212.45					
	D	207.91	209.15					
	E	208.84	210.43					
	F	208.66	210.19					
	G	210.34	211.73					
	H	208.09	209.52					
-001	A	210.46	212.04					
	B	208.09	209.50					
	C	212.14	213.55					
	D	208.74	210.01					
	E	210.07	211.95					
	F	208.39	210.29					
	G	207.77	209.50					
	H	207.75	209.32					
-002	A	211.27	212.72					
	B	209.63	211.07					
	C	209.56	211.18					
	D	210.23	211.86					
	E	207.03	208.89					
	F	210.23	211.95					
	G	209.01	210.41					
	H	208.63	210.52					
DATE		9/1/06	9/6/06					
TIME		1310	1015					
INITIALS		LM	EG					

Americamysis bahia 7 DAY CHRONIC ASSAY
ORGANISM WEIGHTS

CLIENT: BATTELLE - NEW BEDFORD				TEST DATES:				
STUDY #: 14925				SPECIES: *A. bahia*				
CONC	REP	TARE WEIGHT (g)	SHRIMP + FOIL (g)	NET WEIGHT (mg)	# SHRIMP DAY 0	MEAN WEIGHT (mg) DAY 0	# SHRIMP DAY 7	MEAN WEIGHT (mg) DAY 7
-003	A	209.94	211.95					
	B	208.38	210.15					
	C	210.30	212.08					
	D	209.20	211.28					
	E	209.15	211.34					
	F	208.41	210.27					
	G	210.22	212.48					
	H	208.38	210.36					
	A							
	B							
	C							
	D							
	E							
	F							
	G							
	H							
	A							
	B							
	C							
	D							
	E							
	F							
	G							
	H							
DATE		9/1/06	9/6/06					
TIME		1310	1015					
INITIALS		M	EG					

CETIS Test Summary

Report Date: 08 Sep-06 10:03 AM
Link: 12-2827-6446

Mysidopsis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	18-0274-9001	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 19h
Start Date:	29 Aug-06 02:10 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	05 Sep-06 09:15 AM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	29 Aug-06 02:10 PM	**Brine:**	Not Applicable		

Sample No:	04-2857-7808	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	29 Aug-06 11:00 AM	**Code:**	14925-000	**Project:**	Ecological Risk Assessment
Receive Date:	29 Aug-06 11:00 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	3h	**Station:**	WQ-TOX-Lab Control		

Sample No:	09-8741-8251	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	28 Aug-06 09:30 AM	**Code:**	14925-001	**Project:**	Ecological Risk Assessment
Receive Date:	26 Aug-06 04:00 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	29h	**Station:**	WQ-TOX-001		

Sample No:	11-7877-8283	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	28 Aug-06 09:50 AM	**Code:**	14925-002	**Project:**	Ecological Risk Assessment
Receive Date:	28 Aug-06 04:00 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	28h	**Station:**	WQ-TOX-002		

Sample No:	09-3982-0403	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	28 Aug-06 10:15 AM	**Code:**	14925-003	**Project:**	Ecological Risk Assessment
Receive Date:	28 Aug-06 04:00 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	28h	**Station:**	WQ-TOX-003		

7d Proportion Survived Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
14925-000	8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
14925-001	8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
14925-002	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%
14925-003	8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%

Mean Dry Biomass-mg Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
14925-000	8	0.28375	0.24800	0.31800	0.00816	0.02309	8.14%
14925-001	8	0.31875	0.25400	0.38000	0.01620	0.04582	14.37%
14925-002	8	0.32525	0.28000	0.37800	0.01336	0.03780	11.62%
14925-003	8	0.39825	0.35400	0.45200	0.01284	0.03632	9.12%

7d Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
14925-000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
14925-001	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
14925-002	1.00000	0.80000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
14925-003	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
14925-000	0.26000	0.27800	0.29600	0.24800	0.31800	0.30600	0.27800	0.28600
14925-001	0.31600	0.28200	0.28200	0.25400	0.37600	0.38000	0.34600	0.31400
14925-002	0.29000	0.28800	0.32400	0.32600	0.37200	0.34400	0.28000	0.37800
14925-003	0.40200	0.35400	0.35600	0.41600	0.43800	0.37200	0.45200	0.39600

CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	18-0274-9001	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 19h
Start Date:	29 Aug-06 02:10 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	05 Sep-06 09:15 AM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	29 Aug-06 02:10 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	12-2827-6446	12-2827-6446	08 Sep-06 10:02 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	3.93797	8.88539	0.09102	Equal Variances
Distribution	Shapiro-Wilk W	0.97045	0.84420	0.81156	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0049	0.0049	1	3.72	0.07419	Non-Significant Effect
Error	0.0184269	0.0013162	14			
Total	0.02332689	0.0062162	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14925-000		14925-001	-1.9295	1.76131	0.9629	0.03195	Non-Significant Effect

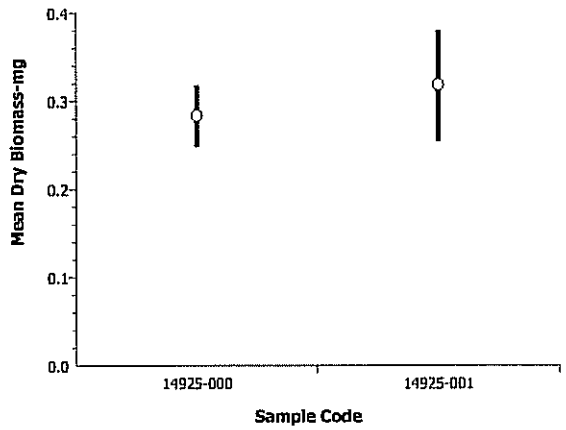
Data Summary

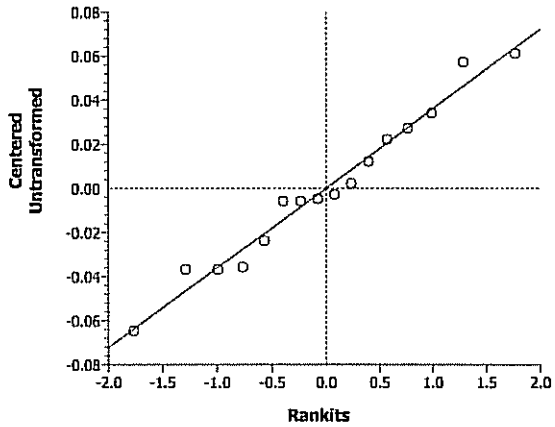
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14925-000	8	0.28375	0.24800	0.31800	0.02309				
14925-001	8	0.31875	0.25400	0.38000	0.04582				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14925-000	0.26000	0.27800	0.29600	0.24800	0.31800	0.30600	0.27800	0.28600		
14925-001	0.31600	0.28200	0.28200	0.25400	0.37600	0.38000	0.34600	0.31400		

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	18-0274-9001	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 19h
Start Date:	29 Aug-06 02:10 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	05 Sep-06 09:15 AM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	29 Aug-06 02:10 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	12-2827-6446	12-2827-6446	08 Sep-06 10:02 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.67958	8.88539	0.21681	Equal Variances
Distribution	Shapiro-Wilk W	0.95401	0.84420	0.53194	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0068893	0.0068893	1	7.02	0.01902	Significant Effect
Error	0.0137310	0.0009808	14			
Total	0.02062032	0.0078701	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14925-000		14925-002	-2.6503	1.76131	0.9905	0.02758	Non-Significant Effect

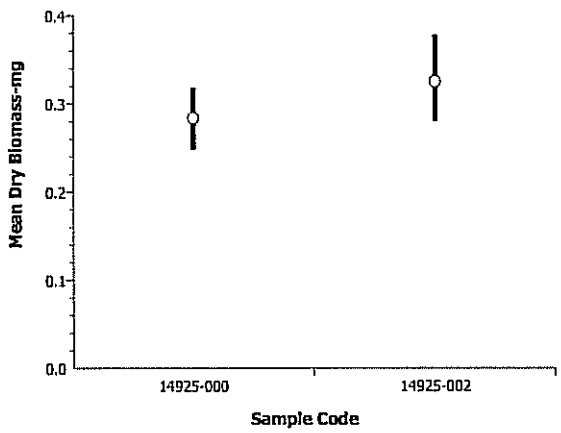
Data Summary

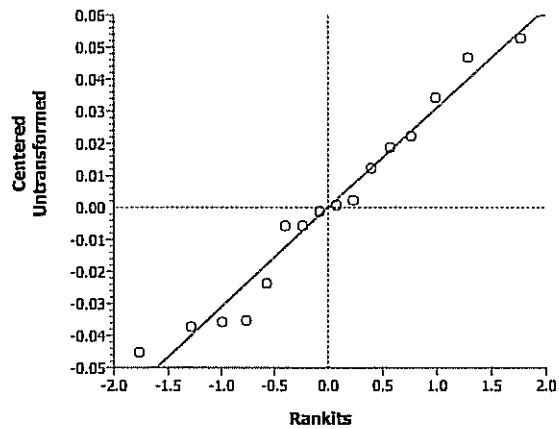
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14925-000	8	0.28375	0.24800	0.31800	0.02309				
14925-002	8	0.32525	0.28000	0.37800	0.03780				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14925-000	0.26000	0.27800	0.29600	0.24800	0.31800	0.30600	0.27800	0.28600		
14925-002	0.29000	0.28800	0.32400	0.32600	0.37200	0.34400	0.28000	0.37800		

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	18-0274-9001	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 19h
Start Date:	29 Aug-06 02:10 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	05 Sep-06 09:15 AM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	29 Aug-06 02:10 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	12-2827-6446	12-2827-6446	08 Sep-06 10:02 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.47492	8.88539	0.25484	Equal Variances
Distribution	Shapiro-Wilk W	0.96813	0.84420	0.77274	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0524410	0.0524410	1	56.62	0.00000	Significant Effect
Error	0.0129673	0.0009262	14			
Total	0.06540836	0.0533673	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14925-000		14925-003	-7.5244	1.76131	1.0000	0.02680	Non-Significant Effect

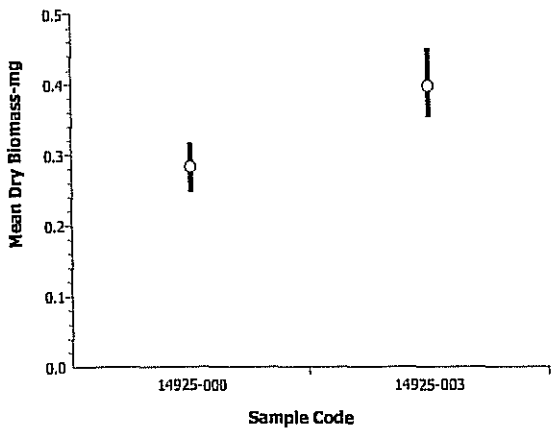
Data Summary

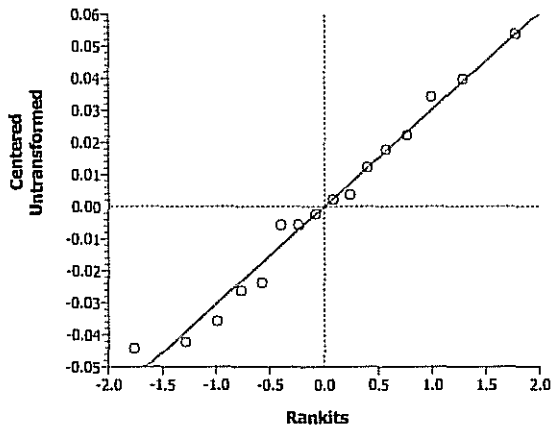
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14925-000	8	0.28375	0.24800	0.31800	0.02309				
14925-003	8	0.39825	0.35400	0.45200	0.03632				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14925-000	0.26000	0.27800	0.29600	0.24800	0.31800	0.30600	0.27800	0.28600		
14925-003	0.40200	0.35400	0.35600	0.41600	0.43800	0.37200	0.45200	0.39600		

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	18-0274-9001	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 19h
Start Date:	29 Aug-06 02:10 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	05 Sep-06 09:15 AM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	29 Aug-06 02:10 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	12-2827-6446	12-2827-6446	08 Sep-06 10:02 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.59115	8.88539	0.55492	Equal Variances
Distribution	Shapiro-Wilk W	0.94436	0.84420	0.39248	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0252811	0.0252811	1	14.79	0.00178	Significant Effect
Error	0.0239309	0.0017093	14			
Total	0.04921201	0.0269905	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14925-001		14925-003	-3.8458	1.76131	0.9991	0.03641	Non-Significant Effect

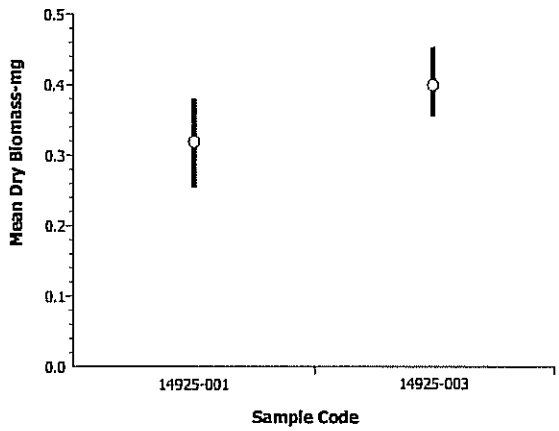
Data Summary

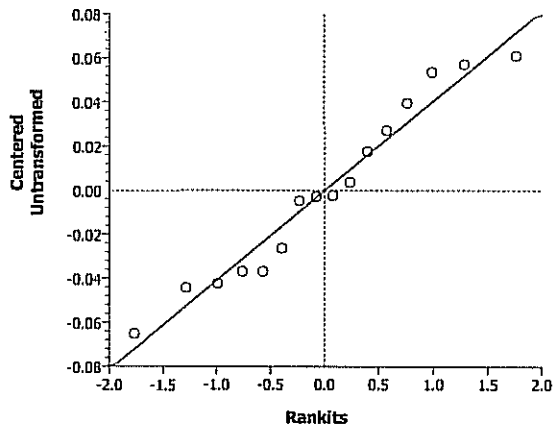
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14925-001	8	0.31875	0.25400	0.38000	0.04582				
14925-003	8	0.39825	0.35400	0.45200	0.03632				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14925-001	0.31600	0.28200	0.28200	0.25400	0.37600	0.38000	0.34600	0.31400		
14925-003	0.40200	0.35400	0.35600	0.41600	0.43800	0.37200	0.45200	0.39600		

Graphics





CETIS Analysis Detail

Mysidopsis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	18-0274-9001	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 19h
Start Date:	29 Aug-06 02:10 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Mysidopsis bahia
Ending Date:	05 Sep-06 09:15 AM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	29 Aug-06 02:10 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	12-2827-6446	12-2827-6446	08 Sep-06 10:02 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.46962	8.88539	0.62410	Equal Variances
Distribution	Shapiro-Wilk W	0.92760	0.84420	0.22060	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0001691	0.0001691	1	0.10	0.76144	Non-Significant Effect
Error	0.0246946	0.0017639	14			
Total	0.02486365	0.001933	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14925-001		14925-002	-0.3096	1.76131	0.6193	0.03699	Non-Significant Effect

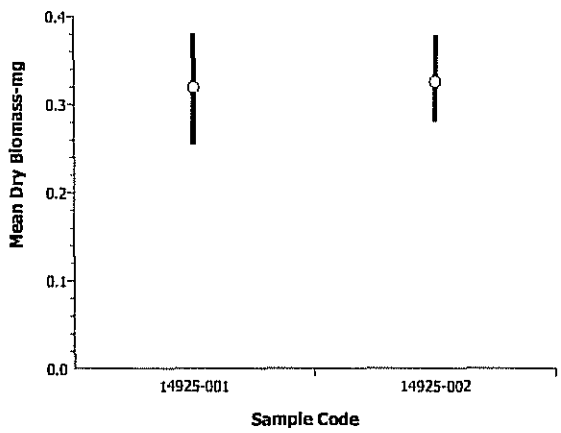
Data Summary

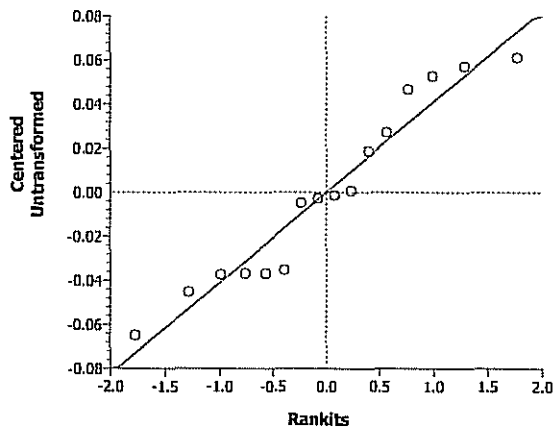
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14925-001	8	0.31875	0.25400	0.38000	0.04582				
14925-002	8	0.32525	0.28000	0.37800	0.03780				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14925-001	0.31600	0.28200	0.28200	0.25400	0.37600	0.38000	0.34600	0.31400		
14925-002	0.29000	0.28800	0.32400	0.32600	0.37200	0.34400	0.28000	0.37800		

Graphics





Aquatic Research Organisms

DATA SHEET

I. Organism History

Species: Americamysis bahia

Source: Lab reared ✓ Hatchery reared ____ Field collected ____

Hatch date 8-21-06 Receipt date ____

Lot number 082106MS Strain ____

Brood Origination Florida

II. Water Quality

Temperature 25 °C Salinity ≈30 ppt DO —

pH 7.8 Hardness — ppm

III. Culture Conditions

System: Recirc

Diet: Flake Food ✓ Phytoplankton ____ Trout Chow ✓

Brine Shrimp ✓ Rotifers ____ Other Encap. Shrimp Diet

Prophylactic Treatments: ____

Comments: ____

IV. Shipping Information

Client: EST # of Organisms: 1500+

Carrier: ____ Date Shipped: 8-28-06

Biologist: Mark Rosengrant

1 - 800 - 927 - 1650

PO Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650

Arbacia punctulata Chronic Fertilization Assay
Water Quality and Gamete Preparation Data

STUDY: 14925	CLIENT: BATTELLE	LOCATION: New Bedford	DATE: 8/29/06 INITIALS: BB

SALINITY ADJUSTMENT RECORD: 500 mL -001 + 1.7 g SALT

SALINITY ADJUSTMENT RECORD: 500 mL -002 + 7.8 g SALT 8/28/06 BB

SALINITY ADJUSTMENT RECORD: 500 mL -003 + 6.7 g SALT

SALINITY ADJUSTED SAMPLE	D.O. (mg/L)	pH (SU)	SPEC COND (µmhos)	TEMP (°C)	SALINITY (ppt)
Lab Control	7.3	8.01	47480	20	31
-001	8.6	7.74	46270	20	30
-002	8.3	7.84	45430	20	30
-003	8.3	7.86	36960	20	29

METERS USED

DO meter # 19 DO probe # 8 pH meter # 470 pH probe # 48 S/C meter # YSI30c S/C probe # YSI30c

SALINITY meter # YSI 30c

DATE & INITIALS FOR GAMETE PREPARATION: 8/29/06 BB

SPERM DILUTIONS:

HEMACYTOMETER COUNT, E: 116 X 10^4 = SPM SOLUTION E = 1.16×10^6

SPERM CONCENTRATIONS:

SOLUTION E X 40 = SOLUTION A = 4.64×10^7 SPM

SOLUTION E X 20 = SOLUTION B = 2.32×10^7 SPM

SOLUTION E X 5 = SOLUTION C = 5.80×10^6 SPM

FINAL COUNTS:

FINAL SPERM COUNT: 4.64×10^7

FINAL EGG COUNT: 2800

TEST TIMES:

SPERM COLLECTED: 1120

EGGS COLLECTED: 1120

SPERM ADDED: 1140

EGGS ADDED: 1240

FIXATIVE ADDED: 1300

See ESI SOP #1412 for additional information

Arbacia punctulata Chronic Fertilization Assay

SAMPLE USE RECORD

STUDY: 14925	CLIENT: Battelle - New Bedford	
SPECIES: *A. punctulata*		
	Day: 0	
SAMPLE	Volume Used (mL)	ESI Cube ID
Lab Control	500	N/A
-001		-001
-002		-002
-003		-003
INITIALS:	BB	
TIME:	1830	
DATE:	8/29/06	

FERTILIZATION COUNTS

STUDY 14925	CLIENT BATTELLE	LOCATION New Bedford	DATE 8/29/06 INITIALS CJB

	REPLICATE VIAL			
	1	2	3	4
SAMPLE	FERT/TOTAL	FERT/TOTAL	FERT/TOTAL	FERT/TOTAL
Lab Control	100/111	100/112	100/113	100/107
-001	100/111	100/106	100/115	100/108
-002	100/110	100/117	100/123	100/120
-003	100/120	100/119	100/111	100/112

CETIS Test Summary

Report Date: 29 Aug-06 3:33 PM
Link: 12-0368-6234

Arbacia Sperm Cell Fertilization Test — EnviroSystems, Inc.

Test No:	08-2788-9482	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	29 Aug-06 11:40 AM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Arbacia punctulata
Ending Date:	29 Aug-06 01:00 PM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	29 Aug-06 11:40 AM	**Brine:**	Generic commercial salts		

Sample No:	04-2857-7808	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	29 Aug-06 11:00 AM	**Code:**	14925-000	**Project:**	Ecological Risk Assessment
Receive Date:	29 Aug-06 11:00 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	40m	**Station:**	WQ-TOX-Lab Control		

Sample No:	09-8741-8251	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	28 Aug-06 09:30 AM	**Code:**	14925-001	**Project:**	Ecological Risk Assessment
Receive Date:	26 Aug-06 04:00 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	26h	**Station:**	WQ-TOX-001		

Sample No:	11-7877-8283	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	28 Aug-06 09:50 AM	**Code:**	14925-002	**Project:**	Ecological Risk Assessment
Receive Date:	28 Aug-06 04:00 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	26h	**Station:**	WQ-TOX-002		

Sample No:	09-3982-0403	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	28 Aug-06 10:15 AM	**Code:**	14925-003	**Project:**	Ecological Risk Assessment
Receive Date:	28 Aug-06 04:00 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	25h	**Station:**	WQ-TOX-003		

Proportion Fertilized Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
14925-000	4	0.90332	0.88496	0.93458	0.01092	0.02183	2.42%
14925-001	4	0.90995	0.86957	0.94340	0.01604	0.03208	3.53%
14925-002	4	0.85253	0.81301	0.90909	0.02068	0.04137	4.85%
14925-003	4	0.86686	0.83333	0.90090	0.01747	0.03494	4.03%

Proportion Fertilized Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
14925-000	0.90090	0.89286	0.88496	0.93458
14925-001	0.90090	0.94340	0.86957	0.92593
14925-002	0.90909	0.85470	0.81301	0.83333
14925-003	0.83333	0.84034	0.90090	0.89286

CETIS Test Summary

Report Date: 29 Aug-06 3:33 PM
Link: 12-0368-6234

Arbacia Sperm Cell Fertilization Test — EnviroSystems, Inc.

Test No:	08-2788-9482	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	29 Aug-06 11:40 AM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Arbacia punctulata
Ending Date:	29 Aug-06 01:00 PM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	29 Aug-06 11:40 AM	**Brine:**	Generic commercial salts		

Sample No:	04-2857-7808	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	29 Aug-06 11:00 AM	**Code:**	14925-000	**Project:**	Ecological Risk Assessment
Receive Date:	29 Aug-06 11:00 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	40m	**Station:**	WQ-TOX-Lab Control		
Sample No:	09-8741-8251	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	28 Aug-06 09:30 AM	**Code:**	14925-001	**Project:**	Ecological Risk Assessment
Receive Date:	26 Aug-06 04:00 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	26h	**Station:**	WQ-TOX-001		
Sample No:	11-7877-8283	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	28 Aug-06 09:50 AM	**Code:**	14925-002	**Project:**	Ecological Risk Assessment
Receive Date:	28 Aug-06 04:00 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	26h	**Station:**	WQ-TOX-002		
Sample No:	09-3982-0403	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	28 Aug-06 10:15 AM	**Code:**	14925-003	**Project:**	Ecological Risk Assessment
Receive Date:	28 Aug-06 04:00 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	25h	**Station:**	WQ-TOX-003		

Proportion Fertilized Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
14925-000	4	0.90332	0.88496	0.93458	0.01092	0.02183	2.42%
14925-001	4	0.90995	0.86957	0.94340	0.01604	0.03208	3.53%
14925-002	4	0.85253	0.81301	0.90909	0.02068	0.04137	4.85%
14925-003	4	0.86686	0.83333	0.90090	0.01747	0.03494	4.03%

Proportion Fertilized Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
14925-000	0.90090	0.89286	0.88496	0.93458
14925-001	0.90090	0.94340	0.86957	0.92593
14925-002	0.90909	0.85470	0.81301	0.83333
14925-003	0.83333	0.84034	0.90090	0.89286

CETIS Analysis Detail

Arbacia Sperm Cell Fertilization Test — EnviroSystems, Inc.

Test No:	08-2788-9482	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	29 Aug-06 11:40 AM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Arbacia punctulata
Ending Date:	29 Aug-06 01:00 PM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	29 Aug-06 11:40 AM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	12-0368-6234	12-0368-6234	29 Aug-06 3:33 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.08552	47.46723	0.56148	Equal Variances
Distribution	Shapiro-Wilk W	0.94130	0.74935	0.58653	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0003485	0.0003485	1	0.15	0.71161	Non-Significant Effect
Error	0.0139081	0.0023180	6			
Total	0.01425651	0.0026665	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14925-000		14925-001	-0.3877	1.94318	0.6442	0.06615	Non-Significant Effect

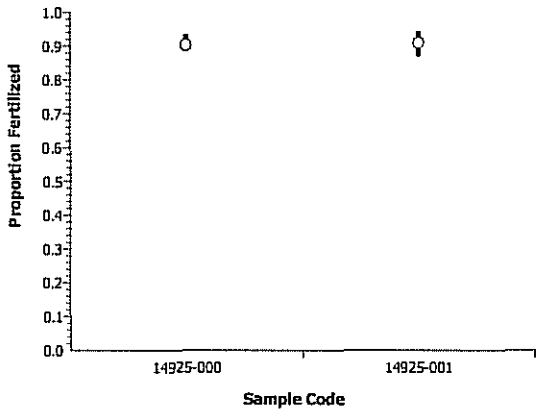
Data Summary

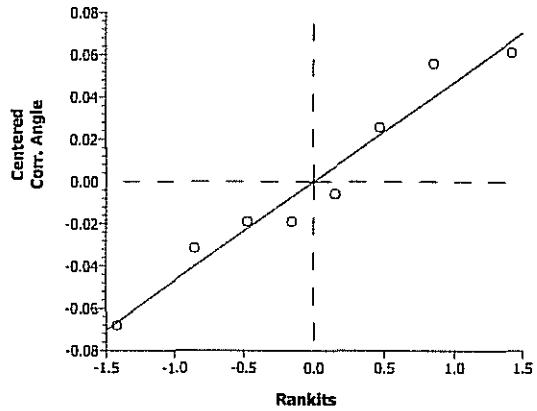
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14925-000	4	0.90332	0.88496	0.93458	0.02183	1.25619	1.22475	1.31215	0.03876
14925-001	4	0.90995	0.86957	0.94340	0.03208	1.26939	1.20129	1.33058	0.05598

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14925-000	0.90090	0.89286	0.88496	0.93458						
14925-001	0.90090	0.94340	0.86957	0.92593						

Graphics





CETIS Analysis Detail

Arbacia Sperm Cell Fertilization Test — **EnviroSystems, Inc.**

Test No:	08-2788-9482	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	29 Aug-06 11:40 AM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Arbacia punctulata
Ending Date:	29 Aug-06 01:00 PM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	29 Aug-06 11:40 AM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	12-0368-6234	12-0368-6234	29 Aug-06 3:33 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.48612	47.46723	0.47414	Equal Variances
Distribution	Shapiro-Wilk W	0.89823	0.74935	0.26453	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0117544	0.0117544	1	4.49	0.07844	Non-Significant Effect
Error	0.0157138	0.002619	6			
Total	0.02746818	0.0143734	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14925-000		14925-002	2.11854	1.94318	0.0392	0.07032	Significant Effect

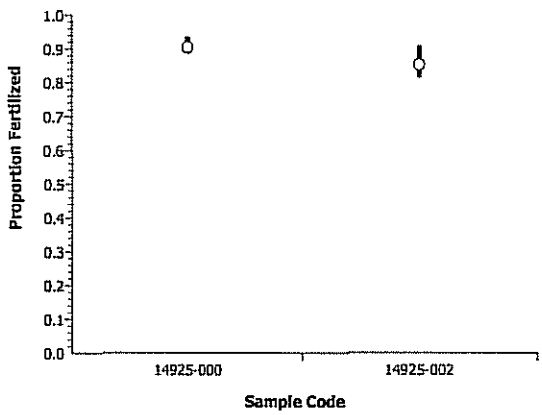
Data Summary

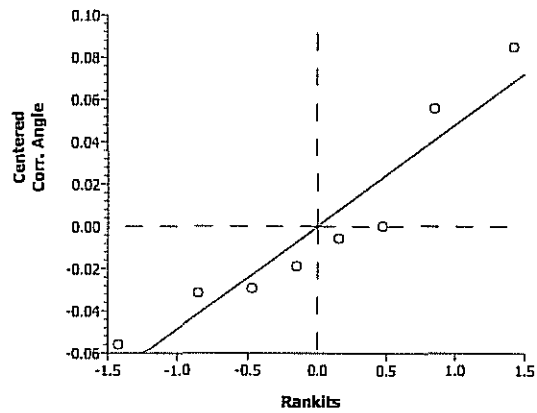
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14925-000	4	0.90332	0.88496	0.93458	0.02183	1.25619	1.22475	1.31215	0.03876
14925-002	4	0.85253	0.81301	0.90909	0.04137	1.17953	1.12362	1.26452	0.06112

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14925-000	0.90090	0.89286	0.88496	0.93458						
14925-002	0.90909	0.85470	0.81301	0.83333						

Graphics





CETIS Analysis Detail

Arbacia Sperm Cell Fertilization Test — EnviroSystems, Inc.

Test No:	08-2788-9482	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	29 Aug-06 11:40 AM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Arbacia punctulata
Ending Date:	29 Aug-06 01:00 PM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	29 Aug-06 11:40 AM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	12-0368-6234	12-0368-6234	29 Aug-06 3:33 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.78415	47.46723	0.64619	Equal Variances
Distribution	Shapiro-Wilk W	0.88182	0.74935	0.19074	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0064353	0.0064353	1	3.08	0.12996	Non-Significant Effect
Error	0.0125496	0.0020916	6			
Total	0.01898492	0.0085269	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14925-000		14925-003	1.75406	1.94318	0.0650	0.06284	Non-Significant Effect

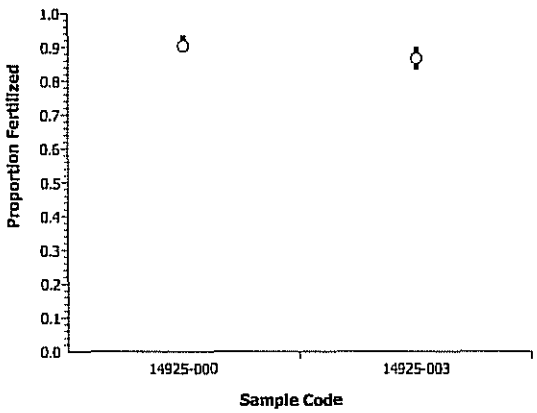
Data Summary

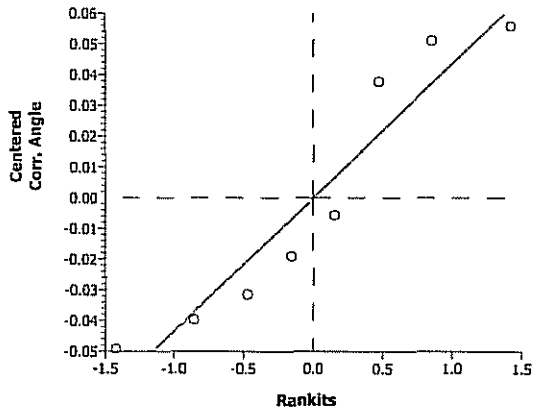
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14925-000	4	0.90332	0.88496	0.93458	0.02183	1.25619	1.22475	1.31215	0.03876
14925-003	4	0.86686	0.83333	0.90090	0.03494	1.19947	1.15026	1.25055	0.05178

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14925-000	0.90090	0.89286	0.88496	0.93458						
14925-003	0.83333	0.84034	0.90090	0.89286						

Graphics





CETIS Analysis Detail

Arbacia Sperm Cell Fertilization Test — EnviroSystems, Inc.

Test No:	08-2788-9482	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	29 Aug-06 11:40 AM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Arbacia punctulata
Ending Date:	29 Aug-06 01:00 PM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	29 Aug-06 11:40 AM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	12-0368-6234	12-0368-6234	29 Aug-06 3:33 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.19209	47.46723	0.88857	Equal Variances
Distribution	Shapiro-Wilk W	0.95607	0.74935	0.73965	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0161505	0.0161505	1	4.70	0.07321	Non-Significant Effect
Error	0.0206068	0.0034345	6			
Total	0.03675727	0.019585	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14925-001		14925-002	2.16852	1.94318	0.0366	0.08052	Significant Effect

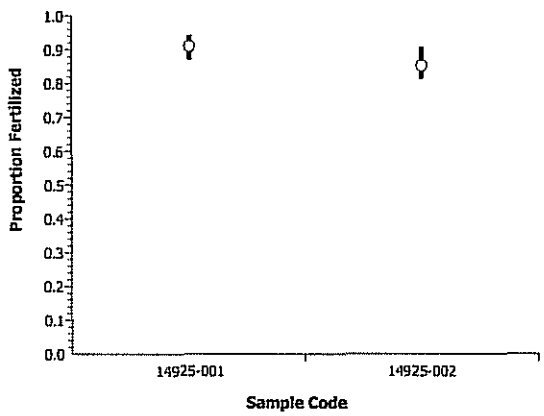
Data Summary

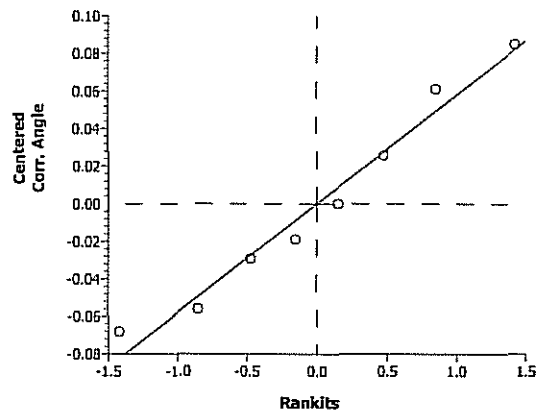
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14925-001	4	0.90995	0.86957	0.94340	0.03208	1.26939	1.20129	1.33058	0.05598
14925-002	4	0.85253	0.81301	0.90909	0.04137	1.17953	1.12362	1.26452	0.06112

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14925-001	0.90090	0.94340	0.86957	0.92593						
14925-002	0.90909	0.85470	0.81301	0.83333						

Graphics





CETIS Analysis Detail

Arbacia Sperm Cell Fertilization Test — **EnviroSystems, Inc.**

Test No:	08-2788-9482	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	29 Aug-06 11:40 AM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Arbacia punctulata
Ending Date:	29 Aug-06 01:00 PM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	29 Aug-06 11:40 AM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	12-0368-6234	12-0368-6234	29 Aug-06 3:33 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.16891	47.46723	0.90094	Equal Variances
Distribution	Shapiro-Wilk W	0.91022	0.74935	0.33382	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0097786	0.0097786	1	3.36	0.11634	Non-Significant Effect
Error	0.0174426	0.0029071	6			
Total	0.02722129	0.0126858	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14925-001		14925-003	1.83404	1.94318	0.0582	0.07408	Non-Significant Effect

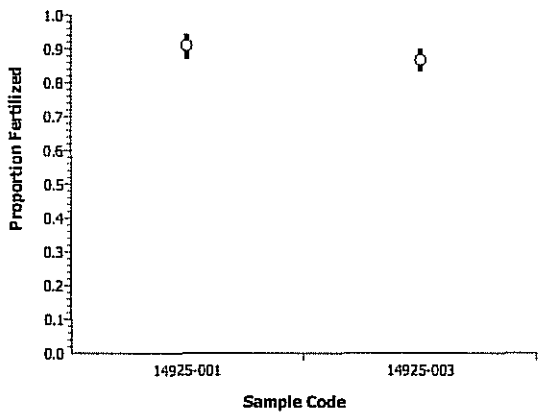
Data Summary

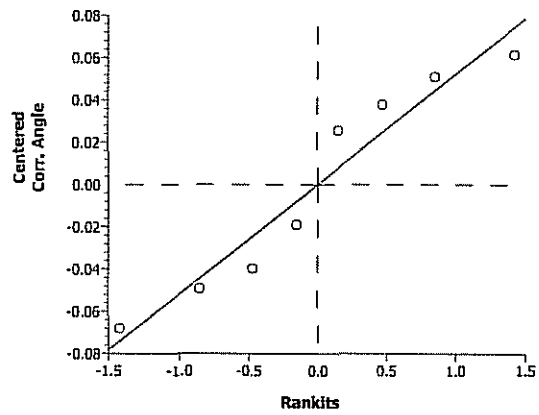
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14925-001	4	0.90995	0.86957	0.94340	0.03208	1.26939	1.20129	1.33058	0.05598
14925-003	4	0.86686	0.83333	0.90090	0.03494	1.19947	1.15026	1.25055	0.05178

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14925-001	0.90090	0.94340	0.86957	0.92593						
14925-003	0.83333	0.84034	0.90090	0.89286						

Graphics





CETIS Test Summary

Report Date: 07 Sep-06 8:33 PM
Link: 04-1749-6359

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	11-9941-0844	**Test Type:**	Champia	**Duration:**	7d 0h
Start Date:	30 Aug-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	06 Sep-06 12:00 PM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	30 Aug-06 12:00 PM	**Brine:**	Generic commercial salts		

Sample No:	04-2857-7808	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	29 Aug-06 11:00 AM	**Code:**	14925-000	**Project:**	Ecological Risk Assessment
Receive Date:	29 Aug-06 11:00 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	25h	**Station:**	WQ-TOX-Lab Control		

Sample No:	09-8741-8251	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	28 Aug-06 09:30 AM	**Code:**	14925-001	**Project:**	Ecological Risk Assessment
Receive Date:	26 Aug-06 04:00 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	50h	**Station:**	WQ-TOX-001		

Sample No:	11-7877-8283	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	28 Aug-06 09:50 AM	**Code:**	14925-002	**Project:**	Ecological Risk Assessment
Receive Date:	28 Aug-06 04:00 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	50h	**Station:**	WQ-TOX-002		

Sample No:	09-3982-0403	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	28 Aug-06 10:15 AM	**Code:**	14925-003	**Project:**	Ecological Risk Assessment
Receive Date:	28 Aug-06 04:00 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	50h	**Station:**	WQ-TOX-003		

Mean Cystocarps Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
14925-000	3	25.0667	17.8	37.6	6.29321	10.9002	43.48%
14925-001	4	29.4	23	37.8	3.22800	6.45600	21.96%
14925-002	4	27.35	20.8	35.8	3.26126	6.52253	23.85%
14925-003	4	29.35	19.6	40.8	5.23155	10.4631	35.65%

Mean Cystocarps Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
14925-000	19.8	17.8	37.6	
14925-001	37.8	30.8	26	23
14925-002	28.8	20.8	24	35.8
14925-003	19.6	21.4	40.8	35.6

CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-1749-6359	04-1749-6359	07 Sep-06 8:32 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.85061	49.79928	0.40489	Equal Variances
Distribution	Shapiro-Wilk W	0.86984	0.72991	0.18198	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	32.19048	32.19048	1	0.44	0.53479	Non-Significant Effect
Error	362.6667	72.53333	5			
Total	394.857132	104.72381	6			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14925-000		14925-001	-0.6662	2.01505	0.7326	13.1073	Non-Significant Effect

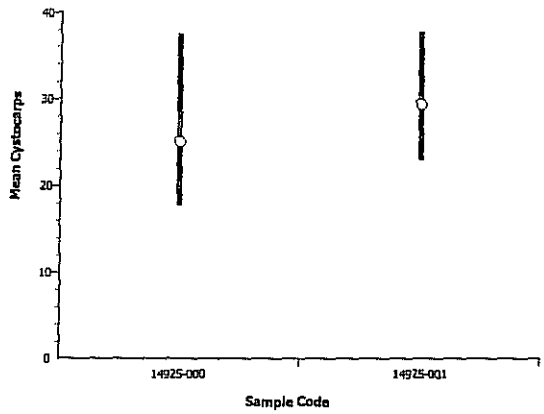
Data Summary

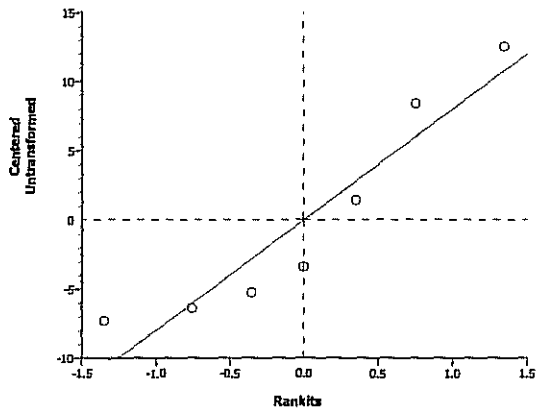
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14925-000	3	25.0667	17.8	37.6	10.9002				
14925-001	4	29.4	23	37.8	6.45601				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14925-000	19.8	17.8	37.6							
14925-001	37.8	30.8	26	23						

Graphics





CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-1749-6359	04-1749-6359	07 Sep-06 8:32 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.79276	49.79928	0.41311	Equal Variances
Distribution	Shapiro-Wilk W	0.87026	0.72991	0.18339	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	8.937619	8.937619	1	0.12	0.74075	Non-Significant Effect
Error	365.2567	73.05133	5			
Total	374.194272	81.98895	6			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14925-000		14925-002	-0.3498	2.01505	0.6296	13.154	Non-Significant Effect

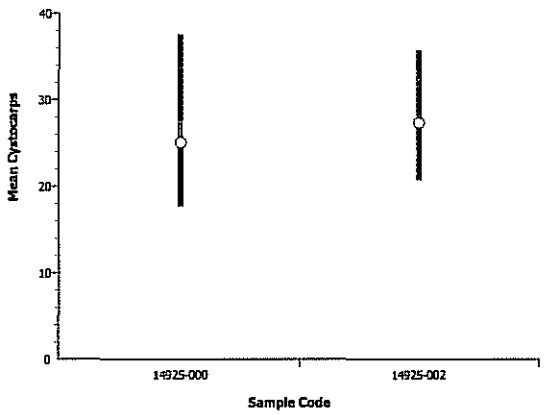
Data Summary

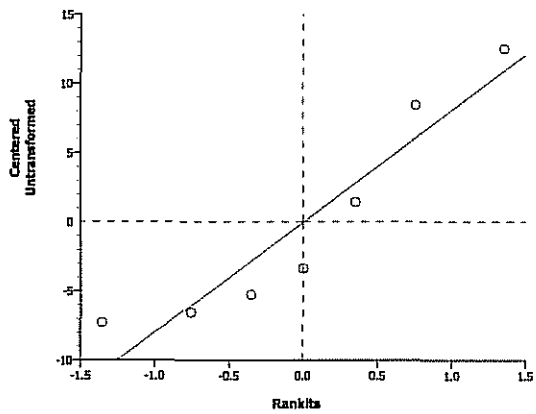
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14925-000	3	25.0667	17.8	37.6	10.9002				
14925-002	4	27.35	20.8	35.8	6.52252				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14925-000	19.8	17.8	37.6							
14925-002	28.8	20.8	24	35.8						

Graphics





CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-1749-6359	04-1749-6359	07 Sep-06 8:32 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.08528	49.79928	0.88390	Equal Variances
Distribution	Shapiro-Wilk W	0.82905	0.72991	0.08448	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	31.4519	31.4519	1	0.28	0.62068	Non-Significant Effect
Error	566.0566	113.2113	5			
Total	597.508545	144.66324	6			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14925-000		14925-003	-0.5271	2.01505	0.6897	16.3753	Non-Significant Effect

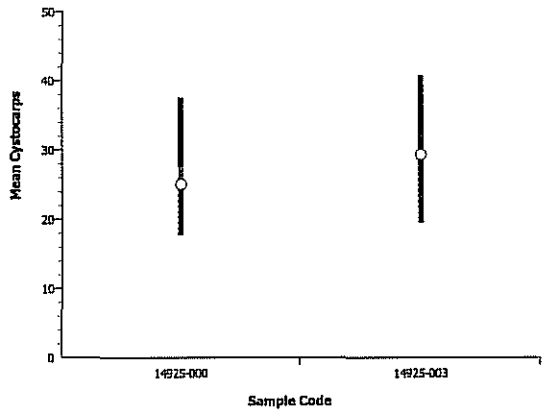
Data Summary

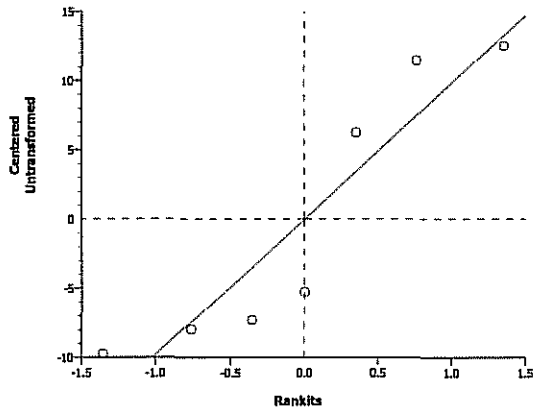
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14925-000	3	25.0667	17.8	37.6	10.9002				
14925-003	4	29.35	19.6	40.8	10.4631				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14925-000	19.8	17.8	37.6							
14925-003	19.6	21.4	40.8	35.6						

Graphics





CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-1749-6359	04-1749-6359	07 Sep-06 8:32 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.02071	47.46723	0.98695	Equal Variances
Distribution	Shapiro-Wilk W	0.87542	0.74935	0.16753	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	8.405	8.405	1	0.20	0.67073	Non-Significant Effect
Error	252.67	42.11167	6			
Total	261.074998	50.516667	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14925-001		14925-002	0.44675	1.94318	0.3354	8.91660	Non-Significant Effect

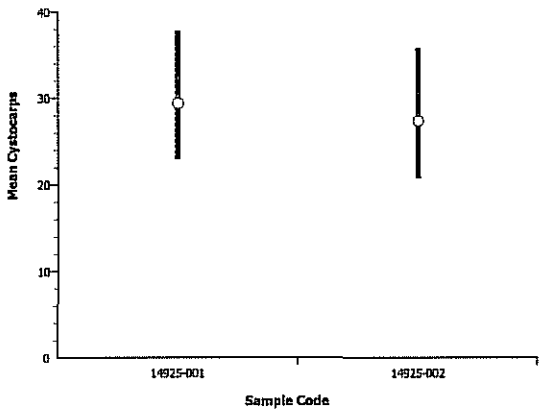
Data Summary

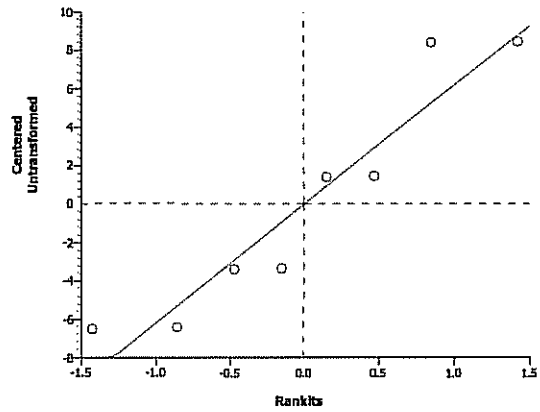
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14925-001	4	29.4	23	37.8	6.45601				
14925-002	4	27.35	20.8	35.8	6.52252				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14925-001	37.8	30.8	26	23						
14925-002	28.8	20.8	24	35.8						

Graphics





CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-1749-6359	04-1749-6359	07 Sep-06 8:32 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.62660	47.46723	0.44870	Equal Variances
Distribution	Shapiro-Wilk W	0.92471	0.74935	0.43802	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.005	0.005	1	0.00	0.99377	Non-Significant Effect
Error	453.47	75.57833	6			
Total	453.475001	75.583331	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
14925-001		14925-003	0.00813	1.94318	0.4969	11.9453	Non-Significant Effect

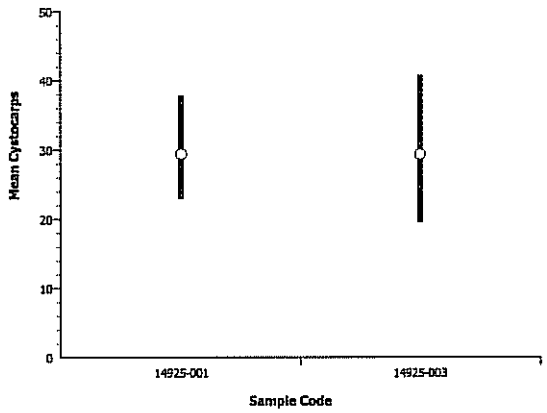
Data Summary

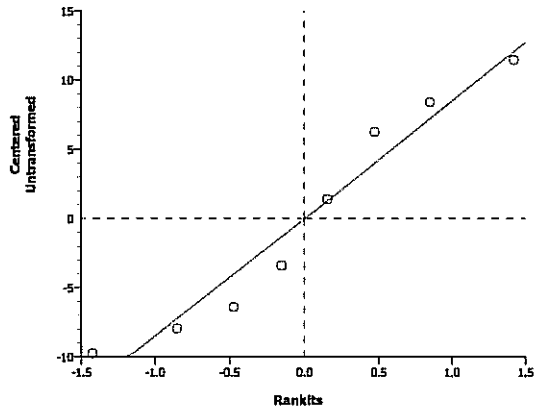
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
14925-001	4	29.4	23	37.8	6.45601				
14925-003	4	29.35	19.6	40.8	10.4631				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
14925-001	37.8	30.8	26	23						
14925-003	19.6	21.4	40.8	35.6						

Graphics





SALTWATER ASSAYS

A. bahia, A. punctulata, C. parvula

STUDY: 14925	LOCATION: New Bedford Harbor				
CHEMISTRY	Lab Salt Control	-001	-002	-003	
AMMONIA	-004	-005	-006	-007	
AS RECEIVED WATER QUALITIES	Lab Salt Control	-001	-002	-003	
SALINITY (ppt)	25	27	16	18	
pH (SU)	7.72	7.53	7.33	7.35	
TRC (mg/L)	<0.05	<0.05	<0.05	<0.05	
DO (mg/L)	7.0	7.1	6.6	7.3	
S/C (µmhos/cm)	38820	42210	26200	28750	
WQ STATION USED	1	1	1	1	
INITIALS	BB	BB	BB	BB	
A. bahia SALINITY ADJUSTMENT RECORD	Lab Salt Control	-001	-002	-003	
SAMPLE (mLs)	N/A	N/A	15000	15000	
SEA SALT (g)	N/A	N/A	160	135	
DATE:	8/28/06				
TIME:	1625				
INITIALS:	BB				

Sample ID	ESI Cube ID
-001	-001
-002	-002
-003	-003

Americamysis bahia 7 DAY CHRONIC ASSAY
NEW WATER QUALITIES

STUDY: 14925	CLIENT: BATTELLE	LOCATION: NEW BEDFORD	LAB CONTROL: HAMPTON ESTUARY

		NEW DISSOLVED OXYGEN (mg/L)							NEW SALINITY (ppt)						
CONC	REP	0	1	2	3	4	5	6	0	1	2	3	4	5	6
LAB	A	7.0	6.5	6.8	6.5	6.6	6.5		25	25	24	24	24	24	
-001	A	7.1	6.9	6.9	6.9	7.0	6.8		27	27	27	27	27	27	
-002	A	6.7	6.5	6.5	6.6	6.6	6.5		25	25	25	25	25	25	
-003	A	6.8	6.1	6.0	6.1	6.0	6.3		25	25	25	25	25	25	

		NEW pH (SU)							NEW TEMPERATURE (°C)						
CONC	REP	0	1	2	3	4	5	6	0	1	2	3	4	5	6
LAB	A	7.72	7.80	7.84	7.78	7.90	7.91		25	24	24	25	24	24	
-001	A	7.50	7.59	7.48	7.49	7.60	7.57		25	26	24	25	24	24	
-002	A	7.58	7.55	7.41	7.41	7.47	7.56		25	25	25	25	25	24	
-003	A	7.60	7.51	7.33	7.29	7.42	7.39		25	25	26	26	25	24	
INC TEMP:		25	25	25	25	25	25								
DATE:		8/29/06	8/30	8/31	9/1	9/2	9/3								
TIME:		1325	1115	1125	1206	1245	1425								
INIT:		SJ	m	EG	EG	yh	CP								

WATER QUALITY METERS USED NEW WATER QUALITIES								
	0	1	2	3	4	5	6	7
Water Quality Station #		1	1	1	2	2		
Initials		m	EG	EG	yh	CP		
Date	8/29/06	8/30	8/31	9/1	9/2	9/3		

Americamysis bahia 7 DAY CHRONIC ASSAY
OLD WATER QUALITIES

STUDY: 14925	CLIENT: BATTELLE	LOCATION: NEW BEDFORD	LAB CONTROL: HAMPTON ESTUARY

OLD SALINITY (ppt)									OLD pH (SU)						
Conc	Rep	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Control	A	25	25	25	25	25	~~25~~	25	7.81	7.84	7.82	7.76	7.81		7.92
-001	A	27	27	27	27	27		28	7.84	7.76	7.79	7.80	7.83		7.91
-002	A	25	25	25	26	26		26	7.85	7.78	7.83	7.87	7.88		7.82
-003	A	25	25	26	26	26		26	7.87	7.78	7.77	7.77	7.70		7.94

OLD TEMPERATURE (°C)								
Conc	Rep	1	2	3	4	5	6	7
Control	A	25	24	24	24	24	~~24~~	24
-001	A	25	24	24	24	24		24
-002	A	25	24	24	24	24		25
-003	A	25	24	24	24	24		24
INC TEMP:		25	25	25	25	25		25
DATE:		8/30	8/31	9/1	9/2	9/3		9/5
TIME:		1005	1050	1115	1200	1340		0915
INITIALS:		m	EG	EG	JL	CP		m

GENERAL NOTES - for additional information refer to SOP #1411 or EPA manual 600/4-91/003

- Test vessels will be 250 mL glass beakers containing a minimum of 150 mL of solution
- 8 replicates per site with 5 organisms each

- Test Temperature: 26±1°C
- Salinity: 25 ±2ppt
- Dissolved Oxygen: >4.3 mg/L

- Photoperiod will be 16 hours light and 8 hours dark.
- Passing criteria require ≥80% survival and average dry weight of ≥0.20 mg/organism in the control vessels.

WATER QUALITY METERS USED OLD WATER QUALITIES								
	0	1	2	3	4	5	6	7
Water Quality Station #		1	2	2	2	2		1
Initials		m	EG	EG	JL	CP		m
Date	8/29	8/30	8/31	9/1	9/2	9/3		8/5

Americamysis bahia 7 DAY CHRONIC ASSAY
SAMPLE USE RECORD

STUDY: 14925 | CLIENT: BATTELLE - New Bedford

SPECIES: *A. bahia* | TEST: chronic renewal

Sample	Day: 0 Volume Used (mL)	Day: 0 ESI Cube ID	Day: 1 Volume Used (mL)	Day: 1 ESI Cube ID	Day: 2 Volume Used (mL)	Day: 2 ESI Cube ID	Day	Date	Time	Init
Lab Control	1600	n/a	1200	n/a	1200	n/a	0	8/29/06	1305	SJ
-001	↓	-001	↓	-001	↓	-001	1	8/30	1030	m
-002	↓	-002	↓	-002	↓	-002	2	8/31	1110	EG
-003	↓	-003	↓	-003	↓	-003	3	9/1	1115	EG
							4	9/2	1240	yz
							5			
							6			

Sample	Day: 3 Volume Used (mL)	Day: 3 ESI Cube ID	Day: 4 Volume Used (mL)	Day: 4 ESI Cube ID	Day: 5 Volume Used (mL)	Day: 5 ESI Cube ID
Lab Control	1200	n/a	1200	n/a		n/a
-001	↓	-001	↓	-001		
-002	↓	-002	↓	-002		
-003	↓	-003	↓	-003		

Sample	Day: 6 Volume Used (mL)	Day: 6 ESI Cube ID
Lab Control		n/a
-001		
-002		
-003		

Americamysis bahia 7 DAY CHRONIC ASSAY
SURVIVAL & OLD WATER QUALITIES

STUDY: 15087	CLIENT: Battelle	LOCATION: NEW BEDFORD	LAB CONTROL: HAMPTON ESTUARY	ORGANISM BATCH/LOT#

		NUMBER OF SURVIVORS								OLD DISSOLVED OXYGEN (mg/L) *						
SAMPLE	Rep	0	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Lab Control	A	5	5	5	5	5	5	5	5	6.2	6.9	6.9	6.7	6.8	7.0	7.1
	B	5	5	5	5	4	4	4	4	6.2	6.9	6.8	6.7	6.8	7.0	6.9
	C	5	5	5	4	4	4	4	4	6.2	6.9	6.8	5.8	6.7	7.0	7.0
	D	5	5	5	5	4	4	4	4	6.3	7.0	6.8	6.4	6.7	7.0	7.0
	E	5	5	5	5	5	5	5	5	6.3	7.0	6.9	6.6	6.8	7.0	7.0
	F	5	5	5	5	5	5	5	5	6.2	7.0	6.4	6.6	6.8	7.0	7.0
	G	5	5	5	5	5	5	5	5	6.0	7.0	6.8	6.7	6.8	7.0	7.0
	H	5	5	5	5	5	5	5	6	5.9	7.0	6.8	6.7	6.8	7.0	7.0
-001	A	5	5	5	5	5	5	5	5	6.1	6.9	6.4	6.7	6.8	7.0	7.0
	B	5	5	5	5	5	5	5	5	5.2	6.9	6.6	6.6	6.8	7.0	7.0
	C	5	5	5	5	5	5	5	5	4.9	6.9	6.8	6.6	6.9	7.0	7.0
	D	5	5	5	4	4	4	4	4	5.5	6.9	6.8	6.5	6.8	6.9	7.0
	E	5	5	5	5	5	5	5	5	5.8	7.0	6.8	6.6	6.8	6.9	7.0
	F	5	5	5	5	5	5	5	5	5.5	7.0	6.9	6.7	6.8	6.9	6.9
	G	5	5	5	5	5	5	5	5	5.6	7.0	6.9	6.6	6.8	5.3	7.0
	H	5	5	5	5	5	5	5	5	5.7	7.0	6.9	6.6	6.8	6.7	7.0
-002	A	5	5	5	5	5	4	4	4	4.7	5.4	6.8	6.6	5.3	6.8	6.8
	B	5	5	5	5	5	5	5	5	5.7	5.4	6.8	6.4	6.6	6.9	6.8
	C	5	5	5	5	5	5	5	5	5.8	5.7	6.8	6.4	6.6	6.9	6.8
	D	5	5	5	5	5	5	5	5	5.6	6.8	6.7	6.6	6.7	6.7	6.6
	E	5	4	4	4	4	4	4	4	5.3	6.9	6.2	6.6	6.7	6.9	6.7
	F	5	5	5	5	5	5	5	5	5.4	5.0	4.9	6.5	6.7	6.9	6.8
	G	5	5	5	5	5	5	5	5	5.3	6.8	6.6	6.6	6.6	6.9	6.8
	H	5	5	5	5	5	5	5	5	5.5	6.9	6.8	6.6	6.7	6.9	6.8
INC TEMP:		25	25	25	25	25	25	25	25							
DATE:		9/20	9/21	9/22	9/23	9/24	9/25	9/26	9/27							
TIME:		1230	1040	1430	1100	1030	1130	1450	1225							
INITIALS:		m	ST	EG	EG	ST	SS	m	CP							

* on air day 1

Americamysis bahia 7 DAY CHRONIC ASSAY
SURVIVAL & OLD WATER QUALITIES

STUDY: 15007	CLIENT: Battelle	LOCATION: NEW BEDFORD	LAB CONTROL: HAMPTON ESTUARY	ORGANISM BATCH/LOT#

		NUMBER OF SURVIVORS								OLD DISSOLVED OXYGEN (mg/L)						
SAMPLE	Rep	0	1	2	3	4	5	6	7	1	2	3	4	5	6	7
-003	A	5	5	5	5	5	5	5	5	5.8	6.9	6.4	6.6	6.7	6.9	6.7
	B	5	5	5	5	5	5	5	5	5.8	6.9	6.8	6.6	6.7	6.9	6.7
	C	5	5	5	5	5	5	5	5	5.7	6.9	6.8	6.7	6.7	7.0	6.7
	D	5	5	5	5	5	5	5	5	5.7	6.9	6.8	6.6	6.8	6.9	6.7
	E	5	5	5	5	5	5	5	5	4.9	6.9	6.8	6.6	6.7	6.9	6.7
	F	5	5	5	5	5	5	5	5	5.1	6.9	6.8	6.5	6.7	6.9	6.7
	G	5	5	5	5	5	5	5	5	5.6	6.8	6.9	6.6	6.9	7.0	6.7
	H	5	5	5	5	5	5	5	5	5.3	6.9	6.8	6.5	6.6	6.9	6.7
-004	A	5	4	4	4	4	4	4	4	4.5	6.9	6.8	3.8	6.6	6.9	6.8
	B	5	5	5	5	5	5	4	4	4.3	6.9	6.7	6.2	6.6	6.9	6.8
	C	5	5	5	5	5	4	4	4	4.3	6.9	6.8	6.3	6.7	6.8	6.8
	D	5	5	5	5	5	5	4	3	4.6	6.33	6.8	6.4	6.6	6.7	6.8
	E	5	5	4	4	4	4	4	4	4.4	3.9	6.8	6.4	6.6	6.8	6.8
	F	5	5	5	5	5	5	4	3	4.2	6.6	6.8	6.4	6.6	4.2	6.8
	G	5	5	5	5	4	4	4	4	4.3	6.7	6.8	6.6	6.7	6.2	6.8
	H	5	5	5	4	4	4	4	4	4.4	6.7	6.7	6.7	6.7	6.4	6.8
INC TEMP:		25	25	25	25	25	25	25	25							
DATE:		9/20	9/21	9/22	9/23	9/24	9/25	9/26	9/27							
TIME:		1230	1040	1430	1100	1030	1130	1450	1225							
INITIALS:		m	SJ	EG	EG	SJ	SJ	m	CP							

Americamysis bahia 7 DAY CHRONIC ASSAY
ORGANISM WEIGHTS

CLIENT: BATTELLE - NEW BEDFORD				TEST DATES:				
STUDY #: 15007				SPECIES: *A. bahia*				
CONC	REP	TARE WEIGHT (g) mg	211.59 SHRIMP + FOIL (g)	NET WEIGHT (mg)	# SHRIMP DAY 0	MEAN WEIGHT (mg) DAY 0	# SHRIMP DAY 7	MEAN WEIGHT (mg) DAY 7
lab	A	210.28	~~212.45~~					
	B	210.43	211.33					
	C	208.48	209.64					
	D	211.09	212.45					
	E	207.48	208.69					
	F	209.87	211.20					
	G	205.89	206.91					
	H	209.42	210.77					
001	A	209.76	212.20					
	B	208.99	211.76					
	C	210.23	212.57					
	D	207.37	209.45					
	E	207.50	210.43					
	F	207.71	210.16					
	G	209.38	211.96					
	H	207.69	210.55					
002	A	208.95	210.93					
	B	206.74	209.10					
	C	209.64	212.09					
	D	209.31	211.83					
	E	210.40	212.00					
	F	209.19	211.77					
	G	206.11	208.58					
	H	209.87	212.37					
DATE 9/27/06		9/27/06	9/28/06					
TIME 11:40		11:40	11:36					
INITIALS GL		GL	MDB					

Americamysis bahia 7 DAY CHRONIC ASSAY
ORGANISM WEIGHTS

CLIENT: BATTELLE - NEW BEDFORD				TEST DATES:				
STUDY #: 15007				SPECIES: *A. bahia*				
CONC	REP	TARE WEIGHT (g)	SHRIMP + FOIL (g)	NET WEIGHT (mg)	# SHRIMP DAY 0	MEAN WEIGHT (mg) DAY 0	# SHRIMP DAY 7	MEAN WEIGHT (mg) DAY 7
003	A	207.21	210.25					
	B	207.28	209.89					
	C	209.86	212.60					
	D	209.98	213.61					
	E	209.83	212.36					
	F	209.67	213.05					
	G	209.48	214.20					
	H	209.34	211.60					
004	A	207.28	213.16					
	B	208.14	212.75					
	C	210.17	211.40					
	D	211.89	212.89					
	E	208.51	214.38					
	F	210.47	211.67					
	G	208.44	209.90					
	H	208.60	210.20					
	A							
	B							
	C							
	D							
	E							
	F							
	G							
	H							
DATE		9/27/06	9/28/06					
TIME		11:40	11:53					
INITIALS		GL	MDB					

CETIS Test Summary

Report Date: 27 Dec-06 2:05 PM
Link: 07-7578-8033

Americamysis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Sample No:	16-3216-2814	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	20 Sep-06 09:00 AM	**Code:**	15007-000	**Project:**	Ecological Risk Assessment
Receive Date:	20 Sep-06 09:00 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	4h	**Station:**	WQ-TOX-Lab Control		
Sample No:	11-7565-0630	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	19 Sep-06 09:00 AM	**Code:**	15007-001	**Project:**	Ecological Risk Assessment
Receive Date:	19 Sep-06 02:15 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	28h	**Station:**	WQ-TOX-001		
Sample No:	06-1096-0183	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	19 Sep-06 10:00 AM	**Code:**	15007-002	**Project:**	Ecological Risk Assessment
Receive Date:	19 Sep-06 02:15 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	27h	**Station:**	WQ-TOX-002		
Sample No:	05-1252-8989	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	19 Sep-06 10:07 AM	**Code:**	15007-003	**Project:**	Ecological Risk Assessment
Receive Date:	19 Sep-06 02:15 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	26h	**Station:**	WQ-TOX-003		
Sample No:	11-4354-7682	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	19 Sep-06 10:22 AM	**Code:**	15007-004	**Project:**	Ecological Risk Assessment
Receive Date:	19 Sep-06 02:15 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	26h	**Station:**	WQ-TOX-004		

CETIS Test Summary

Report Date: 27 Dec-06 2:05 PM
Link: 07-7578-8033

2d Proportion Survived Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
15007-000	8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
15007-001	8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
15007-002	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%
15007-003	8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
15007-004	8	0.95000	0.80000	1.00000	0.03273	0.09258	9.75%

7d Proportion Survived Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
15007-000	8	0.92500	0.80000	1.00000	0.03660	0.10351	11.19%
15007-001	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%
15007-002	8	0.95000	0.80000	1.00000	0.03273	0.09258	9.75%
15007-003	8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
15007-004	8	0.75000	0.60000	0.80000	0.03273	0.09258	12.34%

Mean Dry Biomass-mg Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
15007-000	8	0.24100	0.18000	0.27200	0.01198	0.03389	14.06%
15007-001	8	0.51125	0.41600	0.58600	0.02029	0.05740	11.23%
15007-002	8	0.46150	0.32000	0.51600	0.02411	0.06819	14.78%
15007-003	8	0.62275	0.45200	0.94400	0.05597	0.15831	25.42%
15007-004	8	0.69625	0.20000	2.17400	0.24738	0.69970	100.49

Mean Dry Weight-mg Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
15007-000	8	0.26238	0.20400	0.34000	0.01469	0.04154	15.83%
15007-001	8	0.52425	0.46800	0.58600	0.01507	0.04262	8.13%
15007-002	8	0.48388	0.40000	0.51600	0.01277	0.03613	7.47%
15007-003	8	0.62275	0.45200	0.94400	0.05597	0.15831	25.42%
15007-004	8	0.89323	0.30750	2.71750	0.30326	0.85774	96.03%

CETIS Test Summary

Report Date: 27 Dec-06 2:05 PM
Link: 07-7578-8033

2d Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
15007-000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
15007-001	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
15007-002	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000
15007-003	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
15007-004	0.80000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000

7d Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
15007-000	1.00000	0.80000	0.80000	0.80000	1.00000	1.00000	1.00000	1.00000
15007-001	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	1.00000
15007-002	0.80000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000
15007-003	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
15007-004	0.80000	0.80000	0.80000	0.60000	0.80000	0.60000	0.80000	0.80000

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
15007-000	0.26200	0.18000	0.23200	0.27200	0.24200	0.26600	0.20400	0.27000
15007-001	0.48800	0.55400	0.46800	0.41600	0.58600	0.49000	0.51600	0.57200
15007-002	0.39600	0.47200	0.49000	0.50400	0.32000	0.51600	0.49400	0.50000
15007-003	0.60800	0.52200	0.54800	0.72600	0.50600	0.67600	0.94400	0.45200
15007-004	1.17600	0.92200	0.24600	0.20000	2.17400	0.24000	0.29200	0.32000

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
15007-000	0.26200	0.22500	0.29000	0.34000	0.24200	0.26600	0.20400	0.27000
15007-001	0.48800	0.55400	0.46800	0.52000	0.58600	0.49000	0.51600	0.57200
15007-002	0.49500	0.47200	0.49000	0.50400	0.40000	0.51600	0.49400	0.50000
15007-003	0.60800	0.52200	0.54800	0.72600	0.50600	0.67600	0.94400	0.45200
15007-004	1.47000	1.15250	0.30750	0.33333	2.71750	0.40000	0.36500	0.40000

CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
2d Proportion Survived	Comparison	07-7578-8033	07-7578-8033	27 Dec-06 2:04 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	65535.00000	8.86159	0.00000	Unequal Variances

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0	0	1	65535.0	0.00000	Significant Effect
Error	0	0	14			
Total	0	0	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
15007-000		15007-001	32		0.4796	1	Non-Significant Effect

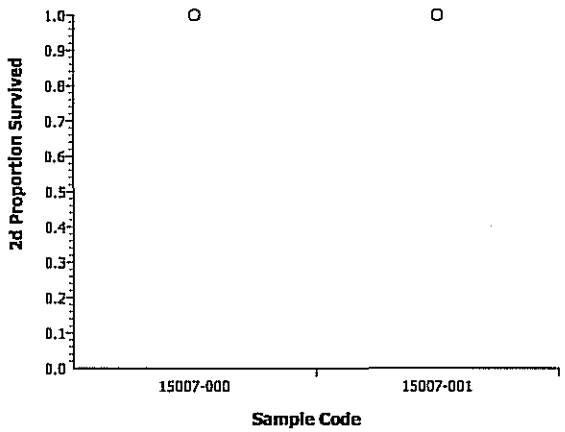
Data Summary

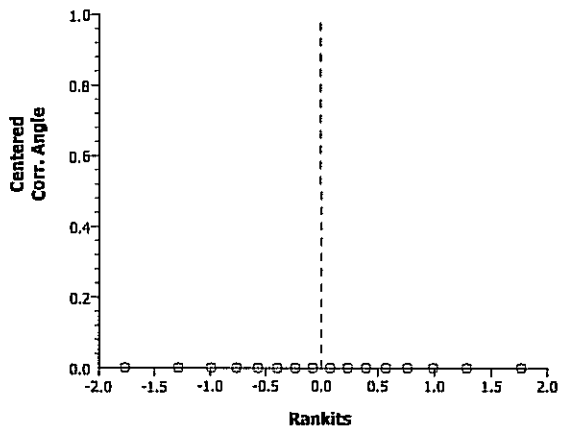
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019
15007-001	8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		
15007-001	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		

Graphics





CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
2d Proportion Survived	Comparison	07-7578-8033	07-7578-8033	27 Dec-06 2:04 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	1.00000	8.86159	0.33428	Equal Variances
Distribution	Shapiro-Wilk W	0.46890	0.84420	0.00000	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0035442	0.0035442	1	1.00	0.33428	Non-Significant Effect
Error	0.0496194	0.0035442	14			
Total	0.05316365	0.0070885	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
15007-000		15007-002	36		0.3605	1	Non-Significant Effect

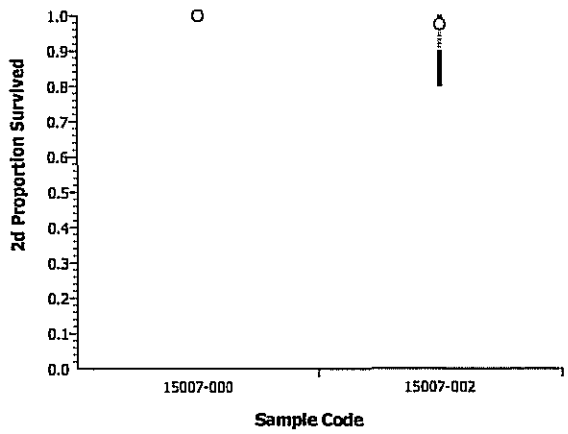
Data Summary

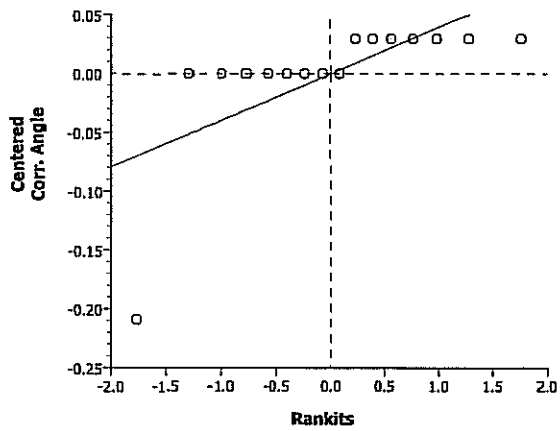
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019
15007-002	8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		
15007-002	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000		

Graphics





CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
2d Proportion Survived	Comparison	07-7578-8033	07-7578-8033	27 Dec-06 2:04 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	65535.00000	8.86159	0.00000	Unequal Variances

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0	0	1	65535.0	0.00000	Significant Effect
Error	0	0	14			
Total	0	0	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
15007-000		15007-003	32		0.4796	1	Non-Significant Effect

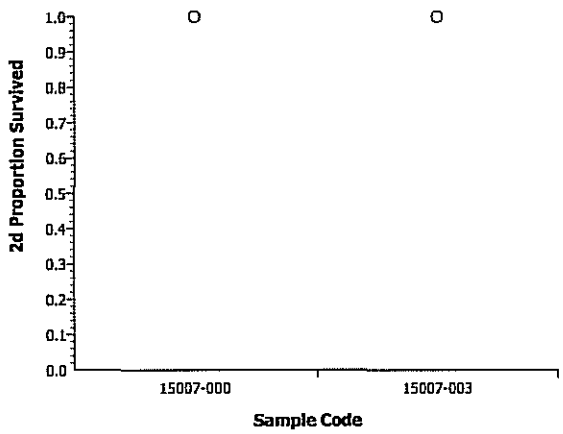
Data Summary

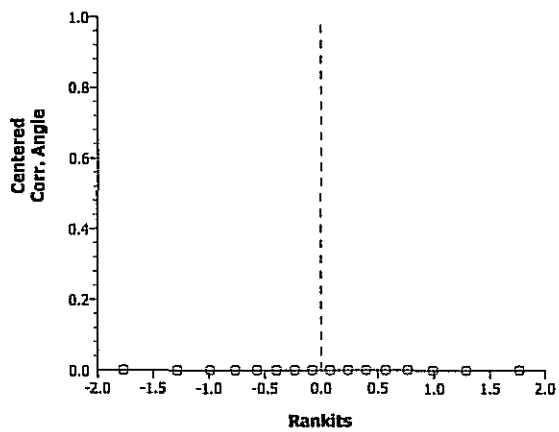
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019
15007-003	8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		
15007-003	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		

Graphics





CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
2d Proportion Survived	Comparison	07-7578-8033	07-7578-8033	27 Dec-06 2:04 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	2.33333	8.86159	0.14890	Equal Variances
Distribution	Shapiro-Wilk W	0.67657	0.84420	0.00001	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.014177	0.014177	1	2.33	0.14890	Non-Significant Effect
Error	0.0850619	0.0060758	14			
Total	0.09923882	0.0202528	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
15007-000		15007-004	40		0.2209	2	Non-Significant Effect

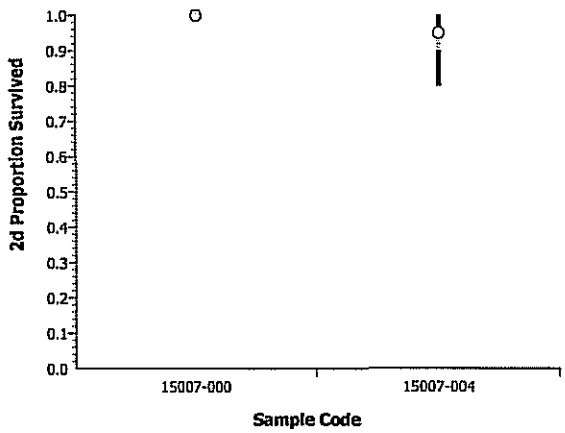
Data Summary

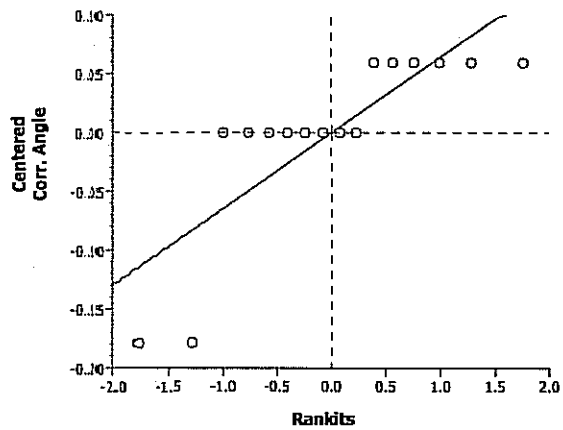
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019
15007-004	8	0.95000	0.80000	1.00000	0.09258	1.28575	1.10715	1.34528	0.11023

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		
15007-004	0.80000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000		

Graphics





CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	07-7578-8033	07-7578-8033	28 Sep-06 2:10 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.14286	8.88539	0.33606	Equal Variances
Distribution	Shapiro-Wilk W	0.75737	0.84420	0.00037	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.014177	0.014177	1	1.27	0.27822	Non-Significant Effect
Error	0.1559467	0.0111391	14			
Total	0.17012369	0.0253160	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
15007-000		15007-001	24		0.7791	2	Non-Significant Effect

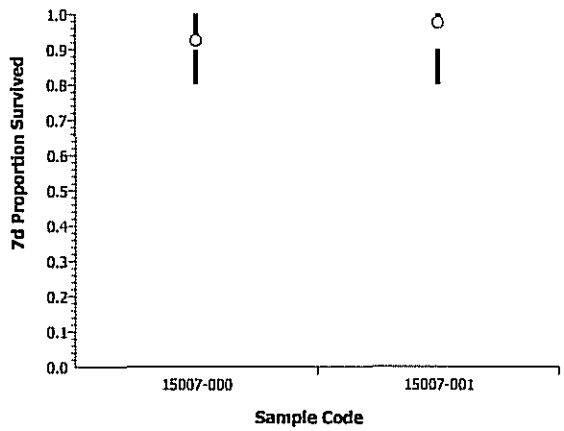
Data Summary

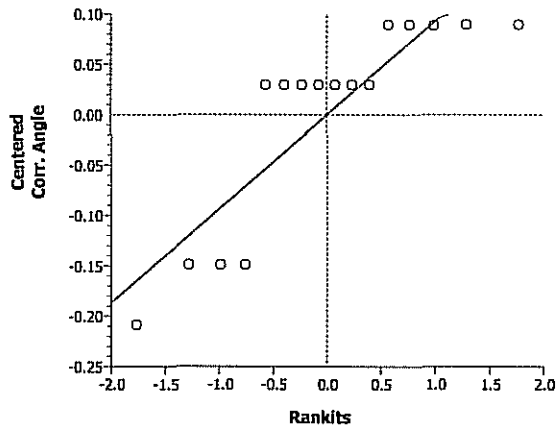
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	8	0.92500	0.80000	1.00000	0.10351	1.25598	1.10715	1.34528	0.12325
15007-001	8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	1.00000	0.80000	0.80000	0.80000	1.00000	1.00000	1.00000	1.00000		
15007-001	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	1.00000		

Graphics





CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	07-7578-8033	07-7578-8033	28 Sep-06 2:11 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.25000	8.88539	0.77596	Equal Variances
Distribution	Shapiro-Wilk W	0.69326	0.84420	0.00003	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0035442	0.0035442	1	0.26	0.61856	Non-Significant Effect
Error	0.1913892	0.0136707	14			
Total	0.19493340	0.0172149	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
15007-000		15007-002	28		0.6395	2	Non-Significant Effect

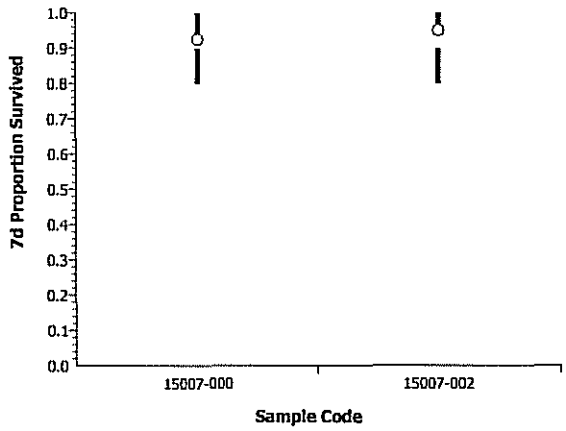
Data Summary

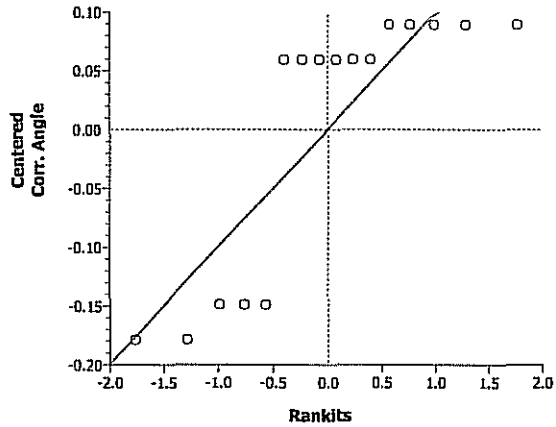
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	8	0.92500	0.80000	1.00000	0.10351	1.25598	1.10715	1.34528	0.12325
15007-002	8	0.95000	0.80000	1.00000	0.09258	1.28575	1.10715	1.34528	0.11023

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	1.00000	0.80000	0.80000	0.80000	1.00000	1.00000	1.00000	1.00000		
15007-002	0.80000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000		

Graphics





CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	07-7578-8033	07-7578-8033	28 Sep-06 2:11 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	4.20000	8.86159	0.05965	Equal Variances
Distribution	Shapiro-Wilk W	0.78560	0.84420	0.00109	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0318982	0.0318982	1	4.20	0.05965	Non-Significant Effect
Error	0.1063273	0.0075948	14			
Total	0.13822550	0.0394930	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
15007-000		15007-003	20		0.8828	2	Non-Significant Effect

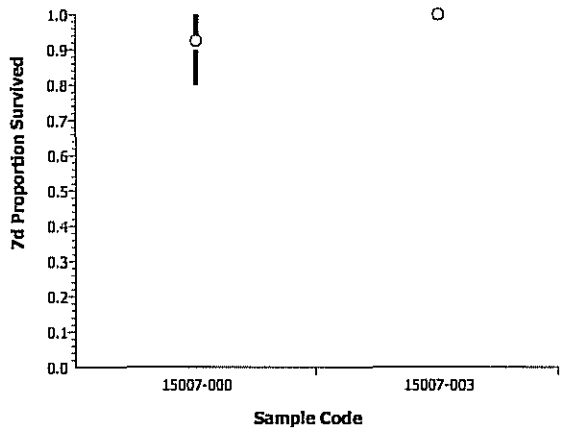
Data Summary

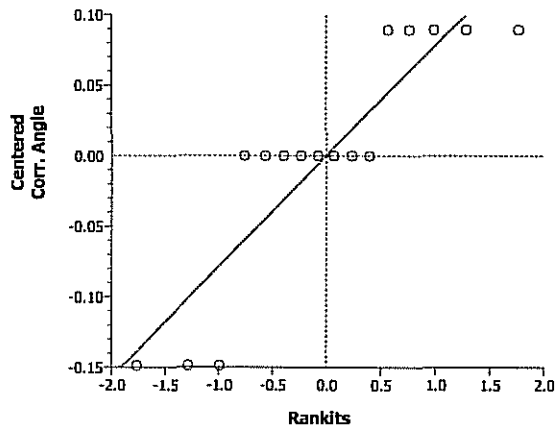
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	8	0.92500	0.80000	1.00000	0.10351	1.25598	1.10715	1.34528	0.12325
15007-003	8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	1.00000	0.80000	0.80000	0.80000	1.00000	1.00000	1.00000	1.00000		
15007-003	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		

Graphics





CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	07-7578-8033	07-7578-8033	28 Sep-06 2:11 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.45040	8.88539	0.63593	Equal Variances
Distribution	Shapiro-Wilk W	0.69594	0.84420	0.00003	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.1666301	0.1666301	1	12.99	0.00288	Significant Effect
Error	0.1796363	0.0128312	14			
Total	0.34626642	0.1794613	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
15007-000		15007-004	55		0.0074	3	Significant Effect

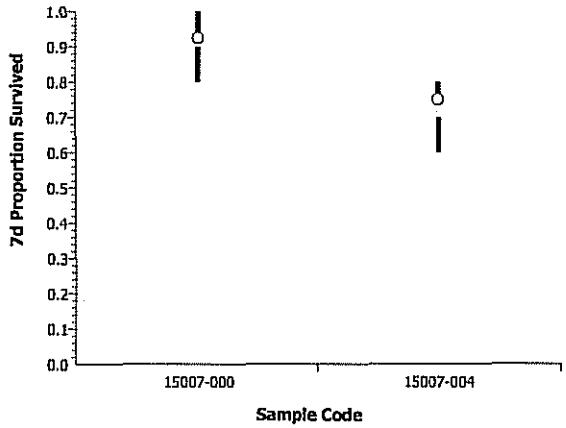
Data Summary

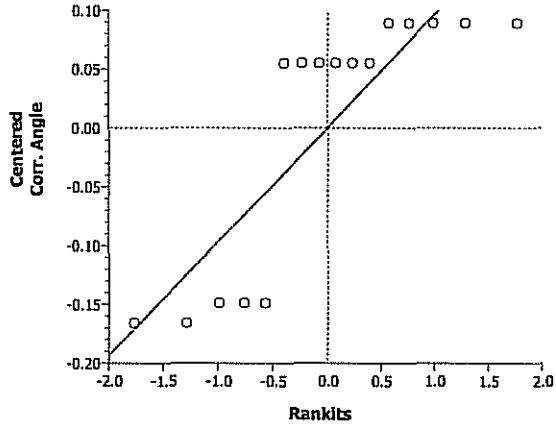
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	8	0.92500	0.80000	1.00000	0.10351	1.25598	1.10715	1.34528	0.12325
15007-004	8	0.75000	0.60000	0.80000	0.09258	1.05188	0.88608	1.10715	0.10234

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	1.00000	0.80000	0.80000	0.80000	1.00000	1.00000	1.00000	1.00000		
15007-004	0.80000	0.80000	0.80000	0.60000	0.80000	0.60000	0.80000	0.80000		

Graphics





CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	07-7578-8033	07-7578-8033	28 Sep-06 2:11 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.71429	8.88539	0.49388	Equal Variances
Distribution	Shapiro-Wilk W	0.61116	0.84420	0.00000	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0035442	0.0035442	1	0.37	0.55358	Non-Significant Effect
Error	0.1346813	0.0096201	14			
Total	0.1382255	0.0131643	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
15007-001		15007-002	36		0.3605	2	Non-Significant Effect

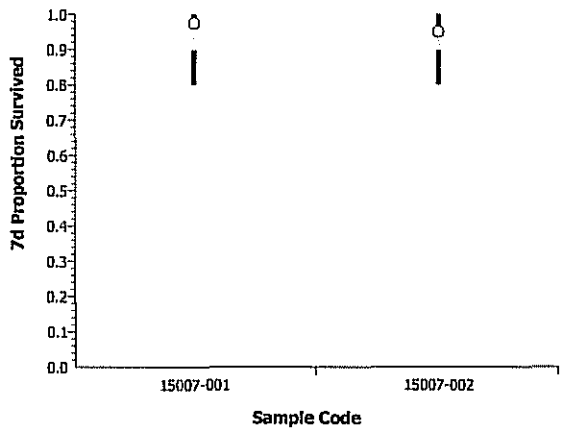
Data Summary

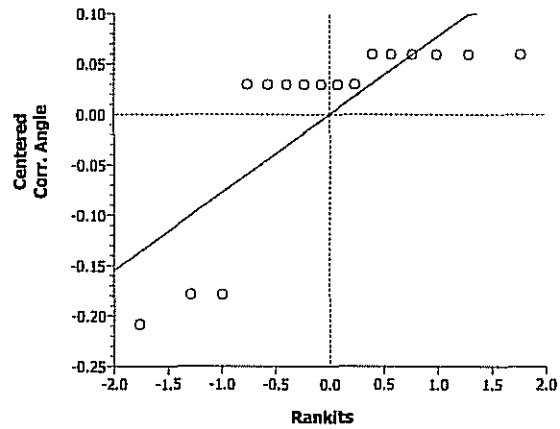
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-001	8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
15007-002	8	0.95000	0.80000	1.00000	0.09258	1.28575	1.10715	1.34528	0.11023

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-001	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	1.00000		
15007-002	0.80000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000		

Graphics





CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	07-7578-8033	07-7578-8033	28 Sep-06 2:11 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	1.00000	8.86159	0.33428	Equal Variances
Distribution	Shapiro-Wilk W	0.46890	0.84420	0.00000	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0035442	0.0035442	1	1.00	0.33428	Non-Significant Effect
Error	0.0496194	0.0035442	14			
Total	0.05316365	0.0070885	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
15007-001		15007-003	28		0.6395	1	Non-Significant Effect

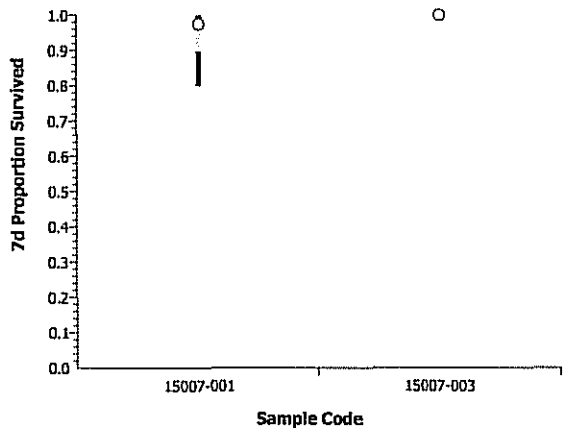
Data Summary

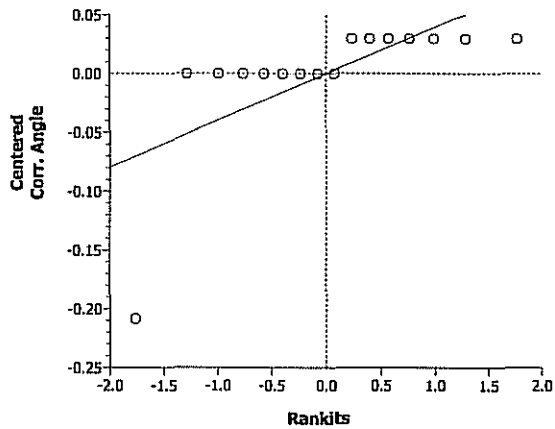
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-001	8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
15007-003	8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-001	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	1.00000		
15007-003	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		

Graphics





CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	07-7578-8033	07-7578-8033	28 Sep-06 2:11 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.47743	8.88539	0.61936	Equal Variances
Distribution	Shapiro-Wilk W	0.60609	0.84420	0.00000	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.2780143	0.2780143	1	31.66	0.00006	Significant Effect
Error	0.1229284	0.0087806	14			
Total	0.40094272	0.2867949	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
15007-001		15007-004	61		0.0005	3	Significant Effect

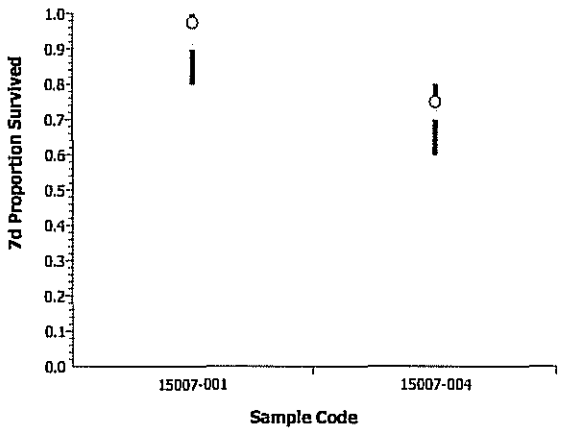
Data Summary

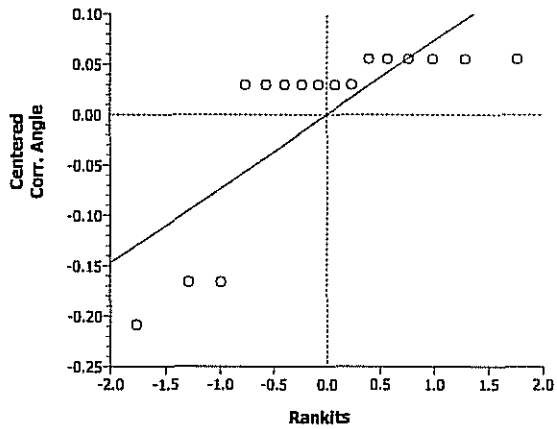
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-001	8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
15007-004	8	0.75000	0.60000	0.80000	0.09258	1.05188	0.88608	1.10715	0.10234

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-001	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	1.00000		
15007-004	0.80000	0.80000	0.80000	0.60000	0.80000	0.60000	0.80000	0.80000		

Graphics





CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	07-7578-8033	07-7578-8033	28 Sep-06 2:11 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.86859	8.88539	0.18780	Equal Variances
Distribution	Shapiro-Wilk W	0.98388	0.84420	0.97510	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.2921385	0.2921385	1	131.50	0.00000	Significant Effect
Error	0.0311026	0.0022216	14			
Total	0.32324112	0.2943601	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-000		15007-001	-11.467	1.76131	1.0000	0.04151	Non-Significant Effect

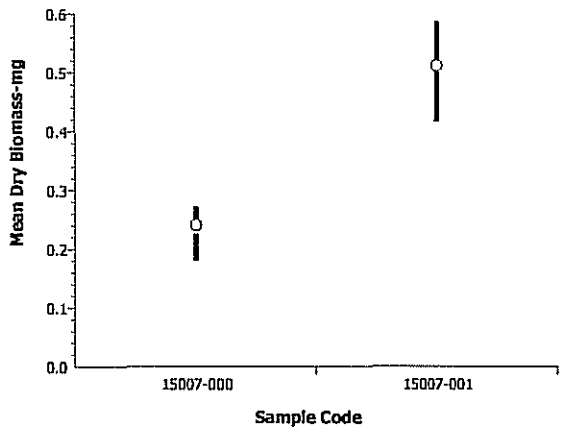
Data Summary

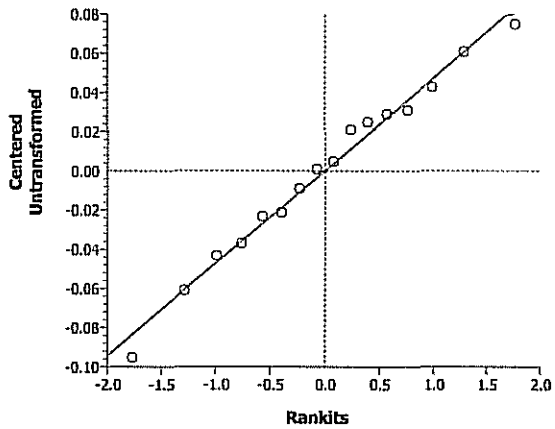
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	8	0.24100	0.18000	0.27200	0.03389				
15007-001	8	0.51125	0.41600	0.58600	0.05740				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	0.26200	0.18000	0.23200	0.27200	0.24200	0.26600	0.20400	0.27000		
15007-001	0.48800	0.55400	0.46800	0.41600	0.58600	0.49000	0.51600	0.57200		

Graphics





CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	07-7578-8033	07-7578-8033	28 Sep-06 2:11 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	4.04860	8.88539	0.08508	Equal Variances
Distribution	Shapiro-Wilk W	0.82450	0.84420	0.00477	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.19448	0.19448	1	67.08	0.00000	Significant Effect
Error	0.0405897	0.0028993	14			
Total	0.23506962	0.1973792	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
15007-000		15007-002	0		0.9999	0	Non-Significant Effect

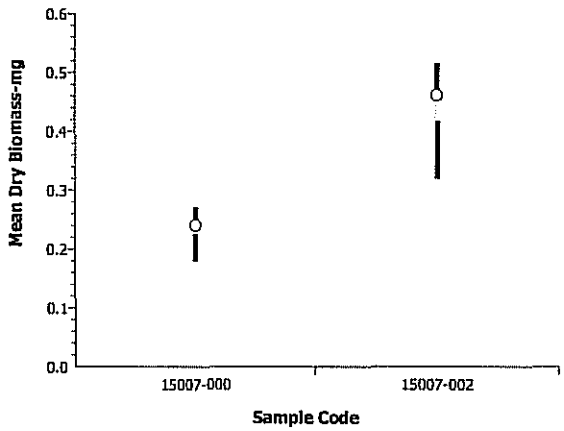
Data Summary

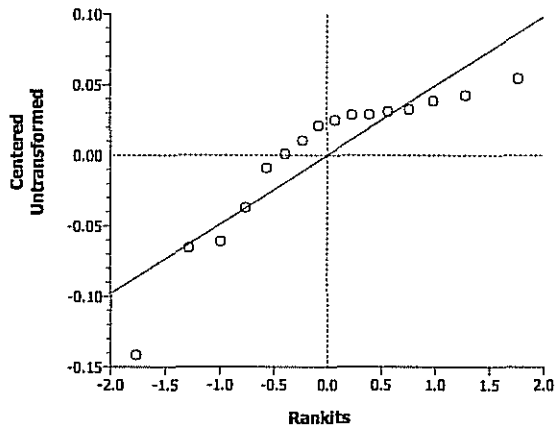
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	8	0.24100	0.18000	0.27200	0.03389				
15007-002	8	0.46150	0.32000	0.51600	0.06819				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	0.26200	0.18000	0.23200	0.27200	0.24200	0.26600	0.20400	0.27000		
15007-002	0.39600	0.47200	0.49000	0.50400	0.32000	0.51600	0.49400	0.50000		

Graphics





CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	07-7578-8033	07-7578-8033	28 Sep-06 2:11 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	21.82139	8.88539	0.00060	Unequal Variances
Distribution	Shapiro-Wilk W	0.88092	0.84420	0.03958	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.5829314	0.5829314	1	44.48	0.00001	Significant Effect
Error	0.183479	0.0131056	14			
Total	0.76641038	0.5960370	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-000		15007-003	-6.6693	1.89458	0.9999	0.10845	Non-Significant Effect

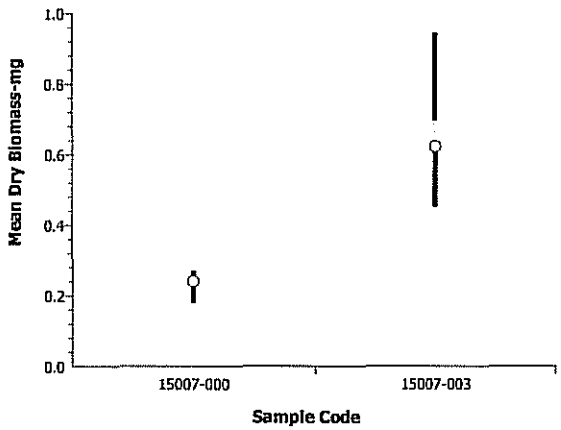
Data Summary

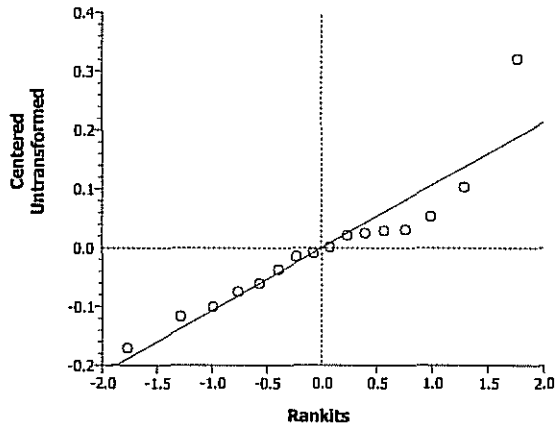
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	8	0.24100	0.18000	0.27200	0.03389				
15007-003	8	0.62275	0.45200	0.94400	0.15831				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	0.26200	0.18000	0.23200	0.27200	0.24200	0.26600	0.20400	0.27000		
15007-003	0.60800	0.52200	0.54800	0.72600	0.50600	0.67600	0.94400	0.45200		

Graphics





CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	07-7578-8033	07-7578-8033	28 Sep-06 2:12 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	426.25730	8.88539	0.00000	Unequal Variances
Distribution	Shapiro-Wilk W	0.77511	0.84420	0.00073	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.8290067	0.8290067	1	3.38	0.08735	Non-Significant Effect
Error	3.435055	0.2453611	14			
Total	4.26406151	1.0743678	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
15007-000		15007-004	16		0.9476	0	Non-Significant Effect

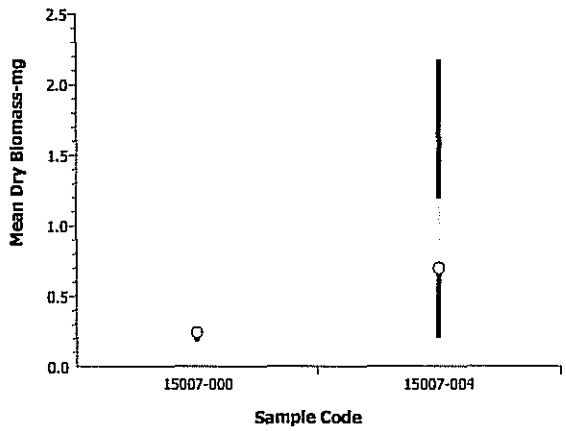
Data Summary

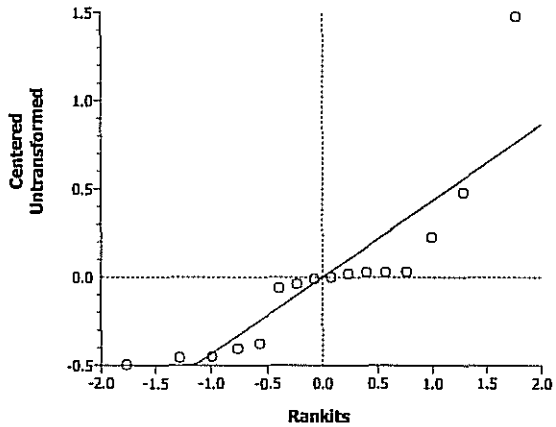
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	8	0.24100	0.18000	0.27200	0.03389				
15007-004	8	0.69625	0.20000	2.17400	0.69970				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	0.26200	0.18000	0.23200	0.27200	0.24200	0.26600	0.20400	0.27000		
15007-004	1.17600	0.92200	0.24600	0.20000	2.17400	0.24000	0.29200	0.32000		

Graphics





CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	07-7578-8033	07-7578-8033	28 Sep-06 2:12 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.41136	8.88539	0.66079	Equal Variances
Distribution	Shapiro-Wilk W	0.91115	0.84420	0.12156	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0099002	0.0099002	1	2.49	0.13673	Non-Significant Effect
Error	0.0556127	0.0039723	14			
Total	0.06551287	0.0138725	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-001		15007-002	1.57869	1.76131	0.0684	0.05550	Non-Significant Effect

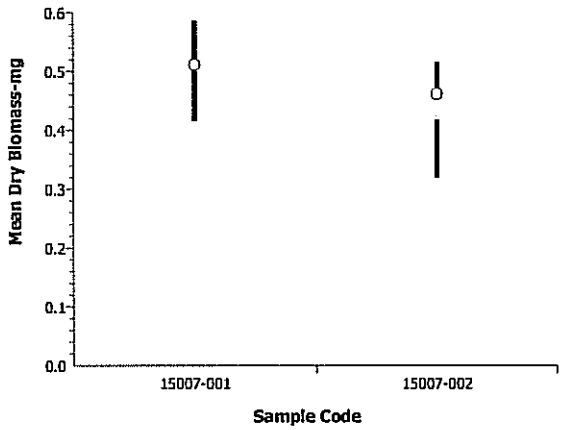
Data Summary

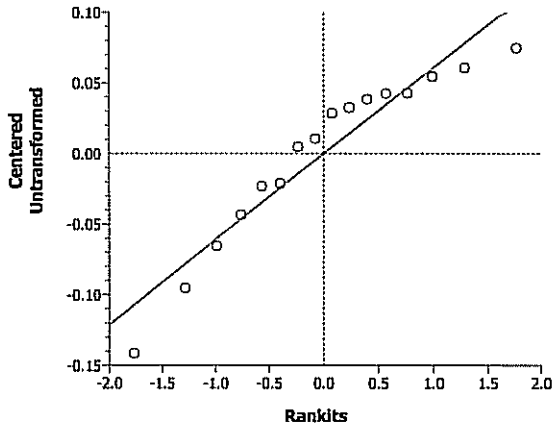
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-001	8	0.51125	0.41600	0.58600	0.05740				
15007-002	8	0.46150	0.32000	0.51600	0.06819				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-001	0.48800	0.55400	0.46800	0.41600	0.58600	0.49000	0.51600	0.57200		
15007-002	0.39600	0.47200	0.49000	0.50400	0.32000	0.51600	0.49400	0.50000		

Graphics





CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — **EnviroSystems, Inc.**

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	07-7578-8033	07-7578-8033	28 Sep-06 2:12 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	7.60700	8.88539	0.01573	Equal Variances
Distribution	Shapiro-Wilk W	0.90814	0.84420	0.10883	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0497295	0.0497295	1	3.51	0.08213	Non-Significant Effect
Error	0.198502	0.0141787	14			
Total	0.24823153	0.0639082	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-001		15007-003	-1.8728	1.76131	0.9589	0.10486	Non-Significant Effect

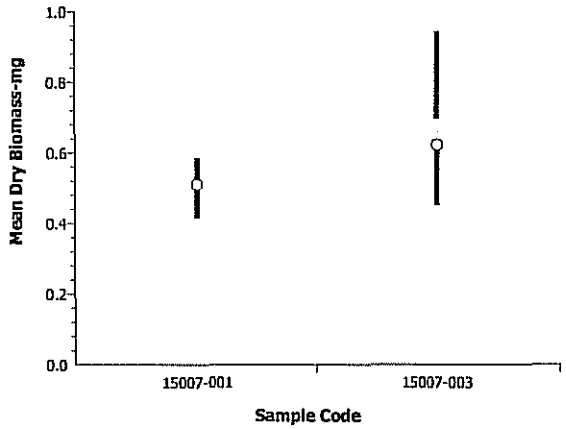
Data Summary

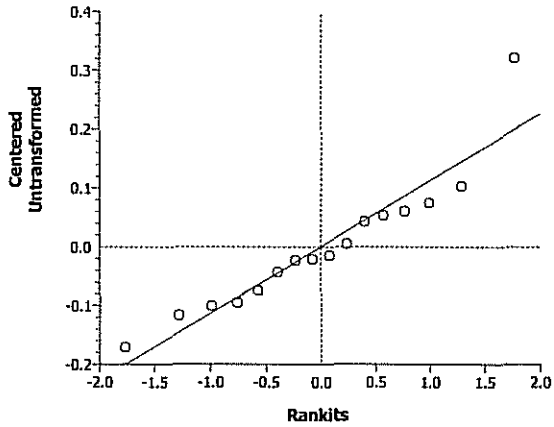
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-001	8	0.51125	0.41600	0.58600	0.05740				
15007-003	8	0.62275	0.45200	0.94400	0.15831				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-001	0.48800	0.55400	0.46800	0.41600	0.58600	0.49000	0.51600	0.57200		
15007-003	0.60800	0.52200	0.54800	0.72600	0.50600	0.67600	0.94400	0.45200		

Graphics





CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test — EnviroSystems, Inc.

Test No:	14-5718-9210	**Test Type:**	Growth-Survival (7d)	**Duration:**	6d 23h
Start Date:	20 Sep-06 12:30 PM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Americamysis bahia
Ending Date:	27 Sep-06 12:25 PM	**Dil Water:**	Not Applicable	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	20 Sep-06 12:30 PM	**Brine:**	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	07-7578-8033	07-7578-8033	28 Sep-06 2:12 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	148.59460	8.88539	0.00000	Unequal Variances
Distribution	Shapiro-Wilk W	0.78843	0.84420	0.00122	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.1368998	0.1368998	1	0.56	0.46840	Non-Significant Effect
Error	3.450078	0.2464341	14			
Total	3.58697756	0.3833339	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
15007-001		15007-004	40		0.2209	0	Non-Significant Effect

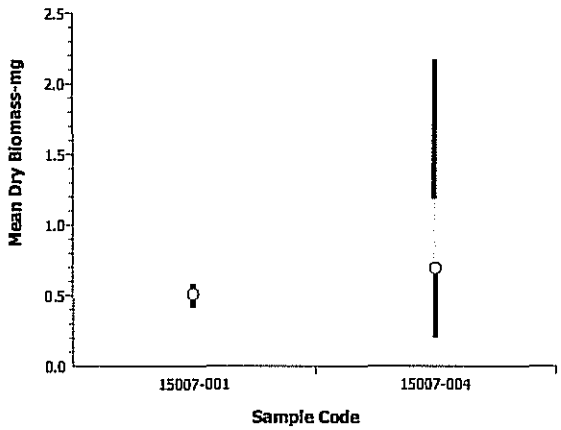
Data Summary

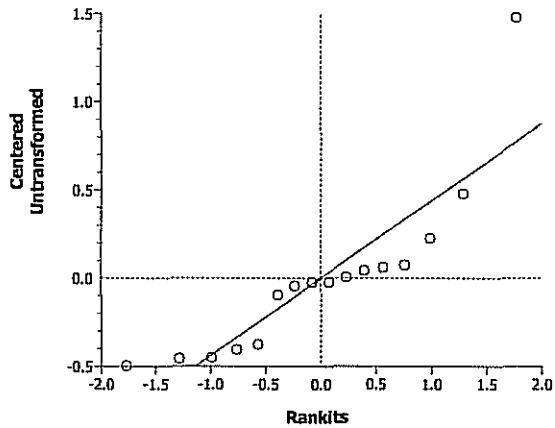
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-001	8	0.51125	0.41600	0.58600	0.05740				
15007-004	8	0.69625	0.20000	2.17400	0.69970				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-001	0.48800	0.55400	0.46800	0.41600	0.58600	0.49000	0.51600	0.57200		
15007-004	1.17600	0.92200	0.24600	0.20000	2.17400	0.24000	0.29200	0.32000		

Graphics





Aquatic Research Organisms

DATA SHEET

I. Organism History

Species: AMERICAMYSIS BAHIA

Source: Lab reared ✓ Hatchery reared ____ Field collected ____

Hatch date 9-13-06 Receipt date ____

Lot number 091306MS Strain ____

Brood Origination FLORIDA

II. Water Quality

Temperature 25 °C Salinity ≈30 ppt DO —

pH 7.8 Hardness — ppm

III. Culture Conditions

System: RECIRC

Diet: Flake Food ✓ Phytoplankton ____ Trout Chow ✓

Brine Shrimp ✓ Rotifers ____ Other EUCAP. SHRIMP DIET

Prophylactic Treatments: ____

Comments: ____

IV. Shipping Information

Client: EST # of Organisms: 160+

Carrier: ____ Date Shipped: 9-20-06

Biologist: Mark [illegible]

1 - 800 - 927 - 1650

PO Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650

Arbacia punctulata Chronic Fertilization Assay
Water Quality and Gamete Preparation Data

STUDY: 15007	CLIENT: BATTELLE	LOCATION: New Bedford	DATE: 9/20/06 INITIALS: SJ

SALINITY ADJUSTMENT RECORD: 1000 mL -001 + 2 g SALT

SALINITY ADJUSTMENT RECORD: 1000 mL -002 + 7 g SALT

SALINITY ADJUSTMENT RECORD: 1000 mL -003 + 8 g SALT

SALINITY ADJUSTMENT RECORD: 1000 mL -004 + 8 g SALT

SALINITY ADJUSTED SAMPLE	D.O. (mg/L)	pH (SU)	SPEC COND (µmhos)	TEMP (°C)	SALINITY (ppt)
Lab Control	6.9	8.06	44840	20	29
-001	8.6	8.05	48860	20	31
-002	8.7	7.99	48810	20	31
-003	8.7	8.05	48740	20	31
-004	8.3	7.99	46620	20	30

METERS USED

DO meter # 19 DO probe # 12 pH meter # 470 pH probe # 48 S/C meter # YSI30C S/C probe # YSI30C

SALINITY meter # YSI30C

DATE & INITIALS FOR GAMETE PREPARATION: 9/20/06

SPERM DILUTIONS:

HEMACYTOMETER COUNT, E: 113 X 10^4 = SPM SOLUTION E = 1.13×10^8

SPERM CONCENTRATIONS:
SOLUTION E X 40 = SOLUTION A = 4.52×10^7 SPM
SOLUTION E X 20 = SOLUTION B = 2.26×10^7 SPM
SOLUTION E X 5 = SOLUTION C = 5.65×10^7 SPM

FINAL COUNTS:

FINAL SPERM COUNT: 113
FINAL EGG COUNT: 26

TEST TIMES:

SPERM COLLECTED: 0905
EGGS COLLECTED: 0855
SPERM ADDED: 0945
EGGS ADDED: 1045
FIXATIVE ADDED: 1105

See ESI SOP #1412 for additional information

Arbacia punctulata Chronic Fertilization Assay

SAMPLE USE RECORD

STUDY: 15007	CLIENT: Battelle - New Bedford
SPECIES: *A. punctulata*	

	Day: 0	
SAMPLE	Volume Used (mL)	ESI Cube ID
Lab Control	200 mL	—
-001	↓	-001
-002		-002
-003		-003
-004		-004
INITIALS:	SJ	
TIME:	0835	
DATE:	9/~~19~~ 20/06	

FERTILIZATION COUNTS

STUDY	CLIENT BATTELLE	LOCATION New Bedford	DATE 9/20/06 INITIALS SJ

	REPLICATE VIAL			
	1	2	3	4
SAMPLE	FERT/TOTAL	FERT/TOTAL	FERT/TOTAL	FERT/TOTAL
Lab Control	100/101	100/100	100/102	100/100
-001	100/108	100/102	101/111	100/106
-002	103/107	100/104	104/112	100/103
-003	101/109	102/108	100/107	100/105
-004	100/108	102/110	100/107	101/110

CETIS Test Summary

Report Date: 20 Sep-06 1:24 PM
Link: 04-9116-7811

Arbacia Sperm Cell Fertilization Test — **EnviroSystems, Inc.**

Test No:	04-5064-7243	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	20 Sep-06 09:45 AM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Arbacia punctulata
Ending Date:	20 Sep-06 11:05 AM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	20 Sep-06 09:45 AM	**Brine:**	Not Applicable		

Sample No:	16-3216-2814	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	20 Sep-06 09:00 AM	**Code:**	15007-000	**Project:**	Ecological Risk Assessment
Receive Date:	20 Sep-06 09:00 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	45m	**Station:**	WQ-TOX-Lab Control		
Sample No:	11-7565-0630	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	19 Sep-06 09:00 AM	**Code:**	15007-001	**Project:**	Ecological Risk Assessment
Receive Date:	19 Sep-06 02:15 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	25h	**Station:**	WQ-TOX-001		
Sample No:	06-1096-0183	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	19 Sep-06 10:00 AM	**Code:**	15007-002	**Project:**	Ecological Risk Assessment
Receive Date:	19 Sep-06 02:15 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	24h	**Station:**	WQ-TOX-002		
Sample No:	05-1252-8989	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	19 Sep-06 10:07 AM	**Code:**	15007-003	**Project:**	Ecological Risk Assessment
Receive Date:	19 Sep-06 02:15 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	24h	**Station:**	WQ-TOX-003		
Sample No:	11-4354-7682	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	19 Sep-06 10:22 AM	**Code:**	15007-004	**Project:**	Ecological Risk Assessment
Receive Date:	19 Sep-06 02:15 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	23h	**Station:**	WQ-TOX-004		

Proportion Fertilized Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
15007-000	4	0.99262	0.98039	1.00000	0.00470	0.00940	0.95%
15007-001	4	0.93991	0.90991	0.98039	0.01513	0.03026	3.22%
15007-002	4	0.95590	0.92857	0.97087	0.00934	0.01869	1.96%
15007-003	4	0.93950	0.92661	0.95238	0.00563	0.01127	1.20%
15007-004	4	0.92649	0.91818	0.93458	0.00336	0.00672	0.73%

Proportion Fertilized Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
15007-000	0.99010	1.00000	0.98039	1.00000
15007-001	0.92593	0.98039	0.90991	0.94340
15007-002	0.96262	0.96154	0.92857	0.97087
15007-003	0.92661	0.94444	0.93458	0.95238
15007-004	0.92593	0.92727	0.93458	0.91818

CETIS Analysis Detail

Arbacia Sperm Cell Fertilization Test — **EnviroSystems, Inc.**

Test No:	04-5064-7243	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	20 Sep-06 09:45 AM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Arbacia punctulata
Ending Date:	20 Sep-06 11:05 AM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	20 Sep-06 09:45 AM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	04-9116-7811	04-9116-7811	20 Sep-06 1:23 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.67845	47.46723	0.43987	Equal Variances
Distribution	Shapiro-Wilk W	0.94385	0.74935	0.61192	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0482054	0.0482054	1	13.70	0.01008	Significant Effect
Error	0.0211193	0.0035199	6			
Total	0.06932466	0.0517253	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-000		15007-001	3.70070	1.94318	0.0050	0.08152	Significant Effect

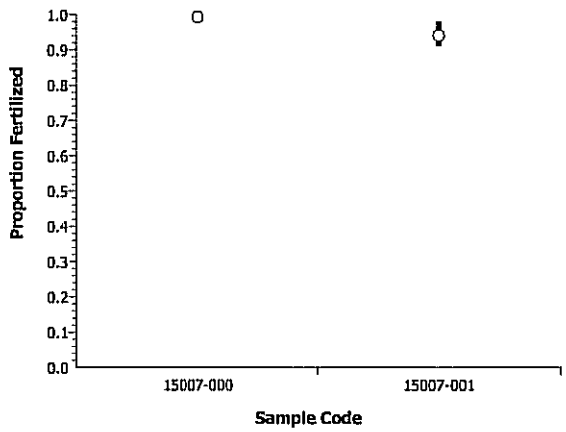
Data Summary

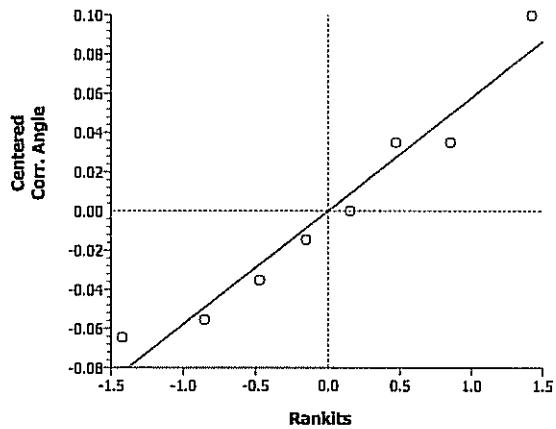
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	4	0.99262	0.98039	1.00000	0.00940	1.48575	1.43031	1.52078	0.04375
15007-001	4	0.93991	0.90991	0.98039	0.03026	1.33050	1.26595	1.43031	0.07160

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	0.99010	1.00000	0.98039	1.00000						
15007-001	0.92593	0.98039	0.90991	0.94340						

Graphics





CETIS Analysis Detail

Arbacia Sperm Cell Fertilization Test — EnviroSystems, Inc.

Test No:	04-5064-7243	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	20 Sep-06 09:45 AM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Arbacia punctulata
Ending Date:	20 Sep-06 11:05 AM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	20 Sep-06 09:45 AM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	04-9116-7811	04-9116-7811	20 Sep-06 1:23 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.03706	47.46723	0.97684	Equal Variances
Distribution	Shapiro-Wilk W	0.84085	0.74935	0.08145	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0304825	0.0304825	1	16.22	0.00690	Significant Effect
Error	0.0112775	0.0018796	6			
Total	0.04176002	0.0323621	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-000		15007-002	4.02711	1.94318	0.0035	0.05957	Significant Effect

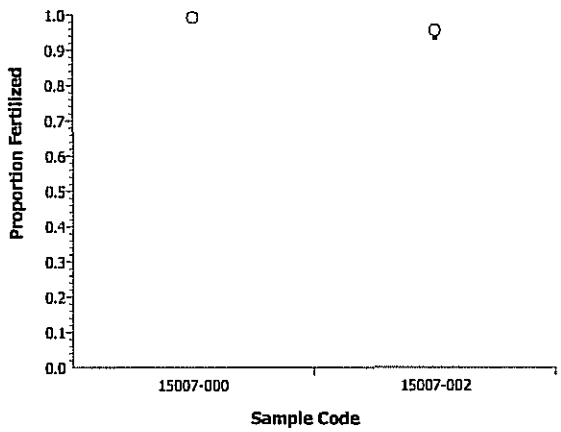
Data Summary

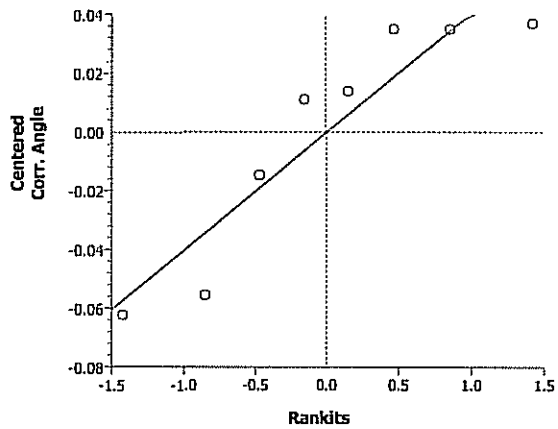
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	4	0.99262	0.98039	1.00000	0.00940	1.48575	1.43031	1.52078	0.04375
15007-002	4	0.95590	0.92857	0.97087	0.01869	1.36229	1.30025	1.39929	0.04296

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	0.99010	1.00000	0.98039	1.00000						
15007-002	0.96262	0.96154	0.92857	0.97087						

Graphics





CETIS Analysis Detail

Arbacia Sperm Cell Fertilization Test — EnviroSystems, Inc.

Test No:	04-5064-7243	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	20 Sep-06 09:45 AM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Arbacia punctulata
Ending Date:	20 Sep-06 11:05 AM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	20 Sep-06 09:45 AM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	04-9116-7811	04-9116-7811	20 Sep-06 1:23 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	3.39145	47.46723	0.34262	Equal Variances
Distribution	Shapiro-Wilk W	0.92221	0.74935	0.41827	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0529296	0.0529296	1	42.72	0.00061	Significant Effect
Error	0.0074342	0.0012390	6			
Total	0.06036386	0.0541687	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-000		15007-003	6.53592	1.94318	0.0003	0.04837	Significant Effect

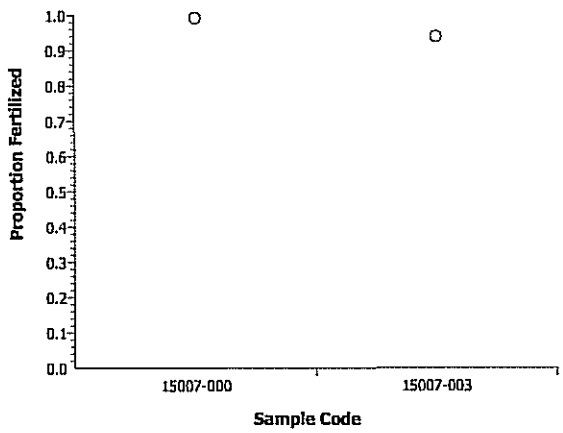
Data Summary

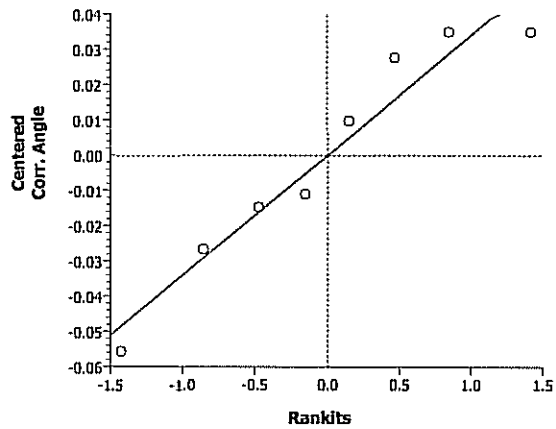
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	4	0.99262	0.98039	1.00000	0.00940	1.48575	1.43031	1.52078	0.04375
15007-003	4	0.93950	0.92661	0.95238	0.01127	1.32307	1.29645	1.35081	0.02376

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	0.99010	1.00000	0.98039	1.00000						
15007-003	0.92661	0.94444	0.93458	0.95238						

Graphics





CETIS Analysis Detail

Arbacia Sperm Cell Fertilization Test — EnviroSystems, Inc.

Test No:	04-5064-7243	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	20 Sep-06 09:45 AM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Arbacia punctulata
Ending Date:	20 Sep-06 11:05 AM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	20 Sep-06 09:45 AM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	04-9116-7811	04-9116-7811	20 Sep-06 1:24 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	11.53760	47.46723	0.07462	Equal Variances
Distribution	Shapiro-Wilk W	0.93173	0.74935	0.49712	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0716770	0.0716770	1	68.93	0.00017	Significant Effect
Error	0.006239	0.0010398	6			
Total	0.07791597	0.0727168	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-000		15007-004	8.30251	1.94318	0.0001	0.04431	Significant Effect

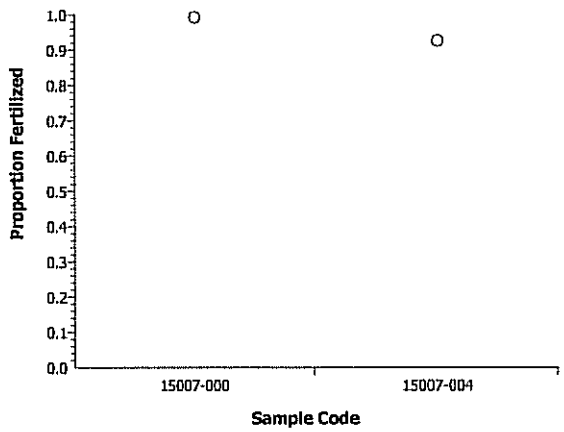
Data Summary

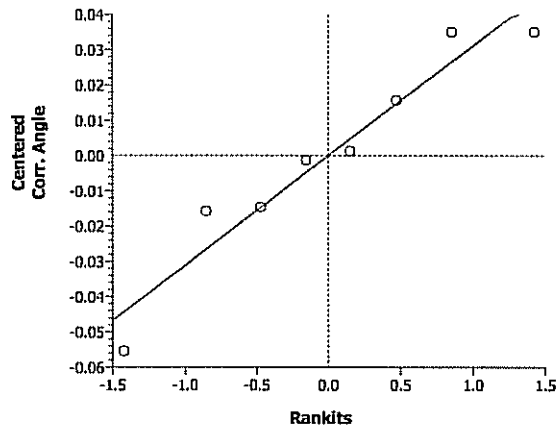
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	4	0.99262	0.98039	1.00000	0.00940	1.48575	1.43031	1.52078	0.04375
15007-004	4	0.92649	0.91818	0.93458	0.00672	1.29644	1.28071	1.31215	0.01288

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	0.99010	1.00000	0.98039	1.00000						
15007-004	0.92593	0.92727	0.93458	0.91818						

Graphics





CETIS Analysis Detail

Arbacia Sperm Cell Fertilization Test — EnviroSystems, Inc.

Test No:	04-5064-7243	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	20 Sep-06 09:45 AM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Arbacia punctulata
Ending Date:	20 Sep-06 11:05 AM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	20 Sep-06 09:45 AM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	04-9116-7811	04-9116-7811	20 Sep-06 1:24 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.77771	47.46723	0.42375	Equal Variances
Distribution	Shapiro-Wilk W	0.93739	0.74935	0.54880	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0020218	0.0020218	1	0.58	0.47516	Non-Significant Effect
Error	0.0209141	0.0034857	6			
Total	0.02293596	0.0055075	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-001		15007-002	-0.7616	1.94318	0.7624	0.08112	Non-Significant Effect

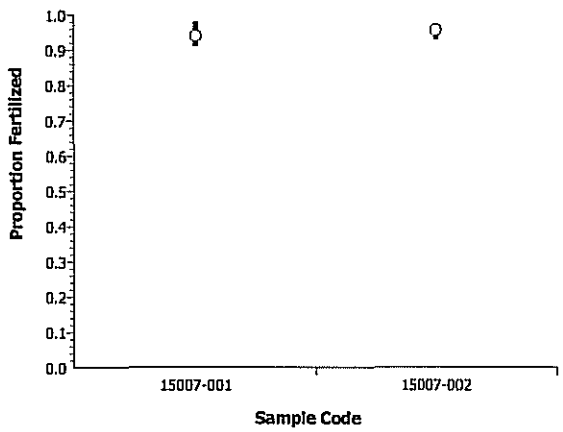
Data Summary

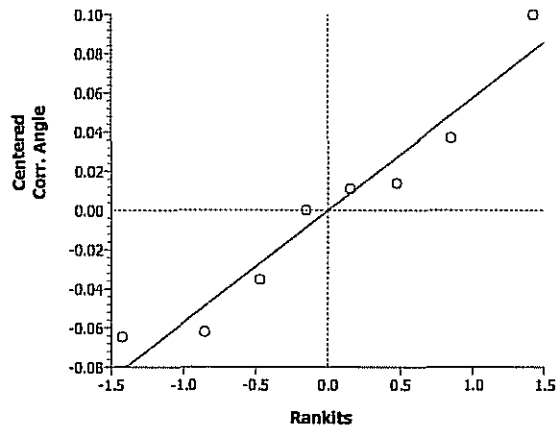
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-001	4	0.93991	0.90991	0.98039	0.03026	1.33050	1.26595	1.43031	0.07160
15007-002	4	0.95590	0.92857	0.97087	0.01869	1.36229	1.30025	1.39929	0.04296

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-001	0.92593	0.98039	0.90991	0.94340						
15007-002	0.96262	0.96154	0.92857	0.97087						

Graphics





CETIS Analysis Detail

Arbacia Sperm Cell Fertilization Test — EnviroSystems, Inc.

Test No:	04-5064-7243	**Test Type:**	Fertilization	**Duration:**	80m
Start Date:	20 Sep-06 09:45 AM	**Protocol:**	EPA/821/R-02-014 (2002)	**Species:**	Arbacia punctulata
Ending Date:	20 Sep-06 11:05 AM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	20 Sep-06 09:45 AM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	04-9116-7811	04-9116-7811	20 Sep-06 1:24 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	9.08384	47.46723	0.10282	Equal Variances
Distribution	Shapiro-Wilk W	0.93581	0.74935	0.53408	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0001104	0.0001104	1	0.04	0.85034	Non-Significant Effect
Error	0.0170708	0.0028451	6			
Total	0.01718121	0.0029555	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-001		15007-003	0.19699	1.94318	0.4252	0.07329	Non-Significant Effect

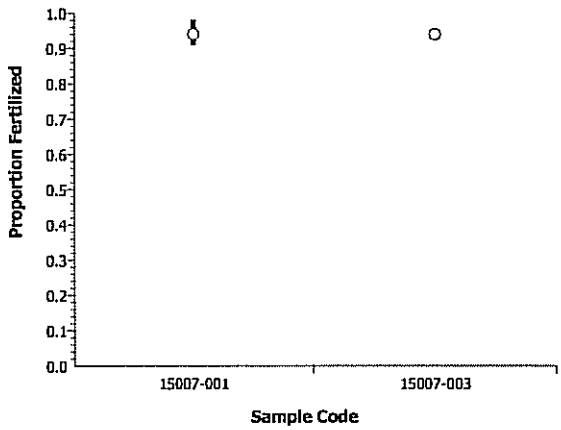
Data Summary

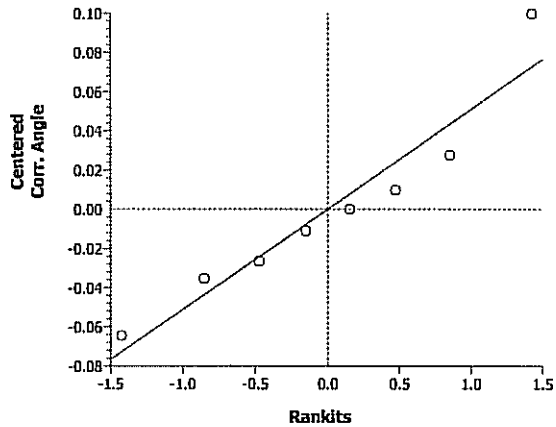
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-001	4	0.93991	0.90991	0.98039	0.03026	1.33050	1.26595	1.43031	0.07160
15007-003	4	0.93950	0.92661	0.95238	0.01127	1.32307	1.29645	1.35081	0.02376

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-001	0.92593	0.98039	0.90991	0.94340						
15007-003	0.92661	0.94444	0.93458	0.95238						

Graphics





CETIS Analysis Detail

Arbacia Sperm Cell Fertilization Test — EnviroSystems, Inc.

Test No:	04-5064-7243	Test Type:	Fertilization	Duration:	80m
Start Date:	20 Sep-06 09:45 AM	Protocol:	EPA/821/R-02-014 (2002)	Species:	Arbacia punctulata
Ending Date:	20 Sep-06 11:05 AM	Dil Water:	Not Applicable	Source:	In-House Culture
Setup Date:	20 Sep-06 09:45 AM	Brine:	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	04-9116-7811	04-9116-7811	20 Sep-06 1:24 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	30.90291	47.46723	0.01866	Equal Variances
Distribution	Shapiro-Wilk W	0.88705	0.74935	0.21190	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0023202	0.0023202	1	0.88	0.38520	Non-Significant Effect
Error	0.0158756	0.0026459	6			
Total	0.01819574	0.0049661	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-001		15007-004	0.93643	1.94318	0.1926	0.07068	Non-Significant Effect

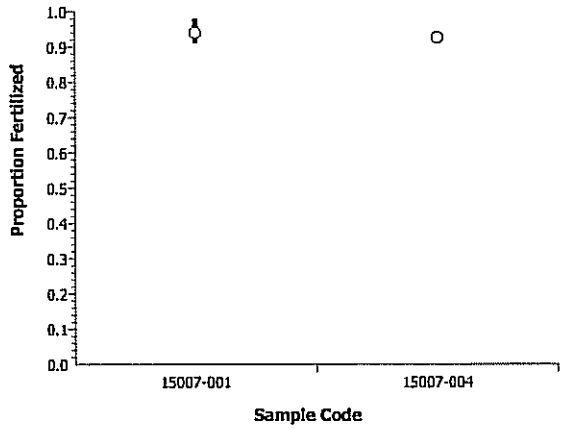
Data Summary

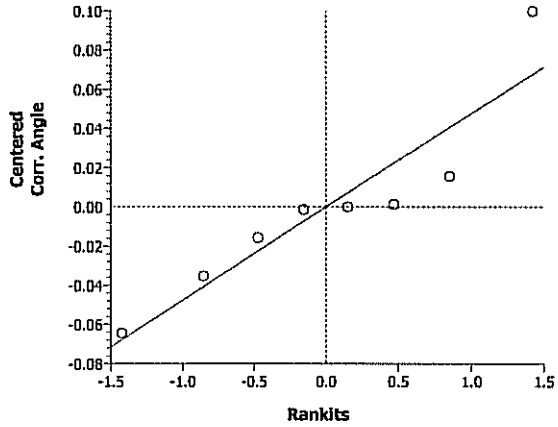
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-001	4	0.93991	0.90991	0.98039	0.03026	1.33050	1.26595	1.43031	0.07160
15007-004	4	0.92649	0.91818	0.93458	0.00672	1.29644	1.28071	1.31215	0.01288

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-001	0.92593	0.98039	0.90991	0.94340						
15007-004	0.92593	0.92727	0.93458	0.91818						

Graphics





STUDY: 15007
CLIENT: Battelle Labs
PROJECT: New Bedford Harbor Dredge Monitoring
ASSAY: Champia parvula Chronic Exposure
SPECIES: Champia parvula

Champia Raw Data

Date of test: Sept 21/06

		Cystocarps per plant					Mean	SD	Group mean and SD	Comments
Control	NSW	15	18	11	15	14	**14.6**	2.5	23.9	
		40	15	18	22	21	**23.2**	9.8	11.3	
		22	50	38	31	29	**34.0**	10.6		
Control	Inst Ocean	32	26	38	39	21	**31.2**	7.7	27.3	
		24	25	22	31	30	**26.4**	3.9	7.1	
		18	15	27	25	36	**24.2**	8.2		
				Pooled controls			**25.6**	9.8		
Samples collected Sept 19/06	% V/V									
SRC #527	100	12	14	33	26	20	**21.0**	8.7	24.5	Healthy red colour
WP-TOX-001	100	23	20	6	18	21	**17.6**	6.7	9.6	Normal growth
	100	14	28	28	25	21	**23.2**	5.9		
	100	44	37	40	31	29	**36.2**	6.2		
SRC #528	100	2	2	3	1	1	**1.8**	0.8	0.8	Branches white with
WP-TOX-002	100	1	0	0	0	1	**0.4**	0.5	13.8	red tips
	100	1	0	0	1	0	**0.4**	0.5		
	100	3	0	0	0	0	**0.6**	1.3		
SRC #529	100	0	0	2	0	0	**0.4**	0.9	0.2	Branches white with
WP-TOX-003	100	0	0	0	0	0	**0.0**	0.0	0.5	red tips
	100	0	1	0	0	0	**0.2**	0.4		
	100	1	0	0	0	0	**0.2**	0.4		
SRC #530	100	0	0	0	0	0	**0.0**	0.0	0.2	Branches slighlty broken
WP-TOX-004	100	0	0	0	0	0	**0.0**	0.0	0.4	White with red tips
	100	0	1	0	1	1	**0.6**	0.5		
	100	0	0	0	0	0	**0.0**	0.0		

Samples 002, 003 and 004 were at salinity of 27 ppt so were adjusted with the addition of 1.2 g Instant Ocean to 500 mL sample to raise salinity to 30 ppt.

CETIS Test Summary

Report Date: 29 Sep-06 12:51 PM
Link: 04-6908-2140

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	00-7249-1704	**Test Type:**	Champia	**Duration:**	7d 0h
Start Date:	21 Sep-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	28 Sep-06 12:00 PM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	21 Sep-06 12:00 PM	**Brine:**	Not Applicable		

Sample No:	16-3216-2814	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	20 Sep-06 09:00 AM	**Code:**	15007-000	**Project:**	Ecological Risk Assessment
Receive Date:	20 Sep-06 09:00 AM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	27h	**Station:**	WQ-TOX-Lab Control		
Sample No:	11-7565-0630	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	19 Sep-06 09:00 AM	**Code:**	15007-001	**Project:**	Ecological Risk Assessment
Receive Date:	19 Sep-06 02:15 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	51h	**Station:**	WQ-TOX-001		
Sample No:	06-1096-0183	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	19 Sep-06 10:00 AM	**Code:**	15007-002	**Project:**	Ecological Risk Assessment
Receive Date:	19 Sep-06 02:15 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	50h	**Station:**	WQ-TOX-002		
Sample No:	05-1252-8989	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	19 Sep-06 10:07 AM	**Code:**	15007-003	**Project:**	Ecological Risk Assessment
Receive Date:	19 Sep-06 02:15 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	50h	**Station:**	WQ-TOX-003		
Sample No:	11-4354-7682	**Material:**	Marine Monitoring Sample	**Client:**	Battelle Labs
Sample Date:	19 Sep-06 10:22 AM	**Code:**	15007-004	**Project:**	Ecological Risk Assessment
Receive Date:	19 Sep-06 02:15 PM	**Source:**	New Bedford Harbor Dredge Monitorin		
Sample Age:	50h	**Station:**	WQ-TOX-004		

Mean Cystocarps Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
15007-000	3	23.933	14.6	34	5.6123	9.7208	40.62%
15007-001	4	24.5	17.6	36.2	4.0665	8.1331	33.20%
15007-002	4	0.8	0.4	1.8	0.3367	0.6733	84.16%
15007-003	4	0.2	0	0.4	0.0816	0.1633	81.65%
15007-004	4	0.15	0	0.6	0.15	0.3	200.00

Mean Cystocarps Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
15007-000	14.6	23.2	34	
15007-001	21	17.6	23.2	36.2
15007-002	1.8	0.4	0.4	0.6
15007-003	0.4	0	0.2	0.2
15007-004	0	0	0.6	0

CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	00-7249-1704	**Test Type:**	Champia	**Duration:**	7d 0h
Start Date:	21 Sep-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	28 Sep-06 12:00 PM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	21 Sep-06 12:00 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-6908-2140	04-6908-2140	29 Sep-06 12:51 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.42854	49.79928	0.73314	Equal Variances
Distribution	Shapiro-Wilk W	0.89684	0.72991	0.29455	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.5504762	0.5504762	1	0.01	0.93610	Non-Significant Effect
Error	387.4267	77.48534	5			
Total	387.977142	78.035812	6			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-000		15007-001	-0.0843	2.01505	0.5320	13.5473	Non-Significant Effect

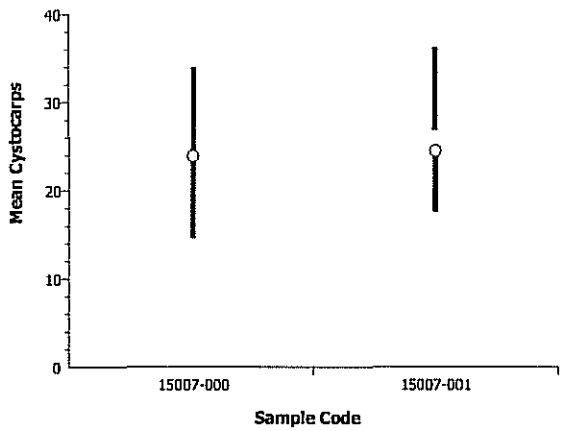
Data Summary

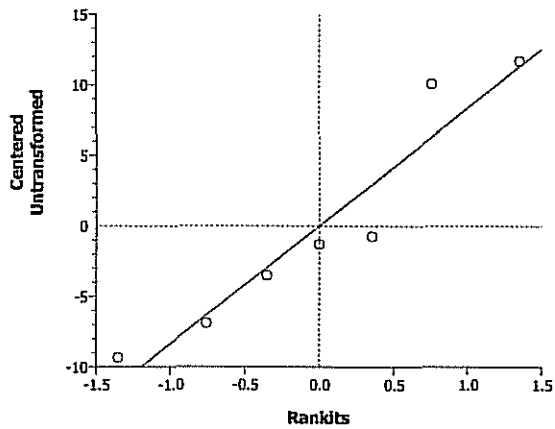
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	3	23.933	14.6	34	9.7208				
15007-001	4	24.500	17.6	36.2	8.1331				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	14.6	23.2	34							
15007-001	21	17.6	23.2	36.2						

Graphics





CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	00-7249-1704	**Test Type:**	Champia	**Duration:**	7d 0h
Start Date:	21 Sep-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	28 Sep-06 12:00 PM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	21 Sep-06 12:00 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-6908-2140	04-6908-2140	29 Sep-06 12:51 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	208.44120	49.79928	0.00121	Unequal Variances
Distribution	Shapiro-Wilk W	0.84008	0.72991	0.10448	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	917.4019	917.4019	1	24.10	0.00444	Significant Effect
Error	190.3467	38.06933	5			
Total	1107.74858	955.47125	6			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-000		15007-002	4.11451	2.91999	0.0272	16.4173	Significant Effect

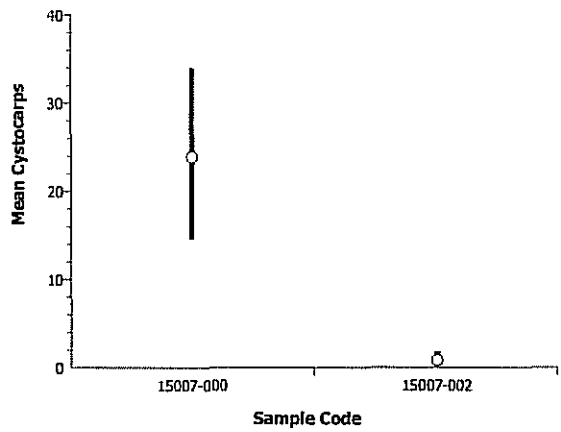
Data Summary

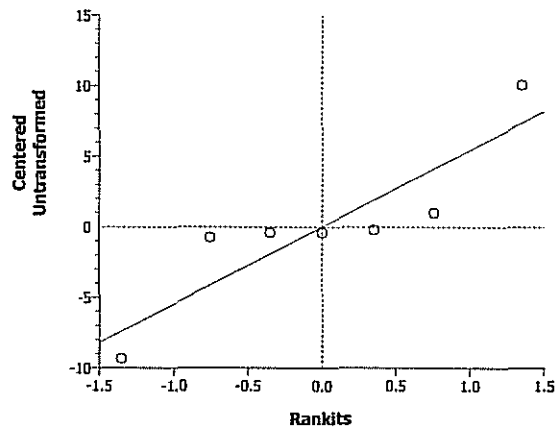
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	3	23.933	14.6	34	9.7208				
15007-002	4	0.8	0.4	1.8	0.6733				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	14.6	23.2	34							
15007-002	1.8	0.4	0.4	0.6						

Graphics





CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	00-7249-1704	**Test Type:**	Champia	**Duration:**	7d 0h
Start Date:	21 Sep-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	28 Sep-06 12:00 PM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	21 Sep-06 12:00 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-6908-2140	04-6908-2140	29 Sep-06 12:51 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	3543.50000	49.79928	0.00002	Unequal Variances
Distribution	Shapiro-Wilk W	0.81364	0.72991	0.06238	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	965.6076	965.6076	1	25.54	0.00392	Significant Effect
Error	189.0667	37.81333	5			
Total	1154.67427	1003.4209	6			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-000		15007-003	4.22837	2.91999	0.0258	16.3895	Significant Effect

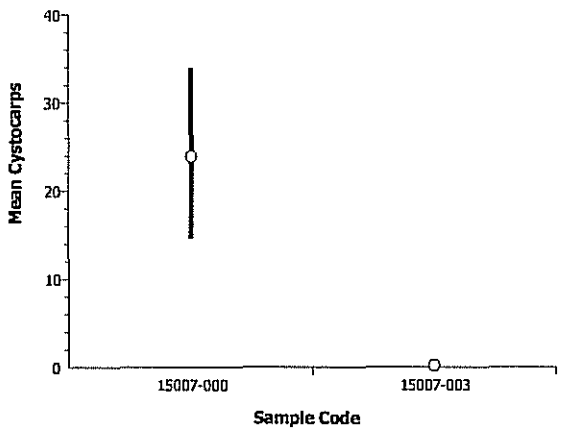
Data Summary

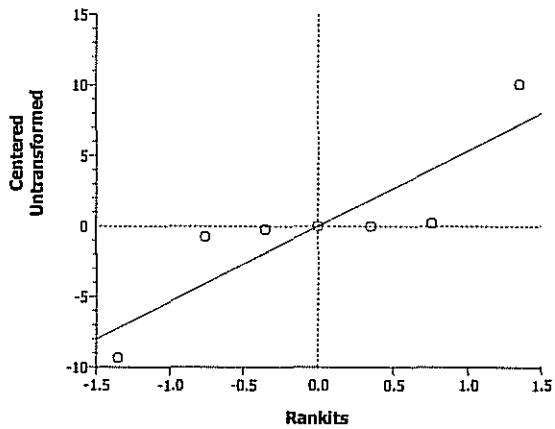
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	3	23.933	14.6	34	9.7208				
15007-003	4	0.2000	0	0.4	0.1633				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	14.6	23.2	34							
15007-003	0.4	0	0.2	0.2						

Graphics





CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	00-7249-1704	**Test Type:**	Champia	**Duration:**	7d 0h
Start Date:	21 Sep-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	28 Sep-06 12:00 PM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	21 Sep-06 12:00 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-6908-2140	04-6908-2140	29 Sep-06 12:51 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1049.92600	49.79928	0.00011	Unequal Variances
Distribution	Shapiro-Wilk W	0.81910	0.72991	0.06952	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	969.6805	969.6805	1	25.62	0.00390	Significant Effect
Error	189.2567	37.85133	5			
Total	1158.93715	1007.5318	6			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-000		15007-004	4.23621	2.91999	0.0257	16.3937	Significant Effect

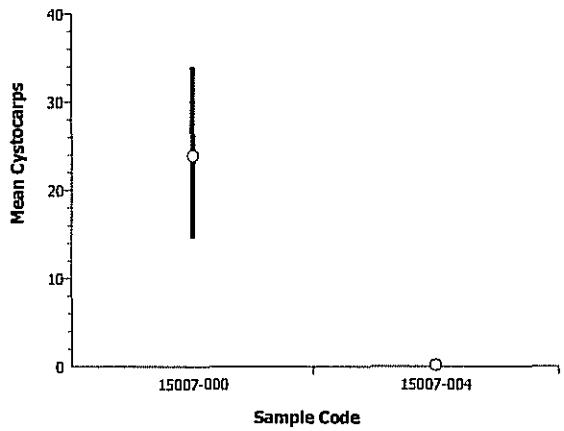
Data Summary

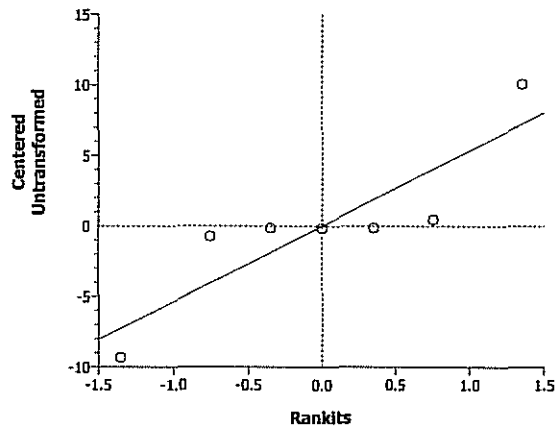
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-000	3	23.933	14.6	34	9.7208				
15007-004	4	0.1500	0	0.6	0.3000				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-000	14.6	23.2	34							
15007-004	0	0	0.6	0						

Graphics





CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	00-7249-1704	**Test Type:**	Champia	**Duration:**	7d 0h
Start Date:	21 Sep-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	28 Sep-06 12:00 PM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	21 Sep-06 12:00 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-6908-2140	04-6908-2140	29 Sep-06 12:51 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	145.91180	47.46723	0.00190	Unequal Variances
Distribution	Shapiro-Wilk W	0.82930	0.74935	0.06355	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	1123.38	1123.38	1	33.74	0.00114	Significant Effect
Error	199.8	33.3	6			
Total	1323.18001	1156.6800	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-001		15007-002	5.8082	2.35336	0.0051	9.60276	Significant Effect

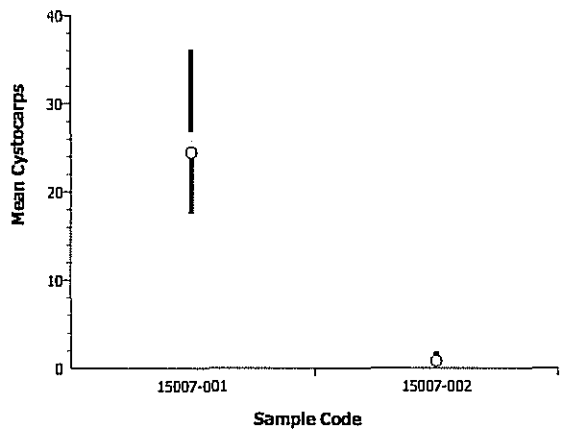
Data Summary

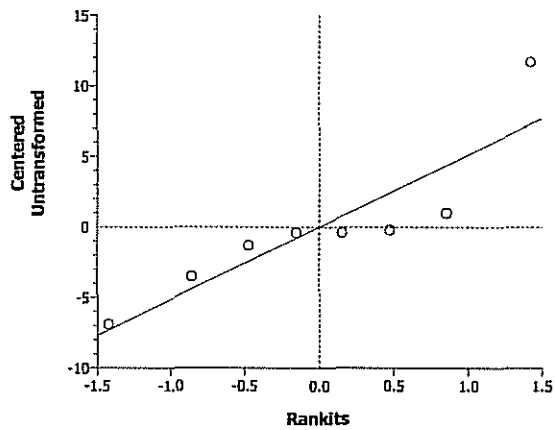
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-001	4	24.500	17.6	36.2	8.1331				
15007-002	4	0.8	0.4	1.8	0.6733				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-001	21	17.6	23.2	36.2						
15007-002	1.8	0.4	0.4	0.6						

Graphics





CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	00-7249-1704	**Test Type:**	Champia	**Duration:**	7d 0h
Start Date:	21 Sep-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	28 Sep-06 12:00 PM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	21 Sep-06 12:00 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-6908-2140	04-6908-2140	29 Sep-06 12:51 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2480.50000	47.46723	0.00003	Unequal Variances
Distribution	Shapiro-Wilk W	0.80802	0.74935	0.03978	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	1180.98	1180.98	1	35.69	0.00099	Significant Effect
Error	198.52	33.08667	6			
Total	1379.49998	1214.0666	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-001		15007-003	5.97441	2.35336	0.0047	9.57195	Significant Effect

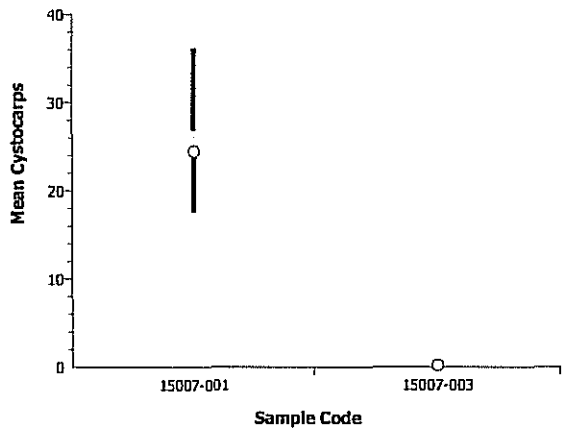
Data Summary

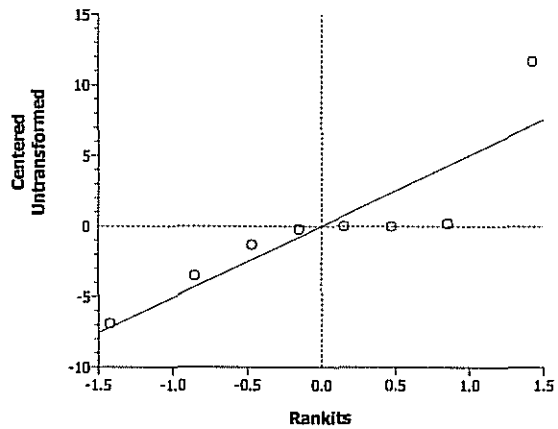
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-001	4	24.500	17.6	36.2	8.1331				
15007-003	4	0.2000	0	0.4	0.1633				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-001	21	17.6	23.2	36.2						
15007-003	0.4	0	0.2	0.2						

Graphics





CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test — **Saskatchewan Research Council**

Test No:	00-7249-1704	**Test Type:**	Champia	**Duration:**	7d 0h
Start Date:	21 Sep-06 12:00 PM	**Protocol:**	EPA/600/4-91/003 (1994)	**Species:**	Champia parvula
Ending Date:	28 Sep-06 12:00 PM	**Dil Water:**	Not Applicable	**Source:**	In-House Culture
Setup Date:	21 Sep-06 12:00 PM	**Brine:**	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-6908-2140	04-6908-2140	29 Sep-06 12:51 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	734.96300	47.46723	0.00017	Unequal Variances
Distribution	Shapiro-Wilk W	0.81257	0.74935	0.04403	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	1185.845	1185.845	1	35.81	0.00098	Significant Effect
Error	198.71	33.11833	6			
Total	1384.55498	1218.9633	7			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
15007-001		15007-004	5.98384	2.35336	0.0047	9.57653	Significant Effect

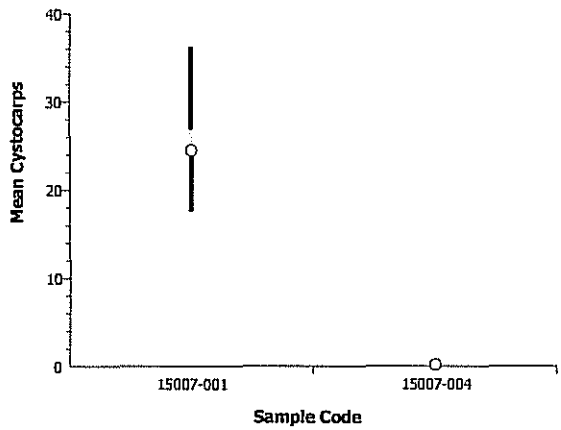
Data Summary

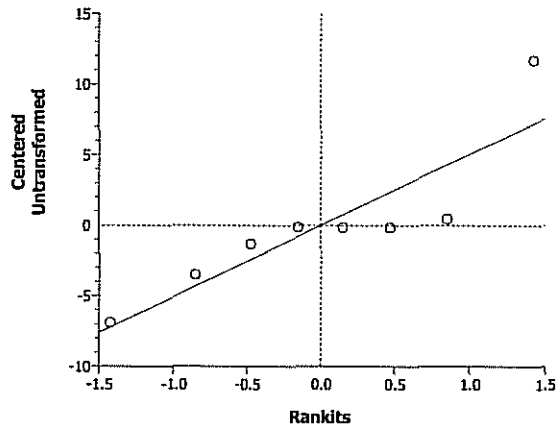
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
15007-001	4	24.500	17.6	36.2	8.1331				
15007-004	4	0.1500	0	0.6	0.3000				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15007-001	21	17.6	23.2	36.2						
15007-004	0	0	0.6	0						

Graphics





SALTWATER ASSAYS

A. bahia, A. punctulata, C. parvula

STUDY: 15007	LOCATION: New Bedford Harbor				
CHEMISTRY	Lab Salt Control	-001	-002	-003	-004
AMMONIA	-009	-005	-006	-007	-008
AS RECEIVED WATER QUALITIES	Lab Salt Control	-001	-002	-003	-004
SALINITY (ppt)	25	28	24	23	23
pH (SU)	7.97	7.89	7.79	7.89	7.80
TRC (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
DO (mg/L)	7.1	8.6	8.5	8.3	7.8
S/C (µmhos/cm)	39520	42790	37390	36050	36190
WQ STATION USED	2	1	1	1	1
INITIALS	m	BB	BB	BB	BB
A. bahia SALINITY ADJUSTMENT RECORD	Lab Salt Control	-001	-002	-003	-004
SAMPLE (mLs)	N/A	N/A	N/A	N/A	N/A
SEA SALT (g)	N/A	N/A	N/A	N/A	N/A
DATE:	9/20	9/19/96	→	→	→
TIME:	1030	1515	→	→	→
INITIALS:	m	BB	→	→	→

Sample ID	ESI Cube ID
-001	-001
-002	-002
-003	-003
-004	-004

Americamysis bahia 7 DAY CHRONIC ASSAY
NEW WATER QUALITIES

STUDY: 15007	CLIENT: BATTELLE	LOCATION: NEW BEDFORD	LAB CONTROL: HAMPTON ESTUARY

		NEW DISSOLVED OXYGEN (mg/L)							NEW SALINITY (ppt)						
CONC	REP	0	1	2	3	4	5	6	0	1	2	3	4	5	6
LAB	A	7.1	7.0	7.0	6.9	6.6	6.8	7.0	25	26	25	25	26	25	25
-001	A	7.6	6.7	7.1	6.9	6.7	6.7	6.8	27	27	28	28	28	28	29
-002	A	7.1	6.3	6.0	6.4	6.5	6.2	6.5	24	24	24	24	24	24	24
-003	A	7.0	6.3	6.4	6.1	6.3	6.7	6.6	23	23	23	23	23	23	23
-004	A	6.6	4.8	5.4	5.3	5.6	6.0	6.2	23	23	23	23	23	23	23

		NEW pH (SU)							NEW TEMPERATURE (°C)						
CONC	REP	0	1	2	3	4	5	6	0	1	2	3	4	5	6
LAB	A	7.97	7.99	7.92	7.94	8.00	8.05	7.78	24	25	24	24	25	25	24
-001	A	7.79	7.75	7.64	7.60	7.68	7.82	7.86	24	25	26	26	26	25	24
-002	A	7.56	7.38	7.24	7.31	7.34	7.39	7.30	26	25	26	26	26	25	24
-003	A	7.62	7.54	7.37	7.34	7.43	7.59	7.37	26	25	26	26	26	25	24
-004	A	7.31	7.08	7.07	7.09	7.09	7.57	7.24	26	25	26	26	26	25	24
INC TEMP:		25	25	25	25	25	25	25							
DATE:		9/20	9/21	9/22	9/23	9/24	9/25	9/26							
TIME:		1130	1135	1445	1110	1105	1210	1540							
INIT:		[illegible]	SJ	EG	EG	SJ	SJ	EG							

WATER QUALITY METERS USED NEW WATER QUALITIES								
	0	1	2	3	4	5	6	7
Water Quality Station #	~~2~~	2	2	1	2	2	1	
Initials	~~YSJ~~	SJ	EG	EG	SJ	SJ	EG	
Date	9/20	9/21	9/22	9/23	9/24	9/25	9/26	

Americamysis bahia 7 DAY CHRONIC ASSAY
OLD WATER QUALITIES

STUDY:	CLIENT:	LOCATION:	LAB CONTROL:
15007	BATTELLE	NEW BEDFORD	HAMPTON ESTUARY

OLD SALINITY (ppt)									OLD pH (SU)						
Conc	Rep	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Control	A	26	25	26	26	26	26	25	7.79	7.92	7.98	7.95	8.04	7.99	7.85
-001	A	28	28	28	28	28	28	29	7.78	7.98	7.89	7.97	8.03	7.97	7.92
-002	A	25	24	25	25	25	25	25	7.51	7.59	7.96	7.96	7.80	7.89	7.87
-003	A	23	24	24	23	23	24	24	7.72	8.00	7.91	7.94	8.01	7.97	7.92
-004	A	23	24	23	23	23	24	24	7.45	8.01	7.92	7.36	7.91	7.95	7.91

OLD TEMPERATURE (°C)								
Conc	Rep	1	2	3	4	5	6	7
Control	A	25	24	24	25	25	24	25
-001	A	25	24	24	25	25	24	25
-002	A	25	24	24	25	25	24	25
-003	A	25	24	24	25	25	24	25
-004	A	25	24	24	25	25	24	25
INC TEMP:		25	25	25	25	25	25	25
DATE:		9/21	9/22	9/23	9/24	9/25	9/26	9/27
TIME:		1040	1350	1035	1030	1130	1450	1210
INITIALS:		SJ	EG	EG	SJ	SJ	m	CP

GENERAL NOTES - for additional information refer to SOP #1411 or EPA manual 600/4-91/003

- Test vessels will be 250 mL glass beakers containing a minimum of 150 mL of solution
- 8 replicates per site with 5 organisms each

- Test Temperature: 26±1°C
- Salinity: 25 ±2ppt
- Dissolved Oxygen: >4.3 mg/L

- Photoperiod will be 16 hours light and 8 hours dark.
- Passing criteria require ≥80% survival and average dry weight of ≥0.20 mg/organism in the control vessels.

WATER QUALITY METERS USED OLD WATER QUALITIES								
	0	1	2	3	4	5	6	7
Water Quality Station #		1	2	1	2	2	2	2
Initials		SJ	EG	EG	SJ	SJ	m	CP
Date	9/20/06	9/21/06	9/22/06	9/23/06	9/24/06	9/25/06	9/26	9/27

Americamysis bahia 7 DAY CHRONIC ASSAY
SAMPLE USE RECORD

STUDY: 15007 | CLIENT: BATTELLE - New Bedford

SPECIES: *A. bahia* | TEST: chronic renewal

Sample	Day: 0 Volume Used (mL)	Day: 0 ESI Cube ID	Day: 1 Volume Used (mL)	Day: 1 ESI Cube ID	Day: 2 Volume Used (mL)	Day: 2 ESI Cube ID	Day	Date	Time	Init
Lab Control	1600	n/a	1600	n/a	1600	n/a	0	9/20	1100	m
-001	↓	-001	↓	-001	↓	-001	1	9/21	1130	SJ
-002	↓	-002	↓	-002	↓	-002	2	9/22	1430	EG
-003	↓	-003	↓	-003	↓	-003	3	9/23	1100	EG
-004	↓	-004	↓	-004	↓	-004	4	9/24	1105	SJ
							5	9/25	1200	SJ
							6	9/26	1520	m

Sample	Day: 3 Volume Used (mL)	Day: 3 ESI Cube ID	Day: 4 Volume Used (mL)	Day: 4 ESI Cube ID	Day: 5 Volume Used (mL)	Day: 5 ESI Cube ID
Lab Control	1600	n/a	1600	n/a	1600	n/a
-001	↓	-001	↓	-001	↓	-001
-002	↓	-002	↓	-002	↓	-002
-003	↓	-003	↓	-003	↓	-003
-004	↓	-004	↓	-004	↓	-004

Sample	Day: 6 Volume Used (mL)	Day: 6 ESI Cube ID
Lab Control	1600	n/a
-001	—	Not enough sample
-002	1600	-002
-003	↓	-003
-004	↓	-004

CLIENT: Battelle
PROJECT: New Bedford Harbor Dredge Monitoring
ASSAY: Various
TASK: As Received" Water Quality
PARAMETER: Ammonia
METHOD: SM 4500-NH3 G

FIELD ID	LAB ID	RESULT	QUAL	QLIMIT	UNITS	SAMPLED	ANALYZED
Laboratory Control	14877-009	ND		0.1	mg/L as N	08/15/06	08/30/06
WQ-TOX-001-081406	14877-008	ND		0.1	mg/L as N	08/15/06	08/30/06
WQ-TOX-002-081406	14877-005	ND		0.1	mg/L as N	08/15/06	08/30/06
WQ-TOX-003-081406	14877-006	ND		0.1	mg/L as N	08/15/06	08/16/06
WQ-TOX-004-081406	14877-007	ND		0.1	mg/L as N	08/15/06	08/30/06
Laboratory Control	14886-008	ND		0.1	mg/L as N	08/16/06	08/25/06
WQ-TOX-001-081606	14886-004	ND		0.1	mg/L as N	08/16/06	08/25/06
WQ-TOX-002-081606	14886-005	ND		0.1	mg/L as N	08/16/06	08/21/06
WQ-TOX-003-081606	14886-006	ND		0.1	mg/L as N	08/16/06	08/21/06
Laboratory Control	14925-004	ND		0.1	mg/L as N	08/28/06	08/30/06
WQ-TOX-001-082806	14925-005	ND		0.1	mg/L as N	08/28/06	08/30/06
WQ-TOX-002-082806	14925-006	0.14		0.1	mg/L as N	08/28/06	08/30/06
WQ-TOX-003-082806	14925-007	ND		0.1	mg/L as N	08/28/06	08/30/06
Laboratory Control	15007-009	0.13		0.1	mg/L as N	09/19/06	09/26/06
WQ-TOX-001-091906	15007-005	ND		0.1	mg/L as N	09/19/06	09/26/06
WQ-TOX-002-091906	15007-006	ND		0.1	mg/L as N	09/19/06	09/26/06
WQ-TOX-003-091906	15007-007	0.2		0.1	mg/L as N	09/19/06	09/26/06
WQ-TOX-004-091906	15007-008	0.17		0.1	mg/L as N	09/19/06	09/26/06

ESI

EnviroSystems, Inc.
One Lafayette Road
P.O. Box 778
Hampton, NH 03843-0778
Telephone: 603-926-3345

SAMPLE RECEIPT RECORD

ESI STUDY NUMBER: 14877 **CLIENT:** Battelle

SAMPLE RECEIPT:
DATE: 8/15 14/06 TIME: 1510 BY: PK

DELIVERED VIA: ☐ FEDEX ☐ CLIENT ☒ ESI ☐ UPS ☐ OTHER

LOGGED INTO LAB:
DATE: 8/15 TIME: 0950 BY: m

SAMPLE CONDITION:

CHAIN OF CUSTODY:	☒ YES	☐ NO
CHAIN OF CUSTODY SIGNED:	☒ YES	☐ NO
CHAIN OF CUSTODY COMPLETE:	☒ YES	☐ NO
SAMPLE DATE:	☒ YES	☐ NO
SAMPLE TIME RECORDED:	☒ YES	☐ NO
SAMPLE TYPE IDENTIFIED:	☒ YES	☐ NO
CUSTODY SEAL IN PLACE:	☒ YES	☐ NO
SHIPPING CONTAINER INTACT:	☒ YES	☐ NO
SAMPLE TEMPERATURE (AT ARRIVAL): 4 °C		
DOES CLIENT NEED NOTIFICATION OF TEMPERATURE?	☐ YES	☒ NO
SAMPLE ARRIVED ON ICE:	☒ YES	☐ NO

COMMENTS: 4x5 gal 55f's

14877

Battelle

The Business of Innovation

Chain of Custody

397 Washington Street
Duxbury, MA 02332
Phone: 781-952-5200
Fax: 781-934-2124

Proj. No	Proj. Name
G606422-ESI	New Bedford Harbor

SAMPLERS: Signature

ANALYSIS REQUESTED → "NUMBER OF CONTAINERS"

DATE	TIME	BATTELLE ID	CLIENT ID	SAMPLE DESCRIPTION	PEST	PCB	TPH FINGERPRINT	PAH	VOA	TBT	METALS	OTHER - Toxicity	ACIDIFIED	PRESERVED	Total Number of Containers
8/14/06	0849	WQ-TOX-001-081406		5 Gal Cube container								X			
8/14/06	1305	WQ-TOX-002-081406		↓								X			
8/14/06	1345	WQ-TOX-004-081406		↓								X			
8/14/06	1320	WQ-TOX-003-081406		↓								X			

Relinquished by:	Date/Time	Received by:	Date/Time
	8-14-06 1510	P. Karbe	8/14/06 1510
Relinquished by:	Date/Time	Received by:	Date/Time

Comments:

ORIGINAL

ESI

EnviroSystems, Inc.
One Lafayette Road
P.O. Box 778
Hampton, NH 03843-0778
Telephone: 603-926-3345

SAMPLE RECEIPT RECORD

ESI STUDY NUMBER: 14886 **CLIENT:** Batelle - New Bedford

SAMPLE RECEIPT:
DATE: 8/17/06 TIME: 0825 BY: DG

DELIVERED VIA: ☐ FEDEX ☐ CLIENT ☒ ESI ☐ UPS ☐ OTHER

LOGGED INTO LAB:
DATE: 8/17/06 TIME: 1120 BY: SJ

SAMPLE CONDITION:

CHAIN OF CUSTODY:	☒ YES	☐ NO
CHAIN OF CUSTODY SIGNED:	☒ YES	☐ NO
CHAIN OF CUSTODY COMPLETE:	☒ YES	☐ NO
SAMPLE DATE:	☒ YES	☐ NO
SAMPLE TIME RECORDED:	☒ YES	☐ NO
SAMPLE TYPE IDENTIFIED:	☒ YES	☐ NO
CUSTODY SEAL IN PLACE:	☒ YES	☐ NO
SHIPPING CONTAINER INTACT:	☒ YES	☐ NO

SAMPLE TEMPERATURE (AT ARRIVAL): 4 °C

DOES CLIENT NEED NOTIFICATION OF TEMPERATURE? ☐ YES ☒ NO

SAMPLE ARRIVED ON ICE: ☒ YES ☐ NO

COMMENTS:

603-702-1597 Dom Cell #2

Battelle

The Business of Innovation

Chain of Custody

397 Washington Street
Duxbury, MA 02332
Phone: 781-952-5200
Fax: 781-934-2124

Proj. No: G606422

Proj. Name: New Bedford Harbor

SAMPLERS: Signature

ANALYSIS REQUESTED → "NUMBER OF CONTAINERS"

DATE	TIME	BATTELLE ID	CLIENT ID	SAMPLE DESCRIPTION	PEST	PCB	TPH FINGERPRINT	PAH	VOA	TBT	METALS	OTHER Toxicity	ACIDIFIED	PRESERVED	Total Number of Containers
8-16-06	1330	WQ-TOX-001-081606		5gal cubitainer Reference Location								X			
8-16-06	1400	WQ-TOX-002-081606		5gal cubitainer Boundary Location								X			
8-16-06	1415	WQ-TOX-003-081606		5gal cubitainer 300' Location								X			

Relinquished by:	Date/Time		Received by:	Date/Time	
	8-17-06	825		8/17	0825
Relinquished by:	Date/Time		Received by:	Date/Time	

Comments:

LAB COPY

603-702-1597 Dom Ouellet

Battelle

The Business of Innovation

Chain of Custody

397 Washington Street
Duxbury, MA 02332
Phone: 781-952-5200
Fax: 781-934-2124

Proj. No: G06422

Proj. Name: New Bedford Harbor

SAMPLERS: Signature

ANALYSIS REQUESTED → "NUMBER OF CONTAINERS"

DATE	TIME	BATTELLE ID	~~CLIENT ID~~	SAMPLE DESCRIPTION	PEST	PCB	TPH FINGERPRINT	PAH	VOA	TBT	METALS	OTHER TOXICITY	ACIDIFIED	PRESERVED	Total Number of Containers
8-16-06	1330	WQ-TOX-001-081606		5gal cubitainer Reference Location								X			
8-16-06	1400	WQ-TOX-002-081606		5gal cubitainer Boundary Location								X			
8-16-06	1415	WQ-TOX-003-081606		5gal cubitainer 300-Location								X			

Relinquished by:	Date/Time	Received by:	Date/Time
	8-17-06 825		8/17 0825
Relinquished by:	Date/Time	Received by:	Date/Time

Comments:

CLIENT COPY

ESI

EnviroSystems, Inc.
One Lafayette Road
P.O. Box 778
Hampton, NH 03843-0778
Telephone: 603-926-3345

SAMPLE RECEIPT RECORD

ESI STUDY NUMBER: 14925 **CLIENT:** Battelle

SAMPLE RECEIPT:
DATE: 8/28/06 TIME: 1600 BY: BB CP

DELIVERED VIA: ☐ FEDEX ☒ CLIENT ☐ ESI ☐ UPS ☐ OTHER

LOGGED INTO LAB:
DATE: 8/28/06 TIME: 1610 BY: BB

SAMPLE CONDITION:

CHAIN OF CUSTODY:	☑ YES	☐ NO
CHAIN OF CUSTODY SIGNED:	☑ YES	☐ NO
CHAIN OF CUSTODY COMPLETE:	☑ YES	☐ NO
SAMPLE DATE:	☑ YES	☐ NO
SAMPLE TIME RECORDED:	☑ YES	☐ NO
SAMPLE TYPE IDENTIFIED:	☑ YES	☐ NO
CUSTODY SEAL IN PLACE:	☑ YES	☐ NO
SHIPPING CONTAINER INTACT:	☑ YES	☐ NO
SAMPLE TEMPERATURE (AT ARRIVAL): 4 °C		
DOES CLIENT NEED NOTIFICATION OF TEMPERATURE?	☐ YES	☑ NO
SAMPLE ARRIVED ON ICE:	☑ YES	☐ NO

COMMENTS:

Ship to: Envirosystems

14925

Battelle

The Business of Innovation

Chain of Custody

397 Washington Street
Duxbury, MA 02332
Phone: 781-952-5200
Fax: 781-934-2124

Proj. No: G-606422

Proj. Name: New Bedford Harbor

SAMPLERS: Signature

ANALYSIS REQUESTED → "NUMBER OF CONTAINERS"

DATE	TIME	BATTELLE ID	~~CLIENT ID~~	SAMPLE DESCRIPTION	PEST (ESD)	PCB	TPH FINGERPRINT	PAH	VOA	TBT	METALS	OTHER TOX	ACIDIFIED	PRESERVED	Total Number of Containers
8-28-06	0930	WQ-TOX-001-082806		Tox Sample, 5gal, Reference Site	-001							1			
8-28-06	0950	WQ-TOX-002-082806		Tox Sample, 5gal, 50 NTU	-002							1			
8-28-06	1015	WQ-TOX-003-082806		Tox Sample, 5gal, 25 NTU	-003							1			

Relinquished by:	Date/Time	Received by:	Date/Time
	08-28-06 11:00	8/28/06 1100	
Relinquished by:	Date/Time	Received by:	Date/Time
8/28/06 1600 BPO		8/28/06 1600	

Comments:

ORIGINAL

Battelle
The Business of Innovation

Chain of Custody

15007

397 Washington Street
Duxbury, MA 02332
Phone: 781-952-5200
Fax: 781-934-2124

Proj. No: G606422
Proj. Name: New Bedford Harbor
SAMPLERS: Signature: Jessica M Fox

ANALYSIS REQUESTED → "NUMBER OF CONTAINERS"

DATE	TIME	BATTELLE ID	CLIENT ID	SAMPLE DESCRIPTION	PEST	PCB	TPH FINGERPRINT	PAH	VOA	TBT	METALS	OTHER TOXICITY	ACIDIFIED	PRESERVED ON ICE	Total Number of Containers
9/19/06	0900	WQ-TOX-001	-091906	Reference Water Sample -001								✓		✓	1
9/19/06	1000	WQ-TOX-002	-091906	50 NTU Water Sample -002								✓		✓	1
9/19/06	1007	WQ-TOX-003	-091906	25 NTU Water Sample -003								✓		✓	1
9/19/06	1022	WQ-TOX-004	-091906	100 NTU Water Sample -004								✓		✓	1

Relinquished by:	Date/Time		Received by:	Date/Time	
Jessica M Fox	9/19/06	1415	[signature]	9/19/06	1415
Relinquished by:	Date/Time		Received by:	Date/Time	

Comments:

ORIGINAL

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