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Region 4
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JACKSONVILLE, FLORIDA OCEAN DREDGED MATERIAL DISPOSAL SITE (ODMDS) SURVEY
JUNE 18-19, 2009
FINAL REPORT:
November 15, 2013
SESD Project I.D. Number: 09-0436

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Title and Approval Sheet

Title: **Jacksonville, Florida Ocean Dredged Material Disposal Site (ODMDS) Survey Final Report: November 15, 2013**

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ACKNOWLEDGEMENTS

Samples were collected June 18-19, 2009 from the Jacksonville Ocean Dredged Material Disposal Site (Christopher McArthur, Site Manager, Morris Flexner, Chief Scientist). Sample tracking and custody were performed by Phyllis Meyer. Sediment sampling, water quality profiling and sampling were led by Morris Flexner, Chief Scientist. Chris McArthur and Drew Kendall both served as crew-chiefs during the survey. On-board sample processing of the invertebrate samples, chemical samples and the sediment particle size samples were conducted by Justin Babendreier, Sue Dye, Adam Forsberg, Drew Kendall, Jon McMahan, Phyllis Meyer, Don Norris, and Greg White, respectively. Don Norris provided the ODMDS station maps and Greg White developed the CTD profile figures. Justin Babendreier provided all of the digital photographs used in this report. Christopher McArthur and Drew Kendall work for the Water Protection Division, EPA Region 4, Atlanta, Georgia. Justin Babendreier works for the EPA Office of Research and Development, National Exposure Research Laboratory, Environmental Research Division, Athens, Georgia. The remaining scientists work for the Science and Ecosystem Support Division, EPA Region 4, Athens, Georgia.

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1.0 INTRODUCTION

At the request of the US-EPA R4, Coastal and Ocean Protection Section (COPS), the R4 Science and Ecosystem Support Division (SESD), Ecological Assessment Branch (EAB), in collaboration with COPS personnel conducted a status and trends study of the Jacksonville Ocean Dredged Material Disposal Site (ODMDS) in order to characterize the chemical, physical and biological characteristics within and surrounding this disposal site.

2.0 BACKGROUND INFORMATION

The Jacksonville ODMDS is an active disposal site that has been in use since 1973 and receives material from the Jacksonville entrance channel and harbor area at Jacksonville, FL. Preliminary to a new disposal initiative from Mayport Harbor, sediment mapping was done in March 1995, using gamma isotope spectroscopy to generate gamma signatures of site sediments. Based on this mapping, a pre-disposal benthic survey was conducted in July 1995. From November 1996 through February 1997, the Jacksonville ODMDS received approximately 1.1 million cubic yards of dredged material from the Mayport Naval Station turning basin and entrance channel. A post disposal sediment mapping survey was conducted in April 1995 (USEPA, 1996). The purpose of this survey was to determine what changes or impacts may have occurred to the benthic community at the disposal site as a consequence of the disposal activities since the last ODMDS survey conducted in July 1998. Sampling station selection was based in part on sites that were selected for the 1998 ODMDS survey. Four new sites were randomly selected within the dump site to replace sites 2, 5, 7 and 8 from the 1998 ODMDS survey that were either located on the edge of the dump site or immediately outside of the dump site based upon the results of the sediment mapping survey conducted in 1995.

3.0 OBJECTIVES

The Jacksonville ODMDS receives dredged material periodically and primarily from the Mayport Naval Station and the Jacksonville entrance channel and harbor area for Jacksonville, Florida. Determination of migration and impact of dredged material at each ocean dredged material disposal site in the region is a goal in the monitoring strategy currently employed by EPA, Region 4 (USEPA/USACE SERIM 2008). This study was a part of that strategy for the Jacksonville ODMDS, and both water quality and biological sampling were the tools employed to accomplish that goal.

It has been 11 years since the last status and trends survey was performed at the Jacksonville ODMDS. A trend assessment survey was needed to assess the extent and trends of environmental impact at each ODMDS due to continued use of the site. Water quality data will also be used as water quality parameters in future dredged material evaluations. Additional impact studies may be recommended by the Chief Scientist or Water Protection Division (WPD) Program Manager.

Project: The project's objectives are to manage and monitor the Jacksonville ODMDS in the most environmentally protective manner, by characterizing the grain size, chemistry and biology of the benthos within and outside of the Jacksonville ODMDS. Also, any anomalies which may be present within the water column will be identified. Over time, the individual surveys will allow for observation of status and trends

Survey: Objectives of the benthic sampling are to characterize selected representative areas of the seafloor from a sedimentological, chemical, and biological perspective within and surrounding the Jacksonville ODMDS. Information gleaned from these efforts will be used to guide management decisions relative to future disposal at the site.

4.0 SURVEY/SAMPLING METHODOLOGIES

4.1 Station Locations

Survey Area Locations: Approximately 2 nautical miles south of the seaward terminus of the Jacksonville, FL entrance channel (Figure 1).

Survey Boundary Coordinates: **SITE COORDINATES**

30N21.50/81W18.57 (NW corner)
30N21.50/81W17.43 (NE corner)
30N20.50/81W18.57 (SW corner)
31N20.50/81W17.43 (SE corner)

Survey Area Size: Jacksonville ODMDS - Approximately 1 X 1 nautical miles (nm) Selected locations beginning north of the Jacksonville ODMDS about 0.25 nautical miles in a depth of approximately 45 feet and extending south of the Jacksonville ODMDS about 0.5 nautical miles in a depth of approximately 55 feet (Figures 1 and 2).

Survey Station Types: Twelve stations received sedimentological, chemistry, and biological sampling. Of these twelve, four received water quality sampling (Table 1, Figure 2).

Hypack® was used to establish the location of the sampling device based on the OSV Bold's Differential Global Positioning System (DGPS), layback and the vessel's heading. Hypack® was also used to electronically log the sample position and water depth at the point when the sample device reached the seafloor.

Actual station locations were determined by DGPS on board the OSV BOLD. Samples collected used the sample location coordinates obtained by the ship during the macroinvertebrate and sediment sampling utilizing the 0.04 m^2 Young Modified Van Veen grab (supplied by Region 4 SESD). Samples collected were within a 150 foot radius of the actual GPS coordinates, whenever possible.

All sampling procedures and sample preservation for analyses were conducted according to the Science and Ecosystem Support Division (SESD), Ecological Assessment Branch (EAB) Operating Procedures listed in Section 5.2 of this report.

4.2 Sampling Methods

4.2.1 Sediment Sampling

Sediment samples collected during the survey were analyzed for sediment particle size distribution (PSD), sediment chemistry and benthic macroinvertebrate identification. Sediment chemistry included analysis for PCBs, pesticides, semi-volatile organics, metals, and organo-tins. The metals analyses in the sediment samples and the semi-volatile, pesticide and PCB analyses in water and sediment were performed by the SESD laboratory in Athens, Georgia. Organo-tins in both sediment and water samples were analyzed by Columbia Analytical Laboratory in Kelso, WA. Benthic macroinvertebrate identification and particle size distribution (PSD) analyses were performed by Barry Vittor and Associates in Mobile, AL.

Sediment samples, analyzed for macroinvertebrate species identification, PSD and sediment chemistry, were collected from the BOLD utilizing the 0.04 m^2 Young Modified Van Veen grab (supplied by SESD). A Young Modified Van Veen grab was collected at each site for macroinvertebrates and a second grab was collected for PSD and sediment chemistry. Once on board, the macroinvertebrate sample was deposited into a large stainless steel pan and carefully aliquoted into #35 screened (0.5 mm) sieve buckets. The sample was washed through the screen until all of the particles smaller than 0.5 mm passed through the screen. The sample retained on the screen after sieving was carefully washed into a cloth sample bag. This was repeated until all of the material collected by the grab had been sieved. Once all material was sieved, the sample bag was labeled with station information and placed into a two gallon bucket containing a 100% NoToX histo® formalin-free histology solution (an aqueous ethanol-based fixative). Sample bags and buckets were labeled both internally and externally and stored for transfer to contract lab facilities for taxonomic identification.

Sediment samples for chemistry and particle size distribution (PSD) were collected from the second drop at each station from the Young Modified Van Veen grab. Pre-cleaned stainless steel spoons were used for this task. The samples from each location were then homogenized and aliquoted into five eight ounce glass containers, and one Whirl-Pak® container. One eight-ounce container was analyzed for PCBs, one was analyzed for pesticides and semi-volatile organics, one was analyzed for metals and one was analyzed for organo-tins. The sample placed in the Whirl-Pak® was analyzed for particle size to associate with sediment chemistry. PSD was analyzed using the wet sieve method by Vittor & Associates (Tables 4 & 5, Appendix B). The samples in eight ounce containers were stored at 4^{o}C and the Whirl-Pak® samples were frozen. All sample handling and labeling complied with the requirements of SESD Operating Procedure for Sample and Evidence Management (USEPA 2007h).

4.2.2 Water Sampling

Water samples were collected and physicochemical parameters measured by means of the Ship's Sea-Bird Conductivity, Temperature, and Depth (CTD) rosette water collection system. Besides conductivity (reported as salinity), temperature and depth, the CTD also measures dissolved oxygen, light transmissivity and turbidity. Ship's personnel were responsible for maintaining calibration of the instrument and insuring that it was in good working order prior to the survey. Samples were collected at the surface and bottom in the vicinity of stations J01, J04, J05, and J12 (Figure 1). Water samples were analyzed for the same suite of chemical parameters as the sediment samples. Due to the short holding times for water samples being analyzed for semi-volatile organics, (7 days), all water samples were collected on the last day of the survey (June 19, 2009).

Water quality measurements were taken on June 19, 2009 utilizing a Sea-Bird SBE 9 CTD maintained aboard the OSV Bold. Data was post processed utilizing the Sea-Bird Data Processing Software following the EPA Western Ecology Division Standard Operating Procedure for Measuring Water Quality Profiles (USEPA 2008). Temperature and Salinity data was filtered using a 0.5 second filter and dissolved oxygen was aligned with a 2.5 second advance. Data was averaged into 0.50 meter bins. Depths of the PAR readings were adjusted 1.50 meters to account for the location of the PAR sensor relative to the depth sensor. Water column station information is provided in the table below:

Station	Date/Time Sampled	Water Depth (m)	Water Depths Sampled (m)	Tidal State
J01	6/19/09: 0900hr	15.2	14.8; 4.1	Ebb
J05	6/19/09: 1015hr	14.5	10.1; 2.9	Ebb
J04	6/19/09: 1515hr	11.3	8.4; 1.1	Flood
J12	6/19/09: 1235hr	15.5	13.4; 3.0	Flood

Sea-Bird CTD data were converted to engineering units using the SEASOFT-Win32: SBE Data Processing software. Data-conversion typically includes profile cast data conversion, filtering, aligning and finally, bin averaging (by depth) (EPA NHEERL 2008). Figures 3-6 provide the data that was collected and processed for stations J01, J04, J05 and J12. Figures 3-6 present dissolved oxygen (mg/L), temperature (°C), salinity (psu) and turbidity (FTU) at all four stations with respect to depth (m). Tabular results of all converted data are presented in Appendix E. Due to a primary DO sensor failure during the survey, all DO data presented in Figures 3-6 was processed and plotted with data collected from the secondary DO sensor.

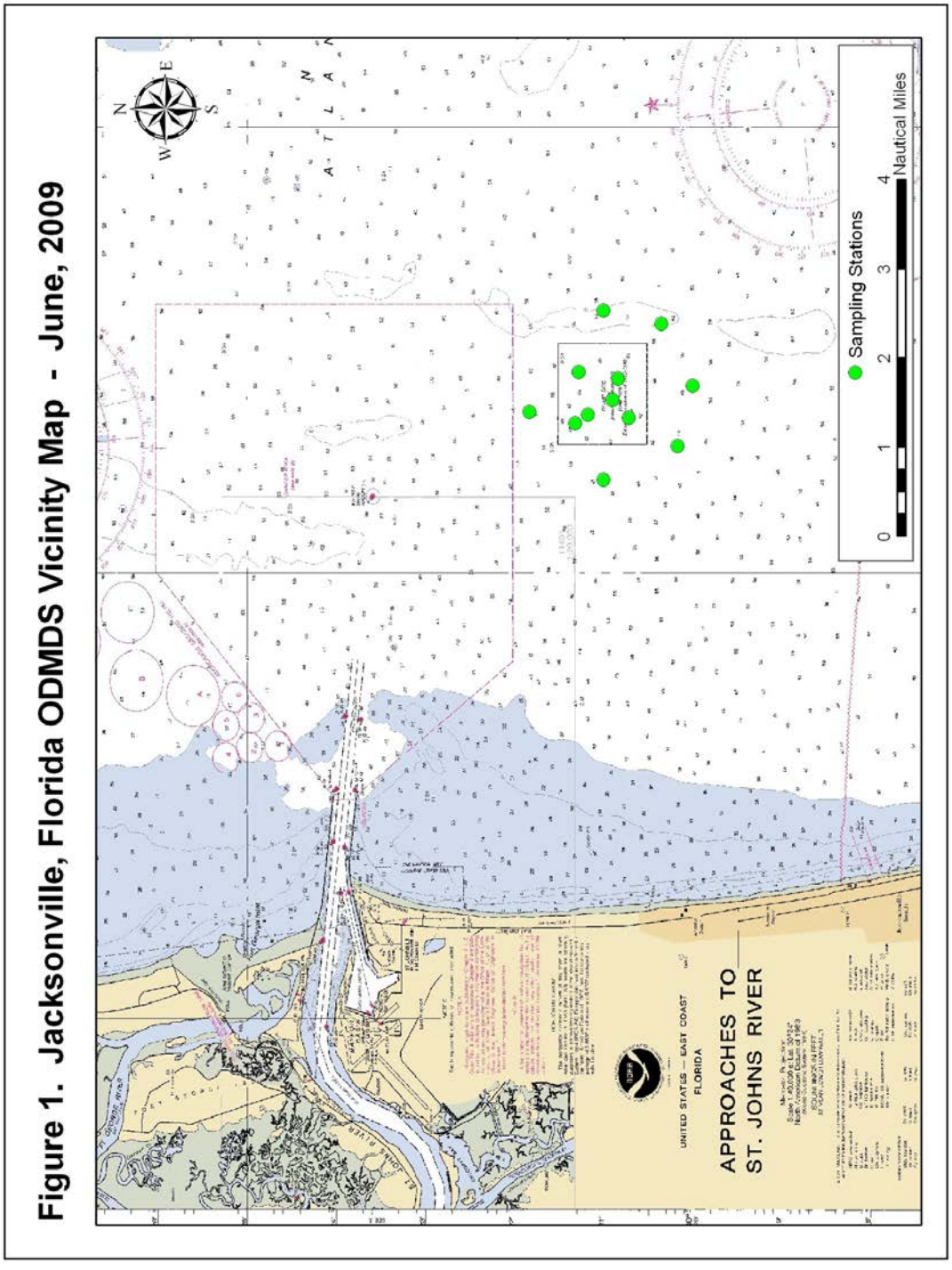

FIGURE 1 – Jacksonville ODMDS Vicinity Map

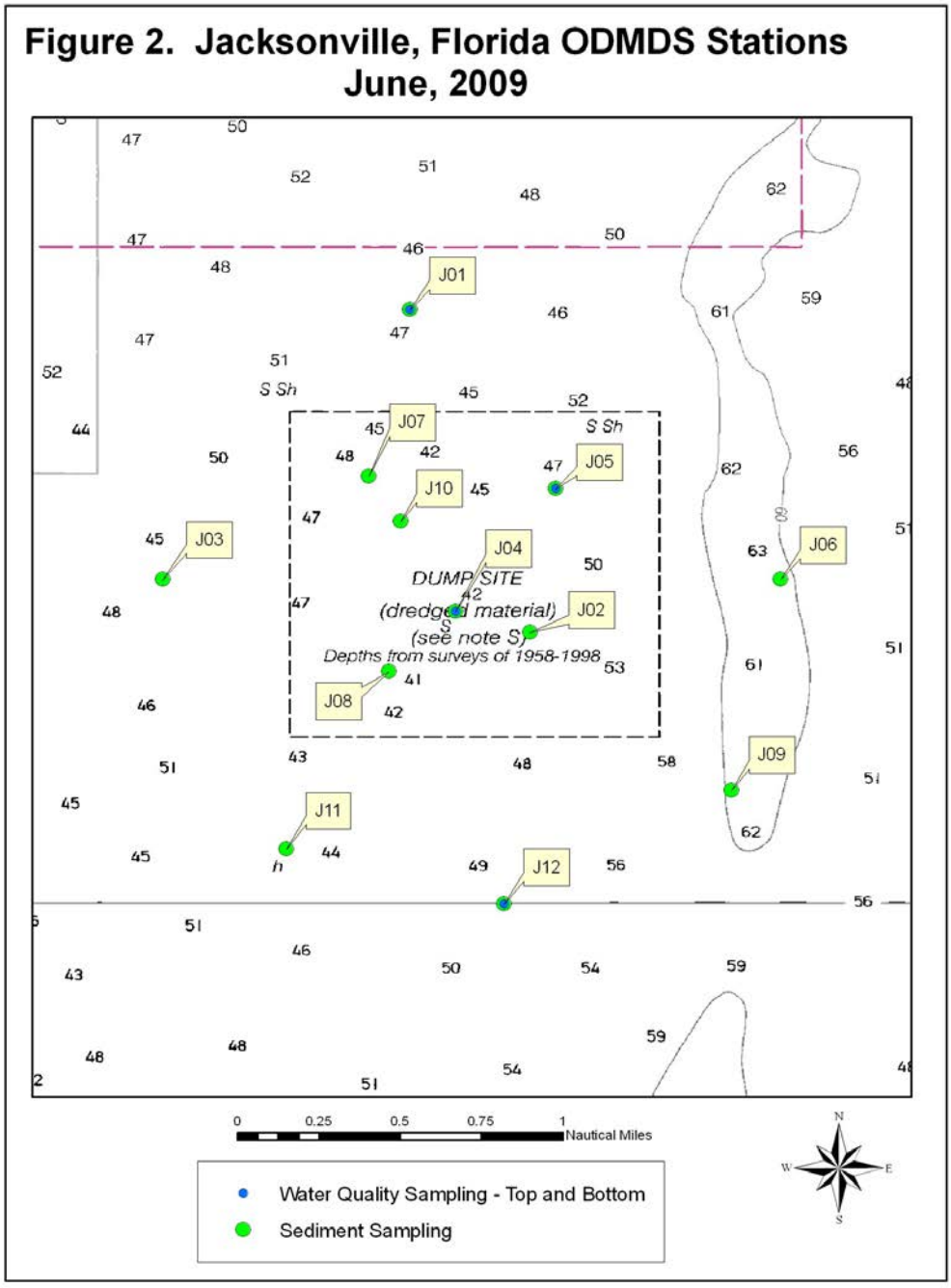

FIGURE 2 – Jacksonville, Florida ODMDS Stations

TABLE 1

Jacksonville ODMDS AND VICINITY STATION LOCATIONS

STATION #	LATITUDE	LONGITUDE
J01*	30N 21.822'	81W 18.186'
J02	30N 20.840'	81W 17.820'
J03	30N 21.003'	81W 18.945'
J04*	30N 20.898'	81W 18.053'
J05*	30N 21.284'	81W 17.719'
J06	30N 21.001'	81W 17.053'
J07	30N 21.326'	81W 18.339'
J08	30N 20.709'	81W 18.252'
J09	30N 20.346'	81W 17.203'
J10	30N 21.169'	81W 18.209'
J11	30N 20.174'	81W 18.571'
J12*	30N 20.002'	81W 17.905'

***Water Quality Sampling – Top and bottom**

TABLE 2. SCHEDULE OF OPERATIONS

JUNE 17, 2009	JUNE 18, 2009	JUNE 19, 2009	JUNE 20, 2009
Mobilization for Survey @ Mayport Naval Base, Jacksonville, FL	Begin Sediment Sampling @ Jacksonville ODMDS	Sediment Sampling @ Jacksonville, ODMDS WQ Sampling at Jacksonville ODMDS	De-mobilization for sampling ops.

5.0 Data Management

5.1 Documentation and Records

Field log books were maintained according to SESD Operating Procedure for Logbooks, SESDPROC-010-R1 (USEPA, 2007a) by each crew for the duration of the field survey. All log books have been maintained by the project leader. The log books and associated project records will be stored in the SESD Records Center. All data generated for this field investigation, whether hand-recorded or recorded and stored in an electronic data logger, have been recorded, stored and managed according to the following procedures:

SESD Operating Procedure for Control of Records (USEPA, 2007k)

Copies of the final report will be provided to the EPA Region 4 Water Protection Division – Coastal and Ocean Protection Section for distribution to the US Army Corps of Engineers (COE) and other interested parties. A copy of the final report will also be maintained in the SESD Records Center. Upon completion of all analyses and data reviews, the data will be stored electronically in the Region 4 Data Archival and Retrieval System (DART).

5.2 Quality Assurance and Quality Control

Quality control procedures were used in the field to ensure that reliable data were obtained. Matrix-spike, matrix duplicate samples for the pesticides, PCBs and PCPs in water were collected at stations J01, J04, J05 and J12. All sampling and measurement activities were conducted in accordance with the SESD field branches quality management system. All samples/sample locations were prescribed by the Water Protection Division to meet the field investigation purposes and objectives for management of the Jacksonville ODMDS site.

The results of all QC sampling results for all water samples were reported at levels either at or below the reporting limit for all MSMSD samples collected. The method blank for total metals was below the reporting limit for all metals and tributyltins. The QA/QC rinse blank reported levels below the reporting limit for all pesticides, semi-volatiles and PCB congeners (Table 10, Appendix C).

The results of all QC sampling results for all sediment samples were reported at levels below the reporting limit. The MS and MSD samples for tributyltins were equivalent.

All sample handling, processing, and preservation was according to EPA/SESD SOPs as follows:

Analytical Support Branch Laboratory Operations and Quality Assurance Manual, US Environmental Protection Agency, Region 4, Science and Ecosystem Support Division, Analytical Support Branch, Athens, GA.

SESD Operating Procedures for Sediment Sampling (SESDPROC-200-R1)

SESD Operating Procedures for Surface Water Sampling (SESDPROC-201-R1)

SESD Operating Procedures for Marine Macroinvertebrate Sampling (SESDPROC-511-R1)

SESD Operating Procedure for Tissue Sample Handling and Processing (SESDPROC-714)

SESD Operating Procedures for Sample and Evidence Management (SESDPROC-005-R1)

SESD Operating Procedure for Logbooks (SESDPROC-010-R3)

SESD Operating Procedure for Field Sampling Quality Control (SESDPROC-011-R2)

SESD Operating Procedure for Packaging, Marking, Labeling and Shipping of Environmental and Waste Samples (SESDPROC-206-R1)

SESD Operating Procedure for Global Positioning System (GPS) (SESDPROC-110-R2)

5.3 Data Validation/Verification

All data were determined to fall within EAB tolerances for minimum reporting limits (MRLs) and data variability (outliers, etc.), and therefore none were flagged when used in water quality and/or grain size analyses. Hand-recorded data were transcribed to spreadsheet or other electronic format for EAB analysis. Transcriptions were independently verified for accuracy. This report includes tables of water quality sampling and sediment sampling results (Appendix C).

6.0 Project Management

Data collection was managed through the Ecological Assessment Branch (EAB) with guidance from the Region 4 Water Protection Division (WPD). The project leader and Chief Scientist from EAB was Morris Flexner. Chris McArthur and Drew Kendall were crew chiefs responsible for assigning work tasks for the sediment and water crews and study logistics. Phyllis Meyer was the task lead for sample labeling, tracking and chain-of-custody procedures. Crew assignments are presented in Section 10 of this report on page 20.

7.0 Project Schedule

Field work for this project was conducted during the week of June 15, 2009. Monitoring efforts for this survey were concluded on Friday afternoon, June 19, 2009 (Table 3).

8.0 Results and Discussion

8.1 Jacksonville ODMDS Water Quality Results including Oxygen, Salinity, Temperature, Turbidity and Depth Profiles

The results of the water quality profiles are summarized in the station specific plots of oxygen saturation (mg/l), salinity (psu), temperature (°C) and turbidity (FTU) with respect to depth (m) (Figures 3-5). In general, the range of values provided at the four stations below indicate adequate mixing within the Jacksonville ODMDS's water column. CTD deployment times and tidal stages at the Mayport Naval Station, St. Johns River, Florida were as follows: Station J01, 0855, 6/19/2009 approximately 1.6 ft. relative to mean lower low water (MLLW), falling mid-tide; Station J05, 1015, 6/19/2009, approximately 0.14 ft. relative to MLLW, falling low-tide; Station J12, 1236, 6/19/2009, approximately 0.13 ft. relative to MLLW, rising high-tide; Station J04, 1516, 6/19/2009, approximately 3.25 ft. relative to MLLW, rising high-tide or flood tide (Figure 3).

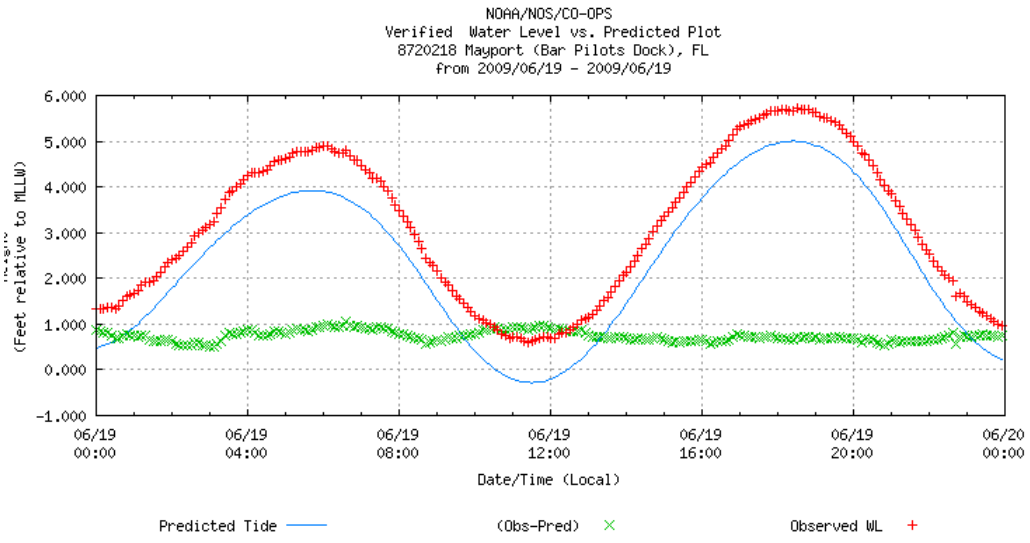

Figure 3. NOAA Tide Chart, Mayport, FL 6/19-20/2009

Turbidity ranged from 0 to 24 formazin turbidity units (FTU), while dissolved oxygen (DO) readings ranged from 4.4 to 6.6 mg/l (Figures 3-6). Temperature and salinity also indicated that the waters within (stations J04 & J05) and around (station J01 & J12) the disposal site are well-mixed above 8 m, with established thermoclines ranging from 2 to 8 m. In general a thermocline and halocline were present between 4 to 8 meters. Dissolved oxygen dropped from above 6 mg/l to around 4.5 mg/l within the thermocline/halocline. Temperatures ranged from 24.2 to 29.3 °C; salinities ranged from 30.8 to 35.7 practical salinity units (PSU) (Figures 3-5). Ocean water has a salinity of approximately 35 psu. Depth ranged from 9.5 m at station J04 to 15.5 m at station J01 (Figures 3 and 4).

Light extinction (2% of surface PAR) occurred at a depth of 6 to 12 meters with station J12 having the greatest depth of light extinction and J04 the least. J04 had the best water clarity with all turbidity readings below 1. J04 was also significantly different than the other three stations with lower salinities, higher temperatures and a more mixed water column with respect to dissolved oxygen. This is likely a result of it being sampled near the end of the flood tide and therefore indicates the influence of the St. Johns River.

Water quality parameters are summarized below:

Station	Salinity (psu)	Temperature (C)	D.O. (mg/l)	Depth of Light Extinction (m)
	Depth Averaged			
J01	35.30	25.24	5.21	8.5
J05	35.20	25.69	5.49	10.5
J04	33.96	28.17	6.45	6.5
J12	35.21	25.73	5.49	12.5

Chemical analyses of the water samples collected as part of this study showed all analytes to be at or below the detection limit for pesticides (Table 5), semi-volatiles (Table 6), polychlorinated biphenyls (PCBs) (Table 7) and tributyltins (Table 9). For total metals (Table 8) there were limited detections for arsenic, copper, lead, nickel and zinc, with none of these metals detected above 5.1 µg/l, which was below the marine acute and chronic ambient water quality criteria (Buchman, 2008, Appendix C).

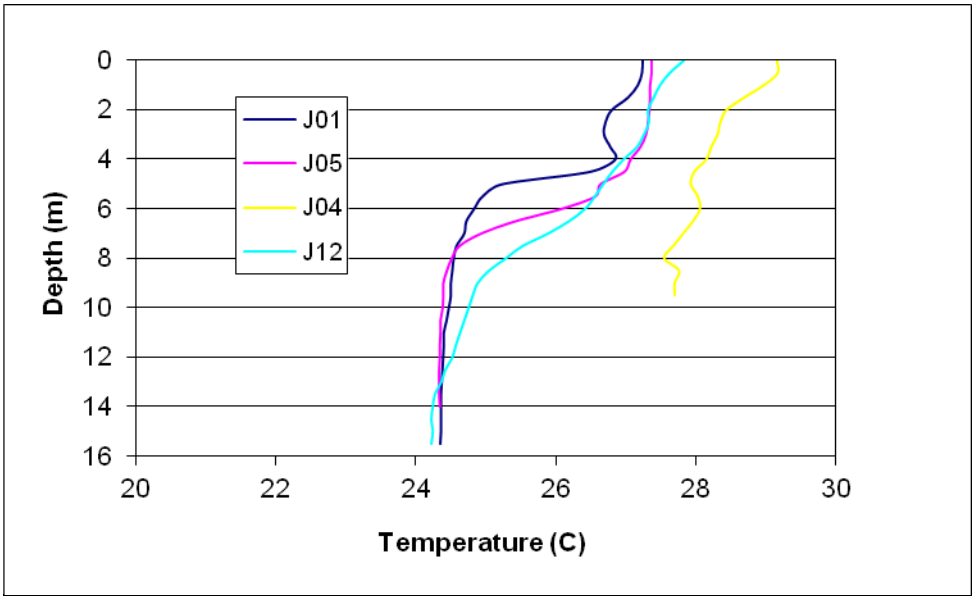

Figure 4. Temperature and Depth Profiles, Stations J01, J05, J04 & J12

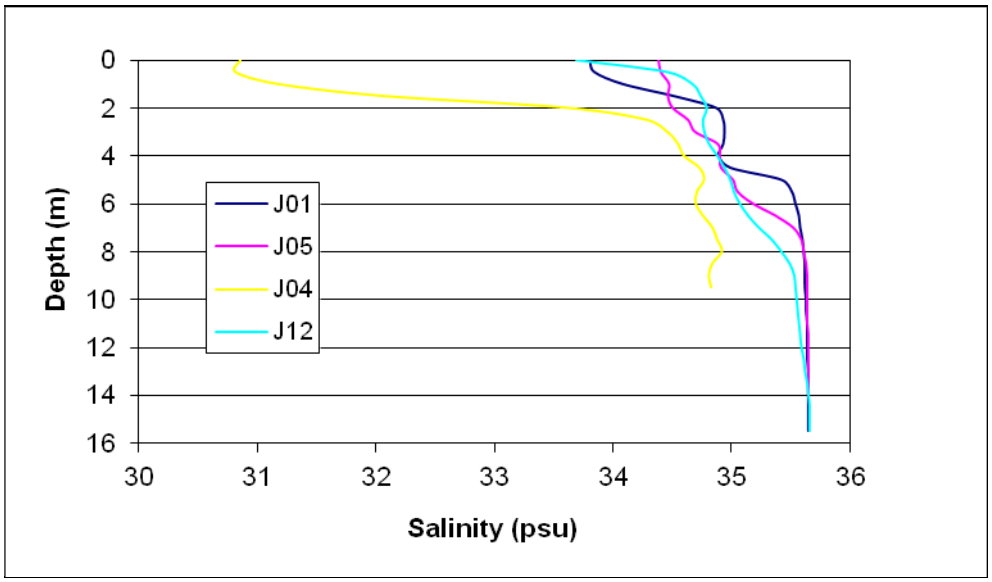

Figure 5. Salinity and Depth Profiles, Stations J01. J05, J04 & J12

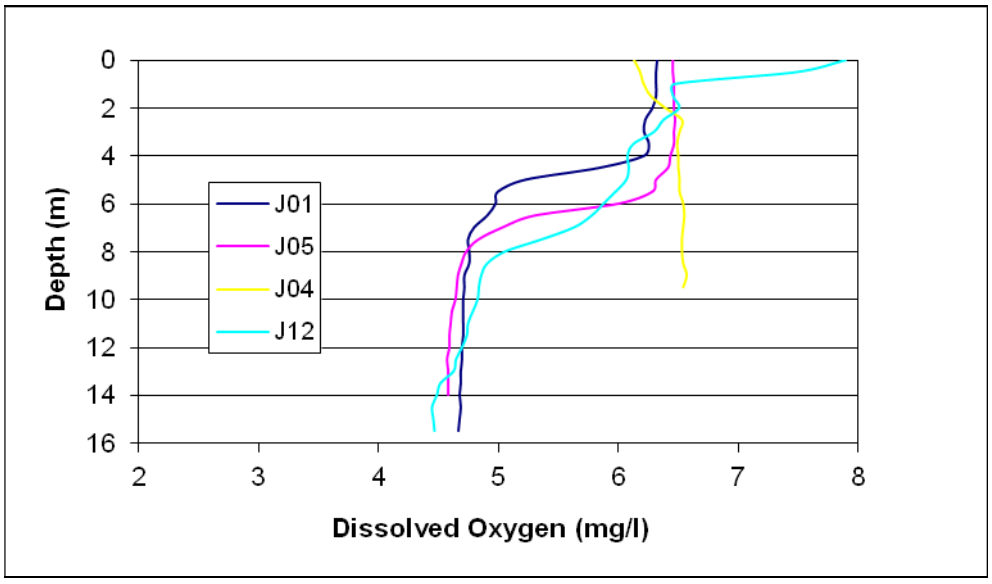

Figure 6. Oxygen and Depth Profiles, Station J01, J05, J04 & J12

8.2 Seafloor Sampling

8.2.1 Sediment Particle Size

The summary results of the sediment particle size analyses are provided in Tables 4 & 5, Appendix B. In general, all stations were found to be predominantly sand or silty sand (Figure 7). Three notable exceptions were stations J5 inside the ODMDS and stations J6 and J9 outside the ODMDS which contained 7.84, 8.75 and 17.47% gravel, respectively. The % sand and gravel averaged 91.3% and 91.0% at stations inside and outside the ODMDS, respectively (Table 4). The median particle sizes using a phi scale that were analyzed were 2.24 mm inside and 2.23 mm outside the Jacksonville ODMDS (Table 4). Therefore, this analysis indicates that the median particle size was very coarse sand inside and outside the Jacksonville ODMDS.

8.22 Sediment Chemistry

The sediment chemistry showed all contaminants to be below the minimum reporting limits (MRLs) for pesticides, semi-volatiles and PCB congeners (Tables 11, 12 & 16, Appendix C). Eight metals, namely aluminum, arsenic, chromium, copper, iron, lead, manganese, and zinc were measured both inside and outside the Jacksonville ODMDS above the MRLs. None of the metals were reported above the NOAA Threshold Effects Levels (TELs) or above the Effects Range Lows (ERLs) for metals (Buchman, 2008).

Most of the metals transported by rivers to the ocean are tightly bound in the aluminosilicate solid phases (Windom, 1988). When dissolved metals come in contact with saline water, they adsorb to particulate matter and are removed from the water column to bottom sediments (Windom, 1988). Therefore, metals are concentrated in the estuarine bottom sediments, not in the water column (Windom, 1988). Tables 8 and 13 in Appendix C of this report support this fact. Because of its high natural abundance and the relatively small inputs from anthropogenic sources, aluminum has been used to normalize metal data as an aid to interpretation of results. Levels of As, Cr, Cu, Pb and Zn were plotted against Al to assess the linear relationship between Al and these metals both inside and outside the ODMDS (Figure 8, Appendix D). The best linear relationship was determined between Cr and Al, with $R^2 = 0.94$; the worst being Cu vs. Al, $R^2 = 0.58$ (Figure 8).

Because the average concentrations for stations from within the Jacksonville ODMDS were similar to the average concentration for stations from outside the site, for all metals, a test for statistical difference between these two treatments was not deemed necessary. Tri-n-butyltin, Di-n-butyltin and n-Butyltin were detected at stations both inside and outside the Jacksonville ODMDS (Table 15, Appendix C). The highest recorded value of tri-n-butyltin was 17 µg/kg dry weight outside the ODMDS at station J12. Di-n-butyltin was detected at 3 out of 6 stations (J07, J08 and J09) inside the ODMDS. The highest recorded value of di-n-butyltin was 2.9 µg/kg dry weight inside the ODMDS at station J10. N-Butyltin was detected at stations J08 and J10 inside the ODMDS with 2.3 µg/kg dry weight as the highest recorded value of n-Butyltin, also at station J10.

None of the 26 PCB congeners were detected in sediment at the Jacksonville ODMDS (Table 16). The arithmetic mean of all PCB congeners from stations outside of the Jacksonville ODMDS was 0.52 µg/kg, whereas the arithmetic mean of all of the PCB congeners from inside the Jacksonville ODMDS was 0.48 µg/kg, dry weight. All non-detected values were averaged as ½ of the minimum MRL provided by the SESD analytical services branch (ASB) laboratory. Thus, there was no measurable difference between the PCB congener values inside the ODMDS versus outside the ODMDS. None of the twenty-six PCB congeners measured in sediment that were totaled by station exceeded the 189 ppb dry weight NOAA probable effects level (PEL) (Buchman, 2008, NOAA 1989, Appendix C, Table 17).

8.23 Benthic Macroinvertebrate Infauna

The benthic infauna data is detailed and summarized in "Jacksonville, Florida 2009 ODMDS Benthic Community Assessment" (Vittor, 2009). Polychaetes were the most numerous inside the ODMDS representing 41.3% of the total assemblage and were followed in abundance by malacostracans (28.5%) and bivalves (12.7%). Polychaetes ranked first in the number of taxa (44.3%) inside the ODMDS. Polychaetes were also the most numerous organisms present outside the ODMDS representing 47.9% of the total assemblage and were followed again by malacostracans (19.0%) and bivalves (13.7%). Polychaetes ranked first in the number of taxa (44.1%) outside the ODMDS.

The dominant taxon collected from the 6 stations inside the ODMDS was the polychaete, *Polygordius* (LPIL), representing 9.9% of the total number of individuals (Table 19, Appendix C). Other dominant taxa collected included the malacostracan, *Metharpinia floridana*, and the polychaete, *Nephtys picta*, representing 8.7% and 5.3% of the total assemblage, repectively (Table 19). The most widely distributed taxa were the polychaetes, *N.picta* and *Owenia fusiformis*, and the malacostracans, *M. floridana*, *Eudevenopus honduranus*, and *Pagurus* (LPIL), being found at 67% of the stations (Table 19). The dominant taxon collected from the 6 stations outside the ODMDS was the polychaete, *Owenia fusiformis*, representing 23.2% of the total number of individuals (Table 20, Appendix C). Other dominant taxa collected outside the ODMDS included the amphipod, *Protohaustorius* sp.B and the bivalve, *Solen viridis*, representing 4.2% and 4.0% of the total assemblage, respectively (Table 20). The bivalve, *S. viridis*, the bivalve family, Lucinidae (LPIL), and the gastropod, *Tectonatica pusilla*, were found at 67% of the stations (Table 20).

Mean densities ranged from 350 organisms/m^2 at station J03 to 6225 organisms/m^2 at station J09. Although densities averaged 1975 outside the ODMDS compared to 1346 inside the ODMDS, there was not a significant difference in densities between stations inside vs. outside the ODMDS (Vittor, 2009).

The number of taxa ranged from 6 taxa/station at station J03 to 53 taxa/station at station J09 (Table 22, Appendix C). Taxa richness averaged 23.8 outside the ODMDS compared to 22.3 inside the ODMDS, and there was not a significant difference in taxa richness between stations inside the ODMDS vs. the outside (Vittor, 2009).

The results of cluster, MDS, ANOSIM and SIMPER analyses are discussed in detail within Vittor, 2009. The ANOSIM (Analysis of Similarities) test was calculated to assess assemblage differences between samples within and outside the ODMDS using the Bray-Curtis similarity matrix. Subsequently, the SIMPER test was used to identify which taxa accounted for any observed differences between assemblage groups (Vittor, 2009). The ANOSIM and SIMPER tests were calculated using PRIMER (Clarke and Gorley, 2007). In summary, these results indicate that assemblages inside and outside the ODMDS are similar. Table 22 lists the infaunal community parameters by station and reflects the fact that station J03 has the lowest total taxa and lowest number of individuals of all of the Jacksonville ODMDS stations.

Biological data collected from the disposal site in 2009 was compared to data collected from the same site in June 1998 (Vittor & Associates, 1999, 2009). In 1998, 15 replicate diver cores (area=0.0079m^2) were collected at each of 10 stations and 30 replicate diver cores were taken at an additional 2 stations; 5 stations were sampled inside the ODMDS and 7 stations outside the ODMDS. Sediments in 1998 at all stations were predominantly sand (>81%). In 1998, taxa richness averaged 22 taxa/station inside the ODMDS and 24 taxa/station outside the ODMDS, while densities averaged 5,454 organisms/m^2 inside and 5632 organisms/m^2 outside the ODMDS (Vittor & Associates, 1999). There was no significant difference in taxa richness either inside the ODMDS or outside the ODMDS between 1998 and 2009. Densities inside and outside the ODMDS were significantly lower in 2009 when compared to 1998. In 1998 a total of 255 diver core samples (area=0.0079m^2) were analyzed; whereas in 2009 a single sample was taken at six stations inside and six stations outside the ODMDS with a Young grab (0.04 m^2) for a total of 12 samples. The discrepancy in sampling regimes between 1998 and 2009 is likely the cause of the density differences noted between 1998 and 2009. The ANOSIM and SIMPER analyses showed no differences in the composition of benthic assemblages between 1998 and 2009. Benthic density is typically variable; station density data collected with a single sample in 2009 could fall within the range of the potential variation in the benthic assemblages, and the observed differences from the data collected in 1998 was not unexpected (Vittor, 2009).

9.0 CONCLUSIONS

When comparing the various study parameters between stations located inside and outside the Jacksonville ODMDS, few differences can be found. There does not appear to be a substantial difference between the total metals detected inside and outside of the Jacksonville ODMDS; Aluminum and iron were higher outside rather than inside the site (Appendix C, Table 14). In the water samples, all pesticide, semi-volatile, PCB and tributyltin compounds were measured below the reporting limits. All other metals in water were below the marine acute and chronic water quality criteria. In the sediment samples, all pesticide, semi-volatile, and PCB compounds were also measured below the reporting limits. The tributyltin and metal compounds measured in sediment were below the NOAA TELs and PELs. Although there was higher taxa richness, diversity and density outside the ODMDS, there was not a significant difference between the outside and inside stations. Overall, there were no notable differences that were detected between the inside and outside of the Jacksonville ODMDS that appear to be effecting the chemical, physical and biological integrity of this designated area.

10.0 SCIENTIFIC PARTY

	Name	Survey Responsibility	Organization
1)	Morris Flexner	Chief Scientist	EPA-SESD/Athens
2)	Phyllis Meyer	Lead Sample Handling/Tracking	EPA-SESD/Athens
3)	Drew Kendall	Crew Chief	EPA-WPD/Atlanta
4)	Chris McArthur	Crew Chief	EPA-WPD/Atlanta
5)	Don Norris	Sample Handling	EPA-SESD/Athens
6)	Sue Dye	Sample Handling	EPA-SESD/Athens
7)	Greg White	Sample Handling	EPA-WPD/Athens
8)	Jon McMahan	Sample Handling	EPA-SESD/Athens
9)	Justin Babendreier	Sample Handling	EPA-ORD/Athens
10)	Adam Forsberg	Sample Handling	EPA-SESD/Athens

11.0 REFERENCES

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USEPA 2007c. SESD Operating Procedure for, Global Positioning System (GPS) (SESDPROC-110-R2)

USEPA 2007d. SESD Operating Procedures for Marine Macroinvertebrate Sampling (SESDPROC-511-R1)

USEPA 2007e. SESD Operating Procedure for Packaging, Marking, Labeling and Shipping of Environmental and Waste Samples (SESDPROC-206-R1).

USEPA 2007f. SESD Operating Procedures for Sediment Sampling (SESDPROC-200-R1)

USEPA 2007g. SESD Operating Procedures for Surface Water Sampling (SESDPROC-201-R1)

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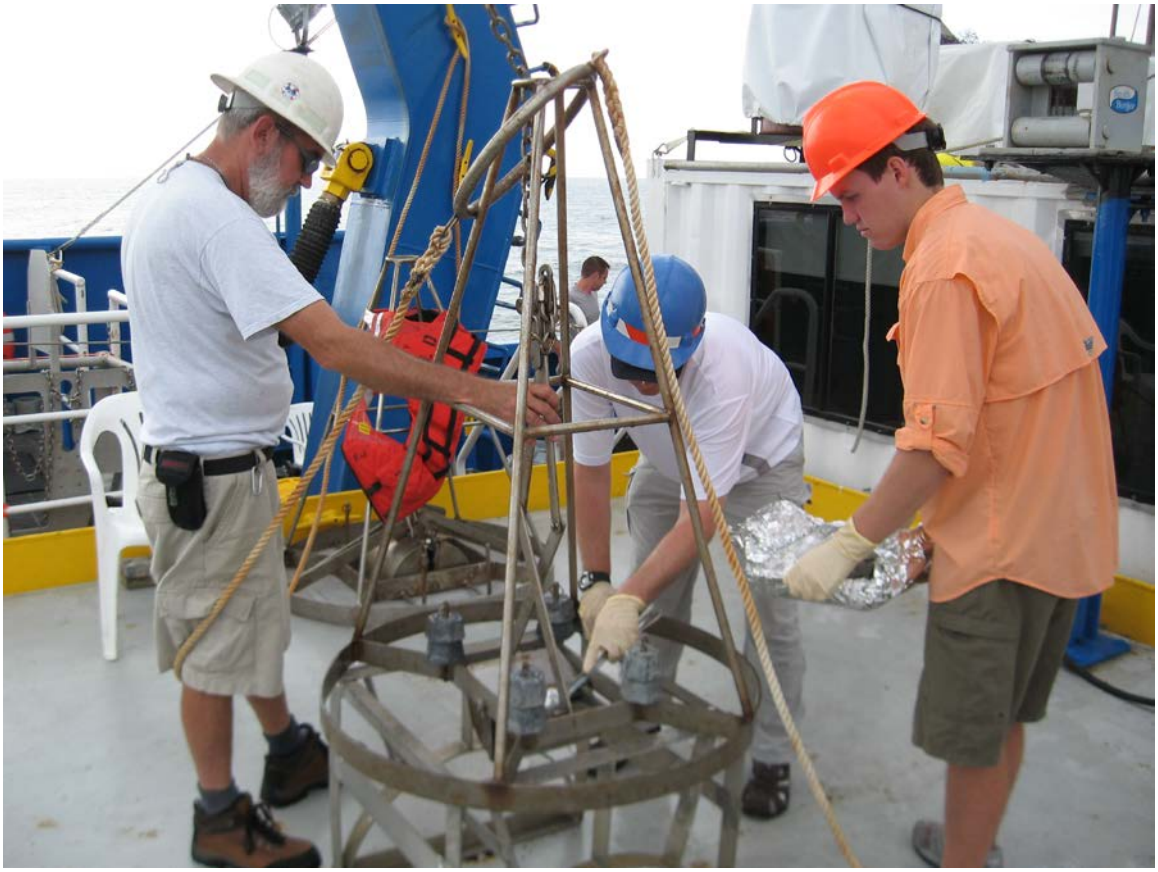
12.0 APPENDIX A – Selected Photographs of the Jacksonville ODMDS Survey Operations

View of OSV Bold from Mayport Naval Base @ 1840 on June 19, 2009


Retrieval of the Young Modified Van Veen Grab @ 1030 on June 18, 2009



Sediment chemistry sample collection @ 1007 on June 18, 2009

Close-up of sediment removal from the Young grab @ 1007 on June 18, 2009

Sediment chemistry sample prepared and classified @ 1600 on June 18,2009

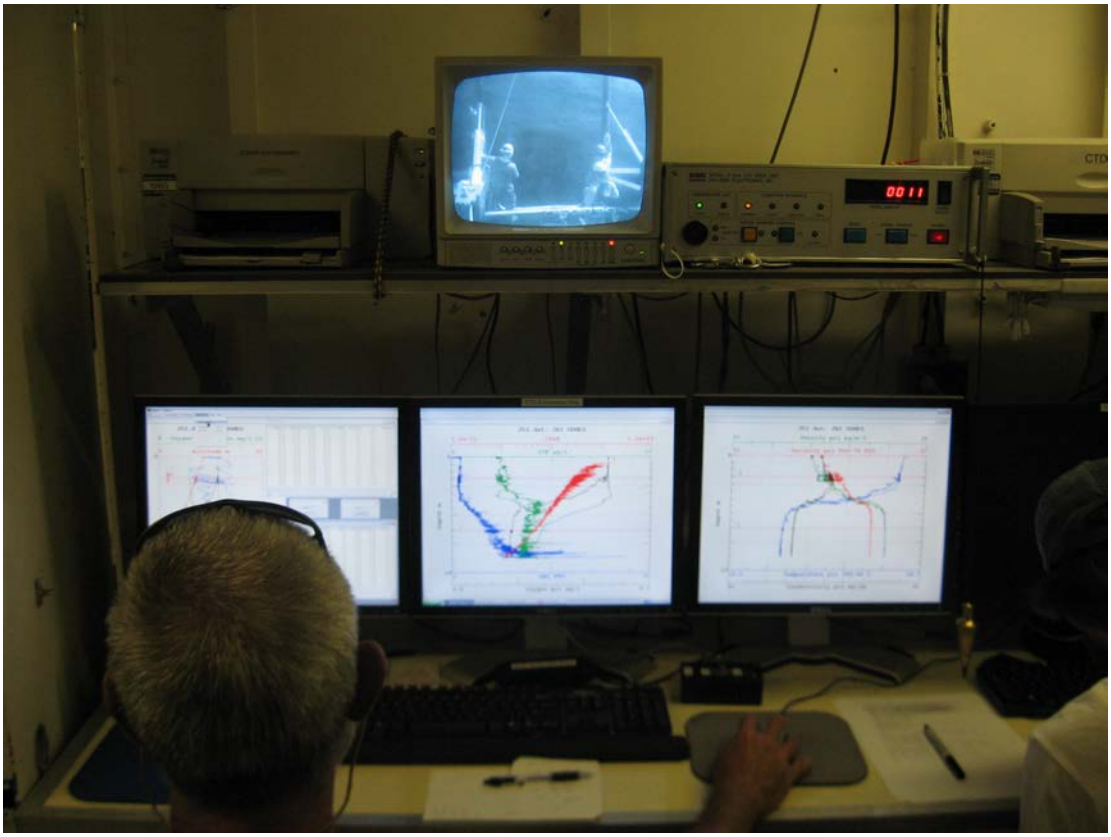
Benthic macroinvertebrate sample placed in sieve buckets @ 1050on June 18, 2009

Benthic macroinvertebrate sieving and sample bagging @ 1030 on June 18, 2009

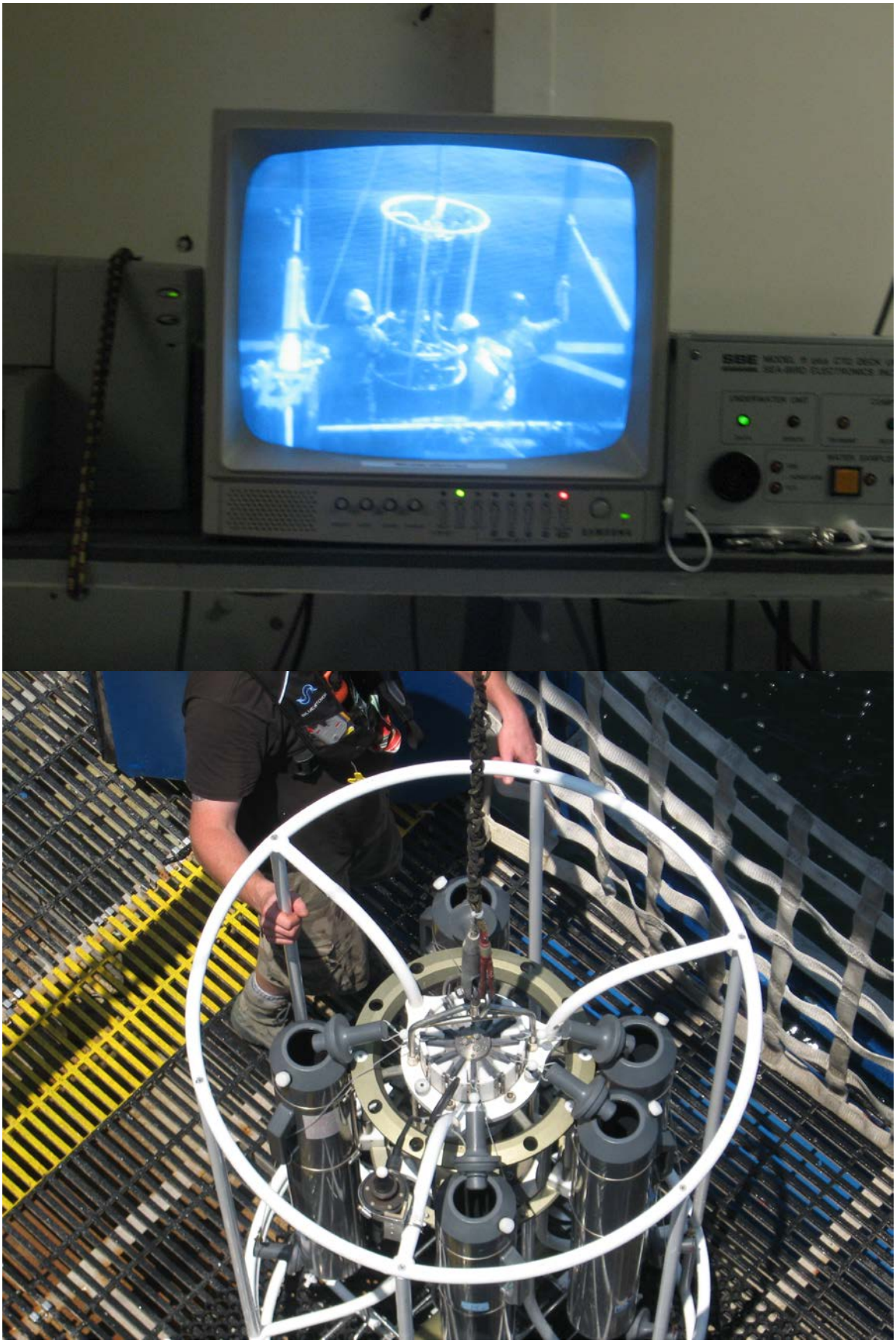
Benthic macroinvertebrate sieving @ 1100 on June 18, 2009

Benthic macroinvertebrates in sieve from station J09 @ 1130 on June 18, 2009

Benthic macroinvertebrate samples in preservative @ 1106 on June 18, 2009

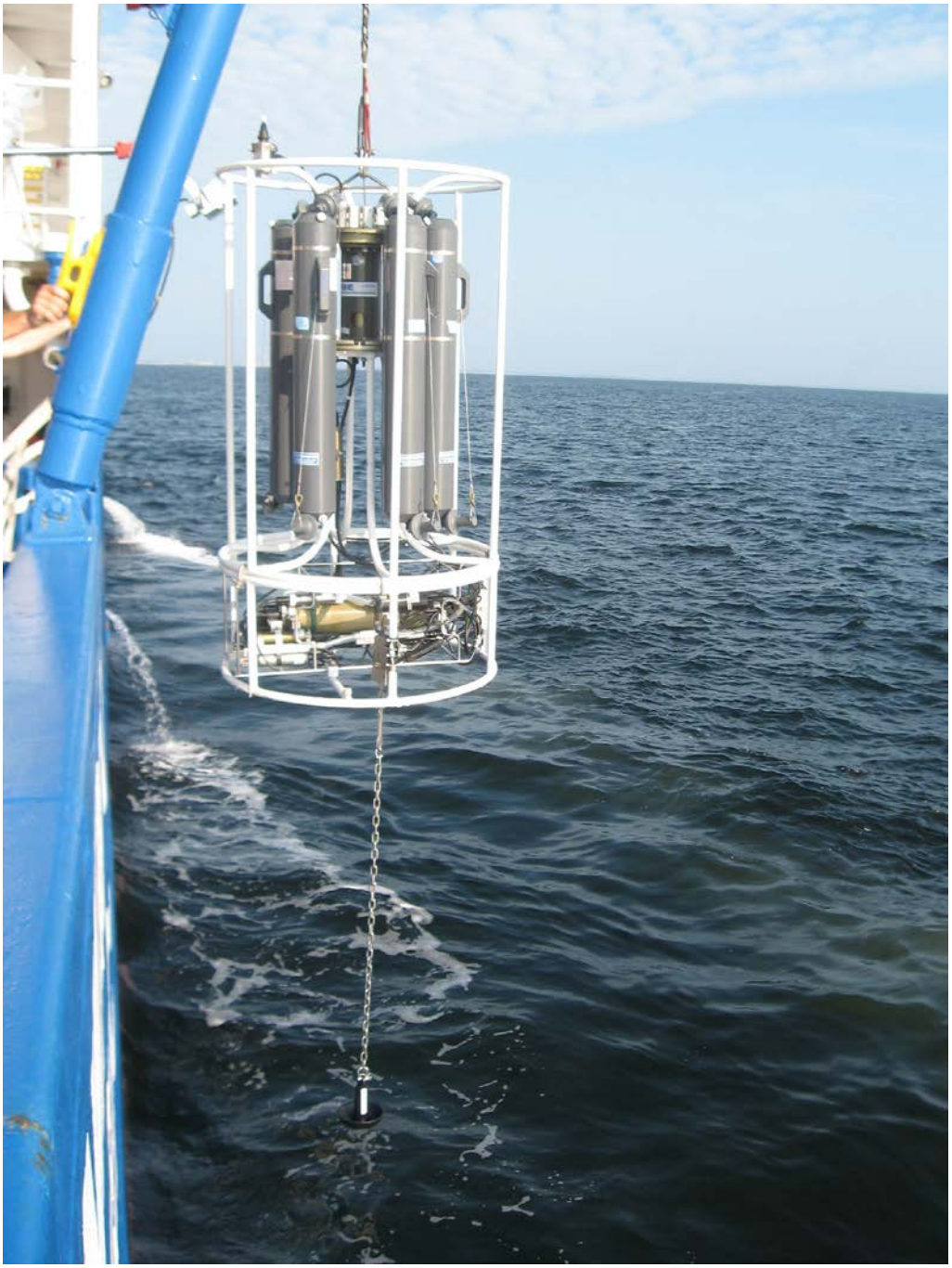


CTD deployment @ 1015 at Station J05 on June 19, 2009

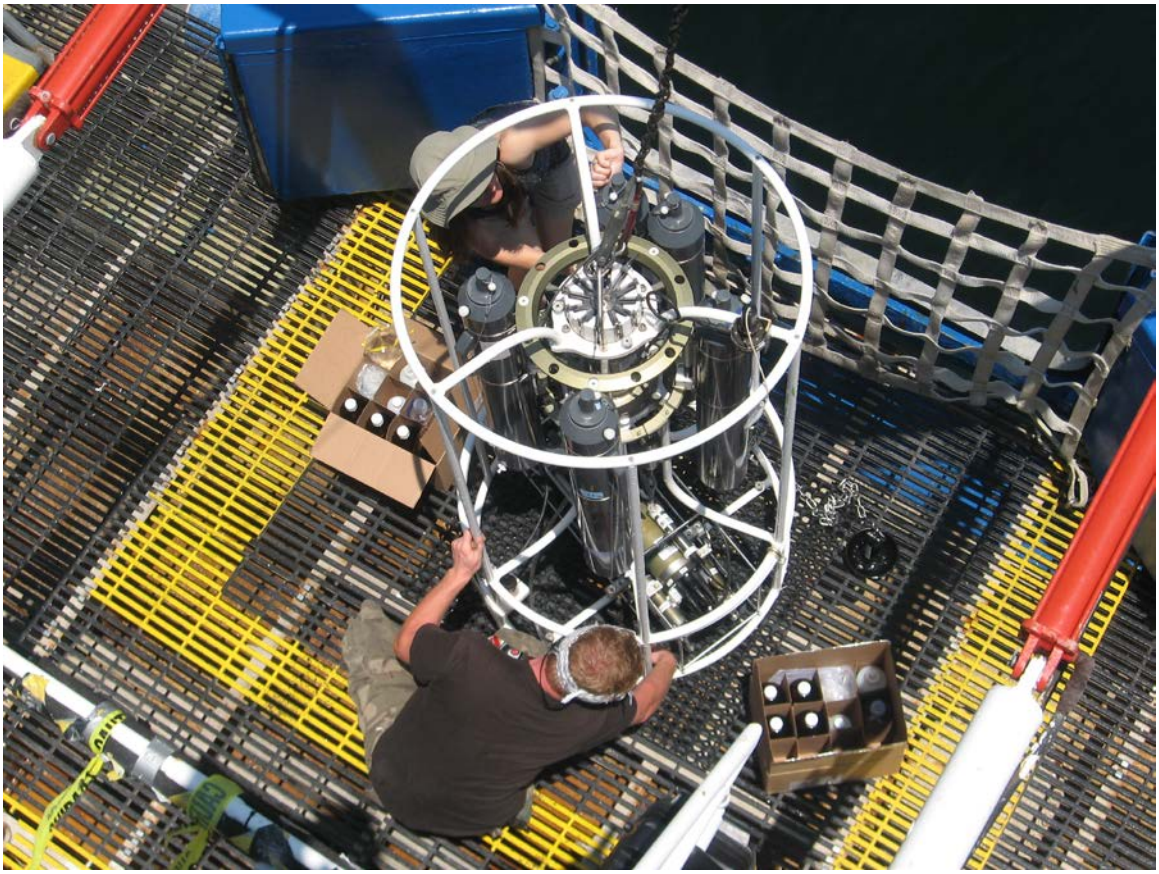


CTD deployment monitor and close up of 10 L Niskin bottles @ 1230 on June 19, 2009

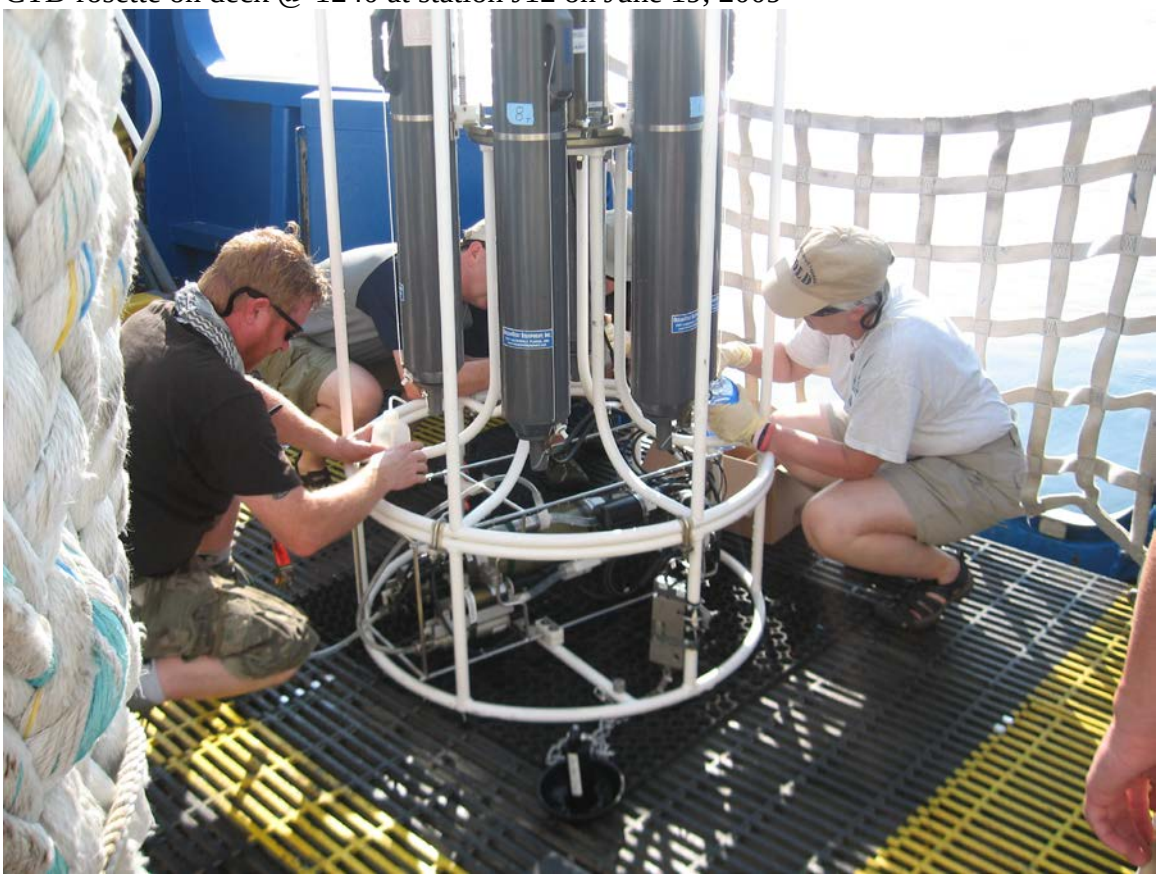
CTD rosette deployment @ 0820 at station J01 on June 19, 2009



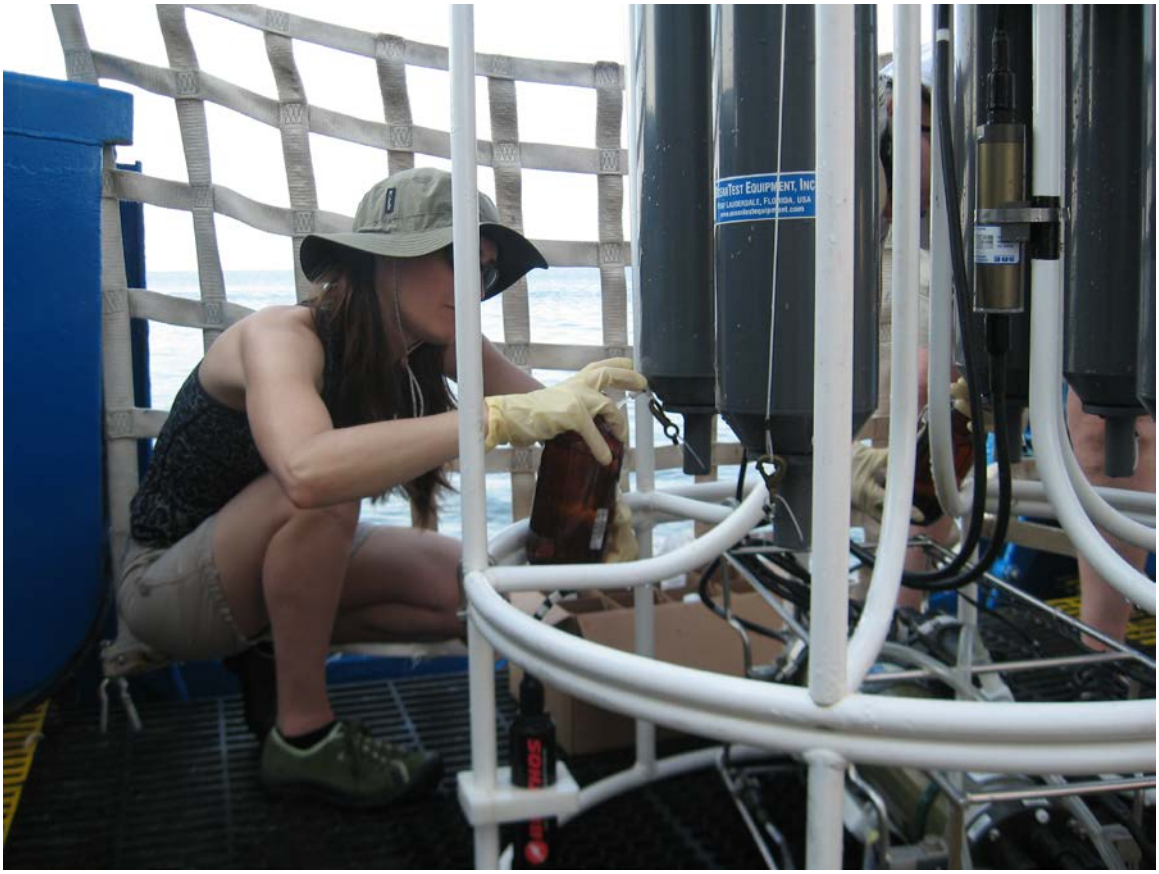
CTD rosette prior to submersion at station J01 @840 on June 19, 2009



CTD rosette on deck @ 1240 at station J12 on June 19, 2009



Collecting water samples from the Niskin bottles @1240 at station J12 on June 19, 2009



Collecting water samples from the Niskin bottles @1240 at station J12 on June 19, 2009

Collecting water samples from the Niskin bottles @1245 at station J12 on June 19, 2009

Water samples labeled and ready for the ship's refrigerator prior to lab delivery, 6/19/2009

The Jacksonville ODMDS crew with Capt. Chamberlain…mission accomplished!

13.0 Appendix B –

Sediment Characteristics (Vittor & Assoc.) & Particle Size Distribution Graph from the Jacksonville ODMDS Survey

Table 3. Sediment characteristics for the Jacksonville, FL ODMDS stations, June 2009.

Station	% Gravel	% Sand	% Silt	% Clay	USACE Description	Median Particle Size (phi)	Sorting Coefficient
J01	0.61	79.11	11.80	8.47	Silty Sand	3.407	1.126
J02	0.00	99.68	0.10	0.23	Sand	2.228	0.734
J03	0.00	97.78	0.41	1.81	Sand	2.408	0.527
J04	1.68	98.13	0.06	0.13	Sand	1.984	0.878
J05	7.84	91.86	0.12	0.18	**	0.718	1.025
J06	8.75	90.75	0.03	0.47	**	0.988	1.044
J07	0.33	97.50	0.70	1.46	Sand	2.492	0.474
J08	0.61	79.11	10.19	10.09	Silty Sand	3.407	1.294
J09	17.47	81.68	0.06	0.79	**	0.581	1.546
J10	0.43	70.75	23.82	5.00	Silty Sand	2.599	1.248
J11	0.00	98.29	1.10	0.61	Sand	2.421	0.504
J12	1.64	70.10	11.81	16.45	Silty Sand	3.589	2.809

Too much gravel for textural descriptions
Vittor & Associates, Miami Florida ODMDS 2007 Benthic Community Assessment

Table 4. Sediment characteristics for the Jacksonville ODMDS stations, June 2009 Comparing Inside Stations to Outside Stations.

Station	% Gravel	% Sand	% Silt	% Clay	USACE Description	Median Particle Size (phi)	Sorting Coefficient
2-In	0.00	99.68	0.10	0.23	Sand	2.228	0.734
4-In	1.68	98.13	0.06	0.13	Sand	1.984	0.878
5-In	7.84	91.86	0.12	0.18	**	0.718	1.025
7-In	0.33	97.50	0.70	1.46	Sand	2.492	0.474
8-In	0.61	79.11	10.19	10.09	Silty Sand	3.407	1.294
10-In	0.43	70.75	23.82	5.00	Silty Sand	2.599	1.248
Mean	1.82	89.51	5.83	2.85		2.24	0.94
1-Out	0.61	79.11	11.80	8.47	Silty Sand	3.407	1.126
3-Out	0.00	97.78	0.41	1.81	Sand	2.408	0.527
6-Out	8.75	90.75	0.03	0.47	**	0.988	1.044
9-Out	17.47	81.68	0.06	0.79	**	0.581	1.546
11-Out	0.00	98.29	1.10	0.61	Sand	2.421	0.504
12-Out	1.64	70.10	11.81	16.45	Silty Sand	3.589	2.809
Mean	4.75	86.29	4.20	4.77		2.23	1.26

Too much gravel for textural descriptions

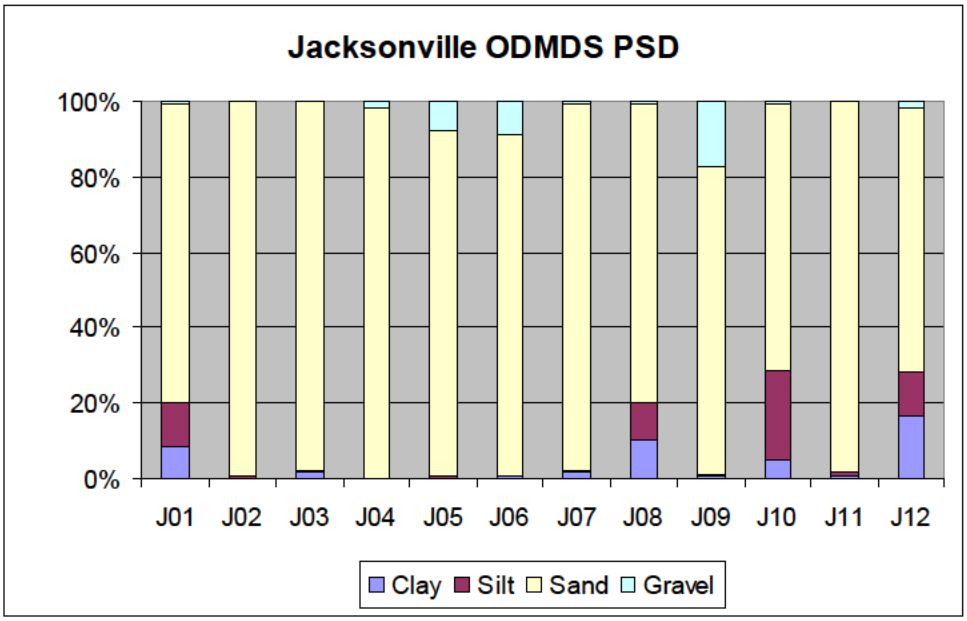


Figure 7. Particle size distribution (PSD) for the Jacksonville ODMDS Survey, Vittor & Associates Sediment Characterization Laboratory

14.0 APPENDIX C -DATA TABLES

Table 5. Water Quality Sampling (Pesticides) – all values are reported in µg/l

CHEMICAL NAME:	J01-09-CWB 06/19/2009	J01-09-CWT 06/19/2009	J04-09-CWB 06/19/2009	J04-09-CWT 06/19/2009	J05-09-CWB 06/19/2009	J05-09-CWT 06/19/2009	J12-09-CWB 06/19/2009	J12-09-CWT 06/19/2009
4,4'-DDD (p,p'-DDD)	0.082 U	0.080 U	0.020 U	0.020 U	0.083 U	0.020 U	0.020 U	0.020 U
4,4'-DDE (p,p'-DDE)	0.041 U	0.040 U	0.0099 U	0.0099 U	0.10 U	0.010 U	0.010 U	0.010 U
4,4'-DDT (p,p'-DDT)	0.10 U	0.10 U	0.025 U	0.025 U	0.10 U	0.025 U	0.025 U	0.025 U
Aldrin	0.10 U,J,QL-1	0.10 U,J,QL-1	0.099 U,J,QL-1	0.099 U,J,QL-1	0.10 U,J,QL-1	0.10 U,J,QL-1	0.10 U,J,QL-1	0.10 U,J,QL-1
alpha-BHC	0.051 U	0.050 U	0.049 U	0.050 U	0.052 U	0.051 U	0.050 U	0.050 U
alpha-Chlordane	0.041 U	0.040 U	0.0099 U	0.0099 U	0.041 U	0.010 U	0.010 U	0.010 U
beta-BHC	0.10 U	0.10 U	0.099 U	0.099 U	0.10 U	0.10 U	0.10 U	0.10 U
delta-BHC	0.10 U	0.10 U	0.099 U	0.099 U	0.10 U	0.10 U	0.10 U	0.10 U
Dieldrin	0.041 U	0.040 U	0.099 U	0.099 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan I (alpha)	0.041 U	0.040 U	0.0099 U	0.0099 U	0.041 U	0.010 U	0.010 U	0.010 U
Endosulfan II (beta)	0.021 U	0.020 U	0.020 U	0.020 U	0.021 U	0.020 U	0.020 U	0.020 U
Endosulfan Sulfate	0.26 U	0.25 U	0.25 U	0.25 U	0.26 U	0.25 U	0.25 U	0.25 U
Endrin	0.021 U	0.20 U	0.020 U	0.020 U	0.021 U	0.020 U	0.020 U	0.020 U
Endrin aldehyde	0.26 U	0.25 U	0.25 U	0.25 U	0.26 U	0.25 U	0.25 U	0.25 U
Endrin ketone	0.26 U	0.25 U	0.25 U	0.25 U	0.26 U	0.25 U	0.25 U	0.25 U
gamma-BHC (Lindane)	0.021 U	0.020 U	0.0049 U	0.0050 U	0.021 U	0.0051 U	0.0050 U	0.0050 U
gamma-Chlordane	0.041 U	0.040 U	0.0099 U	0.0099 U	0.041 U	0.010 U	0.010 U	0.010 U
Heptachlor	0.031 U,J,QL-1	0.030 U,J,QL-1	0.0074 U,J,QL-1	0.0074 U,J,QL-1	0.031 U,J,QL-1	0.0076 U,J,QL-1	0.0075 U,J,QL-1	0.0075 U,J,QL-1
Heptachlor epoxide	0.010 U	0.010 U	0.0099 U	0.0099 U	0.041 U	0.010 U	0.010 U	0.010 U
Methoxychlor	0.51 U	0.50 U	0.49 U	0.50 U	0.52 U	0.51 U	0.50 U	0.50 U
Toxaphene	1.0 U	1.0 U	0.99 U	0.99 U	1.0 U	1.0 U	1.0 U	1.0 U

CWB – Water samples collected via Seabird CTD array off of ocean bottom at 14, 8, 10 & 13 m, respectively for stations J01,J04,J05 & J12.
CWT- Water samples collected via Seabird CTD array at 3m from the top of the ocean surface for J01,J05, & J12; 1m for J04.
U – The analyte was not detected at or above the reporting limit.
J – The identification of the analyte is acceptable; the reported value is an estimate.
QL-1 – Laboratory Control Spike Recovery less than method control limits.

Data provided by the Science and Ecosystem Support Division (SESD), Analytical Services Branch (ASB) Laboratory, Athens, GA.

Table 6. Water Quality Sampling (Semi-Volatiles) - all values are reported in µg/l

CHEMICAL NAME:	J01-09-CWB 06/19/2009	J01-09-CWT 06/19/2009	J04-09-CWB 06/19/2009	J04-09-CWT 06/19/2009	J05-09-CWB 06/19/2009	J05-09-CWT 06/19/2009	J12-09-CWB 06/19/2009	J12-09-CWT 06/19/2009
2-Methylnaphthalene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U,J,QS-3	2.0 U	2.0 U	1.9 U
Acenaphthene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U,J,QS-3	2.0 U	2.0 U	1.9 U
Acenaphthylene	2.0 U	2.0 U,J,QM-3	2.0 U	2.0 U	2.0 U,J,QS-3	2.0 U	2.0 U	1.9 U
Anthracene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U,J,QS-3	2.0 U	2.0 U	1.9 U
Benzo(a)anthracene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U,J,QS-3	2.0 U	2.0 U	1.9 U
Benzo(a)pyrene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U,J,QS-3	2.0 U	2.0 U	1.9 U
Benzo(b)fluoranthene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U,J,QS-3	2.0 U	2.0 U	1.9 U
Benzo(g,h,i)perylene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U,J,QS-3	2.0 U	2.0 U	1.9 U
Benzo(k)fluoranthene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U,J,QS-3	2.0 U	2.0 U	1.9 U
Chrysene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U,J,QS-3	2.0 U	2.0 U	1.9 U
Dibenzo(a,h)anthracene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U,J,QS-3	2.0 U	2.0 U	1.9 U
Fluoranthene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U,J,QS-3	2.0 U	2.0 U	1.9 U
Fluorene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U,J,QS-3	2.0 U	2.0 U	1.9 U
Indeno (1,2,3-cd) pyrene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U,J,QS-3	2.0 U	2.0 U	1.9 U
Naphthalene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U,J,QS-3	2.0 U	2.0 U	1.9 U
Pentachlorophenol	9.9 U	10.0 U	10.0 U	9.9 U	10.0 U	10.0 U	10.0 U	9.7 U
Phenanthrene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U,J,QS-3	2.0 U	2.0 U	1.9 U
Pyrene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U,J,QS-3	2.0 U	2.0 U	1.9 U

CWB – Water samples collected via Seabird CTD array off of ocean bottom at 14, 8, 10 & 13 m, respectively for stations J01,J04,J05 & J12.
CWT- Water samples collected via Seabird CTD array at 3m from the top of the ocean surface for J01,J05, & J12; 1m for J04.
U – The analyte was not detected at or above the reporting limit.
J – The identification of the analyte is acceptable; the reported value is an estimate.
QM-3 – Matrix Spike Precision method control limits.
QS-3 – Surrogate recovery is lower than established control limits.

Data provided by the Science and Ecosystem Support Division (SESD), Analytical Services Branch (ASB) Laboratory, Athens, GA.

Table 7. Water Quality Sampling (PCB Congeners, #8 - #169), Stations J01, J04, J05 & J12; units=µg/l; samples collected 06/19/09.

Station	PCB Congener #8	PCB Congener #18	PCB Congener #28	PCB Congener #44	PCB Congener #49	PCB Congener #52	PCB Congener #66	PCB Congener #77	PCB Congener #87
J01-09 –CWT	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
J01-09 –CWB	0 019 U	0 019 U	0 019 U	0 019 U	0 019 U	0 019 U	0 019 U	0 019 U	0 019 U
J04-09 –CWT	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
J04-09 –CWB	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
J05-09 –CWT	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
J05-09 –CWB	0 021 U	0 021 U	0 021 U	0 021 U	0 021 U	0 021 U	0 021 U	0 021 U	0 021 U
J12-09 –CWT	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
J12-09 –CWB	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
QA-CTD	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
Station	PCB Congener #101	PCB Congener #105	PCB Congener #118	PCB Congener #126	PCB Congener #128	PCB Congener #138	PCB Congener #153	PCB Congener #156	PCB Congener #169
J01-09 –CWT	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
J01-09 –CWB	0 019 U	0 019 U	0 019 U	0 019 U	0 019 U	0 019 U	0 019 U	0 019 U	0 019 U
J04-09 –CWT	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
J04-09 –CWB	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
J05-09 –CWT	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
J05-09 –CWB	0 021 U	0 021 U	0 021 U	0 021 U	0 021 U	0 021 U	0 021 U	0 021 U	0 021 U
J12-09 –CWT	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
J12-09 –CWB	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
QA-CTD	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U

CWB – Water samples collected via Seabird CTD array off of ocean bottom at 14, 8, 10 & 13 m, respectively for stations J01,J04,J05 & J12.
CWT- Water samples collected via Seabird CTD array at 3m from the top of the ocean surface for J01,J05, & J12; 1m for J04.
U – The analyte was not detected at or above the reporting limit.

Data provided by the SESD, ASB Laboratory, Athens, GA.

Table 7, Continued. Water Quality Sampling (PCB Congeners, #170 - #209), Stations J01, J04, J05 & J12; units=µg/l; samples collected 06/19/09.

Station	PCB Congener #170	PCB Congener #180	PCB Congener #183	PCB Congener #184	PCB Congener #187	PCB Congener #195	PCB Congener #206	PCB Congener #209
J01-09-CWT	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
J01-09-CWB	0 019 U	0 019 U	0 019 U	0 019 U	0 019 U	0 019 U	0 019 U	0 019 U
J04-09-CWT	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
J04-09-CWB	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
J05-09-CWT	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
J05-09-CWB	0 021 U	0 021 U	0 021 U	0 021 U	0 021 U	0 021 U	0 021 U	0 021 U
J12-09-CWT	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
J12-09-CWB	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U
QA-CTD	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U	0 020 U

CWB – Water samples collected via Seabird CTD array off of ocean bottom at 14, 8, 10 & 13 m, respectively for stations J01,J04,J05 & J12.
CWT- Water samples collected via Seabird CTD array at 3m from the top of the ocean surface for J01,J05, & J12; 1m for J04.
U – The analyte was not detected at or above the reporting limit.

Data provided by the SESD, ASB Laboratory, Athens, GA

Table 8. Water Quality Sampling (Total Metals) – all values are reported in µg/l except Total Mercury, which is reported in ng/l.

		J01-09-CWT/D	J01-09-CWB	J04-09-CWT	J04-09-CWB	J05-09-CWT	J05-09-CWB	J12-09-CWT	J12-09-CWB	K0905611-MB1
CHEMICAL_NAME	Units	06/19/2009	06/19/2009	06/19/2009	06/19/2009	06/19/2009	06/19/2009	06/19/2009	06/19/2009	06/19/2009
Arsenic	µg/l	1.42/1.41	1.94	1.29	0.86	0.85	1.96	0.88	1.84	ND U
Cadmium	µg/l	0.009/0.009 B	0.009 B	0.008 B	0.008 B	0.006 B	0.008 B	0.008 B	0.01 B	ND U
Chromium	µg/l	0.19/0.19 B	0.24	0.2 B	0.2 B	0.16 B	0.2	0.14 B	0.2 B	ND U
Copper	µg/l	0.328/0.329	0.193	0.631	0.189	0.214	0.349	0.237	0.189	ND B
Lead	µg/l	0.036/0.034	0.081	0.069	0.011 B	0.0009 U	0.052	0.014 B	0.047	ND B
Mercury, Total	ng/l	0.54 B	0.80 B	0.86 B	0.39 B	0.34 B	0.60 B	0.46 B	0.71 B	ND U
Nickel	µg/l	0.23/0.24	0.25	0.24	0.23	0.22	0.23	0.2	0.32	ND U
Selenium	µg/l	0.4/ND B	0.39 B	0.37 U	0.26 B	0.48 B	0.35 B	0.41 B	0.28 B	0.35 B
Silver	µg/l	0.0004 U	0.004 U	0.004 U	0.0004 U	0.004 U	0.004 U	0.004 U	0.012 B	ND U
Zinc	µg/l	2.74/2.76	5.04	1.27	0.53	0.48 B	1.42 B	0.55	1.93 B	ND B

CWB – Water samples collected via Seabird CTD array off of ocean bottom at 14, 8, 10 & 13 m, respectively for stations J01,J04,J05 & J12.
CWT- Water samples collected via Seabird CTD array at 3m from the top of the ocean surface for J01,J05, & J12; 1m for J04.
B – The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
ND/U – The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
K0905611-MB1 is a representative method blank sample run by CAS.

Data provided by Columbia Analytical Services (CAS) Inc. Laboratory, Kelso, WA.

Table 9. Water Quality Sampling (Tri-butyltin) – all values are reported in µg/l, except for Tri-n-propyltin, which is reported in %.

		J1-09-CWT	J01-09-CWB	J04-09-CWT	J04-09-CWB	J05-09-CWT	J05-09-CWB	J12-09-CWT	J12-09-CWB
CHEMICAL_NAME	Units	06/19/2009	06/19/2009	06/19/2009	06/19/2009	06/19/2009	06/19/2009	06/19/2009	06/19/2009
Tetra-n-butyltin	µg/l	0.038 U	0.038 U	0.038 U	0.038 U	0.038 U	0.038 U	0.038 U	0.038 U
Tri-n-butyltin	µg/l	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U
Di-n-butyltin	µg/l	0.0073 U	0.0073 U	0.0073 U	0.0073 U	0.0073 U	0.0073 U	0.0073 U	0.0073 U
n-Butyltin	µg/l	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U
Tri-n-propyltin	%	72	76	68	74	71	74	77	79

CWB – Water samples collected via Seabird CTD array off of ocean bottom at 14, 8, 10 & 13 m, respectively for stations J01,J04,J05 & J12.
CWT- Water samples collected via Seabird CTD array at 3m from the top of the ocean surface for J01,J05, & J12; 1m for J04.
U – The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.

Data provided by Columbia Analytical Services (CAS) Inc. Laboratory, Kelso, WA.

Table 10. QA/QC CTD Rinse Blank Information

	SAMPLE_NAME:	QA-CTD-CW	
	SAMPLE_DATE:	06/19/2009	
CHEMICAL_NAME	RESULT_UNIT		
2-Methylnaphthalene	ug/l	2.0	U
4,4'-DDD (p,p'-DDD)	ug/l	0.020	U
4,4'-DDE (p,p'-DDE)	ug/l	0.010	U
4,4'-DDT (p,p'-DDT)	ug/l	0.025	U
Acenaphthene	ug/l	2.0	U
Acenaphthylene	ug/l	2.0	U
Aldrin	ug/l	0.10	U,J,QL-1
alpha-BHC	ug/l	0.050	U
alpha-Chlordane	ug/l	0.010	U
Anthracene	ug/l	2.0	U
Benzo(a)anthracene	ug/l	2.0	U
Benzo(a)pyrene	ug/l	2.0	U
Benzo(b)fluoranthene	ug/l	2.0	U
Benzo(g,h,i)perylene	ug/l	2.0	U
Benzo(k)fluoranthene	ug/l	2.0	U
beta-BHC	ug/l	0.10	U
Chrysene	ug/l	2.0	U
delta-BHC	ug/l	0.10	U
Dibenzo(a,h)anthracene	ug/l	2.0	U
Dieldrin	ug/l	0.10	U
Endosulfan I (alpha)	ug/l	0.010	U
Endosulfan II (beta)	ug/l	0.020	U
Endosulfan Sulfate	ug/l	0.25	U
Endrin	ug/l	0.020	U
Endrin aldehyde	ug/l	0.25	U
Endrin ketone	ug/l	0.25	U
Fluoranthene	ug/l	2.0	U
Fluorene	ug/l	2.0	U
gamma-BHC (Lindane)	ug/l	0.0050	U
gamma-Chlordane	ug/l	0.010	U
Heptachlor	ug/l	0.0075	U,J,QL-1
Heptachlor epoxide	ug/l	0.010	U
Indeno (1,2,3-cd) pyrene	ug/l	2.0	U
Methoxychlor	ug/l	0.50	U
Naphthalene	ug/l	2.0	U
PCB Congener #101	ug/l	0.020	U
PCB Congener #105	ug/l	0.020	U
PCB Congener #118	ug/l	0.020	U
PCB Congener #126	ug/l	0.020	U
PCB Congener #128	ug/l	0.020	U
PCB Congener #138	ug/l	0.020	U
PCB Congener #153	ug/l	0.020	U
PCB Congener #156	ug/l	0.020	U
PCB Congener #169	ug/l	0.020	U
PCB Congener #170	ug/l	0.020	U
PCB Congener #18	ug/l	0.020	U

PCB Congener #180	ug/l	0.020 U
TABLE 10 CONTINUED: SAMPLE_NAME: SAMPLE DATE:		QA-CTD-CW 06/19/2009
CHEMICAL NAME	RESULT UNIT	
PCB Congener #183	ug/l	0.020 U
PCB Congener #184	ug/l	0.020 U
PCB Congener #187	ug/l	0.020 U
PCB Congener #195	ug/l	0.020 U
PCB Congener #206	ug/l	0.020 U
PCB Congener #209	ug/l	0.020 U
PCB Congener #28	ug/l	0.020 U
PCB Congener #44	ug/l	0.020 U
PCB Congener #49	ug/l	0.020 U
PCB Congener #52	ug/l	0.020 U
PCB Congener #66	ug/l	0.020 U
PCB Congener #77	ug/l	0.020 U
PCB Congener #8	ug/l	0.020 U
PCB Congener #87	ug/l	0.020 U
Pentachlorophenol	ug/l	10.0 U
Phenanthrene	ug/l	2.0 U
Pyrene	ug/l	2.0 U
Toxaphene	ug/l	1.0 U

U – The analyte was not detected at or above the reporting limit.
J - The identification of the analyte is acceptable; the reported value is an estimate.
QL-1 – Laboratory Control Spike Recovery less than method control limits.

Data provided by the SESD, ASB Laboratory, Athens, GA.

Table 11. Sediment Chemistry (Pesticides & TOC), Stations J01-J06
Note: all values are reported in µg/kg dry weight, except for TOC which is reported in mg/kg dry weight

	STATION:	J01-09-SD	J02-09-SD	J03-09-SD	J04-09-SD	J05-09-SD	J06-09-SD
CHEMICAL NAME	Units	6/18/09	6/18/09	6/18/09	6/18/09	6/18/09	6/18/09
Total Organic Carbon	mg/kg dry	8000 U	10000	7100 U	7200 U	7300 U	8200
4,4'-DDD (p,p'-DDD)	ug/kg dry	0.96 U	0.92 U	0.98 U	1.0 U,J,H-7	0.95 U	0.96 U
4,4'-DDE (p,p'-DDE)	ug/kg dry	0.49 U	0.47 U	0.5 U	0.52 U,J,H-7	0.49 U	0.49 U
4,4'-DDT (p,p'-DDT)	ug/kg dry	1.2 U,J,QR-1	1.2 U,J,QR-1	1.3 U,J,QR-1	1.3 U,J,H-7	1.2 U,J,QR-1	1.3 U,J,QR-1
Aldrin	ug/kg dry	2.5 U,J,QR-1	4.7 U,J,QR-1	2.5 U,J,QR-1	0.52 U,J,H-7	2.4 U,J,QR-1	2.5 U,J,QR-1
alpha-BHC	ug/kg dry	1.2 U	2.3 U	1.2 U	0.26 U,J,H-7	1.2 U	1.2 U
alpha-Chlordane	ug/kg dry	2.5 U	4.7 U	2.5 U	0.52 U,J,H-7	2.4 U	2.5 U
beta-BHC	ug/kg dry	2.5 U	4.7 U	2.5 U	0.52 U,J,H-7	2.4 U	2.5 U
delta-BHC	ug/kg dry	2.5 U	4.7 U	2.5 U	0.52 U,J,H-7	2.4 U	2.5 U
Dieldrin	ug/kg dry	0.49 U,J,QR-1	0.47 U,J,QR-1	0.5 U,J,QR-1	0.52 U,J,H-7	0.49 U,J,QR-1	0.49 U,J,QR-1
Endosulfan I (alpha)	ug/kg dry	2.5 U,J,QL-1	4.7 U,J,QL-1	2.5 U,J,QL-1	0.52 U,J,H-7	2.4 U,J,QL-1	2.5 U,J,QL-1
Endosulfan II (beta)	ug/kg dry	4.8 U	9.2 U	4.9 U	1.0 U,J,H-7	4.7 U	4.8 U
Endosulfan Sulfate	ug/kg dry	6.2 U	1.2 U	6.4 U	1.3 U,J,H-7	6.2 U	6.3 U
Endrin	ug/kg dry	4.8 U	9.2 U	4.9 U	1.0 U,J,H-7	4.7 U	4.8 U
Endrin aldehyde	ug/kg dry	6.2 U,J,QR-1	12.0 U,J,QR-1	6.4 U,J,QR-1	1.3 U,J,H-7	6.2 U,J,QR-1	6.3 U,J,QR-1
Endrin ketone	ug/kg dry	6.2 U	1.2 U	6.4 U	1.3 U,J,H-7	6.2 U	6.3 U
gamma-BHC (Lindane)	ug/kg dry	1.2 U,J,QR-1	2.3 U	1.2 U,J,QR-1	0.26 U,J,H-7	1.2 U,J,QR-1	1.2 U,J,QR-1
gamma-Chlordane	ug/kg dry	2.5 U	4.7 U	2.5 U	0.52 U,J,H-7	2.4 U	2.5 U
Heptachlor	ug/kg dry	1.8 U,J,QR-1	3.5 U,J,QR-1	1.9 U,J,QR-1	0.39 U,J,H-7	1.8 U,J,QR-1	1.8 U,J,QR-1
Heptachlor epoxide	ug/kg dry	2.5 U,J,QL-1,QR-1	4.7 U,J,QL-1,QR-1	2.5 U,J,QR-1,QL-1	0.52 U,J,H-7	2.4 U,J,QL-1,QR-1	2.5 U,J,QL-1,QR-1
Methoxychlor	ug/kg dry	2.4 U,J,QL-1,QR-1	2.3 U,J,QL-1,QR-1	2.5 U,J,QL-1,QR-1	2.6 U,J,H-7	2.4 U,J,QL-1,QR-1	2.4 U,J,QL-1,QR-1
Toxaphene	ug/kg dry	49 U	47 U	50 U	52 U,J,H-7	49 U	49 U

U – The analyte was not detected at or above the reporting limit.
H-7 – Recommended preparation holding time exceeded.
J- The identification of the analyte is acceptable; the reported value is an estimate.
QL-1 – Laboratory Control Spike Recovery less than method control limits.
QR-1 – MRL verification recovery less than lower control limits.

Data provided by the SESD, ASB Laboratory, Athens, GA.

Table 11. Sediment Chemistry (Pesticides & TOC), Stations J07-J12, continued.
Note: all values are reported in µg/kg dry weight, except for TOC which is reported in mg/kg dry weight

	STATION:	J07-09-SD	J08-09-SD	J09-09-SD	J10-09-SD	J11-09-SD	J12-09-SD
CHEMICAL_NAME	Units	6/18/09	6/18/09	6/18/09	6/18/09	6/18/09	6/18/09
Total Organic Carbon	mg/kg dry	11000	7500 U	14000	8100 U	7600 U	8100 U
4,4'-DDD (p,p'-DDD)	ug/kg dry	0.95 U	0.99 U	1.1 U	1.1 U	0.99 U	1.1 U
4,4'-DDE (p,p'-DDE)	ug/kg dry	0.49 U	0.51 U	0.55 U	0.56 U	0.51 U	0.56 U
4,4'-DDT (p,p'-DDT)	ug/kg dry	1.2 U,J,QR-1	1.3 U,J,QR-1	1.4 U,J,QR-1	1.4 U,J,QR-1	1.3 U,J,QR-1	1.4 U,J,QR-1
Aldrin	ug/kg dry	2.5 U,J,QR-1	2.5 U,J,QR-1	2.2 U,J,QR-1	2.3 U,J,QR-1	2.5 U,J,QR-1	2.8 U,J,QR-1
alpha-BHC	ug/kg dry	1.2 U	1.3 U	1.1 U	1.1 U	1.3 U	1.4 U
alpha-Chlordane	ug/kg dry	2.5 U	2.5 U	2.2 U	2.3 U	2.5 U	2.8 U
beta-BHC	ug/kg dry	2.5 U	2.5 U	2.2 U	2.3 U	2.5 U	2.8 U
delta-BHC	ug/kg dry	2.5 U	2.5 U	2.2 U	2.3 U	2.5 U	2.8 U
Dieldrin	ug/kg dry	0.49 U,J,QR-1	0.51 U,J,QR-1	0.55 U,J,QR-1	0.56 U,J,QR-1	0.51 U,J,QR-1	0.56 U,J,QR-1
Endosulfan I (alpha)	ug/kg dry	2.5 U,J,QL-1	2.5 U,J,QL-1	2.2 U,J,QL-1	2.3 U,J,QL-1	2.5 U,J,QL-1	2.8 U,J,QL-1
Endosulfan II (beta)	ug/kg dry	4.8 U	4.9 U	4.2 U	4.4 U	4.9 U	5.5 U
Endosulfan Sulfate	ug/kg dry	6.2 U	6.5 U	5.5 U	5.7 U	6.5 U	7.2 U
Endrin	ug/kg dry	4.8 U	4.9 U	4.2 U	4.4 U	4.9 U	5.5 U
Endrin aldehyde	ug/kg dry	6.2 U,J,QR-1	6.5 U,J,QR-1	5.5 U,J,QR-1	5.7 U,J,QR-1	6.5 U,J,QR-1	7.2 U,J,QR-1
Endrin ketone	ug/kg dry	6.2 U	6.5 U	5.5 U	5.7 U	6.5 U	7.2 U
gamma-BHC (Lindane)	ug/kg dry	1.2 U,J,QR-1	1.3 U,J,QR-1	1.1 U,J,QR-1	1.1 U,J,QR-1	1.3 U,J,QR-1	1.4 U,J,QR-1
gamma-Chlordane	ug/kg dry	2.5 U	2.5 U	2.2 U	2.3 U	2.5 U	2.8 U
Heptachlor	ug/kg dry	1.8 U,J,QR-1	1.9 U,J,QR-1	1.6 U,J,QR-1	1.7 U,J,QR-1	1.9 U,J,QR-1	2.1 U,J,QR-1
Heptachlor epoxide	ug/kg dry	2.5 U,J,QL-1,QR-1	2.5 U,J,QL-1,QR-1	2.2 U,J,QL-1,QR-1	2.3 U,J,QL-1,QR-1	2.5 U,J,QL-1,QR-1	2.8 U,J,QL-1,QR-1
Methoxychlor	ug/kg dry	2.4 U,J,QL-1,QR-1	2.5 U,J,QL-1,QR-1	2.7 U,J,QL-1,QR-1	2.8 U,J,QL-1,QR-1	2.5 U,J,QL-1,QR-1	2.8 U,J,QL-1,QR-1
Toxaphene	ug/kg dry	49 U	51 U	55 U	56 U	51 U	56 U

U – The analyte was not detected at or above the reporting limit.
J- The identification of the analyte is acceptable; the reported value is an estimate.
QL-1 – Laboratory Control Spike Recovery less than method control limits.
QR-1 – MRL verification recovery less than lower control limits.

Data provided by the SESD, ASB Laboratory, Athens, GA.

Table 12. Sediment Chemistry (Semi-volatiles), Stations J01-J06
Note: all values are reported in µg/kg dry weight

CHEMICAL_NAME	Units	J01-09-SD 06/18/2009	J02-09-SD 06/18/2009	J03-09-SD 06/18/2009	J04-09-SD 06/18/2009	J05-09-SD 06/18/2009	J06-09-SD 06/18/2009
2-Methylnaphthalene	ug/kg dry	4.9 U,J, H-7	4.8 U	4.9 U,J, H-7	5.1 U	4.8 U,J, H-7	4.9 U
Acenaphthene	ug/kg dry	4.9 U,J, H-7	4.8 U	4.9 U,J, H-7	5.1 U	4.8 U,J, H-7	4.9 U
Acenaphthylene	ug/kg dry	4.9 U,J, H-7	4.8 U	4.9 U,J, H-7	5.1 U	4.8 U,J, H-7	4.9 U
Anthracene	ug/kg dry	4.9 U,J,H-7,QL-1	4.8 U	4.9 U,J, H-7	5.1 U	4.8 U,J, H-7	4.9 U
Benzo(a)anthracene	ug/kg dry	4.9 U,J, H-7	4.8 U	4.9 U,J, H-7	5.1 U	4.8 U,J, H-7	4.9 U
Benzo(a)pyrene	ug/kg dry	4.9 U,J,H-7,QL-1	4.8 U	4.9 U,J, H-7	5.1 U	4.8 U,J, H-7	4.9 U
Benzo(b)fluoranthene	ug/kg dry	4.9 U,J, H-7	4.8 U	4.9 U,J, H-7	5.1 U	4.8 U,J, H-7	4.9 U
Benzo(g,h,i)perylene	ug/kg dry	4.9 U,J,H-7,QL-1	4.8 U	4.9 U,J, H-7	5.1 U	4.8 U,J, H-7	4.9 U
Benzo(k)fluoranthene	ug/kg dry	4.9 U,J, H-7	4.8 U	4.9 U,J, H-7	5.1 U	4.8 U,J, H-7	4.9 U
Chrysene	ug/kg dry	4.9 U,J, H-7	4.8 U	4.9 U,J, H-7	5.1 U	4.8 U,J, H-7	4.9 U
Dibenzo(a,h)anthracene	ug/kg dry	4.9 U,J, H-7	4.8 U	4.9 U,J, H-7	5.1 U	4.8 U,J, H-7	4.9 U
Fluoranthene	ug/kg dry	4.9 U,J, H-7	4.8 J,B-2	4.9 U,J, H-7	5.1 U	4.8 U,J, H-7	4.9 U
Fluorene	ug/kg dry	4.9 U,J, H-7	4.8 U	4.9 U,J, H-7	5.1 U	4.8 U,J, H-7	4.9 U
Indeno (1,2,3-cd) pyrene	ug/kg dry	4.9 U,J, H-7	4.8 U	4.9 U,J, H-7	5.1 U	4.8 U,J, H-7	4.9 U
Naphthalene	ug/kg dry	4.9 U,J, H-7	4.8 U	4.9 U,J, H-7	5.1 U	4.8 U,J, H-7	4.9 U
Pentachlorophenol	ug/kg dry	9.9 U,J,H-7,QL-1	9.6 U,J,QL-1	10.0 U,J,H-7,QL-1	10.0 U,J,QL-1	9.8 U,J,H-7,QL-1	9.9 U,J,QL-1
Phenanthrene	ug/kg dry	4.9 U,J, H-7	7.2 U,B-2	4.9 U,J, H-7	5.1 U	4.8 U,J, H-7	4.9 U
Pyrene	ug/kg dry	4.9 U,J, H-7	4.8 U	4.9 U,J, H-7	5.1 U	4.8 U,J, H-7	4.9 U

U – The analyte was not detected at or above the reporting limit .
J- The identification of the analyte is acceptable; the reported value is an estimate.
B-2 – Reporting level elevated due to trace amounts of analyte present in the method blank.
H-7 – Recommended preparation holding time exceeded.
QL-1 – Laboratory Control Spike Recovery less than method control limits.

Data provided by the SESD, ASB Laboratory, Athens, GA.

Table 12. Sediment Chemistry (Semi-volatiles), Stations J07-J12, continued.
Note: all values are reported in µg/kg dry weight

CHEMICAL_NAME	Units	J07-09-SD 06/18/2009	J08-09-SD 06/18/2009	J09-09-SD 06/18/2009	J10-09-SD 06/18/2009	J11-09-SD 06/18/2009	J12-09-SD 06/18/2009
2-Methylnaphthalene	ug/kg dry	4.9 U	5.0 U,J, H-7	5.4 U	5.6 U,J, H-7	5.0 U,J, H-7	5.6 U,J, H-7
Acenaphthene	ug/kg dry	4.9 U	5.0 U,J, H-7	5.4 U	5.6 U,J, H-7	5.0 U,J, H-7	5.6 U,J, H-7
Acenaphthylene	ug/kg dry	4.9 U	5.0 U,J, H-7	5.4 U	5.6 U,J, H-7	5.0 U,J, H-7	5.6 U,J, H-7
Anthracene	ug/kg dry	4.9 U	5.0 U,J, H-7	5.4 U	5.6 U,J, H-7	5.0 U,J, H-7	5.6 U,J, H-7
Benzo(a)anthracene	ug/kg dry	4.9 U	5.0 U,J, H-7	5.4 U	5.6 U,J, H-7	5.0 U,J, H-7	9.1 J, H-7
Benzo(a)pyrene	ug/kg dry	4.9 U	5.0 U,J, H-7	5.4 U	5.6 U,J, H-7	5.0 U,J, H-7	6.2 J, H-7
Benzo(b)fluoranthene	ug/kg dry	4.9 U	5.0 U,J, H-7	5.4 U	5.6 J, H-7	5.0 U,J, H-7	5.7 J, H-7
Benzo(g,h,i)perylene	ug/kg dry	4.9 U	5.0 U,J, H-7	5.4 U	5.6 U,J, H-7	5.0 U,J, H-7	5.6 U,J, H-7
Benzo(k)fluoranthene	ug/kg dry	4.9 U	5.0 U,J, H-7	5.4 U	5.6 U,J, H-7	5.0 U,J, H-7	5.6 U,J, H-7
Chrysene	ug/kg dry	4.9 U	5.0 U,J, H-7	5.4 U	5.6 U,J, H-7	5.0 U,J, H-7	9.1 J, H-7
Dibenzo(a,h)anthracene	ug/kg dry	4.9 U	5.0 U,J, H-7	5.4 U	5.6 U,J, H-7	5.0 U,J, H-7	5.6 U,J, H-7
Fluoranthene	ug/kg dry	4.9 U	5.0 U,J, H-7	5.4 U	11.0 J, H-7	5.0 U,J, H-7	11.0 J, H-7
Fluorene	ug/kg dry	4.9 U	5.0 U,J, H-7	5.4 U	5.6 U,J, H-7	5.0 U,J, H-7	5.6 U,J, H-7
Indeno (1,2,3-cd) pyrene	ug/kg dry	4.9 U	5.0 U,J, H-7	5.4 U	5.6 U,J, H-7	5.0 U,J, H-7	5.6 U,J, H-7
Naphthalene	ug/kg dry	4.9 U	5.0 U,J, H-7	5.4 U	5.6 U,J, H-7	5.0 U,J, H-7	5.6 U,J, H-7
Pentachlorophenol	ug/kg dry	10.0 U,J,QL-1	10.0 U,J,H-7,QL-1	11.0 U,J,QL-1	11.0 U,J,H-7,QL-1	10.0 U,J, QL-1,H-7	11.0 U,J, H-7,QL-1
Phenanthrene	ug/kg dry	4.9 U	5.0 U,J, H-7	5.4 U	5.6 U,J, H-7	5.0 U,J, H-7	18.0 J, H-7
Pyrene	ug/kg dry	4.9 U	5.0 U,J, H-7	5.4 U	7.3 J, H-7	5.0 U,J, H-7	19.0 J, H-7

U – The analyte was not detected at or above the reporting limit .
J- The identification of the analyte is acceptable; the reported value is an estimate.
H-7 – Recommended preparation holding time exceeded.
QL-1 – Laboratory Control Spike Recovery less than method control limits.

Data provided by the SESD, ASB Laboratory, Athens, GA.

Table 13. Sediment Chemistry (Total Metals), Stations J01-J06 - all values are reported in mg/kg dry weight, except for % solids, which is in %.

		J01-09-SD	J02-09-SD	J03-09-SD	J04-09-SD	J05-09-SD	J06-09-SD
CHEMICAL_NAME	Units	06/18/2009	06/18/2009	06/18/2009	06/18/2009	06/18/2009	06/18/2009
% Solids	%	76	81	76	79	77	79
Aluminum	mg/kg dry	290	200	500	250	340	260
Antimony	mg/kg dry	0.49 U	0.50 U	0.49 U	0.50 U	0.49 U	0.49 U
Arsenic	mg/kg dry	0.91	1.2	1.2	0.59	1.0	0.90
Beryllium	mg/kg dry	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Cadmium	mg/kg dry	0.099 U	0.10 U	0.099 U	0.10 U	0.12	0.099 U
Chromium	mg/kg dry	2.2	0.93	2.6	1.2	2.4	1.5
Copper	mg/kg dry	0.99 U	1.0 U	0.99 U	1.0 U	0.98 U	0.99 U
Iron	mg/kg dry	910	640	1600	620	910	730
Lead	mg/kg dry	0.55	0.50 U	0.76	0.51	0.73	0.49 U
Manganese	mg/kg dry	11.0	13.0	19.0	11.0	14.0	15.0
Mercury	mg/kg dry	0.098 U,QM-1	0.064 U	0.096 U	0.10 U	0.11 U	0.086 U
Nickel	mg/kg dry	0.99 U	1.0 U	0.99 U	1.0 U	0.98 U	0.99 U
Selenium	mg/kg dry	0.99 U	1.0 U	0.99 U	1.0 U	0.98 U	0.99 U
Silver	mg/kg dry	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Thallium	mg/kg dry	0.49 U	0.50 U	0.49 U	0.5 U	0.49 U	0.49 U
Zinc	mg/kg dry	1.8	1.2	2.9	1.7	2.4	1.5

U – The analyte was not detected at or above the reporting limit .
J- The identification of the analyte is acceptable; the reported value is an estimate.
QM-1 – Matrix Spike Recovery less than method control limits.

Data provided by the SESD, ASB Laboratory, Athens, GA

Table 13. Sediment Chemistry (Total Metals), cont., Stations J07-J12 - all values are reported in mg/kg dry weight, except for % solids, which is in %.

CHEMICAL_NAME	Units	J07-09-SD 06/18/2009	J08-09-SD 06/18/2009	J09-09-SD 06/18/2009	J10-09-SD 06/18/2009	J11-09-SD 06/18/2009	J12-09-SD 06/18/2009
% Solids	%	80	76	70	65	78	64
Aluminum	mg/kg dry	260	460	1500	1900	370	2000
Antimony	mg/kg dry	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Arsenic	mg/kg dry	1.4	0.78	2.7	2.3	1.0	2.9
Beryllium	mg/kg dry	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Cadmium	mg/kg dry	0.099 U	0.10 U	0.11	0.099 U	0.099 U	0.10 U
Chromium	mg/kg dry	1.6	2.2	6.0	5.6	2.5	6.7
Copper	mg/kg dry	0.50 U, B2	2.2	0.99 U	2.6	0.99 U	2.9
Iron	mg/kg dry	1500	1100	3000	3400	1100	4300
Lead	mg/kg dry	0.72	1.2	2.2	3.1	0.71	4.6
Manganese	mg/kg dry	22.0	16.0	43.0	91.0	11.0	71.0
Mercury	mg/kg dry	0.086 U	0.091 U	0.096 U	0.074 U	0.091 U	0.087 U
Nickel	mg/kg dry	1.7	1.0 U	1.3	1.4	0.99 U	1.5
Selenium	mg/kg dry	0.99 U	1.0 U	0.99 U	0.99 U	0.99 U	1.0 U
Silver	mg/kg dry	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Thallium	mg/kg dry	0.50 U	0.50 U	0.50 U	0.5 U	0.50 U	0.50 U
Zinc	mg/kg dry	3.0 U, B2	5.9	6.9	9.3	2.4	8.9

U – The analyte was not detected at or above the reporting limit .
J- The identification of the analyte is acceptable; the reported value is an estimate.
B-2 – Reporting level elevated due to trace amounts of analyte present in the method blank.

Data provided by the SESD, ASB Laboratory, Athens, GA.

Table 14. Metal Analyses of Sediments – Jacksonville ODMDS, June 2009

	Aluminum			Arsenic	
	Outside	Inside		Outside	Inside
	290	200		0.91	1.2
	500	250		1.2	0.59
	260	340		0.90	1.0
	1500	260		2.7	1.4
	370	460		1.0	0.78
	2000	1900		2.9	2.3
Mean	820.0	568.3	Mean	1.60	1.2
Std. dev.	742.2	658.7	Std. dev.	0.94	0.61
Variance	550840	433857	Variance	0.88	0.37

	Chromium			Copper	
	Outside	Inside		Outside	Inside
	2.2	0.93		0.99	1.0
	2.6	1.2		0.99	1.0
	1.5	2.4		0.99	0.98
	6.0	1.6		0.99	0.50
	2.5	2.2		0.99	2.2
	6.7	5.6		2.9	2.6
Mean	3.58	2.32	Mean	1.31	1.38
Std. dev.	2.19	1.70	Std. dev.	0.78	0.82
Variance	4.79	0.19	Variance	0.61	0.68

	Iron			Lead	
	Outside	Inside		Outside	Inside
	910	640		0.55	0.50
	1600	620		0.76	0.51
	730	910		0.49	0.73
	3000	1500		2.2	0.72
	1100	1100		0.71	1.2
	4300	3400		4.6	3.1
Mean	1940	1362	Mean	1.55	1.13
Std. dev.	1417	1050.5	Std. dev.	1.62	0.99
Variance	2007880	48426.2	Variance	2.64	0.99

	Manganese			Mercury	
	Outside	Inside		Outside	Inside
	11	13		0.098	0.064
	19	11		0.096	0.10
	15	14		0.086	0.11
	43	22		0.096	0.086
	11	16		0.091	0.091
	71	91		0.087	0.074
Mean	28.33	27.83	Mean	0.092	0.088
Std. dev.	24.09	31.17	Std. dev.	0.005	0.017
Variance	580.3	5.58	Variance	0.00003	0.0003

Table 14. Metal Analyses of Sediments – Miami ODMDS, October 2007, continued.

	Zinc	
	Outside	Inside
	1.8	1.2
	2.9	1.7
	1.5	2.4
	6.9	3.0
	2.4	5.9
	8.9	9.3
Mean	4.07	3.92
Std. dev.	3.07	3.11
Variance	9.45	0.33

Table 15. Sediment Chemistry (Tri-butyltin) - Stations J01-J12 - all values are reported in µg/kg dry weight, except for Tri-n-propyltin & % solids, which are in %.

		J01-09-SD		J02-09-SD		J03-09-SD		J04-09-SD		J05-09-SD		J06-09-SD		J07-09-SD		J08-09-SD		J09-09-SD	
CHEMICAL_NAME	Units	06/18/2009		06/18/2009		06/18/2009		06/18/2009		06/18/2009		06/18/2009		06/18/2009		06/18/2009		06/18/2009	
% Solids	%	75.0		81.2		72.9		78.7		82.8		75.6		79.4		79.1		68.6	
Tetra-n-butyltin	µg/kg	0.44	U	0.44	U	0.44	U	0.44	U	0.44	U	0.44	U	0.44	U	0.44	U	0.44	U
Tri-n-butyltin	µg/kg	0.43	U	0.43	U	0.43	U	0.43	U	0.43	U	0.43	U	1.5		1.4		0.43	U
Di-n-butyltin	µg/kg	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.31	J	0.71	J	0.19	U
n-Butyltin	µg/kg	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.80	J	0.26	U
Tri-n-propyltin	%	43		31		58		50		39		47		58		50		41	

		J10-09-SD		J11-09-SD		J12-09-SD		KWG0905507-4	
CHEMICAL_NAME	Units	06/18/2009		06/18/2009		06/18/2009		06/18/2009	
% Solids	%	67.4		76.5		65.9		67.3	
Tetra-n-butyltin	µg/kg	0.44	U	0.44	U	0.44	U	0.44	U
Tri-n-butyltin	µg/kg	2.3		0.43	U	17		0.43	U
Di-n-butyltin	µg/kg	2.9		0.19	U	2.0		0.19	U
n-Butyltin	µg/kg	2.3		0.26	U	1.3	J	0.26	U
Tri-n-propyltin	%	49		30		50		53	

J –The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
U – The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
KWG0905507-4 – is a representative method blank sample run by CAS .

Data provided by Columbia Analytical Services (CAS) Inc. Laboratory, Kelso, WA.

Table 16. Sediment Chemistry (PCB Congeners, #8 - #169), Stations J01-J12; units=µg/kg dry weight; samples collected 06/18/09.

Station	PCB Congener #8	PCB Congener #18	PCB Congener #28	PCB Congener #44	PCB Congener #49	PCB Congener #52	PCB Congener #66	PCB Congener #77	PCB Congener #87
J01-09-SD	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U
J02-09-SD	0 90 U	0 90 U	0 90 U	0 90 U	0 90 U	0 90 U	0 90 U	0 90 U	0 90 U
J03-09-SD	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U
J04-09-SD	1 0 U	1 0 U	1 0 U	1 0 U	1 0 U	1 0 U	1 0 U	1 0 U	1 0 U
J05-09-SD	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U
J06-09-SD	0 91 U	0 91 U	0 91 U	0 91 U	0 91 U	0 91 U	0 91 U	0 91 U	0 91 U
J07-09-SD	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U
J08-09-SD	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U
J09-09-SD	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U
J10-09-SD	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U
J11-09-SD	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U
J12-09-SD	1 4 U	1 4 U	1 4 U	1 4 U	1 4 U	1 4 U	1 4 U	1 4 U	1 4 U
Station	PCB Congener #101	PCB Congener #105	PCB Congener #118	PCB Congener #126	PCB Congener #128	PCB Congener #138	PCB Congener #153	PCB Congener #156	PCB Congener #169
J01-09-SD	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U
J02-09-SD	0 90 U	0 90 U	0 90 U	0 90 U	0 90 U	0 90 U	0 90 U	0 90 U	0 90 U
J03-09-SD	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U
J04-09-SD	1 0 U	1 0 U	1 0 U	1 0 U	1 0 U	1 0 U	1 0 U	1 0 U	1 0 U
J05-09-SD	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U
J06-09-SD	0 91 U	0 91 U	0 91 U	0 91 U	0 91 U	0 91 U	0 91 U	0 91 U	0 91 U
J07-09-SD	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U
J08-09-SD	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U	0 93 U
J09-09-SD	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U
J10-09-SD	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U	1 1 U
J11-09-SD	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U	0 95 U
J12-09-SD	1 4 U	1 4 U	1 4 U	1 4 U	1 4 U	1 4 U	1 4 U	1 4 U	1 4 U

U – The analyte was not detected at or above the reporting limit.

Data provided by the SESD, ASB Laboratory, Athens, GA.

Table 16. Continued. Sediment Chemistry (PCB Congeners, #170 - #209), Stations J01-J12

Station	PCB Congener #170	PCB Congener #180	PCB Congener #183	PCB Congener #184	PCB Congener #187	PCB Congener #195	PCB Congener #206	PCB Congener #209
J01-09-SD	0.95 U	0.95 U	0.95 U	0.95 U	0.95 U	0.95 U	0.95 U	0.95 U
J02-09-SD	0.90 U	0.90 U	0.90 U	0.90 U	0.90 U	0.90 U	0.90 U	0.90 U
J03-09-SD	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U
J04-09-SD	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
J05-09-SD	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U
J06-09-SD	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U
J07-09-SD	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U
J08-09-SD	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U
J09-09-SD	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
J10-09-SD	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
J11-09-SD	0.95 U	0.95 U	0.95 U	0.95 U	0.95 U	0.95 U	0.95 U	0.95 U
J12-09-SD	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U

U – The analyte was not detected at or above the reporting limit.

Data provided by the SESD, ASB Laboratory, Athens, GA.

N.B. – The arithmetic mean of all PCB congeners from stations outside of the Miami ODMDS was 0.52 µg/kg, standard deviation =0.09, variance =0.008, whereas the arithmetic mean of all of the PCB congeners from inside the Miami ODMDS was 0.48 µg/kg, standard deviation =0.03, variance =0.001. All non-detected values were averaged as ½ of the minimum reporting limit (MRL) provided.

Table 17. Total PCB Congeners (26) by station (µg/kg or ppb), NOAA PCB Congeners [2*Σ(18 congeners)](NOAA, 1989), Threshold Effects Level (TEL) and Probable Effects Level (PEL) for Total PCBs in marine sediment.

Station	Tot. PCBs	NOAA PCBs	TEL	PEL
J01-09-SD	12.4	17.1	21.6	189.0
J02-09-SD	11.7	16.2	21.6	189.0
J03-09-SD	12.1	16.7	21.6	189.0
J04-09-SD	13.0	18.0	21.6	189.0
J05-09-SD	12.1	16.7	21.6	189.0
J06-09-SD	11.8	16.4	21.6	189.0
J07-09-SD	12.1	16.7	21.6	189.0
J08-09-SD	12.1	16.7	21.6	189.0
J09-09-SD	14.3	19.8	21.6	189.0
J10-09-SD	14.3	19.8	21.6	189.0
J11-09-SD	12.4	17.1	21.6	189.0
J12-09-SD	18.2	25.2	21.6	189.0

Table 18. SESD ODMDS Analyte List

OCEAN DREDGED MATERIAL DISPOSAL SITE
ANALYTE LIST

INORGANIC		INORGANICS -ALL MATRICES			
METALS - Sediment & Water	**METALS- Tissue**	**SEMI-VOLATILE PAH ORGANICS**	**PESTICIDES**	**PCB CONGENERS**	
Aluminum		2-Methylnaphthalene	Aldrin	8	187
Antimony	Arsenic	Acenaphthylene	Heptachlor	18	195
Arsenic		Acenaphthene	Hept. Epoxide	28	206
Beryllium	Cadmium	Anthracene	alpha-BHC	44	209
Cadmium	Chromium	Benzo(a)anthracene	beta-BHC	49	
Chromium	Copper	Benzo(a)pyrene	gamma-BHC	52	
Copper		Benzo(b/k)fluoranthene	delta-BHC	66	
Iron	Lead	Benzo(g,h,i)perylene	Endosulfan- I	77	
Lead		Chrysene	Dieldrin	87	
Manganese	Mercury	Dibenz(a,h)anthracene	p,p=-DDT	101	
Mercury	Nickel	Fluoranthene	p,p=-DDE	105	
Nickel		Fluorene	p,p=-DDD	118	
Selenium	Silver	Indeno(1,2,3,c,d)pyrene	Endrin**	126	
Silver	Zinc	Naphthalene	Endosulfan -II	128	
Thallium		Phenanthrene	Endosulfan- SO4	138	
Zinc		Pyrene	Endrin Ketone	153	
TOC			Methoxychlor	156	
% Moisture		**SEMI-VOLATILE NON-PAH ORGANICS**	g-chlordane	169	
		Pentachlorophenol	a-chlordane	170	
			Toxaphene	180	
				183	
				184	

Table 19. Distribution and abundance of benthic macroinfaunal taxa for stations 2, 4, 5, 7, 8 and 10 inside the Jacksonville ODMDS, June 2009.

Taxa	Phylum	Class	Total No. Individuals	% Total	Cumulative %	Station Occurrence	% Station Occurrence
Polygordius (LPIL)	Ann	Poly	32	9.94	9.94	3	50
Metharpinia floridana	Art	Mala	28	8.70	18.63	4	67
Nephtys picta	Ann	Poly	17	5.28	23.91	4	67
Branchiostoma (LPIL)	Cho	Lept	14	4.35	28.26	3	50
Phoxocephalidae (LPIL)	Art	Mala	14	4.35	32.61	1	17
Rhynchocoela (LPIL)	Rhy	-	12	3.73	36.34	3	50
Solen viridis	Mol	Biva	12	3.73	40.06	3	50
Spiophanes bombyx	Ann	Poly	12	3.73	43.79	3	50
Owenia fusiformis	Ann	Poly	9	2.80	46.58	4	67
Tellina (LPIL)	Mol	Biva	9	2.80	49.38	2	33
Eudevenopus honduranus	Art	Mala	8	2.48	51.86	4	67
Semele proficua	Mol	Biva	8	2.48	54.35	1	17
Notomastus hemipodus	Ann	Poly	7	2.17	56.52	2	33
Brachiopoda (LPIL)	Bra	-	6	1.86	58.39	2	33
Hemipodus roseus	Ann	Poly	6	1.86	60.25	3	50
Magelona papillicornis	Ann	Poly	6	1.86	62.11	3	50
Pagurus (LPIL)	Art	Mala	6	1.86	63.98	4	67
Amphiuridae (LPIL)	Ech	Ophi	5	1.55	65.53	2	33
Metatiron triocellatus	Art	Mala	5	1.55	67.08	2	33
Notomastus (LPIL)	Ann	Poly	5	1.55	68.63	1	17
Aoridae (LPIL)	Art	Mala	4	1.24	69.88	2	33
Olivella dealbata	Mol	Gast	4	1.24	71.12	1	17
Paguridae (LPIL)	Art	Mala	4	1.24	72.36	1	17
Batea catharinensis	Art	Mala	3	0.93	73.29	3	50
Bivalvia (LPIL)	Mol	Biva	3	0.93	74.22	1	17
Onuphis eremita oculata	Ann	Poly	3	0.93	75.16	3	50
Ophiuroidea (LPIL)	Ech	Ophi	3	0.93	76.09	2	33
Turbonilla (LPIL)	Mol	Gast	3	0.93	77.02	1	17
Cardiidae (LPIL)	Mol	Biva	2	0.62	77.64	1	17
Crassinella lunulata	Mol	Biva	2	0.62	78.26	1	17
Erichthonius brasiliensis	Art	Mala	2	0.62	78.88	2	33
Gibberosus myersi	Art	Mala	2	0.62	79.50	1	17
Malmgreniella maccraryae	Ann	Poly	2	0.62	80.12	1	17
Mediomastus (LPIL)	Ann	Poly	2	0.62	80.75	2	33
Nereididae (LPIL)	Ann	Poly	2	0.62	81.37	1	17
Photis (LPIL)	Art	Mala	2	0.62	81.99	1	17
Phyllodocidae (LPIL)	Ann	Poly	2	0.62	82.61	2	33
Processa (LPIL)	Art	Mala	2	0.62	83.23	1	17
Protodorvillea kefersteini	Ann	Poly	2	0.62	83.85	2	33
Sipuncula (LPIL)	Sip	-	2	0.62	84.47	2	33
Spio (LPIL)	Ann	Poly	2	0.62	85.09	1	17
Spiochaetopterus oculatus	Ann	Poly	2	0.62	85.71	1	17
Americhelidium americanum	Art	Mala	1	0.31	86.02	1	17
Amphipoda (LPIL)	Art	Mala	1	0.31	86.34	1	17
Anachis (LPIL)	Mol	Gast	1	0.31	86.65	1	17
Aonides (LPIL)	Ann	Poly	1	0.31	86.96	1	17
Aonides paucibranchiata	Ann	Poly	1	0.31	87.27	1	17
Brania wellfleetensis	Ann	Poly	1	0.31	87.58	1	17
Cirratulidae (LPIL)	Ann	Poly	1	0.31	87.89	1	17
Corophiidae (LPIL)	Art	Mala	1	0.31	88.20	1	17

Table 19 continued:

Taxa	Phylum	Class	Total No. Individuals	% Total	Cumulative %	Station Occurrence	% Station Occurrence
Crepidula (LPIL)	Mol	Gast	1	0.31	88.51	1	17
Diopatra cuprea	Ann	Poly	1	0.31	88.82	1	17
Dipolydora socialis	Ann	Poly	1	0.31	89.13	1	17
Dorvilleidae (LPIL)	Ann	Poly	1	0.31	89.44	1	17
Echinoidea (LPIL)	Ech	Echi	1	0.31	89.75	1	17
Exogone lourei	Ann	Poly	1	0.31	90.06	1	17
Gasteropteron rubrum	Mol	Gast	1	0.31	90.37	1	17
Gastropoda (LPIL)	Mol	Gast	1	0.31	90.68	1	17
Glycera (LPIL)	Ann	Poly	1	0.31	90.99	1	17
Glycera dibranchiata	Ann	Poly	1	0.31	91.30	1	17
Haustoriidae (LPIL)	Art	Mala	1	0.31	91.61	1	17
Leptochela (LPIL)	Art	Mala	1	0.31	91.92	1	17
Leptochela serratorbita	Art	Mala	1	0.31	92.23	1	17
Lucinidae (LPIL)	Mol	Biva	1	0.31	92.54	1	17
Magelona (LPIL)	Ann	Poly	1	0.31	92.86	1	17
Maldanidae (LPIL)	Ann	Poly	1	0.31	93.17	1	17
Mysidae (LPIL)	Art	Mala	1	0.31	93.48	1	17
Mytilidae (LPIL)	Mol	Biva	1	0.31	93.79	1	17
Naticidae (LPIL)	Mol	Gast	1	0.31	94.10	1	17
Ophelia denticulata	Ann	Poly	1	0.31	94.41	1	17
Pettiboneia duofurca	Ann	Poly	1	0.31	94.72	1	17
Phyllodoce (LPIL)	Ann	Poly	1	0.31	95.03	1	17
Pinnixa (LPIL)	Art	Mala	1	0.31	95.34	1	17
Pionosyllis gesae	Ann	Poly	1	0.31	95.65	1	17
Pisione remota	Ann	Poly	1	0.31	95.96	1	17
Portunus spinimanus	Art	Mala	1	0.31	96.27	1	17
Prionospio steenstrupi	Ann	Poly	1	0.31	96.58	1	17
Protohaustorius sp. B	Art	Mala	1	0.31	96.89	1	17
Scolelepis texana	Ann	Poly	1	0.31	97.20	1	17
Semele (LPIL)	Mol	Biva	1	0.31	97.51	1	17
Spio pettiboneae	Ann	Poly	1	0.31	97.82	1	17
Spionidae (LPIL)	Ann	Poly	1	0.31	98.13	1	17
Strigilla mirabilis	Mol	Biva	1	0.31	98.45	1	17
Syllidae (LPIL)	Ann	Poly	1	0.31	98.76	1	17
Synopiidae (LPIL)	Art	Mala	1	0.31	99.07	1	17
Tectonatica pusilla	Mol	Gast	1	0.31	99.38	1	17
Travisia carnea	Ann	Poly	1	0.31	99.69	1	17
Upogebia (LPIL)	Art	Mala	1	0.31	100.00	1	17

Taxa Key

Ann=Annelida
- Olig=Oligochaeta
- Poly=Polychaeta

Art=Arthropoda
- Mala=Malacostraca
- Ostr=Ostracoda

Bra=Brachiopoda

Cho=Chordata
- Lept=Leptocardia

Ech=Echinodermata
- Echi=Echinoidea
- Holo=Holothuroidea
- Ophi=Ophiuroidea

Mol=Mollusca
- Biva=Bivalvia
- Gast=Gastropoda
- Scap=Scaphopoda

Nem=Nemertea

Pho=Phoronida

Rhy=Rhynchocoela

Sip=Sipuncula

Table 20. Distribution and abundance of benthic macroinfaunal taxa for stations 1, 3, 6, 9, 11 and 12 outside the Jacksonville ODMDS, June 2009.

Taxa	Phylum	Class	Total No. Individuals	% Total	Cumulative %	Station Occurrence	% Station Occurrence
Owenia fusiformis	Ann	Poly	110	23.16	23.16	3	50
Protohaustorius sp. B	Art	Mala	20	4.21	27.37	2	33
Solen viridis	Mol	Biva	19	4.00	31.37	4	67
Magelona sp. H	Ann	Poly	18	3.79	35.16	1	17
Phoronis (LPIL)	Pho	-	16	3.37	38.53	2	33
Brachiopoda (LPIL)	Bra	-	14	2.95	41.47	3	50
Rhynchocoela (LPIL)	Rhy	-	13	2.74	44.21	2	33
Metharpinia floridana	Art	Mala	12	2.53	46.74	3	50
Ampelisca (LPIL)	Art	Mala	11	2.32	49.05	1	17
Corbula contracta	Mol	Biva	10	2.11	51.16	2	33
Ampelisca vadorum	Art	Mala	9	1.89	53.05	1	17
Aricidea finitima	Ann	Poly	9	1.89	54.95	3	50
Bivalvia (LPIL)	Mol	Biva	9	1.89	56.84	5	83
Dentalium texasianum	Mol	Scap	9	1.89	58.74	1	17
Mediomastus (LPIL)	Ann	Poly	9	1.89	60.63	2	33
Nemertea (LPIL)	Nem	-	9	1.89	62.53	1	17
Pagurus (LPIL)	Art	Mala	8	1.68	64.21	1	17
Polygordius (LPIL)	Ann	Poly	8	1.68	65.89	2	33
Lucinidae (LPIL)	Mol	Biva	7	1.47	67.37	4	67
Semele (LPIL)	Mol	Biva	7	1.47	68.84	2	33
Nephtys picta	Ann	Poly	6	1.26	70.11	3	50
Tectonatica pusilla	Mol	Gast	6	1.26	71.37	4	67
Goniadides carolinae	Ann	Poly	5	1.05	72.42	1	17
Scoletoma verrilli	Ann	Poly	5	1.05	73.47	1	17
Batea catharinensis	Art	Mala	4	0.84	74.32	2	33
Bhawania heteroseta	Ann	Poly	4	0.84	75.16	1	17
Tellina (LPIL)	Mol	Biva	4	0.84	76.00	3	50
Tubificidae (LPIL)	Ann	Olig	4	0.84	76.84	1	17
Aglaophamus verrilli	Ann	Poly	3	0.63	77.47	1	17
Amakusanthura magnifica	Art	Mala	3	0.63	78.11	2	33
Arcidae (LPIL)	Mol	Biva	3	0.63	78.74	2	33
Cirratulidae (LPIL)	Ann	Poly	3	0.63	79.37	1	17
Enchytraeidae (LPIL)	Ann	Olig	3	0.63	80.00	1	17
Euceramus praelongus	Art	Mala	3	0.63	80.63	2	33
Eudevenopus honduranus	Art	Mala	3	0.63	81.26	2	33
Magelona papillicornis	Ann	Poly	3	0.63	81.89	1	17
Photis (LPIL)	Art	Mala	3	0.63	82.53	1	17
Polycirrus eximius dubius	Ann	Poly	3	0.63	83.16	1	17
Sipuncula (LPIL)	Sip	-	3	0.63	83.79	3	50
Amphiuridae (LPIL)	Ech	Ophi	2	0.42	84.21	1	17
Apseudes sp. A	Art	Mala	2	0.42	84.63	1	17
Brania wellfleetensis	Ann	Poly	2	0.42	85.05	1	17
Goniada littorea	Ann	Poly	2	0.42	85.47	1	17
Holothuroidea (LPIL)	Ech	Holo	2	0.42	85.89	1	17
Maldanidae (LPIL)	Ann	Poly	2	0.42	86.32	1	17
Nereididae (LPIL)	Ann	Poly	2	0.42	86.74	1	17
Onuphidae (LPIL)	Ann	Poly	2	0.42	87.16	2	33
Paraprionospio pinnata	Ann	Poly	2	0.42	87.58	1	17
Phascolion strombi	Sip	-	2	0.42	88.00	2	33

Table 20 continued: Taxa	Phylum	Class	Total No. Individuals	% Total	Cumulative %	Station Occurrence	% Station Occurrence
Pinnixa (LPIL)	Art	Mala	2	0.42	88.42	2	33
Pionosyllis gesae	Ann	Poly	2	0.42	88.84	1	17
Spionidae (LPIL)	Ann	Poly	2	0.42	89.26	1	17
Tharyx acutus	Ann	Poly	2	0.42	89.68	1	17
Acteocina bidentata	Mol	Gast	1	0.21	89.89	1	17
Americhelidium americanum	Art	Mala	1	0.21	90.11	1	17
Ampelisca sp. R	Art	Mala	1	0.21	90.32	1	17
Ampithoidae (LPIL)	Art	Mala	1	0.21	90.53	1	17
Anachis (LPIL)	Mol	Gast	1	0.21	90.74	1	17
Ancistrosyllis hartmanae	Ann	Poly	1	0.21	90.95	1	17
Aoridae (LPIL)	Art	Mala	1	0.21	91.16	1	17
Caecum pulchellum	Mol	Gast	1	0.21	91.37	1	17
Cardiidae (LPIL)	Mol	Biva	1	0.21	91.58	1	17
Corbula (LPIL)	Mol	Biva	1	0.21	91.79	1	17
Crassinella lunulata	Mol	Biva	1	0.21	92.00	1	17
Diplodonta (LPIL)	Mol	Biva	1	0.21	92.21	1	17
Diplodonta semiaspera	Mol	Biva	1	0.21	92.42	1	17
Echinoidea (LPIL)	Ech	Echi	1	0.21	92.63	1	17
Edotia triloba	Art	Mala	1	0.21	92.84	1	17
Erichthonius brasiliensis	Art	Mala	1	0.21	93.05	1	17
Eumida sanguinea	Ann	Poly	1	0.21	93.26	1	17
Eusarsiella cresseyi	Art	Ostr	1	0.21	93.47	1	17
Gastropoda (LPIL)	Mol	Gast	1	0.21	93.68	1	17
Glycera (LPIL)	Ann	Poly	1	0.21	93.89	1	17
Glycera americana	Ann	Poly	1	0.21	94.11	1	17
Hemipodus roseus	Ann	Poly	1	0.21	94.32	1	17
Hesionidae (LPIL)	Ann	Poly	1	0.21	94.53	1	17
Lepidonotus sp. A	Ann	Poly	1	0.21	94.74	1	17
Lumbrineris (LPIL)	Ann	Poly	1	0.21	94.95	1	17
Magelona (LPIL)	Ann	Poly	1	0.21	95.16	1	17
Majidae (LPIL)	Art	Mala	1	0.21	95.37	1	17
Malmgreniella maccraryae	Ann	Poly	1	0.21	95.58	1	17
Melinna maculata	Ann	Poly	1	0.21	95.79	1	17
Metatiron (LPIL)	Art	Mala	1	0.21	96.00	1	17
Metatiron triocellatus	Art	Mala	1	0.21	96.21	1	17
Nephtys (LPIL)	Ann	Poly	1	0.21	96.42	1	17
Nereis (LPIL)	Ann	Poly	1	0.21	96.63	1	17
Nereis micromma	Ann	Poly	1	0.21	96.84	1	17
Nereis succinea	Ann	Poly	1	0.21	97.05	1	17
Onuphis eremita oculata	Ann	Poly	1	0.21	97.26	1	17
Paramphinome sp. B	Ann	Poly	1	0.21	97.47	1	17
Parapionosyllis uebelackerae	Ann	Poly	1	0.21	97.68	1	17
Phyllodoce (LPIL)	Ann	Poly	1	0.21	97.89	1	17
Pinnixa pearsei	Art	Mala	1	0.21	98.11	1	17
Prionospio (LPIL)	Ann	Poly	1	0.21	98.32	1	17
Protodorvillea kefersteini	Ann	Poly	1	0.21	98.53	1	17
Pseudophilomedes ambon	Art	Ostr	1	0.21	98.74	1	17
Rictaxis punctostriatus	Mol	Gast	1	0.21	98.95	1	17
Semele nuculoides	Mol	Biva	1	0.21	99.16	1	17
Spiochaetopterus oculatus	Ann	Poly	1	0.21	99.37	1	17
Strigilla mirabilis	Mol	Biva	1	0.21	99.58	1	17
Terebellidae (LPIL)	Ann	Poly	1	0.21	99.79	1	17
Terebra dislocata	Mol	Gast	1	0.21	100.00	1	17

Table 20 continued:

Taxa Key

Ann=Annelida
Olig=Oligochaeta
Poly=Polychaeta
Art=Arthropoda
Mala=Malacostraca
Ostr=Ostracoda
Bra=Brachiopoda
Cho=Chordata
Lept=Leptocardia
Ech=Echinodermata
Echi=Echinoidea
Holo=Holothuroidea
Ophi=Ophiuroidea
Mol=Mollusca
Biva=Bivalvia
Gast=Gastropoda
Scap=Scaphopoda
Nem=Nemertea
Pho=Phoronida
Rhy=Rhynchocoela
Sip=Sipuncula

Table 21. Percentage abundance of dominant benthic macroinfaunal taxa (>10% of the total) for the Jacksonville ODMDS stations, June 2009.

INSIDE

Taxa	2	4	5	7	8	10
Annelida						
Polychaeta						
Magelona papillicornis		10.5				
Notomastus hemipodus		15.8				
Owenia fusiformis					21.1	
Polygordius (LPIL)	26.7					
Arthropoda						
Malacostraca						
Eudevenopus honduranus					21.1	
Metharpinia floridana			14.7	14.3		23.5
Phoxocephalidae (LPIL)				16.7		
Brachiopoda						
Brachiopoda (LPIL)						
Mollusca						
Bivalvia						
Solen viridis		26.3				
Tellina (LPIL)		21.1				
Gastropoda						
Olivella dealbata						23.5

Table 21 Continued:

OUTSIDE

Taxa	1	3	6	9	11	12
Annelida						
Polychaeta						
Owenia fusiformis				42.2		
Polygordius (LPIL)	11.8					
Arthropoda						
Malacostraca						
Metharpinia floridana					22.7	
Protohaustorius sp. B		28.6			36.4	
Brachiopoda						
Brachiopoda (LPIL)	14.7					
Mollusca						
Bivalvia						
Bivalvia (LPIL)	11.8					
Lucinidae (LPIL)						10.3
Semele (LPIL)	17.6					
Solen viridis		42.9	10.0			
Gastropoda						
Tectonatica pusilla						10.3
Rhynchocoela						
Rhynchocoela (LPIL)						37.9

Table 22. Summary of abundance of major benthic macroinfaunal taxonomic groups for the Jacksonville ODMDS, June 2009.

Station	Taxa	Total No. Taxa	% Total	Total No. Individuals	% Total
2-In	Annelida	16	55.2	50	55.6
	Mollusca	4	13.8	14	15.6
	Arthropoda	4	13.8	9	10.0
	Echinodermata	1	3.4	1	1.1
	Other Taxa	4	13.8	16	17.8
	Total	**29**		**90**	
4-In	Annelida	4	33.3	12	31.6
	Mollusca	8	66.7	26	68.4
	Arthropoda	0	0.0	0	0.0
	Echinodermata	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	**12**		**38**	
5-In	Annelida	18	51.4	30	40.0
	Mollusca	2	5.7	2	2.7
	Arthropoda	12	34.3	27	36.0
	Echinodermata	1	2.9	4	5.3
	Other Taxa	2	5.7	12	16.0
	Total	**35**		**75**	
J-In	Annelida	15	44.1	33	39.3
	Mollusca	4	11.8	5	6.0
	Arthropoda	11	32.4	39	46.4
	Echinodermata	1	2.9	2	2.4
	Other Taxa	3	8.8	5	6.0
	Total	**34**		**84**	
8-In	Annelida	5	38.5	8	42.1
	Mollusca	1	7.7	1	5.3
	Arthropoda	6	46.2	9	47.4
	Echinodermata	1	7.7	1	5.3
	Other Taxa	0	0.0	0	0.0
	Total	**13**		**19**	
10-In	Annelida	1	9.1	1	5.9
	Mollusca	3	27.3	6	35.3
	Arthropoda	5	45.5	8	47.1
	Echinodermata	1	9.1	1	5.9
	Other Taxa	1	9.1	1	5.9
	Total	**11**		**17**	

Table 22 continued:

Station	Taxa	Total No. Taxa	% Total	Total No. Individuals	% Total
1-Out	Annelida	4	23.5	8	23.5
	Mollusca	8	47.1	16	47.1
	Arthropoda	3	17.6	4	11.8
	Echinodermata	0	0.0	0	0.0
	Other Taxa	2	11.8	6	17.6
	Total	**17**		**34**	
3-Out	Annelida	3	50.0	3	21.4
	Mollusca	2	33.3	7	50.0
	Arthropoda	1	16.7	4	28.6
	Echinodermata	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	**6**		**14**	
6-Out	Annelida	24	57.1	62	59.6
	Mollusca	9	21.4	27	26.0
	Arthropoda	7	16.7	7	6.7
	Echinodermata	1	2.4	2	1.9
	Other Taxa	1	2.4	6	5.8
	Total	**42**		**104**	
9-Out	Annelida	22	41.5	155	62.2
	Mollusca	9	17.0	20	8.0
	Arthropoda	12	22.6	43	17.3
	Echinodermata	1	1.9	2	0.8
	Other Taxa	9	17.0	29	11.6
	Total	**53**		**249**	
11-Out	Annelida	2	14.3	5	11.4
	Mollusca	5	35.7	6	13.6
	Arthropoda	6	42.9	31	70.5
	Echinodermata	0	0.0	0	0.0
	Other Taxa	1	7.1	2	4.5
	Total	**14**		**44**	
12-Out	Annelida	1	6.7	1	3.4
	Mollusca	6	40.0	10	34.5
	Arthropoda	3	20.0	3	10.3
	Echinodermata	1	6.7	1	3.4
	Other Taxa	4	26.7	14	48.3
	Total	**15**		**29**	

Table 23. Summary of assemblage parameters for the Jacksonville ODMDS stations, June 2009.

Station	Date (m/d/y)	Total No. Taxa	Total No. Individuals	Density (nos/m2)	H' Shannon (log e)	J' Pielou Evenness	D Margalef Richness
2-In	6/18/2009	29	90	2250.0	2.79	0.83	6.22
4-In	6/18/2009	12	38	950.0	2.08	0.84	3.02
5-In	6/18/2009	35	75	1875.0	3.21	0.90	7.87
7-In	6/18/2009	34	84	2100.0	3.04	0.86	7.45
8-In	6/18/2009	13	19	475.0	2.36	0.92	4.08
10-In	6/18/2009	11	17	425.0	2.18	0.91	3.53
	Mean	**22.33**	**53.83**	**1345.83**	**2.61**	**0.88**	**5.36**
	SD	**11.52**	**33.13**	**828.16**	**0.47**	**0.04**	**2.09**
1-Out	6/18/2009	17	34	850.0	2.57	0.91	4.54
3-Out	6/18/2009	6	14	350.0	1.48	0.82	1.89
6-Out	6/18/2009	42	104	2600.0	3.43	0.92	8.83
9-Out	6/18/2009	49	249	6225.0	2.61	0.67	8.70
11-Out	6/18/2009	14	44	1100.0	2.05	0.78	3.44
12-Out	6/18/2009	15	29	725.0	2.23	0.82	4.16
	Mean	**23.83**	**79.00**	**1975.00**	**2.39**	**0.82**	**5.26**
	SD	**17.34**	**88.88**	**2222.05**	**0.65**	**0.09**	**2.86**

Table 24. Summary of overall abundance of major benthic macroinfaunal groups for the Jacksonville ODMDS inside stations, June 2009.

INSIDE

Taxa	Total No. Taxa	% Total	Total No. Individuals	% Total
Annelida				
Polychaeta	39	44.3	134	41.5
Mollusca				
Bivalvia	10	11.4	41	12.7
Gastropoda	8	9.1	13	4.0
Arthropoda				
Malacostraca	24	27.3	92	28.5
Echinodermata				
Echinoidea	1	1.1	1	0.3
Ophiuroidea	2	2.3	8	2.5
Other Taxa	4	4.5	34	10.5
Total	**88**		**323**	

Table 25. Summary of overall abundance of major benthic macroinfaunal groups for the Jacksonville ODMDS outside stations, June 2009.

OUTSIDE

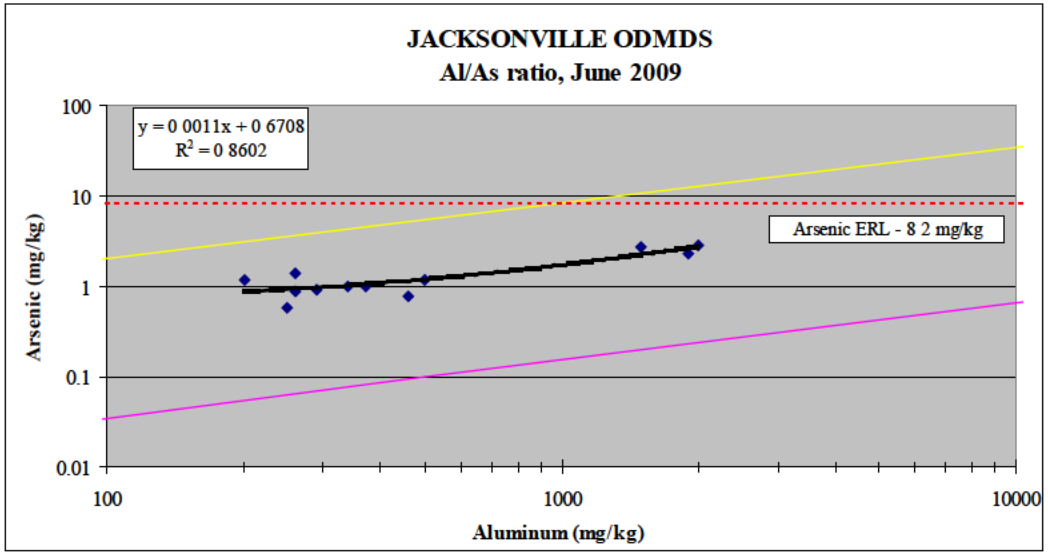
Taxa	Total No. Taxa	% Total	Total No. Individuals	% Total
Annelida				
Oligochaeta	2	2.0	7	1.5
Polychaeta	45	44.1	227	47.9
Mollusca				
Bivalvia	14	13.7	65	13.7
Gastropoda	7	6.9	12	2.5
Scaphopoda	1	1.0	9	1.9
Arthropoda				
Malacostraca	22	21.6	90	19.0
Ostracoda	2	2.0	2	0.4
Echinodermata				
Echinoidea	1	1.0	1	0.2
Holothuroidea	1	1.0	2	0.4
Ophiuroidea	1	1.0	2	0.4
Other Taxa	6	5.9	57	12.0
Total	**102**		**474**	

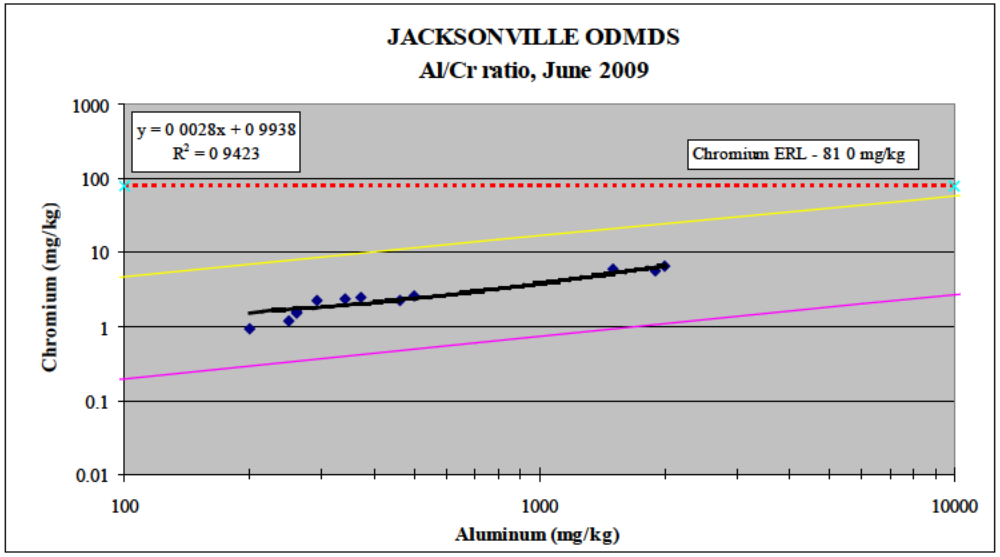
Table 26. Wet-weight biomass of major benthic macroinfaunal taxonomic groups for the Jacksonville ODMDS stations, June 2009.

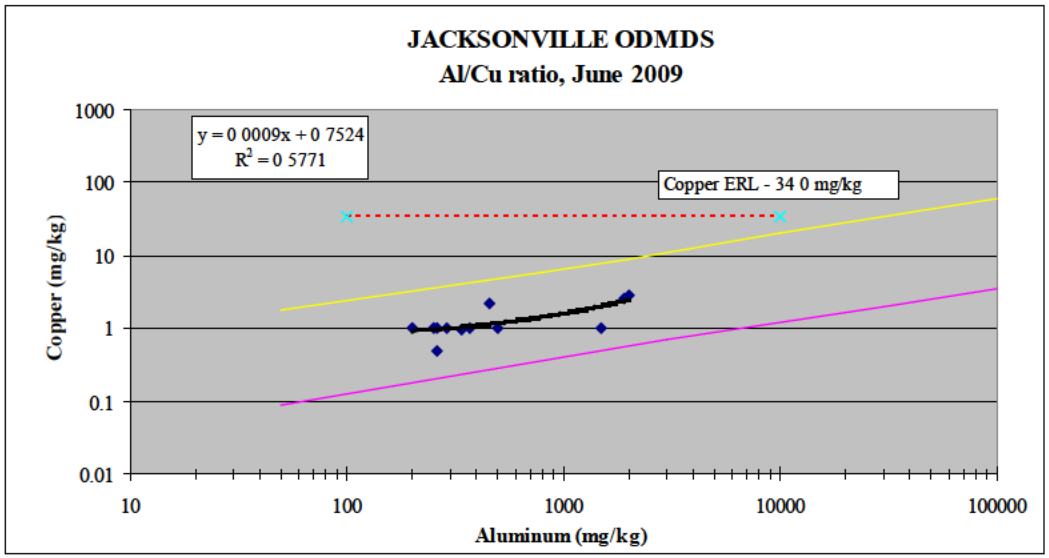
Station		Biomass (g)	Station		Biomass (g)
2 - In	Annelida	0.0935	**1 - Out**	Annelida	0.0183
	Mollusca	0.0766		Mollusca	0.1701
	Arthropoda	0.0086		Arthropoda	0.0018
	Echinodermata	0.0045		Echinodermata	0.0000
	Other Taxa	0.0245		Other Taxa	0.0019
	Total	0.2077		**Total**	0.1921
4 - In	Annelida	0.1034	**3 - Out**	Annelida	0.0589
	Mollusca	5.8914		Mollusca	0.8545
	Arthropoda	0.0000		Arthropoda	0.0019
	Echinodermata	0.0000		Echinodermata	0.0000
	Other Taxa	0.0404		Other Taxa	0.0000
	Total	6.0352		**Total**	0.9153
5 - In	Annelida	0.1890	**6 - Out**	Annelida	0.6653
	Mollusca	0.3134		Mollusca	1.5351
	Arthropoda	0.0231		Arthropoda	0.0118
	Echinodermata	0.1048		Echinodermata	0.0804
	Other Taxa	0.5803		Other Taxa	0.0170
	Total	1.2106		**Total**	2.3096
7 - In	Annelida	0.1935	**9 - Out**	Annelida	3.8349
	Mollusca	0.1614		Mollusca	1.0063
	Arthropoda	0.4454		Arthropoda	0.4130
	Echinodermata	0.0038		Echinodermata	0.0217
	Other Taxa	0.0041		Other Taxa	0.4687
	Total	0.8082		**Total**	5.7446
8 - In	Annelida	0.0862	**11 - Out**	Annelida	0.0141
	Mollusca	0.0203		Mollusca	2.8352
	Arthropoda	0.0534		Arthropoda	0.0214
	Echinodermata	0.0009		Echinodermata	0.0000
	Other Taxa	0.0000		Other Taxa	0.0037
	Total	0.1608		**Total**	2.8744
10 - In	Annelida	0.0143	**12 - Out**	Annelida	0.0002
	Mollusca	0.2063		Mollusca	0.0893
	Arthropoda	0.0027		Arthropoda	0.0014
	Echinodermata	0.0033		Echinodermata	0.2923
	Other Taxa	0.0119		Other Taxa	0.0063
	Total	0.2385		**Total**	0.3895

15.0 APPENDIX D: ALUMINUM TO METALS COMPARISON FOR ARSENIC, CHROMIUM, COPPER, LEAD & ZINC IN MARINE SEDIMENT – JACKSONVILLE ODMDS, JUNE 2009

FIGURE 8. ALUMINUM TO METALS COMPARISON - JACKSONVILLE ODMDS JUNE 2009







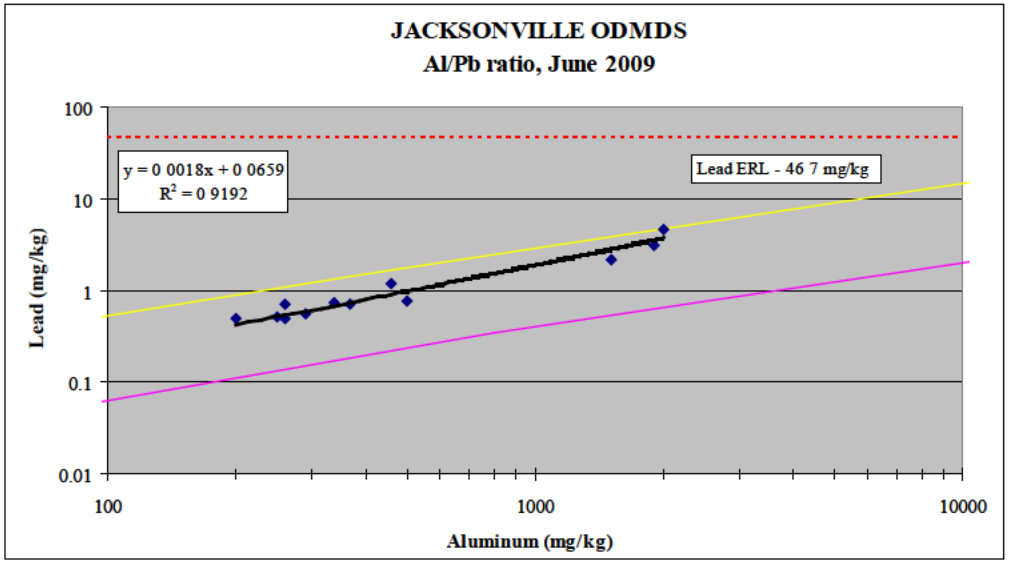
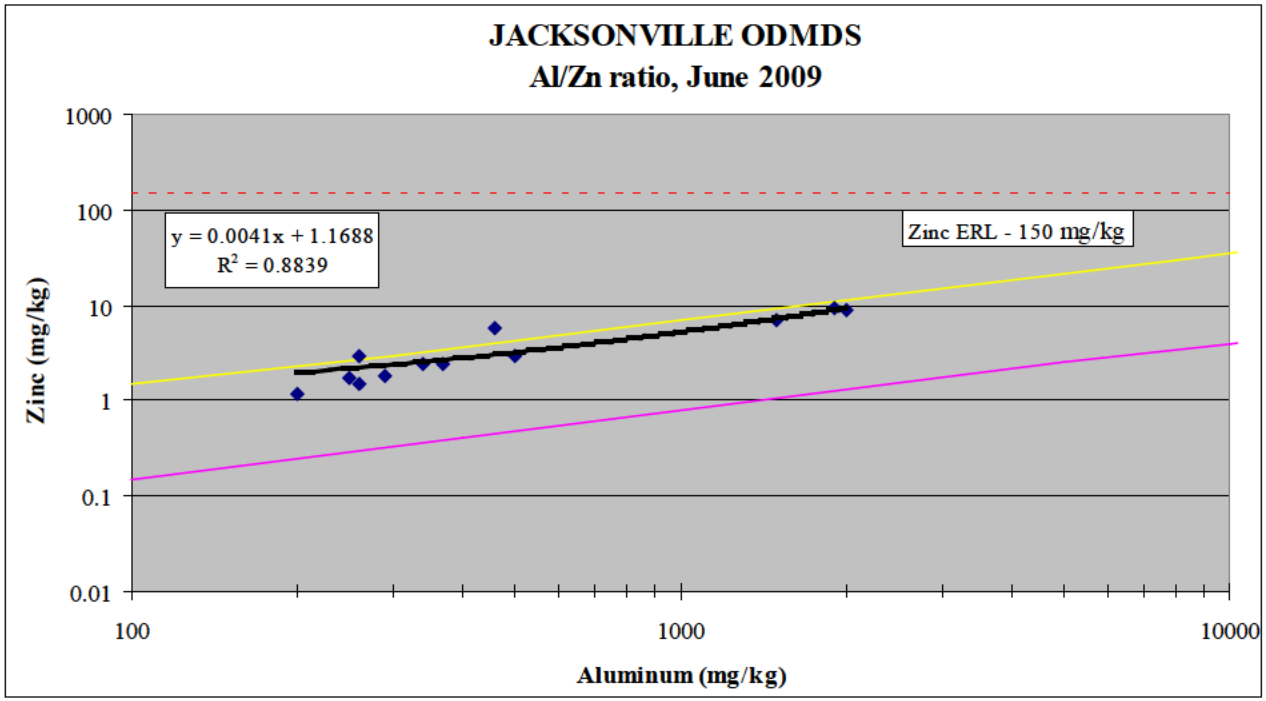


FIGURE 8, CONTINUED. ALUMINUM TO METALS COMPARISON - JACKSONVILLE ODMDS JUNE 2009



16.0 Appendix E: Seabird CTD Data from stations J01, J04, J05 & J12

Table 27. In-situ CTD Data from Stations J01, J04, J05 & J12

Station J01

Depth (m)	Cond. (S/m)	Temp (°C)	Salinity (psu)	Density (kg/m^3)	Fluorenscence (mg/m^3)	OBS (FTU)	Biospherical Irradiance	Surface Irradiance	Normalized Irradiance	O_2 (mg/l)	O_2 2 (mg/l)
2.00	5.37	27.21	33.81	21.75	3.48	0.66	627.00	1870.00	0.14	5.19	6.28
2.50	5.38	27.22	33.88	21.80	3.50	0.65	458.00	1870.00	0.11	5.20	6.28
3.00	5.39	27.23	33.92	21.83	3.59	0.65	342.00	1880.00	0.09	5.21	6.31
3.50	5.39	27.23	33.95	21.85	3.46	0.66	261.00	1870.00	0.06	5.21	6.31
4.00	5.40	27.24	34.00	21.87	3.40	0.62	214.00	1880.00	0.05	5.21	6.29
4.50	5.45	27.29	34.30	22.11	3.35	0.50	162.00	1880.00	0.04	5.24	6.36
5.00	5.49	27.32	34.59	22.31	2.75	0.43	121.00	1870.00	0.04	5.27	6.43
5.50	5.49	27.34	34.57	22.27	2.32	0.44	100.00	1880.00	0.03	5.28	6.40
6.00	5.51	27.18	34.81	22.52	2.46	0.40	76.70	1880.00	0.03	5.30	6.47
6.50	5.51	26.94	34.96	22.71	2.50	0.41	67.50	1870.00	0.03	5.30	6.43
7.00	5.49	26.77	35.01	22.80	2.72	0.41	57.80	1870.00	0.02	5.29	6.39
7.50	5.48	26.61	35.05	22.86	2.67	0.44	55.20	1870.00	0.02	5.27	6.26
8.00	5.44	25.97	35.25	23.25	3.02	0.74	47.40	1860.00	0.02	5.07	5.56
8.50	5.41	25.43	35.39	23.50	3.74	0.99	42.90	1870.00	0.02	4.81	5.18
9.00	5.37	24.91	35.55	23.79	3.91	0.98	38.20	1870.00	0.01	4.58	5.04
9.50	5.36	24.81	35.57	23.83	3.81	1.06	34.70	1880.00	0.01	4.45	4.90
10.00	5.35	24.66	35.60	23.90	3.89	1.12	30.80	1880.00	0.01	4.33	4.83
10.50	5.35	24.61	35.61	23.92	3.94	1.20	27.50	1880.00	0.01	4.27	4.77
11.00	5.34	24.53	35.63	23.96	3.94	1.36	24.50	1880.00	0.01	4.19	4.73
11.50	5.33	24.44	35.64	24.00	3.93	1.85	21.40	1890.00	0.01	4.16	4.71
12.00	5.33	24.40	35.65	24.01	3.77	2.31	19.50	1900.00	0.01	4.13	4.70
12.50	5.33	24.38	35.65	24.02	3.76	2.15	17.10	1900.00	0.01	4.11	4.70
13.00	5.33	24.38	35.65	24.02	3.80	2.23	15.30	1890.00	0.01	4.10	4.70
13.50	5.33	24.37	35.65	24.02	3.84	2.76	14.00	1900.00	0.00	4.07	4.70
14.00	5.33	24.36	35.65	24.03	3.95	2.45	11.90	1920.00	0.00	4.06	4.70
14.50	5.33	24.36	35.65	24.02	3.81	3.37	10.50	1900.00	0.00	4.05	4.68
15.00	5.33	24.35	35.65	24.03	3.99	3.95	9.29	1900.00	0.00	4.03	4.68
15.50	5.33	24.35	35.65	24.03	4.05	4.74	7.72	1890.00	0.00	4.01	4.67
15.00	5.33	24.36	35.65	24.02	3.96	5.44	8.07	1880.00	0.00	4.01	4.68
14.50	5.33	24.36	35.65	24.02	3.88	5.03	10.40	1900.00	0.00	3.96	4.69
14.00	5.33	24.36	35.65	24.03	3.92	3.61	13.20	1900.00	0.00	3.94	4.68
13.50	5.33	24.36	35.65	24.02	3.91	3.10	15.80	1900.00	0.00	3.94	4.69
13.00	5.33	24.37	35.65	24.02	3.93	2.62	19.30	1900.00	0.01	3.95	4.69
12.50	5.33	24.38	35.64	24.01	3.79	2.68	22.00	1910.00	0.01	3.95	4.70
12.00	5.33	24.39	35.64	24.01	3.85	2.17	25.20	1910.00	0.01	3.96	4.70

Table 27, continued.

Station J01 (Continued)

Depth (m)	Cond. (S/m)	Temp (°C)	Salinity (psu)	Density (kg/m^3)	Fluorenscence (mg/m^3)	OBS (FTU)	Biospherical Irradiance	Surface Irradiance	Normalized Irradiance	O_2 (mg/l)	O_2 2 (mg/l)
11.50	5.33	24.40	35.64	24.01	3.78	1.93	28.20	1910.00	0.01	3.96	4.71
11.00	5.33	24.40	35.64	24.01	3.79	2.08	31.30	1910.00	0.01	3.96	4.71
10.50	5.33	24.44	35.63	23.99	3.80	1.56	37.00	1910.00	0.01	3.96	4.71
10.00	5.34	24.47	35.63	23.97	3.75	1.31	44.20	1920.00	0.01	3.96	4.71
9 .50	5.34	24.50	35.62	23.97	3.79	1.48	53.40	1930.00	0.02	3.97	4.72
9.00	5.34	24.50	35.62	23.97	3.74	1.27	60.80	1920.00	0.02	3.97	4.72
8.50	5.34	24.52	35.62	23.95	3.83	1.16	71.10	1910.00	0.02	3.97	4.76
8.00	5.34	24.54	35.61	23.95	3.87	1.07	82.40	1910.00	0.03	3.97	4.76
7.50	5.34	24.58	35.60	23.92	3.82	1.04	100.00	1910.00	0.03	3.99	4.75
7.00	5.35	24.69	35.58	23.87	4.04	1.02	111.00	1920.00	0.04	4.02	4.80
6.50	5.35	24.72	35.57	23.86	4.13	0.97	122.00	1920.00	0.04	4.04	4.91
6.00	5.36	24.83	35.54	23.81	4.16	0.91	133.00	1910.00	0.05	4.08	4.98
5.50	5.37	24.95	35.51	23.74	3.97	0.81	157.00	1910.00	0.06	4.08	5.00
5.00	5.38	25.23	35.42	23.65	3.99	0.51	170.00	1920.00	0.06	4.20	5.23
4.50	5.46	26.48	34.99	22.84	3.86	0.50	184.00	1920.00	0.07	4.60	5.85
4.00	5.49	26.84	34.89	22.68	3.31	0.44	228.00	1920.00	0.08	4.83	6.22
3.50	5.48	26.77	34.93	22.74	2.93	0.43	279.00	1930.00	0.09	5.05	6.26
3.00	5.47	26.68	34.94	22.78	3.22	0.43	414.00	1920.00	0.10	5.09	6.22
2.50	5.48	26.70	34.93	22.76	2.99	0.45	539.00	1940.00	0.12	5.10	6.23
2.00	5.48	26.79	34.87	22.70	2.87	0.47	634.00	1950.00	0.14	5.13	6.29
1.50	5.45	27.02	34.51	22.33	2.88	0.48	855.00	1930.00	0.21	5.18	6.32
1.00	5.40	27.16	34.08	21.98	3.10	0.62	1510.00	1940.00	0.28	5.21	6.32
0.50	5.38	27.22	33.84	21.77	3.39	0.65	3530.00	1940.00	0.33	5.21	6.32
0.00	5.37	27.23	33.80	21.74	3.32	0.67	3530.00	1940.00	0.44	5.22	6.33
Avg.	5.37	25.24	35.30	23.49	3.68	1.68	395.01	1916.06	0.07	4.32	5.21

Table 27, continued.

Station J04											
Depth (m)	Cond. (S/m)	Temp (°C)	Salinity (psu)	Density (kg/m^3)	Fluorenscence (mg/m^3)	OBS (FTU)	Biospherical Irradiance	Surface Irradiance	Normalized Irradiance	O_2 (mg/l)	O_2 2 (mg/l)
5.00	5.58	28.30	34.51	21.92	2.18	0.49	85.60	2240.00	0.04	5.21	6.46
5.50	5.58	28.27	34.52	21.95	2.16	0.48	75.60	2250.00	0.03	5.23	6.47
6.00	5.58	28.23	34.56	21.97	2.15	0.48	66.10	2250.00	0.03	5.24	6.50
6.50	5.59	28.12	34.66	22.12	2.13	0.46	56.10	2250.00	0.02	5.24	6.50
7.00	5.59	28.04	34.72	22.17	2.16	0.42	49.80	2250.00	0.02	5.26	6.51
7.50	5.59	28.00	34.75	22.22	2.12	0.41	45.90	2250.00	0.02	5.27	6.52
8.00	5.59	27.98	34.75	22.21	2.08	0.40	42.40	2240.00	0.02	5.28	6.53
8.50	5.58	27.92	34.77	22.22	2.03	0.39		2240.00	0.00	5.25	6.48
9.00	5.57	27.77	34.81	22.34	1.83	0.39		2240.00	0.00	5.28	6.51
9.50	5.55	27.69	34.83	22.57	1.84	0.36		2240.00	0.00	5.30	6.54
9.00	5.57	27.69	34.81	22.33	2.00	0.30		2250.00	0.00	5.33	6.57
8.50	5.57	27.75	34.84	22.36	1.88	0.35		2240.00	0.00	5.34	6.54
8.00	5.56	27.54	34.92	22.50	1.80	0.33	42.40	2250.00	0.02	5.36	6.53
7.50	5.57	27.67	34.88	22.42	1.75	0.36	41.40	2240.00	0.02	5.36	6.53
7.00	5.58	27.81	34.84	22.34	1.71	0.38	49.10	2240.00	0.02	5.37	6.54
6.50	5.58	27.95	34.76	22.23	1.67	0.39	49.40	2240.00	0.02	5.38	6.55
6.00	5.59	28.05	34.70	22.12	1.64	0.43	60.20	2240.00	0.03	5.37	6.54
5.50	5.58	28.02	34.71	22.14	1.70	0.46	69.70	2240.00	0.03	5.35	6.51
5.00	5.58	27.92	34.77	22.29	1.70	0.50	83.90	2240.00	0.04	5.36	6.51
4.50	5.58	27.97	34.73	22.24	1.83	0.50	95.80	2240.00	0.04	5.36	6.50
4.00	5.58	28.14	34.60	22.02	1.96	0.49	109.00	2240.00	0.05	5.36	6.50
3.50	5.58	28.21	34.55	21.99	1.94	0.49	136.00	2240.00	0.06	5.36	6.49
3.00	5.58	28.30	34.46	21.90	2.02	0.51	166.00	2250.00	0.07	5.37	6.51
2.50	5.57	28.34	34.29	21.82	2.10	0.62	206.00	2250.00	0.09	5.41	6.53
2.00	5.52	28.43	33.63	21.51	2.13	0.70	279.00	2250.00	0.12	5.37	6.39
1.50	5.23	28.68	32.07	19.78	2.16	0.67	389.00	2250.00	0.17	5.33	6.27
1.00	5.15	28.96	31.18	19.12	2.23	0.71	549.00	2250.00	0.24	5.28	6.21
0.50	5.13	29.16	30.82	18.82	4.77	0.84	833.00	2250.00	0.37	5.22	6.18
0.00	5.14	29.15	30.86	18.95	6.99	0.47	1470.00	2250.00	0.65	5.04	6.13
Avg.	5.49	28.17	33.96	21.57	2.29	0.49	272.29	2244.50	0.10	5.33	6.45

Table 27, continued.

Station J05

Depth (m)	Cond (S/m)	Temp ('C)	Salinity (psu)	Density (kg/m^3)	Fluorenscence (mg/m^3)	OBS (FTU)	Biospherical Irradiance	Surface Irradiance	Normalized Irradiance	O_2 (mg/l)	$O_2$2 (mg/l)
3	5.48	27.35	34.45	22.18	2.72	0.46	474	2260	0.21	5.36	6.43
3.5	5.49	27.31	34.59	22.29	2.78	0.4	378	2260	0.17	5.36	6.43
4	5.52	27.27	34.82	22.51	2.76	0.33	334	2260	0.15	5.38	6.49
4.5	5.53	27.19	34.9	22.57	2.57	0.37	299	2260	0.13	5.4	6.49
5	5.51	26.97	34.94	22.67	2.37	0.44	258	2260	0.11	5.36	6.34
5.5	5.48	26.64	35.01	22.85	2.38	0.52	216	2260	0.1	5.3	6.2
6	5.46	26.22	35.14	23.03	3.13	0.65	215	2260	0.1	5.19	5.9
6.5	5.4	25.4	35.41	23.54	3.37	0.75	192	2260	0.08	4.94	5.38
7	5.36	24.83	35.57	23.86	3.62	1.01	168	2260	0.07	4.73	5.05
7.5	5.35	24.62	35.62	23.93	4.12	1.22	141	2260	0.06	4.6	4.9
8	5.34	24.51	35.64	23.98	4.26	1.36	127	2260	0.06	4.51	4.81
8.5	5.34	24.46	35.65	24	4.26	1.5	109	2260	0.05	4.45	4.77
9	5.34	24.45	35.65	24	4.15	1.54	93.6	2260	0.04	4.39	4.74
9.5	5.33	24.4	35.65	24.02	3.93	1.68	77	2230	0.03	4.31	4.69
10	5.33	24.39	35.65	24.02	3.91	1.85	65.8	2250	0.03	4.29	4.68
10.5	5.33	24.38	35.65	24.02	3.88	1.94	53.3	2260	0.02	4.28	4.67
11	5.33	24.36	35.65	24.03	3.79	2.01	43.9	2260	0.02	4.26	4.66
11.5	5.33	24.35	35.66	24.04	3.74	2.04	36.2	2270	0.02	4.23	4.64
12	5.33	24.35	35.65	24.03	3.96	2.17	30.9	2260	0.01	4.2	4.62
12.5	5.33	24.34	35.65	24.04	3.56	2.22	26.5	2260	0.01	4.17	4.6
13	5.32	24.33	35.66	24.04	3.64	2.75		2260	0	4.15	4.58
13.5	5.32	24.32	35.66	24.04	3.44	3.46		2260	0	4.13	4.58
14	5.33	24.34	35.65	24.03	3.69	4.14		2260	0	4.09	4.58
13.5	5.32	24.33	35.65	24.03	3.96	2.67		2260	0	4.04	4.58
13	5.32	24.33	35.65	24.03	3.51	3.34		2260	0	3.92	4.58
12.5	5.32	24.33	35.65	24.03	3.6	2.77	26.5	2260	0.01	3.88	4.57
12	5.32	24.34	35.65	24.03	3.67	2.52	30.8	2260	0.01	3.88	4.59
11.5	5.32	24.34	35.65	24.03	3.66	2.37	35.4	2260	0.02	3.88	4.59
11	5.32	24.35	35.64	24.03	3.61	2.25	45.7	2260	0.02	3.89	4.6
10.5	5.33	24.35	35.64	24.02	3.58	2.04	55.6	2250	0.02	3.89	4.61
10	5.33	24.38	35.64	24.01	3.85	1.98	65.9	2260	0.03	3.91	4.64
9.5	5.33	24.39	35.64	24.01	3.81	1.81	75.9	2260	0.03	3.92	4.65
9	5.33	24.39	35.64	24.01	3.82	1.69	91.2	2260	0.04	3.92	4.66
8.5	5.33	24.44	35.63	23.99	3.78	1.43	108	2260	0.05	3.94	4.69
8	5.34	24.51	35.61	23.95	3.96	1.27	124	2260	0.05	3.97	4.73

Table 27, continued.

Station J05 (Continued)

Depth (m)	Cond. (S/m)	Temp (°C)	Salinity (psu)	Density (kg/m^3)	Fluorenscence (mg/m^3)	OBS (FTU)	Biospherical Irradiance	Surface Irradiance	Normalized Irradiance	O_2 (mg/l)	O_2 2 (mg/l)
7.50	5.35	24.62	35.59	23.90	4.21	1.08	142.00	2260.00	0.06	4.02	4.83
7.00	5.37	24.93	35.52	23.76	4.24	0.86	159.00	2260.00	0.07	4.16	5.03
6.50	5.41	25.42	35.37	23.45	4.29	0.80	176.00	2260.00	0.08	4.32	5.30
6.00	5.45	26.08	35.18	23.14	4.12	0.48	197.00	2260.00	0.09	4.68	6.00
5.50	5.48	26.56	35.05	22.89	3.23	0.39	230.00	2270.00	0.10	4.92	6.28
5.00	5.48	26.64	35.01	22.84	3.17	0.44	265.00	2270.00	0.12	4.99	6.31
4.50	5.50	26.98	34.91	22.66	2.73	0.37	308.00	2270.00	0.14	5.11	6.41
4.00	5.51	27.07	34.90	22.62	2.62	0.37	365.00	2270.00	0.16	5.16	6.43
3.50	5.52	27.21	34.88	22.56	2.47	0.36	412.00	2260.00	0.18	5.22	6.46
3.00	5.50	27.29	34.69	22.39	2.45	0.38	466.00	2260.00	0.21	5.27	6.46
2.50	5.50	27.32	34.63	22.34	2.41	0.40	568.00	2260.00	0.25	5.34	6.47
2.00	5.48	27.34	34.50	22.21	2.38	0.39	673.00	2260.00	0.30	5.34	6.46
1.50	5.48	27.35	34.46	22.20	2.60	0.40	790.00	2260.00	0.35	5.34	6.46
1.00	5.48	27.35	34.47	22.21	2.67	0.42	982.00	2270.00	0.43	5.34	6.46
0.50	5.47	27.37	34.40	22.14	2.61	0.51	1210.00	2270.00	0.53	5.35	6.45
0.00	5.47	27.37	34.38	22.13	2.47	0.43	1470.00	2260.00	0.65	5.34	6.45
Avg.	5.41	25.69	35.20	23.27	3.34	1.22	348.92	2261.79	0.14	4.53	5.49

Table 27, continued.

Station J12											
Depth (m)	Cond. (S/m)	Temp (°C)	Salinity (psu)	Density (kg/m^3)	Fluorenscence (mg/m^3)	OBS (FTU)	Biospherical Irradiance	Surface Irradiance	Normalized Irradiance	O_2 (mg/l)	O_2 2 (mg/l)
0.00	5.55	28.17	34.37	21.87	1.83	-0.05	1260.00	2310.00	0.55	5.38	6.51
0.50	5.53	27.75	34.55	22.11	1.89	0.21	1340.00	2310.00	0.58	5.38	6.47
1.00	5.51	27.24	34.80	22.55	1.87	0.13	1020.00	2310.00	0.44	5.33	6.36
1.50	5.51	27.08	34.89	22.63	1.97	0.10	658.00	2310.00	0.28	5.30	6.33
2.00	5.51	27.03	34.92	22.68	2.10	0.38	741.00	2310.00	0.32	5.30	6.34
2.50	5.51	27.08	34.90	22.61	2.36	0.41	647.00	2310.00	0.28	5.30	6.35
3.00	5.51	27.12	34.88	22.59	2.66	0.40	617.00	2310.00	0.27	5.31	6.37
3.50	5.51	27.14	34.87	22.58	2.85	0.45	563.00	2310.00	0.24	5.32	6.39
4.00	5.51	27.13	34.87	22.55	2.77	0.39	404.00	2310.00	0.17	5.32	6.38
4.50	5.51	27.00	34.94	22.69	2.74	0.39	402.00	2310.00	0.17	5.30	6.34
5.00	5.50	26.89	34.99	22.75	2.85	0.41	385.00	2310.00	0.17	5.28	6.29
5.50	5.50	26.81	35.01	22.78	2.86	0.53	309.00	2310.00	0.13	5.26	6.24
6.00	5.49	26.74	35.03	22.82	2.89	0.45	338.00	2310.00	0.15	5.25	6.23
6.50	5.49	26.68	35.04	22.85	2.95	0.47	264.00	2310.00	0.11	5.23	6.20
7.00	5.48	26.56	35.07	22.89	3.25	0.51	244.00	2310.00	0.11	5.19	6.09
7.50	5.46	26.30	35.12	23.04	3.31	0.63	214.00	2310.00	0.09	5.12	5.94
8.00	5.44	26.01	35.20	23.17	3.31	0.77	192.00	2310.00	0.08	5.04	5.77
8.50	5.42	25.65	35.31	23.37	3.55	0.93	182.00	2310.00	0.08	4.91	5.53
9.00	5.39	25.30	35.42	23.59	3.65	1.11	147.00	2300.00	0.06	4.80	5.28
9.50	5.38	25.12	35.48	23.70	3.75	1.15	136.00	2300.00	0.06	4.72	5.19
10.00	5.38	25.07	35.49	23.68	3.83	1.12	117.00	2300.00	0.05	4.67	5.13
10.50	5.38	25.03	35.51	23.72	4.07	1.18	98.10	2300.00	0.04	4.63	5.08
11.00	5.38	25.00	35.51	23.73	4.46	1.10	82.40	2300.00	0.04	4.60	5.06
11.50	5.37	24.95	35.52	23.75	4.87	1.18	72.40	2300.00	0.03	4.56	5.00
12.00	5.36	24.78	35.56	23.82	4.59	1.40	64.20	2300.00	0.03	4.50	4.88
12.50	5.34	24.57	35.60	23.93	4.60	1.39	56.40	2310.00	0.02	4.43	4.79
13.00	5.33	24.44	35.62	23.98	4.50	1.62	49.30	2310.00	0.02	4.38	4.69
13.50	5.32	24.33	35.64	24.04	4.89	1.93	42.70	2310.00	0.02	4.33	4.62
14.00	5.32	24.28	35.65	24.06	4.53	2.10	41.90	2300.00	0.02	4.28	4.55
14.50	5.31	24.23	35.66	24.08	4.32	4.85		2300.00	0.00	4.24	4.50
15.00	5.31	24.20	35.66	24.10	4.10	15.35		2300.00	0.00	4.20	4.47
15.50	5.31	24.22	35.66	24.10	4.09	24.09		2300.00	0.00	4.19	4.47
15.00	5.32	24.24	35.66	24.07	4.24	10.16		2300.00	0.00	4.18	4.46
14.50	5.31	24.22	35.66	24.07	5.51	3.92		2310.00	0.00	4.10	4.45
14.00	5.31	24.24	35.65	24.06	4.99	3.38	41.90	2310.00	0.02	4.10	4.49

Table 27, continued.

Station J12 (Continued)

Depth (m)	Cond. (S/m)	Temp (°C)	Salinity (psu)	Density (kg/m^3)	Fluorenscence (mg/m^3)	OBS (FTU)	Biospherical Irradiance	Surface Irradiance	Normalized Irradiance	O_2 (mg/l)	O_2 2 (mg/l)
13.50	5.32	24.27	35.64	24.05	5.06	2.22	42.20	2310.00	0.02	4.09	4.52
13.00	5.32	24.36	35.62	24.00	3.66	1.52	49.30	2310.00	0.02	3.84	4.63
12.50	5.33	24.42	35.61	23.98	4.20	1.63	57.70	2310.00	0.02	3.90	4.65
12.00	5.34	24.52	35.59	23.92	4.15	1.44	65.50	2310.00	0.03	3.92	4.70
11.50	5.34	24.57	35.58	23.91	4.09	1.41	94.00	2310.00	0.04	3.94	4.74
11.00	5.35	24.63	35.57	23.89	4.24	1.39	104.00	2310.00	0.05	3.96	4.75
10.50	5.35	24.69	35.56	23.86	4.35	1.44	119.00	2310.00	0.05	3.98	4.79
10.00	5.35	24.75	35.55	23.84	4.43	1.41	136.00	2310.00	0.06	4.00	4.83
9.50	5.36	24.81	35.54	23.81	4.23	1.27	152.00	2310.00	0.07	4.00	4.84
9.00	5.36	24.88	35.53	23.79	4.46	1.12	177.00	2310.00	0.08	4.03	4.86
8.50	5.37	25.04	35.49	23.72	5.05	1.09	204.00	2310.00	0.09	4.07	4.91
8.00	5.40	25.28	35.42	23.54	5.25	1.10	205.00	2310.00	0.09	4.12	5.06
7.50	5.41	25.52	35.34	23.46	5.00	1.09	254.00	2310.00	0.11	4.21	5.36
7.00	5.43	25.88	35.23	23.25	4.99	1.05	279.00	2310.00	0.12	4.33	5.63
6.50	5.45	26.18	35.14	23.07	4.99	0.88	316.00	2310.00	0.14	4.43	5.78
6.00	5.47	26.41	35.07	22.93	4.92	0.73	344.00	2310.00	0.15	4.52	5.88
5.50	5.47	26.55	35.02	22.88	4.51	0.69	384.00	2310.00	0.17	4.59	5.98
5.00	5.48	26.67	34.99	22.82	4.14	0.65	384.00	2310.00	0.17	4.65	6.07
4.50	5.49	26.80	34.94	22.75	3.71	0.58	473.00	2310.00	0.20	4.72	6.09
4.00	5.50	26.96	34.88	22.65	3.53	0.42	568.00	2310.00	0.25	4.79	6.08
3.50	5.51	27.15	34.81	22.51	3.34	0.42	660.00	2310.00	0.29	4.85	6.13
3.00	5.51	27.25	34.77	22.46	3.17	0.41	631.00	2310.00	0.27	4.91	6.30
2.50	5.52	27.32	34.76	22.42	3.25	0.40	794.00	2310.00	0.34	4.95	6.38
2.00	5.52	27.31	34.79	22.46	2.15	0.22	861.00	2310.00	0.37	5.21	6.51
1.50	5.52	27.39	34.74	22.41	2.24	0.33	1110.00	2300.00	0.48	5.37	6.46
1.00	5.52	27.48	34.67	22.35	2.25	0.36	786.00	2300.00	0.34	5.37	6.47
0.50	5.53	27.62	34.46	22.26	2.26	0.26	1030.00	2300.00	0.45	6.20	7.49
0.00	5.54	27.82	33.69	22.10	2.41	-0.09	1430.00	2300.00	0.62	6.47	7.90
Avg.	5.42	25.73	35.21	23.29	4.03	2.09	405.23	2308.13	0.16	4.50	5.49

End of Report