Appendix 4-16: 2003-2004 Summary Report for Periphyton-based Stormwater Treatment Project

Professional Services Industries, Inc. and
Florida International University, February 2005

2003-2004
SUMMARY REPORT
for

PERIPHYTON-BASED STORMWATER TREATMENT PROJECT
Contract No. C-15858-A02

prepared for

South Florida Water Management District
Gun Club Road
West Palm Beach, Florida

February 2005

2003-2004
SUMMARY REPORT
for

PERIPHYTON-BASED STORMWATER TREATMENT PROJECT
Contract No. C-15858-A02

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1. PROJECT INTRODUCTION

1.1 Project Background

Some of the primary factors that affect the health and diversity of the Everglades ecosystem are the quantity, timing, and quality of the water entering the ecosystem. It has been determined that phosphorus loading is a particularly important parameter in evaluating the quality of water entering the system. The South Florida Water Management District (SFWMD, or the District) and other parties are engaged in research and demonstration of advanced treatment technologies (ATTs) that may be used in conjunction with existing and proposed stormwater treatment areas (STAs) with the objective of achieving the long-term water quality goals of the Everglades Program restoration efforts. Particular focus has been placed on the treatment of surface waters coming from the Everglades Agricultural Area (EAA) and the Lake Okeechobee watershed, where phosphorus loading is particularly high.

Periphyton-Based Stormwater Treatment Areas (PSTAs) are one of eight ATTs that are being evaluated by the District. PSTAs have primarily been evaluated as a post-STA treatment to help achieve compliance with the total phosphorus (TP) water quality criterion of 10 micrograms per liter (ug/L). A PSTA system is designed to have a sparse macrophyte community that provides structure to support the dominant periphyton assemblage. Phosphorus is removed from the water column by nutrient uptake by the wetland communities present and sequestered through algal mediated co-precipitation with calcium carbonate. Since normal water quality conditions will favor precipitation, the P will be bound into the accreted sediment layer, where it will remain in long-term storage. The effluent water leaving the PSTA would be significantly lower in P than the influent water entering the PSTA.

1.2 Report Organization

The 2003-2004 Summary Report provides a summary of data collected during routine operation of the field scale cells from July 2003 to December 2003 and a tracer study performed on Field Scale Cell #2, as well as details of two additional studies that were conducted by PSI and FIU in accordance with Amendment No. A02 to the approved scope of work. The report includes the following sections:

Section 1 Introduction
Section 2 Field Scale Treatment Wetlands
Section 3 STA-2 Limerock Pads
Section 4 STA-1W Test Cells
Section 5 References

A summary of tabulated field and laboratory data, along with copies of each laboratory report is included in Appendix A on a CD-ROM disk.

2. FIELD SCALE TREATMENT WETLANDS

2.1 Introduction

The District's research into PSTAs began in 1999 with the development of a three phase research plan. Phase I of the research plan involved the design, construction, and operation of three 1-acre PSTA cells (PSTA Test Cells) and 24 portable experimental mesocosms (Porta-PSTAs) in small trough tanks at the southern end of STA-1W. The initial data collected from these cells was summarized in the Phase I Summary Report, dated August 2000, prepared by CH2M HILL. Phase II of the research plan included continued operation of the Porta-PSTAs and test cells, as well as destructive sampling of the Porta-PSTA mesocosms. Data collected from these small-scale experiments was utilized to design and construct the four, 5-acre Field Scale Cells adjacent to STA-2, in Phase III of the research program. Phase III of the research program also included the operation and monitoring of the Field Scale Cells from July 2001 through December 2002. This monitoring work was performed by CH2M HILL and was summarized in the Phase III Summary Report, dated March, 2003.

At the end of the monitoring period under Phase III of the research program, the District elected to continue the operation of the Field Scale Cells for an additional year. The PSI/FIU research team was selected to perform the continuing monitoring under Contract No. C-15858, which was executed on May 10, 2003. Monitoring was begun by PSI/FIU on July 1, 2003. The PSTA cells were essentially dormant (i.e., no water was pumped into the cells) between December 2002 and July 2003. The District performed some minor improvements to the cells during the interim period, including re-piping of the influent piping from each of the cells. The re-piping was performed to allow a single pump to produce the flow into all cells, rather than separate pumps for each cell.

The original scope of work for Contract No. C-15858 included operation and monitoring of the four Field Scale Cells for a one-year period and performance of tracer studies in each of the cells. However, the contract was amended on two occasions due to factors outside the control of either party. The District elected to discontinue the monitoring of Field Scale Cell 4 (FSC 4 or Cell 4) due to poor performance of this cell during the initial Phase III monitoring period. The operation of the field scale cells was conducted continuously until October 22, 2003 when a leak in the influent piping forced the temporary cessation of pumping. The District issued a contract amendment (A01) which authorized the repair of the piping and formalized the reduced sampling associated with the deletion of FSC-4. After the piping repair was completed on November 19, 2003, the system operated for approximately 3 weeks until another piping leak, discovered on December 3, 2003, forced another shut-down of the pumps. After evaluating the problem, it was determined that the piping leaks were due to a

design flaw which needed to be corrected prior to continued operation of the system. At approximately the same time, the District began lowering the water level in STA-2, which severely limited the volume of water available to operate the Field Scale Cells. Based on the impending lack of available water and the necessity to expend funds to repair the pipeline, the District elected not to continue the operation of the Field Scale Cells. Instead of continuing to operate the Field Scale Cells, the District elected to perform short-term studies designed to provide additional information on the operation and fate of P in PSTA's. The remaining six months of monitoring of the Field Scale Cells was omitted from the scope of work in contract amendment A02. A sediment desorption study and a biological evaluation was added to the scope of work.

The desorption study involved the collection and analysis of sediment samples collected from the STA-1W PSTA test cells 3 and 8 and from FSC-1, FSC-2, and FSC-3. The collected samples were analyzed to determine the analytical composition of selected parameters. Then selected samples were dried and subjected to repeated extractions to determine desorption curves for various locations within each study area.

PSI/FIU also conducted a synoptic survey of the P-containing biotic compartments present in the two operating PSTA systems located within STA-2 (limerock pad, and three FSC cells) and the two STA-1W test cells. In each study area, numerous plots were established and percent coverage and dominant species were estimated in the field. Collected saples included benthic sediments and epipelic mats, submerged aquatic vegetation (SAV), dominant periphyton, and emergent macrophytes. Taxonomic enumeration and identification of algae and diatoms was performed on selected samples.

2.2 Site Description

The PSTA Field Scale Cells are located immediately to the west of STA-2, and approximately 1 mile east of U.S. Highway 27 in Palm Beach County, Florida, as shown on Figure 1-1. The field scale cells consist of four, 5-acre PSTA cells which were created by constructing earthen berms around each cell. The objective of the field scale research was to demonstrate the effectiveness of PSTAs in a larger scale system than undertaken by previous research. The construction of each cell differs slightly; the primary aspects of each cell are outlined below:

- **Cell 1** was constructed by installing and compacting a 24-inch imported limerock base on top of the native muck soils.
- **Cell 2** was constructed using similar methods as Cell 1. However, an interior berm was added to increase the hydraulic residence time in this cell by creating a serpentine flow path through the cell.

- **Cell 3** was constructed by scraping back the native muck layer and constructing the PSTA cell directly on the native limestone cap rock layer.
- **Cell 4** was constructed directly on top of the native muck layer with no surface preparation or amendments.

Water was provided to each cell from an inlet canal, located on the south side of the cells. The inlet canal received water by gravity flow from STA-2 through a pipe and horizontal wier (agridrain®). The level of water in the inlet canal was controlled by the agridrain®; however, during some periods of operation, low water levels in STA-2 resulted in very low flows into the inlet canal. Water was pumped from the inlet canal into the influent end of each cell using a diesel-powered pump. A piping manifold was constructed between the pump and each cell. Piping to each cell was equipped with an ultrasonic flowmeter, tied to a Campbell Scientific CR10x datalogger.

The outlet of each cell was equipped with a concrete outlet structure and an agridrain. The agridrains were used to control the water level in each cell. The water height could be adjusted by 6 cm increments by adding or removing weir plates from the agridrain. The agridrains drained into an outlet canal, which in turn flowed into the STA-2 seepage canal located on the east side of the PSTA field scale cell complex. Staff gauges were installed at each cell outlet to collect manual readings of stage height. Additionally, ultrasonic water level indicators/dataloggers (Infinities®) were installed at the outlet of each cell to monitor stage height on an hourly basis. One additional Infinties® datalogger was installed within the inlet canal to monitor the water depth in the inlet canal.

Scaffolding-type boardwalks were installed across the center of each cell to allow collection of mid-point samples. Bands of spikerush were planted near the inlet and outlet of each cell and at the mid-point just south of the boardwalk to assist in mixing the influent water and to prevent washout of the periphyton mat through the outlet structures. Additonally, ten groundwater monitoring wells were installed in the surounding levies and at the mid-point in each cell.

A water quality sonde and datalogger (Hydrolab/Campbell Scientific CR10x) was installed from the boardwalk in the center of Cell #3. Water quality measurements including pH, conductivity, temperature, and dissolved oxygen (D.O.) were collected on an hourly basis. A radiation sensor and datalogger was installed in the same location as the water quality sonde. The radiation sensor collected solar insolance and photosynthetically active radiation (PAR) measurements on an hourly basis.

Each cell was equipped with an ISCO Autosampler at the outlet for collection of weekly composite water samples for TP analysis. An ISCO Autosampler was also installed on the inlet canal.

All four cells were constructed during the first quarter of 2001. Figure 1-2 provides a schematic diagram of the field scale cells and Figure 1-3 is an aerial photograph. Operational characteristics and design criteria for each of the field scale cells are outlined on Table 1.

2.3 Operations

PSI began routine operation of the Field Scale Cells in July 2003. Operation of the Field Scale Cells continued until December when the District elected to shut-down the cells due to a pipe failure, along with a planned lowering of the water level in STA-2 which would have limited the amount of water available for pumping into the Field Scale Cells. Additionally, after the first couple of weeks of operation, the District elected not to perform monitoring in Field Scale Cell #4 due to poor performance of this cell during previous studies.

PSI conducted routine maintenance of equipment during every weekly site visit. Routine maintenance included monitoring and adjusting the PSTA pumps, checking the water levels within the cells, and recording field data into the field log. PSI collected weekly surface water quality measurements from the inlet, mid-point, and outlet of each cell, and the inlet canal. Additionally, groundwater measurements were collected from ten monitoring wells located around the perimeter and within each cell.

PSI downloaded data on a monthly basis from the water quality sonde data logger and meteorological datalogger located within FSC-3, the ultrasonic flowmeter datalogger that monitored flow into each cell, as well as four water level data loggers located at the outlet of FSC-1, FSC-2, FSC-3 and the inlet canal. PSI also obtained meteorological data from the District's remote access database for the District weather station located at structure S7 on a monthly basis. All of these data were incorporated into a standardized database, which was updated and submitted to the District on a monthly basis.

2.4 Sampling Protocol

Chemical characteristics of the PSTA site water were determined on 7-day composite samples collected in an autosampler and on grab samples collected weekly. A summary of the data collection activities is presented in Table 2-a.

2.4.1 Composite Surface Water Sampling

The weekly composite samples were collected using autosamplers located at the outflow of FSC-1, FSC-2, and FSC-3, and in the inlet canal. The autosamplers were programmed to collect an hourly sample aliquot over a one week period. The composite samples were collected in decontaminated 5-liter Nalgene containers. Prior to setting the sample container into the autosampler each

week, PSI added laboratory-grade nitric acid to the container as a preservative. These composite samples were collected the following week, transferred into the appropriate laboratory containers, preserved with additional nitric acid (as necessary) to a pH of less than 2 standard units, then shipped via overnight mail under chain of custody to the analytical laboratory for analysis. The weekly composite surface water samples were analyzed for total phosphorus (TP) content.

2.4.2 Grab Surface Water Sampling

Weekly surface water grab samples were collected from the inflow, midpoint, and outflow of FSC-1, FSC-2, and FSC-3 and monthly grab samples were collected from the inflow canal. Grab samples were obtained by collecting surface water from mid-depth in the water column using an extension pole grab sampler. Water samples for un-filtered, un-preserved analyses were collected directly into the appropriate sample container, after triple rinsing the container in the surface water. For filtered analyses and analyses with preservation requirements, water was collected in a decontaminated 500 ml Nalgene bottle (rinsed 3x). This sample was then split with approximately 150 ml being used to rinse and fill a decontaminated 140 ml syringe. A filter holder was attached to the syringe, water was flushed through the filter (0.45 μm Gelman Sciences membrane) and used to rinse and fill the bottles for filtered analysis. The remaining un-filtered water sample was then poured into pre-preserved sample containers, provided by the laboratory. All samples were immediately placed in an iced cooler and shipped via overnight mail under chain of custody to the analytical laboratory.

Due to the requirement for minority participation in the contract, some analyses were performed by PPB Environmental Laboratories, Inc. and some analyses were performed by PC&B Environmental Laboratory (a District-approved MBE firm). PPB performed analysis for TP, soluble reactive phosphorus (SRP), total dissolved phosphorus (TDP), soluble nitrate, nitrite (NO_3, NO_2; EPA 353.2), ammonia (NH_3; EPA 350.1), and total Kjeldahl nitrogen (TKN: ASTM D5176). PC&B performed analysis for total suspended solids (TSS), total organic C (TOC; EPA 415.1), alkalinity (APHA 2320), total Ca (APHA 3111 by flame atomic absorption), and chloride (Cl^- by ion chromatography; APHA 4110). A summary of analytical methods and method detection limits is presented in Table 2-b.

2.4.3 Groundwater Sampling

Additionally, weekly groundwater samples were collected from ten monitoring wells located throughout the area, as shown on Figure 1-2. Groundwater samples were collected in accordance with the Florida Department of Environmental Protection (FDEP), Standard Operating Procedures (SOP) 001/01 and Chapter 62-160, F.A.C. Prior to sampling, depth to water measurements were collected using an electronic interface probe. The volume of standing water in the casing was determined and the well was purged at a low flow rate using a

peristaltic pump attached to new polyethylene tubing. Water quality parameters (pH, temperature, conductivity, dissolved oxygen (DO), and turbidity) were collected after each well volume and purging continued until the designated field water quality parameters stabilized to within 5% for consecutive readings. A flow through cell and WTW® water quality sonde were utilized to collect field water quality measurements.

Following purging, groundwater samples were collected into new, laboratory-provided containers. The groundwater samples were immediately placed on ice and shipped via overnight courier to the laboratory under chain of custody procedures. The groundwater samples were analyzed for TP and chlorides.

2.4.4 Biological Sampling and Analyses

Three points were chosen for sampling within mid-reach of each cell (see Figure 2-1). Visual cover estimations and sample collection were initiated on June 30, 2003 and subsequently occurred once a month ending December 2003 prior to site shutdown. At each point, periphyton and macrophyte cover was visually estimated within a one square meter area. A 1 m^2 PVC frame was placed on the water surface at a fixed location. A digital picture was taken via a Nikon CoolPix®, 3 mp, digital camera with UV lens to aid in visual cover estimation. Periphyton and macrophyte type and characteristics were recorded in the field logbook.

The dominant form of periphyton was collected outside the 1 m^2 plot via mat and/or core collection. Epipelon, benthic periphyton associated with cap rock, was collected by coring and/or by cutting a mat sample against a cutting board. Metaphyton, floating periphyton, was collected from a known area of water surface against a cutting board. Core and mat dimensions were recorded for sample surface area and volume calculations. Multiple samples were collected from random points outside the 1 m^2 plot at each location and composited into one representative sample. Samples were placed out of sunlight and on ice until transferred to the laboratory for processing. Submerged aquatic vegetation (SAV), e.g. Chara spp., were collected outside the plot area using a 25 cm x 25 cm PVC frame (625 cm^2). The PVC frame was placed in water and a sample was removed from the entire water column within the frame. Water depth was measured at each location.

Samples were brought to the laboratory and weighed for total wet weight. A 0.25 gram subsample was extracted with 25 ml 0.01 M HCl for 1 hour to extract calcium-bound phosphorus. The sample was vacuum filtered (0.45 µm membrane filter) and analyzed for SRP (EPA 365.1) on a Technicon Autoanalyzer II System (Pulse Instruments Ltd.). A second 1 g subsample was brought to 50 ml DI water, thoroughly homogenized, and further processed for pigment extraction (Chlorophyll *a, b, c* and Pheophytin *a*; APHA 10200H) and analyzed on a HP 8452A diode-array spectrophotometer. The remaining sample

with known mass was dried at 80º C until constant weight (>72 h) to determine water content and dry mass (bulk density). A subsample of dried material was ashed in a muffle furnace at 550º C for 3 h to obtain ash content (ASTM D2974-87). The remaining dried material was ground to a fine powder, and a subsample was processed and analyzed for Total Phosphate (dry ashing - Solorzano and Sharp, EPA 365.1). Total Nitrogen and Total Carbon were analyzed on dried ground sample using a Perkin Elmer Series II 2400 CHNS/O Analyzer (method based on Nelson and Sommers, 1996).

Every other month, (August, October, and December, 2003) a known mass subsample was preserved for taxonomic identification. Diatoms and soft algae present in selected samples were microscopically enumerated, identified and quantified. Each periphyton sample was divided into two subsamples upon return to the laboratory; both were frozen with one being used for soft algae and the second for diatoms. For the soft algae, thawed samples were homogenized in a measured volume of distilled water then a 1 ml subsample of this was dried on a coverslip. The coverslip was inverted on a 0.2 ml drop of distilled water on a microslide, sealed with nail polish, and stored in the dark for no longer than 1 week prior to examination. Five-hundred algal cells were counted and identified from a homogenized subsample to determine species relative abundances. This number (500) was chosen based on analysis of other, similar south Florida algal material where counts exceeding 500 did not change relative abundance estimates more than 1 percent (and no new taxa were added; Prescott 1962, Komárek & Hindak 1975, Komárek & Anagnostidis 1986, Komárek & Anagnostidis 1989, Komárek & Anagnostidis 1999, Gaiser et al. In Press).

Diatoms were also identified in this sample to the lowest possible taxonomic unit (usually genus). The second subsample was used for fine resolution diatom identification. Organic material was removed from theses subsamples by sequential oxidation with H_2SO_4, $KMnO_4$, and oxalic acid in a 500 ml glass beaker. Following oxidation, beakers were filled with distilled water and allowed to settle for 6 hr. Samples were decanted, refilled and settled until a neutral pH was achieved. The final decant was aspirated by vacuum to a 10 ml volume. The final diatom slurry was transferred to a tared scintillation vial which was then re-weighed to estimate the sample volume. Subsamples of known volume were dried onto a coverslip until an appropriate density was obtained. Coverslips containing dried material from each sample were permanently fixed with Naphrax® mounting media onto glass slides. At least 500 diatom valves from each sample were identified to the lowest taxonomic unit using a variety of taxonomic compilations, including but not limited to: Hustedt 1927-1966, 1930, Schmidt et al. 1874-1959, Patrick & Reimer 1966, 1975, Krammer & Lange-Bertalot 1986-1997, Lange-Bertalot 1993, Metzeltin & Lange-Bertalot 1998, Witkowski et al. 2000, and Krammer 2000. For all identifications we also depended on the taxonomic database of specimens and images collected from Florida, available through the microscopy laboratory at FIU.

Field scale cells (1-3) ceased operation around January 2004, after more than three years of loading with P-laden water. In June 2004, after cessation of pumping for approximately 6 months, it was decided (under addendum 02) to determine the retention of P in this system. We sampled at 3 replicate locations at the inflow, midpoint, and outflow of each cell. Sample collection locations were labeled by site, location, and replicate according to Figure 2-2 for Cells 1 and 3, and Figure 2-3 for Cell 2. Sample locations and photographs are therefore labeled as S2F1I1 where S2F = STA2 Field scale, 1 is cell number (either 1, 2, or 3), I is location in a cell (either Inflow, Midpoint, or Outflow), and 1 = replicate plot number (either 1, 2, or 3). Cells 1 and 2 were dry with crusted materials on the limerock surface. Cell 3 had standing surface water that varied 27 to 66 cm depth (deeper water at inflow). Samples were collected using similar sample collection protocol as previously described with the exception of collection in dry cells 1 and 2. In these cells, sample was scraped and collected from within known areas (cm^2). A total of 40 samples were collected from known surface areas of the cells. Samples were analyzed using the same methods as previously discussed with the addition of Total Inorganic Carbon (TIC) analysis on ashed samples by elemental analysis as above.

To determine the potential stability/lability of TP in dried materials, we conducted a series of desorption extractions. One to two gram subsamples of dried, ground sample were placed in oven-dried and tared 50 ml polypropylene centrifuge tubes. Sample plus tube were weighed for initial weight prior to phosphorus desorption. A working solution of artificial marsh water was added to the samples (25 ml:2 g sample; 12.5 ml:1 g sample). Artificial Marsh Water (AMW) is a solution made of Autoclaved Distilled Deionized Water (ADDIH2O) with dissolved salts that is meant to mimic the matrix of Everglades Water and contains the following (in mg L^{-1}) NaHCO3, 23.0; KCl, 1.0; MgSO4 * 7 H2O, 1.0; MgCl2*6 H2O, 11.0; and CaCl2 * 2 H2O, 46. Final pH is adjusted to 7.5 with HCl (Jones and Amador, 1992). The tubes were capped tightly and shaken horizontally on a reciprocating shaker for 24 h. Following shaking, tubes were centrifuged for 20 min at 3400 rpm. The supernatant was gently decanted into a filter apparatus (47 mm, 0.45 µm membrane filter), being careful not to loose substrate material. The procedure was repeated several more times for a total of 10 extractions for each sample over 10 days. Samples were analyzed for SRP (EPA 365.1) then further digested and analyzed for TP. The pellets were then dried in the tube at 80 ºC for 72 h and weighed to determine mass lost following phosphorus desorption.

Specific comparisons of data were analyzed by ANOVA. Generally using biotic type (Chara, metaphyton, epipelon) and events (July, August, September, October, November, and December, 2003) as main effects. Post-hoc tests were conducted using Tukey or Dunnet C to determine specific differences. All

statistics were performed on SPSS v. 12. Average values referred to in the text are presented as means ± SD.

2.5 Data Presentation and Evaluation

2.5.1 Environmental Variables

2.5.1.1 Air Temperature

The average temperature during this period for July was 30.4 ^{o}C, 30.1 ^{o}C for August, 29.9 ^{o}C for September, 27.4 ^{o}C for October, 23.7 ^{o}C for November, and 18.4 ^{o}C for December. The monitoring equipment malfunctioned from August 6th to September 27th. Figure 2-4 presents a summary of the daily mean, maximum, and minimum air temperatures recorded at the Field-Scale site during this operational period.

2.5.1.2 Solar Radiation

Figures 2-5 and 2-6 summarize the total insulation and photosynthetically active radiation (PAR), respectively for this reporting period. During this research period, total insolation averaged 0.17 megajoules (MJ) per m^2/day (d) and PAR averaged 20.14 mols per m^2/d. The monitoring equipment malfunctioned from August 6th to September 27th.

2.5.1.3 Rainfall and Evapotranspiration

Rainfall and ET measurements are tabulated on Table 3. Figure 2-7a shows the measured rainfall for this research period, Figure 2-7b shows the estimated ET, and Figure 2-7c shows the net difference between the two for this period. The total rainfall for the July to December period was 45.9 cm (18.07 inches), which equates to an average daily rainfall of approximately 0.24 cm/d (0.095 in/d). The total ET for the period was 61.5 cm (24.21 in), which equals to an average daily ET value of approximately 0.33 cm/d (0.13 in/d). These data indicate that there was a net loss of approximately 15.6 cm (6.14 in), or an average loss of 0.09 cm/day (0.03 in/day) during this research period.

2.5.2 Flow

2.5.2.1 Stage/Depth

A summary of the weekly average water depths in each cell is tabulated in Table 4. Figure 2-8 summarizes the depth of water for Cell 1, 2, and 3 for this reporting period. The average depth of water in Cell 1 for this research period was 28.49 cm, Cell 2 was 15.10 cm, and Cell 3 was 32.02 cm. It should be noted that there are four weekly periods in which the water depth in Cell 2 was calculated, based on ultrasonic water level datalogger measurements, to be less than zero. In each of these cases, very low water depths (<12 cm) were measured in Cell 2 during weekly manual reading of the staff gage in this Cell. It appears that the low water levels caused erroneous readings on the ultrasonic water level recorder.

2.5.2.2 Flow

Inflow measurements in each cell were recorded on 15 minute intervals utilizing an ultrasonic flow meter and Campell CR10x datalogger. Outflow measurements were calculated using the stage elevation measurements collected at hourly intervals at the outflow via ultrasonic water depth dataloggers (Infinities). The height of the outlet weir was subtracted from the stage elevation to determine the height of water over the weir, which was then utilized to calculate outflow in cubic meters per day. A summary of weekly average inflow and outflow measurements is included in Table 3, along with the calculated net change in storage.

Inflow and Outflow measurements for Cells 1, 2, and 3 are shown on Figures 2-9a, b, and c, respectively. Cell 1 had an average inflow of 584 cubic meters per day (m3/d) with an average outflow of 92 m3/d for this reporting period. Cell 2 had an average inflow of 880 m3/d with an average ouflow 212 m3/d. Cell 3 had an average inflow of 730 m3/d with an average outflow of 931 m3/d.

It should be noted that the data set contains a large number of censored data due to malfunctions in the ultrasonic flow meters caused by air in the inlet piping. The pumps were down from approximately October 10-16 due to mechanical problems. Additionally, the water level in the inlet canal was significantly lowered during the period between mid-September and mid-October due to lowering of the water in STA-2 for maintenance activities. During this period, the pumping rate to the cells was substantially reduced to keep the pumps from running dry. Even still, air in the intake lines caused a large percentage of erroneous data for this time period.

A leak in the pipeline was discovered on October 22, 2003, which resulted in the shut-down of the pumps until November 19, 2003, when the pipeline was

repaired. Another leak was discovered on December 3, 2003 and the pumps were permanently shut down on that date.

2.5.2.3 Hydraulic Loading

Calculated weekly average hydraulic loading rates for each cell in centimeters per day (cm/day) are tabulated in Table 5. Figure 2-10 summarizes the average hydaulic loading based on the inlet and outlet flow values for each Cell. The average hydrulic loading for Cell 1 was 1.59 cm/d, while Cell 2 had an average value of 2.60 cm/d and Cell 3 had an average value of 4.28 cm/d. For Cell 1, the average value for hydraulic loading at the inlet was 2.76 cm/d with an outlet value of 0.42 cm/d. Cell 2 had an average inlet value of 4.20 cm/d with an outlet value of 1.00 cm/d. Cell 3 had an average inlet value of 3.06 cm/d with an outlet value of 4.71 cm/d.

2.5.3 Surface Water Field Measurements

Surface water field measurements including temperature, pH, conductivity, total dissolved solids, and dissolved oxygen were collected from the inlet canal and all three cells using hand held meters. A summary of these weekly measurements is tabulated in Table 6.

2.5.3.1 Water Temperature

Surface water temperatures for all three cells are presented in Figure 2-11. Weekly average water temperature in the inflow canal varied between 16 and 35 Celsius (^{o}C). The average weekly temperatures at the cell outflows ranged between 16 to 35 ^{o}C. The highest temperatures for the cells were recorded for the week of July 31st. The monthly averages for the inflow canal range from 19 ^{o}C to 32 ^{o}C, while average monthly temperatures ranged from 19 to 30 ^{o}C.

2.5.3.2 Conductivity

Surface water conductivity measurements for all three cells and the inflow canal are presented in Figure 2-12. The conductivity generally ranged between 400 and 1400 microhoms per centimeter (umhos/cm) for all cells throughout the research period. However, note that measurements collected on August 14 and August 21 were unusually low and are not believed to be representative. Large rainfall events ocurred during sampling on both of these dates which may have affected the data.

2.5.3.3 pH

Surface water pH measurements for all three cells and the inflow canal are presented in Figure 2-13. pH increased through the three limerock cells from a value of 8.0 units in the inflow canal to a value of 8.6 in Cell 1 outflow, 8.2 in Cell 2 outflow, and 8.3 in Cell 3 outflow. Cell 4 was not monitored for pH during this

period. Cell 1 had the largest change in pH, from a value of about 8.07 for the inflow to a value of about 8.57 for the outflow.

2.5.3.4 Dissolved Oxygen

Weekly dissolved oxygen measurements for all three cells and the inflow canal are presented in Figure 2-14. The average dissolved oxygen (DO) in the inflow canal was about 6.4 mg/L. The cell outflow averages were between 6.3 and 6.8 mg/L during this operational period.

2.5.4 Surface Water Quality Analyses

2.5.4.1 Phosphorus

Phosphorus measurements, including TP, total dissolved phosphorus (TDP) and soluble reactive phosphorus (SRP) were collected from each cell on a weekly basis. Composite samples were also collected weekly from the outflow of each cell for TP analysis. A summary of the weekly TP, TDP, and SRP concentrations in each cell is tabulated in Table 7. Figure 2-15a summarizes the weekly inlet phosphorus (P) surface water data for the research period. Weekly outlet phosphorus data is presented in Figure 2-15b and total phosphorus reduction (outlow/inflow) data is presented in Figure 2-15c.

Average TP in the inflow canal was 0.016 miligrams per Liter (mg/L) during this period. Of this TP, 0.009 mg/L (56 percent) was in the dissolved form with about half as soluble reactive.

Inflow TP concentrations into Cells 1, 2, and 3 averaged 0.024 mg/L, 0.031 mg/L and 0.015 mg/L, respectively for the research period. Outflow TP concentrations for the research period averaged 0.025 mg/L, 0.021 mg/L, and 0.014 mg/L in Cells 1, 2, and 3, respectively. For Cells 1 and 3, the TP concentrations in the outlet were actually greater than the inlet TP concentration on several occasions. Cell 2 consistently had the best reduction in TP concentrations between the inlet and outlet, with an average concentration reduction of 33%.

A mass balance was also calculated for each cell to determine the phosphorus reduction. The TP mass balance is presented as Table 5. The mass of phosphorus entering and leaving each cell was calculated in grams per meter squared per year (g/m^2/year). Phosphorus removal efficiencies were calculated by comparing the mass of phosphorus entering the cell to the mass of phosphorus leaving the cell. In addition to the TP concentrations, the removal efficiency is also directly related to the hydraulic loading in each cell. Cell 1 had the best performance with an average reduction of 83.92%, followed closely by Cell 2 at 83.85%. Cell 3 had a removal efficiency of –8.31 %, indicating a net export of phosphorus. The negative removal efficiency appears to be partially

related to the fact that the average outflow in this cell was calculated to be higher than the inflow.

2.5.4.2 Nitrogen

Nitrogen measurements, including total nitrogen (TN), total Kjeldahl nitrogen (TKN) and nitrate/nitrite (NOx) were collected from each cell on a weekly basis. A summary of the weekly measurements for each form of nitrogen in each cell is tabulated in Table 8. Figures 2-16a, 2-16b, and 2-16c summarize the monthly average total nitrogen and total kjeldahl nitrogen data for Cells 1, 2, and 3, respectively. Average inflow TN was between 1.9 and 2.9 mg/L. The majority of the TN was in in the TKN form. A reduction in total nitrogen between the inlet and outlet was generally measured for all cells, with the exception of the July and December measurements for Cell 1, the December measurements for Cell 2, and the July period for Cell 3.

2.5.4.3 Alkalinity

Weekly alkalinity measurements for the inlet and outlet of each cell are tabulated in Table 9. Figures 2-17a, 2-17b, and 2-17c summarize the analytical data for alkalinity for Cells 1, 2, and 3, respectively.

Inlet alkalinity concentrations for each of the cells generally ranged from 200 mg/L to 350 mg/L, with a significant reduction in concentrations between the inlet and outlet alkalinity in every cell. As shown in Figure 2-17, Cell 1 appears to have the greatest reduction in alkalinity, while Cell 3 had significantly less reduction between inlet and outlet values.

2.5.4.4 Calcium

Weekly calcium measurements for the inlet and outlet of each cell are tabulated in Table 9. Figures 2-18a, 2-18b, and 2-18c summarize the analytical data for dissolved calcium for Cells 1, 2, and 3, respectively. Monthly averages of calcium concentatrions showed a decrease of about half to one-third at the outlet location for all three cells, compared to the inlet. A large inflow of calcium to the three cells was observed from August through October, however, calcium concentations greatly decreased at the inlet for all three cells for the months of November and December as shown in the charts.

2.5.4.5 Chlorides

Weekly chloride measurements for the inlet and outlet of each cell are tabulated in Table 9. Figures 2-19a, 2-19b, and 2-19c summarize the analytical data for chlorides for Cells 1, 2, and 3, respectively. Chloride concentrations generally ranged from 100 mg/L to 200 mg/L in all three cells throughout the research period. On average, chloride concentrations were slightly lower in the outlet than the inlet of each cell.

2.5.4.6 Total Suspended Solids

Weekly total suspended solids (TSS) measurements for the inlet and outlet of each cell are tabulated in Table 9. Figures 2-20a, 2-20b, and 2-20c summarize the analytical data for TSS for Cells 1, 2, and 3, respectively. TSS concentrations ranging from less than 1 mg/L to 14 mg/L were measured throughout the research period. In general, the lowest TSS values for both inlet and outlet were reported for Cell 1. There appears to be an overall decrease in total suspended solids (TSS) loading for all of the cells during this reporting period.

2.5.5 Groundwater

Groundwater samples were collected and depth to water measurements were recorded on a weekly basis for all ten monitoring wells at the site. Monitoring wells MW-7, MW-8 and MW-9 are located in the center of Cells 1, 2, and 3, respectively. Since these wells have the closest interaction with surface water, only information from these wells is presented herein. Weekly laboratory measurements of TP, chlorides, and total dissolved solids for MW-7, MW-8, and MW-9 are tabulated in Table 10 and weekly water level measurements for these wells are tabulated in Table 11.

2.5.5.1 Depth to Groundwater

Weekly depth to groundwater measurements for MW-7, MW-8, and MW-9 are shown in Figure 2-21. Depth to groundwater measurements in each cell remained relatively consistent across the research period. The average depth to water in MW-7, MW-8 and MW-9 was 6.19 feet below top of casing, 5.61 feet below top of casing, and 2.89 feet below top of casing, respectively. The depth to water in MW-7 was significantly lower than the other wells since Cell 3 was excavated down to cap rock.

2.5.5.2 Field Parameters (pH, Conductivity, Temperature)

The values for pH and temerature were generally consistant for all three wells. Average pH in all wells was 6.93, ranging from 6.8 to 7.2. Average temperature in all wells was 25 ^{o}C, ranging from 24.4 to 26.8 ^{o}C. Conductivity values were highest in MW-7, while MW-9 had the lowest values for this research period. Average conductivity for MW-7 was 1636 umhos/cm, ranging from 1449 to 1835 umhos/cm during this operational period. Average conductivity for MW-8 was 1536, ranging from 1381 to 1609 umhos/cm during this research period. MW-9 had the lowest average conductivity value of 1338 umhos/cm for this monitoring period with values ranging from 1229 to 1431 umhos/cm.

2.5.5.3 Phosphorus

Total phosphorus concentrations in MW-7, MW-8, and MW-9 are tabulated in Table 10 and are graphically illustrated in Figure 2-22. TP concentrations in all

wells were generally consistent throughout the monitoring period. Average total phosphorus (TP) concentrations for monitoring wells, 7, 8, and 9 for this research period were 0.0098 mg/L, 0.012 mg/L, and 0.010 mg/L, respectively. It does not appear that a net export of TP from the cells is occurring through groundwater transport.

2.5.5.4 Chlorides

Chloride concentrations in MW-7, MW-8, and MW-9 are shown in Figure 2-23. Chloride concentrations in all wells remained relatively consistent throughout the monitoring period. The average chloride concentration for MW-7 was 272 mg/L, MW-8 had an average value of 238 mg/L, and MW-9 had an average value of 153 mg/L.

2.5.5.5 Total Disolved Solids

Total Dissolved Solids (TDS) concentrations in MW-7, MW-8 and MW-9 are shown on Figure 2-24. TDS concentrations in all three monitoring wells followed a consistent trend. The lowest average TDS concentration for this research period was 984 mg/L in MW-9. MW-7 had the highest value of TDS(1155 mg/L), while MW-8 had an average value of 1092 mg/L. An anomaly occurred on August 21st which is most likely caused by a malfunction of the sensor.

2.5.6 Biological Analyses

2.5.6.1 Total P mass per unit area, concentration, and biotic biomass.

Biological evaluation of the field scale cells (FSC) began in July, 2003 with the collection of the dominant forms of periphyton or SAV present in three representative replicate plots at the midpoints in each of the three cells. It quickly became apparent that each of the cells was "dominated" (biomass, g dw m^{-2}) by differing biotic communities (Figure 2-25). Although there was spatial heterogeneity, and mixing of biotic types, the midpoint of Cell 1 was largely dominated by periphytized *Chara spp.* while Cell 2 was dominated by floating metaphytic mats and Cell 3 was dominated by epipelic periphyton (with some *Chara spp.* present during some sampling events). During the July sampling, Cell 1 had the majority of sequestered TP in epipelic material (Figure 2-26). However by the second sampling of August and for the remainder of the study this cell was dominated by extensive *Chara spp.* growth. To make comparisons between the cells we determined the mass TP per unit area in the dominant biotic compartments. Therefore we considered Cell 1 as *Chara spp.*, Cell 2 as Metaphyton, and Cell 3 as Epipelon. The greatest mass TP contained per unit area occurred in Cell 1 when it was dominated by *Chara spp.* (Figure 2-27). Overall there was a significant effect of type ($p < 0.001$) but not a significant effect of event or the interaction. Pairwise comparisons (based on LSD) generally show that the differences in the mass P sequestered by each type did not differ significantly until the September event when the TP contained in the

Chara spp. of Cell 1 greatly exceeded that of either the metaphyton or epipelon. The metaphyton and epipelon compartments did not contain significantly different TP during the duration of sampling.

The concentration of TP contained in biomass (µg TP g^{-1} dry weight, dw), and the mass biomass present per unit area (g dw m^{-2}) were compared to determine if the retention of TP is more a function of concentration or size of the "biotic" component. It should be noted that although these compartments are considered "biotic types" each contains a considerable amount of inorganic materials (see below). The concentration of TP in biomass differed by type ($p < 0.001$) with higher TP concentrations in *Chara spp.* than in metaphyton which in turn was significantly greater than in epipelon (Figure 2-28). Concentrations did not differ significantly by event. Dry weight biomass per unit area was analyzed to determine the effect of the size of the biotic compartment on the TP retention (Figure 2-29). There was a significant effect of type ($p < 0.001$) with the dry mass of *Chara spp.* and epipelon being greater than metaphyton but not differing from each other. The effect of sampling event and the interaction were also significantly different. Pairwise comparisons show that there were no significant differences in biomass between types for the first two events. The increase in *Chara spp.* growth between August and September, 2003, led to its biomass being significantly greater than metaphyton or epipelon. By October, 2003 the epipelon biomass increased to where it was not significantly different from *Chara spp.* with both being greater than the metaphyton. The biomass of metaphyton increased between October and November such that there were no significant differences between types during the November sampling. By the final sampling event of December, 2003 there was a dramatic and significant increase in the mass of epipelon causing differences between it and the other types. This may be due, in part, to accumulation of materials falling out of the water column to the benthos and being collected with the epipelon.

Although ash content can have an effect on the dry weight per unit area, this increase was not due to changes in the relative ash contents of each type as the ash content tended to remain constant (< 15% variation) within a type throughout sampling (no significant effect of sampling event) (Figure 2-30). Ash contents differed by type ($p < 0.001$) with *Chara spp.* having significantly less ash (mean = 58 %), and thus higher proportion of organic matter, than either metaphyton (mean = 68%) or epipelon (mean = 84%). Epipelon had significantly greater ash content than metaphyton.

Ash content did have an effect on differences in TP concentrations in the biomass of types (Figure 2-31). On a dry weight basis TP concentration was significantly different between types in the order: *Chara spp.*. > metaphyton > epipelon (Figure 2-28). However, on an AFDW basis metaphyton and epipelon did not differ (*Chara spp.* remained significantly greater). The average 16% greater mineral matter in the epipelon dilutes the TP contained in the organic

matter. When this is considered it appears that the TP concentrations in epipelon and metaphyton are similar. Likewise, normalizing for ash contents magnifies the biomass differences between the *Chara spp.* and metaphyton and epipelon with *Chara spp.* > metaphyton = epipelon (Figure 2-32).

2.5.6.2 Patterns in soft algal and diatom community composition

A total of 86 species of soft-algae were found in the interior of cells 1, 2 and 3. The flora was dominated numerically by species of the filamentous cyanobacteria *Leptolyngbya* and *Spirulina* and taxonomically by coccoid cyanobacteria in the genera *Aphanothece*, *Aphanocapsa*, *Chroococcus*, *Gleocapsa*, *Gleothece* and *Synechococcus* (Appendix B – Table 1). Many of these taxa are taxonomically problematic and cannot be confidently identified to species using existing literature. However, species within these genera share similar life-forms and habitats and, therefore, the composition of their assemblages contain meaningful environmental information.

A total of 52 diatom taxa were found in the interior of cells 1, 2 and 3. This flora was dominated numerically by the common Everglades taxa *Achnanthidium minutissimum, Brachysira neoexilis, Encyonema evergladianum, E. microcephala, E. ftsp01, Fragilaria synegrotesca, Nitzschia palea var. debilis, Nitzschia amphibia, Navicula cryptocephala, Mastogloia smithii,* and *Gomphonema affinis* (Appendix B-Table 2).

We used non-metric multidimensional scaling to depict patterns based on relative abundances of soft-algal taxa in two-dimensional space. Biplots represent the similarity among samples based on similarity (using the Bray-Curtis metric) in species composition. We tested for significant differences among cells, dates and substrate types using Analysis of Similarity, a one-way ANOVA (ANOSIM) that compares similarity of assemblages among sample groups (using PRIMER ® software). We report the R value of this statistic which approaches 1 as dissimilarity increases among sample groups.

Compositional analysis effectively separated cells 1 from 2 and 3 based on soft-algal species composition (R = 0.30) and cells 3 from 1 and 2 (R = 0.94) based on diatom species composition (Figure 2-33 a, c). Soft algal communities in cell 1 contained proportionally more green algae (particularly *Oedogonium* spp.) than cells 2 and 3 (35 vs. 22 and 12 %, respectively). The filamentous cyanobacterial community in cell 1 was dominated by *Spirulina* rather than *Leptolyngbya* (the dominant filament in cells 2 and 3). Both patterns indicate higher phosphorus availability in cell 1 than 2 or 3. Cell 3 had proportionally more coccoid cyanobacteria than cells 1 and 2 (56 vs. 18 and 13 %, respectively), which are typical of short hydroperiod Everglades sites that dry regularly.

The diatom assemblage in cell 3 differed from cells 1 and 2 because of higher abundances of *Mastogloia lanceolata*, *Amphora* taxa, *Nitzschia* ft16,

Achnanthidium caledonica and *Encyonema* taxa, which may be indicating higher conductivity in this cell.

There was very little compositional change among the August, October and December sampling dates (R<0.1 for diatoms and soft algae; Figure 2-33 b, d). The sampling events coincided with the late wet season when periphyton production is typically highest and before the transition to a less productive dry season flora occurs.

2.6 "Dry" Sediment Sampling

The STA2 field scale test cells (FSC) were sampled on June 28, 2004, approximately 6 months after the cessation of pumping. This sampling was done to determine the P sequestered in these systems since the beginning of loading (>3 y) and to identify the existence of gradients (inflow to outflow) in this P. The dominant forms of benthic material at the inflow, midpoint, and outflow of each test cell were sampled. If notable amounts of "other" materials (macrophytes, etc.) were present they were also collected. All materials were collected from known surface areas and/or known volumes. The dominant forms of P containing materials at each location within a cell were compared using ANOVAs. Statisitically significant gradients in TP mass per unit area from inflow to outflow was only apparent in Cell 3 (Figure 2-34). Cell 1 was completely dry. The Chara spp. that dominanted the midpoints (and present throughout; pers. obs.) (Figure 2-25 above) was no longer present. What remained was a generally 2-3 cm thick dried blocky crust on the limerock surface. The TP present in these crusts varied from 2023 to 5096 mg TP m^{-2} with highest mass P at the outflow of this cell.

Although not statistically significant ($p = 0.057$), due to large variability, the outflow at Cell 2 contained considerably less TP (730 ± 269 mg TP m^{-2}; mean ± SD) than at the inflow (2198 ± 774 mg TP m^{-2}) or midpoint (1704 ± 614 mg TP m^{-2}). The inflow of this cell was dominated by dried, crusty material, the midpoints by dried crusts with some *Eleocharis sp.*, and at the outflow the surface was covered with exposed limerock and sheets of leathery, dried, formerly metaphytic layers that were easily detached from the limerock . There was considerable growth of *Eleocharis sp* sprouting through the dry crusts of the midpoint sites. Although labelled as dry benthic crusts these samples also contain some young *Eleocharis sp*. Subsamples of the *Eleocharis sp.* alone sugget that it accounted for < 7% of the total TP on a per unit area basis. The outflow material, while containing approximately the same concentrations of TP g^{-1} dw (173 ± 25 µg TP g^{-1} dw; mean ± SD) as the benthic crusts at the midpoint (190 ± 11 µg TP g^{-1} dw), had comparitively less biomass present. The concentration of TP in the inflow samples (305 ± 21 µg TP g-1 dw) was condierably higher.

There was a statistically significant (p = 0.047) general inflow to outflow gradient in the benthic materials of Cell 3 with the inflow mass TP per unit area (1766 ± 767 mg TP m^{-2}) equal to the midpoints (763 ± 323 mg TP m^{-2}) but greater than the outflow (546 ± 162 mg TP m^{-2}). Similarly, the midpoint and outflow were not significantly different but less TP was present in the outflow. Because of elevational differences (this site was scraped to bedrock and therefore the bottom lies below the level of standing water) this cell remained wet with water depths ranging 27 – 66 cm on the day of sampling (June 28, 2004) (water depth was deeper towards inflow all sites were inundated). Comparisons are made for soft sediments (marl, organic seds, benthic periphyton) which contained the majority of TP. There was some metaphyton and *Chara spp.* present at inflow sites 1 and 2, respectively, and combined would have an average of 6% of the unit area TP. At the outflow there was considerable patches of young but dense *Eleocharis sp*. *Eleocharis sp.* was present in FSC 301 where it ocntained 126 mg TP m^{-2} or about 23% of the TP retained in the soft sediments. Additionally, there was some periphytized *Chara spp.* present at FSC 3O3 which contained about 20% of the TP found in the sediments of this site. The benthic material at this site varied from soft organically-rich marl material at the inflow, to increasing cohesive marly mat-like material at the midpoint to a thinner layer of increasingly epipelic material. Average ash contents varied little between the inflow and outflow and ranged 82 to 86%.

2.7 Desorption Study

Pumping of inflow water to the FSC test cell was halted in December 2003, after which the sites became increasingly dry (except Cell 3, see above). Although mechanically induced, this scenerio mimics natural hydroperiod variations in areas that would include seasonal or periodic drying events. We conducted a series of extractions, using AMW, in a desorption experiment to determine the "lability" of the P contained in the benthic materials of the FSC cells. All materials were dried (80º C) and ground before desorption. Most of the materials were dry in the field condition whereas Cell 3 material was dried from a wet field condition. Extracted solutions were analyzed for TP and SRP. The desorption of TP (and SRP, not shown) was generally low for all samples and followed the same basic curves with greater P being released during the first few extractions and less released as the number of extractions progressed (Figure 2-35). All curves tended to assymptote at a value greater than 0 suggesting that desorption could continue indefinitely. However, the amount of P released is generally very low. That is, P released with prolonged wetting would likely be immediately taken up in a rejouvenating mat and not add considerably to downstream P export (Thomas et. al in review). Generally, less than 5% of the TP retained in these benthic materials was released during 10 extractions (Figure 2-36). There were generally no significant differences between the percentage of the initial TP contained between the inflow, midpoint, and outflow. The one exception is that in Cell 2 the midpoint released a significantly greater fraction (p = 0.003) of

retained P than either the inflow or outflow which did not differ. Greater mass release of TP was correlated with initial TP concentration (r^2 = 0.65). Most of the P released was as TP with SRP accounting for an average of 35% of the TP and ranging from 15 to 89% of the TP. The high SRP:TP samples came from the leathery, dried materials from the outflow of Cell 2.

2.8 Tracer study

2.8.1 Background

For a treatment wetland, the nominal hydraulic retention time (HRT) can be calculated by dividing the the volume of the wetland flow rate by the flow into the wetland. In effect, the HRT is a measure of the average time that water remains within the wetland. However, the actual HRT may be significantly less than nominal HRT due to short-circuiting and other effects. Additionally, individual molecules of water will travel through the wetland at different velocities and following different paths due to minor variations in the bottom elevation, vegetation density, wind-induced mixing, and other variables.

The volumetric efficiency of a treatment wetland can be expressed as a ratio of the actual HRT determined by a tracer study, divided by the nominal HRT. The objective of a tracer study is to determine the actual HRT for a given system. The tracer study is initiated by instantanously applying a tracer solution (in this case lithium chloride) at the inlet and collecting water samples over time at the system outlet and other points until all of the tracer is recovered.

2.8.2 Experimental Protocol

A tracer study was initiated in Cell 2 on September 23, 2003. As previously stated, tracer studies were also planned for Cells 1 and 3; however, these studies were not completed due to the pipeline break.

A 40% by weight, technical grade, Lithium Chloride solution, obtained from FMC Lithium was utilized as the tracer solution. The lithium ion was utilized as the tracer because it is conservative (i.e., does not absorb to organic materials) and lithium is not naturally present in the surface water in this area in significant concentrations. The required tracer dosage was determined by calculating the quantity of tracer required to produce tracer concentrations that were 10-20 times the assumed background lithium concentration (0.010 mg/L) in the surface water within the wetland. A volume of 15.2 gallons of tracer solution was calculated and utilized for the tracer study. The 40% tracer solution was further diluted in a 55-gallon drum by adding approximately 35 gallons of water from the cell into the drum and mixing the contents. The intent of the dilution was to minimize the potential density effects, since the 40% solution is significantly more dense than water.

Prior to initiating the tracer study, PSI set ISCO autosamplers at the cell midpoint and outlet and in the inlet canal. The ISCO autosamplers were each equipped with 24, 250 mL plastic sample containers, which were pre-preserved with nitric acid. The autosamplers were set up to collect samples directly into the sample containers in order to avoid potential interferences due to transfer from intermediate sample containers. The sample containers were each pre-labeled and pre-preserved as they were loaded in to the autosampler. The autosamplers were initially programmed to collect a sample each hour, but the sampling frequency was reduced over time throughout the test. The inlet hose for each autosampler was set to collect samples from approximately mid-depth in the water column.

The tracer study was initiated at 14:00 on September 23, 2003 by quickly pouring the tracer solution into the cell. The tracer solution was poured from the 55-gallon drum through a 4-inch diameter PVC pipe with the end placed adjacent to the cell influent water pipe. The entire volume of tracer was poured into the cell within 2-3 minutes of initiation.

The autosamplers were programmed to collect a sample at time 0 (i.e., representing background) and hourly thereafter to the first HRT. The sampling frequency was reduced to every 3 hours for the second HRT, then to every 8 hours for the third HRT. Routine sampling was suspended after the third HRT, but weekly grab samples from the cell outlet were analyzed for lithium for 4 weekly periods following the tracer study, in addition to the routine analyses.

The sample containers were removed from the autosampler each time the sampler was full (i.e., once 24 samples had been collected). The samples were placed on ice and transported under chain of custody to PPB Environmental Laboratories for analysis. All of the samples were shipped to the laboratory for holding; however, only approximately 20% of the samples were initially analyzed. The samples were analyzed by EPA Method 1535 for lithium. Following the receipt of these results approximately 20 additional samples were analyzed.

2.8.3 Data Presentation and Evaluation

2.8.3.1 Flow/Stage/Hydraulic Loading

The data evaluation for the tracer study was significantly limited due to the low water level in the inlet canal during most of the duration of the test. Due to the lowering of the water level in STA-2 for maintenance activities, the water level in the inlet canal was near the bottom of the canal and the pump flow had to be reduced to minimize the potential for running the pump dry. However, the low water level resulted in the presence of air in the influent piping and malfunctioning of the ultrasonic flow meters. While, minimal flow at the outlet

was visually evident at the outset of the test, outflow from the cell was not measured during most of the test.

2.8.3.2 Lithium

Lithium concentations over time are shown at the cell outlet and mid-point in Figures 2-37a and 2-37b, respectively. The baseline lithium concentrations in Cell 2 were 29.6 μg/L at the cell outlet and 27.9 μg/L at the cell mid-point. Lithium concentrations in the outlet remained relatively constant until 4 days into the tracer study. Lithium concentrations at the outlet increased rapidly to a maximum concentration of 817 μg/L after 7 days. The concentration vs. time graph indicates a marked peak in concentration. A similar peak was observed at the cell mid-point after 2 days. The maximum lithium concentration at the cell mid-point was 1,910 μg/L.

3. STA-2 LIMEROCK PAD

3.1 Introduction

Monthly sampling was conducted on limerock pads at STA-2 during 2000 – 2001 by Florida International University. Towards the end of this monitoring period (September 2001) extensive growths of *Chara spp.* and other submerged aquatic macrophytes were observed encroaching on limerock periodically covered with epipelon. In a reconnaissance trip conducted February 10, 2004 it was observed that a considerable portion of the limerock pad had been invaded with SAV. The STA-2 limerock pad has been in place approximately 4+ years. As such it may be a model for developmental projections of similar areas. This is important especially considering the Army Corps of Engineers (ACOE) plan to construct a 600 acre limerock lined PSTA at STA 1E. In February 2004, shallow water areas (approximately 39 cm; relative depths on pad) had little, thin, powdery silt-like material on the limerock surface. This material probably had an algal and detrital component but could not be considered true periphyton. These areas also contain sparse growths of SAV (*Chara spp).* Deeper areas (approximately 60 cm) contained expansive beds of moderately periphytized SAV. The deepest areas had either sparse SAV and a thin green benthic layer of unconsolidated algal material or contained heavy periphytized SAV and a thick layer of soft benthic material, the upper portion of which was algal. Given the diversity of this area and the possible implications for similar developments it was decided that the STA2 Limerock Pad would be resampled.

3.2 Protocols – Field Sampling and Laboratory Analysis

The limerock pad at STA-2 was resampled on June 21 and 22, 2004. The PSI/FIU team revisited each of the 20 sites originally sampled during 2000 – 2001 by Florida International University. The sites were identified by posts installed during the 2000 – 2001 study resulting in the same plots being measured in 2004 as were sampled in 2001. Extensive growths of submerged aquatic vegetation were observed on the eastern side of the limerock pad. None of the original 2001 plots were located in these areas so we added an additional 3 locations. These plots were in the relatively deepest water of our water depth treatment designations and were labeled as “F1 – F3”. Water depth during our sampling ranged from 29 – 85 cm. As was previously done, plots were designated by 10 cm differences in water depth. During the June 2004 sampling, water depths were nominally between 25 – 35 cm for A sites, 35 – 45 for type B, 45 – 55 for sites C, 55 – 65 for those labeled D, 65 – 75 for the E plots, and finally 75 – 85 cm for the new F sites. Each plot was destructively sampled for the mass per unit area of limerock surface (m^2) of the major components present. These include epipelic or detrital benthic layers, *Chara spp.* or other SAV, filamentous green algae, and possibly emergent macrophytes. Not all

components were present at all sites. Numerous sites contained several components and were sampled accordingly. Mat and core samples were collected in a similar manner to that already described (see section 2.4 biological sampling above). The collection of soft sediment (mostly organic detritus) involved initially collecting several small diameter cores to measure depth. Then, large unconsolidated sediment samples were collected by placing a large cylinder on the limerock surface and "vacuuming" the material into a large container using a hand-held suction pump. The sample was brought to the laboratory at FIU and transferred into a large volumetric beaker. The soft sediment was allowed to settle. The water overlying sediment was decanted and sediment volume was recorded. Sediment sample area was calculated using volume and depth measurements. Submerged aquatic vegetation, often periphytized, was collected from a known surface area by using a 25 cm x 25 cm 3-dimensional frame that extended from the limrock surface to the top of the water column. The height of the SAV in the water column was also measured. All root/attached stems in the benthic layers were cut using razor edged knives. A total of 47 samples were collected from 23 sites including numerous samples of benthic periphyton (epipelon), underlying marl material, soft sediments, filtered and unfiltered water, and SAV. Visual evidence of plot appearance and representative samples were obtained using digital cameras as mentioned above. Samples were processed for appropriate physical and chemical characteristics including dry weight, ash free dry weight (mass per unit area), total P, C, N contents, HCl-extractable Pi, total inorganic C, and chlorophyll. A total of 23 samples, corresponding to one from each site, were analyzed for algal and diatom species composition. Algal/diatom samples came either from benthic layers, epipelon, or from the surfaces of SAV if that dominated the sites.

Specific comparisons of data were analyzed by ANOVA using ecosystem compartment (benthic layers, SAV) and treatments (water depth increments A – F) as main effects. Post-hoc tests were conducted using Tukey or Dunnet C to determine specific differences. All statistics were performed on SPSS v. 12. Average values referred to in the text are presented as means ± SD.

3.3 Results and Interpretation

3.3.1 Total P mass per unit area, concentration, and biotic biomass.

Conditions, and therefore sample types varied greatly among plots. Generally, shallow plots had thin benthic periphyton layers (3 mm) overlying varying thicknesses of marly sediment. Several samples of the benthic matter had sparse growth of young SAV (*Chara spp.*) growing on the surface. Generally as the water depth increased so did the mass of benthic material (mostly marl with surficial epipelic layer). However, at depths greater than approximately 65 cm (E

and F) the plots were dominated to a greater extent by SAV (periphytized) with soft, unconsolidated sediments. To determine possible trajectories of TP accumulation with variations in water depth the per unit area mass of TP was compared for sites A – F. Although a total of 47 samples were collected, variation in site characteristics, sample loss (2 cases), presence or absence of components (mixed components), and the desire to compare similar materials, a reduced set of sites were used. Benthic materials were present at all sites and were the only ecosystem component at treatments A – C. Two D sites had SAV in addition to benthic materials as did all sites E (n = 4) and F (n = 3). Benthic materials were compared for all sites A – F however, benthic sample sizes varied by treatment according to A = 2, B, C, D, E, and F = 3. Since SAV occurred on only 2 D sites 2 values of zero were averaged in as the absence of this component would correspond to a reduced probability of TP being sequestered on these sites. Total P per unit area (mg TP m^{-2}) was generally greatest in the deepest sites (E and F) and even though mean values ranged from 900 mg TP m^{-2} for A sites and 2944 mg TP m^{-2} for F sites these differences were not statistically significant ($p = 0.717$) (Figure 3-1). Where SAV and benthic materials both existed (treatments D, E, and F) the benthic material contained significantly greater TP ($p = 0.043$) than did the SAV per unit area (Figure 3-2). The large variability in the benthos for sites E came largely from one sample of dense benthic material that contained about twice the TP concentration of other benthic material and alone accounted for 6191 mg TP m^{-2}. Likewise there was a dense (high biomass) sample at one of the F sites that had TP concentrations similar to the other benthic materials but because of the high biomass had 3461 mg TP m^{-2}. The concentration of TP contained in the SAV was significantly greater ($p = 0.042$) than that of the benthic material (Figure 3-3) but the biomass (as g dry weight per unit area) was significantly ($p = 0.007$) lower (Figure 3-4). This is due in part to the amount of inorganic materials associated with these compartments. The ash content of benthic material did not differ between treatments ($p = 0.074$), nor did the Ash content of SAV differ in the treatments that had SAV ($p = 0.070$). However, the ash content of the benthos was significantly higher than that of the SAV in all treatments ($p < 0.001$; Figure 3-5).

3.3.2 Patterns in soft algal and diatom community composition

A total of 86 soft-algae and 54 diatom taxa were collected from the STA2 limerock pad in June 2004. The diatom assemblages in were dominated by *Encyonema evergladianum*, E. ftsp01 and 02, *E*. *microcephala*, *Fragilaria* ftsp16, *F. synegrotesca*, *M. smithii, Nitzchia amphibia* and *N. ftsp16*. This flora is generally similar to that growing in the FSC test cells, although there were more *Nitzschia* and *Fragilaria* taxa on the limerock pad, both indicating higher P availability.

There was little spatial variation in species composition across the STA2 limerock pad, with the ANOSIM procedure detecting no significant difference among the 6 treatments (A – F; each with 4 replicates except F where n = 3; Figure 3-6a,c).

However, pairwise comparisons found sites 4 and 5 to be slightly more dissimilar from 1, 2 and 3 in both soft algae and diatom composition (R = 0.35 and 0.22, respectively). In addition, the ANOSIM procedure found very high overlap and no significant difference among periphyton communities among substrate types (R = 0.06 for both diatoms and soft-algae), indicating little effect of substrate on community composition (Figure 3-6b, d).

4. STA-1W TEST CELLS

4.1 Introduction

The South STA-1W test cells consist of 15 lined, rectangular, 2,020 m^2 cells, which receive flow from a single head cell. Water is pumped into the head cell from the adjacent STA-1W, Cell 3, then flows by gravity into each of the 15 test cells through a distribution manifold. A horizontal wier (agridrain®) at the outlet of each cell controls the water height in the cell. Outflow from each cell flows back into the STA-1W, Cell 3 seepage canal. Three of the fiteeen test cells were constructed as PSTA Cells (Test Cells 3, 8, and 13). During final construction the substrate in each of the cells was modified by placing the following layers of substrate over the liner.

- Test Cell 13 – 80 cm sand, 30 cm mined shellrock, 30 cm peat
- Test Cell 8 – 1 m sand, 30 cm mined shellrock
- Test Cell 3 – 1 m sand, 30 cm mined shellrock

4.2 Protocols – Field Sampling and Laboratory Analysis

Test Cell 3 and Test Cell 8 at STA1W (south) were sampled on July 24 and 25, 2004. Nine points in each test cell were sampled at three replicate locations at the inflow, midpoint, and outflow of each test cell (Figure 4-1). The water depth in both test cells ranged between 73 – 83 cm. Cell 3 had slightly deeper water. A total of 63 samples were collected from these two test cells using similar sample collection protocols as previously described.

Each plot was destructively sampled for the mass per unit area of wetland surface (m^2) of the major components present. These included soft sediments, heavily periphytized SAV (*Chara spp.*), and some emergent macrophytes *(Eleocharis sp.)*. Visual evidence of plot appearance and representative samples were obtained using digital cameras as mentioned above. Samples were processed for appropriate physical and chemical characteristics including dry weight, ash free dry weight (mass per unit area), total P, C, N contents, HCl-extractable Pi, total inorganic C, and chlorophyll. A total of 6 samples, corresponding to one from the midpoint at the inflow, middle, and outflow (sites B, E, and H in Figure 4-1 above) of each site were analyzed for algal and diatom species composition. Algal/diatom samples were associated with *Chara spp.*.

To determine the potential stability/lability of TP contained in the benthic material we conducted a series of desorption extractions. Protocols followed that given in section 2.5.8. However, all sites in both STA1 W test cells 3 and 8 were inundated necessitating drying (80º C) material before conducting the desorptions.

Specific comparisons of data were analyzed by ANOVA using ecosystem compartment (benthic layers i.e. soft sediment, SAV i.e. *Chara spp.*, macrophytes i.e. *Eleocharis sp.*) and position in the cell (inflow, midpoint, outflow) as main effects. Post-hoc tests were conducted using Tukey or Dunnet C to determine specific differences. All statistics were performed on SPSS v. 12. Average values referred to in the text are presented as means ± SD.

4.3 Results and Interpretation

4.3.1 Total P mass per unit area, concentration, and biotic biomass.

Cell 3 of the STA1W test cells contained soft sediments covering the limerock surface. The water column had extensive *Chara spp.* which was often heavily periphytized. The midpoint and outflow sites contained *Eleocharis sp.* (Figure 4-2). Total biomass of all ecosystem components was greatest at the inflow averaging 4657 ± 1575 g dw m^{-2} declined at the midpoint (2949 ± 875 g dw m^{-2}) and then decreased slightly towards the outflow (2641 ± 513 g dw m^{-2}) however these biomass measurements did not significantly differ. The mass of sediments were not significantly different from the *Chara spp.* biomass but both were significantly greater than the biomass of *Eleocharis sp.* ($p < 0.001$) (Figure 4-2). Significantly greater TP was contained in the sediments and *Chara spp.* than in the *Eleocharis sp*. ($p < 0.001$) (Figure 4-3). There was also a significant effect of location ($p = 0.032$) but post hoc tests were unable to determine which locations differed. The TP per unit area was greatest in the sediment and *Chara spp.* at the inflow and both decreased by the midpoints. Average outflow TP was similar to midpoint for sediments and *Chara spp.* (Figure 4-4). Total P concentration, on dry weight basis, was significanlty effected by the type of ecosytem component with sediment = *Chara spp.* > *Eleocharis sp*. ($p = 0.002$) but was not affected by location ($p = 0.215$).

Cell 8 of the STA1W test cells also contained soft sediments covering the limerock surface and extensive periphytized *Chara spp.* in water column but did not contian appreaciable *Eleocharis sp*. at any sampled location (Figure 4-5). Although it appears that there is greater mass sediment at all locations this biomass was not significantly different from that of the *Chara spp.* (Figure 4-5). Similarly, the slight trend of decreasing total biomass from inflow to outflow was also not significantly different. Thus there was not a clear gradient developed in the biomass of this test cell. The TP retained per unit area of the wetland did not differ by location ($p = 0.118$) but there was more TP contained in the sediments than in the *Chara spp.* ($p = 0.010$) (Figure 4-6). Total P concentration, on dry weight basis, was significanlty effected by the type of ecosytem component with sediment > *Chara spp.* ($p < 0.002$) but TP concentration was not affected by position in the cell (Figure 4-7).

4.3.2 Patterns in soft algal and diatom community composition.

A total of 35 soft-algae and 18 diatom taxa were found growing on *Chara spp.* during the June 2004 sampling visit to cells 3 and 8. The two cells did not differ significantly in species composition of soft-algae or diatoms ($R<0.15$ for both comparisons). Nor were there significant differences among sites when data from the two cells were averaged, although this was likely due to reduced degrees of freedom (having only 2 replicates). However, although not statistically significant, a cluster-analysis based on Bray-Curtis dissimilarity in species composition grouped samples from the same cell together indicating greater within- than among-cell similarity (Figure 4-8 a, b). Also, soft algal species composition was highly dissimilar between inflow and mid- and outflow sites in cell 3 and diatom species composition was most different in the outflow site of cell 8, indicating some degree of community segregation along the flow-way within these cells.

The difference in soft-algal composition between the inflow site in cell 3 from the other 2 sites is due to increased abundances of filamentous algae, particularly *Leptolyngbya*, *Spirogyra* and *Oedogonium*, all indicative of increased P availability at the inflow relative to interior. The inflow site also contained more diatoms in the genus *Nitzschia*, which are generally considered indicative of eutrophy. The interior and outflow sites contained greater abundances of a different *Leptolyngbya* taxon, *Oscillatoria* and *Lyngbya*.

4.3.3 Desorption

The STA1 W test cells have been receiving water for approximately 4 years. At our sampling the sediments were inundated. We therefore dried (80º C) and ground our samples before conducting desorption experiments. Extracted solutions were analyzed for TP and SRP. The desorption of TP (and SRP, not shown) was generally low for all samples and followed the same basic curves with greater P being released during the first few extractions and less released as the number of extractions progressed (Figure 4-9). Generally, around 4% or less of the TP contained in the sediments was released in 10 extractions (Figure 4-10). One replicate at the outflow of Cell 8, 8G desorbed much greater amounts of both TP and SRP (not shown) than all other samples. The desorption curves are shown with this sample included and with it removed (Figure 4-9). There was not a significant effect of location on desorption ($p = 0.749$). Most of the P released was as TP with SRP accounting for an average of 38% of the TP and ranging from 15 to 79% of the TP.

5. REFERENCES

CH2M HILL. February 2000. Periphyton-Based Stormwater Treatment Area (PSTA) Research and Demonstration Project PSTA Research Plan.

CH2M HILL. August 2001. Porta-PSTA Mass Balance (Destructive) Sampling Periphyton-Based Stormawater Treatment Area (PSTA) Research and Demonstration Project.

CH2M HILL. November 2001. PSTA Reseach and Demonstration Project (C-E8624); Draft Supplemental Technology Standards of Comparison (STSOC) Analysis Conceptual Designs and Planning Level Cost Estimates for Full-Scale Periphyton Stormwater Treatment Area.

CH2M HILL. May 2002. Phase 3 Interim Report No. 1 on the PSTA Research and Demonstration Project (C-E8624).

Gaiser, E., J. Richards, J. Trexler, R. Jones and D. Childers. Eutrophication in the Florida Everglades: patterns of periphyton disintegration and alternative metrics for detecting change. Limnology and Oceanography. In Press.

Komárek, J., and K., Anagnostidis. 1999. Cyanoprokaryota. I. Teil Chlorococcales. Pages 13-145 in H. Ettl, G. Gärtner, H. Heynig, and D. Mollenhauer (editors). Süßwasserflora von Mitteleuropa. Volume 19/1. Gustav Fischer, Stuttgart, Germany.

Komárek, J., and F. Hindak. 1975. Taxonomy of new isolated strains of Chroococcidiopsis (Cyanophyceae). Archiv für Hydrobiologie, 46 (Supplement):311-329.

Komárek, J., and K. Anagnostidis. 1986. Modern approach to the classification system of cyanobacteria. 2: Chroococcales. Algological Studies 43:157-226.

Komárek, J., and K. Anagnostidis. 1989. Modern approach to the classification system of cyanobacteria. 4: Nostocales. Algological Studies 56:247-345.

Prescott, G. W. 1962. Algae of the Western Great Lakes Area (revised edition). Wm. C. Brown, Co., Dubuque, Iowa, USA.

Professional Service Industries, Inc. (PSI). August 2004. Workplan for Periphyton Stormwater Treatment Area – Contract Amendment No. A02.

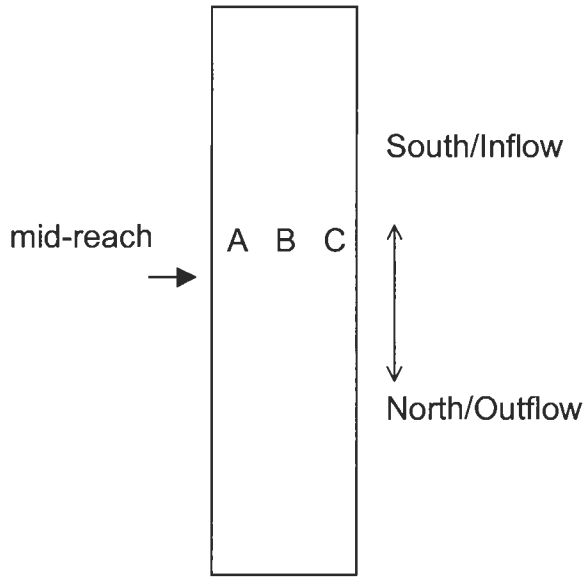


Figure 2-1
Arrangement of Monthly Sampling Points in STA-2 Field Scale Cells 1 and 3

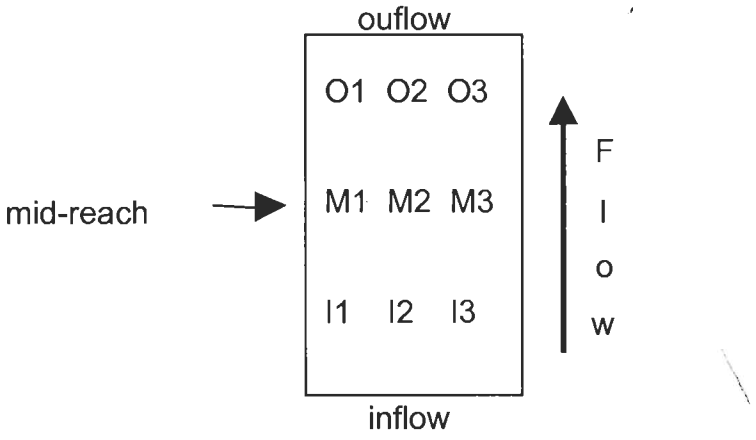


Figure 2-2
Arrangement of Sampled Plots in STA Field Scale Cells 1 and 3

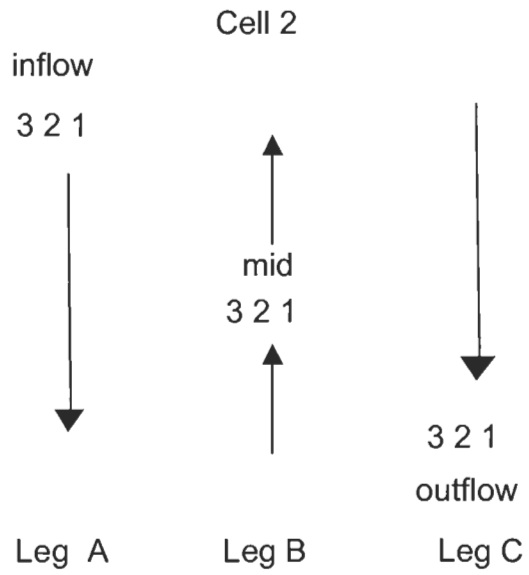


Figure 2-3
Arrangement of Sampled Plots in STA-2 Field Scale Cell 2

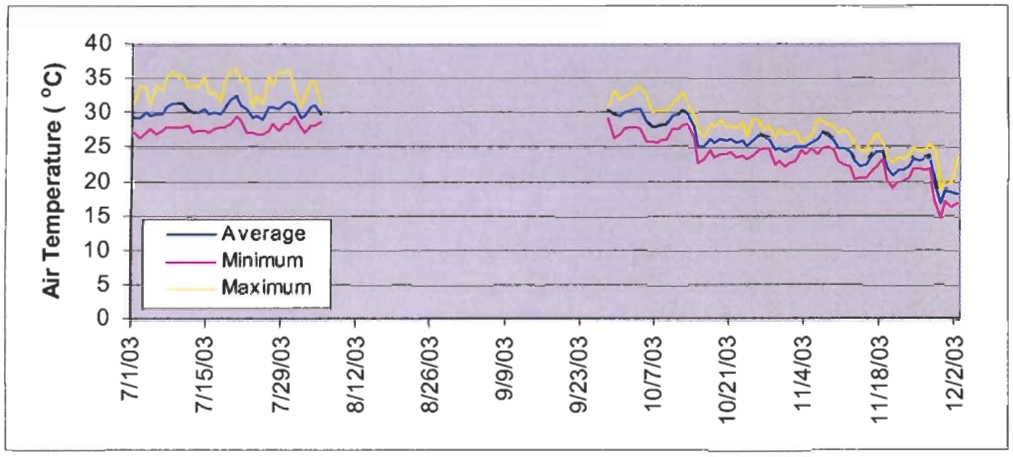


Figure 2-4
Air Temperature vs. Time

Figure 2-5
Total Insolation vs. Time

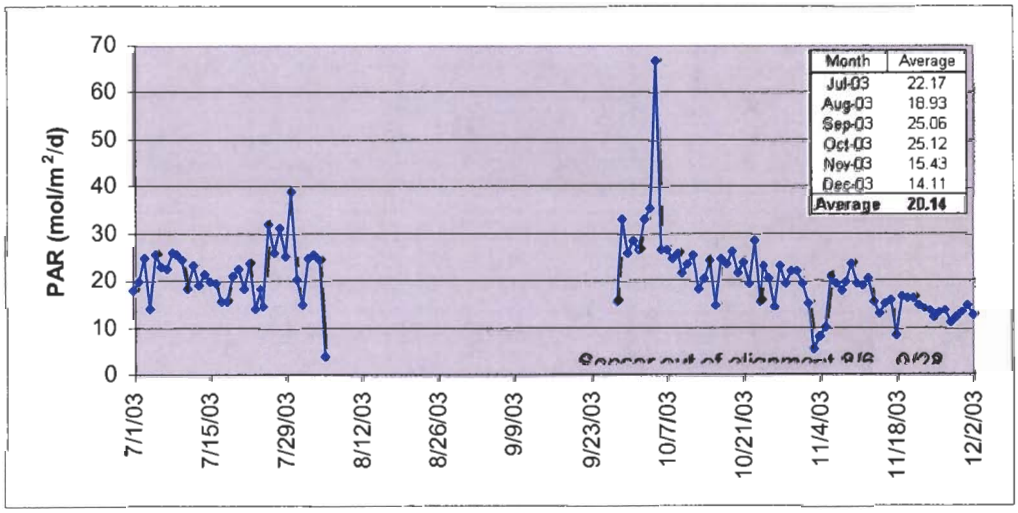


Figure 2-6
Photosynthetically Active Radiation (PAR) vs. Time

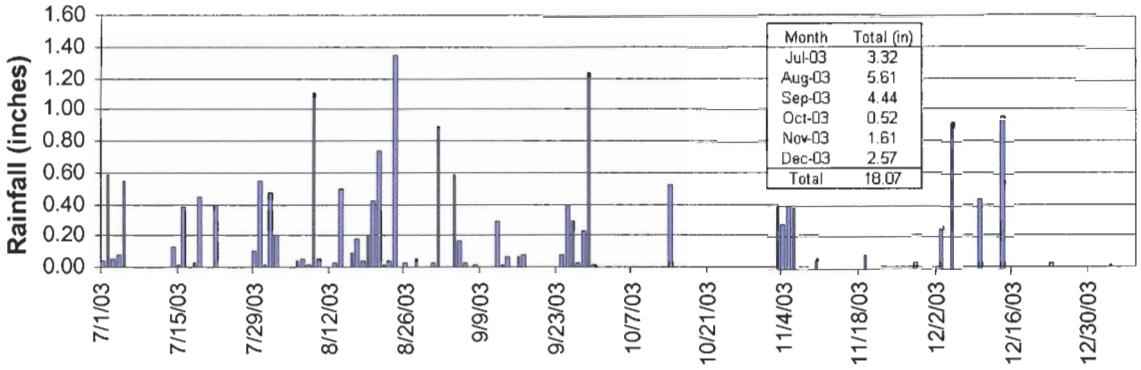


Figure 2-7a
Rainfall vs. Time

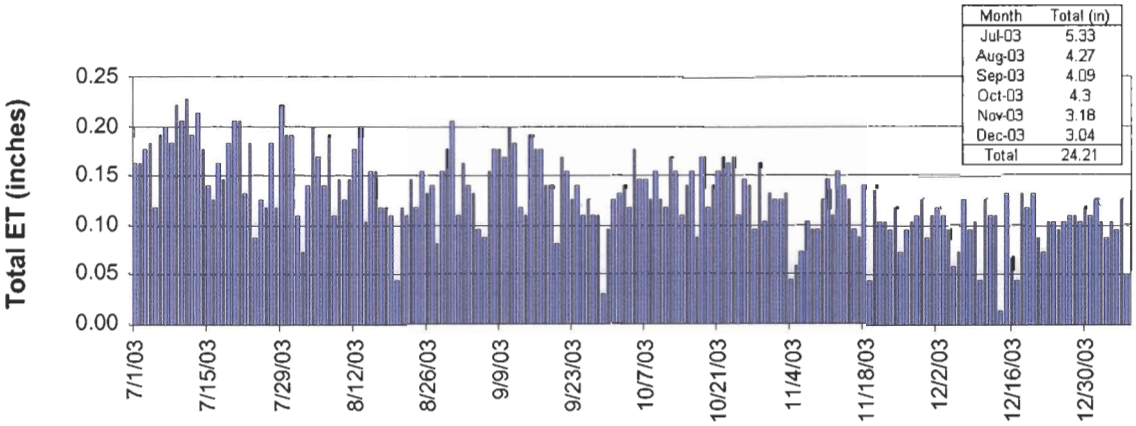


Figure 2-7b
Evapotranspiration vs. Time

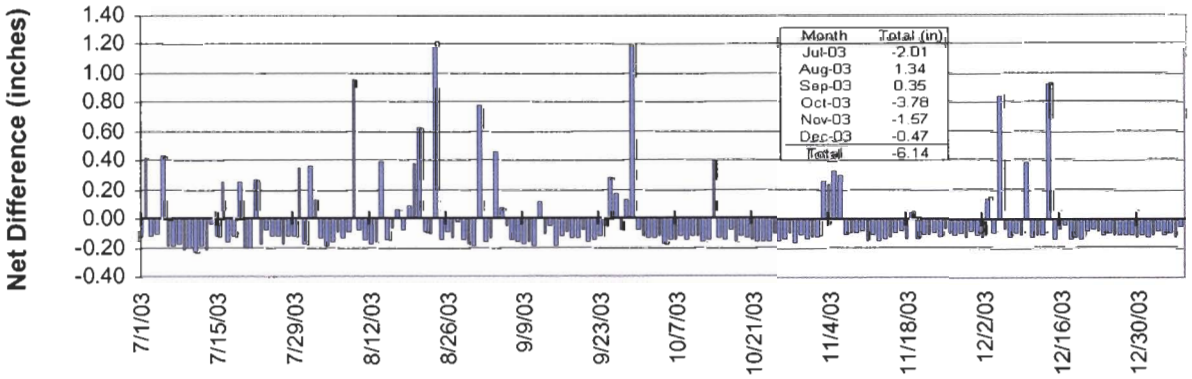


Figure 2-7c
Net Difference (Rainfall – ET) vs. Time

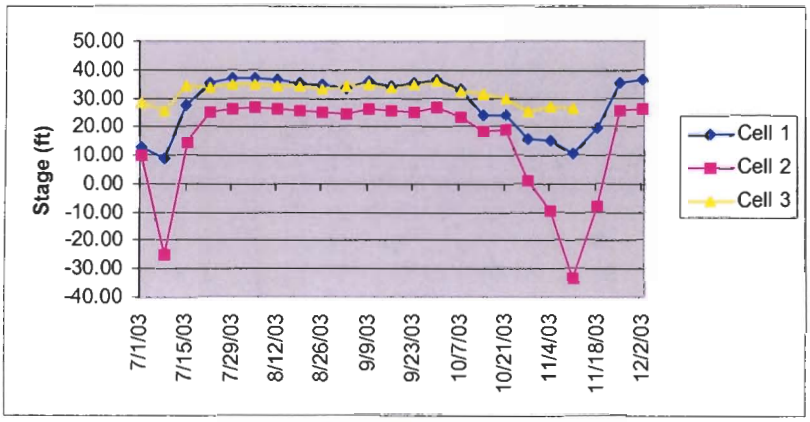


Figure 2-8
Water Depth vs. Time

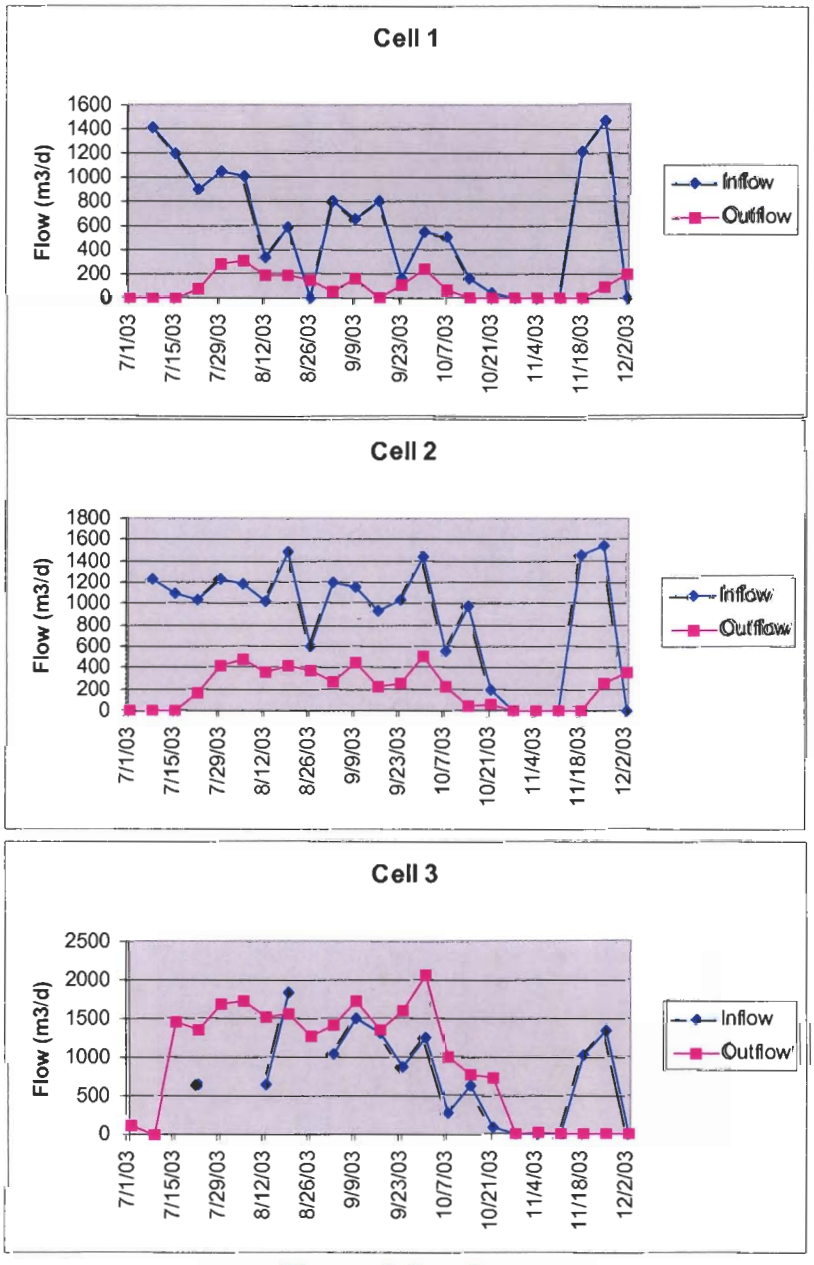


Figure 2-9, a,b,c
Inflow and Outflow vs. Time

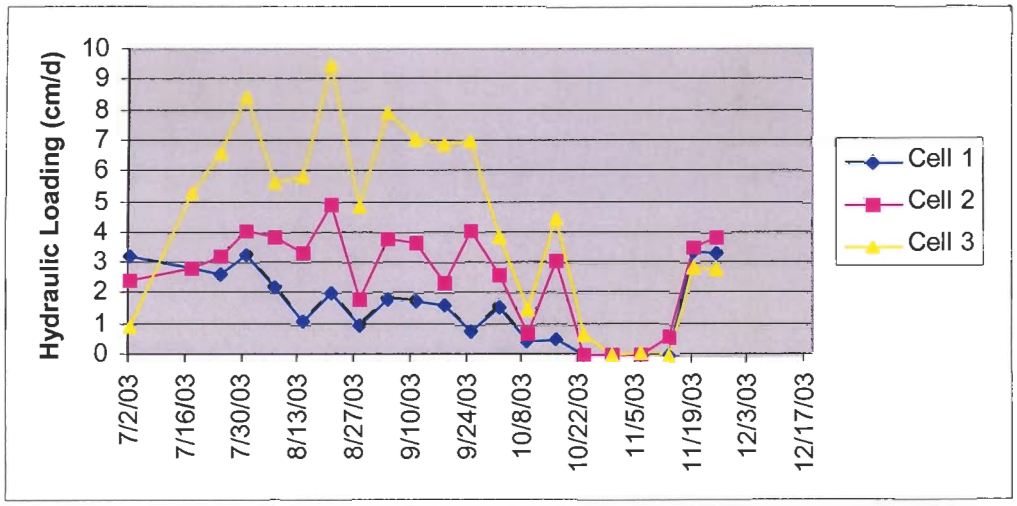


Figure 2-10
Hydraulic Loading vs. Time

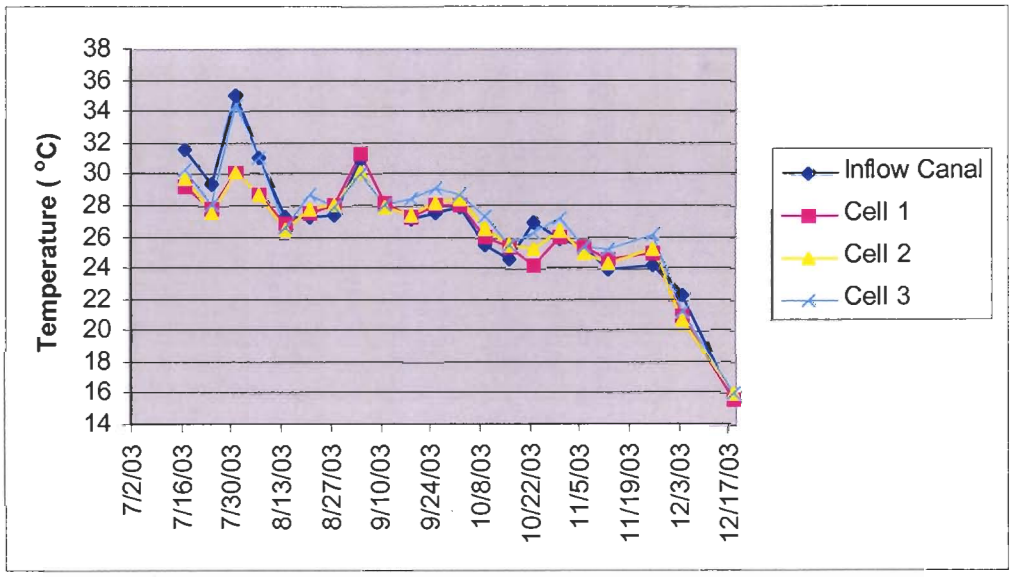


Figure 2-11
Surface Water Temperature vs. Time

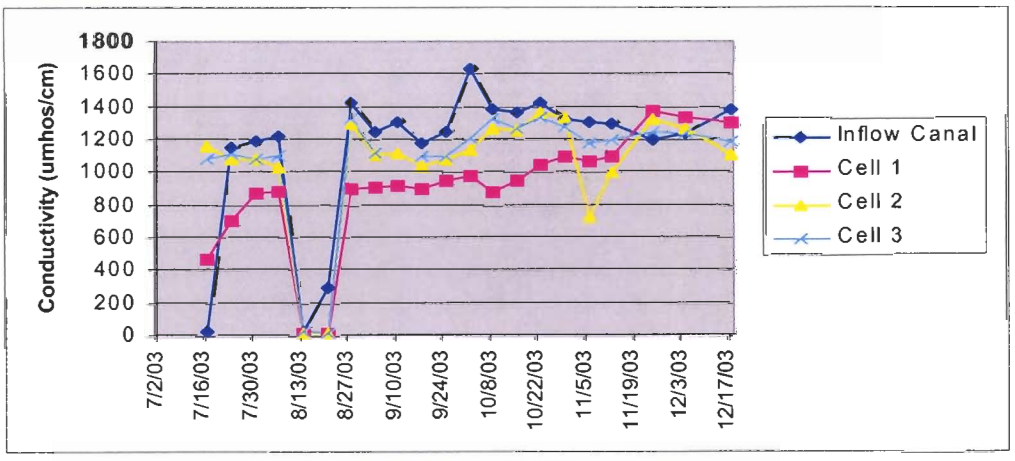


Figure 2-12
Surface Water Conductivity vs. Time

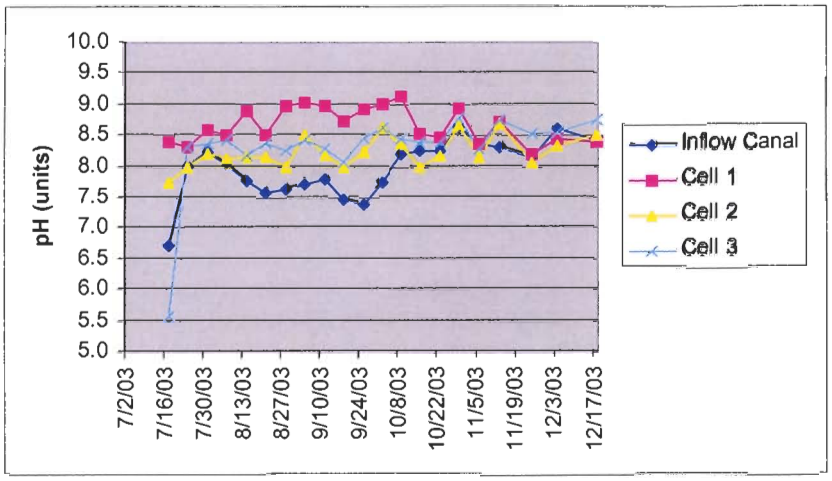


Figure 2-13
Surface Water pH vs. Time

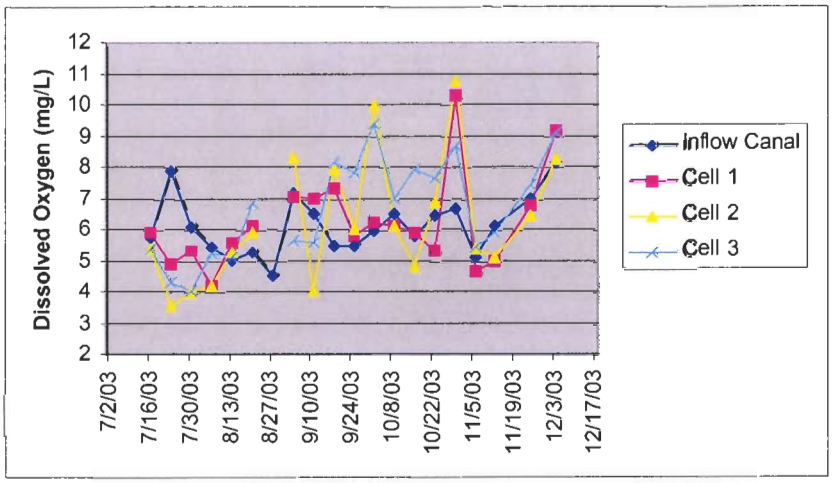


Figure 2-14
Surface Water Dissolved Oxygen vs. Time

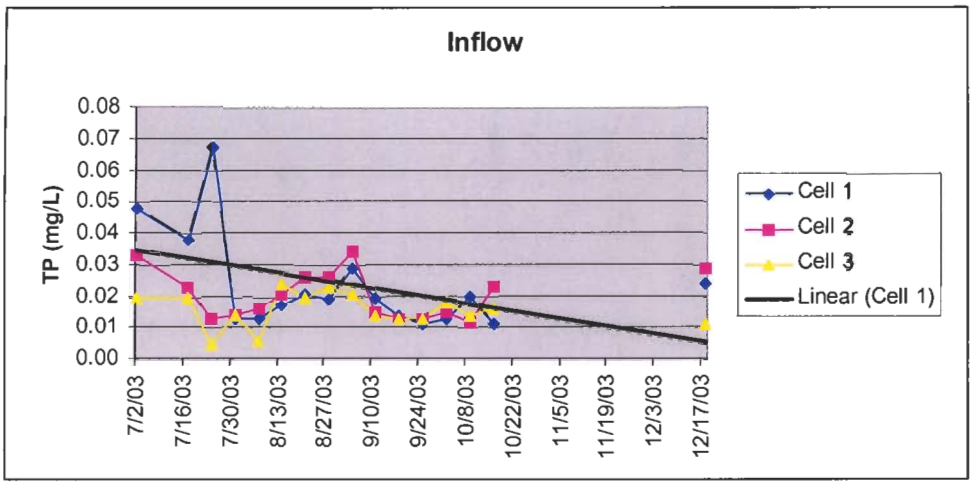


Figure 2-15a
Total Phosphorus (Inflow) vs. Time

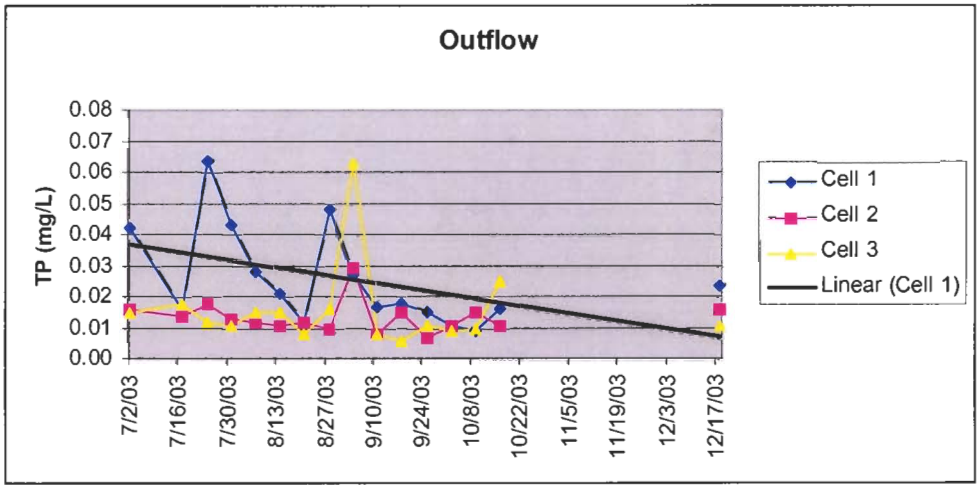


Figure 2-15b
Total Phosphorus (Outflow) vs. Time

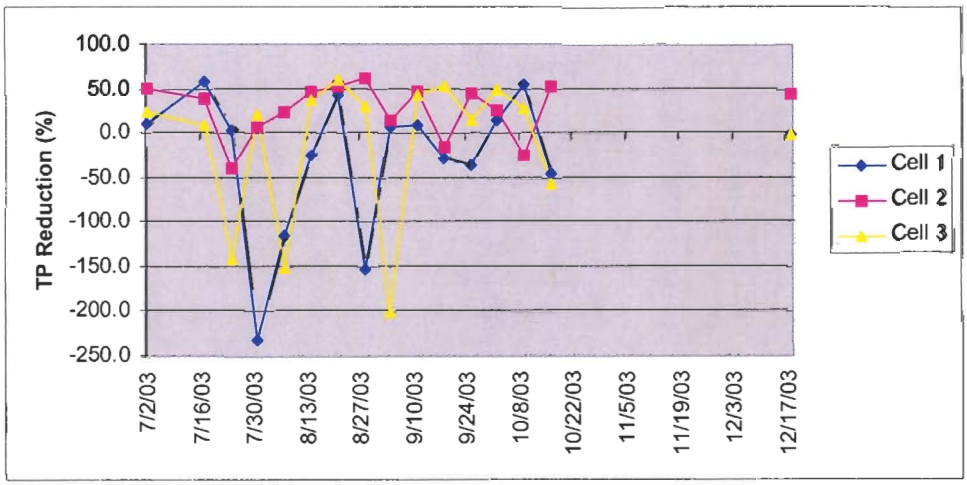


Figure 2-15c
Total Phosphorus % Reduction (Outflow/Inflow) vs. Time

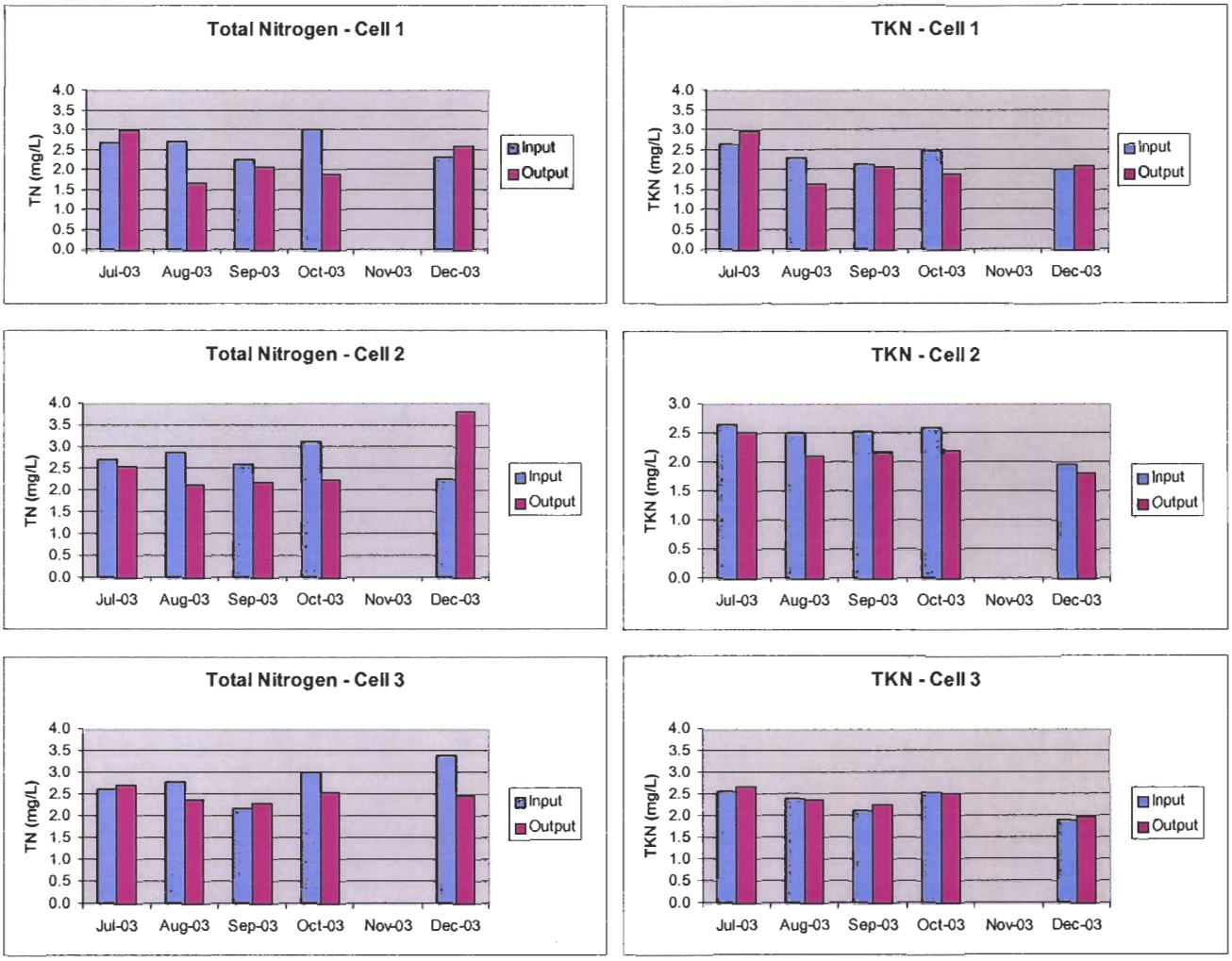


Figure 2-16 a,b,c
Total Nitrogen and Total Kjeldahl Nitrogen for Cells 1, 2, and 3 vs. Time

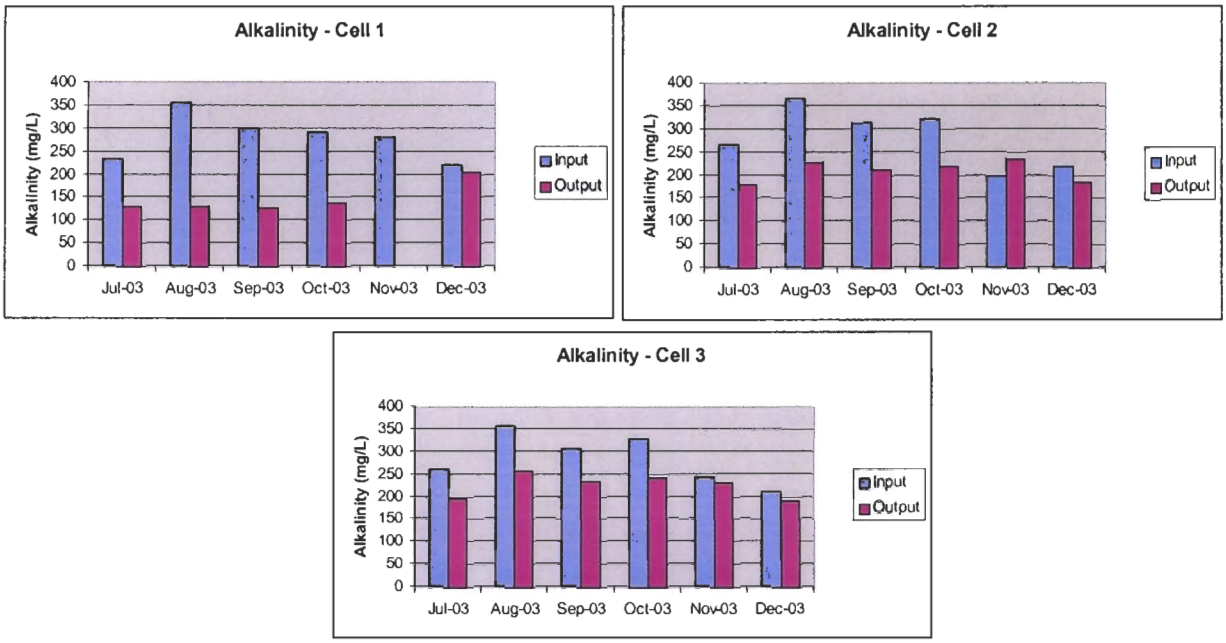


Figure 2-17 a, b, c
Total Alkalinity vs. Time for Cells 1, 2, and 3

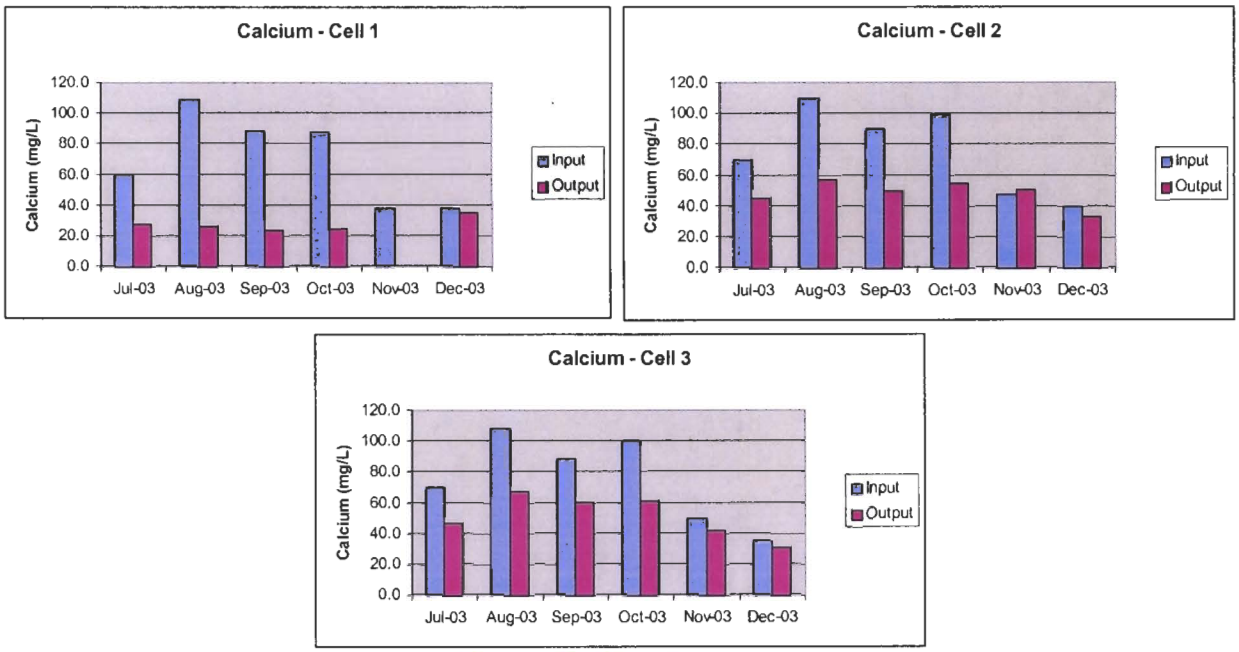


Figure 2-18 a, b, c
Dissolved Calcium vs. Time for Cells 1, 2, and 3

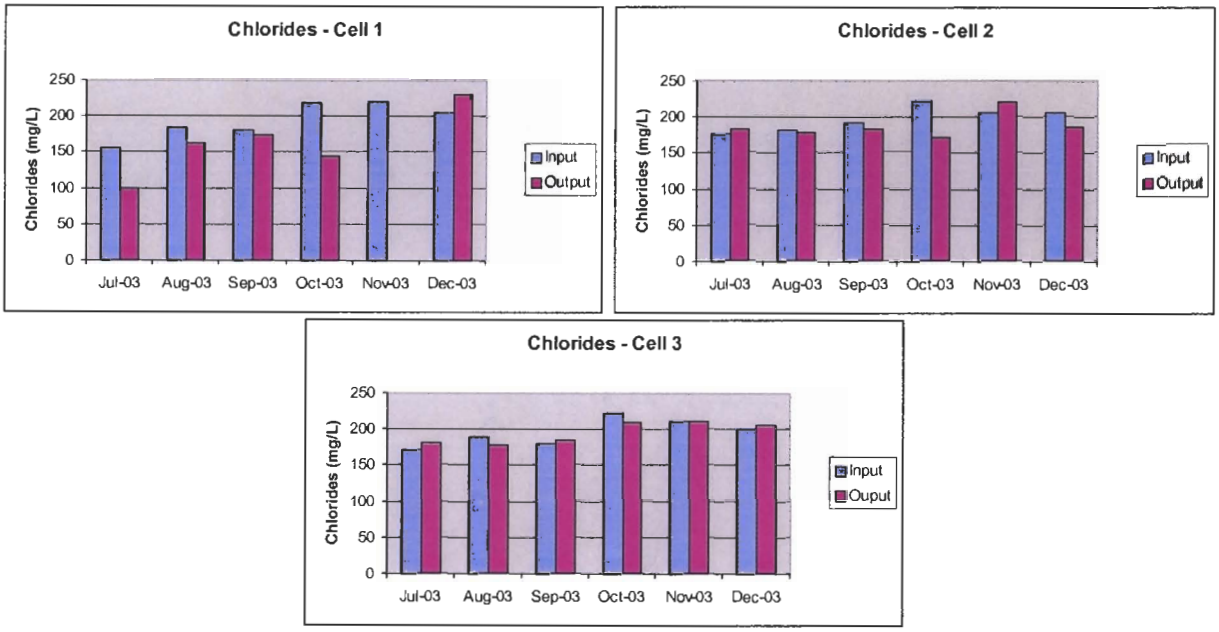


Figure 2-19 a, b, c
Surface Water Chlorides vs. Time for Cells 1, 2, and 3

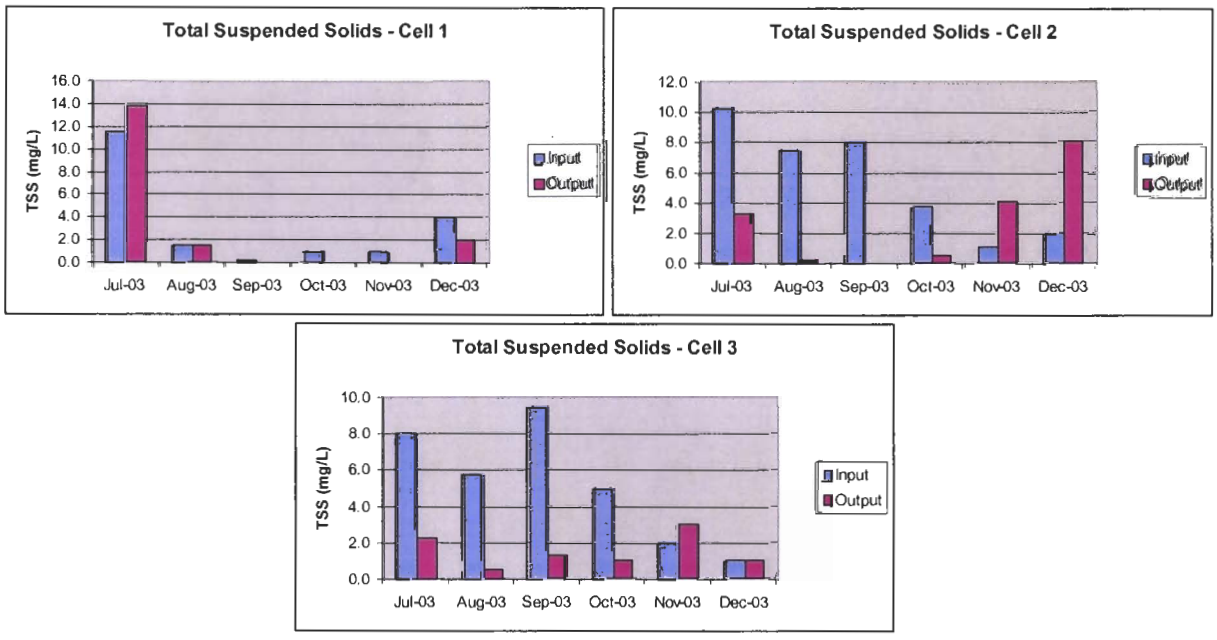


Exhibit 2-20 a, b, and c
Total Suspended Solids vs. Time for Cells 1, 2, and 3

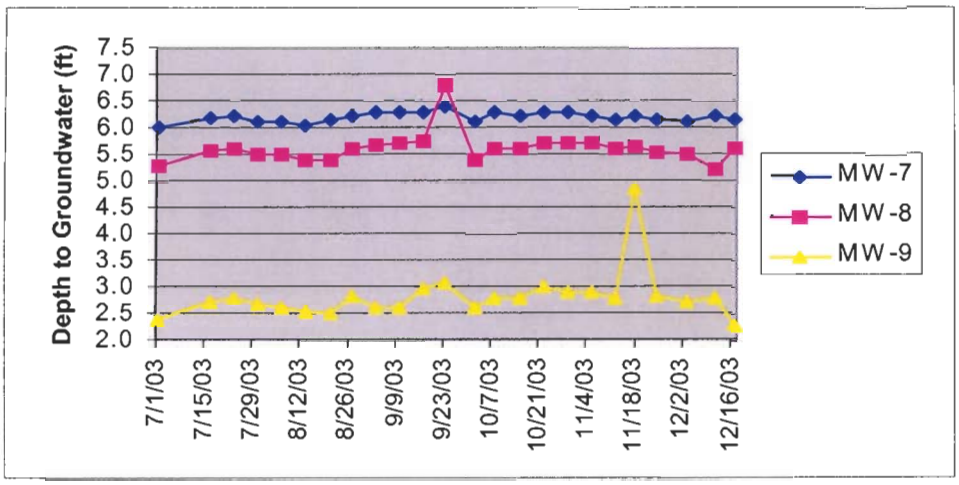


Figure 2-21
Depth to Groundwater vs. Time

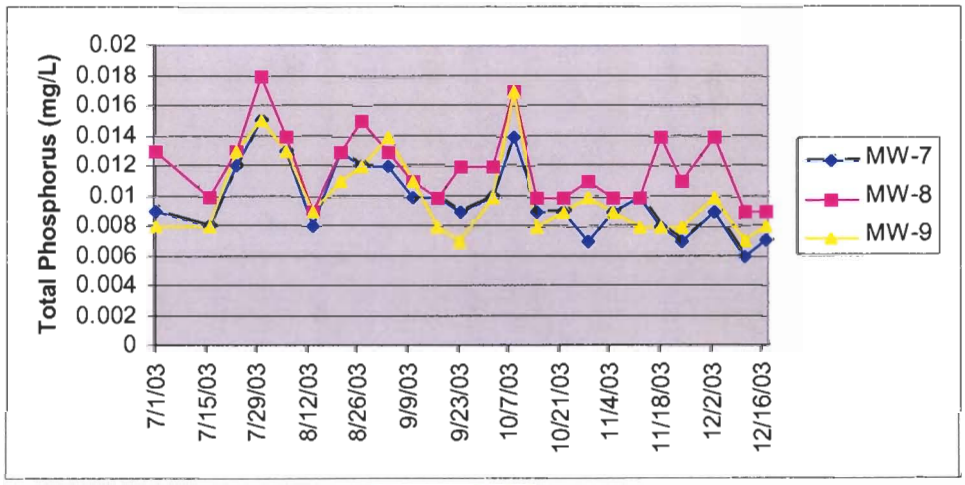


Figure 2-22
Total Phosphorus in Groundwater vs. Time

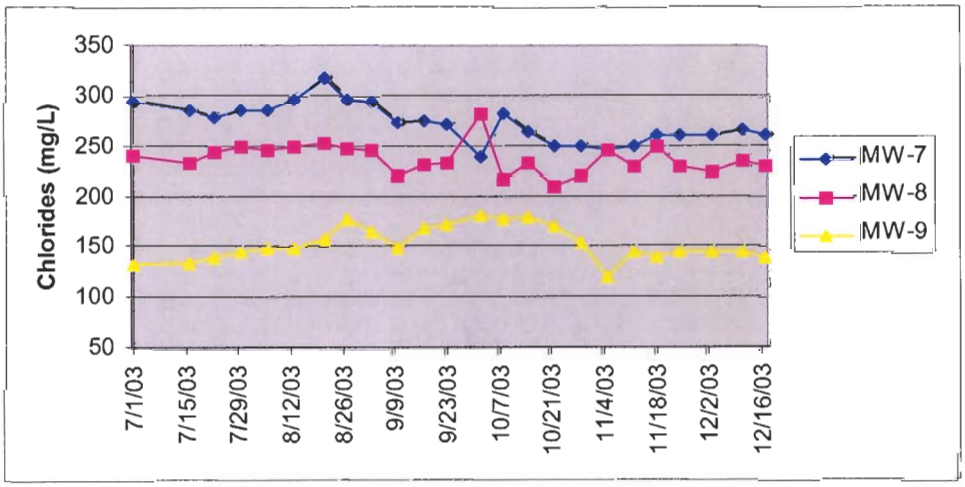


Figure 2-23
Chlorides in Groundwater vs. Time

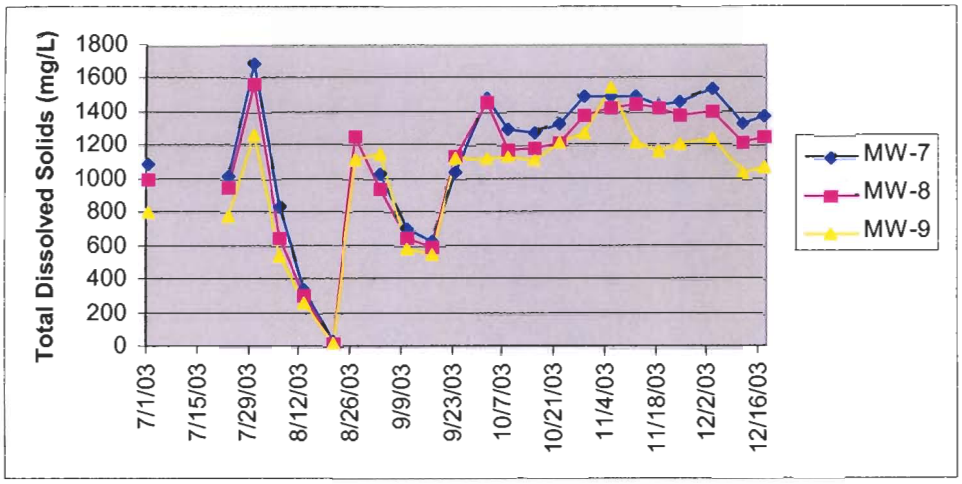


Figure 2-24
Total Dissolved Solids in Groundwater vs. Time

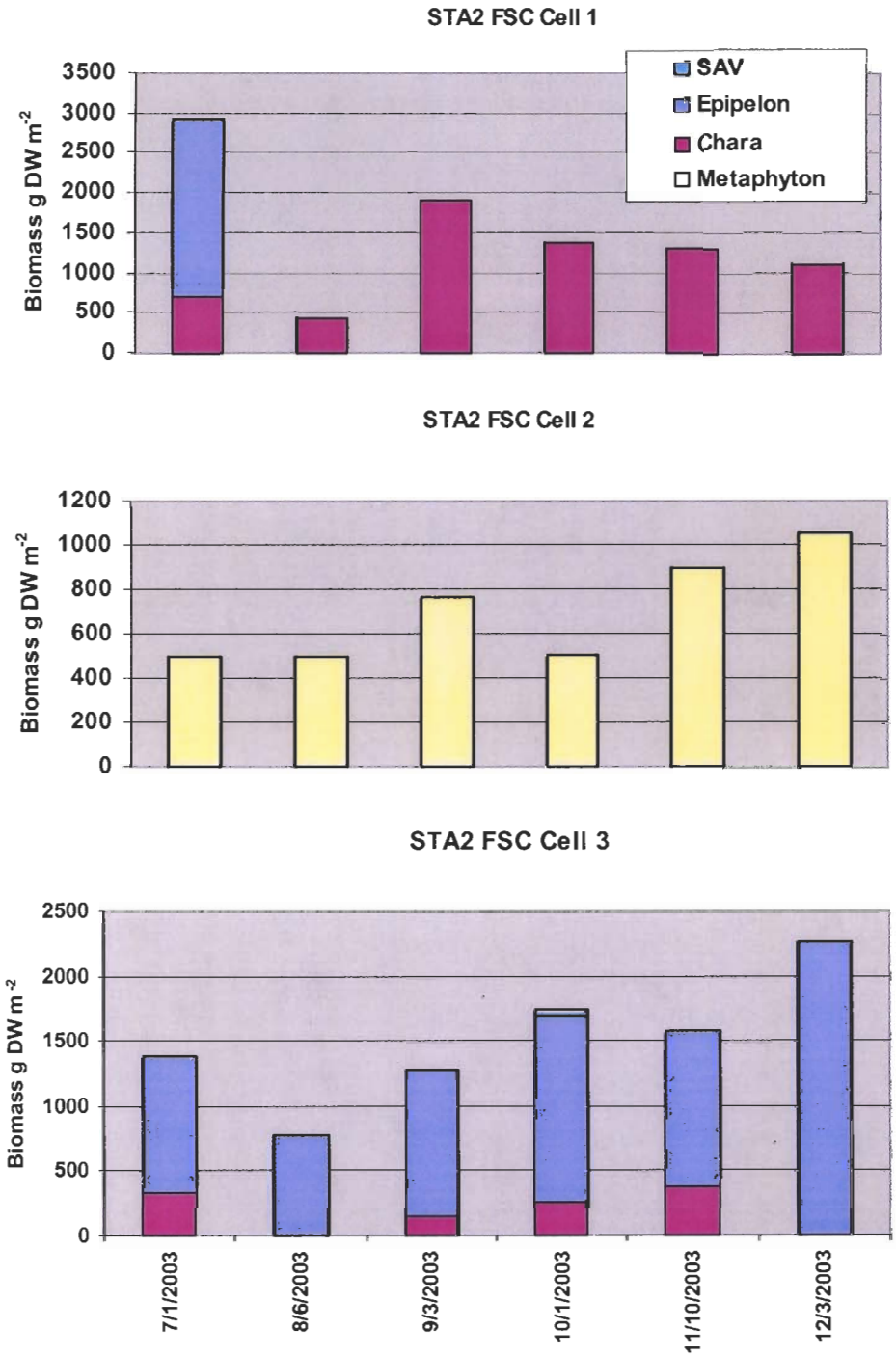


Figure 2-25
Mass of all biotic components present per unit area for each sampling event.

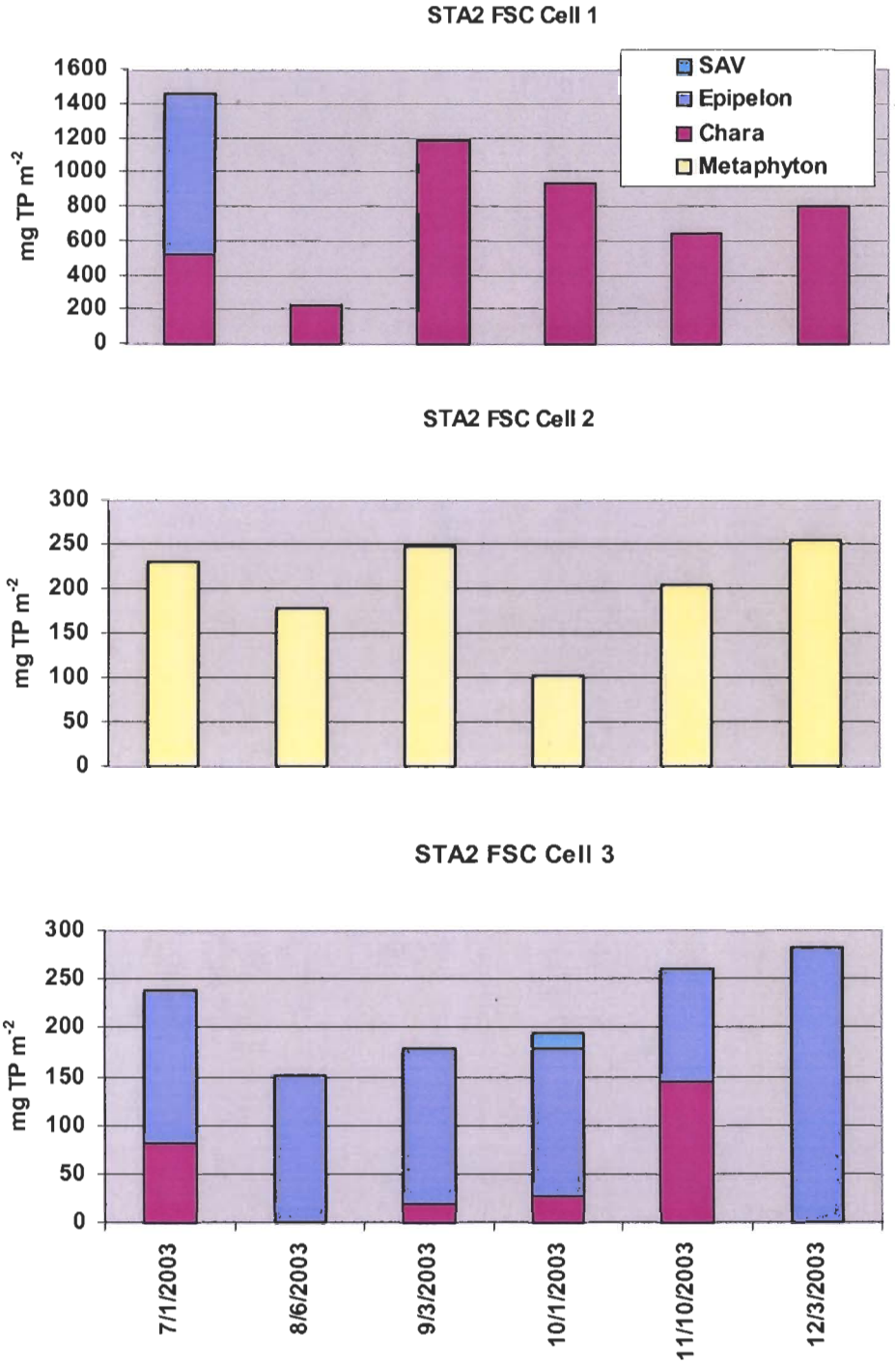


Figure 2-26
The mass TP of each ecosystem component present per unit area for each sampling event.

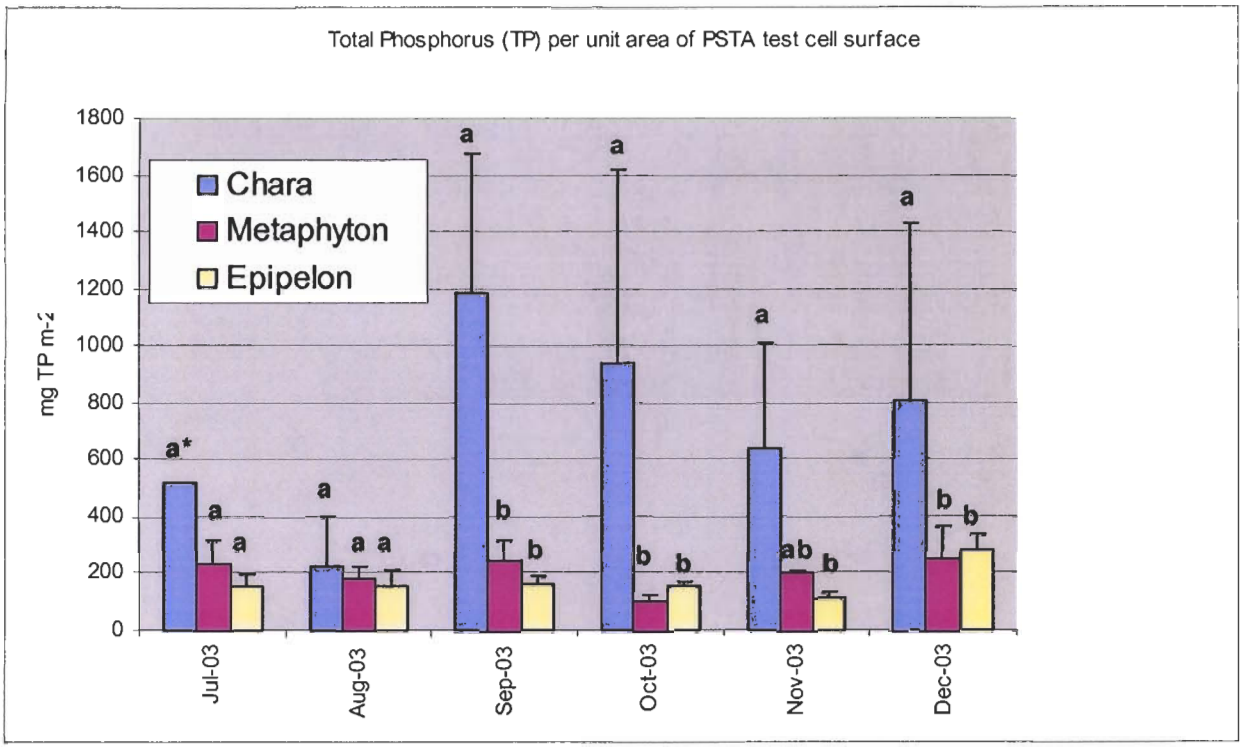


Figure 2-27
The mass TP retained by the dominant biotic type in each cell per unit area (mean ± SD).

Note: Cell 1 was dominated by periphytized Chara spp., Cell 2 was dominated by metaphytic periphyton, and Cell 3 by epipelic periphyton. Letters denote differences between types within each sampling event ($\alpha < 0.05$). * During this event Cell 1 only had Chara spp. dominance at 1 of 3 replicate sites. Epipelon was present at all three Cell1 sites at this time but we chose Chara as the representative biotic type because it dominated the remaining experimental period.

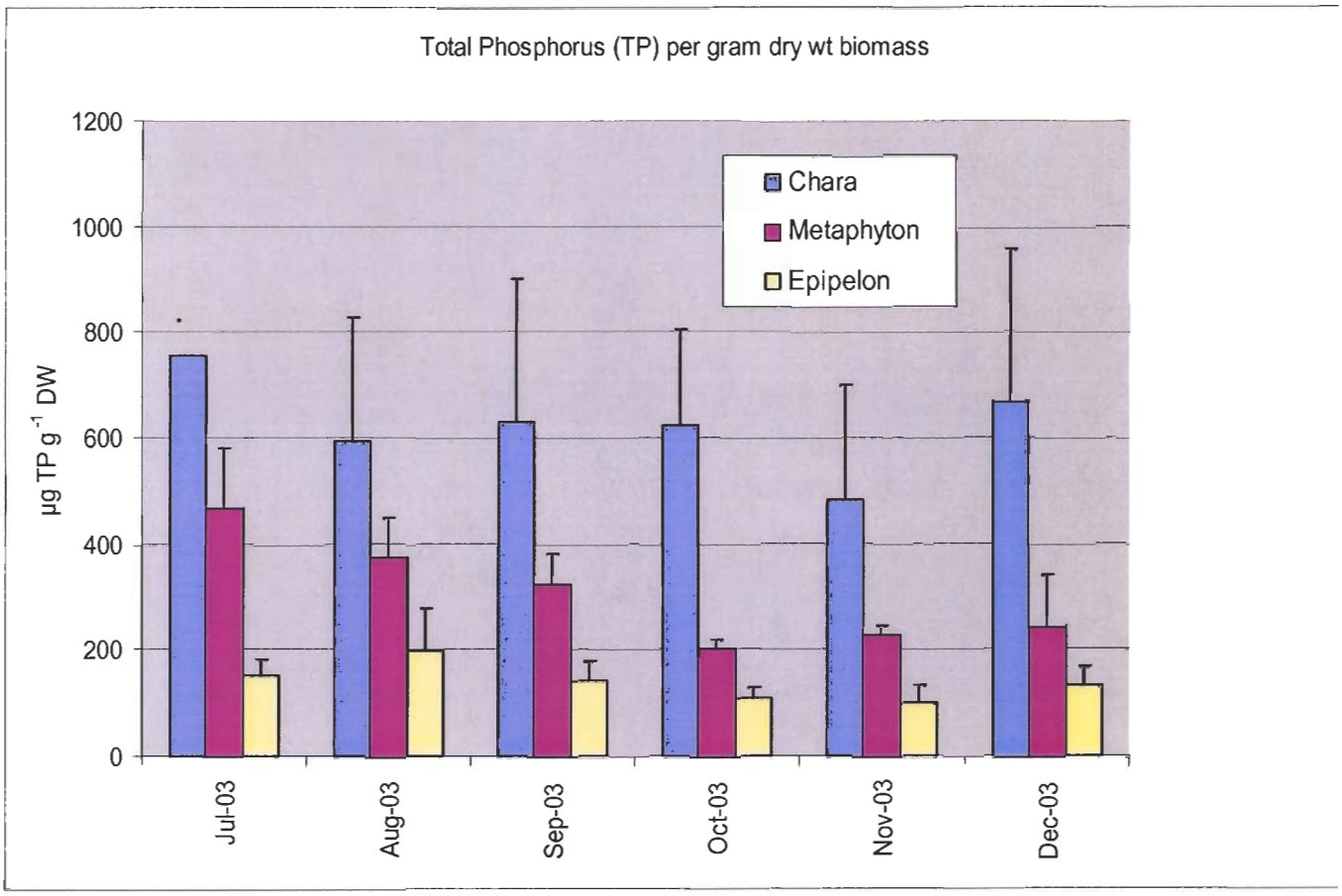


Figure 2-28
Concentration of TP contained in the dominant biotic type in each cell per per mass dry weight (mean ± SD).

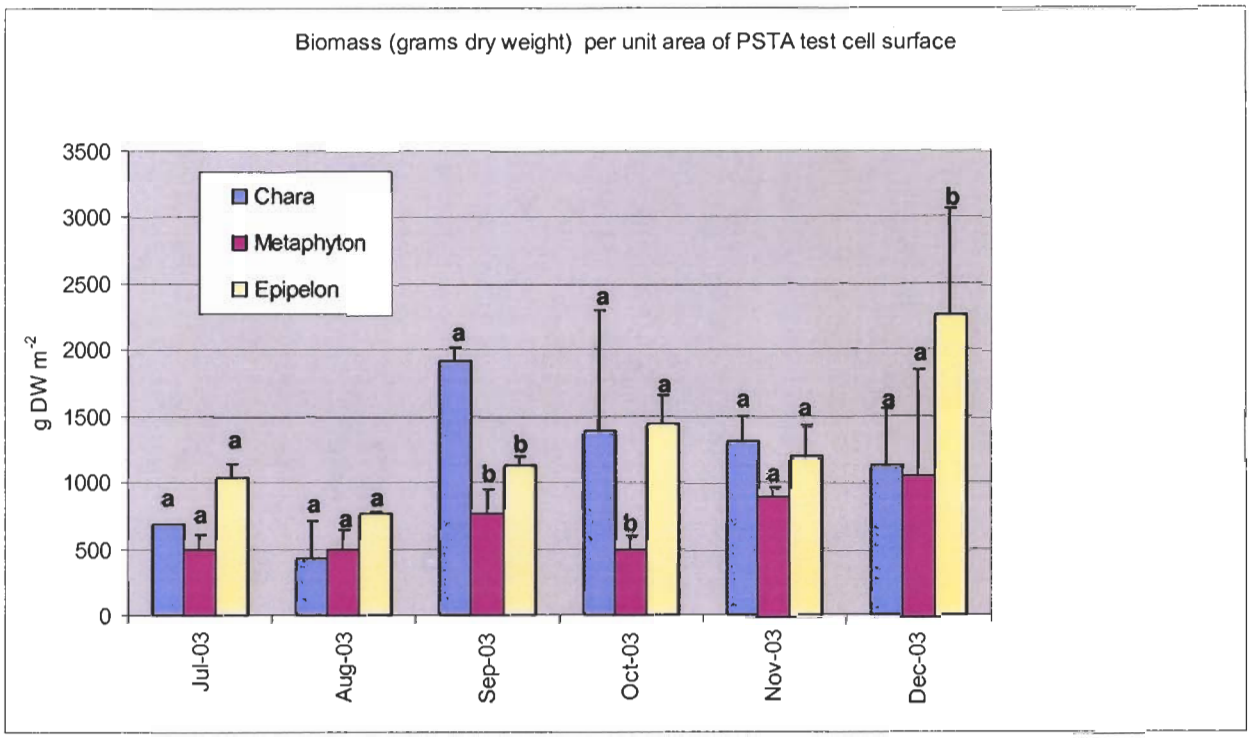


Figure 2-29
Mass of biotic component present per unit area for each sampling event (mean ± SD).

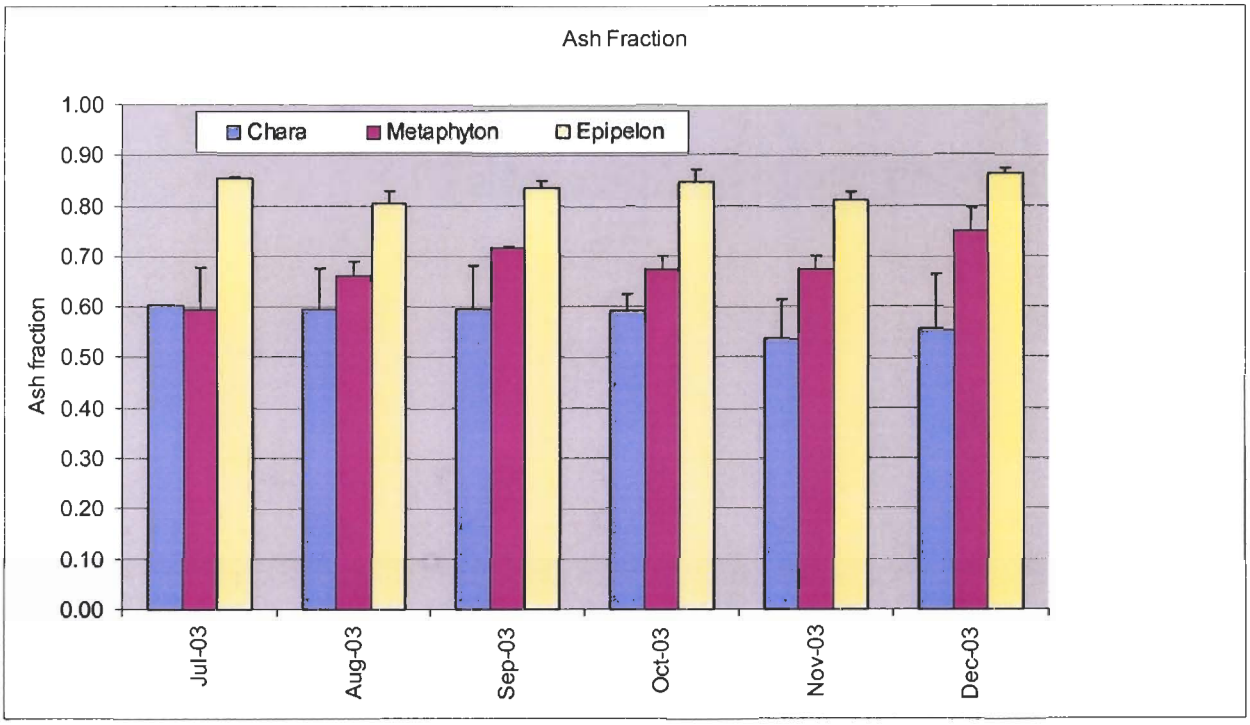


Figure 2-30
Ash contents (fractional percent of dry weight as ash) in each biotic type by event (mean ± SD).

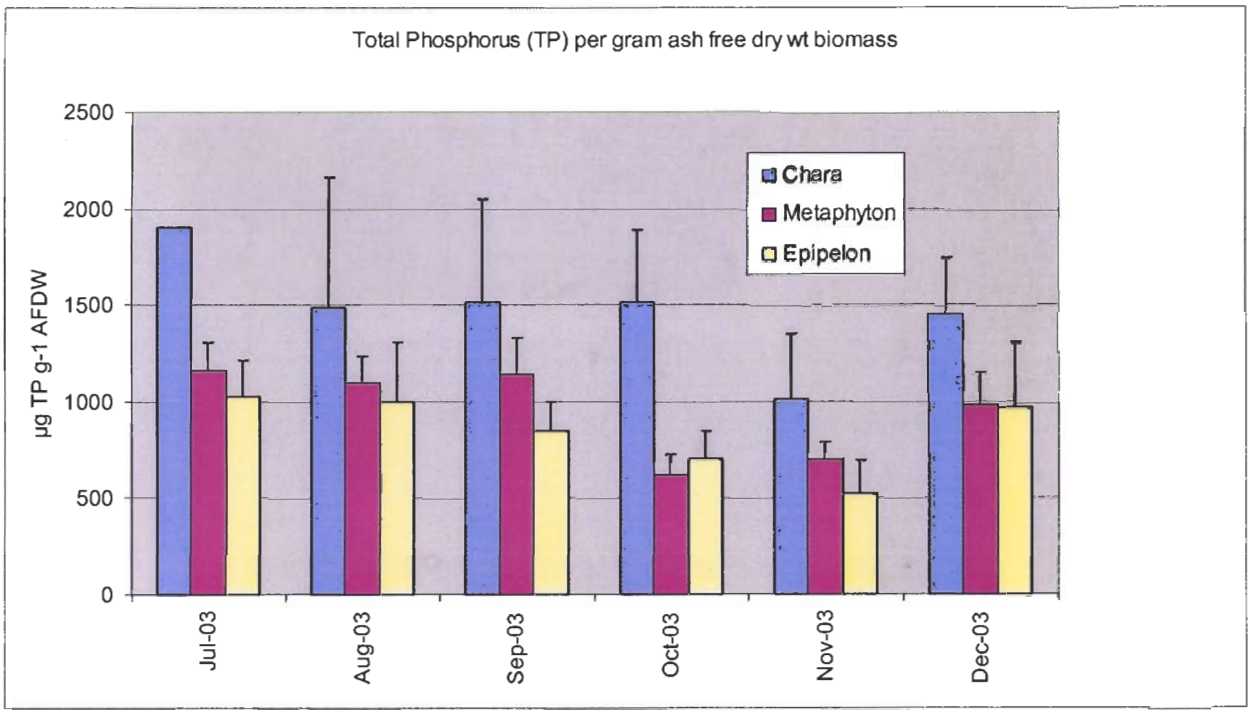


Figure 2-31
Concentration of TP contained in the dominant biotic type in each cell per mass ash free dry weight (AFDW) (mean ± SD).

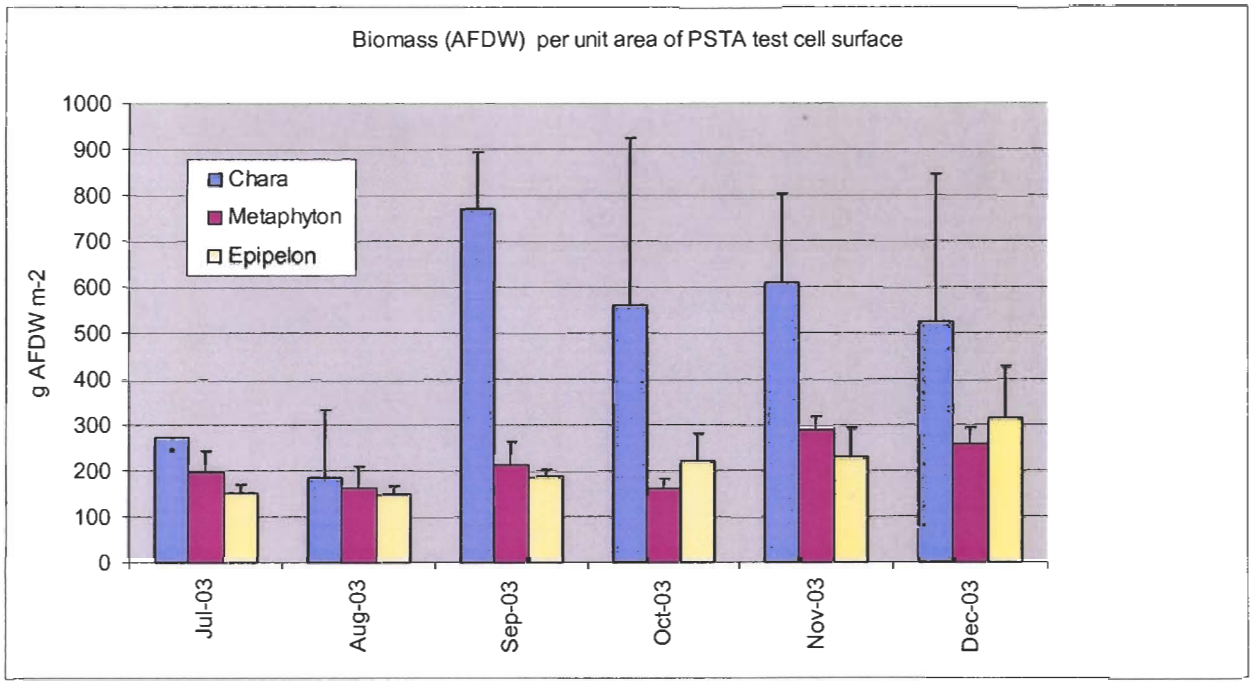


Figure 2-32
Ash free dry weight (AFDW) of biotic components present per unit area for each sampling event (mean ± SD).

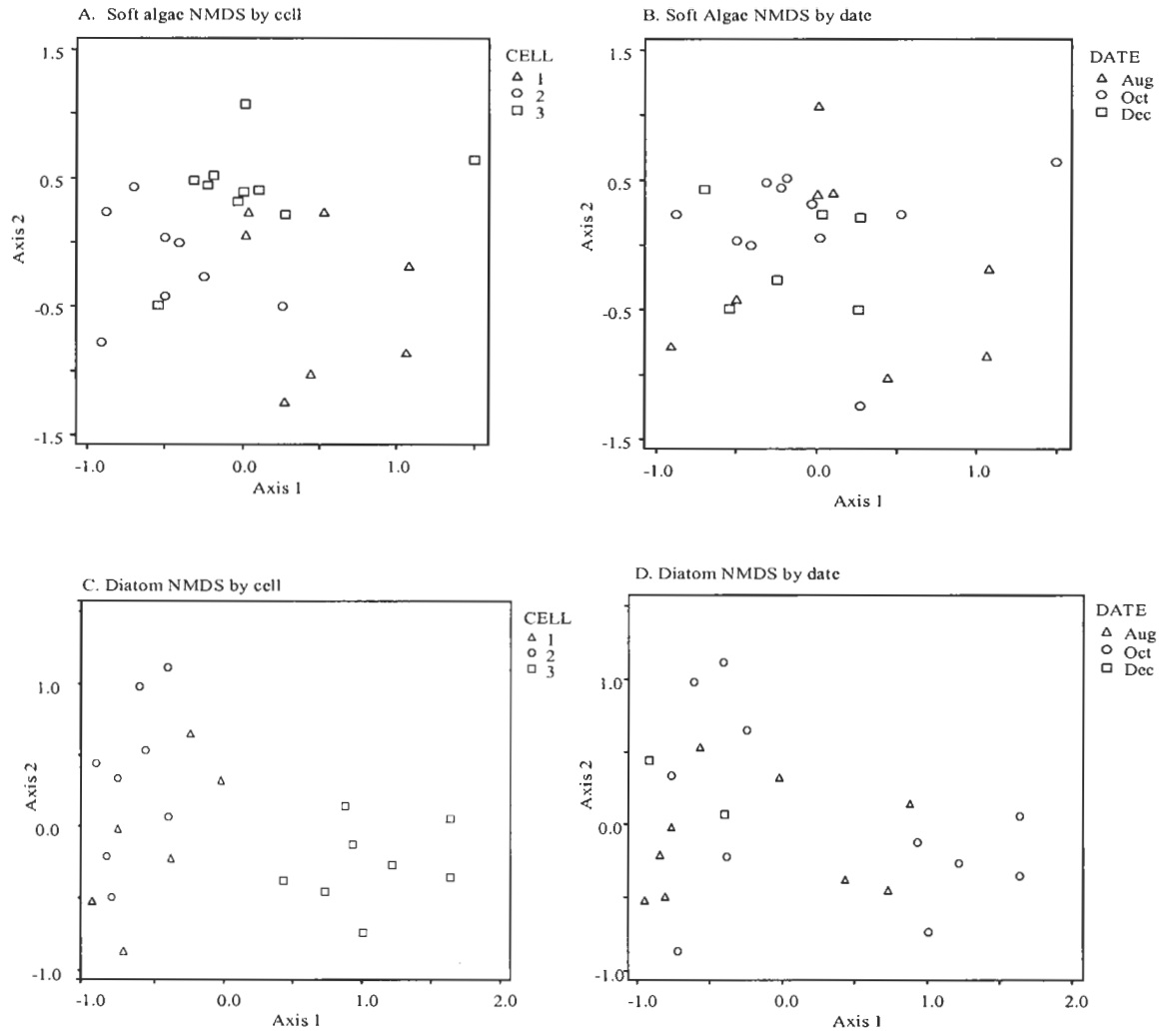


Figure 2-33
Two dimensional non-metric multidimensional scaling ordination bi-plot of sites in FSC cells 1, 2 and 3 distributed by Bray-Curtis differences in soft-algal and diatom species composition coded by cell (a, c) and date (b, d).

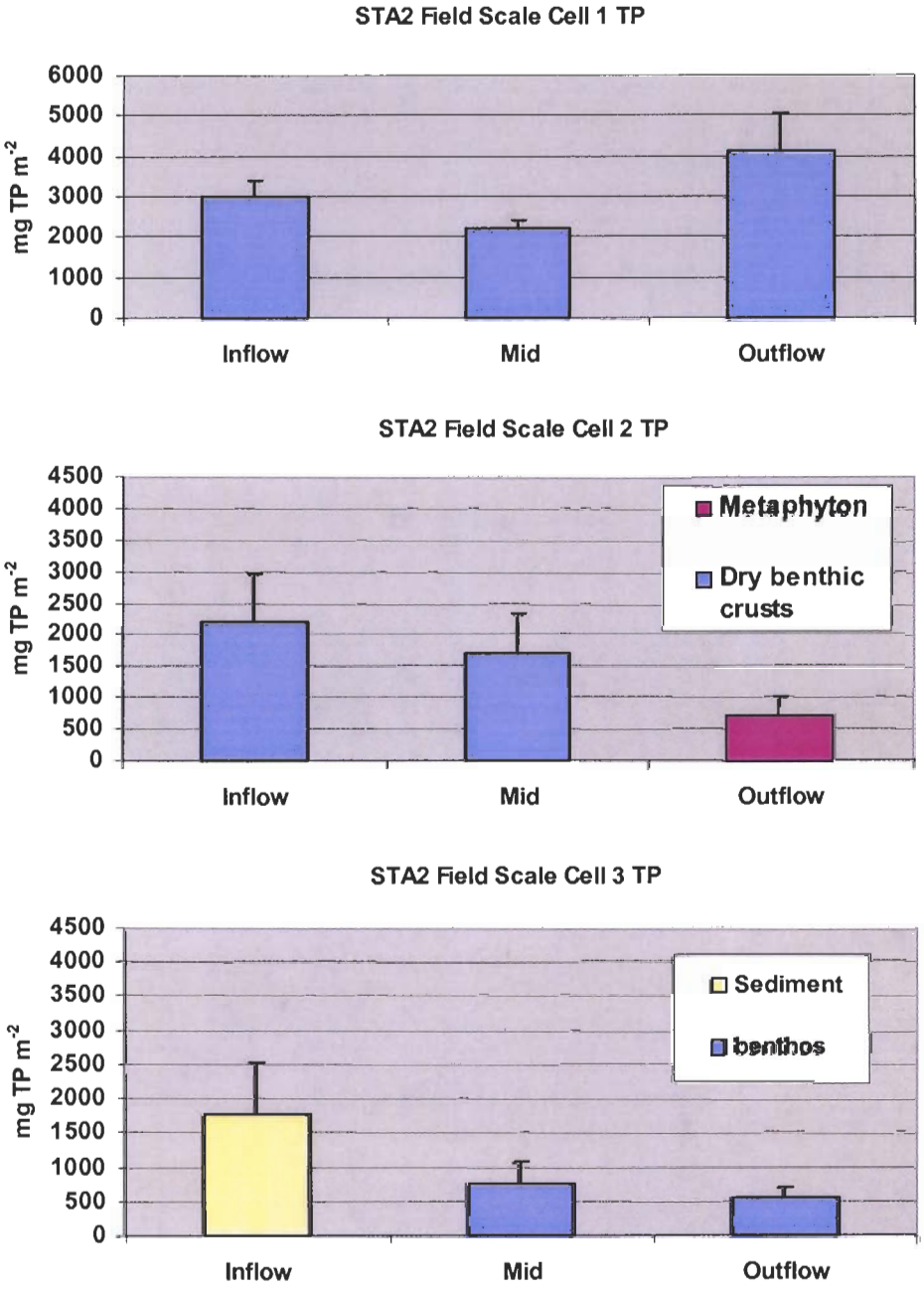


Figure 2-34
The mass TP by biotic type in each cell per unit area (mean ± SD).

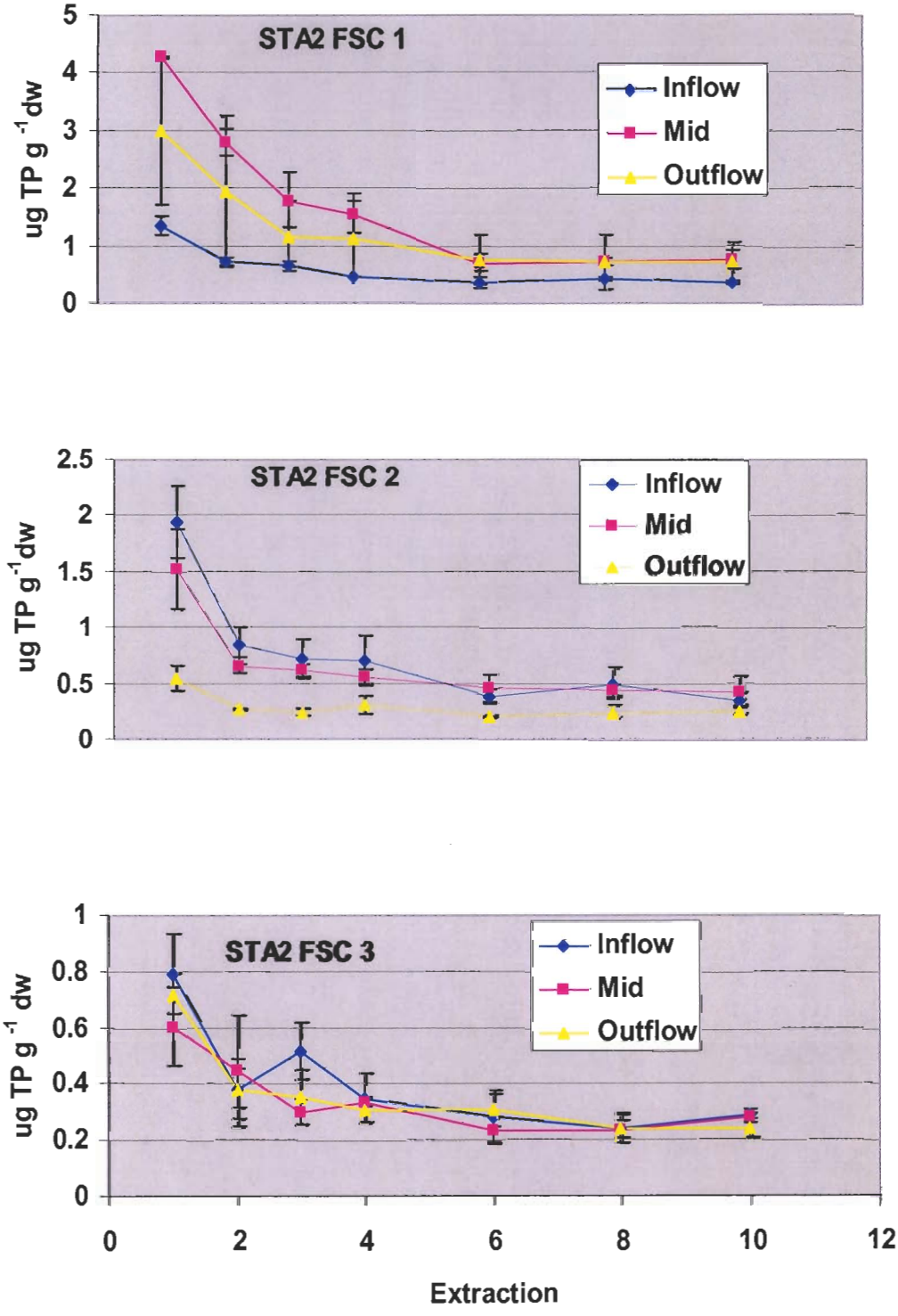


Figure 2-35
TP desorption curves for FSC 1, 2 and 3 (mean ± SD).

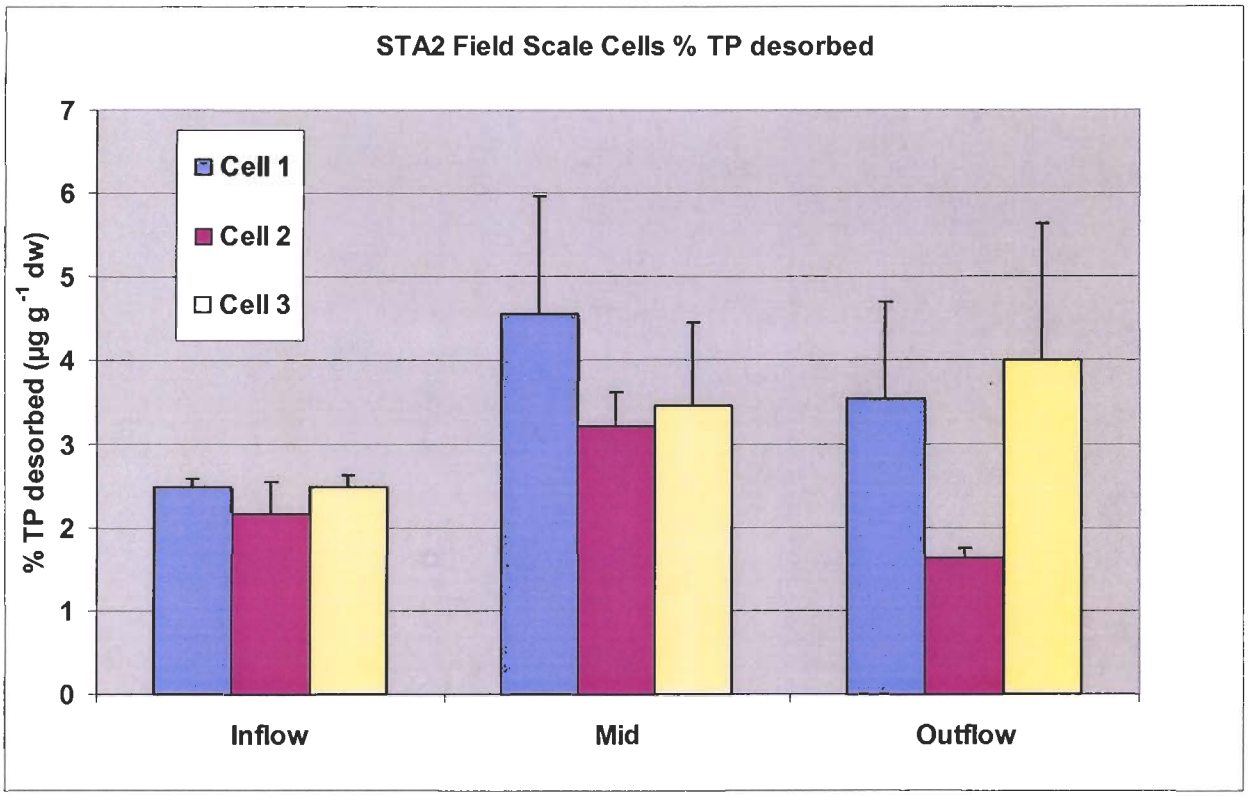


Figure 2-36
Percent of initial TP (µg g^{-1} dw) desorbed in 10 extractions (mean ± SD).

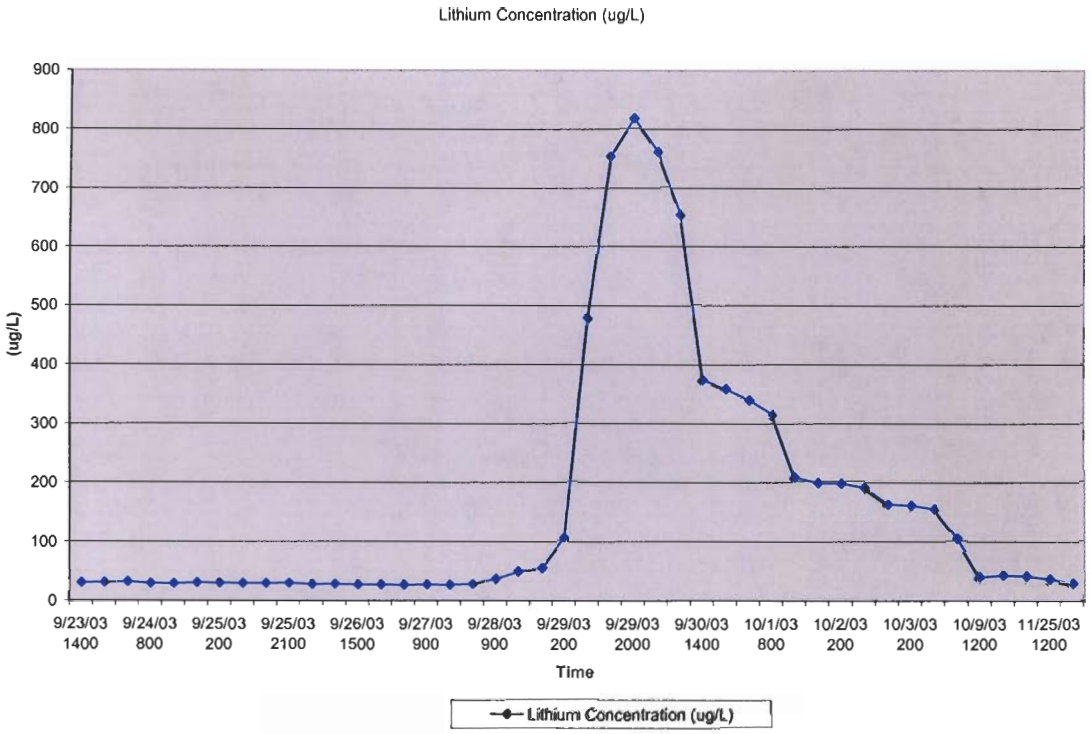


Figure 2-37a
Lithium Concentrations in Cell 2 Outlet
Tracer Study

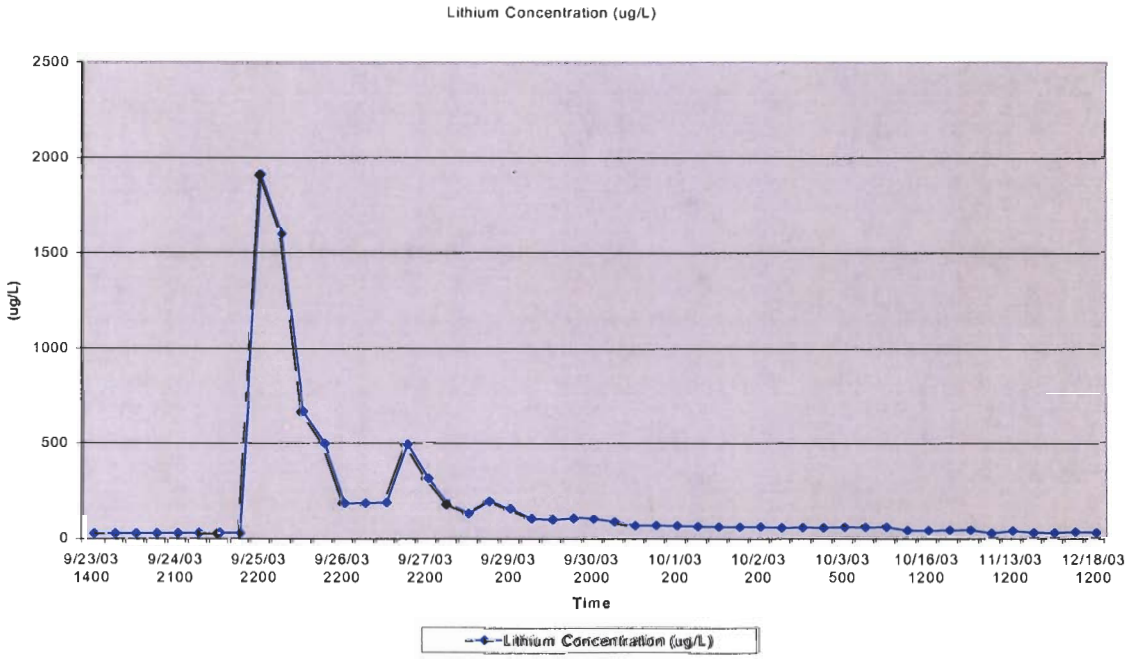


Figure 2-37b
Lithium Concentration in Cell 2 Mid-Point
Tracer Study

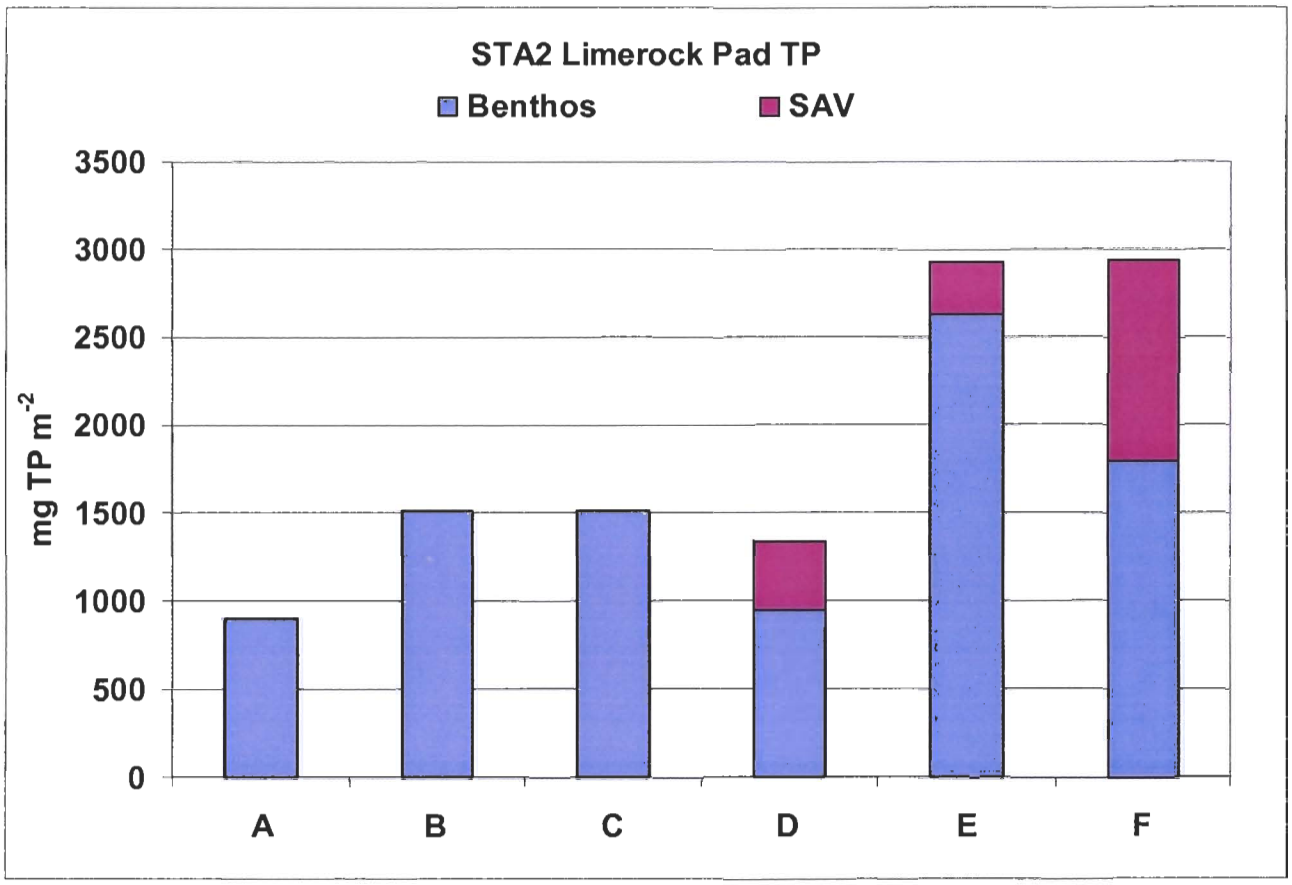


Figure 3-1
The average mass of TP by biotic compartment at each water depth treatment per unit area.

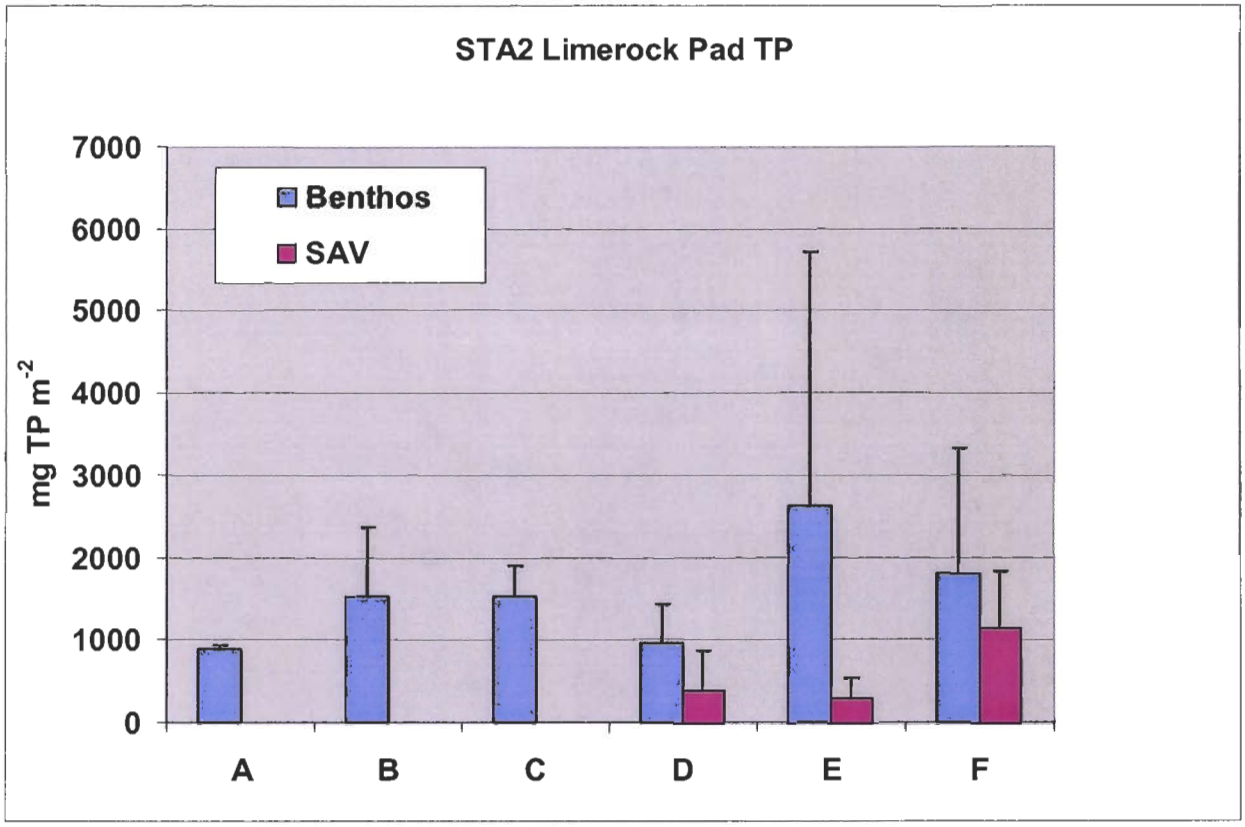


Figure 3-2
The average mass of TP by biotic compartment at each water depth treatment per unit area showing variation (mean ± SD).

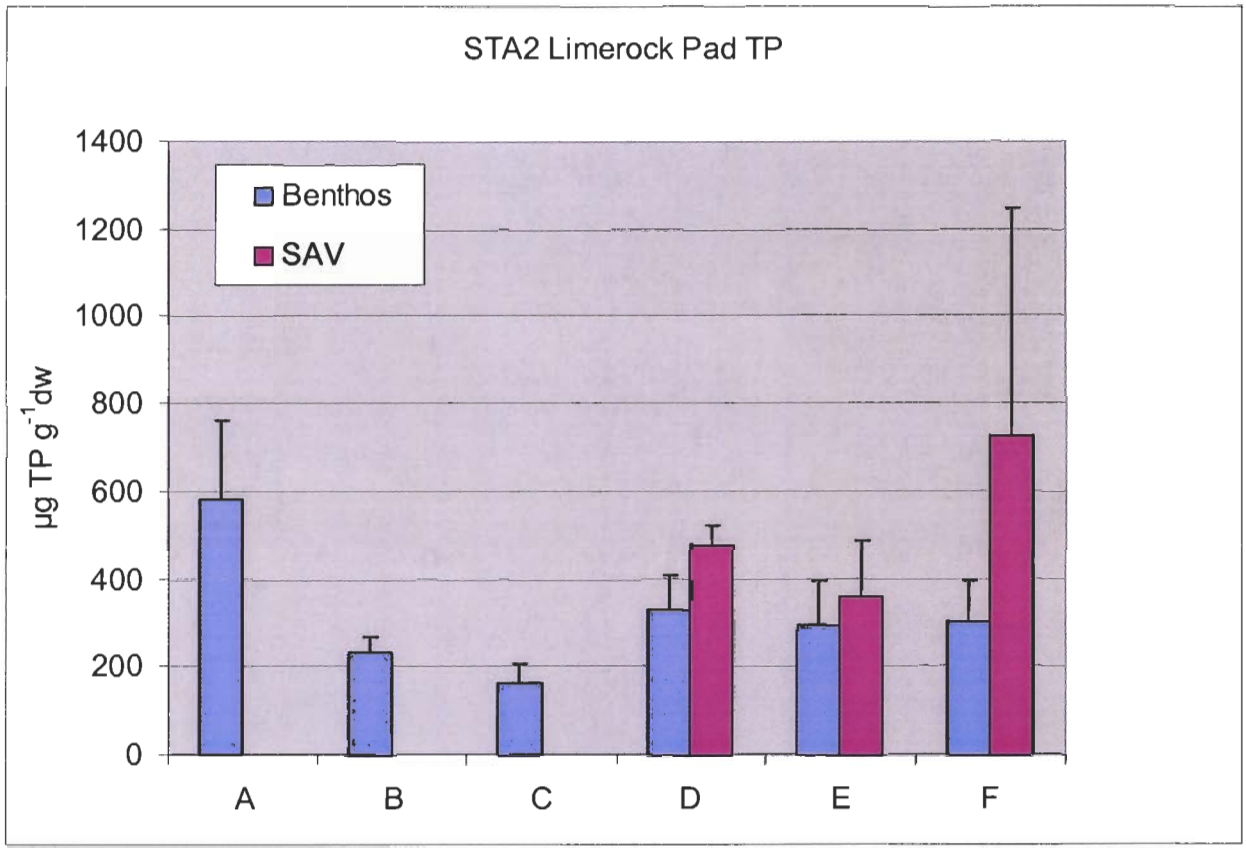


Figure 3-3
Concentration of TP in ecosystem components in each water depth treatment per mass dry weight (mean ± SD).

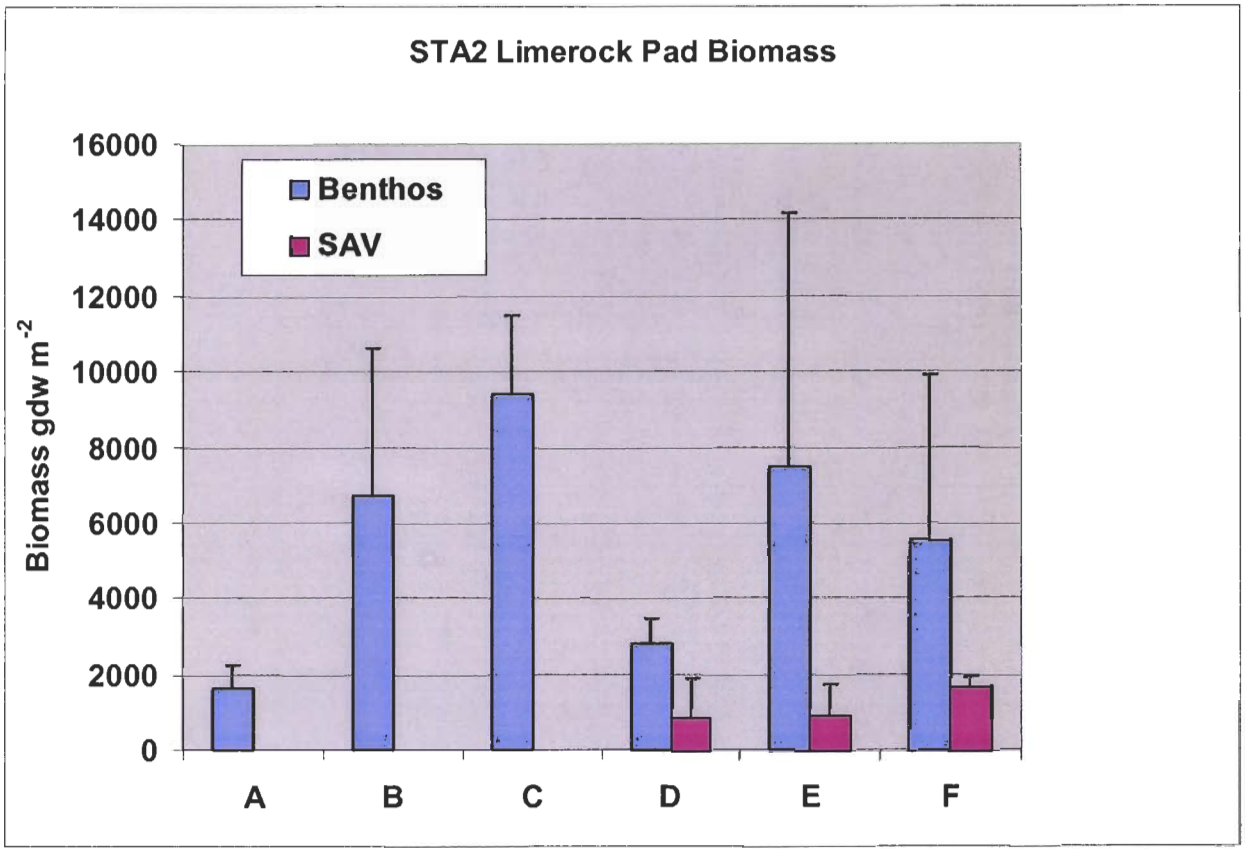


Figure 3-4
Mass of ecosystem components present per unit area in water depth treatment (mean ± SD).

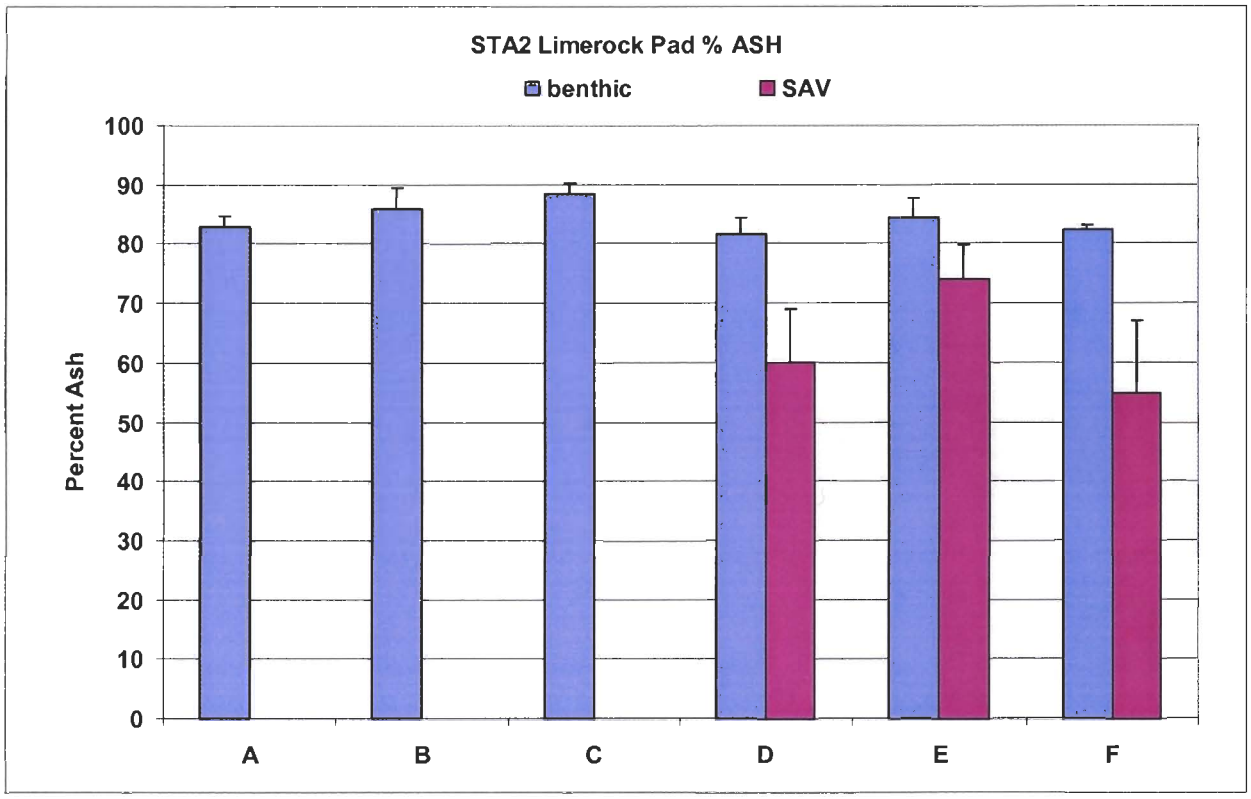


Figure 3-5
Percent ash in ecosystem components in water depth treatments (mean ± SD).

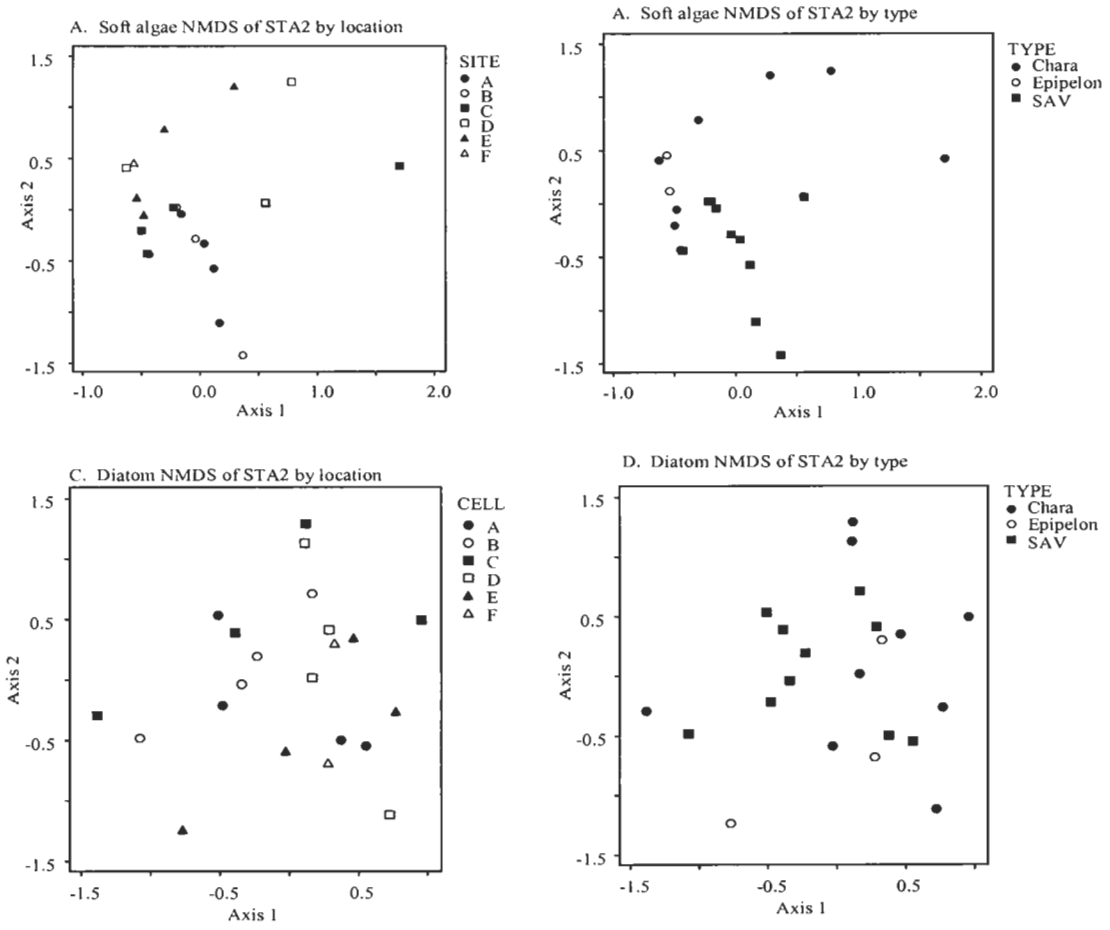


Fig. 3-6 a,b,c,d.
Two dimensional non-metric multidimensional scaling ordination bi-plot of sites in STA 2 Limerock pad distributed by Bray-Curtis differences in soft-algal and diatom species composition coded by location (a, c) and substrate type (b, d).

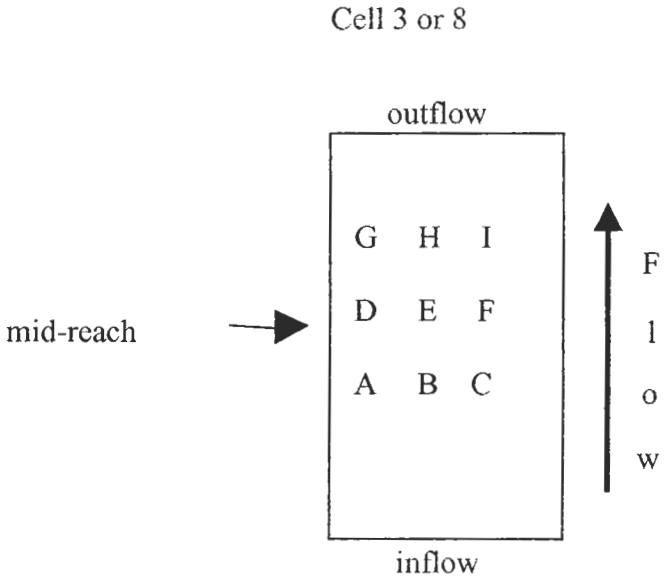


Figure 4-1
Arrangement of plots in STA1W test cells 3 and 8.

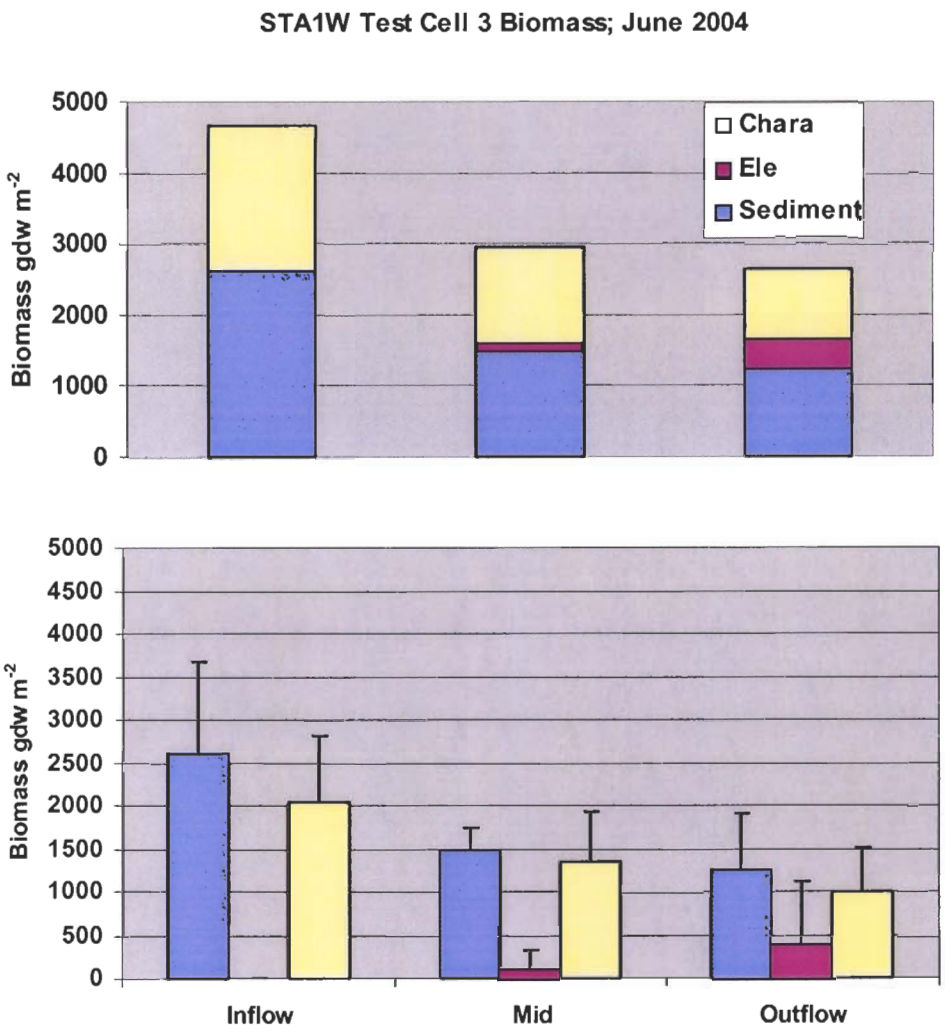


Fig. 4-2
Mass of all biotic components present per unit area for STA1W Cell 3.

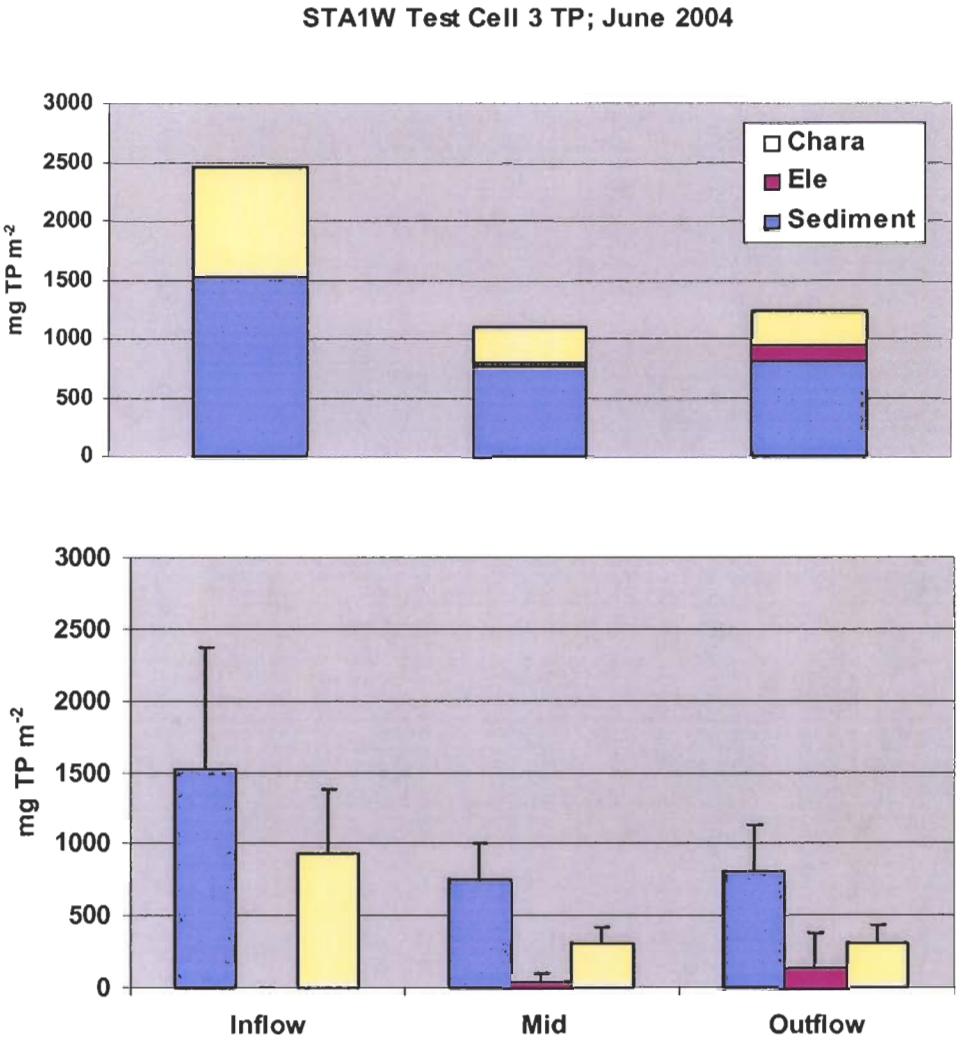


Fig. 4-3
The mass TP of each ecosystem component present per unit area for STA1W Cell 3.

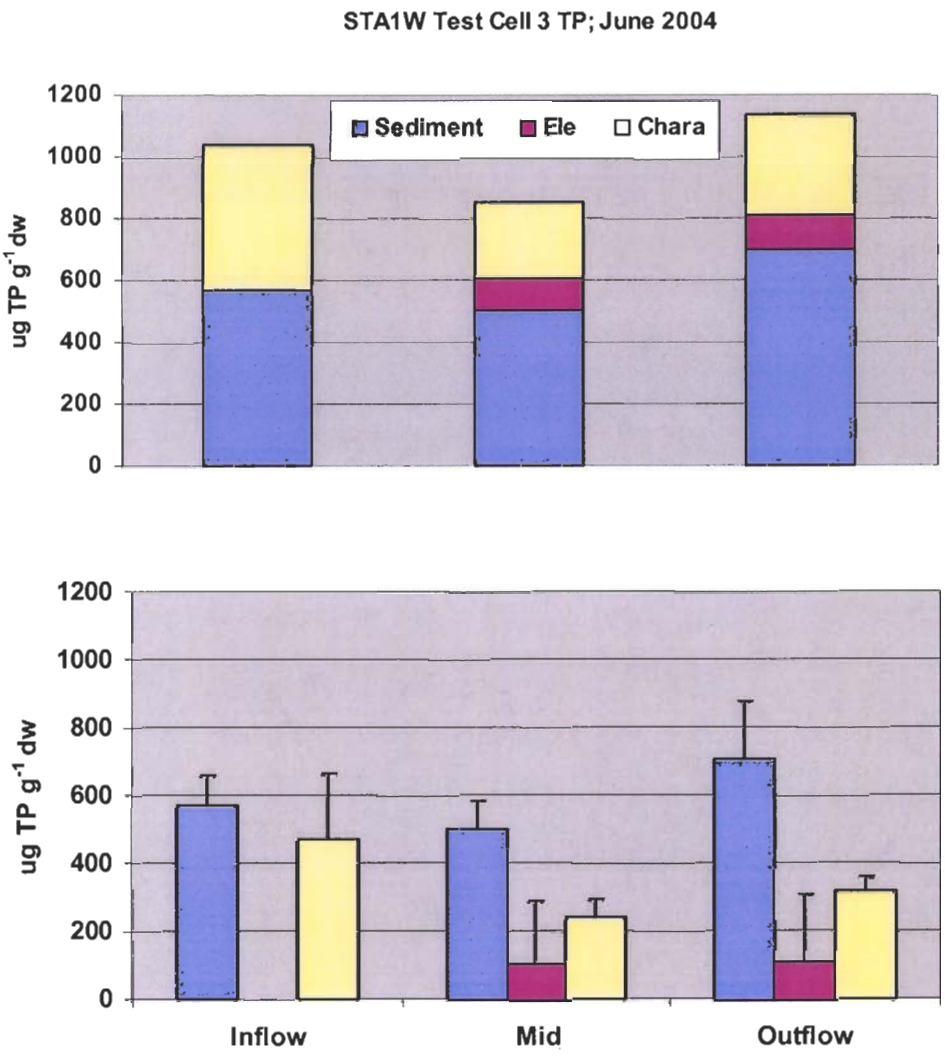


Fig. 4-4
The mass TP retained by each ecosystem component in STA1W Cell 3.

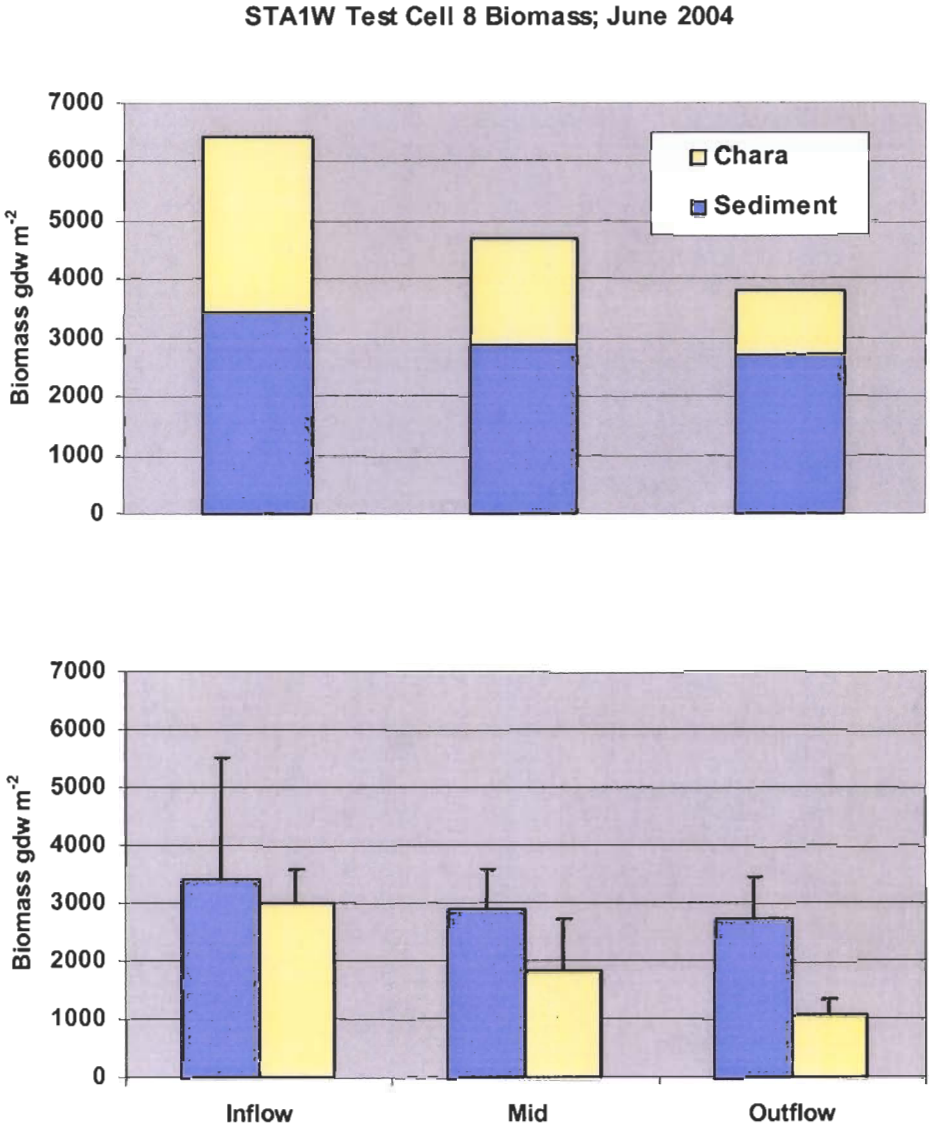


Fig. 4-5
Mass of all biotic components present per unit area for STA1W Cell 8.

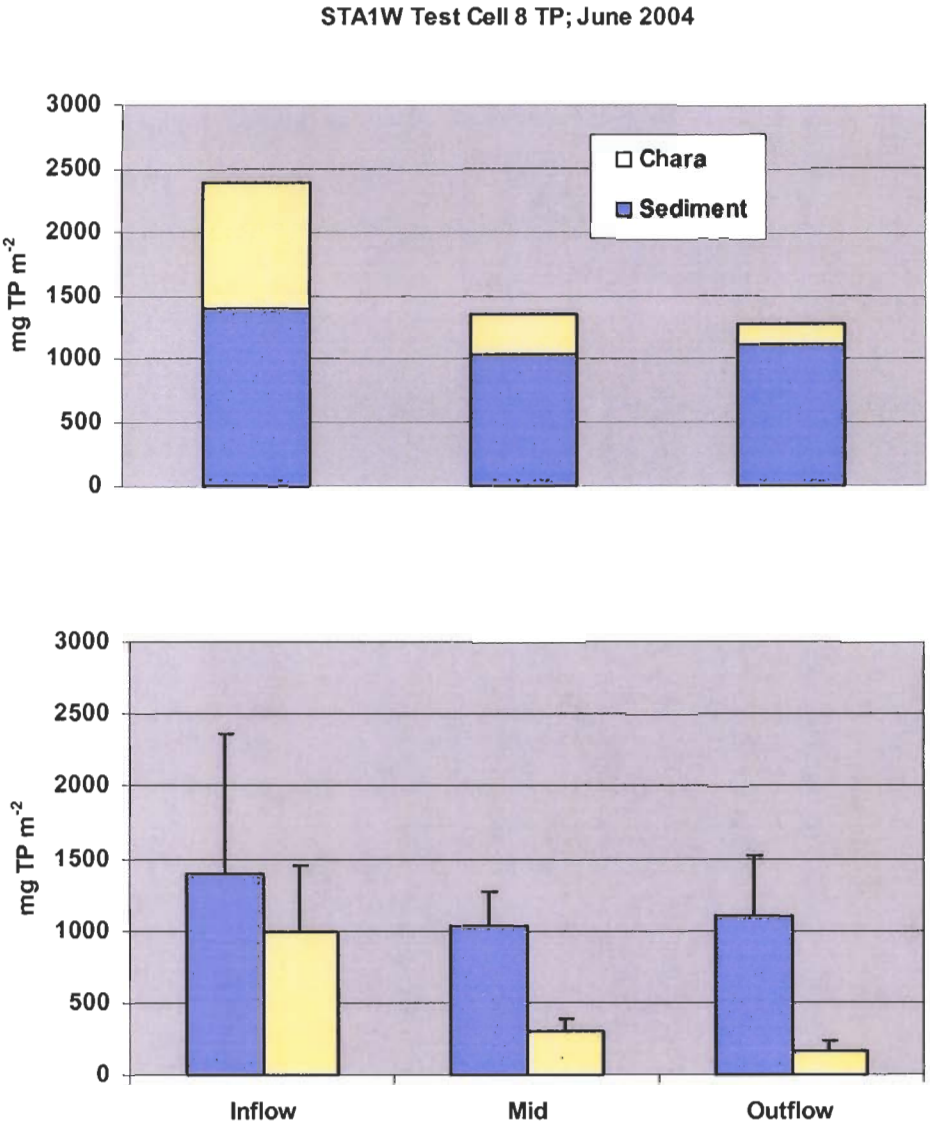


Fig. 4-6
The mass TP of each ecosystem component present per unit area for STA1W Cell 8.

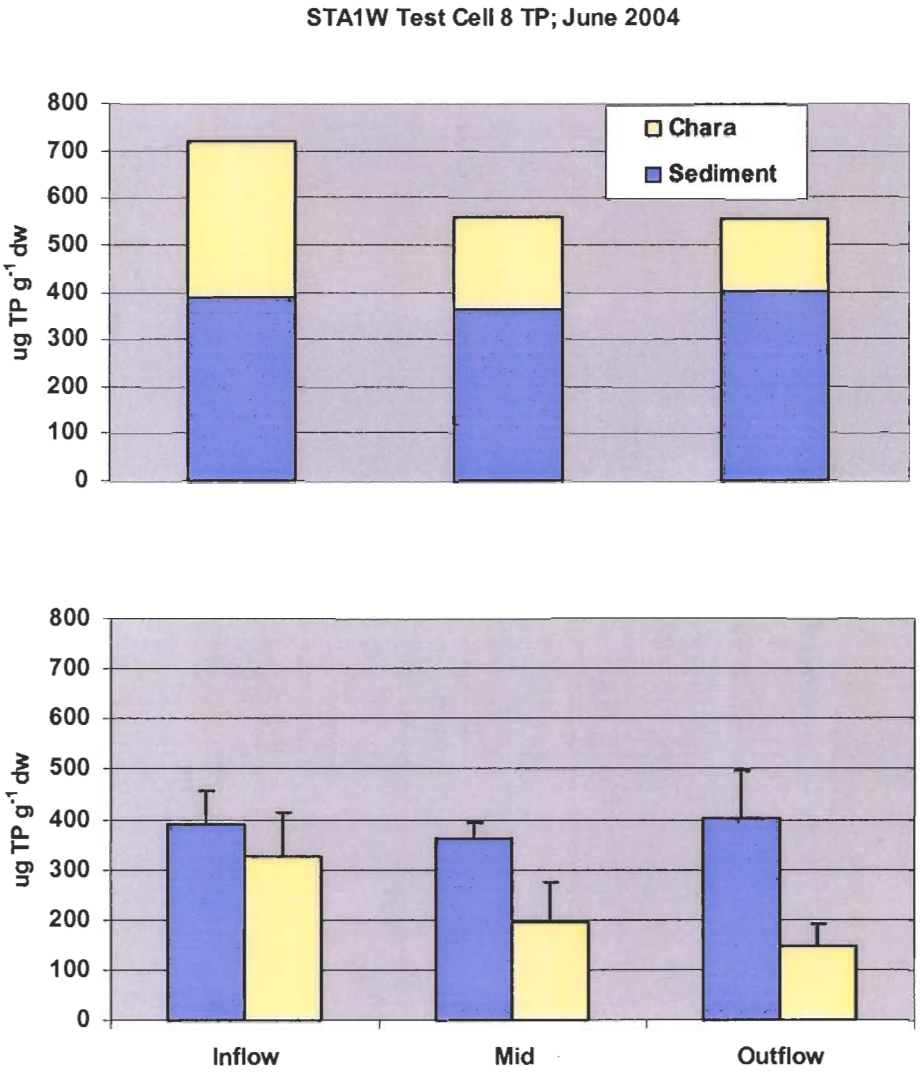
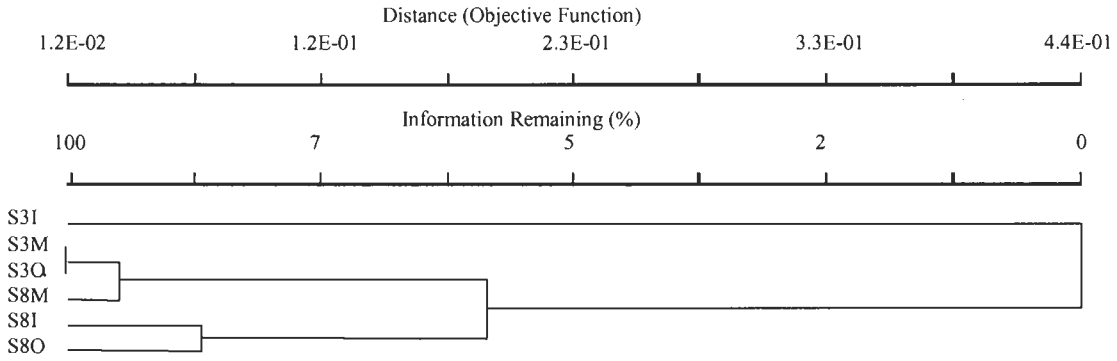


Fig. 4-7
The mass TP retained by each ecosystem component in STA1W Cell 8.

A. Dendrogram of cells 3 and 8 soft algae by location



B. Dendrogram of cells 3 and 8 diatoms by location

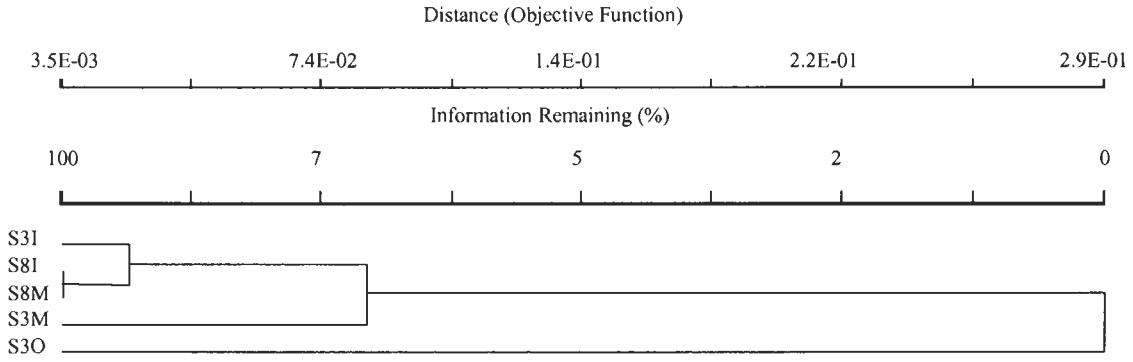


Fig. 4-8
Cluster dendrograms of soft algae (a) and diatom (b) species composition among STA1W test cells 3 and 8 inflow (I), mid-point (M) and outflow (O) sites.

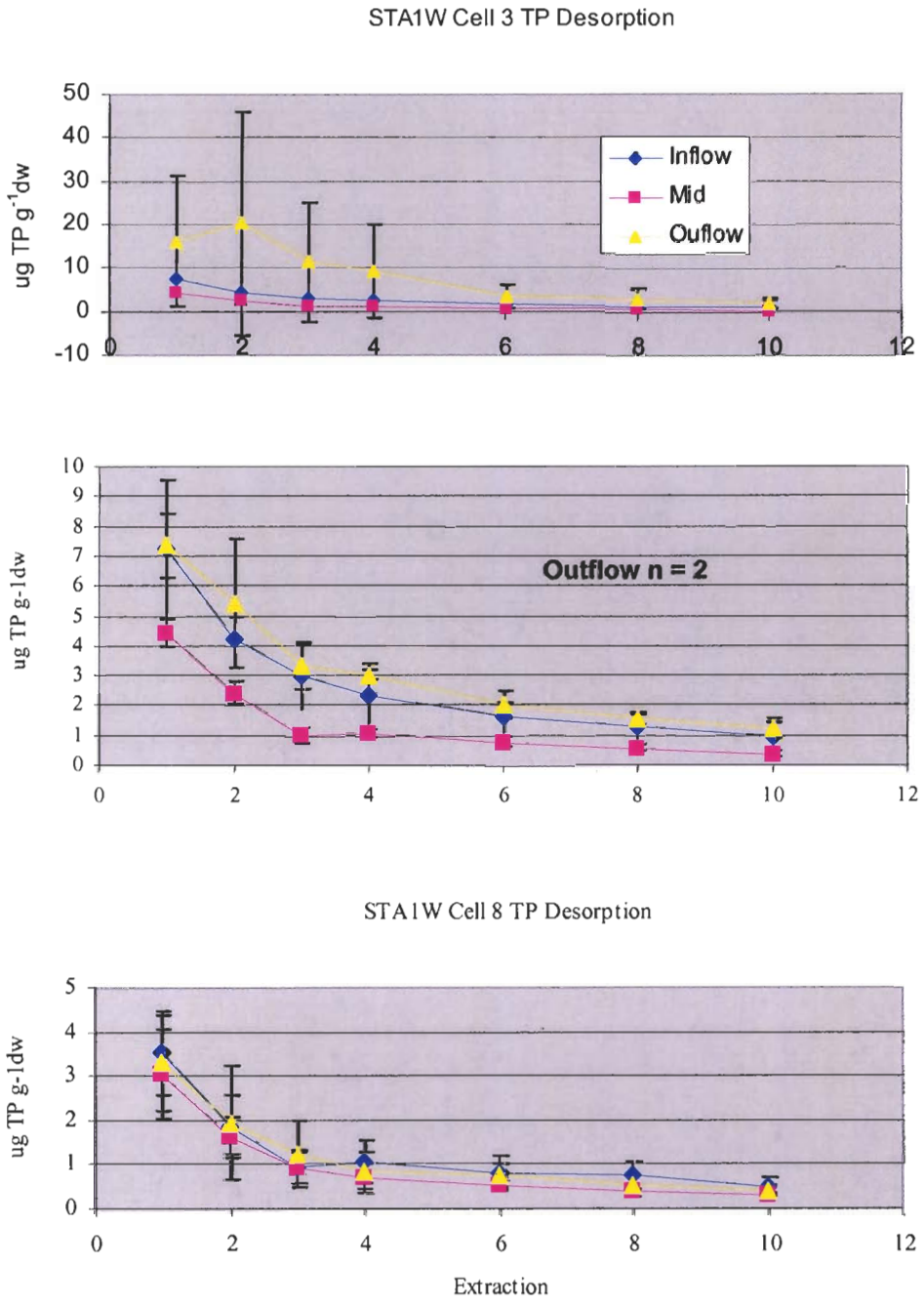


Fig. 4-9
TP desorption curves for STA1W cells 3 and 8 (mean ± SD). Second graph for cell 3 excludes 3G TP desorbed.

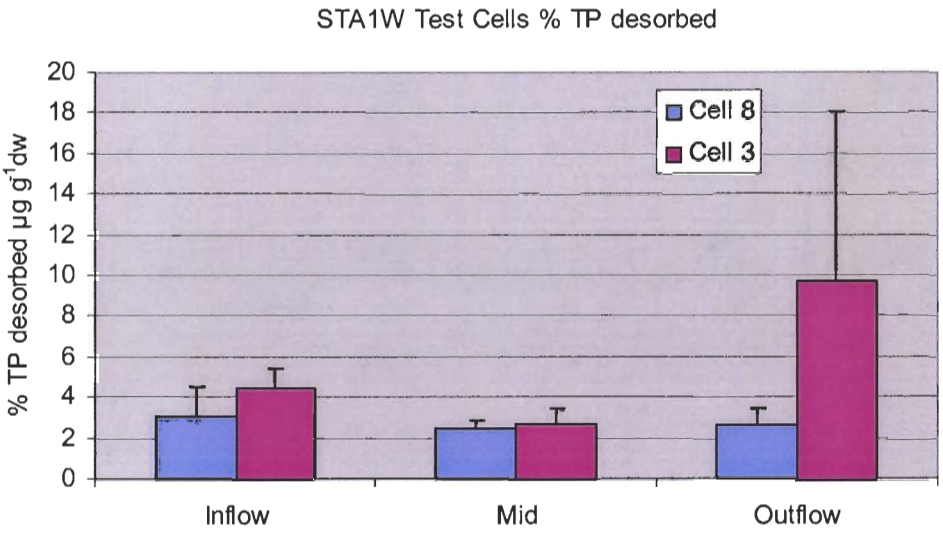


Fig. 4-10
Percent of initial TP (µg g^{-1} dw) desorbed in 10 extractions for STA1W cells (mean ± SD).

Table 1
Operational Characteristics of Field Scale Demonstration Cells

Design Parameter	Cell 1	Cell 2	Cell 3
Flow (m3/day)			
Average	1,250	1,250	1250
Maximum	2,500	2,500	2500
Minimum	0	0	0
Cell Length (m)	315	945	315
Cell Width (m)	66	22	66
Aspect Ratio (L/W)	5	43	5
Water Depth (cm)			
Average	30	30	30
Maximum	60	60	60
Minimum	0	0	0
Operational Water Volume (m3)			
Average	6,237	6,237	6237
Maximum	12,474	12,474	12474
Minimum	0	0	0
Nominal Hydraulic Residence Time (d)			
@ ave. flow and depth	5	5	5
@ max. flow and min. depth	0	0	0
@ min. flow and max. depth	infinite	infinite	infinite
Nominal Linear Velocity (m/day)			
@ ave. flow and depth	63	189	63
Substrate	LR/Peat	LR/Peat	caprock
Liner (Yes/No)	No	No	No
Deep Zones			
No. per Cell	2	4	2
Depth Below Floor (m)	1	1	1
Plant Species (Y/N)			
Periphyton	Y	Y	Y
Macrophytes	Y	Y	Y
Design Influent TP Conc. (ug/L)			
Average	25	25	25
Maximum	40	40	40
Minimum	15	15	15
Design TP Mass Loading (g/m2/y)			
Average	0.55	0.55	0.55
Maximum	0.88	0.88	0.88
Minimum	0.33	0.33	0.33

Table 2
Field Scale Cell Monitoring Protocol

Parameter	Inflow Canal	Inflow	Mid-point	Outflow	Piezometers
Field Meter Readings					
Flow		D			
Stage/Water Level	D			D, W	W
Water Temp.	W	W	D (2),W	W	W
pH	W	W	D (2),W	W	W
Conductivity	W	W	D (2),W	W	W
Dissolved Oxygen	W	W	D (2),W	W	W
Turbidity	W	W	D (2),W	W	W
PAR			D(2)		
Water Quality Analyses					
Phosphorus Series					
Total Phosphorus (TP)	M	W	W	C, W	W
Soluble Reactive P	M	W	W	W	
Total Dissolved P	M	W	W	W	
Nitrogen Series					
Total Nitrogen (N)	M	W	W	W	
Ammonia N	M	W	W	W	
Total Kjeldahl (TKN)	M	W	W	W	
Nitrate/Nitrite (NOx)	M	W	W	W	
Total Suspended Solids	M	W	W	W	
Total Organic Carbon	M	W	W	W	
Calcium	M	W	W	W	
Alkalinity	M	W	W	W	
Chlorides	M	W	W	W	W
Biological Analyses					
Periphyton (% cover)		M	M	M	
Macrophyte (% cover)		M	M	M	
Periphyton Dominant Species		M	M	M	
Soft Algae I.D/Enumeration		BM	BM	BM	
Diatom I.D./Enumeration		BM	BM	BM	
Biomass (AFDW)		M	M	M	
Bulk Density		M	M	M	
Chlorophyll a,b,c/Pheophytin a		M	M	M	
Total P		M	M	M	
Soluble Reactive P		M	M	M	
Total Nitrogen		M	M	M	
Total Organic Carbon		M	M	M	

D = parameter collected continuously with datalogger
D(2) = parameter collected continously with data logger on Cell 2 only
W = weekly grab sample
M = monthly grab sample
C = weekly composite sample (ISCO autosampler)
BM = bi-monthly grab sample

Table 3

Estimated Water Balance for the Field-Scale PSTA Cells, July to December 2003

			Rainfall		Evapotranspiration		Inflow		Outflow		Change Storage
Cell	Frequency	Time Period	(in)	(m^3)	(in)	(m^3)	(m^3/d)	(m^3)	(m^3/d)	(m^3)	(m^3)
FSC-1	Weekly	7/8/03	1.3	976	1.4	1041	1409	9860	0	0	901
		7/15/03	0.1	106	1.4	1041	1205	8437	0	0	-3889.92904
		7/22/03	1.2	938	1.2	879	911	6379	0	0	-1683
		7/29/03	0.1	76	1.0	785	1047	7328	82	571	-260
		8/5/03	1.2	923	1.1	813	1015	7103	285	1994	-23
		8/12/03	1.3	953	1.0	785	330	2308	307	2152	143
		8/19/03	1.0	779	1.0	724	581	4064	185	1298	156
		8/26/03	2.6	1952	0.8	624	0	0	189	1324	202
		9/2/03	1.0	726	1.0	780	795	5566	146	1025	189
		9/9/03	0.8	598	1.0	730	652	4564	56	392	-518
		9/16/03	0.4	318	1.1	869	802	5613	160	1117	366
		9/23/03	0.1	61	1.0	747	162	1135	4	27	-167
		9/30/03	2.3	1710	0.7	545	543	3798	104	728	-306
		10/7/03	0.0	0	1.0	746	508	3555	242	1696	738
		10/14/03	0.5	393	1.0	724	163	1143	71	498	1924
		10/21/03	0.0	0	1.0	730	46	324	0	0	-26
		10/28/03	0.0	0	1.0	752	0	0	0	0	1687
		11/4/03	0.7	515	0.8	624	0	0	0	0	214
		11/11/03	0.8	620	0.7	529	0	0	0	0	928
		11/18/03	0.0	0	0.9	646	1206	8453	0	0	-1965
		11/25/03	0.1	68	0.7	512	1467	10269	0	0	-3230
		12/2/03	0.0	15	0.8	568	0	0	93	652	-206
		12/9/03	1.2	878	0.7	501			196	1372	
		12/16/03	1.4	1052	0.6	456					
		12/23/03	0.0	15	0.7	523					
		12/30/03	0.0	0	0.7	562					
		1/6/04	0.0	8	0.8	568					
FSC-2	Weekly	7/8/03	1.3	976	1.4	1041	1227	8587	0	0	
		7/15/03	0.1	106	1.4	1041	1088	7617	0	0	7288
		7/22/03	1.2	938	1.2	879	1028	7199	6	39	-8183
		7/29/03	0.1	76	1.0	785	1235	8642	170	1193	-2271
		8/5/03	1.2	923	1.1	813	1184	8289	422	2953	-266
		8/12/03	1.3	953	1.0	785	1024	7168	473	3308	-46
		8/19/03	1.0	779	1.0	724	1488	10417	355	2488	112
		8/26/03	2.6	1952	0.8	624	601	4205	422	2955	43
		9/2/03	1.0	726	1.0	780	1202	8416	369	2583	160
		9/9/03	0.8	598	1.0	730	1159	8114	271	1895	122
		9/16/03	0.4	318	1.1	869	934	6539	456	3189	-372
		9/23/03	0.1	61	1.0	747	1028	7195	219	1533	190
		9/30/03	2.3	1710	0.7	545	1433	10034	260	1823	101
		10/7/03	0.0	0	1.0	746	558	3903	513	3594	-395
		10/14/03	0.5	393	1.0	724	974	6819	218	1528	700
		10/21/03	0.0	0	1.0	730	195	1367	45	314	1095
		10/28/03	0.0	0	1.0	752	0	0	60	421	-126
		11/4/03	0.7	515	0.8	624	0	0	0	0	3686
		11/11/03	0.8	620	0.7	529	0	0	0	0	2299
		11/18/03	0.0	0	0.9	646	1461	10227	0	0	4645
		11/25/03	0.1	68	0.7	512	1541	10788	6	44	
		12/2/03	0.0	15	0.8	568	0	0	252	1765	
		12/9/03	1.2	878	0.7	501			356	2490	
		12/16/03	1.4	1052	0.6	456					
		12/23/03	0.0	15	0.7	523					
		12/30/03	0.0	0	0.7	562					
		1/6/04	0.0	8	0.8	568					

			Rainfall		Evapotranspiration		Inflow		Outflow		Change Storage
Cell	Frequency	Time Period	(in)	(m^3)	(in)	(m^3)	(m^3/d)	(m^3)	(m^3/d)	(m^3)	(m^3)
FSC-3	Weekly	7/8/03	1.3	976	1.4	1041			120	838	
		7/15/03	0.1	106	1.4	1041			3	22	619
		7/22/03	1.2	938	1.2	879	638	4466	1466	10263	-1761
		7/29/03	0.1	76	1.0	785			1364	9550	57
		8/5/03	1.2	923	1.1	813			1686	11803	-198
		8/12/03	1.3	953	1.0	785	650	4549	1737	12161	-31
		8/19/03	1.0	779	1.0	724	1829	12800	1522	10653	2
		8/26/03	2.6	1952	0.8	624			1565	10952	217
		9/2/03	1.0	726	1.0	780	1035	7244	1269	8881	-134
		9/9/03	0.8	598	1.0	730	1495	10462	1421	9947	-212
		9/16/03	0.4	318	1.1	869	1306	9145	1729	12105	231
		9/23/03	0.1	61	1.0	747	869	6080	1354	9476	-133
		9/30/03	2.3	1710	0.7	545	1256	8790	1601	11210	-283
		10/7/03	0.0	0	1.0	746	263	1839	2064	14448	739
		10/14/03	0.5	393	1.0	724	626	4381	1008	7053	187
		10/21/03	0.0	0	1.0	730	87	610	763	5338	296
		10/28/03	0.0	0	1.0	752	0	0	726	5084	1000
		11/4/03	0.7	515	0.8	624	0	0	2	12	-336
		11/11/03	0.8	620	0.7	529	0	0	16	110	90
		11/18/03	0.0	0	0.9	646	1019	7133	0	1	
		11/25/03	0.1	68	0.7	512	1333	9329	0	0	
		12/2/03	0.0	15	0.8	568	0	0	0	0	
		12/9/03	1.2	878	0.7	501					
		12/16/03	1.4	1052	0.6	456					
		12/23/03	0.0	15	0.7	523					
		12/30/03	0.0	0	0.7	562					
		1/6/04	0.0	8	0.8	568					
FSC-1	Monthly	Jul-03	3.3	2512	5.3	4036	1102	7713	40	279	-1233
		Aug-03	5.6	4245	4.3	3230	555	3883	230	1609	92
		Sep-03	4.4	3360	4.1	3096	563	3938	86	599	-87
		Oct-03	0.5	393	4.3	3252	285	1992	61	427	1081
		Nov-03	1.6	1218	3.2	2406	575	4025	14	101	-1014
		Dec-03	2.6	1945	3.0	2299	737	5158	207	1450	-206
		Jan-04	0.0	8	0.7	524					
FSC-2	Monthly	Jul-03	3.3	2512	5.3	4036	1095	7666	74	517	-1056
		Aug-03	5.6	4245	4.3	3230	1131	7915	427	2988	-39
		Sep-03	4.4	3360	4.1	3096	1057	7399	301	2106	40
		Oct-03	0.5	393	4.3	3252	667	4669	170	1190	318
		Nov-03	1.6	1218	3.2	2406	648	4539	47	330	3610
		Dec-03	2.6	1945	3.0	2299	781	5470	374	2619	
		Jan-04	0.0	8	0.7	524					
FSC-3	Monthly	Jul-03	3.3	2512	5.3	4036	638	4466	816	5709	-361
		Aug-03	5.6	4245	4.3	3230	1593	11150	1603	11219	-2
		Sep-03	4.4	3360	4.1	3096	1288	9014	1541	10784	-106
		Oct-03	0.5	393	4.3	3252	324	2265	923	6460	555
		Nov-03	1.6	1218	3.2	2406	521	3649	4	26	-123
		Dec-03	2.6	1945	3.0	2299	412	2887	0	0	
		Jan-04	0.0	8	0.7	524					
FSC-1	POR	July-Jan 04	18.1	13681	24.9	18843	636	4451	106	744	-219
FSC-2	POR	July-Jan 04	18.1	13681	24.9	18843	897	6276	232	1625	473
FSC-3	POR	July-Jan 04	18.1	13681	24.9	18843	796	5572	814	5700	20

Table 4
Summary of Weekly Water Depth
Cells 1, 2, and 3

Depth - Weekly Averages (cm)			
Date dd-mmm-yy	Cell 1	Cell 2	Cell 3
1-Jul-03	13.15	10.05	28.73
8-Jul-03	8.82	-25.01	25.75
15-Jul-03	27.53	14.36	34.22
22-Jul-03	35.63	25.28	33.94
29-Jul-03	36.88	26.56	34.89
5-Aug-03	36.99	26.78	35.04
12-Aug-03	36.30	26.24	34.41
19-Aug-03	35.55	26.04	34.40
26-Aug-03	34.58	25.27	33.36
2-Sep-03	33.67	24.68	34.00
9-Sep-03	36.16	26.47	35.02
16-Sep-03	34.40	25.55	33.91
23-Sep-03	35.20	25.07	34.54
30-Sep-03	36.67	26.97	35.91
7-Oct-03	33.12	23.60	32.35
14-Oct-03	23.87	18.33	31.45
21-Oct-03	24.00	18.94	30.03
28-Oct-03	15.88	1.21	25.22
4-Nov-03	14.85	-9.85	26.84
11-Nov-03	10.39	-33.15	26.40
18-Nov-03	19.84	-8.12	
25-Nov-03	35.38	25.69	
2-Dec-03	36.37	26.34	
Average	28.49	15.10	32.02

Table 5
Total Phosphorus Mass Balance Summary from the Field-Scale PSTA Cells, July to December 2003

			Total Phosphorus		Flow (m^3/d)			Hydraulic Loading Rate (cm/d)			MB_TP ($g/m^2/y$)		Removal	
Cell	Frequency	Time Period	Inflow	Outflow	Inflow	Outflow	Average	q_in	q_out	q_avg	Inflow	Outflow	($g/m^2/y$)	(%)
FSC-1	Weekly	07/02/03	0.048	0.042	1324	0	662	6.37	0.00	3.18	1.116	0.000	1.116	100.00
		07/17/03	0.038	0.016	1150	9	580	5.53	0.05	2.79	0.767	0.003	0.764	99.65
		07/24/03	0.067	0.064	941	133	537	4.53	0.64	2.58	1.107	0.149	0.958	86.52
		07/31/03	0.013	0.043	1053	311	682	5.06	1.50	3.28	0.240	0.235	0.005	2.21
		08/07/03	0.013	0.028	668	266	467	3.21	1.28	2.25	0.152	0.131	0.022	14.33
		08/14/03	0.017	0.021	330	140	235	1.59	0.67	1.13	0.098	0.052	0.047	47.53
		08/21/03	0.021	0.012	581	253	417	2.79	1.22	2.01	0.214	0.053	0.161	75.08
		08/28/03	0.019	0.048	328	82	205	1.58	0.40	0.99	0.110	0.069	0.040	36.60
		09/04/03	0.029	0.027	662	88	375	3.18	0.42	1.80	0.337	0.042	0.295	87.61
		09/11/03	0.019	0.017	591	130	361	2.84	0.62	1.73	0.197	0.039	0.158	80.34
		09/18/03	0.014	0.018	668	2	335	3.21	0.01	1.61	0.164	0.000	0.164	99.71
		09/25/03	0.011	0.015	162	177	169	0.78	0.85	0.81	0.031	0.047	-0.015	-48.68
		10/02/03	0.013	0.011	525	120	323	2.53	0.58	1.55	0.120	0.023	0.097	80.62
		10/09/03	0.020	0.009	167	34	101	0.80	0.16	0.48	0.059	0.005	0.053	90.91
		10/16/03	0.011	0.016	210	0	105	1.01	0.00	0.50	0.040	0.000	0.040	100.00
		10/23/03		0.013	0	0	0	0.00	0.00	0.00		0.000	0.000	
		10/30/03			0	0	0	0.00	0.00	0.00				
		11/06/03			0	0	0	0.00	0.00	0.00				
		11/13/03			0	0	0	0.00	0.00	0.00				
		11/19/03	0.026		1409	0	704	6.78	0.00	3.39	0.643		0.643	100.00
		11/25/03			1284	106	695	6.17	0.51	3.34				
		12/04/03												
		12/10/04												
		12/18/03	0.024	0.024							0.000	0.000	0.000	0.00
FSC-2	Weekly	07/02/03	0.033	0.016	1000	0	500	4.81	0.00	2.40	0.579	0.000	0.579	100.00
		07/17/03	0.023	0.014	1118	41	579	5.38	0.20	2.79	0.452	0.010	0.441	97.78
		07/24/03	0.013	0.018	1095	231	663	5.27	1.11	3.19	0.250	0.073	0.177	70.75
		07/31/03	0.014	0.013	1228	456	842	5.91	2.20	4.05	0.302	0.104	0.198	65.48
		08/07/03	0.016	0.012	1195	417	806	5.75	2.01	3.88	0.336	0.088	0.248	73.84
		08/14/03	0.021	0.011	1103	287	695	5.31	1.38	3.34	0.407	0.055	0.351	86.37
		08/21/03	0.026	0.012	1459	577	1018	7.02	2.78	4.90	0.666	0.122	0.545	81.75
		08/28/03	0.026	0.010	549	207	378	2.64	1.00	1.82	0.251	0.036	0.214	85.47
		09/04/03	0.034	0.029	1184	388	786	5.69	1.87	3.78	0.707	0.198	0.509	72.05
		09/11/03	0.015	0.008	1100	422	761	5.29	2.03	3.66	0.290	0.059	0.230	79.51
		09/18/03	0.013	0.015	822	145	484	3.95	0.70	2.33	0.188	0.038	0.150	79.67
		09/25/03	0.013	0.007	1287	404	845	6.19	1.94	4.07	0.294	0.050	0.244	83.09
		10/02/03	0.015	0.011	785	289	537	3.77	1.39	2.58	0.207	0.056	0.151	72.98
		10/09/03	0.012	0.015	184	108	146	0.89	0.52	0.70	0.039	0.028	0.010	26.86
		10/16/03	0.023	0.011	1169	105	637	5.62	0.51	3.06	0.472	0.020	0.452	95.71
		10/23/03		0.096	0	0	0	0.00	0.00	0.00		0.000		
		10/30/03			0	0	0	0.00	0.00	0.00				
		11/06/03			0	0	0	0.00	0.00	0.00				
		11/13/03			252	0	126	1.21	0.00	0.61				
		11/19/03	0.080		1453	7	730	6.99	0.04	3.51	2.041		2.041	100.00
		11/25/03		0.037	1348	265	807	6.49	1.27	3.88		0.172	-0.172	
		12/04/03												
		12/10/04												
		12/18/03	0.029	0.016							0.000	0.000	0.000	0.00

			Total Phosphorus		Flow (m^3/d)			Hydraulic Loading Rate (cm/d)			MB_TP ($g/m^2/y$)		Removal	
Cell	Frequency	Time Period	Inflow	Outflow	Inflow	Outflow	Average	q_in	q_out	q_avg	Inflow	Outflow	($g/m^2/y$)	(%)
FSC-3	Weekly	07/02/03	0.020	0.015		194	194	0.00	0.93	0.93		0.051	-0.051	
		07/17/03	0.020	0.018	638	1563	1101	3.07	7.52	5.29	0.224	0.494	-0.270	-120.54
		07/24/03	0.005	0.012		1378	1378	0.00	6.63	6.63		0.290	-0.290	
		07/31/03	0.014	0.011		1746	1746	0.00	8.40	8.40		0.337	-0.337	
		08/07/03	0.006	0.015	650	1675	1163	3.13	8.06	5.59	0.068	0.441	-0.373	-544.52
		08/14/03	0.024	0.015	1132	1283	1207	5.44	6.17	5.81	0.477	0.338	0.139	29.18
		08/21/03	0.020	0.008	2061	1889	1975	9.91	9.08	9.50	0.724	0.265	0.458	63.34
		08/28/03	0.023	0.016		1000	1000	0.00	4.81	4.81		0.281	-0.281	
		09/04/03	0.021	0.063	1629	1649	1639	7.84	7.93	7.88	0.601	1.823	-1.223	-203.59
		09/11/03	0.014	0.008	1262	1680	1471	6.07	8.08	7.08	0.310	0.236	0.074	23.91
		09/18/03	0.013	0.006	1598	1252	1425	7.69	6.02	6.85	0.365	0.132	0.233	63.85
		09/25/03	0.013	0.011	869	2043	1456	4.18	9.83	7.00	0.198	0.395	-0.196	-99.02
		10/02/03	0.018	0.009	435	1156	796	2.09	5.56	3.83	0.137	0.183	-0.045	-32.89
		10/09/03	0.014	0.010	89	547	318	0.43	2.63	1.53	0.022	0.096	-0.074	-338.28
		10/16/03	0.016	0.025	623	1221	922	3.00	5.87	4.43	0.175	0.536	-0.361	-206.12
		10/23/03		0.010	0	265	132	0.00	1.27	0.64		0.047	-0.047	
		10/30/03			0	0	0	0.00	0.00	0.00				
		11/06/03			0	16	8	0.00	0.08	0.04				
		11/13/03			0	0	0	0.00	0.00	0.00				
		11/19/03	0.017		1189	0	594	5.72	0.00	2.86	0.355		0.355	100.00
		11/25/03		0.010	1166	0	583	5.61	0.00	2.80		0.000	0.000	
		12/04/03											0.000	
		12/10/03											0.000	
		12/18/03	0.011	0.011								0.000	0.000	
FSC-1	Monthly	Jul-03	0.042	0.041	1117	113	615	5.37	0.55	2.96	0.814	0.082	0.732	89.91
		Aug-03	0.018	0.027	477	185	331	2.29	0.89	1.59	0.146	0.089	0.058	39.45
		Sep-03	0.018	0.019	521	99	310	2.50	0.48	1.49	0.167	0.033	0.133	79.93
		Oct-03	0.015	0.012	180	31	106	0.87	0.15	0.51	0.046	0.007	0.040	85.73
		Nov-03	0.026		673	26	350	3.24	0.13	1.68	0.307		0.307	100.00
		Dec-03	0.024	0.024										
FSC-2	Monthly	Jul-03	0.021	0.015	1110	182	646	5.34	0.88	3.11	0.404	0.049	0.356	87.94
		Aug-03	0.022	0.011	1077	372	725	5.18	1.79	3.48	0.421	0.074	0.347	82.52
		Sep-03	0.019	0.015	1098	340	719	5.28	1.63	3.46	0.361	0.088	0.273	75.65
		Oct-03	0.017	0.033	428	100	264	2.06	0.48	1.27	0.125	0.059	0.067	53.18
		Nov-03	0.080	0.037	763	68	416	3.67	0.33	2.00	1.072	0.044	1.028	95.87
		Dec-03	0.029	0.016										
FSC-3	Monthly	Jul-03	0.015	0.014	638	1220	929	0.77	5.87	5.31	0.165	0.300	-0.135	-81.58
		Aug-03	0.018	0.014	1281	1462	1371	4.62	7.03	6.43	0.410	0.346	0.064	15.58
		Sep-03	0.015	0.022	1339	1525	1432	6.44	7.96	7.20	0.359	0.589	-0.230	-64.23
		Oct-03	0.016	0.014	229	638	434	1.10	3.07	2.09	0.064	0.151	-0.087	-134.52
		Nov-03	0.017	0.010	589	4	296	2.83	0.02	1.43	0.176	0.001	0.175	99.61
		Dec-03	0.011	0.011										
FSC-1	POR	July-Dec 03	0.024	0.025	594	91	342	2.76	0.42	1.59	0.246	0.040	0.207	83.92
FSC-2	POR	July-Dec 03	0.031	0.021	895	213	554	4.20	1.00	2.60	0.491	0.079	0.412	83.85
FSC-3	POR	July-Dec 03	0.015	0.014	815	970	892	3.06	4.71	4.38	0.220	0.238	-0.018	-8.31

Table 6
Field Parameter Measurements from the Field-Scale PSTA Cells, July to December 2003

Cell	Frequency	Time Period	Temperature (°C)	pH (units)	Condition (umhos/cm)	Total Dissolved Solids (mg/L)	Dissolved Oxygen (mg/L)
Inflow Canal	Weekly	07/02/03	---	---	---	---	---
		07/17/03	31.60	6.71	32	---	5.76
		07/23/03	29.40	7.98	1154	---	7.91
		07/30/03	35.00	8.23	1193	---	6.09
		08/07/03	31.10	8.03	1223	1186	5.47
		08/13/03	27.40	7.78	30	25	5.05
		08/21/03	27.30	7.58	294	25	5.32
		08/28/03	27.50	7.63	1428	886	4.52
		09/04/03	31.00	7.71	1253	540	7.20
		09/11/03	---	7.81	1306	562	6.53
		09/18/03	27.20	7.48	1182	509	5.52
		09/25/03	27.60	7.40	1253	1015	5.52
		10/02/03	28.00	7.74	1636	1327	5.99
		10/16/03	25.60	8.20	1388	1126	6.55
		10/23/03	24.70	8.27	1365	1174	5.83
		10/29/03	26.90	8.25	1423	1152	6.50
		10/30/03	25.90	8.64	1327	1248	6.71
		11/06/03	25.40	8.36	1306	1227	5.13
		11/13/03	24.00	8.31	1299	1219	6.14
		11/25/03	24.30	8.15	1199	1078	7.05
		12/04/03	22.40	8.62	1237	938	8.17
		12/18/03	15.70	8.42	1383	1093	---
FSC-1	Weekly	07/02/03	---	---	---	328	---
		07/17/03	29.30	8.40	476	---	5.92
		07/24/03	27.87	8.31	708	---	4.90
		07/31/03	30.20	8.59	871	440	5.36
		08/07/03	28.80	8.51	890	869	4.19
		08/14/03	27.00	8.89	19	16	5.62
		08/21/03	27.63	8.50	18	15	6.17
		08/28/03	28.10	8.97	901	558	---
		09/04/03	31.33	9.01	916	394	7.07
		09/11/03	28.20	8.96	921	394	7.03
		09/18/03	27.37	8.73	905	390	7.36
		09/25/03	28.11	8.92	952	771	5.83
		10/02/03	28.10	8.99	986	810	6.25
		10/09/03	26.10	9.14	883	716	6.16
		10/16/03	25.40	8.52	958	777	5.95
		10/23/03	24.27	8.48	1048	904	5.36
		10/30/03	26.10	8.94	1104	1040	10.33
		11/06/03	25.40	8.36	1072	1007	4.68
		11/13/03	24.60	8.72	1104	1044	5.02
		11/25/03	25.03	8.22	1379	1242	6.80
		12/04/03	21.00	8.45	1333	1048	9.20
		12/18/03	15.63	8.39	1310	1035	
FSC-2	Weekly	07/02/03	---	---	---	725	---
		07/17/03	29.83	7.75	1162	---	5.43
		07/24/03	27.60	8.00	1081	---	3.58
		07/31/03	30.23	8.20	1080	530	3.99
		08/07/03	28.80	8.12	1035	839	4.23
		08/14/03	26.60	8.16	23	19	5.32
		08/21/03	27.87	8.16	22	19	5.95
		08/28/03	28.10	7.99	1299	805	---
		09/04/03	30.23	8.50	1110	477	8.32
		09/11/03	28.00	8.18	1123	483	4.07
		09/18/03	27.53	7.98	1043	443	7.95
		09/25/03	28.23	8.24	1086	880	6.03
		10/02/03	28.50	8.61	1143	924	9.98
		10/09/03	26.53	8.37	1265	1023	6.15
		10/16/03	25.50	8.00	1256	1018	4.79
		10/23/03	25.33	8.17	1369	1178	6.91
		10/30/03	26.40	8.67	1337	1236	10.73
		11/06/03	25.03	8.16	731	687	5.41
		11/13/03	24.37	8.69	1003	943	5.13
		11/25/03	25.33	8.08	1329	1201	6.51
		12/04/03	20.77	8.33	1266	988	8.25
		12/18/03	16.03	8.50	1116	882	---

Cell	Frequency	Time Period	Temperature (°C)	pH (units)	Condition (umhos/cm)	Total Dissolved Solids (mg/L)	Dissolved Oxygen (mg/L)
FSC-3	Weekly	07/02/03	---	---	---	795	---
		07/17/03	30.27	5.58	1084	---	5.39
		07/24/03	28.07	8.32	1108	---	4.32
		07/31/03	34.43	8.38	1085	545	4.05
		08/07/03	31.03	8.42	1103	894	5.22
		08/14/03	26.67	8.17	26	21	5.11
		08/21/03	28.70	8.38	23	21	6.85
		08/28/03	27.97	8.26	1330	824	---
		09/04/03	30.10	8.43	1119	481	5.66
		09/11/03	28.15	8.30	---	---	5.64
		09/18/03	28.53	8.08	1100	475	8.16
		09/25/03	29.13	8.44	1103	984	7.86
		10/02/03	28.70	8.62	1214	989	9.40
		10/09/03	27.37	8.46	1324	1073	7.04
		10/16/03	25.57	8.39	1270	1027	7.94
		10/23/03	26.33	8.39	1337	1150	7.69
		10/30/03	27.20	8.78	1283	1213	8.72
		11/06/03	25.37	8.30	1176	1106	5.45
		11/13/03	25.23	8.74	1197	1125	5.92
		11/25/03	26.17	8.54	1251	1126	7.46
		12/04/03	21.37	8.55	1240	967	9.13
		12/18/03	16.00	8.76	1188	940	---
Inflow Canal	Monthly	Jul-03	32.00	7.64	793	---	6.59
		Aug-03	28.33	7.76	744	531	5.09
		Sep-03	90.45	7.56	1247	657	6.19
		Oct-03	26.22	8.22	1428	1205	6.32
		Nov-03	24.57	8.27	1268	1175	6.11
		Dec-03	19.05	8.52	1310	1016	8.17
FSC-1	Monthly	Jul-03	29.12	8.43	685	384	5.39
		Aug-03	27.88	8.43	457	365	5.33
		Sep-03	28.75	8.91	924	487	6.82
		Oct-03	25.99	8.81	996	849	6.81
		Nov-03	25.01	8.43	1185	1098	5.50
		Dec-03	18.32	8.42	1322	1042	9.20
FSC-2	Monthly	Jul-03	29.22	7.98	1108	628	4.33
		Aug-03	27.84	8.11	595	421	5.17
		Sep-03	28.50	8.23	1091	571	6.59
		Oct-03	26.23	8.36	1274	1076	7.71
		Nov-03	24.91	8.31	1021	944	5.68
		Dec-03	18.40	8.42	1191	935	8.25
FSC-3	Monthly	Jul-03	30.92	7.43	1092	670	4.59
		Aug-03	28.59	8.31	620	440	5.73
		Sep-03	29.16	8.31	1107	647	6.83
		Oct-03	26.96	8.53	1286	1090	8.16
		Nov-03	25.59	8.53	1208	1119	6.28
		Dec-03	18.68	8.66	1214	954	9.13
Inflow Canal	POR	JUL - DEC 03	26.46	8.00	1132	917	6.41
FSC-1	POR	JUL - DEC 03	25.85	8.57	928	704	6.51
FSC-2	POR	JUL - DEC 03	25.85	8.23	1047	762	6.29
FSC-3	POR	JUL - DEC 03	26.65	8.29	1088	820	6.78

Table 7
Weekly Phosphorus Data

CELL	Time Period	Total Phosphorus (mg/L)		Percent Reduction (%)	Total Dissolved Phosphorus (mg/L)		Dissolved Reactive Phosphorus (mg/L)	
		Inflow	Outflow		Inflow	Outflow	Inflow	Outflow
Cell 1	07/02/03	0.048	0.042	12.5	0.012	0.014	0.004	0.004
	07/17/03	0.038	0.016	57.9	0.009	0.015	0.004	0.004
	07/24/03	0.067	0.064	4.5	0.007	0.016	-0.004	-0.004
	07/31/03	0.013	0.043	-230.8	0.007		-0.004	0.014
	08/07/03	0.013	0.028	-115.4	0.010	0.021	-0.004	0.018
	08/14/03	0.017	0.021	-23.5	0.009	1.97	-0.004	0.01
	08/21/03	0.021	0.012	42.9	0.013	0.012	-0.004	-0.004
	08/28/03	0.019	0.048	-152.6	0.011	0.011	0.004	-0.004
	09/04/03	0.029	0.027	6.9	0.007	0.007	-0.004	-0.004
	09/11/03	0.019	0.017	10.5	0.006	0.005	-0.004	-0.004
	09/18/03	0.014	0.018	-28.6	0.005	-0.004	-0.004	-0.004
	09/25/03	0.011	0.015	-36.4	0.005	0.01	-0.004	-0.004
	10/02/03	0.013	0.011	15.4	0.01	0.004	0.005	0.005
	10/09/03	0.02	0.009	55.0	0.008	0.006	-0.004	-0.004
	10/16/03	0.011	0.016	-45.5	0.005	0.005	-0.004	-0.004
	10/23/03			-		0.011	-	0.037
	10/30/03			-	-		-	-
	11/06/03			-	-		-	-
	11/13/03			-	-		-	-
	11/19/03				0.012	-	0.006	-
	11/25/03							
	12/04/03							
	12/10/03							
	12/18/03	0.024	0.024	0.0	0.009	0.011	0.004	0.004
Cell 2	07/02/03	0.033	0.016	51.5	0.011	0.019	0.004	0.004
	07/17/03	0.023	0.014	39.1	0.009	0.013	0.004	0.006
	07/24/03	0.013	0.018	-38.5	0.007	0.013	-0.004	-0.004
	07/31/03	0.014	0.013	7.1	0.008	0.013	-0.004	-0.004
	08/07/03	0.016	0.012	25.0	0.011	0.010	-0.004	-0.004
	08/14/03	0.021	0.011	47.6	0.008	0.007	-0.004	-0.004
	08/21/03	0.026	0.012	53.8	0.012	0.034	-0.004	-0.004
	08/28/03	0.026	0.01	61.5	0.017	0.011	0.004	-0.004
	09/04/03	0.034	0.029	14.7	0.005	0.005	-0.004	-0.004
	09/11/03	0.015	0.008	46.7	0.006	0.004	0.004	-0.004
	09/18/03	0.013	0.015	-15.4	-0.004	-0.004	0.007	-0.004
	09/25/03	0.013	0.007	46.2	0.006	0.008	-0.004	-0.004
	10/02/03	0.015	0.011	26.7	0.01	0.007	0.006	-0.004
	10/09/03	0.012	0.015	-25.0	0.008	0.007	-0.004	-0.004
	10/16/03	0.023	0.011	52.2	0.007	0.004	-0.004	-0.004
	10/23/03			-		0.006	-	-0.004
	10/30/03			-	-		-	-
	11/06/03			-	-		-	-
	11/13/03			-	-		-	-
	11/19/03				0.016	-	0.006	-
	11/25/03					0.012		0.315
	12/04/03							
	12/10/03							
	12/18/03	0.029	0.016	44.8	0.01	0.006	0.004	0.004

CELL	Time Period	Total Phosphorus (mg/L)		Percent Reduction (%)	Total Dissolved Phosphorus (mg/L)		Dissolved Reactive Phosphorus (mg/L)	
		Inflow	Outflow		Inflow	Outflow	Inflow	Outflow
Cell 3	07/02/03	0.020	0.015	25.0	0.008	0.009	0.004	0.004
	07/17/03	0.020	0.018	10.0	0.015	0.005	0.004	0.004
	07/24/03	0.005	0.012	-140.0	0.010	0.009	-0.004	-0.004
	07/31/03	0.014	0.011	21.4	0.009	-0.004	-0.004	-0.004
	08/07/03	0.006	0.015	-150.0	0.015	0.025	-0.004	-0.004
	08/14/03	0.024	0.015	37.5	0.008	0.005	-0.004	-0.004
	08/21/03	0.02	0.008	60.0	0.01	0.018	-0.004	-0.004
	08/28/03	0.023	0.016	30.4	0.019	0.009	-0.004	-0.004
	09/04/03	0.021	0.063	-200.0	0.008	0.006	-0.004	-0.004
	09/11/03	0.014	0.008	42.9	0.007	-0.004	-0.004	-0.004
	09/18/03	0.013	0.006	53.8	-0.004	-0.004	-0.004	-0.004
	09/25/03	0.013	0.011	15.4	0.006	0.007	-0.004	-0.004
	10/02/03	0.018	0.009	50.0	0.009	0.006	0.008	-0.004
	10/09/03	0.014	0.01	28.6	0.008	0.006	-0.004	-0.004
	10/16/03	0.016	0.025	-56.3	0.005	-0.004	-0.004	-0.004
	10/23/03				-	0.007	-	0.005
	10/30/03				-	-	-	-
	11/06/03				-	-	-	-
	11/13/03				-	-	-	-
	11/19/03				0.016	-	0.004	-
	11/25/03					0.007		0.335
	12/04/03							
	12/10/03							
	12/18/03	0.011	0.011	0.0	0.006	0.006	-0.004	-0.004

Table 8
Nitrogen Water Quality Data and Total Nitrogen Mass Balances at the Field-Scale PSTA Cells, July to Dec. 2003

			Total Nitrogen (mg/L)		TKN (mg/L)			NO_2NO_3 (mg/L)		NH_3 (mg/L)		Organic Nitrogen (mg/L)	
Cell	Frequency	Time Period	Inflow	Outflow	Inflow	Outflow	TKN Net Output	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
FSC-1	Monthly	Jul-03	2.66	2.98	2.63	2.98	-0.35	0.03	0.00	0.09	0.05	2.54	2.94
		Aug-03	2.69	1.68	2.28	1.64	0.64	0.41	0.04	0.06	0.12	2.21	1.52
		Sep-03	2.24	2.07	2.12	2.07	0.06	0.12	0.00	0.05	0.02	2.07	2.05
		Oct-03	1.79	1.53	2.46	1.92	-0.06	0.53	0.00	0.00	0.01	1.47	1.53
		Nov-03	0.77	0.00	3.00			0.09		-0.01		0.76	0.00
		Dec-03	0.76	0.86	1.99	2.06	-0.03	0.30	0.50	-0.01	-0.01	0.67	0.70
FSC-2	Monthly	Jul-03	2.70	2.52	2.66	2.52	0.14	0.04	0.00	0.18	0.02	2.47	2.49
		Aug-03	2.86	2.11	2.49	2.10	0.39	0.36	0.01	0.18	0.15	2.32	1.95
		Sep-03	2.57	2.17	2.52	2.16	0.36	0.05	0.00	0.25	0.07	2.27	2.09
		Oct-03	1.87	1.33	2.59	2.20	0.23	0.53	0.00	0.07	0.01	1.51	1.89
		Nov-03	0.95	0.85	3.48	2.65	0.21	0.31	0.74	0.08		0.83	0.66
		Dec-03	0.75	1.27	1.95	1.81	0.05	0.30	2.00	0.01	-0.01	0.65	0.61
FSC-3	Monthly	Jul-03	2.61	2.68	2.54	2.68	-0.14	0.07	0.00	0.16	0.04	2.39	2.64
		Aug-03	2.78	2.36	2.39	2.36	0.03	0.38	0.00	0.12	0.02	2.27	2.34
		Sep-03	2.16	2.27	2.12	2.24	-0.12	0.04	0.03	0.20	0.02	1.91	2.22
		Oct-03	1.79	2.05	2.54	2.55	-0.51	0.45	0.02	0.06	0.02	1.49	2.02
		Nov-03	0.83	0.66	2.76	2.08	0.17	0.56	0.55	0.00		0.69	0.52
		Dec-03	1.13	0.82	1.89	1.96	-0.02	1.50	0.50	-0.01	-0.01	0.63	0.66
FSC-1	POR	Jul-Dec 03	1.82	1.52	2.41	2.14	0.05	0.25	0.11	0.03	0.03	1.62	1.46
FSC-2	POR	Jul-Dec 03	1.95	1.71	2.61	2.24	0.23	0.27	0.46	0.13	0.05	1.68	1.62
FSC-3	POR	Jul-Dec 03	1.88	1.81	2.37	2.31	-0.10	0.50	0.18	0.09	0.02	1.56	1.73

Table 9
Weekly Water Quality Data Collected at the Field-Scale PSTA Cells, July to December 2003

			Total Organic Carbon		Total Suspended Solids		Calcium		Alkalinity		Chlorides	
Cell	Frequency	Time Period	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
FSC-1	Weekly	7/2/03	38.8	31.0	11.0	8.0	50.4	24.1	206	120	98	63
		7/17/03	58.8	40.7	28.0	13.0	52.1	26.6	211	127	173	67
		7/24/03	54.0	53.4	5.0	18.0	60.7	31.4	234	140	175	114
		7/31/03	41.4	54.6	2.0	16.0	76.3	29.0	285	130	178	155
		8/7/03	47.5	51.8	2.0	4.0	104.0	28.1	320	125	168	159
		8/14/03	55.6	43.8	-2.0	2.0	112.0	25.9	360	129	190	155
		8/21/03	52.0	39.1	4.0	-2.0	108.0	26.0	359	132	184	160
		8/28/03	47.5	42.0	2.0	2.0	110.0	23.5	384	129	191	172
		9/4/03	53.7	47.3	3.0	2.0	86.5	24.6	299	126	179	184
		9/11/03	47.1	43.8	2.0	-2.0	99.3	23.3	323	123	180	171
		9/18/03	44.7	39.3	-2.0	-2.0	81.6	23.2	283	131	177	165
		9/25/03	44.3	41.8	-2.0	2.0	86.8	25.0	297	126	187	175
		10/2/03	42.4	35.4	2.0	2.0	110.0	23.7	347	121	207	164
		10/9/03	45.7	34.1	3.0	-2.0	94.3	25.3	310	131	214	169
		10/16/03	45.5	36.0	-2.0	-2.0	57.4	25.4	220	146	233	199
		10/23/03		45.8		2.0		24.0		155		44
		10/30/03										
		11/6/03										
		11/13/03										
		11/19/03	57.9		1.0		37.0		280		220	
		11/25/03	41.0									
		12/4/03										
		12/10/03										
		12/18/03	42.7	45.3	4.0	2.0	37.0	35.0	220	205	205	230
FSC-2	Weekly	7/2/03	46.5	45.5	12.0	3.0	83.2	44.2	307	186	176	167
		7/17/03	57.8	57.8	12.0	3.0	53.3	45.9	210	153	179	201
		7/24/03	53.0	51.0	9.0	5.0	63.1	45.3	243	192	174	180
		7/31/03	46.3	43.5	8.0	2.0	81.1	44.6	295	190	175	178
		8/7/03	47.2	45.0	4.0	-2.0	104.0	53.2	324	197	169	162
		8/14/03	57.8	46.9	7.0	3.0	115.0	58.9	368	223	184	171
		8/21/03	51.7	44.8	11.0	2.0	112.0	52.0	372	210	183	169
		8/28/03	48.5	46.9	8.0	-2.0	109.0	65.8	395	282	187	208
		9/4/03	54.0	48.9	8.0	2.0	92.5	46.7	314	200	215	194
		9/11/03	49.6	47.4	12.0	2.0	98.9	55.6	337	229	178	177
		9/18/03	44.4	42.2	7.0	-2.0	79.5	52.3	293	215	180	167
		9/25/03	45.4	47.5	5.0	-2.0	87.4	46.6	306	201	186	188
		10/2/03	44.1	35.9	4.0	-2.0	116.0	48.5	368	196	221	192
		10/9/03	45.1	42.9	2.0	-2.0	98.8	75.3	309	258	217	207
		10/16/03	46.9	45.4	5.0	2.0	82.1	54.2	284	215	226	234
		10/23/03		53.6		4.0		41.3		215		50
		10/30/03										
		11/6/03										
		11/13/03										
		11/19/03	54.8		1.0		48.0		200		205	
		11/25/03	43.0			4.0		51.0		235		220
		12/4/03										
		12/10/03										
		12/18/03	42.5	38.5	2.0	8.0	40.0	33.0	220	185	205	185

			Total Organic Carbon		Total Suspended Solids		Calcium		Alkalinity		Chlorides	
Cell	Frequency	Time Period	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
FSC-3	Weekly	7/2/03	44.2	51.2	4.0	3.0	87.4	57.9	315	233	175	176
		7/17/03	53.8	58.0	13.0	2.0	53.5	36.2	206	159	155	182
		7/24/03	52.2	51.5	11.0	6.0	61.2	46.3	236	193	173	184
		7/31/03	45.2	45.6	4.0	-2.0	78.1	48.3	280	194	177	180
		8/7/03	50.8	45.8	-2.0	3.0	106.0	56.3	318	224	168	148
		8/14/03	51.2	50.7	6.0	-2.0	113.0	78.6	363	276	198	188
		8/21/03	53.1	46.8	10.0	-2.0	109.0	63.4	366	235	197	165
		8/28/03	49.8	49.8	9.0	3.0	105.0	71.4	374	297	190	208
		9/4/03	50.9	51.9	11.0	2.0	89.0	50.4	306	203	176	189
		9/11/03	48.5	48.5	10.0	3.0	97.7	73.0	331	254	179	184
		9/18/03	43.3	44.2	10.0	2.0	79.3	62.5	284	259	172	173
		9/25/03	45.7	47.9	7.0	-2.0	86.6	54.7	302	216	188	187
		10/2/03	41.8	36.6	5.0	3.0	110.0	58.1	357	229	226	176
		10/9/03	45.3	43.3	6.0	-2.0	102.0	86.5	320	284	218	227
		10/16/03	45.5	47.3	4.0	2.0	89.2	51.7	303	212	224	222
		10/23/03		52.7		1.0		48.2		240		
		10/30/03										
		11/6/03										
		11/13/03										
		11/19/03	53.9		2.0		49.0		240		210	
		11/25/03	42.8			3.0		42.0		230		210
		12/4/03										
		12/10/03										
		12/18/03	44.3	44.4	1.0	1.0	35.0	31.0	210	190	200	205
FSC-1	Monthly	Jul-03	48.3	44.9	11.5	13.8	59.9	27.8	234	129	156	100
		Aug-03	50.7	44.2	1.5	1.5	108.5	25.9	356	129	183	162
		Sep-03	47.5	43.1	0.3	0.0	88.6	24.0	301	127	181	174
		Oct-03	44.5	37.8	1.0	0.0	87.2	24.6	292	138	218	144
		Nov-03	49.5		1.0	---	37.0	---	280	---	220	---
		Dec-03	42.7	45.3	4.0	2.0	37.0	35.0	220	205	205	230
FSC-2	Monthly	Jul-03	50.9	49.5	10.3	3.3	70.2	45.0	264	180	176	182
		Aug-03	51.3	45.9	7.5	0.3	110.0	57.5	365	228	181	178
		Sep-03	48.4	46.5	8.0	0.0	89.6	50.3	313	211	190	182
		Oct-03	45.4	44.5	3.7	0.5	99.0	54.8	320	221	221	171
		Nov-03	48.9		1.0	4.0	48.0	51.0	200	235	205	220
		Dec-03	42.5	38.5	2.0	8.0	40.0	33.0	220	185	205	185
FSC-3	Monthly	Jul-03	48.9	51.6	8.0	2.3	70.1	47.2	259	195	170	181
		Aug-03	51.2	48.3	5.8	0.5	108.3	67.4	355	258	188	177
		Sep-03	47.1	48.1	9.5	1.3	88.2	60.2	306	233	179	183
		Oct-03	44.2	45.0	5.0	1.0	100.4	61.1	327	241	223	208
		Nov-03	48.4		2.0	3.0	49.0	42.0	240	230	210	210
		Dec-03	44.3	44.4	1.0	1.0	35.0	31.0	210	190	200	205
FSC-1	POR	Jul - Dec 03	47.2	43.1	3.2	3.5	69.7	27.5	280	146	194	162
FSC-2	POR	Jul - Dec 03	47.9	45.0	5.4	2.7	76.1	48.6	280	210	196	186
FSC-3-	POR	Jul - Dec 03	47.3	47.5	5.2	1.5	75.1	51.5	283	225	195	194

Table 10
Summary of Weekly Groundwater Sampling Parameters

WELL	SAMPLING DATE	CL (mg/L)	TP (mg/L)	TDS (mg/L)
MW-7	7/1/03	295	0.009	1080
MW-7	7/16/03	285	0.008	
MW-7	7/23/03	279	0.012	1020
MW-7	7/30/03	285	0.015	1687
MW-7	8/6/03	285	0.013	831
MW-7	8/13/03	296	0.008	332
MW-7	8/21/03	318	0.013	30
MW-7	8/27/03	297	0.012	
MW-7	9/3/03	294	0.012	1029
MW-7	9/10/03	273	0.01	709
MW-7	9/17/03	274	0.01	628
MW-7	9/23/03	271	0.009	1044
MW-7	10/2/03	238	0.01	1484
MW-7	10/8/03	282	0.014	1296
MW-7	10/15/03	264	0.009	1277
MW-7	10/22/03	250	0.009	1329
MW-7	10/29/03	250	0.007	1494
MW-7	11/5/03	245	0.009	1492
MW-7	11/12/03	250	0.01	1494
MW-7	11/18/03	260	0.008	1443
MW-7	11/24/03	260	0.007	1469
MW-7	12/3/03	260	0.009	1536
MW-7	12/11/03	265	0.006	1332
MW-7	12/17/03	260	0.007	1375
MW-8	7/1/03	240	0.013	1000
MW-8	7/16/03	234	0.01	
MW-8	7/23/03	244	0.013	955
MW-8	7/30/03	250	0.018	1567
MW-8	8/6/03	245	0.014	656
MW-8	8/13/03	249	0.009	303
MW-8	8/21/03	253	0.013	27
MW-8	8/27/03	247	0.015	1263
MW-8	9/3/03	246	0.013	941
MW-8	9/10/03	221	0.011	649
MW-8	9/17/03	231	0.01	593
MW-8	9/23/03	234	0.012	1136
MW-8	10/2/03	282	0.012	1464
MW-8	10/8/03	217	0.017	1180
MW-8	10/15/03	234	0.01	1189
MW-8	10/22/03	210	0.01	1222
MW-8	10/29/03	220	0.011	1383
MW-8	11/5/03	245	0.01	1427
MW-8	11/12/03	230	0.01	1452
MW-8	11/18/03	250	0.014	1436
MW-8	11/24/03	230	0.011	1393
MW-8	12/3/03	225	0.014	1407
MW-8	12/11/03	235	0.009	1221
MW-8	12/17/03	230	0.009	1255

WELL	SAMPLING DATE	CL (mg/L)	TP (mg/L)	TDS (mg/L)
MW-9	7/1/03	133	0.008	802
MW-9	7/16/03	135	0.008	
MW-9	7/23/03	139	0.013	780
MW-9	7/30/03	145	0.015	1273
MW-9	8/6/03	148	0.013	545
MW-9	8/13/03	149	0.009	256
MW-9	8/21/03	158	0.011	23
MW-9	8/27/03	177	0.012	1113
MW-9	9/3/03	165	0.014	1152
MW-9	9/10/03	149	0.011	582
MW-9	9/17/03	169	0.008	552
MW-9	9/23/03	173	0.007	1131
MW-9	10/2/03	181	0.01	1133
MW-9	10/8/03	177	0.017	1143
MW-9	10/15/03	180	0.008	1112
MW-9	10/22/03	170	0.009	1230
MW-9	10/29/03	155	0.01	1281
MW-9	11/5/03	120	0.009	1552
MW-9	11/12/03	145	0.008	1230
MW-9	11/18/03	140	0.008	1171
MW-9	11/24/03	145	0.008	1217
MW-9	12/3/03	145	0.01	1244
MW-9	12/11/03	145	0.007	1041
MW-9	12/17/03	140	0.008	1070

Table 11
Summary of Weekly Depth to Water Measurements

Depth to GW (ft)			
Date	**MW-7**	**MW-8**	**MW-9**
7/1/03	6.00	5.27	2.41
7/16/03	6.19	5.58	2.71
7/23/03	6.20	5.60	2.80
7/30/03	6.10	5.50	2.67
8/6/03	6.10	5.50	2.60
8/13/03	6.05	5.40	2.55
8/21/03	6.13	5.41	2.50
8/27/03	6.22	5.61	2.81
9/3/03	6.30	5.68	2.60
9/10/03	6.30	5.70	2.60
9/17/03	6.30	5.75	2.95
9/23/03	6.39	6.83	3.06
10/2/03	6.10	5.40	2.60
10/8/03	6.30	5.60	2.80
10/15/03	6.20	5.60	2.80
10/22/03	6.30	5.70	3.00
10/29/03	6.30	5.70	2.90
11/5/03	6.20	5.70	2.90
11/12/03	6.15	5.60	2.80
11/12/03	6.15	5.60	2.80
11/18/03	6.22	5.63	4.85
11/18/03	6.22	5.63	4.85
11/24/03	6.16	5.55	2.82
11/24/03	6.16	5.55	2.82
12/3/03	6.10	5.50	2.70
12/11/03	6.20	5.20	2.80
12/17/03	6.15	5.60	2.30

APPENDIX A

Appendix A is a CD-ROM containing tabulated data and the lab report

APPENDIX B

SOFT ALGAL COUNTS

	Actinastrum sp.	Ankistrodesmus sp.	Anabaena sp	Aphanotheca saxicola	Aphanotheca microscopia	Aphanotheca sp. 1	Aphanotheca sp. 2	Aphanotheca sp. 3	Aphanotheca sp. 5	Aphanotheca sp. 6	Aphanocapsa sp. 1	Aphanocapsa sp. 2	Aphanocapsa sp. 3	Aphanocapsa sp. 4	Chlamydomonas sp.	Chlorello sp.	Chroococcus decorticans	Chroococcus giganteus	Chroococcus retrectus sp.	Chroococcus turgidus	Chroococcus sp. 1	Chroococcus sp. 3	Chroococcus sp. 4	Chroococcus sp. 5	Chroococcus sp. 6	Chroococcus sp. 7	Chroococcus sp. 9	Chroococcus sp. 12	Chroococcus sp. 13	Chroococcus sp. 14	Chroococcus sp. 15	Chroococcus sp. 16	Chroococcus sp. 17	Chroococcus sp. 19	Chroococcus sp. 20	Chroococcus sp. 22	Chroococcus sp. 23	Chroococcus sp. 24	Chroococcus sp. 25	Coccoid-cyano 1	Coccoid-cyano 2
A103B062504	0	0	0	0.006	0	0	0	0	0	0	0.003	0.013	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0	0.003	0.006	0	0	0	0	0	0	0	0	0	0	0	0
A103E062504	0	0	0	0	0	0.007	0	0	0	0.003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.013	0	0	0	0	0	0	0	0.003	0	0	0	0
A103H062504	0	0	0	0	0	0.007	0	0	0	0	0	0	0	0	0	0	0	0	0	0.007	0	0.003	0	0	0	0	0	0.013	0	0	0	0	0	0	0	0.007	0	0	0	0
A108B062404	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A108E062404	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0.003	0	0	0	0	0	0	0	0.003	0	0.007	0	0	0.003	0.01	0	0	0.003	0	0	0	0	0	0	0	0	0
A108H062404	0	0	0	0	0	0	0	0	0	0.005	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0.005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A1AO100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.016	0.004	0	0.004	0	0	0	0	0	0	0.004	0	0	0	0	0	0	0
A1BO100103	0	0	0	0.003	0	0.003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0	0	0	0
A1C0120303	0	0	0	0.023	0	0.036	0	0	0	0.013	0	0.006	0	0	0	0	0	0	0	0	0	0	0.006	0	0	0.019	0.003	0	0.009	0	0.003	0	0	0	0	0	0	0	0	0
A1CO100103	0	0	0	0.005	0	0.029	0	0	0	0	0	0	0	0	0	0	0	0	0	0.02	0	0	0.005	0	0	0	0.02	0.025	0	0	0.005	0	0	0	0	0	0	0	0	0
A2AF100103	0	0	0	0	0	0	0	0	0	0	0	0.007	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0	0.003	0	0
A2AP12D303	0	0.016	0.004	0.008	0.008	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.016	0	0	0	0	0	0.052	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2BF100103	0	0	0	0.003	0	0.003	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0.01	0	0	0.003	0	0	0.003	0.01	0.003	0	0	0	0	0	0	0	0	0
A2BP120303	0	0.003	0	0.006	0	0.003	0	0.003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.02	0.013	0	0.056	0.009	0.003	0.013	0	0.016	0	0	0	0	0	0	0	0	0
A2CF100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0	0	0
A2CP120303	0	0	0.006	0.028	0	0.015	0	0	0	0.006	0	0.025	0	0	0	0	0	0	0	0	0	0.003	0.012	0	0	0.047	0	0.022	0	0	0	0	0	0	0	0	0	0	0	0.009
A30A1062104	0	0	0	0	0	0	0	0	0	0	0.007	0.013	0	0	0	0	0	0.003	0	0.013	0	0.007	0.043	0	0	0.04	0	0	0.017	0	0.007	0	0	0.003	0.003	0	0	0	0	0
A30B1062104	0	0	0	0	0	0.003	0	0	0	0	0.003	0.013	0	0	0	0	0	0	0	0.007	0	0	0.02	0	0	0.003	0	0.003	0.003	0.003	0	0.003	0.003	0.003	0	0	0	0	0	0
A30D2062104	0	0	0	0.023	0	0.023	0	0.003	0	0	0.012	0.083	0	0	0	0	0	0	0	0.003	0	0	0.03	0.003	0	0	0	0	0.033	0	0	0	0	0	0	0	0	0	0	0
A30D3062104	0	0.08	0	0.01	0.06	0	0.08	0	0	0	0	0	0	0	0	0	0.01	0	0	0.01	0	0	0.01	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30E1062104	0	0	0	0.02	0	0.022	0.012	0.006	0	0	0.009	0.043	0	0	0	0	0	0	0	0.013	0	0	0.006	0	0	0.006	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30E2062104	0	0	0	0.023	0	0.029	0	0.023	0	0.009	0	0.013	0.006	0	0	0	0	0	0	0.009	0	0.003	0.091	0.003	0	0	0.003	0.019	0	0	0	0	0	0	0	0	0	0	0	0
A30F1062204	0	0	0	0.003	0	0.076	0	0	0	0.007	0.036	0	0.003	0	0	0	0	0	0	0.02	0	0	0.003	0	0	0	0	0.033	0	0	0.003	0	0	0	0	0.02	0	0.007	0	0
A30F3062204	0	0	0	0.017	0	0.03	0	0.017	0	0	0	0.027	0.02	0	0	0	0	0	0	0	0	0.003	0.053	0.003	0	0.003	0.003	0	0	0	0	0	0	0	0	0	0	0	0.003	0
A3AP100103	0	0	0	0.01	0	0.007	0	0	0	0	0.003	0	0.007	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0.007	0.013	0	0	0	0	0	0	0	0	0	0	0	0
A3AP120303	0	0	0	0	0	0.024	0	0	0	0	0.008	0	0	0	0	0	0	0	0	0	0	0	0	0	0.008	0.016	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3BG100103	0	0	0	0	0	0.033	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.036	0.007	0.448	0	0	0.007	0	0	0	0	0	0.003	0	0	0
A3BO100103	0	0	0	0.016	0	0.004	0	0	0	0	0.008	0	0	0	0	0	0	0	0	0	0	0	0.053	0	0	0	0.004	0.028	0.012	0	0.004	0	0	0	0	0	0	0	0	0.002
A3BP100103	0	0	0	0	0	0.007	0	0	0	0	0	0.013	0	0	0.003	0	0	0	0	0	0	0	0.02	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0	0	0	0
A3BP120803	0	0	0	0	0	0.006	0	0.003	0	0	0	0.016	0	0	0	0	0	0	0	0.003	0	0	0.009	0	0	0.038	0	0	0.003	0.003	0	0	0	0	0	0	0	0	0.006	0
A3CP100103	0	0	0	0.017	0	0	0	0.01	0	0.01	0	0	0	0	0	0	0	0	0	0.007	0	0	0	0	0	0	0	0.017	0	0	0	0	0	0	0	0	10	0	0
A3CP120302	0	0	0	0.073	0	0.006	0	0.003	0	0.003	0	0	0	0.003	0	0	0	0	0	0.013	0	0	0.01	0.006	0	0.023	0.003	0	0	0	0	0	0	0	0	0	0	0.026	0
A3O/MC4062104	0	0	0	0.3	0	0.043	0	0.003	0	0.007	0.01	0.08	0	0	0	0	0	0	0	0.003	0	0	0.017	0	0	0.037	0.003	0.003	0	0	0	0	0	0	0	0	0	0	0.003	0
A3P/O/MD4062104	0	0	0	0	0	0.017	0	0.003	0	0.087	0.01	0	0	0	0	0	0	0	0	0.007	0	0	0.01	0.02	0	0.027	0.003	0	0	0	0	0	0	0	0	0	0	0	0	0
A3P/OB3062104	0	0	0	0.033	0	0.098	0	0.013	0	0.023	0	0	0.006	0.003	0	0	0	0	0	0	0	0	0.016	0.006	0	0	0.003	0.049	0	0	0.006	0	0	0	0	0	0	0	0	0
A3P/OC1062104	0	0	0	0.013	0	0.007	0	0	0	0	0.003	0.036	0	0	0	0	0	0	0	0	0	0	0.04	0	0	0.01	0.007	0.01	0	0.006	0.017	0	0.003	0	0	0	0	0	0	0.01
A3P/OC3062104	0	0	0.003	0.009	0.02	0.04	0	0.006	0	0.003	0.009	0	0	0	0	0.003	0	0	0.003	0.009	0	0	0	0.04	0	0	0.03	0	0	0	0	0	0	0	0	0	0	0	0	0
A3P/OE4062104	0	0	0	0	0	0.011	0	0.007	0	0	0.004	0.034	0.019	0	0	0	0	0	0	0	0	0	0.004	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3PA2062104	0	0	0	0.003	0	0.003	0	0	0	0	0.006	0.027	0	0	0	0	0	0	0	0.003	0.003	0.003	0.043	0.003	0	0	0.03	0.013	0	0.003	0.01	0.013	0	0	0	0	0	0	0.02	0
A3PA3062104	0	0	0	0.013	0	0.043	0	0.007	0	0.023	0	0	0.007	0	0	0	0	0	0	0.003	0	0	0.01	0	0	0	0	0.106	0	0	0	0	0	0	0	0	0	0	0	0
A3PA4062104	0	0	0	0.007	0	0.05	0	0.003	0	0.021	0.01	0	0	0	0	0	0	0	0	0.007	0	0	0.013	0	0	0.01	0	0.05	0	0	0.003	0	0	0	0	0	0	0	0	0
A3PB2062104	0	0	0	0.031	0	0.017	0	0	0	0	0.014	0.041	0	0	0	0	0	0	0	0.01	0	0.003	0.055	0.003	0	0.003	0.014	0.014	0.01	0.003	0	0	0	0	0	0	0	0.003	0.003
A3PB4062104	0	0	0	0	0	0.053	0	0.02	0	0.01	0.033	0	0.01	0	0	0	0	0	0	0.003	0	0	0	0	0	0	0	0.03	0	0	0	0	0.003	0	0	0	0	0	0	0
A3PC2062104	0.003	0	0	0.066	0	0.013	0	0	0	0	0	0.016	0	0	0	0	0	0	0	0.006	0	0.013	0.092	0	0	0.009	0.026	0.02	0.003	0.006	0	0.003	0	0	0	0	0	0	0	0.006
A3PD1062104	0	0.003	0	0.069	0	0.016	0	0.013	0.013	0	0.013	0.026	0	0	0	0	0	0	0	0.006	0	0	0.026	0	0	0.053	0.009	0.003	0	0	0.026	0	0	0	0	0	0	0	0	0
AF2B080603	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0	0	0.006	0.006	0	0.006	0	0	0	0	0	0	0	0	0.003
AF2C080603	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.013	0.006	0	0	0	0.003	0.007	0	0	0	0	0	0	0	0	0	0	0
AO1A080603	0	0	0	0	0	0.033	0	0	0	0.003	0.009	0.003	0	0	0	0	0	0.003	0	0	0	0	0.003	0	0	0.003	0.006	0.022	0	0	0.003	0	0	0	0	0	0	0	0	0
AO1B080603	0	0	0	0	0	0	0	0	0	0	0	0.069	0	0	0	0	0	0	0	0.003	0	0.003	0	0.016	0	0	0	0.003	0	0	0	0	0.013	0	0	0	0	0	0	0.003
AO1C080603	0	0	0	0.007	0	0.104	0	0	0	0	0.077	0	0	0	0	0	0	0	0	0.01	0	0	0.013	0	0	0.013	0	0.057	0.003	0	0	0	0	0	0	0.003	0.003	0	0	0
AP3A080603	0	0	0	0.003	0	0.033	0	0	0	0	0	0	0.007	0	0	0	0	0	0	0.003	0	0	0	0	0	0	0	0	0	0	0.007	0	0	0	0	0	0	0	0	0
AP3B080603	0	0	0	0.026	0	0.049	0	0	0	0	0.013	0	0	0	0	0	0	0	0	0	0	0	0.013	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0
AP3C08603	0	0	0	0.026	0	0.013	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0.006	0	0	0	0.006	0.003	0	0	0.003	0	0	0.003	0	0	0	0	0	0.003

SOFT ALGAL COUNTS

	Coccoid-cyano 3	Coccoid-cyano 4	Coccoid-cyano 5	Coccoid-cyano 7	Coccoid-cyano 8	Coccoid-cyano 9	Coccoid-cyano 10	Coccoid-cyano 11	Coccoid-cyano 12	Coccoid-cyano 13	Coccoid-cyano 14	Coccoid-green 1	Coccoid-green 2	Coccoid-green 3	Coccoid-green 4	Coccoid-green 5	Coelospherium sp.	Cosmarium sp. 1	Cosmarium sp. 2	Cosmarium sp. 3	Dynophyceae sp.	Entophysalis sp.	Eremosphaera sp.	Euglena sp.	Fremyela sp.	Filamentous-cyano 1	Filamentous-cyano 2	Filamentous-cyano 3	Filamentous-cyano 4	Filamentous-cyano 5	Filamentous-cyano 6	Filamentous-cyano 7	Filamentous-cyano 8	Gleocapsa aeruginose sp.	Gleocapsa sp. 1	Gleocapsa sp. 2	Gleocapsa sp. 3	Gleocapsa sp. 4	Gleocapsa sp. 5	Gleocapsa sp. 6	Gleocapsa sp. 7
A103B062504	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.023	0	0	0	0	0.003	0	0	0	0	0	0	0.093	0	0.009	0	0	0.009	0	0	0	0	0	0
A103E062504	0	0	0	0	0	0	0	0	0.007	0	0	0	0	0	0	0	0	0.033	0	0	0	0	0	0.003	0	0	0	0.02	0	0	0	0	0	0	0	0.01	0	0.003	0	0	0
A103H062504	0	0	0	0	0	0	0	0.034	0	0	0	0	0	0	0	0	0	0.007	0	0	0	0	0	0	0	0	0	0.01	0	0.003	0	0.06	0.007	0	0	0.017	0	0	0.003	0	0
A108B062404	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0.037	0	0	0	0	0	0	0	0.01	0	0.053	0	0	0	0.017	0	0	0	0.003	0	0	0.003	0	0
A108E062404	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.016	0	0	0	0	0	0	0	0	0.039	0	0	0	0	0	0	0	0.026	0	0	0	0	0
A108H062404	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0.005	0.02	0	0	0	0	0	0	0	0	0.04	0	0	0	0	0.005	0	0	0.015	0	0	0	0	0
A1AO100103	0	0	0	0	0	0	0	0	0	0	0	0.02	0.249	0	0	0	0	0.012	0	0	0	0	0	0	0	0	0	0.008	0	0	0	0.004	0	0	0	0	0	0	0	0	0
A1BO100103	0	0	0	0	0	0	0	0	0	0.007	0	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0.01	0	0	0.026	0	0	0	0.007	0.003	0	0	0	0	0	0	0	0
A1C0120303	0.009	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.019	0	0	0	0	0	0	0.006	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0.009	0.003	0
A1CO100103	0	0	0	0	0	0	0	0.005	0	0	0	0.113	0	0	0	0	0	0	0.005	0	0	0	0	0	0	0	0	0.025	0	0.01	0	0	0	0	0	0	0	0.039	0.005	0	0
A2AF100103	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0.023	0	0	0.007	0	0	0	0.007	0	0	0	0.01	0	0	0	0	0.003
A2AP12D303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.004	0	0	0	0.04	0	0	0	0	0	0	0	0	0.016	0.024	0.02	0	0.012	0	0	0
A2BF100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.012	0	0	0	0	0	0.156	0	0	0.003	0	0	0	0	0	0	0	0.007	0	0	0	0	0
A2BP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.003	0.03	0	0	0	0	0	0	0.043	0	0.016	0.006	0	0.036	0	0	0	0	0	0	0	0	0	0	0.003
A2CF100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0.125	0	0	0.01	0	0	0	0	0	0	0	0.003	0	0	0	0	0
A2CP120303	0.028	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.003	0.019	0.028	0	0	0	0	0	0.003	0	0.022	0.009	0	0	0	0	0	0	0	0.006	0	0	0.009	0.003	0
A30A1062104	0	0.01	0	0	0.013	0	0	0	0	0	0	0	0		0	0	0	0.003	0.023	0	0	0	0	0	0	0	0	0	0.01	0.003	0.003	0	0	0	0	0.003	0.013	0	0	0	0
A30B1062104	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0.013	0.037	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30D2062104	0.026	0	0.003	0	0	0	0	0	0	0	0	0.009	0	0	0	0	0.003	0.036	0	0	0	0	0	0.003	0	0.003	0.069	0	0	0	0	0.016	0	0	0	0.009	0	0.013	0.009	0.009	0
A30D3062104	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0.02	0.02	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.02	0	0.004	0	0.01	0	0	0
A30E1062104	0	0	0.039	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0
A30E2062104	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0.003	0.029	0	0	0	0	0	0	0.003	0	0	0	0	0	0	0	0	0	0.006	0	0.006	0.023	0	0.003
A30F1062204	0	0	0	0	0	0	0	0.007	0.007	0	0	0	0	0	0	0	0	0.013	0.056	0	0	0	0	0.003	0	0.003	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0
A30F3062204	0.006	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.006	0.013	0.07	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0	0	0.013	0.02	0	0.003	0.006	0.003	0
A3AP100103	0	0	0	0	0	0	0	0	0.007	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0.027	0	0	0	0	0	0	0	0.007	0	0	0.023	0	0.007	0.027	0	0
A3AP120303	0	0	0	0	0	0	0	0	0	0	0	0.008	0.004	0	0	0	0	0.008	0.004	0	0	0	0	0	0	0	0	0	0	0.02	0	0	0	0	0	0	0	0	0	0	0
A3BG100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.007	0.023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0	0	0
A3BO100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.008	0	0	0	0	0	0	0.004	0	0	0	0	0	0	0	0	0	0	0	0.016	0	0	0.004	0	0
A3BP100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.007	0.003	0	0	0	0	0	0	0	0	0.01	0.003	0	0	0	0	0	0	0	0	0.017	0.017	0	0
A3BP120803	0	0.006	0	0	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0.009	0	0	0	0	0	0	0.038	0.016		0	0.009	0	0	0	0	0	0	0	0	0	0	0	0
A3CP100103	0	0	0	0	0	0	0	0.003	0.003	0	0	0	0	0	0	0	0.003	0	0.003	0	0	0	0	0	0.074	0	0	0.01	0	0	0	0	0	0	0	0	0.02	0	0	0.003	0	0
A3CP120302	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.013	0.023	0	0	0	0	0	0.006	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0.053	0.003	0
A3O/MC4062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.02	0.02	0.003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.036	0.017	0	0	0.04	0	0.01
A3P/O/MD4062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.027	0.057	0.017	0	0	0	0	0	0	0	0.007	0.023	0	0	0	0	0	0	0	0	0	0	0.007	0.01
A3P/OB3062104	0	0	0	0	0	0	0	0.01	0.016	0	0	0	0	0	0	0	0	0.043	0.029	0	0	0	0	0.006	0	0	0	0	0	0	0	0	0	0	0	0.023	0.003	0.013	0	0	0
A3P/OC1062104	0	0.007	0	0.007	0	0	0	0	0	0	0	0	0	0	0	0	0	0.016	0.004	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0.026	0	0.05	0.01	0	0
A3P/OC3062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.009	0.05	0	0	0	0	0.003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.03	0	0
A3P/OE4062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.004	0.011	0.007	0	0	0	0	0	0.004	0	0	0	0	0	0	0	0	0	0.004	0	0.004	0.007	0.004	0
A3PA2062104	0	0	0	0	0.006	0	0	0	0	0	0	0.003	0	0	0	0	0.003	0	0.013	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0.013	0.087	0	0	0	0	0
A3PA3062104	0	0	0	0	0.003	0	0	0.01	0	0	0.003	0.079	0	0	0	0	0	0.01	0.046	0	0	0	0.003	0	0	0	0	0	0	0	0.007	0	0	0.016	0	0	0.007	0.01	0.003	0.007	0	0
A3PA4062104	0	0	0	0	0.007	0.02	0	0.01	0.017	0	0	0	0	0	0	0	0	0.007	0.043	0	0	0	0	0	0	0	0	0	0	0	0	0	0.013	0	0	0.023	0	0	0	0	0	0
A3PB2062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.034	0	0	0	0	0.003	0	0	0	0.01	0	0	0	0.003	0	0	0	0.003	0.058	0	0.014	0	0
A3PB4062104	0	0	0	0	0	0	0	0.003	0	0	0	0.003	0	0	0	0	0	0.01	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.073	0.003	0	0.013	0	0.003	0
A3PC2062104	0.009	0	0.003	0	0	0	0	0	0	0	0	0	0	0	0	0	0.009	0.013	0.066	0	0	0	0	0	0	0	0.013	0	0	0.003	0	0	0	0	0	0.009	0	0.003	0	0.003	0
A3PD1062104	0	0	0	0	0	0	0	0	0	0	0	0.009	0	0	0	0	0.003	0.02	0	0	0	0	0	0	0	0.006	0	0.013	0	0	0	0	0	0	0	0.003	0	0	0.013	0	0
AF2B080603	0	0.006	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0.316	0.013	0.003	0.01	0	0	0	0	0	0	0	0	0.01	0	0	0.003	0	0
AF2C080603	0	0.009	0	0	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0.003	0.003	0	0	0	0	0	0.371	0	0.003	0	0	0	0	0	0	0	0	0.026	0	0	0	0	0
AO1A080603	0	0.013	0	0	0.003	0	0	0	0	0	0	0.003	0	0	0	0	0	0	0.015	0	0	0.013	0.016	0	0	0	0	0	0	0	0	0	0.049	0.003	0.003	0.006	0.009	0	0	0	0.003	0.013
AO1B080603	0	0.003	0	0	0	0	0	0	0	0	0	0.006	0.247	0	0	0	0	0.009	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.029	0	0	0	0	0.003	0
AO1C080603	0	0	0.007	0	0	0	0	0.017	0.007	0	0	0	0	0	0	0	0.003	0.01	0.017	0	0	0	0	0.007	0	0	0	0	0	0	0	0	0	0.01	0	0	0.044	0.003	0.01	0	0	0
AP3A080603	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.003	0.003	0.003	0.026	0	0
AP3B080603	0	0	0	0	0	0	0	0	0.003	0.003	0	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0	0	0	0.02	0	0	0	0	0	0	0	0.007	0.003	0	0	0	0	0
AP3C08603	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.003	0.023	0	0	0	0	0	0	0	0	0.006	0.006	0	0	0	0	0	0	0.003	0	0.013	0.003	0	0

SOFT ALGAL COUNTS

	Gleocapsa sp. 8	Gleocapsa sp. 9	Gleocapsa sp. 12	Gleocapsa sp. 11	Gleocapsa sp. 17	Gleotheca sp. 1	Gleotheca sp. 2	Gleotheca sp. 3	Gleotheca sp. 7	Gleotheca confluence	Gleotheca lunata	Gomphosphaeria sp.	Heterohormogonium sp.	Leptolyngbya sp. 1	Leptolyngbya sp. 2	Leptolyngbya sp. 3	Leptolyngbya sp. 4	Leptolyngbya sp. 6	Limnothrix sp.	Lyngbya major	Lyngbya sp. 1	Lyngbya sp. 2	Lyngbya sp. 3	Lyngbya sp. 4	Merismopedia sp.	Mougeotia sp.	Nodularia sp.	Nostoc sp.	Oocystis sp.	Oedogonium sp.	Oscillatoria sp. 1	Oscillatoria sp. 2	Rhabdoderma sp.	Pediastrum sp.	Plectenoma sp.	Pleurotenium sp.	Polycystis sp.	Pseudoanabaena sp. 1	Pseudoanabaena sp. 2	Rhabdoderma sp.	Schizothrix sp.
A103B062504	0	0	0	0	0	0	0	0	0	0	0	0	0	0.053	0.056	0.116	0.432	0	0	0	0.006	0.029	0	0.006	0	0	0	0	0.003	0.017	0	0	0	0	0	0	0.006	0	0	0
A103E062504	0	0.003	0.003	0	0	0	0	0	0	0	0	0	0	0.039	0.269	0.4	0	0	0	0	0	0.079	0	0	0	0.003	0	0	0	0.023	0.036	0	0	0	0	0	0.02	0	0	0	0
A103H062504	0	0	0	0	0	0	0	0	0	0	0	0	0	0.04	0.219	0.353	0.007	0	0	0	0	0.007	0	0	0	0.003	0	0	0	0	0.084	0	0	0	0	0	0	0	0	0	0
A108B062404	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06	0.589	0.087	0	0	0	0	0	0.003	0	0	0	0	0	0	0	0.01	0.037	0	0	0.003	0	0	0.003	0	0	0	0
A108E062404	0	0	0	0	0	0.006	0	0	0	0	0	0	0	0.168	0.273	0.303	0.01	0	0	0	0	0.013	0	0	0	0	0	0	0	0.023	0	0.036	0	0	0	0	0	0	0	0	0
A108H062404	0	0	0	0	0	0	0	0	0	0	0	0	0	0.054	0.384	0.212	0.034	0	0.025	0	0	0.01	0	0	0	0	0	0	0	0	0.123	0	0	0	0	0	0	0	0	0	0
A1AO100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0.037	0.008	0.637	0.061	0	0	0	0	0	0	0	0.004	0.004	0	0	0.004	0.037	0	0	0	0	0	0.004	0.004	0.004	0	0	0
A1BO100103	0	0	0	0	0	0	0	0	0	0	0	0	0.003	0.076	0.389	0.231	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0.013	0	0	0	0	0	0	0.003	0	0	0	0
A1C0120303	0	0	0	0	0	0	0	0	0	0	0	0	0.003	0.029	0.016	0.13	0.428	0	0	0	0	0	0	0	0	0	0	0	0	0.006	0.003	0	0	0	0	0	0	0	0	0	0
A1CO100103	0.01	0	0	0	0	0	0.005	0	0	0	0	0.01	0	0.039	0.276	0.005	0	0	0	0	0	0	0	0	0.005	0	0.02	0	0	0.098	0	0	0	0	0	0	0	0	0	0	0
A2AF100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0.173	0.321	0.249	0.149	0	0	0	0	0	0	0.003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2AP12D303	0	0	0	0	0	0.02	0	0	0	0.008	0.004	0	0	0.22	0.38	0.004	0	0	0	0	0	0.004	0	0	0	0.004	0	0	0.004	0	0	0	0	0	0	0	0	0.008	0.012	0.004	0.056
A2BF100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0.119	0.203	0.081	0.224	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2BP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0.103	0.009	0.185	0.139	0	0	0	0	0.003	0	0	0	0	0	0	0	0	0	0.009	0	0	0	0	0	0	0	0	0	0.02
A2CF100103	0	0	0	0	0	0.026	0	0	0	0	0	0	0	0.109	0.406	0.234	0.007	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.007	0	0	0	0	0	0.003	0	0	0	0
A2CP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0.075	0	0.081	0.053	0	0	0	0.016	0.003	0	0	0	0	0.012	0	0	0.012	0.044	0	0	0	0	0	0	0	0	0	0
A30A1062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0.09	0.136	0.365	0.03	0	0.023	0	0	0.013	0.026	0	0.003	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0
A30B1062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0.103	0.475	0.12	0.047	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30D2062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0.013	0	0.172	0.016	0	0.003	0	0.009	0.023	0	0	0	0.023	0	0	0	0.013	0.036	0	0	0	0	0	0.04	0	0	0	0
A30D3062104	0	0	0	0	0	0.03	0	0	0	0	0	0	0	0.2	0.02	0.03	0	0	0.02	0	0	0	0	0	0.004	0.008	0	0	0	0.004	0.03	0	0	0	0	0	0	0	0	0	0	0.01
A30E1062104	0	0	0	0.02	0	0	0	0	0	0	0	0	0	0.03	0	0.158	0.016	0	0	0	0.012	0	0.006	0	0	0.009	0	0.003	0	0.009	0	0	0	0	0	0	0	0	0.006	0	0	0.02
A30E2062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0.019	0.055	0.179	0.085	0	0.006	0	0.013	0	0.023	0	0	0.016	0	0	0	0.006	0	0	0	0	0	0	0	0.081	0	0	0	0
A30F1062204	0	0	0	0	0	0.007	0	0	0	0	0	0	0	0.036	0	0.203	0	0	0	0	0	0	0	0	0.03	0.02	0	0	0	0.03	0.027	0	0	0	0	0	0.133	0	0	0	0
A30F3062204	0	0	0	0	0	0	0	0	0	0	0	0	0	0.03	0.009	0.113	0.006	0	0.009	0	0	0	0	0	0	0.017	0	0	0.006	0.003	0.053	0.046	0	0	0	0	0.043	0.046	0	0	0
A3AP100103	0.003	0	0	0	0	0	0	0	0	0	0	0	0.003	0.054	0.614	0.07	0.01	0	0	0	0	0	0.003	0	0	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0	0
A3AP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.276	0.488	0	0	0	0	0	0	0.016	0	0	0	0	0	0	0	0.004	0	0.004	0
A3BG100103	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.063	0.05	0.013	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0	0	0	0	0	0	0.166	0	0	0	0
A3BO100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0.024	0.02	0.15	0.437	0	0	0	0	0	0	0	0.008	0	0	0	0	0.004	0	0	0	0	0	0	0	0	0	0	0	0
A3BP100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0.083	0.487	0.063	0.169	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3BP120803	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06	0	0.212	0.155	0	0.003	0	0	0.019	0	0	0	0	0	0.003	0.003	0	0.003	0	0	0	0	0	0	0	0	0	0	0.028
A3CP100103	0	0	0	0	0	0.003	0.003	0	0.003	0	0	0	0	0.027	0.562	0.104	0	0	0	0	0	0.003	0	0	0	0.003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3CP120302	0	0	0	0	0	0	0	0	0	0	0	0	0	0.026	0.018	0.1	0.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.026
A3O/MC4062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0.043	0.027	0.237	0.08	0	0.01	0.003	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0
A3P/O/MD4062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0.04	0	0.254	0.01	0	0.017	0.003	0.02	0	0	0	0.013	0	0.003	0	0	0.017	0	0	0	0	0	0	0	0	0.003	0	0	0
A3P/OB3062104	0	0	0	0	0	0.01	0	0	0	0	0	0.003	0	0.082	0.105	0.17	0.006	0	0.003	0	0	0	0	0	0	0	0	0	0	0.016	0	0	0	0	0	0	0.023	0	0	0	0
A3P/OC1062104	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0.06	0.023	0.222	0.176	0	0	0	0	0.01	0	0	0.003	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0
A3P/OC3062104	0	0	0	0	0	0.006	0	0	0	0	0	0.006	0	0.002	0.05	0	0.03	0	0.009	0	0	0	0.09	0	0	0.003	0	0	0.003	0	0	0	0	0	0	0	0	0.009	0	0	0.03
A3P/OE4062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0.019	0.007	0.056	0.026	0	0.019	0	0	0	0	0	0.004	0	0	0	0.007	0.011	0.004	0	0	0	0	0	0	0	0	0	0	0
A3PA2062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0.083	0.013	0.3	0	0.016	0.02	0	0	0.003	0	0	0.003	0	0	0	0.003	0.003	0	0	0	0	0	0	0.02	0	0	0	0
A3PA3062104	0.01	0	0	0	0	0.02	0	0.01	0	0		0	0	0.063	0.132	0.132	0	0	0.003	0	0	0	0.026	0	0	0.003	0	0	0	0	0.007	0	0	0	0	0	0	0.013	0	0	0	0
A3PA4062104	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0.036	0.026	0.232	0	0	0	0	0	0.01	0.03	0	0	0.013	0	0	0	0.003	0.02	0	0	0	0	0	0.007	0	0	0	0.003
A3PB2062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0.014	0.01	0.235	0.058	0	0.024	0	0	0	0	0	0	0.01	0	0	0	0.017	0.014	0	0	0	0	0	0.031	0	0	0	0
A3PB4062104	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0.057	0.174	0.204	0	0	0	0	0	0.003	0	0	0	0.003	0	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0	0
A3PC2062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.009	0.185	0.076	0	0.009	0	0	0	0	0	0	0	0	0	0	0.016	0	0	0	0	0	0	0.026	0	0	0	0
A3PD1062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0.294	0	0.099	0.023	0	0.026	0	0.003	0	0	0	0	0.003	0	0	0	0.03	0.006	0	0	0	0	0	0	0	0.003	0	0
AF2B080603	0	0	0	0	0	0	0	0	0	0	0	0	0	0.069	0.187	0.164	0.01	0	0	0	0	0.053	0	0	0	0	0	0	0	0	0.013	0	0	0	0	0	0.026	0	0	0	0
AF2C080603	0	0	0	0	0	0	0	0	0	0	0	0	0	0.172	0.006	0.146	0.056	0	0	0	0	0	0	0.013	0	0	0	0	0	0	0.073	0	0	0	0	0	0	0	0	0	0	0
AO1A080603	0	0	0	0	0	0	0	0	0	0	0.03	0.003	0.003	0	0.254	0	0	0	0	0	0.003	0	0	0.009	0.155	0	0.026	0	0	0.109	0	0	0	0.003	0.003	0.033	0.003	0	0	0	0
AO1B080603	0	0	0	0	0	0	0	0	0	0	0	0	0.009	0.046	0.03	0.187	0.006	0	0	0	0	0	0	0	0.003	0	0	0	0	0.03	0.026	0	0	0	0	0	0.02	0	0	0	0
AO1C080603	0	0	0	0	0.003	0.01	0	0	0	0	0	0.003	0.013	0.017	0.02	0.117	0	0	0	0	0	0	0.007	0.003	0.07	0.017	0.007	0	0	0.043	0.084	0	0	0	0	0	0.03	0	0	0	0
AP3A080603	0	0	0	0	0	0.003	0.003	0	0	0	0	0	0	0.05	0.558	0.139	0.013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AP3B080603	0	0	0	0	0	0	0	0.003	0	0	0	0	0.003	0.053	0.492	0.119	0.013	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AP3C08603	0	0	0	0	0	0	0	0	0	0	0	0	0	0.082	0.414	0.115	0.043	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.023	0.006	0	0	0

SOFT ALGAL COUNTS

	Scytonema crustaceum	Scytonema sp. 1	Scytonema sp. 2	Scytonema sp. 3	Scenedesmus sp.	Scenedesmus arcuatus	Scenedesmus obliquss	Scenedesmus quadricauda	Selenastrum sp.	Spirulina sp.	Staurastrum sp.	Staurastrum sp. 2	Synechococcu sp. 1	Synechococcu sp. 2	Synechococcu sp. 3	Synechococcu sp. 4	Synechocystis sp. 1	Synechocystis sp. 2	Synechocystis sp. 3	Tetraedron sp.	Tolypothrix sp.
A103B062504	0	0	0	0	0	0	0	0.003	0	0.063	0.003	0	0	0	0.016	0	0.009	0	0	0	0
A103E062504	0	0.013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0
A103H062504	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0.081	0	0.013	0	0	0.003	0
A108B062404	0	0	0	0	0	0	0	0	0	0.04	0.007	0	0	0	0	0	0	0.01	0.02	0.003	0
A108E062404	0	0.01	0	0.003	0	0	0	0.003	0	0.02	0.003	0	0	0	0	0	0	0.013	0	0	0
A108H062404	0	0	0	0.01	0	0	0	0	0.005	0.015	0	0	0.01	0.005	0	0	0	0	0	0	0
A1AO100103	0	0	0	0.008	0.008	0	0	0	0	0.09	0	0	0.012	0	0	0	0	0	0	0.024	0
A1BO100103	0	0	0	0	0.01	0	0	0	0	0.191	0	0	0	0	0	0	0.01	0	0	0.003	0
A1C0120303	0	0	0	0	0	0	0	0	0	0.136	0.016	0	0	0.009	0	0.029	0	0	0	0.009	0
A1CO100103	0	0	0	0.049	0	0	0	0	0	0.133	0	0	0.005	0	0	0	0	0	0	0.029	0
A2AF100103	0	0	0.003	0	0	0	0	0	0	0.026	0	0	0.003	0	0	0	0	0	0	0.013	0
A2AP12D303	0.004	0.056	0.112	0	0	0		0	0	0.024	0	0	0	0	0	0	0	0	0	0.008	0
A2BF100103	0	0.01	0.088	0	0.003	0	0	0	0	0.01	0	0	0	0	0.024	0	0.003	0	0	0.003	0
A2BP120303	0	0	0	0.009	0	0.003	0	0.009	0	0.126	0.003	0	0	0	0.083	0	0.003	0	0	0.003	0
A2CF100103	0	0	0.003	0.01	0	0	0	0	0	0.043	0	0	0	0	0.003	0	0	0	0	0	0
A2CP120303	0	0.019	0	0	0	0	0.006	0.009	0	0.022	0	0.009	0.025	0.019	0.019	0	0	0	0	0.028	0
A30A1062104	0	0.03	0	0	0	0	0	0.003	0	0	0	0	0	0	0	0	0.01	0.003	0	0.007	0
A30B1062104	0	0	0	0	0.017	0	0	0	0	0.02	0.007	0	0	0	0	0	0.06	0.003	0	0.013	0
A30D2062104	0	0	0	0	0	0	0	0.009	0	0.139	0.009	0	0	0	0.026	0	0	0	0	0.036	0
A30D3062104	0	0	0	0	0	0.03	0	0.008	0.02	0.1	0.008	0	0.02	0	0.02	0	0	0	0	0.02	0
A30E1062104	0	0.006	0	0	0	0	0	0	0	0.227	0	0	0.009	0	0.263	0	0	0	0	0.009	0
A30E2062104	0	0	0	0	0	0	0	0	0	0.163	0	0	0	0	0.003	0	0.022	0	0	0.003	0
A30F1062204	0	0	0	0.003	0.003	0.01	0	0	0	0.143	0	0	0	0.01	0.007	0	0.02	0.007	0	0.02	0
A30F3062204	0	0	0	0	0.013	0	0	0	0.003	0.166	0.023	0	0	0	0.006	0	0.003	0	0	0.027	0
A3AP100103	0	0	0	0	0	0	0	0	0	0.06	0.003	0	0	0	0.003	0	0	0	0	0.007	0
A3AP120303	0	0.048	0	0	0	0.004		0	0	0	0	0	0	0.06	0.016	0	0	0	0	0	0
A3BG100103	0	0	0	0	0.003	0	0	0	0	0.076	0	0	0	0	0	0	0.01	0	0	0.007	0
A3BO100103	0	0	0	0	0	0	0	0	0.004	0.154	0.004	0	0	0	0	0	0	0	0	0	0
A3BP100103	0	0	0	0	0	0	0	0	0	0.086	0.003	0	0	0	0	0	0.003	0	0	0.003	0
A3BP120803	0	0	0	0.133	0.003	0	0	0	0	0.032	0.003	0	0	0.006	0.136	0	0	0	0	0.012	0
A3CP100103	0	0	0	0.003	0	0	0	0	0	0.094	0.003	0	0	0.013	0	0	0.013	0	0	0	0
A3CP120302	0	0	0	0	0	0	0	0	0	0.17	0.003	0	0.003	0.01	0	0	0	0	0	0.006	0
A3O/MC4062104	0	0	0	0	0	0	0	0.007	0	0.134	0	0	0.003	0	0.007	0	0	0	0	0.023	0
A3P/O/MD4062104	0	0	0	0	0	0	0.027	0.02	0	0.057	0.013	0	0.01	0	0.063	0	0	0	0	0.023	0
A3P/OB3062104	0	0	0	0	0	0	0	0	0	0.085	0.016	0.006	0.013	0	0	0	0.003	0.036	0	0.01	0
A3P/OC1062104	0	0	0	0	0.01	0	0	0	0	0.126	0.013	0	0	0	0	0	0.017	0	0	0.003	0
A3P/OC3062104	0	0.003	0	0	0	0	0	0	0	0.014	0.003	0	0.04	0.02	0.07	0	0	0	0	0.02	0
A3P/OE4062104	0	0	0	0	0	0	0	0	0	0.093	0.007	0	0	0	0.584	0	0	0	0	0.022	0
A3PA2062104	0	0	0	0	0.003	0	0	0	0	0.04	0.006	0	0	0	0.043	0	0.01	0.003	0	0.017	0
A3PA3062104	0	0	0	0.003	0	0	0	0.007	0	0.082	0	0	0	0	0	0	0.013	0.036	0	0.023	0
A3PA4062104	0	0	0	0	0	0.007	0	0	0	0.179	0.007	0	0	0	0.03	0	0.056	0	0	0.02	0
A3PB2062104	0	0	0	0	0	0.003	0.003	0	0	0.174	0.003	0	0	0	0.02	0	0.01	0.003	0	0.017	0
A3PB4062104	0	0	0	0	0.003	0.003	0	0	0	0.187	0.017	0	0	0.017	0.007	0	0.017	0	0	0.01	0
A3PC2062104	0	0	0	0	0.003	0	0	0	0	0.129	0.003	0	0	0	0.04	0	0.03	0.009	0	0.04	0
A3PD1062104	0	0	0	0	0	0	0	0.006	0	0.086	0	0	0	0	0.026	0	0.026	0	0	0.016	0
AF2B080603	0	0	0	0.003	0	0	0	0	0	0.059	0.003	0	0	0	0	0	0.003	0	0	0	0
AF2C080603	0	0	0	0.023	0	0	0	0	0	0.016	0	0	0	0	0.003	0	0.009	0	0	0	0
AO1A080603	0	0.006	0	0.022	0	0.003	0	0	0.013	0.059	0	0	0	0	0	0	0	0	0	0	0.013
AO1B080603	0	0	0	0	0.009	0	0	0	0	0.082	0	0	0.076	0	0	0	0.02	0	0	0.009	0
AO1C080603	0	0	0	0	0.01	0.003	0	0	0	0.174	0	0	0	0	0.013	0	0	0	0	0	0
AP3A080603	0	0	0	0	0	0	0	0	0	0.099	0	0	0.013	0	0	0	0.003	0.007	0	0.007	0
AP3B080603	0	0	0	0	0	0	0	0	0	0.132	0	0	0	0	0.016	0	0.013	0	0	0	0
AP3C08603	0	0	0	0	0.01	0	0	1	0	0.141	0	0	0.013	0	0	0	0.016	0	0	0	0

DIATOM COUNTS

Sample ID	ACEXIHET	ACLINCUR	AHMINMIN (ACMINMIN)	AHMINM01	ACMINSCO	ACCALCAL *	ACCFMING *	ACSDSPO1	AMCOMVO1	AMFTSP02	AMSDSPO1	AMSULSUL	AMSULM02	AMVENVEN	ANSPHCOS	AUISLISL	AUITAV01	BAPAXPAX	BRAPOAPO	BRBREBRE	BRBREM01 *	BRFTSP01 (BRSTYSTY)	BRNEANEA *	BRNEAM02 *	BRNEOM01 *	BRNEOM02 *	BRNEOM03 *	BRNEOM04 *	BRNEOM05 *	BRVITVIT *	BRSERSER	BRSTYSTY	CABACBAC	CMFTSP01	COPLAEUG	COPLALIN	COPLAPLA	CPCARCAR	CRACCACC	CYCTSP01	CYMENMEN	CYTRIIRI (DICTSP01)	DIOBLOBL	DIPARV01	DIPUE01	ENCTSP01	ECECGSP01 (ENEGSP01)
A108B062404	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
A108E062404	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A108H062404	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A103B062504	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A103E062504	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A103H062504	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AO1A080603	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	146	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
AO1B080603	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0
AO1C080603	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
AF2A080603	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0
AF2B080603	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4	0	0	0	2	0	128	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
AF2C080603	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0
AP3A080603	0	0	0	0	0	4	0	0	0	0	0	38	2	0	0	0	0	0	0	0	0	0	0	0	74	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0
AP3B080603	0	0	0	0	0	0	0	0	0	0	0	8	16	0	0	0	0	0	0	0	0	0	4	0	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0
AP3C080603	0	0	0	0	0	0	0	0	0	0	0	26	8	0	0	0	0	0	8	0	0	0	0	0	154	0	0	8	0	2	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
A1AO100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	154	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A1BO100103	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A1CO100103	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	204	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2AF100103	0	0	4	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	8	0	336	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0
A2BF100103	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	8	8	228	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	8	0	0	0
A2CF100103	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	176	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	8	12	0	0
A3AP100103	0	0	8	0	0	4	0	0	0	0	0	22	4	0	0	0	0	0	0	0	0	0	4	0	56	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	0	0	0
A3BP100103	0	0	0	0	0	2	0	0	0	0	0	44	32	0	0	0	0	0	0	0	0	0	4	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3BO100103	0	0	0	0	0	4	0	0	0	0	0	12	4	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
A3BG100103	0	0	0	0	0	4	0	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	154	8	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0
A3CP100103	0	0	2	0	0	2	0	0	0	0	0	14	4	0	0	0	0	0	0	0	0	0	0	0	88	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0
AR1B080603	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30F3062204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30F1062204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30F2062204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30A1062104	0	0	8	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0
A3PA2062104	0	0	4	0	0	0	0	0	0	0	0	2	6	0	0	0	0	0	0	0	0	0	0	0	32	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
A3PA3062104	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
A3PA4062104	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30B1062104	4	8	0	0	0	0	0	0	0	0	0	2	8	0	4	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	2	4	0	0	0
A3PB2062104	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0
A3P/OB3062104	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0
A3PB4062104	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
A3P/OC1062104	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
A3PC2062104	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3P/OC3062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0
A3O/MC4062104	0	0	4	0	0	0	0	0	0	0	0	0	20	0	2	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	8	0	0	0
A3PD1062104	0	0	0	0	0	0	0	0	0	0	0	8	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30D2062104	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
A30D3062104	0	0	18	0	0	2	0	0	0	0	0	12	6	0	0	0	0	0	0	0	0	0	0	0	14	0	0	2	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0
A3P/O/MD4062104	0	0	6	0	0	0	0	0	0	0	0	22	4	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	8	2	0	0	0	10	0	0	0	0
A30E1062104	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
A30E2062104	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0
A30E3062104	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3P/OE4062104	0	0	28	0	0	4	0	0	0	0	0	0	12	2	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	0	4	0	0	0	12	0	4	0	0	0	0
A1C0120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2AP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2BP120303	0	0	24	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	158	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0
A2CP120303	0	0	0	0	0	4	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	8	0	186	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
A3AP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3BP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3CP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DIATOM COUNTS

Sample ID	ENEVEEVE	ENCFEVER *	ENFTSP01	ENFTSP02	ENFTSP04	ENMICMIC	ECMICMIC *	ECFTSP01 *	ECSUBSUB *	NCPUSPUS (ENPUSPUS)	ENSILSIL	ENSILELE	ENSJSP03	EPTURTUR	EUCAMV01	EUEGSP01	EUFLEFLE	EUFTSP01	EUFTSP03	EUIMPIMP	EUINCV01	EUMONV01	EUNAENAE	EURABELO	EUZYGZYG	FACTSP01	FADELM01 *	FACTSP02	FAULNDAN *	FAFTSP01	FAFTSP02	FAFTSP03	FAFTSP07	FAFTSP12	FAFTSP14	FAFTSP15	FAFTSP16	FAFILEXI	FAMINMIN	FANANNAN	FASYNSYN	FAVIRCAP	FRRHOCRA	GOANGOBT	GOCORCOR (GOACUACU)	GOINTV01 (GOAFFV01)	GOCFVIBR (GOCLACLA)
A108B062404	28	0	20	12	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	2	8	0	0	0	0	48	4
A108E062404	240	0	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	20	0	0	0	0	0
A108H062404	242	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A103B062504	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A103E062504	216	0	4	32	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	4	0	28	0	0	0	0	0	0
A103H062504	420	0	0	10	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	0	0	0	0	0	0
AO1A080603	14	0	14	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	8	0	60	0	0	0	0	18	0
AO1B080603	14	0	4	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	8	48	0	0	0	0	12	0
AO1C080603	88	0	12	12	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	16	0	0	0	0	2	0
AF2A080603	16	0	0	0	0	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	54	0	0	0	0	0	4
AF2B080603	16	0	0	8	0	0	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	0	0	0	0	0	0	12	0	0	0	0	0	0
AF2C080603	20	0	4	0	0	0	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	8	0	0	12	0	0	0	28	0	0	0	0	0	0
AP3A080603	166	4	28	8	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0
AP3B080603	136	0	8	20	0	0	16	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0
AP3C080603	266	0	8	4	0	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A1AO100103	72	0	12	4	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	4	0	132	0	0	0	0	4	4
A1BO100103	42	0	0	4	0	0	44	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	8	0	0	20	0	0	0	0	0
A1CO100103	64	0	4	4	2	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	4	12	0	50	0	0	0	0	0
A2AF100103	12	0	4	0	0	0	32	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	16	0	0	0	0	0	0
A2BF100103	20	0	4	4	0	0	104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	4	0
A2CF100103	4	0	4	12	0	0	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	12	0	0	10	0	0	0	0	4	0
A3AP100103	298	0	12	8	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3BP100103	222	0	52	16	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
A3BO100103	460	0	16	12	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0
A3BG100103	626	0	2	12	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3CP100103	242	0	24	8	0	0	16	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	4	4	0	0	0	0	0
AR1B080603	20	0	12	4	0	0	20	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	12	0	0	0	0	0	0	10	0	0	0	0	46	0
A30F3062204	26	0	16	36	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	154	0	8	0	24	0	0	0	4	0
A30F1062204	28	4	40	20	0	0	12	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	60	0	16	0	30	0	0	0	0	0
A30F2062204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30A1062104	48	4	20	0	0	0	12	0	0	0	20	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	12	0	4	96	0	8	4	4	0	0	0	8	0
A3PA2062104	56	0	14	10	0	0	12	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	110	2	6	0	20	0	0	0	5	0
A3PA3062104	48	0	8	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52	0	8	0	24	0	0	0	4	0
A3PA4062104	0	0	8	120	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	46	0	4	0	14	0	0	0	0	0
A30B1062104	4	0	4	24	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	72	0	0	0	12	0	0	0	4	0
A3PB2062104	16	0	8	68	4	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	64	0	0	0	16	0	0	0	4	0
A3P/OB3062104	54	0	8	24	4	0	4	0	0	0	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	14	0	0	0	8	0	32	0	36	0	0	0	16	4
A3PB4062104	24	0	8	58	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	38	0	8	0	24	0	0	0	2	0
A3P/OC1062104	4	0	16	32	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	12	0	0	0	72	0	0	0	12	0
A3PC2062104	4	0	32	32	0	0	12	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	104	0	16	0	12	0	0	0	4	0
A3P/OC3062104	12	0	76	44	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	2	0	0	0	0	0	0
A3O/MC4062104	12	0	16	46	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	58	0	2	0	2	0	0	0	0	0
A3PD1062104	16	0	36	114	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0	16	0	6	0	0	0	0	0
A30D2062104	14	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	192	0	56	0	58	0	0	0	0	2
A30D3062104	12	0	4	26	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	32	0	38	0	0	0	0	0
A3P/O/MD4062104	14	0	42	64	0	0	16	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	58	0	16	0	28	0	0	0	0	10	16
A30E1062104	58	0	8	100	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	128	0	0	0	46	0	0	0	0	0
A30E2062104	44	0	12	52	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	72	0	24	0	36	0	0	0	0	0
A30E3062104	42	0	4	28	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	106	4	12	0	34	0	0	0	0	0
A3P/OE4062104	8	0	8	12	0	0	4	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	2	0	4	114	0	4	0	52	0	0	0	0	0
A1C0120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2AP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2BP120303	32	0	4	8	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	34	0	0	0	8	0
A2CP120303	4	0	0	12	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	86	0	0	0	0	2
A3AP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3BP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3CP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DIATOM COUNTS

Sample ID	GOAFFAFF (GOCLAV02)	GOCONCON	GOCONCON (GOCTSP05)	GOPARSFR (GOEGSP01)	GOCONCON (GOFTSP01)	GOCFVIBR (GOFTSP02 -SPLIT)	GOINTINT (GOFTSP03)	GOAURAUR (GOFTSP12)	GOINTV03 (GOFTSP13 *)	GOAFFAFF (GOFTSP16)	GOCFVIBR (GOFTSP17)	GOAFFAFF (GOFTSP25)	GOFTSP29	GOGRAGRA	GOMACMAC	GOAFFRHO	GOCONCON (GONEONEO)	GOPAREXI (GOPARV01)	GOPARLAG (GOPARV02)	GOPARPAR (GOPARV03)	GOINTV02 (GOSDSP01)	GYOBSOBS	HAAMPAMP	HAELOELO	HAGRANEO	HASPESPE	MAASPASP	MABRABRA	MALANLAN	MASMILAC	MASMISMI	NAANGANG	NCPUSPUS	NABRAV01	NACRPCRP (cryptocephala)	NACRYCRY	NADENDEN	NAFTSP02	NAFTSP05	NAFTSP27	NAFTSP28	NARADM01	NARAFRAF	NASUBSUB	NASUBM02	NEAMPAMP	NIACIACI	NIAMDAMD
A108B062404	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	288	0	64	0	0	32	0	0	0	0	4	0	12	0	0	0	0
A108E062404	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	156	0	4	0	0	0	0	0	0	0	0	0	2	0	0	0	0
A108H062404	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	144	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0
A103B062504	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A103E062504	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	170	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A103H062504	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AO1A080603	12	0	0	0	0	0	0	0	8	0	0	0	0	8	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	90	0	28	0	0	4	0	0	0	0	0	0	4	0	0	0	0
AO1B080603	2	0	0	0	0	0	0	4	0	0	0	0	0	24	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	82	0	8	0	0	16	0	0	4	0	0	0	0	0	0	0	0
AO1C080603	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	22	0	24	0	0	8	0	0	0	0	0	0	4	0	0	0	0
AF2A080603	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	102	0	48	0	4	48	0	0	0	0	0	2	20	0	0	0	0
AF2B080603	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	22	0	12	0	0	48	0	0	0	0	0	4	16	36	0	0	0
AF2C080603	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	36	0	0	76	0	0	0	0	0	4	0	12	0	0	0
AP3A080603	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	32	0	8	0	0	4	0	0	0	0	0	32	0	12	0	0	0
AP3B080603	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	38	0	40	0	0	16	0	0	0	4	0	8	0	12	0	0	0
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A1AO100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0	108	0	8	0	0	0	4	0	0	0	0	0	12	0	0	0	0
A1BO100103	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	12	0	0	0	0	0	0	0	4	2	82	0	28	0	0	16	0	0	0	0	0	0	0	0	0	0	0
A1CO100103	0	0	0	0	0	0	0	0	4	0	0	0	0	2	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	24	0	8	0	4	8	0	0	0	0	0	0	4	0	0	0	0
A2AF100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	28	0	0	16	16	0	0	0	0	8	0	12	0	0	0
A2BF100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	4	0	12	24	0	0	0	0	0	0	24	4	0	0	0
A2CF100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	50	0	12	60	0	0	0	0	0	0	0	18	0	0	0
A3AP100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	28	0	12	0	0	0	0	0	0	0	0	6	0	4	0	0	0
A3BP100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	84	0	36	0	0	0	0	0	0	0	0	4	2	16	0	0	0
A3BO100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	46	0	16	0	0	0	0	0	0	0	0	6	0	2	0	0	0
A3BG100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
A3CP100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	18	0	2	0	0	0	0	0	0	0	0	4	0	20	0	0	0
AR1B080603	0	0	0	2	0	0	0	32	4	0	0	0	0	12	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	28	0	34	0	0	4	0	0	0	0	28	0	0	0	0	0	0
A30F3062204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	116	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30F1062204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	102	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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A3PA2062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0	26	0	2	14	0	0	0	0	0	8	0	0	0	0	0
A3PA3062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	4	104	0	16	0	0	0	0	0	0	0	0	28	0	0	0	0	0
A3PA4062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	42	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30B1062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	34	0	4	0	0	0	0	0	0	0	0	12	0	4	0	0	0
A3PB2062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3P/OB3062104	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102	0	12	0	4	0	0	0	0	0	0	0	4	0	0	0	0
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A3P/OC1062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3PC2062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	0	12	0	0	4	0	0	0	0	0	0	0	0	0	0	0
A3P/OC3062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	164	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3O/MC4062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	130	0	58	0	0	0	0	0	0	0	0	2	0	0	0	0	0
A3PD1062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	0	52	0	0	0	0	0	0	0	0	4	0	0	0	0	0
A30D2062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30D3062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84	0	22	0	0	1	0	0	0	0	0	2	1	0	0	0	0
A3P/O/MD4062104	0	0	0	0	0	0	0	0	0	10	0	0	0	4	0	0	0	0	0	0	4	0	0	0	0	8	0	0	8	0	48	0	14	0	0	4	0	0	0	0	0	4	0	2	0	0	0
A30E1062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	0	4	0	0	0	0	0	0	0	0	4	0	0	0	0	0
A30E2062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	0	24	0	0	0	0	0	0	0	0	0	4	2	0	0	0
A30E3062104	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126	0	24	0	0	4	0	0	0	0	0	0	0	0	0	0	0
A3P/OE4062104	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	20	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A1C0120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2AP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2BP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	24	0	0	32	0	0	0	0	0	20	0	8	0	0	0
A2CP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	46	0	84	0	0	36	0	0	0	0	0	2	0	8	0	0	0
A3AP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3BP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3CP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DIATOM COUNTS

Sample ID	NIAMPROS *	NIAMPAMP	NIAMPFRA	NICAPCAP	NIFTSP04	NIFTSP05	NIFTSP06	NIFTSP08	NIFTSP09	NIFTSP15	NIFTSP16	NIFTSP17	NIFTSP19	NIFTSP22	NIFTSP26	NILACLAC	NINANNAN	NIPALDEB	NIPALPAL	NIPALTEN	NIPUSPUS	NISCASCA	NISEMSEM	NISERSER	NISERV01	NISUBSCO	NISUBV01	NITHEMIN	PATAETAE	PIACRACR	PIFTSP01	PIGIBV02	PIGIBV03	PIMAIPUL	PIMICMIC	PIRUPV01	PISTRV01	PINNULARIA SP.	PSBREBRE	RHGIBGIB	RHGIBPAR	ROLINLIN	SACONCON	SDMINMIN	SELAELAE	SE(NA?)LATLAT *	SE(NA?)STRSTR *
A108B062404	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A108E062404	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	66	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A108H062404	4	6	0	0	0	0	0	0	0	0	72	0	0	0	2	0	0	14	38	4	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A103B062504	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A103E062504	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A103H062504	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AO1A080603	0	46	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	20	0	0	0	0	12	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AO1B080603	0	136	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	24	0	4	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	2	0	0
AO1C080603	0	46	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AF2A080603	0	52	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	26	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
AF2B080603	0	38	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	46	0	4	0	0	0	2	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AF2C080603	0	98	0	0	0	0	0	0	0	0	4	4	0	0	0	0	2	38	0	0	0	0	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AP3A080603	0	74	0	36	0	0	0	0	0	0	14	0	0	0	0	0	0	42	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AP3B080603	0	58	0	20	0	0	0	0	0	0	32	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AP3C080603	0	30	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	22	8	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A1AO100103	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
A1BO100103	0	150	0	4	0	0	0	0	0	0	0	8	0	0	0	0	0	18	0	8	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A1CO100103	0	8	0	0	0	0	0	0	0	0	8	0	2	0	0	0	0	44	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2AF100103	0	16	2	0	0	0	0	0	0	4	4	4	4	2	0	0	2	40	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2BF100103	0	10	0	0	0	0	0	0	0	0	0	8	0	0	0	0	4	84	4	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
A2CF100103	0	74	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	4	0	0	4	4	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3AP100103	0	26	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3BP100103	0	6	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0
A3BO100103	0	8	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3BG100103	0	4	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3CP100103	0	38	0	0	0	0	0	0	0	0	34	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
AR1B080603	4	178	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30F3062204	0	66	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	16	26	0	0	0	4	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0
A30F1062204	0	28	0	0	0	0	12	0	0	0	100	0	0	0	0	4	0	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0
A30F2062204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30A1062104	0	6	0	0	0	0	0	0	0	0	76	0	0	0	0	0	0	4	8	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0
A3PA2062104	0	60	0	0	0	0	0	0	0	0	86	0	0	0	0	0	0	4	6	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3PA3062104	0	100	0	0	0	0	0	0	0	0	68	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3PA4062104	0	128	0	0	0	0	0	0	0	0	124	0	0	0	0	0	0	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
A30B1062104	4	204	0	0	0	0	0	0	0	0	62	0	0	0	0	0	0	8	4	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	6	0	4	0	0	0	0
A3PB2062104	0	78	0	0	0	0	0	0	0	0	92	4	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3P/OB3062104	0	78	0	0	0	0	0	0	0	0	76	0	0	0	0	0	0	6	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
A3PB4062104	0	28	0	0	0	0	0	0	0	0	136	0	0	0	0	4	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3P/OC1062104	0	216	0	0	0	0	0	0	0	0	36	10	0	0	0	0	0	0	4	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
A3PC2062104	0	16	0	0	0	0	0	0	0	0	178	0	0	0	0	0	0	0	16	8	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3P/OC3062104	0	28	0	0	0	0	0	0	0	0	190	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
A3O/MC4062104	0	94	0	0	0	0	0	0	0	0	84	0	0	0	0	0	0	0	0	0	0	0	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3PD1062104	0	38	0	0	0	0	0	0	0	0	118	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30D2062104	0	40	0	0	0	0	0	0	0	0	78	0	0	0	0	0	0	8	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30D3062104	0	46	0	0	0	0	0	0	0	0	84	0	0	0	0	0	0	6	14	2	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3P/O/MD4062104	6	50	6	0	0	0	0	0	0	0	52	0	0	0	0	0	0	4	0	2	0	2	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30E1062104	0	28	2	0	0	0	0	0	0	0	80	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
A30E2062104	4	24	0	0	0	0	0	0	0	0	150	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30E3062104	0	68	2	0	0	0	0	0	0	0	44	0	0	0	0	0	0	12	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
A3P/OE4062104	0	186	0	0	0	0	8	0	0	0	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
A1C0120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2AP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2BP120303	4	98	0	0	0	0	0	4	0	4	16	0	0	0	0	4	4	30	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2CP120303	0	28	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	16	8	0	0	0	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3AP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3BP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3CP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DIATOM COUNTS

Sample ID	SEPUPPUP	SEPUPREC	SNCURCUR	STPHOPHO	unknown valve	unknown girdle view	Achnanthes sp.	Aulacoseira sp.	Amphora sp.	Brachysira sp	Caloneis sp.	Cocconeis sp.	Cycloatella sp	Cymbell sp.	Diploneis sp.	Encyomena girdle view - probably sdsp	Encyonema sp	Encyonopsis sp.	Eunotia sp	Encyonema silesiacum (Krammer 1997	Fragilaria sp.	Gomphonema sp	Mastogloia sp.	Navicula sp	Nitzschia girdle	Nitzschia sp	Pinnularia sp	Sellaphora sp.
A108B062404	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A108E062404	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0
A108H062404	0	0	0	0	2	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A103B062504	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A103E062504	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	2	0	0	0	0	0	0	0
A103H062504	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0
AO1A080603	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
AO1B080603	0	0	0	0	10	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0
AO1C080603	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
AF2A080603	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0	0	0	0	6	4	0
AF2B080603	0	0	0	0	4	0	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AF2C080603	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AP3A080603	0	0	0	0	12	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AP3B080603	0	0	0	0	0	0	0	0	4	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AP3C080603	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0
A1AO100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A1BO100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4	0	4	0	4	4	0
A1CO100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	0	0	0
A2AF100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2BF100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
A2CF100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0
A3AP100103	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3BP100103	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3BO100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3BG100103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3CP100103	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AR1B080603	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	4	0
A30F3062204	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
A30F1062204	0	0	0	0	2	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0
A30F2062204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A30A1062104	0	0	0	0	2	0	2	0	2	0	0	0	0	0	0	0	4	0	0	0	16	0	0	0	0	0	0	0
A3PA2062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3PA3062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	12	0	0	0	0	0	0	0
A3PA4062104	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	12	2	0	0	12	0	0	4	0	0	0	0
A30B1062104	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	4	0	0	4	0
A3PB2062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	8	0	0	0	0
A3P/OB3062104	2	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
A3PB4062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
A3P/OC1062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0
A3PC2062104	0	0	0	0	0	0	0	0	12	0	0	0	0	0	4	0	12	0	0	0	0	0	0	0	0	0	0	0
A3P/OC3062104	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3O/MC4062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
A3PD1062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0
A30D2062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	0	0	0	0	0	0	0
A30D3062104	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	6	0	0	0	0	6	0	0
A3P/O/MD4062104	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
A30E1062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0
A30E2062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0
A30E3062104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	0	0	0	0	4	0	0
A3P/OE4062104	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	28	0	0	0	0	2	0	0
A1C0120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2AP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2BP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	4	0	0	0	0
A2CP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
A3AP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3BP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A3CP120303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0