5. ECOLOGICAL MONITORING

The purpose of ecological monitoring is to identify existing baseline conditions and evaluate potential impacts, if any, as a result of the Uprate. Ecological monitoring is being conducted to establish the current, pre-Uprate status of ecological conditions and biotic components, the extent to which, if any, CCS operations may impact conditions and components and the extent to which Uprate implementation may result in impacts and changes to these conditions and components. Biotic components of primary interest are marsh vegetation in adjacent wetlands, mangroves, submersed aquatic vegetation (SAV), and benthic fauna in Biscayne Bay.

Data presented in this Semi-Annual Report is primarily focused on findings from August and November 2011 although where relevant, data since inception of monitoring has been presented to provide an understanding of the temporal changes in patterns observed. Analytical porewater data from May 2011 and August 2011 (minus tritium isotopes) are also presented.

5.1 Marsh, Mangroves, and Tree Islands

Per the Monitoring Plan (SFWMD 2009a), 12 transects were set up to capture ecological characteristics and changes over time across the landscape surrounding the Turkey Point Plant (Figure 1.3-1). Originally, the design in the Monitoring Plan included the following: 32 20-meter (m) x 20-m (hereafter referred to as 20x20) plots, with 128 5-m x 5-m (hereafter referred to as 5x5) subplots and 128 1-m x 1-m (hereafter referred to as 1x1) subplots nested within, along six marsh and six mangrove transects. Twenty 20x20 plots were proposed in the marsh and 12 plots were proposed in the mangroves; of the 32 plots, six were proposed for the reference transects (four in the marsh and two within the mangroves).

In conjunction with Agency staff, changes to the sampling design were proposed and implemented in May 2010 where tree islands were included in lieu of one of the marsh plots from each transect. These changes have been reflected in the QAPP (FPL 2010); transect locations are shown on Figure 1.3-1 while plot locations are shown on Figure 5.1-1.

5.1.1 Methods and Materials

Transects were set up in areas identified within the Monitoring Plan (SFWMD 2009a), but with consideration for on-the-ground practicality of access and minimization of ecological impacts to the sensitive wetland habitats. Additional considerations also included setting up in areas that would allow for accurate representation of the habitat without the data being impacted by natural (e.g., shoreline, fringe habitat, boundary impacts, recent fires) or anthropogenic (canals, levees, roads, all-terrain vehicle trails, etc.) influences. For example, care was taken to set up plots in the scrub mangrove that were at least 50 m from the tall fringe forest and from the shoreline.

Marsh plots had to be situated greater than or equal to 50 m from the nearest levee and from tree islands that could potentially influence the marsh vegetation being measured.

Direction was provided by the Agencies to select islands near the end of each transect, approximately 1 kilometer (km) from the L31-E Canal. For example, the F3 tree island (F3-4) had to be close to the end of the F3 transect. Each of the tree islands had to be large enough to fit a 20x20 plot with at least 10 to 15 m of forest on all sides to minimize boundary effects, had to be dominated by native plant populations, and had to have minimal impacts from fire or human disturbance. Most of the tree islands in the northern half of the Model Lands marsh had been impacted by fire that had extended into the center of these islands and, in some areas, had significantly decimated the canopy. In the southern half of the Model Lands marsh, where fire impacts were less, many of the islands had limited canopy cover due to the destruction of the canopy from the treatment and removal of invasive exotics such as Australian pine (*Casuarina* spp.), melaleuca (*Melaleuca quinquenervia*), and Old World climbing fern (*Lygodium microphyllum*). Islands with high numbers of non-native plants (e.g., Brazilian pepper [*Schinus terebinthifolius*] and shoebutton ardisia [*Ardisia elliptica*]) were also avoided.

Despite visiting all islands in the northern half of the Model Lands marsh located between 500 and 1,250 m from the end of the transect, no suitable island (i.e., no fire damage, not dominated by exotics, and large enough for the establishment of the 20x20 plot with sufficient boundary area around) was found near transect F2. An island closer to F3 was selected instead. The F3 tree island (F3-4) was, therefore, located south of the F3 transect to allow for sufficient (approximately 0.5 mile) distance between F2-4 and F3-4. No suitable tree islands near F4 were large enough to fit a 20x20 plot, so the eastern half of the F4-4 (subplots F4-4.1 and F4-4.4) plot (10 m by 20 m) was set up on one tree island, while the western half (10 m by 20 m) was set up on a nearby island. All islands selected and set up met with the approval of the Agencies.

One of the significant challenges of setting up in the tree islands was the prevalence of poison ivy (*Toxicodendron radicans*). Several of the biologists are severely allergic to this plant, while others have developed sensitivities due to repeated contact during the first three sampling events. Despite extra care and time spent avoiding direct contact with this plant, several biologists experienced severe reactions to poison ivy in May 2011. This represents a significant health issue and vegetation monitoring was discontinued (per the FPL and Agency meeting on June 10, 2011). However, porewater samples will continue to be collected from these sites.

All marsh and tree island plots were completely set up between October 2010 and November 2010, with the exception of transect M6 where access and land ownership issues resulted in having to reevaluate the locations of these plots. Potential plot locations were visited with PERA (formerly Miami-Dade County Department of Environmental Resources Management [DERM]) staff in late November 2010, and new locations were identified for both M6 plots. A permit request to PERA for access and monitoring on Environmentally Endangered Lands was approved mid-January 2011, and plot setup of M6 occurred in March 2011. Work conducted to date is shown in Table 5.1-1.

Along each transect, either two or three 20x20 plots (depending on transect length) were set up within the marsh habitats. In the longer marsh transects (F2, F3, F4, and reference transect F6), three plots were set up in the marsh while the fourth plot was set up in a nearby tree island. In the shorter marsh transects (F1, F5, and mangrove transects M1 to M6), two 20x20 plots were set up. Plots were numbered 1 through 4, beginning with the plot closest to the CCS per the QAPP; the only exception being tree island plots which may not have been the furthest plot from the CCS. In the fall of 2010, each transect was visited by airboat, Argo (off-road track vehicle), or on foot. Plots were set up at least 50 m from the end of the transect and, in the marsh transects, plots were set up 50 m, 500 m, and 1,000 m from the end of any anthropogenic structure such as a levy or road. The only exception to this was at transect F4 where the transect ended on PERA property; the location of plot F4-3 was subsequently moved 950 m from the end of the L-31E Canal.

Each plot was divided into quadrants (NE, SE, SW, NW). The 1x1 subplot was established in each quadrant to measure emergent herbaceous plants, and the 5x5 subplot was set up to measure woody plants. Both subplots were established in quadrants containing woody and herbaceous plants. Table 5.1-2 shows the community type of each plot and which subplots were established. Common and scientific names of plant species found during the monitoring effort are included in Appendix J.

The location of each subplot within the quadrant was determined by two randomly generated numbers. The numbers (generated in Microsoft [MS] Excel) represented the distance in meters to the west and south of the quadrant's northeast corner. For example, given the numbers 7 and 3 for a 1x1 subplot, the northeast corner of the subplot would be placed 7 m west and 3 m south of the quadrant's northeast corner (Figure 5.1-2). For a 5x5 subplot, a number between 1 and 4 was generated, where 1 designated placement in the northeast corner, 2 in the southeast corner, 3 in the southwest and 4 in the northwest. If 1x1 and 5x5 subplots overlapped, new random numbers were generated until a non-overlapping design was produced. Some subplots were shifted on site to avoid disturbances such as vehicle tracks.

To mark the corners of plots and subplots, 0.5-inch diameter galvanized pipes were inserted into the soil and the corners of each plot marked with fluorescent paint and/or flagging (Figure 5.1-3). Subplots were marked by tying string around the corner poles of each subplot to prevent accidental trampling. Once established, plots were photographed using a digital camera. Pictures were taken from the northeast corner facing southwest, as shown on Figure 5.1-4.

5.1.1.1 Vegetation Sampling

The 20x20 plots are established to determine overall parameters such as vegetation height and cover. The 5x5 subplots are set up to capture changes in the woody species, while the 1x1 subplots are designed to measure changes within the herbaceous community.

In the marsh plots, overall live biomass cover and average height are estimated for the 20x20 plot once a year (May 2011), and for each 5x5 and 1x1 subplot estimates are performed at quarterly intervals (August and November 2011 for this monitoring period). For herbaceous subplots, all individuals of the dominant and co-dominant herbaceous emergent plants were counted. These plots primarily consisted of sawgrass (*Cladium jamaicense*) and, in some plots, were co-dominant with spikerush (*Eleocharis cellulosa*) (Table 5.1-2); where present, saltgrass (*Distichlis spicata*) was the dominant vegetation in the 1x1 subplot within the mangrove plots. Dominant species within these plots did not change from 2010 to 2011.

In the 1x1 plots, either 30% of the plants or 15 individuals (whichever value was greater) were tagged. Tagged plants were measured for the parameters needed to obtain biomass estimates. Parameters required for the biomass equations varied with species, but measurements included length, width, diameter at base, diameter at tip, and number of live leaves. Biomass estimates were subsequently used to calculate plot productivity and turnover, and then scaled up to the community (hectare) level. Measurements were recorded on field sheets and entered into a MS Access database. In addition to measurements, notes were taken to document significant observations. For example, live love-vine (*Cassytha filiformis*), a parasitic plant, was periodically found growing on sawgrass leaves. Its presence was noted when growing on live leaves of tagged plants.

For the woody species, three trees were tagged in each 5x5 subplot and six branches per tree were tagged. Tree selection was based on the dominance of each species, and individuals of a species were chosen based on which general tree sizes represented the highest percentages of biomass in the subplot. For example, if 60% of the coverage of red mangrove (*Rhizophora mangle)* in a subplot was made up of small trees and 40% of the subplot was made up of large trees, two small trees and one large tree were tagged. Height, canopy width and length, and depth (white mangrove [*Laguncularia racemosa*] only), main stem diameter, and number of branches were recorded for each tagged tree to obtain tree biomass based on published allometric equations. On each tagged branch, leaf, flower, and fruit count were recorded semi-annually to determine plant productivity, biomass turnover, and loss.

Leaves were collected outside of all plots and analyzed for wet mass, dry mass, surface area, and nutrient data semi-annually. Three mature leaves, stems, or culms of each dominant species were collected to represent each subplot (minimum of 12 plants or leaves per plot). For non-broadleaf plants, stems or culms were first measured for length (all species) and diameter (sawgrass and spikerush) using plastic calipers, then collected just above soil level. As with broadleaf plants, samples were collected from outside the plot near each subplot and wet mass was obtained. For sawgrass, the length and base width of the second mature leaf were measured as an index of sclerophylly (leaf hardness or toughness).

Plant samples were collected from no more than 5 m outside the plot, near the respective subplot. For broadleaf plants (e.g., red mangrove, button wood [*Conocarpus erectus*]) the second mature leaf was pulled from a stem. Leaves were kept moist, cool, and away from light before processing. Individual leaves were measured for wet mass and were scanned alongside a ruler for analysis in ImageJ (v. 1.44u, National Institutes of Health). ImageJ is an open-source program that calculates an area when a user defines a pixel-based scale and selects an area for measurement (e.g., the margin of a leaf; Figure 5.1-6). Petioles of the broadleaf plants extending from the leaf bases were not included in leaf surface area measurements. All plant material was then dried in an oven at ≤ 65°C for a minimum of one week before dry mass was measured.

Dried leaves and the second mature leaf of the sawgrass leaf were sent for nutrient analysis. The main vein on all broadleaf plants was removed prior to being sent to the laboratory. Dried leaf mass was then divided by leaf area to obtain specific leaf area, an index of leaf thickness, and an indicator of leaf sclerophylly. In most cases, the thicker a leaf is, the greater the impact a stressor (i.e., nutrients or hydrology) will have on plant growth.

Sawgrass biomass was determined for all quarters, with the exception of February 2011 when the number of culms was not counted. The biomass equation was determined from regression equations derived from bi-annual collections of sawgrass from around each plot. These bi-annual collections represented the wet (November 2011 collection) and dry (May 2011) seasons. Twelve individual culms were selected from the outside of each plot; for each culm, diameter at base, length of longest leaf, and leaf numbers were determined. These individuals were then harvested, separated into live and dead biomass, and dried.

The field parameters and dried biomass from these bi-annual collections were then used to generate biomass regression equations based on field parameters for each of the seasons. Over 150 plants were used to generate the regression equation for each season. These season-specific equations were then used to calculate biomass for that quarter as well as the preceding sample (i.e., wet season November 2011 collections were used to determine biomass for August and November 2011). These equations will continue to be streamlined as more plant harvest data is collected. Live standing crop was calculated for each subplot using the same equation described for the mangroves. Total sawgrass biomass is presented in grams per square meter (g/m^2).

Results of the annual productivity calculations are presented in this report, including total biomass for sawgrass and red mangrove and mangrove leaf turnover. Red mangrove biomass was calculated using the phenometric equation found in Coronado-Molina et al. (2004). Live standing crop was determined for the 5x5 subplot in the northeast corner by multiplying the average biomass of the three trees in the subplot by the total number of trees present. This value was then calculated out to tons/hectare.

5.1.1.2 Porewater Sampling

Porewater was sampled concurrent with vegetation measurements each quarter (October/ November 2010, February 2011, May 2011, August 2011, November 2011); field specific conductance and temperature was recorded at 0, 30, and 60 centimeters [cm], and additional samples were collected at 30 cm for nutrient and Tracer Suite analyses (per the Monitoring Plan [SFWMD 2009a]).

Field porewater-specific conductance and temperature readings were measured from the northeast 1x1 and 5x5 subplots. The method to collect porewater for field porewater assessment is detailed in Appendix A of the QAPP (FPL 2010). In brief, porewater was extracted using a hollow, 36-inch-long, 0.25-inch-diameter, stainless steel porewater sipper (PushPoint Sampler PPX36, M.H.E. Products, East Tawas, Michigan) connected to Tygon® tubing and a 60 milliliter (mL) syringe. An aliquot (15 to 35 mL) of porewater was collected in a 50-mL centrifuge tube and measured using a hand-held conductance/temperature sensor connected to a hand-held console (AT100 probe, Rugged Reader console, In-Situ Inc., Fort Collins, Colorado). The

AT100 sensors were submerged into the porewater sample and readings were allowed to stabilize before specific conductance and temperature values were recorded onto a field datasheet (usually 1 to 2 minutes). Porewater was collected at the surface, and at 20-, 40-, and 60-cm depths. Porewater characteristics (turbidity, color, odor, etc.), general environmental conditions, and ecological observations were also noted on the field datasheet. Samples were discarded after measurements.

Nutrient and Tracer Suite samples were collected using a peristaltic pump (SP100, Global Water Instrumentation Inc., Gold River, California) with polyethylene and silicon tubing, as the nutrient and tracer analyses required significantly more volume (i.e., approximately 1,200 mL compared to less than 50 mL for the field measurements). Upon arrival at a site, the peristaltic pump was placed on a foldable stool (which kept the setup above water) and connected to the PushPoint Sampler inserted just within the boundary of the 1x1 subplot. Water was pumped for several seconds prior to collection in order to clear excess sediment from the tubing, and specific conductance and temperature readings were made. For the nutrient and Tracer Suite, a 500- to 850-mL porewater sample was collected in a pre-cleaned 1-liter sample bottle from the 1x1 subplot at a 30-cm depth interval. The porewater from the 5x5 subplot at a 30-cm depth interval was collected in another 1-liter sample bottle. These two samples were composited by pouring the samples back and forth six times. A pH reading was collected using a pH meter (Extech© PH220, FLIR Systems, Waltham, Massachusetts) and recorded on the field datasheets. The sample bottles were labeled with the site name, date, initial pump start time, and the initials of the field crew. Pump start and stop times were recorded in the field data book. A new or field-cleaned (per FDEP protocols) porewater sipper was used at each site.

The composite sample was distributed into the sample bottles using the same tubing and pump used for sample collection. Once distributed, the sample bottles were put on ice (if necessary) or in sealed plastic bags (for samples not needing refrigeration) and stored for laboratory analysis. The tubing was either: (1) replaced with new tubing; or (2) decontaminated before collection at the next site by pumping three volumes of 10% hydrochloric acid (HCl) solution through the tubing, followed by three volumes of analyte-free water (DEP-SOP-001/01 FC 1000). The porewater sipper was cleaned with an LIQUINOX solution, and rinsed with tap water and analyte-free water.

Lab and field results from the May 2011 and August 2011 events are reported here in this Semi-Annual Report (tritium results from August 2011 are still pending), while results from the November 2011 event will only include field measurements. Analytical results from November 2011 will be provided in the 2012 Annual Report.

5.1.1.3 Soil Sampling

Soil samples were initially collected in November and December 2010. Wet bulk density, soil total carbon (TC), TN, and TP were reported; however, soil dry bulk density was not reported and new soil samples were re-collected in November 2011 for dry and wet bulk density analyses (per the National Environmental Laboratory Accreditation Conference [NELAC] certified ASA-13 method).

Two soil samples were collected from outside each plot (one each from outside the northeast 1x1 and 5x5 subplots) using 3-inch-diameter, clear, acrylic tubes (Figure 5.1-5). Each sample was at least 30 cm long and had less than 10% allowable compression rate; soil compression was determined by comparing the length of the core to the depth of the core hole. Samples were stored vertically for transport back to the laboratory where each core was cut into 10-cm pieces (0- to 10-, 10- to 20-, and 20- to 30-cm); pieces in excess of 30 cm depth were discarded. Notes were taken on each of the samples, after which a composite sample was made by combining two cores from each plot. All cores were refrigerated and sent to a laboratory to be analyzed for wet and dry bulk density. Results of soil nutrient analyses performed during the first sampling event in 2010 are available in the August 2011 Annual Report (FPL 2011b) and the November 2011 results are discussed below.

5.1.2 Results and Discussion

5.1.2.1 Community Description

The key vegetation communities in each of the general habitats are shown in Table 5.1-2. Not all 5x5 subplots had woody species; similarly not all 1x1 subplots had herbaceous species. Therefore, a total of 68 5x5 subplots and 72 1x1 subplots are visited and measured each quarter.

Transects F2, F3, F4, and F6 were freshwater marsh transects dominated by sawgrass and some spikerush, although scrub woody species were periodically encountered. Although the F1 transect was designated as freshwater habitat, mangroves were present in both plots along this transect. F5 was primarily a mangrove plot, dominated by needlegrass rush (*Juncus roemerianus*), saltgrass, red mangrove, and white mangrove. Dense periphyton mats were observed in between the vegetation in the F2, F3, F4, and F6 plots, but were not present in either F1 or F5. Periphyton are present only in non-saline conditions and generally thrive in high-light, low-nutrient, flooded marsh areas. All trees in the M transects were scrub mangroves, dominated mostly by the red mangrove (Table 5.1-2). There are no changes in dominate species since the beginning of monitoring in October 2010.

The Shannon-Wiener Index of Diversity (SWI) and species evenness were calculated from the 1x1 and 5x5 subplots located in the northeast corner. Nine total species of woody and herbaceous plants were documented in the northeast corners of the marsh subplots during the November 2011 sampling event. In the brackish marsh-mangrove F-plots, red mangrove and sawgrass were the two species present. In the mangrove plots, red mangrove was the most prevalent species (Table 5.1-3). Diversity ranged from one to three species within a plot and from one to five species when comparing transects (Table 5.1-4).

The SWI is a measure of the probability that a randomly sampled individual will be of a particular species. For instance, a SWI value of 0 indicates that there is only one species present with no uncertainty as to what species a randomly sampled individual will be. Values can range from 0 to 4.5 but, in the transects measured, SWI was low and all but one transect (F5) had SWI values <1. In the marsh plots, diversity was lowest in the F4 plots (SWI = 0), as all plots along the transect were dominated by a single species, sawgrass. Overall, the relatively low SWI values indicate low species diversity and low abundance of non-dominant species (i.e., most plots are dominated by sawgrass, with spikerush sparsely present). Diversity was highest in the marsh transect F3 (SWI = 0.762), as this transect had four species recorded across all plots. Diversity was also low in the mangrove plots; the mangrove sites were dominated by red mangrove with white and black mangrove sparsely present. The most diverse mangrove plots (M2 and M5) had three species each, although the composition of these transects was different (Table 5.1-3). The highest diversity community was the marsh-mangrove mix which had three (F1) and five (F5) species along that transects. F5 was the most diverse species, as it was composed of a mix of woody and non-woody species within the different plots.

Species evenness is a measure of how evenly distributed each species is at each site. A species evenness of 1 means there is an equal number of individuals of each species present. The low evenness values of the mangrove plots indicate one very dominant species (red mangrove) with other species sparsely intermixed. Higher evenness values for some of the marsh plots show that at plots such as F1-1, F3-1, and F5-2, most species present are well-represented. Species evenness cannot be calculated when there is only one species present in a plot. The mangrove plots had the lowest species evenness, followed by the marsh and marsh-mangrove mix communities (Table 5.1-4). Species evenness was lowest in M4 (0.013), followed by M2 (0.020). The marsh plots F2, F3, and F4 had similar evenness values ranging from 0.609-0.694. The most diverse transect, F5 also had the highest value of species evenness, 0.715.

5.1.2.2 Vegetation Sampling

Sawgrass was the primary herbaceous species measured in the marsh plots; therefore, discussion of the herbaceous vegetation is limited to sawgrass. Of note is that sawgrass cover was consistently ≤25%, and average vegetation height for each sampling event never exceeded 1.0 m during the two quarters measured (Table 5.1-5 and Figure 5.1-7). These vegetation patterns are consistent with the “sparse sawgrass” community commonly observed in Florida, as described in Olmsted and Armentano (1997) (Figure 5.1-7). Seasonal changes were observed in sawgrass vegetation cover and height. As this species senesces in fall, overall vegetation height and cover decreased over the first four quarters measured, before slightly increasing in November 2011.

Sawgrass percent cover values are reported as percentage categories per the approved December 2011 QAPP (Table 5.1-5). Most percent cover values fell within the 6 to 25% range during the first three sampling events, with the remaining sites in the 2 to 5% range, while the opposite was true during the August 2011 and November 2011 events (Table 5.1-5). This decrease in percent cover coincides with decreasing sawgrass height. In August 2011 and November 2011, average sawgrass height for each plot ranged from 60 cm to 109 cm and 64 cm to 110 cm, respectively (Figure 5.1-7). Plots F4-1 and F3-1 have had the highest and lowest sawgrass heights, respectively, since sampling began in October 2010.

Both the cover and height of the sawgrass plots in transects F1 through F4 are comparable to the F6 reference locations (Table 5.1-6). These general short-term observations from the last five quarters are primarily driven by seasonal change at the local level; however, on a broader comparison across South Florida, the marsh community structure is most likely a consequence of nutritional status and hydrology. The drier than normal dry season (December 2010 through

June 2011) may have continued to negatively impact the marsh community despite the onset of the wet season in late 2011.

Sawgrass biomass was calculated using two phenometric equations (dry season and wet season) derived from semi-annual plant harvests conducted in accordance with this project (Table 5.1-7). Sawgrass biomass varied seasonally, with the highest average during the May 2011 sampling event and the lowest in October 2010 and November 2011 (Figure 5.1-8). As with height, the highest average biomass was observed at plot F4-1 and the lowest at F3-1 for all sampling events. There were no consistent spatial patterns with distance from the CCS as biomass increased along transects F1 and F3 and decreased along transects F2 and F4.

The dominant species in all mangrove plots is red mangrove and subsequent discussion will be focused on this species. Average tree height in a plot ranged from 58 cm to 115 cm, but overall the trees were small (< 1 m tall) (Table 5.1-8). Plant height increased from November 2010 to May 2011, a pattern attributable to the seasonal growing patterns of the mangroves. Measurements in May were during the active growing season, after the plants' old leaves had senesced, while November was the end of the active growing season. Concurrently, tree height increased slightly from the plots near the CCS to the coastline for transects M1, M3, M4, and M5 (Figure 5.1-9). This pattern is most likely caused by the proximity of the plots to the fringe habitat. Where the taller fringe mangroves were not observed (i.e., M2 and M6), this pattern of taller mangroves away from the CCS was not observed. Nonetheless, overall, across the plot for the last year and a half, growth in terms of height increase was negligible.

Percent cover of red mangroves in the plots ranged from 2 to 50% (Table 5.1-9) and remained fairly consistent among time periods. Differences observed between one semi-annual sample to the next could have been caused by tidal effects; in the October 2010 measurements, the tides were extremely high in the mangrove forests during that first event, with water depths of up to 70 cm. As many of the mangrove trees were 60 cm to 80 cm tall, cover observed during that time period was most likely affected by the water depth.

Red mangrove biomass varied seasonally, with the highest average during the October 2010 sampling event and the lowest in May 2011 and November 2011 (Table 5.1-10 and Figure 5.1-10). On average, the highest biomass was observed at plot M1-2 and the lowest was observed at M3-2 (not including the F-plots). Spatial patterns varied across the landscape, with no consistent relationship with distance north to south or with distance from the CCS.

Sclerophylly is a measure of leaf hardness or toughness, and high sclerophylly values are an indication of harsh climate and nutrient deficiency. The decrease in sclerophylly exhibited along transects F1 and F3 is consistent with the improved vegetative community structure (increased height and percent cover [Table 5.1-11 and Figure 5.1-11]) and higher soil nutrient patterns observed. Sclerophylly of sawgrass was consistently lower in October 2010 than May 2011, with the exception of site F1-1 (Table 5.1-11). This is to be expected, as October is the end of the growing season and the conditions are less stressful for the plant compared to the measurements in May, at the end of the dry season. Sclerophylly of red mangrove was consistently higher in October 2010 than May 2011, with the exception of plot M5-2 (Figure

5.1-12 and Table 5.1-12). There were no noticeable relationships from north to south or with distance from the CCS.

5.1.2.3 Quarterly Ecological Porewater Sampling

Porewater field measurements are snapshots of conditions when the quarterly vegetation measures are conducted (Table 5.1-13). Field measured specific conductance values across the landscape were significantly higher in August 2011 compared to November 2011; these values reflect the percolation and availability of freshwater into the porewater as the wet season progresses. Conductance and temperature values in the marsh (F-transects) were highest at F5 and lowest at F4. The high values observed in F5 are most likely a consequence of limited freshwater inputs in this impounded area that is surrounded by marine-influenced drainage canals (i.e., the S-20 Canal to the north and the Sea-Dade Canal to the south). Within the mangroves (M-transects), M4 had the highest specific conductance and temperature while M6 had the lowest. The M4 transect is a scrub basin red mangrove forest with limited tidal exchange; the high evaporative rates coupled with limited hydrologic exchange are probably contributing to these observations.

Data collected for the two quarters show decreases in specific conductance for all F and M plots between August 2011 and November 2011, with the exception of F6-3 which showed a 6% increase (Table 5.1-13). A decrease (76%) was observed at plot F5-2. This area is enclosed and there is no surficial tidal flushing—this results in evaporative concentration of the salts during the dry season, as reflected in high salinity porewater that persists into August 2011. With increased rainfall, specific conductance decreases by November 2011. In the M transects, percent decrease in specific conductance ranged from 8 to 43% (Table 5.1-13). M1 through M5 and F5-2 were hypersaline in August 2011, but only M4-1 and M4-2 were hypersaline in November 2011 for reasons described in the previous paragraph.

The analytical data not only support the field observations, but also provide insight into the underlying chemistry of these measurements. Due to the drier-then-normal conditions, only a few samples of porewater were available despite pumping at each site for at least an hour in a number of locations around the plot. A notable observation is the high amount of calcium, DIC, and bicarbonate alkalinity, and low $\delta^{13}C$ in some of the marsh samples for both seasons that indicate high dissolution of carbonate rock at these locations (Tables 5.1-14 to 5-17). The mangrove samples all have high amounts of anions and cations in the samples, but the ratios of these ions are consistent with those of marine water. Similarly, the isotopic values of δD and $\delta^{18}O$ show more evaporated water in May 2011 relative to August 2011.

During May 2011 in the marsh, tritium concentrations ranged from 1.6 pCi/L in F6-1 to 139 pCi/L at F5-1. The high value observed at F5-1 is probably reflective of the high residence time and evaporative conditions in this impounded site. In the mangroves during that same season, values ranged from 14.1 pCi/L at M6-2 to 68.4 pCi/L at M4-1. Most of these porewater values are within the range of values observed for the L-31E stations (TPSWC-1 to TPSWC-3: 35.0-93.3 pCi/L) in June 2011 during the quarterly sampling event.

5.1.2.4 Soil Bulk Density

Wet and dry bulk density values are listed in Table 5.1-18. Wet bulk density values from both 2010 and 2011 were consistent (1.0 to 1.3) among years and differed <10% between the two measurements. As these are wetland soils and completely saturated, wet bulk density does not provide as much insight into the soil conditions as compared to an upland site.

Dry bulk density values, however, can provide some insight into soil compactness as well as the soil type within an area. A higher dry soil bulk density is indicative of inorganic soils and/or compact organic matter. In a previous study of tree island soils, dry soil bulk density ranged from 0.06 to 0.30 g/cm^3 (Ewe 2009). Combined with field observations, lower bulk density in this study was indicative of highly organic, flocculent soils in some of the locations sampled.

Dry bulk density patterns across the landscape were inconsistent, showing no direct relationship with distance from the CCS (Table 5.1-18); however, a few patterns were observed as a consequence of community type and hydrologic conditions. Dry bulk density values were lowest in the tree islands, ranging from 0.13 at F3 to 0.21 at F6; these low values are indicative of a highly organic substrate. Within the marsh plot, F5-2, and the mangrove plot M1-1, dry bulk densities of 0.60 g/cm^3 and 0.62 g/cm^3 were observed, respectively; these sites are impounded and primarily consist of marl-organic mix substrate.

5.2 Biscayne Bay

Per the Monitoring Plan (SFWMD 2009a), ecological sampling in Biscayne Bay will occur twice a year, once in the spring and once in the fall. Fall 2011 ecological sampling was conducted between August 31 and September 23, 2011.

5.2.1 Methods and Materials

Four areas of interest were identified for ecological sampling in the Monitoring Plan (SFWMD 2009a) within Biscayne Bay, Card Sound, and Barnes Sound (Figure 1.3-1). The northernmost of these areas is designated BB1 and is located in Biscayne Bay near the northern end of the FPL Turkey Point CCS. Areas BB2 and BB3 are located in Card Sound near the central and southern portions of the CCS, respectively. Area BB4 is the control site and is located on the western side of northern Barnes Sound north of Middle Key.

Within each study area, five 2-km-long, shore-parallel transects were established (Table 5.2-1 and Figure 1.3-1). Transects designated "*a*" through "*e*" were located 250 m, 500 m, 1,000 m, 2,000 m, and 3,000 m from shore, with *a* being closest to shore. During the initial baseline monitoring event in October 2010, each transect was divided into eight, 250-m-long segments. A random number generator was then used to choose a 1-m-square point along each segment as the permanent sampling location for all future sampling events (Table 5.2-1). These points were numbered 1 to 8 on each transect. For example, BB1-b-4 represents Area BB1, Transect *b*, and

Sampling Point 4. This design produced a total of 40 sampling points per transect, and a grand total of 160 sampling points for all study areas combined.

All field sampling activities and recordkeeping followed the QAPP (FPL 2010). A field notebook was used for documenting sampling activities, including station location, times of sampling, sampling personnel, and weather conditions. Customized field data sheets were utilized for recording data for each type of sampling activity. The data sheets were reviewed for completeness by the field team leader prior to leaving each sampling point.

A 25-ft research vessel, equipped with a Global Positioning System (GPS), depth finder, and davit for retrieving the faunal throw trap, was used for conducting the sampling. The vessel's shallow draft allowed access to all sampling points.

A Trimble® GeoXT GPS, pre-loaded with all sampling points, was used to navigate to each sampling location. When the vessel arrived on station, a weight with an attached float was deployed to precisely mark the sampling point. The boat was then anchored in a manner that positioned it alongside the marker. Depending on wind and current conditions, a second anchor was sometimes deployed to help maintain a constant position at the sampling point. No permanent markers or stakes were deployed to mark the locations of these sites.

5.2.1.1 Ecological Measurements (Porewater Specific Conductance, Temperature, Light Attenuation)

A variety of environmental data were collected at each sampling point. The tidal cycle (high, low, ebb, or flood tide) was recorded based on published tide tables. A NIST-certified thermometer was used to determine ambient air temperature. Wind speed was estimated, and wind direction was determined by use of a compass. Sky conditions were noted as *clear* (0 to 25% cloud cover), *partly cloudy* (25 to 50% cloud cover), *mostly cloudy* (50 to 75% cloud cover) or *overcast* (more than 75% cloud cover). Notes were made of any precipitation during the sampling event.

A Hach Quanta® water quality meter was used to document water quality at each of the 40 sampling points within each study area. Monitored variables included: specific conductance(milliSiemens per centimeter [mS/cm]), temperature (°C), salinity (as a function of conductance ; in PSS78 scale), turbidity (nephelometric turbidity units [NTU]), dissolved oxygen (DO [mg/L]), and oxidation reduction potential (ORP [mV]). Water column measurements were taken approximately 30 cm below the surface and 30 cm above the bottom. At both depths, the meter was allowed to stabilize before readings were recorded. The meter was calibrated prior to the start of daily sampling activities, and continuing calibration verifications were performed throughout the day. All calibrations were recorded in an instrument calibration log.

Porewater temperature and specific conductance measurements were taken concurrently with the SAV and porewater nutrient/Tracer Suite sampling described below. Temperature data were collected using a ThermoWorks TCTemp1000 thermocouple datalogger, and specific conductance was measured using the Hach Quanta® water quality meter.

Upon arrival at each sampling point, a diver with a 4-foot-long section of rebar would probe the area immediately around the sampling point to determine if there was sufficient unconsolidated sediment to permit insertion of a 30-cm porewater sampler to depth. If refusal was less than 30 cm, the bottom within a 2- to 5-m radius of the sampling point was probed until the target depth could be reached. Once a suitable location was found, a temperature probe and the porewater sampler were fully inserted and the time was noted.

The porewater sampler consisted of a stiffening rod to facilitate insertion into the sediment and a sipper to extract the porewater. After the sampler was inserted to depth, the stiffening rod was removed, and a flexible tube was attached to the sipper. To clear the sipper and tube of surface water, a 60-cubic-centimeter (cc) syringe was used to extract and discard a minimum of 100 cc of water. An additional 90 to120 cc of porewater was then extracted and measured for conductance, which was recorded to the nearest 0.1 mS/cm.

The temperature probe remained in place for a minimum of 10 minutes, with temperature data electronically recorded every 15 seconds. The data were later downloaded and reviewed, and the stabilized temperature near the end of the sampling period was used as the porewater temperature for that sampling point.

Light attenuation was measured at a single sampling point (#4) along each transect. A Li-Cor® LI-1400 data logger was connected to a Li-Cor® LI-193 spherical sensor and a Li-Cor® LI-190 quantum sensor to measure light (micromole per square meter per second [μmols/m^2/sec]) at depth and at the surface simultaneously. The LI-193 sensor was mounted in a weighted black frame (Figure 5.2-1), while the LI-190 sensor was placed in an unshaded area on the research vessel (Figure 5.2-2). In water depths less than 5 ft (1.5 m), three measurements were taken: 1 ft (0.3 m) below the surface, mid-depth, and 1 ft above the bottom. In water depths greater than 1.5 m, five measurements were taken at equidistant depths starting at 0.3 m below the surface and finishing at 0.3 m above the bottom. Records of light measurements were made as the sensor was lowered to each depth, and again as the sensor was raised, for a total of six to ten readings per sampling point. Sampling depth and time of sampling were recorded for each paired surface and underwater reading. For this Semi-Annual Report, only surface, mid-depth, and bottom values are presented. The values represent the mean of the lowering and raising readings for each depth.

5.2.1.2 Submerged Aquatic Vegetation Survey

SAV surveys were conducted at each of the 40 sampling points per study area (total of 160 points). Four 0.25 m^2 quadrats were thrown from the boat roughly equidistant around the marked sampling point (total: 640 quadrats). They generally landed within 1 to 3 m of the sampling point. The SAV within each of the four quadrats was examined and recorded on underwater datasheets (Figure 5.2-3). Each of 26 pre-established categories (Table 5.2-2) used by the SFWMD were scored using the Braun-Blanquet Cover Abundance (BBCA) Index methodology (Figure 5.2-4). The BBCA method assigns a code to each species or taxonomic group based on its contribution to bottom coverage, as follows:

0 = bare

0.1 = <5% cover with a solitary individual/shoot

0.5 = <5% cover with few individuals/shoots

1 = <5% cover with numerous individuals/shoots

2 = ≥5% cover and ≤25% cover

3 = >25% cover and ≤50% cover

4 = >50% cover and ≤75% cover

5 = >75% cover

Categories on the data sheet not present in the quadrat (i.e., bare) were left blank. Corals, gorgonians, and sponges were noted as present or absent, but were not scored. For each sampling point, an average percent cover for each category present was calculated for the four quadrats combined using the following formula:

$$C_a = \sum S_{ab}/4$$

Where:

C_a = coverage of taxon *a*,
b = quadrat number from 1 to 4,
S_{ab} = the BBCA score for taxon *a* in quadrat *b*.

One set of quadrats along each transect within a study area was scored by a second diver for QA purposes. The quadrats were left in place while the independent scoring was compared between the two biologists. If there were any differences in scoring, both biologists reevaluated the quadrats until 100% agreement was reached. The final result from the QA was recorded separately from the original two scorings. All SAV scoring was done by scientific divers who had previously attended an Interagency Calibration Exercise hosted by the SFWMD in Key Largo, the most recent of which was held on May 25, 2011.

5.2.1.3 Faunal Throw Traps

Faunal Throw Trap (FTT) surveys were conducted at every other sampling point along each transect, yielding a total of 20 samples per study area (total of 80 points). Sampling points alternated between transects, with even numbered points sampled on Transect *a*, odd numbers on Transect *b*, and so on. Upon completion of porewater specific conductance and SAV sampling, a 1x1 FTT was thrown over the side of the boat. As the FTT descended to the bottom, a diver followed and covered the top of the trap with one of two net panels attached to opposite sides of the trap. Once the trap had settled, the divers ensured that it was resting squarely on the bottom so organisms could not escape under its bottom edge. The net panel on the top was then partially retracted and a hinged sweep net was used to collect fish and invertebrates (Figure 5.2-5). The sweep net was inserted and pushed along the bottom from front to back within the trap. After each pass, the net was closed, extracted from the trap, and transported to the boat for processing.

A minimum of five net sweeps of the FTT were made at each sampling point. Additional sweeps were made if the fifth sweep contained any organisms.

On the research vessel, all fish, penaeid and caridean shrimp, and portunid crabs were removed from the net and preserved in 10% formalin for later species-level identification and measurement in the laboratory. Other organisms were identified to Order or Family level in the field, counted, and returned to the water. At the laboratory, samples remained in formalin for a minimum of five days before being stepped into 70% ethanol for storage, identification, and subsequent archiving. Standard and total lengths (SL and TL, respectively) were recorded for fish, while postorbital carapace length (CL) and carapace width (CW) were measured for penaeid and caridean shrimps and portunid crabs, respectively.

5.2.1.4 Porewater Nutrient and Tracer Suite Sampling

After completing SAV/water quality sampling at all eight points on a transect, porewater conductance data were reviewed. The location with the highest conductance value was then selected as the sampling point for porewater nutrient and Tracer Suite sampling. This yielded a total of five samples, one per transect, for each study area. At each of these sampling points, the porewater sampler was inserted to a depth of 30 cm, and the tubing attached to the sipper was connected to a peristaltic pump on the boat. Sufficient water was pumped to clear the volume of water in the tubing three times prior to collecting 500 to 750 ml of porewater for analysis. The sampler was then removed from the substrate, reinserted within 0.5 m of the first point, and the entire process was repeated. After collection, the two porewater samples were combined and homogenized prior to placing sub-samples into pre-labeled containers for subsequent laboratory analyses. The pH of the sample water was measured and recorded on the field datasheets and chain-of-custody forms. Depending on the type of analysis, some sample containers were spiked with a preservative, while others were not. All sample bottles were labeled with the date of sampling, time of sampling, sample number, and initials of the personnel collecting the samples. The sample bottles were then either placed on ice or left unchilled, depending on the type of analysis to be performed (Figure 5.2-6).

After sampling at each point, the tubing was decontaminated with 10% HCl prior to use at the next station. At the end of the day, the nutrient/Tracer Suite samples along with the corresponding chain-of-custody forms were transferred to a courier for transport to the analytical laboratory. In the laboratory, samples were analyzed for the nutrient and Tracer Suite parameters (per the Monitoring Plan [SFWMD 2009a).

5.2.1.5 Soil Sampling

Two sites were selected along each transect for soil coring in November 2011. Samples were collected at Points 1 and 4 on Transect *a*, 2 and 5 on Transect *b*, 3 and 6 on Transect *c*, 4 and 7 on Transect *d*, and 5 and 8 on Transect *e* within each study area. A 3-inch cylindrical acrylic corer was used to collect the samples. At each sampling location, a diver with a length of rebar probed the bottom for a suitable location which would allow penetration of the core to a depth of at least 30 cm. In those areas where resistance was encountered before reaching a depth of 30 cm, the deepest possible core was collected. The cores were pushed by hand into the substrate and a rubber mallet was used to verify penetration to depth of refusal. The upper end was then capped and the corer was carefully extracted to retain the enclosed sample. As the bottom of the corer neared the substrate surface, a second cap was placed on the bottom of the corer and both the top and bottom were held in place as the sample was transported to the boat. The depth of the extraction hole was measured and compared to the length of the core to ensure the sample had less than 10% compression. Once on board, the caps were secured with electrical tape and the corer was labeled with the date and sample number. The date, sample number, time of collection, and length of soil core were recorded on the corresponding field data sheet. A chain-of-custody form was competed, and the samples were transferred to an analytical laboratory. Prior to analyses, the cores were sub-divided into 10-cm horizons, and corresponding horizons (0- to 10-, 10- to 20-, and 20- to 30-cm) for both samples on each transect were combined into a single sample. This resulted in a total of three samples (one for each horizon) per transect. Wet bulk density and dry bulk density for each sample were reported.

5.2.1.6 Statistical Analyses

Certain water quality variables were statistically analyzed using STATISTICA software (Statsoft, Inc.). For comparisons among transects or study areas, an analysis of variance (ANOVA) was performed on untransformed grouped data, with the critical p value set at 0.05. When the ANOVAs indicated a significant difference among locations, Tukey's honestly significant difference (HSD) test (post-hoc pair-wise comparisons) was used to determine which locations were different. In the event of unequal sample sizes, the Spjotvoll/Stoline test was used for the post-hoc tests. Standard t-tests were used when statistically comparing two independent means (e.g., bottom conductance versus porewater conductance within a study area).

5.2.2 Results and Discussion

5.2.2.1 Water Depths

Sampling was conducted over all tidal cycles. The data presented herein are actual depths at the time of sampling, unadjusted for tides. Mean water depth for all study areas and transects combined was 2.4 m, with minimum and maximum depths of 1.3 m and 3.7 m, respectively (Table 5.2-3). Area BB1 had the shallowest mean depth (1.7 m), ranging from a minimum of 1.3 m to a maximum of 2.2 m, while BB3 had the greatest mean depth (3.0 m; range = 2.4 to 3.7 m). Generally, depths increased with distance from shore. For all study areas combined, 53 sampling points were in water depths of 1.0 to 2.0 m, 85 were in depths of 2.1 to 3.0 m, and only 22 were in depths greater than 3.0 m.

5.2.2.2 Water Quality Sampling

Mean, minimum, and maximum values of each measured water quality variable are presented in Tables 5.2-4 through 5.2-10. Differences in time of day, tidal stage, and weather conditions over the 26-day period of monitoring preclude any meaningful statistical analysis for most of these variables. However, several general characterizations can be made.

Mean water temperatures along each transect, all study areas combined, ranged from 30.4°C (BB1 surface and bottom) to 30.7°C (BB3 surface and BB4 bottom) during the fall 2011 ecological monitoring event (Table 5.2-4). Surface temperatures ranged from a minimum of 28.2°C at BB1-*b* to a maximum of 33.0°C at BB3-*b*. Bottom temperatures ranged from 28.2°C at BB1-*b* to 32.7°C at BB1-*c*. As the result of relatively shallow water depths and thorough mixing by wind and currents, there was very little difference between mean surface and bottom temperatures along any transect.

Mean specific conductance measurements along each transect, all depths and study areas combined, varied from 50.4 (BB4-*a*) to 56.0 mS/cm (BB3-*d*), with the overall maximum conductance (56.8 mS/cm) found at the surface and bottom at BB4-*d* and the overall minimum (46.4 mS/cm) recorded at the surface of BB4-*a* (Table 5.2-5). Similarly, mean salinity values were highest in BB3 (37.1) and lowest in BB1 (35.4) (Table 5.2-6). Average salinity values along each transect, all depths combined, ranged from 30.2 (BB4-*a* surface) to 38.1 (BB4-*d* surface and bottom). There were only slight differences in either conductance or salinity values between surface and bottom waters, indicating little water column stratification during the period of sampling. The greatest disparity occurred along transect BB4-*a*, where mean bottom salinity was about 2 units (PSS78 scale) higher than surface salinity.

Mean DO values along each transect, all depths and study areas combined, ranged from 4.32 (BB2-*e* bottom) to 5.87 mg/L (BB4-*d* surface) (Table 5.2-7). Lowest average values for all transects combined were obtained at BB1 (4.77 mg/L at bottom) and highest average values were obtained at BB4 (5.34 mg/L at surface). As for other monitored variables, differences between surface and bottom DO values were slight.

Minimum and maximum average pH values along each transect, all depths and study areas combined, ranged from 7.76 (BB3-*a* surface) to 7.96 (BB1-*c* bottom) (Table 5.2-8). The highest average pH value for all transects combined was at BB1 (7.90 at surface and bottom), and the lowest was at BB3 (7.81 at surface). There was very little difference between mean surface and bottom values within any area.

Average ORP values along each transect, all depths and study areas combined, ranged from 80.8 mV (BB2-*d* bottom) to 146.4 mV (BB1-*b* surface), with individual values ranging from 27.0 mV (BB2-*e* surface) to 259.0 mV (BB3-*a* surface) (Table 5.2-9). The highest average value for all sampling points within each study area combined was 135.1 mV (BB1 surface), and the lowest was 99.9 mV (BB3 bottom). As for most other measured variables, there was relatively little difference between mean surface and bottom values.

Water clarity was generally high throughout the project area, as reflected by the low turbidity values (Table 5.2-10). Average values along each transect, all depths and study areas combined, ranged from 0 to 11.6 NTU (BB4-*a* surface). The highest average turbidity value for all sampling points within each study area combined was 3.3 NTU (BB4 surface), and the lowest was 0.0 NTU (BB2 bottom). The highest turbidity values were recorded at nearshore transects in BB1 and BB4, with a maximum value of 40.6 NTU obtained at the surface on transect BB4-*a*.

5.2.2.3 Porewater Temperature and Specific Conductance Measurements

During the Fall 2011 ecological sampling event, average porewater temperatures along each transect, all depths and study areas combined, ranged from 29.4°C (BB4-*e*) to 30.5°C (BB1-*b*, BB4-*a*, and BB4-*b*), with minimum and maximum values ranging from 27.8°C (BB4-*c*) to 32.3°C (BB4-*d*) (Table 5.2-11). Mean porewater temperatures did not differ significantly between any of the study areas, ranging only from 30.04°C (BB4) to 30.27°C (BB3) (Table 5.2-12). Such was also the case for the Fall 2010 sampling event. In the Spring of 2011, the mean porewater temperature in Area BB4 (27.9°C) was significantly greater than any other areas, while the mean temperature for BB2 (27.0°C) was significantly lower than all other areas (Table 5.2-12). However, these differences were not likely to have been of ecological significance. During the current sampling event, the only significant differences among transects were found within Area BB4, where transect *e* farthest from shore had significantly cooler porewater temperatures than the two transects closest to shore.

During the Fall 2011 ecological sampling event, porewater temperatures were generally lower than bottom water temperatures (Table 5.2-13). The difference in transect means between porewater and bottom water for all study areas combined ranged from only -0.3ºC (BB1-*e*) to 1.0°C (BB4-*e*). No obvious nearshore to offshore or north to south trends were evident. When bottom water and corresponding porewater temperatures were compared, porewater temperatures were cooler than bottom water temperatures in all areas except BB1 (Table 5.2-13). An opposite pattern was present during the 2010 fall sampling event, when porewater temperatures were significantly warmer than bottom water temperatures in all sampling areas. This difference is likely attributable to the earlier timing of the Fall 2011 sampling event, as water temperatures in the study area had not declined appreciably from seasonal maximum values.

The highest and lowest mean porewater conductance transect values for all study areas combined during the Fall 2011 sampling event ranged from 52.8 mS/cm (BB4-*b*) to 57.3 mS/cm (BB3-*b*), with the highest and lowest individual values ranging from 47.1 mS/cm (BB1-*b*) to 59.0 mS/cm (BB4-*e*) (Table 5.2-14). Mean values tended to decrease with distance from shore in areas BB2 and BB3, while the opposite trend was present in Areas BB1 and BB4. However, the only statistically significant differences among transects were found in Areas BB3 and BB4 (Table 5.2-15). In Area BB3, conductance at the offshore transect (*e*) was significantly lower than at all other transects. Conversely, in Area BB4, porewater conductance at the offshore transect was significantly higher than the two transects nearest shore (*a* and *b*), but statistically similar to the two intermediate transects (*c* and *d*).

Average specific conductance of porewater for all transects combined during the Fall 2011 sampling event was highest in Area BB3 (56.3 mS/cm) and lowest in Area BB1 (54.1 mS/cm) (Table 5.2-14). Statistical differences in porewater conductance values have been detected among study areas during each monitoring event (Table 5.2-15). During the two fall monitoring events (October/November 2010, September 2011), Areas BB1 and BB4 were shown to have relatively low specific conductance values compared to Areas BB2 and BB3, whereas the opposite pattern was detected during the Spring 2011 sampling event.

Porewater specific conductance during the Fall 2011 sampling event was typically higher than the corresponding bottom specific conductance measurements (Table 5.2-16). However, ANOVA tests applied to these data demonstrated that the only statistically significant difference occurred within Area BB3 ($F_{1,78} = 11.96$, $p < 0.001$). During the Fall 2010 sampling event, porewater conductance was also typically higher than the corresponding bottom water conductance within all study areas. However, the opposite pattern was observed during spring 2011, when porewater conductance was generally lower than bottom water conductance.

5.2.2.4 Submerged Aquatic Vegetation

Study Area BB1 can generally be characterized as a shallow (1.3 to 2.2 m) inshore area with sparse to moderate macrophyte coverage, scattered corals and sponges, and open bottom. Total macrophyte coverage (not including drift algae) was highest along Transect *b* and lowest along Transect *e* (Table 5.2-17). The seagrass component of the macrophyte community was dominated by turtle grass (*Thalassia testudinum*). This species was ubiquitous, occurring along all transects and present at every sampling location within Area BB1. However, at most of the sampling locations (21 out of 40), coverage for the four quadrats combined was sparse (less than 5%). The highest coverage of turtle grass at any sampling point within BB1 occurred within the northern portion of Transect *a*, where coverage was estimated at 50 to 75%.

Shoal grass (*Halodule wrightii*) was also present along each transect in Area BB1, but occurred at only 13 of the 40 sampling locations, and bottom coverage never exceeded 5%. The green fleshy algae *Batophora* was also present along each transect in Area BB1 and occurred at every sampling location. It was often the dominant macrophyte species within the quadrats, with coverage varying from less than 5% to greater than 75%. However, coverage of *Batophora* typically fell within the range of 5 to 25%. Green calcareous alga from the genera *Penicillus* and *Halimeda* were also present throughout this study area, but they were consistently classified as sparse (<5%) in coverage. As the distance from shore increased, coverage of stony corals, gorgonians, and sponges generally increased.

Study Area BB2 was of an intermediate depth (1.9 to 3.3 m) and contained a sparse to moderate coverage of seagrass, a sparse to moderate bottom coverage of other macrophytes, and scattered hardbottom resources (Table 5.2-17). Transect *b* contained the highest total macrophyte coverage, while Transect *a* had the lowest. Turtle grass was widespread, occurring at 35 of the 40 sampling locations in BB2, but it was relatively sparse. Coverage of this species only rarely exceeded 25%. Shoal grass in Area BB2 was only recorded on Transects *a*, *b*, and *c*, and never exceeded 5% coverage. In terms of overall coverage, *Batophora* was the dominant macrophyte at nearly all off of the sampling locations within BB2. This alga was present at all sampling locations, with coverage varying from less than 5% to greater than 75%. It was particularly abundant along Transect *b*. Other algae taxa, including *Penicillus*, *Halimeda*, and *Acetabularia*, were widespread throughout BB2, but very sparse. Sponges were also documented throughout BB2, being present within quadrats at 33 of the 40 sampling locations. Stony and gorgonian corals were abundant at the two nearshore transects (Transects *a* and *b*), but nearly absent from the three most seaward transects (Transects *c*, *d*, and *e*).

Area BB3 was the deepest of the study areas monitored, with a mean depth of 3.0 m for all transects combined (Table 5.2-17). Depths increased gradually in a seaward direction. Total macrophyte coverage was sparse to moderate, with the offshore Transect *e* having the highest coverage and Transect *b* having the lowest. Turtle grass was widespread within BB3, occurring at all 40 sampling locations, but it was relatively sparse; it was categorized as less than 5% coverage at 23 of the 40 sampling locations. Average coverage exceeded 25% at only two sampling locations, both along Transect *e*. Shoal grass was only observed at four sampling locations within Area BB3 and was very sparse where it occurred. *Batophora* was present at all sampling locations, at coverages ranging from less than 5% up to 50%. *Halimeda* and *Penicillus* were found throughout BB3 at very low densities. Sponges were prevalent within BB3, occurring within quadrats at 34 of the 40 sampling locations. Small stony and gorgonian corals were encountered frequently nearshore (Transects *a*, *b*, and *c*), but they were only rarely observed further offshore (Transects *d* and *e*).

Study Area BB4 was of intermediate depth (1.8 to 2.8 m), with the shallowest areas occurring closest to shore. This area can be generally described as a relatively open bottom with sparse macrophyte coverage comprised of an intermixture of turtle grass, *Batophora*, and various calcareous algae. Total macrophyte coverage was highest on Transect *e*, and lowest on Transect *c*, but it rarely exceeded 25% anywhere within this study area. Turtle grass was both widespread (occurring at 39 of 40 sampling locations) and sparse, never exceeding 25% coverage. Shoal grass represented an insignificant part of the macrophyte community within BB4. *Batophora*, *Penicillus*, *Halimeda*, and *Udotea* were commonly observed at sampling locations, but were generally sparse in overall coverage.

Macrophytes in each of the four replicate quadrats at each sampling location were assigned a BBCA score and the values averaged to produce a mean value for each point. Coverage of total macrophytes, total seagrass, and total macroalgae was then compared among transects within each study area and among study areas for all transects combined (Table 5.2-17). In Area BB1, there were only minor differences in total seagrass coverage among transects, with mean BBCA scores ranging from 1.1 (Transects *c* and *d*) to 1.4 (Transects *a* and *b*). These values represent less than 25% seagrass bottom coverage. Average total macroalgae coverage was greatest on Transect *b* (BBCA = 2.2) and lowest on Transect *e* (BBCA = 1.1). Average BBCA scores for total macrophyte coverage ranged from 1.4 (Transect *e*) to 2.3 (Transect *b*). There were no apparent trends with distance from shore for any of these three SAV categories.

Within Area BB2, total seagrass coverage ranged from 0.5 on Transects *a* and *b* to 2.0 on Transect *e* (Table 5.2-17). Turtle grass generally increased in coverage with distance from shore. Average total macroalgae coverage was lowest (1.4) on Transect *e* and highest (2.2) on Transect *b*. Transect *a* had the lowest total macrophyte coverage (BBCA = 1.8), while Transect *b* had the highest (BBCA = 2.4).

Mean seagrass coverage within Area BB3 ranged from 1.0 (Transect *b*) to 1.7 (Transect *e*) (Table 5.2-17). Average macroalgae coverage was highest along Transects *d* and *e* (mean = 1.7) and lowest on Transect *a* (BBCA = 1.5). The offshore Transect (*e*) had the highest total macrophyte coverage (BBCA = 2.1), while Transect *b* and had the lowest (BBCA = 1.6).

Average total seagrass coverage in Area BB4 ranged from 0.6 (Transect *c*) to 1.1 (Transect *e*), and total macroalgae coverage from 1.1 (Transect *c*) to 1.5 (Transect *a*) (Table 5.2-17). Total macrophyte coverage was highest along Transect *e* (1.6) and lowest on Transect *c* (1.3).

When data for all sampling points within each study area were compared, mean total macrophyte coverages in BB1 and BB2 were similar (BBCA = 2.1 and 2.0, respectively) and slightly greater than BB3 (mean = 1.8), while BB4 had the lowest total macrophyte coverage (BBCA = 1.5) of any area (Table 5.2-17). This same pattern was found with total macroalgae coverage. Total seagrass coverage was similar within Areas BB1, BB2, and BB3 (1.2 to 1.3), while somewhat lower within Area BB4 (0.9).

The distribution of macrophytes, particularly seagrasses, within the study area is, to a large degree, affected by bottom type and the depth of unconsolidated sediments above limestone hardbottom. Consequently, a qualitative assessment of the substrate was made at each SAV sampling point. Four categories were used to characterize sediments: sandy, silty, shell hash, and rubble. If a quantity of substrate was picked up, released, and settled relatively quickly with little drift, it was classified as sandy. If a plume was evident and it settled more slowly, it was classified as silty. Pockets of shell fragments mixed in with the sand were classified as shell hash, while rocks or hardbottom either exposed or just beneath a veneer of sediment were classified as rubble. Each sampling point could have one or a combination of these components.

One hundred seven (107) of the 160 sampling points (67%) were classified as sandy, shell hash. A total of 22 sampling points had a silty component. Area BB4 accounted for 20 (91%) of the silty substrate sampling locations, while the remaining two were found along inshore portions (Transects *a* and *b*) of Area BB1. Fifteen (15) sampling locations included rubble in the sediment description, all of which were in area BB4. Thus, sedimentological conditions within the "control" area for this study (BB4) were somewhat different from the other areas in that they had a higher percentage of stations with both silty and rubble conditions. This might account for this area's relatively low mean total seagrass Braun-Blanquet score.

Since the commencement of baseline monitoring, SAV coverage has been somewhat variable on an annual and seasonal basis (Table 5.2-18). Within most sampling areas, the mean coverage of seagrasses and macroalgae was highest during the Spring 2011 sampling event. Mean seagrass coverage was lowest in each sampling area during Fall 2011, while mean macroalgae coverage was lowest during Fall 2010. Within area BB1, mean seagrass coverage along each transect was generally consistent between the three monitoring events. The maximum change within this area occurred along Transect *c*, where seagrass coverage was reduced from an average BBCA value of 1.6 in Fall 2010 to a value of 1.1 in Fall 2011. Area BB2 showed the most variation in mean seagrass coverage between events, particularly along Transects *c* and *e*, where mean seagrass coverage was reduced by a full BBCA category since the inception of monitoring. Within Area BB3, mean seagrass conditions were generally similar between monitoring events, with the exception of Transect *e*. Mean seagrass conditions in Area BB4 were also generally similar between events, except along Transect *d*.

Mean macroalgae coverage has proven to be somewhat more variable between monitoring events than seagrass coverage (Table 5.2-18). The maximum change in macroalgal conditions occurred within Area BB3 along Transect *b*, when macroalgae coverage increased from an average BBCA value of 1.0 in Fall 2010 to a value of 2.4 in Spring 2011. Whether these fluctuations in seagrass and macroalgal coverage are indicative of natural temporal variation, or represent the small scale spatial variability in the sampling areas, is unclear.

5.2.2.5 Faunal Throw Traps

Of the 80 FTT stations sampled, a total of 1,508 organisms representing 49 taxa of fish, crustaceans, echinoderms, and mollusks were captured in the Fall 2011 event. Common and scientific names of all taxa collected are presented in Table 5.2-19. Organisms were captured at all but two sampling points (2.5% of all samples). Fish represented 10% of the total organisms collected and 29% of all taxa. Fourteen (14) species of fish were collected, with *Gobiosoma robustum* being the most frequently captured (33 sampling points) (Table 5.2-20) and the most abundant (72 individuals) (Table 5.2-21). *Anarchopterus criniger* (30 individuals from 16 sampling points), *Hippocampus zosterae* (23 individuals from 15 points), *Diplogrammus pauciradiatus* (17 individuals from 13 points), and *Opsanus beta* (11 individuals from 8 points) and were also relatively common. Six fish species (*Ctenogobius boleosoma*, *Gobiosoma grosvenori*, *Haemulon plumierii*, *Lucania parva*, *Microgobius gulosus*, and *Microgobius* spp.) were collected only once from all traps combined. Minimum and maximum lengths (SL, CL, and CW) for measured organisms are shown in Table 5.2-22.

Shrimp represented 58% of the total number of organisms captured and 45% of all taxa. Twenty-two taxa of shrimp were collected (Table 5.2-21). Seventeen of those were caridean shrimp, which were present in 69% of the traps (55 points) and accounted for approximately 53% of the total number of organisms collected. Penaeid shrimp, (mostly *Farfantepenaeus duorarum*) accounted for about 5% of the total number of organisms collected. Only four specimens of Mysid shrimp were collected in all FTTs combined.

Crabs as a group represented 26% of the total catch while comprising only 10% of the total number of taxa. Hermit crabs (order Paguroidea) were the most abundant taxa collected in the fish traps, representing 26% of all organisms collected (Table 5.2-21). Twenty-two crabs in the order Xanthoidea were also collected, being present in 18% of the throw traps. Fifteen spider crabs (order Majoidea) were collected from 19% of the traps. Portunid crabs within the genera *Portunus* and *Callinectes* were rarely captured, with only seven total collected during this sampling event.

Only three taxa of echinoderms were collected during the Fall 2011 sampling event. *Echinaster spinulosus* (order Spinulosida) was the most abundant. Fifteen of these sea stars were collected from eight sampling locations. Eleven brittle stars (order Ophiuroidea) were collected from ten sampling locations. A total of five urchins (*Lytechinus variegatus*) were collected at three different sampling locations. These three taxa represented about 2% of the total fauna collected in the throw traps.

Area BB4 had the fewest (n=172) total numbers of organisms caught by study area (Table 5.2-23). Higher numbers of organisms were collected farther north in Card Sound within Areas BB2 (n=283) and BB3 (n=324). The highest total number of organisms (n=729) was found in the northernmost study area (BB1). Species richness followed a similar pattern, with the fewest number of taxa (n=20) captured in BB4 and the most (n=29) in BB1.

When comparing distance from shore for all study areas combined, Transect *d*, located 2,000 m from shore, had the fewest organisms captured (n=135), while Transect *a*, located closest to shore, had the most (601 specimens) (Table 5.2-21).

A substantially higher number of total organisms were captured in the Fall 2011 sampling event than during previous sampling events (Table 5.2-24). Approximately 50% more organisms were captured during Fall 2011 (n=1,508) than during Spring 2011 (n=1,008), although species richness was nearly identical (49 versus 50 taxa, respectively). Thirty taxa were present during both the Spring 2011 and Fall 2011 sampling events, while the remainder were present during only one event. A much higher abundance of organisms was documented in the Fall 2011 sampling event than in the Fall 2010 sampling event. Insofar as Caridean shrimp were not taken to lower taxonomic levels during the Fall 2010 event, comparison of species richness between the two fall events is not meaningful.

5.2.2.6 Light Attenuation

Photosynthetic Photon Flux (PPF) is a unit of measure used to express the light quantum in photons of solar energy related specifically to photosynthesis and is measured with a quantum meter in units called micro-moles. Micro-moles reflect the number of photons per square meter per second. Differences in the amounts of radiation striking a meter sensor on the boat and another sensor suspended within the water column allow determination of light attenuation with depth.

Mean ambient light measurements taken at each transect ranged from 229 µmols m^{-2} sec^{-1} (BB2-*d* sub-surface) to 2,760 µmols m^{-2} sec^{-1} (BB4-*d* mid-depth), and mean bottom values ranged from 96 µmols m^{-2} sec^{-1} (BB2-*d* at 2.5 m) to 1,250 µmols m^{-2} sec^{-1} (BB1-*a* at 1 m) (Table 5.2-25). Average percent attenuation between ambient and bottom values was greater in study areas BB3 (66%) and BB4 (66%) than in BB1 (49%) and BB2 (54%). Area BB3 had the greatest mean depth (2.7 m), so the highest attenuation percent is not unexpected. BB4, however, was shallower than BB2, but also had a high mean attenuation value. Possible contributing factors include turbidity and substrate composition. BB4 had the highest turbidity values of any study area (Table 5.2-10) and was characterized as having a relatively high silty sediment component. Even small amounts of suspended silt in the water can affect the amount of light reaching the bottom.

5.2.2.7 Porewater Nutrient and Tracer Suite Sampling

Twenty-one nutrient and Tracer Suite parameters were analyzed and reported for the Fall 2011 sampling event (Table 5.2-26 and 5.2-27). Overall, there were very few notable differences among study areas and no discernible trends among transects within any study area. BB1 in southern Biscayne Bay had the highest mean concentrations of bromide (72.8 mg/L) and fluoride (0.814 mg/L), while BB4 in Barnes Sound had the highest mean concentrations of calcium (482.00 mg/L), nitrate/nitrite as nitrogen (N) (0.170 mg/L), and total Kjeldahl nitrogen (TKN) (0.640 mg/L). Although, the Card Sound areas (BB2 and BB3) had the highest concentrations of most other sampled variables, differences in mean values among areas were relatively small. Sulfides at Transect *e* in BB2 (42 mg/L) were much higher than values obtained at any other location.

5.2.2.8 Soil Sampling

Wet bulk densities ranged from 1.20 to 1.90 g/cm^3 and dry bulk densities from 0.35 to 1.40 g/cm^3 (Table 5.2-28). Area BB2 had the highest average wet bulk density (1.77 g/cm^3) for all horizons, and Area BB4 had the lowest average wet bulk density (1.59 g/cm^3). Dry bulk densities for all horizons and transects followed the same pattern, with Area BB2 having the highest (1.21 g/cm^3) and Area BB4 the lowest (0.94 g/cm^3).

TABLES

Table 5.1-1. Data and Samples Collected in October 2010, February, May, August and November 2011

Measurements	October 2010	February 2011	May 2011	August 2011	November 2011
Collect 30 cm soil cores	X				X
Conduct aerial survey			X		
Measure herbaceous plants in 1x1m subplots	X	X	X	X	X
Measure woody plant leaf turnover	X		X		X
Measure woody plants in 5x5m subplots	X		X		X
Collect leaf samples for mass and nutrient analysis	X		X		X
Estimate herbaceous plant cover in 1x1m subplots	X	X	X	X	X
Estimate woody plant cover in 5x5m subplots	X		X		X
Estimate herbaceous and woody cover in 20x20m plots	X				X
Measure surface water depth	X	X	X	X	X
Collect porewater samples for nutrient analysis	X		X		X
Collect porewater samples for tracer suite analysis	X	X	X	X	X

Table 5.1-2. Plot Location, Community Description, Dominant Vegetation in subplots in 2010 and 2011

Transect	Plot	Latitude (NE)	Longitude (NE)	Community	Herbaceous Dominant Species	Woody Dominant Species	Set Up	
							1x1	5x5
F1	1	25.43503	-80.34692	Marsh/Mangrove	*Cladium jamaicense*	*Rhizophora mangle*	Y	Y
F1	2	25.44027	-80.34042	Freshwater marsh	*C. jamaicense*	*R. mangle*	Y	Y
F2	1	25.43310	-80.35403	Freshwater marsh	*C. jamaicense*	None	Y	N
F2	2	25.43286	-80.35864	Freshwater marsh	*C. jamaicense*	*R. mangle*	Y	Y
F2	3	25.43328	-80.36346	Freshwater marsh	*C. jamaicense* *Eleocharis cellulosa*	None	Y	N
F2	4	25.41342	-80.37015	Hammock	*B. serrulatum*	*Chrysobalanus icaco* *Myrica cerifera* *R. mangle* *Conocarpus erectus*	Y	Y
F3	1	25.40840	-80.36248	Freshwater marsh	*C. jamaicense*	None	Y	N
F3	2	25.40824	-80.34716	Freshwater marsh	*C. jamaicense*	None	Y	N
F3	3	25.40806	-80.37231	Freshwater marsh	*C. jamaicense* *E. cellulosa*	None	Y	N
F3	4	25.40583	-80.37246	Hammock	*B. serrulatum* *Thelypteris sp.*	*C. icaco* *M. cerifera* *C. erectus*	Y	Y
F4	1	25.38657	-80.37074	Freshwater marsh	*C. jamaicense* *E. cellulosa*	None	Y	N
F4	2	25.38669	-80.37492	Freshwater marsh	*C. jamaicense*	None	Y	N

Table 5.1-2. Plot Location, Community Description, Dominant Vegetation in subplots in 2010 and 2011

Transect	Plot	Latitude (NE)	Longitude (NE)	Community	Herbaceous Dominant Species	Woody Dominant Species	Set Up 1x1	Set Up 5x5
F4	3	25.38655	-80.37908	Freshwater marsh	*C. jamaicense*	None	Y	N
F4	4	25.38601	-80.37723	Hammock	*B. serrulatum*	*M. cerifera* *Ilex cassine* *C. erectus*	Y	Y
F5	1	25.35570	-80.36692	Scrub mangrove	*Distichlis spicata*	*Laguncularia racemosa* *R. mangle*	Y	Y
F5	2	25.35304	-80.35600	Scrub mangrove	*D. spicata* *Juncus roemerianus*	*R. mangle*	Y	Y
F6	1	25.35469	-80.43848	Freshwater marsh	*C. jamaicense* *E. cellulosa*	None	Y	N
F6	2	25.34966	-80.43619	Freshwater marsh	*C. jamaicense* *E. cellulosa*	None	Y	N
F6	3	25.34413	-80.43097	Freshwater marsh	*C. jamaicense* *E. cellulosa*	*C. erectus*	Y	N
F6	4	25.37166	-80.44778	Hammock	*B. serrulatum* *Peltandra virginica*	*C. icaco* *I. cassine* *M. cerifera* *M. virginiana*	Y	Y
M1	1	25.44296	-80.33598	Scrub mangrove	None	*R. mangle*	N	Y
M1	2	25.44716	-80.33269	Scrub mangrove	None	*R. mangle*	N	Y
M2	1	25.40535	-80.33070	Scrub mangrove	None	*R. mangle*	N	Y
M2	2	25.40521	-80.32990	Scrub mangrove	None	*R. mangle*	N	Y

Table 5.1-2. Plot Location, Community Description, Dominant Vegetation in subplots in 2010 and 2011

Transect	Plot	Latitude (NE)	Longitude (NE)	Community	Herbaceous Dominant Species	Woody Dominant Species	Set Up	
							1x1	5x5
M3	1	25.38628	-80.33083	Scrub mangrove	None	*R. mangle*	N	Y
M3	2	25.38450	-80.32794	Scrub mangrove	None	*R. mangle*	N	Y
M4	1	25.35630	-80.33138	Scrub mangrove	None	*R. mangle*	N	Y
M4	2	25.34568	-80.32911	Scrub mangrove	None	*R. mangle*	N	Y
M5	1	25.35186	-80.35543	Scrub mangrove	*D. spicata*	*R. mangle* *Avicennia germinans*	Y	Y
M5	2	25.34507	-80.33381	Scrub mangrove	None	*R. mangle*	Y	Y
M6	1	25.29448	-80.39633	Scrub mangrove	None	*R. mangle*	N	Y
M6	2	25.29305	-80.39538	Scrub mangrove	None	*R. mangle*	N	Y

Table 5.1-3. Species and Individuals Counted in Subplots for Shannon-Wiener Index of Diversity Calculations. In the marsh plots, all plants were counted in the northeast 1x1 (1 m^2) subplot; similarly the northeast 5x5 (25 m^2) was counted for the mangrove plots.

Community Type	Plot	Species Present	# of Individuals
Marsh	F2-1	Sawgrass	69
		Gulf Coast spikerush	2
	F2-2	Red mangrove	2
		Sawgrass	39
	F2-3	Sawgrass	34
		Gulf Coast spikerush	2
	F3-1	Sawgrass	31
		Gulf Coast spikerush	20
	F3-2	Sawgrass	24
		Saltmarsh morning glory	2
	F3-3	Sawgrass	10
		Gulf Coast spikerush	37
	F4-1	Sawgrass	67
	F4-2	Sawgrass	36
	F4-3	Sawgrass	39
	F6-1	Sawgrass	47
	F6-2	Sawgrass	42
		Gulf Coast spikerush	31
	F6-3	Sawgrass	61
Brackish marsh-mangrove	F1-1	Red mangrove	16
		Sawgrass	39
	F1-2	Red mangrove	10
		Sawgrass	69
		Buttonwood	1
	F5-1	Red mangrove	34
		White mangrove	129
	F5-2	Red mangrove	153
		Saltgrass	53
		Needlegrass rush	9
		Sea oxeye	7

Table 5.1-3. Species and Individuals Counted in Subplots for Shannon-Wiener Index of Diversity Calculations. In the marsh plots, all plants were counted in the northeast 1x1 (1 m^2) subplot; similarly the northeast 5x5 (25 m^2) was counted for the mangrove plots.

Community Type	Plot	Species Present	# of Individuals
Mangrove	M1-1	Red mangrove	515
	M1-2	Red mangrove	151
		White mangrove	1
	M2-1	Red mangrove	18
	M2-2	Red mangrove	300
		Black mangrove	8
	M3-1	Red mangrove	53
	M3-2	Red mangrove	21
	M4-1	Red mangrove	21
	M4-2	Red mangrove	70
		Black mangrove	1
	M5-1	Red mangrove	299
		Black mangrove	6
		Saltgrass	19
	M5-2	Red mangrove	36
	M6-1	Red mangrove	18
	M6-2	Red mangrove	58

Table 5.1-4. Shannon-Wiener Index Calculated Values for Plots and Transects

Community Type	Transect	Plot	Species Count		Shannon-Wiener Index		Species Evenness	
			Per Plot	Per Transect	Per Plot	Per Transect	Per Plot	Per Transect
Marsh	F2	F2-1	2	3	0.128	0.670	0.185	0.609
		F2-2	2		0.195		0.281	
		F2-3	2		0.215		0.310	
	F3	F3-1	2	3	0.670	0.762	0.966	0.694
		F3-2	2		0.271		0.391	
		F3-3	2		0.518		0.747	
	F4	F4-1	1	1	0.000	N/A	N/A	N/A
		F4-2	1		0.000		N/A	
		F4-3	1		0.000		N/A	
	F6	F6-1	1	2	0.000	0.458	N/A	0.661
		F6-2	2		0.682		0.984	
		F6-3	3		0.000		N/A	
Marsh-Mangrove	F1	F1-1	2	3	0.603	0.532	0.870	0.484
		F1-2	3		0.442		0.403	
	F5	F5-1	2	5	0.512	1.151	0.739	0.715
		F5-2	4		0.837		0.604	
Mangrove	M1	M1-1	1	2	0.000	0.011	N/A	0.002
		M1-2	2		0.040		0.057	
	M2	M2-1	1	2	0.000	0.115	N/A	0.020
		M2-2	2		0.120		0.174	
	M3	M3-1	1	1	0.000	N/A	N/A	N/A
		M3-2	1		0.000		N/A	
	M4	M4-1	1	2	0.000	0.060	N/A	0.013
		M4-2	2		0.074		0.563	
	M5	M5-1	3	3	0.314	0.290	0.453	0.049
		M5-2	1		0.000		N/A	
	M6	M6-1	1	1	0.000	N/A	N/A	N/A
		M6-2	1		0.000		N/A	

Key:

N/A = Not applicable as the transect only had 1 species.

Table 5.1-5. Average Sawgrass Cover per Plot and Transect for Each Quarter

Transect	Plot ID	Average Cover Per Plot					Average Cover Per Transect				
		Oct-10	Feb-11	May-11	Aug-11	Nov-11	Aug-11	Nov-11	May-11	Aug-11	Nov-11
F1	F1-1	2-5%	6-25%	6-25%	2-5%	2-5%	6-25%	6-25%	6-25%	6-25%	2-5%
	F1-2	6-25%	6-25%	6-25%	6-25%	2-5%					
F2	F2-1	6-25%	6-25%	6-25%	6-25%	6-25%	6-25%	6-25%	6-25%	6-25%	2-5%
	F2-2	6-25%	6-25%	6-25%	2-5%	2-5%					
	F2-3	6-25%	6-25%	6-25%	2-5%	2-5%					
F3	F3-1	2-5%	6-25%	2-5%	2-5%	2-5%	6-25%	6-25%	6-25%	2-5%	2-5%
	F3-2	6-25%	6-25%	6-25%	2-5%	2-5%					
	F3-3	6-25%	6-25%	6-25%	2-5%	2-5%					
F4	F4-1	6-25%	6-25%	6-25%	6-25%	6-25%	6-25%	6-25%	6-25%	6-25%	2-5%
	F4-2	6-25%	2-5%	6-25%	6-25%	2-5%					
	F4-3	2-5%	6-25%	6-25%	2-5%	2-5%					
F6	F6-1	6-25%	6-25%	6-25%	2-5%	2-5%	6-25%	6-25%	6-25%	2-5%	2-5%
	F6-2	6-25%	6-25%	6-25%	2-5%	2-5%					
	F6-3	6-25%	6-25%	6-25%	2-5%	2-5%					

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Table 5.1-6. Average Sawgrass Height per Plot and Transect for August and November 2011

Transect	Plot ID	Average Height (cm)							
		August 2011				November 2011			
		Plot	Std. Error	Transect	Std. Error	Plot	Std. Error	Transect	Std. Error
F1	F1-1	87.5	2.3	95.5	1.8	87.9	2.2	95.2	1.9
	F1-2	102.6	2.4			101.9	2.7		
F2	F2-1	80.6	1.6	76.0	1.1	81.7	1.7	77.4	1.2
	F2-2	74.9	2.4			76.7	2.6		
	F2-3	70.9	1.6			71.6	1.9		
F3	F3-1	60.2	1.5	73.6	1.6	64.3	1.6	72.9	1.6
	F3-2	67.7	1.6			68.2	1.8		
	F3-3	94.0	2.9			86.3	3.4		
F4	F4-1	108.8	2.3	85.7	1.8	110.3	2.6	87.5	1.9
	F4-2	68.1	1.6			71.8	2.7		
	F4-3	76.4	2.1			76.6	1.8		
F6	F6-1	85.6	1.9	74.9	1.4	83.1	2.5	75.8	1.2
	F6-2	72.2	2.6			73.1	1.9		
	F6-3	67.3	1.7			70.4	1.3		

Table 5.1-7. Sawgrass Biomass Equations for Each Season

Season	Model	R^2	p-Value	N
Wet	Biomass = -1.13718 + 0.71677(cdb2)^2 + 0.0002799(LLL)^2 + 0.06467(NoLL)^2 + 1.459(cdb1)^2	0.90	0.0000	168
Dry	Biomass=-0.63058 + 3.47639(cdb2)^2 + 0.0002671(LLL)^2 + 0.70457(cdb1)^2	0.91	0.0582	162

Key:
- cdb1 = Culm diameter at base 1.
- cdb2 = Culm diameter at base 2.
- LLL = Longest live leaf.
- N = Sample size.
- NoLL = Number of live leaves.

Table 5.1-8. Average Red Mangrove Height per Plot and Transect for October 2010, and May and November 2011

		Average Height (cm)											
		October 2010				May 2011				November 2011			
Transect	Plot	Plot	Std. Error	Transect	Std. Error	Plot	Std. Error	Transect	Std. Error	Plot	Std. Error	Transect	Std. Error
F1	F1-1	113	6.5	100	4.9	112	5.9	99	4.7	115	6.6	101	5.1
	F1-2	90	3.3			84	3.6			84	3.7		
F5	F5-1	83	21.4	66	7.9	81	13.9	65	7.4	77	16.5	65	6.7
	F5-2	59	6.6			58	6.2			60	6.5		
M1	M1-1	72	2.3	78	2.5	71	2.0	79	2.5	73	2.0	79	2.7
	M1-2	85	3.6			86	3.5			86	3.9		
M2	M2-1	89	5.0	79	3.3	87	4.5	77	3.3	87	4.4	78	3.0
	M2-2	70	2.2			67	2.2			69	1.9		
M3	M3-1	85	4.9	91	4.5	81	4.0	89	4.3	82	4.0	89	4.4
	M3-2	97	7.4			98	7.0			96	7.4		
M4	M4-1	83	6.7	83	4.3	79	6.1	81	4.3	79	5.6	80	4.0
	M4-2	84	5.8			83	6.1			82	5.9		
M5	M5-1	59	3.2	86	6.5	58	3.0	85	6.4	60	3.4	86	6.4
	M5-2	112	5.6			110	5.5			111	5.9		
M6	M6-1	103	5.7	97	4.7	100	5.6	94	4.2	104	5.7	99	4.2
	M6-2	90	7.3			89	5.9			94	6.2		

Table 5.1-9. Percent Cover of Red Mangroves in the Plots and Transects for October 2010, and May and November 2011

Transect	Plot	Average Cover Per Plot			Average Cover Per Transect		
		October 2010	May 2011	November 2011	October 2010	May 2011	November 2011
F1	F1-1	26-50%	26-50%	6-25%	6-25%	6-25%	6-25%
	F1-2	6-25%	2-5%	2-5%			
F5	F5-1	6-25%	6-25%	6-25%	26-50%	6-25%	6-25%
	F5-2	26-50%	6-25%	6-25%			
M1	M1-1	26-50%	26-50%	26-50%	26-50%	26-50%	26-50%
	M1-2	26-50%	26-50%	26-50%			
M2	M2-1	6-25%	6-25%	6-25%	26-50%	6-25%	6-25%
	M2-2	26-50%	26-50%	26-50%			
M3	M3-1	26-50%	26-50%	6-25%	26-50%	6-25%	6-25%
	M3-2	6-25%	6-25%	6-25%			
M4	M4-1	26-50%	6-25%	6-25%	26-50%	6-25%	6-25%
	M4-2	26-50%	26-50%	6-25%			
M5	M5-1	6-25%	6-25%	6-25%	6-25%	6-25%	6-25%
	M5-2	6-25%	26-50%	6-25%			
M6	M6-1	2-5%	6-25%	6-25%	2-5%	6-25%	6-25%
	M6-2	6-25%	6-25%	6-25%			

Table 5.1-10. Red Mangrove Biomass for October 2010, and May and November 2011

Transect	Plot	Units (Tons/ha)					
		October 2010	May 2011	November 2011	October 2010	May 2011	November 2011
F1	F1-1	9.17	9.12	7.15	10.24	9.60	7.66
	F1-2	1.07	0.48	0.51			
F2	F2-2	0.04	0.04	0.00	-	-	-
F5	F5-1	19.26	10.56	15.61	26.61	12.84	17.02
	F5-2	7.35	2.28	1.41			
M1	M1-1	22.66	17.38	22.45	65.41	56.97	61.96
	M1-2	42.75	39.59	39.50			
M2	M2-1	6.68	4.93	5.46	47.41	28.62	29.15
	M2-2	40.73	23.68	23.70			
M3	M3-1	15.32	9.84	11.14	18.38	13.03	14.35
	M3-2	3.06	3.20	3.21			
M4	M4-1	7.90	6.06	6.50	19.48	17.81	16.60
	M4-2	11.59	11.75	10.11			
M5	M5-1	50.94	26.60	25.55	62.61	37.57	34.14
	M5-2	11.68	10.98	8.59			
M6	M6-1	8.02	9.13	7.51	13.97	15.42	14.66
	M6-2	5.95	6.29	7.16			

Key:
ha = Hectares.

Table 5.1-11. Sawgrass Leaf Sclerophylly for November 2011

Transect	Plot	Subplot	Leaf	2nd Live Leaf Length (cm)	Width (cm)	Dry Mass (g)	Area (cm^2)	Sclerophylly (g/m^2)
F1	1	1.1	A	53.0	0.7	0.315	18.55	1.70
	1	1.1	B	86.5	0.6	0.451	25.95	1.74
	1	1.1	C	104.0	1.0	1.017	52.00	1.96
	1	1.2	A	67.5	0.8	0.504	27.00	1.87
	1	1.2	B	84.0	1.5	0.655	63.00	1.04
	1	1.2	C	93.0	2.0	0.913	93.00	0.98
	1	1.4	A	81.0	0.7	0.633	28.35	2.23
	1	1.4	B	79.5	1.2	0.729	47.70	1.53
	1	1.4	C	76.0	0.9	0.674	34.20	1.97
F1	2	1.1	A	97.5	1.4	1.040	68.25	1.52
	2	1.1	B	44.5	0.5	0.258	11.13	2.32
	2	1.1	C	82.5	1.3	0.503	53.63	0.94
	2	1.2	A	61.0	0.9	0.343	27.45	1.25
	2	1.2	B	86.0	1.1	0.771	47.30	1.63
	2	1.2	C	60.0	1.4	0.558	42.00	1.33
	2	1.3	A	86.0	1.1	0.455	47.30	0.96
	2	1.3	B	93.5	1.6	0.802	74.80	1.07
	2	1.3	C	66.5	0.7	0.325	23.28	1.40
	2	1.4	A	92.0	0.8	0.811	36.80	2.20
	2	1.4	B	81.0	0.7	0.495	28.35	1.75
	2	1.4	C	118.0	1.1	0.821	64.90	1.27
F2	1	1.1	A	76.5	1.4	0.408	53.55	0.76
	1	1.1	B	70.5	1.6	0.588	56.40	1.04
	1	1.1	C	63.8	0.5	0.399	15.95	2.50
	1	1.2	A	75.8	0.9	0.338	34.11	0.99
	1	1.2	B	79.9	1.2	0.485	47.94	1.01
	1	1.2	C	105.4	1.7	0.956	89.59	1.07
	1	1.3	A	80.9	0.9	0.461	36.41	1.27
	1	1.3	B	122.0	2.0	1.269	122.00	1.04
	1	1.3	C	90.0	1.1	0.486	49.50	0.98
	1	1.4	A	72.2	0.7	0.412	25.27	1.63
	1	1.4	B	74.5	1.0	0.558	37.25	1.50
	1	1.4	C	90.5	1.4	0.625	63.35	0.99
F2	2	1.1	A	72.5	1.5	0.524	54.38	0.96
	2	1.1	B	60.1	0.6	0.349	18.03	1.94
	2	1.1	C	63.5	1.6	0.900	50.80	1.77
	2	1.2	A	86.4	1.3	0.644	56.16	1.15

Table 5.1-11. Sawgrass Leaf Sclerophylly for November 2011

Transect	Plot	Subplot	Leaf	2nd Live Leaf Length (cm)	Width (cm)	Dry Mass (g)	Area (cm^2)	Sclerophylly (g/m^2)
	2	1.2	B	64.4	0.5	0.322	16.10	2.00
	2	1.2	C	66.8	1.0	0.503	33.40	1.51
	2	1.3	A	73.0	1.5	0.744	54.75	1.36
	2	1.3	B	81.0	0.6	0.569	24.30	2.34
	2	1.3	C	78.8	1.3	0.679	51.22	1.33
	2	1.4	A	54.0	0.7	0.388	18.90	2.05
	2	1.4	B	84.0	1.2	0.560	50.40	1.11
	2	1.4	C	61.5	0.5	0.229	15.38	1.49
F2	3	1.1	A	73.0	1.3	0.524	47.45	1.10
	3	1.1	B	69.0	1.6	0.534	55.20	0.97
	3	1.1	C	65.5	1.6	0.438	52.40	0.84
	3	1.2	A	31.0	0.4	0.086	6.20	1.39
	3	1.2	B	62.5	0.5	0.280	15.63	1.79
	3	1.2	C	63.0	0.7	0.349	22.05	1.58
	3	1.3	A	99.5	1.9	1.112	94.53	1.18
	3	1.3	B	48.0	0.5	0.290	12.00	2.42
	3	1.3	C	69.5	0.7	0.437	24.33	1.80
	3	1.4	A	70.0	1.1	0.352	38.50	0.91
	3	1.4	B	82.5	0.8	0.564	33.00	1.71
	3	1.4	C	76.5	1.5	0.679	57.38	1.18
F3	1	1.1	A	63.5	1.2	0.386	38.10	1.01
	1	1.1	B	49.5	1.0	0.340	24.75	1.37
	1	1.1	C	71.0	1.5	0.612	53.25	1.15
	1	1.2	A	45.0	1.7	0.408	38.25	1.07
	1	1.2	B	58.0	1.2	0.463	34.80	1.33
	1	1.2	C	71.0	0.6	0.510	21.30	2.39
	1	1.3	A	37.0	1.0	0.226	18.50	1.22
	1	1.3	B	82.0	2.0	0.790	82.00	0.96
	1	1.3	C	67.5	1.1	0.737	37.13	1.99
	1	1.4	A	65.0	1.2	0.392	39.00	1.01
	1	1.4	B	56.5	1.3	0.639	36.73	1.74
	1	1.4	C	64.0	0.5	0.143	16.00	0.89
F3	2	1.1	A	50.0	0.6	0.269	15.00	1.79
	2	1.1	B	89.0	0.9	0.414	40.05	1.03
	2	1.1	C	51.0	1.1	0.476	28.05	1.70
	2	1.2	A	73.0	1.1	0.489	40.15	1.22

Table 5.1-11. Sawgrass Leaf Sclerophylly for November 2011

Transect	Plot	Subplot	Leaf	2nd Live Leaf				
				Length (cm)	Width (cm)	Dry Mass (g)	Area (cm^2)	Sclerophylly (g/m^2)
	2	1.2	B	69.5	1.5	0.577	52.13	1.11
	2	1.2	C	61.0	1.6	0.628	48.80	1.29
	2	1.3	A	74.0	0.5	0.342	18.50	1.85
	2	1.3	B	87.0	1.4	0.654	60.90	1.07
	2	1.3	C	57.0	1.2	0.447	34.20	1.31
	2	1.4	A	66.0	1.1	0.482	36.30	1.33
	2	1.4	B	81.0	1.1	0.597	44.55	1.34
	2	1.4	C	77.5	1.2	0.485	46.50	1.04
F3	3	1.1	A	75.5	1.3	0.490	49.08	1.00
	3	1.1	B	74.0	1.2	0.526	44.40	1.18
	3	1.1	C	91.5	2.0	0.861	91.50	0.94
	3	1.2	A	86.5	1.2	0.486	51.90	0.94
	3	1.2	B	87.5	1.4	0.703	61.25	1.15
	3	1.2	C	75.0	1.3	0.595	48.75	1.22
	3	1.3	A	71.0	1.0	0.341	35.50	0.96
	3	1.3	B	78.5	1.1	0.565	43.18	1.31
	3	1.3	C	84.0	0.6	0.462	25.20	1.83
	3	1.4	A	64.0	1.2	0.496	38.40	1.29
	3	1.4	B	64.0	1.8	0.734	57.60	1.27
	3	1.4	C	67.0	0.7	0.352	23.45	1.50
F4	1	1.1	A	101.8	1.5	0.881	76.35	1.15
	1	1.1	B	139.2	0.4	0.498	27.84	1.79
	1	1.1	C	139.2	0.9	0.927	62.64	1.48
	1	1.2	A	115.8	2.1	1.514	121.59	1.25
	1	1.2	B	67.9	0.6	0.510	20.37	2.50
	1	1.2	C	91.3	0.8	0.776	36.52	2.12
	1	1.3	A	107.7	1.7	0.947	91.55	1.03
	1	1.3	B	123.0	0.5	0.600	30.75	1.95
	1	1.3	C	85.6	0.4	0.395	17.12	2.31
	1	1.4	A	105.1	0.8	0.871	42.04	2.07
	1	1.4	B	157.2	0.9	1.090	70.74	1.54
	1	1.4	C	135.8	1.4	1.255	95.06	1.32
F4	2	1.1	A	65.6	0.7	0.395	22.96	1.72

Table 5.1-11. Sawgrass Leaf Sclerophylly for November 2011

Transect	Plot	Subplot	Leaf	2nd Live Leaf Length (cm)	Width (cm)	Dry Mass (g)	Area (cm^2)	Sclerophylly (g/m^2)
	2	1.1	B	70.6	0.8	0.357	28.24	1.26
	2	1.1	C	69.0	0.7	0.443	24.15	1.83
	2	1.2	A	59.0	0.5	0.200	14.75	1.36
	2	1.2	B	75.1	1.1	0.591	41.31	1.43
	2	1.2	C	80.2	1.3	1.208	52.13	2.32
	2	1.3	A	85.3	1.1	0.599	46.92	1.28
	2	1.3	B	69.0	1.2	0.575	41.40	1.39
	2	1.3	C	98.6	1.0	0.983	49.30	1.99
	2	1.4	A	67.0	1.1	0.449	36.85	1.22
	2	1.4	B	86.4	1.0	0.719	43.20	1.66
	2	1.4	C	73.8	1.3	0.617	47.97	1.29
F4	3	1.1	A	91.2	1.6	0.783	72.96	1.07
	3	1.1	B	70.7	0.8	0.659	28.28	2.33
	3	1.1	C	71.6	1.9	0.906	68.02	1.33
	3	1.2	A	82.2	1.1	0.657	45.21	1.45
	3	1.2	B	82.3	1.0	0.745	41.15	1.81
	3	1.2	C	72.4	1.4	0.580	50.68	1.14
	3	1.3	A	58.4	1.4	0.317	40.88	0.78
	3	1.3	B	80.9	1.1	0.734	44.50	1.65
	3	1.3	C	70.9	1.4	0.687	49.63	1.38
	3	1.4	A	79.9	0.7	0.512	27.97	1.83
	3	1.4	B	76.7	0.8	0.648	30.68	2.11
	3	1.4	C	80.7	0.9	0.600	36.32	1.65
F6	1	1.1	A	82.8	1.4	0.840	57.96	1.45
	1	1.1	B	66.8	1.0	0.364	33.40	1.09
	1	1.1	C	81.4	1.7	0.890	69.19	1.29
	1	1.2	A	74.0	1.7	0.992	62.90	1.58
	1	1.2	B	110.5	1.8	1.029	99.45	1.03
	1	1.2	C	66.3	1.5	0.485	49.73	0.98
	1	1.3	A	67.8	1.2	0.333	40.68	0.82
	1	1.3	B	74.2	1.1	0.518	40.81	1.27
	1	1.3	C	82.7	1.3	0.764	53.76	1.42
	1	1.4	A	107.5	1.3	0.753	69.88	1.08

Table 5.1-11. Sawgrass Leaf Sclerophylly for November 2011

Transect	Plot	Subplot	Leaf	2nd Live Leaf				
				Length (cm)	Width (cm)	Dry Mass (g)	Area (cm^2)	Sclerophylly (g/m^2)
	1	1.4	B	112.4	1.5	1.003	84.30	1.19
	1	1.4	C	102.3	1.5	0.808	76.73	1.05
F6	2	1.1	A	75.0	1.2	0.425	45.00	0.94
	2	1.1	B	70.7	1.5	0.601	53.03	1.13
	2	1.1	C	70.5	1.1	0.562	38.78	1.45
	2	1.2	A	77.0	0.5	0.634	19.25	3.29
	2	1.2	B	73.5	1.2	0.497	44.10	1.13
	2	1.2	C	73.0	1.1	0.520	40.15	1.30
	2	1.3	A	91.0	1.1	0.526	50.05	1.05
	2	1.3	B	56.5	0.9	0.244	25.43	0.96
	2	1.3	C	90.5	1.2	0.927	54.30	1.71
	2	1.4	A	79.5	1.3	0.625	51.68	1.21
	2	1.4	B	81.0	0.8	0.345	32.40	1.06
	2	1.4	C	78.5	1.1	0.406	43.18	0.94
F6	3	1.1	A	66.0	0.6	0.424	19.80	2.14
	3	1.1	B	77.5	1.5	0.520	58.13	0.89
	3	1.1	C	80.0	1.5	0.598	60.00	1.00
	3	1.2	A	72.5	1.4	0.611	50.75	1.20
	3	1.2	B	78.0	1.5	0.627	58.50	1.07
	3	1.2	C	70.5	1.0	0.448	35.25	1.27
	3	1.3	A	71.0	0.7	0.595	24.85	2.39
	3	1.3	B	78.0	0.7	0.475	27.30	1.74
	3	1.3	C	68.0	0.8	0.576	27.20	2.12
	3	1.4	A	51.5	0.8	0.453	20.60	2.20
	3	1.4	B	81.0	1.0	0.635	40.50	1.57
	3	1.4	C	74.0	1.0	0.746	37.00	2.02

Table 5.1-12. Red Mangrove Leaf Sclerophylly for November 2011

Transect	Plot	Subplot	Leaf	Species	Dry Mass (g)	Area (cm^2)	Sclerophylly (g/m^2)
M1	1	5.1	A	Red mangrove	0.495	21.794	2.27
	1	5.1	B	Red mangrove	0.467	22.805	2.05
	1	5.1	C	Red mangrove	0.768	34.577	2.22
	1	5.2	A	Red mangrove	0.15	8.998	1.67
	1	5.2	B	Red mangrove	0.291	15.039	1.93
	1	5.2	C	Red mangrove	0.698	24.575	2.84
	1	5.3	A	Red mangrove	0.353	17.059	2.07
	1	5.3	B	Red mangrove	0.461	21.941	2.10
	1	5.3	C	Red mangrove	0.441	18.311	2.41
	1	5.4	A	Red mangrove	0.411	17.875	2.30
	1	5.4	B	Red mangrove	0.329	15.346	2.14
	1	5.4	C	Red mangrove	0.503	24.961	2.02
M1	2	5.1	A	Red mangrove	0.404	19.424	2.08
	2	5.1	B	Red mangrove	0.426	21.032	2.03
	2	5.1	C	Red mangrove	0.548	28.415	1.93
	2	5.2	A	Red mangrove	0.304	11.329	2.68
	2	5.2	B	Red mangrove	0.315	15.324	2.06
	2	5.2	C	Red mangrove	0.498	24.212	2.06
	2	5.3	A	Red mangrove	0.328	12.679	2.59
	2	5.3	B	Red mangrove	0.256	11.850	2.16
	2	5.3	C	Red mangrove	0.451	18.728	2.41
	2	5.4	A	Red mangrove	0.279	13.815	2.02
	2	5.4	B	Red mangrove	0.493	24.144	2.04
	2	5.4	C	Red mangrove	0.571	26.711	2.14
M2	1	5.1	A	Red mangrove	0.176	7.478	2.35
	1	5.1	B	Red mangrove	0.279	11.370	2.45
	1	5.1	C	Red mangrove	0.355	13.660	2.60
	1	5.2	A	Red mangrove	0.376	13.560	2.77
	1	5.2	B	Red mangrove	0.423	18.021	2.35
	1	5.2	C	Red mangrove	0.478	18.528	2.58
	1	5.3	A	Red mangrove	0.341	13.825	2.47
	1	5.3	B	Red mangrove	0.337	15.098	2.23
	1	5.3	C	Red mangrove	0.322	14.174	2.27
	1	5.4	A	Red mangrove	0.418	16.276	2.57

Table 5.1-12. Red Mangrove Leaf Sclerophylly for November 2011

Transect	Plot	Subplot	Leaf	Species	Dry Mass (g)	Area (cm^2)	Sclerophylly (g/m^2)
	1	5.4	B	Red mangrove	0.456	20.395	2.24
	1	5.4	C	Red mangrove	0.686	25.144	2.73
M2	2	5.1	A	Red mangrove	0.486	23.750	2.05
	2	5.1	B	Red mangrove	0.569	23.891	2.38
	2	5.1	C	Red mangrove	0.648	27.359	2.37
	2	5.2	A	Red mangrove	0.39	14.115	2.76
	2	5.2	B	Red mangrove	0.31	14.366	2.16
	2	5.2	C	Red mangrove	0.724	26.449	2.74
	2	5.3	A	Red mangrove	0.43	15.648	2.75
	2	5.3	B	Red mangrove	0.47	17.214	2.73
	2	5.3	C	Red mangrove	0.449	17.853	2.51
	2	5.4	A	Red mangrove	0.298	13.478	2.21
	2	5.4	B	Red mangrove	0.481	22.974	2.09
	2	5.4	C	Red mangrove	0.741	28.958	2.56
M3	1	5.1	A	Red mangrove	0.439	18.453	2.38
	1	5.1	B	Red mangrove	0.388	21.891	1.77
	1	5.1	C	Red mangrove	0.578	23.474	2.46
	1	5.2	A	Red mangrove	0.265	10.496	2.52
	1	5.2	B	Red mangrove	0.54	14.738	3.66
	1	5.2	C	Red mangrove	0.607	23.611	2.57
	1	5.3	A	Red mangrove	0.304	13.066	2.33
	1	5.3	B	Red mangrove	0.346	18.323	1.89
	1	5.3	C	Red mangrove	0.37	25.387	1.46
	1	5.4	A	Red mangrove	0.227	9.421	2.41
	1	5.4	B	Red mangrove	0.445	18.743	2.37
	1	5.4	C	Red mangrove	0.46	20.986	2.19
M3	2	5.1	A	Red mangrove	0.372	15.595	2.39
	2	5.1	B	Red mangrove	0.396	18.583	2.13
	2	5.1	C	Red mangrove	0.487	20.199	2.41
	2	5.2	A	Red mangrove	0.358	15.422	2.32
	2	5.2	B	Red mangrove	0.677	26.974	2.51
	2	5.2	C	Red mangrove	0.403	18.180	2.22
	2	5.3	A	Red mangrove	0.307	12.723	2.41

Table 5.1-12. Red Mangrove Leaf Sclerophylly for November 2011

Transect	Plot	Subplot	Leaf	Species	Dry Mass (g)	Area (cm^2)	Sclerophylly (g/m^2)
	2	5.3	B	Red mangrove	0.406	15.553	2.61
	2	5.3	C	Red mangrove	0.568	17.970	3.16
	2	5.4	A	Red mangrove	0.25	11.089	2.25
	2	5.4	B	Red mangrove	0.304	13.711	2.22
	2	5.4	C	Red mangrove	0.569	26.429	2.15
M4	1	5.1	A	Red mangrove	0.282	13.799	2.04
	1	5.1	B	Red mangrove	0.35	16.661	2.10
	1	5.1	C	Red mangrove	0.51	18.263	2.79
	1	5.2	A	Red mangrove	0.399	20.787	1.92
	1	5.2	B	Red mangrove	0.366	17.070	2.14
	1	5.2	C	Red mangrove	0.609	27.331	2.23
	1	5.3	A	Red mangrove	0.233	11.141	2.09
	1	5.3	B	Red mangrove	0.314	17.440	1.80
	1	5.3	C	Red mangrove	0.346	17.621	1.96
	1	5.4	A	Red mangrove	0.528	16.707	3.16
	1	5.4	B	Red mangrove	0.572	20.971	2.73
	1	5.4	C	Red mangrove	0.446	23.940	1.86
M4	2	5.1	A	Red mangrove	0.377	18.514	2.04
	2	5.1	B	Red mangrove	0.415	20.433	2.03
	2	5.1	C	Red mangrove	0.458	24.281	1.89
	2	5.2	A	Red mangrove	0.127	6.422	1.98
	2	5.2	B	Red mangrove	0.314	16.891	1.86
	2	5.2	C	Red mangrove	0.653	23.000	2.84
	2	5.3	A	Red mangrove	0.219	10.343	2.12
	2	5.3	B	Red mangrove	0.273	14.456	1.89
	2	5.3	C	Red mangrove	0.523	24.169	2.16
	2	5.4	A	Red mangrove	0.39	14.565	2.68
	2	5.4	B	Red mangrove	0.398	19.345	2.06
	2	5.4	C	Red mangrove	0.533	24.066	2.21
M5	1	5.1	A	Red mangrove	0.23	8.936	2.57
	1	5.1	B	Red mangrove	0.592	19.020	3.11
	1	5.1	C	Red mangrove	0.774	26.219	2.95
	1	5.2	A	Red mangrove	0.401	13.791	2.91

Table 5.1-12. Red Mangrove Leaf Sclerophylly for November 2011

Transect	Plot	Subplot	Leaf	Species	Dry Mass (g)	Area (cm^2)	Sclerophylly (g/m^2)
	1	5.2	B	Red mangrove	0.367	13.147	2.79
	1	5.2	C	Red mangrove	0.338	11.484	2.94
	1	5.3	A	Red mangrove	0.363	12.470	2.91
	1	5.3	B	Red mangrove	0.433	15.218	2.85
	1	5.3	C	Red mangrove	0.452	15.140	2.99
	1	5.4	A	Black mangrove	0.113	3.684	3.07
	1	5.4	B	Black mangrove	0.15	9.139	1.64
	1	5.4	C	Black mangrove	0.242	11.959	2.02
	1	5.4	A	Red mangrove	0.144	8.017	1.80
	1	5.4	B	Red mangrove	0.392	15.239	2.57
	1	5.4	C	Red mangrove	0.309	17.534	1.76
M5	2	5.1	A	Red mangrove	0.237	12.479	1.90
	2	5.1	B	Red mangrove	0.383	19.058	2.01
	2	5.1	C	Red mangrove	0.422	18.258	2.31
	2	5.2	A	Red mangrove	0.358	13.548	2.64
	2	5.2	B	Red mangrove	0.519	23.413	2.22
	2	5.2	C	Red mangrove	0.564	23.397	2.41
	2	5.3	A	Red mangrove	0.386	17.257	2.24
	2	5.3	B	Red mangrove	0.428	19.900	2.15
	2	5.3	C	Red mangrove	0.615	25.865	2.38
	2	5.4	A	Red mangrove	0.487	21.408	2.27
	2	5.4	B	Red mangrove	0.385	17.621	2.18
	2	5.4	C	Red mangrove	0.432	21.167	2.04
M6	1	5.1	A	Red mangrove	0.375	15.724	2.38
	1	5.1	B	Red mangrove	0.380	17.706	2.15
	1	5.1	C	Red mangrove	0.563	25.272	2.23
	1	5.2	A	Red mangrove	0.318	14.954	2.13
	1	5.2	B	Red mangrove	0.359	15.103	2.38
	1	5.2	C	Red mangrove	0.418	17.885	2.34
	1	5.3	A	Red mangrove	0.550	18.829	2.92
	1	5.3	B	Red mangrove	0.361	18.239	1.98
	1	5.3	C	Red mangrove	0.442	19.523	2.26
	1	5.4	A	Red mangrove	0.325	13.417	2.42
	1	5.4	B	Red mangrove	0.329	14.416	2.28

Table 5.1-12. Red Mangrove Leaf Sclerophylly for November 2011

Transect	Plot	Subplot	Leaf	Species	Dry Mass (g)	Area (cm^2)	Sclerophylly (g/m^2)
	1	5.4	C	Red mangrove	0.520	20.995	2.48
M6	2	5.1	A	Red mangrove	0.294	11.037	2.66
	2	5.1	B	Red mangrove	0.521	20.684	2.52
	2	5.1	C	Red mangrove	0.514	23.839	2.16
	2	5.2	A	Red mangrove	0.434	15.866	2.74
	2	5.2	B	Red mangrove	0.677	20.875	3.24
	2	5.2	C	Red mangrove	0.604	26.003	2.32
	2	5.3	A	Red mangrove	0.472	19.948	2.37
	2	5.3	B	Red mangrove	0.578	25.084	2.30
	2	5.3	C	Red mangrove	0.493	20.287	2.43
	2	5.4	A	Red mangrove	0.412	17.766	2.32
	2	5.4	B	Red mangrove	0.375	16.761	2.24
	2	5.4	C	Red mangrove	0.689	31.255	2.20

Key:
cm^2 = Square centimeter.
g = Gram.
g/m^2 = Gram per square meter.

Table 5.1-13. Average Specific Conductance and Temperature of Porewater at Each Site for August and November 2011

Transect	Plot	August 2011 Average Sp. Cond	August 2011 Average Temp	August 2011 Sp. Cond Std. Error	August 2011 Temp Std. Error	August 2011 Average Sp. Cond	August 2011 Average Temp	August 2011 Sp. Cond Std. Error	August 2011 Temp Std. Error	November 2011 Average Sp. Cond	November 2011 Average Temp	November 2011 Sp. Cond Std. Error	November 2011 Temp Std. Error	November 2011 Average Sp. Cond	November 2011 Average Temp	November 2011 Sp. Cond Std. Error	November 2011 Temp Std. Error	% Difference Sp. Cond	% Difference Temp	% Difference Sp. Cond	% Difference Temp
F1	F1-1	4435.1	29.4	509.8	0.3	3248.6	28.8	443.5	0.3	3219.0	25.0	543.1	0.2	2545.6	26.6	353.5	0.2	37.8%	17.7%	27.6%	8.4%
	F1-2	2062.1	28.2	206.0	0.2					1872.2	28.2	271.1	0.7					10.1%	0.1%		
F2	F2-1	1737.3	29.3	132.9	0.5	1812.2	29.3	138.4	0.2	1313.8	25.0	274.5	0.1	1441.6	25.8	186.6	0.3	32.2%	17.1%	25.7%	13.3%
	F2-2	2185.4	28.8	90.6	0.1					1468.1	26.3	333.9	0.4					48.9%	9.6%		
	F2-3	2298.3	28.7	338.3	0.2					2076.8	26.7	494.1	0.9					10.7%	7.4%		
	F2-4	1027.7	30.4	113.0	0.4					801.1	25.3	75.5	0.2					28.3%	20.1%		
F3	F3-1	1625.9	28.6	270.4	0.2	1595.3	29.6	192.3	0.3	1427.8	23.3	317.9	0.6	1498.5	24.5	217.6	0.3	13.9%	22.6%	6.5%	20.8%
	F3-2	1602.7	30.2	288.8	0.3					1462.2	24.5	320.5	0.2					9.6%	23.2%		
	F3-3	2339.5	31.0	535.3	0.3					2240.7	25.5	540.3	0.5					4.4%	21.5%		
	F3-4	813.0	28.4	64.6	0.2					545.8	24.4	47.3	0.3					49.0%	16.2%		
F4	F4-1	856.3	28.7	76.5	0.2	995.5	28.9	79.9	0.2	725.0	25.4	64.0	0.5	831.2	25.5	76.1	0.3	18.1%	12.9%	19.8%	13.1%
	F4-2	746.6	30.4	57.9	0.4					515.0	27.6	35.0	0.8					45.0%	10.0%		
	F4-3	886.2	29.6	114.8	0.3					714.8	25.8	99.5	0.5					24.0%	14.9%		
	F4-4	1244.2	27.9	164.7	0.1					1125.2	24.3	152.0	0.2					10.6%	14.5%		
F5	F5-1	23975.0	31.5	4243.7	0.3	42877.4	33.0	6074.1	0.3	19532.9	25.6	3394.7	0.2	27285.5	26.0	5012.8	0.2	22.7%	23.0%	57.1%	26.8%
	F5-2	61779.7	34.4	1187.3	1.1					35038.1	26.4	8660.2	0.2					76.3%	30.5%		
F6	F6-1	882.6	27.4	113.2	0.1	1313.6	28.5	188.3	0.3	811.7	25.1	129.3	0.2	1315.2	27.2	225.9	0.5	8.7%	9.1%	0.1%	5.0%
	F6-2	967.4	29.8	122.5	0.4					877.5	28.6	143.3	1.1					10.2%	4.2%		
	F6-3	2292.4	29.9	529.6	0.7					2432.7	28.5	631.6	0.5					6.1%	4.7%		
	F6-4	1112.1	27.0	288.5	0.2					1050.6	26.0	61.7	0.6					5.9%	3.8%		
M1	M1-1	58543.1	31.7	2637.8	0.5	58351.5	31.2	1587.7	0.5	49239.8	26.6	5468.4	0.2	46058.0	26.0	5050.6	0.2	18.9%	19.2%	26.7%	20.0%
	M1-2	58159.9	30.6	2029.6	0.1					42876.1	25.3	8847.9	0.3					35.6%	20.8%		
M2	M2-1	62787.2	33.1	642.4	0.7	62374.3	32.5	692.8	0.7	50938.5	28.9	5283.4	0.4	51301.4	28.5	3571.0	0.4	23.3%	14.6%	21.6%	13.8%
	M2-2	61754.9	31.4	1534.6	0.5					51664.4	28.1	5305.0	0.4					19.5%	11.7%		
M3	M3-1	64508.7	31.0	1118.2	0.2	63560.5	30.9	776.3	0.2	51357.9	25.3	6450.8	0.2	50335.4	25.0	4268.3	0.2	25.6%	22.6%	26.3%	23.6%
	M3-2	62612.3	30.9	1020.5	0.1					49312.9	24.8	6174.8	0.1					27.0%	24.6%		
M4	M4-1	76937.3	33.5	2474.7	0.8	75996.4	33.7	2111.7	0.8	57466.6	26.2	6009.1	0.2	58922.2	26.1	4396.7	0.2	33.9%	27.7%	29.0%	29.0%
	M4-2	75055.5	33.9	3625.2	0.7					60377.8	26.0	6935.4	0.1					24.3%	30.4%		
M5	M5-1	76027.3	33.9	3539.7	1.2	66605.3	32.5	3315.2	1.2	53335.8	26.6	8491.4	0.4	50416.4	25.8	4788.8	0.4	42.5%	27.5%	32.1%	26.3%
	M5-2	57183.4	31.1	564.0	0.3					47496.9	24.9	5038.7	0.4					20.4%	25.1%		
M6	M6-1	46609.4	31.7	1624.6	0.3	47611.6	32.1	839.6	0.3	40699.9	26.5	2712.4	0.2	42763.5	26.6	1765.5	0.2	14.5%	20.0%	11.3%	20.7%
	M6-2	48613.9	32.5	245.8	0.3					44827.0	26.8	2157.6	0.2					8.4%	21.3%		

Key:

Cond = Conductance.

Sp = Specific.

Std = Standard.

Temp = Temperature.

Table 5.1-14. Analytical Porewater Data for Marsh Sites in May 2011

Parameter	Units	PW-F1-1		PW-F2-3		PW-F3-1		PW-F3-2		PW-F3-3		PW-F4-1		PW-F4-2		PW-F4-3		PW-F5-1		PW-F6-1		PW-F6-2		PW-F6-3	
		5/19/2011		5/3/2011		5/9/2011		5/9/2011		5/9/2011		5/12/2011		5/12/2011		5/12/2011		5/10/2011		5/17/2011		5/17/2011		5/18/2011	
Temperature	°C	31.6		30.9		27.7		31.5		32.2		27.6		31.4		32.4		32.9		27.3		28.4		27.5	
pH	SU	7.32		7.62		7.39		7.73		7.53		7.35		7.78		7.56		7.15		7.25		7.19		7.7	
Dissolved Oxygen	mg/L																								
Spec Cond	µS/cm	4036.48		2622.94		1637.74		1677.76		2455.43		925.27		763.26		961.44		20357.85		990.40		1070.28		3293.55	
Turbidity	NTU																								
Arsenic	mg/L																								
Barium	mg/L	0.016	U	0.023	I	0.071	I	0.016	U	0.035	I	0.017	I	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.03	I
Beryllium	mg/L																								
Cadmium	mg/L																								
Copper	mg/L																								
Iron	mg/L	0.071	I	0.89	I	0.2	I	0.15	I	0.93	I	0.14	I	0.14	I	0.62	I	1.5		0.91	I	0.24	I	0.15	I
Lead	mg/L																								
Manganese	mg/L																								
Molybdenum	mg/L																								
Nickel	mg/L																								
Selenium	mg/L																								
Thallium	mg/L																								
Vanadium	mg/L																								
Zinc	mg/L																								
Silica	mg/L																								
Calcium	mg/L	110		370		220		230		200		130		99		250		350		230		130		220	
Magnesium	mg/L	81		53		27		33		27		11		7.6		10		410		12		15		54	
Potassium	mg/L	23		6.2		7		6.4		8.5		3		3.2		4.7		120		2.5		1.9		10	
Sodium	mg/L	560		260		170		150		260		45		42		62		3400		51		69		400	
Boron	mg/L	0.58		0.11		0.091		0.079		0.1		0.039	I	0.037	I	0.046	I	1.3		0.034	I	0.043	I	0.13	
Strontium	mg/L	0.95		2.2		1.4		1.8		1.6		0.9		0.7		1.3		3.9		1.6		1.3		1.7	
Chromium VI	mg/L																								
Mercury	mg/L																								
Bromide	mg/L	1.9	I	1.7		0.89		0.93		1.8		0.21		0.21		0.36		23		0.53		0.5		2.7	
Chloride	mg/L	950		590		340		320		570		78		80		110		6500		93		130		800	
Fluoride	mg/L	0.2	U	0.071		0.11		0.076		0.12		0.082		0.072		0.058		0.2	U	0.1		0.11		0.28	I
Sulfate	mg/L	110		6.8		41		16		72		25		21		6.8		850		27		39		120	
Total Ammonia	mg/L as N	0.4		1		1.9		1.4		1.3		0.46		2.1		1.7		0.97		2.1		1.5	J3	1.1	
Ammonium Ion NH4	mg/L as N	0.58		1.2		2.4		1.7		1.6		0.58		2.6		2.1		1.2		2.7		1.9		1.4	
Unionized NH3	mg/L																								
Nitrate/Nitrite as N	mg/L	1.7		0.041		0.038		0.21		0.1		0.018		0.13		0.023		0.023		0.16		0.013	J3	0.18	
TKN	mg/L	1.8		2.4		3		2.6		2		1.8		2.7		3.5		2.5		2.6		2.2		1.5	
TN[9]	mg/L																								
Orthophosphate	mg/L	0.0014	U Q	0.011	J3	0.0014	U	0.0014	U	0.0027	I	0.0014	U	0.0014	U	0.0016	I	0.0014	U Q J	0.0042	I	0.0059	I	0.014	
Phosphorus (P)	mg/L	0.0077	I	0.014		0.0068	I	0.0079	I	0.0088	I	0.046		0.0075	I	0.02		0.052		0.0044	U	0.0044	U	0.0044	U
Alkalinity	mg/L	550		430		290		350		300		290		220		310		440		310		260		320	
Bicarbonate Alkalinity as $CaCO_3$	mg/L	550		430		290		350		300		290		220		310		440		310		260		320	
Sulfides	mg/L	1	U	1	U	1	U	1	U	1.1		1	U	1	U	1	U	5.1		1	U	1	U	1	U
Total Dissolved Solids	mg/L																								
Dissolved Inorganic Carbon	mg/L	14		120		80		94		76		70		53		75		140		10	U	10	U	78	
δ18O	‰	0.7		0.3		1		0.7		0.5		-0.4		-0.5		0.7		0.7		0.3		0.4		0.4	
δ2H	‰	3.0		11.0		14.0		11.0		11.0		2.0		-3.0		3.0		6.0		3.0		0.0		8.0	
δ13C	‰	-7.45		-4.39		-8.63		-6.76		-8.40		-7.32		-5.56		-5.45		-13.51		-1.30		-4.89		-7.46	
Gross Alpha	pCi/L																								
Salinity	‰																								
Sr 87/86	‰	0.70915		0.70917		0.70920		0.70917		0.70917		0.70914		0.70914		0.70915		0.70916		0.70915		0.70911		0.70913	
Tritium	pCi/L (1σ)	83.4		31.4		65.4		48.2		66.2		88.4		58.6		51.9		139.0		1.6		13.5		15.1	

Note: No water could be collected at sites F1-2, F2-1, F2-2, F2-4, F3-4, F5-2 and F6-4.

Key:

‰ = Parts per mille.
δ = Isotope.
°C = Degrees Celcius.
$CaCO_3$ = Calcium carbonate.
I = Value between the method detection limit and reporting limit.
J = Estimated (+/- indicate bias).
mg/L = Milligrams per liter.
N = Nitrogen.
NTU = Nephelometric turbidity unit(s).
pCi/L = Picocuries per liter.
Q = The sample was held beyond the acceptable holding time.
SU = Salinity units.
TKN = Total Kjeldahl nitrogen.
U = Analyzed for but not detected at the reported value.
µS/cm = Micro Siemens per centimeter.
V = Detected in method blank.

Table 5.1-15. Analytical Porewater Data for Mangrove Sites in May 2011

Parameter	Units	PW-M1-1 5/6/11		PW-M1-2 5/20/11		PW-M2-1 5/5/11		PW-M2-2 5/5/11		PW-M3-1 5/19/11		PW-M3-2 5/19/11		PW-M4-1 5/27/11		PW-M4-2 5/27/11		PW-M5-2 5/20/11		PW-M6-1 5/11/11		PW-M6-2 5/11/11		PW-EB1 5/3/11		FCEB-1 5/19/11		PW-FB-1 5/27/11	
Temperature	°C	26.2		21.8		28.6		31.3		25		19.4		17.3		16.7		24.1		18.4		22.7							
pH	SU	7.68		7.12		7.27		7.02		7.26		7.41		6.97		6.83		7.14		7.1		7.24							
Dissolved Oxygen	mg/L																												
Spec Cond	µS/cm	56588.71		57895.91		59849.17		62007.59		64201.38		61782.28		78742.86		77557.75		56294.48		44079.02		47719.22							
Turbidity	NTU																												
Arsenic	mg/L																												
Barium	mg/L	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.0016	I	0.016	U	0.00081	U
Beryllium	mg/L																												
Cadmium	mg/L																												
Copper	mg/L																												
Iron	mg/L	0.33	I	0.66	I	0.23	I	0.5	I	0.4	I	0.49	I	0.054	U	0.12	I	0.12	I	0.37	I	0.25	I	0.0047	I	0.91	I	0.0053	I
Lead	mg/L																												
Manganese	mg/L																												
Molybdenum	mg/L																												
Nickel	mg/L																												
Selenium	mg/L																												
Thallium	mg/L																												
Vanadium	mg/L																												
Zinc	mg/L																												
Silica	mg/L																												
Calcium	mg/L	610		710		490		610		600		640		760		570		500		570		500		0.1	U	0.17	I	0.1	U
Magnesium	mg/L	1400		1500		1400		1500		1400		1500		2100		1400		1400		1100		1100		0.037	I	0.02	U	0.02	U
Potassium	mg/L	450		480		460		480		490		500		690		480		460		320		350		0.19	U	0.19	U	0.19	U
Sodium	mg/L	11000		12000		11000		12000		12000		12000		16000		11000		11000		8300		9000		0.32	I	0.31	U	0.31	U
Boron	mg/L	3.9		4.5		4.2		4.5		4.3		4.7		6.3		4.2		4.4		3.6		3.8		0.1		0.069		0.069	
Strontium	mg/L	9.4		10		8.6		9.6		9.3		9.4		13		9.5		8.5		7.5		7.5		0.001	U	0.0013	I	0.001	U
Chromium VI	mg/L																												
Mercury	mg/L																												
Bromide	mg/L	76		69		80		87		77		74		120		120		64		54		61		0.027	U	1	U	0.027	U
Chloride	mg/L	22000		23000		22000		25000		26000		24000		32000		32000		21000		15000		17000	V	0.2	U	1	U	0.2	U
Fluoride	mg/L	0.56		1	U	0.61		0.64		1	U	1	U	0.38	I	0.39	I	1	U	0.55		0.45	I	0.02	U	0.2	U	0.02	U
Sulfate	mg/L	2600		3100		2700		3000		3500		3300		4300		4400		2900		1900		1900		0.4	I	2.6	U	0.2	U
Total Ammonia	mg/L as N	0.63		0.88		1.1		1.1		0.99		1.2		1.3		1.2		1.1		2.3		2.2		0.74	J3	0.79		1.1	
Ammonium Ion NH4	mg/L as N	0.79		1.1		1.4		1.4		1.3		1.5		1.6		1.5		1.4		2.9		2.8							
Unionized NH3	mg/L																												
Nitrate/Nitrite as N	mg/L	0.089		0.75		0.086		0.087		0.26		0.18		0.03		0.041		0.23		0.021		0.037		0.14		0.046		0.022	
TKN	mg/L	0.72		2.8		1.1		1.4		1.4		2.8		1.6		1.9		2		2.9		2.4		0.69		0.65		0.94	
TN[9]	mg/L																												
Orthophosphate	mg/L	0.0018	I J3	0.0042	I	0.0035	I J3	0.0056	I	0.0058	I	0.0014	I	0.019		0.012	J	0.0017	I	0.0014	U Q	0.0014	U Q	0.0014	I	0.0018	I	0.0014	U
Phosphorus (P)	mg/L	0.017		0.022		0.018		0.022		0.02		0.02		0.027		0.027		0.018		0.017		0.018		0.0044	U	0.0044	U	0.0044	U
Alkalinity	mg/L	360		390		170		360		300		220		220		230		160		450		430		14		1	U	1	U
Bicarbonate Alkalinity as $CaCO_3$	mg/L	360		390		170		360		300		220		220		230		160		450		430		14		1	U	1	U
Sulfides	mg/L	4.6		5		4.8		3		4.6		4.3		4.2		4.3		7.5		38		45		1	U	1	U	1	U
Total Dissolved Solids	mg/L																												
Dissolved Inorganic Carbon	mg/L	110		11		41		120		10	U	10	U	10	U	10	U	10	U	120		100		10	U	10	U	10	U
δ18O	‰	2.6		2.6		-1.5		0.3		3.9		3.4		4.9		4.4		2.3		2.8		2.7		-1.5		-1.4		-1.7	
δ2H	‰	20.0		18.0		-6.0		11.0		32.0		22.0		24.0		32.0		15.0		20.0		16.0		-6.0		-3.0		-5.0	
δ13C	‰	-10.68		-11.74		-7.66		-10.70		-10.47		-9.52		-7.20		-9.56		-8.61		-12.55		-11.62		-7.69		-17.66		-14.95	
Gross Alpha	pCi/L																												
Salinity	‰																												
Sr 87/86	‰	0.70918		0.70913		0.70918		0.70916		0.70914		0.70915		0.70913		0.70913		0.70915		0.70917		0.70914		0.1		0.3		<DL	
Tritium	pCi/L (1σ)	26.6		30.8		37.8		39.7		56.1		46.2		68.4		63.2		65.8		13.8		14.1		9.5		3.7		1.2	

Note: No water could be collected at site M5-1.

Key:

‰ = Parts per mille.
δ = Isotope.
°C = Degrees Celcius.
$CaCO_3$ = Calcium carbonate.
J = Estimated (+/- indicate bias).
I = Value between the method detection limit and reporting limit.
mg/L = Milligrams per liter.
N = Nitrogen.
NTU = Nephelometric turbidity unit(s).
pCi/L = Picocuries per liter.
Q = The sample was held beyond the acceptable holding time.
SU = Salinity units.
TKN = Total Kjeldahl nitrogen.
U = Analyzed for but not detected at the reported value.
µS/cm = Micro Siemens per centimeter.
V = Detected in method blank.

Table 5.1-16. Analytical Porewater Data for Marsh Sites in August 2011

Parameter	Units	PW-F1-1 8/10/11	PW-F1-2 8/10/11	PW-F2-1 8/10/11	PW-F2-2 8/10/11	PW-F2-3 8/10/11	PW-F2-4 8/12/11	PW-F3-1 8/12/11	PW-F3-2 8/12/11	PW-F3-3 8/9/11	PW-F3-4 8/12/11	PW-F4-1 8/9/11	PW-F4-2 8/9/11	PW-F4-3 8/9/11	PW-F4-4 8/12/11	PW-F5-1 8/4/11	PW-F5-2 8/4/11	PW-F6-1 8/11/11	PW-F6-2 8/11/11	PW-F6-3 8/11/11	PW-F6-4 8/11/11
Temperature	°C	30.5	28.6	28.5	28.6	28.7	31.5	26.5	32.9	33.4	31.3	30.0	31.7	30.8	26.4	25.3	32.6	28.4	31.5	30.6	29.5
pH	SU	6.86	7.37	7.36	7.46	7.43	6.73	6.54	7.07	7.14	6.26	7.09	7.19	7.13	6.84	7.04	7.28	7.09	7.19	7.19	7.09
Dissolved Oxygen	mg/L																				
Spec Cond	µS/cm	5230.92	2102.77	2127.73	2362.21	2649.11	1180.80	2105.13	2089.18	3214.55	782.42	937.60	825.80	1012.20	1719.90	31996.60	65050.80	1125.21	1206.76	2638.41	1218.60
Turbidity	NTU																				
Arsenic	mg/L																				
Barium	mg/L	0.081 U	0.081 U	0.081 U	0.081 U	0.081 U	0.081 U	0.081 U	0.081 U	0.130 I	0.100 I	0.081 U	0.081 U	0.081 U	0.081 U	0.016 U	0.016 U	0.081 U	0.081 U	0.081 U	0.081 U
Beryllium	mg/L																				
Cadmium	mg/L																				
Copper	mg/L																				
Iron	mg/L	0.43 I	1.60 I	2.70 I	0.93 I	1.70 I	0.27 I	0.59 I	1.00 I	0.49 I	0.37 I	0.91 I	0.27 U	0.32 I	0.41 I	0.62 I V	0.78 I V	0.44 I	1.20 I	1.80 I	0.61 I
Lead	mg/L																				
Manganese	mg/L																				
Molybdenum	mg/L																				
Nickel	mg/L																				
Selenium	mg/L																				
Thallium	mg/L																				
Vanadium	mg/L																				
Zinc	mg/L																				
Silica	mg/L																				
Calcium	mg/L	200	640	680	270	500	97	200	410	240	45	120	88	190	180	530	660	170	170	300	160
Magnesium	mg/L	110	37	28	44	44	12	34	38	40	9	10	7	10	33	660	1700	13	18	45	22
Potassium	mg/L	31	5	9	12	5	3	9	9	11	7	3	3	4	3	180	540	3	2	8	4
Sodium	mg/L	700	240	220	220	290	110	220	200	370	93	54	59	67	190	5400	13000	55	70	300	60
Boron	mg/L	0.6	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0 I	0.0 I	0.0 I	0.2	1.6	4.8	0.0 I	0.1	0.1	0.1
Strontium	mg/L	1.5	3.1	2.8	1.3	2.6	1.0	1.6	2.5	2.4	0.6	0.9	0.7	1.2	1.7	6.1	9.6	1.6	1.5	2.3	1.7
Chromium VI	mg/L																				
Mercury	mg/L																				
Bromide	mg/L	4.60	1.20	1.50	1.10	1.30	1.00	1.10	1.20	2.00	0.87	0.61	0.49	0.61	1.20	33.00	0.54 U	0.51	0.60	1.60	0.93
Chloride	mg/L	1300	510 J3	440	380	650	180	390	380	790	160	120	120	140	290	10000	26000	110	130	570	100
Fluoride	mg/L	0.40 U	0.13	0.11	0.14	0.14	0.10	0.14	0.14	0.14	0.09	0.13	0.10	0.13	0.19	1.10	1.10	0.13	0.13	0.13	0.17
Sulfate	mg/L	160	110 J3	67	120	99	3	97	48	170	0 I	25	17	15	48	1200	2700	63	61	110	28
Total Ammonia	mg/L as N																				
Ammonium Ion NH4	mg/L as N																				
Unionized NH3	mg/L																				
Nitrate/Nitrite as N	mg/L																				
TKN	mg/L																				
TN[9]	mg/L																				
Orthophosphate	mg/L																				
Phosphorus (P)	mg/L																				
Alkalinity	mg/L	530	230	310	280	260	270	260	390	280	100	270	160	210	380	490	170	280	290	290	350
Bicarbonate Alkalinity as CaCO3	mg/L	530	230	310	280	260	270	260	390	280	100	270	160	210	380	490	170	280	290	290	350
Sulfides	mg/L	4.2	1.0 U	1.0 U	1.1	1.0 U	1.0 U	1.1	1.0 U	1.1	1.0 U	3.8	1.6	1.3	1.0 U	4.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Total Dissolved Solids	mg/L																				
Dissolved Inorganic Carbon	mg/L	16	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11	14	10 U	10 U	10 U	10 U	11
δ180	‰	1.1	0.6	1.0	-0.8	0.1	-0.8	0.8	0.2	0.3	-0.9	-1.3	-0.5	-0.7	-1.6	1.0	3.0	-0.2	0.1	0.1	-2.7
δ2H	‰	8.0	2.0	9.0	0.0	4.0	-7.0	11.0	2.0	10.0	-6.0	-7.0	-5.0	-6.0	-8.0	10.0	17.0	7.0	6.0	2.0	-16.0
δ13C	‰	-11.02	-7.93	-4.72	-7.60	-11.00	-10.04	-10.41	-8.91	-12.40	-7.46	-6.80	-5.63	-10.41	-9.33	-11.43	-10.66	-3.23	-7.45	-9.67	-13.43
Gross Alpha	pCi/L																				
Salinity	‰																				
Sr 87/86	‰	0.70914	0.70915	0.70913	0.70914	0.70911	0.70916	0.70916	0.70918	0.70916	0.70919	0.70916	0.70919	0.70916	0.70920	0.70916	0.70918	0.70914	0.70913	0.70916	0.70915
Tritium	pCi/L (1σ)																				

Key:

‰ = Parts per mille.
δ = Isotope.
°C = Degrees Celcius.
$CaCO_3$ = Calcium carbonate.
I = Value between the method detection limit and reporting limit.
mg/L = Milligrams per liter.
N = Nitrogen.
NTU = Nephelometric turbidity unit(s).
pCi/L = Picocuries per liter.
SU = Salinity units.
TKN = Total Kjeldahl nitrogen.
U = Analyzed for but not detected at the reported value.
µS/cm = Micro Siemens per centimeter.
V = Detected in method blank.

Table 5.1-17. Analytical Porewater Data for Mangrove Sites in August 2011

Parameter	Units	PW-MI-1 8/3/11		PW-M1-2 8/2/11		PW-M2-1 8/5/11		PW-M2-2 8/5/11		PW-M3-1 8/5/11		PW-M3-2 8/5/11		PW-M4-1 8/5/11		PW-M4-2 8/2/11		PW-M5-1 8/4/11		PW-M5-2 8/2/11		PW-M6-1 8/3/11		PW-M6-2 8/3/11		PW-EB1 8/2/11		PW-FB-1 8/10/11		PW-FCEB-1 8/11/11	
Temperature	°C	32.6		24.4		31.6		25.0		23.4		19.1		29.9		27.1		34.4		28.6		29.5		32.2							
pH	SU	7.32		6.98		7.46		7.02		7.26		7.26		7.04		7.05		7.08		7.12		7.08		7.14							
Dissolved Oxygen	mg/L																														
Spec Cond	µS/cm	64315.25		63884.65		62515.95		64093.40		67367.60		64913.55		79855.80		85880.45		81750.90		58485.80		51057.40		48738.75							
Turbidity	NTU																														
Arsenic	mg/L																														
Barium	mg/L	0.016	U	0.016	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.001	U	0.001	U
Beryllium	mg/L																														
Cadmium	mg/L																														
Copper	mg/L																														
Iron	mg/L	0.29	I V	0.34	I V	0.51	I	0.74	I	0.82	I	0.74	I	0.75	I	0.22	I V	0.46	I V	0.28	I V	0.66	I V	0.33	I V	0.05	U	0.00	U	0.01	I
Lead	mg/L																														
Manganese	mg/L																														
Molybdenum	mg/L																														
Nickel	mg/L																														
Selenium	mg/L																														
Thallium	mg/L																														
Vanadium	mg/L																														
Zinc	mg/L																														
Silica	mg/L																														
Calcium	mg/L	680		670		560		720		660		660		820		890		860		560		650		520		3		0	U	0	I
Magnesium	mg/L	1600		1500		1600		1700		1800		1700		2200		2300		2200		1500		1200		1100		2		0	U	0	I
Potassium	mg/L	540		510		540		560		590		570		770		780		700		500		380		350		7		0	U	0	U
Sodium	mg/L	13000		12000		13000		13000		14000		13000		18000		18000		17000		12000		9200		8600		17		0	U	1	
Boron	mg/L	5.1		4.9		5.7		5.7		6.1		5.8		7.2		6.8		5.7		5.0		4.1		3.8		0.1		0.1		0.1	
Strontium	mg/L	10.0		10.0		8.8		10.0		9.9		9.7		13.0		14.0		13.0		9.1		8.0		7.0		0.0		0.0	U	0.0	I
Chromium VI	mg/L																														
Mercury	mg/L																														
Bromide	mg/L	85.00		81.00		85.00		88.00		92.00		88.00		120.00		120.00		120.00		75.00		61.00		59.00		0.09		0.03	U	0.03	U
Chloride	mg/L	26000		24000		24000		25000		27000		26000		35000		34000		35000		22000		18000		17000	J3	21		0	I	0	I
Fluoride	mg/L	1.30		2.00	U	1.00		0.78	I	0.96	I	0.92	I	1.10		2.00	U	0.40	U	2.00	U	0.40	U	1.20		0.12		0.02	U	0.02	U
Sulfate	mg/L	2600		2800		3000		3000		3300		3100		4200		3700		4100		2600		1600		1500		3		0	U	0	U
Total Ammonia	mg/L as N																														
Ammonium ion NH4	mg/L as N																														
Unionized NH3	mg/L																														
Nitrate/Nitrite as N	mg/L																														
TKN	mg/L																														
TN[9]	mg/L																														
Orthophosphate	mg/L																														
Phosphorus (P)	mg/L																														
Alkalinity	mg/L	300		320		93		320		190		170		150		160		300		200		260		270		1	U	1		3	
Bicarbonate Alkalinity as CaCO3	mg/L	300		320		93		320		190		170		150		160		300		200		260		270		1	U	1		3	
Sulfides	mg/L	8.2		5.9		3.7		5.0		4.3		4.2		4.6		5.6		3.8		12.0		28.0		51.0		1.0	U	1.0	U	1.0	U
Total Dissolved Solids	mg/L																														
Dissolved Inorganic Carbon	mg/L	10	U	10	U	10	U	12		10	U	10	U	10	U	10	U	11		10	U	11		13		10	U	10	U	10	U
δ180	‰	3.00		2.50		2.50		2.60		3.30		2.90		4.50		4.50		3.20		2.20		2.40		2.60		-1.30		-1.30		-1.40	
δ2H	‰	25.00		19.00		18.00		18.00		18.00		21.00		27.00		28.00		23.00		26.00		19.00		20.00		-5.00		-5.00		-9.00	
δ13C	‰	-11.47		-11.49		-7.84		-11.55		-7.08		-8.18		-11.23		-11.29		-10.87		-10.24		-11.36		-10.75		-12.67		-9.75		-10.37	
Gross Alpha	pCi/L																														
Salinity	‰																														
Sr 87/86	‰	0.70916		0.70918		0.70916		0.70916		0.70916		0.70918		0.70916		0.70916		0.70917		0.70923		0.70916		0.70919		0.9		<DL		0.5	
Tritium	pCi/L (1σ)																														

Key:

‰ = Parts per mille.
δ = Isotope.
°C = Degrees Celcius.
$CaCO_3$ = Calcium carbonate.
I = Value between the method detection limit and reporting limit.

mg/L = Milligrams per liter.
N = Nitrogen.
NTU = Nephelometric turbidity unit(s).
pCi/L = Picocuries per liter.
SU = Salinity units.

TKN = Total Kjeldahl nitrogen.
U = Analyzed for but not detected at the reported value.
µS/cm = Micro Siemens per centimeter.
V = Detected in method blank.

Table 5.1-18. Wet and Dry Bulk Density for All Plots and Transects

Transect	Site ID	Wet (g/cm³)	Dry (g/cm³)	Plot				Transect			
				Average Wet (g/cm³)	Std. Error Wet	Average Dry (g/cm³)	Std. Error Dry	Average Wet (g/cm³)	Std. Error Wet	Average Dry (g/cm³)	Std. Error Dry
F1	F1-1-10	1.10	0.29	1.23	0.07	0.47	0.09	1.20	0.04	0.38	0.07
	F1-1-20	1.30	0.57								
	F1-1-30	1.30	0.55								
	F1-2-10	1.10	0.16	1.17	0.07	0.29	0.09				
	F1-2-20	1.10	0.26								
	F1-2-30	1.30	0.45								
F2	F2-1-10	1.10	0.31	1.30	0.10	0.57	0.13	1.23	0.05	0.43	0.06
	F2-1-20	1.40	0.70								
	F2-1-30	1.40	0.69								
	F2-2-10	1.20	0.33	1.33	0.07	0.54	0.10				
	F2-2-20	1.40	0.61								
	F2-2-30	1.40	0.67								
	F2-3-10	1.20	0.26	1.30	0.06	0.46	0.11				
	F2-3-20	1.30	0.49								
	F2-3-30	1.40	0.62								
	F2-4-10	1.00	0.14	1.00	0.00	0.17	0.02				
	F2-4-20	1.00	0.17								
	F2-4-30	1.00	0.21								
F3	F3-1-10	1.20	0.42	1.27	0.03	0.53	0.06	1.22	0.04	0.42	0.05
	F3-1-20	1.30	0.60								
	F3-1-30	1.30	0.57								
	F3-2-10	1.30	0.49	1.30	0.00	0.51	0.03				

Table 5.1-18. Wet and Dry Bulk Density for All Plots and Transects

				Plot				Transect			
Transect	Site ID	Wet (g/cm^3)	Dry (g/cm^3)	Average Wet (g/cm^3)	Std. Error Wet	Average Dry (g/cm^3)	Std. Error Dry	Average Wet (g/cm^3)	Std. Error Wet	Average Dry (g/cm^3)	Std. Error Dry
	F3-2-20	1.30	0.56								
	F3-2-30	1.30	0.47								
	F3-3-10	1.30	0.43	1.30	0.00	0.50	0.04				
	F3-3-20	1.30	0.57								
	F3-3-30	1.30	0.49								
	F3-4-10	1.00	0.13	1.00	0.00	0.13	0.01				
	F3-4-20	0.99	0.14								
	F3-4-30	1.00	0.12								
F4	F4-1-10	1.00	0.17	1.03	0.03	0.18	0.04	1.10	0.03	0.26	0.03
	F4-1-20	1.10	0.25								
	F4-1-30	1.00	0.12								
	F4-2-10	1.30	0.46	1.13	0.09	0.32	0.07				
	F4-2-20	1.10	0.28								
	F4-2-30	1.00	0.21								
	F4-3-10	1.20	0.35	1.20	0.00	0.37	0.01				
	F4-3-20	1.20	0.40								
	F4-3-30	1.20	0.37								
	F4-4-10	1.00	0.15	1.03	0.03	0.16	0.01				
	F4-4-20	1.00	0.18								
	F4-4-30	1.10	0.16								
F5	F5-1-10	1.20	0.42	1.13	0.07	0.32	0.08	1.25	0.06	0.46	0.08
	F5-1-20	1.20	0.37								

Table 5.1-18. Wet and Dry Bulk Density for All Plots and Transects

				Plot				Transect			
Transect	Site ID	Wet (g/cm^3)	Dry (g/cm^3)	Average Wet (g/cm^3)	Std. Error Wet	Average Dry (g/cm^3)	Std. Error Dry	Average Wet (g/cm^3)	Std. Error Wet	Average Dry (g/cm^3)	Std. Error Dry
	F5-1-30	1.00	0.16								
	F5-2-10	1.40	0.66	1.37	0.03	0.60	0.05				
	F5-2-20	1.40	0.65								
	F5-2-30	1.30	0.50								
F6	F6-1-10	1.10	0.20	1.03	0.03	0.20	0.01	1.13	0.04	0.30	0.05
	F6-1-20	1.00	0.23								
	F6-1-30	1.00	0.18								
	F6-2-10	1.20	0.32	1.13	0.07	0.27	0.06				
	F6-2-20	1.20	0.34								
	F6-2-30	1.00	0.16								
	F6-3-10	1.20	0.34	1.30	0.06	0.52	0.09				
	F6-3-20	1.30	0.57								
	F6-3-30	1.40	0.65								
	F6-4-10	1.00	0.16	1.07	0.03	0.21	0.03				
	F6-4-20	1.10	0.23								
	F6-4-30	1.10	0.24								
M1	M1-1-10	1.30	0.47	1.37	0.03	0.62	0.08	1.25	0.06	0.42	0.10
	M1-1-20	1.40	0.74								
	M1-1-30	1.40	0.65								
	M1-2-10	1.20	0.26	1.13	0.03	0.22	0.02				
	M1-2-20	1.10	0.21								
	M1-2-30	1.10	0.18								

Table 5.1-18. Wet and Dry Bulk Density for All Plots and Transects

Transect	Site ID	Wet (g/cm^3)	Dry (g/cm^3)	Plot Average Wet (g/cm^3)	Plot Std. Error Wet	Plot Average Dry (g/cm^3)	Plot Std. Error Dry	Transect Average Wet (g/cm^3)	Transect Std. Error Wet	Transect Average Dry (g/cm^3)	Transect Std. Error Dry
M2	M2-1-10	1.10	0.21	1.10	0.00	0.23	0.01	1.13	0.02	0.25	0.02
	M2-1-20	1.10	0.22								
	M2-1-30	1.10	0.25								
	M2-2-10	1.10	0.20	1.17	0.03	0.27	0.04				
	M2-2-20	1.20	0.34								
	M2-2-30	1.20	0.27								
M3	M3-1-10	1.20	0.37	1.23	0.03	0.43	0.03	1.23	0.02	0.43	0.02
	M3-1-20	1.30	0.48								
	M3-1-30	1.20	0.43								
	M3-2-10	1.20	0.41	1.23	0.03	0.43	0.03				
	M3-2-20	1.30	0.49								
	M3-2-30	1.20	0.39								
M4	M4-1-10	1.40	0.60	1.23	0.09	0.40	0.10	1.17	0.05	0.29	0.07
	M4-1-20	1.10	0.32								
	M4-1-30	1.20	0.29								
	M4-2-10	1.10	0.25	1.10	0.00	0.18	0.03				
	M4-2-20	1.10	0.15								
	M4-2-30	1.10	0.15								
M5	M5-1-10	1.40	0.66	1.33	0.03	0.51	0.08	1.20	0.06	0.33	0.09
	M5-1-20	1.30	0.47								
	M5-1-30	1.30	0.41								
	M5-2-10	1.10	0.08	1.07	0.03	0.15	0.06				

Table 5.1-18. Wet and Dry Bulk Density for All Plots and Transects

Transect	Site ID	Wet (g/cm^3)	Dry (g/cm^3)	Plot Average Wet (g/cm^3)	Plot Std. Error Wet	Plot Average Dry (g/cm^3)	Plot Std. Error Dry	Transect Average Wet (g/cm^3)	Transect Std. Error Wet	Transect Average Dry (g/cm^3)	Transect Std. Error Dry
	M5-2-20	1.00	0.11								
	M5-2-30	1.10	0.26								
M6	M6-1-10	1.30	0.48	1.30	0.00	0.51	0.02	1.30	0.00	0.52	0.01
	M6-1-20	1.30	0.54								
	M6-1-30	1.30	0.52								
	M6-2-10	1.30	0.49	1.30	0.00	0.53	0.02				
	M6-2-20	1.30	0.54								
	M6-2-30	1.30	0.55								

Key:

g/cm^3 = Grams per cubic centimeter.

ID = Identification.

Std. = Standard.

TABLES

Table 5.2-1. Latitude and Longitude of Biscayne Bay, Card Sound and Barnes Sound Ecological Sampling Points

Point	Latitude	Longitude	Point	Latitude	Longitude
BB1-a-1	25.42632	80.32344	BB2-a-1	25.37277	80.30706
BB1-a-2	25.42355	80.32348	BB2-a-2	25.37171	80.30782
BB1-a-3	25.42296	80.32346	BB2-a-3	25.37021	80.30888
BB1-a-4	25.41888	80.32347	BB2-a-4	25.36822	80.31030
BB1-a-5	25.41664	80.32343	BB2-a-5	25.36692	80.31122
BB1-a-6	25.41644	80.32344	BB2-a-6	25.36490	80.31265
BB1-a-7	25.41217	80.32345	BB2-a-7	25.36334	80.31375
BB1-a-8	25.41074	80.32344	BB2-a-8	25.36009	80.31604
BB1-b-1	25.42769	80.32095	BB2-b-1	25.37296	80.30388
BB1-b-2	25.42335	80.32097	BB2-b-2	25.37088	80.30538
BB1-b-3	25.42116	80.32096	BB2-b-3	25.36808	80.30740
BB1-b-4	25.42049	80.32096	BB2-b-4	25.36702	80.30816
BB1-b-5	25.41750	80.32094	BB2-b-5	25.36481	80.30966
BB1-b-6	25.41514	80.32094	BB2-b-6	25.36344	80.31065
BB1-b-7	25.41306	80.32094	BB2-b-7	25.36159	80.31196
BB1-b-8	25.41130	80.32095	BB2-b-8	25.35886	80.31391
BB1-c-1	25.42668	80.31597	BB2-c-1	25.36943	80.30046
BB1-c-2	25.42545	80.31597	BB2-c-2	25.36876	80.30094
BB1-c-3	25.42265	80.31597	BB2-c-3	25.36619	80.30273
BB1-c-4	25.41907	80.31597	BB2-c-4	25.36413	80.30421
BB1-c-5	25.41709	80.31597	BB2-c-5	25.36190	80.30580
BB1-c-6	25.41626	80.31597	BB2-c-6	25.36146	80.30609
BB1-c-7	25.41294	80.31597	BB2-c-7	25.36004	80.30710
BB1-c-8	25.41097	80.31597	BB2-c-8	25.35743	80.30896
BB1-d-1	25.42776	80.30600	BB2-d-1	25.36569	80.29147
BB1-d-2	25.42519	80.30600	BB2-d-2	25.36426	80.29251
BB1-d-3	25.42207	80.30600	BB2-d-3	25.36154	80.29439
BB1-d-4	25.41909	80.30600	BB2-d-4	25.35935	80.29598
BB1-d-5	25.41689	80.30600	BB2-d-5	25.35895	80.29626

Table 5.2-1. Latitude and Longitude of Biscayne Bay, Card Sound and Barnes Sound Ecological Sampling Points

Point	Latitude	Longitude	Point	Latitude	Longitude
BB1-d-6	25.41594	80.30600	BB2-d-6	25.35572	80.29853
BB1-d-7	25.41311	80.30600	BB2-d-7	25.35434	80.29953
BB1-d-8	25.41173	80.30600	BB2-d-8	25.35232	80.30095
BB1-e-1	25.42738	80.29607	BB2-e-1	25.36028	80.28339
BB1-e-2	25.42353	80.29607	BB2-e-2	25.35832	80.28483
BB1-e-3	25.42201	80.29607	BB2-e-3	25.35688	80.28588
BB1-e-4	25.42071	80.29607	BB2-e-4	25.35472	80.28749
BB1-e-5	25.41863	80.29607	BB2-e-5	25.35272	80.28898
BB1-e-6	25.41573	80.29607	BB2-e-6	25.35165	80.28976
BB1-e-7	25.41312	80.29607	BB2-e-7	25.34946	80.29140
BB1-e-8	25.41017	80.29607	BB2-e-8	25.34767	80.29273
BB3-a-1	25.35211	80.32451	BB4-a-1	25.28361	80.38995
BB3-a-2	25.35034	80.32586	BB4-a-2	25.28203	80.39109
BB3-a-3	25.34834	80.32731	BB4-a-3	25.28096	80.39186
BB3-a-4	25.34671	80.32854	BB4-a-4	25.27843	80.39368
BB3-a-5	25.34400	80.33055	BB4-a-5	25.27762	80.39426
BB3-a-6	25.34172	80.33224	BB4-a-6	25.27576	80.39561
BB3-a-7	25.34089	80.33284	BB4-a-7	25.27357	80.39718
BB3-a-8	25.33927	80.33405	BB4-a-8	25.27135	80.39879
BB3-b-1	25.35051	80.32288	BB4-b-1	25.28255	80.38793
BB3-b-2	25.34832	80.32450	BB4-b-2	25.28035	80.38951
BB3-b-3	25.34663	80.32575	BB4-b-3	25.27996	80.38978
BB3-b-4	25.34426	80.32749	BB4-b-4	25.27821	80.39103
BB3-b-5	25.34346	80.32808	BB4-b-5	25.27587	80.39272
BB3-b-6	25.34202	80.32914	BB4-b-6	25.27476	80.39350
BB3-b-7	25.33996	80.33068	BB4-b-7	25.27293	80.39482
BB3-b-8	25.33817	80.33199	BB4-b-8	25.27068	80.39641
BB3-c-1	25.34858	80.31828	BB4-c-1	25.28008	80.38355
BB3-c-2	25.34651	80.31978	BB4-c-2	25.27795	80.38512

Table 5.2-1. Latitude and Longitude of Biscayne Bay, Card Sound and Barnes Sound Ecological Sampling Points

Point	Latitude	Longitude	Point	Latitude	Longitude
BB3-c-3	25.34398	80.32159	BB4-c-3	25.27716	80.38567
BB3-c-4	25.34213	80.32293	BB4-c-4	25.27580	80.38667
BB3-c-5	25.33995	80.32450	BB4-c-5	25.27384	80.38809
BB3-c-6	25.33916	80.32507	BB4-c-6	25.27152	80.38977
BB3-c-7	25.33620	80.32719	BB4-c-7	25.26974	80.39108
BB3-c-8	25.33442	80.32849	BB4-c-8	25.26788	80.39242
BB3-d-1	25.34335	80.31044	BB4-d-1	25.27501	80.37554
BB3-d-2	25.34053	80.31248	BB4-d-2	25.27356	80.37659
BB3-d-3	25.33901	80.31358	BB4-d-3	25.27311	80.37694
BB3-d-4	25.33764	80.31457	BB4-d-4	25.27060	80.37874
BB3-d-5	25.33514	80.31637	BB4-d-5	25.26912	80.37982
BB3-d-6	25.33371	80.31742	BB4-d-6	25.26687	80.38145
BB3-d-7	25.33165	80.31889	BB4-d-7	25.26584	80.38219
BB3-d-8	25.33121	80.31921	BB4-d-8	25.26361	80.38381
BB3-e-1	25.33736	80.30289	BB4-e-1	25.27146	80.36615
BB3-e-2	25.33698	80.30317	BB4-e-2	25.26796	80.36876
BB3-e-3	25.33404	80.30533	BB4-e-3	25.26660	80.36974
BB3-e-4	25.33295	80.30612	BB4-e-4	25.26541	80.37062
BB3-e-5	25.33108	80.30749	BB4-e-5	25.26345	80.37209
BB3-e-6	25.32836	80.30948	BB4-e-6	25.26167	80.37343
BB3-e-7	25.32621	80.31106	BB4-e-7	25.25893	80.37544
BB3-e-8	25.32586	80.31130	BB4-e-8	25.25798	80.37616

Table 5.2-2. The 26 Pre-Existing Categories of Submerged Aquatic Vegetation Scored Using Braun-Blanquet Cover Abundance Index Method at Each Sampling Point

Totals	Algae	Seagrasses	Calcareous Algae	Fleshy Green Algae	Corals/ Sponges[1]
Total Macrophytes	Total Macroalgae	*Thalassia testudinum*	*Penicillus*	*Batophora/ Dasycladus*	Corals
Total Drift Red	Total Calcareous	*Halodule wrightii*	*Rhipocephalus*	*Anadyomene*	Gorgonians/Soft Corals
Total Macrophytes Minus Drift Red	Total Green Other (Fleshy)	*Syringodium filiforme*	*Halimeda*		Sponges
Total Seagrass	Total Red Other	*Ruppia martima*	*Udotea*		
	Total Brown	*Halophila engelmannii*	*Acetabularia*		
		Halophila johnsonii			
		Halophila decipiens			

[1] Presence/absence only.

Table 5.2-3. Mean, Standard Error (SE), Minimum, and Maximum Values for Water Depth (m) by Transect and Sampling Area

Area	Transect	Mean ± SE	Min	Max
BB1	a	1.6 ± 0.06	1.5	2.0
	b	1.6 ± 0.07	1.3	1.8
	c	1.7 ± 0.06	1.6	2.0
	d	1.8 ± 0.09	1.5	2.2
	e	1.8 ± 0.07	1.5	2.0
	Area	1.7 ± 0.03	1.3	2.2
BB2	a	2.2 ± 0.11		2.7
	b	2.4 ± 0.10	2.0	2.9
	c	2.7 ± 0.12	2.3	3.2
	d	2.9 ± 0.09	2.5	3.3
	e	2.8 ± 0.07	2.5	3.2
	Area	2.6 ± 0.06	1.9	3.3
BB3	a	2.6 ± 0.05	2.4	2.9
	b	2.8 ± 0.06	2.6	3.1
	c	3.1 ± 0.05	2.9	3.3
	d	3.3 ± 0.03	3.2	3.4
	e	3.1 ± 0.13	2.7	3.7
	Area	3.0 ± 0.05	2.4	3.7
BB4	a	1.9 ± 0.04	1.8	2.1
	b	2.0 ± 0.04	1.8	2.1
	c	2.2 ± 0.03	2.1	2.3
	d	2.3 ± 0.06	2.1	2.6
	e	2.7 ± 0.02	2.7	2.8
	Area	2.2 ± 0.05	1.8	2.8
All Areas and Transects		**2.4 ± 0.04**	**1.3**	**3.7**

Table 5.2-4. Mean, Standard Error (SE), Minimum, and Maximum Values for Surface and Bottom Water Temperature (°C) by Transect and Sampling Area

Area	Transect	Surface			Bottom		
		Mean ± SE	Min	Max	Mean ± SE	Min	Max
BB1	a	30.4 ± 0.35	28.5	31.1	30.4 ± 0.35	28.5	31.1
	b	30.4 ± 0.51	28.2	31.7	30.4 ± 0.50	28.2	31.6
	c	30.5 ± 0.66	28.5	32.7	30.5 ± 0.66	28.5	32.7
	d	30.7 ± 0.46	29.4	32.6	30.7 ± 0.47	29.4	32.6
	e	30.0 ± 0.42	28.8	31.2	30.0 ± 0.43	28.8	31.2
	Area	30.4 ± 0.21	28.2	32.7	30.4 ± 0.21	28.2	32.7
BB2	a	30.7 ± 0.30	29.5	31.6	30.6 ± 0.32	29.5	31.6
	b	30.9 ± 0.38	29.4	31.9	30.9 ± 0.38	29.4	31.9
	c	30.8 ± 0.44	29.5	32.0	30.8 ± 0.43	29.5	32.0
	d	30.5 ± 0.15	29.9	31.0	30.5 ± 0.17	29.9	31.0
	e	30.4 ± 0.26	29.6	31.1	30.4 ± 0.26	29.6	31.1
	Area	30.6 ± 0.14	29.4	32.0	30.6 ± 0.14	29.4	32.0
BB3	a	30.9 ± 0.26	30.1	31.9	30.8 ± 0.30	29.9	31.7
	b	31.0 ± 0.47	29.4	33.0	30.8 ± 0.32	29.6	31.8
	c	30.3 ± 0.26	29.6	31.4	30.4 ± 0.30	29.6	31.4
	d	30.8 ± 0.23	30.2	31.6	30.7 ± 0.23	30.1	31.4
	e	30.3 ± 0.12	30.0	30.7	30.3 ± 0.11	30.0	30.7
	Area	30.7 ± 0.13	29.4	33.0	30.6 ± 0.12	29.6	31.8
BB4	a	30.8 ± 0.17	29.8	31.5	31.0 ± 0.15	30.6	31.9
	b	31.0 ± 0.26	29.9	31.7	31.0 ± 0.25	29.9	31.7
	c	30.4 ± 0.17	30.0	31.5	30.3 ± 0.18	29.8	31.5
	d	30.7 ± 0.09	30.5	31.1	30.7 ± 0.09	30.5	31.0
	e	30.4 ± 0.15	29.7	30.7	30.4 ± 0.15	29.7	30.8
	Area	30.6 ± 0.09	29.7	31.7	30.7 ± 0.09	29.7	31.9

Table 5.2-5. Mean, Standard Error (SE), Minimum, and Maximum Values for Surface and Bottom Water Specific Conductance (mS/cm) by Transect and Sampling Area

Area	Transect	Surface			Bottom		
		Mean ± SE	Min	Max	Mean ± SE	Min	Max
BB1	a	52.5 ± 0.69	50.6	54.6	52.5 ± 0.69	50.6	54.6
	b	52.6 ± 0.85	49.4	54.9	52.7 ± 0.86	49.5	55.0
	c	53.1 ± 0.93	50.3	55.7	53.0 ± 0.94	50.2	55.7
	d	54.1 ± 0.67	52.2	56.0	54.1 ± 0.67	52.2	56.0
	e	54.5 ± 0.33	53.3	55.5	54.5 ± 0.33	53.4	55.5
	Area	53.3 ± 0.33	49.4	56.0	53.4 ± 0.33	49.5	56.0
BB2	a	55.1 ± 0.17	54.3	55.6	55.1 ± 0.18	54.3	55.6
	b	55.2 ± 0.16	54.4	55.8	55.2 ± 0.17	54.4	55.8
	c	55.6 ± 0.07	55.3	55.8	55.6 ± 0.06	55.3	55.8
	d	55.4 ± 0.10	55.0	55.7	55.4 ± 0.10	55.0	55.7
	e	54.7 ± 0.10	54.2	55.0	54.7 ± 0.10	54.1	55.0
	Area	55.2 ± 0.07	54.2	55.8	55.2 ± 0.08	54.1	55.8
BB3	a	54.2 ± 0.33	52.9	55.3	55.4 ± 0.06	55.1	55.6
	b	54.0 ± 0.80	49.4	55.6	55.6 ± 0.08	55.3	56.0
	c	54.8 ± 0.27	53.8	55.6	55.8 ± 0.14	55.3	56.3
	d	55.7 ± 0.24	54.8	56.4	56.0 ± 0.11	55.5	56.4
	e	55.2 ± 0.17	54.8	56.3	55.3 ± 0.15	55.0	56.3
	Area	54.8 ± 0.21	49.4	56.4	55.6 ± 0.06	55.0	56.4
BB4	a	50.4 ± 0.99	46.4	53.7	53.2 ± 0.13	52.5	53.7
	b	53.4 ± 0.12	52.9	53.9	53.5 ± 0.11	52.9	53.8
	c	54.2 ± 0.24	53.3	55.2	54.4 ± 0.36	53.2	56.2
	d	55.0 ± 0.60	53.1	56.8	55.0 ± 0.58	53.2	56.8
	e	55.4 ± 0.46	54.0	56.7	55.5 ± 0.41	54.1	56.7
	Area	53.7 ± 0.37	46.4	56.8	54.3 ± 0.21	52.5	56.8

Table 5.2-6. Mean, Standard Error (SE), Minimum, and Maximum Values for Surface and Bottom Water Salinity (PSS78) by Transect and Sampling Area

Area	Transect	Surface			Bottom		
		Mean ± SE	Min	Max	Mean ± SE	Min	Max
BB1	a	34.8 ± 0.56	33.1	36.5	34.8 ± 0.56	33.2	36.5
	b	34.8 ± 0.71	32.3	36.7	34.9 ± 0.70	32.3	36.8
	c	35.2 ± 0.76	32.9	37.4	35.2 ± 0.76	32.9	37.4
	d	35.9 ± 0.57	34.4	37.6	35.9 ± 0.57	34.4	37.6
	e	36.2 ± 0.32	35.2	37.1	36.2 ± 0.31	35.2	37.1
	Area	35.4 ± 0.27	32.3	37.6	35.4 ± 0.27	32.3	37.6
BB2	a	36.7 ± 0.09	36.2	37.0	36.7 ± 0.09	36.2	37.0
	b	36.8 ± 0.09	36.4	37.0	36.8 ± 0.08	36.4	37.1
	c	37.1 ± 0.04	37.0	37.3	37.1 ± 0.04	37.0	37.3
	d	36.9 ± 0.12	36.5	37.3	36.9 ± 0.11	36.6	37.3
	e	36.4 ± 0.11	35.8	36.8	36.4 ± 0.11	35.8	36.8
	Area	36.8 ± 0.06	35.8	37.3	36.8 ± 0.06	35.8	37.3
BB3	a	36.0 ± 0.25	35.0	37.0	37.0 ± 0.07	36.6	37.3
	b	36.9 ± 0.20	36.0	37.9	37.1 ± 0.11	36.7	37.5
	c	36.4 ± 0.16	35.8	36.9	37.2 ± 0.17	36.7	37.8
	d	37.1 ± 0.12	36.6	37.5	37.4 ± 0.05	37.1	37.5
	e	36.8 ± 0.15	36.2	37.6	36.9 ± 0.10	36.6	37.5
	Area	36.6 ± 0.10	35.0	37.9	37.1 ± 0.06	36.6	37.8
BB4	a	33.2 ± 0.69	30.2	35.6	35.1 ± 0.25	33.4	35.7
	b	35.5 ± 0.12	34.9	36.0	35.5 ± 0.12	34.9	35.9
	c	36.0 ± 0.20	35.2	36.7	36.2 ± 0.29	35.2	37.6
	d	36.6 ± 0.48	35.2	38.1	36.6 ± 0.49	35.0	38.1
	e	36.9 ± 0.38	35.8	38.0	37.1 ± 0.33	35.8	38.0
	Area	35.7 ± 0.28	30.2	38.1	36.1 ± 0.18	33.4	38.1

Table 5.2-7. Mean, Standard Error (SE), Minimum, and Maximum Values for Surface and Bottom Water Dissolved Oxygen (mg/L) by Transect and Sampling Area

Area	Transect	Surface			Bottom		
		Mean ± SE	Min	Max	Mean ± SE	Min	Max
BB1	a	4.50 ± 0.400	3.31	5.71	4.42 ± 0.376	3.30	5.55
	b	4.63 ± 0.401	3.72	6.54	4.55 ± 0.379	3.60	6.23
	c	5.07 ± 0.223	4.25	5.92	5.09 ± 0.215	4.25	5.99
	d	5.06 ± 0.297	3.85	6.11	5.05 ± 0.292	3.86	6.10
	e	4.76 ± 0.102	4.43	5.08	4.74 ± 0.140	4.27	5.21
	Area	4.80 ± 0.135	3.31	6.54	4.77 ± 0.132	3.30	6.23
BB2	a	5.21 ± 0.195	4.39	6.07	5.20 ± 0.215	4.40	6.13
	b	5.03 ± 0.298	4.12	6.72	5.06 ± 0.292	4.14	6.68
	c	5.08 ± 0.065	4.76	5.30	5.11 ± 0.081	4.81	5.61
	d	4.99 ± 0.127	4.53	5.35	4.96 ± 0.166	4.42	5.46
	e	4.39 ± 0.169	3.92	4.99	4.32 ± 0.158	3.65	4.80
	Area	4.94 ± 0.092	3.92	6.72	4.93 ± 0.097	3.65	6.68
BB3	a	4.75 ± 0.093	4.45	5.14	4.93 ± 0.132	4.31	5.43
	b	4.79 ± 0.162	3.90	5.30	4.93 ± 0.210	3.90	5.76
	c	4.70 ± 0.142	3.98	5.08	4.60 ± 0.158	3.84	5.01
	d	5.13 ± 0.186	4.51	5.65	5.16 ± 0.163	4.41	5.70
	e	4.85 ± 0.430	3.51	6.73	4.66 ± 0.349	3.55	5.74
	Area	4.84 ± 0.103	3.51	6.73	4.85 ± 0.097	3.55	5.76
BB4	a	4.56 ± 0.376	3.43	5.93	4.46 ± 0.373	2.98	5.97
	b	5.39 ± 0.499	3.61	6.91	5.24 ± 0.414	3.88	6.79
	c	5.68 ± 0.326	4.16	6.91	5.48 ± 0.188	4.71	6.27
	d	5.87 ± 0.233	5.00	6.68	5.66 ± 0.270	4.86	6.53
	e	5.19 ± 0.065	4.90	5.46	5.17 ± 0.088	4.76	5.47
	Area	5.34 ± 0.159	3.43	6.91	5.20 ± 0.140	2.98	6.79

Table 5.2-8. Mean, Standard Error (SE), Minimum, and Maximum Values for Surface and Bottom Water pH by Transect and Sampling Area

Area	Transect	Surface			Bottom		
		Mean ± SE	Min	Max	Mean ± SE	Min	Max
BB1	a	7.87 ± 0.018	7.79	7.92	7.87 ± 0.016	7.81	7.92
	b	7.87 ± 0.027	7.79	7.99	7.87 ± 0.025	7.79	7.97
	c	7.95 ± 0.023	7.89	8.10	7.96 ± 0.023	7.90	8.10
	d	7.94 ± 0.013	7.90	8.01	7.94 ± 0.012	7.91	8.01
	e	7.88 ± 0.011	7.85	7.93	7.88 ± 0.011	7.85	7.93
	Area	7.90 ± 0.010	7.79	8.10	7.90 ± 0.010	7.79	8.10
BB2	a	7.82 ± 0.010	7.78	7.86	7.83 ± 0.008	7.79	7.87
	b	7.83 ± 0.013	7.78	7.89	7.84 ± 0.013	7.79	7.88
	c	7.84 ± 0.016	7.79	7.90	7.86 ± 0.020	7.80	7.93
	d	7.81 ± 0.012	7.78	7.87	7.82 ± 0.009	7.79	7.85
	e	7.80 ± 0.018	7.74	7.86	7.80 ± 0.017	7.74	7.86
	Area	7.82 ± 0.006	7.74	7.90	7.83 ± 0.007	7.74	7.93
BB3	a	7.76 ± 0.006	7.73	7.78	7.78 ± 0.009	7.76	7.84
	b	7.80 ± 0.009	7.76	7.83	7.82 ± 0.013	7.77	7.86
	c	7.84 ± 0.012	7.79	7.87	7.83 ± 0.009	7.81	7.87
	d	7.87 ± 0.021	7.81	7.93	7.87 ± 0.022	7.80	7.93
	e	7.79 ± 0.018	7.71	7.85	7.79 ± 0.012	7.73	7.83
	Area	7.81 ± 0.008	7.71	7.93	7.82 ± 0.008	7.73	7.93
BB4	a	7.81 ± 0.014	7.75	7.87	7.83 ± 0.009	7.80	7.87
	b	7.83 ± 0.018	7.78	7.90	7.85 ± 0.014	7.79	7.89
	c	7.80 ± 0.009	7.76	7.83	7.82 ± 0.009	7.79	7.87
	d	7.80 ± 0.015	7.74	7.87	7.82 ± 0.013	7.78	7.88
	e	7.88 ± 0.022	7.79	7.98	7.87 ± 0.023	7.79	7.98
	Area	7.82 ± 0.008	7.74	7.98	7.84 ± 0.007	7.78	7.98

Table 5.2-9. Mean, Standard Error (SE), Minimum, and Maximum Values for Surface and Bottom Water Oxidation Reduction Potential (ORP) (mV) by Transect and Sampling Area

Area	Transect	Surface			Bottom		
		Mean ± SE	Min	Max	Mean ± SE	Min	Max
BB1	a	134.4 ± 5.66	116.0	169.0	120.4 ± 6.36	86.0	139.0
	b	146.4 ± 24.94	28.0	244.0	136.9 ± 24.00	33.0	238.0
	c	131.9 ± 16.20	52.0	187.0	126.9 ± 17.67	52.0	188.0
	d	140.0 ± 14.97	79.0	201.0	135.6 ± 15.57	74.0	193.0
	e	123.0 ± 11.46	87.0	198.0	118.4 ± 12.16	86.0	200.0
	Area	135.1 ± 6.87	28.0	244.0	127.6 ± 6.99	33.0	238.0
BB2	a	128.6 ± 6.35	98.0	152.0	129.8 ± 8.46	96.0	170.0
	b	142.6 ± 12.77	83.0	213.0	136.4 ± 13.67	81.0	210.0
	c	110.4 ± 9.59	77.0	140.0	106.5 ± 10.91	76.0	149.0
	d	83.5 ± 9.61	66.0	149.0	80.8 ± 8.80	62.0	140.0
	e	109.9 ± 15.94	27.0	179.0	103.0 ± 15.24	36.0	178.0
	Area	115.0 ± 5.77	27.0	213.0	111.3 ± 5.91	36.0	210.0
BB3	a	117.4 ± 21.84	63.0	259.0	116.6 ± 19.58	66.0	241.0
	b	98.9 ± 14.30	46.0	184.0	93.0 ± 13.97	43.0	180.0
	c	106.0 ± 8.09	74.0	131.0	97.6 ± 8.14	67.0	123.0
	d	96.1 ± 9.22	48.0	139.0	92.0 ± 8.88	47.0	134.0
	e	110.0 ± 15.90	67.0	202.0	100.1 ± 15.48	57.0	194.0
	Area	105.7 ± 6.36	46.0	259.0	99.9 ± 6.05	43.0	241.0
BB4	a	105.6 ± 6.38	73.0	129.0	94.3 ± 8.87	51.0	126.0
	b	119.9 ± 11.54	72.0	164.0	113.4 ± 11.07	71.0	162.0
	c	117.9 ± 13.15	85.0	185.0	111.5 ± 12.29	77.0	183.0
	d	104.0 ± 8.39	81.0	132.0	98.1 ± 7.28	75.0	128.0
	e	89.9 ± 18.28	41.0	182.0	88.8 ± 17.36	46.0	178.0
	Area	107.5 ± 5.47	41.0	185.0	101.2 ± 5.27	46.0	183.0

Table 5.2-10. Mean, Standard Error (SE), Minimum, and Maximum Values for Surface and Bottom Water Turbidity (NTU) by Transect and Sampling Area

Area	Transect	Surface			Bottom		
		Mean ± SE	Min	Max	Mean ± SE	Min	Max
BB1	a	4.5 ± 1.74	0.0	12.7	4.0 ± 1.69	0.0	12.5
	b	4.5 ± 1.97	0.0	14.9	5.0 ± 2.08	0.0	15.6
	c	3.0 ± 1.59	0.0	10.7	3.9 ± 1.81	0.0	11.8
	d	1.9 ± 1.89	0.0	15.1	1.7 ± 1.65	0.0	13.2
	e	0.0 ± 0.00	0.0	0.0	0.0 ± 0.00	0.0	0.0
	Area	2.8 ± 0.74	0.0	15.1	2.9 ± 0.75	0.0	15.6
BB2	a	0.0 ± 0.00	0.0	0.0	0.0 ± 0.00	0.0	0.0
	b	0.0 ± 0.00	0.0	0.0	0.0 ± 0.00	0.0	0.0
	c	0.0 ± 0.00	0.0	0.0	0.0 ± 0.00	0.0	0.0
	d	0.0 ± 0.00	0.0	0.0	0.0 ± 0.00	0.0	0.0
	e	0.5 ± 0.35	0.0	2.5	0.2 ± 0.16	0.0	1.3
	Area	0.1 ± 0.07	0.0	2.5	0.0 ± 0.06	0.0	1.3
BB3	a	0.0 ± 0.00	0.0	0.0	0.0 ± 0.00	0.0	0.0
	b	0.0 ± 0.00	0.0	0.0	0.0 ± 0.00	0.0	0.0
	c	0.0 ± 0.00	0.0	0.0	0.0 ± 0.00	0.0	0.0
	d	0.0 ± 0.00	0.0	0.0	0.0 ± 0.00	0.0	0.0
	e	5.9 ± 2.91	0.0	17.0	5.4 ± 2.63	0.0	15.1
	Area	1.2 ± 0.67	0.0	17.0	1.1 ± 0.60	0.0	15.1
BB4	a	11.6 ± 5.19	0.0	40.6	10.1 ± 4.09	0.0	30.7
	b	4.1 ± 2.72	0.0	18.0	4.1 ± 2.66	0.0	17.2
	c	0.1 ± 0.06	0.0	0.5	0.0 ± 0.00	0.0	0.0
	d	0.4 ± 0.14	0.0	1.0	0.6 ± 0.19	0.0	1.5
	e	0.4 ± 0.20	0.0	1.4	0.7 ± 0.33	0.0	2.5
	Area	3.3 ± 1.32	0.0	40.6	3.1 ± 1.11	0.0	30.7

Table 5.2-11. Mean, Standard Error (SE), Minimum, and Maximum Values for Porewater Temperature (°C) by Transect and Sampling Area

Area	Transect	Mean ± SE		Min	Max
BB1	a	30.2	0.31	28.6	31.2
	b	30.5	0.26	29.3	31.3
	c	30.1	0.28	29.4	31.0
	d	30.2	0.33	29.3	31.2
	e	30.3	0.31	29.3	31.1
	Area	30.3	0.13	28.6	31.3
BB2	a	30.4	0.24	29.7	31.1
	b	30.3	0.24	29.6	31.1
	c	30.2	0.23	29.6	30.9
	d	30.2	0.23	29.6	30.9
	e	30.2	0.22	29.6	30.9
	Area	30.3	0.10	29.6	31.1
BB3	a	30.2	0.15	29.8	30.7
	b	30.2	0.14	29.7	30.6
	c	30.2	0.19	29.7	30.8
	d	30.1	0.17	29.6	30.6
	e	30.2	0.13	29.8	30.6
	Area	30.2	0.07	29.6	30.8
BB4	a	30.5	0.14	30.0	30.9
	b	30.5	0.17	29.9	31.1
	c	29.8	0.30	27.8	30.7
	d	30.0	0.35	29.2	32.3
	e	29.4	0.25	28.2	30.0
	Area	30.0	0.13	27.8	32.3

Table 5.2-12. Statistical Analyses of Mean Porewater Temperature (°C) Among Transects, Study Areas, and Seasons. Solid Lines Indicate That Means are Not Significantly Different (p<0.05).

Differences Among Transects									
Group	Low				High	Statistical Results			
BB1-BB3 Combined	**c**	**d**	**a**	**e**	**b**	F Value	*p*	df Effect	df Error
	30.18	30.18	30.25	30.25	30.30	0.155	0.96	4	115
BB1	**c**	**a**	**d**	**e**	**b**	F Value	*p*	df Effect	df Error
	30.12	30.20	30.21	30.27	30.45	0.168	0.95	4	35
BB2	**c**	**d**	**e**	**b**	**a**	F Value	*p*	df Effect	df Error
	30.20	30.22	30.24	30.30	30.38	0.928	0.98	4	35
BB3	**d**	**b**	**a**	**c**	**e**	F Value	*p*	df Effect	df Error
	30.11	30.16	30.19	30.22	30.24	3.759	0.012	4	35
BB4	**e**	**c**	**d**	**a**	**b**	F Value	*p*	df Effect	df Error
	29.36	29.80	30.01	30.49	30.54	3.709	<0.05	4	35
Differences Among Study Areas									
Group	Low			High		Statistical Results			
Fall 2011	**BB4**	**BB3**	**BB1**	**BB2**		F Value	*p*	df Effect	df Error
	30.04	30.18	30.25	30.27		0.915	0.43	3	156
Spring 2011	**BB2**	**BB3**	**BB1**	**BB4**		F Value	*p*	df Effect	df Error
	26.99	27.24	27.29	27.95		92.149	<0.001	3	156
Fall 2010	**BB2**	**BB4**	**BB1**	**BB3**		F Value	*p*	df Effect	df Error
	26.37	26.58	26.69	26.73		2.046	0.110	3	156

Table 5.2-13. Average Values for Porewater and Bottom Water Temperature (°C) by Transect and Sampling Area

Area	Transect	Mean		Difference [1]
		Porewater	Bottom	
BB1	a	30.2	30.4	0.2
	b	30.5	30.4	-0.1
	c	30.1	30.5	0.4
	d	30.2	30.7	0.5
	e	30.3	30.0	-0.3
	Area	30.3	30.4	0.1
BB2	a	30.4	30.6	0.2
	b	30.3	30.9	0.6
	c	30.2	30.8	0.6
	d	30.2	30.5	0.3
	e	30.2	30.1	-0.1
	Area	30.3	30.6	0.3
BB3	a	30.2	30.8	0.6
	b	30.2	30.7	0.5
	c	30.2	30.4	0.2
	d	30.1	30.7	0.6
	e	30.2	30.3	0.1
	Area	30.2	30.6	0.4
BB4	a	30.5	31.0	0.5
	b	30.5	31.0	0.5
	c	29.8	30.3	0.5
	d	30.0	30.7	0.7
	e	29.4	30.4	1.0
	Area	30.0	30.7	0.7

[1] Positive values indicate the porewater temperature is lower than the ambient water temperature.

Table 5.2-14. Mean, Standard Error (SE), Minimum, and Maximum Values for

Porewater Specific Conductance (mS/cm) by Transect and Sampling Area

Area	Transect	Mean ±SE	Min	Max
BB1	a	53.7 ± 0.89	50.8	58.8
	b	53.5 ± 1.09	47.1	56.5
	c	53.9 ± 0.59	51.6	56.3
	d	54.5 ± 0.49	52.1	56.3
	e	54.9 ± 0.43	53.1	57.1
	Area	54.1 ± 0.33	47.1	58.8
BB2	a	55.9 ± 0.54	53.6	57.5
	b	55.5 ± 0.44	53.7	57.0
	c	55.3 ± 0.45	53.7	57.3
	d	55.3 ± 0.31	54.1	57.0
	e	54.9 ± 0.29	53.8	55.8
	Area	55.4 ± 0.18	53.6	57.5
BB3	a	56.9 ± 0.25	55.5	58.0
	b	57.3 ± 0.28	56.0	58.4
	c	56.3 ± 0.38	53.9	57.4
	d	56.4 ± 0.29	54.8	57.3
	e	54.7 ± 0.34	53.0	55.9
	Area	56.3 ± 0.19	53.0	58.4
BB4	a	53.5 ± 0.53	50.4	55.5
	b	52.8 ± 0.65	49.7	55.6
	c	54.9 ± 0.37	53.6	56.8
	d	54.9 ± 1.16	48.5	57.4
	e	57.2 ± 0.52	54.7	59.0
	Area	54.7 ± 0.38	48.5	59.0

Table 5.2-15. Statistical Analyses of Mean Porewater Conductance (mS/cm) Among Transects, Study Areas, and Seasons. Solid Lines Indicate That Means are Not Significantly Different (p<0.05)

Differences Among Transects									
Group	**Low**				**High**	**Statistical Results**			
BB1-BB3 Combined	**e**	**c**	**d**	**b**	**a**	F Value	*p*	df Effect	df Error
	54.85	55.16	55.4	55.42	55.46	0.499	0.74	4	115
BB1	**b**	**a**	**c**	**d**	**e**	F Value	*p*	df Effect	df Error
	53.49	53.66	53.89	54.46	54.94	0.655	0.628	4	35
BB2	**e**	**c**	**d**	**b**	**a**	F Value	*p*	df Effect	df Error
	54.89	55.27	55.34	55.51	55.85	0.706	0.593	4	35
BB3	**e**	**c**	**d**	**a**	**b**	F Value	*p*	df Effect	df Error
	54.71	56.31	56.39	56.87	57.26	9.833	<0.001	4	35
BB4	**b**	**a**	**c**	**d**	**e**	F Value	*p*	df Effect	df Error
	52.82	53.46	54.91	54.94	57.22	5.846	<0.05	4	35
Differences Among Study Areas									
Group	**Low**			**High**		**Statistical Results**			
Fall 2011	**BB1**	**BB4**	**BB2**	**BB3**		F Value	*p*	df Effect	df Error
	54.09	54.67	55.37	56.31		0.561	<0.001	3	156
Spring 2011	**BB4**	**BB3**	**BB1**	**BB2**		F Value	*p*	df Effect	df Error
	51.60	54.21	55.62	56.52		31.351	<0.001	3	156
Fall 2010	**BB4**	**BB1**	**BB3**	**BB2**		F Value	*p*	df Effect	df Error
	43.68	44.03	46.35	48.43		15.478	0.001	3	156

Table 5.2-16. Average Values for Porewater and Bottom Water Specific Conductance (mS/cm) by Transect and Sampling Area

Area	Transect	Mean		Difference
		Porewater	Bottom	
BB1	a	53.7	52.5	-1.2
	b	53.5	52.6	-0.9
	c	53.9	53.0	-0.9
	d	54.5	54.1	-0.4
	e	54.9	54.5	-0.4
	Area	54.1	53.4	-0.7
BB2	a	55.9	55.1	-0.8
	b	55.5	55.2	-0.3
	c	55.3	55.6	0.3
	d	55.3	55.4	0.1
	e	54.9	54.6	-0.3
	Area	55.4	55.2	-0.2
BB3	a	56.9	55.4	-1.5
	b	57.3	55.6	-1.7
	c	56.3	55.8	-0.5
	d	56.4	56.0	-0.4
	e	54.7	55.3	0.6
	Area	56.3	55.6	-0.7
BB4	a	53.5	53.1	-0.4
	b	52.8	53.5	0.7
	c	54.9	54.4	-0.5
	d	54.9	55.0	0.1
	e	57.2	55.5	-1.7
	Area	54.7	54.6	-0.1

[1] Positive values indicate the porewater specific conductance is lower than the ambient bottom water specific conductance.

Table 5.2-17. Mean and Standard Error of Water Depth (m) and Braun-Blauquet Coverage Abundance (BBCA) Scores for Total Macrophytes, Total Seagrass, and Total Macroalgae by Transect and Sampling Area

Area	Transect	Depth		Macrophytes		Seagrass		Macroalgae	
		Mean	±SE	Mean	±SE	Mean	±SE	Mean	±SE
BB1	a	1.6	± 0.06	2.1	± 0.14	1.4	± 0.14	1.8	± 0.13
	b	1.6	± 0.07	2.3	± 0.11	1.4	± 0.10	2.2	± 0.14
	c	1.7	± 0.06	2.0	± 0.15	1.1	± 0.10	1.8	± 0.16
	d	1.8	± 0.09	2.1	± 0.21	1.1	± 0.10	1.9	± 0.21
	e	1.8	± 0.07	1.4	± 0.10	1.2	± 0.12	1.1	± 0.06
	Area	1.7	± 0.03	2.0	± 0.13	1.2	± 0.06	1.8	± 0.16
BB2	a	2.2	± 0.11	1.8	± 0.14	0.5	± 0.09	1.8	± 0.14
	b	2.4	± 0.10	2.4	± 0.17	0.5	± 0.13	2.2	± 0.17
	c	2.7	± 0.12	2.1	± 0.12	1.3	± 0.10	1.8	± 0.10
	d	2.8	± 0.09	2.0	± 0.08	1.6	± 0.10	1.7	± 0.09
	e	2.8	± 0.07	2.0	± 0.08	2.0	± 0.08	1.4	± 0.09
	Area	2.6	± 0.06	2.1	± 0.09	1.2	± 0.27	1.8	± 0.12
BB3	a	2.6	± 0.05	1.8	± 0.13	1.3	± 0.08	1.5	± 0.12
	b	2.8	± 0.06	1.6	± 0.11	1.0	± 0.07	1.6	± 0.11
	c	3.0	± 0.05	1.8	± 0.08	1.3	± 0.10	1.6	± 0.10
	d	3.3	± 0.03	1.8	± 0.08	1.1	± 0.07	1.7	± 0.09
	e	3.1	± 0.13	2.1	± 0.05	1.7	± 0.11	1.7	± 0.08
	Area	3.0	± 0.05	1.8	± 0.07	1.3	± 0.05	1.6	± 0.03
BB4	a	1.9	± 0.03	1.5	± 0.10	1.0	± 0.06	1.5	± 0.10
	b	2.0	± 0.04	1.5	± 0.09	0.9	± 0.09	1.4	± 0.09
	c	2.2	± 0.03	1.3	± 0.08	0.6	± 0.09	1.1	± 0.07
	d	2.3	± 0.06	1.4	± 0.10	0.7	± 0.13	1.2	± 0.08
	e	2.7	± 0.02	1.6	± 0.11	1.1	± 0.14	1.3	± 0.11
	Area	2.2	± 0.05	1.5	± 0.06	0.9	± 0.07	1.3	± 0.06

Table 5.2-18. Mean Braun-Blauquet Coverage Abundance (BBCA) Scores for Total Macrophytes, Total Seagrass, and Total Macroalgae by Transect, Sampling Area and Event

Area	Transect	Total Macrophytes			Total Seagrass			Total Macroalgae		
		Fall 2010	Spring 2011	Fall 2011	Fall 2010	Spring 2011	Fall 2011	Fall 2010	Spring 2011	Fall 2011
BB1	a	1.6	2.3	2.1	1.3	1.4	1.4	1.0	1.6	1.8
	b	1.1	2.7	2.3	1.0	1.6	1.4	0.9	2.0	2.2
	c	2.1	2.0	2.0	1.6	1.3	1.1	1.2	1.6	1.8
	d	2.1	3.0	2.1	1.3	1.4	1.1	1.4	2.2	1.9
	e	1.4	1.7	1.4	1.1	1.3	1.2	0.8	1.1	1.1
	Area	1.7	2.4	2.0	1.3	1.4	1.2	1.1	1.7	1.8
BB2	a	2.2	2.3	1.8	1.1	1.0	0.5	1.2	1.7	1.8
	b	1.8	2.3	2.4	1.0	1.1	0.5	1.1	1.8	2.2
	c	2.5	2.7	2.1	2.3	1.6	1.3	1.4	2.1	1.8
	d	3.3	3.4	2.0	2.3	1.8	1.6	1.9	2.3	1.7
	e	3.4	2.8	2.0	3.0	2.0	2.0	0.9	1.8	1.4
	Area	2.6	2.7	2.1	1.9	1.6	1.2	1.3	1.9	1.8
BB3	a	2.5	2.8	1.8	1.7	1.6	1.3	1.1	1.9	1.5
	b	1.3	2.8	1.6	0.7	1.1	1.0	1.0	2.4	1.6
	c	2.1	2.6	1.8	1.0	1.2	1.3	1.4	2.1	1.6
	d	1.8	2.2	1.8	1.2	1.2	1.1	1.3	1.9	1.7
	e	3.2	2.4	2.1	2.6	1.8	1.7	1.3	2.0	1.7
	Area	2.2	2.6	1.8	1.4	1.4	1.3	1.2	2.1	1.6
BB4	a	1.5	2.0	1.5	0.7	1.1	1.0	1.2	1.8	1.5
	b	2.1	2.4	1.5	0.7	1.1	0.9	1.3	1.8	1.4
	c	1.4	2.1	1.3	0.7	1.0	0.6	1.2	1.4	1.1
	d	2.0	1.5	1.4	1.5	0.9	0.7	1.3	1.3	1.2
	e	1.5	1.8	1.6	1.2	1.3	1.1	0.9	1.4	1.3
	Area	1.7	1.9	1.5	1.0	1.1	0.9	1.2	1.5	1.3

Table 5.2-19. Scientific Name and Common Name of Organisms Captured During Faunal Throw Trap (FTT) Sampling

Taxa	Common Name
Achirus lineatus	Lined sole
Alpheidae	Snapping shrimp
Alpheus floridanus	Sand snapping shrimp
Alpheus heterochaelis/estuariensis complex	Bigclaw/estuarine shrimp complex
Alpheus normani complex	Green snapping shrimp complex
Alpheus spp.	Snapping shrimp
Anarchopterus criniger	Fringed pipefish
Bollmannia communis	Ragged goby
Bowmaniella dissimilis	Opposum shrimp
Bowmaniella mexicana	Opposum shrimp
Callinectes danae	Dana swimming crab
Callinectes ornatus	Shellig
Callinectes spp.	Swimming crab
Caridea	Caridean shrimp
Chaenopsis ocellata	Bluethroat pikeblenny
Cosmocampus albirostris	Whitenose pipefish
Cosmocampus elucens	Shortfin pipefish
Ctenogobius boleosoma	Darter goby
Cuapetes americanus	Long-arm shrimp
Diplogrammus pauciradiatus	Spotted dragonet
Echinaster spinulosus	Small-spine sea star
Epialtidae	Spider crabs
Farfantepenaeus duorarum	Pink shrimp
Farfantepenaeus spp.	Penaeid shrimp
Gobiosoma grosvenori	Rockcut goby
Gobiosoma robustum	Code goby
Haemulon plumierii	White grunt
Hipployte cf. obliquimanus	Humpback shrimp
Hippocampus erectus	Spotted seahorse
Hippocampus zosterae	Dwarf seahorse
Hippolyte cf. obliquimanus	Humpback shrimp
Hippolyte cf. zostericola	Humpback shrimp
Hippolyte obliquimanus	Hippolyte obliquimanus
Hippolyte pleuracanthus	False zostera shrimp
Hippolyte pleuracanthus/zostericola complex	Zostera shrimp/false zostera shrimp complex
Hippolyte spp.	Humpback shrimp
Hippolyte zostericola	Zostera shrimp
Lagodon rhomboides	Pinfish
Latreutes fucorum	Slender sargassum shrimp

Table 5.2-19. Scientific Name and Common Name of Organisms Captured During Faunal Throw Trap (FTT) Sampling

Taxa	Common Name
Lucania parva	Rainwater killifish
Lytechinus variegatus	Green sea urchin
Majoidea	Spider crabs
Microgobius gulosus	Clown goby
Microgobius microlepis	Banner goby
Microgobius spp.	Bannerfin gobies
Mysida	Opposum shrimp
No Catch	No organisms captured
Octopus joubini	Atlantic pygmy octopus
Ophiuroidea	Brittle stars
Opsanus beta	Gulf toadfish
Paguroidea	Hermit crab
Paraclinus fasciatus	Banded blenny
Paraclinus marmoratus	Marbled blenny
Periclimenes americanus	American grass shrimp
Periclimenes cf. americanus	Grass shrimp
Periclimenes iridescens	Iridescent shrimp
Periclimenes spp.	Grass shrimp
Phycomenes siankaanensis	Siankaanensis grass shrimp
Portunus gibbesii	Iridescent swimming crab
Portunus ordwayi	Redhair swimming crab
Portunus sayi	Sargassum swimming crab
Portunus spp.	Portunid crab
Processa bermudensis	Bermuda night shrimp
Sicyonia spp.	Rock shrimp
Sphoeroides spengleri	Bandtail puffer
Synalpheus bousfieldi	Bousfields snapping shrimp
Synalpheus brooksi complex	Brooks snapping shrimp complex
Synalpheus spp.	Snapping shrimp
Syngnathus louisianae	Chain pipefish
Thor floridanus	Bryozoan shrimp
Thor floridanus/manningi complex	Bryozoan/Manning grass shrimp complex
Thor manningi	Manning grass shrimp
Thor spp.	Hippolytid shrimp
Xanthoidea	Mud crab

Table 5.2-20. Number of Occurrences in Faunal Throw Traps (n=80) and Percentage of Occurrence

Taxa	Number of Samples Occurred	Percentage of Samples Occurred
Paguroidea	59	74%
Gobiosoma robustum	33	41%
Farfantepenaeus duorarum	32	40%
Thor spp.	30	38%
Thor floridanus/manningi complex	29	36%
Thor floridanus	27	34%
Anarchopterus criniger	16	20%
Hippocampus zosterae	15	19%
Xanthoidea	14	18%
Diplogrammus pauciradiatus	13	16%
Alpheus spp.	12	15%
Hippolyte spp.	10	13%
Majoidea	10	13%
Ophiuroidea	10	13%
Hippolyte zostericola	9	11%
Echinaster spinulosus	8	10%
Opsanus beta	8	10%
Caridea	7	9%
Hippolyte cf. obliquimanus	4	5%
Periclimenes iridescens	4	5%
Hippolyte pleuracanthus	3	4%
Hippolyte pleuracanthus/zostericola complex	3	4%
Lytechinus variegatus	3	4%
Periclimenes spp.	3	4%
Farfantepenaeus spp.	2	3%
Hippolyte obliquimanus	2	3%
Lagodon rhomboides	2	3%
Microgobius microlepis	2	3%
No Catch	2	3%
Paraclinus fasciatus	2	3%
Portunus ordwayi	2	3%
Bowmaniella dissimilis	1	1%
Bowmaniella mexicana	1	1%
Callinectes danae	1	1%
Callinectes ornatus	1	1%
Callinectes spp.	1	1%
Ctenogobius boleosoma	1	1%
Gobiosoma grosvenori	1	1%

Table 5.2-20. Number of Occurrences in Faunal Throw Traps (n=80) and Percentage of Occurrence

Taxa	Number of Samples Occurred	Percentage of Samples Occurred
Haemulon plumierii	1	1%
Hippolyte cf. zostericola	1	1%
Lucania parva	1	1%
Microgobius gulosus	1	1%
Microgobius spp.	1	1%
Mysida	1	1%
Octopus joubini	1	1%
Periclimenes americanus	1	1%
Periclimenes cf. americanus	1	1%
Portunus gibbesii	1	1%
Portunus spp.	1	1%
Thor manningi	1	1%

Table 5.1-21. Total Number of Each Taxon Collected, the Percentage of Total Catch by Taxon and the Species Richness with Increasing Distance from Shore, All Study Areas Combined

Taxa	Transect [1]					Total	% of Total Catch
	a	b	c	d	e		
Fish							
Gobiosoma robustum	19	7	10	8	28	72	4.8%
Anarchopterus criniger	10	11	6	1	2	30	2.0%
Hippocampus zosterae	4	6	5	2	3	20	1.3%
Diplogrammus pauciradiatus	1	2	3	3	8	17	1.1%
Opsanus beta	2	1		1	7	11	0.7%
Lagodon rhomboides					3	3	0.2%
Microgobius microlepis		2		1		3	0.2%
Paraclinus fasciatus			1	1		2	0.1%
Ctenogobius boleosoma					1	1	0.1%
Gobiosoma grosvenori					1	1	0.1%
Haemulon plumierii					1	1	0.1%
Lucania parva					1	1	0.1%
Microgobius gulosus	1					1	0.1%
Microgobius spp.		1				1	0.1%
Caridean Shrimp							
Thor floridanus/manningi complex	174	28	16	24	81	323	21.4%
Thor spp.	67	8	44	12	80	211	14.0%
Thor floridanus	80	18	14	11	25	148	9.8%
Alpheus spp.	3	3	2	1	12	21	1.4%
Hippolyte spp.	8	1	4		8	21	1.4%
Hippolyte zostericola	10	3	2		6	21	1.4%
Caridea	8	1	1	1	1	12	0.8%
Hippolyte cf. obliquimanus		2			6	8	0.5%
Hippolyte pleuracanthus/zostericola complex	4				3	7	0.5%
Periclimenes iridescens				1	5	6	0.4%
Thor manningi	5					5	0.3%
Periclimenes spp.			2		2	4	0.3%
Hippolyte pleuracanthus			3			3	0.2%

Table 5.1-21. Total Number of Each Taxon Collected, the Percentage of Total Catch by Taxon and the Species Richness with Increasing Distance from Shore, All Study Areas Combined

Taxa	Transect [1] a	b	c	d	e	Total	% of Total Catch
Hippolyte obliquimanus		1		1		2	0.1%
Hippolyte cf. zostericola	1					1	0.1%
Periclimenes americanus					1	1	0.1%
Periclimenes cf. americanus					1	1	0.1%
Penaeid Shrimp							
Farfantepenaeus duorarum	28	7	13	12	18	78	5.2%
Farfantepenaeus spp.				1	1	2	0.1%
Mysid Shrimp							
Bowmaniella dissimilis			2			2	0.1%
Bowmaniella mexicana					1	1	0.1%
Mysida	1					1	0.1%
Crabs							
Paguroidea	156	83	78	45	27	389	25.8%
Xanthoidea	6	8	4	1	3	22	1.5%
Majoidea	4	5	4		2	15	1.0%
Portunus ordwayi	1	1				2	0.1%
Callinectes danae				1		1	0.1%
Callinectes ornatus		1				1	0.1%
Callinectes spp.			1			1	0.1%
Portunus gibbesii			1			1	0.1%
Portunus spp.			1			1	0.1%
Echinoderms							
Echinaster spinulosus	6	3	1	4	1	15	1.0%
Ophiuroidea	2	2	2	3	2	11	0.7%
Lytechinus variegatus					5	5	0.3%
Mollusks							
Octopus joubini					1	1	0.1%
Total	**601**	**205**	**220**	**135**	**347**	**1508**	**100.0%**
Percentage of Total	**39.9%**	**13.6%**	**14.6%**	**9.0%**	**23.0%**	**100.0%**	
Species Richness	**24**	**24**	**24**	**21**	**33**	**49**	

[1] Distance from shore for each transect: a = 250 m; b = 500 m; c = 1000 m; d = 2000 m; e = 3000 m.

Table 5.2-22. Number Captured and Minimum and Maximum Lengths of Measured Specimens Captured During Faunal Throw Trap (FTT) Sampling

Taxa	Number Captured	Length (mm)		Length Type [1]
		Minimum	Maximum	
Thor floridanus/manningi complex	261	0.8	2.2	CL
Thor spp.	193	0.7	2.7	CL
Thor floridanus	148	1.0	2.7	CL
Farfantepenaeus duorarum	78	3.5	11.8	CL
Gobiosoma robustum	71	7.5	24.8	SL
Anarchopterus criniger	30	31.1	57.7	SL
Alpheus spp.	21	3.6	10.2	CL
Hippolyte spp.	21	1.0	2.1	CL
Hippolyte zostericola	21	1.4	2.1	CL
Hippocampus zosterae	20	10.6	27.3	CL
Diplogrammus pauciradiatus	16	9.3	22.2	SL
Opsanus beta	11	26.1	104.0	SL
Hippolyte cf. obliquimanus	8	1.3	2.0	CL
Hippolyte pleuracanthus/zostericola complex	7	1.0	2.2	CL
Periclimenes iridescens	6	1.9	2.7	CL
Caridea	5	0.9	1.1	CL
Thor manningi	5	1.0	1.5	CL
Periclimenes spp.	4	2.0	3.3	CL
Hippolyte pleuracanthus	3	1.3	1.8	CL
Lagodon rhomboides	3	38.0	83.0	SL
Microgobius microlepis	3	21.8	24.5	SL
Bowmaniella dissimilis	2	1.7	2.1	CL
Hippolyte obliquimanus	2	2.0	2.1	CL
Paraclinus fasciatus	2	26.5	28.1	SL
Portunus ordwayi	2	9.5	16.1	CW
Bowmaniella mexicana	1	2.0	2.0	CL
Callinectes danae	1	33.4	33.4	CW
Callinectes ornatus	1	47.6	47.6	CW
Callinectes spp.	1	17.2	17.2	CW
Ctenogobius boleosoma	1	18.8	18.8	SL
Farfantepenaeus spp.	1	2.5	2.5	CL
Gobiosoma grosvenori	1	19.1	19.1	SL
Haemulon plumierii	1	51.5	51.5	SL
Hippolyte cf. zostericola	1	1.7	1.7	CL
Lucania parva	1	14.4	14.4	SL
Microgobius gulosus	1	24.9	24.9	SL
Microgobius spp.	1	12.6	12.6	SL
Mysida	1	1.2	1.2	CL
Octopus joubini	1	22.1	22.1	ML

Table 5.2-22. Number Captured and Minimum and Maximum Lengths of Measured Specimens Captured During Faunal Throw Trap (FTT) Sampling

Taxa	Number Captured	Length (mm)		Length Type [1]
		Minimum	Maximum	
Periclimenes americanus	1	3.8	3.8	CL
Periclimenes cf. americanus	1	3.2	3.2	CL
Portunus gibbesii	1	18.0	18.0	CW
Portunus spp.	1	13.5	13.5	CW

[1] Length Types: CL = Carapace Length, CW = Carapace Width, ML = Mantle Length, SL = Standard Length.

Table 5.2-23. Total Number of Each Taxon Collected within (n=20) and among (n=80) Study Areas, the Percentage of Total Catch by Taxon and the Species Richness of Each Area

Taxa	Area				Total	% of Total Catch
	BB1	BB2	BB3	BB4		
Paguroidea	247	57	29	56	389	25.8%
Thor floridanus/manningi complex	191	87	45		323	21.4%
Thor spp.	49	10	103	49	211	14.0%
Thor floridanus	69	45	34		148	9.8%
Farfantepenaeus duorarum	51	11	13	3	78	5.2%
Gobiosoma robustum	20	12	35	5	72	4.8%
Anarchopterus criniger	5	11	8	6	30	2.0%
Xanthoidea	8		4	10	22	1.5%
Alpheus spp.	7	3	11		21	1.4%
Hippolyte spp.	7	6	6	2	21	1.4%
Hippolyte zostericola	15	5	1		21	1.4%
Hippocampus zosterae	2	1	3	14	20	1.3%
Diplogrammus pauciradiatus	6	2	3	6	17	1.1%
Echinaster spinulosus	7			8	15	1.0%
Majoidea	2	6	6	1	15	1.0%
Caridea	9	3			12	0.8%
Ophiuroidea	4	3	2	2	11	0.7%
Opsanus beta		4	6	1	11	0.7%
Hippolyte cf. obliquimanus	4	3	1		8	0.5%
Hippolyte pleuracanthus/zostericola complex	7				7	0.5%
Periclimenes iridescens	5	1			6	0.4%
Lytechinus variegatus			4	1	5	0.3%
Thor manningi	5				5	0.3%
Periclimenes spp.			4		4	0.3%

Table 5.2-23. Total Number of Each Taxon Collected within (n=20) and among (n=80) Study Areas, the Percentage of Total Catch by Taxon and the Species Richness of Each Area

Taxa	Area				Total	% of Total Catch
	BB1	BB2	BB3	BB4		
Hippolyte pleuracanthus	2	1			3	0.2%
Lagodon rhomboides	1		2		3	0.2%
Microgobius microlepis				3	3	0.2%
Bowmaniella dissimilis		2			2	0.1%
Farfantepenaeus spp.			1	1	2	0.1%
Hippolyte obliquimanus		2			2	0.1%
Paraclinus fasciatus		1		1	2	0.1%
Portunus ordwayi		2			2	0.1%
Bowmaniella mexicana				1	1	0.1%
Callinectes danae	1				1	0.1%
Callinectes ornatus	1				1	0.1%
Callinectes spp.		1			1	0.1%
Ctenogobius boleosoma	1				1	0.1%
Gobiosoma grosvenori		1			1	0.1%
Haemulon plumierii	1				1	0.1%
Hippolyte cf. zostericola			1		1	0.1%
Lucania parva			1		1	0.1%
Microgobius gulosus				1	1	0.1%
Microgobius spp.				1	1	0.1%
Mysida	1				1	0.1%
Octopus joubini	1				1	0.1%
Periclimenes americanus		1			1	0.1%
Periclimenes cf. americanus		1			1	0.1%
Portunus gibbesii		1			1	0.1%
Portunus spp.			1		1	0.1%
Total	**729**	**283**	**324**	**172**	**1508**	**100.0%**
Percentage of Total	**72.4%**	**28.1%**	**32.2%**	**17.1%**	**100.0%**	
Species Richness	**29**	**28**	**24**	**20**	**49**	

Table 5.2-24. Comparison of Taxa Collected in Fall 2011, Spring 2011, and Fall 2010 Sampling Events

Taxa	Fall 2011		Spring 2011		Fall 2010	
	Number Collected	% of Catch	Number Collected	% of Catch	Number Collected	% of Catch
Paguroidea	389	26%	216	21%	8	2%
Thor floridanus/manningi complex	323	21%	33	3%		
Thor spp.	211	14%	108	11%		
Thor floridanus	148	10%	192	19%		
Farfantepenaeus duorarum	78	5%	9	1%	16	5%
Gobiosoma robustum	72	5%	76	8%	49	15%
Anarchopterus criniger	30	2%	14	1%	13	4%
Xanthoidea	22	1%	35	3%	3	1%
Alpheus spp.	21	1%	15	1%		
Hippolyte spp.	21	1%	2	0%		
Hippolyte zostericola	21	1%	85	8%		
Hippocampus zosterae	20	1%	23	2%	12	4%
Diplogrammus pauciradiatus	17	1%	26	3%	14	4%
Echinaster spinulosus	15	1%	4	0%		
Majoidea	15	1%	8	1%		
Caridea	12	1%	5	0%	140	43%
Ophiuroidea	11	1%	12	1%		
Opsanus beta	11	1%	23	2%	4	1%
Hippolyte cf. obliquimanus	8	1%				
Hippolyte pleuracanthus/zostericola complex	7	0%	3	0%		
Periclimenes iridescens	6	0%	1	0%		
Lytechinus variegatus	5	0%				
Thor manningi	5	0%	12	1%		
Periclimenes spp.	4	0%				
Hippolyte pleuracanthus	3	0%				
Lagodon rhomboides	3	0%	10	1%	1	0%
Microgobius microlepis	3	0%	6	1%		
Bowmaniella dissimilis	2	0%	1	0%		
Farfantepenaeus spp.	2	0%	15	1%		
Hippolyte obliquimanus	2	0%	1	0%		
Paraclinus fasciatus	2	0%	13	1%	5	2%
Portunus ordwayi	2	0%				

Table 5.2-24. Comparison of Taxa Collected in Fall 2011, Spring 2011, and Fall 2010 Sampling Events

Taxa	Fall 2011		Spring 2011		Fall 2010	
	Number Collected	% of Catch	Number Collected	% of Catch	Number Collected	% of Catch
Bowmaniella mexicana	1	0%				
Callinectes danae	1	0%				
Callinectes ornatus	1	0%			3	1%
Callinectes spp.	1	0%				
Ctenogobius boleosoma	1	0%				
Gobiosoma grosvenori	1	0%				
Haemulon plumierii	1	0%				
Hippolyte cf. zostericola	1	0%	1	0%		
Lucania parva	1	0%				
Microgobius gulosus	1	0%				
Microgobius spp.	1	0%				
Mysida	1	0%	1	0%		
Octopus joubini	1	0%				
Periclimenes americanus	1	0%				
Periclimenes cf. americanus	1	0%				
Portunus gibbesii	1	0%				
Portunus spp.	1	0%	1	0%		
Achirus lineatus			1	0%		
Alpheidae					39	12%
Alpheus floridanus			1	0%		
Alpheus heterochaelis/estuariensis complex			3	0%		
Alpheus normani complex			14	1%		
Bollmannia communis			1	0%		
Chaenopsis ocellata			1	0%		
Cosmocampus albirostris			1	0%		
Cosmocampus elucens			1	0%		
Cuapetes americanus			8	1%		
Epialtidae					17	5%
*Hipploy*te *cf. obliquimanus*			8	1%		
Hippocampus erectus			1	0%		
Latreutes fucorum			2	0%		
Paraclinus marmoratus					1	0%
Phycomenes			5	0%		

Table 5.2-24. Comparison of Taxa Collected in Fall 2011, Spring 2011, and Fall 2010 Sampling Events

Taxa	Fall 2011		Spring 2011		Fall 2010	
	Number Collected	% of Catch	Number Collected	% of Catch	Number Collected	% of Catch
siankaanensis						
Portunus sayi			1	0%		
Processa bermudensis			2	0%		
Sicyonia spp.			1	0%		
Sphoeroides spengleri			1	0%		
Synalpheus bousfieldi			1	0%		
Synalpheus brooksi complex			3	0%		
Synalpheus sp.			1	0%		
Syngnathus louisianae					1	0%
Total	**1508**	**100%**	**1008**	**100%**	**326**	**100%**
Number of taxa	**49**		**50**		**16**	

Table 5.2-25. Light Readings (µmols/m2/sec) Taken Simultaneously in Air and at Each of Three Water Depths at One Point Along Each Transect

		Sub-Surface					Mid-Depth					Off-Bottom				
Area	Transect	Depth (m)	Air	Water Column	ATN [1]	ATN %	Depth (m)	Air	Water Column	ATN	ATN %	Depth (m)	Air	Water Column	ATN	ATN %
BB1	a	0.3	2219	1732	487	22%	0.7	2202	1372	830	38%	1.0	2219	1250	969	44%
	b	0.3	1532	1218	314	20%	0.8	2262	1273	989	44%	1.3	2417	1241	1176	49%
	c	0.3	1873	1462	411	22%	0.8	2620	1700	920	35%	1.2	1762	897	865	49%
	d	0.3	2491	1705	786	32%	0.8	2503	1481	1022	41%	1.4	2476	1137	1339	54%
	e	0.3	2411	1881	530	22%	0.9	2407	1471	936	39%	1.4	2411	1213	1198	50%
	Area	0.3	2105	1600	506	24%	0.8	2399	1459	939	39%	1.3	2257	1148	1109	49%
BB2	a	0.3	2308	1553	755	33%	0.9	2308	1365	943	41%	1.5	2303	1182	1121	49%
	b	0.3	2324	1668	656	28%	1.0	2300	1516	784	34%	1.8	2319	1246	1073	46%
	c	0.3	478	436	42	9%	1.4	1196	662	534	45%	2.6	627	251	376	60%
	d	0.3	229	238	-9	-4%	1.4	244	146	98	40%	2.5	230	96	134	58%
	e	0.3	1161	989	172	15%	1.4	1191	680	511	43%	2.5	1432	637	795	56%
	Area	0.3	1300	977	323	16%	1.2	1448	874	574	41%	2.2	1382	682	700	54%
BB3	a	0.3	2345	2000	345	15%	1.2	1459	686	773	53%	2.2	2334	678	1656	71%
	b	0.3	2316	1731	585	25%	1.5	2364	1385	979	41%	2.7	2304	835	1469	64%
	c	0.3	2457	2133	324	13%	1.5	1502	924	578	38%	2.7	2469	1075	1394	56%
	d	0.3	893	712	181	20%	1.6	1619	812	807	50%	2.9	2440	827	1613	66%
	e	0.3	493	425	68	14%	1.8	1264	653	611	48%	3.2	481	143	338	70%
	Area	0.3	1701	1400	301	17%	1.5	1642	892	750	46%	2.7	2006	712	1294	66%
BB4	a	0.3	2629	2244	385	15%	0.8	1717	791	926	54%	1.4	2296	750	1546	67%
	b	0.3	2567	2204	363	14%	0.9	2511	1174	1337	53%	1.6	2446	986	1460	60%
	c	0.3	2617	1761	856	33%	1.0	2493	1611	882	35%	1.7	2519	850	1669	66%
	d	0.3	1180	864	316	27%	1.1	2760	1775	985	36%	1.8	2556	955	1601	63%
	e	0.3	2010	1547	463	23%	1.3	800	372	428	54%	2.4	1961	552	1409	72%
	Area	0.3	2201	1724	477	22%	1.0	2056	1145	912	46%	1.8	2356	819	1537	66%

[1] Attenuation (ATN) is the difference between the air and water readings.

Table 5.2-26. Summary of Porewater Analytical Results from the September 2011 Sampling Event

Parameter	Units	BB1-a-4-NTR		BB1-b-7-NTR		BB1-c-8-NTR		BB1-d-4-NTR		BB1-e-1-NTR		BB2-a-3-NTR		BB2-b-8-NTR		BB2-c-5-NTR		BB2-d-6-EB		BB2-d-6-NTR	
		9/21/2011		9/21/2011		9/21/2011		9/21/2011		9/20/2011		9/20/2011		9/20/2011		9/20/2011		9/20/2011		9/20/2011	
Temperature	°C																				
pH	SU																				
Dissolved Oxygen	mg/L																				
Spec Cond	μS/cm																				
Turbidity	NTU																				
Arsenic	mg/L																				
Barium	mg/L	0.08	U	0.08	U	0.08	U	0.08	U	0.08	U	0.08	U	0.08	U	0.08	U	0.00	U	0.08	U
Beryllium	mg/L																				
Cadmium	mg/L																				
Copper	mg/L																				
Iron	mg/L	0.57	I	0.67	I	0.89	I	0.55	I	0.69	I V	0.67	I V	1.90	I V	0.63	I V	0.00	I V	0.84	I V
Lead	mg/L																				
Manganese	mg/L																				
Molybdenum	mg/L																				
Nickel	mg/L																				
Selenium	mg/L																				
Thallium	mg/L																				
Vanadium	mg/L																				
Zinc	mg/L																				
Silica	mg/L																				
Calcium	mg/L	490.00		430.00		440.00		450.00		430.00		460.00		490.00		440.00		0.27	I	440.00	
Magnesium	mg/L	1300.00		1200.00		1300.00		1300.00		1300.00		1400.00		1400.00		1300.00		0.09		1400.00	
Potassium	mg/L	430.00		380.00		390.00		400.00		400.00		430.00		430.00		410.00		0.19	U	420.00	
Sodium	mg/L	11000.00		9600.00		10000.00		10000.00		10000.00		11000.00		11000.00		11000.00		0.51		11000.00	
Boron	mg/L	4.7		4.3		4.6		4.6		4.4		4.9		4.7		4.8		0.069		4.7	
Strontium	mg/L	8.10		7.20		7.40		7.40		7.60		8.30		8.70		7.90		0.00	I	7.80	
Chromium VI	mg/L																				
Mercury	mg/L																				
Bromide	mg/L	73.00		69.00		75.00		75.00		72.00	J3	76.00		68.00		73.00		0.03	U	76.00	
Chloride	mg/L	20000.00	V	20000.00	V	20000.00	V	20000.00	V	19000.00	V	19000.00	V	19000.00	V	19000.00	V	0.45	I	22000.00	V
Fluoride	mg/L	0.71	I	0.87	I	0.76	I	0.75	I	0.78	I	0.72	I	0.66	I	0.82	I	0.02	U	0.76	I
Sulfate	mg/L	2300.00		2200.00		2600.00		2000.00		2300.00	J3	2400.00		2500.00		2600.00		0.20	U	2500.00	
Total Ammonia	mg/L as N	0.26		0.30		0.33		0.25		0.55		0.51		0.25		0.57		0.28		0.30	
Ammonium ion NH4	mg/L as N																				
Unionized NH3	mg/L																				
Nitrate/Nitrite as N	mg/L	0.01		0.00	U	0.01	I	0.00	U	0.01		0.00	U	0.00	U	0.00	U	0.00	U	0.00	U
TKN	mg/L	0.34		0.52		0.44		0.44		0.44		0.73		0.35		0.57		0.53		0.37	
TN[9]	mg/L																				
Orthophosphate	mg/L	0.00	U J3	0.00	I	0.00	I	0.00	I	0.00	I J3	0.00	I	0.00	I	0.00	I	0.00	U	0.00	U
Phosphorus (P)	mg/L	0.01		0.01		0.01		0.01		0.02	U	0.02		0.01		0.01		0.00	U	0.01	
Alkalinity	mg/L ($CaCO_3$)	270.00		150.00		170.00		200.00		130.00		190.00		150.00		220.00		1.00	U	130.00	
Bicarbonate Alkalinity as CaCO3	mg/L	270.00		150.00		170.00		200.00		130.00		190.00		150.00		220.00		1.00	U	130.00	
Sulfides	mg/L	8.00		4.00		8.80		6.40		4.60		8.80		5.80		14.00		1.00	U	4.30	
Total Dissolved Solids	mg/L																				
Dissolved Inorganic Carbon	mg/L	10.00	U	10.00	U	10.00	U	10.00	U	10.00	U	10.00	U	10.00	U	10.00	U	10.00	U	10.00	U
δ18O	‰	1.7		1.6		1.7		1.7		2.0		2.0		1.8		1.8		-1.3		1.5	
δ2H	‰	10		10		11		17		9		19		18		10		0		9	
δ13C	‰	-4.55		-3.08		-3.29		-2.80		-3.37		-5.54		-2.82		-5.24		-13.62		-3.37	
Gross Alpha	pCi/L																				
Salinity	‰																				
Sr 87/86	‰																				
Tritium	pCi/L (1σ)																				

Notes:
* = No criteria specified for porewaters.
Salinity by PSS78 is not calculated for samples with chloride concentration less than 1500 mg/L (marine classification).

Key:
°C = Degrees Celcius.
I = Value betweeen the MDL and PQL.
J = estimated (+/- indicate bias)
mg/L = Milligrams per liter.
MDL = Minimum detection limits.
N = Nitrogen.
N.A. - not applicable.
NTU = Nephelometric turbidity unit(s).
pCi/L = Picocuries per liter.
SU = Salinity units.
U = Analyzed for but not detected at the reported value.
μS/cm = Micro Siemens per centimeter.
V = Detected in method blank (result<10X blank).

Table 5.2-26. Summary of Porewater Analytical Results from the September 2011 Sampling Event

		BB2-e-7-NTR		BB3-a-6-NTR		BB3-b-4-NTR		BB3-c-7-NTR		BB3-d-4-NTR		BB3-e-2-NTR		BB4-a-7-NTR		BB4-b-4-NTR		BB4-c-2-NTR		BB4-d-7-NTR	
Parameter	**Units**	9/20/2011		9/19/2011		9/20/2011		9/20/2011		9/20/2011		9/20/2011		9/19/2011		9/19/2011		9/19/2011		9/19/2011	
Temperature	°C																				
pH	SU																				
Dissolved Oxygen	mg/L																				
Spec Cond	µS/cm																				
Turbidity	NTU																				
Arsenic	mg/L																				
Barium	mg/L	0.08	U	0.08	U	0.08	U	0.08	U	0.08	U	0.08	U	0.08	U	0.08	U	0.08	U	0.08	U
Beryllium	mg/L																				
Cadmium	mg/L																				
Copper	mg/L																				
Iron	mg/L	0.77	I V	0.57	I	0.77	I V	0.81	I V	0.65	I V	0.79	I V	0.59	I	0.72	I	0.47	I	0.65	I
Lead	mg/L																				
Manganese	mg/L																				
Molybdenum	mg/L																				
Nickel	mg/L																				
Selenium	mg/L																				
Thallium	mg/L																				
Vanadium	mg/L																				
Zinc	mg/L																				
Silica	mg/L																				
Calcium	mg/L	500.00		490.00		470.00		460.00		470.00		480.00		530.00		470.00		470.00		470.00	
Magnesium	mg/L	1400.00		1300.00		1400.00		1400.00		1400.00		1400.00		1300.00		1300.00		1400.00		1300.00	
Potassium	mg/L	430.00		430.00		440.00		430.00		430.00		430.00		420.00		410.00		420.00		390.00	
Sodium	mg/L	11000.00		11000.00		11000.00		11000.00		11000.00		11000.00		10000.00		10000.00		11000.00		9800.00	
Boron	mg/L	4.9		4.7		5		4.8		4.8		4.7		4.7		4.5		4.6		4.4	
Strontium	mg/L	8.40		8.10		8.40		8.30		8.40		8.30		8.60		7.90		8.00		8.30	
Chromium VI	mg/L																				
Mercury	mg/L																				
Bromide	mg/L	66.00		73.00		74.00		66.00		68.00		70.00		69.00		72.00		73.00		75.00	
Chloride	mg/L	20000.00	V	20000.00		21000.00	V	20000.00	V	19000.00	V	19000.00	V	19000.00		18000.00		19000.00		18000.00	
Fluoride	mg/L	0.76	I	0.71	I	0.69	I	0.63	I	0.63	I	0.71	I	0.72	I	0.59	I	0.90	I	0.40	U
Sulfate	mg/L	2400.00		2300.00		2500.00		2300.00		2300.00		2300.00		2300.00		2200.00		2400.00		2300.00	
Total Ammonia	mg/L as N	0.23		0.26		0.34		0.35		0.49		0.27		0.34		0.35		0.18		0.51	
Ammonium ion NH4	mg/L as N																				
Unionized NH3	mg/L																				
Nitrate/Nitrite as N	mg/L	0.00	U	0.01	I	0.01	I	0.20		0.01		0.03	J3	0.01	I	0.00	U	0.71		0.07	
TKN	mg/L	0.25		0.34		0.46		0.56		0.51		0.32		0.65		0.62		0.72		0.66	
TN[9]	mg/L																				
Orthophosphate	mg/L	0.01		0.00	U	0.00	I J3	0.00	U	0.00	I	0.00	U	0.00	U	0.00	U	0.00	U	0.00	I
Phosphorus (P)	mg/L	0.01		0.01		0.01		0.01		0.01		0.01		0.01		0.01		0.01		0.02	
Alkalinity	mg/L ($CaCO_3$)	340.00		270.00		130.00		160.00		160.00		190.00		170.00		190.00		160.00		210.00	
Bicarbonate Alkalinity as CaCO3	mg/L	340.00		270.00		130.00		160.00		160.00		190.00		170.00		190.00		160.00		210.00	
Sulfides	mg/L	42.00		8.00		7.70		6.70		6.90		6.10		4.60		5.60		4.50		5.10	
Total Dissolved Solids	mg/L																				
Dissolved Inorganic Carbon	mg/L	11.00		10.00	U	10.00	U	10.00	U	10.00	U	10.00	U	10.00	U	10.00	U	10.00	U	10.00	U
δ18O	‰	1.4		1.9		2.1		2.0		1.7		1.8		2.4		2.2		2.6		1.9	
δ2H	‰	14		18		23		16		12		13		17		17		16		8	
δ13C	‰	-3.55		-3.41		-4.54		-4.79		-4.36		-3.44		-5.77		-6.16		-5.02		-5.82	
Gross Alpha	pCi/L																				
Salinity	‰																				
Sr 87/86	‰																				
Tritium	pCi/L (1σ)																				

Notes:
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mg/L = Milligrams per liter.
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N = Nitrogen.
N.A. - not applicable.
NTU = Nephelometric turbidity unit(s).
pCi/L = Picocuries per liter.
SU = Salinity units.
U = Analyzed for but not detected at the reported value.
µS/cm = Micro Siemens per centimeter.
V = Detected in method blank (result<10X blank).

Table 5.2-26. Summary of Porewater Analytical Results from the September 2011 Sampling Event

Parameter	Units	BB4-e-4-NTR 9/19/2011		BB1-a-4-EB 9/21/2011		BB4-a-7-EB 9/19/2011	
Temperature	°C						
pH	SU						
Dissolved Oxygen	mg/L						
Spec Cond	µS/cm						
Turbidity	NTU						
Arsenic	mg/L						
Barium	mg/L	0.08	U	0.00	U	0.00	I
Beryllium	mg/L						
Cadmium	mg/L						
Copper	mg/L						
Iron	mg/L	0.58	I	0.00	I	0.01	I
Lead	mg/L						
Manganese	mg/L						
Molybdenum	mg/L						
Nickel	mg/L						
Selenium	mg/L						
Thallium	mg/L						
Vanadium	mg/L						
Zinc	mg/L						
Silica	mg/L						
Calcium	mg/L	470.00		0.26	I	0.10	U
Magnesium	mg/L	1300.00		0.14		0.02	U
Potassium	mg/L	400.00		0.19	U	0.19	U
Sodium	mg/L	9900.00		1.60		0.31	U
Boron	mg/L	4.3		0.062		0.063	
Strontium	mg/L	7.80		0.00	I	0.00	U
Chromium VI	mg/L						
Mercury	mg/L						
Bromide	mg/L	0.68		0.03	U	0.03	U
Chloride	mg/L	18000.00		0.37	I	0.31	I
Fluoride	mg/L	0.65	I	0.02	U	0.02	U
Sulfate	mg/L	2400.00		0.53		0.20	U
Total Ammonia	mg/L as N	0.32		0.21		0.23	
Ammonium ion NH4	mg/L as N						
Unionized NH3	mg/L						
Nitrate/Nitrite as N	mg/L	0.08	J3	0.47		0.05	
TKN	mg/L	0.55		0.16	I	0.29	
TN[9]	mg/L						
Orthophosphate	mg/L	0.00	U J3	0.00	U	0.00	U
Phosphorus (P)	mg/L	0.01		0.00	U	0.00	U
Alkalinity	mg/L ($CaCO_3$)	200.00		1.30		1.50	
Bicarbonate Alkalinity as CaCO3	mg/L	200.00		1.30		1.50	
Sulfides	mg/L	8.80		1.00	U	1.00	U
Total Dissolved Solids	mg/L						
Dissolved Inorganic Carbon	mg/L	10.00	U	10.00	U	10.00	U
δ18O	‰	2.0		-1.2		-1.4	
δ2H	‰	12		-9		-5	
δ13C	‰	-4.82		-10.51		-13.56	
Gross Alpha	pCi/L						
Salinity	‰						
Sr 87/86	‰						
Tritium	pCi/L (1σ)						

Notes:
* = No criteria specified for porewaters.
Salinity by PSS78 is not calculated for samples with chloride concentration less than 1500 mg/L (marine classification).

Key:
°C = Degrees Celcius.
I = Value betweeen the MDL and PQL.
J = estimated (+/- indicate bias)
mg/L = Milligrams per liter.
MDL = Minimum detection limits.
N = Nitrogen.
N.A. - not applicable.
NTU = Nephelometric turbidity unit(s).
pCi/L = Picocuries per liter.
SU = Salinity units.
U = Analyzed for but not detected at the reported value.
µS/cm = Micro Siemens per centimeter.
V = Detected in method blank (result<10X blank).

Table 5.2-27. Laboratory Results for Biscayne Bay Ecological Monitoring Porewater Nutrient and Tracer Suite Sampling (Fall 2011)

Area	Transect	(mg/L)																				(‰)		
		Barium	Iron	Calcium	Magnesium	Potassium	Sodium	Boron	Strontium	Bromide	Chloride	Fluoride	Sulfate	Total Ammonia as N	Nitrate/ Nitrite as N	TKN	Phos-phorus	Alkali-nity	Bi-carbonate Alkalinity as $CaCO_3$	Sulfides	Dissolved Inorganic Carbon	δ13C	δ18O	δ2H
BB1	a	0.080	0.670	460.0	1300.0	410.0	10000.0	5.0	7.70	73.0	20000.0	0.91	2900.0	0.38	0.02	0.53	0.01	190.0	190.0	11.0	10.0	-4.55	1.7	10.0
	b	0.080	0.670	430.0	1200.0	380.0	9600.0	4.3	7.20	69.0	20000.0	0.87	2200.0	0.30	0.00	0.52	0.01	150.0	150.0	4.0	10.0	-3.08	1.6	10.0
	c	0.080	0.890	440.0	1300.0	390.0	10000.0	4.6	7.40	75.0	20000.0	0.76	2600.0	0.33	0.01	0.44	0.01	170.0	170.0	8.8	10.0	-3.29	1.7	11.0
	d	0.080	0.550	450.0	1300.0	400.0	10000.0	4.6	7.40	75.0	20000.0	0.75	2000.0	0.25	0.00	0.44	0.01	200.0	200.0	6.4	10.0	-2.80	1.7	17.0
	e	0.080	0.690	430.0	1300.0	400.0	10000.0	4.4	7.60	72.0	19000.0	0.78	2300.0	0.55	0.01	0.44	0.02	130.0	130.0	4.6	10.0	-3.37	2.0	9.0
	Area Means	0.080	0.690	442.0	1280.0	396.0	9920.0	4.60	7.50	72.8	19800.0	0.81	2400.0	0.36	0.01	0.47	0.01	168.0	168.0	7.0	10.0	-3.42	1.7	11.4
BB2	a	0.080	0.670	460.0	1400.0	430.0	11000.0	4.9	8.30	76.0	19000.0	0.72	2400.0	0.51	0.00	0.73	0.02	190.0	190.0	8.8	10.0	-5.54	2.0	19.0
	b	0.080	1.900	490.0	1400.0	430.0	11000.0	4.7	8.70	68.0	19000.0	0.66	2500.0	0.25	0.00	0.35	0.01	150.0	150.0	5.8	10.0	-2.82	1.8	18.0
	c	0.080	0.630	440.0	1300.0	410.0	11000.0	4.8	7.90	73.0	19000.0	0.82	2600.0	0.57	0.00	0.57	0.01	220.0	220.0	14.0	10.0	-5.24	1.8	10.0
	d	0.080	0.840	440.0	1400.0	420.0	11000.0	4.7	7.80	76.0	22000.0	0.76	2500.0	0.30	0.00	0.37	0.01	130.0	130.0	4.3	10.0	-3.37	1.5	9.0
	e	0.080	0.770	500.0	1400.0	430.0	11000.0	4.9	8.40	66.0	20000.0	0.76	2400.0	0.23	0.00	0.25	0.01	340.0	340.0	42.0	11.0	-3.55	1.4	14.0
	Area Means	0.080	0.960	466.0	1380.0	424.0	11000.0	4.80	8.20	71.8	19800.0	0.74	2480.0	0.37	0.00	0.45	0.01	206.0	206.0	15.0	10.2	-4.10	1.7	14.0
BB3	a	0.080	0.570	490.0	1300.0	430.0	11000.0	4.7	8.10	73.0	20000.0	0.71	2300.0	0.26	0.01	0.34	0.01	270.0	270.0	8.0	10.0	-3.41	1.9	18.0
	b	0.080	0.770	470.0	1400.0	440.0	11000.0	5.0	8.40	74.0	21000.0	0.69	2500.0	0.34	0.01	0.46	0.01	130.0	130.0	7.7	10.0	-4.54	2.1	23.0
	c	0.080	0.810	460.0	1400.0	430.0	11000.0	4.8	8.30	66.0	20000.0	0.63	2300.0	0.35	0.20	0.56	0.01	160.0	160.0	6.7	10.0	-4.79	2.0	16.0
	d	0.080	0.650	470.0	1400.0	430.0	11000.0	4.8	8.40	68.0	19000.0	0.63	2300.0	0.49	0.01	0.51	0.01	160.0	160.0	6.9	10.0	-4.36	1.7	12.0
	e	0.080	0.790	480.0	1400.0	430.0	11000.0	4.7	8.30	70.0	19000.0	0.71	2300.0	0.27	0.03	0.32	0.01	190.0	190.0	6.1	10.0	-3.44	1.8	13.0
	Area Means	0.080	0.720	474.0	1380.0	432.0	11000.0	4.80	8.30	70.2	19800.0	0.67	2340.0	0.34	0.05	0.44	0.01	182.0	182.0	7.1	10.0	-4.11	1.9	16.4
BB4	a	0.080	0.590	530.0	1300.0	420.0	10000.0	4.7	8.60	69.0	19000.0	0.72	2300.0	0.34	0.01	0.65	0.01	170.0	170.0	4.6	10.0	-5.77	2.4	17.0
	b	0.080	0.720	470.0	1300.0	410.0	10000.0	4.5	7.90	72.0	18000.0	0.59	2200.0	0.35	0.00	0.62	0.01	190.0	190.0	5.6	10.0	-6.16	2.2	17.0
	c	0.080	0.470	470.0	1400.0	420.0	11000.0	4.6	8.00	73.0	19000.0	0.90	2400.0	0.18	0.71	0.72	0.01	160.0	160.0	4.5	10.0	-5.02	2.6	16.0
	d	0.080	0.650	470.0	1300.0	390.0	9800.0	4.4	8.30	75.0	18000.0	0.40	2300.0	0.51	0.07	0.66	0.02	210.0	210.0	5.1	10.0	-5.82	1.9	8.0
	e	0.080	0.580	470.0	1300.0	400.0	9900.0	4.3	7.80	68.0	18000.0	0.65	2400.0	0.32	0.08	0.55	0.01	200.0	200.0	8.8	10.0	-4.82	2.0	12.0
	Area Means	0.080	0.600	482.0	1320.0	408.0	10140.0	4.50	8.10	71.4	18400.0	0.65	2320.0	0.34	0.17	0.64	0.01	186.0	186.0	5.7	10.0	-5.52	2.2	14.0

Table 5.2-28. Biscayne Bay Ecological Monitoring Soil Core Wet and Dry Bulk Densities (g/cm^3) by Horizon and Transect within Areas with Means (Fall 2011)

Area	Transect	Wet Bulk Density By Horizon (g/cm^3)			Dry Bulk Density By Horizon (g/cm^3)		
		10 cm	20 cm	30 cm	10 cm	20 cm	30 cm
BB1	a	1.20	1.30	1.40	0.31	.42	0.63
	b	1.60	1.60	1.40	0.88	0.96	0.65
	c	1.70	1.70	1.50	1.10	1.20	0.78
	d [1]	1.80	1.70	1.80	1.20	0.99	1.30
	e	1.90	1.80	1.70	1.30	1.20	1.10
	Area Means by Horizon	1.640	1.620	1.560	0.958	1.090	0.890
	Area Means	1.607			0.979		
BB2	a	1.80	1.80	1.80	1.30	1.30	1.20
	b [1]	1.70	1.70	-	1.10	1.10	-
	c	1.70	1.80	1.90	1.10	1.20	1.40
	d	1.80	1.80	1.80	1.20	1.30	1.30
	e	1.70	1.70	1.80	1.00	1.20	1.30
	Area Means by Horizon	1.740	1.760	1.830	1.140	1.220	1.300
	Area Means	1.777			1.220		
BB3	a	1.70	1.70	1.70	1.10	1.20	1.10
	b	1.70	1.70	1.80	1.00	1.10	1.30
	c	1.60	1.70	1.70	0.96	1.10	1.10
	d	1.60	1.60	1.60	0.81	0.97	0.97
	e	1.40	1.60	1.50	0.62	0.86	0.78
	Area Means by Horizon	1.600	1.660	1.660	0.900	1.050	1.050
	Area Means	1.640			1.000		
BB4	a	1.50	1.20	1.30	0.78	0.35	0.41
	b	1.60	1.60	1.40	0.99	1.00	0.63
	c	1.70	1.70	1.90	1.10	1.20	1.40
	d	1.60	1.70	1.70	0.97	1.00	1.10
	e	1.60	1.70	1.70	0.93	1.20	1.00
	Area Means by Horizon	1.600	1.580	1.600	0.950	0.950	0.910
	Area Means	1.593			0.937		

[1] Insufficient sediment depth to collect 30 cm core.

FIGURES

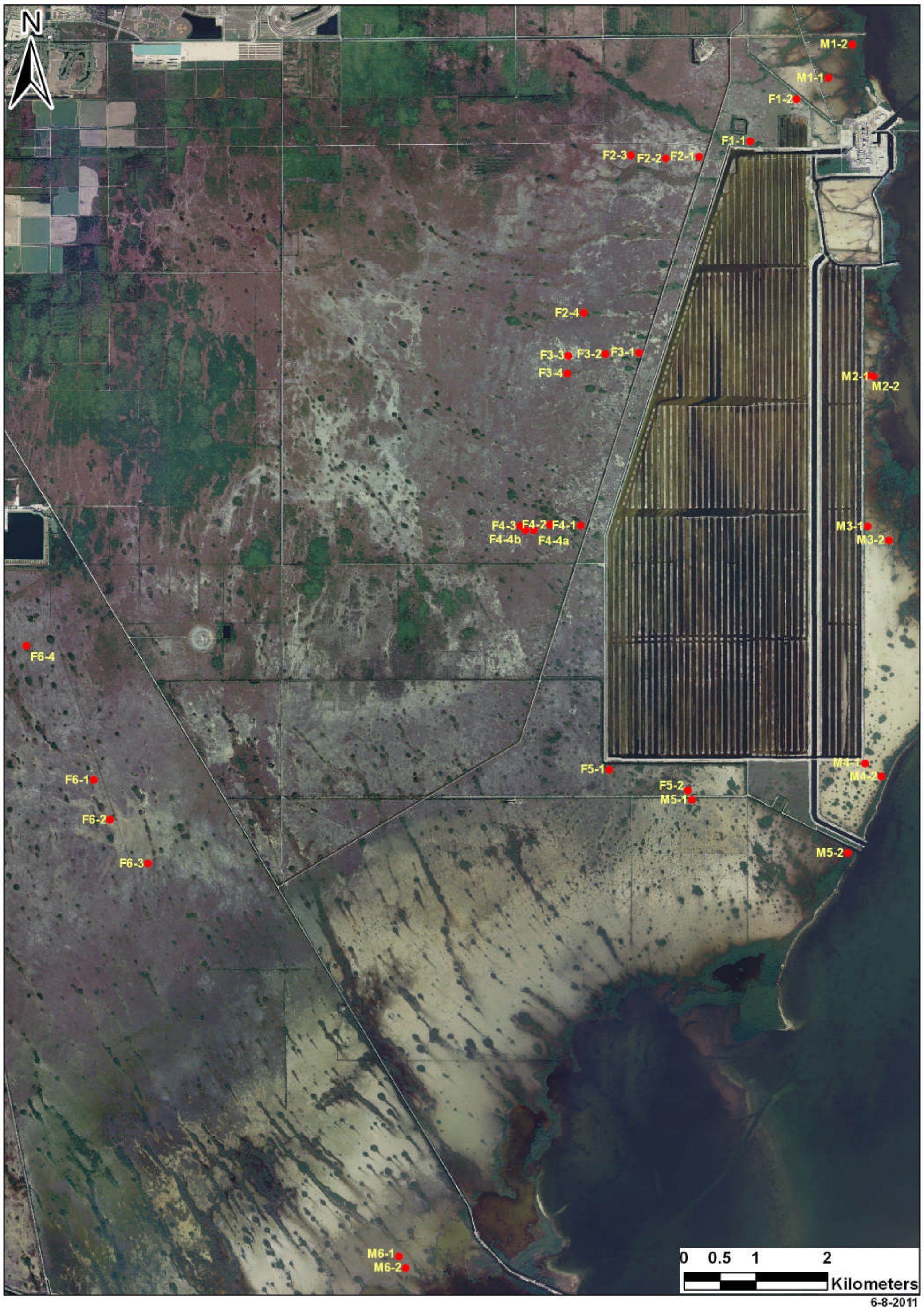

Figure 5.1-1. Marsh and Mangrove Plot Locations.

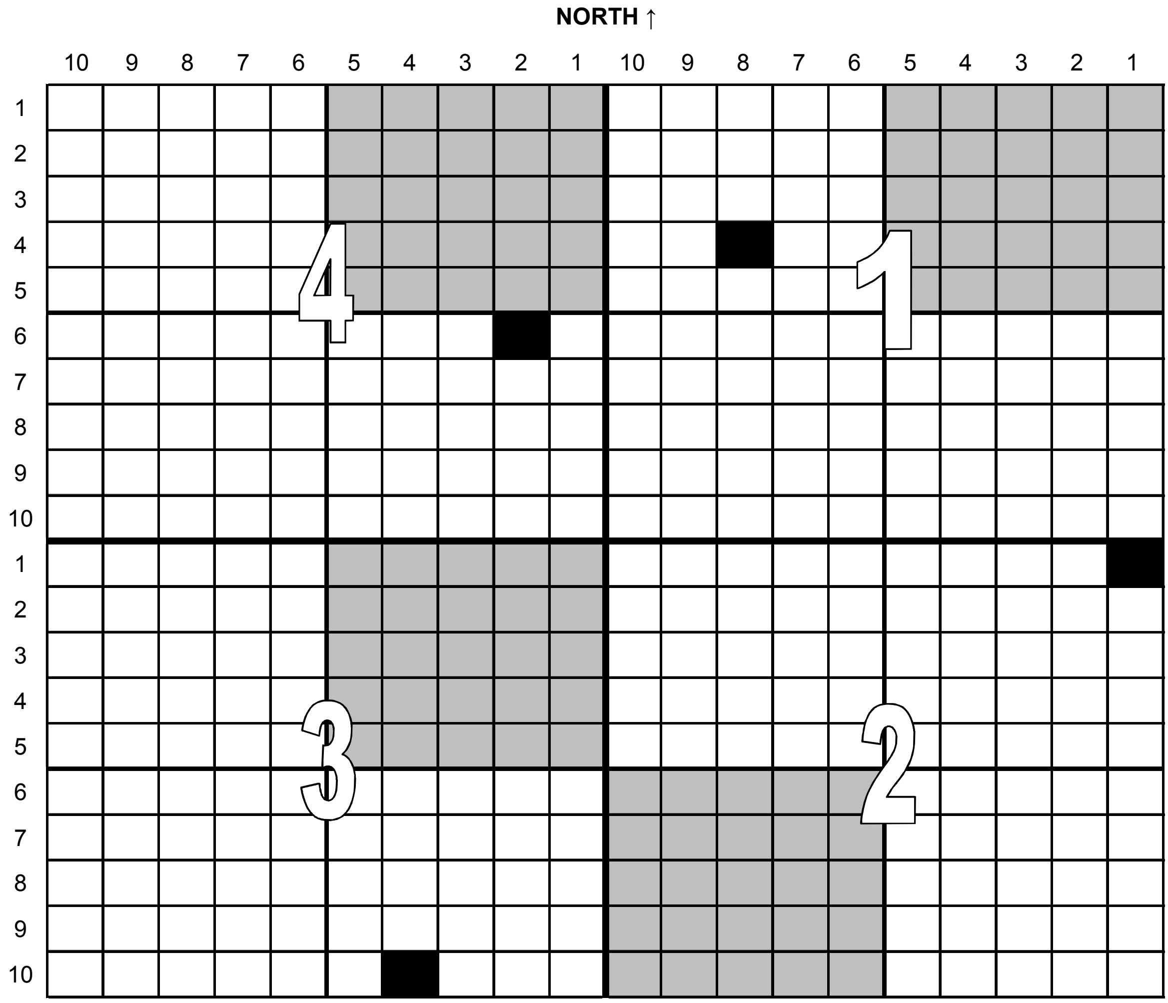

Figure 5.1-2. Example of Plot Design. One square represents one square meter. Gray areas represent 5x5 woody subplots; black squares represent 1x1 herbaceous subplots.

Figure 5.1-3. 1m x 1m Marsh Subplot.

Figure 5.1-4. Picture of Plot F3-3 Taken from the Northeast Corner Facing Southwest.

(Photo courtesy of Ecological Associates, Inc.)

Figure 5.1-5. Soil Cores Capped and Ready for Transport to the Lab for Processing.

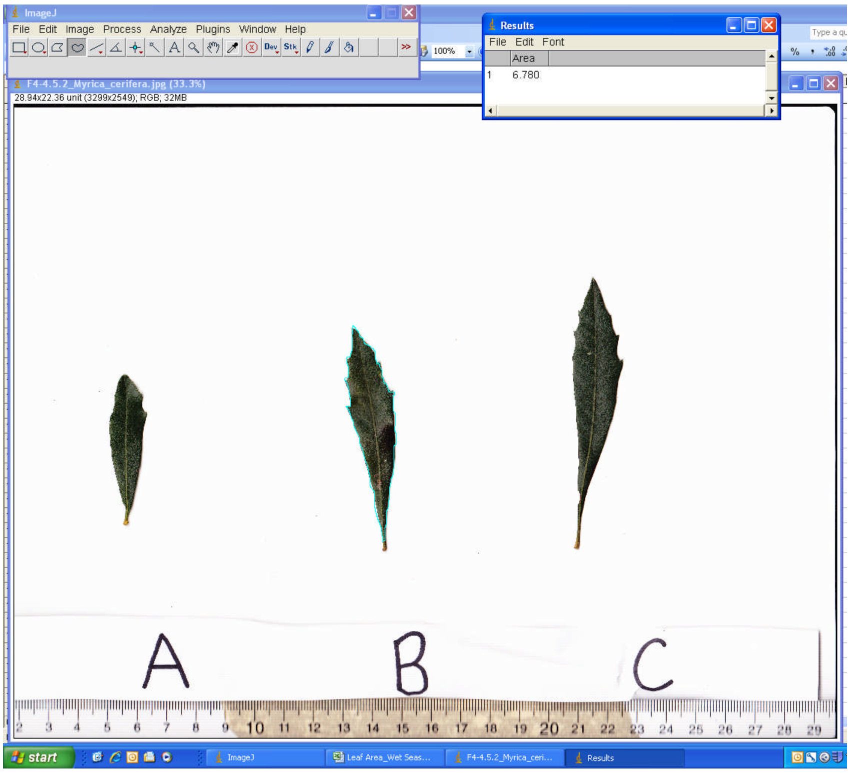

Figure 5.1-6. Screenshot of ImageJ with a Leaf Outlined for Surface Area Measurement.

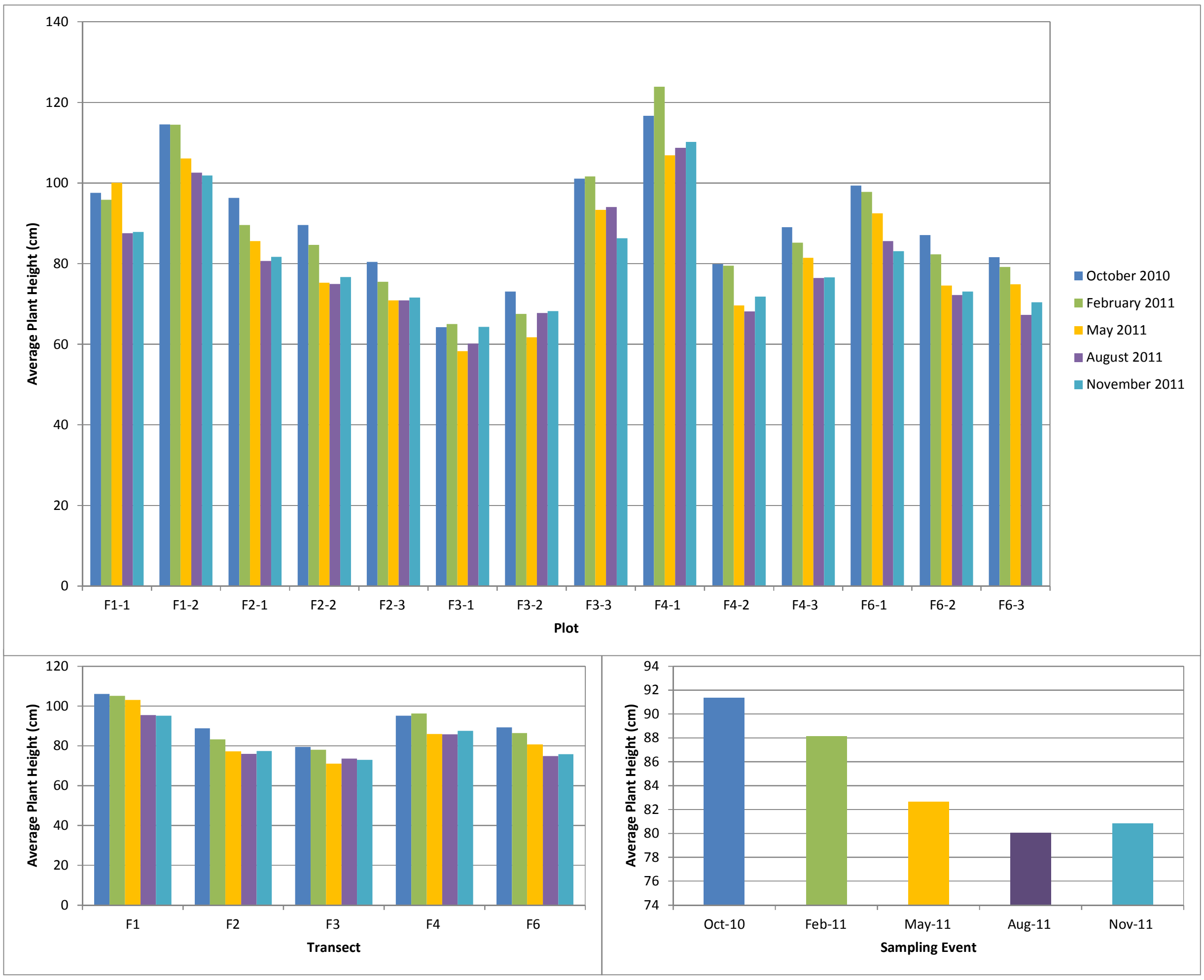

Figure 5.1-7. Sawgrass Height per Plot (Top), Transect (Left) and Sampling Event (Right).

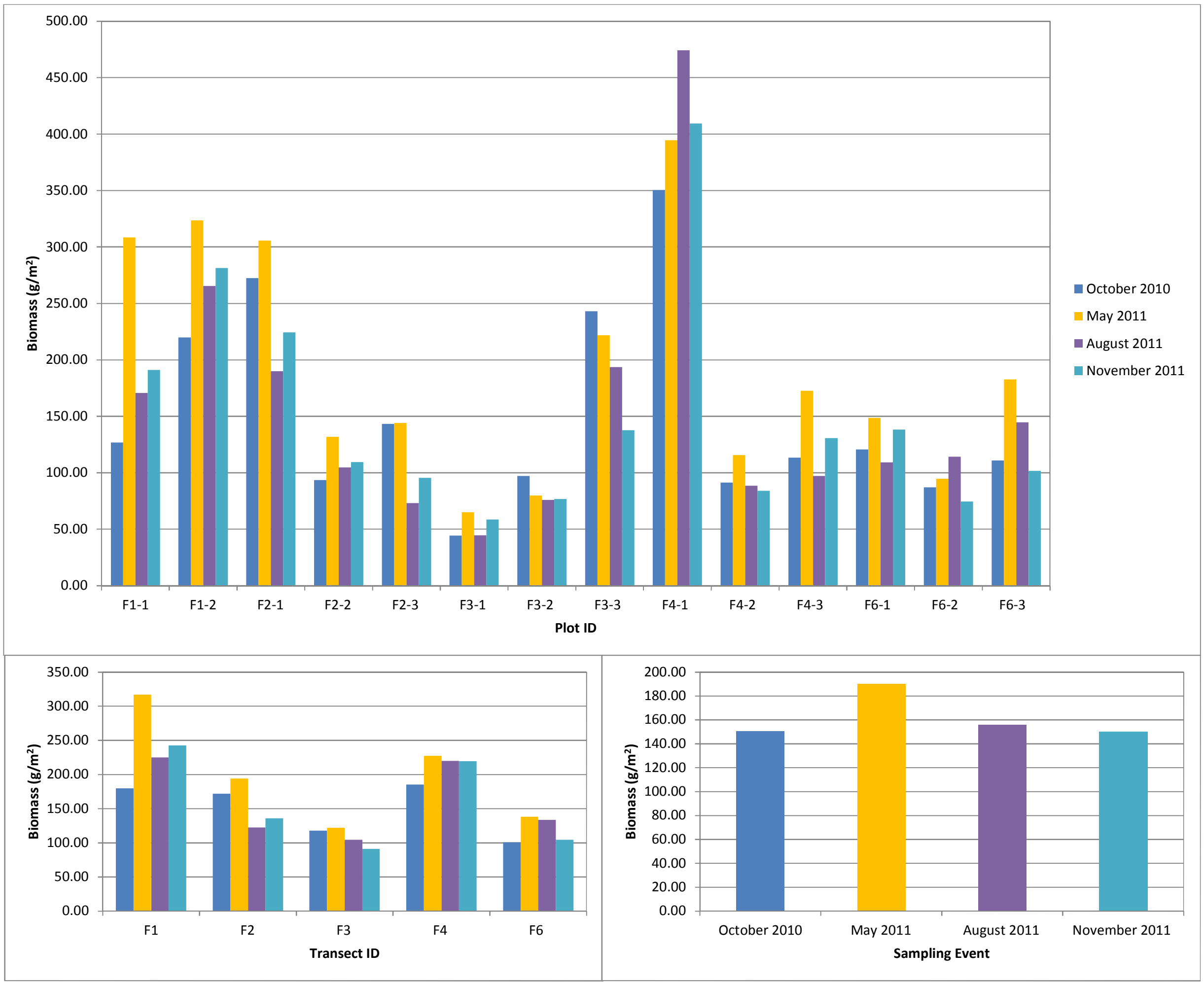

Figure 5.1-8. Sawgrass Biomass (g/m^2) per Plot (Top), Transect (Left) and Sampling Event (Right).

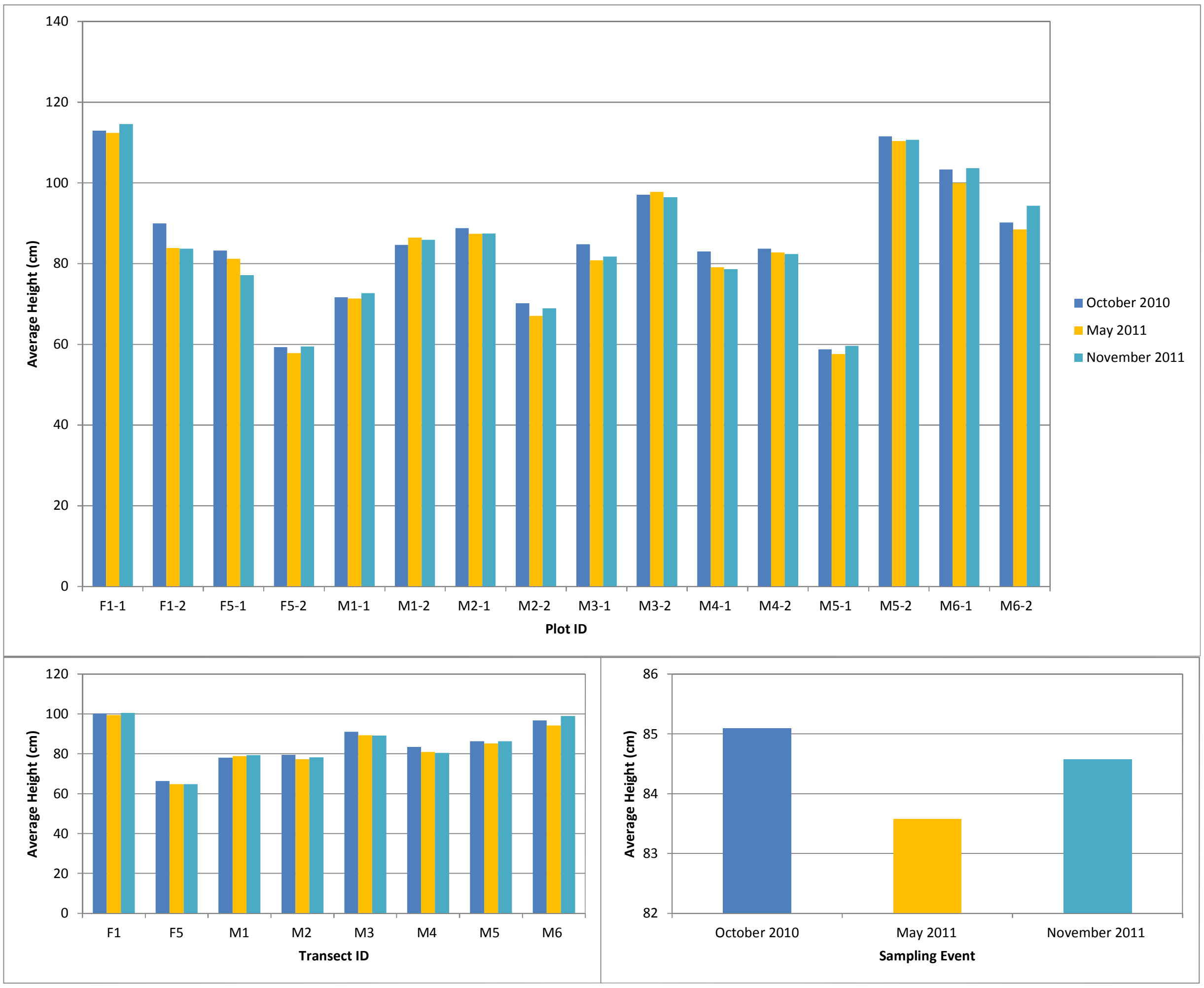

Figure 5.1-9. Red Mangrove Height per Plot (Top), Transect (Left) and Sampling Event (Right).

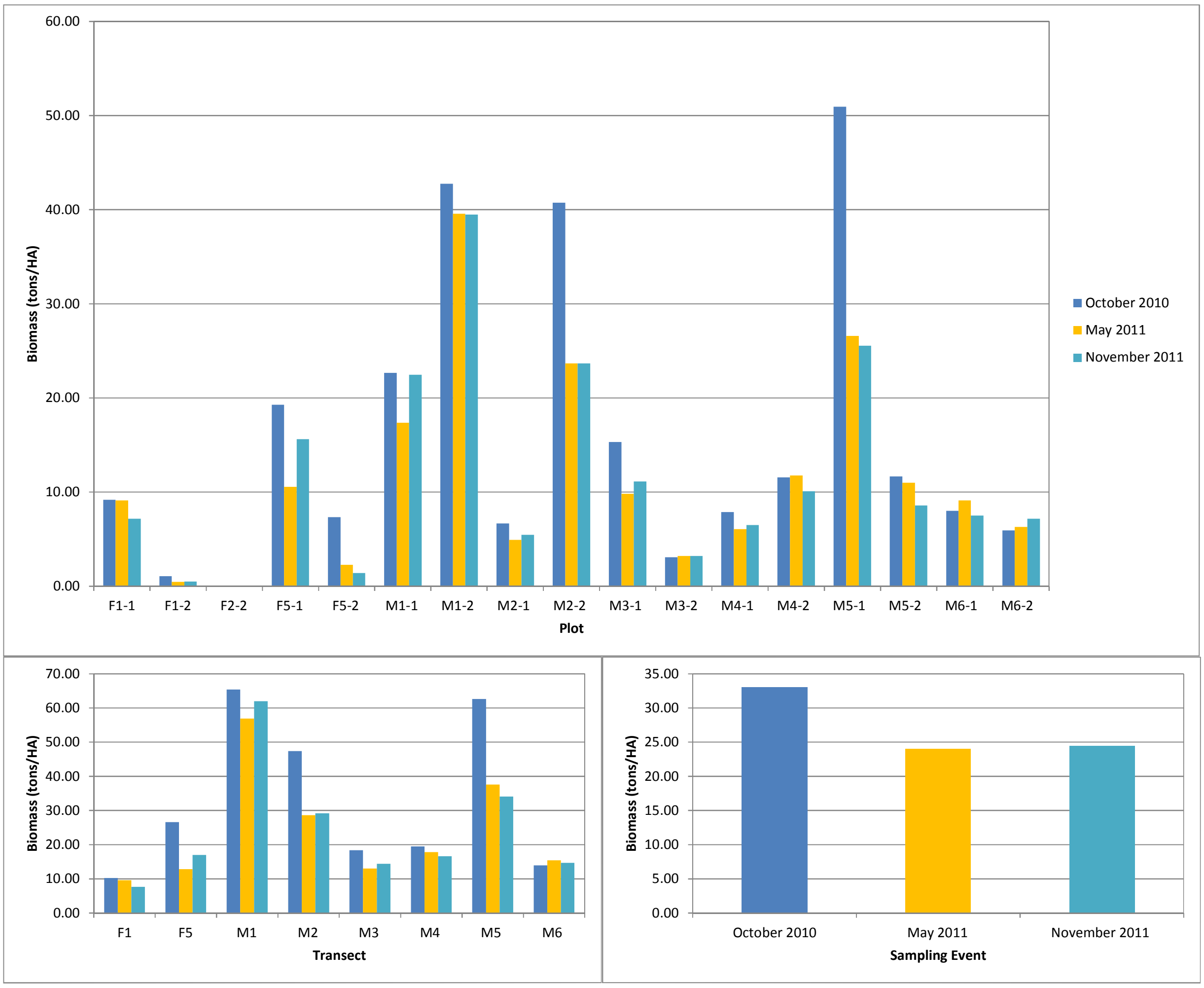

Figure 5.1-10. Red Mangrove Biomass (g/m^2) per Plot (Top), Transect (Left) and Sampling Event (Right).

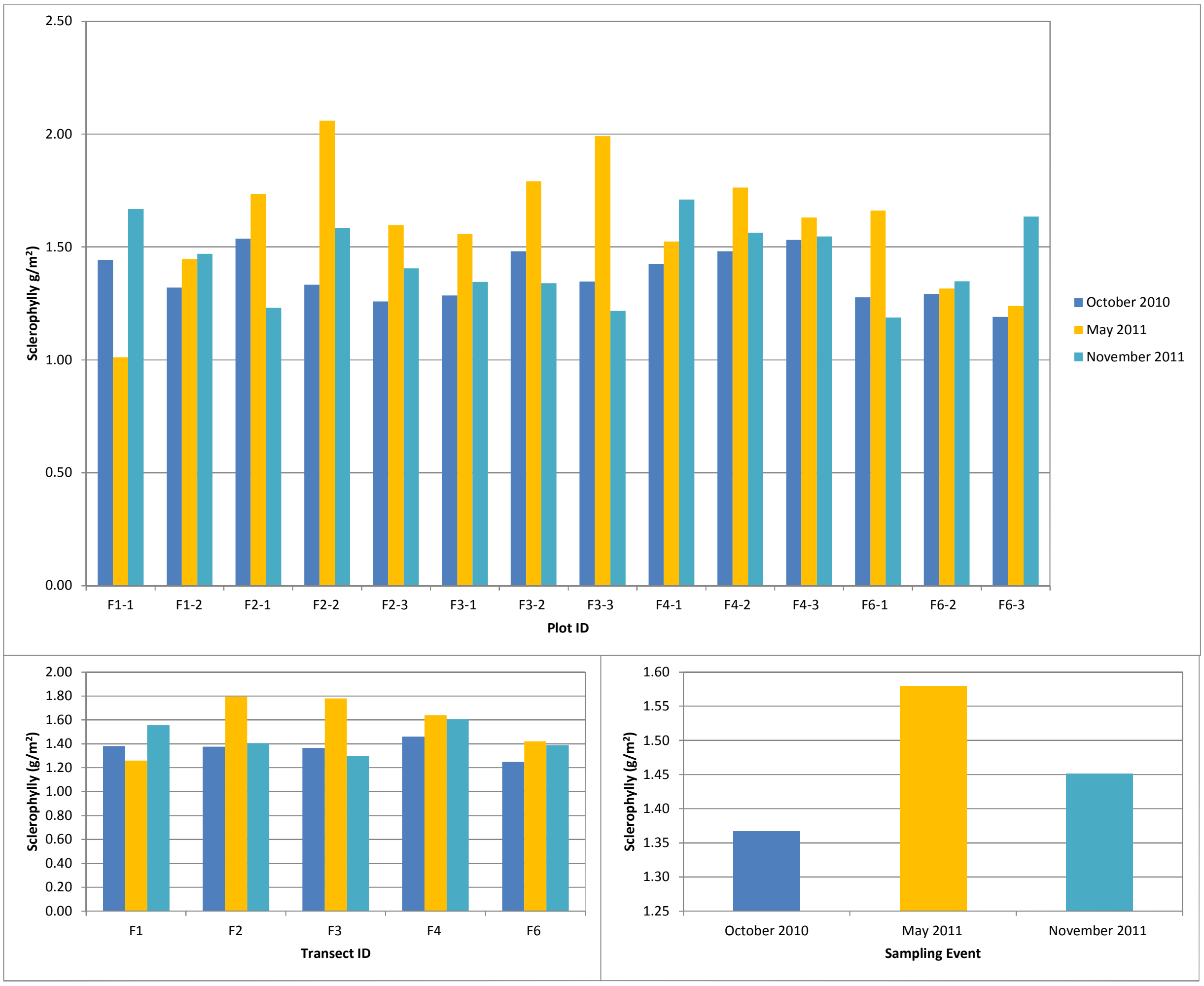

Figure 5.1-11. Sawgrass Leaf Sclerophylly per Plot (Top), Transect (Left) and Sampling Event (Right).

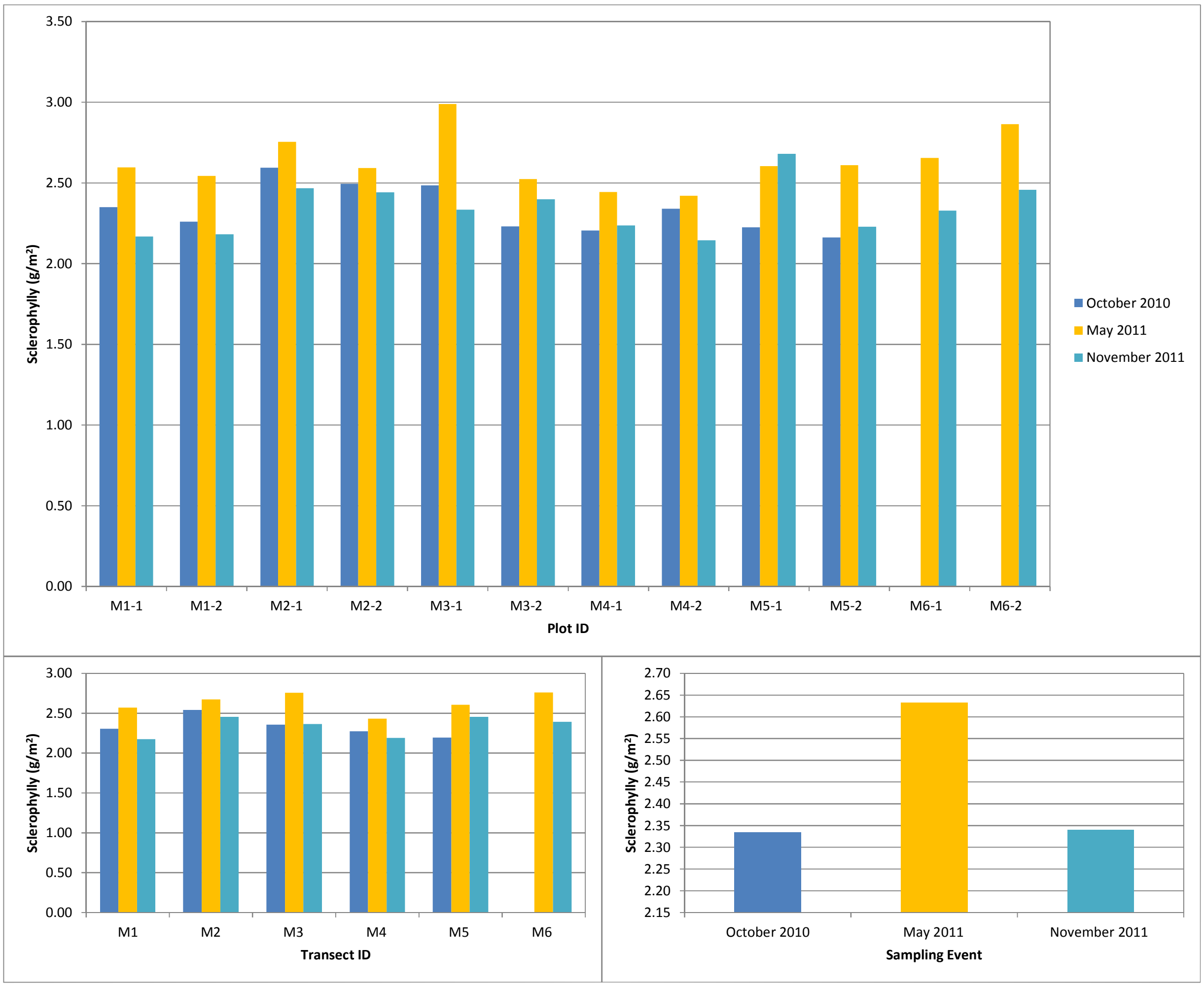

Figure 5.1-12. Red Mangrove Leaf Sclerophylly per Plot (Top), Transect (Left) and Sampling Event (Right).

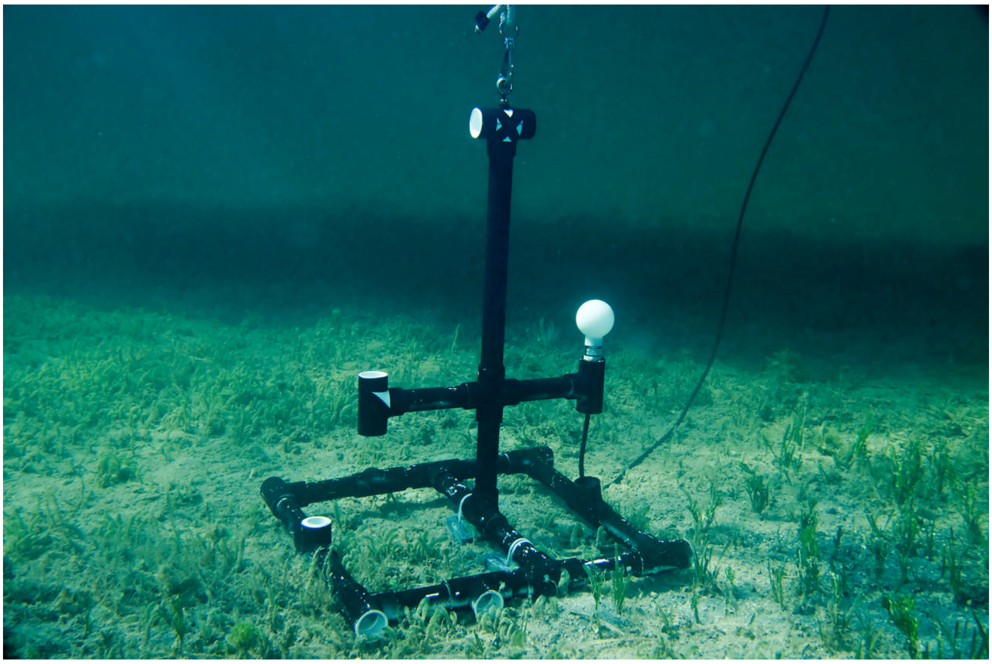

Figure 5.2-1. Licor LI-193 Sensor Mounted in a Non-Reflective Frame Used for Measuring Light at Different Depths within the Water Column, Shown Here Resting on the Bottom.

Figure 5.2-2. Licor LI-190 Sensor Used to Measure Ambient Light at the Surface Simultaneously with Underwater Measurements to Calculate Light Attenuation with Depth.

Figure 5.2-3. A Biologist Records SAV Data from a ¼ m^2 Quadrat on an Underwater Datasheet.

Figure 5.2-4. Representative SAV Components Scored Using the Braun-Blanquet Cover Abundance Index. A) *Thalassia testudinum* with epiphytes; B) *T. testudinum* and *Batophora*; C) *Penicillus*; D) *Halimeda*; E) *Udotea*; F) *Ripocephalus*; G) *Caulerpa prolifera*; H) *Acetabularia* and *Batophora.*

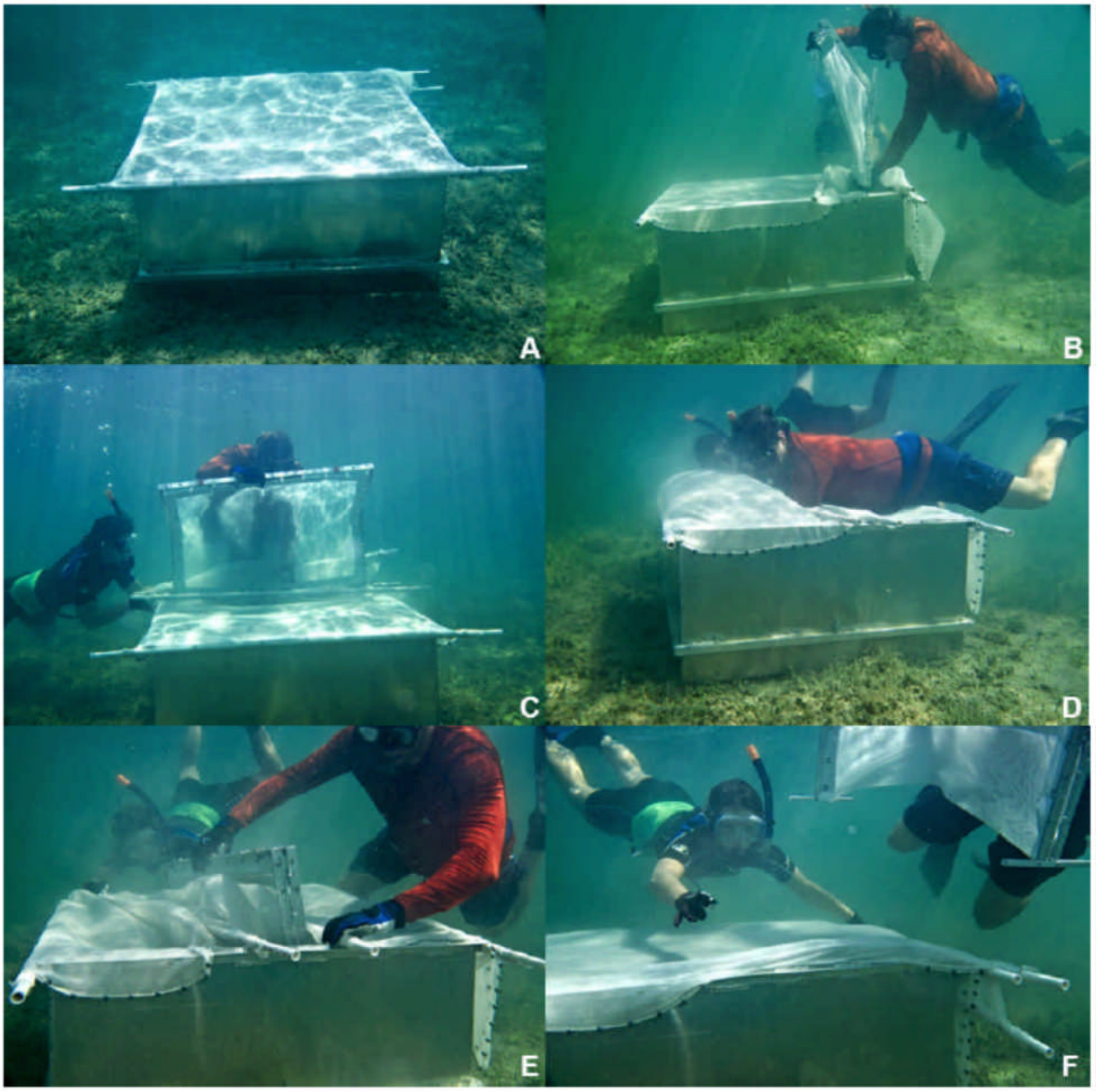

Figure 5.2-5. Photos of a Faunal Throw Trap. A) Faunal throw trap fully deployed with top covered; B) top panel being retracted so sweep net can be inserted; C) sweep net being inserted into the trap; D) net being swept along the bottom of the trap while top remains covered by net panel; E) closed sweep net being removed from the trap for transport to the boat for processing; F) faunal throw trap remains covered between sweeps.

Figure 5.2-6. A Peristaltic Pump (on Top of Green Coolers) Used to Collect Porewater for Nutrient and Tracer Suite Analysis.