4. ECOLOGICAL MONITORING

The purpose of ecological monitoring was to identify existing baseline conditions and evaluate potential impacts, if any, as a result of the Uprate. Ecological monitoring was conducted to 1) establish the Pre-Uprate status of ecological conditions and biotic components, 2) determine the extent to which, if any, CCS operations may impact conditions and components, and 3) establish Post-Uprate conditions to determine the extent to which Uprate implementation may result in impacts and changes to these conditions and components. Biotic components of primary interest were marsh vegetation in adjacent wetlands and mangroves, and submerged aquatic vegetation (SAV) in Biscayne Bay.

This section includes data from the Post-Uprate sampling period, which includes four terrestrial ecological monitoring events (August 2013, November 2013, February 2014, and May 2014; Table 4.1-1), and two sampling events in Biscayne Bay (September 2013 and April 2014). An overview of Post-Uprate ecological conditions is provided, and Pre-Uprate conditions are presented as either an average or a minimum and maximum value range for all calculated values for comparison with the Post-Uprate data.

4.1 Marsh, Mangroves, and Tree Islands

Plot establishment and monitoring setup is provided in detail in the Comprehensive Pre-Uprate Report (FPL 2012). Per the Monitoring Plan (SFWMD 2009a), 12 transects were established to capture ecological characteristics and changes over time across the landscape surrounding the Turkey Point Power Plant (Figure 1.1-4). A total of 16 marsh, 4 tree island, and 12 mangrove 20-meter-by-20-meter (20x20) plots were established along six marsh and six mangrove transects. Nested within each 20x20 plot are four 1-meter-by-1-meter (1x1) subplots and four 5-meter-by-5-meter (5x5) subplots. The 5x5 subplots were set up to capture changes in the woody species, and the 1x1 subplots were designed to measure changes within the herbaceous community. Of the 32 20x20 plots, six were established within reference transects (four in the marsh and two within the mangroves). For the Post-Uprate, a reduction in ecological monitoring was implemented (Table 1.1-1). As part of the reduction, the mangrove site measurements were limited to once a year. Marsh vegetation measurements were still conducted on a quarterly basis while tree islands were sampled semi-annually. Ionic analyses were limited to chloride and sodium, and stable isotopic analyses were eliminated from all sites; nutrients and tritium still continue to be sampled at all sites.

United States Nuclear Regulatory Commission Official Hearing Exhibit
In the Matter of: FLORIDA POWER & LIGHT COMPANY (Turkey Point Nuclear Generating, Units 3 and 4)
ASLBP #: 15-935-02-LA-BD01
Docket #: 05000250 & 05000251
Exhibit #: FPL-024G-00-BD01 Identified: 1/4/2016
Admitted: 1/4/2016 Withdrawn:
Rejected: Stricken:
Other:

4.1.1 Methods and Materials

4.1.1.1 Vegetation Sampling

For herbaceous subplots, all individuals of the dominant and co-dominant herbaceous emergent plants were counted. Plots to the west of the CCS and the reference plots primarily consisted of sawgrass (*Cladium jamaicense*); in some plots during certain events, sawgrass was co-dominant with spikerush (*Eleocharis cellulosa*) (Table 4.1-2). In plots to the south, saltgrass (*Distichlis spicata*) was the dominant herbaceous vegetation in the 1x1 subplots within the mangrove plots.

In the 1x1 plots, either 30% of the plants or 15 individuals (whichever value was greater) of the dominant species were tagged. Tagged plants were measured for the parameters needed to calculate 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 in grams per square meter (g/m^2).

For the woody species, three trees were tagged in each 5x5 subplot and up to six branches per tree were tagged. Only dominant species were individually measured. Tree species 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. Canopy width and length (and depth for white mangrove [*Laguncularia racemosa*] only), height, main stem diameter, and number of branches were recorded for each tagged tree to obtain tree biomass based on published allometric equations (Coronado-Molina et al. 2004).

Additional information about biomass and productivity calculations for dominant woody and herbaceous species is provided in both the Comprehensive Pre-Uprate Report (FPL 2012) and Appendix J.

4.1.1.2 Porewater Sampling

Field specific conductance and temperature were recorded at 0, 30, and 60 centimeter (cm) depths, and additional samples were collected at 30 cm for nutrient analyses per the Monitoring Plan (SFWMD 2009a) and were modified per the Post-Uprate reductions (SFWMD 2013b and c; Table 1.1-1). Samples were collected from the northeast 1x1 and 5x5 subplots at all sites. The method to collect porewater is detailed in Appendix A of the QAPP (FPL 2013b) and the Comprehensive Pre-Uprate Report (FPL 2012). Less porewater is required for each sample in the Post-Uprate due to the reduction in number of analytes.

At each subplot, a peristaltic pump was connected to a PushPoint Sampler (PushPoint Sampler PPX36, M.H.E. Products, East Tawas, Michigan) using polyethylene and silicon tubing. Low volume samples (approximately 50 milliliters [mL]) were collected at 0 and 60 cm within both the 1x1 and 5x5 subplots for specific conductance and temperature readings. These readings

were collected using a conductance/temperature sensor connected to a hand-held console (AT100 probe and Rugged Reader console, In-Situ Inc., Fort Collins, Colorado). New tubing and a PushPoint Sampler cleaned using FDEP FC1000 was used to collect samples at 30 cm. Once the PushPoint Sampler was inserted to 30-cm depth, water was pumped for several seconds prior to collection to clear excess sediment from the tubing, and a small volume was collected for conductance and temperature readings. For the nutrient analysis, a 200- to 450-mL porewater sample was collected in a pre-cleaned, 1-liter sample bottle from both the 1x1 and the 5x5 subplots at a 30-cm depth interval, for a total composite sample volume of 400 to 900 mL. When sampling nutrients, a pH reading was made using a pH meter (Extech© PH220, FLIR Systems, Waltham, Massachusetts) and was recorded on the field datasheets. The pH value is used to calculate ammonia and is therefore only recorded during nutrient sampling events. The composite sample was distributed into the sample bottles using the same tubing and pump used for sample collection at 30 cm. Once the sample was distributed, the water level was marked on each sample bottle to help the lab determine if water was lost or gained (from melted ice) during transport. The sample bottles were then placed in sealed plastic bags and were stored per their preservation requirements for laboratory analysis.

4.1.1.3 Statistical Analysis

Differences among sites were examined statistically using NCSS 9.0 (NCSS LLC, Kaysville, Utah). Data were examined to determine if there were differences between Pre-Uprate and Post-Uprate data using repeated measures analyses-of-variance (ANOVAs).

4.1.2 Results and Discussion

4.1.2.1 Community Description

The key vegetation communities in each of the general habitats are shown in Table 4.1-2 and a complete list of species is provided in Appendix L. Transects F2, F3, F4, and F6 were freshwater marsh transects dominated by sawgrass, 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 among the vegetation in the F2, F3, F4, and F6 plots, but were not present in either F1 or F5 because of the higher salinity environments found along these two transects due to impoundment. All trees in the M transects were scrub mangroves, dominated mostly by the red mangrove (Table 4.1-2).

The Shannon-Wiener Index (SWI) of Diversity and species evenness were calculated from the plant communities in the 1x1 and 5x5 subplots located in the northeast corner of each plot. Eleven total species of woody and herbaceous plants were documented in the northeast corners of the marsh subplots during the November 2013 sampling event. In the freshwater marsh-mangrove F plots (F1 and F5), red mangrove and sawgrass were the two species present. In the mangrove plots, red mangrove was the most prevalent species (Table 4.1-3). Diversity ranged

from one to four species within a plot and from one to six species when comparing transects (Table 4.1-3).

The SWI is a measure of the probability that a randomly sampled individual will be of a particular species. For instance, an SWI value of 0 indicates that only one species is 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 transects had SWI values less than 1.5 (Table 4.1-4). In the marsh plots, diversity was lowest in the F4 plots and the reference transect F6 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 at transect F3 (SWI = 0.742), as this transect had four species recorded across all plots. Diversity was also low in the mangrove plots, which were dominated by red mangrove with white and black mangrove sparsely present. M5-1 was the most diverse mangrove plot with four species (Table 4.1-3). The community with the highest diversity was the marsh-mangrove mix which had three (F1) and six (F5) species along those transects. F5 was the most diverse transect, as it was composed of a mix of woody and non-woody species within the different plots. Although the SWI values have fluctuated each year, the overall trends have remained consistent throughout the entire monitoring period (Table 4.1-4).

Species evenness is a measure of how evenly distributed (numerically) each species is at a site. A species evenness of 1 means an equal number of individuals of each species is present. The low evenness values of the mangrove plots indicate one highly 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 F3-3, most species present are well-represented (Table 4.1-4). Species evenness cannot be calculated when only one species is present in a plot, which is the case for both the F6 and M6 reference transects. The mangrove plots had the lowest species evenness, while the marsh sites had the highest (Table 4.1-4). These trends have remained consistent throughout the entire monitoring period.

4.1.2.2 Freshwater Marsh Sampling

Sawgrass was the primary herbaceous species measured in the marsh plots; therefore, to focus on landscape trends, discussion of the herbaceous vegetation is limited to sawgrass. Sawgrass cover was consistently ≤25%, and average vegetation height for each sampling event never exceeded 1.0 meter (m) (Tables 4.1-5 and 4.1-6, respectively). These vegetation patterns are consistent with the "sparse sawgrass" community commonly observed in Florida (Olmsted and Armentano 1997).

Sawgrass percent cover values have remained consistent during the entire monitoring period. The percent cover values are reported as percentage categories per the QAPP (FPL 2013b; Table 4.1-5). During the Post-Uprate period, values remained the same with the exception of small variations at F3-3, F6-1, and F6-3 (Table 4.1-5). Changes in percentage categories observed

between the Pre-Uprate and the Post-Uprate events are present, but are due to incremental and/or seasonal changes in percent cover and not due to rapid decline/growth.

Sawgrass height varied significantly by site, with F4-1 and F1-2 being the tallest plots and F3-1 being the shortest (Table 4.1-6). Most sites have been consistently trending downward with the exception of F4-1, F1-2, F6-2, and F6-3, which show a more irregular pattern that is possibly linked to wet/dry seasonal variations. The reason for the downward trend is unclear as other parameters that are related to height (porewater nutrients, live biomass, and total biomass) do not reflect the same trend. Notably, although the field crews take as much care and precaution as possible not to damage the vegetation, anthropogenic factors related to repeated sampling of the same plants over time could cause the decrease. However, despite this trend of decreasing height across the landscape, there have been no differences in the rank order of vegetation heights between the Pre and the Post-Uprate. Plants in F3, F2, and F6 (reference transect) have always had shorter sawgrass relative to F1 and F4 for the Pre-Uprate and the Post-Uprate periods. These differences may be explained by inherent hydrologic and biogeochemical interactions within each plot and are not related to the Uprate or CCS operations.

Both live and total sawgrass biomass were calculated using the four equations presented in Table 4.1-7. These equations were derived from semi-annual plant harvests conducted in accordance with this project. Both live and total biomass follow the same general patterns across the landscape, with F4-1 and F1-2 having the highest values and F3-1 the lowest (Tables 4.1-8 and 4.1-9). This overall trend has remained consistent during the Pre-Uprate and the Post-Uprate monitoring. A statistical test was performed to determine whether Pre-Uprate live sawgrass biomass is significantly different from Post-Uprate live sawgrass biomass. The analysis showed there is no significant difference in sawgrass live biomass between the two time periods ($F_{1,125}$=0.22; P>0.05). The Model Lands Marsh adjacent to the Turkey Point plant has similar hydrology and community composition as the C-111 Basin and Taylor Slough (Childers et al. 2006). Although the Model Lands is smaller in size than either the C-111 or Taylor Slough, these landscapes are similarly characterized by sawgrass marshes; tree islands; and hydrology driven by rain, canal overflow, and surface water runoff (Childers et al. 2006). Historic live biomass data at study sites in the C-111 Basin and Taylor Slough (located west of the study area) generally range from 100 to 300 grams per square meter (g/m^2) annually (Childers et al. 2006). Live biomass during the Pre-Uprate and the Post-Uprate periods was less than 100 g/m^2 at 10 of the 14 sawgrass plots, including all three plots along reference transect F6 (Table 4.1-9). None of the sawgrass plots exceeded 300 g/m^2 (Table 4.1-9).

Since ecological sampling initially began in November 2010, sawgrass Annual Net Primary Productivity (ANPP) is calculated from November of each year. ANPP could not be calculated for the Post-Uprate because the time period does not include a November-to-November timeframe. Instead, productivity was calculated for the six months from November 2013 to May 2014. Data from the same six-month period between November and May during Pre-Uprate monitoring are included in Table 4.1-10 for comparison. Annual mean productivity from the C-111 Basin typically ranges from about 200 to 500 g/m^2, while mean productivity at Taylor Slough within Everglades National Park was typically less than 300 g/m^2 (Childers et al. 2006). The values from this study are consistent with the values observed at Taylor Slough.

Sclerophylly is a measure of leaf hardness or toughness that reflects climate and nutrient conditions. Low sclerophylly values represent more ideal growing conditions compared to high sclerophylly values. Sclerophylly of sawgrass was higher in May 2014 than in November 2013 for all F1, F2, and F4 plots, and lower in May relative to November for all F3 and F6 plots (Table 4.1-11). Sawgrass sclerophylly was significantly higher during the Post-Uprate monitoring period compared to the Pre-Uprate ($F_{1,69}$=112.1; P<0.0001). The 12 months during the Post-Uprate monitoring have been about 40% drier relative to the previous year, i.e., 40.15 inches from June 2013 to May 2014 relative to 70.38 inches from June 2012 to May 2013 at the S-20 rainfall station (Figure 2.4-4). The increase in sclerophylly is most likely due to the drier meteorological conditions that were present during the Post-Uprate time period.

The leaf nutrient trends in November 2013 and May 2014 are consistent with data from the Pre-Uprate period. A summary of sawgrass leaf nutrients and stable isotopes is presented in Tables 4.1-12 through 4.1-18. C3 photosynthetic plants (e.g., sawgrass) can have carbon isotope values between -34 parts per mille (‰) and -22‰ (Smith and Epstein 1971), where -22‰ is representative of plants from desert conditions and -34‰ is indicative of tropical rainforest vegetation (Kohn 2010). Chang et al. (2009) found that carbon isotopes from sawgrass in the Loxahatchee National Wildlife Refuge (LNWR) ranged from -30.1‰ to -24.5‰. The average range of carbon isotopes from sawgrass collected during November 2013 ranged from -27.3‰ to -26.1‰ and from -27.8 to -26.3 in May 2014, within range of the plant community in the LNWR and the Pre-Uprate data (Table 4.1-15). The $\delta^{15}N$ found in sawgrass from the LNWR ranged from -5.3‰ to 7.7‰ while sawgrass adjacent to Turkey Point had an average range of -3.9‰ to -0.83‰ in November 2013 and -5.8 to -0.8 in May 2014 (Table 4.1-16). The molar ratio of C:N never fell below 47:1 which is representative of mature plants with high lignin content (Table 4.1-17). Terrestrial environments are considered nitrogen-limited when the N:P ratio is below 14 and phosphorous-limited when the N:P ratio is above 16. All N:P ratios were well above 16, indicating a P-limited system (Table 4.1-18).

Porewater specific conductance and temperature collected from 30 cm depth within the sediment are presented in Tables 4.1-19 and 4.1-20. Statistical comparisons were performed to determine whether or not porewater specific conductance and temperature at a 30-cm depth changed significantly between Pre- and Post-Uprate monitoring. Because F5-1 and F5-2 are not representative of a freshwater marsh (their water chemistry and vegetation communities are more consistent with a brackish marsh) they were omitted from this analysis. Additionally, the tree island plots were not included in this analysis because they are not considered marsh habitat. The analysis showed that Pre-Uprate porewater specific conductance was significantly higher than the Post-Uprate values ($F_{1,116}$=15.43; P=0.002) while there was no significant difference in Pre-Uprate and Post-Uprate porewater temperature ($F_{1,116}$=0.37; P=0.660). The difference in specific conductance is likely driven by the high values observed during a drought in the Pre-Uprate monitoring period. CCS water is characterized by high specific conductance and temperature. The absence of higher specific conductance and temperature in the Post-Uprate porewater data suggests that the surrounding marsh is not influenced by the Uprate or CCS operations.

Post-Uprate monitoring consists of sampling quarterly for sodium, chloride, and tritium; and bi-annually for nutrients (May and November). Porewater analytical data for August 2013 to May 2014 are presented in Tables 4.1-21 through 4.1-24. In some quarters, data are not available for sites (e.g., F2-4, F-3-4, F4-2) which were often too dry at 30 cm and did not yield enough porewater for analysis.

In the Post-Uprate, marsh transects west of the CCS (F2, F3, F4) generally had higher sodium and chloride values with distance from the L-31 Canal (Figures 4.1-1 and 4.1-2). The reference transect, F6, showed a similar trend across the landscape as well, with the farthest site from any canal, F6-3, having the highest values. The impounded north transect (plots F1-1 and F1-2) had lower sodium and chloride levels than the impounded plots to the south (F5-1 and F5-2). Although considered marsh sites, the southern impounded plots were similar to the mangrove sodium and chloride values than the other marsh plots.

A repeated measures ANOVA was performed to evaluate Pre-Uprate and Post-Uprate differences in porewater analytes. For all marsh analyses, the four impounded plots (F1-1, F1-2, F5-1, and F5-2) and the four tree island plots (F2-4, F3-4, F4-4, and F6-4) were omitted because the vegetative communities and the water chemistry found at these sites are different from marsh habitat. Sodium and chloride values were generally lowest during the wet season and highest in the dry season. The lowest annual values were observed during the wet season, i.e., either in August or November. There was no significant difference between Pre-Uprate and Post-Uprate values for either sodium ($F_{1,114}$=2.19; P=0.1667) or chloride ($F_{1,114}$=4.56; P=0.0561) in the marsh.

Porewater nutrients (TKN, ammonia, and TP) were also analyzed to evaluate Pre-Uprate and Post-Uprate differences. There was no difference in Pre-Uprate and Post-Uprate TKN ($F_{1,56}$=4.63; P=0.054) or TP ($F_{1,56}$=2.76; P=0.1246) in the marsh sites, but Pre-Uprate ammonia was significantly higher than Post-Uprate ammonia ($F_{1,44}$=118.67; P<0.001). In the Post-Uprate period, the average TN ranged from 1.68 mg/L at F1-1 to 4.67 mg/L at F3-2. The TN data from each plot show seasonal variability with higher concentrations occurring generally in or at the end of the wet season (i.e., November) sampling (Figure 4.1-3). The differences in the types of nitrogen and phosphorus available may be, in part, a consequence of regional meteorological conditions.

The porewater nutrient concentrations in the tree island plots are typically higher than the surrounding marsh. Ion concentrations vary seasonally with higher values observed in the dry season months (February and May) than the wet season (August and November).

The structure and composition of the sawgrass marsh communities within the study area have remained stable throughout the entire monitoring effort. Many of the fluctuations observed are due to seasonal and meteorological conditions. Overall, the vegetation characteristics summarized above (i.e., live biomass, productivity, leaf nutrient concentration), porewater chemistry, and community composition are representative of the hydrologically modified marshes found throughout southern Florida.

4.1.2.3 Mangrove Sampling

Post-Uprate vegetation sampling at the M sites occurred during the November 2013 event while porewater sampling occurred in November 2013 and May 2014. Values from the same timeframes during the Pre-Uprate monitoring period are provided for comparison along with the Pre-Uprate value ranges. Red mangrove is the primary woody species measured in the mangrove plots; therefore, to focus on landscape trends, discussion of the woody vegetation is limited to red mangrove.

Percent cover has remained consistent during the Post-Uprate period for all sites (Table 4.1-25). The cover also has not changed between the Pre- and the Post-Uprate time periods with the exception of M3-1. The change in percentage categories observed between Pre-Uprate and Post-Uprate events at M3-1 is difficult to interpret due to the wide range of values included in each percentage category. Because of this, it is worth noting that the changes in percent cover classes that have occurred during the monitoring period are due to incremental and/or seasonal changes in percent cover and not due to rapid decline/growth.

Lugo and Snedaker (1974) classified a scrub mangrove forest as having trees that are less than 1.5 m (150 cm) tall. All of the trees measured within the study area are consistent with this classification. At the F sites, red mangrove height remained consistent throughout the Post-Uprate sampling period (within 9 cm), indicating that very little vertical growth/die-off has occurred during the Post-Uprate events (Table 4.1-26). A statistical test was performed to compare Pre-Uprate and Post-Uprate red mangrove height at the M sites. The Post-Uprate height dataset consists of one event at the M sites (November 2013), therefore, the analysis included Pre-Uprate data from October 2010 and November 2011 to help balance the dataset while still representing similar seasons. The analysis showed that the trees are significantly taller Post-Uprate, suggesting that the dwarf mangrove populations within the study area are slowly growing and that no considerable die-off has occurred ($F_{1,45}$=11.95; P<0.0001). Slow growth is expected in dwarf mangrove ecosystems due to the difficult growing conditions naturally found in these areas (McKee et al. 2002).

Red mangrove biomass was calculated using the allometric equation presented in Coronado-Molina et al. (2004). Seasonal fluctuations in red mangrove biomass are present, and while Post-Uprate biomass values for plots M2-1, M3-2, M4-2, and M5-2 are below the Pre-Uprate ranges for these sites, there are no consistent increasing or decreasing trends over time (Table 4.1-27). A statistical test was conducted to compare Pre-Uprate and Post-Uprate red mangrove biomass at the M sites. The Post-Uprate biomass dataset consists of one event at the M sites (November 2013), therefore, the analysis included Pre-Uprate data from October 2010 and November 2011 to help balance the dataset while still representing similar seasons. The analysis showed that Pre-Uprate biomass during the October 2010 and November 2011 events was higher than Post-Uprate biomass during the November 2013 event ($F_{1,47}$=11.62; P=0.006). The difference is likely a result of the drier meteorological conditions during the November 2013 time period.

Sclerophylly measurements were performed during the November 2013 sampling event (Table 4.1-28). A statistical test was performed to compare Pre-Uprate and Post-Uprate red mangrove

sclerophylly at the M sites. The Post-Uprate sclerophylly dataset consists of one event at the M-sites (November 2013), therefore, the analysis included Pre-Uprate data from October 2010 and November 2011 to help balance the dataset while still representing similar seasons. The Post-Uprate red mangrove sclerophylly values from the November 2013 event were significantly higher than the Pre-Uprate data, indicative of the mangrove leaves being thicker and more succulent ($F_{1,45}$=11.95; *P*=0.005). This is most likely a result of the drier meteorological conditions during this time period.

Mangrove leaf nutrients, stable isotopes, and molar ratios for the November 2013 Post-Uprate event are presented in Tables 4.1-29 through 4.1-35. Carbon isotope data were within the normal range that C3 plants are known to have (-34‰ to -22‰), reaching as high as -24.8‰ and as low as -28.0‰. Carbon isotope total average over all Post-Uprate seasons was -25.8‰, which is representative of data from scrub red mangroves in Belize (-25.3‰ from Smallwood et al. 2003 and -26.4‰ from McKee et al. 2002). The N:P molar ratios of the leaves were well above 16, indicating that all mangrove sites are P-limited. Red mangrove $\delta^{15}N$ ranged from -9.95‰ to 3.2‰ and averaged -3.5‰. McKee et al. (2002) found average $\delta^{15}N$ values of -5.38‰ in similar scrub mangrove habitats. Low nitrogen isotope values are a consequence of the slow growth patterns and the resulting low nitrogen demand associated with scrub mangrove forests (McKee et al. 2002). The Post-Uprate leaf nutrient and isotope values are consistent with the Pre-Uprate data, and are within the ideal ranges established in the literature for similar dwarf mangrove plant communities (Smallwood et al. 2003; McKee et al. 2002).

A statistical test was performed to determine whether or not porewater specific conductance and temperature at a 30-cm depth changed significantly between Pre- and Post-Uprate monitoring. The Post-Uprate porewater dataset consists of two events at the M sites (November 2013 and May 2014), so the analysis included Pre-Uprate data from October 2010 and May and November 2011 to help balance the dataset while still representing similar seasons. The analysis showed that Pre-Uprate porewater specific conductance was significantly higher than the Post-Uprate time period ($F_{1,93}$=13.06, *P*=0.004), while porewater temperature was significantly higher in the Post-Uprate ($F_{1,57}$=5.08, *P*=0.050). CCS water is characterized by both high specific conductance and temperature. The absence of higher specific conductance values coincident with higher temperatures in the Post-Uprate porewater data suggest that the higher porewater temperature is likely due to insular effects and not the Uprate or CCS operations. The higher specific conductance values in the Pre-Uprate period appear to be influenced by the 2011 drought.

Sodium and chloride values were higher in May 2014 relative to November 2013, most likely the consequence of seasonal meteorological conditions. Values in most of the transects were similar with the exception of M4 which is located in a basin and generally has standing water with limited tidal exchange. Overall Post-Uprate sodium and chloride values were lower than the Pre-Uprate values ($F_{1,86}$=17.74; *P*=0.001 and $F_{1,86}$=10.64; *P*=0.008); the highest values were observed in May and August 2011 after a dry spring earlier that year.

There was an increase in TN and TP from November 2013 to May 2014 during the Post-Uprate. This slight increase, similar to the observations for sodium and chloride, may have been due to

the drier conditions in the mangroves. A comparison of the Post-Uprate (November 2013) and the Pre-Uprate (May and November 2011) events showed that the Post-Uprate ammonia and TP levels were lower than the Pre-Uprate ($F_{1,46}$=119.23; P=0.000 and $F_{1,56}$=61.80; P<0.0001), while Post-Uprate TKN was not significantly different from Pre-Uprate values ($F_{1,56}$=1.87; P=0.200). This is similar to the observations in the marsh over the same time period and is most likely a meteorologically driven phenomenon.

The structure and composition of the scrub mangrove communities within the study area have remained stable throughout the entire monitoring effort. The system is driven by concurrent stressors, including nutrient deficiency, high salinities, and saturated soil. The vegetation characteristics of the study area are consistent with scrub mangrove forests found along the coastal fringe of south Florida and the Florida Keys (Lugo and Snedaker 1974).

4.2 Biscayne Bay

Pre-Uprate ecological monitoring in Biscayne Bay was conducted bi-annually between September 2010 and September 2011 (two fall events and one spring event) and Post-Uprate monitoring was conducted in September 2013 and May 2014 (single fall and spring events). The sampling setup was based on the approved Monitoring Plan (FPL 2010) and followed the QAPP (FPL 2011a, 2013b); three study areas (BB1 to BB3) within Biscayne Bay and Card Sound, as well as a reference site in Barnes Sound (BB4) were selected for ecological sampling (Figure 1.3-1).

In the Pre-Uprate, monitoring was conducted along five shore-parallel transects within each study area to document changes in SAV cover and faunal composition with increasing distance from the CCS. However, as no ecologically significant differences were observed in the Pre-Uprate period, all faunal monitoring and three of the five (i.e., 12 of the 20) SAV transects in each area were eliminated in the Post-Uprate, leaving the two nearest shore-parallel transects in each area (Figure 4.2-1). In this section, the results of the Post-Uprate monitoring (fall 2013 and spring 2014) at the remaining eight transects are compared and then contrasted with Pre-Uprate observations.

Within each study area, two 2-kilometer-long, shore-parallel transects were used to monitor ecological conditions (Figure 1.3-1). These transects, designated "*a*" and "*b*," were located 250 m and 500 m from shore, respectively. Each transect was divided into eight 250-m-long segments. A 1-m-square point was randomly selected along each 250-m segment as the permanent sampling location for all future sampling events (Table 4.2-1). These points were numbered 1 through 8. Thus, a sampling point designated as BB1-*b*-4 represents Area BB1, Transect *b,* and Sampling Point 4. This design produced a total of 16 sampling points per study area and 64 points for all areas combined.

4.2.1 Methods and Materials

Data collection methods followed the QAPP (FPL 2013b) and were consistent with methods used for the Pre-Uprate Period and as reported in the Comprehensive Pre-Uprate Report (FPL 2012).

4.2.1.1 Physical Parameters and Surface Water Quality Data

General environmental data were collected at each sampling point. This included tidal cycle, air temperature, wind speed and direction, and sky conditions. The tidal cycle (high, low, ebb, or flood tide) was recorded based on published tide tables. A NIST-certified thermometer was used to determine 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.

Light attenuation was measured at a single, fixed sampling point (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 (micromoles 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, while the LI-190 sensor was placed in an unshaded area on the boat. In water depths less than 1.5 m, three measurements were taken: 0.3 m below the surface, mid-depth, and 0.3 m 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 report, only surface, mid-depth, and bottom values are presented.

A Hach Quanta water quality meter was used to measure water quality at each sampling point. Monitored variables included temperature (°C), specific conductance (millisiemens per centimeter [mS/cm], converted to µS/cm for reporting purposes), salinity (ppt), dissolved oxygen (DO; mg/L), pH, oxidation reduction potential (ORP; mV), and turbidity (nephelometric turbidity units [NTU]). Salinity was calculated (not measured directly) by the water quality meter using conductance and a temperature correction normalized to 15°C (PSS-78 scale; UNESCO method). Water column measurements were taken approximately 30 cm below the surface and 30 cm above the bottom.

4.2.1.2 Porewater Water Quality

At each station, porewater was collected at 30 cm using the methods described in the Comprehensive Pre-Uprate Report (FPL 2012). If sediment depth was less than 30 cm, the bottom was probed within a 2-5 m radius of the sampling point until the target depth could be reached. Porewater was extracted with a Pushpoint Sampler and measured with a Hach Quanta water quality meter while temperature was measured in-situ with a thermocouple datalogger (TCTemp1000, ThermoWorks Inc., Lindon, UT).

Similar to the Pre-Uprate events (FPL 2012), after completing SAV/water quality sampling at all eight points on a transect, porewater specific conductance data were reviewed, and the location with the highest conductance value was selected as the sampling point for porewater. 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. For each sample, 500 to 750 mL of porewater was extracted from three sampling locations (<0.5 m apart). After collection, the three porewater samples were combined and homogenized, and subsequently distributed into pre-labeled analyte containers for laboratory analyses in accordance with the QAPP (FPL 2013b). Samples were analyzed for the following variables: sodium, chloride, nitrate nitrite as N, ortho-phosphate (OP), unionized ammonia (NH_3), Kjeldahl nitrogen, phosphorus, and tritium.

4.2.1.3 Submerged Aquatic Vegetation Surveys and Ecological Observations

Post-Uprate SAV surveys were conducted at 16 sampling points within each study area (eight/transect) using the same method applied during the Pre-Uprate monitoring (FPL 2012). Four quarter-meter quadrats were thrown from the boat roughly equidistant within a 3-m radius around the marked sampling point. The SAV within each of the four quadrats was examined and percent cover score was recorded on underwater datasheets. Each of 26 pre-established categories of SAV (Table 4.2-2) used by the SFWMD, Florida Fish and Wildlife Fisheries Habitat Assessment Program, and the RER were scored using the Braun-Blanquet Cover Abundance (BBCA) Index methodology previously described in the Comprehensive Pre-Uprate Report (FPL 2012). To ensure consistency in assessments among FPL and the Agencies, BBCA scoring was done only by scientific divers who had previously attended annual Interagency Calibration Exercises hosted by the SFWMD in Key Largo (April 17, 2013, and May 22, 2014).

In addition to quantifying SAV coverage, sediment depth was considered an important variable in determining the relative abundance of seagrasses. During the two Post-Uprate sampling events, a rod was inserted into the substrate within each scored quadrat. Depth to refusal (i.e., underlying hardbottom) was recorded.

A qualitative characterization of benthic conditions surrounding each sampling point was made by a diver at the beginning of each SAV survey. This characterization, made out to the range of visibility, generally encompassed an area within a 10- to 15-m radius of the sampling point. Observations were recorded under three main categories:

- Overall conditions – radius and visibility (in feet) of the area that was assessed and the overall biotic coverage (Open, Fairly Open, Moderately Open, Mostly Covered, and Uniform);
- Qualitative assessment of seagrass, drift algae, and *Batophora* coverage in the surveyed area (Sparse, Sparse to Moderate, Moderate to Dense); and
- Generalization of the amount of calcareous algae, sponges, corals, and gorgonians found in the area (None, Few, Many).

The substrate in the immediate vicinity of each sampling point was also qualitatively characterized by noting the presence/absence of the following sediment types: sandy, shell hash, silty, and rubble. If a handful 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.

4.2.1.4 Statistical Analyses

To ensure that unequal Pre- and Post-Uprate sample sizes did not influence statistical results, data from the two Pre-Uprate fall events were averaged to yield a single value for comparison with the single Pre-Uprate fall value. All variables were statistically analyzed using STATISTICA 64 Version 11 software (Statsoft, Inc.). Data were first tested to determine if they met requisite requirements for parametric testing, namely normality (Shapiro-Wilks Test) and homogeneity of variance (Levene's Test). The tests revealed that much of the data did not meet either assumption, and thus non-parametric tests were used instead. A Kruskal-Wallis ANOVA by Ranks Test was first used to determine if differences in measured variables existed among areas or when comparing Pre- and Post-Uprate events. Further analyses were conducted using a Multiple Comparisons of Mean Ranks Post-hoc Test to determine which differences were statistically significant.

Differences among areas were analyzed for all Pre- and Post-Uprate events combined, Pre-Uprate events only, and Post-Uprate events only. Within-area values were also compared for both the Pre- and Post-Uprate. The significance levels (i.e., *P*-values) for the analyses were then Bonferroni-corrected by dividing the number of analyses run on each dataset i.e., $P = 0.05/2 = 0.025$.

To further investigate seagrass distribution and relative abundance, depth to hardbottom was measured during Post-Uprate sampling events and then correlated with mean seagrass BBCA scores using the non-parametric Spearman Rank Order Correlation Test. The same test was used to correlate bottom water and corresponding porewater water quality measurements. The significance value used for the Spearman Rank Order Correlation Test was set at $P \leq 0.05$. Significant correlations were considered to be strong if $r \geq |0.6|$, weak if $r < |0.6|$ and $> |0.2|$, and very weak if $r \leq |0.2|$. Only statistically significant correlations are reported.

4.2.2 Results and Discussion

4.2.2.1 Surface Water Quality

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 during the fall 2013 and spring 2014 sampling events was 2.2 m (Table 4.2-3). Area BB1 had the shallowest mean depth (1.7 m), while BB3 had the greatest (2.8 m). For all study areas combined, 37% of all sampling points during Post-Uprate monitoring were in water depths of 1 to 2 m, 60% were in depths of 2.1 to 3 m, and only 3% were in depths greater than 3 m.

Ambient surface light measurements during the fall 2013 sampling event ranged from 407 to 2,621 µmols/m^2/sec, while the bottom water column values ranged from 166 to 1,296 µmols/m^2/sec (Table 4.2-4). Average percent attenuation between ambient and bottom values for fall 2013 was greatest in Areas BB2 and BB3 (71% and 81%, respectively) and least in Area BB1 (48%). For spring 2014, the average percent attenuation was greatest in Area BB4 (56%) and lowest in BB1 (37%). Area BB4 was characterized as having a relatively high silty sediment component. Even small amounts of suspended silt in the water from surface waves can affect the amount of light reaching the bottom. Regardless, these values do not suggest that light is limiting seagrass coverage.

Sediment depth and type also varied across the four areas monitored. Seventy percent (70%) of the points sampled in the fall 2013 event and 75% in the spring 2014 monitoring event were classified as sandy-shell hash (Table 4.2-5). Twenty-eight percent (28%) of sediments had a silty component in the fall 2013 event, and 16% were in that category in spring 2014; more than half of all silty sampling points were located in BB4. Similarly, 10% to 15% of sampling points during the fall 2013 and spring 2014 events had rubble present, mostly in Area BB4. Consistent with the Pre-Uprate (FPL 2012) observations, the BB4 reference transects within Barnes Sound had different characteristics from the other areas as it had a higher percentage of stations with both silty and rubble components.

Temperature

Temperatures in Biscayne Bay surface waters have been shown to track the meteorological conditions regionally (see Section 2). In the Post-Uprate, mean surface and bottom water temperatures along each transect were on average approximately 3ºC to 5ºC warmer in the fall of 2013 (29.0°C to 30.2°C) relative to the spring 2014 (26.0°C to 28.0°C) event (Table 4.2-6). These values are reflective of the observations from the automated surface water stations in Biscayne Bay (Section 2) and within the normal tolerance ranges of the biota living in the Bay. As would be expected in a shallow, well-mixed water body, there was very little difference between mean surface and bottom water quality values along any transect for either the Pre- or Post-Uprate (Table 4.2-7). This consistency includes the reference transect which is within Barnes Sound, further supporting landscape scale influences on water temperatures.

Pre-Uprate surface water temperatures were significantly lower than the Post-Uprate because of colder temperatures in fall 2010 and spring 2011 (FPL 2012); the fall 2010 event was conducted in October and November 2010, which was later in the year than fall events in the subsequent years. Temperatures differed among areas in the Pre-Uprate but not in the Post-Uprate. Mean bottom water temperatures were lower in BB2 and BB3 during the Pre-Uprate (P=0.0012) compared to the reference study area (BB4). Consequently, differences were observed between the Pre- and Post-Uprate in BB2 (P=0.0116) and BB3 (P=0.0140); these differences, however, were small (<1.0°C) (Table 4.2-7). Care must be used in drawing any definitive conclusions from these results since the surface water temperature data (Tables 4.2-7 and 4.2-8) are from spot-measurements that are reflective of the conditions of the area and thus are a function of

sampling at different times of day, tidal stage, and prevailing weather conditions, which create considerable natural spatial and temporal variability in the data.

Specific Conductance and Salinity

Mean water column specific conductance and its derivative, salinity, was lower in the fall 2013 sampling (wet season) compared to the spring 2014 (dry season) event, consistent with seasonal and regional hydrologic influences. Values ranged from 39,988 to 52,900 µS/cm (25.7 to 35.1) during the fall and from 52,863 to 59,613 µS/cm (35.0 to 39.9) during the spring (Table 4.2-9 and 4.2-10). BB4, however, had lower specific conductance than BB2 and BB3 (P=0.0005) during the Post-Uprate (Table 4.2-8), and BB3 (P=0.0047) during the Pre-Uprate. As BB4 is located in a different basin, Barnes Sound, further south than the other three transects, these consistent observations may be attributable to the hydrologic and hydrodynamic conditions of the basin, i.e., freshwater terrestrial runoff and longer residence time of water.

Dissolved Oxygen, pH, Oxidation-Reduction Potential and Turbidity

Although seasonal differences were observed in the DO, pH, and ORP levels, these differences were not significant and the patterns were consistent seasonally for both the Pre- and the Post-Uprate. DO levels were slightly lower in the fall (4.9 to 6.2 mg/L) compared to the spring (5.3 mg/L to 6.3 mg/L) during Post-Uprate monitoring (Table 4.2-11), similar to the patterns observed for pH (Table 4.2-12). ORP values were higher in the fall (40.3 mV to 113.8 mV) compared to the spring (13.1 mV to 85.5 mV) (Table 4.2-13).

Water clarity has been high, as reflected by the very low turbidity values for both the Pre-Uprate (FPL 2012) and the Post-Uprate (Table 4.2-14) at all sites. The only values above 0.0 NTU recorded during Post-Uprate monitoring occurred on Transect *a* in Area BB3 during the spring 2014, and the mean bottom value for that transect was only 1.4 NTU.

4.2.2.2 Porewater Quality

Average porewater temperatures differed 2ºC to 5ºC between seasons (29.2°C to 31.5°C in fall 2013, to 27.2°C to 27.5°C in spring 2014) (Table 4.2-15), tracking values from the overlying surface water. Porewater temperatures during the fall 2013 and spring 2014 sampling events differed in range from -2.6°C to 1.0°C during the fall and from -1.4°C to 0.6°C during the spring compared with corresponding bottom water column temperatures (Table 4.2-16).

All Post-Uprate porewater temperatures were within the range of values observed during the Pre-Uprate. Average porewater temperatures among BB1, BB2, and BB3 were very similar (<0.5ºC difference) for both the Pre- and Post-Uprate. Mean values at the reference site BB4, however, were higher compared to the other transects in the Post-Uprate (fall: 1.3ºC, spring: 0.3ºC). This reference site is located farthest from the CCS in Barnes Sound and has very different sediment characteristics (i.e., silty) compared to the other three areas which were more open, hardbottom habitats. The sediment characteristics as well as lower hydrologic exchange in Barnes Sound may contribute to the differences observed at BB4.

There was little contrast in seasonal differences between porewater temperature and the overlying water between Pre- and Post-Uprate monitoring, particularly within those areas closest to the CCS (Table 4.2-17). These overall findings, coupled with a strong positive correlation (R=0.77) between bottom water column temperature and porewater temperature ($p<0.0001$; Table 4.2-18), suggest that temperatures in the overlying water column are likely the primary driver of porewater temperatures.

A comparison of Pre- and Post-Uprate bottom water specific conductance showed that the rank order of areas was always fairly consistent over the last four years; the freshest site was BB4, followed by BB1, BB2, and BB3 (Table 4.2-11). Average values in BB1 were similar to BB4 and BB2 for both the Pre- and the Post-Uprate; values observed in BB1 are consistent with the automated data from TPBBSW-10 in Biscayne Bay (Figure 2.2-7) and of the area in general.

During the fall 2013 sampling event, porewater specific conductance ranged from 46,963 to 52,550 µS/cm and during the spring 2014 event, from 49,550 to 57,825 µS/cm (Table 4.2-19); these patterns are seasonally consistent with observations from the Pre-Uprate and with the automated data from the surface water Biscayne Bay probes (see Section 2). In fall 2013, porewater specific conductance was higher than the bottom water column values at BB1 and BB4, while only slight differences (<1%) were found in the other two areas (Table 4.2-20). During the spring 2014 sampling event, mean porewater specific conductance was lower than the corresponding bottom water column value in all four study areas, with the largest mean difference (3181 µS/cm) found in the reference area (BB4). This indicates that there were considerable seasonal differences in the relationship of bottom water column and porewater specific conductance Post-Uprate, likely caused by the insular effects of sediments. There was a strong positive correlation (R=0.84) between bottom water column and porewater mean specific conductance within all areas ($p<0.0001$; Table 4.2-18) and the similarity of surface and bottom water column conductance values suggests that porewater specific conductance is largely influenced by conditions in the overlying water column.

Chloride concentrations ranged from an average of 18,900 mg/L to 22,250 mg/L during Post-Uprate period. These data overlapped with the values observed during the Pre-Uprate. Most of the areas had similar chloride values for the Pre- and the Post-Uprate with the exception of BB4, which had slightly lower values (Table 4.2-8). Similarly, there were no significant sodium differences among areas during either the Pre- or the Post-Uprate sampling periods (Table 4.2-8) and no significant changes within any study area following the Uprate (Table 4.2-7).

Porewater nutrient results for fall 2013 and spring 2014 are presented in Table 4.2-21 and comparisons between Pre- and Post-Uprate values are presented in Table 4.2-22. There were no differences in TN and TP concentrations between the Pre- and Post-Uprate, although the nitrogen speciation patterns did differ slightly; more ammonia was observed in the Post-Uprate relative to the Pre-Uprate. Tritium values were not available for either the fall or spring Post-Uprate events.

4.2.2.2 Submerged Aquatic Vegetation

Study Area Characterization

Study Area BB1 can generally be described as embayment-like and is somewhat more sheltered than the other study areas, as portions are located west of the Arsenicker Islands and south of the Turkey Point peninsula (Figure 4.2-1). It is also the shallowest of the study areas (Table 4.2-3). Transects within this area had sparse to moderate macrophyte coverage throughout for both the Pre- and the Post-Uprate. Turtle grass, *Thalassia testudinum*, was present in 97% of quadrats during the fall 2013 and the spring 2014 sampling events (Table 4.2-23). Shoal grass, *Halodule wrightii*, was also present but much less widespread, and bottom coverage never exceeded 5%.

The nearshore transects in BB2 had many open areas, with drift algae, gorgonians, sponges, and sparse seagrass. Shoal grass was present in about 33% of the quadrats during the fall 2013 and the spring 2014 sampling events, and was most abundant along the nearshore transect but coverage never exceeded 5%. Turtle grass coverage in BB2 was greater in the fall 2013 (36% of all quadrats), than in the following spring (25% of all quadrats).

Area BB3 is the deepest of the four study areas (mean depth 2.8 m; Table 4.2-3). Turtle grass occurred in about 73% of the quadrats during fall 2013 and spring 2014 (Table 4.2-23). Shoal grass was largely absent, occurring in just a few quadrats along the transect farthest from shore. Both BB4 transects were composed of silty substrates, with rubble and small corals scattered throughout. Turtle grass was present in about 90% of the quadrats during the fall 2013 and the spring 2014 sampling events (Table 4.2-23), while shoal grass was largely absent during both events.

Although seagrasses were widely observed, they occurred primarily in sparse or sparse to moderate assemblages around the sampling points used for this study. For the fall 2013 sampling event, Areas BB2 and BB4 had the highest percentage of observations of sparse seagrass (87.5% and 93.8%, respectively) and, conversely, the lowest percentages of sparse to moderate coverage (12.5% and 6.3%, respectively); no points were scored as moderate to dense (Table 4.2-24). Area BB1 was the only area where seagrass was characterized as moderate to dense during the fall 2013 monitoring event (12.5%). For the spring 2014 sampling event, Areas BB2 and BB3 had the highest percentage of points scored as sparse (87.5% and 81.3%, respectively). Areas BB1 and BB4 had 25% and 31.3%, respectively, scored as sparse to moderate coverage, and again, BB1 was the only area where moderate to dense seagrass was present (12.5%).

Calcareous algae was ubiquitous throughout the project area, with all areas listed as having either a few or many present (Table 4.2-24). During the fall 2013 sampling event, 68.8% to 100% of survey points within the study area were characterized as having many calcareous algae present. Similar results were obtained during the spring 2014 event, although a smaller percentage of points were classified as having many present.

Drift algae was present in all areas for both fall 2013 and spring 2014 (Table 4.2-24). *Batophora* was widespread in all areas and ranged from sparse to moderate/dense coverage. Overall, the

fall 2013 event had more *Batophora* present in the survey areas than the spring 2014 sampling event, with Areas BB1 and BB2 having the highest percentage of moderate to dense coverage.

Sponges were prevalent in all of the areas, with most points having either a few or many present. Gorgonians (soft corals) occurred less frequently and were completely absent for all points in areas BB1 and BB4. Stony corals were found in all areas, but less frequently in BB1 than the other three areas. The relative abundance of both stony and soft corals within the study area relates largely to the amount of exposed hardbottom present. Those areas with relatively large amounts of unconsolidated sediments, such as Area BB1, have fewer corals than areas where exposed hardbottom is more expansive.

Macrophyte Coverage and Chemistry

Average total macrophyte (seagrass and macroalgae) cover ranged between 5% and 50% in fall 2013 and spring 2014 (Table 4.2-25). BBCA values at BB1, BB2, and BB4 did not differ significantly across the landscape in the last year, but BB3 was slightly lower compared to the other three areas (Table 4.2-5). Within each area, there were no differences in BB1 and BB2 between the Pre- and Post-Uprate; BB3, however, showed a decrease during the Post-Uprate relative to the Pre-Uprate. At the same time, BB4 showed an increase from the Pre-Uprate to the Post-Uprate. The lowered BBCA values in BB3 and increased values in BB4 are attributable to the Post-Uprate macroalgae cover at these area (Table 4.2-25), driven by changes in drift macroalgae cover (Table 4.2-24). Drift macroalgae cover can be highly variable as the algae are not attached and can be moved by prevailing winds and tides. These conditions can be greatly influenced depending on the wind conditions and tidal cycles before and during the sampling event.

A better assessment of the Pre- and Post-Uprate conditions is a comparison of the attached seagrass community. During the Post-Uprate, seagrass cover did not differ among sites in the fall, but in the spring, BBCA values were slightly lower for most of the areas (Table 4.2-25). These differences are attributable to the phonological growth patterns of the seagrassess as a function of the growing season; the fall 2013 sampling captures cover at the end of the growing season, while the seagrasses during spring 2014 sampling were just starting to grow back after the winter die-off. Depending on the site-specific conditions, the seagrasses may grow back slower in some areas than in others.

A comparison of the Pre- and Post-Uprate seagrass cover showed that BBCA values did not differ between the Pre- and the Post-Uprate, although there were differences among areas. Area BB1 had the highest cover, followed by BB3, BB4, and BB2 and these patterns were consistent over the monitoring period, indicating fairly stable conditions over the last four years. The SAV conditions observed are typical of those reported elsewhere in South Florida.

The seagrass cover in the study areas was primarily a consequence of *Thalassia* cover. Robblee and Browder (2007) found *Thalassia* generally to be the most abundant seagrass present at their monitoring locations in both Biscayne Bay and Florida Bay (frequency of occurrence 80% to 98%). High cover and low-standing crop of seagrass is typical of Biscayne Bay and has been

attributed to the shallow depth of sediments. As the *Thalassia* rhizosphere typically extends 25 to 40 cm into the substrate (Enriquez et al. 2001; Robblee and Browder 2007), this grass cannot effectively colonize and grow in areas where only a thin veneer of substrate exists over the hardbottom. A positive correlation (R=0.79; $P < 0.0001$) was observed between seagrass BBCA scores and sediment depth across all areas (Table 4.2-17), suggesting that seagrass coverage within the study area was largely based on the availability of suitable substrate for colonization and growth.

Leaf nutrients were collected at two points per transect during the fall 2013; transect averages are presented in Table 4.2-27. Leaf TN, TC, $\delta^{13}C$, and $\delta^{15}N$ values were all within expected values for seagrasses (Fourqurean and Zieman 2002). Mean values for TN and TC were higher at BB1 and decreased towards the south, while TP was highest at BB4 and lowest at BB1. Consequently, N:P ratios were higher in the north relative to the south, indicating a greater N-limitation in BB4 relative to BB1. As the TN and $\delta^{15}N$ values are positively correlated, this indicates that higher nitrogen concentrations are probably contributing to the higher $\delta^{15}N$ observed. The patterns among the areas do not clearly indicate any CCS influence on the seagrass community, but rather the regional landscape hydrology and anthropogenic management influences.

TABLES

Table 4.1-1. Data and Samples Collected in August and November 2013 and in February and May 2014

Measurements	August 2013	November 2013	February 2014	May 2014
Measure herbaceous plants in 1x1m subplots	X	X	X	X
Measure woody plants in 5x5m subplots		X		
Collect herbaceous leaf samples for mass and nutrient analysis		X		X
Collect woody leaf samples for mass and nutrient analysis		X		
Estimate herbaceous plant cover in 1x1m subplots	X	X	X	X
Estimate woody plant cover in 5x5m subplots		X		
Collect porewater samples for nutrient analysis		X		X
Collect porewater samples for tracer suite analysis	X	X	X	X

Key:
cm = centimeter(s).
m = meter(s).

Table 4.1-2. Plot Location, Community Description, Dominant Vegetation in Subplots in 2013 -2014

Location		North East Plot (decimal degrees)		Community	Herbaceous Dominant Species	Woody Dominant Species	Set Up (meters)	
Transect	Plot	Latitude	Longitude				1 x 1m	5 x 5m
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	25.4331	-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*	None	Y	N
F3	1	25.4084	-80.36248	Freshwater marsh	*C. jamaicense*	None	Y	N
F3	2	25.40815	-80.36722	Freshwater marsh	*C. jamaicense*	None	Y	N
F3	3	25.40806	-80.37231	Freshwater marsh	*C. jamaicense*	None	Y	N
F4	1	25.38657	-80.37074	Freshwater marsh	*C. jamaicense*	None	Y	N
F4	2	25.38669	-80.37492	Freshwater marsh	*C. jamaicense*	None	Y	N
F4	3	25.38655	-80.37908	Freshwater marsh	*C. jamaicense*	None	Y	N
F5	1	25.3557	-80.36692	Scrub mangrove	*Distichlis spicata*	*Laguncularia racemosa* *R. mangle*	Y	Y

Table 4.1-2. Plot Location, Community Description, Dominant Vegetation in Subplots in 2013 -2014

Location		North East Plot (decimal degrees)		Community	Herbaceous Dominant Species	Woody Dominant Species	Set Up (meters)	
Transect	Plot	Latitude	Longitude				1 x 1m	5 x 5m
F5	2	25.35304	-80.356	Scrub mangrove	*D. spicata* *Juncus roemerianus*	*R. mangle*	Y	Y
F6	1	25.35469	-80.43848	Freshwater marsh	*C. jamaicense*	None	Y	N
F6	2	25.34966	-80.43619	Freshwater marsh	*C. jamaicense*	None	Y	N
F6	3	25.34413	-80.43097	Freshwater marsh	*C. jamaicense*	*C. erectus*	Y	N
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	-80.3307	Scrub mangrove	None	*R. mangle*	N	Y
M2	2	25.40521	-80.3299	Scrub mangrove	None	*R. mangle*	N	Y
M3	1	25.38628	-80.33083	Scrub mangrove	None	*R. mangle*	N	Y
M3	2	25.3845	-80.32794	Scrub mangrove	None	*R. mangle*	N	Y
M4	1	25.3563	-80.33138	Scrub mangrove	None	*R. mangle*	N	Y
M4	2	25.35468	-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

Note:
NE = Location is at northeast corner of plot.
Key:
m = Meter(s).

Table 4.1-3. Species and Individuals Counted in Subplots for Shannon-Wiener Index of Diversity Calculations in November 2013

Community Type *	Plot	Species Present	# of Individuals
Marsh	F2-1	*C. jamaicense*	77
		E. cellulosa	17
	F2-2	*C. jamaicense*	38
		E. cellulosa	38
		R. mangle	2
	F2-3	*C. jamaicense*	66
		E. cellulosa	4
	F3-1	*C. jamaicense*	34
		E. cellulosa	35
	F3-2	*C. jamaicense*	37
		Aster spp.	1
		M. scandens	1
	F3-3	*C. jamaicense*	33
		E. cellulosa	84
	F4-1	*C. jamaicense*	155
	F4-2	*C. jamaicense*	44
	F4-3	*C. jamaicense*	41
	F6-1	*C. jamaicense*	37
	F6-2	*C. jamaicense*	38
	F6-3	*C. jamaicense*	53
Brackish Marsh-Mangrove	F1-1	*C. jamaicense*	56
		R. mangle	32
	F1-2	*C. jamaicense*	62
		R. mangle	11
		C. erectus	1
	F5-1	*R. mangle*	45
		L. racemosa	58
		C. erectus	5
	F5-2	*D. spicata*	28
		J. romerianus	8
		B. frutescens	5
		R. mangle	169
Mangrove	M1-1	*R. mangle*	269
	M1-2	*R. mangle*	116
		L. racemosa	4
	M2-1	*R. mangle*	14
	M2-2	*R. mangle*	464

Table 4.1-3. Species and Individuals Counted in Subplots for Shannon-Wiener Index of Diversity Calculations in November 2013

Community Type *	Plot	Species Present	# of Individuals
Mangrove	M3-1	*R. mangle*	74
	M3-2	*R. mangle*	47
	M4-1	*R. mangle*	73
		A. germinans	1
	M4-2	*R. mangle*	64
		A. germinans	1
	M5-1	*D. spicata*	24
		R. mangle	189
		A. germinans	15
		L. racemosa	4
	M5-2	*R. mangle*	38
	M6-1	*R. mangle*	24
	M6-2	*R. mangle*	31

Note:
* In the marsh plots, all plants were counted in the northeast 1x1 (1 m2) subplot; similarly the northeast 5x5 (25 m2) was counted for the mangrove plots.

Table 4.1-4. Pre-Uprate and Post-Uprate Shannon-Wiener Index Calculated Values for Plots and Transects

Location		Pre-Uprate								Post-Uprate			
		August 2011				August 2012				November 2013			
		Shannon Wiener Index		Species Evenness		Shannon Wiener Index		Species Evenness		Shannon Wiener Index		Species Evenness	
Transect	Plot	Plot	Transect	Plot	Transect	Plot	Transect	Plot	Transect	Plot	Transect	Plot	Transect
F1	1	0.603	0.532	0.870	0.484	0.530	0.541	0.764	0.492	0.288	0.580	0.946	0.837
	2	0.442		0.403		0.510		0.464		0.206		0.446	
F2	1	0.128	0.670	0.185	0.609	0.113	0.192	0.162	0.175	0.473	0.601	0.682	0.547
	2	0.195		0.281		0.506		0.461		0.701		0.723	
	3	0.215		0.310		0.000		N/A		0.219		0.316	
F3	1	0.670	0.762	0.966	0.694	0.130	0.243	0.187	0.221	0.693	0.742	1.000	0.535
	2	0.271		0.391		0.239		0.345		0.026		0.024	
	3	0.518		0.747		0.325		0.469		0.595		0.858	
F4	1	0.000	0.000	0.000	0.000	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
	2	0.000		0.000		0.000		N/A		0.000		N/A	
	3	0.000		0.000		0.000		N/A		0.000		N/A	
F5	1	0.512	1.151	0.739	0.715	0.766	1.169	0.697	0.653	0.476	1.014	0.765	0.566
	2	0.837		0.604		0.943		0.680		0.482		0.474	
	1	0.000		0.000		0.000		N/A		0.000		N/A	
F6	2	0.682	0.458	0.984	0.661	0.687	0.460	0.991	0.664	0.000	0.000	N/A	N/A
	3	0.000		0.000		0.000		N/A		0.000		N/A	
M1	1	0.000	0.011	0.000	0.002	0.000	0.076	N/A	0.109	0.000	0.057	N/A	0.083
	2	0.040		0.057		0.255		0.369		0.113		0.211	
M2	1	0.000	0.115	0.000	0.020	0.000	0.116	N/A	0.168	0.000	0.000	N/A	N/A
	2	0.120		0.174		0.122		0.176		0.000		N/A	
M3	1	0.000	0.000	0.000	0.000	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
	2	0.000		0.000		0.000		N/A		0.000		N/A	
M4	1	0.000	0.060	0.000	0.013	0.063	0.070	0.091	0.101	0.058	0.075	0.103	0.109
	2	0.074		0.563		0.079		0.115		0.064		0.115	
M5	1	0.314	0.290	0.453	0.049	0.577	0.530	0.416	0.383	0.482	0.584	0.468	0.421
	2	0.000		0.000		0.000		N/A		0.000		N/A	
M6	1	0.000	0.000	0.000	0.000	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
	2	0.000		0.000		0.000		N/A		0.000		N/A	

Key:
N/A = Not applilcable.

Table 4.1-5. Average Sawgrass Coverage per Plot and Transect for Post-Uprate Period with Pre-Uprate Average

Location		Percent (%) Cover									
		Pre-Uprate Average		August 2013		November 2013		February 2014		May 2014	
Transect	Plot	Plot	Transect	Plot	Transect	Plot	Transect	Plot	Transect	Plot	Transect
F1	1	2 - 5	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25
	2	6 - 25		6 - 25		6 - 25		6 - 25		6 - 25	
F2	1	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25
	2	6 - 25		2 - 5		2 - 5		2 - 5		2 - 5	
	3	6 - 25		2 - 5		6 - 25		2 - 5		2 - 5	
F3	1	2 - 5	2 - 5	2 - 5	2 - 5	2 - 5	2 - 5	2 - 5	2 - 5	2 - 5	2 - 5
	2	2 - 5		2 - 5		2 - 5		2 - 5		2 - 5	
	3	6 - 25		2-5		2 - 5		2 - 5		6 - 25	
F4	1	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25
	2	2 - 5		2 - 5		2 - 5		2 - 5		2 - 5	
	3	2 - 5		2 - 5		2 - 5		2 - 5		2 - 5	
F6	1	2 - 5	2 - 5	2 - 5	2 - 5	2 - 5	2 - 5	2 - 5	2 - 5	6 - 25	2-5
	2	2 - 5		2 - 5		2 - 5		2 - 5		2 - 5	
	3	6 - 25		2 - 5		6 - 25		6 - 25		2 - 5	

Key:
% = Percent.

Table 4.1-6. Average Sawgrass Height per Plot and Transect for Post-Uprate Period with Pre-Uprate Range

Location		Average Height ± Standard Error (cm)																	
		Pre-Uprate Range		August 2013				November 2013				February 2014				May 2014			
Transect	Plot	Plot	Transect	Plot	SE	Transect	SE	Plot	SE	Transect	SE	Plot	SE	Transect	SE	Plot	SE	Transect	SE
	1	84.9 - 100		83.53	2.88			81.35	2.46			80.94	2.06			80.63	1.99		
F1	2	100 - 114.5	93.8 - 107.8	89.72	2.23	87.21	1.78	97.01	2.23	88.36	1.80	93.29	2.63	86.47	1.71	94.27	1.97	86.79	1.52
	1	80.6 - 96.3		76.74	1.08			76.91	0.97			74.55	1.39			70.75	1.23		
	2	73.5 - 89.6		74.99	1.66			74.92	2.28			73.53	3.09			69.38	2.32		
F2	3	67.6 - 80.4	75.5 - 90.3	69.77	1.49	74.26	0.81	66.71	1.50	73.43	0.89	63.71	1.65	71.15	1.15	60.67	1.43	67.47	0.95
	1	58.2 - 64.9		65.48	1.37			63.57	1.39			58.21	1.80			53.10	1.60		
	2	61.7 - 73		67.78	1.40			66.44	1.65			60.43	2.01			53.18	1.78		
F3	3	79.8 - 101.6	67.7 - 78.3	81.53	2.14	72.39	1.17	80.38	2.15	70.16	1.15	71.76	2.20	63.50	1.24	69.66	2.05	58.68	1.19
	1	103.1 - 123.9		97.88	2.19			99.83	2.04			96.16	2.07			93.91	1.87		
	2	62.1 - 79.9		67.11	1.24			66.45	1.59			63.47	1.73			57.93	1.91		
F4	3	73.9 - 89.1	80.9 - 96.3	75.07	1.33	82.38	1.43	74.61	1.79	84.87	1.52	70.93	1.73	81.37	1.53	61.91	1.84	76.55	1.59
	1	76.3 - 99.3		82.36	1.71			88.36	1.73			85.20	2.07			78.83	2.60		
	2	66.6 - 87		74.12	1.21			80.58	1.54			79.66	2.27			71.80	2.03		
F6	3	67.3 - 81.5	70.5 - 89.9	67.01	1.40	74.72	0.97	74.20	1.31	81.01	0.98	70.88	1.65	78.54	1.24	66.67	1.39	72.37	1.24

Key:
cm = Centimeters.
SE= Standard Error.

Table 4.1-7. Live and Total Sawgrass Biomass Equations for Post-Uprate Events

Season	Model	R^2	p-Value	N
Total Biomass Equations				
November 2013	Total Biomass = -1.22987 + 2.55800 $(Cdb2)^2$ + 0.03882 $(NoLL)^2$ + 0.0002949 $(LLL)^2$	0.8286	<0.0001	168
May 2014	Total Biomass = -0.46210 + 2.63119 $(cdb1)^2$ + 0.0003069 $(LLL)^2$	0.8722	<0.0001	168
Live Biomass Equations				
November 2013	Live Biomass = -1.53848 + 1.18027 (Cdb1) + 0.71527 $(Cdb2)^2$ + 0.04703 $(NoLL)^2$ + 0.0002064 $(LLL)^2$	0.8785	<0.01	168
May 2014	Live Biomass = -2.45943 + 2.31954 (cdb2) + 0.37373 (NoLL) + 0.0001897 $(LLL)^2$	0.8158	<0.01	168

Key:
Cdb1 = Culm diameter at base 1.
Cdb2 = Culm diameter at base 2.
LLL = Longest live leaf.
NoLL = Number of live leaves.
N = Sample size.

Table 4.1-8. Average Sawgrass Live Biomass per Plot and Transect for Post-Uprate Events with Pre-Uprate Range

Location		Sawgrass Live Biomass (g/m^2)																	
		Pre-Uprate Range		August 2013				November 2013				February 2014				May 2014			
Transect	Plot	Plot	Transect	Plot	SE	Transect	SE	Plot	SE	Transect	SE	Plot	SE	Transect	SE	Plot	SE	Transect	SE
F1	1	66.7 - 145.2	104.8 - 167.7	117.7	26.7	151.3	18.9	135.8	37.5	141.7	20.1	128.1	34.0	145.4	18.9	150.1	20.5	176.52	17.70
	2	142.9 - 190.2		184.9	14.2			147.6	21.5			162.7	17.5			202.9	24.0		
F2	1	112.7 - 208.8	69.1 - 122.2	130.4	15.8	75.8	12.9	151.3	20.4	90.7	15.1	126.6	15.8	80.6	11.2	135.1	17.0	88.86	11.67
	2	42.3 - 74.3		46.6	8.4			54.9	9.5			56.5	6.8			56.9	4.4		
	3	52.4 - 83.5		50.3	4.0			65.9	11.5			58.6	5.6			74.6	8.2		
F3	1	29.2 - 43.3	53.1 - 79.4	38.0	5.9	58.4	6.9	39.5	4.9	61.4	6.1	44.5	2.8	51.9	4.5	42.2	4.8	60.39	7.35
	2	43.4 - 60.3		50.9	8.4			61.1	5.2			42.8	6.4			45.6	4.4		
	3	78.5 - 141.9		86.2	1.7			83.5	6.0			68.5	6.0			93.3	2.8		
F4	1	184.9 - 275.5	94.7 - 147.8	264.4	71.6	125.6	36.9	320.9	85.6	146.0	45.6	234.0	30.1	115.0	27.0	268.4	26.4	127.48	31.26
	2	41.3 - 70.8		47.7	5.8			50.7	10.2			54.2	6.4			61.2	9.3		
	3	57.9 - 97.7		64.7	11.3			66.4	9.2			56.7	2.5			52.9	4.3		
F6	1	48.7 - 98	50.8 - 92.1	49.4	10.6	52.5	4.5	63.6	14.8	60.7	7.0	75.4	24.5	65.0	9.7	94.1	25.4	72.39	11.12
	2	36 - 84.8		54.9	8.8			54.6	10.4			48.4	7.6			50.2	13.3		
	3	62.6 - 100.8		53.2	5.7			64.0	13.9			71.3	15.4			72.9	14.7		

Key:
g/m^2 = Grams per square meter.
SE = Standard Error.

Table 4.1-9. Average Sawgrass Total Biomass per Plot and Transect for Post-Uprate Events with Pre-Uprate Range

Location		Sawgrass Total Biomass (g/m^2)																	
		Pre-Uprate Range		August 2013				November 2013				February 2014				May 2014			
Transect	Plot	Plot	Transect	Plot	SE	Transect	SE	Plot	SE	Transect	SE	Plot	SE	Transect	SE	Plot	SE	Transect	SE
F1	1	87.6 - 262.8		164.1	35.2			189.3	54.8			201.0	55.8			231.7	36.3		
	2	174.8 - 396.7	131.2 - 314.1	254.6	15.7	209.3	24.7	206.8	29.4	198.0	29.0	259.0	27.3	230.0	30.8	326.7	37.2	279.2	30.0
F2	1	203 - 306.9		169.9	23.5			197.3	29.5			213.3	22.2			224.2	31.5		
	2	65.6 - 166.6		61.8	12.5			73.2	11.3			86.4	10.4			93.4	8.9		
	3	80.8 - 157.9	116.5 - 199.7	67.4	7.2	99.7	17.1	87.4	13.5	119.3	19.7	87.5	7.4	129.1	19.6	106.9	6.8	141.5	20.4
F3	1	32.7 - 104.1		49.3	8.5			51.2	6.3			67.7	5.1			59.3	4.5		
	2	50 - 138.2		65.7	9.7			80.5	9.4			69.3	12.5			68.9	13.2		
	3	142.4 - 285.2	75.0 - 169.0	118.9	4.4	78.0	9.8	116.0	9.6	82.5	9.2	125.1	13.4	87.4	9.9	146.1	6.2	91.4	12.6
F4	1	287.6 - 661.8		363.1	100.0			448.3	116.9			392.3	48.7			428.9	33.3		
	2	59.3 - 161.7		60.9	6.1			68.4	14.5			83.3	8.3			92.9	15.0		
	3	81.5 - 206	142.8 - 325.9	87.7	15.6	170.6	51.3	87.9	13.6	201.5	63.6	97.6	4.3	191.0	45.5	99.0	5.3	206.9	48.6
F6	1	84.4 - 219.2		67.3	13.9			87.7	19.6			140.9	44.3			155.8	39.1		
	2	51.9 - 205.8		74.5	13.9			70.5	13.8			95.2	15.2			92.3	22.6		
	3	60.5 - 258	65.6 - 228.4	73.7	7.1	71.8	6.4	87.3	18.8	81.8	9.5	115.3	23.1	117.1	16.7	131.1	26.0	126.4	17.6

Key:
g/m^2 = Grams per square meter.
SE = Standard Error.
.

Table 4.1-10. Sawgrass Productivity for 6-Month Interval of October/November to May during the Pre- and Post-Uprate Periods

Location		Sawgrass Productivity (g/m^2/6 months)		
		Pre-Uprate		Post-Uprate
Transect	Plot	October 2010 - May 2011	November 2011 - May 2012	November 2013 - May 2014
F1	1	49.72	183.38	115.62
	2	97.99	162.91	174.07
F2	1	55.57	105.25	84.31
	2	25.05	43.40	37.18
	3	22.15	47.90	53.76
F3	1	16.34	22.81	29.92
	2	16.71	40.96	15.84
	3	36.85	64.66	66.55
F4	1	50.44	220.66	107.43
	2	10.84	27.32	53.68
	3	22.90	39.14	31.97
F6	1	51.30	42.82	129.19
	2	52.44	25.74	40.11
	3	65.93	47.73	68.19

Key:
g/m^2 = Grams per square meter.

Table 4.1-11. Sawgrass Leaf Sclerophylly per Plot and Transect for Post-Uprate Period with Pre-Uprate Range

Location		Sclerophylly (g/m^2)									
		Pre-Uprate Range		November 2013				May 2014			
Transect	Plot	Plot	Transect	Plot	SE	Transect	SE	Plot	SE	Transect	SE
F1	1	101.2 - 166.8		170.3	6.7			196.1	13.4		
F1	2	132.0 - 147	126.1 - 155.5	156.4	12.1	163.3	6.9	216.6	12.0	206.4	9.0
F2	1	123.2 - 230.9		175.6	4.2			261.2	13.3		
F2	2	133.2 - 235.1		202.3	10.6			236.6	8.7		
F2	3	125.9 - 215.3	137.6 - 179.7	197.7	20.3	191.9	7.8	209.2	11.4	235.7	7.3
F3	1	128.6 - 174.8		222.6	11.5			130.0	9.9		
F3	2	134.0 - 179.8		200.2	6.8			183.0	11.3		
F3	3	121.7 - 199.1	130 - 178	233.3	16.5	218.7	7.3	219.0	14.1	177.3	9.1
F4	1	142.4 - 171.0		149.6	9.2			228.2	16.2		
F4	2	148 - 183.2		138.5	5.8			205.0	13.6		
F4	3	153.0 - 186.7	146.1 - 163.9	149.3	7.1	145.8	4.3	248.3	8.6	227.2	8.0
F6	1	118.7 - 170.0		210.8	9.3			205.8	8.5		
F6	2	129.2 - 160.7		206.6	6.7			189.5	15.8		
F6	3	118.9 - 163.5	125.1 - 142.1	206.8	10.6	208.1	5.1	199.0	11.3	198.1	6.9

Key:
g = Grams.
m^2 = Square Meters.

Table 4.1-12. Average Leaf Carbon for Sawgrass per Plot and Transect during the Post-Uprate Period with Pre-Uprate Range

Location		*C. jamaicense* Total Carbon (mg/kg)									
		Pre-Uprate Range		November 2013				May 2014			
Transect	Plot	Plot	Transect	Plot	SE	Transect	SE	Plot	SE	Transect	SE
F1	1	441033 - 499000	452371 - 501143	478000	1000	478250	1264	449000	3342	453750	3261
	2	460875 - 502750		478500	2533			458500	4839		
F2	1	458275 - 507000	458367 - 503000	468000	3629	468833	2135	460500	3594	460917	2360
	2	456450 - 498840		465750	5023			464750	2839		
	3	460375 - 503750		472750	1797			457500	5605		
F3	1	453150 - 513174	449917 - 507079	464250	4404	467000	2153	458750	2496	458250	1280
	2	436000 - 505443		470750	3591			460750	2175		
	3	452000 - 501134		466000	3342			455250	1377		
F4	1	438725 - 489974	449909 - 487403	472500	4873	478167	2760	463000	4223	471333	2638
	2	456250 - 486780		479500	5560			473250	1887		
	3	451000 - 485454		482500	3403			477750	4131		
F6	1	470025 - 512279	457867 - 510524	475250	3568	472083	3049	463750	3794	466250	2104
	2	467325 - 508211		478500	5795			468000	4416		
	3	436250 - 511270		462500	2872			467000	3391		

Key:
Mg/kg = Milligrams per kilogram.
SE = Standard Error.

Table 4.1-13. Average Leaf Total Nitrogen for Sawgrass per Plot and Transect during the Post-Uprate Period with Pre-Uprate Range

Location		*C. jamaicense* Total Nitrogen (mg/kg)									
		Pre-Uprate Range		November 2013				May 2014			
Transect	Plot	Plot	Transect	Plot	SE	Transect	SE	Plot	SE	Transect	SE
F1	1	5233 - 9701	4771 - 10286	7250	250	6500	327	8500	645	8625	420
	2	4425 - 10750		5750	250			8750	629		
F2	1	6725 - 11000	7175 - 11083	6250	479	6250	179	8500	289	8250	179
	2	8750 - 10500		6000	0			8250	250		
	3	6050 - 11750		6500	289			8000	408		
F3	1	6625 - 9250	6308 - 8423	6000	0	5917	149	7500	500	7583	288
	2	5975 - 8476		6000	408			7250	629		
	3	6325 - 9185		5750	250			8000	408		
F4	1	7725 - 8250	6763 - 8746	5750	479	5750	218	8500	645	7917	313
	2	5800 - 8987		5750	479			7500	289		
	3	8000 - 9139		5750	250			7750	629		
F6	1	6000 - 10500	5283 - 10917	6000	408	6500	337	7750	479	8167	271
	2	5225 - 12000		5750	250			8750	250		
	3	4625 - 10250		7750	479			8000	577		

Key:
Mg/kg = Milligrams per kilogram.
SE = Standard Error.

Table 4.1-14. Average Leaf Total Phosphorous for Sawgrass per Plot and Transect During the Post-Uprate Period with Pre-Uprate Range

Location		*C. jamaicense* Total Phosphorous (mg/kg)									
		Pre-Uprate Range		November 2013				May 2014			
Transect	Plot	Plot	Transect	Plot	SE	Transect	SE	Plot	SE	Transect	SE
F1	1	213 - 247	194 - 241	144	12	136	7.5	296	37	304	22
	2	180 - 248		127	9			313	30		
F2	1	175 - 228	143 - 230	163	14	164	6.9	232	6	239	7
	2	160 - 203		164	11			237	17		
	3	93 - 260		167	15			249	13		
F3	1	148 - 195	147 - 225	120	6	134	7.4	190	6	199	9
	2	163 - 220		120	7			175	13		
	3	123 - 273		164	9			234	10		
F4	1	225 - 300	181 - 234	117	30	147	12.1	319	8	272	11
	2	93 - 218		156	13			244	8		
	3	208 - 240		169	5			252	11		
F6	1	190 - 240	193 - 220	159	26	159	11.3	219	20	202	9
	2	215 - 225		155	9			196	15		
	3	130 - 200		162	12			192	15		

Key:
mg/kg = Milligrams per kilogram.
SE = Standard Error.

Table 4.1-15. Average Leaf Carbon Isotopes for Sawgrass per Plot and Transect during the Post-Uprate Period with Pre-Uprate Range

Location		*C. jamaicense* Carbon Isotopes (‰)									
		Pre-Uprate Range		November 2013				May 2014			
Transect	Plot	Plot	Transect	Plot	SE	Transect	SE	Plot	SE	Transect	SE
F1	1	-28.3 to -25.5	-27.2 to -25.6	-27.3	0.5	-27.3	0.3	-27.3	0.2	-27.0	0.2
	2	-27.3 to -24.3		-27.3	0.4			-26.8	0.3		
F2	1	-26.5 to -25.4	-26.7 to -25.4	-26.1	0.1	-26.4	0.1	-27.0	0.1	-27.0	0.1
	2	-27.0 to -25.2		-26.3	0.2			-26.9	0.1		
	3	-26.8 to -25.6		-26.7	0.3			-27.1	0.2		
F3	1	-26.5 to -25.2	-26.1 to -25.1	-26.5	0.2	-26.3	0.2	-26.7	0.1	-26.5	0.1
	2	-26.0 to -25.1		-26.2	0.3			-26.6	0.1		
	3	-26.2 to -25.1		-26.1	0.3			-26.3	0.2		
F4	1	-26.9 to -24.9	-26.5 to -25.0	-27.1	0.2	-26.6	0.1	-27.5	0.5	-27.4	0.2
	2	-26.7 to -25.2		-26.3	0.1			-27.8	0.4		
	3	-26.3 to -25.4		-26.5	0.2			-26.9	0.3		
F6	1	-26.7 to -24.8	-26.5 to -25.0	-26.3	0.3	-26.3	0.2	-27.6	0.2	-27.4	0.1
	2	-26.3 to -24.9		-26.1	0.3			-27.0	0.1		
	3	-26.7 to -25.4		-26.5	0.2			-27.6	0.1		

Key:
‰ = Parts per mille.
SE = Standard Error.

Table 4.1-16. Average Leaf Nitrogen Isotopes for Sawgrass per Plot and Transect during the Post-Uprate Period with Pre-Uprate Range

Location		*C. jamaicense* Nitrogen Isotopes (‰)									
		Pre-Uprate Range		November 2013				May 2014			
Transect	Plot	Plot	Transect	Plot	SE	Transect	SE	Plot	SE	Transect	SE
F1	1	-3.38 to 2.44	-3.62 to 1.31	-0.83	0.62	-1.30	0.40	-0.80	0.29	-0.93	0.28
	2	-3.79 to 0.53		-1.78	0.46			-1.05	0.53		
F2	1	-3.2 to -0.45	-3.65 to -0.48	-2.50	0.74	-1.83	0.32	-2.70	0.38	-2.34	0.26
	2	-4.63 to -0.98		-1.88	0.50			-2.90	0.31		
	3	-3.13 to 0.00		-1.13	0.17			-1.43	0.31		
F3	1	-4.93 to -2.2	-4.55 to -1.39	-3.45	0.32	-3.11	0.29	-5.15	0.93	-3.79	0.49
	2	-4.45 to -0.73		-2.78	0.60			-3.23	0.48		
	3	-4.28 to -0.79		-3.10	0.64			-3.00	0.77		
F4	1	-5.01 to -0.18	-5.45 to -1.32	-2.60	0.42	-3.34	0.26	-1.60	0.64	-3.77	0.56
	2	-5.88 to -2.40		-3.90	0.43			-5.75	0.35		
	3	-3.07 to -1.40			0.31			-3.95	0.22		

Key:
‰ = Parts per mille.
SE = Standard Error.

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Table 4.1-17. Sawgrass Leaf C:N Molar Ratio per Plot and Transect in November 2013 and May 2014

Location		*C. jamaicense* C:N Molar Ratio			
		November 2013		May 2014	
Transect	Plot	Plot	Transect	Plot	Transect
F1	1	77:1	86:1	62:1	61:1
	2	97:1		61:1	
F2	1	87:1	88:1	63:1	65:1
	2	91:1		66:1	
	3	85:1		67:1	
F3	1	90:1	92:1	71:1	71:1
	2	92:1		74:1	
	3	95:1		66:1	
F4	1	96:1	97:1	64:1	69:1
	2	97:1		74:1	
	3	98:1		72:1	
F6	1	92:1	85:1	70:1	67:1
	2	97:1		62:1	
	3	70:1		68:1	

Key:
C = Carbon.
N = Nitrogen.

Table 4.1-18. Sawgrass Leaf N:P Molar Ratio per Plot and Transect in November 2013 and May 2014

Location		*C. jamaicense* C:N Molar Ratio			
				May 2014	
Transect	Plot	Plot	Transect	Plot	Transect
F1	1	111:1	106:1	64:1	63:1
	2	100:1		62:1	
F2	1	85:1	84:1	81:1	76:1
	2	81:1		77:1	
	3	86:1		71:1	
F3	1	111:1	98:1	88:1	84:1
	2	111:1		92:1	
	3	78:1		76:1	
F4	1	109:1	87:1	59:1	65:1
	2	82:1		68:1	
	3	75:1		68:1	
F6	1	83:1	91:1	78:1	89:1
	2	82:1		99:1	
	3	106:1		92:1	

Key:
N = Nitrogen.
P = Phosphorous.

Table 4.1-19. Average Specific Conductance (µS/cm) of Porewater at Each Site for Each Post-Uprate Quarter with Pre-Uprate Range

		Porewater Specific Conductance at 30 cm Depth (µS/cm)																					
		Pre-Uprate								Post-Uprate													
		Pre-Uprate Range		October 2010		May 2011		November 2011		August 2013				November 2013				February 2014				May 2014			
Transect	Plot	Plot	Transect	Plot	Transect	Plot	Transect	Plot	Transect	Plot	SE	Transect	SE	Plot	SE	Transect	SE	Plot	SE	Transect	SE	Plot	SE	Transect	SE
F1	1	2260.8 - 5230.9	1790.6 - 3666.8	2505.8	2011.9	4036.5	3104.7	3196.5	2555.5	1543.9	258.4	1359.5	224.0	1382.3	5.7	1460.1	45.8	1458.5	145.1	1363.3	86.6	1508.2	137.1	1621.0	98.2
	2	1320.4 - 2173		1518.0		2173.0		1914.6		1175.1	407.8			1537.9	21.5			1268.1	76.4			1733.7	116.9		
F2	1	908.0 - 2127.7	1227.4 - 2622.9	1031.1	1317.9	N/A	2622.9	1587.0	1722.0	1074.2	240.0	1527.8	238.5	1145.1	122.8	1411.0	219.4	971.3	164.0	1352.8	169.9	1163.2	80.3	1486.7	218.7
	2	1231 - 2362.2		1351.2		N/A		1695.1		1273.3	63.8			1432.3	37.8			1260.1	115.9			1481.8	60.1		
	3	2048 - 2722.6		2219.3		2622.9		2722.6		2236.0	138.7			2316.6	16.5			1826.9	116.9			2414.3	46.9		
	4	670.0 - 1180.8		670.0		N/A		883.3		N/A	N/A			749.9	49.8			N/A	N/A			887.4	53.0		
F3	1	1380.2 - 2105.1	1436.9 - 2047.8	1736.1	1763.3	1637.7	1923.6	1832.3	1805.7	1341.8	58.2	1690.7	167.1	1298.8	23.7	1409.9	199.3	1191.0	7.0	1529.1	179.3	1290.3	63.9	1592.4	131.2
	2	1559.1 - 2089.2		1631.1		1677.8		1902.6		1529.2	42.3			1498.0	72.1			1314.1	26.3			1502.9	22.5		
	3	2359.9 - 3214.6		2614.0		2455.4		2926.7		2201.0	74.8			2140.5	217.9			2082.3	121.2			1984.0	30.6		
	4	380.6 - 782.4		380.6		N/A		561.4		N/A	N/A			702.5	64.8			N/A	N/A			N/A	N/A		
F4	1	758.0 - 965.6	883.3 - 1243.1	858.1	908.6	925.3	883.3	758.0	1023.1	697.5	28.8	666.5	53.9	858.4	6.0	947.4	54.7	873.2	68.8	894.8	49.3	1030.7	2.9	965.2	49.5
	2	568.0 - 825.8		689.3		763.3		568.0		512.4	45.2			728.3	47.6			799.6	16.3			787.0	34.9		
	3	827.3 - 1012.2		978.3		961.4		844.1		789.6	30.9			943.2	82.1			1011.6	91.2			1053.6	72.6		
	4	1108.9 - 1719.9		1108.9		N/A		1472.7		N/A	N/A			1103.5	59.3			N/A	N/A			1013.8	N/A		
F5	1	19168.9 - 31996.6	19413.9 - 48523.7	22990.9	21486.5	20357.9	29147.8	23680.7	33494.3	34647.6	301.1	44786.5	5970.3	44370.5	25.7	47401.8	1751.7	34810.5	22.5	41646.2	3954.4	38982.4	443.6	53363.7	8334.3
	2	19903.9 - 65050.8		19982.1		46727.7		43307.8		54925.4	2860.2			50433.2	180.3			48482.0	606.6			67745.0	1709.5		
F6	1	888.5 - 1125.2	1282.1 - 1784.7	1027.2	1373.0	990.4	1784.7	1009.8	1577.1	1005.7	15.4	1797.5	455.0	1060.5	28.8	1586.8	310.6	1034.0	48.8	1604.1	312.6	1039.2	42.2	1958.0	528.0
	2	1070.3 - 1206.8		1095.0		1070.3		1130.8		1187.0	18.0			1230.0	11.7			1200.0	7.7			1213.7	1.4		
	3	2523.5 - 3293.6		2679.0		3293.6		3214.2		3199.7	372.3			2936.5	445.0			2578.5	160.3			3621.2	126.9		
	4	645.5 - 1218.6		691.1		N/A		953.6		N/A	N/A			1120.4	242.4			N/A	N/A			N/A	N/A		
M1	1	40788.2 - 64315.3	43403.9 - 64100.0	47100.8	47534.4	56588.7	57242.3	55947.0	55180.0	N/A	N/A	N/A	N/A	42284.0	670.6	44387.6	1266.0	N/A	N/A	N/A	N/A	47442.4	3794.9	50762.9	3313.2
	2	46019.7 - 63884.7		47967.9		57895.9		54413.1		N/A	N/A			46491.1	562.6			N/A	N/A			54083.4	5423.1		
M2	1	43276.9 - 62516.0	46998 - 63304.7	52510.3	52186.0	59849.2	60928.4	55072.4	57860.1	N/A	N/A	N/A	N/A	49759.1	761.2	49784.9	503.8	N/A	N/A	N/A	N/A	54776.0	49.5	54399.0	224.5
	2	49553.4 - 64093.4		51861.8		62007.6		60647.8		N/A	N/A			49810.8	970.6			N/A	N/A			54022.1	125.3		
M3	1	45589.1 - 67367.6	44903.7 - 66140.6	52123.6	51545.2	64201.4	62991.8	57153.8	56772.6	N/A	N/A	N/A	N/A	44296.6	2824.3	46397.9	1679.4	N/A	N/A	N/A	N/A	54147.0	1529.0	54830.9	1399.4
	2	43649.9 - 64913.6		50966.7		61782.3		56391.4		N/A	N/A			48499.3	337.0			N/A	N/A			55514.8	2911.4		
M4	1	41543.2 - 79855.8	44093.6 - 82868.1	43344.8	44739.5	78742.9	78150.3	59997.0	64434.6	N/A	N/A	N/A	N/A	51665.7	1095.6	49850.3	1321.1	N/A	N/A	N/A	N/A	67294.6	4403.4	64759.7	2332.1
	2	46134.3 - 85880.5		46134.3		77557.8		68872.3		N/A	N/A			48034.9	1637.2			N/A	N/A			62224.8	625.0		
M5	1	44949.4 - 81750.9	46473 - 70118.4	51624.5	46473.0	55111.7	55900.2	61393.0	57845.4	N/A	N/A	N/A	N/A	47225.9	536.0	48143.7	715.5	N/A	N/A	N/A	N/A	63430.5	1078.3	60176.4	1998.4
	2	41321.5 - 58485.8		41321.5		56294.5		54297.8		N/A	N/A			49061.6	1048.3			N/A	N/A			56922.2	1272.7		
M6	1	41186.5 - 51057.4	42908.5 - 49898.1	N/A	N/A	44079.0	45899.1	46514.1	47405.4	N/A	N/A	N/A	N/A	42390.8	323.2	43680.2	771.4	N/A	N/A	N/A	N/A	47797.3	1007.2	46716.3	764.8
	2	44630.5 - 48738.8		N/A		47719.2		48296.7		N/A	N/A			44969.5	375.0			N/A	N/A			45635.3	398.1		

Key:

µS = Microsiemens.

cm = Centimeters.

N/A = Not applicable.

Table 4.1-20. Average Specific Conductance (µS/cm) of Porewater at Each Site for Each Post-Uprate Quarter with Pre-Uprate Range

		Porewater Temperature at 30 cm Depth (°C)																							
		Pre-Uprate								Post-Uprate															
		Pre-Uprate Range		October 2010		May 2011		November 2011		August 2013				November 2013				February 2014				May 2014			
Transect	Plot	Plot	Transect	Plot	Transect	Plot	Transect	Plot	Transect	Plot	SE	Transect	SE	Plot	SE	Transect	SE	Plot	SE	Transect	SE	Plot	SE	Transect	SE
F1	1	23.2 - 30.6	21.8 - 31.1	27.8	28.7	30.6	31.1	24.8	26.0	30.0	0.1	29.5	0.3	26.3	0.1	26.3	0.1	25.9	0.1	25.2	0.4	28.1	0.2	27.3	0.5
	2	20.0 - 31.7		29.5		31.7		27.3		29.1	0.2			26.4	0.1			24.6	0.1			26.5	0.0		
F2	1	22.6 - 29.6	22.9 - 29.3	27.8	26.1	N/A	29.0	25.0	25.3	28.8	0.0	28.6	0.1	26.3	0.5	25.1	0.4	22.3	0.2	22.3	0.2	28.5	0.4	27.6	0.3
	2	22.3 - 28.6		27.3		N/A		25.7		28.5	0.1			24.0	0.1			21.6	0.1			27.3	0.3		
	3	22.8 - 29.0		26.9		29.0		25.1		28.7	0.0			24.2	0.2			22.9	0.3			26.7	0.2		
	4	22.3 - 30.0		22.3		N/A		25.5		N/A	N/A			25.7	0.1			N/A	N/A			28.0	0.4		
F3	1	22.8 - 28.8	23.0 - 29.7	27.4	26.3	26.9	29.5	23.8	24.7	30.0	0.0	29.9	0.1	26.0	0.1	26.2	0.2	25.0	0.2	25.0	0.1	27.6	0.2	27.3	0.3
	2	23.0 - 30.1		26.5		29.0		25.0		29.9	0.1			26.7	0.2			25.1	0.2			27.9	0.2		
	3	22.7 - 32.6		26.7		32.6		26.1		29.7	0.2			26.4	0.3			24.8	0.3			26.3	0.3		
	4	23.1 - 28.7		23.1		N/A		24.1		N/A	N/A			25.4	0.1			N/A	N/A			N/A	N/A		
F4	1	21.4 - 29.2	22.8 - 30.2	21.4	22.8	28.9	30.2	26.3	25.4	30.0	0.5	30.1	0.2	26.2	0.2	26.3	0.2	24.6	0.1	25.2	0.3	26.8	0.4	26.9	0.3
	2	21.4 - 31.4		21.4		29.8		26.7		30.3	0.1			27.4	0.1			25.5	0.6			26.5	0.3		
	3	24.7 - 32.1		24.7		32.1		25.1		30.1	0.1			26.6	0.1			25.5	0.2			26.7	0.4		
	4	23.6 - 27.9		23.6		N/A		24.5		N/A	N/A			25.8	0.2			N/A	N/A			28.3	N/A		
F5	1	25.1 - 34.5	24.9 - 33.7	27.5	27.4	34.5	33.7	26.1	26.0	30.0	0.2	30.5	0.3	28.5	0.1	28.3	0.2	25.0	0.1	25.8	0.5	28.7	0.2	28.4	0.2
	2	24.8 - 34.1		27.4		32.1		26.0		30.9	0.4			28.0	0.4			26.5	0.2			28.1	0.0		
F6	1	23.5 - 28.7	22.9 - 28.5	28.7	26.4	24.7	25.8	25.4	26.5	28.7	0.1	29.3	0.2	24.5	0.2	24.2	0.2	23.3	0.1	24.2	0.3	26.4	0.5	26.4	0.2
	2	23.9 - 29.4		27.3		25.9		27.4		29.7	0.1			24.6	0.2			24.8	0.0			26.8	0.2		
	3	21.6 - 30.1		28.3		26.9		27.4		29.5	0.1			24.6	0.1			24.6	0.3			26.1	0.4		
	4	21.4 - 27.1		21.4		N/A		25.7		N/A	N/A			23.2	0.2			N/A	N/A			N/A	N/A		
M1	1	22.1 - 31.9	22.7 - 31.5	26.2	26.4	26.3	28.1	26.6	26.2	N/A	N/A	N/A	N/A	25.1	0.3	25.8	0.4	N/A	N/A	N/A	N/A	28.6	0.1	28.2	0.2
	2	23.4 - 31.1		26.6		30.0		25.7		N/A	N/A			26.5	0.0			N/A	N/A			27.9	0.0		
M2	1	22.8 - 32.6	23.0 - 32.3	25.9	25.9	27.3	26.3	28.0	28.3	N/A	N/A	N/A	N/A	26.8	0.3	27.0	0.2	N/A	N/A	N/A	N/A	28.4	0.1	28.5	0.2
	2	23.2 - 32.1		25.9		25.3		28.7		N/A	N/A			27.2	0.0			N/A	N/A			28.6	0.4		
M3	1	22.1 - 31.3	21.5 - 31.1	26.1	26.7	29.8	29.9	25.7	25.3	N/A	N/A	N/A	N/A	27.0	0.2	27.0	0.1	N/A	N/A	N/A	N/A	29.7	0.3	29.5	0.3
	2	20.9 - 31.0		27.3		30.0		25.0		N/A	N/A			26.9	0.2			N/A	N/A			29.3	0.6		
M4	1	23.0 - 33.5	23.3 - 33.1	23.0	23.3	29.2	30.8	26.1	26.1	N/A	N/A	N/A	N/A	27.5	0.3	27.4	0.2	N/A	N/A	N/A	N/A	29.1	0.0	29.1	0.2
	2	20.5 - 32.7		23.6		32.4		26.1		N/A	N/A			27.4	0.5			N/A	N/A			29.2	0.5		
M5	1	24.2 - 32.8	22.8 - 31.9	28.0	27.7	31.8	29.8	26.7	26.1	N/A	N/A	N/A	N/A	27.1	0.2	26.8	0.2	N/A	N/A	N/A	N/A	30.1	0.4	29.0	0.7
	2	18.4 - 31.0		27.4		28.8		25.5		N/A	N/A			26.5	0.2			N/A	N/A			27.8	0.1		
M6	1	24.3 - 31.5	24.4 - 32.0	N/A	N/A	28.2	28.8	26.8	27.0	N/A	N/A	N/A	N/A	27.5	0.0	27.7	0.2	N/A	N/A	N/A	N/A	27.7	0.1	27.5	0.2
	2	24.5 - 32.5		N/A		29.4		27.2		N/A	N/A			27.9	0.2			N/A	N/A			27.2	0.2		

Key:
°C = Degrees Celsius.
cm = Centimeters.
N/A = Not applicable.

Table 4.1-21. Marsh and Mangrove Analytical Porewater August 2013

Parameter	Units	PW-F1-1 8/7/2013		PW-F1-2 8/7/2013		PW-F2-1 8/9/2013		PW-F2-2 8/9/2013		PW-F2-3 8/9/2013		PW-F3-1 8/13/2013		PW-F3-2 8/13/2013		PW-F3-3 8/13/2013	
Temperature	°C	29.98		29.06		28.77		28.48		28.69		30.02		29.94		29.66	
pH	SU																
Dissolved Oxygen	mg/L																
Specific Conductance	µS/cm	1543.93		1175.11		1074.17		1273.25		2235.98		1341.78		1529.19		2201.01	
Turbidity	NTU																
Silica, dissolved	mg/L																
Calcium	mg/L																
Magnesium	mg/L																
Potassium	mg/L																
Sodium	mg/L	132		73		88		87.2		103		125		139		268	
Boron	mg/L																
Strontium	mg/L																
Bromide	mg/L																
Chloride	mg/L	184		107		146		195		433		227		281		496	
Fluoride	mg/L																
Sulfate	mg/L																
Total Ammonia	mg/L as N																
Ammonium ion (NH_4^+)	mg/L																
Unionized NH_3	mg/L																
Nitrate/Nitrite	mg/L as N																
TKN	mg/L																
TN	mg/L																
ortho-Phosphate	mg/L																
Total Phosphorus (P)	mg/L																
Alkalinity	mg/L																
Bicarbonate Alkalinity	mg/L as $CaCO_3$																
Sulfide	mg/L																
Total Dissolved Solids	mg/L																
Salinity	*	0.9	J	0.6	J	0.4	J	0.7	J	1.2	J	0.7	J	0.8	J	1.1	J
Tritium	pCi/L (1σ)																

NOTES:

Laboratory anion and cation results are reported with 3 digits although only the first 2 are significant figures.

* PSS-78 Salinity is unitless.

KEY:

°C = Degrees Celsius.

µg/L = Microgram(s) per liter.

µS/cm = MicroSiemen(s) per centimeter.

σ = sigma (Standard Deviation).

$CaCO_3$ = Calcium carbonate.

I = Value between the MDL and PQL.

J = Estimated (+/- indicate bias).

mg/L = Milligram(s) per liter.

NH_3 = Ammonia.

NH_4^+ = Ammonium ion.

NTU = Nephelometric Turbidity Units(s).

pCi/L = PicoCuries per liter.

PW = Porewater.

RPD = Relative Percent Difference.

SU = Standard unit(s).

TKN = Total Kjeldahl nitrogen.

U = Analyzed for but not detected at the reported value.

Table 4.1-21. Marsh and Mangrove Analytical Porewater August 2013

Parameter	Units	PW-F4-1 8/13/2013		PW-F4-3 8/13/2013		PW-F5-1 8/8/2013		PW-F5-2 8/8/2013		PW-F6-1 8/12/2013		PW-F6-2 8/12/2013		PW-F6-3 8/12/2013		PW-EB1 8/7/2013		PW-FB1 8/13/2013	
Temperature	°C	30.04		30.05		30.02		30.91		28.72		29.72		28.01					
pH	SU																		
Dissolved Oxygen	mg/L																		
Specific Conductance	µS/cm	697.5		789.57		34647.64	J	54925.39		1005.72		1186.95		3199.73					
Turbidity	NTU																		
Silica, dissolved	mg/L																		
Calcium	mg/L																		
Magnesium	mg/L																		
Potassium	mg/L																		
Sodium	mg/L	38.5		52.2		6690		10500		223		77		386		2.39		0.31	U
Boron	mg/L																		
Strontium	mg/L																		
Bromide	mg/L																		
Chloride	mg/L	71.9		92.7		24900	J	20200		119		152		804		0.253	I	0.25	U
Fluoride	mg/L																		
Sulfate	mg/L																		
Total Ammonia	mg/L as N																		
Ammonium ion (NH_4^+)	mg/L																		
Unionized NH_3	mg/L																		
Nitrate/Nitrite	mg/L as N																		
TKN	mg/L																		
TN	mg/L																		
ortho-Phosphate	mg/L																		
Total Phosphorus (P)	mg/L																		
Alkalinity	mg/L																		
Bicarbonate Alkalinity	mg/L as $CaCO_3$																		
Sulfide	mg/L																		
Total Dissolved Solids	mg/L																		
Salinity	*	0.3	J	0.4	J	22.4	J	37.1		0.5	J	0.6	J	1.7	J				
Tritium	pCi/L (1σ)																		

NOTES:
Laboratory anion and cation results are reported with 3 digits although only the first 2 are significant figures.
* PSS-78 Salinity is unitless.
KEY:

°C = Degrees Celsius.
µg/L = Microgram(s) per liter.
µS/cm = MicroSiemen(s) per centimeter.
σ = sigma (Standard Deviation).
$CaCO_3$ = Calcium carbonate.
I = Value between the MDL and PQL.
J = Estimated (+/- indicate bias).
mg/L = Milligram(s) per liter.
NH_3 = Ammonia.
NH_4^+ = Ammonium ion.
NTU = Nephelometric Turbidity Units(s).
pCi/L = PicoCuries per liter.
PW = Porewater.
RPD = Relative Percent Difference.
SU = Standard unit(s).
TKN = Total Kjeldahl nitrogen.
U = Analyzed for but not detected at the reported value.

Table 4.1-22. Marsh and Mangrove Analytical Porewater November 2013

		PW-F1-1		PW-F1-2		PW-F2-1		PW-F2-2		PW-F2-3		PW-F2-4	
Parameter	Units	11/05/2013		11/19/2013		11/08/2013		11/14/2013		11/14/2013		11/12/2013	
Temperature	°C	26.29		26.36		26.33		26.33		24.24		25.75	
pH	SU	6.56		6.65		6.69		6.69		6.62		6.04	
Dissolved Oxygen	mg/L												
Specific Conductance	µS/cm	1382.26		1537.93		1145.06		1432.31		2316.59		749.91	
Turbidity	NTU												
Silica, dissolved	mg/L												
Calcium	mg/L												
Magnesium	mg/L												
Potassium	mg/L												
Sodium	mg/L	127		121		73.3		102		219		60	
Boron	mg/L												
Strontium	mg/L												
Bromide	mg/L												
Chloride	mg/L	164		204		134		205		453		112	
Fluoride	mg/L												
Sulfate	mg/L												
Total Ammonia	mg/L as N	0.629	J	1.4		1.96		2.13		1.76		0.772	
Ammonium ion (NH_4^+)	mg/L	0.807	J	1.81		2.51		2.73		2.26		0.992	
Unionized NH_3	mg/L	0.00172	J	0.00478		0.00726		0.00789		0.00479		0.000616	
Nitrate/Nitrite	mg/L as N	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U
TKN	mg/L	2.18	J	2.77		2.7		3.28		3.15		2.26	
TN	mg/L	2.207	J	2.797		2.727		3.307		3.177		2.287	
ortho-Phosphate	mg/L	0.0014	U	0.00246	I	0.0028	U J-	0.0014	U J-	0.00215	I J-	0.00234	I V
Total Phosphorus (P)	mg/L	0.0023	I	0.0022	U	0.0316		0.0177		0.0136		0.0022	U
Alkalinity	mg/L												
Bicarbonate Alkalinity	mg/L as $CaCO_3$												
Sulfide	mg/L												
Total Dissolved Solids	mg/L												
Salinity	*	0.70	J	0.78	J	0.58	J	0.75	J	1.21	J	0.37	J
Tritium	pCi/L (±1σ)												

NOTES:
Laboratory anion and cation results are reported with 3 digits although only the first 2 are significant figures.
* PSS-78 Salinity is unitless.
KEY:

°C = Degrees Celsius.
µg/L = Microgram(s) per liter.
µS/cm = MicroSiemen(s) per centimeter.
σ = sigma (Standard Deviation).
$CaCO_3$ = Calcium carbonate.
I = Value between the MDL and PQL.
J = Estimated (+/- indicate bias).
mg/L = Milligram(s) per liter.
NH_3 = Ammonia.
NH_4^+ = Ammonium ion.
NTU = Nephelometric Turbidity Units(s).
pCi/L = PicoCuries per liter.
PW = Porewater.
RPD = Relative Percent Difference.
SU = Standard unit(s).
TKN = Total Kjeldahl nitrogen.
U = Analyzed for but not detected at the reported value.
V = Detected in method blank.

Table 4.1-22. Marsh and Mangrove Analytical Porewater November 2013

		PW-F3-1		PW-F3-2		PW-F3-3		PW-F3-4		PW-F4-1		PW-F4-2		PW-F4-3		PW-F4-4	
Parameter	**Units**	**11/12/2013**		**11/12/2013**		**11/12/2013**		**11/12/2013**		**11/11/2013**		**11/11/2013**		**11/11/2013**		**11/11/2013**	
Temperature	°C	26.05		26.75		26.43		25.42		26.24		27.36		26.58		25.48	
pH	SU	6.69		6.76		6.69		5.81		6.61		6.9		6.68		6.31	
Dissolved Oxygen	mg/L																
Specific Conductance	µS/cm	1298.82		1497.47		2140.47		702.46		858.43		728.3		943.17		1103.53	
Turbidity	NTU																
Silica, dissolved	mg/L																
Calcium	mg/L																
Magnesium	mg/L																
Potassium	mg/L																
Sodium	mg/L	109		120		230		71.6		40.1		42.1		52.2		77.9	
Boron	mg/L																
Strontium	mg/L																
Bromide	mg/L																
Chloride	mg/L	214		253		479		132		77.9		85.2		102		145	
Fluoride	mg/L																
Sulfate	mg/L																
Total Ammonia	mg/L as N	2.45		2.72		1.98		0.421		0.857		1.92		1.72		1.03	
Ammonium ion (NH_4^+)	mg/L	3.14		3.48		2.54		0.541		1.1		2.46		2.2		1.32	
Unionized NH_3	mg/L	0.0089		0.0122		0.00739		0.000193		0.00263		0.0124		0.00634		0.0015	
Nitrate/Nitrite	mg/L as N	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U
TKN	mg/L	4.02		4.16		3.3		2.09		2.76		2.82		2.78		2.9	
TN	mg/L	4.047		4.187		3.327		2.117		2.787		2.847		2.807		2.927	
ortho-Phosphate	mg/L	0.00141	I V	0.0014	U	0.0014	U	0.00255	I V	0.00265	I V J	0.00194	I V	0.0014	U	0.00328	I V
Total Phosphorus (P)	mg/L	0.00999	I	0.00623	I	0.00227	I	0.0022	U	0.0022	U J	0.0022	U	0.00504	I	0.00545	I
Alkalinity	mg/L																
Bicarbonate Alkalinity	mg/L as $CaCO_3$																
Sulfide	mg/L																
Total Dissolved Solids	mg/L																
Salinity	*	0.66	J	0.76	J	1.11	J	0.35	J	0.43	J	0.36	J	0.48	J	0.55	J
Tritium	pCi/L (±1σ)																

NOTES:
Laboratory anion and cation results are reported with 3 digits although only the first 2 are significant figures.
* PSS-78 Salinity is unitless.
KEY:

°C = Degrees Celsius.
µg/L = Microgram(s) per liter.
µS/cm = MicroSiemen(s) per centimeter.
σ = sigma (Standard Deviation).
$CaCO_3$ = Calcium carbonate.
I = Value between the MDL and PQL.
J = Estimated (+/- indicate bias).
mg/L = Milligram(s) per liter.
NH_3 = Ammonia.
NH_4^+ = Ammonium ion.
NTU = Nephelometric Turbidity Units(s).
pCi/L = PicoCuries per liter.
PW = Porewater.
RPD = Relative Percent Difference.
SU = Standard unit(s).
TKN = Total Kjeldahl nitrogen.
U = Analyzed for but not detected at the reported value.
V = Detected in method blank.

Table 4.1-22. Marsh and Mangrove Analytical Porewater November 2013

		PW-F5-1		PW-F5-2		PW-F6-1		PW-F6-2		PW-F6-3		PW-F6-4		PW-M1-1		PW-M1-2	
Parameter	**Units**	**11/18/2013**		**11/18/2013**		**11/13/2013**		**11/13/2013**		**11/13/2013**		**11/13/2013**		**11/05/2013**		**11/06/2013**	
Temperature	°C	28.96		28		24.47		24.64		24.63		23.21		25.14		26.48	
pH	SU	6.72		6.86		6.75		6.67		6.57		6.4		6.53		6.61	
Dissolved Oxygen	mg/L																
Specific Conductance	µS/cm	44370.52		50433.17		1060.5		1229.96		2936.48		1120.44		42284		46491.1	
Turbidity	NTU																
Silica, dissolved	mg/L																
Calcium	mg/L																
Magnesium	mg/L																
Potassium	mg/L																
Sodium	mg/L	8550		9130		49.5		76		313		44		7950		9170	J
Boron	mg/L																
Strontium	mg/L																
Bromide	mg/L																
Chloride	mg/L	16600		18800		112		171		639		78.9		16300		18200	
Fluoride	mg/L																
Sulfate	mg/L																
Total Ammonia	mg/L as N	0.904		0.996		2.53		2.01		1.61		0.822		0.411	J	0.287	J
Ammonium ion (NH_4^+)	mg/L	1.16		1.27		3.24		2.58		2.07		1.06		0.527	J	0.368	J
Unionized NH_3	mg/L	0.0043		0.00612		0.00944		0.00632		0.00402		0.00125		0.00097	J	0.00089	J
Nitrate/Nitrite	mg/L as N	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.0443	I	0.027	U	0.027	U J
TKN	mg/L	2.59		1.57		3.64		2.95		2.71		3.02		0.719	J	0.89	J
TN	mg/L	2.617		1.597		3.667		2.977		2.737		3.0643		0.746	J	0.917	J
ortho-Phosphate	mg/L	0.0014	U	0.0014	U	0.00233	I J-	0.0014	U J-	0.0014	U J-	0.00478	I J-	0.00656	I J	0.0206	J
Total Phosphorus (P)	mg/L	0.0022	U	0.0022	U	0.0022	U	0.0022	U	0.0022	U	0.0022	U J	0.0022	U J	0.0022	U J
Alkalinity	mg/L																
Bicarbonate Alkalinity	mg/L as $CaCO_3$																
Sulfide	mg/L																
Total Dissolved Solids	mg/L																
Salinity	*	29.16		33.69		0.54	J	0.62	J	1.55	J	0.56	J	27.59		30.70	
Tritium	pCi/L (±1σ)																

NOTES:

Laboratory anion and cation results are reported with 3 digits although only the first 2 are significant figures.

* PSS-78 Salinity is unitless.

KEY:

°C = Degrees Celsius.
µg/L = Microgram(s) per liter.
µS/cm = MicroSiemen(s) per centimeter.
σ = sigma (Standard Deviation).
$CaCO_3$ = Calcium carbonate.
I = Value between the MDL and PQL.
J = Estimated (+/- indicate bias).
mg/L = Milligram(s) per liter.
NH_3 = Ammonia.
NH_4^+ = Ammonium ion.
NTU = Nephelometric Turbidity Units(s).
pCi/L = PicoCuries per liter.
PW = Porewater.
RPD = Relative Percent Difference.
SU = Standard unit(s).
TKN = Total Kjeldahl nitrogen.
U = Analyzed for but not detected at the reported value.
V = Detected in method blank.

Table 4.1-22. Marsh and Mangrove Analytical Porewater November 2013

		PW-M2-1		PW-M2-2		PW-M3-1		PW-M3-2		PW-M4-1		PW-M4-2		PW-M5-1		PW-M5-2	
Parameter	**Units**	**11/19/2013**		**11/20/2013**		**11/19/2013**		**11/20/2013**		**11/19/2013**		**11/06/2013**		**11/18/2013**		**11/06/2013**	
Temperature	°C	26.78		27.17		27.02		26.91		27.5		27.38		27.09		26.5	
pH	SU	6.83		6.55		7.04		6.91		6.88		6.59		6.85		6.84	
Dissolved Oxygen	mg/L																
Specific Conductance	µS/cm	49759.1		49810.8		44296.6		48499.3		48034.9		48034.9		47225.9		49061.6	
Turbidity	NTU																
Silica, dissolved	mg/L																
Calcium	mg/L																
Magnesium	mg/L																
Potassium	mg/L																
Sodium	mg/L	9660		9330		8670		8960	J	10100		9490	J	8720		9530	
Boron	mg/L																
Strontium	mg/L																
Bromide	mg/L																
Chloride	mg/L	18800		19000		17200		17900		19500		18800		18000		19600	
Fluoride	mg/L																
Sulfate	mg/L																
Total Ammonia	mg/L as N	1.02		0.406	J	0.529		0.756	J	0.834		1.1	J	0.495		0.894	
Ammonium ion (NH_4^+)	mg/L	1.31		0.521	J	0.675		0.967	J	1.07		1.41	J	0.633		1.14	
Unionized NH_3	mg/L	0.00538		0.00054	J	0.00459		0.00483	J	0.00518		0.00349	J	0.00279		0.00473	
Nitrate/Nitrite	mg/L as N	0.027	U	0.0428	I	0.027	U	0.027	U J	0.027	U	0.027	U J	0.027	U	0.027	U
TKN	mg/L	1.45		0.916	J	1.2		1.59	J	1.65		2.37	J	1.37		1.38	
TN	mg/L	1.477		0.9588	J	1.227		1.617	J	1.677		2.397	J	1.397		1.407	
ortho-Phosphate	mg/L	0.00625	I J	0.0242	J	0.00214	I	0.00245	I	0.0014	U	0.00625	I J	0.0014	U	0.0193	J
Total Phosphorus (P)	mg/L	0.0022	U J	0.0022	U J	0.0022	U	0.0022	U J	0.0022	U	0.0022	U J	0.0022	U	0.0022	U J
Alkalinity	mg/L																
Bicarbonate Alkalinity	mg/L as $CaCO_3$																
Sulfide	mg/L																
Total Dissolved Solids	mg/L																
Salinity	*	33.13		33.18		29.10		32.19		34.57		31.86		31.25		32.60	
Tritium	pCi/L (±1σ)																

NOTES:

Laboratory anion and cation results are reported with 3 digits although only the first 2 are significant figures.

* PSS-78 Salinity is unitless.

KEY:

°C = Degrees Celsius.
µg/L = Microgram(s) per liter.
µS/cm = MicroSiemen(s) per centimeter.
σ = sigma (Standard Deviation).
$CaCO_3$ = Calcium carbonate.
I = Value between the MDL and PQL.
J = Estimated (+/- indicate bias).
mg/L = Milligram(s) per liter.
NH_3 = Ammonia.
NH_4^+ = Ammonium ion.
NTU = Nephelometric Turbidity Units(s).
pCi/L = PicoCuries per liter.
PW = Porewater.
RPD = Relative Percent Difference.
SU = Standard unit(s).
TKN = Total Kjeldahl nitrogen.
U = Analyzed for but not detected at the reported value.
V = Detected in method blank.

Table 4.1-22. Marsh and Mangrove Analytical Porewater November 2013

		PW-M6-1		PW-M6-2		PW-EB1		PW-FB1	
Parameter	**Units**	**11/07/2013**		**11/07/2013**		**11/05/2013**		**11/20/2013**	
Temperature	°C	27.46		27.89					
pH	SU	6.49		6.46					
Dissolved Oxygen	mg/L								
Specific Conductance	µS/cm	42390.9		44969.6					
Turbidity	NTU								
Silica, dissolved	mg/L								
Calcium	mg/L								
Magnesium	mg/L								
Potassium	mg/L								
Sodium	mg/L	7800	J	8300	J	1.28		0.31	U
Boron	mg/L								
Strontium	mg/L								
Bromide	mg/L								
Chloride	mg/L	16300		16800		0.25	U	0.25	U
Fluoride	mg/L								
Sulfate	mg/L								
Total Ammonia	mg/L as N	2.22	J	2.41	J	0.236		0.273	
Ammonium ion (NH_4^+)	mg/L	2.85	J	3.09	J				
Unionized NH_3	mg/L	0.00562	J	0.00587	J				
Nitrate/Nitrite	mg/L as N	0.027	U J	0.027	U J	0.027	U	0.027	U
TKN	mg/L	2.83	J-	3.02	J	0.498		0.285	
TN	mg/L	2.857	J	3.047	J				
ortho-Phosphate	mg/L	0.0319	J	0.0344	J	0.00284	I	0.0014	U
Total Phosphorus (P)	mg/L	0.00556	I J	0.0022	U J	0.0022	U	0.0022	U
Alkalinity	mg/L								
Bicarbonate Alkalinity	mg/L as $CaCO_3$								
Sulfide	mg/L								
Total Dissolved Solids	mg/L								
Salinity	*	27.70		29.59					
Tritium	pCi/L (±1σ)								

NOTES:

Laboratory anion and cation results are reported with 3 digits although only the first 2 are significant figures.

* PSS-78 Salinity is unitless.

KEY:

°C = Degrees Celsius.
µg/L = Microgram(s) per liter.
µS/cm = MicroSiemen(s) per centimeter.
σ = sigma (Standard Deviation).
$CaCO_3$ = Calcium carbonate.
I = Value between the MDL and PQL.
J = Estimated (+/- indicate bias).
mg/L = Milligram(s) per liter.
NH_3 = Ammonia.
NH_4^+ = Ammonium ion.
NTU = Nephelometric Turbidity Units(s).
pCi/L = PicoCuries per liter.
PW = Porewater.
RPD = Relative Percent Difference.
SU = Standard unit(s).
TKN = Total Kjeldahl nitrogen.
U = Analyzed for but not detected at the reported value.
V = Detected in method blank.

Table 4.1-23. Marsh and Mangrove Analytical Porewater February 2014

		020414-PW-F1-1		020414-PW-F1-2		021314-PW-F2-1		021314-PW-F2-2		021314-PW-F2-3		020614-PW-F3-1		020614-PW-F3-2		020614-PW-F3-3	
Parameter	Units	02/04/2014		02/04/2014		02/13/2014		02/13/2014		02/13/2014		02/06/2014		02/06/2014		02/06/2014	
Temperature	°C	25.9		24.6		22.3		21.6		22.9		25.0		25.1		24.8	
Specific Conductance	µS/cm	1458		1268		971		1259		1826		1190		1314		2082	
Sodium	mg/L	162		125		77.9		95.7		189		110		124		245	
Chloride	mg/L	157		193		126		178		330		196		230		455	
Salinity	*	0.74	J	0.64	J	0.49	J	0.64	J	0.94	J	0.60	J	0.67	J	1.01	J
Tritium	pCi/L (1σ)																

		020514-PW-F4-1		020514-PW-F4-2		020514-PW-F4-3		021114-PW-F5-1		021114-PW-F5-2		021214-PW-F6-1		021214-PW-F6-2		021214-PW-F6-3	
Parameter	Units	02/05/2014		02/05/2014		02/05/2014		02/11/2014		02/11/2014		02/12/2014		02/12/2014		02/12/2014	
Temperature	°C	24.6		25.6		25.5		25.0		26.5		23.3		24.8		24.6	
Specific Conductance	µS/cm	873		799		1011		34810		48481		1033		1200		2578	
Sodium	mg/L	55.5		56.4		59.2		6910		10400		53.9		81.5		312	
Chloride	mg/L	119		110		126		12900		18700		116		167		560	
Salinity	*	0.44	J	0.40	J	0.51	J	22.2		32.2		0.52	J	0.61	J	1.4	J
Tritium	pCi/L (1σ)																

		020514-PW-EB1		021314-PW-FB-1	
Parameter	Units	02/05/2014		02/13/2014	
Temperature	°C				
Specific Conductance	µS/cm				
Sodium	mg/L	0.310	U	0.310	U
Chloride	mg/L	0.250	U	0.250	U
Salinity	*				
Tritium	pCi/L (1σ)				

NOTES:
Laboratory anion and cation results are reported with 3 digits although only the first 2 are significant figures.
* PSS-78 salinity is unitless.
KEY:

°C = Degrees Celsius.
µS/cm = MicroSiemen(s) per centimeter.
σ = Sigma (Standard Deviation).
J = Estimated (+/- indicate bias).
mg/L = Milligram(s) per liter.
pCi/L = PicoCuries per liter.
PW = Porewater.
U = Analyzed for but not detected at the reported value.

Table 4.1-24. Marsh and Mangrove Analytical Porewater May 2014

		050514-PW-F1-1		050514-PW-F1-2		050814-PW-F2-1		050814-PW-F2-2		050814-PW-F2-3		050214-PW-F2-4		050214-PW-F3-1		050214-PW-F3-2		050214-PW-F3-3	
Parameter	**Units**	**05/05/2014**		**05/05/2014**		**05/08/2014**		**05/08/2014**		**05/08/2014**		**05/02/2014**		**05/02/2014**		**05/02/2014**		**05/02/2014**	
Temperature	°C	28.08		26.49		28.52		27.33		26.74		27.98		27.62		27.94		26.31	
pH	SU	6.99		6.86		7.36		7.17		6.91		6.17		6.86		6.77		6.7	
Dissolved Oxygen	mg/L																		
Specific Conductance	µS/cm	1508.19		1733.73		1163.22		1481.83		2414.26		887.41		1290.31		1502.9		1983.95	
Turbidity	NTU																		
Silica, dissolved	mg/L																		
Calcium	mg/L																		
Magnesium	mg/L																		
Potassium	mg/L																		
Sodium	mg/L	138		176		82.3		127.0		256		66		110		123		215.0	
Boron	mg/L																		
Strontium	mg/L																		
Bromide	mg/L																		
Chloride	mg/L	174		316		150		246		498		138		213		273		434	
Fluoride	mg/L																		
Sulfate	mg/L																		
Total Ammonia	mg/L as N	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.341		0.026	U	0.026	U	0.026	U
Ammonium ion (NH_4^+)	mg/L	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.438		0.05	U	0.05	U	0.05	U
Unionized NH_3	mg/L	0.000017	U	0.000017	U	0.000017	U	0.000017	U	0.000017	U	0.000429		0.000017	U	0.000017	U	0.000017	U
Nitrate/Nitrite	mg/L as N	0.0654		0.638		0.027	U	0.276		0.0294	I	0.0297	I	0.0349	I	0.027	U	0.0541	
TKN	mg/L	1.08		2.45		3.05		2.91		4.44		2.14		4.23		5.12		3.17	
TN	mg/L	1.1454		3.088		3.077		3.186		4.4694		2.1697		4.2649		5.147		3.2241	
ortho-Phosphate	mg/L	0.00171	I	0.0047	I	0.0014	I	0.0014	U	0.00159	I	0.0014	U	0.0014	U	0.0014	U	0.0014	U
Total Phosphorus (P)	mg/L	0.00292	I	0.00492	I	0.0022	U	0.00351	I	0.0116		0.013		0.0217		0.0022	U	0.00246	I
Alkalinity	mg/L																		
Bicarbonate Alkalinity	mg/L as $CaCO_3$																		
Sulfide	mg/L																		
Total Dissolved Solids	mg/L																		
Salinity	*	0.77		0.89		0.59		0.75		1.26		0.42		0.66		0.77		1.03	
Tritium	pCi/L (1σ)																		

NOTES:

Laboratory anion and cation results are reported with 3 digits although only the first 2 are significant figures.

* PSS-78 salinity is unitless.

KEY:

°C = Degrees Celsius.
µg/L = Microgram(s) per liter.
µS/cm = MicroSiemen(s) per centimeter.
σ = sigma (Standard Deviation
$CaCO_3$ = Calcium carbonate.
I = Value between the MDL and PQL.
MCL = Maximum Contaminant Levels.
MDL = Minimum detection limit.
mg/L = Milligram(s) per liter.
N = Nitrogen.
NH_3 = Ammonia.
NH_4 = Ammonium.
NTU = Nephelometric Turbidity Units(s).
pCi/L = PicoCuries per liter.
PQL - Practical quantitation limit.
PSS-78 = Practical Salinity Scale of 1978.
PW = Porewater.
TKN = Total Kjeldahl nitrogen.
TN = Total nitrogen.
U = Analyzed for but not detected at the reported value.

Table 4.1-24. Marsh and Mangrove Analytical Porewater May 2014

		050614-PW-F4-1		050614-PW-F4-2		050614-PW-F4-3		050214-PW-F4-4		051314-PW-F5-1		051314-PW-F5-2		050714-PW-F6-1		050714-PW-F6-2		050714-PW-F6-3	
Parameter	**Units**	**05/06/2014**		**05/06/2014**		**05/06/2014**		**05/02/2014**		**05/13/2014**		**05/13/2014**		**05/07/2014**		**05/07/2014**		**05/07/2014**	
Temperature	°C	26.8		26.55		26.72		28.34		28.69		28.05		26.39		26.82		26.08	
pH	SU	6.68		6.78		6.62		6.53		6.59		6.88		6.71		6.58		6.67	
Dissolved Oxygen	mg/L																		
Specific Conductance	µS/cm	1030.69		786.97		1053.64		1013.77		38982.43		67745.02		1039.19		1213.67		3621.23	
Turbidity	NTU																		
Silica, dissolved	mg/L																		
Calcium	mg/L																		
Magnesium	mg/L																		
Potassium	mg/L																		
Sodium	mg/L	60.7		48.3		65		68		7210.0		13600.0		55		80.600		442.000	
Boron	mg/L																		
Strontium	mg/L																		
Bromide	mg/L																		
Chloride	mg/L	132		94		123		125		14200		26400		111		167.000		870.000	
Fluoride	mg/L																		
Sulfate	mg/L																		
Total Ammonia	mg/L as N	0.026	U	0.026	U	0.026	U	0.026	U	0.515		0.152		0.026	U	1.07		0.026	U
Ammonium ion (NH_4^+)	mg/L	0.05	U	0.05	U	0.05	U	0.05	U	0.66		0.194		0.05	U	1.37		0.05	U
Unionized NH_3	mg/L	0.000017	U	0.000017	U	0.000017	U	0.000017	U	0.00179		0.000981		0.000017	U	0.00319		1.7E-05	U
Nitrate/Nitrite	mg/L as N	0.0288	I	0.027	U	0.027	U	0.0285	I	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U
TKN	mg/L	4.65		6.02		6.13		3.49		2.96		2.64		5.46		3.87		2.16	
TN	mg/L	4.6788		6.047		6.157		3.5185		2.987		2.667		5.487		3.897		2.187	
ortho-Phosphate	mg/L	0.0014	U	0.0014	U	0.0014	U	0.00199	I	0.0014	U	0.0014	U	0.0014	U	0.0014	U	0.0014	U
Total Phosphorus (P)	mg/L	0.0147		0.0022	U	0.0022	U	0.00716	I	0.011	U	0.015	I	0.0022	U	0.0022	U	0.0414	
Alkalinity	mg/L																		
Bicarbonate Alkalinity	mg/L as $CaCO_3$																		
Sulfide	mg/L																		
Total Dissolved Solids	mg/L																		
Salinity	*	0.52		0.39		0.53		0.51		25.24		47.05		0.52		0.61		1.93	
Tritium	pCi/L (1σ)																		

NOTES:

Laboratory anion and cation results are reported with 3 digits although only the first 2 are significant figures.

* PSS-78 salinity is unitless.

KEY:

°C = Degrees Celsius.
µg/L = Microgram(s) per liter.
µS/cm = MicroSiemen(s) per centimeter.
σ = sigma (Standard Deviation
$CaCO_3$ = Calcium carbonate.
I = Value between the MDL and PQL.
MCL = Maximum Contaminant Levels.
MDL = Minimum detection limit.
mg/L = Milligram(s) per liter.
N = Nitrogen.
NH_3 = Ammonia.
NH_4 = Ammonium.
NTU = Nephelometric Turbidity Units(s).
pCi/L = PicoCuries per liter.
PQL - Practical quantitation limit.
PSS-78 = Practical Salinity Scale of 1978.
PW = Porewater.
TKN = Total Kjeldahl nitrogen.
TN = Total nitrogen.
U = Analyzed for but not detected at the reported value.

Table 4.1-24. Marsh and Mangrove Analytical Porewater May 2014

		050514-PW-M1-1		051214-PW-M1-2		050114-PW-M2-1		050114-PW-M2-2		050114-PW-M3-1		050114-PW-M3-2		050114-PW-M4-1		051214-PW-M4-2		050114-PW-M5-1		051214-PW-M5-2	
Parameter	**Units**	**05/05/2014**		**05/12/2014**		**05/01/2014**		**05/01/2014**		**05/01/2014**		**05/01/2014**		**05/01/2014**		**05/12/2014**		**05/01/2014**		**05/12/2014**	
Temperature	°C	28.61		27.88		28.41		28.59		29.71		29.27		29.08		29.19		30.09		27.84	
pH	SU	6.65		6.71		7.13		6.51		6.83		6.79		6.78		6.7		6.81		6.99	
Dissolved Oxygen	mg/L																				
Specific Conductance	µS/cm	47442.4		54083.4		54776		54022.1		54147		55514.8		67294.6		62224.8		63430.5		56922.3	
Turbidity	NTU																				
Silica, dissolved	mg/L																				
Calcium	mg/L																				
Magnesium	mg/L																				
Potassium	mg/L																				
Sodium	mg/L	9090		10300		9210		10800		7480		10700		12600		12600		12400		11400	
Boron	mg/L																				
Strontium	mg/L																				
Bromide	mg/L																				
Chloride	mg/L	16800		20000		20600		20500		20400		21100		27000		24200		24600		21900	
Fluoride	mg/L																				
Sulfate	mg/L																				
Total Ammonia	mg/L as N	0.0764		0.0611		0.026	U	0.026	U	0.283		0.283		0.309		0.814		0.144		0.394	
Ammonium ion (NH_4^+)	mg/L	0.0979		0.783		0.05	U	0.05	U	0.362		0.362		0.395		1.04		0.184		0.503	
Unionized NH_3	mg/L	0.0003		0.00264		1.7E-05	U	1.7E-05	U	0.00183		0.00162		0.0017		0.00376		0.00091		0.00322	
Nitrate/Nitrite	mg/L as N	0.027	U	0.027	U	0.027	U	0.0354	I	0.027	U	0.038	I	0.0303	I	0.027	U	0.0589		0.0477	I
TKN	mg/L	0.685		1.34		1.78		1.62		1.5		3.14		5.04		2.52		2.41		2.24	
TN	mg/L	0.712		1.367		1.807		1.6554		1.527		3.178		5.0703		2.547		2.4689		2.2877	
ortho-Phosphate	mg/L	0.0014	U	0.00203	I	0.0014	U	0.0014	U	0.0014	U	0.0014	U	0.0014	U	0.00489	I	0.0014	U	0.0028	I
Total Phosphorus (P)	mg/L	0.0022	U	0.011	U	0.0022	U	0.0128		0.0023	I	0.00478	I	0.0022	U	0.011	U	0.00432	I	0.0197	I
Alkalinity	mg/L																				
Bicarbonate Alkalinity	mg/L as $CaCO_3$																				
Sulfide	mg/L																				
Total Dissolved Solids	mg/L																				
Salinity	*	31.45		36.45		36.95		36.38		36.49		37.54		46.74		42.72		43.69		38.58	
Tritium	pCi/L (1σ)																				

NOTES:

Laboratory anion and cation results are reported with 3 digits although only the first 2 are significant figures.

* PSS-78 salinity is unitless.

KEY:

°C = Degrees Celsius.
µg/L = Microgram(s) per liter.
µS/cm = MicroSiemen(s) per centimeter.
σ = sigma (Standard Deviation
$CaCO_3$ = Calcium carbonate.
I = Value between the MDL and PQL.
MCL = Maximum Contaminant Levels.
MDL = Minimum detection limit.
mg/L = Milligram(s) per liter.
N = Nitrogen.
NH_3 = Ammonia.
NH_4 = Ammonium.
NTU = Nephelometric Turbidity Units(s).
pCi/L = PicoCuries per liter.
PQL - Practical quantitation limit.
PSS-78 = Practical Salinity Scale of 1978.
PW = Porewater.
TKN = Total Kjeldahl nitrogen.
TN = Total nitrogen.
U = Analyzed for but not detected at the reported value.

Table 4.1-24. Marsh and Mangrove Analytical Porewater May 2014

		051214-PW-M6-1		051214-PW-M6-2		050114-PW-EB1		051314-PW-FB-1		51114-BB1-a-1-NTF		51114-BB1-b-1-NTF		51114-BB2-a-3-NTF		51114-BB2-b-2-NTF		51114-BB3-a-2-NTF		51114-BB3-b-7-NTF	
Parameter	**Units**	05/12/2014		05/12/2014		05/01/2014		05/13/2014		05/11/2014		05/11/2014		05/11/2014		05/11/2014		05/11/2014		05/11/2014	
Temperature	°C	27.72		27.25						27.1		27.1		27.1		27.2		27.1		27.1	
pH	SU	6.8		6.82						7.24		7.52		7.5		7.31		7.41		7.41	
Dissolved Oxygen	mg/L																				
Specific Conductance	µS/cm	47797.3		45635.3						59.1		59.3		57.8		58		57.7		56.4	
Turbidity	NTU																				
Silica, dissolved	mg/L																				
Calcium	mg/L																				
Magnesium	mg/L																				
Potassium	mg/L																				
Sodium	mg/L	9200		8830		0.31	U	0.31	U												
Boron	mg/L																				
Strontium	mg/L																				
Bromide	mg/L																				
Chloride	mg/L	17900		16300		1.25		0.25	U	23300		23400		22000		22500		22500		21600	
Fluoride	mg/L																				
Sulfate	mg/L																				
Total Ammonia	mg/L as N	1.19		1.64		0.026	U	0.026	U	0.64		0.858		0.657		0.496		0.819		0.754	
Ammonium ion (NH_4^+)	mg/L	1.52		2.1						0.814		1.08		0.827		0.629		1.04		0.953	
Unionized NH_3	mg/L	0.00625		0.00873						0.0088		0.0223		0.0163		0.00806		0.0166		0.0153	
Nitrate/Nitrite	mg/L as N	0.0311	I	0.0316	I	0.027	U	0.027	U	0.084		0.027	U	0.049	I	0.027	U	0.034	I	0.027	U
TKN	mg/L	3.21		3.17		0.462		0.444		0.717		0.987		0.791		0.3	U	0.896		0.59	
TN	mg/L	3.2411		3.2016		0.489		0.471		0.801		1.014		0.84		0.327		0.93		0.617	
ortho-Phosphate	mg/L	0.0115		0.0409		0.0014	U	0.00303	I	0.0014	U	0.0014	U	0.0014	U	0.0014	U	0.0014	U	0.0014	U
Total Phosphorus (P)	mg/L	0.011	U	0.011	U	0.00231	I	0.011	U	0.0022	U	0.0022	U	0.0022	U	0.0022	U	0.0022	U	0.0022	U
Alkalinity	mg/L																				
Bicarbonate Alkalinity	mg/L as $CaCO_3$																				
Sulfide	mg/L																				
Total Dissolved Solids	mg/L																				
Salinity	*	31.68		30.08																	
Tritium	pCi/L (1σ)																				

NOTES:

Laboratory anion and cation results are reported with 3 digits although only the first 2 are significant figures.

* PSS-78 salinity is unitless.

KEY:

°C = Degrees Celsius.
µg/L = Microgram(s) per liter.
µS/cm = MicroSiemen(s) per centimeter.
σ = sigma (Standard Deviation
$CaCO_3$ = Calcium carbonate.
I = Value between the MDL and PQL.
MCL = Maximum Contaminant Levels.
MDL = Minimum detection limit.
mg/L = Milligram(s) per liter.
N = Nitrogen.
NH_3 = Ammonia.
NH_4 = Ammonium.
NTU = Nephelometric Turbidity Units(s).
pCi/L = PicoCuries per liter.
PQL - Practical quantitation limit.
PSS-78 = Practical Salinity Scale of 1978.
PW = Porewater.
TKN = Total Kjeldahl nitrogen.
TN = Total nitrogen.
U = Analyzed for but not detected at the reported value.

Table 4.1-24. Marsh and Mangrove Analytical Porewater May 2014

		051114-BB4-a-1-NTF		051114-BB4-b-4-NTF		051114-PW-EB1	
Parameter	**Units**	**05/11/2014**		**05/11/2014**		**05/11/2014**	
Temperature	°C	27		27			
pH	SU	7.44		7.47			
Dissolved Oxygen	mg/L						
Specific Conductance	µS/cm	50.2		50.6			
Turbidity	NTU						
Silica, dissolved	mg/L						
Calcium	mg/L						
Magnesium	mg/L						
Potassium	mg/L						
Sodium	mg/L						
Boron	mg/L						
Strontium	mg/L						
Bromide	mg/L						
Chloride	mg/L	19100		18500		0.25	U
Fluoride	mg/L						
Sulfate	mg/L						
Total Ammonia	mg/L as N	0.624		0.804		0.445	
Ammonium ion (NH_4^+)	mg/L	0.788		1.01			
Unionized NH_3	mg/L	0.0134		0.0185			
Nitrate/Nitrite	mg/L as N	0.027	U	0.027	U	0.027	U
TKN	mg/L	1.02		0.974		0.71	
TN	mg/L	1.047		1.001		0.737	
ortho-Phosphate	mg/L	0.0014	U	0.0014	U	0.0014	U
Total Phosphorus (P)	mg/L	0.0022	U	0.0022	U	0.0022	U
Alkalinity	mg/L						
Bicarbonate Alkalinity	mg/L as $CaCO_3$						
Sulfide	mg/L						
Total Dissolved Solids	mg/L						
Salinity	*						
Tritium	pCi/L (1σ)						

NOTES:

Laboratory anion and cation results are reported with 3 digits although only the first 2 are significant figures.

* PSS-78 salinity is unitless.

KEY:

°C = Degrees Celsius.
µg/L = Microgram(s) per liter.
µS/cm = MicroSiemen(s) per centimeter.
σ = sigma (Standard Deviation
$CaCO_3$ = Calcium carbonate.
I = Value between the MDL and PQL.
MCL = Maximum Contaminant Levels.
MDL = Minimum detection limit.
mg/L = Milligram(s) per liter.
N = Nitrogen.
NH_3 = Ammonia.
NH_4 = Ammonium.
NTU = Nephelometric Turbidity Units(s).
pCi/L = PicoCuries per liter.
PQL - Practical quantitation limit.
PSS-78 = Practical Salinity Scale of 1978.
PW = Porewater.
TKN = Total Kjeldahl nitrogen.
TN = Total nitrogen.
U = Analyzed for but not detected at the reported value.

4.1-25. Percent Cover of Red Mangroves per Plot and Transect for Post-Uprate Period with Pre-Uprate Average

Location		Percent (%) Cover							
		Pre-Uprate Average		August 2013		November 2013		February 2014	
Transect	Plot	Plot	Transect	Plot	Transect	Plot	Transect	Plot	Transect
F1	1	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25
	2	2 - 5		2 - 5		2 - 5		2 - 5	
F2	1	N/A	0 - 1	N/A	0 - 1	N/A	0 - 1	N/A	0 - 1
	2	0 - 1		0 - 1		0 - 1		0 - 1	
	3	N/A		N/A		N/A		N/A	
F5	1	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25	6 - 25
	2	6 - 25		6 - 25		6 - 25		6 - 25	
M1	1	26 - 50	26 - 50	N/A	N/A	26 - 50	26 - 50	N/A	N/A
	2	26 - 50		N/A		26 - 50		N/A	
M2	1	6 - 25	6 - 25	N/A	N/A	6 - 25	6 - 25	N/A	N/A
	2	26 - 50		N/A		26 - 50		N/A	
M3	1	26 - 50	6 - 25	N/A	N/A	6 - 25	6 - 25	N/A	N/A
	2	6 - 25		N/A		6 - 25		N/A	
M4	1	6 - 25	6 - 25	N/A	N/A	6 - 25	6 - 25	N/A	N/A
	2	6 - 25		N/A		6 - 25		N/A	
M5	1	6 - 25	6 - 25	N/A	N/A	6 - 25	6 - 25	N/A	N/A
	2	6 - 25		N/A		6 - 25		N/A	
M6	1	6 - 25	6 - 25	N/A	N/A	6 - 25	6 - 25	N/A	N/A
	2	6 - 25		N/A		6 - 25		N/A	

Table 4.1-26. Average Red Mangrove Height per Plot and Transect for Post-Uprate Period with Pre-Uprate Range

Location		Height ± Standard Error (cm)													
		Pre-Uprate Range		August 2013				November 2013				February 2014			
Transect	Plot	Plot	Transect	Plot	SE	Transect	SE	Plot	SE	Transect	SE	Plot	SE	Transect	SE
F1	1	112.3 - 114.6	83.7 - 114.6	112.3	6.2	101.5	4.4	113.8	6.3	104.0	4.3	113.7	5.9	104.1	4.1
	2	83.7 - 90.0		88.4	2.8			92.4	3.2			92.6	2.8		
F2	2	41.8 - 43.5	41.8 - 43.5	48.7	3.5	-	-	49.5	3.1	-	-	48.8	2.8	-	-
F5	1	77.1 - 83.2	57.8 - 83.2	85.8	19.2	68.0	7.4	83.8	19.7	72.7	7.1	90.4	17.5	72.5	7.0
	2	57.8 - 59.5		60.6	6.4			69.0	7.2			65.1	6.2		
M1	1	71.3 - 72.7	71.3 - 86.4	N/A	N/A	N/A	N/A	74.5	1.9	81.6	2.5	N/A	N/A	N/A	N/A
	2	84.6 - 86.4		N/A	N/A			88.7	3.6			N/A	N/A		
M2	1	87.3 - 88.8	67.0 - 88.8	N/A	N/A	N/A	N/A	90.3	4.1	80.1	3.1	N/A	N/A	N/A	N/A
	2	67.0 - 70.2		N/A	N/A			69.9	2.1			N/A	N/A		
M3	1	80.8 - 84.8	80.8 - 97.8	N/A	N/A	N/A	N/A	82.2	4.0	90.6	4.1	N/A	N/A	N/A	N/A
	2	96.4 - 97.8		N/A	N/A			99.1	6.5			N/A	N/A		
M4	1	78.6 - 83.0	78.6 - 83.7	N/A	N/A	N/A	N/A	86.4	4.7	86.2	3.6	N/A	N/A	N/A	N/A
	2	82.3 - 83.7		N/A	N/A			86.0	5.8			N/A	N/A		
M5	1	57.5 - 59.6	57.5 - 111.5	N/A	N/A	N/A	N/A	61.5	3.2	87.9	6.2	N/A	N/A	N/A	N/A
	2	110.3 - 111.5		N/A	N/A			112.0	5.3			N/A	N/A		
M6	1	100.0 - 103.7	88.5 - 103.7	N/A	N/A	N/A	N/A	105.4	5.6	101.8	4.2	N/A	N/A	N/A	N/A
	2	88.5 - 94.3		N/A	N/A			98.3	6.4			N/A	N/A		

Key:
cm = Centimeters.
N/A = Not applicable.
SE = Standard Error.

Table 4.1-27. Average Red Mangrove Biomass per Plot and Transect for Post-Uprate Events with Pre-Uprate Range

Location		Biomass (g/m^2)															
		Pre-Uprate								Post-Uprate							
		Pre-Uprate Range		October 2010		November 2011		February 2012		November 2013				February 2014			
Transect	Plot	Plot	Transect	Plot	Transect	Plot	Transect	Plot	Transect	Plot	SE	Transect	SE	Plot	SE	Transect	SE
F1	1	210.0 - 221.0	121.7 - 128.5	220.2	128.5	210.0	126.7	221.0	123.0	262.8	65.6	155.4	51.1	257.6	68.8	152.4	51.3
	2	25.0 - 36.8		36.7		33.5		25.0		48.1	14.2			47.3	14.1		
F2	1	0.0 - 0.0	0.8 - 3.3	0.0	3.1	0.0	3.3	0.0	3.3	0.0	0.0	4.6	2.4	0.0	0.0	4.5	2.4
	2	2.3 - 10.0		9.2		2.3		10.0		13.7	4.8			13.5	4.6		
	3	0.0 - 0.0		0.0		0.0		0.0		0.0	0.0			0.0	0.0		
F5	1	93.8 - 118.8	179.3 - 211.3	118.0	205.1	105.4	211.3	93.8	193.8	188.7	83.1	218.2	43.1	126.1	43.6	186.1	34.7
	2	253.2 - 303.9		292.3		253.2		293.7		247.6	34.2			246.0	36.4		
M1	1	660.5 - 849.7	649.1 - 766.9	849.7	766.9	660.5	719.2	688.7	654.5	757.6	43.5	690.8	33.7	N/A	N/A	N/A	N/A
	2	620.4 - 684.1		684.1		637.7		620.4		624.0	21.0			N/A	N/A		
M2	1	119.0 - 134.0	347.7 - 393.6	132.3	393.6	123.0	392.9	119.0	354.7	100.8	18.5	343.0	96.9	N/A	N/A	N/A	N/A
	2	572.5 - 654.8		654.8		572.5		590.4		585.1	66.5			N/A	N/A		
M3	1	360.1 - 399.2	282 - 322.4	392.0	322.4	360.1	318.3	362.2	282.0	393.4	43.1	292.6	45.0	N/A	N/A	N/A	N/A
	2	201.8 - 252.8		252.8		220.0		201.8		191.9	28.9			N/A	N/A		
M4	1	201.5 - 226.2	273.5 - 307	226.2	307.0	204.8	303.1	201.5	276.7	208.1	22.6	267.1	28.6	N/A	N/A	N/A	N/A
	2	342.2 - 387.9		387.9		342.2		351.9		326.1	31.2			N/A	N/A		
M5	1	256.5 - 319.9	288.6 - 366.3	308.1	359.6	280.4	366.3	256.5	288.6	271.0	39.1	271.7	23.5	N/A	N/A	N/A	N/A
	2	320.7 - 412.6		411.0		391.1		320.7		272.5	32.5			N/A	N/A		
M6	1	145.3 - 168.4	154.8 - 207.3	168.4	207.3	145.3	196.1	152.9	154.8	145.8	19.4	161.1	14.7	N/A	N/A	N/A	N/A
	2	156.7 - 246.3		246.3		227.1		156.7		176.4	21.8			N/A	N/A		

Key:
g/m^2 = Grams per square meter.
N/A = Not applicable.
SE = Standard Error.

Table 4.1-28. Red Mangrove Sclerophylly per Plot and Transect for Post-Uprate Period with Pre-Uprate Range

Location		Sclerophylly (g/m^2)					
		Pre-Uprate Range		November 2013			
Transect	Plot	Plot	Transect	Plot	Transect	Plot	Transect
F1	1	234.1 - 249.5	229.0 - 251.7	269.8	3.9	255.5	5.0
	2	223.9 - 253.9		241.2	7.1		
F2	2	228.8 - 291.0	228.8 - 291.0	250.9	6.9	250.9	6.9
F5	1	163.0 - 240.8	180.6 - 242.1	227.3	3.2	242.6	8.3
	2	206.9 - 265.5		257.9	15.3		
M1	1	216.8 - 259.6	217.5 - 257	253.1	9.9	261.3	10.1
	2	218.2 - 254.4		269.6	17.8		
M2	1	246.7 - 275.4	245.5 - 267.3	281.1	9.8	273.3	6.3
	2	244.3 - 259.1		265.5	7.5		
M3	1	233.5 - 298.9	235.7 - 275.7	255.8	6.2	252.2	4.7
	2	223.1 - 252.4		248.6	7.3		
M4	1	220.6 - 244.3	219.1 - 243.1	232.2	6.4	234.1	4.4
	2	214.6 - 242.0		236.0	6.2		
M5	1	222.3 - 267.9	219.3 - 260.7	249.1	4.5	258.1	4.5
	2	216.2 - 260.9		267.1	7.1		
M6	1	232.9 - 265.6	239.4 - 276.0	269.6	8.4	269.3	5.2
	2	245.8 - 286.3		268.9	6.6		

Key:
g = Grams.
m^2 = Square meters.

Table 4.1-29. Average Leaf Carbon for Red Mangrove per Plot and Transect during the Post-Uprate Period with Pre-Uprate Range

Location		*R. mangle* Total Carbon (mg/kg)					
		Pre-Uprate Ranges		November 2013			
Transect	Plot	Plot	Transect	Plot	SE	Transect	SE
F1	1	462675 - 490082	474612 - 490000	441750	854	445125	2349
	2	476030 - 490500		448500	4173		
F2	2	437350 - 488040	448467 - 488040	440000	4041	440000	4041
F5	1	456250 - 494134	460750 - 496441	463000	3873	454500	4351
	2	465250 - 498172		446000	5017		
M1	1	454750 - 492975	456125 - 496888	433750	2250	435875	3603
	2	457500 - 500800		438000	7246		
M2	1	459250 - 471325	431738 - 468300	430750	10028	429375	4847
	2	392150 - 468684		428000	2799		
M3	1	459059 - 476925	436025 - 464579	444000	4601	446000	3207
	2	395125 - 470100		448000	4916		
M4	1	460750 - 586650	456250 - 511975	457500	7053	455625	6050
	2	437300 - 474908		453750	10896		
M5	1	434450 - 477310	442575 - 479169	438250	3473	441000	3606
	2	450700 - 481027		443750	6600		
M6	1	441500 - 471298	442875 - 470251	430000	5292	433375	4464
	2	444250 - 469203		436750	7576		

Key:
mg/kg = Milligrams per kilogram.
SE = Standard Error.

Table 4.1-30. Average Leaf Total Nitrogen for Red Mangrove per Plot and Transect during the Post-Uprate Period with Pre-Uprate Range

Location		*R. mangle* Total Nitrogen (mg/kg)					
		Pre-Uprate Ranges		November 2013			
Transect	Plot	Plot	Transect	Plot	SE	Transect	SE
F1	1	12355.3 - 15975.0	12402.8 - 16450.0	10750.0	250.0	10750.0	163.7
	2	12450.3 - 16925.0		10750.0	250.0		
F2	2	10370.9 - 14500.0	10370.9 - 15400.0	10333.3	881.9	10333.3	881.9
F5	1	13250.0 - 19300.0	12750.0 - 16433.3	13750.0	250.0	13250.0	250.0
	2	12250.0 - 15000.0		12750.0	250.0		
M1	1	12721.3 - 15500.0	12939.1 - 15862.5	10250.0	478.7	10750.0	313.4
	2	13000.0 - 16275.0		11250.0	250.0		
M2	1	10250.0 - 14175.0	10500.0 - 13725	9500.0	500.0	10250.0	411.9
	2	10750.0 - 13275.0		11000.0	408.2		
M3	1	11500.0 - 13925.0	11875.0 - 13350.0	11750.0	250.0	11250.0	313.4
	2	12250.0 - 12775.0		10750.0	478.7		
M4	1	12250.0 - 20525.0	12625.0 - 17737.5	13000.0	577.4	13000.0	327.3
	2	13000.0 - 14950.0		13000.0	408.2		
M5	1	12000.0 - 18450.0	11814.5 - 16862.5	11750.0	478.7	11250.0	313.4
	2	11454.4 - 15275.0		10750.0	250.0		
M6	1	10278.6 - 11750.0	10392.8 - 11750.0	10500.0	500.0	10250.0	313.4
	2	10507.0 - 11750.0		10000.0	408.2		

Key:
mg/kg = Milligrams per kilogram.
SE = Standard Error.

Table 4.1-31. Average Leaf Total Phosphorus for Red Mangrove per Plot and Transect during the Post-Uprate Period with Pre-Uprate Range

Location		*R. mangle* Total Phosphorous (mg/kg)					
		Pre-uprate Ranges		November 2013			
Transect	Plot	Plot	Transect	Plot	SE	Transect	SE
F1	1	305.3 - 500.0	365.2 - 535.0	444.0	21.1	454.0	22.3
	2	425.0 - 570.0		464.0	42.4		
F2	2	305.5 - 560.0	360.0 - 560.0	526.7	67.3	526.7	67.3
F5	1	315.7 - 565.0	360.2 - 498.8	606.3	13.9	556.3	24.1
	2	382.5 - 432.5		506.3	29.0		
M1	1	380.0 - 485.0	417.5 - 486.3	474.5	25.5	514.1	22.9
	2	455.0 - 487.5		553.8	27.5		
M2	1	412.5 - 502.5	407.5 - 483.8	550.5	20.5	567.6	23.3
	2	402.5 - 465.0		584.8	43.9		
M3	1	233.1 - 497.5	344.0 - 517.5	639.8	19.5	633.0	17.5
	2	455.0 - 537.5		626.3	31.8		
M4	1	365.3 - 557.5	371.4 - 537.5	707.0	60.3	673.4	32.8
	2	377.5 - 517.5		639.8	25.1		
M5	1	345.0 - 480.0	401.4 - 433.8	546.3	30.9	497.6	24.3
	2	322.9 - 522.5		449.0	15.2		
M6	1	430.0 - 525.0	416.3 - 493.8	480.5	19.6	468.9	17.5
	2	402.5 - 462.5		457.3	30.8		

Key:
mg/kg = Milligrams per kilogram.
SE = Standard Error.

Table 4.1-32. Average Leaf Carbon Isotopes for Red Mangrove per Plot and Transect during the Post- Uprate Period with Pre-Uprate Range

Location		*R. mangle* Carbon Isotopes (‰)					
		Pre-Uprate Ranges		November 2013			
Transect	Plot	Plot	Transect	Plot	SE	Transect	SE
F1	1	-27.6 to -25.8	-27.2 to -25.7	-27.2	0.2	-27.2	0.2
	2	-27.1 to -25.7		-27.3	0.3		
F2	2	-28.4 to -26.1	-28.4 to -26.1	-28.0	0.3	-28.0	0.3
F5	1	-27.7 to -25.9	-26.9 to -25.8	-27.3	0.3	-26.5	0.3
	2	-26.4 to -25.7		-25.7	0.2		
M1	1	-26.1 to -24.4	-26.0 to -24.3	-25.9	0.1	-25.8	0.2
	2	-26.0 to -24.2		-25.8	0.4		
M2	1	-25.7 to -22.6	-25.6 to -23.4	-25.2	0.2	-25.3	0.2
	2	-25.6 to -24.3		-25.4	0.3		
M3	1	-25.7 to -24.1	-25.5 to -24.1	-24.8	0.4	-24.8	0.2
	2	-25.3 to -23.9		-24.8	0.2		
M4	1	-25.7 to -23.4	-25.9 to -24.3	-25.1	0.3	-25.1	0.1
	2	-26.0 to -24.9		-25.1	0.1		
M5	1	-25.3 to -22.8	-25.4 to -22.9	-25.4	0.1	-25.6	0.1
	2	-25.9 to -22.9		-25.8	0.2		
M6	1	-25.9 to -24.7	-25.8 to -24.9	-25.4	0.3	-25.5	0.2
	2	-25.6 to -25.1		-25.5	0.2		

Key:
‰ = Parts per mille.
SE =Standard Error.

Table 4.1-33. Average Leaf Nitrogen Isotopes for Red Mangrove per Plot and Transect during the Post-Uprate Period with Pre-Uprate Range

Location		*R. mangle* Nitrogen Isotopes (‰)					
		Pre-Uprate Ranges		November 2013			
Transect	Plot	Plot	Transect	Plot	SE	Transect	SE
F1	1	-2.4 to -0.3	-4.5 to -3.2	-0.10	0.54	-1.99	0.85
	2	-6.5 to -6.0		-3.88	0.84		
F2	2	-1.7 to -0.7	-1.9 to -0.7	-0.23	0.54	-0.23	0.54
F5	1	-2.7 to -0.8	-2.0 to -1.4	-0.55	0.72	-1.81	0.66
	2	-2.1 to -1.6		-3.08	0.66		
M1	1	-1.3 to -0.6	0.4 to 0.8	1.23	0.59	2.19	0.47
	2	1.4 to 2.5		3.15	0.23		
M2	1	-11.2 to -9.3	-6.8 to -6.0	-9.95	1.26	-5.70	1.77
	2	-2.6 to -1.2		-1.45	1.00		
M3	1	-9.0 to -4.1	-7.3 to -5.7	-5.60	1.44	-6.93	1.07
	2	-8.5 to -5.6		-8.25	1.47		
M4	1	-6.0 to -5.1	-5.8 to -4.6	-5.20	0.43	-5.86	0.43
	2	-6.4 to -4.0		-6.53	0.61		
M5	1	1.3 to 2.6	-3.0 to -1.1	2.05	0.99	-1.96	1.66
	2	-7.4 to -4.8		-5.98	1.11		
M6	1	-6.1 to -4.1	-6.6 to -5.6	-6.40	0.86	-7.40	0.55
	2	-7.2 to -7.1		-8.40	0.11		

Key:
‰ = Parts per mille.
SE =Standard Error.

Table 4.1-34. Red Mangrove Leaf C:N Molar Ratio per Plot and Transect in November 2013

Location		*R. mangle* C:N Molar Ratio	
		November 2013	
Transect	Plot	Plot	Transect
F1	1	48:1	48:1
	2	49:1	
F2	2	50:1	-
F5	1	39:1	40:1
	2	41:1	
M1	1	49:1	47:1
	2	45:1	
M2	1	53:1	49:1
	2	45:1	
M3	1	44:1	46:1
	2	49:1	
M4	1	41:1	41:1
	2	41:1	
M5	1	44:1	46:1
	2	48:1	
M6	1	48:1	49:1
	2	51:1	

Key:
C = Carbon.
N = Nitrogen.

Table 4.1-35. Red Mangrove Leaf N:P Molar Ratio per Plot and Transect in November 2013

Transect Location	Plot Location	*C. jamaicense* N:P Ratio	
		November 2013	
		Plot	Transect
F1	1	54:1	52:1
	2	51:1	
F2	2	43:1	-
F5	1	50:1	53:1
	2	56:1	
M1	1	48:1	46:1
	2	45:1	
M2	1	38:1	40:1
	2	42:1	
M3	1	41:1	39:1
	2	38:1	
M4	1	41:1	43:1
	2	45:1	
M5	1	48:1	50:1
	2	53:1	
M6	1	48:1	48:1
	2	48:1	

Key:
N = Nitrogen.
P = Phosphorous.

Table-4.2-1. 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	BB3-a-1	25.35211	80.32451
BB1-a-2	25.42355	80.32348	BB3-a-2	25.35034	80.32586
BB1-a-3	25.42296	80.32346	BB3-a-3	25.34834	80.32731
BB1-a-4	25.41888	80.32347	BB3-a-4	25.34671	80.32854
BB1-a-5	25.41664	80.32343	BB3-a-5	25.34400	80.33055
BB1-a-6	25.41644	80.32344	BB3-a-6	25.34172	80.33224
BB1-a-7	25.41217	80.32345	BB3-a-7	25.34089	80.33284
BB1-a-8	25.41074	80.32344	BB3-a-8	25.33927	80.33405
BB1-b-1	25.42769	80.32095	BB3-b-1	25.35051	80.32288
BB1-b-2	25.42335	80.32097	BB3-b-2	25.34832	80.32450
BB1-b-3	25.42116	80.32096	BB3-b-3	25.34663	80.32575
BB1-b-4	25.42049	80.32096	BB3-b-4	25.34426	80.32749
BB1-b-5	25.41750	80.32094	BB3-b-5	25.34346	80.32808
BB1-b-6	25.41514	80.32094	BB3-b-6	25.34202	80.32914
BB1-b-7	25.41306	80.32094	BB3-b-7	25.33996	80.33068
BB1-b-8	25.41130	80.32095	BB3-b-8	25.33817	80.33199
BB2-a-1	25.37277	80.30706	BB4-a-1	25.28361	80.38995
BB2-a-2	25.37171	80.30782	BB4-a-2	25.28203	80.39109
BB2-a-3	25.37021	80.30888	BB4-a-3	25.28096	80.39186
BB2-a-4	25.36822	80.31030	BB4-a-4	25.27843	80.39368
BB2-a-5	25.36692	80.31122	BB4-a-5	25.27762	80.39426
BB2-a-6	25.36490	80.31265	BB4-a-6	25.27576	80.39561
BB2-a-7	25.36334	80.31375	BB4-a-7	25.27357	80.39718
BB2-a-8	25.36009	80.31604	BB4-a-8	25.27135	80.39879
BB2-b-1	25.37296	80.30388	BB4-b-1	25.28255	80.38793
BB2-b-2	25.37088	80.30538	BB4-b-2	25.28035	80.38951
BB2-b-3	25.36808	80.30740	BB4-b-3	25.27996	80.38978
BB2-b-4	25.36702	80.30816	BB4-b-4	25.27821	80.39103
BB2-b-5	25.36481	80.30966	BB4-b-5	25.27587	80.39272
BB2-b-6	25.36344	80.31065	BB4-b-6	25.27476	80.39350
BB2-b-7	25.36159	80.31196	BB4-b-7	25.27293	80.39482
BB2-b-8	25.35886	80.31391	BB4-b-8	25.27068	80.39641

Note: Latitude and Longitude are in decimal degrees.

Table 4.2-2. Categories of Submerged Aquatic Vegetation Scored Using Braun-Blanquet Cover Abundance Index Method at Each Ecological 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			

Note:
[1] Presence/absence only.

Table 4.2-3. Water Depth (m), Standard Error (SE), and Minimum and Maximum Depth by Transect and Sampling Area, Fall 2013 and Spring 2014

Area	Transect	Fall 2013	Spring 2014	Fall 2013 and Spring 2014 Combined	
		Mean ± SE	Mean ± SE	Min	Max
BB1	a	1.7 ± 0.0	1.5 ± 0.0	1.3	1.9
	b	1.6 ± 0.0	1.5 ± 0.0	1.5	1.8
	Total	**1.7 ± 0.0**	**1.5 ± 0.0**	**1.3**	**1.9**
BB2	a	2.2 ± 0.1	2.2 ± 0.1	1.9	2.6
	b	2.6 ± 0.1	2.4 ± 0.1	2.0	3.0
	Total	**2.4 ± 0.1**	**2.3 ± 0.1**	**1.9**	**3.0**
BB3	a	2.7 ± 0.1	2.8 ± 0.0	2.5	3.0
	b	3.0 ± 0.1	2.8 ± 0.0	2.6	3.2
	Total	**2.8 ± 0.1**	**2.8 ± 0.0**	**2.5**	**3.2**
BB4	a	2.0 ± 0.0	2.1 ± 0.0	2.0	2.2
	b	2.1 ± 0.0	2.1 ± 0.0	2.0	2.2
	Total	**2.1 ± 0.0**	**2.1 ± 0.0**	**2.0**	**2.2**
All Areas		**2.2 ± 0.1**	**2.2 ± 0.1**	**1.3**	**3.2**

Key:
m = meter(s).
SE = Standard Error.

Table 4.2-4. Light Readings (µmols/m^2/sec) Taken Simultaneously in Air and at Each of Three Water Depths at One Point Along Each Transect by Area, Fall 2013 and Spring 2014

Area	Transect	Sub-Surface									
		Fall 2013					Spring 2014				
		Depth (m)	Air	Water Column	ATN[1]	% ATN[2]	Depth (m)	Air	Water Column*	ATN	% ATN
BB1	a	0.3	2263	1825	439	19%	0.3	2065	1772	293	14%
	b	0.3	2256	1872	385	17%	0.3	2061	1627	434	21%
	Area	**0.3**	**2260**	**1848**	**412**	**18%**	**0.3**	**2063**	**1700**	**363**	**18%**
BB2	a	0.3	1965	1478	487	25%	0.3	2177	1790	387	18%
	b	0.3	1352	1062	290	21%	0.3	2293	1935	358	16%
	Area	**0.3**	**1658**	**1270**	**388**	**23%**	**0.3**	**2235**	**1862**	**372**	**17%**
BB3	a	0.3	2066	1044	1023	49%	0.3	2045	1760	285	14%
	b	0.3	2432	1462	971	40%	0.3	2151	1674	478	22%
	Area	**0.3**	**2249**	**1253**	**997**	**44%**	**0.3**	**2098**	**1717**	**381**	**18%**
BB4	a	0.3	408	301	107	26%	0.3	1371	1155	216	16%
	b	0.3	424	268	156	37%	0.3	1819	1582	237	13%
	Area	**0.3**	**416**	**284**	**131**	**32%**	**0.3**	**1595**	**1369**	**226**	**14%**

Table 4.2-4. Light Readings (µmols/m^2/sec) Taken Simultaneously in Air and at Each of Three Water Depths at One Point Along Each Transect by Area, Fall 2013 and Spring 2014

Area	Transect	Mid-Depth									
		Fall 2013					Spring 2014				
		Depth (m)	Air	Water Column	ATN[1]	% ATN[2]	Depth (m)	Air	Water Column*	ATN	% ATN
BB1	a	0.9	2268	1293	976	43%	0.7	2062	1425	637	31%
	b	0.9	2261	1451	810	36%	0.6	2060	1439	622	30%
	Area	**0.9**	**2264**	**1372**	**893**	**39%**	**0.7**	**2061**	**1432**	**629**	**31%**
BB2	a	1.0	1065	520	545	51%	1.0	2180	1486	694	32%
	b	1.2	1594	688	906	57%	1.2	2292	1564	728	32%
	Area	**1.1**	**1330**	**604**	**726**	**55%**	**1.1**	**2236**	**1525**	**711**	**32%**
BB3	a	1.3	2621	1190	1432	55%	1.3	2028	1381	648	32%
	b	1.5	2438	840	1598	66%	1.5	2204	1432	772	35%
	Area	**1.4**	**2530**	**1015**	**1515**	**60%**	**1.4**	**2116**	**1406**	**710**	**34%**
BB4	a	0.9	419	200	219	52%	0.9	681	356	325	48%
	b	1.0	407	205	202	50%	1.0	2060	1460	601	29%
	Area	**0.9**	**413**	**202**	**211**	**51%**	**0.9**	**1370**	**908**	**463**	**34%**

Table 4.2-4. Light Readings (µmols/m^2/sec) Taken Simultaneously in Air and at Each of Three Water Depths at One Point Along Each Transect by Area, Fall 2013 and Spring 2014

Area	Transect	Off-Bottom									
		Fall 2013					Spring 2014				
		Depth (m)	Air	Water Column	ATN[1]	% ATN[2]	Depth (m)	Air	Water Column*	ATN	% ATN
BB1	a	1.5	2266	1043	1224	54%	1.0	2055	1304	751	37%
	b	1.4	2264	1296	968	43%	1.5	2057	1293	765	37%
	Area	**1.5**	**2265**	**1169**	**1096**	**48%**	**1.3**	**2056**	**1298**	**758**	**37%**
BB2	a	1.7	803	253	550	69%	1.7	2176	1419	757	35%
	b	2.0	2559	727	1833	72%	2.0	2289	1289	1000	44%
	Area	**1.9**	**1681**	**490**	**1191**	**71%**	**1.9**	**2232**	**1354**	**879**	**39%**
BB3	a	2.2	1615	538	1077	67%	2.2	2028	1055	974	48%
	b	2.7	2424	242	2183	90%	2.7	2210	1126	1084	49%
	Area	**2.5**	**2020**	**390**	**1630**	**81%**	**2.5**	**2119**	**1090**	**1029**	**49%**
BB4	a	1.5	413	179	234	57%	1.5	608	275	333	55%
	b	1.7	413	166	247	60%	1.7	393	163	230	59%
	Area	**1.6**	**413**	**172**	**241**	**58%**	**1.6**	**500**	**219**	**282**	**56%**

Notes:
[1] Attenuation (ATN) is the difference between the air and water readings.
[2] Percent Attenuation (% ATN) is the percentage of attenuation from the air reading.
Key:
µmols/m^2/sec = Micromoles per second per square meter.
m = Meter(s).
ATN = Attenuation.

Table 4.2-5. Number of Points Within Each Study Area (n=16) Containing Each of Six Substrate Types, Fall 2013 and Spring 2014

Sample Period	Area	Sandy and Shell Hash	Sandy, Shell Hash, Rubble	Sandy, Shell Hash, Silty, and Rubble	Silty	Sandy and Silty	Sandy, Shell Hash, and Silty
Fall 2013	BB1	7	1			2	6
	BB2	16					
	BB3	15					1
	BB4	7		7	1		1
	Total	**45**	**1**	**7**	**1**	**2**	**8**
Spring 2014	BB1	13	1				2
	BB2	15				1	
	BB3	14					2
	BB4	6	5	4		1	
	Total	**48**	**6**	**4**		**2**	**4**

Table 4.2-6. Mean and Standard Error (SE) Values for Surface and Bottom Water Temperature (°C) by Transect and Sampling Area, Fall 2013 and Spring 2014

Area	Transect	Surface		Bottom	
		Fall 2013	Spring 2014	Fall 2013	Spring 2014
		Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE
BB1	a	29.6 ± 0.1	26.0 ± 0.0	29.6 ± 0.15	26.0 ± 0.0
	b	30.1 ± 0.2	27.0 ± 0.1	30.2 ± 0.1	27.1 ± 0.1
	Area	**29.8 ± 0.1**	**26.5 ± 0.1**	**29.9 ± 0.1**	**26.5 ± 0.1**
BB2	a	29.3 ± 0.1	26.7 ± 0.1	29.2 ± 0.1	26.7 ± 0.1
	b	29.6 ± 0.2	27.5 ± 0.1	29.6 ± 0.1	27.5 ± 0.1
	Area	**29.4 ± 0.1**	**27.1 ± 0.1**	**29.4 ± 0.1**	**27.1 ± 0.1**
BB3	a	29.1 ± 0.0	26.8 ± 0.0	29.2 ± 0.0	26.8 ± 0.1
	b	29.4 ± 0.0	27.3 ± 0.1	29.4 ± 0.0	27.4 ± 0.2
	Area	**29.2 ± 0.0**	**27.0 ± 0.1**	**29.2 ± 0.0**	**27.1 ± 0.1**
BB4	a	29.0 ± 0.1	27.1 ± 0.0	29.1 ± 0.1	27.1 ± 0.0
	b	29.7 ± 0.1	28.0 ± 0.1	29.7 ± 0.1	28.0 ± 0.1
	Area	**29.4 ± 0.1**	**27.5 ± 0.1**	**29.4 ± 0.1**	**27.5 ± 0.1**

Key: SE = Standard Error °C = Degrees Celsius

Table 4.2-7. Results of Statistical Comparisons of Bottom Water Temperature and Conductivity, Porewater Temperature and Conductivity, Total Macrophytes Cover, Total Seagrass Cover, Total Macroalgae Cover, and Porewater Nutrients between Pre- (Fall 2010 to Fall 2011) and Post-Uprate (Fall 2013 and Spring 2014) Sampling Events for All Areas Combined and for Each Area Analyzed Separately

Bottom Water Temperature						
Sampling Area	Mean Temperature (°C) ± SE		df	n	H	p
	Pre-Uprate	Post-Uprate				
All	27.86 ±0.10	28.27 ±0.12	1	256	8.8281	**0.0030**
BB1	27.83 ±0.24	28.22 ±0.32	1	64	1.4443	0.2294
BB2	27.46 ±0.17	28.24 ±0.22	1	64	6.3723	**0.0116**
BB3	27.62 ±0.20	28.17 ±0.20	1	64	6.0400	**0.0140**
BB4	28.53 ±0.08	28.46 ±0.18	1	64	0.0065	0.9358
Bottom Water Specific Conductance						
Sampling Area	Mean Specific Conductance (µS/cm) ± SE		df	n	H	p
	Pre-Uprate	Post-Uprate				
All	52,000 ±0.51	52,400 ±0.53	1	256	0.5481	0.4591
BB1	50,980 ±1.24	50,700 ±1.54	1	64	0.0218	0.8826
BB2	52,740 ±0.92	54,980 ±0.47	1	64	7.8337	**0.0051**
BB3	53,070 ±0.90	55,430 ±0.50	1	64	4.2827	**0.0385**
BB4	51,200 ±0.93	48,510 ±0.82	1	64	10.6089	**0.0011**

Table 4.2-7. Results of Statistical Comparisons of Bottom Water Temperature and Conductivity, Porewater Temperature and Conductivity, Total Macrophytes Cover, Total Seagrass Cover, Total Macroalgae Cover, and Porewater Nutrients between Pre- (Fall 2010 to Fall 2011) and Post-Uprate (Fall 2013 and Spring 2014) Sampling Events for All Areas Combined and for Each Area Analyzed Separately.

Porewater Temperature						
Sampling Area	Mean Temperature (°C) ± SE		df	n	H	p
	Pre-Uprate	Post-Uprate				
All	28.02 ±0.07	28.39 ±0.12	1	251	6.0439	**0.0140**
BB1	28.18 ±0.20	28.23 ±0.18	1	64	0.0724	0.7879
BB2	27.65 ±0.12	28.24 ±0.18	1	64	5.6524	**0.0174**
BB3	27.88 ±0.13	28.22 ±0.18	1	64	4.6915	**0.0303**
BB4	28.38 ±0.04	28.97 ±0.41	1	59	1.4908	0.2221
Porewater Specific Conductance						
Sampling Area	Mean Specific Conductance (µS/cm) ± SE		df	n	H	p
	Pre-Uprate	Post-Uprate				
All	52,180 ±0.32	52,300 ±0.36	1	256	0.0667	0.7962
BB1	52,790 ±0.77	51,700 ±0.92	1	64	0.8963	0.3438
BB2	53,660 ±0.52	54,660 ±0.46	1	64	0.8218	0.3647
BB3	53,380 ±0.41	54,420 ±0.43	1	64	1.8587	0.1728
BB4	48,900 ±0.45	48,440 ±0.35	1	64	0.2959	0.5865

Table 4.2-7. Results of Statistical Comparisons of Bottom Water Temperature and Conductivity, Porewater Temperature and Conductivity, Total Macrophytes Cover, Total Seagrass Cover, Total Macroalgae Cover, and Porewater Nutrients between Pre- (Fall 2010 to Fall 2011) and Post-Uprate (Fall 2013 and Spring 2014) Sampling Events for All Areas Combined and for Each Area Analyzed Separately.

Total Macrophyte Coverage						
Sampling Area	Mean BBCA Score ± SE		df	n	H	p
	Pre-Uprate	Post-Uprate				
All	2.24 ±0.06	2.36 ±0.08	1	256	0.4833	0.4869
BB1	2.23 ±0.10	2.39 ±0.13	1	64	1.0026	0.3167
BB2	2.27 ±0.16	2.31 ±0.21	1	64	0.0657	0.7978
BB3	2.44 ±0.13	2.11 ±0.15	1	64	4.7610	**0.0291**
BB4	2.02 ±0.1	2.62 ±0.11	1	64	12.8865	**0.0003**
Total Seagrass Coverage						
Sampling Area	Mean BBCA Score ± SE		df	n	H	p
	Pre-Uprate	Post-Uprate				
All	1.12 ±0.05	1.08 ±0.06	1	256	0.2022	0.6529
BB1	1.41 ±0.13	1.39 ±0.12	1	64	0.0315	0.8591
BB2	0.86 ±0.11	0.72 ±0.12	1	64	0.7289	0.3932
BB3	1.16 ±0.10	1.17 ±0.11	1	64	0.0037	0.9516
BB4	1.05 ±0.04	1.03 ±0.06	1	64	0.0068	0.9341

Table 4.2-7. Results of Statistical Comparisons of Bottom Water Temperature and Conductivity, Porewater Temperature and Conductivity, Total Macrophytes Cover, Total Seagrass Cover, Total Macroalgae Cover, and Porewater Nutrients between Pre- (Fall 2010 to Fall 2011) and Post-Uprate (Fall 2013 and Spring 2014) Sampling Events for All Areas Combined and for Each Area Analyzed Separately.

Total Macroalgae Coverage						
Sampling Area	Mean BBCA Score ± SE		df	n	H	p
	Pre-Uprate	Post-Uprate				
All	1.65 ±0.05	1.82 ±0.07	1	256	1.5095	0.2192
BB1	1.64 ±0.10	1.87 ±0.10	1	64	2.3630	0.1242
BB2	1.67 ±0.10	1.87 ±0.19	1	64	0.0438	0.8342
BB3	1.73 ±0.10	1.38 ±0.07	1	64	6.6309	**0.0100**
BB4	1.56 ±0.07	2.17 ±0.12	1	64	14.6143	**0.0001**
Porewater Chloride						
Sampling Area	Mean Value Per Area ± SE		df	n	H	p
	Pre-Uprate	Post-Uprate				
All	20313 ±551	21194 ±417	1	32	2.0602	0.1512
BB1	21125 ±1663	21650 ±999	1	8	0.0000	1.0000
BB2	20750 ±1031	22250 ±119	1	8	1.0457	0.3065
BB3	20375 ±747	21975 ±225	1	8	3.0361	0.0814
BB4	19000 ±913	18900 ±135	1	8	0.0000	1.0000

Table 4.2-7. Results of Statistical Comparisons of Bottom Water Temperature and Conductivity, Porewater Temperature and Conductivity, Total Macrophytes Cover, Total Seagrass Cover, Total Macroalgae Cover, and Porewater Nutrients between Pre- (Fall 2010 to Fall 2011) and Post-Uprate (Fall 2013 and Spring 2014) Sampling Events for All Areas Combined and for Each Area Analyzed Separately.

Porewater Sodium						
Sampling Area	Mean Value Per Area ± SE		df	n	H	p
	Pre-uprate	Post-uprate				
All	10538	32982	1	32	2.2773	0.1313
	±280	±6013				
BB1	10875	34283	1	8	0.3333	0.5637
	±961	±14387				
BB2	10988	34175	1	8	0.3333	0.5637
	±360	±13698				
BB3	10488	33825	1	8	3.0361	0.0814
	±205	±13412				
BB4	9800	29645	1	8	0.0000	1.0000
	±426	±11983				

Notes:
Means are presented for each area plus or minus one Standard Error (SE). The black lines denote significant differences among Uprate.
P Values in bold font are statistically significant.

Key:
°C = Degrees Celsius.
µS/cm = Micro-Siemens per Centimeter.
ANOVA = Analysis of Variance.
BBCA = Braun-Blanquet Cover Abundance.
SE = Standard Error.

Table 4.2-8. Results of Statistical Comparisons of Bottom Water Temperature and Conductivity, Porewater Temperature and Conductivity, Total Macrophytes Cover, Total Seagrass Cover, Total Macroalgae Cover, and Porewater Nutrients Among Areas for All Events Combined and for Pre- (Fall 2010 to Fall 2011) and Post-Uprate (Fall 2013 and Spring 2014) Sampling Events Analyzed Separately.

Bottom Water Temperature								
Sampling Period	**Mean Temperature (°C) ± SE**				**df**	**n**	**H**	**p**
	BB1	**BB2**	**BB3**	**BB4**				
All Events	28.02 ±0.20	27.85 ±0.15	27.89 ±0.14	28.49 ±0.10	3	256	10.0500	**0.0181**
Pre-uprate	27.83 ±0.24	27.46 ±0.17	27.62 ±0.20	28.53 ±0.08	3	128	15.8217	**0.0012**
Post-uprate	28.22 ±0.32	28.24 ±0.22	28.17 ±0.20	28.46 ±0.18	3	128	1.1697	0.7603
Bottom Water Specific Conductance								
Sampling Period	**Mean Specific Conductance (µS/cm) ± SE**				**df**	**n**	**H**	**p**
	BB1	**BB2**	**BB3**	**BB4**				
All Events	50,840 ±0.98	53,860 ±0.53	54,250 ±0.53	49,850 ±0.64	3	256	27.9526	**< 0.0001**
Pre-uprate	50,980 ±1.24	52,740 ±0.92	53,070 ±0.90	51,200 ±0.93	3	128	12.9623	**0.0047**
Post-uprate	50,700 ±1.54	54,980 ±0.47	55,430 ±0.50	48,510 ±0.82	3	128	17.6811	**0.0005**

Table 4.2-8. Results of Statistical Comparisons of Bottom Water Temperature and Conductivity, Porewater Temperature and Conductivity, Total Macrophytes Cover, Total Seagrass Cover, Total Macroalgae Cover, and Porewater Nutrients Among Areas for All Events Combined and for Pre- (Fall 2010 to Fall 2011) and Post-Uprate (Fall 2013 and Spring 2014) Sampling Events Analyzed Separately.

Porewater Temperature								
Sampling Period	**Mean Temperature (°C) ± SE**				**df**	**n**	**H**	**p**
	BB1	**BB2**	**BB3**	**BB4**				
All Events	28.20 ±0.13	27.94 ±0.11	28.05 ±0.11	28.65 ±0.19	3	251	11.0275	**0.0116**
Pre-uprate	28.18 ±0.20	27.65 ±0.12	27.88 ±0.13	28.38 ±0.04	3	128	13.6864	**0.0034**
Post-uprate	28.23 ±0.18	28.24 ±0.18	28.22 ±0.18	28.97 ±0.41	3	123	8.1112	**0.0438**
Porewater Specific Conductance								
Sampling Period	**Mean Specific Conductance (µS/cm) ± SE**				**df**	**n**	**H**	**p**
	BB1	**BB2**	**BB3**	**BB4**				
All Events	52,250 ±0.60	54,160 ±0.35	53,900 ±0.30	48,670 ±0.28	3	256	88.2148	< **0.0001**
Pre-uprate	52,790 ±0.77	53,660 ±0.52	53,380 ±0.41	48,900 ±0.45	3	128	36.7862	< **0.0001**
Post-uprate	51,700 ±0.92	54,660 ±0.46	54,420 ±0.43	48,440 ±0.35	3	128	53.8535	< **0.0001**

Table 4.2-8. Results of Statistical Comparisons of Bottom Water Temperature and Conductivity, Porewater Temperature and Conductivity, Total Macrophytes Cover, Total Seagrass Cover, Total Macroalgae Cover, and Porewater Nutrients Among Areas for All Events Combined and for Pre- (Fall 2010 to Fall 2011) and Post-Uprate (Fall 2013 and Spring 2014) Sampling Events Analyzed Separately.

Total Macrophyte Coverage								
Sampling Period	Mean BBCA Score ± SE				df	n	H	p
	BB1	BB2	BB3	BB4				
All Events	2.31 ±0.08	2.29 ±0.13	2.28 ±0.10	2.32 ±0.08	3	256	0.7731	0.8559
Pre-uprate	2.23 ±0.10	2.27 ±0.16	2.45 ±0.13	2.02 ±0.10	3	128	6.1667	0.1038
Post-uprate	2.39 ±0.13	2.31 ±0.21	2.11 ±0.15	2.62 ±0.11	3	128	9.0548	**0.0286**
Total Seagrass Coverage								
Sampling Period	Mean BBCA Score ± SE				df	n	H	p
	BB1	BB2	BB3	BB4				
All Events	1.40 ±0.09	0.79 ±0.08	1.17 ±0.07	1.04 ±0.03	3	256	22.8571	**< 0.0001**
Pre-uprate	1.41 ±0.13	0.86 ±0.11	1.16 ±0.10	1.05 ±0.04	3	128	10.4596	**0.0150**
Post-uprate	1.39 ±0.12	0.72 ±0.12	1.17 ±0.11	1.03 ±0.06	3	128	12.6605	**0.0054**

Table 4.2-8. Results of Statistical Comparisons of Bottom Water Temperature and Conductivity, Porewater Temperature and Conductivity, Total Macrophytes Cover, Total Seagrass Cover, Total Macroalgae Cover, and Porewater Nutrients Among Areas for All Events Combined and for Pre- (Fall 2010 to Fall 2011) and Post-Uprate (Fall 2013 and Spring 2014) Sampling Events Analyzed Separately.

Total Macroalgae Coverage								
Sampling Period	**Mean BBCA Score ± SE**				**df**	**n**	**H**	**p**
	BB1	**BB2**	**BB3**	**BB4**				
All Events	1.76 ±0.07	1.77 ±0.10	1.56 ±0.06	1.87 ±0.08	3	256	8.4892	**0.0369**
Pre-uprate	1.65 ±0.10	1.67 ±0.10	1.73 ±0.10	1.56 ±0.07	3	128	1.1089	0.7749
Post-uprate	1.87 ±0.10	1.87 ±0.19	1.38 ±0.07	2.17 ±0.12	2	128	21.9025	**0.0001**
Porewater Chloride								
Sampling Period	**Mean Value Per Area ± SE**				**df**	**n**	**H**	**p**
	BB1	**BB2**	**BB3**	**BB4**				
All Events	21388 ±903	21500 ±558	21175 ±471	18950 ±428	3	32	8.4077	**0.0383**
Pre-uprate	21125 ±1663	20750 ±1031	20375 ±747	19000 ±913	3	16	2.0338	0.5654
Post-uprate	21650 ±999	22250 ±119	21975 ±225	18900 ±135	3	16	8.6466	**0.0344**

Table 4.2-8. Results of Statistical Comparisons of Bottom Water Temperature and Conductivity, Porewater Temperature and Conductivity, Total Macrophytes Cover, Total Seagrass Cover, Total Macroalgae Cover, and Porewater Nutrients Among Areas for All Events Combined and for Pre- (Fall 2010 to Fall 2011) and Post-Uprate (Fall 2013 and Spring 2014) Sampling Events Analyzed Separately.

Porewater Sodium								
Sampling Period	Mean Value Per Area ± SE				df	n	H	p
	BB1	BB2	BB3	BB4				
All Events	22579	22581	22156	19723	3	32	3.2986	0.3478
	±8007	±7710	±7616	±6699				
Pre-uprate	10875	10988	10488	9800	3	16	2.9699	0.3963
	±961	±360	±205	±426				
Post-uprate	34283	34175	33825	29645	3	16	2.1524	0.5414
	±14387	±13697	±13411	±11983				

Notes:
Means are presented for each area plus or minus one Standard Error (SE). The black lines denote significant differences among Uprate.
P Values in bold font are statistically significant.

Key:
°C = Degrees Celsius.
µS/cm = Micro-Siemens per Centimeter.
ANOVA = Analysis of Variance.
BBCA = Braun-Blanquet Cover Abundance.
SE = Standard Error.

Table 4.2-9. Mean and Standard Error (SE) Values for Surface and Bottom Water Specific Conductance (µS/cm) by Transect and Sampling Area, Fall 2013 and Spring 2014

Area	Transect	Surface		Bottom	
		Fall 2013	Spring 2014	Fall 2013	Spring 2014
		Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE
BB1	a	39,988 ± 373	59,613 ± 190	40,313 ± 358	59,538 ± 180
	b	42,925 ± 111	58,775 ± 190	44,238 ± 243	58,700 ± 210
	Area	**41,456 ± 423**	**59,194 ± 170**	**42,275 ± 548**	**59,119 ± 170**
BB2	a	51,863 ± 311	57,638 ± 30	52,138 ± 184	57,575 ± 30
	b	51,625 ± 518	57,600 ± 50	52,663 ± 134	57,525 ± 40
	Area	**51,744 ± 293**	**57,619 ± 30**	**52,400 ± 129**	**57,550 ± 30**
BB3	a	52,400 ± 204	58,013 ± 180	52,438 ± 189	57,975 ± 200
	b	52,800 ± 105	58,413 ± 170	52,900 ± 63	58,400 ± 170
	Area	**52,600 ± 123**	**58,213 ± 130**	**52,669 ± 113**	**58,188 ± 140**
BB4	a	43,413 ± 348	53,175 ± 100	43,775 ± 524	53,088 ± 80
	b	44,238 ± 273	52,900 ± 60	44,300 ± 296	52,863 ± 60
	Area	**43,825 ± 239**	**53,038 ± 60**	**44,038 ± 299**	**52,975 ± 60**

Key:
µS/cm = MicroSiemens per centimeter(s).
SE = Standard Error.

Table 4.2-10. Mean and Standard Error (SE) Values for Surface and Bottom Water Salinity (PSU) by Transect and Sampling Area, Fall 2013 and Spring 2014

Area	Transect	Surface		Bottom	
		Fall 2013	Spring 2014	Fall 2013	Spring 2014
		Mean	Mean	Mean	Mean
BB1	a	25.7 ± 0.3	39.9 ± 0.1	25.9 ± 0.24	39.9 ± 0.1
	b	27.8 ± 0.1	39.3 ± 0.1	28.7 ± 0.16	39.3 ± 0.1
	Area	**26.8** ± 0.3	**39.6** ± 0.1	**27.3** ± 0.4	**39.6** ± 0.1
BB2	a	34.3 ± 0.2	38.5 ± 0.0	34.5 ± 0.1	38.5 ± 0.0
	b	34.2 ± 0.4	38.5 ± 0.0	34.9 ± 0.1	38.5 ± 0.0
	Area	**34.3** ± 0.2	**38.5** ± 0.0	**34.7** ± 0.1	**38.5** ± 0.0
BB3	a	34.7 ± 0.2	38.8 ± 0.1	34.7 ± 0.1	38.8 ± 0.1
	b	35.0 ± 0.1	39.1 ± 0.1	35.1 ± 0.0	39.1 ± 0.1
	Area	**34.9** ± 0.1	**39.0** ± 0.1	**34.9** ± 0.1	**38.9** ± 0.1
BB4	a	28.1 ± 0.2	35.2 ± 0.1	28.3 ± 0.4	35.1 ± 0.1
	b	28.7 ± 0.2	35.0 ± 0.0	28.8 ± 0.2	35.0 ± 0.0
	Area	**28.4** ± 0.2	**35.1** ± 0.0	**28.6** ± 0.2	**35.1** ± 0.0

Key:
PSU = Practical Salinity Unit(s).
SE = Standard Error.

Table 4.2-11. Mean and Standard Error (SE) Values for Surface and Bottom Water DO (mg/L) by Transect and Sampling Area, Fall 2013 and Spring 2014

Area	Transect	Surface		Bottom	
		Fall 2013	Spring 2014	Fall 2013	Spring 2014
		Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE
BB1	a	6.1 ± 0.3	5.3 ± 0.1	6.2 ± 0.2	5.3 ± 0.1
	b	5.0 ± 0.9	6.2 ± 0.1	5.3 ± 0.2	6.1 ± 0.1
	Area	**5.6 ± 0.3**	**5.7 ± 0.1**	**5.8 ± 0.4**	**5.7 ± 0.1**
BB2	a	5.4 ± 0.2	5.7 ± 0.0	5.3 ± 0.1	5.7 ± 0.1
	b	4.9 ± 0.4	6.1 ± 0.0	5.3 ± 0.1	6.1 ± 0.0
	Area	**5.2 ± 0.2**	**5.9 ± 0.0**	**5.3 ± 0.1**	**5.9 ± 0.0**
BB3	a	5.3 ± 0.2	5.7 ± 0.1	5.2 ± 0.1	5.7 ± 0.1
	b	5.6 ± 0.1	6.0 ± 0.1	5.6 ± 0.0	6.1 ± 0.1
	Area	**5.5 ± 0.1**	**5.9 ± 0.1**	**5.4 ± 0.1**	**5.9 ± 0.1**
BB4	a	5.1 ± 0.2	5.6 ± 0.1	5.0 ± 0.4	5.6 ± 0.1
	b	5.7 ± 0.2	6.3 ± 0.0	5.7 ± 0.2	6.3 ± 0.0
	Area	**5.4 ± 0.2**	**6.0 ± 0.0**	**5.3 ± 0.2**	**6.0 ± 0.0**

Key:
mg/L = Milligram per liter.
SE = Standard Error.

Table 4.2-12. Mean and Standard Error (SE) Values for Surface and Bottom Water pH by Transect and Sampling Area, Fall 2013 and Spring 2014

Area	Transect	Surface		Bottom	
		Fall 2013	Spring 2014	Fall 2013	Spring 2014
		Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE
BB1	a	8.0 ± 0.0	8.2 ± 0.0	8.0 ± 0.0	8.2 ± 0.0
	b	8.1 ± 0.0	8.3 ± 0.0	8.1 ± 0.0	8.3 ± 0.0
	Area	**8.0 ± 0.0**	**8.3 ± 0.0**	**8.1 ± 0.0**	**8.3 ± 0.0**
BB2	a	8.1 ± 0.0	8.2 ± 0.0	8.1 ± 0.0	8.2 ± 0.0
	b	8.0 ± 0.0	8.2 ± 0.0	8.0 ± 0.0	8.3 ± 0.0
	Area	**8.1 ± 0.0**	**8.2 ± 0.0**	**8.1 ± 0.0**	**8.2 ± 0.0**
BB3	a	8.1 ± 0.0	8.2 ± 0.0	8.1 ± 0.0	8.3 ± 0.0
	b	8.1 ± 0.0	8.3 ± 0.0	8.1 ± 0.0	8.3 ± 0.0
	Area	**8.1 ± 0.0**	**8.2 ± 0.0**	**8.1 ± 0.0**	**8.3 ± 0.0**
BB4	a	7.9 ± 0.0	8.2 ± 0.0	7.9 ± 0.0	8.2 ± 0.0
	b	8.0 ± 0.0	8.2 ± 0.0	8.0 ± 0.0	8.2 ± 0.0
	Area	**7.9 ± 0.0**	**8.2 ± 0.0**	**7.9 ± 0.0**	**8.2 ± 0.0**

Key: SE = Standard Error.

Table 4.2-13. Mean and Standard Error (SE) Values for Surface and Bottom Water ORP (mV) by Transect and Sampling Area, Fall 2013 and Spring 2014

Area	Transect	Surface		Bottom	
		Fall 2013	Spring 2014	Fall 2013	Spring 2014
		Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE
BB1	a	113.8 ± 15.6	25.5 ± 23.8	107.8 ± 13.5	21.6 ± 22.5
	b	49.1 ± 7.2	29.8 ± 7.8	40.3 ± 5.9	23.8 ± 7.2
	Area	**81.4 ± 11.7**	**27.6 ± 12.1**	**74.0 ± 11.2**	**22.7 ± 11.4**
BB2	a	78.6 ± 8.7	52.1 ± 13.9	72.5 ± 9.6	41.8 ± 15.2
	b	71.1 ± 11.4	20.8 ± 9.0	65.0 ± 11.6	13.1 ± 7.0
	Area	**74.9 ± 7.0**	**36.4 ± 9.0**	**68.8 ± 7.3**	**27.4 ± 8.9**
BB3	a	89.6 ± 6.5	54.9 ± 11.8	71.8 ± 8.8	46.5 ± 13.1
	b	75.8 ± 6.6	44.1 ± 16.8	61.6 ± 7.5	33.8 ± 16.8
	Area	**82.7 ± 4.8**	**49.5 ± 10.0**	**66.7 ± 5.7**	**40.1 ± 10.4**
BB4	a	98.0 ± 8.4	85.5 ± 16.2	90.1 ± 8.8	79.4 ± 17.0
	b	74.4 ± 6.3	65.5 ± 10.6	72.1 ± 5.3	59.4 ± 10.3
	Area	**86.2 ± 5.9**	**75.5 ± 9.7**	**81.1 ± 5.5**	**69.4 ± 10.0**

Key:
mV = Millivolt(s).
SE = Standard Error.

Table 4.2-14. Mean and Standard Error (SE) for Surface and Bottom Water Turbidity (NTU) by Transect and Sampling Area, Fall 2013 and Spring 2014

Area	Transect	Surface		Bottom	
		Fall 2013	Spring 2014	Fall 2013	Spring 2014
		Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE
BB1	a	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	b	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	Area	**0.0 ± 0.0**	**0.0 ± 0.0**	**0.0 ± 0.0**	**0.0 ± 0.0**
BB2	a	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	b	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	Area	**0.0 ± 0.0**	**0.0 ± 0.0**	**0.0 ± 0.0**	**0.0 ± 0.0**
BB3	a	0.0 ± 0.0	0.9 ± 0.6	0.0 ± 0.0	1.4 ± 0.6
	b	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	Area	**0.0 ± 0.0**	**0.4 ± 0.5**	**0.0 ± 0.0**	**0.7 ± 0.4**
BB4	a	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	b	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	Area	**0.0 ± 0.0**	**0.0 ± 0.0**	**0.0 ± 0.0**	**0.0 ± 0.0**

Key:
NTU = Nephelometric Turbidity Unit(s).
SE = Standard Error.

Table 4.2-15. Mean and Standard Error (SE) Values for Porewater Temperature (°C) by Transect and Sampling Area, Fall 2013 and Spring 2014

Area	Transect	Fall 2013		Spring 2014	
		Mean	±SE	Mean	±SE
BB1	a	29.2	± 0.2	27.4	± 0.0
	b	29.2	± 0.0	27.2	± 0.0
	Area	**29.2**	**± 0.1**	**27.3**	**± 0.0**
BB2	a	29.2	± 0.0	27.3	± 0.0
	b	29.3	± 0.1	27.2	± 0.0
	Area	**29.2**	**± 0.0**	**27.2**	**± 0.0**
BB3	a	29.2	± 0.0	27.3	± 0.0
	b	29.2	± 0.0	27.2	± 0.0
	Area	**29.2**	**± 0.0**	**27.2**	**± 0.0**
BB4	a	30.8	± 0.6	27.6	± 0.0
	b[1]	32.3	± 0.5	27.4	± 0.1
	Area	**31.5**	**± 0.5**	**27.5**	**± 0.1**

Notes:

[1] During the Fall 2013 sampling event, porewater temperatures were collected at only three sampling points along Transect *b* in area BB4 due to instrument malfunction

Key:

°C = Degrees Celsius.

SE = Standard Error.

Table 4.2-16. Average Values for Porewater and Bottom Water Temperature (°C) by Transect and Sampling Area, Fall 2013 and Spring 2014

Area	Transect	Fall 2013		Difference[1]	Spring 2014		Difference[1]
		Mean			Mean		
		Porewater	Bottom		Porewater	Bottom	
BB1	a	29.2	29.6	0.4	27.4	26.0	-1.4
	b	29.2	30.2	1.0	27.2	27.0	-0.2
	Area	**29.2**	**29.9**	**0.7**	**27.3**	**26.5**	**-0.8**
BB2	a	29.2	29.2	0.0	27.3	26.7	-0.6
	b	29.3	29.6	0.3	27.2	27.5	0.3
	Area	**29.2**	**29.4**	**0.2**	**27.2**	**27.1**	**-0.1**
BB3	a	29.2	29.1	-0.1	27.3	26.8	-0.5
	b	29.2	29.4	0.2	27.2	27.4	0.2
	Area	**29.2**	**29.2**	**0.0**	**27.2**	**27.1**	**-0.1**
BB4	a	30.8	29.1	-1.7	27.6	27.1	-0.5
	b[2]	32.3	29.7	-2.6	27.4	28.0	0.6
	Area	**31.5**	**29.4**	**-2.1**	**27.5**	**27.5**	**0.0**

Notes:
[1] Positive values indicate the porewater temperature is lower than the ambient water temperature.
[2] During the Fall 2013 sampling event, porewater temperatures were collected at only three sampling points due to instrument malfunction.

Key:
°C = Degrees Celsius.

Table 4.2-17. Comparison of Mean Porewater to Mean Bottom Water Column Temperatures (°C) by Transect and Sampling Area, Pre- and Post- Uprate Sampling Events

Area	Tran-sect	Fall events						Spring Events					
		Pre-Uprate Fall[1]			Post-Uprate Fall			Pre-Uprate Spring			Post-Uprate Spring		
		PW Temp	Bott. Temp	Differ-ence[2]	PW Temp	Bott. Temp	Differ-ence	PW Temp	Bott. Temp	Differ-ence	PW Temp	Bott. Temp	Differ-ence
BB1	a	29.3	29.4	0.1	29.2	29.6	0.4	27.3	26.6	-0.7	27.4	26.0	-1.4
	b	29.1	28.1	-1.0	29.2	30.1	1.0	27.0	27.3	0.3	27.2	27.0	-0.2
	Area	**29.2**	**28.8**	**-0.4**	**29.2**	**29.9**	**0.7**	**27.2**	**26.9**	**-0.3**	**27.3**	**26.5**	**-0.8**
BB2	a	28.3	27.9	-0.4	29.2	29.2	0.0	27.3	27.2	-0.1	27.3	26.7	-0.6
	b	28.2	28.2	0.0	29.3	29.6	0.3	26.8	26.5	-0.3	27.2	27.5	0.3
	Area	**28.2**	**28.1**	**0.1**	**29.2**	**29.4**	**0.2**	**27.1**	**26.8**	**-0.3**	**27.2**	**27.1**	**-0.1**
BB3	a	28.6	28.6	0.0	29.2	29.1	-0.1	27.3	26.6	-0.7	27.3	26.8	-0.5
	b	28.5	28.5	0.0	29.2	29.4	0.2	27.1	26.7	-0.4	27.2	27.4	0.2
	Area	**28.6**	**28.6**	**0.0**	**29.2**	**29.2**	**0.0**	**27.2**	**26.6**	**-0.6**	**27.2**	**27.1**	**-0.1**
BB4	a	28.6	28.2	-0.4	30.8	29.1	-1.7	28.2	28.6	0.4	27.6	27.1	-0.5
	b	28.5	28.5	0.0	32.3	29.7	-2.6	28.2	28.8	0.6	27.4	28.0	-0.6
	Area	**28.5**	**28.3**	**-0.2**	**31.5**	**29.4**	**-2.1**	**28.2**	**28.7**	**0.5**	**27.5**	**27.5**	**-0.1**

Notes:
[1] Mean calculated from the two pre-uprate fall events (Fall 2010 and Fall 2011) to get a single mean value for comparison to post-uprate fall values.
[2] Positive values indicate the porewater temperature is lower than the ambient water temperature.
[3] During the Fall 2013 sampling event, porewater temperatures were collected at only three sampling points due to instrument malfunction.
Key:
°C = Degrees Celsius.
Bott. Temp = Bottom Temperature.

Table 4.2-18. Results of Statistical Comparisons (Spearman Rank Order Correlations) of Bottom Water to Porewater Temperature (°C), Bottom Water to Porewater Specific Conductivity (µS/cm), and Seagrass Abundance (BBCA) to Depth to Hard Bottom (cm) for All Areas Combined, among Pre- and Post-Uprate Sampling Events[1]

Sampling Area	n	R	p
Temperature (°C): Bottom Water to Porewater			
All	256	0.77	**< 0.0001**
Specific Conductivity (µS/cm): Bottom Water to Porewater			
All	251	0.84	**< 0.0001**
Seagrass Abundance (BBCA) with Depth to Hard Bottom (cm)			
All	128	0.79	**< 0.0001**

Note:
[1] Fall 2010 and Fall 2011events combined for a single pre-uprate fall mean for analysis.
P Values in bold font are statistically significant.
Key:
µS/cm = Micro-Siemens per centimeter.
°C = Degrees Celsius.
BBCA = Braun-Blanquet Cover Abundance.
cm = Centimeter(s).

Table 4.2-19. Mean Values for Porewater and Bottom Water Column Specific Conductance (µS/cm) by Transect and Sampling Area, Fall 2013 and Spring 2014

Area	Transect	Fall 2013		Difference[1]	Spring 2014		Difference
		Mean			Mean		
		Porewater	Bottom		Porewater	Bottom	
BB1	a	46,963	40,313	-6,650	56,163	59,538	3,375
	b	47,425	44,238	-3,188	56,263	58,700	2,438
	Area	**47,194**	**42,275**	**-4,919**	**56,213**	**59,119**	**2,906**
BB2	a	52,275	52,138	-138	57,825	57,575	-250
	b	52,550	52,663	112	55,975	57,525	1,550
	Area	**52,413**	**52,400**	**-13**	**56,900**	**57,550**	**650**
BB3	a	52,113	52,438	325	56,688	57,975	1,287
	b	52,513	52,900	388	56,363	58,400	2,038
	Area	**52,313**	**52,669**	**356**	**56,525**	**58,188**	**1,663**
BB4	a	46,463	43,775	-2,688	49,550	53,088	3,538
	b	47,700	44,300	-3,400	50,038	52,863	2,825
	Area	**47,081**	**44,038**	**-3,044**	**49,794**	**52,975**	**3,181**

Note:
[1] Positive values indicate the porewater specific conductance is lower than the bottom water column specific conductance.
Key:
µS/cm = Micro-Siemens per centimeter.

Table 4.2-20. Difference[1] Between Bottom Water Column and Porewater Specific Conductance (µS/cm) by Transect and Sampling Area, Pre- and Post-Uprate Sampling Events

Area	Transect	Pre-Uprate		Post-Uprate	
		Fall	Spring	Fall	Spring
BB1	a	-3,143.1	-6,812.5	-6,650.0	3,375.0
	b	-5,078.1	-3,843.8	-3,187.5	2,437.5
	Area	**-4,110.6**	**-5,328.1**	**-4,918.8**	**2,906.2**
BB2	a	-4,034.4	-275.0	-137.5	-250.0
	b	-3,993.8	-406.3	112.5	1,550.0
	Area	**-4,014.1**	**-340.6**	**-12.5**	**650.0**
BB3	a	-4,409.4	306.2	325.0	1,287.5
	b	-5,831.3	337.5	387.5	2,037.5
	Area	**-5,120.3**	**321.9**	**356.2**	**1,662.5**
BB4	a	-4,253.1	-2,868.8	-2,687.5	3,537.5
	b	-3,225.0	-3,431.2	-3,400.0	2,825.0
	Area	**-3,739.1**	**-3,150.0**	**-3,043.8**	**3,181.3**

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

Key:
µS/cm = Micro-Siemens per Centimeter.

Table 4.2-21. Results of Porewater Nutrient Sampling by Transect and Sampling Area, Fall 2013 and Spring 2014

Area	Transect	Sodium (mg/L)			
		Fall 2013		Spring 2014[1]	
		Value	Qual	Value	Qual
BB1	a	8,970		59,100.00	
	b	9,760		59,300.00	
	Area Mean	**9,365**		**59,200.00**	
BB2	a	10,300		57,800.00	
	b	10,600		58,000.00	
	Area Mean	**10,450**		**57,900.00**	
BB3	a	10,600		57,700.00	
	b	10,600		56,400.00	
	Area Mean	**10,600**		**57,050.00**	
BB4	a	8,870		50,200.00	
	b	8,910		50,600.00	
	Area Mean	**8,890**		**50,400.00**	
Area	**Transect**	**Chloride (mg/L)**			
		Fall 2013		**Spring 2014**	
		Value	**Qual**	**Value**	**Qual**
BB1	a	19,500		23,300	
	b	20,400		23,400	
	Area Mean	**19,950**		**23,350**	
BB2	a	22,100		22,000	
	b	22,400		22,500	
	Area Mean	**22,250**		**22,250**	
BB3	a	22,200		22,500	
	b	21,600		21,600	
	Area Mean	**21,900**		**22,050**	
BB4	a	19,000		19,100	
	b	19,000		18,500	
	Area Mean	**19,000**		**18,800**	

Table 4.2-21. Results of Porewater Nutrient Sampling by Transect and Sampling Area, Fall 2013 and Spring 2014

Area	Transect	Nitrate/Nitrite (mg/L)			
		Fall 2013		Spring 2014	
		Value	Qual	Value	Qual
BB1	a	0.0079	I J	0.0840	
	b	0.0090	I J	0.0270	U
	Area Mean	**0.0085**		**0.0555**	
BB2	a	0.0054	U	0.0490	I
	b	0.7860		0.0270	U
	Area Mean	**0.3957**		**0.0380**	
BB3	a	0.0054	U	0.0340	I
	b	0.0054	U	0.0270	U
	Area Mean	**0.0054**		**0.0305**	
BB4	a	0.0054	U	0.0270	U
	b	0.0067	I J	0.0270	U
	Area Mean	**0.0060**		**0.0270**	
Area	**Transect**	**Unionized Ammonia (mg/L)**			
		Fall 2013		**Spring 2014**	
		Value	**Qual**	**Value**	**Qual**
BB1	a	0.002	J	0.009	
	b	0.008	J	0.022	
	Area Mean	**0.005**		**0.016**	
BB2	a	0.024	J	0.016	
	b	0.003	J	0.008	
	Area Mean	**0.013**		**0.012**	
BB3	a	0.001	J	0.017	
	b	0.005	J	0.015	
	Area Mean	**0.003**		**0.016**	
BB4	a	0.002	J	0.013	
	b	0.002	J	0.019	
	Area Mean	**0.002**		**0.016**	

Table 4.2-21. Results of Porewater Nutrient Sampling by Transect and Sampling Area, Fall 2013 and Spring 2014

Area	Transect	Total Kjeldahl Nitrogen (mg/L)			
		Fall 2013		Spring 2014	
		Value	Qual	Value	Qual
BB1	a	0.6750	J	0.7170	
	b	0.7790	J	0.9870	
	Area Mean	**0.7270**		**0.8520**	
BB2	a	0.9670	J	0.7910	
	b	0.5980	J	0.3000	U
	Area Mean	**0.7825**		**0.5455**	
BB3	a	0.4990	J	0.8960	
	b	0.3710	I J	0.5900	
	Area Mean	**0.4350**		**0.7430**	
BB4	a	0.6330	J	1.0200	
	b	0.6020	J	0.9740	
	Area Mean	**0.6175**		**0.9970**	
Area	**Transect**	**Total Phosphorus (mg/L)**			
		Fall 2013		**Spring 2014**	
		Value	**Qual**	**Value**	**Qual**
BB1	a	0.0022	U J	0.0022	U
	b	0.0022	U J	0.0022	U
	Area Mean	**0.0022**		**0.0022**	
BB2	a	0.0022	U	0.0022	U
	b	0.0022	U J	0.0022	U
	Area Mean	**0.0022**		**0.0022**	
BB3	a	0.0022	U J	0.0022	U
	b	0.0022	U J	0.0022	U
	Area Mean	**0.0022**		**0.0022**	
BB4	a	0.0022	U J	0.0022	U
	b	0.0022	U	0.0022	U
	Area Mean	**0.0022**		**0.0022**	

Table 4.2-21. Results of Porewater Nutrient Sampling by Transect and Sampling Area, Fall 2013 and Spring 2014

Area	Transect	ortho-Phosphate (mg/L)			
		Fall 2013		Spring 2014	
		Value	Qual	Value	Qual
BB1	a	0.0181	J	0.0014	U
	b	0.0089	I J	0.0014	U
	Area Mean	**0.0135**		**0.0014**	
BB2	a	0.0016	I	0.0014	U
	b	0.0288	J	0.0014	U
	Area Mean	**0.0152**		**0.0014**	
BB3	a	0.0262	J	0.0014	U
	b	0.0171	J	0.0014	U
	Area Mean	**0.0217**		**0.0014**	
BB4	a	0.0052	I J	0.0014	U
	b	0.0023	I	0.0014	U
	Area Mean	**0.0038**		**0.0014**	

Notes:
[1] No values for sodium reported for the Spring 2014 sampling event.
[2] No values for tritium reported for the Fall 2013 sampling event.
[3] No values for tritium reported for the Spring 2014 sampling event.

Key:
I = Value between the MDL and PQL.
J = Estimated (+/- indicate bias).
Q = Holding time exceeded.
U = Analyzed for but not detected at the reported value.

Table 4.2-22. Comparison of Pre- (Fall 2010 to Fall 2011) and Post-Uprate (Fall 2013 and Spring 2014) Analytical Results for Porewater Nutrient Samples by Transect and Sampling Area

Area	Transect	Sodium (mg/L)			
		Pre-Uprate Fall	Pre-Uprate Spring	Post-Uprate Fall	Post-Uprate Spring[1]
BB1	a	9,150	13,000	8,970	59100
	b	9,350	12,000	9,760	59300
	Area Mean	**9,250**	**12,500**	**9,365**	**59200**
BB2	a	10,450	12,000	10,300	57800
	b	10,500	11,000	10,600	58000
	Area Mean	**10,475**	**11,500**	**10,450**	**57900**
BB3	a	10,500	10,000	10,600	57700
	b	10,450	11,000	10,600	56400
	Area Mean	**10,475**	**10,500**	**10,600**	**57050**
BB4	a	9,300	9,800	8,870	50200
	b	9,100	11,000	8,910	50600
	Area Mean	**9,200**	**10,400**	**8,890**	**50400**
Area	**Transect**	**Chloride (mg/L)**			
		Pre-Uprate Fall	Pre-Uprate Spring	Post-Uprate Fall	Post-Uprate Spring
BB1	a	18,000	24,000	19,500	23,300
	b	18,500	24,000	20,400	23,400
	Area Mean	**18,250**	**24,000**	**19,950**	**23,350**
BB2	a	19,000	23,000	22,100	22,000
	b	19,000	22,000	22,400	22,500
	Area Mean	**19,000**	**22,500**	**22,250**	**22,250**
BB3	a	20,000	22,000	22,200	22,500
	b	18,500	21,000	21,600	21,600
	Area Mean	**19,250**	**21,500**	**21,900**	**22,050**
BB4	a	18,000	20,000	19,000	19,100
	b	17,000	21,000	19,000	18,500
	Area Mean	**17,500**	**20,500**	**19,000**	**18,800**

Table 4.2-22. Comparison of Pre- (Fall 2010 to Fall 2011) and Post-Uprate (Fall 2013 and Spring 2014) Analytical Results for Porewater Nutrient Samples by Transect and Sampling Area

Area	Transect	Nitrate+Nitrite (mg/L)			
		Pre-Uprate Fall	Pre-Uprate Spring	Post-Uprate Fall	Post-Uprate Spring
BB1	a	0.0225	0.1100	0.0079	0.0840
	b	0.0289	0.2100	0.0090	0.0270
	Area Mean	**0.0257**	**0.1600**	**0.0085**	**0.0555**
BB2	a	0.0049	0.0260	0.0054	0.0490
	b	0.0051	0.0250	0.7860	0.0270
	Area Mean	**0.0050**	**0.0255**	**0.3957**	**0.0380**
BB3	a	0.0065	0.0360	0.0054	0.0340
	b	0.0070	0.0240	0.0054	0.0270
	Area Mean	**0.0067**	**0.0300**	**0.0054**	**0.0305**
BB4	a	0.0184	0.1300	0.0054	0.0270
	b	0.0124	0.1200	0.0067	0.0270
	Area Mean	**0.0154**	**0.1250**	**0.0060**	**0.0270**
Area	**Transect**	**Unionized Ammonia (mg/L)**			
		Pre-Uprate Fall	Pre-Uprate Spring	Post-Uprate Fall	Post-Uprate Spring
BB1	a	0.001	0.003	0.002	0.009
	b	0.002	0.000	0.008	0.022
	Area Mean	**0.001**	**0.002**	**0.005**	**0.016**
BB2	a	0.004	0.006	0.024	0.016
	b	0.001	0.010	0.003	0.008
	Area Mean	**0.002**	**0.008**	**0.013**	**0.012**
BB3	a	0.001	0.000	0.001	0.017
	b	0.002	0.002	0.005	0.015
	Area Mean	**0.001**	**0.001**	**0.003**	**0.016**
BB4	a	0.004	0.003	0.002	0.013
	b	0.004	0.009	0.002	0.019
	Area Mean	**0.004**	**0.006**	**0.002**	**0.016**

Table 4.2-22. Comparison of Pre- (Fall 2010 to Fall 2011) and Post-Uprate (Fall 2013 and Spring 2014) Analytical Results for Porewater Nutrient Samples by Transect and Sampling Area

Area	Transect	Total Kjedahl Nitrogen (mg/L)			
		Pre-Uprate Fall	Pre-Uprate Spring	Post-Uprate Fall	Post-Uprate Spring
BB1	a	0.6000	0.9000	0.6750	0.7170
	b	0.5950	1.2000	0.7790	0.9870
	Area Mean	**0.5975**	**1.0500**	**0.7270**	**0.8520**
BB2	a	0.6600	0.8100	0.9670	0.7910
	b	0.4750	0.4600	0.5980	0.3000
	Area Mean	**0.5675**	**0.6350**	**0.7825**	**0.5455**
BB3	a	0.5000	0.2300	0.4990	0.8960
	b	0.3900	0.3500	0.3710	0.5900
	Area Mean	**0.4450**	**0.2900**	**0.4350**	**0.7430**
BB4	a	1.1250	0.4600	0.6330	1.0200
	b	0.6850	1.0000	0.6020	0.9740
	Area Mean	**0.9050**	**0.7300**	**0.6175**	**0.9970**
Area	**Transect**	**Total Phosphorus (mg/L)**			
		Pre-Uprate Fall	**Pre-Uprate Spring**	**Post-Uprate Fall**	**Post-Uprate Spring**
BB1	a	0.0120	0.0230	0.0022	0.0022
	b	0.0135	0.0210	0.0022	0.0022
	Area Mean	**0.0128**	**0.0220**	**0.0022**	**0.0022**
BB2	a	0.0155	0.0200	0.0022	0.0022
	b	0.0160	0.0200	0.0022	0.0022
	Area Mean	**0.0158**	**0.0200**	**0.0022**	**0.0022**
BB3	a	0.0180	0.0190	0.0022	0.0022
	b	0.0135	0.0200	0.0022	0.0022
	Area Mean	**0.0158**	**0.0195**	**0.0022**	**0.0022**
BB4	a	0.0280	0.0260	0.0022	0.0022
	b	0.0195	0.0230	0.0022	0.0022
	Area Mean	**0.0238**	**0.0245**	**0.0022**	**0.0022**

Table 4.2-22. Comparison of Pre- (Fall 2010 to Fall 2011) and Post-Uprate (Fall 2013 and Spring 2014) Analytical Results for Porewater Nutrient Samples by Transect and Sampling Area

Area	Transect	Orthophosphate (mg/L)			
		Pre-Uprate Fall	Pre-Uprate Spring	Post-Uprate Fall	Post-Uprate Spring
BB1	a	0.0382	0.0400	0.0181	0.0014
	b	0.0387	0.0024	0.0089	0.0014
	Area Mean	**0.0385**	**0.0212**	**0.0135**	**0.0014**
BB2	a	0.0071	0.0044	0.0016	0.0014
	b	0.0241	0.0036	0.0288	0.0014
	Area Mean	**0.0156**	**0.0040**	**0.0152**	**0.0014**
BB3	a	0.0657	0.0038	0.0262	0.0014
	b	0.0510	0.0029	0.0171	0.0014
	Area Mean	**0.0584**	**0.0034**	**0.0217**	**0.0014**
BB4	a	0.0162	0.0015	0.0052	0.0014
	b	0.0162	0.0051	0.0023	0.0014
	Area Mean	**0.0162**	**0.0033**	**0.0038**	**0.0014**
Area	**Transect**	**Tritium (pCi/L)**			
		Pre-Uprate Fall	**Pre-Uprate Spring**	**Post-Uprate Fall[2]**	**Post-Uprate Spring[3]**
BB1	a	9.3	11.9	NA	NA
	b	9.5	16.3	NA	NA
	Area Mean	**9.4**	**14.10**	**NA**	**NA**
BB2	a	13.7	13.0	NA	NA
	b	9.0	5.8	NA	NA
	Area Mean	**11.3**	**9.40**	**NA**	**NA**
BB3	a	20.0	9.6	NA	NA
	b	23.2	15.2	NA	NA
	Area Mean	**21.6**	**12.40**	**NA**	**NA**
BB4	a	8.1	13.7	NA	NA
	b	9.6	19.5	NA	NA
	Area Mean	**8.8**	**16.60**	**NA**	**NA**

Notes:
[1] No values for sodium reported for the Spring Post-Uprate sampling event.
[2] No values for tritium reported for the Fall Post-Uprate sampling event.
[3] No values for tritium reported for the Spring Post-Uprate sampling event.

Key:
NA = Not available.

Table 4.2-23. Number of Quadrats Along Each Transect (n=32) with *Halodule wrightii* (HW) and/or *Thalassia testudinum* (TT) by Study Area (n=64), Fall 2013 and Spring 2014

Area	Transect	Fall 2013		Spring 2014	
		HW	TT	HW	TT
BB1	a	5	32	7	32
	b	12	30	9	30
	Total	**17**	**62**	**16**	**62**
BB2	a	16	11	15	3
	b	5	12	6	13
	Total	**21**	**23**	**21**	**16**
BB3	a	0	23	0	23
	b	5	24	3	23
	Total	**5**	**47**	**3**	**46**
BB4	a	2	32	2	32
	b	0	27	1	25
	Total	**2**	**59**	**3**	**57**
Total All Areas		**45**	**191**	**43**	**181**

Key: HW = *Halodule wrightii.* TT = *Thalassia testudinum.*

Table 4.2-24. Percent (%) of Points within Each Study Area (n=16) Having Different Bottom Conditions, Fall 2013 and Spring 2014

Category	Coverage / Presence	BB1		BB2		BB3		BB4	
		Fall 2013	Spring 2014	Fall 2013	Spring 2014	Fall 2013	Spring 2014	Fall 2013	Spring 2014
Overall	Open				18.8		12.5		
	Fairly Open	25.0	68.8	50.0	68.8	50.0	62.5	31.3	37.5
	Moderately Open	37.5	12.5	18.8	12.5	37.5	25.0	50.0	37.5
	Mostly Covered	37.5	18.8	25.0		12.5		18.8	25.0
	Uniform			6.3					
Seagrass	Sparse	25.0	62.5	87.5	87.5	75.0	81.3	93.8	68.8
	Sparse to Moderate	62.5	25.0	12.5	12.5	25.0	18.8	6.3	31.3
	Moderate to Dense	12.5	12.5						
Drift Algae	Sparse	93.8	62.5	43.8	68.8	25.0	93.8	18.8	43.8
	Sparse to Moderate	6.3	37.5	43.8	25.0	43.8	6.3	68.8	37.5
	Moderate to Dense			12.5	6.3	31.3		12.5	18.8
Batophora	Sparse	31.3	31.3	25.0	62.5	31.3	93.8	56.3	18.8
	Sparse to Moderate	25.0	56.3	37.5	25.0	68.8	6.3	43.8	68.8
	Moderate to Dense	43.8	12.5	37.5	12.5				12.5
Calcareous Algae	None								
	Few	31.3	62.5	12.5	12.5		18.8		
	Many	68.8	37.5	87.5	87.5	100.0	81.3	100.0	100.0
Sponges	None		6.3	6.3					6.3
	Few	87.5	87.5	25.0	18.8	56.3	25.0	25.0	68.8
	Many	12.5	6.3	68.8	81.3	43.8	75.0	75.0	25.0

Table 4.2-24. Percent (%) of Points within Each Study Area (n=16) Having Different Bottom Conditions, Fall 2013 and Spring 2014

Category	Coverage / Presence	BB1		BB2		BB3		BB4	
		Fall 2013	Spring 2014	Fall 2013	Spring 2014	Fall 2013	Spring 2014	Fall 2013	Spring 2014
Corals	None	43.8	37.5	6.3	18.8	6.3	18.8	6.3	6.3
	Few	56.3	62.5	31.3	12.5	56.3	31.3	25.0	62.5
	Many			62.5	68.8	37.5	50.0	68.8	31.3
Gorgonians	None	100.0	100.0	25.0	18.8	25.0	31.3	100.0	100.0
	Few			12.5		37.5	18.8		
	Many			62.5	81.3	37.5	50.0		

Table 4.2-25. Mean and Standard Error of Water Depth (m), Mean Braun-Blaunquet Coverage Abundance1 (BBCA) Scores for Total Macrophytes, Total Seagrass, and Total Macroalgae, and Depth to Hardbottom (cm) by Transect and Sampling Area, Fall 2013 and Spring 2014

Area	Tran-sect	Total Macrophytes		Total Seagrass		Total Macroalgae		Depth to Hardbottom (cm)	
		Fall 2013	Spring 2014	Fall 2013	Spring 2014	Fall 2013	Spring 2014	Fall 2013	Spring 2014
		Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE
BB1	a	2.1 ± 0.1	3.0 ± 0.2	1.5 ± 0.2	1.8 ± 0.2	1.5 ± 0.1	2.1 ± 0.1	24.3 ± 3.3	21.4 ± 2.2
	b	2.3 ± 0.1	2.1 ± 0.1	1.1 ± 0.1	1.1 ± 0.1	2.1 ± 0.1	1.7 ± 0.1	17.9 ± 2.0	12.1 ± 2.1
	Area	**2.2 ± 0.1**	**2.5 ± 0.1**	**1.3 ± 0.1**	**1.4 ± 0.1**	**1.8 ± 0.1**	**1.9 ± 0.1**	**21.1 ± 2.0**	**16.8 ± 1.6**
BB2	a	3.2 ± 0.3	1.7 ± 0.2	1.2 ± 0.1	0.5 ± 0.1	2.9 ± 0.3	1.3 ± 0.1	10.6 ± 1.6	4.3 ± 0.8
	b	2.6 ± 0.2	1.8 ± 0.2	1.5 ± 0.1	0.4 ± 0.1	1.8 ± 0.1	1.5 ± 0.2	12.2 ± 2.7	9.4 ± 2.2
	Area	**2.9 ± 0.2**	**1.7 ± 0.1**	**1.4 ± 0.1**	**0.5 ± 0.1**	**2.4 ± 0.2**	**1.4 ± 0.1**	**11.3 ± 1.5**	**6.8 ± 1.2**
BB3	a	3.0 ± 0.2	1.4 ± 0.1	1.5 ± 0.1	1.1 ± 0.1	1.4 ± 0.1	1.1 ± 0.1	12.7 ± 1.6	11.1 ± 1.3
	b	2.3 ± 0.2	1.8 ± 0.1	1.2 ± 0.1	0.9 ± 0.1	1.7 ± 0.1	1.3 ± 0.1	12.8 ± 1.5	10.7 ± 1.9
	Area	**2.6 ± 0.1**	**1.6 ± 0.1**	**1.3 ± 0.1**	**1.0 ± 0.1**	**1.6 ± 0.1**	**1.2 ± 0.0**	**12.7 ± 1.1**	**10.9 ± 1.1**
BB4	a	2.7 ± 0.1	2.5 ± 0.1	1.3 ± 0.1	1.0 ± 0.0	2.3 ± 0.2	2.1 ± 0.2	16.1 ± 1.4	15.0 ± 1.3
	b	2.4 ± 0.2	2.8 ± 0.2	1.0 ± 0.1	0.8 ± 0.1	1.8 ± 0.1	2.5 ± 0.2	12.7 ± 1.8	9.6 ± 1.0
	Area	**2.6 ± 0.1**	**2.7 ± 0.1**	**1.1 ± 0.1**	**0.9 ± 0.1**	**2.0 ± 0.1**	**2.3 ± 0.1**	**14.4 ± 1.1**	**12.3 ± 0.9**

Notes:
[1] BBCA scores: 1 (includes 0.1 and 0.5) - less than 5% coverage; 2 - 5% to 25% coverage; 3 - 25% to 50% coverage; 4 - 50% to 75% coverage; 5 - 75% to 100% coverage.

Key:
BBCA = Braun-Blaunquet Coverage Abundance.
m = Meter(s) cm = Centimeter(s).
SE = Standard Error.

Table 4.2-26. Comparison of Pre- and Post-Uprate[1] Mean Braun Blanquet Coverage Abundance (BBCA) Scores[2] for Total Macrophytes, Total Seagrass, and Total Macroalgae by Transect and Sampling Area, Pre- and Post- Uprate Sampling Events

Area	Transect	Total Macrophytes				Total Seagrass				Total Macroalgae			
		Pre-Uprate		Post-Uprate		Pre-Uprate		Post-Uprate		Pre-Uprate		Post-Uprate	
		Fall*	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
BB1	a	2.1	2.3	2.1	3.0	1.5	1.4	1.5	1.8	1.4	1.6	1.5	2.1
	b	1.8	2.7	2.3	2.1	1.2	1.6	1.1	1.1	1.6	2.0	2.1	1.7
	Area	1.9	2.5	2.2	2.5	1.3	1.5	1.3	1.4	1.5	1.8	1.8	1.9
BB2	a	2.2	2.3	3.2	1.7	1.1	0.4	1.2	0.5	1.5	1.7	2.9	1.3
	b	2.3	2.3	2.6	1.8	0.9	1.1	1.5	0.4	1.7	1.8	1.8	1.5
	Area	2.2	2.3	2.9	1.7	1.0	0.7	1.3	0.5	1.6	1.7	2.4	1.4
BB3	a	2.3	2.8	3.0	1.4	1.5	1.3	1.5	1.1	1.3	1.9	1.4	1.1
	b	1.8	2.8	2.3	1.8	0.9	0.8	1.2	0.9	1.3	2.4	1.7	1.3
	Area	2.1	2.8	2.6	1.6	1.2	1.1	1.3	1.0	1.3	2.2	1.6	1.2
BB4	a	1.8	2.0	2.7	2.5	1.0	1.1	1.2	1.0	1.3	1.8	2.2	2.1
	b	1.9	2.4	2.4	2.8	1.0	1.1	1.0	0.8	1.4	1.8	1.8	2.5
	Area	1.9	2.2	2.6	2.7	1.0	1.1	1.1	0.9	1.4	1.8	2.0	2.3

Notes:
[1] Fall 2010 and 2011 averaged for Fall Pre-Uprate values.
[2] BBCA scores: 1 (includes 0.1 and 0.5) - less than 5% coverage; 2 - 5% to 25% coverage; 3 - 25% to 50% coverage; 4 - 50% to 75% coverage; 5 - 75% to 100% coverage.

Key:
BBCA = Braun-Blaunquet Coverage Abundance.

Table 4.2-27. Analytical Results for Seagrass Leaf Nutrient Samples Collected within Each of the Study Areas, Fall 2013

Method		353.2 & 351.2		365.4		U of M		U of M		U of M	
Parameter		Total Nitrogen		Total Phosphorus		Total Carbon		$\delta^{13}C$		$\delta^{15}N$	
Area	Transect	wt%	Qualifier	mg/Kg	Qualifier	wt%	Qualifier	‰	Qualifier	‰	Qualifier
BB1	a	2.35		548.50		41.25		-9.70		6.45	
	b	2.30		555.00		41.85		-9.60		4.55	
	Total	**2.33**		**551.75**		**41.55**		**-9.65**		**5.50**	
BB2	a	2.00		581.50		41.65		-9.00		2.95	
	b	2.05		607.50		40.60		-9.85		3.25	
	Total	**2.03**		**594.50**		**41.13**		**-9.43**		**3.10**	
BB3	a	2.00		628.50		41.25		-10.55		3.70	
	b	2.05		628.00		41.35		-10.50		3.65	
	Total	**2.03**		**628.25**		**41.30**		**-10.53**		**3.68**	
BB4	a	2.00		689.50		40.70		-10.75		4.85	
	b	2.10		706.00		40.55		-10.70		4.10	
	Total	**2.05**		**697.75**		**40.63**		**-10.73**		**4.48**	

Note:
Methods 353.2 and 351.2 refer to the corresponding EPA methods.
Key:
‰ = Parts per mille.
wt% = Weight percent.
mg/kg = Milligrams per kilogram.
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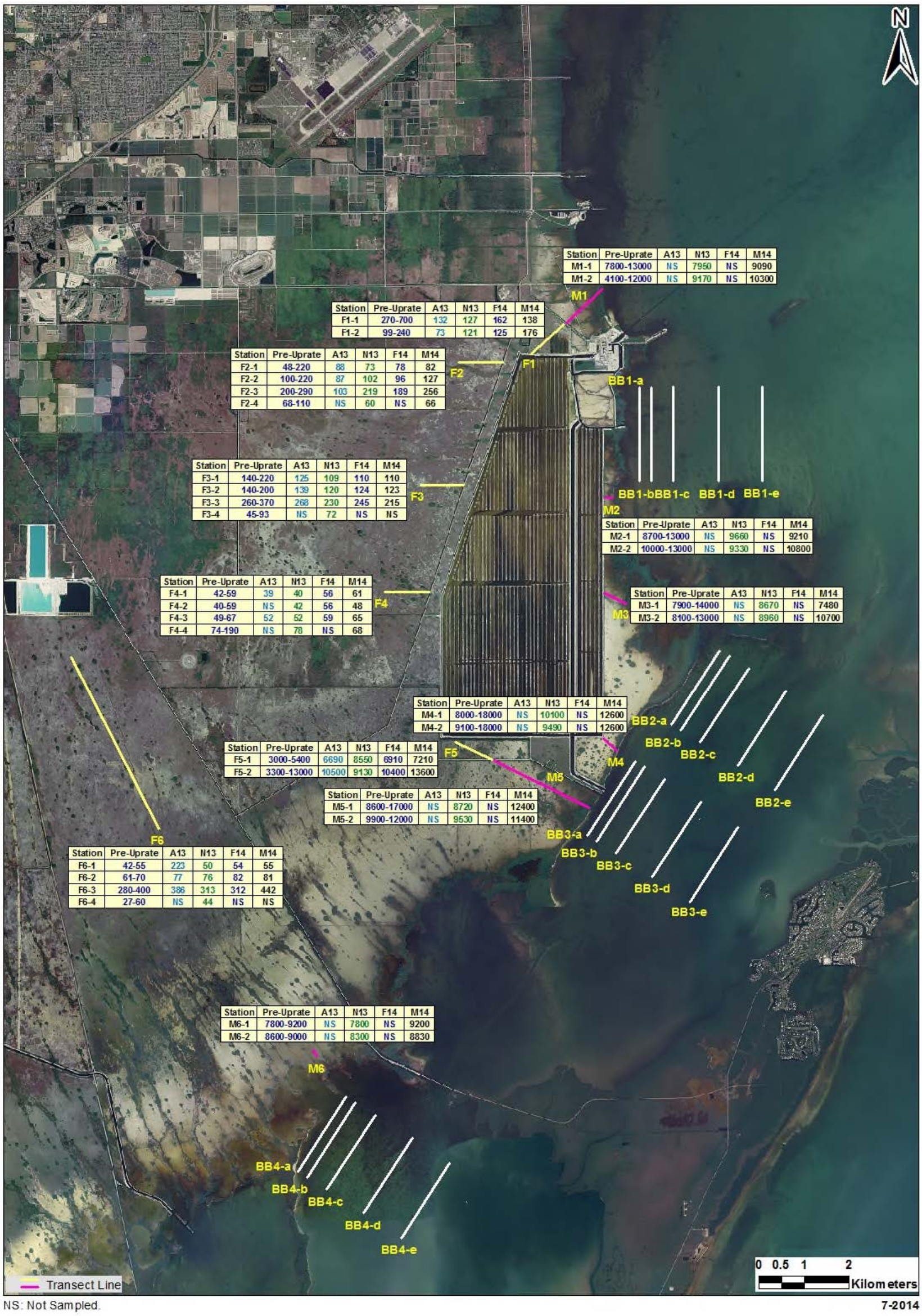
FIGURES



Station	Pre-Uprate	A13	N13	F14	M14
M1-1	7800-13000	NS	7950	NS	9090
M1-2	4100-12000	NS	9170	NS	10300

Station	Pre-Uprate	A13	N13	F14	M14
F1-1	270-700	132	127	162	138
F1-2	99-240	73	121	125	176

Station	Pre-Uprate	A13	N13	F14	M14
F2-1	48-220	88	73	78	82
F2-2	100-220	87	102	96	127
F2-3	200-290	103	219	189	256
F2-4	68-110	NS	60	NS	66

Station	Pre-Uprate	A13	N13	F14	M14
F3-1	140-220	125	109	110	110
F3-2	140-200	139	120	124	123
F3-3	260-370	268	230	245	215
F3-4	45-93	NS	72	NS	NS

Station	Pre-Uprate	A13	N13	F14	M14
M2-1	8700-13000	NS	9660	NS	9210
M2-2	10000-13000	NS	9330	NS	10800

Station	Pre-Uprate	A13	N13	F14	M14
F4-1	42-59	39	40	56	61
F4-2	40-59	NS	42	56	48
F4-3	49-67	52	52	59	65
F4-4	74-190	NS	78	NS	68

Station	Pre-Uprate	A13	N13	F14	M14
M3-1	7900-14000	NS	8670	NS	7480
M3-2	8100-13000	NS	8960	NS	10700

Station	Pre-Uprate	A13	N13	F14	M14
M4-1	8000-18000	NS	10100	NS	12600
M4-2	9100-18000	NS	9490	NS	12600

Station	Pre-Uprate	A13	N13	F14	M14
F5-1	3000-5400	6690	8550	6910	7210
F5-2	3300-13000	10500	9130	10400	13600

Station	Pre-Uprate	A13	N13	F14	M14
M5-1	8600-17000	NS	8720	NS	12400
M5-2	9900-12000	NS	9530	NS	11400

Station	Pre-Uprate	A13	N13	F14	M14
F6-1	42-55	223	50	54	55
F6-2	61-70	77	76	82	81
F6-3	280-400	386	313	312	442
F6-4	27-60	NS	44	NS	NS

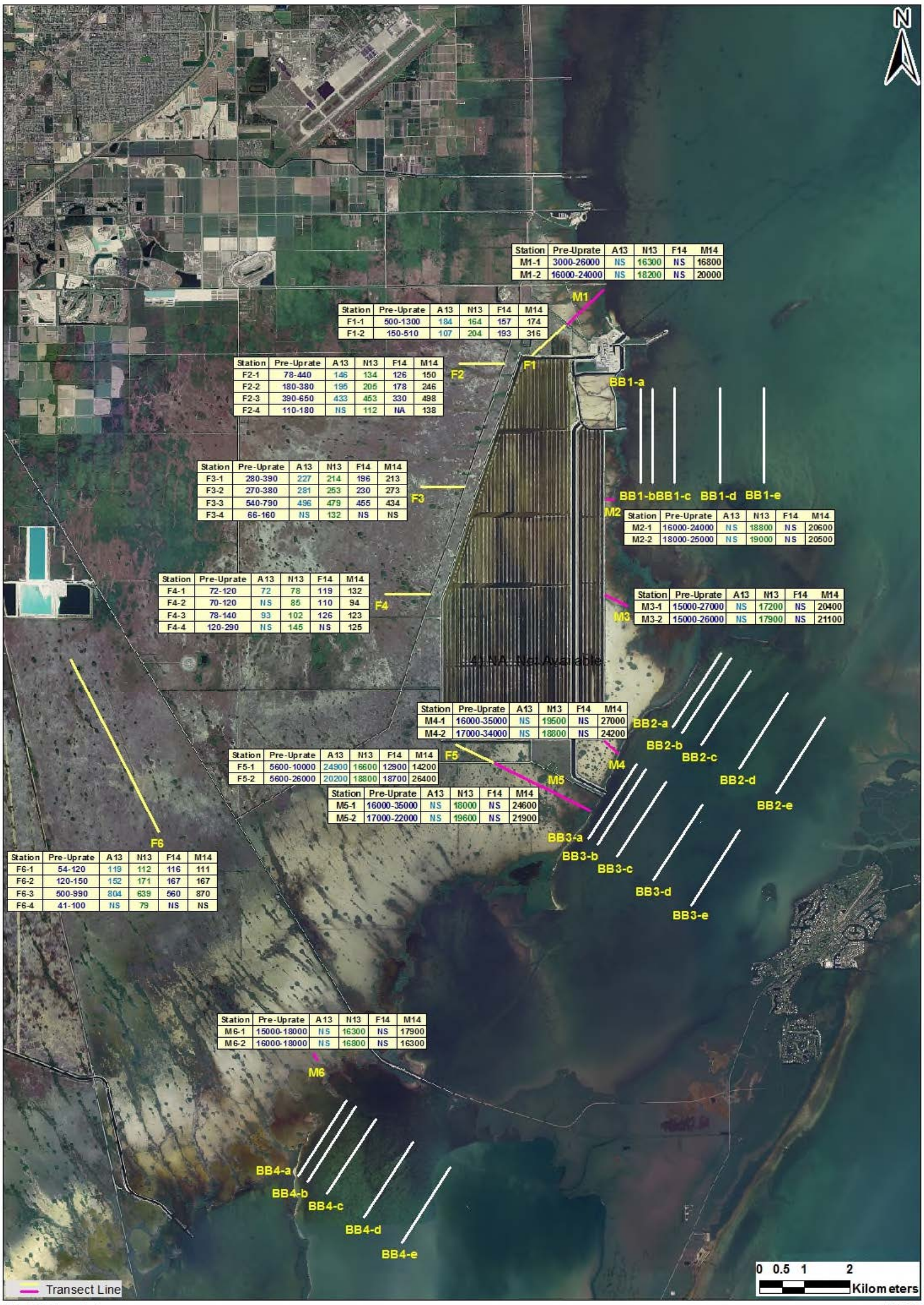
Station	Pre-Uprate	A13	N13	F14	M14
M6-1	7800-9200	NS	7800	NS	9200
M6-2	8600-9000	NS	8300	NS	8830

NS: Not Sampled.

7-2014

Quarterly ecological Sodium samples (mg/L) collected at 30 cm depth.
Ranges of data in periods of Pre-Uprate and quaterly values in the Post-Uprate period from June 2013 to March 2014.

Figure 4.1-1. Post-Uprate Quarterly Porewater Sodium (mg/L) Results with Pre-Uprate Ranges.



Quarterly ecological Chloride samples (mg/L) collected at 30 cm depth.
Ranges of data in periods of Pre-Uprate and quaterly values in the Post-Uprate period from June 2013 to March 2014.

Figure 4.1-2. Post-Uprate Quarterly Porewater Chloride (mg/L) Results with Pre-Uprate Ranges.

Note: 1) NH3: Total Ammonia (mg/L as N); NOx: Nitrate / Nitrite as N (mg/L); TN: Total Nitrogen (mg/L); TP: Total Phosphorus (mg/L). **7-2014**
2) Pre-Uprate: Jun 2010 to Dec 2011.
3) N13: Nov 2013; M14: May 2014.
4) NS: Not sampled.

Quarterly ecological Nutrient samples (mg/L) collected at 30 cm depth.
Ranges of data in periods of Pre-Uprate and quaterly values in the Post-Uprate period from June 2013 to March 2014.

Figure 4.1-3. Post-Uprate Semi-Annual Porewater Nutrient (mg/L) Results with Pre-Uprate Ranges.

Figure 4.2-1 Ecological Transect Locations

Figure 4.2-1. Post-Uprate Ecological Transect Locations with Reduced Monitoring Locations in Biscayne Bay.

5. HYDROGEOLOGIC ASSESSMENT

In the Comprehensive Pre-Uprate Report (FPL 2012), FPL provided an overview of the Biscayne aquifer and geologic formations. Information was also presented that showed groundwater responses to environmental conditions in the area, operational effects of the CCS on water levels, and the extent of CCS waters. This Post-Uprate report follows up on some of the information previously presented and notes any changes since the Pre-Uprate Report.

5.1 Post-Uprate Hydrogeologic Observations

Water levels in the CCS have been in a general decline over the Post-Uprate period. Unlike in the Pre-Uprate period when substantial rain events raised water levels throughout the CCS, no substantial rain events have occurred during the Post-Uprate, which is one of the reasons for the currently higher specific conductance values in the CCS. With lower water levels (basically no major spikes in water levels) there is less of a driving head for water to move outward into the groundwater. Any effects of generally lower water level in the CCS are offset, though, by the increased specific conductance/densities of the CCS water. In the Post-Uprate period, the previously reported occasional seepage effects of the CCS at TPSWC-5 (Grand Canal immediately adjacent, south of the CCS) were not as evident based on temperature and specific conductance data.

When reviewing the CCS water levels for the entire monitoring period from June 2010 through May 2014, the smallest difference in water levels among the CCS stations was during the middle part of the Interim Operating period when the nuclear units were being uprated. Water level on the intake side of the plant at TPSWCCS-6 was also higher than normal for an extended period during the Interim Operating period. It is possible that the increase in specific conductance and tritium at TPGW-10D could be attributable, in part, to the higher water levels at TPSWCCS-6, but that has not been confirmed.

While specific conductance and temperature have increased in the CCS since the Uprate, the effect has not yet been observed in TPGW-13S, the shallow well in the CCS. The temperature in TPGW-13S has gradually decreased over the entire monitoring period and specific conductance levels in this well were lower in May 2014 than in May 2011. These observations provide some insights into the vertical hydraulic conductivity below the CCS.

As a follow-up to the assessment conducted in the Comprehensive Pre-Uprate Report, FPL reviewed the Post-Uprate data along with the rest of the water level data to determine if the CCS operations were having any profound effect on the groundwater levels. Groundwater levels for the three well clusters in Biscayne Bay are shown in Figures 5.1-1, 5.1-2, and 5.1-3. The values reflect daily averages and the vertical scale is enhanced to facilitate a review of the differences

between each zone. Since the TPGW-10 well cluster is located closest to the CCS plant intake where the CCS water levels are the lowest, the potential for drawing down the groundwater in the shallow zone, and possibly in the intermediate zone, is greatest at this location. A review of the time series plot for the three wells at TPGW-10 shows that differences in water levels between zones are minimal i.e. typically within hundredths of a foot; these differences are within the accuracy of the instruments and their settings. Additionally, the differences in water levels among the three wells do not track each other consistently. If there is continued drawdown from the CCS, water level at the zone of withdrawal would most likely be lower compared to the other wells. Neither TPGW-10 nor TPGW-11 exhibited such a pattern over the Pre-Uprate or Post-Uprate periods

At well cluster TPGW-14, difference in water levels among the three zones was greater than at other Biscayne Bay well clusters. In the Comprehensive Pre-Uprate Report (FPL 2012), FPL noted that the only well cluster that consistently had the shallow and intermediate zones lower than the deeper zone groundwater levels was at well cluster TPGW-14, which is farthest from the pump intake into the CCS. The water levels in the shallow and intermediate zones were shallower than the deep zone for approximately half of the Post-Uprate period, but since the beginning of 2014, the shallow zone now has the highest elevations. Thus, there is no consistency in the trends. None of the observations at well clusters TPGW-10, TPGW-11, and TPGW-14 indicate an influence of the CCS on groundwater level at any depth interval. Differences in water levels between zones such as at TPGW-14 are more likely associated with site-specific hydrogeological conditions.

In an effort to further determine if and how the groundwater responds to operation of the CCS, FPL reviewed groundwater levels during periods of outages and non-outages for the plant with a focus on the Uprate construction/Interim Operating period when either Nuclear Unit 3 or Nuclear Unit 4 was out of service for an extended period of time. When pumping and associated flow is reduced, the CCS water levels may rise on the intake side and drop on the discharge canal side of the plant. Figures 5.1-4 and 5.1-5 show plots of flow for the nuclear units with CCS water levels and adjacent groundwater level superimposed for TPGW-1 and TPGW-10 for the entire monitoring period. The Interim Operating period is clearly noted. The flow from the nuclear units is based on the run time of the four circulating water pumps and configuration of the three intake cooling water pumps for each nuclear unit. TPGW-1 would be the most likely location to see an effect of reduced flows/lower water levels on the discharge side of the CCS, and TPGW-10 would be the most likely location to see an effect of reduced flows/increased water levels on the intake side of the CCS as a result of an outage. Water levels at TPSWCCS-1 and TPSWCCS-6 are included with TPGW-1 and TPGW-10, respectively. For both TPGW-1 and TPGW-10, there is no clear trend or influence associated with the Uprate outage. If there are effects, they are subtle and are masked by meteorological and seasonal conditions. This still suggests that other factors (perhaps meteorological or hydrological) exert a greater influence on groundwater in wells near the CCS than does operation of the CCS.

5.2 Extent of CCS Water

As discussed in Sections 2 and 3, the most notable changes in the extent of saline water in the groundwater is the increase in specific conductance at TPGW-10D and, to a lesser extent, in TPGW-11D. Another notable increase in specific conductance was at TPGW-7D where levels began to rise in July 2013 from less than 600 µS/cm to over 4300 µS/cm by May 2014 (Figure 2.1-8).

Figures 5.2-1, 5.2-2, and 5.2-3 show cross-section locations and cross-sections with pre-CCS (April 1, 1971, through February 1, 1972) and recent (March 2014) specific conductance data. Isopleths are drawn to show the approximate change in specific conductance concentrations from the early 1970s (pre-CCS operation) to the recent period. Other than accounting for the increases, primarily in TPGW-10D and TPGW-7D, these figures are similar to those provided in the Comprehensive Pre-Uprate Report (FPL 2012). All isopleths represent estimations of historical and current water quality conditions and were developed based on interpolation methods and best professional judgment. While chloride concentrations provide more direct evidence of saltwater/marine water intrusion, specific conductance can also be used as a surrogate, with the understanding that its value could be affected by salts found in fresh water. In nearly all the wells sampled for this current monitoring effort, a high specific conductance value (greater than 1,275 µS/cm) appears to indicate marine influences. Only one well (TPGW-8S) had specific conductance readings that were influenced by another ion (calcium) and may not reflect marine influences.

Figures 5.2-2 and 5.2-3 show the approximate historical limit of what would now be defined by the FDEP as Class III groundwater (TDS greater than 10,000 mg/L per Chapter 62-520.430, F.A.C.). While historical TDS values are not available for all stations, there is a relationship between specific conductance and TDS; based on the Comprehensive Pre-Uprate Report findings from recent analytical data, the TDS value on average is 60% of the specific conductance value. This relationship was used to calculate historical TDS values and to estimate the approximate limits of Class III groundwater prior to CCS construction.

Plan view maps showing the isopleths of specific conductance in each zone (shallow, intermediate, and deep) are provided as Figures 5.2.4, 5.2-5, and 5.2-6. Although there have been some slight adjustments, these figures are almost identical to the Pre-Uprate figures (FPL 2012).

5.3 Water and Salt Balance Model

Tetra Tech developed a model of the water and salt balance for the CCS. The purpose of this model is to quantify the volume of water and mass of salt entering and exiting the CCS over a period of time. This Excel-based model, the underlying conceptualization of the relationship between the CCS and the surrounding environmental systems, key calculations, and results were most recently detailed in the Comprehensive Pre-Uprate Report (FPL 2012). That version of the model simulated water and salt flow to and from the CCS for the period between September

2010 and June 2012. Currently, the modeled period extends through May 2014 and encompasses a Post-Uprate period.

The conceptual model and associated calculations are predominantly unchanged since last presented in the Comprehensive Pre-Uprate Report. As such, only a brief summary of the model is provided below. In addition, model results and corresponding conclusions regarding the operation of the CCS, based on the current calibrated water and salt balance model, are provided herein. The Excel spreadsheet that comprises the model is provided in a separate data file.

5.3.1 Model Summary

As Figure 5.3-1 depicts, the water balance for the proposed control volume is comprised of seepage (lateral through the sides and vertical through the bottom), blowdown (additional water pumped from other units to the CCS), precipitation (including runoff from earth berms between canals), and evaporation. Aside from evaporation and precipitation, these are the same mechanisms by which salt flows into and out of the CCS. The means by which water and/or salt is transferred (e.g., seepage, evaporation) are calculated using various equations provided in the Comprehensive Pre-Uprate Report (FPL 2012). Calculations were performed for a 45-month period from September 2010 through May 2014. Average flows of water and salt into and out of the control volume were calculated for each day of this period using hydrologic, water quality, and meteorological data measured within, beneath, and adjacent to the CCS. The average daily flows were summed to estimate the amount of water and salt that enters or exits the control volume (i.e., the CCS) during each month and the entire 45-month period. These calculations demonstrate and validate the conceptual model of the CCS and, in so doing, illustrate the hydrologic mechanisms by which the CCS functions.

Calculated water flows are reported in 10^6 gallons per day (millions of gallons per day [MGD]). The mass flux into or out of the control volume is calculated by multiplying the volumetric flow by the salinity of the body of water from which the water is flowing. Salinity was monitored at all groundwater and surface water stations employed in the ensuing calculations and was reported in the practical salinity scale (PSS-78), which is equivalent to grams per liter (g/L). Calculated mass fluxes are reported in thousands of pounds per day (lb x 1000/day).

The gain/loss of water and salt mass within the control volume during some period of time results in a change in the control volume's water and salt mass storage. Increased water storage, for instance, occurs when more water enters the control volume than exits. Storage, then, can be estimated by summing all of the components of the water (and salt) balance. When the net flow is positive (into the control volume) during a specified period of time, the storage of control volume increases. Conversely, a net negative (out of the control volume) flow implies a decrease in storage during a specified time period.

Another manner in which a change in storage can be estimated relies on direct measurements of water elevations and salinities within the control volume. A change in water elevation within the control volume can be calculated as a difference between water elevations at the beginning and end of a specified time period. The product of this change in water elevations and the

surface area of the control volume provide an estimate of the change in the volume of water contained in the control volume during that period of time. Estimates of daily storage changes derived from this method are used to further calibrate the water and salt balance model to ensure an accurate simulation of temporal trends CCS water elevation and salinity.

5.3.2 Results and Discussion

The individual components of the water and salt balance were simulated daily and summed for each month from September 2010 through May 2014, as well as for the collective 45-month period. The individual components of flow are summed in order to calculate a simulated change in volume for each month and for the 45-month period. These simulated changes in storage were compared to observed changes in CCS water and salt storage for each month and the entire calibration period. Errors between the simulated and observed storage changes were minimized by adjusting key variables associated with the flow balance model; this process is called calibration. The calibration process ensures that the model can accurately reflect the average changes in CCS storage over the 45-month time frame, while also effectively capturing day-to-day changes in CCS water and mass storage. Calibration of the water and salt balance model was achieved by adjusting hydraulic conductivities of the aquifer materials adjacent to and beneath the CCS that factor into the calculation of seepage to/from groundwater and Biscayne Bay. Additional adjustable parameters include the coefficients in the wind function (FPL 2012), the amount of runoff that enters the control volume as percentage of precipitation, the amount of Unit 5 cooling tower water that is lost to evaporation before entering the CCS, and the salinity of the Unit 5 blowdown as a percentage of seawater. The calibrated model parameter values are provided in Table 5.3-1.

The horizontal hydraulic conductivities laterally adjacent to the control volume were calibrated to range between 500 ft/d and 950 ft/d. The calibrated vertical conductivities beneath the control volume ranged from 0.1 ft/day to 4 ft/d. The northern portion of the discharge canals and return canals, where it is assumed deeper canals intersect highly permeable material underlying the muck and Miami limestone, were calibrated to have higher vertical hydraulic conductivities (3.8 ft/d and 4 ft/d, respectively). Lower vertical conductivities were calibrated for the mid- and southern portions of the discharge canals, as well as the southern portion of the return canals (0.1 ft/d).

Results of the simulated 45-month water and salt balance model are provided in Tables 5.3-2 and 5.3-3, respectively. Monthly balance results follow in Table 5.3-4 through Table 5.3-5. The modeled net flow of water, as calculated by the summing the components of the water balance for the 45-month calibration period, is denoted as the "Modeled Change in CCS Storage" and was calculated to be an average inflow of 0.05 MGD over the 45-month calibration period. The observed change in storage, which is the difference in the volume of water in the CCS between the final and first days of the calibration period, divided by the number of days in the period, was observed to be 0.31 MGD (inflow). Though the model underestimated the net inflow of water from the CCS, the residual error between the simulated and observed flow is only 0.26 MGD. This error is small (0.26%) relative to the monthly net observed flows, which for the entire 45-month period range from a net outflow of 46.6 MGD (October 2010) and a net inflow of 52.1

MGD (September 2010). During the Post-Uprate period (June 2013 – May 2014), the monthly net observed flows range from a net outflow of 31.1 MGD (June 2013) to a net inflow of 19.6 MGD (July 2013). The model simulates a net outflow of 3.26 MGD of water from the CCS during the Post-Uprate period, which matches the observed net outflow of water during Post-Uprate (3.42 MGD) reasonably well. The net outflow of water during this timeframe is predominantly attributable to a relative lack of precipitation (which accounts for 30% of the simulated inflow during this timeframe) and relatively high evaporation (which accounts for 85% of the simulated outflow). During the simulated Pre-Uprate and Interim Operating period (September 2010 through May 2013), precipitation accounted for 39.4% of inflowing water to the CCS and evaporation accounted for 63.7% of the outflowing water from the CCS.

The model simulated a net influx of salt over the 45-month period at rate of 1,938 (lb x 1,000)/day. The corresponding observed rate of salt inflow was calculated by multiplying the average observed salinity in the CCS on the final and first day of the calibration period by the corresponding CCS volumes on those days. The difference between these two products, divided by the number of days in the calibration period, provides the net inflow of salt, 497 (lb x 1,000)/day. The error associated with the mass flux is an overestimation by approximately 697 (lb x 1,000)/day. As in the case of water balance simulation, the magnitude of this overestimation is small (3.1%) relative to the range in monthly average flows for the entire 45- month period; the monthly net mass fluxes range from an outflow of 13,790 (lb x 1,000)/day (October 2010) to an inflow of 8,659 (lb x 1,000)/day (June 2011). During the Post-Uprate period (June 2013 – May 2014), the monthly observed net salt mass fluxes range from a net outflow of 6,529 (lb x 1,000)/day (December 2013) to a net inflow of 5,847 (lb x 1,000)/day (April 2014). There was a net gain of salt within the CCS during the Post-Uprate period of 2,216 (lb x 1,000)/day. This gain in salt is likely to be attributable to two factors. First, the relative paucity in freshwater precipitation resulted in reduced CCS water levels. As such, groundwater and associated salt mass account for much of the inflow to the CCS during the Post-Uprate period. Second, the low water levels and relatively high evaporation (which removes freshwater from the CCS and leaves salt behind) resulted in seepage to groundwater being a relatively small component of the water and mass outflow from the CCS. Thus, CCS salt mass outflow was not a pronounced element of the salt balance during the Post-Uprate period and salt mass from evaporation was generally retained. As a result, the CCS gained salt between June 2013 and May 2014.

Figures 5.3-2 and 5.3-3 illustrate the model's ability to match the magnitude and direction of net monthly flows of water and salt, respectively. Figure 5.3-2 compares observed and modeled net monthly flows of water into and out of the CCS. There is a seasonal trend in observed flows to/from the CCS, where inflows are generally associated with the wet season and outflows are generally associated with the dry season. The model is able to replicate this trend reasonably well. However, there are isolated months where the model does not accurately simulate the net flow (e.g., April and September 2011). Figure 5.3-3 compares observed and modeled net monthly flows of salt into and out of the CCS. Like the modeled water flows, estimated salt mass fluxes generally match observed fluxes well, though there are individual months where the estimated mass flux is less accurate.

Implicit in the model's ability to simulate monthly net water and salt mass flows is the accurate simulation of daily flows to and from the CCS. Because the model is able to characterize the daily flows of water and salt, the model estimates the daily changes in CCS water and salt storage. As previously mentioned, these changes in storage are associated with daily changes in CCS water levels and salinity. Figure 5.3-4 shows the model-calculated water level in the CCS, which varies over the period of record. These modeled water levels range between approximately -1.5 ft NAVD 88 and 1 ft NAVD 88, and reflects an average water level throughout the entire CCS. Also shown in this figure are the observed CCS water levels over time; the observed values reflect the mean of daily-averaged water elevations across the seven sensors in the CCS. Simulated water elevations are calculated by dividing the simulated daily change in CCS storage by the average daily CCS surface area and adding the resulting value (which reflects a change in water level) to the previous day's simulated water elevation. It is evident from this figure that the model effectively captures the general trend in CCS water elevations over the 45-month period, and accurately simulates average CCS water elevations throughout much of the calibration period.

Similarly, changes in salt mass storage within the CCS can be used to calculate average CCS salinity changes over time. The simulated daily net flow of salt is divided by the simulated volume of water in the CCS, which results in a change in salinity. This change in salinity is added to the simulated salinity calculated for the previous day to produce a simulated salinity for the current day. Like the simulated CCS water level, the model salinity reflects a representative daily salinity throughout the CCS. Figure 5.3-5 compares the simulated salinities to those observed in the CCS over the period of record. Observed salinities are the mean of daily averaged salinities measured in the CCS monitoring stations. The modeled CCS salinity changes over time match changes in the average observed CCS salinity throughout the 45-month period of record. This timeframe includes the recent rise in salinity from approximately 60 g/L to approximately 90 g/L. That the model can match this notable increase in CCS salinity reinforces the conceptual model, which suggests that changes in CCS salinity are predicated solely on changes in the flow of water into and out of the CCS.

The accurate simulation of changing CCS inflows, outflows, water elevations and salinities is complex due to the different components of the balance model and their varying impacts upon CCS water and salt storage. For instance, vertical flows into and out of the control volume are generally larger than horizontal flows, and have a greater impact upon CCS water elevation. The salinity of inflowing water, however, can vary depending upon the source of the water. For example, horizontal flow from the west (L-31E) is non-saline and has a pronounced mitigating impact upon CCS salinities; vertical flow from groundwater beneath portions of the discharge canals is saline to hyper-saline and generally increases the salinity of the CCS. The correct balance of both water and salt mass flow is difficult to estimate in the model. In addition, the simulated timeframe encompasses both Pre- and Post-Uprate periods, during which CCS water temperatures slightly increase. The model addresses associated impacts to the CCS by explicitly simulating the effects of water/air temperature gradients on evaporation. Whereas myriad sources and sinks of water, varying salinities, and changes in water temperature do increase model complexity, the need to accurately simulate these different components of CCS operation constrains the number of possible solutions.

Though the model is able to simulate the complex dynamics associated with the CCS over a 45-month timeframe with reasonable accuracy, there are periods of time where the simulated flows of water and salt do not accurately reflect observed conditions. Consequently, the simulated water level and salinities in the CCS deviate from those that have been observed at various times in the simulation period. However, the overall performance of the model reinforces its utility as a tool for understanding how the CCS has and will operate under varying meteorological, hydrological, and operational conditions. This is best demonstrated by the fact that the same conceptual model employed to characterize changes in CCS storage of water and salt during the Pre-Uprate period is used to explain changes in storage during the Post-Uprate period. This is a period of time during which water levels have generally decreased, salinities have dramatically increased and water temperatures have risen within the CCS. Nevertheless, the exchanges of flows between the CCS and surrounding environment during Post-Uprate are governed by the same hydrologic principles as during the Pre-Uprate period. This robustness and accuracy in the model underpins FPL's firm understanding of processes that control the CCS and the manner in which the CCS interacts with the adjacent aquifer and water bodies. This accuracy in simulating the historical changes within the CCS bolsters confidence in the model's utility as a tool to evaluate the sensitivity of CCS operations to certain factors such as changes in operation, drought conditions, storm events, and other potential environmental stresses. Additionally, the model accuracy validates the fact that the most appropriate data are being collected to effectively capture CCS operations, identify interactions between the CCS and the surrounding environment, and support FPL's comprehension of historical and future operations of the CCS.

TABLES

Table 5.3-1. Calibration Parameters

Parameter Name	Calibrated Value	Units
Vertical Hydraulic Conductivity (Zone A)	3.8	ft/day
Vertical Hydraulic Conductivity (Zone B)	0.1	ft/day
Vertical Hydraulic Conductivity (Zone C)	0.1	ft/day
Vertical Hydraulic Conductivity (Zone D)	4	ft/day
West Face Hydraulic Conductivity	950	ft/day
East Face Hydraulic Conductivity	1000	ft/day
North Face Hydraulic Conductivity	500	ft/day
South Face Hydraulic Conductivity	500	ft/day
Evaporation Modifier (Factor Multiplier)	0.69	
Runoff Modifier (as % of Precipitation)	34%	
Blowdown Evaporation Factor	20%	
Blowdown Concentration (as % of Seawater)	0.4	

Table 5.3-2. Calculated Fluid Flows from Water Budget Components

September 2010 to May 2014			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.92	1256.71
	E. Seepage	15.37	21044.68
	N. Seepage	0.01	13.96
	S. Seepage	2.39	3274.42
	Bottom Seepage	11.47	15708.95
	Precipitation and Runoff	20.44	27984.72
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.47	648.79
	Unit 5 Blowdown	0.92	1256.99
	ID Pumping	3.31	4529.48
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**55.31**	**75718.69**
Out of CCS	W. Seepage	0.00	-3.91
	E. Seepage	-4.12	-5642.91
	N. Seepage	-0.01	-8.68
	S. Seepage	-0.12	-162.98
	Bottom Seepage	-12.48	-17091.43
	Precipitation and Runoff	0.00	0.00
	Evaporation	-38.53	-52744.39
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-55.26**	**-75654.30**
Modeled Change in CCS Storage:		**0.05**	**64.39**
Observed Change		**0.31**	**417.57**

Key:
CCS = Cooling Canal System.
gal = Gallon.
ID = Interceptor Ditch.
MGD = Million gallons per day.

Table 5.3-3. Calculated Mass Flows from Salt Budget Components

September 2010 to May 2014			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	6.55	8965.03
	E. Seepage	4324.59	5920366.26
	N. Seepage	2.30	3150.21
	S. Seepage	466.15	638163.40
	Bottom Seepage	3350.12	4586312.27
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	107.28	146861.12
	ID Pumped Water	363.67	497869.29
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**8620.66**	**11801687.58**
Out of CCS	W. Seepage	-42.58	-58287.90
	E. Seepage	-1632.46	-2234836.51
	N. Seepage	-3.05	-4179.04
	S. Seepage	-63.49	-86913.97
	Bottom Seepage	-5685.41	-7783332.80
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-7426.99**	**-10167550.22**
Modeled Change in CCS Storage:		**1193.67**	**1634137.36**
Observed Change		**497.04**	**680445.13**

Key:
CCS = Cooling Canal System.
ID = Interceptor Ditch.
lb = Pound(s).

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

September 2010			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.73	21.80
	E. Seepage	10.82	324.68
	N. Seepage	0.02	0.45
	S. Seepage	2.54	76.13
	Bottom Seepage	8.29	248.59
	Precipitation and Runoff	78.65	2359.64
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.29	8.64
	Unit 5 Blowdown	0.98	29.36
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**102.31**	**3069.29**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-6.06	-181.83
	N. Seepage	0.00	-0.08
	S. Seepage	0.00	0.00
	Bottom Seepage	-7.18	-215.33
	Precipitation and Runoff	0.00	0.00
	Evaporation	-38.11	-1143.43
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-51.36**	**-1540.66**
Modeled Change in CCS Storage:		**50.95**	**1528.63**
Observed Change		**52.14**	**1564.08**

Key:
CCS = Cooling Canal System.
gal = Gallon.
ID = Interceptor Ditch.
MGD = Million gallons per day.

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

October 2010			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.25	7.86
	E. Seepage	0.74	22.98
	N. Seepage	0.00	0.15
	S. Seepage	2.04	63.20
	Bottom Seepage	6.04	187.28
	Precipitation and Runoff	13.60	421.63
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.29	8.93
	Blowdown	0.75	23.11
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**23.71**	**735.14**
Out of CCS	W. Seepage	-0.01	-0.33
	E. Seepage	-24.43	-757.44
	N. Seepage	-0.01	-0.19
	S. Seepage	-0.04	-1.13
	Bottom Seepage	-23.74	-735.81
	Precipitation and Runoff	0.00	0.00
	Evaporation	-29.88	-926.14
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-78.10**	**-2421.04**
Modeled Change in CCS Storage:		**-54.38**	**-1685.91**
Observed Change		**-46.60**	**-1444.52**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

November 2010			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.30	9.12
	E. Seepage	4.85	145.62
	N. Seepage	0.00	0.14
	S. Seepage	1.77	53.17
	Bottom Seepage	1.67	50.15
	Precipitation and Runoff	26.93	807.85
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.29	8.64
	Blowdown	0.50	14.98
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**36.32**	**1089.69**
Out of CCS	W. Seepage	-0.07	-1.99
	E. Seepage	-7.91	-237.30
	N. Seepage	0.00	-0.11
	S. Seepage	-0.02	-0.66
	Bottom Seepage	-14.98	-449.29
	Precipitation and Runoff	0.00	0.00
	Evaporation	-29.16	-874.94
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-52.14**	**-1564.29**
Modeled Change in CCS Storage:		**-15.82**	**-474.60**
Observed Change		**-5.02**	**-150.50**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

December 2010			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.85	26.31
	E. Seepage	18.20	564.28
	N. Seepage	0.00	0.00
	S. Seepage	1.60	49.75
	Bottom Seepage	2.36	73.31
	Precipitation and Runoff	3.79	117.56
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.29	8.93
	Blowdown	0.72	22.33
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**27.82**	**862.46**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-0.49	-15.24
	N. Seepage	-0.01	-0.41
	S. Seepage	0.00	-0.13
	Bottom Seepage	-15.08	-467.61
	Precipitation and Runoff	0.00	0.00
	Evaporation	-27.76	-860.43
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-43.35**	**-1343.82**
Modeled Change in CCS Storage:		**-15.53**	**-481.36**
Observed Change		**-12.72**	**-394.29**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

January 2011			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.76	54.46
	E. Seepage	9.94	308.08
	N. Seepage	0.00	0.00
	S. Seepage	1.38	42.83
	Bottom Seepage	2.80	86.95
	Precipitation and Runoff	19.42	602.16
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.29	8.93
	Blowdown	0.82	25.40
	ID Pumping	4.91	152.24
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**41.32**	**1281.04**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-4.19	-129.74
	N. Seepage	-0.01	-0.45
	S. Seepage	0.00	0.00
	Bottom Seepage	-18.38	-569.72
	Precipitation and Runoff	0.00	0.00
	Evaporation	-26.80	-830.84
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-49.38**	**-1530.75**
Modeled Change in CCS Storage:		**-8.06**	**-249.71**
Observed Change		**-2.54**	**-78.88**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

February 2011			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.26	35.15
	E. Seepage	25.22	706.19
	N. Seepage	0.00	0.00
	S. Seepage	2.80	78.37
	Bottom Seepage	10.00	279.99
	Precipitation and Runoff	0.70	19.51
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.29	8.06
	Blowdown	0.70	19.46
	ID Pumping	2.25	63.03
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**43.21**	**1209.76**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-0.38	-10.77
	N. Seepage	-0.02	-0.56
	S. Seepage	0.00	0.00
	Bottom Seepage	-19.59	-548.63
	Precipitation and Runoff	0.00	0.00
	Evaporation	-32.26	-903.41
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-52.26**	**-1463.38**
Modeled Change in CCS Storage:		**-9.06**	**-253.62**
Observed Change		**-14.26**	**-399.40**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

March 2011			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.41	43.73
	E. Seepage	20.83	645.80
	N. Seepage	0.00	0.08
	S. Seepage	3.06	94.99
	Bottom Seepage	11.11	344.53
	Precipitation and Runoff	7.12	220.82
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.29	8.93
	Blowdown	0.66	20.55
	ID Pumping	9.37	290.40
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**53.87**	**1669.85**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-0.31	-9.51
	N. Seepage	0.00	-0.14
	S. Seepage	0.00	0.00
	Bottom Seepage	-17.95	-556.34
	Precipitation and Runoff	0.00	0.00
	Evaporation	-33.91	-1051.21
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-52.17**	**-1617.21**
Modeled Change in CCS Storage:		**1.70**	**52.64**
Observed Change		**3.19**	**99.02**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

April 2011			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.11	33.40
	E. Seepage	29.39	881.74
	N. Seepage	0.00	0.13
	S. Seepage	3.75	112.65
	Bottom Seepage	16.92	507.68
	Precipitation and Runoff	10.36	310.85
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.29	8.64
	Blowdown	1.13	33.95
	ID Pumping	7.46	223.80
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**70.43**	**2112.84**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	0.00	0.00
	N. Seepage	0.00	-0.06
	S. Seepage	0.00	0.00
	Bottom Seepage	-18.57	-557.09
	Precipitation and Runoff	0.00	0.00
	Evaporation	-35.31	-1059.27
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-53.88**	**-1616.42**
Modeled Change in CCS Storage:		**16.55**	**496.41**
Observed Change		**-7.85**	**-235.45**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

May 2011			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.44	44.50
	E. Seepage	47.76	1480.44
	N. Seepage	0.00	0.00
	S. Seepage	4.38	135.75
	Bottom Seepage	28.64	887.78
	Precipitation and Runoff	6.92	214.50
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.29	8.93
	Blowdown	1.16	35.93
	ID Pumping	14.81	459.13
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**105.39**	**3266.96**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	0.00	0.00
	N. Seepage	-0.04	-1.19
	S. Seepage	0.00	0.00
	Bottom Seepage	-51.71	-1603.15
	Precipitation and Runoff	0.00	0.00
	Evaporation	-42.03	-1302.87
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-93.78**	**-2907.21**
Modeled Change in CCS Storage:		**11.60**	**359.75**
Observed Change		**11.51**	**356.77**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

June 2011			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.59	47.67
	E. Seepage	38.31	1149.35
	N. Seepage	0.00	0.00
	S. Seepage	4.26	127.95
	Bottom Seepage	28.84	865.18
	Precipitation and Runoff	8.02	240.68
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.53	15.99
	Blowdown	1.02	30.60
	ID Pumping	16.13	483.83
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**98.71**	**2961.25**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-0.01	-0.27
	N. Seepage	-0.03	-1.02
	S. Seepage	0.00	0.00
	Bottom Seepage	-43.32	-1299.71
	Precipitation and Runoff	0.00	0.00
	Evaporation	-46.24	-1387.09
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-89.60**	**-2688.10**
Modeled Change in CCS Storage:		**9.11**	**273.16**
Observed Change		**10.30**	**309.07**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

July 2011			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.95	60.52
	E. Seepage	4.81	149.10
	N. Seepage	0.00	0.00
	S. Seepage	1.56	48.21
	Bottom Seepage	5.91	183.20
	Precipitation and Runoff	45.19	1400.79
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.54	16.59
	Blowdown	1.13	35.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**61.08**	**1893.42**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-12.01	-372.46
	N. Seepage	-0.01	-0.43
	S. Seepage	-0.05	-1.58
	Bottom Seepage	-14.48	-449.03
	Precipitation and Runoff	0.00	0.00
	Evaporation	-46.43	-1439.30
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-72.99**	**-2262.80**
Modeled Change in CCS Storage:		**-11.92**	**-369.38**
Observed Change		**9.24**	**286.59**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

August 2011			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.16	36.08
	E. Seepage	14.19	439.99
	N. Seepage	0.00	0.13
	S. Seepage	2.56	79.39
	Bottom Seepage	7.27	225.36
	Precipitation and Runoff	37.76	1170.55
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.53	16.36
	Blowdown	1.04	32.25
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**64.52**	**2000.11**
Out of CCS	W. Seepage	0.00	-0.05
	E. Seepage	-2.37	-73.46
	N. Seepage	0.00	-0.03
	S. Seepage	0.00	0.00
	Bottom Seepage	-3.97	-123.00
	Precipitation and Runoff	0.00	0.00
	Evaporation	-44.75	-1387.17
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-51.09**	**-1583.72**
Modeled Change in CCS Storage:		**13.43**	**416.39**
Observed Change		**20.17**	**625.23**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

September 2011			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.83	24.75
	E. Seepage	10.10	302.92
	N. Seepage	0.00	0.02
	S. Seepage	2.10	62.99
	Bottom Seepage	3.65	109.50
	Precipitation and Runoff	37.53	1125.82
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.55	16.55
	Blowdown	0.98	29.36
	ID Pumping	5.74	172.08
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**61.47**	**1843.99**
Out of CCS	W. Seepage	-0.02	-0.70
	E. Seepage	-2.05	-61.38
	N. Seepage	-0.01	-0.21
	S. Seepage	0.00	0.00
	Bottom Seepage	-8.12	-243.67
	Precipitation and Runoff	0.00	0.00
	Evaporation	-44.87	-1346.23
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-55.07**	**-1652.19**
Modeled Change in CCS Storage:		**6.39**	**191.81**
Observed Change		**-5.14**	**-154.17**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

October 2011			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.75	23.15
	E. Seepage	6.22	192.95
	N. Seepage	0.00	0.11
	S. Seepage	2.48	76.86
	Bottom Seepage	6.96	215.70
	Precipitation and Runoff	52.98	1642.32
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.52	16.21
	Blowdown	0.75	23.11
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**70.66**	**2190.41**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-9.88	-306.26
	N. Seepage	-0.01	-0.24
	S. Seepage	0.00	0.00
	Bottom Seepage	-12.38	-383.88
	Precipitation and Runoff	0.00	0.00
	Evaporation	-32.60	-1010.53
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-54.87**	**-1700.91**
Modeled Change in CCS Storage:		**15.79**	**489.50**
Observed Change		**8.79**	**272.51**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

November 2011			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.47	14.01
	E. Seepage	14.55	436.40
	N. Seepage	0.01	0.22
	S. Seepage	2.26	67.69
	Bottom Seepage	6.76	202.89
	Precipitation and Runoff	1.24	37.18
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.47	14.14
	Blowdown	0.50	14.98
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**26.25**	**787.53**
Out of CCS	W. Seepage	0.00	-0.01
	E. Seepage	-1.08	-32.32
	N. Seepage	0.00	-0.07
	S. Seepage	0.00	0.00
	Bottom Seepage	-4.06	-121.76
	Precipitation and Runoff	0.00	0.00
	Evaporation	-34.24	-1027.32
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-39.38**	**-393.94**
Modeled Change in CCS Storage:		**-13.13**	**393.58**
Observed Change		**-25.56**	**-766.91**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

December 2011			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.03	31.82
	E. Seepage	21.14	655.36
	N. Seepage	0.01	0.16
	S. Seepage	2.52	78.16
	Bottom Seepage	7.44	230.79
	Precipitation and Runoff	1.77	55.02
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.61	18.76
	Blowdown	0.72	22.33
	ID Pumping	9.14	283.37
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**44.38**	**1375.75**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-0.22	-6.77
	N. Seepage	0.00	-0.13
	S. Seepage	0.00	0.00
	Bottom Seepage	-13.23	-410.20
	Precipitation and Runoff	0.00	0.00
	Evaporation	-30.89	-957.49
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-44.34**	**-1374.58**
Modeled Change in CCS Storage:		**0.04**	**1.16**
Observed Change		**-11.66**	**-361.51**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

January 2012			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.66	51.39
	E. Seepage	25.43	788.46
	N. Seepage	0.00	0.02
	S. Seepage	2.79	86.45
	Bottom Seepage	10.43	323.45
	Precipitation and Runoff	2.83	87.58
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.59	18.37
	Blowdown	0.89	27.50
	ID Pumping	15.39	476.96
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**60.01**	**1860.18**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-0.03	-0.97
	N. Seepage	-0.02	-0.54
	S. Seepage	0.00	0.00
	Bottom Seepage	-29.36	-910.08
	Precipitation and Runoff	0.00	0.00
	Evaporation	-32.79	-1016.63
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-62.20**	**-1928.22**
Modeled Change in CCS Storage:		**-2.19**	**-68.04**
Observed Change		**-9.98**	**-309.33**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

February 2012			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.24	36.07
	E. Seepage	12.17	353.03
	N. Seepage	0.01	0.23
	S. Seepage	2.04	59.02
	Bottom Seepage	6.98	202.37
	Precipitation and Runoff	35.50	1029.63
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.52	15.17
	Blowdown	0.78	22.68
	ID Pumping	1.50	43.56
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**60.75**	**1761.77**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-1.65	-47.80
	N. Seepage	0.00	-0.03
	S. Seepage	0.00	0.00
	Bottom Seepage	-9.41	-272.99
	Precipitation and Runoff	0.00	0.00
	Evaporation	-31.84	-923.30
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-42.90**	**-1244.12**
Modeled Change in CCS Storage:		**17.85**	**517.65**
Observed Change		**12.36**	**358.44**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

March 2012			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.91	28.18
	E. Seepage	18.19	563.76
	N. Seepage	0.02	0.67
	S. Seepage	2.86	88.75
	Bottom Seepage	12.57	389.53
	Precipitation and Runoff	2.42	74.90
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.35	10.99
	Blowdown	0.99	30.56
	ID Pumping	4.10	126.99
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**42.40**	**1314.32**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-0.54	-16.60
	N. Seepage	0.00	-0.01
	S. Seepage	0.00	0.00
	Bottom Seepage	-7.89	-244.56
	Precipitation and Runoff	0.00	0.00
	Evaporation	-33.18	-1028.59
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-41.61**	**-1289.77**
Modeled Change in CCS Storage:		**0.79**	**24.56**
Observed Change		**-11.24**	**-348.30**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

April 2012			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.45	43.59
	E. Seepage	17.94	538.28
	N. Seepage	0.01	0.25
	S. Seepage	2.80	84.04
	Bottom Seepage	14.20	426.09
	Precipitation and Runoff	50.85	1525.64
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.39	11.73
	Blowdown	0.98	29.41
	ID Pumping	9.76	292.86
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**98.40**	**2951.89**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-0.28	-8.41
	N. Seepage	0.00	-0.05
	S. Seepage	0.00	0.00
	Bottom Seepage	-13.20	-395.99
	Precipitation and Runoff	0.00	0.00
	Evaporation	-35.04	-1051.09
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-48.52**	**-1455.54**
Modeled Change in CCS Storage:		**49.88**	**1496.35**
Observed Change		**33.69**	**1010.73**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

May 2012			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.23	38.01
	E. Seepage	0.55	17.06
	N. Seepage	0.02	0.74
	S. Seepage	0.93	28.94
	Bottom Seepage	11.40	353.36
	Precipitation and Runoff	41.18	1276.57
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.41	12.61
	Blowdown	0.97	30.04
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**56.69**	**1757.33**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-14.73	-456.50
	N. Seepage	0.00	-0.02
	S. Seepage	0.00	-0.04
	Bottom Seepage	-12.23	-379.01
	Precipitation and Runoff	0.00	0.00
	Evaporation	-33.39	-1035.06
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-60.34**	**-1870.64**
Modeled Change in CCS Storage:		**-3.66**	**-113.31**
Observed Change		**-2.89**	**-89.62**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

June 2012			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.66	19.79
	E. Seepage	3.72	111.63
	N. Seepage	0.02	0.48
	S. Seepage	1.65	49.57
	Bottom Seepage	7.95	238.37
	Precipitation and Runoff	30.82	924.74
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.29	8.66
	Blowdown	1.03	30.98
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**46.14**	**1384.22**
Out of CCS	W. Seepage	0.00	-0.06
	E. Seepage	-10.75	-322.64
	N. Seepage	0.00	-0.02
	S. Seepage	0.00	0.00
	Bottom Seepage	-13.23	-397.04
	Precipitation and Runoff	0.00	0.00
	Evaporation	-33.57	-1007.10
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-57.56**	**-1726.87**
Modeled Change in CCS Storage:		**-11.42**	**-342.65**
Observed Change		**-3.50**	**-105.04**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

July 2012			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.06	32.85
	E. Seepage	0.02	0.63
	N. Seepage	0.02	0.73
	S. Seepage	1.05	32.46
	Bottom Seepage	14.22	440.68
	Precipitation and Runoff	29.66	919.46
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.34	10.51
	Blowdown	1.07	33.07
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**47.43**	**1470.39**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-12.89	-399.63
	N. Seepage	0.00	0.00
	S. Seepage	-0.05	-1.46
	Bottom Seepage	-13.30	-412.33
	Precipitation and Runoff	0.00	0.00
	Evaporation	-39.84	-1235.10
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-66.08**	**-2048.51**
Modeled Change in CCS Storage:		**-18.65**	**-578.12**
Observed Change		**-7.97**	**-247.19**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

August 2012			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.09	33.71
	E. Seepage	6.43	199.31
	N. Seepage	0.02	0.64
	S. Seepage	1.86	57.76
	Bottom Seepage	12.81	396.99
	Precipitation and Runoff	40.10	1243.25
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.27	8.51
	Blowdown	1.10	34.11
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**63.69**	**1974.28**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-6.81	-211.21
	N. Seepage	0.00	0.00
	S. Seepage	-0.02	-0.67
	Bottom Seepage	-8.84	-273.91
	Precipitation and Runoff	0.00	0.00
	Evaporation	-39.04	-1210.28
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-54.71**	**-1696.07**
Modeled Change in CCS Storage:		**8.97**	**278.21**
Observed Change		**21.72**	**673.22**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

September 2012			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.74	22.06
	E. Seepage	2.79	83.61
	N. Seepage	0.01	0.37
	S. Seepage	1.69	50.83
	Bottom Seepage	7.98	239.35
	Precipitation and Runoff	30.04	901.31
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.73	22.00
	Blowdown	0.96	28.93
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**44.95**	**1348.46**
Out of CCS	W. Seepage	-0.01	-0.20
	E. Seepage	-11.11	-333.35
	N. Seepage	0.00	0.00
	S. Seepage	-0.03	-0.77
	Bottom Seepage	-15.01	-450.33
	Precipitation and Runoff	0.00	0.00
	Evaporation	-38.60	-1157.98
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-64.75**	**-1942.63**
Modeled Change in CCS Storage:		**-19.81**	**-594.17**
Observed Change		**-5.35**	**-160.61**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

October 2012			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.31	9.61
	E. Seepage	21.31	660.75
	N. Seepage	0.02	0.63
	S. Seepage	2.62	81.26
	Bottom Seepage	15.41	477.83
	Precipitation and Runoff	14.29	442.88
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.89	27.69
	Blowdown	0.94	29.23
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**55.80**	**1729.88**
Out of CCS	W. Seepage	-0.02	-0.55
	E. Seepage	-4.96	-153.62
	N. Seepage	0.00	-0.06
	S. Seepage	-0.01	-0.40
	Bottom Seepage	-7.18	-222.59
	Precipitation and Runoff	0.00	0.00
	Evaporation	-38.34	-1188.48
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-50.51**	**-1565.69**
Modeled Change in CCS Storage:		**5.30**	**164.19**
Observed Change		**7.58**	**235.01**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

November 2012			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.43	12.93
	E. Seepage	8.63	259.02
	N. Seepage	0.02	0.71
	S. Seepage	2.20	66.04
	Bottom Seepage	14.44	433.31
	Precipitation and Runoff	1.73	51.85
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.79	23.74
	Blowdown	0.66	19.70
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**28.91**	**867.29**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-2.76	-82.85
	N. Seepage	0.00	0.00
	S. Seepage	0.00	0.00
	Bottom Seepage	-3.44	-103.32
	Precipitation and Runoff	0.00	0.00
	Evaporation	-28.02	-840.52
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-34.22**	**-1026.70**
Modeled Change in CCS Storage:		**-5.31**	**-159.41**
Observed Change		**-3.88**	**-116.28**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

December 2012			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.84	26.02
	E. Seepage	0.48	14.75
	N. Seepage	0.02	0.57
	S. Seepage	1.07	33.05
	Bottom Seepage	8.05	249.53
	Precipitation and Runoff	1.87	57.85
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.50	15.62
	Blowdown	0.75	23.17
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**13.57**	**420.55**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-8.92	-276.63
	N. Seepage	0.00	0.00
	S. Seepage	0.00	-0.01
	Bottom Seepage	-7.14	-221.42
	Precipitation and Runoff	0.00	0.00
	Evaporation	-22.81	-707.02
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-38.87**	**-1205.08**
Modeled Change in CCS Storage:		**-25.31**	**-784.53**
Observed Change		**-28.66**	**-888.55**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

January 2013			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.95	29.50
	E. Seepage	7.94	246.29
	N. Seepage	0.02	0.57
	S. Seepage	2.38	73.65
	Bottom Seepage	9.83	304.76
	Precipitation and Runoff	1.06	32.80
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.52	16.25
	Blowdown	0.87	26.94
	ID Pumping	2.40	74.25
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**25.97**	**805.01**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-2.66	-82.60
	N. Seepage	0.00	0.00
	S. Seepage	0.00	0.00
	Bottom Seepage	-2.09	-64.77
	Precipitation and Runoff	0.00	0.00
	Evaporation	-23.85	-739.42
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-28.61**	**-886.79**
Modeled Change in CCS Storage:		**-2.64**	**-81.78**
Observed Change		**-10.70**	**-331.69**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

February 2013			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.07	30.08
	E. Seepage	10.79	302.00
	N. Seepage	0.01	0.35
	S. Seepage	2.55	71.41
	Bottom Seepage	9.59	268.52
	Precipitation and Runoff	5.45	152.71
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.34	9.50
	Blowdown	0.82	22.83
	ID Pumping	8.45	236.52
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**39.07**	**1093.92**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-3.25	-91.04
	N. Seepage	0.00	-0.01
	S. Seepage	0.00	0.00
	Bottom Seepage	-7.21	-201.87
	Precipitation and Runoff	0.00	0.00
	Evaporation	-22.90	-641.16
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-33.36**	**-934.09**
Modeled Change in CCS Storage:		**5.71**	**159.83**
Observed Change		**1.10**	**30.86**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

March 2013			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.88	27.34
	E. Seepage	21.89	678.71
	N. Seepage	0.01	0.18
	S. Seepage	3.17	98.25
	Bottom Seepage	16.08	498.39
	Precipitation and Runoff	5.20	161.33
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.52	16.05
	Blowdown	0.96	29.83
	ID Pumping	7.41	229.77
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**56.12**	**1739.86**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	0.00	0.00
	N. Seepage	0.00	-0.13
	S. Seepage	0.00	0.00
	Bottom Seepage	-11.23	-348.23
	Precipitation and Runoff	0.00	0.00
	Evaporation	-27.15	-841.74
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-38.39**	**-1190.10**
Modeled Change in CCS Storage:		**17.73**	**549.76**
Observed Change		**3.84**	**119.01**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

April 2013			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.09	32.79
	E. Seepage	25.76	772.76
	N. Seepage	0.00	0.00
	S. Seepage	2.60	78.12
	Bottom Seepage	10.33	309.85
	Precipitation and Runoff	23.05	691.63
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.71	21.24
	Blowdown	0.96	28.69
	ID Pumping	9.24	277.20
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**73.74**	**2212.27**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-0.14	-4.26
	N. Seepage	-0.02	-0.66
	S. Seepage	0.00	0.00
	Bottom Seepage	-25.36	-760.88
	Precipitation and Runoff	0.00	0.00
	Evaporation	-37.37	-1121.21
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-62.90**	**-1887.02**
Modeled Change in CCS Storage:		**10.84**	**325.25**
Observed Change		**12.76**	**382.66**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

May 2013			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.02	31.48
	E. Seepage	14.39	446.22
	N. Seepage	0.00	0.00
	S. Seepage	1.87	57.86
	Bottom Seepage	4.02	124.74
	Precipitation and Runoff	49.66	1539.39
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.93	28.68
	Blowdown	1.08	33.35
	ID Pumping	6.15	190.71
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**79.11**	**2452.43**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-1.90	-59.04
	N. Seepage	-0.01	-0.41
	S. Seepage	-0.02	-0.69
	Bottom Seepage	-16.77	-519.88
	Precipitation and Runoff	0.00	0.00
	Evaporation	-42.31	-1311.46
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-61.02**	**-1891.48**
Modeled Change in CCS Storage:		**18.10**	**560.95**
Observed Change		**22.68**	**703.18**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

June 2013			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	1.07	32.22
	E. Seepage	7.03	210.99
	N. Seepage	0.00	0.00
	S. Seepage	1.06	31.66
	Bottom Seepage	2.24	67.19
	Precipitation and Runoff	18.55	556.60
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.56	16.94
	Blowdown	0.99	29.80
	ID Pumping	0.68	20.52
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**32.20**	**965.92**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-15.80	-474.03
	N. Seepage	-0.02	-0.66
	S. Seepage	-0.63	-18.87
	Bottom Seepage	-23.48	-704.44
	Precipitation and Runoff	0.00	0.00
	Evaporation	-45.17	-1355.04
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-85.10**	**-2553.03**
Modeled Change in CCS Storage:		**-52.90**	**-1587.12**
Observed Change		**-31.07**	**-931.98**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

July 2013			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.92	28.55
	E. Seepage	15.42	478.03
	N. Seepage	0.00	0.02
	S. Seepage	2.04	63.12
	Bottom Seepage	7.38	228.73
	Precipitation and Runoff	48.46	1502.27
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.55	16.95
	Blowdown	1.02	31.72
	ID Pumping	0.70	21.78
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**76.49**	**2371.18**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-3.03	-94.08
	N. Seepage	-0.01	-0.33
	S. Seepage	0.00	0.00
	Bottom Seepage	-10.00	-310.06
	Precipitation and Runoff	0.00	0.00
	Evaporation	-51.16	-1585.93
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-64.21**	**-1990.40**
Modeled Change in CCS Storage:		**12.28**	**380.77**
Observed Change		**19.61**	**607.86**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

August 2013			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.78	24.32
	E. Seepage	22.08	684.41
	N. Seepage	0.01	0.16
	S. Seepage	2.50	77.35
	Bottom Seepage	8.36	259.08
	Precipitation and Runoff	32.70	1013.62
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.70	21.73
	Blowdown	1.28	39.82
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**68.40**	**2120.49**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-3.02	-93.58
	N. Seepage	-0.01	-0.29
	S. Seepage	-0.03	-0.78
	Bottom Seepage	-7.51	-232.82
	Precipitation and Runoff	0.00	0.00
	Evaporation	-73.27	-2271.47
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-83.84**	**-2598.94**
Modeled Change in CCS Storage:		**-15.43**	**-478.45**
Observed Change		**-6.11**	**-189.45**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

September 2013			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.27	7.98
	E. Seepage	16.35	490.64
	N. Seepage	0.01	0.43
	S. Seepage	1.85	55.50
	Bottom Seepage	12.61	378.33
	Precipitation and Runoff	21.01	630.35
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.36	10.89
	Blowdown	0.73	21.80
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**53.20**	**1595.93**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-0.28	-8.28
	N. Seepage	0.00	0.00
	S. Seepage	0.00	0.00
	Bottom Seepage	-0.63	-19.03
	Precipitation and Runoff	0.00	0.00
	Evaporation	-34.46	-1033.67
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-35.37**	**-1060.98**
Modeled Change in CCS Storage:		**17.83**	**534.95**
Observed Change		**10.23**	**307.04**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

October 2013			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.32	10.00
	E. Seepage	20.94	649.25
	N. Seepage	0.03	1.02
	S. Seepage	3.47	107.62
	Bottom Seepage	27.04	838.34
	Precipitation and Runoff	7.44	230.56
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.55	16.96
	Blowdown	1.13	34.94
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**60.93**	**1888.70**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-0.70	-21.55
	N. Seepage	0.00	0.00
	S. Seepage	0.00	0.00
	Bottom Seepage	-0.25	-7.81
	Precipitation and Runoff	0.00	0.00
	Evaporation	-53.02	-1643.73
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-53.97**	**-1673.08**
Modeled Change in CCS Storage:		**6.96**	**215.62**
Observed Change		**-5.40**	**-167.52**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

November 2013			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.30	8.93
	E. Seepage	17.55	526.60
	N. Seepage	0.03	0.82
	S. Seepage	3.34	100.05
	Bottom Seepage	22.26	667.85
	Precipitation and Runoff	32.66	979.94
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.49	14.56
	Blowdown	0.90	26.92
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**77.52**	**2325.68**
Out of CCS	W. Seepage	0.00	-0.03
	E. Seepage	-0.97	-29.03
	N. Seepage	0.00	0.00
	S. Seepage	-0.52	-15.71
	Bottom Seepage	-1.31	-39.43
	Precipitation and Runoff	0.00	0.00
	Evaporation	-42.96	-1288.94
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-45.77**	**-1373.13**
Modeled Change in CCS Storage:		**31.75**	**952.55**
Observed Change		**13.98**	**419.29**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

December 2013			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.38	11.64
	E. Seepage	5.56	172.29
	N. Seepage	0.01	0.21
	S. Seepage	0.00	0.00
	Bottom Seepage	4.28	132.60
	Precipitation and Runoff	4.49	139.14
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.50	15.50
	Blowdown	0.90	27.77
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**16.10**	**499.14**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-4.05	-125.64
	N. Seepage	0.00	-0.03
	S. Seepage	-3.28	-101.80
	Bottom Seepage	-6.13	-190.01
	Precipitation and Runoff	0.00	0.00
	Evaporation	-40.62	-1259.22
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-54.09**	**-1676.69**
Modeled Change in CCS Storage:		**-37.99**	**-1177.56**
Observed Change		**-21.47**	**-665.45**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

January 2014			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.66	20.51
	E. Seepage	11.24	348.43
	N. Seepage	0.02	0.48
	S. Seepage	1.55	48.07
	Bottom Seepage	9.95	308.55
	Precipitation and Runoff	8.57	265.64
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.47	14.68
	Blowdown	0.84	25.90
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**33.30**	**1032.26**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-1.39	-43.04
	N. Seepage	0.00	0.00
	S. Seepage	-0.59	-18.28
	Bottom Seepage	-2.37	-73.59
	Precipitation and Runoff	0.00	0.00
	Evaporation	-37.88	-1174.16
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-42.23**	**-1309.07**
Modeled Change in CCS Storage:		**-8.93**	**-276.81**
Observed Change		**-6.40**	**-198.28**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

January 2014			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.66	20.51
	E. Seepage	11.24	348.43
	N. Seepage	0.02	0.48
	S. Seepage	1.55	48.07
	Bottom Seepage	9.95	308.55
	Precipitation and Runoff	8.57	265.64
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.47	14.68
	Blowdown	0.84	25.90
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**33.30**	**1032.26**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-1.39	-43.04
	N. Seepage	0.00	0.00
	S. Seepage	-0.59	-18.28
	Bottom Seepage	-2.37	-73.59
	Precipitation and Runoff	0.00	0.00
	Evaporation	-37.88	-1174.16
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-42.23**	**-1309.07**
Modeled Change in CCS Storage:		**-8.93**	**-276.81**
Observed Change		**-6.40**	**-198.28**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

February 2014			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.79	22.17
	E. Seepage	15.37	430.48
	N. Seepage	0.02	0.57
	S. Seepage	3.49	97.74
	Bottom Seepage	14.67	410.76
	Precipitation and Runoff	10.41	291.45
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.48	13.58
	Blowdown	0.81	22.76
	ID Pumping	1.35	37.89
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**47.41**	**1327.40**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-0.41	-11.39
	N. Seepage	0.00	0.00
	S. Seepage	0.00	0.00
	Bottom Seepage	-0.94	-26.25
	Precipitation and Runoff	0.00	0.00
	Evaporation	-51.37	-1438.25
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-52.71**	**-1475.89**
Modeled Change in CCS Storage:		**-5.30**	**-148.49**
Observed Change		**-7.95**	**-222.68**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

March 2014			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.79	24.35
	E. Seepage	16.02	496.70
	N. Seepage	0.02	0.71
	S. Seepage	3.19	98.98
	Bottom Seepage	14.92	462.52
	Precipitation and Runoff	6.87	212.90
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.39	12.07
	Blowdown	1.01	31.25
	ID Pumping	1.93	59.76
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**45.14**	**1399.24**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-0.01	-0.37
	N. Seepage	0.00	0.00
	S. Seepage	0.00	0.00
	Bottom Seepage	-1.40	-43.38
	Precipitation and Runoff	0.00	0.00
	Evaporation	-49.14	-1523.26
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-50.55**	**-1567.01**
Modeled Change in CCS Storage:		**-5.41**	**-167.78**
Observed Change		**-7.86**	**-243.70**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

April 2014			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.75	22.64
	E. Seepage	27.81	834.36
	N. Seepage	0.02	0.67
	S. Seepage	3.92	117.48
	Bottom Seepage	22.82	684.73
	Precipitation and Runoff	2.40	71.92
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.33	10.01
	Blowdown	1.21	36.35
	ID Pumping	3.19	95.76
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**62.46**	**1873.92**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	0.00	0.00
	N. Seepage	0.00	0.00
	S. Seepage	0.00	0.00
	Bottom Seepage	-5.24	-157.10
	Precipitation and Runoff	0.00	0.00
	Evaporation	-50.28	-1508.52
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-55.52**	**-1665.62**
Modeled Change in CCS Storage:		**6.94**	**208.31**
Observed Change		**1.08**	**32.37**

Table 5.3-4. Calculated Fluid Flows from Water Budget Components

May 2014			
Water Budget Component		**Flow (MGD)**	**Volume (gal x 10^6)**
Into CCS	W. Seepage	0.76	23.63
	E. Seepage	41.30	1280.37
	N. Seepage	0.01	0.18
	S. Seepage	4.24	131.29
	Bottom Seepage	28.85	894.27
	Precipitation and Runoff	7.42	229.90
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.46	14.40
	Blowdown	1.10	34.21
	ID Pumping	7.00	217.08
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**91.14**	**2825.32**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	0.00	0.00
	N. Seepage	0.00	-0.06
	S. Seepage	0.00	0.00
	Bottom Seepage	-12.07	-374.12
	Precipitation and Runoff	0.00	0.00
	Evaporation	-67.69	-2098.40
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-79.76**	**-2472.58**
Modeled Change in CCS Storage:		**11.38**	**352.75**
Observed Change		**3.55**	**110.04**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

September 2010			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	1.53	45.92
	E. Seepage	2500.92	75027.64
	N. Seepage	3.26	97.90
	S. Seepage	104.83	3144.88
	Bottom Seepage	1942.12	58263.66
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	114.36	3430.81
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**4667.03**	**140010.82**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-2444.34	-73330.24
	N. Seepage	-1.00	-30.03
	S. Seepage	0.00	0.00
	Bottom Seepage	-3732.66	-111979.85
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-6178.00**	**-185340.12**
Modeled Change in CCS Storage:		**-1510.98**	**-45329.30**
Observed Change		**1464.29**	**43928.58**

Key:
CCS = Cooling Canal System.
ID = Interceptor Ditch.
lb = Pound.

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

October 2010			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	0.49	15.06
	E. Seepage	149.53	4635.38
	N. Seepage	1.03	32.01
	S. Seepage	7.25	224.80
	Bottom Seepage	1882.00	58341.96
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	87.08	2699.59
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**2127.38**	**65948.81**
Out of CCS	W. Seepage	-103.73	-3215.68
	E. Seepage	-9444.01	-292764.18
	N. Seepage	-2.35	-72.84
	S. Seepage	-14.68	-455.19
	Bottom Seepage	-9054.26	-280682.01
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-18619.03**	**-577189.91**
Modeled Change in CCS Storage:		**-16491.65**	**-511241.10**
Observed Change		**-13790.42**	**-427502.87**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

November 2010			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	0.72	21.47
	E. Seepage	1143.70	34310.91
	N. Seepage	1.02	30.47
	S. Seepage	63.96	1918.87
	Bottom Seepage	538.98	16169.37
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	58.36	1750.73
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**1806.73**	**54201.83**
Out of CCS	W. Seepage	-646.37	-19391.23
	E. Seepage	-2969.21	-89076.29
	N. Seepage	-1.36	-40.70
	S. Seepage	-8.71	-261.42
	Bottom Seepage	-5590.81	-167724.26
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-9216.46**	**-276493.90**
Modeled Change in CCS Storage:		**-7409.74**	**-222292.08**
Observed Change		**-2876.16**	**-86284.89**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

December 2010			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	3.04	94.39
	E. Seepage	4725.01	146475.21
	N. Seepage	0.00	0.00
	S. Seepage	302.77	9385.88
	Bottom Seepage	674.69	20915.51
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	84.15	2608.67
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**5789.67**	**179479.65**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-180.61	-5598.89
	N. Seepage	-4.76	-147.53
	S. Seepage	-1.76	-54.64
	Bottom Seepage	-5505.29	-170663.91
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-5692.42**	**-176464.98**
Modeled Change in CCS Storage:		**97.25**	**3014.68**
Observed Change		**-1555.92**	**-48233.42**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

January 2011			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	6.71	207.92
	E. Seepage	2694.88	83541.26
	N. Seepage	0.02	0.72
	S. Seepage	260.16	8065.07
	Bottom Seepage	805.49	24970.29
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	95.74	2967.93
	ID Pumped Water	185.05	5736.69
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**4048.06**	**125489.88**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-1635.00	-50684.88
	N. Seepage	-5.83	-180.58
	S. Seepage	0.00	0.00
	Bottom Seepage	-7338.77	-227501.97
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-8979.59**	**-278367.43**
Modeled Change in CCS Storage:		**-4931.53**	**-152877.56**
Observed Change		**-910.35**	**-28220.95**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

February 2011			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	4.28	119.79
	E. Seepage	6730.29	188448.01
	N. Seepage	0.00	0.00
	S. Seepage	469.04	13133.08
	Bottom Seepage	2790.13	78123.66
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	81.20	2273.71
	ID Pumped Water	73.70	2063.56
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**10148.64**	**284161.82**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-169.22	-4738.19
	N. Seepage	-9.05	-253.36
	S. Seepage	0.00	0.00
	Bottom Seepage	-8852.81	-247878.63
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-9031.08**	**-252870.18**
Modeled Change in CCS Storage:		**1117.56**	**31291.64**
Observed Change		**1264.60**	**35408.76**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

March 2011			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	7.25	224.79
	E. Seepage	6208.79	192472.59
	N. Seepage	0.57	17.59
	S. Seepage	624.64	19363.87
	Bottom Seepage	3113.68	96524.02
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	77.46	2401.17
	ID Pumped Water	774.24	24001.46
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**10806.63**	**335005.48**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-148.18	-4593.68
	N. Seepage	-2.15	-66.72
	S. Seepage	0.00	0.00
	Bottom Seepage	-8266.32	-256256.01
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-8416.66**	**-260916.41**
Modeled Change in CCS Storage:		**2389.97**	**74089.06**
Observed Change		**2504.94**	**77653.08**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

April 2011			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	7.97	239.04
	E. Seepage	9397.48	281924.52
	N. Seepage	0.96	28.87
	S. Seepage	981.96	29458.82
	Bottom Seepage	4763.76	142912.67
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	132.20	3966.02
	ID Pumped Water	751.05	22531.49
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**16035.38**	**481061.43**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	0.00	0.00
	N. Seepage	-0.90	-27.12
	S. Seepage	0.00	0.00
	Bottom Seepage	-7890.82	-236724.70
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-7891.73**	**-236751.82**
Modeled Change in CCS Storage:		**8143.65**	**244309.61**
Observed Change		**-4057.292603**	**-121718.78**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

May 2011			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	26.21	812.61
	E. Seepage	15905.29	493063.91
	N. Seepage	0.00	0.00
	S. Seepage	1444.80	44788.85
	Bottom Seepage	8038.52	249194.22
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	135.40	4197.49
	ID Pumped Water	3405.55	105571.94
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**28955.78**	**897629.03**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	0.00	0.00
	N. Seepage	-18.40	-570.36
	S. Seepage	0.00	0.00
	Bottom Seepage	-24742.36	-767013.22
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-24760.76**	**-767583.58**
Modeled Change in CCS Storage:		**4195.01**	**130045.45**
Observed Change		**6228.37**	**193079.32**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

June 2011			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	39.65	1189.35
	E. Seepage	13544.39	406331.65
	N. Seepage	0.00	0.00
	S. Seepage	1490.22	44706.45
	Bottom Seepage	8163.91	244917.21
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	119.17	3575.20
	ID Pumped Water	4597.36	137920.85
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**27954.69**	**838640.72**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-4.59	-137.70
	N. Seepage	-16.95	-508.48
	S. Seepage	0.00	0.00
	Bottom Seepage	-21348.75	-640462.48
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-21370.29**	**-641108.66**
Modeled Change in CCS Storage:		**6584.40**	**197532.06**
Observed Change		**8658.55**	**259756.64**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

July 2011			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	22.97	712.22
	E. Seepage	1630.60	50548.47
	N. Seepage	0.00	0.00
	S. Seepage	475.00	14724.90
	Bottom Seepage	1945.63	60314.59
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	131.92	4089.50
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**4206.12**	**130389.67**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-5721.60	-177369.67
	N. Seepage	-6.85	-212.23
	S. Seepage	-23.87	-739.95
	Bottom Seepage	-8531.61	-264479.96
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-14283.93**	**-442801.82**
Modeled Change in CCS Storage:		**-10077.81**	**-312412.15**
Observed Change		**3237.34**	**100357.40**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

August 2011			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	7.40	229.41
	E. Seepage	5237.66	162367.43
	N. Seepage	0.98	30.43
	S. Seepage	370.58	11488.05
	Bottom Seepage	3135.13	97189.15
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	121.55	3768.14
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**8873.31**	**275072.61**
Out of CCS	W. Seepage	-65.81	-2040.12
	E. Seepage	-56.73	-1758.59
	N. Seepage	-0.60	-18.59
	S. Seepage	0.00	0.00
	Bottom Seepage	-1578.95	-48947.51
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-1702.09**	**-52764.81**
Modeled Change in CCS Storage:		**7171.22**	**222307.79**
Observed Change		**4028.64**	**124887.94**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

September 2011			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	2.83	84.91
	E. Seepage	2797.96	83938.71
	N. Seepage	0.12	3.49
	S. Seepage	270.92	8127.56
	Bottom Seepage	1137.21	34116.32
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	114.36	3430.81
	ID Pumped Water	406.90	12207.06
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**4730.30**	**141908.85**
Out of CCS	W. Seepage	-785.14	-23554.07
	E. Seepage	-805.76	-24172.71
	N. Seepage	-3.46	-103.68
	S. Seepage	0.00	0.00
	Bottom Seepage	-3949.78	-118493.44
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-5544.13**	**-166323.91**
Modeled Change in CCS Storage:		**-813.84**	**-24415.05**
Observed Change		**-3663.57**	**-109906.97**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

October 2011			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	1.49	46.05
	E. Seepage	3112.09	96474.66
	N. Seepage	0.39	12.19
	S. Seepage	162.49	5037.32
	Bottom Seepage	5213.92	161631.44
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	87.08	2699.59
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**8577.46**	**265901.26**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-1100.79	-34124.58
	N. Seepage	-3.96	-122.70
	S. Seepage	0.00	0.00
	Bottom Seepage	-52.38	-1623.93
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-1157.14**	**-35871.22**
Modeled Change in CCS Storage:		**7420.32**	**230030.04**
Observed Change		**-3871.33**	**-120011.08**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

November 2011			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	1.52	45.49
	E. Seepage	2565.58	76967.38
	N. Seepage	1.24	37.31
	S. Seepage	307.94	9238.14
	Bottom Seepage	2510.60	75318.05
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	58.36	1750.73
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**5445.24**	**163357.10**
Out of CCS	W. Seepage	-2.99	-89.68
	E. Seepage	-439.02	-13170.52
	N. Seepage	-1.38	-41.50
	S. Seepage	0.00	0.00
	Bottom Seepage	-1521.48	-45644.54
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-1964.87**	**-58946.24**
Modeled Change in CCS Storage:		**3480.36**	**104410.86**
Observed Change		**-3673.05**	**-110191.36**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

December 2011			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	2.94	91.04
	E. Seepage	3995.18	123850.50
	N. Seepage	1.01	31.46
	S. Seepage	519.26	16096.99
	Bottom Seepage	2237.19	69352.75
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	84.15	2608.67
	ID Pumped Water	431.13	13365.08
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**7270.85**	**225396.49**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-110.41	-3422.62
	N. Seepage	-2.01	-62.16
	S. Seepage	0.00	0.00
	Bottom Seepage	-6366.94	-197375.12
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-6479.35**	**-200859.90**
Modeled Change in CCS Storage:		**791.50**	**24536.58**
Observed Change		**-3828.22**	**-118674.85**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

January 2012			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	6.81	211.17
	E. Seepage	6137.16	190252.10
	N. Seepage	0.16	4.83
	S. Seepage	611.10	18944.11
	Bottom Seepage	3217.71	99748.94
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	103.64	3212.87
	ID Pumped Water	2219.37	68800.40
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**12295.95**	**381174.41**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-15.97	-495.22
	N. Seepage	-8.30	-257.31
	S. Seepage	0.00	0.00
	Bottom Seepage	-14015.44	-434478.71
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-14039.72**	**-435231.24**
Modeled Change in CCS Storage:		**-1743.77**	**-54056.83**
Observed Change		**-2625.35**	**-81385.79**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

February 2012			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	5.52	160.15
	E. Seepage	3019.88	87576.55
	N. Seepage	1.78	51.48
	S. Seepage	465.01	13485.18
	Bottom Seepage	3938.11	114205.18
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	91.37	2649.68
	ID Pumped Water	189.46	5494.29
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**7711.12**	**223622.50**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-792.88	-22993.52
	N. Seepage	-0.50	-14.61
	S. Seepage	0.00	0.00
	Bottom Seepage	-5050.78	-146472.57
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-5844.16**	**-169480.70**
Modeled Change in CCS Storage:		**1866.96**	**54141.81**
Observed Change		**3362.46**	**97511.42**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

March 2012			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	4.03	124.88
	E. Seepage	5251.01	162781.35
	N. Seepage	4.94	153.03
	S. Seepage	666.34	20656.69
	Bottom Seepage	4261.43	132104.46
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	115.17	3570.40
	ID Pumped Water	187.62	5816.11
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**10490.55**	**325206.92**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-271.03	-8402.01
	N. Seepage	-0.21	-6.62
	S. Seepage	0.00	0.00
	Bottom Seepage	-3822.04	-118483.22
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-4093.29**	**-126891.84**
Modeled Change in CCS Storage:		**6397.26**	**198315.08**
Observed Change		**-500.48**	**-15514.87**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

April 2012			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	14.59	437.77
	E. Seepage	5648.88	169466.31
	N. Seepage	1.97	59.07
	S. Seepage	760.81	22824.26
	Bottom Seepage	4206.65	126199.62
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	114.52	3435.57
	ID Pumped Water	1035.51	31065.19
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**11782.93**	**353487.78**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-135.08	-4052.44
	N. Seepage	-0.98	-29.32
	S. Seepage	0.00	0.00
	Bottom Seepage	-7211.96	-216358.94
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-7348.02**	**-220440.70**
Modeled Change in CCS Storage:		**4434.90**	**133047.07**
Observed Change		**4132.59**	**123977.58**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

May 2012			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	8.43	261.37
	E. Seepage	167.09	5179.69
	N. Seepage	5.55	172.14
	S. Seepage	120.42	3732.88
	Bottom Seepage	3176.41	98468.64
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	113.23	3510.03
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**3591.12**	**111324.74**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-6338.52	-196494.19
	N. Seepage	-0.30	-9.32
	S. Seepage	-0.62	-19.08
	Bottom Seepage	-5139.67	-159329.63
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-11479.10**	**-355852.21**
Modeled Change in CCS Storage:		**-7887.98**	**-244527.47**
Observed Change		**-4664.11**	**-144587.53**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

June 2012			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	2.04	61.29
	E. Seepage	816.37	24491.01
	N. Seepage	3.75	112.60
	S. Seepage	233.05	6991.63
	Bottom Seepage	2430.80	72924.06
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	120.64	3619.20
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**3606.66**	**108199.80**
Out of CCS	W. Seepage	-37.06	-1111.94
	E. Seepage	-4366.87	-131006.04
	N. Seepage	-0.27	-8.24
	S. Seepage	0.00	0.00
	Bottom Seepage	-5327.02	-159810.66
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-9731.23**	**-291936.88**
Modeled Change in CCS Storage:		**-6124.57**	**-183737.08**
Observed Change		**-2740.38**	**-82211.41**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

July 2012			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	2.64	81.86
	E. Seepage	5.03	155.99
	N. Seepage	5.49	170.22
	S. Seepage	67.33	2087.08
	Bottom Seepage	3725.02	115475.55
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	124.64	3863.85
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**3930.15**	**121834.54**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-5218.31	-161767.61
	N. Seepage	0.00	0.00
	S. Seepage	-19.14	-593.20
	Bottom Seepage	-5299.15	-164273.54
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-10536.59**	**-326634.36**
Modeled Change in CCS Storage:		**-6606.45**	**-204799.82**
Observed Change		**-2497.19**	**-77412.85**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

August 2012			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	2.56	79.25
	E. Seepage	1461.90	45319.00
	N. Seepage	4.79	148.53
	S. Seepage	121.94	3779.99
	Bottom Seepage	3312.48	102686.78
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	128.56	3985.44
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**5032.23**	**155998.99**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-2580.57	-79997.52
	N. Seepage	0.00	0.00
	S. Seepage	-8.82	-273.56
	Bottom Seepage	-3380.97	-104809.92
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-5970.36**	**-185081.01**
Modeled Change in CCS Storage:		**-938.13**	**-29082.02**
Observed Change		**1642.83**	**50927.78**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

September 2012			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	1.47	44.10
	E. Seepage	623.77	18713.19
	N. Seepage	2.87	85.98
	S. Seepage	27.07	812.14
	Bottom Seepage	1848.79	55463.79
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	112.67	3380.18
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**2616.65**	**78499.38**
Out of CCS	W. Seepage	-77.47	-2324.18
	E. Seepage	-4199.05	-125971.36
	N. Seepage	-0.02	-0.64
	S. Seepage	-9.90	-297.00
	Bottom Seepage	-5567.11	-167013.34
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-9853.55**	**-295606.52**
Modeled Change in CCS Storage:		**-7236.90**	**-217107.14**
Observed Change		**-2600.46**	**-78013.94**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

October 2012			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	0.86	26.69
	E. Seepage	3782.89	117269.47
	N. Seepage	3.25	100.85
	S. Seepage	453.51	14058.84
	Bottom Seepage	3995.58	123863.13
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	110.18	3415.60
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**8346.28**	**258734.58**
Out of CCS	W. Seepage	-187.80	-5821.75
	E. Seepage	-1844.55	-57181.05
	N. Seepage	-1.16	-35.89
	S. Seepage	-4.83	-149.83
	Bottom Seepage	-2616.30	-81105.23
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-4654.64**	**-144293.77**
Modeled Change in CCS Storage:		**3691.64**	**114440.81**
Observed Change		**6379.02**	**197749.67**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

November 2012			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	3.11	93.25
	E. Seepage	1982.22	59466.75
	N. Seepage	4.16	124.84
	S. Seepage	507.20	15215.92
	Bottom Seepage	3748.30	112448.92
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	76.71	2301.26
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**6321.70**	**189650.93**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-1089.28	-32678.52
	N. Seepage	0.00	0.00
	S. Seepage	0.00	0.00
	Bottom Seepage	-1345.04	-40351.31
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-2434.33**	**-73029.83**
Modeled Change in CCS Storage:		**3887.37**	**116621.10**
Observed Change		**2368.82**	**71064.75**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

December 2012			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	7.16	222.04
	E. Seepage	120.97	3750.04
	N. Seepage	4.21	130.51
	S. Seepage	213.94	6632.26
	Bottom Seepage	2162.13	67026.11
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	87.33	2707.18
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**2595.75**	**80468.14**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-3727.61	-115556.04
	N. Seepage	0.00	0.00
	S. Seepage	-0.17	-5.27
	Bottom Seepage	-2787.01	-86397.17
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-6514.79**	**-201958.48**
Modeled Change in CCS Storage:		**-3919.04**	**-121490.34**
Observed Change		**-7753.08**	**-240345.33**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

January 2013			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	7.13	221.15
	E. Seepage	2137.92	66275.51
	N. Seepage	4.36	135.08
	S. Seepage	509.08	15781.57
	Bottom Seepage	2831.19	87766.98
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	101.55	3148.06
	ID Pumped Water	60.40	1872.54
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**5651.64**	**175200.90**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-1194.63	-37033.67
	N. Seepage	0.00	0.00
	S. Seepage	0.00	0.00
	Bottom Seepage	-886.76	-27489.51
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-2081.39**	**-64523.18**
Modeled Change in CCS Storage:		**3570.25**	**110677.72**
Observed Change		**525.54**	**16291.69**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

February 2013			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	9.73	272.46
	E. Seepage	2944.36	82442.07
	N. Seepage	2.94	82.31
	S. Seepage	662.71	18555.81
	Bottom Seepage	2727.16	76360.57
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	95.25	2667.00
	ID Pumped Water	324.14	9075.87
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**6766.29**	**189456.09**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-1539.91	-43117.37
	N. Seepage	-0.14	-3.95
	S. Seepage	0.00	0.00
	Bottom Seepage	-3737.34	-104645.54
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-5277.39**	**-147766.86**
Modeled Change in CCS Storage:		**1488.90**	**41689.23**
Observed Change		**1710.98**	**47907.57**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

March 2013			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	10.92	338.65
	E. Seepage	6720.90	208347.99
	N. Seepage	1.42	44.00
	S. Seepage	907.96	28146.66
	Bottom Seepage	2775.04	86026.14
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	112.44	3485.58
	ID Pumped Water	347.21	10763.51
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**10875.89**	**337152.53**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	0.00	0.00
	N. Seepage	-2.06	-63.94
	S. Seepage	0.00	0.00
	Bottom Seepage	-4630.17	-143535.30
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-4632.23**	**-143599.24**
Modeled Change in CCS Storage:		**6243.65**	**193553.29**
Observed Change		**4065.17**	**126020.42**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

April 2013			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	13.29	398.66
	E. Seepage	7583.24	227497.21
	N. Seepage	0.00	0.00
	S. Seepage	621.43	18642.97
	Bottom Seepage	3016.09	90482.64
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	111.74	3352.32
	ID Pumped Water	478.94	14368.08
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**11824.73**	**354741.89**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-67.89	-2036.72
	N. Seepage	-10.84	-325.20
	S. Seepage	0.00	0.00
	Bottom Seepage	-12414.68	-372440.38
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-12493.41**	**-374802.29**
Modeled Change in CCS Storage:		**-668.68**	**-20060.41**
Observed Change		**4774.59**	**143237.63**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

May 2013			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	6.46	200.39
	E. Seepage	4085.21	126641.42
	N. Seepage	0.00	0.00
	S. Seepage	458.41	14210.60
	Bottom Seepage	1178.02	36518.75
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	125.70	3896.83
	ID Pumped Water	287.40	8909.54
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**6141.21**	**190377.53**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-829.74	-25721.93
	N. Seepage	-6.57	-203.76
	S. Seepage	-9.41	-291.63
	Bottom Seepage	-8045.67	-249415.76
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-8891.39**	**-275633.07**
Modeled Change in CCS Storage:		**-2750.18**	**-85255.55**
Observed Change		**1237.57**	**38364.62**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

June 2013			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	4.14	124.17
	E. Seepage	2150.78	64523.46
	N. Seepage	0.00	0.00
	S. Seepage	192.72	5781.63
	Bottom Seepage	659.63	19788.97
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	116.04	3481.32
	ID Pumped Water	15.15	454.46
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**3138.47**	**94154.00**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-6840.75	-205222.53
	N. Seepage	-10.10	-303.10
	S. Seepage	-272.05	-8161.40
	Bottom Seepage	-10583.21	-317496.26
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-17706.11**	**-531183.29**
Modeled Change in CCS Storage:		**-14567.64**	**-437029.29**
Observed Change		**-4607.17**	**-138215.25**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

July 2013			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	2.99	92.71
	E. Seepage	4378.23	135725.17
	N. Seepage	0.00	0.00
	S. Seepage	385.67	11955.68
	Bottom Seepage	2207.77	68440.94
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	119.57	3706.56
	ID Pumped Water	16.53	512.41
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**7110.76**	**220433.48**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-1372.52	-42548.06
	N. Seepage	-6.19	-191.85
	S. Seepage	0.00	0.00
	Bottom Seepage	-4865.49	-150830.09
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-6244.19**	**-193570.00**
Modeled Change in CCS Storage:		**866.56**	**26863.49**
Observed Change		**4833.38**	**149834.84**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

August 2013			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	1.89	58.46
	E. Seepage	4344.14	134668.40
	N. Seepage	0.40	12.37
	S. Seepage	323.17	10018.35
	Bottom Seepage	1637.07	50749.12
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	108.99	3378.64
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**6415.66**	**198885.33**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-1329.80	-41223.88
	N. Seepage	-6.00	-186.11
	S. Seepage	-11.98	-371.29
	Bottom Seepage	-3824.23	-118551.19
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-5172.02**	**-160332.47**
Modeled Change in CCS Storage:		**1243.64**	**38552.86**
Observed Change		**3101.52**	**96147.08**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

September 2013			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	1.44	43.23
	E. Seepage	5544.96	166348.73
	N. Seepage	3.92	117.62
	S. Seepage	550.99	16529.68
	Bottom Seepage	4740.46	142213.90
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	127.36	3820.73
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**10969.13**	**329073.89**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-149.50	-4484.98
	N. Seepage	-0.19	-5.75
	S. Seepage	0.00	0.00
	Bottom Seepage	-375.37	-11261.16
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-525.06**	**-15751.89**
Modeled Change in CCS Storage:		**10444.07**	**313321.99**
Observed Change		**5122.20**	**153666.00**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

October 2013			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	1.11	34.27
	E. Seepage	4338.18	134483.49
	N. Seepage	7.80	241.71
	S. Seepage	638.39	19790.19
	Bottom Seepage	7719.11	239292.29
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	131.68	4082.17
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**12836.26**	**397924.13**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-351.11	-10884.34
	N. Seepage	0.00	0.00
	S. Seepage	0.00	0.00
	Bottom Seepage	-127.96	-3966.81
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-479.07**	**-14851.15**
Modeled Change in CCS Storage:		**12357.19**	**383072.99**
Observed Change		**5172.10**	**160335.08**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

November 2013			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	1.54	46.14
	E. Seepage	3784.29	113528.78
	N. Seepage	6.40	192.02
	S. Seepage	788.22	23646.53
	Bottom Seepage	4634.87	139046.00
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	104.86	3145.67
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**9320.17**	**279605.14**
Out of CCS	W. Seepage	-24.64	-739.25
	E. Seepage	-522.89	-15686.55
	N. Seepage	0.00	0.00
	S. Seepage	-280.41	-8412.37
	Bottom Seepage	-1054.80	-31643.98
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-1882.74**	**-56482.15**
Modeled Change in CCS Storage:		**7437.43**	**223122.99**
Observed Change		**3117.41**	**93522.19**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

December 2013			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	1.72	53.40
	E. Seepage	1116.93	34624.86
	N. Seepage	1.41	43.82
	S. Seepage	0.00	0.00
	Bottom Seepage	1208.70	37469.70
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	104.66	3244.56
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**2433.43**	**75436.35**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-2138.71	-66299.91
	N. Seepage	-0.72	-22.30
	S. Seepage	-1832.93	-56820.81
	Bottom Seepage	-3278.69	-101639.42
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-7251.05**	**-224782.44**
Modeled Change in CCS Storage:		**-4817.62**	**-149346.09**
Observed Change		**-6529.12**	**-202402.80**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

January 2014			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	2.72	84.28
	E. Seepage	2474.28	76702.81
	N. Seepage	3.76	116.46
	S. Seepage	197.48	6121.95
	Bottom Seepage	2808.39	87059.94
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	97.62	3026.14
	ID Pumped Water	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**5584.24**	**173111.57**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-733.83	-22748.81
	N. Seepage	-0.11	-3.52
	S. Seepage	-322.82	-10007.33
	Bottom Seepage	-1256.16	-38940.86
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-2312.92**	**-71700.52**
Modeled Change in CCS Storage:		**3271.32**	**101411.05**
Observed Change		**-445.87**	**-13822.03**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

February 2014			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	3.45	96.51
	E. Seepage	4009.26	112259.16
	N. Seepage	4.91	137.49
	S. Seepage	305.60	8556.90
	Bottom Seepage	4137.32	115844.97
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	94.98	2659.47
	ID Pumped Water	26.82	750.88
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**8582.34**	**240305.39**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-216.72	-6068.14
	N. Seepage	0.00	0.00
	S. Seepage	0.00	0.00
	Bottom Seepage	-527.63	-14773.52
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-744.34**	**-20841.66**
Modeled Change in CCS Storage:		**7837.99**	**219463.73**
Observed Change		**625.60**	**17516.93**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

March 2014			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	3.87	120.12
	E. Seepage	4519.76	140112.41
	N. Seepage	5.56	172.22
	S. Seepage	282.87	8768.83
	Bottom Seepage	4212.27	130580.33
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	117.78	3651.18
	ID Pumped Water	44.90	1391.85
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**9187.00**	**284796.94**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	-7.14	-221.35
	N. Seepage	-0.08	-2.45
	S. Seepage	0.00	0.00
	Bottom Seepage	-949.86	-29445.56
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-957.08**	**-29669.35**
Modeled Change in CCS Storage:		**8229.92**	**255127.58**
Observed Change		**3657.01**	**113367.46**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

April 2014			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	6.46	193.90
	E. Seepage	9135.31	274059.17
	N. Seepage	5.79	173.62
	S. Seepage	674.16	20224.71
	Bottom Seepage	6679.44	200383.16
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	141.58	4247.38
	ID Pumped Water	100.96	3028.93
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**16743.70**	**502310.88**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	0.00	0.00
	N. Seepage	0.00	0.00
	S. Seepage	0.00	0.00
	Bottom Seepage	-3970.68	-119120.46
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-3970.68**	**-119120.46**
Modeled Change in CCS Storage:		**12773.01**	**383190.43**
Observed Change		**5846.87**	**175406.11**

Table 5.3-5. Calculated Mass Flows from Salt Budget Components

May 2014			
Mass Budget Component		**lb/day (x1000)**	**Mass (lb x 1000)**
Into CCS	W. Seepage	19.46	603.27
	E. Seepage	14107.29	437325.92
	N. Seepage	1.45	44.98
	S. Seepage	1396.99	43306.83
	Bottom Seepage	8690.90	269417.84
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	128.95	3997.50
	ID Pumped Water	392.49	12167.09
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total In:	**24737.53**	**766863.42**
Out of CCS	W. Seepage	0.00	0.00
	E. Seepage	0.00	0.00
	N. Seepage	-1.50	-46.56
	S. Seepage	0.00	0.00
	Bottom Seepage	-9219.39	-285801.22
	Precipitation and Runoff	0.00	0.00
	Evaporation	0.00	0.00
	Unit 3, 4 Added Water	0.00	0.00
	Unit 5 Blowdown	0.00	0.00
	ID Pumping	0.00	0.00
	Plant Outflow	Equal to Intake	
	Plant Intake	Equal to Outflow	
	Total Out:	**-9220.90**	**-285847.79**
Modeled Change in CCS Storage:		**15516.63**	**481015.64**
Observed Change		**5312.43**	**164685.21**

FIGURES

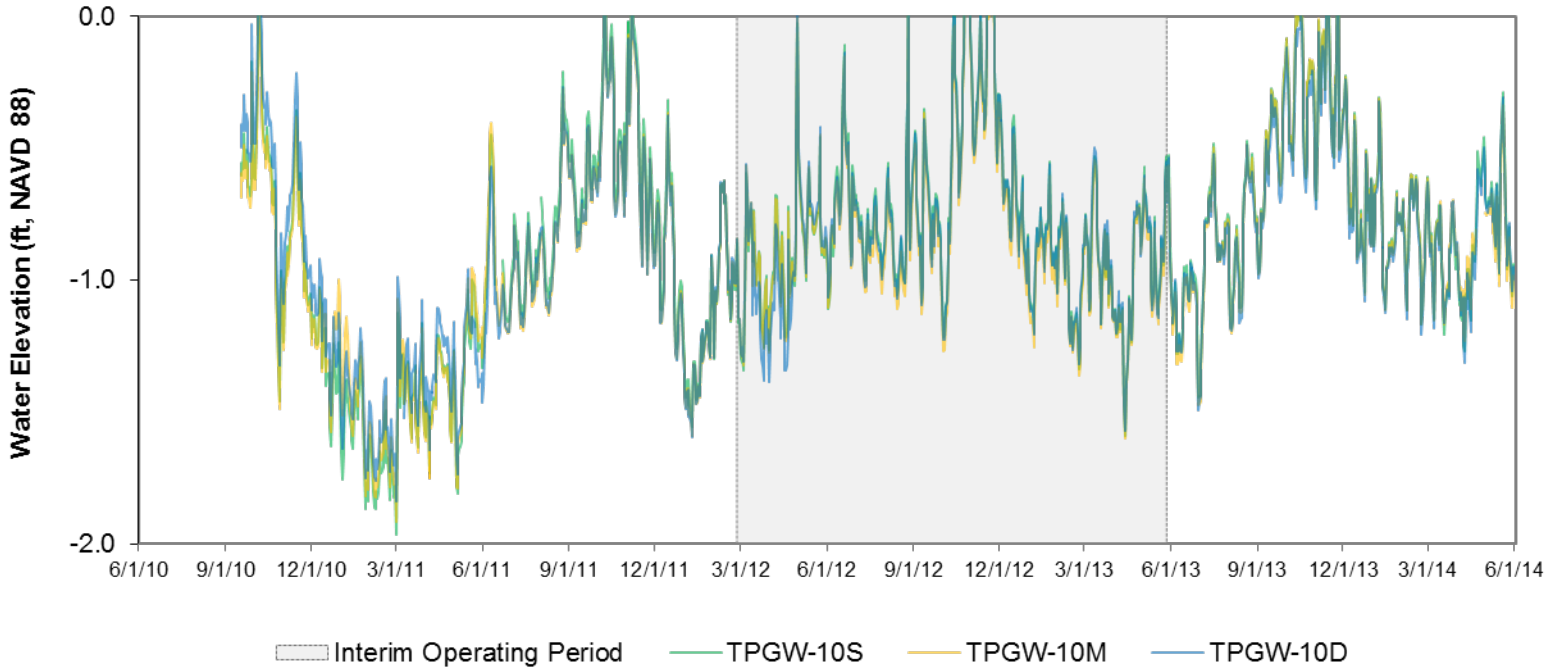


Figure 5.1-1. Averaged Daily Groundwater Elevations for TPGW-10 Wells.

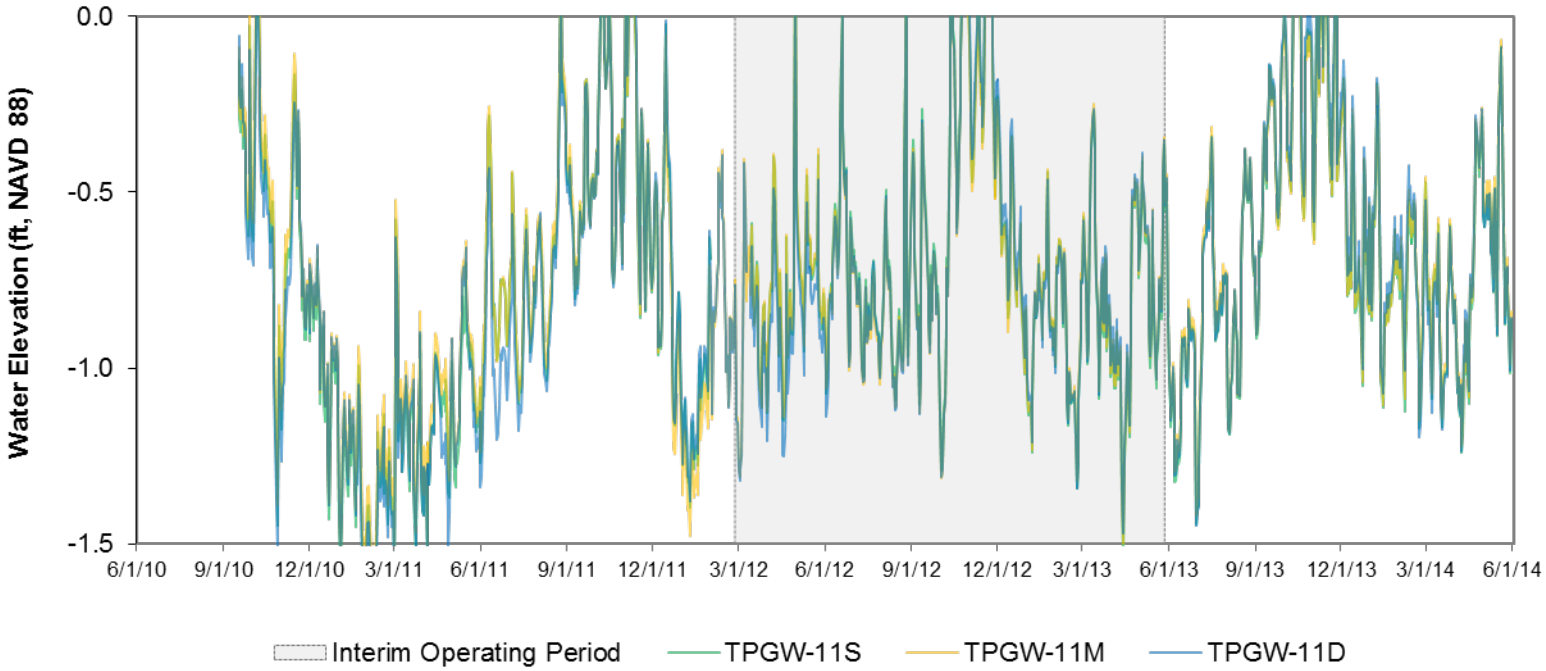


Figure 5.1-2. Averaged Daily Groundwater Elevations for TPGW-11 Wells.

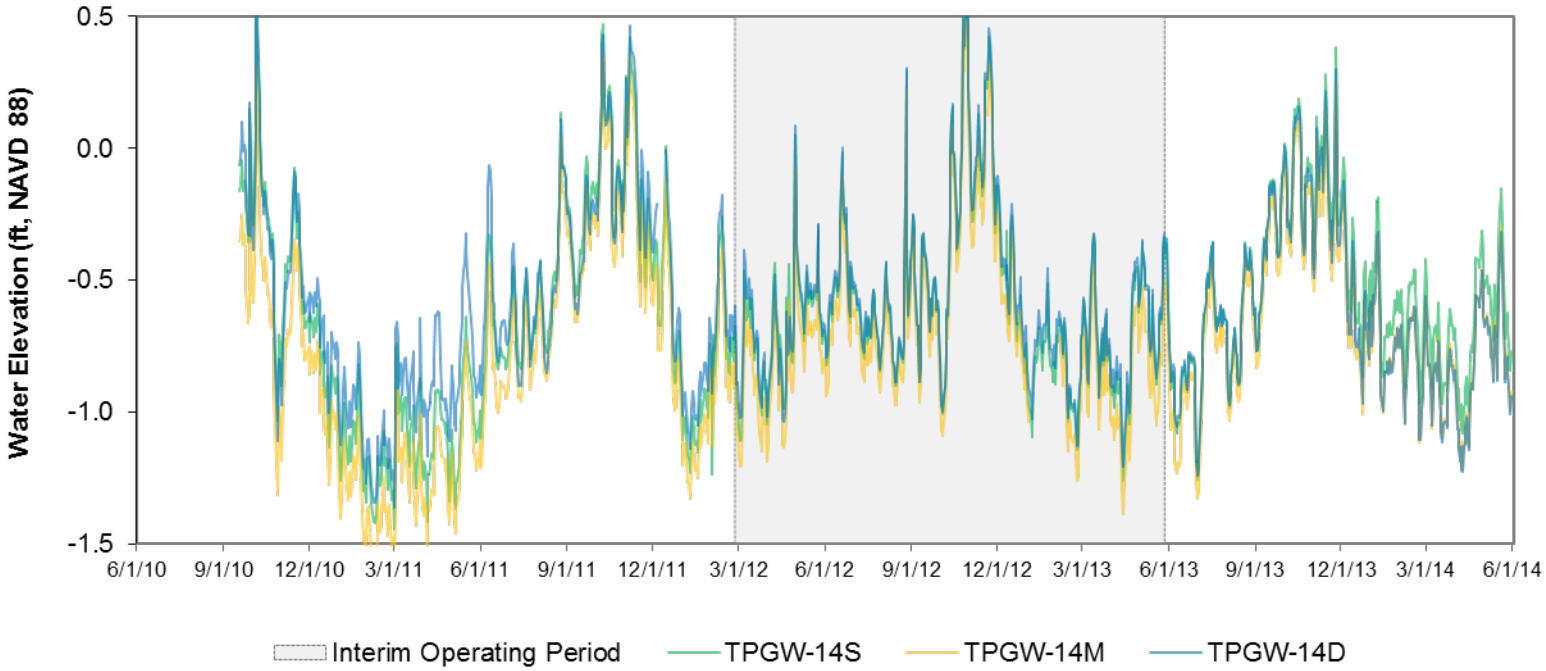


Figure 5.1-3. Averaged Daily Groundwater Elevations for TPGW-14 Wells.

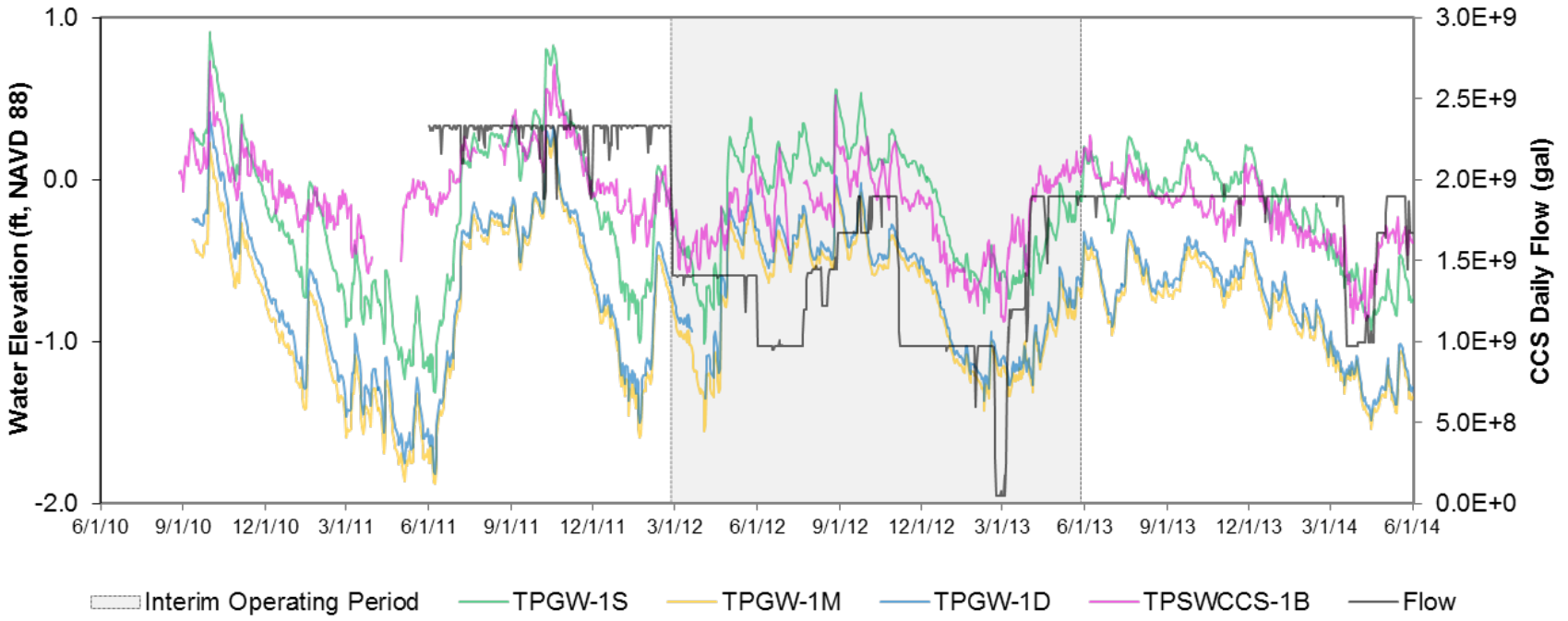


Figure 5.1-4. TPGW-1 Groundwater and TPSWCCS-1 Surface Water Responses to Rainfall and Nuclear Unit Power Outages, January 2012 – May 2014. CCS Daily Flow Units are in Scientific Notation.

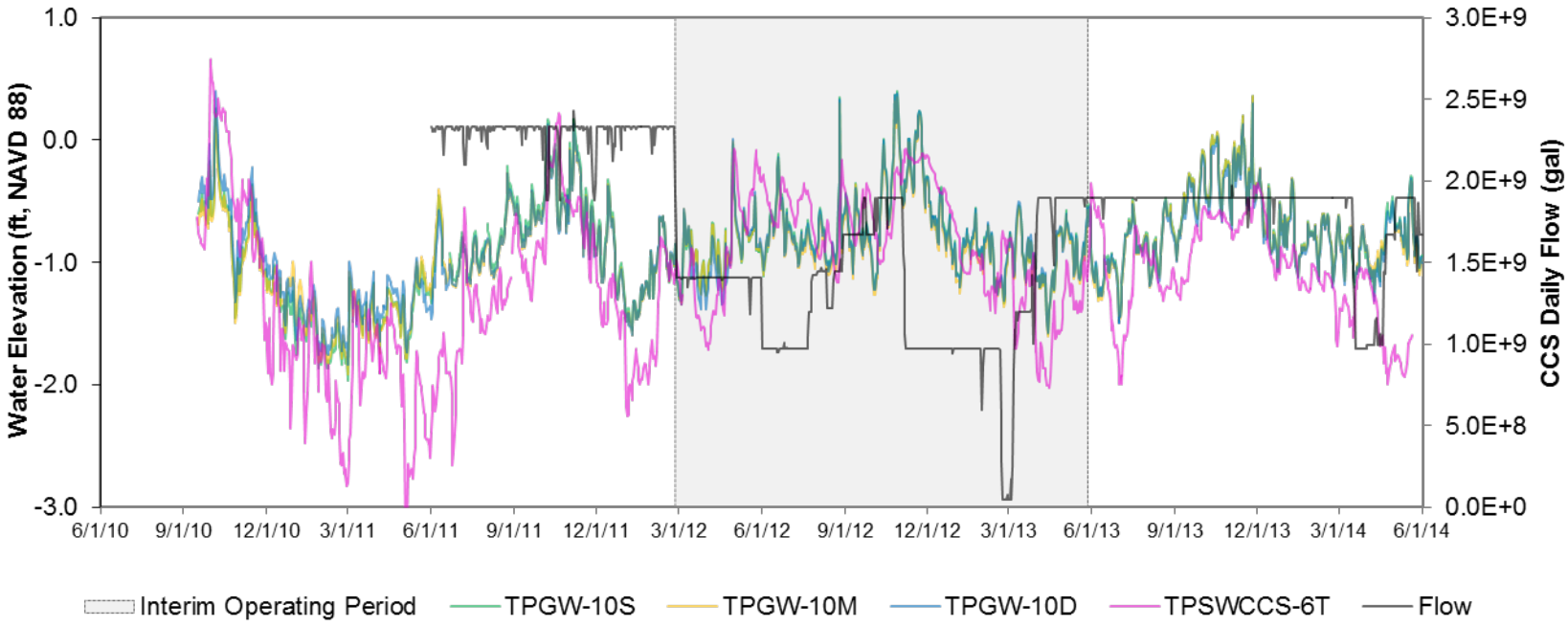


Figure 5.1-5. TPGW-10 Groundwater and TPSWCCS-1 Surface Water Responses to Rainfall and Nuclear Unit Power Outages, January 2012 – May 2014. CCS Daily Flow Units are in Scientific Notation.

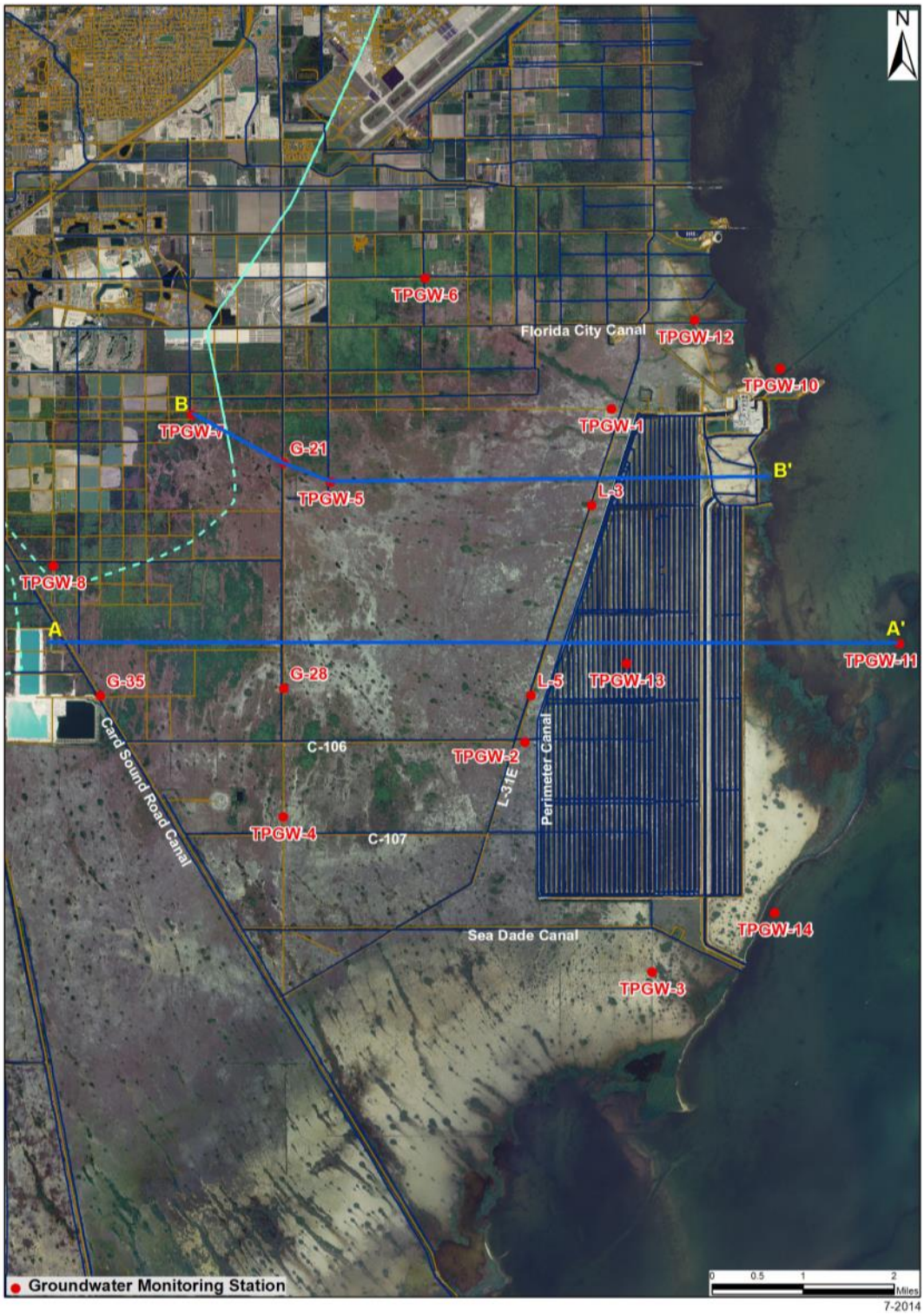


Figure 5.2-1. Locations of Specific Conductance Cross Sections.

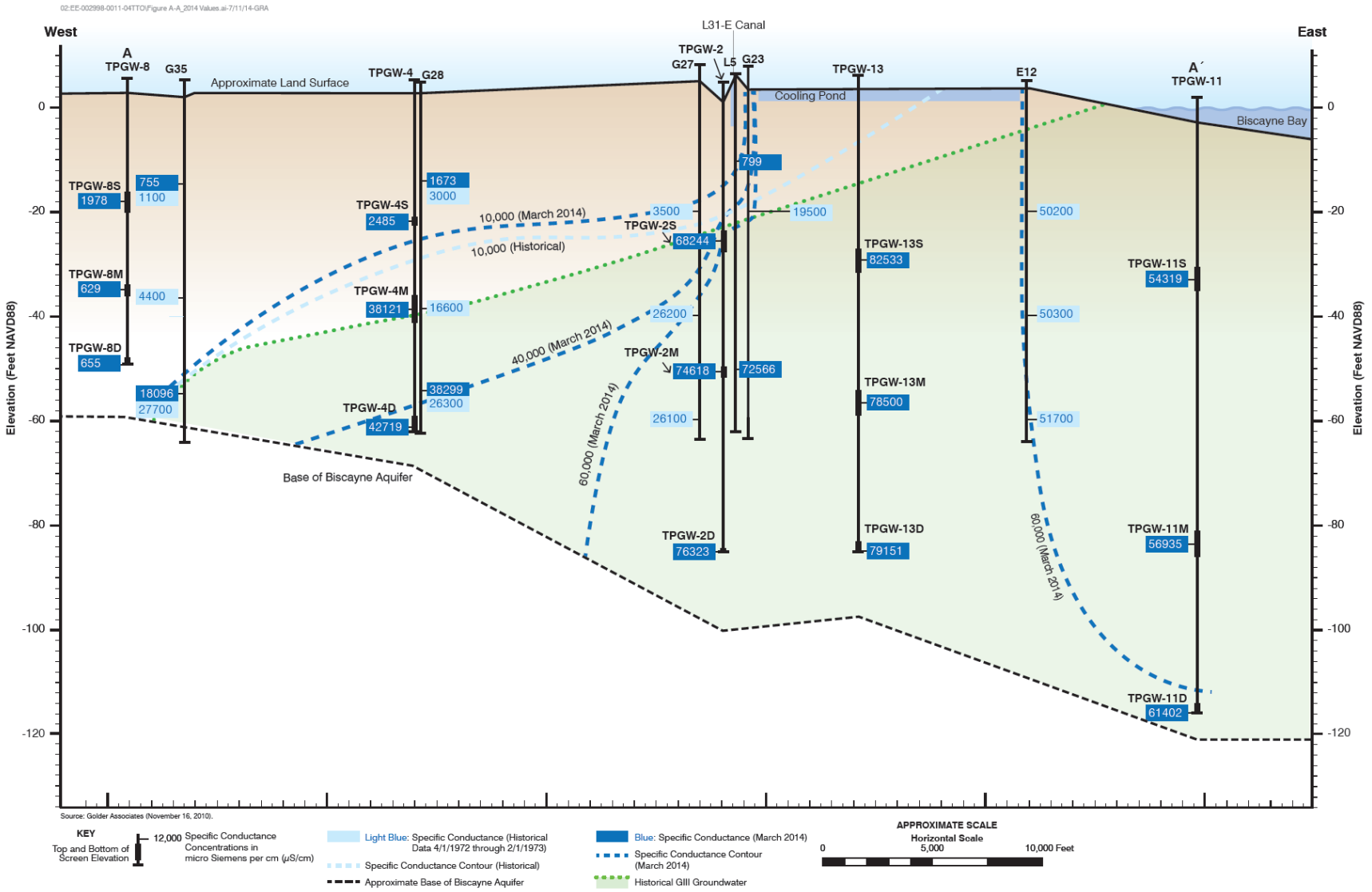


Figure 5.2-2. Specific Conductance Cross Section A-A', Historic and Current Concentration Isopleths.

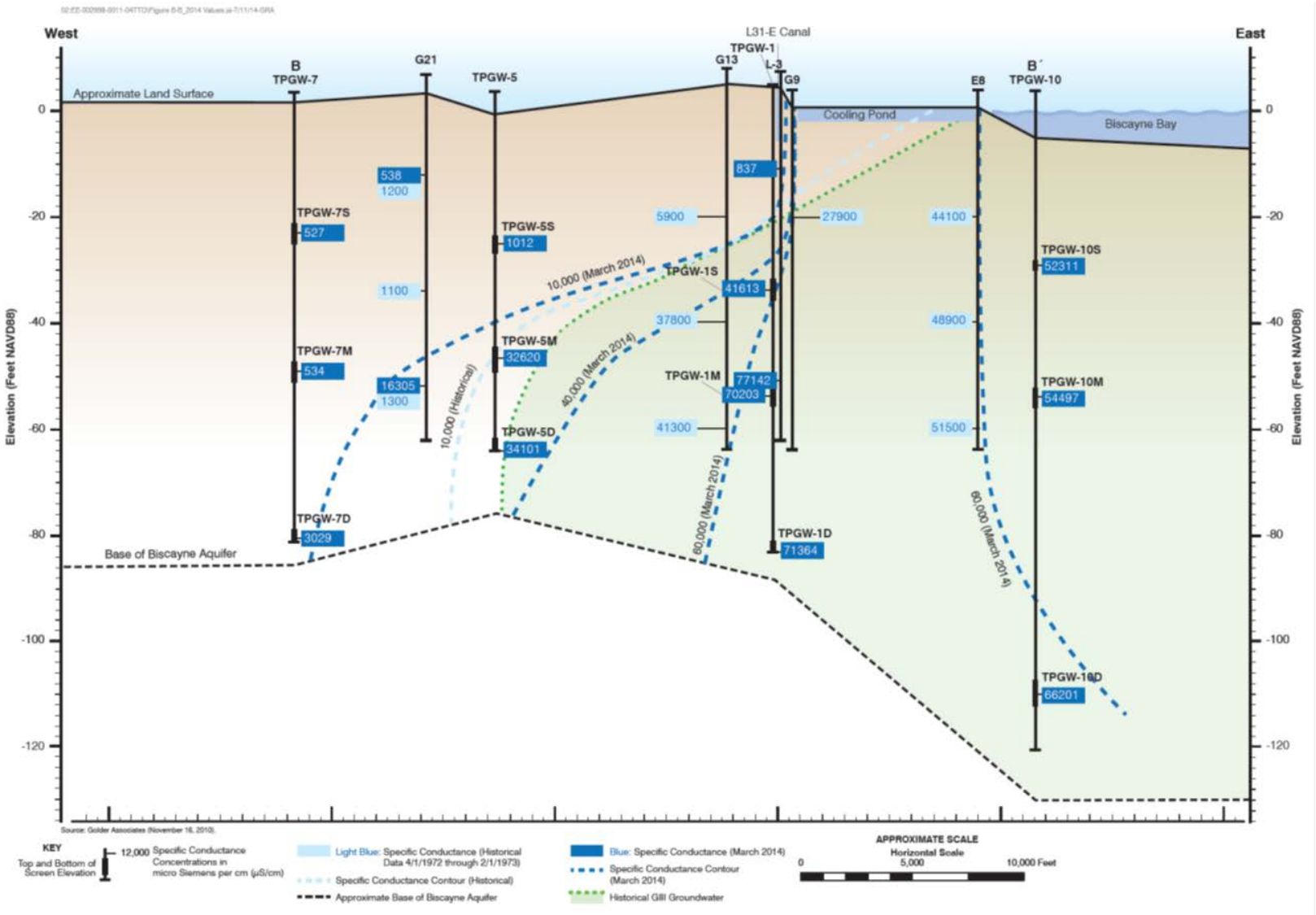


Figure 5.2-3. Specific Conductance Cross Section B-B', Historic and Current Concentration Isopleths.

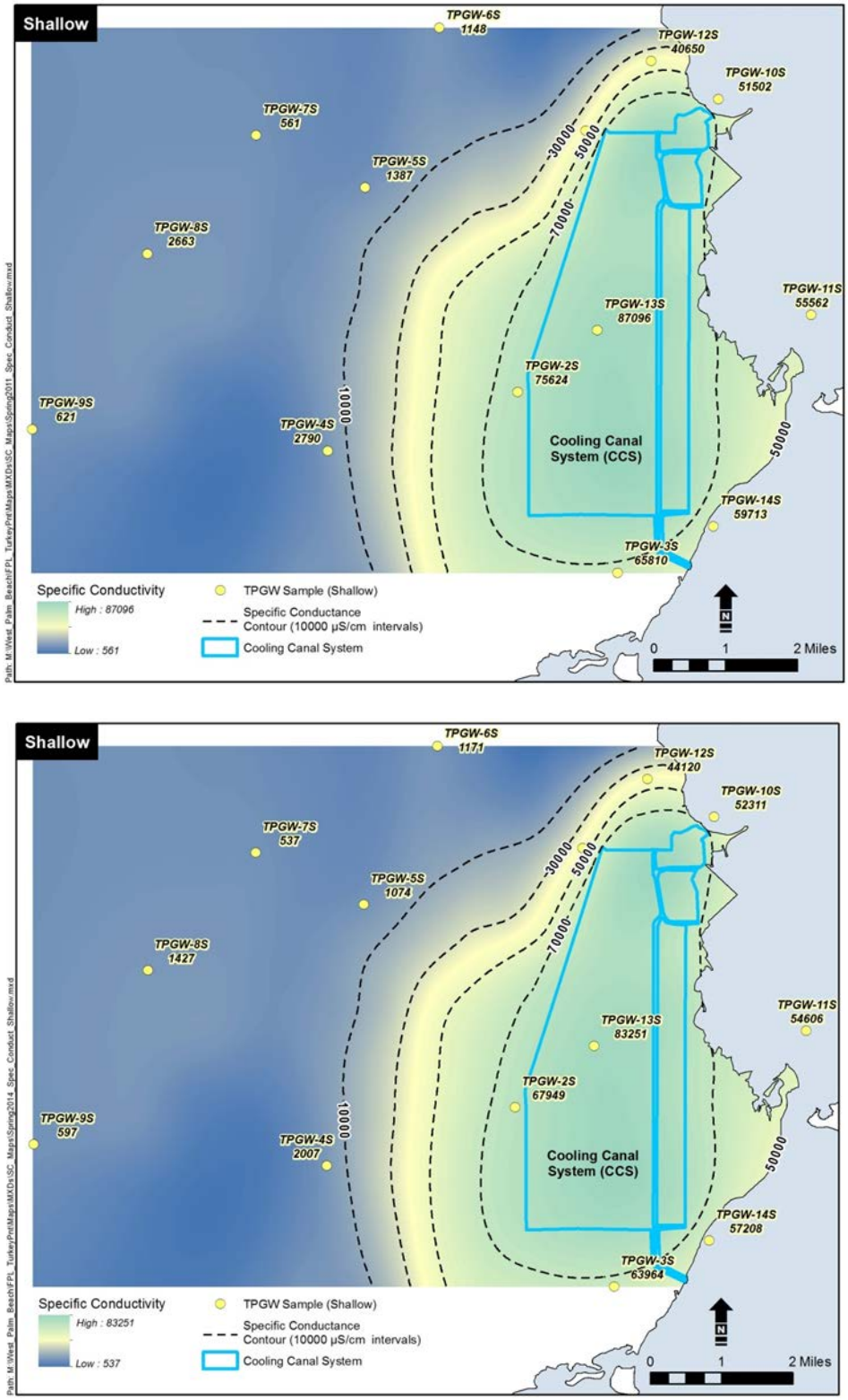


Figure 5.2-4. Shallow Well Pre-Uprate (Top) and Post-Uprate (Bottom) Average Specific Conductance Isopleths.

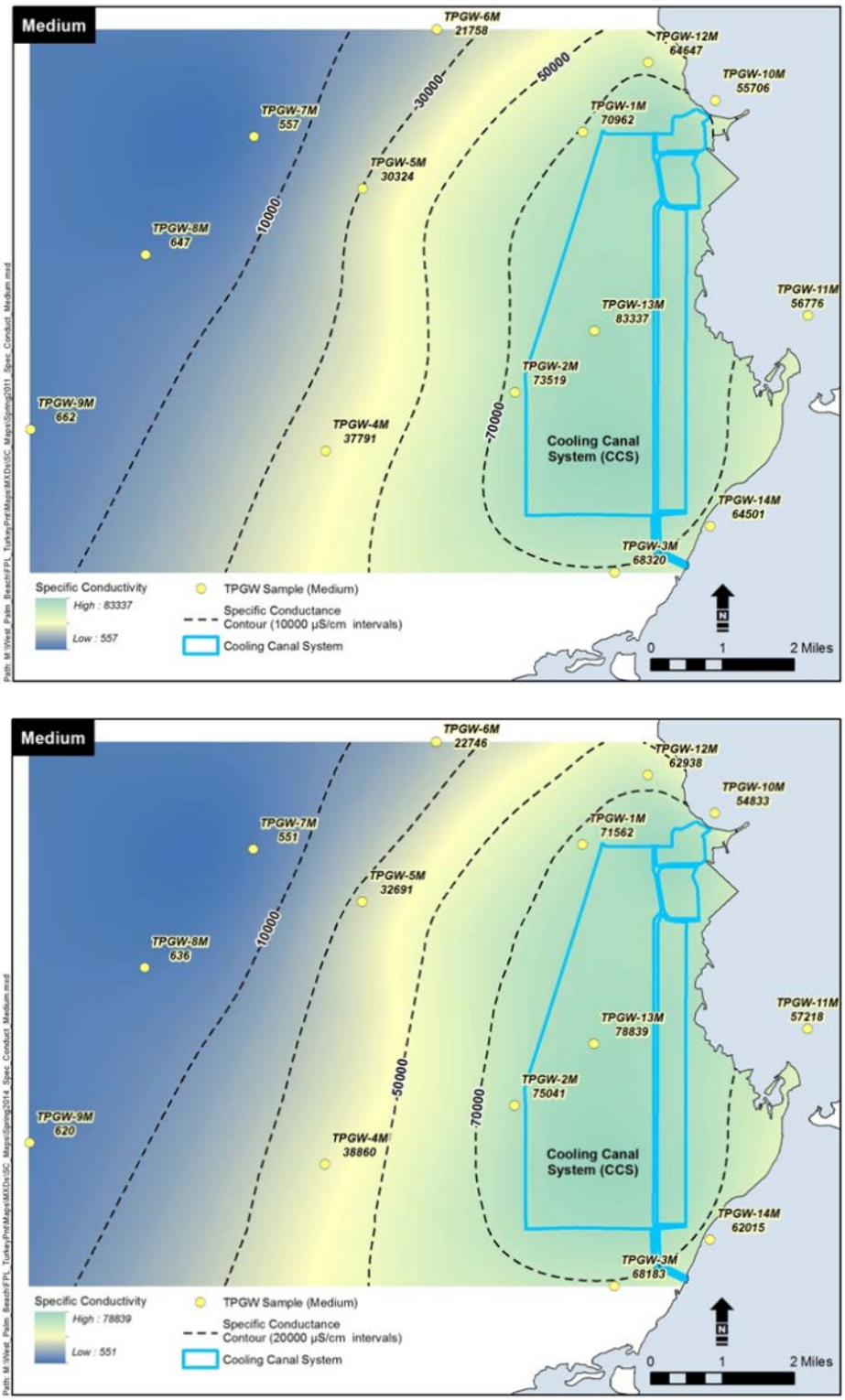


Figure 5.2-5. Medium Well Pre-Uprate (Top) and Post-Uprate (Bottom) Average Specific Conductance Isopleths.

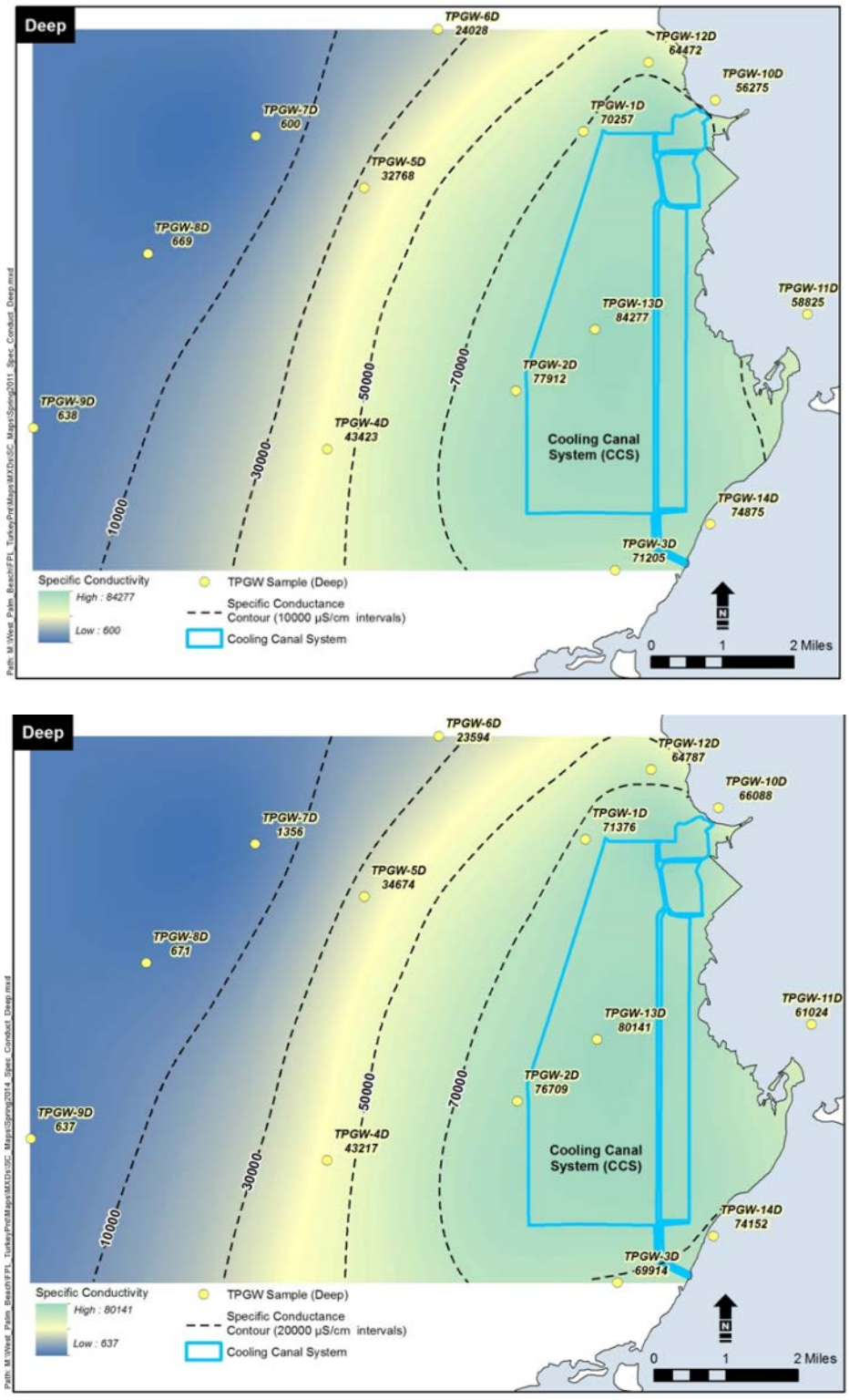
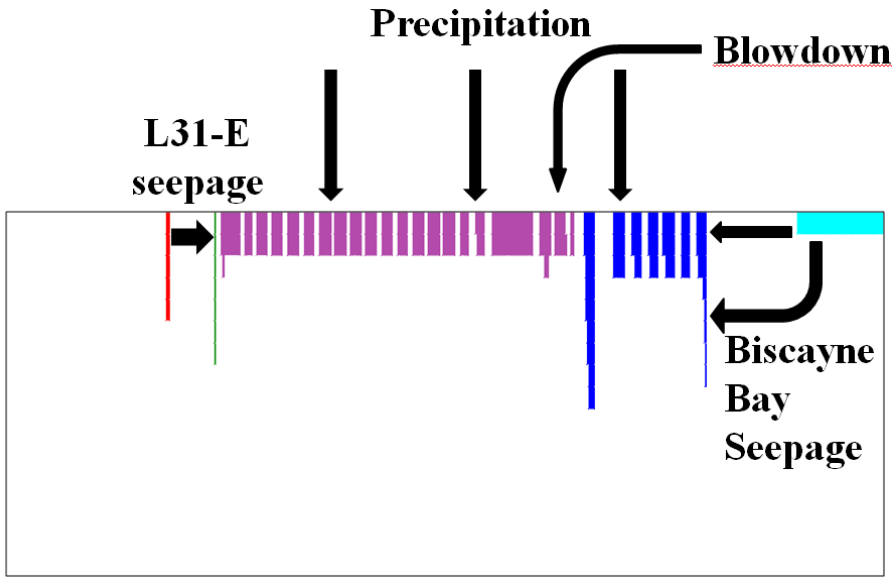
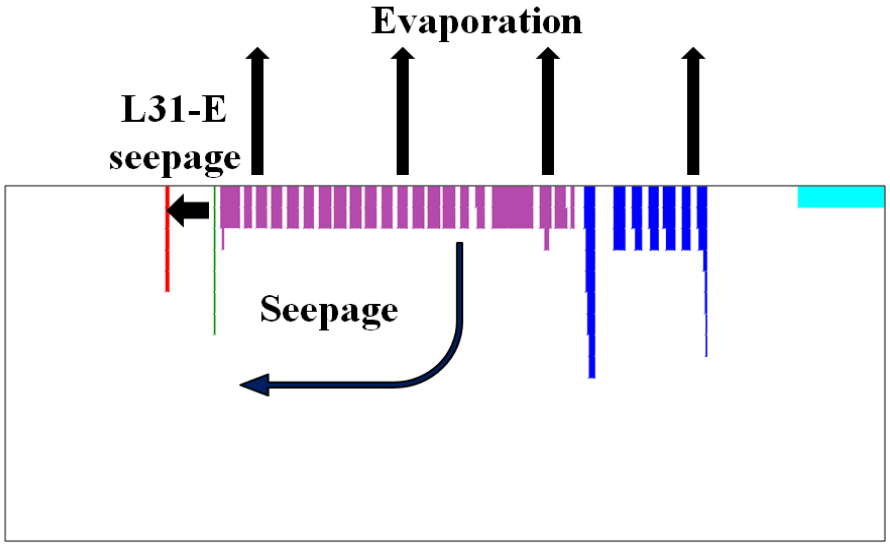


Figure 5.2-6. Deep Well Pre-Uprate (Top) and Post-Uprate (Bottom) Average Specific Conductance Isopleths.



(A)



(B)

Figure 5.3-1. Flow (A) into and (B) out of the CCS, Shown in Cross-Section.

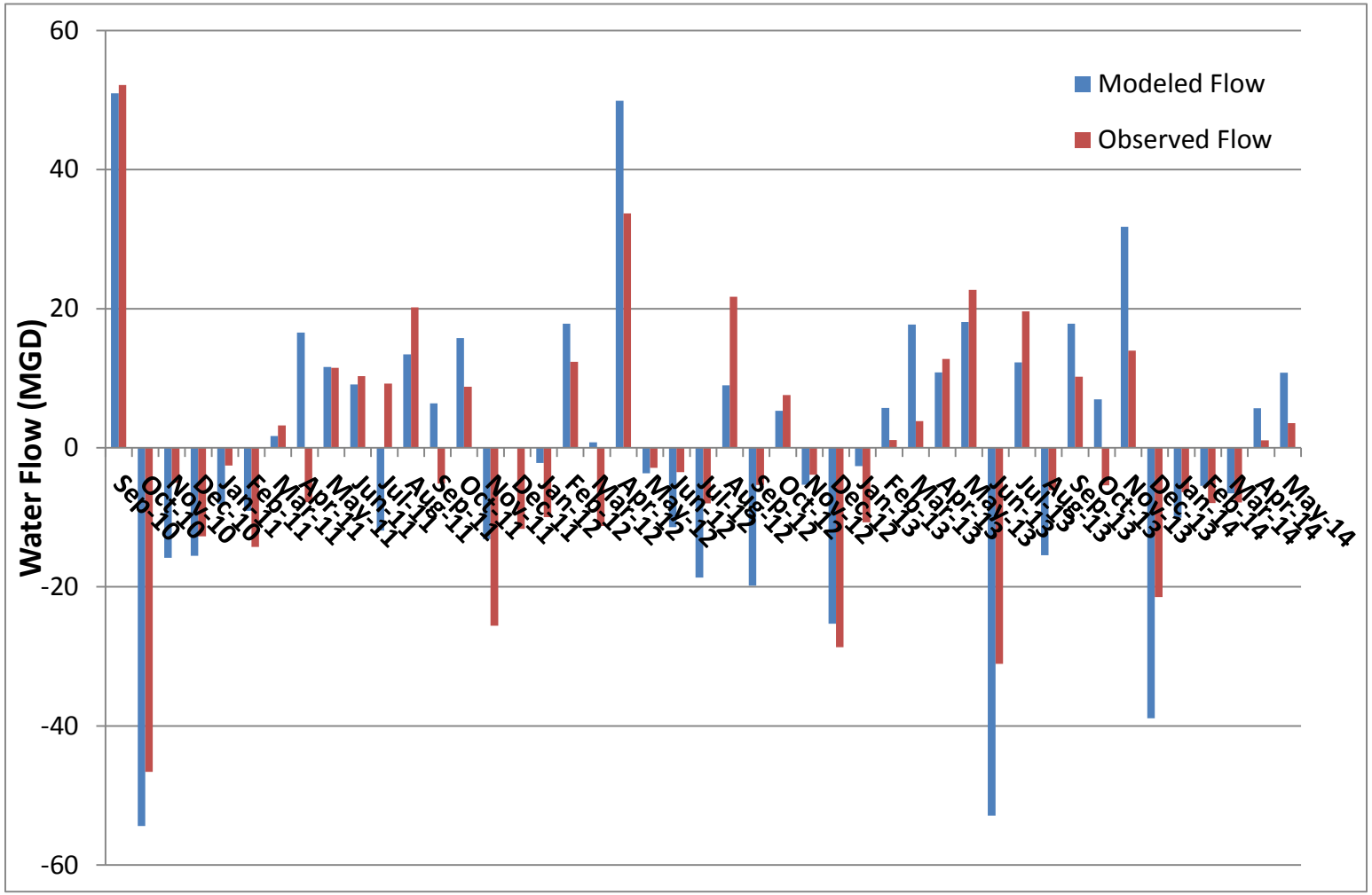


Figure 5.3-2. Modeled versus Measured Net Monthly Flows of Water for the CCS over the 45-Month Period.

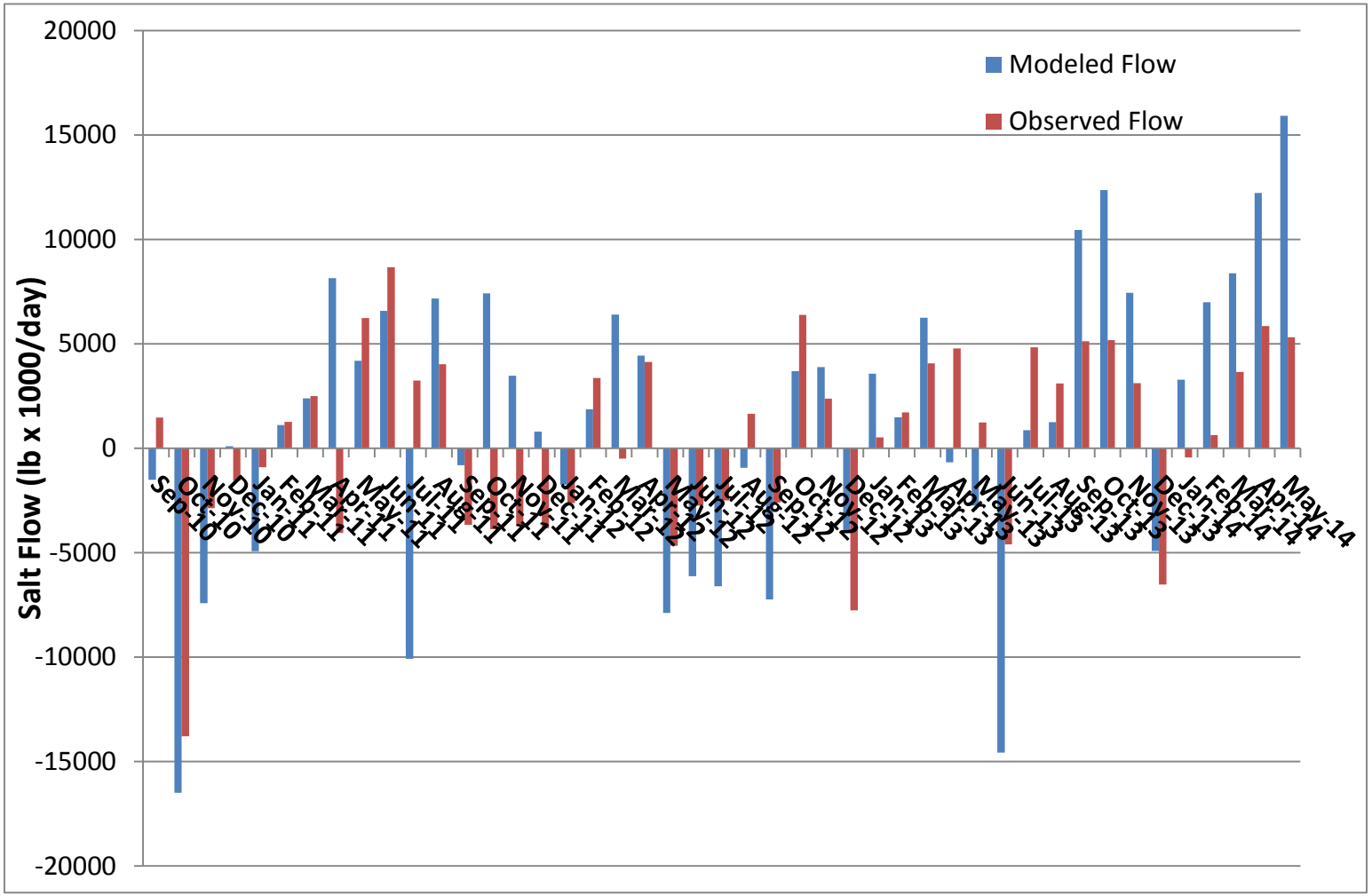


Figure 5.3-3. Modeled versus Measured Net Monthly Flows of Salt Mass for the CCS over the 45-Month Period

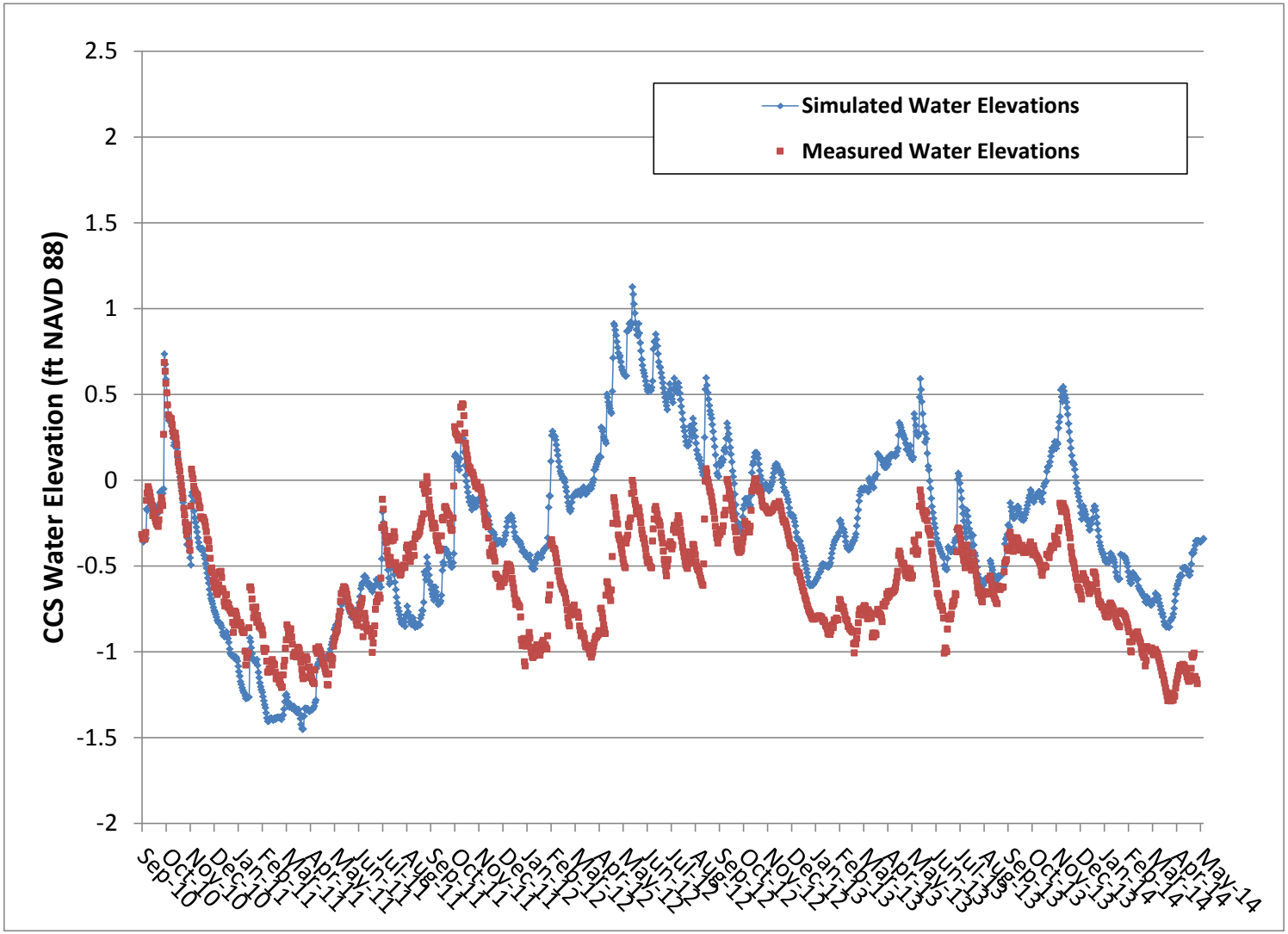


Figure 5.3-4. Modeled versus Measured Water Elevations (NAVD 88) in the CCS over the 45-Month Period; Used to Validate the Conceptual Model and Calibrate the Water Balance Model to Temporal Trends in Water Elevation.

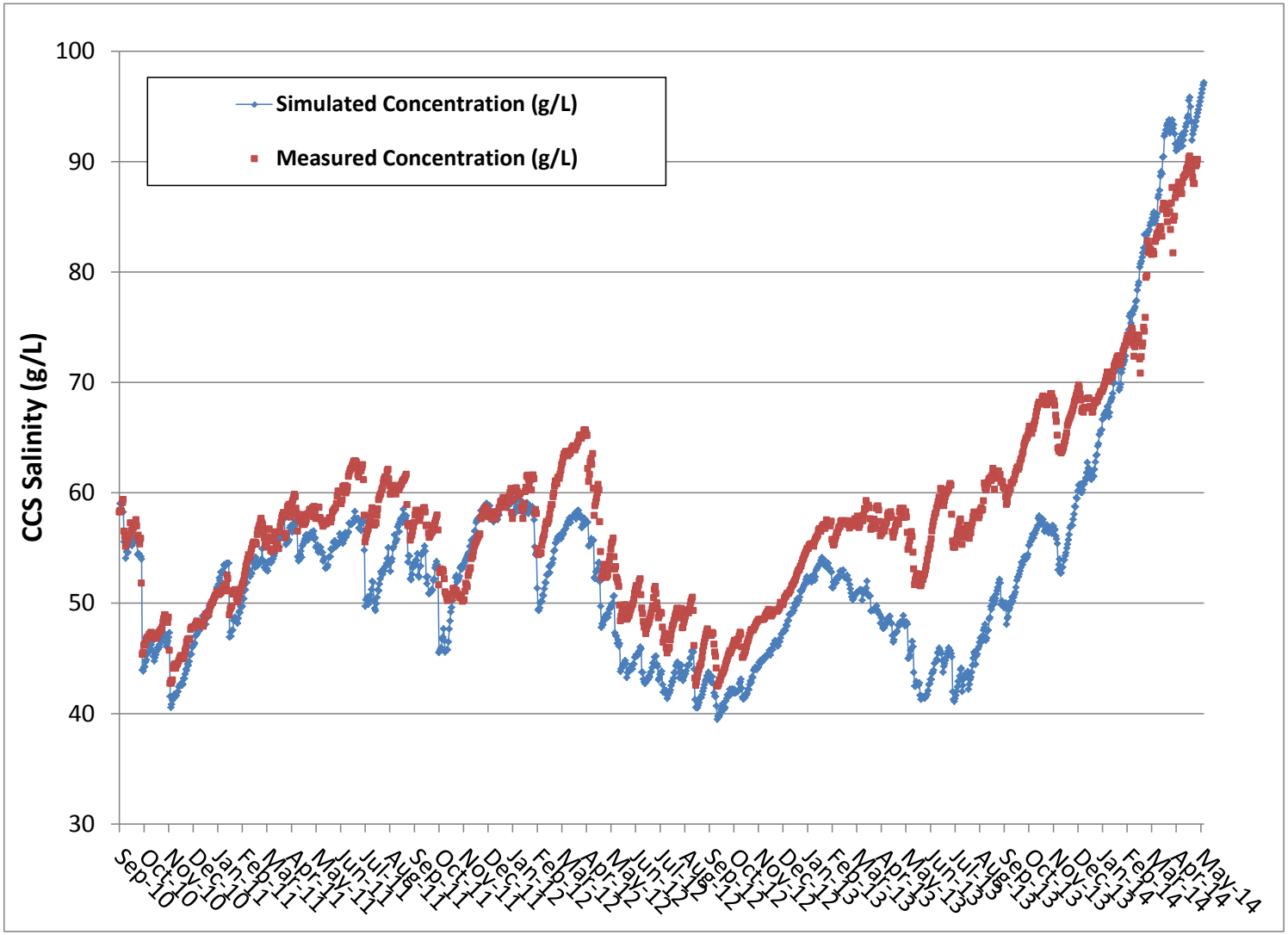


Figure 5.3-5. Modeled versus Measured Salinity in the CCS over the 45-Month Period; Used to Validate the Conceptual Model and Calibrate the Water Balance Model to Temporal Trends in Salinity.

6. INTERCEPTOR DITCH OPERATION

6.1 INTRODUCTION

FPL has prepared annual reports on the Interceptor Ditch (ID) operation and groundwater conditions referred to as Annual Report Groundwater Monitoring Program in compliance with the Agreement between FPL and the SFWMD, dated July 15, 1983 (the Agreement). The Agreement outlined the criteria for operating the ID pumps and the groundwater monitoring including groundwater levels, conductivities, and temperatures in wells L-3, L-5, G-21, and G-28. In addition, surface water levels were required to be monitored in the L-31E, ID, and westernmost CCS canal (C-32) at five transects (A through E). The operation of the ID is designed to prevent any seasonal inland movement of the saltwater into the potable portion of the Biscayne aquifer west of the site. The saline groundwater is intercepted by the ditch and pumped back to the CCS during the dry season when natural freshwater hydraulic gradients are low and the potential for saltwater intrusion exists. Pumping the water from the ID to the CCS creates a seaward gradient east of the L-31E, thereby restricting inland movement of cooling canal water in the upper zones of the aquifer. The monitoring program provides water level information that triggers the need to pump the ID, as well as assists in the evaluation of ID operations.

On October 14, 2009, the Agreement was modified to expand the monitoring program as part of the Units 3 and 4 Uprate Project and added well G-35 to the historical monitoring network. This modified agreement resulted in two annual reports being submitted: one for the ID operation/groundwater monitoring and one for the Units 3 and 4 Uprate monitoring. On August 2, 2012, FPL and SFWMD agreed to consolidate the annual ID reporting into the Turkey Point Plant Uprate annual reports. Combining the reports helps improve the efficiency and consistency of reporting and storage of data.

The information presented in this section pertains to the operation of the ID from June 1, 2013 through May 31, 2014 and includes the same type of information as presented in previous ID operation reports (i.e., Golder Associates Inc. 2010, 2011b; FPL 2012). For consistency, the focus of this section is the historical L and G wells, and the operation of the ID. Figure 6.1-1 shows the well locations and five surface water transects A through E. Information on wells installed as part of the Uprate Project can be found in Sections 2 and 3 of this report. Where appropriate, references to the data in these sections will be made.

6.2 OPERATIONAL OR STRUCTURAL CHANGES

As discussed in the Comprehensive Pre-Uprate Report (FPL 2012), FPL initiated a more conservative, revised operation procedure for the ID in December 2011 that considered freshwater head equivalents for the surface water transects. This resulted in changes to

triggers/operational criteria for when pumping of the ID would occur. The operational criteria/triggers that have been used since December 2012 are as follows:

- If the L-31E water elevation minus the C-32 water elevation is equal to or greater than 0.25 ft then no pumping of ID is necessary, and a seaward gradient exists.
- If the L-31E water elevation minus the C-32 water elevation is less than 0.25 ft, a natural seaward gradient may still exist if the L-31E water elevation minus the ID water elevation is equal to or greater than 0.30 ft and the density of the water in the ID is less than or equal to 1.012 g/cm^3. If a density in the ID is higher than 1.012 g/cm^3, a higher elevation difference between L-31E and the ID is necessary and can be calculated by converting the surface water levels to freshwater head equivalents.
- If a natural seaward gradient does not exist, create an artificial gradient by pumping the ID until the ID is maintained at an elevation of at least 0.30 to 0.70 ft depending on the density of the ID water.

The operation of the ID pumps is based on water level readings at each of the five surface water transects. Traditionally, FPL has taken manual water level readings at least once every week during the dry season and at least twice a month during the wet season (Appendix L). When the Turkey Point Uprate Monitoring Plan (2009) was approved by the Agencies, automated stations were installed at Transects A, C, and E. As discussed in Section 2, these stations currently report data at 1-hour intervals and typically transmit by telemetry to a database every day. FPL is still going out at least once every week at each transect during the dry season, and at least twice per month during the wet season, to manually record water levels to evaluate hydraulic gradients. Additionally, FPL is using the automated data to determine if they need to visit the sites more frequently and operate the ID pumps (Appendix L).

6.3 Meteorological Conditions

Meteorological data are set forth in Section 2.4 of this report and include data collected from TPM-1. Daily rainfall data have also been traditionally recorded by SFWMD at structure S-20F located along the L-31E, approximately 2.5 miles north of the CCS. Figure 6.3-1 shows the monthly rainfall at S-20F and TPM-1 for the ID reporting period from June 2013 through May 2014 and compares them to historical averages (1968 to 2012) at S-20F.

Rainfall for June 2013 to May 2014 was below the historic monthly average from July 1968 to May 2012 at Station S-20F. Additionally, rainfall at TPM-1 was well below that of the S-20F station for the June 2013 through May 2014 time period. It should be noted, however, that TPM-1 was offline for several weeks in June 2013. The rain gauge at structure S-20F recorded 40.1 inches of precipitation from June 2013 to May 2014, while 13 inches of rain were recorded at TPM-1. The annual average at S-20F from 1968-2014 is 46.60 inches.

As shown on Figure 6.3-1, the rainfall distribution for 2013 was concentrated in the months of June through November, which are the traditionally wet season months. During an average year, approximately 74% of the precipitation occurs during the wet season with the remainder occurring during the six-month-long dry season (November to May). During 2013,

approximately 70% of the annual rainfall occurred during the wet season at S-20F and TPM-1. The 2013 hurricane season produced no significant storms during the monitoring period.

6.4 WATER QUALITY AND WATER LEVEL RESULTS AND DISCUSSION

6.4.1 Groundwater Levels

Groundwater levels are manually measured and samples are collected quarterly in the historical wells L-3, L-5, G-21, G-28, and G-35. For the Post-Uprate reporting period, water levels were measured in June 2013, September 2013, December 2013, and March 2014. Figure 6.4-1 shows the groundwater levels measured during this time period and the maximum and minimum levels recorded during the historical period. The start dates for the historical period for each well are as follows:

- L-3: April 1974
- L-5: January 1976
- G-21: April 1972
- G-28: April 1972
- G-35: April 1972

The historical period for wells L-3, L-5, G-21, and G-28 was extended to include data through May 2014 for this report. Data were not recorded for well G-35 between 1983 and 2010; therefore, the historical envelope for this well covers a limited period.

The groundwater elevation at L-3 (-1.2 feet NAVD 88) was over 1 ft lower in June 2013 than any other time period. By September 2013, the groundwater elevation in L-3 had rebounded (0.4 ft NAVD 88) and was slightly higher than the elevation in L-5 but then exhibited the lowest groundwater elevations of all the wells for the rest of the monitoring period. The G-series wells (G-21, G-28, and G-35) exhibited groundwater elevations closer to their historical maximums with elevations in June 2013, September 2013, and December 2013 being within 1 ft of their highest levels. G-35 consistently had the highest groundwater elevations, including a measurement of 2.94 feet NAVD 88 in June 2013 that exceeded the historical maximum by 0.37 feet; however, the historical maximum is based on a limited time period. Groundwater elevations in the G-series wells were always higher than L-3 and L-5 elevations with levels ranging from 0.4 to 4 ft higher for this monitoring period.

6.4.2 Vertical Groundwater Temperature Profiles

Groundwater temperatures are measured on a quarterly basis at 1 ft intervals throughout the water column in L-3, L-5, G-21, G-28, and G-35. For this monitoring period, temperatures were recorded in June 2013, September 2013, December 2013, and March 2014. Figures 6.4-2 through 6.4-6 show the temperature profile with depth and are compared with the historical envelope for each well where available. As reported by Golder Associates Inc. (2011b), the

historical envelope represents both the highest and lowest temperatures recorded during the period from July 1981 through June 1991.

All wells were within the historical envelopes (where established) for temperature except one location in September 2013. Well L-5 had groundwater temperatures close to 1°C higher than the historical maximum at a depth interval from -2 to -14 ft NAVD 88. There is no historical envelope for G-35, but the temperature profile for G-35 is similar to G-28 so the temperature is within expected values.

6.4.3 Vertical Groundwater Chloride Profiles

The groundwater is measured for specific conductance at 1 ft intervals in the entire water column in all five wells. The specific conductance data are then converted to chloride values according to the procedures outlined in the Agreement. For this monitoring period, specific conductance values were measured in June 2013, September 2013, December 2013, and March 2014, and corresponding chloride values were calculated. Similar to the temperature profiles, chloride profiles have been developed and compared to historical envelopes when available (Figures 6.4-7 through 6.4-11). The historical envelope represents both the highest and lowest chloride levels recorded during the period from July 1981 through June 1991.

For the current reporting period, and similar to previous reporting periods, the chloride values at depth exceed the historical envelope. The calculated chloride values at L-3 began to exceed the historical envelope in September 2013 at -28 ft NAVD 88 and in June 2013, December 2013, and March 2014 at a depth of -33 ft NAVD 88. At L-5, the calculated chloride values begin to exceed the historical maximum at elevations of -24 ft to -28 ft NAVD 88 depending on the time of year. In the G-series wells, the depths of excursion from the historical maximum are deeper (-42 ft to -43 ft NAVD 88 at G-21, and -32 ft to -35 NAVD 88 for G-28). The highest values are found at L-3 (34.1 parts per thousand [ppt]) and L-5 (31.6 ppt) at the bottom sample depth of approximately -50 ft NAVD 88. The lowest concentrations are at G-35 where the levels are minimal to about elevation -41 ft NAVD 88, below which they increase to values between 4 and 8 ppt. Golder Associates Inc. (2011b) reports that the historical chloride levels at those depths in the 1970s ranged to about 10 ppt.

What is clear from the vertical profiles is the quick change in chloride values with depth indicating a fairly sharp transition in water quality. This transitional boundary moves up and down depending on seasonal variations. The profiles also show the presence of a shallow predominantly freshwater (per FDEP, F.A.C. 62-302.200) lens in L-3, L-5, G-21, and G-35. The chloride values at G-28 indicate higher chloride concentrations than found in the other wells in the upper 15 ft or so of the aquifer; however, that may be, in part, an artifact of the well construction. Unlike the other L and G series wells that have screen beginning near the surface, G-28 is hard-cased to 16.6 ft below the top of casing. Thus, water measured from the surface to the downward extent of the hard casing is predominantly reflective of the water quality at 16.6 ft below the top of casing.

6.4.4 Interceptor Ditch Operation and Transect Surface Water Levels

Surface water levels have been traditionally measured in L-31E, the ID, and C-32 as required by the ID operation procedure. The water levels are measured in these canals at pumping Lines A, B, C, D, and E, as shown previously on Figure 6.1-1. Water levels recorded during the past 12-month monitoring period are presented on Figures 6.4-12 through 6.4-16. The data for these figures are based on the manual readings by FPL staff at all five transect locations.

With a few exceptions, water levels in the L-31E were higher than in the C-32 at all transects. The notable exception was in April and/or May 2014 when the CCS was higher for up to one to three weeks in transects A, B, and C. Table 6.4-1 shows the range in head differences in L-31E and C-32 at each transect. At all transects, the water elevations in the L-31E were higher than ID water elevations. Table 6.4-1 shows the range in head differences in L-31E and ID at each transect.

While none of the information presented in the above figures is corrected for density, Figures 6.4-17 through 6.4-19 illustrates differences in water levels between L-31 and the CCS (C-32) and differences between L-31E and the ID for transects A, C, and E, respectively, considering density differences (freshwater head equivalents). Basically, the figures show how much difference in elevation the L-31E canal is in relation to the CCS and ID, as well as the difference in water level between the ID and CCS. For these graphs, the undesired scenario is when both the black line and the orange line are less than zero (both the CCS and ID are higher than L-31E) and the black line is lower than the orange line (CCS is also higher than ID). This rarely happens and when it occurs, it is for a very short duration.

Operation of the ID pumps is shown on Figure 6.4-20, along with the measured rainfall. Table 6.4-2 shows how many hours and days each pump operated every month. Data in Table 6.4-3 identifies when pumping was required by the water levels and when such pumping actually occurred.

6.4.5 Pressure Gradient Density Correction

In the previous reports for the ID, Golder Associates Inc. (2011b) and FPL (2012) presented analysis of the data to assess groundwater flow based on pressure gradients between L-3 and G-21 and L-5 and G-28. The analysis was to address the Agencies' concerns that water level readings taken in wells and surface water bodies do not necessarily represent the actual pressure gradients within the ground or surface water because of differences in density and temperature between locations. Because surface water levels are being measured as proxies for groundwater levels in order to estimate groundwater movement, and groundwater levels are being estimated as proxies for pressure gradients, their analyses dealt with groundwater pressure gradients only.

This type of analysis lends itself favorably to the L and G series wells since they are screened across their entire (or nearly entire) depth, and temperature and specific conductance data are available at 1-ft intervals. This is important since the temperature and specific conductance do not vary linearly with depth. The temperature and specific conductance data can be used to calculate a density at each measurement point.

Using specific conductance and temperature data collected from the September 2013 sampling event, the water densities by depth for wells L-3 and G-21 have been calculated and are plotted on Figure 6.4-21. Based on the densities shown on Figure 6.4-21, the pressure over depth (pressure gradient) for wells L-3 and G-21 for the September 2013 sampling event has been calculated and is shown on Figure 6.4-22. The data shown on Figure 6.4-22 indicate that the pressure gradient at well G-21 is slightly higher than that at well L-3 from the surface down to about -43 ft NAVD 88, below which that gradient is slightly higher at L-3 than at G-21. Because the pressure gradients are close in value, it is easier to see the difference when plotted as shown on Figure 6.4-23, which illustrates the pressure excess or deficit between the G and the corresponding L series wells. Similar analyses were performed for wells G-21 and L-3 during the March 2014 sampling event (Figure 6.4-24). These same analyses were also conducted for well G-28 versus well L-5 during the September 2013 sampling episode (Figure 6.4-25) and for well G-28 versus well L-5 during the March 2014 sampling episode (Figure 6.4-26).

In all of the cases examined (G-21 and L-3 in September 2013, G-21 and L-3 in March 2014, G-28 and L-5 in September 2013, and G-28 and L-5 in March 2014), the groundwater gradient is seaward in the upper levels of the aquifer, down to approximately -43 ft to -45 ft NAVD 88 for well G-21 versus well L-3, and down to about -33 ft to -38 ft NAVD 88 for well G-28 versus well L-5. In the Comprehensive Pre-Uprate Report, March 2012 was noted as having a landward gradient from L-3 to G-21 for the entire water column; however, further assessment indicates that was not the case: a seaward gradient existed down to an elevation of -13 ft NAVD 88. The operation of the ID still maintains a seaward gradient from the L-31E and/or the L-series wells in the upper levels of the aquifer.

TABLES

Table 6.4-1 Range in Surface Water Head Differences

Date	Line A		Line B		Line C		Line D		Line E	
	L31-C32	L31-ID	L31-C32	L31-ID	L31-C32	L31-ID	L31-C32	L31-ID	L31-C32	L31-ID
6/5/13	0.42	0.3	0.45	0.25	0.42	0.19	0.61	0.19	0.63	0.17
6/17/13	0.47	0.29	0.48	0.3	0.48	0.22	0.8	0.25	0.87	0.22
6/26/13	0.21	0.29	0.11	0.25	0.29	0.05	0.73	0.25	0.84	0.22
6/27/13	0.17	0.49	0.18	0.43	0.23	0.41	0.64	0.31	0.73	0.24
6/28/13	0.14	0.28	0.18	0.24	0.24	0.21	0.68	0.26	0.8	0.22
7/1/13	0.01	0.29	0.08	0.23	0.19	0.24	0.65	0.27	0.82	0.21
7/2/13	0.01	0.47	0.02	0.4	0.14	0.37	0.61	0.37	0.79	0.3
7/5/13	0.36	0.38	0.28	0.24	0.3	0.18	0.71	0.2	0.82	0.15
7/8/13	0.28	0.28	0.32	0.21	0.36	0.16	0.75	0.2	0.84	0.14
7/16/13	0.38	0.24	0.44	0.22	0.38	0.15	0.72	0.15	0.78	0.09
8/1/13	0.54	0.28	0.6	0.2	0.63	0.17	0.86	0.19	0.84	0.12
8/19/13	0.36	0.19	0.46	0.18	0.5	0.12	0.78	0.12	0.83	0.09
9/3/13	0.43	0.27	0.47	0.17	0.52	0.12	0.78	0.16	0.83	0.11
9/19/13	0.5	0.2	0.52	0.17	0.52	0.03	0.74	0.08	0.74	0.04
10/2/13	0.64	0.18	0.67	0.17	0.63	0.09	0.78	0.08	0.76	0.02
10/16/13	0.6	0.14	0.63	0.11	0.63	0.07	0.81	0.08	0.9	0.08
12/3/13	0.42	0.14	0.44	0.1	0.45	0.05	0.6	0.08	0.56	0.04
12/10/13	0.36	0.18	0.37	0.12	0.43	0.1	0.58	0.12	0.57	0.06
12/16/13	0.35	0.15	0.39	0.12	0.43	0.08	0.62	0.11	0.54	0.06
12/23/13	0.37	0.19	0.47	0.16	0.57	0.14	0.7	0.2	0.74	0.16
1/2/14	0.28	0.18	0.37	0.17	0.48	0.16	0.6	0.16	0.64	0.14
1/6/14	0.37	0.19	0.47	0.16	0.57	0.14	0.8	0.17	0.7	0.12

Table 6.4-1 Range in Surface Water Head Differences

Date	Line A		Line B		Line C		Line D		Line E	
	L31-C32	L31-ID	L31-C32	L31-ID	L31-C32	L31-ID	L31-C32	L31-ID	L31-C32	L31-ID
1/13/14	0.4	0.21	0.45	0.17	0.51	0.13	0.7	0.17	0.65	0.11
1/21/14	0.32	0.25	0.39	0.15	0.51	0.18	0.78	0.22	0.7	0.18
1/27/14	0.29	0.24	0.36	0.2	0.49	0.21	0.76	0.22	0.73	0.17
2/3/14	0.32	0.19	0.31	0.08	0.5	0.14	0.7	0.12	0.73	0.11
2/10/14	0.35	0.24	0.44	0.23	0.52	0.22	0.76	0.2	0.74	0.14
2/17/14	0.44	0.2	0.49	0.19	0.57	0.15	0.82	0.2	0.73	0.15
2/24/14	0.32	0.24	0.4	0.2	0.5	0.2	0.78	0.22	0.77	0.15
2/26/14	0.2	0.19	0.3	0.21	0.41	0.18	0.73	0.19	0.77	0.15
2/28/14	0.2	0.51	0.3	0.53	0.42	0.17	0.42	0.17	0.73	0.12
3/3/14	0.24	0.19	0.32	0.19	0.43	0.17	0.72	0.19	0.75	0.14
3/4/14	0.23	0.65	0.34	0.67	0.39	0.21	0.69	0.25	0.7	0.21
3/6/14	-0.07	0.21	0.2	0.22	0.38	0.19	0.69	0.2	0.73	0.13
3/7/14	0.28	0.8	0.4	0.82	0.58	0.2	0.83	0.21	0.79	0.17
3/10/14	0.26	0.21	0.32	0.21	0.44	0.15	0.69	0.16	0.67	0.08
3/11/14	0.18	0.19	0.32	0.21	0.41	0.14	0.69	0.17	0.68	0.09
3/12/14	0.16	0.73	0.25	0.75	0.38	0.17	0.66	0.17	0.72	0.12
3/13/14	0.24	0.23	0.32	0.24	0.38	0.14	0.66	0.11	0.64	0.08
3/14/14	0.26	0.74	0.34	0.74	0.35	0.17	0.62	0.2	0.65	0.15
3/17/14	-0.08	0.22	0.1	0.22	0.27	0.17	0.59	0.14	0.6	0.08
3/18/14	0.07	0.2	0.14	0.22	0.22	0.04	0.62	0.03	0.7	0.01
3/18/14	0.2	0.25	0.29	0.24	0.37	0.25	0.68	0.18	0.69	0.09
3/19/14	0.29	0.41	0.36	0.42	0.46	0.34	0.68	0.22	0.68	0.18

Table 6.4-1 Range in Surface Water Head Differences

Date	Line A		Line B		Line C		Line D		Line E	
	L31-C32	L31-ID	L31-C32	L31-ID	L31-C32	L31-ID	L31-C32	L31-ID	L31-C32	L31-ID
3/24/14	0.44	0.23	0.49	0.2	0.48	0.14	0.61	0.16	0.61	0.09
3/31/14	0.56	0.18	0.61	0.21	0.58	0.12	0.73	0.14	0.68	0.08
4/7/14	0.13	0.22	0.23	0.23	0.29	0.09	0.52	0.1	0.61	0.05
4/8/14	0.04	0.59	0.15	0.57	0.27	0.21	0.53	0.2	0.64	0.14
4/9/14	0.31	0.19	0.39	0.22	0.39	0.11	0.59	0.11	0.58	0.06
4/14/14	0.06	0.26	0.17	0.27	0.12	0.1	0.49	0.13	0.6	0.04
4/15/14	-0.06	0.46	0.08	0.5	0.07	0.26	0.42	0.15	0.54	0.11
4/16/14	0.1	0.26	0.16	0.28	0.08	0.07	0.41	0.05	0.52	0.02
4/17/14	0.15	0.67	0.23	0.67	0.06	0.36	0.35	0.15	0.42	0.08
4/18/14	0.01	0.13	0.11	0.15	0.34	0.18	0.67	0.19	0.82	0.12
4/19/14	0.04	0.54	0.14	0.56						
4/21/14	0.16	0.22	0.24	0.23	0.25	0.12	0.55	0.12	0.62	0.04
4/22/14	0.16	0.33	0.22	0.4	0.23	0.28	0.54	0.19	0.6	0.07
4/22/14	-0.01	0.24	0.17	0.24	0.06	0.08	0.5	0.1	0.6	0.03
4/23/14	0	0.37	0.03	0.4	0.04	0.28	0.51	0.16	0.6	0.14
4/23/14	-0.01	0.19	0.1	0.22	0.08	0.08	0.52	0.08	0.63	0.02
4/24/14	-0.1	0.42	0.01	0.44	0.03	0.31	0.49	0.17	0.57	0.07
4/25/14	-0.04	0.2	0.04	0.22	0.08	0.1	0.48	0.08	0.48	0.06
4/26/14	-0.08	0.4	0.04	0.42	0.05	0.3	0.45	0.13	0.55	0.05
4/28/14	-0.08	0.18	0.01	0.17	0.1	0.1	0.5	0.11	0.6	0.04
4/29/14	-0.06	0.4	0.03	0.43	0.11	0.33	0.45	0.15	0.59	0.11
4/29/14	-0.11	0.19	0.08	0.2	0.13	0.12	0.51	0.11	0.62	0.05

Table 6.4-1 Range in Surface Water Head Differences

Date	Line A		Line B		Line C		Line D		Line E	
	L31-C32	L31-ID	L31-C32	L31-ID	L31-C32	L31-ID	L31-C32	L31-ID	L31-C32	L31-ID
4/30/14							0.45	0.19	0.62	0.13
4/30/14	-0.13	0.41	0.03	0.42	0.13	0.4				
5/2/14	-0.16	0.17	-0.06	0.16	0.11	0.11	0.44	0.09	0.71	0.05
5/3/14	-0.22	0.52	-0.08	0.52	0.03	0.48	0.43	0.2	0.76	0.12
5/5/14	0.09	0.19	0.15	0.2	0.19	0.09	0.54	0.08	0.77	0.01
5/6/14	-0.01	0.45	0.09	0.48	0.08	0.34	0.45	0.13	0.41	0.06
5/7/14	-0.04	0.24	0.08	0.26	0.02	0.08	0.38	0.06	0.4	0
5/8/14	-0.1	0.44	0	0.44	0.03	0.3	0.3	0.1	0.4	0.04
5/9/14	-0.12	0.2	-0.04	0.24	-0.05	0.05	0.3	0.08	0.39	0
5/10/14	-0.14	0.5	-0.04	0.6	-0.06	0.44	0.26	0.13	0.36	0.06
5/12/14	-0.19	0.28	-0.1	0.25	-0.14	0.04	0.24	0	0.35	-0.04
5/13/14	-0.18	0.48	-0.06	0.6	-0.15	0.32	0.28	0.31	0.34	0.08
5/13/14	-0.15	0.21	-0.02	0.24	-0.12	0	0.2	-0.02	0.32	-0.06
5/14/14	-0.22	0.52	-0.1	0.56	-0.13	0.36	0.21	0.28	0.34	0.08
5/15/14	-0.26	0.26	-0.1	0.31	0.04	0.32			0.57	0.19
5/16/14	0.08	0.12	0.17	0.14	0.31	0.15	0.41	0.31	0.66	0.08
5/17/14	0.14	0.5	0.28	0.54	0.39	0.21	0.64	0.14	0.68	0.12
5/19/14	0.18	0.18	0.25	0.19	0.34	0.14	0.67	0.21	0.69	0.09
5/20/14	0.25	0.59	0.27	0.57	0.34	0.2	0.65	0.15	0.65	0.15
5/20/14	0.17	0.17	0.28	0.2	0.37	0.18	0.59	0.19	0.69	0.11
5/21/14	0.2	0.63	0.25	0.61	0.36	0.24	0.63	0.17	0.65	0.15
5/21/14	0.19	0.23	0.28	0.24	0.38	0.19	0.62	0.22	0.66	0.1

Table 6.4-1 Range in Surface Water Head Differences

Date	Line A		Line B		Line C		Line D		Line E	
	L31-C32	L31-ID	L31-C32	L31-ID	L31-C32	L31-ID	L31-C32	L31-ID	L31-C32	L31-ID
5/22/14	0.15	0.63	0.22	0.62	0.35	0.26	0.63	0.17	0.68	0.29
5/22/14	0.08	0.2	0.18	0.23	0.29	0.19	0.63	0.26	0.64	0.22
5/23/14	0.02	0.42	0.12	0.46	0.24	0.32	0.59	0.19	0.54	0.18
5/27/14	-0.04	0.21	0.1	0.17	0.07	0.05	0.52	0.25	0.45	0.01
5/28/14	-0.14	0.44	-0.04	0.45	-0.05	0.3	0.52	0.25	0.38	0.1
5/29/13	-0.12	0.2	0.02	0.24	0.02	-0.02	0.38	0.05	0.39	0
5/30/14	-0.09	0.4	-0.02	0.43	-0.08	0.28	0.27	0.14	0.3	0.06

Table 6.4-2. Hours and Days of ID Pump Operation per Month

ID	2013							2014				
Pump	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
N1	24 (1)	24 (1)	0.0	0.0	0.0	0.0	0.0	0.0	43 (1.8)	62 (2.6)	62 (2.6)	84 (3.5)
N2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5 (0.2)	43 (1.8)	134 (3.5)
S2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22 (0.9)

Note:
Values are reported as 'Hours (Days)'.

Key:
ID = Identification.
N# = North.
S# = South.

Table 6.4-3. Pumping Summary

Date	Pump 1	Pump 2	Pump 3	Pump 4	Performed Pumping
6/26/2013	Yes				X
6/27/2013	Yes				X
6/28/2013	Yes				X
7/1/2013	Yes				X
7/2/2014	Yes				X
2/26/2014	Yes				X
2/28/2014	Yes				X
3/3/2014	Yes				X
3/4/2014	Yes				X
3/6/2014	Yes				X
3/11/2014	Yes				X
3/13/2014	Yes				X
3/17/2014	Yes				X
3/18/2014	Yes		Yes		X
3/19/2014	Yes				X
4/7/2014	Yes				X
4/14/2014	Yes				X
4/15/2014	Yes				X
4/16/2014	Yes		Yes		X
4/21/2014	Yes				X
4/22/2014	Yes				X
4/23/2014	Yes				X
4/24/2014			Yes		X
4/25/2014	Yes				X
4/28/2014	Yes				X
4/29/2014	Yes		Yes		X
4/30/2014			Yes		X

Table 6.4-3. Pumping Summary

Date	Pump 1	Pump 2	Pump 3	Pump 4	Performed Pumping
5/2/2014	Yes				X
5/5/2014			Yes		X
5/6/2014			Yes		X
5/7/2014			Yes		X
5/8/2014			Yes		X
5/9/2014	Yes		Yes		X
5/12/2014	Yes		Yes		X
5/13/2014			Yes		X
5/14/2014	Yes		Yes	Yes	X
5/15/2014				Yes	X
5/16/2014	Yes				X
5/19/2014	Yes				X
5/20/2014	Yes				X
5/21/2014	Yes				X
5/22/2014	Yes				X
5/23/2014	Yes				X
5/27/2014			Yes		X
5/28/2014			Yes		X
5/29/2014			Yes		X
5/30/2014			Yes		X

FIGURES

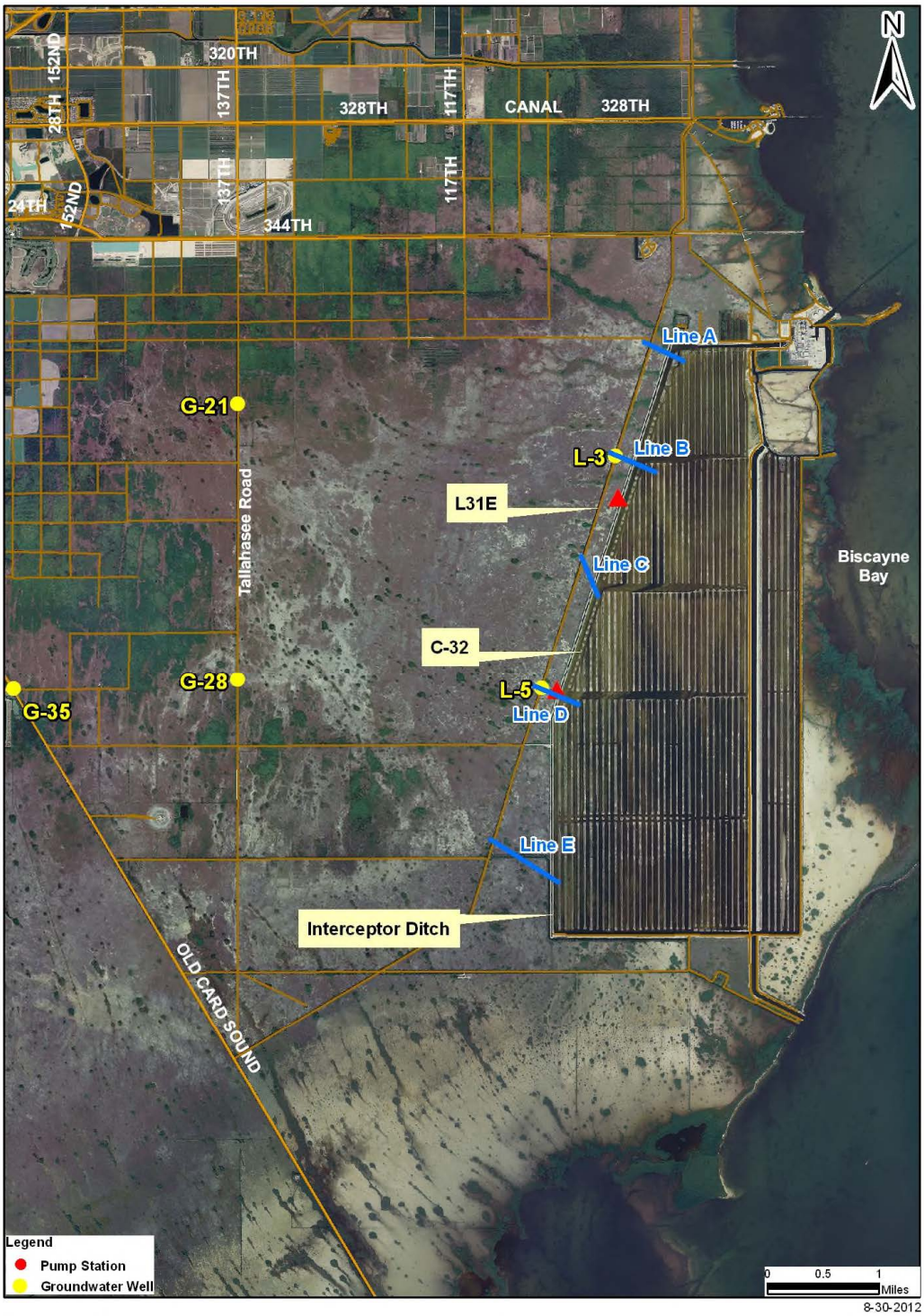


Figure 6.1-1. Historic ID Monitoring Wells and Transects.

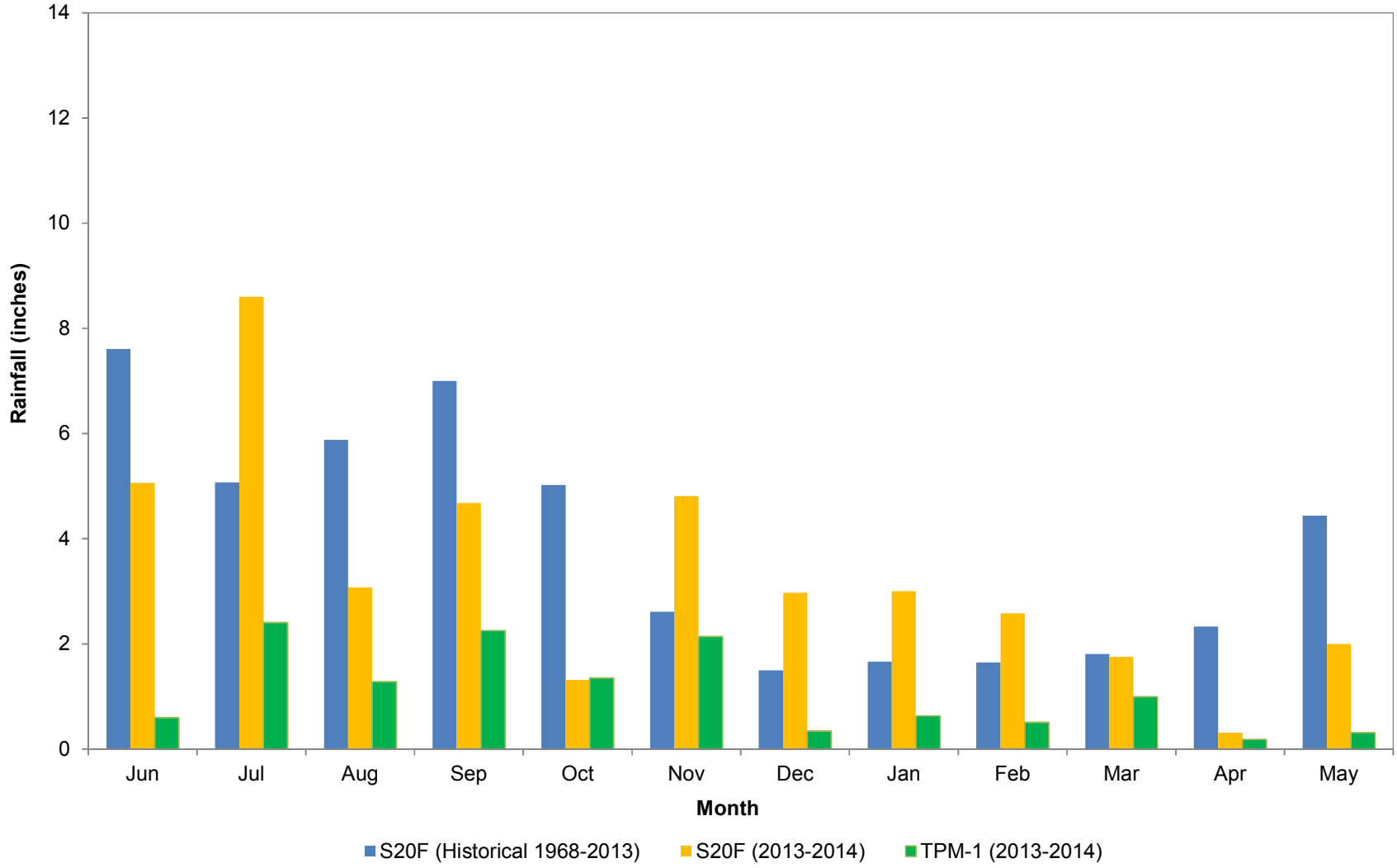


Figure 6.3-1. Comparison of ID Monitoring Period to Average Monthly Historic Rainfall.

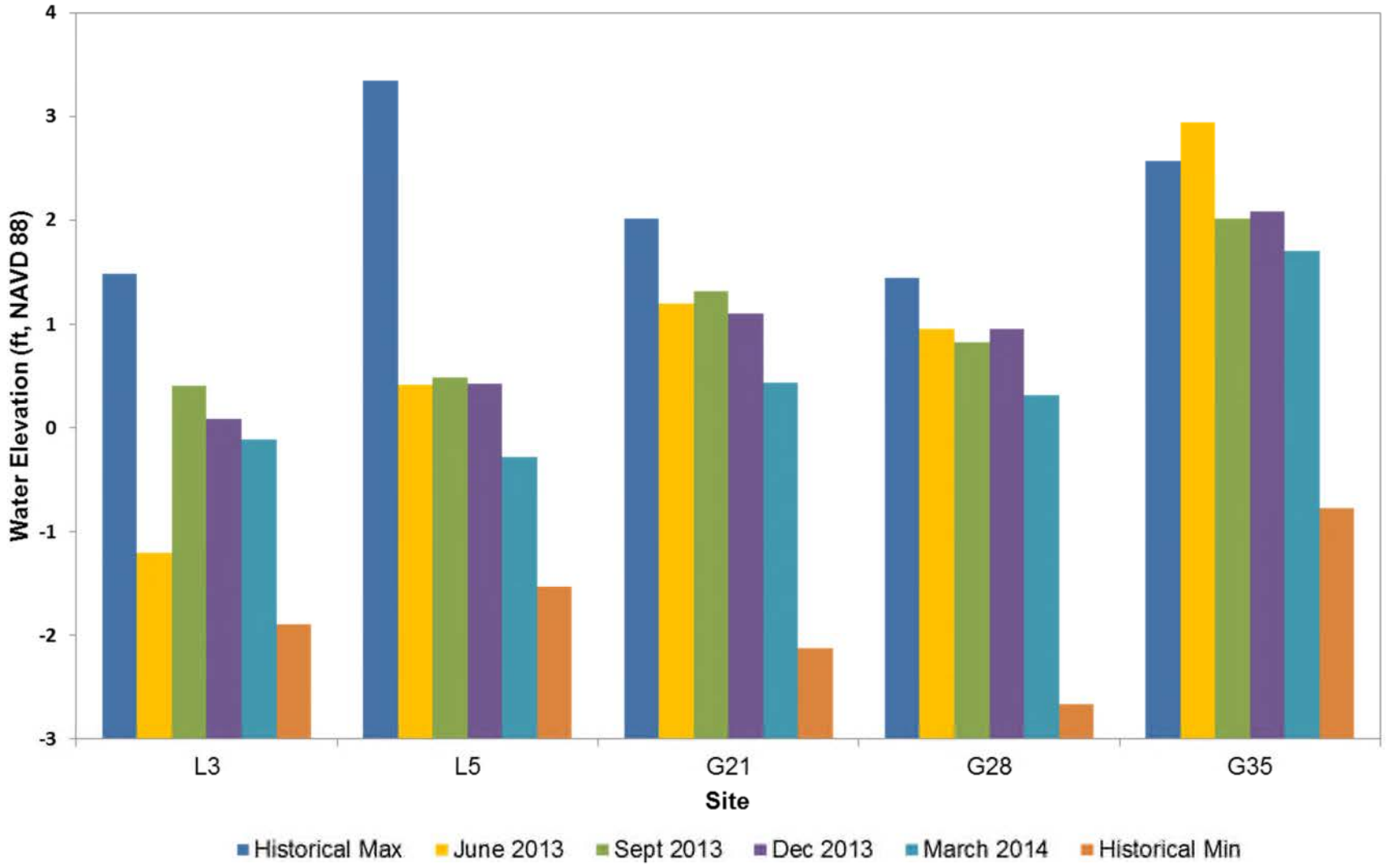


Figure 6.4-1. Historical Min and Max, and Quarterly L-3, L-5, G-21, G-28, and G-35 Groundwater Levels.

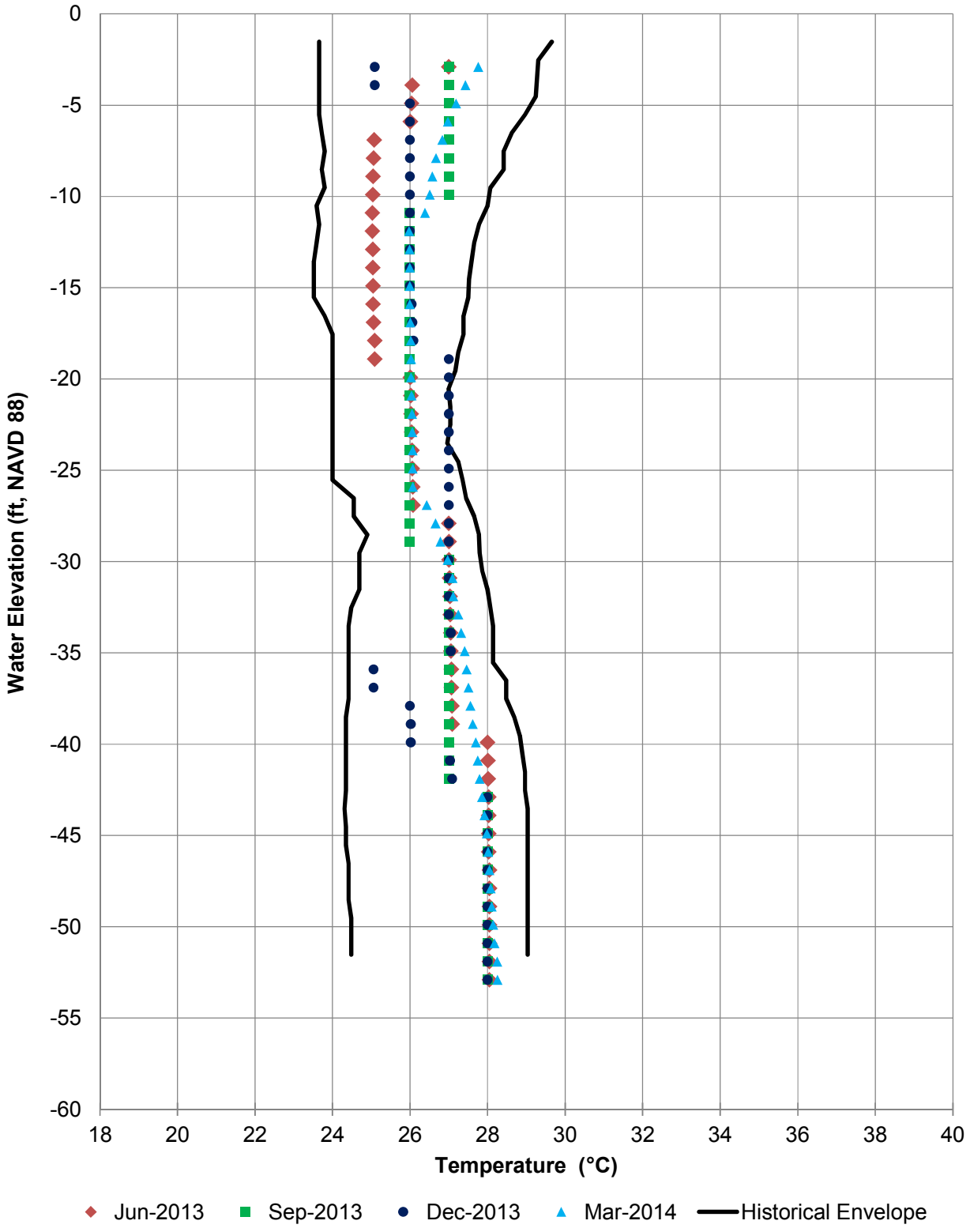


Figure 6.4-2. L-3 Vertical Temperature Profile June 2013 through March 2014.

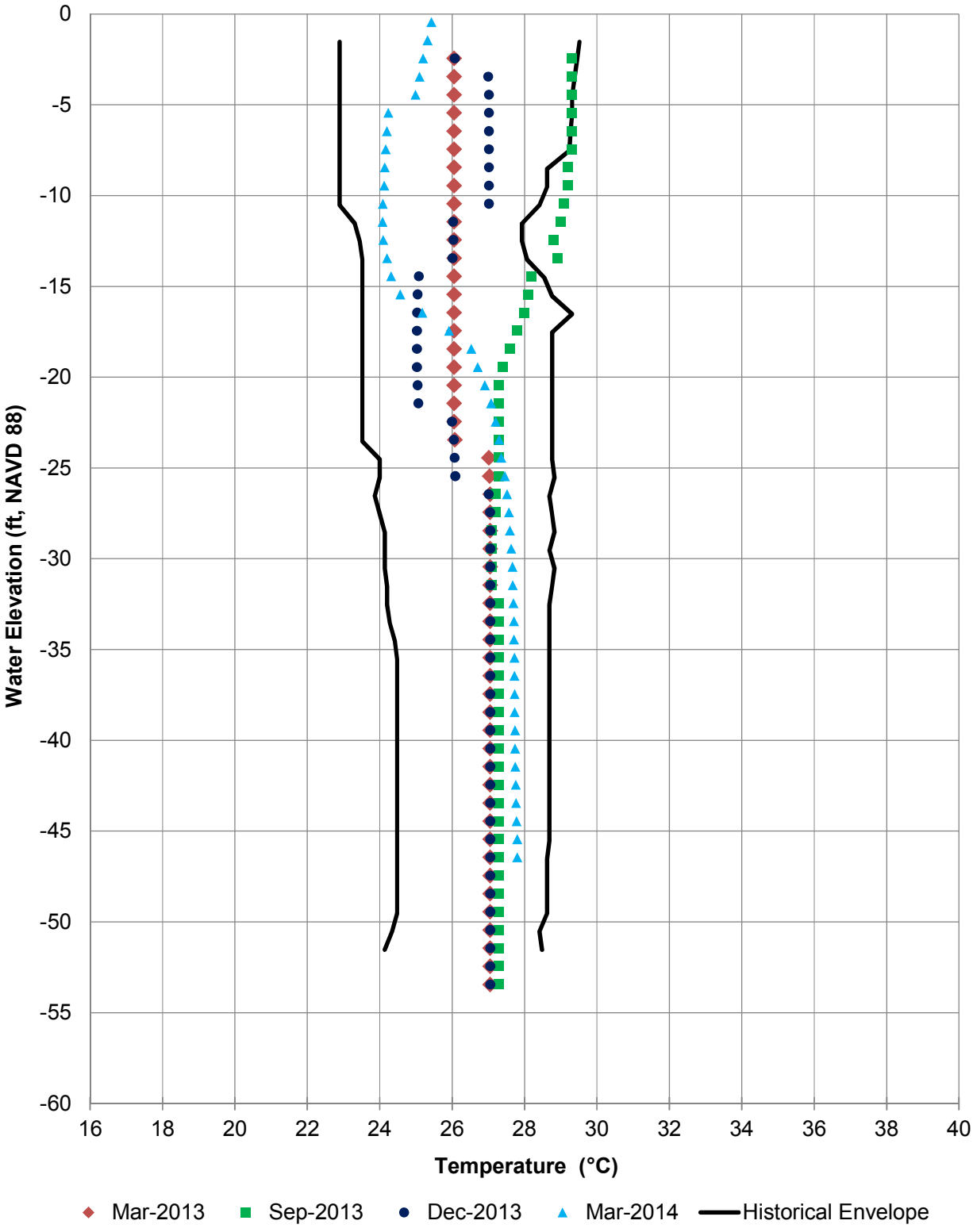


Figure 6.4-3. L-5 Vertical Temperature Profile June 2013 through March 2014.

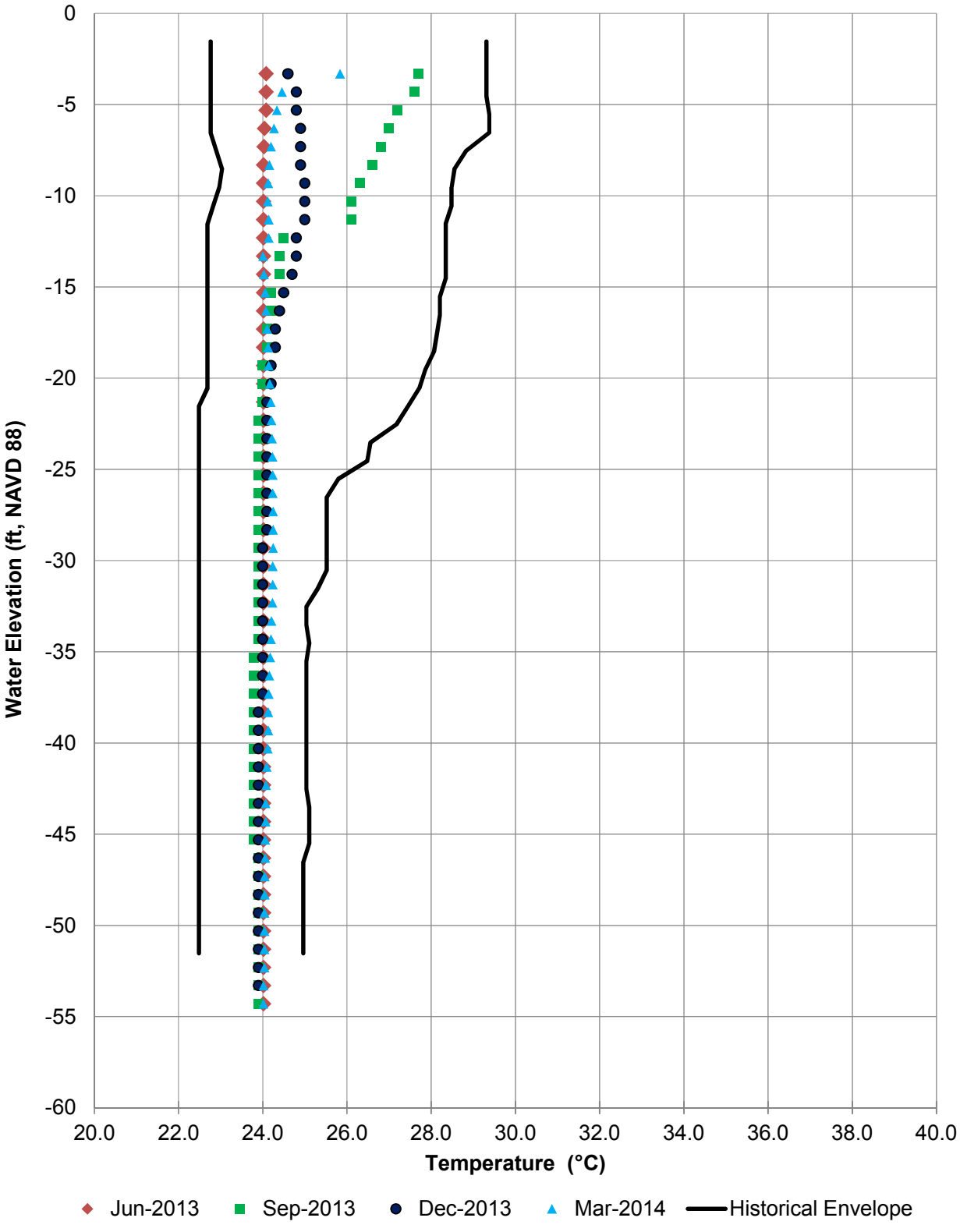


Figure 6.4-4. G-21 Vertical Temperature Profile June 2013 through March 2014.

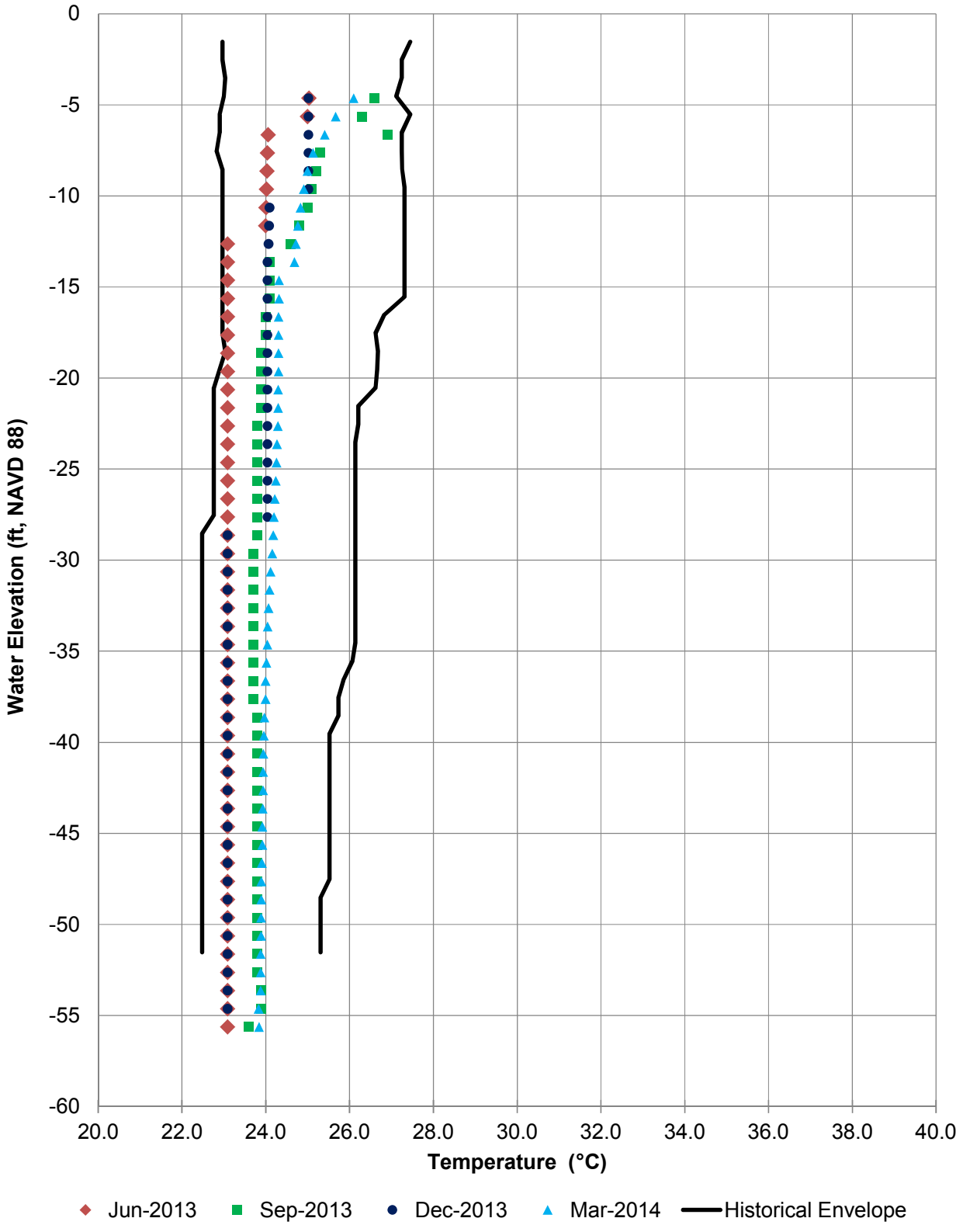


Figure 6.4-5. G-28 Vertical Temperature Profile June 2013 through March 2014.

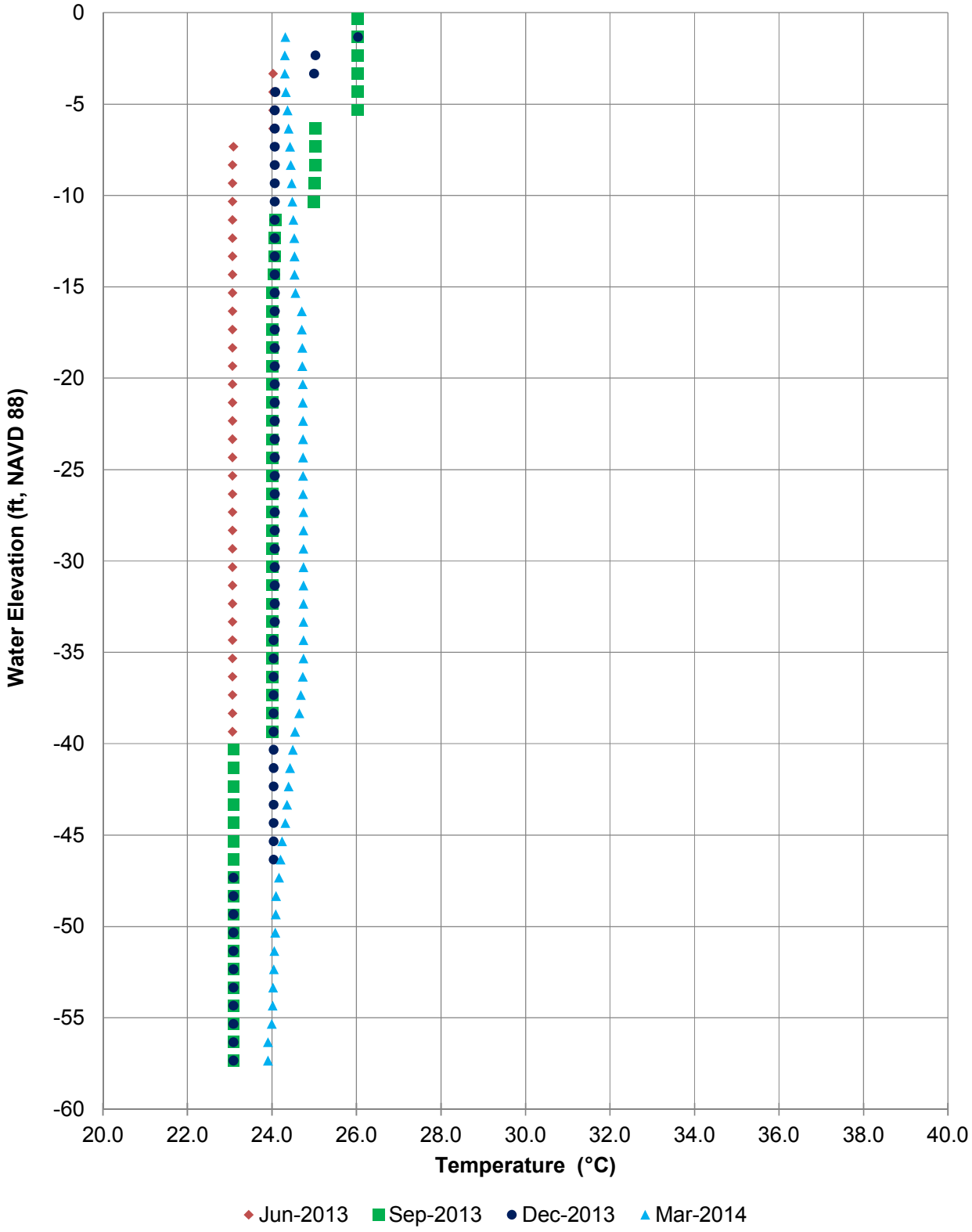


Figure 6.4-6. G-35 Vertical Temperature Profile June 2013 through March 2014.

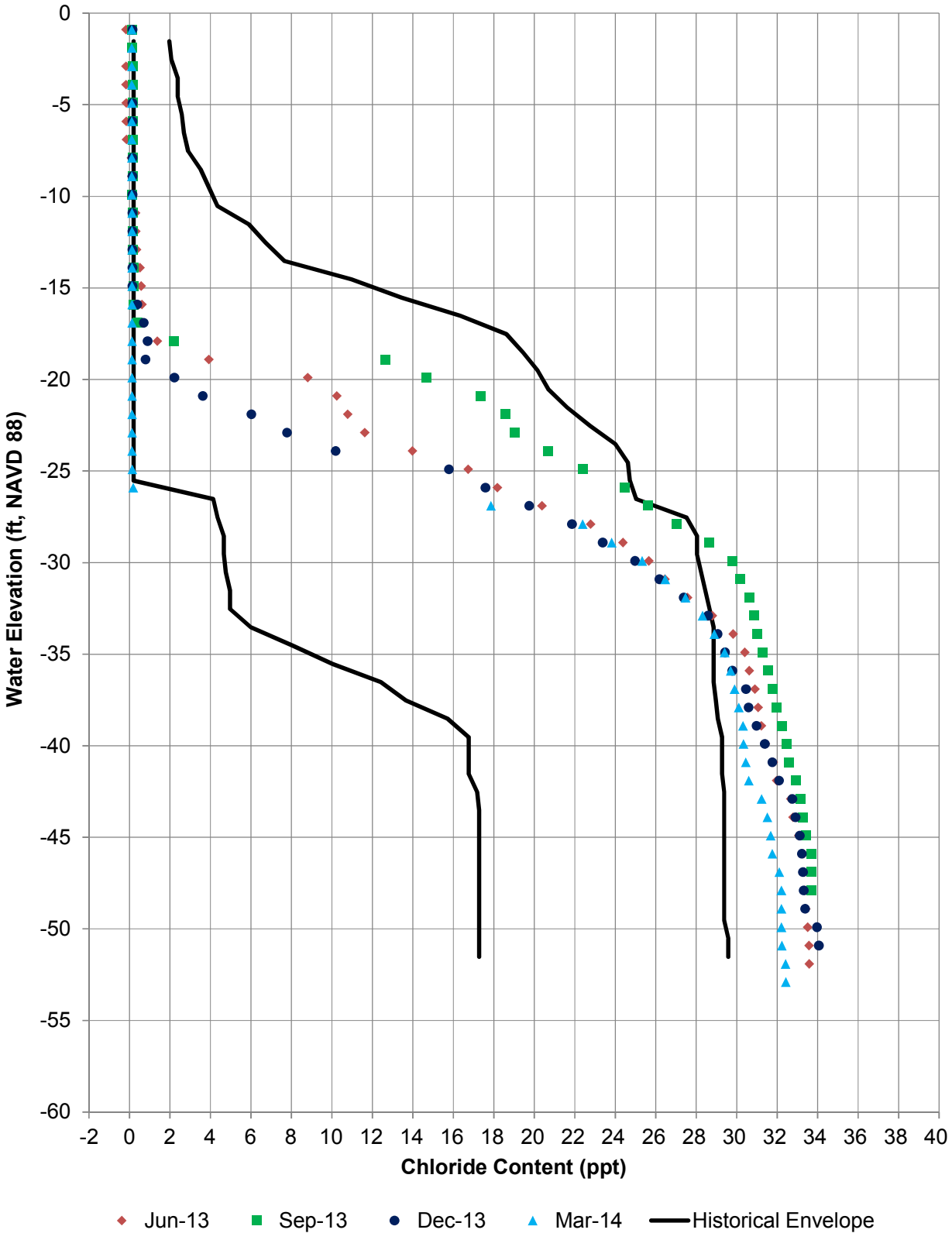


Figure 6.4-7. L-3 Vertical Chloride Profile June 2013 through March 2014.

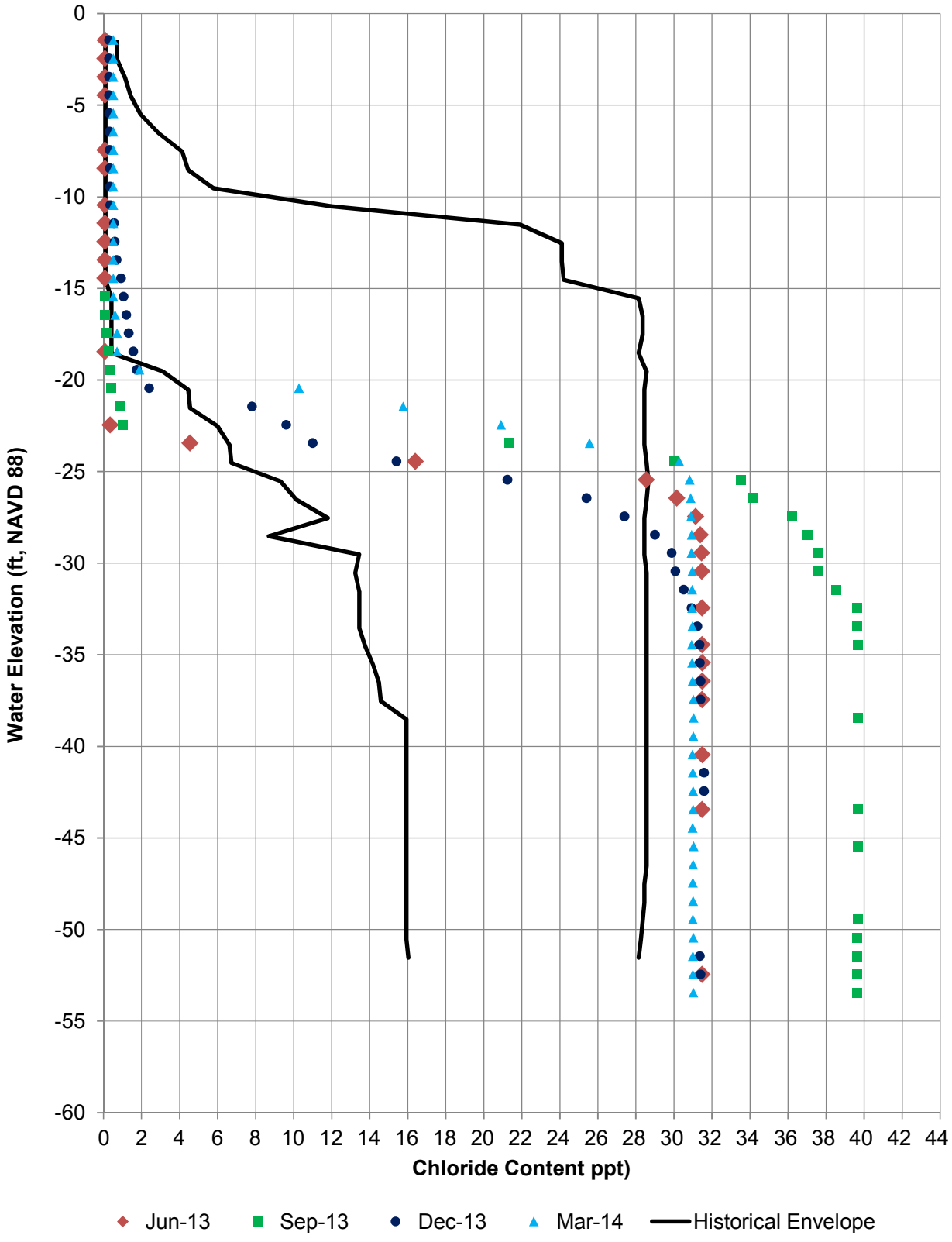


Figure 6.4-8. L-5 Vertical Chloride Profile June 2013 through March 2014.

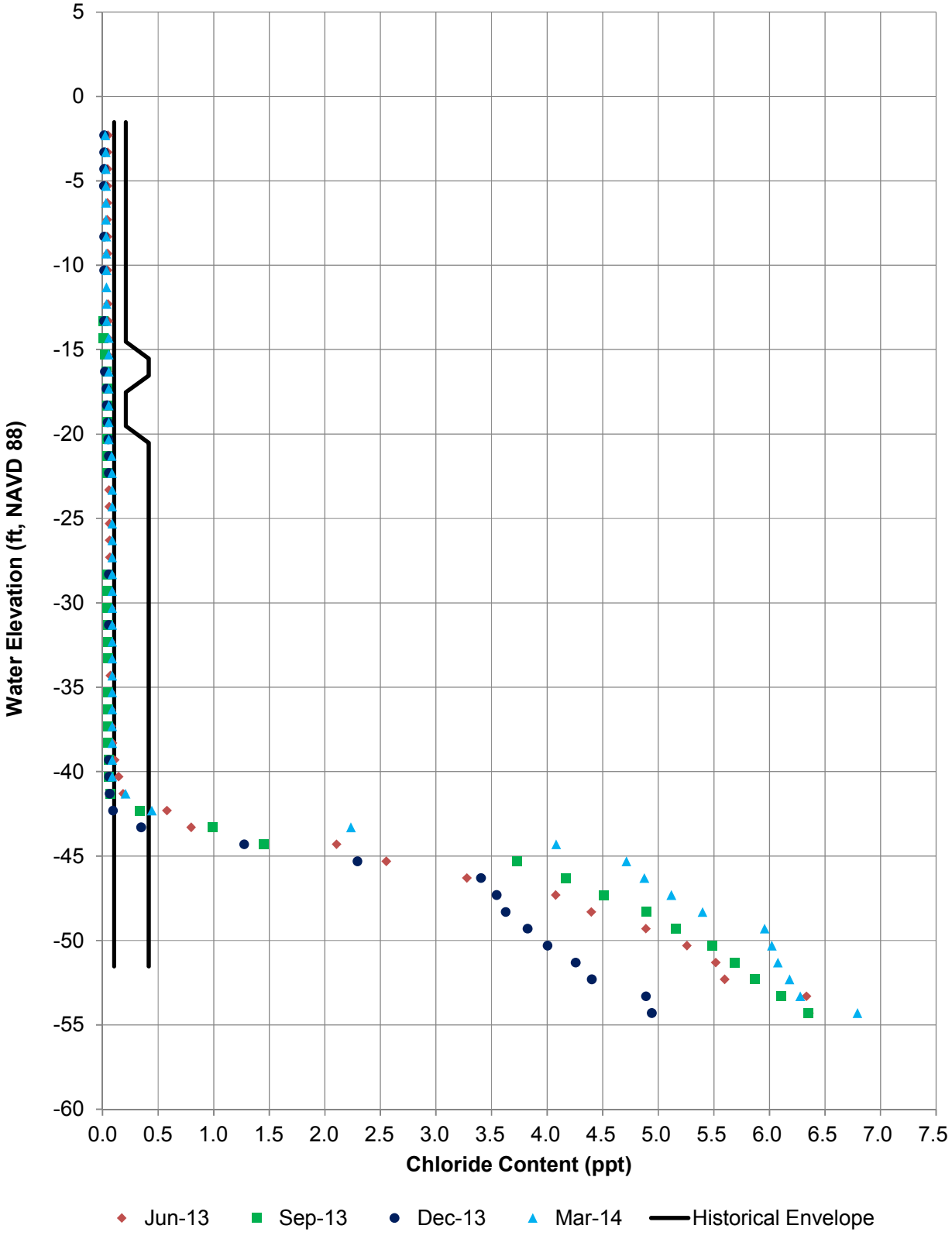


Figure 6.4-9. G-21 Vertical Chloride Profile June 2013 through March 2014.

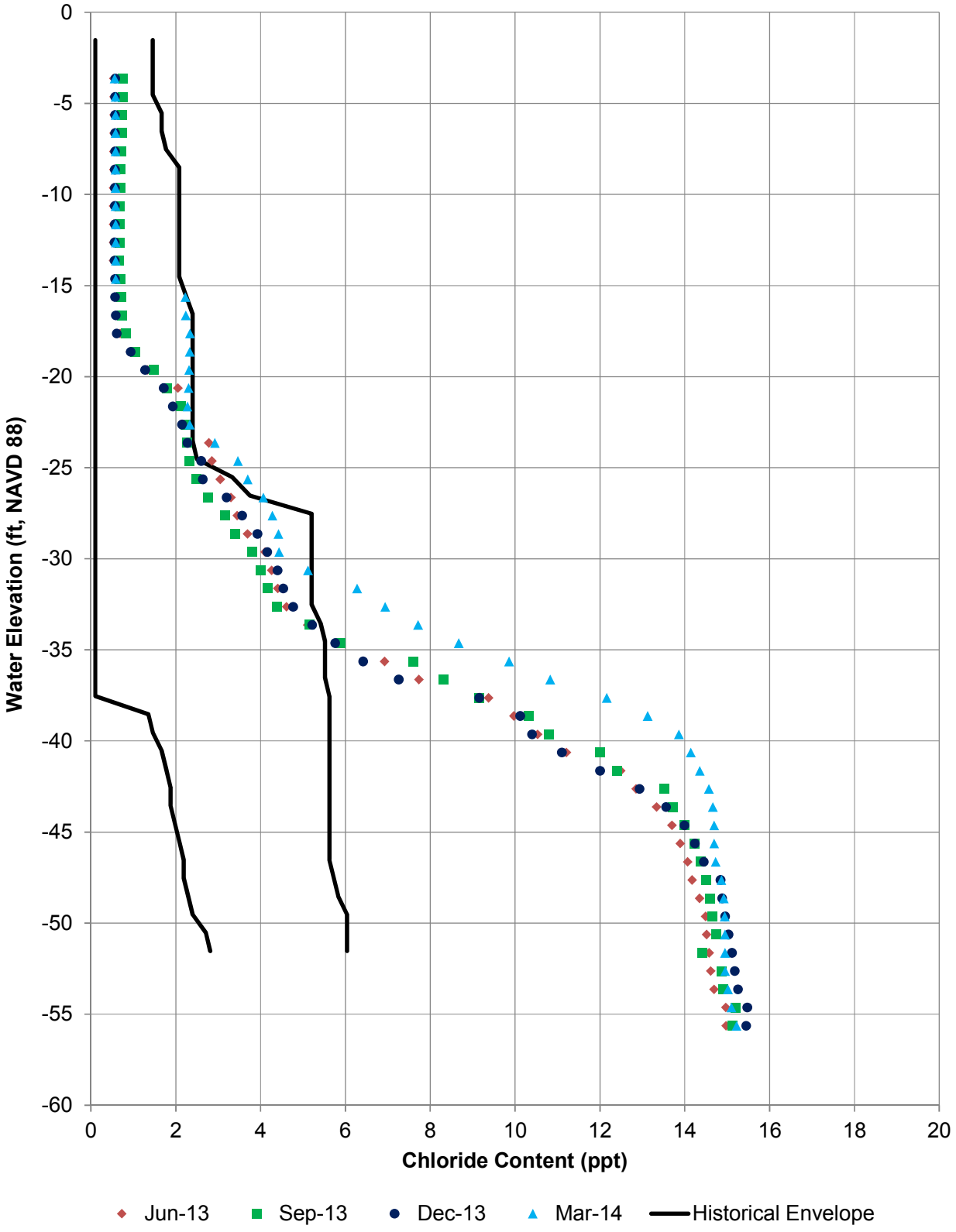


Figure 6.4-10. G-28 Vertical Chloride Profile June 2013 through March 2014.

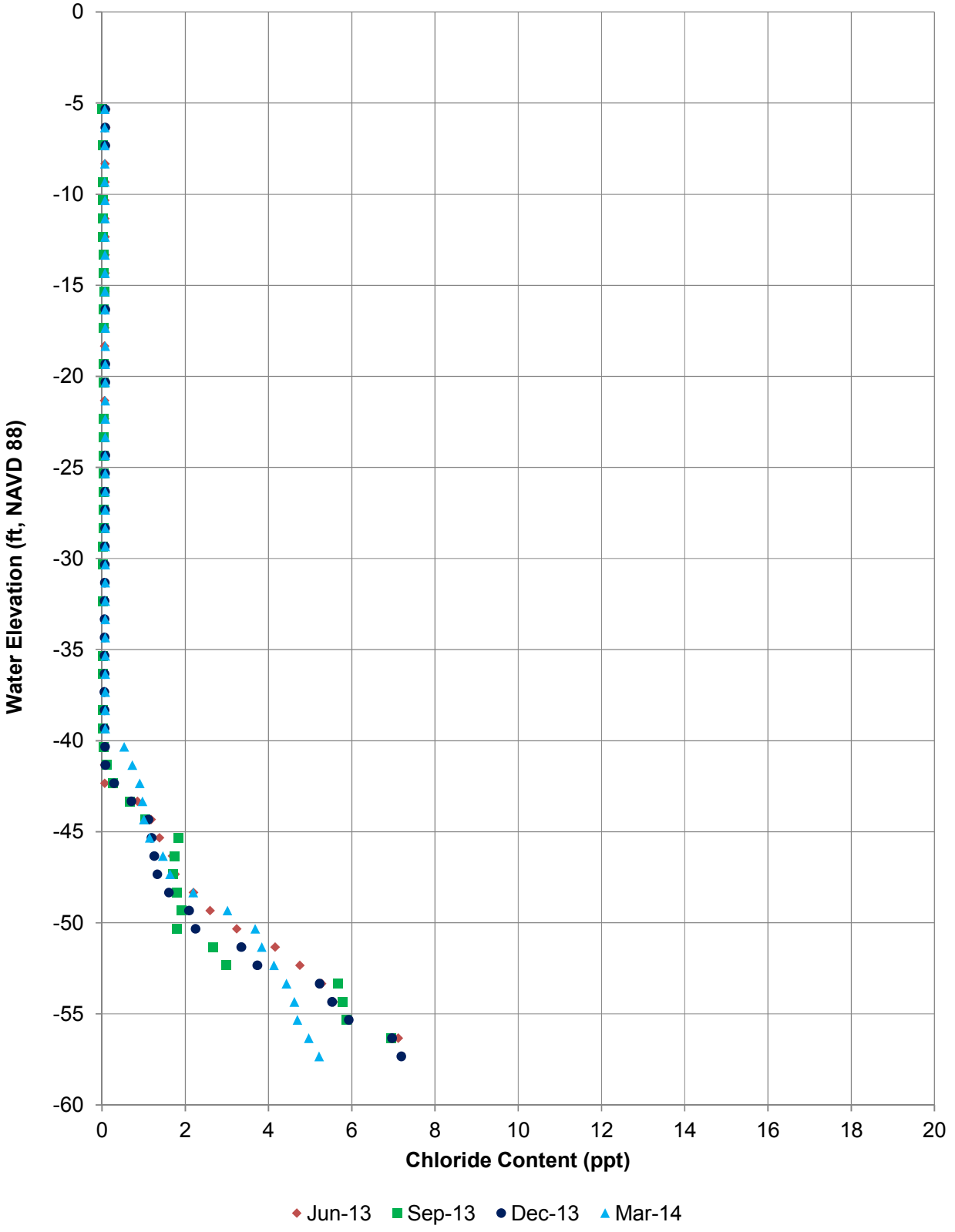


Figure 6.4-11. G-35 Vertical Chloride Profile June 2013 through March 2014.

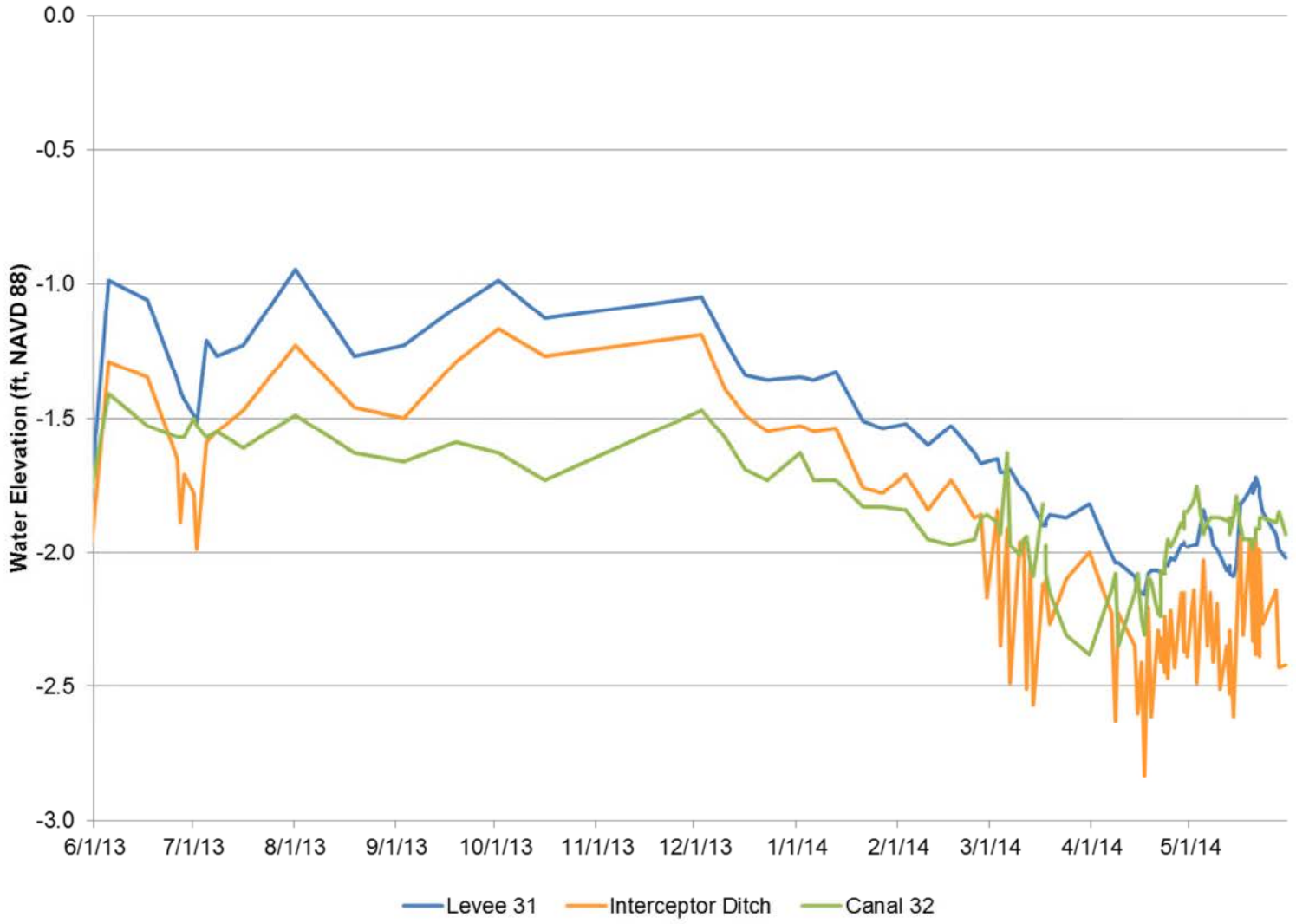


Figure 6.4-12. Transect A Water Levels June 2013 through May 2014.

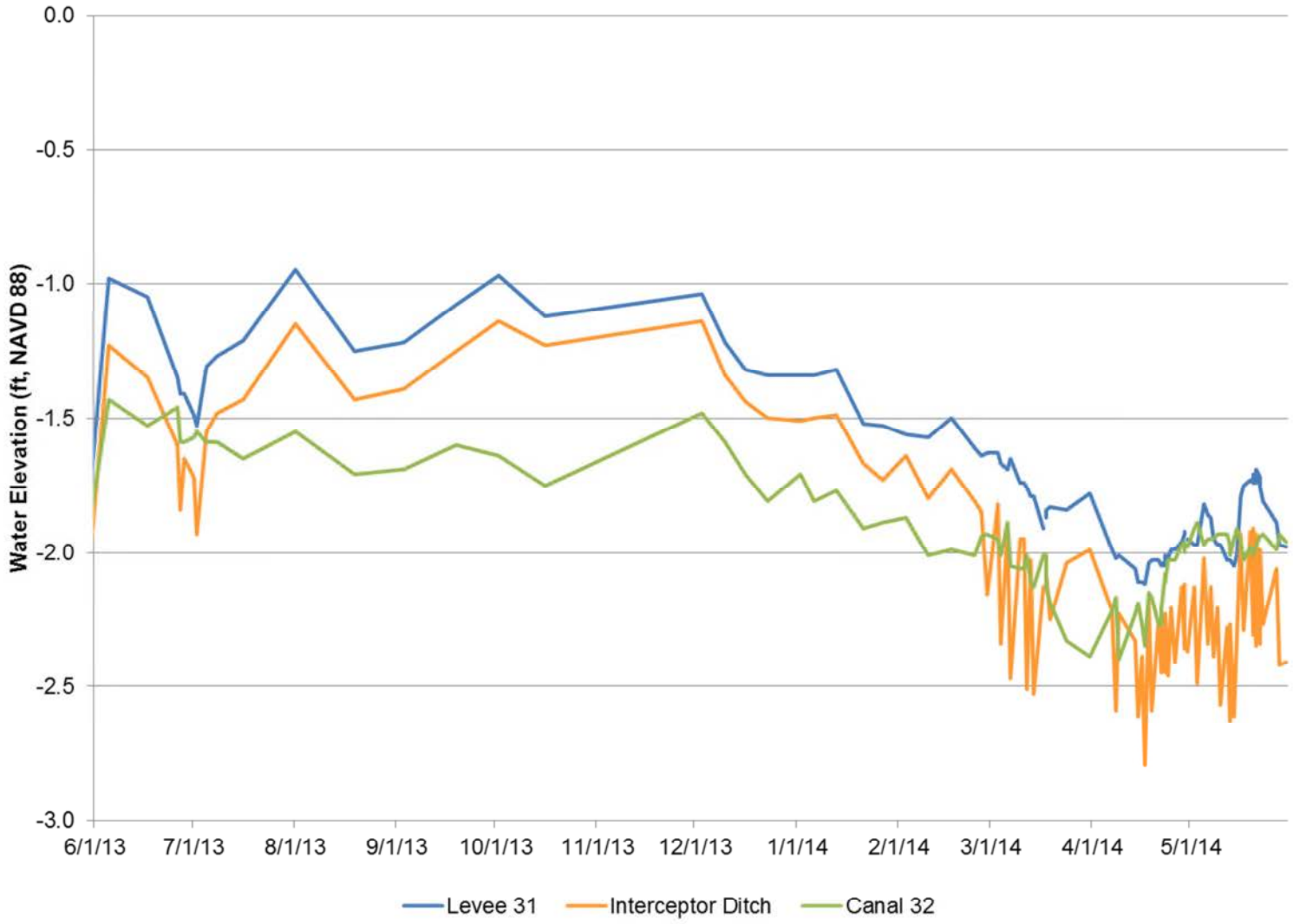


Figure 6.4-13. Transect B Water Levels June 2013 through May 2014.

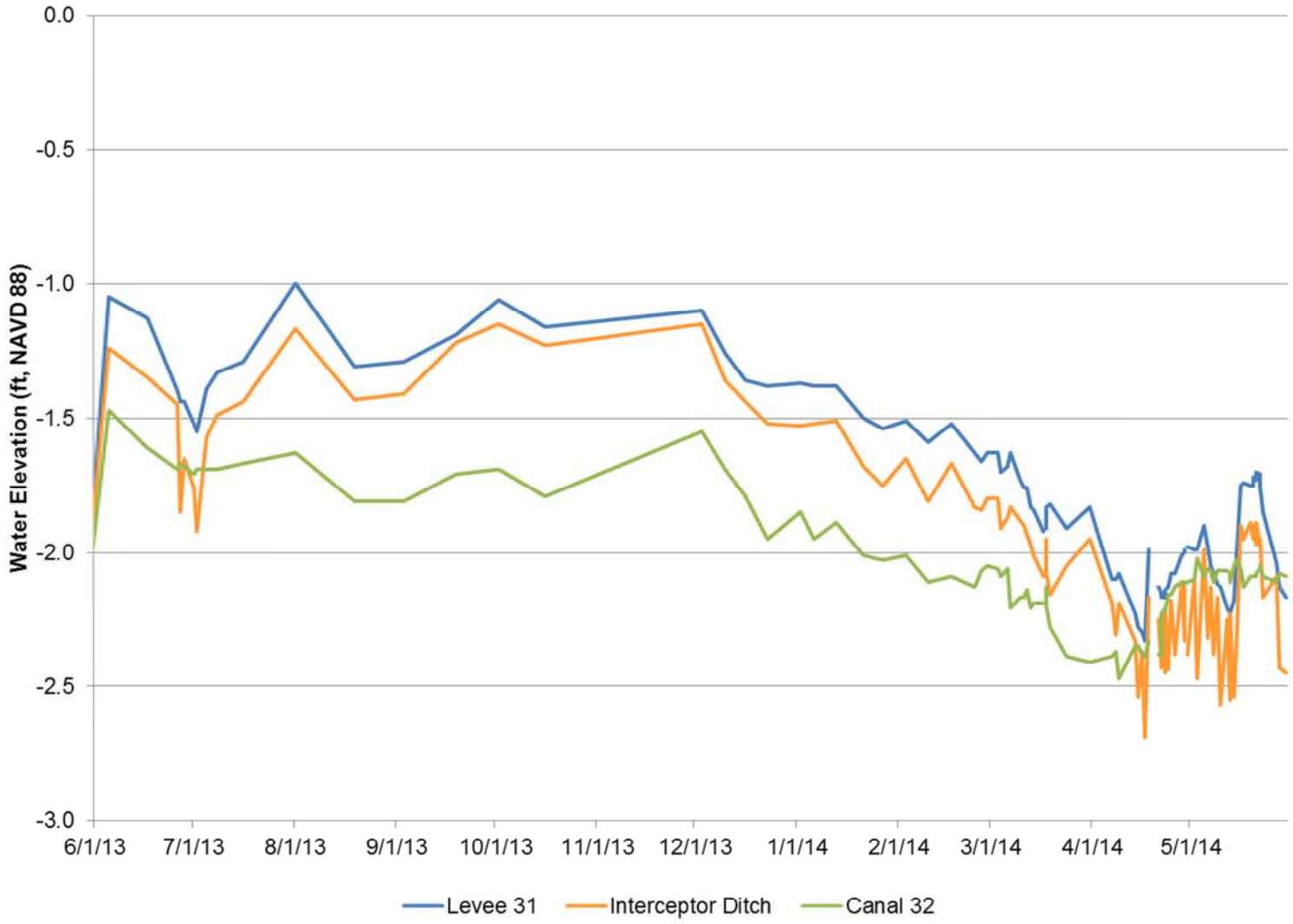


Figure 6.4-14. Transect C Water Levels June 2013 through May 2014.

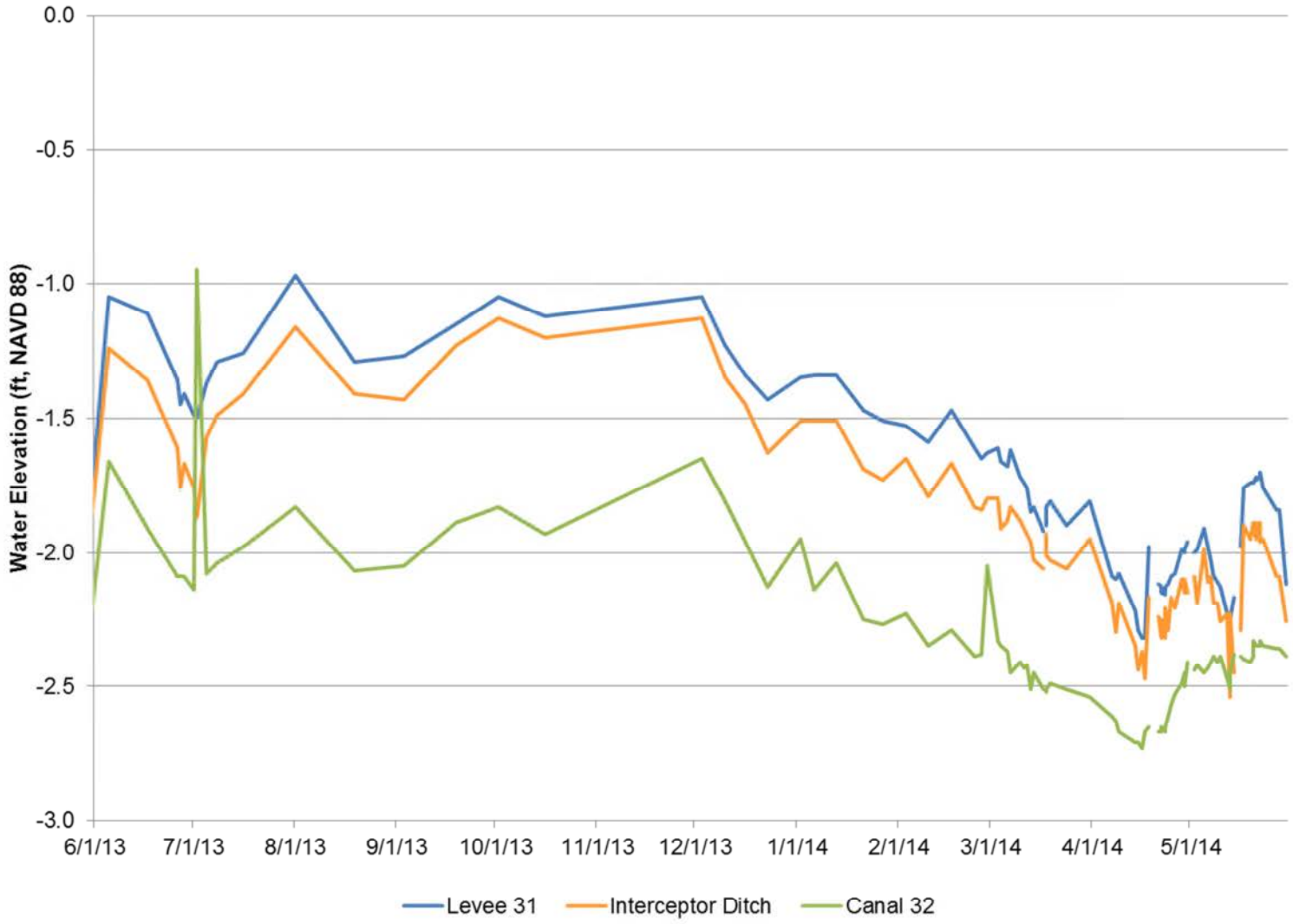


Figure 6.4-15. Transect D Water Levels June 2013 through May 2014.

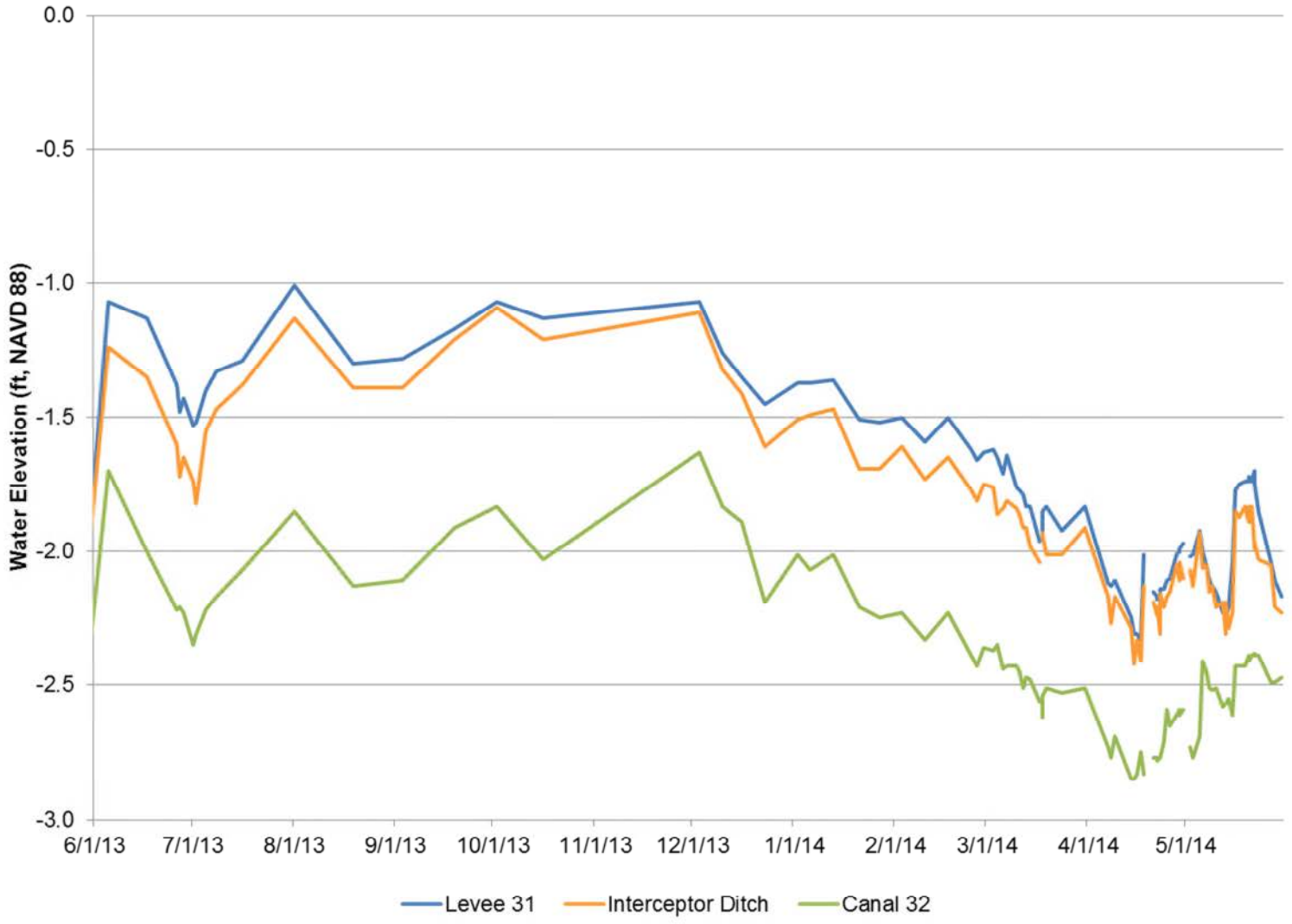


Figure 6.4-16. Transect E Water Levels June 2013 through May 2014.

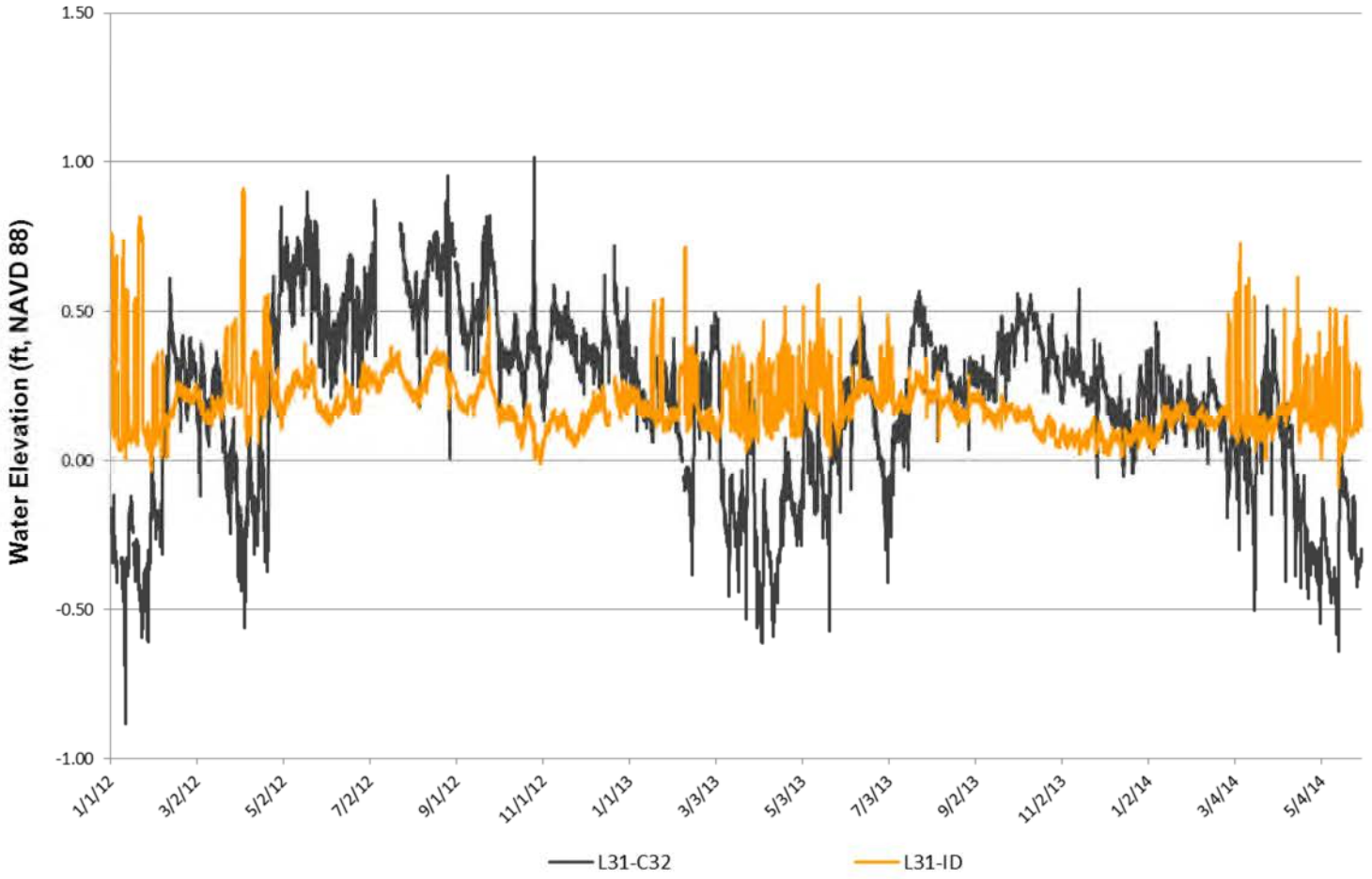


Figure 6.4-17. Differences in Freshwater Head Equivalent/Density Corrected Water Levels Between L-31 and -C32, and L-31 and ID (based on actual water depths and bottom densities) – Transect A.

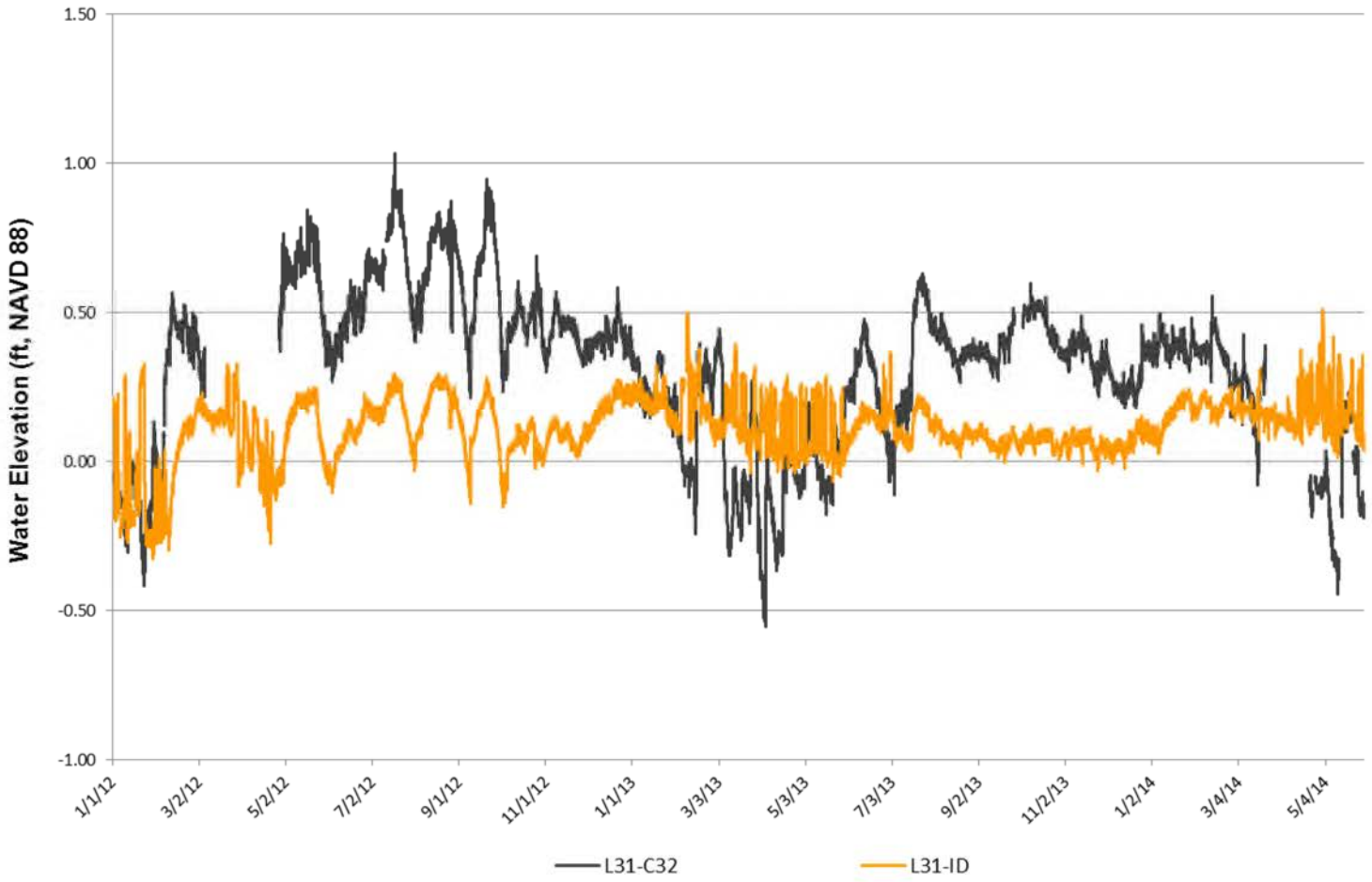


Figure 6.4-18. Differences in Freshwater Head Equivalent/Density Corrected Water Levels Between L-31 and C-32, and L-31 and ID (based on actual water depths and bottom densities) – Transect C.

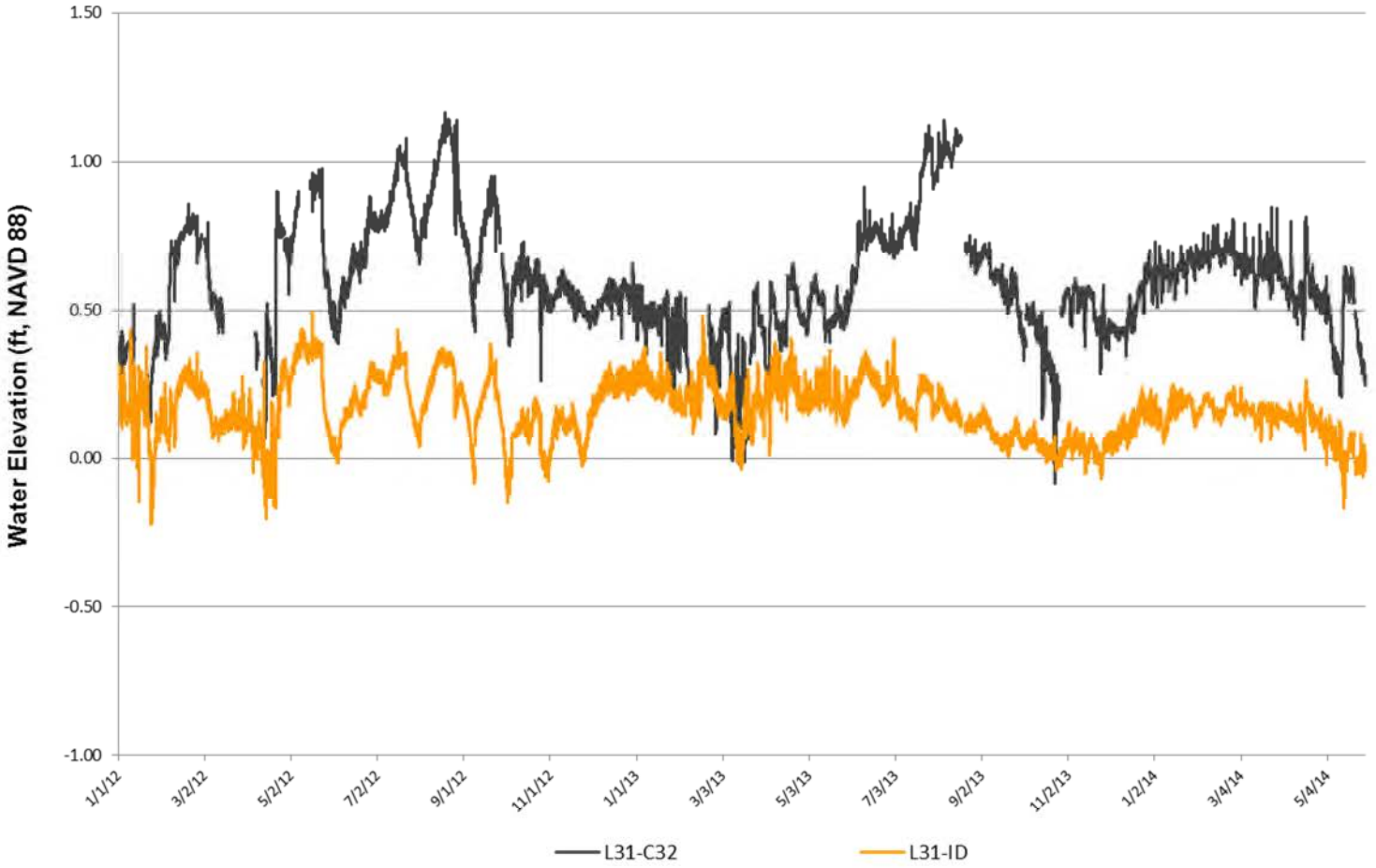


Figure 6.4-19. Differences in Freshwater Head Equivalent/Density Corrected Water Levels Between L-31 and C-32, and L-31 and ID (based on actual water depths and bottom densities) – Transect E.

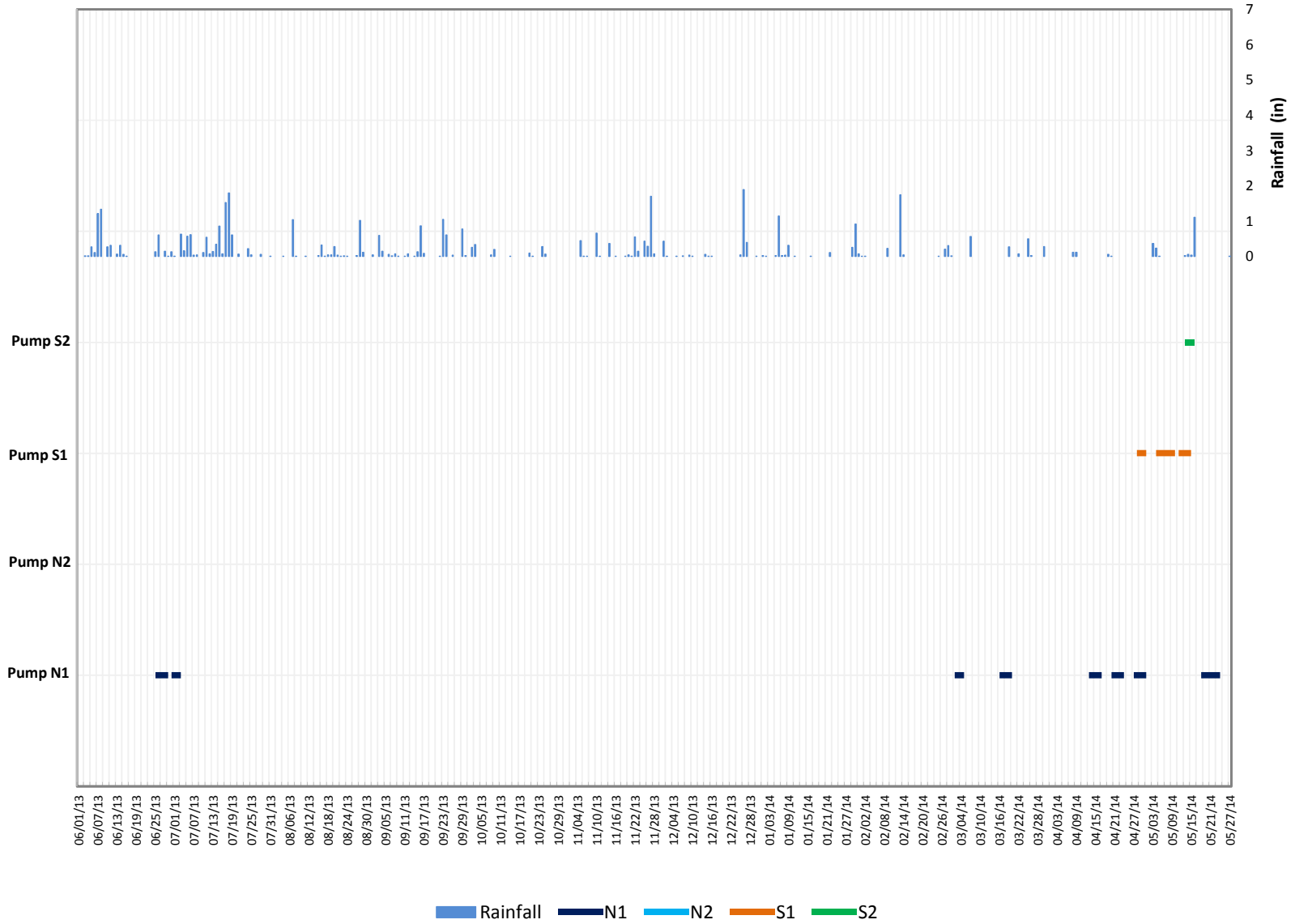


Figure 6.4-20. Interceptor Ditch Pump Operation and Rainfall.

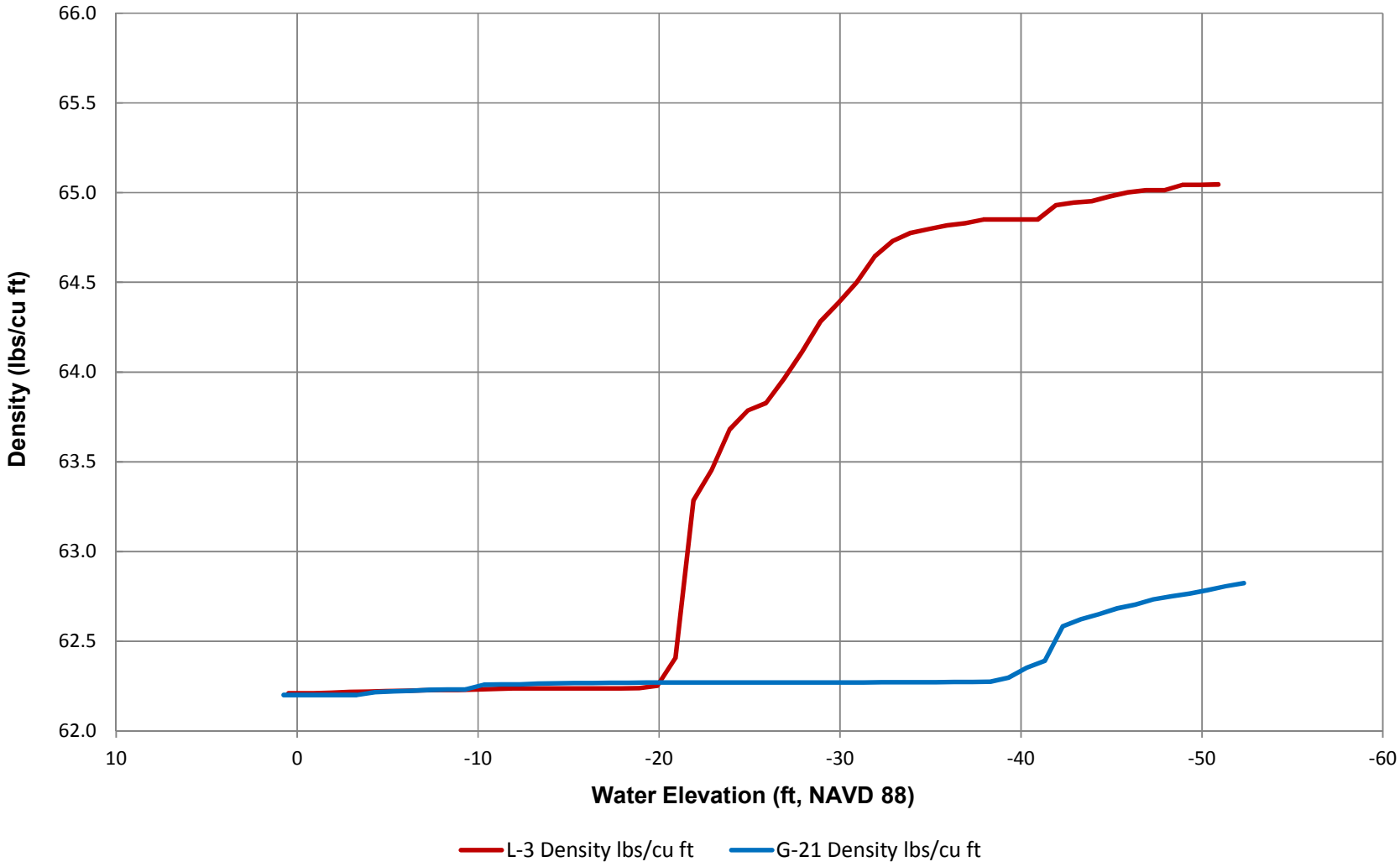


Figure 6.4-21. Density vs. Elevation Wells L-3 and G-21 During September 2013 Sampling Event.

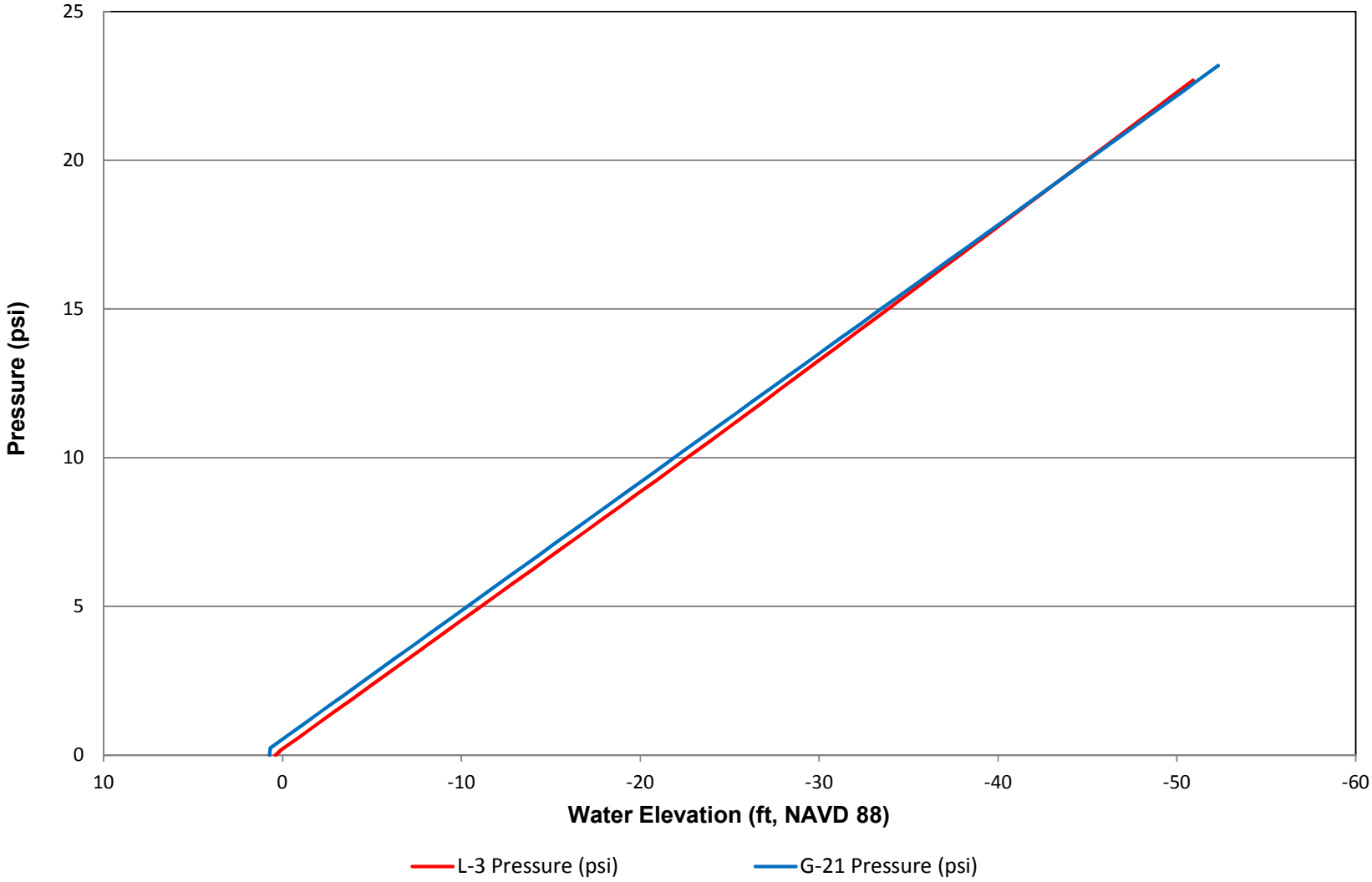


Figure 6.4-22. Pressure vs. Elevation Wells L-3 and G-21 During September 2013 Sampling Event.

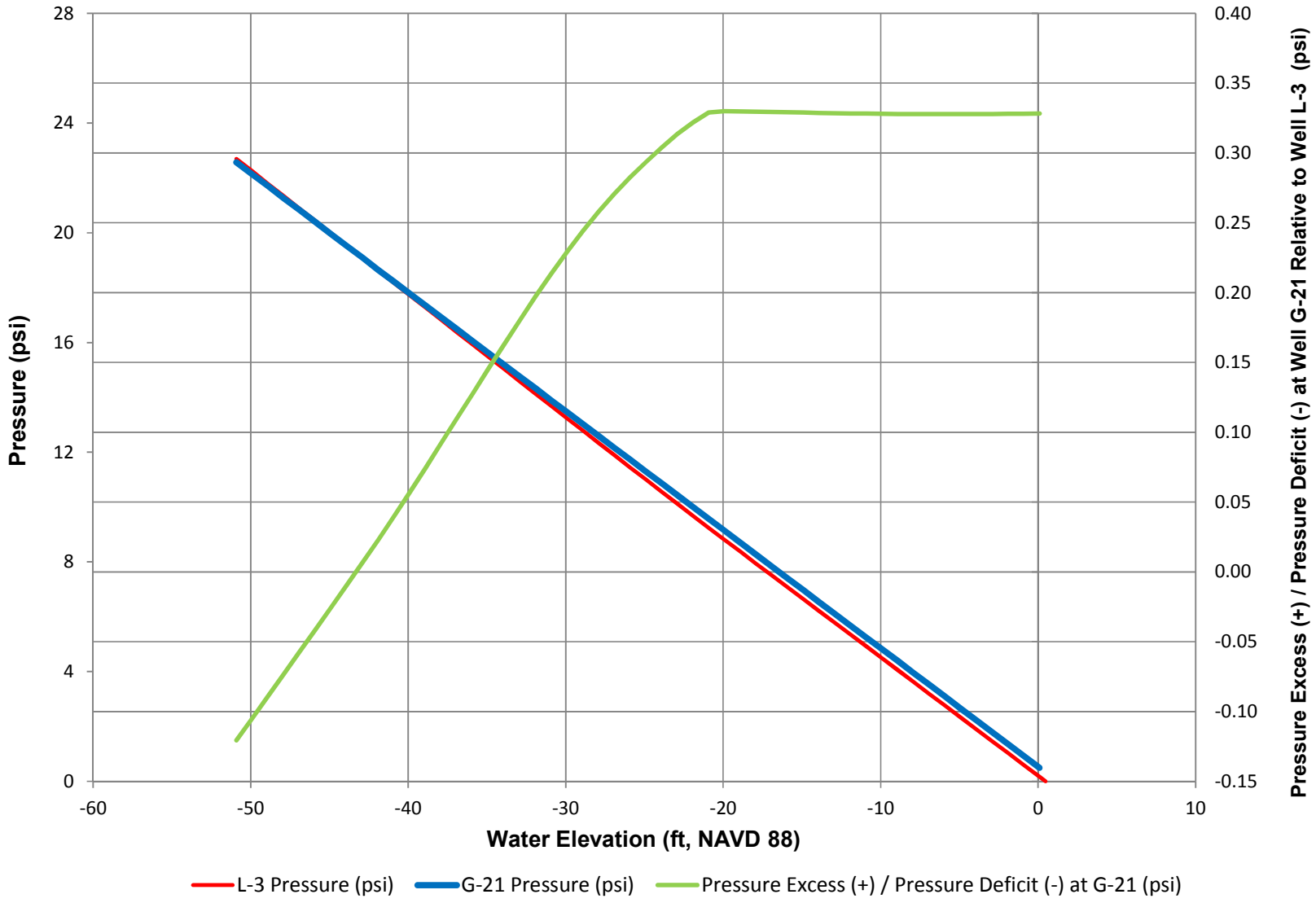


Figure 6.4-23. Pressure Gradient Difference between Well L-3 and Well G-21 during September 2013 Sampling Event.

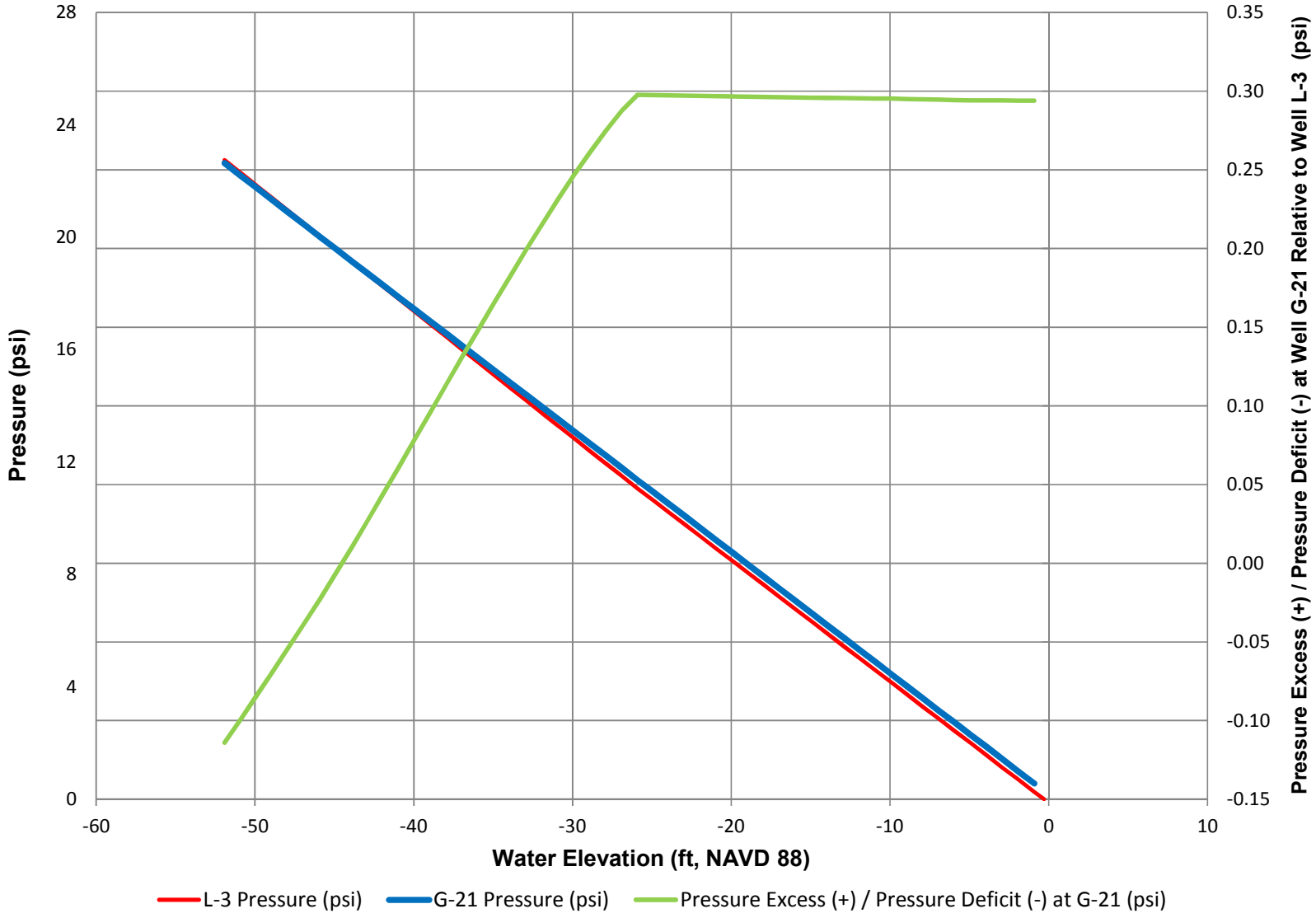


Figure 6.4-24. Pressure Gradient Difference between Well L-3 and Well G-21 during March 2014 Sampling Event.

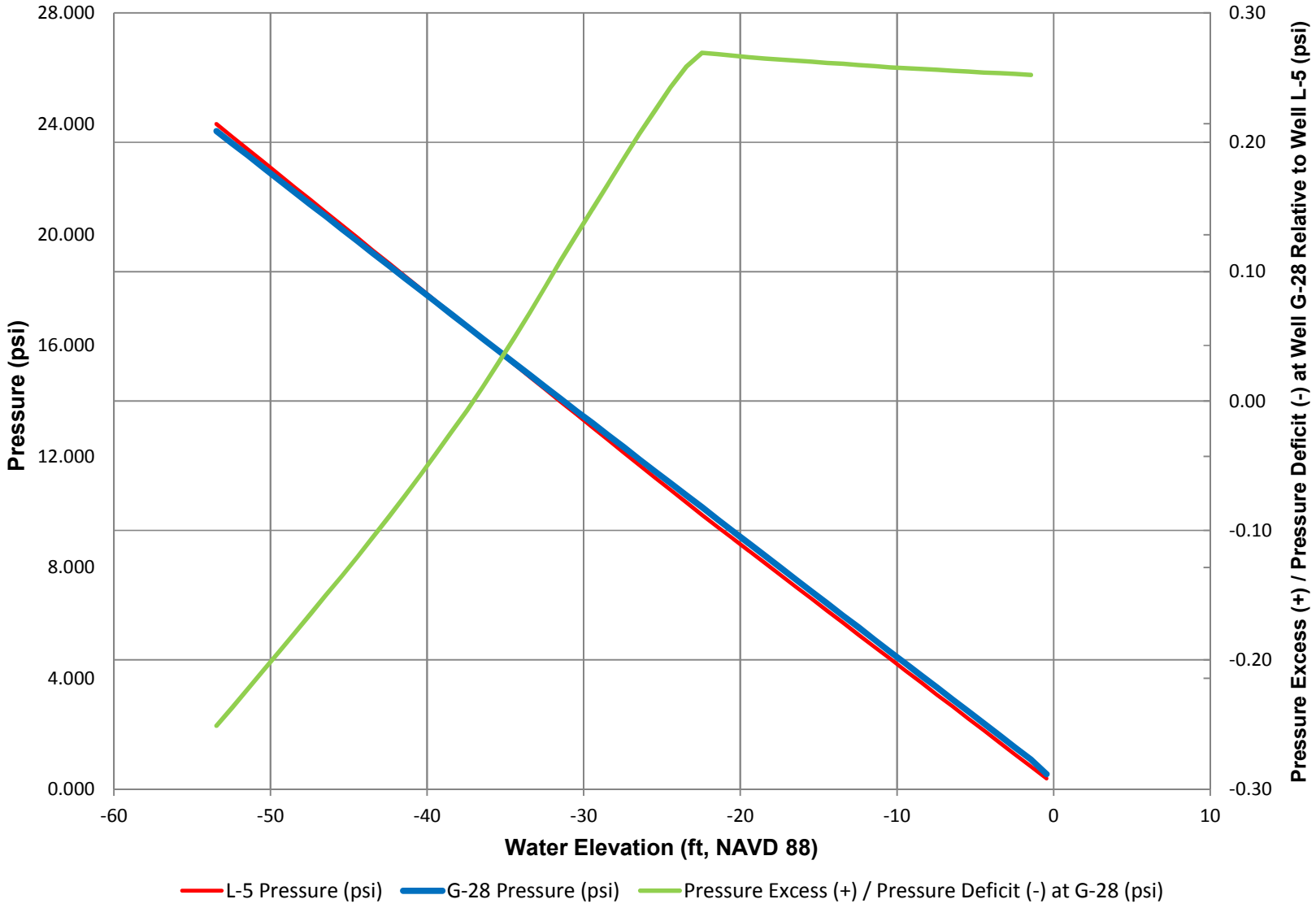


Figure 6.4-25. Pressure Gradient Difference between Well L-5 and Well G-28 during September 2013 Sampling Event.

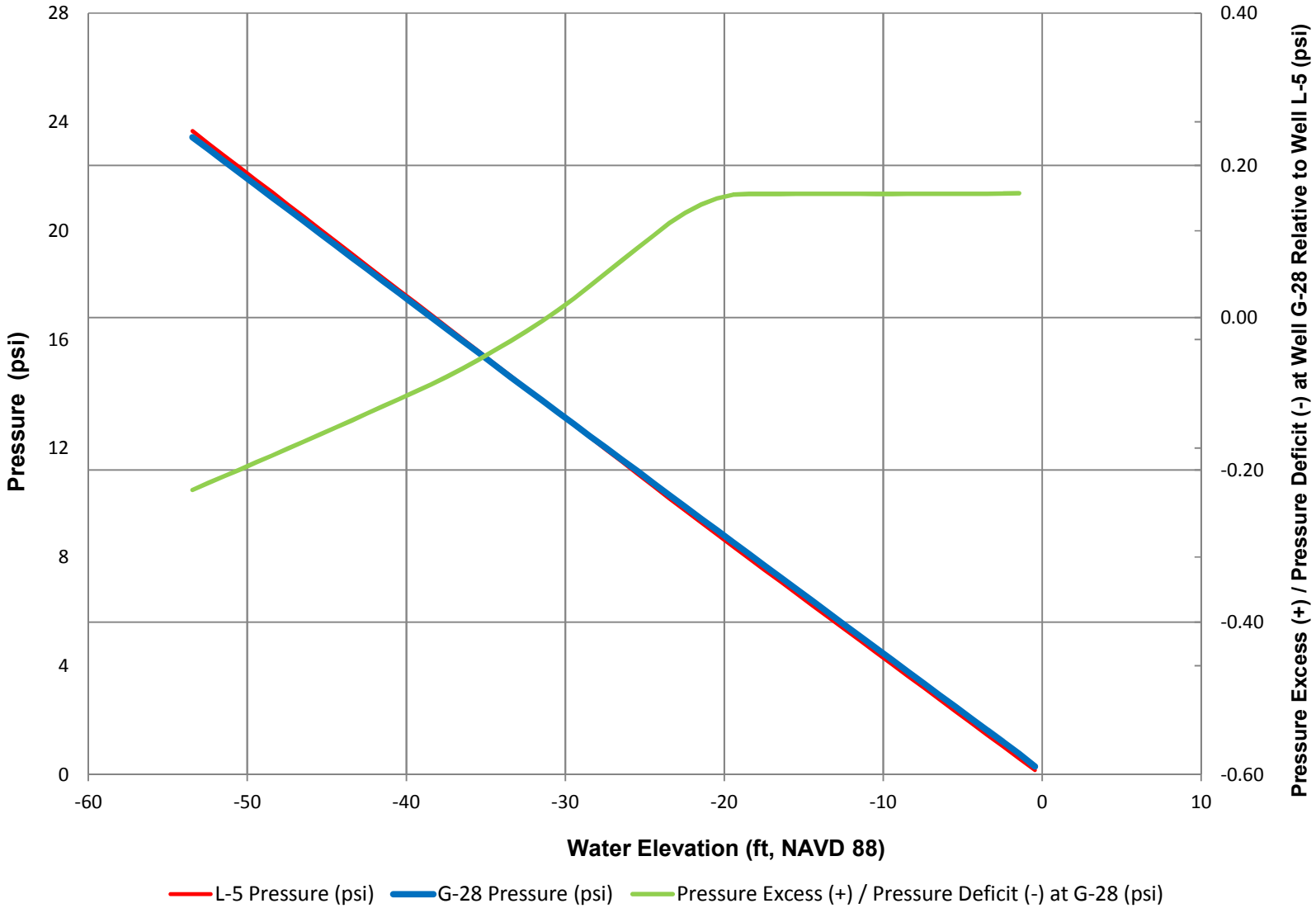


Figure 6.4-26. Pressure Gradient Difference between Well L-5 and Well G-28 during March 2014 Sampling Event.

7.0 SUMMARY, INTERPRETATIONS AND RECOMMENDATIONS

In accordance with the Turkey Point Monitoring Plan (SFWMD 2009a) and the Fifth Supplemental Agreement (SFWMD 2009b), FPL is required to assess the groundwater, surface water, ecological, and meteorological conditions in and surrounding to the Turkey Point Plant Cooling Canal System (CCS). The purpose of the effort is to assess Pre-Uprate conditions prior to the uprating of the Turkey Point nuclear Units 3 and 4 and to assess effects following the Uprating (Post-Uprate).

Monitoring was initiated in June 2010 and has continued through May 2014. FPL notified the FDEP of commencement of the Uprate of nuclear Units 3 and 4 on September 24, 2010. Uprate modifications were performed on both Unit 3 and Unit 4 over a period of time. One unit was uprated at a time. The final modifications for Unit 3 took place during February 26, 2012 to September 5, 2012 and the unit reached full uprate power on October 31, 2012. The final modifications for Unit 4 took place during November 5, 2012 to April 17, 2013 and the unit reached full uprated power on May 8, 2013. Both units were operating together within their uprated capacities starting May 27, 2013. Data collected prior to February 26, 2012, are part of the Pre-Uprate period, while data collected between February 26, 2012 and May 27, 2013, are referred to as part of the Interim Operating Period. Data collected after May 27, 2013, are referred to as part of the Post-Uprate period.

This annual report incorporates findings from the Post-Uprate monitoring period from June 2013 to May 2014 and, where applicable, makes comparisons to the Pre-Uprate monitoring period. This section provides a summary and interpretation of the results.

7.1 Groundwater

Major Findings

- In the Post-Uprate period, the salt constituents have remained relatively consistent for most wells; however, notable increases in chloride and sodium were observed in two deep wells (more than 100 feet below Bay bottom) in Biscayne Bay (TPGW-10D, and to a lesser extent in TPGW-11D) at the start of the Interim Operating period. The specific conductance also increased in response to the increase in saltwater constituents in these two wells. The effects were not observed in the shallow and intermediate depth wells.

- Chloride, sodium, and specific conductance at TPGW-7D were higher during the Post-Uprate period compared to the Pre-Uprate. This well was previously fresh at depth. It is

not clear if the increase in specific conductance is the result of the long-term operation of the CCS, lag effects of the 2011 drought, or some other factor.

- The extent of CCS water in the groundwater does not appear to have changed appreciably between Pre- and Post-Uprate beyond the deep Biscayne Bay well, TPGW-10D; however, further verification with tritium data is still needed. The Post-Uprate results still indicated hypersaline water immediately adjacent to the west in the groundwater. Further west from the CCS, there is evidence of saline water present in decreasing ionic concentrations at depth out approximately 3 miles. The outermost wells to the west, TPGW-8 and TPGW-9, were fresh at all depths.

- Nearly all of the observations made in the Pre-Uprate period regarding groundwater quality and levels, the influence of meteorological conditions, operation of the CCS, and operation of the ID (FPL 2012a) are the same during the Post-Uprate period. The higher water densities in the CCS will impact groundwater flow and gradients, but seasonal changes and rainfall have a greater impact on groundwater levels. There was no discernable evidence of CCS operations on water levels at nearby wells TPGW-1 and TPGW-10.

7.2 Surface Water

Major Findings

- Specific conductance in the CCS has been rising since the beginning of the dry season in 2014 and reached over 120,000 µS/cm (salinity of 95 PSU) in May 2014. The average Post-Uprate value for all stations was 92,594 µS/cm. The maximum value was over 25,000 µS/cm higher and the average value was over 15,000 µS/cm higher than that reported in the Pre-Uprate period. For comparison, Biscayne Bay surface water stations from June 2013 through May 2014 had specific conductance values that ranged from 23,315 to 63,186 µS/cm.

- The temperature has also increased in the CCS during the Post-Uprate period and on average was 3°C to 5°C warmer than during the Pre-Uprate period. The increase in CCS surface water temperatures during the Post-Uprate period cannot be explained by the Uprate since the total heat rejection rate to the CCS from Turkey Point Units 1, 2, 3, and 4, operating at full capacity prior to the Uprate would have been higher than the Post-Uprate heat rejection rate to the CCS for Units 1, 3, and 4, operating at full capacity. Unit 2 has been dedicated to operate in a synchronous generator mode (i.e. not producing steam heat).

- Nutrients (TKN) have increased in the CCS since June 2013 and may have contributed to algal blooms in the CCS. The algal species in the CCS is known to be a nitrogen-fixer, which may be contributing to the TKN observed. FPL is currently assessing the cause as it may be attributable to a number of factors unrelated to the Uprate.

- In conjunction with specific conductance, data indicate there is no measurable contribution of nutrients to the Bay that can be attributed to the CCS.

- There continue to be no discernable effects of the CCS on Biscayne Bay surface water quality.

- Some of the potential seepage effects reported in the Comprehensive Pre-Uprate Report (FPL 2012) at TPSWC-4 and TPSWC-5 were not as evident in the Post-Uprate period based on temperature and specific conductance.

- With the exception of the CCS, the majority of observations made in the Pre-Uprate reporting period (FPL 2012) regarding water quality and stage are still the same.

7.3 Water Budget

Major Findings

- The model simulates a net water loss of 3.26 MGD from the CCS during the Post-Uprate period and a net salt gain of 2,216 (lb x 1,000)/day within the CCS over the same period. This has resulted in decreased water levels and increased salinity within the CCS.

- A significant lack of precipitation and increase in evaporative losses have contributed to the decline in water levels in the CCS during the Post-Uprate period.

- Reductions in CCS water levels and the amplified role of saline groundwater inflow during the Post-Uprate period have increased the salt content (and salinity) in the CCS.

7.4 Interceptor Ditch

Major Findings

- The use of freshwater head equivalents provides a more rigorous approach to the operation of the ID.

- FPL is operating and maintaining a net seaward gradient in the upper zone of the aquifer.

7.5 Ecological

Major Findings

- Ecological monitoring in Biscayne Bay and the marsh and mangrove areas surrounding Turkey Point show no evidence of impacts from the CCS. Changes appear to be more seasonally and meteorologically driven.

- Findings were similar to those previously summarized in the Comprehensive Pre-Uprate Report (FPL 2012).

7.6 Recommendations

- Based on data consistency over the monitoring duration in the groundwater stations, FPL recommends reducing the automated recording of groundwater quality data and level measurements at non-tidal stations (TPGW-1, -2, -4, -5, -6, -7, -8, -9 well clusters) from hourly to daily.

- Based on the lack of ecological changes from the Pre-Uprate to the Post-Uprate, FPL recommends eliminating all (Biscayne Bay, marsh and mangrove) ecological monitoring.

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