

Turkey Point Units 3 and 4  
Docket Nos. 50-250 and 50-251  
2018 Annual Remediation/Restoration Report  
L-2019-031 Enclosure 3 Page 1 of 46

### **Enclosure 3**

#### **2018 Annual Turkey Point Power Plant Remediation/Restoration Report**

**December 2018**





**FPL**

# **2018 Annual Turkey Point Power Plant Remediation/Restoration Report**

**December 2018**





# TABLE OF CONTENTS

<b><u>Section</u></b>	<b><u>Page</u></b>
<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>1. BACKGROUND .....</b>	<b>3</b>
<b>2. STATUS .....</b>	<b>4</b>
2.1 CCS Freshening Activities .....	4
2.1.1 Upper Floridan Aquifer Freshening Well Operations.....	5
2.1.2 Marine Well Operations .....	5
2.1.3 Thermal Efficiency Plan (TEP).....	5
2.1.4 Nutrient Management Plan (NMP).....	6
2.2 Remediation/Restoration/Containment Activities.....	6
2.2.1 Groundwater Recovery Well System.....	7
2.2.2 Barge Canal – Turtle Point Canal Restoration.....	8
2.2.3 Site Assessment Plan and Report .....	8
2.2.4 Inspection of CCS Perimeter .....	9
2.3 Mitigation for Impacts Related to Historical Operations of the CCS .....	10
2.3.1 Saltwater Interface Allocation of Contribution.....	10
2.3.2 Agreements to Convey Property Interests .....	10
2.3.3 Increase Weir Elevations in FPL’s Everglades Mitigation Bank.....	11
2.3.4 Escrow Funding for Mitigation of Saltwater Intrusion .....	11
2.4 Monitoring and Reporting .....	11
2.4.1 Continuous Surface Electromagnetic Mapping .....	12
2.4.2 Expanded Groundwater Monitoring .....	12
2.4.3 Expanded Biscayne Bay Water Quality Sampling .....	13
2.4.4 Expanded Reporting of CCS Related Monitoring Data.....	13
2.4.5 Annual Progress Reports .....	14
<b>3. PROGRESS IN ACHIEVING THE OBJECTIVES OF THE CA AND CO.....</b>	<b>15</b>
<b>4. RECOMMENDATIONS FOR REFINEMENT OF ACTIVITIES .....</b>	<b>16</b>
<b>5. REFERENCES .....</b>	<b>17</b>

## LIST OF TABLES

<b><u>Table</u></b>	<b><u>Page</u></b>
Table 2.0-1 Permitting Activities Status .....	19
Table 2.0-2 Overall Status of Activities.....	23
Table 2.1-1 Monthly Summary of Upper Floridan Aquifer and CCS Rainfall Inputs during the Reporting Period (October 2017–September 2018).....	26
Table 2.2-1 Summary of Monthly Water Pumped from UIC Extended Testing and RWS Wells with Total Salt Removed from the Biscayne Aquifer during the Reporting Period (October 2017– September 2018) .....	27
Table 2.4-1 Additional Related Water Monitoring Data Required by Other Governmental Entities (Consent Order Paragraph 31.b.; Data Provided in the Florida Power & Light Company Electronic Data Management System).....	28
Table 2.4-1 Additional Related Water Monitoring Data Required by Other Governmental Entities (Consent Order Paragraph 31.b.; Data Provided in the Florida Power & Light Company Electronic Data Management System).....	29
Table 2.4-2 Additional Consent Order Related Reports Required by Other Governmental Entities and Provided in the Florida Power & Light Company Electronic Data Management System .....	30

# LIST OF FIGURES

<b><u>Figure</u></b>	<b><u>Page</u></b>
Figure 2.1-1 Daily Rainfall over CCS.....	32
Figure 2.1-2 Monthly CCS Rainfall, Freshening Water Inputs with Average Monthly Salinities .....	32
Figure 2.1-3 Location of Floridan Wells and Marine Wells .....	33
Figure 2.1-4 Monthly CCS Thermal Efficiency Trends: August 2010 through September 2018 .....	34
Figure 2.1-5 Semi-Annual Total Nitrogen Trends in the CCS: June, 2010 through September, 2018 .....	34
Figure 2.1-6 Semi-Annual Total Phosphorus Trends in the CCS: June, 2010 through September, 2018 .....	34
Figure 2.2-1 Location of Recovery Wells and Pipeline, UIC Extended Testing Production Wells, and Deep Injection Well .....	35
Figure 2.2-2 Monthly Total Salt and Volume of Hypersaline Groundwater Removed from Biscayne Aquifer .....	36
Figure 2.3-1 Annual Sawgrass and Juncus/Distichlis Acreage Expansion South of the L-31E Levee in the FPL Everglades Mitigation Bank .....	37
Figure 2.4-1 Location of Groundwater Monitoring Wells and USGS Wells Identified in the Consent Agreement and Consent Order .....	38
Figure 2.4-2 Location of Surface Water Monitoring Stations in Biscayne Bay and Card Sound per the Consent Order .....	39

## ACRONYMS AND ABBREVIATIONS

3-D	three-dimensional
Agencies	Miami-Dade County's Department of Regulatory and Economic Resources and the Florida Department of Environmental Protection
Barge Basin	Barge Canal Turning Basin
BBCW	Biscayne Bay Coastal Wetlands
CA	Miami-Dade County Consent Agreement
CCS	Cooling Canal System
CO	Florida Department of Environmental Protection Consent Order
CSEM	Continuous Surface Electromagnetic Mapping
DERM	Miami-Dade County's Department of Environmental Resources Management
EDMS	Florida Power & Light Company Turkey Point Power Plant Electronic Data Management System
EMB	Everglades Mitigation Bank
FDEP	Florida Department of Environmental Protection
FDOH	Florida Department of Health
FPL	Florida Power & Light Company
MDC	Miami-Dade County
mgd	million gallons per day
mg/L	milligrams per liter
NAVD 88	North American Vertical Datum of 1988
NGVD	National Geodetic Vertical Datum

NMP	Nutrient Management Plan
Plant	Turkey Point Power Plant
psu	practical salinity unit
RAP	Remediation Action Plan
RWS	Recovery Well System
SAP	Site Assessment Plan
SAR	Site Assessment Report
SFWMD	South Florida Water Management District
SWI	saltwater interface
TEP	Thermal Efficiency Plan
TKN	total Kjeldahl nitrogen
UFA	Upper Floridan aquifer
UIC	underground injection control
USGS	United States Geological Survey

## EXECUTIVE SUMMARY

The primary objective of the Miami-Dade County Consent Agreement (CA) is to demonstrate a statistically valid reduction in the salt mass and volumetric extent of hypersaline water (as represented by chloride concentrations above 19,000 milligrams per liter [mg/L]) in groundwater west and north of Florida Power & Light Company (FPL's) property without creating adverse environmental impacts. A further objective of the CA is to reduce the rate of, and as an ultimate goal, arrest migration of hypersaline groundwater. The objectives of the Florida Department of Environmental Protection (FDEP) Consent Order (CO) are threefold and include: (1) the cessation of discharges from the CCS that impair the reasonable beneficial use of adjacent G-II groundwaters; (2) prevention of releases of groundwater from the CCS to surface waters connected to Biscayne Bay that would result in exceedances of surface water standards in the Bay; and (3) mitigation for impacts related to the historical operations of the CCS.

FPL continues to make progress in implementing the measures and achieving the objectives outlined in the CA and CO. These measures focus on Cooling Canal System (CCS) freshening, groundwater salinity remediation and containment, remnant external canal restoration, managing CCS nutrient impacts on groundwater and surface water resources outside the CCS boundaries, monitoring, and reporting. The following is a summary of the actions taken and milestones achieved during the reporting period (October 2017 through September 2018) to meet the requirements of the CA and CO.

- 4.5 billion gallons of low salinity Upper Floridan aquifer (UFA) water was added to the CCS to offset freshwater evaporation and lower salinity.
- Despite an unusually dry "dry season," UFA freshening coupled with the return of a healthy wet season rainfall resulted in an annual average salinity of 50.9 practical salinity units (psu) for the period of June 1, 2017, to May 31, 2018 (first year of freshening per Condition 29.j, of the CO).
- Full-time operation of the approved groundwater recovery well system (RWS) began on May 15, 2018.
- Over 4.5 billion gallons of hypersaline groundwater, consisting of over 874,000 tons of salt, was removed from the Biscayne aquifer.
- Prior to the initiation of RWS operations, baseline groundwater conditions were determined from monitoring and the regional Continuous Surface Electromagnetic Mapping (CSEM) survey conducted from March to April 2018.
- Implementation of the 2016 Turkey Point Cooling Canal System Nutrient Management Plan (NMP) continued to show positive progress in reducing nitrogen and phosphorus levels in the CCS.



- All federal, state, and local permits associated with the Turtle Point and Barge Turning Basin restoration projects were issued on or before August 17, 2018, and FPL issued a notice to proceed to the selected contractor on September 26, 2018. The canal restorations are anticipated to be completed on or before August 17, 2020.
- FPL continued to work with Miami-Dade County's Department of Environmental Resources Management (DERM) to address issues and requirements identified in the CA Addendum of August 15, 2016.
- FPL provided all required submittals in compliance with requirements of the CA and CO.
- All applicable permits required to carry out the objectives of the CA CO have been received by FPL on or before August 17, 2018.
- FPL continued to implement its CCS Thermal Efficiency Plan (TEP) with an annual CCS thermal efficiency of approximately 85% for the reporting period, which is above the CO target level of 70%.
- Maintenance recommendations contained in the 2016 CCS perimeter canal inspection report have been implemented.
- Modeling to allocate relative contributions of entities and factors on the movement of the saltwater interface, as required under the FDEP CO, was completed and results presented to FDEP on June 19, 2018.
- Agreements between FPL and the South Florida Water Management District (SFWMD) on conveying property rights in support of the Biscayne Bay Coastal Wetlands (BBCW) Everglades Restoration Project were executed on April 23, 2018.
- FPL has consulted with DERM on the operations of the Everglades Mitigation Bank (EMB) weirs that meet the permitted restoration objectives of FPL's EMB state and federal permits and the objectives of the Comprehensive Everglades Restoration Plan C-111 Spreader Canal project. Alternative weir settings proposed by DERM and implemented by FPL have significantly reduced water flows to the EMB resulting in adverse impacts to wetland resources and restoration goals.
- Expansion of groundwater and surface water monitoring stations, as required in the CA and CO, were permitted and constructed. Sampling of the installed monitoring wells commenced prior to startup of the RWS. The two years of bi-monthly bay water quality monitoring, required under the CO, was completed in May 2018.
- Expanded monitoring reporting has been made available on the FPL Plant's Electronic Data Management System (EDMS) available to MDC and FDEP.

# 1. BACKGROUND

Miami-Dade County (MDC) and Florida Power & Light Company (FPL) entered into a Consent Agreement (CA) on October 7, 2015 (amended on August 15, 2016) in which FPL agreed to conduct specific actions to remediate impacts of hypersaline groundwater adjacent to the FPL Turkey Point Power Plant (Plant) and to take actions to address MDC's allegations that Cooling Canal System (CCS) water quality contributed to exceedances of county ammonia standards. In addition, the Florida Department of Environmental Protection (FDEP) and FPL entered into a Consent Order (CO) on June 20, 2016, which also required actions to be undertaken by FPL to address groundwater impacts associated with the CCS.

Both documents require FPL to regularly provide data and analyses to gauge progress made in achieving the objectives stated therein including annual reports. Specifically, Paragraph 17.d.v of the MDC CA states:

"FPL shall submit annual reports providing an evaluation of progress in achieving the objectives of this Consent Agreement, status of implementing projects identified above, and the results of monitoring to determine the impacts of these activities. Recommendations for refinements to the activities will be included in the annual report. This may include deletions of monitoring that is demonstrated to no longer be needed, or additional monitoring that is warranted based on observations."

Paragraph 28 of the FDEP CO states:

"FPL shall expand the 2009 Monitoring Plan database to include all additional water monitoring data related to this Order required by all other governmental agencies and entities, including but not limited to the SFWMD, Nuclear Regulatory Commission, Miami-Dade County and the Florida Department of Health, as well as all monitoring data that is required in this Order."

This language is essentially repeated in Paragraphs 31. a., and b., of the CO.

FPL submits this consolidated 2018 Annual Turkey Point Power Plant Remediation/Restoration Report in compliance with the above reporting requirements of the MDC CA and FDEP CO. The information contained in this report supplements the information provided in the 2018 Recovery Well Startup Report, the 2018 Annual Monitoring Report and the FPL Plant Electronic Data Management System (EDMS; <https://www.ptn-combined-monitoring.com>), and presents a comprehensive update and status of the progress FPL is making in meeting the remediation, restoration, and reporting requirements of both Agencies' (Miami-Dade County's Department of Environmental Resources Management [DERM] and FDEP) directives. The information included herein is organized to be consistent with the sections of the MDC CA and FDEP CO that require actions by FPL, and covers the reporting period of October 2017 through September 2018.

## 2. STATUS

The following is a summary of the actions taken during the reporting period (October 2017 through September 2018) to meet the requirements of the CA and CO. A summary of the permits required and the overall status of activities is provided in Table 2.0-1 and Table 2.0-2.

### 2.1 CCS Freshening Activities

Higher specific gravity hypersaline water can displace saline groundwater contributing to saltwater migration in groundwater surrounding the CCS. Paragraph 20.a of the CO requires FPL to achieve an average annual CCS salinity at or below 34 practical salinity units (psu) by the end of the fourth year of freshening. Having sustained average annual salinities closer to those of Biscayne Bay (34 psu) will reduce the CCS influence on the hypersaline groundwater surrounding the CCS, and support seagrass re-population and associated natural nutrient management in the CCS.

*FPL continued to utilize the least impactful sources of freshening water to achieve CO and CA goals for CCS salinity reduction. Progress was assisted by rainfall associated with Hurricane Irma, but hindered by a drier than normal dry-season that followed.*

Currently, FPL has two sources of lower-salinity water available to moderate CCS salinity: UFA groundwater and shallow marine groundwater from the Biscayne aquifer. Due to the high salinity of the marine groundwater, this source is limited to extraordinary circumstances to avoid extremely high CCS salinities or extremely low CCS water levels. A summary of the use and status of both sources is provided below in Sections 2.1.1 and 2.1.2. In addition to the two existing freshening sources, FPL continues to work with MDC on a feasible reclaimed water supply for the CCS and Plant, as recommended by MDC in their December 22, 2016 letter to FPL.

Wet season rainfall (Figure 2.1-1), as combined with the freshening activities, was effective in lowering the CCS average annual salinity. Monthly volumes of freshening sources, rainfall, and average monthly CCS salinity for the reporting period are shown on Figure 2.1-2. A monthly summary of inputs from the Upper Floridan aquifer (UFA) wells and rainfall is provided in Table 2.1-1. During the reporting period, the CCS average daily salinities ranged from a maximum of 60.5 psu on May 13, 2018 to a low of 38.8 psu on October 20, 2017. Note that very little rainfall occurred during the dry season, particularly in the first quarter of 2018, which was second driest in the 50-year historical record, based on data collected at the South Florida Water Management District (SFWMD) rain gauge S20-F. As expected, CCS salinities increased during this period.

Pursuant to Paragraph 29.j of the FDEP CO, the average annual CCS salinity is to be calculated for the time period of June 1 through May 31 using the prescribed criteria contained therein. Based on this, the average annual daily CCS salinity for the first full year of freshening, using the authorized UFA wells, was 50.9 psu (June 1, 2017 to May 31, 2018). This value is down from the

preceding year's (June 1, 2016 to May 31, 2017) average annual salinity of 61.9 psu, during which UFA freshening wells were operational for only half of the year. Considering that the highest annual CCS salinity was 82.5 psu (June 2014 through May 2015), a substantial reduction in CCS salinity has occurred over the past several years as a result of FPL's actions.

### **2.1.1 Upper Floridan Aquifer Freshening Well Operations**

Pursuant to Paragraph 20.a of the FDEP CO, FPL completed construction of the UFA freshening system authorized in the Turkey Point site certification, and initiated full-time freshening operations on November 28, 2016. Figure 2.1-3 shows the locations of the operating UFA wells. The wells flow under natural artesian pressure and have been in continuous operation since startup. During this reporting period (October 1, 2017, through September 30, 2018), the wells discharged approximately 4.5 billion gallons of low-salinity (2.4 psu) UFA groundwater into the CCS. Table 2.1-1 shows the monthly inflows into the CCS from the UFA wells. The average daily inflow of UFA water to the CCS during the reporting period declined to 11.8 million gallons per day (mgd) due to reductions in natural artesian flow rates. Aquifer testing of each production well was completed in September 2018 and indicated the reduced flows were the result of partial formation plugging in the vicinity of the well bore. Well development to restore the flows were initiated in late 2018 will be completed during the first quarter of 2019. Analytical results from the UFA wells are included in the EDMS.

### **2.1.2 Marine Well Operations**

The marine wells were not operated during this reporting period as hydrologic and CCS salinity conditions did not support the need to operate these wells.

### **2.1.3 Thermal Efficiency Plan (TEP)**

Pursuant to Paragraph 20.b of the FDEP CO, FPL submitted a Thermal Efficiency Plan (TEP) to FDEP on December 14, 2016. The plan identified primary and secondary performance metrics to be monitored. These metrics are used to guide corrective actions, and near and long-term actions

*Maintaining high thermal efficiency within the CCS moderates cooling canal temperatures and reduces CCS salinity levels.*

to maintain high thermal efficiencies (equal or greater than 70). On July 7, 2017, FDEP instructed FPL to implement the plan. Since then several of the near-term actions have been implemented to varying degrees in the CCS. These actions included sediment removal in many of the CCS canals, flow management within the CCS, water stage management, and vegetation management. During this reporting period, FPL continued implementing the berm vegetation management program, which improves airflow over the canals and enhances cooling. Areal thermal mapping of the CCS was also conducted in 2018 and compared with last year's survey and indicated no significant reductions in cooling patterns that would warrant changes to existing canal flow throttles.

Thermal efficiency during the 2018 reporting period met the objectives of the CO, with an annual average CCS efficiency calculated at 84.8%. Monthly thermal efficiency values for the reporting period ranged from a low of 80.1% to a high of 91.3%. Figure 2.1-4 shows a monthly summary of the thermal efficiency values since October 2010 and documents the efficiency improvements

achieved by FPL since 2016.

### 2.1.4 Nutrient Management Plan (NMP)

Pursuant to Paragraph 21.b of the FDEP CO, FPL submitted a Nutrient Management Plan (NMP) to FDEP on September 16, 2016. On July 7, 2017, FDEP instructed FPL to implement the NMP.

Components of the NMP were incorporated into FPL's proposal to address CCS nutrient impacts to ground and surface water resources beyond the CCS boundaries submitted to MDC DERM on October 8, 2018, pursuant to Paragraph 34 of the CA.

*The NMP is composed of three primary nutrient management strategies: active algae/nutrient removal; canal and berm maintenance; and salinity reduction and controlled flow management.*

During the reporting period, FPL has investigated methods to reduce nutrients in the CCS surface waters that would be compatible with the unique ecology and water chemistry of the CCS. These methods include:

- Chemical flocculants/coagulants, non-chemical physical removal methods, and aeration.
- Canal maintenance practices that integrate the goal of minimizing erosion and nutrient inputs from sediment and berm sources.
- A pilot foam collection and condenser system by which nutrient-rich foam can be collected and rendered to liquid for disposal.
- A field scale test planting of a total of 3 acres of *Ruppia maritima* at separate locations in the CCS to determine whether current conditions will support the repatriation of historic nutrient-moderating seagrass meadows in the CCS.

Canal nutrient management actions implemented by FPL to date (canal sediment removal, canal berm management, vegetation management, canal freshening with low-nutrient Floridan aquifer, and groundwater extraction) have been effective in reducing nutrient concentrations in the cooling canals. Since reaching its peak in September 2013, semi-annual total nitrogen concentrations in the CCS canals have dropped from 15.2 milligrams per liter (mg/L) to 3.6 mg/L in September 2018, with the March and September 2018 levels being the lowest measured since 2011 (Figure 2.1-5). Total phosphorous concentrations peaked at 0.087 mg/L in September 2014, and have declined to 0.029 mg/L by September 2018 (Figure 2.1-6).

## 2.2 Remediation/Restoration/Containment Activities

Phase I of the MDC CA, and the first objective of the FDEP CO, focus on halting the westward migration of hypersaline groundwater from the CCS and reducing the westward extent of the hypersaline plume to the L-31E canal. These objectives are to be achieved through the design,

*During the reporting period, all permits for the approved remediation and restoration projects were acquired, construction was initiated or completed, baseline monitoring completed and request reporting submitted.*



construction, and operation of a groundwater Recovery Well System (RWS). The second objective of the CO is to prevent potential releases of groundwater from the CCS to surface waters connected to Biscayne Bay by undertaking restoration projects in the Turtle Point Canal and Barge Canal Turning Basin (Barge Basin). The August 15, 2016, amendment to the MDC CA directed FPL to identify sources and extent of ammonia exceedances in surface waters surrounding the facility. Detailed description of the project status is provided below in Sections 2.2.1 through 2.2.4.

### 2.2.1 Groundwater Recovery Well System

Pursuant to Paragraph 20.c.i and .ii of the FDEP CO and Paragraph 17.b.i of the MDC CA, the groundwater RWS design, informed by the FPL variable density three-dimensional (3-D) solute transport groundwater flow model, was submitted to MDC on May 16, 2016, and to FDEP on July 20, 2016. In September 29, 2017 letter, MDC required FPL to submit a Phase I Remediation Action Plan (RAP) within 120 days (MDC 2017). Elements required in the RAP included revisions to sensitivity analyses conducted by the 3-D variable density model and details regarding monitoring and reporting over the first several years of RWS operations.

*The approved RWS began fulltime operations on May 15, 2018, and had removed over 1.8 billion gallons of hypersaline groundwater from the Biscayne aquifer by September 2018.*

FPL submitted the Phase I RAP and conditional approval of the RAP and original design of the RWS was provided by MDC on May 15, 2017. FPL initiated construction of the RWS on June 19, 2017, consisting of road and site improvements, transmission line installations, well construction, and pipe placement.

The location of the recovery wells and main pipeline is shown on Figure 2.2-1. Following completion of construction, the RWS was activated on May 15, 2018. Details on the RWS design and data collected from the first quarter of operation were provided in the RWS Startup Report (FPL 2018).

Part of the RWS design includes the repurposing of a permitted underground injection control (UIC) disposal test well located on site. The existing test injection well (DIW-1) was installed into a regionally confined disposal horizon (the Boulder Zone) located over 3,000 feet below the Biscayne aquifer. FPL applied for, and received, a UIC permit modification for extended operational injection testing of DIW-1 (Permit No. 293962-003-UC/MM, issued on September 21, 2016). In order to conduct the extended testing, FPL designed and constructed four 90-foot-deep Biscayne aquifer production wells (Figure 2.2-1). The disposal well and production wells are equipped with pumps and power adequate for the withdrawal and injection of 15 mgd of hypersaline groundwater from beneath the CCS into the Boulder Zone.

FPL began injection testing of DIW-1 on September 28, 2016, and continued that effort until startup of the RWS. During the reporting period from October 2017 until RWS startup, the injection testing system removed and safely disposed of approximately 2.63 billion gallons of hypersaline groundwater which equates to approximately 575,844 tons of salt removed from the

Biscayne aquifer. Since the startup of the RWS on May 15, 2018, through September 30, 2018, the RWS extracted 1.94 billion gallons of hypersaline groundwater, which equates to approximately 396,129 tons of salt removed from the Biscayne aquifer, and properly disposed in the Boulder Zone. In total, over 4.5 billion gallons of water and 971,866 tons of salt mass were removed from the Biscayne aquifer from October 2017 through September 2018. Table 2.2-1 and Figure 2.2-2 show a monthly summary of the salt mass removed and the volume of water pumped during the reporting period. The combined total volume of hypersaline groundwater and the associated mass of salt removed from the Biscayne aquifer from September 28, 2016, through September 30, 2018, was almost 9.5 billion gallons and over 2,157,000 tons, respectively.

### 2.2.2 Barge Canal – Turtle Point Canal Restoration

Pursuant to Paragraph 21.a of the FDEP CO, FPL developed a detailed plan and design for restoring the Barge Basin and Turtle Point canals. These artificial, deep canals were originally designed as the cooling water intake and discharge for Units 1 and 2 at the Plant. The plan includes filling the deep areas of the Barge Basin to an elevation of -15 feet North American Vertical Datum of 1988 (NAVD 88) and the deep areas of Turtle Point to an elevation -7 feet NAVD 88. This restoration strategy will significantly reduce or eliminate any potential for groundwater flow from the CCS to the canals and is expected to improve tidal flows and dissolved oxygen levels in the canals. In order to further improve coastal habitat, FPL proposes to fill the western one-third of the Turtle Point canal to -0.33 NAVD 88 in order to provide additional mangrove and American crocodile habitat east of the CCS.

*Permitting was completed on August 17, 2018, and restoration of the Turtle Point Canal has begun.*

All federal, state, and local permits associated with these canal restorations were issued on or before August 17, 2018, and FPL issued a notice to proceed to the selected contractor on September 26, 2018. FPL submitted a Construction Commencement Notice in October 2018, in accordance with Chapter 62-330.350 (1) (d) Florida Administrative Code, with construction initiated soon thereafter. The canal restorations are anticipated to be completed on or before August 17, 2020.

Water quality monitoring at new station TPBBSW-7T, located approximately 500 feet seaward of the end of the Turtle Point Canal restoration area, was initiated in June 2018 pursuant to Condition 29.k of the CO. In addition to analytic parameters required under the 2009 Monitoring Plan, an automated probe was also installed at this location that records physical parameters including specific conductance, salinity, density, and temperature data on an hourly basis.

### 2.2.3 Site Assessment Plan and Report

Pursuant to Paragraph 34.a of the MDC CA, FPL submitted a Site Assessment Plan (SAP) on September 14, 2016, for the purpose of identifying the source and extent of ammonia in surface waters surrounding the Plant facility that exceeded MDC water quality standards. In a letter dated December 21, 2016, MDC identified revisions to the FPL

*FPL has provided all Site Assessment Report (SAR) data and analyses requested by MDC and is working with MDC on actions to manage nutrients within the CCS and adjacent waters.*

SAP, and on December 29, 2016, FPL submitted an amended SAP and commenced sampling with MDC approval on January 3, 2017 (letter documenting MDC approval received February 14, 2017).

Pursuant to Paragraph 34.b of the MDC CA, FPL submitted a SAR on March 17, 2017, which included all data and FPL evaluations regarding the sources and extent of elevated ammonia in surface waters. The report found that the CCS and Biscayne Bay had very low levels of ammonia, while elevated ammonia (greater than 0.5 mg/L) was measured at bottom samples collected in some of the deep, stagnant, man-made canals. The report concluded the occurrence of elevated ammonia measured during the sampling event did not come from the CCS, but was likely the result of localized organic nitrogen (originating from vegetation detritus, organic soils, nitrogen fixation, etc.) being converted to ammonia through microbial processes in anaerobic, stagnant, basal portions of deep canals. The report also found that these conditions occur elsewhere in Biscayne Bay and the extent of elevated ammonia occurrences was limited (vertically, spatially, and temporarily).

MDC requested FPL provide additional documentation and analyses in support of the Site Assessment Report (SAR). FPL provided the requested additional information on November 13, 2017. On July 10, 2018, MDC DERM issued a letter that summarized DERM's evaluation of the FPL SAR and required FPL to undertake actions to address nutrient impacts to groundwater and surface water resources outside the boundaries of the CCS. On October 8, 2018, FPL submitted a letter report to MDC DERM outlining actions that FPL is undertaking to manage nutrient levels within the CCS that will continue to minimize impacts to adjacent groundwater and surface water resources consistent with the NMP, and associated proposal for monitoring.

## 2.2.4 Inspection of CCS Perimeter

Pursuant to Paragraph 21.c of the FDEP CO, FPL contracted for services for an independent, qualified, and licensed Professional Engineer to conduct an inspection of the CCS periphery, including all dams, dikes, surrounding berms, and appurtenant structures. The survey was completed, and a signed and sealed copy was provided to FDEP on October 12, 2016. The survey found no structural defects or breaches. The inspection report included six recommendations for near-term and long-term maintenance activities. All recommendations have been implemented as follows:

*The CCS perimeter berm and dams remain effective in preventing cooling canal water discharges to the Bay and other surface waters.*

- 1) Repair tie rods, walers, steel corrosion inhibitors, and crest road on Barge canal coffer dam (completed April 2018);
- 2) Backfill old C-107 canal cut on CCS side of bank with compacted structural fill (completed April 2017);
- 3) Stabilize slopes (both sides) of Hotel 2 dam with rock riprap (completed November 2017),

- 4) Remove trees greater than 4 inches in diameter on perimeter berm (completed April 2017);
- 5) Conduct yearly inspection of perimeter berm and dams (most recent inspection completed September 2018); and
- 6) Conduct five year comprehensive perimeter berm and dam inspection by professional dam safety engineer; pending.

## 2.3 Mitigation for Impacts Related to Historical Operations of the CCS

Both the MDC CA and FDEP CO included actions for FPL to implement in order to address impacts related to historical operations of the CCS. Progress made by FPL during the reporting period is described in Sections 2.3.1 through 2.3.4.

### 2.3.1 Saltwater Interface Allocation of Contribution

Paragraph 23.a of the FDEP CO requires FPL to complete an analysis of the location of the saltwater interface (SWI) with input from FDEP and other agencies using the variable density 3-D model developed under the MDC CA that seeks to allocate relative contributions of other entities and factors to

*Modeling was conducted that assessed the contributing factors affecting the position of the saltwater-freshwater interface.*

the movement of the coastal SWI. The original model used to design and assess the RWS was modified to incorporate time-variant factors such as drainage canals, land use changes, sea level rise, climate and water use changes, and CCS operations. The revised model was recalibrated and the various factors affecting the location and movement of the SWI were independently assessed. The model identified that the hypersaline water from the CCS was the single most influential factor on the SWI but the other factors combined had the largest impact to the position and movement of the SWI. The results of the modeling evaluation were presented to FDEP on June 19, 2018.

### 2.3.2 Agreements to Convey Property Interests

Paragraph 23.b of the FDEP CO states that, if requested by the SFWMD, FPL will convey interests in essential properties within the Biscayne Bay Coastal Wetlands (BBCW) Phase I project to facilitate the Comprehensive Everglades

*FPL, worked with the SFWMD to make essential lands available in support the Biscayne Bay Coastal Wetlands Phase I CERP project.*

Restoration Plan in exchange for payment based on a jointly approved appraisal process or other mutually agreeable considerations. The SFWMD provided notification of their intent to purchase FPL lands on August 25, 2016. FPL entered into negotiations with the SFWMD to identify lands for purchase, lands for easement, and procedures for appraisal and compensation, and an agreement was reached on May 5, 2017.

At total of 193 acres of FPL-owned lands within the BBCW Phase I project corridor were initially identified to be conveyed to the SFWMD. Subsequent land appraisals and project assessments

refined the parcel sizes necessary to meet the BBCW project objectives. The resulting purchase/sale agreement and exchange of easement agreement between FPL and the SFWMD conveying property interests for essential properties within the BBCW were executed on April 23, 2018.

### 2.3.3 Increase Weir Elevations in FPL's Everglades Mitigation Bank

Paragraph 17.c.i of the MDC CA required FPL to raise the control elevations of the 40 Everglades Mitigation Bank (EMB) culvert weirs to be no lower than 0.2 foot below than the 2.4-foot National Geodetic Vertical Datum (NGVD) trigger elevation of the S-20 structure and maintain this elevation for one year so that the change in control elevation with regards to impacts to salinity, water

*The operations of the EMB have complied with the CA and adverse impacts to wetland restoration were documented. FPL continues to consult with MDC on future operations under the C-111 CERP project.*

quality, and environmental lift in the EMB could be assessed. FPL implemented the revised weir operational elevations for over a year and documented the results in a May 2017 report presented to MDC and FDEP. The report identified significant reductions in freshwater flows to the south of the weirs and an associated increase in salinity to a degree that affects the viability of freshwater wetland recruitment that has been achieved south of the L-31E levee since 2005 as well as ability of the EMB to meet the success criteria specified in the FDEP mitigation bank permit. FPL and MDC DERM began consultations regarding the weir settings and the associated impacts to the EMB in 2017 which continued through 2018.

On June 28, 2018, FDEP issued a permit modification to release credits for the EMB with a stipulation that FPL set and maintain the 40 EMB weirs at 1.8 feet NGVD. MDC DERM challenged the FDEP permit modification, and FPL and DERM continue to evaluate potential alternative EMB weir operations. The latest EMB vegetative survey (conducted in December 2017) has documented the creation of over 334 acres of freshwater wetlands south of the L-31 levee as a result of FPL's historic weir operations since 2005, as well as the significant reduction in the rate of wetland expansion in 2016 and 2017 when weir elevations were raised (Figure 2.3-1).

### 2.3.4 Escrow Funding for Mitigation of Saltwater Intrusion

Paragraph 23.d of the FDEP CO requires FPL to deposit \$1.5 million into a Florida Department of Financial Services escrow account in accordance with an escrow agreement signed by FPL, FDEP, and the Florida Department of Financial Services. The escrow account shall be used to finance projects in the Plant's region that support mitigation of saltwater intrusion. No project proposals were filed or have been approved by FDEP for funding during this reporting period.

## 2.4 Monitoring and Reporting

Both the MDC CA and FDEP CO include requirements for installation of additional monitoring stations, conducting initial baseline surveys prior to operation of the RWS, expansion

*FPL continued to implement the extensive monitoring program used to assess progress of the remediation of the hypersaline plume and conditions within and surrounding the CCS.*



of data posting, and annual reporting primarily for the purpose of monitoring progress toward achievement of the hypersaline plume retraction and determination of the rate of westward migration of the hypersaline groundwater.

On October 5, 2018, FPL submitted a Recovery Well Startup Report pursuant to MDC DERM letters dated September 29, 2016, and May 15, 2017, and included information related to the first quarter of the RWS operation (May 15, 2018, through August 15, 2018). Details on the system design, recovery well pumping, salt mass removal, and other relevant information were included in the report. FPL also submitted an Annual Monitoring Report on August 31, 2018, as required by the Fifth Supplemental Agreement (SFWMD 2009) and included results from additional monitoring stations required by the CO up through May 31, 2018. More recent results and other relevant information related to the CA and CO are included in the FPL EDMS and available to the Agencies. Additional detail regarding monitoring and reporting made by FPL during the reporting period are discussed below.

#### 2.4.1 Continuous Surface Electromagnetic Mapping

Pursuant to Paragraph 17.d.iii of the MDC CA and Paragraph 29.a of the FDEP CO, FPL shall conduct and report to the Agencies, a baseline survey of the hypersaline plume after freshening activities are in operation but before the complete RWS begins

*The baseline CSEM mapping will provide the basis for assessing the effectiveness of the hypersaline plume remediation.*

operation. A baseline Continuous Surface Electromagnetic Mapping (CSEM) survey was conducted in the last week of March 2018 and the first week of April 2018 prior to the operation of the completed groundwater RWS. The results of this baseline CSEM survey were summarized in the October 2018 Recovery Well System Startup Report provided to FDEP and MDC DERM and posted on the FPL EDMS database. The baseline volume of the aquifer material with chloride concentrations greater than 19,000 mg/L within the compliance area west and north of the FPL property as identified in the MDC CA is estimated to be 450,493,000 cubic meters. Subsequent surveys will be conducted annually for the first three years of operation and every other year thereafter.

#### 2.4.2 Expanded Groundwater Monitoring

Pursuant to Paragraph 17.d.iv of the MDC CA and Paragraph 27.a of the FDEP CO, FPL is required to expand the groundwater monitoring network. The MDC CA requires that FPL add three groundwater monitoring clusters (shallow, mid, and deep) to monitor groundwater conditions in the Model

*Expanded groundwater monitoring in conjunction with CSEM mapping improves assessment of progress in hypersaline plume remediation.*

Lands basin, similar in design and function to existing groundwater monitoring wells in the region, as part of the CCS monitoring program. These new groundwater wells were designated as TPGW-17, TPGW-18, and TPGW-19. Monitoring well TPGW-17 construction was completed by November 8, 2017, TPGW-18 construction was completed by March 20, 2018, and TPGW-19 construction was completed by September 20, 2017.

The CO required that FPL replace existing monitoring well TPGW-8S, and construct a new deep

monitoring well (TPGW-20) and a new three-well monitoring cluster (TPGW-21) consistent with the 2009 Monitoring Plan. FPL completed the construction and installation of TPGW-20 on August 16, 2017, TPGW-8S on October 18, 2017, and TPGW-21 on December 18, 2017. The new well clusters were similar in design and function to the existing groundwater monitoring wells in the region as part of the CCS monitoring program. Figure 2.4-1 includes the locations of these wells.

Groundwater monitoring in the new wells includes collection of analytical grab samples and continuously monitored data. Analytical grab samples are collected quarterly and analyzed each event. The quarterly events occur each March, June, September, and December. The continuously monitored data includes salinity specific conductance, temperature, density, and water level that is recorded by automated probes in each well. Per the Quality Assurance Project Plan, the monitoring wells are purged annually to eliminate potential stratification (FPL 2013).

The CO also requires that FPL add monitoring data from six existing United States Geological Survey (USGS) wells to the EDMS (G-3946-S, G-3946-D, G-3900, G-3976, G-3966, and G-3699). The USGS groundwater analytical data, along with the automated monitoring, analytical sample results, and all associated laboratory reporting documentation of the new groundwater monitoring wells are available on the EDMS.

FPL is working with both MDC DERM and FDEP on potential revisions to the monitoring conducted under the 2009 monitoring program, the Miami Dade Class I permit (CLI-2014-0312, expired), and the CO-CA. It is anticipated a revised CO-CA monitoring plan will be finalized in 2019.

#### **2.4.3 Expanded Biscayne Bay Water Quality Sampling**

Pursuant to Paragraph 23.d of the FDEP CO, FPL is required to collect surface water samples in Biscayne Bay once every two months at six new stations (TPBBSW-15, TPBBSW-16, TPBBSW-17, TPBBSW-18, TPBBSW-19, and TPBBSW-20) near the top and bottom of the water column. Figure

*The two-year water sampling program, completed during this reporting period, will assist FDEP's assessment of regional Bay water quality.*

2.4-2 shows the locations of these stations. The parameters sampled include temperature, conductivity, pH, dissolved oxygen, turbidity, salinity, tritium, ammonia, nitrate/nitrite, total Kjeldahl nitrogen (TKN), orthophosphate, total phosphorus, chlorophyll-a, and Secchi disk depth. The sampling period began in September 2016 and ended in May 2018; bimonthly results are posted on the EDMS database. Biscayne Bay monitoring station TPBBSW-7T located approximately 500 feet east of the mouth of the Turtle Point Canal was deployed in June 2018 (Figure 2.4-2). Water quality data consistent with the parameters and frequency in the 2009 Monitoring Plan are posted on the EDMS.

#### **2.4.4 Expanded Reporting of CCS Related Monitoring Data**

As required by the 2009 Monitoring Plan, which is part of the Fifth Supplemental Agreement, FPL developed an EDMS in 2010 where all the

*Coordinating the various monitoring and reporting requirements into a comprehensive database and annual reporting system helps in the assessment of progress in achieving goals.*

associated automated and analytical data were stored and accessible to the SFWMD, MDC and FDEP (SFWMD 2009). Other relevant information and reports were also included in the EDMS. A separate EDMS was subsequently developed in 2015 to facilitate the storage and review of extensive groundwater and surface water data being collected in accordance with the MDC Class I permit for the L-31E freshening. Since the requirement and timelines of the Fifth Supplemental Agreement and the L-31E permit were different, two separate EDMS sites were maintained until August 2018.

Pursuant to Paragraphs 28, 31, and 33 of the FDEP CO, FPL is required to expand the 2009 Monitoring Plan database to include additional water monitoring data required by all other governmental agencies and entities including, but not limited to, SFWMD, the Nuclear Regulatory Commission, MDC, and the Florida Department of Health (FDOH), as well as all monitoring data that are required in the CO. As a result FPL, developed a consolidated EDMS that included all the relevant automated and analytical data collected as part of the Fifth Supplemental Agreement, and MDC L-31E Class I permit into one EDMS and included data collected as part of the CA and CO. This consolidated EDMS came online in August 2018 and the link to the password protected site is: <https://www.ptn-combined-monitoring.com>. The Public Resources section of the EDMS database was also updated beginning in June 2016, when the CO was executed through September 2018. The public resources section includes flat files of relevant monitoring data and reports required by other governmental entities. Tables 2.4-1 and 2.4-2 provide a summary of the additional water monitoring data and reports required by other governmental agencies and entities that are included in the EDMS.

#### **2.4.5 Annual Progress Reports**

FPL is required to provide an annual report pursuant to Paragraph 17.d.v of the MDC CA and Paragraph 31 of the FDEP CO. The first annual report was provided to the Agencies on November 11, 2016, (FPL 2016) and the second annual report submitted November 29, 2017 (FPL 2017). This report constitutes the third annual Remediation/Restoration Report and supplements information provided in the 2018 Annual Monitoring Report, RWS Startup Report, and data and documents in the EDMS.

### **3. PROGRESS IN ACHIEVING THE OBJECTIVES OF THE CA AND CO**

FPL continues to make progress in achieving the objectives of the CA and CO this reporting period (October 2017 through September 2018). While a number of activities were conducted, key actions related to the objectives focused on:

- Continuing freshening activities to abate CCS salinities;
- Reducing the salt mass of hypersaline water in groundwater west and north of the CCS;
- Halting the westward migration of the plume and eventually retracting the hypersaline groundwater from the CCS back to L-31E canal; and
- Preventing releases of groundwater from the CCS to surface waters connected to Biscayne Bay that cause violations of water quality standards.

As the operation of the UFA wells and the RWS continue, nutrient levels in the CCS stabilize, and the Turtle Point/Barge Canal restoration project is ongoing, detailed assessments of the progress made in achieving the objectives of the CA and CO will continue annually using data collected from the extensive monitoring system.

## **4. RECOMMENDATIONS FOR REFINEMENT OF ACTIVITIES**

FPL recommends that reporting for the MDC CA and FDEP CO which includes the monitoring required under the 2009 Monitoring Plan be consolidated into one annual report, with the focus on the progress in abating/remediating the CCS plume and associated impacts per the CA and CO. FPL also recommends that the annual reports be streamlined and summarized with the detailed backup data provided in the EDMS, rather than included in multi-volume reports. At three years, five years and ten years, additional information required by MDC for the Performance and Compliance Reporting will be included.

At this time, FPL has no recommendations for changes to operations or monitoring but will continue to work with the FDEP and MDC on opportunities to improve the effectiveness and efficiency of implementing the objectives of the CO and CA.



## 5. REFERENCES

- Florida Power & Light Company (FPL). 2013. Florida Power & Light Company Quality Assurance Project Plan (QAPP) for the Turkey Point Monitoring Project. Prepared for Florida Power & Light Company by Ecology and Environment, Inc. June 2013.
- \_\_\_\_\_. 2016. Florida Power & Light Company Consent Agreement 2016 Annual Report. November 10, 2016.
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- \_\_\_\_\_. 2018. Florida Power & Light Company Recovery Well System Startup Report. Prepared for Florida Power & Light Company by Ecology and Environment, Inc. October 5, 2018.
- Miami-Dade County (MDC). 2017. Phase 1 Remedial Action Plan Submittal dated January 27, 2017 for the Florida Power and Light facility and Cooling Canal System. May 15, 2017.
- South Florida Water Management District (SFWMD). 2009. FPL Turkey Point Power Plant Groundwater, Surface Water, and Ecological Monitoring Plan (Exhibit B). Prepared by SFWMD, Florida Department of Environmental Protection, and Miami-Dade County Department of Environmental Resource Management. October 14, 2009.

# TABLES

**Table 2.0-1 Permitting Activities Status**

Project	Agency	Permit Type	Permit Application Number	Permit Number	Submittal Date	Permit Issued Date
<b>FDEP Consent Order Paragraph 21.a</b>						
Turtle Point and Barge Canal Restoration	Florida Department of Environmental Protection	Joint Application Environmental Resource Permit	13-0127512-013	13-0127512-013	8/4/16	9/27/16
Turtle Point and Barge Canal Restoration	U.S. Army Corps of Engineers	Section 404: Dredge & Fill	SAJ-2016-02462(SP-MLC)	SAJ-2016-02462	8/4/16	4/5/18
Turtle Point and Barge Canal Restoration	Miami-Dade County Department of Environmental Resource Management	Class I Wetlands Permit	CLI-2016-0244	CLI-2016-0244	8/4/16	8/17/18
<b>FDEP Consent Order Paragraph 27.c</b>						
Groundwater Monitoring Wells: TPGW-8S	Miami-Dade County	Right of Way	2017002979	2017002979	9/15/16	5/18/17
Groundwater Monitoring Wells: TPGW-8S	Miami-Dade County	Well Construction Permit	13-59-13647	13-59-13647	4/7/17	4/11/17
<b>MDC Consent Agreement Paragraph 17.d.iv</b>						
Groundwater Monitoring Wells: TPGW-17	Miami-Dade County	Well Construction Permit	Shallow: 13-59-13648 Mid:13-59-13692 Deep: 13-59-13693	Shallow: 13-59-13648 Mid:13-59-13692 Deep: 13-59-13693	4/7/17	5/2/17
Groundwater Monitoring Wells: TPGW-18	Miami-Dade County	Well Construction Permit	Shallow: 13-59-13885 Mid:13-59-13886 Deep: 13-59-13887	Shallow: 13-59-13885 Mid:13-59-13886 Deep: 13-59-13887	6/30/17	7/6/17
Groundwater Monitoring Wells: TPGW-18	Florida Department of Environmental Protection	Joint Application Environmental Resource Permit	13-0127512-014EI	13-0127512-014EI	9/15/16	12/19/16

**Table 2.0-1 Permitting Activities Status**

Project	Agency	Permit Type	Permit Application Number	Permit Number	Submittal Date	Permit Issued Date
Groundwater Monitoring Wells: TPGW-18	U.S. Army Corps of Engineers	Section 404: Dredge & Fill	SAJ-2016-02462	SAJ-2016-02462	9/15/16	2/27/17
Groundwater Monitoring Wells: TPGW-18	Miami-Dade County Department of Environmental Resource Management	Class I Wetlands Permit	CLI-2016-0303	CLI-2016-0303	11/11/16	1/19/18
Groundwater Monitoring Wells: TPGW-19	Miami-Dade County	Well Construction Permit	Shallow: 13-59-13888 Mid: 13-59-13889 Deep: 13-59-13884	Shallow: 13-59-13888 Mid: 13-59-13889 Deep: 13-59-13884	6/30/17	7/6/17
<b>FDEP Consent Order Paragraph 27.d</b>						
Groundwater Monitoring Wells: TPGW-20	City of Homestead	Right of Way	NA	17-14	3/2/17	5/30/17
Groundwater Monitoring Wells: TPGW-20	Miami-Dade County	Well Construction Permit	Deep: 13-59-13650	Deep: 13-59-13650	4/7/17	4/11/17
<b>FDEP Consent Order Paragraph 27.b</b>						
Groundwater Monitoring Wells: TPGW-21	Miami-Dade County	Right of Way	2017002980	201700298	9/15/16	5/18/17
Groundwater Monitoring Wells: TPGW-21	Miami-Dade County	Well Construction Permit	Shallow: 13-59-13649 Mid: 13-59-1394 Deep: 13-59-13695	Shallow: 13-59-13649 Mid: 13-59-1394 Deep: 13-59-13695	4/7/17	5/2/17

**Table 2.0-1 Permitting Activities Status**

Project	Agency	Permit Type	Permit Application Number	Permit Number	Submittal Date	Permit Issued Date
<b>FDEP Consent Order Paragraph 21.c and MDC Consent Agreement Paragraph 17.b.i</b>						
Recovery Well System: Pipeline & L31 Levee Crossing	South Florida Water Management District	Right of Way	16-0920-2	14742	9/15/16	3/7/17
Recovery Well System: Pipeline & L31 Levee Crossing	U.S. Army Corps of Engineers	Section 408	NA	NA	2/24/17	1/25/18
Recovery Well System: Pipeline along Palm Drive	Miami-Dade County	Right of Way	2017003859	2017003859	5/30/17	8/16/17
Recovery Well System: Consumptive Use (15 MGD)	South Florida Water Management District	Consumptive Water Use	160916-12	13-06251-W	9/15/16	3/1/17
Recovery Well System: RWS-1	Miami-Dade County	Well Construction Permit	13-59-13736	13-59-13736	5/5/17	5/8/17
Recovery Well System: RWS-2	Miami-Dade County	Well Construction Permit	13-59-13737	13-59-13737	5/5/17	5/8/17
Recovery Well System: RWS-3	Miami-Dade County	Well Construction Permit	13-59-13738	13-59-13738	5/5/17	5/8/17
Recovery Well System: RWS-4	Miami-Dade County	Well Construction Permit	13-59-13739	13-59-13739	5/5/17	5/8/17
Recovery Well System: RWS-5	Miami-Dade County	Well Construction Permit	13-59-13740	13-59-13740	5/5/17	5/8/17
Recovery Well System: RWS-6	Miami-Dade County	Well Construction Permit	13-59-13741	13-59-13741	5/5/17	5/8/17
Recovery Well System: RWS-7	Miami-Dade County	Well Construction Permit	13-59-13742	13-59-13742	5/5/17	5/8/17



**Table 2.0-1 Permitting Activities Status**

Project	Agency	Permit Type	Permit Application Number	Permit Number	Submittal Date	Permit Issued Date
Recovery Well System: RWS-8	Miami-Dade County	Well Construction Permit	13-59-13743	13-59-13743	5/5/17	5/8/17
Recovery Well System: RWS-9	Miami-Dade County	Well Construction Permit	13-59-13744	13-59-13744	5/5/17	5/8/17
Underground Injection Control Well: Disposal Well	Florida Department of Environmental Protection	Injection Test	293962-003-UC/MM	293962-003-UC/MM	8/31/16	9/21/16
Underground Injection Control Well: Disposal Well	Florida Department of Environmental Protection	Operational Permit	0293962-004-UO/II	0293962-004-UO/II	6/1/17	7/12/18

**Table 2.0-2 Overall Status of Activities**

Activity	CO / CA No.	Status	Additional Comments
<b>CCS Freshening Activities</b>			
Upper Floridan Aquifer Wells	CO 20.a.	UFA well system operational 11/28/17. Operations maintained throughout reporting period.	Average salinity of UFA water added during reporting period: 2.4 psu. Total UFA water added to CCS during reporting period: 4.5 billion gallons.
Marine Well Operation	CA 17.a.i.2.	Marine wells were not operated during the reporting period. No operation during the reporting permit period	No operation during the reporting period
L-31E Source Water	CA 17.a.i.2.	Not Available.	FPL removed L-31E facilities in December 2016.
Evaluation of Alternative Sources	CA 17.a.ii.	FPL working with MDC on use of reclaimed water for CCS freshening source.	None.
Thermal Efficiency Plan (TEP)	CO 20.b.	Continued implementation of the approved Thermal Efficiency Plan.	Average CCS thermal efficiency during the reporting period is approximately 85%.
Nutrient Management Plan (NMP)	CO 21.b.	Continued implementation of the FDEP approved NMP	Total nitrogen and total phosphorous levels in the CCS continue to decline with September 2018 levels at 3.6 mg/L and 0.029 mg/L respectively
<b>Remediation – Restoration Activities</b>			
Recovery Well System (RWS)	CO 20.c.i. & ii. CA 17.b.i.	Permitting and construction completed with full time system operation commencing on May 15 <sup>th</sup> 2018.	Baseline hypersaline plume assessment and monitoring conducted prior to the RWS startup and RWS data are summarized in a report to the Agencies dated October 5, 2018.  Over 4.5 billion gallons of hypersaline groundwater containing 861,061 tons of salt were disposed of during reporting period.
Turtle Point and Barge Basin Canal Restoration	CO 21.a.	All applications received permits acquired, Construction contractor selected, notice to proceed issued on or before August 17 <sup>th</sup> September 26, 2018	Construction to be completed on or before August 17, 2020.

**Table 2.0-2 Overall Status of Activities**

Activity	CO / CA No.	Status	Additional Comments
Site Assessment Plan (SAP)	CA 34.a.	SAP submitted by FPL 9/14/2016, Plan amended 12/29/2016. Plan approved by MDC 2/14/2017.	Sampling completed in January 2017.
Site Assessment Report (SAR)	CA 34.b.	Report submitted on 3/17/2017. MDC issued RFI on 7/7/2017. Supplemental information provided to MDC on 11/13/2017. FPL submitted report summarizing actions FPL is implementing to address CCS nutrient impacts to adjacent groundwater and surface water resources on 10/8/2018.	Total nitrogen concentrations in the CCS canals dropped to 3.6 mg/L in September 2018 while total phosphorous concentrations declined to 0.029 mg/L
Inspection of CCS perimeter	CO 21.c.	Inspection report filed with FDEP 10/12/2016. Recommended maintenance actions contained in the report were completed by April 2018.	September 2018 perimeter berm inspection found no structural defects or breaches.
<b>Mitigation for Impacts Related to Historical Operations of the CCS</b>			
Saltwater Interface allocation of contributions	CO 23.a.	Modeling results presented to FDEP on June 19, 2018	The model identified the hypersaline water from the CCS was the single most influential factor on the SWI but the other factors combined had the largest impact to the position and movement of the SWI.
Agreements to convey property interests for CERP BBCW and S-20 structure projects	CO 23.b. CA 17.c.iii.	Purchase/sale and exchange of easement agreements completed on April 23, 2018. No determination of need by District at this time for S-20 structure.	None.
Filling portions of Model Lands North Canal	CA 17.c.ii.	Activity completed.	No additional actions required.
Increase weir control elevation test in FPL Everglades Mitigation Bank	CO 32. CA 17.c.i.	One-year weir elevation test completed; report submitted to MDC and FDEP on 5/9/2017. Adverse impacts to wetland restoration were documented.	Evaluation of alternative EMB weir operations ongoing with MDC and FDEP.

**Table 2.0-2 Overall Status of Activities**

Activity	CO / CA No.	Status	Additional Comments
Escrow funding for mitigation of saltwater intrusion	CO 23.d.	No proposals for funding were filed with FDEP during the reporting period.	None.
<b>Monitoring and Reporting</b>			
CSEM Baseline Survey	CO 29.a. CA 17.d.iii.	CSEM baseline survey was conducted in April-May 2018.	Results of the baseline CSEM survey along with concurrent WQ field sampling results are summarized in the October 5, 2018 Recovery Well System (RWS) Startup Report.
Expanded groundwater monitoring in Model Lands and surrounding area	CO 27a.,b., c., & d. CA 17.d.iv.	Construction of all new monitoring wells identified in the FDEP CO and MDC CA were completed prior to RWS startup.	Data from new, existing and required USGS wells are posted on EDMS.
Expanded Biscayne Bay WQ sampling	CO 23.d., CO 29.k.	Bi-monthly sampling was initiated in September 2016 and completed on May 2018. TPBBSW-7T was deployed in June 2018	Data provided on EDMS database.
Expanded reporting of CCS related monitoring	CO 28., 31, and 33.	Updates to EDMS and posting of reports complete: August 2018.	Updated combined EDMS accessible to agencies at <a href="https://www.ptn-combined-monitoring.com">https://www.ptn-combined-monitoring.com</a> .
Submit annual progress reports	CO 31. CA 17d.v.	Provided November 2016, November 2017 and 2018.	Reports provided on the EDMS database
Provide FDEP with copies of submittals to other agencies	CO 33.	Copies of FPL reports and compliance submittals to MDC and Extended Power Uprate reports to SFWMD provided to FDEP.	Reports and data provided on the EDMS database

**Table 2.1-1 Monthly Summary of Upper Floridan Aquifer and CCS Rainfall Inputs during the Reporting Period (October 2017–September 2018)**

Month	Total Water Inputs (million gallons)	
	Upper Floridan Wells	CCS Rainfall
10/2017	405.3	552.1
11/2017	399.7	90.3
12/2017	409.2	74.8
1/2018	384.7	121.9
2/2018	354.9	54.3
3/2018	385.0	41.2
4/2018	370.6	304.9
5/2018	378.1	1057.3
6/2018	366.4	233.6
7/2018	372.8	700.8
8/2018	370.2	639.1
9/2018	359.2	1131.1
<b>Total</b>	<b>4,556.08</b>	<b>5,005.19</b>

**Table 2.2-1 Summary of Monthly Water Pumped from UIC Extended Testing and RWS Wells with Total Salt Removed from the Biscayne Aquifer during the Reporting Period (October 2017– September 2018)**

Date	Production Wells		RWS Wells		TOTAL	
	Total Volume Extracted (million gallons)	Salt Removed (tons)	Total Volume Extracted (million gallons)	Salt Removed (tons)	Total Volume Extracted (million gallons)	Monthly Salt Removed (tons)
10/2017	427	96,245	-	-	427	96,245
11/2017	384	85,314	-	-	384	85,314
12/2017	430	96,480	-	-	430	96,480
1/2018	436	95,695	-	-	436	95,695
2/2018	387	82,216	-	-	387	82,216
3/2018	297	62,974	-	-	297	62,974
4/2018	218	46,945	-	-	218	46,945
5/2018*	50	9,974	247	50,558	296	60,533
6/2018	-	-	439	89,129	439	89,129
7/2018	-	-	442	90,519	442	90,519
8/2018	-	-	383	78,242	383	78,242
9/2018	-	-	427	87,681	427	87,681
<b>Total</b>	<b>2,629</b>	<b>575,844</b>	<b>1,938</b>	<b>396,129</b>	<b>4,567</b>	<b>971,973</b>

\* RWS wells were started (and UIC extended testing well pumping terminated) on May 15, 2018.

**Table 2.4-1 Additional Related Water Monitoring Data Required by Other Governmental Entities (Consent Order Paragraph 31.b.; Data Provided in the Florida Power & Light Company Electronic Data Management System)**

EDMS Folder	Permit/Condition #	Submittal/Parameters	Frequency	Government Agency
Industrial Wastewater Facility Permit (Outfalls I-001 & I-002)	FL0001562	pH	Monthly	FDEP
		Temperature	Monthly	FDEP
		Specific conductance	Quarterly	FDEP
		TSS, pH, salinity, specific conductance	Quarterly	FDEP
		TSS, lead, oil & grease, copper, zinc	Semi-annually	FDEP
		Copper, iron, zinc	Semi-annually	FDEP
		Log check and report	Monthly	FDEP
Domestic Wastewater Annual Operating Permit	DWO-000010-2017/2018	DMR	Monthly	MDC
Domestic Wastewater Facility Permit and Underground Injection Well	FLA013612 and 0127512-006-UO	MOR	Monthly	FDEP
		Wastewater effluent stream analysis	Within 6 months expiration of permit	FDEP
		Permit renewal notice	60 days prior to expiration	FDEP
Other data/documents (Consent Agreement)	17.d.ii	L-31E data (current and historic) groundwater and surface water data	Weekly, Quarterly, SA	MDC
	Addendum	SAP and SAP associated data collection	TBD	MDC
	17.d.ii/17.b.ii	Data reports including operation of RWS, consistent with the data reports currently required by the MDC Class I permit	Monthly/Semi-Annual	MDC
Other data/documents (Consent Order)	SC 23.d	Data from six Biscayne Bay sites	Every 2 months (for 2 years)	FDEP
	SC 27.a	Data from six USGS wells	Updated monthly	FDEP

**Table 2.4-1 Additional Related Water Monitoring Data Required by Other Governmental Entities (Consent Order Paragraph 31.b.; Data Provided in the Florida Power & Light Company Electronic Data Management System)**

EDMS Folder	Permit/Condition #	Submittal/Parameters	Frequency	Government Agency
Interceptor Ditch (5th Supplemental Agreement)	Monitoring Plan	Seasonal readings	Updated Bi-Monthly	SFWMD
		Telemetry based readings	Updated Daily	SFWMD
		Surface water samples	Updated Bi-Monthly	SFWMD
		Manual readings	Updated Bi-Monthly	SFWMD
		ID readings and pump operations entries	Updated Bi-Monthly	SFWMD
		ID staff gauge surveys and pump calibrations	Annual or as needed	SFWMD



**Table 2.4-2 Additional Consent Order Related Reports Required by Other Governmental Entities and Provided in the Florida Power & Light Company Electronic Data Management System**

EDMS Folder	Permit/Condition #	Submittal/Parameters	Frequency	Government Agency
Other Reports (Consent Agreement)	Addendum	SAR	Single submittal	MDC
	17.d.v	Alternative Water Supply Report	Single submittal	MDC
	17.d.v	Model Documentation Reports	Single submittal	MDC
	17.d.ii/17.b.ii	Data reports including operation of RWS, consistent with the data reports currently required by the MDC Class I permit	Monthly/Semi-Annual	MDC
	SC 20.b	Thermal Efficiency Plan	Single submittal	FDEP
	SC 28	Nutrient Management Report	Single submittal	FDEP
	SC 28	REMP/RETZ reports	Annual report	FDEP
Interceptor Ditch (5th Supplemental Agreement)	Monitoring Plan	Annual Interceptor Ditch Assessment (as part of Annual Uprate Report)	Annual	SFWMD
UIC Class I Injection Well System Permit	293962-004-UO/11	UIC MOR	Monthly	FDEP
Upper Floridan Aquifer data/documents (Conditions of Certification )	PA 03-45E	UFA Water withdrawal Report	Quarterly	SFWMD/FDEP
Nuclear Regulatory Commission	CA, Special Condition 28	REMP/RETZ reports	Annual report	FDEP
Florida Department of Health (FDOH)	COC VII. B.4.	Tritium monitoring	Monthly	FDOH

# FIGURES

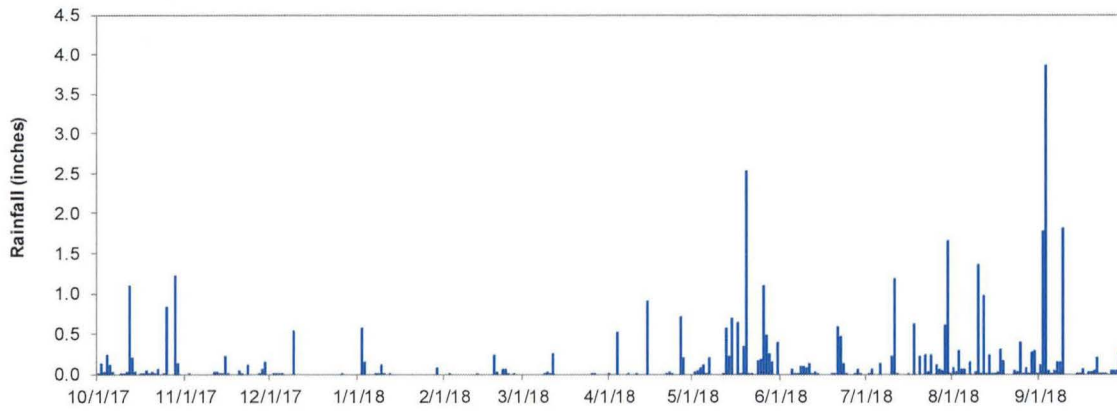


Figure 2.1-1 Daily Rainfall over CCS

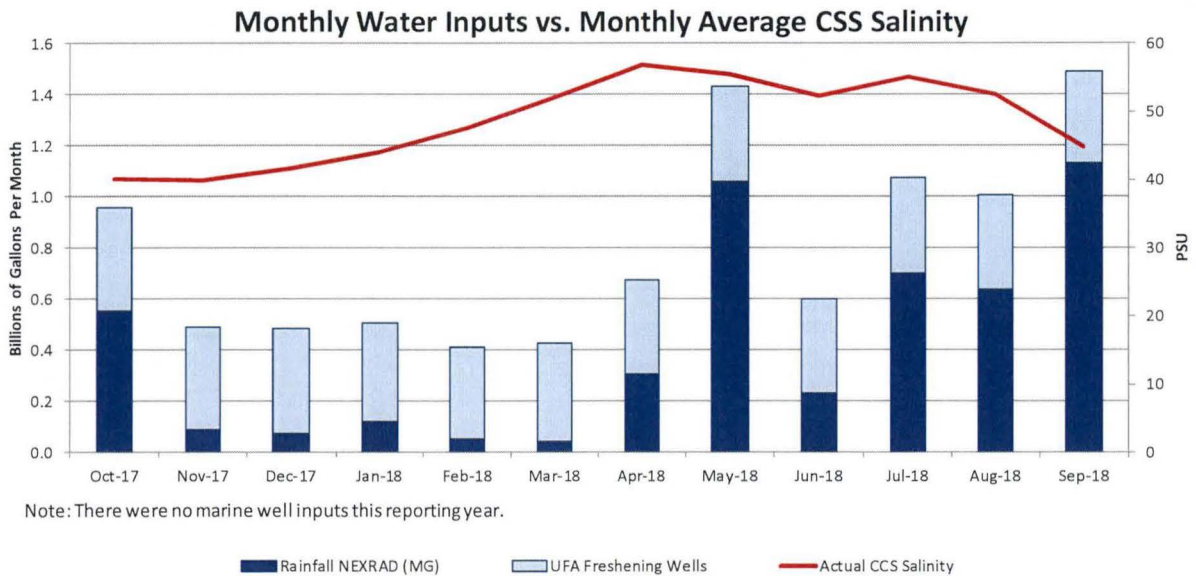


Figure 2.1-2 Monthly CCS Rainfall, Freshening Water Inputs with Average Monthly Salinities



Figure 2.1-3 Location of Floridan Wells and Marine Wells



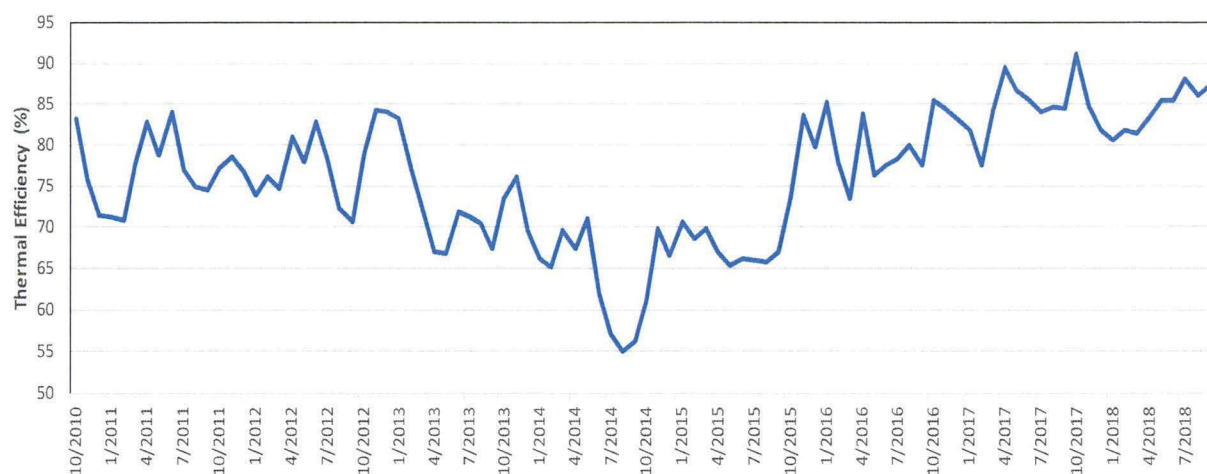


Figure 2.1-4 Monthly CCS Thermal Efficiency Trends: August 2010 through September 2018

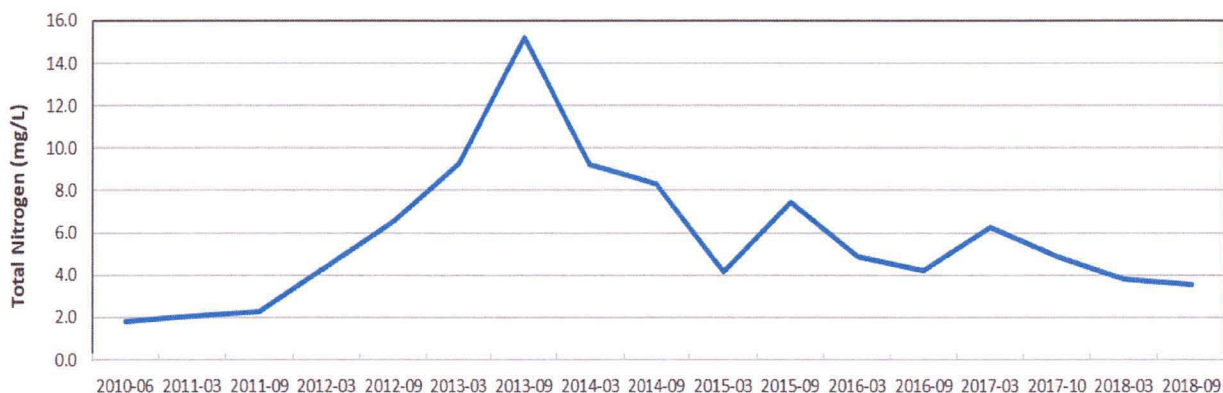


Figure 2.1-5 Semi-Annual Total Nitrogen Trends in the CCS: June, 2010 through September, 2018

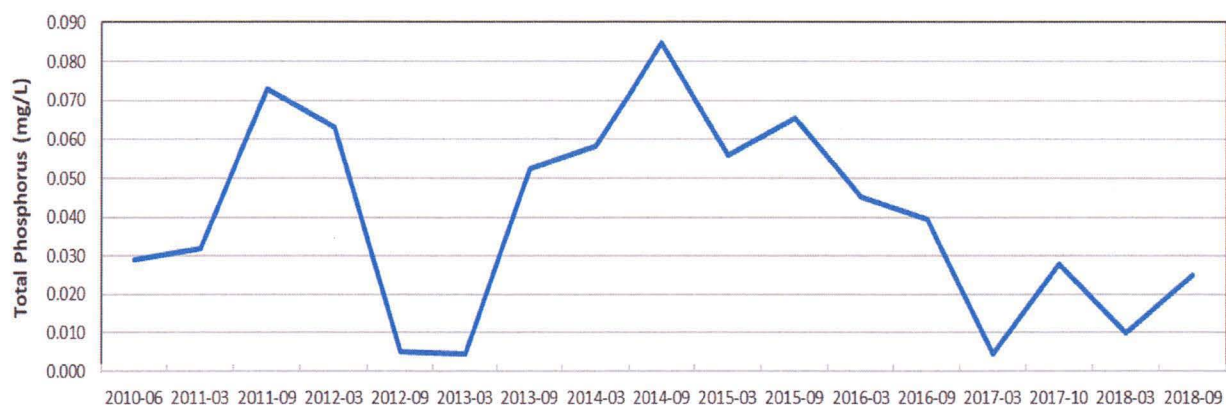


Figure 2.1-6 Semi-Annual Total Phosphorus Trends in the CCS: June, 2010 through September, 2018

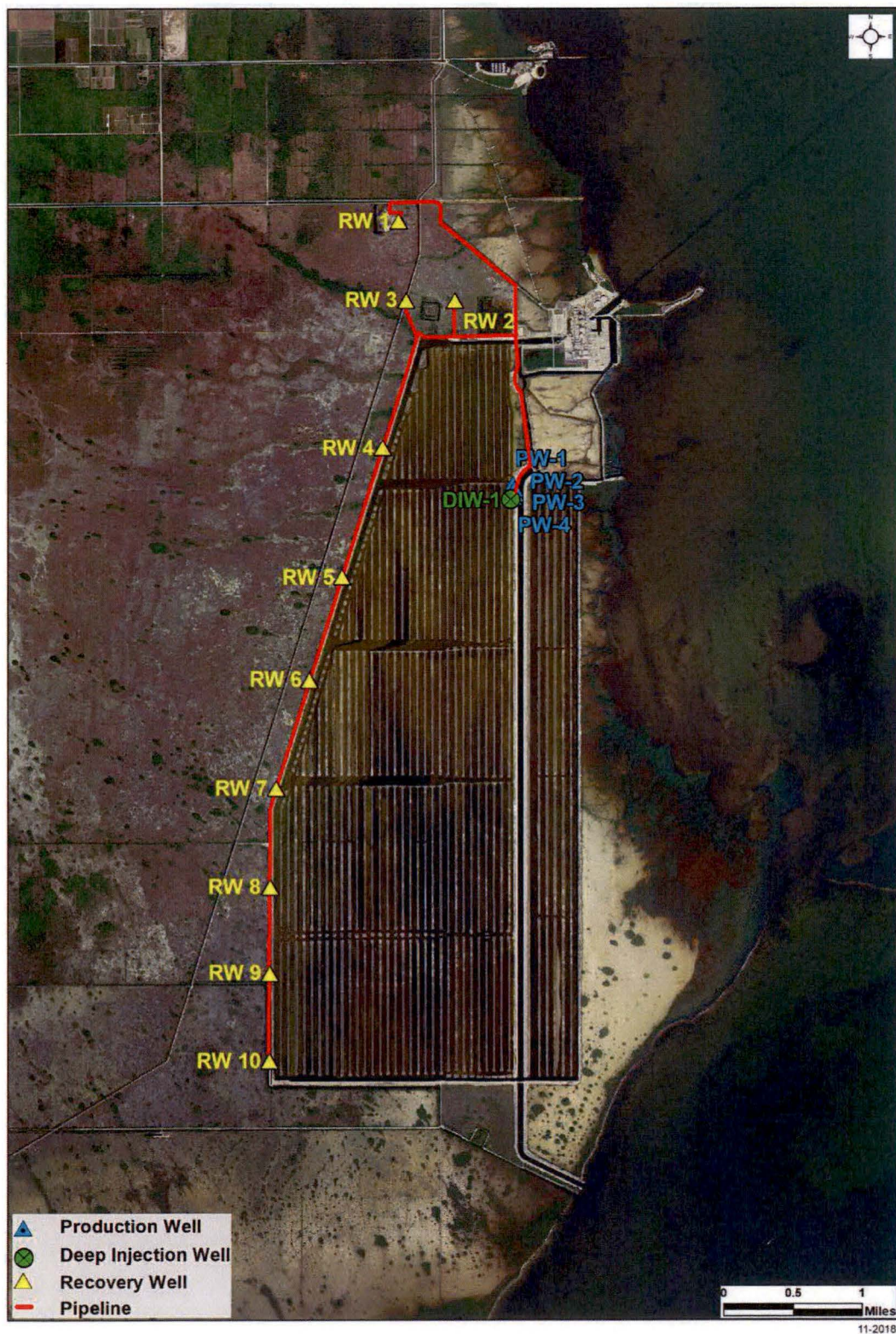


Figure 2.2-1 Location of Recovery Wells and Pipeline, UIC Extended Testing Production Wells, and Deep Injection Well



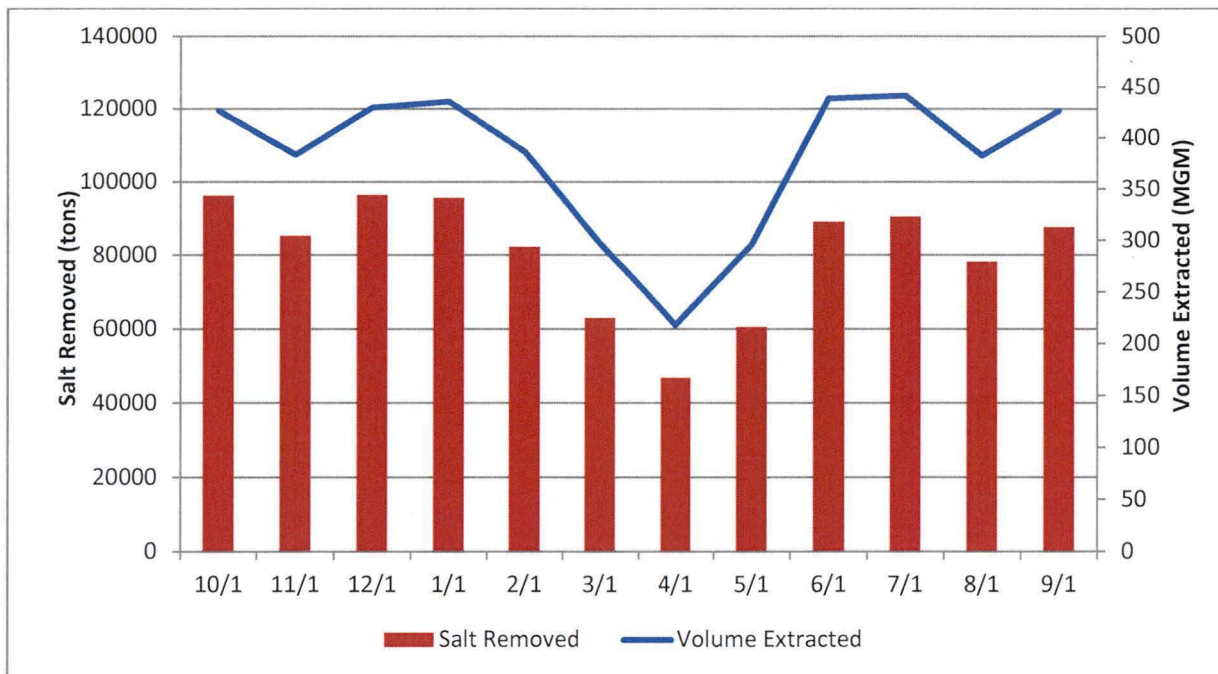
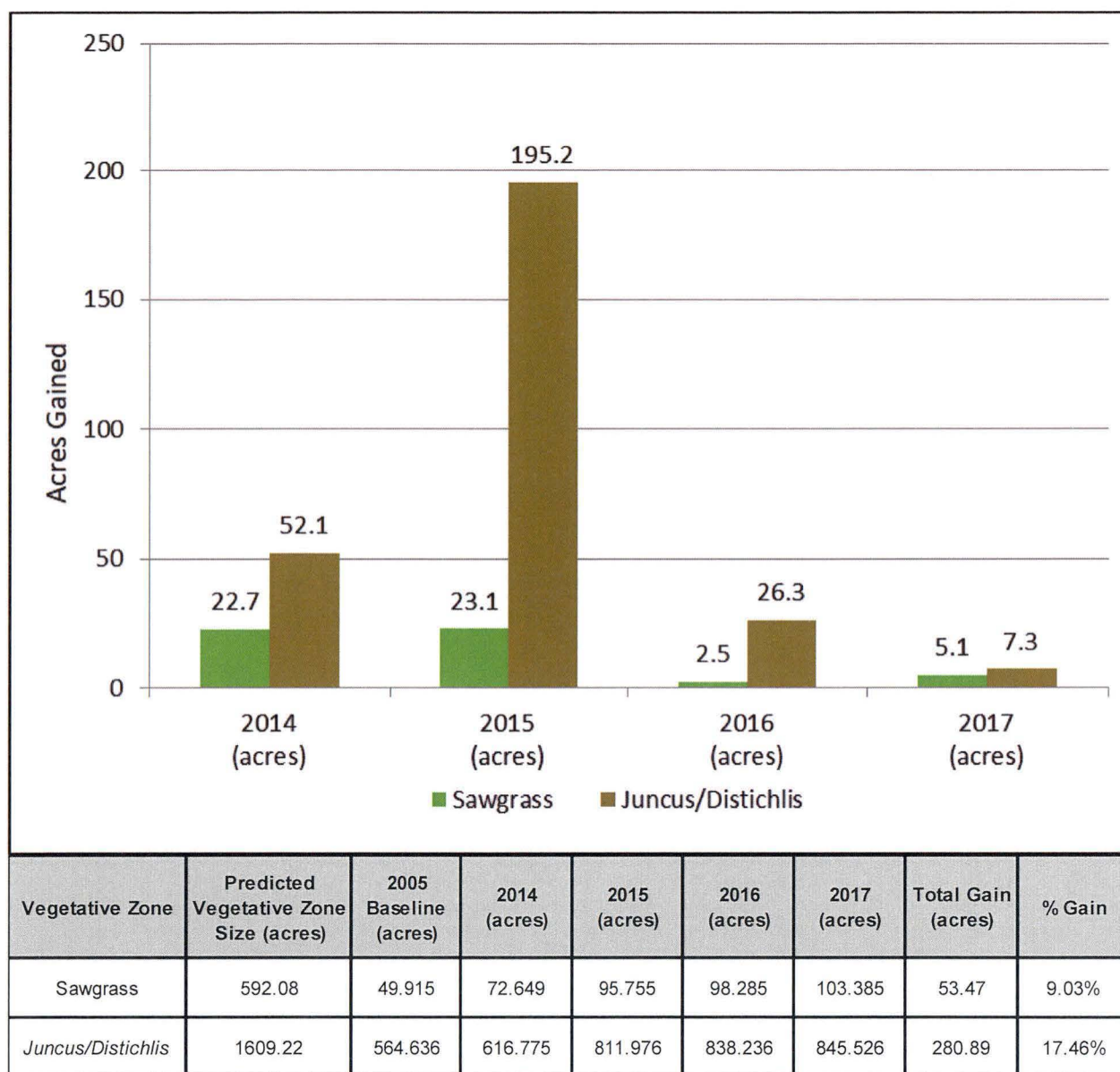


Figure 2.2-2 Monthly Total Salt and Volume of Hypersaline Groundwater Removed from Biscayne Aquifer



**Figure 2.3-1 Annual Sawgrass and Juncus/Distichlis Acreage Expansion South of the L-31E Levee in the FPL Everglades Mitigation Bank**



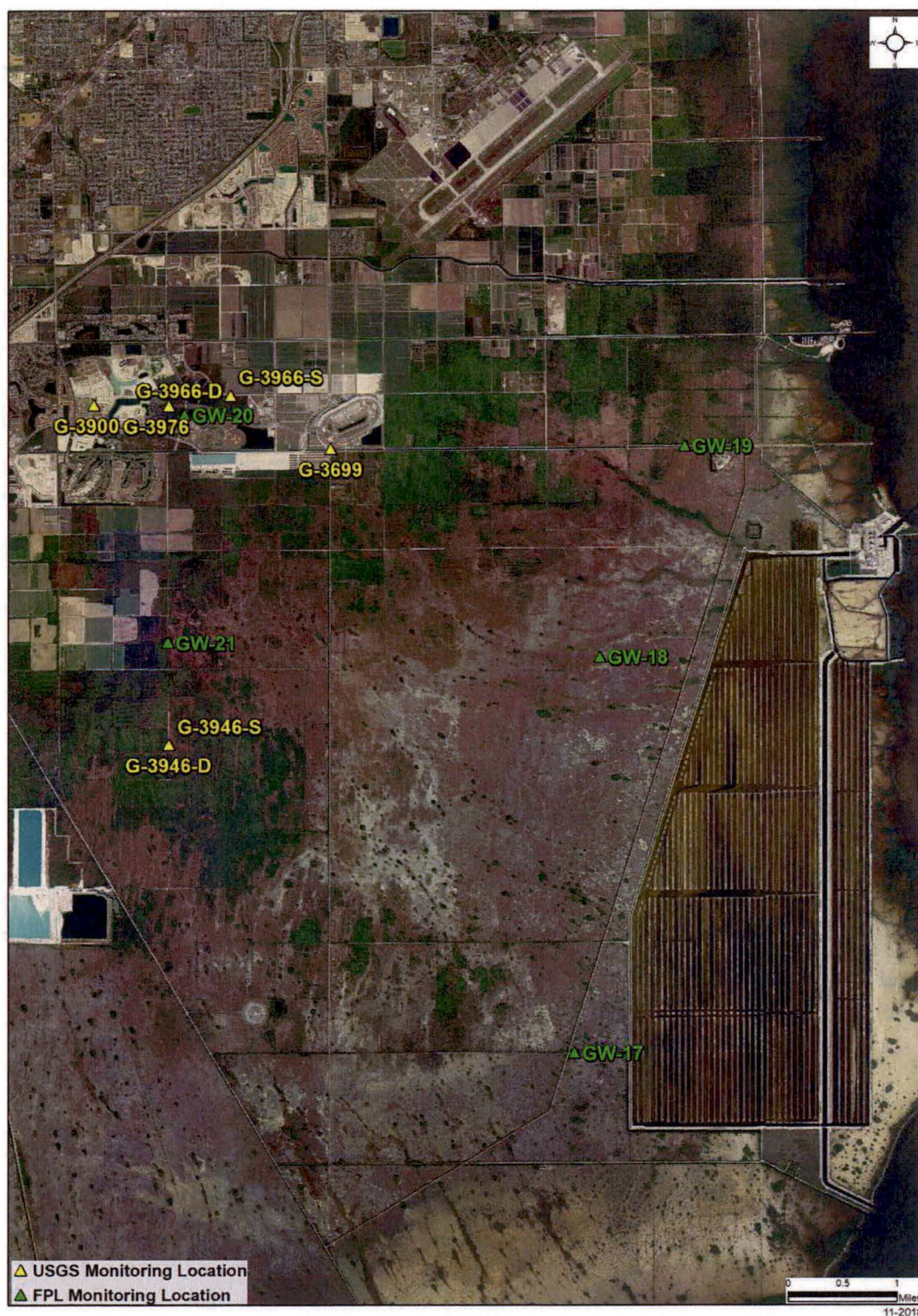


Figure 2.4-1 Location of Groundwater Monitoring Wells and USGS Wells Identified in the Consent Agreement and Consent Order





Figure 2.4-2 Location of Surface Water Monitoring Stations in Biscayne Bay and Card Sound per the Consent Order