

Chapter 8: Implementation of the Long-Term Plan for Achieving Water Quality Goals in the Everglades Protection Area

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SUMMARY

Pursuant to the requirements of Section 373.4592(13), Florida Statutes, also known as the Everglades Forever Act, this chapter presents an update on the progress of the implementation of the Long-Term Plan for Achieving Water Quality Goals in the Everglades Protection Area (Long-Term Plan) (Burns and McDonnell, 2003) and subsequent amendments. In addition to being required by state and federal law, achieving Everglades water quality standards by implementing the Long-Term Plan is one of the strategic priorities of the South Florida Water Management District (SFWMD or District).

Because there is overlap between many of the Long-Term Plan projects and other District Everglades restoration efforts, the updates for many of the Long-Term Plan projects appear in other chapters of this volume. The Long-Term Plan projects that cover the non-Everglades Construction Project (or non-ECP) basins and source controls are covered in Chapter 4 of this volume, and the Long-Term Plan projects relating to the Everglades Construction Project Stormwater Treatment Areas (STAs) are covered in Chapter 5 of this volume. The Long-Term Plan projects being implemented as part of the District's Everglades expedited projects effort are covered in Chapter 7A of this volume. **Table 8-1** indicates the specific chapters in this report where each Long-Term Plan project update appears. The financial reporting related to the implementation of the Long-Term Plan is covered in Chapter 13 of this volume.

The long-term Everglades water quality goal is for all discharges to the Everglades Protection Area (EPA) to achieve and maintain water quality standards in the EPA, including compliance with the total phosphorus (TP) criterion established in Rule 62-302.540, Florida Administrative Code. Substantial progress toward reducing phosphorus levels discharged into the EPA has been made by the state of Florida and other stakeholders. As of April 30, 2008, the Everglades Agricultural Area's Best Management Practices and the Everglades Construction Project Stormwater Treatment Areas have collectively removed more than 2,848 metric tons¹ of TP that otherwise would have entered the Everglades.

¹Similar to last year's report, the inception-to-date numbers presented for the Stormwater Treatment Areas now include start-up flows and loads.

However, additional measures are necessary to achieve the Everglades water quality goal. The Long-Term Plan sets forth measures to achieve that goal, permitting the state of Florida and the District to fulfill their obligations under both the Everglades Forever Act (Section 373.4592, Florida Statutes) and the federal Settlement Agreement (Case No. 88-1886-CIV-MORENO). A summarized list and locations of the basins addressed in the Long-Term Plan are presented in **Table 8-2** and **Figure 8-1**, respectively.

The District continued implementation of the Long-Term Plan in Fiscal Year 2008 (FY2008) (October 1, 2007–September 30, 2008). The District’s request for a revision to the Long-Term Plan was approved by the Florida Department of Environmental Protection on December 10, 2007, as summarized in this chapter.

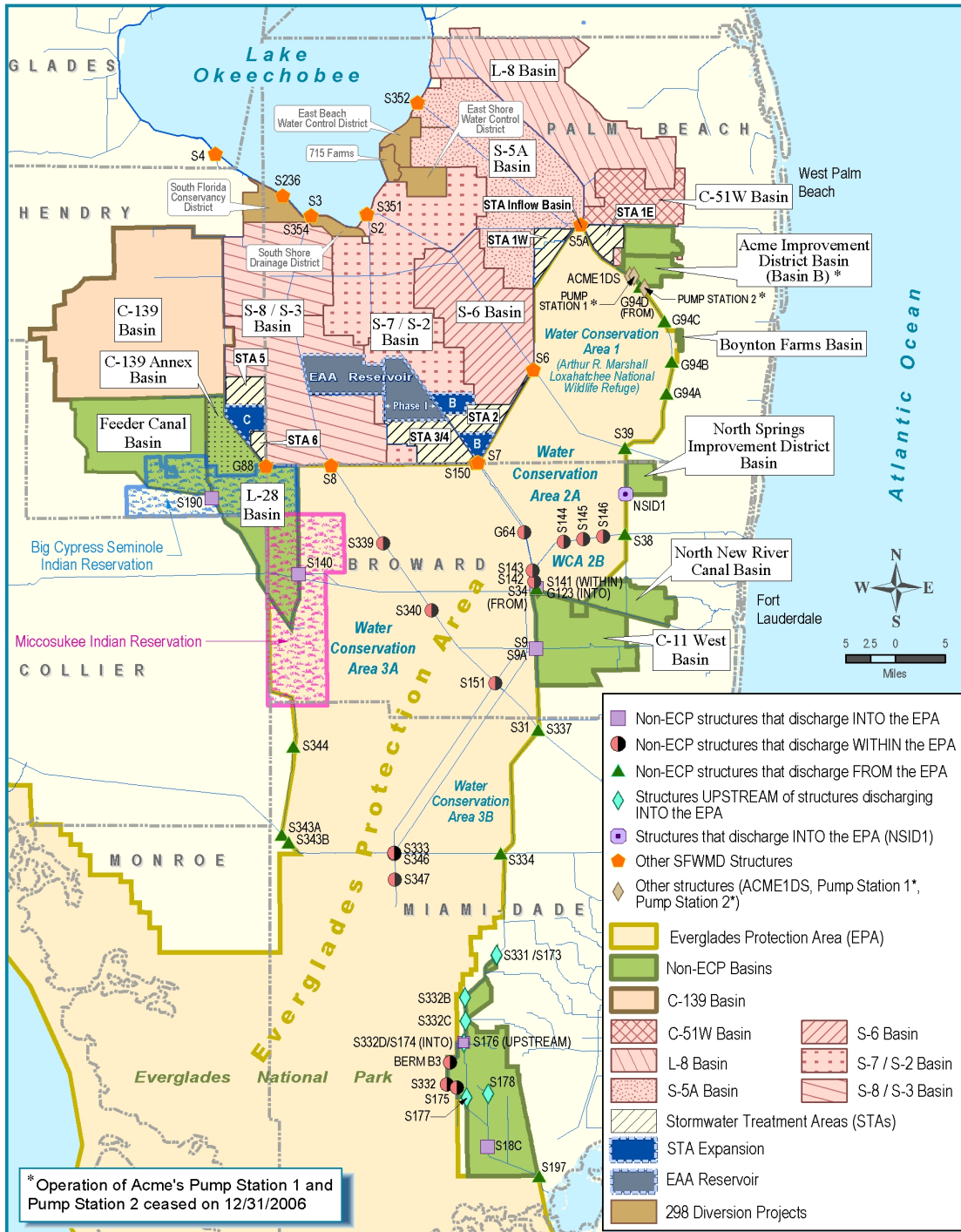


Figure 8-1. Overview of the Everglades Protection Area (EPA) and tributary basins.

Table 8-1. Summary of projects and cross-referenced chapters in the Long-Term Plan.

Project Description	Chapter References in the 2009 SFER – Volume I
<u>EVERGLADES CONSTRUCTION PROJECT (ECP) BASINS</u>	
STA-1E Enhancements	5 (STA-1E section)
STA-1W Enhancements	5 (STA-1W section)
STA-2 Enhancements	5 (STA-2 section); 7A
STA-3/4 Enhancements	5 (STA-3/4 section)
STA-5 Enhancements	5 (STA-5 section); 7A
STA-6 Enhancements	5 (STA-6 section); 7A
ECP Operation and Maintenance - STAs and non-STAs	5 (each STA section)
ECP Compliance Monitoring	5 (each STA section)
ECP Operations Monitoring	5 (project-level activities section)
STA Site Management	5 (project-level activities section)
<u>NON-ECP BASINS</u>	
Acme Basin B	4
North Springs Improvement District Basin	4
North New River Canal Basin	4
C-11 West Basin	4
Feeder Canal Basin	4
<u>PROCESS DEVELOPMENT AND ENGINEERING (PDE)</u>	
<u>Basin Source Controls</u>	
EAA Basins - Source Controls	4
C-139 Basin - Source Controls	4
<u>Enhanced Control and Monitoring</u>	
Acquisition of Survey Data	5 (Project complete – see prior reports)
Additional Flow and Water Quality Monitoring Stations	5 (Project complete – see prior reports)
Review and Correction of Flow Measurement Anomalies	5 (project-level activities section)
Analysis and Interpretation	5 (project-level activities section)
Update and Maintenance of Hydraulic Models	5 (project-level activities section)

Table 8-1. Continued.

Project Description	Chapter References in the 2009 SFER – Volume I
<u>Improved Analytical and Forecasting Tools</u>	
Continued Development and Refinement of DMSTA	8
Water Quality Impacts of Reservoirs	8
Periphyton-based STA (PSTA) Investigations	5 (project-level activities section)
PSTA Implementation Project in STA-3/4	5 (project-level activities section)
<u>Optimizing SAV Performance</u>	
Operational Strategy	Project complete – see prior reports
Vegetation Maintenance	5
Hydrologic and Hydraulic Assessment	5 (future reports)
Internal Measurements	5 (future reports)
Comparative Analysis	5 (future reports)
<u>Additional Structural and Operational Measures</u>	
Evaluation of Full-Scale STA Enhancements	Project complete – see prior reports
<u>Improved Reliability of Inflow Forecasts</u>	
Update Baseline Datasets	8
Basins With Limited Current Data	8
Influence of CERP Projects on Inflow Volumes and Loads	8
Lake Okeechobee Long-Term Trends	8
Determine Water Quality Relationships in the EPA	3A
<u>ACCELERATE RECOVERY OF IMPACTED AREAS</u>	
Recovery Model Development and Calibration	6
Downstream Influence of Adding Clean Water to Previously Impacted Areas	5
Options for Accelerating Recovery	6
Alternatives Analysis and Plan Formulation	Future reports
Hydropattern Restoration	Future reports
Implement Steps for Recovery in Impacted Areas	Future reports
<u>ADAPTIVE IMPLEMENTATION</u>	5, 8
<u>PROGRAM MANAGEMENT</u>	8

Table 8-2. EPA tributary basins included in the Long-Term Plan.

Basin	Canal	Stormwater Treatment Areas	Receiving Water Conservation Areas
S-5A (EAA)	West Palm Beach Canal	STA-1W, STA-1E, STA-2	WCA-1
S-6 (EAA)	Hillsboro Canal	STA-2	WCA-2A
S-7 (EAA)	North New River Canal (NNRC)	STA-3/4	WCA-2A
S-8 (EAA)	Miami Canal	STA-3/4, STA-6	WCA-3A
C-51 West and L-8 Basin	C-51 West	STA-1E, STA-1W	WCA-1
C-139 (including Annex)	L-3 Canal	STA-5, STA-6	WCA-3A
ACME Basin B	N/A	N/A	WCA-1
North Springs Improvement District (NSID)	N/A	N/A	WCA-2A
North New River Canal (NNRC) (G-123)	NNRC	N/A	WCA-3A
C-11 West	C-11 West	N/A	WCA-3A
Feeder Canal	L-28 Interceptor Canal	N/A	WCA-3A
L-28	L-28	N/A	WCA-3A

N/A = Not Applicable

INTRODUCTION

The long-term Everglades water quality goal is for all discharges to the Everglades Protection Area (EPA) to achieve and maintain water quality standards, including compliance with the total phosphorus (TP) criterion established in Rule 62-302.540, Florida Administrative Code. For additional information about the phosphorus (P) criterion rule, see Chapter 3A of this volume. The Long-Term Plan for Achieving Water Quality Goals in the Everglades Protection Area (Long-Term Plan) contains activities to achieve the Everglades water quality goal and to permit the state of Florida and the South Florida Water Management District (SFWMD or District) to fulfill their obligations under both the Everglades Forever Act (EFA) (Section 373.4592, Florida Statutes) and the federal Everglades Settlement Agreement (Settlement Agreement dated July 26, 1991, entered in Case No. 88-1886-CIV-MORENO, U.S. District Court for the Southern District of Florida, as modified by the Omnibus Order entered in the case on April 27, 2001).

Achieving Everglades water quality standards by implementing the Long-Term Plan is one of the agency's key strategic priorities, as outlined in the District's Strategic Plan (see <http://www.sfwmd.gov/>, under *About SFWMD, Budget & Strategic Plan* section). The District's strategies for the Everglades program include implementing on schedule the Long-Term Plan projects as well as the Everglades expedited projects included in the Long-Term Plan. Success indicators include completing the Long-Term Plan projects on schedule. This chapter presents the status update on the implementation of the Long-Term Plan.

For more information about the Everglades Agricultural Area (EAA) source controls program and Stormwater Treatment Area (STA) performance, refer to Chapters 4 and 5 of this volume, respectively. Source control measures recommended in the Long-Term Plan are being implemented in urban and other tributary basins as described in the *Non-ECP Basins* sections of Chapter 4 of this volume. In addition, STA expansion projects are being implemented through the District's Everglades expedited projects (see Chapter 7A of this volume).

OVERVIEW OF THE LONG-TERM PLAN

The Long-Term Plan was developed in response to a requirement of the 1994 EFA, for the District to develop a document describing the state's plan for achieving the long-term Everglades water quality goals. The EFA was amended in 2003 to require implementation of the Long-Term Plan because it was recognized by the Florida legislature as the Best Available Phosphorus Reduction Technology (BAPRT). The Everglades phosphorus rule, which was developed in 2003, also recognized the Long-Term Plan as BAPRT.

As required by the EFA, the Long-Term Plan (dated October 27, 2003) was submitted to the Florida Department of Environmental Protection (FDEP) in December 2003. The October 27, 2003, version of the Long-Term Plan is located on the District's web site at <http://www.sfwmd.gov/sta>. Through this web link, descriptions of all subsequent revisions to the Long-Term Plan — including documents, data, presentations, and related links — are also available.

The Long-Term Plan program encompasses more than 50 individual projects, each having a schedule, scope, and cost estimate. Many of its components are more process-like, such as source controls components and ongoing STA maintenance, operations, and monitoring. The Long-Term Plan also contains restoration projects that are intended to assist in accelerating the recovery of

impacted areas in the EPA. In general, the Long-Term Plan is focused on implementing regional projects and source controls to improve water quality entering the EPA and water quality within the EPA.

The status of water quality conditions within the EPA is presented in Chapter 3A of this volume. Both Chapters 3A and 8 of this volume are careful to point out that until the Long-Term Plan projects have been implemented for a sufficient period of time, it is not possible to measure the response of the EPA to the Long-Term Plan projects. In the meantime, there is a measurable reduction in the TP levels in discharges from the Everglades Construction Project (ECP) basins when compared to the historical period prior to implementation of the EAA Best Management Practices (BMPs) and the ECP STAs.

The Long-Term Plan is being implemented on a parallel path with several other large-scale ecosystem restoration programs, such as the Comprehensive Everglades Restoration Plan (CERP), the Lake Okeechobee Protection Plan (LOPP), the Lake Okeechobee and Estuary Recovery Plan (LOER), and the Northern Everglades and Estuaries Protection Program (NEEPP). There is overlap between many CERP projects and Long-Term Plan projects, but there is very little overlap between the projects in the Long-Term Plan and those in the LOPP, LOER, and NEEPP. This is because the focus of the Long-Term Plan is on the Southern Everglades region, while the focus of LOPP, LOER, and NEEPP is on the Northern Everglades region (see Chapter 7A of this volume).

While the Long-Term Plan focuses on water quality issues in the Southern Everglades, CERP covers both the Northern and Southern Everglades and consists of more than 50 projects with multiple purposes, such as water supply, flood protection, and in some cases water quality improvement. CERP is being implemented on a 50/50 cost-share basis between the local sponsor (the SFWMD) and the federal government. In contrast, the Long-Term Plan is being implemented mainly by the SFWMD, the FDEP, and local partners, and is being funded predominantly with state funds, also referred to as the Everglades Trust Fund (i.e., dedicated *ad valorem* taxes, agricultural privilege tax revenues, and license plate and toll fees). For more information about the Everglades Trust Fund and Long-Term Plan funding, see Chapter 13 of this volume.

Because there are many basins covered in the Long-Term Plan that also contain CERP projects, the Florida legislature recognized (in the 2003 EFA revision) that in basins where a CERP project could also help achieve Everglades water quality goals, it would be the most efficient use of taxpayer dollars to integrate the two program's projects. For example, the C-11 Impoundment has multiple purposes, such as flood protection, water storage, water supply, and water quality. The legislature recognized that once implemented, this project will also significantly reduce discharges from this basin to the Everglades; therefore, in lieu of the state constructing a separate water quality treatment project in the C-11W basin, integration efforts have focused on finding ways to further reduce phosphorus levels in the remaining discharges from the C-11W basin to the Everglades — or better yet, to help eliminate the remaining discharges to the Everglades by redirecting these discharges to other areas with water supply needs.

This year, therefore, in keeping with the direction of the legislature, the District has continued to look for ways to integrate Long-Term Plan and CERP projects, and successful integration efforts are described in the *Revisions to the Long-Term Plan* section of this chapter.

STATUS OF PROJECT-LEVEL ACTIVITIES

The District began implementing the Long-Term Plan projects in Fiscal Year 2004 (FY2004) (October 1, 2003–September 30, 2004). On February 29, 2008, the fifth annual public meeting was held at the District headquarters in West Palm Beach, FL. The purpose of this meeting was to provide the public with an updated status of the projects in FY2008 (October 1, 2007–September 30, 2008) at that time and to receive input on proposed additional modifications to the Long-Term Plan. This chapter presents the status update on the project-level activities for FY2008.

Because of overlap among several Long-Term Plan projects and other Everglades restoration efforts by the District, updates for several of the Long-Term Plan projects appear in other chapters of this volume. **Table 8-1** summarizes all of the Long-Term Plan projects, including cross-references to other chapters in which the specific project update appears. The status of project-level activities for nine of the Long-Term Plan projects, including overall program management activities for FY2008, is updated and summarized below.

Continued Development and Refinement of the Dynamic Model for Stormwater Treatment Areas

The Dynamic Model for Stormwater Treatment Areas (DMSTA) (Walker and Kadlec, 2001) [<http://www.walker.net/index.htm#Resources>] is the tool used to model phosphorus removal performance in the STAs. The DMSTA was used to evaluate components of the Long-Term Plan and will be applied to future enhancements and the interaction between CERP reservoirs and the STAs. To increase the certainty in the accuracy of the model predictions, the model is continually updated and calibrated.

The DMSTA was originally developed in 2001 based upon data from approximately 80 experimental wetland treatment platforms, test cells, and full-scale demonstration cells, and natural wetlands. It served to integrate and scale-up diverse data from small-scale systems into a tool for use in design and optimization of full-scale STAs to remove phosphorus from agricultural runoff and other sources of inflow to the Everglades. A second version (DMSTA2) (Walker and Kadlec, 2005) [<http://www.walker.net/dmsta>] incorporated refinements to the structure, calibrations, and interface based upon additional data from full-scale STAs collected through early 2005. Separate calibrations were developed for four wetland community types (emergent, submerged, periphyton, and mixed communities on pre-existent wetland soils) and for Florida lakes and reservoirs. The DMSTA has been used in several regional planning efforts undertaken by SFWMD and the USACE.

The DMSTA refinement tasks identified in the Long-Term Plan for FY2008 were completed by Dr. William W. Walker, Jr. Work on a third release of the DMSTA continues with data and technical support from the District and with financial support from the U.S. Department of the Interior. Applications and enhancements under development include:

- Testing and refinement of model calibrations using updated datasets from STAs and natural wetland areas.
- Tracking STA performance. While developed primarily as a design tool, the DMSTA can also be used as a diagnostic tool for interpreting recent monitoring data. Variations in measured STA outflow concentrations and loads reflect variations in inflow volumes, inflow P loads, water depths, climate, management, P cycling within wetland communities, measurement errors, and other random

factors. It is difficult to evaluate the inherent P removal performance of the wetland community in the context of data variations induced by the other factors. The DMSTA attempts to factor out the effects of management (inflow distribution, depth), hydrologic variations, and climatologic variations, so that the data provide a better signal of vegetation function and long-term performance relative to design simulations and management expectations. Walker and Kadlec (2008) provide examples of this type of application to recent data from Stormwater Treatment Areas 1W and 2 (STA-1W and STA-2).

- Coupling with the Everglades Phosphorus Gradient Model (EPGM) (Walker and Kadlec, 1996) [<http://www.wwwalker.net/epgm>]. The water column P gradient in STA cells and natural wetlands downstream of inflow points is typically accompanied by decreasing gradients of P storage in vegetation and soils. The EPGM was developed to simulate water column and soil P gradients in marsh areas receiving STA discharges. Coupling with the DMSTA provides full representation of the three major P storage compartments. Walker and Kadlec (2008) described preliminary testing and application of the coupled models to simulate long-term enrichment and recovery of the S10 inflow region of Water Conservation Area 2A (WCA-2A) in response to historical loads and hypothetical decreases in future inflow loads. Several other wetland datasets have been compiled to support further refinement and testing of the coupled models. The potential inclusion of soil floc as a fourth storage compartment is also being evaluated.
- Enhancements to other model features: hydraulics, topography, dry-out simulation, uncertainty analysis, report formats, design diagnostics, capacity for handling larger and more complex cell networks, user interface, and reprogramming to increase computational speed.
- A third release of the DMSTA coupled with the EPGM is expected in Water Year 2009 (WY2009) (May 1, 2008–April 30, 2009).

Water Quality Impacts of Reservoirs

The Water Quality Impacts of Reservoirs Project was initiated in FY2004, as recommended in Section 5.3.2, *Water Quality Impacts of Reservoirs of the Process Development and Engineering* component of the Long-Term Plan. This project was completed in FY2005. All documents completed in support of this project can be found on the District's web site at <http://www.sfwmd.gov/sta>, under the *Long-Term Plan, Documents* tab (see *WQ Impacts of Reservoirs Project* section). Project-specific hydrologic, water quality, and climatic data are available at <http://my.sfwmd.gov/gisapps/wqir/>.

Update Baseline Datasets

As recommended in the Long-Term Plan, the analyses presented in the baseline data for the Basin-Specific Feasibility Studies to Achieve the Long-Term Water Quality Goals for the Everglades (Goforth and Piccone, 2001) should be updated no less frequently than once every two years in order to continually improve the degree of confidence in the accuracy of projected flow volumes and associated TP loads for inflows to the treatment areas and, in some instances, discharges that flow directly into to the EPA.

The Long-Term Plan recommendation was to provide funding for the inflow dataset updates beginning in FY2005, and extending through FY2015 in alternating years. As recommended, the inflow datasets were updated in FY2007 and finalized in October 2007. The results of this update are posted on the District's web site at www.sfwmd.gov/sta, under the *Long-Term Plan, Documents* tab (see *Documents for Comp B & C EIS* section). The District is responsible for updating the baseline datasets, which are subsequently reviewed by the FDEP as well as interested stakeholders.

Basins with Limited Current Data

Water quality performance projections for Everglades restoration efforts depend on understanding water movement and nutrient loadings from multiple watersheds. The projections utilize models that are calibrated from flow and water quality data collected at representative sites throughout the region. The FY2007 work associated with this project was completed as part of the effort to develop the long-term compliance permits for the non-ECP basins and the revised Part 3 of the Long-Term Plan, which was included in the January 2007 FDEP-approved Long-Term Plan revisions. The revised Part 3 document can be found on the District's web site at www.sfwmd.gov/sta, under the *Revisions to Long-Term Plan* section. This project was completed with the FY2007 effort.

Influence of CERP Projects on Inflow Volumes and Loads

As CERP projects proceed through planning and implementation, the projected impact of these projects on the inflow volumes and loads to the STAs and to receiving water bodies in the EPA must be updated. Of particular interest is the EAA Storage Reservoirs Project, which will be linked operationally to one or more of the STAs upon its completion. Because the Phase I EAA Storage Reservoir has been expedited to the design and construction phase, more detailed information now exists regarding the proposed size, location, and operation of the reservoir, which will provide inflows to the STAs. As part of the EAA Regional Feasibility Study, analyses were conducted in FY2005 and early FY2006 to determine ways to optimize the performance of the linked Phase I EAA Storage Reservoir and the STAs. The documents produced as part of the EAA Regional Feasibility Study can be found on the District's web site at www.sfwmd.gov/sta, under the *Long-Term Plan, Documents* tab (see the *EAA Regional Feasibility Study* section).

The next scheduled work effort for this project is expected to occur in FY2010. In the meantime, coordination continues on an ongoing basis between the District and U.S. Army Corps of Engineers (USACE) staff working on the Phase I EAA Storage Reservoir and the STAs to ensure that the goals and objectives for both programs are met.

Lake Okeechobee Long-Term Trends

When the Long-Term Plan was developed, it was assumed that Lake Okeechobee would contribute a significant portion of the water anticipated to be captured and treated in the STAs. The most recent estimated percent contribution of Lake Okeechobee releases to the total STA inflows is about 4 percent of the volume and TP load. This estimated percent contribution is based on WY2008 Lake Okeechobee water quality information. In FY2006 and FY2007, District staff and consultants working on the Long-Term Plan and Lake Okeechobee projects coordinated with the USACE to develop updated STA performance projections in support of the USACE's evaluation of alternative revised Lake Okeechobee operating schedules. The revised Lake Okeechobee regulation schedule was approved in April 2008 (see Chapter 10 of this volume).

2008 Report to Governor and Legislature

The 2008 Report to the Governor and Legislature is currently being developed in accordance with the 2003 Long-Term Plan requirement that by December 31, 2008, the District submit a comprehensive report to the governor and legislature on the status and progress of water quality improvement measures identified in the 2003 Long-Term Plan.

The draft 2008 report was completed in September 2008 with the support of a consultant team. The final report is to be completed in December 2008. Public meetings and involvement are included in the report development process pursuant to the public involvement process described in Part 1 of the 2003 Long-Term Plan.

Adaptive Implementation

Part 6 of the Long-Term Plan includes a recommendation that a dedicated funding source be established to facilitate the adaptive implementation process and assure that additional steps are expeditiously implemented. Work continued on several STA optimization activities, including the strategies for STA vegetation management. The adaptive implementation activity of Best Management Practices in District canals also continued in FY2008. The results of the canal sediment analysis were used to develop and implement a canal sediment cleaning project in the L-3 canal reach immediately upstream of the STA-5 inflow structures. For further information, see Chapter 5 of this volume.

Program Management

During FY2008, the District and its contractors performed various program management activities, including STA operational support, project and program accounting activities, project and program reporting activities, and overall Everglades program coordination.

REVISIONS TO THE LONG-TERM PLAN

As stated in the amended EFA (October 2003), revisions to the Long-Term Plan shall be incorporated through an adaptive management approach, including a Process Development and Engineering (PDE) component used to identify and implement incremental optimization measures for further reductions in phosphorus. Also, as stated in the amended EFA, revisions to the Long-Term Plan shall be approved by the FDEP.

During FY2008, the District submitted one revision request to the FDEP, as summarized below. Descriptions of previously approved revisions to the Long-Term Plan can be found on the District's web site and in the 2005–2008 SFER – Volume I, Chapter 8. Copies of all District request letters, FDEP approval letters, and supporting documentation can be found at www.sfwmd.gov/sta. On November 5, 2007, the District submitted a request to the FDEP for a proposed revision to the Long-Term Plan. On December 10, 2007, the FDEP approved the District's proposed revision, a brief description of which is presented verbatim below:

Following are proposed revisions to Part 3, Post-2006 Strategies, Non-ECP Basins, of the Everglades Protection Area Tributary Basins Long-Term Plan for Achieving Water Quality Goals (Long-Term Plan). At this time, revisions are proposed specifically to Section 3.6, Feeder Canal Basin, and Section 3.7, Summary Opinion of Cost and Expenditures.

FEEDER CANAL BASIN

The Feeder Canal Basin covers an area of about 72,000 acres (113 square miles) in southeastern Hendry County. It is located west of Water Conservation Area (WCA) 3A, southwest of the Everglades Agricultural Area (EAA), and north of the Big Cypress National Preserve. A portion of the Big Cypress Seminole Indian Reservation (approximately 13,500 acres) is located in the southeast corner of the basin. A map of the Feeder Canal Basin is presented in **Figure 1**.

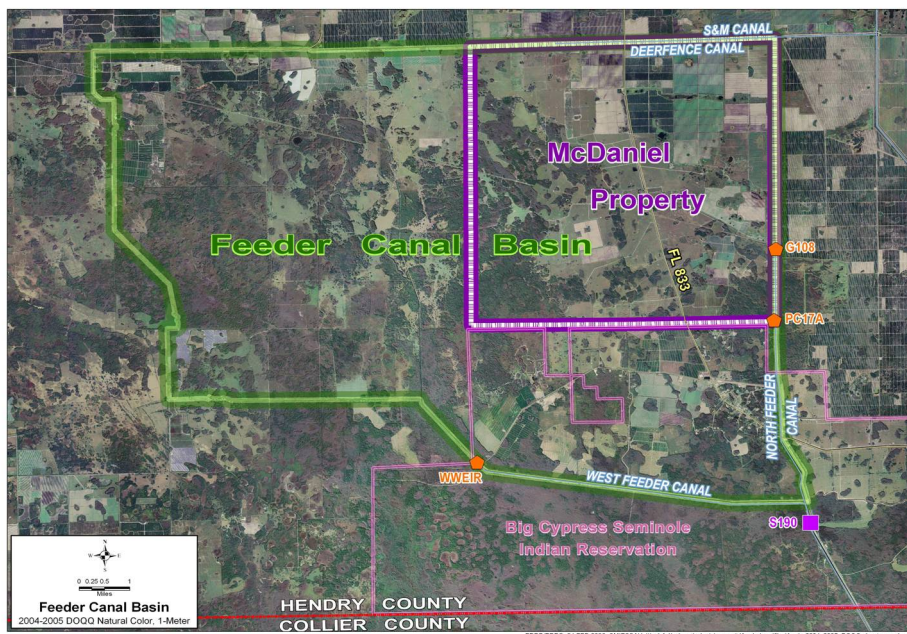


Figure 1. Feeder Canal Basin Map

The strategies recommended in the January 3, 2007, revision to the Long-Term Plan for the Feeder Canal Basin included (1) implementing major source control projects on the property known as McDaniel Ranch, (2) implementing a regulatory phosphorus source control program for the entire basin, and (3) providing additional funding in Fiscal Year (FY) 2007 through FY 2009 for the continued implementation of source controls beyond FY 2006. Also, the following two projects which were discussed in the October 27, 2003, Long-Term Plan continue to be other planned future projects that have the potential to significantly reduce the phosphorus load being generated by the Feeder Canal Basin: (1) a Central and South Florida Critical Restoration Project on the Big Cypress Seminole Indian Reservation, and (2) the Big Cypress/L-28 Interceptor Canal Modifications Comprehensive Everglades Restoration Plan (CERP) Project.

As recommended in the January 3, 2007, Long-Term Plan Revision, the District is taking steps to ensure that stormwater, from the property historically known as McDaniel Ranch, discharging through the structures PC-17A and G-108 (see **Figure 1**) meets a 50 parts per billion (ppb) flow-weighted mean (FWM) total phosphorus (TP) concentration resulting from a combination of Best Management Practices (BMPs) implementation and the construction of a stormwater management system, as described under the original ERP No. 26-00623-P (including timelines and monitoring requirements), issued on July 12, 2006. Additionally, in response to the increasing trend in TP concentrations in discharges from the Feeder Canal Basin, in early 2007 the District initiated implementation of a phosphorus source control program through an integrated regulatory compliance program applicable to all landowners throughout the basin. This program includes ensuring compliance with Environmental Resource Permits (ERP), Surface Water Management (SWM) permits, and Water Use Permits (WUP) and requiring implementation of BMPs). The program includes a methodology to measure its effectiveness in reducing phosphorus loads and concentrations to acceptable levels based on water quality monitoring results. The District will evaluate compliance with the FWM TP concentration of 50 ppb and the landowners' proportional share of phosphorus load in discharges from the Feeder Canal Basin, based on monitoring results from the WWEIR, G-108 and PC-17A structures (see **Figure 1**). Compliance for Feeder Canal Basin landowners within the West Feeder Canal sub-basin (i.e., the areas within the Feeder Canal Basin west of the westernmost boundaries of the historic McDaniel Ranch property and the Big Cypress Seminole Indian Reservation) will be based on the WWEIR structure (see **Figure 1**) monitoring results. Compliance for the property historically known as McDaniel Ranch will continue to be based on the G-108 and PC-17A structures (see **Figure 1**) monitoring results. Any potential sheet flow between the McDaniel Ranch property and the West Feeder Canal sub-basin will be considered to have a negligible effect on water quality at the downstream structures (WWEIR, G-108 and PC-17A).

In order to insure the continued progress toward meeting the phosphorus reduction goals of the Long-Term Plan, the following revisions to the Long-Term Plan strategies for the Feeder Canal Basin are recommended:

- Initiate rulemaking for a Feeder Canal Basin BMP Program if after implementation of the projects and regulatory programs described above, water year (WY) results do not show TP concentration in discharges have achieved the 50 ppb concentration level.
- Provide additional funding of \$150,000 per year for FYs 2009 and 2010 for implementation of source controls.

SUMMARY OPINION OF COST AND EXPENDITURES (PART 3 OF LONG-TERM PLAN)

When the Long-Term Plan was developed in 2003, the 1994 Everglades Forever Act required Everglades Source Controls Program had already been underway for several years. Therefore, the Long-Term Plan recommendation for source controls funding included some limited additional funding to augment the Source Controls Program that was already underway. In order to more accurately represent the overall Everglades Sources Controls program being implemented in support of the Long-Term Plan, it is recommended that those costs be identified as part of the Long-Term Plan. The projected costs from FY 2008 through FY 2016 for the Everglades Source Controls Program are approximately \$2.16 Million per year (in FY 2008 dollars). The proposed revision will allow the District to track costs for the Everglades Source Controls Programs and the supplemental source controls projects activities under a unified Long-Term Plan accounting and reporting code.

Proposed Revisions to Downstream Monitoring Project in Part 7 of Long-Term Plan:

This project is part of the “Recovery of Impacted Areas within the EPA” component (Part 7) of the Long-Term Plan. As recommended in the October 27, 2003, Long-Term Plan, monitoring in the impacted areas downstream of the STA discharges was conducted over FY 2004, 2005 and 2006. This monitoring was a continuation of the transect monitoring that was incorporated into the Section 404 permit associated with the construction and operation of the Everglades Construction Project Stormwater Treatment Areas (STAs). The objective of the downstream monitoring effort has been to assess the impacts (positive or negative) of STA discharges on the downstream receiving areas of the Water Conservation Areas (WCAs). As envisioned in the Long-Term Plan, the monitoring data was also intended to help in the development and calibration of a recovery model for the Everglades, therefore, all data collected pursuant to this project was provided to District staff working on the development of the recovery model. In order to fulfill the requirement to assess the impacts of the STA discharges on the receiving areas, in FY 2007, District staff performed an exhaustive review and analysis of the soils data, water quality data, and periphyton data that had been collected in the downstream areas in both the pre-STA-2 discharge and post-STA-2 discharge timeframes. A report summarizing this effort was drafted and is currently being finalized in preparation for a formal peer-review process. Initial results indicate that there have been improvements at several previously impacted sites and there has been generally no negative impact at previously unimpacted sites in WCA-2A resulting from STA-2 discharges. The positive impacts include increased hydroperiod and hydroperiod, decreased surface water TP, steady soil TP concentrations, increased relative abundances of low nutrient periphyton indicator species, decreased relative abundances of high nutrient periphyton indicator species, and decreased nutrient content in periphyton tissues. To further evaluate the trend in ecological conditions in the downstream area, it is recommended to continue the transect monitoring at sites that will augment those being incorporated into the long-term compliance permit for STA-2, and the data being collected as part of the Soil Reflux Study described in item 3.0 below.

The current proposed revision is to add three years of monitoring (ending in FY 2009) to the Downstream Monitoring Project. Costs to date for the Downstream Monitoring Project have been approximately \$750,000, well below the original recommended budget of \$1.5 million as described in the 2003 Long-Term Plan. The total estimated costs for the three additional years of monitoring are \$500,000, therefore, **no additional funding** is proposed as a result of the latest proposed revision to add three years of monitoring to this project.

Proposed Revisions to the Determine the Relationship between Discharges to and Water Quality within the Everglades Protection Area Project in Part 5 of the Long-Term Plan:

This project fulfills a requirement of the Everglades Forever Act (Section 2.(4).e.3&4) and is part of the Process Development and Engineering (PDE) component of the Long-Term Plan. In the October 27, 2003, Long-Term Plan, this project was recommended to start in FY 2004 and to be completed in FY 2005, however, initial efforts to determine the relationship between discharges to and water quality within the Everglades Protection Area (EPA) were not successful using the data available at the time of the analyses. As a result, in 2006, the District requested and received approval for a Long-Term Plan revision to extend the completion date for this project by two years (from FY 2005 to FY 2007) to allow additional time to collect and analyze the data needed to determine the discharge relationship. In the 2006 Long-Term Plan revision, the District committed to providing funding for the Soil Reflux Study project being conducted by the Community Watershed Fund in the amount of \$100,000 in FY 2006 and \$50,000 in FY 2007. The intent of the revision was to use the results of the Soil Reflux Study to help determine the

discharge relationship. Subsequent to the 2006 Long-Term Plan revision approval for this project, the Soil Reflux Study schedule was extended to May 2009 due to the 2006/2007 drought. As a result of the extension to the schedule for the Soil Reflux Study, and to allow incorporation of additional downstream monitoring data described in item 2.0 above, the completion date for the Determine the Relationship project is now proposed to be extended by three years, i.e., completion in FY 2010. Costs to date for this project have been approximately \$200,000 which is well below the currently approved funding amount of \$550,000. The total estimated costs to complete this project over FY 2008, 2009 and 2010 are \$350,000, therefore, **no additional funding** is proposed as a result of the latest proposed revision.

CHALLENGES TO ACHIEVING LONG-TERM WATER QUALITY GOALS

Successful implementation of the Long-Term Plan continues to require integration of numerous research, planning, regulatory, and construction activities. The District and the FDEP are committed to achieving the long-term water quality goals for the Everglades.

REGULATORY ISSUES

The Long-Term Plan being implemented by the District has the planning goal of achieving water quality standards, including the TP criterion, in the EPA. During the initial phase of implementation (pre-2016) of the Long-Term Plan, permits issued by the FDEP are based on Best Available Phosphorus Reduction Technology, as defined by the EFA, and include technology-based effluent limitations consistent with the Long-Term Plan. To date, several long-term EFA permits have been issued to these facilities, with the remaining permits scheduled for issuance prior to December 2008.

These permits include Administrative Orders which provide an adequate period of time for the District to achieve the newly adopted numeric phosphorus criterion. The long-term permits and associated Administrative Orders not only provide an adequate time frame for the District to achieve the new standard, they also include several key provisions such as (1) transect monitoring (necessary to monitor what effect the discharges from these facilities may have on the impacted and unimpacted areas), (2) monitoring to determine the effectiveness and responsiveness of the facilities based on inflows (flows and TP loads), and (3) the requirement to undertake a plan of study to collect the information necessary for the FDEP to establish a Water Quality Based Effluent Limitation for discharges from these facilities pursuant to Chapter 62-650, Florida Administrative Code.

In addition to the FDEP fulfilling the regulatory requirements associated with these facilities as outlined in the EFA, the FDEP is also tasked with evaluating water quality standards for parameters other than TP for the EPA and EAA canals. As a part of this evaluation, the FDEP is specifically directed by the EFA to recognize, by rulemaking, the existing beneficial uses of the EAA conveyance canals. The FDEP continues to evaluate water quality standards for canals as a part of a state-wide reevaluation of water quality standards, with a specific emphasis on classifications, which will include consideration of the existing beneficial uses. The FDEP has been conducting this review in consultation with a policy advisory committee of appropriate stakeholders, with final conclusions and findings from this effort scheduled to be submitted by the end of calendar year 2008. Other regulatory issues are discussed in Chapter 4 of this volume.

STA OPTIMIZATION RESEARCH

Chapter 5 of this volume presents a summary of STA optimization research during FY2008. While critical research is continuing on STA optimization, the Long-Term Plan includes a process of adaptive implementation to incorporate the best available and scientifically defensible information throughout the implementation of the Long-Term Plan.

SOURCE CONTROL MEASURES

Controlling TP loads at the source, from the EAA, the C-139, and the non-ECP basins, continues to be a high priority in the Long-Term Plan. For this reason, source control development and implementation funding was provided again in FY2008 and will continue to be provided throughout the implementation of the Long-Term Plan. Additional information about the Long-Term Plan source control projects, including efforts to evaluate the effectiveness of different source control activities, can be found in Chapter 4 of this volume.

SYNCHRONIZATION WITH CERP PROJECTS

The majority of Everglades tributary basins contain proposed CERP projects (see Chapter 7A of this volume). As in previous years, the District continued in FY2008 to coordinate with members of CERP's Project Delivery Teams (PDTs) in an effort to integrate Long-Term Plan projects with CERP projects, where possible, consistent with the 2003 amended EFA. Integrating some of the Long-Term Plan components with CERP projects continues to have the potential for significant cost savings and water quality improvements as many CERP projects are still in the early planning and design phases. However, uncertainty continues as to how CERP projects will influence flows and water quality as well as the implementation schedules for the projects. Continued close coordination is needed between members of the PDTs and staff implementing the Long-Term Plan components to ensure that project goals are met on schedule.

STATUS OF WATER QUALITY AND FLOW CONDITIONS IN THE EVERGLADES PROTECTION AREA

The EAA BMPs and the ECP STAs have been removing phosphorus from waters discharging to the EPA for over 10 years. As a result, water quality conditions are improving in the areas of the EPA that are downstream of STA discharges. Additional water quality improvements are anticipated as more Long-Term Plan projects are implemented and those projects complete a stabilization phase. The Long-Term Plan not only has a series of projects being implemented, but also an adaptive management component providing continual enhancements to projects with the expectation of improved phosphorous control.

The response of the EPA to the Long-Term Plan projects from a flow distribution and timing perspective may not be measured until after the Hydropattern Restoration projects are completed. It is anticipated that future SFERs will include details on the plans for future Hydropattern Restoration projects. For more information about the hydrology of the South Florida environment and on the status of water quality in the EPA, see Chapters 2 and 3A of this volume, respectively.

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