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 (EFA), 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).

The Long-Term Plan is a comprehensive set of water quality improvement measures designed to ensure that all waters entering the Everglades Protection Area (EPA) achieve compliance with water quality standards. These measures include enhancements to the existing Stormwater Treatment Areas (STAs), expanded Best Management Practices (BMPs), and integration with the Comprehensive Everglades Restoration Plan (CERP) projects. In addition, the Long-Term Plan continues a strong science-based and adaptive implementation philosophy to allow continuous improvement until the long-term water quality goal is achieved.

The Long-Term Plan was developed in response to the 1994 EFA requirement that the District submit to the Florida Department of Environmental Protection (FDEP) a plan by December 31, 2003, for achieving compliance with the total phosphorus (TP) criterion and other state water quality standards in the EPA, and to include the estimated costs, funding mechanisms, and implementation schedules associated with the plan.

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 (non-ECP) basins and source controls are discussed in Chapter 4 of this volume, and the Long-Term Plan projects relating to the Everglades Construction Project (ECP) Stormwater Treatment Areas (STAs) are covered in Chapter 5 of this volume. The Long-Term Plan STA expansion projects in Compartments B and C are presented in Chapter 5 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 EPA to achieve and maintain water quality standards in the EPA, including compliance with the TP criterion established in Rule 62-302.540, Florida Administrative Code. Substantial progress toward

reducing TP levels discharged into the EPA has been made by the State of Florida and other stakeholders. As of April 30, 2010, the Everglades Agricultural Area's BMPs and the ECP STAs have collectively removed more than 3,500 metric tons[1] of TP that otherwise would have entered the Everglades. As described in Chapter 3A, the effectiveness of the BMP and STA TP removal efforts is demonstrated by the decreased TP loading to the Water Conservation Areas (WCAs) in recent periods compared to the baseline period (despite increased flows to the EPA). For the recent reporting periods, the unimpacted (i.e., non-phosphorus enriched) portions of each WCA are in compliance with the TP criterion. However, because impacted portions of the WCAs are not consistently meeting the TP criterion, 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 EFA 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 2010 (FY2010) (October 1, 2009–September 30, 2010). No FY2010 Long-Term Plan revision requests were submitted to the Florida Department of Environmental Protection.

In 2008, in *Miccosukee Tribe of Indians of Florida v. United States of America, et al.*, the U.S. District Court for the Southern District of Florida determined that portions of the 2003 amendments to the EFA and Florida's Everglades TP rule were improper changes in water quality standards and invalid under the Clean Water Act. In general, the Court invalidated provisions allowing discharges of TP above the phosphorus criterion if the District was implementing the requirements of its Long-Term Plan. (The District was not a party to that case.) Two years later, in response to a motion for contempt against the U.S. Environmental Protection Agency (USEPA), the Court further ordered USEPA to establish effluent limits for the District's permits and a schedule of projects by which those limits could be achieved. As a result, on September 3, 2010, the USEPA issued an "Amended Determination" that contained new National Pollutant Discharge Elimination System and EFA permits for the District with new effluents and a list of new remedies to be built. That order is presently under appeal.

Although the Long-Term Plan may no longer be used as a permitting tool, it is still an important District planning document and implementation of the Long-Term Plan is still mandated under Florida law (until such time as the EFA is amended directing otherwise).

[1] The inception-to-date numbers for the Stormwater Treatment Areas include start-up flows and loads.

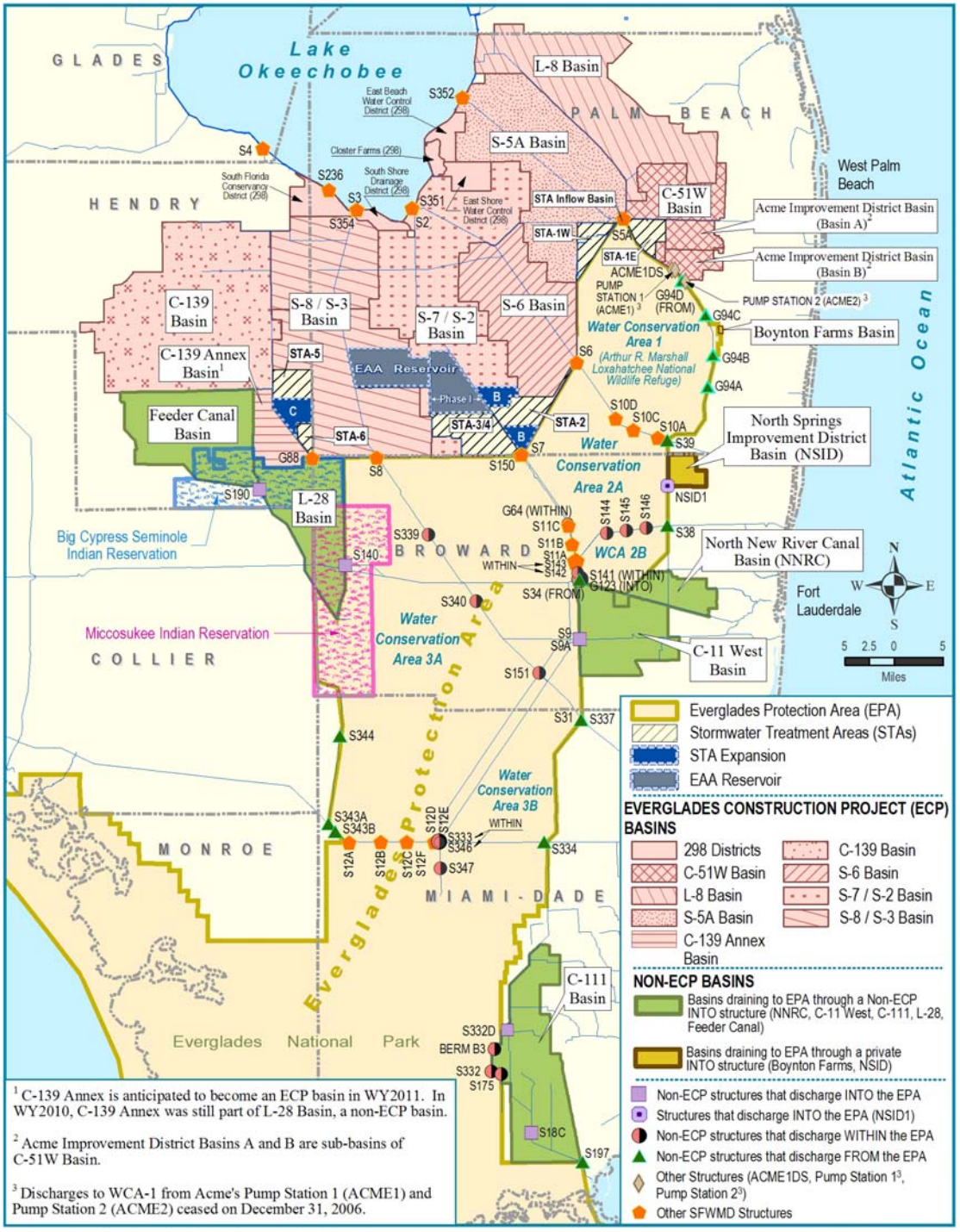

Figure 8-1. Overview of the Everglades Protection Area (EPA) and tributary basins.

Table 8-1. Summary of projects and cross-referenced chapters in the Long-Term Plan for Achieving Water Quality Goals in the Everglades Protection Area (Long-Term Plan).

Project Description	Chapter References in the 2011 SFER – Volume I
EVERGLADES CONSTRUCTION PROJECT BASINS	
STA-1E Enhancements	5 (STA-1E section) (Project complete – see prior reports)
STA-1W Enhancements	5 (STA-1W section) (Project complete – see prior reports)
STA-2 Enhancements	5 (STA-2 section)
STA-3/4 Enhancements	5 (STA-3/4 section)
STA-5 Enhancements	5 (STA-5 section)
STA-6 Enhancements	5 (STA-6 section)
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)
Acme Basin B	4 (Source Controls); 7 (Basin B Discharge Project)
Compartment B STA including STA-2, Cell 4	5
Compartment C STA including STA-5 Flow-way 3 and STA-6, Section 2	5
EAA Conveyance and Regional Treatment Project (ECART)	Future reports
NON-ECP BASINS	
North Springs Improvement District Basin Source Controls	4
North New River Canal Basin Source Controls	4
C-11 West Basin Source Controls	4
Feeder Canal Basin Source Controls	4
PROCESS DEVELOPMENT AND ENGINEERING	
Basin Source Controls	
EAA Basins - Source Controls	4
C-139 Basin - Source Controls	4
Enhanced Control and Monitoring	
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 2011 SFER – Volume I
Improved Analytical and Forecasting Tools	
Continued Development and Refinement of DMSTA	8
Water Quality Impacts of Reservoirs	8 (Project complete – see prior reports)
Periphyton-based STA (PSTA) Investigations	5 (Project-level activities section)
PSTA Implementation Project in STA-3/4	5 (Project-level activities section)
Optimizing SAV Performance	
Operational Strategy	Project complete – see prior reports
Vegetation Maintenance	5
Hydrologic and Hydraulic Assessment	Future reports
Internal Measurements	Future reports
Comparative Analysis	Future reports
Additional Structural and Operational Measures	
Evaluation of Full-Scale STA Enhancements	Project complete – see prior reports
Improved Reliability of Inflow Forecasts	
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
ACCELERATE RECOVERY OF IMPACTED AREAS	
Recovery Model Development and Calibration	6 (2007 SFER) and future reports
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
ADAPTIVE IMPLEMENTATION	5, 8
PROGRAM MANAGEMENT	8

CERP – Comprehensive Everglades Restoration Plan
DMSTA – Dynamic Model for Stormwater Treatment Areas
ECP – Everglades Construction Project
EPA – Everglades Protection Area
PSTA – Periphyton-Based Stormwater Treatment Area
STA – Stormwater Treatment Area

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	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	West Palm Beach Canal	STA-1E	WCA-1
North Springs Improvement District	N/A	N/A	WCA-2A
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

EAA – Everglades Agricultural Area
N/A – Not Applicable
NNRC – North New River Canal
WCA – Water Conservation Area

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 TP 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 www.sfwmd.gov/budget). The District's strategies for the Everglades program include implementing on schedule the Long-Term Plan projects as well as the Expedited Everglades Restoration Projects included in the Long-Term Plan. 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 *Source Controls for the Non-ECP Basins* section of Chapter 4. In addition, substantial STA expansion projects are being implemented on parcels of land referred to as Compartments B and C in the Everglades Agricultural Area (EAA) (see Chapter 5 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 the BAPRT. In July 2008, however, a federal district court judge concluded that provisions in the EFA and phosphorus rule relating to moderating provisions (that purportedly extended compliance deadlines to 2016) and interim effluent limits violated the Clean Water Act. The court upheld the phosphorus rules' criterion, four-part test, and data screening provisions.

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 website at 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 48 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.

As of April 30, 2010, the EAA Best Management Practices (BMPs) and the Everglades Construction Project (ECP) STAs have collectively removed more than 3,500 metric tons (mt) of TP that otherwise would have entered the Everglades. Of the 3,500 mt removed, the STAs were responsible for removing approximately 1,400 mt and the BMPs were responsible for removing approximately 2,100 mt. Detailed data summaries and findings related to the individual performance of the BMPs and STAs can be found in Chapters 4 and 5, respectively.

The status of water quality conditions within the EPA is presented in Chapter 3A of this volume. While it is not possible to measure specific responses of the EPA to individual Long-Term Plan projects, there is a measurable reduction in the TP levels in discharges from the ECP basins when compared to the historical period prior to implementation of the EAA BMPs and the ECP STAs.

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 25, 2010, the seventh annual public meeting was held at the District headquarters in West Palm Beach, FL. This chapter presents the status update on the project-level activities for FY2010.

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 FY2010, 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, available at: www.wwwalker.net/dmsta) was originally developed in 2001 based on 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) incorporated refinements to the structure, calibrations, and interface based on 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 preexistent wetland soils) and for Florida lakes and reservoirs.

The DMSTA Model has been used throughout the implementation of the Long-Term Plan to predict the TP removal performance of proposed STA enhancements and expansions. The model developer routinely updates the model using data collected from the STAs, thereby improving the predictive capability of the model. Information on the status of updates to the DMSTA2 Model can be obtained from the model developer.

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 obtained by contacting the District.

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 the EPA.

The Long-Term Plan recommendation was to provide funding for the inflow dataset updates beginning in FY2005, and extend through FY2015 in alternating years. As recommended, the inflow datasets were updated in FY2009 and finalized in October 2009. All documents completed in support of this project can be obtained by contacting the District.

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. This project, which focused on obtaining improved water quality data for several Everglades tributary basins, was completed in FY2007. All documents completed in support of this project can be obtained by contacting the District.

Influence of CERP Projects on Inflow Volumes and Loads

As Comprehensive Everglades Restoration Plan (CERP) projects proceed through planning and implementation, their projected impact on the inflow volumes and loads to the STAs and to receiving water bodies in the EPA will require periodic review and updates. In that regard, construction on the EAA A-1 CERP Reservoir Project, which was slated to be linked operationally to STA-3/4 in 2010, was suspended in June 2008 and the associated contract was terminated in December 2008 following litigation-related delays linked to the issued permit and the pending *River of Grass* land acquisition. As a result, the FY2010 work effort for the Influence of CERP Projects on Inflow Volumes and Loads Project was postponed. It is anticipated that updates on this planned project will be presented in future *South Florida Environmental Reports* (SFERs).

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 Water Year 2009 (WY2009) (May 1, 2008–April 30, 2009) Lake Okeechobee water quality information. In FY2010, District staff working on the Long-Term Plan continued to closely monitor the quality of water discharged from the lake to STA-3/4 to ensure that the inflow volumes and phosphorus loads were within the STA's operational envelope.

Adaptive Implementation

Part 6 of the Long-Term Plan recommends that a dedicated funding source be established to facilitate the adaptive implementation process and assure that additional steps are expeditiously implemented. Numerous amendments have been made to the Long-Term Plan over the course of implementation, resulting in the addition of approximately $1 billion in additional projects, evidence that adaptive implementation has been successful. Key examples of this include the construction of approximately 18,000 acres of additional STAs in Compartments B and C, as well as the addition of notably increased source controls funding in the ECP and non-ECP basins.

Program Management

During FY2010, 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 component used to identify and implement incremental optimization measures for further reductions in total phosphorus. In addition, as stated in the amended EFA, revisions to the Long-Term Plan shall be approved by the FDEP.

The District did not submit any FY2010 Long-Term Plan revision requests to the FDEP. Descriptions of previously approved revisions to the Long-Term Plan can be found on the District's website and in the 2005–2009 SFERs – Volume I, Chapter 8. Summaries of all previous Long-Term Plan revision requests can be found in the 2005–2009 SFERs.

During this reporting period, the District was in negotiations with United States Sugar Corporation (USSC) for the purchase of numerous parcels of land in the EAA. On August 12, 2010, the District's Governing Board approved a transaction for the initial acquisition of approximately 26,800 acres of land from USSC. Because these strategically located lands can assist the existing STAs in improving water quality of discharges to the Everglades, a Long-Term Plan revision can be developed once the acquisition is complete. Future SFER chapters can include the details of any resulting Long-Term Plan revisions. For information on the status of the initial acquisition of the USSC parcels (*River of Grass* acquisition), see Volume II, Chapter 6A.

LITERATURE CITED

Burns and McDonnell. 2003. Everglades Protection Area Tributary Basins Long-Term Plan for Achieving Water Quality Goals. October 2003. Report prepared for the South Florida Water Management District, West Palm Beach, FL.

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