Chapter 8B: The Everglades Stormwater Program

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SUMMARY

The Everglades Stormwater Program (ESP) is charged with administering the Non-Everglades Construction Project (Non-ECP) permit, and developing and implementing strategies for achieving compliance with state water quality standards at structures that discharge into the Everglades Protection Area (EPA), but are not part of the ECP. The South Florida Water Management District's (SFWMD's or District's) water quality monitoring program indicates that the quality of water discharging into the EPA is generally acceptable, with the exception of phosphorus concentrations.

The District continues to foster communication with local governments, special districts, Miccosukee and Seminole Indian Tribes, and other state and federal agencies to achieve the goals of the Everglades Forever Act (EFA), the Non-ECP permit and a future long-term compliance permit. Improved monitoring programs upstream of structures, which discharge into the EPA, have been implemented to identify "hot spots," or areas of water quality concern. Several cooperative/cost share agreements have been executed with local governments to implement water quality improvement plans consisting of monitoring, Best Management Practices (BMPs) and operational modifications. Public outreach initiatives have expanded to include public education and development of educational tools, such as turfgrass and landscaping BMPs, and an urban BMP development manual for South Florida. A feasibility study has been initiated in conjunction with the ECP program to evaluate alternative combinations of private works and public works, including integration with the Comprehensive Everglades Restoration Plan (CERP), to achieve compliance with the long-term water quality standards for the EPA. These and other accomplishments as well as updates to ongoing activities are described in more detail in this chapter.

INTRODUCTION

This portion of Chapter 8 of the *2002 Everglades Consolidated Report* provides an update on the status and progress of the implementation of the Everglades Stormwater Program (ESP). On April 20, 1998, the Florida Department of Environmental Protection (Department or FDEP) issued the Non-ECP permit (FDEP File No. 06, 50259070). This permit was issued pursuant to Sections 9(k) and 9(l) of the Everglades Forever Act (EFA). The permit authorized the continued operation of water control structures operated, maintained and controlled by the District that discharge waters into, within or from the EPA and that were not included in the permit(s) issued for the ECP. The Non-ECP permit requires that the District implement schedules and strategies to: (1) achieve and maintain water quality standards; (2) evaluate existing programs, permits and water quality data; (3) develop a regulatory program, where needed, to improve water quality; and (4) develop a monitoring program to track progress toward achieving compliance with water quality standards to the maximum extent practicable. The ESP elements, along with other District programs and activities, have previously been identified as the District's water quality improvement strategies for Non-ECP tributary basins and structures discharging into, within or from the EPA. The ESP elements were described in detail in Chapter 11 of the *2000 Everglades Consolidated Report*.

The first and most basic element of the ESP is the water quality monitoring and analysis program. The Non-ECP permit conditions require the District to document the accuracy of the data collected and measure progress toward achieving and maintaining compliance with state water quality standards by December 31, 2006**.** To fulfill permit conditions, the District has completed annually an analysis of water quality data at Non-ECP structures by comparing the data with state water quality standards.

To continue to document the accuracy of the data collected and measure progress toward achieving and maintaining compliance with state water quality standards, the District has compared water quality data at Non-ECP structures from May 1, 2000 through April 30, 2001 to state water quality standards. **Table 8B-1** provides a summary of flow-weighted mean total phosphorus concentrations at Non-ECP "INTO" structures for this period of record. Results of all water quality analyses in this year's report are included in **Appendix 8B-1**. A brief narrative summary of these analyses is also provided in the Water Quality Monitoring and Analysis section below.

The ESP portion of Chapter 8 of the *2002 Everglades Consolidated Report* also contains an update on the implementation of the 10-step Regulatory Action Strategy, water quality improvement initiatives, financial assessments, public outreach initiatives, an update of specific activities in ESP basins and a "findings" section.

Figure 8B-1 is an updated map of the ESP hydrologic basins and Non-ECP structures. This map provides a wealth of regional information, including urban and tributary boundaries for basins associated with the ESP program and the location of Non-ECP structures. This map depicts the location of ESP structures, the boundaries of ESP hydrologic contributing basins, the Everglades Agricultural Area boundaries (regulated by Chapters 40E-61 and 40E-63 of the Florida Administrative Code) and the EPA boundaries.

Chapter 11 of the *2001 Everglades Consolidated Report* included a comparison of quality assured water quality data at Non-ECP structures to state water quality standards from May 1, 1999 through April 30, 2000. That analysis found that other than dissolved oxygen, there were very few excursions from Class III numeric water quality criterion for any parameter in all eight ESP contributing basins. **Table 11-1** is provided as a summary of flow-weighted mean total phosphorus concentrations at Non-ECP "INTO" structures from May 1, 1999 through April 30, 2000. It was concluded in Chapter 11 that water quality was generally acceptable in all eight ESP contributory basins, with the exception of dissolved oxygen and total phosphorus concentrations in three of the eight basins. Chapter 11 of the 2001 Everglades Consolidated Report also included a section on the Everglades Agricultural Area (EAA) Best Management Practices (BMP) Program and the C-139 Basin rulemaking, Chapter 40E-63, F.A.C. This year, the EAA BMP section is not included within this chapter, but is included in Chapter 3.

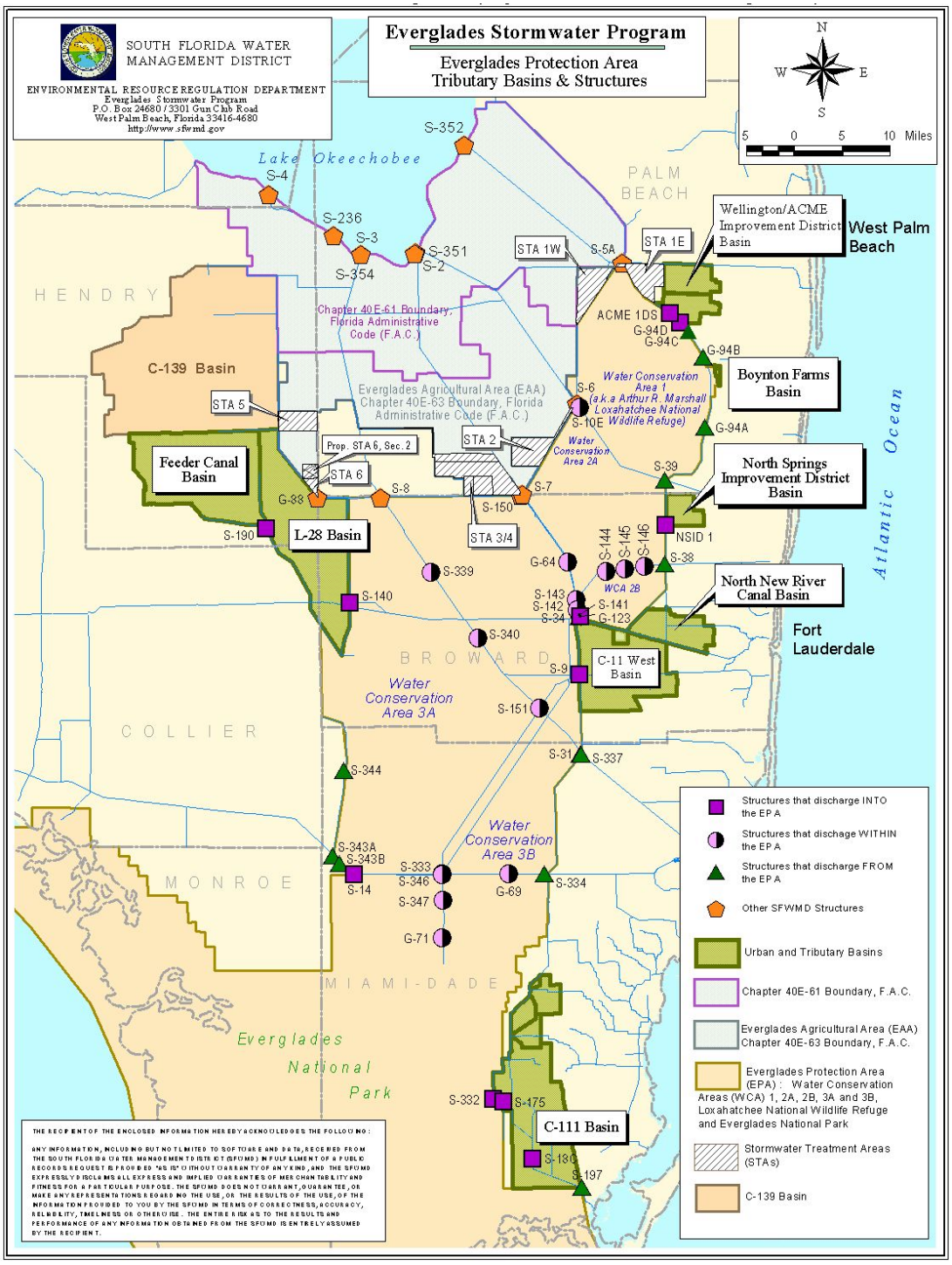

Figure 8B-1. Tributary Basins, Water Control Structures and Other Features Related to the ESP

STATUS AND PROGRESS OF IMPLEMENTING THE ELEMENTS OF THE ESP

ESP Water Quality Analysis and Monitoring Programs

The appendices to this chapter include an annual update of the Non-ECP Permit monitoring program (Specific Condition No. 12) and a comparison of water quality data at Non-ECP structures to state water quality standards from May 1, 2000 through April 30, 2001 (Non-ECP fourth year's data). These comparisons fulfill Non-ECP permit requirements to document the accuracy of the data collected and to measure progress toward achieving and maintaining compliance with state water quality standards. The data evaluations (physical parameters, nutrients, major ions, trace metals) indicated that from May 1, 2000 through April 30, 2001, with the exception of dissolved oxygen, very few excursions from Class III water quality numeric criteria were found at Non-ECP structures. The quarterly surface water and biannual sediment pesticide sampling during this period indicated that only two detections were of concern related to surface water concentrations for diazinon and endosulfan (α plus β).

Table 8B-1 summarizes the flow-weighted mean Total Phosphorus (TP) concentrations at Non-ECP INTO structures for the period from May 1, 2000 through April 30, 2001. As shown from the table, flow-weighted mean TP concentrations vary greatly between basins. The highest TP concentrations are from the Feeder Canal Basin, L-28 Basin and ACME Basin B. The North Springs Improvement District, North New River and C-11 West Basins have TP concentrations below 50 µg/L. Although these concentrations are low, as discussed in Chapter 5, concentrations greater than approximately 10 µg/L will have to be addressed. The only basin that has a TP concentration below the potential default standard of 10 µg/L is the C-111 Basin. The TP data for the Everglades Protection Area, as a whole, is provided in Chapter 2 of this Report.

Some of the highest TP concentrations for Non-ECP structures discharging directly to the EPA during WY2001 were observed for the monitoring locations at the ACME1DS and G94D culverts, and the upstream pump stations. Weekly autosampler collection and biweekly grab samples at the respective upstream monitoring locations VOW1 (ACME Pump Station 1) and VOW2 (ACME Pump Station 2) were initiated in July 2000 based on a monitoring agreement between the District and the Village of Wellington/ACME Improvement District (VOW/ACME).

The ACME1DS and G94D culverts, operated by VOW/ACME, remain open at all times and discharge to the Arthur R. Marshall Loxahatchee National Wildlife Refuge (Refuge) when upstream pump stations ACME1 or ACME2 are operating. During WY2001, the VOW/ACME pump stations discharged on an infrequent basis due to drought conditions. Therefore, District data collection trips (13) to the culvert monitoring locations resulted in a low number of sampled flow events (2). However, the monitoring agreement with VOW/ACME resulted in a sufficient number (26) of samples collected by both grab and autosampler upstream of the pump stations to cover a broad range of flows observed during pumping events, and therefore adequately characterize the TP concentrations.

Table 8B-1. Annual flow-weighted mean TP concentrations for INTO structures from May 1, 2000 through April 30, 2001

Hydrologic Basin	Structure	Water Quality Station I.D.	Total Flow Volume (acre-feet)	Sample Size (Grab)	Number of Days with Positive Flow	Arith. Average (Grab) (µg/L)	Sample Size (Comp)	Sample Type	Total Samples Collect During Flow	Flow-Weighted Mean[2] Concentration (µg/L)	Flow-Weighted Mean[3] Concentration (µg/L)
ACME (Basin B)	ACME1DS	ACME1DS	6,252 [6]	13	40 [6]	80	0	Grab [4]	2	95 [7]	107 [7]
	ACME1	VOW1	6,252	26	40	57	11[8]	Auto[5] & Grab[4]	35	65	65
	G94D	G94D	7,696 [6]	13	43 [6]	121	0	Grab [4]	3	145 [7]	169 [7]
	ACME2	VOW2	7,696	27	43	87	10[8]	Auto[5] & Grab[4]	35	104	117
North Springs Improv. District	NSID1	S-38B (WCA-2A near NSID1)	2,412	5	14	14	0	Grab [4]	1	16	16
North New River	G-123	G123	38,379	21	102	12	28 [8]	Auto [5] & Grab [4]	27	13	13
C-11 West	S-9	S9	172,045	50	146	18	30	Auto [5] & Grab [4]	52	23	23
C-111	S-175	S175	278	28	7	9	0	Grab [4]	0	ND [1]	6
	S-332	S332	1,377	29	69	9	0	Grab [4]	8	16	12
	S-18C	S18C	151,696	29	216	8	0	Grab [4]	18	9	9
L-28	S-140	S140	62,972	13	94	61	37 [8]	Auto [5] & Grab [4]	24	113	144
Feeder Canal	S-190	S190	37,286	13	89	50	35 [8]	Auto [5] & Grab [4]	20	156	177
Boynton Farms	ND[1]	ND[1]									

1) ND – no data available

2) Flow-weighted Mean Concentration based on days of flow and monitored TP data only.

3) Flow-weighted Mean Concentration based on estimation algorithm to determine TP concentration on non-monitored days combined with monitored days.

4) (Grab) indicates samples collected by grab sampling methodology.

5) (Auto) indicates that samples were collected by automatic composite samples.

6) Flow data from upstream pump structures, ACME1 and ACME2, is representative of the flow through the ACME1DS and G94D culverts respectively.

7) Flow-weighted mean concentrations for ACME1DS and G94D were calculated using the flow data at upstream structures ACME1 and ACME2, respectively.

8) Autosampler installed upstream of structure during WY2001.

More than 75 percent of the data collected at the upstream VOW/ACME monitoring sites were below 95 ppb, with median TP values ranging between 50 and 70 ppb. Discharge data were not available for the ACEM1DS and G94D culverts. However, the discharge data during WY2001 from the upstream pump stations (6,252 and 7,695 acre-feet for ACME1 and ACME2, respectively) can be used as an indication of the magnitude and occurrence of flow through the downstream culverts.

During WY2001, the District initiated a limited sampling program to characterize the water quality from farms discharging from the Boynton Farms Basin into the Refuge headquarters property. The headquarters property is owned and operated by the U.S. Fish and Wildlife Service

and is bordered by several farms immediately east of its boundary that discharge onto the property. The headquarters property is identified in the EFA as being within the boundary of the EPA, but is east of the protective levee, has no connection to discharge westward to WCA-1, and stands alone as an isolated parcel. Attempts were made to collect samples at several farms in May, September, October and November 2000 and in March 2001. However, a majority of the samples was collected during nonflow events. The usefulness of the observed TP data, along with other parameters, is undergoing evaluation. It is anticipated that more data will be collected during WY2002 during flow events and that a discussion of the data can be provided in next year's compliance report. The WY2001 data for sites BFBAFCP, BFBAFNP, BFBAFSP and BFBWNCP are included in the Non-ECP structures monitoring data submittal provided in **Appendix 8B-2**.

The G94A and G94B structures, when opened, allow interior Lake Worth Drainage District (LWDD) canals to fill, and the direction of flow has always been toward the LWDD canal system. The G-94C structure is operated in a similar manner. However, due to a March 2001 storm event producing heavy rainfall and high canal stages in the LWDD system, it was possible to capture the runoff for drought-storage purposes by discharging through G94C toward the Refuge. The discharges started on March 19, 2001 were intermittent and ceased on March 29, 2001. During the first day of discharge, a grab sample was collected on the LWDD side. The TP concentration from this sampling event was 898 ppb. Two additional samples were collected on April 5 and 10 to measure the LWDD canal background levels after the discharges had ceased. The TP concentrations were 310 and 227 ppb, respectively. The grab-sampled data are provided in the data submittal with this report under the name G94C. Estimated discharges for the March event are provided in **Appendix 8B-1a**, **Table 3**. Operational records were unavailable to determine the frequency and magnitude of water supply releases to LWDD canals during WY2001 at the three structures.

Reporting Requirements

As required by Specific Condition No. 5 of the Non-ECP permit, the District is required to submit annually a report that includes a description and evaluation of the implementation of strategies and schedules contained in the permit, as appropriate. The annual reports are also required to include the results of the evaluation of water quality data, updates on the implementation of the Regulatory Action Strategy and the Mercury Screening Program. Information contained in this chapter and in Chapters 1, 2, 3, 4 and 7 of the *2002 Everglades Consolidated Report* fulfill the reporting requirements of the Non-ECP permit, as detailed in the specific conditions of the Non-ECP permit. The reporting requirements are listed below in **Table 8B-2**.

Table 8B-2. Non-ECP Permit Reporting Requirements

Specific Condition	*Reporting Requirement*	*Referenced Location*
4	New Permit or Permit Mods	Not Applicable at this Time
5	Submittal of Annual Report	ECR, Chapters 1, 2A, 2B, 3, 4A, 4B, 4C, 7, 8A, 8B, 8C
6	Land Acquisition & Water Treatment Facility Status Update	ECR, Chapter 8B
7	First & Second Data Evaluation Reports	Completed in 1998 Annual Report
8	Regulatory Action Report	ECR, Chapter 8B
9	Update on Implementation of Schedules & Strategies	ECR, Chapters 1, 2A, 2B, 3, 4A, 4B, 4C, 7, 8A, 8B, 8C
10	CompQAP	CompQAP 870166G (DEP Approved)
11	Mercury Screening Program Report	ECR, Chapter 2A, 2B
12	Annual Report, Data Requirements	See Below
12(b)	Dates of Sampling	ECR, Appendix 8B-1e
12(c)	Water Quality Sampling Methodology	CompQAP 870166G (Sec's 6.0 & 7.0)
12(d)	Map of Sampling Locations	ECR, Chapter 8B, Figure 8B-1
12(e)	Statement of Sampling Authenticity	ECR, Appendix 8B-1f
12(f)	CompQAP	CompQAP 870166G
12(g)(I-v)	Water Quality Data & Associated Information	ECR, Appendix 8B-1e
12(g)(iv)	Monthly Flow Volumes	ECR, Chapter 8B, Table 8-3
12(h)	Water Quality Data Evaluation	ECR, Appendix 8B-1 and 8B-1 (a-d)
12(I)	Recommendations for Improving WQ Monitoring	Completed in 1998 Annual Report
12(j)	Implementation of Strategies	ECR, Chapters 1, 2A, 2B, 3, 4A, 4B, 4C, 7, 8A, 8B, 8C
16	Monitoring Locations Report	Submitted to FDEP in 1998
19	Additional Strategies (if developed)	Not Applicable at this Time

In addition to the required reports, the District has prepared several informational products that discuss different aspects of the Everglades Program. The District has produced a document titled *Everglades Stormwater Program*, January 2000. The document provides a summary of the various elements that make up the ESP.

Regulatory Action Strategy

The status of the Regulatory Action Strategy (RAS), which applies to all basins discharging into the Everglades Protection Area, but are not part of the ECP, is updated and submitted annually to the FDEP. A detailed description of the RAS and the 10-step approach to addressing basin-specific water quality issues are provided in Chapter 11 of the *2000 Everglades Consolidated Report.*

Steps 1 through 3 of the RAS require an inventory of all structures directly discharging into the EPA (Step 1), the characterization of available water quality data (Step 2) and, when needed, an expanded monitoring program at structures discharging into the EPA (Step 3). At the time of this update, steps 1 through 3 of the RAS have been completed for all basins, with the exception

of Steps 2c and 3 within two of the four sub-basins within the Boynton Farms Basin. The District has a monitoring plan for Boynton Farms but has been unable to obtain agreements for access to two of the private properties. Step 4 (evaluating data from direct structures) is ongoing, as additional sources of historical data are being investigated. District staff had, ahead of schedule, analyzed all the District's data available since 1978 and presented it as part of the Non-ECP Permit's first annual monitoring report on April 20, 1999 (SFWMD, 1999a). Autosampling equipment for flow-proportional TP sampling has been installed for the Wellington/ACME, North Springs Improvement District and C-11 West basins. Autosampling equipment for time-composite TP sampling has been installed for the North New River, L-28, and Feeder Canal basins. Additional equipment, necessary for flow-proportional TP sampling, has been purchased and partially installed, with the remainder to be installed this year for these basins and the C-111 Basin.

Step 6 requires the identification of structures upstream of the direct structures with potential water quality concerns and has been completed for all basins. The basins are at varying stages of Steps 5, 7 and 8. The District has executed cooperative/cost-share agreements with local governments for upstream water quality monitoring within the Wellington/ACME, North Springs Improvement District and the C-11 West basins. Additional agreements are being pursued within these and other basins. District personnel are conducting upstream sampling within the C-111, C-11 West, North New River Canal, L-28 and Feeder Canal basins.

Implementation of water quality improvement plans, including BMPs and operational modifications, has been partially initiated in the L-28, Feeder Canal, C-11 West, and Wellington/ACME basins (See the "Updates of Activities in ESP Basins" section of this chapter for more detailed information on each basin).

Water Quality Improvement Plans

In FY 2000, the District began a process that will lead to the development of basin-specific alternatives analysis/conceptual designs for tributary basins discharging into the EPA. The activities associated with this effort include six non-ECP basins and all basins associated with the Everglades Construction Project. The goal of this effort is to provide alternatives analysis and conceptual designs that identify the best combination of Best Management Practices, optimized STAs and Advanced Treatment Technologies needed to meet the final water quality and water quantity objectives for the benefit of the Everglades. This process is ongoing. See the "Long-term Water Quality Strategy" section of this chapter for more detailed information.

Agreements with local stakeholders (municipalities and water control districts) within the C-11 West, North Springs Improvement District and the Wellington/ACME basins have been executed requiring the local stakeholders to develop and implement BMPs where feasible. The District has provided in-kind services, expertise and funding to aid these initiatives. Additional agreements and coordination with landowners in other basins are being pursued. Upstream water quality monitoring data being collected will help determine the location and type of BMPs that should be implemented.

The Comprehensive Everglades Restoration Plan (CERP) includes several components that will have a direct impact on the activities of the ESP (Chapter 7). Staff from ESP have coordinated and contributed to the Water Preserve Area (WPA) Feasibility Study (covers several Non-ECP basins) and the C-111 North Spreader Canal Project delivery team. Additional coordination will occur as planning activities for individual CERP components are initiated. In

addition, ESP staff is coordinating with ECP research staff on Advanced Treatment Technologies to determine the applicability in the Non-ECP basins and the WPA components.

The District has entered into a cost-share agreement with the United States Department of Agriculture-Agricultural Research Service (USDA-ARS) to perform research of BMPs to protect groundwater and surface water from agricultural chemicals in Southern Dade County. The goal of this research is to determine pesticide and nutrient loading to groundwater from normal farming practices and evaluate the efficacy of summer cover crops as a BMP for vegetable crop production.

Financial Assessments

A conceptual methodology for calculating a financial assessment based on the benefit each parcel may receive has been developed and is currently under review. This methodology would require a higher assessment per acre from land uses that generate a larger loading of pollutants relative to other land uses within the drainage basin. The methodology would use GIS to identify the size, land use, ownership and existence of permitted treatment facilities for each parcel within a basin. GIS mapping in the Wellington/ACME Improvement District Basin is near completion and additional mapping in the North Springs Improvement District, North New River Canal and C-11 West basins is continuing. A comprehensive review of funding sources is also underway for Everglades restoration activities without dedicated sources of revenue. This review includes policy issues and decisions regarding the sources of revenue. It is unclear how this financial assessment will fit into these policy decisions, if at all. While these issues are being resolved, mapping within the basins will continue, as well as technical and policy review of the calculation methodology.

Public Outreach Initiatives

The public involvement campaign has expanded considerably in the past year. The current campaign includes a new Website, the development of Best Management Practices (BMPs) Manuals, and various activities in the C-11 West Basin, the ESP pilot basin for public involvement activities.

Numerous meetings have been and will continue to be held with stakeholders in the ESP basins. At these meetings, the EFA deadline for meeting the future standard for phosphorus in 2006 is emphasized. In addition, District staff communicates the integrated nature of other District programs with the ESP and other agencies' programs.

The Website will be completed in the near future and will include basin information, such as maps, publications, photos, project information and basin program updates. The ESP has a summary document describing the program in layman's terms. A copy in pdf format may be found at the District's Website at http://www.sfwmd.gov/org/reg/evg/espsum/espsum2000.pdf.

Another significant publication currently being prepared is the Urban Best Management Practices Manual. The manual will discuss sources of pollutants, targeting and quantifying pollutant types, as well as methods for selecting feasible BMPs. A key goal of the manual is to provide information on structural and nonstructural BMPs for urban land uses.

Several public involvement pilot activities are being implemented in the C-11 West Basin. The activities include a variety of strategies aimed at educating stakeholders and the public to

implement changes that will result in enhanced water quality and reduced phosphorus content in the stormwater discharges.

To implement the campaign, the District and the Broward County Extension Education Division hosted the first C-11 West Canal Basin Working Group early in 2000. The 36-member working group includes landscaping interests, fertilizer industries, government agencies, colleges, universities, special interest groups and environmental organizations. Together the group has developed turfgrass and landscaping Best Management Practices (BMPs) that will help residents reduce pollution without sacrificing the basin's urban landscapes.

The Final Draft of the *Turf & Landscape Best Management Practices Manual* is being prepared into a "mini Website" that will be posted on each of the Work Group Member Websites. The agreed-upon messages in the BMP Manual will also be used to develop retail displays, complimentary fliers and other promotional pieces. Group members will also be soliciting speaking engagements to promote the manual throughout the basin, and have agreed to promote the effort in their respective newsletters and publications.

Another public involvement activity is The Freddy's Friends Club, piloted at Silver Ridge Elementary. The Freddy's Friends Club concept was expanded to include "Teddy," the Central Broward Water Control District mascot. The clubs were established at four new elementary schools in the basin.

The program has also posted a total of 10 signs along the C-11 Canal. The interpretive signs communicate the canal's role in flood protection, its connection to the Everglades and the concept that resident's activities affect water quality. The District signs are complemented by a series of canal signs developed by Central Broward Water Control District.

PROGRAM MANAGEMENT AND IMPLEMENTATION

UPDATES OF ACTIVITIES IN ESP BASINS

Wellington/Acme Improvement District Basin

An additional cooperative agreement between Wellington and the District was executed on May 23, 2000 for implementation of a water quality improvement plan. The plan includes implementation of BMPs, operational changes in the local water management system and development of an alternate Water Preserve Area plan in the Basin B area. As a result of this agreement, the Village of Wellington has created a BMP ordinance that addresses the storage, handling and transport of livestock waste and the storage and application of fertilizer. The ordinance includes an educational component on the proper use of fertilizers and irrigation practices. Wellington has also implemented several maintenance BMPs within its canal right of ways, including raised inlets, sediment sumps, sediment removal and canal vegetation harvesting.

ESP staff has been coordinating with the Surface Water Management staff to encourage additional water quality treatment and BMPs in new Environmental Resource Permit applications. The staff has been successful in issuing permits that exceed the required water quality treatment criteria and include innovative BMPs designed to reduce discharges of nutrients into the Wellington canal system.

ESP staff coordinated with District research staff and Wellington to implement a Chemical Treatment and Solids Separation (CTSS) pilot study within Basin B (located at Acme Pump Station 2 near G-94D). The pilot study trailer used is one of the same trailers used for the CTSS pilot study done in the Everglades Nutrient Removal Project. This pilot study was conducted to determine the feasibility of chemical treatment of stormwater in a more urban basin. The study indicates that TP levels of 10 ppb or less can be achieved using this technology (Chapter 4).

Boynton Farms Basin

During the past year, surface water quality sampling was performed within the basin. Due to limited access, it was difficult to take samples during pump discharge events, but a few discharge samples were obtained. Due to unresolved property boundaries, stormwater discharges from the pumps along the west side of the basin (Refuge side) believed to be discharging into the refuge property boundaries have not been verified. Access to these areas has been impractical due to a high water table and overgrowth of vegetation along the boundary. In these areas, access must be provided from the farm side. Voluntary landowner cooperation and access has been encouraged, but participation has been limited. The District continues to offer technical support to help landowners comply with water quality requirements. The Refuge staff is also sampling surface water on the farms and within the Refuge property. ESP staff is coordinating with the Refuge staff to improve the two monitoring programs and share the data.

North Springs Improvement District Basin (NSID)

As part of the cooperative/cost share water quality improvement agreement between the District and NSID, an autosampler and flow monitoring equipment with telemetry was installed at NSID's pump station that discharges into WCA-2A. The autosampler will collect flow proportional samples for TP analysis. Operation of the equipment has been delayed due to unforeseen pump repairs, but will be operational in time to provide data for next year's report. Additional sampling points upstream of the pump station have been identified for a grab-sample monitoring program during flow events. NSID staff will conduct this sampling and the data will be reported to the District. The upstream data will be used to develop water quality improvement strategies and implement BMPs where feasible. A program for public outreach is being developed that will include coordination with municipalities in the basin.

North New River Basin

The District staff has completed review of the upstream water quality data available for these areas and implemented a water quality monitoring program. Based on the results of the water quality assessment, a comprehensive upstream water quality monitoring program is being instituted. The cooperative agreement being developed with the Old Plantation Water Control District includes implementation of a water quality monitoring program. Identification of "hot spots" and implementation of BMPs will be determined from the data collected.

C-11 West Basin

The District has continued to work closely with Central Broward Water Control District and South Broward Drainage District to implement cooperative/cost share water quality improvement agreements within the C-11 West Basin. A water quality monitoring program for upstream structures is ongoing, and if "hot spots" are identified remedial actions will be taken. The

remedial actions may require construction of capital improvement projects. As discussed in the Public Outreach Initiatives section above, several outreach activities are being conducted within the basin to reduce the sources of pollutants entering the C-11 West Canal.

C-111 Basin

Drainage patterns in this basin have historically been in the form of surface water movement from west to east, with very few canals or structures. In addition, surface water infiltrated directly into the ground water, with high seepage influence from the Everglades National Park (ENP or Park). Due to the mandated restoration efforts in this basin, federal agencies, local sponsors and interested parties have been promoting environmental projects in the area. Flow patterns are changing into pumped systems directing water to the west, with goals to improve conditions in the Park and sheet flow being directed to the south and east to improve Florida Bay and the Park Panhandle. Several federal projects are scheduled for construction in this area and are at different stages of implementation. The federal initiatives are: the C-111 Project, the Modified Water Deliveries (MWD) to Everglades National Park, the Interim Structural and Operation Plan (ISOP) and Interim Operational Plan (IOP), the C-111 General Re-evaluation Report (GRR) and a component of the CERP called the C-111N Spreader Canal. Many of these projects will have an effect on how the Regulatory Action Strategy (RAS) is implemented in this basin. The District staff participates in project delivery teams and public outreach efforts to organize and foresee program implementation changes, as needed.

A final report on the S-332D Pump test was submitted to the Department in August 2000. The four-week pump test was conducted in August and September 1999. The test was constructed to observe how well pump station operations could replicate natural flow patterns from L-31W into the adjacent marsh in ENP. The final report recommended adjustments to operational targets and monitoring and suggested removal of the road in the western bank of the L-31W Canal.

The C-111 system modifications completed a three-year period of construction activity with the replacement of the Taylor Slough Bridge in the Park. The replacement of the old bridge with two wider spans removes a constriction within Taylor Slough. The new bridges complement flows at S-332D to rehydrate Taylor Slough by mimicking a more natural sheet flow of water through the Slough. Construction was completed in October 2000.

Emergency actions to protect the Cape Sable Seaside Sparrow strongly influenced C-111 system operations through 2000. The biological opinion issued in 1999 by U.S. Fish and Wildlife Service (USFWS) established water management targets for the eastern populations of the sparrow located on the edge of the Park next to the C-111 canal and the L-31N Canal. Beginning with the year 2000 spring nesting season, hydrologic targets were to be attained in the C-111 basin through the operation of S-332D and a new, temporary facility constructed this year in the Rocky Glades at the S-332B location. Emergency operations and monitoring of water quality at these two structures was authorized by the Department to the USACE. The results of year 2000 operations and monitoring will be used to complete the Interim Operating Plan (IOP), now under development, which will carry protective measures through the year 2003, or until the Modified Water Deliveries and C-111 projects are complete.

A supplement to the C-111 General Reevaluation Report (GRR) being developed by the USACE will incorporate a strategy to meet state and federal water quality standards. Evaluation of water quality impacts, the selection and design of appropriate treatment methods, and

construction of treatment facilities within the C-111 project will be cost shared equally by the USACE and the District.

The CERP C-111N Spreader Canal Project alters the 1994 design for the Lower C-111 Basin by adding the following enhancements: a conceptual footprint for a 3,200-acre Stormwater Treatment Area, enlargement of Pump Station S-332E from 50 to 500 cfs, extension of the spreader canal approximately two miles to the east and under U.S. Highway 1 and Card Sound Road; and placement of culverts under the roadways to rehydrate the Model Lands Area. The CERP Project also proposes to fill in the southern reach of the C-111 Canal below C-111N to S-197, and suggests removal of S-18C and S-197. The USACE and the District share equally in the implementation of the project, beginning this year with the development of a project management plan and ending in 2008 with the completion of construction activities.

The RAS continues to be implemented in the C-111 Basin. District staff confirmed that Miami-Dade Department of Environmental Resources Management has not issued any permits in this basin under delegation authority. There have been no additional sources of adequate water quality data to determine compliance at any upstream structures. District staff found no historic water quality data in the area where the nine existing culverts were identified between S-18C and S-197. The District and USACE are coordinating efforts to create a water quality monitoring plan to capture these structures accordingly. The District continues to monitor and characterize flow for upstream basin structures. The current flow data for structure S-178 was based on a culvert rating. Hydraulic conditions indicate that monitoring this structure as a spillway would be more appropriate. The new monitoring regime will be implemented accordingly. In addition, the water quality monitoring program will be modified to capture pesticides in the region.

Scientists at the Homestead, Florida-based University of Florida Tropical Research and Education Center submitted a final report in June 2001. The report concluded three years of field investigations on vegetable and fruit crops cultivated in the South Dade County region. Project activities included fertilizer trials, innovative methods of conducting groundwater nutrient analyses, using this information to customize irrigation schedules, and public education activities to transfer these new techniques to area growers. As a follow-up project, the District recently executed a cooperative agreement with the U.S. Department of Agriculture and its subcontractor, the University of Florida Tropical Research and Education Center, for a two-year study. The study will evaluate the fate and transport of indicator pesticides, the efficacy of summer cover crops in controlling pesticide contamination of surface water and groundwater, and attenuation of pesticides during their transport in the Upper Biscayne Aquifer. It is anticipated that results from this study will contribute to risk-reduction strategies for pesticide use and will enhance water quality and promote agricultural sustainability.

L-28 Basin

Flow-proportional sampling equipment has been purchased and is scheduled to be installed this budget year in order to upgrade the existing time-composite automatic sampler currently onsite at the S-140 Structure. The ESP staff will continue to schedule cooperative informational exchange meetings with the Seminole and Miccosukee Indian Tribes, the two largest landowners within the basin. The new G-409 pump station that provides “entitlement” irrigation water supply from the Everglades Agricultural Area to the Seminole Reservation is online and operational. Flow-proportional sampling equipment has been purchased and is scheduled to be installed this budget year at the structure.

The District has partnered with the National Resources Conservation Service and several other government agencies to share information and provide support to local landowners in developing voluntary Best Management Practices (BMPs). Workshops have been held to provide education on BMPs, available landowner assistance programs and guidance in developing on-farm conservation plans. The Seminole Indian Tribe demonstrated the Birch Wet Blade Machine BMP at the last workshop. Additional workshops and training sessions have been scheduled for the future.

Feeder Canal Basin

Flow-proportional sampling equipment has been purchased and is scheduled to be installed this budget year in order to upgrade the existing time-composite automatic sampler currently onsite at the S-190 Structure. District efforts continue to improve the water quality at upstream structures. A small lab area has been established at the Clewiston Field Station to provide support for local landowners in acquiring water quality data and to locate higher phosphorus sources on farms. Internal water quality sampling for farms and ranches will become a viable component in developing BMP plans for local landowners. Data will provide information on whether BMPs are achieving desired results and whether BMPs need further development or additional BMPs need to be implemented.

Upstream of the North Feeder Canal Structure Project, discharges from McDaniel Ranch continue to be monitored and submitted to the District for review and to determine compliance with the Landowner Agreement and permit conditions. An onsite farm inspection was conducted and revealed that construction of Phase 1 of the system is approximately 95 percent complete, with minor earthwork remaining for full completion. Certification of Phase 1 will occur at the completion, which will entail elevation shots on the control structures and dikes to assure it was built to specifications as outlined in the permit for this basin. Photos were taken of this phase to document works, along with a visual inspection of the dikes and control structure. Phase 2 construction was already taking place and is approximately 80 percent complete at this time. Construction certification will be conducted on this phase at its completion. Inspections are conducted on a regular basis to ensure compliance with the conditions of the permit.

ESP staff recognizes that McDaniel Ranch was issued a permit and understands that a significant portion of the permit design is to address water quality concerns. Construction of the facilities contemplated in the master plan is ongoing and is not scheduled to be complete until 2003. As construction of the McDaniel's surface water system progresses to completion, the ranch appears to be able to retain more surface water and discharge less water offsite. In 1999 McDaniel Ranch discharged twice offsite: June 9 through July 17 and September 7 through October 28. On October 3 and 4, 2000, a large, isolated storm event occurred, dumping nearly eight inches of rain on the ranch in two days. McDaniel Ranch was forced to open the structures, as surface water was topping the structures and threatening the ranch with severe flooding. McDaniel Ranch had not opened the structures or discharged offsite for nearly a full year (since October 1999). During and after the storm, McDaniel Ranch opened both structures in order to alleviate flooding. There are two sites that are monitored for water quality compliance at McDaniel's. The first compliance site, NF040TW (PC17A), was opened for 12 days and the second compliance site, NF05.5TN (G108), was opened for 13 days. Since that time, no structures have been opened through June 21, 2001.

Surface water and water use permits in the basin have been examined in the area. Landowners who have been identified as needing permits have been instructed to submit

applications for the appropriate permits. Staff is currently verifying whether each permitted surface water system has been constructed as designed and is in permit compliance.

The District has partnered with the National Resources Conservation Service and several other government agencies to share information and provide support to local landowners in developing voluntary BMPs. Workshops have been held to provide education on BMPs, available landowner assistance programs, and guidance in developing on-farm conservation plans. Additional workshops and training sessions have been scheduled for the future.

FINDINGS

That portion of the District's water quality monitoring program implemented as a result of the EFA and the Non-ECP permit indicates that the quality of water discharging into the EPA is generally acceptable, with the exception of phosphorus concentrations discharging from the Wellington/ACME, Feeder Canal and L-28 basins. However, with a potential phosphorus numerical standard of 10 ppb, any basin not meeting this standard will be required to implement appropriate water quality improvement measures. To better characterize the quality of water discharging into the EPA, the District has implemented a plan to install flow-proportional automated samplers at all "INTO" structures.

After cursory reviews of existing water quality monitoring programs upstream of the direct "INTO" structures, it appears necessary to revise existing programs and implement new programs where none currently exist to better characterize water quality within the basins. Revised monitoring programs within the Wellington/ACME, C-11 West, North New River Canal and North Springs Improvement District basins have been implemented. Recommendations for implementation of new water quality programs and revisions to existing programs are also being developed in other basins. Concurrently, the District will continue to monitor water quality in accordance with the Non-ECP permit to measure progress toward achieving compliance with state water quality standards.

To achieve the goals/requirements of the EFA, the Non-ECP permit and the future Long Term Compliance Permit, extensive coordination with local governments, 298 special districts, the Miccosukee and Seminole Indian Tribes and other state and federal agencies is essential. Several meetings have been conducted to foster this coordination within all the basins. Several cooperative/cost-share agreements with local governments have been executed to implement water quality improvement plans consisting of BMPs and operational modifications. The public-involvement element of the ESP will provide additional avenues of participation for environmental groups, agricultural and urban communities, locally impacted industries and the general public. Coordination with CERP, the Water Preserve Area Feasibility Study, ongoing critical projects within Non-ECP basins, the Basin-Specific Feasibility Study and local governments is facilitating the development of long-term solutions for achieving state water quality standards.

LITERATURE CITED

The Non-ECP Structures First Annual Monitoring Report. 1999a. Submitted to the Florida Department of Environmental Protection pursuant to the EFA Permit No. 06, 502590709, South Florida Water Management District, West Palm Beach, FL.

The Non-ECP Structures Second Annual Monitoring Report. 1999b. Submitted to the Florida Department of Environmental Protection pursuant to EFA Permit No. 06, 502590709, South Florida Water Management District, West Palm Beach, FL.

Everglades Consolidated Report. 2001 and 2000. South Florida Water Management District, West Palm Beach, FL.