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. Through its Regulatory Action Strategy, the ESP is also responsible for 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 Everglades Construction Project. The South Florida Water Management District (District or SFWMD) continues to foster communication with local governments, special districts, the Miccosukee and Seminole Indian tribes, and other state and federal agencies to achieve the goals of the Everglades Forever Act, the non-ECP permit, and a future long-term compliance permit.

The District has implemented improved monitoring programs upstream of structures that discharge into the EPA to identify Everglades "hot spots" (areas of water quality concern). The 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, dissolved oxygen, and occasional excursions from standards for pH, alkalinity, specific conductance, and turbidity. In addition, the District has executed a number of cooperative cost-share agreements with local governments to implement water quality improvement plans that consist of monitoring, Best Management Practices (BMPs), and operational modifications.

Public outreach initiatives have expanded to include public education, development of educational tools such as urban, turf grass and landscaping BMP manuals, and an urban BMP development document for South Florida. A feasibility study has been completed to evaluate alternative combinations of private and public works, including integration with the Comprehensive Everglades Restoration Plan, to achieve compliance with the long-term water quality standards for the EPA. This chapter describes these and other accomplishments and provides updates to ongoing activities.

INTRODUCTION

This chapter provides an update on the status and progress of the implementation of the Everglades Stormwater Program (ESP). This chapter also contains an update on the implementation of the 10-step Regulatory Action Strategy (RAS), water quality improvement initiatives, financial assessments, public outreach initiatives, an update of specific activities in ESP basins, and a "Findings" section.

On April 20, 1998, the Florida Department of Environmental Protection (FDEP) issued the non-Everglades Construction Project (non-ECP) permit (FDEP File No. 06, 50259070), which 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 that are operated, maintained, and controlled by the South Florida Water Management District (SFWMD or District), that discharge waters into, within, or from the Everglades Protection Area (EPA), and which were not included in the permit(s) issued for the Everglades Construction Project (ECP). The non-ECP permit requires that the District implement schedules and strategies for the following purposes: (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 and described in detail in Chapter 11 of the *2000 Everglades Consolidated Report* as the District's water quality improvement strategies for non-ECP tributary basins and structures discharging into, within, or from the EPA.

The first and most basic element of the ESP is the water quality monitoring and analysis program. Non-ECP permit conditions require the District to document the accuracy of collected data 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 an annual 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 collected data and measure progress toward achieving and maintaining compliance with state water quality standards, the District has compared water quality data from non-ECP structures collected in Water Year 2003 (WY2003) (May 1, 2002 through April 30, 2003) to state water quality standards. **Table 8B-1** provides a summary of flow-weighted mean total phosphorus (TP) concentrations at non-ECP "into" structures for the period of record. Results of all water quality analyses in the *2004 Everglades Consolidated Report* are included in Appendix 8B-1. A brief summary of these analyses is also provided in the "Water Quality Monitoring and Analysis" section below.

Figure 8B-1 is an updated map indicating the location of ESP structures, the boundaries of ESP hydrologic contributing basins, the Everglades Agricultural Area (EAA) boundaries (regulated by Chapter 40E-63 of the Florida Administrative Code, F.A.C.), and the EPA boundaries.

The ESP chapters of previous Everglades Consolidated Reports (ECRs) (2001 ECR, Chapter 11; 2002 and 2003 ECR, Chapter 8B) included comparisons of state water quality standards to water quality data obtained from non-ECP structures. These analyses found that there were very few excursions from Class III numeric water quality criterion for any parameter in the eight ESP contributing basins, except for excursions from the existing standard for dissolved oxygen (DO).

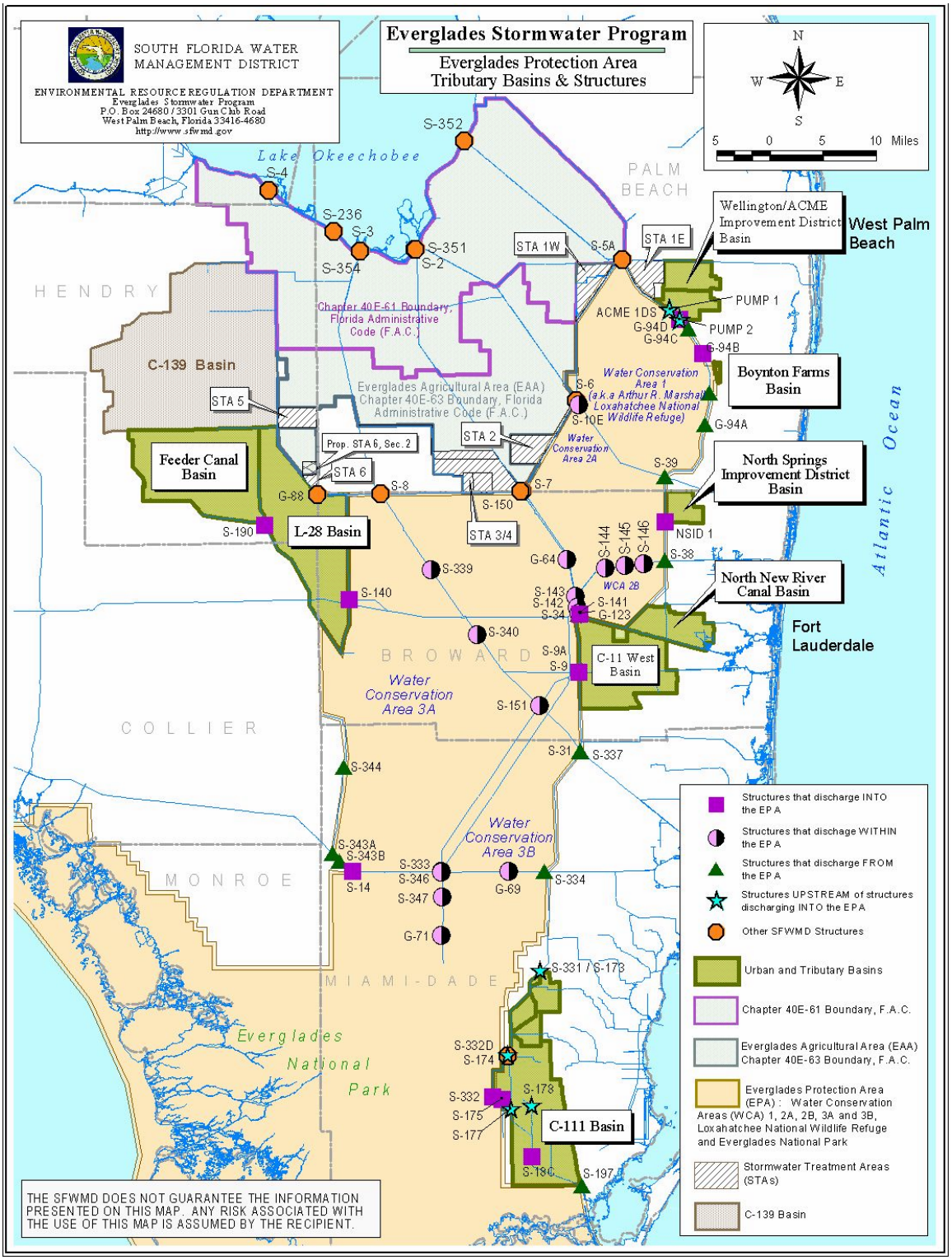

Figure 8B-1. Tributary basins, water control structures, and other features related to the Everglades Stormwater Program (ESP).

Table 8B-1. Annual flow-weighted mean total phosphorus (TP) concentrations for Water Year 2003 (WY2003) (May 1, 2002 through April 30, 2003).

Hydrologic Basin	Structure	Water Quality Station Id	Total Flow Volume (acre-feet)	Sample Size (Grab)	Number of Days with Positive Flow	Arithmetic Average (Grab)(µg/L)	Sample Size (Comp)	Sample Type	Total Samples Collected During Flow	Flow-Weighted [2] Mean Concentration (µg/L)	Flow-Weighted [3] Mean Concentration (µg/L)	TP Load (kg)
ACME (Basin B)	ACME1DS	ACME1DS	8,813 [6]	11	48 [6]	51	0	Grab [4]	3	80 [7]	76	827
	ACME1	VOW1	8,813	5	48	69	17 [8]	Auto [5] & Grab [4]	37	83	80	867
	G94D	G94D	9,469 [6]	16	75 [6]	92	0	Grab [4]	9	117 [7]	92	1,076
	ACME2	VOW2	9,469	5	75	143	19 [8]	Auto [5] & Grab [4]	67	108	119	1,387
North Springs Improv. District	NSID1	NSIDSP01	688	ND	ND	ND	0 [9]	Grab [4]	ND	ND	ND	ND
		S-38B (WCA-2A near NSID1)	688	4	4	29	0	Auto [5] & Grab [4]	0	ND	ND	ND
North New River	G-123	G123	0	30	0	23	48 [8]	Auto [5] & Grab [4]	0	ND	ND[1]	0
C-11 West	S-9	S9	264,301	50	214	17	36	Auto [5] & Grab [4]	219	17	17	5,580
	S-9A	S9A	ND	24	ND	15	23	Auto [5] & Grab [4]	ND	ND	ND	ND
C-111	S-175	S175	2,396	26	2	10	0	Grab [4]	2	10	9	27
	S-332	S332	547	26	9	8	0	Grab [4]	1	ND [1]	6	4
	S-18C	S18C	134,932	35	270	5	0	Auto [5] & Grab [4]	6	6	7	1,200
L-28	S-140	S140	136,367	35	200	42	39 [8]	Auto [5] & Grab [4]	189	65	62	10,191
Feeder Canal	S-190	S190	88,026	17	233	58	40 [8]	Auto [5] & Grab [4]	215	84	86	9,358
Boynton Farms	Various[10]	Various[10]	ND[1]	55	ND[1]	310-1656	ND[1]	Grab [4]	ND[1]	ND[1]	ND[1]	ND[1]

Notes:

1) ND - no data are 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

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 ACMD1DS 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) Auto-sampler installed upstream of structure during WY2001.

9) Auto-sampler installed upstream of structure during WY2002, but no data are available.

10) Sites include BFBAFCP, BFBAFNP, BFBAFSP, BFBDFCP, BFBDFNP, BFBDFSP, BFBDFWP, BFBMFCP, BFBMFSP, BFBMFNP, and BFBWNCP.

It should be noted that the FDEP has completed an evaluation of DO levels in the EPA. Based on this evaluation, the FDEP has developed a site-specific alternative criterion (SSAC) to formally recognize the natural background conditions in the EPA marshes. Additional information on the DO SSAC is presented in Chapter 2A of the 2004 Everglades Consolidated Report. **Table 8B-1** provides a summary of flow-weighted mean concentrations of total phosphorus at non-ECP "into" structures for WY2003. This year's data, along with data from previous ECRs, indicates that water quality, with the exception of DO and TP concentrations, was generally acceptable in all eight ESP contributory basins.

STATUS AND PROGRESS OF IMPLEMENTING THE ELEMENTS OF THE EVERGLADES STORMWATER PROGRAM

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), monitoring results from the S-332D structure at the C-111 basin, and a comparison of water quality data from samples collected at non-ECP structures to state water quality standards from May 1, 2002 through April 30, 2003 (non-ECP sixth year data). These comparisons fulfill non-ECP permit requirements to document the accuracy of the collected data and measure progress toward achieving and maintaining compliance with state water quality standards. The data for the groups of water quality parameters, including physical parameters, nutrients, major ions, and trace metals, were evaluated for WY2003. The evaluation indicated that except for incidences of variations for DO, there were very few excursions from Class III water quality standards found in samples collected at non-ECP structures. The excursions found included the following: pH at S-143 and NSID1; alkalinity at S-140; specific conductance at S-143; and turbidity at S-339.

Based on the analysis provided in Appendix 8B-1, none of the pesticides detected during the quarterly surface water sampling were found to be of concern. The biannual sediment pesticide sampling, however, indicated that some of the pesticides detected in the bottom sediments could be of potential concern.

Table 8B-1 summarizes the flow-weighted mean TP concentrations, total flow volumes, and TP loads at non-ECP "into" structures for WY2003. As shown in this table, flows were significantly higher in WY2003 than in WY2002 for some structures (S-175, S-332, S-140, and S-190), while flows were significantly lower for other structures (ACME1DS, ACME1, G94D, ACME2, NSID1, G-123, S-9, and S-18C). This is the second year that TP loads have been presented in the ECR, thus allowing an evaluation of trends or changes. A direct comparison with last year's data indicated a reduction of TP load for ACME1DS, G94D, G-123, S-9, and S-18C structures and an increase of the load from S-175, S-332, S-140, and S-190. The changes in loads through these structures are predominantly associated with changes in flow volumes.

Flow-weighted mean TP concentrations vary greatly between basins. The highest TP concentrations are identified in the ACME Basin B, the Feeder Canal, and the L-28 basins, whereas the North Springs Improvement District (NSID), North New River, and C-11 West basins have TP concentrations below 50 micrograms per liter (μg/L). The only basin that has a TP concentration below the proposed TP standard of 10 μg/L is the C-111 basin. Although many of these concentrations are relatively low, all TP concentrations greater than approximately 10 μg/L

will have to be addressed further (as discussed in Chapter 5). The Boynton Farms basin exhibits the highest TP concentrations of any basin, but because no flow measurements are available for this basin, no flow-weighted mean concentrations could be determined. All of the TP data for the EPA during WY2003 are provided in Chapter 2C of the *2004 Everglades Consolidated Report*.

Some of the highest TP concentrations for non-ECP structures discharging directly to the EPA during WY2003 were observed for the monitoring locations at the VOW2, VOW2Auto, ACME1DS, and G-94D culverts and the upstream pump stations. The ACME1DS and G-94D culverts, operated by the Village of Wellington (VOW), 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. Sixteen District data collection trips to the culvert monitoring locations resulted in only nine sampled flow events. The monitoring agreement with VOW resulted in a sufficient number of samples (37) collected by both grab and auto-sampler techniques upstream of the pump stations to cover a broad range of flows observed during pumping events and adequately characterize the TP concentrations.

As shown in Table 3 of Appendix 8B-1b, more than 75 percent of the data collected at the upstream VOW1 monitoring sites were below 88 µg/L, with median TP values ranging between 43 and 72 µg/L. More than 75 percent of the data collected at the upstream VOW2 monitoring sites were below 100 µg/L, with median TP values ranging between 62 and 89 µg/L. Discharge data were not available for the ACEM1DS and G-94D culverts, although discharge data from the upstream pump stations during WY2003 (8,813 acre-feet [ac-ft] for ACME1 and 9,469 ac-ft for ACME2, respectively) can be used as an indication of the magnitude and occurrence of flow through the downstream culverts.

Additional high TP concentrations were observed for structures S-190 (Feeder Canal basin) and S-140 (L-28 basin), with median TP concentrations of 42 and 36 µg/L, respectively. During WY2003, structure S-190 discharged 88,026 ac-ft, and S-140 discharged 136,367 ac-ft into the western portion of Water Conservation Area 3A (WCA-3A).

The lowest TP concentrations were observed at structures in the C-111 basin at S-18C, S-174, S-177, S-331, S-173 and S-332D, which discharge to the southeastern portion of Everglades National Park (ENP or Park) by way of the C-111 canal and Taylor Slough. The TP data for these monitoring locations had an observed median concentration of 5 µg/L for S-18C and 7 µg/L for S-332 and S-175, with 75 percent of the samples having concentrations below 6 µg/L for S-18C, 9 µg/L for S-175, and 8 µg/L for S-332. During WY2003, the S-175 and S-332 structures were operated infrequently and discharged only 2,396 ac-ft through S-175, and 547 ac-ft through S-332 to the Park. The S-18C structure discharged approximately 134,932 ac-ft to the lower C-111 canal.

The Refuge headquarters property is owned and operated by the U.S. Fish and Wildlife Service (USFWS) 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 enable discharge westward to WCA-1, and stands alone as an isolated parcel. The Boynton Farm basin water quality monitoring program that monitors the discharge onto the Refuge headquarters property has been ongoing during WY2003. Although access limitations and other boundary issues still exist, surface water quality samples for most of the identified “into” structures have been obtained during times of flow. Recently, the Williams Nursery pump on the north side of the Refuge was voluntarily removed. Data collected during WY2003 for Amestoy Farm includes sites BFBAFCP, BFBAFNP, and BFBAFSP; Dubois Farm includes sites BFBDFCP, BFBDFNP, BFBDFSP, and BFBDFWP; Mecca Farm includes sites BFBMFCP, BFBMFSP, and BFBMFNP;

and Williams Nursery includes site BFBWNCP. These are event-driven grab samples with no associated flow measurements. The TP data, provided in **Table 8B-1,** show extremely high TP concentrations ranging from 310 to 1,656 µg/L for the samples collected from these stations. These very high TP results are consistent with the crops and agricultural practices currently found on these farms.

The flow-proportional auto-sampler, headwater pressure sensor, and calibrated flow-monitoring equipment with telemetry that monitor the NSID's pump station (NSID1) discharges into WCA-2A are continuing to function for the NSID basin, with some improvements. The surface water quality monitoring program has continued at NSID1 during times of flow into WCA-2A. Again this year, the District has not obtained upstream water quality monitoring samples taken during times of flow. The auto-sampler and telemetry equipment are operational, but flow-weighted proportional sampling data results for WY2003 are not currently available for this location (NSIDSP01). At this time, the TP concentration data have not been used due to the failure of the analytical reports to include quality assurance/quality control (QA/QC) data that are required for all water quality data submitted to the District. Therefore, the flow-weighted mean concentrations for TP could not be calculated (Table 3, Appendix 8B-1b; Table 3, Appendix 8B-1e). Active discussions are ongoing with NSID and their subcontracting laboratory to resolve these issues.

Reporting Requirements

As required by Specific Condition 5 of the non-ECP permit, the District is required to submit an annual report that includes a description and evaluation of the implementation of strategies and schedules contained in the permit, as appropriate. The annual report must also include results of the evaluation of water quality data and updates on the implementation of the Regulatory Action Strategy and the Mercury Screening Program. Information contained in this chapter and other chapters of the *2004 Everglades Consolidated Report* fulfills the reporting requirements of the non-ECP permit as detailed in the specific conditions of the non-ECP permit. The requirements are listed below in **Table 8B-2**.

Table 8B-2. Non-Everglades Construction Project (non-ECP) permit reporting requirements.

Specific Condition*	Reporting Requirement	Location in 2004 Everglades Consolidated Report
4	New permit or permit modifications	Renewal due in April 21, 2008
5	Submittal of Annual Report	Chapters 1, 2A, 2B, 3, 4A, 4B, 7, 8A, 8B, and 8C
6	Land acquisition and water treatment facility status update	Chapter 8B
7	First and second data evaluation reports	Completed in 1998 Annual Report
8	Regulatory Action Report	Chapter 8B
9	Update on implementation of schedules and strategies	Chapters 1, 2A, 2B, 3, 4A, 4B, 7, 8A, 8B, and 8C
10	Quality Assurance Manual	Current FDEP approved manual

Specific Condition*	Reporting Requirement	Location in 2004 Everglades Consolidated Report
11	Mercury Screening Program Report	Chapter 2B and Chapter 2B Appendices
12	Annual Report, data requirements	See below
12(b)	Dates of sampling	Chapter 8B Appendices
12(c)	Water quality sampling methodology	CompQAP 870166G (Sections 6.0 & 7.0)
12(d)	Map of sampling locations	Chapter 8B, Figure 8B-1
12(e)	Statement of sampling authenticity	Appendix 8B-1f
12(f)	CompQAP	CompQAP 870166G
12(g)(I-v)	Water quality data and associated information	Chapter 8B Appendices
12(g)(iv)	Monthly flow volumes	Chapter 8B Appendices
12(h)	Water quality data evaluation	Chapter 8B Appendices
12(I)	Recommendations for improving WQ monitoring	Completed in 1998 Annual Report
12(j)	Implementation of strategies	Chapters 1, 2A, 2B, 3, 4A, 4B, 7, 8A, 8B, and 8C
16	Monitoring Locations Report	Submitted to FDEP in 1998
19	Additional strategies (if developed)	Not applicable at this time

* Note: Specific conditions 1–3 do not deal with reporting requirements and therefore are not referenced in this table.

Regulatory Action Strategy

The status of the Regulatory Action Strategy, which applies to all basins discharging into the EPA 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* and in the Everglades Stormwater Program Regulatory Action Strategy Status Report, dated August 2002.

Steps 1 through 3 of the RAS require an inventory of all structures discharging directly 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. Step 4 evaluates data from direct structures, and this step is ongoing as additional data are collected. District staff have analyzed the District's data that are available since 1978, a task that has been completed ahead of schedule. These data were presented as part of the non-ECP permit in the Non-ECP Structures First Annual Monitoring Report, dated April 20, 1999 (SFWMD, 1999a). Auto-sampling equipment for flow-proportional TP sampling has been installed at the "into" structures in the Wellington/ACME, North Springs Improvement District, North New River Canal, L-28, Feeder Canal, and C-11 West basins. Auto-sampling equipment for time-composite TP sampling has been installed at the S-18C "into" structure in the C-111 basin. Step 5 requires

shifting the monitoring burdens for direct structures, and this step has been completed at the Wellington/ACME and North Springs Improvement District basins. The only other structures not owned or operated by the District are the Boynton Farms structures. The District is continuing to monitor these structures to ensure collection of data that meets the needs of the RAS and is actively working to correct any data deficiencies that may occur.

Steps 6 and 7 require that any structures that are upstream of the direct structures and have potential water quality concerns must be identified, and any existing data must be characterized. Both of these steps have been completed in all basins, where applicable. The basins are at varying stages of steps 8, 9, and 10. These steps require monitoring of upstream structures, evaluating the data obtained during that monitoring and taking appropriate remedial actions, and shifting the monitoring burdens for upstream structures, respectively. The District has executed cooperative/cost-share agreements with local governments for upstream water quality monitoring within the Wellington/ACME, North Springs Improvement District, C-11 West, and North New River Canal basins. Additional agreements will be pursued within these and other basins, as needed. District personnel are conducting additional upstream sampling within the C-111, C-11 West, North New River Canal, L-28, and Feeder Canal basins.

A summary of the vital statistics for each of the basins covered by the RAS is presented in the Everglades Stormwater Program Regulatory Action Strategy Status Report (SFWMD, 2000) and is also presented in **Table 8B-3**. The data in this table indicate the size of each basin in acres, TP concentrations and loads entering the EPA, cooperative agreements in place in each basin, and how each basin interfaces with the relevant portions of the Comprehensive Everglades Restoration Plan (CERP).

The cooperative agreements discussed above also include implementation of Best Management Practices (BMPs), and operational changes to improve water quality. A BMP incentive (grant) program that will provide funds for landowners who meet specific requirements to implement BMPs has been initiated within the C-139, L-28, and Feeder Canal basins. This program is being conducted in cooperation with the Hendry Soil and Water Conservation District and the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS). Implementation of water quality improvement plans, including BMPs and operational modifications, has been partially initiated in the L-28, Feeder Canal, C-11 West, North Springs Improvement District, and Wellington/ACME basins (reference the "Updates of Activities in ESP Basins" section of this chapter for more detailed information on each basin).

Water Quality Improvement Plans

In October 2002, the District completed the Basin-Specific Feasibility Study for tributary basins discharging into the EPA. The activities associated with this study included six non-ECP basins and all basins associated with the ECP. The goal of this study was to provide analyses of the various alternatives available for each basin to help identify the best combination of BMPs, optimized Stormwater Treatment Areas (STAs), and Advanced Treatment Technologies (ATTs) necessary to meet the final water quality and water quantity objectives for the benefit of the Everglades. In March 2003, a conceptual plan for achieving long-term water quality goals in the EPA was developed using the information provided in the feasibility study. This plan is discussed in more detail in Chapter 8A.

Table 8B-3. Regulatory Action Strategy (RAS) summary table.

Basin	Structures and Type*	County	Area (acres)	Average Annual TP Conc. (ppb)**	Average Annual Load (tons/year)**	Cooperative Agreements	CERP and Other Federal Projects
Wellington/Acme Improvement District	ACME1DS (pump 1), Type 3 G94D (pump 2), Type 1	Palm Beach	18,894	117	5.1	WQ monitoring WQ improvement plan	Acme Basin B OPE
Boynton Farms	Several Private Pumps Types 3 & 4	Palm Beach	489	1,193	N/A	None	Agricultural Reserve Reservoir
North Springs Improvement District	NSID1 Type 3	Broward	7,064	29	0.3	WQ monitoring & improvement	Site 1 Impoundment
North New River Canal	G-123 Type 1	Broward	17,904	16	0.6	OPWCD WQ monitoring & improvement PAID WQ monitoring & improvement BDD WQ monitoring & improvement City of Sunrise WQ improvement plan	Divert Flows from WCA-2 to Central Lake Belt
C-11 West	S-9 Type 1	Broward	45,701	20	5.4	SBDD WQ monitoring & improvement CBWCD WQ monitoring & improvement ITDD (Weston) WQ monitoring & improvement	C-11 West Impoundment/Diversion C-11 West Critical Project
C-111	S-332 S-175 S-18C All Type 1	Miami-Dade	62,776	8	4.2	USDA BMP Research Agreement	C-111 General Reevaluation Report Mod Water Deliveries Interim Operating Plan for CSSS
Feeder Canal	S-190 Type 1	Hendry	72,324	116	12.2	Western Basins BMP Incentive Program	Tribal Critical Projects CERP Components
L-28	S-140 Type 1	Hendry, Collier & Broward	71,790	89	7.6	Western Basins BMP Incentive Program	Tribal Critical Projects CERP Components

Notes:

* Structure Types: Type 1 – structures that are owned and operated by SFWMD; Type 2 – structures that are not owned but are operated by SFWMD; Type 3 – structures that are not owned or operated by SFWMD but are permitted by SFWMD; and Type 4 – structures that are not owned or operated by SFWMD and not permitted by SFWMD.

** Loads and concentrations calculated as averages over the last eight water years.

The District has executed agreements, where feasible, with local stakeholders (municipalities and water control districts) that require local stakeholders to develop and implement BMPs within the C-11 West, North New River canal, North Springs Improvement District (NSID), and the Wellington/ACME basins. The District has provided in-kind services, expertise, and funding to aid these initiatives. Also, a BMP incentive (grant) program has been initiated within the C-139, L-28, and Feeder Canal basins that will provide funds for landowners who meet specific requirements to implement BMPs. This program is being conducted in cooperation with the Hendry Soil and Water Conservation District and the NRCS. Additional agreements and coordination with agencies and landowners in other basins are being pursued. Upstream water quality monitoring data being collected will help determine the locations for and types of BMPs that should be implemented.

The Comprehensive Everglades Restoration Plan includes several components that will have a direct impact on ESP activities. The ESP staff have coordinated and contributed to the Water Preserve Area (WPA) Feasibility Study, which covers several non-ECP basins, the Wellington/ACME Basin B Project Delivery Team (PDT), and the C-111 Spreader Canal PDT. Additional coordination will occur as planning activities for individual CERP components are initiated. In addition, the ESP personnel are coordinating with the ECP research staff regarding ATTs to determine their applicability in the non-ECP basins and the WPA components.

The District has entered into a cost-sharing agreement with the United States Department of Agriculture-Agricultural Research Service (USDA-ARS) to perform BMP research aimed at protecting groundwater and surface water from agricultural chemicals in southern Miami-Dade County. The primary 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. This research is near completion, and the results and recommendations will be disseminated to the southern Miami-Dade County farm community through the University of Florida's Tropical Research and Education Center (UF-TREC).

The ESP staff have initiated the development of two working groups to address water quality concerns for both the nursery and the equestrian industries in Broward County. The purpose of these working groups is to develop area-specific BMPs for these industries and disseminate this information to the local business owners.

Public Outreach Initiatives

District staff have prepared a draft Public Outreach Plan (POP) for the ESP basins. The POP is designed to be applicable in all the ESP basins, but also specifically includes both new components and enhancements to the existing public outreach initiatives being implemented in the C-11 West basin. The plan also coordinates public outreach initiatives being conducted by other District departments and governmental agencies to maximize resources and target audiences. Additional details of the ESP public outreach initiatives will be provided in this plan. The ESP Website, containing the Urban Stormwater BMPs document and the Turf and Landscape BMP Manual for the C-11 West basin, is now linked to the District's Website. For more information, refer to the District's Website at http://www.sfwmd.gov/org/reg/esp/index.html.

District staff are working with basin stakeholders in Broward County to develop nursery BMPs and equine BMPs that both industries can voluntarily implement. In addition, Broward County staff are working with District staff on development of a countywide Turf and Landscape BMP Manual based on the Turf and Landscape BMP Manual developed specifically for the C-11

West basin, and an enhancement of the District's "Know-the-Flow" seminar to include turf and landscape BMP components.

The "Freddy's Friends" club was reestablished at two elementary schools in the Central Broward Water Control District (CBWCD). Through the club's efforts, educational presentations related to the C-11 West canal and its water quality have reached approximately 2,000 local elementary school students during the period from May 2002 through April 2003.

UPDATES OF ACTIVITIES IN THE EVERGLADES STORMWATER PROGRAM BASINS

WELLINGTON/ACME IMPROVEMENT DISTRICT BASIN

A water quality improvement plan was implemented through a cooperative agreement between the village of Wellington (VOW) and the District. The plan includes implementation of BMPs, operational changes in the local water management system, and development of several alternatives to resolve water quality concerns in the ACME Basin B area. As a result of this agreement, the VOW has implemented a BMP ordinance that addresses the storage, handling, and transport of livestock waste; the proper use, storage, and application of fertilizer; and irrigation practices. The VOW has also implemented several maintenance BMPs within its canal right-of-ways, including raised inlets, sediment sumps, sediment removal, and canal vegetation harvesting. Additionally, upstream monitoring has identified "hotspots" within ACME Basin B. The District will be working with the VOW to develop remedial measures to address these hotspots.

The PDT for the Wellington/ACME Basin B component of CERP has been initiated and is in the Project Implementation Report (PIR) development phase. This phase develops and selects alternatives and completes the federal National Environmental Policy Act (NEPA) process. The information provided in the Basin-Specific Feasibility Study to Achieve Long-Term Water Quality Goals will be used in the PIR phase to accelerate the technical review process. Representatives from both the ESP and the VOW staff are members of the PDT.

The ESP personnel have been coordinating with Surface Water Management staff to encourage additional water quality treatment and BMPs in new Environmental Resource Permit applications. The staffs have been successful in issuing permits that exceed the required water quality treatment criteria, including permits for innovative BMPs designed to reduce discharges of nutrients into the Wellington canal system. In addition, the Environmental Resource Compliance staff have increased its efforts in compliance and enforcement within ACME Basin B.

A new cooperative/cost-share agreement is being drafted that will provide up to $50,000 toward the remediation of "hotspots" within ACME Basin B. The VOW will be designing and implementing the agreed upon BMPs.

BOYNTON FARMS BASIN

The water quality monitoring program in the Boynton Farms basin is continuing. Although access limitations and other boundary issues still exist, surface water quality samples for most of the identified "into" structures have been obtained during times of flow. However, only grab

samples have been collected during these sampling events and no flow measurements are available. The results of these analyses are presented in the Chapter 8B appendices. Recently, the Williams Nursery pump on the north side of the Refuge headquarters property was voluntarily removed.

As previously discussed, the Refuge headquarters property is owned and operated by the USFWS. It 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. However, it is east of the protective levee for WCA-1, has no connection to enable discharging westward to WCA-1, and stands alone as an isolated parcel. The District will continue to offer technical support to help landowners comply with EFA requirements.

NORTH SPRINGS IMPROVEMENT DISTRICT BASIN

The existing cooperative agreement between the District and the NSID continues to be effective in meeting ESP goals in this basin. As previously discussed, the flow-proportional auto-sampler, headwater pressure sensor, and calibrated flow-monitoring equipment with telemetry that monitor the NSID's pump station (NSID1) discharges into WCA-2A are functioning as designed. The surface water quality monitoring program is continuing at NSID1 during times of flow into WCA-2A. Although water quality sampling continued during WY2003, there was a lack of usable water quality data during flow events. This was a direct result of field personnel changes which caused sampling discontinuities and problems with laboratory data being submitted to the District that did not include QA/QC documentation sufficient to meet District standards. These issues are being addressed through ongoing discussions with NSID personnel and the subcontracting laboratory that performed the analyses.

During WY2004, upstream water quality sampling will continue to collect data to indicate areas where sources of phosphorus are potentially higher and to identify hot spots where both public outreach and implementation of stormwater BMPs will be most effective. The agricultural lands in the north sub-basin that had previously showed the highest TP concentrations have mostly been cleared and the development has begun that will convert these lands to residential and recreational (golf course) use. Once this development is complete, an improvement in water quality is expected to occur.

In addition, the District has initiated a contract to perform a hydrologic and hydraulic analysis of the NSID basin through the District's Science and Engineering Support Services (SESS) agreement. As part of this project, a stormwater management model will be developed and several stormwater management options will be evaluated which are designed to maximize water storage and minimize discharges. An initial report is currently scheduled to be completed by April 2004.

During the past year, the NSID has reduced the amount of discharges to the WCA-2A by attenuating flows to L-36N, holding back more water, and instituting an interbasin water transfer to the east. Through operational BMPs such as these, the NSID intends to minimize all required pumping to WCA-2A.

NORTH NEW RIVER CANAL BASIN

The Plantation Acres Improvement District's original agreement, signed in May 2002, was amended in September 2003 to include the determination and implementation of feasible BMPs

in addition to the existing monitoring program. The District is still pursuing an agreement with the city of Sunrise to implement BMPs, with an emphasis on public education. The sampling program for the Bonaventure Development District sub-basin within the city of Weston is continuing, and District staff have met with city officials to begin the formulation of a BMP program. The Old Plantation Water Control District's original agreement, signed in September 2001, was amended in July 2003 to include determination and implementation of appropriate BMPs and public education initiatives. The G-123 pump station was not operated during WY2003. Therefore, there were no TP loads discharged into the EPA during this period.

C-11 WEST BASIN

The District has continued to work closely with the Indian Trace Development District, Central Broward Water Control District, and the South Broward Drainage District to implement the cooperative/cost-share water quality monitoring and improvement agreements within the C-11 West basin. The purpose of these agreements is consistent with the recommendation of the Conceptual Plan to Achieving Long-Term Water Quality Goals to implement BMPs within the basin.

The District has hired a consultant to evaluate the stormwater treatment potential of the proposed Western C-11 impoundment. Also, as recommended by the Conceptual Plan to Achieving Long-Term Water Quality Goals, the District will evaluate the feasibility of using the levee seepage management area between I-75 and the C-11 West canal as a treatment area for excess stormwater inflow that cannot be accommodated within the Western C-11 impoundment. Both evaluations are expected to be completed by March 2004.

Pumping station S-9A, phase I of the Western C-11 Basin Critical Restoration Project, was completed in late 2002, and an auto-sampler was installed. The schedule for completion of the divide structure S-381, phase II of the Western C-11 Basin Critical Restoration Project, has been delayed until late 2004 due to the redesign of the structure.

C-111 BASIN

The U.S. Army Corps of Engineers (USACE) has submitted an application to the FDEP for an Environmental Resource Permit (ERP) to operate the S-332B, S-332C, and S-332D structures, in accordance with the Interim Operating Plan (IOP) for the Cape Sable Seaside Sparrow (CSSS). The FDEP has issued an eighth amendment to the Emergency Order (EO #8) allowing operation of the structures to continue. It is anticipated that the ERP operational permit will be issued prior to the expiration of EO #8 on January 31, 2004. The monitoring plan outlined in EO #8 is currently being implemented in the C-111 Basin and will be incorporated into the permit when issued.

The District is currently developing an agreement with the UF-TREC to perform BMP research aimed at protecting groundwater and surface water from agricultural chemicals in southern Miami-Dade County. The primary goal of this research will be to determine the efficacy of zeolite as a soil amendment on water holding capacity and movement of phosphorus, ammonium, and nitrate in agricultural soils in the C-111 basin. The results and recommendations will be disseminated to the southern Miami-Dade County farm community through UF-TREC. As discussed in the "Water Quality Improvement Plans" section of this chapter, research in this area on pesticide and nutrient transport and groundcover BMPs continues to occur.

L-28 BASIN

The ESP staff continue to work with the Seminole Indian Tribe's Water Resource Management Department on a joint project with the District's Environmental Monitoring and Assessment (EMA) Department and the U.S. Geological Survey (USGS). The project includes the installation of ultrasonic velocity meters (UVMs) to estimate flow, auto-samplers to collect composite water quality samples, and grab samples at select locations based on watershed boundaries, land use, and discharge quantities. The automatic sampler onsite at the S-140 structure was converted from time-proportional to flow-proportional sampling on December 24, 2002. A canal that will convey the tribe's established entitlement of water (47,000 ac-ft per year) via the recently constructed S-409 pump station has now been completed.

The NRCS has assisted with the completion of conservation plans for the reservations of both the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida. Both reservations are located in the L-28 basin. Both tribes have voluntarily completed the NRCS conservation plans and implementation of on-farm BMPs. The ESP staff will continue to include the development and implementation of BMPs for row crops, citrus, beef cattle, and other agricultural activities in the basin. Water quality monitoring will gauge the effectiveness of these BMPs and indicate where farm conservation plans might need adjustment.

To maximize basin participation and provide incentives to improve water quality, the District has proposed a volunteer program of BMP implementation for the three western basins (Feeder Canal, L-28, and C-139 basins). This program was funded with $100,000 in FY2002; additional requests of $100,000 each year for the next two years will provide a total funding of $300,000. Future funding is dependent on budget approval by the District's governing board. The program has conducted informational workshops, informal site visits, and the cost sharing of BMPs while coordinating closely with landowners to prepare BMP plans for implementation. The District has entered into a cooperative agreement with the Hendry Soil and Water Board to disburse funds to landowners upon their implementation of recommended BMP plans. The NRCS is providing technical oversight for the program. Three projects were selected in the Fiscal Year 2003 (FY2003). These include Toney Strand, a regional BMP project in the Feeder Canal basin; Howell Farms, a beef cattle and row crop operation in the Feeder Canal basin; and the J-7 Ranch, a beef cattle and row crop operation in the C-139 basin. Each of these project areas received initial funding for BMP projects. The FY2004 program sign-up period extended through August 14, 2003. Additional water quality projects are being selected for implementation during the current fiscal year. The District anticipates that this program will result in an immediate reduction in nutrient loads entering the EPA.

FEEDER CANAL BASIN

The ESP staff continue to work with the Seminole Tribe's Water Resource Management Department on a joint project with the District's EMA Department and the USGS. This project includes the installation of UVMs to estimate flow, auto-samplers to collect composite water quality, and grab samples at select locations based on watershed boundaries, land use, and discharge quantities. The automatic sampler currently on-site at the S-190 structure is scheduled to be converted from time sampling to flow-proportional sampling within the coming year. The Seminole Tribe's established entitlement of water (47,000 ac-ft per year) is to be conveyed via the recently constructed S-409 pump station. The operation of the S-190 structure, which is the main discharge location for the Feeder Canal basin, will be coordinated with flows from the entitlement waters.

The District has proposed a volunteer program for the three western basins (Feeder Canal, L-28, and C-139 basins), discussed in the previous section, to maximize basin participation and provide incentives to improve water quality. This program is also being implemented in this basin.

The District, in partnership with the NRCS and other government agencies, shares information and provides support to local landowners in developing voluntary BMPs. Workshops that provide education about BMPs, available landowner assistance programs, and guidance in developing on-farm conservation plans is expected to be ongoing. The District will continue to evaluate water quality within this basin by initiating a sampling program for upstream discharges to the S-190. The objective of these data will be either to confirm the level of success from present BMPs or highlight the need for additional BMPs.

FINDINGS

The portion of the District's water quality monitoring program that has been implemented as a result of the EFA and the non-ECP permit indicates that TP concentrations are greater than 10 µg/L in seven of the eight ESP basins. Except for those elevated TP levels, the quality of water discharging into the EPA is generally acceptable. With a potential TP numerical standard of 10 µg/L, these seven basins will be required to implement appropriate water quality improvement measures to meet the anticipated standard. 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 initial reviews of water quality monitoring programs upstream of the direct "into" structures, it is necessary to revise existing programs and implement new programs where none exist to better characterize water quality within the basins. The District has implemented revised monitoring programs within the Wellington/ACME, Feeder Canal, C-11 West, North New River Canal, and North Springs Improvement District basins. 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.

Extensive coordination with local governments, the "298" special districts, the Miccosukee and Seminole Indian tribes, and other state and federal agencies will continue to be essential for achieving the goals and requirements of the EFA, the non-ECP permit, and the future long-term compliance permit. Consequently, the District has conducted several meetings to foster coordination within the basins. The District has also executed several cooperative/cost-share agreements with local governments to implement water quality improvement plans involving 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 efforts with CERP, ongoing critical projects within non-ECP basins, the Conceptual Plan for Achieving Long-Term Water Quality Goals in the EPA (discussed in Chapter 8A), and local governments are also facilitating the development of long-term solutions for achieving statewide water quality standards.

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