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INTRODUCTION

This document presents the legal background and methods used by staff at the South Florida Water Management District (SFWMD) to monitor and report water quality conditions associated with structures in the C-111 Basin which discharge directly into Everglades National Park (Park). The monitoring and reporting requirements are mandated by either the federal Settlement Agreement (US vs. SFWMD, et al., No. 88-1886-Civ-Hoeveler, United States District Court for the Southern District of Florida) dated July 26, 1991, or the Non-Everglades Construction Project (Non-ECP) Permit (DEP No. 06-502590709) issued to the SFWMD by the Department of Environmental Protection (DEP) on April 20, 1998.

LEGAL BACKGROUND

Passage of the Everglades Forever Act (EFA) in 1994, required the establishment of a numeric phosphorus criterion for the Everglades Protection Area (EPA). Section 4(e) of the EFA, indicates that the phosphorus criterion would be established based on research results targeted at numerically interpreting the Class III narrative nutrient criterion necessary to meet state water quality standards in the EPA. The phosphorus criterion will be 10 parts per billion (ppb) in the EPA in the event that DEP does not adopt by rule a research established criterion by December 31, 2003.

The method of determining compliance with the phosphorus criterion in the Park is specifically indicated in section 4(e), stating the following:

- For the Everglades National Park (Park) and the Arthur R. Marshall Loxahatchee National Wildlife Refuge (Refuge), the method for measuring compliance with the phosphorus criterion shall be in a manner consistent with Appendices A and B, respectively of the settlement agreement dated July 26, 1991, entered in case No. 88-1886-Civ-Hoeveler, United States District Court for the Southern District of Florida, that recognizes and provides for incorporation of relevant research.

In the settlement agreement, Appendix A refers to the phosphorus limits for the combined inflow to Shark River Slough and the phosphorus limits for the combined inflow to Taylor Slough (S-332 and S-175) and the Coastal Basins (S-18C) as attachments I and II, respectively. This document on C-111 water quality monitoring does not cover Shark River Slough since it is not a part of the C-111 basin.

As required by Section 9(k) of the EFA, the SFWMD obtained a permit (Non-ECP permit) from the DEP to operate and maintain water management structures within the control of the District which discharge into, within, and from the EPA and are not included in the Everglades Construction Project. The Non-ECP permit includes structures S-332, S-175, and S-18C.

The EFA further states in section 10 that by December 31, 2006, the water delivered to the EPA will achieve compliance with all state water quality standards, including the phosphorus criterion, in all areas of the EPA.

Therefore, the SFWMD has utilized the settlement agreement mechanisms for total phosphorus to conduct monitoring and reporting of the results towards achieving compliance with state water quality standards in the C-111 basin discharges to Taylor Slough and the Coastal Basins. The Non-ECP permit requirements are utilized for all

other water quality parameters that have numeric Class III criteria as stated in Section 62-302.530, F.A.C.

Settlement Agreement Requirements

There are specific requirements in the settlement agreement governing water quality compliance issues associated with total phosphorus. The relevant parts for the C-111 basin are as follows:

- The state parties (DEP and SFWMD) must take such action as is necessary so that waters delivered to the Park achieve state water quality standards, including Class III standards, by December 31, 2006.
- The state parties commit to achieving interim phosphorus concentration limits and levels by October 1, 2003, and long-term limits and levels by December 31, 2006.

Both an interim and long-term limit is specified for Shark River Slough. However, only a long-term limit is specified for Taylor Slough and the Coastal Basins. In the agreement it states:

- The long-term concentration limit for Taylor Slough (S-332 and S-175) and the Coastal Basins (S-18C) is 11 ppb.

Compliance with the long-term total phosphorus concentration limits and levels for the Park is determined in accordance with the methodologies and procedures established in the agreement, and in Appendix A. If a conflict arises in the methods or procedures between the agreement and Appendices, the Appendices prevail.

The agreement further stipulates how the Corps is to conduct matters relating to water quality issues associated with any new discharges to the park resulting from the construction of new structures, as follows:

- The Corps is required to apply to FDEP for stormwater management permit(s) pursuant to Section 373.416, F.S., for the construction and operation of new structures which may affect the Park or Refuge, and shall comply with reasonable permit terms and conditions relating to the abatement of the water quality problems addressed in the agreement.
- New structures to be designed and constructed by the Corps shall be designed and constructed in accordance with the agreement.
- Future projects designed by the United States which affect the Park or Refuge shall consider the environmental and water quality commitments set forth in the agreement.

Attachment II of Appendix A of the settlement agreement discusses the discharge limits and OFW standards for Taylor Slough and Coastal Basins. This section defines how the total phosphorus compliance calculations are made, provides direction on adding new structures to the calculation, and states:

- The basin flow is defined as the total flow through structures S-332, S-175, S-18C, plus any new release points from this basin in the future.

All total phosphorus data should be sampled on the same day since a spatial average from the data collected at each structure is used for a compliance calculation. All new structures should also have a consistent monitoring regime to allow for compliance calculations to be made. This intent was made clear earlier this year, when the TOC

agreed with SFWMD that monitoring activities needed to be initiated at the S-355A and S-355B structures discharging into the Park through northeast Shark River Slough. These structures, and the S-332D structure, are not directly under the control of the SFWMD, yet the water quality monitoring program must conform to settlement agreement requirements for compliance calculations.

REPORTING MECHANISMS

Everglades Consolidated Report

The Non-ECP Permit requires that all data collected pursuant to the permit be reported on an annual basis. The annual report consists of an evaluation of the data (physical parameters, nutrients, mercury, major ions, trace metals, pesticides in water and sediments, and priority pollutants), a determination if excursions from Class III numeric criterion have occurred, and documentation of the EFA requirement to achieve state water quality standards by December 31, 2006. All of the data collected by the SFWMD pursuant to the Non-ECP permit is evaluated on a water year basis (May 1 – April 30).

In order to improve efficiencies associated with reporting the annual data for the Non-ECP permit, the SFWMD consolidated the permit reporting requirements into the annual Everglades Consolidated Report. The annual report is utilized to report progress toward compliance with the EFA requirement to achieve state water quality standards by December 31, 2006 for discharges to the EPA, which includes the C-111 basin. Three annual reports have been issued to date in accordance with the Non-ECP Permit, and these include:

1. Non-ECP Structures Annual Monitoring Report, April 20, 1999
2. Everglades Consolidated Report, January 1, 2000
 - Chapters 4, 7, and 11
3. Everglades Consolidated Report, January 1, 2001
 - Chapters 7 and 11

The Everglades Consolidated Reports can be found on the internet at:

<http://www.sfwmd.gov/org/ema/everglades/index.html>

Water Quality Conditions Report

On a quarterly basis, the SFWMD reports on concentration levels for total phosphorus for Taylor Slough and the Coastal Basins in a SFWMD publication entitled the *Environmental Conditions Update*, formerly called *Water Quality Conditions Report*. The methodology for tracking compliance with the long-term limit stipulated in the settlement agreement forms the basis for the Taylor Slough and Coastal Basins analysis. The latest issue of this report can be found on the internet at:

<http://www.sfwmd.gov/org/ema/ecu/>

Everglades Technical Oversight Committee Reports

The TOC meets on a quarterly basis to review the ongoing monitoring efforts associated with the settlement agreement. The total phosphorus data collected for the Refuge, Shark River Slough, and Taylor Slough/Coastal Basins are compared to the interim and long-term compliance limits. The compliance water year is October 1 to September 30. At the TOC meetings, the members (SFWMD, DEP, CORPS, PARK, FWS) review the data and determine if progress is being made toward achieving compliance with the phosphorus limits.

The original compliance limit calculation for Taylor Slough and Coastal Basins required total phosphorus data to be combined as a flow-weighted mean concentration for the S-332, S-175, and S-18C structures. At the September 7, 2000, TOC meeting, a determination was made by TOC members to designate the upstream S-332D and S-174 structures, along with the S-18C structure, as the new compliance structures for calculation purposes.

WATER QUALITY COLLECTION

The SFWMD adheres to the regulatory requirements of the DEP as outlined in the Non-ECP Permit, and ensures that all necessary water quality monitoring efforts required by the settlement agreement are coordinated with Non-ECP sampling efforts. In general, the Non-ECP permit dictates the collection frequency and parameters to be sampled. The Non-ECP permit sampling frequencies for water quality parameters is shown in Table 1.

Table 1. Non-ECP sampling frequencies

Non-ECP PERMIT STRUCTURE	WATER QUALITY SAMPLING SITE	WATER QUALITY MONITORING SCHEDULE							WATER QUALITY COMMENTS
		Physical	Nutrients	Major Ions	Trace Metals	Pesticides Water	Pesticides Sediment	Priority Pollutants	
S-332	S332	BWF/M	BWF/M	QTR	SA	QTR	SA		Settlement agreement site
S-175	S175	BWF/M	BWF/M	QTR	SA				Settlement agreement site
S-18C	S18C	BWF/M	BWF/M	QTR	SA	QTR	SA	N/A	Settlement agreement site
S-174 +	S176	BWF/M	BWF/M	QTR	SA	QTR	SA	N/A	
S-177 +	S177	BWF/M	BWF/M	QTR	SA	QTR	SA	N/A	
S-178 +	S178	BWF/M	BWF/M	QTR	SA	QTR	SA	N/A	
S-331 +, S-173	S331-173	BWF/M	BWF/M	QTR	SA	QTR	SA	N/A	S173 is not listed in Permit, but is adjacent to and flows in same direction as S331

Note:

1) Water quality sample site is located on upstream side of permitted structure, unless otherwise noted with different representative sampling location

2) Structure names with a "+" are upstream of Non-ECP INTO structures and are additional monitoring locations

3) Table Legend:

BWF/M = Biweekly if Flowing/Otherwise Monthly

BWF = Biweekly if Flowing

QTR = Quarterly

QTRF = Quarterly if Flowing

SA = Semiannually

SAF = Semiannually if Flowing

1 WS - 1 DS = 1 Wet Season and 1 Dry Season

NA = Sampling for priority pollutants was required at these sites originally, however, a Non-ECP permit modification request allowed priority pollutants to be dropped from the sampling regime.

Water quality sampling for total phosphorus compliance in inflows to Taylor Slough is conducted biweekly on the same date. The TOC requested that both the old (S332 and S175) and the new (S332D and S174) compliance monitoring structures be sampled for

one year to determine if the initial increased total phosphorus concentrations observed at the new structures persist over time.

The tables on the following page provide a recommended monitoring regime, including parameters to be sampled and frequency of collection. The minimum criteria required for water quality monitoring efforts is also listed. It is recommended that data collected for the first three years of the proposed monitoring program be utilized as a baseline data set. A location of the old (S332 and S175) and new (S332D, S174, and S18C) settlement agreement monitoring sites, along with the proposed new discharge sites (S332A, S332B, S332C) into the Park are shown in Figure 1.

PROPOSED C-111 WATER QUALITY MONITORING PROGRAM**LEGENDS:****FREQUENCY:**

SA	SEMIANNUAL
BWF/M	BIWEEKLY IF FLOWING, OTHERWISE MONTHLY
W	WEEKLY
QTR	QUARTERLY

PARAMETERS:

Detection limits need to be determined and listed for pesticides

PHYSICAL	Temperature, Specific Conductivity, pH, Dissolved Oxygen, Turbidity, Total Suspended Solids, Color, Alkalinity, (Total Dissolved Solids Sampled QTR Only)
NUTRIENT	TKN, OPO4, NO2, NOX, NH4, (SO4, SIO4 Sampled QTR Only)
MERCURY	Ultra trace total mercury, ultra trace methyl mercury
TRACE METALS	CD, CU, ZN
MAJOR IONS	CA, MG, NA, K, (CL Sampled BWF/M), FE
PESTICIDES – WATER	Chlorinated acids: 2,4-D; 2,4,5-T; 2,4,5-TP Organochlorine compounds: Aldrin, BHC Alpha, BHC Beta, BHC Gamma, BHC Delta, Carbophenothion, Chlordane Tech, Chlorothalonil, Cypermethrin, Dicofol, Dieldrin, DDD-P,P'; DDE-P,P'; DDT-P,P'; Endosulfan Alpha, Endosulfan Beta, Endosulfan Sulfate, Endrin, Endrin Aldehyde,, Heptachlor, Epoxide, Methoxychlor, Mirex, Permethrin, Toxaphene, Trifluralin PCB's:1016, 1221, 1232, 1242, 1248, 1254,1260 Organophosphorus & nitrogen compounds: Alachlor, Ametryn, Atrazine, Atrazine Desethyl, Atrazine Deisopropyl, Azinphos Methyl, Bromacil, Butylate, Chlorpyrifos Ethyl, Chlorpyrifos Methyl, Demeton, Diazinon, Disulfoton, Ethion, Ethoprop, Fenamiphos, Fonofos, Hexazinone, Malathion, Metalaxyl, Metolachlor, Metribuzin, Mevinphos, Naled, Norflurazon, Parathion Ethyl, Parathion Methyl, Phorate, Prometryn, Simazine Urea and other Pesticides: Diuron, Imidacloprid, Linuron

PESTICIDES - SEDIMENT	Chlorinated acids: 2,4-D; 2,4,5-T; 2,4,5-TP Organochlorine compounds: Aldrin, BHC Alpha, BHC Beta, BHC Gamma, BHC Delta, Carbophenothion, Chlordane Tech, Chlorothalonil, Cypermethrin, Dicolfol, Dieldrin, DDD-P,P'; DDE-P,P'; DDT-P,P'; Endosulfan Alpha, Endosulfan Beta, Endosulfan Sulfate, Endrin, Endrin Aldehyde, Heptachlor, Epoxide, Methoxychlor, Mirex, Permethrin, Toxaphene, Trifluralin PCB's: 1016, 1221, 1232, 1242, 1248, 1254, 1260 Organophosphorus & nitrogen compounds: Alachlor, Ametryn, Atrazine, Atrazine Desethyl, Atrazine Deisoprpyl, Azinphos Methyl, Bromacil, Butylate, Chlorpyrifos Ethyl, Chlorpyrifos Methyl, Demeton, Diazinon, Disulfoton, Ethion, Ethoprop, Fenamiphos, Fonofos, Hexazinone, Malathion, Metalaxyl, Metolachlor, Metribuzin, Mevinphos, Naled, Norflurazon, Parathion Ethyl, Parathion Methyl, Phorate, Prometryn, Simazine Urea and other Pesticides: Diuron, Imidacloprid, Linuron
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LOCATION AND FREQUENCY:*Depth of autosampler intake and depths of grabs to be determined*

STRUCTURE NUMBER	PARAMETER	SAMPLE TYPE	FREQUENCY
S-332A	Total Phosphorus	Autosampler	Daily/discrete
	Physical	Grab	BWF/M
	Nutrients	"	BWF/M
	Major Ions	"	QTR
	Pesticides – Water	"	QTR
	Pesticides - Sediment	"	SA
	Mercury	"	QTR
	Trace Metals	"	SA
S-332B	Total Phosphorus	Autosampler	Daily
	Physical	Grab	BWF/M
	Nutrients	"	BWF/M
	Major Ions	"	QTR
	Pesticides – Water	"	QTR
	Pesticides - Sediment	"	SA
	Mercury	"	QTR
	Trace Metals	"	SA
S-332C	Total Phosphorus	Autosampler	Daily/discrete
	Physical	Grab	BWF/M
	Nutrients	"	BWF/M
	Major Ions	"	QTR
	Pesticides – Water	"	QTR
	Pesticides - Sediment	"	SA
	Mercury	"	QTR
	Trace Metals	"	SA
S-332D	Total Phosphorus	Autosampler	Daily/discrete
	Physical	Grab	BWF/M
	Nutrients	"	BWF/M
	Major Ions	"	QTR
	Pesticides – Water	"	QTR

	Pesticides - Sediment	“	SA
	Mercury	“	QTR
	Trace Metals	“	SA

MINIMUM CRITERIA FOR WATER QUALITY MONITORING**GENERAL:**

- Quality Assurance Plan approved by Department of Health
- Must be willing to subject to unannounced audits
- Must have documented Standard Operating Procedures for all lab and field procedures

FIELD COLLECTION:

- Experience with sample collection
- Internal field audits

LABORATORY:

- Participate in Blind QC studies
- Working on/ or approval through National Environmental Laboratory Accreditation Program (NELAP)
- Conduct internal audits
- Provide data in certain specified format

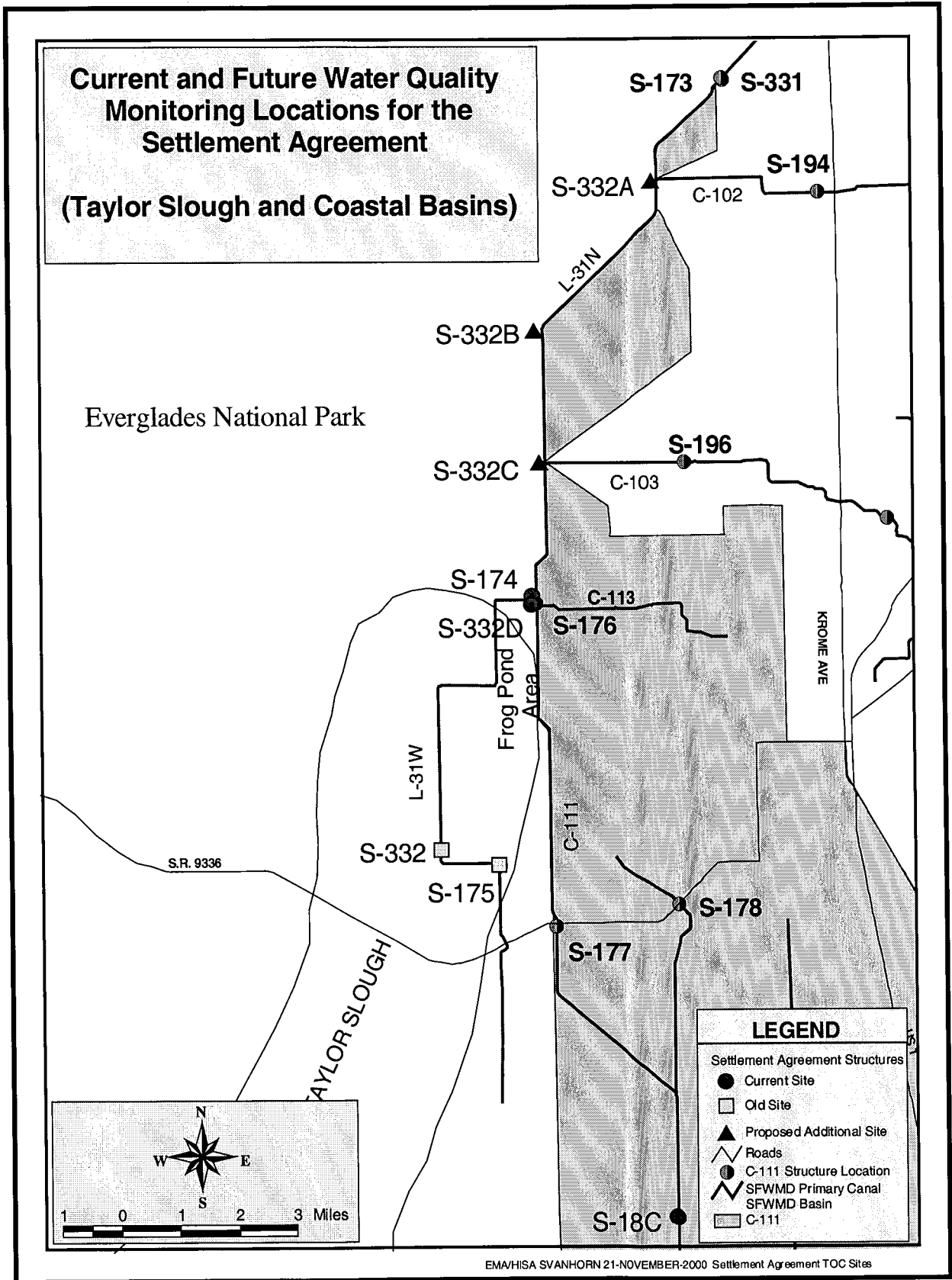


Figure 1. Settlement Agreement Monitoring Sites