S-12D Flow-way Maintenance Plan

March 2006

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INTRODUCTION

Plan Overview

The S-12D Flow-way Maintenance Plan is a plan to improve the conveyance capacity of the regulatory outlets for Water Conservation Area 3A (WCA-3A) through removal of exotic vegetation and maintenance dredging in the upstream inflow channel and the distribution canal downstream of the S-12D structure. The anticipated start date for this Plan is 1 November 2006 (see Appendix I).

Plan Background

The S-12 system consists of four weir-type spillways (S-12A-D) located along U.S. 41 (Tamiami Trail), between the L-67 canal and 40-Mile Bend. These structures serve as the primary regulatory outlets for WCA-3A, delivering flows south into Shark River Slough within Everglades National Park (ENP). A portion of the S-12 deliveries move directly south to the Park through getaway channels excavated through the Old Tamiami Trail. The remaining flows move east and west via the Old Tamiami canal before moving south into the Park through box culverts. This distribution system currently contains significant accumulations of sediment and aquatic vegetation, which is contributing to reduced conveyance capacities. Table 1 shows the percent reduction in flow at each of the S-12 structures between 1988 and 2000. Numerous onsite inspections of the S-12D structure have confirmed the existence of accumulated sediment, both in the upstream inflow channel and the downstream distribution canal.

Table 1. Flow reductions in the S-12 system, 1988-2000

Structure	1988 Rating (cfs)	2000 Rating (cfs)	Change (cfs)	Reduction* (% Change)
S-12A	866	648	218	25%
S-12B	769	518	251	33%
S-12C	1291	948	343	27%
S-12D	2343	1031	1312	56%
Total	5269	3145	2124	40%

*Percent reduction in flow at 10.5' NGVD with gates fully opened

Recent bathymetric analysis confirms the accumulation of sediment in the upstream and down stream portions of S-12D. Appendix III is the baseline (January 2006) bathymetric survey for the project area. Based on this survey information and the as-built plans produced in 1963 (see Figure 1), there is an estimated 7000 cubic yards (dewatered volume) of accumulated material in the immediate upstream and downstream sections of the structure.

Given that the long term forecast (5 to 10 years) is for wetter than normal wet seasons (on average) in combination with the closures of S-12A, S-12B, and S-12C required by the Interim Operational Plan Protection for the Projection of the Cape Sable Seaside Sparrow, there is clearly a need for additional discharge capacity from WCA-3A to prevent the long durations of water at depth detrimental to tree islands.

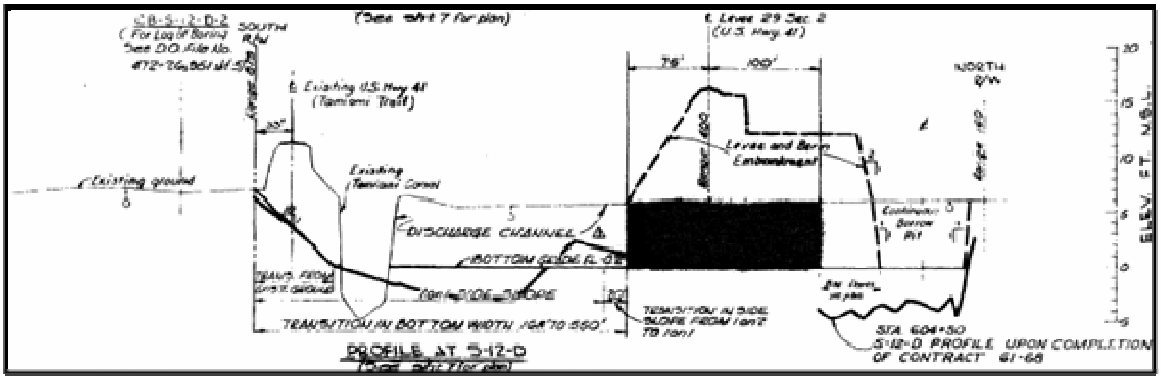

Figure 1. S-12D Cross Section as shown in the USACE 1963 as-built surveys

Plan Area

The Plan area (Figure 2) includes the upstream and downstream channels of S-12D and the distribution canal, which extends south of S-12D to the northern boundary of ENP (located 33' south of the centerline of the Old Tamiami Trail), east to S-12E and west to the FP&L ROW access road, formerly the site of the S-12F structure. The east-west span of the Plan extends approximately 2 miles. The Plan area also includes the north and south slopes of Old Tamiami Trail from S-12E, west to the FP&L cross over, which will be cleared of all invasive, non-native vegetation.

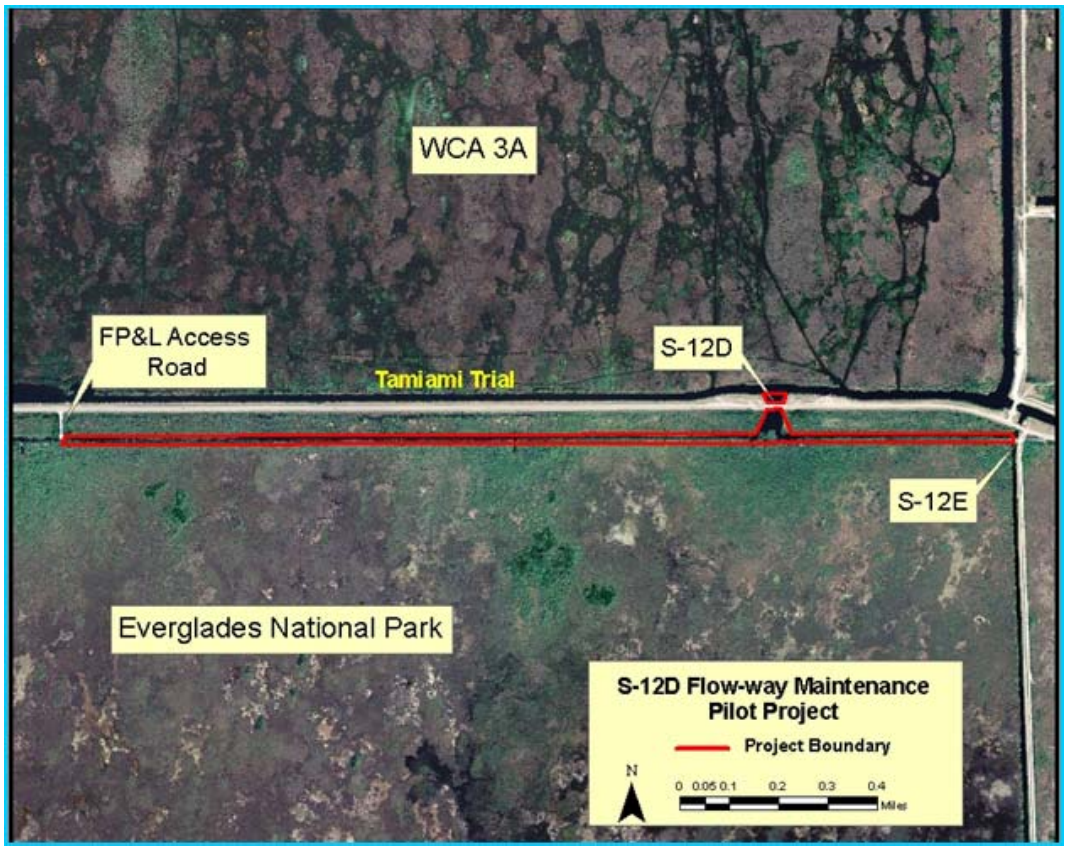

Figure 2. Plan boundary.

Plan Goal
Improve the flow conveyance through the S-12 WCA-3A regulatory outlets. This goal was defined in the he Fish and Wildlife Service's (Service) amendment to the February 19, 1999, biological opinion for the U.S. Army Corps of Engineers Interim Operational Plan (IOP) for Protection of the Cape Sable Seaside Sparrow, dated March 28, 2002. In the section entitled Reasonable and Prudent Measures, Terms and Conditions on page 54 the following is detailed:

The Corps must, in cooperation with the SFWMD, Service, ENP, FWC, Miccosukee Tribe, and other appropriate groups, explore ways to increase outflow capacity of the S-333, S-12C, and S-12D structures that will alleviate high water in WCA-3A without increasing harm to sparrow habitats.

Plan Objectives

- Complete maintenance removal of vegetation within the Old Tamiami Canal from S-12E to the FP&L access road;
- Complete treatment and removal of invasive, non-native vegetation growing along the north and south bank of Old Tamiami Trail from S-12E to the FP&L access road;
- Complete maintenance dredging in the upstream and downstream channels of S-12D, in conformance with the design specifications for this flow-way;
- Collect and analyze pre- and post-maintenance flow measurements at S-12D to determine Plan benefits to conveyance;
- Monitor water quality and turbidity during maintenance dreding to evaluate potential downstream water quality impacts to ENP;
- Prepare a final report with recommendations on the feasibility of additional canal maintenance at the S-12A, B, & C structures.

MAINTENANCE PROCEDURES

Preliminary Work
A right-of-way analysis was conducted for the Plan area to identify legal boundaries and affected interests. Right-of-way mapping and Plan boundary surveying is completed for the Plan area. Additionally, the defined dredging boundaries will be field marked to assist contractors.

Bathymetric data was collected during January 2006. Ten cross-scectional transects were surveyed for bottom depth, distributed along the north-south extent of the S-12D dredging area (Figure 2). These measurements were collected using manual bar depth readings. In addition, the centerline depth of the east-west distribution ditch was surveyed using a dual-frequency depth sounder to allow for a more detailed determination of sediment depths. Cross section profiles were also measured for the eastern span of the distribution canal (from S-12D to S-12E) to ensure accessibility for barges. A comparison of survey results before and after maintenance dredging will be used to determine the changes in bathymetry resulting from the dredging.

District and ENP staff conducted a joint site visit in January 2006 to evaluate vegetation within the Plan area. Plant communities were visually surveyed, and desirable vegetation that is to be avoided during the maintenance process was identified. Based on this site inspection, Brazilian pepper is the most common invasive plant species present. It is found in scattered patches along the Old Tamiami Trail levee and densely concentrated at the spoil sites created from excavation of the Trail south of S-12D. District and ENP staff agreed that this vegetation would be removed using the Old Tamiami Trail as an access point for contractors.

Vegetation Removal

The primary vegetation maintenance activities for this Plan will involve removal of emergent vegetation growing within the S-12D stilling basin and the east-west distribution canal. Woody vegetation (primarily Carolina willow) that is either rooted within or growing into the canal will be removed. Herbaceous vegetation and floating tussocks will also be removed, the largest concentration of which being directly south of S-12D. Since vegetation management activities in the distribution canal will be conducted from a barge, it will be necessary to maintain stages within the distribution canal above the minimal navigable depth. The minimum stage will be based on the draft of the contractor's barge and existing bathymetric data.

As stated above, non-native, invasive vegetation will be removed (and stumps treated with herbicide) on the north and south bank of the Old Tamiami Trail along the entire east-west span of the Plan area. Work in this area will proceed with an emphasis on minimizing damage to native vegetation. In cases where mechanical removal of invasive plants will result in excessive damage to non-target vegetation, trees will be left in place and chemically treated using basal bark herbicide applications.

Woody vegetation debris will be removed from the site daily and deposited at the temporary vegetation debris disposal site located north of S-333 (Figure 3). Prior to Plan completion, all vegetation debris will be removed from the stockpile area and disposed of at an appropriate landfill. Aquatic vegetation removed during dredging will be stockpiled with the dredge spoil at a different contained location (see below).

Figure 3. Temporary vegetation stockpiling and dredge spoil stockpile locations.

Sediment Removal

Dredging will involve excavation of accumulated sediment and vegetation within the boundaries of the dredging area as shown on Figure 4. During the dredging operations, all S-12D gates will be closed.

Sediment removal on the downstream side of the structure will be accomplished by mechanical dredging from a barge. The dredging barge will gain access via the distribution canal extending east to the S-12E structure. This launching area is the closest available location that has adequate equipment access and avoids all wetland impacts. Fill will be placed on upland portions of the dirt access road adjacent to the L-67 extension levee to build the crane pad for barge deployment. Prior to constructing the crane pad, the boundaries for fill placement will be marked by a trained wetland delineator to ensure that no jurisdictional wetlands will be filled as a result of this Plan. Standard construction turbidity control measures will be utilized to minimize turbidity in stormwater run-off. Fill will be obtained from the existing spoils site just north of S-333.

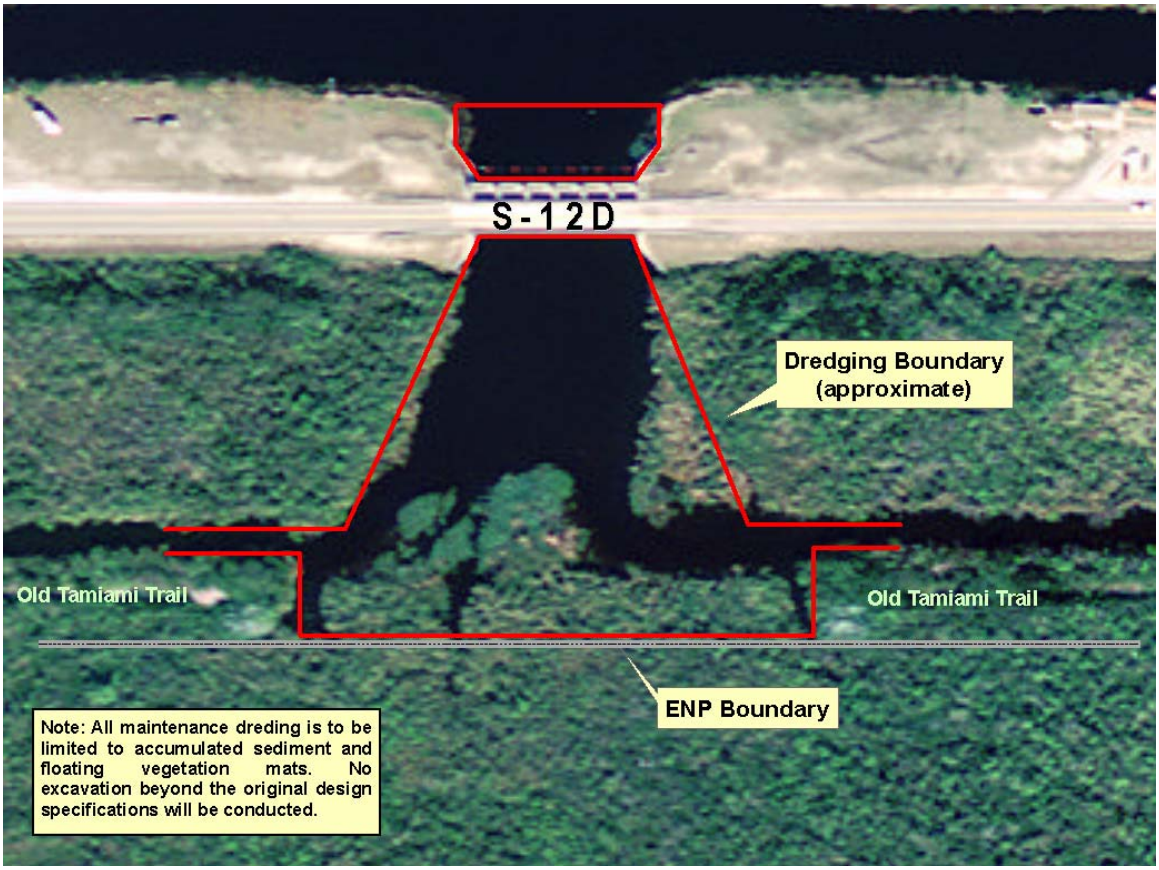

Figure 4. Approximate maintenance dredging boundary.

Loaded barges will transport spoil to the launch point. Dump trucks will then carry the spoil material to the stockpile area shown on Figure 3. The crane pad will be left in place for use in future maintenance work efforts.

A significant challenge to this Plan involves maintaining navigable stages in the dredging area and distribution ditch while limiting downstream water quality impacts. Based on currently available information, when stages are at the minimum level for barge navigation, there will continue to be some surface water connection between the stilling basin and the ENP. To address potential downstream water quality impacts, a continuous Aquadam® barrier will be installed at the downstream limits of the dredging area, and will extend across the entire getaway channel (see Figures 4 & 5). Stop logs will also be placed in the S-346 culverts to minimize flows south along the L-67 extension canal. The S12-D tailwater stages will then the maintained between the minimum navigable level for barges and the maximum surface water gradient across the Aquadam® barrier. These stages will be determined upon completion of the initial bathymetric analysis and consultation with District water managers.

Figure 4. Aquadam® installation along a wetland boundary

Within one month of completing dredging operations, a second bathymetric survey will be conducted for the entire Plan area. The second survey will follow the same methods discussed above.

PLAN EVALUATION

Flow monitoring

Currently, the USGS collects bi-weekly flow measurements at S-12D when the gates are fully open through contract with the USACE. Measurements are taken using the floating stick method. Rating curves are then generated for the structure. Flow measurements were made throughout the 2005 wet season during period when the gates were fully open. Flow measurement will be taken during the 2007 wet season (gates fully open) and used to assess the maintenance work.

Water Quality Monitoring

Currently, the District monitors water quality at the headwaters of S-12D through a contract with Miami/Dade County. Samples are collected biweekly if S-12D is flowing, otherwise samples are collected monthly. Sampling includes D.O., pH, conductivity, temperature, TP, TKN, NOX, TSS, and turbidity. To evaluate potential water quality impacts of canal maintenance activities, the samples will be collected at S-12D and downstream of the work area at three additional stations: immediately downstream of the Aquadam® barrier, and at the culverts near the east and west end of the Plan area (Figure 4). The parameter list at all four stations will be physical parameters, TP, TKN, NOX, TSS, and Turbidity. A baseline sample will be taken at all stations prior to start of canal maintenance. Results of the water quality analysis will be available in DBHYDRO, typically two weeks after sample collection. Features of the water quality monitoring plan include the following:

- Conductivity probes will be installed immediately downstream of maintenance Plan limits to shorten response time to any water quality degradation.
- Daily turbidity monitoring will be conducted to identify water quality problems.
- Monitoring will be extended 4 weeks after initiation of the first post-maintenance flow event. At the end of this monitoring period, an additional sampling round will be collected during the next storm event to occur.
- Water quality samples will be collected by the District during no flow conditions
- A site manager will be assigned to the Plan to oversee implementation of water quality BMPs and to make daily observations of turbidity conditions.

Appendix II includes a complete scope of the proposed water quality monitoring plan for this maintenance Plan.

Upon completion of the Plan, collected information will be compiled and analyzed. District staff will prepare a final report on the plan with recommendations on the feasibility of additional canal maintenance at the S-12A, B, & C structures.

In addition to weekly water quality monitoring, the dredging contract will require the contractor to submit a turbidity monitoring plan and conduct daily turbidity monitoring. Locations for the turbidity sample collection will be specified in the completed turbidity monitoring plan.

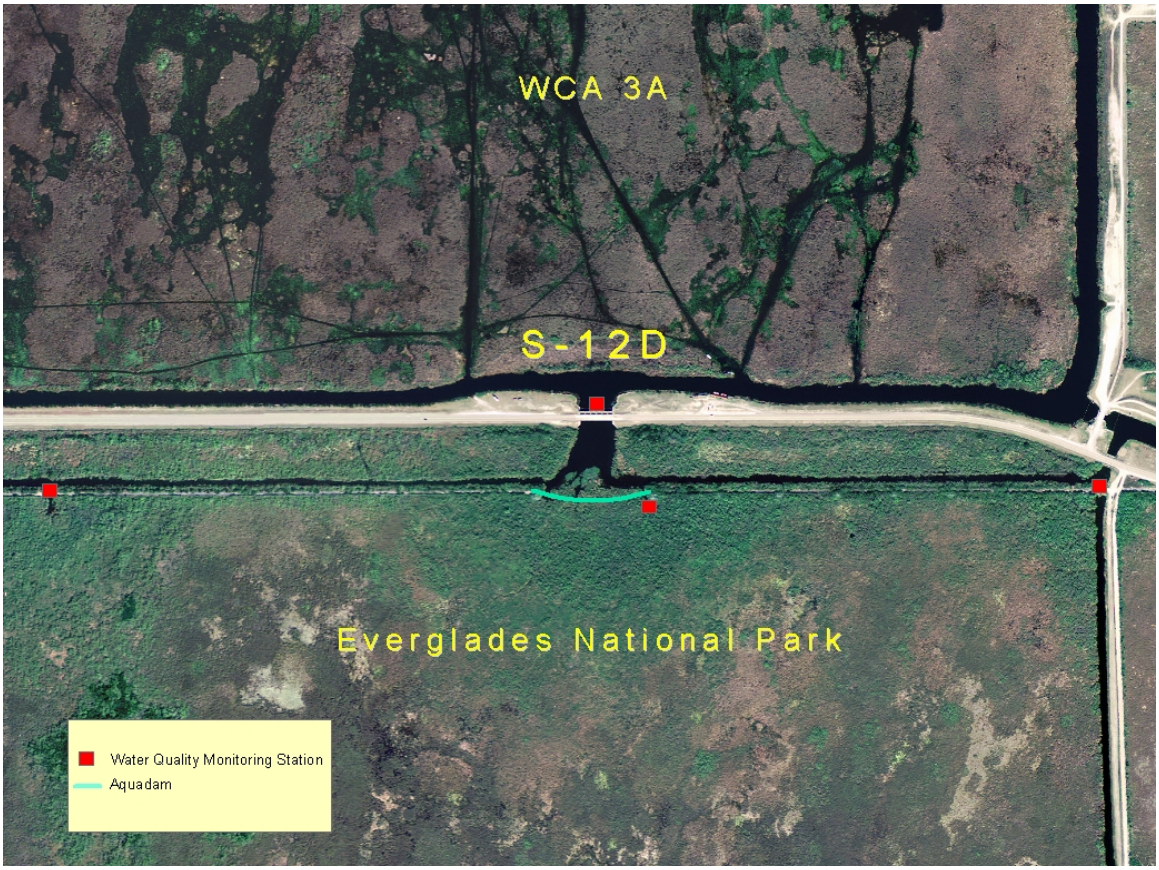

Figure 5. Water quality monitoring stations and proposed location for Aquadam barrier.

Permitting Requirements

In order to conduct maintenance dredging activities on a USACE-owned structure, the District is required to obtain a Section 404 Permit. The District has submitted a permit application and anticipates that the USACE will approve the request under the Nationwide 31 permit. USACE regulatory staff will also coordinate with USFWS staff for Section 7 consultation with the USFWS. The canal dredging proposed in this Plan fall within the State of Florida maintenance dredging exemption criteria pursuant to Sec. 40E-4.051(2)(a) F.A.C. Additionally, Chapter 373.406(6), Florida Statutes, allows for the exemption from regulation those activities that will have a insignificant individual or cumulative adverse impacts on the water resources of the District.

Plan Coordination

Close interagency coordination between the USACE, District, and ENP will be maintained throughout the Plan. Plan coordination will be facilitated through interagency meetings conducted during the planning, execution, and evaluation phases of the Plan. All involved entities will also receive weekly updates from the District's Plan coordinator (LeRoy Rodgers). Communication will also be maintained with USGS, Florida Department of Transportation, Florida Power & Light, and the Miccosukee Tribe of Indians of Florida.

Plan Contacts

Agency	Contact	Phone	Email
SFWMD	LeRoy Rodgers	561-682-2773	lrodgers@sfwmd.gov
USACE	Andy Ashley	904-232-2053	jonathan.a.ashley@usace.army.mil
ENP	Kevin Kotun	305-242-7829	kevin_kotun@nps.gov

Plan Costs

Site Survey & Bathymetry		**$30,000**
Vegetation Management		**$200,000**
Dredging		**$700,000**
Water Quality monitoring		**$12,500**
	Total	**$942,500**

APPENDIX II. Monitoring Plan for S12 Maintenance Plan

Monitoring Plan

For

S12 Maintenance Project (S12MNT)

March 31, 2006

South Florida Water Management District
Environmental Resource Assessment Department
Water Quality Monitoring Division

Monitoring Plan

For

S12 Maintenance Project (S12MNT)

_____

Peter Rawlik, Field Project Manager Date

_____

LeRoy Rodgers Program Manager Date

_____

Linda Crean, Water Quality Monitoring Division Director Date

_____

David Struve, Water Quality Analysis Division Director Date

_____

Julianne LaRock, Water Quality Assessment Division Director Date

_____

Delia Ivanoff, Quality Assurance Administrator Date

_____ **Date**

Linda Lindstrom, Environmental Resource Assessment Department Director

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2.0 Project Description

2.1 Introduction and background

This document serves as a reference for surface water quality monitoring in Miami-Dade County for the S-12 Maintenance Project (S12MNT) which is planned to begin in February 2006. The guidance contained in this document will assist in maintaining consistency in sampling locations, parameter lists, and frequencies as well as providing documentation of the project scope and an ongoing historical perspective.

2.2 Active Mandates and Permits

The monitoring under this project is not mandated by any permit or cooperative agreement.

2.3 Purpose and Scope

To evaluate potential water quality impacts of routine canal maintenance activities.

2.4 Duration

Surface water quality monitoring and in situ measurements for baseline conditions will be initiated concurrent with maintenance activities. Sampling and in situ measurements will continue for approximately one year.

3.0 Geographic Location

3.1 Regional Area

The project is located along the Old Tamiami Trail canal in the area immediately downstream of S12D. See Figure 4.1 for location of S12D and project location.

3.2 Sampling Locations

There are a total of 6 monitoring locations that will be used to supply data relative to this project. Sampling sites are registered in Laboratory Information Management System (LIMS). Table 3.2 provides the GPS coordinates for each monitoring location.

In addition to monitoring specific to this plan, additional monitoring in the area serves to supply relevant data. Under Project CAMB, S12D has been monitored for several years and will continue to be monitored at a frequency of biweekly if flowing otherwise monthly. Supplementary to S12D, Project ENPAS has an autosampler at S333 that takes samples every 8 hours and creates daily composites which are analyzed discretely. Samples from both S12D and S333 will serve to provide data on conditions on the upstream side of S12D.

On the downstream side of the structure, Project EVER has a long term monitoring monthly station approximately three miles downstream of S12C at NP201. This station can serve as a historical and concurrent reference station.

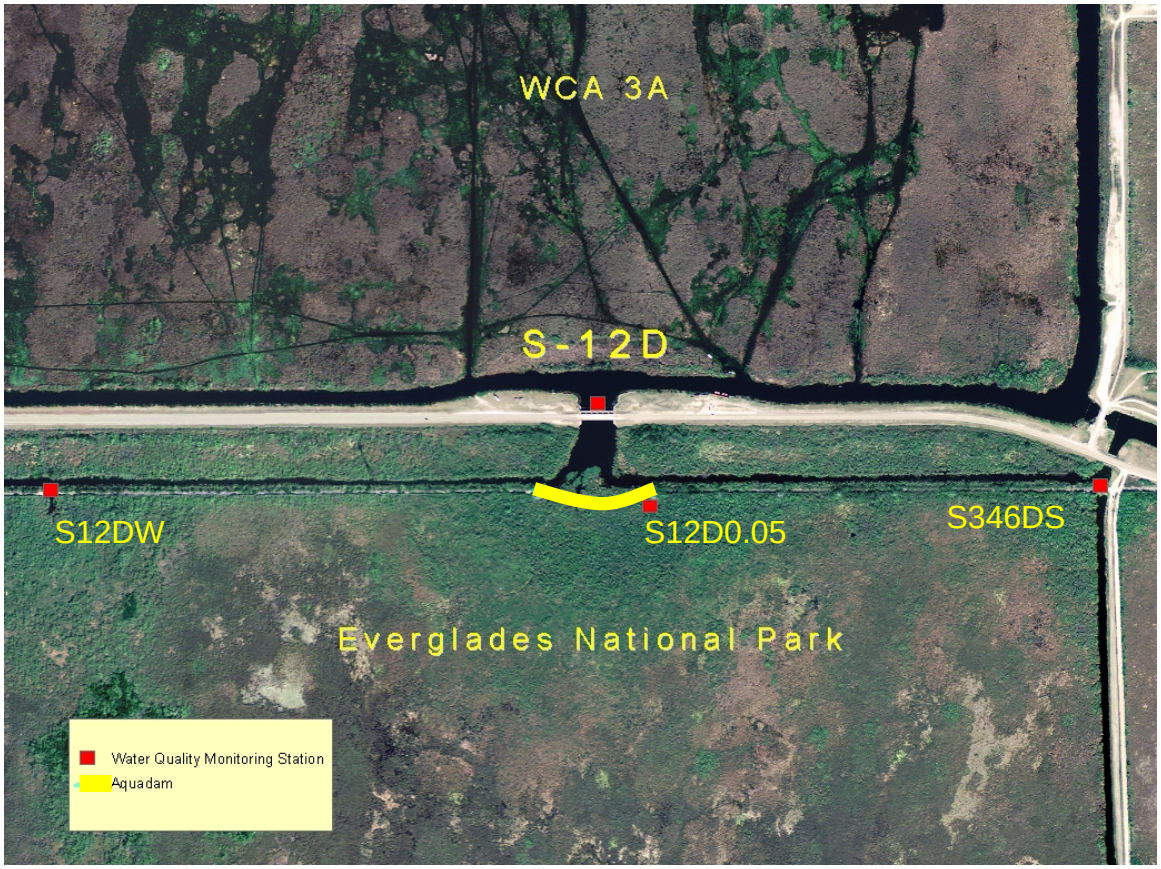

Figure 3.1 – Location of S12D and Project Location

Table 3.1 Surface Water Quality Monitoring Sites and GPS Coordinates			
Site Name	Location	GPS Latitude**	GPS Longitude**
S346DS	On Old Tamiami Trail immediately south of S333.	TBD	TBD
S12D0.05	On Old Tamiami Trail 0.05 miles south of S12D.	TBD	TBD
S12DW	On Old Tamiami Trail between S12D and S12C.	TBD	TBD
S12D0.5	In the marsh 0.5 miles south of S12D	TBD	TBD
S12D1.0	In the marsh 1.0 miles south of S12D	TBD	TBD
S12D3.0	In the marsh 3.0 miles south of S12D	TBD	TBD

3.3 Access and Authority

These areas border and are within Everglades National Park. Access will be limited by Park staff and construction management.

4.0 Data Quality Objectives

4.1 Data Uses, Resolutions, and Conclusions

The data is used to fulfill the purposes listed in Section 2.3.

4.2 Data Quality

Samples and quality control samples are collected in accordance with the FDEP Quality Assurance Rule, 62-160.200 and 62-160.320, F.A.C. and the District Field Sampling Quality Manual (FSQM). Data is qualified in accordance with the District Laboratory Quality Manual. Data not meeting the quality objectives is qualified using standard FDEP qualifier codes (F.A.C. 62-160). Refer to Table 4.1 for SFWMD data quality requirements.

Data for this project will be coded as experimental in LIMS and DBHYDRO.

Table 4.1 Measures of Data Quality and Their Target Limits

QC Measure	Description	Target Limits
Method Blank	Laboratory analytical and preparation blank.	<MDL
Equipment blank	Equipment blank prepared and handled as routine field sample, to assess effectiveness of decontamination, preservation, processing, and handling of samples (once)	<MDL
Laboratory precision	Laboratory duplicates, analyzed for every batch of 20 samples or less	10%
Laboratory accuracy	Laboratory control spike (LCS) and matrix spike (MS), analyzed for every batch of 20 samples or less	90-110%
Field precision	Field replicates (once)	20%

4.3 Parameter and Frequency Rationale

Parameters and frequencies were selected based on: 1) water quality information that has been collected in the general area for a number of years, and 2) to assure the project is not contributing to an increase in concentrations of parameters of concern (See Table 6.1).

5.0 Instrumentation

Specific conductivity probes will be deployed at S346DS, S12D0.05, and S12DW during maintenance activities. Probes will be set to measure at every hour. Probes will be maintained and downloaded on a weekly basis.

6.0 Monitoring Parameters, Detection Limits, and Completeness Targets

For each project, monitoring parameters and frequencies will be registered in LIMS. This process aids in the creation of header sheet templates, quality assurance and determining completeness. Completeness targets, meaning the number of samples successfully collected and analyzed, are set at 95% annually for this project.

Samples are collected in accordance with the FDEP Quality Assurance Rule, 62-160.200 & 62-160.320, F.A.C. and the Field Sampling Quality Manual (FSQM). Applicable sections of the FSQM include the method for surface water grab collection (5.13.2), decontamination (4.2.1, 4.2.3), field test methods (6.0) and quality control procedures (7.0).

6.1 Surface Water

Samples should be representative of the site as a whole, requiring the collector to make some use of professional judgment. For the purposes of sampling, the collection site should be contiguous with the rest of the water body. In general, a water depth of less than 10 cm is not considered sufficient to sample. Avoid collection from alligator holes, airboat trails, ruts, or other isolated depressions.

6.1.1 Grab Samples

Grab samples are collected to provide point measurements of parameters of interest. Samples should be collected using standard techniques, processing, preservation and transport. These procedures may vary slightly depending on the analytical laboratories being used. Consequently, the sample requirements for each lab should be consulted before samples are collected. Samples should be taken at half the total depth. If the total depth exceeds 1 meter, samples should be taken at 0.5 meters.

6.1.1.1 Parameters

Table 6.1 lists the project parameters, matrices, preferred methods, detection limits, precisions, and accuracies.

Table 6.1 Standard Surface Water Sample Parameters and Detection Limits				
Parameter	Preferred Method	Preferred Detection Limit	Preferred Precision (% RPD)	Preferred Accuracy (% Recovered)
Total Phosphorus	SM4500-P F	0.002 mg/L	0-10	90-110
OPO4		0.002 mg/L	0-10	90-110
TKN	EPA 351.2 (modified)	0.05 mg/L	0-10	90
NOX	SM4500NO_3F	0.004 mg/L	0-10	90
TSS	EPA 160.2	3 mg/L	0-10	90
Turbidity	SM2130B	0.1 NTU	0-10	90
Cl			0-10	90
Ca			0-10	90
SO4				

Matrix is water for all parameters
RPD = Relative Percent Difference

6.1.2 In situ measurements

Simultaneous to the collection of water quality grab samples, in-situ physical parameters are measured with a multi-parameter measurement instrument following methods documented in the FSQM. All field measurement data are directly read from the instruments or stored and uploaded directly into a Laboratory Information Management System (LIMS). These measurements typically include pH, specific conductance, dissolved oxygen, temperature, and depth. The data are automatically temperature-compensated for pH, specific conductance, and dissolved oxygen. The cell constant for specific conductance is determined by the manufacturer. The field technician does not perform any calculations on field data.

6.1.2.1 Parameters

Table 6.2 lists the project parameters, matrices, preferred methods, detection limits, precisions, and accuracies.

Table 6.2 Surface Water Physical Parameters and Detection Limits				
Parameter/Matrix	**Preferred Method**	**Preferred Detection Limit**	**Preferred Precision**	**Preferred Accuracy**
Depth/Water	meter stick	NA	0.01	0.01
Temperature/Water	SM2550B	NA	0.01	± 0.5 º C *
pH/Water	SM4500H^+ B	NA	0.01	± 0.2 pH units
Dissolved Oxygen/Water	SM4500-O G	NA	0.01	± 0.3 mg/L
Specific Conductivity/Water	SM2510B	NA	0 .1	± 5 %

* Value is from the FSQM and deviates from the FDEP SOP preferred accuracy ± 0.2 º C

7.0 Monitoring Frequencies by Site and Parameter

The sampling schedules for the referenced monitoring sites and parameters are depicted in Table 7.1. In general samples are collected monthly, but in the event of major flow through the structure, staff may opt to perform two event response collections.

Table 7.1 Monitoring parameters and frequencies				
Site	**Matrix**	**Collection Method**	**Frequency**	**Parameters**
All Six stations	Water	Grab	Monthly or in response to major flow events	TPO4, OPO4, TKN, NOX, TSS, Turbidity, Cl, Ca. SO4, Physical Parameters

8.0 Quality Control and Custody

8.1 Ethics

Every individual participant performing field sampling must commit to ethical and data integrity responsibilities. Field and laboratory personnel are expected to be trained on ethical practices and how to maintain data integrity, prior to performing any monitoring work and annually, thereafter. The lead agency (i.e.,

SFWMD) or designated party is responsible for verifying this during project audits.

8.2 Quality Control Samples

For each sample collection trip, a field cleaned equipment blank (FCEB) must be collected. One equipment blank (EB) and two replicates samples (RS) are required once during this program. These quality control terms are defined as follows:

Equipment Blank (EB) - A sample composed of de-ionized water (one liter or enough to fill one set of all containers) that is used to rinse all sampling equipment at the first field site before a field sample is taken. On this project, an EB is required during every sampling event. Equipment blanks are prepared by pouring de-ionized water into the sample collection container and through each piece of sampling equipment. The equipment blank for grab samples is filtered, preserved and handled as a routine sample.

Replicate Sample (RS) - Two distinct samples collected nearly simultaneously from the same sampling site. On this project, an EB is required during every sampling event.

Field Cleaned Equipment Blank (FCEB) – Field cleaned equipment blanks are prepared by pouring de-ionized water through each piece of field cleaned sampling equipment and into the sample container. The field-cleaned equipment blank for grab samples is filtered, preserved and handled as a routine sample. The field-cleaned equipment blank for the autosampler samples (pre-acidified) is run through a laboratory cleaned sample bottle and preserved and handled as a routine sample.

8.3 Documentation

This section contains the minimum guidelines and requirements for field documentation. This section is written for the purpose of standardizing the field reportable data and dialogue so that the intermediate-users and end-users can more readily access, comprehend and utilize that data. Field documentation must be sufficient and clear to allow history tracking for any sample collected or any measurement performed. Accuracy, consistency and legibility are key factors that will enhance the utilization of the field data. For all documents the following standards should apply:

- Print text, do not use cursive.
- Dates should be recorded as MM/DD/YYYY.
    - Time should be recorded in 24 hour format using local time.
    - Logs and notes should be recorded on site and at the time of collection.
    - Entries are to be made in waterproof ink.

-Corrections must be done using a single strike through the incorrect entry, initialing and dating the corrections and writing the correct information next to the previous entry.

- Samplers must be registered in the appropriate database.

For more details see the FSQM Chapter 8.

8.3.1 Header Sheet

The header sheet (also know as pre-login summary report, chemistry field data log, or contract laboratory chain of custody form) serves as a chain of custody and must accompany all samples submitted to the District or external laboratories. This sheet must be legible, accurate and complete. The header sheet is the primary source for the minimum data required to uniquely identify samples for the analytical laboratory and database. Header sheets should identify project, collectors, collection agency, sample identification number, sample site, sample date, sample time, sample type, collection method, discharge and orientation status, weather, sample depth, matrix code, collection span and in situ measurements. Also on the header sheet are the frequency of collection, the parameters to be analyzed, and the number of bottles submitted to the laboratory. This document must be signed by the collector before it is relinquished to the laboratory.

8.3.2 Field Notes

Relevant field observations are noted in a bound waterproof notebook that is project specific. Information to be entered into the field notes include project name, frequency, trip type, date, collectors, responsibilities, weather, acids, labs being submitted to, sample id, site id, time collected, and sample type. Additional comments on observations, equipment cleaning, maintenance, and calibration should be recorded here. Field service contractors shall provide copies of all field notes to the SFWMD field project manager within one week of sample collection.

8.3.3 Calibration Sheet

Field multiparameter probe calibrations are recorded on a supplemental page of the header sheet (or equivalent). The exact requirements of the calibration are dependent on the model of probe, the parameters measured, the range of parameters expected, and the range of parameters encountered. The field instruments used in conjunction with grab sample collection must be calibrated daily. The continuing calibration verification (CCV) standard must be read at the end of the sampling event or every 24 hours whichever is less.

8.3.4 Field Data Validation and Responsibilities

All staff associated with the project is responsible for ensuring the accuracy and completeness of data. The following sections provide a list of responsibility parties:

8.3.4.1 Sampling Team

The sample team will review and validate the sampling data collected during the course of the sampling event. This includes header sheets, field notes, and calibration sheets. Signature by the samplers indicates the data has been reviewed and validated.

8.3.4.2 Laboratory

In the process of entering field data into the database, the laboratory will review the data for completeness and accuracy. Incomplete or inaccurate data may result in the inability to enter data, or may flag the data as suspect.

8.3.4.3 Field Project Manager

It is the field project manager's responsibility to review header sheets, field notes, and calibration sheets as well as the entry of these items into the database. The field project manager is required to approve the electronic version of the data. The field project manager is responsible for scanning the field notes and according to protocol, filing them in an assigned file server.

8.**3.4.4** Quality Assurance

The SFWMD's QA staff is responsible fro overseeing the overall QA/QC program for this project. This is done by ensuring that there are sufficient data quality elements in the project plan, and conducting audits of the different processes, including field and laboratory activities. Data are validated by SFWMD's data validators

8.3.5 Corrections

If sample collectors, the laboratory, or the project manager discover errors in any of the field notes, header sheets, or calibration sheets, corrections may be required. Corrections to header sheets, field notes, or calibration sheets may only be made by staff who participated in the production of the document. Changes are made by striking through the error, writing the correction, initialing and dating the change. On occasion, a detailed explanation of the error may be required.

8.4 Sample Submission

Samples are transported on wet ice at 4^{o} Celsius to the laboratory for analysis. Samples are submitted to the laboratory on the same day as collection or via courier the following day. Some analyses might require delivery to the lab within

a specific time frame. Samples are submitted as described in the FSQM. Laboratory staff "time stamp" the sample header (Chain of Custody) sheet and verify that all samples arrive with the required preservation (e.g. cooling and acidification) and signatures. The samples are sorted and placed in a temperature environment.

8.5 Field Audits

No audits will be required on this project.

9.0 Data and Records Management

After the data validation process, all data are archived in DBHYDRO and maintained so that end users can retrieve and review all information relative to a sampling event. Field notes are maintained on an internal server either by scanning actual field note pages or by uploading narratives from field computers. All analytical data and field conditions are sent to a database designated by the sponsors for long-term storage and retrieval.

The sampling agency or contractor maintains records of field notes and copies of all records relative to the chain of custody and analytical data. It is the responsibility of each agency or contractor to maintain both current and historical method and operating procedures so that at any given time the conditions that were applied to a sampling event can be evaluated.

10.0 Project Reporting

10.1 *There is no project report required.*

11.0 Project Contacts and Responsibilities

11.1 Field Project Manager

The field project manager for this project is Peter Rawlik. The field project manager is responsible for maintaining this document and making sure that any changes are well documented and communicated to the field staff and other parties as necessary.

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11.2 Field Lead

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11.3 Analytical Lead/Contract Manager

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11.4 Quality Assurance Lead

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12.0 Revisions and Modifications