

## **Statement of Work EAA Basin Data Evaluation (Phase I)**

### **1.0 Introduction**

Florida's 1994 Everglades Forever Act (EFA), F.S. 373.4592, established long-term water quality goals designed to restore and protect the Everglades Protection Area (EPA). As defined in the Act, the EPA includes Water Conservation Areas (WCAs) 1, 2A, 2B, 3A, 3B, the Arthur R. Marshall Loxahatchee National Wildlife Refuge and the Everglades National Park. A primary component of the EFA is the Everglades Construction Project which includes a combination of phosphorus source control programs using mandatory best management practices (BMPs) within the Everglades Agricultural Area (EAA) and downstream treatment within manmade stormwater treatment areas (STAs) to reduce phosphorus levels prior to discharge into the EPA. Through the implementation of BMPs, the EFA requires a reduction in total phosphorus (TP) load in runoff from the EAA of not less than 25% compared to historic levels (1979-1988). To date, an average reduction of approximately 50% has actually been achieved since full implementation of BMPs starting 1996.

During the 2003 legislative session, the 1994 EFA was amended to include reference to the March 17, 2003, Conceptual Plan for Achieving Long-term Water Quality Goals (Long-Term Plan). Although the Long-Term Plan for the EAA recognized that the combined performance of the EAA BMP regulatory program and the STAs has exceeded expectations, supplemental adaptive management measures were identified to ultimately achieve water quality goals in the EPA. Accordingly, the Process Development and Engineering (PDE) component of the Long-Term Plan's overall water quality improvement strategy directed activities and funds towards "Identifying opportunities to maintain and improve upon the performance of source controls (BMPs) in reducing overall pollutant loads<sup>1</sup>" discharging from specific basins, including the EAA. For the EAA, maintenance of the current level of performance is considered necessary to the Long-Term Plan as stated in section 5.1.1 *EAA Basins [Bc81(1)]*.

As stated in section 5.1 *Source Controls (BMPs) [Bc81]* of the Long Term Plan, activities directed at maintaining performance levels can be categorized into characterization, identification and implementation efforts. Therefore, the South Florida Water Management District (DISTRICT) is interested in conducting an investigation to characterize EAA basin discharges and processes tributary to those discharges in more detail, including Lake Okeechobee inflows. It is not sufficiently understood in particular the extent to which Lake Okeechobee inflows impact the EAA basins and the relatedness of those inflows to the maintenance of current levels of BMP performance in the EAA. Additionally, in recent years, in response to the published data, the DISTRICT has received public inquiries on why differences in phosphorus concentration and load exist in surface waters throughout the EAA and the effects of the load coming into the EAA from Lake Okeechobee in the form of irrigation waters and pass through waters. Pass through waters are defined as any water deliveries from Lake Okeechobee through the

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<sup>1</sup> Long-Term Plan page 5-2.

EAA canals not used for irrigation purposes within the EAA. The DISTRICT is interested in exploring trends in the Lake Okeechobee inflows as well as trends in the distribution of these inflows. Furthermore, there have been questions raised about the perceived effects of the 2005 hurricanes on the water quality of the EAA and the spatial distribution of flows and loads. As a result of the large number of influences on the EAA Basin it is important to determine the relationships between these influences and how they have changed with time.

Therefore, in recognition of the Long-Term Plan requirement to carry out additional investigations and to further address public inquiries, this analysis to characterize EAA basin discharges and sub-basin (S-5A, S-6/S-2, S-7/S-2, and S-8/S-3) discharges, and Lake Okeechobee inflows, will be conducted.

## **2.0 Objectives**

The primary objective of this project is to develop an understanding of the relationship between Lake Okeechobee inflows, EAA Basin runoff, and downstream points of entry into STA's and the driving factors that govern those relationships. This could be accomplished through a basin level data evaluation (flows, load, concentrations, and any other relevant data) for trends, changes, and significance that will help define the relationships. This analysis will assist the DISTRICT in discriminating between verifiable trends in data and perceived trends in data, helping to focus on important aspects that contribute or do not contribute to maintaining the current level of performance of the BMP Program within the EAA basin.

This project will be broken into two phases. Phase I, included in this work order, will be devoted to developing a minimum of three analysis proposals. Phase II, if conducted, will be devoted to conducting one or more of the analyses proposed in Phase I. The Scoping of Phase II of this project will take into consideration the objectives of section 5.6.4 *Lake Okeechobee Long-Term Trends [Bc86(4)]* of the Long-Term Plan which identifies a need to better understand the relationship between Lake Okeechobee nutrient status and operation (depth regulation, choice of outflow point) on phosphorus loads discharged to the STAs.

## **3.0 Scope of Work**

The focus of this work order will be on document and data reviews, coordination meetings, and development of analysis proposals. The geographic area of interest is the EAA with Lake Okeechobee to the north and the Water Conservation Areas and STAs to the south as depicted in Figure 1. This figure also depicts many major features including DISTRICT water control structures, canals, and adjacent lands in and around the study area. The scope of Phase I includes the following:

- The CONSULTANT shall perform a full review of all DISTRICT supplied documents to gain an understanding of the issues associated with the EAA Basin.

- The CONSULTANT shall research, review, and determine the appropriateness of other DISTRICT documents.
- The CONSULTANT shall review all data provided by the DISTRICT as well as research other possible sources of data.
- The CONSULTANT shall attend onsite meetings to discuss the direction of the data evaluation and the expectations of the final letter report.
- The CONSULTANT shall use the results of the data and document review to develop multiple cause and effect scenarios that may warrant further analysis and investigation, as well as to define the approach for each proposed investigation/analysis. The consultant will assist the DISTRICT in identifying appropriate statistical methods (parametric vs. non-parametric) for Phase II.
- The CONSULTANT shall develop Phase II analysis proposals and present these proposals to DISTRICT staff at an on-site meeting.

All professional services shall be performed under the direction of professional staff knowledgeable in watershed evaluations and data evaluation, and understanding of the EAA Regulatory Program. A technical editor shall review and be responsible for the production of all written deliverables. With the exception of onsite meetings, all work will be performed offsite.

For tasks 2 through 4 in Phase I, the DISTRICT will determine whether and how the CONSULTANT should proceed with subsequent tasks. At each juncture, the DISTRICT reserves the right to discontinue the project and cancel the remaining tasks; in which case, the CONSULTANT hereby agrees that the DISTRICT shall have no further obligations regarding subsequent tasks described herein. The DISTRICT will provide the CONSULTANT with written Notice to Proceed along with appropriate technical direction in the event the District chooses to continue remaining tasks under this work order.

This work order may be amended to include additional tasks.

#### **4.0 Work Breakdown Structure**

All deliverables for Tasks 1 through 4 shall be provided in both hard copy and electronic format. Five (5) hard copies (Four bound and one loose) shall be provided, unless specified differently in the task deliverable. The CONSULTANT shall provide all of the necessary computer hardware, software and broadband internet access needed to complete the tasks and deliverables of this purchase order. All electronic documents shall be in Microsoft Word and Excel format.

The CONSULTANT shall conduct the following tasks as elements of this project.

### **Task 1: Initial Kick-off Meeting**

The CONSULTANT shall attend a kick-off meeting at the District Headquarters in West Palm Beach, Florida. The meeting will last no more than three (3) hours. The objective of this meeting is to confirm the project Statement of Work and the project schedule, to establish lines of communication and data sharing, and clarifying project requirements.

### **Task 2: Documents and Data Review**

The CONSULTANT shall review all documents provided by the DISTRICT to gain an understanding of the challenges facing the EAA Basin with respect to the Long-Term Plan requirements and the goal to maintain current actual BMP performance levels. Documents provided by the District will help define the scopes of other research projects that have been completed or have been initiated. The CONSULTANT shall research additional sources of information regarding the Lake Okeechobee phosphorus levels and possible down stream impacts from these phosphorus levels.

The CONSULTANT shall perform a review of all data provided to them as well as researching any additional sources of data both internal and external to the DISTRICT. The CONSULTANT shall develop and understand how the data is derived and how it is used in the context of the EAA basin compliance model. The CONSULTANT shall detail the quality and appropriateness of any additional sources of data found in this process.

The CONSULTANT shall prepare a letter report detailing the findings of the Document and Data Review. The CONSULTANT shall provide a draft of this letter report for DISTRICT comments before producing the final letter report.

### **Task 3: Interim Coordination Meeting**

The CONSULTANT shall attend an on-site interim coordination meeting with DISTRICT staff. The CONSULTANT shall present the findings of the document and data review. The data review and document review will be discussed with particular focus applied to the data review to ensure that the CONSULTANT understands the data to be used in the data evaluation. The CONSULTANT shall be prepared to informally present and discuss the data evaluation methods and datasets that will be used in the evaluation. The data evaluation may investigate the following but will not be limited to:

- Flows
  - Distributions (seasonal, WY, and event)
  - Rainfall vs. Runoff (seasonal, WY, and event)
  - Rainfall vs. Runoff by Sub-Basin (seasonal, WY, and event)
  - Net Inflows vs. Net Outflows (seasonal, WY, and event)
- Loads
  - Distributions (North, South, Sub-Basins)
  - Inflows from the Lake vs. EAA model Outflows
  - Net Inflow and outflow loads

- Rainfall vs. Net Inflow and Outflow Loads
- Concentrations
  - Rainfall vs. Runoff Conc. By Sub-Basin (seasonal, WY, and event)
  - Net Inflow and Outflow Concentrations (seasonal, WY, and event)
  - Net Inflow and Outflow Conc. By Sub-Basin (seasonal, WY, and event)

#### **Task 4: Phase II SOW Analysis Proposals**

The CONSULTANT shall develop multiple analysis proposals in an effort to develop the Phase II SOW. The core of these proposals will be the interaction between the EAA basin and Lake Okeechobee. These proposals shall be developed based on the input from the interim coordination meeting but may look beyond those relationships discussed in the meeting if anomalies or strong correlations in the data are discovered.

The CONSULTANT shall present its proposals for analysis to the DISTRICT during an onsite Proposal Presentation. This presentation shall detail the data required, the expected limitations, and the expected level of effort for each proposed analysis.

The CONSULTANT shall produce a letter report that will detail the proposed analyses as well as the data required to perform these analyses. The report shall provide sufficient detail into approaches of further analyses that it can be used as a guide to develop the full SOW for Phase II. The CONSULTANT shall provide the DISTRICT with a draft copy of the letter report with the purpose of soliciting input during an onsite Proposals Presentation. The final letter report will incorporate the information and comments gathered at the onsite Proposals Presentation.

| <b>Deliverable</b> | <b>Description</b>                           |
|--------------------|--|
| 1.1                | Kick-off Meeting Attendance                  |
| 1.2                | Kick-off Meeting Minutes                     |
| 2.1                | Draft Document and Data Review Letter Report |
| 2.2                | Final Document and Data Review Letter Report |
| 3.1                | Interim Coordination Meeting Attendance      |
| 3.2                | Interim Coordination Meeting Minutes         |
| 4.1                | Draft Letter Report                          |
| 4.2                | Onsite Proposals Presentation                |
| 4.3                | Final Letter Report                          |

## References

(March 1, 2006). 2006 South Florida Environmental Report, *South Florida Water Management District*. Online: <http://www.sfwmd.gov/sfer/>

Burns & McDonald (October 27<sup>th</sup>, 2003). Long-Term Plan for Achieving Water Quality Goals in the Everglades Protection Area Tributary Basins, *South Florida Water Management District*.

Online: <http://www.sfwmd.gov/org/erd/longtermplan/documents.shtml>

Daroub, S. H., & et al (April 2003). Water Conservation Area Canal Sediment Phosphorus Studies – Inventory, Release and Transport, *Everglades Research and Education Center*

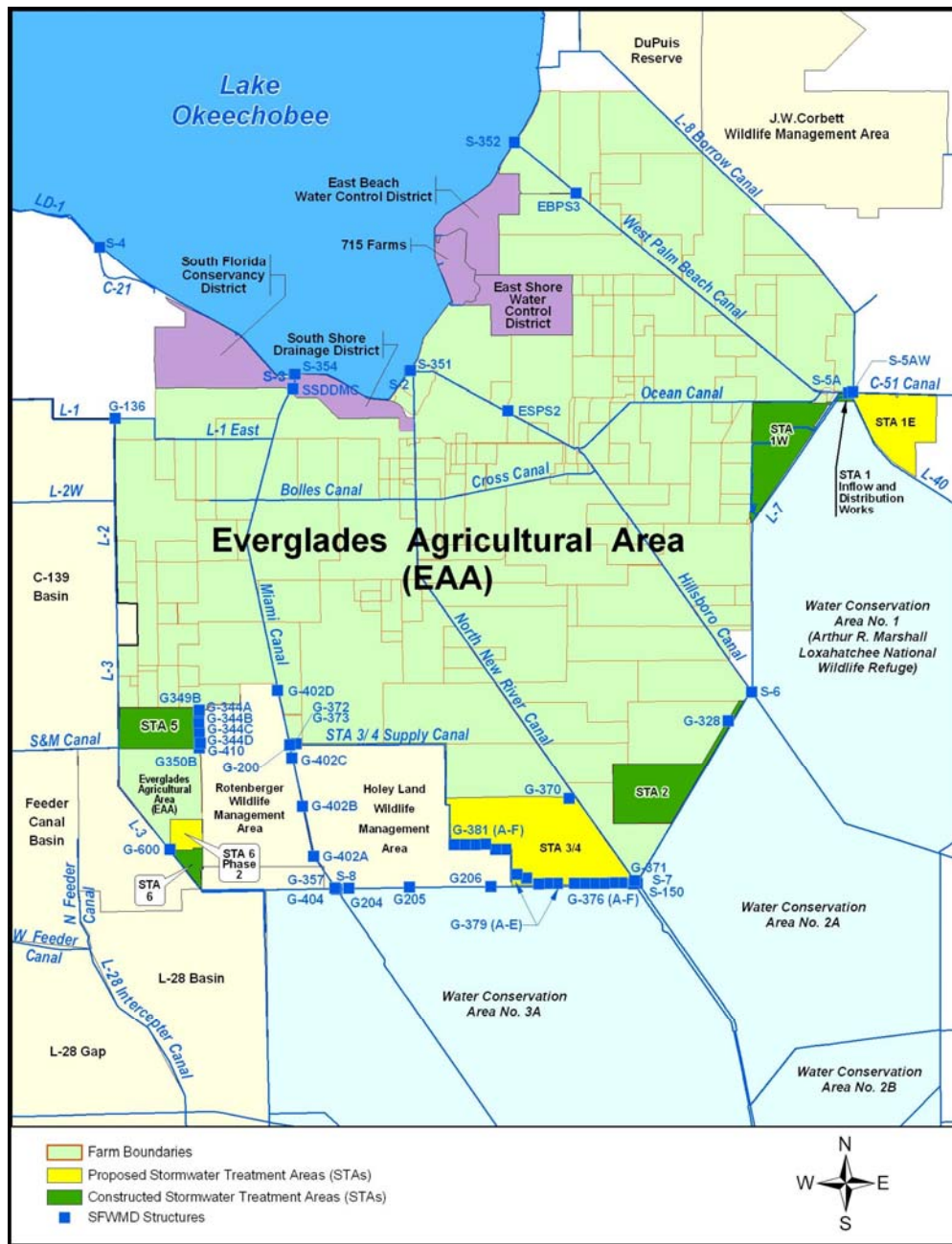
Havens, K. E., & et al (2001). Hurricane Effects on a Shallow Lake Ecosystem and Its Response to a Controlled Manipulation of Water Level, *Scientific World* (2001) 1, 44-70.

Medri, A., & Ritter, G. J., & Iricanin, N., & Hills, S. (June 9<sup>th</sup> 2003). Baseline Conditions in Selected Tributaries in the Lake Okeechobee Watershed, *2003 ASAE Florida Section Meeting*.

Pietro, K. (2006). Draft Lake Okeechobee Long-Term Trends [Bc86(4)] , *South Florida Water Management District*.

Pietro, K., Goforth, G. (June 2005). C-51 West Sub-basin Updated Analysis of Flow and Phosphorus Data, *South Florida Water Management District*.

Figure 1



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