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# CENTRAL AND SOUTHERN FLORIDA PROJECT

## COMPREHENSIVE EVERGLADES RESTORATION PLAN



# Management Plan for CERP Monitoring Programs Quality Assurance and Quality Control

## Fiscal Years 2007-2010




U.S. Army Corps of Engineers  
Jacksonville District

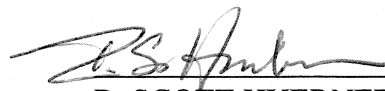


South Florida  
Water Management District

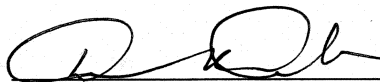


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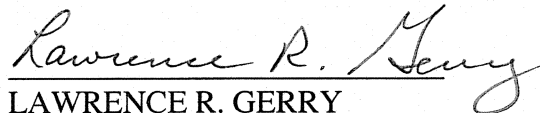
  
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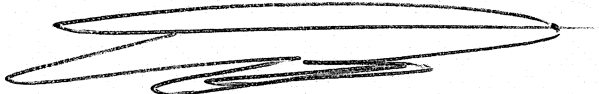
  
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## Background

The Comprehensive Everglades Restoration Plan (CERP or Comprehensive Plan) provides a blueprint for the restoration and preservation of the south Florida ecosystem, while providing for other water-related needs of the region, including water supply and flood protection. This nationally and internationally known ecosystem has deteriorated significantly over the past 50 years, and the outlook for the future, without implementation of the Comprehensive Plan, shows further degradation. Construction and operations of the Central and Southern Florida (C&SF) Project have disrupted the natural timing, quantity, quality and distribution of water to the natural system. The size of the remaining natural system has been substantially reduced as a result of development in south Florida. Prior to the C&SF Project Comprehensive Review Study, referred to as the Restudy, a comprehensive look at the water management system had not been conducted since the projects first authorization in 1949.

*CERP monitoring and assessment activities shall generate monitoring data of acceptable and verifiable quality, and in a consistent manner to allow sharing and utilization of data.*

*(CERP Monitoring Program  
QA/QC Vision, 2004)*

The Restudy was authorized by Congress in 1992 to conduct a system-wide review of the C&SF Project with an eye towards recommending structural or operational changes to the project to restore and protect the south Florida ecosystem while maintaining, and in some cases enhancing, other authorized project purposes. The Restudy culminated in a feasibility report to Congress dated July 1999 (USACE and SFWMD 1999). This report resulted in an authorization of the Water Resources Development Act (WRDA) of 2000 that provides the U.S. Army Corps of Engineers (USACE) with the authority to conduct studies and implement projects, utilizing an adaptive management strategy, in the CERP.

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As implementation of the CERP moves forward, the critical need for establishing a Quality Assurance and Quality Control (QA/QC) program<sup>1</sup> was devised to ensure the accuracy, precision, and reliability of CERP monitoring data. The purpose of the program is to accomplish the following:

- Ensure all CERP monitoring activities adhere to science-based QA/QC requirements to support project-level and system-wide assessments
- Ensure the consistency and comparability of data using standardized procedures, to the maximum extent practicable, across agencies or organizations
- Provide guidance to those involved in the CERP monitoring activities to establish accuracy and precision criteria for each data type
- Provide for the efficient and effective analysis of data collected by the various organizations in South Florida and provide users of these data with some degree of confidence that the data were collected with similar accuracy and processing standards across agencies

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<sup>1</sup> CERP Master PMP (2000) defines program-level activities as “any work that spans multiple projects and system-wide issues”.

- Provide guidance on accuracy and precision requirements to agencies and organizations involved with establishing new monitoring stations

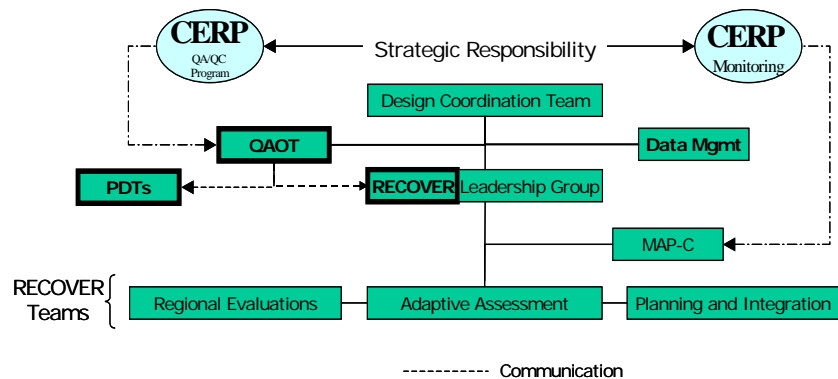
To fulfill the need for a QA/QC Program, the Quality Assurance Oversight Team (QAOT) was formed. The QA/QC Program is a system-wide program of the CERP, designed to organize and provide the highest scientific and technical quality assurance and quality control in all CERP monitoring activities during the implementation of the Comprehensive Plan. Given the science-based approach to the Comprehensive Plan, it is the role of QAOT to oversee the implementation of the CERP Monitoring Program QA/QC to help ensure all CERP monitoring activities, including laboratory procedures, adhere to science-based QA/QC requirements to support project-level and system-wide assessments. Part of which and to help maintain consistency, the QAOT will encourage non-CERP monitoring activities to adopt the CERP QA/QC aspects, particularly when the data collected under non-CERP activities will be used for CERP assessments and evaluations. The QAOT provides an opportunity for participation in the important process of QA/QC through partnerships with federal, state and local agencies, and tribal governments. The QAOT also provides opportunities for stakeholders to participate in the review of QAOT work products.

The purpose of this Monitoring Program QA/QC Management Plan (PMP) is to provide a guide for QA/QC efforts that support the implementation of the CERP. This PMP reflects the USACE and SFWMD strategy for providing support for implementation of the CERP Monitoring Program QA/QC, including individual projects, system-wide activities, and other efforts that produce data of interest that are not directly linked to CERP activities.

## 1.0 Description

The role of the QAOT, that oversees the CERP Monitoring Program QA/QC, is to help ensure the accuracy, precision, and reliability of CERP monitoring data and, to the extent practicable, of non-CERP monitoring data that CERP may be using in evaluating and assessment progress; and to help ensure that the system-wide goals and purposes of the CERP are achieved. While QAOT is an interdisciplinary, interagency body, responsibility for QAOT rests jointly with the USACE and the SFWMD, as the sponsoring agencies. The QAOT is responsible for providing guidance and oversight on monitoring procedures, QA/QC issues; and data validations for CERP projects and RECOVER. The team is the forum to develop consistency among the various entities involved with monitoring, data quality and QA/QC processes.

The QAOT reports to CERP Program Managers (Design Coordination Team - DCT); however, it provides effective feedback directly to the RECOVER Program Managers (RLG) and Project Managers (PDTs) on QA/QC issues affecting their programs. The QAOT is



organizationally independent of the RECOVER and CERP projects because of its QA oversight responsibility for both projects and system-wide monitoring efforts. Oversight of CERP QA monitoring activities requires the QAOT function at the CERP Program level. Although the QAOT work-effort spans the entire implementation period of the Comprehensive Plan monitoring activities, this management plan focuses, for budgetary purposes, on fiscal years 2005-2007.

The QAOT is a multi-agency team comprised of one representative from six standing member agencies. The lead agencies are the Army Corps of Engineers and the South Florida Water Management District. Representatives from the following agencies are serving as standing members:

- Army Corps of Engineers, Jacksonville District
- South Florida Water Management District
- U.S. Environmental Protection Agency
- Florida Department of Environmental Protection
- U.S. Geological Survey
- U.S. Fish and Wildlife Service

Any of the standing member agencies may bring any number of agency personnel or contractors to support team's efforts. Decisions are, however, made by the standing members. The QAOT is responsible for assisting the Corps and SFWMD to establish short and long-term goals and procedures.

While this management plan is a management document between the sponsoring agencies (USACE and SFWMD), the resources provided to the CERP Monitoring Program QA/QC, via the QAOT, by participating agencies, their contractors, and the public are crucial to the Program's continued success.

### **1.1 Authority**

Initial CERP program guidance was published in August 2000 in the Master Program Management Plan (MPMP). The MPMP is regarded as the baseline program guidance document for the implementation of the CERP program. Since the initial MPMP, the USACE and SFWMD Program Managers have made decisions on a wide array of issues that directly affect their staff's execution of the program. The program managers translated their decisions into CERP Guidance Memoranda (CGM). The authority and mandates for Monitoring Program QA/QC activities originates from the enactment of CGM #41.00 signed by the CERP Program Managers on November 19, 2003.

By signing CGM #41.00, the CERP Program Managers fulfilled the requirements on the Water Resources Development Act of 2000 (WRDA 2000) (PL 106- 541) enacted in December 2000. The executed CGM creating the Monitoring Program QA/QC therefore became part of the Design Agreement (USACE and SFWMD, 2000a) and the 2000 Master Program Management Plan (USACE and SFWMD, 2000b) between the Department of the Army and the South Florida Water Management District.

## 1.2 QAOT Vision and Mission Statements

The QAOT standing members adopted the following vision and mission statements in October 2004. The vision statement provides the intent while the mission statement provides the purpose and guiding principles for the QAOT.

**Vision**—QAOT will help ensure that CERP monitoring and assessment activities shall generate monitoring data of acceptable and verifiable quality, in a consistent manner that would allow effective utilization and sharing of data across programs throughout the course of CERP.

**Mission**—QAOT provides essential support to CERP in meeting its goals and purposes by overseeing the implementation of the QA/QC program. QAOT establishes and sets QA/QC guidance, provides training and support, oversees compliance with relevant regulatory requirements, conducts assessments of QA/QC activities, reviews and coordinates the approval of new and alternative procedures for use in CERP, and provides guidance for and facilitates the resolution of QA/QC issues throughout project-level and system-wide monitoring activities.

In accomplishing its mission, QAOT adheres to the following principles:

- **Quality**—Ensures monitoring activities, including planning, field activities, laboratory analysis, and data verification and validation, adhere to the quality assurance and quality control requirements and relevant regulatory requirements necessary to support project-level and system-wide assessments.
- **Conformance to relevant regulatory requirements**—Ensures that procedures and practices related to the generation of monitoring data are consistent with relevant state and federal requirements. Any variances or alternative procedures are reviewed and evaluated for CERP use.
- **Science-based performance approach**—Incorporates objective and fact-driven investigations, constructive oversight and peer review.
- **Transparency and access**—Offers transparency and universal access to team work-products and tools.
- **Consensus-building**—Uses fair processes and strives to reach consensus on conclusions and proposals.
- **Inclusiveness**—Uses multi-governmental and interdisciplinary collaboration to foster inclusiveness.
- **Accountability**—Meets schedules, maintains professional responsibilities, and efficiently provides quality products for CERP processes and teams.
- **Adaptive Management**—Seeks continuous improvement in the CERP Monitoring Program QA/QC.

### **1.3 Related Program-level Activities**

As the CERP Monitoring Program QA/QC is implemented and becomes operational, it must be coordinated with a number of related project- and program-level activities, such as RECOVER, Information and Data Management, Interagency Modeling Center, and individual CERP projects. It is of utmost importance for the success of the CERP Monitoring Program QA/QC that there be coordination and oversight activities between program-level QA/QC activities and QA/QC activities required for individual projects. All of the more than 60 projects planned for CERP implementation will have specialized, sub-regional and project specific QA/QC activities that must be consistent with the overall CERP program-level QA/QC requirements.

### **2.0 Scope**

QAOT shall successfully accomplish its mission at both the program and project level. At the program level, the QAOT will consider the regional and system-wide perspective as it evaluates and assesses the QA/QC practices implemented by CERP program-level activities. Concurrently, QA/QC requirements are applicable to all CERP projects and the QAOT oversees the application of the same QA/QC Program requirements to individual project-level activities. QAOT will continue to function throughout the entire duration of the restoration process, continuously seeking ways to improve QA/QC activities throughout CERP. The QAOT may also evaluate and assess other non-CERP related projects data collection and analytical protocols (i.e., methods and procedures) to determine if their data and protocols are deemed useful to CERP.

QAOT provides project and system-wide feedback to the Design Coordination Team (DCT), through its program managers from the USACE and SFWMD as well as the other standing members. The DCT, as the oversight body for CERP implementation, will oversee the QAOT and its products.

The QAOT will regularly provide feedback to the RECOVER leadership concerning QA/QC aspects of the MAP implementation and QA/QC guidance to PMs on a project-level basis.

### **2.1 Two Mission Areas: Quality Assurance and Quality Control**

To ensure that all CERP decisions can be supported by data of known quality (i.e., accurate, precise, and reliable), it is important that QA/QC become an integral part of all data collection and laboratory analysis activities. To accomplish this, the QAOT identified several tasks that are summarized in the following sub-sections. Many of these tasks have been underway since the approval of CGM #41.00 and they will continue until implementation of all CERP data collection activities is completed. The tasks are intended to fulfill the two QAOT missions: quality assurance and quality control.

Quality assurance consists of an overarching check to certify/verify that QC procedures have been properly implemented to produce data of known quality. Quality assurance is generally a managerial and peer review oversight function. Quality control consists of a system of procedural checks on field sampling and laboratory analysis using field blanks, duplicates,

documentation of all sample movement, and chain of custody records to provide supporting information. Outlined below are some of the key differences between quality assurance and quality control:

| <b>Quality assurance</b>                                  | <b>Quality control</b>   |
|---|--|
| - anticipates problems before they occur                  | - responds to observed problems  |
| - uses all available information to generate improvements | - uses ongoing measurements to make decisions on processes or products |
| - is not tied to a specific quality standard              | - requires a pre-specified quality standard for comparability          |
| - is applicable mostly at the data collection stage       | - is applicable mostly at the data/sample processing stage             |

Successful implementation of the CERP Monitoring Program QA/QC will lead to:

- **Scientific Data Integrity**—CERP will produce data of known and documented quality based on sound scientific principles.
- **Proper Evaluation of Activities**—CERP Monitoring Program QA/QC will provide documentation of activities and needed program-level oversight for evaluation purposes.
- **Reliable and Defensible Decisions**—When the quality of data is known, it is possible to determine whether the data can be used for a specific decision. This reduces surprises and challenges to regulations or permit appeals.
- **Reduced or Justifiable Resource Expenditures**—Resource expenditures can be reduced if CERP's information needs are more closely matched to the information collection. Through proper planning, only the correct type, amount, and quality of data will be collected for CERP use.

Overall, implementation of the CERP Monitoring Program QA/QC will reduce the CERP's vulnerabilities and increase CERP ability to make reliable, cost-effective, and defensible decisions.

### **2.1.1 Quality Assurance**

Quality assurance is an integrated system of management activities involving planning, implementation, assessment, reporting and quality improvement to ensure that a process, item or service is of the type and quality needed and expected by the end user. Quality assurance is the

total integrated program for assuring the reliability of measurements to ensure that all acquired data are suitable for the intended purpose. The quality assurance process tasks are as follows:

- Develop and oversee the implementation of an overarching QA/QC program for CERP.
- Oversee and provide guidance in the development of QA Project Plans for CERP projects.
- Provide guidance to QA Officers<sup>2</sup> on how to conduct a review of RECOVER and project-level monitoring plans to ensure all required QA/QC protocols are addressed properly.
- Oversee the approval process for alternative sampling and analysis procedures.
- Standardize the procedure of performing third party validation of field and laboratory analyses that include data review and electronic data deliverables.
- Oversee data quality assurance activities and data quality investigations for adherence to requirements in the Quality Assurance Systems Requirements (QASR) document.
- Coordinate with program- and project-level PMs on QA/QC and data quality issues.
- Coordinate with RECOVER leadership on QA/QC issues regarding MAP implementation.
- Develop and implement data review criteria and assessment procedures for QA/QC information.
- Compile individual program- and project-level QA/QC reports and produce an integrated QA/QC report on CERP program and project related monitoring activities to CERP and RECOVER managers.

### **2.1.2 Quality Control**

Quality control is the overall system of technical activities that measure the attributes and performance of a process or service against defined standards to verify that they meet the predetermined requirements. Quality Control activities consist of submitting specific samples to participating laboratories, which are used to measure the accuracy and precision in analytical data. Quality control sample results are reviewed as part of the self-assessment program to determine if the monitoring data are meeting CERP Monitoring Program QA/QC goals.

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<sup>2</sup> While RECOVER and PDTs will need to designate their own QA Officers, the CERP Monitoring Program QA/QC will designate its own QA Officers to support RECOVER and PDTs QA Officers, when needed, to conduct laboratory audits, and to conduct field audits for CERP. This is done to maintain closer communication between RECOVER, PDTs, and the QAOT, on QA/QC issues and to make sure appropriate QA/QC expertise are assigned QA Officer responsibilities.

Examples of quality control samples include: blanks (trip blanks), field duplicates and/or replicates, splits, and known standards. The quality control process tasks include:

- Develop and oversee a quality audit program for CERP program- and project-level monitoring activities.
- Oversee the laboratory and field comparison (round-robin) studies program.
- Develop and oversee an evaluation program to assess the comparability of data collected and analyzed by the various entities involved in monitoring activities for CERP.
- Review quarterly QA/QC reports from program- and project-level monitoring activities to verify compliance with CERP Monitoring Program QA/QC criteria.

## **2.2 Lead Agencies Responsibilities**

The CERP Monitoring Program QA/QC is an equal partnership between the USACE Jacksonville District and SFWMD, which serve as the lead agencies and co-chairs of the QAOT. They represent the sponsoring agencies of the CERP Monitoring Program QA/QC and, as such, they will verify that monitoring data is of known quality and meets the data quality objectives established in program- and project-level activities. As it relates to QA/QC, the lead agencies have the following major duties (see CGM #41.00, November 19, 2003):

- Develop and implement data review criteria and assessment procedures.
- Oversee the approval process for alternative procedures for sampling and analysis as described in the QASR.
- Develop and Oversee a QA management audit program for CERP monitoring activities.
- Ensure data quality assurance and data quality investigations adhere to requirements in the QASR.
- Oversee the laboratory and field comparison studies program to assess consistency and comparability among agencies involved in CERP monitoring activities.
- Compile individual QA CERP reports and produce an integrated QA report on CERP projects to CERP and RECOVER management.
- Oversee and provide guidance in the development of QA Project Plans for CERP projects.
- Review RECOVER and project-level monitoring plans to ensure all required QA/QC protocols are addressed properly.

- Coordinate with the Water Quality and Adaptive Assessment teams of RECOVER on QA/QC and data quality issues.
- Coordinate with Project Delivery Teams on QA/QC and data quality issues.
- Coordinate with and reach out to participating laboratories and field sampling groups to ensure adequate training, coordination and consistency in laboratory and field procedures.
- Standardize the procedure of performing third party validation of field and laboratory analyses including data review and electronic data deliverables.

### **2.3 Roles of USEPA, FDEP, USGS, and USFWS**

Per CGM #41.00, the QAOT will have up-to six standing members, including the lead agencies above-mentioned. The responsibilities of the USEPA, FDEP, USGS, and USFWS are as follows:

- Active participation in QAOT activities, including meetings and workshops.
- Provide technical assistance and/or guidance as needed to the QAOT.
- The Florida Department of Environmental Protection will, in addition, maintain and seek implementation of relevant QA/QC regulations (such as the Florida Administrative Code, F.A.C., 62-160) and keep the QAOT apprised of relevant changes to these regulations.

### **3.0 Work Breakdown Structure**

A work breakdown structure represents the basic elements of a project (in this case, CERP QA/QC, a program-level activity for quality assurance and quality control throughout CERP project and program monitoring activities as part of the Comprehensive Plan implementation) that flows from the top element (CERP Monitoring Program QA/QC) through its QAOT team and ultimately to work products. The underlying philosophy of a work breakdown structure is to identify the layer of division where work products are assigned and accountability can be expected with respect to milestones and budget.

The work breakdown structure is developed from the QA/QC program's scope, and leads to the development of a schedule, budget and task lists. The schedule and budget for the CERP Monitoring Program QA/QC is included in the Appendix. The cost estimate for the Monitoring Program QA/QC activities is included in **Appendix A**. A workplan is included in **Appendix B**. The program costs shown in the appendix are USACE and SFWMD only, and do not reflect the contributions made by other agencies through their representatives that support the QAOT. What follows in this section is a breakdown of each CERP Monitoring Program QA/QC tasks, as implemented by the QAOT, by major program areas.

The following work breakdown structure is grouped first into the CERP Monitoring Program QA/QC Management activities followed by the QAOT roles and responsibilities required to accomplish the program's mission.

### **3.1 Monitoring Program QA/QC Management**

#### *3.1.1 Program Management*

3.1.1.1 Coordinate and/or facilitate relevant workshops, meetings, and coordination activities. Workshops and meetings are important ways of providing venues for discussing modifications to the QA/QC Program, reviewing project-level QA/QC performance for system-wide QA/QC deficiencies, developing strategies for activities, and coordinating with other CERP teams or project QA Officers. A contractor(s) will provide support, facilitation, coordination and documentation services for the workshops and meetings, as appropriate.

3.1.1.2 Prepare and update the program management plan. This activity includes the preparation and update, when necessary, of the program management plan for the CERP Monitoring Program QA/QC, the review necessary for plan approval, and public involvement.

3.1.1.3 Provide a link between QAOT and the Design Coordination Team. The USACE and SFWMD managers of CERP Monitoring Program QA/QC will sit as members of the DCT, keeping that body apprised of QAOT activities. The program managers will be responsible for communications to the DCT regarding: (a) QA/QC status and progress in project- and program-level data collection, (b) any technical or programmatic issues not resolved at the QA/QC Program level, (c) review of draft technical documents produced by QAOT, and (d) any matters brought before them that are more appropriately addressed by the DCT. A monthly progress report will be prepared for the DCT that includes a summary of work completed during the reporting period, work planned for the next reporting period, potential or active issues and actions taken to resolve issues and program milestones and status.

3.1.1.4 Coordinate independent, external peer review. A fundamental means for strengthening the quality of the science that is applied to the Comprehensive Plan is through independent peer review of appropriate technical documents and analytical tools. The Science Coordination Group, an organization newly formed by the South Florida Ecosystem Restoration Task Force, may provide one mechanism for ensuring peer review of QA/QC Program documents such as the QASR. In addition, independent technical review may occur through the journal publication process, expert assistance or other mechanisms typically employed by each agency. This task is for the coordination of these reviews by the QAOT, and does not include the actual costs of the reviews.

3.1.1.5 Coordinate preparation of and/or review of QAOT reports and guidance documents. The QAOT prepares and produces both technical and process documents in carrying out its mission. The program managers will coordinate the preparation,

review, and distribution of those documents. This task will be ongoing throughout the life of the CERP Monitoring Program QA/QC.

3.1.1.6 QAOT Document Control. The QAOT establishes a document control strategy for QASR/guidance documents - ensuring that QA/QC documents in use are the most current and approved versions available. Document control activities will be coordinated with data management groups as needed. Documentum, the CERP document management system, will be used for all program documents as needed.

### *3.1.2 Quality Assurance Oversight Team*

This section is organized by major program functions immediately followed by the roles and responsibilities of the QAOT. The QAOT identifies and helps to develop corrective and preventative actions to resolve systematic QA issues (e.g., tracking of system QA problems, identifying laboratories and procedures that do not meet CERP requirements, poor data from malfunctioning sensors).

#### 3.1.2.1 Program Document Development, Review and Revision.

The QAOT will provide QA/QC guidance for implementation of the CERP QA program outlined in the QASR (the QAOT compiles the methods and procedures being/to be followed in program- and project-level monitoring activities, compose the QASR, and seeks DCT approval of the document as appropriate). It will develop and seek DCT adoption of technical guidelines for estimating data quality in terms of precision (variability), bias (accuracy), representativeness, completeness and comparability, as appropriate, and incorporate data quality requirements in all projects and tasks involving environmentally related measurements.

3.1.2.1.1 CERP Annual QA/QC Report. The QAOT will prepare an annual integrated QA/QC report on CERP monitoring activities to CERP and RECOVER management. The report will be based upon the individual standardized QA/QC reports received from CERP program- and project-level QA Officers.

3.1.2.1.1.1 Reporting Requirements. The QAOT will develop standard reporting requirements and QA/QC report template(s) for QA Officers' use(s). The QAOT will also develop an SOP and report template(s) for reporting by QA Officers to the QAOT and will develop annual integrated QA/QC report template(s) for reporting findings to the DCT and RECOVER.

3.1.2.1.2 QA/QC Issues Resolution. The QAOT will develop a SOP in which recommendations/guidelines are provided to PDTs and RECOVER for resolving systematic and recurring QA/QC issues. Based on a random review of PDTs and RECOVER QA/QC reports, the QAOT may identify and will provide guidance on developing corrective and preventive actions to resolve systematic QA/QC issues. It is expected that the PDTs and/or RECOVER QA Officers will

seek the resolution of problems they identify or problems identified by the QAOT. The QAOT also identifies and helps to develop corrective and preventative actions to resolve systematic QA issues.

3.1.2.1.3 Data Deliverables and Formatting. QAOT will review QA/QC procedures followed by PDTs and RECOVER for data deliverables and data formatting as described in the QASR. This will help ensure data and formatting requirements are consistent and easily transferred for data storage and management. The QAOT will coordinate with the Data Management team to help ensure QA/QC requirements are in place to maintain consistent formatting and other data structure requirements.

3.1.2.1.4 QA/QC Elements in CERP Monitoring Activities. The QAOT will prepare an SOP for setting guidance, review of QA/QC elements and training activities to PDTs and RECOVER QA Officers. The QAOT will implement a process for randomly reviewing QA/QC documents, procedures and formatting for data deliverables as specified in the QASR. It is expected that PDTs and RECOVER QA Officers will conduct their individual monitoring activity reviews of procedures and formatting of data deliverables as specified in the QASR.

3.1.2.1.5 QASR Preparation and Updates. The QAOT will review current criteria and procedures specified in the QASR and revise where necessary. QAOT will seek continuous improvement of the QA/QC requirements to help ensure that CERP monitoring data is of known quality. The QAOT will issue notices to PDTs and RECOVER whenever improvements to the QASR have been made and will present, discuss, and seek DCT approval of the QASR document.

3.1.2.1.6 Management Audits. Management audits are defined as audits conducted in respect to the resources, systems, processes, structures and operational tasks of the QAOT. The objective is to maintain and enhance the proper management of the Monitoring Program QA/QC by the QAOT. This is achieved by providing independent assurance that QA/QC activities and delivery of data products are achieved in an economical, efficient and effective manner. The QAOT will prepare an SOP for conducting its QA/QC Program management audits and the results of such audits will be reported to the DCT.

3.1.2.1.7 Coordination of new or alternative methods or procedures. The QAOT will develop an SOP for the coordination of the review and approval of new or alternative procedures or analyses not included in the QASR. Any changes made in procedures or analyses will be reported to the PDTs and RECOVER QA Officers. The QAOT will inform and seek guidance of changes in alternative procedures from participating CERP agencies. The QAOT will establish and communicate to PDTs and RECOVER the requirements (such as a

validation package) to affirm that the new or alternative methods or procedures meet the QA requirements.

3.1.2.1.8 Field and Laboratory Comparability Studies. The QAOT will prepare an SOP for laboratory and field comparability studies. Field and laboratory comparability studies will be conducted to assure QA/QC protocols, SOPs, data handling, and other activities are adhered to over the lifetime of CERP monitoring activities.

3.1.2.1.9 Participate in the development of CERP Guidance Memoranda. As mandated or requested, QAOT members will participate in the development of CERP guidance required for the implementation of CERP QA/QC protocols and procedures in support of the Comprehensive Plan. The QAOT may recommend changes/revisions to current CGMs and other documents as needed to help ensure consistency among CERP guidance documents that include QA/QC elements.

### 3.1.2.2 Communications

3.1.2.2.1 Meeting with Project and RECOVER QA Officers. Semiannually, the QAOT will conduct a meeting with projects and RECOVER QA Officers to:

- Review, discuss and compile individual QA/QC reports (PDTs and RECOVER QA Officers will present and provide copies of their individual QA/QC reports to the QAOT).
- Inform PMs (through their QA Officers) of QAOT procedures and QA/QC requirements, assessment procedures, and assessment findings.

3.1.2.2.2 Reports. The QAOT will issue the following reports:

- *Quality Assessment Report*—Annually, the QAOT will deliver and communicate the findings of its annual QA/QC findings to CERP management (DCT and copy to RECOVER/PDTs). The report will be based on the individual QA/QC reports received from PDTs and RECOVER QA Officers and the audits conducted by the QAOT
- *Approval of New or Alternative Methods and Procedures*—The QAOT will communicate to PDTs, RECOVER QA Officers and PMs its process for coordinating the approval of new or alternative methods and procedures for use in CERP monitoring activities

3.1.2.3 Coordination with Other CERP Program Level Teams. The QAOT is a program-level team that reports to and seeks guidance from the DCT. In its effort to support the CERP Monitoring Program QA/QC, the QAOT will provide coordination and information exchange with the Data Management

Team. Moreover, the QAOT provides guidance to the PDTs and the RECOVER Leadership Group for implementation of the QA/QC Program through the individual program- and/or project-level monitoring efforts through the RECOVER MAP and PDTs.

3.1.2.3 Training and Technical Support. The QAOT will develop and provide a list of available QA/QC-subject area trainings to CERP PMs and QA Officers:

- Audit procedures
- QASR
- QA/QC Protocols
- QA/QC Reporting to QAOT

Not all training activities will be funded by the QA/QC Program. For example, training on QASR may be funded while training on hydrology, water quality or biology QA/QC procedures will not.

3.1.2.4 Quality Audit Programs. QAOT will ensure implementation of QA/QC protocols, outlined in the QASR or other CERP documents, are addressed in all contracts and financial assistance involving environmentally related measurements; including subcontracts and sub-agreements. The QAOT will help verify that all CERP monitoring activities adhere to the QASR. The QAOT expects that CERP QA Officers will conduct QA/QC investigations and report findings to the QAOT.

3.1.2.4.1 *QA Program Audits*—QAOT will conduct QA Program audits to (a) randomly assess conformance and effectiveness of review criteria and procedures as specified in the QASR; (b) perform random reviews of QAPPs, MPs, and SOWs and assess conformance to procedures and requirements; (c) randomly select and review audit reports submitted by QA Officers; (d) review project audit documents and perform random audits of conformance to CERP monitoring and QA/QC requirements; and (e) address issues identified by project audit results and provide guidance and recommendations for resolution.

3.1.2.4.2 *Laboratory, Field, and Project Audits*—QAOT will conduct laboratory, field, and project audits to: (a) provide feedback and guidance on contractual progress and the quality and consistency of work products and procedures for laboratory and field comparison evaluations; and (b) evaluate and provide approved or corrective measures to entities involved in CERP monitoring activities (including data or sample collection and analysis).

3.1.2.4.3 *Management Audits*—QAOT will conduct management audits to randomly address conformance and effectiveness of the QA program.

3.1.2.4.4 *Monitoring Program QA/QC Status Reporting*—QAOT will prepare an annual CERP-wide Quality Assessment report. The initial report will be produced in calendar year 2006 and submitted in January/February 2007.

#### **4.0 Change Control Procedures**

This Monitoring Program QA/QC Management Plan extends over a three-year period (2005 to 2007) and will be updated before the beginning of Fiscal Year 2008. This management plan incorporates flexibility into its design and will be updated as necessary during the three-year period. Any significant changes in scope, schedule or cost will be presented to the DCT for review and approval.

#### **5.0 List of Management Plan Preparers**

The following individuals prepared this plan: Delia Ivanoff, South Florida Water Management District and Orlando Ramos-Gines, U.S. Army Corps of Engineers.

#### **6.0 Summary of Work In-Kind Services**

The SFWMD will receive work-in-kind credit for work performed under the QAOT activity. The SFWMD will transmit a letter requesting work-in-kind credit with this management plan to the USACE. The SFWMD will prepare quarterly reports detailing in-kind work under this activity. The USACE will review the work-in-kind credit reports and provide SFWMD with a letter indicating approval of in-kind work completed.

## 7.0 References

- RECOVER. 2003. Draft CERP Quality Assurance System Requirement Manual. Restoration Coordination and Verification Program, c/o Jacksonville District, United States Army Corps of Engineers, Jacksonville, Florida, and South Florida Water Management District, West Palm Beach, Florida.
- RECOVER. 2004. CERP Monitoring and Assessment Plan. Restoration Coordination and Verification Program, c/o Jacksonville District, United States Army Corps of Engineers, Jacksonville, Florida, and South Florida Water Management District, West Palm Beach, Florida.
- RECOVER. In prep. CERP System-wide Performance Measures. Restoration Coordination and Verification Program, c/o Jacksonville District, United States Army Corps of Engineers, Jacksonville, Florida, and South Florida Water Management District, West Palm Beach, Florida.
- USACE and SFWMD. 1999. Central and Southern Florida Project Comprehensive Review Study Final Integrated Feasibility Report and Programmatic Environmental Impact Statement. United States Army Corps of Engineers, Jacksonville District, Jacksonville, Florida, and South Florida Water Management District, West Palm Beach, Florida.
- USACE and SFWMD. 2000a. Mater Program Management Plan. Comprehensive Everglades Restoration Plan, United States Army Corps of Engineers, Jacksonville District, Jacksonville, Florida, and South Florida Water Management District, West Palm Beach, Florida.
- USACE and SFWMD. 2000b. Design Agreement between the Department of the Army and South Florida Water Management District for the Design of the Elements of the Comprehensive Plan for the Everglades and South Florida Ecosystem Restoration Project. United States Army Corps of Engineers, Jacksonville District, Jacksonville, Florida, and South Florida Water Management District, West Palm Beach, Florida.
- U.S. Congress. 2000. Water Resources Development Act of 2000. Public Law No. 106-541, signed December 11, 2000. Title VI, Section 601, of the act, describes authorizations specific to the Comprehensive Everglades Restoration Plan.

## 8.0 Lead Agencies Responsibilities and QAOT Tasks

| LEAD AGENCY ROLES & RESPONSIBILITIES   | Program Document Development, Review and Revision | Communication | Training and Technical Support | Quality Audit Programs | QA/QC Status Reporting |
|--|---|---------------|--------------------------------|------------------------|------------------------|
| QAOT Tasks   |   |               |                                |                        |                        |
| <b>Prepare and Maintain The QASR</b>   |   |               |                                |                        |                        |
| Develop and maintain the QASR (coordinates revisions, reviews, recommendations to DCT, maintain/edit/update QASR).             | X   |               |                                |                        |                        |
| <b>Prepare an Annual QA Report</b>   |   |               |                                |                        |                        |
| Prepare an annual integrated QA report (CERP Annual Quality Assessment Report) on CERP projects to CERP and RECOVER management | X   |               |                                |                        |                        |
| Develop reporting requirements and templates for QA Officers   | X   |               |                                |                        |                        |
| Meet with QA Officers twice annually to compile and review QA reports  |   | X             |                                |                        |                        |
| Prepare an annual CERP-wide QA report  |   |               |                                |                        | X                      |
| Develop an SOP and report templates for reporting by QA Officers and for the final annual integrated QA report                 | X   |               |                                |                        |                        |
| Deliver and communicate the findings of the annual QA report to users and program managers                                     |   | X             |                                |                        |                        |
| <b>Coordinate with RECOVER and Project Delivery Teams Conducting Monitoring Activities</b>                                     |   |               |                                |                        |                        |
| Develop an SOP for providing recommendations to resolve systematic and recurring QA/QC issues                                  | X   |               |                                |                        |                        |
| Review QA/QC procedures for data deliverables and data formatting as described in the QASR                                     | X   |               |                                |                        |                        |
| Prepare an SOP for setting guidance, review of QA/QC elements and training activities  | X   |               |                                |                        |                        |
| Communicate QA/QC requirements and QAOT procedures to QA Officers and PMs through training activities                          |   | X             |                                |                        |                        |
| Provide technical support to laboratory and field participants   |   |               | X                              |                        |                        |
| Help ensure adequate training, coordination, and consistency are maintained in laboratory and field procedures                 |   |               | X                              |                        |                        |
| <b>Develop and Implement Review Criteria and Assessment Procedures</b>   |   |               |                                |                        |                        |
| Review QA/QC requirements, procedures as specified in the QASR and provide modifications where necessary                       | X   |               |                                |                        |                        |
| Inform PMs, consultants and contractors of review criteria and QA/QC assessment procedures                                     |   | X             |                                |                        |                        |
| Inform PMs of QAOT procedures and QA/QC requirements   |   | X             |                                |                        |                        |
| Randomly assess conformance and effectiveness of review criteria and procedures as specified in the QASR                       |   |               |                                | X                      |                        |

| <b>LEAD AGENCY ROLES &amp; RESPONSIBILITIES</b>  | Program Document Development, Review and Revision | Communication | Training and Technical Support | Quality Audit Programs | QA/QC Status Reporting |
|--|---|---------------|--------------------------------|------------------------|------------------------|
| QAOT Tasks   |   |               |                                |                        |                        |
| <b>Standardize Format and Minimum Content For Data Deliverables</b>                                  |   |               |                                |                        |                        |
| Review QA/QC procedures for data deliverables and data formatting as described in the QASR           | <b>X</b>  |               |                                |                        |                        |
| Prepare SOP that sets guidance and provides for the review of QA/QC elements                         | <b>X</b>  |               |                                |                        |                        |
| Perform random reviews of QAPPs, MPs, and SOWs and assess conformance to procedures and requirements |   |               |                                | <b>X</b>               |                        |
| <b>Develop and Oversee a QA Management Audit Program</b>   |   |               |                                |                        |                        |
| Develop QA Management Program  | <b>X</b>  |               |                                |                        |                        |
| Implement and Oversee QA Management Program  |   | <b>X</b>      |                                |                        |                        |

**Appendix A: FY 2007 - FY 2011 Total Cost Estimates**

| Item   | FY-2007           |                   | FY-2008           |                   | FY-2009           |                     |
|--|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------|
|  | USACE             | SFWMD             | USACE             | SFWMD             | USACE             | SFWMD               |
| Program Management   |                   |                   |                   |                   |                   |                     |
| Chair Labor and Travel (see note 1)                                    |                   | 50,000            |                   | 60,000            |                   | 63,000              |
| Contractual Support (see note 2)                                       |                   | 84,000            |                   | 100,000           |                   | 105,000             |
| QAOT   |                   |                   |                   |                   |                   |                     |
| Inhouse Support (Other than audits)                                    | 195,000           | 27,000            | 204,750           | 50,000            | 214,988           | 53,000              |
| External Contractual Support (other than audits)                       |                   | 35,000            |                   | 50,000            |                   | 53,000              |
| Audits - Water Quality Field and Laboratory (Inhouse Labor and Travel) | 250,000           | 25,000            | 262,500           | 30,000            | 250,000           | 115,500             |
| Audits - Water Quality Field and Laboratory (Contractual)              |                   | 100,000           |                   | 110,000           |                   | 120,000             |
| Audits - Ecological/Biological/Hydrology (Contractual)                 |                   | 50,000            |                   | 80,000            |                   | 100,000             |
| <b>TOTALS</b>  | <b>\$ 445,000</b> | <b>\$ 371,000</b> | <b>\$ 467,250</b> | <b>\$ 480,000</b> | <b>\$ 464,988</b> | <b>\$ 609,500</b>   |
| <b>GRAN TOTALS</b>   | <b>\$</b>         | <b>\$ 816,000</b> | <b>\$</b>         | <b>\$ 947,250</b> | <b>\$</b>         | <b>\$ 1,074,488</b> |

| Item   | FY-2010           |                     | FY-2011           |                     |
|--|-------------------|---------------------|-------------------|---------------------|
|  | USACE             | SFWMD               | USACE             | SFWMD               |
| Program Management   |                   |                     |                   |                     |
| Chair Labor and Travel (see note 1)                                    |                   | 67,000              |                   | 70,350              |
| Contractual Support (see note 2)                                       |                   | 110,000             |                   | 115,500             |
| QAOT   |                   |                     |                   |                     |
| Inhouse Support (Other than audits)                                    | 225,737           | 56,000              | 237,024           | 58,800              |
| External Contractual Support (other than audits)                       |                   | 56,000              |                   | 58,800              |
| Audits - Water Quality Field and Laboratory (Inhouse Labor and Travel) | 300,000           | 110,000             | 315,000           | 115,500             |
| Audits - Water Quality Field and Laboratory (Contractual)              |                   | 130,000             |                   | 136,500             |
| Audits - Ecological/Biological/Hydrology (Contractual)                 |                   | 110,000             |                   | 115,500             |
| <b>TOTALS</b>  | <b>\$ 525,737</b> | <b>\$ 639,000</b>   | <b>\$ 552,024</b> | <b>\$ 670,950</b>   |
| <b>GRAN TOTALS</b>   | <b>\$</b>         | <b>\$ 1,164,737</b> | <b>\$</b>         | <b>\$ 1,222,974</b> |

| Fiscal Year         | USACE               | SFWMD               |
|---------------------|---------------------|---------------------|
| 2007                | \$ 445,000          | \$ 371,000          |
| 2008                | 467,250             | 480,000             |
| 2009                | 464,988             | 609,500             |
| 2010                | 525,737             | 639,000             |
| 2011                | 552,024             | 670,950             |
| <b>GRAND TOTALS</b> | <b>\$ 2,454,999</b> | <b>\$ 2,770,450</b> |
| <b>Distribution</b> | <b>47%</b>          | <b>53%</b>          |

NOTES:

1. Corps QAOT Chairs labor and travel funds under the RECOVER PLA.
2. EPJV support for meetings.

**Appendix B: FY 2007 - FY 2011 Work Breakdown**











