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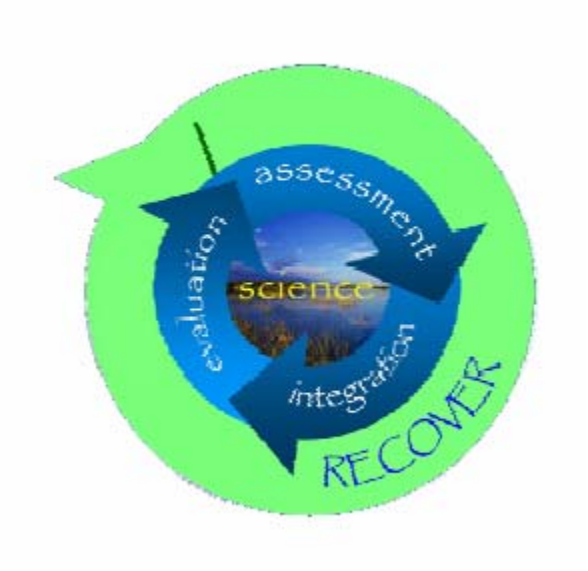
Monitoring and Assessment Plan (MAP), Part 2
2006 Assessment Strategy for the MAP

Final Draft



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1.0 INTRODUCTION

The Comprehensive Everglades Restoration Plan (CERP or Plan) monitoring program is built upon a strong science foundation that is logistically and economically feasible, sustainable over the long term, and provides data at appropriate spatial and temporal scales to conduct assessments of the status and trends of those physical, chemical, and biological attributes that support the CERP Adaptive Management (AM) Program. The CERP Monitoring and Assessment Plan (MAP) was developed with these characteristics in mind, and it reflects the Monitoring Program Planning Guidelines presented in Section 9.5.3 of the Central and Southern Florida (C&SF) Project Comprehensive Review Study Final Integrated Feasibility Report and Programmatic Environmental Impact Statement (U.S. Army Corps of Engineers [USACE or Corps] and the South Florida Water Management District [SFWMD] 1999) and the Applied Science Strategy (Ogden and Davis 1999, Ogden et al. 2003). These guidelines were used to define the scope and focus of the MAP and to determine its major components.

Natural and human system attributes prior to, during and following CERP implementation will be compared to the trends or targets established for each performance measure. These comparisons will be used for evaluating how the implementation of CERP projects, individually and collectively meet the overall goals and objectives of the CERP. The combined responses from the full set of performance measures will determine CERP's overall success.

Once analyzed and interpreted, monitoring data will be used for six broad purposes in support of the CERP:

1) Assess and document progress towards meeting performance measure targets and interim and long-term goals
2) Detect undesirable system responses as early as possible in order to minimize the adverse effects of these responses
3) Provide a basis for identifying options for improvements in the design and operation of CERP projects and components
4) Develop reports on the status and progress of the CERP for the agencies involved, the public, Congress, the Florida Legislature, and stakeholders
5) Evaluate CERP hypotheses and performance measures and revise conceptual ecological models as appropriate
6) Enhance predictive ability through improvements in simulation models before and after project construction

The purpose of this document is to present a clear understanding of the assessment process that replaces the current Section 2.0 (Technical Assessment Guidance Process) of the MAP. The principal clients for this document are Restoration Coordination and Verification (RECOVER), the Assessment Team (AT), the Integrative Assessment Team (IAT), MAP Module Groups and Leads and their Principal Investigators (PIs) (see

Section 2.2.3) who have the responsibility for conducting the assessment of MAP monitoring information and preparing annual reports on their findings. Because of the continued and rapid development of analytical methods used for the assessments the IAT anticipates that this will be a "living document" in that it will be regularly updated as relevant information becomes available. The technical assessment reports that will be developed by RECOVER using this assessment strategy will be used to satisfy a variety of reporting requirements for CERP.

RECOVER will periodically issue technical reports on CERP's progress based on comparisons between the measured performance of the CERP and the performance measure's restoration targets (Figure 1-1). These technical reports will identify where ecosystem responses to the CERP are on track to meet the goals of the plan and/or where performance does not meet expectations. Where responses occur or are anticipated based on initial interpretations of monitoring and research data, the technical reports will seek to identify whether these responses are due to some structural or operational component of the restoration plan or are external to the plan.

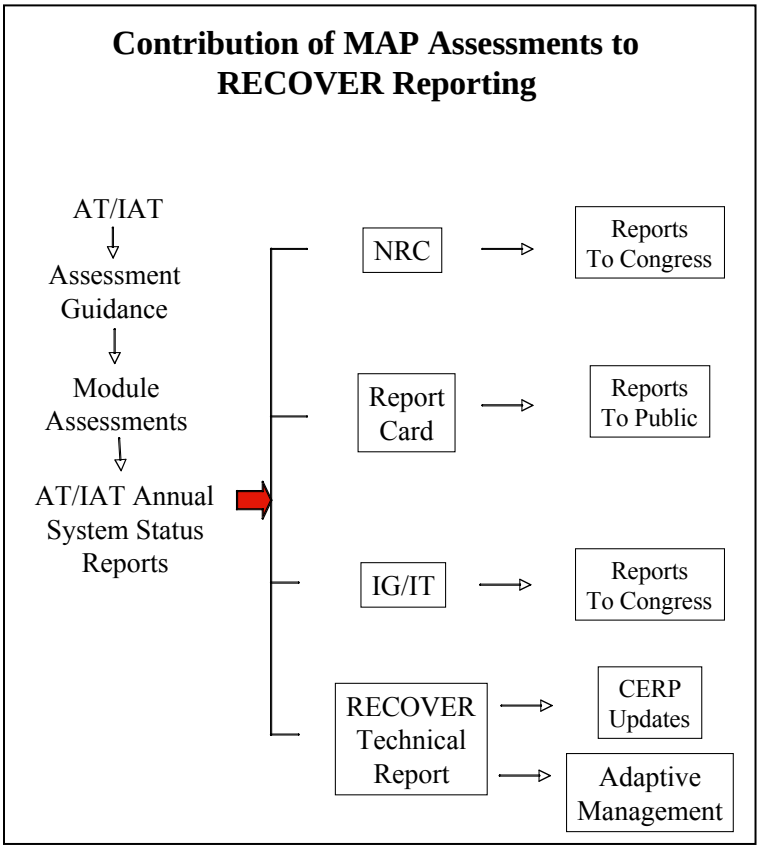

Figure 1-1: RECOVER Reporting Requirements

These technical reports will be consulted and referenced by the Corps and the SFWMD when preparing assessment reports as required by the Programmatic Regulations (DOD 2003). The technical reports and assessments of key indicators will be the source of information in preparing a proposed CERP Report Card to be issued to the public, stakeholders, and legislators.

1.1 Purpose of Technical Assessment Guidance Process

The objective of MAP is to assess the performance of CERP implementation, as described previously. As part of MAP, pre-CERP reference conditions in the South Florida Ecosystem will be characterized and compared with post-CERP conditions using scientifically rigorous analyses of hypotheses and changes in performance measures. The purpose of the MAP technical assessment guidance process is to provide a systematic

framework for analyzing relevant monitoring data and providing feedback to support, improve, or change the CERP monitoring and research design. CERP performance measures are defined by measurable indicators with quantitative targets or assessed by trend analysis (i.e. direction of change). This guidance process is applicable to all adaptive management monitoring tasks within CERP (e.g. MAP Module Groups, Project Delivery Teams [PDTs], and contracts,) and will therefore provides a means of comparable data analyses, minimize debate regarding analyses methods, and subsequently allow decision-makers to focus on the results of the analyses. The characterization of pre-CERP conditions will provide the baseline from which to measure the magnitude and direction of ecosystem responses during and following CERP implementation. The key principles of the technical assessment guidance follow.

1) The guidance is generic and designed to be applicable to a wide range of CERP monitoring components and other CERP programs not included in the current MAP.
2) The guidance provides the MAP Module Groups with a systematic framework and process for analyzing databases.
3) The guidance provides "minimum" criteria to ensure consistency and uniformity in conducting assessments.
4) The guidance process is not intended to be a "cook-book"; it is flexible and allows innovative analysis approaches that are consistent with the overall technical assessment process.
5) The guidance process provides references and/or case-study examples to illustrate the application of important concepts.

1.2 Programmatic Regulations

The Programmatic Regulations (Pro Regs) for CERP authorize the implementation of an adaptive management strategy to improve our understanding of, and subsequently support the restoration of, the natural system and the human environment of the South Florida ecosystem. The guidance process presented here represents a vital part of the Guidance Memorandum for “general directions for the conduct of the assessment activities of RECOVER” required by the Pro Regs [Section 385.31(a)(2)(iv)].

This guidance process will address the three principal RECOVER tasks stipulated in the Pro Regs [Section 385.31(b)(3)] and listed below.

1) Determine if measured responses are desirable and achieving the Interim Goals and the Interim Targets or the expected performance level of the Plan.
2) Evaluate whether corrective actions to improve performance or cost-effectiveness should be considered.
3) Prepare reports on the status of the CERP projects and trends in ecosystem responses to the CERP projects.

The Pro Regs specify that "whenever it is deemed necessary, but at least every five years, RECOVER shall prepare a technical report that presents an assessment of whether the goals and purposes of the Plan, including the Interim Goals and Interim Targets, are being achieved or are likely to be achieved. The technical report shall be submitted to the Corps and to the SFWMD for use in preparing the Interagency Assessment Report for submittal to Congress, as required in Section 385.31(b)(4)(i).

1.3 Adaptive Management

The CERP is a large-scale, long-term plan to restore, preserve, and protect the natural systems in South Florida while addressing other water-related needs in South Florida, including water supply and flood protection. However, ecosystem restoration is inherently uncertain, owing to the complex and often unexpected responses of natural systems to human intervention.

Congress recognized the challenge posed by uncertainty when it approved the CERP and the Water Resources Development Act (WRDA) of 2000 specifically provided funds for an Adaptive Assessment and Monitoring (AA&M) Program, and required the development of Pro Regs, which ensured that new scientific or technical information acquired due to unexpected results, or the application of AM be integrated into the Plan. The Pro Regs direct the Corps and the SFWMD to develop a CERP AM program that includes monitoring and assessment of the ecosystem, as well as periodic updates and necessary changes to the Plan.

The MAP incorporates AM to assess whether CERP projects are meeting restoration goals and targets and refine the Plan based on this assessment. The AM component of CERP is a science and performance based approach to ecosystem management that relies on a continual process of refining and improving the Plan based on new information, rigorous monitoring, and assessment. Consequently, alternative actions can be developed and the best course of action can be selected. Appropriate application of adaptive management improves the likelihood of meeting desired targets and goals by reducing uncertainty, incorporating robustness into project design, and incorporating new information about ecosystem interactions and processes.

1.3.1 Adaptive Management Framework

The CERP AM Framework (Figure 1-2) is composed of four elements or "boxes" that together outline the process for, and the interactions among, the various components of a comprehensive AM program designed to address uncertainty and support collaborative decision making. The four boxes are: (1) Project Development; (2) Performance Assessment; (3) Management and Science Integration; and (4) the CERP Update Process. These elements are discussed further in Section 7.

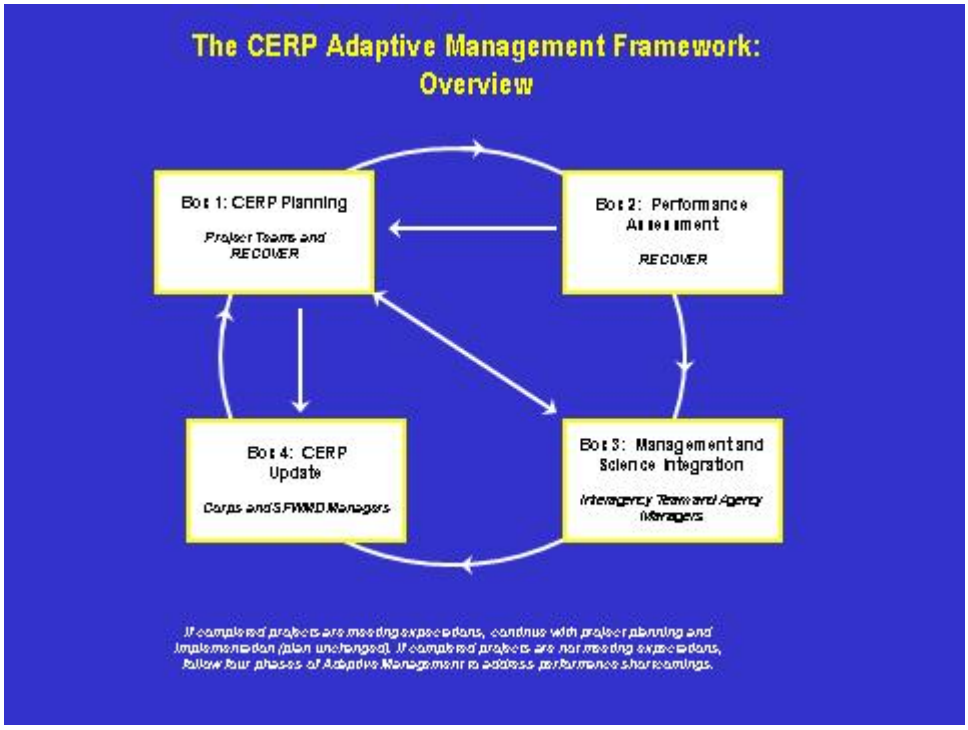

Figure 1-2: The CERP Adaptive Management Framework which illustrates the four elements (boxes) in the AM Framework.

Box 1, Project Development, is defined by the appropriate CERP project and project team. The remaining elements are described in the following sections.

1.3.2 Performance Assessment (Box 2)

An essential element of the CERP AM program is the development and implementation of the integrated system-wide MAP, prepared by RECOVER (Figure 1-3). The implementation of the MAP allows natural and human system responses to be assessed in the context of hypotheses specific to these ecosystems and evaluated relative to established CERP targets using PMs and Interim Goals and Targets (IG/IT). The MAP is a key element of the Performance Assessment component (Box 2) and is essential to CERP success because the monitoring and assessment provide the feedback necessary to identify and implement necessary refinements to the Plan. The scientific and technical information generated from implementation of the MAP provides the technical basis for RECOVER annual system status reports and a five-year technical report that documents the success of the CERP goals, targets and objectives.

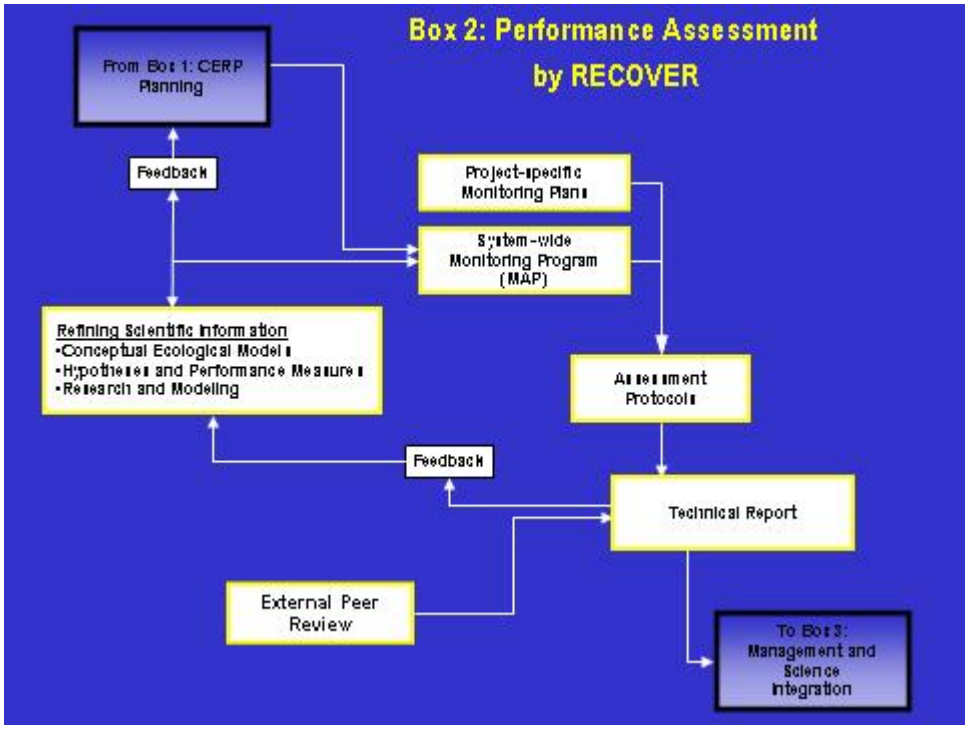

Figure 1-3: Performance Assessment (Box 2) describes how monitoring data is evaluated annually to assess the performance of CERP.

In response to the Pro Regs, the IG/IT have been established to provide a means of documenting CERP progress. Several MAP technical reports will provide RECOVER the means to determine if CERP IG/IT are being accomplished. Additionally, as ecosystem relationships are better understood and predictive capabilities improve, the IG/IT will be refined to more accurately reflect CERP expectations. This incorporation of new information and subsequent Plan refinement to improve performance embodies the ongoing responsiveness of the AM process.

The final product of the Performance Assessment is the RECOVER Technical Report which represents a system wide and science based assessment of CERP performance toward achieving the goals and purposes of the Plan. The RECOVER Technical Report will be compiled at (a minimum of) five year intervals and used, along with policy, legal, and cost considerations (Box 3) to develop the Interagency Assessment Report to be submitted to Congress (Figure 1-3).