

3.0 Relationship to CERP Adaptive Management Framework

Adaptive management provides resource managers with an active strategy for dealing with considerable uncertainties that characterize management of large natural ecosystems. Natural systems are remarkably complex and it is difficult to predict how the system will respond to restoration and management efforts. Adaptive management is used to develop opportunities to increase knowledge by applying methods of scientific inquiry to planning, implementation and assessment of ecosystem management projects. The CERP Adaptive Management Strategy (RECOVER 2006a) provides a formal process for CERP refinement and addressing uncertainties inherent in implementing and managing large-scale ecosystem restoration programs. This approach supports improved decision making and plan performance over time. Performance measures are an integral component of CERP adaptive management, allowing program and project managers to gain knowledge to improve restoration success.

The CERP Adaptive Management Framework (**Figure 3-1**) is a graphical overview of the CERP adaptive management process. This framework identifies four major components of the CERP Adaptive Management Strategy and shows how these components link together (RECOVER 2006a). The four strategy components are Box 1: CERP Planning, Box 2: Performance Assessment, Box 3: Management and Science Integration, and Box 4: CERP Update Process. CERP system-wide performance measures are integral to CERP planning (Box 1) and performance assessment (Box 2) processes. The role of performance measures in these processes is discussed below. Even though information from performance measures may contribute to integrating management and science (Box 3) and to decisions made to update CERP (Box 4), performance measures themselves are not an explicit component of these processes.

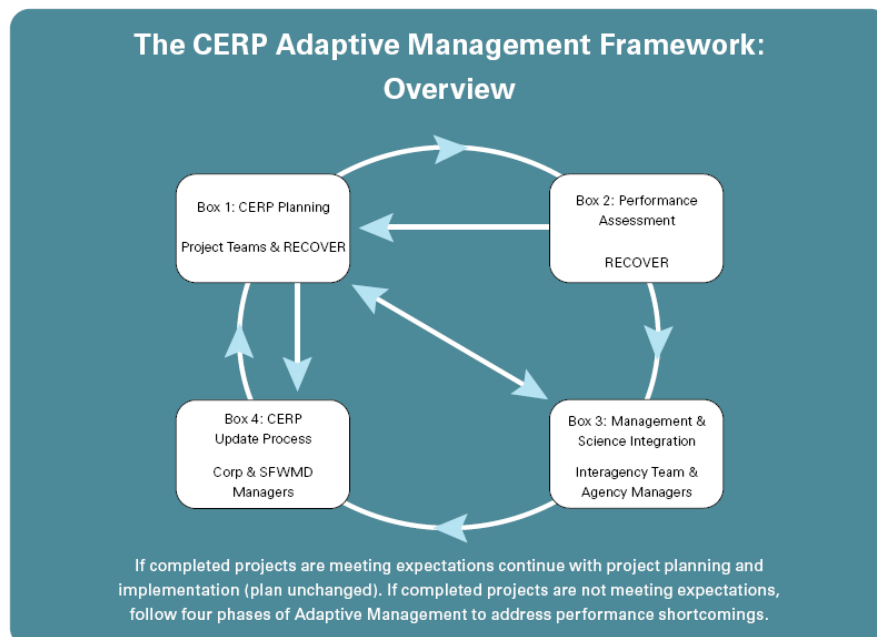
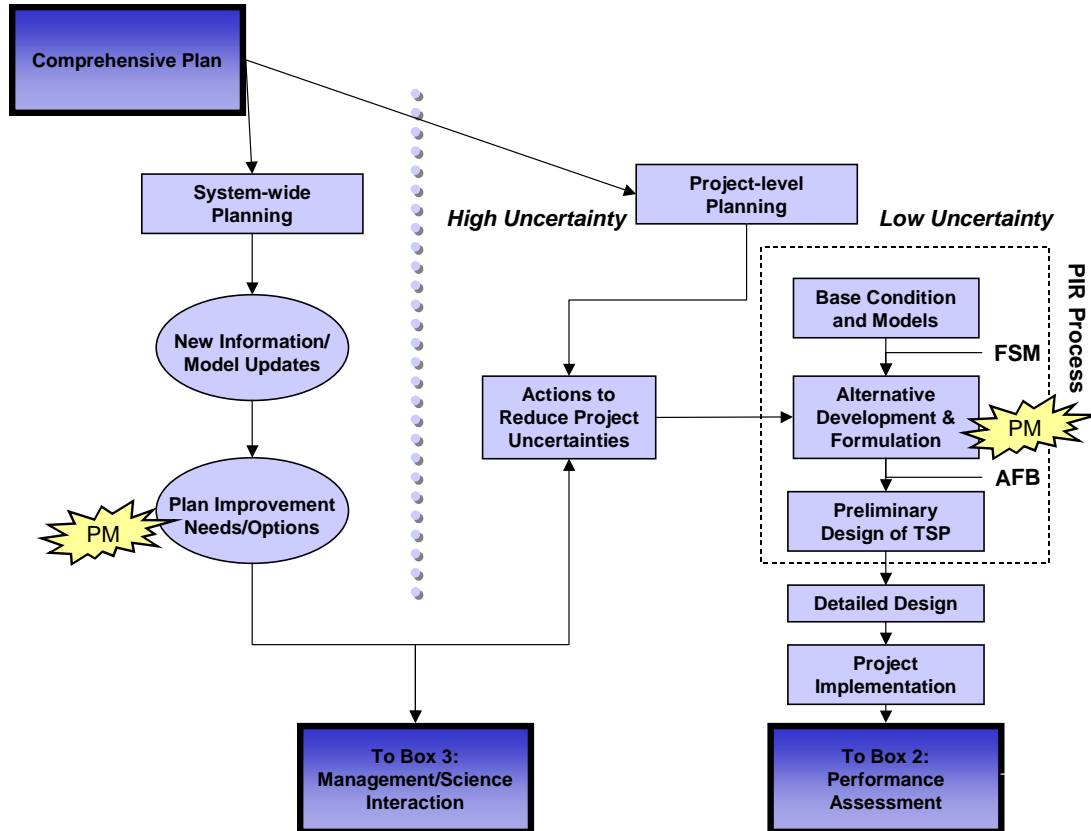


Figure 3-1. CERP Adaptive Management Framework

3.1 Box 1: CERP Planning

The goal of Box 1: CERP Planning is to apply adaptive management principles during system-wide and project planning by addressing performance uncertainties and incorporating performance-based versatility and recommended CERP improvements into project designs. **Figure 3-2** illustrates adaptive management principals that play a role in the planning process.



PM = performance measure, TSP = tentatively selected plan, FSM = feasibility scoping meeting, AFB = alternatives formulation briefing, PIR = project implementation report

Figure 3-2. Box 1: CERP Planning

Performance measures play a vital role in both system-wide and project planning activities. CERP is composed of 68 major components broken down into over 40 projects. Each project has or will have a project team that develops and uses project-level performance measures during the planning phase. RECOVER is responsible for providing technical and scientific support to CERP on a system-wide scale. To this end, RECOVER develops and uses system-wide performance measures.

Within project planning (i.e., alternative plan development and formulation), RECOVER is responsible for evaluating performance of project alternative plans using CERP system-wide performance measures, project performance measures, and best professional judgment. RECOVER will also describe the ability of each alternative plan to meet

targets established for each performance measure and describe expected effects on the natural system. Similarly, when investigating system responses to large planning scenarios (e.g., sensitivity analysis of sea-level rise, updated modeling assumptions), RECOVER evaluates CERP's ability to meet targets established for system-wide performance measures.

3.2 Box 2: Performance Assessment

Monitoring and assessment of the South Florida ecosystem must be undertaken to determine success of CERP implementation and to provide a feedback mechanism to improve future planning decisions. RECOVER is using a hypothesis-based approach for assessment of system performance, which will provide a more robust and flexible approach than addressing individual performance measures. This approach takes into consideration complexities of ecological responses being measured by CERP system-wide and project-level monitoring by assessing their status and trends using multiple measures (clusters of physical, water quality and ecological attributes). This approach attempts to capture mechanistic interactions of multiple stressor-response pathways rather than relying on one metric to characterize ecological complexity (RECOVER 2006b).

Figure 3-3 shows the framework for integrating adaptive management into the performance assessment process. System responses to CERP implementation will be monitored and assessed through the CERP Monitoring and Assessment Program (MAP). This program is described in two documents: *CERP Monitoring and Assessment Plan: Part 1, Monitoring and Supporting Research* (RECOVER 2004) and draft *Monitoring and Assessment Plan (MAP), Part 2 2006 Assessment Strategy for the MAP* (RECOVER 2006b).

RECOVER will produce technical reports (referred to as system status reports) every two years describing and interpreting ecosystem responses. During this process, hypotheses clusters will be tested, refined and updated. Updated hypotheses clusters will serve as the basis for revisions and improvements to conceptual ecological models that depict ecosystem relationships and system-wide performance measures developed from these models. Interim goals and targets are also part of the performance assessment process. These are described in Section 5.

It is necessary that a feedback loop exist between evaluation performance measures used for CERP planning (Box 1; **Figure 3-2**) and collection and assessment of monitoring data (Box 2; **Figure 3-3**) and. Because performance measures play an integral role in describing project performance at the system-wide scale, it is important that evaluation tools used to evaluate system-wide performance measures are developed, refined and revised as understanding of the ecosystem grows. It is through continual collection of monitoring data, calibration and verification of evaluation tools, and development of new tools to evaluate ecosystem responses to CERP implementation that the ability to plan projects to meet system-wide performance targets is improved. This feedback mechanism from monitoring and assessment data to evaluation tools for project planning is a key adaptive management principle incorporated into the CERP Adaptive Management Strategy.

IG/IT = interim goals and targets

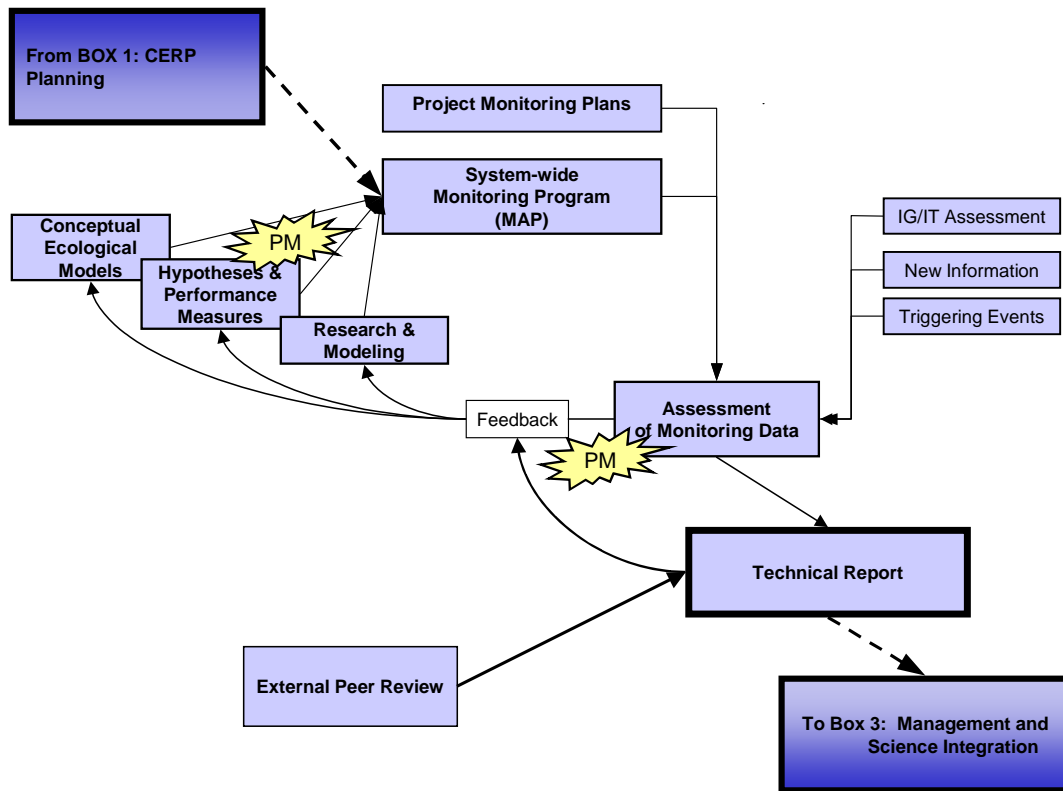


Figure 3-3. Box 2: Performance Assessment

3.3 References

RECOVER. 2004. CERP Monitoring and Assessment Plan: Part 1 Monitoring and Supporting Research. Restoration Coordination and Verification Program, c/o United States Army Corps of Engineers, Jacksonville District, Jacksonville, FL, and South Florida Water Management District, West Palm Beach, FL. www.evergladesplan.org/pm/recover/recover_map.aspx

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