Appendix 7-3: RECOVER Activities Update

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RECOVER ACTIVITIES

2009 SYSTEM STATUS REPORT

The Comprehensive Everglades Restoration Plan (CERP) 2009 System Status Report (RECOVER, 2010a) is a formal assessment of data generated from the CERP Monitoring and Assessment Plan (MAP) (RECOVER, 2004; 2006; 2009) implemented by the Restoration Coordination and Verification Program (RECOVER). Data are assessed biennially to establish pre-CERP reference conditions, and ultimately determine whether the goals and objectives of CERP are being met. A robust system-wide monitoring and assessment program like the MAP is a key component of the CERP Adaptive Management Program. Adaptive management is a structured management approach linking science to decision making in order to improve the probability of restoration success. Scientific information collected by the MAP and reported in System Status Reports is fed into the decision-making process, allowing managers and decision makers to use the best available science during CERP implementation.

The 2009 System Status Report is formatted as an interactive web page accessible from www.evergladesplan.org/pm/ssr_2009/ssr_main.aspx. This web-based approach allows managers, stakeholders, and scientists with many different interests and degrees of technical expertise to easily find needed information. Key findings, which provide a high-level synthesis of the assessments, are available directly from the System Status Report home page. Detailed information about each geographic MAP module (Lake Okeechobee, Northern Estuaries, Greater Everglades and Southern Coastal Systems) are also available on the interactive web page. Information on the web page is not only organized geographically but thematically as well, allowing users to directly view the status and trends of key ecological indicators such as oysters or sheetflow.

In the current report, information is presented in a hierarchical way. Users can access very general information about each assessment (e.g., general trends in wading birds), slightly more detailed information (e.g., location and number of wading bird nests in Everglades National Park), or very detailed information (e.g., specific wading bird survey techniques by location) by downloading reports developed by MAP principal investigators.

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ADAPTIVE MANAGEMENT INTEGRATION GUIDE AND GUIDANCE MEMORANDUM

With the authorization of CERP, it was recognized that an adaptive management approach must be used to address the many uncertainties about how to best implement the various project components to ultimately achieve the program's overall goals and objectives. Adaptive management is a formal process for continually improving management policies and practices by learning from their outcomes. In the context of CERP, adaptive management is a structured management approach for addressing uncertainties by testing hypotheses, linking science to decision making, and adjusting implementation, as necessary, to improve the probability of restoration success. It is acknowledged that much uncertainty is associated with the ability to predict ecological restoration responses versus engineering outcomes, even when cause-and-effect ecological relationships are fairly well understood. With this in mind, a sound adaptive management approach is fundamental to most effectively implement the CERP program.

In 2006, the CERP Adaptive Management Strategy (RECOVER, 2006) was developed by the RECOVER interagency team to provide a general framework for applying adaptive management to Everglades restoration. The U.S. Army Corps of Engineers (USACE) requires an adaptive management plan be prepared for all ecosystem restoration projects. Building on this foundation, an Adaptive Management Integration Guide has been developed (RECOVER, 2010b). This guide describes how to apply adaptive management to the CERP program and its related projects by addressing key uncertainties and incorporating adaptive management activities into existing CERP planning and implementation processes. Collectively, the adaptive management principles outlined in this guide are framed into nine activities, which complement the USACE six-step planning process being used to prepare CERP Project Implementation Reports. The guide comprises four sections highlighting the (1) core principles of CERP adaptive management, (2) nine-activity process for applying these principles to CERP, (3) step-wise tasks for integration into the existing CERP process and project lifecycle, and (4) essential criteria that can be used to assess if subsequent results are successful. To supplement this information, further details on applying adaptive management to USACE planning is presented in the CERP Guidance Memorandum 56 (RECOVER, 2010c).

Adaptive management is not a linear course and new information can be incorporated into CERP at any stage of a project's lifecycle. Specifically, this is an iterative process intended to be used early and often to raise key questions and communicate with managers and other governmental and non-governmental stakeholders about the desired approach to achieve restoration goals, identify ways to deal with major issues and uncertainties at both program and project levels, provide new information, and improve understanding in order to maximize CERP program/project design and execution. The Adaptive Management Integration Guide outlines a process for improving communication and collaboration with all stakeholders — both governmental and non-governmental — during the planning process as well as the operation, monitoring, assessment, and feedback phases. This is important for project managers, as several CERP projects have completed the planning process and are beginning design or construction.

The adaptive management activities covered in the Adaptive Management Integration Guide can be done efficiently during either planning or other project stages. It is important to note that the integration of adaptive management principles into CERP is not intended to add process or cost, but is expected to improve restoration success by addressing key issues and uncertainties at the proper time. The guide reflects how new monitoring data and other relevant information can be used by key stakeholders for making future decisions. It is anticipated this will result in a more focused, optimized approach toward key project-related efforts, not in additional monitoring. It is also foreseen that a passive adaptive management approach will be used in most cases, in which hypotheses regarding key restoration benefits will be addressed through planning, post-

construction monitoring, operations, assessment, and feedback to management. In a few cases, more active measures, where key uncertainties are more thoroughly addressed before the project is fully implemented, may be beneficial. Overall, the guide provides several key resources and sufficient detail for project managers and teams to reduce or eliminate key uncertainties and increase the likelihood of meeting restoration goals and objectives. CERP Project Delivery Teams will use the adaptive management principles as part of project planning or design, particularly as the potential for restoration success greatly increases with this approach.

2015 BAND 1 CERPA UPDATE REPORT

RECOVER conducts periodic system-wide updates to the modeling conditions used for CERP. These updates are mandated by the Programmatic Regulations (DOD, 2003). These updates include an evaluation of the current plan using new or updated modeling and incorporate information regarding CERP and other state and federal projects in South Florida as well as the latest scientific, technical, and planning information. RECOVER reviews the updated model output and compares it to a set of system-wide performance measures developed for the CERP (www.evergladesplan.org/pm/recover/eval_team_perf_measures.aspx). The updated plan's predicted performance is evaluated to determine how close the plan is to meeting CERP's goals and objectives.

The current condition being used in CERP planning efforts is the 2015 Band1 CERPA condition. This condition reflects the Master Implementation Sequencing Plan (MISP) Band 1 projects and the updated Integrated Delivery Schedule. The MISP (USACE and SFWMD, 2005) describes the following CERP projects as being implemented by 2010: (1) C-44 Reservoir (part of Indian River Lagoon – South Project), (2) C-9 Impoundment, C-11 Impoundment, and Water Conservation Area 3A/3B Seepage Management (components of the Broward County Water Preserve Areas projects), (3) Acme Basin B Discharge, (4) Site 1 Impoundment (Fran Reich Preserve), (5) C-111 Spreader Canal (Frog Pond/Leaky Reservoir), (6) C-51 and L-8 Basin Reservoir (part of North Palm Beach County), (7) Everglades Agricultural Area Storage Reservoir – Phase 1, (8) Lake Okeechobee Watershed, (9) Rotenberger Wildlife Management Area using Rain-Driven Operations, and (10) C-43 Basin Storage Reservoir. The Integrated Delivery Schedule developed in July 2007 indicates that most of these projects will not be complete until 2015, so these are now referred to as 2015 Band 1 projects. More information on the MISP and Integrated Delivery Schedule is available at www.evergladesplan.org.

The evaluation of the current condition is documented in the Technical Report on System-wide Performance of CERP 2015 Band 1 Projects (RECOVER, 2010d). Key findings of the evaluation effort are summarized below.

Evaluation of the model results revealed several important performance results to inform future CERP and non-CERP planning activities:

- Regional groupings of projects provide measurable predicted restoration benefits using RECOVER system-wide performance measures.
- Using these groupings will help staff evaluate major project alternatives as part of the project planning process.
- Several opportunities exist to employ adaptive management as a part of system operations and long-term implementation. Adaptive management provides the means to address uncertainties related to system-wide performance among multiple regional goals and objectives in order to optimize total system benefits.

In addition, the 2015 Band 1 projects revealed the following system-wide and regional performance trends:

- Damaging high flows in the Northern Estuaries were reduced.
- High stages (e.g., > 16 feet mean sea level) increased in Lake Okeechobee, impacting lake littoral and nearshore zone health.
- Extreme high water events were reduced in the southern portions of Arthur R. Marshall Loxahatchee National Wildlife Refuge and Water Conservation Area (WCA) 3A.
- Extended periods of ponding continue to occur in southern WCA-2B.
- Rotenberger Wildlife Management Area stages moved closer to the Natural System Model targets.
- Overall inflow into the Everglades Protection Area increased by 138,000 acre-feet per year in the model, upon the assumption that water quality conditions were adequate.
- Decreased inundation duration occurred in northern WCA-3, which reflects an increase in cumulative drought intensity.
- As a result of the Broward County Water Preserve Area C-11 impoundment, S-9 pumping was reduced from 36,200 to 700 acre-feet per year, improving water quality in this area.
- Everglades National Park experienced longer inundation durations, which reflects a decrease in cumulative drought intensity.
- Flow across Tamiami Trail into Everglades National Park increased by 176,000 acre-feet annually, primarily in the dry season.
- Peak high salinities in the Southern Coastal Systems were reduced in duration and intensity.
- Band 1 is projected to increase total water storage capacity by 466,990 acre-feet per year, which is 9 percent of total reservoir and aquifer storage recovery storage planned for CERP. It should be noted when the modeling was performed for the Band 1 effort, it was still presumed that the Everglades Agricultural Area Reservoir Phase 1 (170,000 acre-feet) would be in place.
- Flood control results were mixed, and water supply cutbacks for the Lake Okeechobee and Lower East Coast Service Areas increased.

RECOVER offers two main technical conclusions regarding opportunities to improve CERP performance for consideration in future planning and implementation efforts. The first addresses the Everglades restoration program as a whole, while the second is directed specifically toward RECOVER.

The entire restoration program will benefit by developing and implementing adaptive management system-wide strategies as part of the System Operating Manual Study to substantially improve CERP performance. This should accomplish the following:

- Help address Lake Okeechobee operations uncertainty associated with accomplishing multiple CERP goals and objectives.
- Improve the ability to deliver water to coastal estuaries during the dry season while meeting multiple regional goals.
- Couple the results of system-wide monitoring and assessment with integration of future projects that add significant water storage and delivery capacity to the regional system.

In addition, planned future CERP and non-CERP projects are needed to build upon Band 1 performance. The Band 1 modeling clearly indicates the need for additional projects to capture, store, and clean more water and for all water resource related needs. System-wide planning (multi-project planning) activities, using groups of projects such as those used in this 2015 Band 1 analysis, are expected to improve plan formulation and project integration.

Overall, RECOVER recommends the following actions to improve its technical and scientific support for system-wide CERP planning and evaluation:

- Establish and resource a Water Supply and Flood Protection Subteam to update performance measures and to participate in evaluations.
- Develop total system performance measures and evaluation methods to better summarize system-wide performance of alternatives or scenarios.
- Develop evaluation methods to aid in prioritization of projects and operations to achieve strategic restoration benefits. These methods, combined with system-wide performance tools, will help managers and policymakers in the development of sequencing plans, system operating manuals, and changes to projects as part of major CERP update activities in order to optimize delivery of restoration and other water resource-related benefits.

LITERATURE CITED

DOD. 2003. Programmatic Regulations for the Comprehensive Everglades Restoration Plan; Final Rule. Department of Defense, 33 CFR Part 385, Federal Register, November 12, 2003.

RECOVER. 2006. Comprehensive Everglades Restoration Plan Adaptive Management Strategy. Restoration Coordination and Verification Program, c/o United States Army Corps of Engineers, Jacksonville District, Jacksonville, Florida, and South Florida Water Management District, West Palm Beach, FL. April 2006.

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, FL, and South Florida Water Management District, West Palm Beach, FL.

RECOVER. 2009. CERP Monitoring and Assessment Plan. Restoration Coordination and Verification Program, United States Army Corps of Engineers, Jacksonville District, Jacksonville, FL, and South Florida Water Management District, West Palm Beach, FL. Revised December 2009.

RECOVER. 2010a. 2009 System Status Report. Restoration Coordination and Verification Program, U.S. Army Corps of Engineers, Jacksonville, FL, and South Florida Water Management District, West Palm Beach, FL.

RECOVER. 2010b. (in prep.) Adaptive Management Integration Guide. Restoration Coordination and Verification Program, U.S. Army Corps of Engineers, Jacksonville, FL, and South Florida Water Management District, West Palm Beach, FL.

RECOVER. 2010c. (in prep.) CERP Guidance Memorandum 56, Integrating Adaptive Management into CERP Project Implementation Reports. Restoration Coordination and Verification Program, U.S. Army Corps of Engineers, Jacksonville, FL, and South Florida Water Management District, West Palm Beach, FL.

RECOVER. 2010d. Technical Report on System-wide Performance of CERP 2015 Band 1 Projects. Restoration Coordination and Verification Program, U.S. Army Corps of Engineers, Jacksonville, FL, and South Florida Water Management District, West Palm Beach, FL. January 28, 2010.

USACE and SFWMD. 2005. Programmatic Regulations Master Implementation Sequencing Plan 1.0. U.S. Army Corps of Engineers, Jacksonville, FL, and South Florida Water Management District, West Palm Beach, FL.