

Chapter 7B: RECOVER Activities

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SUMMARY AND HIGHLIGHTS

RECOVER is an interagency, interdisciplinary team sponsored by the United States Army Corps of Engineers (USACE) and the South Florida Water Management District (District or SFWMD). The role of RECOVER is to organize and apply scientific and technical information in ways that are most effective in supporting the objectives of the Comprehensive Everglades Restoration Plan (CERP) and to ensure that the CERP's system-wide goals and purposes are achieved. RECOVER applies science and the tools of science to the three broad mission areas of system-wide evaluation, assessment, and planning. These linkages provide RECOVER with the scientific basis for meeting its overall objectives of evaluating and assessing CERP performance, refining and improving the CERP during the implementation period, and ensuring that a system-wide perspective is maintained throughout the restoration program.

RECOVER is developing an adaptive management program for CERP that will measure how well the CERP's desired goals are achieved. The program will also provide a "feedback mechanism" for assessing whether the responses by the systems being restored are matching the restoration expectations. These assessments will be used to determine when and how the programs could be improved where expectations are not being met. The ultimate role of adaptive management in CERP is to have an ongoing, scientifically based process for substantially increasing the probability that the plan will succeed.

RECOVER continues the evaluation process that began during the development of CERP. RECOVER continues to develop and refine models, such as the South Florida Water Management Model (SFWMM) and the Natural System Model (NSM), which were used during the development of CERP. Also, the Everglades Landscape Model (ELM) is being considered to evaluate water quality in the greater Everglades region. A total system conceptual ecological model is being developed to evaluate the interactions among the regional conceptual models and the upstream and downstream effects of what happens across boundaries.

Several of the projects currently being undertaken by RECOVER will allow tracking of CERP performance. Development of a *CERP Monitoring and Assessment Plan* (MAP) has continued, and the second draft will be distributed in early 2003. The MAP establishes the framework for measuring system-wide responses and for assessing how well CERP is meeting its goals and objectives. As part of this process, monitoring and assessment performance measures and a process for establishing interim goals have been developed.

To provide the public and state legislators with an indication of CERP's performance, a CERP Annual Report Card is being developed. The initial report will cover baseline or pre-CERP

conditions. Successive report cards are intended to provide an indication of improvements or other changes brought about by the implementation of CERP.

The Initial CERP Update is currently under way in response to environmental changes and new information gained since the release of the CERP feasibility report (USACE and SFWMD, 1999). The Initial CERP Update will result in a clearer picture of plan performance and a revised existing condition and future without project condition. Moreover, this information will be provided to the individual CERP project delivery teams (PDTs) as they begin project-level formulation and evaluation.

INTRODUCTION

RECOVER is an interagency, interdisciplinary team sponsored by the USACE and the SFWMD. RECOVER's role is to organize and apply scientific and technical information in ways that are most effective in supporting the objectives of CERP and to ensure that the CERP's system-wide goals and purposes are achieved. RECOVER applies science and the tools of science to three broad mission areas of system-wide evaluation, assessment, and planning. These linkages provide RECOVER with the scientific basis for meeting its overall objectives of evaluating and assessing CERP performance, refining and improving the plan during the implementation period, and ensuring that a system-wide perspective is maintained throughout the restoration program.

RECOVER's three mission areas are:

- **Evaluation:** Work with the project delivery teams to evaluate (through modeling) and maximize the contribution made by each project to the system-wide performance of CERP
- **Assessment:** Measure (through monitoring) and interpret responses in natural and human systems as CERP projects are brought on line
- **Planning and Integration:** Identify potential improvements in the design and operation of CERP, consistent with plan objectives, and strive for consensus regarding scientific and technical aspects of the plan

The process of "evaluation" refers to the analysis of the predicted performance of CERP projects in the context of the entire program. Plan and project performance is forecast through the use of predictive simulation modeling. "Assessment" is the process by which the actual performance of implemented projects is measured and interpreted, based on data gathered from the system-wide monitoring and assessment plan.

More detailed information regarding the RECOVER program of CERP is contained in the Management Plan for Restoration Coordination and Verification (RECOVER)¹ (USACE and SFWMD, 2001a) and in the *2002 Everglades Consolidated Report* (SFWMD, 2002). This section of Chapter 7 will focus on RECOVER activities organized by its mission areas for the period of September 2001 to August 2002.

¹ The management plan is available at www.evergladesplan.org/pm/recover/recover.shtml

RECOVER ACTIVITIES

RECOVER is a system-wide CERP program. Evaluation, assessment and planning, and integration activities will encompass all CERP projects, pilot projects and critical projects, as appropriate. RECOVER may also evaluate other non-CERP projects that can potentially affect CERP's ability to achieve its goals and purposes. RECOVER will function throughout the entire duration of the CERP process, continuously seeking ways to improve the plan as responses measured by a system-wide monitoring and assessment plan are used to direct the adaptive management program. Evaluation and assessment activities, as well as data from cause-effect research and new technologies, will shape planning and integration efforts towards this goal.

RECOVER's three mission areas are the primary means of improving CERP performance as implementation of the individual CERP projects proceeds. **Figure 7B-1** depicts this relationship.

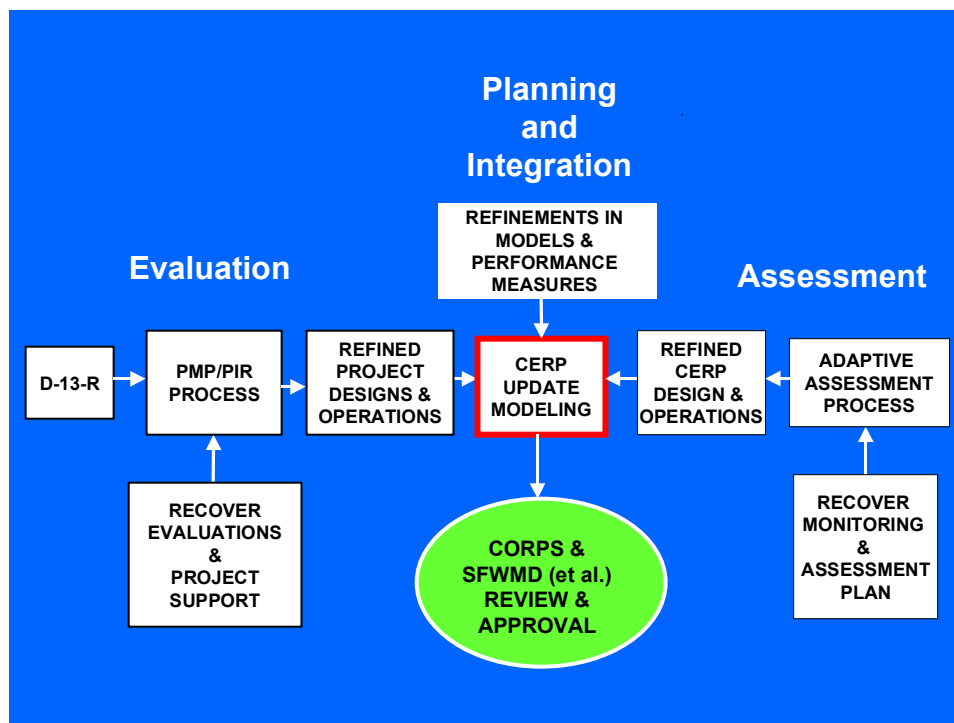


Figure 7B-1. The relationship between the three missions of RECOVER and CERP implementation

EVALUATION

Conceptual Ecological Models

As reported in last year's *2002 Everglades Consolidated Report* (SFWMD, 2002), conceptual ecological models have been developed that represent South Florida's major wetland physiographic regions. The models have served as the basis for the development of performance measures used in RECOVER's evaluation and assessment missions. As the models have been

revised, so too have the performance measures used in evaluating the hydrologic performance of CERP and its projects. The second revision of the models was published in the March 2001 draft of the CERP Monitoring and Assessment Plan (RECOVER, 2001b)².

The latest conceptual ecological model in preparation is for the total South Florida system. The reason for the development of the Total System Conceptual Ecological Model is to integrate the major, system-wide, working hypotheses common to several or all the regional conceptual models. The model is designed to show the ecological linkages among the working hypotheses that explain the important effects of system-wide stressors on the greater Everglades ecosystem. These stressors, which include sea level rise, water management practices, changes in land use patterns, and proliferation of exotic species, echo those seen in many of the regional models.

The Total System Model identifies the working hypotheses that explain the major ecological changes that have occurred at the larger scale of the greater Everglades. It also addresses whether there are major stressors and ecological effects that, because they are operating at such a large scale, have not been adequately characterized by the regional models. The Total System Model looks at the bigger picture to pick up where the regional models leave off. The model also looks at the interactions among the regional models and at the upstream and downstream effects of what happens across boundaries. The draft model is scheduled for completion in winter 2002.

Regional Evaluation Team Revision of Hydrologic Performance Measures

A key tenet of South Florida ecosystem restoration is that hydrologic restoration is a necessary starting point for ecological restoration. Altered hydrology appears as a stressor in all the conceptual ecological models. Based on this premise, the alternative evaluation team developed stressor-based performance measures during the CERP feasibility phase to set a number of hydrologic targets for restoration that could be simulated by hydrologic models as a basis for evaluating alternative plans.

The alternative evaluation team identified the hydrologic performance measures and targets that best defined restoration. This set of performance measures measured how well each alternative plan achieved hydrologic targets. The alternative evaluation team refined this set of performance measures during the two-year alternative plan formulation and evaluation process from a much larger set of potential measures generated by the hydrologic models. The RECOVER regional evaluation team continues to perform this function and has refined several performance measures since completion of the CERP feasibility report. These revisions incorporated new scientific information about the ecology of the major landscapes and changes to the primary tools (SFWMM and NSM) used to evaluate alternative plans. In addition, the water quality team is refining measures that can be used with the ELM to assess system-wide predicted changes in water quality and nutrient loading in the greater Everglades. The hydrologic and water quality performance measures listed in **Table 7B-1-1**, Appendix 7B-1, represent the current set of performance measures necessary to evaluate changes in the stressors and achieve CERP goals.

The hydrologic performance measures presented in Appendix 7B-1 define multiple facets of how the natural system and the human population depend on water. The performance measures define hydropatterns for the various Everglades ecosystems (e.g., ridge and slough, marl prairie),

² The March 2001 draft of the Monitoring and Assessment Plan is available at www.evergladesplan.org/pm/recover/recover_cerp_monitor_plan_1.shtml.

the range of water flows necessary to sustain estuaries and bays, and the ability to meet the human population's water supply and flood protection needs.

Regional Evaluation of the Indian River Lagoon South and Water Preserve Areas Feasibility Studies

The Indian River Lagoon South and Water Preserve Areas feasibility studies were initiated prior to completion of the Central and Southern Florida Project Comprehensive Review Study, Final Integrated Feasibility Report and Programmatic Environmental Impact Statement (USACE and SFWMD, 1999), but did not move forward in earnest until its completion. These two feasibility studies are the first attempts to refine the conceptual design of CERP. They also represent the first attempts to evaluate alternative plans to CERP at both the regional and project level. The regional evaluation team reviewed several alternative plans, as well as the recommended plans. The regional evaluation team was able to conclude that the recommended plans for both studies performed as well as, or better than, CERP.

Indian River Lagoon-South Evaluation

The regional evaluation and water quality teams reviewed three alternative plans developed by the study team. Simulation 1A was designed to match CERP as closely as possible, using storage features alone to meet the original goal of matching salinity distributions in the estuary. Alternatives 1B and 1C made further attempts to maximize local benefits and enhance regional benefits by adding wetland restoration, additional storage, water quality features, water conveyance flexibility, and muck-removal features. When simulated within the context of the rest of the South Florida ecosystem, the three Indian River Lagoon South simulations performed almost identically to CERP. Although performance within the footprint of the project varied, it was concluded that any of the alternatives would be capable of providing the same level of benefits as CERP to the system as a whole. The most significant improvements to system-wide performance due to plan alternatives were related to improved water supply in the Lake Okeechobee and Lower East Coast service areas.

Water Preserve Areas Evaluation

The regional evaluation team reviewed two alternatives and two scenarios for the recommended plan for this feasibility study. In the study, plan formulation was iterative, enabling the incorporation of regional evaluation team recommendations into the next alternative design. All four designs were expected to provide levels of benefits comparable to CERP. Performance in WCA-2B, WCA-3A, Everglades National Park, and Biscayne Bay did not perform quite as well as was necessary in some of the alternatives. The Water Preserve Areas Preliminary Selected Plan (the recommended plan) model simulation performs almost identically to CERP in most areas within the region. Performance in Everglades National Park, Biscayne Bay, and the Lower East Coast Service Area 2 varies somewhat from CERP, but this was not necessarily due to Water Preserve Areas' components. Changes in other model assumptions affected the performance.

ASSESSMENT

CERP Annual Report Card

The objective of the CERP Annual Report Card is to provide a report to the public on how the natural and human systems are responding to CERP influences and to attempt to explain why

the observed responses are occurring. To meet these objectives, the report card will use a set of “key indicators” of environmental health for both natural and human systems in South Florida as a way of informing the public and decision makers about the plan’s progress. An example of a key indicator is the total area of healthy oyster beds in the St. Lucie Estuary. The CERP target for oyster beds in the St. Lucie Estuary is an increase in their area by 4.5 times. As the CERP is implemented, the area will be measured periodically, and the level of restoration will receive a grade.

The CERP Annual Report Card will provide an annual grade for each of the key indicators. The range of grades for the full set of key indicators is intended to be representative of CERP’s success in meeting its goals. Grades will be based on annual assessments of each of the indicators during CERP implementation. For most key indicators, one or more interim goals will be developed, in addition to the final goal(s). These interim goals will illustrate the levels of improvement that are expected at appropriate intervals during the plan’s implementation. These interim goals will be added to the report card in the next one to two years.

The draft 2001 CERP Annual Report Card is presented in Appendix 7B-2 and reports on the status of 14 key indicators. The 2001 Annual Report Card is the first annual report card for the initial elements of CERP. Now in the earliest stages of implementation, CERP is not yet expected to show any indication as to the health of the Everglades basin. Thus, the grades reported in the report card are indicative of baseline, or pre-CERP, conditions rather than any improvements brought about by CERP implementation.

A major reason for issuing a report card so early in the implementation of CERP, even though system responses are not yet possible, is to assure the public that there will be regular reporting on progress made towards meeting CERP restoration goals. It is important at this early stage to familiarize the public with the key indicators that are proposed to be used for this purpose and to prompt public review and comment on the content and organization of this reporting document. An early objective of the report card is to make improvements in its content and organization in response to public reviews. It should be noted that more in-depth and site-specific reporting on CERP’s influences on the natural and human systems in South Florida will be carried out through the Adaptive Management Program (below).

Monitoring and Assessment Plan

The first draft of the CERP Monitoring and Assessment Plan (MAP) (USACE and SFWMD, 2001) was released in March 2001 and underwent public and agency comment throughout the summer of 2001. The document has been substantially revised subsequent to received comments, as well as refinements in the monitoring protocols developed by a more recent set of workshops that began in fall of 2001. A second draft of the MAP will be released for formal agency and public review in early 2003.

The MAP establishes the framework for measuring system-wide responses and for assessing how well CERP is meeting its goals and objectives. Each CERP project will develop a separate, localized monitoring plan to assess the local performance of each individual project.

The development and refinement of the CERP MAP will, by necessity, be an iterative process. As new information becomes available, periodic reviews and revisions of the MAP will ensure both the plan’s technical soundness and the continuing support of participating agencies. RECOVER anticipates that formal reviews of the MAP will occur no less than every three years.

The goal in implementing the MAP is to have a single, integrated, system-wide monitoring and assessment plan that will be used and supported by all participating agencies and tribal governments as the means of tracking and measuring CERP performance. The MAP presents the performance measures and parameters of the natural and human systems in South Florida that should be measured for the purpose of determining CERP's success. CERP performance measures must address the system-wide performance problems that CERP is explicitly designed to improve or correct. The draft document identifies the specific set of hydrologic, biological, and water quality performance measures that should be monitored; the geographic regions where these performance measures should be monitored; how each should be measured and at what frequency; and the improvements in these performance measures that are predicted to occur during, and following the implementation of, CERP.

Numerous efforts have been undertaken over the years to evaluate ecological, water quality and hydrological conditions and trends in South Florida. The draft MAP is built upon and incorporates the following three assumptions:

- The MAP will assess system-wide and regional-scale monitoring requirements (i.e., the MAP is not intended to satisfy project-specific "local" monitoring needs)
- Existing, relevant monitoring will continue
- Partnering agencies will contribute funding and/or will participate in MAP implementation

The draft MAP is organized into five sections. Sections 1 and 2 detail the purpose, developmental process, and objectives of the MAP and provide tables of the CERP performance measures. Section 3 presents a set of spatially discrete monitoring modules that outline integrated monitoring requirements. Sections 4 and 5 explain the plans for quality assurance and/or quality control (QA/QC), data management and evaluation requirements and procedures, and implementation and refinement needs and plans.

Monitoring Modules

During a series of 22 workshops that took place from fall 2001 to spring 2002, adaptive assessment and water quality team members and other agency and academic scientists integrated the nine conceptual ecological models into a set of monitoring modules. A monitoring module for water supply and flood protection was developed independently. Each module contains the following sections: summary and introduction, restoration expectations, monitoring objectives, methods (sampling protocols), key uncertainties and research topics, and references. The five modules contained in the plan are:

- Greater Everglades
- Northern Estuaries
- Southern Estuaries
- Lake Okeechobee
- Water Supply and Flood Protection

The individual performance measures associated with the monitoring modules that will be used in the monitoring and assessment process can be found in **Table 7B-1-2**, Appendix 7B-1. A

brief description of the monitoring modules follows. The text below is taken from the draft document.

Greater Everglades Wetlands Module

The declines in wading birds, alligators and other higher vertebrates in the Everglades are largely attributed to breakdowns in aquatic trophic relationships that have diminished the abundance and availability of prey. These breakdowns have resulted from a combination of altered hydrology, salinity and nutrient patterns in the remaining wetlands and from habitat loss in developed areas.

The restoration of natural patterns of hydrology, salinity, and water quality in the remaining Everglades' wetlands is expected to enhance the primary productivity of periphyton mats and mangrove forests. Periphyton mats and mangrove forests are considered to be regional indicators of the functional bases of food webs supporting the aquatic fauna that ultimately sustain reproduction by higher vertebrates.

The objectives of monitoring greater Everglades' wetlands are to determine baseline conditions and variability, cause-effect relationships, unexpected responses, and status and trends.

Monitoring methods for wetland landscape patterns will include vegetation mapping; ridge and slough measurements; tidal creek channel delineation, mapping, and volume measurement; and marl prairie/sparrow habitat measurements. Monitoring for wetland trophic relationships will include regional populations of fishes and associated fauna; seasonal concentrations of fishes and associated fauna; wading bird nesting; American alligator distribution; the American crocodile; the Cape Sable seaside sparrow; coastal salinity gradients and flow volume; regional hydrology; and surface water and soil nutrients.

Northern Estuaries Module

Altered freshwater inflows have affected circulation and salinity patterns in the Caloosahatchee and St. Lucie/Indian River Lagoon estuarine systems and have had adverse impacts on epibenthic communities and the fauna that use them as habitat. In achieving beneficial patterns of freshwater inflow, salinity and water quality, both estuaries share a common restoration expectation of healthier epibenthic communities that will support desired groups of estuarine fauna.

The monitoring objective is to determine if the restoration of beneficial patterns of freshwater inflow, salinity, and water quality to the Caloosahatchee Estuary, the St. Lucie Estuary and the Indian River Lagoon will achieve the expected distribution, community structure, and viability of submerged aquatic vegetation (SAV) beds and oyster bars. Monitoring should also determine if the restoration of SAV and oysters would enhance habitat for desired estuarine fish communities and for juvenile stages of spotted sea trout.

Monitoring in the Caloosahatchee Estuary includes a general reconnaissance study of the area with specific attention to SAV, oysters and water quality. Monitoring in the St. Lucie Estuary and Indian River Lagoon includes oysters, SAV, benthos, juvenile fish, salinity and flow, and water quality.

The restoration expectations for the Loxahatchee Estuary are improved freshwater deliveries and decreased pollutant loading to the estuary and improved water quality and salinity balance within the estuary. The restoration expectations for Lake Worth Lagoon are reduced loads of

nutrients and contaminants (sediment and excessive freshwater) released to the lagoon by tributary waterways, and improved water quality, sediment quality and ecological conditions in the lagoon.

The objectives are to restore phytoplankton and macroinvertebrate communities to pre-eutrophic, stable salinity regime conditions, maintain “good” estuarine quality in the Loxahatchee Estuary and Lake Worth Lagoon, and document reductions in loadings of nutrients, contaminants and freshwater releases.

Southern Estuaries Module

Altered freshwater inflows have affected circulation and salinity patterns in Biscayne Bay, Florida Bay, and the Everglades mangrove estuaries. Restoration of Biscayne Bay’s epibenthic communities is expected primarily in the near-shore environment of the southern bay, including Barnes and Card sounds, and should restore estuarine fish communities. The recovery of mixed seagrass beds in Florida Bay is expected to enhance nursery ground habitat values.

The objective of monitoring this module is to determine if the restoration of beneficial patterns of freshwater inflow, salinity and water quality to South Florida estuaries will achieve the expected distribution, community structure and viability of SAV beds and oyster bars. Monitoring should also determine if the restoration of SAV and oysters will enhance habitat for desired estuarine fish communities and for juvenile stages of pink shrimp and spotted sea trout.

Monitoring in Florida Bay will include SAV, salinity, pink shrimp/invertebrates, shoreline fish communities, phosphorus (P) and nitrogen (N). Monitoring in Biscayne Bay will include SAV, salinity, pink shrimp/invertebrates and the shoreline fish communities.

Lake Okeechobee Module

Management of Lake Okeechobee within the constraints of the Herbert Hoover Dike has led to periods of extreme high and low water levels, resulting in large-scale losses of native submerged and emergent plant communities and synergistic negative effects with phosphorus. A reduction in lake P is expected to bring about an ecologically beneficial reduction in the frequency and intensity of nuisance/toxic algal blooms, an increased diversity of benthic invertebrates, a reduced rate of cattail expansion, and an increased spatial extent of submerged plants. Restoration expectations related to improved hydropatterns are expected to result in increased spatial extent and diversity of native submerged and emergent plant communities, improved quality of the associated periphyton and invertebrates, and increases in the diversity and abundance of native fish, wading birds, and other vertebrate populations that rely on these communities for habitat and food.

The monitoring objective for ecological assessment of the lake is to determine if the modified hydropattern and reduced phosphorus inputs that are projected to occur under CERP will allow for recovery of native plant and animal communities in the lake from their present degraded conditions.

The monitoring objective for the lake’s water quality is to determine to what extent projects implemented under CERP result in improvements to the water quality of Lake Okeechobee, its major tributary inflows and, ultimately, the quality of water available from the lake for downstream uses.

Ecological monitoring will include littoral plant communities, submerged vegetation, invertebrates and forage fish, wading birds, alligators, fish, and snail kites. Water quality monitoring will include nutrients, ions, metals, pesticides, sediments, and flow.

Water Supply and Flood Protection Module

The primary target for flood protection is to maintain the levels in existence on December 11, 2000 and in accordance with applicable law. The expectations for water supply are decreased seepage losses, decreased harmful releases of excess water from the natural system, and the prevention of saltwater intrusion into the Biscayne aquifer.

Monitoring for water supply should assess the short-term ability to meet water demands and identify how the demands were met. Flood control monitoring should assess real-time conditions and regional system operations.

Implementation of the Monitoring and Assessment Plan

Implementation of the MAP will consist of three major tasks: implementing and operating the monitoring and assessment program, managing RECOVER data in collaboration with the CERP Data Management Program, and assessing and reporting the monitoring data.

The initial sequencing of the MAP entails four main goals:

1. By 2005, establish all stations/projects necessary to measure the physical and chemical stressors (hydrological and water quality) identified in the MAP
2. By 2005, close the gaps in high-priority existing biological monitoring programs that are relevant to the MAP
3. By 2005, initiate high-priority baseline monitoring for the MAP
4. By 2005, initiate high-priority research to address uncertainties in system responses

It is proposed that co-project managers from both the SFWMD and USACE will provide general oversight of the day-to-day operations and maintenance of the overall system. A multi-agency and multi-institutional monitoring and assessment team will coordinate implementation of the monitoring and research projects for each of the five aforementioned modules. Working together, coordinators and teams will be responsible for preparing for each monitoring package a work plan and schedule that delineates the logical order of activities, timelines, and approaches for accomplishing all the monitoring program's tasks and objectives over the next three years.

Adaptive Management Program

The interagency RECOVER team has the responsibility to develop and implement a system-wide Adaptive Management Program in support of CERP. The purpose of the Adaptive Management Program is to create a set of measurable restoration objectives for CERP consistent with CERP goals, assess how well CERP meets these objectives during and following its implementation, and identify opportunities to improve the CERP's design and operation based on assessments of its performance and on new information acquired through cause-effect research and monitoring.

The overall Adaptive Management Program includes a set of interconnected tasks and products that collectively provide RECOVER with the ability to apply the principle of adaptive

management to CERP. These tasks and products include the development of conceptual ecological models of South Florida's natural systems, a set of peer-reviewed and approved system-wide performance measures and restoration objectives, a system-wide monitoring plan, a data management and quality control strategy, and a data assessment protocol.

The draft CERP Performance Assessment Protocol Paper (Appendix 7B-3) describes how RECOVER teams will organize and interpret new information obtained from system-wide and local monitoring and research programs in ways that will detect interim and final responses caused by CERP and other features of the C and SF Project. RECOVER will determine when these responses are undesirable relative to the CERP interim and final performance measures and restoration goals and will use modeling to identify potential solutions to any performance problems.

Performance assessment reports will be issued periodically by RECOVER for purposes of:

1. Reporting the natural and human systems' responses to CERP implementation
2. Identifying any performance problems attributable to CERP implementation
3. Identifying potential options for resolving undesirable performance responses

The assessment protocol will be further revised and formalized upon the codification of the programmatic regulations³ (DOD, 2002) called for in the Water Resources Development Act (WRDA) of 2000 and will serve as a precursor to an assessment guidance memorandum identified in the regulations. The guidance memorandum will identify the process that will be used to actually carry out the adaptive management program and may be incorporated into the Monitoring and Assessment Plan by reference.

Interim Goals

WRDA 2000 directs that the programmatic regulations (DOD, 2002) establish a process "to ensure the protection of the natural system consistent with the goals and purposes of the Plan..." (sec. 601 (h)(C)(i)(III)). The vehicle for this assurance is the establishment of quantitative interim goals through which the plan's restoration success may be evaluated incrementally as CERP implementation proceeds.

A self-selected subteam of RECOVER members worked in the fall of 2001 to develop a process for RECOVER to follow in the establishment of interim goals. A final draft Process to Establish and Refine Interim Goals for the Comprehensive Everglades Restoration Plan was issued in December 2001 and is included herein as Appendix 7B-4. Since that time, the team has developed criteria for choosing indicators for the interim goals. Criteria that the team agreed on for the selection of indicators are:

- Indicators should be consistent with goals and purposes of CERP

³ Section 601 of WRDA 2000 requires the Secretary of the Army to promulgate programmatic regulations to ensure that the goals and purposes of CERP are achieved. The regulations establish the administrative structure for implementing the plan by instituting processes to be carried out throughout the implementation period. The draft regulations were published in the Federal Register on August 2, 2002 and are undergoing a 60-day comment period.

- Indicators should address physical aspects (quantity, quality, timing, or distribution of water)
- There should be biological indicators (use the Total System Model attributes as a guide)
- Indicators should include a balance of short, intermediate, and long-term responders
- Indicators should be consistent with the MAP
- Indicators should be predictable and interpretable

The sub-team will continue to work through the process for developing the interim goals, with the next step being indicator selection. The public, stakeholders and other interested parties will be asked to provide input and comment on the selected indicators.

PLANNING AND INTEGRATION

CERP implementation will take place over an estimated 30-year period. The magnitude of CERP, as well as direction from the U.S. Congress and the Florida Legislature, necessitate that a process to incorporate changing conditions, new information and other factors that may affect the CERP performance be put into practice. As more detail becomes available from the CERP feasibility studies (7a-22) and Project Implementation Reports (7a-27-30), the integration function of RECOVER will incorporate this information into the overall prediction of CERP progress.

An effort known as the “Initial CERP Update” is a first step in assuring that new technical information is integrated into CERP’s implementation. The purpose of the Initial CERP Update is to respond to a changed environment and new information gained since the CERP feasibility report was released (USACE and SFWMD, 1999). Since that time, work has continued on several fronts relating to CERP implementation. Performance measures and indicator regions that are used to predict the natural system’s performance under CERP have been revised. Upgrades have been made and new data have been added to the SFWMM and NSM, which are the primary hydrologic tools used in plan formulation and evaluation. Of note is the extension of the climatic period of record from 31 to 36 years; the more data that is built into the models, the more reliable is their predicted output. Seven years have passed since the development of the “restudy” existing conditions, and there have been changes in assumptions for the future without project condition. For these reasons and others, the plan must be evaluated and updated with this new information.

The Initial CERP Update will result in a clearer picture of plan performance, a revised existing condition using 2000 data, and a revised future without project condition. Included in the revised future without project condition analysis will be the effects of new population growth figures and sea level rise. This information will be provided to the individual CERP project delivery teams (PDTs) as they begin project-level formulation and evaluation.

The Comprehensive Plan Refinement Team within RECOVER will lead and coordinate the interagency, interdisciplinary, initial CERP update team. The effort will be supported by RECOVER’s other technical teams and agency resources. In general, the initial CERP update team composition is representative of RECOVER’s multi-agency and tribal participants. The team will perform the analyses necessary to carry out the update and will document all actions and findings in a technical report.

RECOVER program managers will communicate the findings of the initial CERP update team to the appropriate senior-level management within the USACE and the SFWMD. Management will then provide RECOVER managers with guidance and direction for any future actions determined to be necessary. Due to the nature of the Initial CERP Update, close coordination with stakeholders and others will be paramount.

It was originally envisioned that the Initial CERP Update would include operational optimization of CERP, a step that was not performed during the development of the feasibility report due to time constraints. After hearing concerns that such “optimization” constitutes a change to CERP, the decision was made to end update activities with the issuance of the technical documentation. Management will decide whether to proceed with the optimization exercise. If it proceeds, the National Environmental Policy Act (NEPA) process will be initiated.

Major Milestones

The major milestones for the Initial CERP Update are presented in **Table 7B-1**. These milestones represent the anticipated schedule for accomplishing the Initial CERP Update.

Table 7B-1. Initial CERP update milestones

Task	Date
Data gathering and assimilation	
1. Define assumptions for CERP Existing and Future Without Project Conditions	September 02
2. Update 2000 and 2050 land use/land cover	November 02
3. Update population projections	November 02
Upgrade simulation models	
1. Extend climatic period of record from 31 to 36 years	June 02
2. Incorporate latest topography (SFWMM v5.0 & NSM v5.0)	June 02
3. Calibrate and verify (SFWMM v5.0)	February 03
4. Technical review of SFWMM v5.0 & NSM v5.0	February 03
5. Compare NSM v3.5 & NSM v5.0	February 03
Evaluate CERP	
1. Simulate CERP Planning Conditions and compare to Restudy 1995 and 2050	April 03
2. Simulate the Comprehensive Plan with SFWMM v5.0; compare to Restudy	April 03
Technical documentation	
1. Prepare technical report	May 03

Related Efforts

Three efforts are linked to the Initial CERP Update: (1) Incremental modeling of the CERP Master Implementation Schedule; (2) ASR Contingency Planning; and (3) Development of the pre-CERP baseline. All of these activities will rely heavily on the use of computer simulation modeling. The implementation schedule has been modified from that which is contained in the 1999 feasibility report (USACE and SFWMD, 1999), and there is a desire to understand what these changes mean hydrologically. It is envisioned that the modeling effort will analyze the currently scheduled sequence of construction projects at five-year increments. This work will also form the foundation for establishing interim goals.

The second effort, ASR contingency planning, will entail the formulation and evaluation of two planning scenarios. One scenario will be to remove 100 percent of the ASR in the CERP from the plan; the second will be to remove just 50 percent of the ASR. There is little doubt that ASR will work nearly everywhere in South Florida at some scale and some degree of efficiency. Investigating a worst case scenario for ASR (no ASR) and a reduced ASR scenario (50 percent ASR) will give interested persons a gauge of what revisions to CERP may be necessary or are possible under these conditions. For both scenarios, features will be returned to the plan in an attempt to realize the same level of performance as in the original CERP. The types of features to be investigated in the contingency planning will be scoped out in the plan of action for the effort.

The programmatic regulations (DOD, 2002) call for the development of a pre-CERP baseline that represents regional conditions on the date of enactment of WDRA 2000, accounting for natural variations and including existing legal sources of water. The baseline will establish the amount of water delivered by the C and SF Project, which is of central importance to ensure attainment of the plan's benefits. All projects must evaluate any changes in the pre-CERP baseline water availability in identifying the quantity, timing and distribution of water to be made available to the natural system.

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