ANNEX E
REGIONAL EVALUATION REPORT
PREPARED BY RECOVER

January 13, 2005

E.1 INTRODUCTION AND SUMMARY

The Site 1 Impoundment project team has completed the plan formulation phase of their project and requested Restoration Coordination and Verification (RECOVER) prepare a regional evaluation report of the final three proposed project alternatives. 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). One of the primary missions of RECOVER is to work with the project team, through predictive modeling, to evaluate and maximize the contribution made by each project to the system-wide performance of CERP.

The RECOVER Regional Evaluation Team (RET) is an interagency and interdisciplinary scientific and technical team charged with developing and using performance measures for evaluating alternative plans developed for Project Implementation Reports. The purpose of RET evaluations is to ensure that each PIR selects an alternative that is consistent with the goals and purposes of the CERP, specifically, an alternative that maximizes ecological benefits on a system-wide spatial scale. For evaluating alternative restoration projects, the RET has developed a suite of approximately 40 hydrological performance measures and approximately eight ecological performance measures to evaluate project alternatives. Performance measures are calculated using output from the South Florida Water Management Model (SFWMM), which is the primary hydrologic simulation model for the CERP. The SFWMM is a regional scale model that provides simulations of hydrologic conditions at a 2-mile by 2-mile spatial resolution. Due to the large-scale resolution of the model and the relatively small hydrologic influence of some CERP projects, RET performance measures will not always illuminate differences in system-wide performance.

The Site 1 Impoundment project is a relatively small-scale water storage project that, using RET performance measures, would not be likely to result in substantial differences between alternative plans. In addition, on a relative scale, the Site 1 Impoundment is so small that RET performance measure may not differentiate between the selected alternative plan and the no action alternative. Therefore, the RET will not apply its performance measures to compare alternative for the Site 1 Impoundment. Intuitively, the Site 1 Impoundment alternative with the most storage capacity and most efficient operations is likely to maximize its contribution towards meeting the goals and purposes of the CERP, however, this cannot be confirmed using RET performance measures. Finally, the selected alternative plan provides 90% of the storage that was initially proposed to maximize both local and system-wide benefits in the "Final integrated Feasibility Report and Programmatic Environmental Impact Statement of the Central and Southern Florida Comprehensive Review Study (USACE and SFWMD 1999). This represents a 74% decrease in discharges to tide for the selected alternative plan compared to the future without project. Therefore, the RET suggests that Phase 2 of the Site 1 Impoundment project,

developing aquifer storage, and recovery, continue pursuing opportunities to store the volume of water that was originally planned in the Restudy.

E.1.2 Purpose of Evaluation

The purpose of this regional evaluation is to 1) inform the project team of the compatibility of proposed project alternatives with regional CERP restoration goals and performance expectations, 2) identify improvements for project performance that would improve its regional performance, and 3) provide decision-makers required information regarding regional performance expectations of the Site 1 Impoundment project. RECOVER performed an initial review for the Water Preserve Areas (WPAs) Feasibility Study in 2001 (Appendix H of the WPA Feasibility Report). This regional evaluation is considered an update to the previous evaluation.

E.1.3 Study Scope

This evaluation compares the three project alternatives to performance expectations of the Comprehensive Plan (Alternative D13R) by contrasting the alternatives to the 2050 future without project conditions and against restoration expectations when possible. All plan formulation for this PIR occurred in previous planning efforts (Restudy and WPA Feasibility Study). Model runs from the previous studies were used to compare alternatives. Consequently, no additional SFWMM runs were performed for plan formulation and evaluation for the Site 1 Impoundment Project.

Location - The Site 1 Impoundment project is located in southern Palm Beach County bordering Broward County. The Hillsboro Canal forms the southern border of the project, and the L-40 Levee forms the northern border of the project. The Loxahatchee National Wildlife Refuge (LNWR) borders on the west and the Lake Worth Drainage District on the east.

Project Objectives - Due to its location and function as a source of water to reduce demands on the natural system, objectives for the Site 1 Impoundment project were specifically developed to meet the ecological objectives of the CERP:

- Achieve target hydroperiods and hydropatterns within the LNWR and WCA-2A by reducing the amount of water withdrawn from the regional water management system;
- Protect against saltwater intrusion into the aquifer by providing an additional source of water for maintenance of saltwater interface;
- Reduce seepage out of the LNWR;
- Reduce phosphorus loads and decrease the rate of cattail expansion within LNWR and WCA-2A;
- Restore the spatial extent of tree island habitat within LNWR and WCA-2A; and
- Increase the spatial extent of functional marine habitat in Hillsboro Canal and Atlantic Intracoastal Waterway.

The project team considered an initial array of alternatives ranging from the no action alternative to over 2460 acres of storage. The team was able to eliminate four alternatives during initial screening, leaving two alternatives plus the future without plan or Alternative A for evaluation.

The final array of alternative plans includes two 1,660-acre impoundments and the future without project conditions. The two1,660-acre impoundments are identical with the exception of levee height, and include an inflow pump station, a gated discharge culvert, an emergency overflow spillway, an internal levee and culvert for compartment stage equalization, and a seepage control canal with associated structures. Alternative B impounds a maximum depth of 6 feet of water; Alternative C impounds a maximum depth of 8 feet of water. Deepening of the Hillsboro Canal to provide for additional conveyance capacity in the project area is also included in Alternatives B and C. The final array of alternatives is listed below:

Alternative A: Future Without Project
Alternative B: Includes a 1,660-acre impoundment at 6-feet above ground depth.
Alternative C: Includes a 1,660-acre impoundment at 8-feet above ground depth

Selected Alternative Plan – Alternative C, the 1,660-acre impoundment at 8-foot depth is the Selected Alternative Plan (SAP). This alternative provides a maximum net storage of about 13,000 acre-feet. The impoundment will be composed of two cells. Seepage management from the impoundment will be achieved through use of a seepage management canal along the eastern project border and the Hillsboro Canal and inflow pump station at the southern project border. The initial impoundment design includes littoral zones, littoral shelf, and deepwater refugia features.

Differences between Selected Alternative Plan and Component described in Restudy (D13R) – The Site 1 Impoundment described in the Comprehensive Plan was "an aboveground reservoir with a total storage capacity of approximately 15,000 acre-feet located in the Hillsboro Canal Basin in southern Palm Beach County." The initial design of the reservoir assumed 2,460 acres with water levels fluctuating up to 6 feet above grade. Further analyses during the Water Preserve Area Feasibility Study resulted in alteration of the D13R recommended plan in order to provide a more optimal project design as described below:

Size – the overall size of the impoundment footprint was reduced from 2,460 to 1,660 acres primarily because the 800-acre cell south of the Hillsboro Canal was permitted for aggregate mining and unavailable for purchase.
Conveyance Capacity – the conveyance capacity of the Hillsboro was increased in the reach downstream of the inflow pump station by deepening the canal; the increase was needed to accommodate a larger pump station to improve water storage efficiency
Inflow Pump – the size of the inflow pump station was increased from 700 to 1500 cfs; the size increase was necessary to maintain an existing level of flood protection and to capture the maximum amount of water lost to tide.

Although the Site 1 Impoundment project included a southern reservoir in the Comprehensive Plan, this feature was removed during the Water Preserve Area Feasibility Study. Although justifiable, the southern compartment is actively being mined which eliminates its availability for purchase and viability as an above-ground storage feature, the project is no longer as large as original designed in the Comprehensive Plan and may not provide the same contribution towards the goals and objectives.

E.2 PERFORMANCE OF SITE 1 IMPOUNDMENT

RECOVER anticipates ecological improvement to occur as a result of constructing water storage projects such as the Site 1 Impoundment. During the Restudy and the Water Preserve Area Feasibility Study, the combined effects of all the CERP projects on the regional system were modeled, analyzed and determined to provide ecological benefits to the south Florida ecosystem. However, the magnitude of the incremental system-wide benefits resulting from implementing individual CERP projects, relative to the level of ecological improvements brought about by the entire Comprehensive Plan is difficult to discern for a smaller project like the Site 1 Impoundment. This is especially true when all CERP projects are included in the model simulations.

All project alternatives are designed to retain at any one time about 13,000 acre-feet of water while reducing seepage from LNWR. The only difference between the two project designs is the depth of the single reservoir. Consequently, on a regional scale the differences between alternatives become minor. Regional evaluations on projects with limited effects on the total system are difficult for RECOVER. The system-wide performance measures of RECOVER were not designed to evaluate projects the size of the Site 1 Impoundment or those that primarily affect the timing and distribution of water at this scale. Needless to say, collectively the Water Preserve Area projects provide the only opportunities to significantly reduce water losses to tide on the Lower East Coast, reduce seepage losses from the Water Conservation Areas, and provide an alternative source of water to meet Lower East Coast urban and agricultural demands other than the Everglades.

E.3 RECOVER SUGGESTION ON THE SELECTED ALTERNATIVE PLAN

The RET suggests that Phase 2 of the Site 1 Impoundment project, developing aquifer storage and recovery, pursue opportunities to store the volume of water that was originally planned in the Restudy.

E.4 CONCLUSIONS

The Site 1 Tentatively Selected Plan achieves its intended functions and will contribute towards achieving CERP's goals and objectives. Given the scale and the tools available, the ability of RECOVER to effectively identify benefits to the natural system is very limited. The system-wide evaluation relied heavily upon the analyses conducted by the project team. The Site 1 Impoundment is a small piece of the overall CERP plan; yet the restoration success of CERP will depend on the interaction of individual projects rather than the successful performance of one project. In this case, improved performance is best observed through examination of the reservoir's ability to capture and store water.