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Performance Measure Development and Application to Evaluate Water Management Alternatives that Exceed Authorized River Restoration Project Performance

PERFORMANCE MEASURE DEVELOPMENT AND APPLICATION TO EVALUATE WATER MANAGEMENT ALTERNATIVES THAT EXCEED AUTHORIZED RIVER RESTORATION PROJECT PERFORMANCE

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The Kissimmee Basin Modeling and Operations Study (Study) is formulating and evaluating lake and river water management strategies that will meet or exceed the performance of the federally authorized Kissimmee River Restoration Project operations (USACE 1996) while also improving desired hydrologic characteristics for the 19 regulated upstream water bodies interconnected to the project in the Kissimmee Chain of Lakes. The Study developed hydrologic performance measures and indicators for the lake and river system in consultation with federal, state and local stakeholders and utilized these measures and indicators to screen and formulate alternative plans (AECOM 2012a). River restoration performance measures were translated from the original river restoration project hydrologic measures (Loftin et al. 1990) and validated using Study modeling tools (AECOM 2011). Lake stage and flow performance measures, focused on providing the hydrologic conditions needed to sustain habitat quality and promote fish and wildlife productivity, were developed in consultation with the Florida Fish and Wildlife Conservation Commission and the U.S. Fish and Wildlife Service. Lake performance measures specify frequencies, durations, and variability for seasonal high and low water levels, establish extreme low thresholds, and define desired rates of change for water-levels during critical breeding seasons.

A multi-phase alternative plan screening, formulation, and evaluation process was used to identify operating strategies, refine performance measures, and define the top performing operating strategies that the U.S. Army Corps of Engineers is evaluating to determine implementation feasibility. The screening phase of the project utilized computer-aided participation workshops to develop an initial understanding of how the system reacts to modified hydraulic structure operating criteria and to gain familiarity with the performance measures. Proposed modifications to Kissimmee Basin hydraulic structure operating criteria were simulated using the Study modeling tools and were evaluated using the Study performance measures. Information gained during alternative plan screening was used to refine performance measures and improve the evaluation and modeling tools. The performance measure development and alternative plan formulation process required stakeholders to view the Kissimmee River and Kissimmee Chain of Lakes from a system-wide perspective, accept resource management constraints, and adjust resource management thinking to include the needs of multiple ecosystems and multiple species. The information shared and knowledge gained produced multi-agency

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sanctioned resource management targets and processes that represent a shared vision for future resource management and interagency cooperation.

Over 100 alternative plans were formulated and evaluated during the alternative plan screening phase (AECOM 2009). These alternative plans were refined during the alternative plan formulation phase into four top performing plans. Performance of all four plans exceed the goals of authorized river restoration project operations and improve hydrologic conditions within the 19 regulated water bodies in the Kissimmee Chain of Lakes (AECOM 2012b).

This presentation will focus on the Study performance measure development process that played a critical role in developing a shared vision among stakeholders for future lake and river management. These measures provided the foundation for development of the operating strategies contained in the top performing alternative plans.

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