

## **Hydrological simulations of water-management scenarios in support of the Comprehensive Everglades Restoration Plan**

**ERIC D. SWAIN, MELINDA LOHMANN & JEREMY DECKER**

*US Geological Survey, Florida Integrated Science Center, 3110 SW 9th Avenue, Fort Lauderdale, Florida 33315, USA*  
[edswain@usgs.gov](mailto:edswain@usgs.gov)

**Abstract** Applications of new and improved numerical models of proposed restoration scenarios are presented and discussed in terms of how they support and necessitate communication between hydrologists and water managers. Management of ecosystem hydrology has become a major concern in communities worldwide due to competition for limited water resources. Numerical models have been developed by the US Geological Survey (USGS) in southern Florida, USA, for the Comprehensive Everglades Restoration Plan (CERP). Specifically, the coupled surface-water/groundwater Flow and Transport in a Linked Overland-Aquifer Density-Dependent System (FTLOADDS) code has been developed and applied to three locations to simulate the complex hydrology of southern Florida. The Tides and Inflow in the Mangroves of the Everglades (TIME) application domain encompasses Everglades National Park, the Ten Thousand Island (TTI) domain contains the Ten-Thousand Islands and Picayune Strand Restoration Project area, and the Biscayne domain contains the coastal area of Miami-Dade county and Biscayne National Park. In a subarea of the TIME domain, the UCODE parameter estimation code was linked with FTLOADDS to design water-management restoration scenarios to maintain desired salinities within coastal estuaries. The successful application of FTLOADDS to evaluate CERP restoration scenarios required close communication and information transfer between water managers and hydrologists. The water manager defines the configuration of the proposed scenario and ensures that the hydrologist is presented with a realistic perspective of the system. The hydrologist clearly defines the assumptions, limitations, and uncertainty of the model simulation and results. Application of a parameter-estimation code (UCODE) with FTLOADDS to design water-management scenarios displays the integration of water management and hydrological studies. Applications of FTLOADDS in southern Florida shows how ecosystem restoration projects that use advanced hydrological modelling tools rely on continuous feedback between water managers and hydrologists.

**Key words** numerical modelling; restoration; water managers; Florida, USA; Everglades