

SOUTH FLORIDA WATER MANAGEMENT MODEL

What is the South Florida Water Management Model (SFWMM)?

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The South Florida Water Management Model (SFWMM) is a regional-scale computer model that simulates the hydrology and the management of the water resources system from Lake Okeechobee to Florida Bay. It covers an area of 7600 square miles using a mesh of 2 mile x 2 mile cells ([click here to view domain](#)). In addition, the model includes inflows from Kissimmee River, and runoff and demands in the Caloosahatchee River and St. Lucie canal basins. The model simulates the major components of the hydrologic cycle in south Florida including rainfall, evapotranspiration, infiltration, overland and groundwater flow, canal flow, canal-groundwater seepage, levee seepage and groundwater pumping. It incorporates current or proposed water management control structures and current or proposed operational rules. The ability to simulate water shortage policies affecting urban, agricultural, and environmental water uses in South Florida is a major strength of this model. The SFWMM simulates hydrology on a daily basis using climatic data for the 1965-2000 period which includes many droughts and wet periods. The model has been calibrated and verified using water level and discharge measurements at hundreds of locations distributed throughout the region within the model boundaries. Technical staffs of many federal/state/local agencies and public/private interest groups have accepted the SFWMM as the best available tool for analyzing regional-scale structural and/or operational changes to the complex water management system in south Florida.

Why is the SFWMM needed?

The hydrology of south Florida is unique due to the flat topography, high water table, sandy soils, and high conductivity of the aquifer system. With the rapid population growth in South Florida, the water control system has been expanded and its operation has become increasingly complex, making the southern Florida water management system one of the most complex in the world. Currently, federal/state/local agencies are involved in numerous environmental restoration and water resources development projects that are necessary to sustain the quality of life in this rapidly growing region. These projects can potentially cost billions of dollars and accurate determination of their benefits and costs is extremely important. Simulation models have become the only feasible means of assessing system-wide impacts of the various proposed modifications to the water resources system in south Florida. The SFWMM, developed specifically for the south Florida system, is probably the best available tool that can simulate the complexities of the water control system and operational rules of proposed regional-scale water management alternatives and provide adequate information for making water management decisions.

What major studies has the SFWMM been used for?

USACE Modified Water Deliveries General Design

Regional-scale hydrologic effects of the Everglades Construction Project

Lower East Coast Regional Water Supply Planning effort

Lake Okeechobee Regulation Schedule Study

Central & Southern Florida Comprehensive Review Study (C&SF Restudy)

Who developed and maintains the SFWMM?

The SFWMM was originally developed by the staff of the South Florida Water Management District (SFWMD) in the late 1970's. Since then, the SFWMM has undergone numerous modifications to improve its capabilities and to meet the unprecedented demand for information for new projects. In 1992, a team of senior SFWMD engineering staff was assembled to perform the continuous development and application function. Extensive refinements have been made by this team to further improve the model and to apply it for several studies. This team of highly-educated modelers has over 60 years of combined experience in modeling south Florida's hydrologic and water control system.

What are appropriate uses of the SFWMM?

As a planning tool, the SFWMM can be applied to estimate regional-scale hydrologic responses to proposed structural and operational modifications to the water management system in south Florida. The large-scale and spatial extent of the model allows it to perform system-wide evaluations. For example, hydrologic conditions in the Water Conservation Areas (WCA's) and Everglades National Park (ENP) due to changes in Lake Okeechobee's operations can be evaluated. Other appropriate uses include the evaluation of changes in water restrictions in the Lower East Coast and Lake Okeechobee Service Areas under different management scenarios; hydrologic performance of new storage areas; and the examination of corresponding water levels and hydropatterns in Lake Okeechobee, the WCAs and ENP. Results from these regional scale investigations can then be used for more detailed modeling and investigations at a subregional scale which in turn can provide the bases for detailed design of specific projects.

Is the SFWMM documented?

Three reports exist:

1. MacVicar, T., T. Van Lent, and A. Castro. 1984. South Florida Water Management Model Documentation Report, Technical Publication 84-3, South Florida Water Management District, West Palm Beach, Florida.
2. South Florida Water Management District. 1997. [DRAFT Documentation for the South Florida Water Management Model](#). Hydrologic Systems Modeling Department, Water Supply Division, SFWMD, West Palm Beach, Florida.
3. South Florida Water Management District, 2005. [Final Documentation for the South Florida Water Management Model](#). Hydrologic & Environmental Systems Modeling Department, Everglades Restoration, SFWMD, West Palm Beach, Florida.

Where can more information be found?

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