

An Integrated Model of a Hydrologically Altered Watershed in Southwest Florida

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Abstract

The 225 square-mile Upper Myakka River watershed is a hydrologically altered system in Southwest Florida. Significant environmental damage, including widespread tree mortality, has resulted from abnormal and prolonged dry-season inundation in areas that historically were flooded only seasonally. Previous investigators have attributed the hydrologic changes in the watershed to agricultural water use and management. Much of the resulting damage has occurred within a 4.5 square-mile mixed hardwood wetland known as Flatford Swamp.

The watershed lies within the Southern Water Use Caution Area (SWUCA), and therefore water supply is also an important issue for the area. The Myakka River Watershed Initiative is a comprehensive watershed study and planning effort designed to develop strategies to restore natural systems while addressing issues of water supply and flood protection. The initiative is funded and administered through the Southwest Florida Water Management District's Watershed Management Program. The project will evaluate the effectiveness of recommended strategies to reach the desired watershed condition through assisted decision making, using data analysis and watershed modeling.

As part of this initiative, an integrated surface water / groundwater model was applied to the watershed using the MIKE SHE / MIKE-11 software package. The modeling objectives are to quantify the amount of excess flows in the Upper Myakka River, investigate the linkages between land use and hydrologic changes, and evaluate alternative scenarios for restoring the hydrology of the Upper Myakka River Watershed. The calibrated model will be used to simulate wetland hydroperiods as well as annual and seasonal water budgets for historical, current, and future land use conditions. Restoration and flood protection alternatives will consider solutions that could provide an alternative water supply.

Keywords: watershed management, modeling, ecosystem restoration

Challenges:

Land use change impacts to water resource sustainability
Ecosystem health and water resource sustainability

Issues:

Water availability and allocation