
LAKE OKEECHOBEE WATERSHED ASSESSMENT MODEL (WAM) ENHANCEMENT AND APPLICATION PROJECT

Mandate:

Lake Okeechobee Watershed Protection Program (LOWPP)

Background:

In recent years, the Watershed Assessment Model (WAM) has been used to provide simulations for the northern Lake Okeechobee drainage basins and other drainage basins south and west of the lake. These model setups have focused on evaluating the individual basin's water quality responses to proposed phosphorus best management practices (BMPs) and other abatement programs. Though, these model setups have provided good estimates within individual basin based on land use data, they did not fully integrate the flow responses throughout the watershed, i.e. Lake Istokpoga and the upper Kissimmee River watersheds were not hydraulically connected through the C-38 canal/Kissimmee River to the lake. The WAM interface is being upgraded to the ArcGIS 9.2 environment from the current ArcView 3.2 version. The upgrade is being done in cooperation with the Environmental Systems Research Institute, Inc (ESRI) and includes all of the ArcHydro features as well as a property window feature for easy access and modification of all model parameters. The ArcHydro tools will allow easier model setup, especially for the District because of their recent commitment to the ArcHydro data schema. The new interface will also have additional output analysis tools for comparative evaluation of modeled scenarios. The overall goal of this project is to develop an assessment tool that will evaluate various phosphorus control programs at the watershed level to maximize water quality improvements to meet the lake's Total Maximum Daily Load (TMDL) goal of 140 metric tons of total phosphorus per year.

Project Overview:

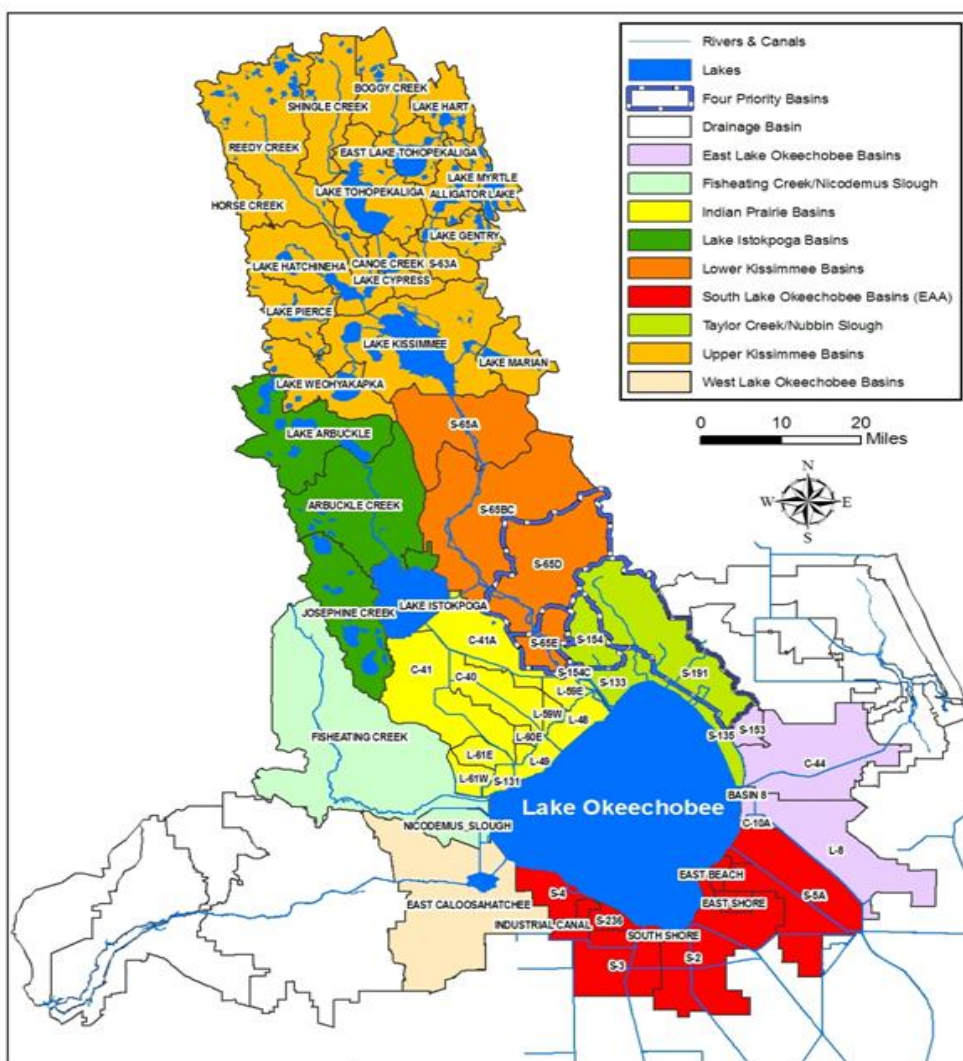
There are five objectives of this project: 1) update WAM input data sets to the latest District land use and phosphorus control efforts, 2) add an enhanced submodel to WAM to better represent internal lake processes in the upper chain of lakes, 3) setup of the hydrography of the entire northern basins into an integrated flow network, 4) complete a full recalibration and verification of WAM for all of the northern Lake Okeechobee basins using all available monitoring data; and 5) evaluate the effectiveness of the field level BMPs and the basin/regional level phosphorus control projects or performance measures on phosphorus load reductions to the lake. These projects or performance measures are provided in the Phase II technical plan of the Lake Okeechobee construction project.

The latest land use, hydrography, flow, and water quality data for the Lake Okeechobee watershed, will be incorporated into WAM input files with a special focus on land use and the hydrologic network interconnectivity so that the upper chain of lakes and C-38/Kissimmee River are more accurately represented. The entire Kissimmee River watershed and the Lake Istokpoga drainage basins will be included as primary basins so that the entire interconnectivity of these

systems can be properly represented. While these data are being obtained and processed, the model enhancement for large lake processes will be developed and tested. The model enhancement will improve the representation of transformation, retention, and attenuation processes of nutrients as they move through the larger lakes in the upper Kissimmee River basins and the Lake Istokpoga basins.

Application of Results:

WAM will be calibrated against a select subgroup of flow and water quality data that are representative across the watershed. Once calibrated, the model will be verified using the remaining monitoring data that was not used during the calibration process. The final calibrated/verified model will then allow various scenarios or “what if” alternatives to be evaluated including landowner BMPs and regional treatment strategies.



Location Map of the Lake Okeechobee Watershed (color area), St. Lucie River Watershed (all east drainage basins), and the Caloosahatchee River Watershed (all west drainage basins)