LAKE OKEECHOBEE NUTRIENT LOADS AND BUDGET PROJECT

Mandate:

Lake Okeechobee Protection Program (LOPP)
Lake Okeechobee Operating Permit

Background:

The South Florida Water Management District has monitored inflows and water chemistry to Lake Okeechobee since the mid-1970s. Various programs to reduce and/or regulate phosphorus (P) loads to the lake have been carried out over time. These include the Surface Water Improvement and Management Plan, the Lake Okeechobee Phosphorus Total Maximum Daily Load, and the Northern Everglades and Estuaries Protection Program. These programs have relied on load estimates for Lake Okeechobee to determine baselines and progress to mandated goals.

Project Overview:

Loads into and out of Lake Okeechobee are estimated at 34 structures that discharge to/from the lake or to tributaries that flow to the lake (Figure 1). The load estimates are based on daily flow and water quality samples gathered on a regular basis (either monthly, biweekly or continuously by autosamplers). Flow and water quality data are available on the District's DBHYDRO data base (see Table 1).
District staff estimates load (L) with a computer program that multiplies the daily flow (Q) by a daily water quality concentration (C) that is estimated from the samples taken close in time to the daily date (equation 1):
$L=Q \times C$
The daily loads are summed for each structure to determine monthly and yearly loads. The loads estimated for each structure are summed to estimate the total loads to Lake Okeechobee. The loads in to the lake can be used in concert with loads out of the lake and in-lake estimates of nutrient mass to develop nutrient budgets for Lake Okeechobee. Further information on loading and budget estimates can be found in James et al. (1995), Havens & James (1997) and Havens & James (2005).

Application of Results:

Loads to Lake Okeechobee are evaluated yearly in Chapter 10 of the South Florida Environmental Report and the Lake Okeechobee Operating Permit Annual Report. The latest updates of loads and budgets are available on a monthly and water year (May to April) basis. Updates of these loads may result in small changes to past load estimates as methods to determine flows are improved and water quality data are reevaluated.

Loads and flows measured at certain C41H78 are used to indirectly estimate flow from a series of small, unmonitored basins (HP7, Inflow 1, Inflow 2, Inflow 3, L61E). These indirect flows and loads will be added in the future to the load and budget estimates for the lake.

Loads and budgets have been used in numerous publications in the scientific literature to evaluate various trends and affects of nutrient loads on Lake Okeechobee (see publications list in this section).