LAKE OKEECHOBEE NORTHERN WATERSHED EVALUATION OF LEGACY PHOSPHORUS

Mandate:

Lake Okeechobee Watershed Protection Program (LOWPP)

Background:

Over the last three decades, Lake Okeechobee has experienced accelerated eutrophication due to excessive phosphorus (P) inputs from agricultural activities that dominate land use in its watershed. Lake Okeechobee's northern drainage area consists of 21 summary basins covering more than 2.65 million acres. Phosphorus loads from the northern drainage area contributed significantly to the annual average base load of 549 metric tons per year (mt/yr) measured from 1991 to 2005 for the entire Lake Okeechobee watershed, including 35 mt/yr from atmospheric deposition, which is well above the established TMDL target of 140 metric tons per year. Current estimates indicate that more than 80% of the net P imported into the northern watershed (excluding the Upper Kissimmee and Lake Istokpoga basins) is stored in soils and sediments. This currently "stored P" also known as legacy P is sourced primarily from animal feeds, fertilizers, and domestic products that are either generated locally or imported. An accurate assessment of the spatial distribution and transport potential of legacy P is required in order that P source control strategies can be developed to lower P loadings sufficiently to meet the TMDL target by 2015.

Project Overview:

A comprehensive review and analysis of available information was conducted to make a meaningful evaluation of the legacy P issue in the northern Lake Okeechobee watershed. Key issues related to the quantification of legacy P and its distribution, the time it will take to bring the quantity of legacy P down to background conditions and identification of specific management strategies for the abatement of legacy P formed the basis of this work.

The work was divided into 3 tasks. In Task 1, the Consultant did a thorough search and review of all P studies conducted in the 21 summary basins. In Task 2, the Consultant analyzed and processed all available information and formulated recommendations. In Task 3, the Consultant developed a legacy P abatement plan based on the findings of the first two tasks of this project.

Project Status:

There is about 176,000 mt of legacy P within the studied basin that is potentially available for transport to Lake Okeechobee (Fig. 1). At the current TP loading rate to the lake (500 mt/yr), it would take about 350 years to wash the existing legacy P from the watershed assuming P

imports and exports were immediately balanced. However, it is likely that as much as 50% of the legacy P would not be mobile due to soil P storage capacity and the low mobility of legacy P that has moved to lower soil layers. Even with a significant portion of the legacy P being relatively immobile there is an abundance of legacy in the watershed to maintain elevated P levels going to Lake Okeechobee for many years. Therefore, reduction of new sources of legacy P and its mobility to the lake through abatement practices will be the only effective means of addressing P loads to the lake and that these practices must address upland, wetlands and streams legacy P sources. A legacy P abatement plan that outlines specific P control practices and strategies at different spatial scales, anticipated P reduction performances, implementation costs and a general implementation schedule was developed. The approach for the plan was to first meet the tributaries TMDL followed by regional treatment to obtain additional P reductions needed to meet the lake TMDL.



Fig. 1. Spatial distribution of legacy P in the northern Lake Okeechobee watershed.