
LAKE OKEECHOBEE WATERSHED ISOLATED WETLANDS PROGRAM (LOIWP)

Mandate:

Lake Okeechobee Watershed Protection Program (LOWPP)

Background:

Historically, isolated wetlands covered a considerable percentage of land area in the Lake Okeechobee watershed's four priority basins, capturing storm water runoff and helping to retain phosphorus in the watershed. However, many of these wetlands have been drained to increase the amount of land in agricultural production and may be allowing more phosphorus to reach Lake Okeechobee. Conceptually, the isolated wetlands program was intended to enhance and restore wetlands and reduce total phosphorus (TP) loads with the secondary benefits including peak stormwater runoff attenuation by increasing regional water storage in the Lake Okeechobee watershed. Restoration of natural wetlands was identified in the Lake Okeechobee Protection Act as a mechanism for reducing phosphorus loading to the lake. A 20% or higher P reduction was expected and the more restored wetlands, the more P reduction was expected to be achieved while increasing the regional water storage in the watershed (Lake Okeechobee Protection Plan: Project Management Plan. January 2004).

Project Overview:

Six isolated wetland projects were implemented under varying LOPP components: Lemkin Creek, Eckerd Youth, Kirton Ranch, Lofton Ranch, Lamb Island West and Smith Okeechobee.

Although all these projects shared common goals, the configuration of each of these wetlands was unique since they were designed to fit the hydrology and topography of their respective sites and they cover a range of ecological community types from forested cypress wetland (Eckerd Youth) to mixed forest and open marsh (Lamb Island West and Kirton Ranch) to open marsh alone (Lemkin Creek, Lofton Ranch and Smith Okeechobee). Except for Eckerd Youth, which relies on a pump to move water through the wetland during the wet season all the other projects rely on passive flow through a variety of types of water control structures. Similarly, with the exception of Lemkin Creek, which currently receives low P (20-40 ppb approx) inflow water from its associated Hybrid Wetland Treatment Technology (HWTT) pilot project, the other isolated wetlands appear to receive inflow water in the 150-1000 ppb TP range.

In general, the quantity of available water quality and other monitoring data (i.e. flow, actual storage volumes, vegetation composition and wildlife utilization) for all of the wetland projects is very sparse and in most cases was limited to event monitoring during the initial year of the project, resulting partly from conscious decisions to limit monitoring due to budgetary

constraints. Based on the available data it appears that all of these created or restored wetlands were net exporters of P during the periods that they were monitored. To date, there is insufficient data to evaluate actual storage, potential improvements in habitat quality, or wildlife utilization.

Application of Results:

The apparent net positive P balance of these wetlands is not surprising given that nearly all of the available water quality monitoring data were collected during the time that the wetlands might have been expected to be discharging accumulated legacy P from prior uses (Kadlec and Knight 1996) and transitioning from their previous vegetation community to another, wetter successional state probably resulting in the decay of the pre-restoration plant community. However, while the literature suggests that Cypress wetlands like Eckerd Youth may be effective nutrient sinks for N and P (Dieberg F and P Brezonick 1986), information gained through the operation of storm water treatment areas (STAs) indicates that for open marsh wetlands characterized by alternating wetting and drying, similar in nature to most of the isolated wetland projects in this review, P retention may be poor due to oxidative processes that release P during dry periods which is then flushed from the system upon rehydration (SFWMD 2008, SFWMD 2010). In addition, the management plan for at least one isolated wetland in this group (Kirton Ranch) allows grazing of cattle within the conservation easement during the dry season (Laing pers. comm.) which may lead to the deposition of additional P and to soil disturbance, both of which may contribute to increased export of P during periods of hydration and net positive flow.

A simple and inexpensive plan was developed for ongoing surveillance of these systems in the interest of obtaining additional information regarding their functioning as improved habitat, and in some cases, from the perspective of actual water storage capability. After recently evaluating the available information for each wetland it was recommended that additional effort be put into following: Eckerd Youth, Lemkin Creek, Kirton Ranch and Lamb Island West. Eckerd Youth is of interest because it is the only cypress wetland in the group and because it had a good initial vegetation survey, which facilitates identifying changes resulting from rehydration. Lemkin Creek is of interest because of its association with HWTT which has resulted in low P inflows, a long hydoperiod which favors P retention and its apparent function as a trap for aluminum (Al) escaping the downstream end of the HWTT pilot. Kirton Ranch and Lamb Island West are of interest both because of their size, and because both had good pre-construction vegetation surveys which like Eckerd Youth, will facilitate the documentation of changes resulting from rehydration. The dearth of available information on Smith Okeechobee (coupled with apparently restricted access) and the reported poor hydraulic performance of Lofton Ranch make these two projects less amenable to continued tracking efforts. Therefore, unless there is a significant increase in available resources or access to these two properties, no further monitoring is anticipated.

References:

Dieberg F and P Brezonick: (1986) Nitrogen and Phosphorus Mass Balance in a Cypress Dome Receiving Waste Water: in Cypress Swamps, Katherine Ewel and Howard T. Odum ed. University of Florida Press, Gainesville Fl

Kadlec Robert and Robert Knight (1996) Treatment Wetlands. CRC press LLC. Boca Raton, Florida. Chaps. 14 and 19.

Lake Okeechobee Protection Plan: Project Management Plan. January 2004

SFWMD (2008) STA Drought Operations Contingency Plan.

SFWMD (2010): Adaptive Protocols for Lake Okeechobee Operations Draft.