

## **Evaluation of ranchland best management practices for phosphorus discharge in the Lake Okeechobee basin**

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### **Abstract**

Excessive phosphorus (P) loading is a serious problem facing the Lake Okeechobee, the largest freshwater lake in the Southeast. A Total Maximum Daily Load (TMDL) of 140 metric tons/year of P has been set for the lake. Since cow-calf operations in the basin are one of the major sources of P loadings, ranchers are encouraged to implement Best Management Practices (BMP) to help achieve the TMDL. However, limited data is available on the effectiveness of these BMPs. A study was started in 2003 at a commercial ranch in the basin to evaluate the effectiveness of two BMPs: fencing and cattle crossing and wetland water retention. Five contiguous sub-watersheds within the ranch were selected for flow and P concentration monitoring in addition to ground water, weather, and land use data collection. Flow and P loading was monitored through flumes equipped with water level gauges and use of water quality autosamplers. The effectiveness of fencing BMP was evaluated in a stream section (130 m). The water retention BMP was implemented at two isolated wetland sites within the ranch (sites 1 and 4).

Results so far indicated that the P loading and the flow weighted P concentration at the fencing site were reduced by 32% and 10%, respectively during the post-BMP period. For wetland site 1, the BMP was implemented in 2007 so only pre-BMP data are currently available. At wetland site 4, P loading was reduced from 135.61 kg (pre-BMP) to 5.10 kg (post-BMP) and mean flow-weighted P concentration was reduced from 1.67 mg/L (pre-BMP) to 1.09 mg/L (post-BMP). However, one of the masking factors for the BMP analyses was the variability in rainfall and runoff between the pre-BMP and post-BMP periods (post-BMP flow and rainfall 8% and 57% of pre-BMP). The study is continuing to reduce the uncertainty in the BMP evaluation.

**Keywords:** Cattle crossing and fencing BMP, wetland water retention BMP, water quality.

### **Challenge(s) and Issue(s) addressed by the presentation**

This presentation addresses the effectiveness of the ranchland BMPs in reducing the P loadings to the Lake Okeechobee as well as other waterbodies in south Florida. One of the BMPs involves retaining water in the wetland (wetland rehydration) which has been proposed as one of the most important BMPs in the basin. The second BMP consists of fencing the cattle out of drainage ditches to reduce the direct deposition of P in the ditches.