In-Lake Strategies

Location:	-
Subwatershed:	Lake Okeechobee
Basin:	-
Purpose:	Reduce phosphorus loading from sediment beds in Lake Okeechobee.
Project Operation Start:	Strategies have not been implemented/funded.
Considerations/Update:	Several conceptual in-lake strategies to address internal phosphorus loading in Lake Okeechobee have been identified. Earlier strategies included consideration of sediment dredging, creation of in-lake islands or littoral zones, and chemical treatment. New strategies include creation of in-lake break-water barriers and phosphorus treatment technologies. Sediment dredging: Removal of surface sediments by dredging can reduce potential phosphorus flux into the water column, particularly in the pelagic areas. However, there are water quality concerns if water from dredging operations is to be returned to the lake. Treating the water is very expensive, and significant costs savings are possible if treatment can be avoided. Creation of sediment traps and in-lake islands or littoral zones near outlets. Large sumps could be excavated in the pelagic zone of the lake, creating large reservoirs to trap entrained material. Sediments, propelled by the natural currents of the lake, would settle into the sump and would be confined below any likely disturbance created by wind events,. This could greatly reduce the surface area of the sediments contributing to phosphorus flux. Excavated sand and rock material could be used to build islands or could be removed from the lake. Alternatively, sediment impoundments (sand and rock) could be constructed in the lake that would receive the dredged muck material, which would have a top elevation similar to the existing littoral zone. Once the area is filled with the dredged muck material, it could be capped with sand and muck to create littoral habitat. These areas could be selected to provide additional buffers to littoral zones or outflows as well, which may reduce turbidity in discharged waters. Creation of break-water barriers to reduce pelagic and nearshore exchange. Interactions between nearshore littoral areas and turbid pelagic zones are primarily regulated by wind/wave action and lake stage. Currently, a natural underwater reef in the southern portion of the lake tends to isolate the nearshore marshes from pelagic water issues at stages of roughly 13 feet NGVD.

Considerations/Update:	**Additional material, either from dredging projects above or from off-lake areas, could be deposited along this reef to further isolate the southern marshes at higher lake stages, and further to the east. Improved water clarity would promote positive feedback loops through expansions of submerged vegetation, potentially leading to dramatic improvements in water quality in a large portion of the southern lobe. This would have additional benefits to water quality that is discharged south to Everglades STAs, or by extending north to S-308, in discharges to the St Lucie basin.** **Nutrient removal technologies: Some improvements to nutrient and algal bloom removal technologies have occurred over the past several years, some of which may be implemented at small scales in outlets like S-308. Conversion of algal mats to biofuel, nutrient removal through algal treatments, and water treatments via cavitation are some of the small scale pilot studies potentially being implemented by the USACE on Okeechobee in 2019. Depending on the success, scalability, and cost of these experiments, one or more of these technologies could be implemented at other locations in the lake.** **The ability to investigate these ideas is limited at this time due to funding constraints. Staff will pursue these approaches within current data and skill limitations. As funding becomes available, feasibility studies should proceed rapidly. However, the coordinating agencies included an in-lake phosphorus management study as a near-term project. This study will review the recommendations from the 2003 feasibility study. New concepts and technologies would be evaluated and then compared against those from the previous report. Permitting requirements and potential limitations associated with these options will also be evaluated. Finally, new recommendations would be made for implementation.**