Reservoir Within Lake Okeechobee

Purpose and General Description: This feature involves constructing a reservoir within the Lake Okeechobee. It would require construction of an embankment within Lake Okeechobee to compartmentalize the Lake.

Physical Description: Can be varying depths. Existing analysis considers elevations up to 18.5 ft NGVD. The reservoir stages would vary more widely than those of the current Lake stage range, and would average 2.5 feet lower. Embankment height is 46 feet above grade (elevation 27' within Lake Okeechobee) with three horizontal to one vertical side slopes (3:1). Features include inflow pump stations, embankment within the lake, gravity outflows, and a boat lock.

General Description of Operations: This feature utilizes both gravity structures as well as a pump station to bring water into the reservoir within the Lake. In the proposed application, primarily flows from the Taylor Creek/Nubbin Slough subwatershed would be directed into the reservoir, while flows from the Kissimmee River would not flow into the reservoir but rather would flow into the remaining portion of the Lake. The reservoir would be operated to provide deep storage, as needed, within the existing Lake footprint. Water from the reservoir could be released via gravity into the Lake in order to maintain minimum water levels during dry periods. Water could also be released to be sent south for additional treatment and then delivery to the Everglades or released and sent to the Caloosahatchee estuary to achieve minimum flows.

Hydrologic Performance: Constructing a reservoir within the Lake is intended to store water at greater depths within the impounded portion of the Lake in order to minimize land acquisition needs and associated impacts and also to reduce losses to evapotranspiration (ET). Storing water at these depths requires pumped inflows but creates sufficient hydraulic head to allow for gravity outflows most of the time. The Reservoir would not mimic natural hydrology within the footprint, but can be utilized to provide deliveries to downstream water bodies that are more consistent with natural hydrology. The intent of this feature is to utilize the reservoir component for storage, while being able to better manage water levels within the remaining portions of the lake to improve ecological conditions within that portion of the Lake, to minimize damaging discharges to the Estuaries, and to provide deliveries to the Everglades.

Water Quality Performance: High uncertainty in predicting water quality performance. Limited long-term TP removal performance data exist for large reservoirs, and evidence suggests that under ideal conditions, removal of 15-25% may be achieved. Under less than ideal conditions, TP removal may drop significantly and if reservoir sediments go anoxic then this feature could be a P source. Discharges from reservoirs must receive further treatment in a STA prior to discharge to the Everglades.

Environmental / Ecological Advantages or Benefits: Deep storage reservoirs are not intended to provide ideal or natural habitat within the footprint. The intent is to utilize the reservoir to provide benefits to downstream water bodies or other users. This feature could isolate a large portion of the mud bottom within Lake Okeechobee, although portions of the mud bottom remain outside the reservoir and will continue to interact with the water column. This feature may reduce the likelihood of re-suspension of the mud bottom due to reduced stirring during

wind events, although some concerns have been raised regarding this as seen in Environmental/Ecological Impacts below.

Environmental / Ecological Impacts or Concerns: Concerns have been expressed regarding impacts of this proposed feature on lake functions and ecological communities. The presence of such a large feature within the lake itself could disrupt whole-lake water circulation patterns with unknown environmental consequences. Construction of the reservoir could substantially alter or eliminate approximately 150,000 acres of pelagic and littoral habitat (about 1/3 of the lake) that is presently utilized by numerous fish and wildlife species. Affected species could include the black crappie, forage species such as threadfin shad, and other fish species that occur in the pelagic zone during some or all of their life stages, wading birds and snail kites, which currently or previously have utilized the northern littoral zone for nesting and feeding, and other native and migratory waterbirds that have been documented in this portion of the lake. A lack of connectivity to the remaining lake and the potential for poor water quality conditions (e.g., low dissolved oxygen, algal blooms) would limit any ecological value of this feature.

Economic / Recreational Advantages or Benefits: The Reservoir Within the Lake would not require additional land acquisition (other than for associated conveyance improvements) and therefore is expected to reduce costs and minimize impacts to land owners and local governments as compared to deep storage reservoirs.

Economic / Recreational Impacts or Concerns: This feature will potentially impact the lake's black crappie fishery, which is the largest in the state and constitutes a substantial recreational and economic resource for the region. Could have an economic impact on the City of Okeechobee and western Martin County if configuration impacts access to Lake Okeechobee from the existing marinas in the northeastern portion of the Lake.

O&M Considerations (if any): Maintenance of the new embankment/levee within the Lake Okeechobee will be difficult with both sides of the embankments surrounded by water. Staging and turn-around areas would need to be considered during the design.

Uncertainty Concerns: High uncertainty related to water quality performance. Uncertain effect of Lake Okeechobee deep storage reservoir on water quality within the reservoir itself and on water quality within the remaining portions of the Lake, although improved water quality within the remaining portions of the lake is anticipated by many. Potential impacts to littoral zone, fisheries, and other wildlife in Lake Okeechobee. Avoidance of impacts to Lake access/navigation. Complexity of constructing an embankment within Lake Okeechobee and ability to maintain water quality levels during construction. See Audubon comment letter (dated June 24, 2009 , letter on file) and Florida Fish and Wildlife Conservation Commission comment letter (dated June 24, 2009, letter on file) for more specific comments and concerns in regards to impacts to littoral zone, SAV, birds, fisheries, and benthic communities.