Reservoir Within Lake Okeechobee (RWL)

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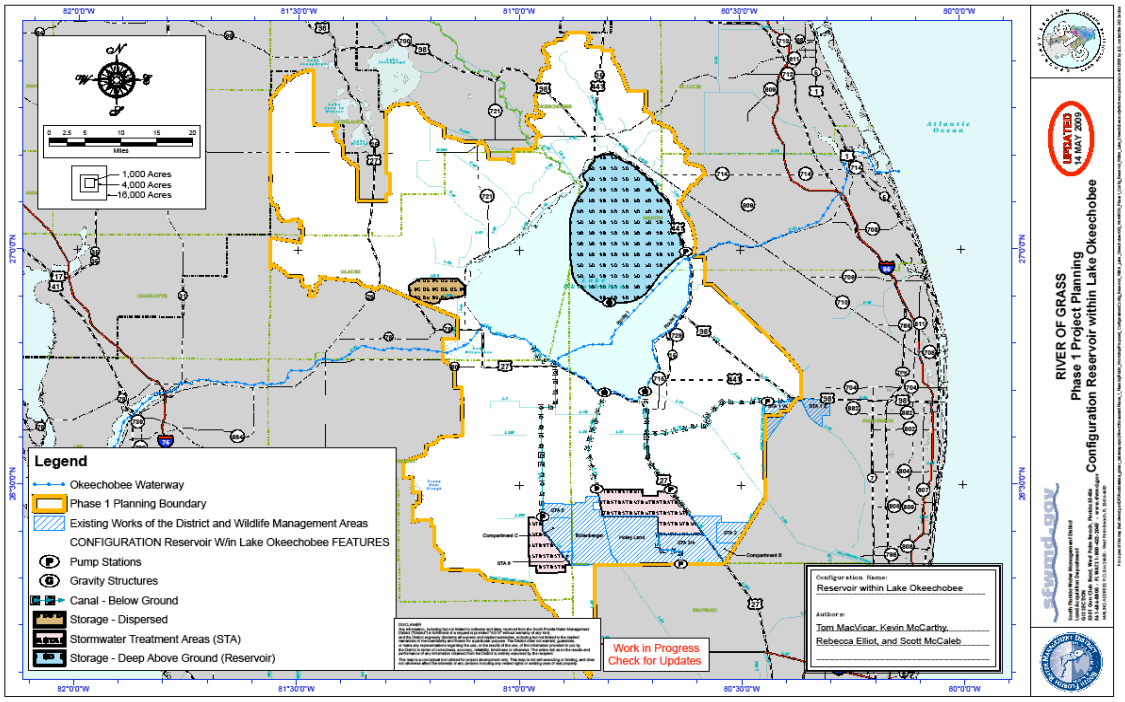
Construct a reservoir in the northeastern portion of Lake Okeechobee which will provide 1,200,000 acre-feet of storage. The flows from the Kissimmee River will NOT go in to the reservoir but rather into the main portion of Lake Okeechobee. Improve conveyance south of Lake Okeechobee to allow the movement of water from the Lake to a stormwater treatment area (STA) that will be constructed on the Compartment A / Talisman parcel and will also provide supplemental flows to the Holey Land according to its regulation schedule.

Construct an STA on US Sugar Corporation (USSC) land immediately west of STA-5 which will receive water from the S-4 Basin. Construct conveyance from the S-4 Basin to the new STA.

Implement the Nicodemus Slough management measure from the Lake Okeechobee Phase 2 Plan (LO12k). This will create the potential to store 31,000 acre-feet on 18,000 acres.



Major Components:

- North Deep Storage – 1,200,000 acre-feet
- North Dispersed Storage/Treatment – 31,000 acre-feet
- South Stormwater Treatment Area - 47,300 net acres of treatment area

General Description of How Water Flows Through System/Operational Intent: Water could be released into Lake Okeechobee in order to maintain minimum levels during dry periods. If water is needed for release to the south it could be released into Lake Okeechobee and then moved via the southern conveyance to the Talisman STA for treatment prior to the water being pumped into the northern end of the Everglades. Water would be available for the Holey Land if it was needed. If water was not needed in the Holey Land it would be routed around Holey Land and then pumped into the northern end of the Everglades.

Water from the S-4 Basin would be directed south through the improved conveyance to the new stormwater treatment area just west of STA-5. After treatment the water would be available for release to the northern end of the Everglades.

Total Acreage Identified:

- 158,000 acres within Lake Okeechobee
- 18,000 acres north of Lake Okeechobee
- 53,500 acres south of Lake Okeechobee

Of the total acreage identified 192,782 acres is in public ownership and 18,718 acres would need to be acquired. The remainder of 18,000 acres would be addressed through the dispersed storage program.

Hydrologic Performance: Achieved 93% (overall result of six (6) months total in Lake-triggered high discharges during the 41-year period of record) reduction in Lake-triggered high discharges to the Northern Estuaries. Received an 87% standard score for Lake Okeechobee Stage Envelope Standard Score Above and a 34% Standard Score Below when only considering the area outside of the reservoir (remaining portions that would be managed as the Lake). Received an 84% standard score for Everglades demand target delivered and an 86% standard score for dry season Everglades demand target delivered.

Note: The impounded reservoir portion of the Lake is being managed according to the needs of the other portions of the system, not according to the Lake stage envelope. However, based on a request received, a separate standard score calculation was made that evaluates water levels within the reservoir component. When evaluating only the water levels within the reservoir portion of the lake, the values for the Standard Score Above and Below were 20% and 0%, respectively.

Water Quality Performance: This configuration requires an additional 0 to 9,400 acres of Stormwater Treatment Area depending on phosphorous concentration from Lake Okeechobee.

Environmental / Ecological Advantages or Benefits:

- Proposes no major construction north of the Lake which will retain the ecological significance of the lands north of the Lake
- Isolates 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.

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- Reduces the likelihood of re-suspension of the mud bottom in Lake Okeechobee due to reduced stirring during wind events, although some concerns have been raised regarding this as seen in Environmental/Ecological Impacts below.
- Creates opportunity to more effectively manage the Holey Land and meet the operational criteria on a more frequent basis
- Provides an opportunity to treat water flowing from the S-4 Basin in to the Lake and Caloosahatchee River by rerouting southward and treating before entering the Everglades

Environmental / Ecological Impacts or Concerns: Potential impact to the water depths in the Holey Land area. Impacts to the Lake's littoral zone. Impacts to Lake ecology resulting from compartmentalization and potential for decoupling the interaction between open water and littoral zone/interior marsh areas, particular concerns regarding impacts to fisheries. Concerns that a wholly mud-bottomed reservoir without littoral areas could have higher levels of water-column nutrients and that if clarity increased, algal blooms could increase. Also concerns that if wind stirring is reduced, the reservoir portion could become thermally stratified and anoxic, which could destroy the benthic community.

Increased Spatial Extent of Shallow Storage/Treatment (≤ 4 feet water depth): 71,500 total acres. Results of relative landscape viability comparisons between the alternative configurations (based on maintenance of minimum depths) indicate that this configuration fell in the high range.

Economic / Recreational Advantages or Benefits: Expect improved water quality within the non-segregated portion of Lake Okeechobee. Some concerns have been raised that water quality may not improve because inflows will have a greater effect and because portions of mud material will remain outside of the proposed reservoir. There is an expectation that Lake Okeechobee would be able to be operated with fewer high levels and would be able to provide water to the main portion of the Lake when the Lake levels fall below the preferred range. However, concerns have been raised that the lake will rise more rapidly with the same inflows (due to smaller spatial extent) and that a 5,000 cfs pump would not be adequate to address >10,000 cfs inflows.

Economic / Recreational Impacts or Concerns: Will potentially impact the fishing activities associated with Crappy in the northeastern portion of Lake Okeechobee. 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.

Major Infrastructure Impacts: Road and bridge impacts associated with upsized conveyance capacities of existing canal networks.

O&M Considerations (if any): Maintenance of the new embankment/levee within the Lake Okeechobee will be difficult to access and stage equipment with both sides of the embankments surrounded by water.

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Uncertainty Concerns: Potential impacts to littoral zone and fisheries in Lake Okeechobee. Avoidance of impacts to Lake access/navigation. 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. Complexity of constructing an embankment within Lake Okeechobee and ability to maintain water quality levels during construction. See below for more specific comments and concerns raised by Audubon of Florida in regards to impacts to littoral zone, SAV, birds, fisheries, and benthic communities.

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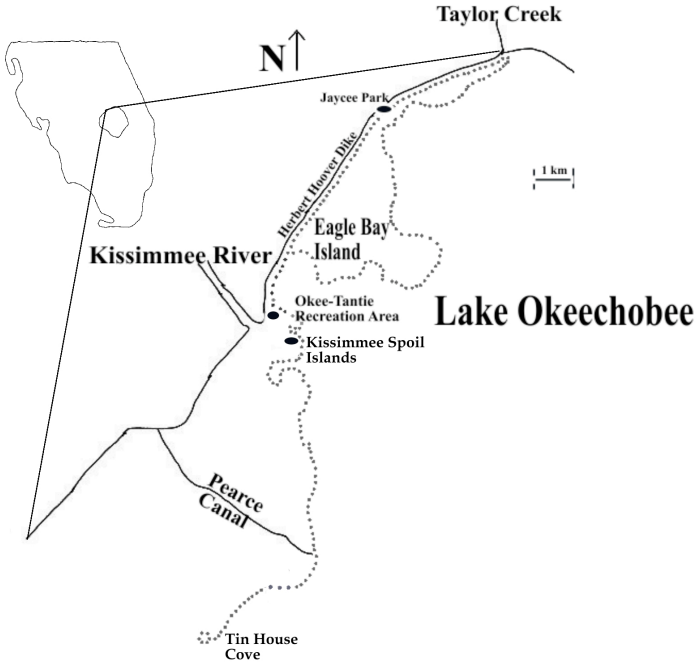
Ecological Concerns raised by Audubon of Florida:

This option could essentially destroy large areas of littoral zone in the lake and seems to assume that the pelagic zone of the lake is not of value. Below, is a brief list of some of the values of this region that would be threatened by the reservoir.

Submerged aquatic vegetation and littoral vegetation: the acres of rooted plants within this area must be mapped and reported. Along with Eagle Bay Island, Little Grassy, and marshes long the northeast shore of Lake Okeechobee, large beds of SAVs have ringed the northern shoreline, attracting heavy use from wildlife and recreationists.

Shorebirds: in 5 surveys in 2007, Gray et al. (2009. Shorebird and larid use of mudflats at Lake Okeechobee Florida, during drought conditions. Florida Field Naturalist. 37:33-44.) documented 24 species of shorebirds and 11 species of gulls, terns and skimmers in this area, including a one-day high count of more than 20,000 individuals. This map shows survey routes.



Snail Kites: Kites have recently nested along the northeast shore in marshes near Henry. Creek.

Wading Birds: Eagle Bay Island has one of the largest and most consistent nesting rookeries on Lake Okeechobee. The 2006 South Florida Wading Bird Report)https://my.sfwmd.gov/pls/portal/docs/PAGE/PG_GRP_SFWMD_WATERSHED/PORTLET%20-%20EVERGLADES%20FLORIDA%20BAY/TAB1832037/WADINGBIRDREPORT06.PDF) found more than 1,500 wading birds nests at this colony. Smith and Collopy (1995. Colony turnover, nest success and productivity, and causes of nest failure among wading birds (Ciconiiformes) at Lake Okeechobee, Florida (1989-1992). Arch. Hydrobiol. Spec. Issues Advanc. Limnol. 45:287-316) found nesting on Eagle Bay Island each year with numbers ranging from 834-1960.

Waterfowl: Hundreds of thousands of Scaup (Aythya affinis and marila) have been counted in the center of Okeechobee by the Waterfowl Section of FWC. These diving ducks feed on benthos and could be harmed by a reservoir (see benthic invertebrate section).

Benthic invertebrates: Although the mud bottom has reduced the diversity of benthos in the pelagic zone, great productivity remains. Densities of 5,000-20,000 invertebrates per meter square have been recorded ((Warren et al. 2009. Structural dynamics of benthic invertebrate communities of the Lake Okeechobee pelagic region. SFWMD Contract No. CP051040), and these benthos feed crappie, catfish and sunfish fisheries. In addition, insect larve (e.g., Chironomidae) "bloom" from the mud bottom as flying adults and feed other invertebrates, birds, fish, frogs and other amphibians, and reptiles. If one assumed Chironomids bloomed at an annual average density of just 1000 per meter square per year, the area of an 158,000 acre in-lake reservoir could produce 6,882,480,000,000 (6.8 quadrillion) individuals available as food for other organisms. If the reservoir was deep and not mixing well, there is a chance it would thermally stratify and reduce oxygen levels so much the Chironomid community could be wiped out…a problem even if occurring only periodically.

Fisheries: Many species of fish rely on this region. The Black Crappie fishery, which likely is larger than the entire rest of the state combined, could be heavily impacted. Larval crappie live in the open water as part of the plankton food chain. As they become fingerlings, they feed heavily on benthos (such as Chironomids described above). As they grow to adults, they switch to shad, who rely on the plankton food chain for food. Thus, cutting crappie off from the lake center cuts them off from larval, fingerling and adult life cycle needs. Other fish have similar reliance and need both the pelagic and marshes zones to complete their life cycles. Building a reservoir would have a similar effect as walling the ocean off from its estuaries.

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