



High Water Levels in Lake Okeechobee: The Threat of Disaster

Significant discharges to the St. Lucie and Caloosahatchee estuaries in 2013 and 2016 highlighted the challenges surrounding Lake Okeechobee water management and the need to increase water storage infrastructure. There is broad consensus that more storage capacity is needed outside of Lake Okeechobee. But an interest in storing more water in the Lake itself has arisen as an alternative.

Consistently holding more water in Lake Okeechobee is risky due to constraints of dam safety, water quality, economic and environmental impacts.

Safety of the Herbert Hoover Dike

The recent Herbert Hoover Dike dam safety modification study¹ notes that Dike rehabilitation efforts were initiated because the structure was identified as an “Urgent and Compelling (Unsafe)” water control system that is “critically near failure or extremely high risk.” The Dike was constructed in the 1930s using sand, gravel, shell and limestone, all of which are permeable materials that are susceptible to erosion. Many years of high water levels in the Lake made the Dike prone to “piping,” a leak that can lead to collapse. Erosion and Dike failure can also occur from water overtopping the Dike during major storm events. On a scale of Dam Safety Action Classification, the Dike is identified at Level 1 on a scale of 1-5. This represents the highest danger of failure.

The U.S. Army Corps of Engineers is currently repairing the HHD to help protect the health and safety of more than 40,000 residents who live around the Lake. When completed, the Corps will have invested about \$1.6 billion to repair and reinforce the Dike.. The goal of the remediation is to make the Dike of “tolerable residual risk and meeting essential USACE guidelines.” The current repairs underway are meant to make the Dike safer under the current Lake Okeechobee water management schedule. A report conducted for the South Florida Water Management District cautioned that “[i]t should not be expected that structural repairs-even when successfully completed- will necessarily provide a once and for all solution.”² There is absolutely no indication that consistently higher water levels could be safely managed.

The likelihood of initiation of a piping failure and the rate at which piping occurs is directly related to Lake elevations.

¹ United States Army Corps of Engineers. 2016. Final environmental impact statement: Herbert Hoover Dike dam safety modification study. Jacksonville District, Jacksonville, FL.

² Bromwell, R., Dean, R., Vick, S. Prepared for South Florida Water Management District. 2006. Report of Expert Review Panel Technical Evaluation of Herbert Hoover Dike, Lake Okeechobee, Florida.

The rate of rise

Decisions about Lake Okeechobee's water levels must include a consideration of the rapid and uncontrolled rate at which water can enter the Lake. With the infrastructure in place today, water can enter the Lake six times faster than it can be released. Tropical Storm Fay in 2008 caused Lake levels to rise three feet in one week and nearly an additional foot over the next month. Raising the average water stage in the Lake will increase the threat of uncontrolled and dangerously high water levels.

Deeper levels damage Lake Okeechobee's marsh, fish, and wildlife

The marshes on Lake Okeechobee can cover about 150,000 acres,³ one-third of the Lake. These marshes host a remarkable diversity of plants, fish and wildlife and improve water quality.

Since the Herbert Hoover Dike was built, when water in the Lake was held at or below 15 feet, the Lake's marshes generally thrived. Water levels only started to be held consistently higher than 15 feet starting in the late 1970s. This drowned deep water plant communities, eliminated short-hydroperiod marsh wildlife, harmed the fishery, and reduced aquatic bird use to the extent that "ecological emergencies" were declared in 1988 and again in the year 2000.

Experience in the past 65 years has repeatedly shown levels above 16 feet are harmful to the Lake.⁴ When water levels rise to 16 feet, plants begin to die in the 65 square mile submerged marsh zone. Plant die-offs harm fisheries and resulting increased turbidity makes Lake water dirtier. Prolonged deep water also eliminates the wildlife-rich wet prairie communities that wading birds and waterfowl need for foraging. Once plant communities are lost, habitat for fish spawning and feeding is lost, creating a domino effect on the Lake's food chain. Rapidly rising water also drowns alligator and bird nests, including those of the endangered Everglade Snail Kite.

The tourism-based economy related to the Lake is heavily dependent on the bass and crappie fisheries. After hurricanes raised the Lake levels in 2004 and 2005, the crappie fishery took about eight years to recover, demonstrating that the economic harm can be long-lasting.

A deeper lake is a dirtier lake

Phosphorus concentrations and turbidity increase in Lake Okeechobee with increasing water levels.⁵ Deeper water levels stir sediments on the bottom of the Lake and drown submerged aquatic plants that otherwise remove nutrients and help clean water. Deep

³ About 240 square miles

⁴ For more detailed information and literature citations about high water levels and Lake Okeechobee responses, see Audubon's "Brief history of lake Okeechobee ecosystem responses to water management" paper @ [hyperlink](#)

⁵ Havens, K. E. 1997. Water levels and total phosphorus in Lake Okeechobee. *Journal of Lake and Reservoir Management*. 13:16-25.

water levels also tend to occur with large inflows from north of the Lake that carry high nutrient loads. Conversely, in 2012 after several years of relatively low Lake levels, the average phosphorus level in the Lake's middle dropped to the lowest levels in more than a decade.

Deep dirty water in the Lake increases harm to the St. Lucie and Caloosahatchee estuaries. The Lake simply cannot hold an unlimited amount of water. When discharges to these estuaries are required after high water impacts have occurred, water released is even more nutrient rich, creating problems such as the toxic algae blooms and other negative impacts seen in 2016.

The Need for a Southern Outlet

Lake Okeechobee is subject to very rapid water level rises because the system of canals and structures around Okeechobee allow water to flow in from its massive watershed much more quickly than it can be released. The Corps' Dam Safety Modification Report notes that "[w]ater managers are unable to maintain safe water levels following sustained high rainfall events or water patterns because the outlet capacity to release lake water is limited." Increasing this outlet capacity should be the highest priority in response to the challenges posed to reduce damaging discharges of water from Lake Okeechobee. Constructing the EAA Reservoir project provides a new outlet for Lake Okeechobee water that can begin to store water currently discharged to estuaries, and provide a much needed source of freshwater for the Southern Everglades and Florida Bay.

The Herbert Hoover Dike was built in response to one of the nation's most catastrophic events. Florida should not tempt history to repeat itself by inviting a disaster.