Essential #5

Provide additional water storage to protect the estuaries and Lake Okeechobee

The Problem

The water issues surrounding Lake Okeechobee and the St. Lucie and Caloosahatchee estuaries are as complex and contentious as any in the country. When the southern reaches of the Herbert Hoover Dike was completed in 1933, outflows from the Lake to the Everglades were cut off--with all major releases sent to the St. Lucie and Caloosahatchee instead. During these destructive releases, plumes of nutrient and sediment-laden water from Lake Okeechobee are observed well into the Gulf of Mexico and the Atlantic Ocean. The pollution of Lake Okeechobee, which only gets worse with each passing year, has further aggravated the problems associated with these releases adding the threat of algae blooms, low dissolved oxygen levels, fish lesions, and a host of other maladies that damage these delicate estuarine systems and threatens the Everglades.

Large volumes of polluted water are frequently released into the St. Lucie Canal from Lake Okeechobee, in some instances causing large pollution plumes in the Atlantic Ocean.

Artificial manipulation of water levels within Lake Okeechobee started in the 1880s and continues today. Around 1913, water levels in the Lake dropped from around 22 feet above mean sea level to about 15 feet above mean sea level, primarily to provide flood control. As a result, large releases have been sent to the estuaries during wet years ever since. By maintaining Lake Okeechobee at these lower levels, the system has also lost its single largest place to store water in the Everglades. Attempts to establish a fishery in the Lake by maintaining low levels has been hampered by the highly variable inflows. These inflows also confound attempts to compensate for high nutrient levels in the Lake by holding the Lake at lower stages.

Adding to the environmental woes of the Lake are the operational rules, which are largely determined by flood control and water supply. An aging Herbert Hoover Dike has limited options for the Lake. Fearing a levee failure, the U.S. Army Corps of Engineers has opted for large and sustained releases to the estuaries.

As a result of trying to manage the Lake for various interests, no one is satisfied and these policies have created the “perfect storm” for a collapse of the Lake.

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The Solution

The answer to the problem of discharges to the estuaries and to the wild swings in Lake Okeechobee water levels is straightforward: ***More Storage***.

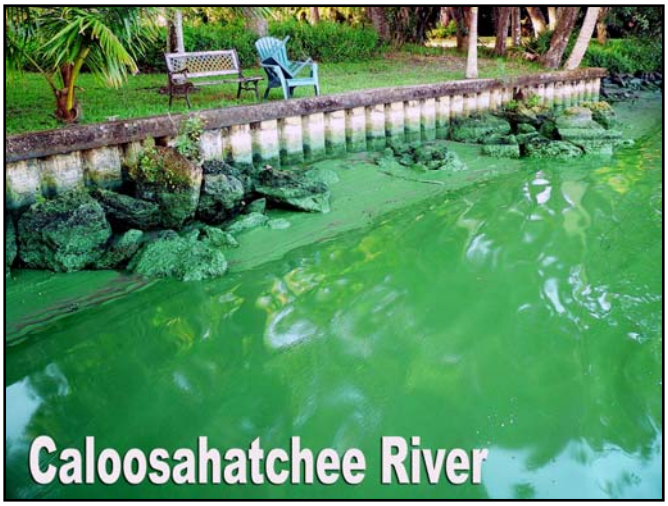
The Comprehensive Everglades Restoration Plan (CERP) proposed solving the storage issues in the Lake with Aquifer Storage and Recovery (ASR) wells, where water is pumped underground instead of diverted to the estuaries or the Everglades, and then recovered later. Recent simulations estimate Lake Okeechobee ASR storage at 5.4 million acre-ft--roughly 4.5 times the capacity of the Lake itself. Given the inherent risks with ASR at this massive scope, practicality would suggest looking at a variety of alternative solutions. These solutions, including deep reservoir technology, should be evaluated to assess cost, energy efficiency, and overall ecological benefits to the system.

This storage requirement can be significantly reduced by a few common-sense steps. First, send as much water as possible (after treatment) through the Everglades (Essential #4). Secondly, construct about 1.5 million acre-ft of storage for water supply in the Everglades Agricultural Area (Essential #3). Then, build about 2.8 million acre-ft of additional storage, near Lake Okeechobee, which will buffer lake stages (changes in water levels) and eliminate damaging discharges to the estuaries.

Unfortunately no single solution is likely to appear that will realize capacities of this magnitude. Therefore, several approaches are called for:

- **Increase natural wetland, groundwater, and lake storage in the Lake Okeechobee watershed.** Restoring wetland function to the wetlands in the Kissimmee River basin, the Lake Istokpoga basin, and Upper Chain of Lakes (Essential #2) will greatly ease the amount of water draining into the Lake from the north, easing the pressure on Lake levels that require estuary discharges.

  Hundreds of miles of private drainage ditches flow toward South Florida Water Management District canals with few modern water control structures. These ditches over drain the land and unnecessarily lower groundwater levels--sending the water toward Lake Okeechobee far too quickly. Inventorying, modeling, and modernizing this haphazard



Discharges of polluted water from Lake Okeechobee into the Caloosahatchee Canal cause massive blooms of algae which in turn cause fish kills due to low oxygen levels in the water column.

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The Solution continued…

drainage system with new control structures could add millions of feet of storage. Additionally, programs to encourage and increase water storage on private lands should be pursued and implemented.

- **Consider a suite of storage options, including surface storage in the Kissimmee basin and in the Everglades Agricultural Area (EAA) south of the Lake.** Finding an effective and efficient storage solution will require constructing a storage feature along with an aggressive program to restore wetlands in the Kissimmee River Watershed.

- **Thoroughly examine the trade-offs of raising the level of Lake Okeechobee for additional storage.** The National Academy of Sciences review of storage options suggests that scientists investigate and report on the options and trade-offs related to Lake levels. Only then can an informed decision be determined.

- **Proceed with the repair of Herbert Hoover Dike.** The U.S. Army Corps of Engineers is supported in their efforts to rehabilitate Herbert Hoover Dike. The Corps also needs to be vigilant in controlling activities that undermine the integrity of this structure, or preclude future retrofits--such as incompatible land uses like rock mining and development adjacent to the levee.

Essentials #3, #4, #5

Construct the requisite storage and flow to restore the Everglades, the estuaries, and Lake Okeechobee

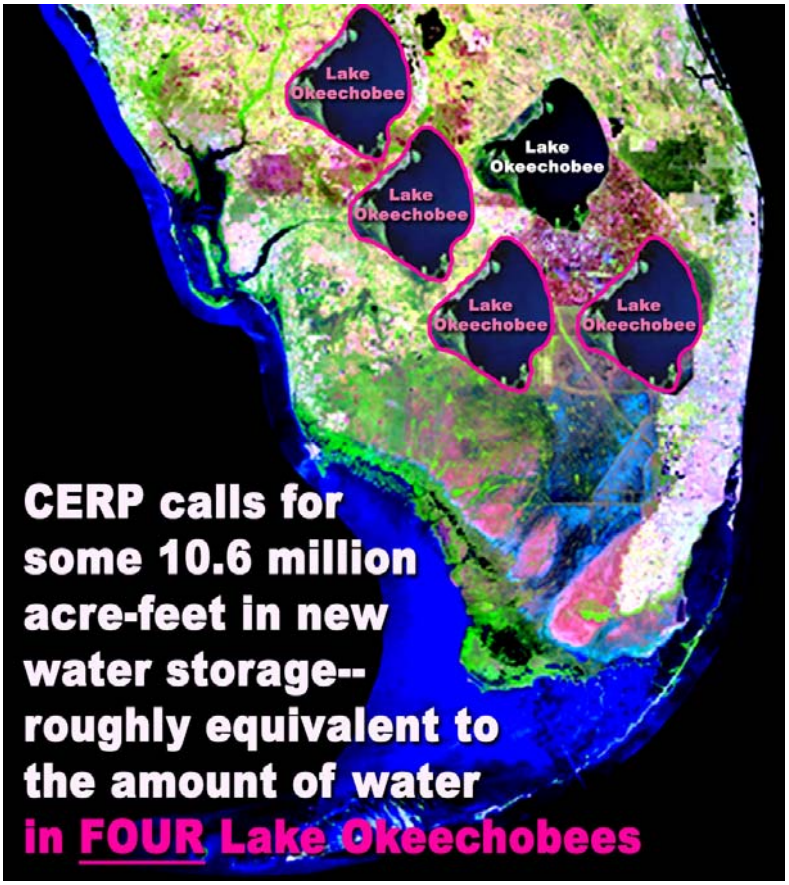
The Background

When the southern reaches of the Hoover Dike were completed around Lake Okeechobee in 1933, the Everglades lost most of its water supply. Without water from Lake Okeechobee's watershed, the Everglades became much drier, causing reduced productivity in Florida Bay as well as in the Gulf Coast estuaries.

Water that historically flowed south was directed to the east coast by the St. Lucie River and the west coast by the Caloosahatchee River. This caused the coastal estuaries to bear the brunt of huge amounts of damaging fresh water releases from Lake Okeechobee.

Decades of relentless drainage of the Everglades marshes coupled with lowered Lake Okeechobee water levels has decreased the amount of space available to store water--the amount of water the natural systems need to get them through the dry season, and through times when rainy season does not bring its usual bounty. As a consequence of not being able to save water, the remnant Everglades ecosystem is very susceptible to floods and droughts.

If the Everglades is to survive, the storage that was inherent in the vast spatial extent of its natural wetlands must be recovered. This need to store additional water is of paramount importance to the Comprehensive Everglades Restoration Plan (CERP). CERP calls for huge increases in storage--some 10.6 million acre-feet in new storage which is roughly equivalent to the amount of water in four Lake Okeechobees.



The fate of CERP relies on the plan's ability to provide this storage. Yet the 2000 plan suggested that 90 percent of this new storage could be provided by Aquifer Storage and Recovery (ASR) wells. Beyond the ASRs, CERP also planned to store another 3 percent of the water necessary in “reclaimed” rock mines.

Today both technologies are recognized as extremely risky and of highly uncertain feasibility. Long-promised ASR contingency plans have not been delivered by the State and federal partner agencies; Essentials #3, #4, and #5 propose just such a contingency plan.

Essentials #3, #4, #5

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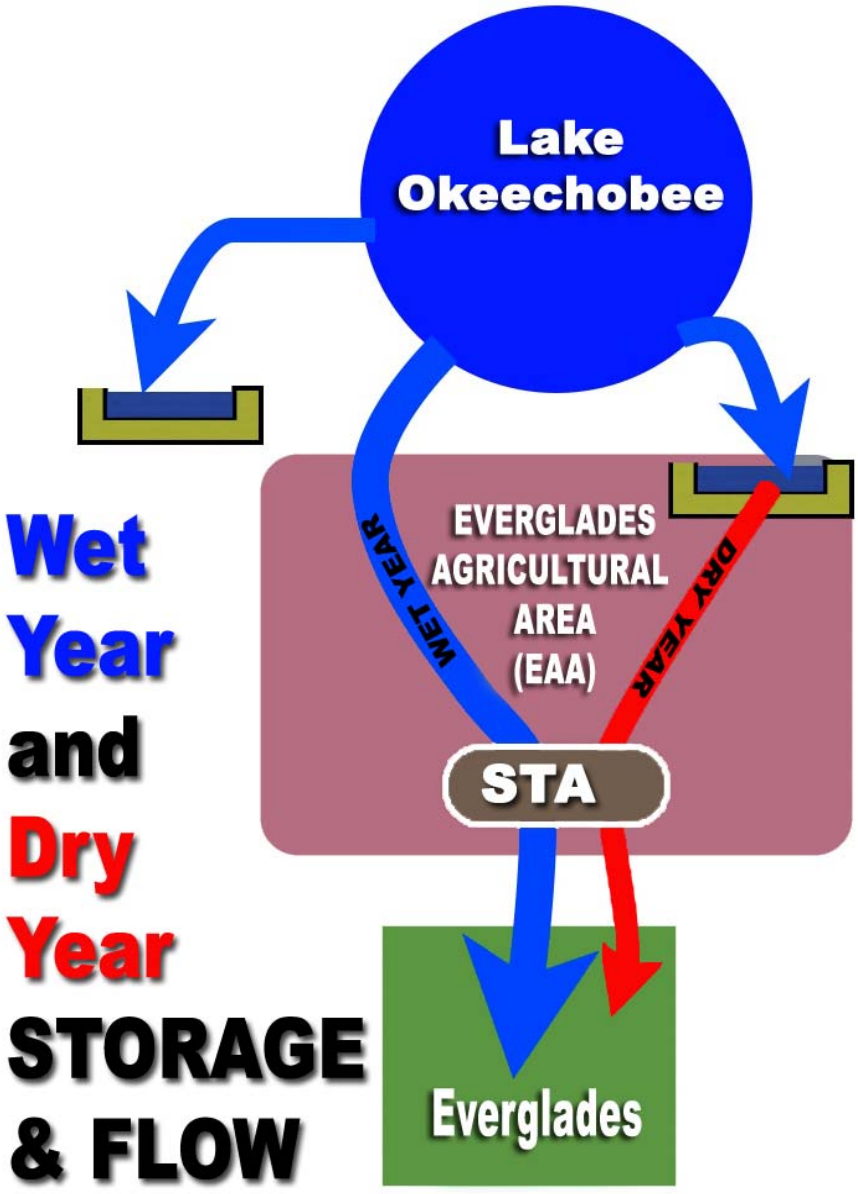

The Key Concept

The concepts of storage and flow are linked.

During wet years, THREE ACTIONS must occur:

First, store sufficient water in a surface reservoir to supply the Everglades with enough water during droughts. (Essential #3)

Second, after treating the water to remove pollutants, send as much water from Lake Okeechobee as possible to the Everglades. (Essential #4)

And finally, construct enough additional storage to prevent damaging discharges to the estuaries, and use this water for drought supplies to the Lake and for other water needs. This is the operational strategy that minimizes storage need, but restores the estuaries and the Everglades. (Essential #5)

The Everglades Agricultural Area (EAA) is over 700,000 acres in size,