

Issue: FL – Environment

Lake Okeechobee and the Blue-Green Algae Problem

Blue-Green Algae Problem

The pollution in Lake Okeechobee in central Florida that results in blue-green algae blooms presents serious public health and economic problems, producing dangerous toxins that affect residents of five counties. The algae must be controlled.

Blue-green algae are actually a family of photosynthetic cyanobacteria, some of which produce toxins. A combination of warm temperatures, sunlight, and nutrient-rich fresh water can cause the cyanobacteria to reproduce rapidly, or "bloom." The blue-green blooms usually float to the surface and cause a vast green, evil-smelling goop. These blooms persist through the hot summer and die off when they have used up their nutrients. Then they fall to the bottom and rot, depleting the water of oxygen and releasing potent toxins, thereby posing a double threat to fish and to humans.

Possible solutions include:

- 1) Reducing the flow of chemicals into the lake that promote algae growth
- 2) Adding algicides or salt to the lake
- 3) Strengthening the dikes around the lake to reduce the volume of contaminated water that must be released so the blooms do not enter the rivers, estuaries and ocean or gulf shores.

How Did it Happen?

Originally, water flowed south, slightly downhill from the Kissimmee River into Lake Okeechobee, then into the Everglades, and finally to the Florida Bay.¹ Although the area was originally thought to be a swamp, it was later found to be a slow-moving river. Marjorie Douglas Stoneman (1890-1998), a conservationist, popularized the phrase "River of Grass" for the Everglades.

In 1905, Governor Broward initiated large-scale development of the Everglades to create an agricultural area.² The land was drained, and thousands of water-control structures—canals, levees, and pump stations—were built. The result was that the land south of Lake Okeechobee was designated the Everglades Agricultural Area.

Severe hurricanes in 1926 and 1928 caused Lake Okeechobee to overflow, devastating the developments in the Everglades and causing over 3000 deaths. To prevent future disasters, the Federal Government took control. Between 1930 and 1937, the Army Corps of Engineers built the Hoover Dike, a higher dike around Lake Okeechobee's edge.³

To provide flood control for the region, the U.S. Corps operates a sprawling, jerry-rigged plumbing system consisting of 2,100 miles of canals, 2,000 miles of levees, and 71 major pumping stations. Annual operating costs are three-quarters of a billion dollars.⁴

What's Happening Now?

According to the National Oceanic and Atmospheric Administration (NOAA), in May 2018, blue-green algae existed in 90% of Lake Okeechobee.⁵ However, most of the algae blooms exist in water columns beneath the surface and are not visible from the air.

Cyanobacteria have gas vesicles that act as buoyancy control devices. They may fill with gas—causing the cyanobacteria to float on the water surface - or they may lose gas—causing the bacteria to

descend into the water column. NOAA computer-generated imagery shows cyanobacteria blooms below the surface that are invisible to the human eye.

The Army Corps of Engineers began discharging excess water from the lake on June 1st. Algae blooms showed up 4 days later at Port Mayaca.⁶ The Corps suspended discharges on June 30th.

On July 9th, Governor Rick Scott issued an emergency order over the reemergence of toxic algae outbreaks on both coasts.⁷ The order applies to Glades, Hendry, Lee, Martin, Okeechobee, Palm Beach and St. Lucie counties.

This year's emergency order followed that of 2016, when Governor Scott declared a state of emergency after algae blooms caused water at over 20 miles of beaches to thicken and turn pea green.

Why Does Lake Okeechobee Get These Blue-green Algae Blooms?

Blue-green algae requires phosphorus and nitrogen for growth. These nutrients seep into the lake as the result of human activity around the lake. Development of central and southern Florida have brought agriculture, industry, tourism, and housing developments, all of which produce phosphorus and nitrogen.

Over the past 33 years, phosphorus levels in the lake have nearly always been three to four times higher than the target level of 105 metric tons a year. For example, in 1985, 500 metric tons of phosphorus flowed into the lake. Last year, the total was 450 tons. In March 2016, the state's own scientists concluded that there has been no improvement at all.⁸ The presence of excessive phosphorus nutrients promotes the rapid growth of the blooms.

Why Is the Water Being Discharged into the Rivers?

The Hoover Dike, now 75 years old, is deteriorating. When water levels exceed the target height of 15 feet, (currently set by The Corps) there is a real danger that the dike will collapse. A collapse would flood the surrounding areas and could potentially cause thousands of deaths. To prevent this, excess water from the Lake must be discharged into canals that connect to the St Lucie and the Caloosahatchee rivers. The release of water involves difficult choices "between trying to protect the integrity of the dike—the safety of the people who live and work around the lake—or upsetting the balance of a delicate ecological system," said Corps spokesman John Campbell.⁹

Who is to Blame?

Republican Governor Rick Scott, has blamed the algae plague largely on the Obama administration's failure to fix the federally-controlled dike around the lake.

However, others, such as Eric Draper, Executive Director of Audubon of Florida, disagree.¹⁰ "I think it's irresponsible to point the finger at the federal government," he says. "The question of who let all that pollution into Lake Okeechobee is not a federal responsibility, that's a state responsibility. Florida allowed three million acres that drain into Lake Okeechobee to become over-drained and overdeveloped."

Environmentalists point to decades of uncontrolled overdevelopment and lax regulation of agriculture, saying the state never forced farms, cities and other sources of phosphorus to reduce it sufficiently to allow the lake to recover.

It is difficult to attribute blame to a single cause. Various studies show differing sources.

From the north: cattle ranches and farms apply phosphorus-containing fertilizers that eventually seep into the rivers and ground water that are flowing south.

- One study found that about 37% of nutrients in the lake come from the farms, citrus groves, and cattle ranches in the Kissimmee River area. Even as far north of Orlando, lawn fertilizer and animal waste wash into the river. (A)
- Another study found that 61% originates in farms and cattle ranches to the north. (B).

Urban development around the lake has proceeded with little regulation of septic tanks.

- One study estimates that 58% of algae-growing nutrients found in the lake originate in leaking septic tanks in the area's urban developments. (A)
- Another study concluded that urban runoff contributed 29%. (B)

In the south: sugar plantations pump excess water, which contains phosphorus, north into the Lake.

- Studies have estimated that southern sugar fields, farms, and towns account for either 5.8% (A) or 10% (B) of the Lake's total phosphorus content.

(A) 2015 report by the South Florida Water Management District¹¹:

(B) March 2011 update of the Lake Okeechobee Protection Plan¹²:

The Florida Chamber of Commerce touts its promotion of “science-based water research solutions.” In videos about Lake Okeechobee¹³, it attributes the problem solely to septic tanks: Videos #3, 5, 7. It makes no mention of agriculture in the north or sugar plantations in the south. The videos feature Dr. Brian LaPointe of Florida Atlantic University, Harbor Branch Oceanographic Institute.

According to the ACLU, water management districts have been gutted by the Scott administration.¹⁴

Residents of Martin County blame the new leadership at the South Florida Water Management District, appointed by Scott soon after he took office in 2011. Scott chose Peter Antonacci, a lawyer, lobbyist and Scott's former general counsel in Tallahassee, with no experience in water management, to lead the District.

Scott also appointed a new nine-member Board of Directors to support his business-first policies. Martin County residents, pleading for the fast tracking of Senate Bill 10 (more below) and relief from the dangerous algae contamination, say they met only dismissive –and sometimes aggressive – opposition from the Water Management District.

Furthermore, during his six years in office, Scott has slashed the number of employees at the Department of Environmental Protection from 3,551 to 2900— a reduction of 18 percent. The number of cases enforced by environmental investigators plummeted even further, from more than 1600 to fewer than 400. Fines assessed for violations fell by 90 percent.

At the same time, Scott reduced the ad valorem taxes used to fund Florida's five Water Management Districts. The South Florida Water Management District reduced its payroll from 1828 employees in 2009 to 1475 in 2016, according to District budget figures.

What is Currently Being Done to Fix the Problems?

The Hoover Dike, now 143 miles long, is defective in certain areas. In 2001, the Corps began a \$1.6 billion repair project, which is projected to finish in 2025.

On Feb 12, 2018, President Trump proposed an "innovative partnership" with Florida.¹⁵ The federal budget would provide \$96 million for the dike repairs, plus \$66 million to accelerate work, contingent upon the Florida Legislature providing another \$50 million in the 2018-19 state budget. Thus far, the federal government has exclusively funded these repairs. However, Florida appropriated \$50 million in 2018 and 2019 to accelerate completion of the work.

What Additional Steps Can be Taken to Fix the Problem

The problem can be ameliorated, but not totally solved, by strengthening the dikes around the lake, allowing them to hold more water. This would decrease the amount of contaminated water released into canals, water which then flows into rivers, estuaries, and the ocean or gulf.

A true solution to the problem would be to reduce the seepage of algae-growth promoting nutrients into the Lake. Building public sewage plants to replace individual septic tanks would be worth the investment of public funds. Fertilizer runoff is difficult to control. Every source of upstream pollution should be analyzed and measured, and the most efficient reduction in runoff should be enforced.

Other possible solutions are short term. They include:

- Adding algicides to control the blooms. However, algicides don't work well in large bodies of water and would quickly get diluted.
- Adding salt to the Lake is another approach, since these are freshwater algae. But fresh water entering the Lake would quickly reduce salinity.
- Using a skimmer to scoop up thick algae mats can reduce their concentration in the lake or attempt to vacuum up the algae. But these would create the problem of how to dispose of the toxic algae.

What are the Health Dangers?

Toxins released from the bloom as the algae decays may cause skin rashes, vomiting and respiratory problems. "The smell is so bad it will make you gag," said Martin county resident Mary Radabaugh at an emergency meeting. "We have red eyes and scratchy throats. We can smell it in our office. It's terrible."¹⁶ There are also fears that manatees, which graze on seagrasses in the estuary area, and sea turtles could be killed off by the toxins.

More worrying is the link to liver disease. Data from an Ohio State University Study showed a strong and robust positive correlation between algae blooms and non-alcoholic liver disease.¹⁷ Analysis found that there is a less than 0.1% chance that the observed correlation was due to chance. The study also found a significant positive relationship between an increase in algae blooms and increased risk of death from non-alcoholic liver disease. The researchers concluded that "more attention should be centered around the public health impact of harmful cyanobacterial blooms."

Furthermore, there is a strong link between a cyanobacteria toxin and neurodegenerative diseases such as Alzheimer's, Parkinson's disease, and Lou Gehrig's disease.¹⁸ A paper published in January 2016 showed that long-term exposure to the toxin can trigger neurodegenerative illnesses.

Why did the U.S. Government Sue the State of Florida over the Everglades?

In 1988, Acting U.S. Attorney Dexter Lehtinen initiated a federal government lawsuit against Florida,¹⁹ *United States v. South Florida Water Management District and Florida Department of Environmental Regulation, et al.*

The lawsuit alleged violations of state water quality standards, particularly excessive phosphorus content, in the Loxahatchee National Wildlife Refuge and Everglades National Park. The litigation continued until May 21, 1991, when Governor Chiles announced an end to the litigation at the federal courthouse. "I came here today convinced that continuing the litigation does little to solve the problems or restore the Everglades. We want to surrender. We want to plead that the water

is dirty. We want the water to be clean, and the question is how can we get it the quickest,” he said. This led to the Everglades Forever Act.

What Have Legislators Done?

The Comprehensive Everglades Restoration Plan (CERP), essentially a continuation of the earlier Everglades Forever Act, was signed into law in 2000. It provides a framework to restore, protect, and preserve the water resources of central and southern Florida, including the Everglades.²⁰ It covers 16 counties over an 18,000-square-mile (47,000 km²) area. The State of Florida (South Florida Water Management District) and the U.S. Army Corps of Engineers are undertaking numerous projects under CERP to ensure the proper quantity, quality, timing and distribution of waters to the Everglades and all of South Florida.

In 2000, it was estimated that CERP would cost a total of \$8.2 billion and take approximately 30 years to complete.²¹ More recent estimates (2014) indicate that the plan would take approximately 50 years to implement and would cost an additional \$1.63 billion. Under CERP, the federal government is required to fund half of the restoration costs, while state, tribal, and local agencies are required to fund the other half.

Since 2000, the federal government has provided more than \$1 billion in funding for CERP. Based on estimates of various state contributions and related restoration efforts, most agree that Florida has spent significantly more on Everglades restoration than the federal government.

The Florida Harmful Algal Blooms Task Force was established in 1999 by the Florida Legislature.²² It was founded in response to serious outbreaks of red tide, caused by algae that regularly attack the west coast of Florida. The statute called for scientists, engineers, government representatives and members of citizens’ organizations to monitor, study and try to mitigate algae damage. It was to be headed by the Florida Fish and Wildlife Research Institute. It has not been funded since 2001.

Senate Bill 10: Passed May 2017; Senate Bill 552; HR 2137

Sugar: Are Legislators Completely Unbiased?

The Florida sugar industry employs more than 14,000 people and had an annual income over \$800 million in 2016²³. By contrast, the tourism industry in Florida employs 1.1 million employees and generated \$51 billion in 2015.²⁴

In the 2016 election cycle, Florida’s two largest sugar companies – Florida Crystals and U.S. Sugar – gave federal candidates almost \$3 million in campaign contributions, according to the Center for Responsive Politics.²⁵ The two companies paid out more than \$3.6 million to federal lobbyists and the Florida Sugar Cane League added another \$2 million.

During the 2017 government session, U.S. Sugar had 28 lobbyists and Florida Crystal had 30. In comparison, the Everglades Foundation had eight.

These lobbying efforts have likely influenced Congress’ continuation of a national sugar program, which was put in place in 1934 specifically for the sugar industry. Through a combination of import quotas, tariffs, and loan guarantees, sugar prices are artificially inflated for American consumers. “Last year, (2015), on average, sugar cost nearly twice as much in the United States as in the rest of the world,” said Bryan Riley, a senior policy analyst at The Heritage Foundation, “causing many candy producers to relocate to other countries to escape high U.S. sugar prices.”

A 2013 study by Iowa State University found the sugar program costs consumers up to \$3.5 billion a year – and a loss of approximately 20,000 jobs. A 2015 analysis by Mark J. Perry of the American Enterprise Institute found the sugar program costs consumers and businesses more than \$3 billion annually.

Talking Points- Toxic Algae

- Blue-green algae requires phosphorus and nitrogen for growth. These nutrients seep into the lake as the result of human activity around the lake. Development of central and southern Florida have brought agriculture, industry, tourism, and housing developments, all of which produce phosphorus and nitrogen.
- Studies have attributed multiple different causes for the excess phosphorus and nitrogen pollution in the lake. These include cattle ranches and farming in the north, poorly regulated and maintained septic tanks and lawn fertilizer usage from the excessive urban development around the lake, and sugar plantations in the south, pumping waste water north into the lake.
- The pollution in Lake Okeechobee that results in blue-green algae blooms presents a serious threat to the health and economy of our citizens. Residents near the pollution suffer skin rashes, vomiting and respiratory problems. They are also at risk for non-alcoholic liver disease and neurodegenerative diseases such as Alzheimer's.
- The algae must be controlled. There are no good short-term solutions. Elimination of the nutrients flowing into the lake that cause the algae blooms is the necessary permanent solution. The State should do a better job of enforcing existing regulations related to nutrients such as phosphorus and nitrogen that flow into the lake and promote the growth of algae.
- Republican Governor Scott has reduced environmental enforcement and staffing that would address the pollution in Lake Okeechobee.
- We must restore enforcement of existing regulations.
- We must move forward with The Everglades Comprehensive Restoration Plan ASAP to solve our water problems.
- We need officials who are responsive to the concerns of our residents.
- It is shameful to politicize an issue that threatens the health of our citizens.

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