Legislative Edition

Everglades Restoration

Facts from the Past
Projects for the Present
Recommendations for the Future

The following recommendations and background information are offered in the hopes of speeding the day when the Everglades ecosystem will be considered restored, stable and sustainable.

Addressing Stormwater

1. **Expedite funding for the Lake Okeechobee Watershed Restoration Project.**

2. **Complete renovations to the Herbert Hoover Dike and construction of reservoirs and stormwater treatment areas east, west, and south of Lake Okeechobee ON-TIME.**

3. **Multiply the use of water farms.**

Addressing Wastewater

4. **Upgrade wastewater treatment plants to minimize outflows and failures.**

5. **Renovate deteriorating sewer system infrastructure.**

6. **Develop onsite sewage treatment and disposal system remediation plans to address water quality issues associated with septic systems and open the Florida marketplace to innovative, nitrogen-reducing septic systems.**

Addressing Fertilizer

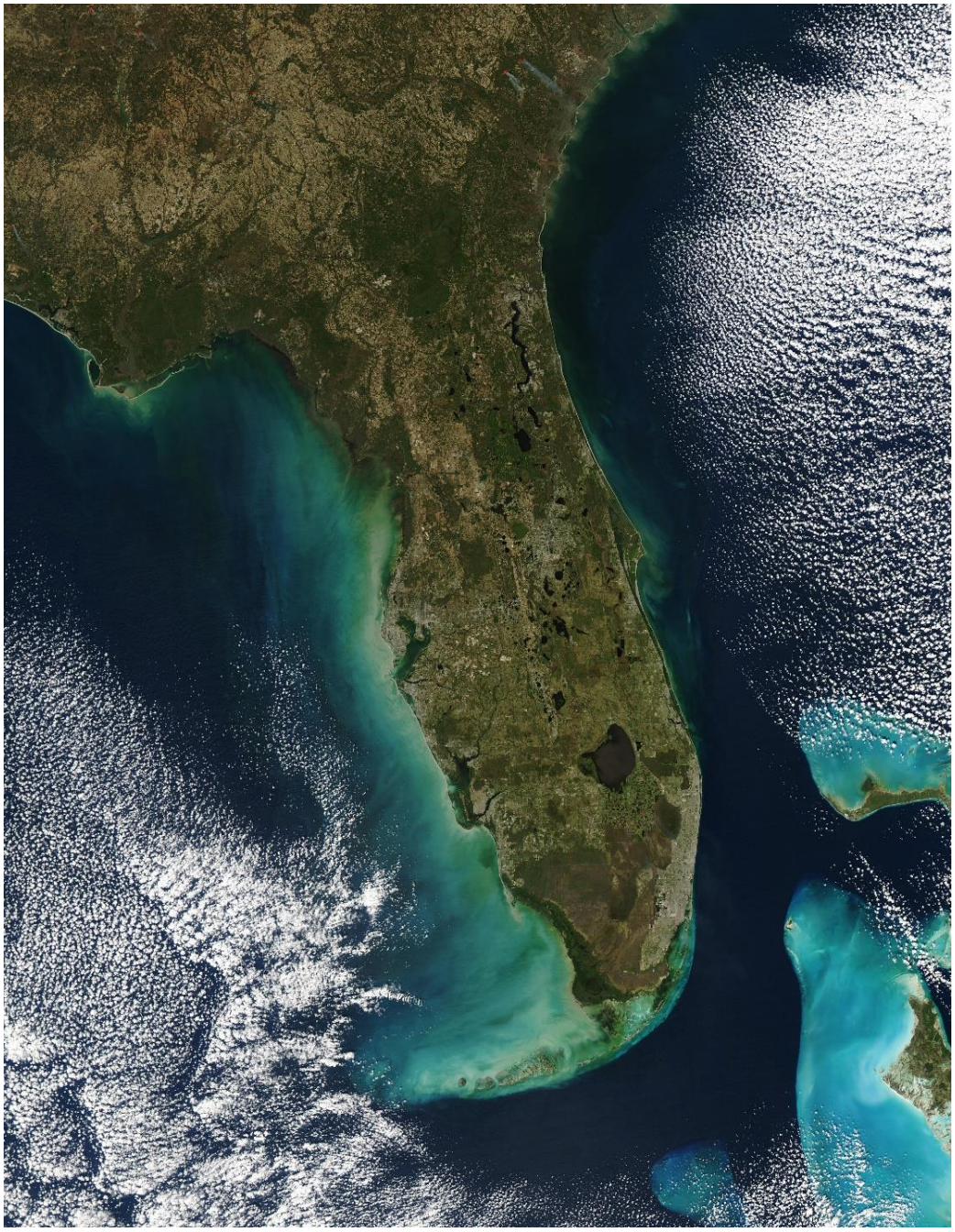
7. **Continue best management practices.**

8. **Develop policy to reduce the impact of residential and commercial fertilizer.**

Prepared by
The Coalition for Property Rights-FL
www.cpr-fl.org

For more information, please contact:
Dan Peterson
danpeterson@cpr-fl.org
407-758-2491
Box 1875
Minneola, FL 34755

Everglades Restoration



I. Everglades Restoration - Why Should You Care?

The Everglades is America's most unique wetlands eco-system occupying much of the southern part of Florida; however, its political, environmental, and economic impacts are felt statewide.

Every Floridian should take notice of and be concerned for its restoration. Why?

First, Everglades restoration is costing you, the taxpayer, billions of dollars. Billions have been and more will be spent to preserve, protect, and restore what's left of it.

Second, Everglades restoration contributes to Florida's economy through job creation and tourist dollars. Each year millions of tourists come to Florida because of its beauty and its natural and man-made attractions. The Everglades ecosystem is the center of Florida's natural attractions. enjoyed by people from all over the world.

Third, Everglades restoration benefits each of us who call Florida home. Its restoration, in addition to our beaches, lakes, and waterways, contributes to our quality of life.

Everglades restoration is more than simply preserving and protecting "the swamp." It's also about preserving and improving water quality in Florida. It's about protecting people and property from flooding. And, it's about ensuring enough quantities of water for drinking and irrigation for food crops.

For these reasons, it is important and necessary to ensure the Everglades eco-system is restored, preserved, and protected including it waters, plants and wildlife.

The Aim of This Report

This report is prepared with the view of helping you understand why vast amounts of money are being spent and why Everglades restoration is such a hotly debated topic. It will give you basic understanding of the problems to be overcome if restoration is to take place.

It will give you an understanding and appreciation for key elements or pieces of the Everglades Restoration Puzzle. And, it truly is a puzzle with moving pieces on multiple levels. A change or delay in placing one piece affects other pieces much like changing the one face of a Rubik's Cube can affect solving the whole puzzle. This report will help you understand those key pieces and how and why they must work together.

In this report, you will learn how the impacts of nature, man, and government over the decades have shaped current conditions in the Everglades. It will describe things which hinder faster restoration progress.

It's sad, but true: facts and science are often skewed or obscured by politics and propaganda. And, even the best plans are often delayed by government. Of course, the most challenging and frustrating part can be securing the funding – and there is a great deal of funding to be secured. Balancing the stewardship of the environment and the stewardship of the public's money to pay for its restoration is a challenge unto itself.

Without such an understanding of past public policies and events, one cannot appreciate the work and progress already completed. Without an understanding of current restoration projects and future plans, one cannot have any perspective going forward.

Finally, it will outline recommendations that call for immediate action. The pathway forward is clear but, the opportunities must be seized by leaders who understand and are willing to make decisions.

Are you a tax-paying citizen concerned about improving water quality, maintaining flood control, or sustaining enough drinking water? Are you an environmentalist concerned for the environmental health of the Everglades as an eco-system or a tourist destination? Do you have business interests and have concerns related to Florida's domestic and international economy? Are you a legislator concerned about the allocation of billions of tax dollars towards restoration?

Regardless of who you are, this report will provide information you need to know and understand.

When all is said and done, remember, it's your tax dollars. It's your government organizing the restoration. And, it's your Everglades.

II. Everglades Restoration – What's It All About?

We've all heard that famous saying by American inventor and businessman Charles Kettering, "a problem well-stated is a problem half-solved." So, here it is, plain and simple: the arrival and residency of man has disrupted the normal water flows into, through, and out of the Everglades. The transformation of parts of a swamp into a human paradise has had an impact on the Everglades ecosystem. Acts of nature, such as hurricanes, merely complicate it all.

Much of Everglades restoration is related to the water-body jewel at the center of its eco-system, Lake Okeechobee. There is no Everglades restoration without addressing issues surrounding Lake Okeechobee. The quantities of nutrient-rich water entering the Lake have a huge impact on the quantities of nutrient laden water that leave the Lake. Likewise, the quality of water entering the Lake from the north affects the rest of the ecosystem as it exits the Lake to the east, west, and south. Controlling and managing water quantity, improving water quality, and conveying water to the south are all connected to Lake Okeechobee.

The impact of human changes is magnified in the economy and environment when natural algae blooms explode in new urbanized coastal areas with highly developed tourist and "snow bird" destinations. It is felt along the eastern Florida coast when the beautiful waters are turned into a tea-like brown keeping tourists and local residents away from beaches. It is felt along the western coast where an imbalance of Caloosahatchee River freshwater and Gulf of Mexico salt water have damaged aquatic plant life and driven fish out of the area in search of food. Others would highlight the imbalance of water volumes which flood some parts of the Everglades while other parts are severely dehydrated.

Some argue, had man not "invaded" the Everglades, none of these changes would have occurred. That may be true. But, had man not taken up residence and "tamed" the Everglades, Florida would still be a swamp and not one of our nation's best and most economical states in which to live. Florida has transformed part of a "swamp" into a national and international economic engine. Florida is the world's number one tourist destination. Florida provides much of our nation's fruits and vegetables each winter. And, Florida is renown for its simulation and space industries, among other things.

Florida's friendly climate (despite hurricanes), no-income-tax status, and inland and coastal waters have made it our nation's third most populous state. In 2018, roughly 1,000 people moved to Florida each day. There is every reason to believe people will continue to move here. Our ever-increasing population makes it even more important to stress that what remains of the Everglades must be restored and preserved.

While this is a complex issue, understanding three "water words" and their role will make you sound like an expert on Everglades matters: ***quantity, quality, and conveyance***.

Water Quantity

Water quantity has always been a blessing and a challenge for Florida. Its flood control management protects the life of people and property from flooding. Its water supply management can sustain water for drinking and irrigation. Its balanced, science-based management can mitigate times of heavy rain events or times of drought. The key to managing water quantity is ***storage***.

Water Quality

Water quality is highly affected by the way water management is handled. Florida, apart from man, is a phosphorus-rich state along with other nutrients. Add to that the disruption of normal water flows and sudden heavy rain events, and the imbalance of these nutrients can wreak havoc on the eco-system. The key to restoring and maintaining water quality is ***treatment***.

Water Conveyance

Managing the flow of water, overly abundant in some areas and woefully lacking in others, is an ongoing challenge. The water is available. But, it needs to be moved to where it is needed most, at the proper time in the proper amounts, be it for drinking, hydration, or irrigation. The key to balanced water flow is proper ***conveyance***.

III. The Everglades Puzzle – Key Pieces

Everglades restoration has many interconnecting pieces. Some pieces enable us to see the management of water quantity. Other pieces reveal the improvement of water quality. Yet others, show us the conveyance of water. Seeing the pieces of this puzzle will equip you to see the full picture better and appreciate its complexity more fully. By the way, seeing the full picture is still 20-30 years into the future.

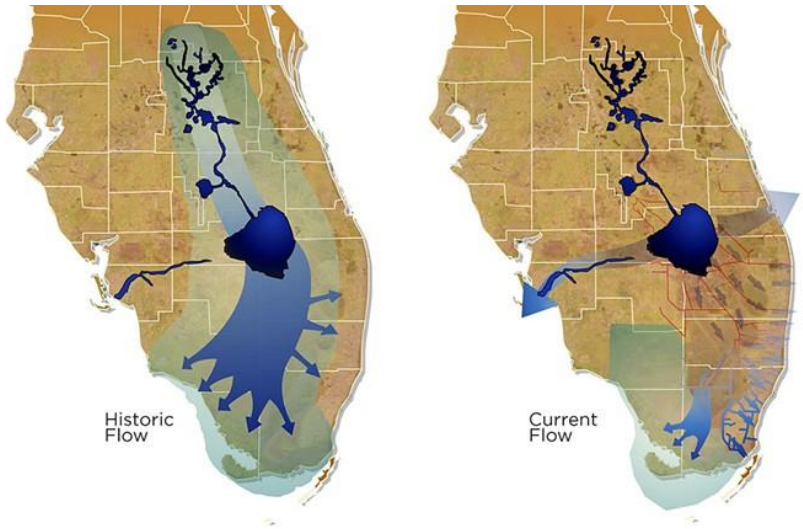
Methods of Water Storage

In 2013, massive rain and stormwater runoff led to more than 4 million acre-feet of water being discharged from the Herbert Hoover Dike (HHD) into the estuaries of the St. Lucie River and the Caloosahatchee River. The effect was devastating to marine and aquatic life, not to mention the local beaches and economy. Capturing and storing masses of stormwater could have minimized or prevented the damage. Here are the four main puzzle pieces to understand this part of the puzzle.

The Herbert Hoover Dike

At the core of water quantity management is the Herbert Hoover Dike. It surrounds the Lake.

Since its construction in the 1930's, it has provided the main degree of flood control for south Florida. It is a body of water whose surface area covers 730 square miles yet its average depth less than ten feet. Water enters the Lake primarily via the Kissimmee River from the north and exits west and east through two canals, C-43 to the Caloosahatchee River and C-44 to the St. Lucie River.



In heavy rain events, the Lake can fill six times faster than is can be drained. Therefore, the level of water is closely monitored and controlled by the U.S. Army Corps of Engineers (USACE) in order to protect the integrity of the dike. There have been times when the depth of water in Lake Okeechobee has been as high 17.5 feet to prevent flooding. But over the years, age and seepage have weakened the HHD to the point where the depth of water allowable to prevent a catastrophic dike failure has been reduced to a fluctuating "safe" level of between 12.5 feet and 15.5 feet.

When it is deemed that approaching rain events may put more water into the Lake than is safe, massive amounts of water are released into the canals and into the estuaries of the St. Lucie and Caloosahatchee rivers. When these masses of fresh water collide with the brackish waters of the estuaries, this upsets the delicate balance in the estuaries which can influence and devastate water quality and aquatic life. This, in turn, has a severely negative impact on local economies.

For several years, the USACE has been working to renovate the HHD. In a recently released report of the National Academies of Sciences, Engineering, and Medicine, the Committee on Independent Scientific Review of Everglades Restoration Progress (CISRERP) noted that repairs would allow an additional 1.25 feet of depth in the lake, thereby increasing storage capacity by 364,00 acre-feet of water. While this is not the desired long-term solution, it could be an invaluable and welcome short-term solution until more permanent solutions could be put into place. Its increased capacity could stop the immediate need to discharge water to the east and west prior to predicted storm events.

The CISRERP report also advised that accelerating funding – which is solely the responsibility of the federal government - could lead to renovations being completed by 2021. This was something former Governor and now U.S. Senator Rick Scott discussed with President Donald Trump. The funding has been provided to the USACE.

The current plan calls for finishing renovations by 2022 at a cost of $1.7 billion.

Above-Ground Reservoirs

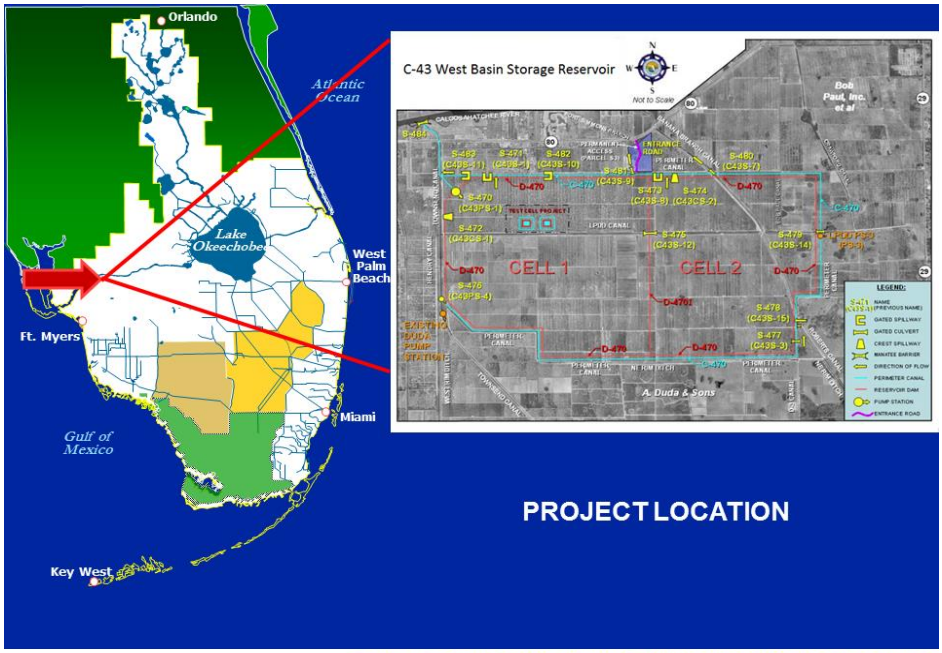
Reservoirs are manmade "lakes" designed to capture and store excessive storm-water run-off such as the Lake Okeechobee regulatory releases. This would allow for a more consistent flow of water from the Lake into estuaries, a more enhanced water supply, and better flood control. They will be constructed on government-owned property and can cover thousands of acres of land at depths of 20-35 feet. That can translate into storage of hundreds of thousands of acre-feet of excess water. These are costly and the time required from planning to construction is lengthy. Three major reservoirs are currently underway.

The C-43 Caloosahatchee River (C-43) West Basin Storage Reservoir Project

This reservoir is located west of Lake Okeechobee in Hendry County. The project will use two large pump stations that can move more than a billion gallons of water each day and 14 water control stations connecting to 15 miles of perimeter canals.

The size of the reservoir will be 18 square miles, a footprint larger than the City of Naples, FL. The embankments defining the reservoir will be 27 feet high. It will have a storage capacity of approximately 170,000 acre-feet of water. That's approximately 55 billion gallons of water.

The initial project design was completed in 2008 and authorized in 2014 at an estimated cost of $500 million. The first construction contract was awarded in 2015. The fourth contract is scheduled to be awarded in 2019. Completion of the project is scheduled for December 2022 at an estimated $809, 700, 000.



CERP – Caloosahatchee River (C-43) West Basin Storage Reservoir

The C-44 Reservoir and Canal Project

The C-44 Reservoir and Stormwater Treatment Area (STA) is the first component of the Indian River Lagoon-South Project and is located in Martin County. It will a pump station which will be able to pump 1,000 cubic feet per minute.

The size of the reservoir will be 3,400 acres. Its 35-foot embankment height will allow for a storage capacity of 50,600 acre-feet of water or 16 billion gallons. Its accompanying STA will cover 6,300 acres capturing and treating 9,900 acre-feet. Also, to be included are 3,600 acres of new wetlands.

The Indian River Lagoon-South Project was authorized by Congress in 2007 and its first contract for the C-44 Reservoir and Canal was awarded in 2011.

Completion of the project is estimated for 2024 at an estimated cost of $400,000,000.

Everglades Agricultural Area (EAA) Storage Reservoir Project

The EAA Storage Reservoir Storage Reservoir Project was authorized by Congress in 2000. Before construction could be begin, a lawsuit arose stopping the project.

In 2016, the Florida Legislature passed legislation to redesign and expedite the project. This required a "Change Report" to be developed and directed to Congress for re-authorization.

In May of 2017, Governor Rick Scott signed legislation providing more than $1 billion to expedite the project. Later that year, in October, the plan developed by the South Florida Water Management District was authorized by Congress, and site preparation is now underway.

The project will hold 240,000 acre-feet of water and include a new constructed Stormwater Treatment Area, necessary to meet state and federal water quality standards.

Cost of the EAA Storage Reservoir Project is $2,400,000,000.

Water Farming

Water farming is a growing part of the stormwater run-off storage solution. A shining example of how it can work is the Caulkins Water Farm. The former Caulkins Citrus Company, whose citrus trees were destroyed by citrus greening, is now the Caulkins Water Farm (pictured here). President George Caulkins and colleague Thomas Kenny translated the 3200-acre property into a public-private partnership with the State of Florida to capture and store storm-water runoff.

Using $7.5 million of State funds, borders were built up on the perimeter of the property leaving 2800 acres on which to store water up to four feet deep. The money was also used to install three high-powered pumps to pull excess water from the C-44 Canal (a man-made canal connecting Lake Okeechobee to the St. Lucie River and its estuary).

When threatening rain events occur, excessive waters released from Lake Okeechobee are pumped out of the C-44 canal before they can mix with the waters of the lower St. Lucie River and its estuary. The waters pumped into the water farm property are reduced one-tenth of one foot per day due to evaporation and absorption. This allows the water farm to take on additional water each day without changing the water depth.

The Caulkins Water Farm is operated in cooperation with the South Florida Water Management District. Its annual budget is $5.5 million. This translates into a storage cost of approximately $100 to $150 per acre-foot of water, making it one of the most cost-effective tools in the District's "toolbox."

Other benefits have been discovered at the Caulkins Water Farm since the pilot project began in 2014. In its "pilot program," a three-year test of the water farming theory, over twenty metric tons of phosphorous and over five metric tons of Nitrogen were removed into the 415-acre test cell. Vegetation in the farm such as water lettuce and water hyacinth upload these nutrients. This provides treated water for aquifer recharge as it percolates downward. Such recharge provides counter-pressure to salt water intrusion of the aquifer.

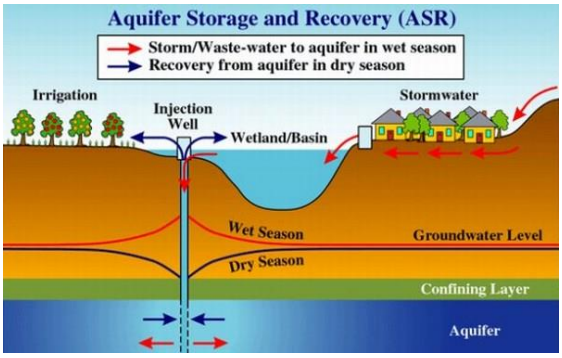
Another benefit is the water lettuce itself. It can be harvested periodically and made into cattle feed. Additionally, while such crops grow, the abundance of vegetation and fish, among other things, have made the water farm a welcome sanctuary for wildlife as well.

Water farms, with their multi-benefits, are quick to be built and economic to operate. One can only imagine the benefits and cost effectiveness to be gained if more such water farms were to be strategically placed to the north of Lake Okeechobee.

Aquifer Storage & Recovery (ASR Wells)

ASR wells are drilled deep into the aquifer in places where the geology is hydrologically, ecologically, and geotechnically safe and appropriate for storage. ASR technology offers the potential to store large volumes of water beneath a relatively small surface footprint.

During wet seasons or times of heavy and prolonged rain events, excess stormwater (not wastewater) can be treated and pumped into these wells creating a "bubble" of fresh water in the Floridan Aquifer System. Water can be "stored" here until the dry season returns and water is needed. It can then be pumped back out for whatever purposes are needed.



When strategically placed, such wells can reduce the amounts of stormwater flowing into Lake Okeechobee from the north and significantly reduce or eliminate discharges into the estuaries of the St. Lucie and Caloosahatchee rivers.

Methods of Water Treatment

Since 1994, the State of Florida has spent more than $2.5 billion on Everglades restoration, including projects to lower the levels of phosphorus in the waters of the Everglades. Like the water storage pieces, these puzzle pieces are expensive, but they are improving the quality of Everglades water.

Best Management Practices (BMPs)

Best management practices are methods of farming (mainly soil and water management techniques) mandated by the 1994 Everglades Forever Act (EFA). The goal is to reduce phosphorus from surface waters.

Water volumes and phosphorus concentrations are monitored at various inflow and outflow points which define the boundary of the five sub-basins making up the Everglades Agricultural Area (EAA) in any given water year.

Three major practices are used on EAA farms: water management, nutrient control, and matter export.

Water Management Practices

This mainly consists of minimizing water table fluctuations in agricultural fields and retention of rainfall on the farm to reduce overall soil and nutrient losses. This requires moving drainage water to sugar cane or fallow lands for retention while limiting ditch or canal storage.

These practices include water detention and water retention. Detention is temporarily holding water until conditions are met for release. Detention controls discharge rates to reduce the impact on downstream receiving systems. Retention prevents water from discharging into receiving waters. The water is held until it is lost to percolation, evapotranspiration or evaporation.

Nutrient Control Practices

These practices include optimizing fertilizer use by applying fertilizer for vegetable production in a "banded" or targeted manner rather than "broadcasting" it across an entire field. This helps to prevent fertilizer spills and the direct spreading of fertilizer into drainage ditches.

Banding and nutrient control BMPs can reduce the amount of fertilizer applied to certain crops by 66% compared to broadcast application.

Prevention of Matter Export

This practice prevents the export of particular matter and fertilizer from farm fields which effectively reduces off-site losses of nutrients. It involves planting aquatic cover crops for off-season vegetable production, fallow rotation of sugarcane, coordinated farm cropping patterns, water management practices designed to control particulate matter in the water discharge, and recycling of organic ditch sediments back to farm fields.

To accomplish this, WIFI-driven, laser and GPS guided land-leveling equipment is used to level fields to reduce the potential for soil erosion into field ditches and drainage canals after heavy rainfalls. Leveled fields drain and irrigate more uniformly, thus reducing the likelihood of improperly draining and irrigating lower and higher areas of the field.

A part of the EFA mandated an annual 25 percent reduction in phosphorus contained in waters flowing off of agricultural lands. Since that mandate, the industry has greatly exceeded that requirement. According to the South Florida Water Management District (SFWMD), implementation of BMPs have resulted in an overall average annual phosphorus reduction of 56 percent – more than twice the 25 percent required by law. Every year since 1996, through the implementation of BMP, farmers in the EAA have contributed 173 billion gallons of clean water to the Everglades ecosystem. By August 2015, the SFWMD announced that more than 90 percent of the Everglades was meeting the stringent 10 parts per billion Water Quality Standard. Great success has come in part from the active role of the region's farmers in improving water quality and protecting the environment.

The EFA also imposed a $25 per-acre per year tax, along with comprehensive water quality

monitoring and reporting requirements. Every year since 1996, EAA farmers have paid that tax, contributing over $200 million toward the protection and restoration of the Everglades.

Investments in technology and innovative best management practices have been used by the agricultural community to achieve great improvements in water quality. All of these water quality improvements have been paid for 100 per cent by private property owners, cleaning farm water before it leaves their property.

In the Lake Okeechobee, Caloosahatchee, and St. Lucie watersheds, the Florida Department of Agriculture and Consumer Services (FDACS) Office of Agricultural Water Policy works with agricultural producers, industry groups, the Florida Department of Environmental Protection, the university system and the Florida water management districts to develop and implement agricultural BMPs addressing both water quality and water conservation. Agricultural BMPs are practical, cost-effective actions that agricultural producers can take to conserve water and reduce the amount of pesticides, fertilizers, animal waste and other pollutants entering our water resources. These are mandatory for the producers that are located within an area covered by a Basin Management Action Plan.

Stormwater Treatment Areas (STAs)

Stormwater Treatment Areas (STAs) are large, man-made wetlands designed to maximize phosphorus removal from urban stormwater, lake water, and agricultural water runoff. Currently, south of Lake Okeechobee, there are five in operation covering 57,000 acres. Two others are planned as part of current reservoir construction project. They are designed to treat sustained flows of water rather than the regulatory water releases by the USACE.

STAs are constructed on large tracts of land with a footprint, in some cases, the size of cities such as Ft. Lauderdale (more than 20,000 acres). Large pumps pull tens of thousands of gallons

per minute of stormwater from canals, allowing it to flow slowly through these wetland areas.

As the water passes through the area, phosphorus and other nutrients are absorbed by the soils and aquatic vegetation. The STAs are effective in removing approximately 80 percent of the phosphorus before the cleansed water is pumped into the Everglades.

Flow Equalization Basins (FEBs)

Flow Equalization Basins are shallow versions of reservoirs, most often used to direct and moderate the flow of water into STAs. They are used primarily to capture and temporarily store peak stormwater flows before those excessive flows can enter an STA.

Time is needed for an STA to properly remove phosphorus from stormwater. If too much water is allowed to flow into an STA too quickly, the nutrient removing capabilities of the STA can be less efficient or damaged. The FEB enables flow into the STA to be moderated and allows the STA to "do its job" of treating water. FEB's maximum depths are three to four feet; therefore, they are simpler and less expensive to construct than an above-ground reservoir.

Several planned FEBs are expected to accommodate 116,000 acre-feet of water allowing for correct STA treatment.

Water Conservation Areas (WCAs)

These natural wetland areas are the state-owned part of what remains of the historic Everglades. They were authorized by Congress in 1948 and their water levels are managed by the USACE. WCAs help to provide flood control, water supply, and habitat for plants and wildlife. They also provide recreational venues for fishing, hunting, and bird watching.

While technically these areas are not for water treatment, they receive waters and can temporarily store water. These marsh – there are three on the eastern side of the Everglades - are formerly a part of the "River of Grass" which flowed uninterrupted from north of Lake Okeechobee to the Florida Bay 100 years ago.

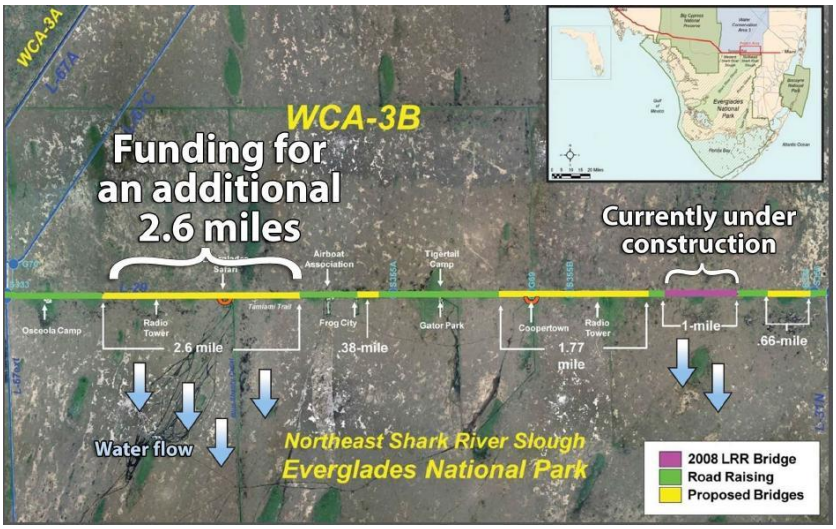
Tools of Conveyance: Canals, Pumps, & Levees

The third challenging piece to the puzzle is conveying water from where it is to places in the ecosystem where it is needed. Managing the flow of water to prevent flooding while hydrating the Everglades is a balancing act requiring miles of canals, pumps, and levees. In doing so, endangered species and wildlife habitat must be considered. Conveyance is complicated, but necessary.

Canals

Canals serve several critical purposes. Most importantly they help to control flood waters by moving water to the ocean or to places where water is needed such as the Everglades National Park. They also help maintain the proper water levels in the WCAs. An added benefit they provide for is local coastal urban aquifer recharge.

The importance of water flow cannot be underestimated. For years during heavy rain events, water that was conveyed south toward the Everglades was stopped by the Tamiami Trail. This interruption of flow forced water to backup into the WCAs, STAs, and the estuaries of the St. Lucie and Caloosahatchee rivers.



In 2016, then- Governor Rick Scott committed $90 million to replace 2.6 miles of Tamiami Trail roadway berm with a bridge. This would allow limited water from the north to flow unobstructed to the south, relieving some backups, creating more storage to the north, and providing needed water for Everglades National Park.

Pumps

Development and agriculture have changed the topography of the Everglades ecosystem making it flatter. The natural water flows from the north to the south have been disrupted. In order to move water, pumps are used. They are used to pump water into reservoirs and water farms. All water must be pumped from the EAA into STAs. It then must be pumped again into WCAs. Without pumps in today's water system, there would be no water conveyance.

Levees

Levees help impound and direct water in the WCAs. But, they were not built to accommodate high inflows from Lake Okeechobee during wet periods. Another concern is the main barrier protecting the urbanized cities along the east coast of Florida from potential flood waters in the WCAs in the eastern part of the Everglades: The East Coast Protective Levee.

The problems of capacity and seepage which plague the Herbert Hoover Dike, also plague this protective levee. Over the years, more than $20 million has been spent to ensure it meets FEMA and flood control requirements. Water levels are constantly monitored and adjusted as needed to protect its integrity. Pushing the WCA water levels above their recommended flood stage by sending water south, puts millions of south Floridians living east of this protective levee at risk of severe flooding.

IV. Historical Review:

From the "Swamp State to the Sunshine State?"

One cannot appreciate the immensity of Everglades restoration without looking at the past. The intentions and conditions which got us here may surprise you. As you will see, the need for Everglades restoration is largely due to government policies – policies that were demanded by previous generations and were well-intentioned. Some of those policies were pursued without the knowledge we have today; certain things were just not understood at the time. As a knowledge and understanding the ecology and science have increased, changes have been made by the private and public sectors to correct harmful policies. But, the "damage" was already done and therefore, restoring what remains of the Everglades and preserving it for the future are current day tasks.

Prior to becoming a state, the Everglades ecosystem was approximately twice the size it is today. Its headwaters began just south of, what is now called, Orlando. Its continuous flow streamed southward ending in the Gulf of Florida.

The following historic highlights (pieces) will give you a picture of how and why we arrived here today.

1850: The Swamp and Overflowed Land Act

A key condition to the granting of statehood (March 3, 1845) was that the initial government and citizenry would reside in the state and work the land. This was done primarily by encouraging agricultural development which involved draining the swamp (no pun intended) and turning its untamed wilderness into land suitable for habitation and production. The mechanism by which federally owned land was deeded over to the state and, thus, to individuals was "The Swamp and Overflowed Land Act of 1850." The "Act" transferred 20 million acres from the federal government to the state for the purpose of drainage and reclamation. Its impact was felt immediately, and things would never be the same.

In 1850, Florida's population was 87,445. In 1881, the state sold 4 million acres of land to developer Hamilton Disston for $1 million – which according to an article in the New York Times during that period was reportedly the most land ever purchased by a single person in world history. He sought to drain part of the Everglades in the Kissimmee River region by constructing a canal connecting Lake Okeechobee to Lake Hicpochee at the headwaters of the Caloosahatchee River. So successful was he in freeing land for agriculture that the value of his land soon doubled, bringing an influx of people migrating to the area. By 1900, the state had grown to more than half a million.

1905: The Official State Policy – "drain, fill-in, and develop"

In 1905, newly-elected Governor Napoleon Bonaparte Broward made it the official state policy of Florida to "drain, fill-in, and develop." His massive reclamation policy gained him national attention, including a visit and tour by President Theodore Roosevelt who, himself, was an advocate for the drainage program.

By 1906, more than 22 million acres of swamp land had been ceded to Florida, more than any other state.

By 1920, despite the challenges of accessibility and harsh living conditions, the population of Florida had nearly doubled to almost one million residents. Inexpensive fertile land, the liberty to use it, and a lack of government intrusion were strong motivators for pioneers to shoulder the risk and move to Florida.

1928: The Impact of the "Great Okeechobee Hurricane"

In 1928, many paid the price for taking on risk. On September 17, a category 4 hurricane made landfall in Palm Beach County. Lack of communications and forecasting abilities exposed an ill-prepared population to sustained winds of 145 mph, gusting up to 160 mph. The agricultural communities and fields that had grown up in the fertile lands south of Lake Okeechobee were hit especially hard. Massive rainfall and high winds contributed to a storm surge and overwhelmed a small dike which had been built at the south end of the lake. Communities and farmlands were flooded for hundreds of square miles, in some places more than 20 feet deep. Homes and other buildings were literally swept off their foundations, creating a devastating wall of water and debris. The city of Belle Glade, celebrating just its fifth month in existence, was nearly washed away. As the hurricane moved further north, the changing winds produced a similar, though smaller, flood on the lake's north shores. What became known as "the Great Okeechobee Hurricane of 1928" has been estimated to have taken more than 2,500 lives.[11]

Interestingly, there had been a proposal to build a more permanent dike around the lake in the early 1920's. Work was projected to begin in 1927 and was designed to stand 27 feet above sea level. However, a lawsuit from Dade County contesting the $20 million bond issue prevented its construction.

In 1928, newly-elected President Herbert Hoover, in a major intervention by the federal government, moved to protect the people of Florida and their property from future devastation by initiating the construction and management of a 143-mile gravel, rock, limestone, sand, and shell barrier, around the lake – the Herbert Hoover Dike.

In 1947, the Everglades National Park was designated preserving a large part of what remained of the Everglades.

1948: The Central and South Florida Project

In 1948, the federal government authorized a multi-purpose plan to provide for flood control, water supply for municipal, industrial, and agricultural uses, prevention of salt water intrusion, water supply for the Everglades National Park, and the protection of fish and wildlife resources.

The plan was entitled "the Central and South Florida Project" (C&SF). It established a series of canals (720 miles), levees (1,000 miles) and, water control structures (200) designed to manage the flow of excess water.

It also designated the Everglades Agricultural Area to the south of Lake Okeechobee. It measured 700,000 acres, approximately 27 percent of the original Everglades.

In 1949, the Legislature created the Central and Southern Florida Flood Control District which became responsible for the project. This entity later became the South Florida Water Management District in 1977.

One of the projects connected to this plan authorized the U.S. Army Corp of Engineers to deepen, straighten, and widen the once meandering Kissimmee River. While effective at relieving the threat of flooding, its effect on the ecology of the Kissimmee River was momentous. Scientists discovered the massive project, while well intentioned as planned, was causing devastating changes to the Kissimmee River watershed and its wildlife. It also prevented nutrient-rich waters from the north to be cleansed naturally before flow into Lake Okeechobee Thus, the 1950's and 1960's ushered in a new recognition of government's impacts on the environment. It also saw government take another look at the C&SF Project.

1967: The Florida Air and Water Pollution Act

In1967, the Florida Legislature enacted the Florida Air and Water Pollution Act (FAWPCA)[15]. While the Act has been amended numerous times to align with changing federal and state policies and rules, it continues to be the foundational piece of legislation addressing environmental protections in Florida. Its purpose is described as: "to conserve, protect, and improve the quality of Florida's waters for a variety of purposes, including public water supplies and preservation of wildlife, and to achieve and maintain levels of air quality that will protect human health and safety, plant and animal life, and property in order to promote the social and economic development of Florida."

FAWPCA acknowledged the need to establish water quality standards, and the requirement "to encourage industry to install new machinery and facilities to improve air and water quality as technology progresses even though such installations can be expensive."

In 1969, under the governorship of Claude Kirk, Florida policymakers created the first government agency completely focused on environmental quality – the Department of Air and Water Pollution Control. This was the forerunner of the Florida Department of Environmental Protection (FDEP)[16].

Among many other things, this act FAWPCA gave FDEP broad authority to:

- exercise general supervision of the administration and enforcement of the laws, rules, and regulations related to air and water pollution in Florida;

- adopt a comprehensive program for the prevention, abatement, and control of pollution of the air and waters of Florida, and to review and modify this program as necessary; and

- establish a permit requirement system for the operation, construction, or expansion of any installation that may be the source of air or water pollution, and provide for the issuance and revocation of such permits…; adopt the rules and requirements related to administration of the Federal National Pollution Discharge Elimination System (NPDES) permitting program

in Florida (Note that NPDES permits are required for industrial, municipal, and agricultural pollution sources that discharge pollution into surface waters); and, implement programs to protect and restore Florida's water, including the implementation of land acquisition programs.

The political landscape had shifted from largely laissez faire policies of nearly unlimited use of land and property to one of environmental restrictions on land and property use as permitting for development and land use began to be evaluated through to prism of environmental protection. This was merely the beginning of government-imposed restrictions.

1972: The Environmental Land and Water Management Act

In the 1970's, policymakers implemented additional land use regulations with the goals of increasing environmental protection and slowing development and growth. In 1972, the Federal Clean Water Act impacted new wetland and pollution discharge elimination.[17] In Florida, the 1972 Environmental Land and Water Management Act[18] addressed issues regarding developments of regional impact (more than one county), areas of critical state concern, wetland permitting, and stormwater management.

The 1980's saw further erosion of land use and property rights as government protection of the environment became the priority. A number of new laws were passed regulating growth management, land use, and the environment. One particular example was the 1985 Growth Management Act[19], which required all Florida counties to engage in long/short range comprehensive planning, land use regulation, capital improvement planning, public facilities/services concurrency, protection of wetlands, wildlife, groundwater and coastal resources and intergovernmental coordination.

Preservation 2000 and Florida Forever

It was in the 1990's that the Florida Legislature began to move in the direction of purchasing land and easements for conservation and water protection. In 1990, Preservation 2000 became a vehicle for accumulating money for such purchases. When it expired in 1999, Florida Forever was authorized to continue the plan, providing $300 million per year for 10 years for land acquisition, water resource protection and supply, ecosystem restoration, and urban parks and open space. Not all purchases directly affected Everglades restoration, but many did.

1994: The Everglades Forever Act

In 1994, the Florida Legislature passed the "Everglades Forever Act." Among other things, it called for the restoration and protection of the Everglades ecological system, reducing excessive levels of phosphorus, and achieving the water quality goals of the Everglades program through implementation of stormwater treatment areas and best management practices. Many of its objectives were aimed at agricultural interests in the Everglades Agricultural Area which had been active south of Lake Okeechobee since 1920's. The area had become the winter source for fruits and vegetables, not to mention a major source of sugar.

Because it was determined that phosphorus-laden fertilizer run-off was negatively impacting the

water quality of the Everglades, a part of the Act mandated a 25 percent reduction in the phosphorus contained in waters flowing off of agricultural lands. This mandate was especially aimed at the sugar cane industry. The Act also imposed a $25 per-acre per year tax to fund restoration efforts, along with comprehensive water quality monitoring and reporting requirements.

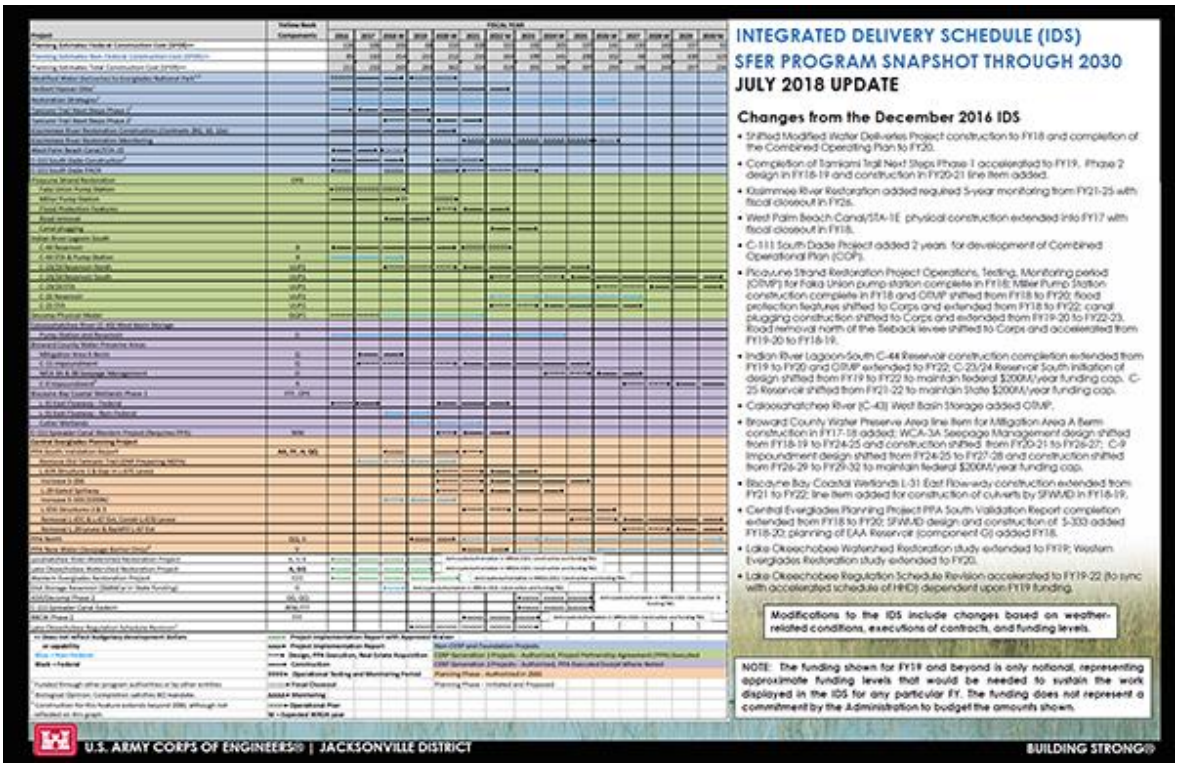
The results of agriculture's response have been impressive. First, since the mandated phosphorus reduction, the agricultural industry has produced an average annual phosphorus reduction of 56 percent. Additionally, every year since, farmers have paid the per-acre tax, contributing over $200 million toward protection of the Everglades. Finally, since 1996, the implementation of Best Management Practices by farmers has led to an annual return of 173 billion gallons of clean water to the Everglades.

2000: The Everglades Protection Act and CERP

While many of the environmental laws passed in the eighties and nineties were aimed and improving and protecting Florida's environment in general, the year 2000 saw both the federal and Florida state governments take a more direct aim at Everglades restoration and protection.

First, the Florida Legislature enacted The Everglades Protection Act. It directed the State to establish and implement the Surface Water Improvement and Management (SWIM) plan to restore the Everglades. It also authorized the South Florida Water Management District to impose additional ad valorem taxes on properties within the Everglades Agricultural Area and to adopt stormwater utility fees.

Second, the U.S. Congress passed the Water Resources Development Act (WRDA) of 2000. It authorized the Comprehensive Everglades Restoration Plan (CERP), whose complex framework aims to restore, protect, and preserve the water resources of central and south Florida including the Everglades. CERP includes more than 62 components or projects which are synchronized together to manage water quantity through storage, improve water quality through treatment, and distribute water through conveyance. CERP is now estimated to cost more than $15-$20 billion, nearly three time its originally estimated cost, over a period of 30 years. A snapshot of projects and programs scheduled between now through 2030.


INTEGRATED DELIVERY SCHEDULE (IDS)
SFER PROGRAM SNAPSHOT THROUGH 2030
JULY 2018 UPDATE
Changes from the December 2016 IDS
• Shifted Modified Water Deliveries Project construction to FY18 and completion of the Combined Operating Plan to FY20.
• Completion of Tamiami Trail Next Steps Phase 1 accelerated to FY19. Phase 2 design in FY18-19 and construction in FY20-21 line item added.
• Kissimmee River Restoration added required 5-year monitoring from FY21-25 with flood closeout in FY26.
• West Palm Beach Canal/STA-1E physical construction extended into FY17 with flood closeout in FY18.
• C-111 South Dade Project added 2 years for development of Combined Operational Plan (COP).
• Picayune Strand Restoration Project Operations, Testing, Monitoring period (OTMP) for Faka Union pump station complete in FY18; Miller Pump Station construction complete in FY18 and OTMP shifted from FY18 to FY20; flood protection features shifted to Corps and extended from FY18 to FY22; canal plugging construction shifted to Corps and extended from FY19-20 to FY22-23. Road removal north of the Seibock levee shifted to Corps and accelerated from FY19-20 to FY18-19.
• Indian River Lagoon-South C-44 Reservoir construction completion extended from FY19 to FY20 and OTMP extended to FY22; C-23/24 Reservoir South initiation of design shifted from FY19 to FY22 to maintain federal $200M/year funding cap. C-25 Reservoir shifted from FY21-22 to maintain State $200M/year funding cap.
• Caloosahatchee River (C-43) West Basin Storage added OTMP.
• Broward County Water Preserve Area line item for Mitigation Area A Berm construction in FY17-18 added; WCA-3A Seepage Management design shifted from FY18-19 to FY24-25 and construction shifted from FY20-21 to FY26-27; C-9 Impoundment design shifted from FY24-25 to FY27-28 and construction shifted from FY26-29 to FY29-32 to maintain federal $200M/year funding cap.
• Biscayne Bay Coastal Wetlands L-31 East Flowway construction extended from FY21 to FY22; line item added for construction of culverts by SFWMD in FY18-19.
• Central Everglades Planning Project PPA South Validation Report completion extended from FY18 to FY20; SFWMD design and construction of S-333 added FY18-20; planning of EAA Reservoir (component G) added FY18.
• Lake Okeechobee Watershed Restoration study extended to FY19; Western Everglades Restoration study extended to FY20.
• Lake Okeechobee Regulation Schedule Revision accelerated to FY19-22 (to sync with accelerated schedule of HHD) dependent upon FY19 funding.
Modifications to the IDS include changes based on weather-related conditions, executions of contracts, and funding levels.
NOTE: The funding shown for FY19 and beyond is only notional, representing approximate funding levels that would be needed to sustain the work displayed in the IDS for any particular FY. The funding does not represent a commitment by the Administration to budget the amounts shown.
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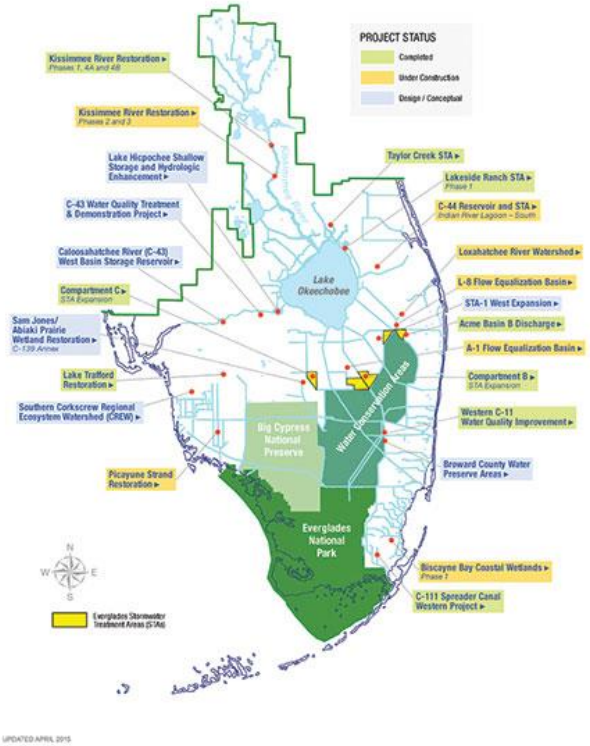

PROJECT STATUS
Completed
Under Construction
Design / Conceptual
Kissimmee River Restoration ▸
Phases 1, 4A and 4B
Kissimmee River Restoration ▸
Phases 2 and 3
Lake Hicpochee Shallow Storage and Hydrologic Enhancement ▸
C-43 Water Quality Treatment & Demonstration Project ▸
Caloosahatchee River (C-43) West Basin Storage Reservoir ▸
Compartment C ▸
STA Expansion
Sam Jones/ Abiaki Prairie Wetland Restoration ▸
C-139 Annex
Lake Trafford Restoration ▸
Southern Corkscrew Regional Ecosystem Watershed (CREW) ▸
Picayune Strand Restoration ▸
Taylor Creek STA ▸
Lakeside Ranch STA ▸
Phase 1
C-44 Reservoir and STA ▸
Indian River Lagoon – South
Loxahatchee River Watershed ▸
L-8 Flow Equalization Basin ▸
STA-1 West Expansion ▸
Acme Basin B Discharge ▸
A-1 Flow Equalization Basin ▸
Compartment B ▸
STA Expansion
Western C-11 Water Quality Improvement ▸
Broward County Water Preserve Areas ▸
Biscayne Bay Coastal Wetlands ▸
Phase 1
C-111 Spreader Canal Western Project ▸
Lake Okeechobee
Water Conservation Areas
Big Cypress National Preserve
Everglades National Park
N
W
E
S
Everglades Stormwater Treatment Areas (STAs)
UPDATED APRIL 2015

2011: The Central Everglades Restoration Project

In October 2011, the Assistant Secretary of the Army (Civil Works), the Secretary of the Interior, the Governor of Florida, the Executive Director of the South Florida Water Management District, and other senior principals agreed to initiate the planning effort of the CERP Central Everglades components. Its goal was to accomplish a planning process for a suite of components for Congressional authorization in half the time. The Central Everglades Planning Project (CEPP) identifies and plans projects on land already in public ownership to allow more water to be directed south to the central Everglades, Everglades National Park, and Florida Bay. CEPP's components include three objects: increase storage, treatment and conveyance of water south of Lake Okeechobee; remove canals and levees within the central Everglades; retain water within Everglades National Park and protect urban and agricultural areas to the east from flooding.

2014: The Florida Water and Conservation Initiative Amendment

In 2014, the voters of Florida soundly approved an amendment to the Florida Constitution entitled the Florida Water and Conservation Initiative. It authorized an annual allocation of one-third of doc stamp revenue towards environmental improvements. The revenues were defined for the following uses: "to acquire and improve conservation easements, wildlife management areas, wetlands, forests, fish and wildlife habitats, beaches and shores, recreational trails and parks, urban open space, rural landscapes, working farms and ranches, historical and geological sites, lands protecting water and drinking water resources and lands in the Everglades Agricultural Areas and the Everglades Protection Area." That same year the Legislature passed a specific component within the amendment - the Legacy Florida - setting aside $200 million a year for Everglades restoration.

In 2016, the Florida Legislature passed Senate Bill 10 which authorized the building of the Everglades Agricultural Area Reservoir and STA. Because this project brought a change to CERP it required Congressional re-authorization which was given in October 2018. When complete, the reservoir will hold up to 240,000 acre-feet of water and a new STA will accommodate and additional 110,000 acre-feet of water. The project is projected for completion by 2032. In 2017, Governor Rick Scott signed legislation providing more than $1 billion toward the project.

2016: The Lake Okeechobee Watershed Restoration Project

Another critical component to CERP is the Lake Okeechobee Watershed Restoration Project. Originally begun in 2006, but put on hold, the project is an Everglades restoration planning effort to the north of Lake Okeechobee. When completed, it will improve water levels in the Lake, improve the quantity and timing of discharges to the St. Lucie and Caloosahatchee estuaries, restore degraded habitat for fish and wildlife throughout the study area, and increase the spatial extent and functionality of wetlands.

Because the inflow of water into Lake Okeechobee has always many more times (six times), its ability to drain water, the USACE has regulated the level of water in the Lake to protect the integrity of the Herbert Hoover Dike. The massive amounts of water which must be released, at times, is seen as the major contributor of algae blooms in the estuaries of the St. Lucie and Caloosahatchee rivers. Above-ground storage reservoirs to the east, west, and south of the Lake

have been a long-term strategy to capture these outflows of fresh water before they can merge with the brackish waters in the estuaries.

But, it only makes sense to manage the inflows from the north into the Lake as well. A major tool proposed to moderate water inflow is the Aquifer and Storage Recovery (ASR)well.

The most current, recommended plan calls for 80 ASR wells which will have a holding capacity of 448,000 acre-feet of water per year. An additional 46,000 acre-feet of water will be held in shallow storage called a Wetland Attenuation Feature. Forty-seven hundred acres of wetland restoration will also be a part of the project. The cost is estimated at $1.4 - $1.8 billion.

When completed, this restoration project will achieve an astounding 80 percent reduction in discharges from Lake Okeechobee.

V. Hindrances to Everglades Restoration

Everglades restoration is an enormous undertaking with many moving parts, all ideally synchronized without interruption. People often ask, "Why does restoration of the Everglades take so long?" Two words describe why: complex and expensive. Under the CERP umbrella are nearly seventy projects designed to move like the gears of a clock so that they tell "one time." Such project all totaled cost billions of dollars. Three factors work against such synchronization.

Bureaucracy: Planning, Authorization, & Funding

Planning

The first step in the restoration process is project planning. Studies, sometimes requiring years and millions, must be done to determine their environmental feasibility. Projects must be conducted in ways so as not to violate a host of other Federal requirements such as the Endangered Species Act, the Migratory Bird Protect Act, the National Environmental Policy Act, the Clean Water Act, etc.

Beyond these federal requirements, state law adds its purposes including mandates to "consider all applicable water resource issues, including water supply, water quality, flood protection, threatened and endangered species, and other natural systems and habitat needs." Other state purposes require that permits issued for component projects comply with water quality standards; that discharges from project components not pose a serious danger to public health, safety or welfare; and that any impacts to wetlands, or threatened or endangered species, be avoided, minimized and mitigated.

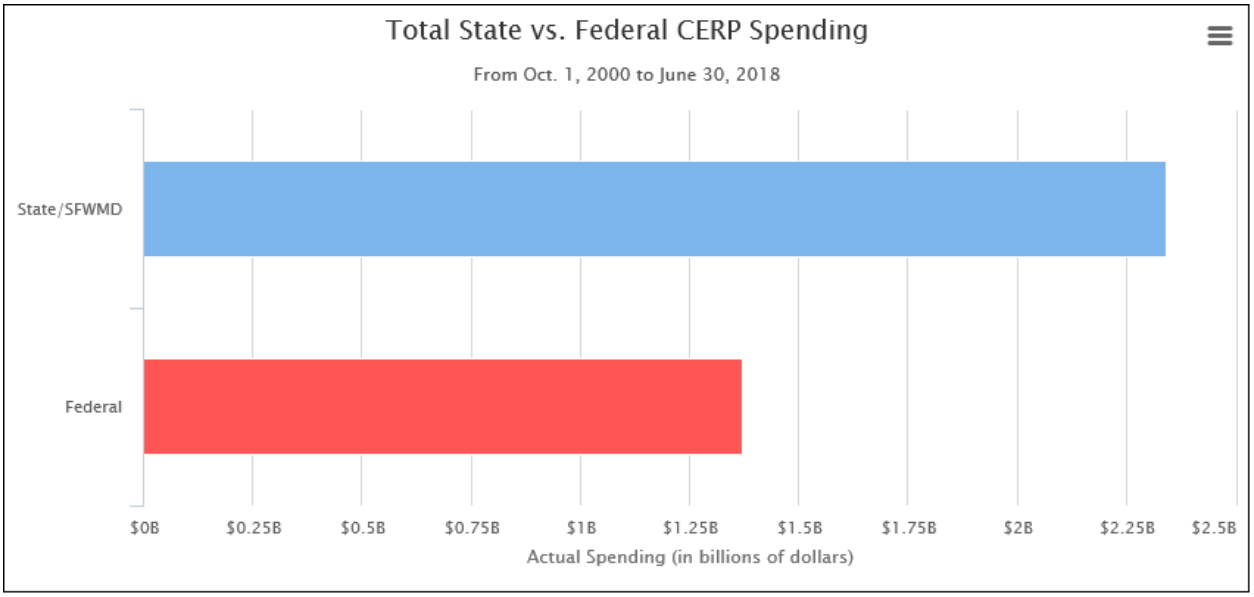
Authorization

Once plans are offered and accepted, Congress must authorize them. Obtaining Authorization Federal laws going as far back as the 1930s require each project to have a defined "authorized purpose." Such purposes include flood damage mitigation, navigation, agricultural, municipal and industrial water supply, preservation of fish and wildlife, drainage and water control, water management specific to the Everglades National Park, recreation, protection of water quality, prevention of saltwater intrusion, and aquifer recharge.

The legislative vehicle most often used to authorize projects is the Water Resources Development Act. The first WRDA was passed and signed into law on 1938 and is periodically revised as needed. These are large pieces of legislation because they include water-related projects from nearly every state. Once passed, any changes to the authorization must be re-authorized after careful consideration by the USACE which administers the bulk of the acts.

Funding

Once projects have been planned and authorized by Congress, they must obtain funding or an "appropriation." CERP projects are funded in a cost-sharing, 50-50 partnership split between the State of Florida and the Federal government. While the Florida share of funding has been relatively consistent and stable, the federal government has not been so reliable.



Currently the federal government is approximately a billion dollars behind in their fiscal commitment to Florida. Without financial predictability and stability, projects take longer and become more expensive due to the stops and re-starts.

Politics

Politics raise it head most often, but not exclusively, at the appropriations stage at both federal and state levels. The competition for limited dollars is incredibly intense. Failure to secure funding in a legislative cycle can mean delays or cancellation of projects even though millions of dollars may have been spent in the planning and authorization stages.

Particularly at the state level, politics can adversely affect tax-payer dollars being allocated towards needed restoration projects. Some people are elected with the help of influential, special-interest organizations. Once elected, those officials can feel an obligation to embrace the opinions of those groups even though they may be detrimental to the bigger picture of a coordinated restoration plan.

Some politicians enter their service with a "snap-shot" perspective. They may be unaware of the complexities of Everglades restoration, the progress that has been made, the priority of understanding the "next step" in the plan, or the tools available to accomplish components of the restoration. Such "myopathy" can disable the most logical of plans.

Propaganda

There are many ways to distort and cloud debate. Taking the truth and skewing it, falsely reporting facts, or injected accusations designed to create emotional over-reactions into the Everglades restoration discussion, hinder debate and discovery of real solutions. Such efforts, often motivated by the desire to raise money or build-up someone's narcissistic need for prestige, only prevent objective thinking, discussion, and solutions that are rational, effective, and creative.

They misinform, disinform, and distort the real issues wasting both time and money. In the end, they only delay the restoration they claim to be seeking.

Planning and bureaucracy require due-diligence. Politics must be endured. But, propaganda must be ignored.

VI. Policy Recommendations

In the big picture, three sources of environmental pollution affect Everglades restoration and must be managed: stormwater, wastewater, and fertilizer.

Stormwater in sudden, massive quantities must be captured, treated, and slowly re-introduced to the environment.

Wastewater in raw, untreated quantities or partially treated quantities must be minimized or prevented from entering the environment.

Residential and commercial use of fertilizers should be looked at with a view towards reducing the amounts being applied to the environment.

Because these sources are massive and expensive to resolve, objectives and plans must be crystal clear to maximize the flow of limited financial resources. With this in view, CPR makes the following recommendations.

Address Excessive Stormwater

1. **Expedite funding for the Lake Okeechobee Watershed Restoration Project.**

   This should be the top priority. Now that projects are being developed for reservoirs to store and treat water east, west, and south of the Lake, and renovations for the HHD have been funded, lawmakers would be wise to fund and expedite this watershed project. Storing and treating water before it enters Lake Okeechobee is cost effective and affects the rest of the eco-system. Completion of this project in concert with previously authorized CERP projects, will achieve the CERP goal of an 80 percent reduction in the harmful discharges from Lake Okeechobee. Immediate attention should be given to this.

2. **Complete renovations to the Herbert Hoover Dike and construction of reservoirs and stormwater treatment areas east, west, and south of Lake Okeechobee ON-TIME.**

   With full funding allocated to the Army Corps of Engineers, renovations to the HHD have been accelerated with a new completion date set for 2022 – four years earlier than the original plan. This will provide approximately one-third of a million acre-feet of temporary storage as needed without damaging aquatic habitat and wildlife.

Completion of the three reservoirs and their STAs will add nearly 500,000 more acre-feet of storage. Keeping these project ***on-time*** means Florida's storage issues could be solved within the next 5-10 years.

3. **Multiply the use of water farms.**

Water farming is one of the quickest and most cost-effective means of storing stormwater. These public-private partnerships keep property in private ownership while providing for needs such as water storage and aquifer recharge. They also employ people within the private sector. Strategically placed, they can play an important part in controlling excessive stormwater.

Address Wastewater Pollution

4. **Upgrade wastewater treatment plants to minimize outfalls and failures.**

Florida's wastewater treatment plants need upgrades in two major areas. First, they need to be equipped to handle greater capacities of wastewater. When the capacity of wastewater is exceeded, outfalls occur where raw or partially treated wastewater is released into the environment.

Second, older plants need to be upgraded to prevent their failure and provide increased nitrogen reduction. The push to connect increasing numbers of septic systems to these plants only demands greater capacity.

Two-thirds of wastewater in Florida is handled by wastewater treatment plants. A funding prioritization list should be established to address the "worst offenders" first. Such renovations are expensive but getting started in the worst places only makes sense.

5. **Renovate deteriorating sewer system infrastructure.**

Renovating wastewater treatment plants is only the start. The sewers connecting homes to those plants are in desperate need to renovation as well. The cities of Ft. Lauderdale and Tampa alone have seen hundreds of millions of gallons of raw sewage released into the environment because of failing sewer pipes.

Additionally, it is believed that 10 per cent of the raw sewage flowing through these pipes is exfiltrated directly into the environment on a regular basis. Failed infrastructure is an enormous source of environmental pollution. But, because it occurs underground and unseen, few pay attention to it.

6. **Develop onsite sewage treatment and disposal system remediation plans to address water quality issues associated with and open the Florida**

marketplace to innovative and affordable nitrogen-reducing septic systems.

In 2016, the Florida Legislature passed the Florida Springs and Aquifer Protection Act that required the development of an onsite sewage treatment and disposal system (OSTDS) remediation plan if it has been determined that OSTDSs within a priority focus area contribute at least 20 percent of nonpoint source nitrogen pollution. If they are to be effective, OSTDS remediation plans must include options for repair, upgrade, replacement, drainfield modification, addition of effective nitrogen reducing features, connection to a central sewerage system, use of hybrid sewer systems, or other action for a sewage system or group of systems. The options must be cost-effective and financially feasible projects necessary to reduce the nutrient impacts from OSTDSs within the area.

Standing in the way of the potential effectiveness of remediation plans is Florida's current, government-approved "solution" to replace traditional systems with "advanced" systems (which are only modified septic tanks). These modified tanks can demonstrate a fifty percent nitrogen reduction in a laboratory but, only a very few have ever been tested under "real-world" conditions. Those tested failed to reduce nitrogen as advertised. In fact, "real-world" testing of traditional septic systems shows that they can reduce nitrogen by nearly 50 per cent and, given 15 feet of soil between the system and ground water, they reduce nitrogen by 90 per cent or more. Nevertheless, government mandates replacements whose installation cost can exceed $20,000, require a service contract, and be dependent on electricity.

In recent years, innovative, passive, nitrogen-reducing technologies have been developed by the private sector. These new technologies reduce nutrients in the septic drainfield or under it rather than in the septic tank. But, they have been prevented from market entry by the Florida Department of Health. These new technologies would provide an affordable and effective replacement alternative if allowed to compete in the Florida market.

One simple option would be to designate an objective, third-party organization (or organizations) to test and certify all potential septic system products for nutrient reduction. Once certified, they should be allowed to be used. The free-market will allow these systems to be improved regarding nitrogen production and do it at prices that will become more and more affordable.

Address the Impact of Fertilizer

7. **Continue the best management practices.**

Agricultural use of fertilized, especially in the EAA, has been monitored and mitigated since the 1994 Act. Farmers in the 470,000-acre Everglades Agricultural Area implement a rigorous nutrient reduction program that requires BMP implementation. are improved farming techniques in the and are the first step to

clean water flowing south. Over the history of the BMP program, phosphorus levels in water leaving the EAA dropped by an annual average of 55 percent compared to initial conditions. This is more than twice the improvement required under the Everglades Forever Act. This is one of the most under-publicized success stories in Florida.

North of Lake Okeechobee and in the coastal estuary watersheds, agricultural producers in a watershed covered by basin management action plan must implement BMP nutrient reduction program prescribed by the Florida Department of Agriculture and Consumer Services (FDACS) or a monitoring program prescribed by the Florida Department of Environmental Protection (FDEP). FDEP has statutory authority to pursue enforcement, including fines, for non-compliance. Examples of the DACS BMPs include refined stormwater management practices, on-farm erosion controls and more precise fertilizer application methods. These and other management practices reduce the amount of phosphorus discharged from agricultural areas.

The BMP programs throughout south Florida programs have been very successful and should be continued.

8. **Develop policy to reduce the impact of residential and commercial fertilizer.**

Reducing the amount of residential and commercial use of fertilizer for landscaping has been promoted but, on a volunteer basis for the most part. Apart from, such applications of fertilizer, when taken together, introduces more nitrogen into the environment than any other source. Some local governments already have ordinances detailing Florida-friendly plants and grasses which can be used for landscaping. However, the uses of fertilizers are left up to property owners. Further study and proposals should be considered to reduce the amount of such fertilizer use.

In Conclusion

History documents how well-intentioned government policies have often been aimed at solving problems. Nevertheless, in doing so, they created others. The "drain and farm" policies of Florida's early days opened the state to unimagined economic prosperity but, changed the landscape of the Everglades forever. Construction of the HHD helped control flooding and protected people's lives but, created unimagined environmental problems decades later. In some cases, the consequences of such actions took decades to reveal themselves. They will take decades to remedy.

Armed with a knowledge of the past and with new technologies (some of them currently being used and others yet to be discovered), the Everglades can and will be a sustainable, jewel of environmental beauty. Florida will continue to be a place for economic hope and prosperity.

Planning and coordinating the multiple projects under the CERP umbrella will restore and protect the Everglades if given the chance. Stabilizing and properly allocating financial resources by plan rather than politics will accelerate developing the pieces to the puzzle of Everglades restoration. It is a puzzle in-progress and, when completed, it will be beautiful for all to see and enjoy.