# Reviving America's Water Garden

*USACE changes course to restore the Everglades*

Written by: Eric Tegler on March 19, 2011

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**Shown here is the Site 1 Impoundment Project area. It is located adjacent to the Arthur R. Marshall Loxahatchee National Wildlife Refuge, which covers 1,660 acres, and will provide water storage that is considered essential to restoring the Everglades' health and viability. Photo courtesy of the U.S. Army Corps of Engineers**

The Florida Everglades are, in effect, America's water garden. This vast collection of marshes, swamps, forests, rivers, and tributaries in southern Florida is home to myriad species of animals, fish, and plants, and one of the most diverse ecosystems on Earth. The system begins near Orlando, including Lake Okeechobee, and extends southward to Florida Bay at the southern tip of the state. The Everglades are the major fresh water source for southern Florida and the key to regulating its propensity for flooding and drought.

For more than a century, human efforts to remake the Everglades to suit the development needs and desires of a burgeoning South Florida population literally transformed the natural landscape, erasing nearly half of the Everglades and diverting their fresh water to the Atlantic Ocean and the Gulf of Mexico. By the late 20th century, recognition of the harm done to this amazing resource and the potential loss of the remainder of the Everglades prompted the state and federal governments and local authorities to join together to reverse the decline.

The U.S. Army Corps of Engineers (USACE) has been actively involved in major alterations to the Everglades for more than 50 years. Today, USACE is just as involved in restoration – reviving America's water garden.

"The Everglades are a wetland of international significance, one of the largest fresh water wetland systems in the world," Steven Kopecky, USACE's South Florida Everglades Ecosystem Restoration program manager said. "As a result, they are one of the primary nurseries for all sorts of fish and bird types including lots of endangered species. We're talking about a wilderness and wildlife gem, so much so that in the 1940s it was designated as the first national park that was essentially a wildlife reserve. It's also the only one on the east coast preserved for its biologic diversity rather than big mountains or scenery."

Kopecky oversees the program from USACE Headquarters in Washington, D.C. Understanding Everglades restoration he pointed out, requires understanding the history of South Florida.

"Almost the entire concept of what we think of as South Florida today was related to or originated in the Everglades somewhere. When we talk about places like Miami, Fort Lauderdale, or any of the cities down there, they were basically carved out of the Everglades. They all used to flood, so badly that back in the 1940s, the Corps was brought in to do what was called the Central and Southern Florida (C&SF) Project. That's really the plumbing system of South Florida. It's what allows South Florida to exist. It is still the most important feature of the landscape that prevents flooding."

Indeed, flood control made possible the development of South Florida and forever changed the Everglades. In 1948, Congress directed the Corps to undertake the C&SF Project, which essentially drained much of the marsh to prevent flooding, irrigate farm lands, and provide drinking water to facilitate new development. USACE's work ultimately resulted in the drainage of more than 1.7 billion gallons of water from the Everglades

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to coastal waters each day. Since then, the altered water flow has eaten away half of the Everglades and water quality has been compromised.

As recognition of the significance of the Everglades dawned, Congress enacted the Everglades National Park (ENP) Protection and Expansion Act in 1989. The act directed the secretary of the Army to take all measures feasible consistent with the C&SF Project to protect natural values associated with ENP. Several years later, the Corps completed the C-111 General Reevaluation Report. This and several other reports ultimately gave rise to the Comprehensive Everglades Restoration Plan (CERP).

CERP was developed in the 1990s with widespread public interest and support. Numerous public meetings were held and thousands of people provided input, resulting in a widely supported plan that balances many competing interests. In 2000, Congress authorized the plan, the largest environmental restoration effort in history. CERP is intended to enhance Everglades' wetlands and associated lakes, rivers, and bays in the 16-county region of South Florida. CERP projects will capture and store much of the water currently lost to the Atlantic Ocean and Gulf of Mexico. Essentially, CERP will ensure that the biodiversity of the Everglades can be preserved and expanded. Without it, both the size and diversity of the Everglades would diminish.


**This map depicts the scope of the Comprehensive Everglades Restoration Plan (CERP). CERP comprises some 68 components, five of which kicked off in 2010. Map courtesy of Everglades Comprehensive Restoration Plan**

"One of the things that is unique about the Everglades is that most of it is still Everglades," Kopecky said. "It's still there from a footprint standpoint despite the many things we've done to it over the last 100 years. The problem is that it's too dry and too wet at the wrong times. So much of the goal is to try to rehab as much of the existing Everglades as we can. There are certain places we know we'll never get back – there are large cities there now. But what this is about is trying to take what remains and use it as best as possible."

CERP can't happen without the cooperation of a variety of agencies and governments. USACE actively works with the South Florida Water Management District, the Department of the Interior, the U.S Fish and Wildlife Service, the Everglades National Park Service, the Florida Department of Environmental Protection, and the Miami-Dade Department of Environmental Resources Management to name a few.

Though CERP has been in existence for a decade, its multitude of projects has only recently received funding and has just begun. Kopecky noted a significant amount of work was already under way.

"You must recognize that there are really two sets of Everglades projects; firstly there's what we call foundation projects. These are projects that have been on the books or ongoing for years – many of which pre-date CERP. There's a whole suite of landscape-level foundation projects out there. They're all over South Florida and they come from a variety of different authorizations, different political pressures, but they're all generally good ideas. We call them foundation projects because they're things you need to have in place before you can do CERP."

Such foundation projects are generally aimed at water management and have confusing names, like the "C-111 Spreader Canal Western Project."

"There's an Everglades code and the names all come from the 1940s C&SF Project," Kopecky said. "C is for canal; L is for levee; and S is for structure. So C-111, for instance, is actually a big ol' ditch that was dug as part of the C&SF. When we talk about the C-43 Reservoir Project, we're talking about the Caloosahatchee River. The nomenclature is hard to figure out. There's the natural landscape and a superimposed engineering landscape."

Confusing the names may be easy, but the projects are important building blocks for CERP. C-111 affects the critical Taylor Slough area of ENP.

"The Everglades are marsh so the topography variation is measured in inches," said Kopecky. "The natural landscape is called region slough. Largely, you have slightly higher marsh followed by wet, slow rivers, which are referred to as a slough. There are two main sloughs in ENP. The largest of the pair, Shark River Slough, is one of the biggest in the world and Taylor Slough is a good model to work on because it's a bit smaller with a watershed of its own. The C-111 Western Project now under way is designed to keep more water in Taylor Slough instead of flowing out to the ocean."

Most foundation projects are complete or nearing completion according to Kopecky. Among the most ambitious of these is the Kissimmee River Restoration Project. "The Kissimmee River was the first large-scale ecosystem restoration project the Corps did. It's really what inspired the whole restoration mission. It has reached the point where it's almost done and the benefits are astounding."

CERP comprises some 68 components. Five CERP projects have kicked off in 2010, including the restoration of the Merritt Canal area of the Picayune Strand in Collier County. The project will restore water flow across the landscape, rehydrate drained wetlands, improve estuarine waters, and return habitat to threatened wildlife communities. It is the closest thing to rehydrating the ENP, Kopecky said, and the only CERP project that actually enlarges the Everglades.

"If you remember the 'buy some swampland in Florida' thing that was going on in the 1960s and 70s, that was an area that was dug out for a development that was called Golden Gate Estates. They basically sold plots out in the middle of the Everglades. They drained them and sold them and when people went out there to build, they found out the land was wet and they couldn't build properly. So they dug all these canals and really made a

mess of everything. Before anyone could really build, the company went bankrupt."

The Picayune Strand Restoration Project includes wetlands and uplands located between Alligator Alley (Interstate 75) and the Tamiami Trail (U.S. Highway 41) in the southwestern corner of the state. The ecological condition of the project area affects not only the immediate project, but also significant regional resources. Public lands nearly surround it, including treasures such as the Florida Panther National Wildlife Refuge, Fakahatchee Strand Preserve State Park, Everglades National Park, Big Cypress National Preserve, and more.

Florida ended up with 55,000 acres of confused canals and other features that debilitated the local ecosystem. Since the development failed, the state has been buying back the land. As part of CERP, USACE is filling in the canals, building pumps to direct water where desired, and rehydrating the area.

"Picayune Strand is a crown jewel of the Comprehensive Everglades Restoration Plan," said Paul Souza, field supervisor of the U.S. Fish and Wildlife Service's South Florida Office. "Restoration of this area is vital to establishing connections between regional habitats and a host of endangered species that depend on it. Because of leadership shown by our Everglades partnership, we're another step closer to achieving its restoration potential, one step closer to saving our endangered Florida panther, wood stork, manatee, and many other species."

The Merritt Canal portion of the project requires several major alterations, including installing 55 plugs in 13.5 miles of the canal that was originally dug to provide flood protection for a later-abandoned residential development. USACE contractors will build an 810-cubic-feet-per-second pump station and spreader canal that will allow natural resource and water managers to direct fresh water to drained wetlands. This will also maintain current flood-reduction conditions on land outside the project area. USACE will oversee the removal of 95 miles of roads and non-native vegetation. The construction/alteration will take about two years to complete.

"We're adding 55,000 acres of habitat to the Everglades system," Kopecky said. "That, to me, is one of the most beautiful projects we have."

Its beauty he added will be visible in satellite photos, a highly tangible sign of progress from which to draw inspiration and energy. But it is the cumulative effect of the many smaller CERP projects that will tell over time in a positive way. "Where we build a project and where we see the benefits in the Everglades are not one and the same," Kopecky admitted.

Those projects have to address the peculiar topographical conditions of South Florida and employ a variety of tools.

"The geology of South Florida makes this really bizarre but the ground is basically limestone," Kopecky said. "It looks like hard Swiss cheese. If you pour a cup of water into the ground in Florida, it might pop up somewhere else. So you're actually trying to fool water that has gone underground to stay in the Everglades rather than [draining] into Miami. By putting some pressure against the water it will go where the least resistance is so it will flow south instead of east or west.

"Mostly what we're doing is installing pumps and hydraulic ridges which are essentially small, shallow reservoirs that can be used to create a ground water gradient. That allows more water to stay on the Everglades side while staying dry on the other developed side."

What often comes as a surprise to those unfamiliar with USACE is that all of the CERP and foundation project work is funneled through just one district: Jacksonville. One of the largest USACE districts, Jacksonville has no significant military mission but works across a huge area over 16 counties. The population in South Florida alone makes the area roughly equivalent to the 19th largest state by population. While CERP must work around all of those people, its South Florida focus has advantages.

"One of the strengths and weaknesses of the Everglades Restoration is that it's in one state," Kopecky maintained. "Sometimes that causes [political jealousy] from other states but on the other hand, that means we only have one state to deal with in terms of a government. It's a very large state with a very strong congressional delegation."

Another CERP project that got under way this summer was the Site 1 Impoundment Project (Fran Reich Preserve) near Boca Raton. The project will capture and store excess surface water runoff from the Hillsboro watershed, as well as releases from the Arthur R. Marshall Loxahatchee National Wildlife Refuge and Lake Okeechobee. Capturing the excess runoff – water currently discharged to the Atlantic Intracoastal Waterway – will supplement water deliveries to the Hillsboro Canal. These supplemental deliveries will reduce demands on the Loxahatchee Refuge. The 1,660-acre impoundment will also provide groundwater recharge, reduce seepage from adjacent natural areas, and prevent saltwater intrusion by releasing impounded water back to the Hillsboro Canal when conditions dictate.

The Site 1 Impoundment is a good example of a project that will add capability to the existing Everglades infrastructure and allow for more flexible management of the resource. Collectively, such projects will also return the Everglades to a more natural (albeit still managed) state. A healthy ecosystem is in fact a self-reinforcing proposition where water management is concerned, Kopecky said.

"If you have a healthy marsh instead of a degrading marsh, there's a lot more flexibility to do things. That's what we're after. The trick now, I guess, is to make the Everglades as little-managed and as flexible as possible. That's the whole concept. We still have this human infrastructure. Let's use it smarter and give it more capability to do more beneficial things."

While the recent American Recovery and Reinvestment Act unlocked significant funding with which to move CERP forward, restoring the Everglades will be a long and costly process. When CERP passed in 2000, the plan was expected to spin out over 30 years and cost $8 billion. Now about a decade behind schedule, CERP will of course be costlier and take longer, in part because of its sheer magnitude.

“Every single thing we do is always the biggest in the world,” Kopecky stated. “The spaces and the size of this aren’t something I can explain to people. You have to take them down there to see it. You can be in a helicopter in the middle of the Everglades and look in every direction on the horizon and see nothing but marsh. Everything is so huge; the CERP will be very expensive and very time-consuming.”

But Kopecky said it will definitely be worth it.

“As a restoration guy, the one thing I can say about Florida, which is different than working in the Chesapeake Bay, is that if you get the water management right or even close, it is such a productive environment that the right stuff grows. If you look at the Kissimmee River, the vegetation came back like crazy. Florida has a wet subtropical system full of nutrients. Despite all we’ve done, the Everglades are still there. They’re not thriving, but they have persevered.”

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