

KISSIMMEE RIVER

CHANNELIZATION TO RESTORATION

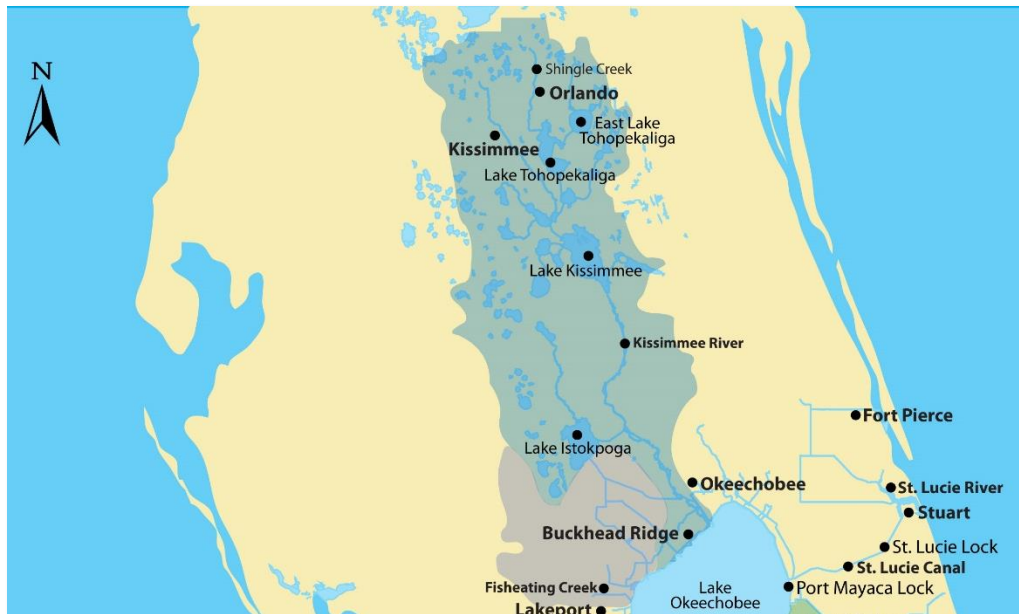


Photos: South Florida Water Management District

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INTRODUCTION

The Kissimmee Basin is the headwaters of the greater Kissimmee-Okeechobee-Everglades (“KOE”) system.¹ The Kissimmee Basin includes (1) the Kissimmee Chain of Lakes (“KCOL”), (2) the streams and marshes associated with the lakes, and (3) the Kissimmee River and floodplain. It is located between Orlando and Lake Okeechobee.



(map by Jacksonville Office, U.S. Army Corp of Engineers)

Due to major flooding by hurricanes in the 1920's and 1940's, the Central & Southern Florida Flood Control (“C&SF”) Project was created in 1948. The C&SF Project took many naturally curved waterways in central and southern Florida and turned them into deep, straight canals. This in turn negatively impacted the entire system of rivers, sloughs and marshes throughout central and southern Florida.

The Kissimmee portion of this project was added in 1954, and between 1962 and 1971, the U.S. Army Corp of Engineers (“ACOE”) dredged the Kissimmee River. It went from a 103 mile meandering river with seasonal floodplains to a 56 miles long, 30 feet deep, and up to 300 feet wide stagnant canal. Six water control structures were also installed that subdivided the

¹ “Kissimmee River Restoration Project, Fact and Tour Sheet”, South Florida Water Management District, 8/11/2010, pg. 1

canal creating five impoundments. One of the main reasons for this change was to decrease the flow of the river during the wet seasons and to allow water to flow more uniform throughout the year to help decrease flooding.

Due to the channelization of the river into the C-38 canal, 90% of the waterfowl who visited in the winter and most of the wading birds and game fish stopped using the damaged river and floodplain ecosystem. Unfortunately, the Kissimmee River was reduced with a loss of over 19,500 acres of wetlands, and the Kissimmee floodplain was transformed into pastures for cattle.

The one primary cause of environmental harm was the lack of flowing water in the remnant river sections.² This lack of flowing water was shown to have caused the following changes:

- Lowered oxygen levels in the water due to increase of organic matter on the river bottom
- Wetland plant and animals communities were replaced by terrestrial communities³
- Loss of flood pulse caused an interruption of nutrient cycling and food web dynamics⁴
- Increase in the transportation of nutrients down to Lake Okeechobee due to a large increase in agriculture and the cattle pastures.

TIMELINE OF EVENTS

1972	The first public hearing was held to discuss the restoration of the Kissimmee River due to the environmental impacts to the riverine and floodplain ecosystem.
1972	The Florida Water Resources Act initiated three major restoration and planning studies to evaluate the recommended de-channelization plan.
1976	The Kissimmee River Restoration Act was passed to restore seasonal water level fluctuations in the floodplain ⁵ .
1978 -1985	The first Federal feasibility study was conducted.
1991	The second Federal feasibility study was conducted.

² "Below the Surface: Kissimmee River Restoration Phase I", South Florida Water Management District report, October 2008, pg. 2

³ "Executive Summary: Kissimmee River Restoration Studies, Volumes 1 and 2", South Florida Water Management District report, September 2006. pg. 7

⁴ "Kissimmee River Restoration Project Update", South Florida Water Management District, Lawrence Glenn, February 2012, pg. 8

⁵ "Kissimmee River Restoration Project Update", South Florida Water Management District, Lawrence Glenn, February 2012, pg. 9

1992	The Water Resources Development Act was passed by Congress.
1994	A Project Cooperative Agreement (“PCA”) was created between the Federal Government and the State of Florida.
1996	The feasibility study on the Headwaters portion of the project was completed.
1995-1999	Baseline sampling done by South Florida Water Management District (“SFWMD”)
1999-2001	Phase I backfilling construction done.
2006-2010	Phase IV backfilling construction done.
2015-2020	Phase II and III construction underway

RESULTS OF LEGISLATURE

The passing of the Water Resources Development Act by Congress in 1992 paved the way for the start of the restoration of two projects: (1) the Kissimmee River Restoration Project and (2) the Headwater Revitalization Project. These two projects were combined into one: The Kissimmee River Restoration Project (“KRRP”). The headwater portion of the project is just as important as it will modify the lake flow in the Upper Kissimmee Basin so it flows more naturally to the Kissimmee River. The remainder of the project will fill in portions of the canal, restore the river channel and floodplain habitats.

Under the 1994 Project Cooperative Agreement, the SFWMD and the ACOE are working together to complete this restoration project including the backfilling of portions of the flood control canal and restoring part of the river back to its original water flow. SFWMD is responsible for the purchasing of over 102,000 acres and the restoration evaluation, and the ACOE is responsible for the design and construction costs. Originally, the project was expected to take 13 years to complete in 2012, at a cost of \$787 million. It is now expected to be completed in 2020, and will have 5 years of ecosystem monitoring afterwards.

PHASES AND CONSTRUCTION

The project is divided into four major construction phases that include backfilling sections of the canal and removing 2 water control structures. Phase I backfilling construction started in 1999 and was completed in 2001. Phase IV backfilling construction was completed in 2010. Phase II and III are underway and are expected to be completed in 2020. As of March 2018, 15 of the 22 miles of the original canal have been backfilled and 19 of the 44 original river channel and 6,500 acres of floodplain wetlands have been restored.⁶

At the end of the construction, the ACOE will have backfilled 22 miles of the C-38, re-carved 6 miles of river channel, restored 24 miles of river channel and restored 15,041 acres of riverine and floodplain habitat⁷. These phases will also have included the installation of concrete culverts under Highway 98, removal of 2 water control structures and a new CSX Railroad Bridge.

Not all of the canal will be backfilled to allow flooding controls to remain -- only 22 of the actual 56 miles of C-38 will backfilled. Flooding is expected to remain in non-residential areas, and fee acquisition of land will occur around the headwater lakes in case of flooding. Any fill material eroding into the river will dissipate before reaching Lake Okeechobee.

MONITORING AND EVALUATIONS

Ecological monitoring was done prior to the start of construction to establish a baseline of the conditions of the project area from which to compare results of the restoration. Continued ecological monitoring was performed after Phase I was completed and in 2014, the following positive results were found:

- Wetlands plants are thriving in the floodplain
- Undesirable plants have been replaced by native plants
- Organic deposits on the river bottom decreased 71%
- Sand bars have re-established allowing for new habitat by birds and invertebrates

⁶ "Kissimmee River Fact Sheet", U.S. Army Corp of Engineers, March 2018, pg. 1

⁷ "Kissimmee River Restoration Project Update", South Florida Water Management District presentation by Lawrence Glenn, February 2012, pg. 39

- A six-fold increase of oxygen in the water
- 50% increase of largemouth bass and sunfishes
- Wading bird populations have doubled expected numbers
- Ducks and shorebirds have returned to the river that were absent before the restoration.

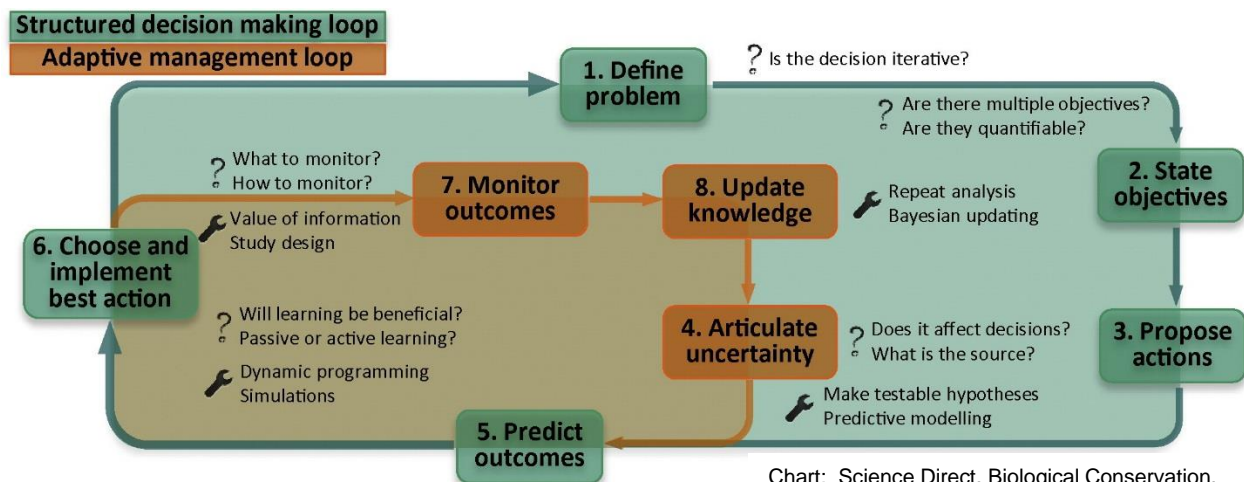
The Kissimmee River Restoration Evaluation Program (“KRREP”) is the ecological evaluation system created to monitor the project and provide expected outcomes from the project.

It has four main monitoring functions:

1. Ecological monitoring to measure attributes including water quality, vegetation, habitat, fish and wildlife, endangered species, energy, flow and nutrient cycling.
2. Monitoring of water levels, velocity and flows
3. Monitoring of erosion and deposition, and possible excess sedimentation
4. Monitoring the stability of the restored river channels.

RESTORATION EXPECTATIONS

Adaptive management will be used whereby management actions will be monitored, evaluated, and used to adjust future management actions.⁸ This style of management will allow for changes in the project to provide positive results.



⁸ “Executive Summary: Kissimmee River Restoration Studies, Volumes 1 and 2”, South Florida Water Management District report, September 2006. pg. 20

The restoration expectations include changes to the river and floodplains in many ways regarding hydrology, geomorphology, water quality, vegetation, and fish and wildlife. Seasonal water levels and natural flow patterns will help increase oxygen, decrease riverbed deposits, recreate sandbars, and form point bars on the inside bends of the river. Vegetation cover will decrease and emergent plants will increase in the river. Broadleaf marshes and wet prairies will return to the floodplains.

It is estimated that at least 24 species of amphibians and reptiles will return to the broadleaf marshes. Small fish populations in marshes and fish communities will increase. During dry season, more wading birds will be present, and in the winter, more waterfowl species will be seen. Evapotranspiration may occur during wet periods causing lower water levels but it should not affect water supply during droughts. It is expected that for 90% of the time, the river level will be at least 3 feet.

The floodplains will help with the filtering of nutrients which will decrease nutrient loads to Lake Okeechobee. The restructuring of the headwaters will also bring about better water levels and flows, and will allow shorelines to expand to support habitats.

CONCLUSION

The Kissimmee River Restoration Project is one of the few [projects] in the world to attempt re-establishment of the integrity of an entire ecosystem.⁹ The project is projected to bring about an increase in key species. It will also result in more feeding and breeding birds throughout South Florida. This in turn will increase recreational usage which will bring in more money through local and regional businesses and taxes. Good for the people, good for the wildlife, good for the environment. Everyone wins!!

⁹ "Executive Summary: Kissimmee River Restoration Studies, Volumes 1 and 2", South Florida Water Management District report, September 2006. pg. 20

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