C-111 SPREADER CANAL
Western Project and Design Test
Integration of Science and Engineering into Innovative Ecosystem Restoration Concepts

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C-111 Spreader Canal Western Project and Design Test
“Ever Views”
A View of Water Stage Levels in the Everglades
Pre-drainage Conditions
Water Depth Viewing Window

Transect L1 for Pre-drainage NSRSMv3.3

* Ground Elevation
* Water Level

Jan 15 1969

* Within the ridge & slough landscape, ground elevation = slough bottom.
For other landscapes, ground elevation = average model ground surface.
Current Conditions
Water Depth Viewing Window

Transect L1 for Scenario RSM_PCB1_GLD_rev_4848

* With the ridge & slough landscape, ground elevation = slough bottom. For other landscapes, ground elevation = average model ground surface.
C-111 Project Area

- C-111 is southernmost canal of C&SF system and serves a 100 square-mile basin
- Provides flood protection and drainage for agricultural areas west and south of Homestead

Challenges:

- Water is seeping out of Everglades National Park into the C-111 Canal.
- There is poor distribution of freshwater into wetlands in the eastern project site
Western Project: South Florida Landscape

- Minimal Relief (less than 3-feet in project area)
- Less than 1 foot of soil on top of limestone
- Limestone is extremely porous and easily drained by canals
Western Project

- Focus restoration on reducing seepage out of Everglades National Park, allowing water to follow its natural flow path.

Current seepage

Historical/Desired flow

**Problem:** We can’t just block flows to the east completely!
EXISTING STRUCTURE

ENP

ROADS

EXISTING STRUCTURE

ENP

PROJECT FEATURES

Hydraulic Ridge

Frog Pond Area

Aerojet Canal

S-197

Joe Bay

Trout Cove

Manatee Bay

Barnes Sound

Little Madeira Bay

NOT TO SCALE
Frog Pond Detention Area

Everglades National Park

C-111 Canal

Frog Pond Detention Area
Hydraulic Ridge Concept

Detention area used to infiltrate water into ground and artificially raise groundwater table

- Water from canal pumped into Detention Area
- Water infiltrates down into ground
- Excess water
- Groundwater rises hydrating Taylor Slough
Freshwater Rehydrated Acres

- > 120 days better
- 90 – 120 days better
- 60 – 90 days better
- 31 – 60 days better

Benefit to System
Benefits to System

- Rehydrated sawgrass freshwater habitat
- Increased nesting success for water dependent birds
- Restoration of nursery habitat in Florida Bay
- Approximately 240,000 acres of benefited area
Existing System and Restudy Concept

- C-111 constructed to relieve flooding
- Canal acts like a sump and is draining the Park
- Restudy conceptualized backfilling C-111 and constructing a new canal to redistribute the water - surface water
C-111 Spreader Canal Design Test

Background

- Critical uncertainties have to be resolved before advancing with the Eastern project
- How long should the canal be?
- What size should the pump station be?
- Will there be flooding?
- How much restoration can be accomplished?
- PDT developed a small scope effort to gather data to assist future plan formulation efforts
Design Test

- 3 - 25 cfs pumps
- ½ mile of conveyance
- ½ mile of spreader canal
- Monitoring network north and south of the canal
- Incremental adaptive operations
Monitoring Network

- A network of piezometers, flowmeters, and alarm gages were installed
- Monitored groundwater and surface water changes
- Flowmeters monitored the direction and velocity
- Alarm gages were put in to ensure we didn’t affect any private land
Results
What Did We Learn?

- We could fill the canal, even in the dry season
- Backwater effects were minimal in both the dry and wet season
- Surface water in the wet season, but the overall stage change was minimal
- Dry season operations yielded significant results, in some cases 12 inches of stage increase
- Future CERP Projects may stop recession below ground surface elevations