

Managing Invasive Plant Species in the Picayune Strand Restoration Project



Project Location - Southwest Florida



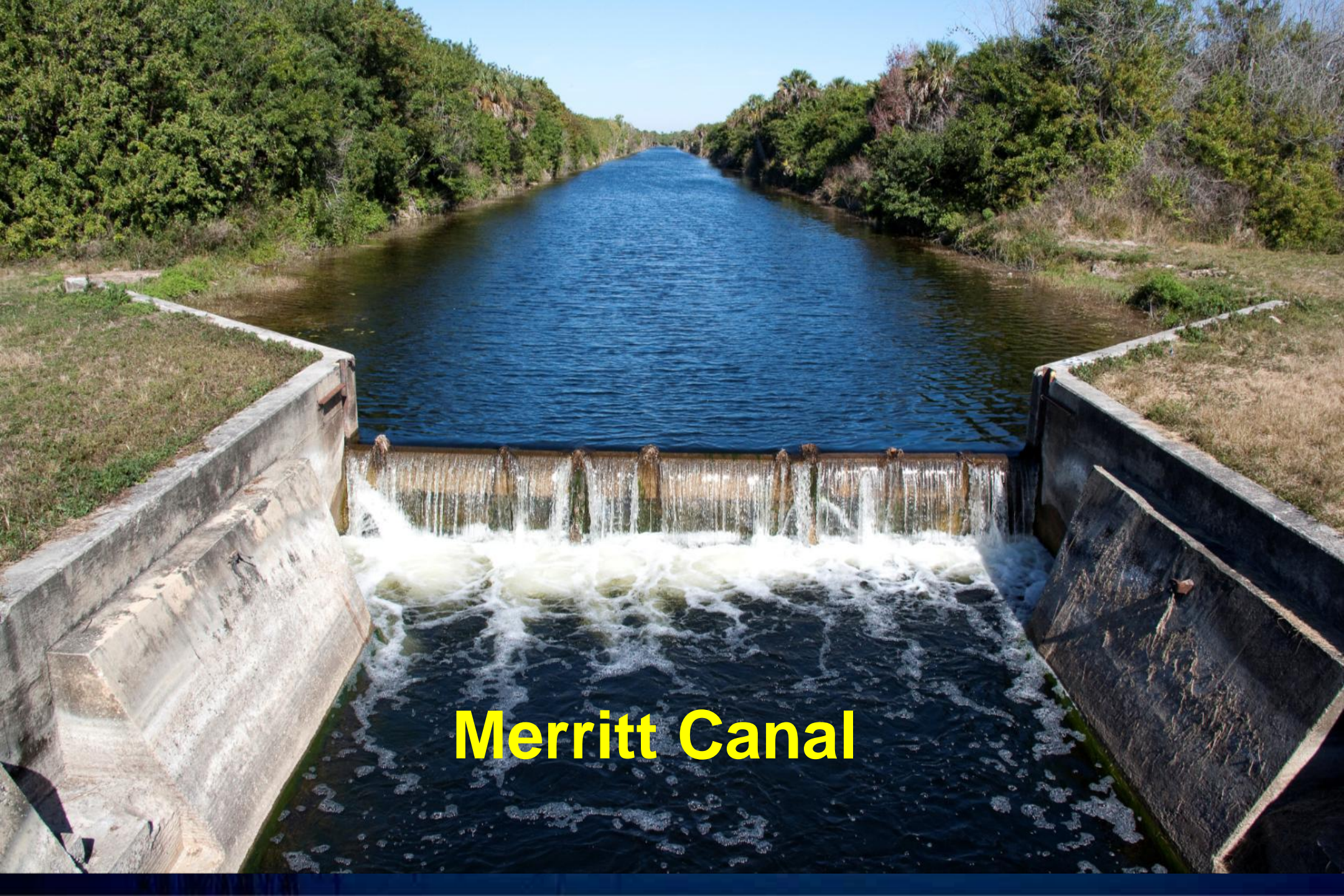
- Project covers over 55,000 acres in Collier County, southeast of Naples, Florida
- Located in Picayune Strand State Forest
- Located on west edge of Big Cypress Ecosystem

Project History

- Logging of baldcypress occurred during 1940's
- Residential development (55,000 acres) occurred during 1960's - 4 drainage canals (48 miles) and 279 miles of roads in a grid pattern
- Developer went bankrupt during 1970's
- Land acquisition began during the 1980's
- 20,000 parcels acquired from 17,000 land owners
- Land acquired became Picayune Strand State Forest

Effects of Logging and Development

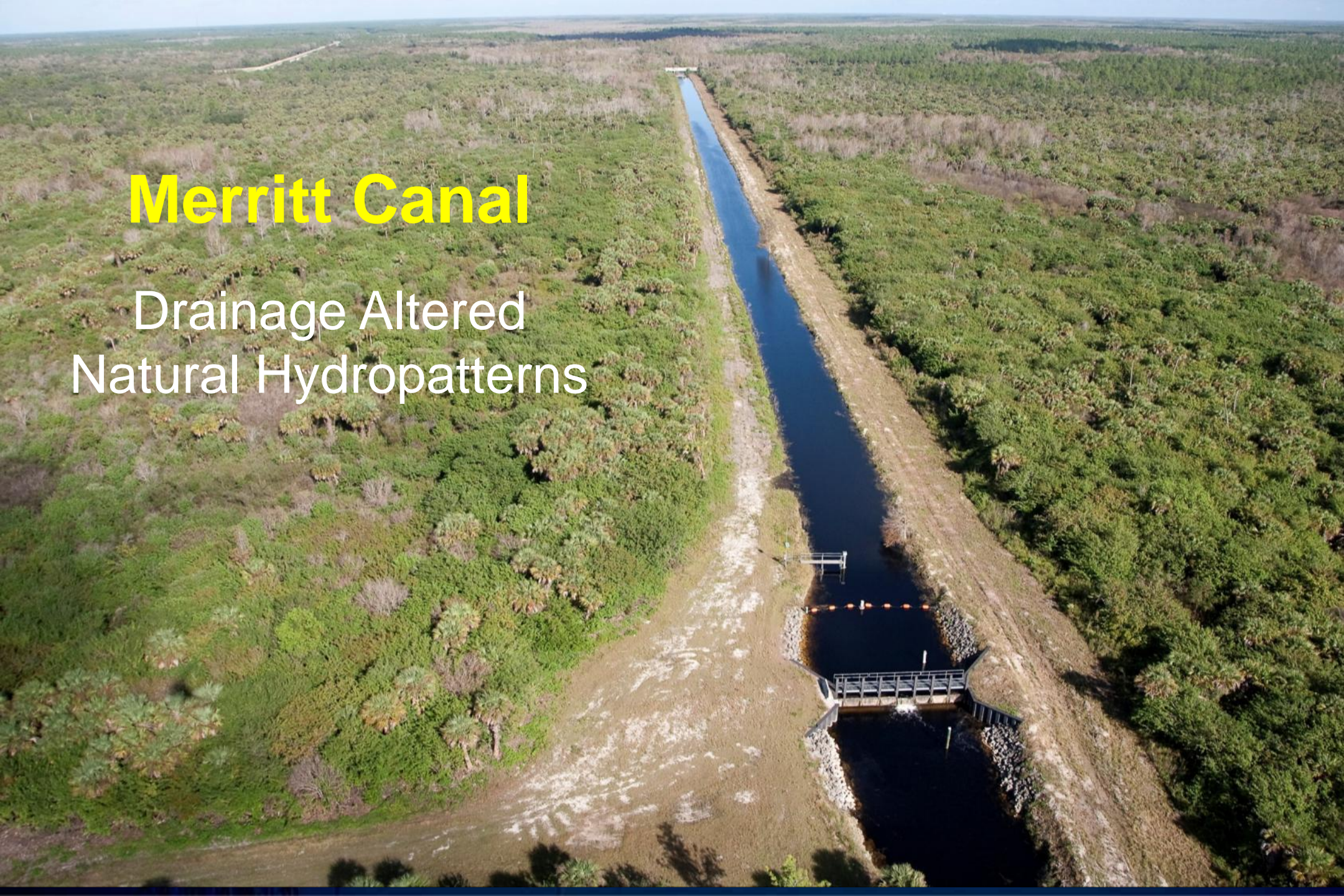
- Loss of baldcypress trees from forest canopy
- Lowered groundwater table from canal drainage altered hydro patterns, resulted in wetland loss
- North to south sheet flow blocked by roads
- Forest habitats fragmented by road grid
- Disturbed or drained areas invaded by exotic and nuisance native plants
- Altered fire regime, destructive forest fires



Merritt Canal

Merritt Canal

Drainage Altered
Natural Hydropatterns





Road Grid

Habitat Fragmentation and
Obstructed Sheet Flow

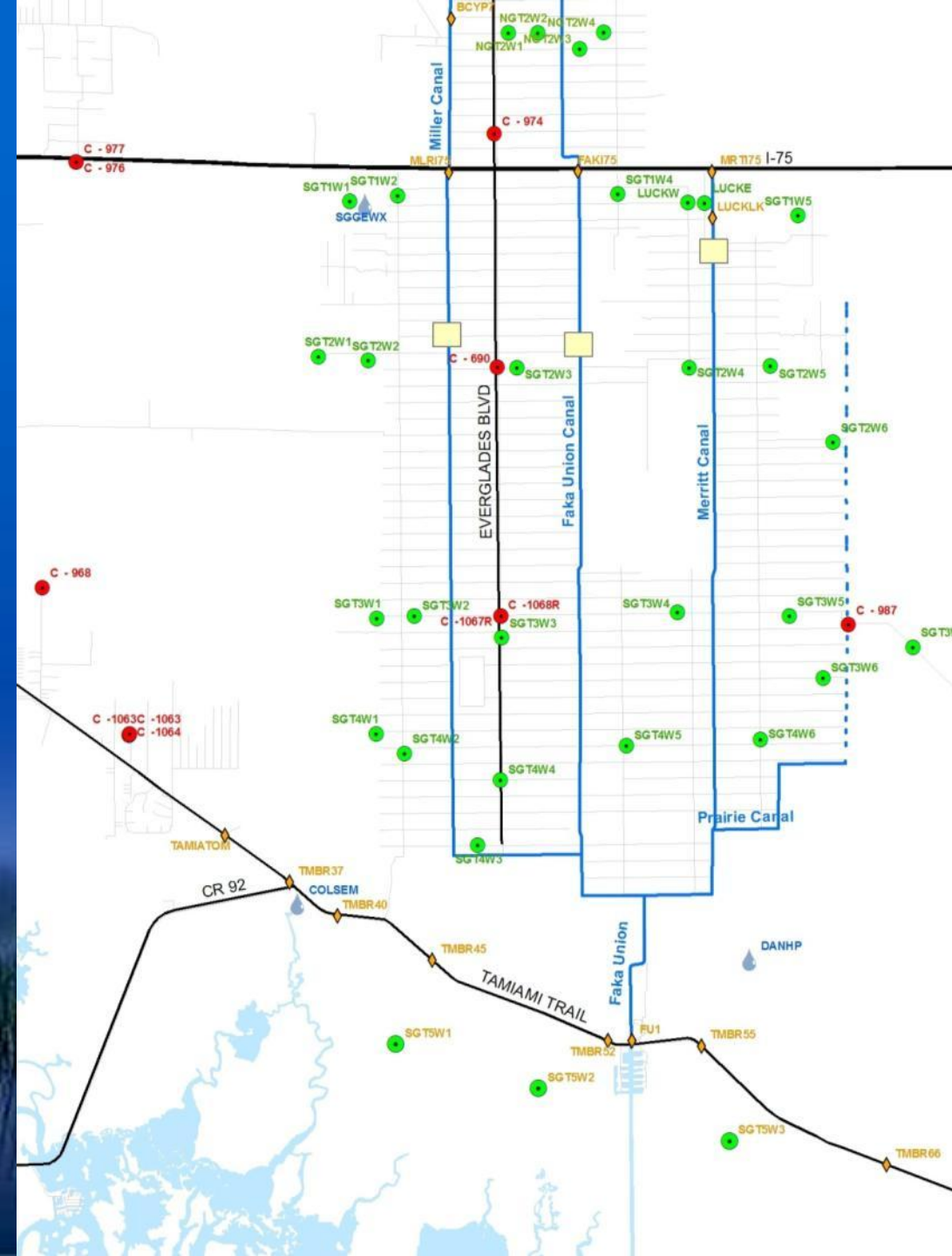


Altered Fire Regime

Less Frequent, More Intense Forest Fires

Project Description

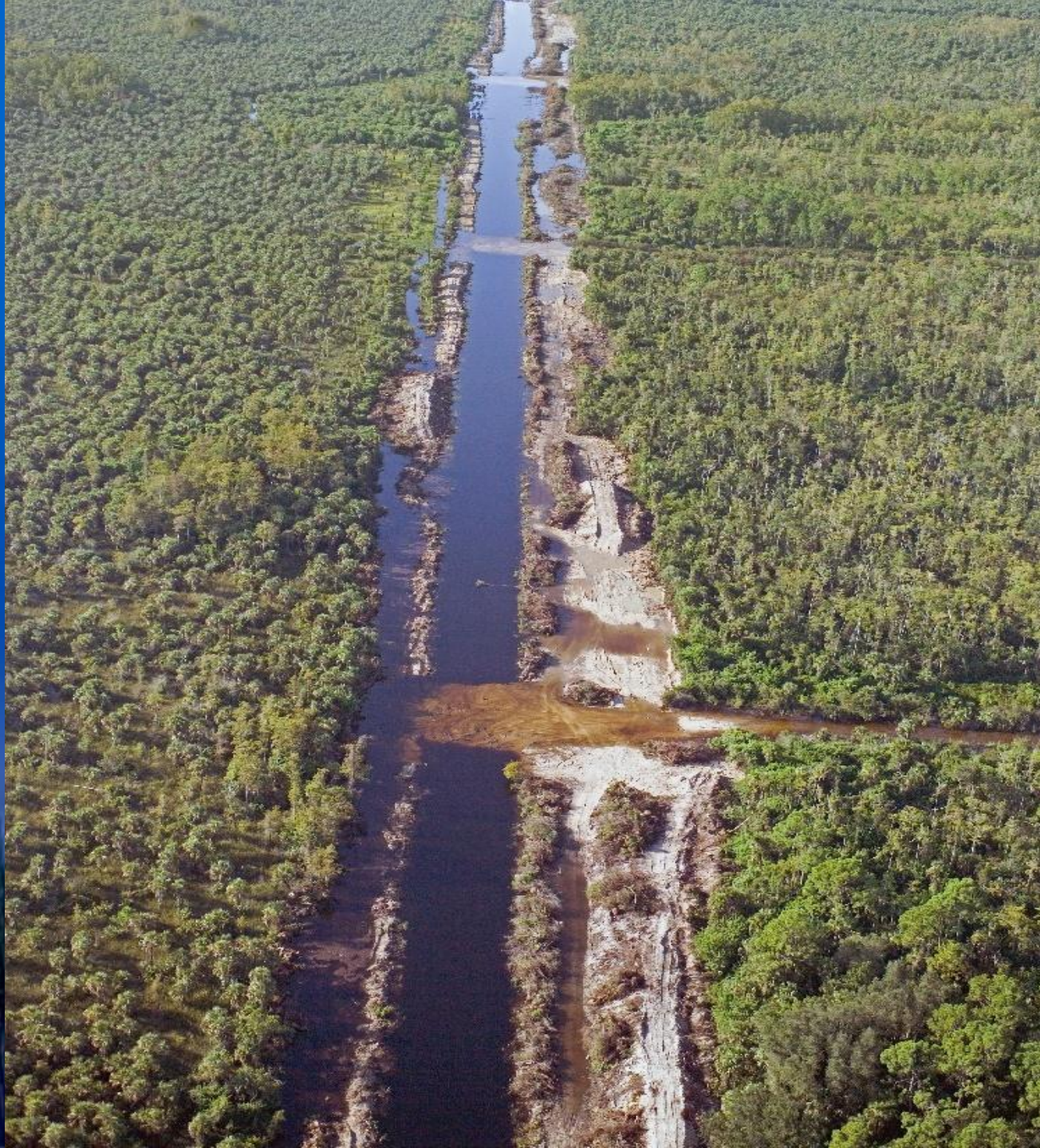
- Fill or plug 4 drainage canals
- Remove or degrade roads and logging trams
- Construct 3 pump stations and a levee to provide flood protection for development north (upstream) of project area
- Control exotic and nuisance native plants in areas disturbed by road removal and canal filling



Prairie Canal Filling



Prairie Canal Filling



Prairie Canal Filled



Ecosystem Restoration Goals

- Restore natural hydropatterns and sheet flow (fill canals, remove roads and logging trams)
- Reestablish natural fire regime (conduct frequent, controlled burns)
- Restore native plant communities (control exotic and nuisance native plants)

Plant Communities to be Restored

Complex Mosaic of Four Wetland Plant Communities

- Pine Flatwoods (Mesic & Hydric)
- Wet Prairie
- Baldcypress Forest
- Mixed Hardwood Swamp Forest



Mesic Pine Flatwoods



Wet Prairie

A photograph of a Baldcypress forest. The trees are tall and slender, with characteristic buttresses and a silvery-grey bark. A person wearing an orange shirt and a hat is standing in the middle ground, providing a sense of scale. The forest floor is dark and appears to be a swampy or wetland environment. The text "Baldcypress Forest" is overlaid in yellow, and "Baldcypress, Taxodium distichum" is overlaid in white below it.

Baldcypress Forest

Baldcypress, *Taxodium distichum*



Mixed Hardwood Swamp Forest

Prior to Logging, included Old-growth Baldcypress

Age 400 to 600 yrs, 3'-5' Diameter, 120' Height

Project Area Invaded by Exotic and Nuisance Native Plants

- Brazilian peppertree and exotic grasses have invaded open areas due to network of roads
- Brazilian peppertree, *Schinus terebinthifolius*, an exotic upland shrub or small tree, has become established due to lowered groundwater table
- Cabbage palm, *Sabal palmetto*, normally present at low densities in native plant communities, have multiplied by one to two orders of magnitude because of the lowered groundwater table and altered fire regime

A landscape photograph showing a field of tall, dry, yellowish-brown grass in the foreground. In the middle ground, there is a dense stand of Sabal palm trees with green fronds. Behind the palms, several tall, thin, dead tree trunks stand against a clear blue sky. The overall scene depicts a natural area that has been significantly altered by fire.

Former Pine Flatwoods

Invaded by Sabal Palm and
Burned by Intense Forest Fire

Sabal Palm & Brazilian Peppertree Invasion



Brazilian Peppertree Invasion





Fruit of Brazilian Peppertree

Dispersed by birds and
mammals

Multi-agency Team

- Formed to address invasive species concerns
- Developed Vegetation Management Plan
- Included biologists, botanists and ecologists representing:
 - U.S. Army Corps of Engineers
 - U.S. Fish & Wildlife Service
 - Florida Division of Forestry
 - Florida Fish and Wildlife Conservation Commission
 - South Florida Water Management District
 - Institute for Regional Conservation

Vegetation Management Plan – Part A

- Vegetation management in restoration footprints
 - One growing season prior to road removal, treat road right-of way for exotic grasses (cogon grass, *Imperata cylindrica* and torpedo grass, *Panicum repens*)
 - Treat restoration footprints once or twice a year for up to six years post-construction
 - Estimated cost: \$7.6 million

Vegetation Management Plan – Part B

- Vegetation management in entire project area in order of priority:
 1. Treat to eliminate *Melaleuca quinquenervia* and *Lygodium microphyllum* (Old World climbing fern)
 2. Treat and control exotic grasses
 3. Treat and control Brazilian peppertree
 4. Treat and reduce density of sabal palm in pine flatwoods

Regeneration in Road Removal Footprints

Exotic Plants Controlled by Periodic Treatments



Restored Hydopattern and Native Plant Regeneration

Former Location of Prairie Canal



Funding of Vegetation Management

- Project lands are managed by the Florida Division of Forestry (DOF)
- During pump station construction, road removal, and canal filling, Corps and SFWMD fund vegetation management in restoration footprints
- During construction, DOF has responsibility for vegetation management in remainder of project area outside of restoration footprints
- Beyond six-years post-construction (operations phase), DOF will assume primary responsibility for vegetation management in entire project area
- DOF has insufficient funding to adequately treat and control exotic and nuisance native plants in the project area

Policy Question

How to achieve cost effective and long term vegetation management?

- Comprehensive exotic and nuisance native plant control over the life of the project, thru year 2050, is potentially very expensive
- Insufficient exotic and nuisance native plant control would reduce ecosystem restoration benefits
- Biological controls might help manage some invasive exotic species, but would have risks and uncertainties
- Cost effective vegetation management will remain a challenge for now and the foreseeable future

Key Points

- Collaboration between Federal, state and local agencies is essential to identify and address invasive species concerns
- Incorporate invasive species management into planning, engineering & design, construction and operational phases of the project
- Need to establish priorities in vegetation management plans because funding is limited

