

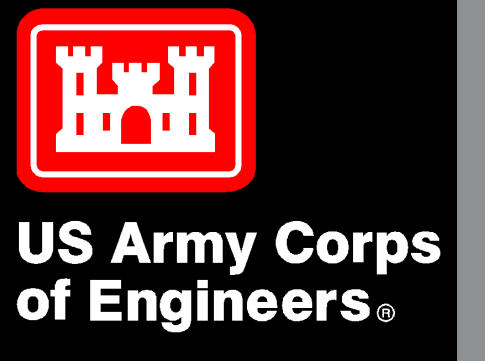


The Loxahatchee River Watershed Restoration Project: Monitoring and Adaptive Management for Project Success

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Background

- Channelization for flood control and agriculture during the 1900s along with development led to:
 - Altered connections between the Loxahatchee River and surrounding natural areas
 - Degraded wetland structure and function throughout watershed
 - Periods of excessive or insufficient flows to Loxahatchee River, floodplains, and estuary
 - Negative impacts on native flora and fauna
- The Loxahatchee River Watershed Restoration Project (LRWRP) was authorized by Congress in the Water Resources Development Act of 2020
- It is a component of the Comprehensive Everglades Restoration Plan (CERP), which provides a framework for restoring the South Florida ecosystem while providing for other water-related needs of the region.

Project Purpose

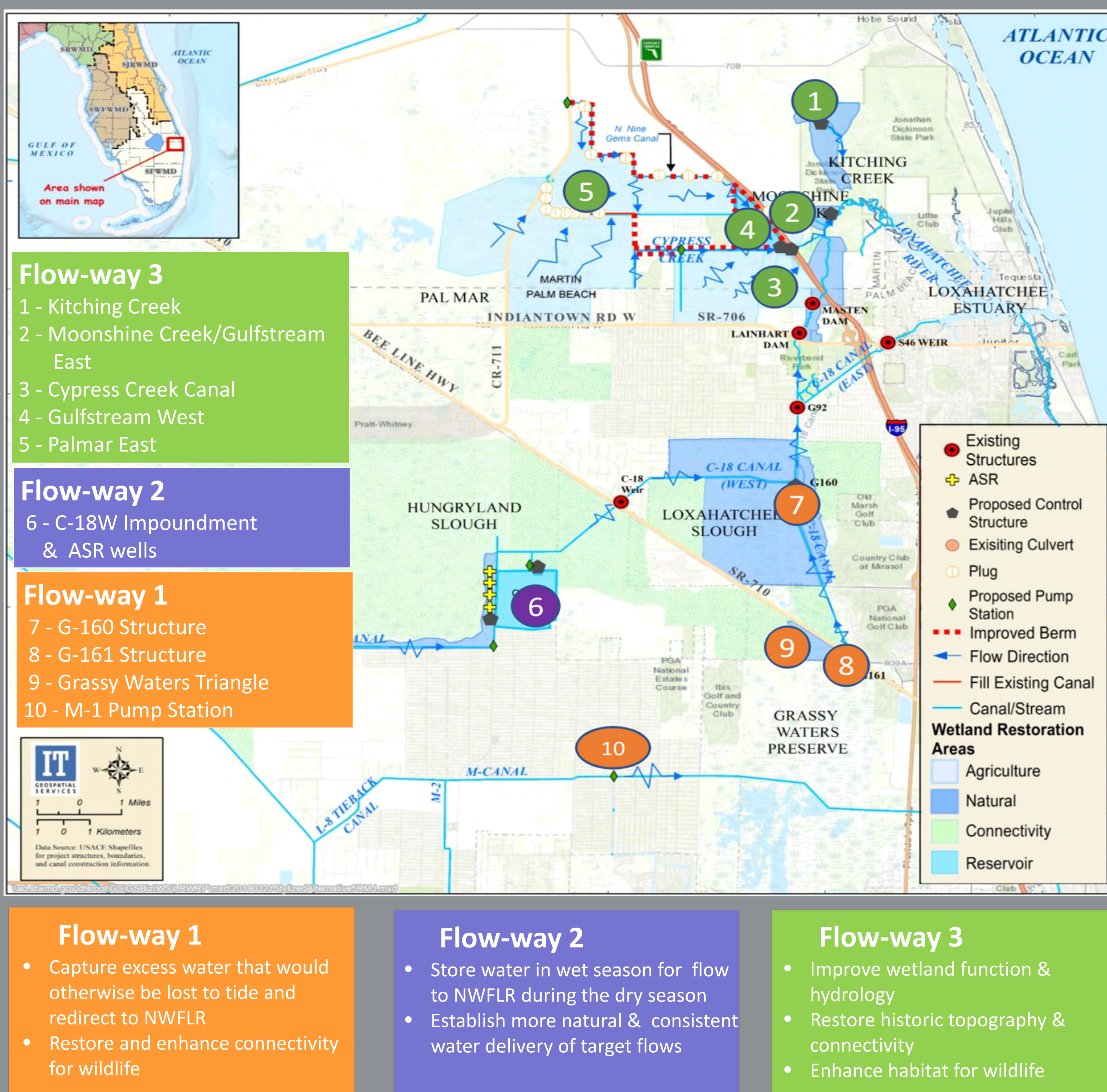
- Improve freshwater flows to the Northwest Fork of the Loxahatchee River (NWFLR), a nationally designated Wild and Scenic River
- Restore wetland and watershed hydrology and connectivity that form the historic headwaters

Objectives & Anticipated Benefits

- Restoration of:
 - Seasonality of flows to the Northwest Fork
 - Watershed connections among the headwater natural areas to improve hydrology, sheet flow, hydroperiods, natural storage, and vegetative communities
 - Oysters, seagrass, and other estuarine communities in the Loxahatchee River Estuary
 - Abundant and diverse native plant and animal species in watershed, natural areas, river, and estuary
- Increased spatial extent and function of wetlands
- Improve watershed wetland hydrology
 - 17,000 acres former agricultural lands
 - 10,000 acres existing natural areas
- Restore Northwest Fork target flows to promote recovery of freshwater species in riverine/floodplain zone and the downstream estuary
- Improve ecological connectivity for ~78,000 acres
- Provide additional recreational opportunities

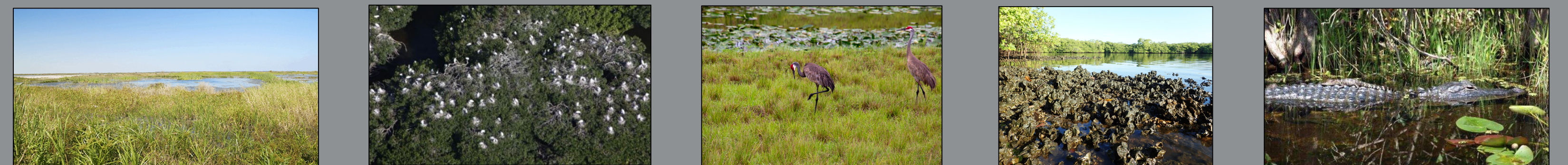


Restoration Plan



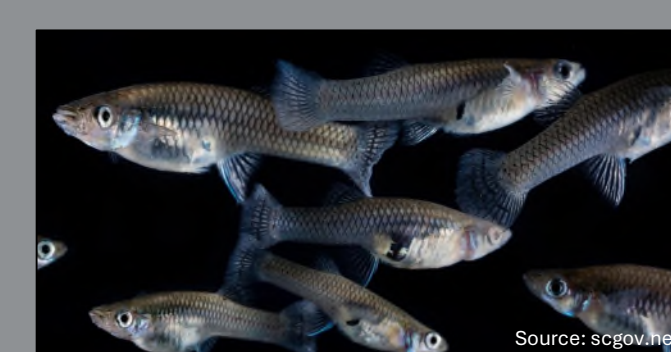
Ecological Monitoring

- The LRWRP includes monitoring plans for Water Quality, Hydrometeorology, Ecology, and Adaptive Management. This poster will focus on the latter two, with the Ecological Monitoring Plan frequently supporting Adaptive Management.
- The purpose of the Ecological Monitoring Plan is to measure project progress towards objectives. This monitoring will examine key ecological indicators before and after project implementation to assess whether the anticipated benefits are being achieved.
- The metrics, methods, and targets for each indicator are outlined in the Project Implementation Report and will be refined and implemented as appropriate throughout the project timeline.
- Key ecological indicators identified for this project are listed below.



Wetlands & Floodplain

- Hydrology
 - Flow and stage
- Wetland and Floodplain Vegetation
 - Vegetation transects
 - Wetland assessments
 - Remote sensing/aerial surveys
 - Photopoints
- Wading Bird nesting and foraging
- Fish biodiversity, movement, and age/size
- Frog biodiversity and reproduction
- Alligators and Small Mammals
- Invasive species



River & Estuary

- Hydrology
 - Flow and stage
- Water Column Characteristics
 - Salinity, temperature, DO, turbidity, etc.
- Wading Bird nesting and foraging
- Fish biodiversity, movement, and age/size
- Submerged Aquatic Vegetation
 - *Vallisneria* (tapegrass) and seagrasses
 - Small-scale (patch) and Large-scale (mapping)
- Oysters
 - Small-scale (patch) and Large-scale (mapping)
- Benthic Substrate

Science and Monitoring to Inform Project Implementation and Adaptive Management

- The Adaptive Management Plan was developed to address uncertainties that exist in the natural environment and are associated with restoration efforts.
- By linking science to decision making and adjusting implementation as necessary, the probability of restoration success can be improved.
- Identified uncertainties can be addressed as hypotheses and informed by additional science such as experimentation, modeling, and/or monitoring of an indicator or attribute prior to or during implementation of a restoration project.
- Decision criteria such as thresholds can indicate when to consider different approaches or management actions that may improve project performance.
- Management Options can include structural, non-structural, and/or operational alternatives that may be considered as new information provides clarity for a given uncertainty.

Example of an Adaptive Management Strategy in the LRWRP

Uncertainty	Time Until Changes are Measurable	Indicator or Attribute	Specific Property to be Monitored and Frequency	Decision Criteria: Threshold(s) for Management Action	Management Action Options
Will wetland vegetation establish in areas that were high impact agriculture?	6 months 2-3 years	Visual observation (photopoints) or establishing vegetation (native vs. exotics) Vegetation Transects	Coverage of invasive species vs. desired wetland and/or upland species coverage	>15% of area establishing with invasive and/or exotic species <25% of area where hydroperiods have been restored has desirable vegetation	Sweep (vegetation management) for exotics to keep under control to further allow native vegetation to establish Introduce desired vegetation seed or plantings to the area

Status & Timeline

- All Flow-ways are currently in Pre-Construction, Engineering, and Design Phase
 - SFWMD leading efforts including additional modeling, geotech, real estate acquisition, and design
- Vegetation Management work being done in high-impact agricultural areas in Flow-way 3 and within planned impoundment boundary
- Construction for initial components scheduled to start end of 2026 and be completed in 2034



PROJECT	YELLOW BOOK COMPONENT	2023	2024W	2025	2026W	2027	2028W	2029	2030W	2031	2032W	2033	2034W	2035
Loxahatchee River Watershed Restoration Project	K, OPE													
Flow-way 1 (M-1 Canal, G160/161 and Grassy Water Preserve)														
Flow-way 2 (C-18 Impoundment)														
Flow-way 2 (ASR Wells)														
Flow-way 3 (Kitching Creek, Moonshine Creek, Gulfstream East, Cypress Creek Canal, Gulfstream West, and Palmar East)														

Non-federal

Federal

Fiscal Closeout

Monitoring

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W

XXXXX

XXXXX

Does not reflect budgetary development dollars or capability
Expected WRDA year
Project Implementation Report
Project Implementation Report with Exemption

Design, PPA Execution, Real Estate Acquisition
Construction (initiated by award of construction contract)
Operational Plan
Operational Testing and Monitoring Period

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