COMPREHENSIVE EVERGLADES RESTORATION PLAN ADAPTIVE MANAGEMENT: INTEGRATING SCIENCE ACROSS PROJECTS TO INCREASE RESTORATION SUCCESS

Lisa Cowart Baron and Gina Paduano Ralph, U.S. Army Corps of Engineers, Jacksonville, Florida

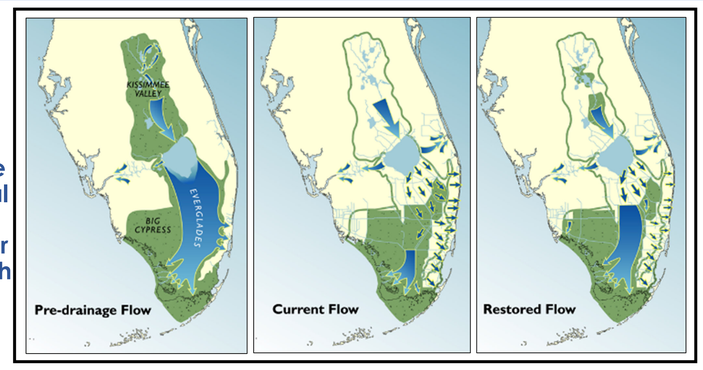

Image Credit: USGS

BACKGROUND | COMPREHENSIVE EVERGLADES RESTORATION PLAN (CERP) AND RECOVER

Authorized by Congress in 2000, the CERP aims to change the quantity, quality, timing, and distribution of water, leading to improved ecosystem health and quality of life in southern Florida. The CERP is the largest ecosystem restoration effort in the nation.

RECOVER (REstoration, COordination and VERification) is an interagency and interdisciplinary scientific and technical team created to ensure that systemwide science guides CERP implementation. Partners include members from 10 federal and state agencies and 2 federally-recognized Tribes (the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida), and the South Florida Water Management District (SFWMD). RECOVER program management rests jointly with the U.S. Army Corps of Engineers (USACE) and the SFWMD.

RECOVER Mission: Evaluation | Assessment | Planning/Integration



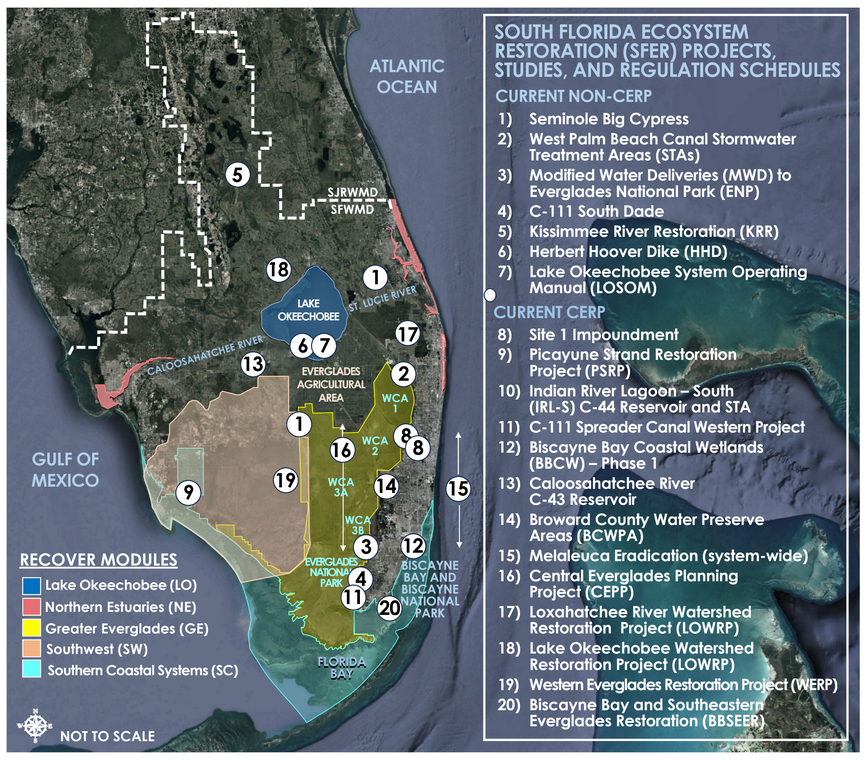
Two primary components of RECOVER include the:

- Monitoring and Assessment Plan
- Adaptive Management Program

Together they facilitate the continuous improvement in implementation of the plan and its operations by using and building upon existing science and technology.

As illustrated in the South Florida Ecosystem Restoration Project Map, to facilitate restoration evaluation, assessment and planning, the CERP footprint is sub-divided into regions or "modules" that share similar ecology and natural characteristics.

REDUCING UNCERTAINTY ACROSS THE CERP PROJECT LIFECYCLE



WHAT IS AN UNCERTAINTY?

A question that:

- ✓ Is related to the best actions to achieve desired goals and objectives within constraints, or
- ✓ Cannot be fully answered with available data or monitoring

WHY AND HOW DO WE ADDRESS UNCERTAINTIES?

- ✓ Improve the probability of restoration success
- ✓ Testing hypotheses
- ✓ Linking science to decision making
- ✓ Adjusting project implementation as necessary

WHAT IS BASELINE MONITORING?

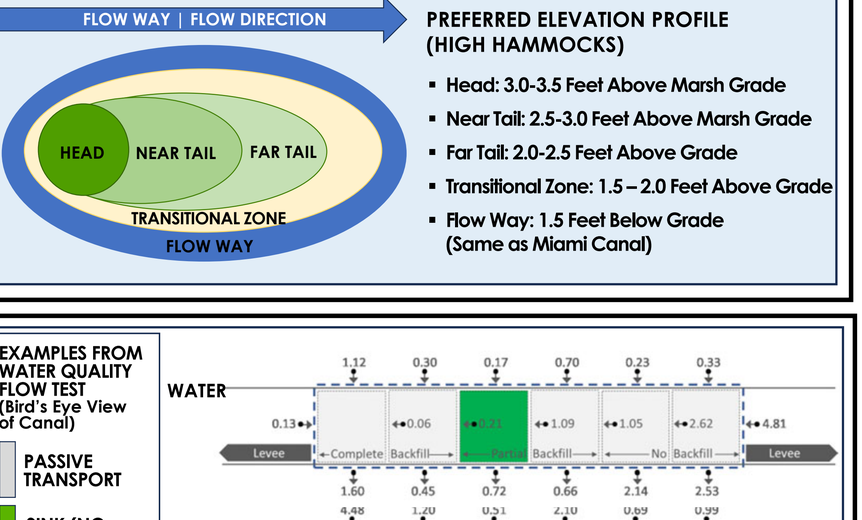
- ✓ Collection of data prior to project implementation
- ✓ Comparisons to what? to inform project adjustments, improve project performance, and to meet goals and objectives

WHAT IS ADAPTIVE MANAGEMENT?

- ✓ A structured management approach for addressing uncertainties
- ✓ Adjustments that are considered major design changes require reformulation and reauthorization

RECOVER ADAPTIVE MANAGEMENT AND THE PROJECT LIFECYCLE

PLAN | DESIGN | BUILD | OPERATE



CERP ADAPTIVE MANAGEMENT IN ACTION (REFER TO PROJECT MAP FOR LOCATIONS)

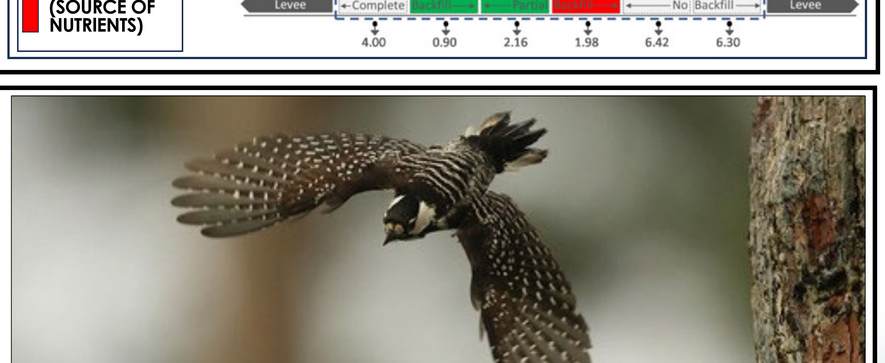

SALINITY GRADIENT ACROSS HABITATS

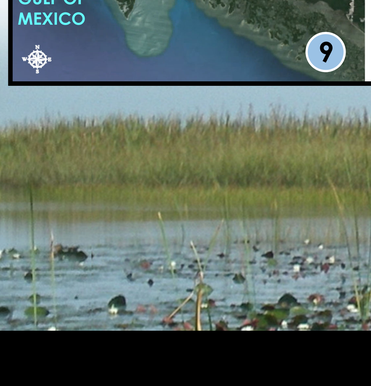
BISCAYNE BAY AND SOUTHEASTERN EVERGLADES RESTORATION

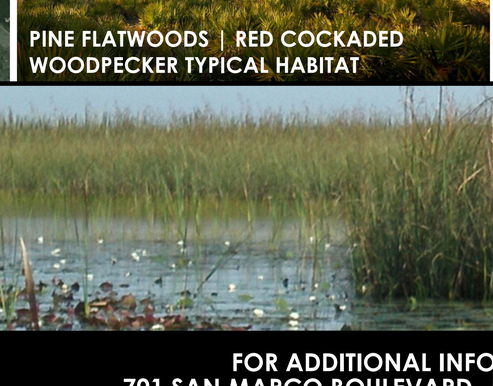
PROJECT PURPOSE: Restore connectivity and habitat gradients and increase and restore ecological resilience in coastal habitats (habitat vulnerable to climate change and sea level rise).

UNCERTAINTY | PLANNING AND DESIGN PHASES: Can Thin-Layer Placement be used to jump start internal mechanisms of peat accretion to enhance resilience of mangroves and promote inland migration?

HOW UNCERTAINTY ADDRESSED: Utilizing a large-scale field test using thin layer placement.


THIN-LAYER PLACEMENT TO CREATE MARSH




TREE ISLAND

CENTRAL EVERGLADES PLANNING PROJECT | NORTH

PROJECT PURPOSE: Restore northern Water Conservation Area (WCA) 3A and move addition water south.

UNCERTAINTY | DESIGN PHASE: What is the best way to design and construct a sustainable engineered vegetated hammock in the Miami Canal?

HOW UNCERTAINTY ADDRESSED: Utilized a hydrologic physical model to develop high and low design and success criteria for the restoration effort.

Image (left): A Loxahatchee Impoundment Landscape Assessment (LILA) tree island in WCA 1; LILA is a living laboratory created by RECOVER to understand flow, ridge, slough, and tree island dynamics.

Image (right): Information learned through LILA informed the Miami Canal Hammock Design.

MIAMI CANAL ENGINEERED VEGETATED HAMMOCK DESIGN

PREFERRED ELEVATION PROFILE (HIGH HAMMOCKS)

- Head: 3.0-3.5 Feet Above Marsh Grade
- Near Tail: 2.5-3.0 Feet Above Marsh Grade
- Far Tail: 2.0-2.5 Feet Above Grade
- Transitional Zone: 1.5 – 2.0 Feet Above Grade
- Flow Way: 1.5 Feet Below Grade (Same as Miami Canal)

FLOW TEST THROUGH STRUCTURE | WITH DYE

CENTRAL EVERGLADES PLANNING PROJECT | SOUTH

PROJECT PURPOSE: Minimize ponding in southern WCA 3A that has caused loss of tree islands and sawgrass ridges; hydrate WCA 3B to prevent continued soil loss and subsidence; and send more water south to Everglades National Park.

UNCERTAINTY | DESIGN AND OPERATION PHASES: What is the best design to promote flow velocities to create characteristic ridge and slough morphology within the Everglades?

HOW UNCERTAINTY ADDRESSED: Conducted flow tests to identify factors influencing effective restoration. A dye test, depicted to the left, was used to determine the location of flow from a pump station. Water quality testing (examples to the right) helped to determine potential nutrients transported with water flows.

PINE FLATWOODS | RED COCKADED WOODPECKER TYPICAL HABITAT

PICAYUNE STRAND RESTORATION PROJECT

PROJECT PURPOSE: Restore natural water flow across 85 square miles in western Collier County drained in 1960s for residential development. The restoration involves plugging 48 miles of canals, removing 260 miles of crumbling roads, and constructing three major pump stations – restoring more than 55,000 acres of natural habitat and increasing freshwater flows to the southern Gulf estuaries.

UNCERTAINTY | BUILD AND OPERATIONS PHASES: How do we balance hydrological restoration with the needs of an endangered species?

HOW UNCERTAINTY ADDRESSED: Performing a foraging analysis to determine potential impacts.

Photo courtesy of Martjan Lammertink, USFS

FOR ADDITIONAL INFORMATION: CONTACT LISA C. BARON, U.S. ARMY CORPS OF ENGINEERS, JACKSONVILLE DISTRICT
701 SAN MARCO BOULEVARD, JACKSONVILLE, FLORIDA, USA 32207 | PHONE: 904.232.3691 | EMAIL: LISA.C.BARON@USACE.ARMY.MIL

FOR MORE INFORMATION ABOUT SOUTH FLORIDA ECOSYSTEM RESTORATION AND THE COMPREHENSIVE EVERGLADES RESTORATION PLAN, PLEASE SCAN THE QR CODE TO THE RIGHT