Adaptive Management to Improve Achievement of Restoration Benefits



Presentation Outline

- 1. Introduction
- 2. Adaptive Management and Science Reporting Framework
- 3. Factors that Inform Decision-Making
- 4. Tools to Link Science to Decision-Making
- 5. Program Scale Examples
- 6. Project Scale Examples
- 7. Conclusion





Adaptive Management Framework

Adaptive Management Defined:

 "A structured management approach for addressing uncertainties by testing hypotheses, linking science to decision making, and adjusting implementation, as necessary, to improve the probability of restoration success."



- WRDA 2000
 - CERP Implementation through Adaptive Management Principles
 - Adaptive Assessment and Monitoring
- 2003 Programmatic Regulations
 - New information from monitoring and modeling be used to refine CERP plan
- 2010 Adaptive Management Integration Guide (How to Apply CERP Adaptive Management)

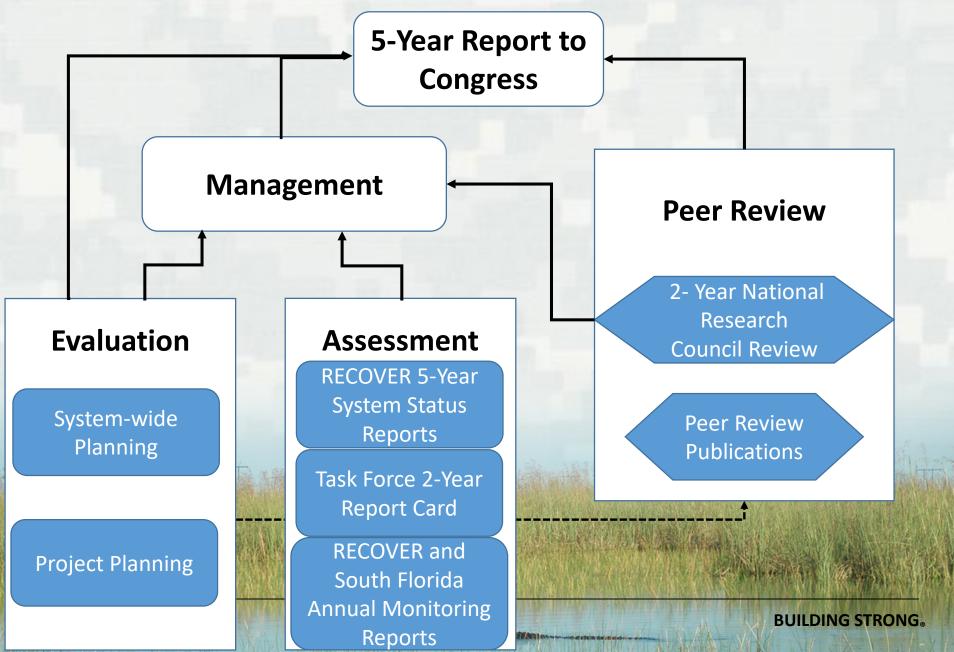








Science Reporting Framework



Factors that Influence Decision-Making

- What are the Performance Issues?
 - Science Reporting of Restoration Performance
- What are the Options?
 - Technical Feasibility
 - Authority
 - Funding
 - Policy



Linking Science to Decision-Making Example: Central Everglades Management Options Matrix

Example: Central Everglades Management Options Matrix			
Parameter	Timing (years)	Decision-Criteria	Management Action Option
Hydrology – flow direction and volume, velocity, hydroperiod	3	Flow direction change to North South Flow velocity target of 2.5 cm/second downstream of L-67 structures for 4 weeks or more	 Vegetation management options to improve flow Implement rest of L-67A conveyance Implement Blue Shanty Levee Vegetation management
Soil Oxidation and Accretion	3 to 10	Statistically significant soil moisture content; organic soil matter increase	
Ridge and Slough	5 to 20	Marked differences in elevation	

between ridge and slough habitat

Adjust operations to minimize

nutrient load from canals

No increase total phosphorus

increase in periphyton

sloughs

Increased sediment floc in

and Tree Islands

3 to 10

Water Quality

Decision-Making Framework

Figure 3-9: Decision-Making Process for Adaptive Management Activities 7, 8, and 9 Identify and Need for Adjustment Develop Evaluate Options and Recommend Adjustment to Formal Public Review Implement Finalize Based on New Learning Management and Comment Management Action(s) Management Decision Options Action Assessment Feedback to Decision Making Adjustment Approved Action(s) Ad hoc team Ad hoc RECOVER team **PRB** Options Report PRB Implement Partner USACE/ Assessment management Agencies/ DCT SFWMD action Tribes QAT Formal Assessment public Report review and comment Partner PDT Ad hoc Agencies/ team Tribes Legend Implementing Agency Venue Interagency and Opportunities for Public Comment/Feedback Interagency Forums and Feedback (No Public Comment/Feedback Venue and Forum Depends on the Action

Note: DCT = Design Coordination Team, QRB = Quality Review Board, and Joint PRB = Joint Project Review Board



Program Overview

Increase water flows to Biscayne Bay, and restore

natural pattern of freshwater

flow to wetlands

KISSIMMMEE RIVER RESTORATION

Watershed storage; restoration of floodplain habitat and flows to Lake Okeechobee

LAKE OKEECHOBEE WATERSHED AND ASR

Water storage and treatment; reduce phosphorus loading to lake; and reduce freshwater discharges to the east and west coast estuaries

CALOOSAHATCHEE C-43 RESERVOIR

Water storage; restoration of natural water flow to the Caloosahatchee River & Estuary

EAA STORAGE, ASR AND DECOMPARTMENTALIZATION 2

Water storage and treatment to reduce freshwater discharges to east and west coast estuaries; and increase water availability for irrigation, the Everglades, and Florida Bay

SEMINOLE BIG CYPRESS **CRITICAL PROJECT**

Rehydrate wetlands, improve water quality, and provide stormwater attenuation on the Seminole Tribe of Florida's Big Cypress Basin Reservation

WESTERN EVERGLADES RESTORATION

Alleviate over-drainage; improve water storage and distribution to natural areas; and improve quality of water entering the central Everglades

PICAYUNE STRAND

55,000-acre habitat restoration in the Western Everglades

TAMIAMI TRAIL BRIDGING

Bridging and roadway modifications to improve water flow to ENP

C-111 SPREADER CANAL **WESTERN PROJECT**

Reduces water loss from Taylor Slough and increases freshwater flow to Florida Bay

HERBERT HOOVER DIKE (HHD) REHABILITATION

to reduce the risk of failure of aging structure

LAKE OKEECHOBEE REGULATION

Revision to the lake schedule once sufficient rehabilitation of HHD has been completed to support moving water south

INDIAN RIVER LAGOON (IRL)-SOUTH RESERVOIR and STA

Water storage/ treatment for discharges from the watershed to the St. Lucie Estuary

LOXAHATCHEE RIVER WATERSHED RESTORATION

Re-connect and restore natural areas in the headwaters and improve basin water storage and water flow to the river

Reduces seepage from the

Improves water quality; reduces seepage loss from central Everglades; increases water supply; and reduces saltwater intrusion

CENTRAL EVERGLADES

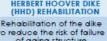
Reduces freshwater flow to the east and west coast estuaries and restores habitat and water flow to the Everglades and

BISCAYNE BAY COASTAL WETLANDS PROJECT PHASE 1

Restores the natural pattern of freshwater inflows to Biscayne Bay

and improves freshwater flow to Taylor Slough and Florida Bay

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Program-Scale Changes

- Schedule: Adjust Schedule of Next Projects in Planning, Design and Operations
- Operations: Operations plan at systemwide operating scale and project scales are updated
- Adjustments to CERP Plan
 - ▶ Small Design Changes
 - ► Large Scale CERP Modification New Projects







CERP Project-Scale Changes

- Design: Improve design of authorized project features (improve flexibility or capability to achieve performance)
- Operations: Project operations in project operating manual adjusted to alter amount or timing of water delivery
- Contingency Options: Additional project features or changes are implemented (e.g., vegetation management)
- Physical Models, Field Tests, Pilot Projects



Conclusions

- Conduct Program and Project-scale monitoring and assessment of restoration performance.
- Create a process that directly links restoration performance science and project selection and operations.
- Report on restoration performance in as many forums as possible.
- Implement Adaptive Management and Program and Project-scale changes to realize full restoration benefits.



Adaptive Management to Improve Achievement of Restoration Benefits

