

Progress in Comprehensive Everglades Restoration Plan Adaptive Management Program

Presented by:

Andrew LoSchiavo, Jacksonville District
Planning and Policy Division

Ronnie Best², Rebecca Burns³, Susan Gray⁴,
Matthew Harwell⁵, Eliza Hines³, Agnes
McLean⁶, Tom St. Clair³, Steve Traxler⁷

² U.S. Geological Survey, Davie, FL, USA

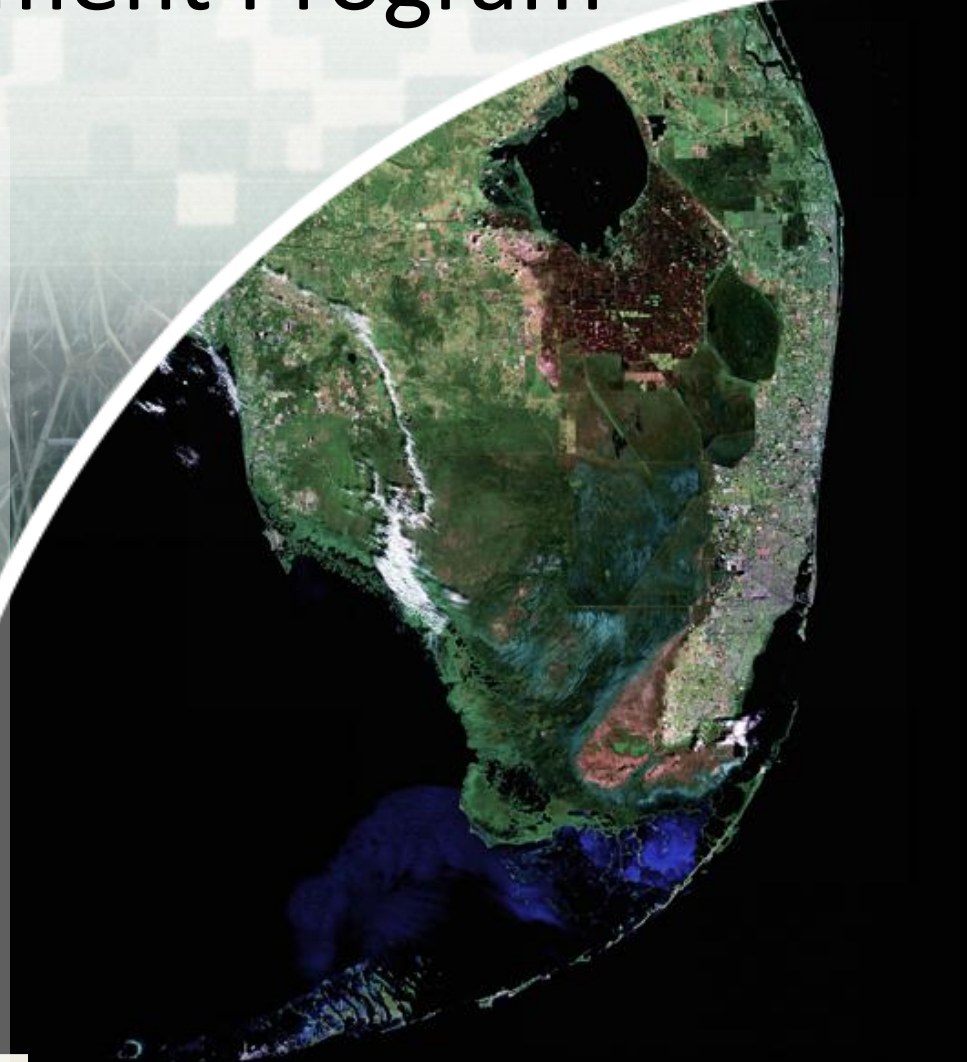
³ Atkins, Jacksonville, FL, USA

⁴ South Florida Water Management District,
West Palm Beach, FL, USA

⁵ U.S. Environmental Protection Agency, Gulf
Breeze, FL, USA

⁶ Everglades National Park, Homestead, FL,
USA

⁷ U.S. Fish and Wildlife Service, Vero Beach, FL,
USA



Overview

- Why Use Adaptive Management?
- What is CERP Adaptive Management?
- Lessons Learned
- What is Success?



Why Use Adaptive Management?

- Reduce risk of not meeting ecosystem restoration goals
- Builds shared understanding and stakeholder support
- Formalizes activities done in good planning and project management to address uncertainty
- New knowledge (learning) to improve current/future projects and program implementation, and operations



CERP Adaptive Management Definition

- 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.



Lessons Learned



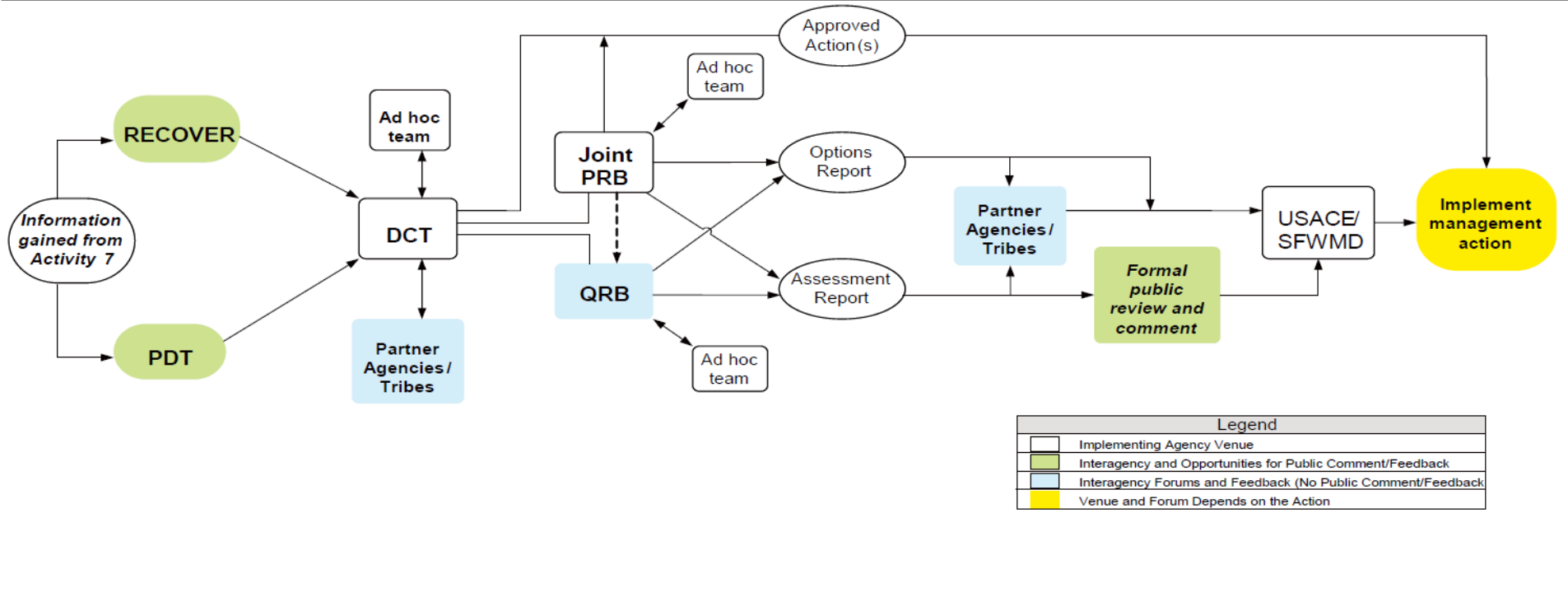
Legislative and Regulatory Authority

- Creates requirement to maintain commitment
- Funding development and implementation
- Impetus to make it work
 - Congress passed Water Resources Development Act 2000 required use of AM
 - 2003 Programmatic regulations laid out requirements for AM program



Clearly Defined Governance Structure

Need for Adjustment Based on New Learning	Identify and Develop Management Options	Evaluate Options and Recommend Adjustment to Management Action(s)	Formal Public Review and Comment	Finalize Decision	Implement Management Action
Assessment	Feedback to Decision Making				Adjustment



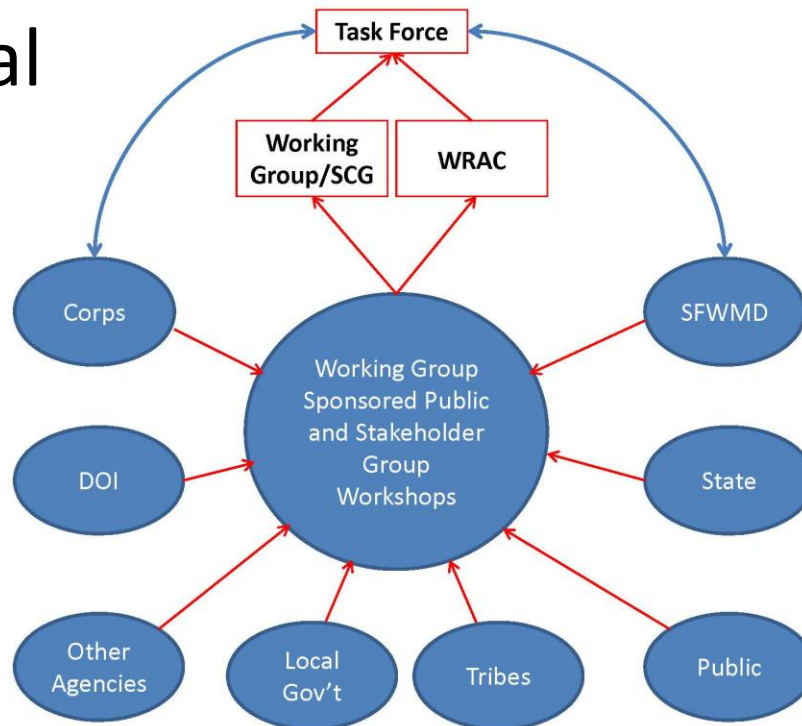
Legend	
	Implementing Agency Venue
	Interagency and Opportunities for Public Comment/Feedback
	Interagency Forums and Feedback (No Public Comment/Feedback)
	Venue and Forum Depends on the Action

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



Stakeholder Engagement

- Builds shared understanding and trust, as well as support of AM actions
- FACA constraints
- Find creative solutions for engaging non-governmental



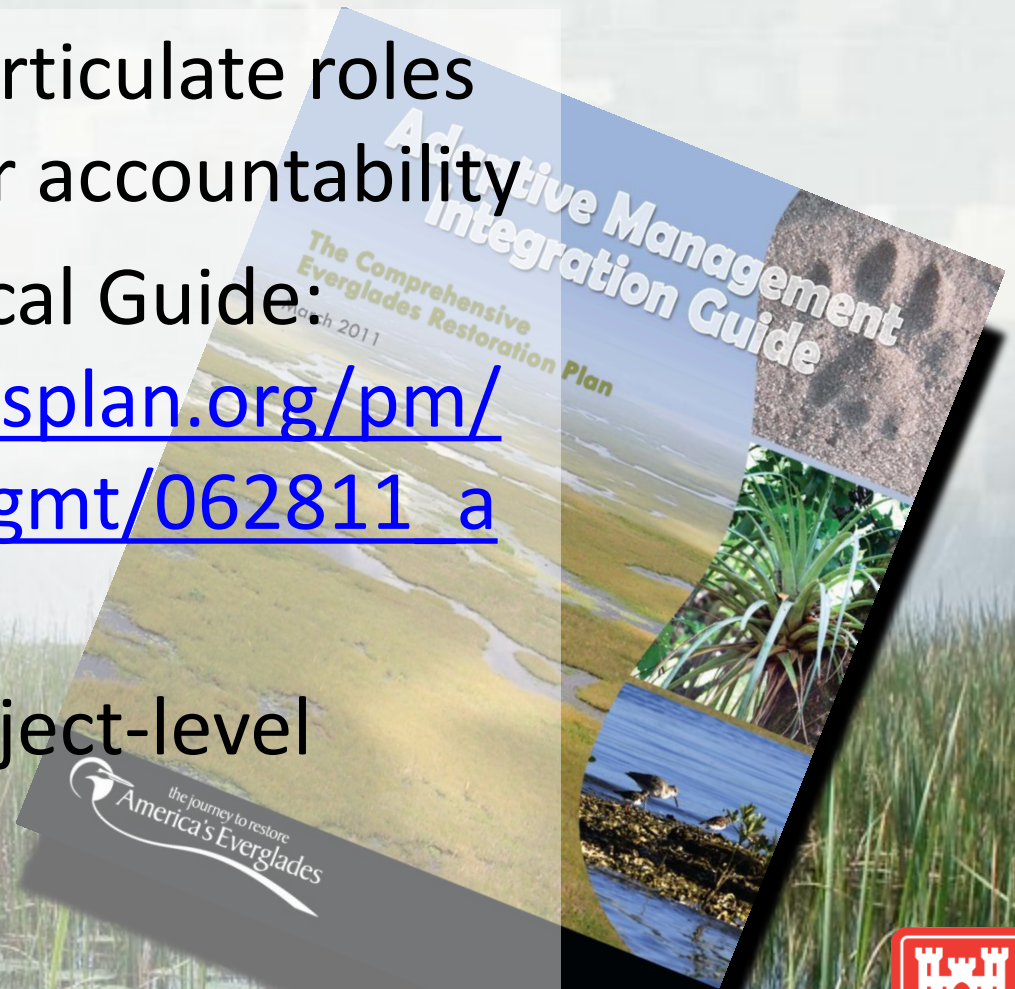
Establish and Support AM Champions

- Need agency “AM champions” to
 - collaboratively develop the AM program
 - engage staff and managers across various agencies and disciplines
 - build understanding, support, and acceptance
 - Applications at multiple scales and different applications



Integrate AM Activities Into Institutional Processes

- Develop guidance to articulate roles and responsibilities for accountability
- Everglades AM Technical Guide:
http://www.evergladesplan.org/pm/pm_docs/adaptive_mgmt/062811_a_m_guide_final.pdf
- Both program and project-level activities



Integrate Adaptive Management Activities into Institutional Processes

Plan →

Design/
Construct

→

Operate/Maintain

1: Engage Stakeholders and Collaborate with Agencies

2: Establish/Refine Restoration
Goals and Objectives

6: Monitor

3: Identify and Prioritize
Uncertainties

7: Assess

4: Apply Conceptual
Models, Develop
Hypotheses, and
Performance Measures

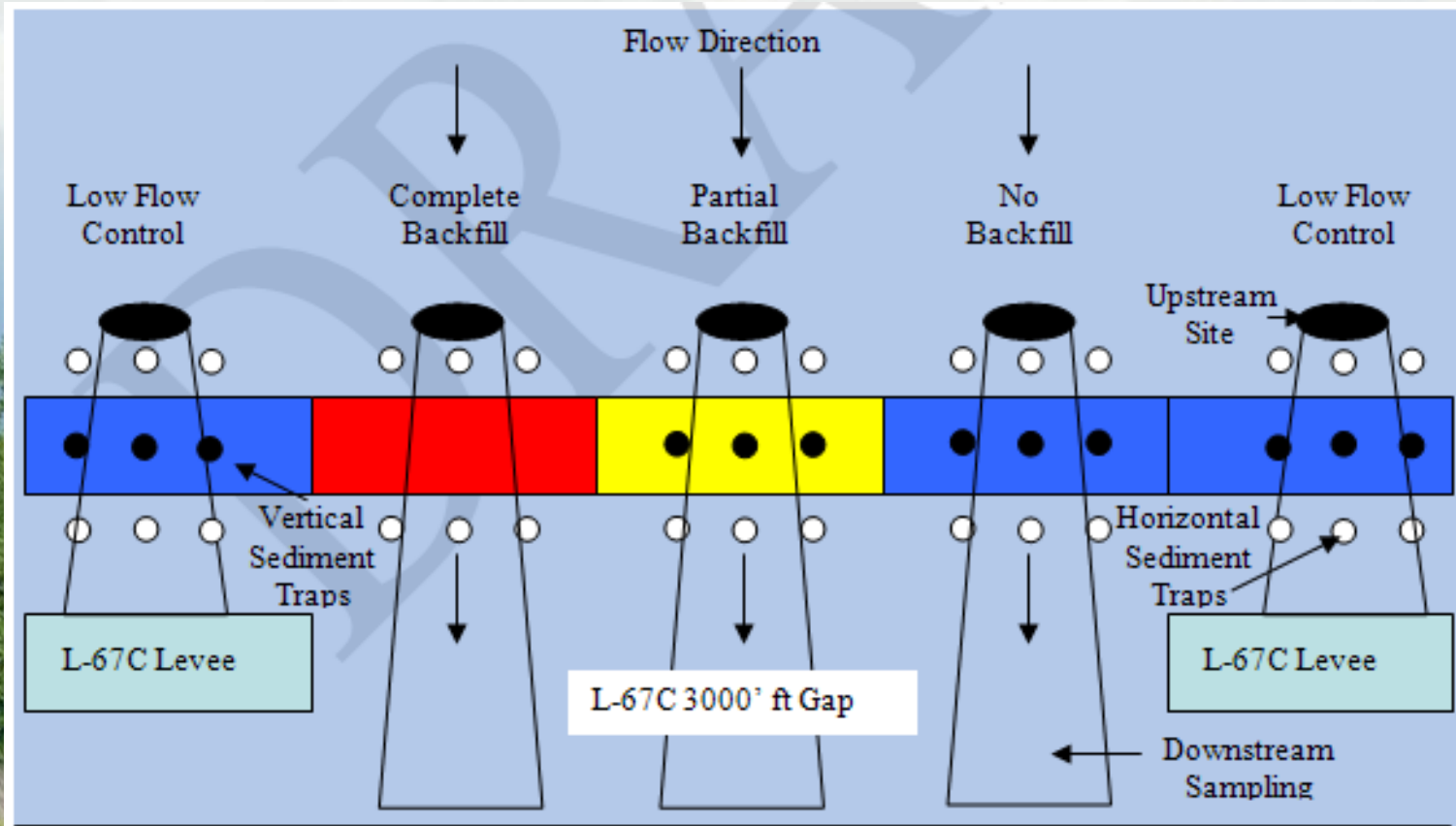
8: Feedback to Decision Making

9: Adjust

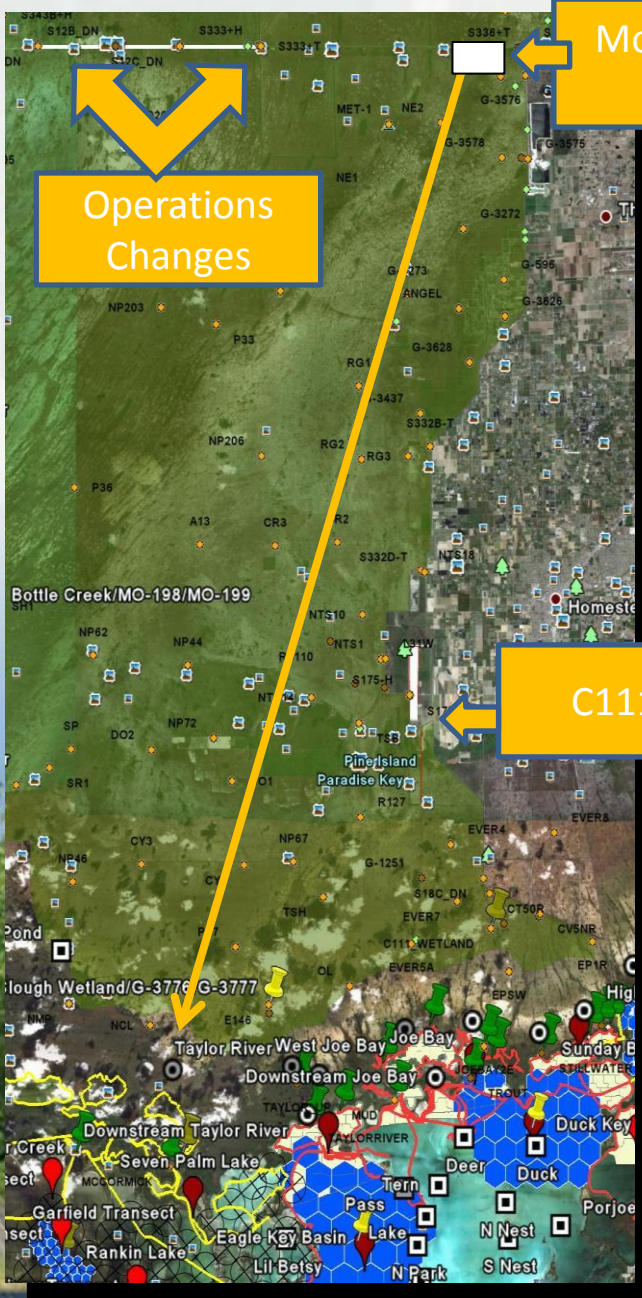
5: Alternative Plan Design and
Implementation

Inform Project Planning and Design

- Uses Before and After Control Impact (BACI) Test
- Determine Best Design
- Update Models to Evaluate Benefits



CERP Program and Project Interaction



Modified Water Deliveries

Operations Changes

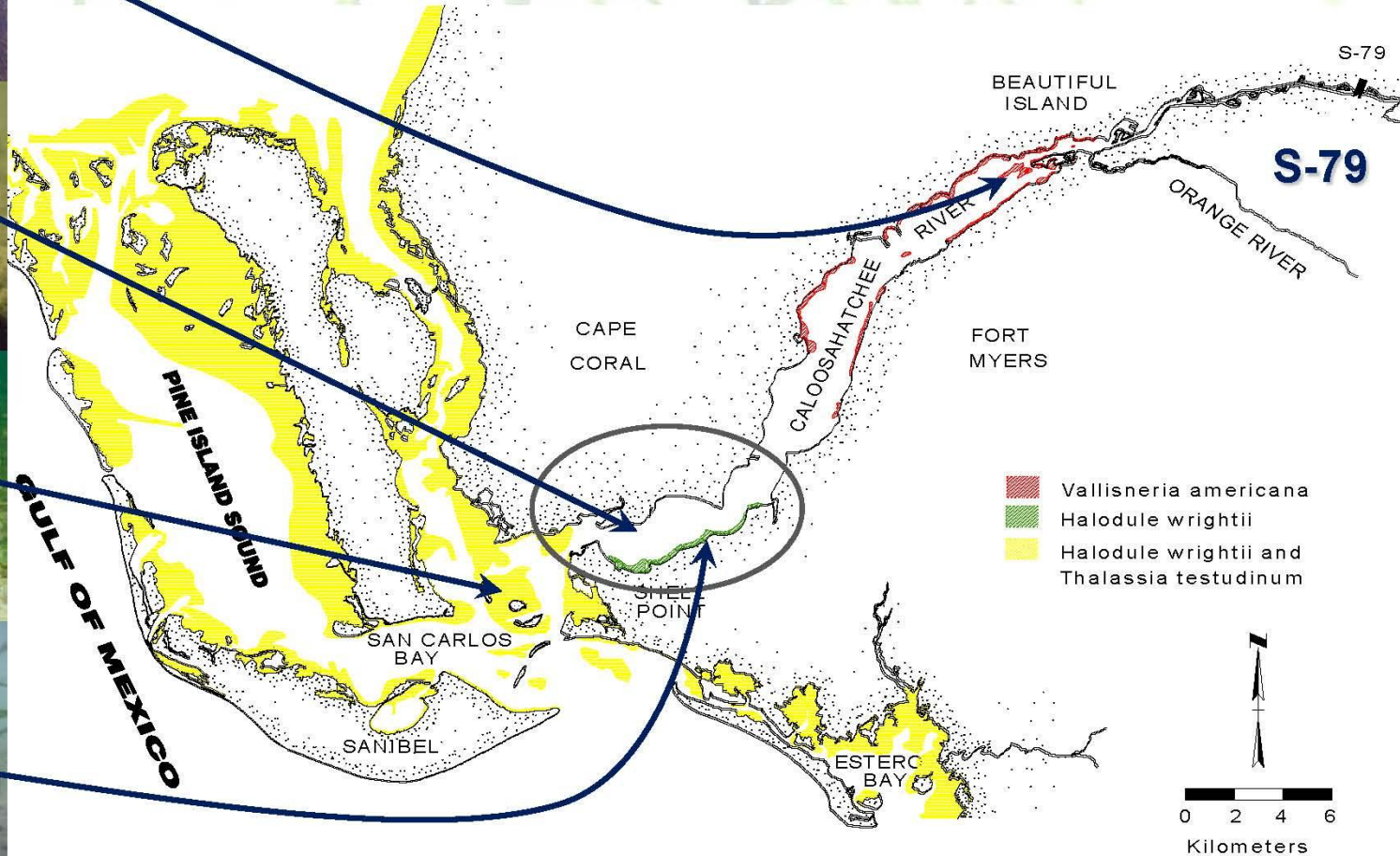
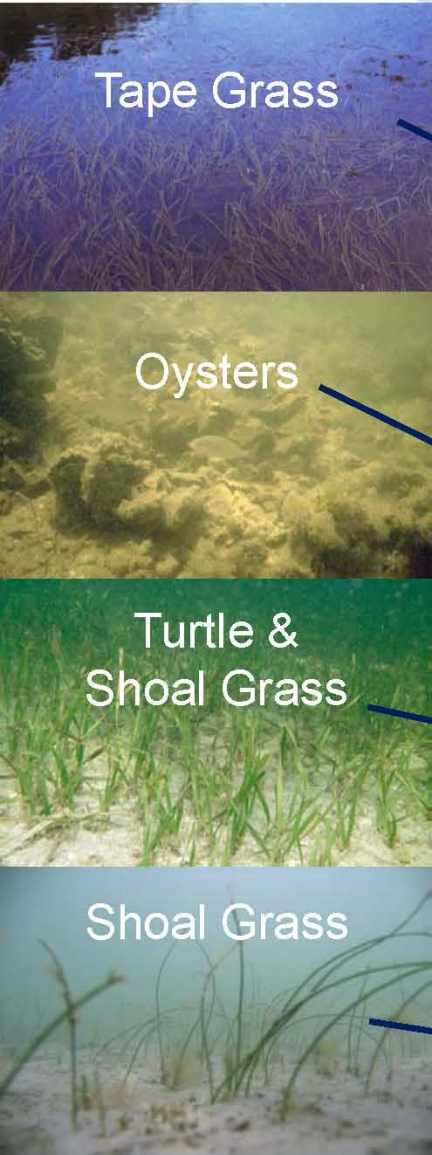
C111 SC



- Coastal Gradients RECOVER –USGS
- Coastal Gradients Other – USGS
- Crocodile Transect Surveys – UF
- Everglades Depth and Elevation Network (EDEN) – USGS
- Fish and Invertebrate – USGS/NOAA
- FL Bay Seagrass – FWC
- Coastal Bay Seagrass –DERM
- Seatrout (sportfish) – NOAA
- Spoonbill Trophic Sampling - Audubon



Inform Operations

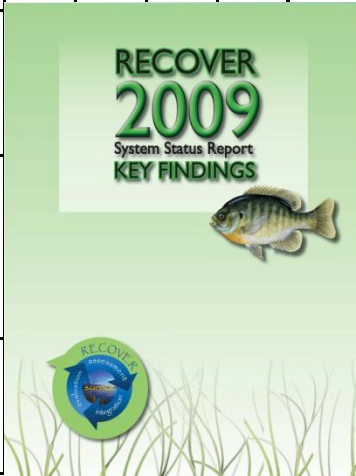


SUBMERGED PLANTS

Tape Grass		Shoal Grass		Oysters		Turtle & Shoal Grass	
<10 psu	>450 cfs	>6 psu	<2800 cfs	>3-5 psu	<4000 cfs	>20 psu	<4500 cfs

Develop Strong Applied Science Framework

- Develop conceptual models
- Restoration hypotheses
- Predictive tools and performance measures
- Robust monitoring and assessment plans

Performance Measure		'00	'01	'02	'03	'04	'05	'06	'07	Current Status
Total Fish		G	G	R	R	R	R	R	R	Y
Wading Bird Indicator Summary							R	R	R	Y
Sea-grass	Abundance						R	R	Y	Y
	Target Species						Y	Y	G	G

Develop Tools to Link Science to Decision-Making

- Prioritize uncertainties that pose a risk to meeting restoration goals
- Identify strategies to address them
- Develop management options matrices to link hypotheses and performance measures to monitoring and options adjust



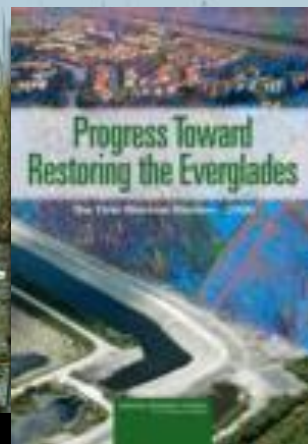
Management Option Matrix Example

Stressor Metric	Target	Management OPTION 1	Management OPTION 2	Program Management OPTION 3
Seepage Control	Maintain stages in Taylor Slough	Increase Frog Pond Stages	Increase Aerojet Canal Stages	System-wide/Regional issue (need additional water)
Salinity	Taylor River (0-9ppt); L. Madeira Bay (12-22 ppt) Terrapin Bay (12-26ppt)	Increase C-111 Stages	Adjust operations	System-wide/Regional issue (need additional water)
Seagrass Species and Area (SAV performance measure)	Seagrass Species and Area Increase Ruppia and Halodule species presence	Adjust operations to even salinity range transition and decrease salinities	Adjust Water Quality Source Control Measures	Targeted Seagrass Plantings
Wetland macro vegetation	Narrow mangrove fringe along shoreline; graminoid marsh inland from mangrove	Provide a more natural fire regime to promote and maintain graminoid marsh community	Physically remove forested wetland vegetation to promote growth and establishment of graminoids	



Peer Review of AM Program and Restoration

- Independent external peer reviews can
 - highlight possible solutions to restoration challenges
 - Build credibility amongst stakeholders



Successful AM Implementation

- Stakeholders and management support experimentation
- Learning is valued and strategies to gain new information prioritized
- New information is incorporated into decision-making
- Progress towards restoration goals



Questions

- For More Information Go To:

http://www.evergladesplan.org/pm/program/docs/adaptive_mgmt.aspx

