

Presentation Outline

1. CERP Adaptive Management (AM) Requirements
2. CERP AM Program
3. Program-Level AM
4. Project-Level AM
5. RECOVER 5 year Plan tasks
6. Path Forward To Targeted AM to Support CERP Implementation



CERP AM Requirements

- 1992-1999 Science Foundation for CERP Adaptive Management (AM)
- 2000 WRDA Authorized CERP and Adaptive Assessment and Monitoring
- 2003 CERP Programmatic Regulations required development of AM Program
- 2006 CERP AM Strategy
- 2010 CERP AM Integration Guide
- 2011 CERP Guidance Memorandum
- 2015 CERP Program-Level AM Plan



CERP AM Program

- Integration of Science – Improve program and project plans and implementation
- Evaluation – Update models, performance measures, interim goals and targets
- Assessment – Monitor and report on ecosystem status and performance
- PEER Review – National Research Council Supports Everglades AM



CERP Program-Level AM Plan

- Consolidated and prioritized key CERP uncertainties posing risk to achieving CERP goals and objectives.
- Developed AM strategies to address uncertainties
- Developed Management Option Matrices to link monitoring/science to CERP project and expected interim and Full CERP Restoration Performance



Caloosahatchee Program Adaptive Management Example



Lake O Flows to Caloosahatchee



Tape Grass



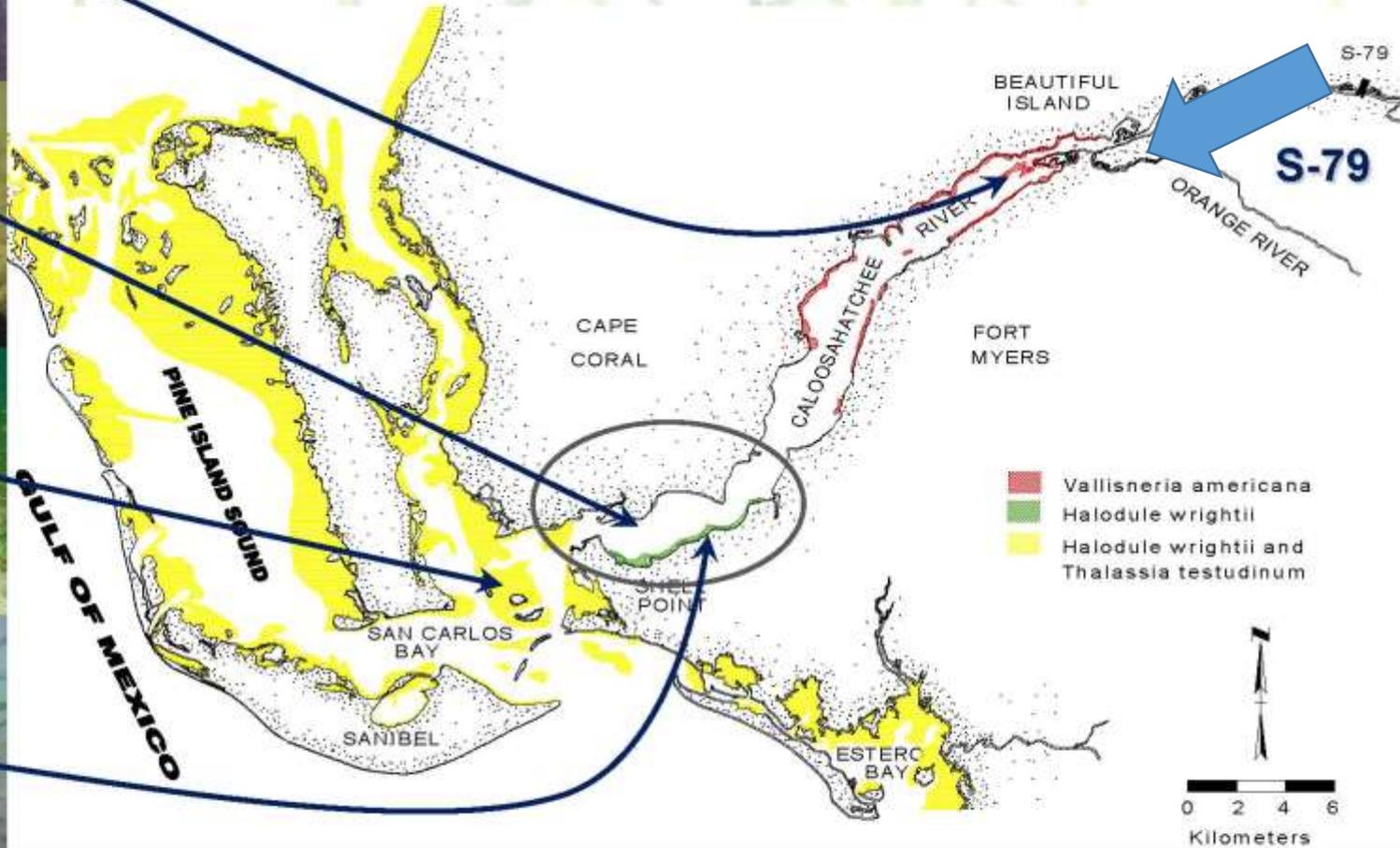
Oysters



Turtle & Shoal Grass



Shoal Grass

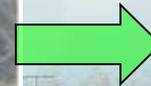


SUBMERGED PLANTS

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

Lake O Flows to Caloosahatchee – RECOVER Program, Feedback to Project

Performance Measure	Target	Current	Future Without	C-43	CEPP	CERP
<450 cfs Low Flow	0	116	117	26	25	25
>2800 cfs High Flow	0	94	95	81	68	24



CERP Project Level Adaptive Management

LoSchiavo, et al., Ecology Society, 2013

CERP project	Current life-cycle phase (yr authorized; see Fig. 3)	Adaptive management plan	Adaptive management features
Aquifer storage and recovery	Pilot projects implemented (2000)	No†	Testing pilot projects and sensitivity modeling
Indian River Lagoon-South Picayune Strand	Construction (2007) Construction (2007)	No No	Monitoring and assessment plan with recommendations to use adaptive management
Site 1 impoundment	Construction (2007)	No	
Melaleuca eradication	Implementation (2007)	No†	Adaptive management implementation strategy and some monitoring
C-111 spreader canal	Pilot project and Planning Chief's report (2011), operations†	No†	Design and operational tests, project phasing
Decomartmentalization of Water Conservation Area 3	Pilot project (2011), construction (2013)	Yes	Decomartmentalization physical model adaptive management field test
Biscayne Bay coastal wetlands	Planning Chief's report (2012), operations‡	Yes	Post-construction management options matrix and linked monitoring
Broward County Water Preserve Areas	Planning Chief's report (2012), design‡	Yes	Operational options linked to nutrient and ecological monitoring; design improvements
Central Everglades planning project	Planning	Yes	Design tests, project phasing, postconstruction contingency options, and operations linked to monitoring

RECOVER 5 Year Plan Tasks

- **Task 1:** Update *CERP Guidance Memorandum 56*
- **Task 2:** Update uncertainties
- **Task 3:** Categorize and prioritize uncertainties associated with ecosystem vulnerability (risk)
- **Task 4:** Update *The CERP Adaptive Management Integration Guide* (RECOVER 2011b)
- **Task 5:** Develop passive and active AM strategy scopes of work
- **Task 6:** Schedule, design, and recommend AM strategies for implementation



Adaptive Management Strategies

- **Passive – Test Single Project Design or Operational Criteria**
 - *System-wide Planning* - Scenario planning to inform next restoration projects/operations to test
 - *Evaluation* - Performance measure/model development to identify best project alternatives to test
 - *Assessment* - Before and After Project/Operations Monitoring
- **Active – Test Multiple Project Designs or Operational Criteria**
 - Mesocosms
 - Physical Models
 - Operational Field Tests

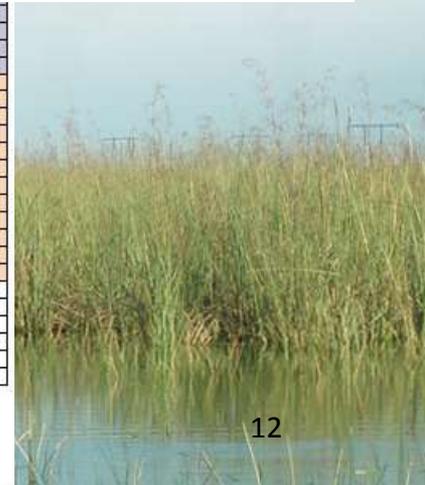
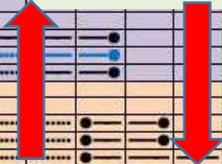


Targeted AM In Support of CERP Implementation

Project	Yellow Book Code	FISCAL YEAR																			
		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Planning Estimates Federal Construction Cost (\$FER)++		126	106	190	147	145	217	207	206	223	213	196	210	154	161	109	0	0	0	0	0
Planning Estimates Non-Federal Construction Cost (\$FER)++		80	113	101	126	164	83	151	169	168	210	210	192	192	123	123	0	0	0	0	0
Planning Estimates Total Construction Cost (\$FER)++		206	219	291	273	309	300	359	375	391	423	406	402	346	284	232	0	0	0	0	0
Modified Water Deliveries to Everglades National Park*		◆◆◆◆	◆◆◆◆	◆◆◆◆																	
Herbert Hoover Dike*																					
Seminole Big Cypress*	OPE																				
Restoration Strategies*																					
Tamiami Trail Next Steps Phase 1*		*****	●																		
Kissimmee River Restoration																					
West Palm Beach Canal/STA-2E			●																		
C-111 South Dede Contract 3 & 9																					
C-111 South Dede PACR		●●●●●	●●●●●	●●●●●	●●●●●																
Picayune Strand Restoration	OPE																				
Merritt Pump Station																					
Fake Union Pump Station			●◆◆◆																		
Manatee Mitigation and Flood Protection Features																					
Miller Pump Station																					
Remaining Features - Road removal & canal backfill																					
Site 1 Impoundment	M		●◆◆◆																		
Phase 1																					
Indian River Lagoon-South																					
C-44 Intake Canal	B																				
C-44 Reservoir	B		●			●															
C-44 STA & Pump Station	B																				
C-23/24 Reservoir North	B																				
C-23/24 Reservoir South	B																				
C-23/24 STA	B																				
C-25 Reservoir	B																				
C-25 STA	B																				
Natural Lands	B																				
Decomp Physical Model	Q		◆◆◆◆																		
Caloosahatchee River [C-43, West Basin Storage																					
Pump Station & Cell 1	D		●																		
Cell 2	D																				
Broward County Water Preserve Areas																					
Northern Mitigation Area	Q		●●●●		●																
C-11 Impoundment	Q		●●●●		●																
WCA 3A&3B Seepage Management	D																				
C-9 Impoundment	R																				
Biscayne Bay Coastal Wetlands Phase 1	FFF, OPE		●●●●		●																
L-33 East Flowway																					
Cuttler Wetlands																					
C-111 Spreader Canal Western Project	WW																				
Central Everglades Planning Project [Authorization WRDA 2016]																					
PPA South: LRR & PPA Execution	AA, FF, H, QQ																				
Remove Old Tamiami Trail (CNTX)																					
L-67A Structure 1 & Gap in L-67C Levee (CNT 3)																					
Increase S-356 (CNT 4)																					
L-29 Gated Spillway (CNT 4b)																					
Increase S-333 (CNT 4a)																					
L-67A Structures 2 & 3 (CNT 5)																					
Removal L-67C & L-67 Ext. Constr L-67D Levee (CNT 6)																					
Removal L-29 Levee & Baddill L-67 Ext (CNT 7)																					
PPA North	QQ, II, G		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
PPA New Water	V																				
Loxahatchee River Watershed Restoration Project	X, Y, K		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Lake Okechobee Watershed Restoration Project	A, GG		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Western Everglades Restoration Project	CCC		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
EAA Storage & ASR/Decomp Ph2	G, GG																				
C-111 Spreader Canal Eastern & BBCW Ph2	WW, FFF																				
Lake Okechobee Regulation Schedule Revision**																					



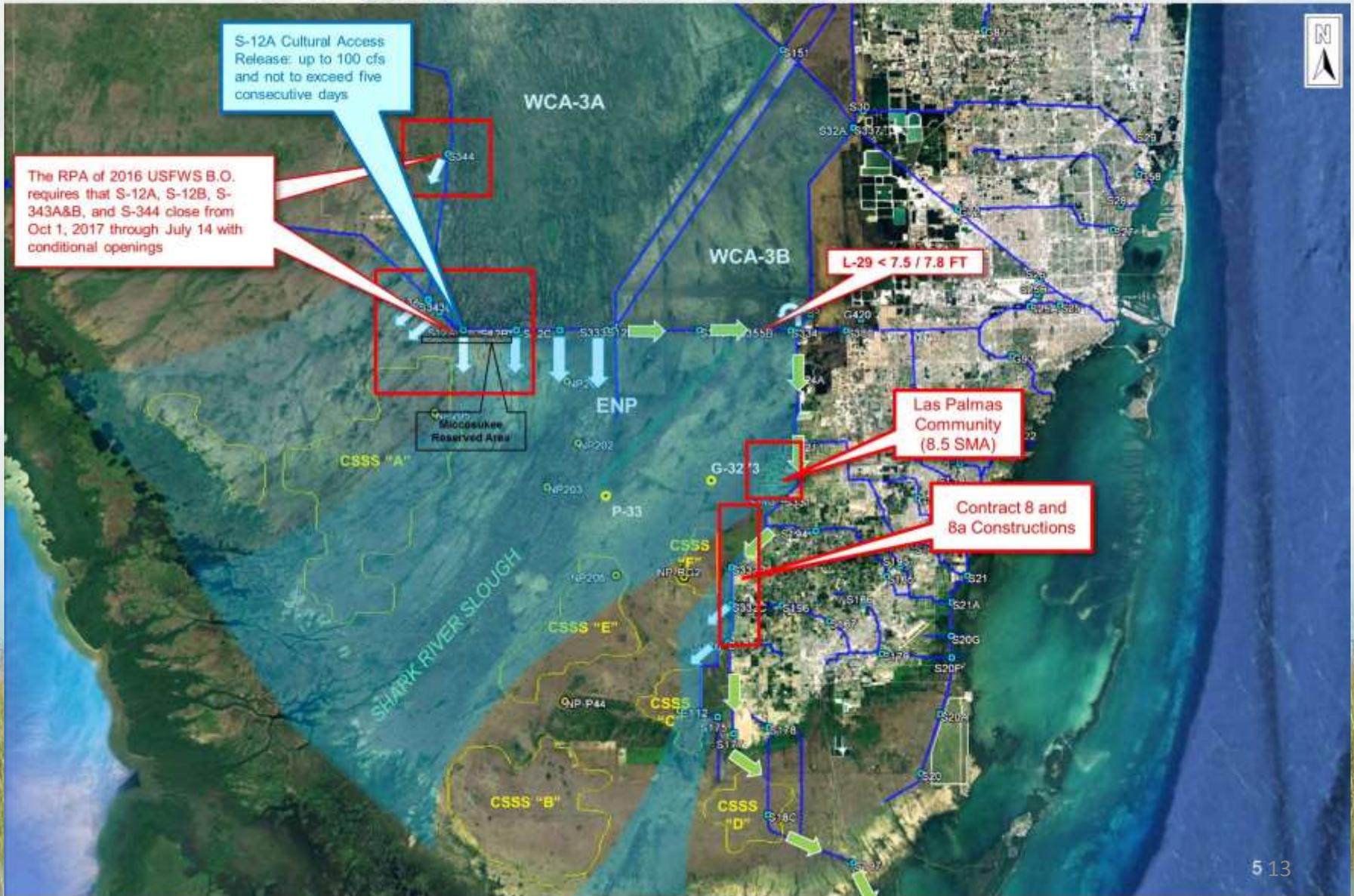
(Zweig, Sklar, Newman, Saunders, SFWMD, 2016)



++ Does not reflect budgetary development dollars or capability
 ***** Planning
 ***** Design, PPA Execution, Real Estate Acquisition
 ***** Construction
 ***** Operational Testing and Monitoring Period
 Non-CERP and Foundation Projects
 CERP Generation 1 Projects - Authorized, Project Partnership Executed (PPA)
 CERP Generation 2 Projects - Authorized, requires PPA
 Planning Phase - Requires Authorization
 Planning Phase - Proposed

Adaptive Management Operations

EVERGLADES RESTORATION TRANSITION PLAN MWD INCREMENT 1.1/1.2 OPERATIONAL PLAN



Take Home Message

1. CERP Adaptive Management (AM) requirements and Program have been defined and developed based on two decades of interagency/interdisciplinary dialogue and experience
2. AM strategies (passive and active) need to be tailored to answer priority questions about achieving specific program/project goals (not one size fits all)
3. RECOVER 5 Year Plan lays out a path forward to target AM to support CERP implementation where its needed (right time and most vulnerable parts of system) given available budget.

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