EVALUATION OF RESTORATION BENEFITS FROM PROJECT PLANS

Michael Simmons, USACE

Steve Schubert[2], Andrew Rodusky[4], Gretchen Ehlinger[1], Phyllis Klarmann[4], Agnes McLean[3], Thomas Dreschel[4] , Jenna May[1], Miles Meyer[2], David Rudnick[3], Patrick Pitts[2], Amanda McDonald[4], Fred Sklar[4], Patricia Gorman[4]

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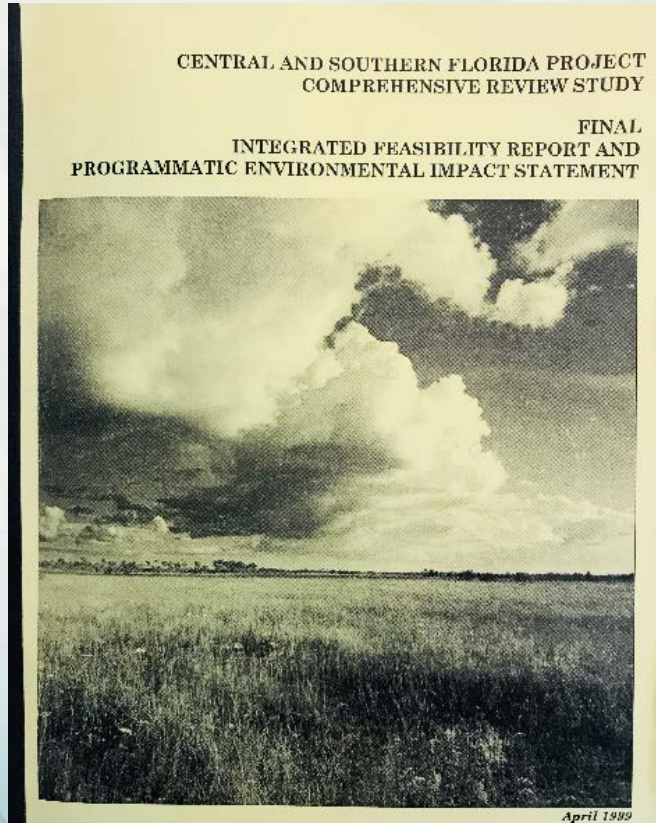National Conference on Ecosystem Restoration

New Orleans, LA

August 30, 2018

THE YELLOW BOOK

- **Largest environmental restoration program in history**
- **Ecological restoration via restoration of natural hydrologic flows**
- **68 restoration components**
- **Signed into law: December 11, 2000**
- **Implementation Guidance**
  - **WRDA 2000**
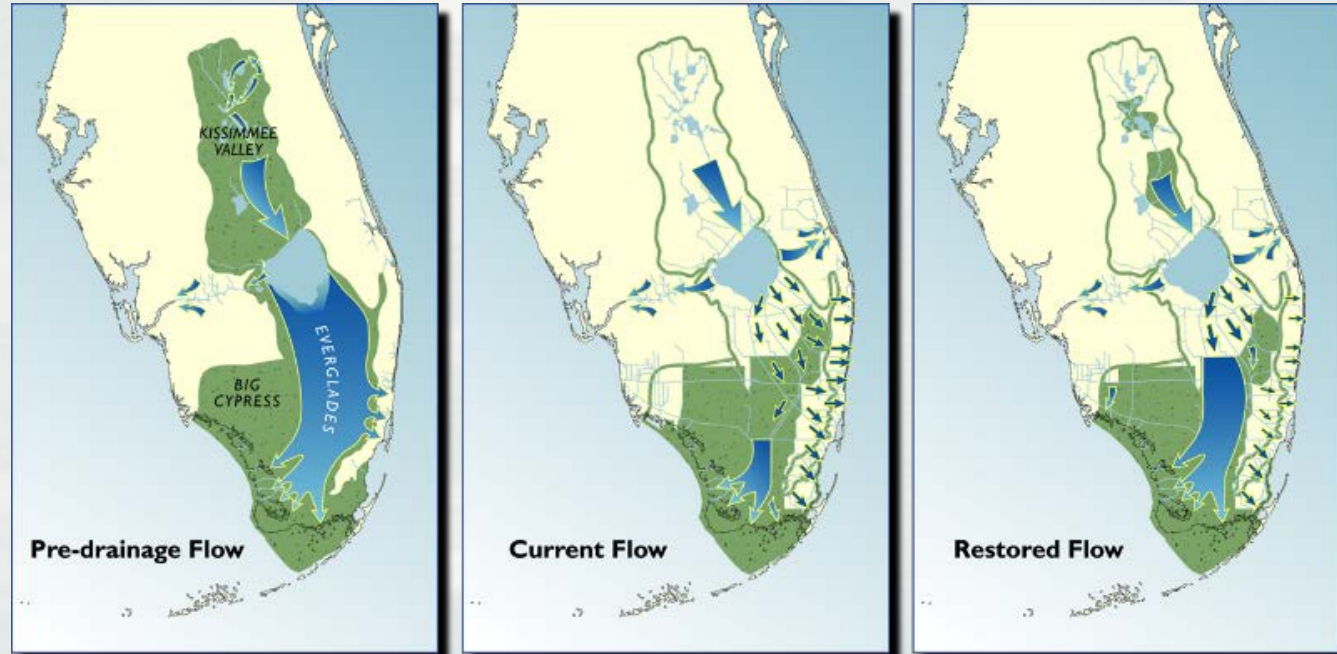 - **CERP Programmatic Regulations (2003)**
  - **6 Draft Guidance Memoranda (2007)**
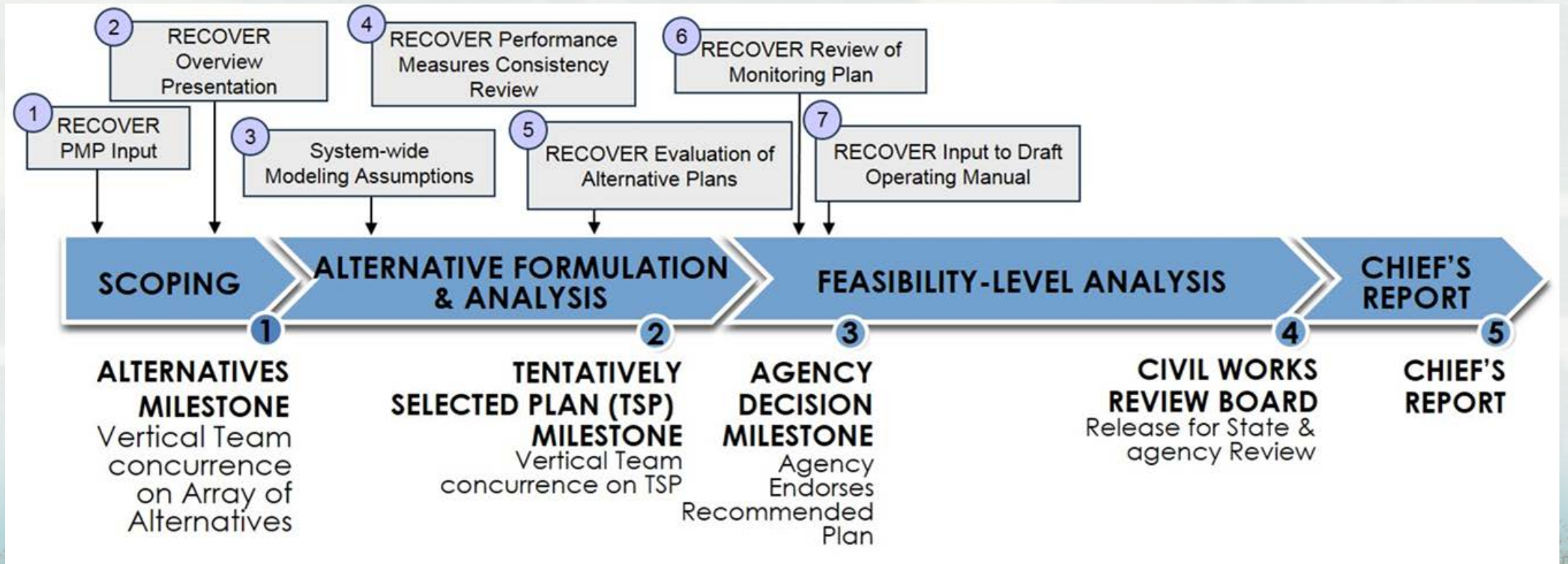
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CERP: GUIDING RESTORATION

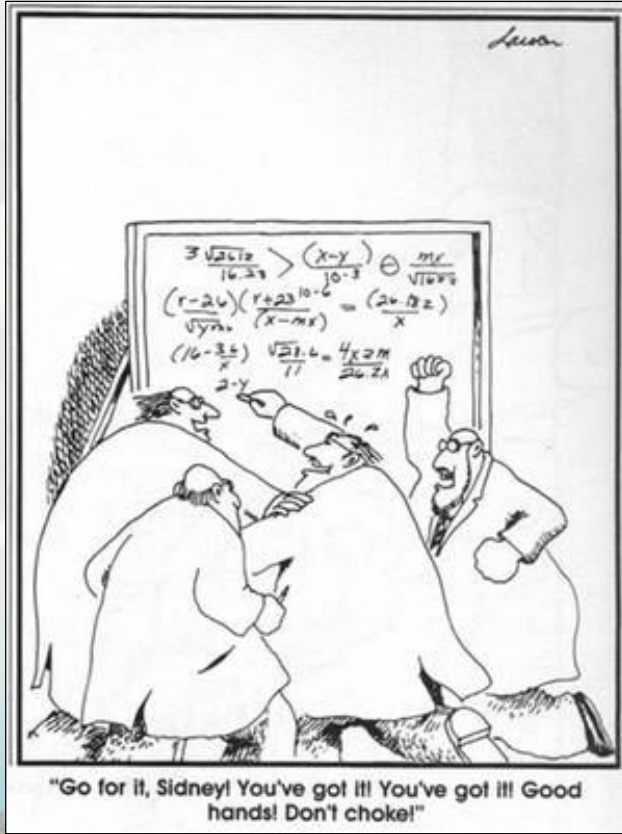| CERP Goals and Objectives	
1	Enhance ecological values.
A	Increase the total spatial extent of natural areas.
B	Improve habitat and functional quality.
C	Improve native plant and animal species diversity.
2	Enhance economic values and social well-being.
A	Increase availability of fresh water (agricultural/municipal and industrial).
B	Reduce flood damages (agricultural/urban).
C	Provide recreational opportunities.
D	Protect cultural and archaeological resources and values.

Pre-drainage Flow

Current Flow

Restored Flow

Natural Areas

Water Flows

Pre-drainage Boundary

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RECOVER AND THE PLANNING PROCESS

INITIAL INTERACTIONS WITH THE PDT

"Go for it, Sidney! You've got it! You've got it! Good hands! Don't choke!"

1. **Input to Project Management Plan Development**

2. **RECOVER Overview**
   a. System-wide approach
   b. Project Goals/Objective relation to CERP
   c. Performance Measures

3. **System-wide Model Assumptions**

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PERFORMANCE MEASURES

CERP System-wide Performance Measure Documentation Sheet — Southern Coastal Systems – Spotted Seatrout

Southern Coastal Systems Performance Measure
Juvenile Spotted Seatrout Habitat Quality

"Quantitative indicators of conditions in natural and human systems that have been selected as targets for restoration."

Criteria:

1. Exhibit change directly in relation to CERP.

2. Tied into a Conceptual Ecological Model.

3. Be a strong indicator of ecosystem health or stress on the system.

4. Be an indicator of an important ecological process, ecological structure, or major environmental change.

5. Be a regional indicator of CERP performance (versus a project-level measure).

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PERFORMANCE MEASURE APPLICATION

Background/Justification

- Rely on estuarine environments characterized by appropriate salinity regimes and freshwater inflows.

Restoration Goal

- Growth and survival increase when salinity fluctuates below 20 ppt in shoreline, pond, and creek habitats of Everglades coastal wetlands

Evaluation Metric

- Crocodile growth & Survival Salinity Index

Scoring

- Salinity < 20 ppt = 1
- Salinity ≥20 ppt but <30 ppt = 0.6
- Salinity ≥30 ppt but <40 ppt = 0.3
- Salinity ≥ 40 ppt = 0

RESTORATION TARGETS

Date	Numerical Month	Month	Year	Salinity ppt				Crocodile growth and salinity index (0-1)			
				Joe Bay	Maderia Bay	Long Sound	Trout Cove	Joe BayCrocIndex2012ECB	Little Maderia BayCrocIndex2012ECB	Long SoundCrocIndex2012ECB	Trout CoveCrocIndex2012ECB
8/1/1965	8	8	1965	39.49699	28.64511	30.81166	46.41754	0.3	0.6	0.3	0
8/2/1965	8	8	1965	40.10362	28.11159	31.02775	46.75646	0	0.6	0.3	0
8/3/1965	8	8	1965	37.15006	27.46449	30.78032	47.49497	0.3	0.6	0.3	0
8/4/1965	8	8	1965	35.76708	27.18457	31.01035	45.50388	0.3	0.6	0.3	0
8/5/1965	8	8	1965	35.57756	27.83966	30.98907	44.8871	0.3	0.6	0.3	0
8/6/1965	8	8	1965	35.4203	27.24089	31.1495	46.47947	0.3	0.6	0.3	0
8/7/1965	8	8	1965	35.06145	27.73236	31.16889	47.76197	0.3	0.6	0.3	0
8/8/1965	8	8	1965	34.70768	28.29412	31.97561	47.91975	0.3	0.6	0.3	0
8/9/1965	8	8	1965	36.38584	28.59463	32.21369	49.93529	0.3	0.6	0.3	0
8/10/1965	8	8	1965	37.46262	29.04863	32.91241	50.12758	0.3	0.6	0.3	0
.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.
12/20/1965	12	12	1965	9.650533	18.83401	15.87865	16.07912	1	1	1	1
12/21/1965	12	12	1965	10.75732	20.11543	16.21328	14.47882	1	0.6	1	1
12/22/1965	12	12	1965	8.303665	20.98909	16.21418	12.51566	1	0.6	1	1
12/23/1965	12	12	1965	7.65484	19.87906	16.35708	10.46233	1	1	1	1
12/24/1965	12	12	1965	7.706985	18.16331	16.04606	13.02176	1	1	1	1
12/25/1965	12	12	1965	8.363732	18.36004	16.2142	15.42397	1	1	1	1
12/26/1965	12	12	1965	8.879417	19.36881	17.12753	12.63198	1	1	1	1
12/27/1965	12	12	1965	9.65102	20.0934	17.53645	12.13943	1	0.6	1	1
12/28/1965	12	12	1965	7.653523	19.1302	17.58582	10.14118	1	1	1	1
12/29/1965	12	12	1965	7.280297	18.38955	17.53312	11.14245	1	1	1	1
12/30/1965	12	12	1965	7.569091	17.75489	17.72923	13.05136	1	1	1	1
12/31/1965	12	12	1965	7.935829	17.54594	17.7872	14.24072	1	1	1	1
							Average	0.8	0.9	0.8	0.8

formula for cells using 8/1/1965 Joe Bay as an example- =IF(E2<20,1,IF(E2<30,0.6,IF(E2<40,0.3, IF(E2 >=40, 0))))

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EXAMPLES OF INDICATORS

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CONSISTENCY REVIEW

Loxahatchee River Watershed Restoration Project (LRWRP)

RECOVER Consistency Review of Project Goals and Objectives and Performance Measures

Reviewers: Peter Doering, SFWMD, Tom Dreschel, SFWMD, Gretchen Ehlinger, USACE, Amanda McDonald, SFWMD, Agnes McLean, NPS, Steve Traxler, FWS

Coordinator: Kelly Keefe, USACE

Date: May 15, 2015

Introduction

The following document summarizes a few members of the RECOVER review of LRWRP project goals and objectives and performance measures as they related to CERP goals and objectives and RECOVER system-wide/regional performance measures. The review was conducted using the following documents:

1. LRWRP Report Synopsis (includes goals and objectives and background on project)
2. Performance Measure 1 - Northwest Fork Salinity
3. Performance Measure 4 - Plant Community Hydrology
4. Performance measure 9 - Connectivity
5. LRWRP Virtual Tour Presentation and Project Delivery Team PM presentation

General Comments

Goals and Objectives Consistency

1. LRWRP goals and objectives are consistent with CERP goals and objectives described in the yellow-book table 5-1. The overall goal of LRWRP is to restore and sustain the overall quantity, quality, timing, and distribution of freshwaters to the federally designated "National Wild and Scenic" Northwest Fork of the Loxahatchee River (NWFLR) for current and future generations. This project also seeks to restore, sustain, and reconnect the area's wetlands and watersheds that form the historic headwaters for the river and flows and salinity conditions in the Loxahatchee River Estuary. While the LRWRP Objectives are clearly listed, a crosswalk table with the CERP Goals and Objectives would be useful. The table below is our attempt at that table.

CERP Goal: Enhance Ecological Values	
Yellow-Book Goal and Objective	LRWRP Objective
CERP Goal: Enhance Ecological Values	
Increase the total spatial extent of natural areas	Objective 3: Increase natural area extent of wetlands
Improve habitat and functional quality	Objective 1: Restore wet and dry season flows of water to the National Wild and Scenic Northwest Fork of the Loxahatchee River and the river floodplain

Purpose:

1.	Ensure consistency with CERP, RECOVER PMs, and system-wide approach.

2.	Are the correct metrics being used? Will the resultant data properly assess project impacts?

Components:

1.	Introduction: includes information and documents used for consistency assessment.

2.	Goals/Objectives Consistency.

3.	Performance Measure Consistency.

Correspondence:

1.	RECOVER review submission to PDT.

2.	PDT provides to Project Eco-subteam.

3.	Eco-subteam addresses RECOVER review.

4.	Responses provided to RECOVER review team.

5.	Follow-up discussions as needed.

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SYSTEM-WIDE (*REGIONAL*) EVALUATION

Purpose:
1. Evaluate alternative performance.
2. Assess benefits of each alternative.
3. Provide recommendations to PDT.
4. Alternative recommendation for TSP.

Sources of Information:
1. Modeling Results
2. Ecological Assessment Tools
3. Best Available Scientific Knowledge

Process:
1. RECOVER review submission to REC.
2. REC provides feedback to Review Team.
3. RECOVER review incorporated into PIR/EIS.
4. RECOVER draft PIR/EIS sections submitted to PDT.
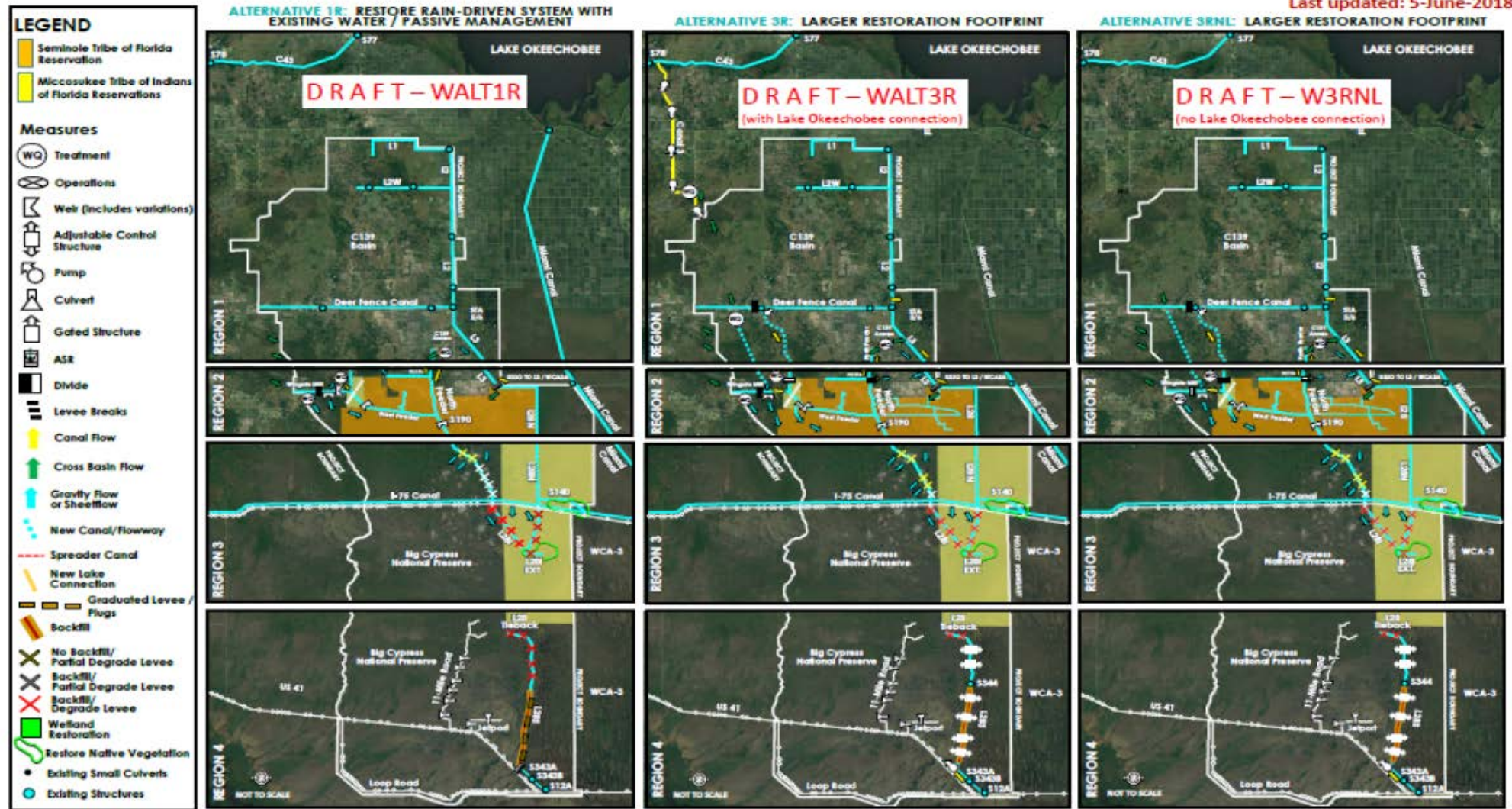5. Follow-up discussions as needed.

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EVALUATION EXAMPLE: WERP

WERP:
Roughly the
size of Rhode
Island

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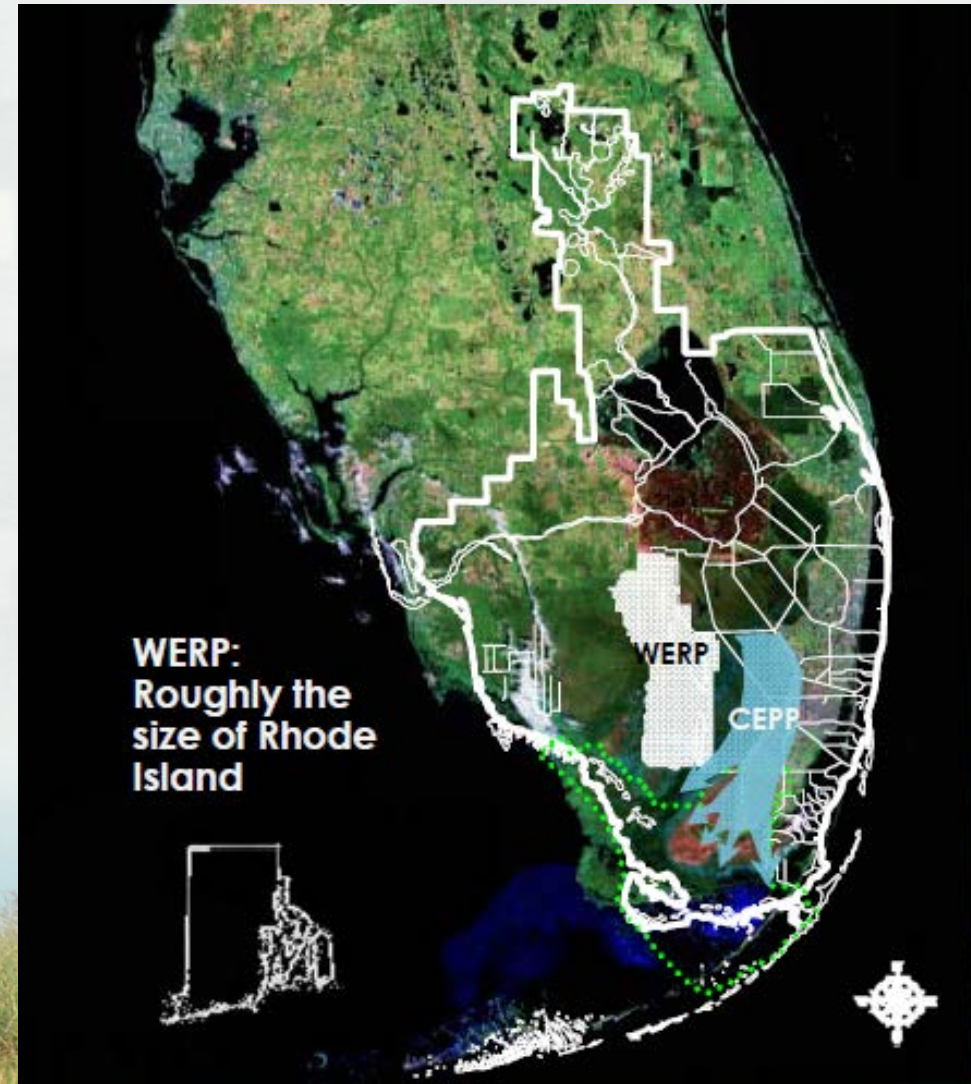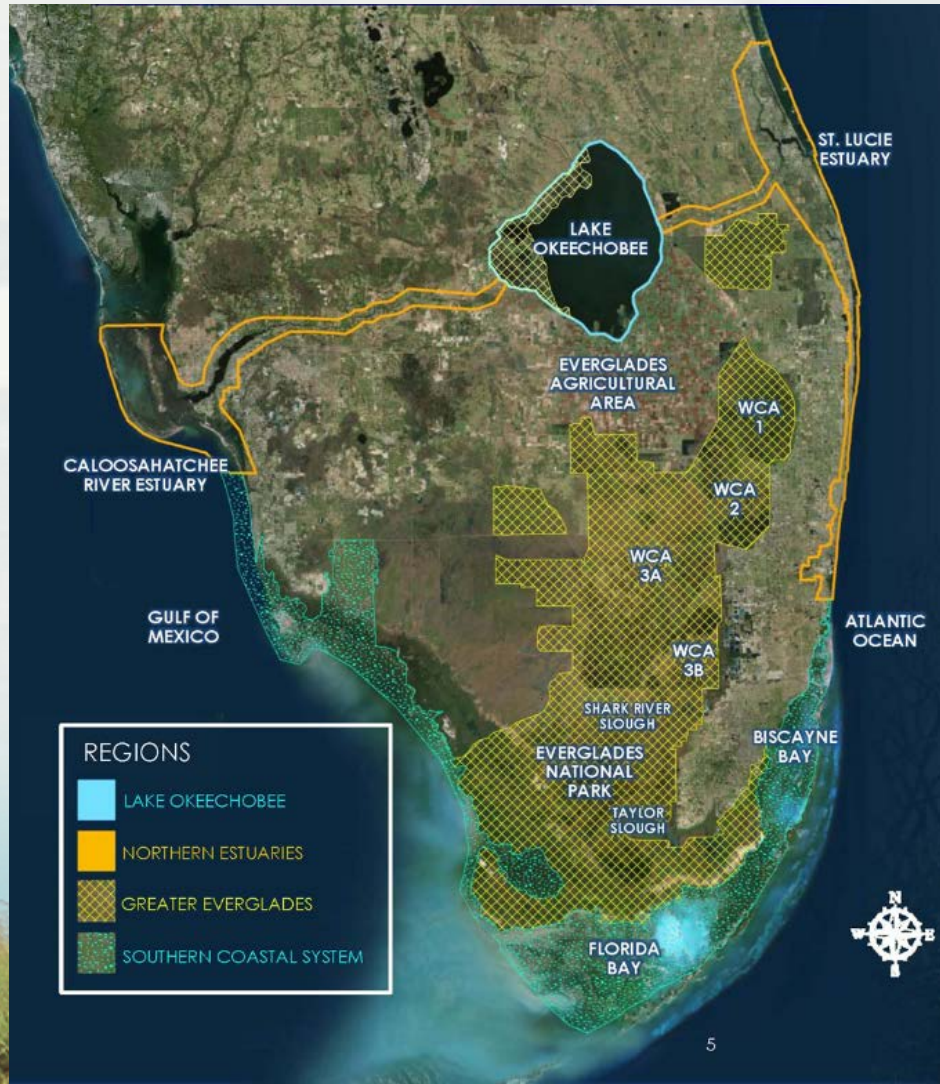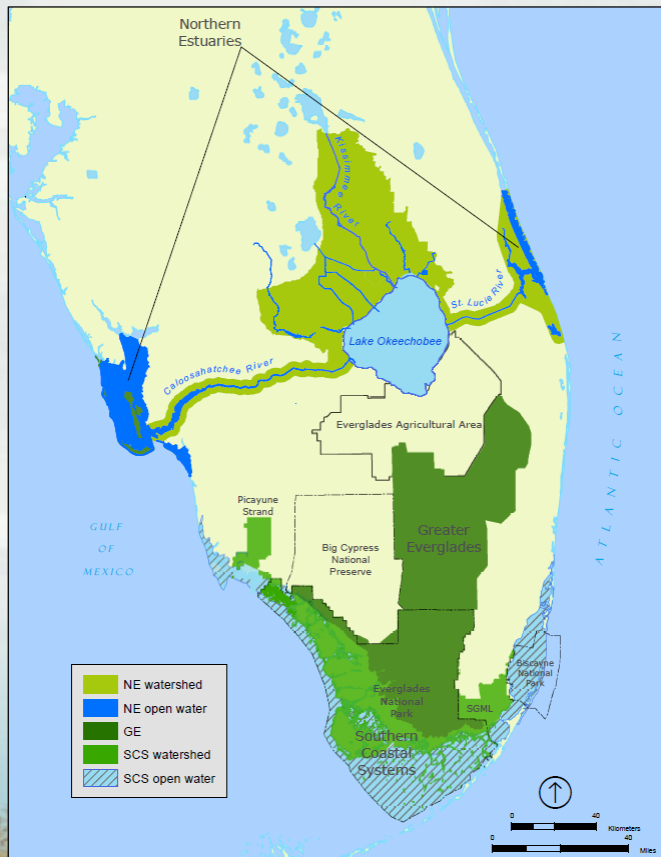
EVALUATION EXAMPLE: WERP

COMPREHENSIVE EVERGLADES RESTORATION PLAN | WESTERN EVERGLADES RESTORATION PROJECT (WERP) FOCUSED ARRAY OF ALTERNATIVES (CONCEPTUAL ONLY/FEATURES NOT TO SCALE)

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EVALUATION EXAMPLE: WERP

Greater Everglades (GE):

1. **Performance Measures**
    a) **Inundation Duration**
    b) **Vegetation Communities**
    c) **Fire Risk**
    d) **Soil Oxidation/Drought Intensity**
2. **Ecological Planning Tools**
    a) **Cape Sable Seaside Sparrow (Sparrow Helper)**
    b) **Marl Prairie Hydrologic Suitability Model**
    c) **Wading Birds (WADEM)**
    d) **Alligator Production Probability**
    e) **Small Freshwater Fish Density Model**
    f) **Apple Snail Population Model**
3. **Additional Hydrological Model Output**
    a) **Dry Events in Northeast Shark River Slough**
    b) **Transect Flows**

Northern Estuaries (NE):

1. **Performance Measures**
    1. **NE Salinity Envelope**
    2. **Oysters**
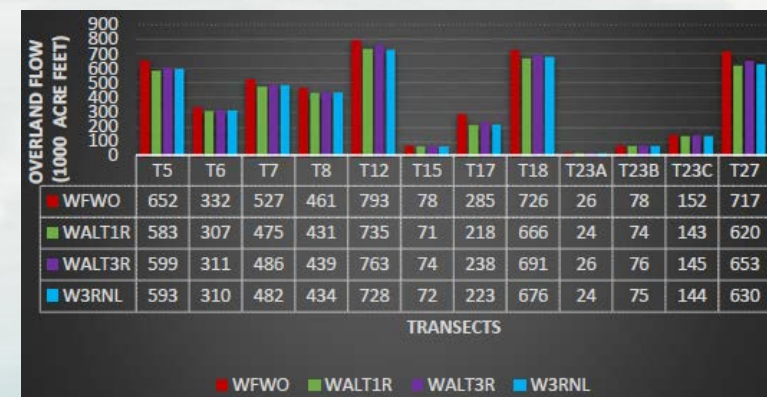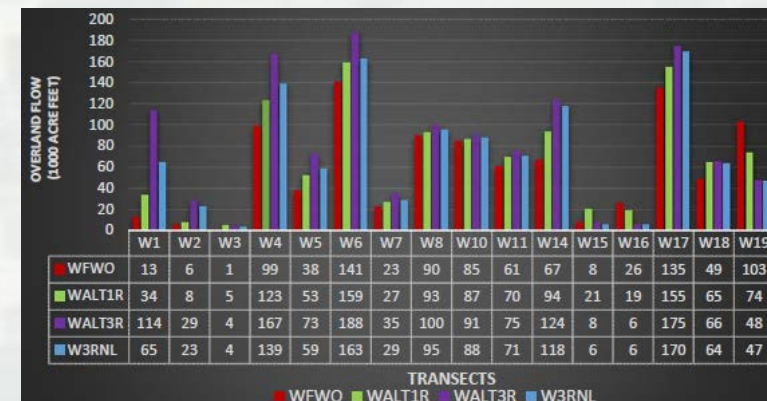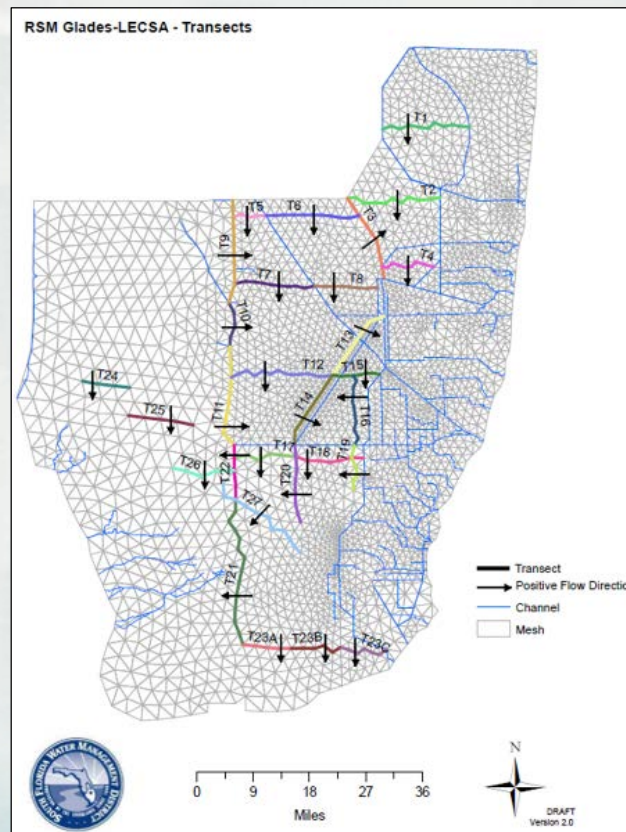   3. **SAV**

Southern Coastal Systems (SCS):

1. **Performance Measures**
    a) **Salinity in Florida Bay**
    b) **American Crocodile Growth and Survival**
2. **Additional Hydrological Model Output**
   a) **Transect Flows**

RECOVER EVALUATION EXAMPLE

WERP: Flow to SCS	FLOW TRANSECTS											
	Taylor Slough and Adjacent Estuaries				Shark River Slough			Lower Southwest Coast	Upper Southwest Coast		
Alternative	T23A	T23B	T23C	TOTAL	T21	T27	TOTAL	T26	T24	T25	TOTAL
FWO	26	78	152	256	727	717	1444	128	67	88	155
WALT1R	23	74	143	240	640	620	1260	102	69	121	190
WALT3R	26	76	145	247	672	653	1325	78	72	148	220
WALT3RNL	23	75	144	242	651	630	1281	75	70	141	211

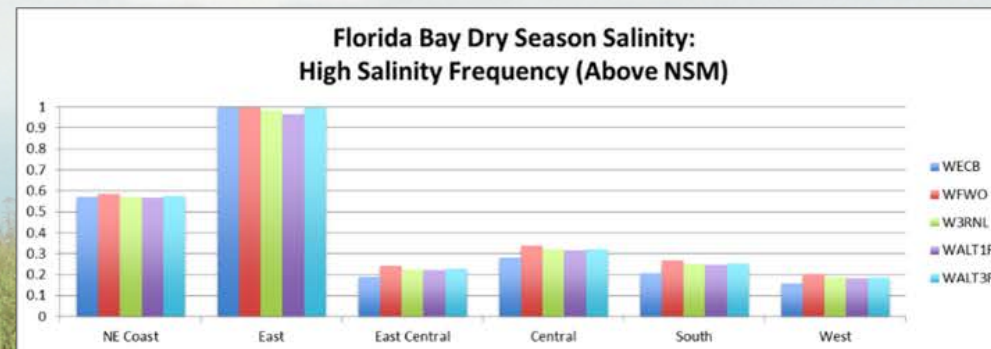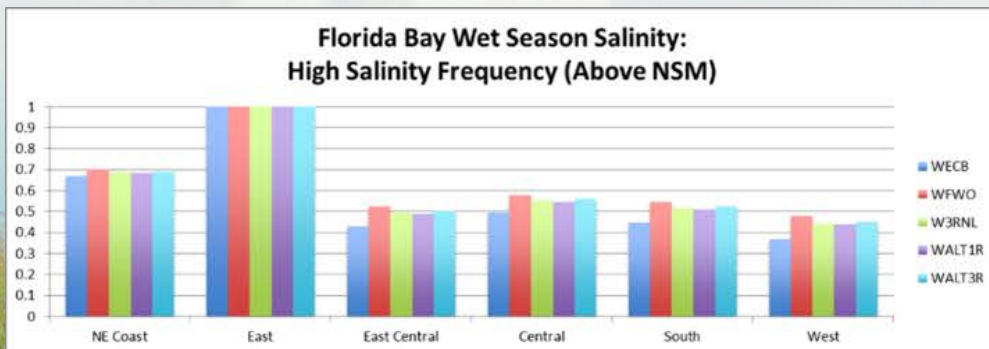BUILDING STRONG®

RECOVER EVALUATION EXAMPLE

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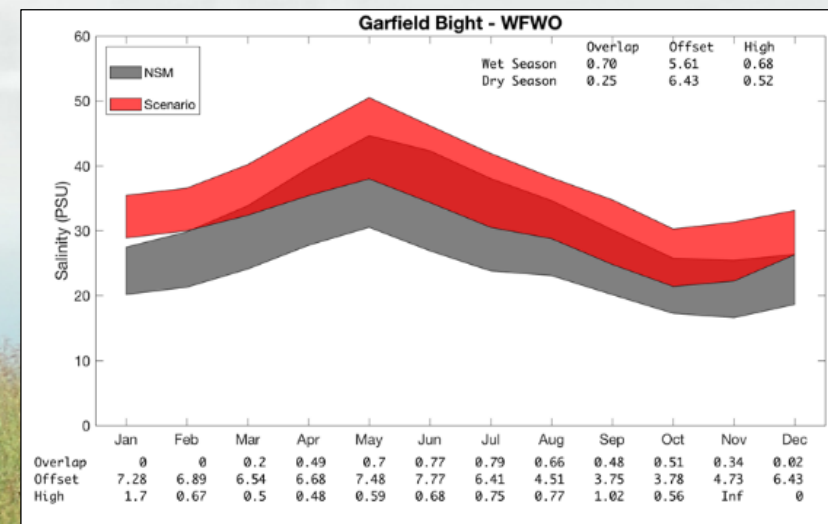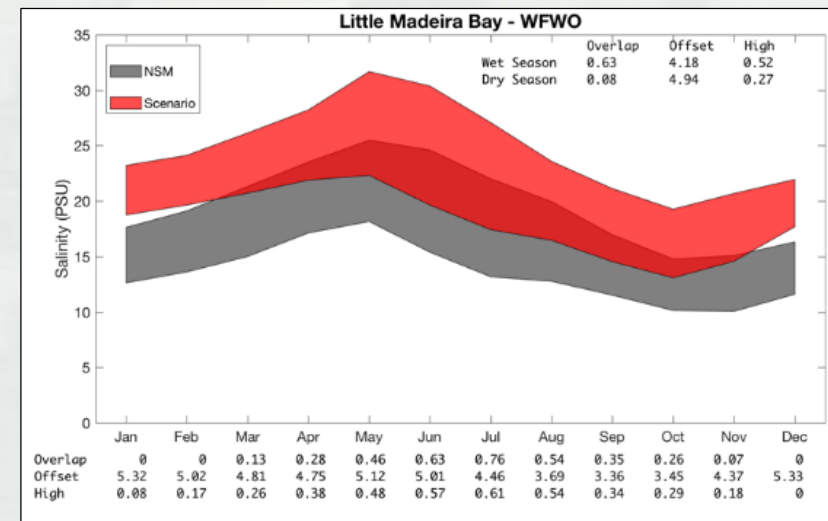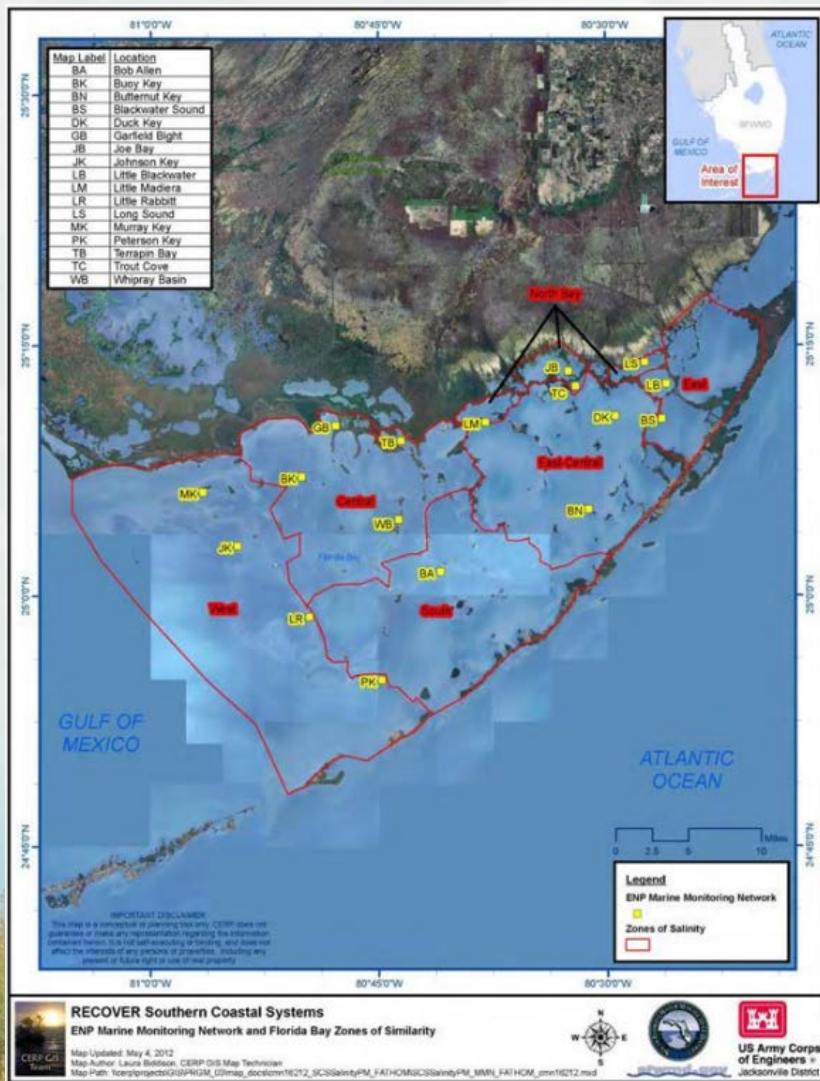
RECOVER EVALUATION EXAMPLE

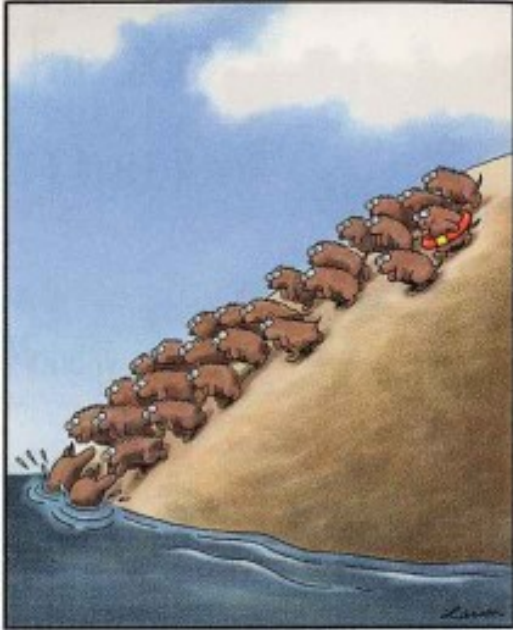## Florida Bay Salinity PM: Overlap Metric
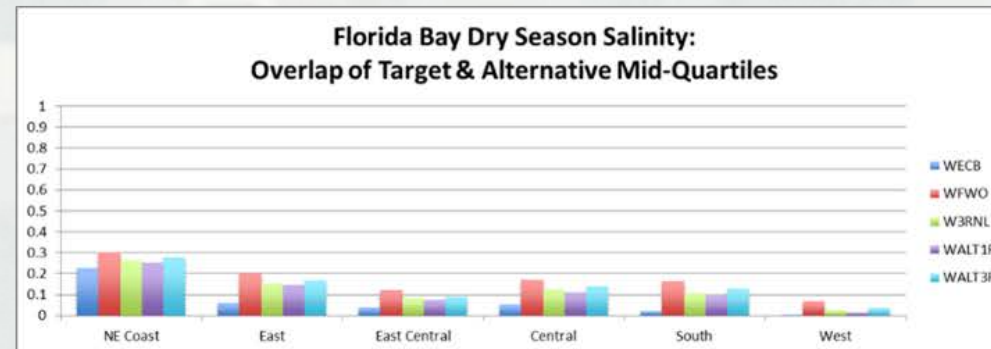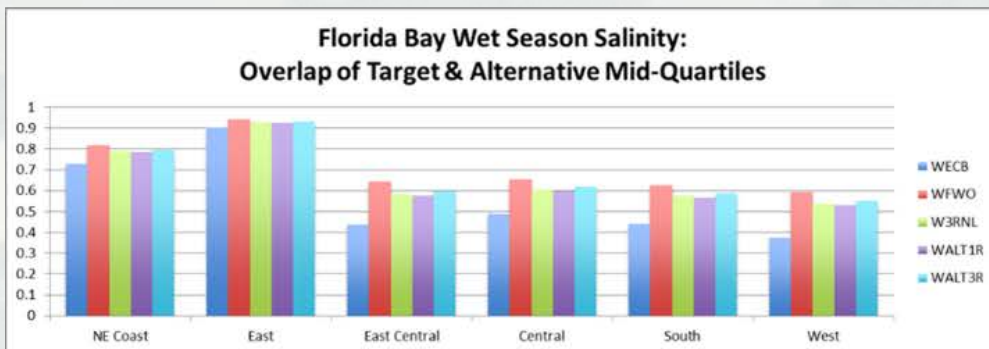
Florida Bay Salinity PM: High Salinity Frequency Metric

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ADDITIONAL INTERACTIONS

6. **Review of adaptive management and monitoring plans.**
   - Consistency, complimentary, and compatible with RECOVER's Monitoring and Assessment Plan.
   - Identify duplication of monitoring efforts or reliance on RECOVER monitoring
   - Identify potential information that could be incorporated into future system-wide assessment reports.

7. **Review of the project operating manual.**
   - Optimize performance of each project feature
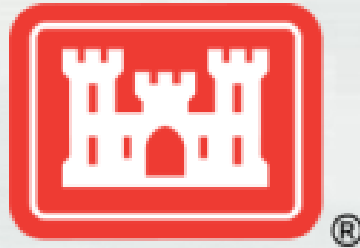   - CERP
     - System-wide restoration goals

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SUMMARY

- **Everglades restoration guided by "Yellow Book" containing 68 restoration components.**
  - Enhance ecological values.
  - Enhance economical values and social well-being.

- **RECOVER has 7 interaction points with the PDT during a project's planning phase.**
  - RECOVER members participate on PDT.

- Key interactions
  - Consistency Review
    - Ensures consistency with CERP, RECOVER PMs, and system-wide approach.
  - System-wide (Regional) Evaluation
    - Evaluates alternative performance.
    - Assesses benefits of each alternative.
    - Provides RECOVER recommendation for TSP

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ACKNOWLEDGEMENTS

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