CALCULATING ENVIRONMENTAL BENEFITS

TEACHING ECOSYSTEM RESTORATION PLANNING TO A NEW GENERATION OF PLANNERS

Goals, Performance Metrics, and Habitat Units

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PRESENTATION OUTLINE

Teaching Ecosystem Restoration Planning to a New Generation of Planners

Goals, Performance Metrics, and Habitat Units…

- Six-step Process…really?
  - Problem Identification
  - Project Objectives
  - Selection of Measures
  - Performance Metrics
- At the Heart of the Matter
- Case Studies 1 – 4
- Conclusions and Recommendations

1. identify problems and opportunities
2. inventory and forecast conditions
3. formulate alternatives
4. evaluate alternatives
5. compare alternatives
6. select plan

The Six-step Planning Process

Examples of Common Issues

A. Defining the Underlying Problem
B. Defining Objectives
C. Selecting Measures
D. Metrics, Models and Alternative Evaluation

National Economic Development (NED) vs. National Ecosystem Restoration (NER)

(A) Defining the Underlying Problems

NED | NER

Navigation

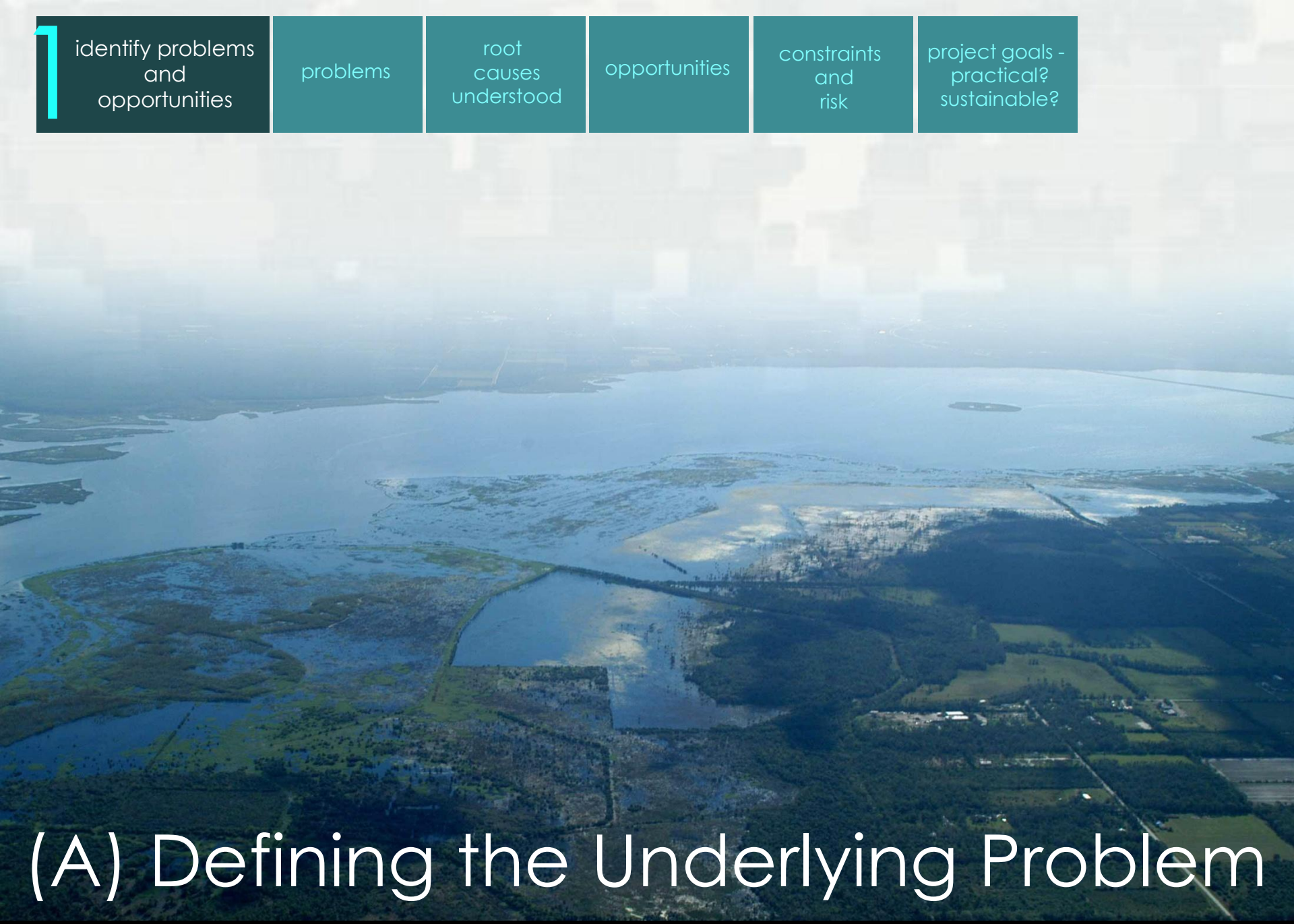
Flood Risk Reduction

Generally obvious…

Ecosystem Restoration

Not so obvious… Both causes and symptoms may not be readily visible

NED studies have pre-defined monetary outputs and the scale of the problem is generally well known. Ecosystem restoration studies may have neither the problem or the end-state defined.



(A) Defining the Underlying Problem

Examples of Common Issues

National Economic Development (NED) vs. National Ecosystem Restoration (NER)

(B) Defining Project Objectives

NED

- Reduce NED inefficiencies
- Other objectives ancillary

NER

- Requires a clear understanding of what portions of the problem can be fixed
- Team must avoid consensus by a "kitchen sink" mentality

Examples of Common Issues

1 identify problems and opportunities

problems

root causes understood

opportunities

constraints and risk

project goals - practical? sustainable?

team consensus

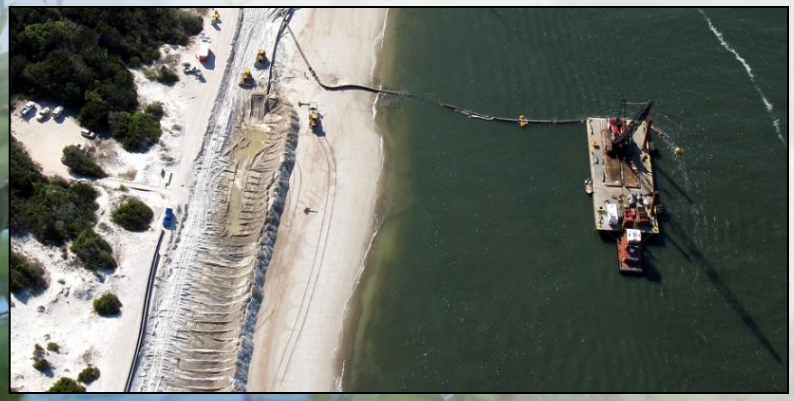
(B) Defining Project Objectives

Examples of Common Issues

(C) Selecting Project Measures

NED

- Teams choose from a suite of common solutions
- Results from application of standard measures are well understood and conceptually predictable



NER

- Potential measures are almost completely unique to each project
- Generally must be identified (and agreed upon!) by the team
- Ways in which a measure potentially affects problems and objectives may be uncertain

1 identify problems and opportunities

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project goals - practical? sustainable?

current (existing) relevant to problem

2 inventory and forecast conditions

measures formulated

objectives – measurable and specific

team consensus

resource trends identify future year w/o and w/project conditions

identify and approve methods or models to forecast project outputs

forecast or justify future without conditions

4 evaluate alternatives

(C) Selecting Project Measures

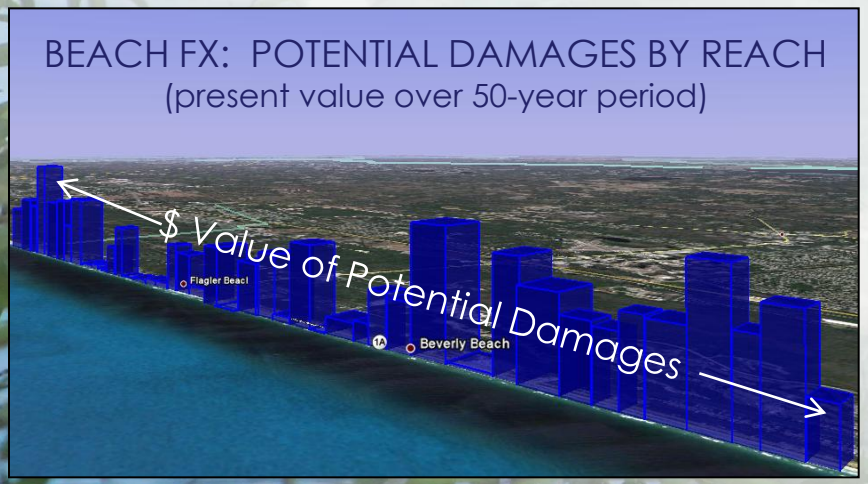
Examples of Common Issues

National Economic Development (NED) vs. National Ecosystem Restoration (NER)

(D) Metrics, Models and Alternative Evaluation

NED

- Metrics are defined by doctrine
- Relationship between the metric (dollars) and the problem/objective/measure is intuitive
- Standard models are generally available



NER

- Metrics are defined by the team
- Must have scientific link to the problem, the objective, and the measures
- Must be measurable at the appropriate scale
- Models are almost always project specific and often developed or modified for individual use

Examples of Common Issues

(D) Metrics, Models, and Alternative Evaluation

Examples of Common Issues

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- root causes understood
- opportunities
- constraints and risk
- project goals - practical? sustainable?

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- current (existing) relevant to problem
- resource trends identify future year w/o and w/project conditions

- metrics (note: not $) unique to NER & ER studies
- measures formulated
- objectives – measurable and specific
- team consensus

3 formulate alternatives

- identify and approve methods or models to forecast project outputs
- forecast or justify future without conditions

- management measures (scale, duration, sustainability)
- combine management measures into alternatives
- develop rough order of magnitude costs

4 evaluate alternatives

- publicly and politically acceptable?
- legal? sustainable? compliant with laws and regulations?
- complete? scale appropriate?
- efficient? fix the problem? provide practical engineering solution?
- outputs (metrics) significantly above the future without project condition (no action)?

"PLANNING LAND"

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5 compare alternatives

- cost effectiveness analysis (CE)
- incremental cost analysis (ICA)

6 select plan

Examples of Common Issues

At the Heart of the Matter….

- Ecosystem Restoration planning is inherently more complex than traditional NED planning
- There are many more than six steps involved in linking performance measures and metrics back to the problem and forward to the benefits
- Strong team leadership is needed to avoid dangerous detours and dead-end side trips

CASE STUDY 1: LAKE JESUP

INCORRECT PROBLEM STATEMENT

Government Cut is causing sedimentation and the channel should be removed versus there is a sedimentation problem; we need to investigate and address causes

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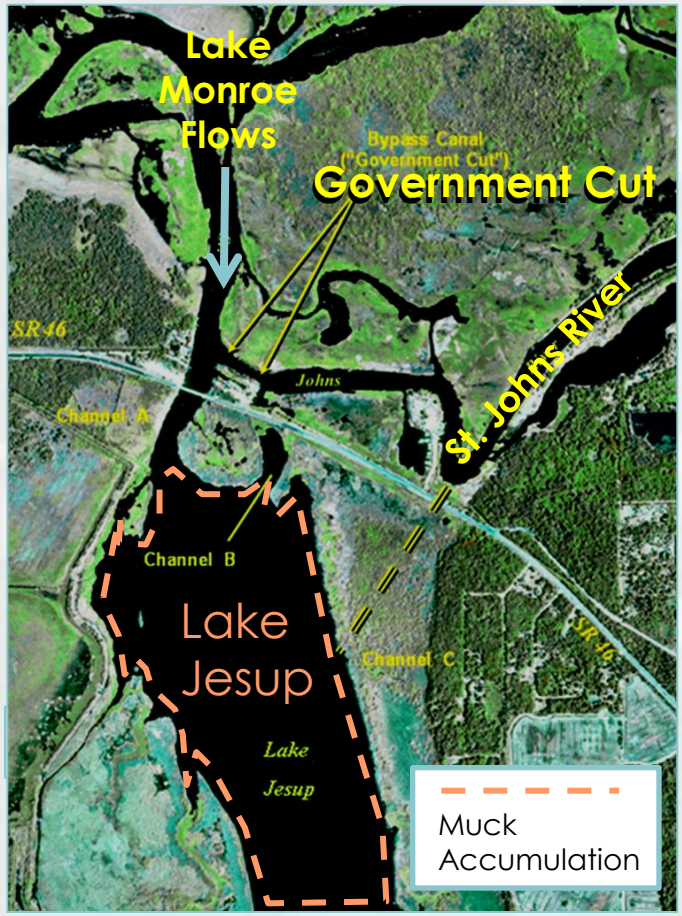

Actual Problem: Eutrophication (upstream nutrient flow)

CASE STUDY 2: LOXAHATCHEE RIVER RESTORATION

MULTIPLE UNRELATED OBJECTIVES

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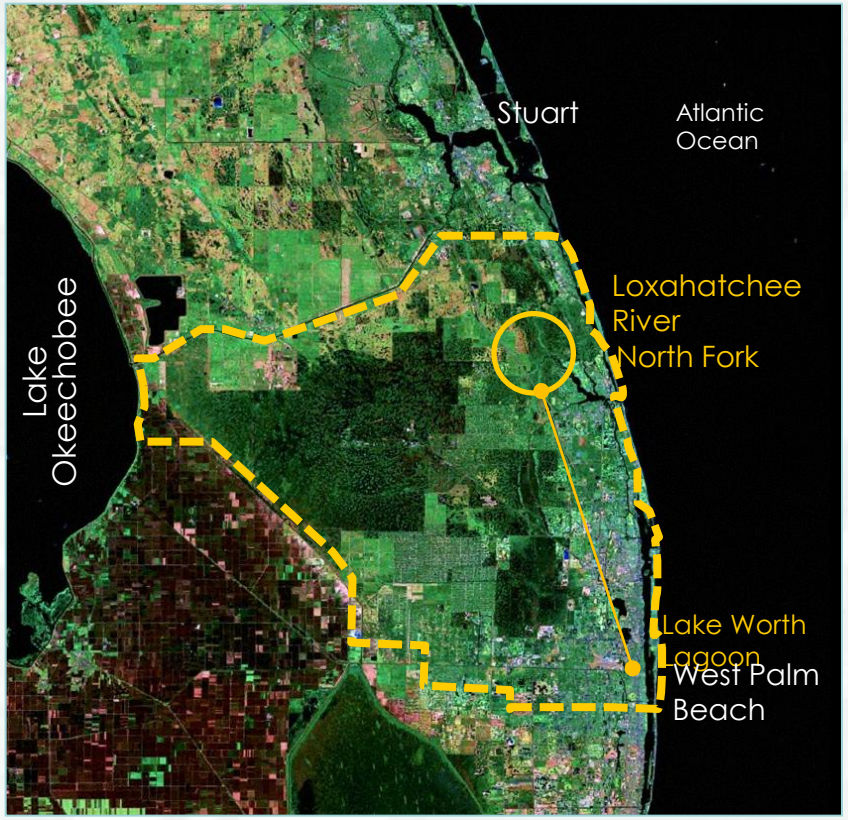
Objectives NOT linked to original problem:

- Regional water supply objective adding NED to the mix
- Lake Worth Lagoon restoration objectives: an estuary geographically unrelated (and of a small scale with reduced benefits)



PROBLEM: A loss of freshwater inflows from inland sources causing intrusion of brackish water up-river and loss of cypress forest stands

CASE STUDY 3: DECOMP

GOALS VERSUS MEASURES
"The Means Became the End"

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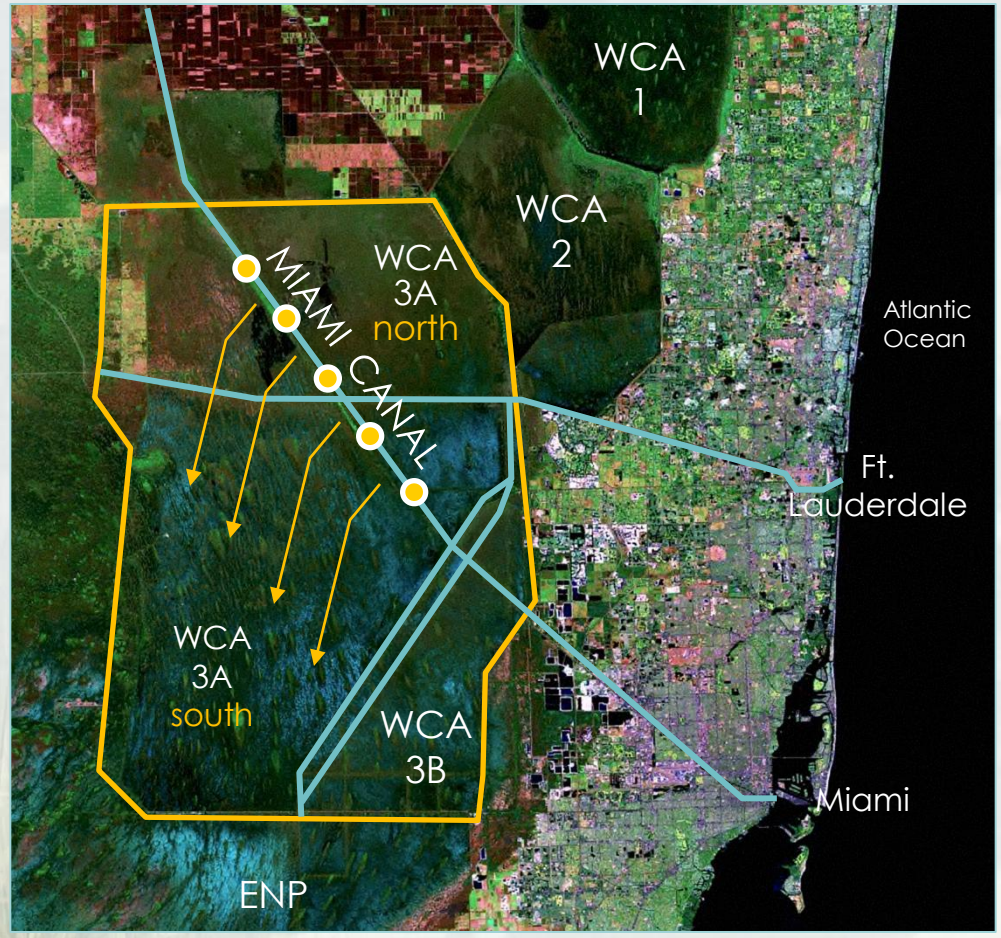
PROJECT GOAL:
Enable sheetflow from WCA 3A North to WCA 3A South, keeping flow in marsh NOT to backfill Miami Canal - management measure



Modeling indicated partial fill of Miami Canal sufficient to hydrate WCA 3A south

CASE STUDY 4:
C-111 SPREADER CANAL
ALTERNATIVE EVALUATION AND METRICS

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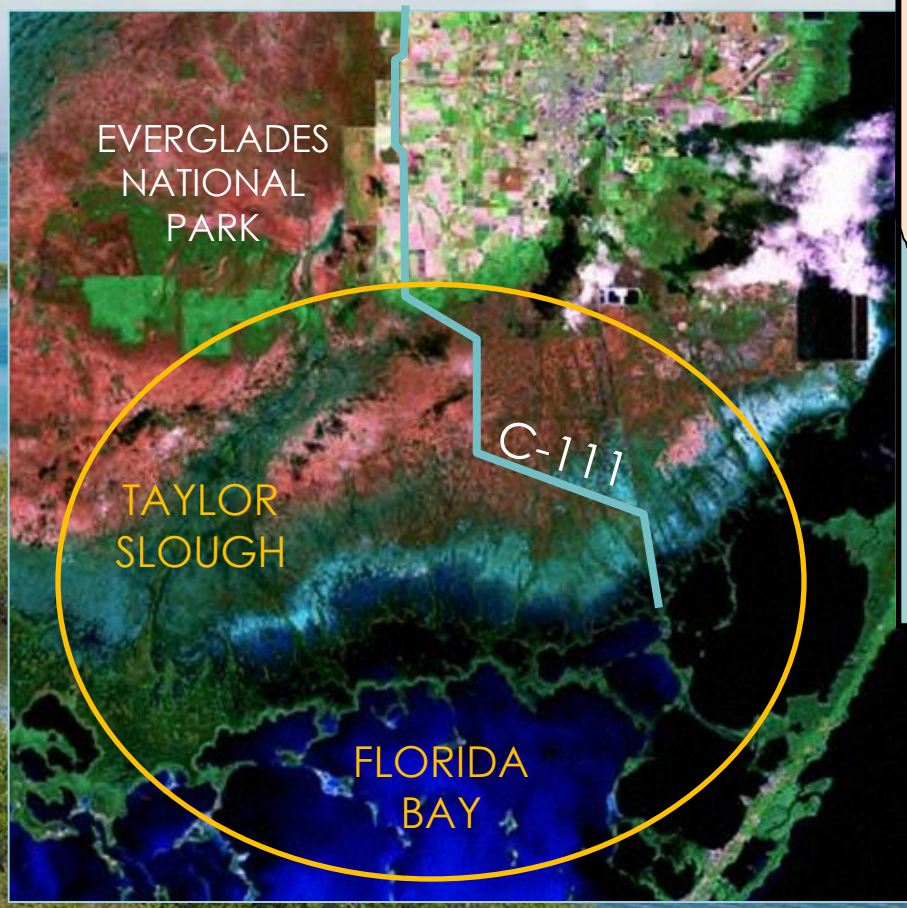

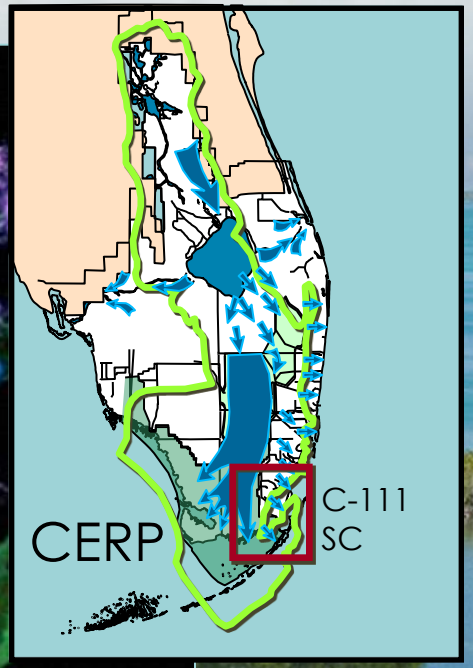

Taylor Slough and C-111 toward the end of the natural and built system

Measuring Project Impacts:
Taylor Slough Hydration (more scale appropriate to project)
versus Salinity Levels in Florida Bay

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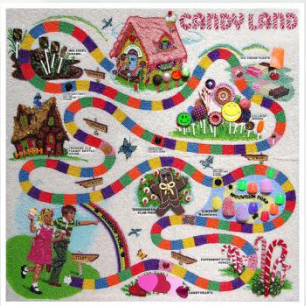

Conclusions and Recommendations
Winning the Game

Macro-view

- Detailed audit by experienced planner "early in the game." Is the team asking the right questions? What are the risks?
- Long-term recording strategy to document team decisions
- Facilitation training
- Training/mentoring by senior planners
- Communication with maps, graphics, diagrams, etc.

Micro-view

- Goals and objectives linked to problems and opportunities
- Objectives measurable at a scalar level
- Sizing and combining of management measures into alternatives should be based on a clear understanding of the ecosystem function
- Performance metrics sensitive to the study scale and model capability