SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Water Resources Advisory Commission
July 2, 2009
Phase I Planning Update

Temperince Morgan, River of Grass Project Liaison/Northern Everglades Program Implementation Manager

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RESTORATION PLANNING

Presentation Outline

- Planning Process
- Relationships, Trends, Tradeoffs, Other Considerations
  - Analysis of Phase I ROG Modeling Results
  - Everglades Ecology
  - Water Quality Performance
  - Aquifer Storage and Recover (ASR) Implementation Update
- Phase II Planning Transition
- Next Meeting/Future Meeting Topics

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Planning Process

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RESTORATION PLANNING

Planning Process

- Where We Have Been and Where We Are Headed
  - ✓ Development of Vision and Goal Statements
  - ✓ Development of Problems, Objectives, and Constraints
  - ✓ Development of Tools (including modeling and maps)
  - ✓ Development of Team Configurations
  - ✓ Evaluation of Stakeholder Team Configurations (June 2nd and June 18th meetings)
  - Evaluation of Relationships and Developing Refined Concepts (we are here- July 1st and August 4th)
  - Discuss next steps for Phase II Planning

Planning Process- Evaluating Relationships and Developing Refined Concepts

- Discuss and Identify
  - **Initial Findings/Areas of Agreement-** What has this analysis of configurations shown us? What have we learned?
  - **Areas Requiring Further Evaluation/Additional Information-** What features show promise but require more detailed information or a greater understanding? For what issues is more data, detailed modeling, or additional discussion required?
  - **Common Elements/Foundation Projects-** What features are fundamental/common to all plans? What features should we pursue in the near term while planning and other evaluation activities continue?
  - **Next Steps for Phase II**

Planning Process
RESOPS Peer Review Workshop

- Held June 30th
- Technical Review Panel
  - Provide information and address panel questions on RESOPS computer model
  - Solicit experts opinions on use of the model for River of Grass Project
- Follow-up teleconference call will be held July 9
- http://webboard.sfwmd.gov/default.asp?boardid=PR_RESOPS_P1&action=0

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Relationships, Trends, Tradeoffs, Other Considerations

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Analyses of Phase 1 River of Grass Modeling Results
Objectives/Modeling Analyses Methodology

- Objectives
  - Additional analysis to analyze trends in performance
  - Helps to derive conclusions from Phase 1 effort and identify areas for additional study in Phase 2.
- Methodology
  - Data extracted from RESOPS results (performance measures) and benefits evaluation (ecological summaries)
  - Data was summarized in various forms to illustrate observed trends
  - In some cases, sensitivity analysis was performed to further explore relationships or examine “what if” scenarios
  - Effort focused on examining the overall information provided by ALL configurations, not on further optimizing individual scenarios

Modeling Analyses Topics

1. Observed hydrologic trends in configurations
2. Hydrologic sensitivity to water quality considerations
3. Hydrologic sensitivity to differing ecologic or system objectives
   - Examination of robustness
   - Role of storage in supplementing low Lake Okeechobee stages
4. Hydrologic efficiency of storage features
   - Deep / Shallow storage evaporation losses

Summary of Key Observations

- Total storage volumes beyond the range of diminishing hydrologic improvement will likely be needed to improve ecological conditions
- Per given storage capacity, features that are maintained wet maximize hydrologic performance within the project footprint, but generally have less overall potential to achieve hydrologic objectives in the Everglades and estuaries
- It is possible for any particular configuration to achieve different hydrologic performance by modifying operational assumptions and/or changing assumed storage characteristics (e.g. wet vs. dry, shallow vs deep, etc…)
- Hydrologic impacts associated with adding needed treatment area to configurations in order to achieve water quality goals are small in most cases

Summary of Key Observations (continued)

- Most configurations demonstrated high robustness (i.e. can be used to effectively meet multiple system objectives)
- In general, when trying to improve low stage conditions in the Lake, there is a corresponding reduction in flow to the Everglades and an increase in high Lake stage impacts and estuary events
- There is a potential need for a minimum amount of “North Storage”, which from a hydrologic perspective does not have to be sited north of the Lake, but must serve to help supplement low Lake stages
- Evapotranspiration volumes relative to total inflow volumes are markedly higher in shallow storage compared to deep storage (increased ET is water that does not reach the Everglades)

Everglades Ecology

New Spatial Extent or Improved Remaining Extent?

Land

Use to create new "Natural" landscape

Create Ridge & Slough

-- No historical basis

Create Sawgrass Plains

- Missing slope
- Feasibility?
- Historical function?

Create Custard Apple

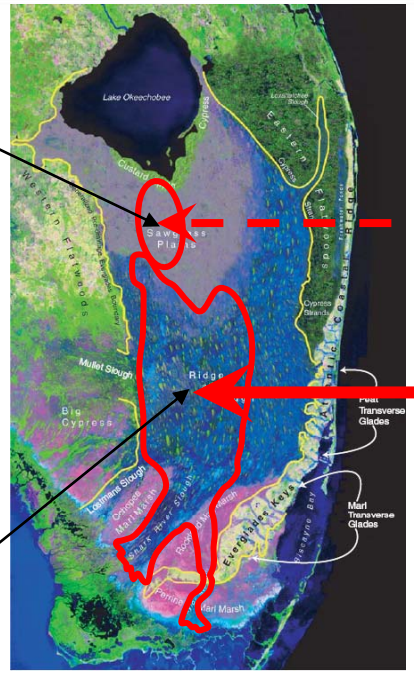
- Historically small
- Treatment?

Use to store or treat water for existing landscape

- Footprint may be much less "natural"
- Primary benefit is water / WQ to downstream
- Water quantities needed are very large

New Spatial Extent or Improved Remaining Extent?

Sawgrass Plains



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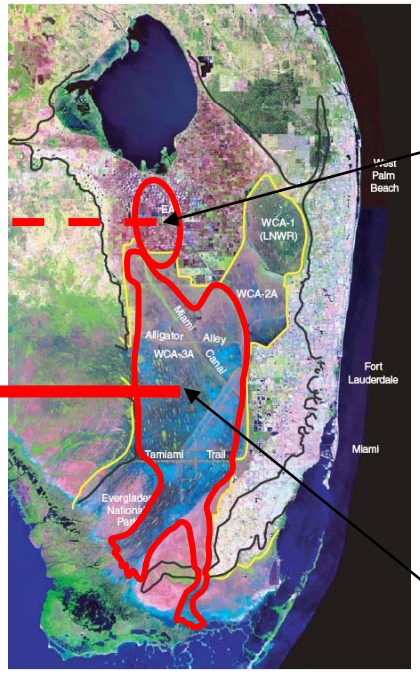


Subsided Ag Land

- *Elevation*
- *Slope*
- *Soil chem*
- *Plant comm.*

Healthy Ridge & Slough

- *Depth*
- *Flow*
- *WQ*

Degraded Ridge & Slough

Water Quality Performance

Overview

- As part of the Phase 1 Planning process, the goal was to provide feedback on potential TP removal performance
- Used a steady-state WQ modeling approach to work in concert with RESOPS
  - This Phase 1 Planning study will be followed by more detailed water quality analyses
- The water quality evaluation did not assess discharges into Lake Okeechobee or the estuaries, and did not extend into the Everglades
  - Water quality issues and recommended water quality projects for these watersheds are addressed in the Northern Everglades Lake Okeechobee Protection Plan (LOPP) and River Watershed Protection Plans.
    - An update to the LOPP will be prepared in 2010 and delivered to the legislature in early 2011.
  - During Phase 2 planning, Northern Everglades and ROG efforts will be coordinated and if necessary and/or appropriate, water quality evaluations related to discharges to the Lake or estuaries will be included in Phase 2 analysis

Water Quality Performance – Summary

- Relationships: TP removal is sensitive to
  - Hydrologic targets
  - TP concentrations in Lake Okeechobee deliveries
  - Type of water resource feature
  - Maintaining wet conditions
- Tradeoffs:
  - Degree of management vs. TP removal performance
  - Maintaining sufficient storage/treatment area to handle infrequent but high flows
- Other considerations:
  - Uncertainty

Water Quality Performance – Next Steps

- Depending on the hydrologic targets (magnitude, inter-annual and intra-annual variability) an optimal combination of water resource features can be implemented
  - For example, to capture extreme high pulses, reservoir(s) followed by appropriately-sized STAs
- Phase II and subsequent planning-
  - Conduct dynamic water quality evaluation using daily time step
  - Further refine information related to water quality benefits of various feature types (e.g., flow-ways)
  - Refined evaluation of issues related to wet versus dry footprints and associated effects on water quality and hydrologic performance

Aquifer Storage and Recovery (ASR) Implementation Update

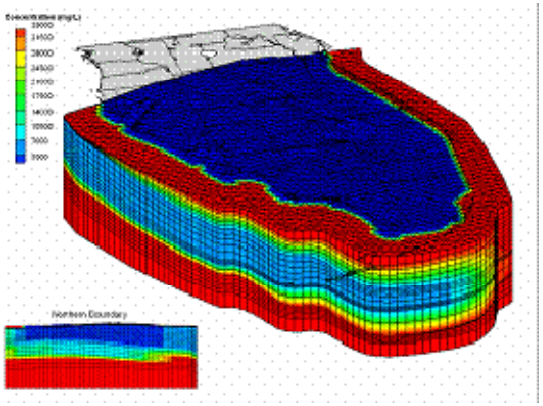
CERP ASR Pilot Projects

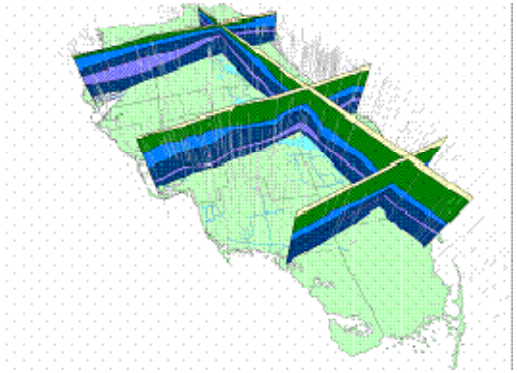
- Kissimmee River Pilot Project
  - Excellent recovery efficiency during Cycle 1
  - Already one month into Cycle 2

- Hillsboro ASR Pilot Project
  - Should begin cycle testing in early fall - delayed for nearly one year
  - High capacity (10 mgd) well – probably will need fewer at Site 1

CERP ASR Regional Study

- To address regional issues beyond the scope of the pilot projects associated with full-scale ASR implementation
- Groundwater model and ecological risk assessment underway
- Results and simulations tied to pilot project cycle testing data
- Final report due in 2012





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Phase II Planning Transition

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RESTORATION PLANNING

Transitioning from Phase I to Phase II

- Phase I Planning
  - Valuable screening level exercise
  - Document findings (what seems to work, what trends and relationships do we see, what needs further analysis)
  - Limitations of screening level model and unconstrained analysis
  - Need more detailed modeling and evaluation effort to further refine these findings
- Transition into Phase II for Further Evaluation and Discussion
  - Utilize these findings as starting point for more detailed planning and analysis in Phase II
  - More detailed model and evaluation methodology
  - Consider system constraints
  - Consider phasing and common elements

Phase I Planning

- Developed a better understanding of value systems and perspectives of stakeholders
- Discussed and refined environmental restoration targets
- Used a water budget model (monthly time step) to test ideas and develop better understanding of relationships and tradeoffs between:
  - Northern storage and southern storage
  - Shallow storage and deep storage
  - Performance within different regions of the system

Phase I Planning

- Utilized steady state model to evaluate water quality performance and determine additional treatment needs
- Developed preliminary cost estimates in order to improve understanding of cost drivers and relationships
- Document initial findings/common understandings
- Identify areas requiring further analysis or additional information
- Identify next steps which will allow us to transition from Phase I Planning into Phase II Planning

Phase II Planning

- Develop detailed Phase II Planning Strategy
  - Further refine Phase I Findings
  - Evaluate Areas Requiring Further Evaluation or Additional Information from Phase I
  - Utilize results from Phase II modeling and evaluations to reassess or identify:
    - Ability to achieve restoration targets within constrained system
    - Likelihood of resolving/removing constraints; timeframes
    - Regional Robustness/System Wide Tradeoffs
    - Areas of Agreement/Disagreement
    - Proposed Features/Phasing Approach

Initial Steps Phase II Planning

- Refine hydrologic and ecologic relationships and targets as appropriate
- Identify Phase II modeling toolbox and evaluation criteria
  - Complete model set-up
  - Finalize performance measure/evaluation methodology
- Identify Common Elements
  - Prioritize/decide which features can move first

Initial Steps Phase II Planning

- Develop Plans of Study for areas requiring further evaluation/additional information, for example:
  - Dispersed Storage/FRESP
  - Hydraulics (e.g., Potential use of LILA or other site to study flow-way hydraulics, hydrologic and/or water quality performance)
  - Economic Study
- Further refine Phase I Findings
  - Hydrologic and ecologic connections
  - Best balance of north storage and south storage
  - Determining the best mix of deep storage versus shallow storage
  - Wet footprints versus dry footprints- Use more detailed model to assess tradeoffs for water quality and hydrologic performance
  - Spatial extent of wetlands

Next Meeting/Future Meeting Topics

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Next Meeting- Date and Location

Next WRAC Issues Workshop

August 4, 2009

South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL
10:00 a.m. – 4:00 p.m.

Next Meeting- Meeting Topics

- Continue Discussion of Relationships, Trends, Tradeoffs, Other Considerations
- Discuss Initial Findings/Common Understandings
- Discuss Areas Requiring Further Evaluation or Additional Information

Phase I Planning
Future Meetings and Topics

Future Meetings

(10:00 a.m. – 4:00 p.m.)

- August 20, SFWMD, West Palm Beach
- September 2, SFWMD, West Palm Beach

Future Meeting Topics

- Next Steps for Phase II Planning

Phase I Planning
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Restoration Project Planning

On December 16, 2008, the South Florida Water Management District Governing Board voted to accept a contract with the United States Sugar Corporation to acquire more than 180,000 acres of agricultural land for Everglades restoration. This historic transaction provides water managers with the unprecedented opportunity to store and treat water on a scale never before envisioned for the benefit of America's Everglades, Lake Okeechobee and the St. Lucie and Caloosahatchee rivers and estuaries.

With full public involvement, the first phase of *River of Grass* restoration project planning is under way. Through a series of Water Resources Advisory Commission Issues Workshops, the Phase 1 planning process will determine viable configurations for constructing a managed system of water storage and treatment to support ecosystem restoration efforts.

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RELATED MATERIALS

- Public Workshops: Dates, Agendas, Presentations, Minutes
- News, Fact Sheets, Public Information
- Reservoir Sizing and Operations Screening (RESOPS) Model

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