



Northern Everglades: River Watershed Protection Plans Update

Water Resource Advisory Commission Meeting- 07/03/08

Tom Teets, Everglades Restoration Policy Manager



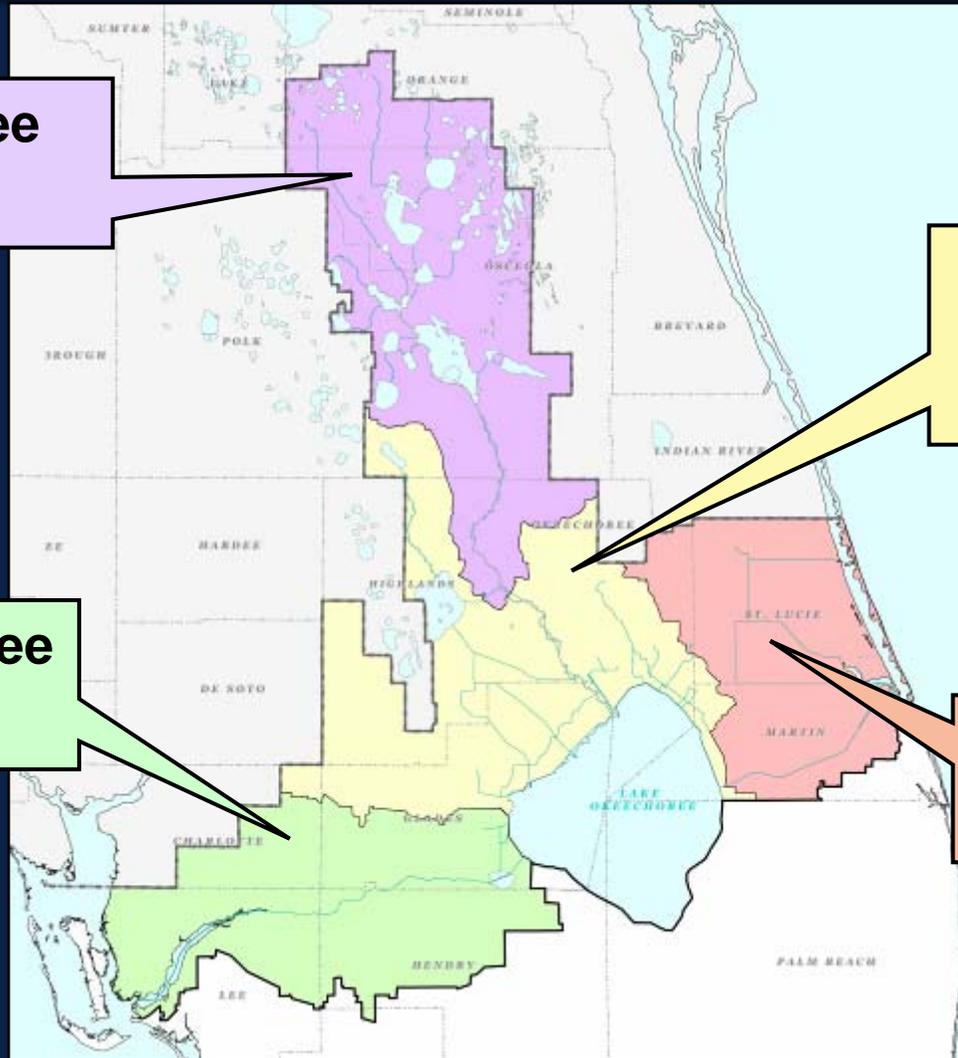
The Northern Everglades

**Kissimmee
Region**

**Lake
Okeechobee
Region**

**Caloosahatchee
Region**

**St Lucie
Region**





Northern Everglades and Estuaries 2007 Legislation

- Recognizes that Lake Okeechobee, Caloosahatchee, and St. Lucie Watersheds are critical water resources of the state
- Builds upon existing restoration plans
- Technical plan to identify water quality treatment projects and water storage requirements for the Lake Okeechobee watershed by February 1, 2008
- **Caloosahatchee and St. Lucie River Watershed Protection Plans to identify water quality and storage projects by January 1, 2009**



River Watershed Protection Plans- Elements



- **Watershed Construction Project**
- **Watershed Pollutant Control Program**
- **Watershed Research and Water Quality Monitoring Program**



River Watershed Protection Plans Plan Development

- **Working Team Participation**
 - **Coordinating Agencies**
 - **South Florida Water Management District (SFWMD)**
 - **Florida Department of Environmental Protection (FDEP)**
 - **Florida Department of Agriculture and Consumer Services (FDACS)**
 - **Lee, Martin, and other affected counties and municipalities**
 - **Various stakeholder groups and interested parties**



River Watershed Protection Plans Schedule

- **Formulation and Evaluation of Alternatives** **Apr - Jul 2008**
- **WRAC and Lake Okeechobee Committee Briefings** **Aug – Oct 2008**
- **Draft Plan for Public Review** **Oct 2008**
- **Final Plan to Governing Board** **Dec 2008**
- **Submit Plan to Legislature** **January 1, 2009**



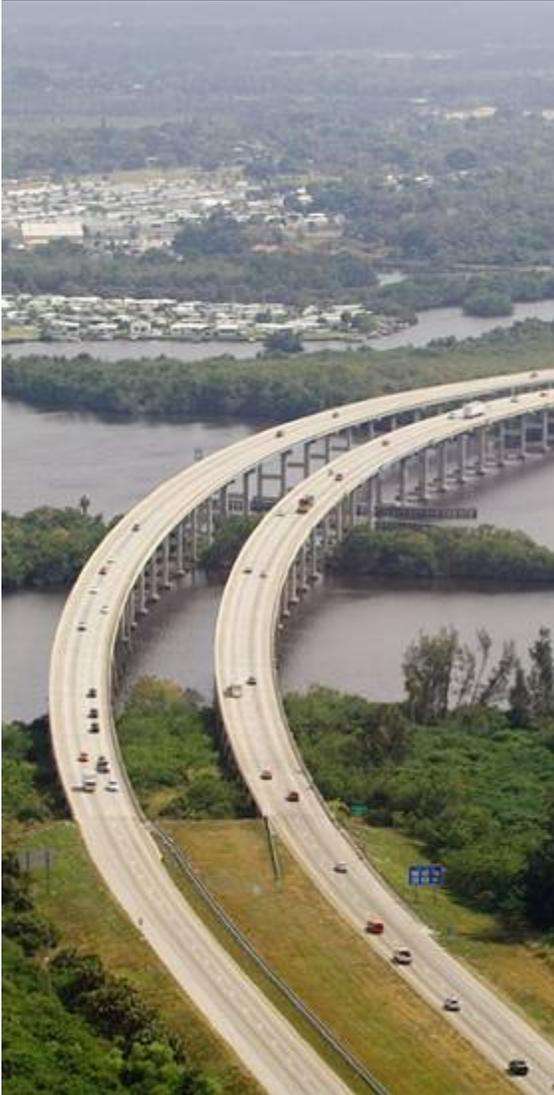
River Watershed Protection Plans Objectives



- **Meet Total Maximum Daily Loads**
- **Manage watershed discharges to meet salinity ranges for estuary**
- **Improve management of pollutant sources throughout the watershed**
- **Establish Research and Water Quality Monitoring Program**



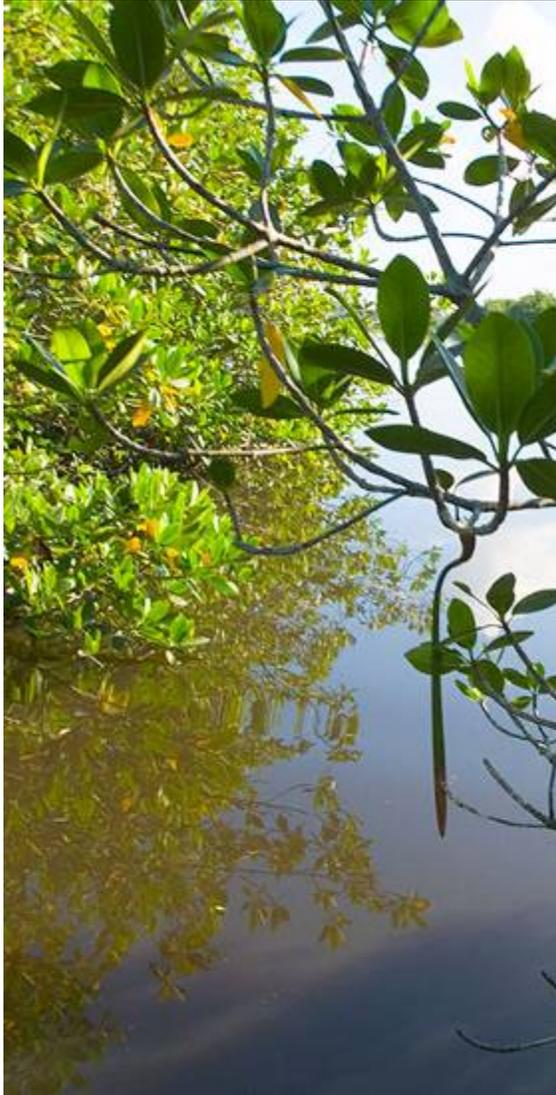
River Watershed Protection Plans Constraints



- **Maintain existing levels of flood protection**
- **Maintain water supply for affected water user basins**
- **Minimum flows and levels**



Presentation Outline



- **Caloosahatchee River Watershed Protection Plan Water Quality Update**
- **St. Lucie River Watershed Protection Plan Water Quality Update**
- **Hydrologic Modeling Update**
- **Research and Water Quality Monitoring Plan Update**

SOUTH FLORIDA WATER MANAGEMENT DISTRICT



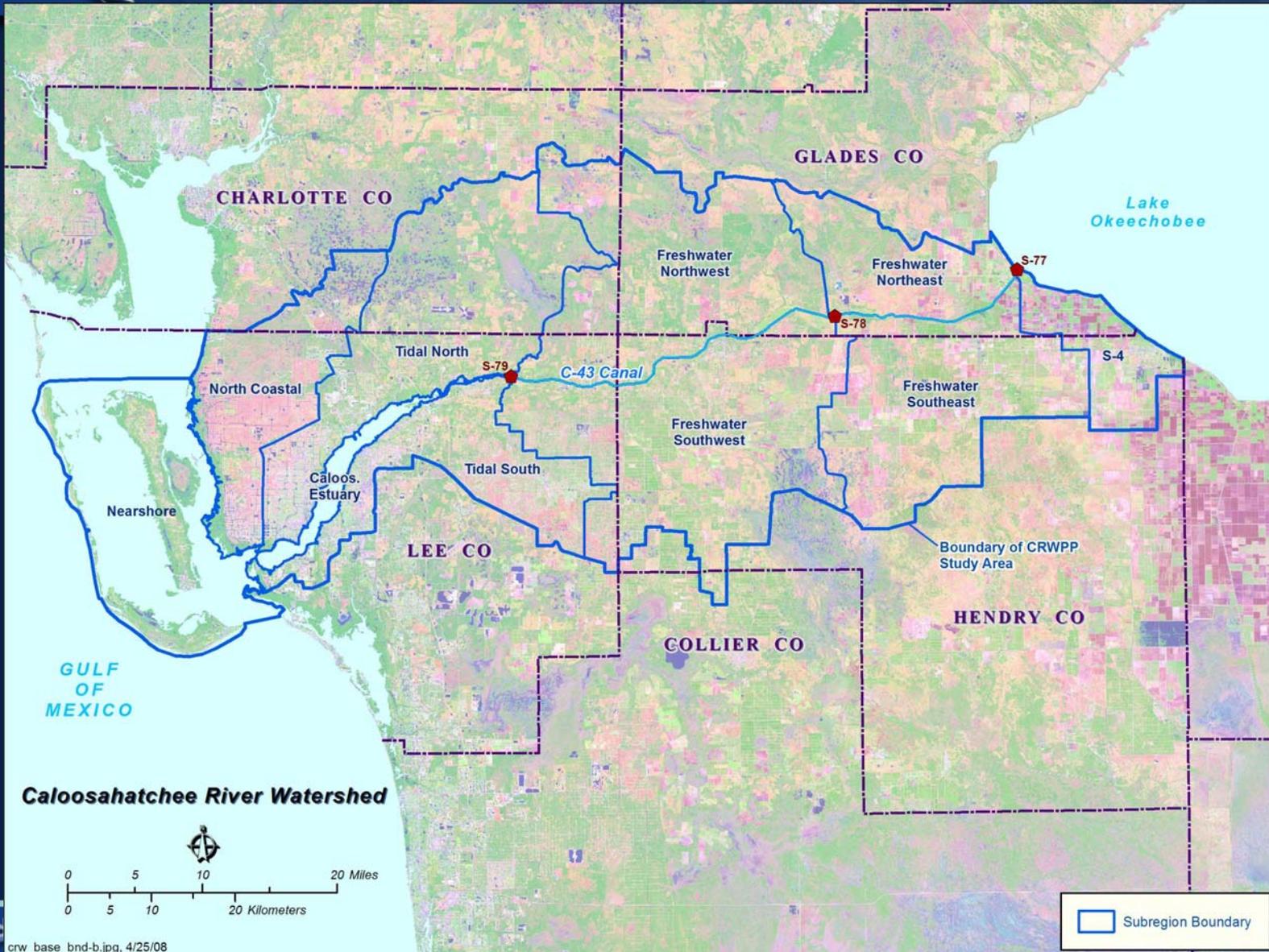
Caloosahatchee River Watershed Protection Plan

Janet Starnes, Principal Project Manager





Caloosahatchee River Watershed



Caloosahatchee River Watershed



Presentation Topics



- **Description of Alternatives 1, 2 and 3**
- **WQ Analysis Results**



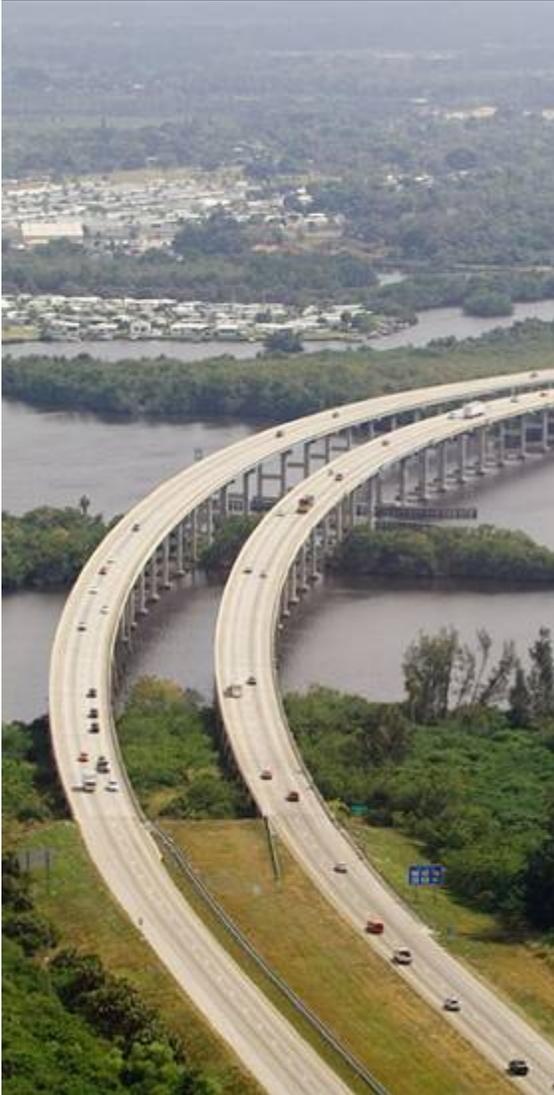
Alternative 1 Summary



- **Common Elements (current, ongoing, and planned projects)**
- **Source Control Measures:**
 - **Agricultural and Urban Best Management Practices**
 - **Statewide Stormwater Rule**
 - **Source Control Regulatory Program**
 - **Land Application of Residuals**
 - **Florida Yards and Neighborhoods**



Alternative 1 Summary



- **Regional Projects:**
 - **C-43 Distributed Reservoirs**
 - **Spanish Creek 4 Corners Preserve**
- **Local Projects:**
 - **Stormwater Retrofits**
 - **Hydrologic Restoration**



WQ Results Alternative 1 Total Phosphorus

Current Load from Watershed	326.1 mt/yr
Load Reduction for Base Condition	6.8 mt/yr
Load Reduction for Alternative 1	76.8 mt/yr
Remaining TP Load from Watershed	242.5 mt/yr
Remaining TP Concentration	122 ppb

mt = metric ton = 1000 kg



WQ Results Alternative 1 Total Nitrogen

Current Load from Watershed	2,899.7 mt/yr
Load Reduction for Base Condition	48.3 mt/yr
Load Reduction for Alternative 1	667.6 mt/yr
Remaining TN Load from Watershed	2,183.8 mt/yr
Remaining TN Concentration	1.10 ppm



Alternative 2 Summary



- **Focus on water storage**
 - **Reservoirs**
 - **Well field rehydration**
 - **Stormwater recovery and ASR**
 - **Recyclable water containment areas**



Preliminary WQ Results Alternative 2 Total Phosphorous

Current Load from Watershed	326.1 mt/yr
Load Reduction from Alternative 1	83.6 mt/yr
Load Reduction from Additional Alternative 2 Management Measures	15.1 mt/yr
Total Load Reduction from Alternative 2	98.7 mt/yr
Remaining TP Load from Watershed	227.4 mt/yr
Remaining TP Concentration	116 ppb



Preliminary WQ Results Alternative 2 Total Nitrogen

Current Load from Watershed	2,899.7 mt/yr
Load Reduction from Alternative 1	715.9 mt/yr
Load Reduction from Additional Alternative 2 Management Measures	116.2 mt/yr
Total Load Reduction from Alternative 2	832.1 mt/yr
Remaining TN Load from Watershed	2,067.6 mt/yr
Remaining TN Concentration	1.05 ppm



Alternative 3 Summary



- Focus on water quality improvement - phosphorus and nitrogen
- **Regional**
 - Lake Hicpochee Restoration
 - Caloosahatchee Ecoscape Water Quality Treatment Area
 - West Caloosahatchee Water Quality Treatment Area
- **Local**
 - Wastewater conversion and stormwater retrofits
 - Urban stormwater treatment areas



Preliminary WQ Results Alternative 3 Total Phosphorous

Current Load from Watershed	326.1 mt/yr
Load Reduction from Alternative 1	83.6 mt/yr
Load Reduction from Additional Alternative 3 Management Measures	29.4 mt/yr
Total Load Reduction from Alternative 3	113.0 mt/yr
Remaining TP Load from Watershed	213.1 mt/yr
Remaining TP Concentration	108 ppb



Preliminary WQ Results Alternative 3 Total Nitrogen

Current Load from Watershed	2,899.7 mt/yr
Load Reduction from Alternative 1	715.9 mt/yr
Load Reduction from Additional Alternative 3 Management Measures	246.9 mt/yr
Total Load Reduction from Alternative 3	962.8 mt/yr
Remaining TN Load from Watershed	1,936.9 mt/yr
Remaining TN Concentration	0.98 ppm



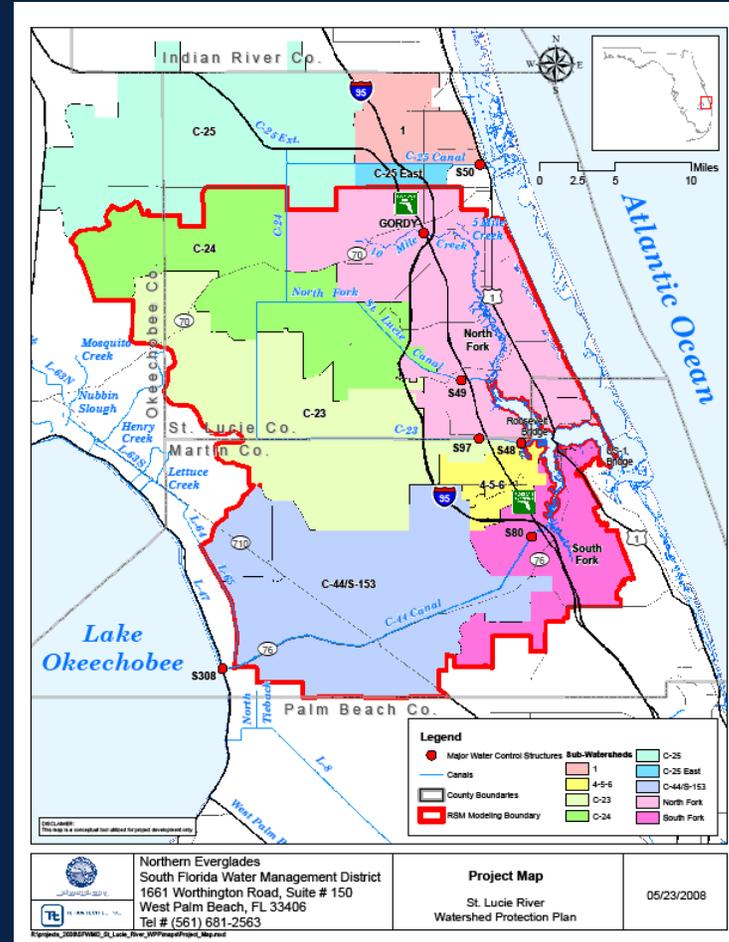
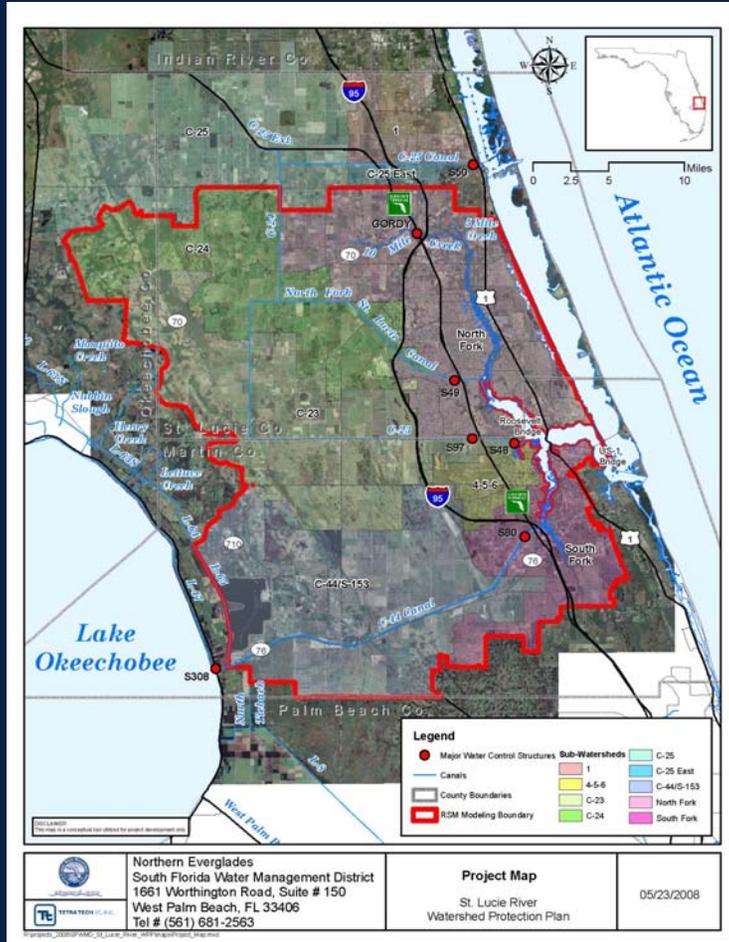
St. Lucie River Watershed Protection Plan

Mike Voich, P.E., Lead Project Manager



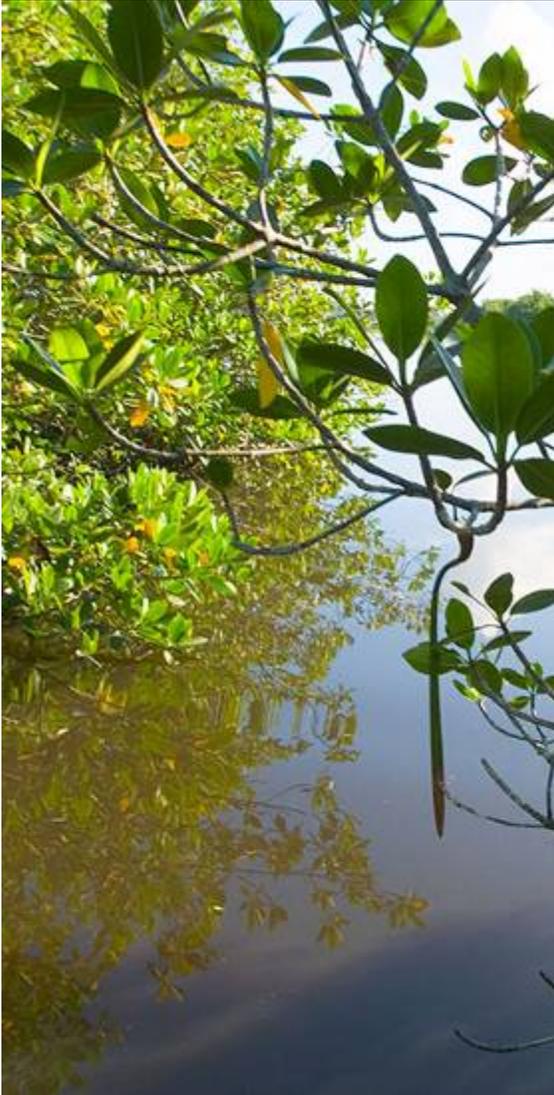


St. Lucie River Watershed





Presentation Topics



- **Description of Alternatives 1, 2 and 3**
- **WQ Analysis Results**
- **Next Steps**



Alternative 1 Summary



- **Common Elements (current, ongoing, and planned projects)**
- **Source Control Measures:**
 - **Agricultural and Urban Best Management Practices**
 - **Statewide Stormwater Rule**
 - **Source Control Regulatory Program**
 - **Land Application of Residuals**
 - **Florida Yards and Neighborhoods**



Alternative 1 Summary

- **Regional Projects:**
 - **CERP Indian River Lagoon – South**
 - **Ten Mile Creek Reservoir & Stormwater Treatment Area**
- **Local Projects:**
 - **Stormwater Retrofits**
 - **Septic Tank to Sewer Conversion**





WQ Results Alternative 1 Total Phosphorus

Current Load from Watershed	276.5 mt/yr
Load Reduction for Base Condition	28.3 mt/yr
Load Reduction for Alternative 1	84.4 mt/yr
Remaining TP Load from Watershed	163.7 mt/yr
Remaining TP Concentration	190 ppb

mt = metric ton = 1000 kg



WQ Results Alternative 1 Total Nitrogen

Current Load from Watershed	1,296.1 mt/yr
Load Reduction for Base Condition	103.5 mt/yr
Load Reduction for Alternative 1	402.4 mt/yr
Remaining TN Load from Watershed	790.2 mt/yr
Remaining TN Concentration	0.92 ppm



Alternative 2 Summary

- **Focus on water storage**
- **Note: No specific Water Storage Management Measures are sited within the St. Lucie Watershed for Alternative 2**





Alternative 3 Summary



- **Focus on water quality improvement - phosphorus and nitrogen**
- **Regional Project:**
 - **C-23/C-24 Water Quality Project**
- **Local Projects:**
 - **Stormwater Retrofits**
 - **Muck Removal Projects**
 - **Source Control**



Preliminary WQ Results Alternative 3 Total Phosphorus

Current Load from Watershed	276.5 mt/yr
Load Reduction from Alternative 1*	112.7 mt/yr
Load Reduction from Additional Alternative 3 Management Measures	30.1 mt/yr
Total Load Reduction from Alternative 3	142.8 mt/yr
Remaining TP Load from Watershed	133.7 mt/yr
Remaining TP Concentration	155 ppb

*includes Base Condition reductions



Preliminary WQ Results Alternative 3 Total Nitrogen

Current Load from Watershed	1,296.1 mt/yr
Load Reduction from Alternative 1*	402.4 mt/yr
Load Reduction from Additional Alternative 3 Management Measures	100.2 mt/yr
Total Load Reduction from Alternative 3	502.6 mt/yr
Remaining TN Load from Watershed	690.0 mt/yr
Remaining TN Concentration	0.80 ppm

*includes Base Condition reductions



Hydrologic Modeling Update

***Mike Voich, P.E., St. Lucie River Watershed
Protection Plan Project Manager***



Water Quantity Analysis

- **Water budget analysis using Northern Everglades Regional Simulation Model (NERSM)**
- **General Assumptions**
 - **Period of simulation: 1970-2005**
 - **Daily time step**
 - **Lake Okeechobee Regulation Schedule: Water Supply and Environment (WSE)**



Summary of Model Run Assumptions - Current Base

- **Represents conditions as they existed in the Northern Everglades Watershed in 2005**
- **Assumes no projects as defined by the Comprehensive Everglades Restoration Plan (CERP)**
- **Same as in the current base scenario established for the Lake Okeechobee Watershed Construction Project Phase II Technical Plan (LOWCP P2TP)**



Summary of Model Run Assumptions - RWPP Base

- **Kissimmee River Restoration including Kissimmee River Headwaters Revitalization project**
- **All Acceler8 projects are in place**
- **Authorized MODWATERs and C-111 projects**
- **Northern Everglades LOWCP P2TP**



Summary of Model Run Assumptions - Alternative 1

- **RWPP base conditions plus Alt1 management measures:**
- ***For Caloosahatchee River Watershed:***
 - **Additional Reservoirs**
 - **Additional Water Quality Treatment Areas**
- ***For St. Lucie River Watershed:***
 - **Indian River Lagoon-South Recommended Plan Components**



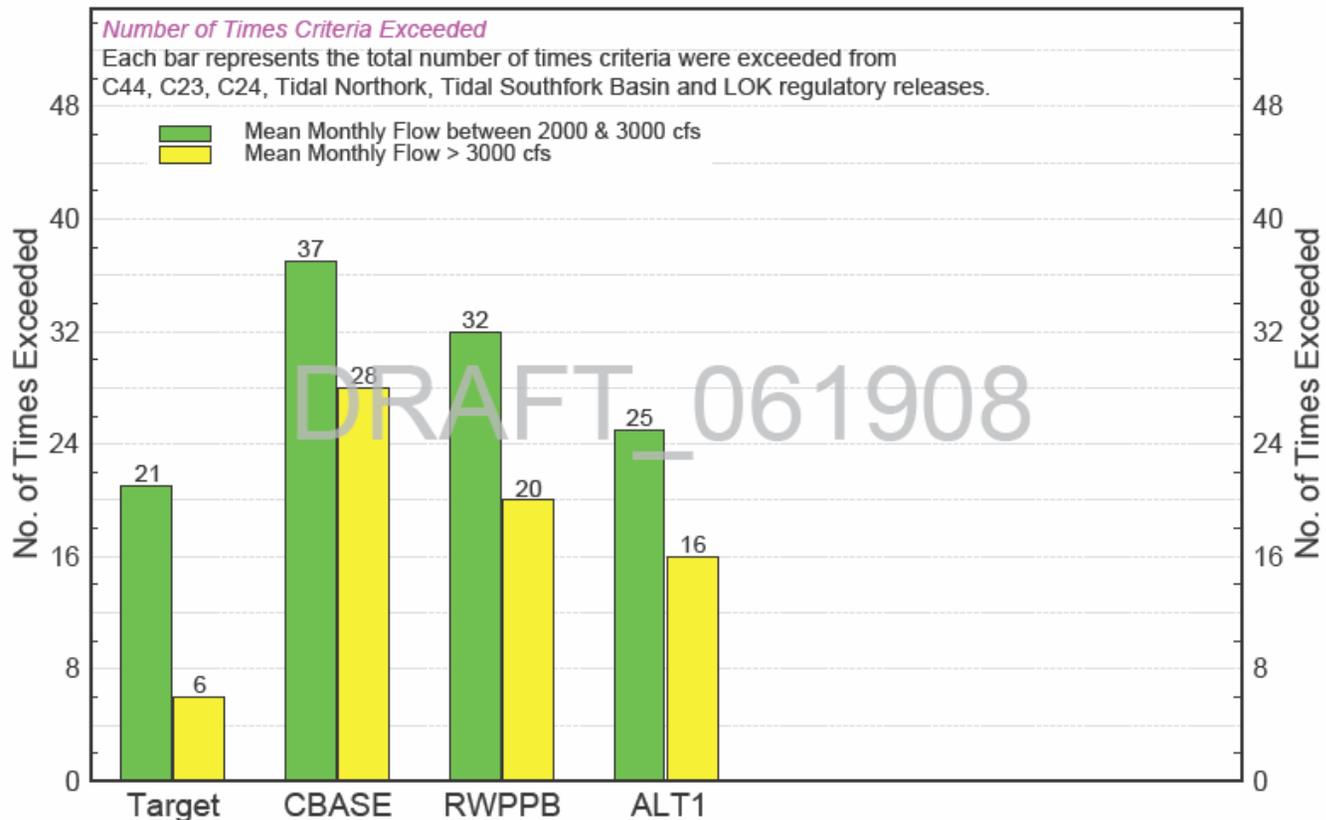
Lake Okeechobee Performance

- **Alternative 1 results showed little to no impact to Lake Okeechobee Stage Envelope performance (above and below) when compared to RWPP Base Run**
- **Alternative 1 showed improvement to water supply cutback volumes for “7 Worst Years” in Period of Simulation when compared to RWPP Base Run**



St. Lucie Estuary Performance

Number of Times St. Lucie High Discharge Criteria Exceeded
(mean monthly flows > 2000 cfs from 1970 - 2005)



Note: A favorable maximum monthly flow was developed for the estuary (2000 cfs) that will theoretically provide suitable salinity conditions which promote the development of important benthic communities (eg. oysters & shoalgrass). Mean monthly flows above 3000 cfs result in freshwater conditions throughout the entire estuary causing severe impacts to estuarine biota.

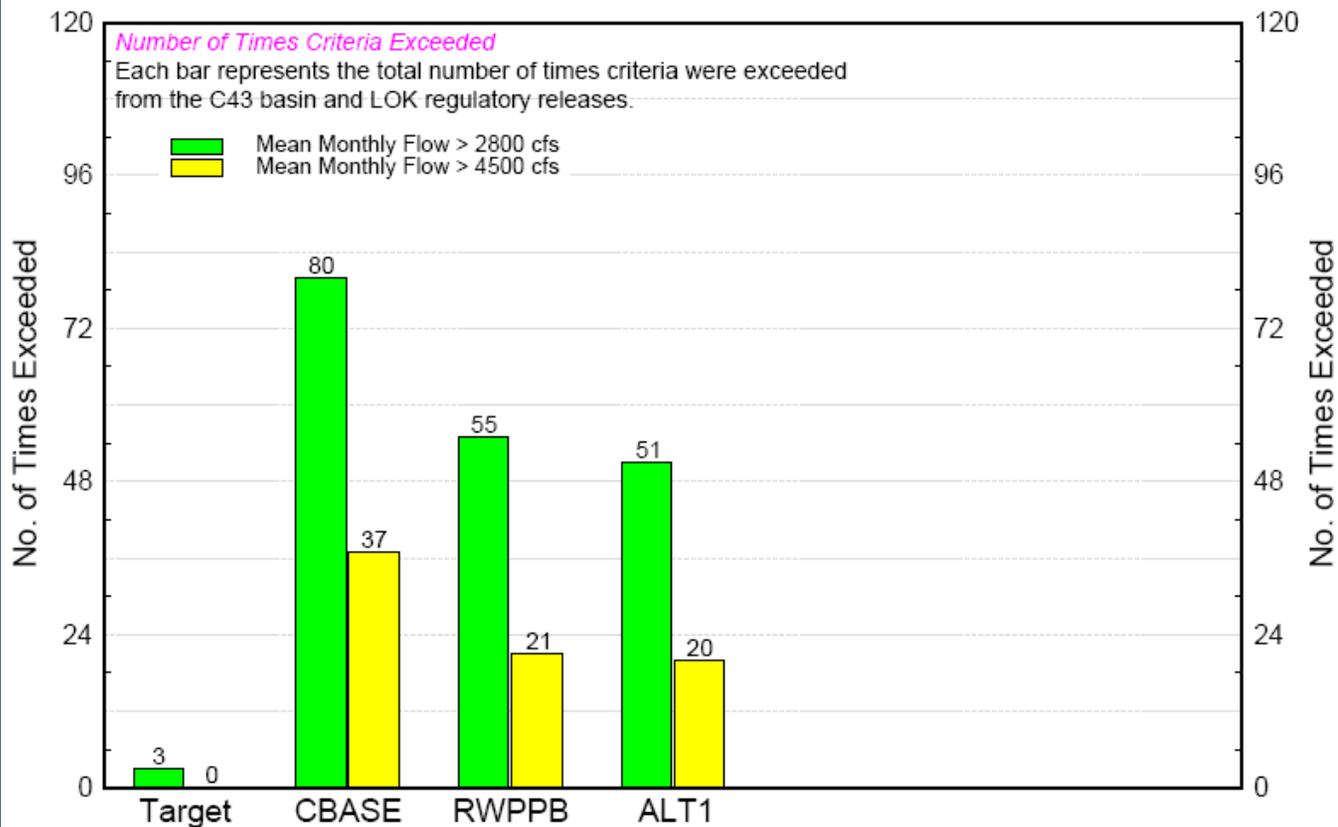
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Caloosahatchee Estuary Performance

Number of Times Caloosahatchee Estuary High Discharge Criteria Exceeded
(mean monthly flows > 2800 & 4500 cfs from 1970 - 2005)



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Estuary Salinity Envelope Performance

St. Lucie Estuary:

- Results show improvement toward current operational targets
- Additional effort to refine RECOVER's existing low-flow target

Caloosahatchee Estuary:

- Results show improvement toward established targets although additional storage may be needed



River Watershed Protection Plans - Next Steps



- **Complete hydrologic modeling and water quality analysis of Alternatives 2 and 3**
- **Formulate and evaluate Alternative 4 based on results of Alternatives 1, 2, and 3**
- **Identify preferred plan and complete drafting of document**

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Questions



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