SOUTH FLORIDA WATER MANAGEMENT DISTRICT

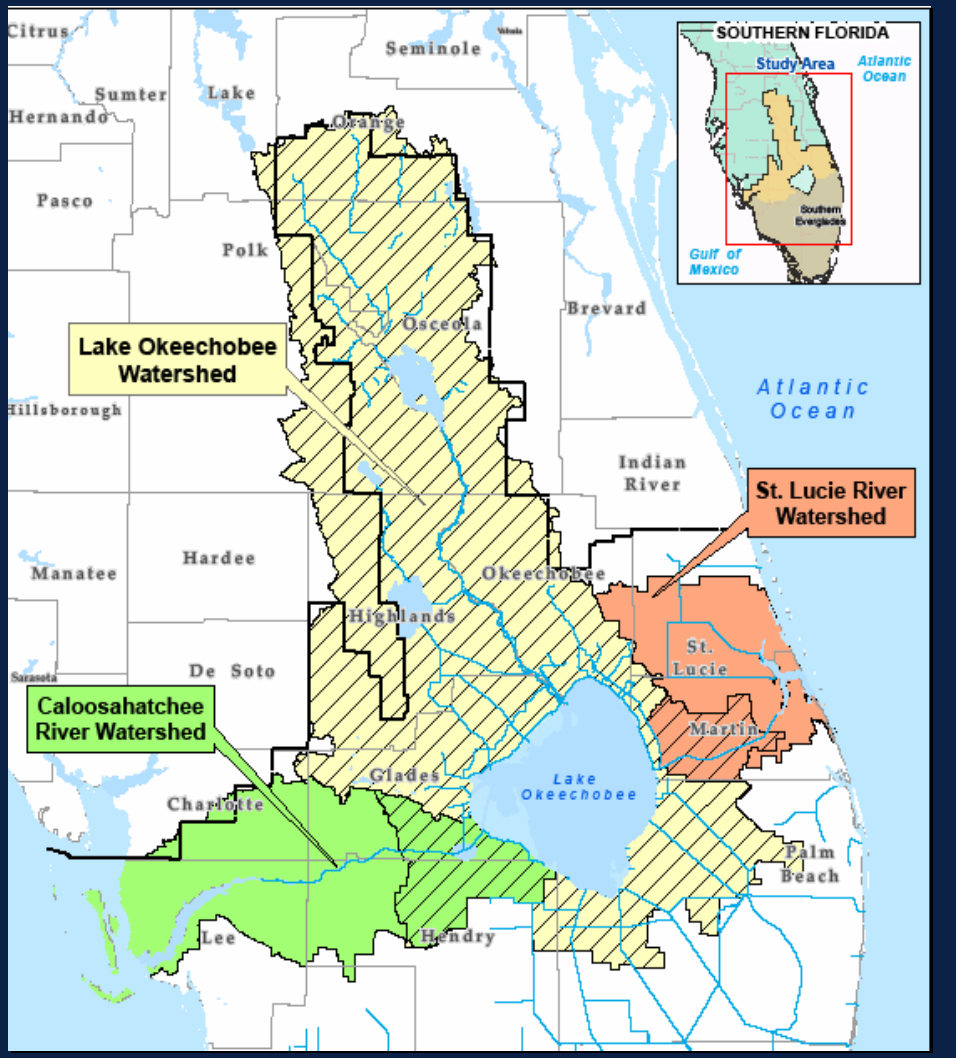
Northern Everglades- Draft Caloosahatchee River Watershed Protection Plan

Watershed Council Meeting – October 16, 2008
Janet Starnes – Principal Project Manager

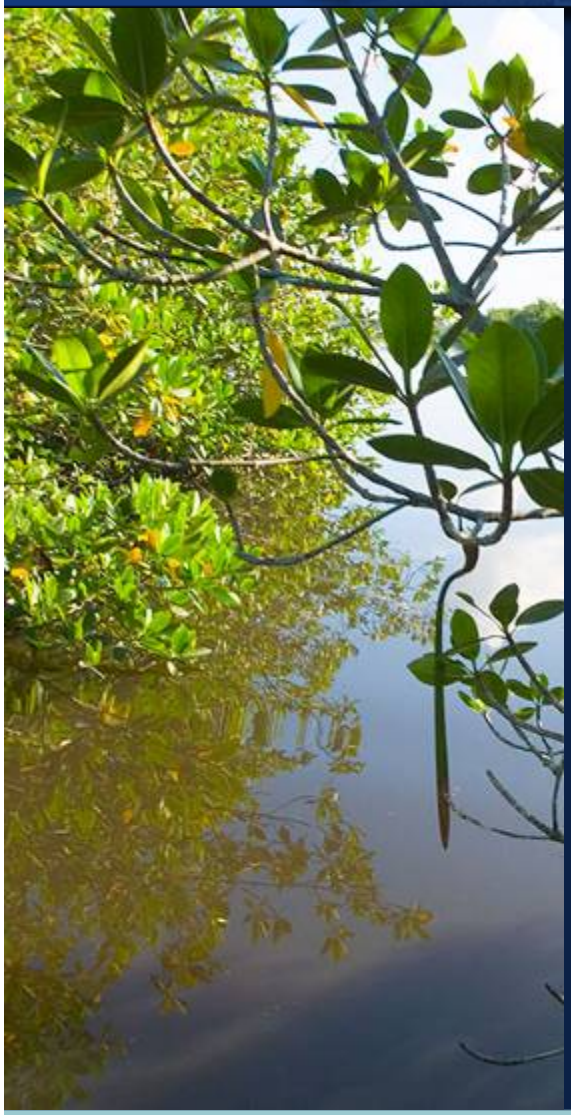
sfwmd.gov

Northern Everglades and Estuaries 2007 Legislation

- Requires development of **Caloosahatchee** and **St. Lucie River Watershed Protection Plans** to identify water quality and storage projects
  - Due by January 1, 2009
  - Developed by SFWMD, in cooperation with
    - Coordinating Agencies (FDEP and FDACS)
    - Lee, Martin, and other affected counties and municipalities
    - Working team



Working Team Meetings and Draft Plan



Working Team Meetings:

- Eight Interagency Working Team Meetings
- Two Ad-Hoc Group Meetings

Draft Report:

- Review by District Internal Team and Interagency Working Team Completed

River Watershed Protection Plan Objectives

- **Nutrient load reductions to achieve adopted Total Maximum Daily Loads**
- **Reduce frequency and duration of undesirable salinity ranges in estuary, while meeting other water-related needs of the region**

River Watershed Protection Plans Elements

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

Watershed Pollutant Control Program

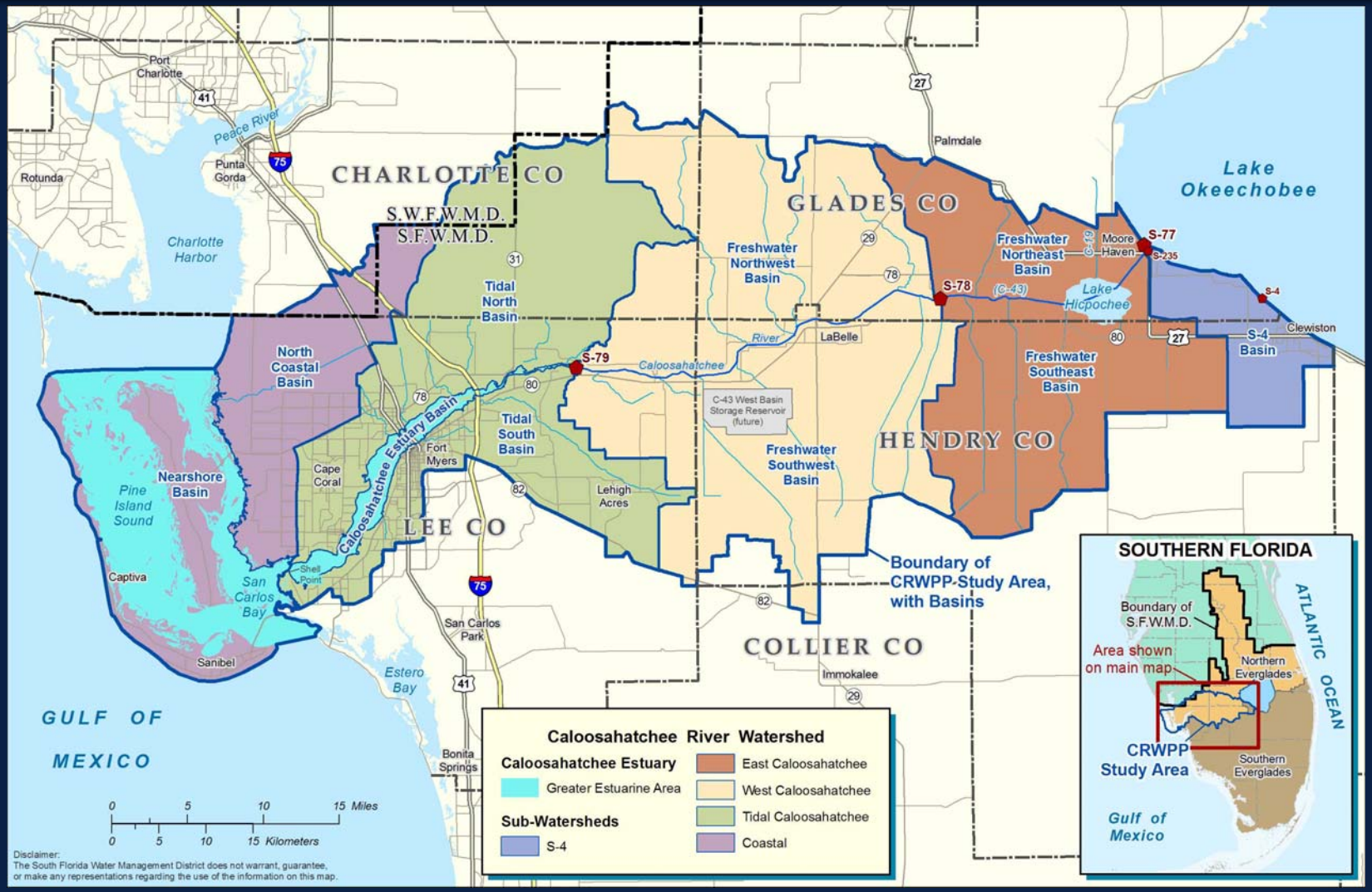
- **Implementation of Agricultural and Urban Best Management Practices**
- **Revisions to Regulatory Programs**
  - **Environmental Resources Permitting (ERP) Program**
    - **Statewide Stormwater Rule**
    - **Northern Everglades Basin Rule**
  - **40E-61 Regulatory Source Control Program in Estuaries**

Alternative Formulation and Evaluation – Watershed Construction Plan

- **Formulated alternatives for the watershed using management measures**
- **Evaluated each alternative for**
  - **Nitrogen and phosphorus load removal**
  - **Water quantity performance**

Alternative	Objective
1	Common elements (current, on-going and planned projects)
2	Maximizes water storage capacity
3	Maximizes phosphorus and nitrogen load reduction
4	Optimizes storage capacity and phosphorus and nitrogen load reductions – Selected as Preferred Plan

Caloosahatchee Sub-watersheds



Alternative Evaluation Results

- **Alternative 4 was selected as Preferred Plan**
- **Alternative 4 builds upon Lake Okeechobee Phase II Technical Plan**
- **Water quality and quantity results reflect benefits provided by implementation of the Lake Phase II Technical Plan and the River Watershed Protection Plans**

Preferred Plan Summary

Caloosahatchee Preferred Plan
• BMPs/Regulatory Programs • Regional water quality projects-emphasis on nitrogen • C-43 West Reservoir • Additional storage in freshwater basins • Local quality/quantity projects (e.g., stormwater retrofits; septic conversions- Lehigh, Cape Coral; Alternative Water Storage Facilities) • Additional watershed monitoring
Summary
• ~400,000 ac-ft/yr storage (including C-43 West Reservoir) • Nutrient treatment

Caloosahatchee Preferred Plan Results

- **Nutrient load reductions to the estuary:**
  - **Total Nitrogen- 38%**
  - **Total Phosphorus- 39%**
- **Approximately 400,000 acre-feet of watershed storage:**
  - **Including the C-43 West Basin Storage Reservoir and additional storage in freshwater basins**
  - **In addition to the 900,000 acre-feet of storage in the Okeechobee Watershed (Lake Okeechobee Technical Plan- Phase 2)**

Caloosahatchee Preferred Plan- Water Quality Results

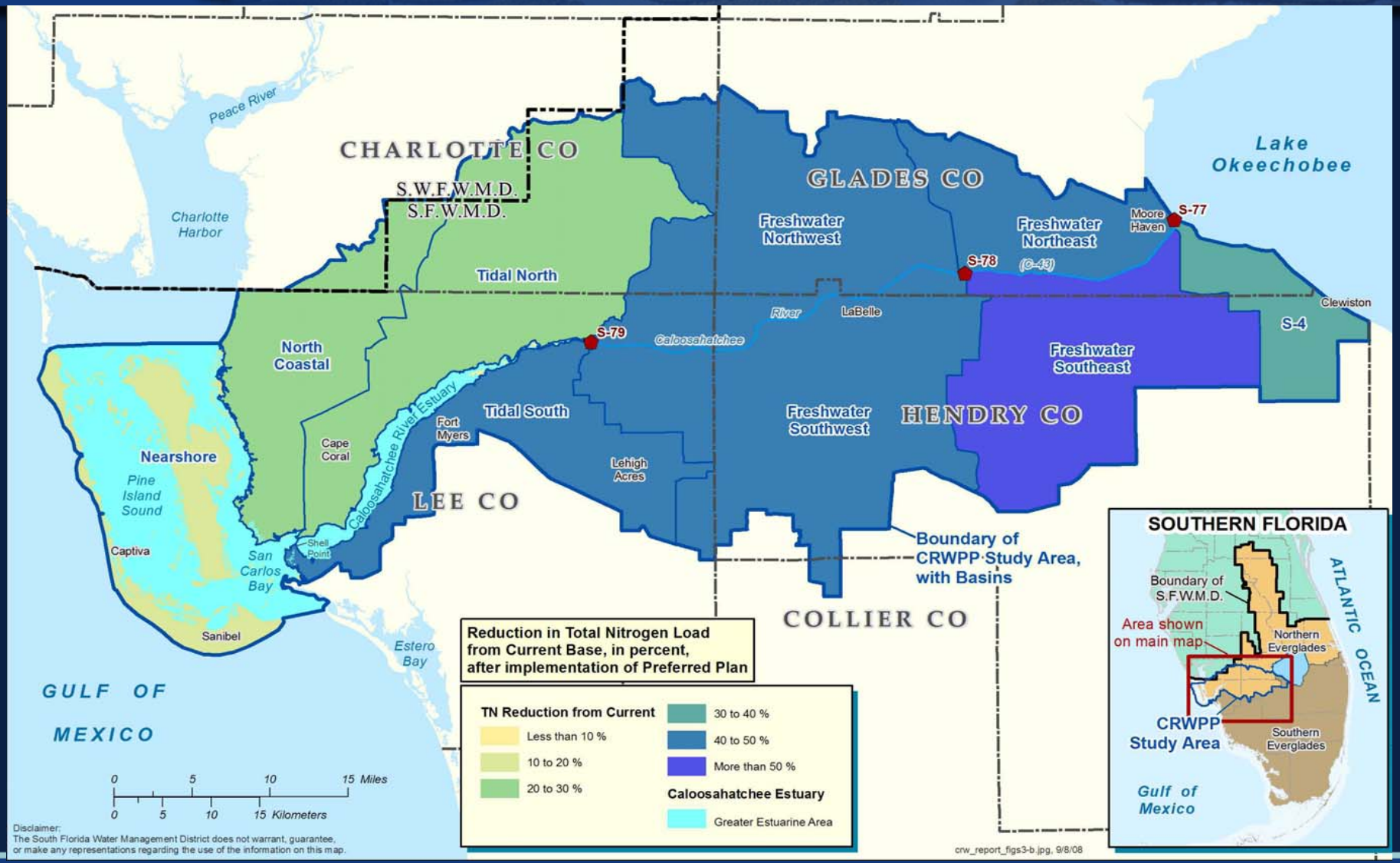
	Total Nitrogen	Total Phosphorus
Total Load Reduction[1]	**38%**	**39%**
Watershed Load Reduction[2]	36%	38%
Lake Okeechobee Load Reduction[3]	38%	36%
Resulting Load	**3011 mt**	**265 mt**
Resulting Concentration	**1.08 ppm**	**94 ppb**

[1] Lake Okeechobee and CR Watershed Combined Load Reduction from Current Base

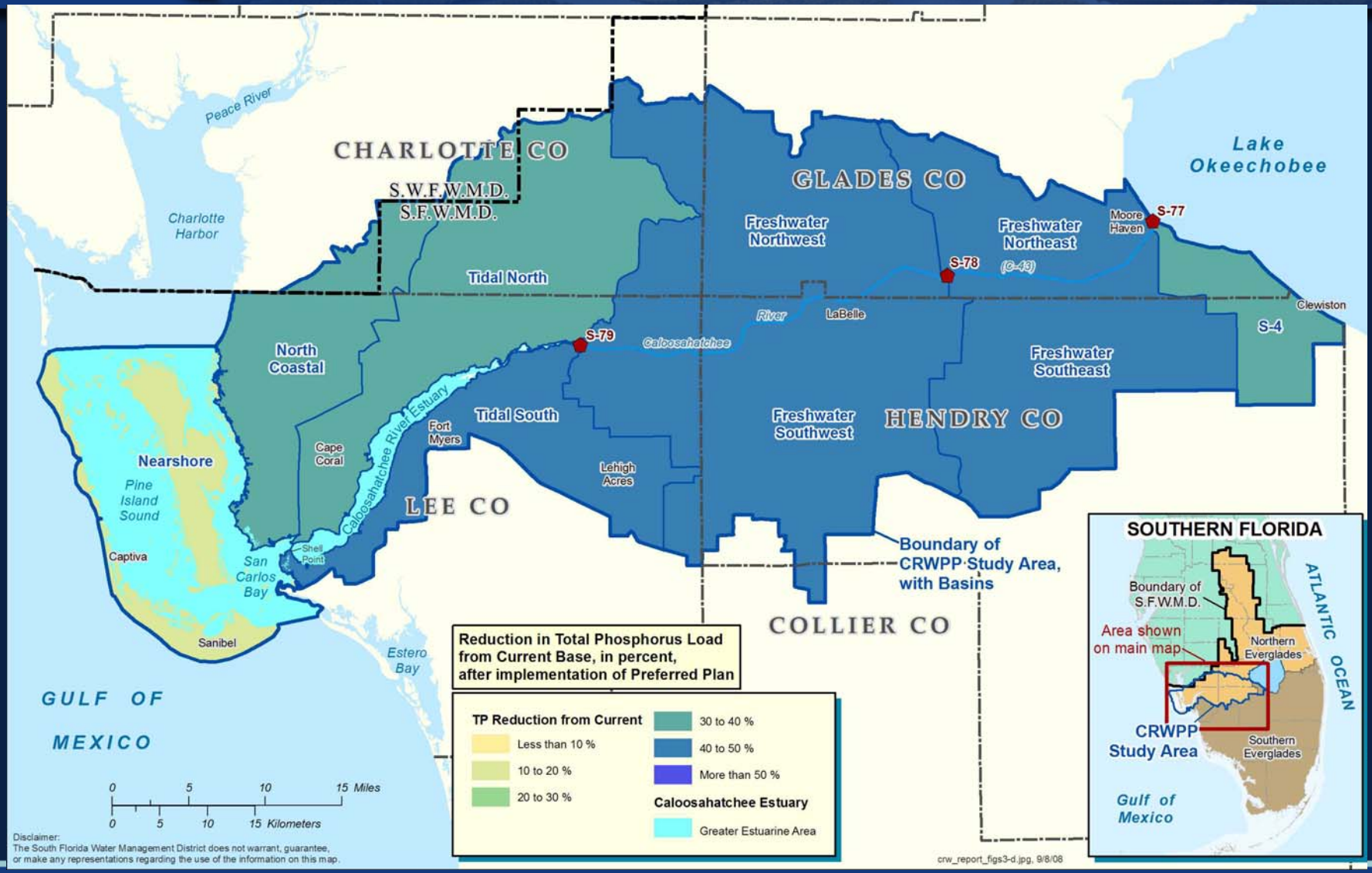
[2] Watershed Only Load Reduction from River Watershed Protection Plan Base

[3] Lake Okeechobee Only Load Reduction from Current Base

Caloosahatchee Preferred Plan- Nitrogen Results



Caloosahatchee Preferred Plan- Phosphorus Results



Caloosahatchee Preferred Plan- Water Quantity Results

High Flows

- Reduces high flow events caused by watershed alone by more than half (from 48 to 20 events)

Low Flows

- Reduces low flow events from 189 events to 4 events

Ecological Assessment

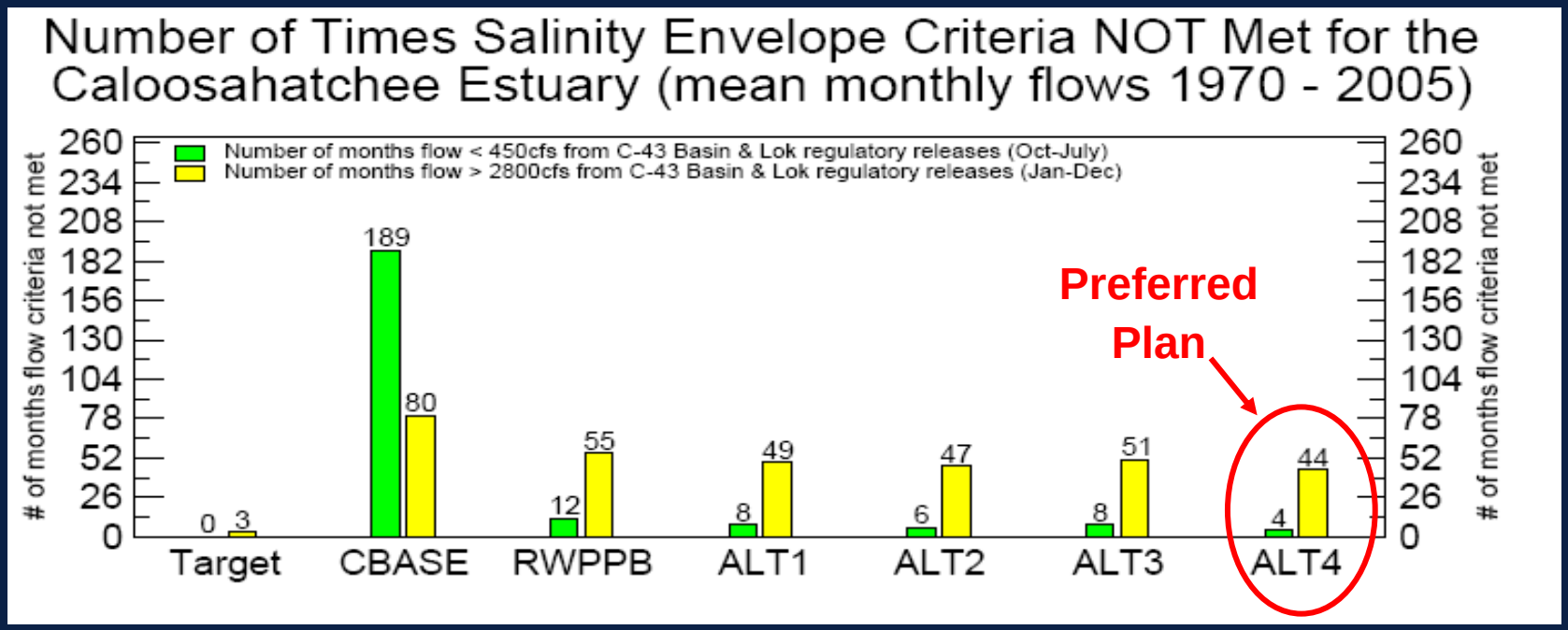
- Target Flow Distribution- 84% improvement over current conditions
- Reduction in months with detrimental flows from 62% to 11%

Caloosahatchee Preferred Plan- Storage Capacity (ac-ft/yr)

		Total Storage
CRWPP	▪Includes C-43 West Reservoir ▪Includes ~215,000 ac-ft additional storage	~400,000 ac-ft/yr

- This table reflects total watershed storage for the Preferred Plan
- This watershed storage is in addition to storage identified in the Lake Okeechobee Phase II Technical Plan (~900,000 ac-ft/yr)

Caloosahatchee Performance-Salinity Envelope



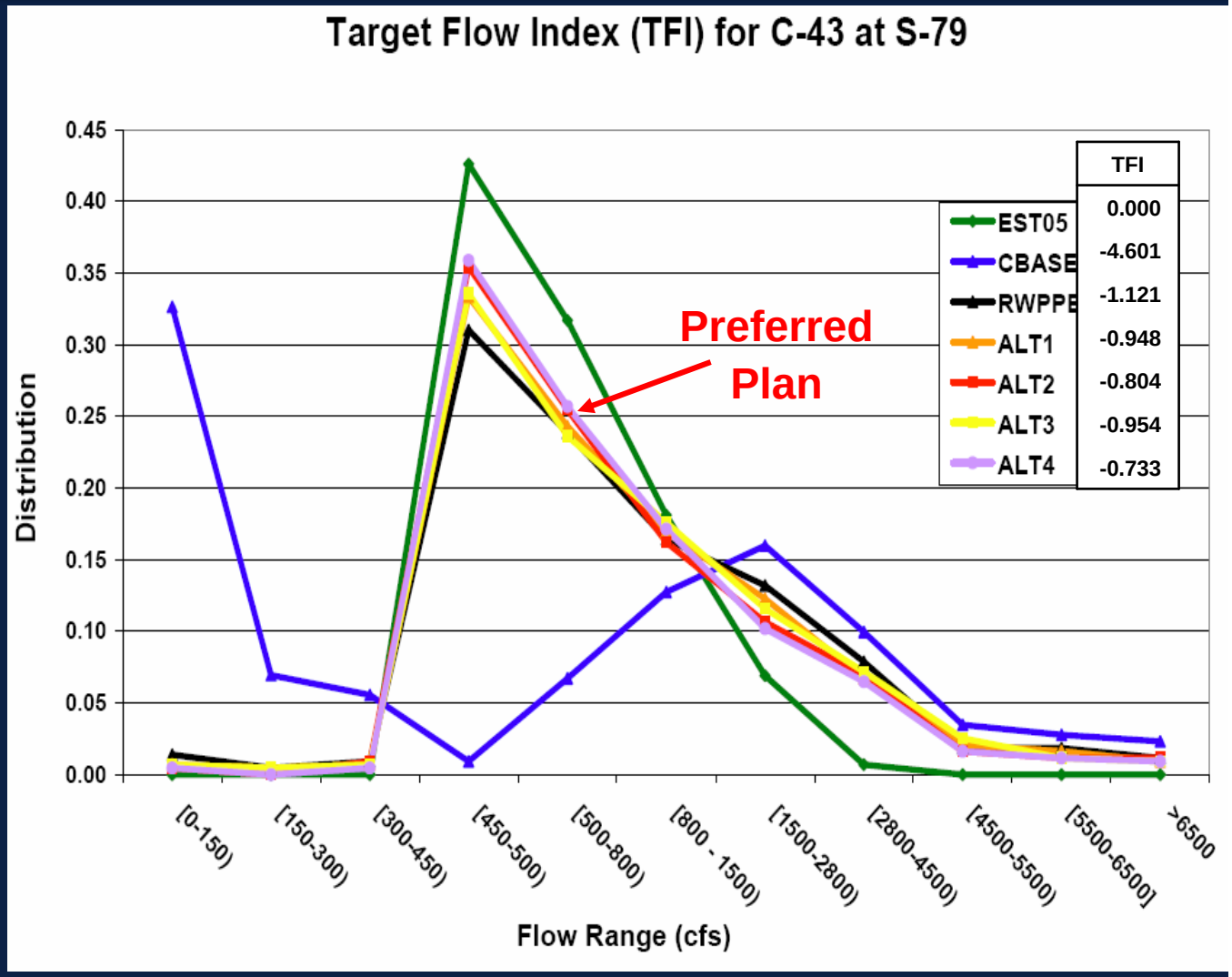
- Results show improvement toward established targets
- High flow- (compared to CBASE)
  - RWPPB greatly reduces lake only high flow events (from 21 months to 8 events);
  - Alt 4 greatly reduces watershed only exceedances (from 48 months to 20 months);
  - Remaining high flow events are caused by a combination of lake and watershed flows (16 events remaining)
- Low flow- Alt 4 reduces low flow exceedances from 189 to 4 months as compared to CBASE

Caloosahatchee Performance- Target Flow Index

- **Target Flow Index= preferred flow distribution shown by green line**

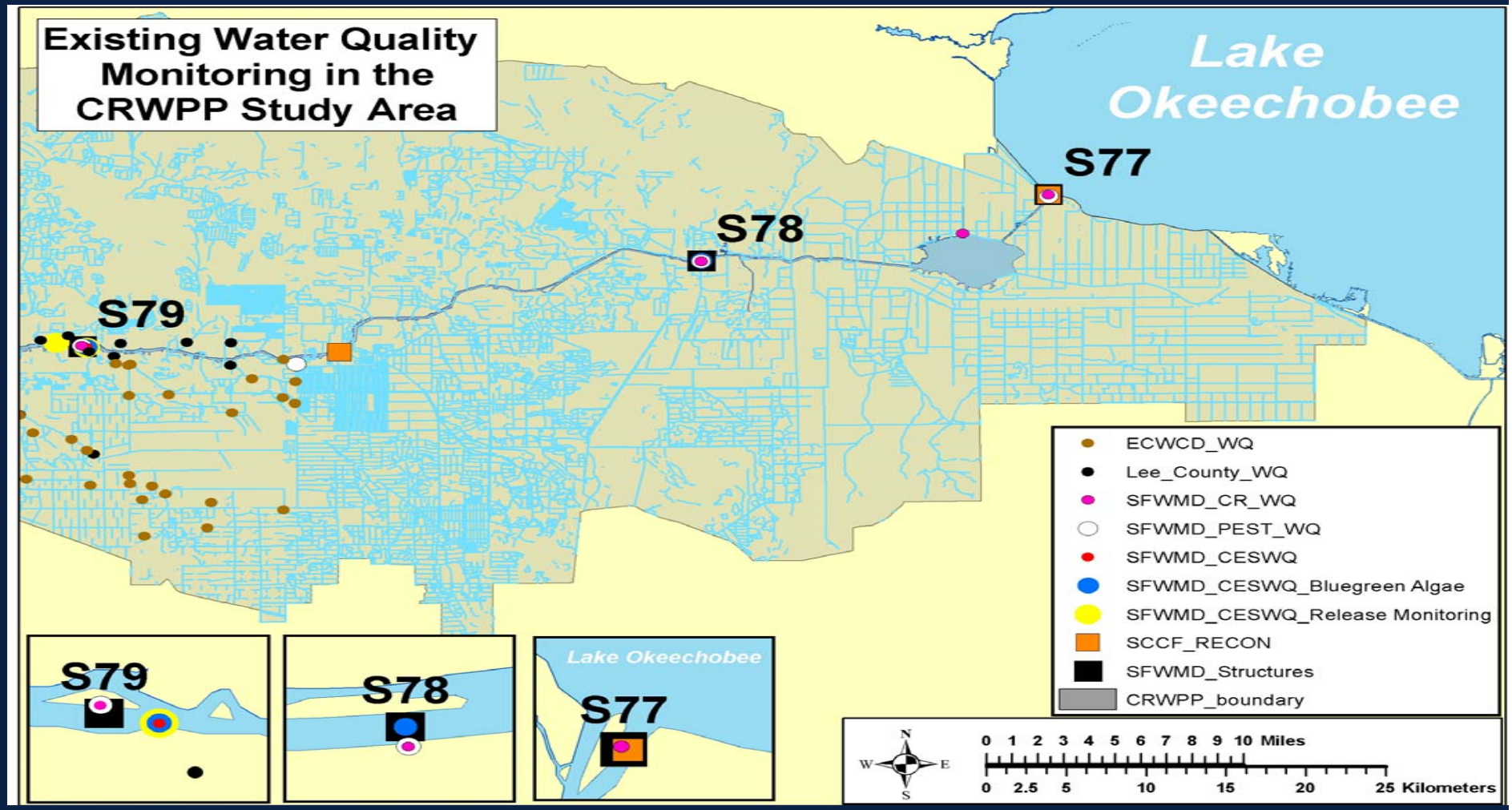
Alt	Improvement*
1	79 %
2	82 %
3	79 %
4	84%

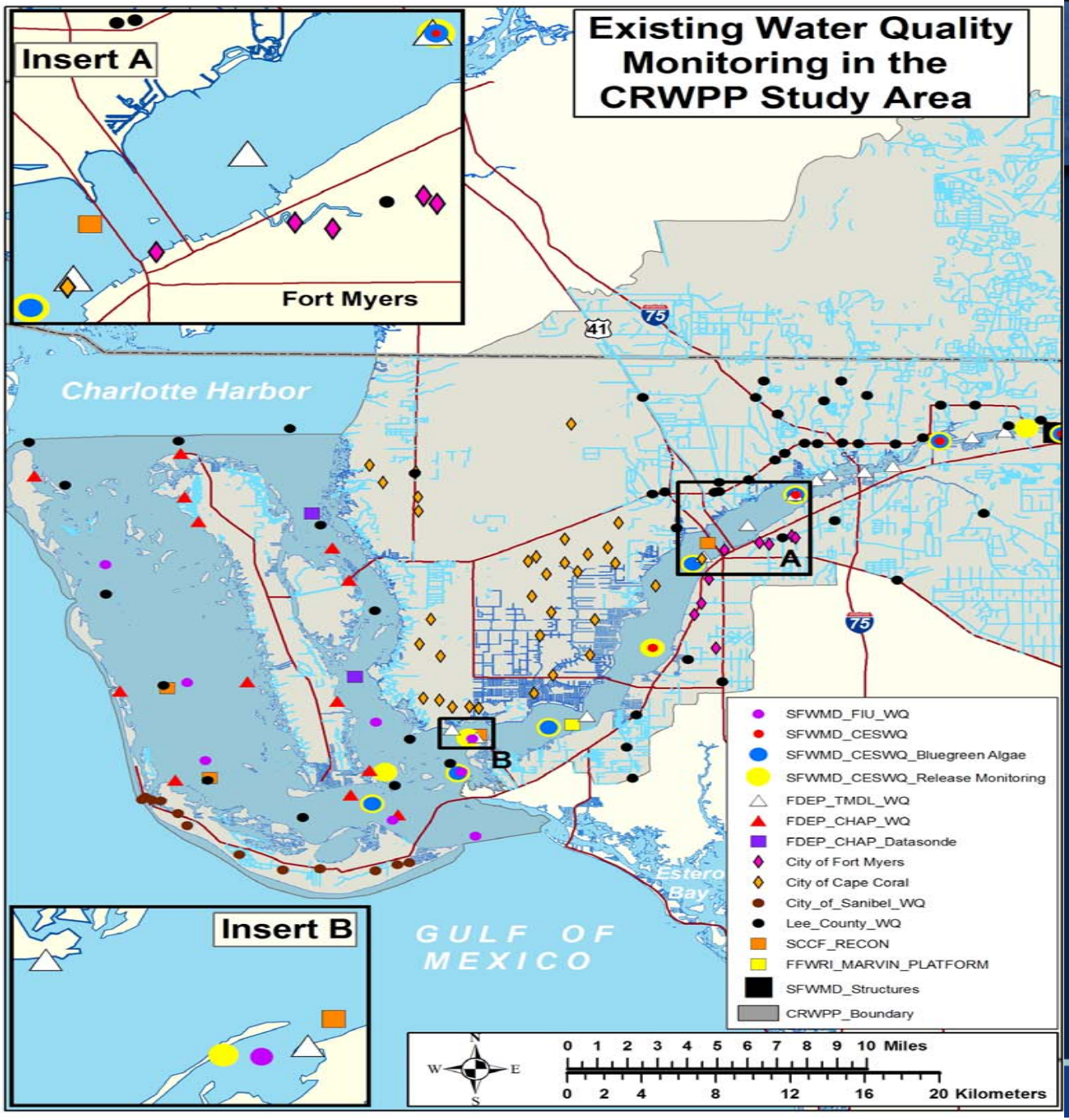
*** Improvement compared to CBase**



Monitoring Program – Caloosahatchee River and Estuary

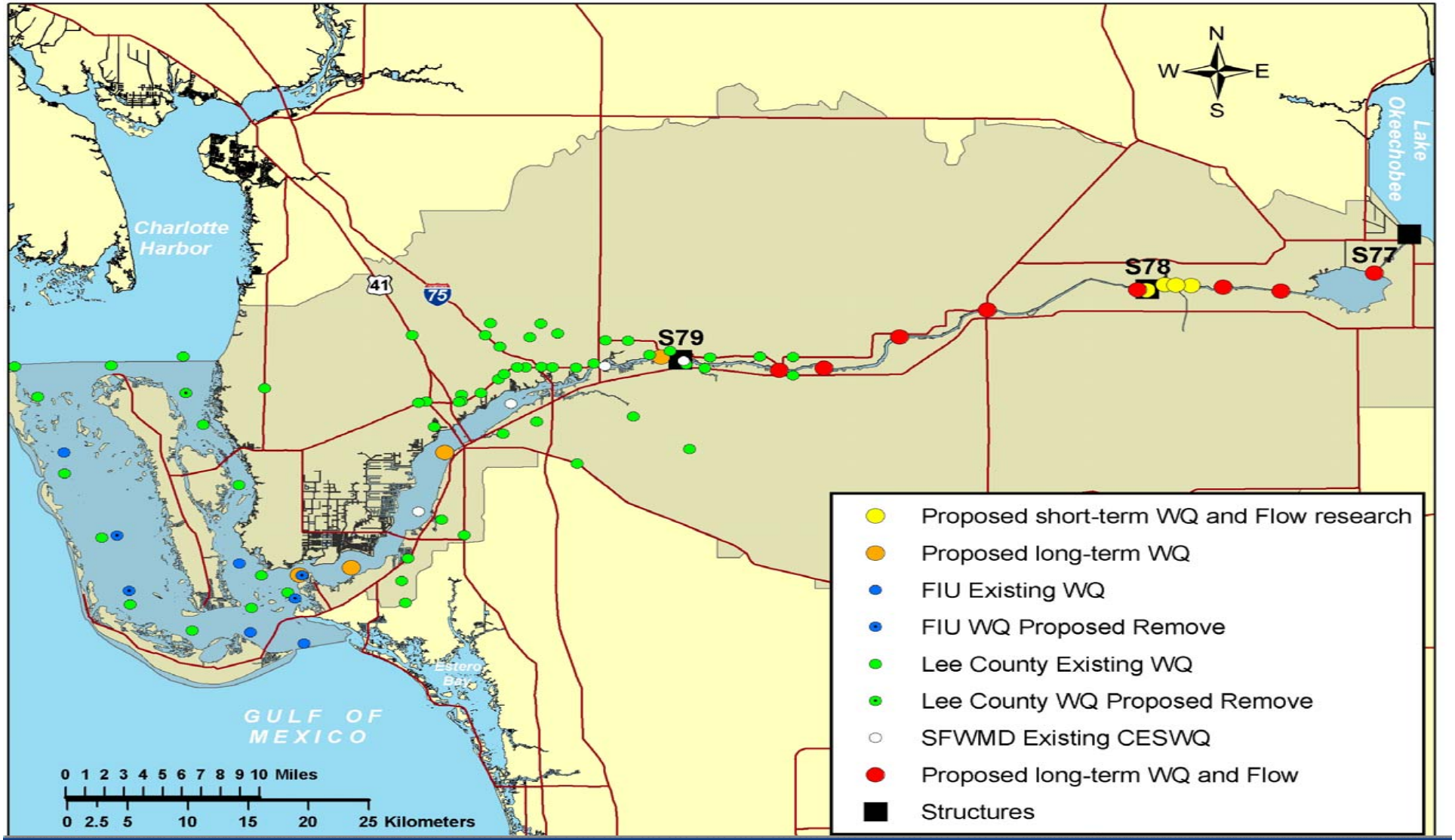
Existing Water Quality Monitoring Program – East of S-79





Caloosahatchee Existing Water Quality Monitoring Program - Estuary

Caloosahatchee Water Quality
Working Team Summary - Long Term Water Quality and Flow Stations



Caloosahatchee Existing Aquatic Habitat Monitoring Inventory

- **Seagrass monitoring**
  - **Sanibel Captiva Conservation Foundation (SCCF) Marine Lab**
  - **FDEP-**
    - **South District**
    - **Charlotte harbor Aquatic Preserve (CHAP)**
    - **ESTERO Bay Aquatic Preserve (EBAP)**
  - **South Florida Water Management District (SFWMD) – Hydroacoustic and aerial photo monitoring program**

- **Oyster Distribution – District RECOVER Monthly Monitoring Program**

Caloosahatchee Monitoring Program Assessment Summary

Water Quality and Flow Monitoring	**East of S-79-** Lack of water quality and flow monitoring: **Add eight long-term sites in the main stem of CR and four short-term sites in canal tributaries flowing into CR**
	West of S-79: Most of the estuarine portion of the study area is sufficient to assess status and trends. However spatial gaps exist: **Propose to reinstate four historic CESWQ sites and to optimize the system by removing five SFWMD/FIU existing sites and one Lee County site**
	Additional water quality parameters are also recommended: **Dissolved forms of organic nitrogen and BOD5**
Salinity Monitoring	**Existing monitoring is adequate** to meet the objectives. **Recommend continuation**
Aquatic Habitat Monitoring (Oysters and SAV)	**Existing programs are sufficient** to detect trends and assess status of seagrass and oysters. **Recommend continuation**

Research Program – Caloosahatchee River and Estuary

Research Projects

Research Topics

- Nutrient Budget
- Dissolved Oxygen Dynamics
- Low Salinity Zone- Nursery Function
- Light Attenuation in San Carlos Bay*
- Integrated Modeling Framework

Research
#1 Estuarine Nutrient Budget

- **Nutrient budget determines nutrient reduction approaches and evaluate and optimize project effectiveness.**
- **Terms in the nutrient budget will be determined by a variety of methods: Input, Cycling, Output.**

Research
#2 Dissolved Oxygen Dynamics

- **DO – Health Indicator**
- **Understand DO dynamics helps understand impacts from the pollutant loads to estuarine ecosystems.**
- **The role of internal and external factors in determining the concentration of dissolved oxygen will be examined and studied.**

Research
#3 Low Salinity Zone

- **Provide primary ecological nursery function for early life stages of economically important fish and shell fish.**
- **Provide information needed for flow and salinity envelope refinements.**
- **The effects of freshwater discharge on production of fish larvae in the low salinity zone will be examined and studied.**

Research - Caloosahatchee

#4 Light Attenuation in San Carlos Bay

- **Caloosahatchee Value Ecosystem Component – Seagrass**
- **To identify the controlling factors (Colored dissolved organic matter -CDOM, Chlorophyll/nutrient, TSS/Turbidity) and determine their relative contributions to light attenuations.**

Research
#5 Integrated Modeling Framework

- **Provide needed technical support for implementation and adaptive management**
- **Integrated Modeling Framework**
- **Examine existing modeling inventory and identify data or modeling needs**
  - **Watershed hydrology (surface and groundwater) and water quality models**
  - **Estuary hydrodynamic (salinity) and water quality models**
  - **Estuary Ecological (Seagrass, oyster, etc.) models.**
- **3 years plan and long term goal identified**

Plan Implementation Strategy

- **Multiple Phases**
  - **Phase I- projects initiated 2009-2012**
  - **Phase II- projects initiated 2013-2018**
  - **Phase III- projects initiated beyond 2018**

Caloosahatchee RWPP- Phase I

		Initiated	Completed
Construction Project	Powell Creek Algal Turf Scrubber		✓
	Alternative Water Storage Facilities- Barron Water Control District		✓
	Caloosahatchee Area Lakes Restoration (Lake Hicpochee)	✓	
	C-43 Water Quality Treatment Demonstration Project (BOMA)	✓	
	Spanish Creek/Four Corners Environmental Restoration Phase I	✓	
	C-43 West Reservoir	✓	
	Local-Stormwater Projects (e.g., treatment wetlands, conveyance and structural improvements, and stormwater recovery projects)	✓	✓
	Florida Ranchlands and Environmental Services Projects	✓	
	Farm and Ranchland Protection Program	✓	

Cost Categories

- **Non-CERP Cost**
  - Costs to be paid from State, SFWMD, and/or local sources
- **CERP Cost**
  - State CERP costs are eligible for 50 percent cost share with the federal government; may also include local cost share
- **Local Cost**
  - Costs that will be covered entirely by local government or may be cost shared with local government and State or SFWMD sources
  - $5M per River Watershed per year was used for Phase I estimates (covers local projects and Alternative Water Storage Facilities)

Caloosahatchee RWPP- Phase I Costs

		CERP	Non-CERP	Local
Construction Project		$524-781M	$117-175M	$15M[a]
Pollutant Control Program	Agricultural		$3.3-4.0M[b]	
	Urban		$663-809M[c]	
Research and Water Quality Monitoring			$5.2M[d]	

[a] $15M reflects state's contribution

[b] Assumes 50% state contribution for capital costs only; all BMPs implemented by 2015

[c] Includes total capital costs

- No cost share assumptions included, but most costs will be borne by local and state programs and only a fraction of these costs will likely be borne by RWPPs
- No phasing assumptions included

[d] Reflects research and additional monitoring not ongoing monitoring

Next Steps

- **Complete Public Review Process**
  - **Draft Plan is available online between Oct 1 and Oct 31 at https://my.sfwmd.gov/northerneverglades**
  - **Comments can be submitted via**
    - **Website (web board)**
    - **US Mail to- Janet Starnes, c/o SFWMD, Lower West Coast Regional Service Center, 2301 McGregor Boulevard, Fort Myers, FL 33901**
- **Final Plan delivery to the Legislature by Jan 1, 2009**
- **Annual progress reports and three year plan updates**
- **Public involvement throughout plan updates and revisions**

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Questions?