

Governing Board Workshop
February 10, 2010

**Adaptive Protocols For
Lake Okeechobee Operations**
Status Update

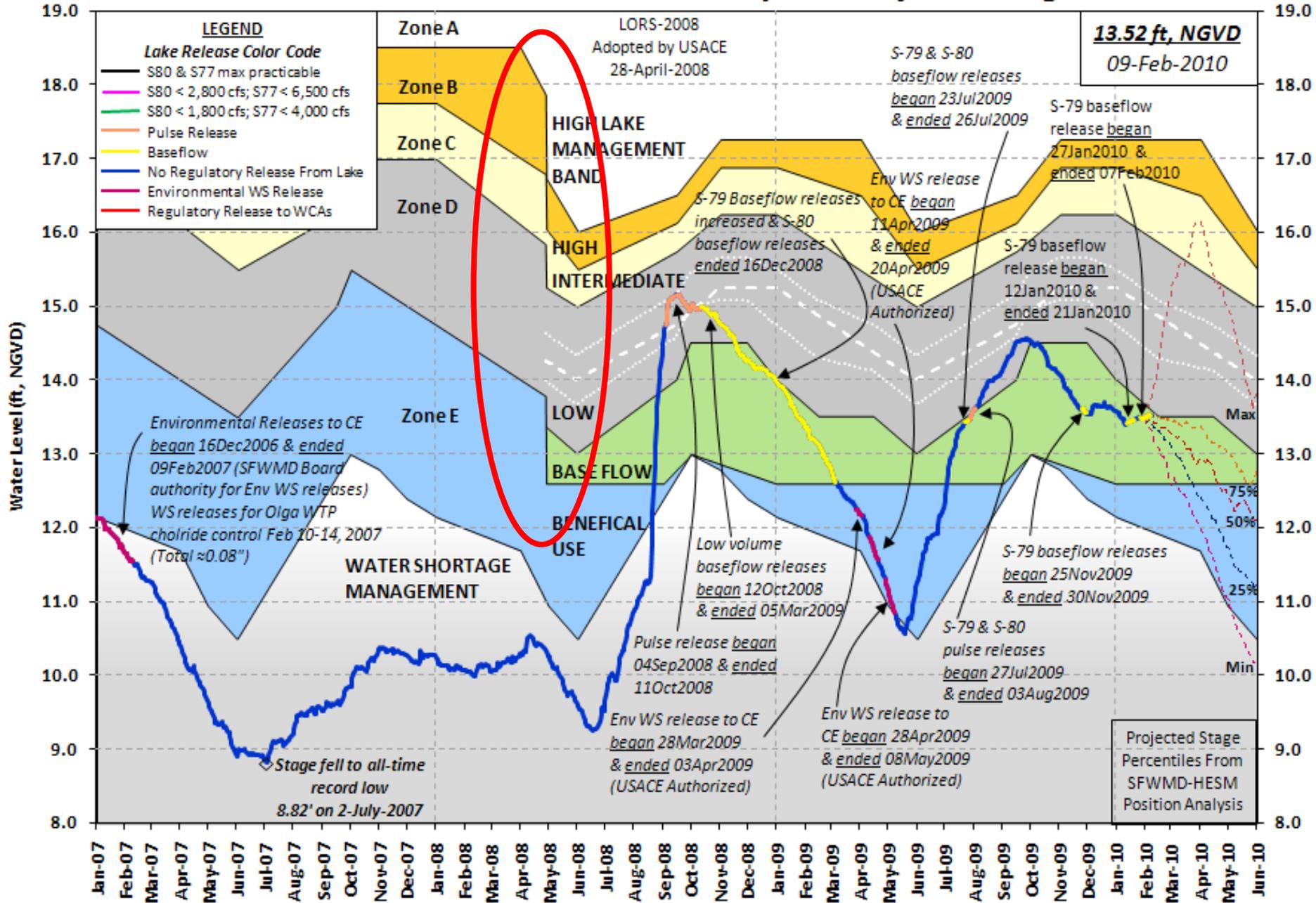
Susan Gray, Ph.D., Chief Scientist
Restoration Sciences Department

2003 Adaptive Protocols Summary

- Identify specific discharge amounts in WSE where the schedule indicates an “up to” amount
- Aim to maximize benefits to environment without increased risk to water supply
- Include the option of making environmental water deliveries to downstream ecosystems, but not exceeding 300 cfs unless approved by the Governing Board, and only in Zone D or above
- Take advantage of opportunities where the WSE schedule calls for releases to the WCAs to provide freshwater to meet demands of the estuaries

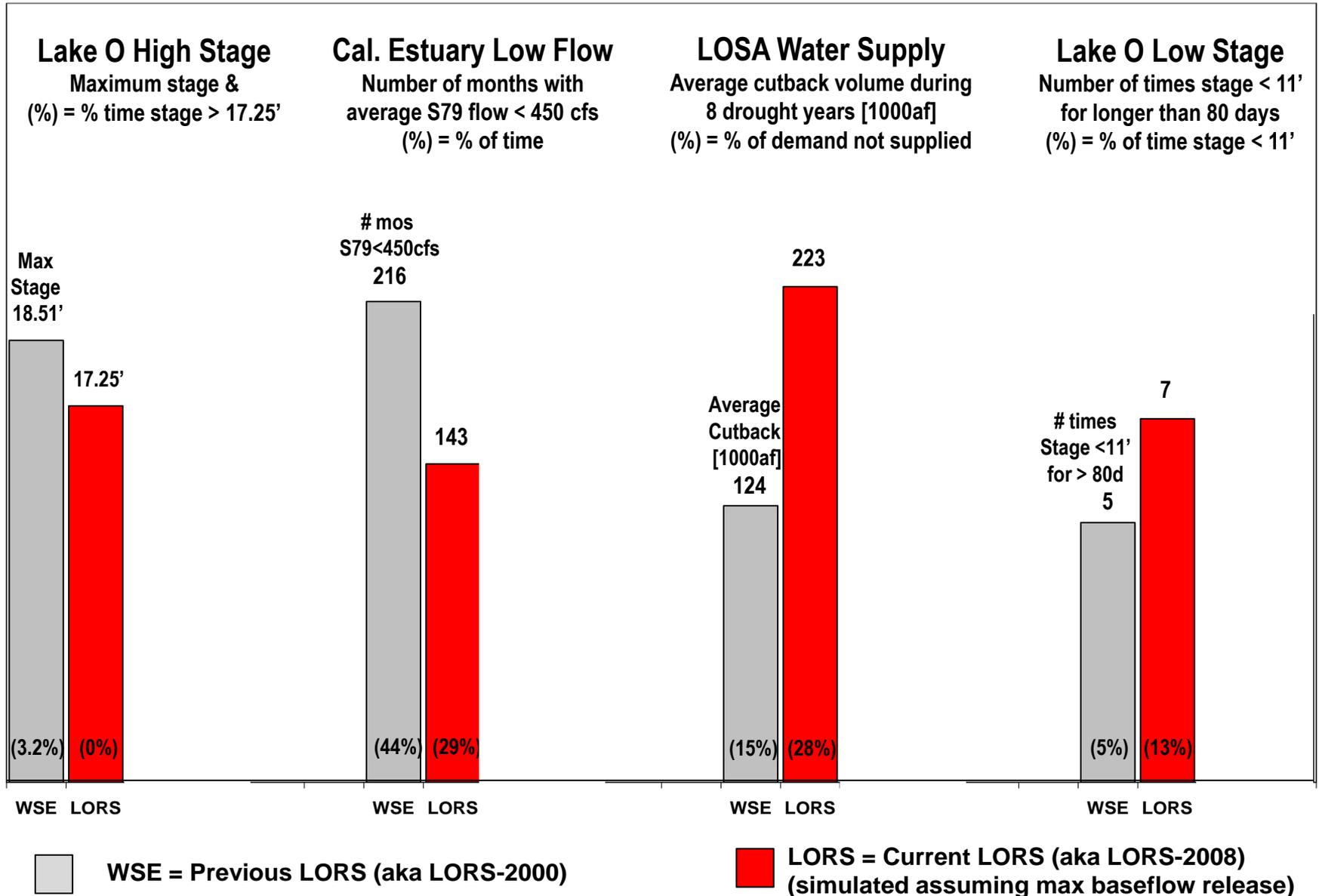


Lake Okeechobee Water Level History and Projected Stages



Performance Comparison (41-yr simulation)

WSE v. LORS



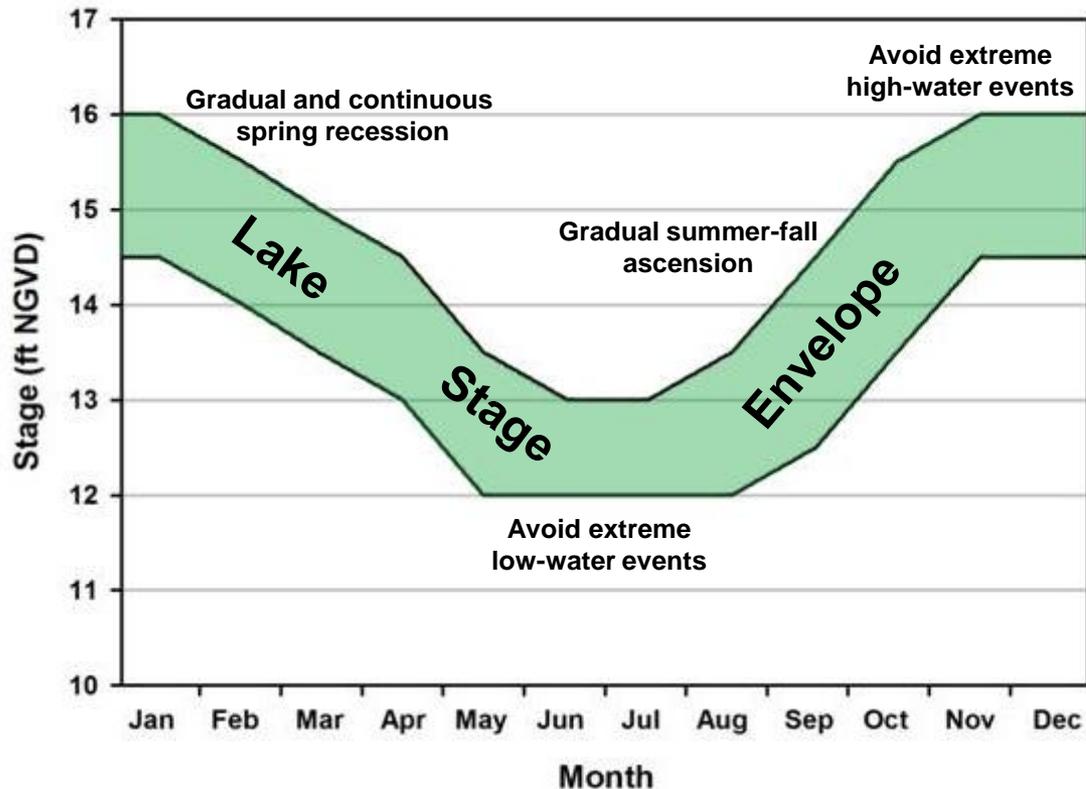
Draft Guiding Principles – Key Components

- Balance water supply, flood protection, and environmental protection
- Provide guidance where releases are expressed as a range of volumes, i.e. “up to 2000 cfs”
- Identify opportunities for “win-win” or “win-neutral” improvements
- Provide guidance on environmental deliveries to the estuaries in the base flow and beneficial use subbands



Lake Okeechobee: Weekly Performance Measures

Stage Envelope (Desirable Seasonal Range):



Lake Okeechobee: Weekly Performance Measures

Performance Measure

Categories

Extreme High Stage

Impacts can occur rapidly

>17 ft
16 to 17 ft



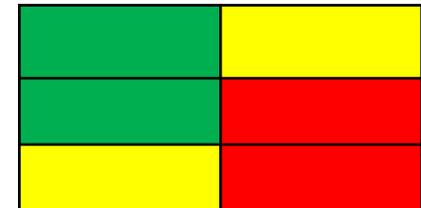
Moderate High Stage

Stages in excess of 15 ft, impacts build over time

Impacts depend on season

>1 month
>2 month
>4 month

Oct-Apr May-Sept



Extreme Low Stage

Stages below 11 ft, impacts build over time

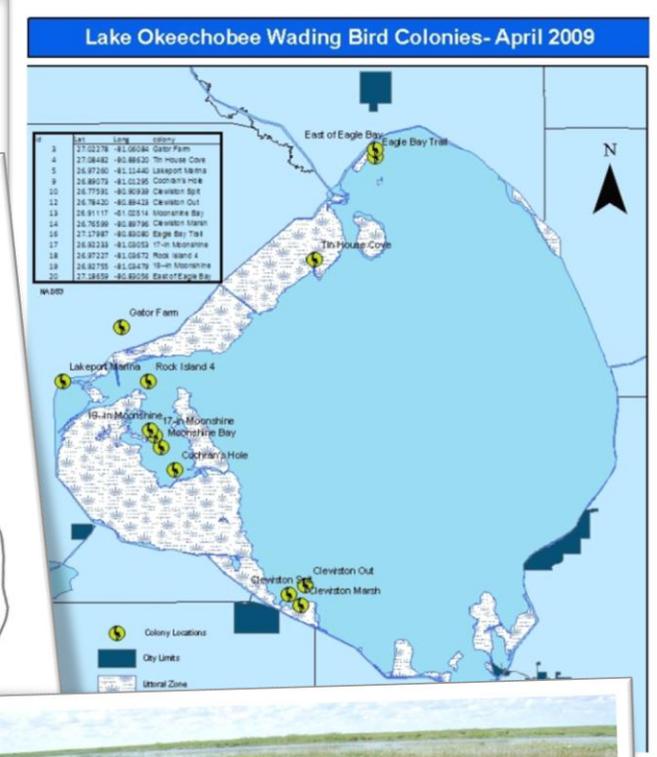
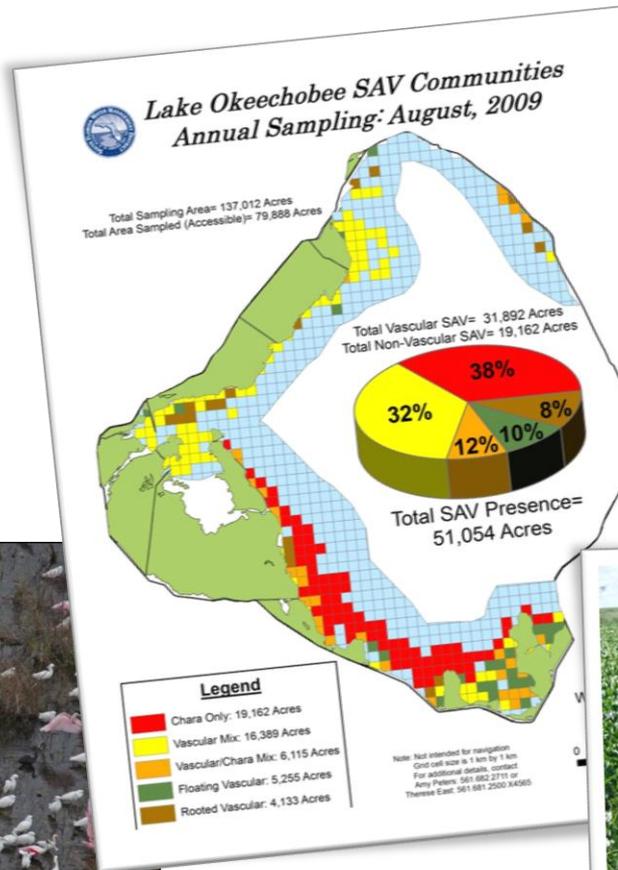
<1 month
1-3 months
>3 month



Lake Okeechobee: Weekly Performance Measures

Ecological Conditions

- Wading birds
 - Nesting
 - Foraging
- Vegetation
 - Native
 - Exotics



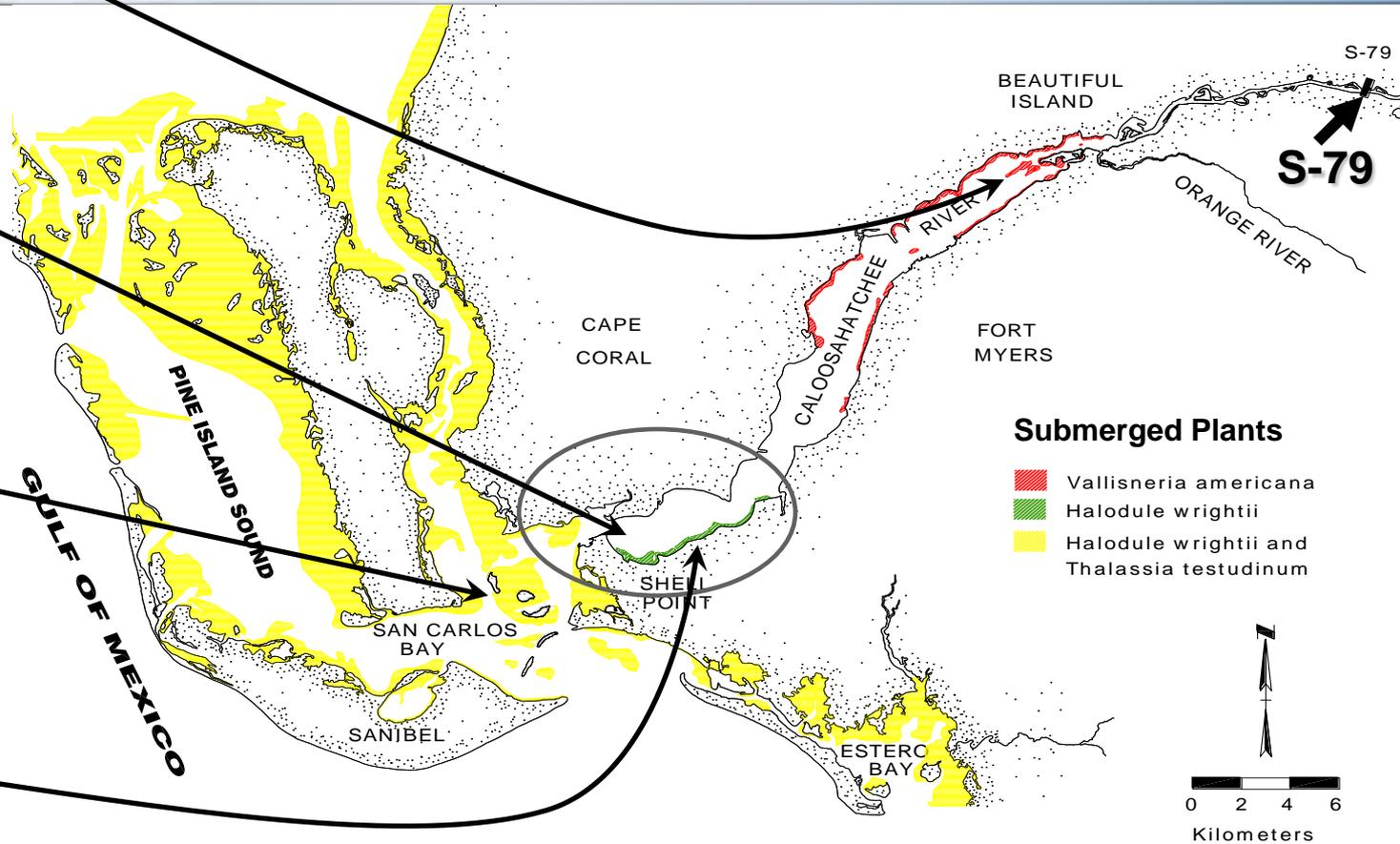
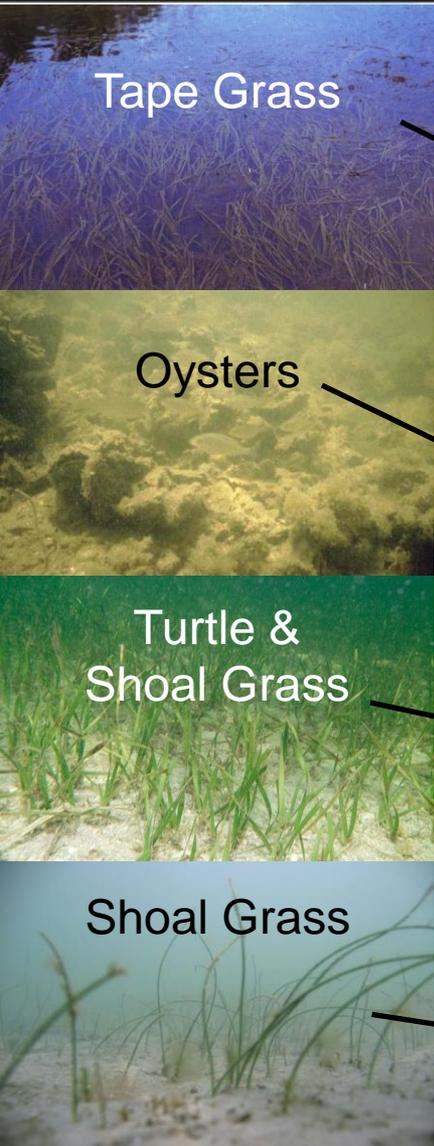
St Lucie Estuary: Weekly Performance Measures



Caloosahatchee Estuary: Weekly Performance Measures



Flow Range at S-79

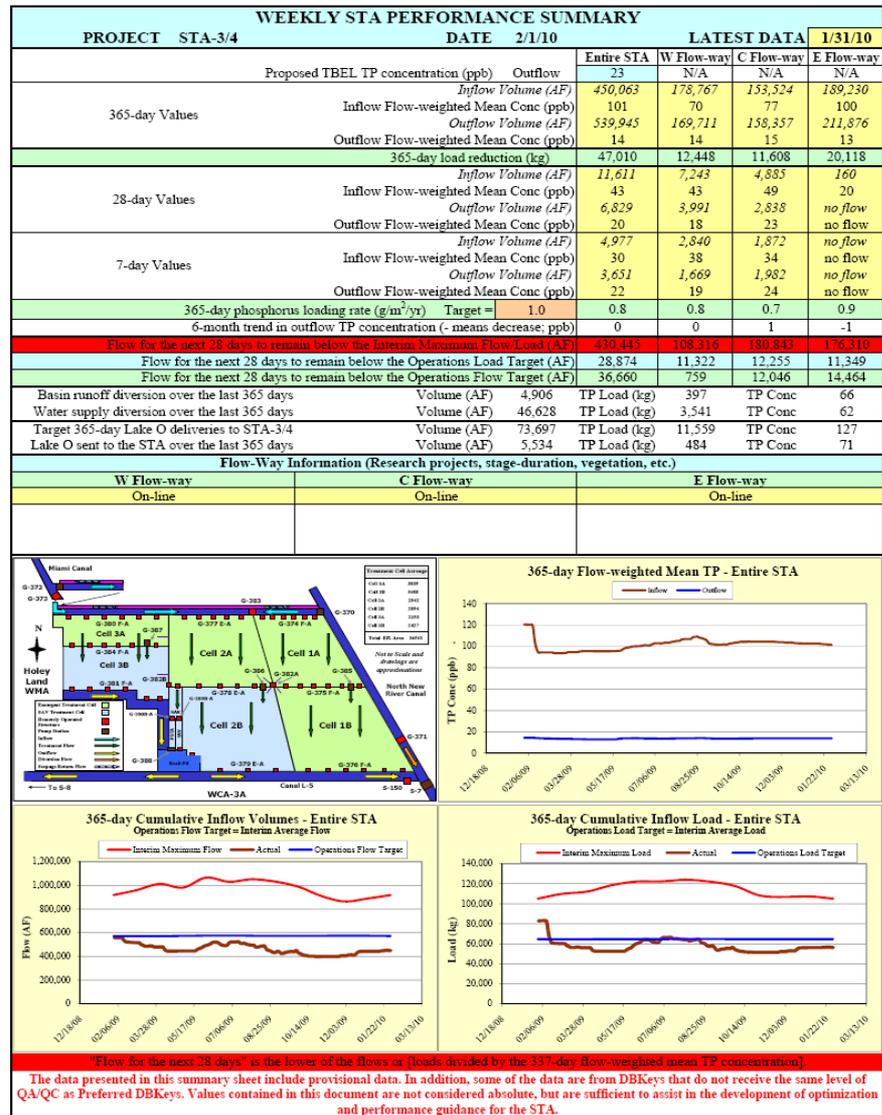


SUBMERGED PLANTS

Tape Grass		Shoal Grass		Oysters		Turtle & Shoal Grass	
<10 psu	>450 cfs	>6 psu	<2800 cfs	>3-5 psu	<4000 cfs	>20 psu	<4500 cfs

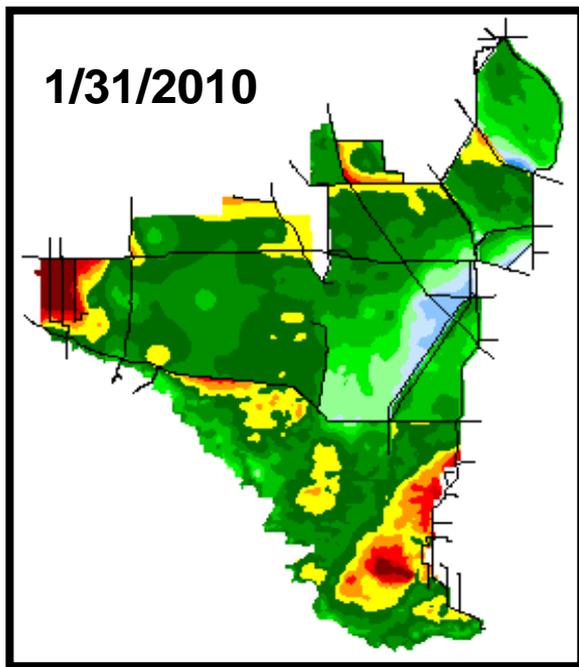
Stormwater Treatment Areas: Weekly Performance Measures

- Run weekly for STA operational guidance
- Balance flows and loads among flow-ways and STAs
- Stay within “Envelope” for optimal performance
- Uses “near-real time” provisional flow and load data
- Used with other critical data such as cell depths and durations

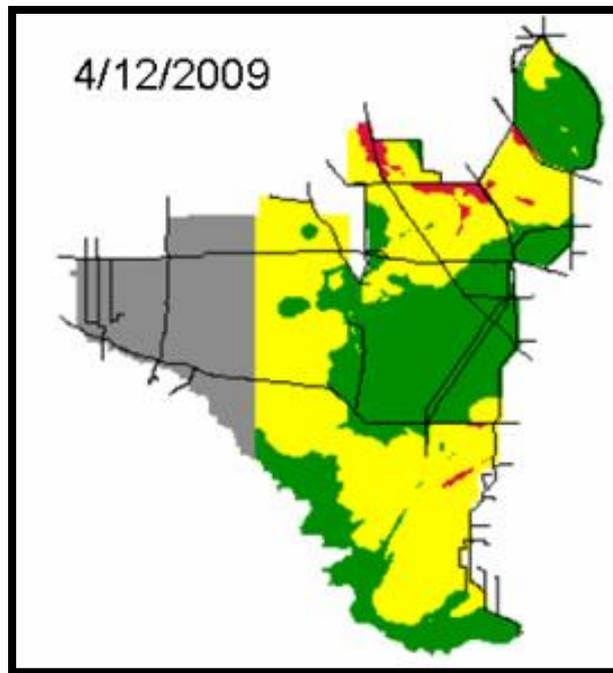


Greater Everglades: Weekly Performance Measures

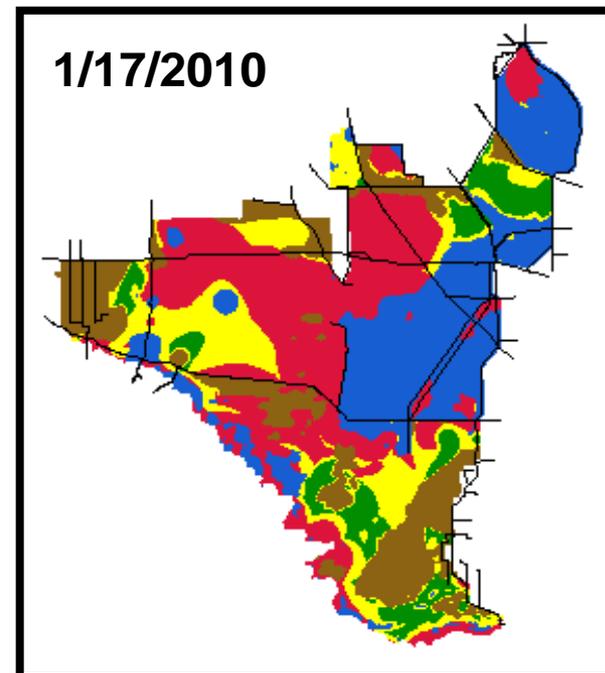
Water depths and stage changes affecting soils,
wildlife and vegetation



Water Depths



Muck Fire Risk



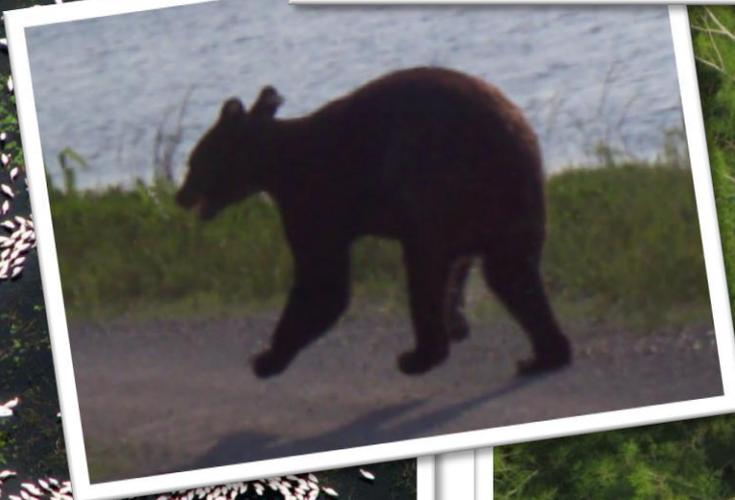
Recession rates



Greater Everglades: Weekly Performance Measures

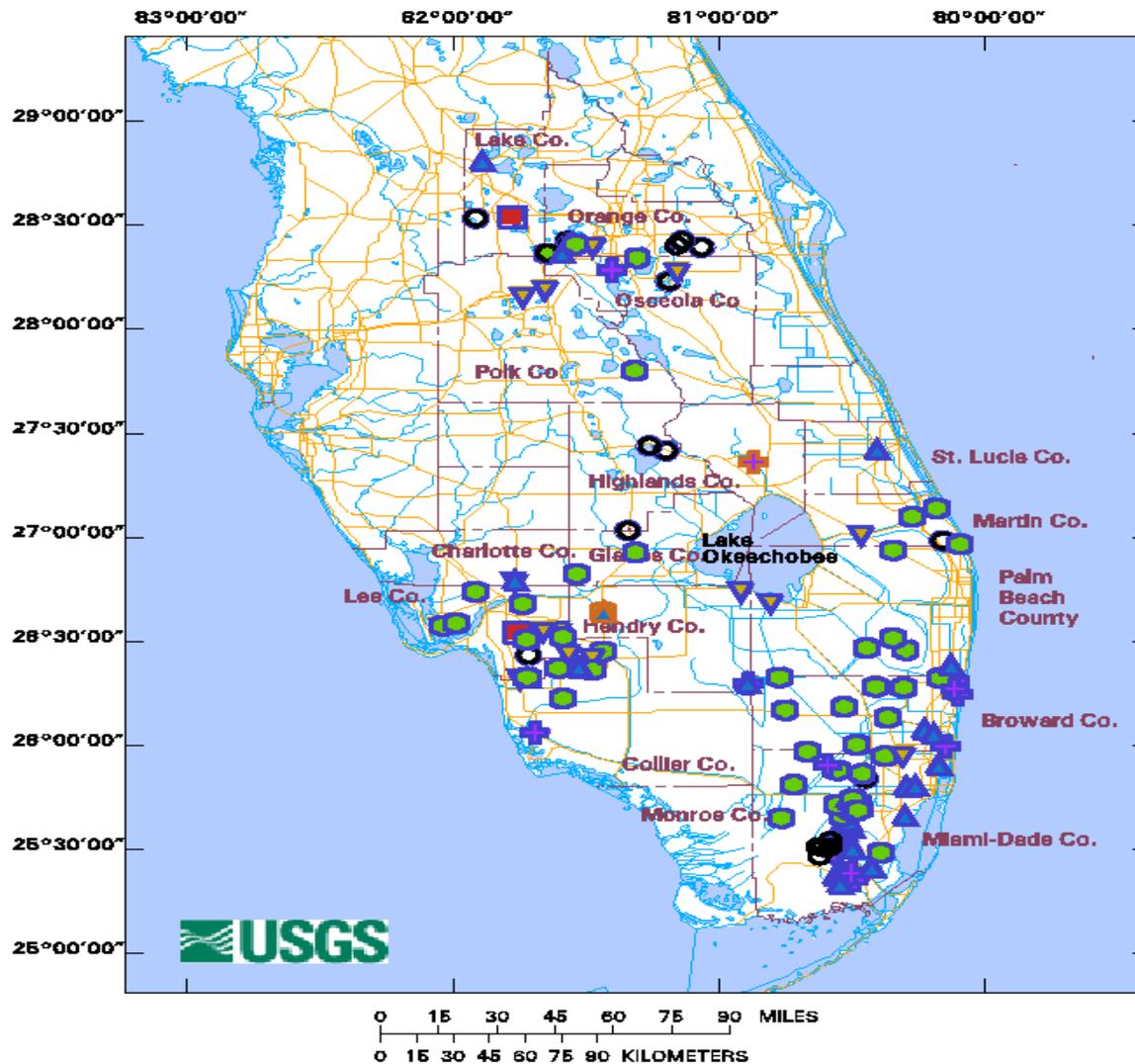
■ Wildlife Reports

- Wading birds
 - Nesting
 - Flocks
- Fish kills, deer, others



Agriculture and Urban Water Supply: Weekly Performance Measures

PROVISIONAL DRAFT – Subject to Revision



Agriculture and Urban Water Supply: Weekly Performance Measures

Water Supply Risk Evaluation Week of February 2, 2010

Area	Indicator	Value	Color Coded Scoring Scheme
LOK	Projected LOK Stage for the next two months	Base Flow	L
	Palmer Index for LOK Tributary Conditions	1.11 (Near Normal)	L
	CPC Precipitation Outlook	1 month: Above Normal 3 months: Above Normal	L
	LOK Seasonal Net Inflow Forecast AMO warm/ENSO El Nino	2.10 ft (Very Wet)	L
	LOK Multi-Seasonal Net Inflow Forecast AMO warm/ENSO El Nino	5.27 ft (Very Wet)	L
WCAs	WCA 1: 3 Station Average (3 Station 1-7, 1-8T, and 1-9 Average)	Above Line 1 (16.56ft)	L
	WCA 2A: Site 2-17	Above Line 1 (11.75 ft)	L
	WCA-3A: 3 Station Average (3 Station 63, 64, and 65)	Above Line1 (10.10 ft)	L
LEC	Service Area 1	Two days per week watering	L
	Service Area 2	Two days per week watering	L
	Service Area 3	Two days per week watering	L



Adaptive Protocols

Areas of Consensus

- Clarify advisory role for SFWMD to make release recommendations to the USACE
- Recommend to the USACE to be “conservative” in releases in the Low Release subband at the beginning of the dry season as long as it does not impact dike safety (verify with modeling)
- Develop release decision flow chart for guiding releases in the Base Flow and Beneficial Use subbands



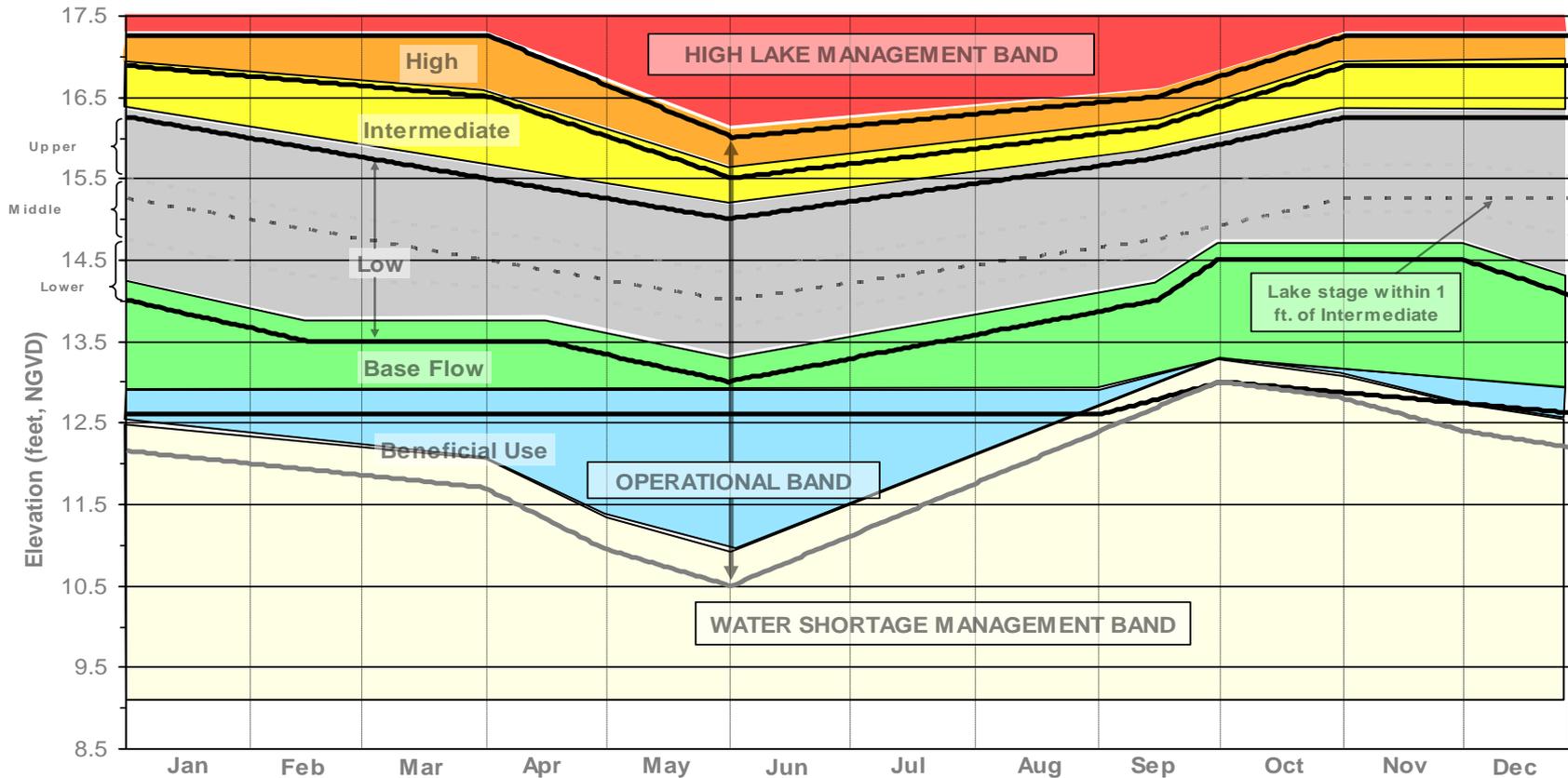
SFWMD Staff Proposed Protocol

- Objective was to provide additional release guidance toward maximizing benefits of baseflow releases (& environmental water deliveries) and minimize adverse impacts to Lake O water levels & to permitted water supply users
- Proposed Protocol designed using a Flowchart as suggested by stakeholders during previous WRAC-AP workshops
- “Bookend Simulations” performed to bracket the range of possible performance from proposed protocols



2008 Lake Okeechobee Interim Regulation Schedule

(aka 2008 LORS, or LORS-2008)



NOTES:

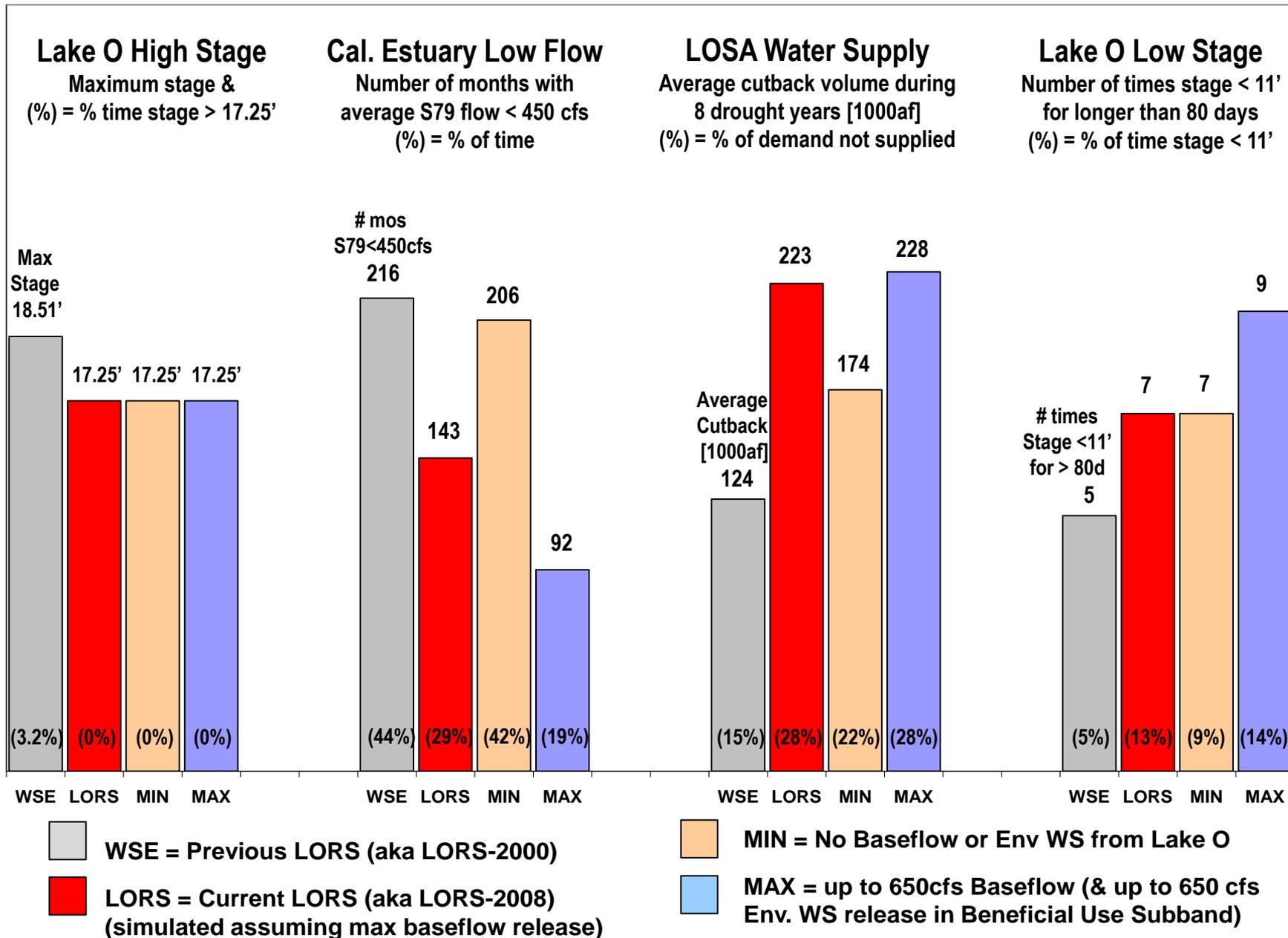
- High Lake Management Band:** Outlet canals may be maintained above their optimum water management elevations.
- Operational Band:** Outlet canals should be maintained within their optimum water management elevations.
- Water Shortage Management Band:** Outlet canals may be maintained below optimum water management elevations.

CENTRAL AND SOUTHERN FLORIDA PROJECT

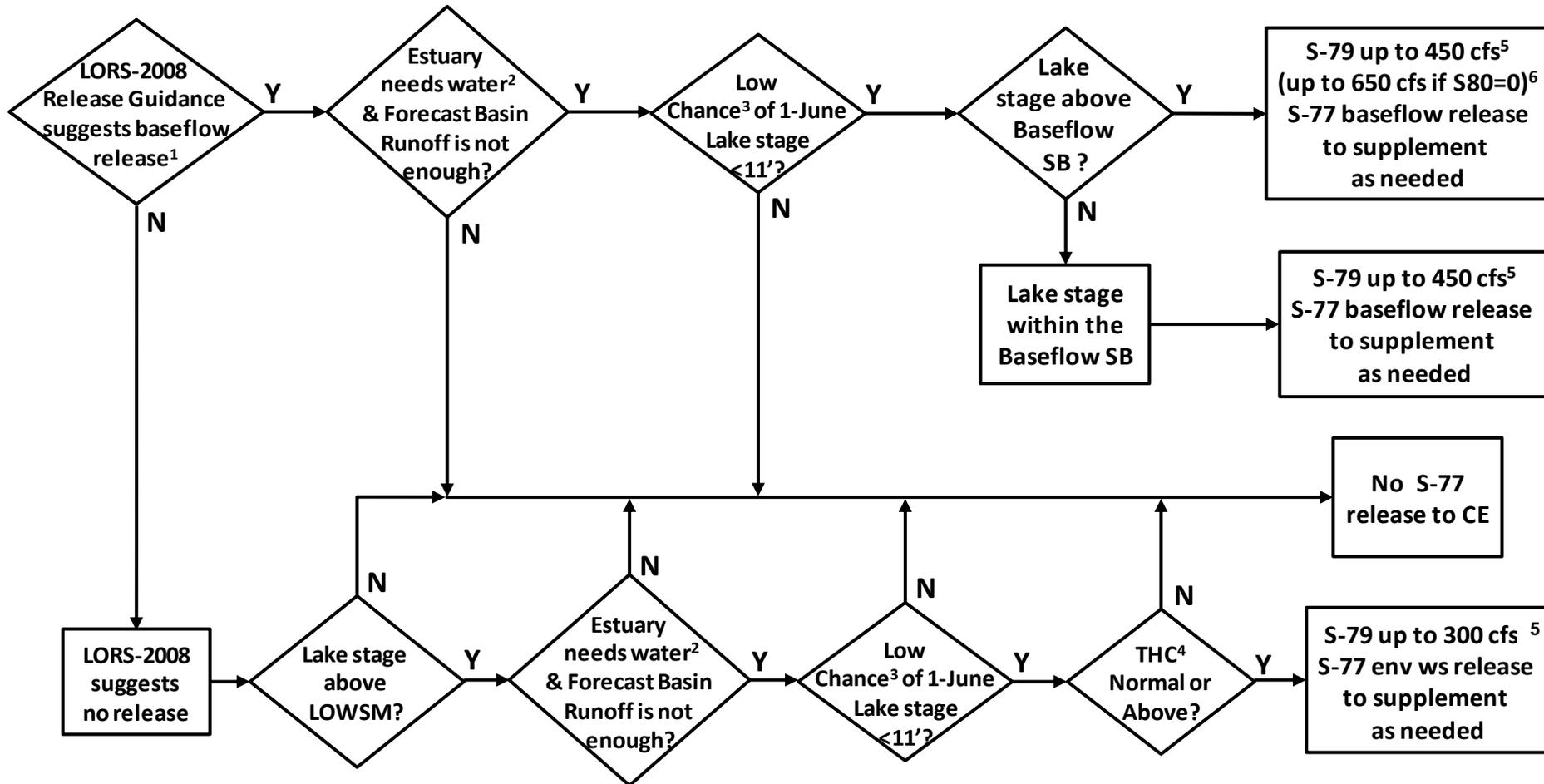
2008 LAKE OKEECHOBEE
INTERIM REGULATION SCHEDULE
PART B

DATED: March 2008
DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT
CORPS OF ENGINEERS, JACKSONVILLE, FLORIDA

Performance Comparison (41-yr simulation)



Flowchart to Guide Recommendations for Lake Okeechobee Releases to the Caloosahatchee Estuary for LORS-2008 Baseflow & for Environmental Water Supply



¹The LORS-2008 Release Guidance (Part D) can suggest baseflow releases in the Intermediate, Low, or Baseflow Subbands.

²For simulation testing, estuary “needs” water when 30d moving avg. salinity at I-75 bridge is projected to exceed 5psu within 2 weeks.

³For simulation testing, “Low chance” is defined as less than a 30% chance that the 1-June Lake stage falls below elevation 11.0', NGVD.

⁴THC = Tributary Hydrologic Condition is based on classification of Lake O Net Inflow and Palmer Index.

⁵Can release less than the “up to” limit if lower release is sufficient to reach or sustain desired estuary salinity.

⁶Based on confirmation that the St. Lucie Estuary does not need all or a portion of this baseflow

Outstanding Stakeholder Concerns

- Impact of low lake stages caused by shift to LORS 2008 on:
 - Water supply
 - Lake Okeechobee Minimum Flow & Level
- Existing legal rights of permitted water users
- Estuary environmental needs



And the current path forward.....

- District staff proposes to continue recommending to the U.S. Army Corps of Engineers potential releases of up to 450 cfs to the Caloosahatchee Estuary, based upon:
 - Demonstrated need of the ecosystem
 - Balancing water supply and flood protection
 - Lake stage is in the Base Flow subband of the Lake Okeechobee Regulation Schedule 2008

- This recommendation will be revisited at the March Governing Board Meeting

