

Governing Board Meeting
April 12, 2012

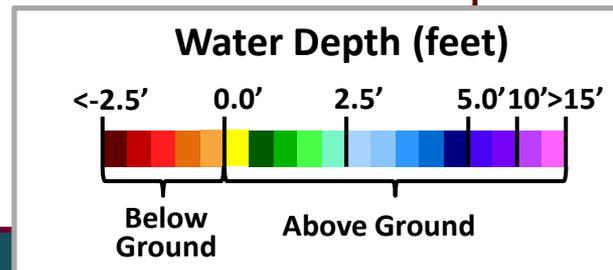
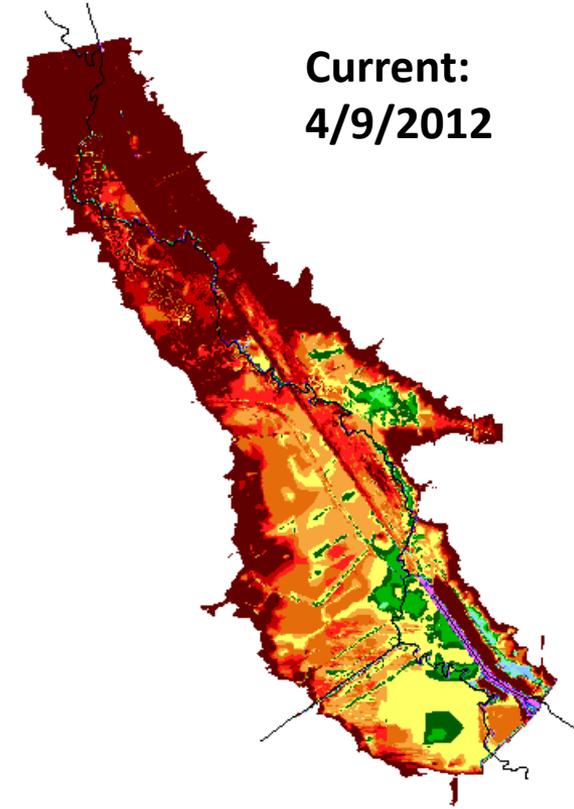
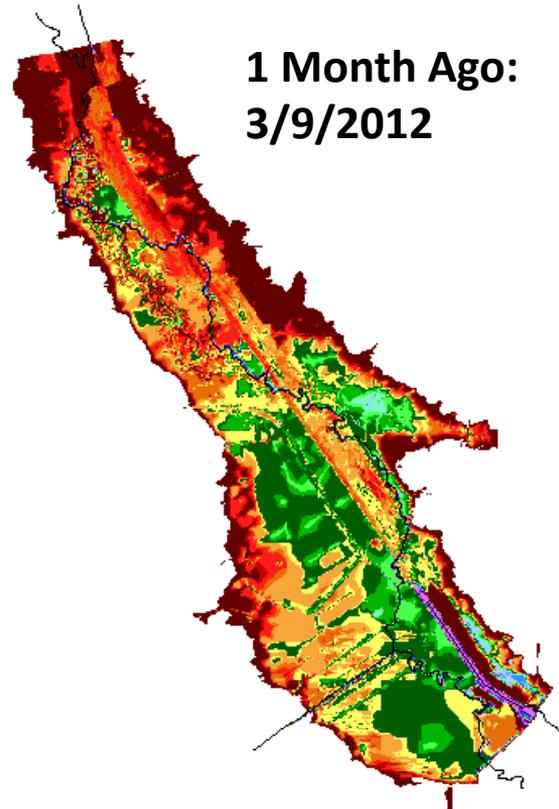
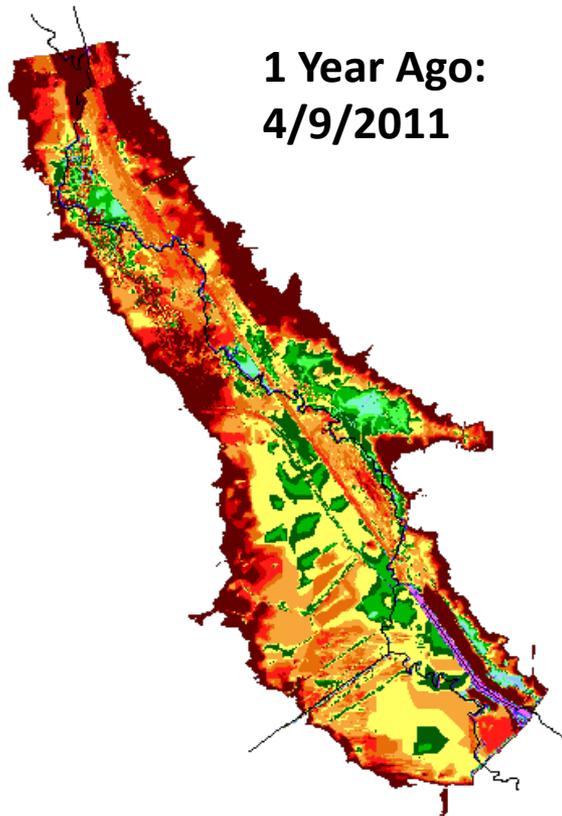
Ecological Conditions Update



Terrie Bates
Director, Water Resources Division

Kissimmee River (Pool C)

Monthly Water Depth Maps



Kissimmee Basin and Lake Okeechobee Snail Kite Nesting Activity



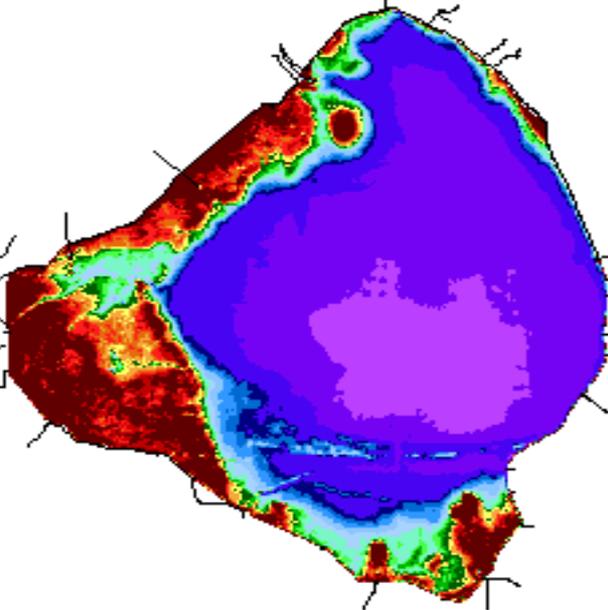
Lake	March	April
Jackson	3	4
E. Toho	16	21
Toho	29	34
Hatchineha	1	1
Kissimmee	9	11
Istokpoga	3	4
Okeechobee	27	39
TOTALS	88	114

Lake Okeechobee Water Depth Timeseries Maps

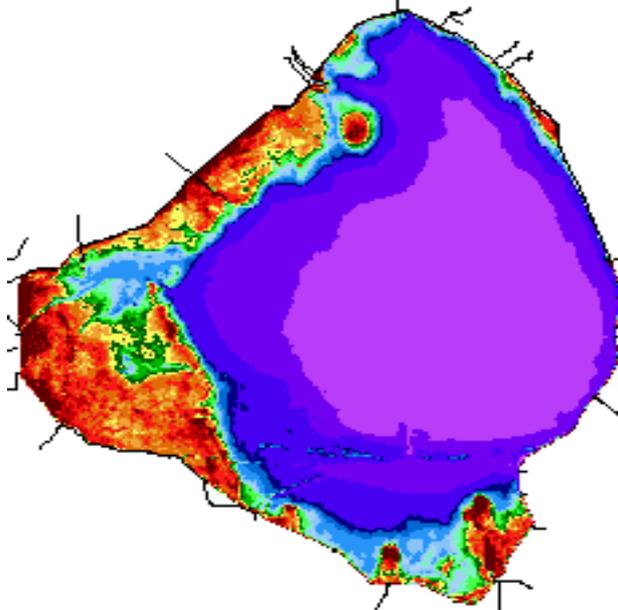
1 Year Ago: 04/09/2011

1 Month Ago: 03/10/2012

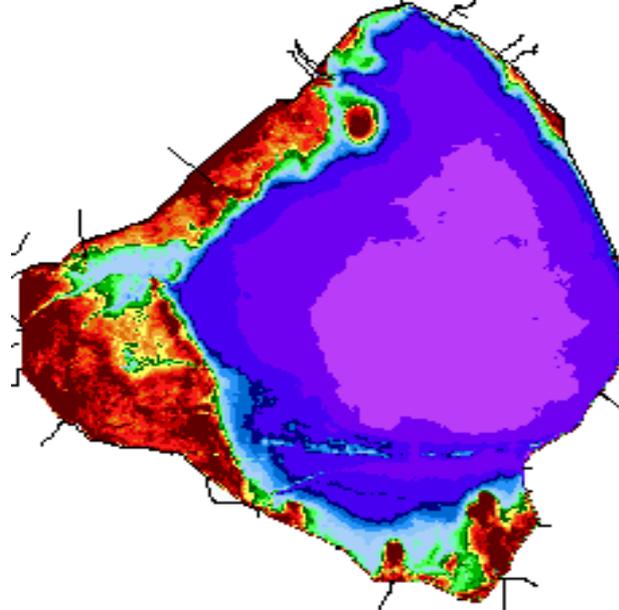
Current: 04/09/2012



(11.58 ft NGVD29)



(12.87 ft NGVD29)

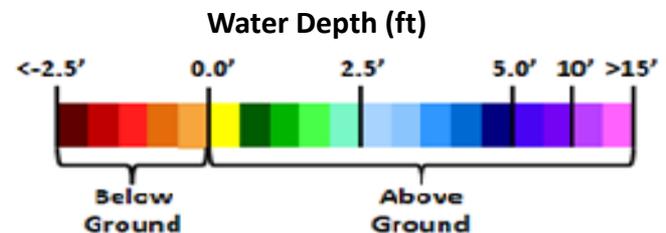


(11.97 ft NGVD29)

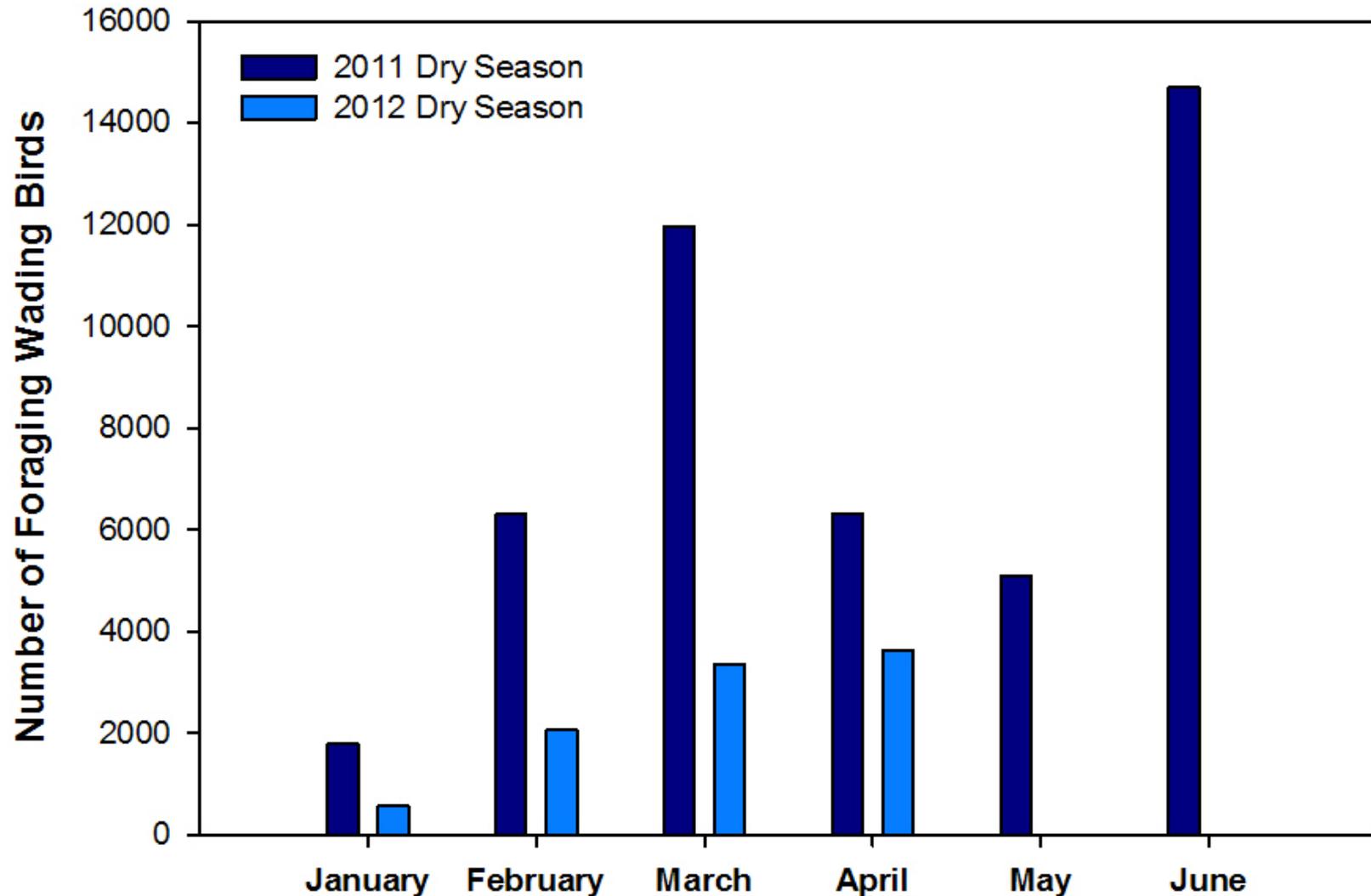
Lowest lake stage in 2011
9.53 ft NGVD29 (06/24/11)

Record low lake stage:
8.82 ft NGVD29 (7/2/07)

CURRENT LAKE LEVEL:
11.97 ft NGVD29 4/10/12



Lake Okeechobee Wading Bird Foraging in 2011 & 2012

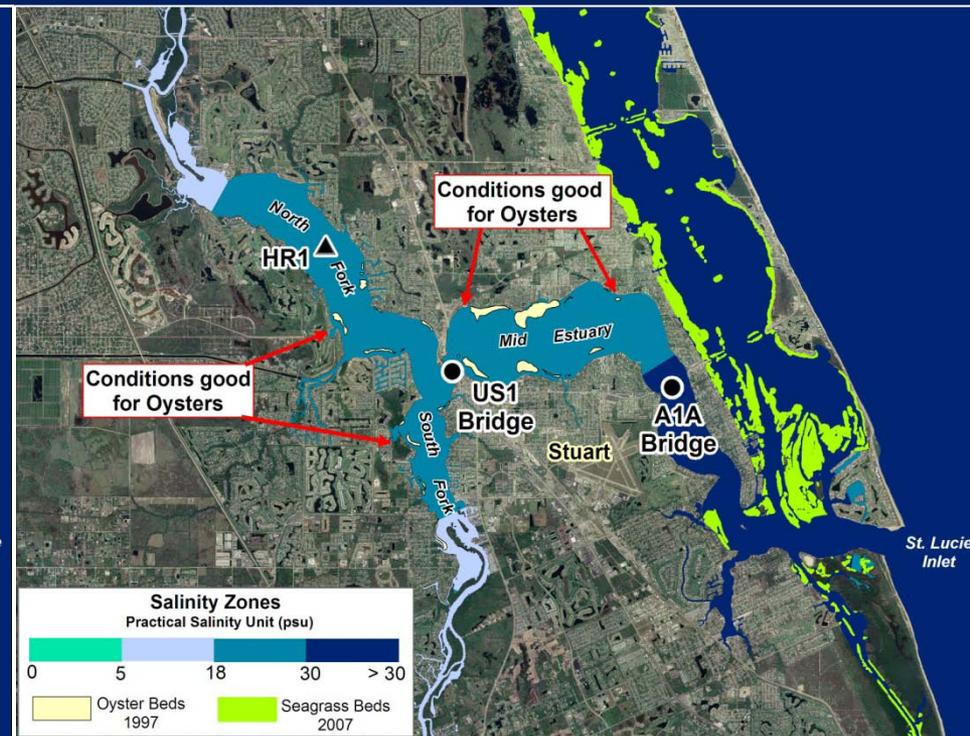
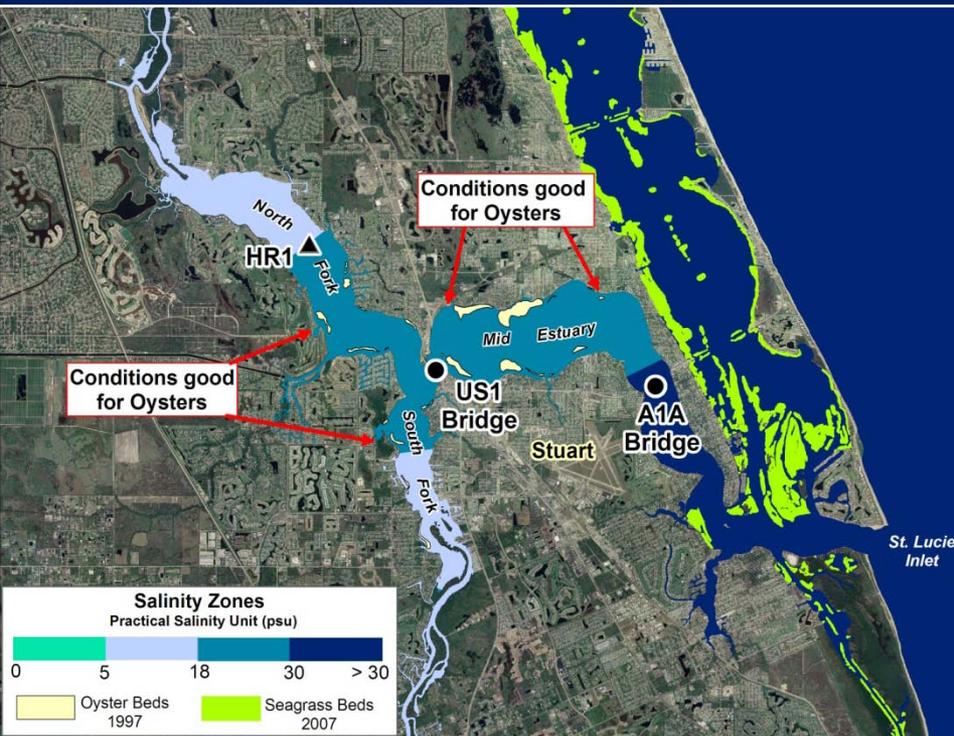


St. Lucie Estuary

Salinity Conditions

March 12, 2012

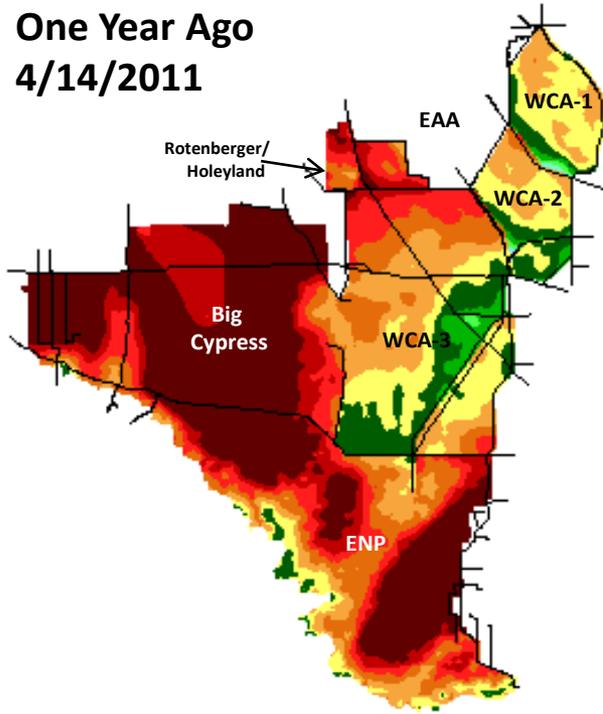
April 9, 2012



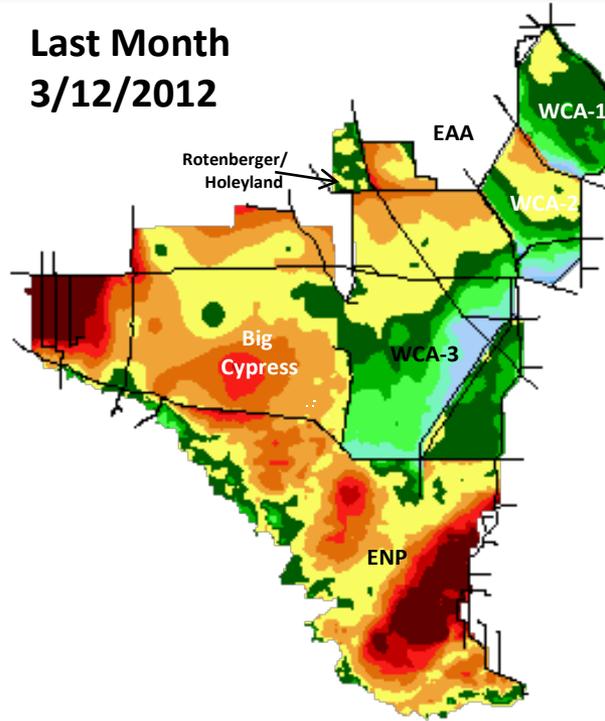
NOTE: Good Range for Oysters: 10 – 30

Greater Everglades Water Depth Monthly Snapshots

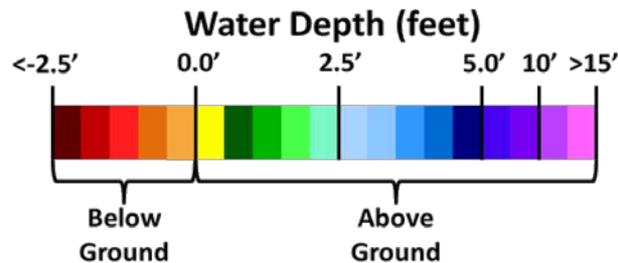
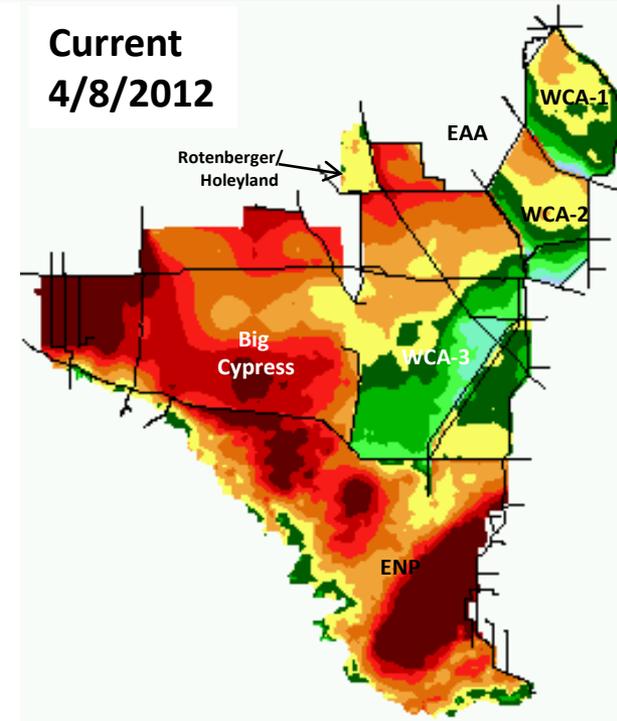
One Year Ago
4/14/2011



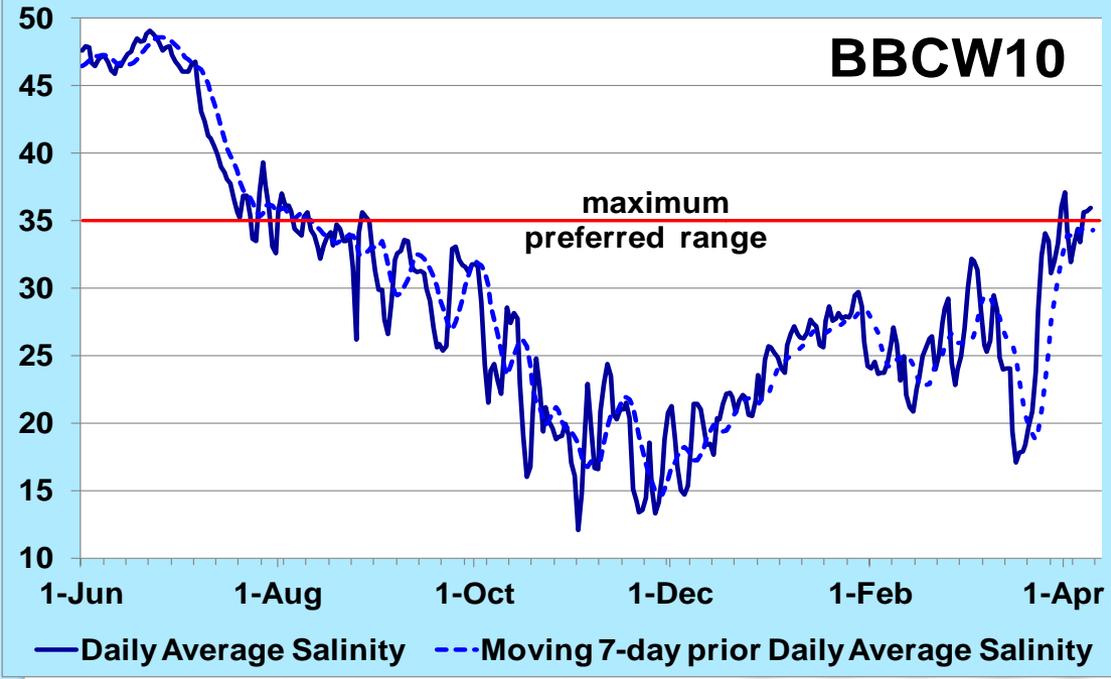
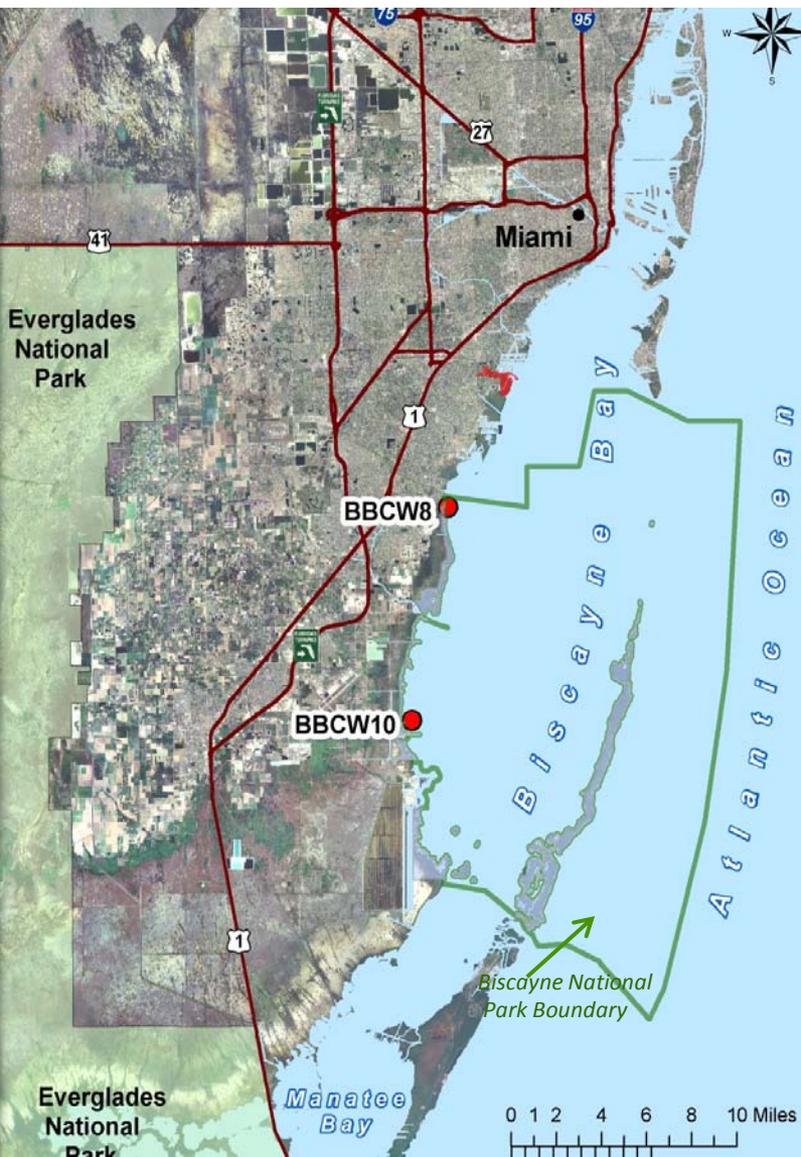
Last Month
3/12/2012



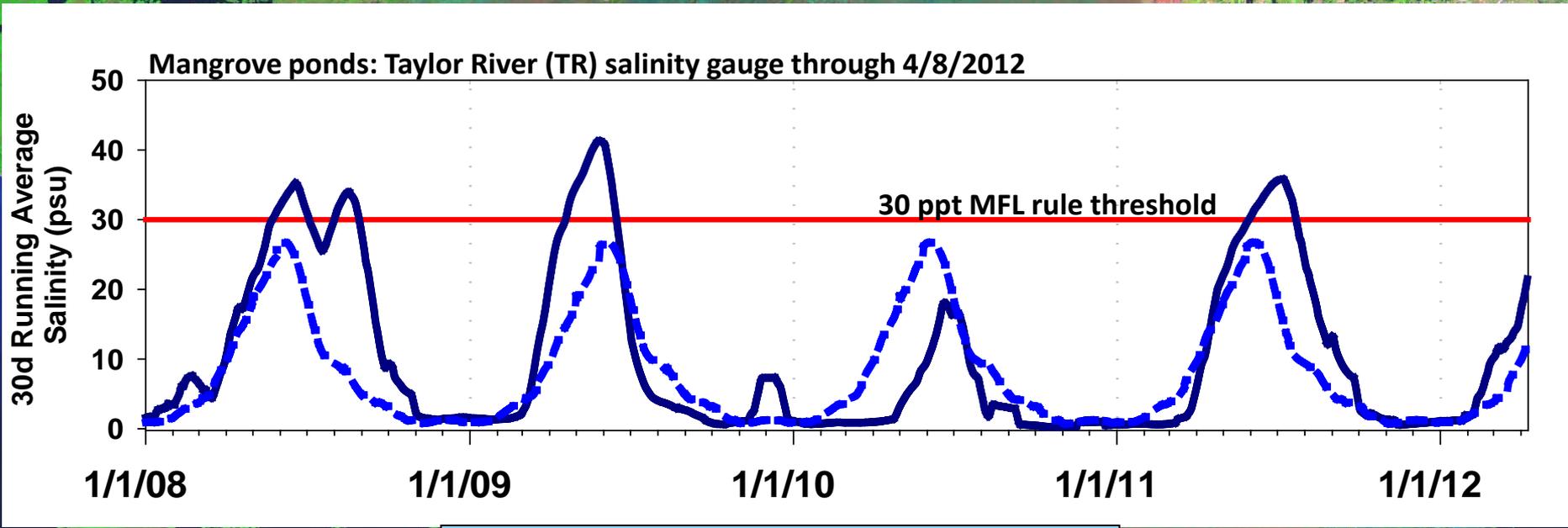
Current
4/8/2012



Biscayne Bay Salinity

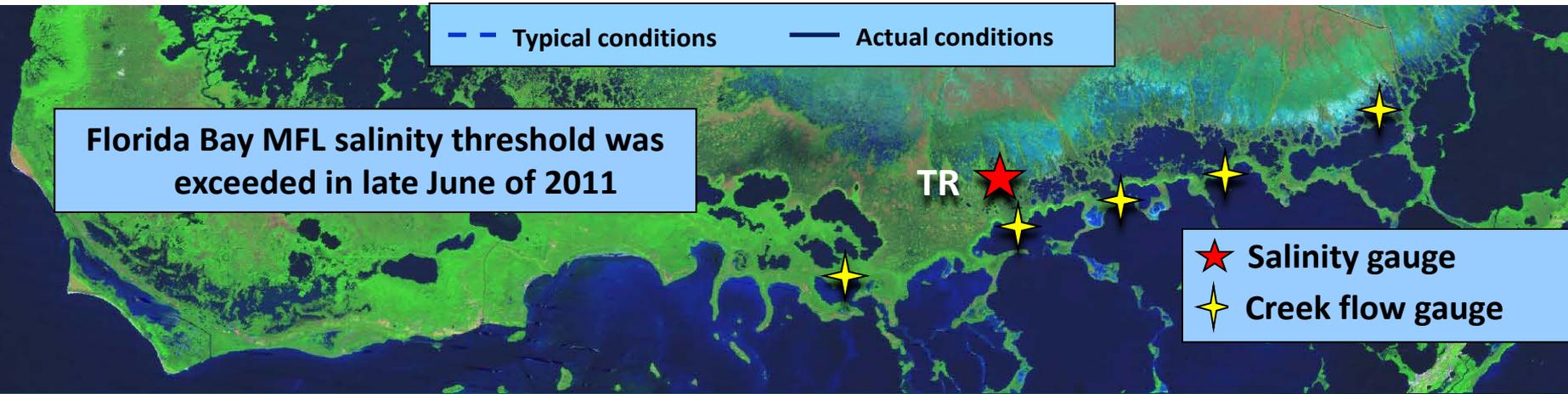


Tracking Salinity in Florida Bay



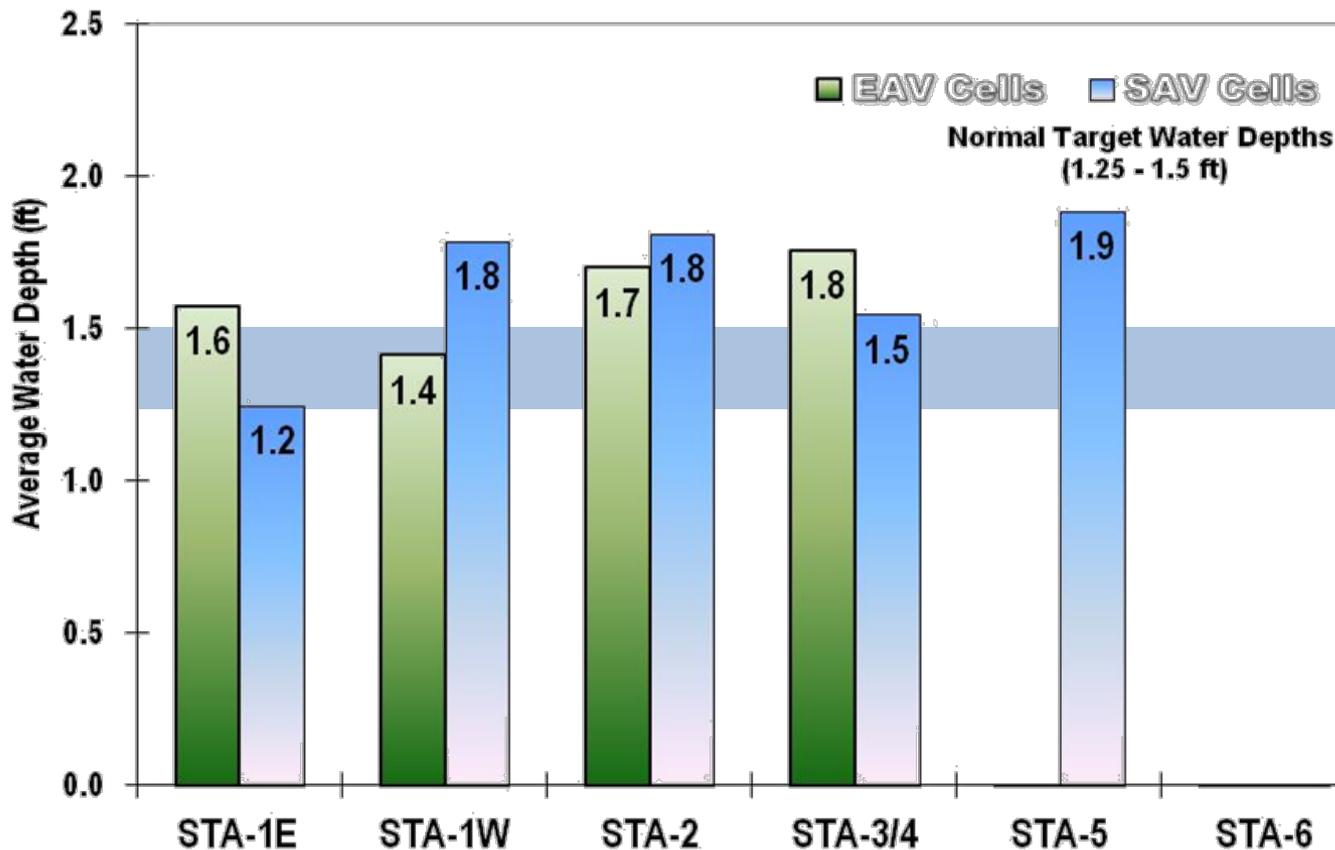
--- Typical conditions — Actual conditions

Florida Bay MFL salinity threshold was exceeded in late June of 2011



★ Salinity gauge
★ Creek flow gauge

Water Depths in the STAs



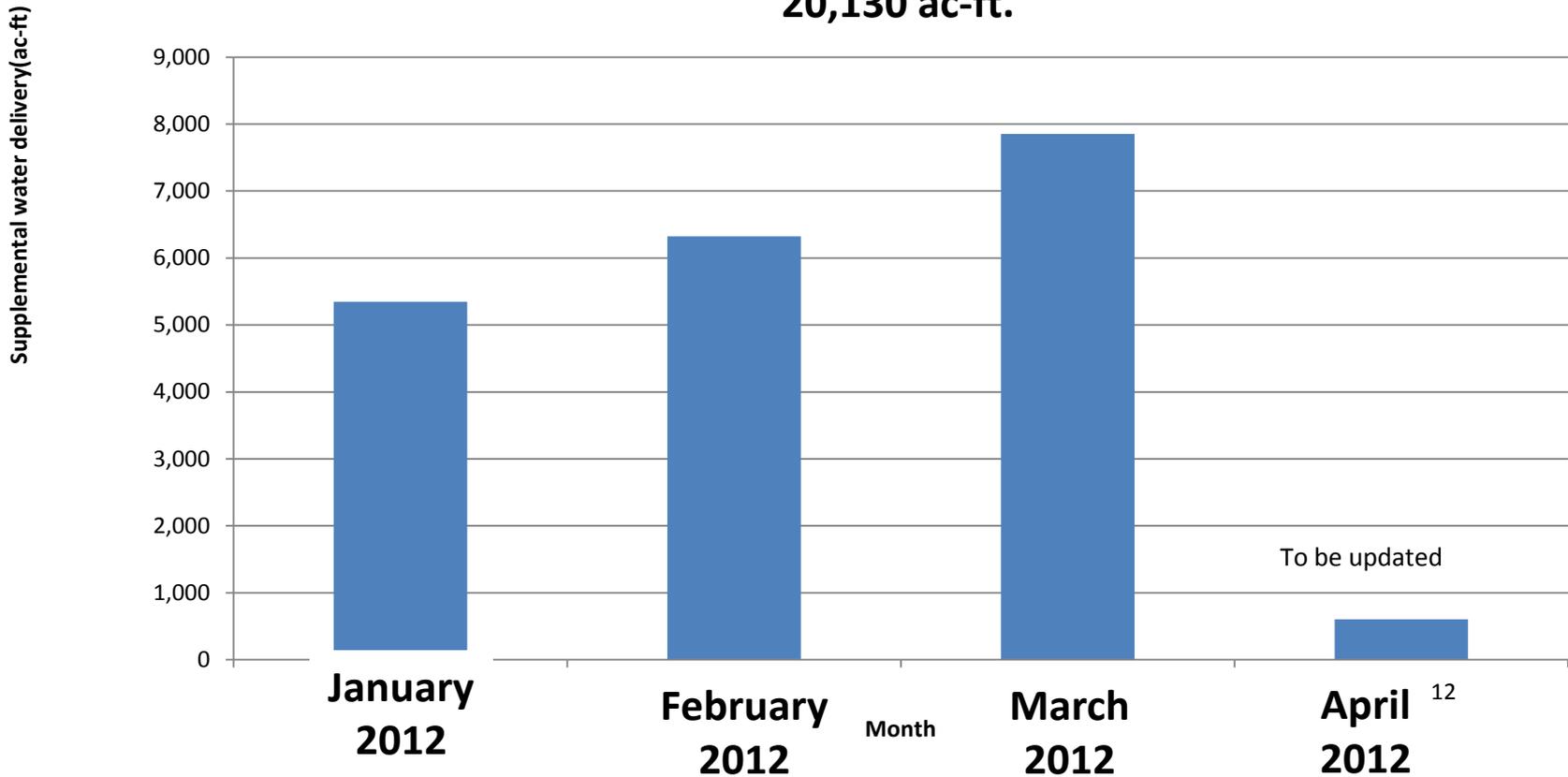
Target depth for optimal
vegetation growth:
1.25 - 1.5 ft

Currently dry:

- STA-1E Eastern Flow-way
- STA-6 Cells 3 and 5 (emergent vegetation)
- STA-5 Cells 1A, 2A, 3A and 3B

Supplemental Water Deliveries from Lake Okeechobee to the STAs

Supplemental water delivery from January 17, 2012 to April 1, 2012
20,130 ac-ft.

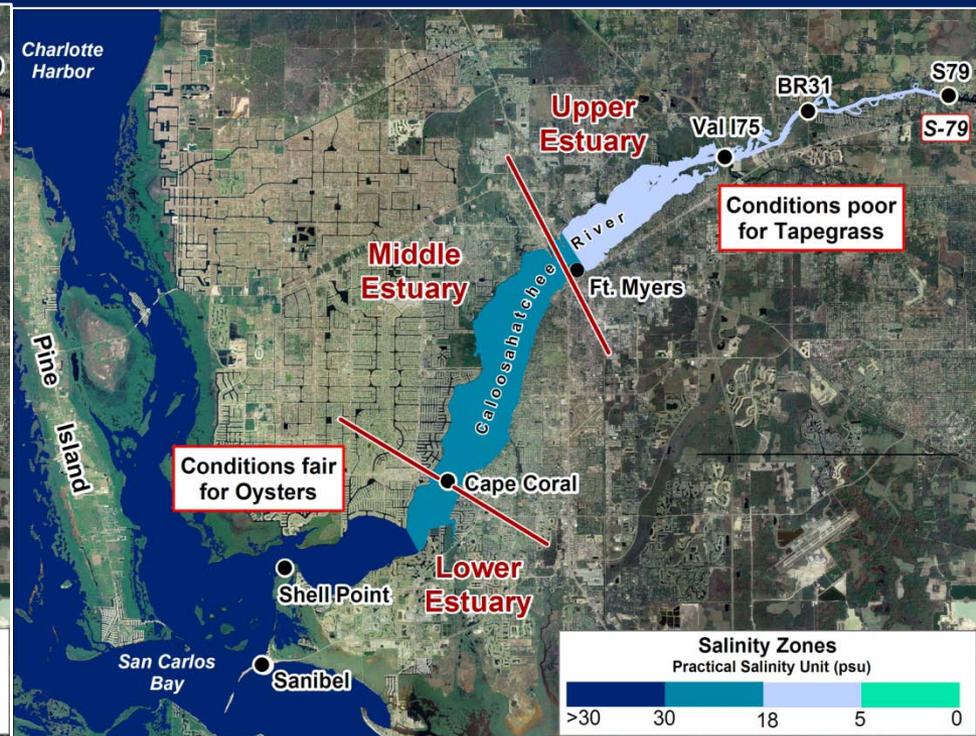
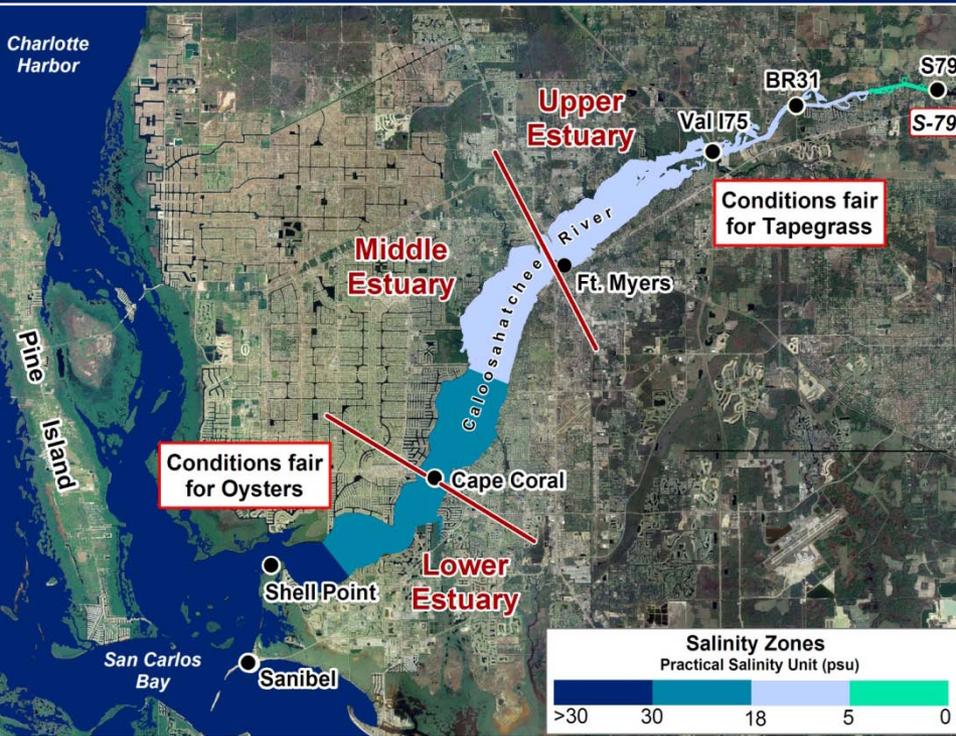


Caloosahatchee Estuary

Salinity Conditions

March 12, 2012

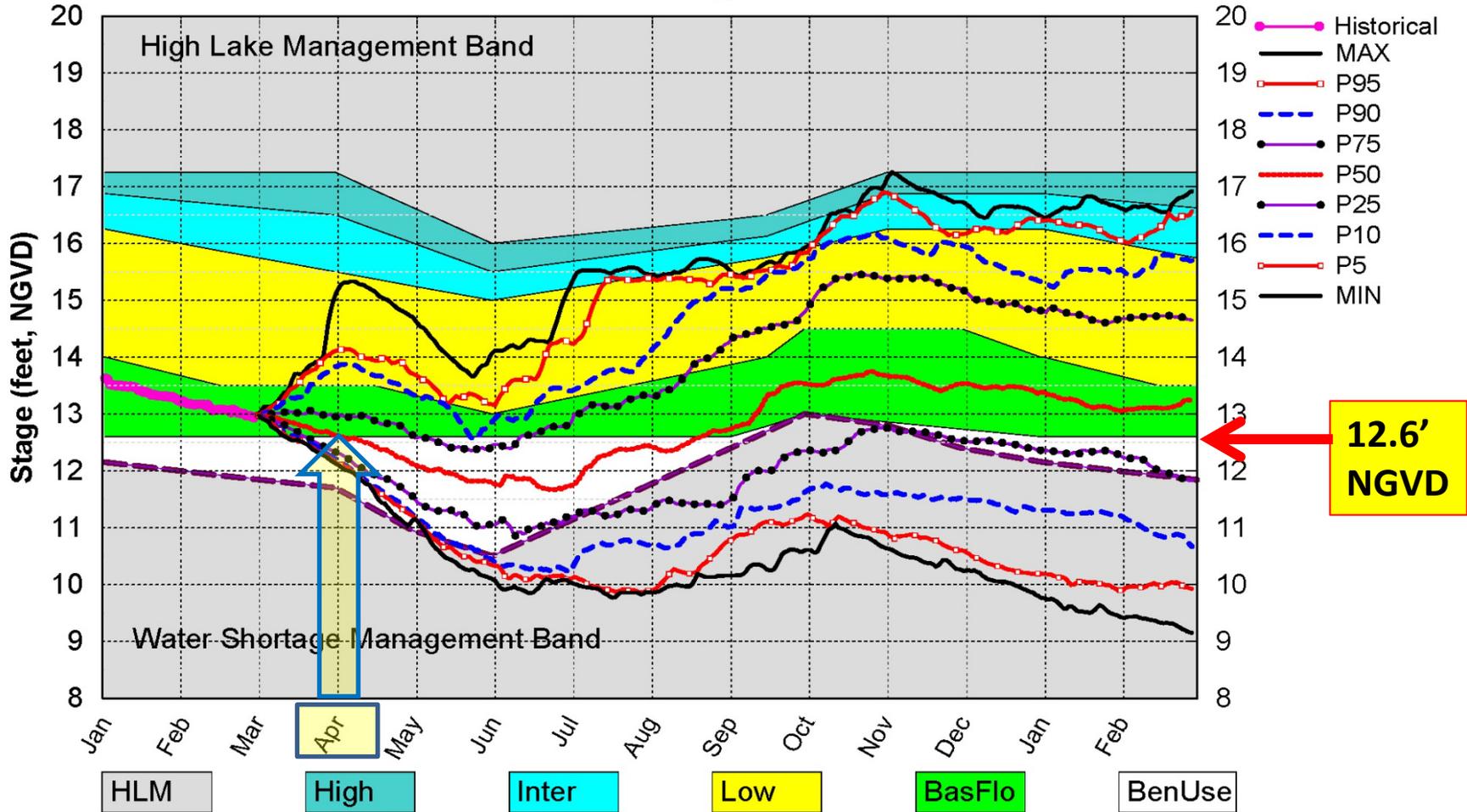
April 9, 2012



NOTE: Good Range for Oysters: 10 – 30 Optimal Range for Tape Grass: 0 – 5

Lake Okeechobee SFWMM March 2012 Position Analysis

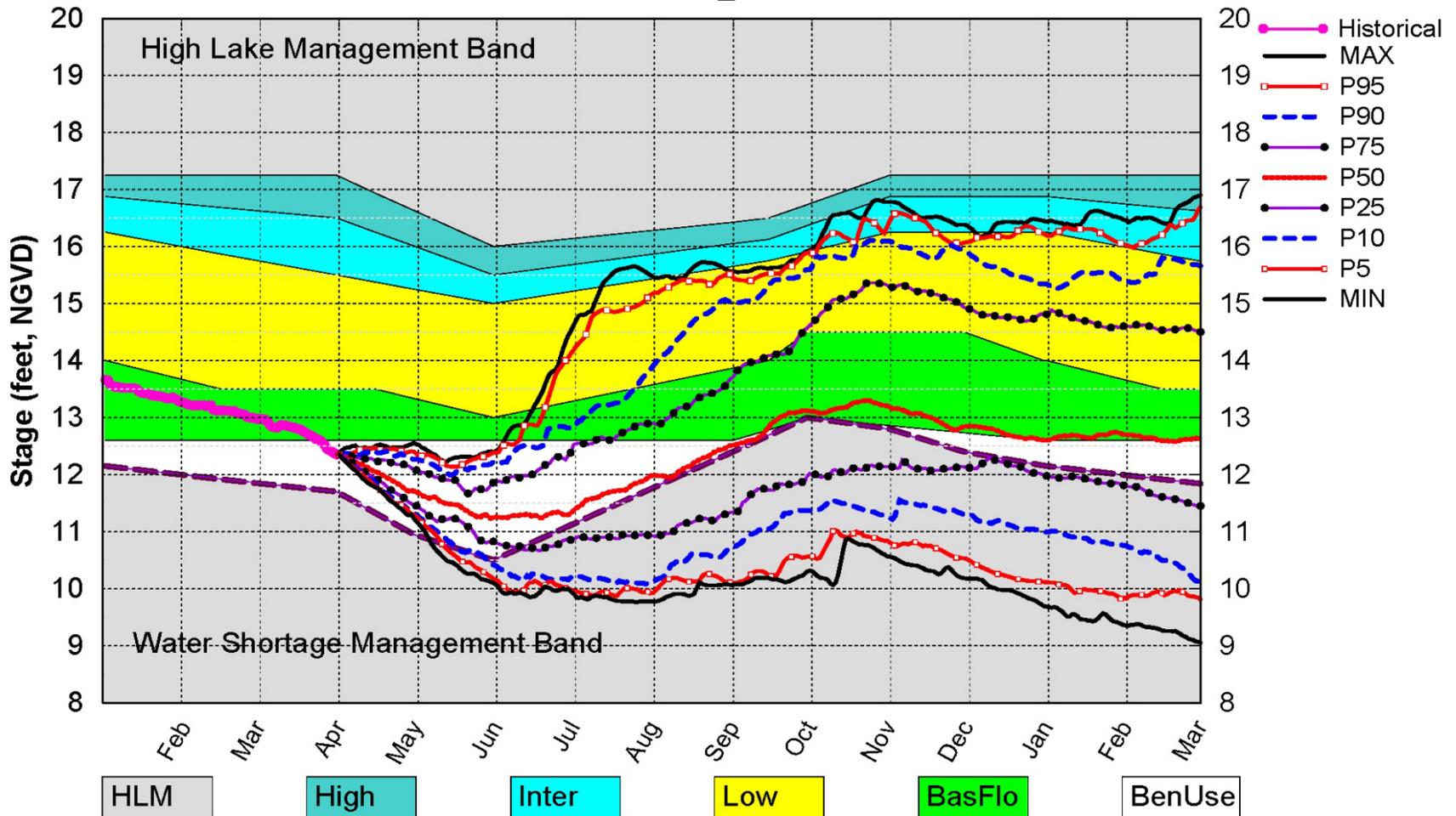
Percentiles PA_V4



(See assumptions on the Position Analysis Results website)

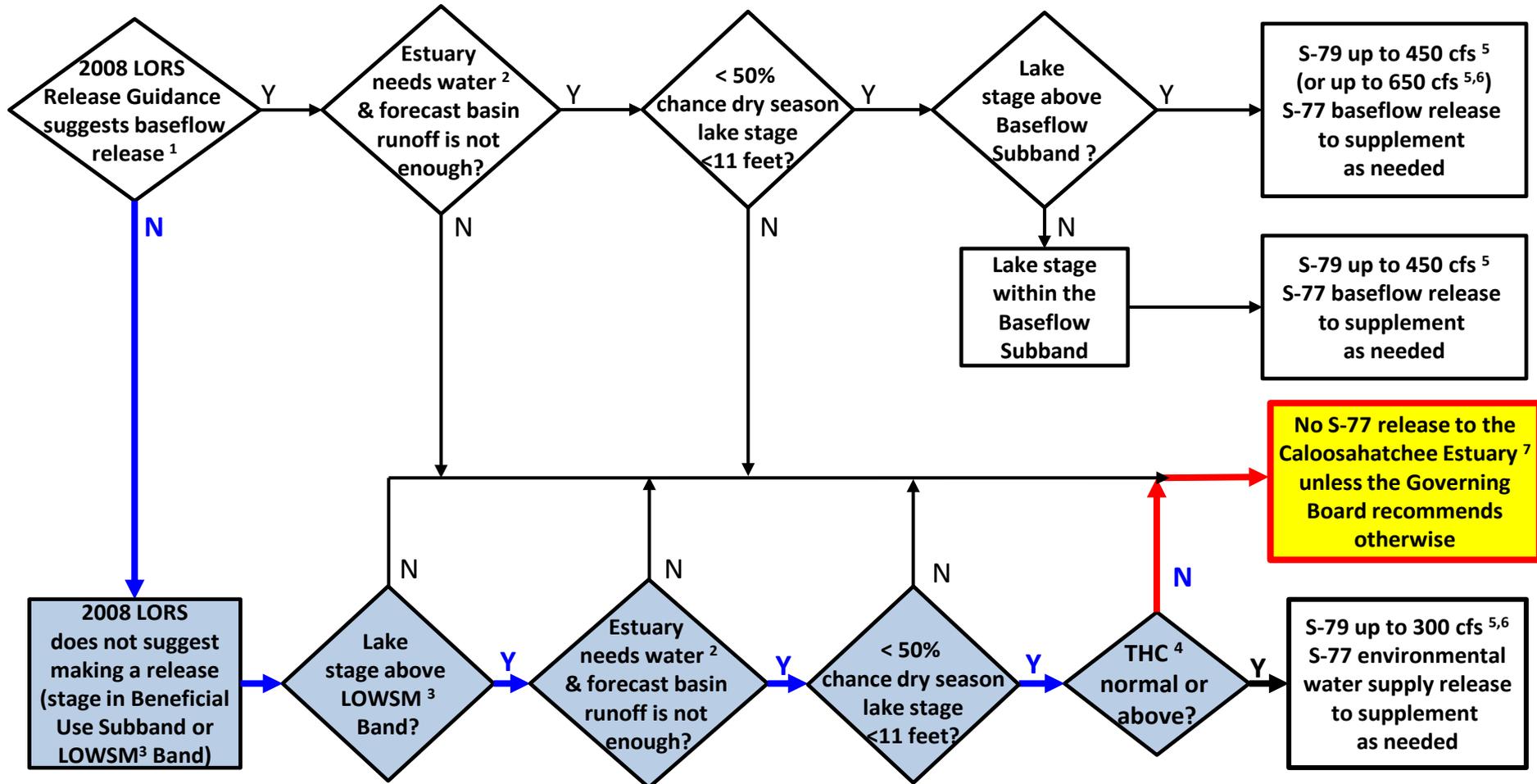
Lake Okeechobee SFWMM April 2012 Position Analysis

Percentiles PA_V5



(See assumptions on the Position Analysis Results website)

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



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

²Estuary “needs” water when the 30-day moving average salinity at I-75 bridge is projected to exceed 5 practical salinity units (psu) within 2 weeks.

³LOWSM = Lake Okeechobee Water Shortage Management.

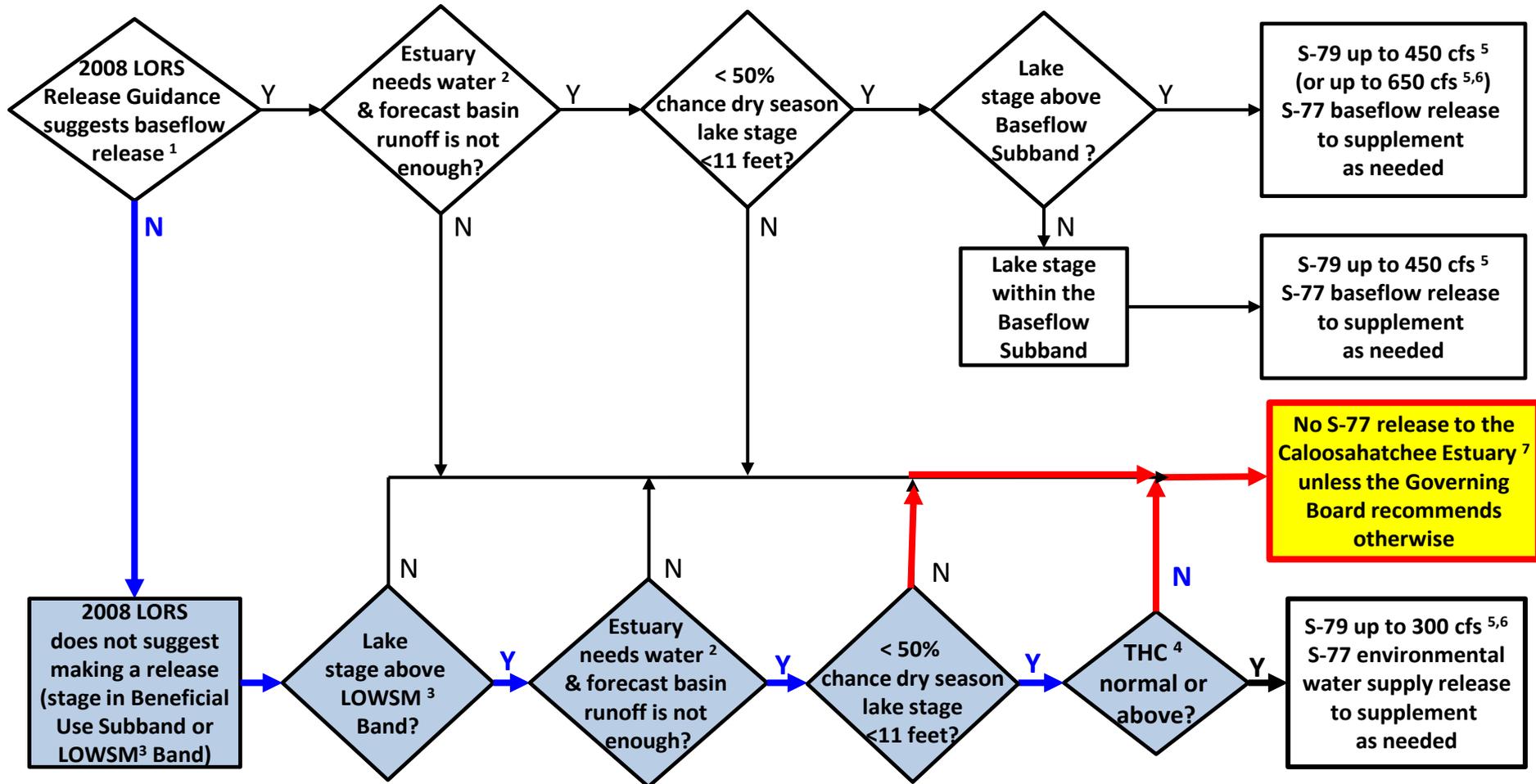
⁴Tributary Hydrologic Condition (THC) is based on classification of Lake Okeechobee Net Inflow and Palmer Index.

⁵Can release less than the “up to” limit if lower release is sufficient to reach or sustain desired estuary salinity; cfs = cubic feet per second.

⁶After reviewing conditions in Water Conservation Areas (WCAs), Stormwater Treatment Areas (STAs), ENP, St. Lucie Estuary and Lake Okeechobee.

⁷Should this condition be reached, the Governing Board will be briefed at their next regularly scheduled meeting as part of the State of the Water Resources agenda item.

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



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

²Estuary “needs” water when the 30-day moving average salinity at I-75 bridge is projected to exceed 5 practical salinity units (psu) within 2 weeks.

³LOWSM = Lake Okeechobee Water Shortage Management.

⁴Tributary Hydrologic Condition (THC) is based on classification of Lake Okeechobee 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; cfs = cubic feet per second.

⁶After reviewing conditions in Water Conservation Areas (WCAs), Stormwater Treatment Areas (STAs), ENP, St. Lucie Estuary and Lake Okeechobee.

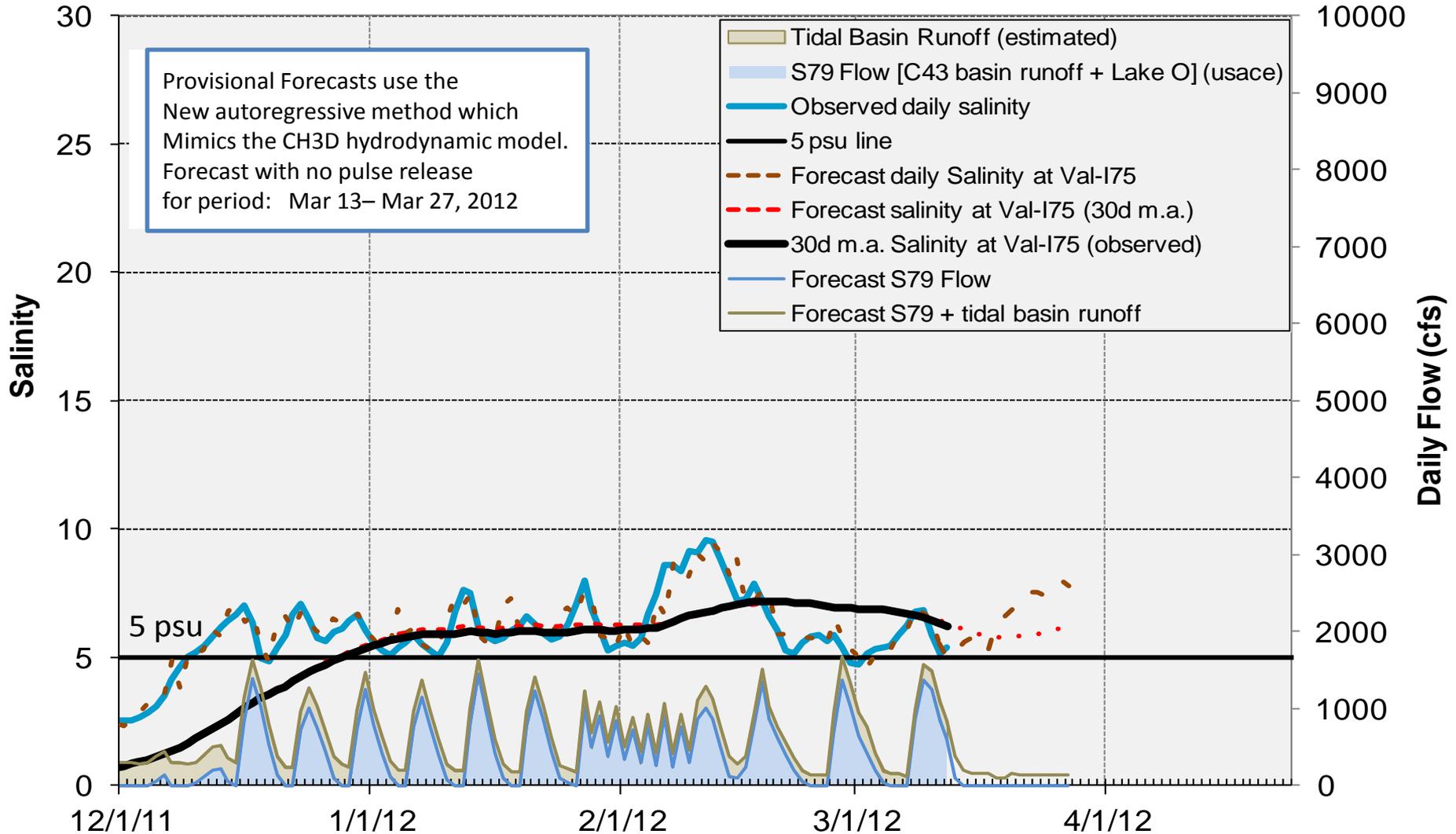
⁷Should this condition be reached, the Governing Board will be briefed at their next regularly scheduled meeting as part of the State of the Water Resources agenda item.

Adaptive Protocols

- Monthly updates for Governing Board on current water supply and ecological conditions for STAs, Water Conservation Areas, Caloosahatchee, St. Lucie and Lake Okeechobee
- Adaptive management of changing resource conditions
- Provides opportunity for Governing Board guidance to staff on discretionary releases for ecosystem benefits or to improve conditions to C&SF Project purposes

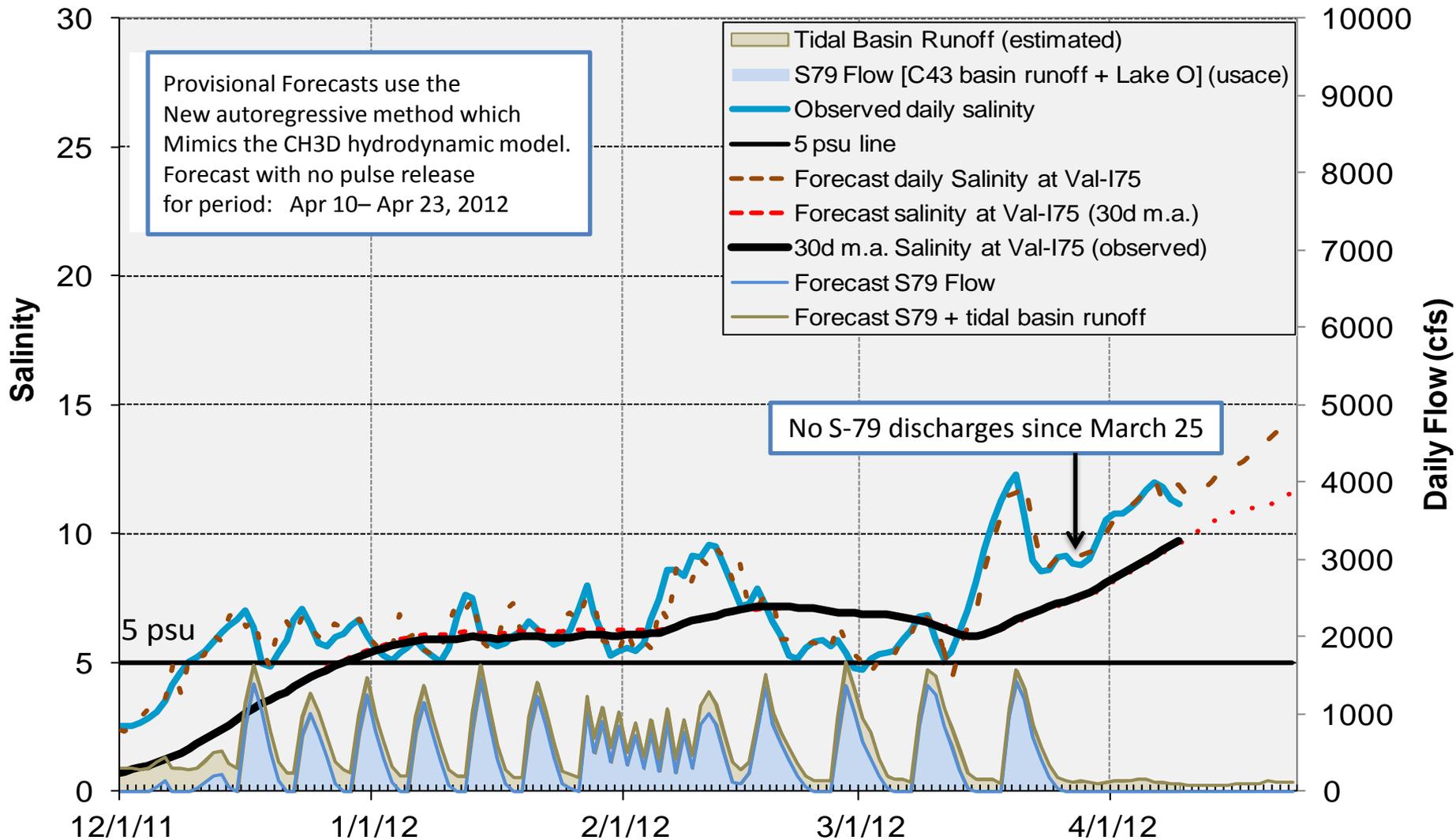
Caloosahatchee Estuary Flows and Salinity Observed and Forecast Salinity at Val I-75

Forecast 1: S-79=0 cfs & TBR = 135 cfs



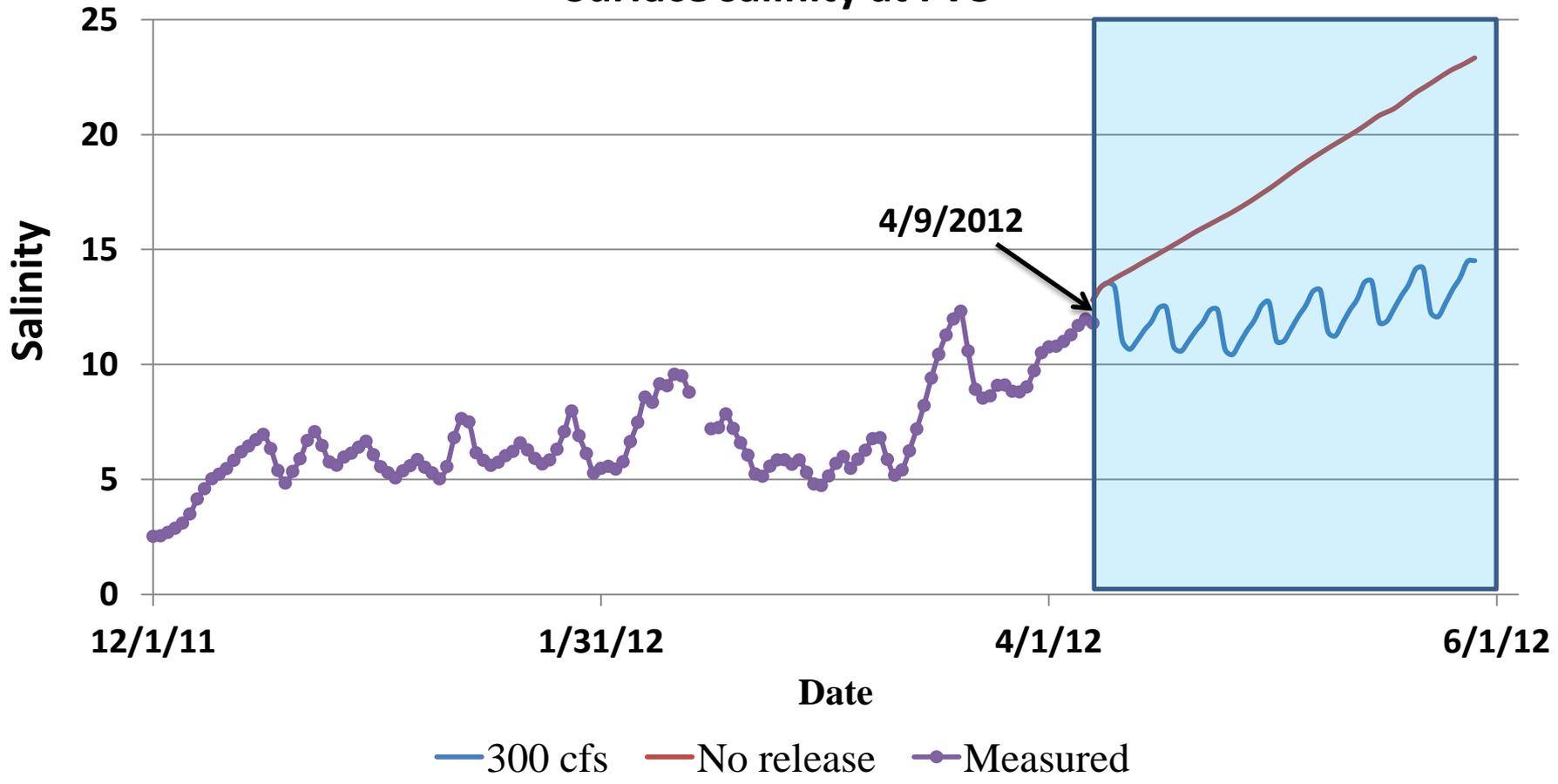
Caloosahatchee Estuary Flows and Salinity Observed and Forecast Salinity at Val I-75

Forecast 1: S-79=0 cfs & TBR = 110 cfs



Caloosahatchee Estuary Salinity Forecast Assuming 300 cfs Pulse Releases

Surface salinity at I-75



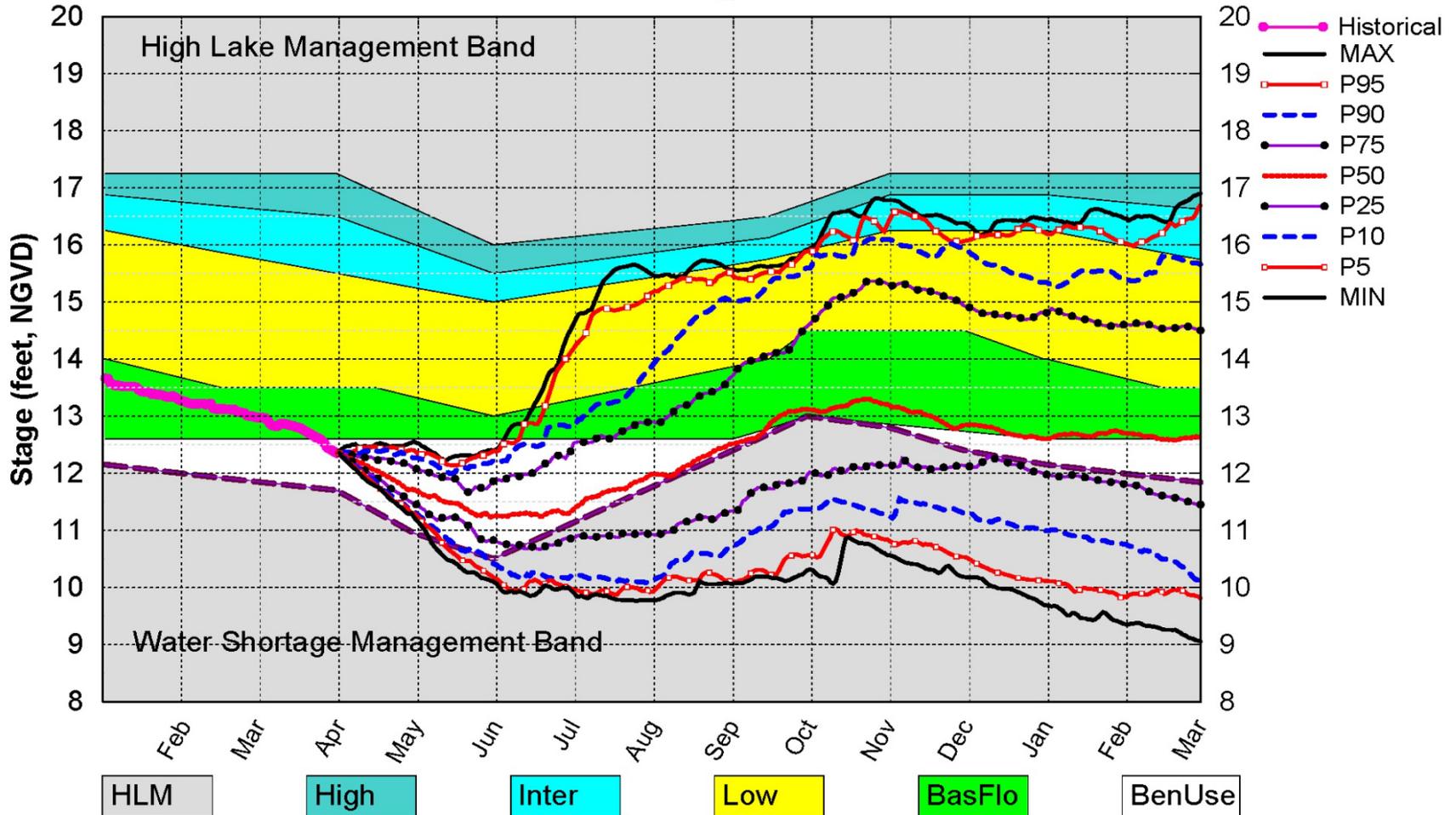
Ecological Benefits of Some Level of Releases to Caloosahatchee

- Provides for salinity gradient downstream of S-79
- Provide nutrients to support growth and survival
- March-June is period of high recruitment for young fish, crabs and other estuarine organisms.
- Provide some lower salinity nursery area
- Helps maintain spatial separation from predators and subsequent mortality of larvae and early juveniles at S-79
- Helps prevent stagnation & algal blooms upstream of S-79

With no releases to Caloosahatchee Estuary in Beneficial Use Zone

Lake Okeechobee SFWMM April 2012 Position Analysis

Percentiles PA_V5

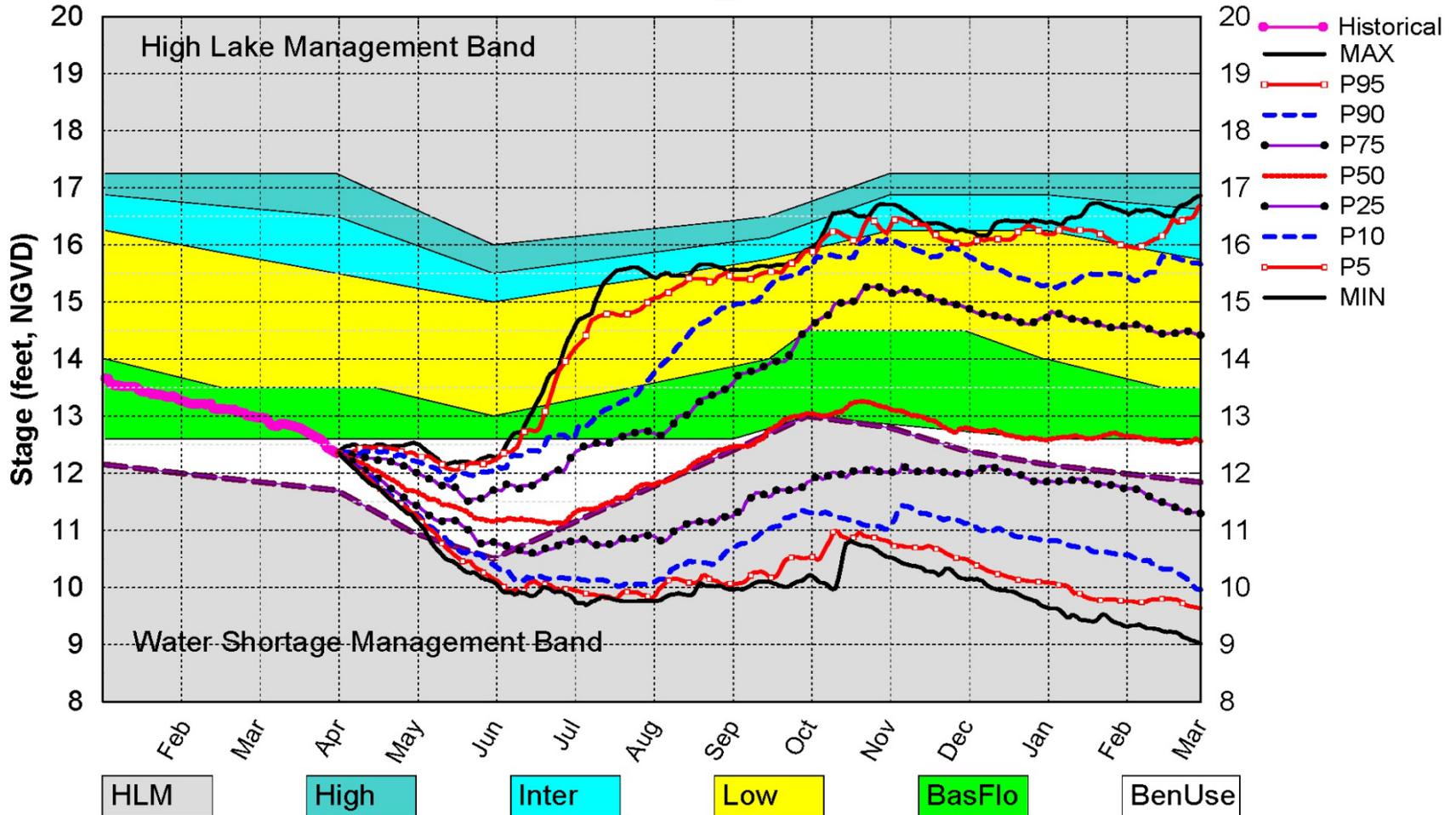


(See assumptions on the Position Analysis Results website)

With 300 cfs releases to Caloosahatchee Estuary in Beneficial Use Zone

Lake Okeechobee SFWMM April 2012 Position Analysis

Percentiles PA_C1



(See assumptions on the Position Analysis Results website)

Other Ecological Issues with Water Management Operations

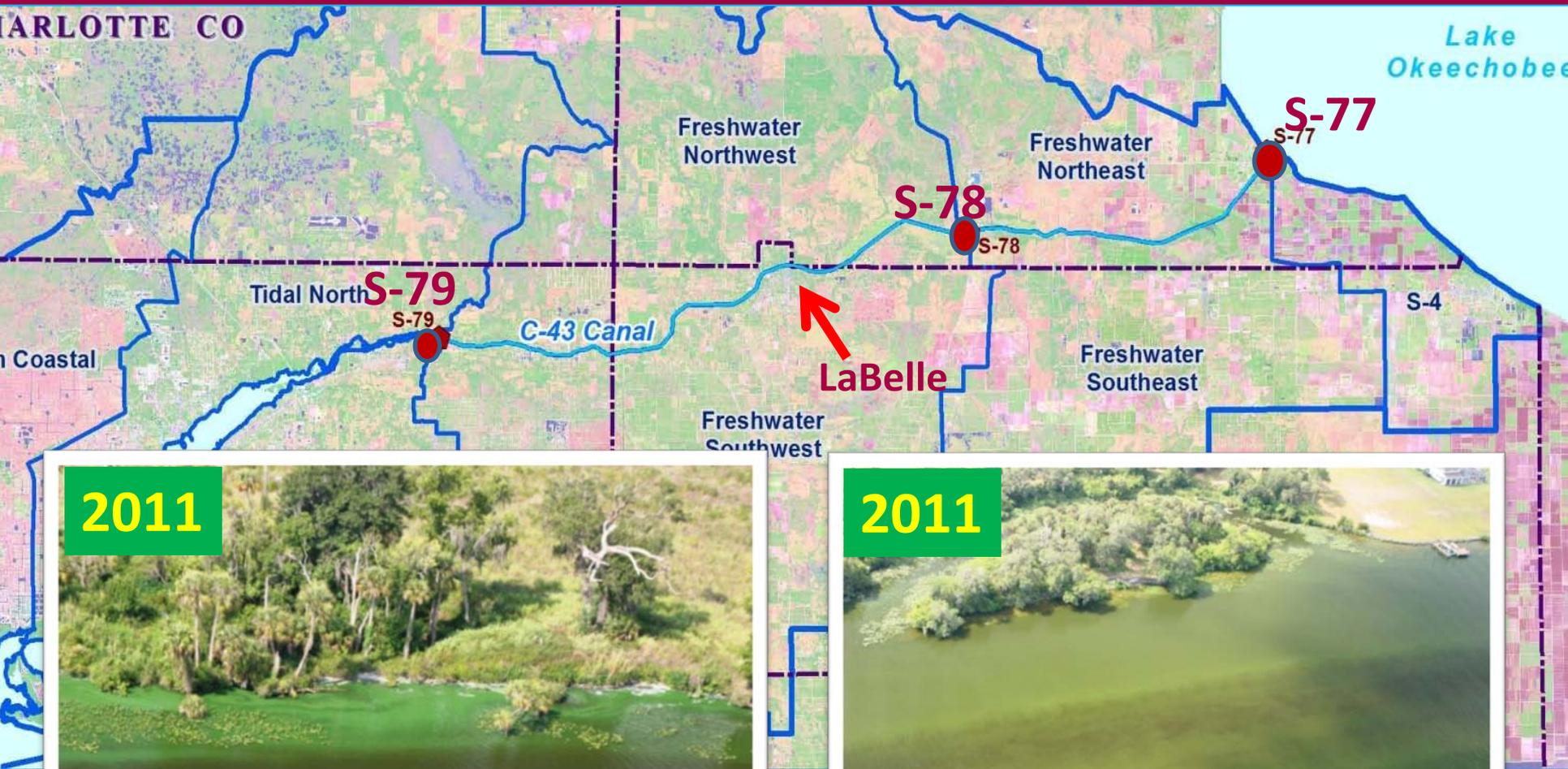
Salinity Issues

- Provides for salinity gradient downstream of S-79
 - Provide nutrients to support growth and survival
 - March-June is period of high recruitment for young fish, crabs and other estuarine organisms.
 - Provide some lower salinity nursery area
 - Helps maintain spatial separation from predators and subsequent mortality of larvae and early juveniles at S-79
-
- Helps prevent stagnation & algal blooms upstream of S-79

Blue-Green Algae

- Under warm temperatures and no flow conditions, potential for blue-green algae blooms – but no definitive trigger point
- Blue-green algae may or may not produce toxins
- District WQ sampling initiative between S-79 and S-78
- Reports of blue-green algae present in samples, but no substantive bloom formation to date.

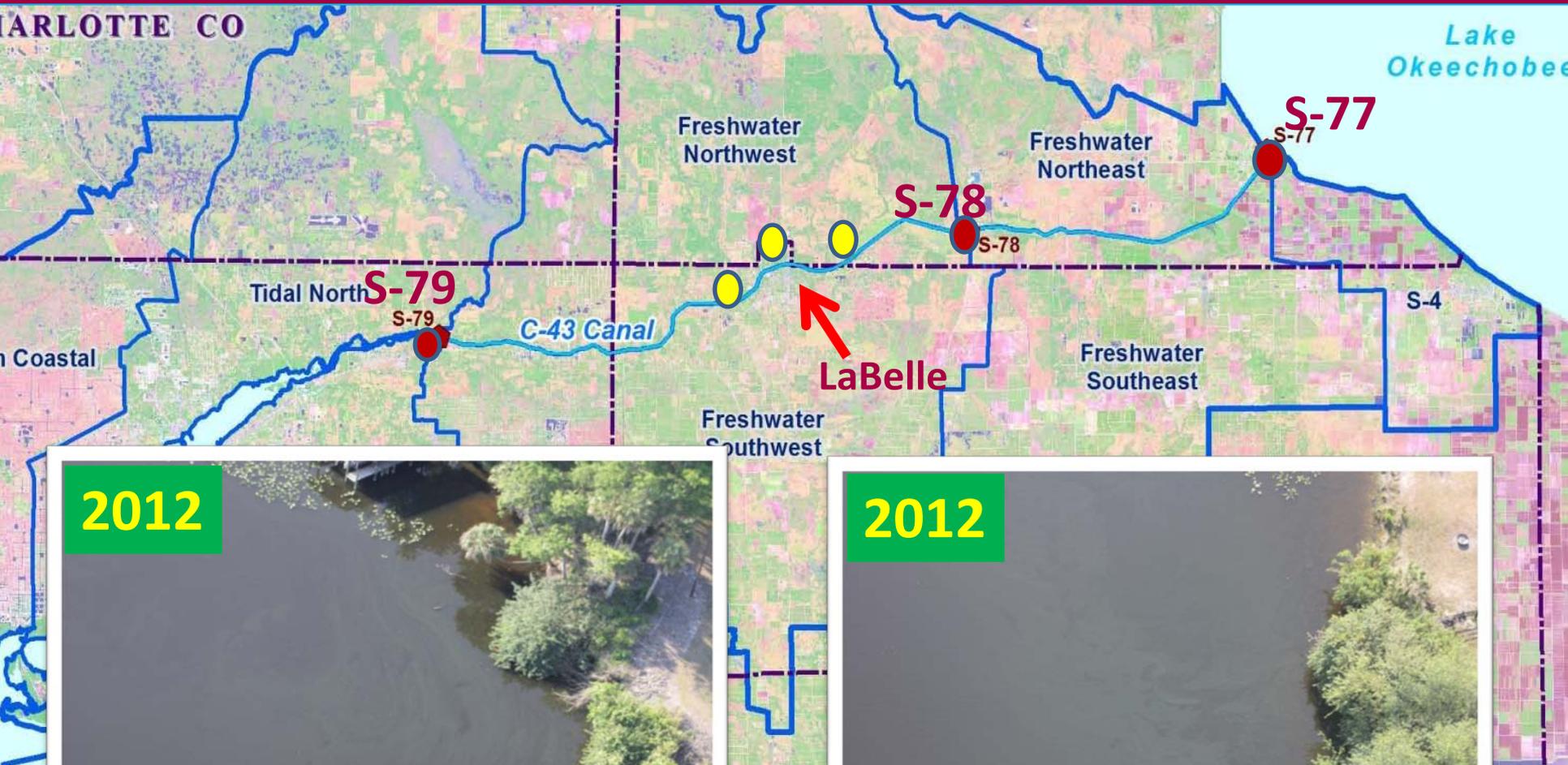
Reports of Blue-Green Algae Blooms



2011

2011

Reports of Blue-Green Algae Blooms



ACOE Lake Okeechobee Water Control Plan

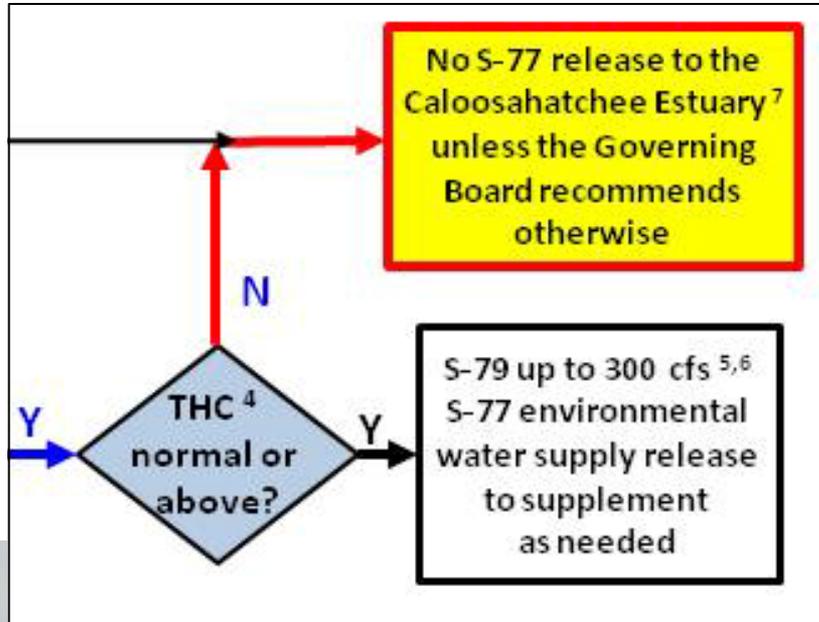
- Water Control Plan describes circumstances where use of “Additional Operational Flexibility” may be considered – anticipated to be used infrequently
- When lake is above the Water Shortage Management Band, a low volume pulse release may be implemented to benefit water quality within the lake and/or downstream
- Water Control Plan specifically notes that short-term high rates of release from Lake Okeechobee are often effective at breaking up algal blooms

Preventing / Managing Blooms

- No definitive method to predict formation, severity, duration or potential for toxic forms
- Pulse push of water through the river may help prevent or manage algal bloom conditions
- Initiate before severe bloom conditions forms
- Ongoing water quality sampling to evaluate conditions and timing in which pulse push might be needed
- Short duration (3 –day) push up to 2,000 cfs would move ~ 80% of river volume between Alva & S-79
- May need to repeat pulse push

Adaptive Protocols

- When it came to final decision box in the beneficial use zone, the Governing Board explicitly included discretion:
- “No S-77 release to the Caloosahatchee Estuary unless the Governing Board recommends otherwise”



- Governing Board briefed each month on water & ecological conditions
- Provides opportunity for Governing Board direction

Options for Governing Board Consideration & Direction to Staff

Salinity Issues

Adaptive Protocols:

- No S-77 release to the Caloosahatchee Estuary; or
- Governing Board recommends otherwise ...up to 300 cfs

Algae Bloom Management

Water Control Plan:

- Direct staff to continue to monitor WQ and, if conditions warrant, request the ACOE conduct a short duration pulse release to manage algal bloom conditions in the Caloosahatchee River under Additional Operational Flexibility provisions
- Monitoring response and potential to repeat

Thank You!

