



Governing Board Meeting
August 15, 2013



ECOLOGICAL CONDITIONS UPDATE

Terrie Bates

DIRECTOR, WATER RESOURCES DIVISION

Kissimmee Basin

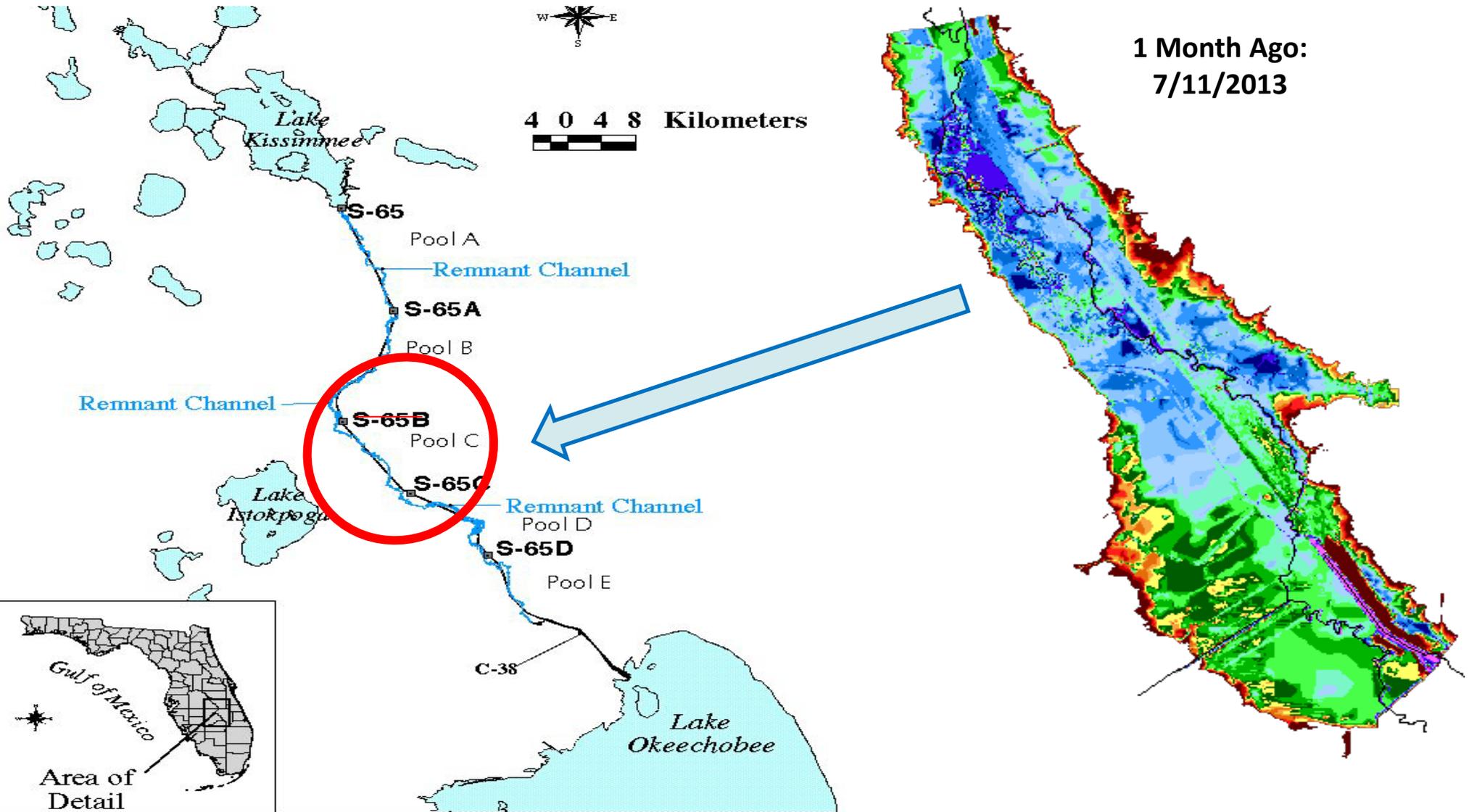
Current Conditions



- Lakes and river experiencing both benefits & challenges of a wet early wet season
 - *Stages in the lakes are at or above summer regulation schedules*
 - *Discharge to the Kissimmee River is high, with the floodplain fully inundated*
- However, current lake stages mean little or no storage available in Kissimmee Basin
- High lake stages can demand sudden flood control operations in response to storm forecasts
 - *Lake stages reduced to provide flood control buffer (0.1 - 0.5 ft below regulation schedule)*

Kissimmee Basin

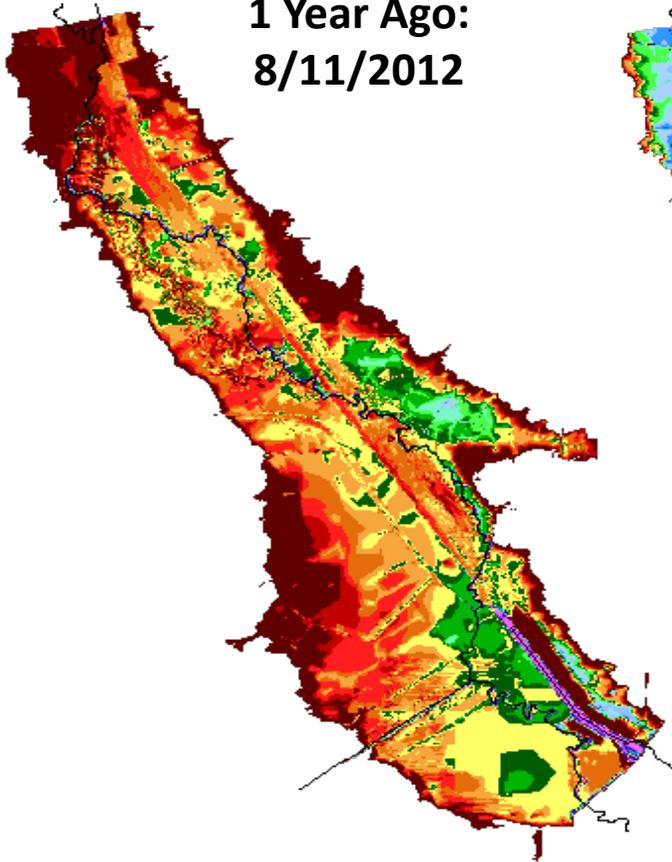
Kissimmee River (Pool C)



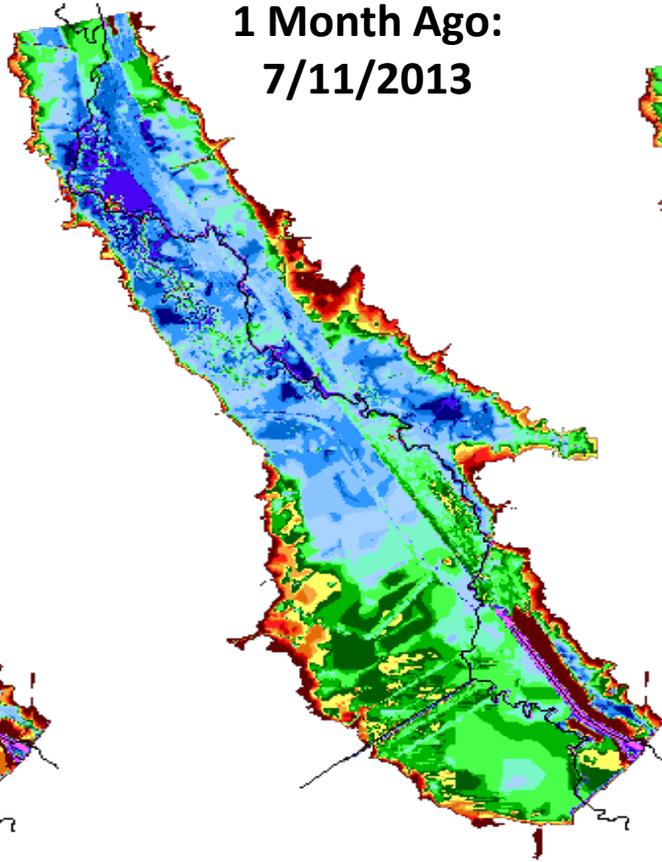
Kissimmee River (Pool C)

Water Depth Maps

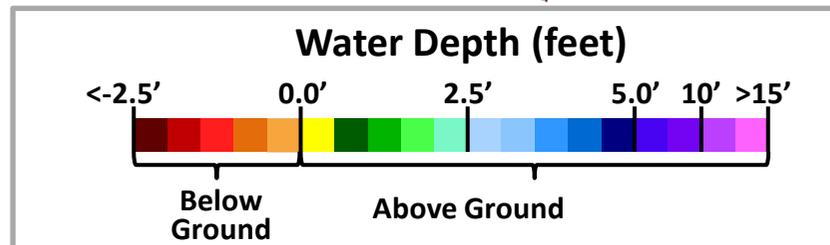
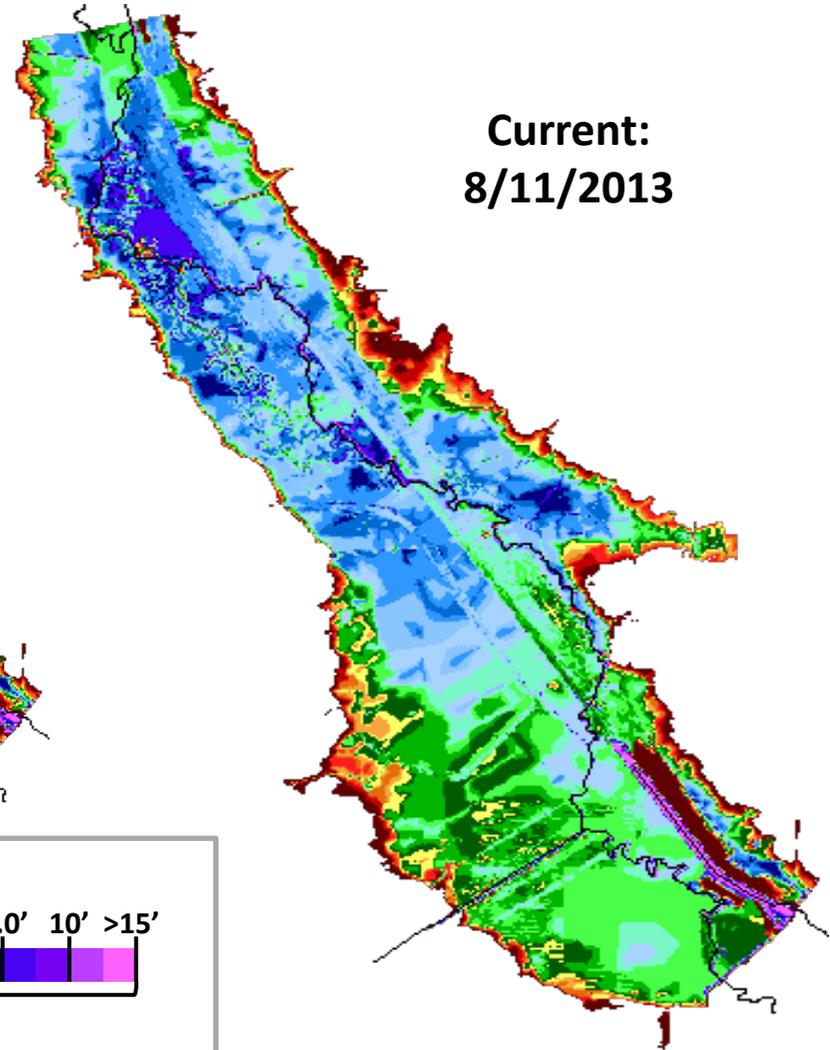
1 Year Ago:
8/11/2012



1 Month Ago:
7/11/2013



Current:
8/11/2013



Kissimmee Basin

Current Conditions

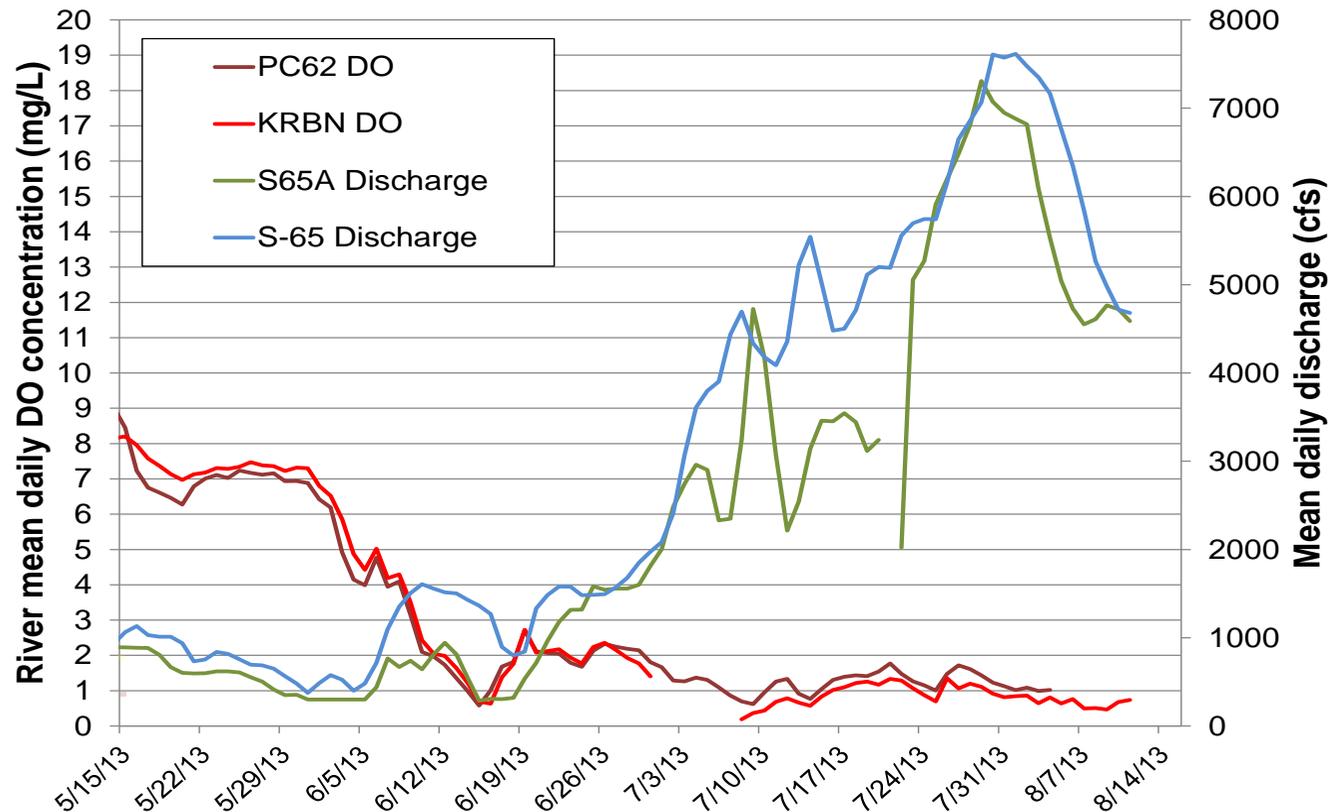
- During and after high rain/discharge events, river DO can crash

- *DO Level of Concern: below 2 mg/L (stressful)*
- *DO Critical Level: below 1 mg/L (can be lethal)*

- **Can cause fish kills**

- *Fish can sometimes find refuge in pockets of higher-DO water*

Currently, DO in the river is averaging 1.2 mg/L (just above the critical level) and has improved recently on the floodplain to a similar level



Kissimmee River – Floodplain Inundation (Dry Conditions in May)

An aerial photograph of the Kissimmee River floodplain. The river is visible as a narrow, winding blue line through a vast, green landscape. The surrounding area is a mix of dense green vegetation and patches of brown, dry earth, indicating a lack of water. The terrain appears flat and expansive, with the river meandering through it. The sky is clear and blue, suggesting a bright day.

May 7, 2013

Kissimmee River – Floodplain Inundation (Wet Conditions in July)

An aerial photograph showing a vast expanse of green wetlands and marshes. A central waterway, the Kissimmee River, flows through the landscape, surrounded by numerous smaller channels and flooded areas. The vegetation is dense and lush green, indicating wet conditions. The sky is clear and blue, and the overall scene depicts a significant inundation of the floodplain.

July 16, 2013

Kissimmee River

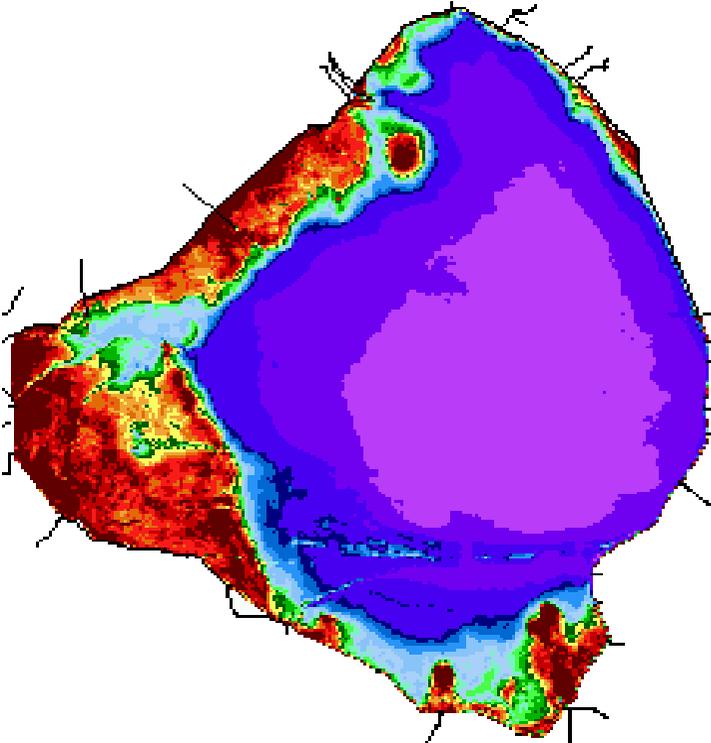
A wide, shallow river flows through a lush green wetland. The water is calm, reflecting the sky and the surrounding vegetation. The sky is filled with large, dramatic clouds, with patches of blue visible. The foreground is dominated by tall, thin reeds or grasses growing in the water. The background shows a flat expanse of green wetland stretching to the horizon.

July 17, 2013

Lake Okeechobee

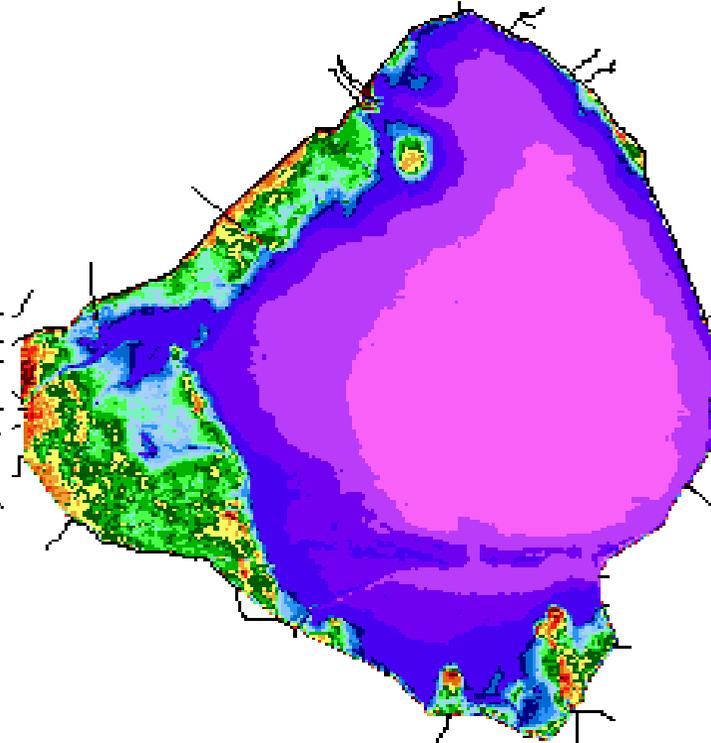
Water Depth Maps

1 Year Ago: 8/12/2012



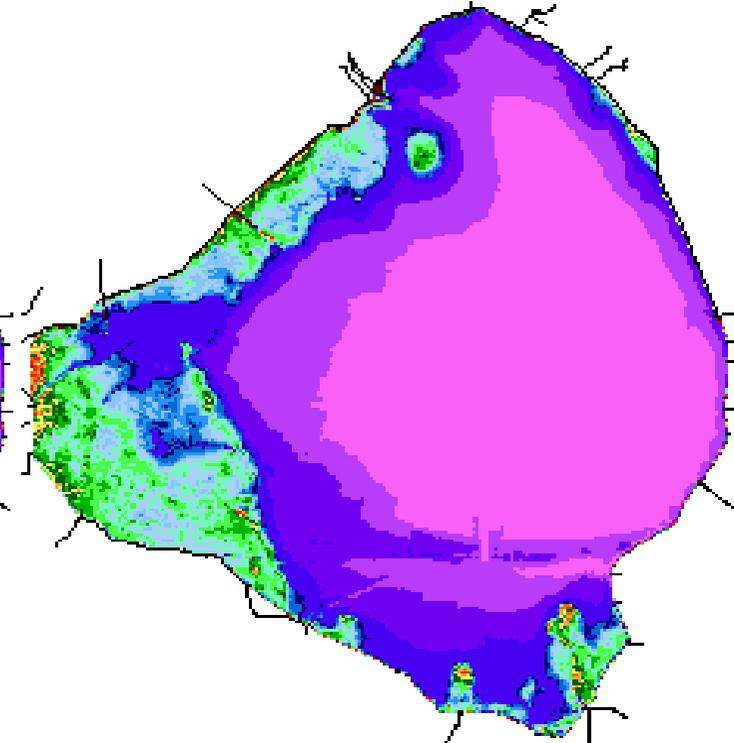
(12.14 ft NGVD29)

1 Month Ago: 7/13/2013

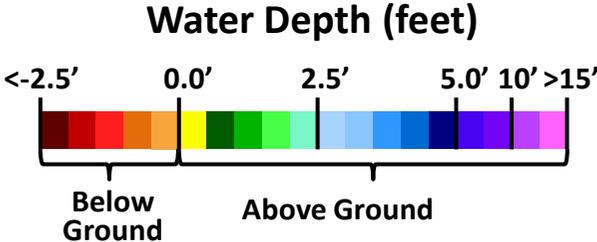


(14.88 ft NGVD29)

Current: 8/12/2013



(16.01 ft
NGVD29)



Lake Okeechobee

Current Conditions



Combination of High Lake Levels and Strong Winds and Waves Can Uproot Thousands of Acres of Plants



Lake Okeechobee

Current Conditions

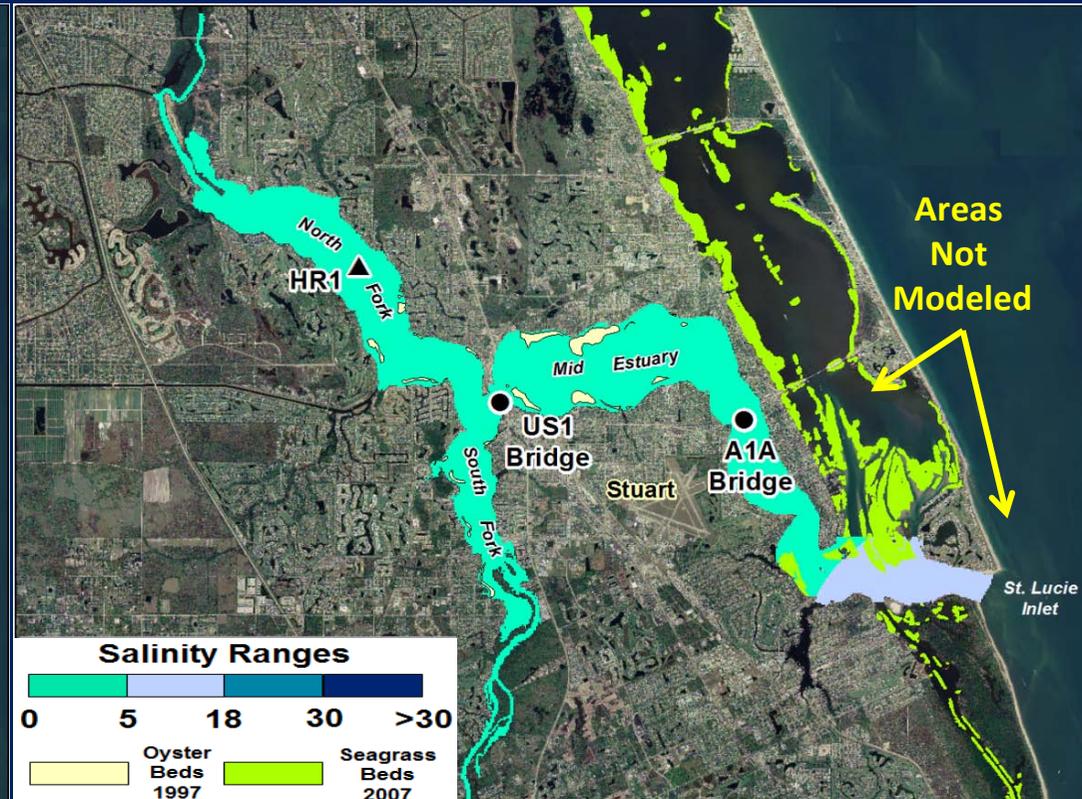
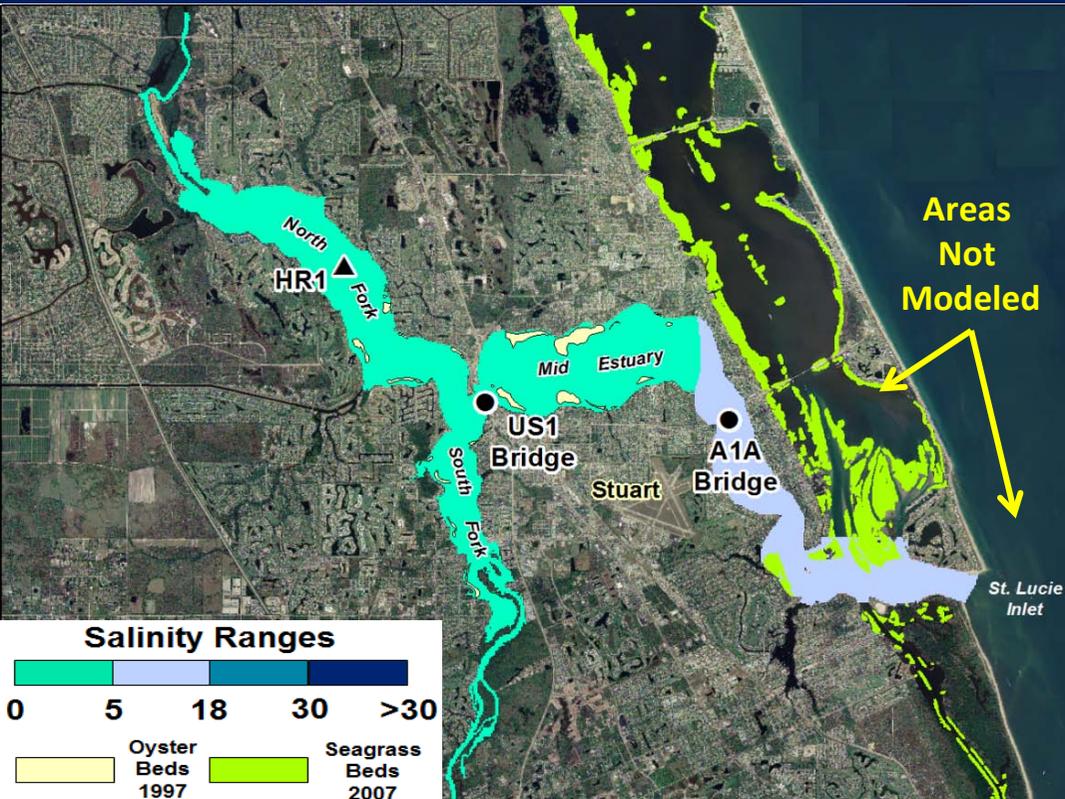


St. Lucie Estuary

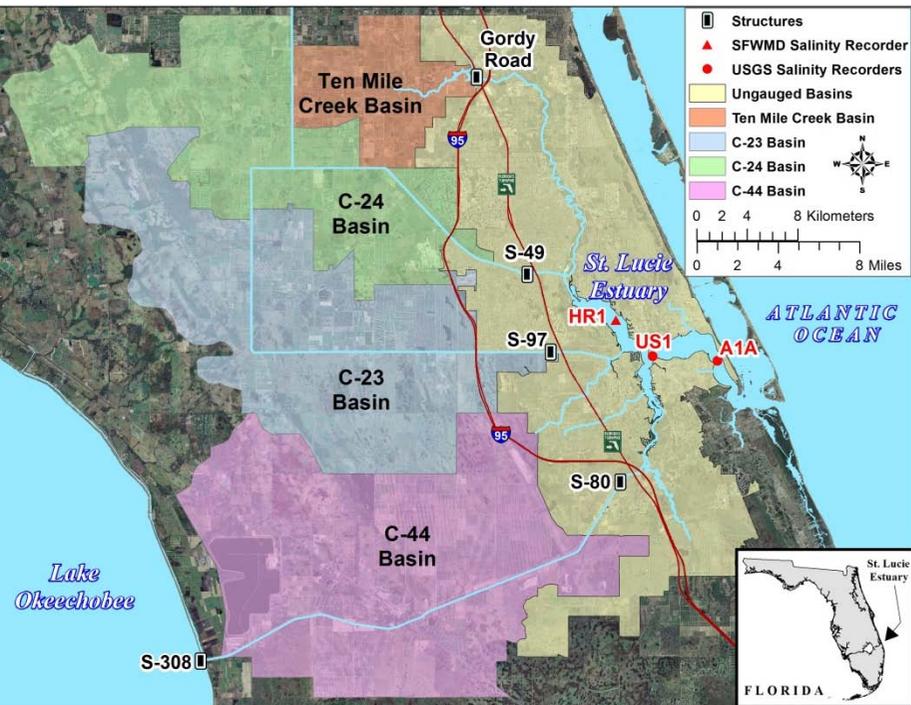
Salinity Conditions

July 12, 2013

August 12, 2013

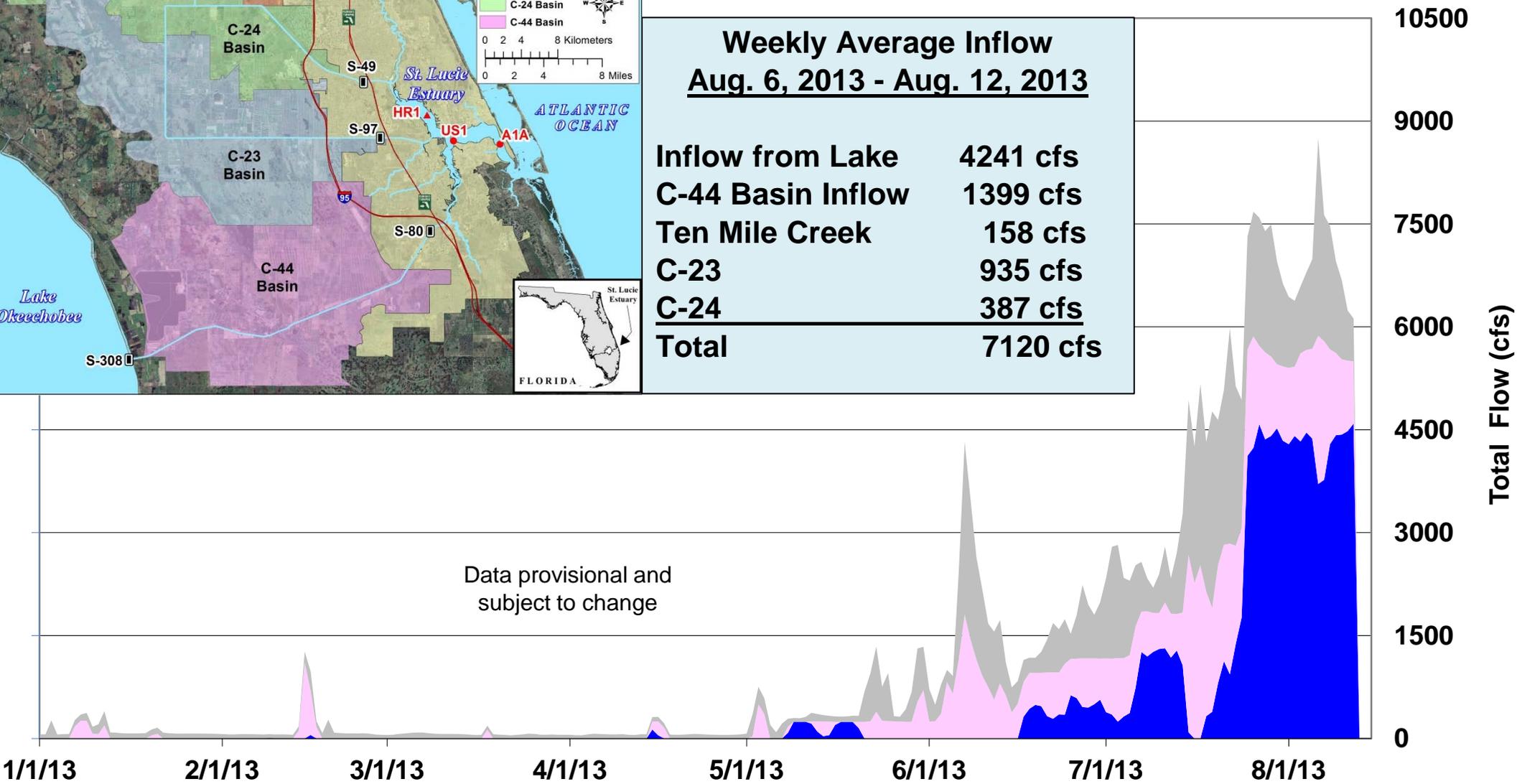


St. Lucie Estuary



**Weekly Average Inflow
Aug. 6, 2013 - Aug. 12, 2013**

| | |
|-------------------|-----------------|
| Inflow from Lake | 4241 cfs |
| C-44 Basin Inflow | 1399 cfs |
| Ten Mile Creek | 158 cfs |
| C-23 | 935 cfs |
| C-24 | 387 cfs |
| Total | 7120 cfs |



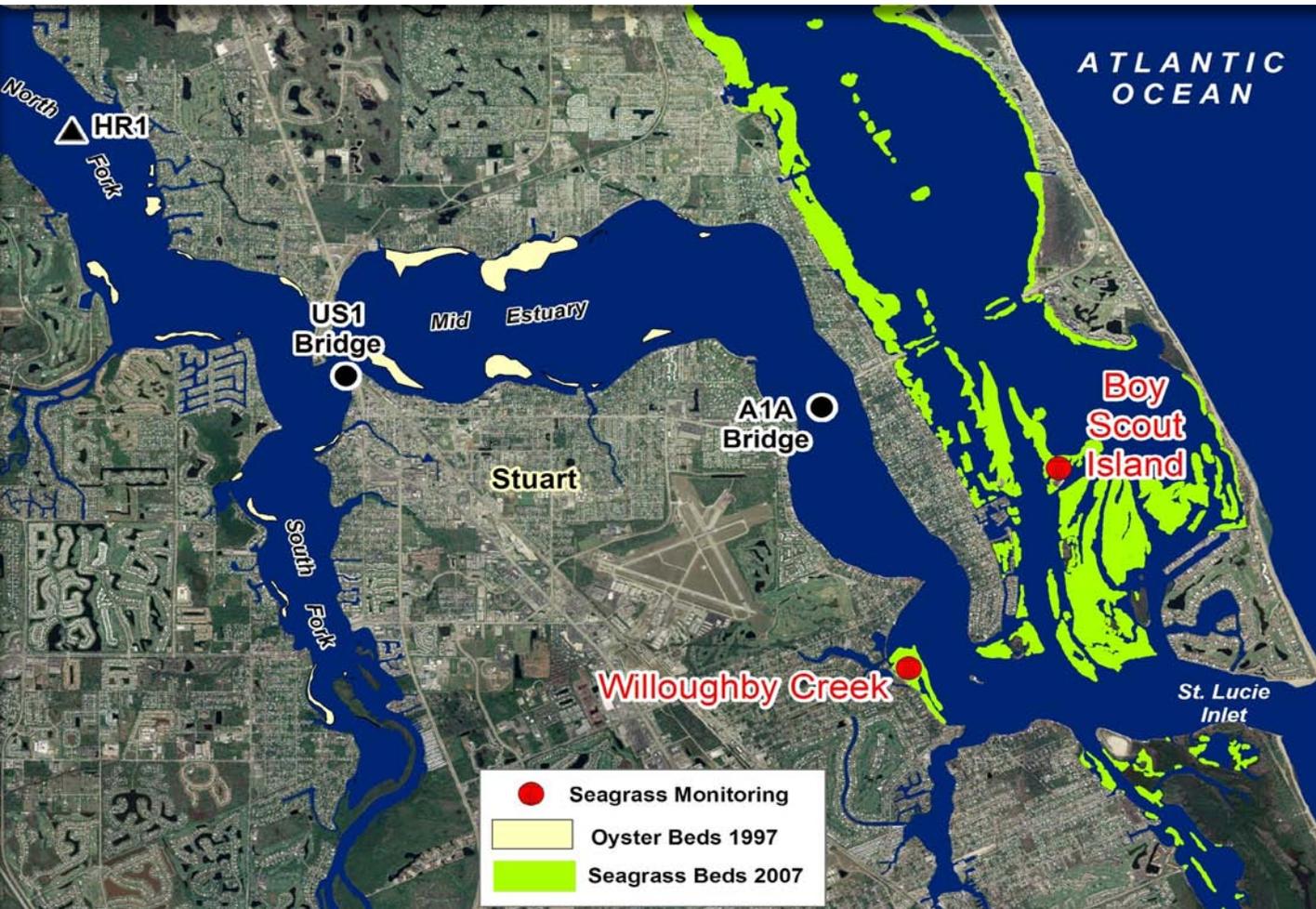
Data provisional and subject to change

■ Inflow from Lake ■ C-44 Basin Runoff ■ Inflow from C-24, C-23, and Ten Mile Creek Basins *

*Does not include runoff from the tidal basin or groundwater

St Lucie Estuary

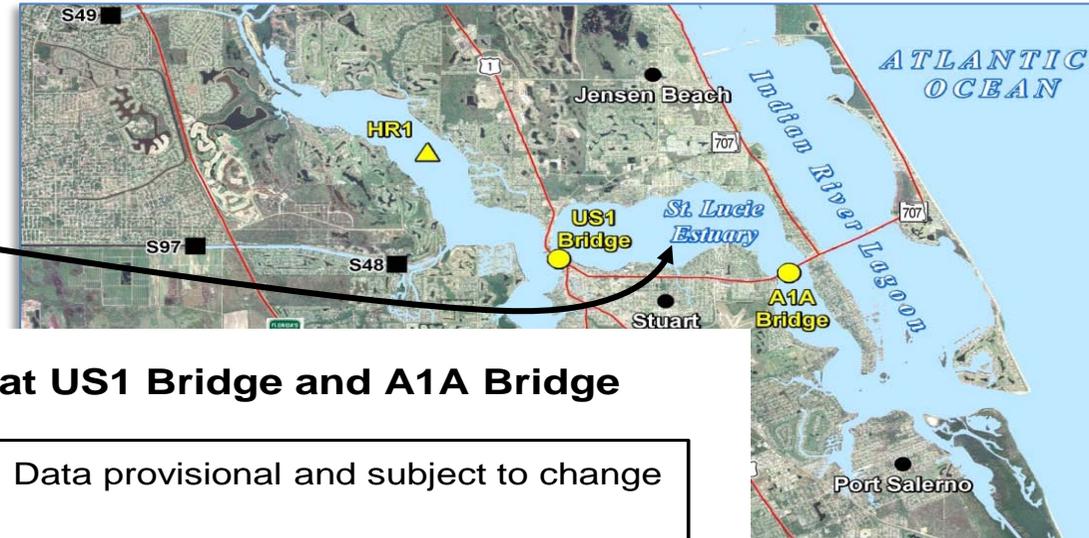
Salinity Tolerances of Oysters



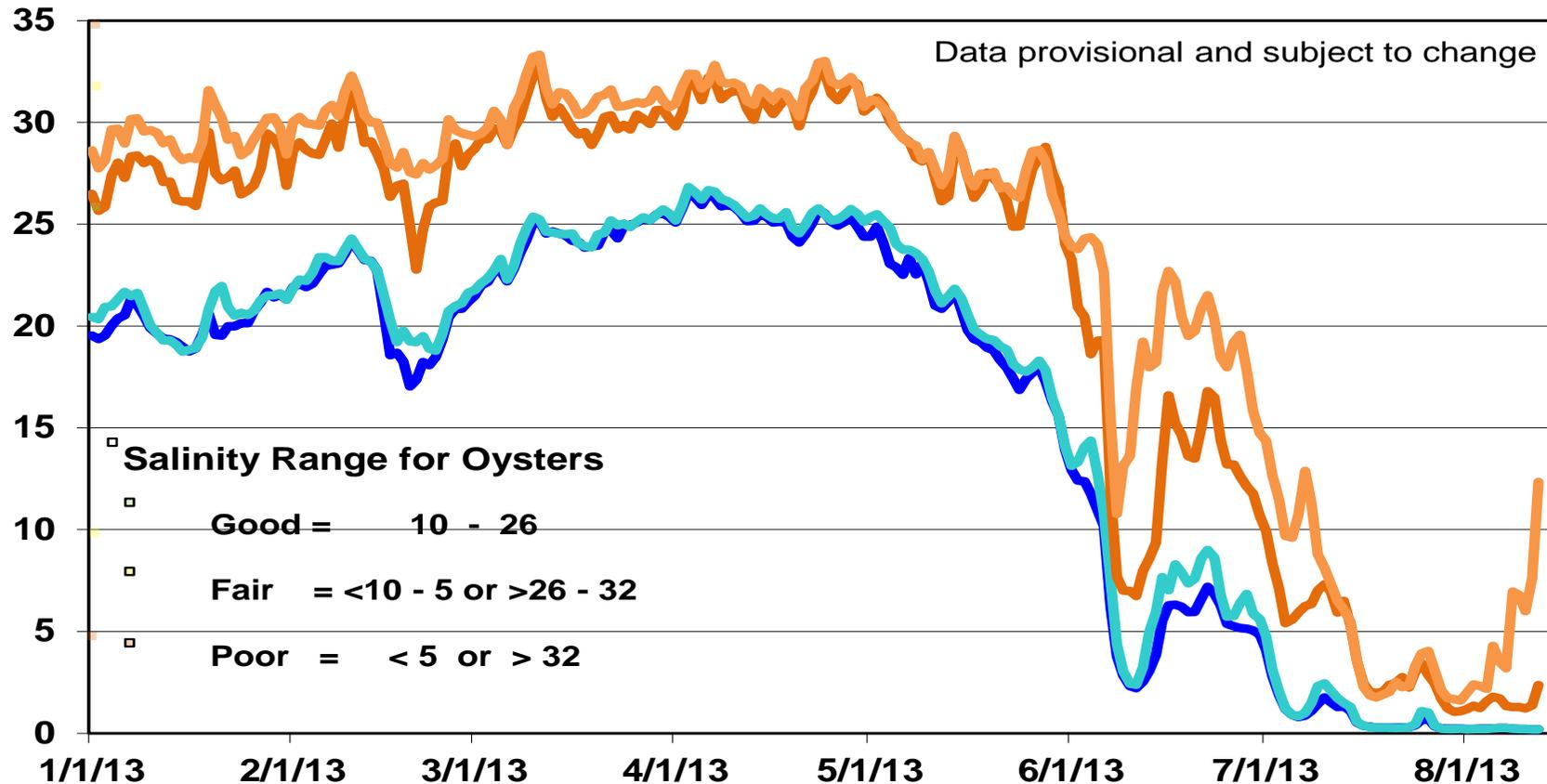
- **Juveniles:** Mortality after 7 days at < 5
- **Adults:** Mortality after 28 days at < 5

St. Lucie Estuary

- Major oyster beds are located between the US1 and A1A Bridges
- Salinity has fallen below 5 in this area



Surface and Bottom Mean Daily Salinity at US1 Bridge and A1A Bridge



St. Lucie Estuary Salinity Recorders

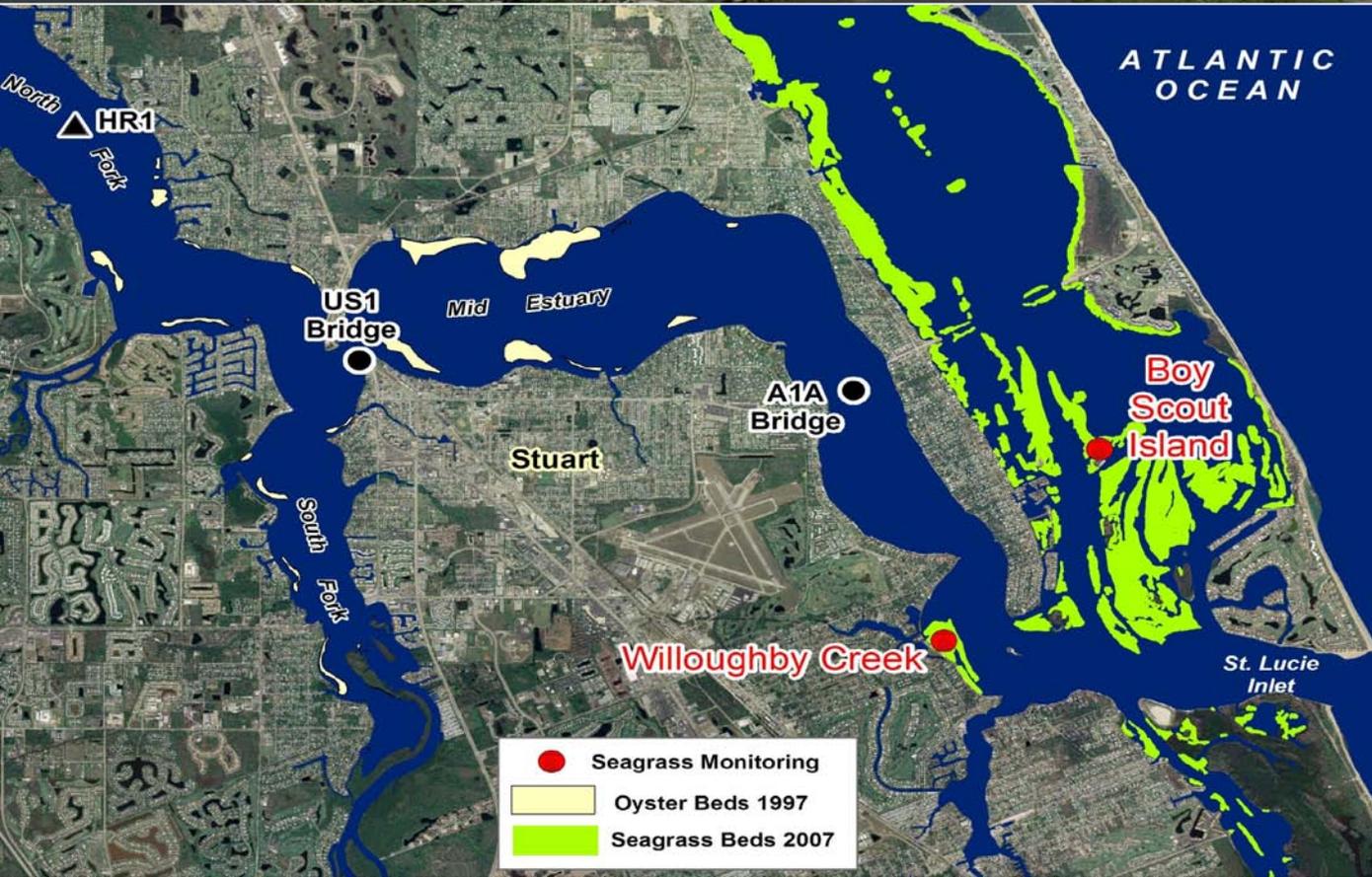
- ▲ SFWMD Recorder
- USGS Recorders

— US1: Daily Mean Surface Salinity
— A1A Daily Mean Surface Salinity

— US1: Daily Mean Bottom Salinity
— A1A Daily Mean Bottom Salinity

St Lucie Estuary

Boy Scout Island

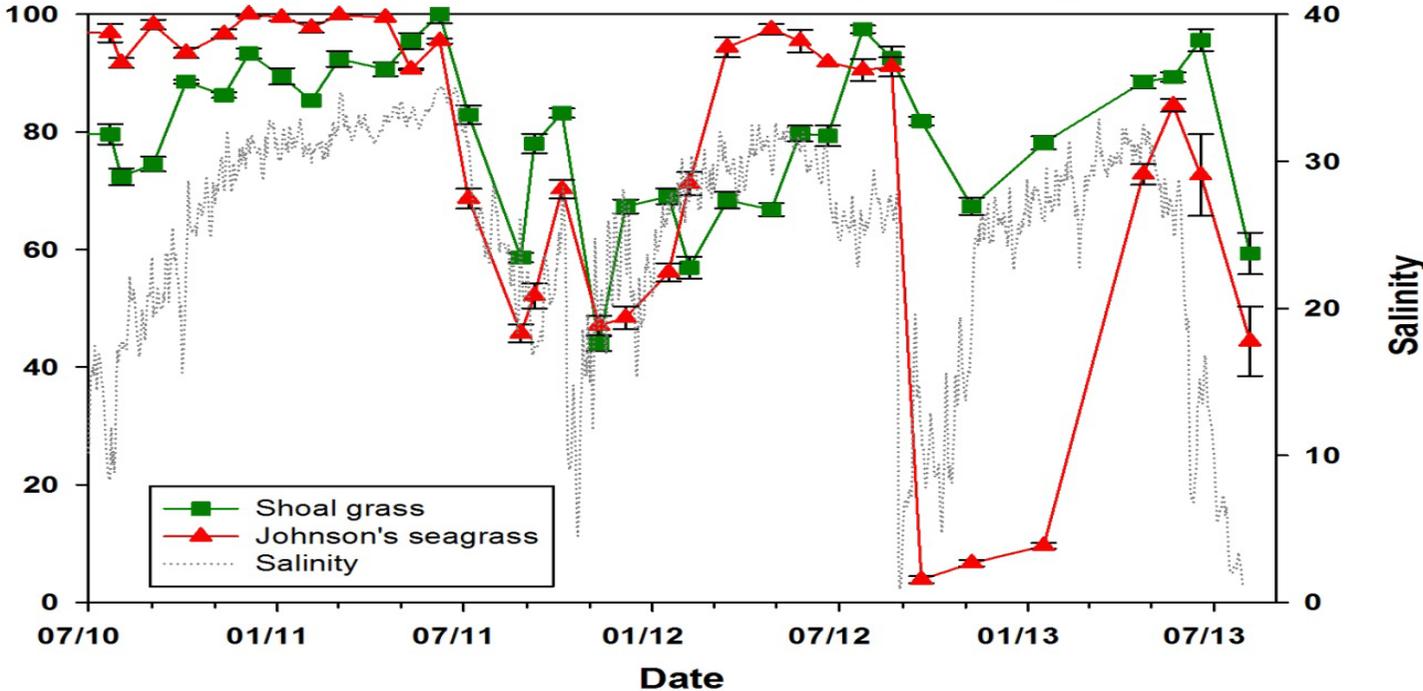




Willoughby Creek



Willoughby Creek
Seagrass Percent Occurrence (Mean \pm SE)



St Lucie Estuary

Photo by: Jacqui Thurlow-Lippisch

Atlantic Ocean



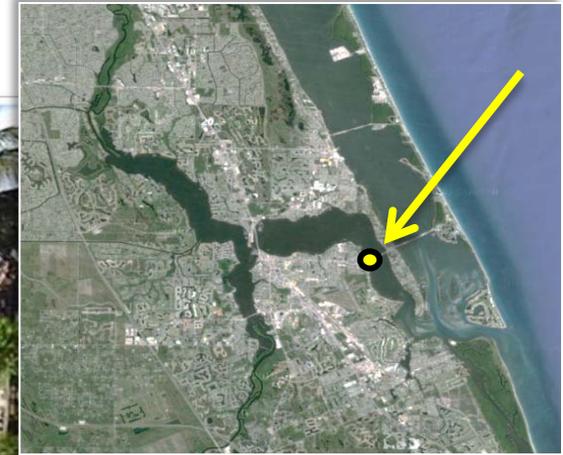
St Lucie Estuary

Algal Blooms



St Lucie Estuary

Algal Bloom



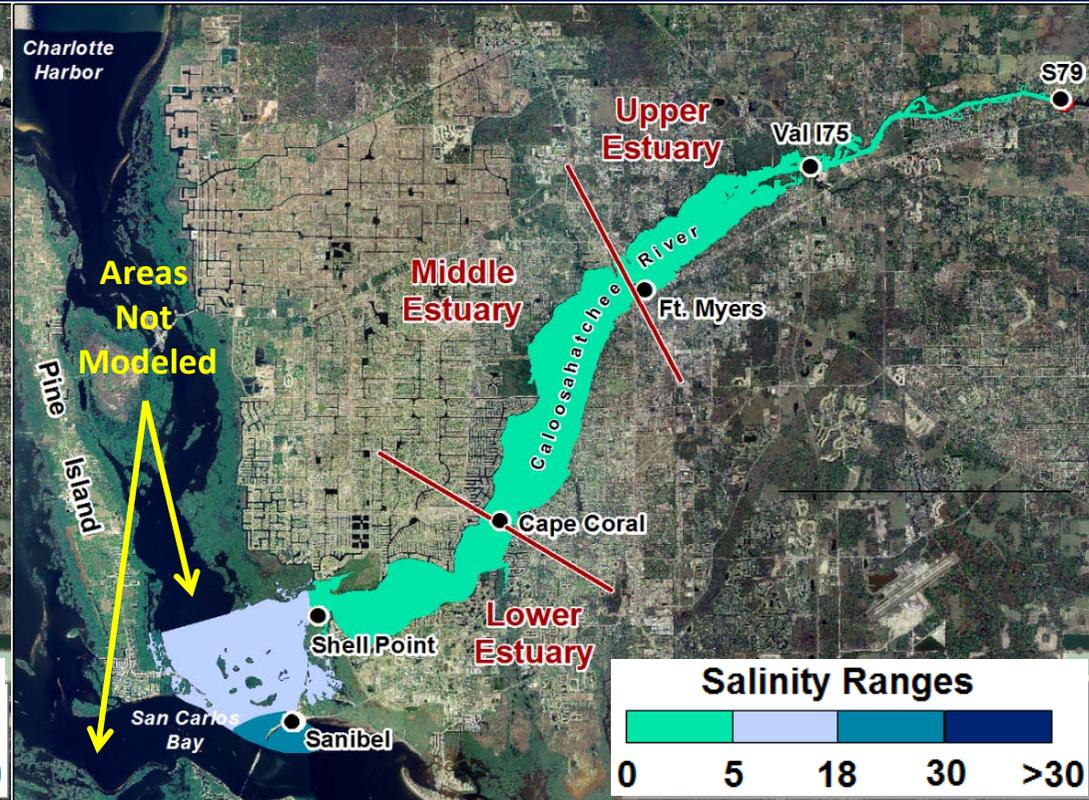
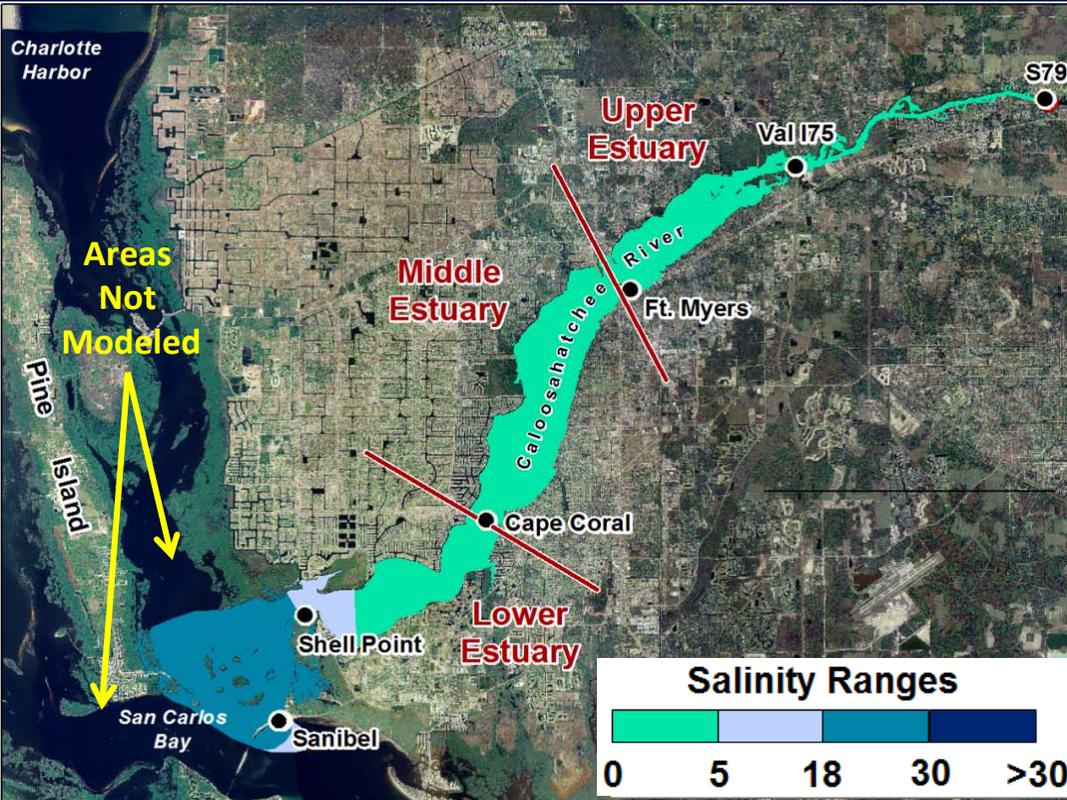
Evans Crary Bridge (west side) in Martin County

Caloosahatchee Estuary

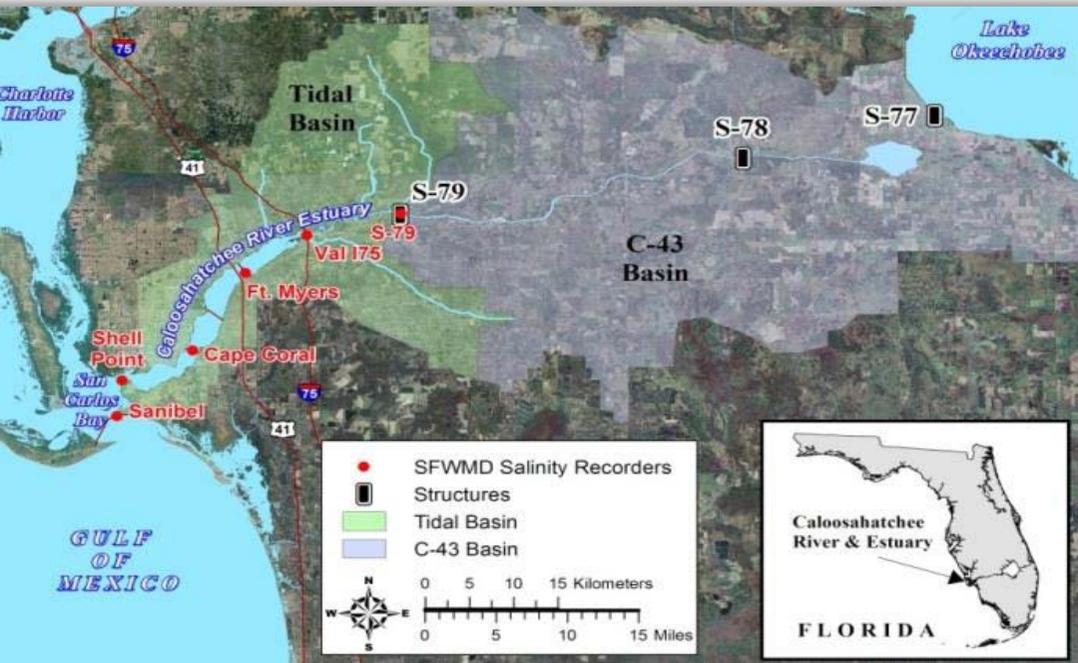
Salinity Conditions

July 12, 2013

August 12, 2013



Caloosahatchee Estuary



Data are provisional and subject to change

16,000

14,000

12,000

10,000

8,000

6,000

4,000

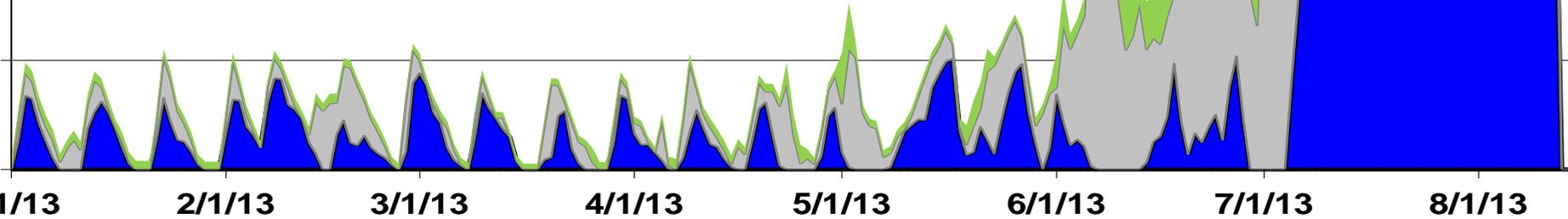
2,000

0

Total Flow (cfs)

Weekly Average Inflow Aug. 6, 2013 - Aug. 12, 2013

Inflow from Lake: 6289 cfs
C-43 Basin Inflow: 3860 cfs
Tidal Basin Inflow: 2035 cfs
Total : 12184 cfs

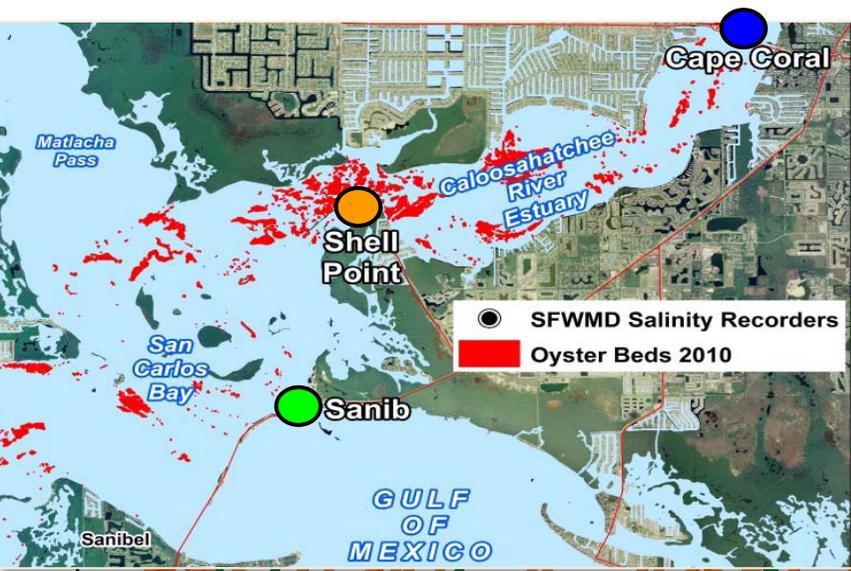


■ Inflow from Lake ■ C-43 Basin Inflow ■ Tidal Basin Inflow (downstream of S79)

*Does not include direct overland runoff from the tidal basin or groundwater

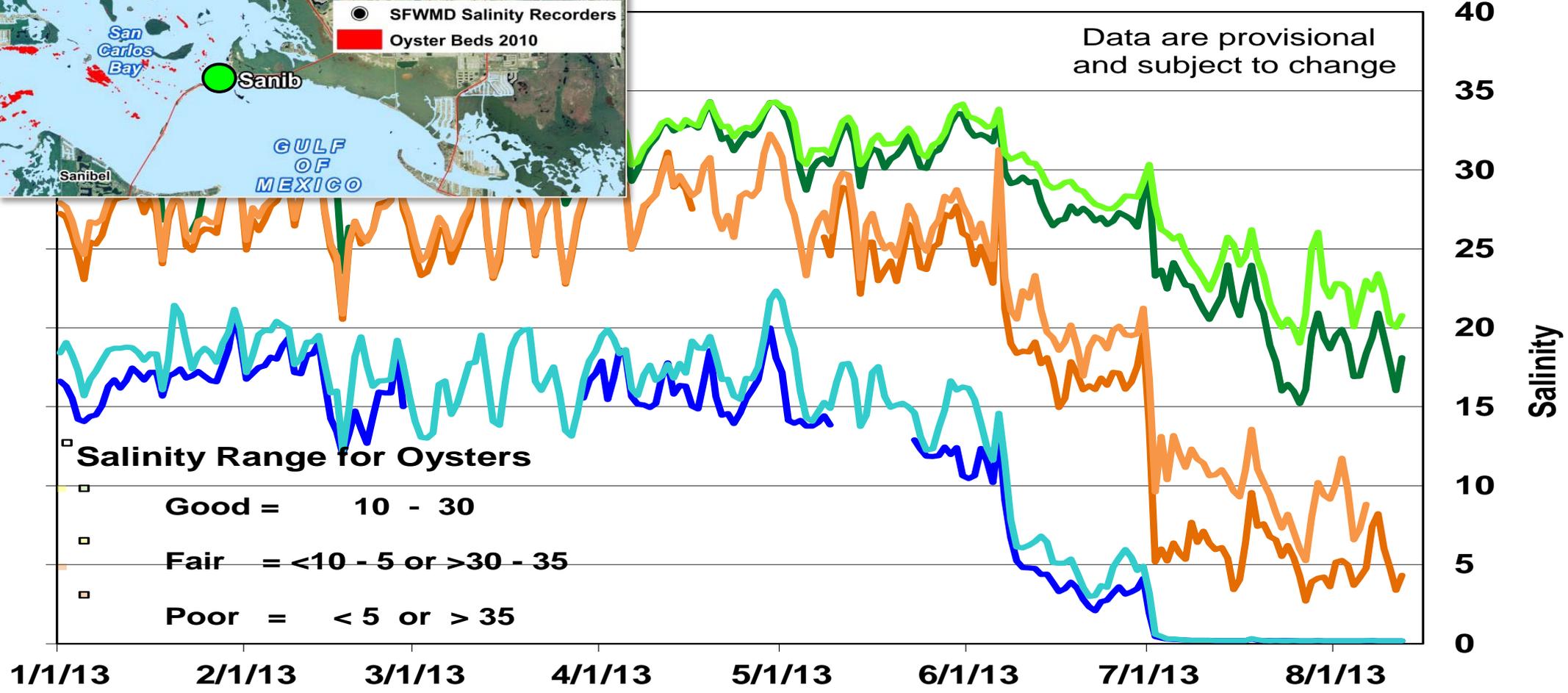
Caloosahatchee Estuary

Surface and Bottom Mean Salinity at 3 monitoring stations in the Caloosahatchee Estuary



● SFWMD Salinity Recorders
 ■ Oyster Beds 2010

Data are provisional and subject to change



Salinity Range for Oysters

- Good = 10 - 30
- Fair = <10 - 5 or >30 - 35
- Poor = < 5 or > 35



Caloosahatchee Estuary

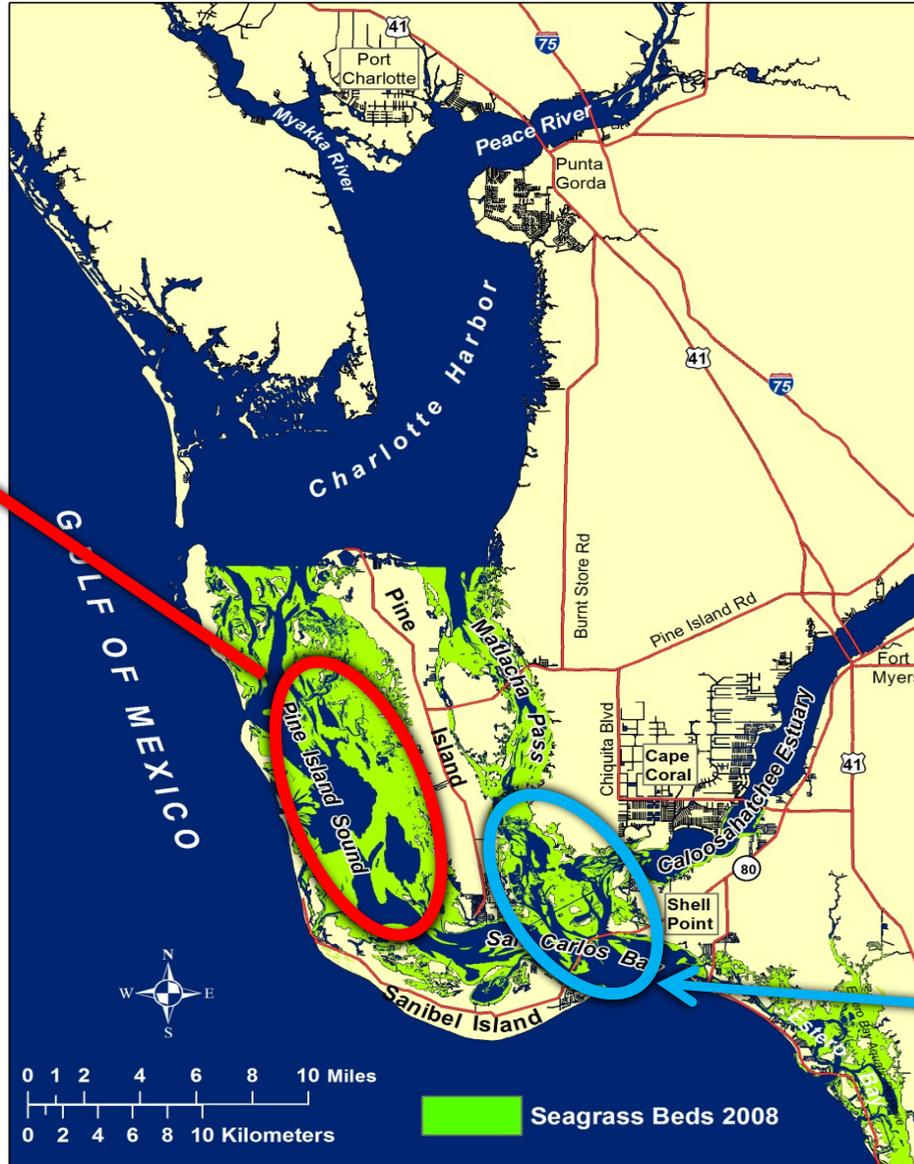
“Dark Water”
at Point Ybel,
Sanibel



*Photo by: Greg Rawl
Illustrative of past
high discharge events
Mid-2000*

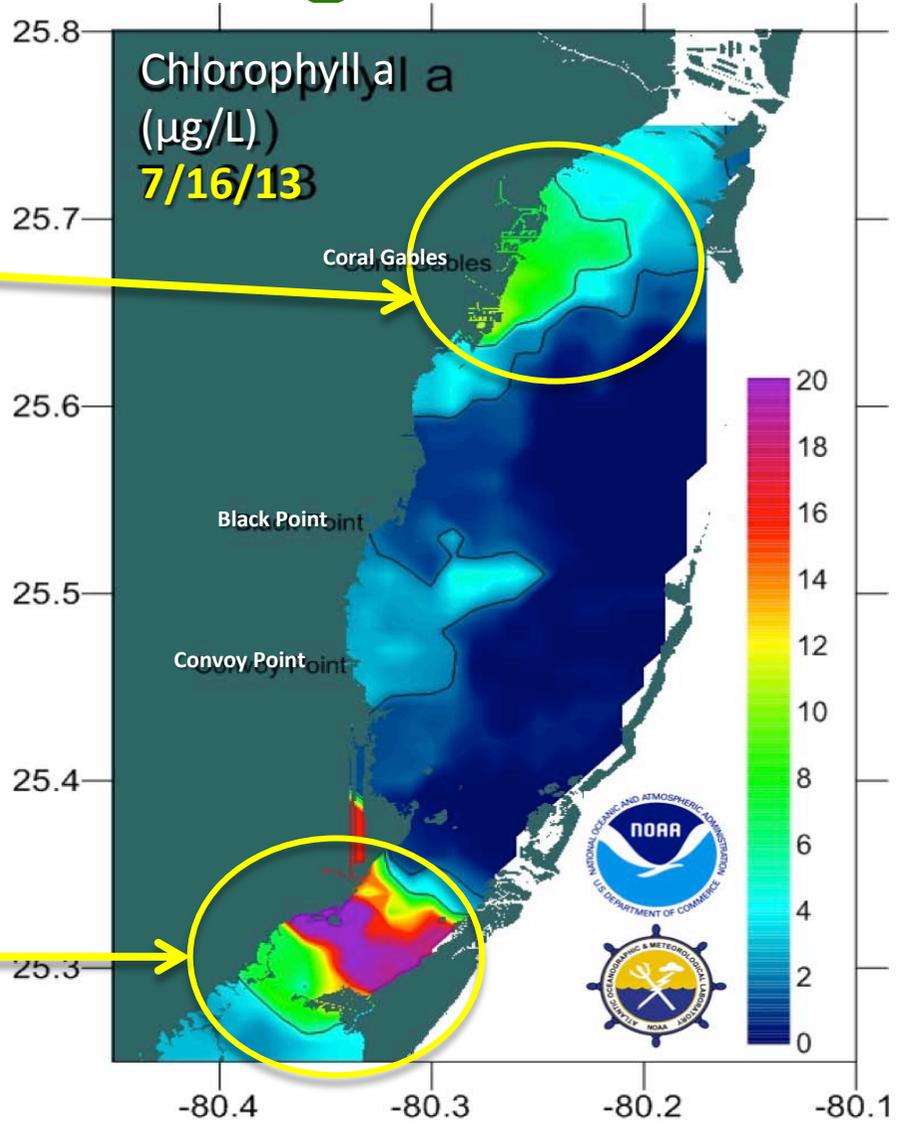
Caloosahatchee Estuary

phytoplankton
bloom

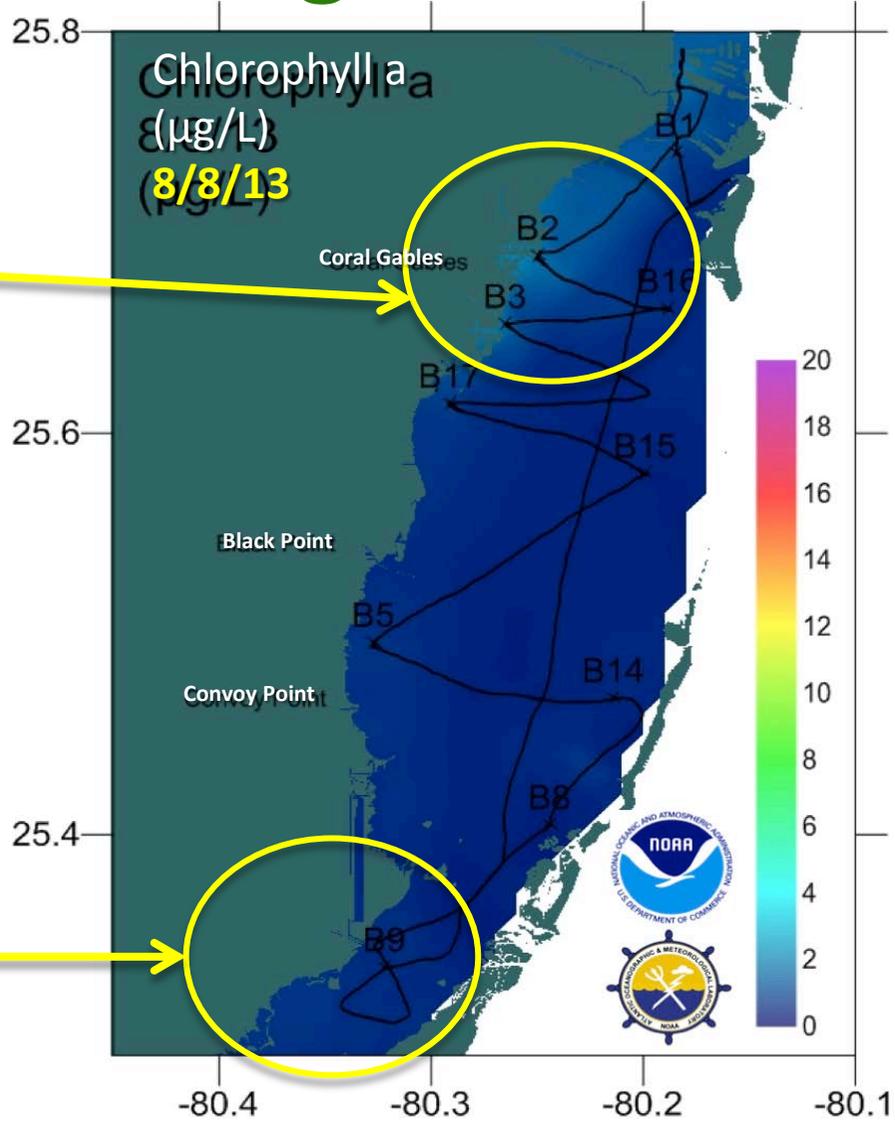


salinity stress

Biscayne Bay Algal Blooms



Biscayne Bay Algal Blooms



Biscayne Bay Bloom



Aerial photo of a bloom boundary taken on July 25th.

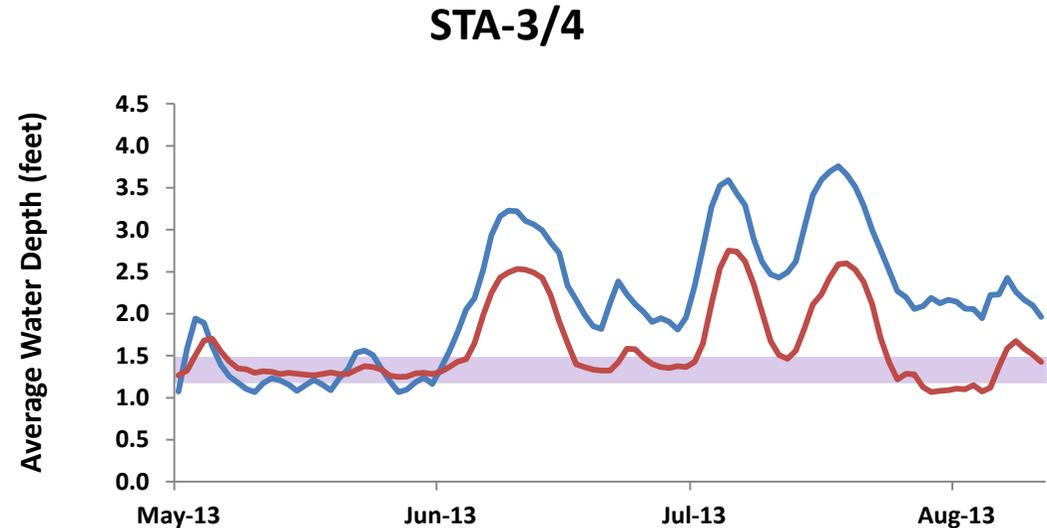
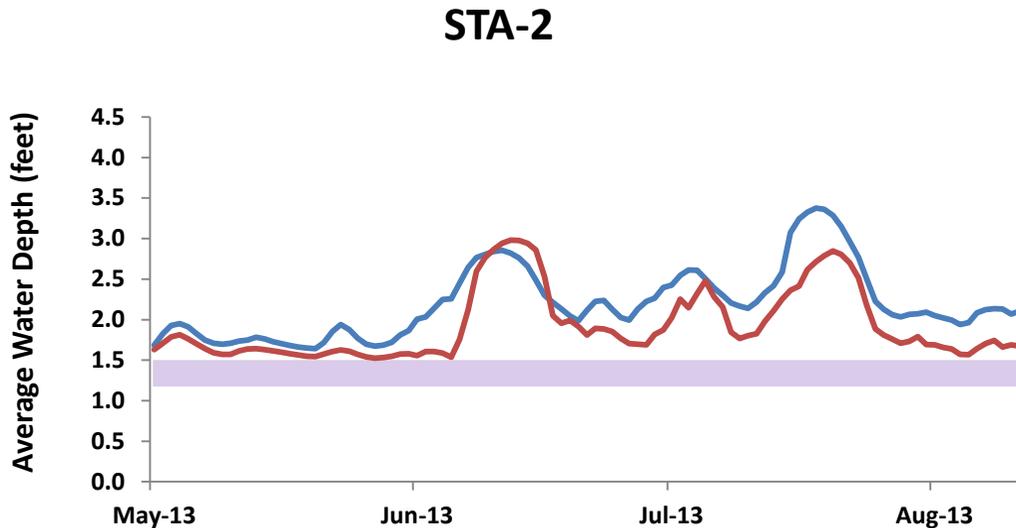
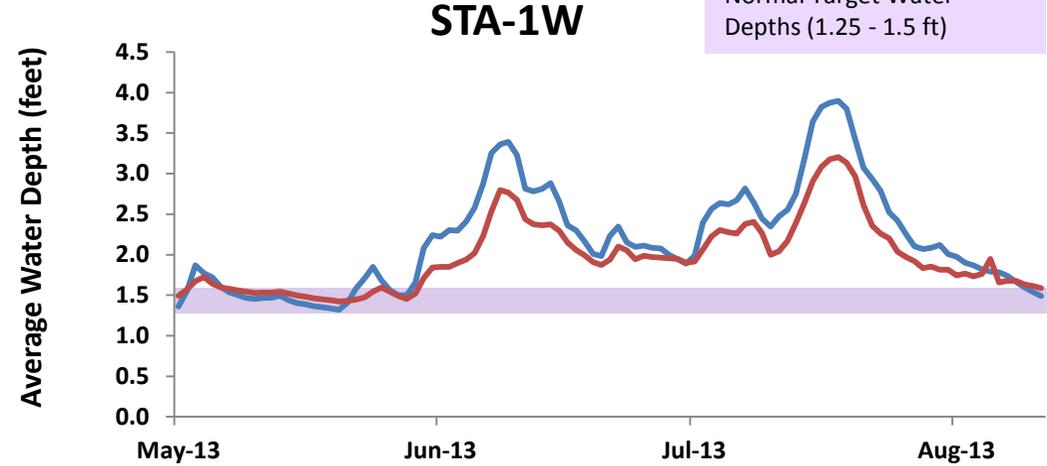
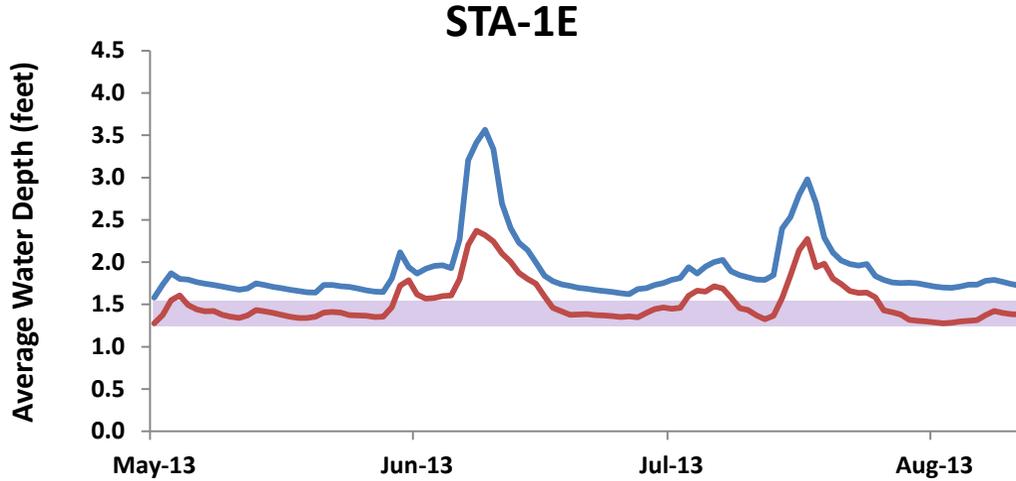
Stormwater Treatment Areas

Recent High Water Levels in the STAs

(May 1, 2013 – August 11, 2013)

— EAV
— SAV

Normal Target Water
Depths (1.25 - 1.5 ft)



Stormwater Treatment Areas

Current Conditions: STA-1W Impaired Vegetation

- Cattail thinning or uprooting
- Submerged Aquatic Vegetation dislodged from substrate
- Un-vegetated open water areas created



*Left: Uprooted and floating cattail in STA-1W , Center: open water areas in the treatment cell;
Right: dying submerged aquatic vegetation in STA-1W*

Stormwater Treatment Areas Exotic Apple Snail Infestation in STA-1E

Large number of exotic
Apple Snails recently found
in STA-1E Cell 4S



Apple Snail egg masses on Cattails; snail laying eggs

Stormwater Treatment Areas

Exotic Apple Snail Infestation in STA-1E

- Significant loss of submerged aquatic vegetation due to foraging
 - *Leaves stripped from stems*
- STA Performance has declined significantly
 - *365-day outflow average = 35 ppb*
while current 7-day outflow = 131 ppb
- Staff is communicating with Fish & Wildlife about possible control options



Apple Snails Foraging



**Defoliated Submerged
Aquatic Vegetation**

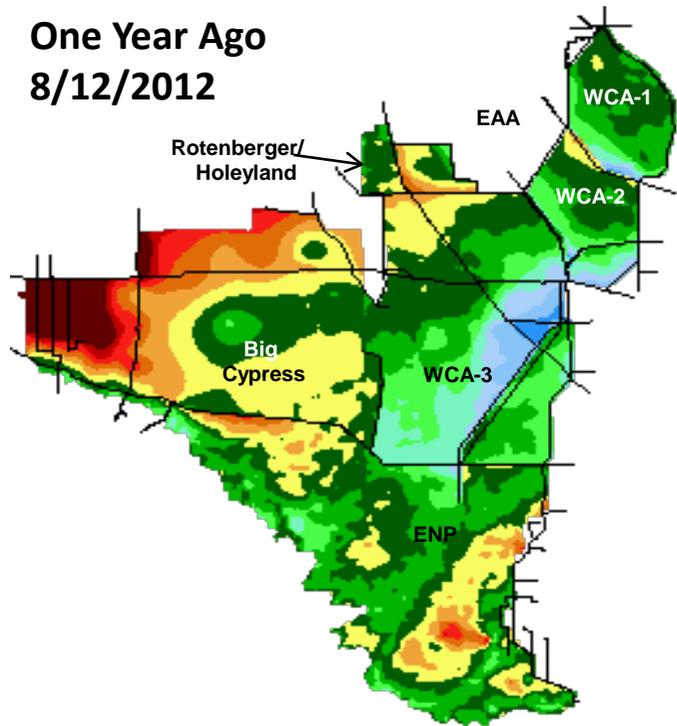


**Healthy Submerged
Aquatic Vegetation**

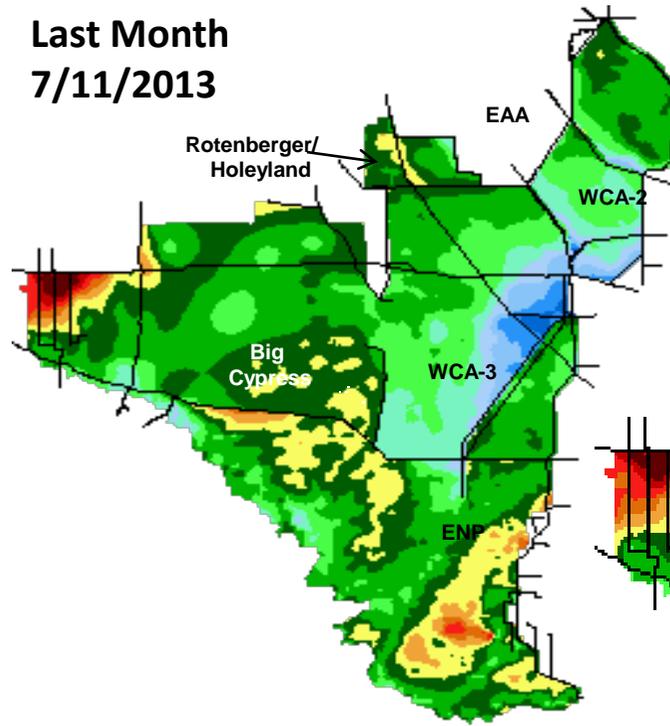
Greater Everglades

Water Depth Monthly Snapshots

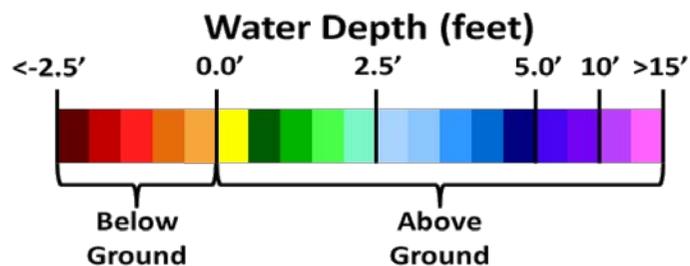
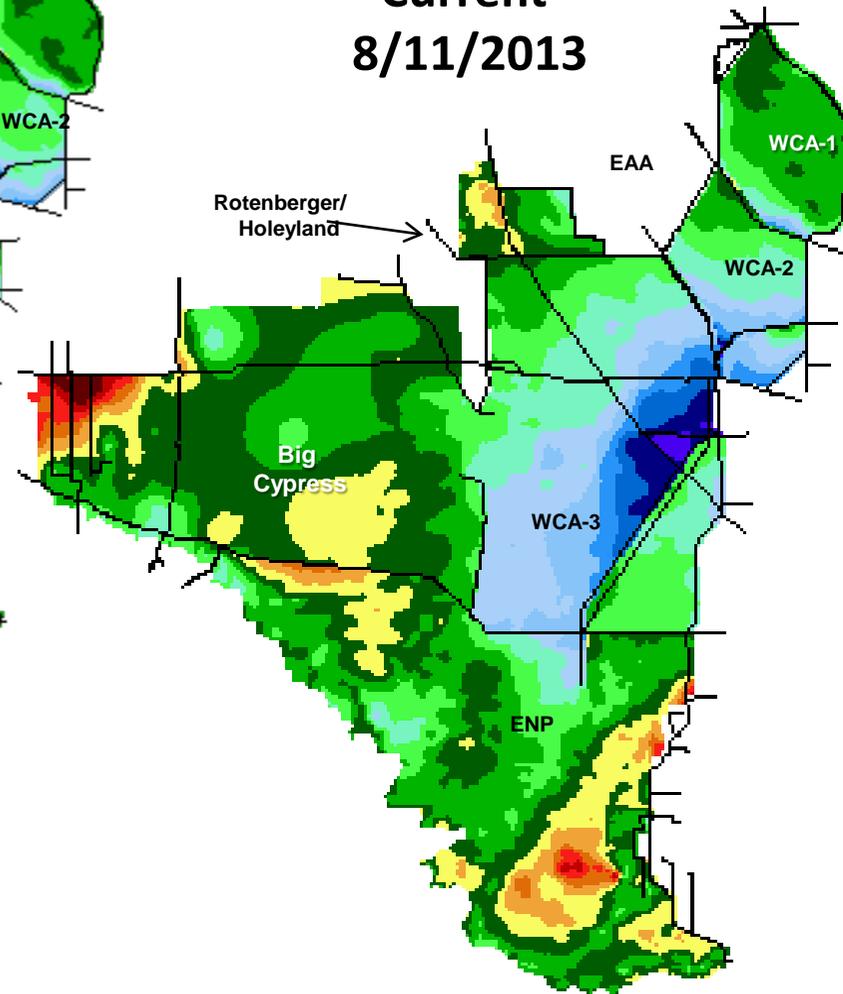
One Year Ago
8/12/2012



Last Month
7/11/2013



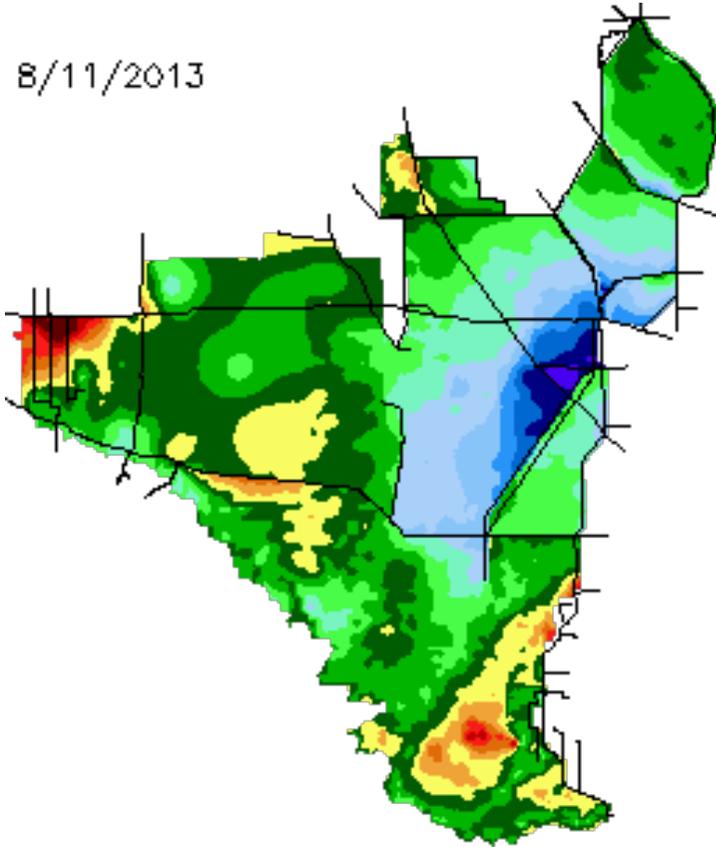
Current
8/11/2013



Greater Everglades

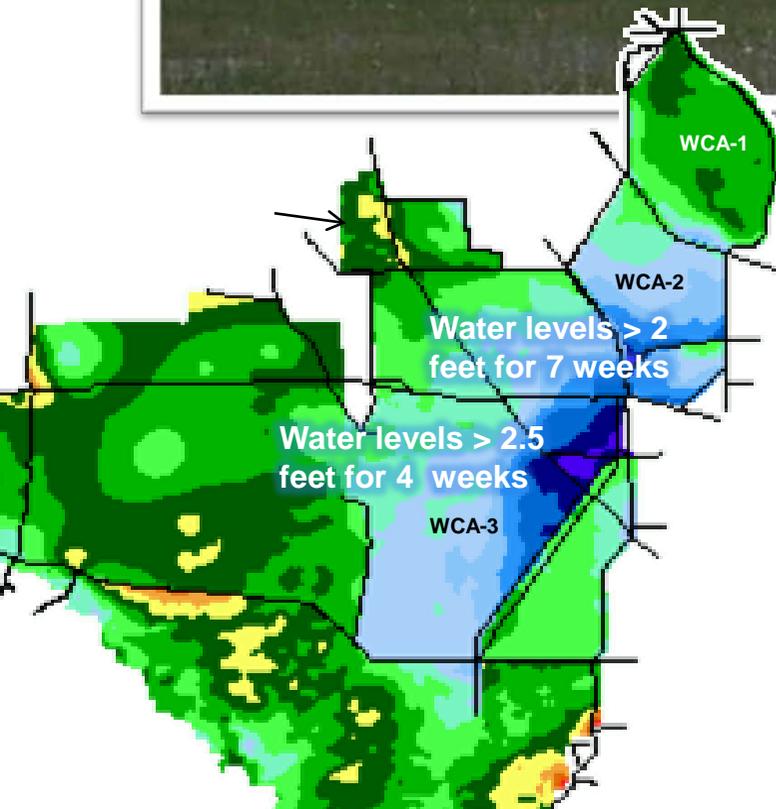
Water Conservation Area 3A

8/11/2013



Greater Everglades

High Water on Tree Islands



Tolerance of tree islands to high water varies across the landscape. Some islands are fine while others can be stressed by long periods of high water.

Tolerance depends on:

- Height of the tree island - Trees on the head may be less tolerant
- Growth stage - Young trees do not tolerate long-term high water as well as adults
- Species - Some species tolerate extended inundation better than others

Greater Everglades

Wildlife and High Water in the Everglades



- Alligator nests may be drowned by high water
- Deer and other terrestrial animals are stressed when water levels are above 2 feet locally
- High water provides good habitat and feeding for native aquatic animals (fish, turtles, frogs, Everglades mink, river otters)
- Extended wet conditions allow prey species to grow and reproduce so food sources improve for wading birds and aquatic animals



Everglades Mink



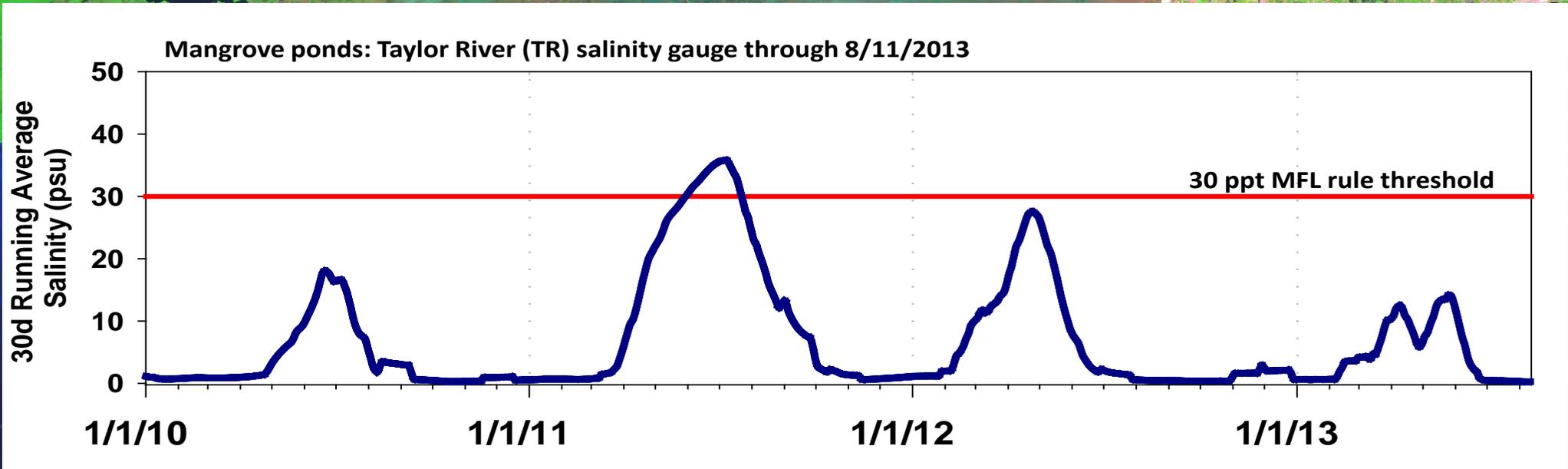
Green Tree Frog



River Otter

Florida Bay

Tracking Salinity in Florida Bay



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

TR

- ★ Salinity gauge
- ★ Creek flow gauge

Questions?

May 22, 2013