Ecological Indicators and Conditions

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Director, Water Resources Division

Water Resources Advisory Committee Meeting
August 8, 2013

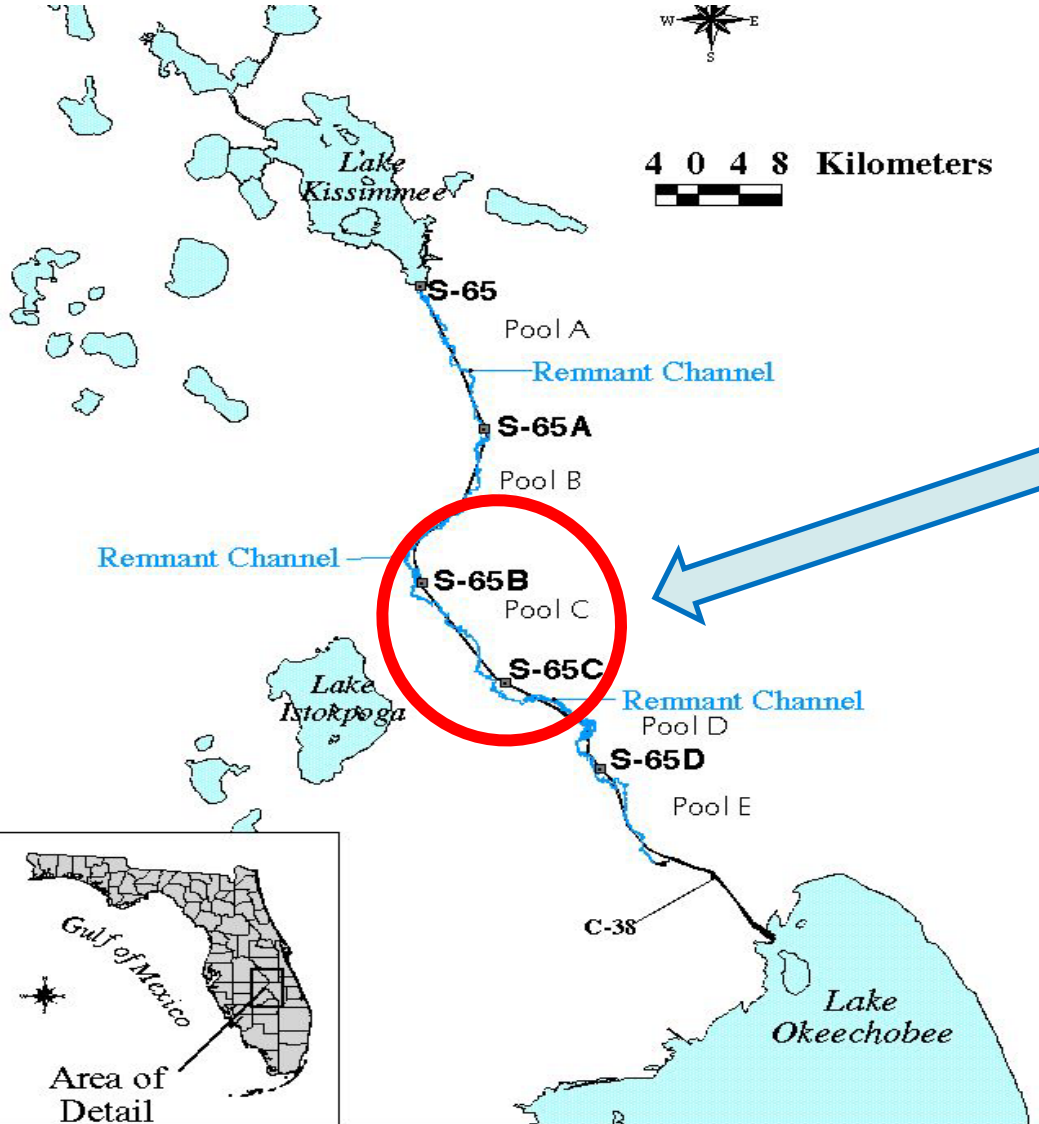
Kissimmee Basin

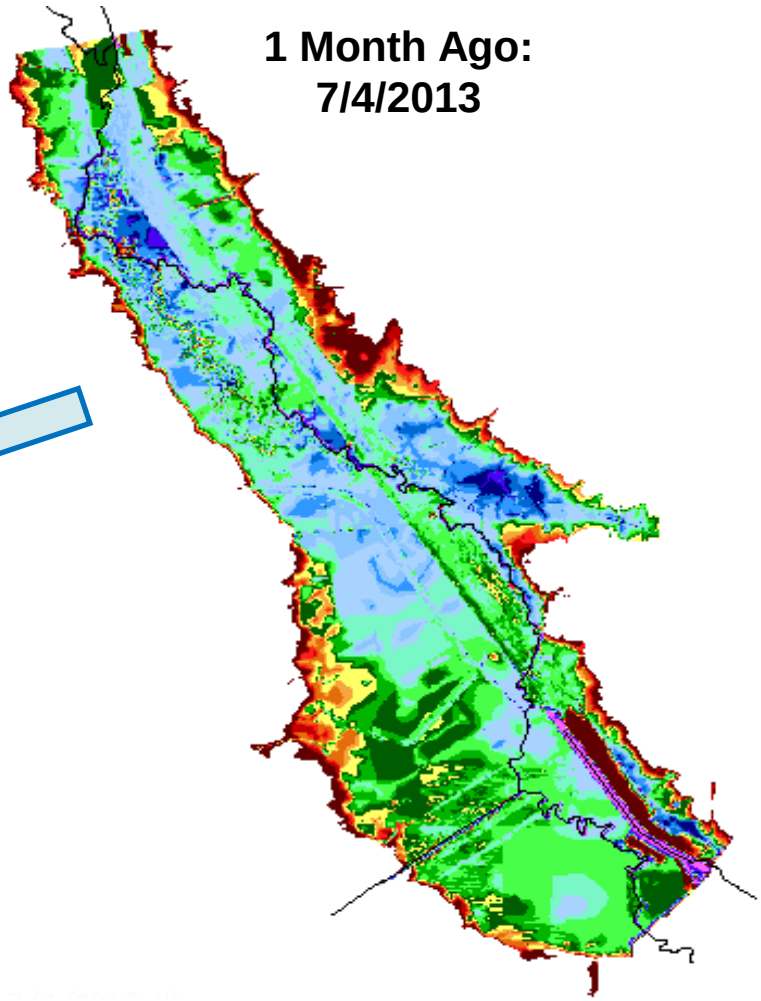
Kissimmee Basin – Current Conditions

- The lakes and the river are experiencing both the benefits and challenges of a wet early wet season
- Overall:
  - *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 there is little or no storage available in the 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)

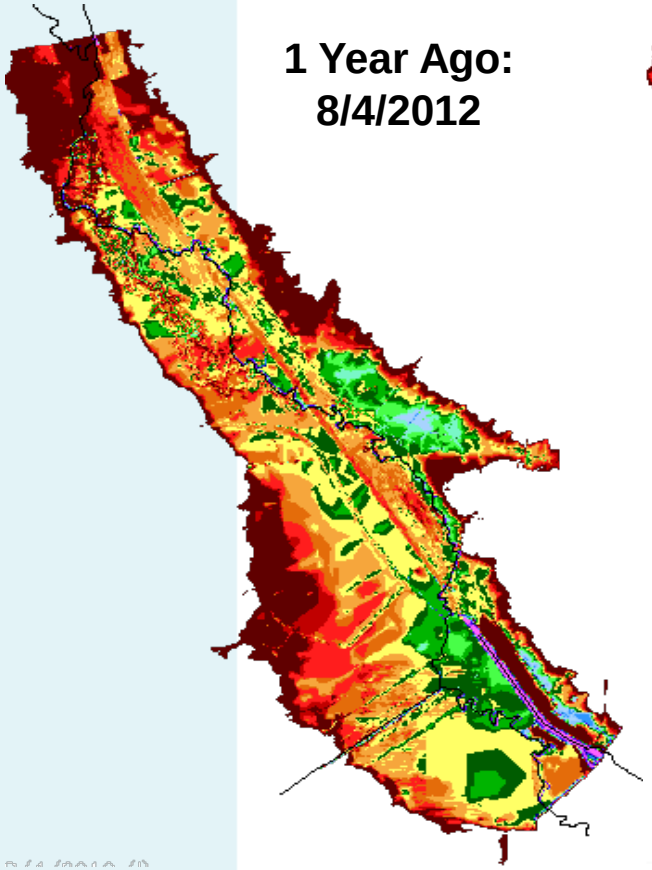


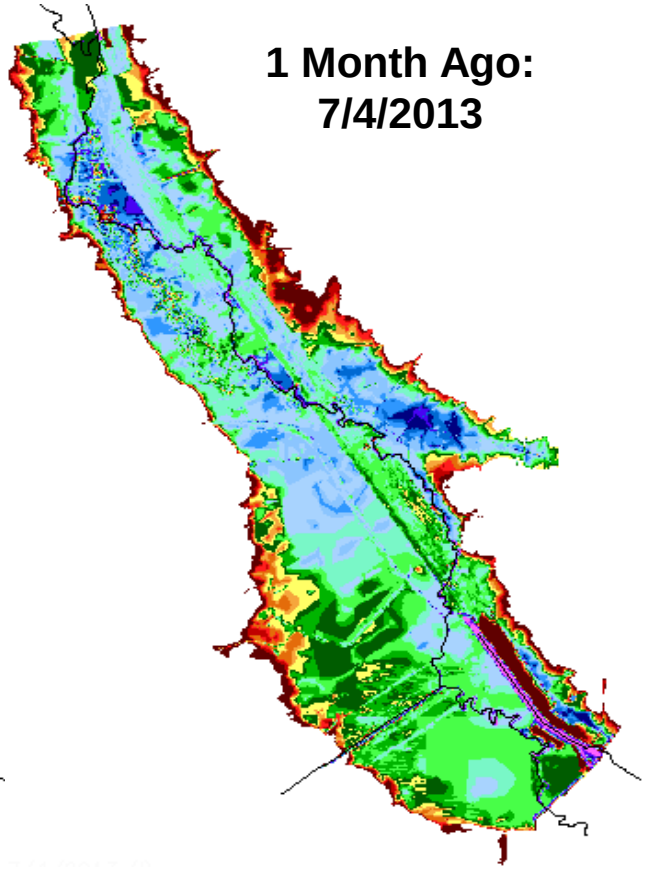


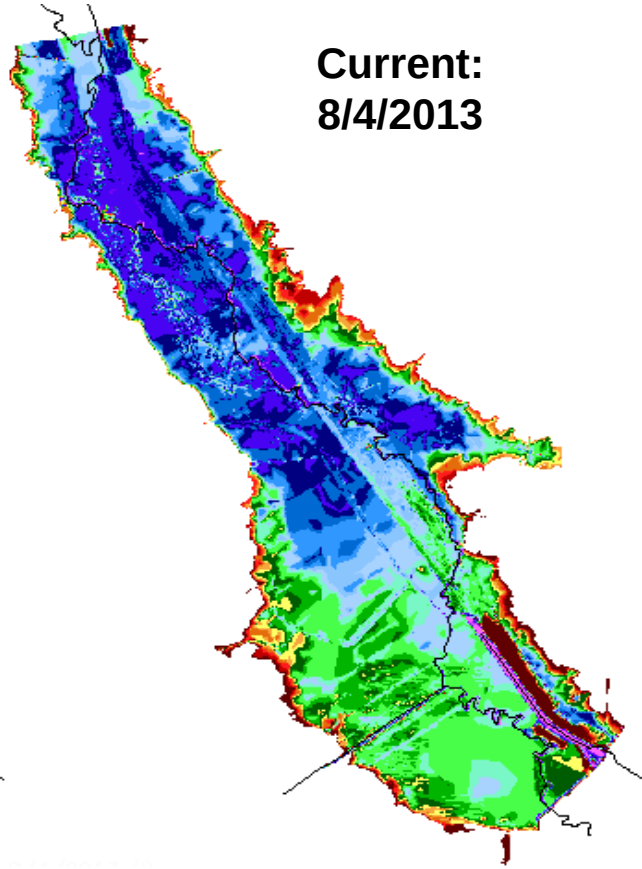
Kissimmee Basin

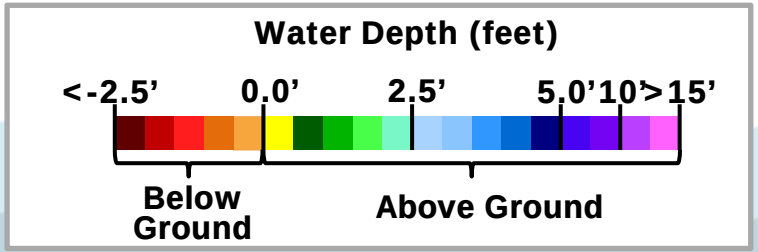
Kissimmee River (Pool C)

Monthly Water Depth Maps









Kissimmee Basin

Kissimmee Basin - Wildlife Effects of High Water

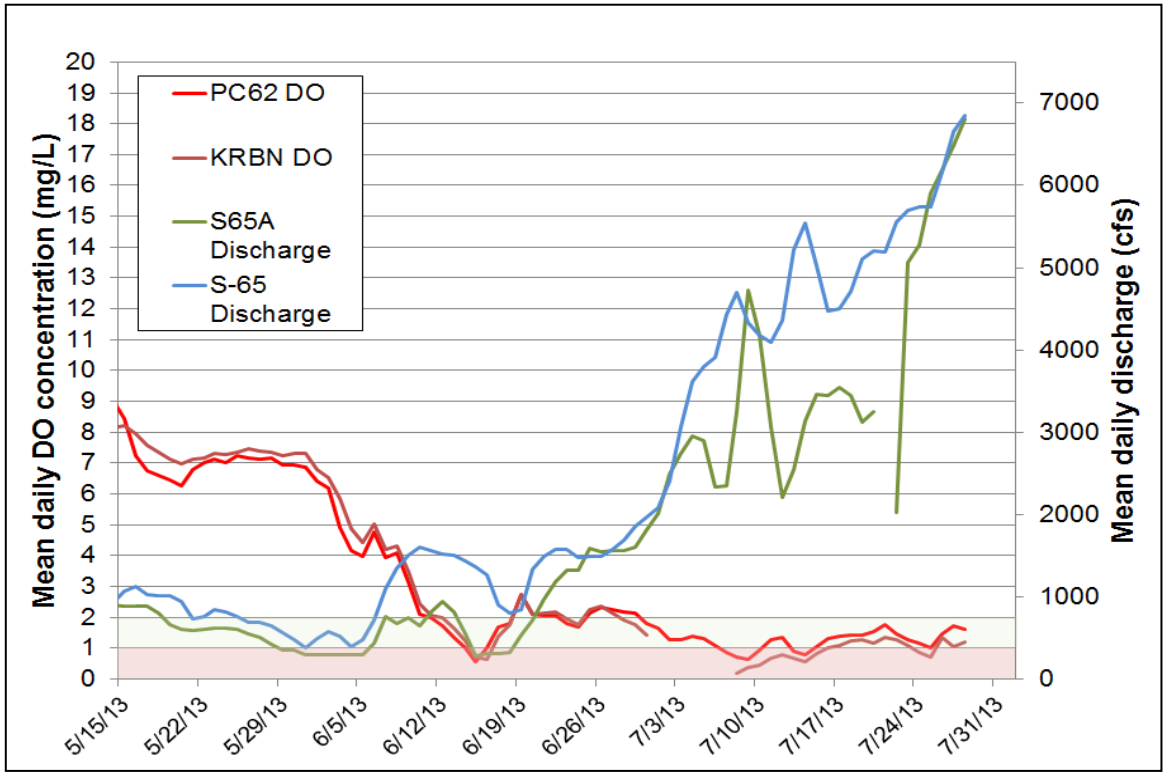
- Floodplain and lake wetlands are inundated
- Fish disperse and make use of inundated wetlands
- Apple snail egg clusters can be drowned, which can affect snail kite reproduction
- The number of wading birds declines naturally in the wet season (winter is peak breeding season)
- River dissolved oxygen (DO) concentrations decline in the wet season, in part naturally due to high temperatures and rainfall
  - *DO is very sensitive to sudden high discharge in the summer*

Kissimmee Basin

Kissimmee Basin - DO Effects of High Water

- **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)

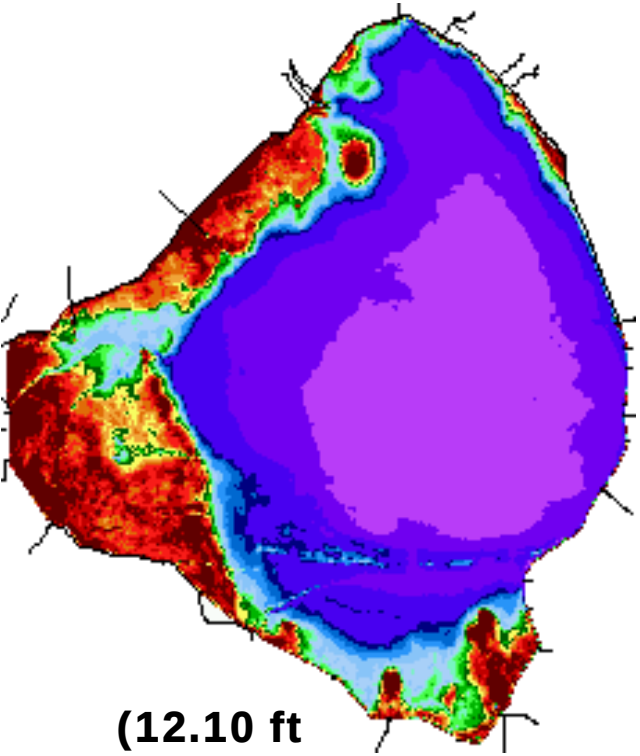
Kissimmee River – Floodplain Inundation (Wet Conditions in July)

Kissimmee Basin

Lake Okeechobee

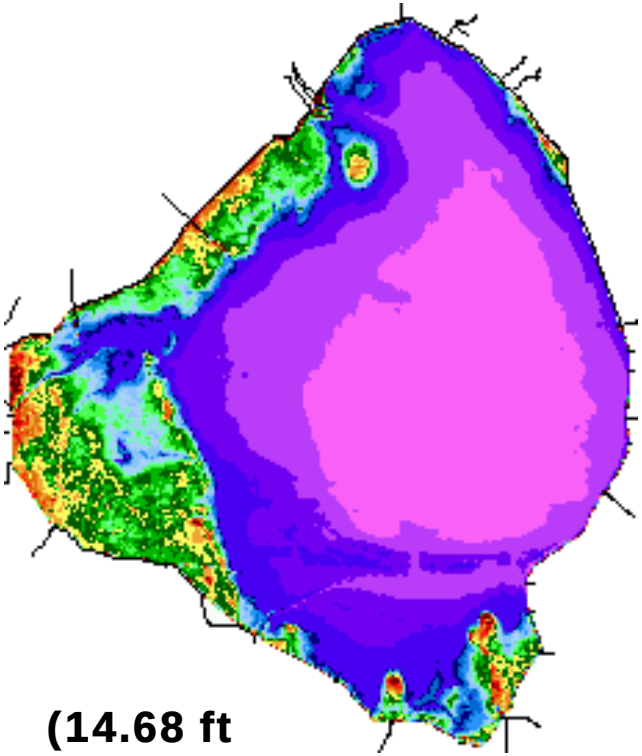
Water Depth Timeseries Maps

1 Year Ago: 8/5/2012



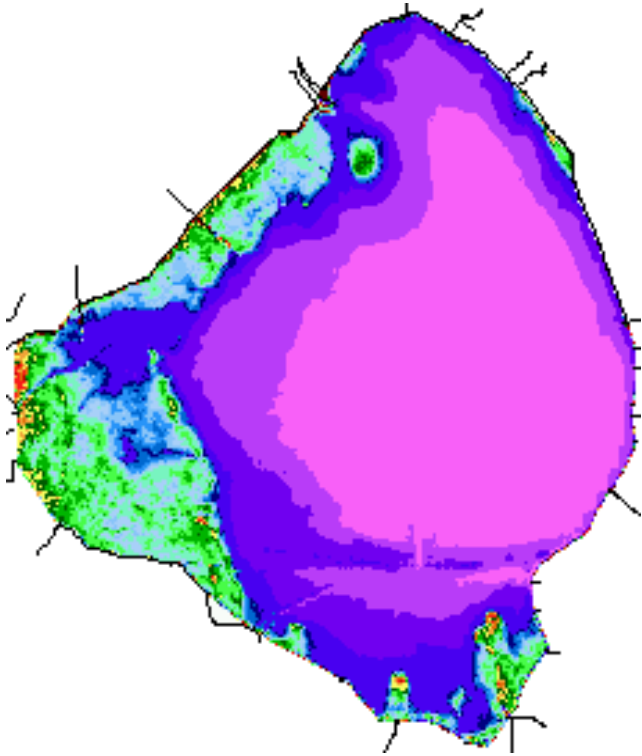
(12.10 ft NGVD29)

1 Month Ago: 7/6/2013



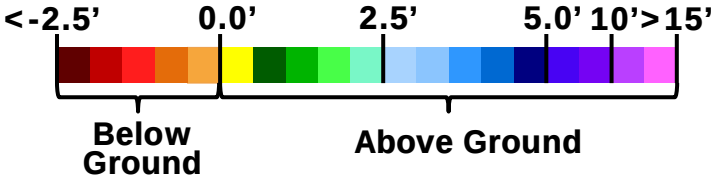
(14.68 ft NGVD29)

Current: 8/5/2013



(16.03 ft NGVD29)

Water Depth (feet)

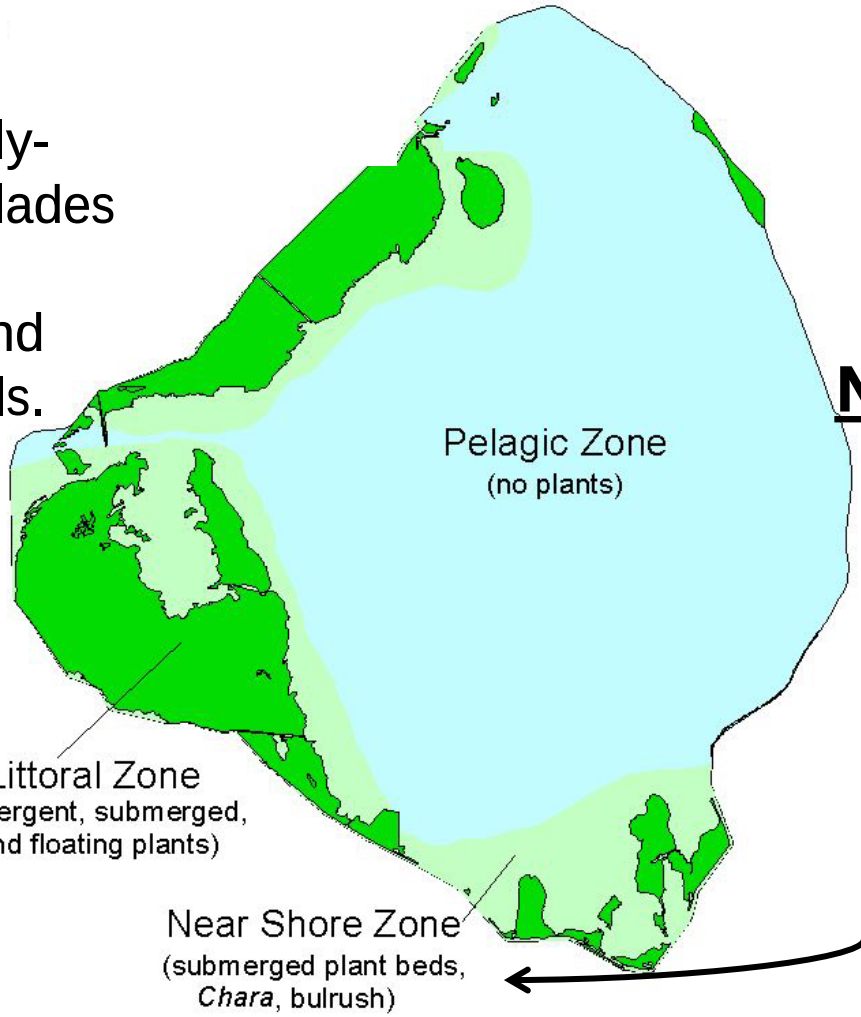


Lake Okeechobee

Impacts of high water occur in two zones of the lake:

Littoral Zone

Habitat for federally-endangered Everglades Snail Kite, wading birds, alligators, and many other animals. High water floods their habitat



Near-Shore Zone

Habitat for sport fish (bass, crappie) and commercial fish. High water kills submerged plants, and leads to poor water quality (algal blooms)

Lake Okeechobee

Okeechobee – Current Conditions

Uprooted vegetation near the Indian Prairie Canal July 2013

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

Uprooted hydrilla and cattails near S-135 August 6, 2013

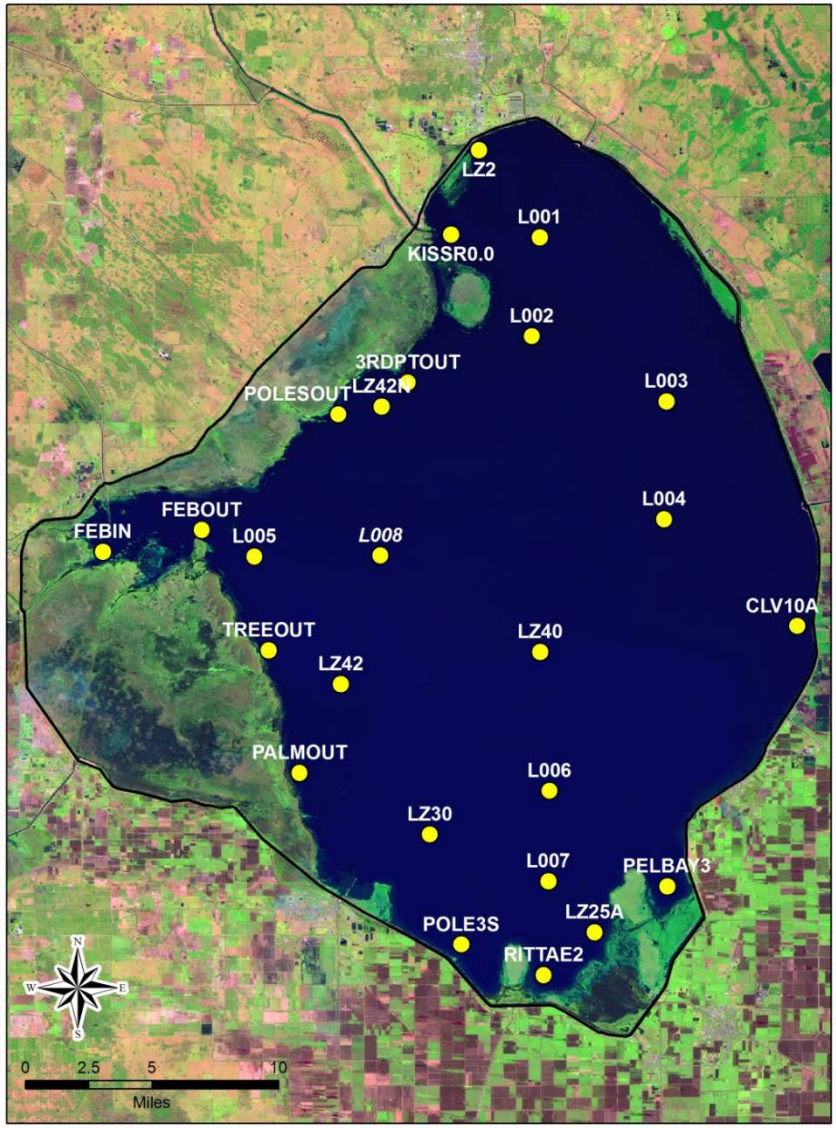
Lake Okeechobee

Okeechobee – Current Conditions

Lake Okeechobee

Lake Okeechobee Water Quality

Parameter	May 2013	June 2013	July 2013
Lakewide TP ppb	111	82	95
Nearshore TP ppb	76	62	85
Lakewide TSS ppm	23	11	9
Nearshore TSS ppm	14	9	4



High Freshwater Inflows to Estuaries

Estuarine Conditions

- Low Salinity
- High Turbidity
- Increased Nutrient and Sediment Load
- Offshore Plume of Freshwater

Effects

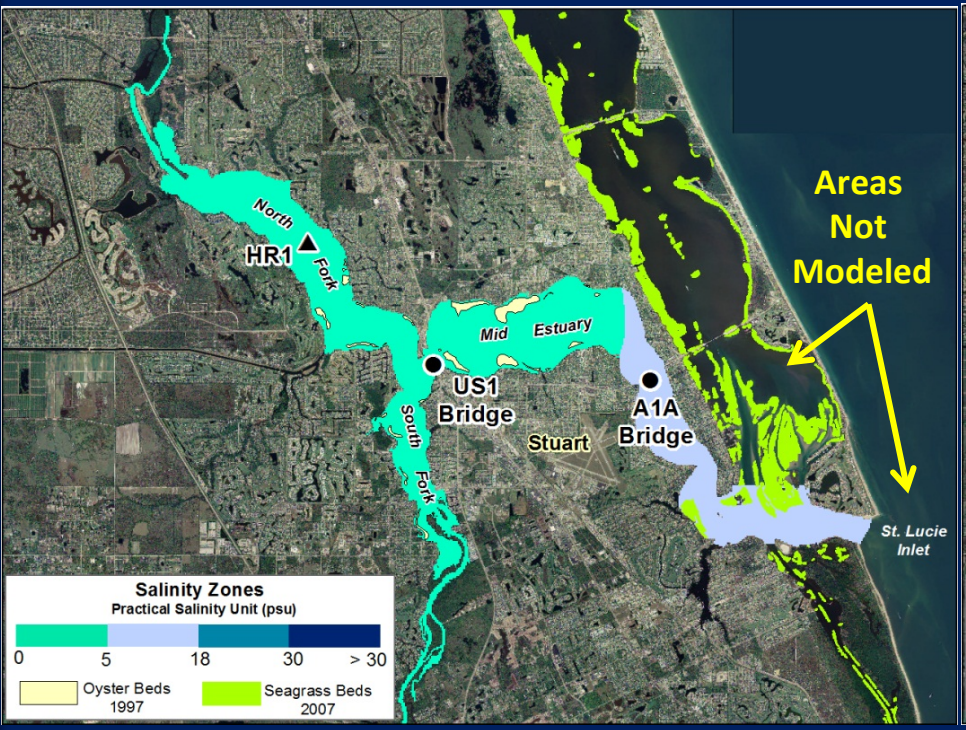
- Mortality of Estuarine and Marine Organisms
  - Oysters
  - Seagrasses
- Possible Algal Blooms
- Potential Fish Lesions
- Sedimentation on Offshore Reefs

St Lucie Estuary

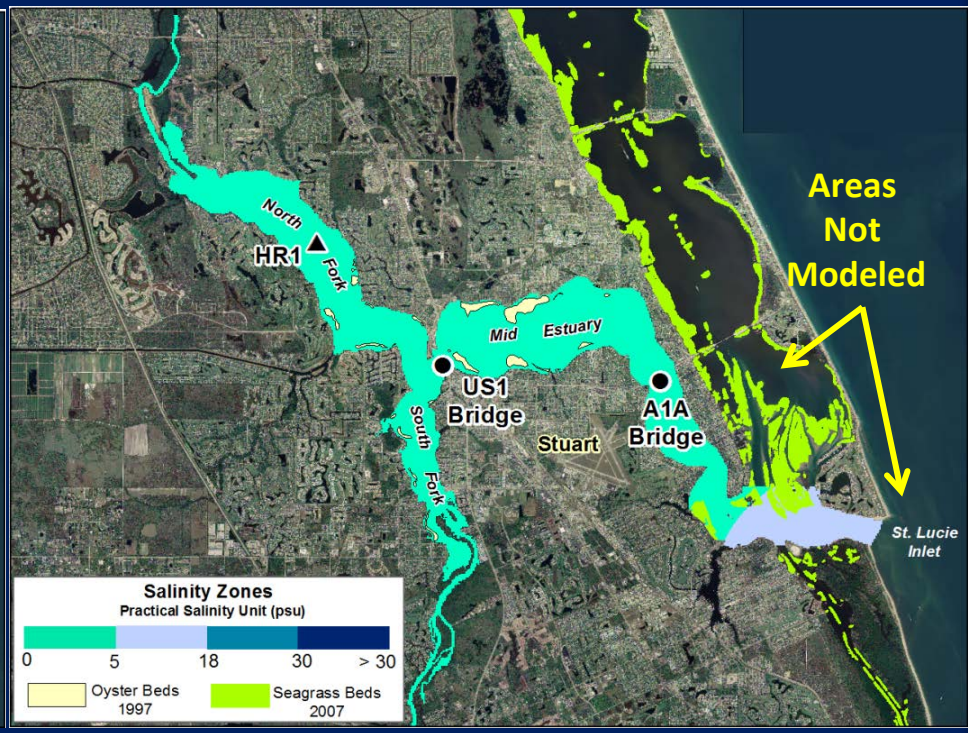
St. Lucie Estuary

Salinity Conditions

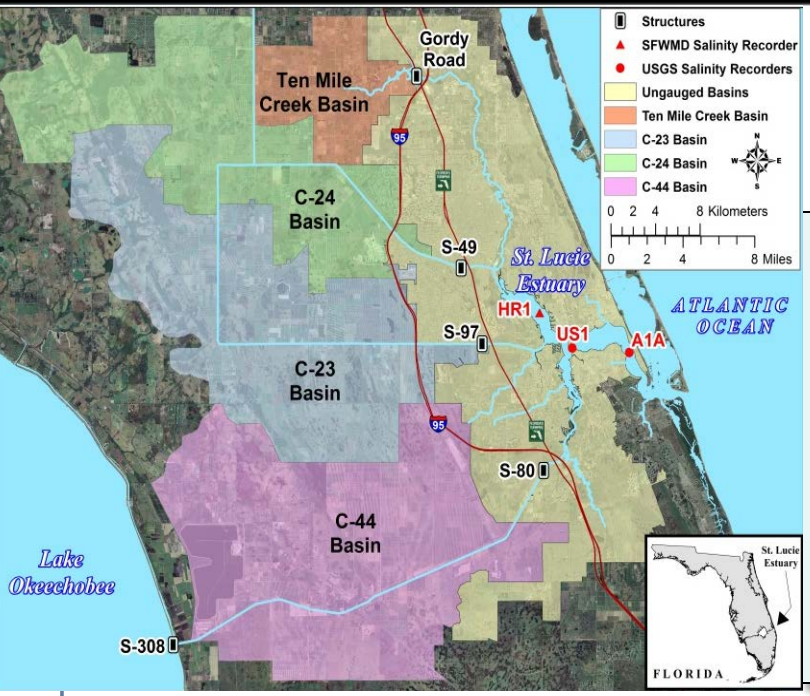
July 5, 2013



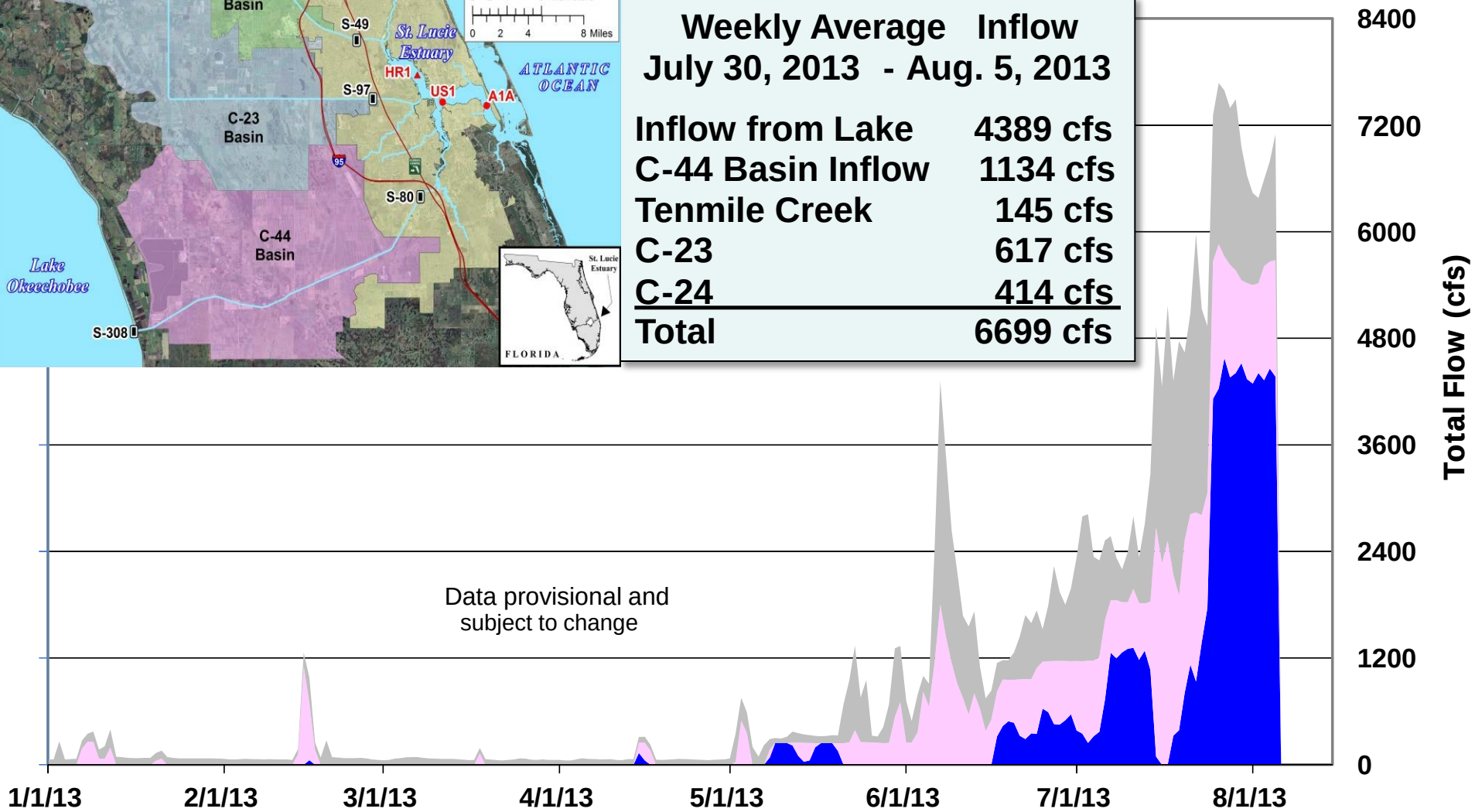
August 5, 2013



St. Lucie Estuary



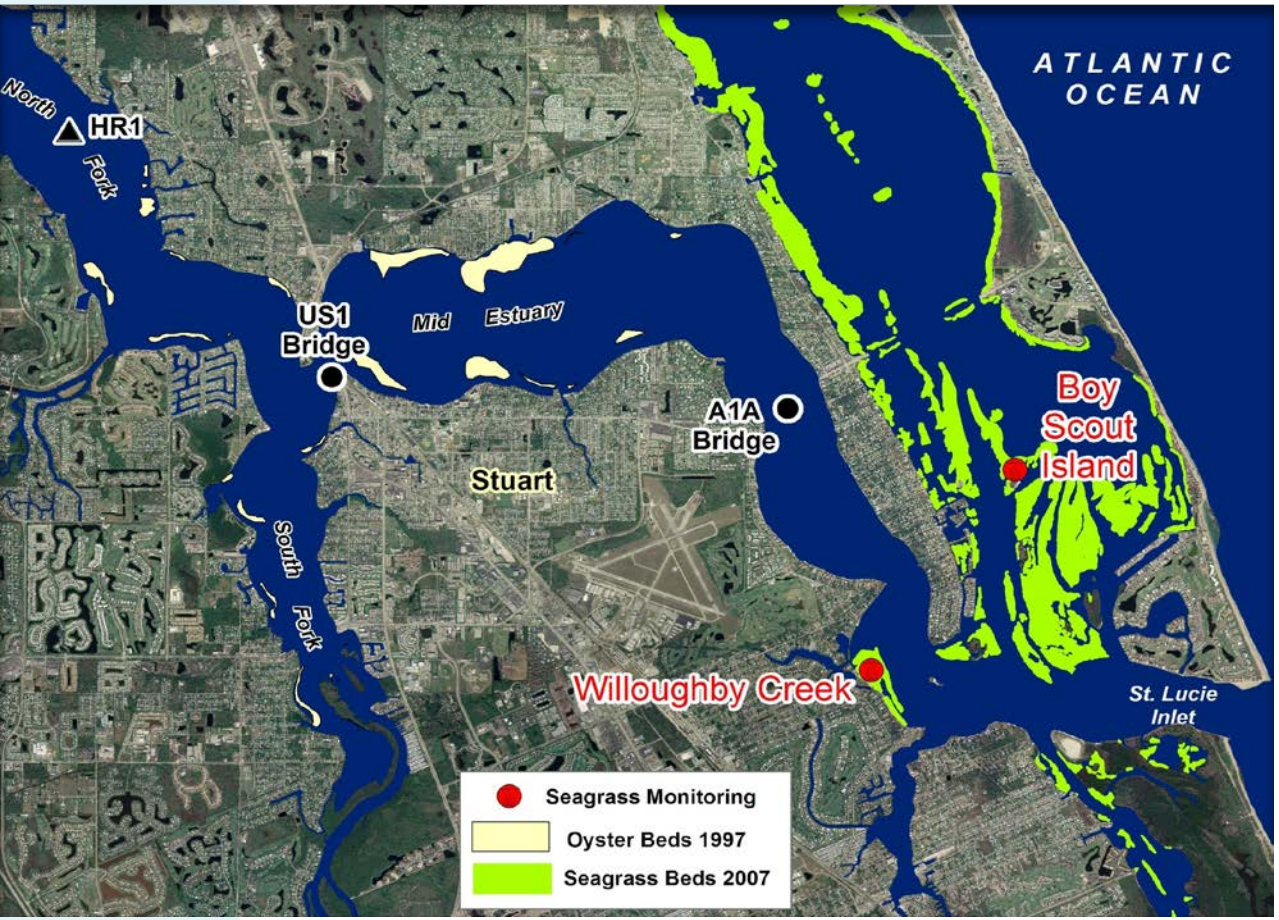
Weekly Average Inflow July 30, 2013 - Aug. 5, 2013	
Inflow from Lake	4389 cfs
C-44 Basin Inflow	1134 cfs
Tenmile Creek	145 cfs
C-23	617 cfs
C-24	414 cfs
Total	6699 cfs



*Does not include runoff from the tidal basin or groundwater

St Lucie Estuary

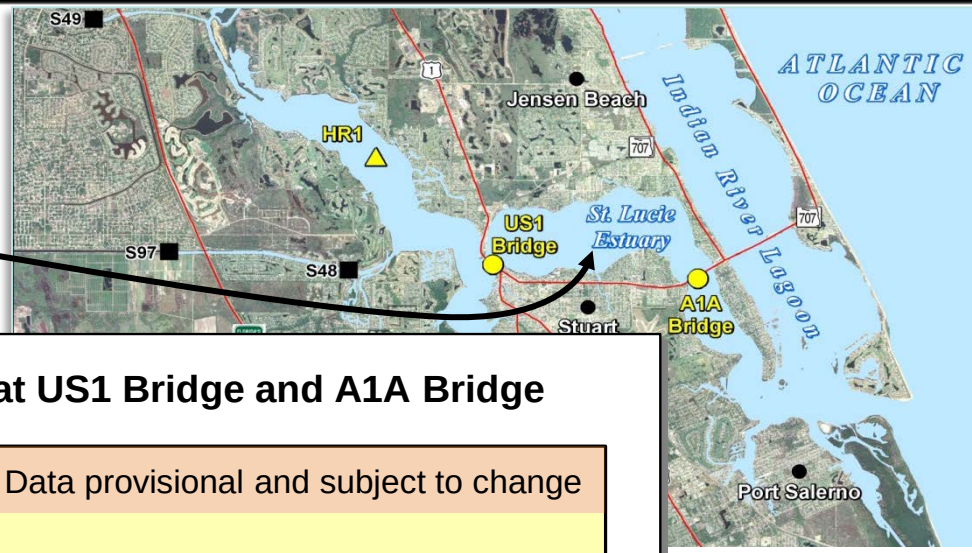
Salinity Tolerances of Oysters



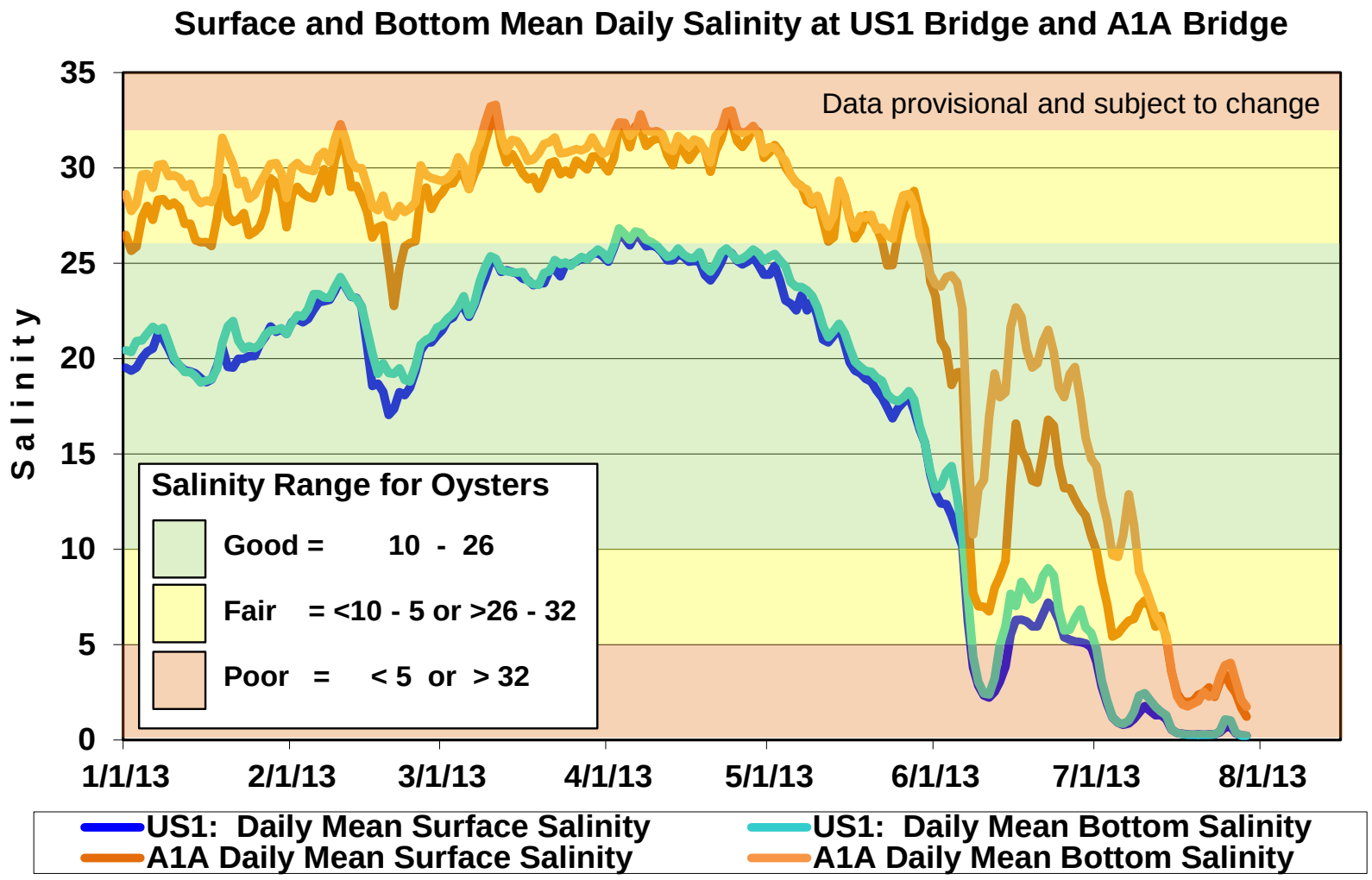
- **Juveniles**: Mortality after 7 days at < 5 psu
- **Adults**: Mortality after 28 days at < 5 psu

St. Lucie Estuary

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

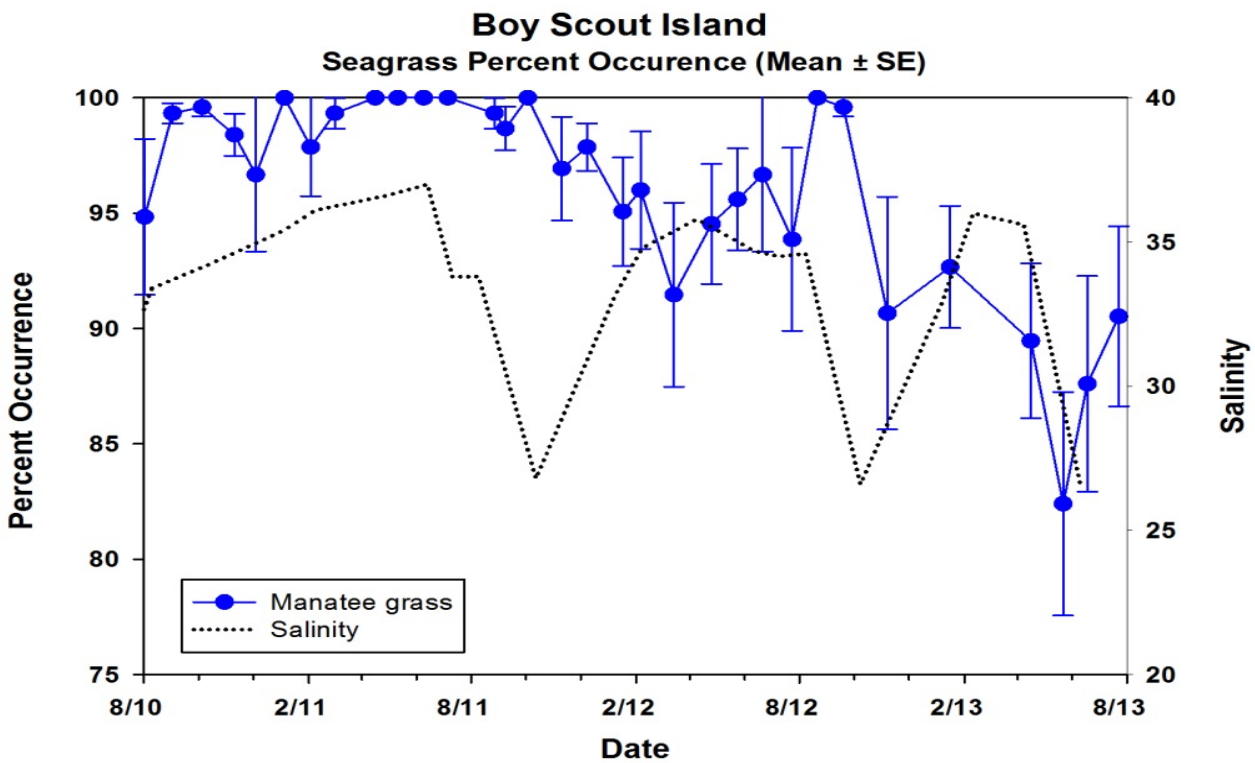


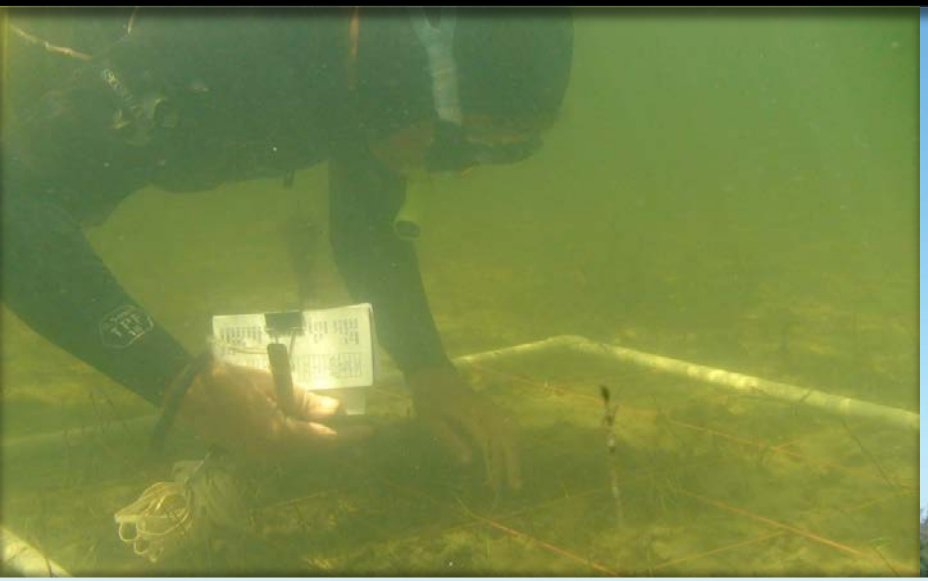
St. Lucie Estuary Salinity Recorders
SFWMD Recorder
USGS Recorders



St Lucie Estuary

Photo by: Jacqui Thurlow-Lippisch





Willoughby
Creek

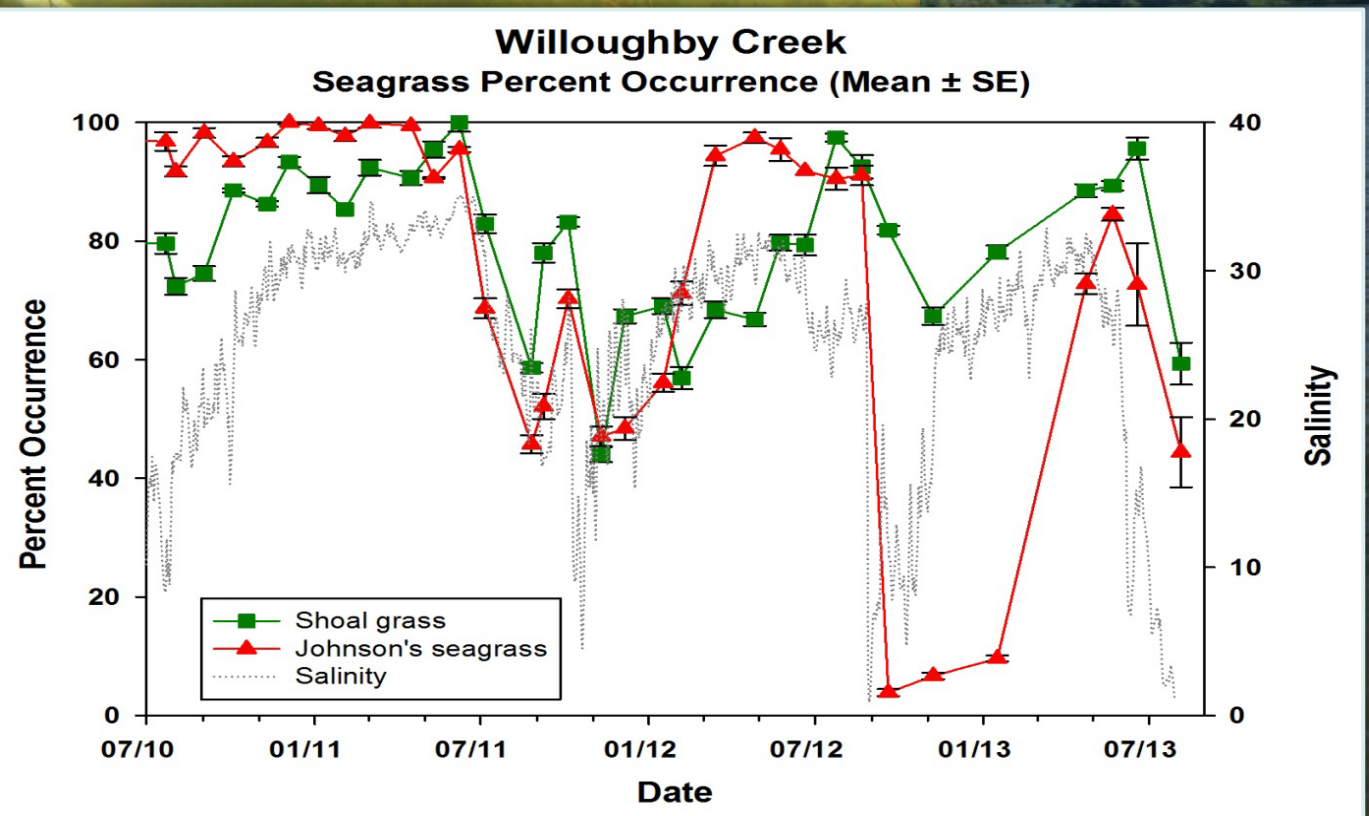

Willoughby Creek
Seagrass Percent Occurrence (Mean ± SE)
Percent Occurrence
Salinity
Date
100
80
60
40
20
0
40
30
20
10
0
07/10
01/11
07/11
01/12
07/12
01/13
07/13
Shoal grass
Johnson's seagrass
Salinity

Photo by: Jacqui Thurlow-Lippisch

St Lucie Estuary

St Lucie Estuary

Algal Blooms

St Lucie Estuary

Algal Bloom

Evans Crary Bridge (west side) in Martin County

St Lucie Estuary

- Interagency Coordination
  - Florida Department of Environmental Protection
  - Fish & Wildlife Conservation Commission
  - Department of Health
  - SFWMD
- Water Quality Sampling & Analyses for Microcystin
- Public Health Advisory
- Hotlines for reporting algae blooms and fish kills

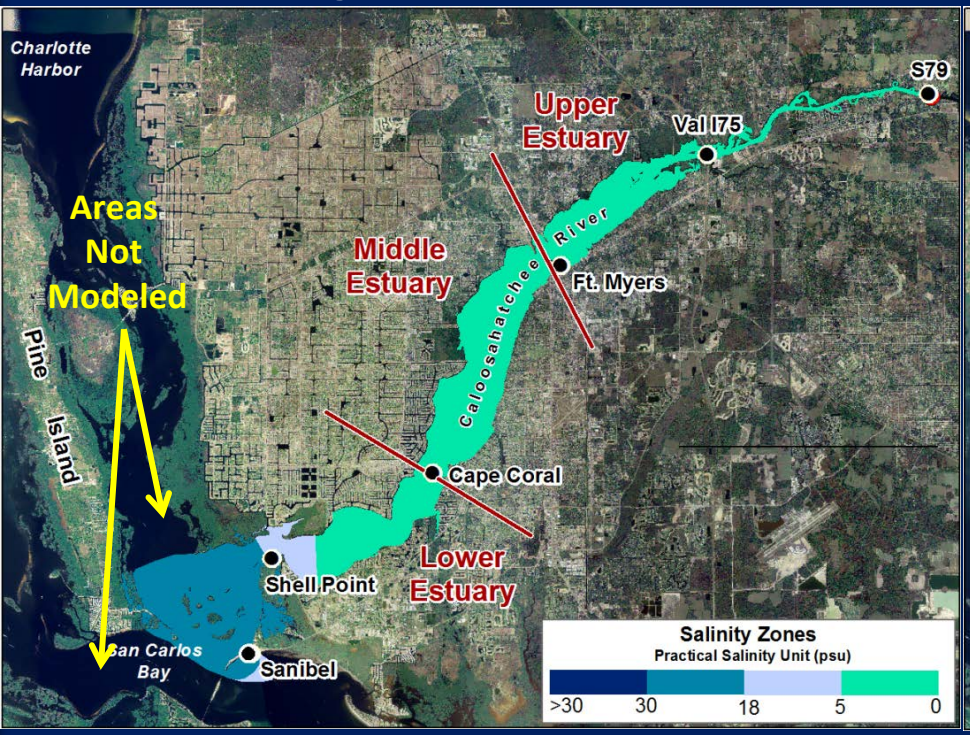
Algae Blooms - DEP (772) 467-5572
Fish Kills / Lesions FWC 1-800-636-0511

Caloosahatchee Estuary

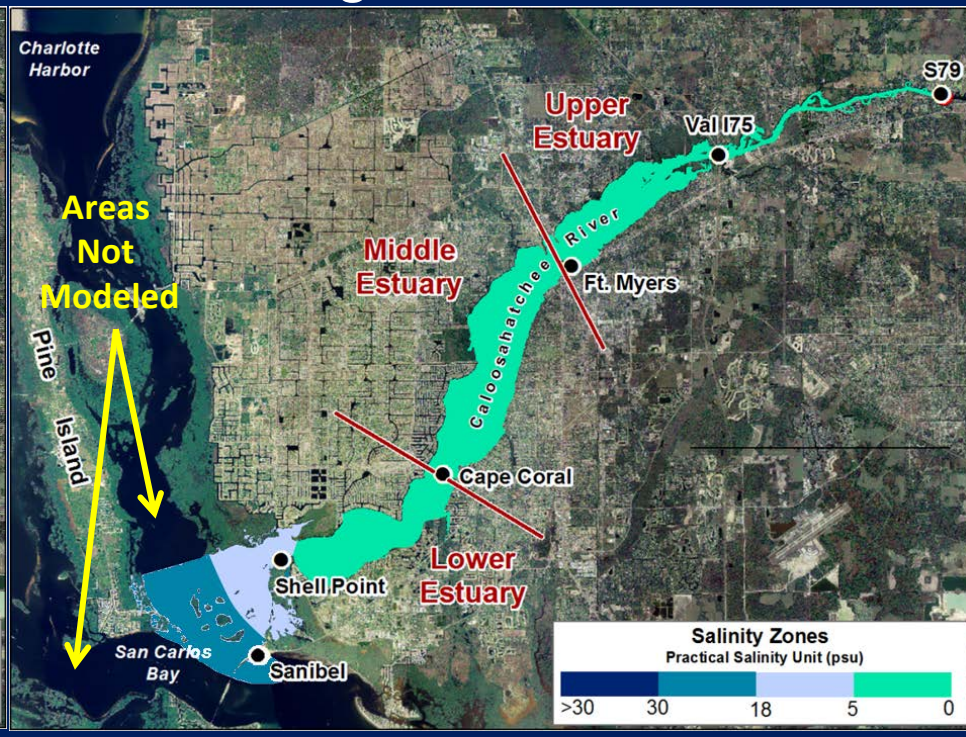
Caloosahatchee Estuary

Salinity Conditions

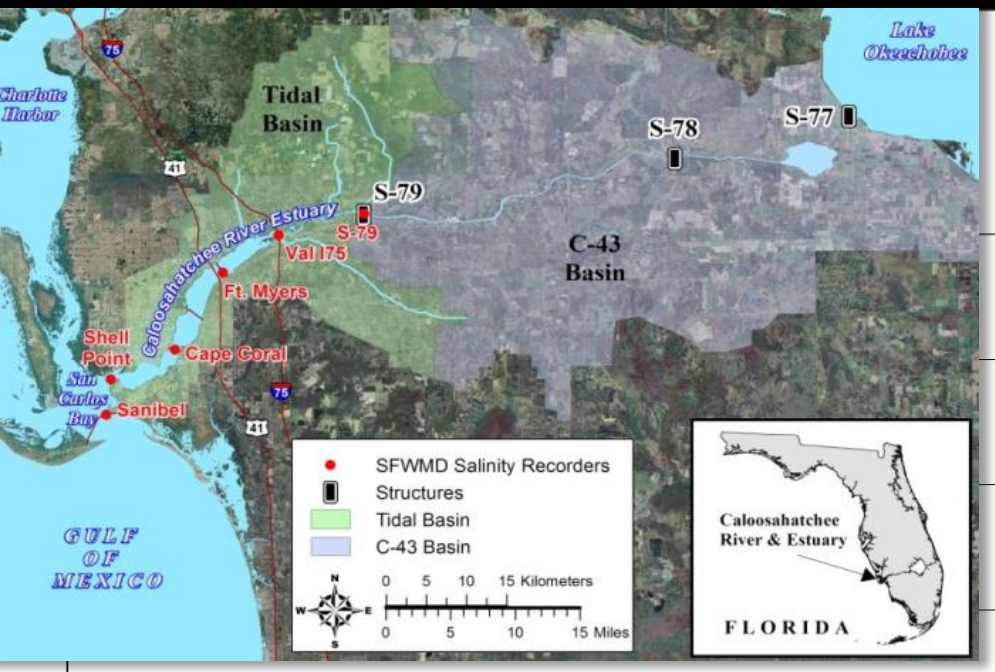
July 5, 2013

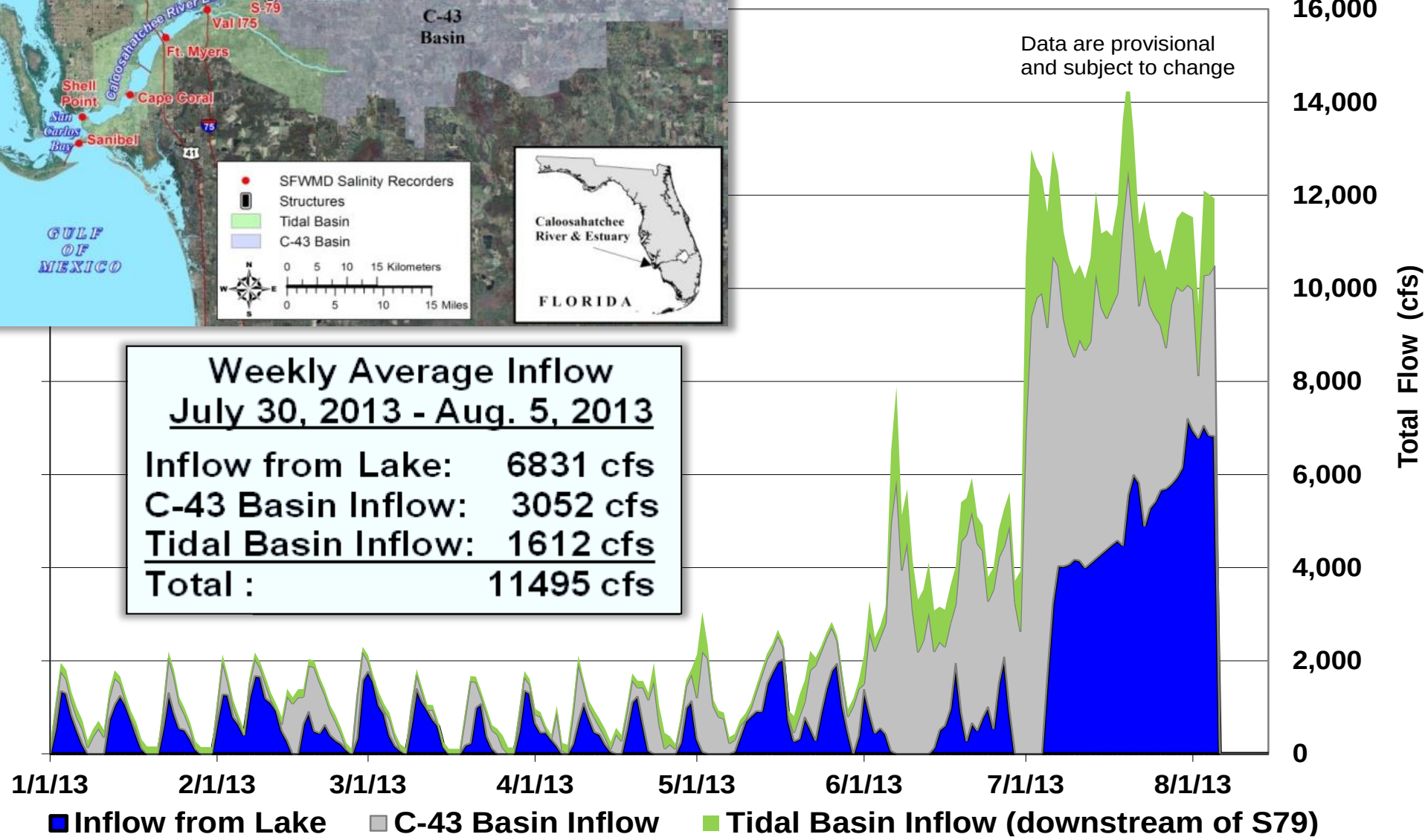


August 5, 2013



Caloosahatchee Estuary



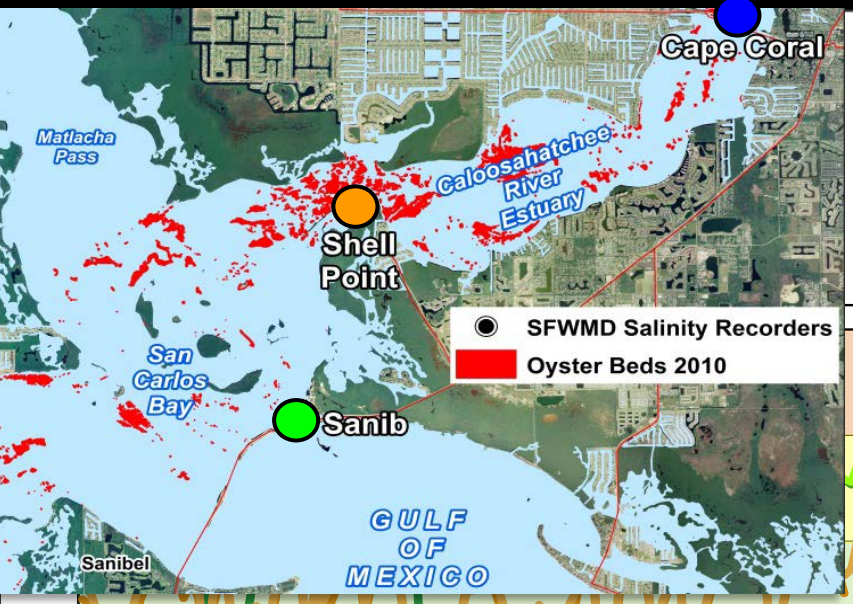


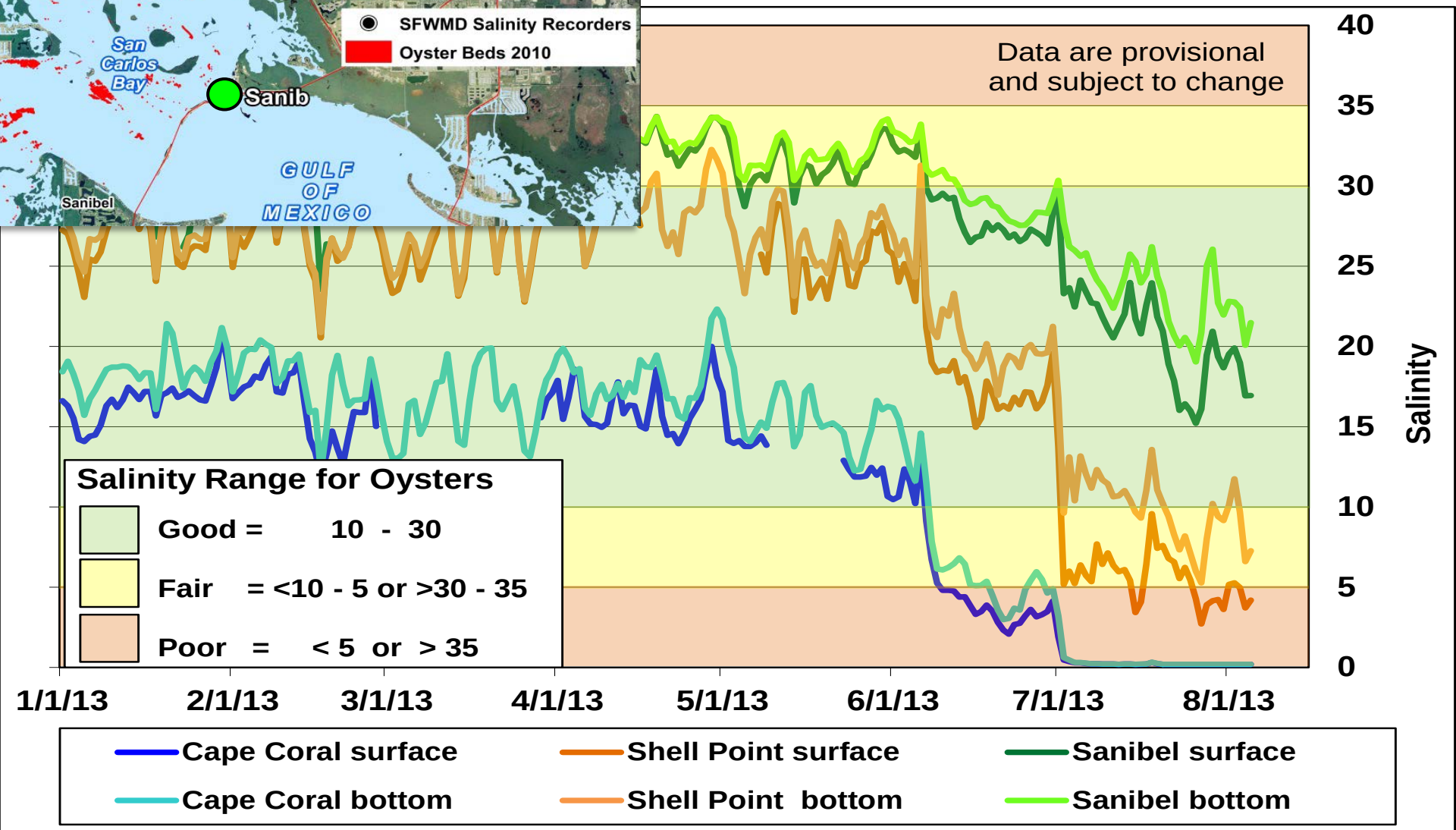
Weekly Average Inflow
July 30, 2013 - Aug. 5, 2013

Inflow from Lake:	6831 cfs
C-43 Basin Inflow:	3052 cfs
Tidal Basin Inflow:	1612 cfs
Total :	11495 cfs

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

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



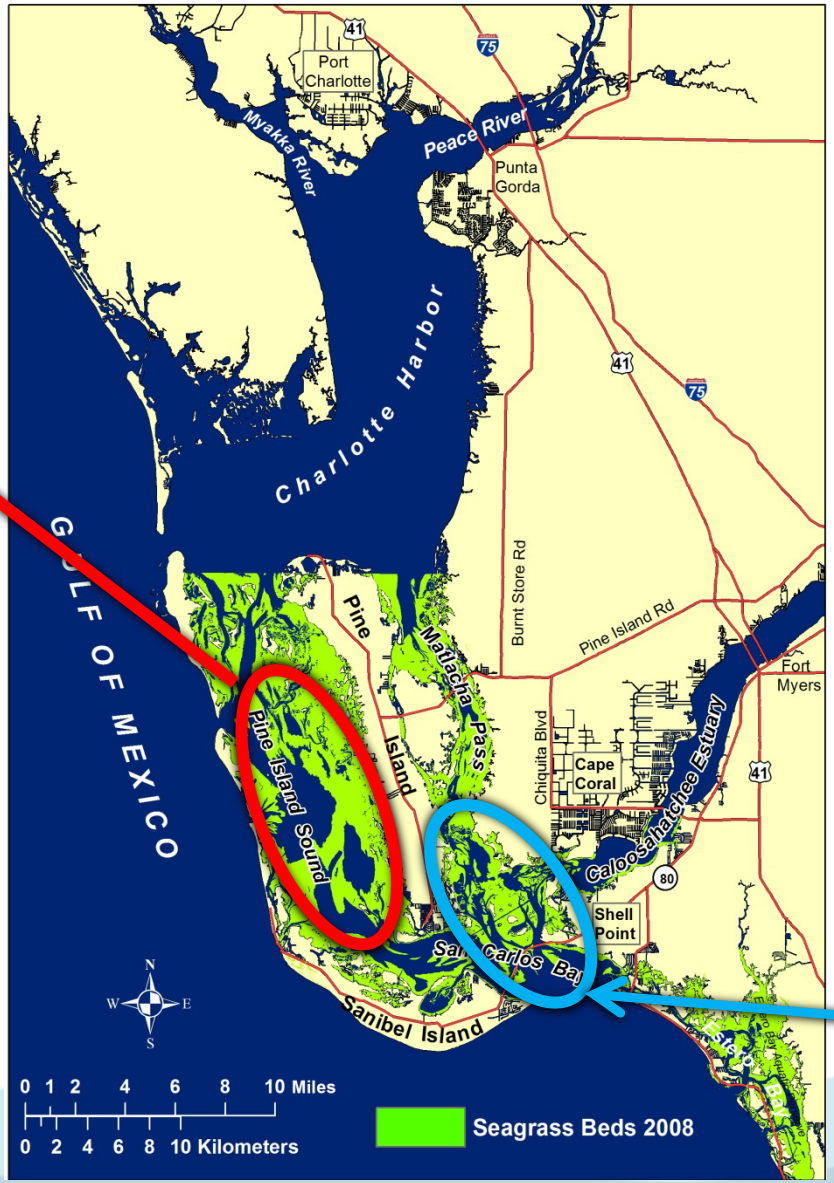


Caloosahatchee Estuary

"Dark Water" at Point Ybel, Sanibel

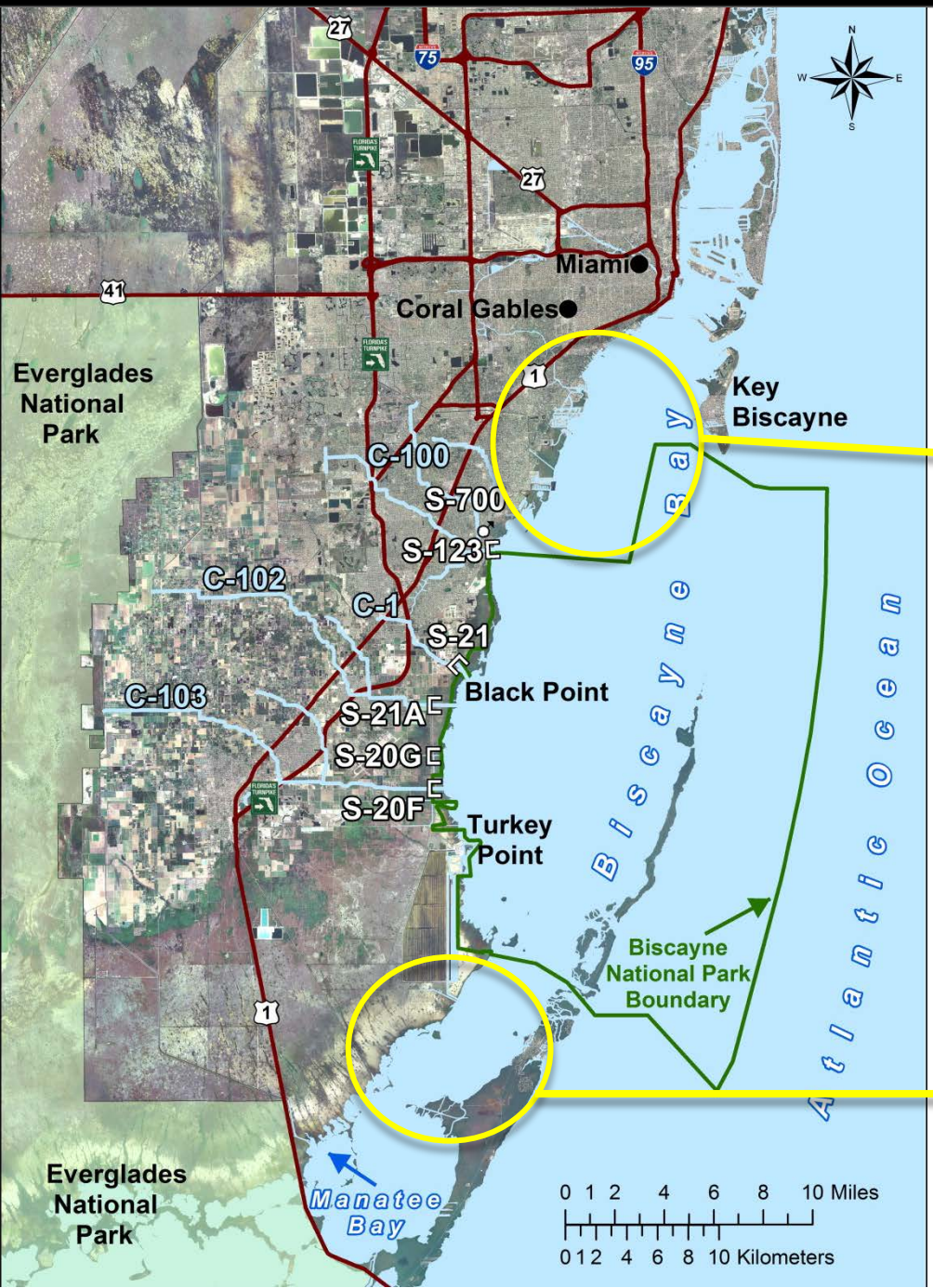
Caloosahatchee Estuary

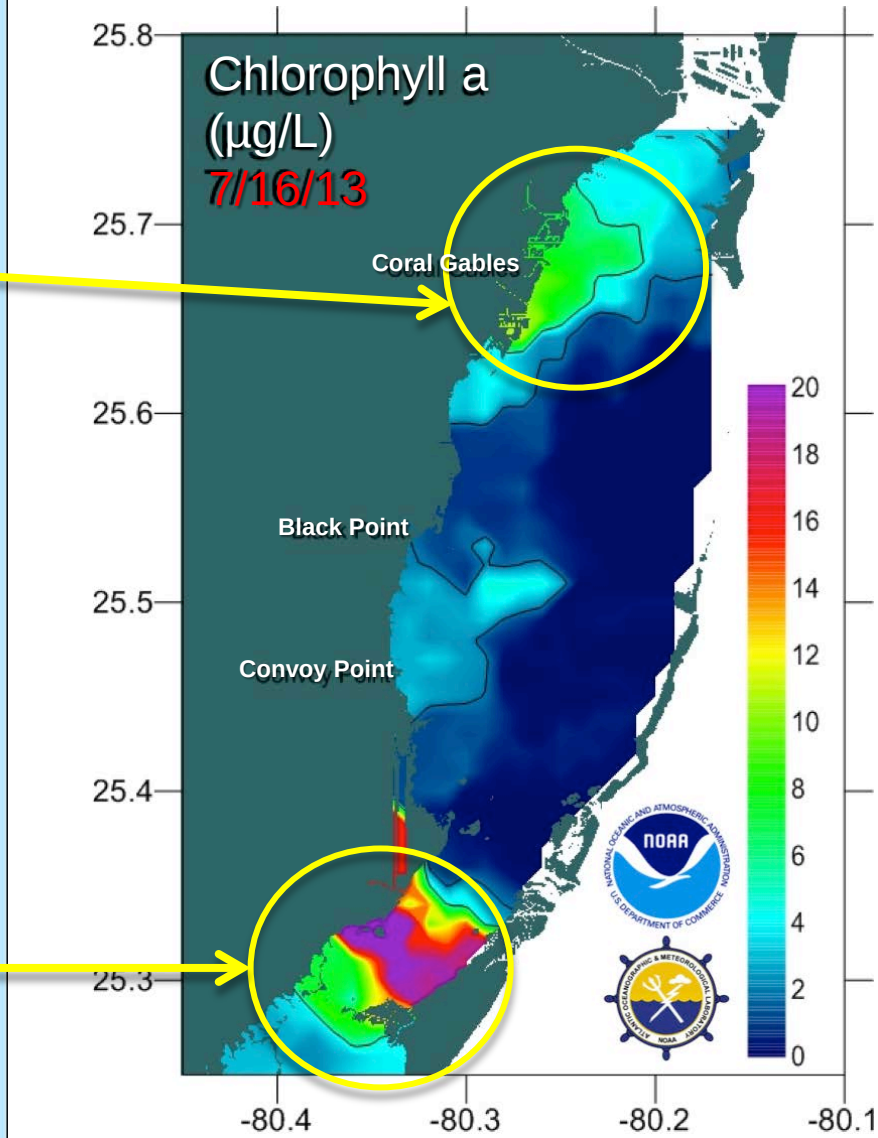
phytoplankton bloom



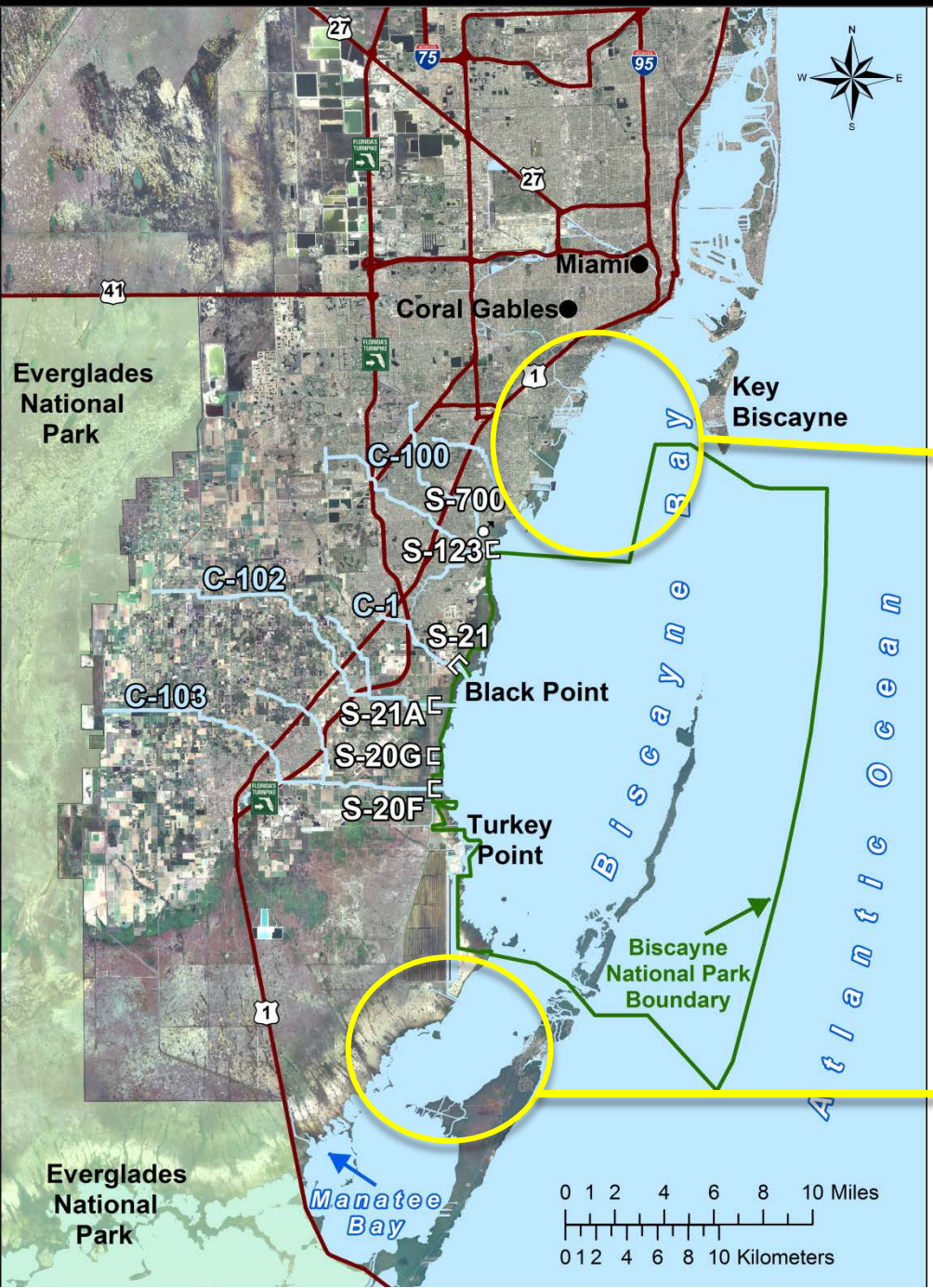
salinity stress

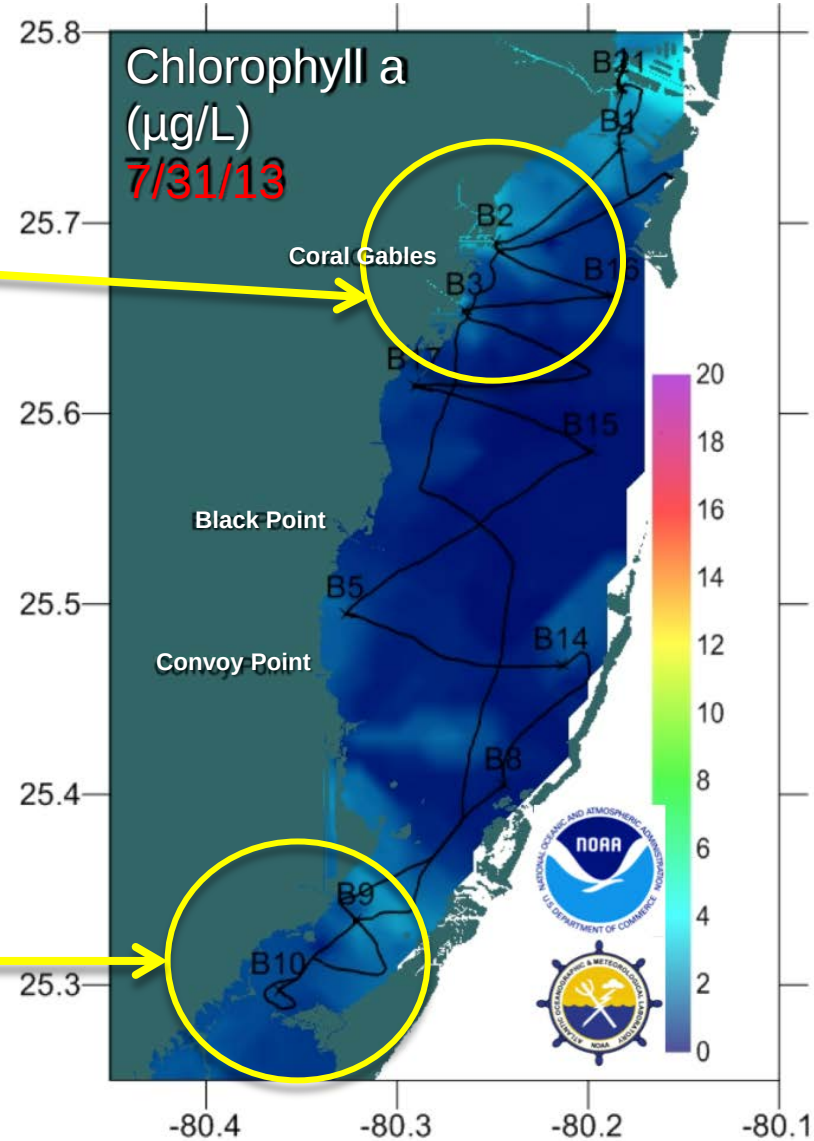
Biscayne Bay Algal Blooms





Biscayne Bay Algal Blooms





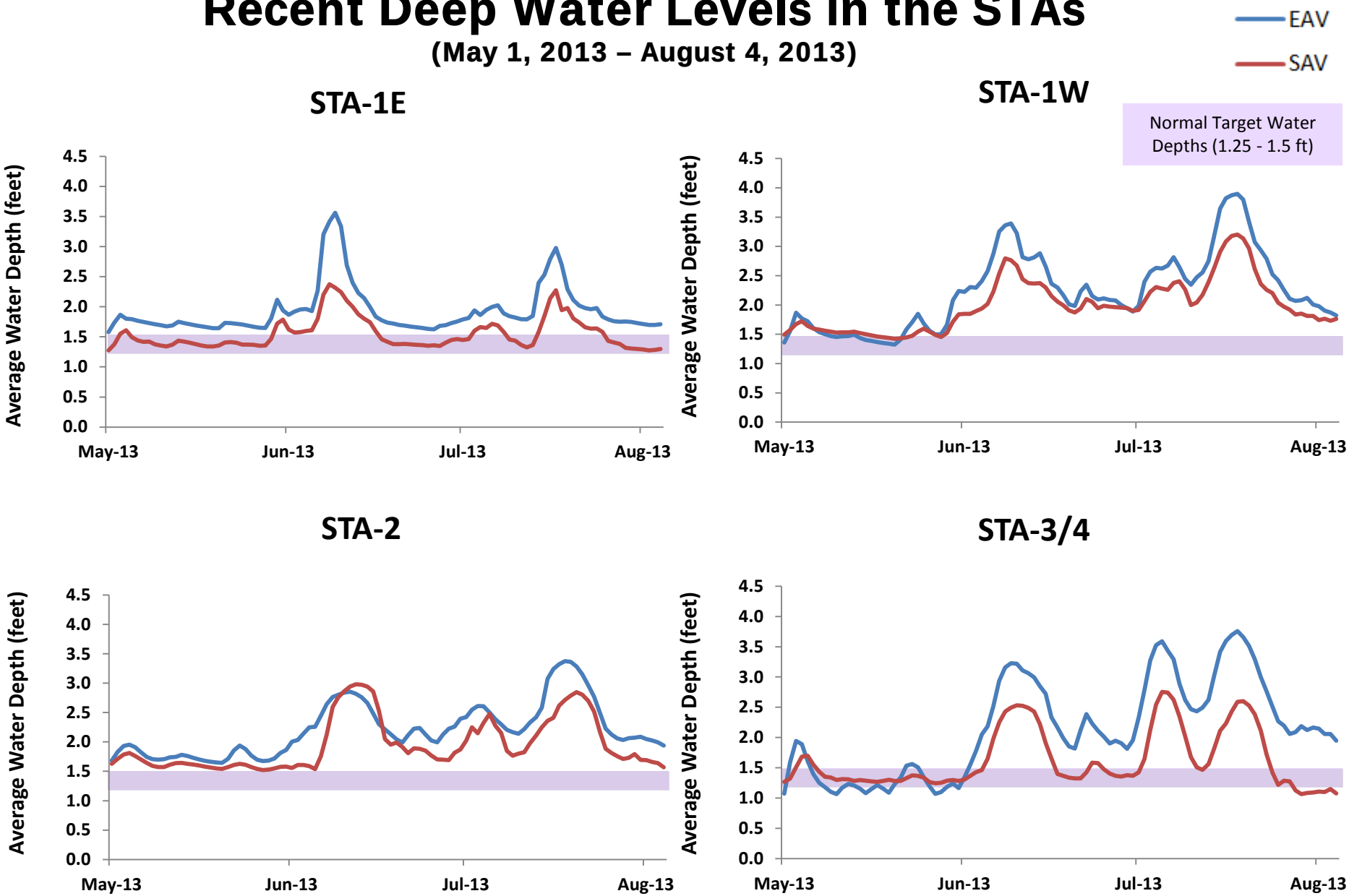
Biscayne Bay Bloom

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

Stormwater Treatment Areas

Recent Deep Water Levels in the STAs

(May 1, 2013 – August 4, 2013)



Stormwater Treatment Areas

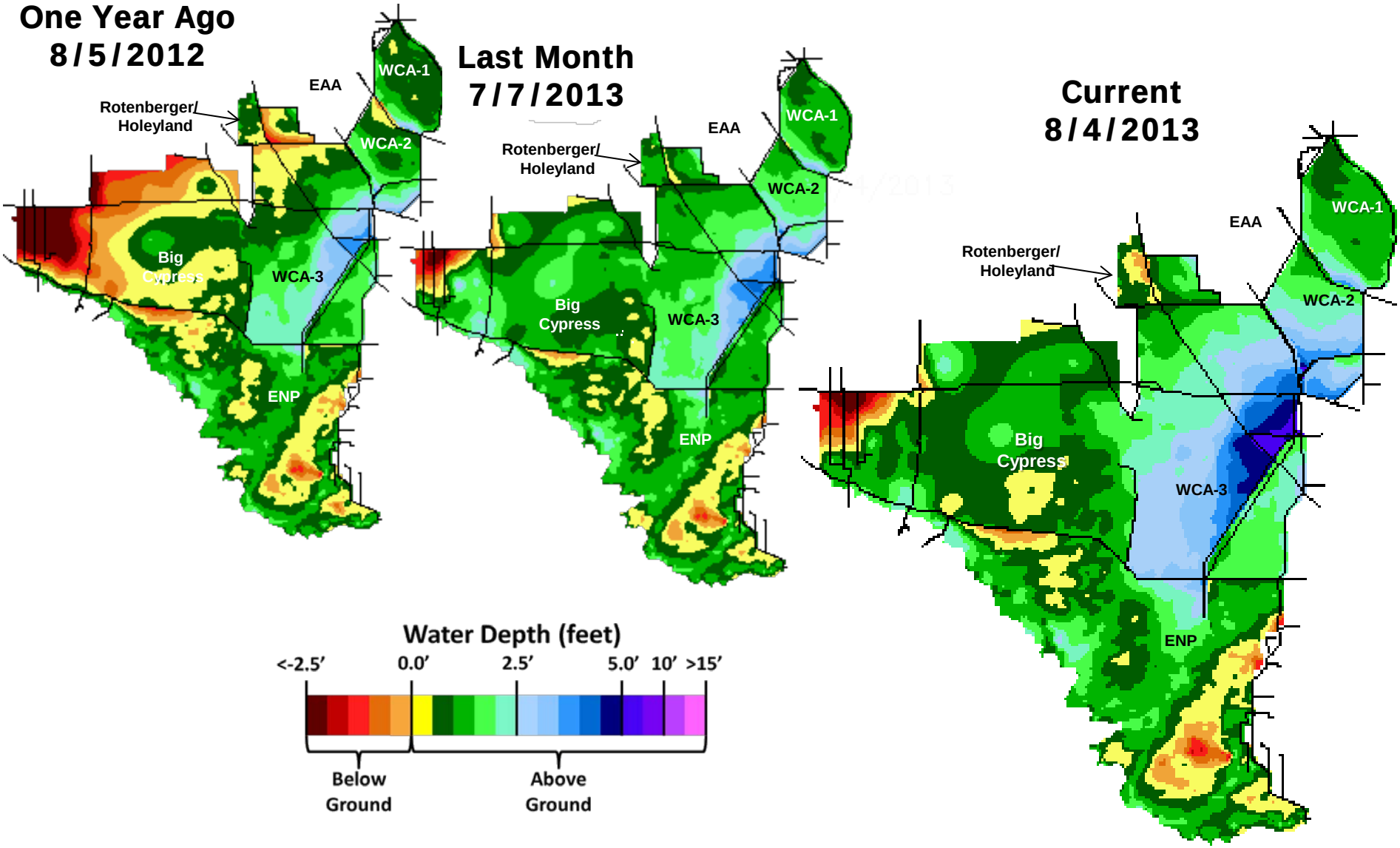
Current Conditions: Vegetation Stress

Response to High Water/Loading in STA 1W

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

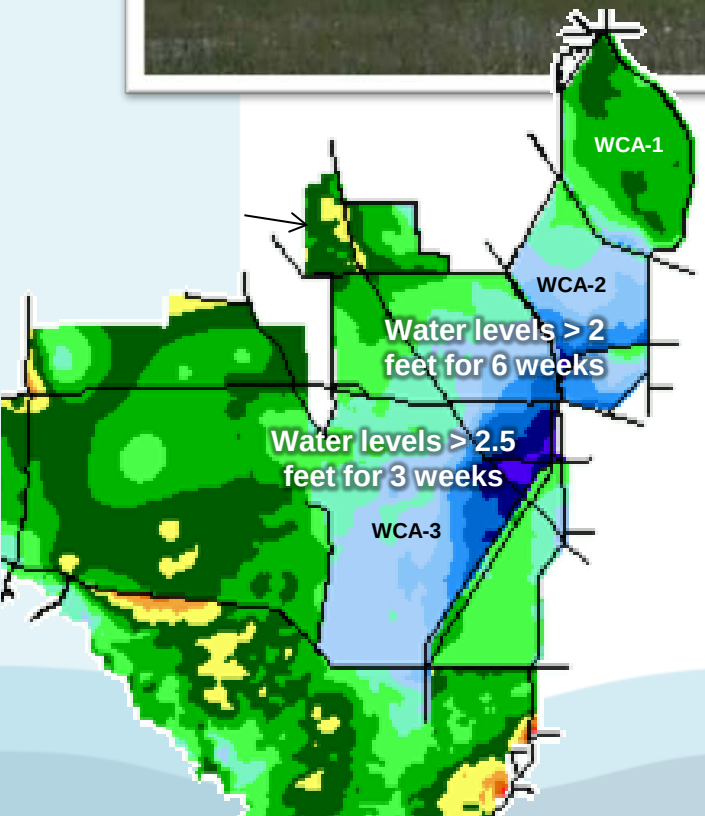
Left: Uprooted and floating cattail in STA-1W , Center: open water areas in the treatment cell; Right: dying submerged aquatic vegetation in STA-1E

Greater Everglades
Water Depth Monthly Snapshots



Greater Everglades

Tree Islands



Tree islands vary in tolerance for extended 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.

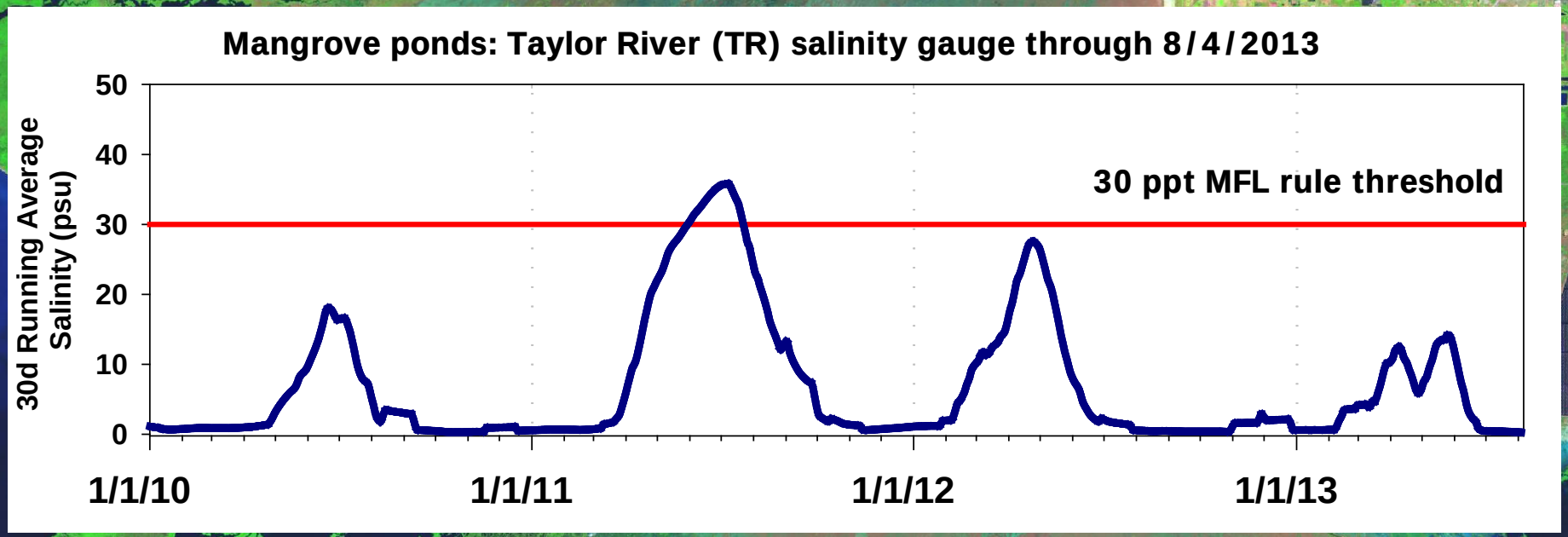
Everglades Mink

Green Tree Frog

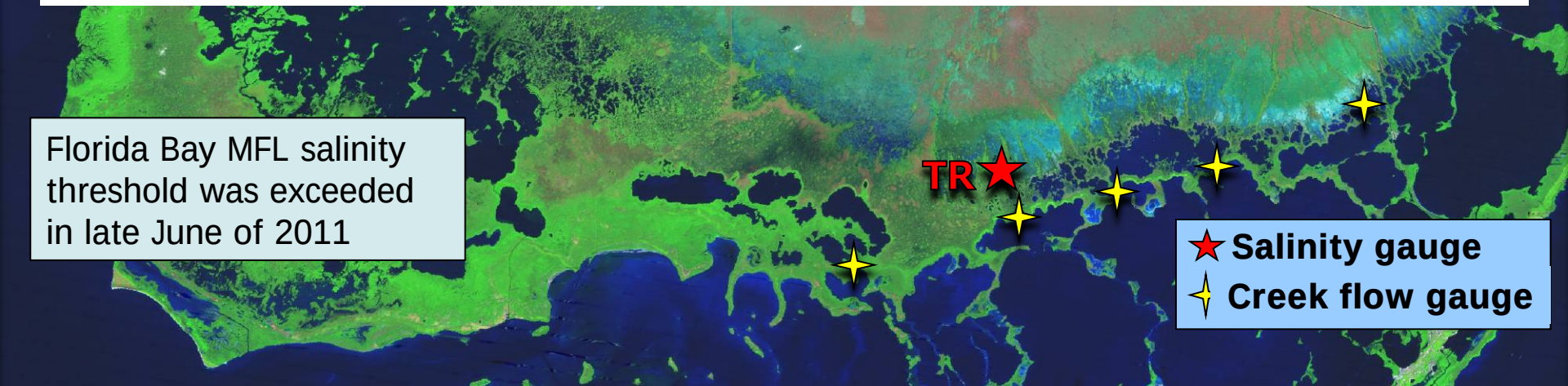
River Otter

Florida Bay

Tracking Salinity in Florida Bay



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



QUESTIONS?