SOUTH FLORIDA WATER MANAGEMENT DISTRICT

DRAFT

Governing Board Meeting
August 13, 2020

Ecological Conditions Update

Kissimmee River Phase III Restoration Area
Photograph courtesy of Brent Anderson, SFWMD

Lawrence Glenn
Water Resources Division Director

Kissimmee River Phase I Restoration Area Water Depth Maps

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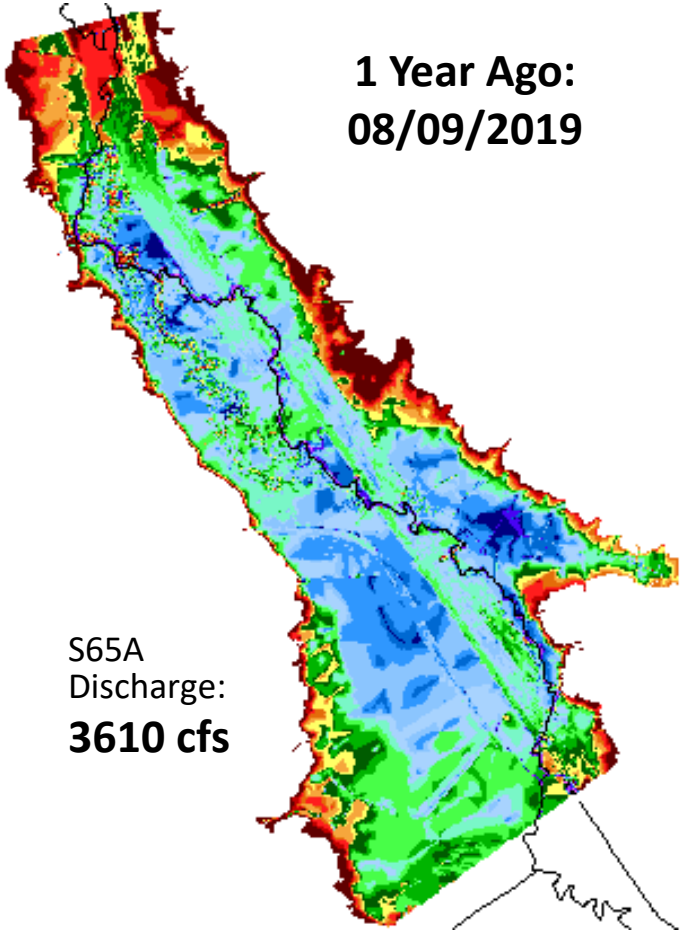

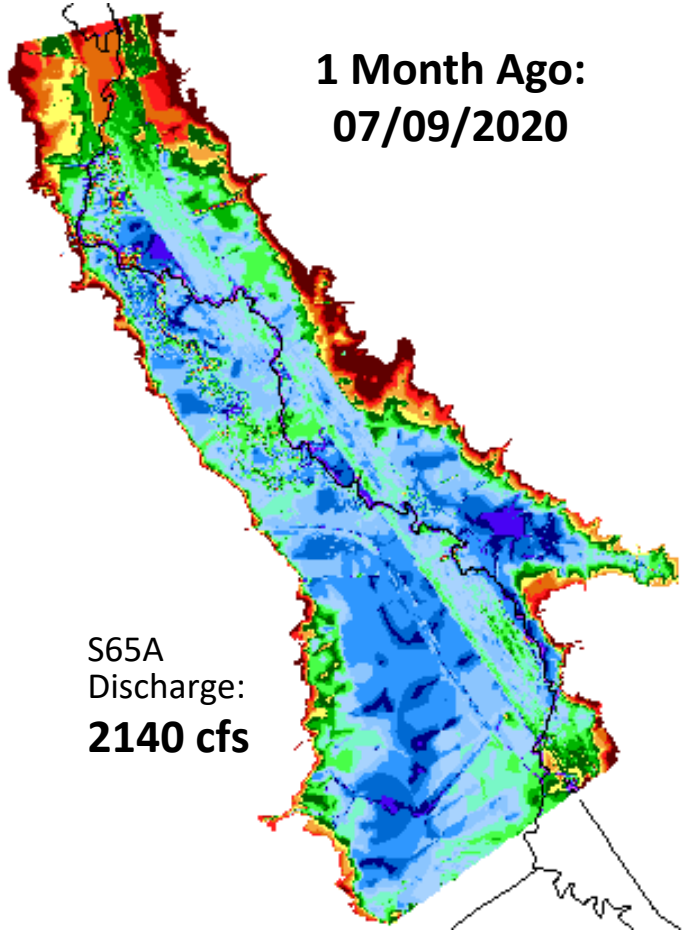

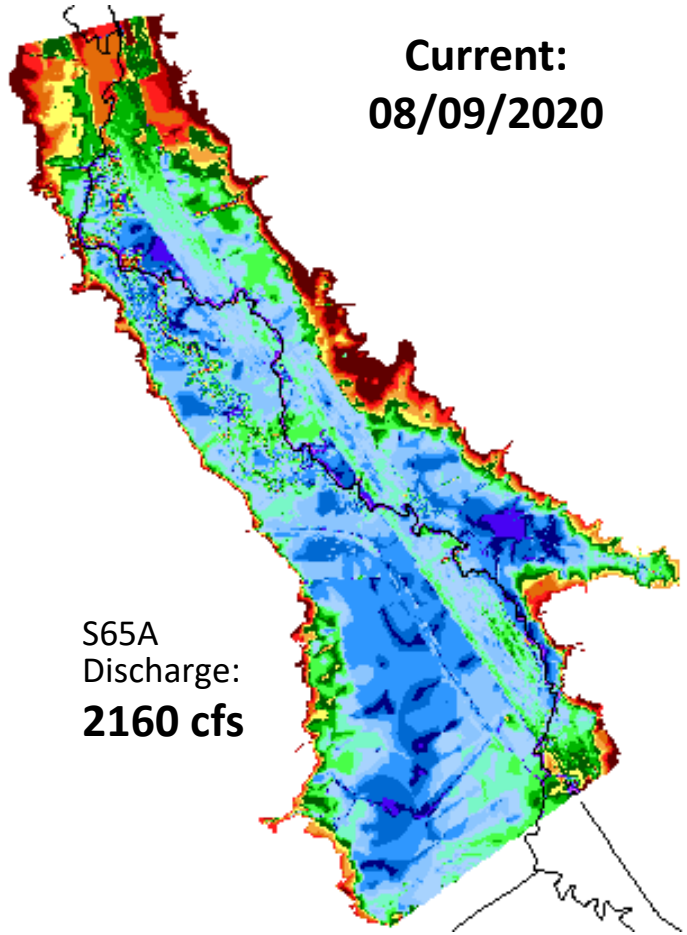

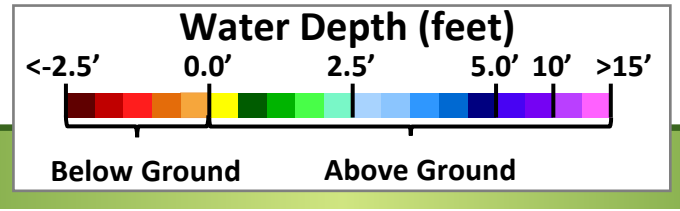

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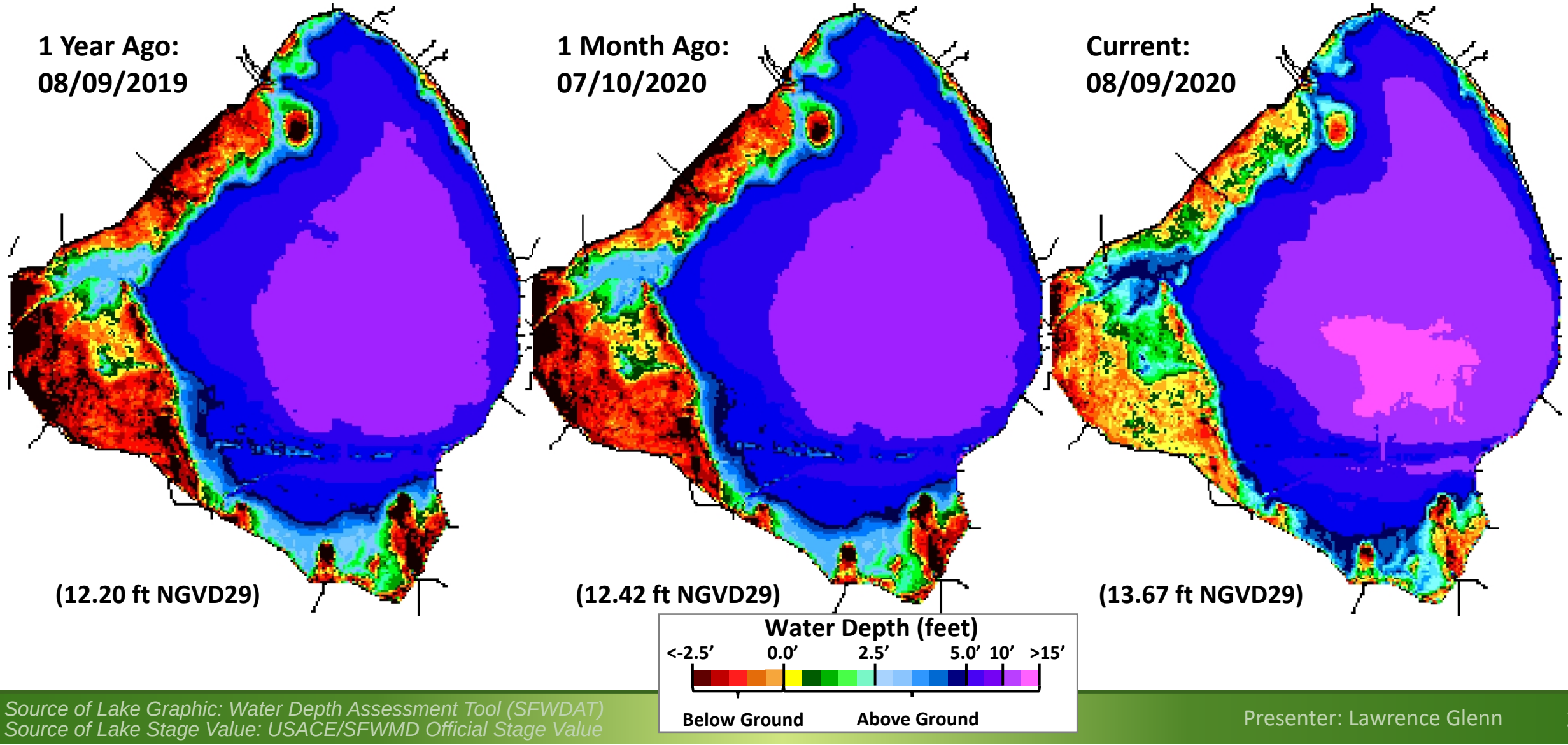
Lake Okeechobee Water Depth Maps



Source of Lake Graphic: Water Depth Assessment Tool (SFWDAT)
Source of Lake Stage Value: USACE/SFWMD Official Stage Value

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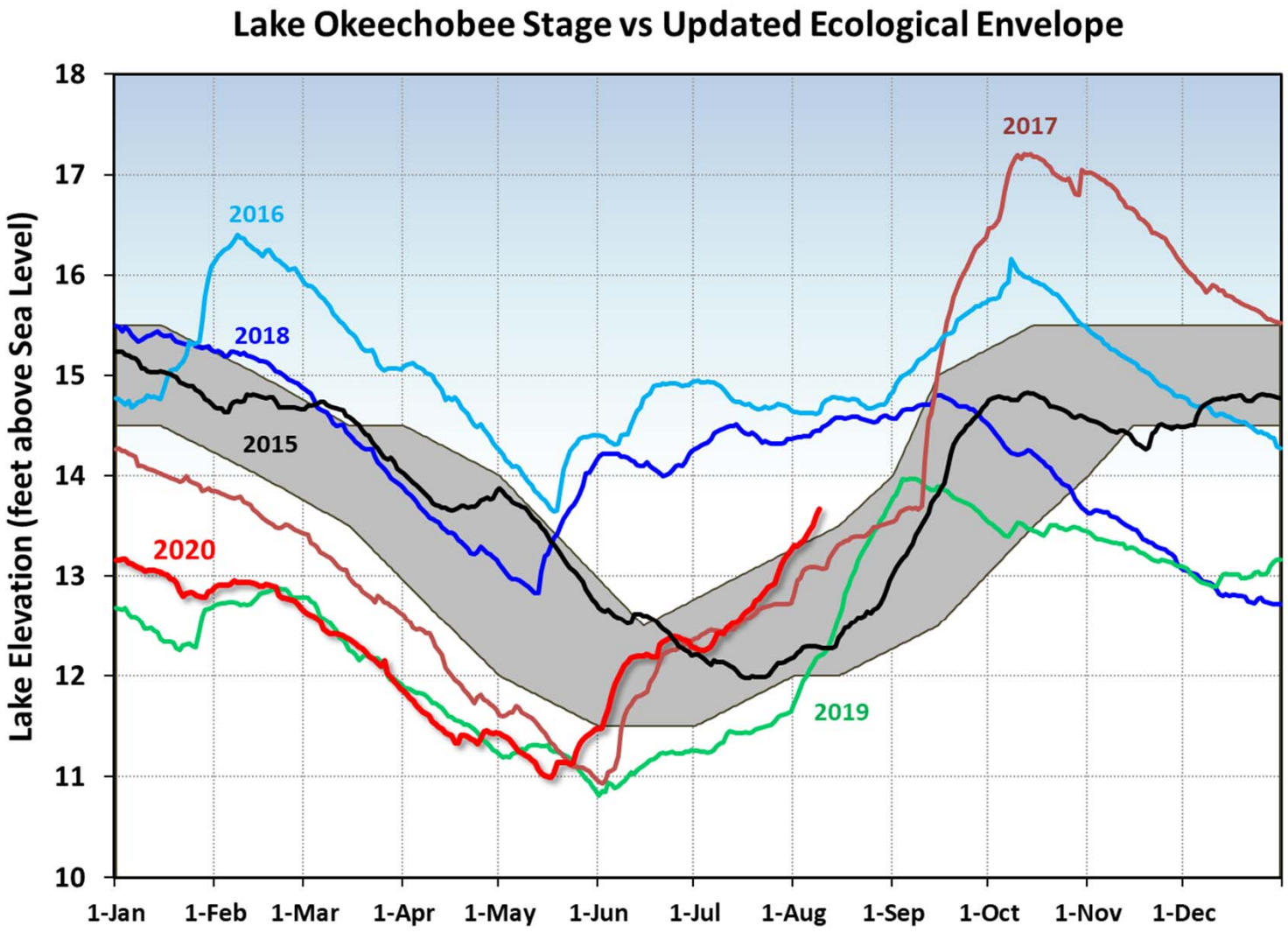
Lake Okeechobee Stages and Ecological Envelope



Presenter: Lawrence Glenn

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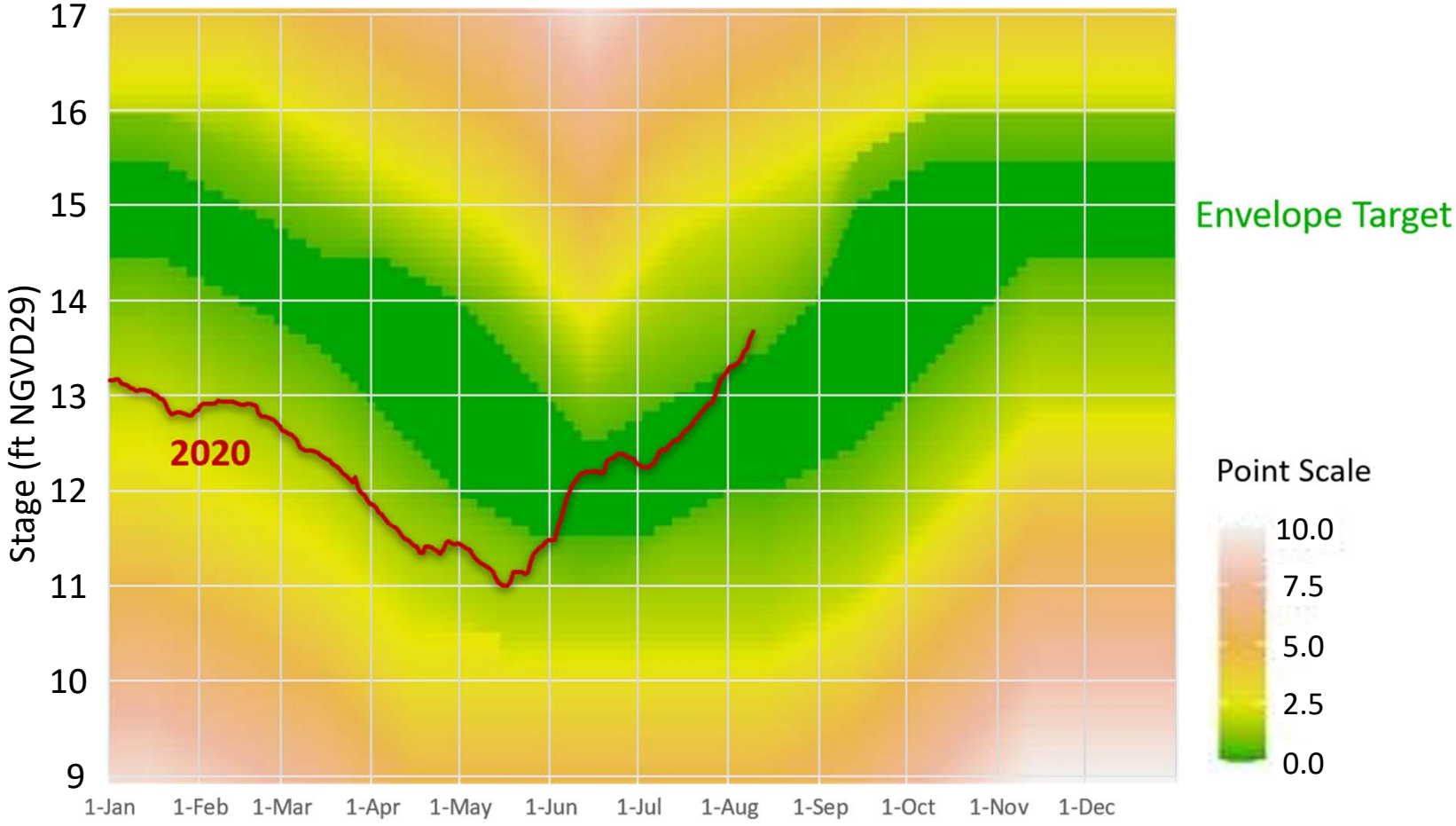
Lake Okeechobee Stages and Ecological Envelope

Visualizing Potential Ecological Risk Associated with Deviation from Stage Envelope



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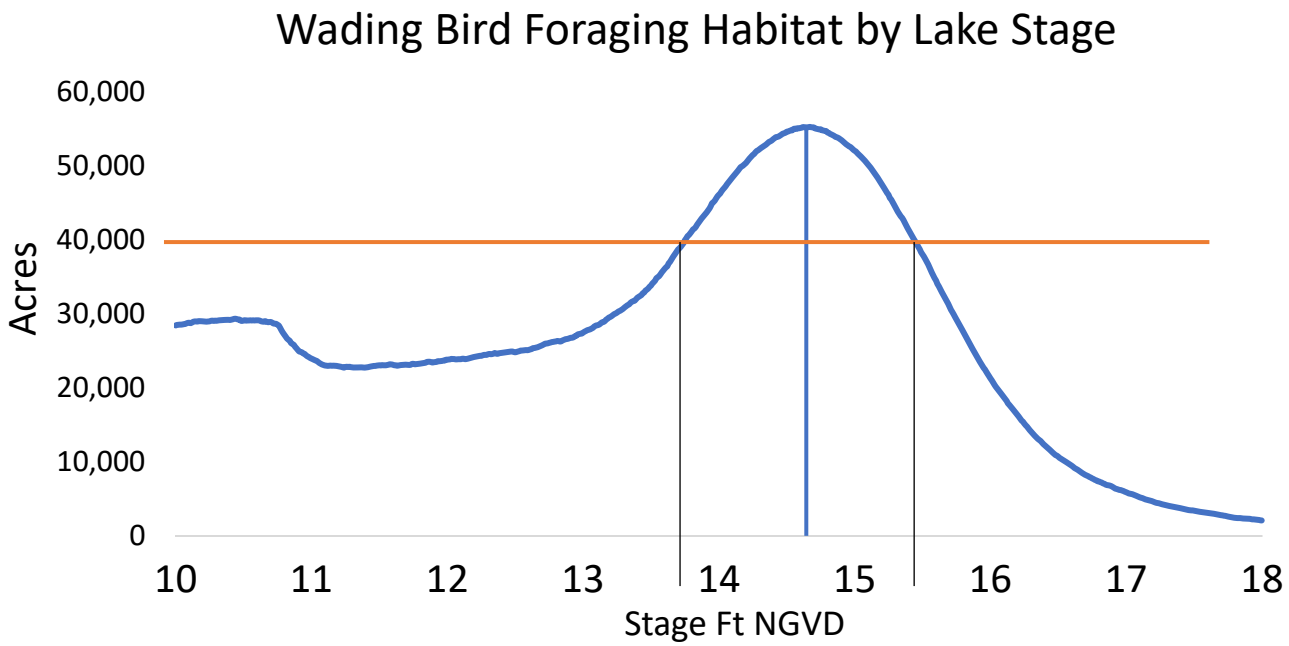
Seasonal Flooding of Upper Marshes



- High (15-15.5 ft) winter lake stages inundate entire marsh
  - Promote aquatic prey production in upper marshes, supporting fish and wildlife
  - Maximize fish and wildlife habitat for breeding season
  - Push back woody/terrestrial plants
  - Reduce spread of invasive/ exotic vegetation
  - Improve torpedograss management efforts
  - Reduce displacement of submerged aquatic vegetation (SAV) by emergent vegetation

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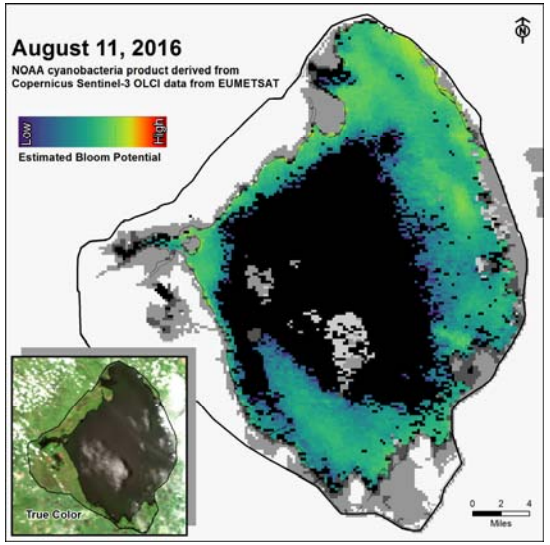
Lake Okeechobee
Cyanobacteria Bloom Potential



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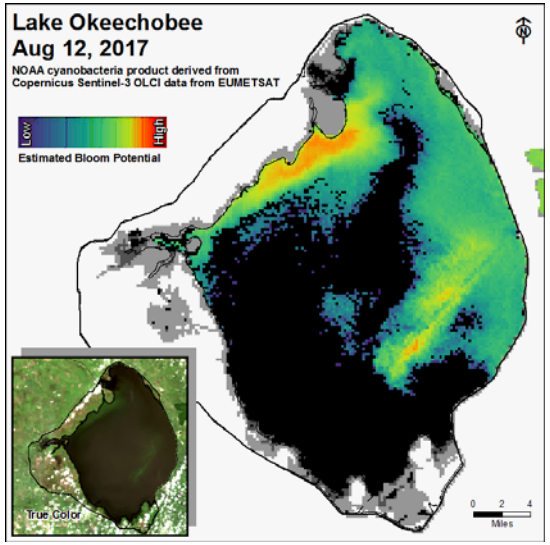
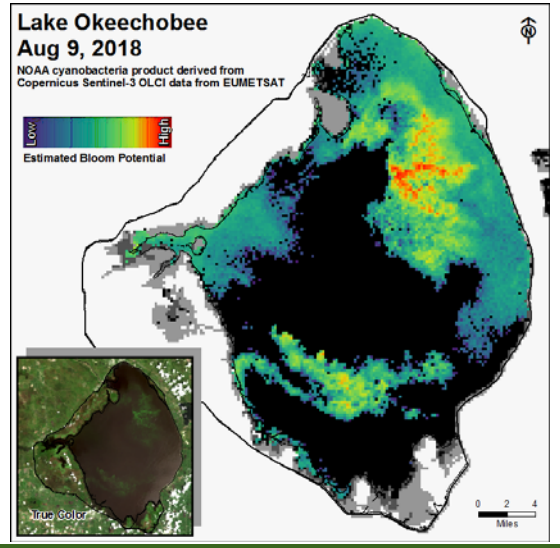
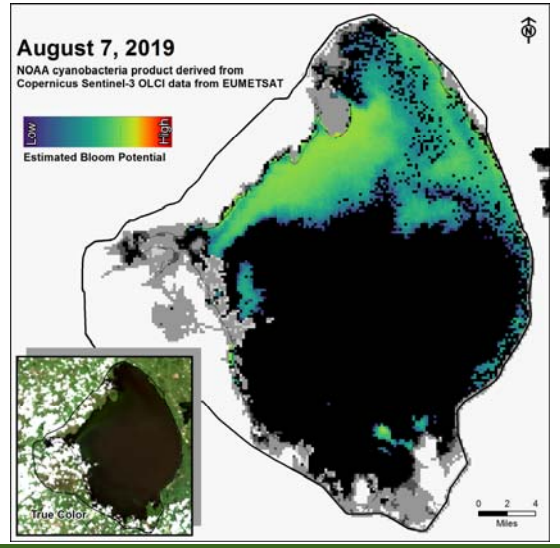


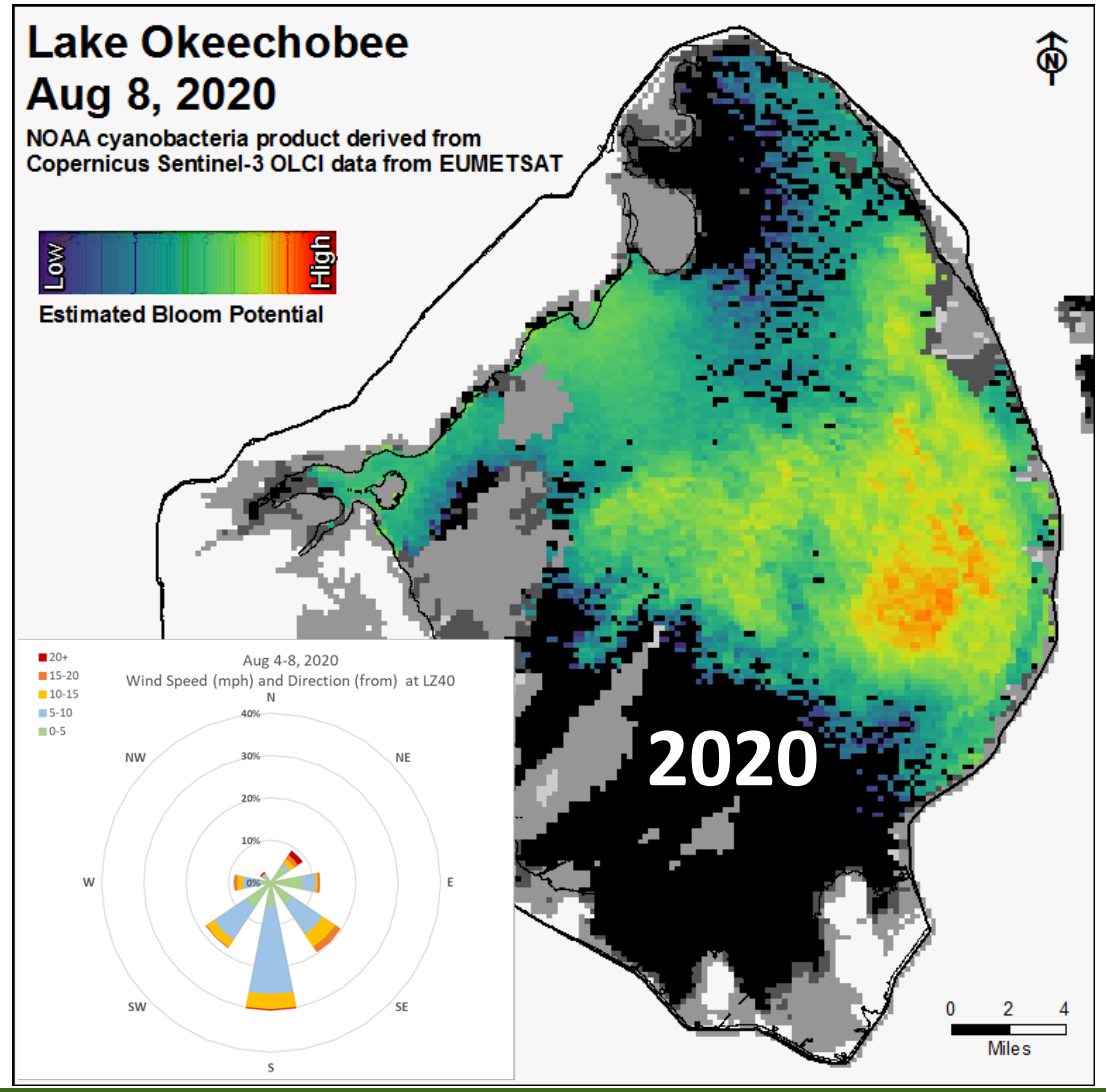
2017



2018



2019



NOAA cyanobacteria product derived from Copernicus Sentinel-3 OLCI data from EUMETSAT

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee Water Quality

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Provisional Data

Collection Date: July 21 - 22, 2020

Station	CHL*a* (ug/L)	TOXIN (ug/L)	TAXA
FEBIN			NS
FEBOUT			NS
KISSR0.0	17.5	BDL	*Microcys*
L005	42.1	BDL	mixed
LZ2	34.5	**0.3**	mixed
KBARSE	52.8	**0.3**	*Cylindro*
RITTAE2	8.0	BDL	*Planktol*
PELBAY3	8.0	**0.5**	*Microcys*
POLE3S	11.2	BDL	mixed
LZ25A	16.8	**1.0**	*Microcys*
PALMOUT	6.8	**1.1**	mixed
PALMOUT1	17.1	BDL	mixed
PALMOUT2	13.0	**0.5**	*Microcys*
PALMOUT3	12.5	**4.7**	*Microcys*
POLESOUT	75.5	**0.3**	*Cylindro*
POLESOUT1	121.0	**0.3**	*Cylindro*
POLESOUT2	41.3	**0.7**	*Microcys*
POLESOUT3	19.2	**4.6**	*Microcys*
EASTSHORE	47.6	**0.3**	mixed
NES135	72.2	**0.4**	*Microcys*
NES191	29.2	BDL	mixed

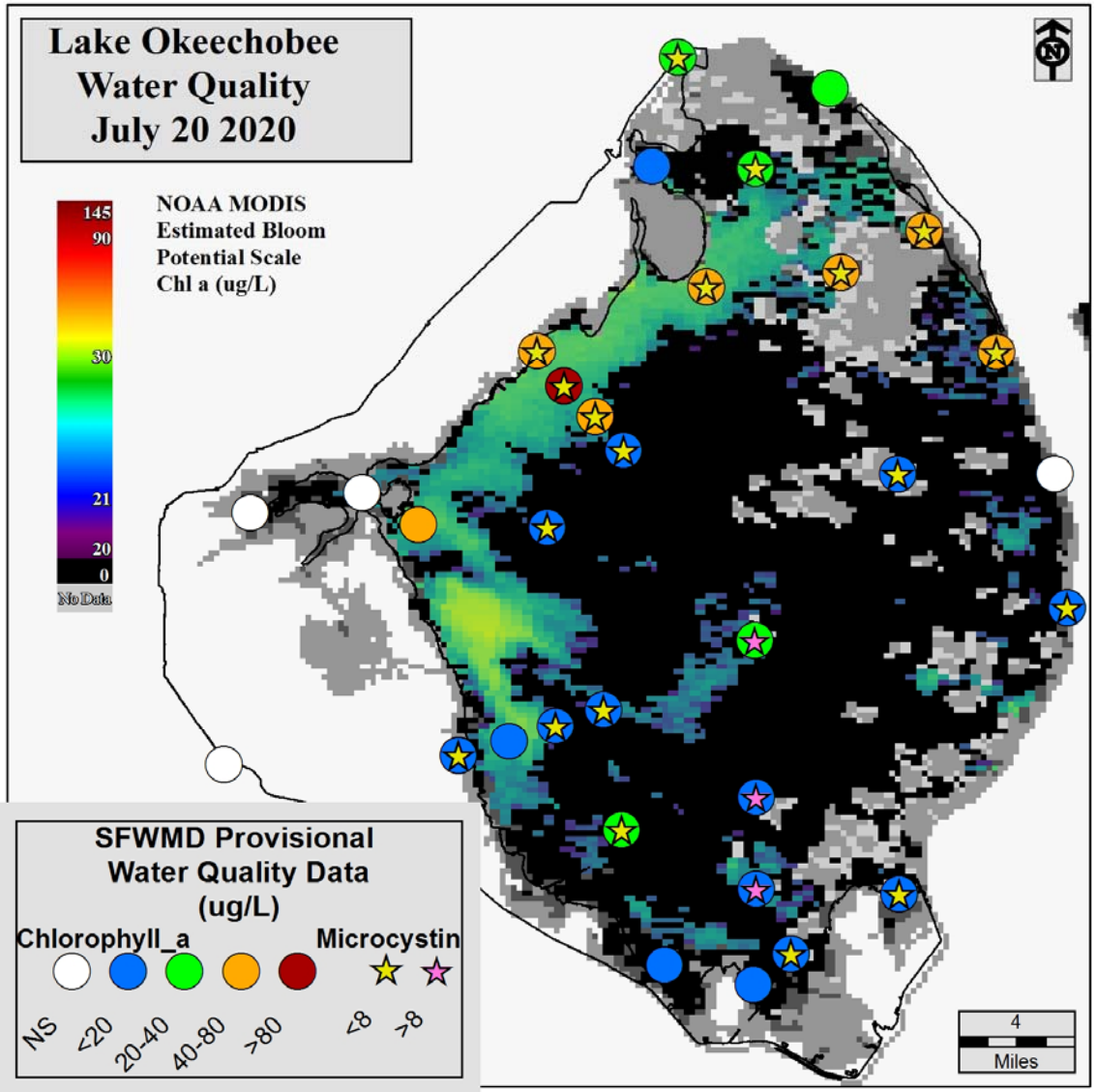
Station	CHL*a* (ug/L)	TOXIN (ug/L)	TAXA
L001	36.2	**0.4**	*Microcys*
L004	15.4	**1**	*Microcys*
L006	12.0	29.0	*Microcys*
L007	18.3	12.0	*Microcys*
L008	16.0	**0.5**	*Microcys*
LZ30	20.5	**7.6**	*Microcys*
LZ40	22.1	18	*Microcys*
CLV10A	19.0	**2.4**	*Microcys*
NCENTER	71.6	**0**	*Microcys*

Samples collected July 13

S308C	4.4	BDL	mixed
S77	3.9	BDL	mixed

- SFWMD considers >40 µg/L Chlorophyll *a* (Chl*a*) an algal bloom
- BDL – Below Detectable Limit of **0.25** µg/L
- ND – No Dominant taxa
- P – Pending
- NS – Not Sampled
- Bold – crew observed possible BGA
- Chlorophyll *a* analyzed by SFWMD
- Toxin and Taxa analyzed by FDEP

Cylindro = Cylindrospermopsis
Planktol = Planktolyngbya
Dolicho = Dolichospermum



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee Water Quality

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Provisional Data

Collection Date: August 4 - 5, 2020

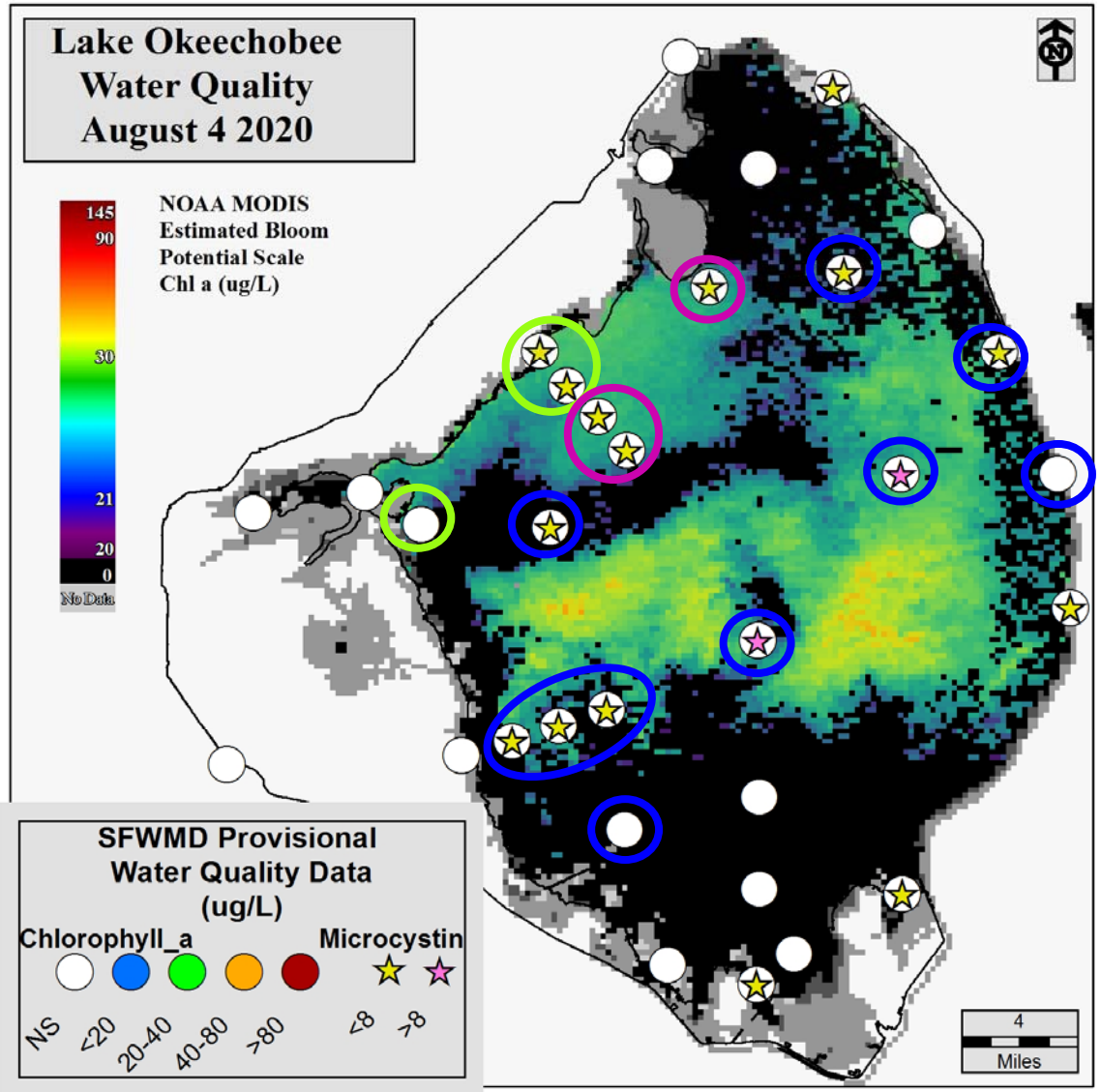
Station	CHL*a* (ug/L)	TOXIN (ug/L)	TAXA
FEBIN			*NS*
FEBOUT			*NS*
KISSR0.0	P	BDL	*mixed*
L005	P	BDL	*Cylindro*
LZ2	P	BDL	*mixed*
KBARSE	P	**1.0**	*Micro/Cylin*
RITTAE2	P	**0.4**	*Microcys*
PELBAY3	P	**0.3**	*mixed*
POLE3S	P	BDL	*mixed*
LZ25A	P	BDL	*mixed*
PALMOUT	P	BDL	*mixed*
PALMOUT1	P	**3.2**	*Microcys*
PALMOUT2	P	**2.2**	*Microcys*
PALMOUT3	P	**2.0**	*Microcys*
POLESOUT	P	**0.3**	*Cylindro*
POLESOUT1	P	**0.3**	*Cylindro*
POLESOUT2	P	**0.3**	*Micro/Cylin*
POLESOUT3	P	**0.5**	*Micro/Cylin*
EASTSHORE	P	**0.5**	*Microcys*
NES135	P	BDL	*NS*
NES191	P	**0.3**	*mixed*

Station	CHL*a* (ug/L)	TOXIN (ug/L)	TAXA
L001	P	BDL	*mixed*
L004	P	**28.0**	*Microcys*
L006	P	BDL	*mixed*
L007	P	BDL	*mixed*
L008	P	**0.7**	*Microcys*
LZ30	P	BDL	*Microcys*
LZ40	P	**25.0**	*Microcys*
CLV10A	P	**0.3**	*Microcys*
NCENTER	P	**1.8**	*Microcys*

Samples collected July 27

S308C	P	BDL	*mixed*
S77	P	BDL	*Microcys*

- SFWMD considers >40 µg/L Chlorophyll *a* (Chl*a*) an algal bloom
- BDL – Below Detectable Limit of **0.25** µg/L
- ND – No Dominant taxa
- P – Pending
- NS – Not Sampled
- Bold – crew observed possible BGA
- Chlorophyll *a* analyzed by SFWMD
- Toxin and Taxa analyzed by FDEP
  - *Cylindro = Cylindrospermopsis*
  - *Planktol = Planktolyngbya*
  - *Dolicho = Dolichospermum*



Snail Kite Population and Trends

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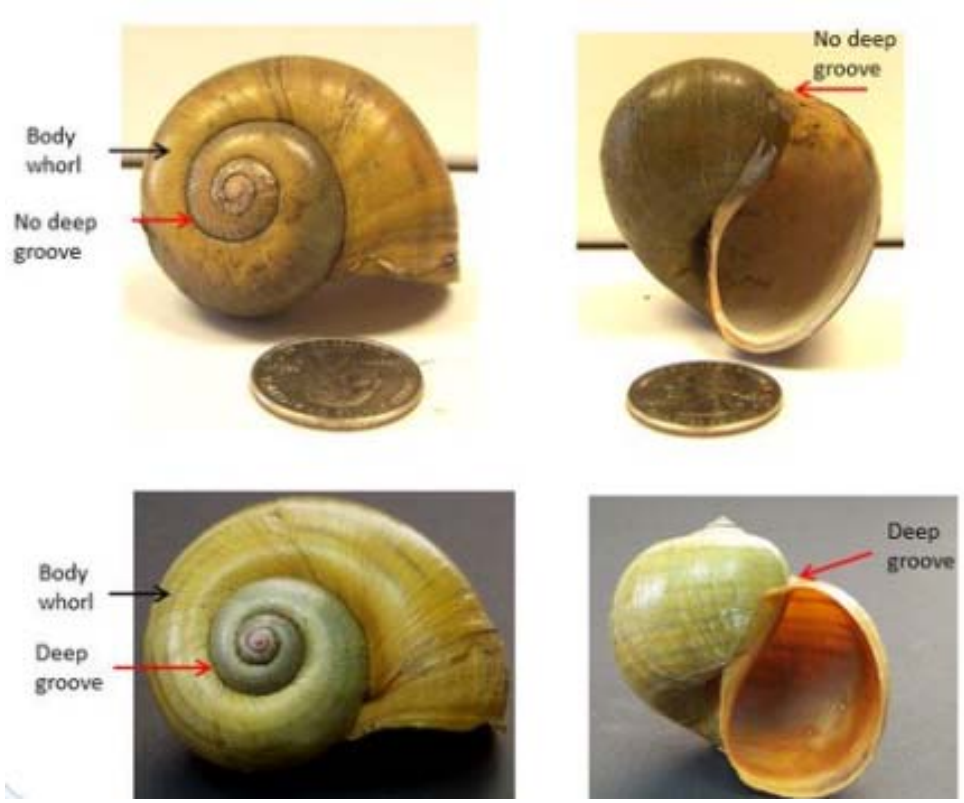
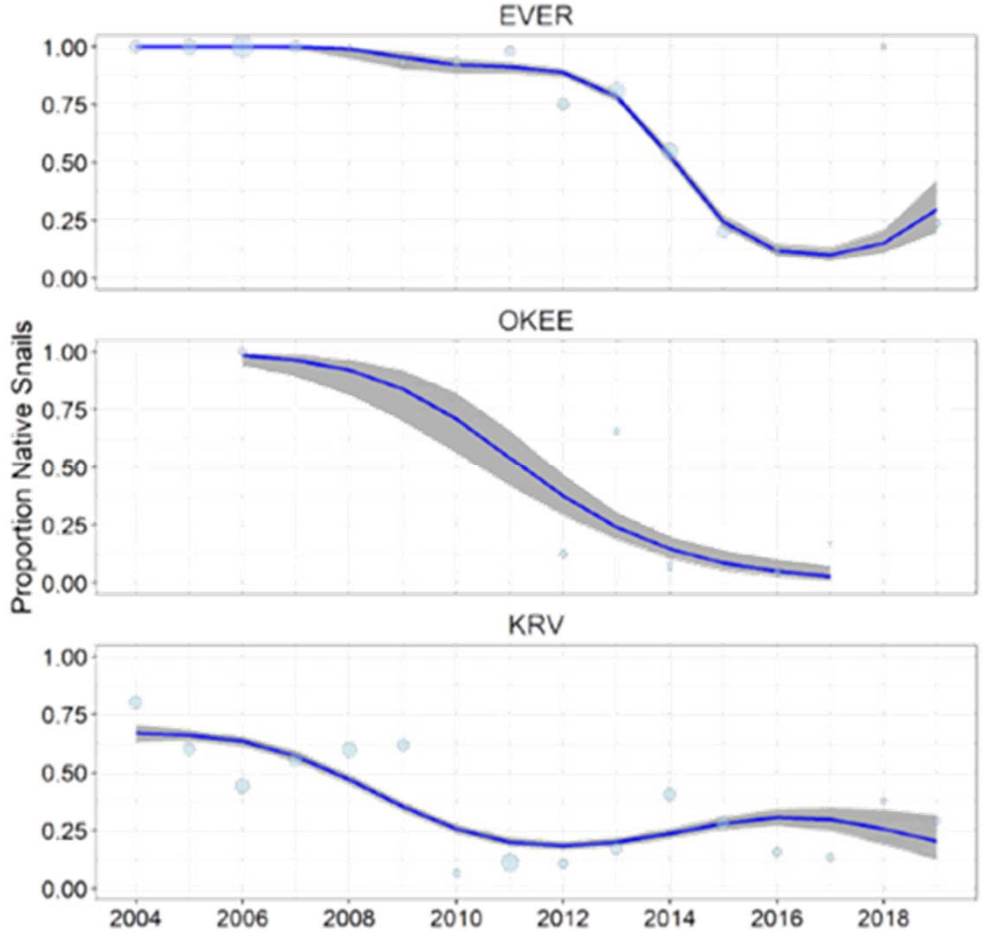
Native Apple Snail



Exotic Apple Snail

Eggs

Proportion of Native Snails at Foraging Sites



Not Good?

Population increase due to invasive exotic snails, decline in proportion of natives

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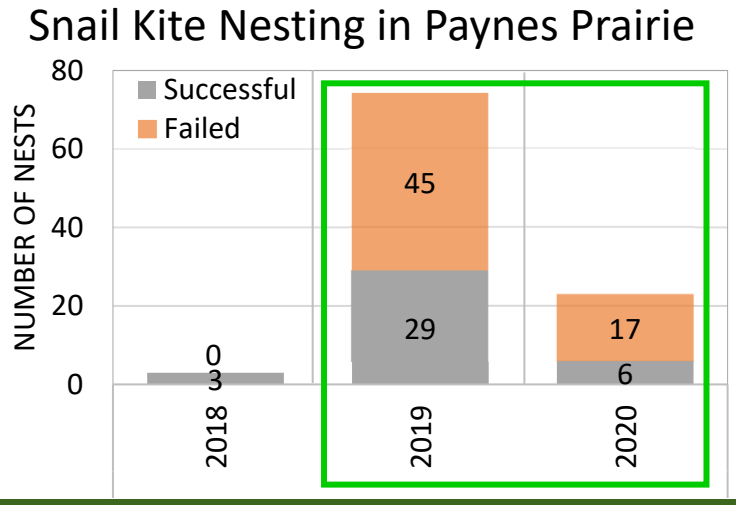
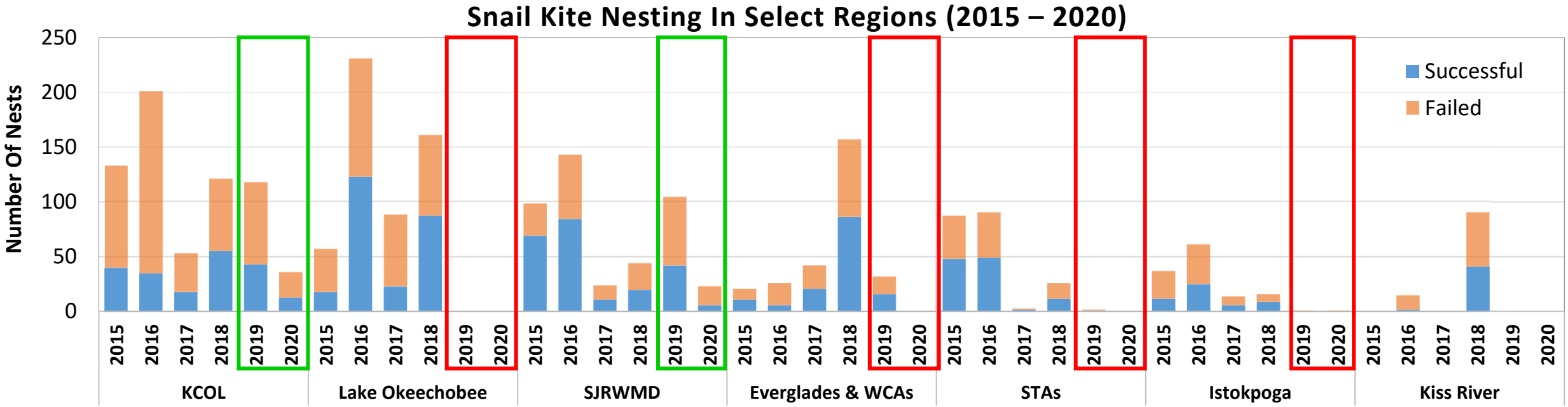
Statewide Snail Kite Nesting 2015 - 2020





SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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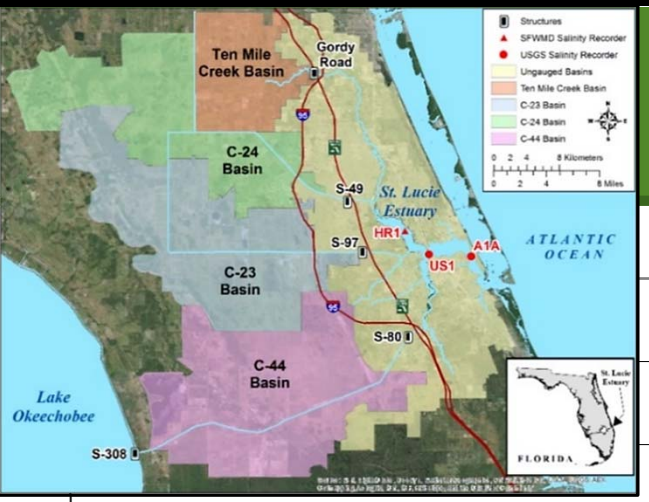
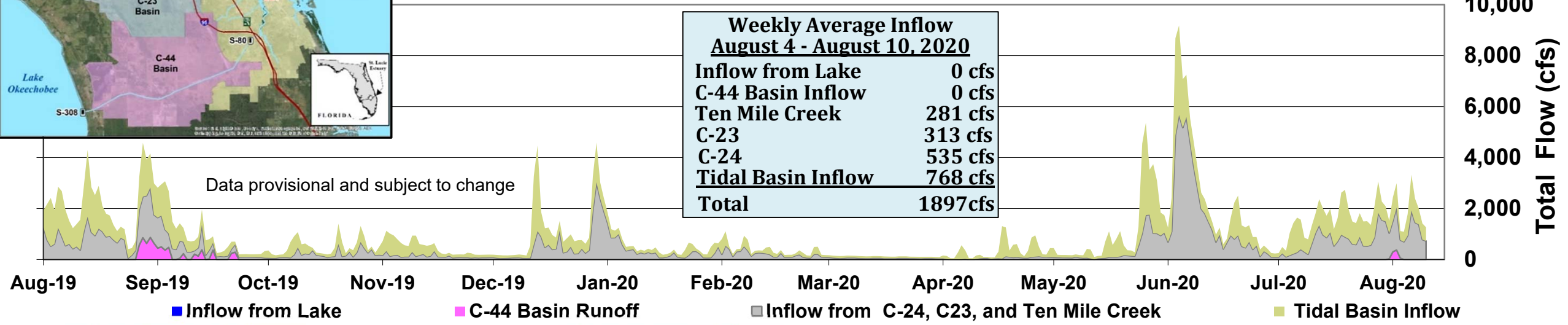
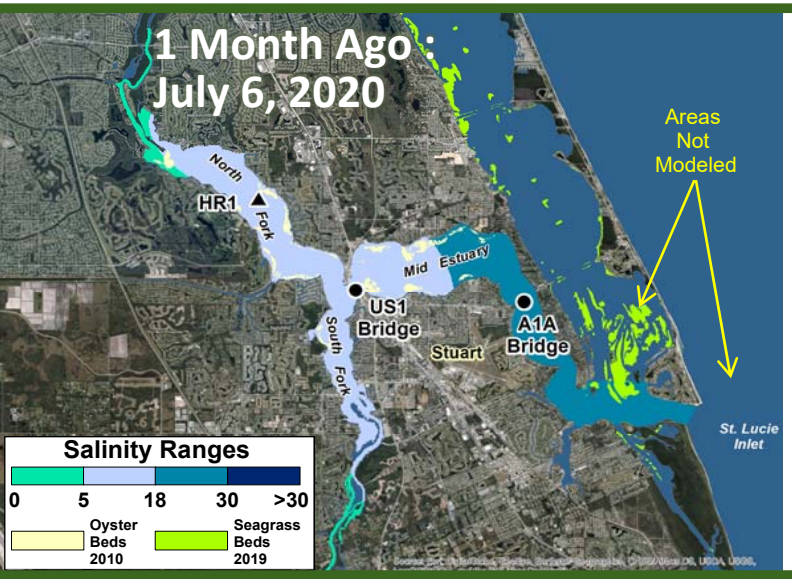
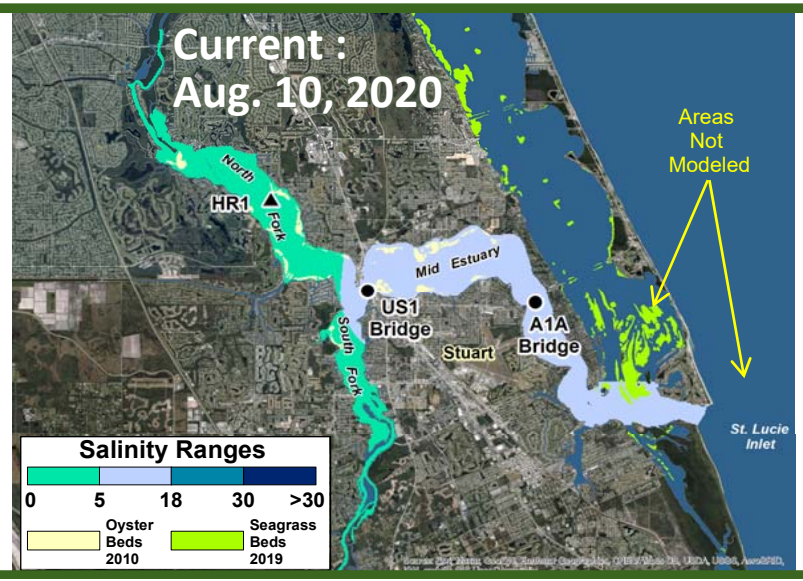
St. Lucie Inflows and Salinity Conditions

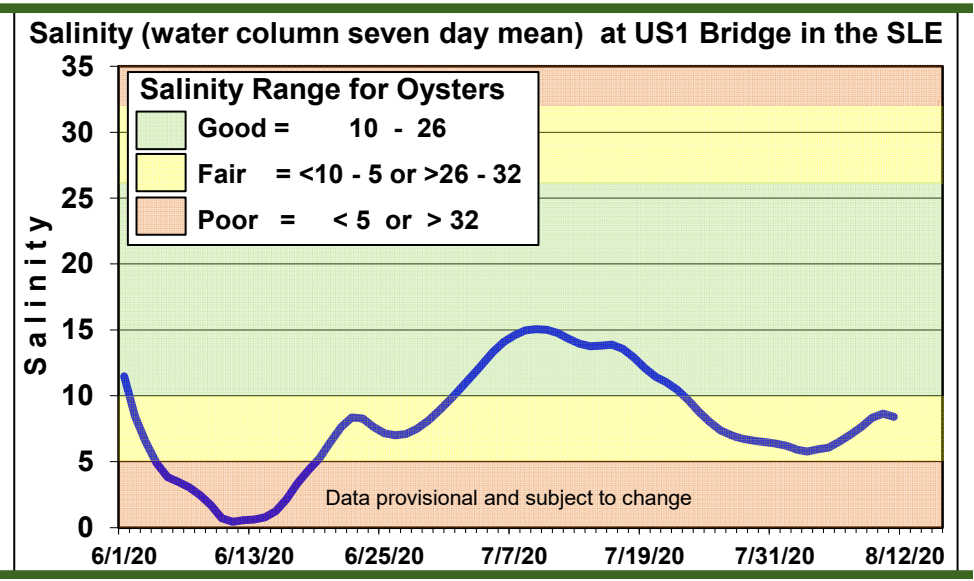


Total Daily Inflow into the St. Lucie Estuary

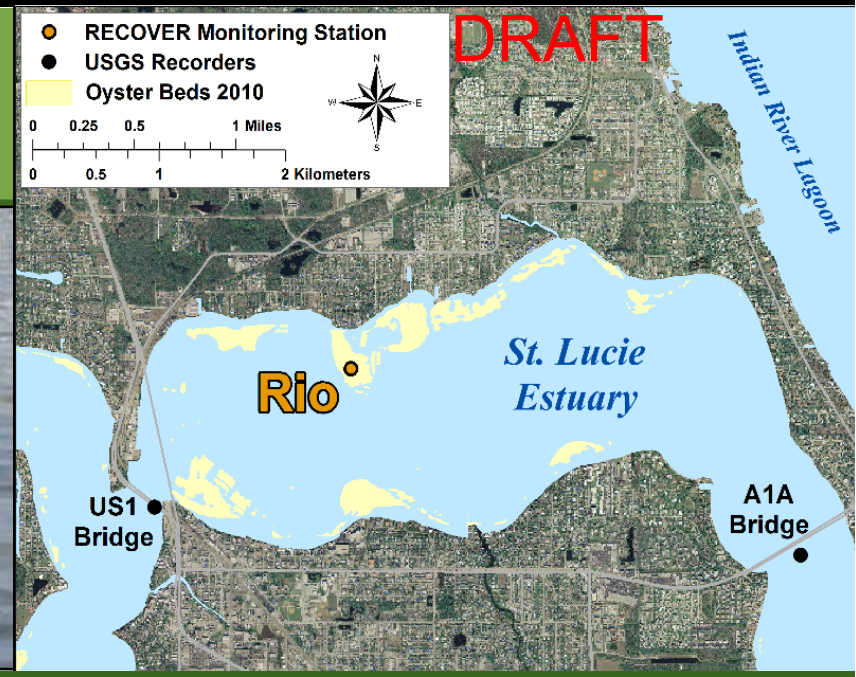


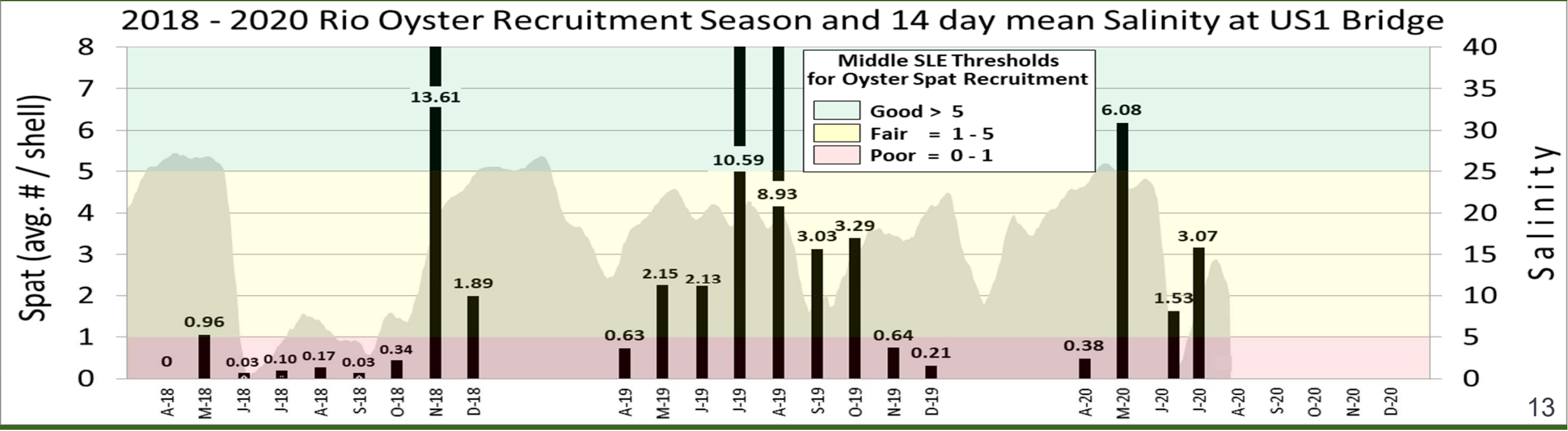




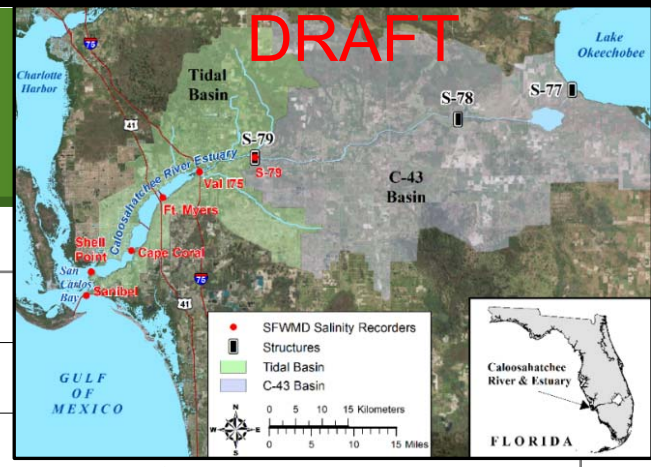


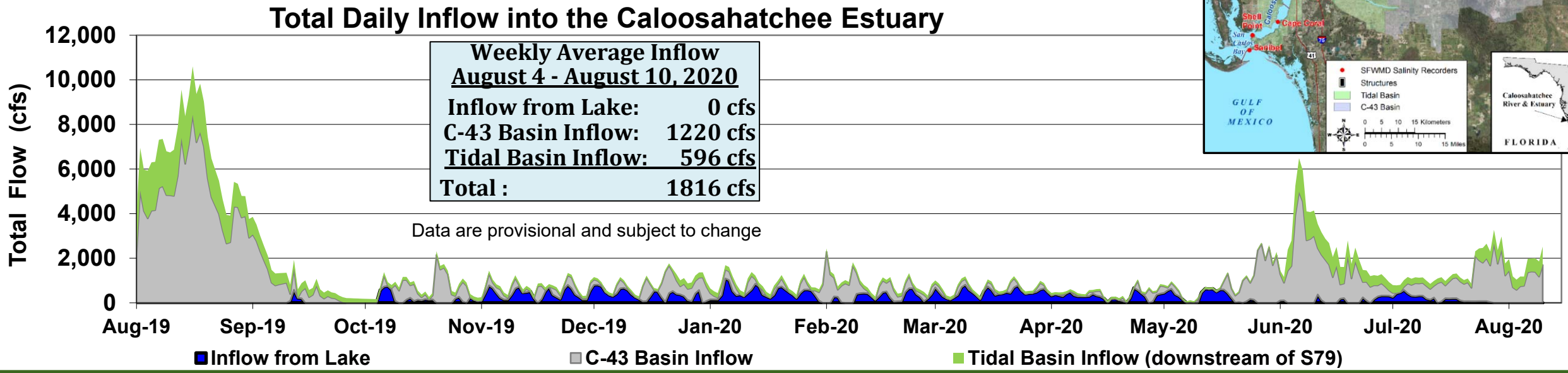
St. Lucie Estuary – Oysters at Rio Station

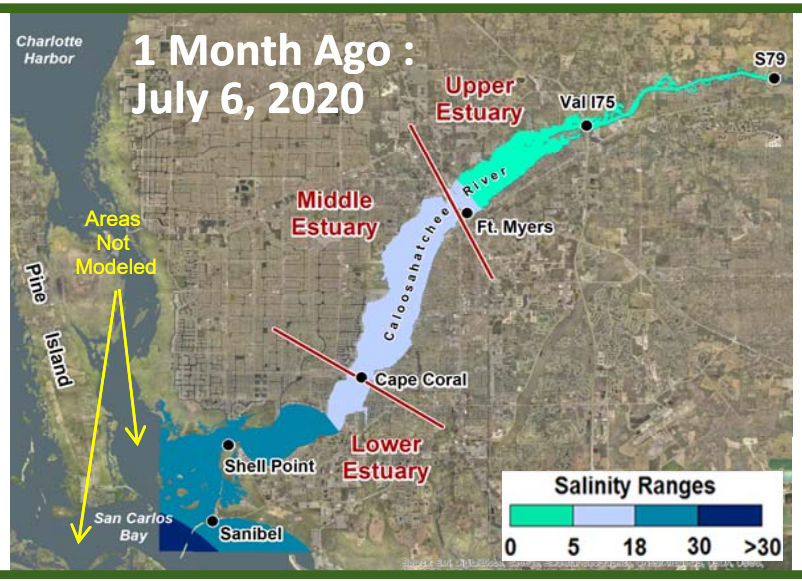


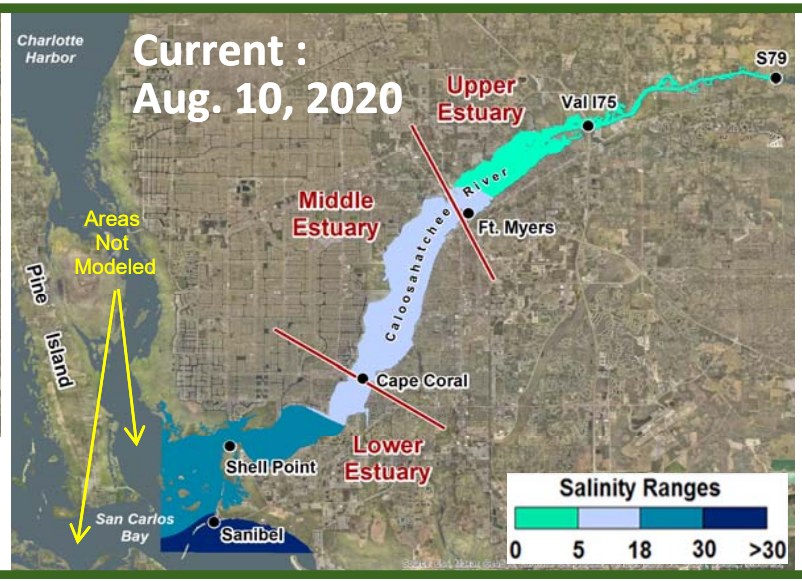


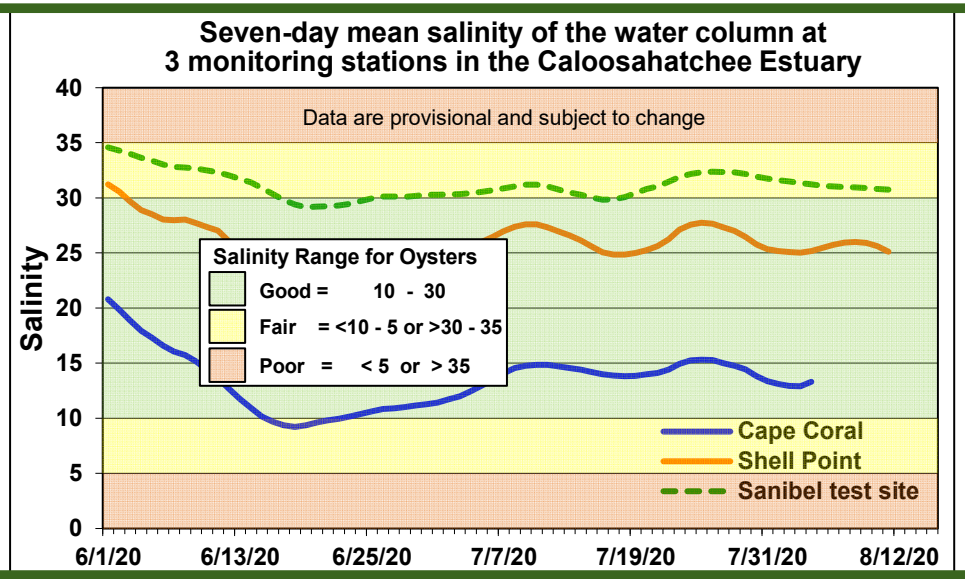
Caloosahatchee Inflows and Salinity Conditions











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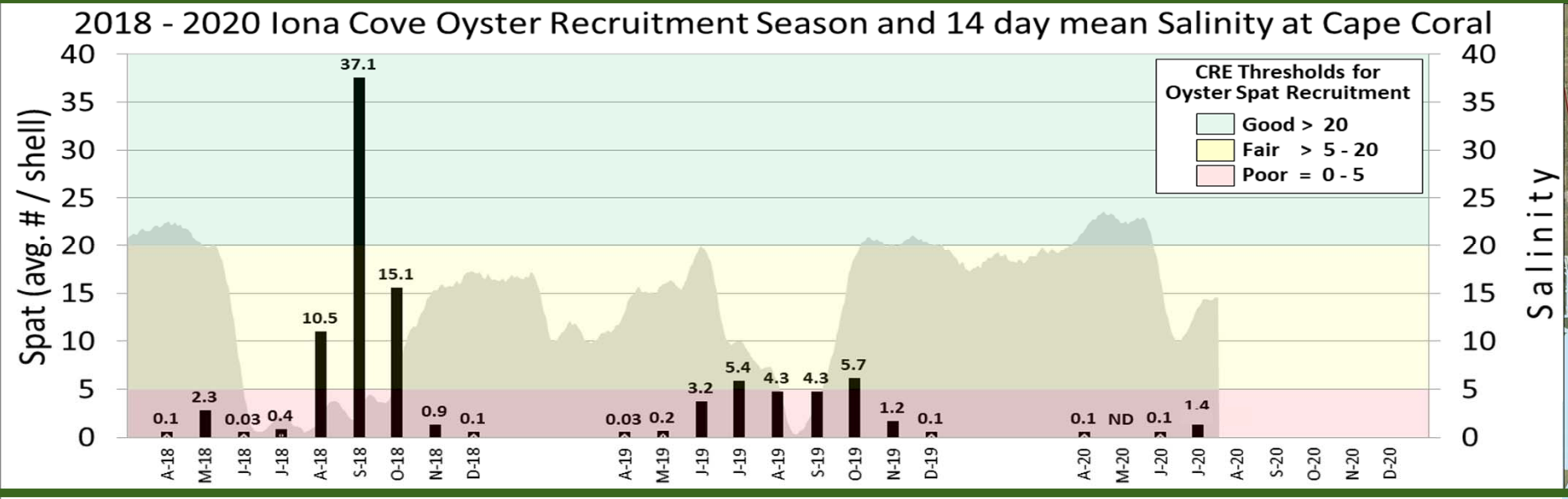
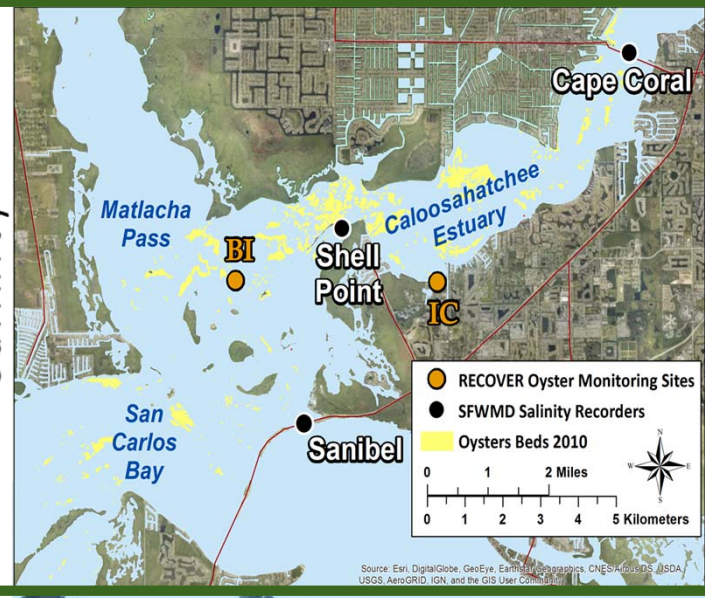
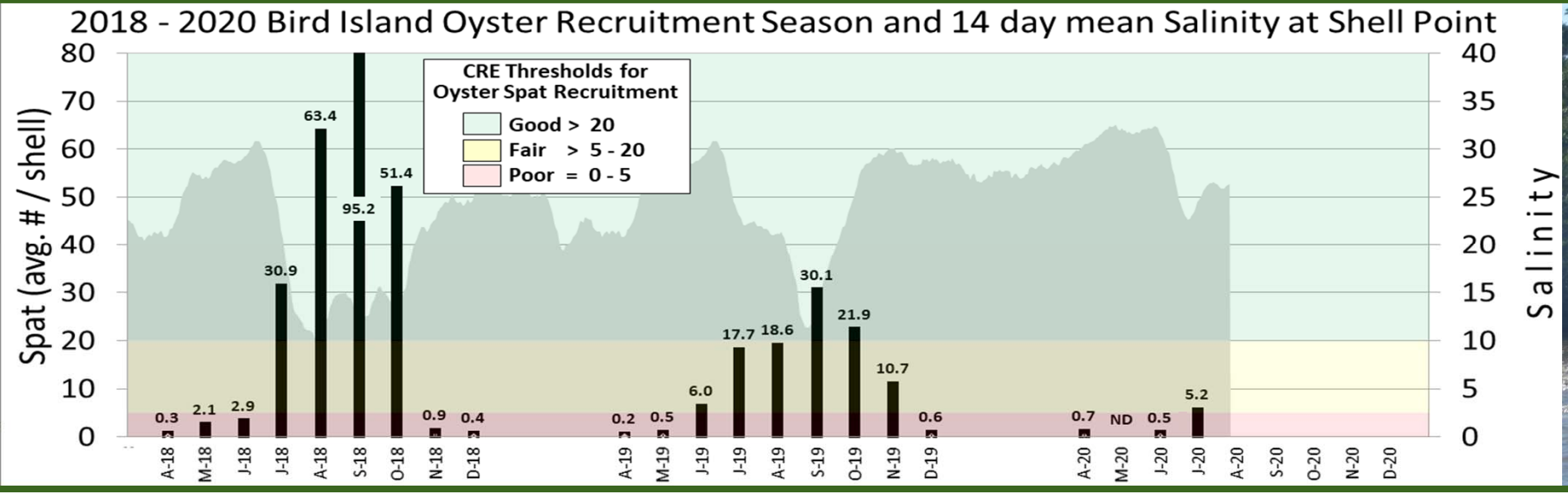
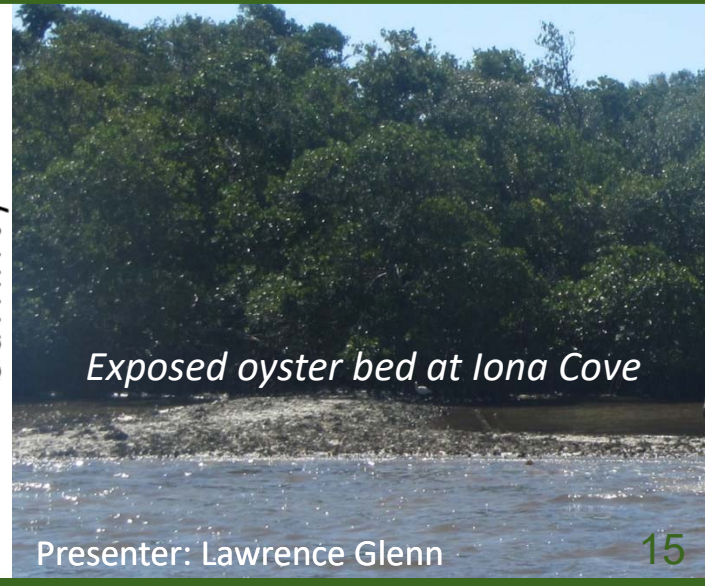
Caloosahatchee Estuary - Oyster Recruitment









Presenter: Lawrence Glenn

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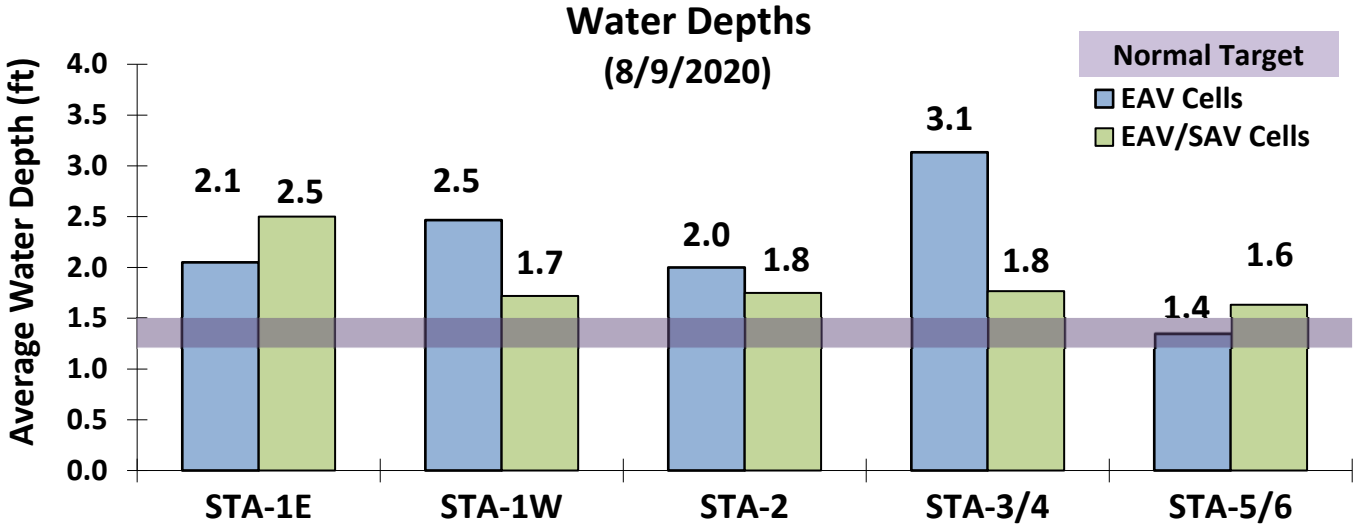
Everglades Stormwater Treatment Areas (STAs)

- STAs treated high inflow volumes from basin runoff in July
  - Total Inflows to STAs in WY2021 ~560,000 ac-ft
  - Lake Okeechobee releases to STAs in WY2021 ~11,000 ac-ft (2% of total)
- Extensive vegetation management activities underway to address stressed and highly stressed vegetation especially in EAV cells
- All treatment cells are at or above target depth

Water Year 2021
5/1/2020 to 8/9/2020

	STA-1E	STA-1W	STA-2	STA-3/4	STA-5/6
Inflow TP Concentration (ppb)	116	235	119	50	231
Outflow TP Concentration (ppb)	17	32	18	11	91
365-day Phosphorus Loading Rate ($g/m^2/yr$)	1.7	1.5	0.5	0.4	0.5
Inflow Volume (ac-ft)	84,300	87,000	133,700	224,400	31,200

Includes preliminary data; all concentrations are flow-weighted means



Includes preliminary data; Emergent Aquatic Vegetation (EAV); Submerged Aquatic Vegetation (SAV)

Everglades Stormwater Treatment Areas

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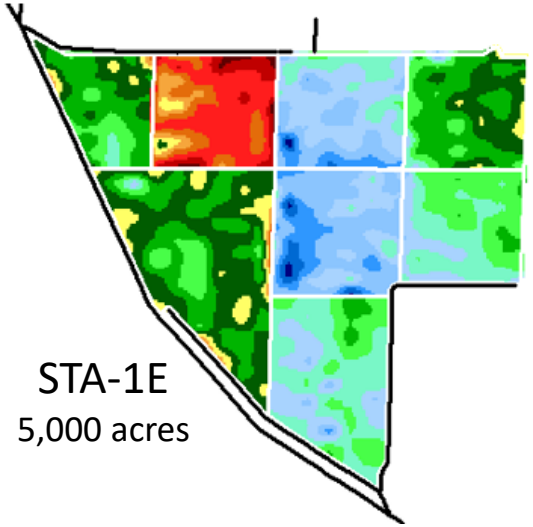
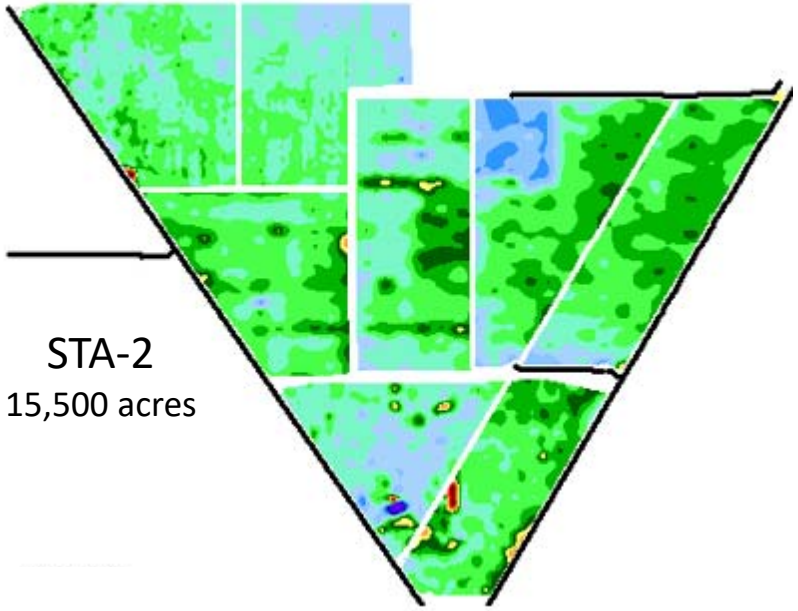
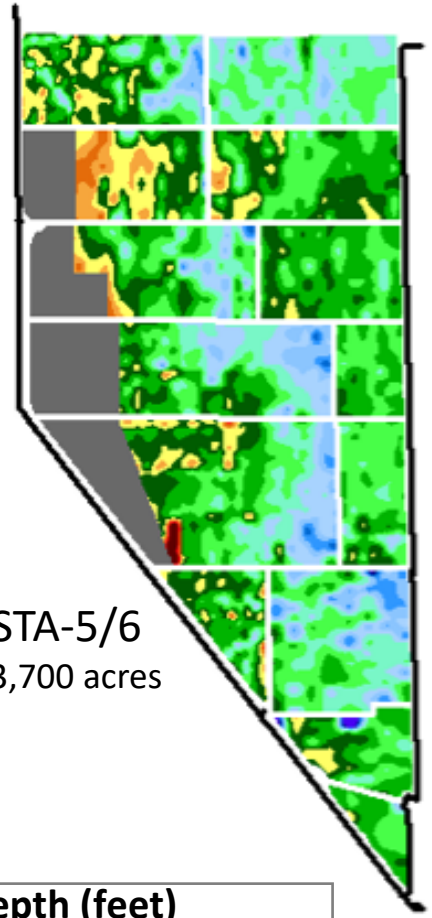
Daily Average Water Depths on 8/9/2020



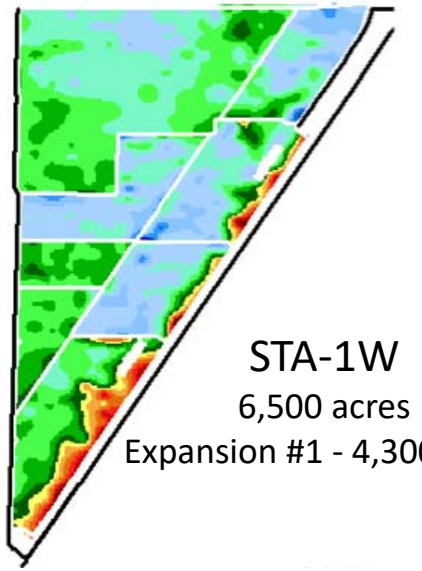
STA-1E
5,000 acres



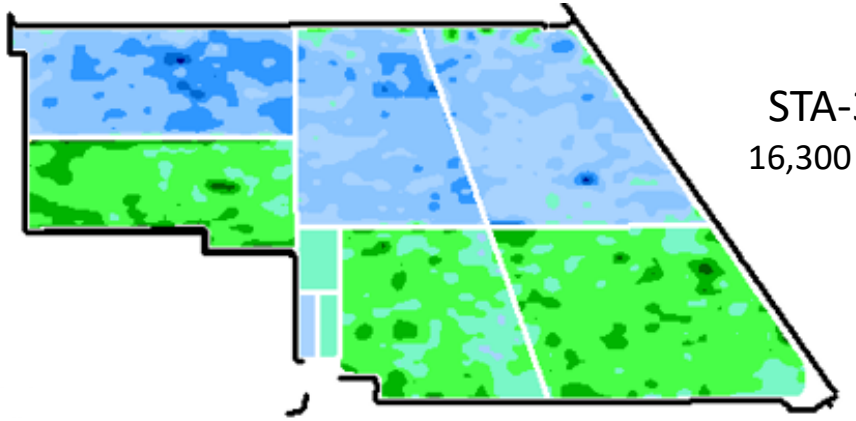
STA-2
15,500 acres



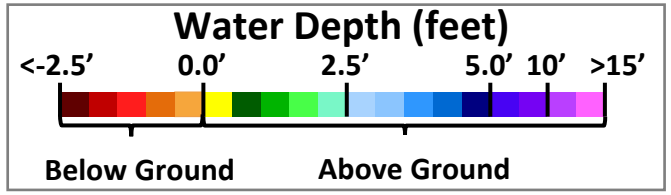
STA-5/6
13,700 acres



STA-1W
6,500 acres
Expansion #1 - 4,300 acres



STA-3/4
16,300 acres



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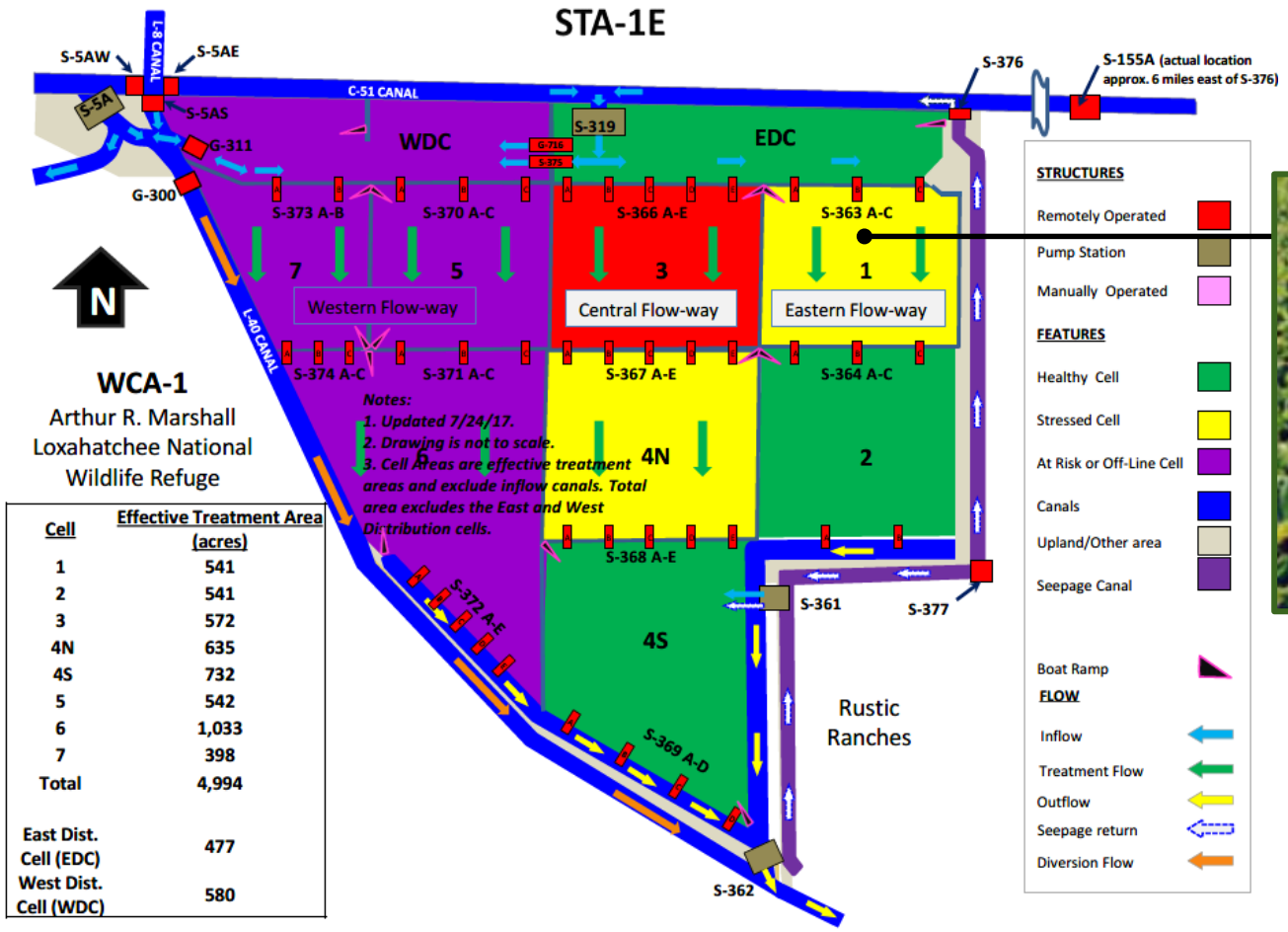
Stressed STA Vegetation



Cell	Effective Treatment Area (acres)
1	541
2	541
3	572
4N	635
4S	732
5	542
6	1,033
7	398
Total	4,994
East Dist. Cell (EDC)	477
West Dist. Cell (WDC)	580

STA-1E Cell 1

- Cattail coverage in 75% of cell; however, floating aquatic vegetation (FAV) is present in scattered patches throughout cell

Presenter: Lawrence Glenn

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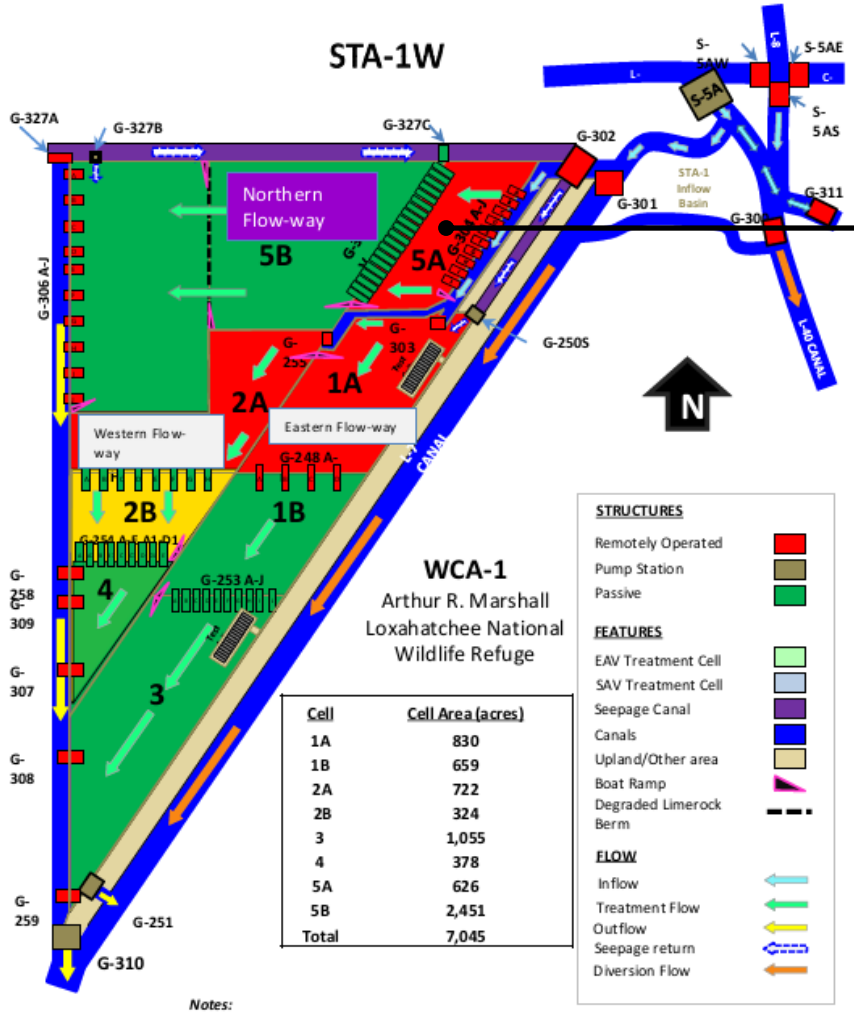
Highly Stressed STA Vegetation



Cell	Cell Area (acres)
1A	830
1B	659
2A	722
2B	324
3	1,055
4	378
5A	626
5B	2,451
Total	7,045

Notes:
1. Updated 11/2/15.
2. Drawing Not to Scale.
3. Cell Areas calculated using digitized levee centerlines and do not include inflow canals.
4. Cell Areas include utility easements and test cells located in Cells 1A, 1B, and 3.

STA-1W Cell 5A

- Large open water areas of cattail die-off and floating aquatic vegetation (water lettuce)

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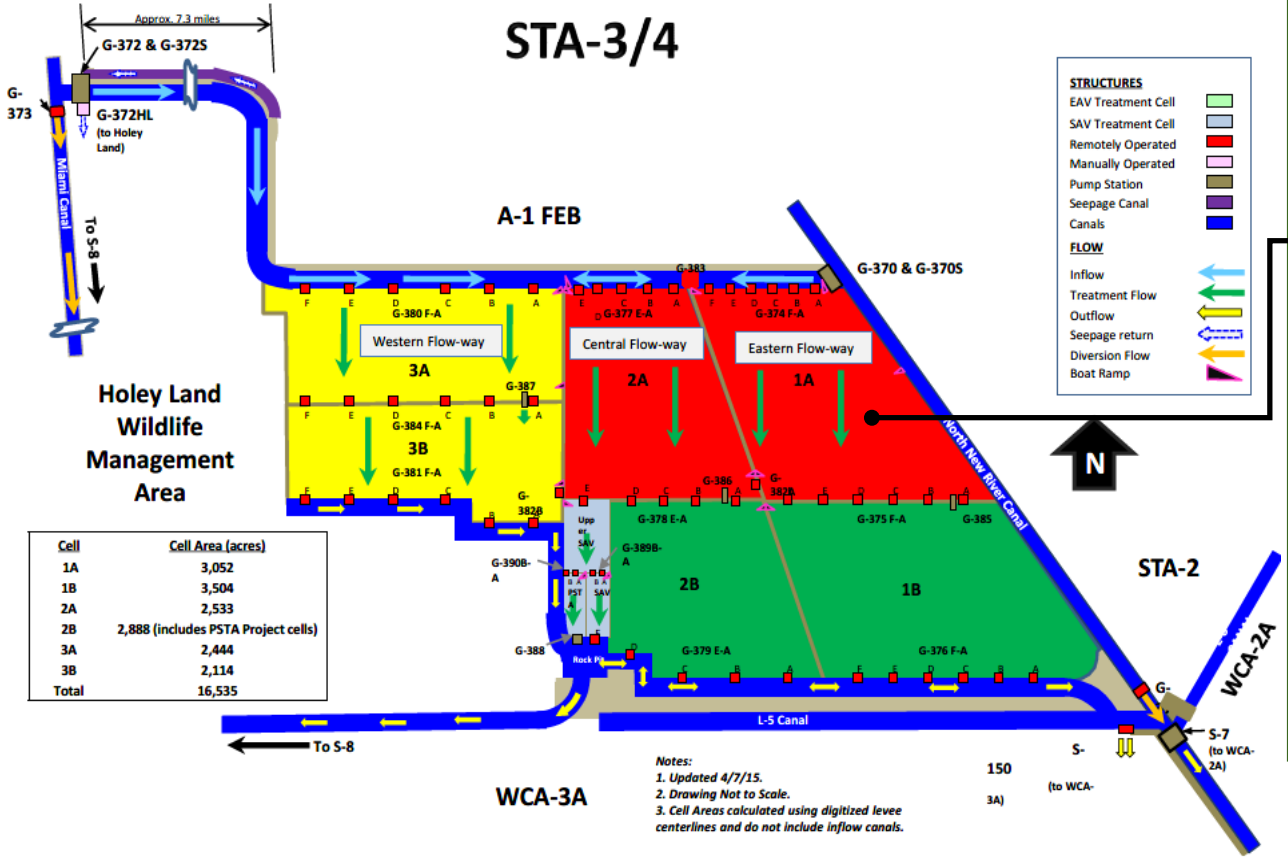
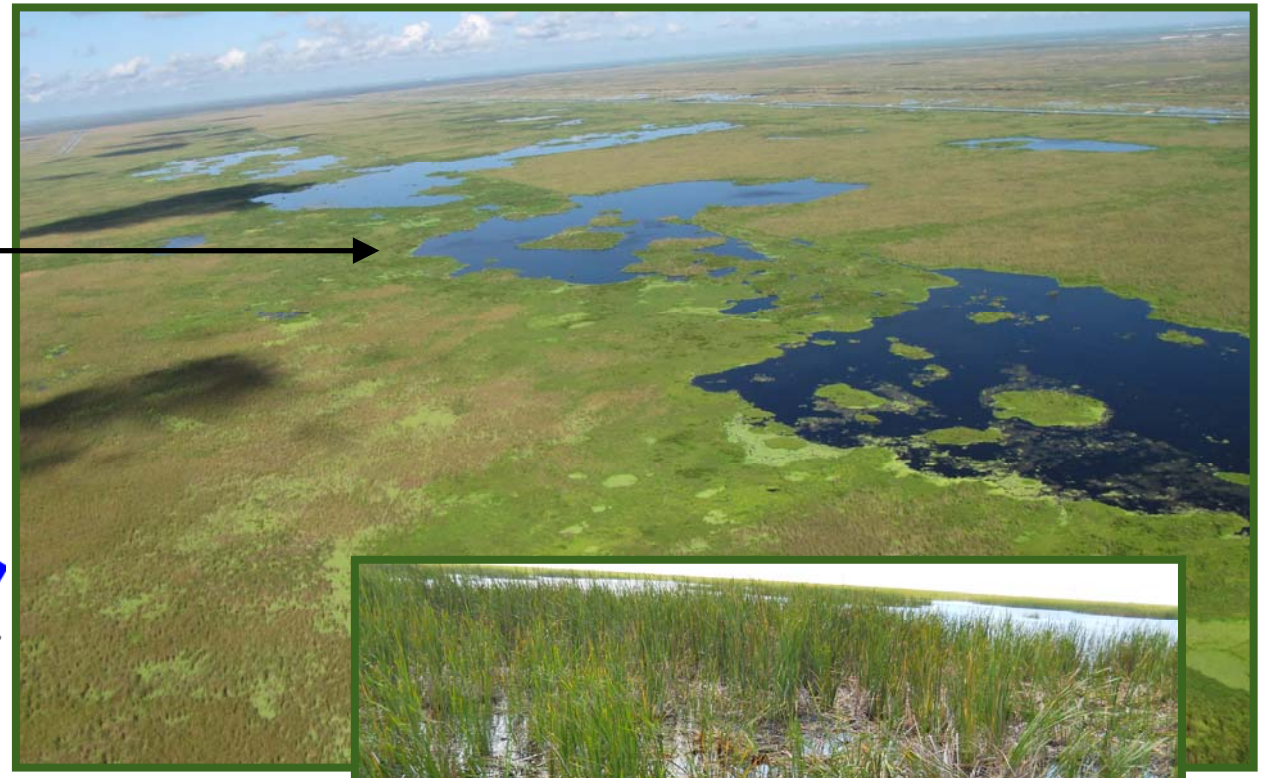
Highly Stressed STA Vegetation



Cell	Cell Area (acres)
1A	3,052
1B	3,504
2A	2,533
2B	2,888 (includes PSTA Project cells)
3A	2,444
3B	2,114
Total	16,535



STA-3/4 Cell 1A

- Large open water areas of cattail die-off
- Short-circuits extending far into the cell

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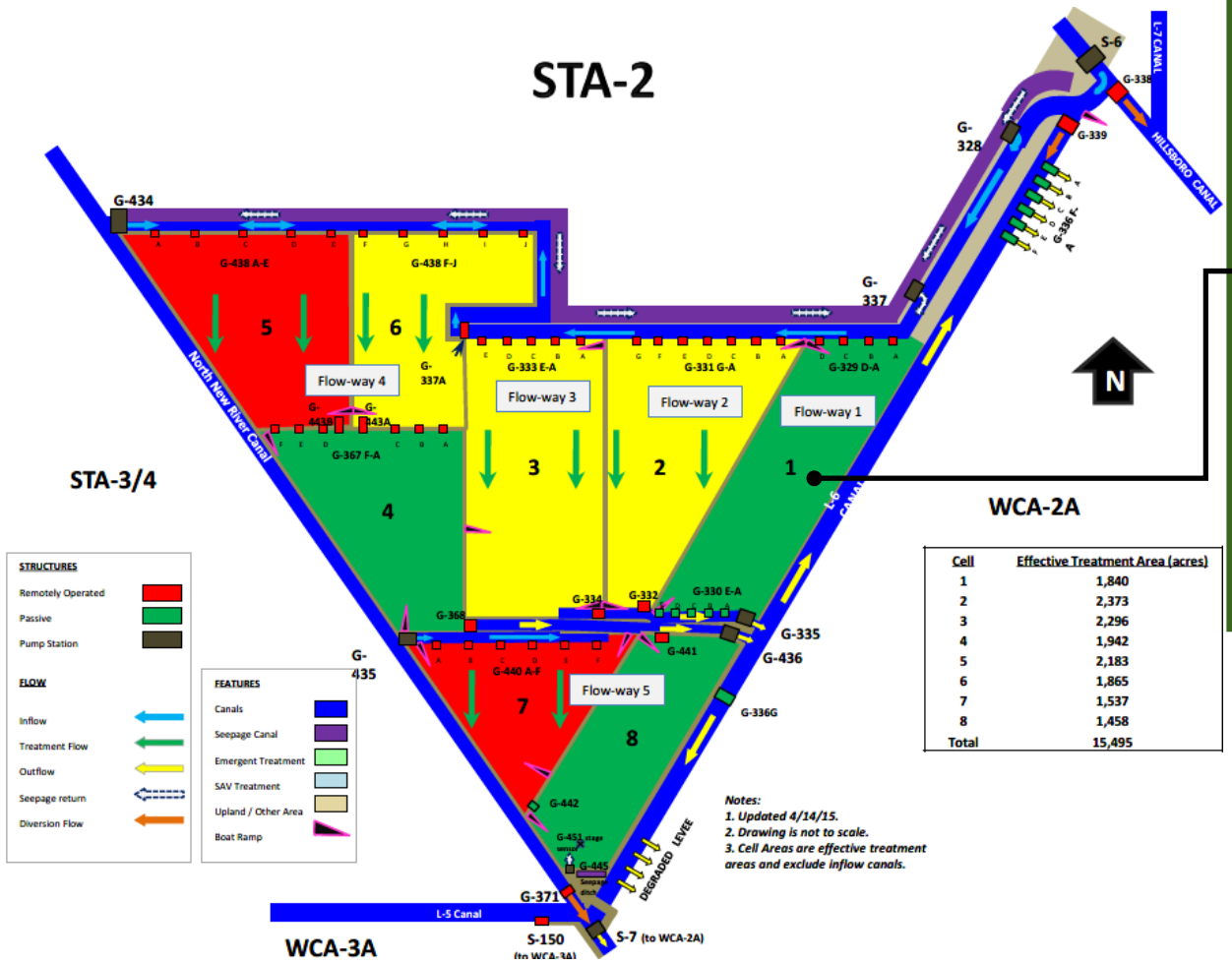
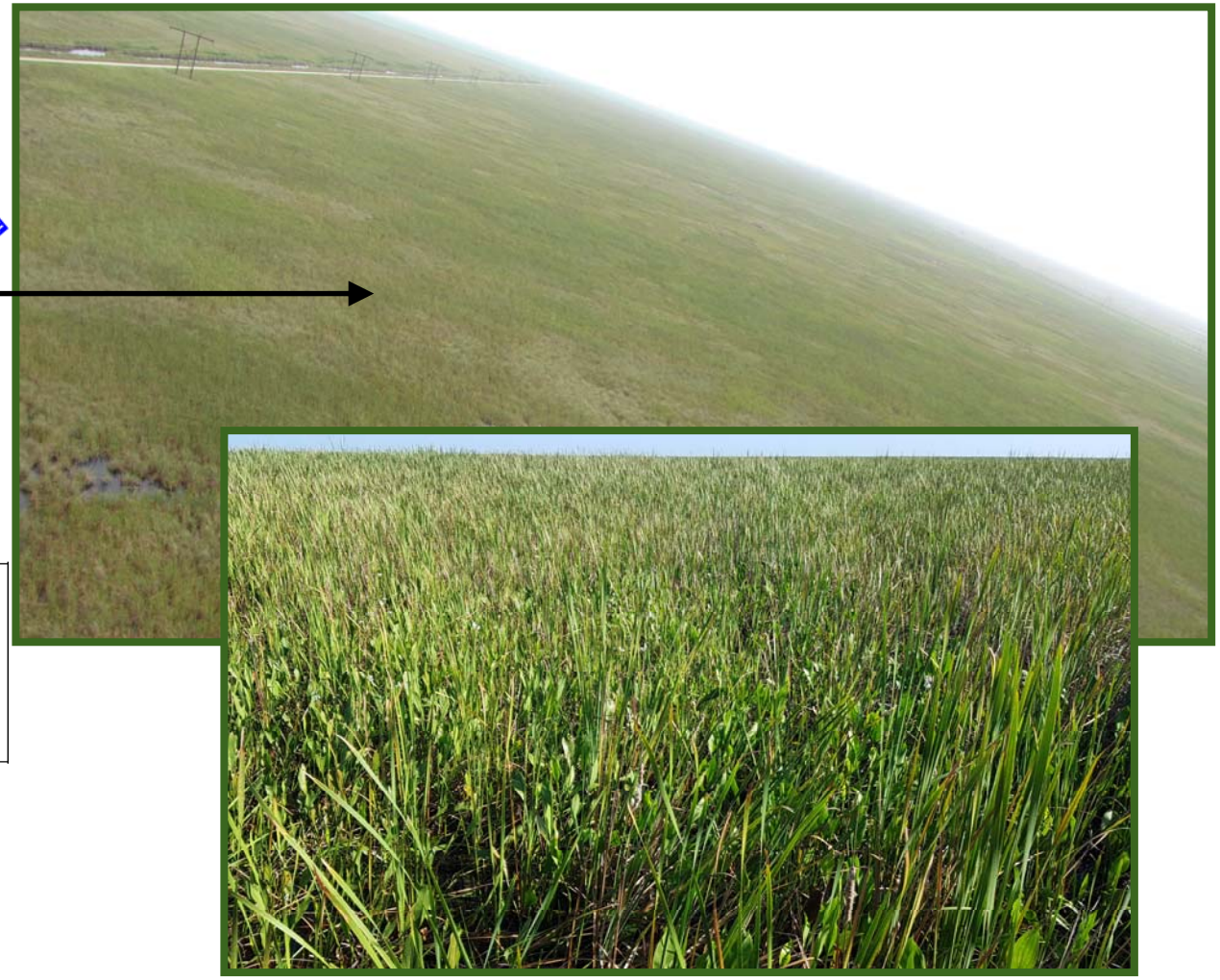
Healthy STA Vegetation



Cell	Effective Treatment Area (acres)
1	1,840
2	2,373
3	2,296
4	1,942
5	2,183
6	1,865
7	1,537
8	1,458
Total	15,495

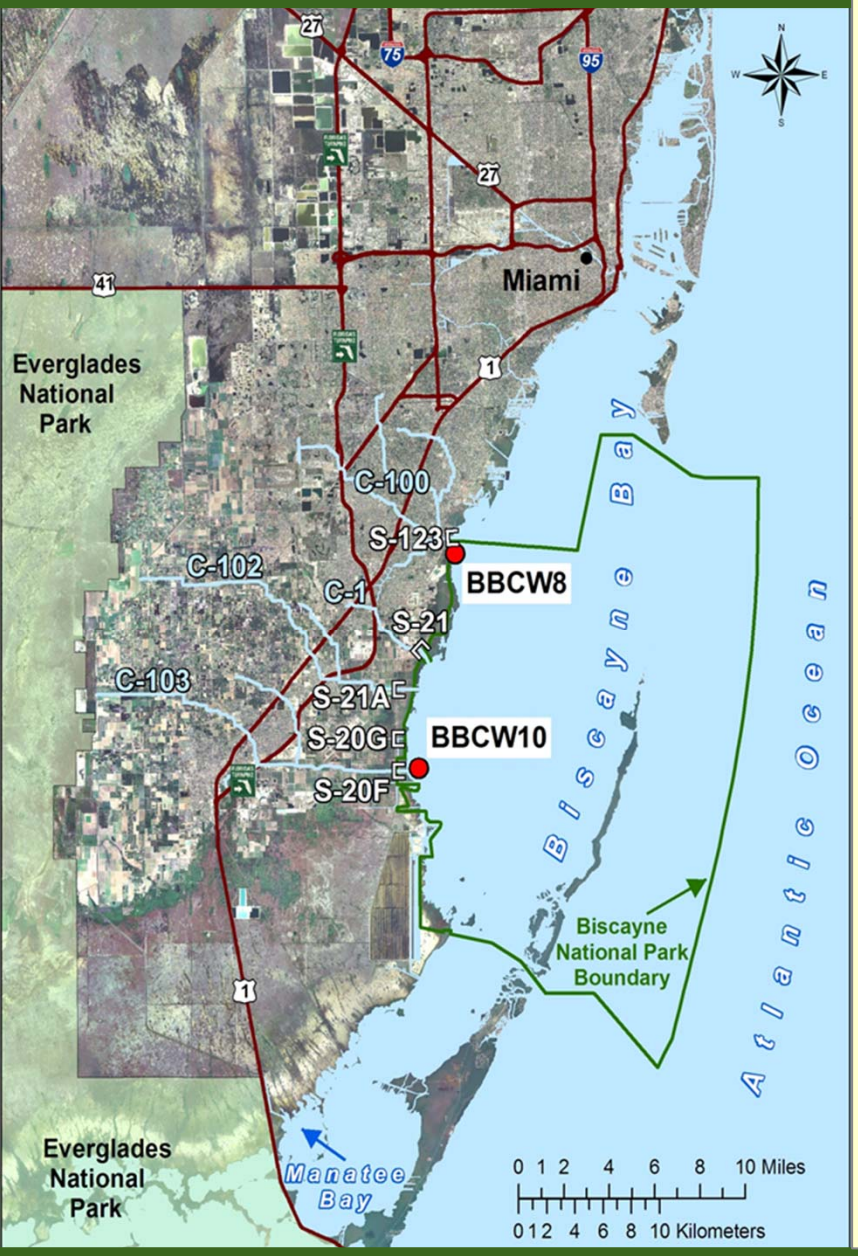
Notes:
1. Updated 4/14/15.
2. Drawing is not to scale.
3. Cell Areas are effective treatment areas and exclude inflow canals.

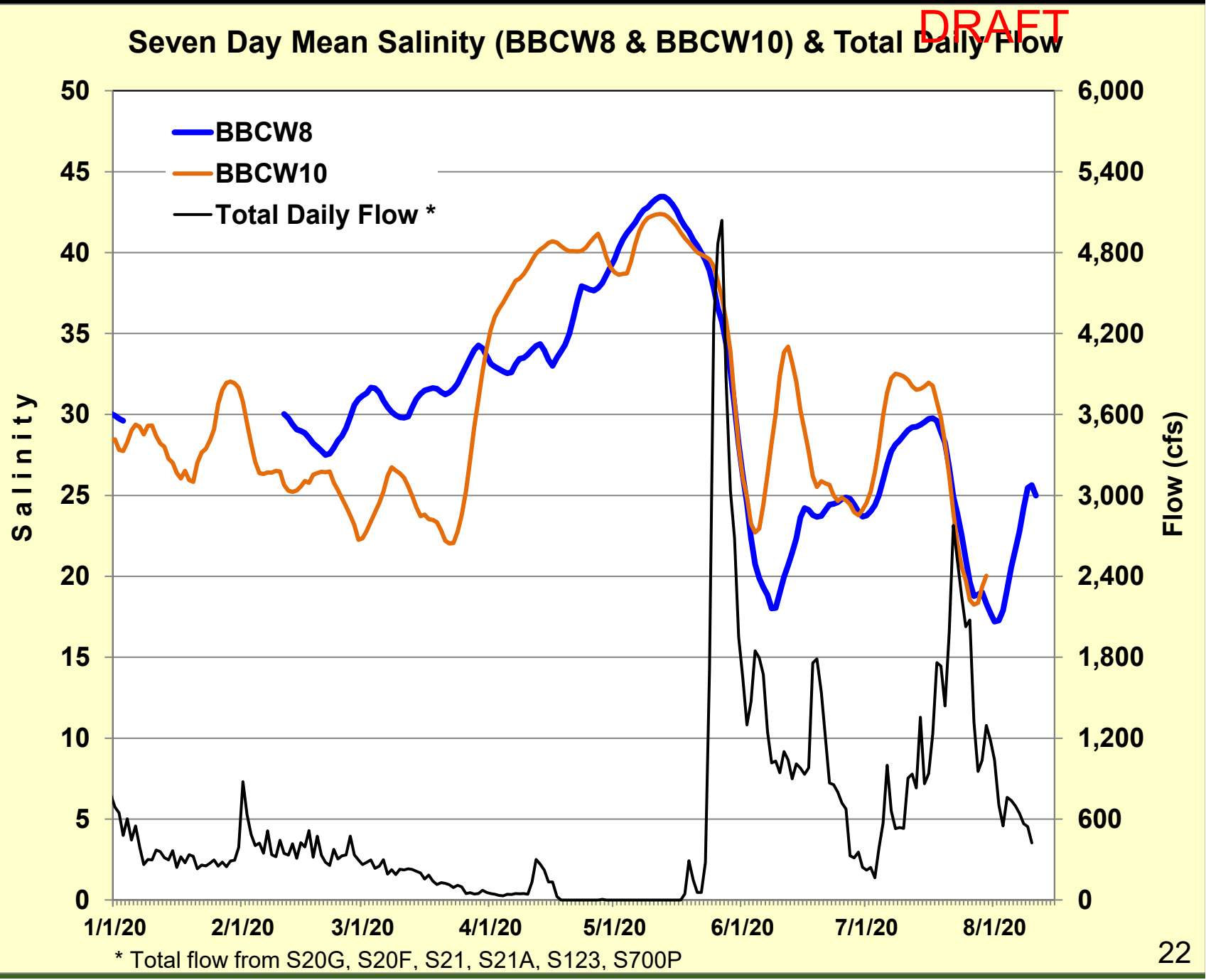


STA-2 Cell 1 – Healthy cattail

Presenter: Lawrence Glenn

Biscayne Bay





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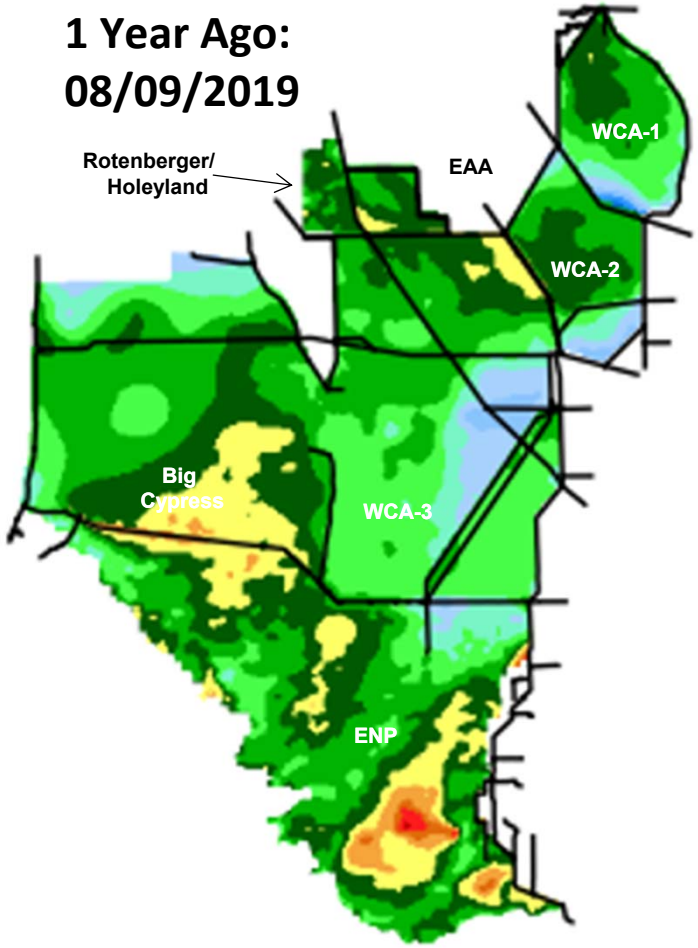
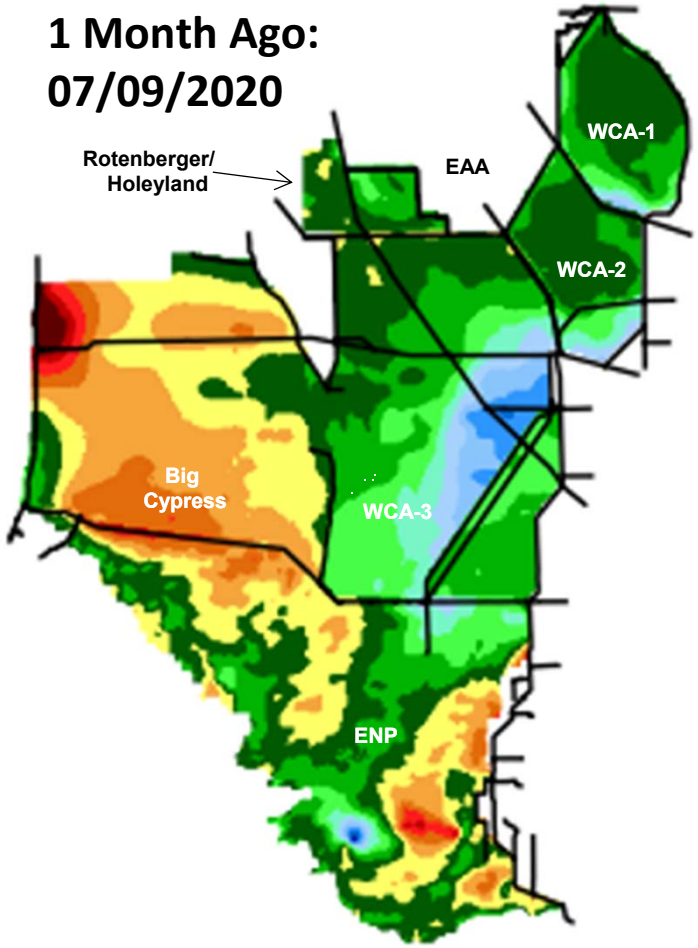
Everglades Water Depth Maps

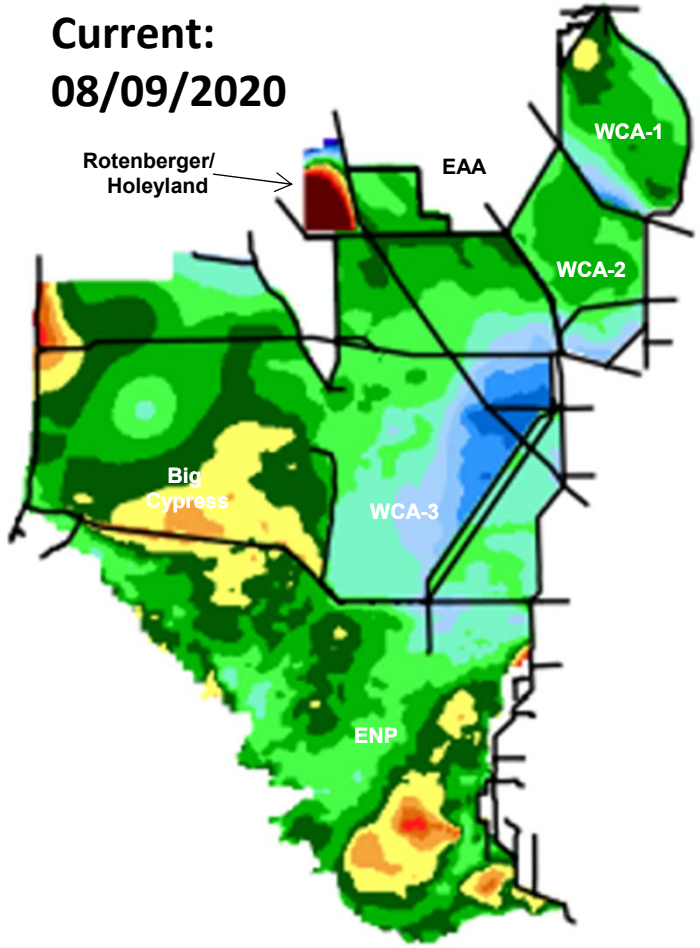
1 Year Ago: 08/09/2019

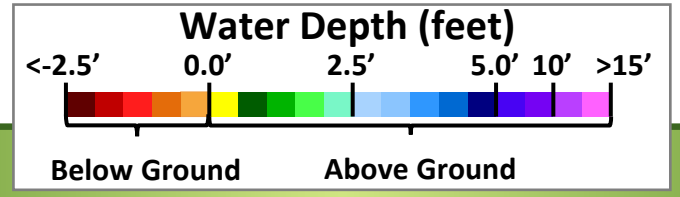


1 Month Ago: 07/09/2020



Current: 08/09/2020





Tree Island Inundation and Depth Relative to the Highest Elevation – Maps from July 26th and Data from August 10th (Work In Progress)

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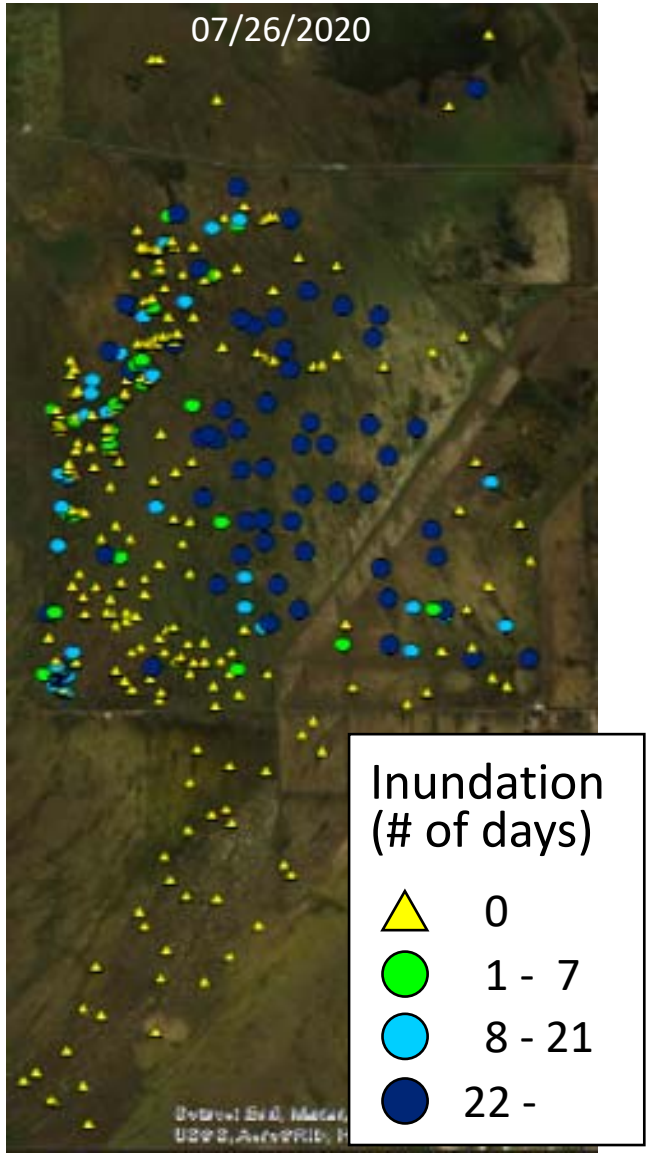

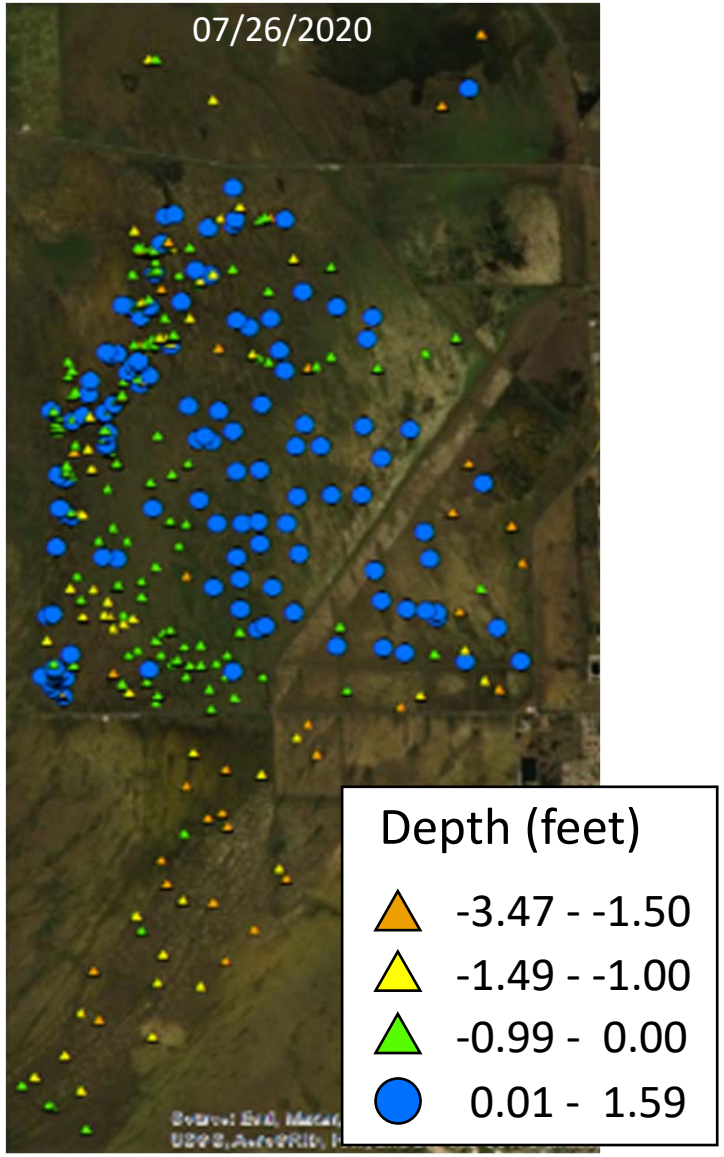

- 371 Tree Islands of known elevation within the Central Everglades and Everglades National Park's Shark Slough
- Current rough estimates using WDAT (8/10/20), 46% or 169 of the tree islands are currently inundated, up from 41% the week prior
- Initial islands inundated beginning 5/24/20, longest duration of continuous inundation is 73 days

Northeast Florida Bay MFL

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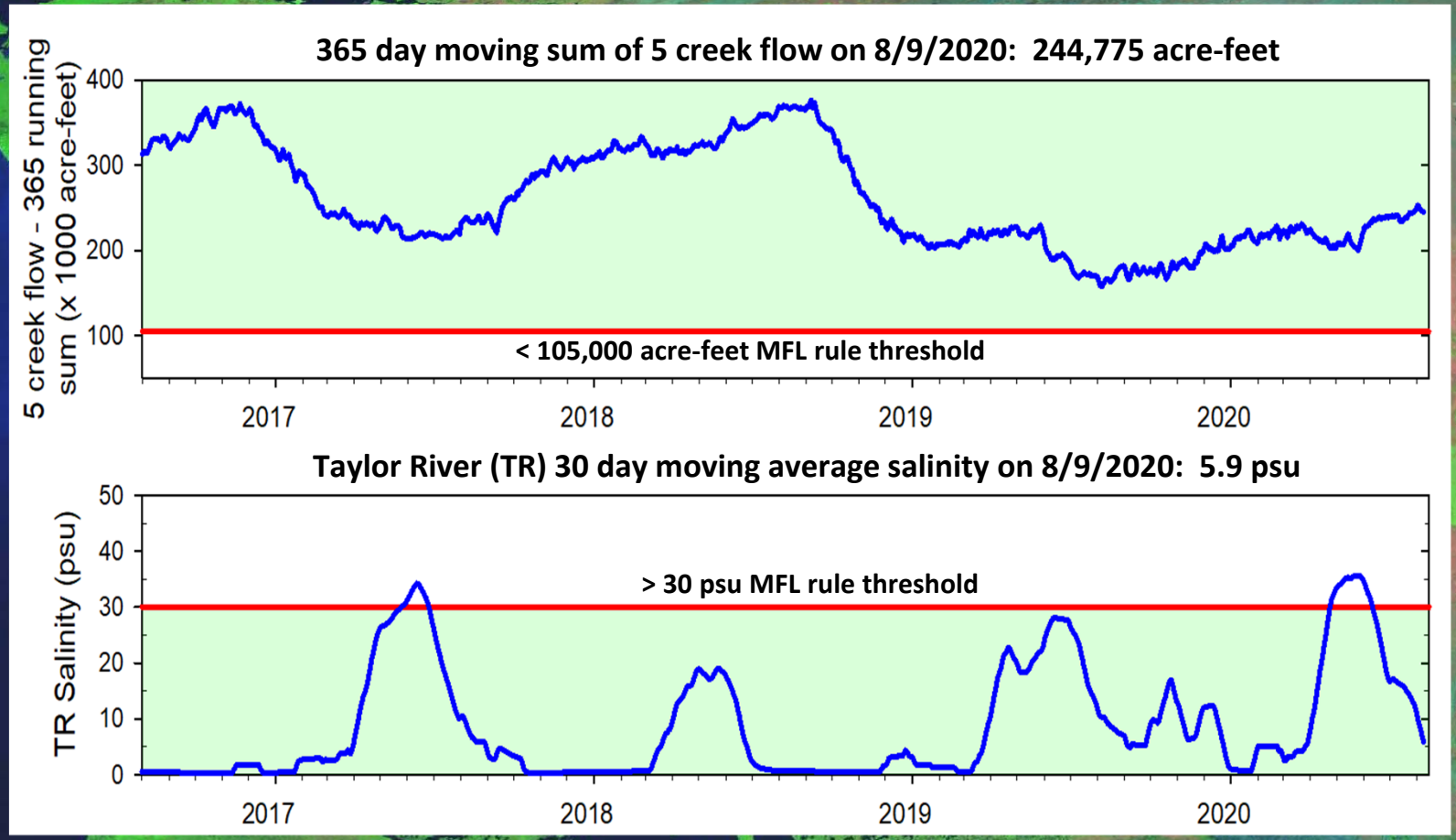

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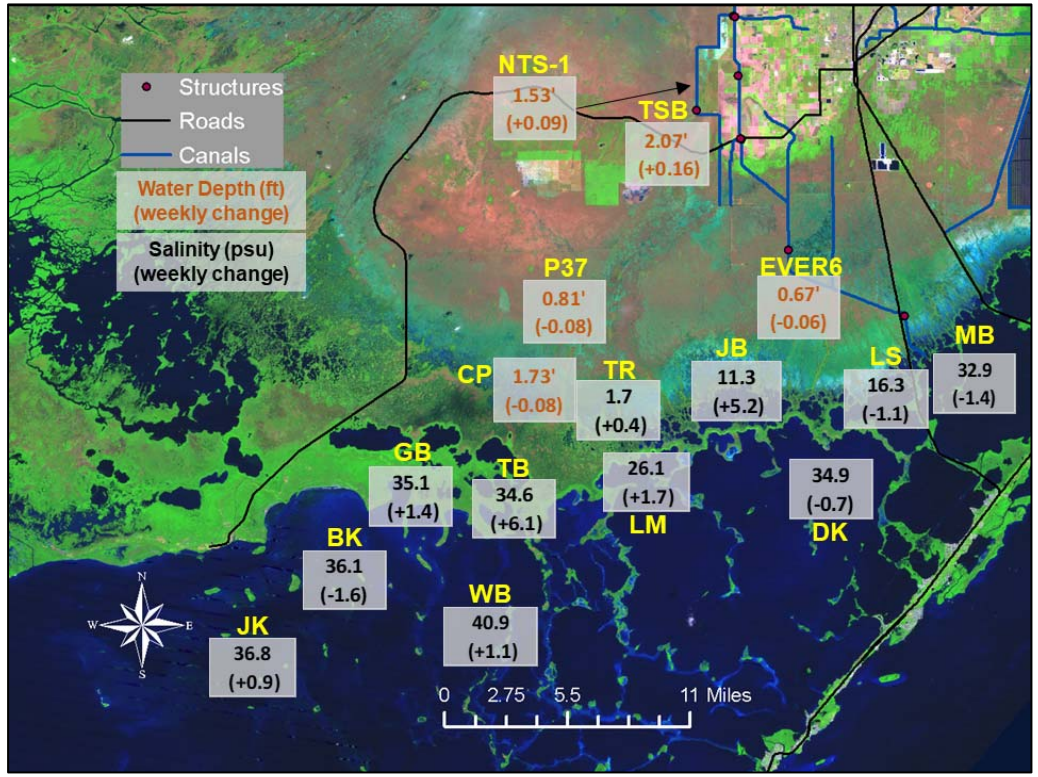
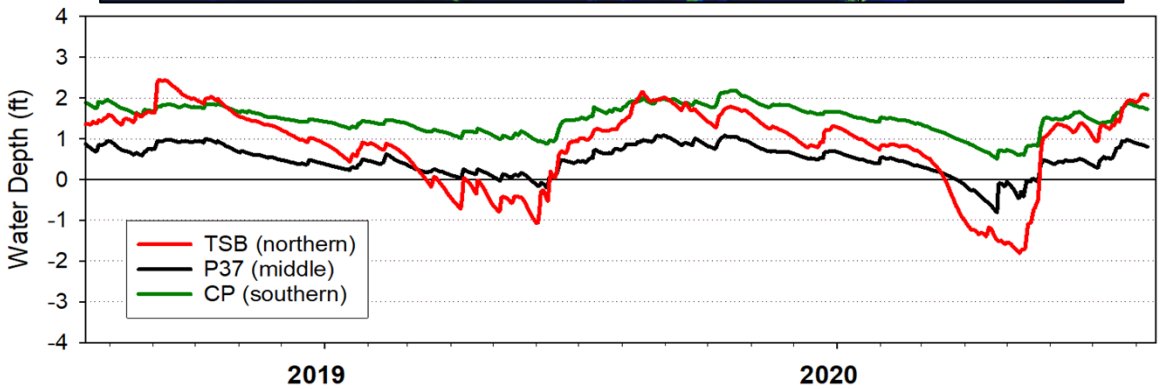
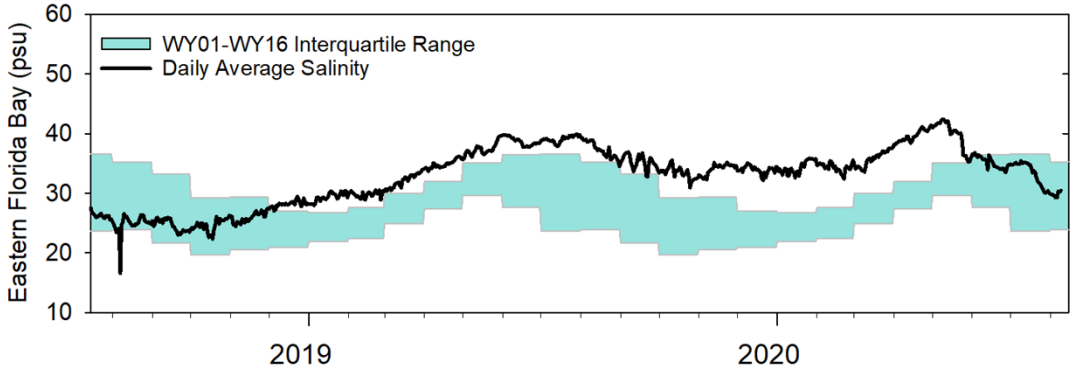
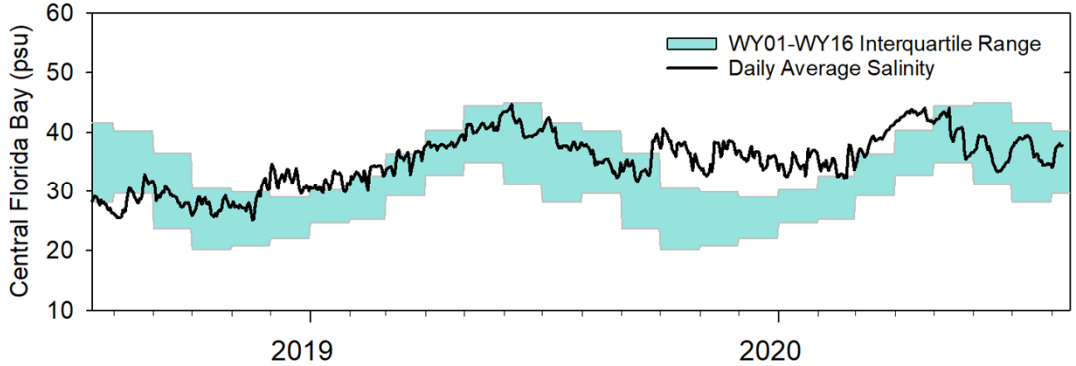
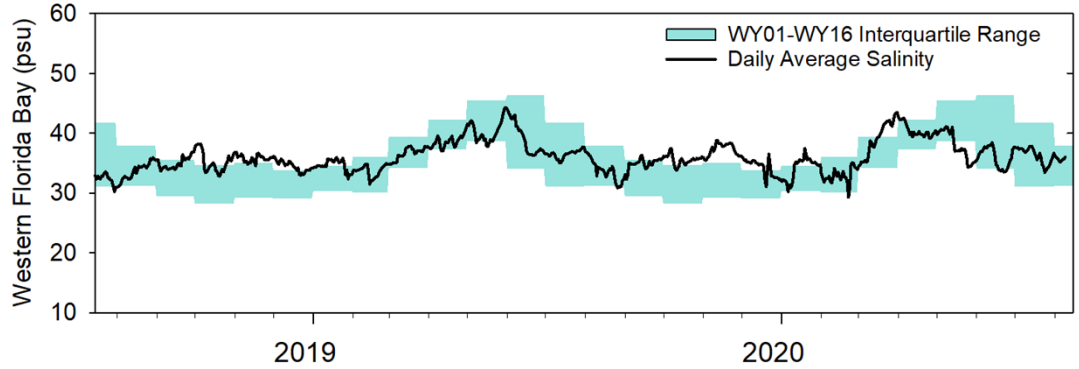
Taylor Slough Stages and Florida Bay Salinity











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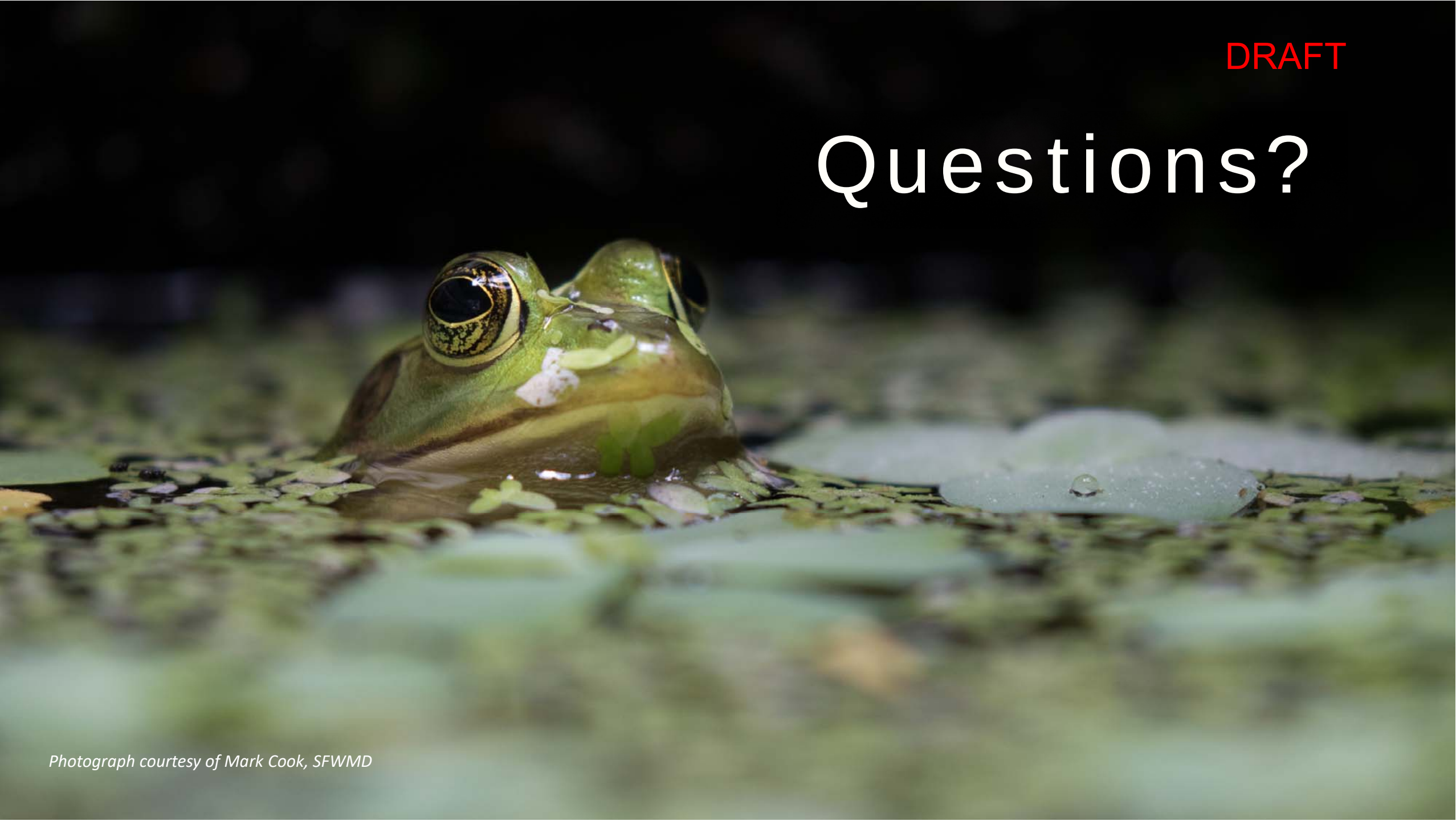
Questions?



Photograph courtesy of Mark Cook, SFWMD