

Ecological Conditions Update

Governing Board Meeting
September 9, 2021

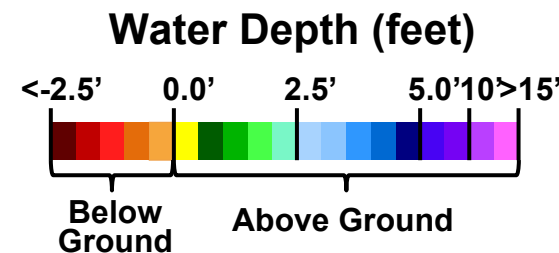
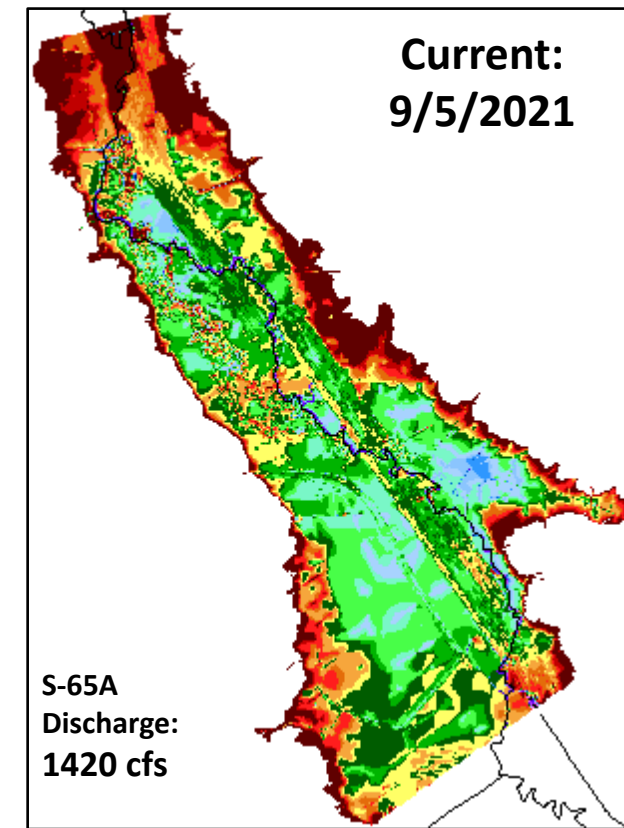
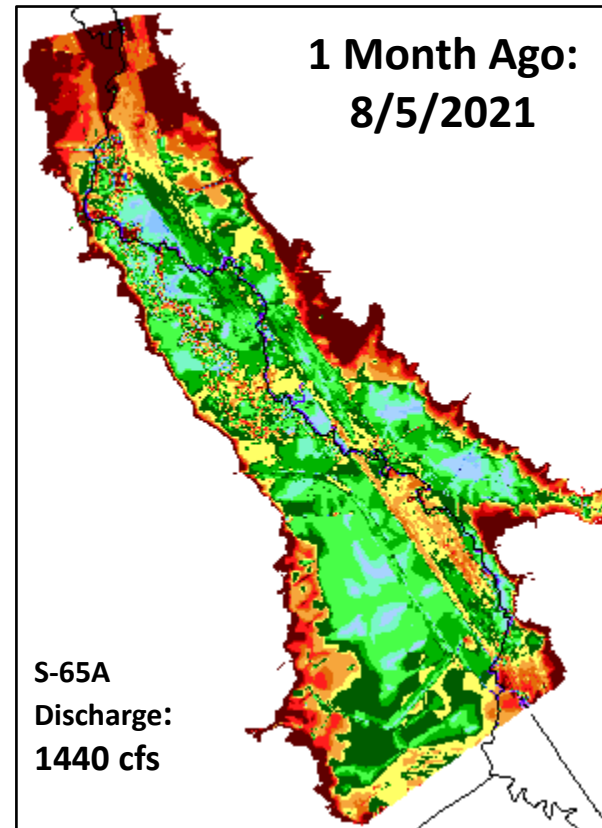
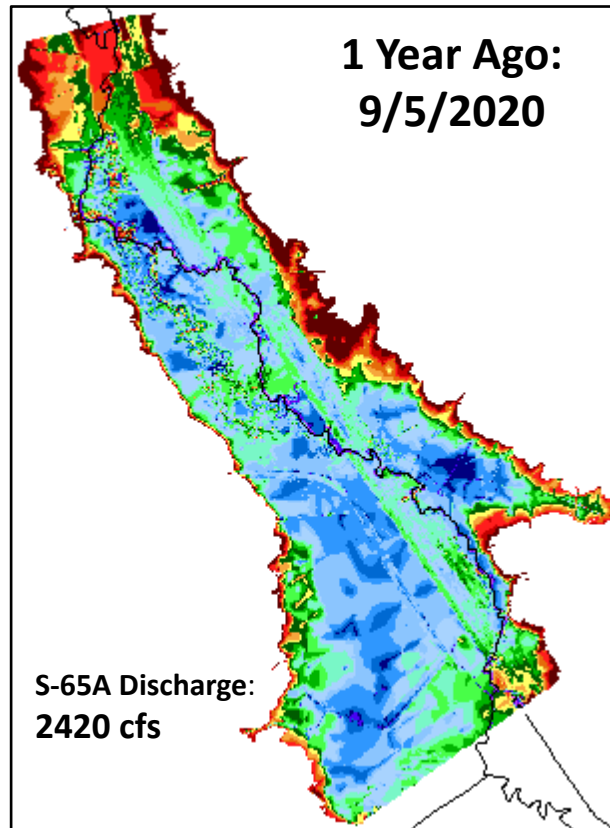


Lawrence Glenn

Division Director
Water Resources

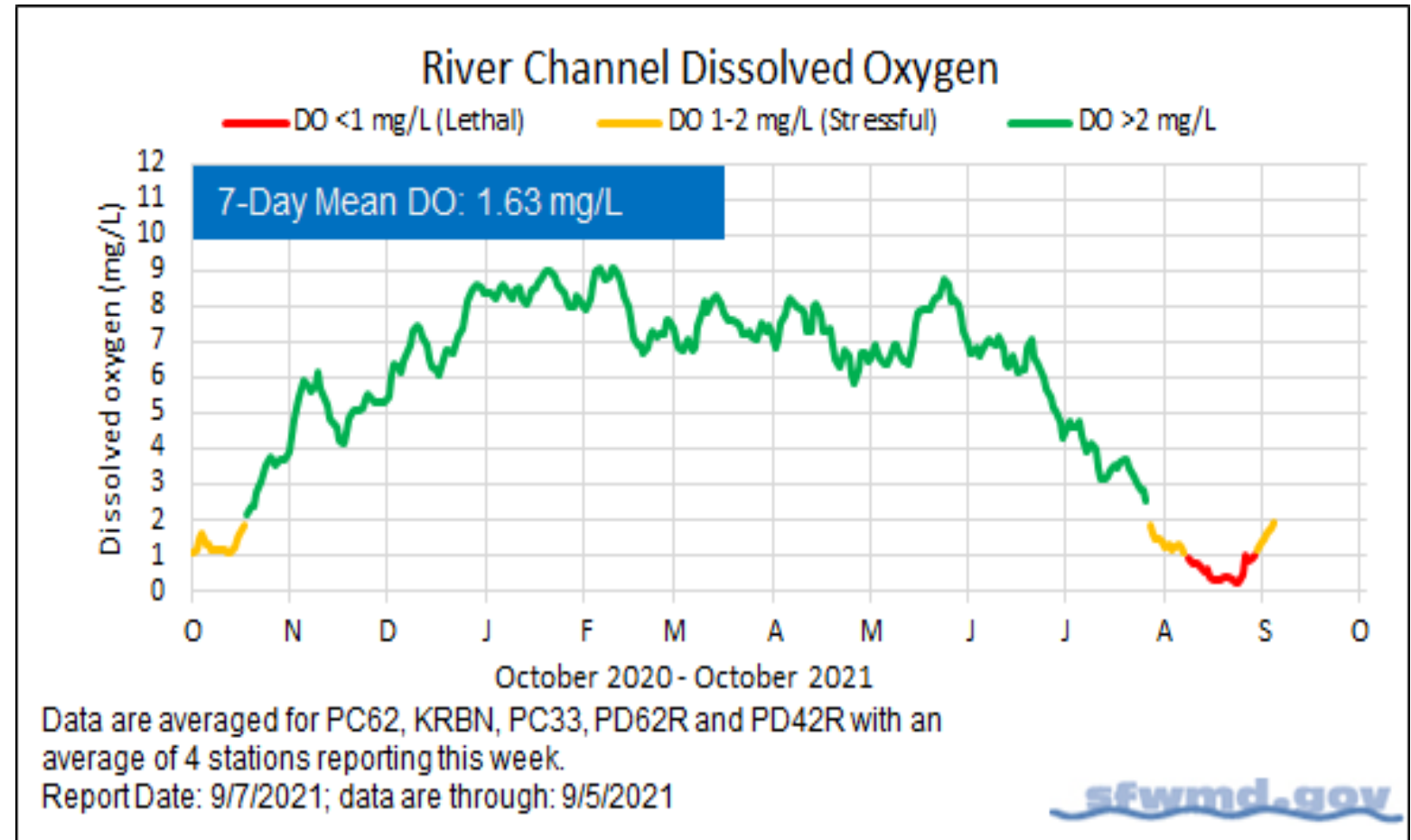
*Kissimmee River Restoration Phase II,
Photograph courtesy of Brent Anderson, SFWMD*

Kissimmee River Floodplain Water Depth Maps



Dissolved Oxygen Decline in the Kissimmee River

- Dissolved oxygen (DO) is rising following the discharge reduction at S65A to 1400 cfs in late August and is out of the lethal zone for native fish
- DO sags and crashes tend to occur in the Kissimmee River in wet season as water temperature and water depth increase



Lake Okeechobee Water Depth Maps

1 Year Ago:
09/05/2020

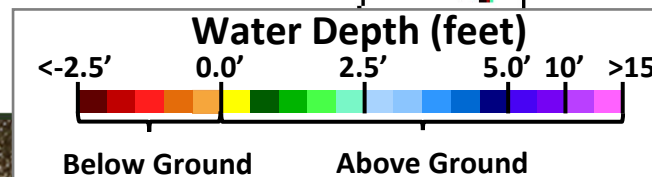
1 Month Ago:
08/06/2021

Current:
09/05/2021

(14.42 ft NGVD29)

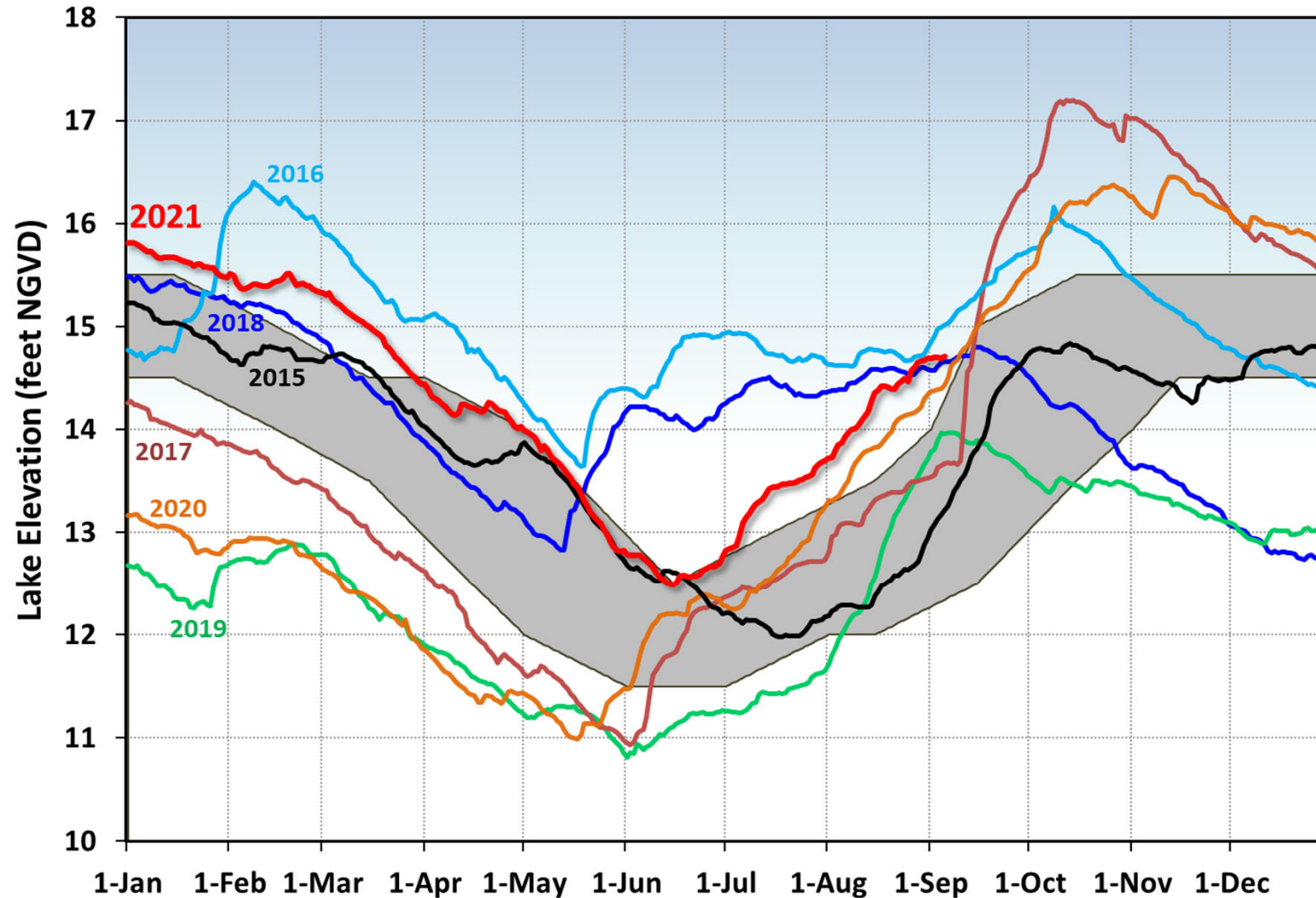
(13.92 ft NGVD29)

(14.71 ft NGVD29)

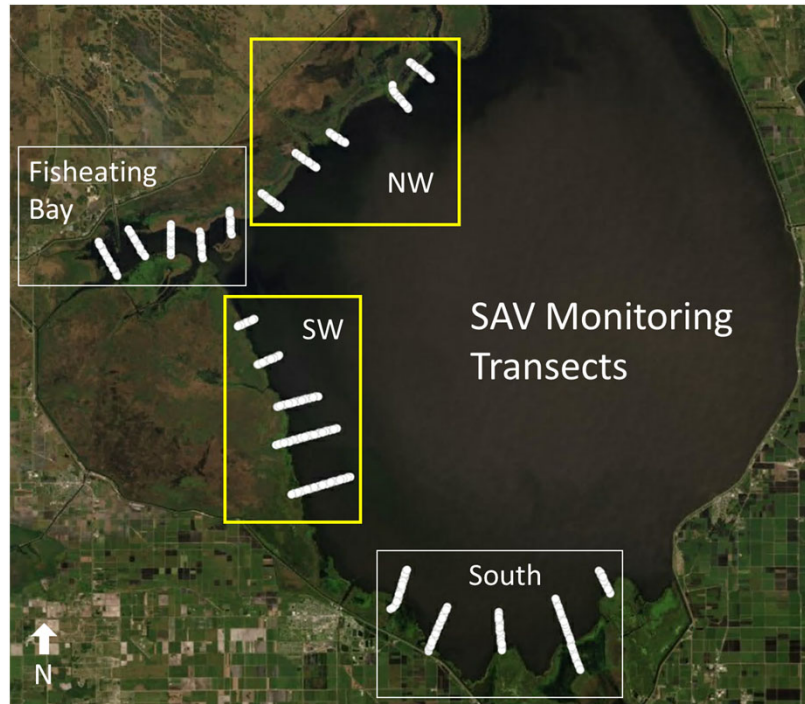


Lake Okeechobee Stages and Ecological Envelope

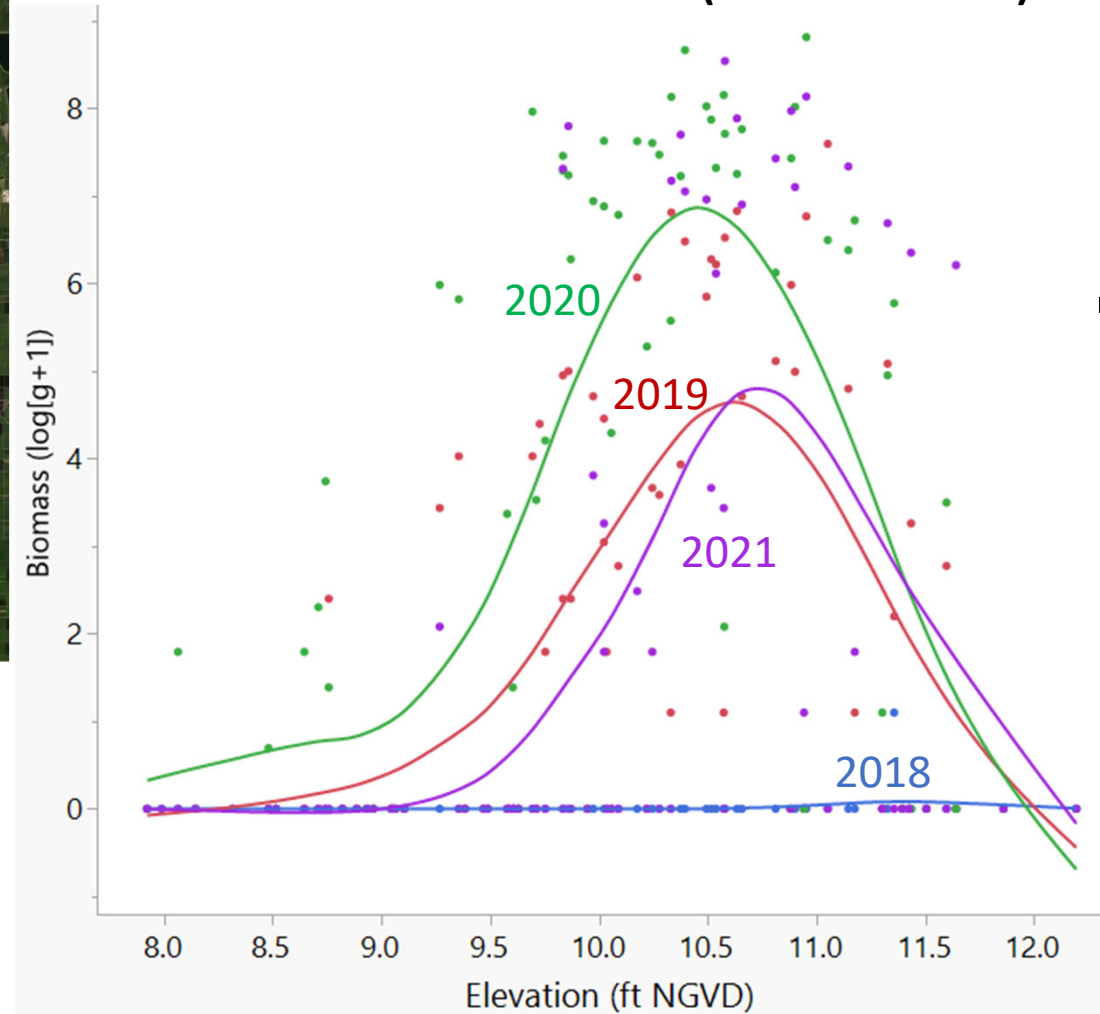
Lake Okeechobee Stage vs Updated Ecological Envelope



Submerged Aquatic Vegetation

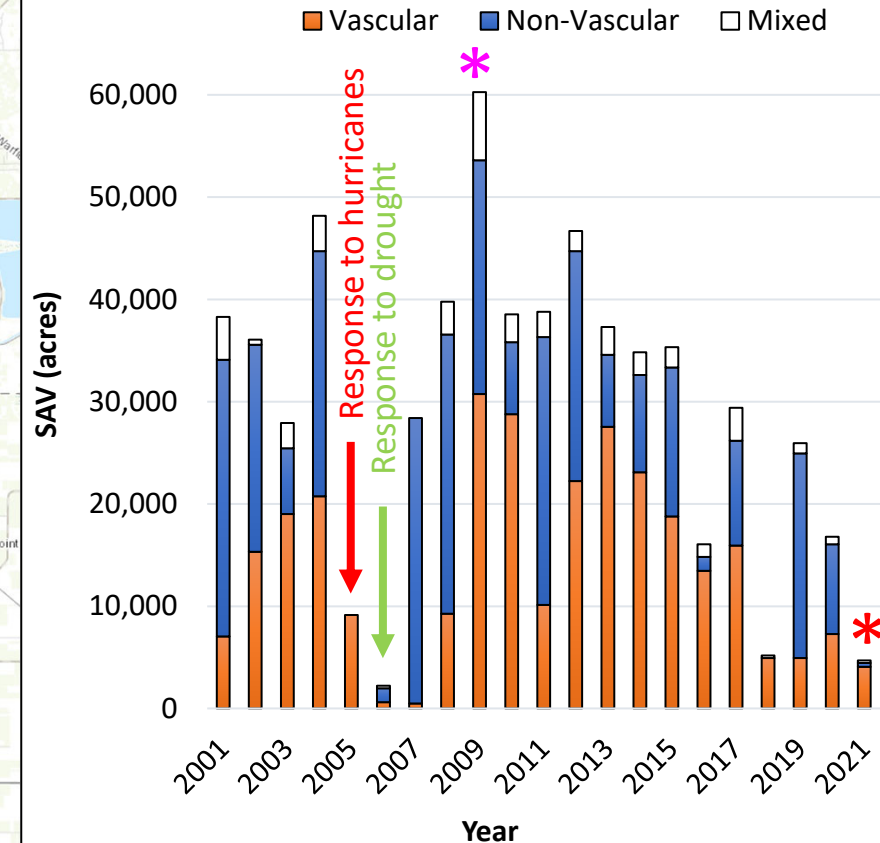
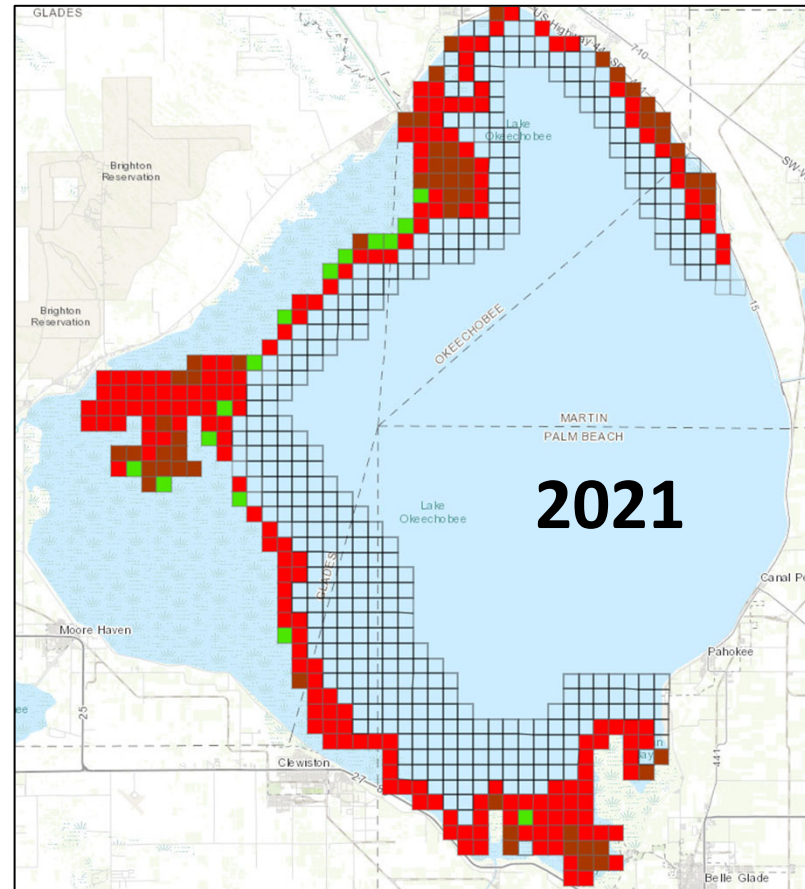
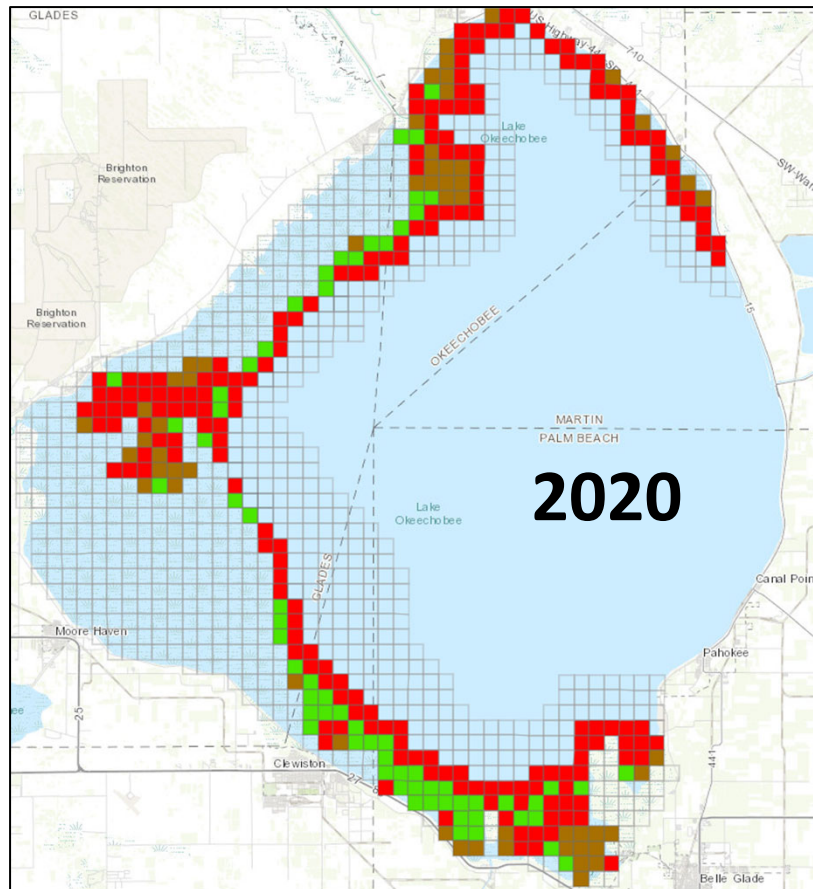


SAV Fall Biomass 2018-2021 (NW & SW Sites)



- After 2 years of recovery, SAV biomass is declining
- Robust, tall SAV survived but is more patchy
- Total biomass closer to 2019 levels but coverage is reduced
- Losses at all elevations but primarily deeper areas

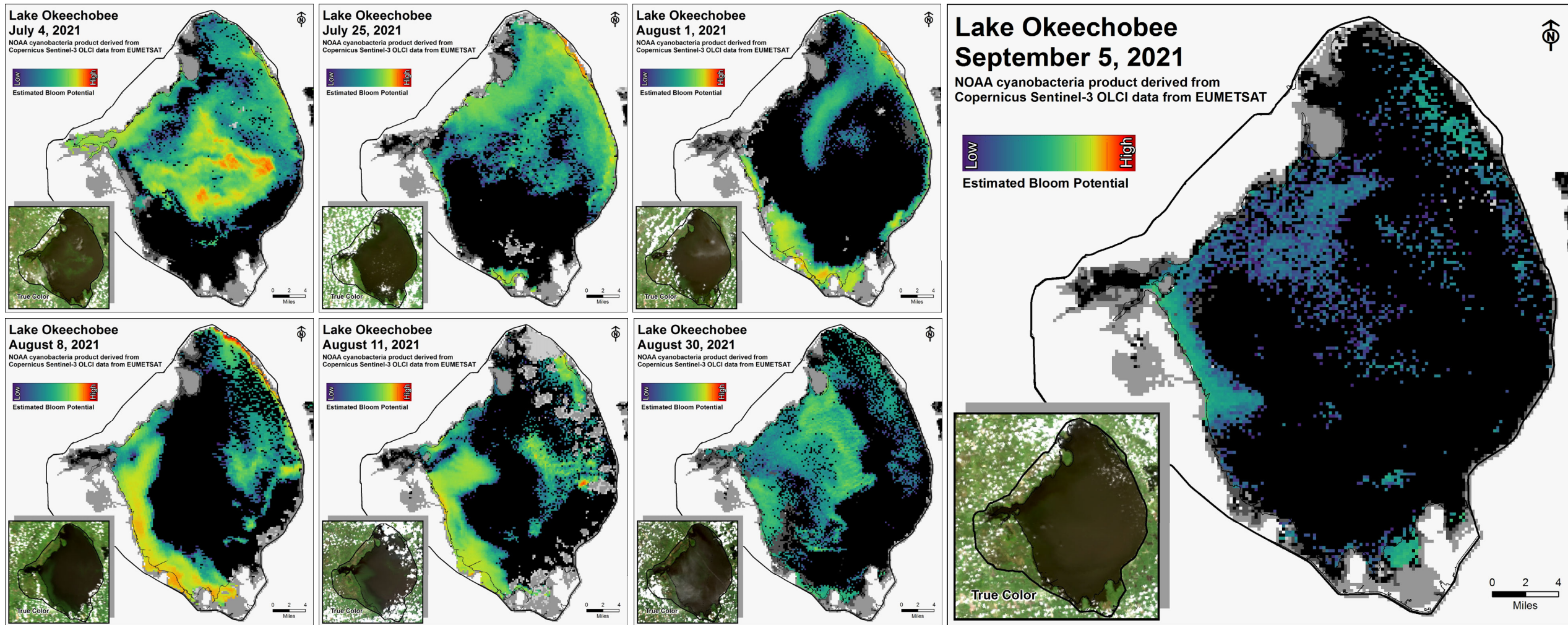
Okeechobee Lake-wide SAV Coverage



- Preliminary estimate for 2021 shows 75% (12k ac) decline in total SAV areal coverage
- Up to 50% decline in vascular SAV, to near or below 2018 levels (approx. 4-5k ac)
- Robust pockets of vascular SAV exist but are shrinking in spatial extent (laterally and up slope)

Lake Okeechobee

Cyanobacteria Bloom Potential



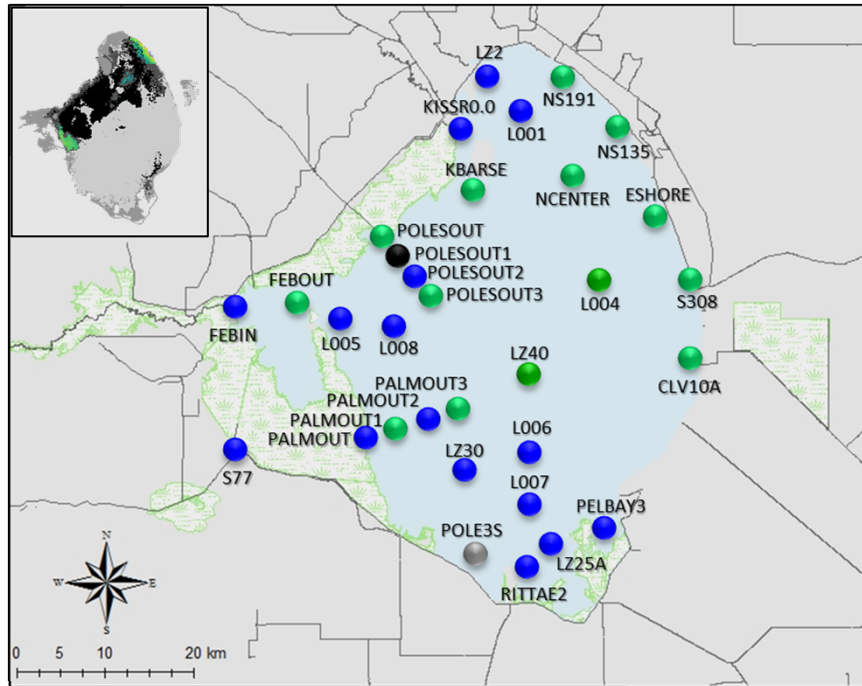
NOAA cyanobacteria product derived from Copernicus Sentinel-3 OLCI data from EUMETSAT

Provisional Data

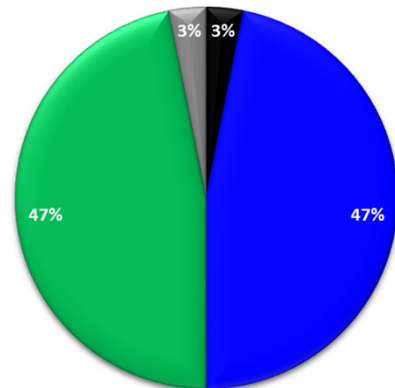
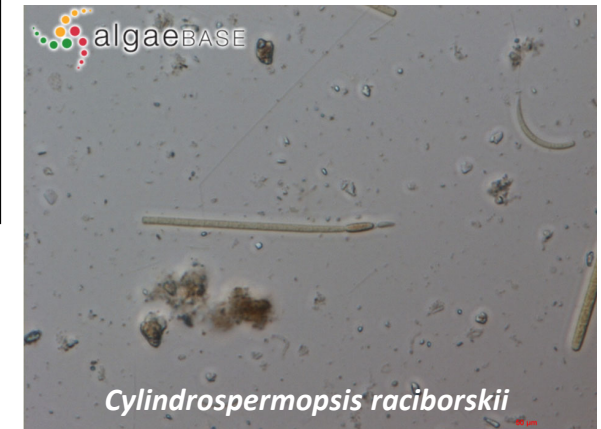
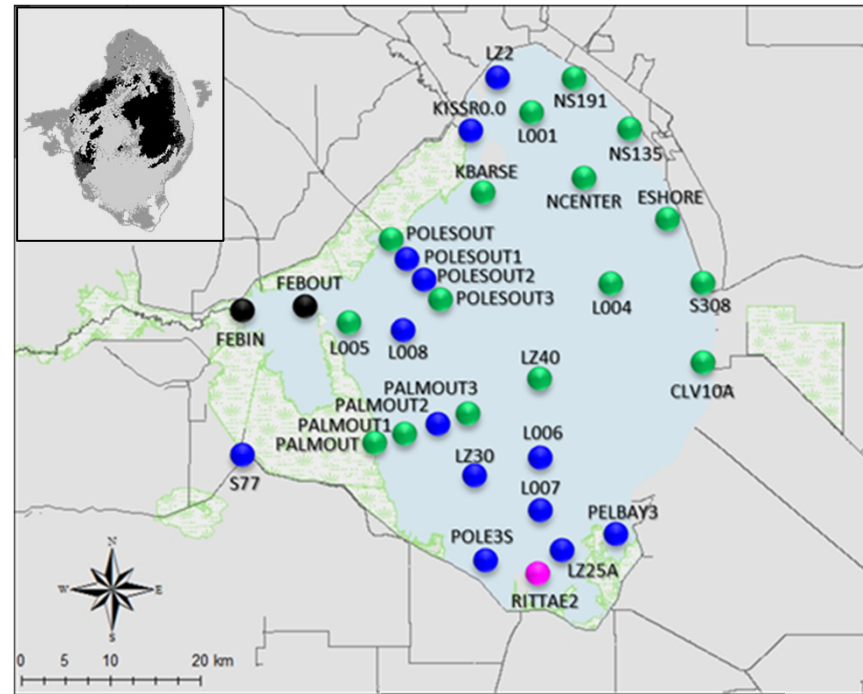
- 8

August 2021 Dominant Cyanobacteria Taxa

August 2 - 4, 2021

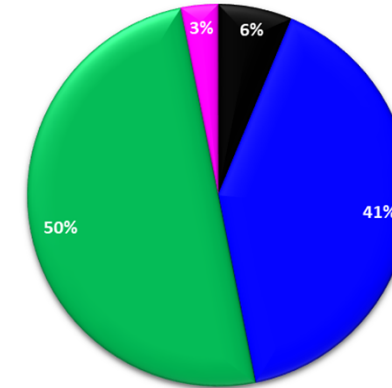


August 23 - 25, 2021



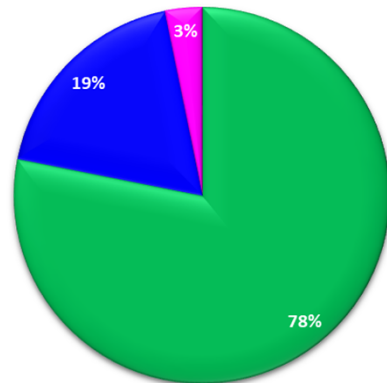
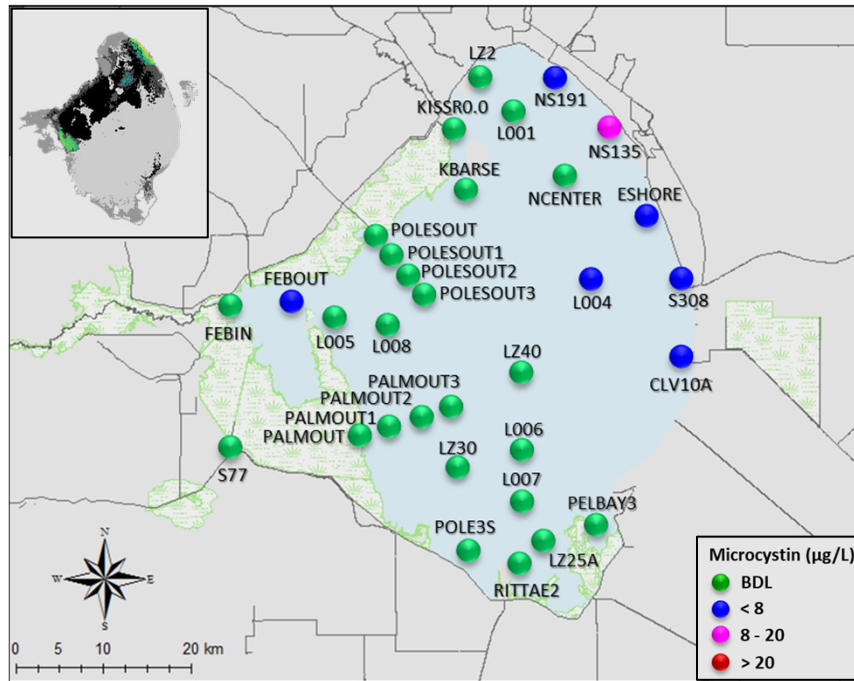
% of Samples in Different Taxa Category

- Not Sampled
- Mixed Communities
- *Microcystis aeruginosa*
- *Cylindrospermopsis raciborskii*
- *M. aeruginosa/C. raciborskii*
- *Dolichospermum circinale*



August 2021 Toxin Concentrations

August 2 - 4, 2021



Microcystin Concentration ($\mu\text{g/L}$)

● Below Detection Level (BDL)

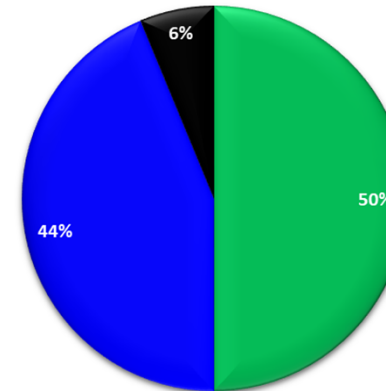
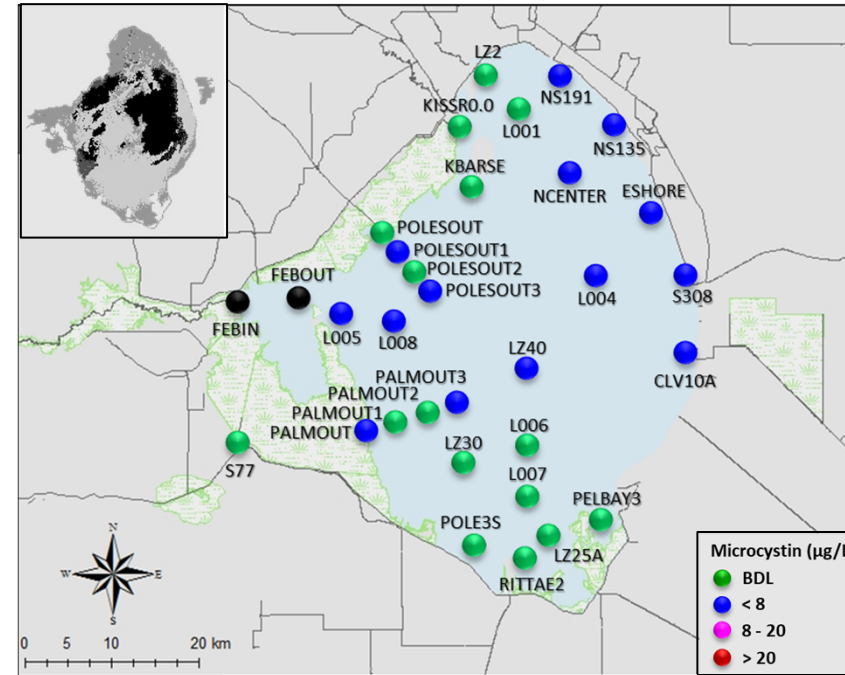
● < 8

● 8 - 20

● > 20

● Not sampled

August 23 - 25, 2021

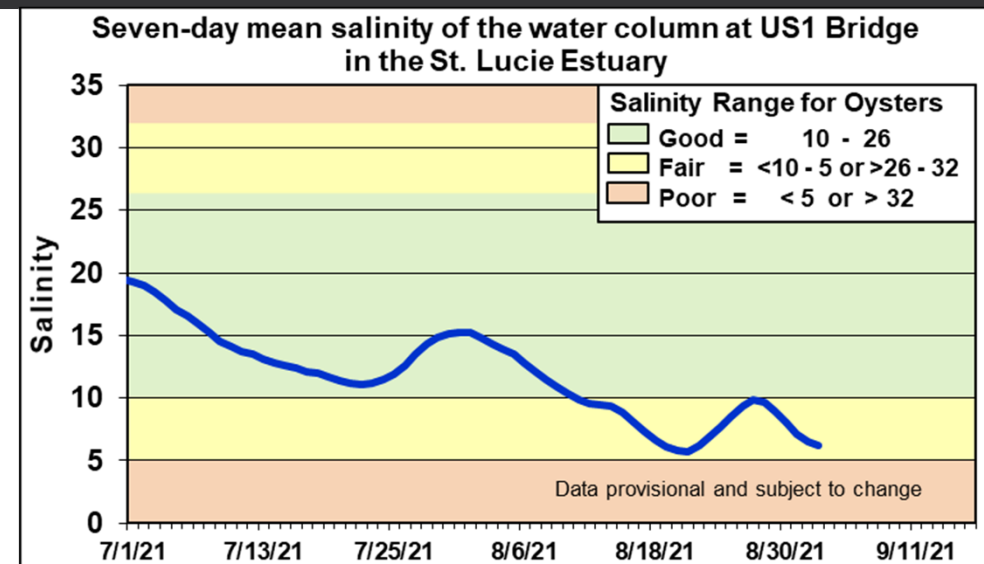
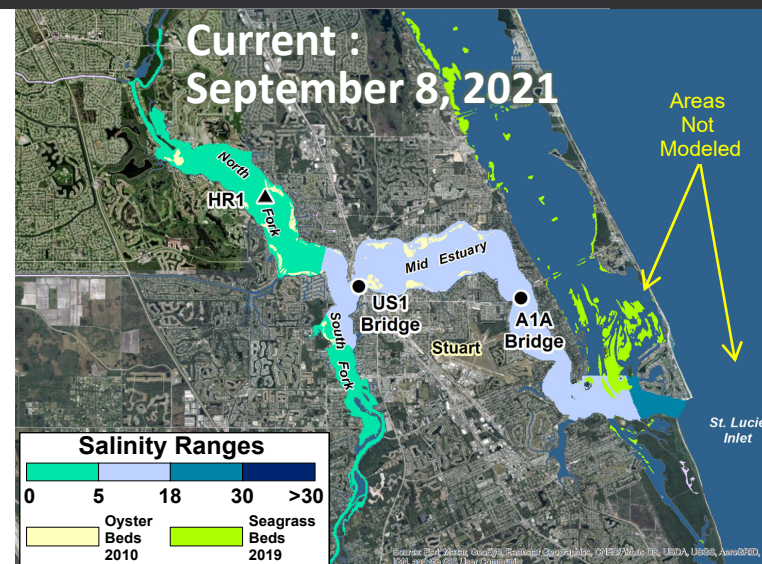
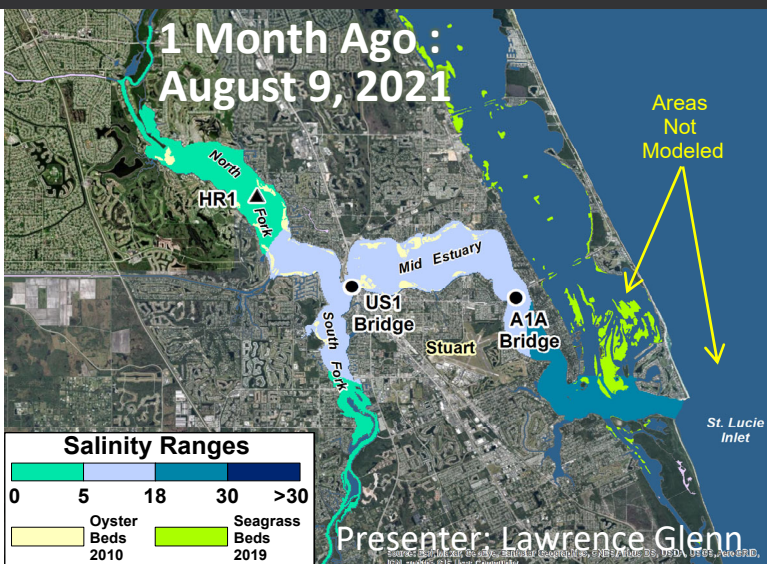
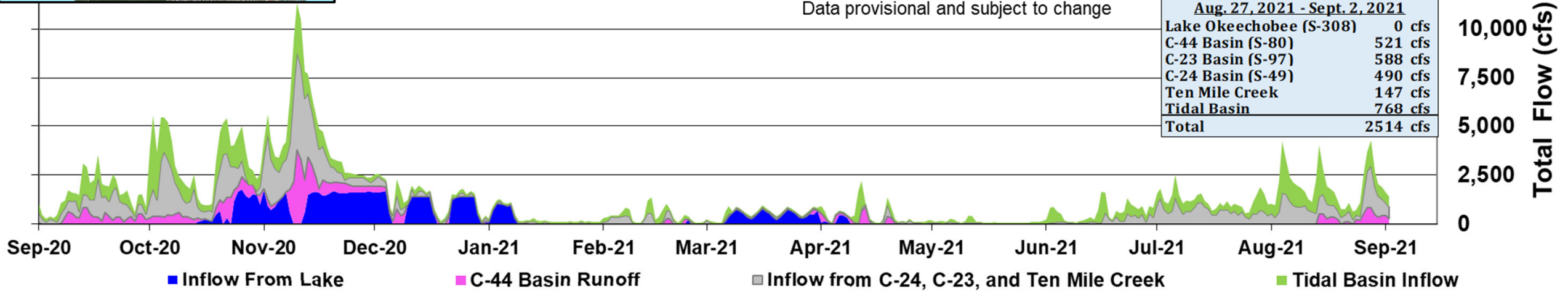


Microcystin ($\mu\text{g/L}$)
(*Provisional Data)

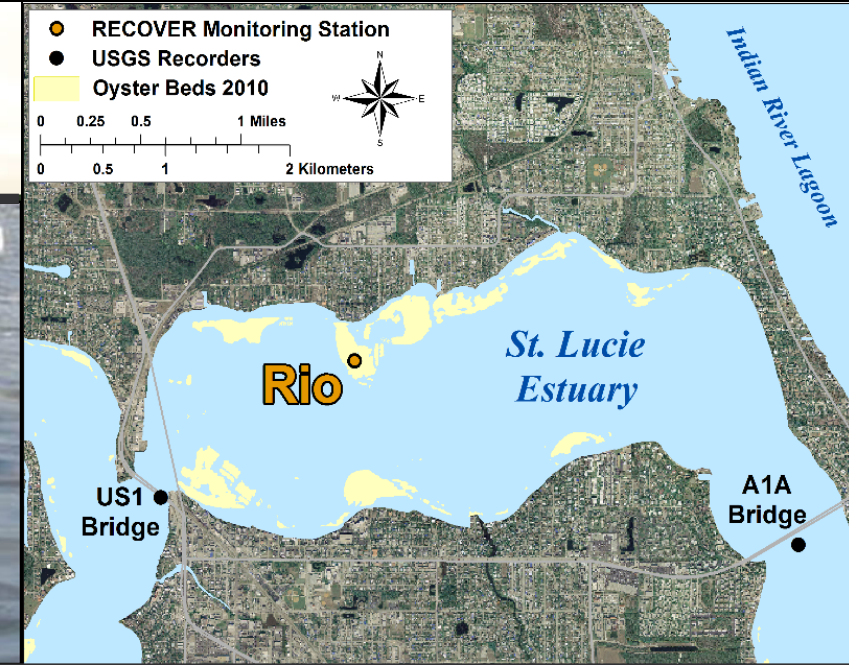
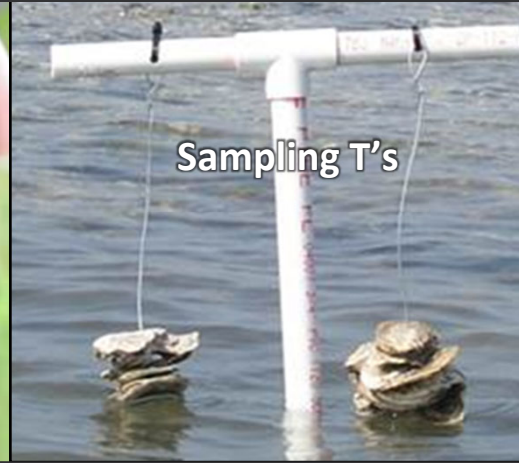
Station	Survey 7 (August 2 - 4)	Survey 8 (August 23 - 25)
FEBIN	BDL	NS
FEBOUT	0.3	NS
KISSR0.0	BDL	BDL
L005	BDL	4.3
LZ2	BDL	BDL
KBARSE	BDL	BDL
RITTAE2	BDL	BDL
PELBAY3	BDL	BDL
POLE3S	BDL	BDL
LZ25A	BDL	BDL
PALMOUT	BDL	0.4
PALMOUT1	BDL	BDL
PALMOUT2	BDL	BDL
PALMOUT3	BDL	0.3
POLESOUT	BDL	BDL
POLESOUT1	BDL	0.5
POLESOUT2	BDL	BDL
POLESOUT3	BDL	1.2
EASTSHORE	2	0.4
NES135	13	0.6
NES191	2.2	0.3
L001	BDL	BDL
L004	1.1	0.3
L006	BDL	BDL
L007	BDL	BDL
L008	BDL	0.3
LZ30	BDL	BDL
LZ40	BDL	1
CLV10A	0.4	0.3
NCENTER	BDL	0.6
S308C	0.6	1.1
S77	BDL	BDL

St. Lucie Inflows and Salinity Conditions

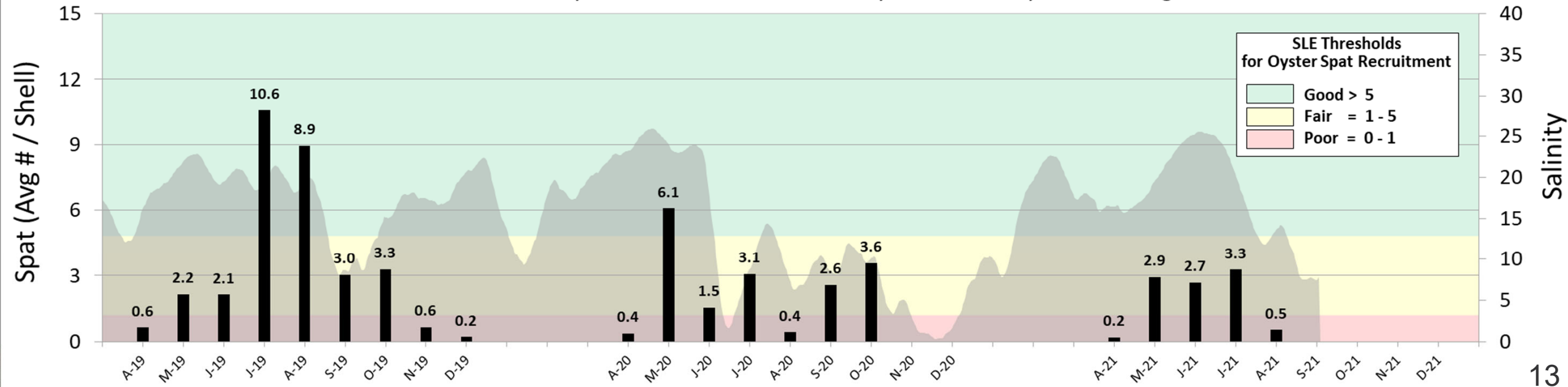
Total Daily Inflow into the St. Lucie Estuary



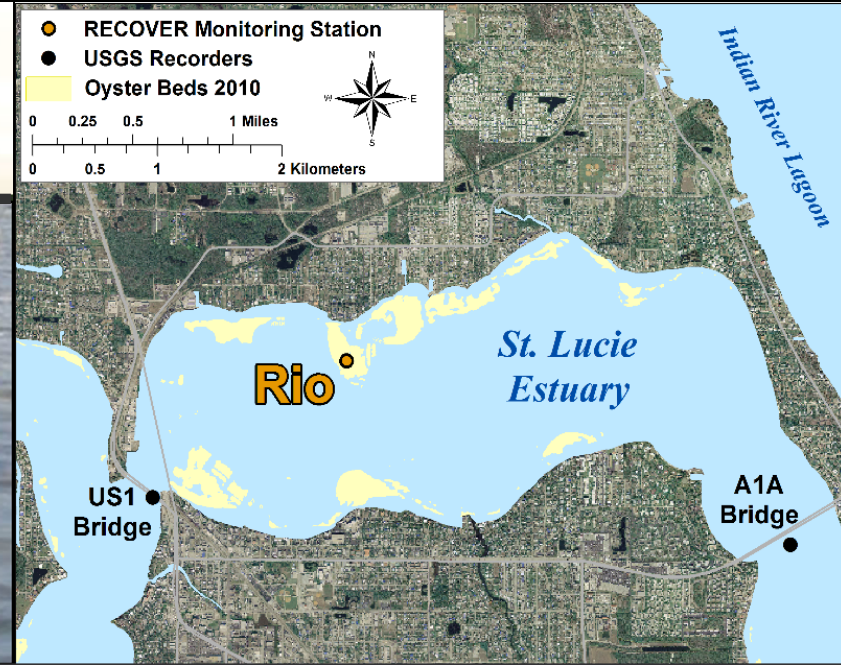
St. Lucie Estuary – Oyster Recruitment



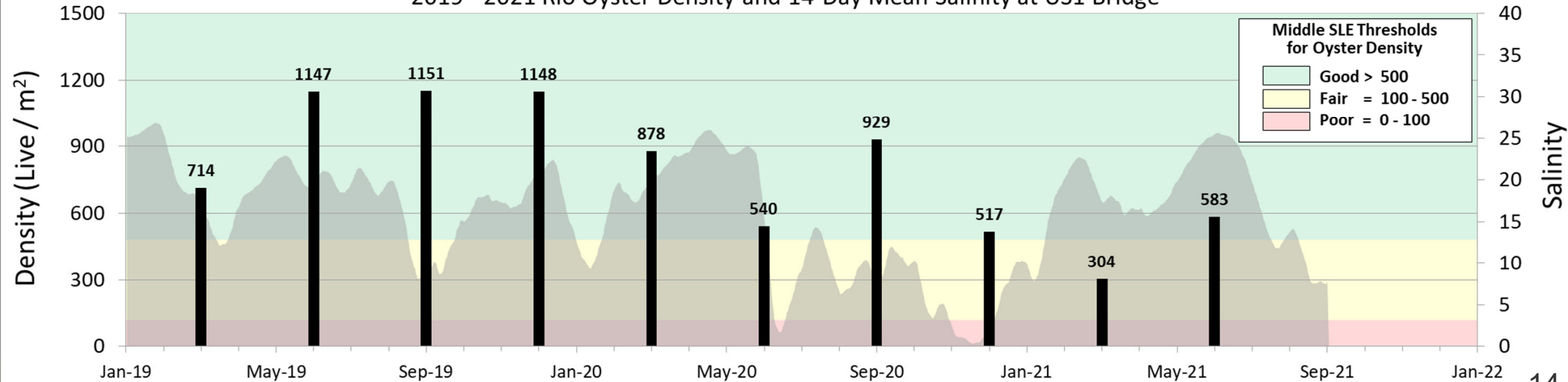
2019 - 2020 Rio Oyster Recruitment and 14-Day Mean Salinity at US1 Bridge



St. Lucie Estuary – Oyster Density



2019 - 2021 Rio Oyster Density and 14-Day Mean Salinity at US1 Bridge

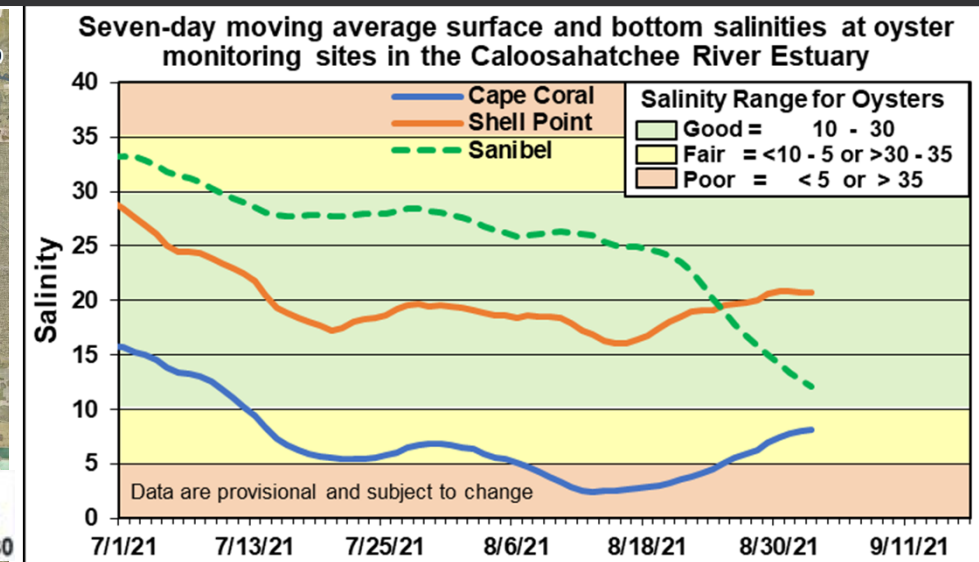
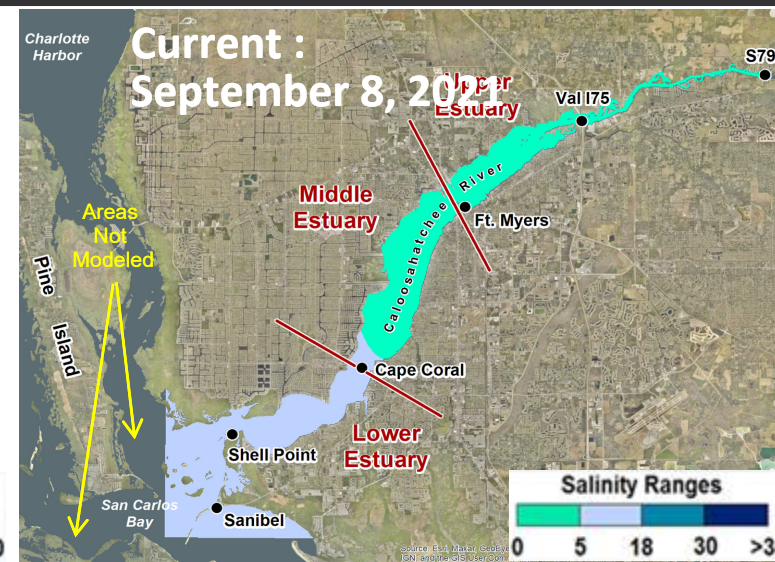
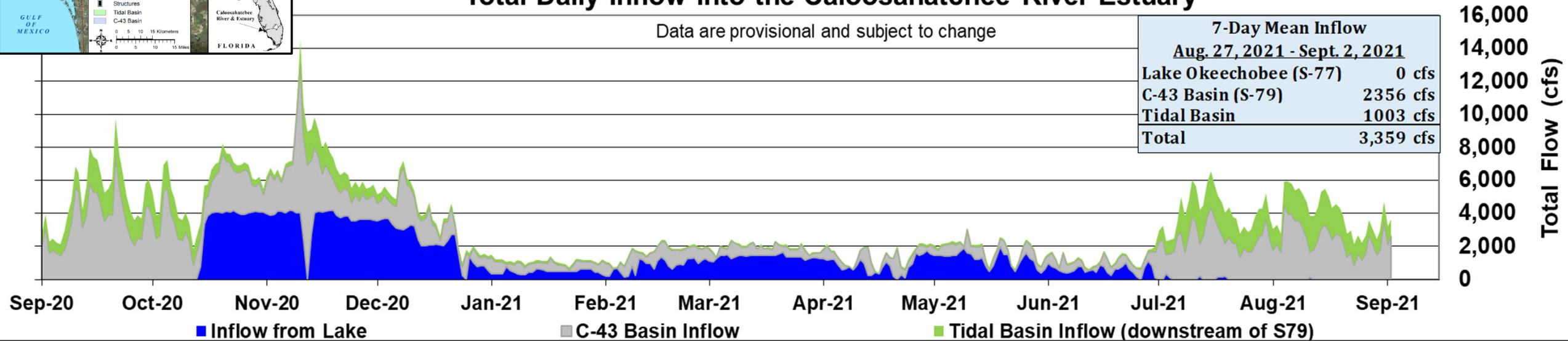


Caloosahatchee Inflows and Salinity Conditions

Total Daily Inflow into the Caloosahatchee River Estuary

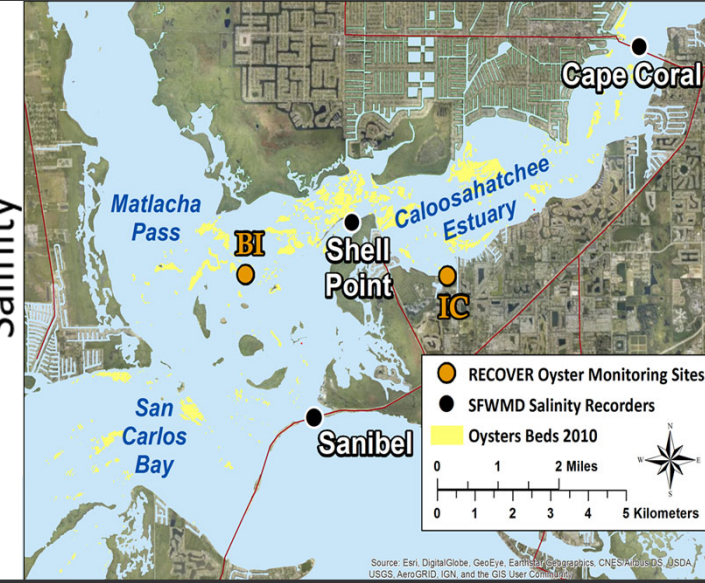
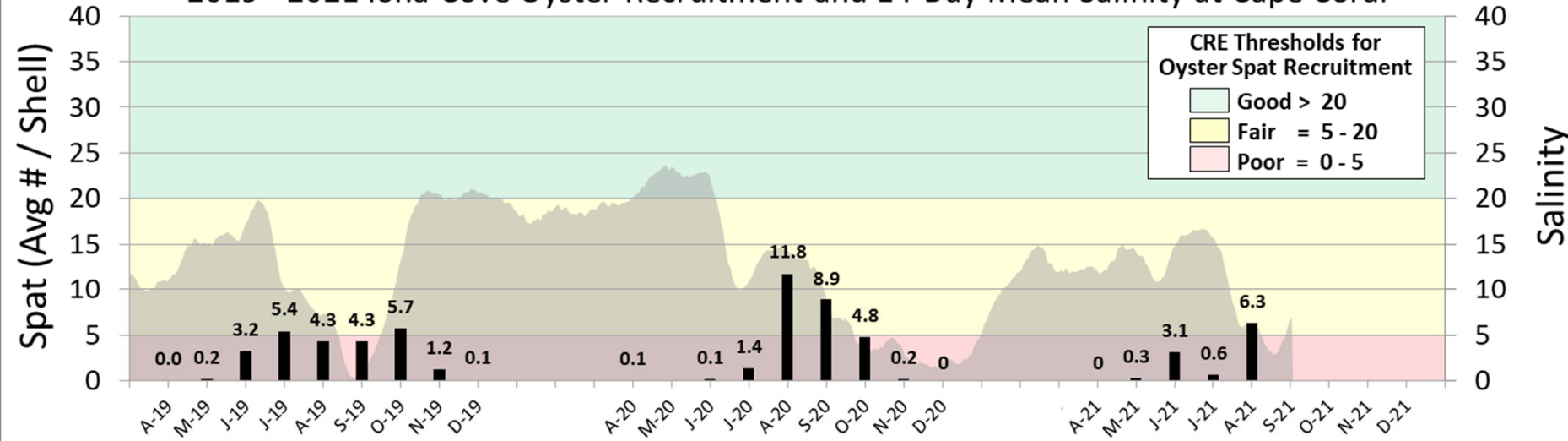
Data are provisional and subject to change

7-Day Mean Inflow Aug. 27, 2021 - Sept. 2, 2021	
Lake Okeechobee (S-77)	0 cfs
C-43 Basin (S-79)	2356 cfs
Tidal Basin	1003 cfs
Total	3,359 cfs

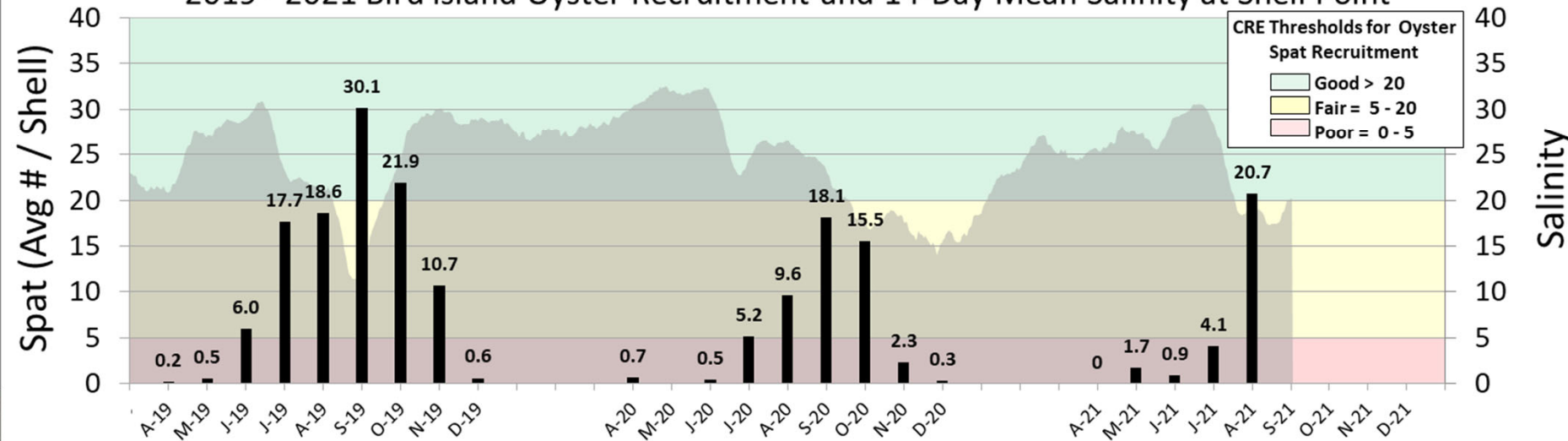


Caloosahatchee Estuary – Oyster Recruitment

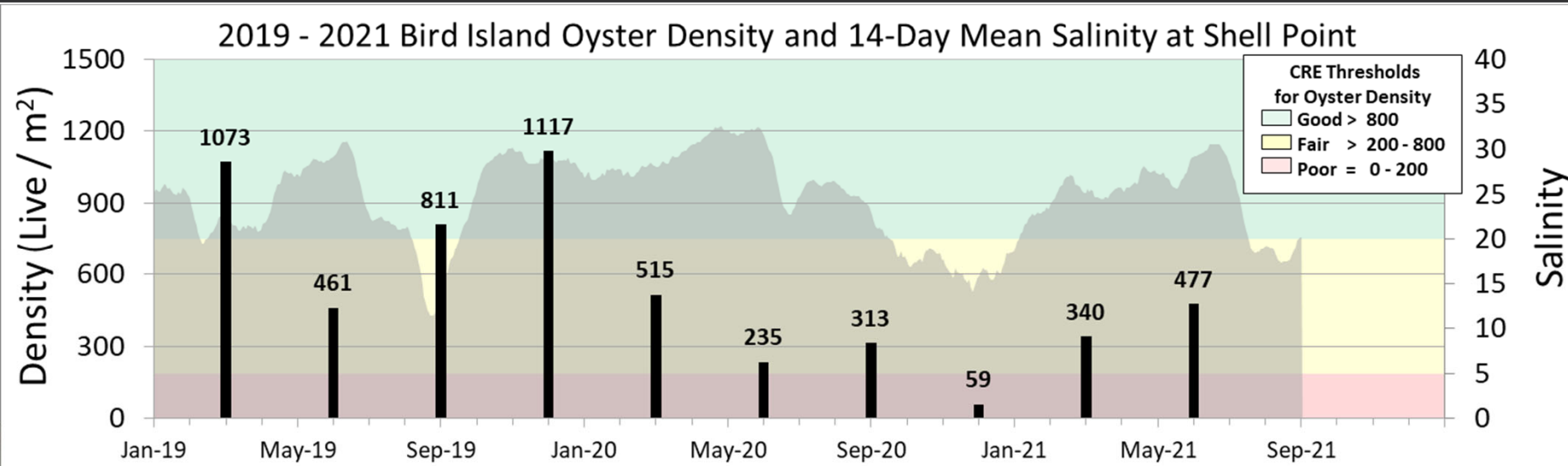
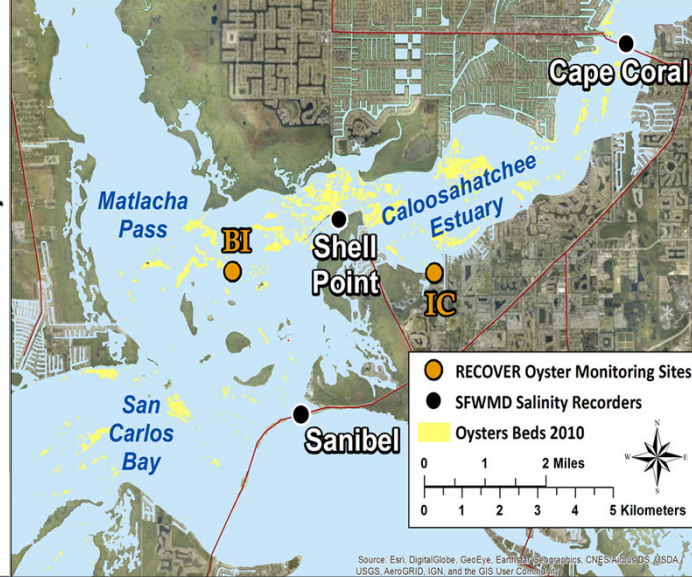
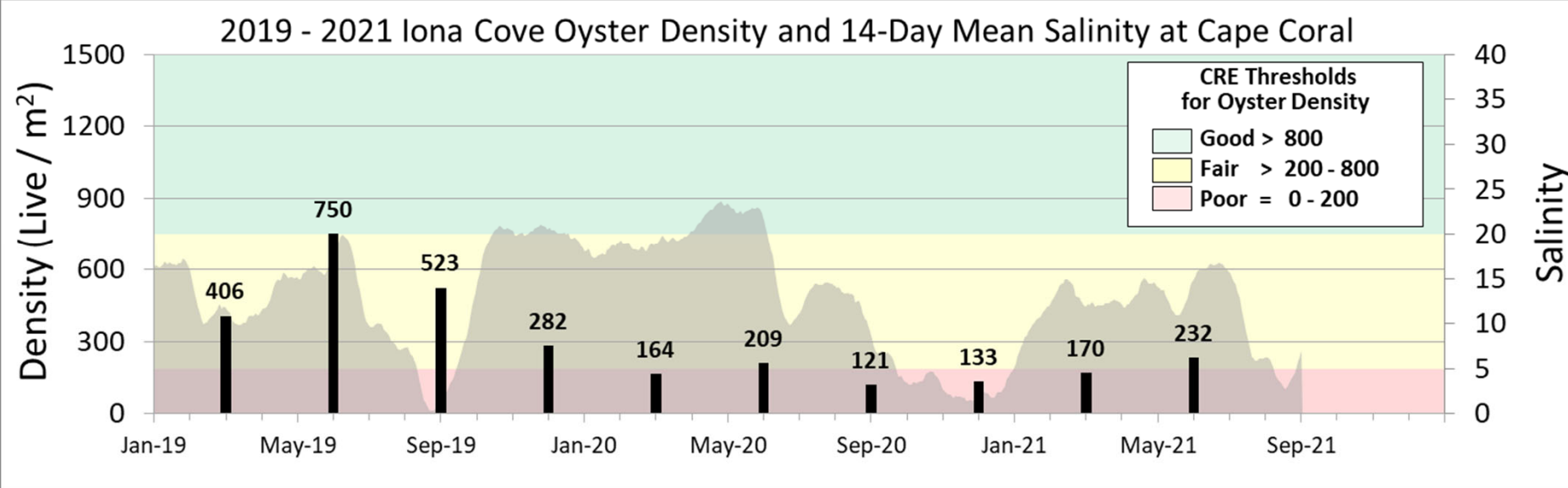
2019 - 2021 Iona Cove Oyster Recruitment and 14-Day Mean Salinity at Cape Coral



2019 - 2021 Bird Island Oyster Recruitment and 14-Day Mean Salinity at Shell Point



Caloosahatchee Estuary – Oyster Density



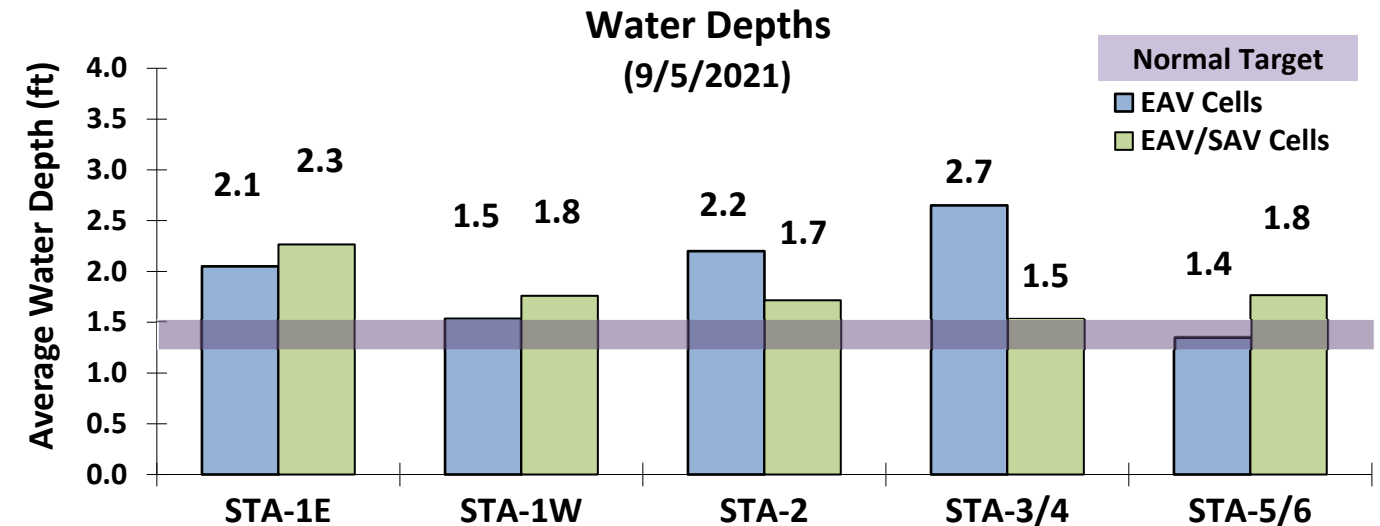
Everglades Stormwater Treatment Areas (STAs)

- STAs treated basin runoff in August
 - Total Inflows to STAs in WY2022 ~550,000 ac-ft
 - Lake Okeechobee releases to STAs in WY2022 ~61,000 ac-ft (11% of total)
- Extensive vegetation management activities underway to address stressed and highly stressed vegetation especially in EAV cells
- Most treatment cells are at or above target depth

Water Year 2022
5/1/2021 to 9/5/2021

	STA-1E	STA-1W	STA-2	STA-3/4	STA-5/6
Inflow TP Concentration (ppb)	111	177	91	63	272
Outflow TP Concentration (ppb)	19	24	15	18	51
365-day Phosphorus Loading Rate (g/m ² /yr)	4.1	0.8	0.8	0.8	1.0
Inflow Volume (ac-ft)	84,000	36,300	145,400	239,100	62,200

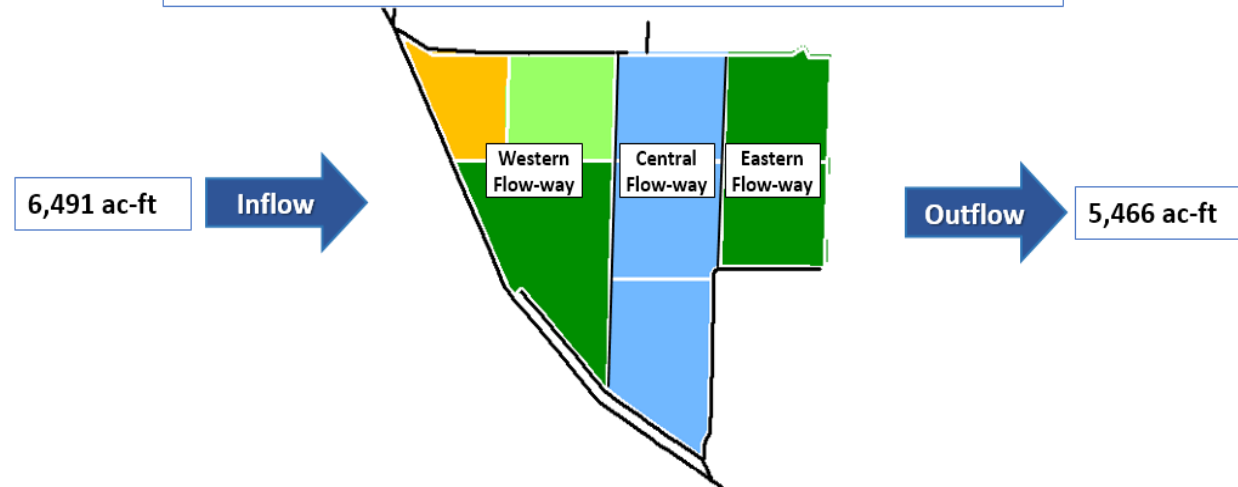
Includes preliminary data; all concentrations are flow-weighted means

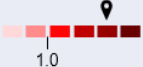
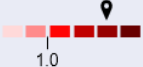
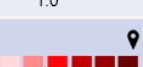


Includes preliminary data; Emergent Aquatic Vegetation (EAV); Submerged Aquatic Vegetation (SAV)

STA-1E

STA-1E Weekly Status Report – 8/30/2021 through 9/5/2021



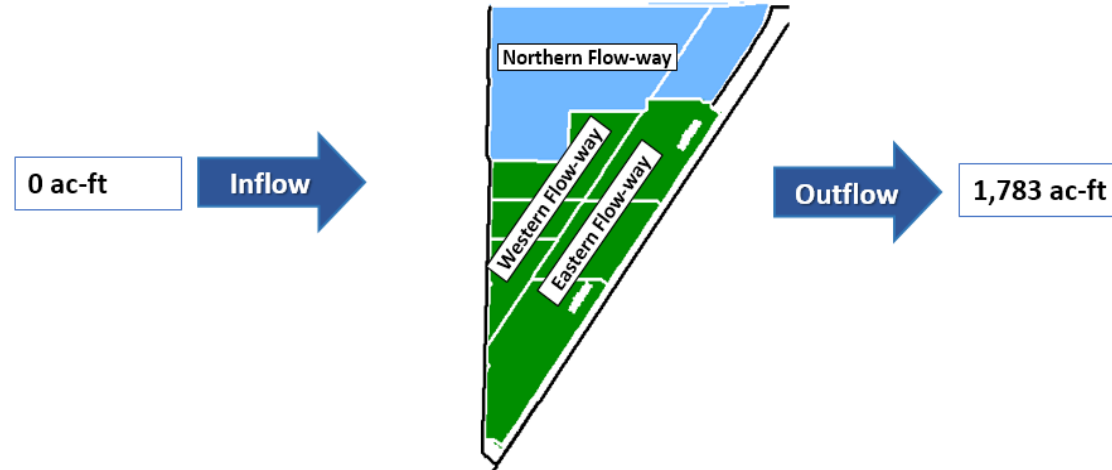
STA-1E Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed 	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal) 	Online / Offline / Restrictions
Eastern			Online
Central			Vegetation Rehab
Western	Offline, construction activities starting 11/01/2019		

As of 9/5/2021	
Stage Based: Relative to Target Stage (TS)	
 Deep Water Level (> 2.8' above TS)	
 High Water Level (1.5' – 2.8' above TS)	
 0.2' – 1.5' above TS	
 Target Stage (TS +/- 0.2')	
 Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
 0-25% Dry	 50-75% Dry
 25-50% Dry	 75-100% Dry

STA-1E Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	6,491	35,679	284,080
--Lake Inflow, ac-ft	0	N/A	26,000
Total Outflow, ac-ft	5,466	31,003	239,353
Inflow Conc., ppb	144	123	144
Outflow Conc., ppb	16	18	42
Includes Preliminary Data			

STA-1W

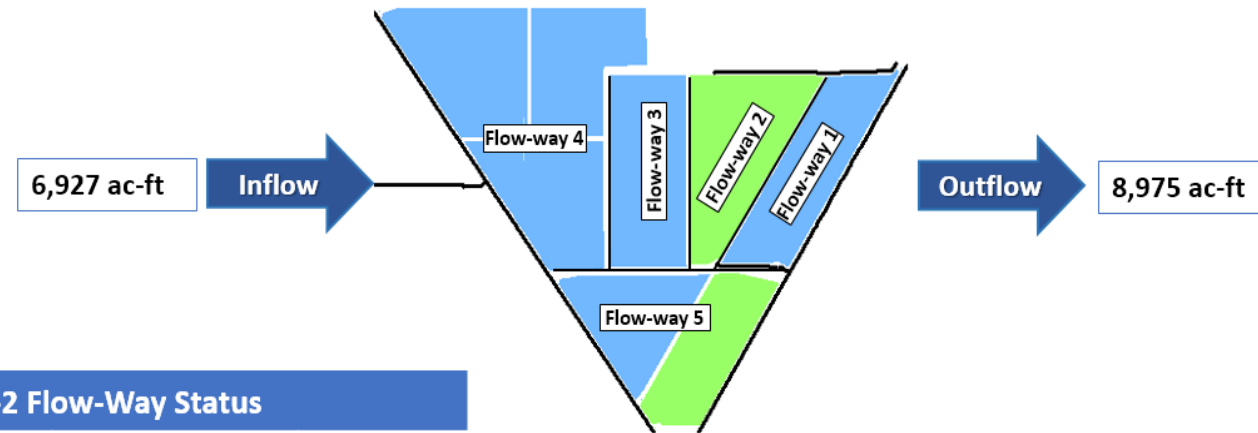
STA-1W Weekly Status Report – 8/30/2021 through 9/5/2021



STA-1W Flow-Way Status				As of 9/5/2021				STA-1W Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy --- Stressed	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)					7-day	28-day	365-day
				Deep Water Level (> 2.8' above TS)	High Water Level (1.5' – 2.8' above TS)	0.2' – 1.5' above TS	Target Stage (TS +/- 0.2')				
Northern			Construction	Depth / Area Based: Percent of Area Dry							
Western			Construction	0-25% Dry	50-75% Dry						
				25-50% Dry	75-100% Dry						
Eastern			Construction								
Includes Preliminary Data											

STA-2

STA-2 Weekly Status Report – 8/30/2021 through 9/5/2021



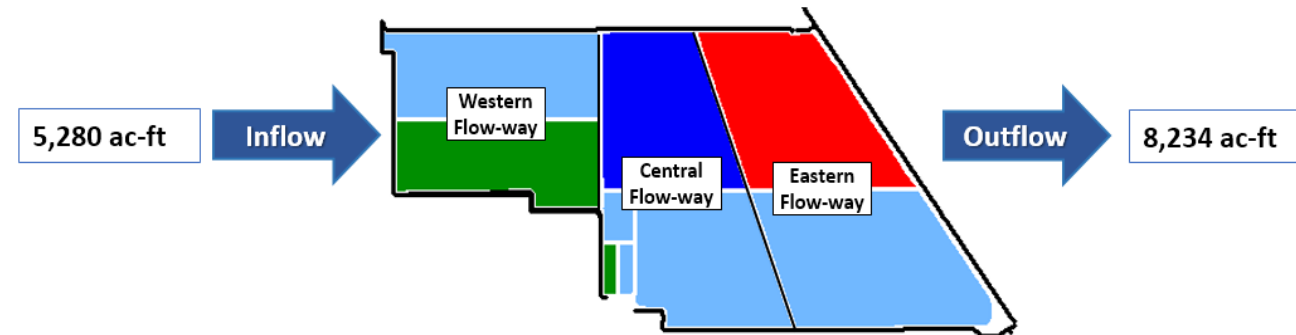
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ——— Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1	← →	1.0	Online
2	← →	1.0	Construction
3	← →	1.0	Vegetation Rehab
4	← →	1.0	Vegetation Rehab
5	← →	1.0	Online

As of 9/5/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-2 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	6,927	28,407	428,867
--Lake Inflow, ac-ft	0	N/A	90,800
Total Outflow, ac-ft	8,975	31,976	467,253
Inflow Conc., ppb	68	87	92
Outflow Conc., ppb	15	16	20
Includes Preliminary Data			

STA-3/4

STA-3/4 Weekly Status Report – 8/30/2021 through 9/5/2021



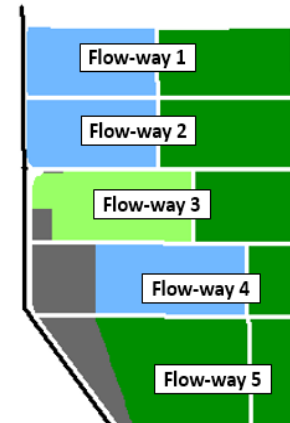
STA-3/4 Flow-Way Status				As of 9/5/2021		STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)			7-day	28-day	365-day
				Deep Water Level (> 2.8' above TS)	High Water Level (1.5' – 2.8' above TS)				
Eastern	Offline, vegetation management drawdown as of 3/1/2021			0.2' – 1.5' above TS	Target Stage (TS +/- 0.2')				
				Low Water Level (<0.2' below TS)					
Central			Online	Depth / Area Based: Percent of Area Dry					
Western			Online	0-25% Dry	50-75% Dry				
				25-50% Dry	75-100% Dry				
						Includes Preliminary Data			

STA-5/6

STA-5/6 Weekly Status Report – 8/30/2021 through 9/5/2021

5,066 ac-ft

Inflow



Outflow

5,197 ac-ft

STA-5/6 Flow-Way Status

Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P / m ² /yr is optimal)	Online / Offline / Restrictions
1	← →		Online
2	← →	N/A	Post-construction
3	← →	N/A	Post-construction
4	← →		Online
5	← →		Online

As of 9/5/2021

Stage Based: Relative to Target Stage (TS)

- Deep Water Level (> 2.8' above TS)
- High Water Level (1.5' – 2.8' above TS)
- 0.2' – 1.5' above TS
- Target Stage (TS +/- 0.2')
- Low Water Level (<0.2' below TS)

Depth / Area Based: Percent of Area Dry

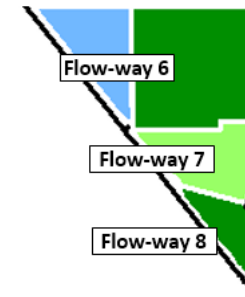
- 0-25% Dry
- 25-50% Dry
- 50-75% Dry
- 75-100% Dry

STA-5/6 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	5,066	31,244	153,646
--Lake Inflow, ac-ft	0	N/A	9,000
Total Outflow, ac-ft	5,197	33,169	169,939
Inflow Conc., ppb	245	304	296
Outflow Conc., ppb	53	58	72
Includes Preliminary Data			

STA-5/6

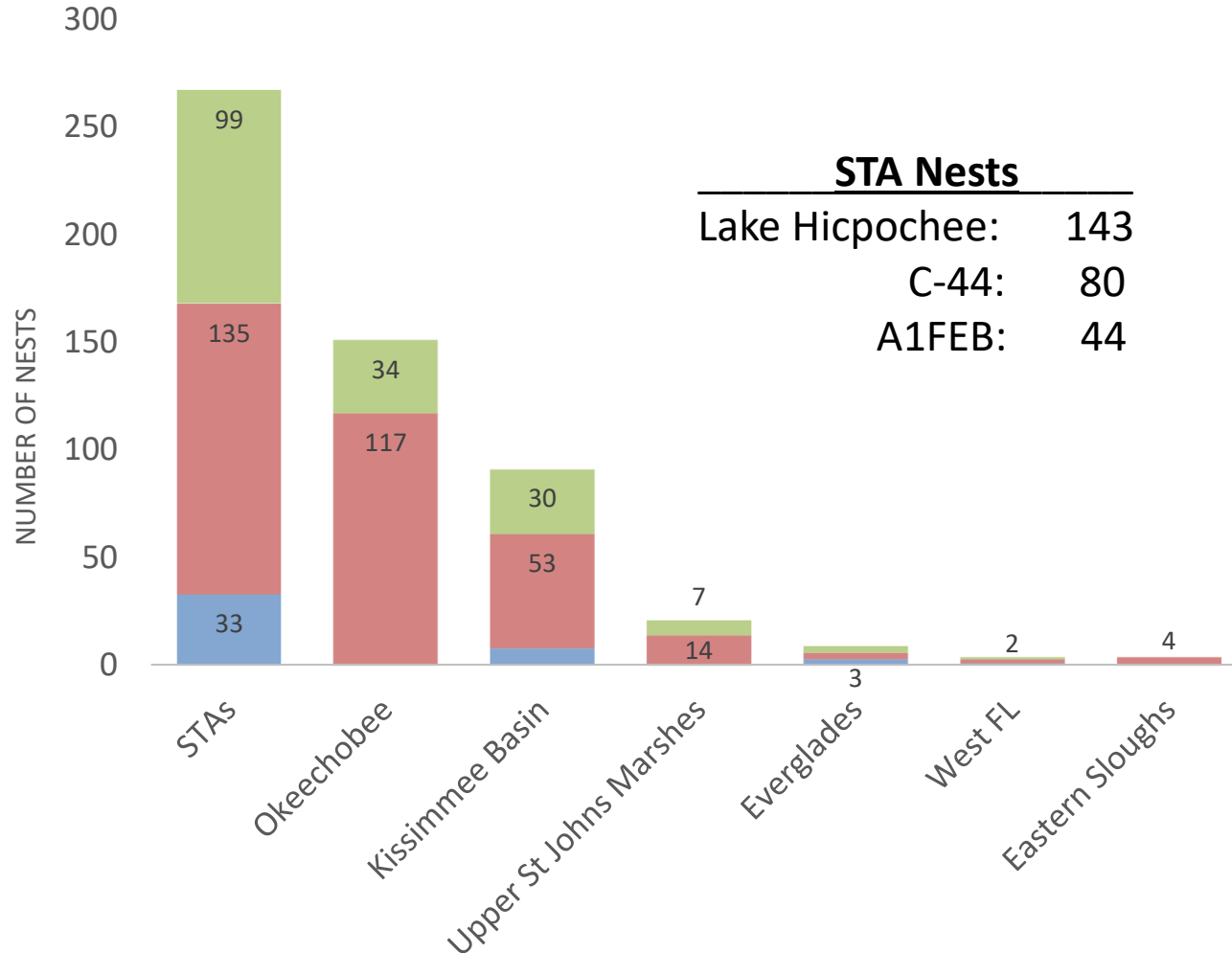
STA-5/6 Weekly Status Report – 8/30/2021 through 9/5/2021



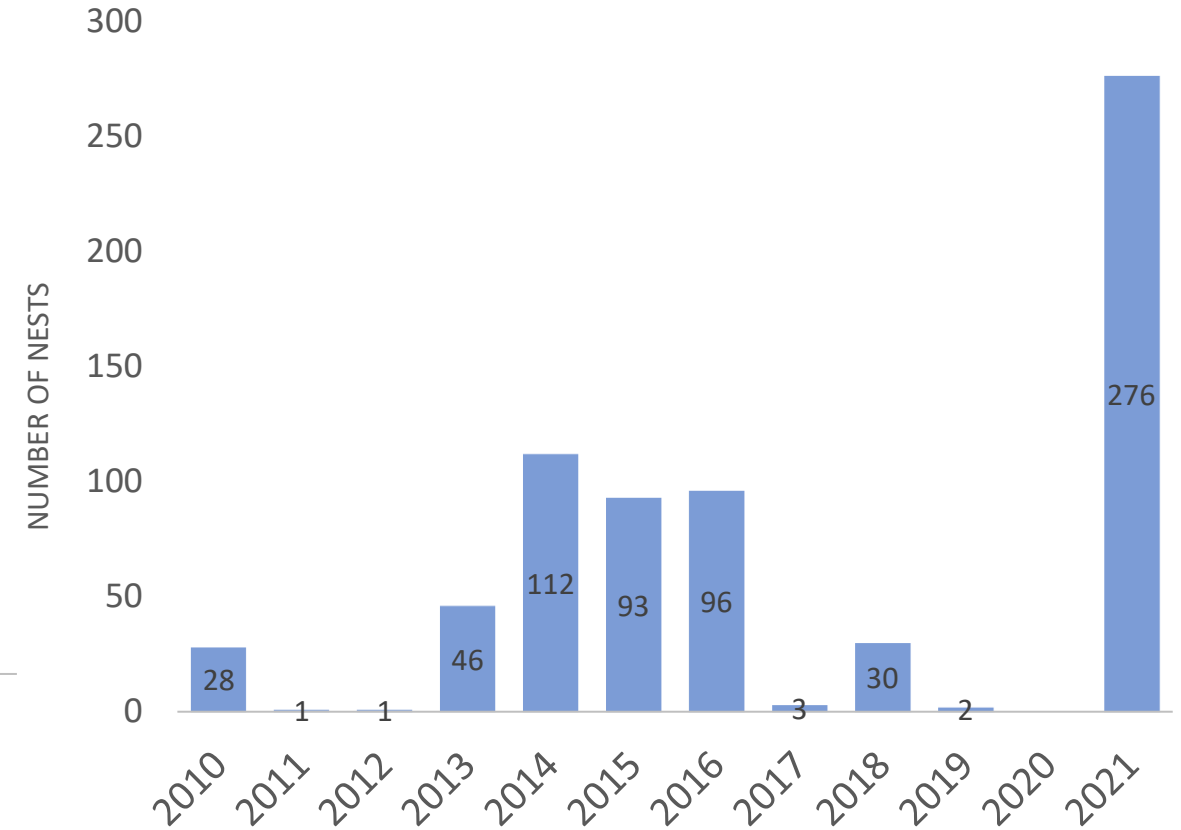
STA-5/6 Flow-Way Status				As of 9/5/2021	
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)	
6	← →		Online	Deep Water Level (> 2.8' above TS)	Depth / Area Based: Percent of Area Dry 0-25% Dry 50-75% Dry 25-50% Dry 75-100% Dry
7	← →		Online	High Water Level (1.5' – 2.8' above TS)	
8	← →		Online	0.2' – 1.5' above TS	
				Target Stage (TS +/- 0.2')	
				Low Water Level (<0.2' below TS)	

Snail Kite Nesting Activity

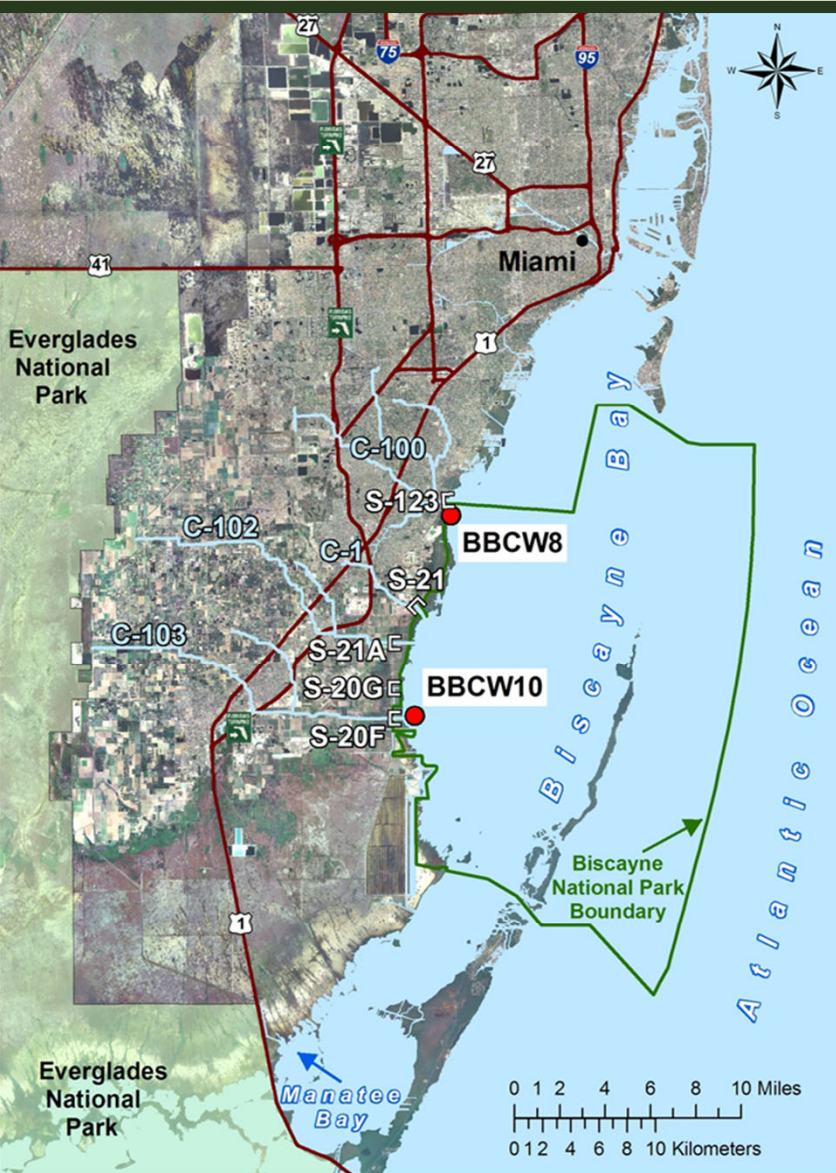
STATEWIDE SNAIL KITE NESTING THROUGH AUGUST 2021



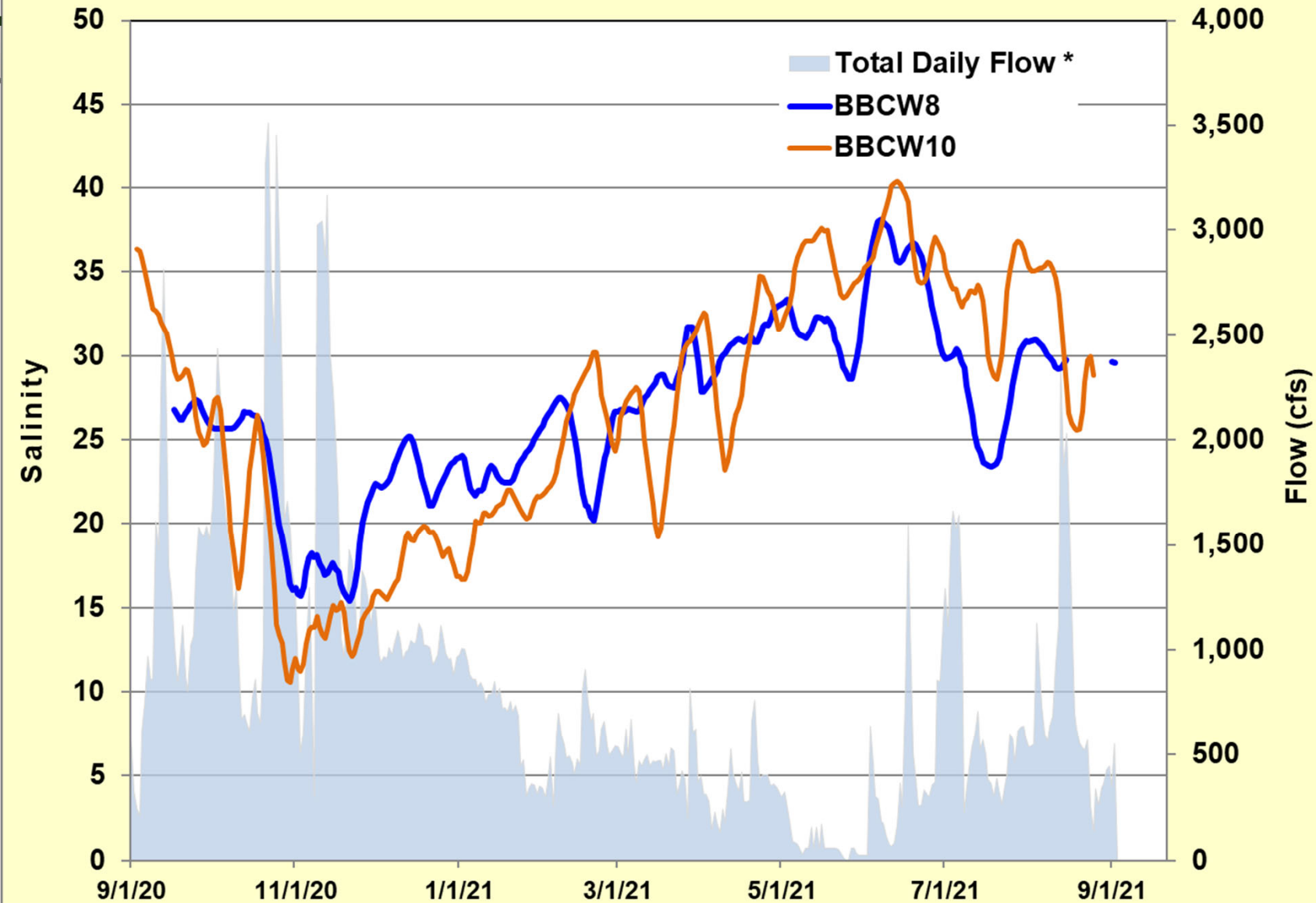
SNAIL KITE NESTS IN STORMWATER TREATMENT AREAS 2010-2021



Biscayne Bay



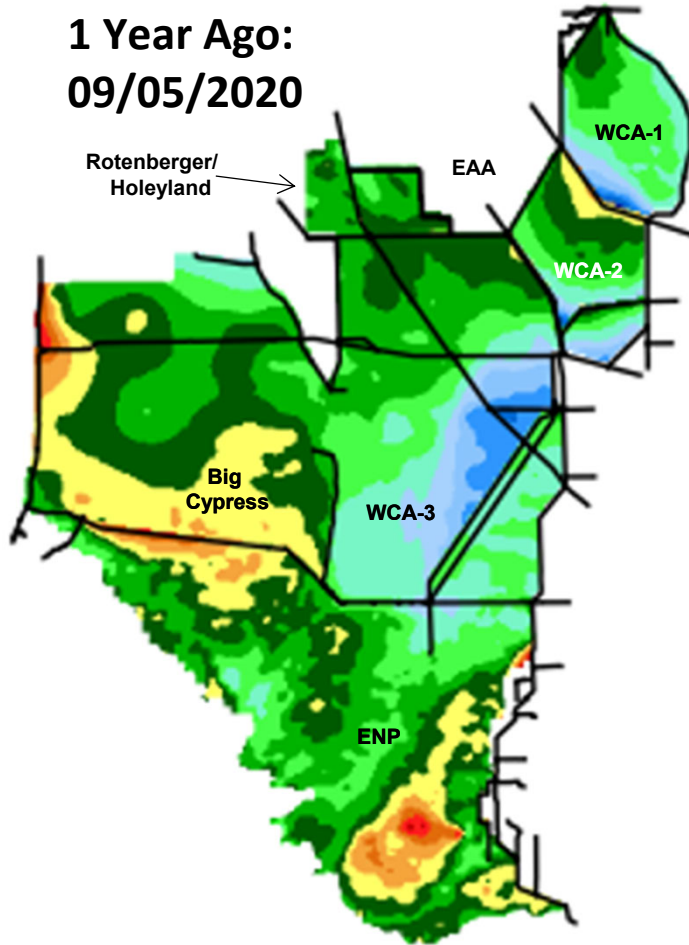
Seven Day Mean Salinity (BBCW8 & BBCW10) & Total Daily Flow



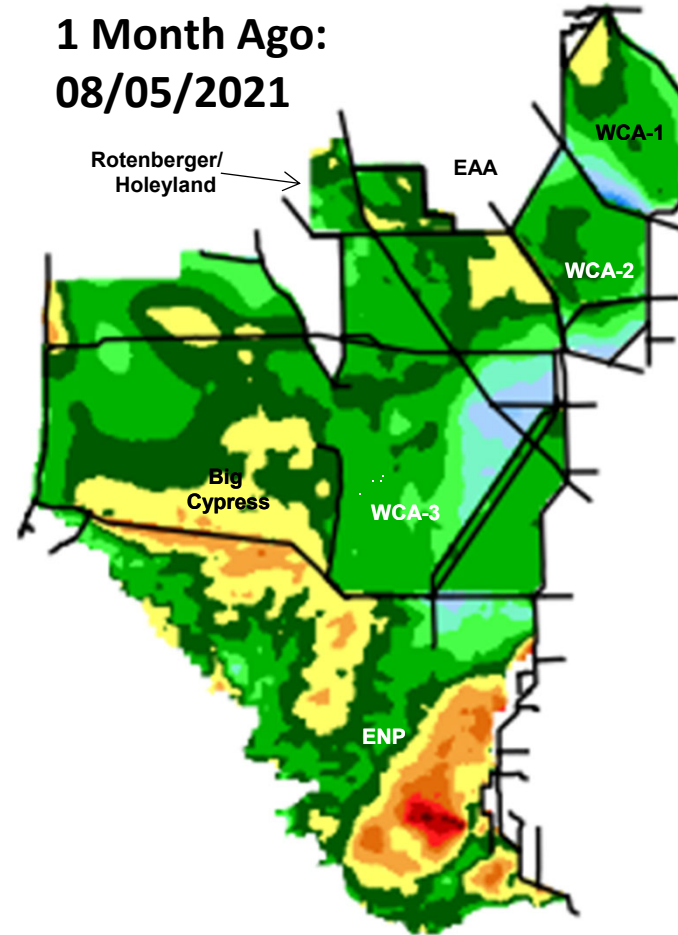
* Total flow from S20G, S20F, S21, S21A, S123, S700P

Everglades Water Depth Maps

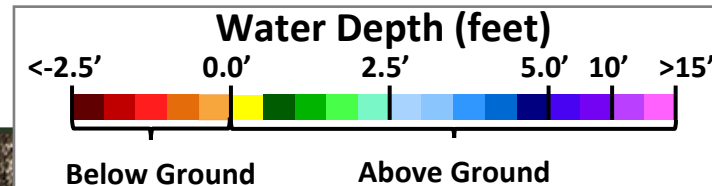
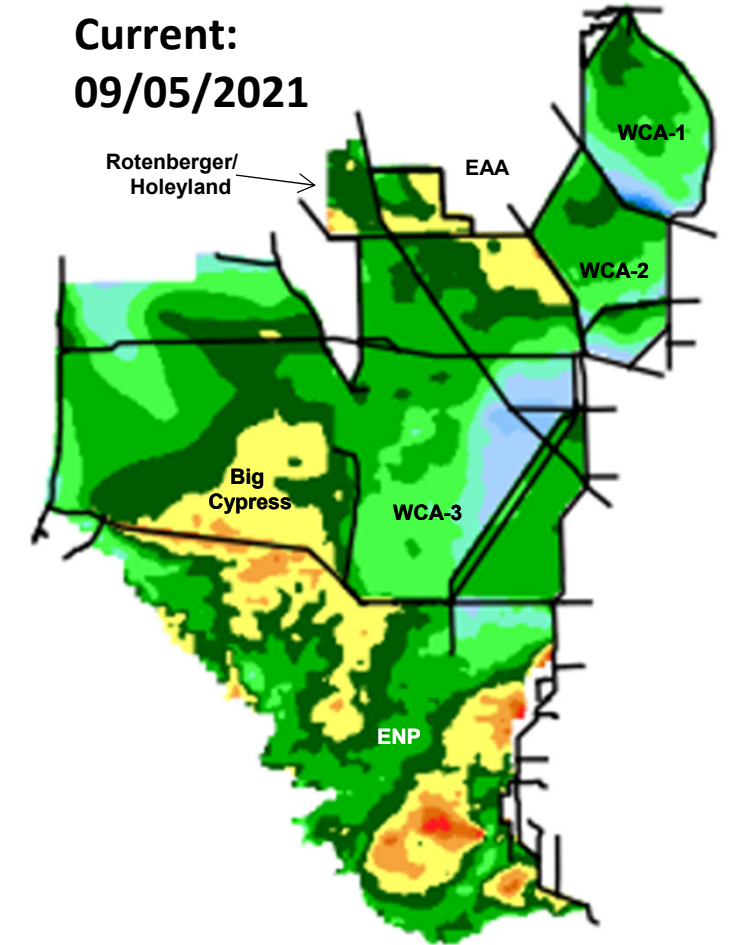
1 Year Ago:
09/05/2020



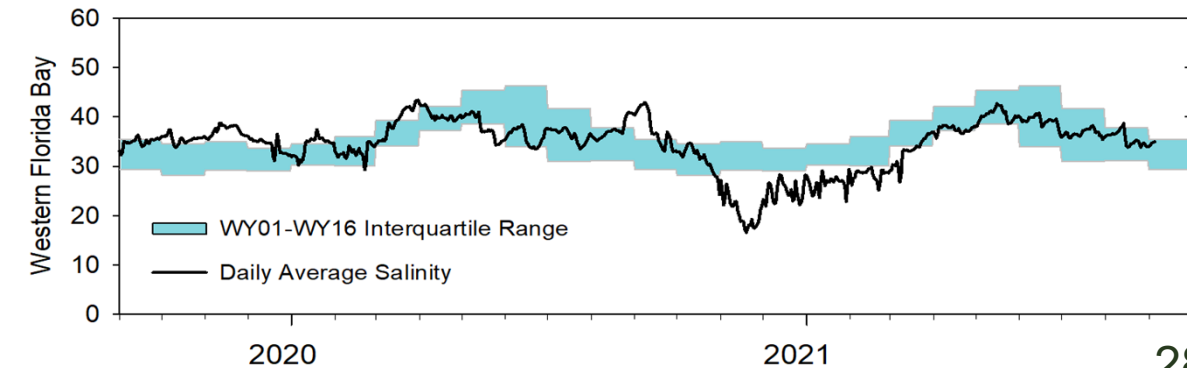
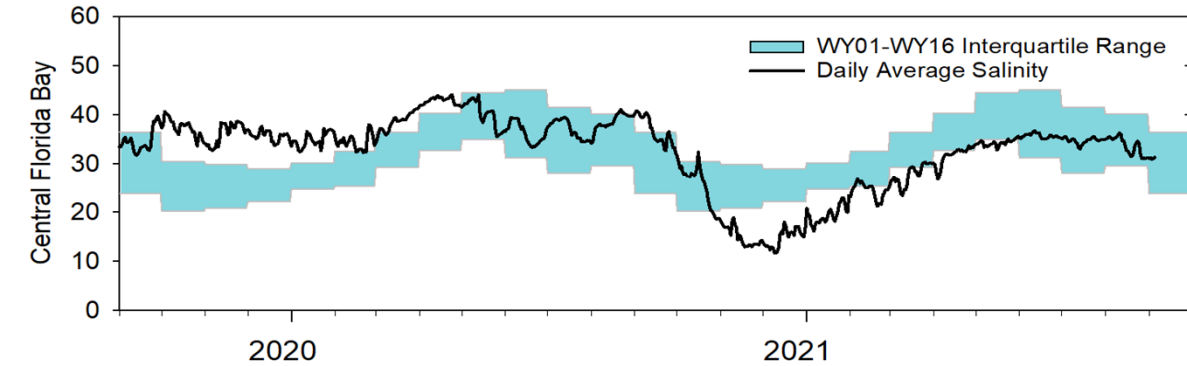
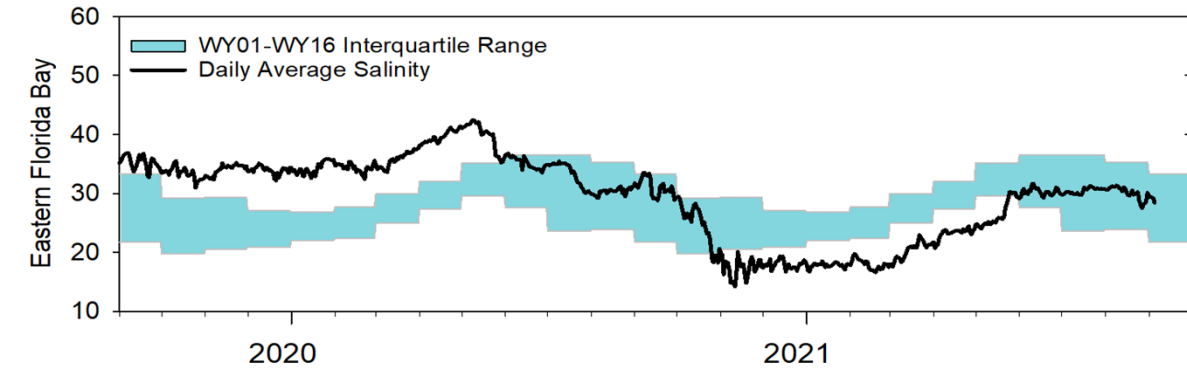
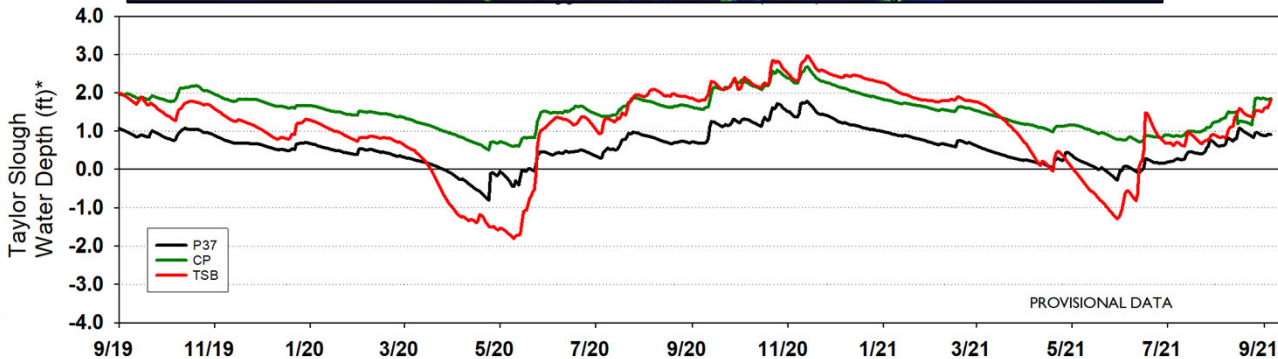
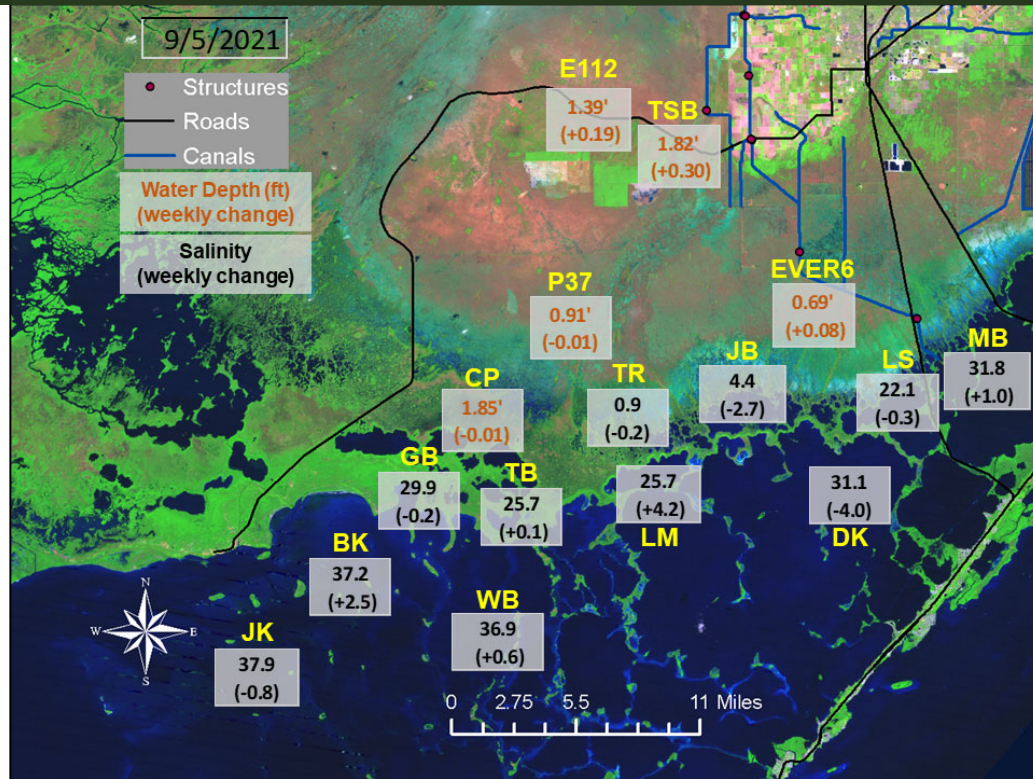
1 Month Ago:
08/05/2021



Current:
09/05/2021



Taylor Slough Stages and Florida Bay Salinity



Questions



*Eastern Meadowlark at Kissimmee Prairie Preserve State Park
Photograph courtesy of SFWMD staff*