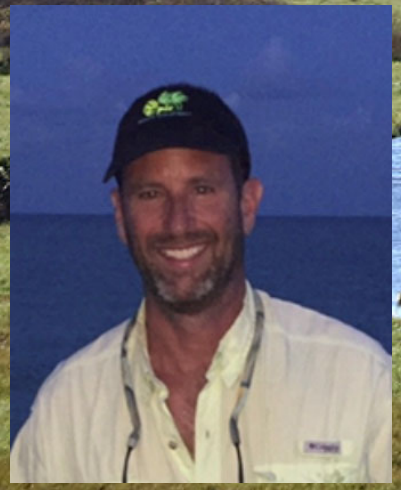
SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Ecological Conditions Update

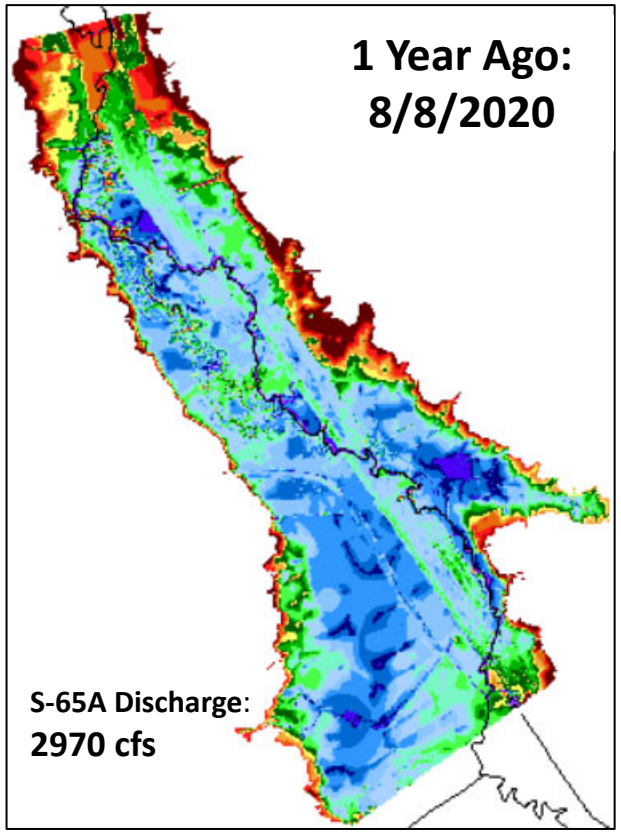
Governing Board Meeting
August 12, 2021

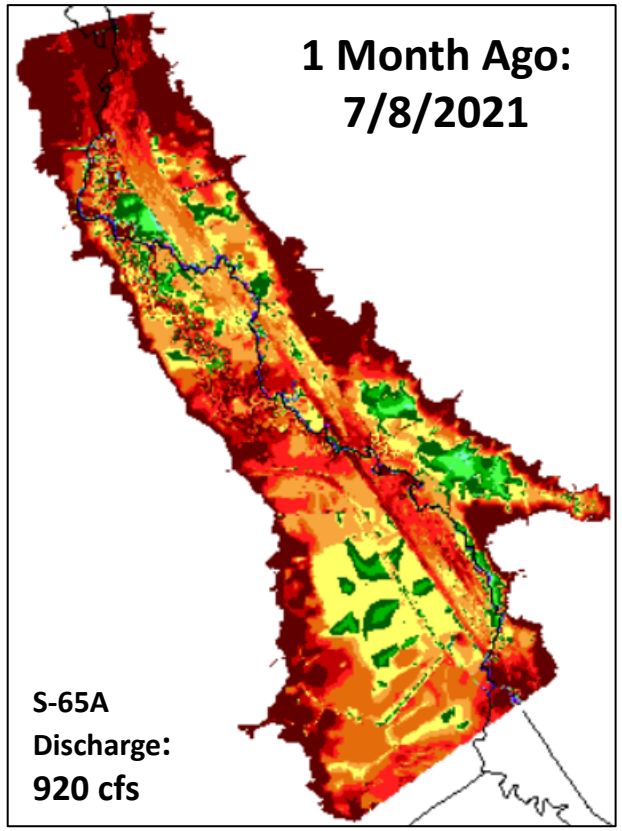


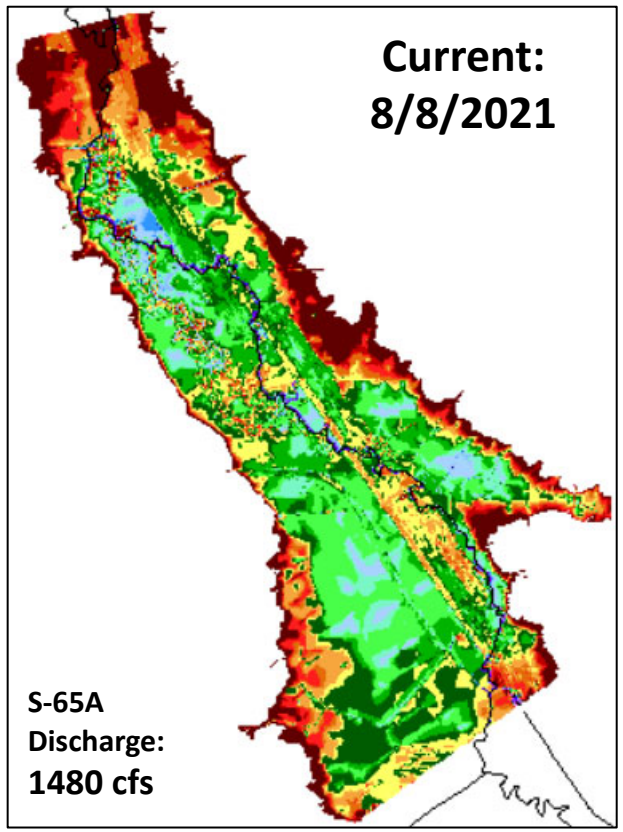
Lawrence Glenn
Director, Water Resources Division

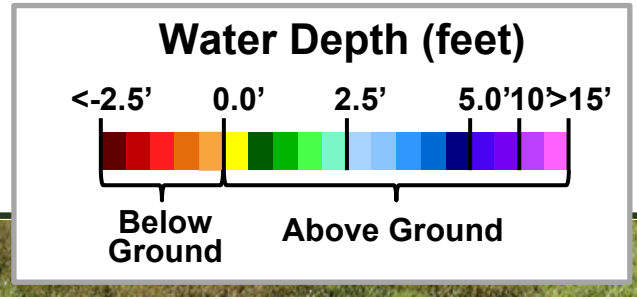
Kissimmee River Restoration Area, Pool C
Photograph courtesy of Brent Anderson, SFWMD

Kissimmee River Floodplain
Water Depth Maps

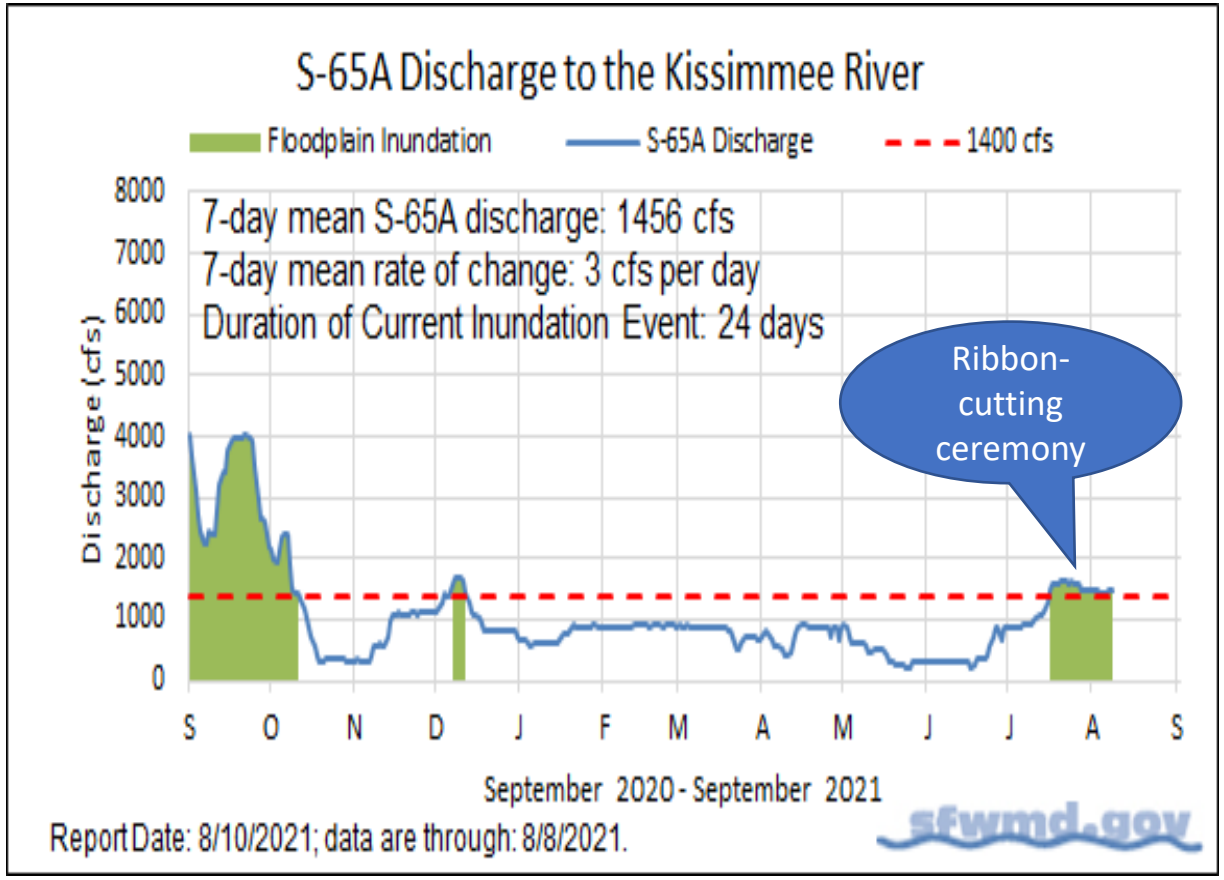




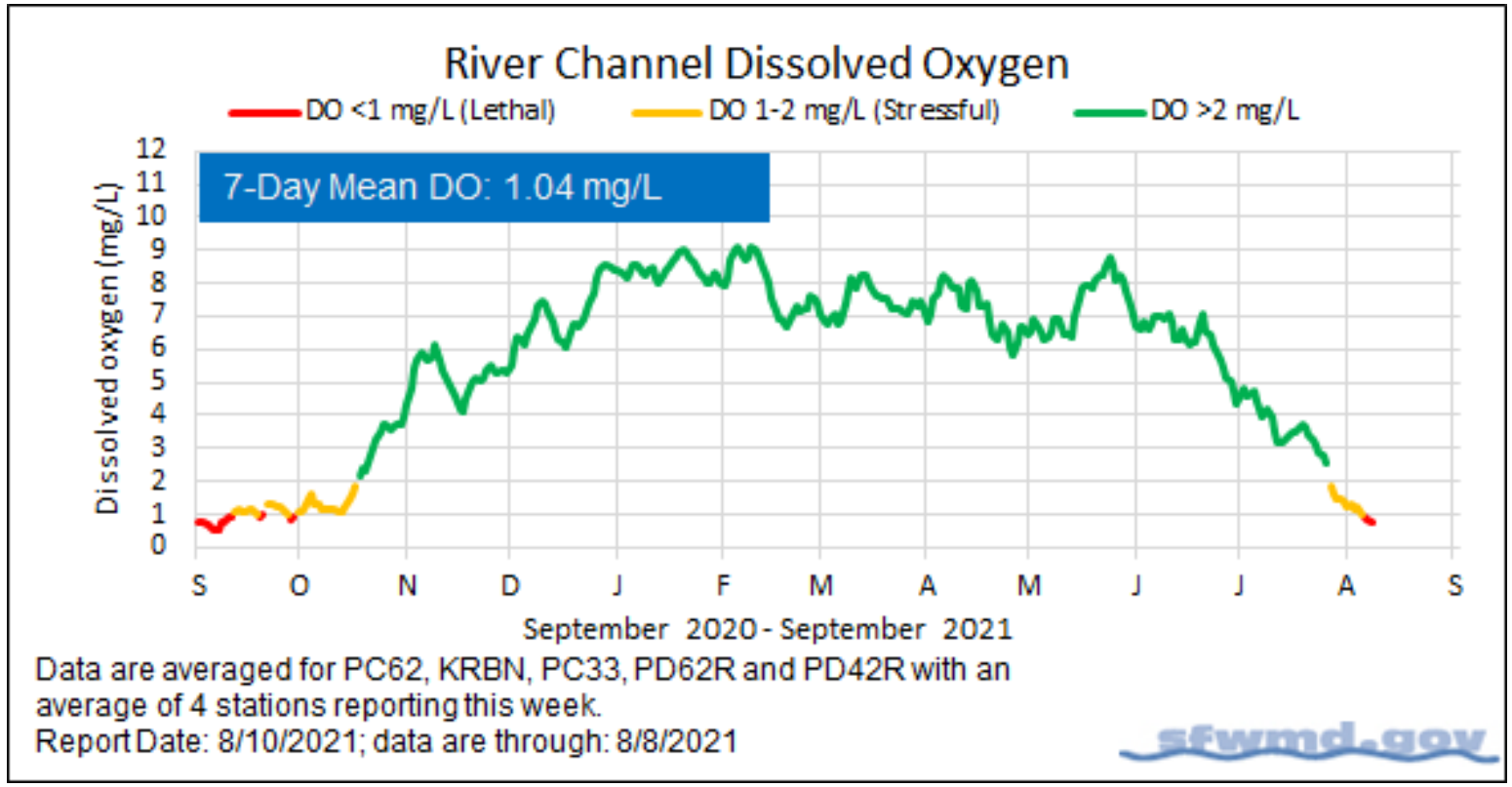




Kissimmee River Restoration Project Construction Completion Ribbon-Cutting Ceremony July 29, 2021

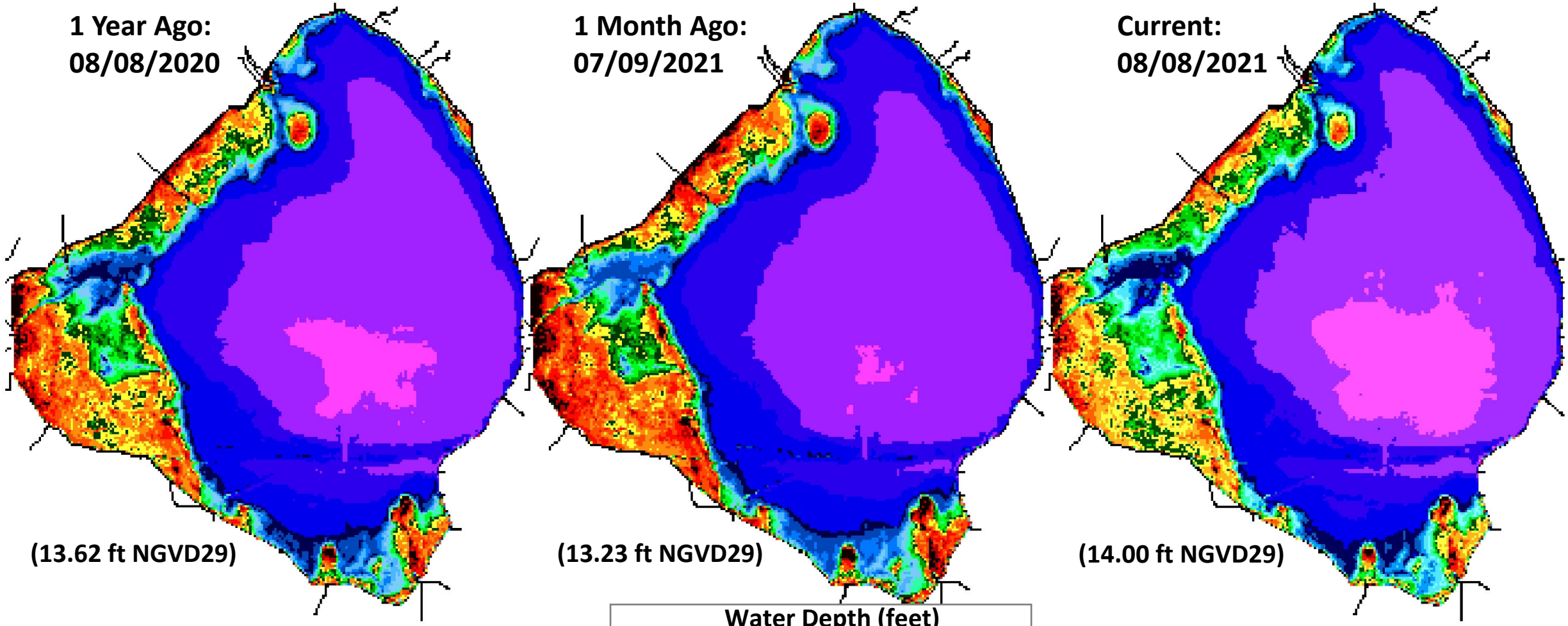


Dissolved Oxygen Decline in the Kissimmee River



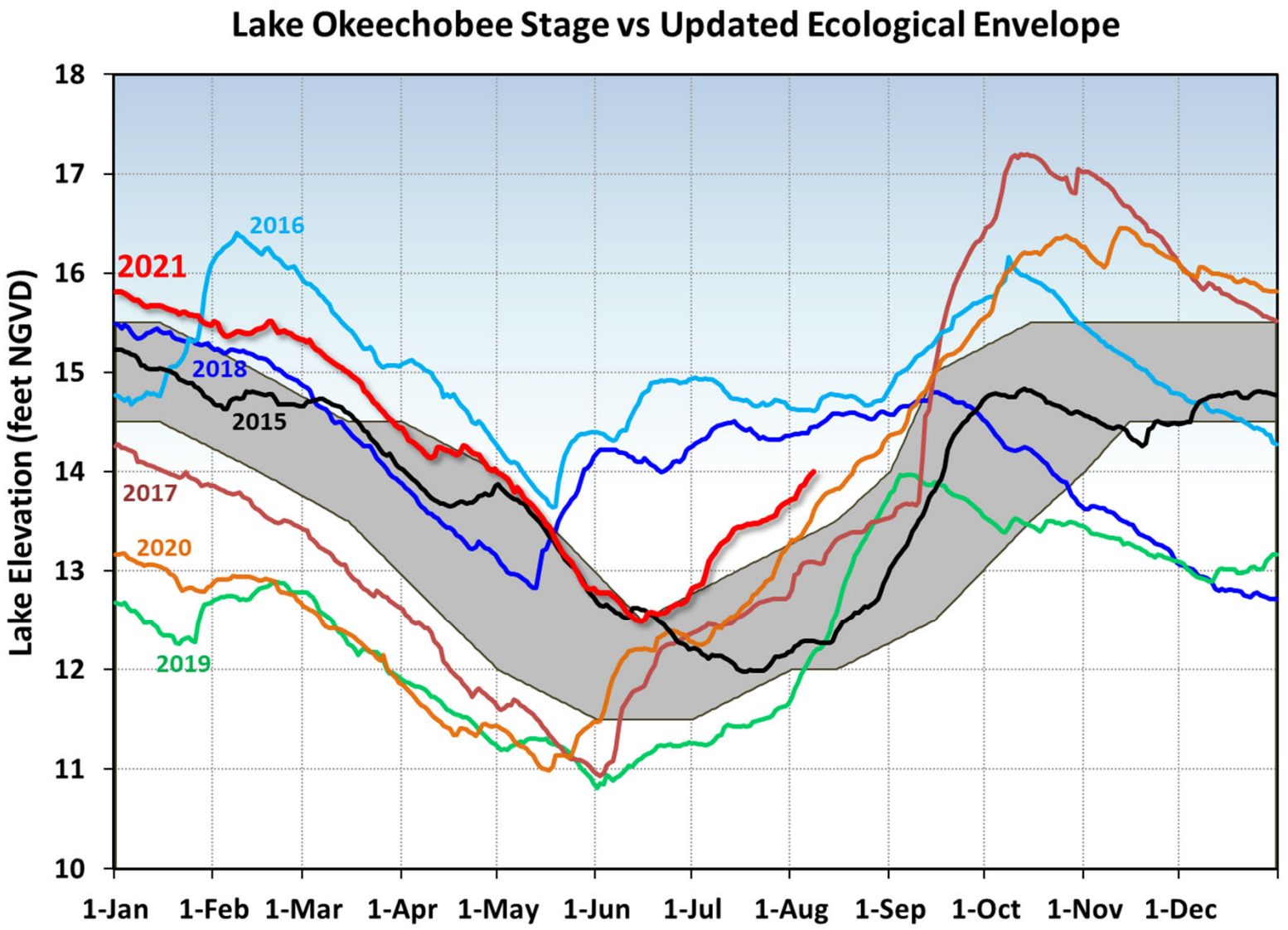
- Dissolved oxygen (DO) sags and crashes tend to occur in wet season as water temperature and water depth increase in the Kissimmee River
- DO declined this week below 1 mg/L, which can be lethal to native fish
- Implementation of the Headwaters Regulation Schedule is expected to help ameliorate these sags in dissolved oxygen levels

Lake Okeechobee Water Depth Maps



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

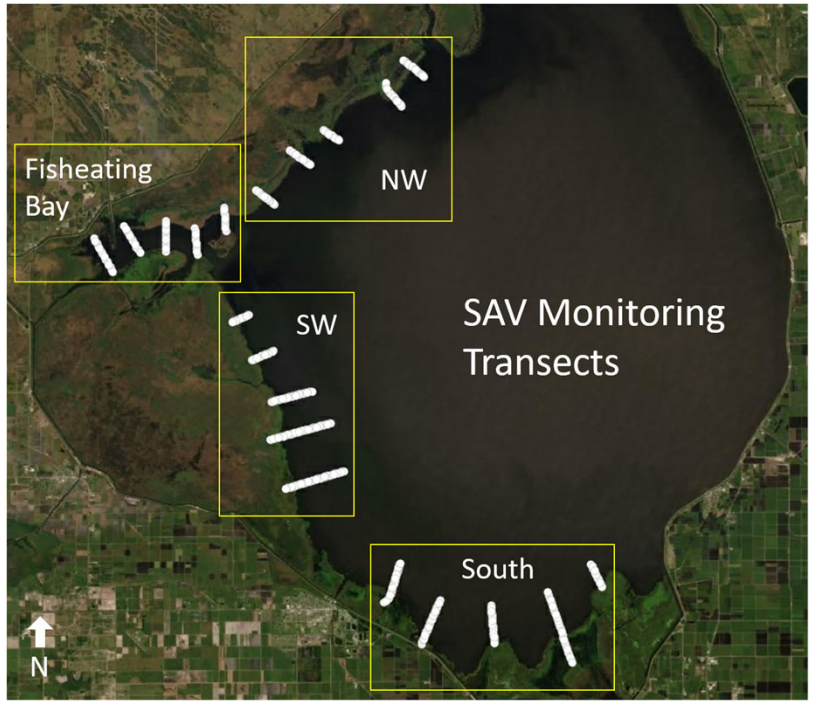
Lake Okeechobee Stages and Ecological Envelope



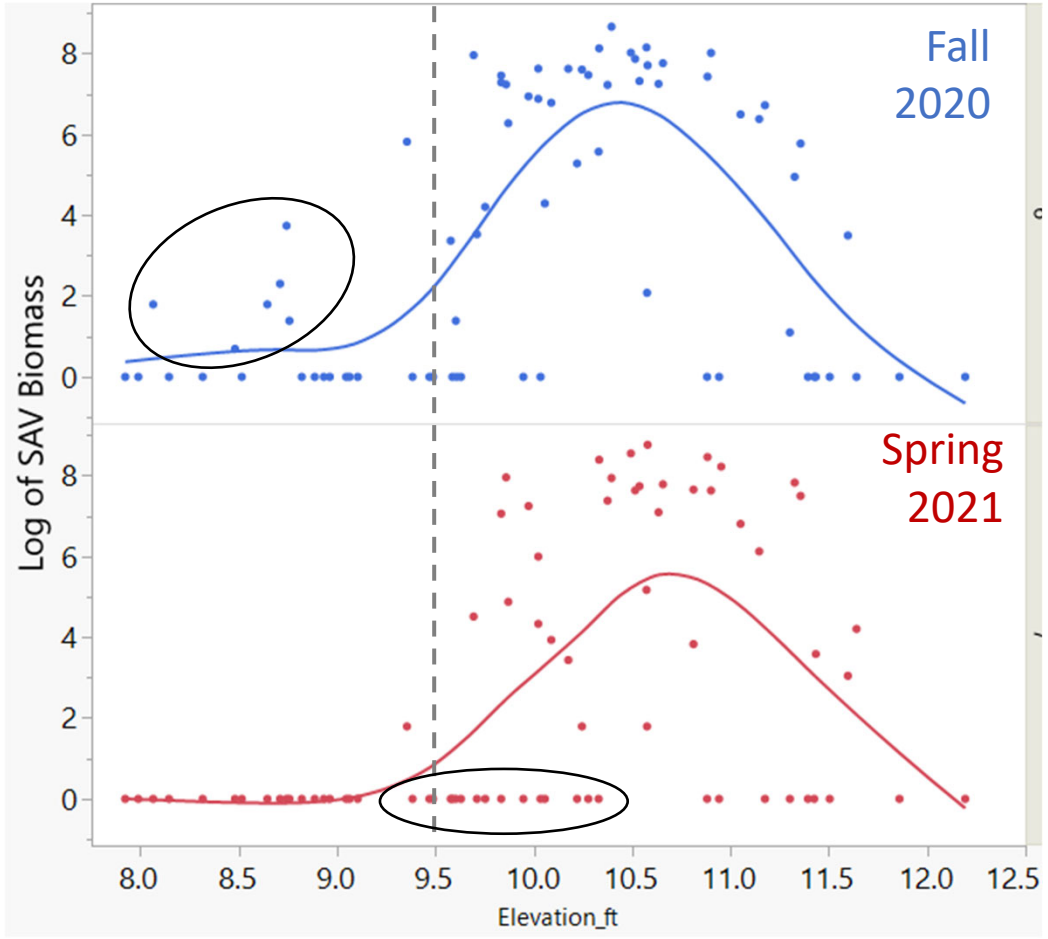

Water lotus, Moonshine Bay – Okeechobee, Aug 2020

Presenter: Lawrence Glenn

Submerged Aquatic Vegetation



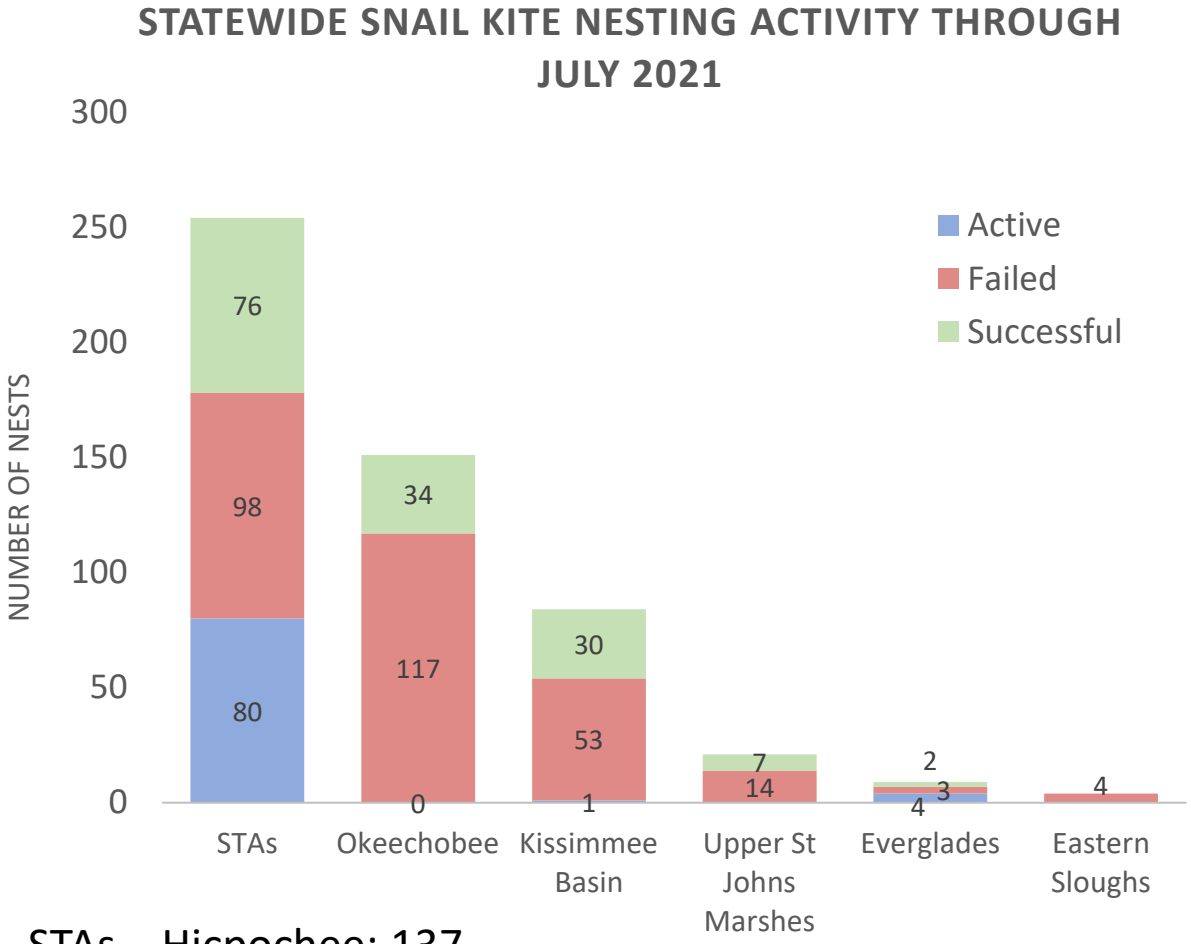
SAV Biomass 2020-2021: NW, SW Shorelines

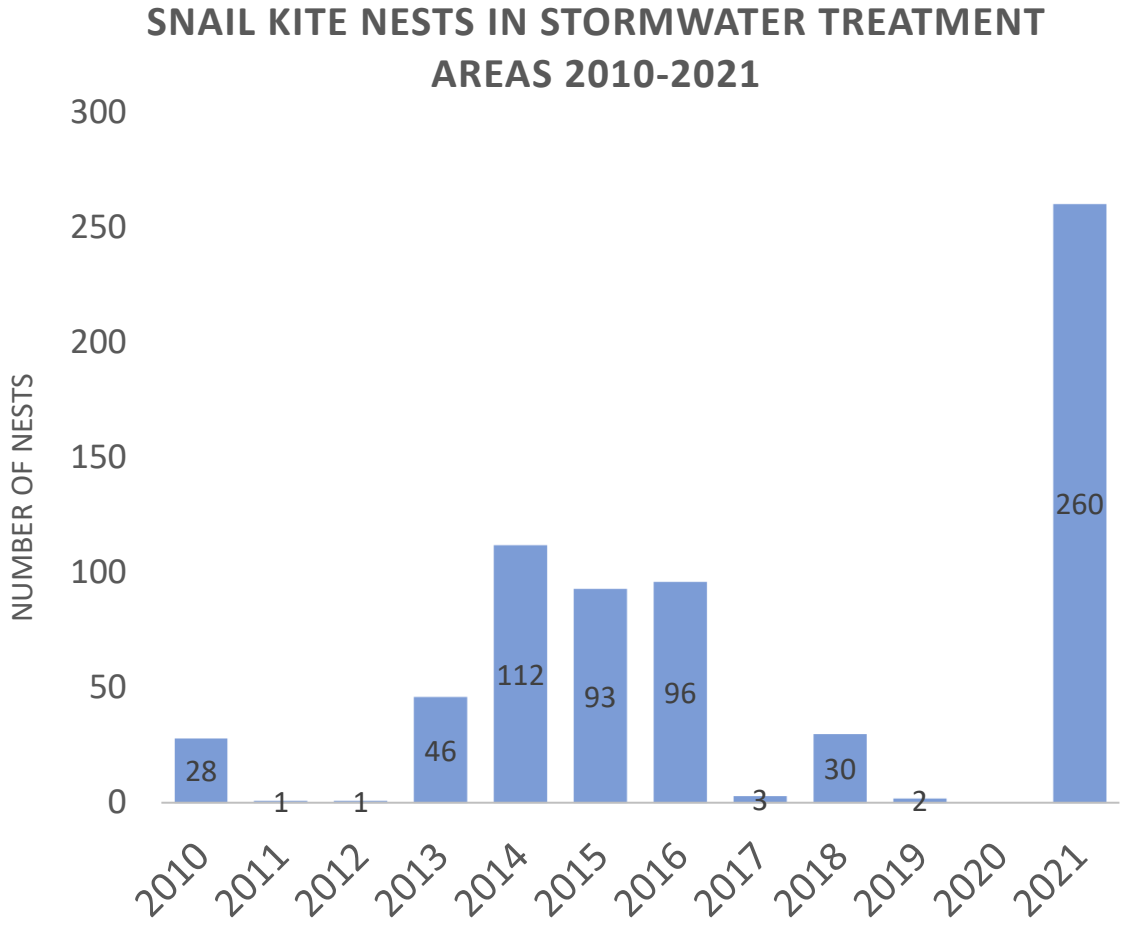


Deeper Water

- Loss of small plants in deeper areas (<9.5ft elevation) after high lake stages in winter 2020
- Robust, tall SAV survived but is more patchy
- More areas with no SAV especially at <10.5’ elev.

Snail Kite Nesting Activity

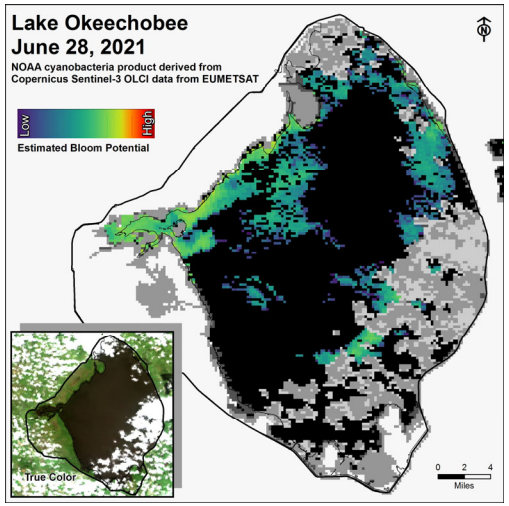


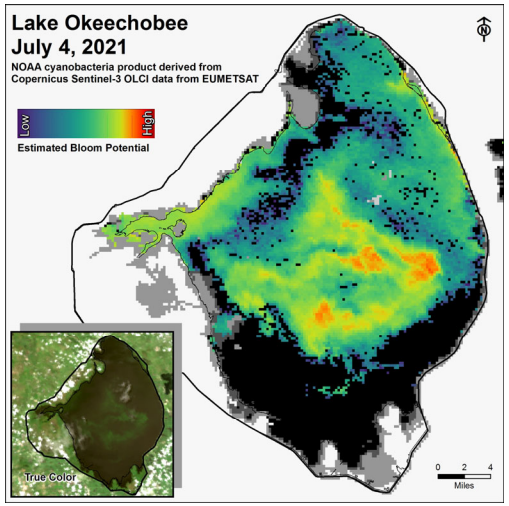


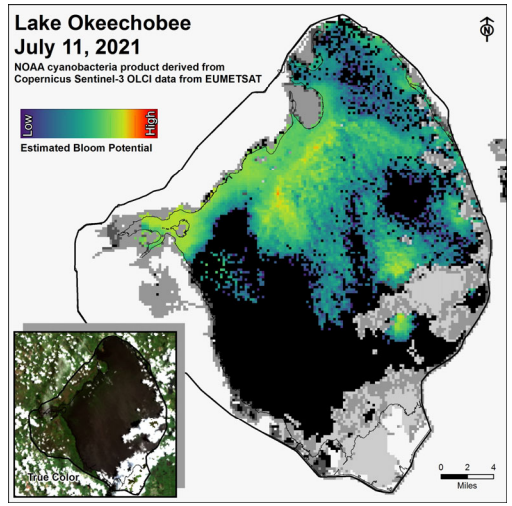
STAs – Hicpochee: 137
C-44: 71
A1FEB: 43

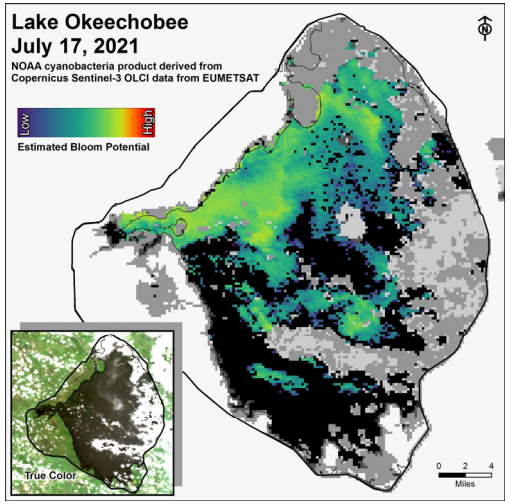
Presenter: Lawrence Glenn

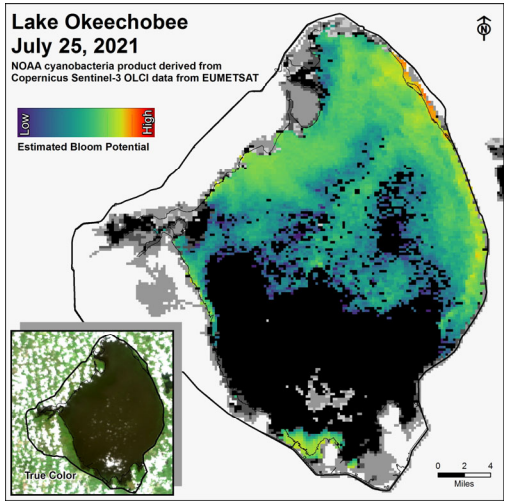
Lake Okeechobee
Cyanobacteria Bloom Potential

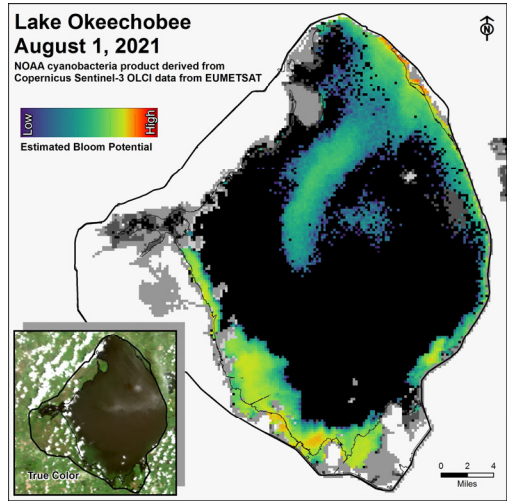


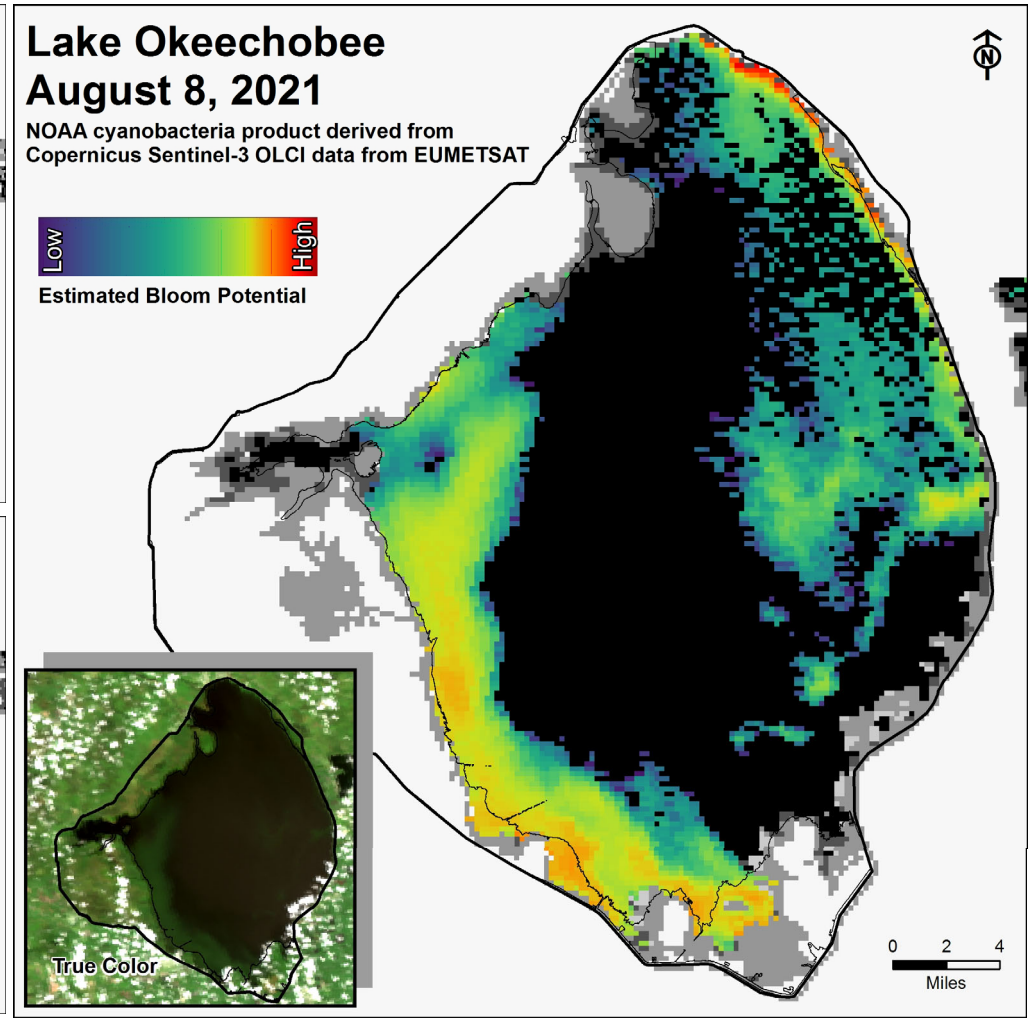












NOAA cyanobacteria product derived from Copernicus Sentinel-3 OLCI data from EUMETSAT

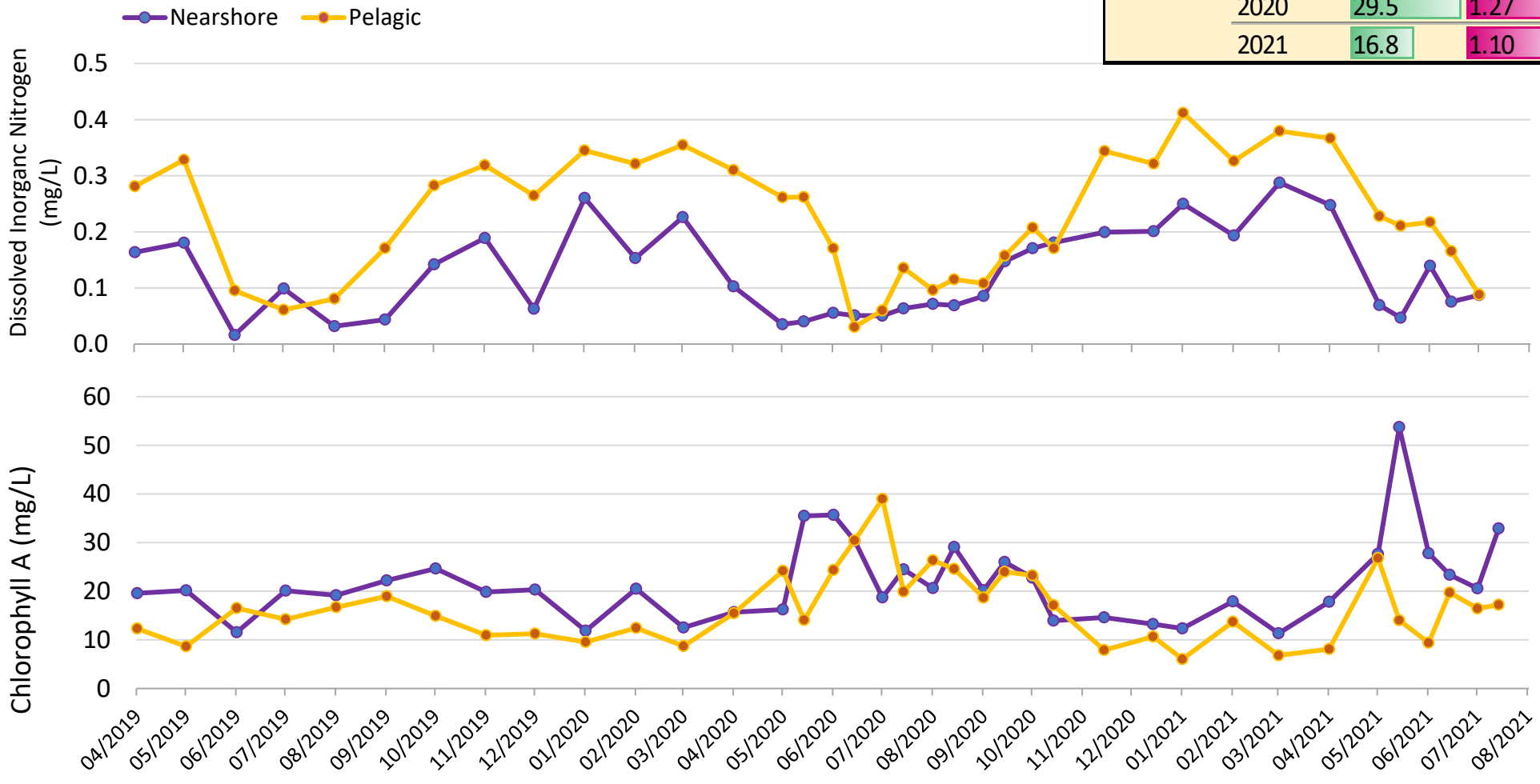
SOUTH FLORIDA WATER

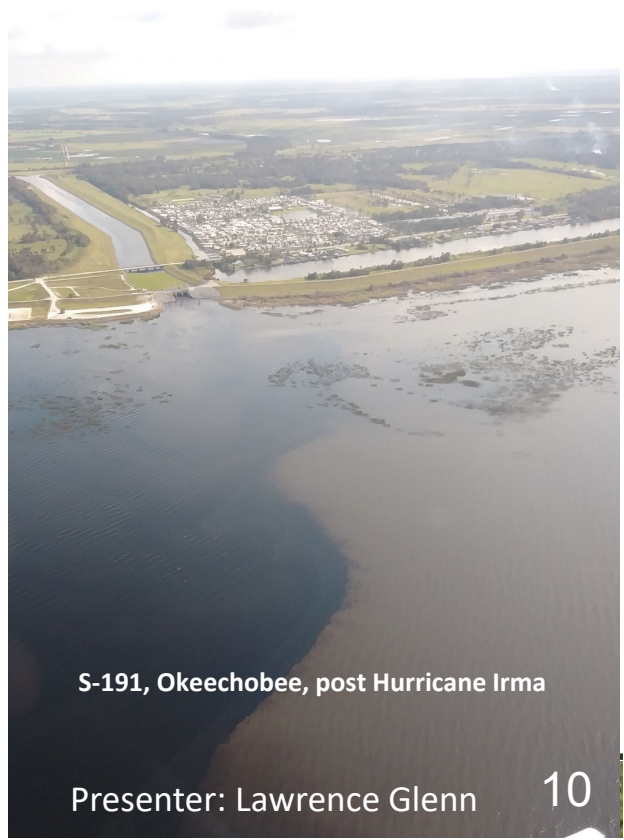
Recent Water Quality

Provisional Data

- Nearshore and pelagic DIN remain lower after initial heavy bloom activity

July	Year	Chl-A	TN	DIN	TP	SRP	Turbidity
Nearshore	2017	36.0	1.72	0.133	0.122	0.061	7.6
	2018	31.0	1.52	0.034	0.122	0.033	15.6
	2019	20.1	1.32	0.099	0.065	0.026	6.2
	2020	21.6	1.22	0.057	0.071	0.022	5.2
	2021	26.7	1.20	0.087	0.086	0.030	8.1
Pelagic	2017	10.6	1.14	0.184	0.124	0.064	13.7
	2018	17.9	1.14	0.032	0.148	0.069	22.0
	2019	14.2	1.28	0.061	0.149	0.044	39.6
	2020	29.5	1.27	0.098	0.133	0.049	25.1
	2021	16.8	1.10	0.088	0.126	0.051	25.6





Presenter: Lawrence Glenn

SOUTH FLORIDA WATER

Recent Water Quality

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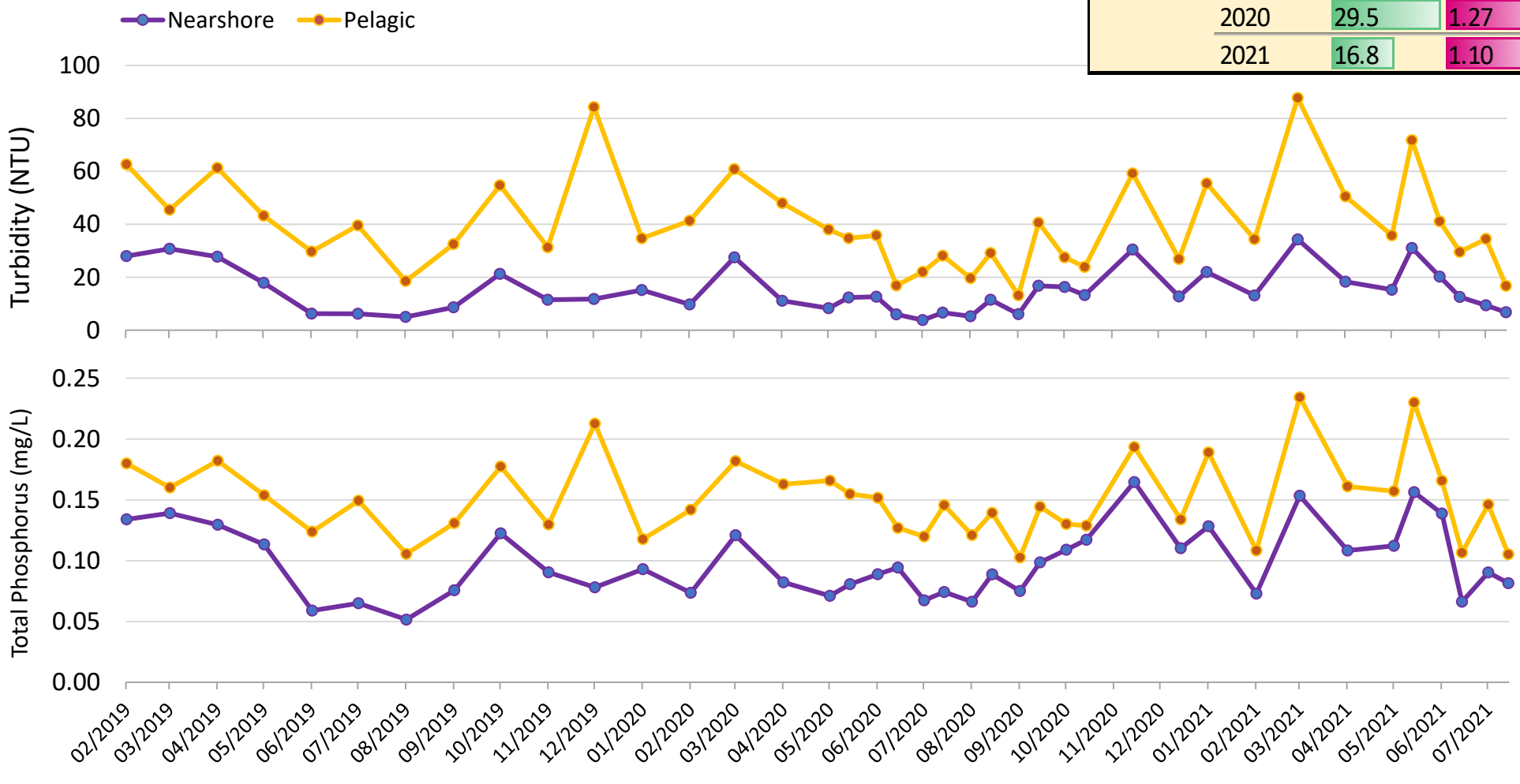
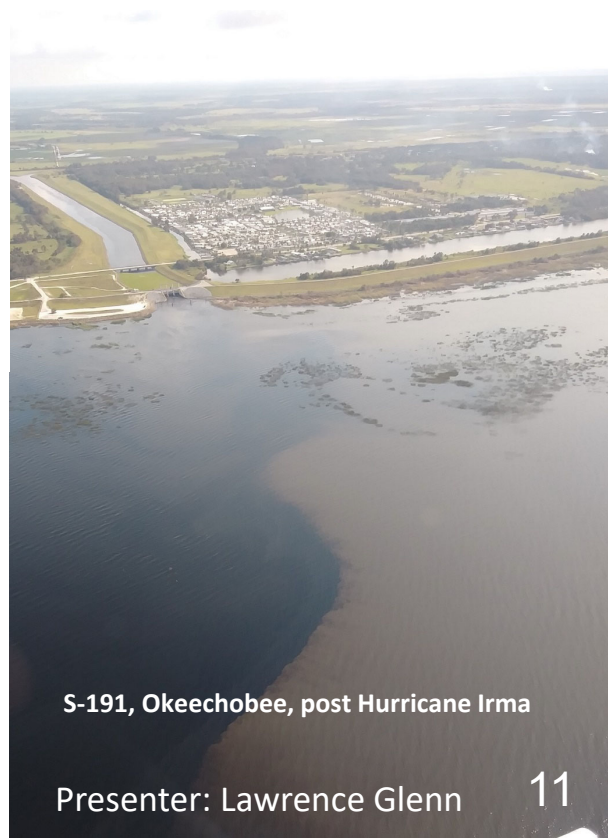
Turbidity and Total Phosphorus decreased since May

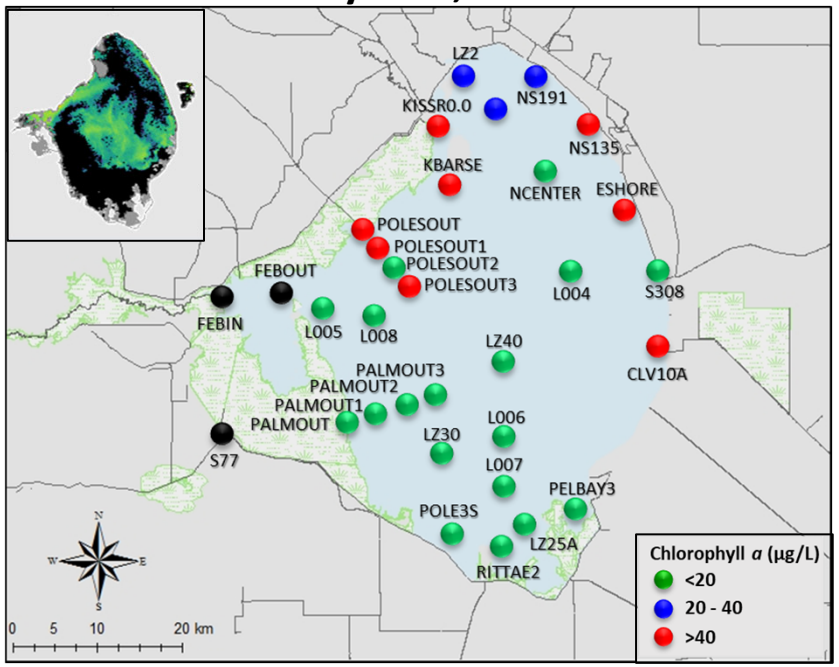




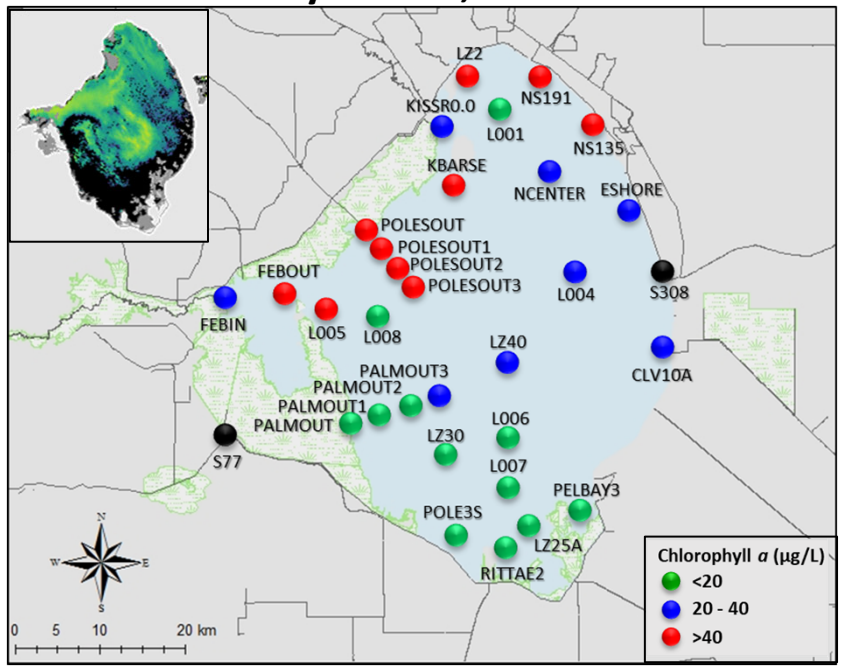
Presenter: Lawrence Glenn

July 2021 Phytoplankton Biomass Concentrations

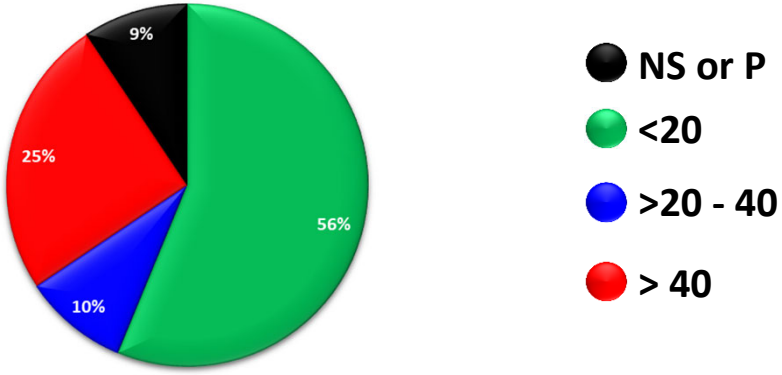
July 7 - 8, 2021

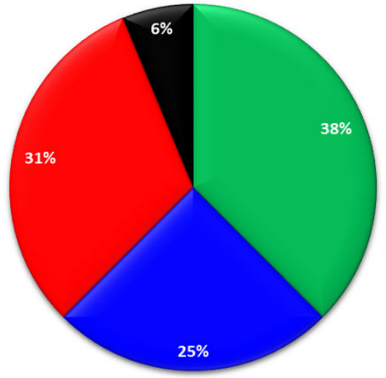


July 19 - 21, 2021



% of Samples in Different Chlorophyll *a* (µg/L) Categories





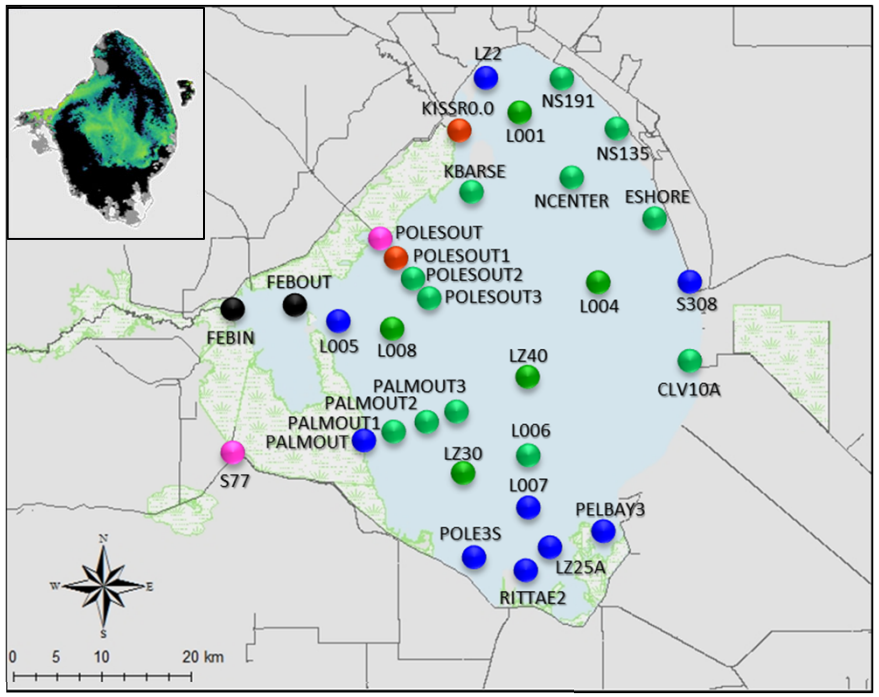
Chlorophyll *a* (µg/L)
(*Provisional Data)

Station	Survey 5 (July 7 - 8)	Survey 6 (July 19 - 21)
FEBIN	NS	37.6
FEBOUT	NS	76.6
KISSR0.0	61.5	20.9
L005	18.2	67.6
LZ2	36.70	55.1
KBARSE	72.3	43.6
RITTAE2	4.03	2.7
PELBAY3	3.8	7.4
POLE3S	3.87	2.8
LZ25A	3.01	7.3
PALMOUT	10.9	7.3
PALMOUT1	4.83	15.7
PALMOUT2	7.69	9.6
PALMOUT3	5.44	24.8
POLESOUT	43.3	125
POLESOUT1	68.6	142
POLESOUT2	16.7	120
POLESOUT3	45.5	58.1
EASTSHORE	42.8	29.2
NES135	82.2	40.5
NES191	36.6	64.9
L001	22	15.2
L004	16.6	21.2
L006	8.51	10.5
L007	9.53	11.1
L008	12.8	18.1
LZ30	7.78	8.6
LZ40	14	24.7
CLV10A	40.4	28.4
NCENTER	19.1	20.9
S308C	5.67	13.1
S77	P	10.4

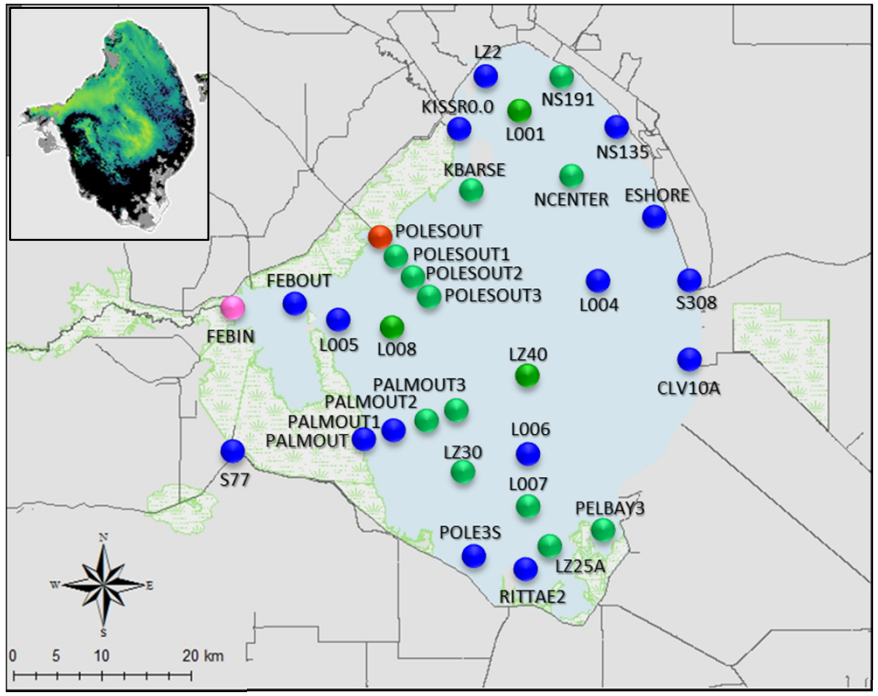
Presenter: Lawrence Glenn

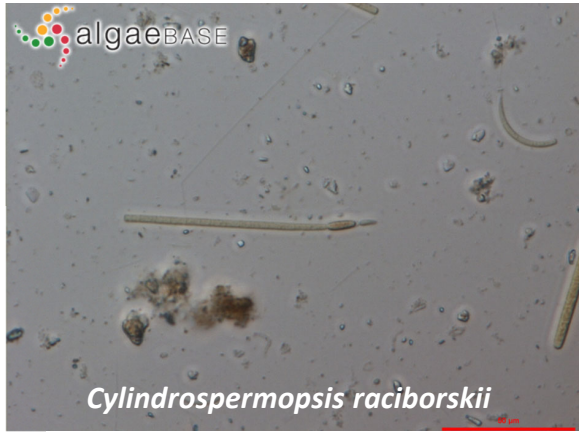
July 2021 Dominant Cyanobacteria Taxa

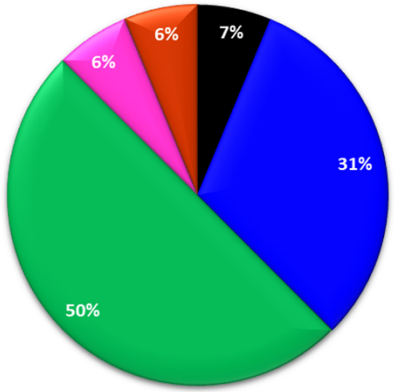
July 6 - 8, 2021



July 19 - 21, 2021

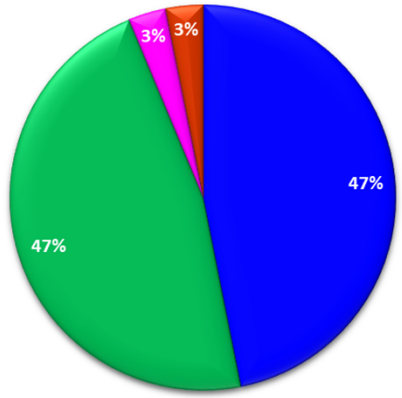






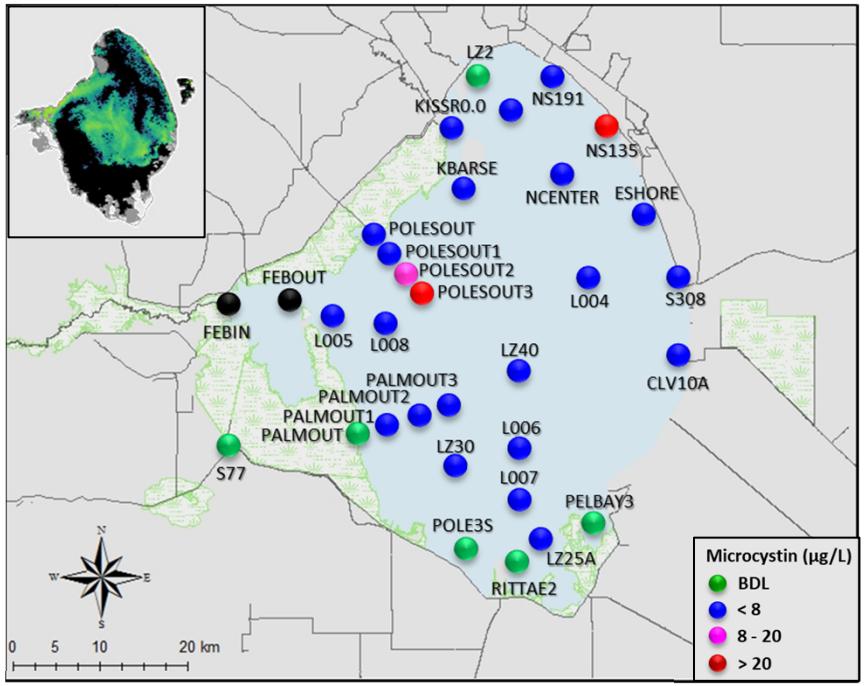
% of Samples in Different Taxa Category

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

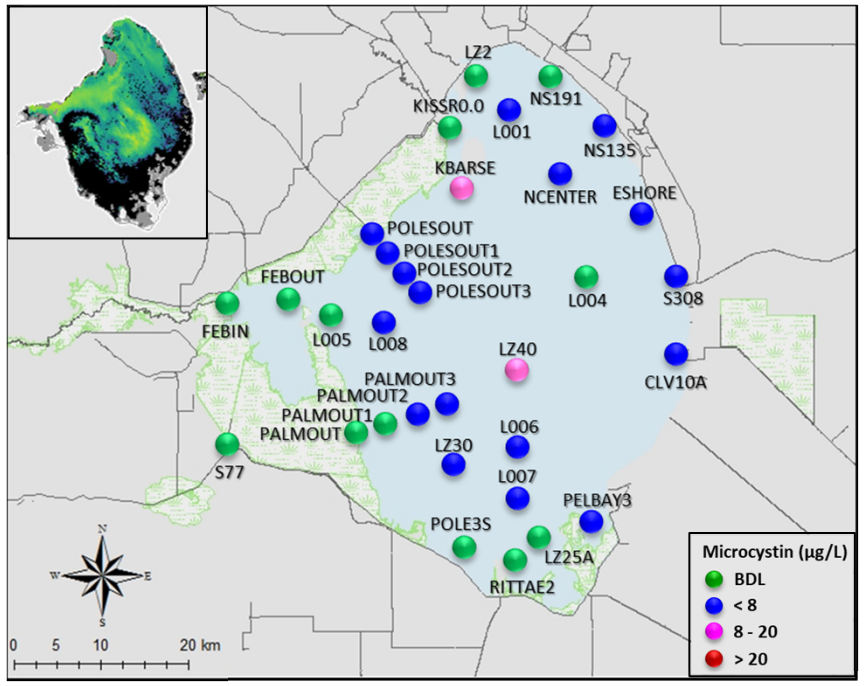


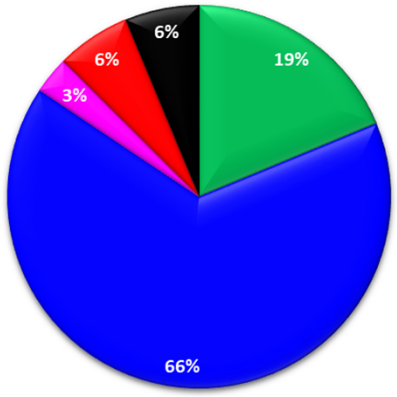
July 2021 Toxin Concentrations

July 6 - 8, 2021



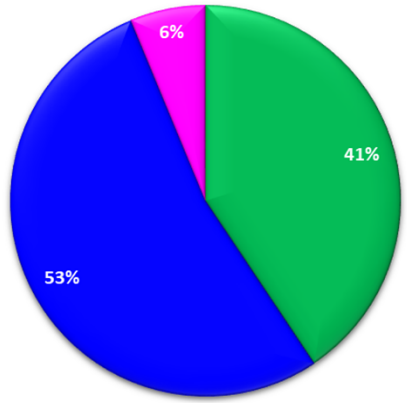
July 19 - 21, 2021





Microcystin Concentration (µg/L)

- Below Detection Level (BDL)
- < 8
- 8 - 20
- > 20
- Not sampled

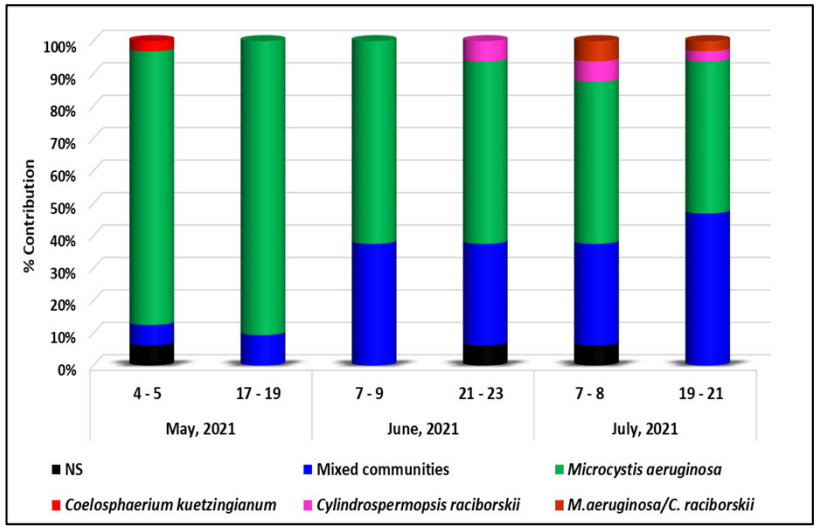


Microcystin (µg/L)
(*Provisional Data)

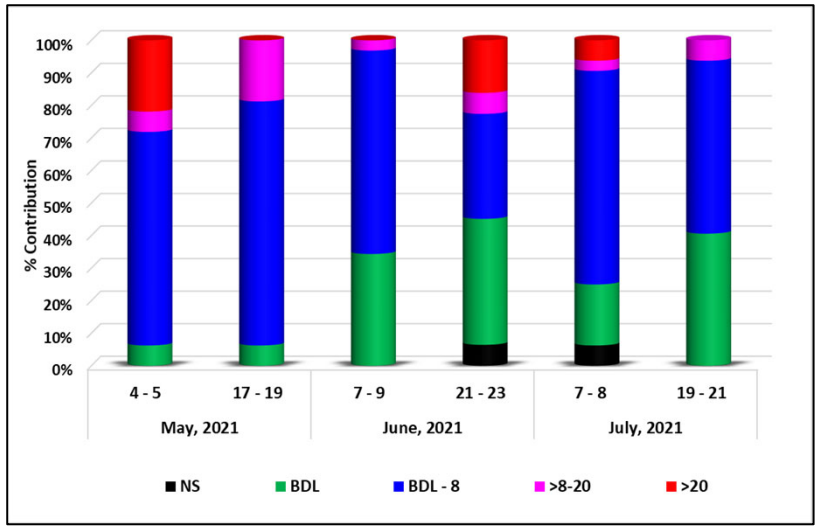
Station	Survey 5 (July 7 - 8)	Survey 6 (July 19 - 21)
FEBIN	NS	BDL
FEBOUT	NS	BDL
KISSR0.0	0.4	BDL
L005	0.5	BDL
LZ2	BDL	BDL
KBARSE	0.7	13
RITTAE2	BDL	BDL
PELBAY3	BDL	0.3
POLE3S	BDL	BDL
LZ25A	0.3	BDL
PALMOUT	BDL	BDL
PALMOUT1	2.3	BDL
PALMOUT2	0.5	1.8
PALMOUT3	2	5
POLESOUT	0.3	0.3
POLESOUT1	2.5	0.5
POLESOUT2	12	0.5
POLESOUT3	37	6.7
EASTSHORE	5.2	0.4
NES135	21	0.3
NES191	0.4	BDL
L001	1.7	6.7
L004	0.7	BDL
L006	0.3	0.5
L007	0.3	0.3
L008	7.5	3.3
LZ30	0.8	1.7
LZ40	5.3	9.7
CLV10A	7.3	0.3
NCENTER	0.8	5
S308C	0.7	0.3
S77	BDL	BDL

Summary - May and July BGA Surveys

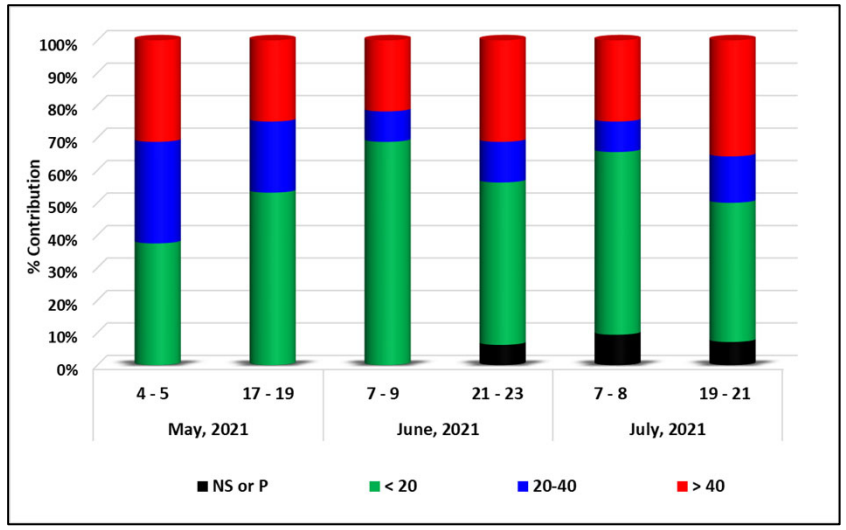
Dominant Taxa



Microcystin (µg/L)



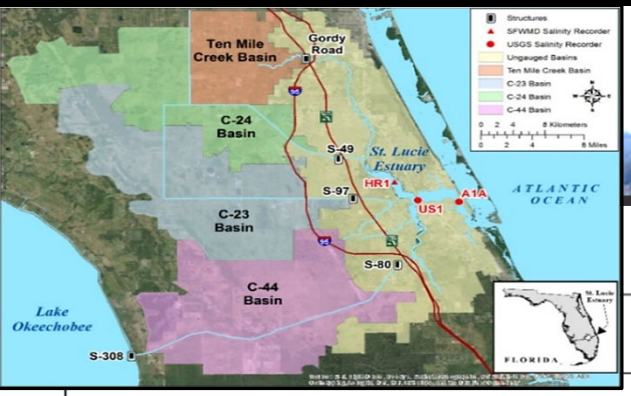
Chlorophyll *a* (µg/L)




Microcystis aeruginosa

- **The abundance of *Microcystis aeruginosa,* decreased over time and was < 50% of the total for the first time in late July. Concurrently, the percent of mixed taxa communities increased.**
- **Since May, between 69-97 % of the samples had microcystin concentrations < 8 µg/L. The highest percent of samples with toxin concentration > 8 µg/L (22%) and the max. toxin concentration (440 µg/L at PALMOUT3) was recorded in early May.**
- **Since May, less than 35% of the sites had bloom conditions (chl *a* > 40 µg/L). The highest bloom value (142 µg/L at POLESOUT1) was recorded in late July. Southern part of the Lake had persistent low phytoplankton biomass since early May, while NW and NE nearshore areas had persistent high biomass.**

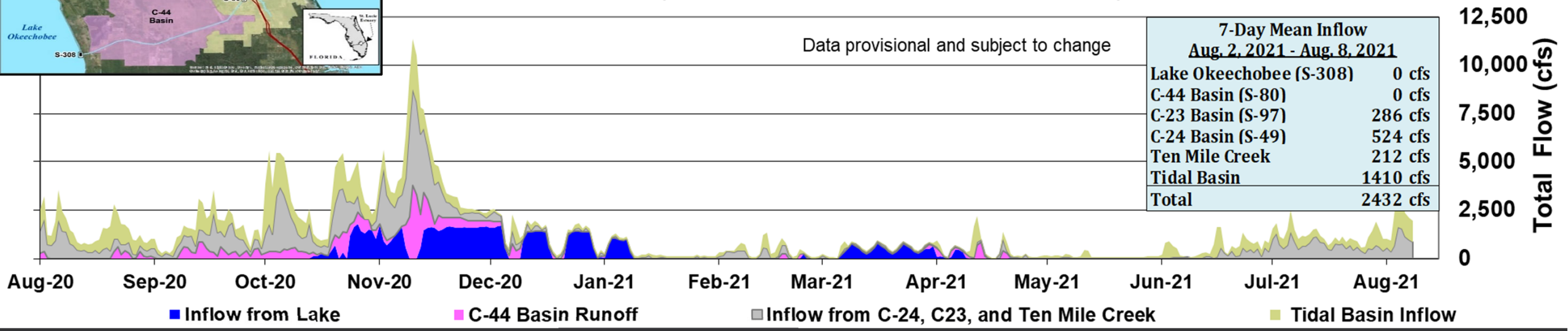
St. Lucie Inflows and Salinity Conditions

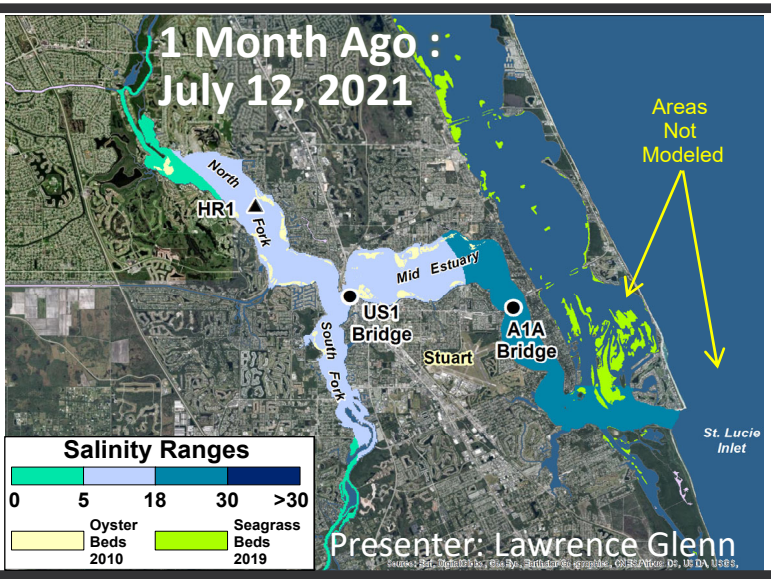


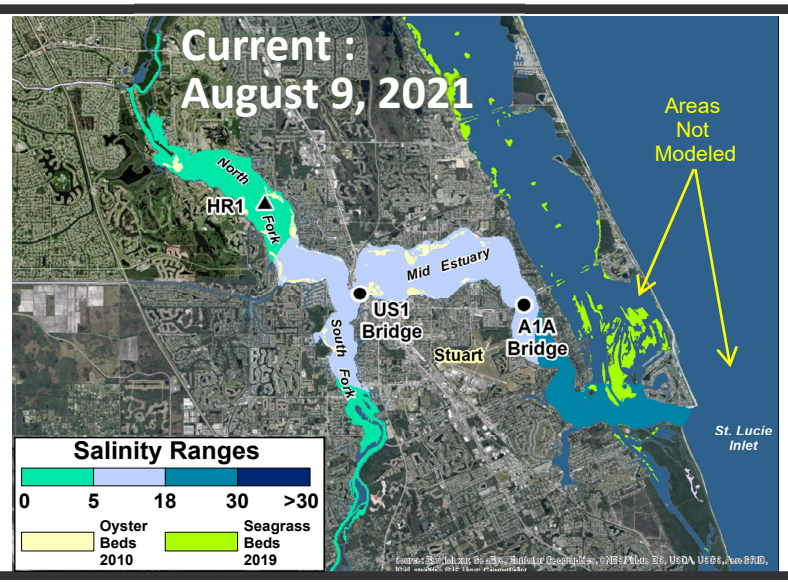
Total Daily Inflow into the St. Lucie Estuary

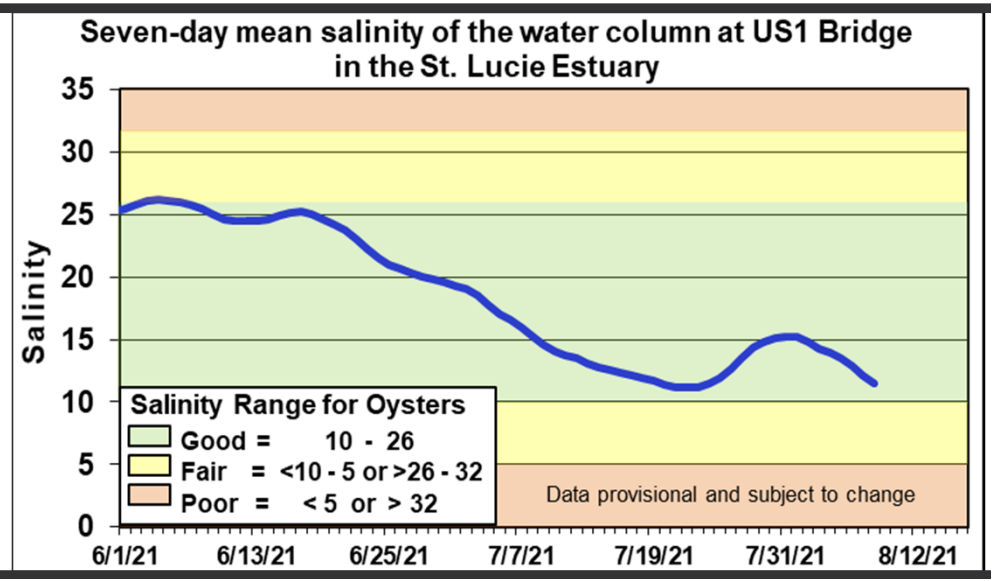
Data provisional and subject to change

7-Day Mean Inflow Aug. 2, 2021 - Aug. 8, 2021	
Lake Okeechobee (S-308)	0 cfs
C-44 Basin (S-80)	0 cfs
C-23 Basin (S-97)	286 cfs
C-24 Basin (S-49)	524 cfs
Ten Mile Creek	212 cfs
Tidal Basin	1410 cfs
Total	2432 cfs

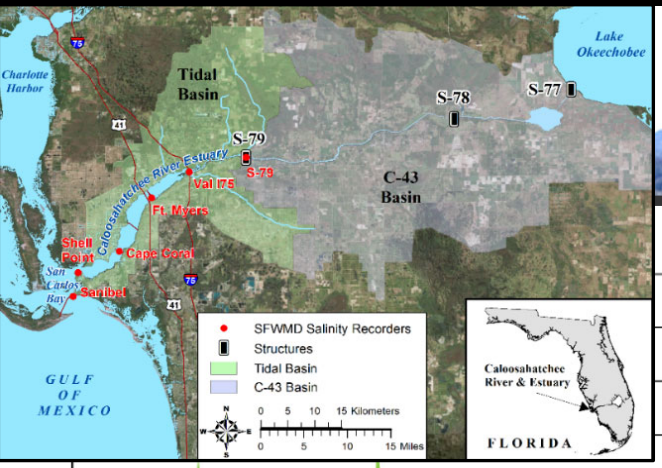






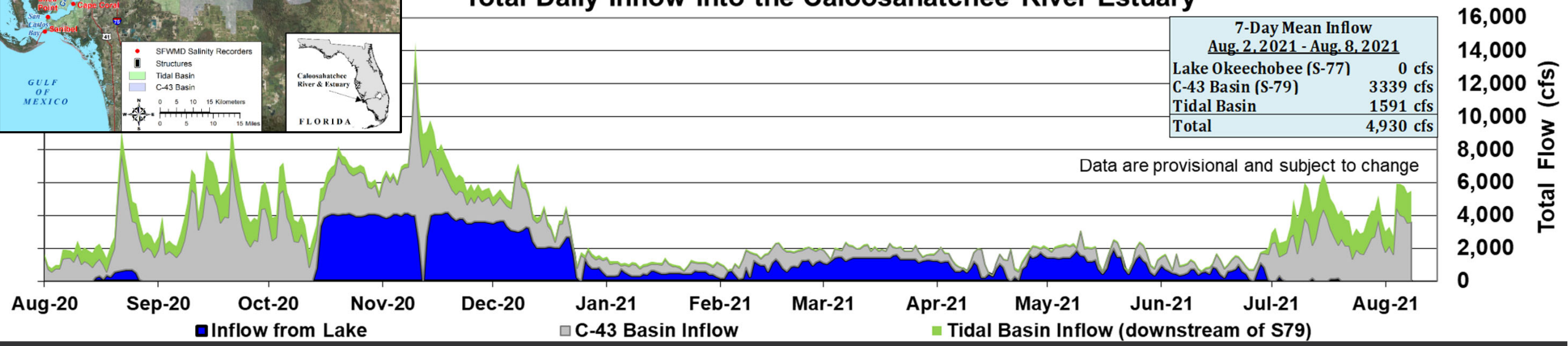


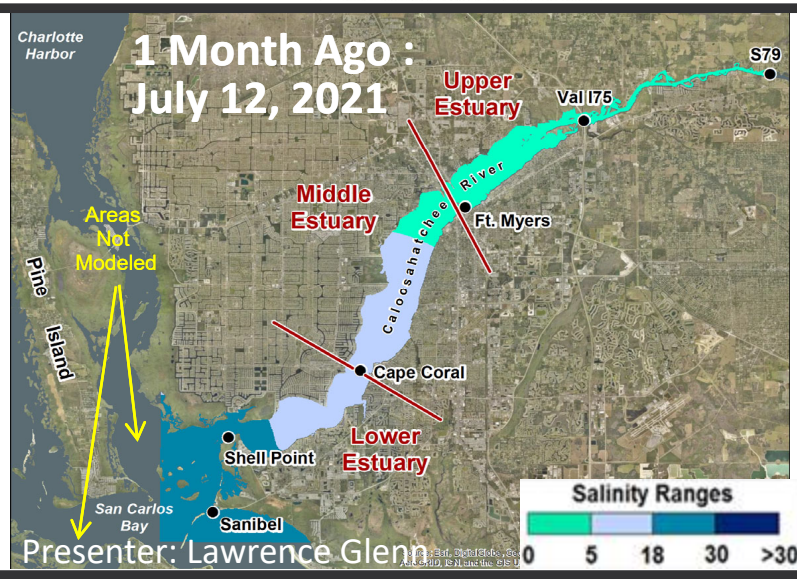
Caloosahatchee Inflows and Salinity Conditions

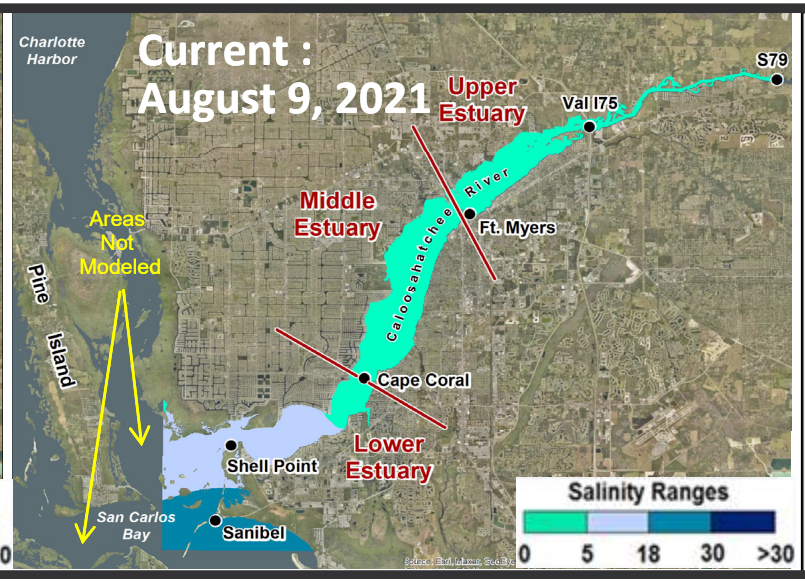


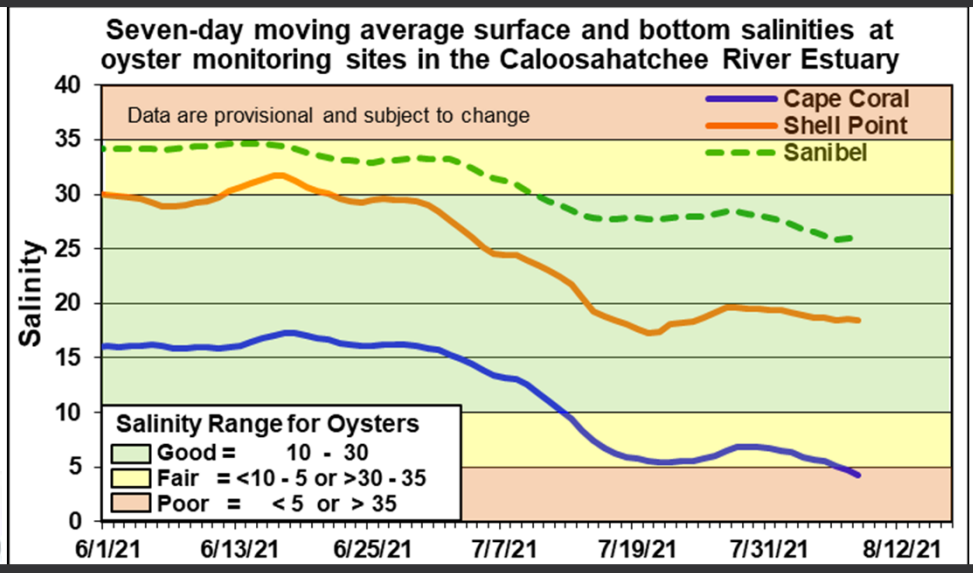
Total Daily Inflow into the Caloosahatchee River Estuary

7-Day Mean Inflow Aug. 2, 2021 - Aug. 8, 2021	
Lake Okeechobee (S-77)	0 cfs
C-43 Basin (S-79)	3339 cfs
Tidal Basin	1591 cfs
Total	4,930 cfs









Presenter: Lawrence Glenn

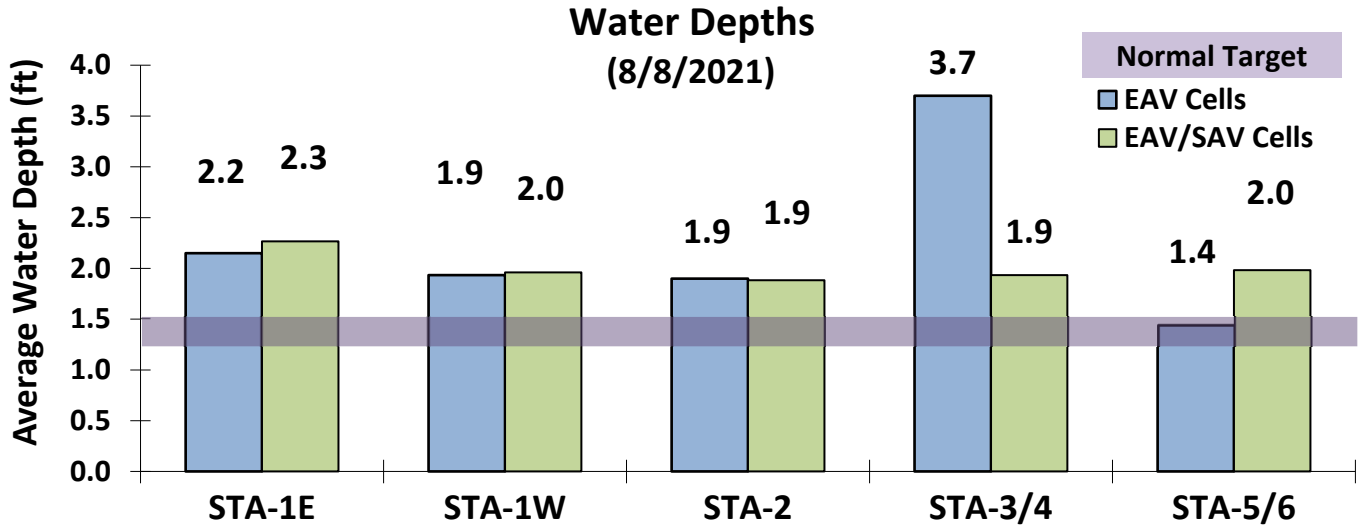
Everglades Stormwater Treatment Areas (STAs)

- STAs treated basin runoff and Lake releases in July
  - Total Inflows to STAs in WY2022 ~409,000 ac-ft
  - Lake Okeechobee releases to STAs in WY2022 ~61,000 ac-ft (15% of total)
- Extensive vegetation management activities underway to address stressed and highly stressed vegetation especially in EAV cells
- Most treatment cells are above target depth

Water Year 2022
5/1/2021 to 8/8/2021

	STA-1E	STA-1W	STA-2	STA-3/4	STA-5/6
Inflow TP Concentration (ppb)	94	181	97	64	223
Outflow TP Concentration (ppb)	20	23	15	17	36
365-day Phosphorus Loading Rate ($g/m^2/yr$)	4.0	1.0	0.8	0.8	0.7
Inflow Volume (ac-ft)	48,400	32,200	116,100	194,000	30,300

Includes preliminary data; all concentrations are flow-weighted means



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

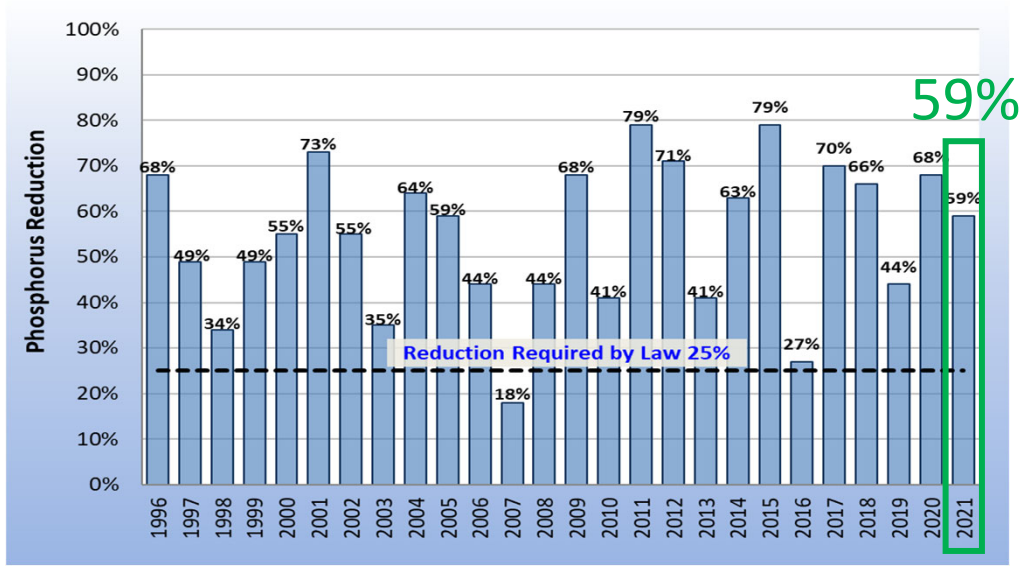
Presenter: Lawrence Glenn

Source Control Programs in the Everglades Agricultural Area and C-139 Basins

The SFWMD monitors Basin discharges to collectively quantify TP loads in runoff from the EAA and C-139 Basins. The TP load for the current Water Year is compared to a period before the BMP Program to determine compliance with required TP levels. The Rule adopted compliance methodology is a 2-part, Target and Limit, test to account for statistical uncertainty. For example, if the target is not met in a single year, the basin is considered to have achieved the expected performance level unless the target is exceeded for three consecutive years. However, exceeding the limit (having a relatively higher statistical certainty) in a single year would be considered to not meet the required TP levels.

EAA Basin Monitoring & Performance Results

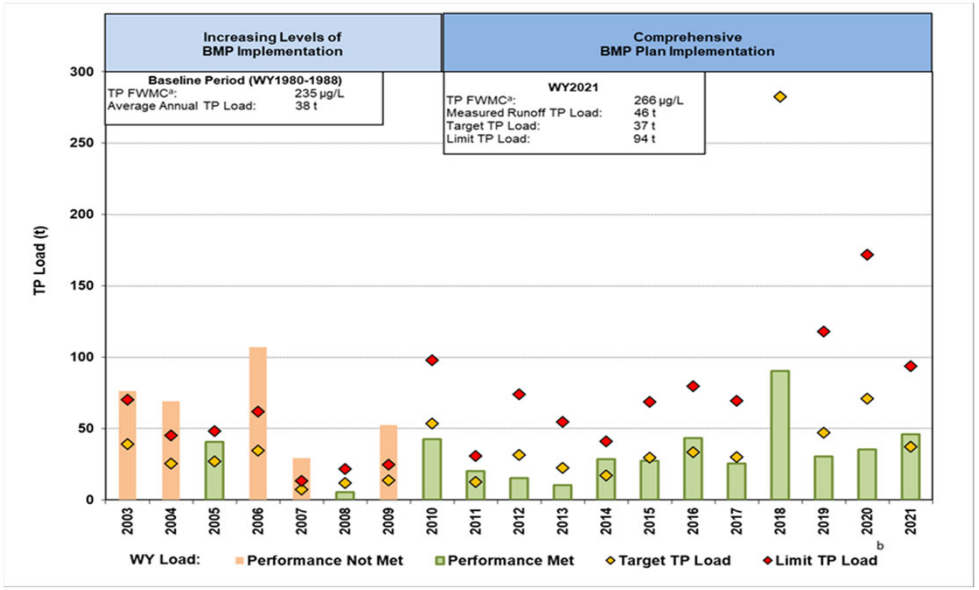
EAA Basin permittees implement BMPs and must collectively reduce total phosphorus (TP) loads in basin runoff in a current water year by 25% compared to the TP loads that occurred during a historic base period, prior to the BMP program being implemented. In Water Year (WY) 2021, the EAA Basin achieved a TP load reduction of 59% (blue bar highlighted in green) compared to the base period meeting the TP load requirements.



*Water year 2007 phosphorus reduction was below 25%, however due to the 2-part test, the EAA Basin was in compliance.

C-139 Basin Monitoring & Performance

TP loads in C-139 Basin runoff in a current WY may not exceed pre-BMP program TP loads. The measured WY2021 TP load, 46 metric tons in discharges, from the basin (as indicated by the green bar) was found to have exceeded the target load, 37 metric tons (yellow diamond), but was below the limit load, 94 metric tons (red diamond). Because the target was not exceeded in three consecutive years, and the Limit was not exceeded, the basin met the TP load requirement.

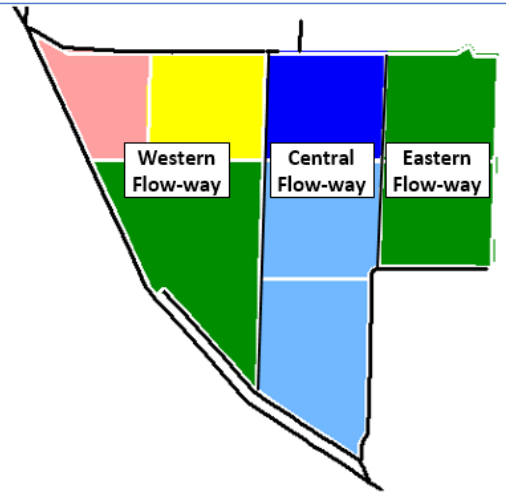


a. TP FWMC calculated based on the measured TP load and the C-139 Basin outflow.
b. WY2018 limit TP load off-scale.

STA-1E

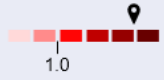
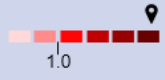
STA-1E Weekly Status Report – 8/2/2021 through 8/8/2021

10,976 ac-ft → Inflow



Outflow → 6,923 ac-ft

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 8/8/2021

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-1E Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	10,976	26,419	288,574
--Lake Inflow, ac-ft	0	N/A	26,200
Total Outflow, ac-ft	6,923	20,251	247,121
Inflow Conc., ppb	62	73	136
Outflow Conc., ppb	15	17	41

Includes Preliminary Data

STA-1W

STA-1W Weekly Status Report – 8/2/2021 through 8/8/2021

4,817 ac-ft → Inflow

Outflow → 8,296 ac-ft

STA-1W 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
Northern	← 🍃 →	1.0	Construction
Western	← 🍃 →	1.0	Construction
Eastern	← 🍃 →	1.0	Construction

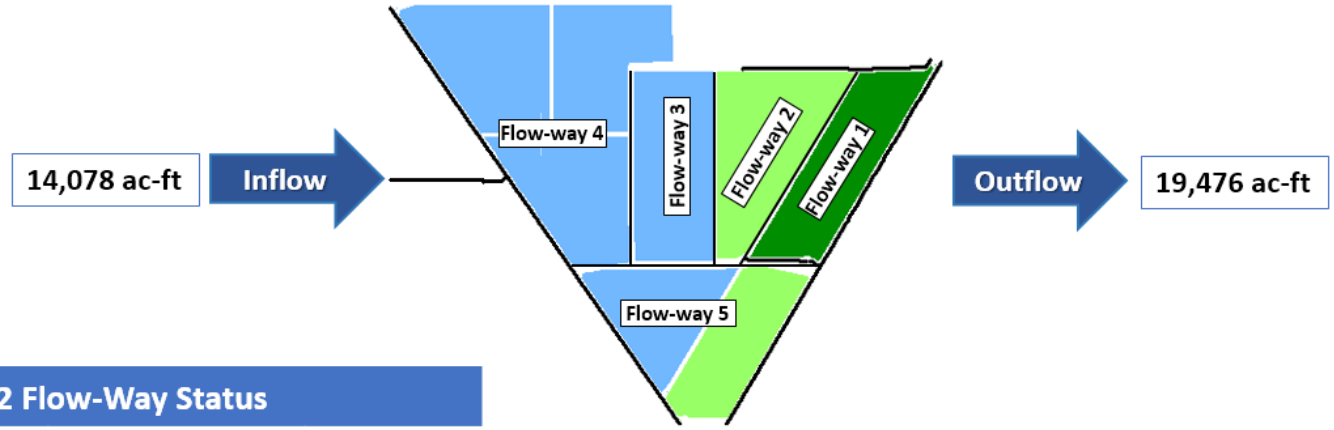
As of 8/8/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-1W Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	4,817	18,450	138,184
--Lake Inflow, ac-ft	0	N/A	7,700
Total Outflow, ac-ft	8,296	18,023	147,580
Inflow Conc., ppb	172	173	246
Outflow Conc., ppb	19	20	39
Includes Preliminary Data			

STA-2

STA-2 Weekly Status Report – 8/2/2021 through 8/8/2021



STA-2 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
1		1.0	Online
2		1.0	Construction
3		1.0	Vegetation Rehab
4		1.0	Vegetation Rehab
5		1.0	Online

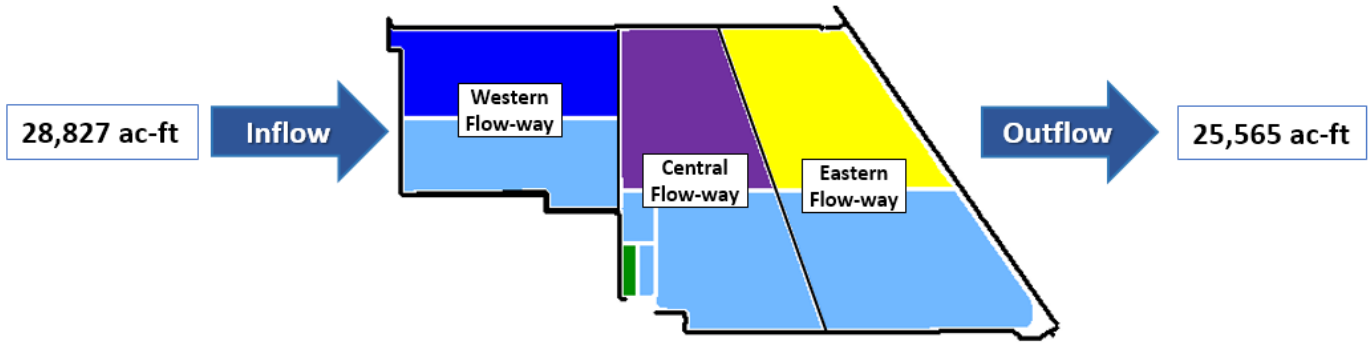
As of 8/8/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-2 Flow & Phosphorus Concentration

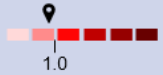
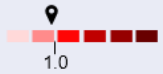
	7-day	28-day	365-day
Total Inflow, ac-ft	14,078	37,312	424,009
--Lake Inflow, ac-ft	0	N/A	90,800
Total Outflow, ac-ft	19,476	48,486	467,909
Inflow Conc., ppb	132	102	93
Outflow Conc., ppb	15	15	20
Includes Preliminary Data			

STA-3/4

STA-3/4 Weekly Status Report – 8/2/2021 through 8/8/2021



STA-3/4 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	Offline, vegetation management drawdown as of 3/1/2021		
Central			Online
Western			Online

As of 8/8/2021	
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

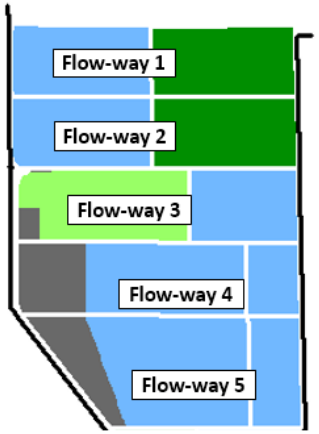
STA-3/4 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	28,827	69,942	533,462
--Lake Inflow, ac-ft	0	N/A	61,600
Total Outflow, ac-ft	25,565	62,673	494,539
Inflow Conc., ppb	67	60	62
Outflow Conc., ppb	14	14	14
Includes Preliminary Data			

STA-5/6

STA-5/6 Weekly Status Report – 8/2/2021 through 8/8/2021

10,189 ac-ft → Inflow



Outflow → 11,573 ac-ft

STA-5/6 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
1		1.0	Online
2		N/A	Post-construction
3		N/A	Post-construction
4		1.0	Online
5		1.0	Online

As of 8/8/2021

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

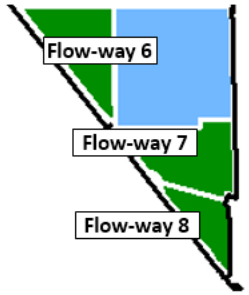
STA-5/6 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	10,189	27,236	129,637
--Lake Inflow, ac-ft	0	N/A	9,000
Total Outflow, ac-ft	11,573	18,531	146,012
Inflow Conc., ppb	246	231	280
Outflow Conc., ppb	37	36	72

Includes Preliminary Data

STA-5/6

STA-5/6 Weekly Status Report – 8/2/2021 through 8/8/2021

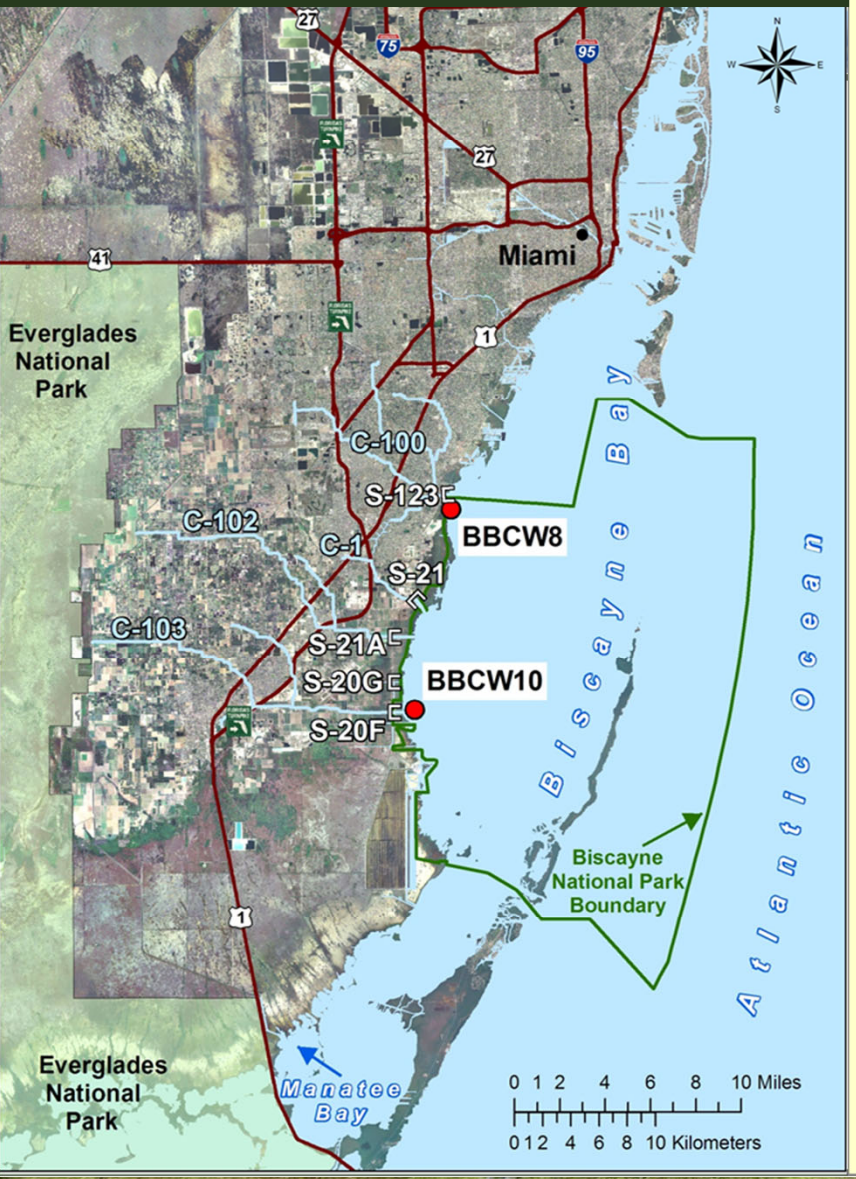


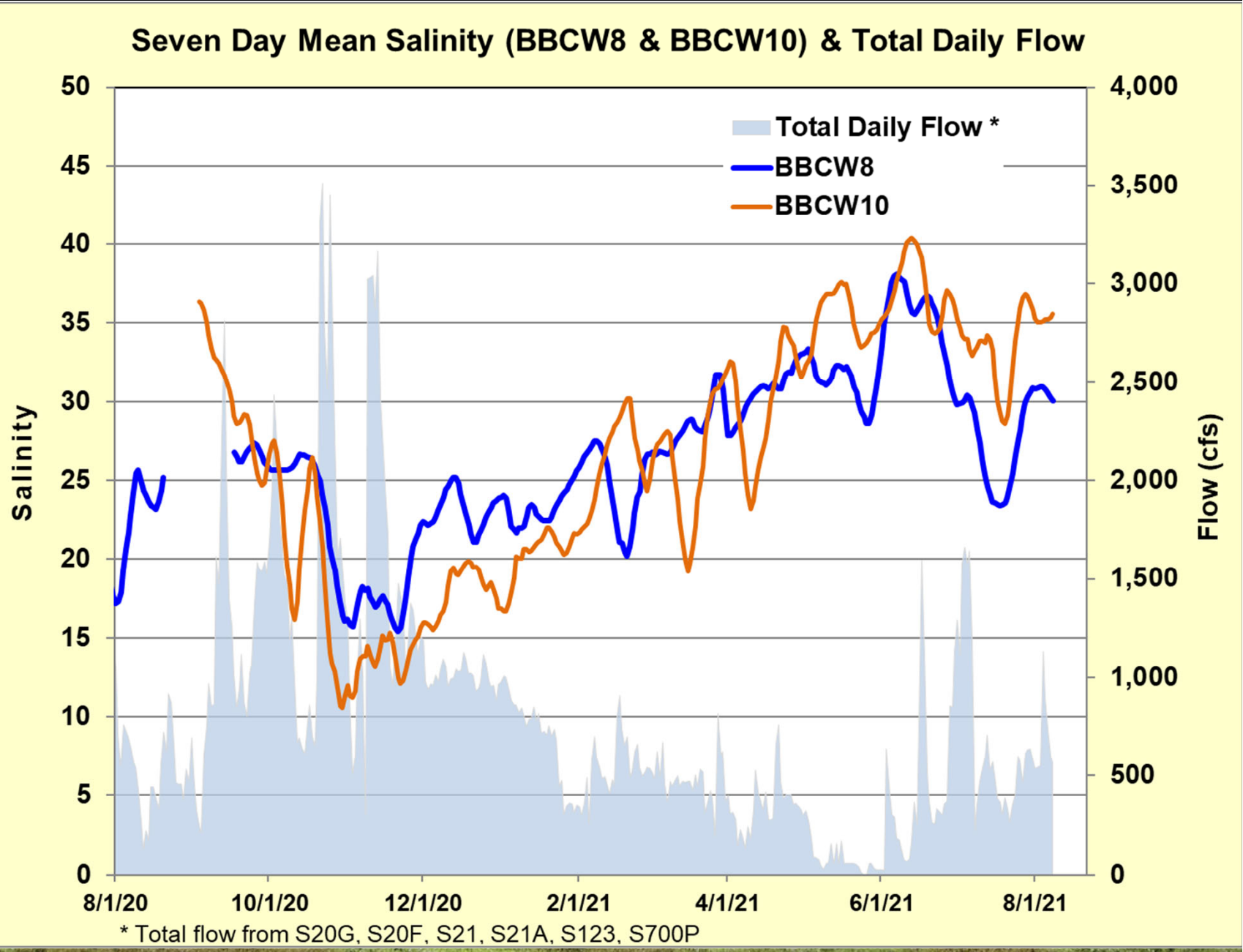
STA-5/6 Flow-Way Status

Flow-Way	Vegetation Status (Healthy ------ Stressed)	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
6		1.0	Online
7		1.0	Online
8		1.0	Online

As of 8/8/2021	
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

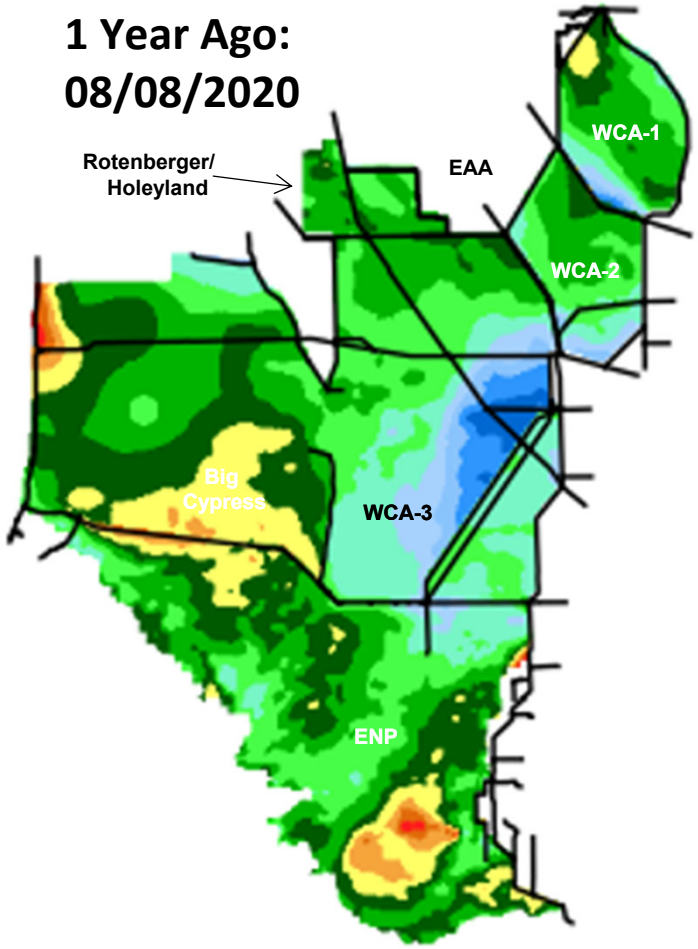
Biscayne Bay



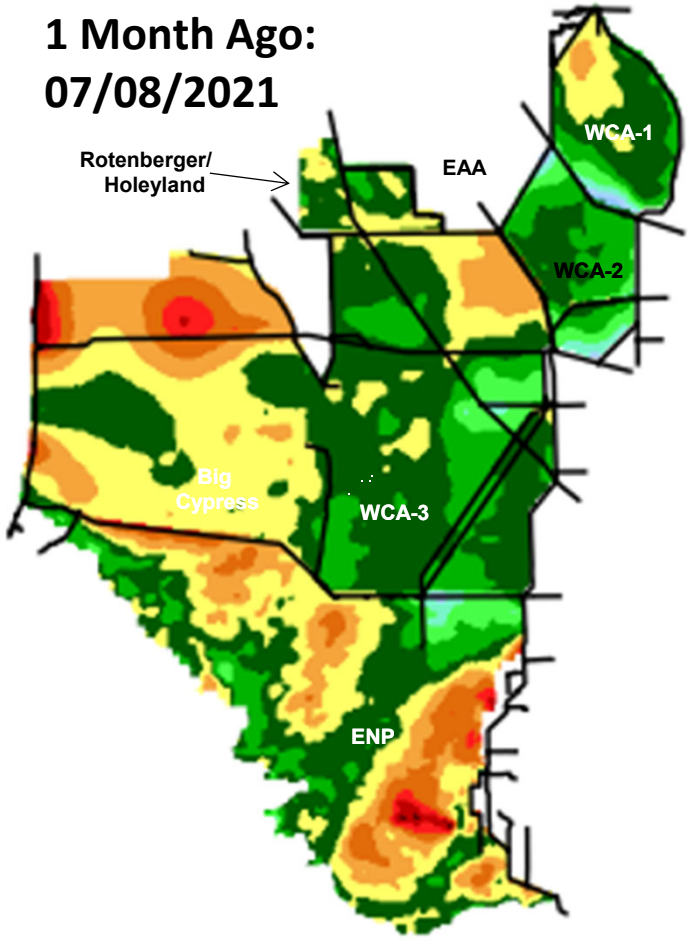


Everglades Water Depth Maps

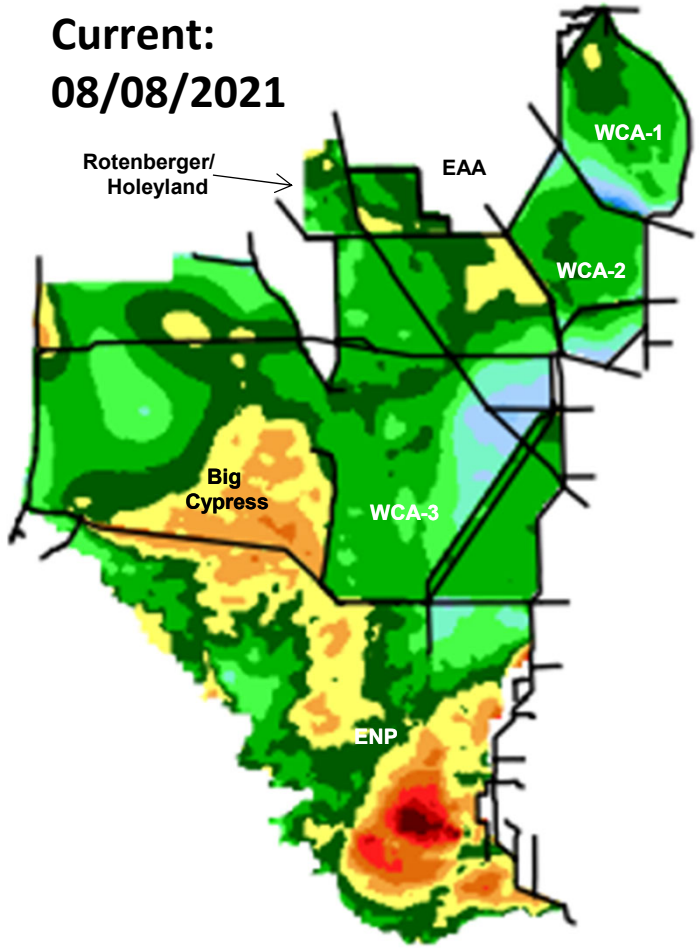
1 Year Ago:
08/08/2020

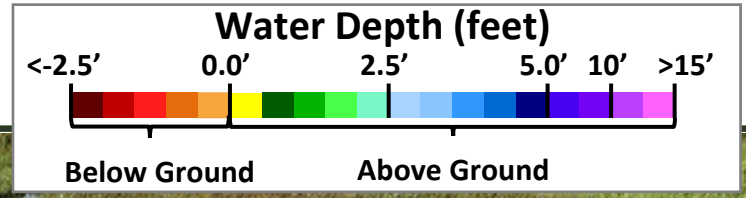


1 Month Ago:
07/08/2021

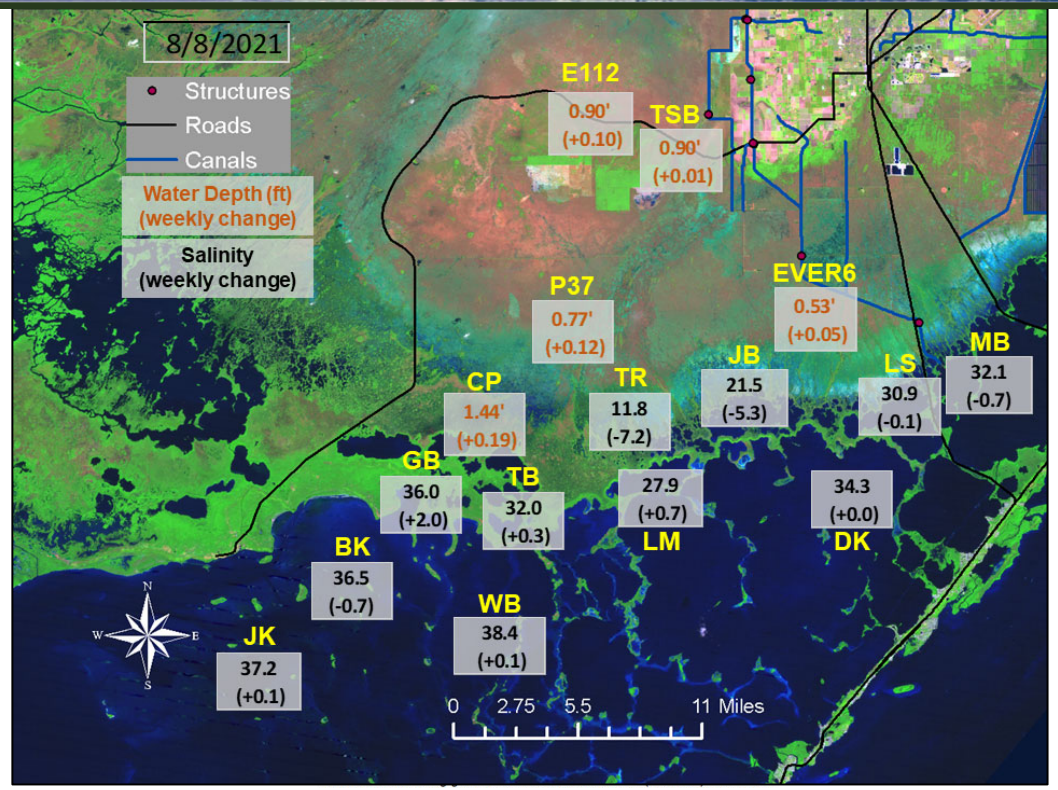


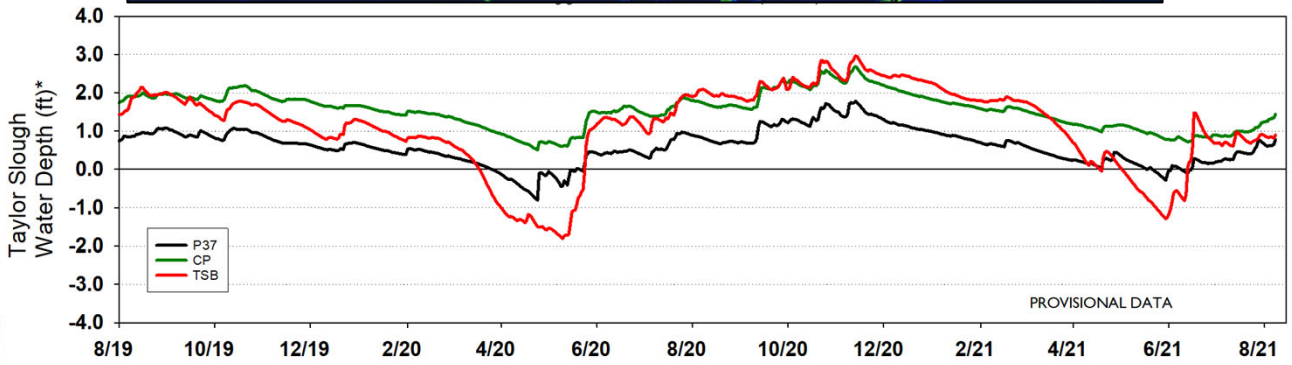
Current:
08/08/2021

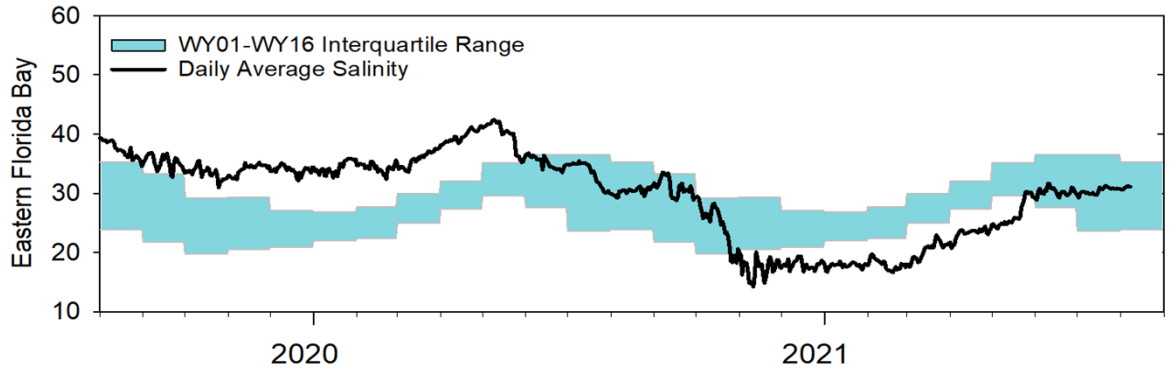


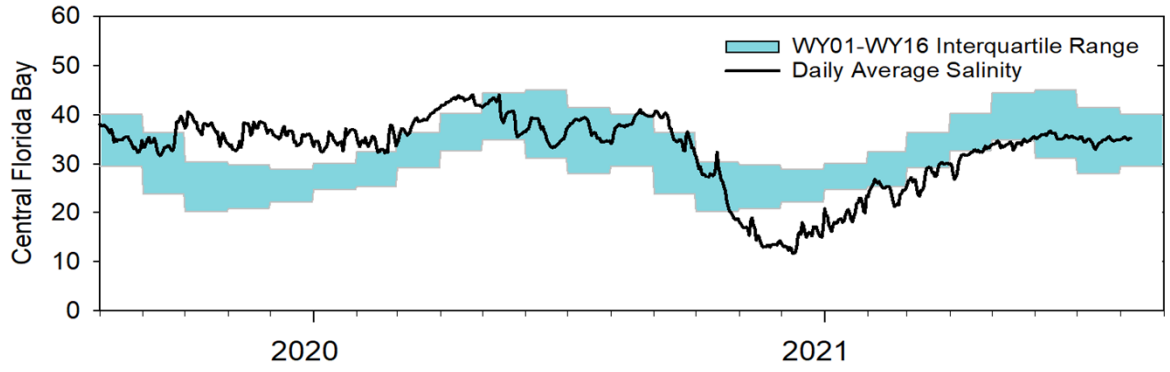


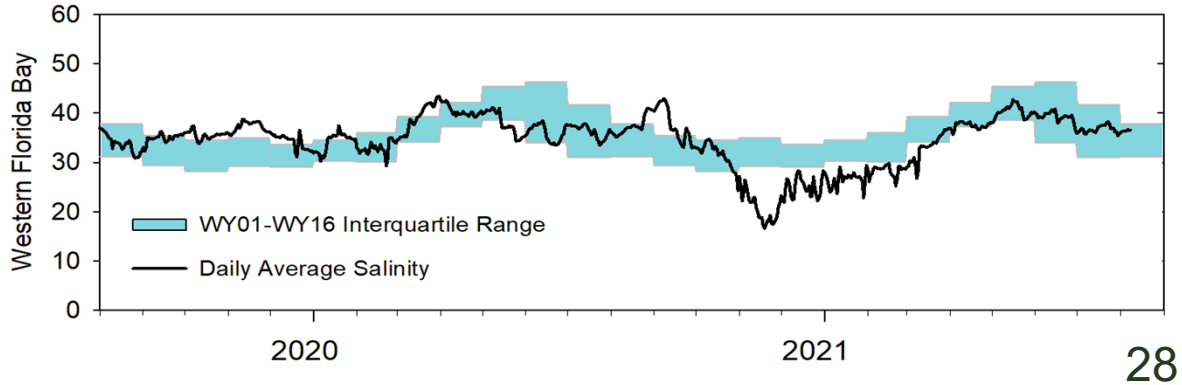
Taylor Slough Stages and Florida Bay Salinity











Presenter: Lawrence Glenn

Questions

Great Egret in Lake Istokpoga
Photograph courtesy of Brent Anderson, SFWMD