

Governing Board Meeting  
November 12, 2020

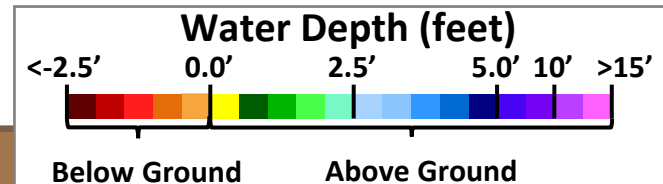
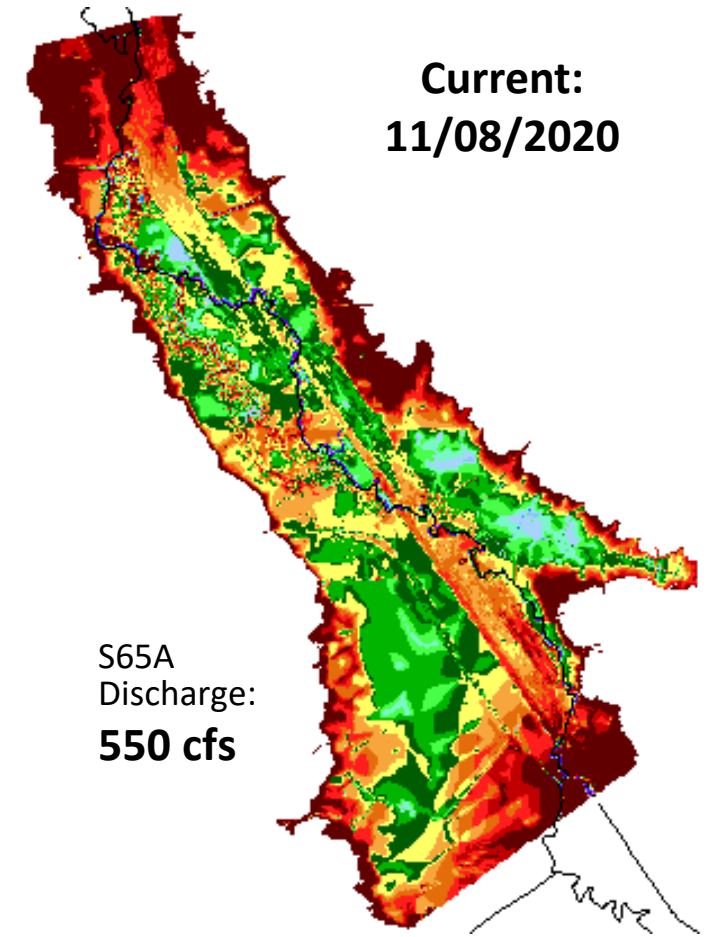
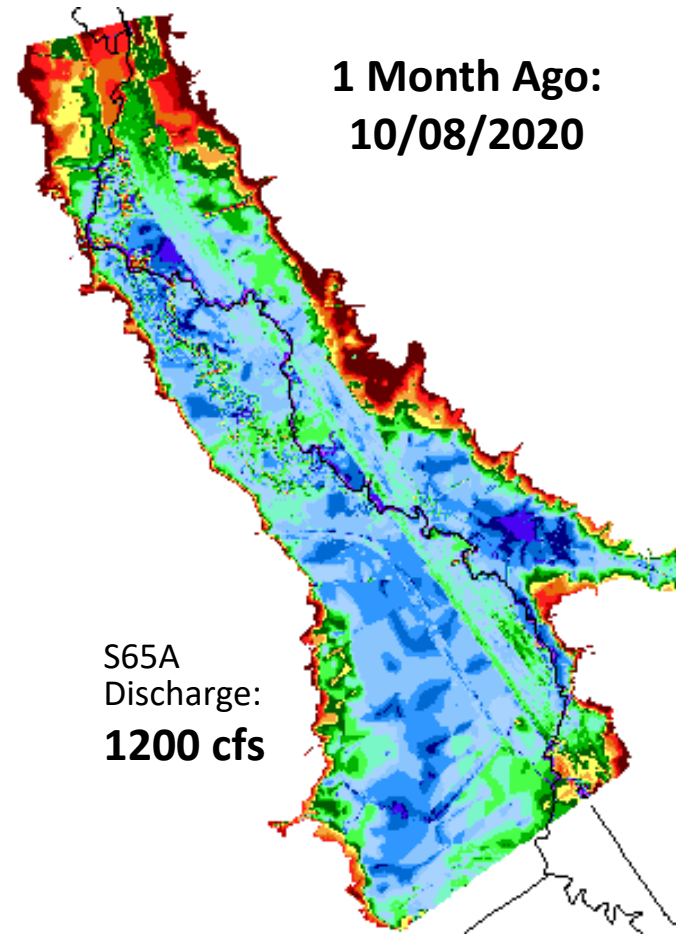
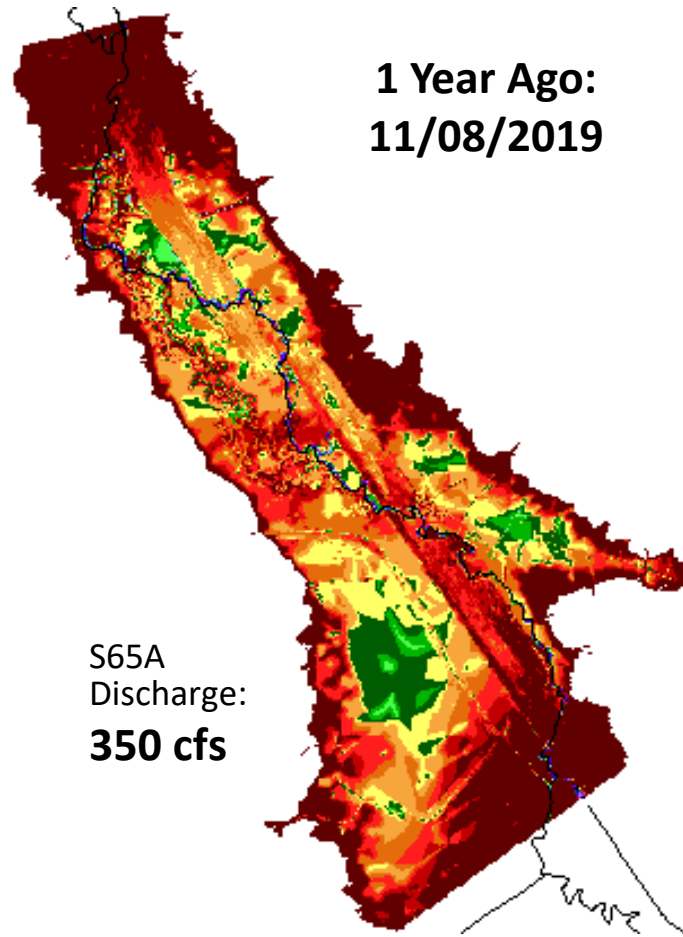
# Ecological Conditions Update

**Lawrence Glenn**  
Water Resources Division Director

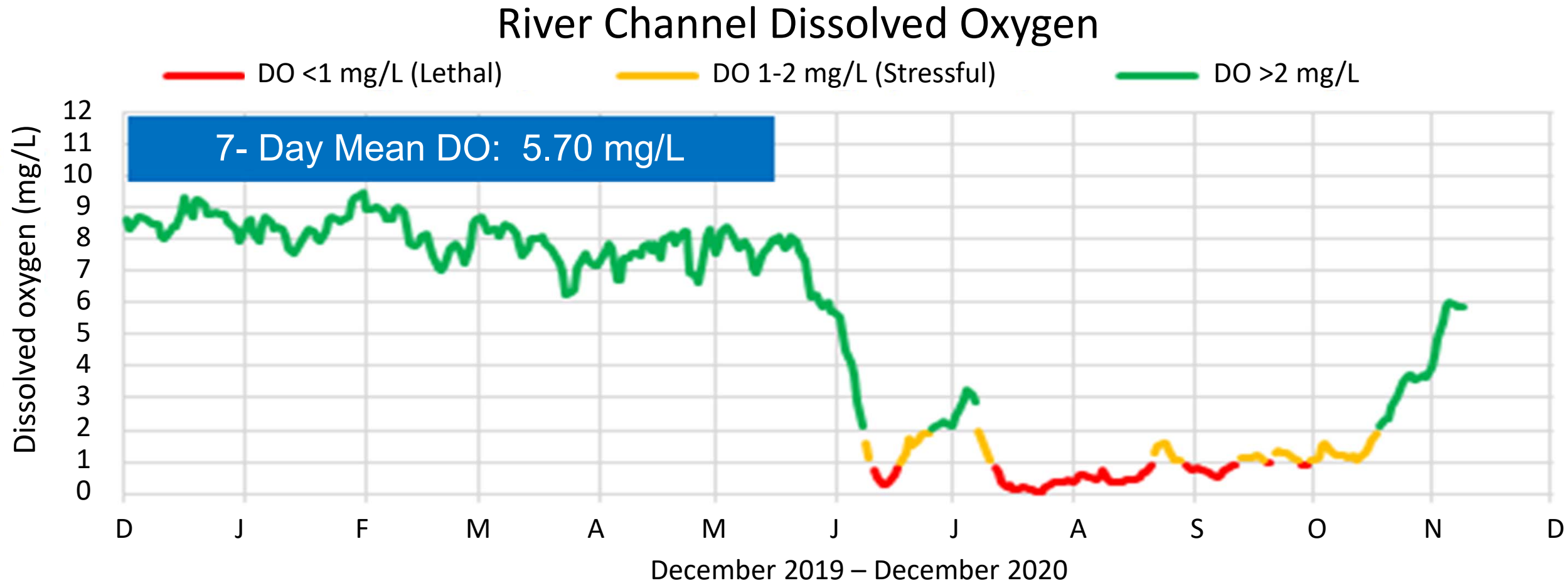
*Photograph courtesy of Brent Anderson, SFWMD*



# Kissimmee River Phase I Restoration Area Water Depth Maps



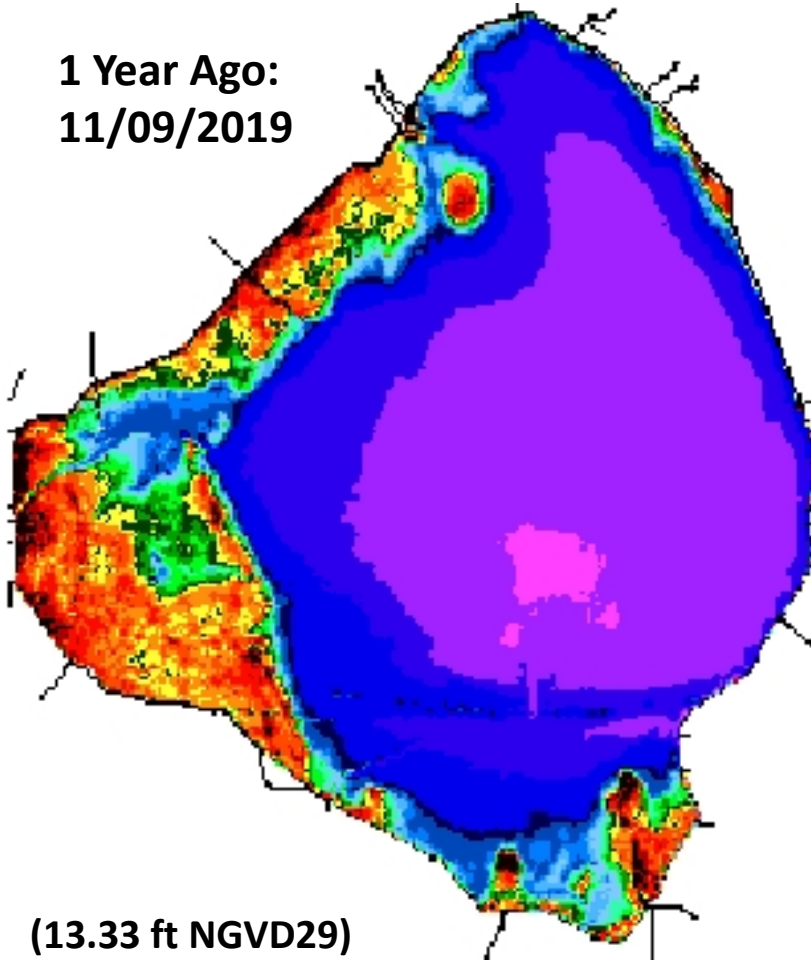
# Kissimmee River (Phases I and II/III Area) Mean Daily Dissolved Oxygen



Data are averaged for PC62, KRBN, PC33, PD62R, and PD42R with and average of 4 stations reporting this week.  
Report Date: 11/10/2020; data are through: 11/08/2020

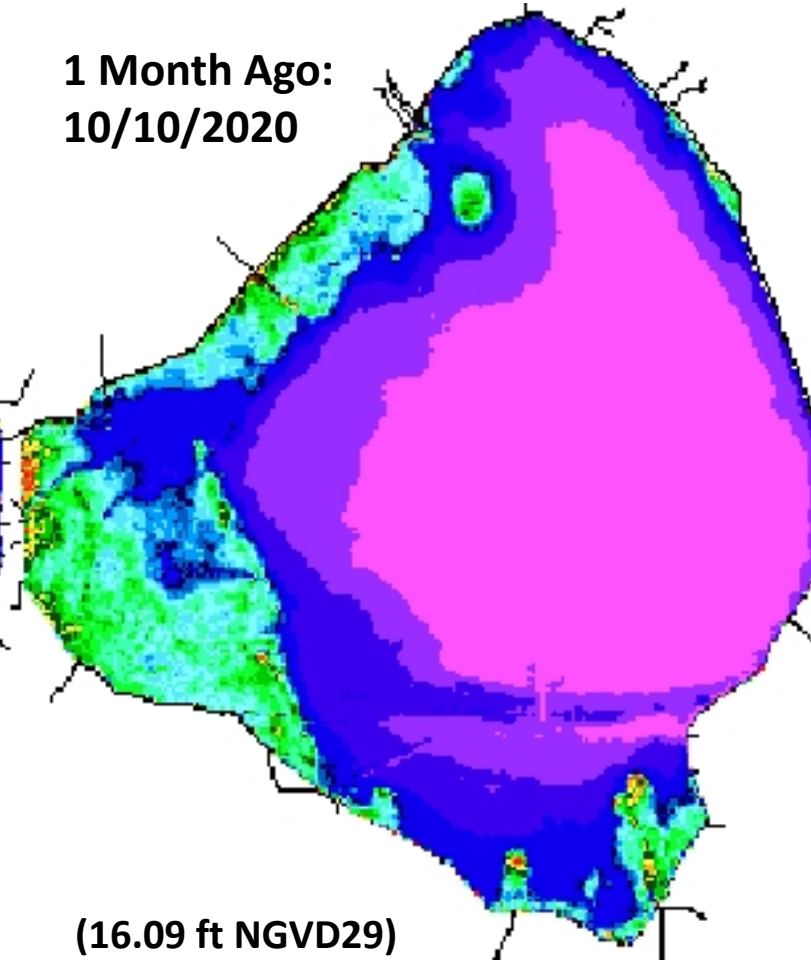
# Lake Okeechobee Water Depth Maps

1 Year Ago:  
11/09/2019



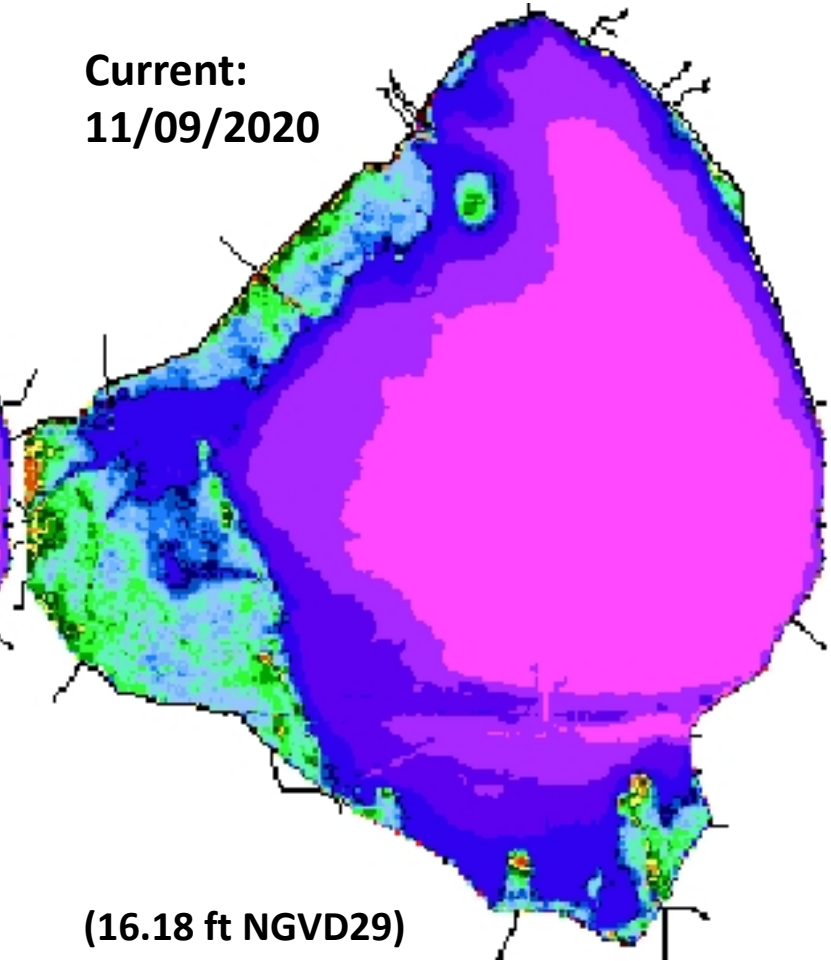
(13.33 ft NGVD29)

1 Month Ago:  
10/10/2020

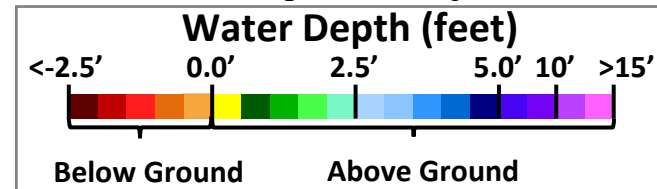


(16.09 ft NGVD29)

Current:  
11/09/2020



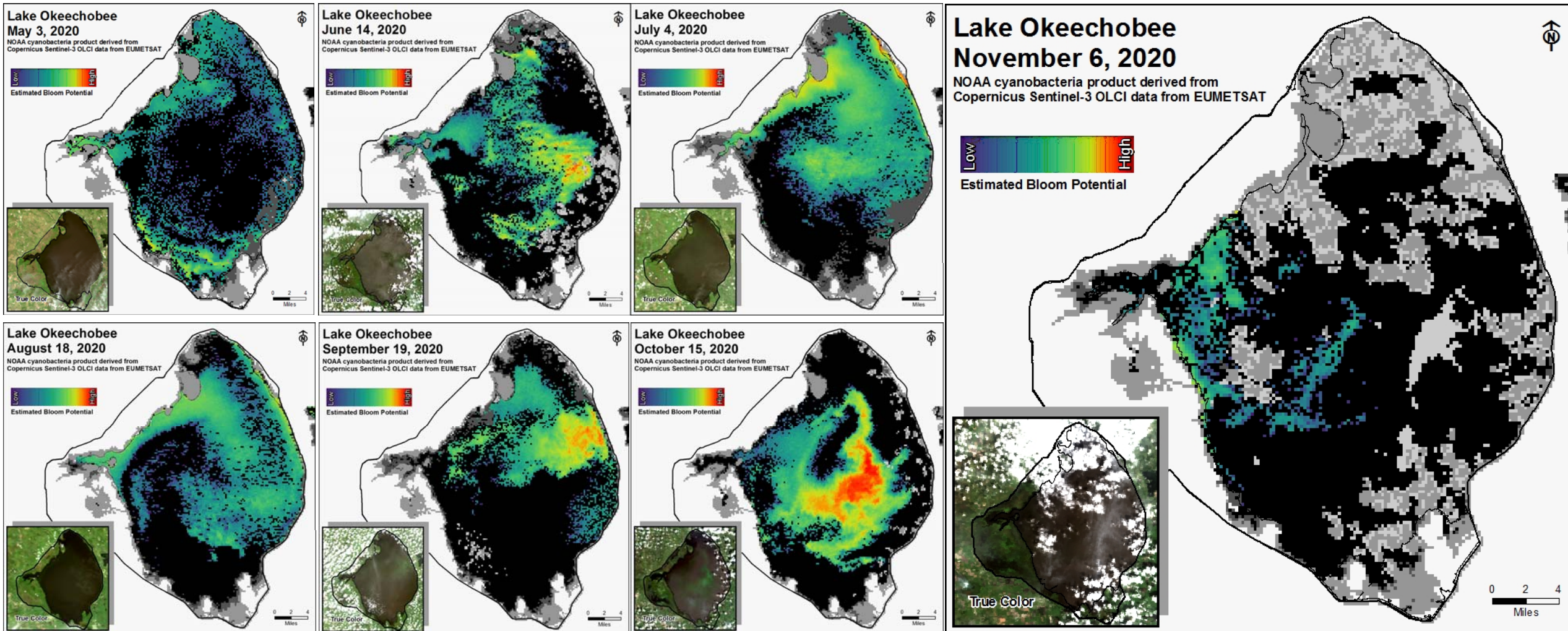
(16.18 ft NGVD29)





# Lake Okeechobee

## Cyanobacteria Bloom Potential



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

# Lake Okeechobee Water Quality

\*Provisional Data\*

Collection Date: October 21-22, 2020

Station	CHL <sub>a</sub> (ug/L)	TOXIN (ug/L)	TAXA
FEBIN			NS
FEBOUT			NS
KISSRO.0	8.2	BDL	<i>Micro/Micro</i>
L005	<b>45.0</b>	BDL	<i>Plank/Cylin</i>
LZ2	10.7	BDL	mixed
KBARSE	7.6	BDL	<i>Microcys</i>
RITTAE2	6.2	BDL	mixed
PELBAY3	2.5	BDL	mixed
POLE3S	4.6	BDL	mixed
LZ25A	3.0	BDL	mixed
PALMOUT			NS
<b>PALMOUT1</b>	<b>45.4</b>	<b>10.0</b>	<i>Microcys</i>
<b>PALMOUT2</b>	<b>35.1</b>	<b>13.0</b>	<i>Microcys</i>
<b>PALMOUT3</b>	14.2	<b>13.0</b>	<i>Microcys</i>
POLESOUT	<b>31.4</b>	BDL	<i>Microcys</i>
POLESOUT1	<b>22.7</b>	<b>0.6</b>	<i>Microcys</i>
POLESOUT2	12.8	BDL	<i>Microcys</i>
<b>POLESOUT3</b>	<b>47.7</b>	<b>5.0</b>	<i>Microcys</i>
EASTSHORE	2.9	BDL	mixed
NES135	9.2	BDL	mixed
NES191	3.7	BDL	mixed

Station	CHL <sub>a</sub> (ug/L)	TOXIN (ug/L)	TAXA
L001	9.9	BDL	mixed
L004	4.1	BDL	mixed
<b>L006</b>	<b>41.8</b>	<b>16.0</b>	<i>Microcys</i>
L007	3.0	<b>1.0</b>	<i>Microcys</i>
<b>L008</b>	<b>20.4</b>	<b>2.3</b>	<i>Microcys</i>
<b>LZ30</b>	17.5	<b>8.1</b>	<i>Microcys</i>
<b>LZ40</b>	<b>23.2</b>	<b>0.3</b>	<i>Microcys</i>
CLV10A	P	BDL	NS
NCENTER	7.0	BDL	mixed

Sampled 10/19

S308C	4.8	BDL	mixed
S77	7.9	BDL	mixed

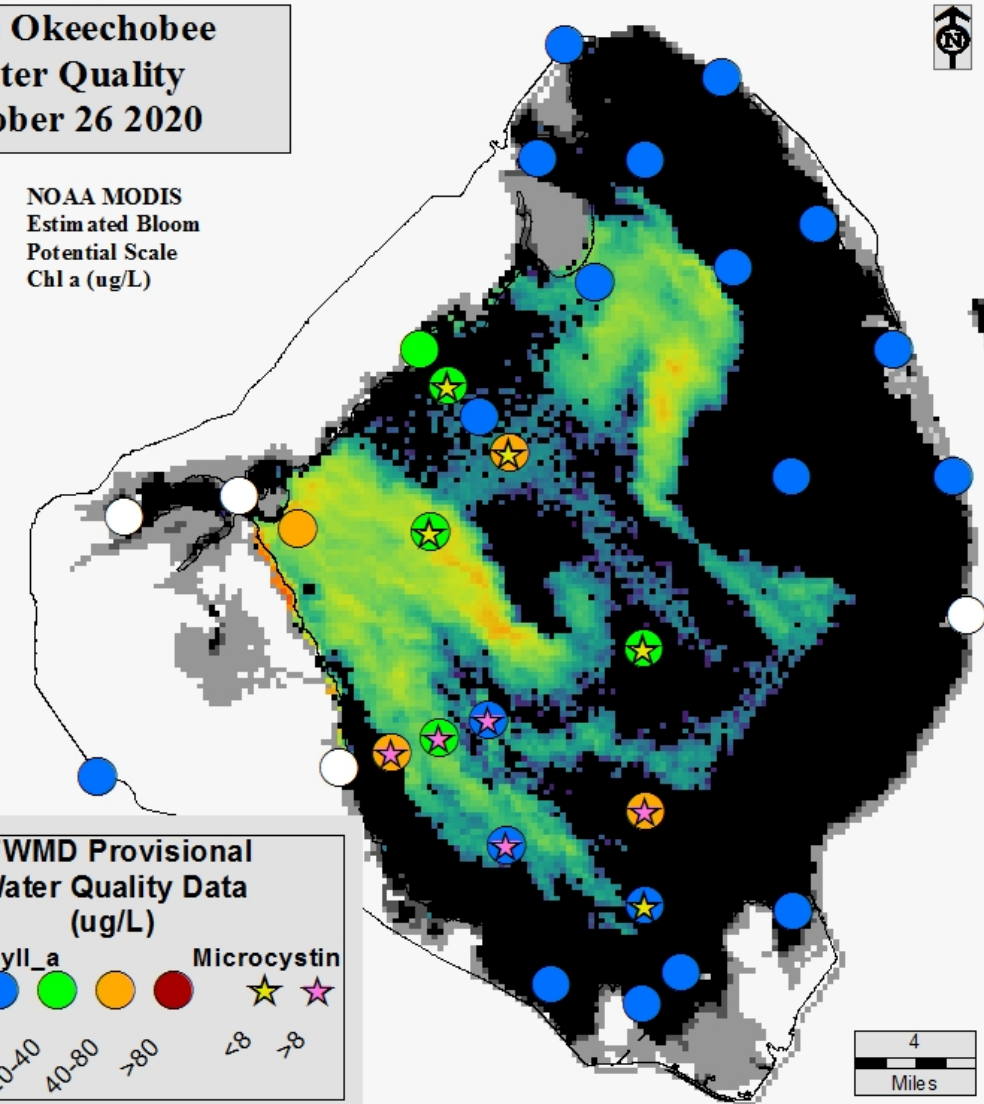
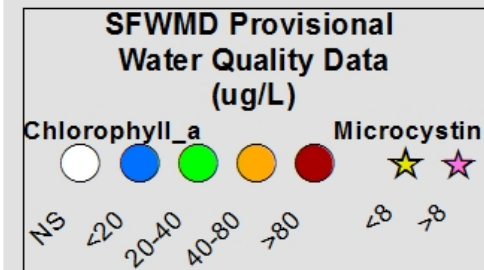
- SFWMD considers >40 µg/L Chlorophyll *a* (Chl<sub>a</sub>) an algal bloom
- BDL – Below Detectable Limit of **0.25** µg/L
- ND – No Dominant taxa
- P – Pending
- NS – Not Sampled
- Bold – crew observed possible BGA
- Chlorophyll *a* analyzed by SFWMD
- Toxin and Taxa analyzed by FDEP

*Cylindro* = *Cylindrospermopsis*  
*Planktol* = *Planktolyngbya*  
*Dolicho* = *Dolichospermum*

## Lake Okeechobee Water Quality October 26 2020



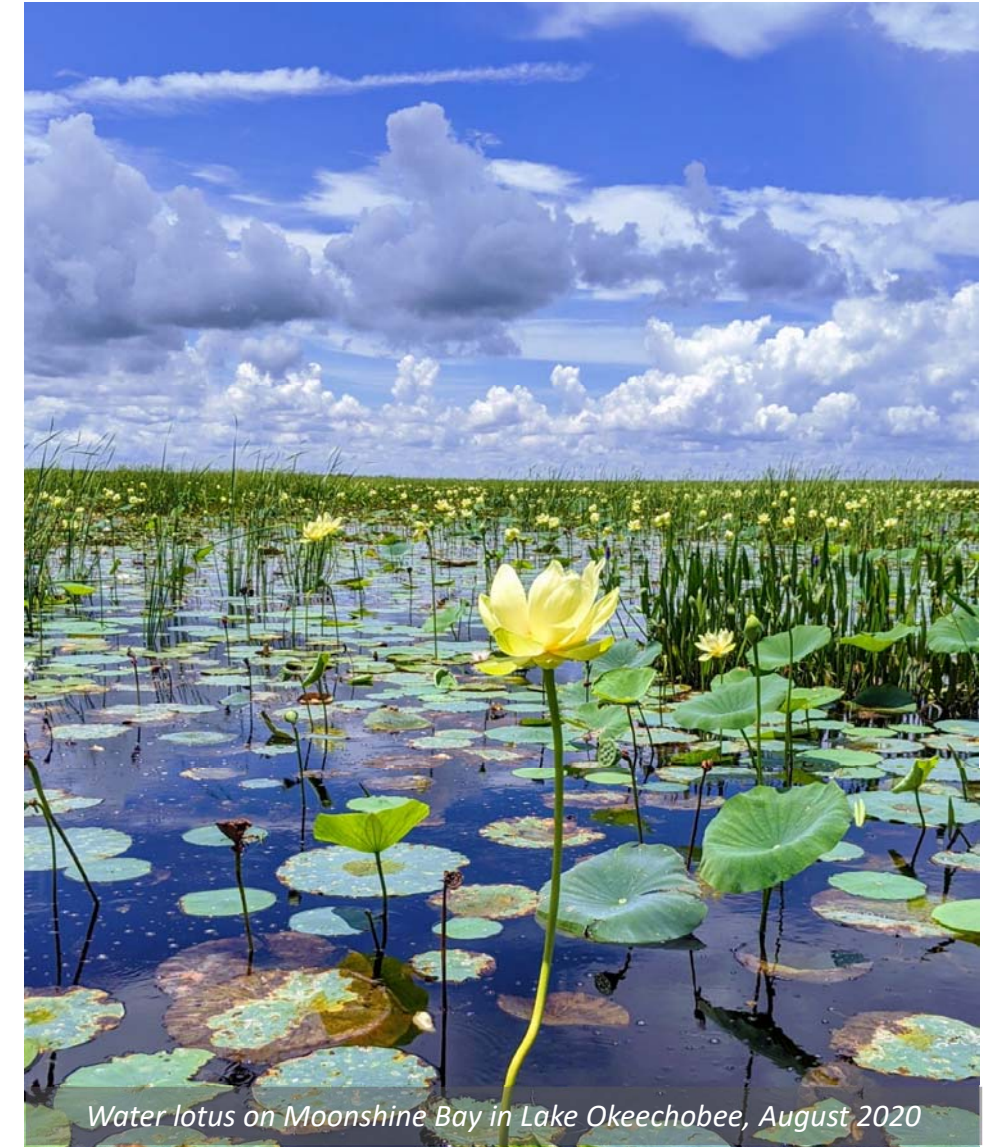
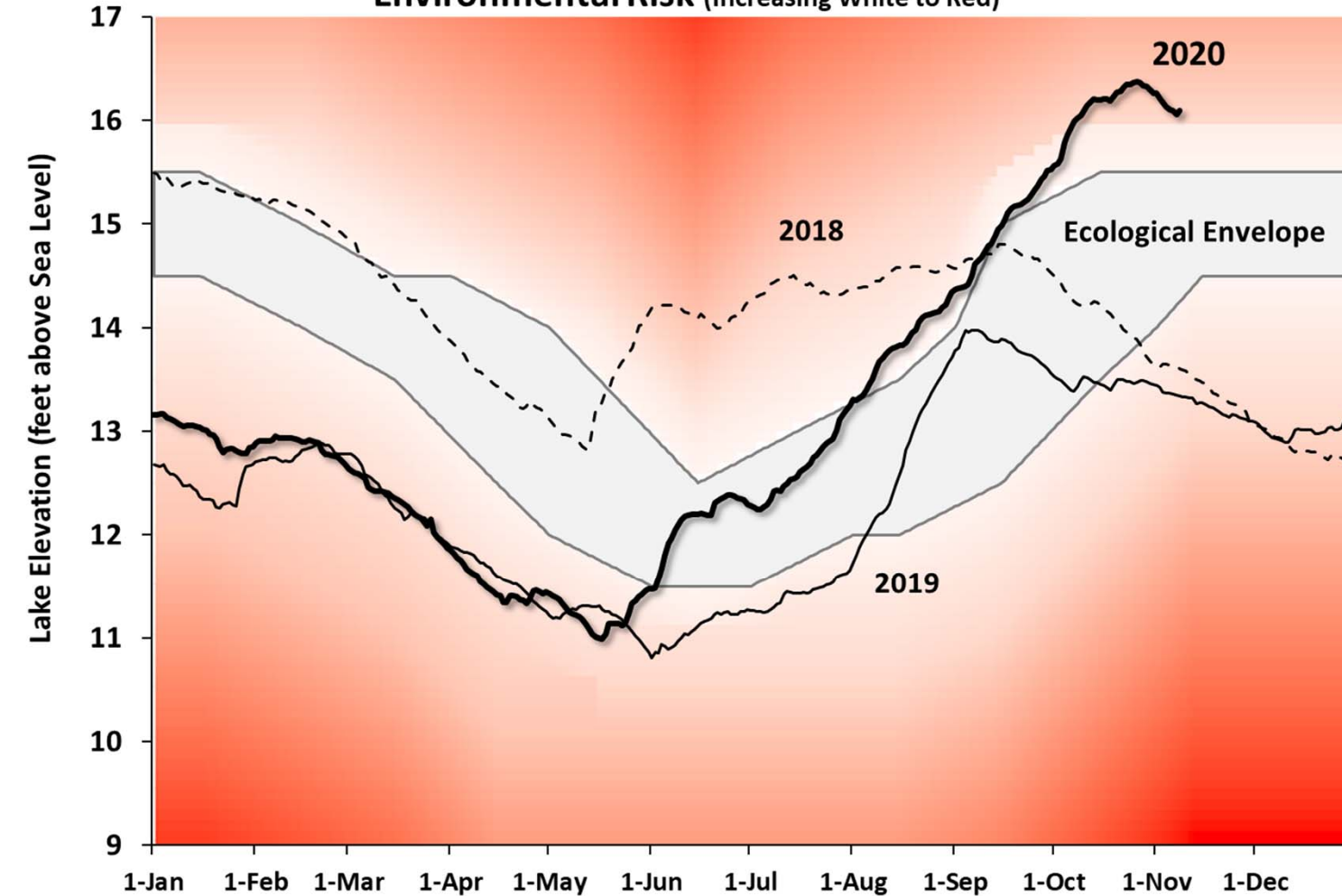
NOAA MODIS  
Estimated Bloom  
Potential Scale  
Chl *a* (ug/L)





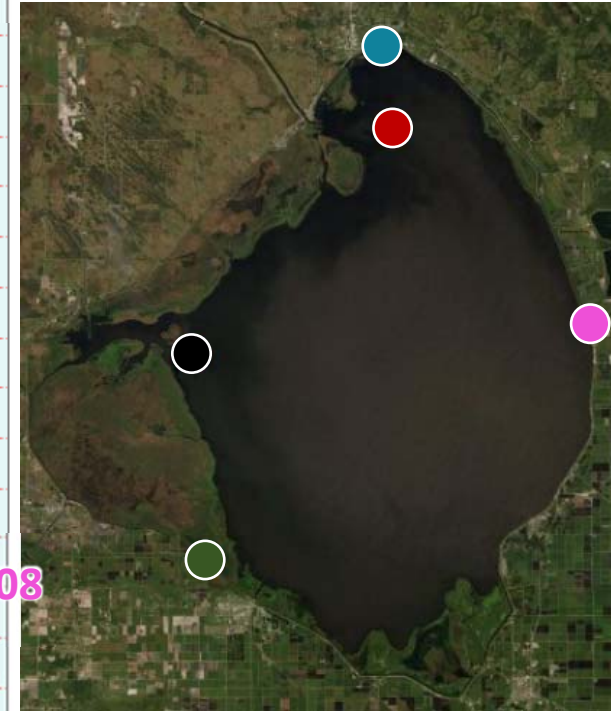
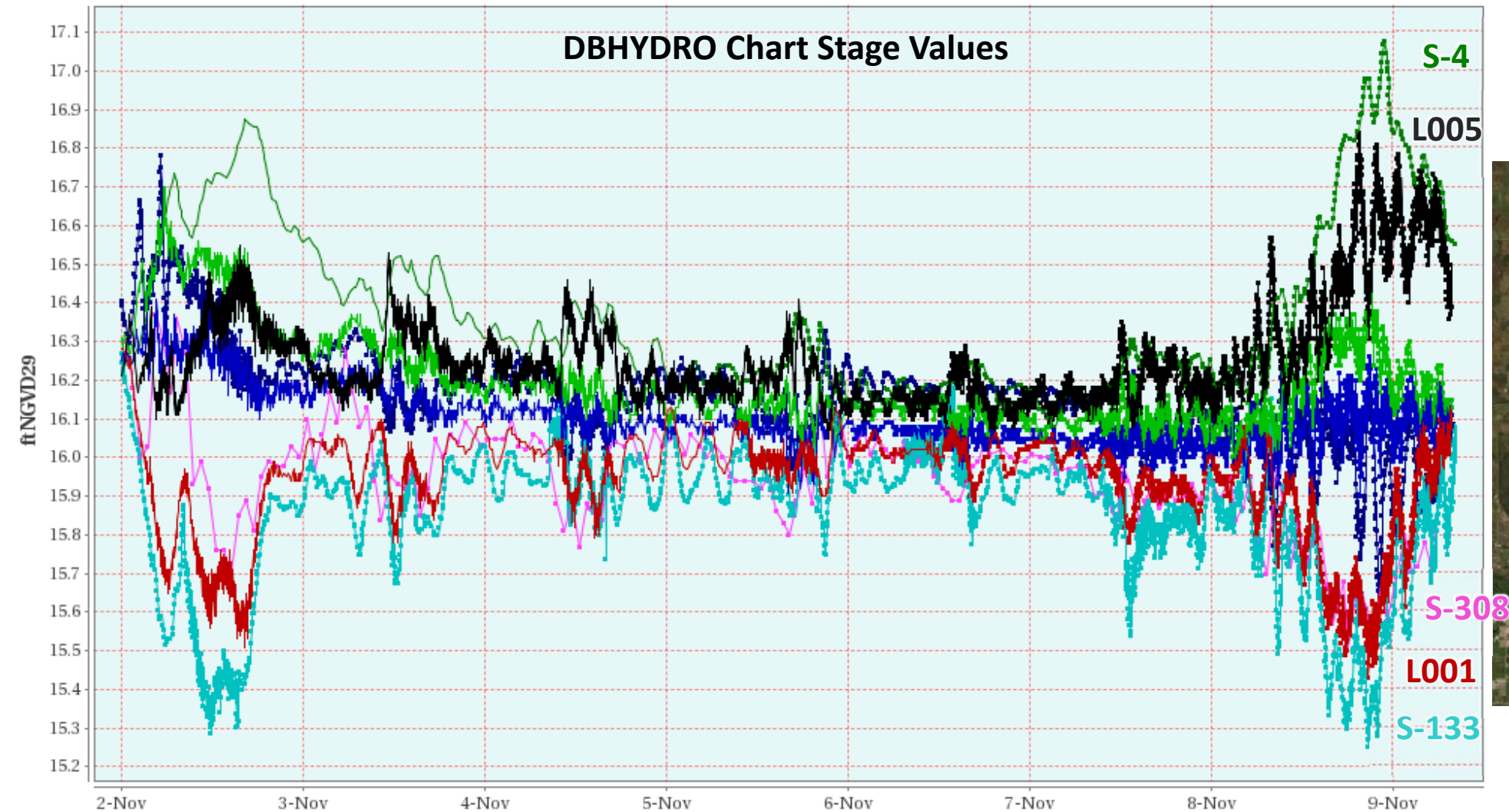
# Lake Okeechobee Stages and Ecological Envelope

Lake Okeechobee Stage vs Ecological Envelope and Environmental Risk (Increasing White to Red)



# Lake Okeechobee Wind Driven Stage Differences

*\*Provisional Data\**





# 2021 Dry Season Stage Considerations

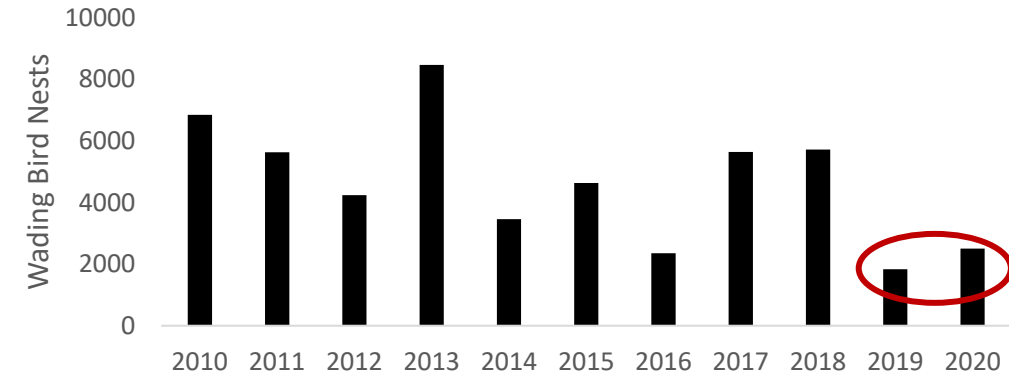
## Benefits of Higher Stages

- Wading birds and snail kites had poor nesting in 2019 and 2020; attributed to low water levels, reduced habitat
- Very few young of the year sport fish (LMB, black crappie) observed in 2019 (2020 not yet avail), likely due to reduced habitat (low SAV, low stages)
- Invasive species can expand under low lake stages (torpedograss, Wright's nutrush, cattail, etc.)
- Increase marsh habitat diversity with variable lake stages

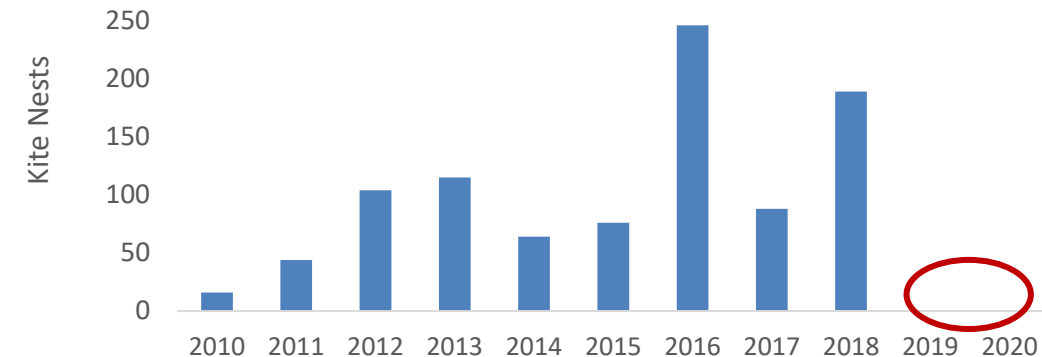
## Reduced Impact of Higher Stages

- Robust SAV community established along western shores
- Long periods of drying in past several years – allowed fire management, soils oxidation, germination, woody nesting substrate recovery, etc.

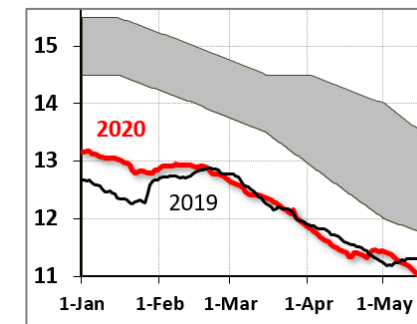
Wading Bird Nests – Lake Okeechobee



Snail Kite Nests - Lake Okeechobee



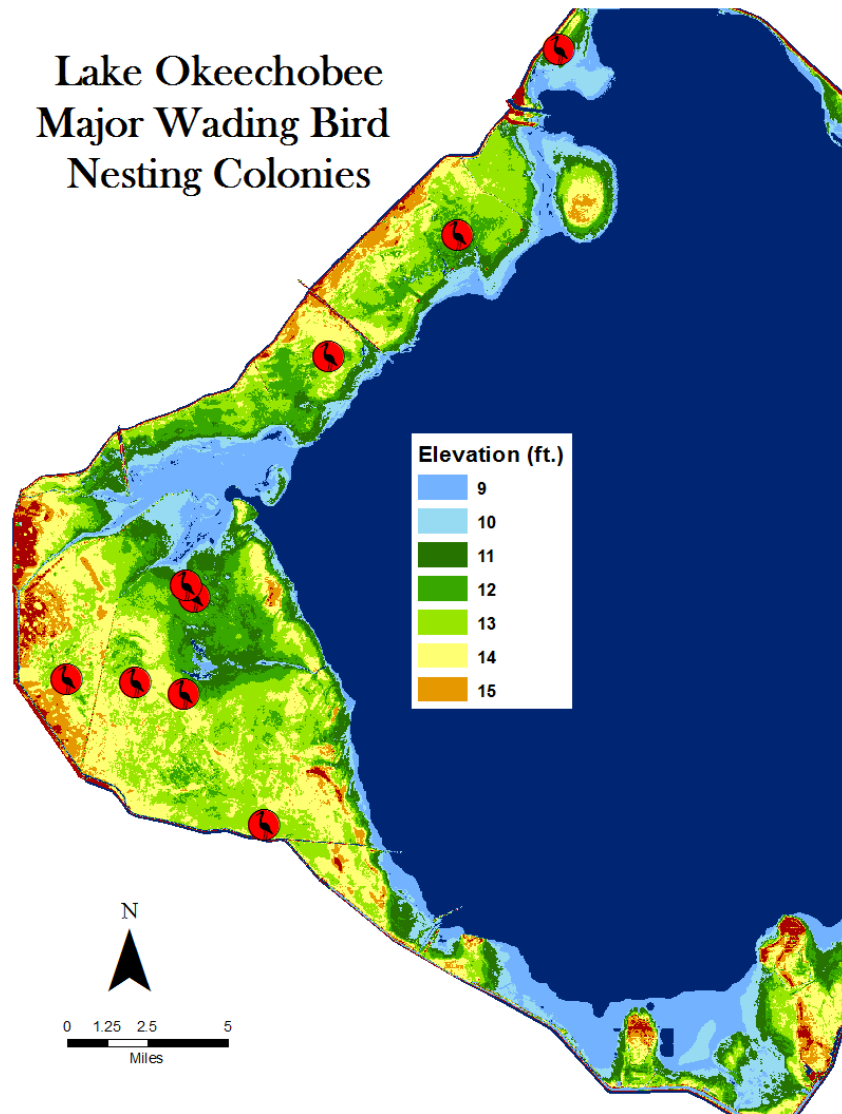
Recent Spring Lake Stages (ft)  
Relative to Ecological Envelope (gray)



Robust SAV Community



# Location and Elevation of Lake Okeechobee Wading Bird Colonies



- Major wading bird colonies are located in the interior marsh
- Nesting colonies are established between elevations 11' and 13'
- Maintaining water under colonies reduces the threat of terrestrial predators



# 2021 Dry Season Stage Considerations

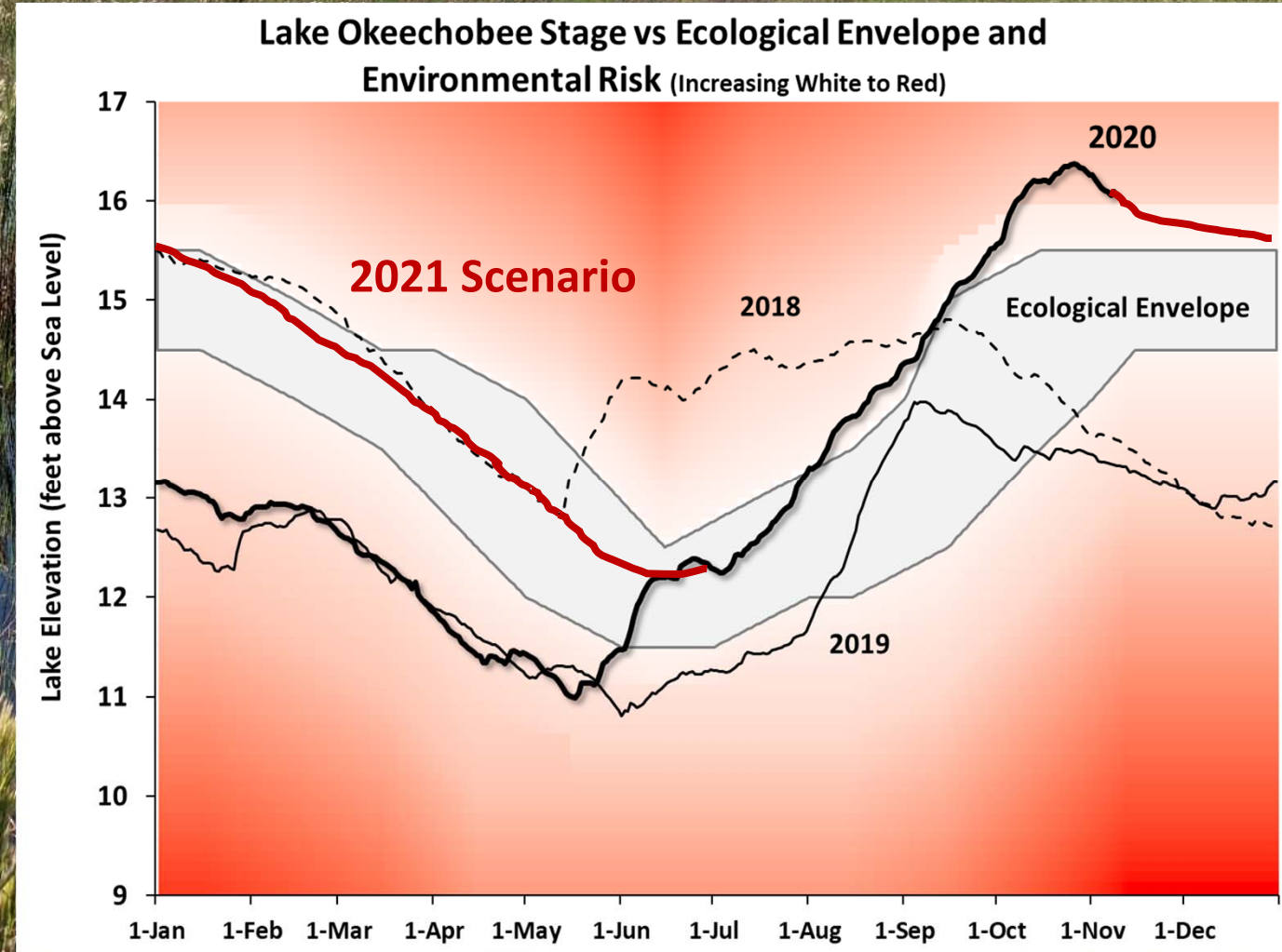
Wetter stage targets in winter and spring would provide better breeding season conditions

Recent dry years help mitigate some high-water impacts

Conservative approach with La Niña

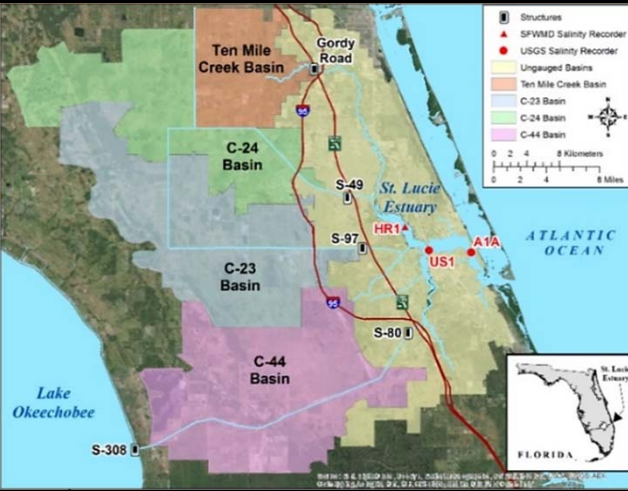
Considerations:

- Minimize time near 16 ft this winter
- Slow recession rates through spring
- <13 as low stage target near June





# St. Lucie Inflows and Salinity Conditions



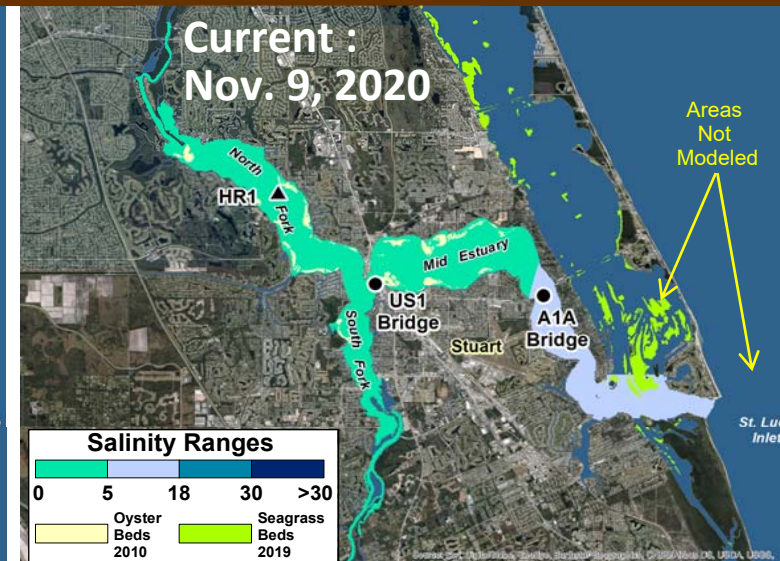
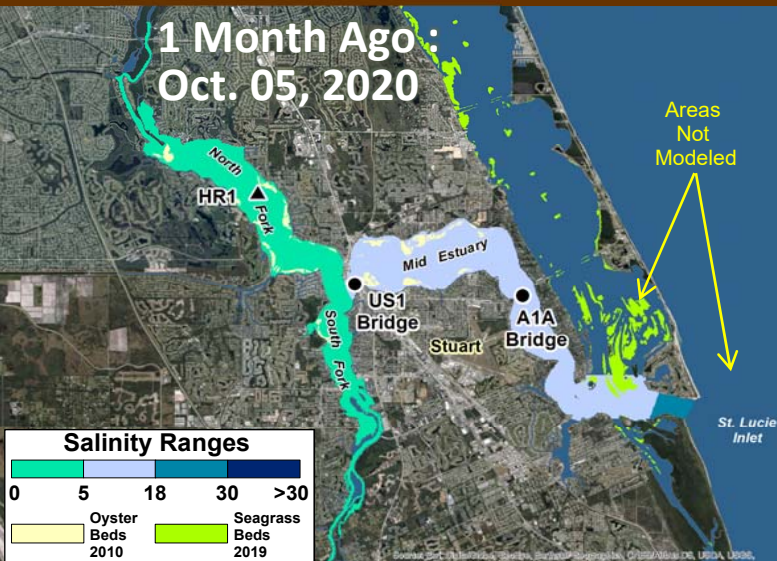
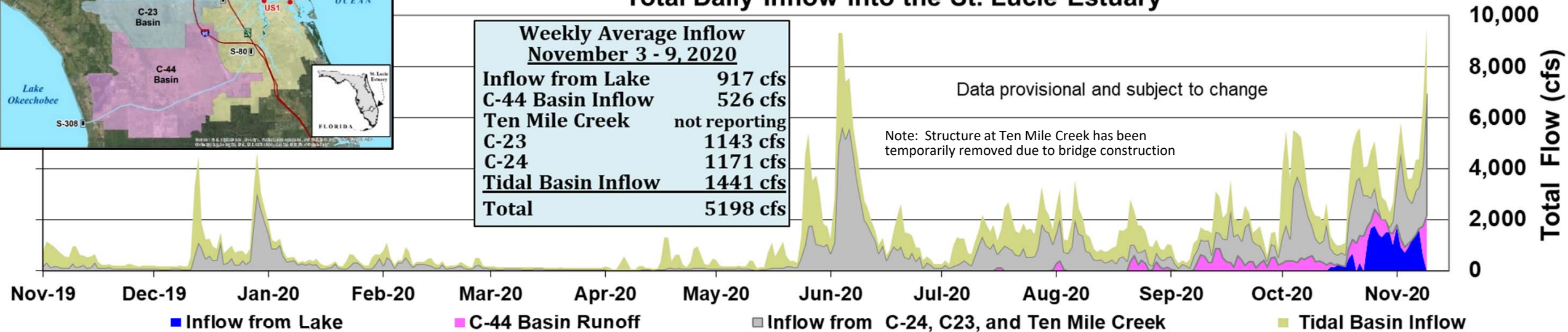
## Total Daily Inflow into the St. Lucie Estuary

### Weekly Average Inflow November 3 - 9, 2020

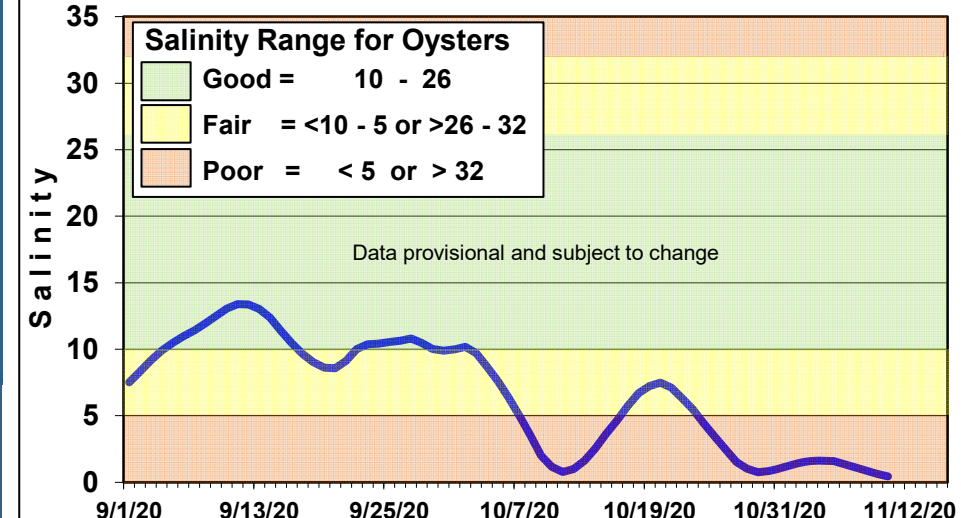
Inflow from Lake	917 cfs
C-44 Basin Inflow	526 cfs
Ten Mile Creek	not reporting
C-23	1143 cfs
C-24	1171 cfs
Tidal Basin Inflow	1441 cfs
<b>Total</b>	<b>5198 cfs</b>

Data provisional and subject to change

Note: Structure at Ten Mile Creek has been temporarily removed due to bridge construction

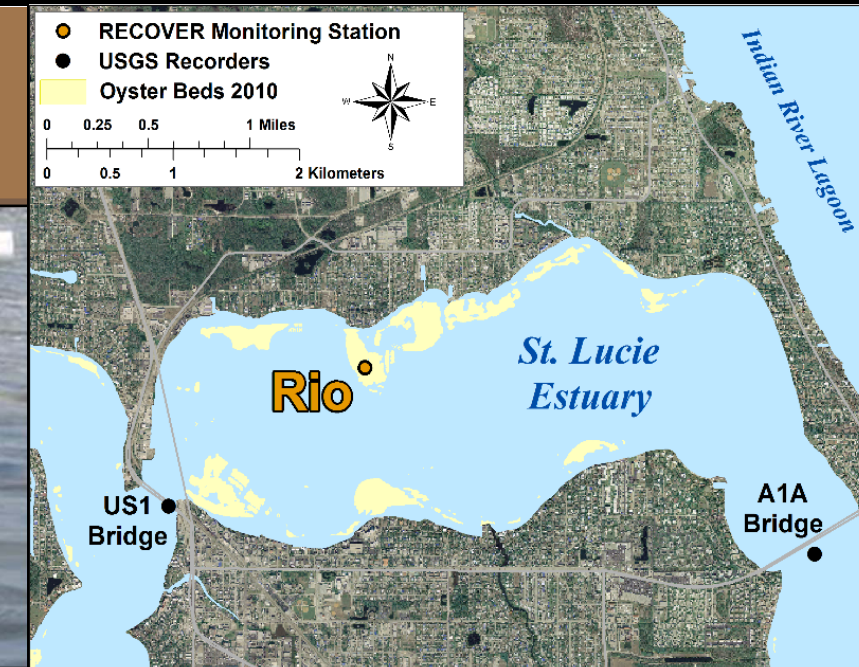
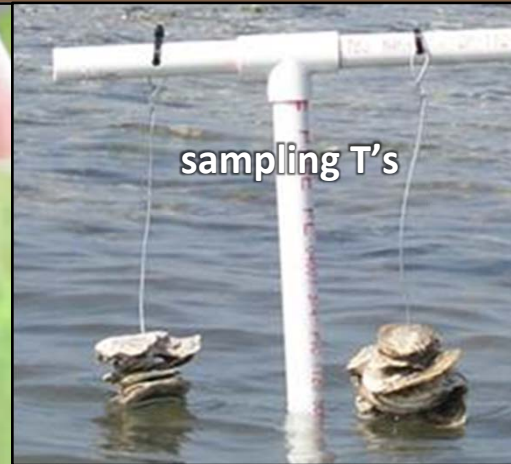


## Salinity (water column seven day mean) at US1 Bridge in the SLE

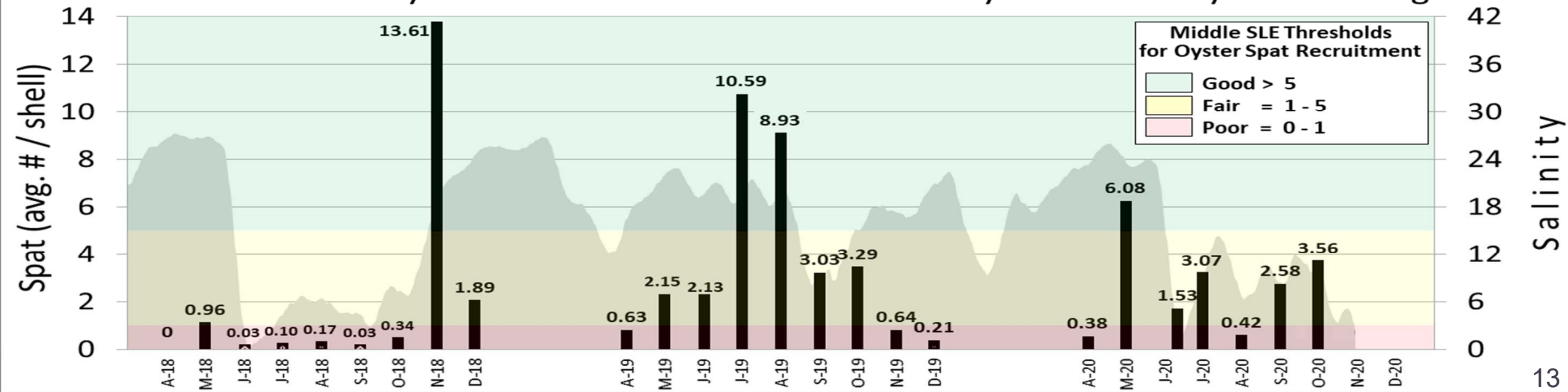




# St. Lucie Estuary – Oysters at Rio Station

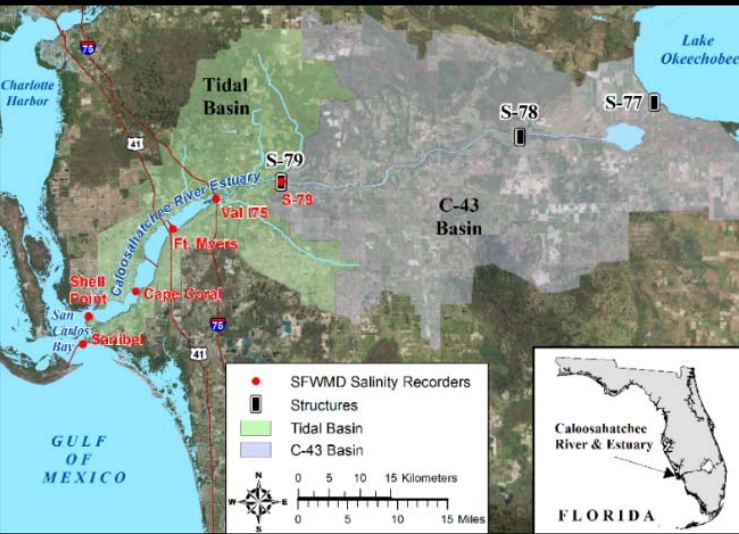


## 2018 - 2020 Rio Oyster Recruitment Season and 14 day mean Salinity at US1 Bridge





## Caloosahatchee Inflows and Salinity Conditions

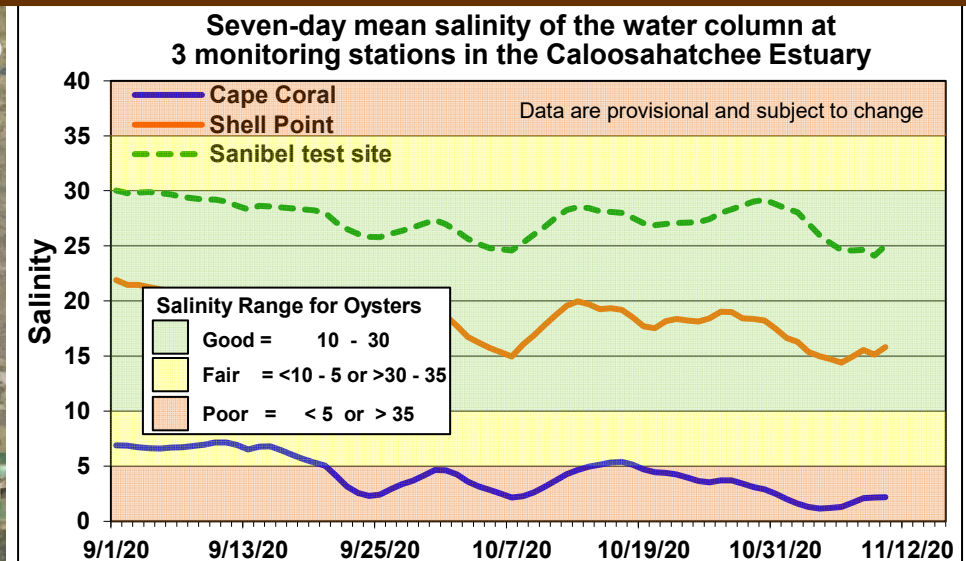
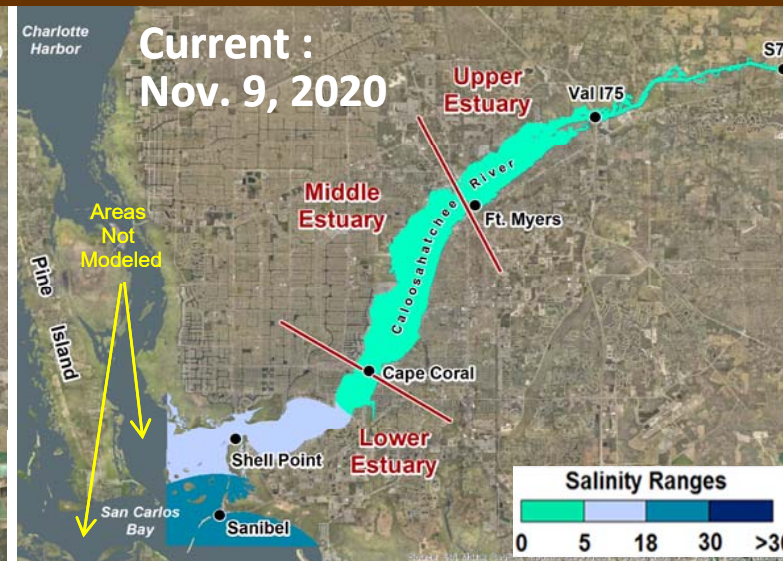
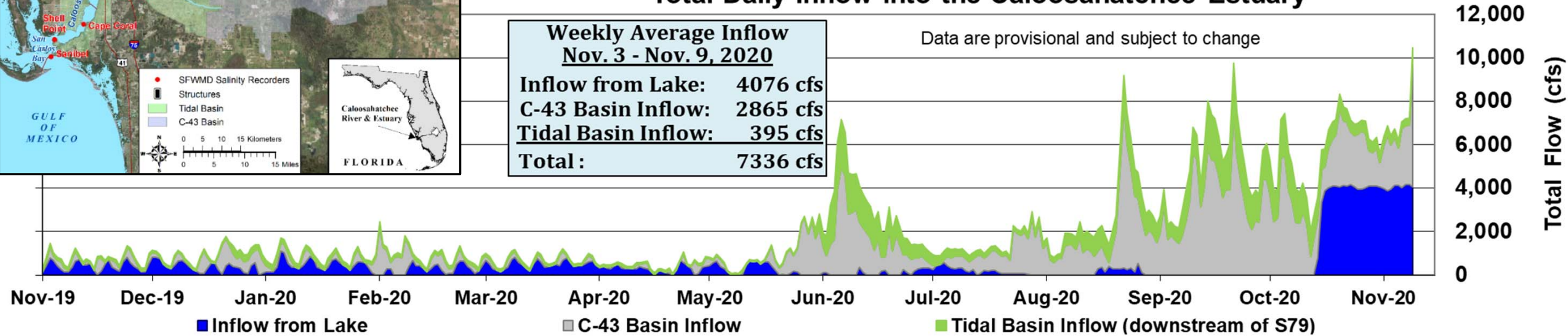


## Total Daily Inflow into the Caloosahatchee Estuary

**Weekly Average Inflow**  
**Nov. 3 - Nov. 9, 2020**

**Inflow from Lake: 4076 cfs**  
**C-43 Basin Inflow: 2865 cfs**  
**Tidal Basin Inflow: 395 cfs**  
**Total: 7336 cfs**

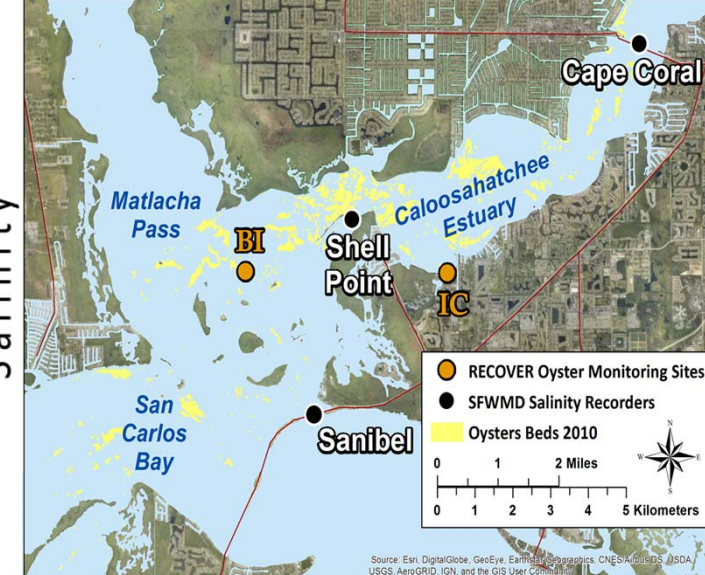
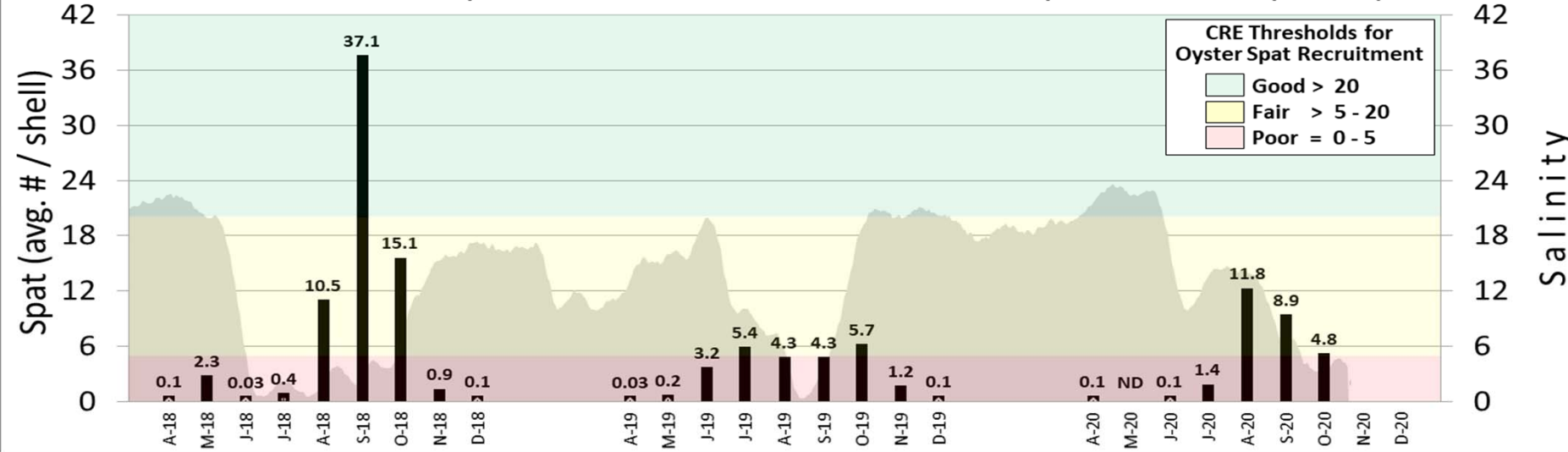
Data are provisional and subject to change



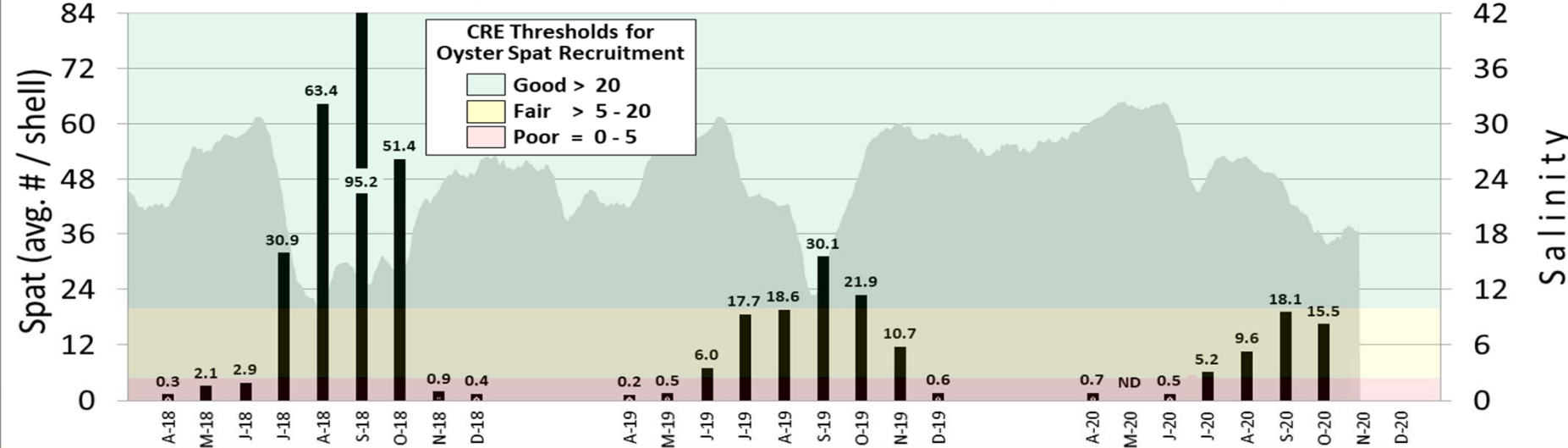


# Caloosahatchee Estuary - Oyster Recruitment

2018 - 2020 Iona Cove Oyster Recruitment Season and 14 day mean Salinity at Cape Coral



2018 - 2020 Bird Island Oyster Recruitment Season and 14 day mean Salinity at Shell Point



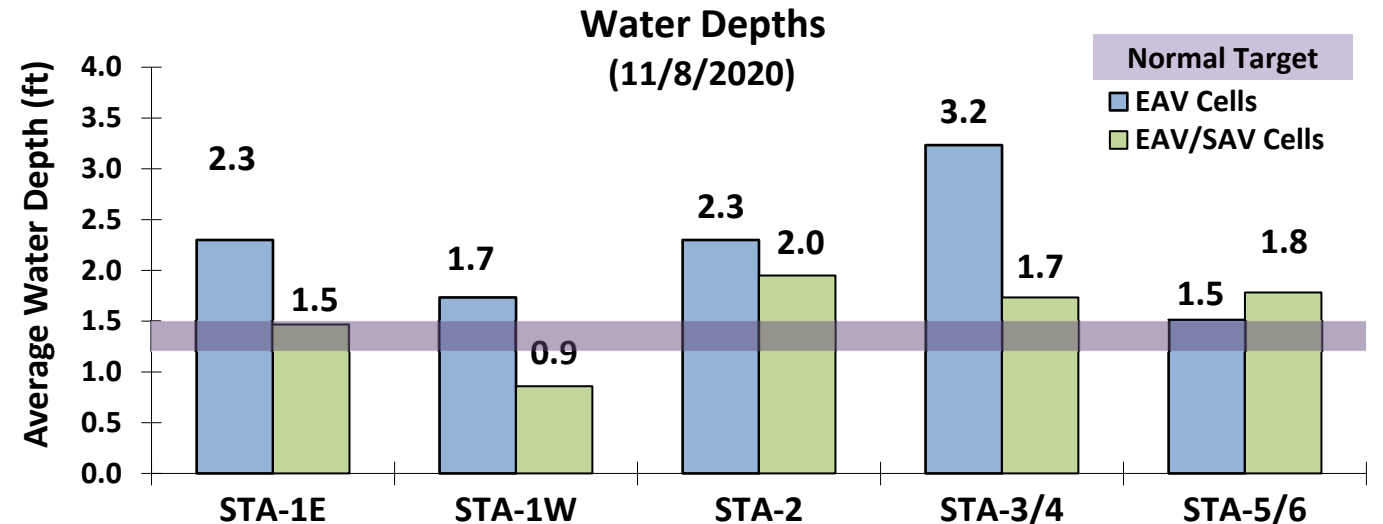
# Everglades Stormwater Treatment Areas (STAs)

- STAs treated basin runoff and Lake Okeechobee releases in October
- Total Inflows to STAs in WY2021  
~1,228,000 ac-ft
- Lake Okeechobee releases to STAs/FEBs in WY2021 95,000 ac-ft (8% 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 2021**  
5/1/2020 to 11/8/2020

	STA-1E	STA-1W	STA-2	STA-3/4	STA-5/6
Inflow TP Concentration (ppb)	129	245	107	52	192
Outflow TP Concentration (ppb)	31	35	20	12	51
365-day Phosphorus Loading Rate (g/m <sup>2</sup> /yr)	3.5	2.4	0.7	0.5	0.3
Inflow Volume (ac-ft)	253,000	167,400	313,100	433,600	60,500

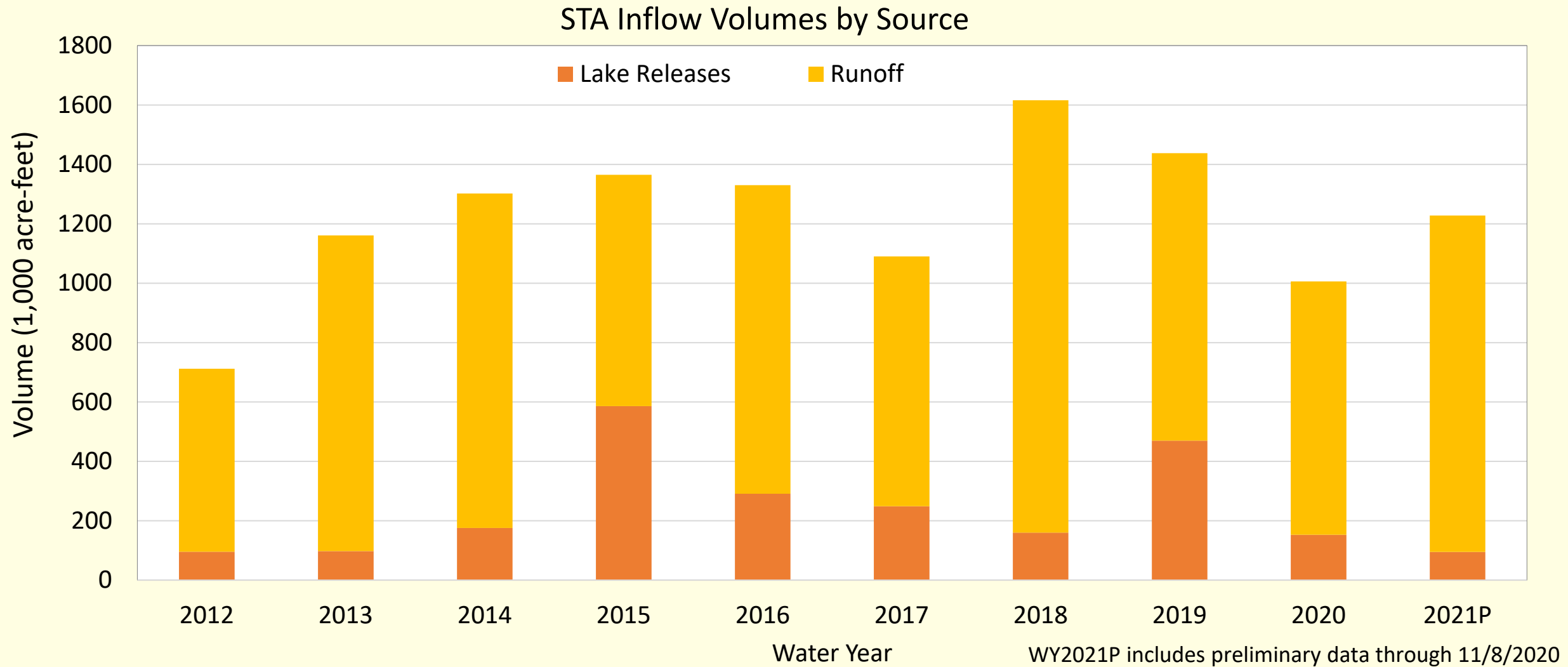
*Includes preliminary data; all concentrations are flow-weighted means*



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

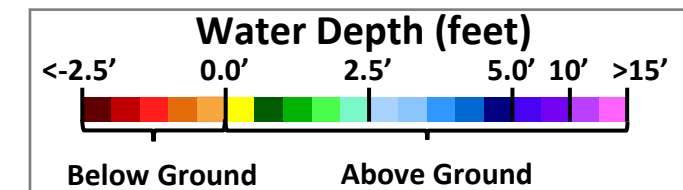
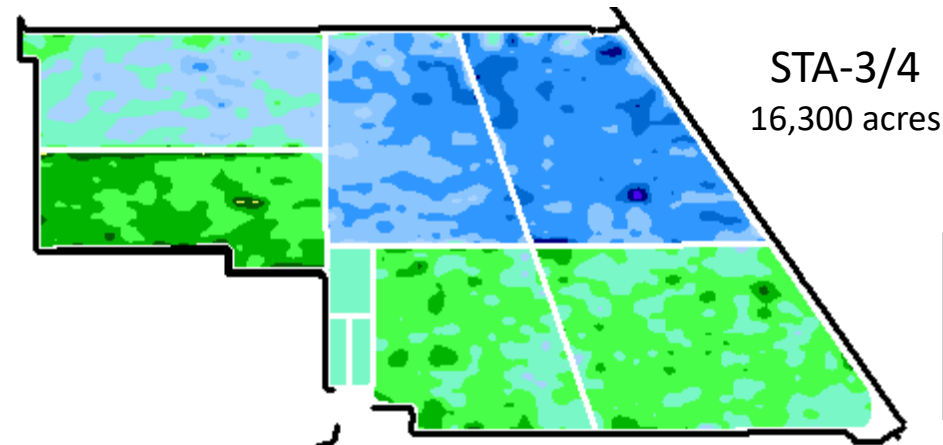
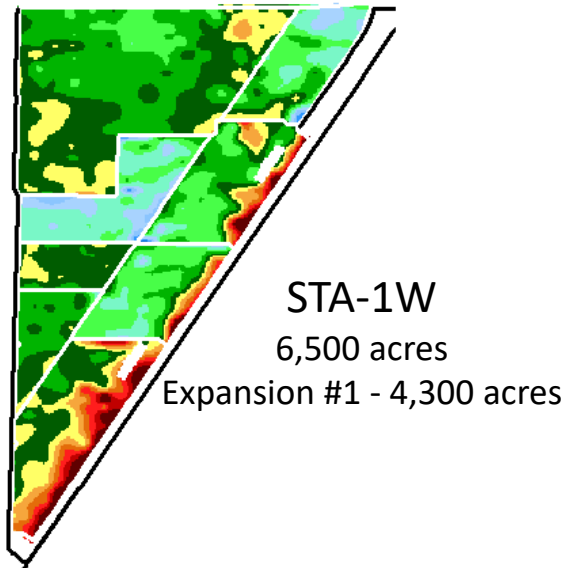
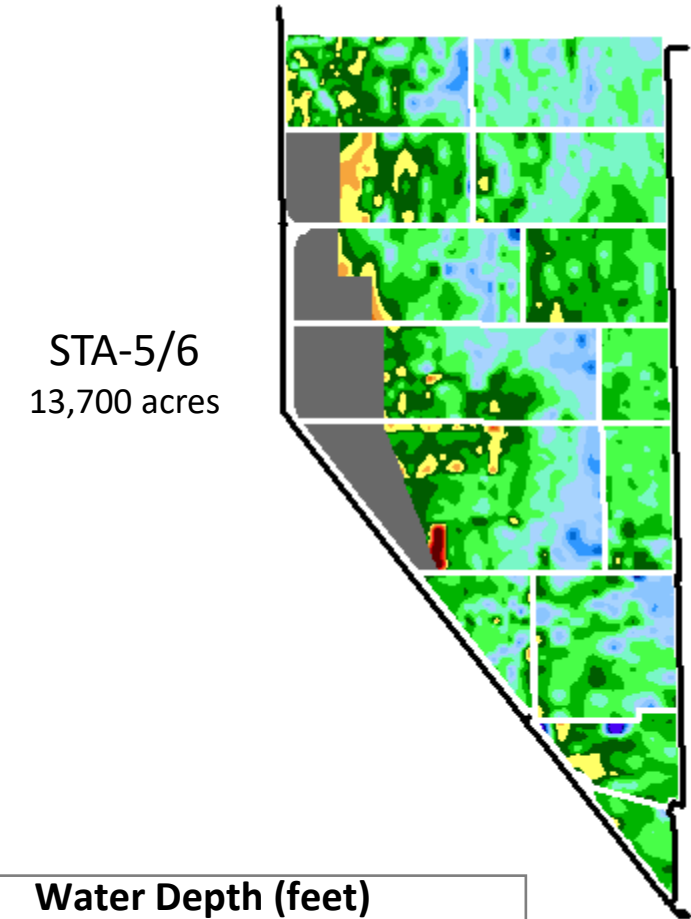
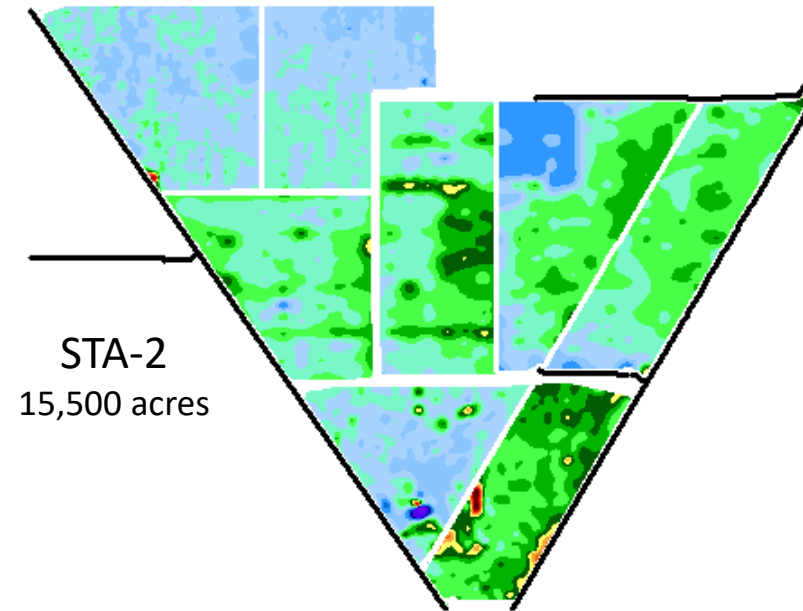
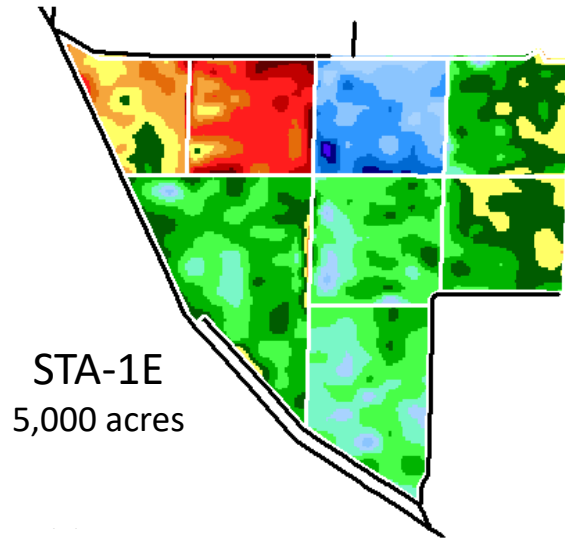


# STA Inflow Volumes by Source



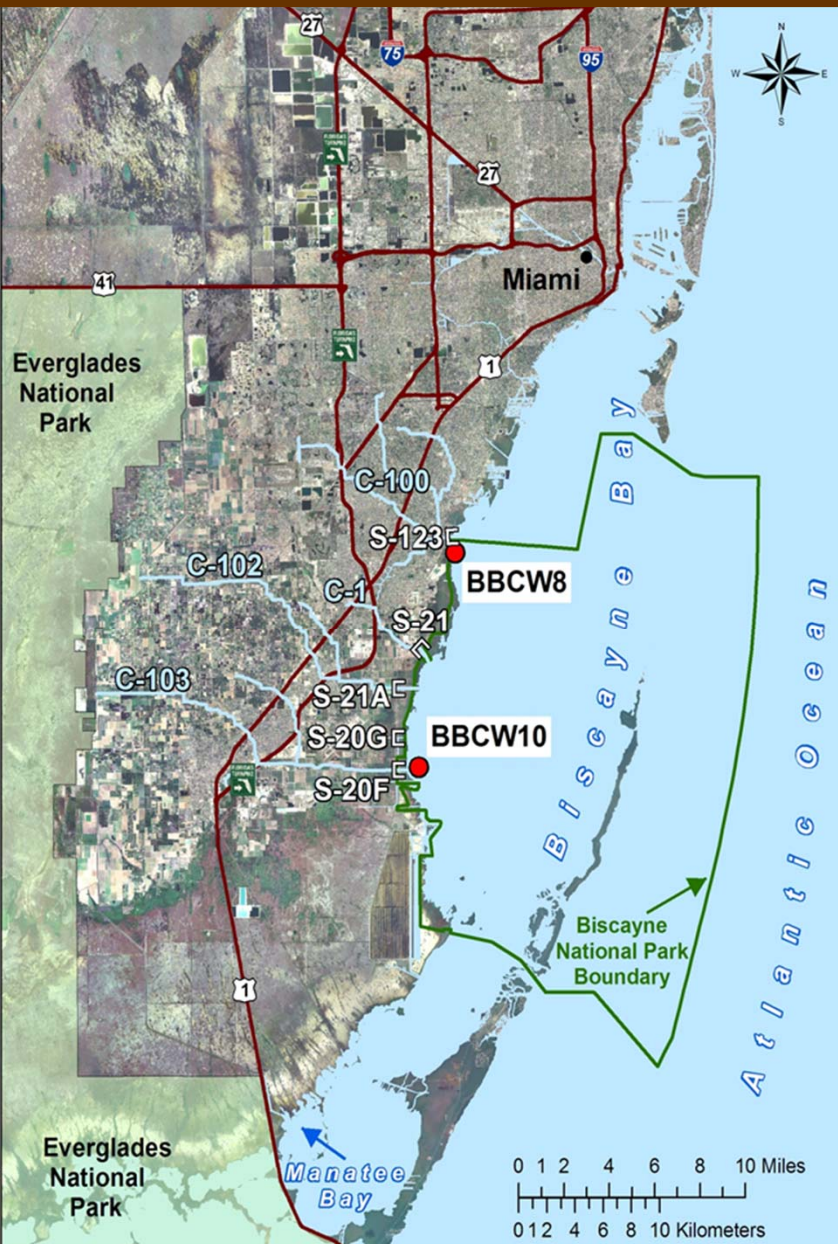
# Everglades Stormwater Treatment Areas

Daily Average Water Depths on 11/8/2020

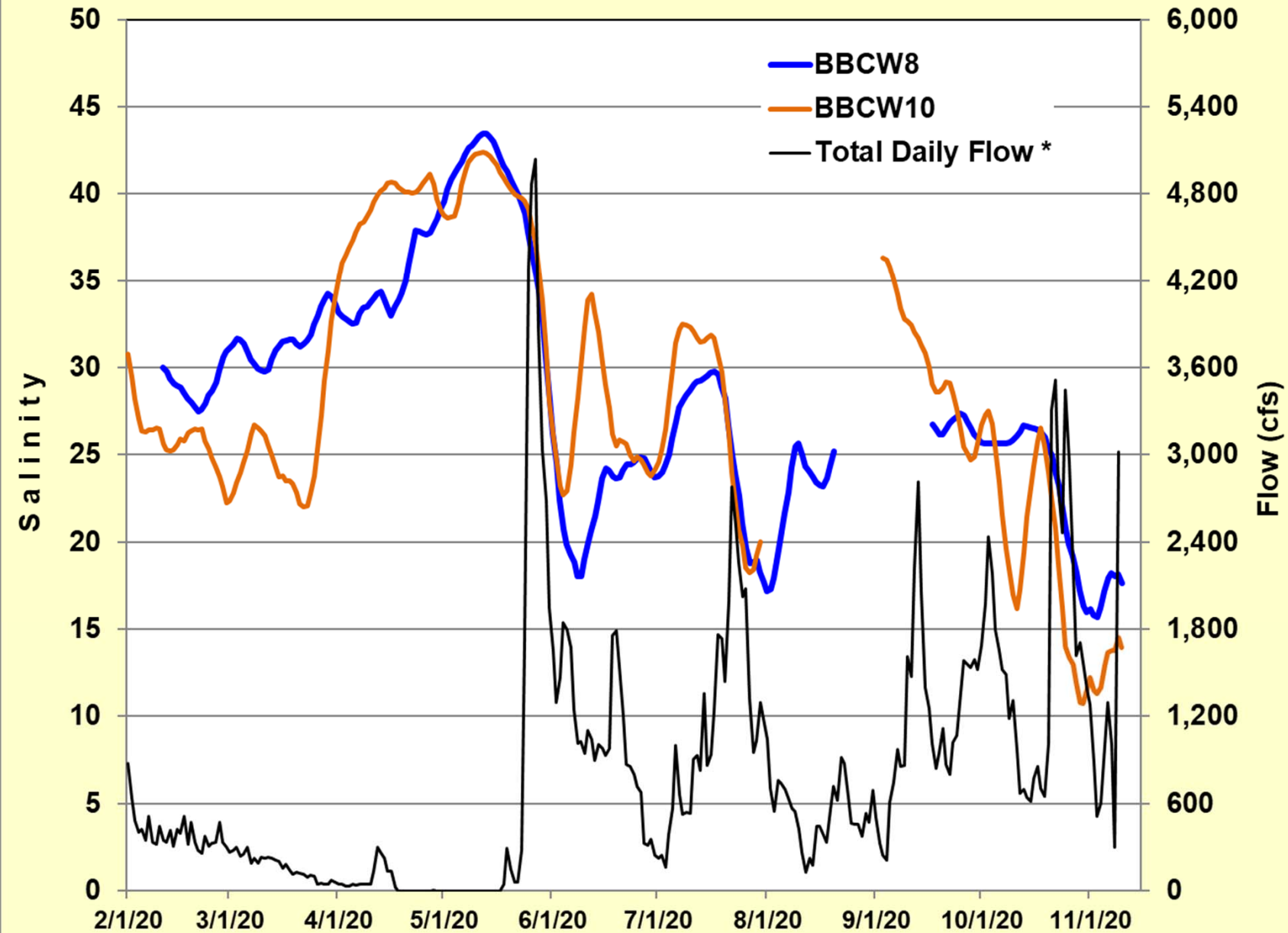




## Biscayne Bay



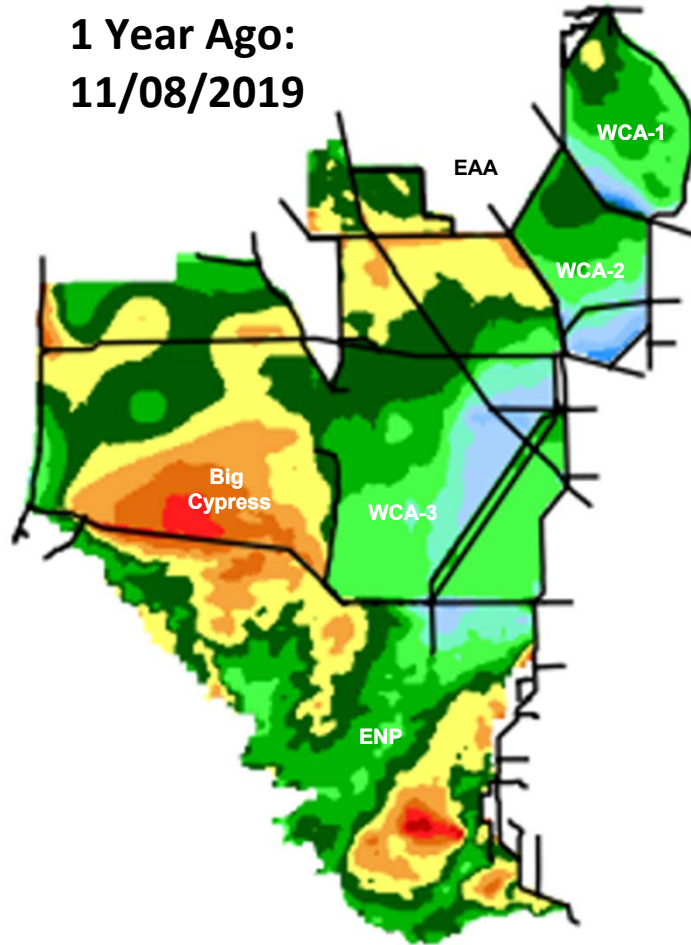
## Seven Day Mean Salinity (BBCW8 &amp; BBCW10) &amp; Total Daily Flow



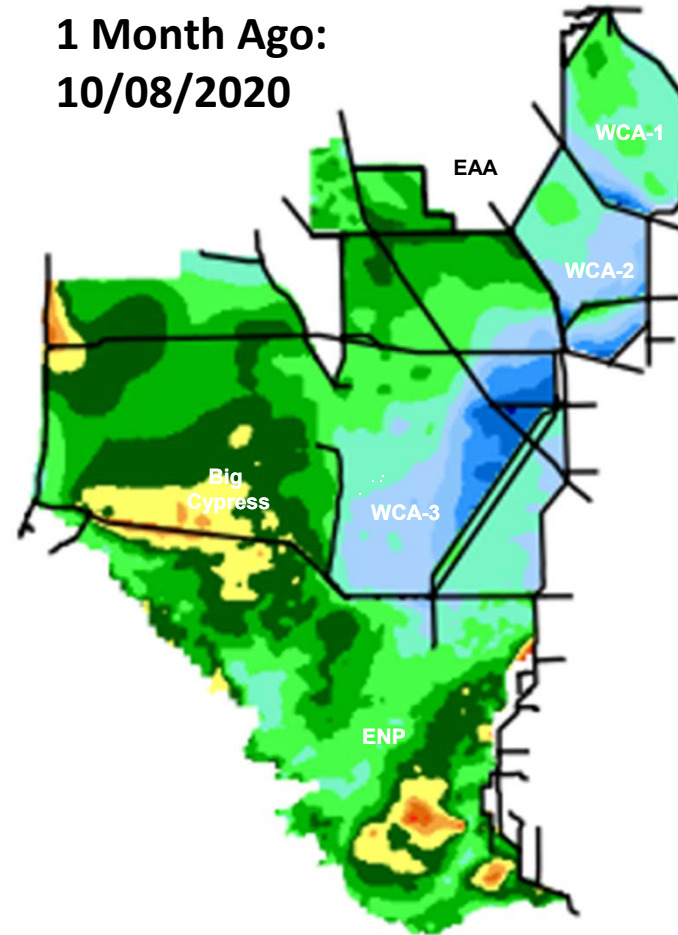
\* Total flow from S20G, S20F, S21, S21A, S123, S700P

# Everglades Water Depth Maps

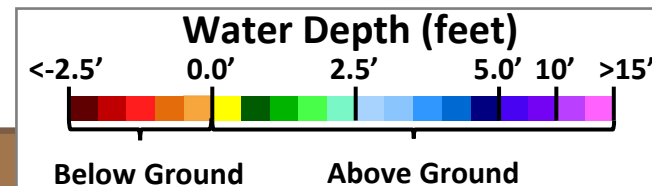
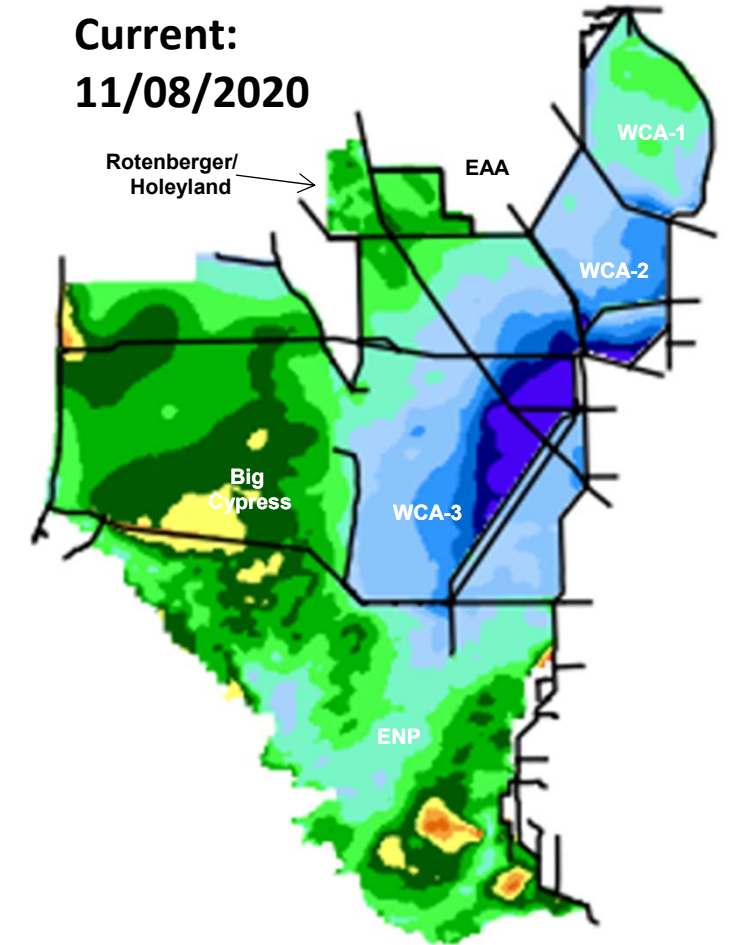
1 Year Ago:  
11/08/2019



1 Month Ago:  
10/08/2020







Current:  
11/08/2020



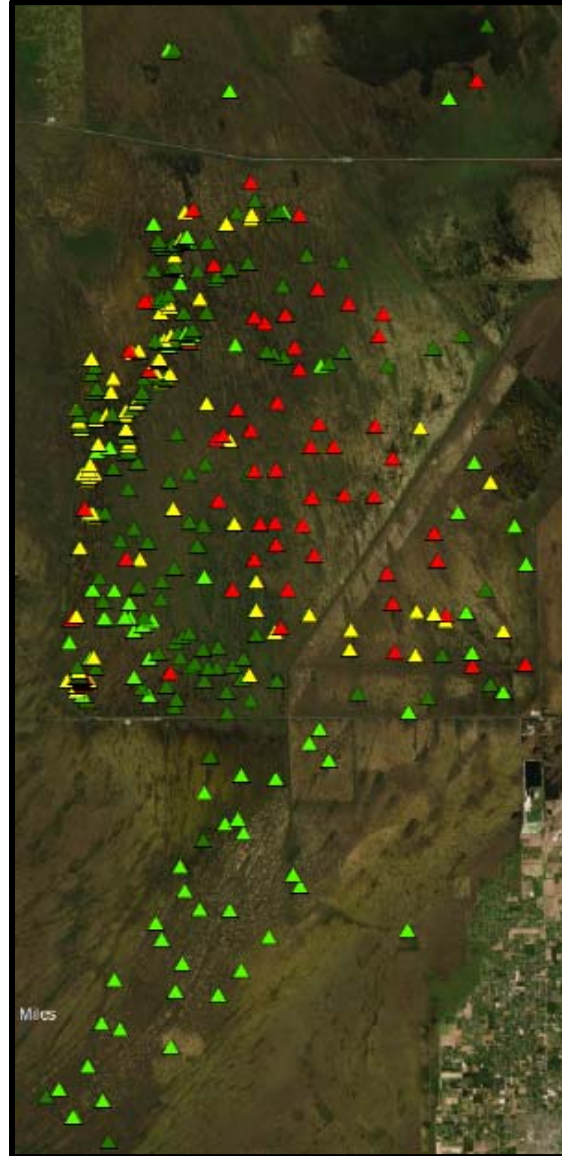


# Tree Island Inundation (days) - – Map and Data from November 8<sup>th</sup> (Work In Progress)

-  Not inundated
-  0 to 90 days inundated
-  More than 90 days
-  More than 120 days



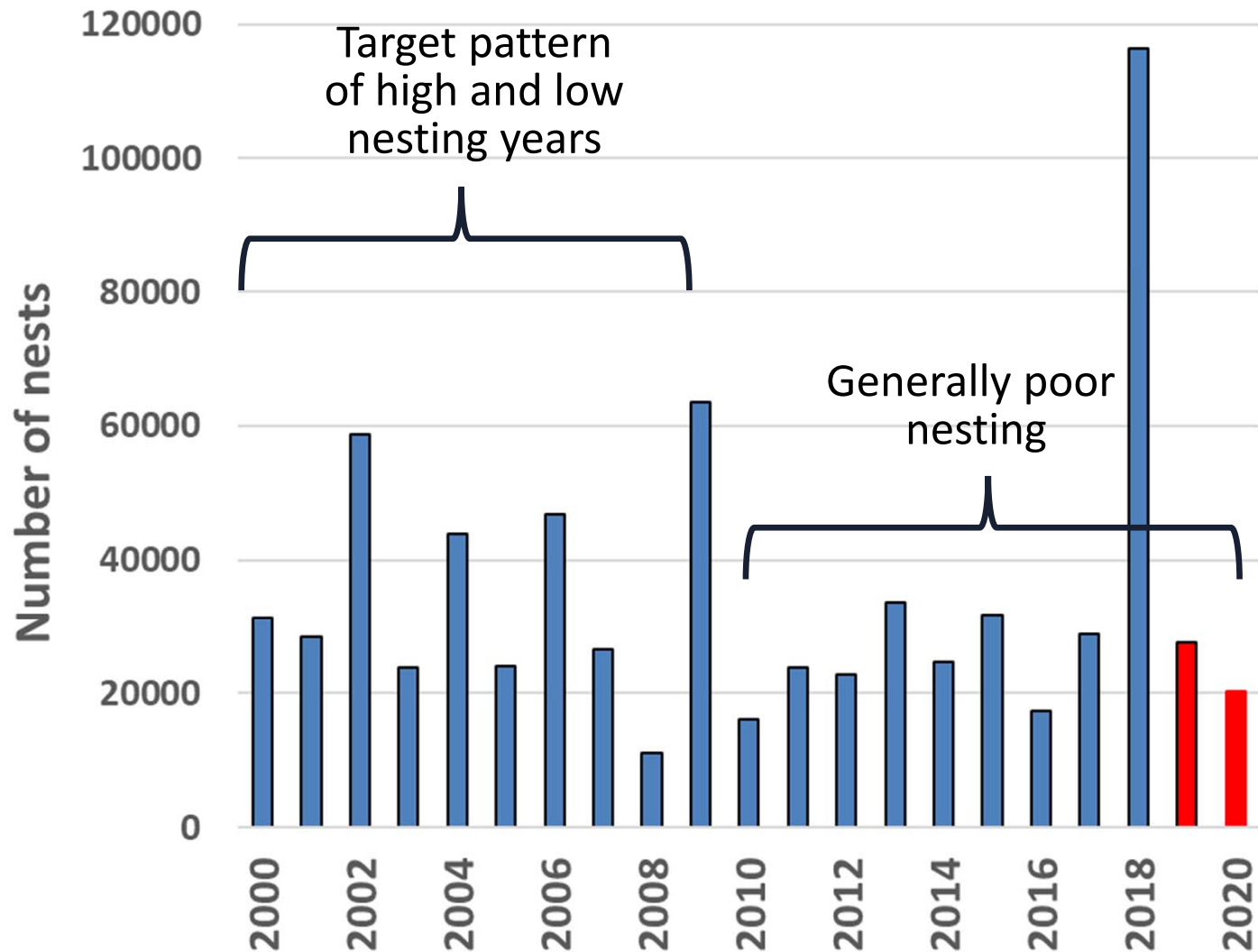
*Cypress Tree Island with photographer, Clyde Butcher, in the foreground*



- 371 Tree Islands of known elevation within WCA-3A, -3B, and Everglades National Park's Shark Slough
- Current preliminary estimates using WDAT indicate that 79% or 293 of the tree islands are currently inundated, up from 67% the week prior
- Initial islands inundated beginning 5/24/20, longest duration of continuous inundation is 158 days
  - Inundation for more than 90 days has the potential for ecological harm
  - Inundation for more than 120 days will cause ecological harm

# Wading Birds Nesting Effort in the Everglades (2000-2020)

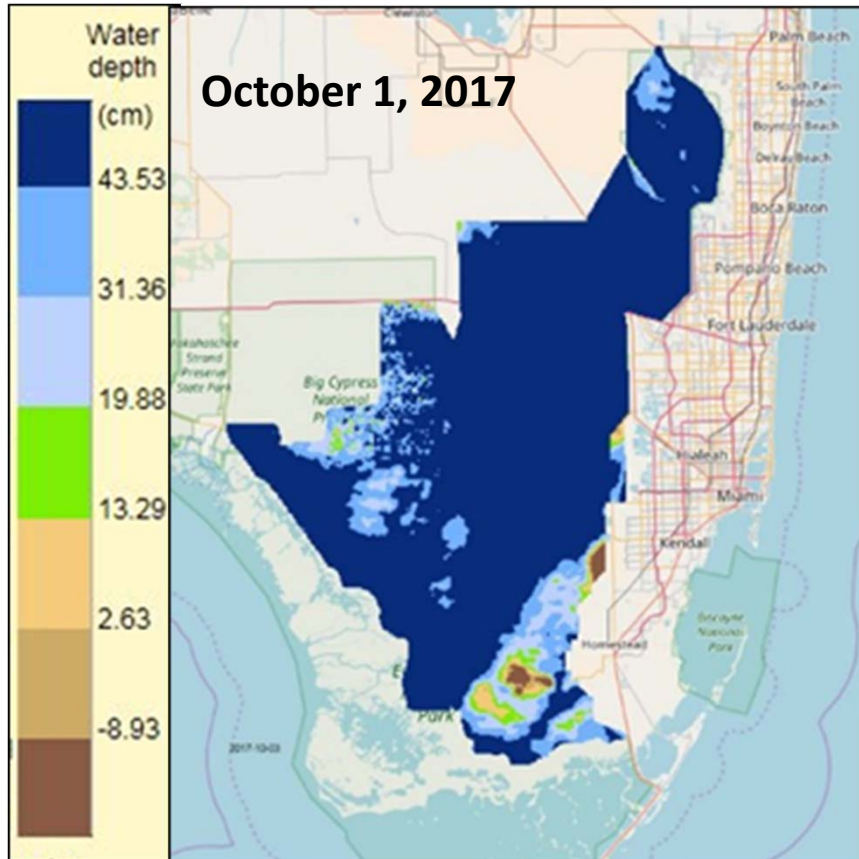
## Wading birds nesting effort in the Everglades (2000-2020)



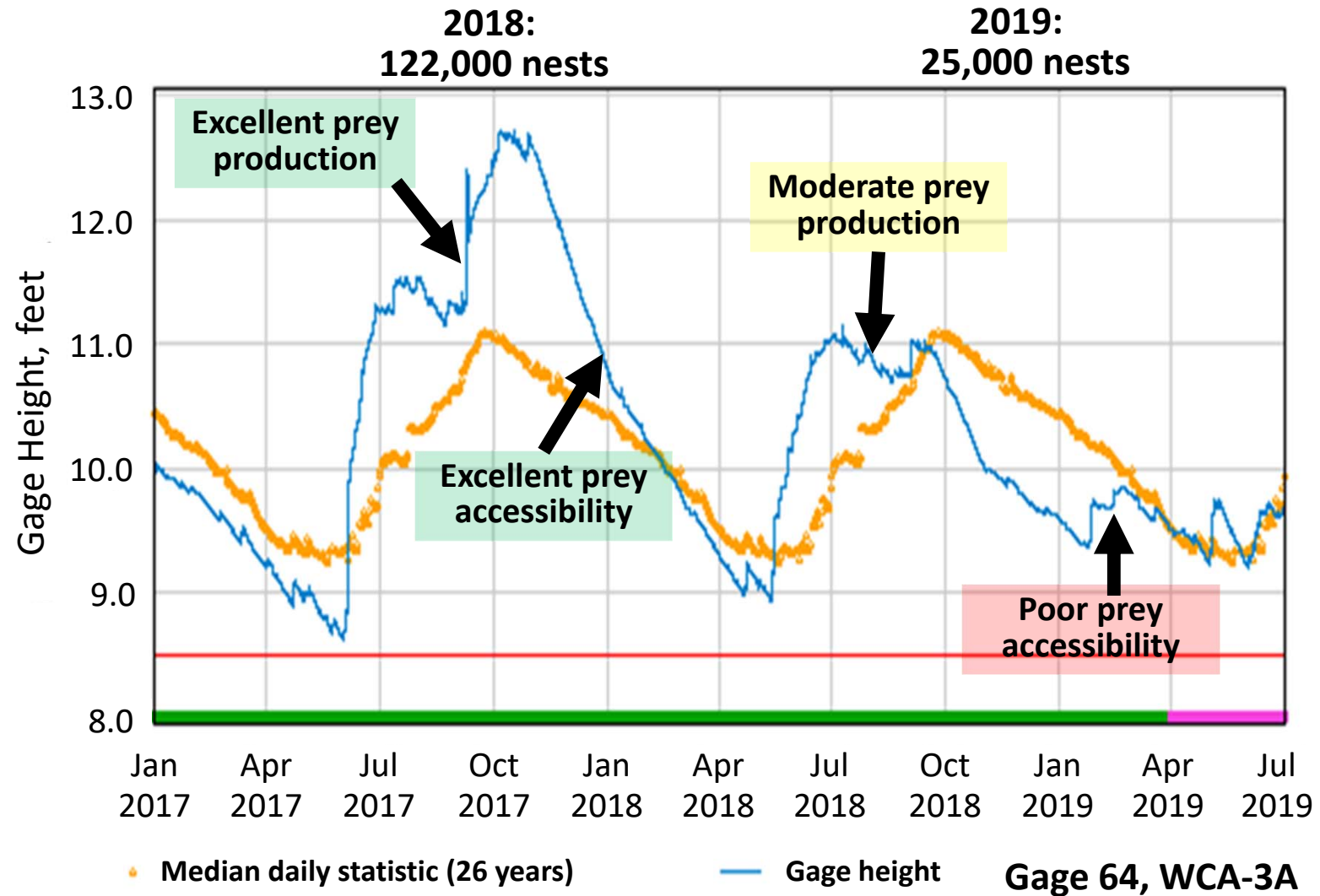
- The natural pattern of nesting effort fluctuates (high to low) among years, e.g. 2000-2009
- But, we've seen consistent low nesting effort from 2010-2020 (except 2018)
- **Poor** nest effort/success in 2019 and 2020
- Need a good nesting year in 2021



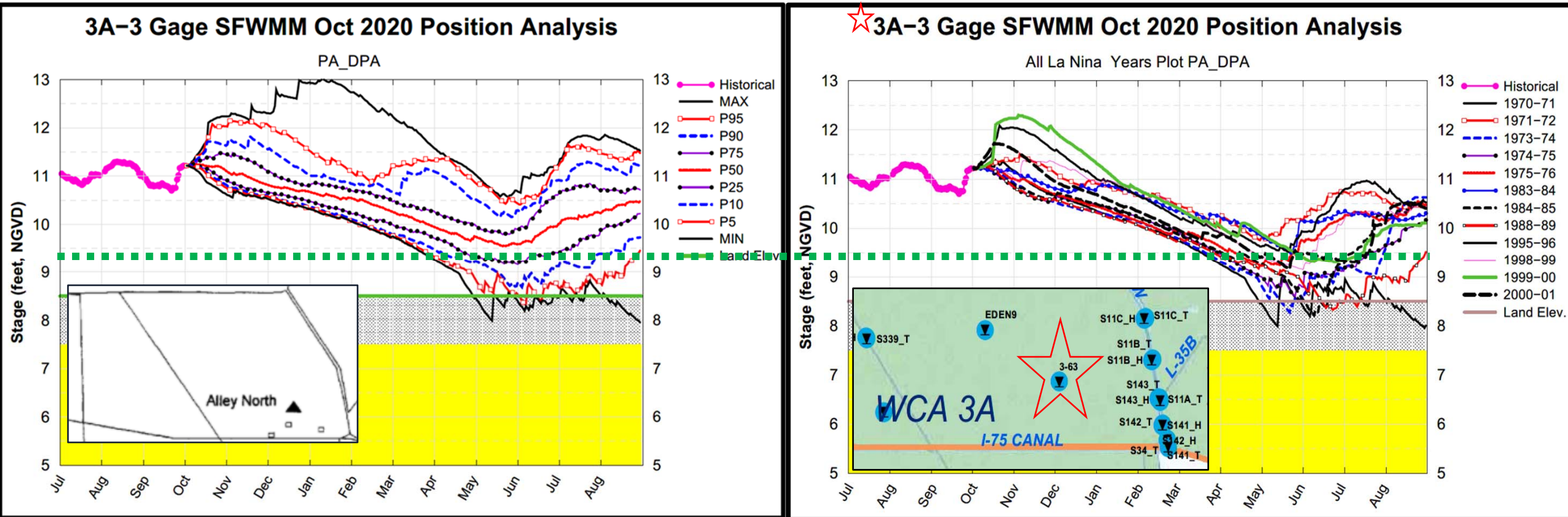
# Wading Birds Require High Wet-Season Stages Followed by Consistent Drying (e.g. 2017-18 Nesting Season)



“Wet wet-seasons” create high prey production over large spatial scales and in key habitats



# Stages predicted by the October DPA at gauge 63 near the important wading bird colony, Alley North

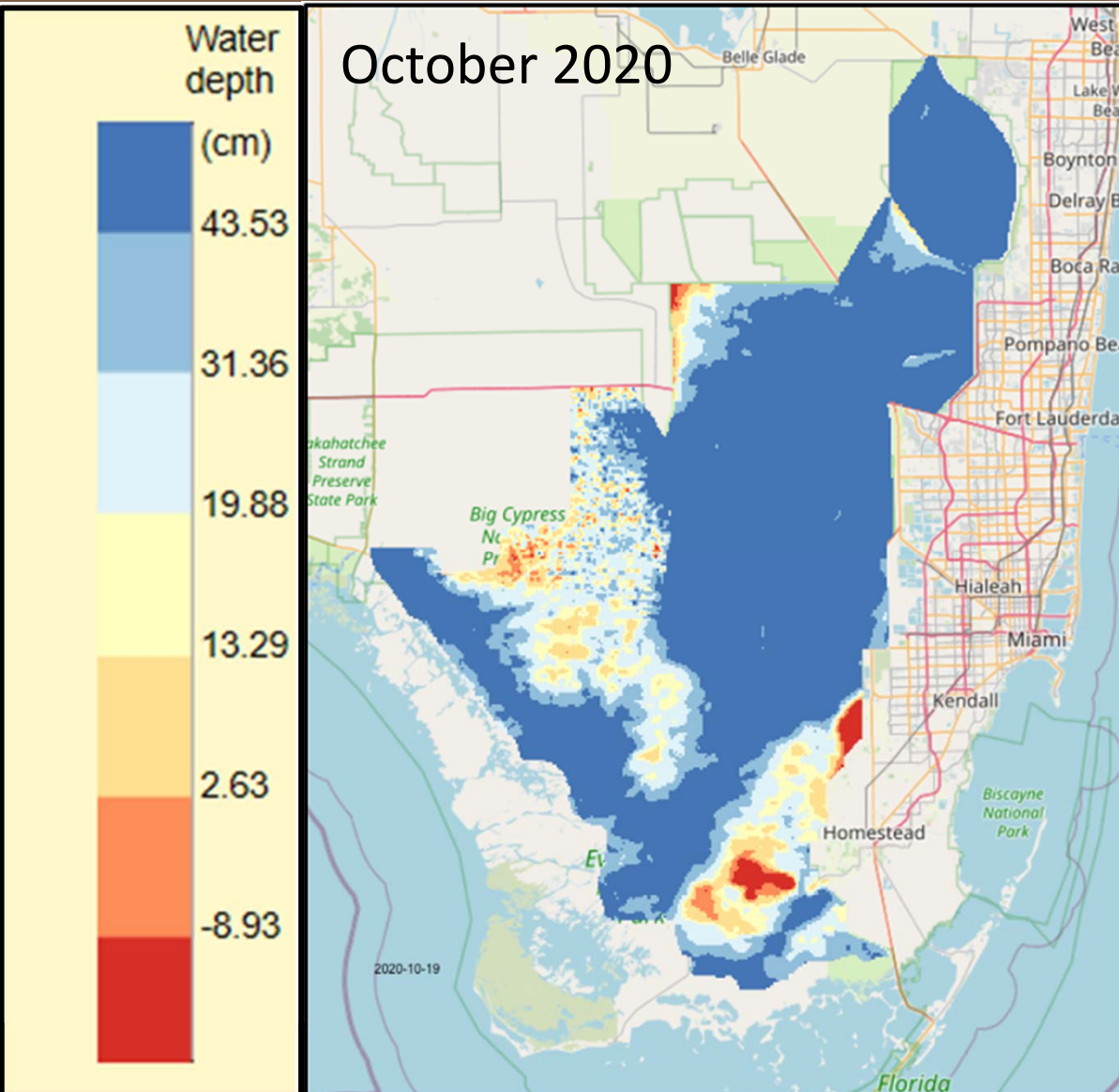


Comparing the prediction on the left that uses all year's precipitation patterns, to the one on the right which uses precipitation only from La Nina years

..... This green dashed line is the stage below which nesting success at Alley north is low



# 2021 Nesting Predictions and Recommendations



## Current high stages are good for wading birds

- Promotes high prey production across landscape
- Allows for greater scope & duration of drydown

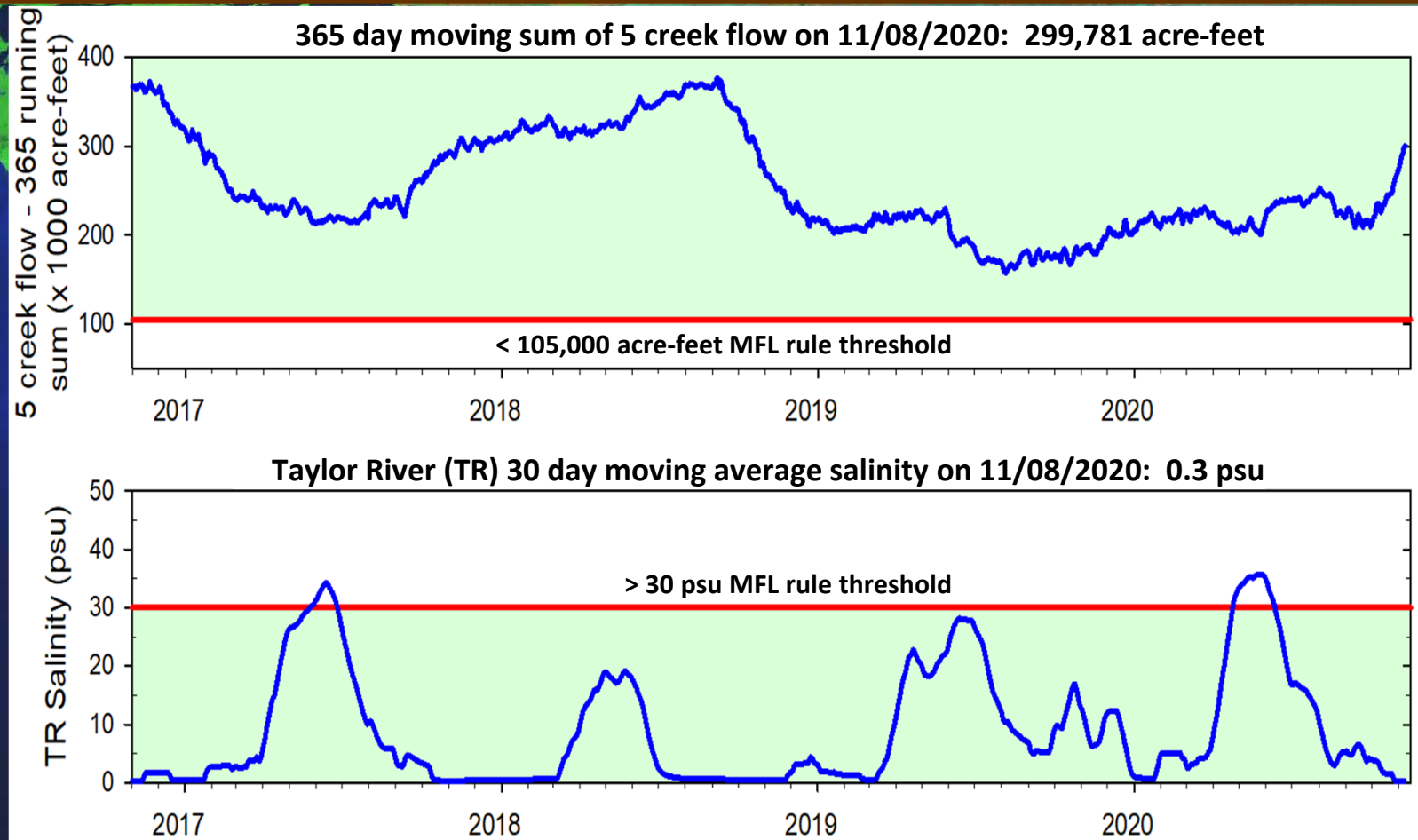
## Prediction is for a 'dry' dry-season (La Niña)

- Lengthy, consistent drydown
- Excellent prey availability
- High wading bird nesting effort/success

## Recommendations

- Following return to Pre-Eta stages, manage for a dry-down consistent for optimal foraging

## Northeast Florida Bay MFL

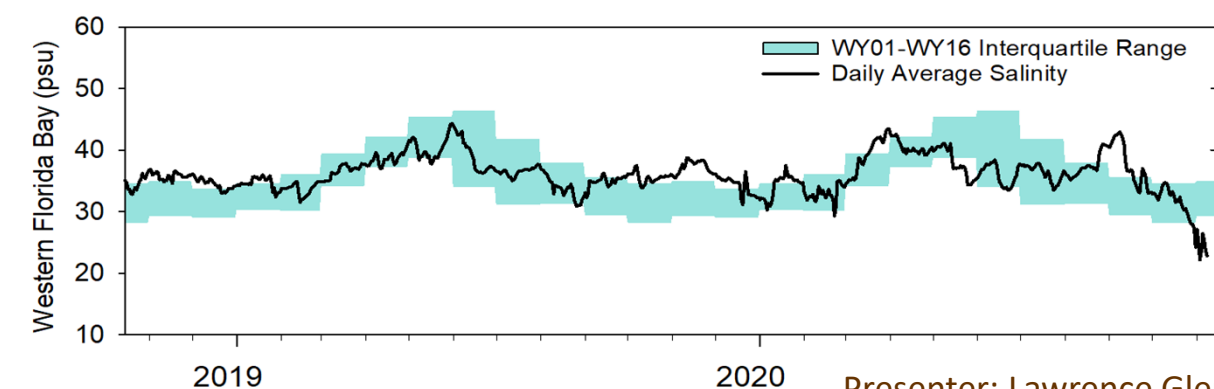
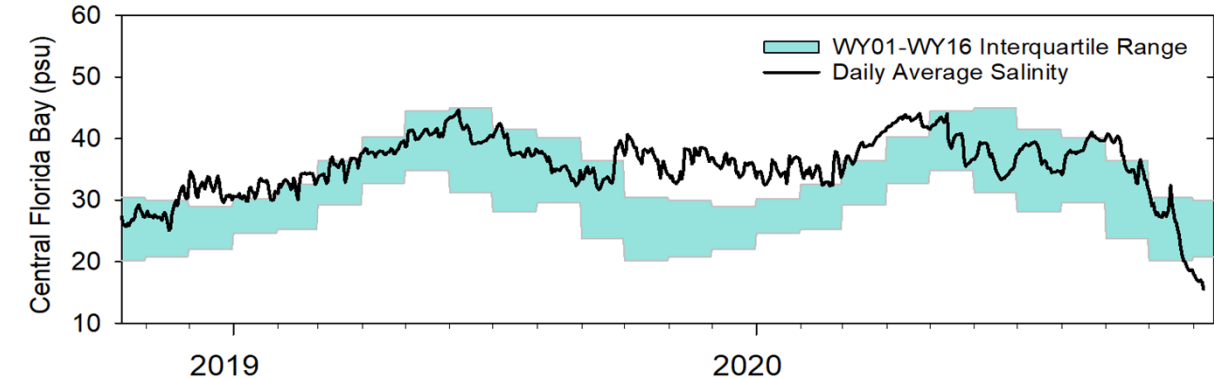
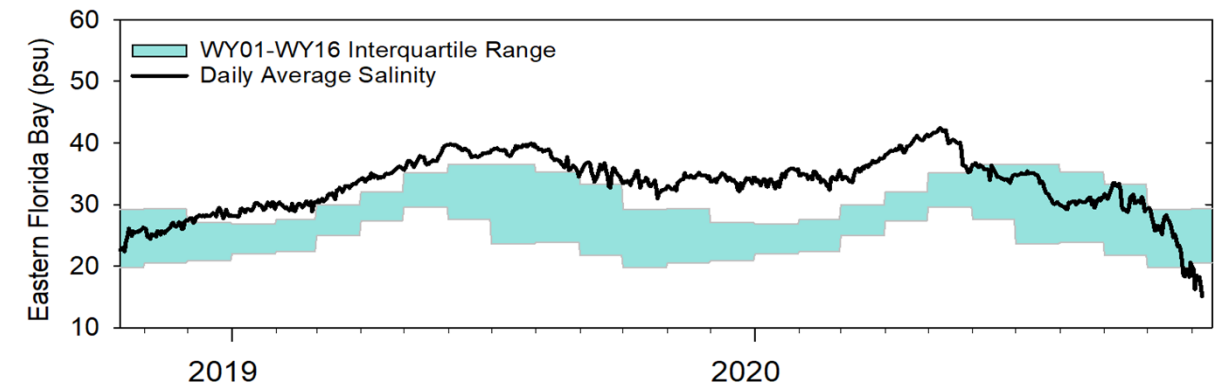
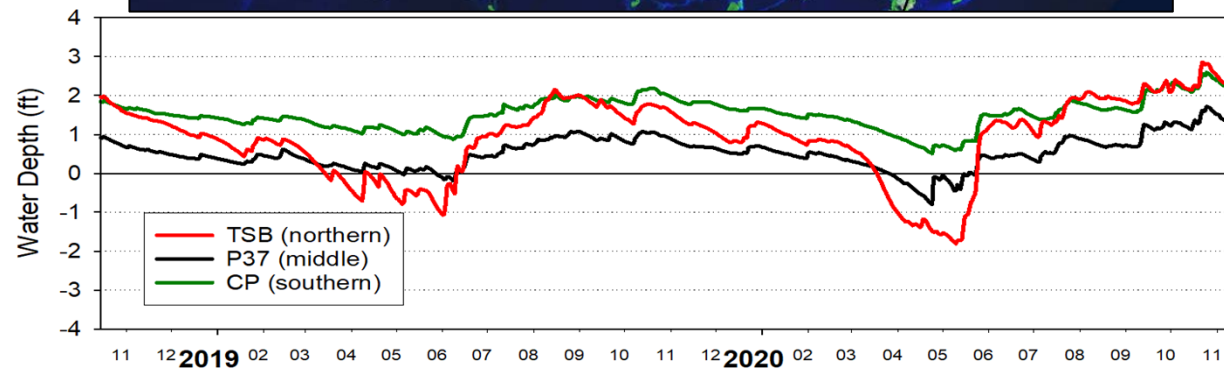
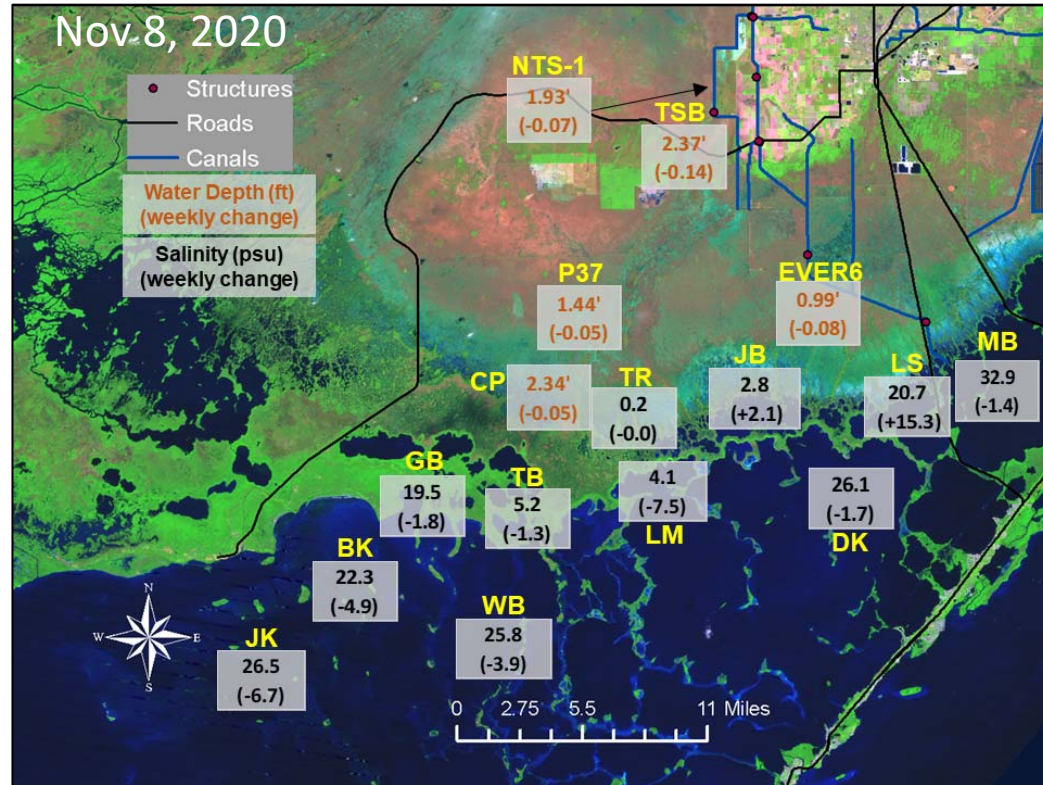


- ★ Salinity gauge
- ★ Creek flow gauge

TR



# Taylor Slough Stages and Florida Bay Salinity





# Questions?



*Doe and fawn with an egret hitching a ride  
Frog Pond Wildlife Management Area, Homestead*

*Photograph courtesy of Manuel Porras , SFWMD*