

Disclaimer: Information contained in the report addresses environmental conditions only and is not the official South Florida Water Management District operations recommendation or decision.

## **M E M O R A N D U M**

**TO:** John Mitnik, Assistant Executive Director, Executive Office Staff

**FROM:** SFWMD Staff Environmental Advisory Team

**DATE:** November 18, 2020

**SUBJECT:** Weekly Environmental Conditions for Systems Operations

### **Summary**

#### **Weather Conditions and Forecast**

As a cold front moves through the District, much drier and stable air will inhibit rainfall and provide for dry conditions. Following the frontal passage, breezy, dry, and cooler weather will prevail across the District, with only a slight chance for isolated light showers along the immediate east coast. No measurable total rainfall is expected, however. A return of shallow moisture is forecast Thursday and Friday this week, which should fuel a marginal increase of showers. The shower activity will largely be confined to the eastern half of the District (especially along and near the east coast), with a still-stable atmosphere generally keeping areal average rainfall no greater than a tenth of an inch and with local maxima under an inch. On Saturday, a surge of greater moisture is predicted to overspread Florida from the Bahamas, which should help to produce a broader coverage of shower activity to at least include some over the western half of the District. However, the heaviest rains are most likely to occur in the eastern half of the area and primarily along or near the east coast. Late in the weekend a broad non-tropical low-pressure area could form several hundred miles east of the Bahamas and strengthen while moving north-northeastward over the west-central Atlantic. While light shower activity could continue across parts of the District on Sunday, a push of drier air behind the western Atlantic low is forecast to cause a drying across southern and central Florida by early next week that could last for a couple of days.

#### **Kissimmee**

Tuesday morning stages were 58.1 feet NGVD (0.1 feet above schedule) in East Lake Toho, 55.0 feet NGVD (at schedule) in Toho, and 52.9 feet NGVD (0.4 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.7 feet NGVD at S-65A and 27.0 feet NGVD at S-65D. Tuesday morning discharges were 950 cfs at S-65, 1,120 cfs at S-65A, 1,800 cfs at S-65D and 2,160 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 5.3 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 0.84 feet. Today's recommendation is to maintain minimum flow of 300 cfs +/- 50 cfs at S-65A.

#### **Lake Okeechobee**

Lake Okeechobee stage was 16.41 feet NGVD on November 16, 2020, 0.18 feet higher than the previous week and 0.20 feet higher than the previous month. Rainfall was much reduced from the prior week, which was affected by Tropical Storm Eta, but inflows were still high at the beginning of the week. Inflows declined from a high of over 8,500 cfs on November 11 to less than 4,500 cfs on November 16. Stage has been above or near the top of the envelope since August 1, 2020 and is currently 0.91 feet above. Satellite imagery suggests cyanobacterial bloom potential is low on the lake, likely due to high winds associated with the tropical storm the prior week.

## **Estuaries**

Total inflow to the St. Lucie Estuary averaged more than 7,812 cfs with approximately 984 cfs coming from Lake Okeechobee. The seven-day average salinities decreased throughout the estuary over the past week. Salinity at the US1 Bridge is in the poor range (0-5) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 10,084 cfs over the past week with approximately 3,059 cfs coming from the Lake. Seven-day average salinities remained almost fresh (0.2) at the three most upstream sites (S-79, Val I75 and Ft. Myers Yacht Basin), decreased at Cape Coral, and increased at Shell Point and Sanibel over the past week. Salinities are in the good range (0-10) for tape grass at Val I-75 and Ft. Myers. Salinities are in the good range (10-30) for adult eastern oysters at Shell Point and Sanibel and in the poor range (0-5) at Cape Coral.

Lake stage is in the Intermediate Sub-Band of 2008 LORS. Tributary hydrological conditions are very wet. The LORS2008 Release Guidance suggests up to 4000 cfs release at S-79 to the Caloosahatchee Estuary and up to 1800 cfs release at S-80 to the St. Lucie Estuary.

## **Stormwater Treatment Areas**

Over the past week, no Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2021 (since May 1, 2020) is approximately 94,600 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 1,381,000 ac-feet. Most STA cells are well above target stage. STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7. Operational restrictions are in place in STA-1W Northern Flow-way related to STA-1W Expansion #1 startup activities; in STA-1E Central Flow-way, STA-2 Flow-way 3, STA-2 Flow-way 4, STA-3/4 Eastern, Central, and Western Flow-ways for vegetation management activities; and in STA-5/6 Flow-ways 2 and 3 following the Restoration Strategies project to grade non-effective treatment areas. This week, there is no capacity for Lake releases in the STAs.

## **Everglades**

Above average precipitation was recorded across the WCAs last week, particularly in northern WCA-3A. At the gauges monitored for this report, WCA-1 is around 0.54 feet, central WCA-2A is 2.3 foot, and WCA-3A is about 2.1 feet above the mean stage for this time of year. WCA-2A and 3A are well above schedule and trending away from their respective regulation stages, with the ascension slowing early this week. WCA-1 is close to schedule, while WCA-2A nears 3.0 feet and WCA-3A is around 2.3 feet above schedule. Heavy rainfall associated with Tropical Storm Eta fell across Taylor Slough and Florida Bay last week, and stages increased. Salinities decreased on average across Florida Bay, more so at individual nearshore stations. Salinities in the Taylor River mangrove zone to the east remained near fresh, as discharge rates from the creeks remain high and the 365-day moving sum is at its highest rate since October 2018.

## Supporting Information

### KISSIMMEE BASIN

#### Rainfall

The Upper Kissimmee Basin received 1.89 inches of rainfall in the past week, and the Lower Basin received 0.87 inches (SFWMD Daily Rainfall Report 11/16/2020).

#### Upper Kissimmee

**Table 1** lists stage and discharge for several KCL water bodies using data from lake outfall structures. KCL stage hydrographs with respective regulation schedules and rainfall are shown in **Figures 1-3**.

**Table 1.** Average discharge (cfs) for the preceding seven days, stage (feet NGVD), and departures from KCL flood regulation (R) or temporary schedules (T, A, or S); provisional, real-time data are from SFWMD.

Report Date: 11/17/2020

Water Body	Structure	7-day Average Discharge (cfs) <sup>1</sup>	Stage Monitoring Site <sup>2</sup>	Lake Stage (feet)	Schedule Type <sup>3</sup>	Schedule Stage (feet)	Daily Departure (feet)						
							11/15/20	11/8/20	11/1/20	10/25/20	10/18/20	10/11/20	10/4/20
Lakes Hart and Mary Jane	S-62	277	LKMJ	61.1	R	61.0	0.1	-0.1	0.0	0.0	0.1	0.1	0.0
Lakes Myrtle, Preston, and Joel	S-57	88	S-57	62.0	R	62.0	0.0	-0.1	0.0	0.0	0.2	0.2	0.1
Alligator Chain	S-60	186	ALLI	64.1	R	64.0	0.1	-0.1	-0.3	-0.1	-0.1	-0.1	0.0
Lake Gentry	S-63	258	LKGT	61.5	R	61.5	0.0	0.0	-0.1	-0.1	0.0	0.0	-0.1
East Lake Toho	S-59	645	TOHOE	58.1	R	58.0	0.1	0.0	-0.1	0.0	-0.2	0.0	0.2
Lake Toho	S-61	1,307	TOHOW, S-61	55.0	R	55.0	0.0	-0.1	-0.2	-0.1	-0.1	0.1	0.2
Lakes Kissimmee, Cypress, and Hatchineha	S-65	385	KUB011, LKIS5B	52.9	R	52.5	0.4	0.0	-0.1	0.1	0.2	0.5	0.6

<sup>1</sup> Seven-day average of weighted daily means through midnight.

<sup>2</sup> Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.

<sup>3</sup> A = projected ascension line, R = USACE regulation schedule, S = temporary recession target line, T = temporary schedule, N/A= not applicable or data not available.

DATA ARE PROVISIONAL

## Lower Kissimmee

Discharges at lower basin structures are shown in **Table 2**. **Figure 4** compares floodplain inundation depths from one year and one month ago with current inundation depths in the Phase I restored area of the Kissimmee River. **Figure 5** shows dissolved oxygen concentration along with S-65A discharge, water temperature and rainfall. **Figures 6-8** are included for reference: **Figure 6** is the current guide for operation of S-65 and S-65A, called the “Preferred Discharge Plan IS-14-50.0”. This is developed collaboratively each year between ecologists and SFWMD water managers based on prevailing ecological and hydrologic conditions. A preferred discharge plan and the interim regulation schedule (**Figure 7**) will be used until the Headwaters Lakes Revitalization regulation schedule is implemented. **Figure 8** is a map of the Kissimmee Basin showing Central and Southern Florida (C&SF) flood control project structures and color-coded watersheds.

**Table 2.** One- and seven-day average discharge at lower basin structures, dissolved oxygen concentration in phases I and II/III area river channel, and depth in the Phase I area floodplain using provisional, real-time data from SFWMD.

**Report Date:** 11/17/2020

Metric	Location	1-Day Average	Average for the Preceding 7-Days <sup>1</sup>								
		11/15/2020	11/15/20	11/8/20	11/1/20	10/25/20	10/18/20	10/11/20	10/4/20	9/27/20	9/20/20
Discharge (cfs)	S-65	678	385	187	209	180	678	1,265	1,725	2,890	3,143
Discharge (cfs)	S-65A <sup>2</sup>	1,086	724	361	330	346	861	1,916	2,248	3,578	3,855
Discharge (cfs)	S-65D <sup>2</sup>	1,808	1,590	797	1,122	1,714	3,267	4,848	4,715	5,198	3,738
Headwater Stage (feet NGVD)	S-65D <sup>2</sup>	27.11	27.03	26.94	27.35	27.62	27.66	27.68	27.75	27.73	27.77
Discharge (cfs)	S-65E <sup>2</sup>	2,142	1,904	895	1,283	1,935	3,501	5,287	5,081	4,994	3,919
Discharge (cfs)	S-67	0	0	0	0	0	0	0	0	0	0
DO (mg/L) <sup>3</sup>	Phases I & II/III river channel	4.7	5.3	5.6	3.8	3.0	1.5	1.2	1.2	1.2	1.1
Mean depth (feet) <sup>4</sup>	Phase I floodplain	0.84	0.75	0.52	0.75	0.53	0.66	0.90	1.91	2.70	2.31

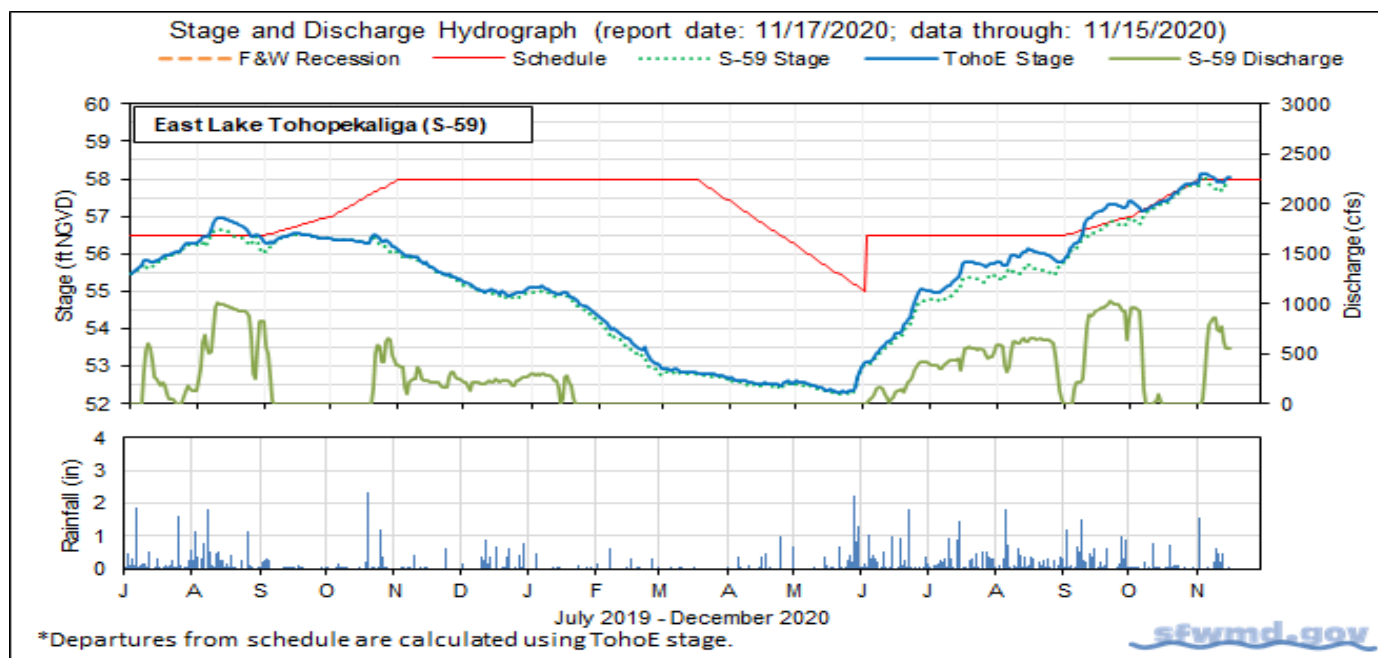
<sup>1</sup>Seven-day average of weighted daily means through Sunday midnight.

<sup>2</sup>S-65A discharge combines S-65A with auxiliary structures; S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2; S-65D stage averages stage at S-65D and S-65DX1; S-65E discharge combines S-65E and S-65EX1.

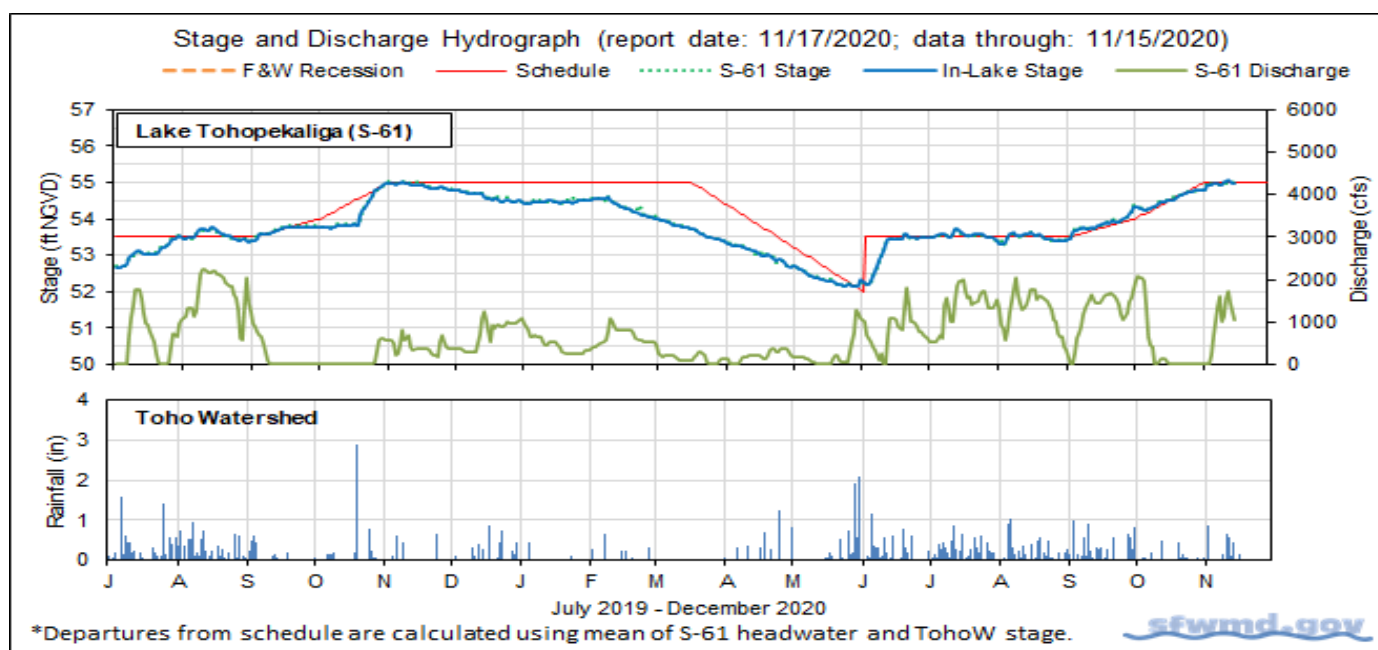
<sup>3</sup>DO is the average for sondes at KRBN, PC62, PC33, PD62R, and PD42R.

<sup>4</sup>1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).

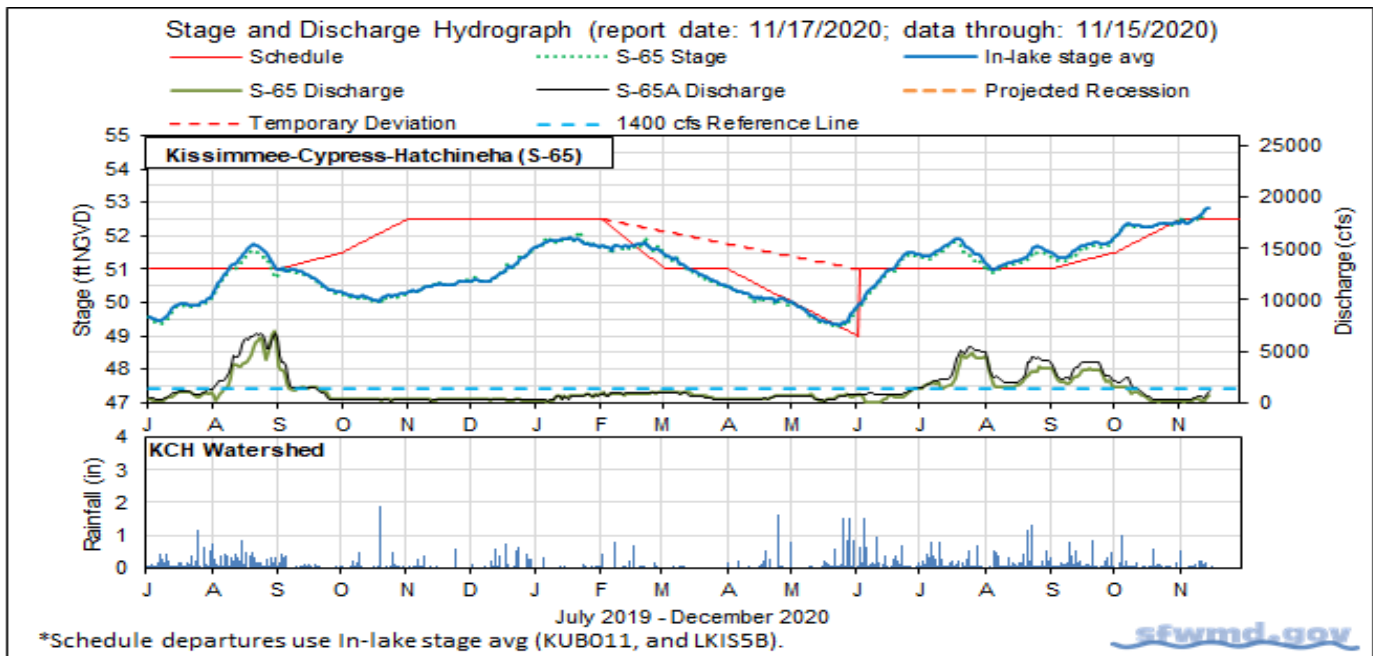
DATA ARE PROVISIONAL; N/A indicates that data were not available.



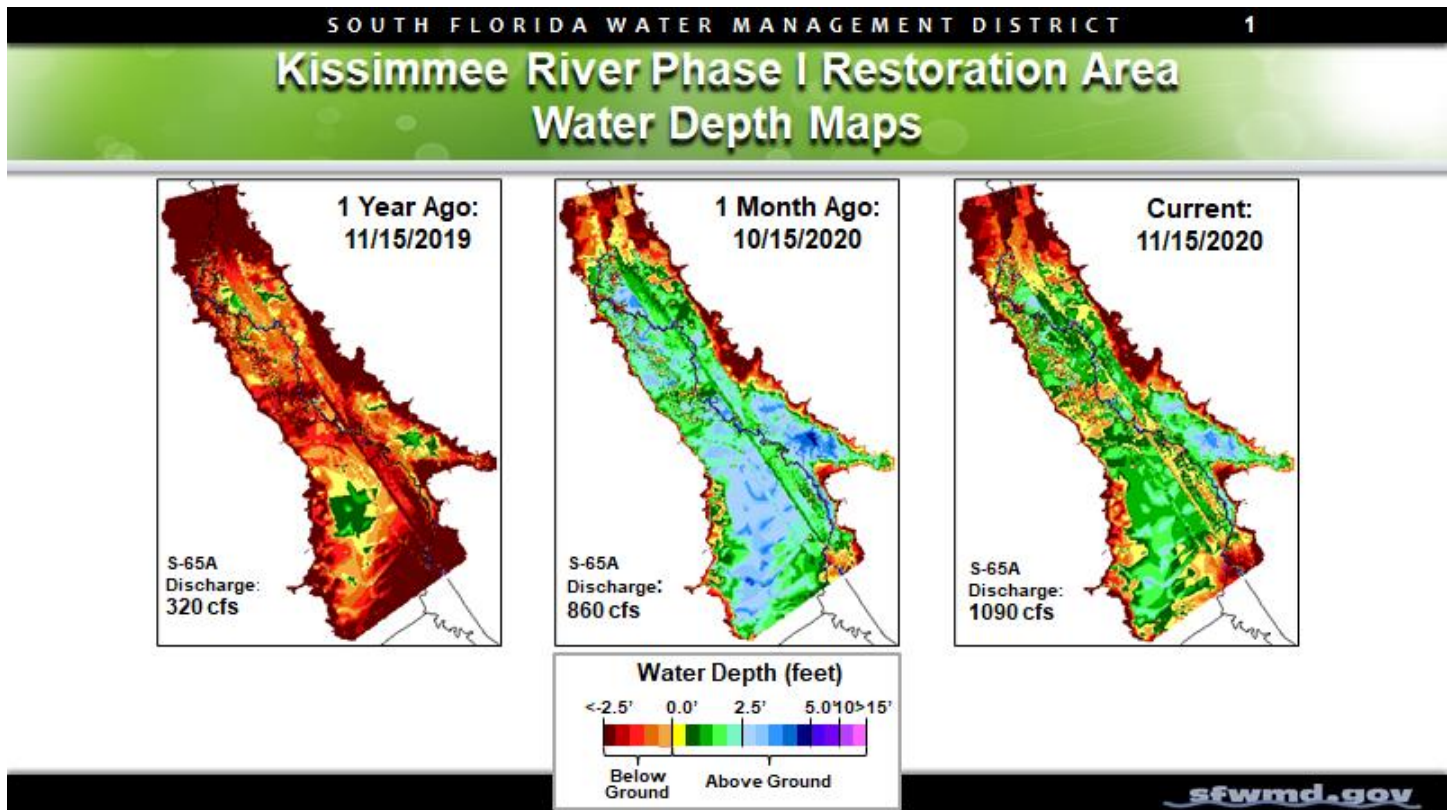
**Figure 1.** East Lake Toho regulation schedule, stage, discharge and rainfall.



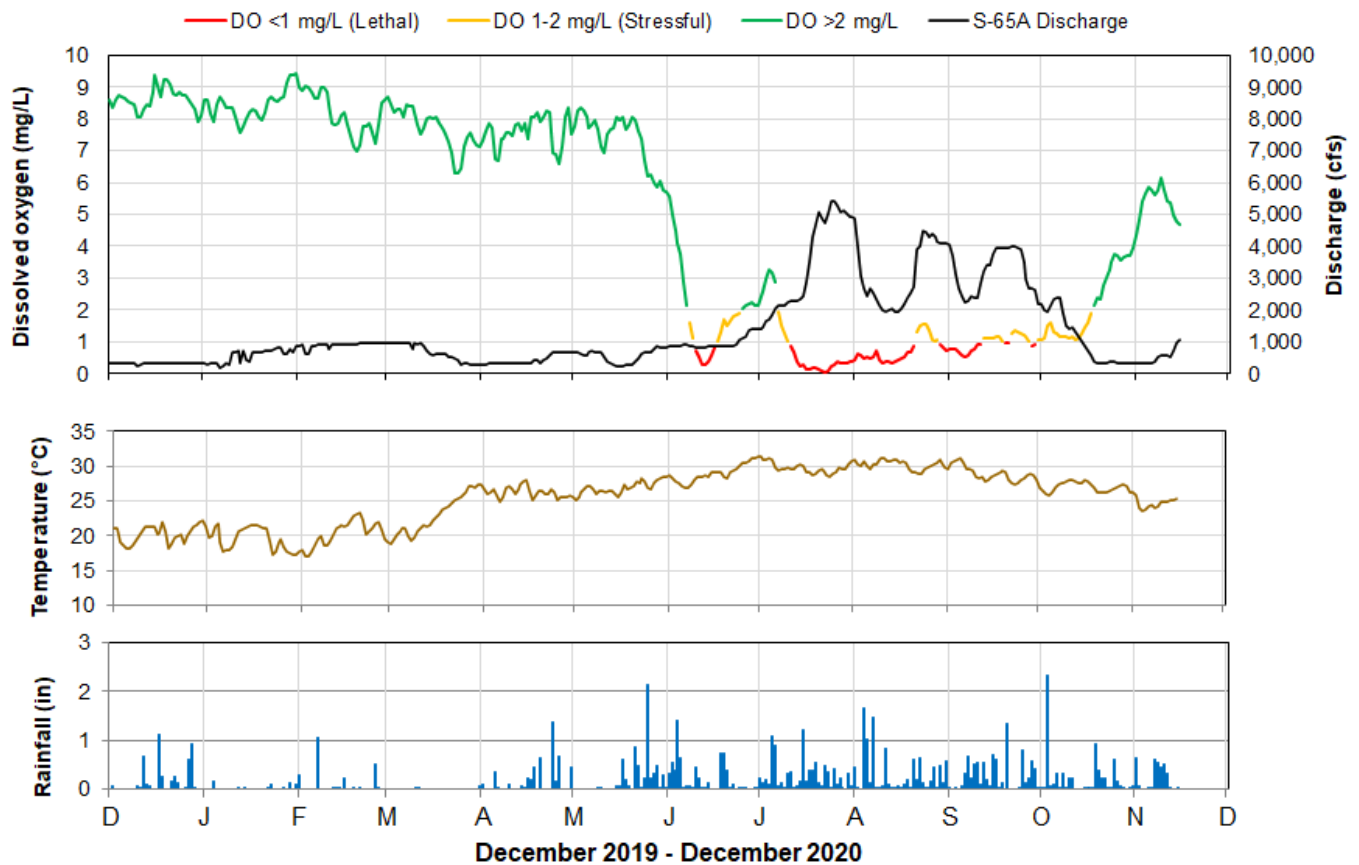
**Figure 2.** Lake Toho regulation schedule, stage, discharge and rainfall.



**Figure 3.** Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.



**Figure 4.** Phase I area floodplain water depths (from left to right) one year ago, one month ago and current. Color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.



Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRBN, PC33, PD62R and PD42R with an average of 3 stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

Report Date: 11/17/2020; data are through: 11/15/2020

[sfwmd.gov](http://sfwmd.gov)

**Figure 5.** Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches)



**Stage and Discharge Guidance for 2019-2020.**

Zone	KCH Stage (ft NGVD)	S-65/S-65A Discharge*
A	Above regulation schedule line.	Flood control releases as needed with no limits on the rate of discharge change.
B1	In flood control buffer zone (0.5 ft below the schedule line).	Adjust S-65 discharge so that S-65A discharge is between 1400 cfs at the buffer zone line and 3000 cfs at the schedule line.
B2	Between the Flood Control Buffer and the 50.0 ft line.	Adjust S-65 discharge to maintain at least 1400 cfs at S-65A. Use $\pm 0.2$ ft buffer (gray band) above and below the 50.0 ft line to decide when to begin ramping up to 1400 cfs or down to 300 cfs; do not continue reducing discharge if stage rises back to or above the threshold stage line.
B3	Between the 50.0 ft line and 49 ft.	Adjust S-65 discharge to maintain at least 300 cfs at S-65A.
B4	Between 48.5 ft to 49 ft.	Adjust S-65 discharge to maintain S-65A discharge between 0 cfs at 48.5 ft and 300 cfs at 49 ft.
C	Below 48.5 ft.	0 cfs.

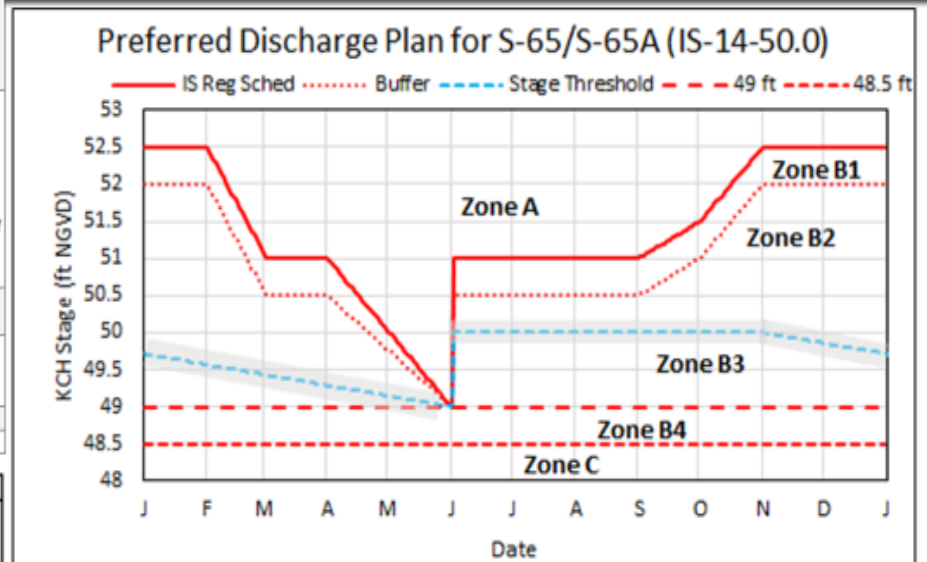
\*Changes in discharge should not exceed limits in inset table below.

**Discharge Rate of Change Limits for S65/S65A (revised 7/13/18).**

Q (cfs)	Maximum rate of increase (cfs/day)	Maximum rate of decrease (cfs/day)
0-300	50	-50
301-650	75	-75
651-1400	150	-150
1401-3000	300	-600
>3000	1000	-2000

Revised 5/16/2019

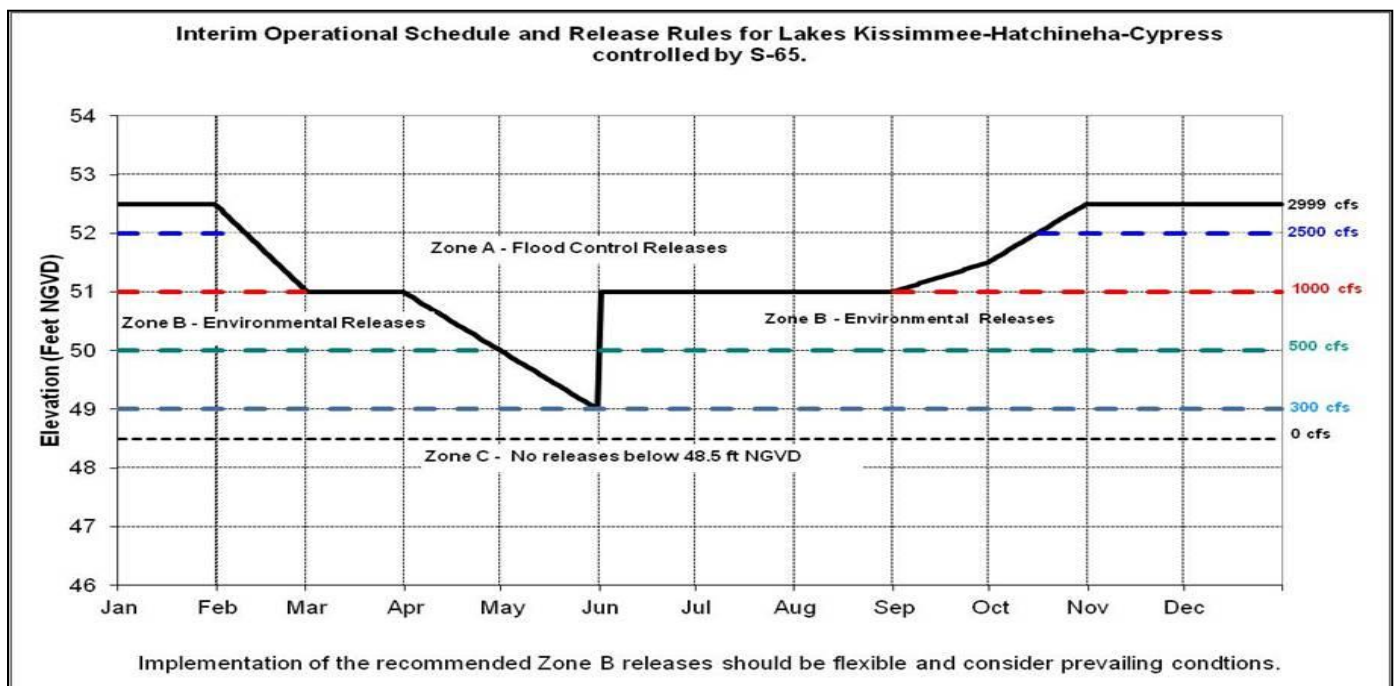
## 2019-2020 Discharge Plan S-65/S65A



**Other Considerations**

- When possible, limit lake ascension rate in the Jun 1 - Aug 15 window to 0.5 ft per 14 days in Lakes Kissimmee, Cypress, Hatchineha (S-65), East Toho (S-59) and Toho (S-61).
- If outlook is for extreme dry conditions meet with KB staff to discuss modifications to this plan.

**Figure 6.** The 2019-2020 Discharge Plan for S-65/S-65A.



**Figure 7.** Interim operations schedule for S-65 (solid black line). The discharge schedule shown to the right has not been used in recent years.



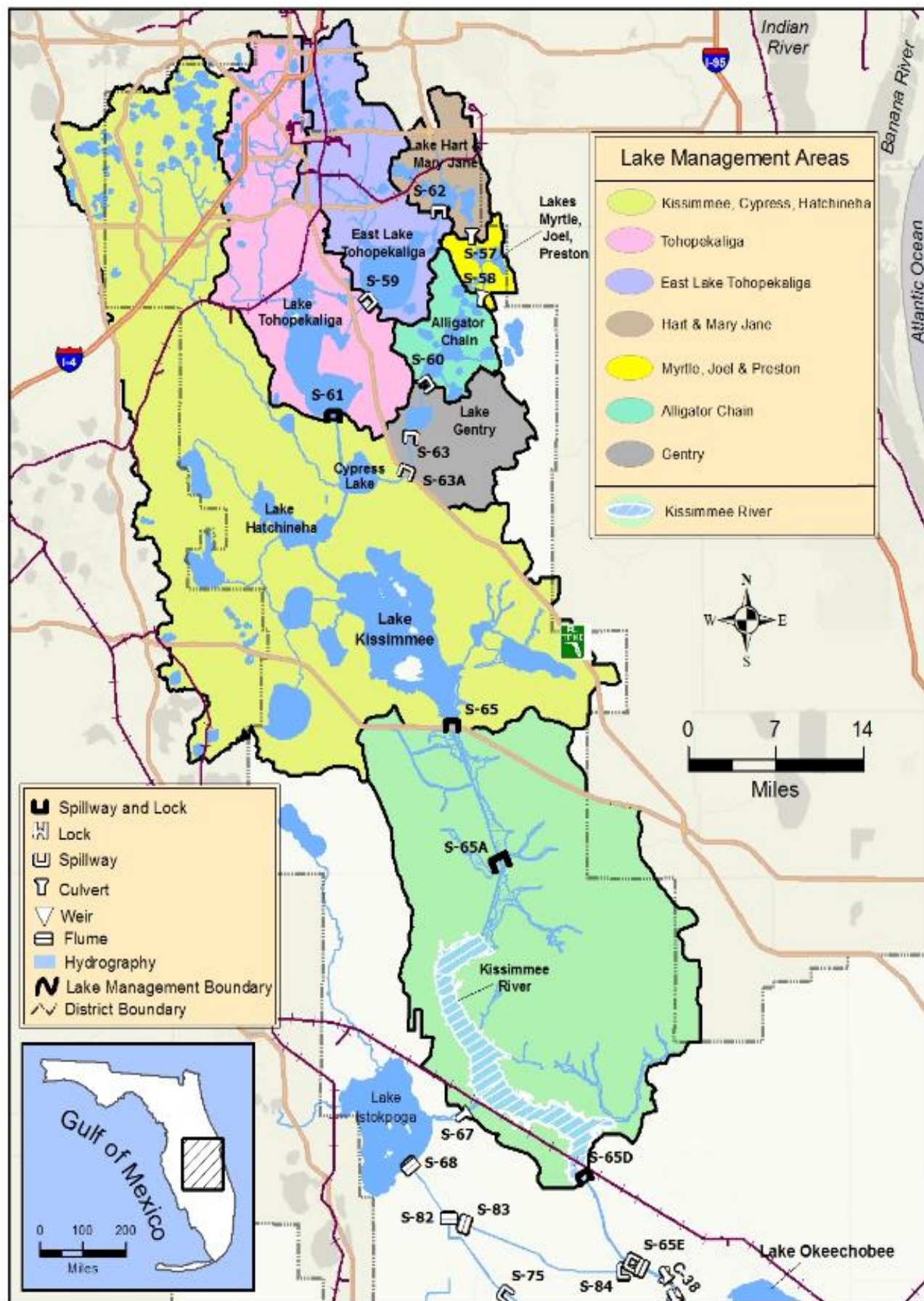


Figure 8. The Kissimmee Basin.

## **LAKE OKEECHOBEE**

Lake Okeechobee stage is 16.41 feet NGVD, 0.20 feet higher than a month ago, and 3.15 feet higher than one year ago (Figure 1). Lake stages rose into the lower portion of the preferred ecological envelope on June 2, 2020 (Figure 2) but have been above the envelope since the end of July; currently 0.91 feet above. Lake stage moved from the Beneficial Use sub-band in mid-July to the Intermediate sub-band in early October; a rise of over 3.5 feet in under three months (Figure 3). Lake stage reached a low of 10.99 feet on May 17 and a high of 16.45 feet on November 12, a difference of 5.5 feet. Releases in early November resulted in a slight stage decline before rains associated with Tropical Storm Eta increased stages again last week. The bulk of the watershed runoff associated with the storm occurred earlier in the week, with inflows falling roughly 4,300 cfs from November 11 to November 16.

Average daily inflows (excluding rainfall) were higher than the previous week, going from 3,755 cfs to 6,832 cfs. Outflows (excluding evapotranspiration) decreased from 5,611 cfs to 4,043 cfs. Most of the inflows came from the Kissimmee River (1,984 cfs through S-65E & S-65EX1), followed by the C-41a canal (1,189 cfs through S-84 & S-84X), but there were substantial inflows from Taylor Creek (1,002 cfs through S-191), the C-40 and C-41 canals (861 cfs through S-71 & S-72), and Fisheating Creek (462 cfs). Pumps contributed a combined 745 cfs of inflow, an increase of 335 cfs from the previous week. Releases to the west via S-77 decreased from the prior week, going from 4,076 cfs to 3,059 cfs, while releases east via S-308 were very similar at 984 cfs. There were no outflows south through the S-350 structures. Total lake inflows and outflows for the past week are detailed in Table 1, as well as the approximate change in lake stage from each major structure's total flows over the period. Figure 5 shows the combined average daily cfs for inflows and outflows for the Lake over the past eight weeks. These data are provisional and are subject to change.

The most recent satellite image (November 15, 2020) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed no current bloom activity on the Lake, likely due to high winds associated with Tropical Storm Eta last week (Figure 6).

## **Water Management Summary**

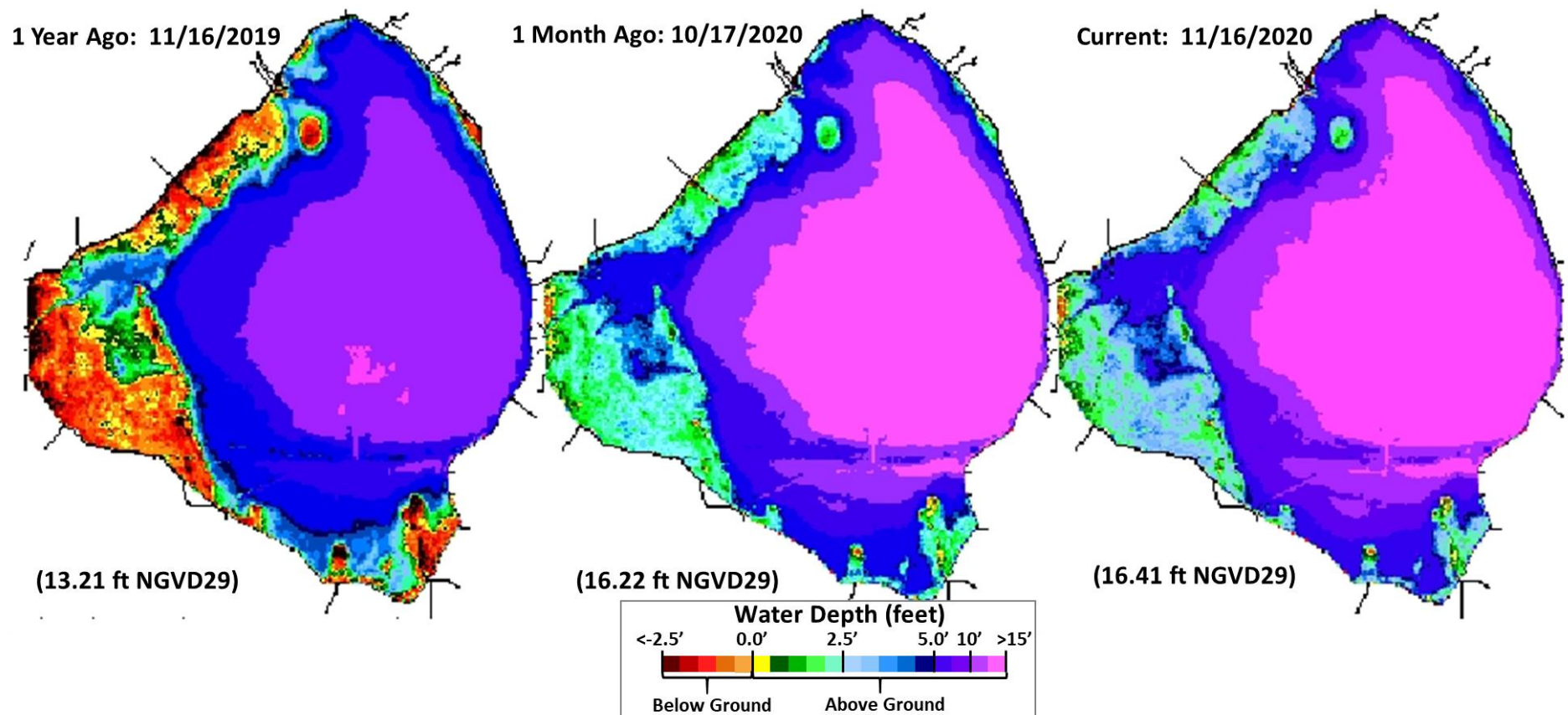
Lake Okeechobee stage was 16.41 feet NGVD on November 16, 2020, 0.18 feet higher than the previous week and 0.20 feet higher than the previous month. Rainfall was much reduced from the prior week, which was affected by Tropical Storm Eta, but inflows were still high at the beginning of the week. Inflows declined from a high of over 8,500 cfs on November 11 to less than 4,500 cfs on November 16. Stage has been above or near the top of the envelope since August 1, 2020 and is currently 0.91 feet above. Satellite imagery suggests cyanobacterial bloom potential is very low on the lake, likely due to high winds associated with the tropical storm the prior week.

**Table 1.** Average daily inflows and outflows and the approximate depth equivalents on Lake Okeechobee for various structures.

INFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-65E & S-65EX1	925	1984	0.8
S-71 & S-72	376	861	0.3
S-84 & S-84X	1024	1189	0.4
Fisheating Creek	324	462	0.2
S-154	95	188	0.1
S-191	471	1002	0.4
S-133 P	159	239	0.1
S-127 P	34	85	0.0
S-129 P	21	65	0.0
S-131 P	10	33	0.0
S-135 P	206	323	0.1
S-2 P	0	0	0.0
S-3 P	0	0	0.0
S-4 P	0	0	0.0
L-8 Backflow	110	402	0.2
Rainfall	6016	1987	0.8
<b>Total</b>	<b>9771</b>	<b>8819</b>	<b>3.3</b>

OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-77	4076	3059	1.2
S-308	974	984	0.4
S-351	251	0	0.0
S-352	189	0	0.0
S-354	120	0	0.0
L-8 Outflow			
ET	1630	1301	0.5
<b>Total</b>	<b>7241</b>	<b>5344</b>	<b>2.0</b>

Provisional Data



**Figure 1.** Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.



## Lake Okeechobee Stage vs Updated Ecological Envelope

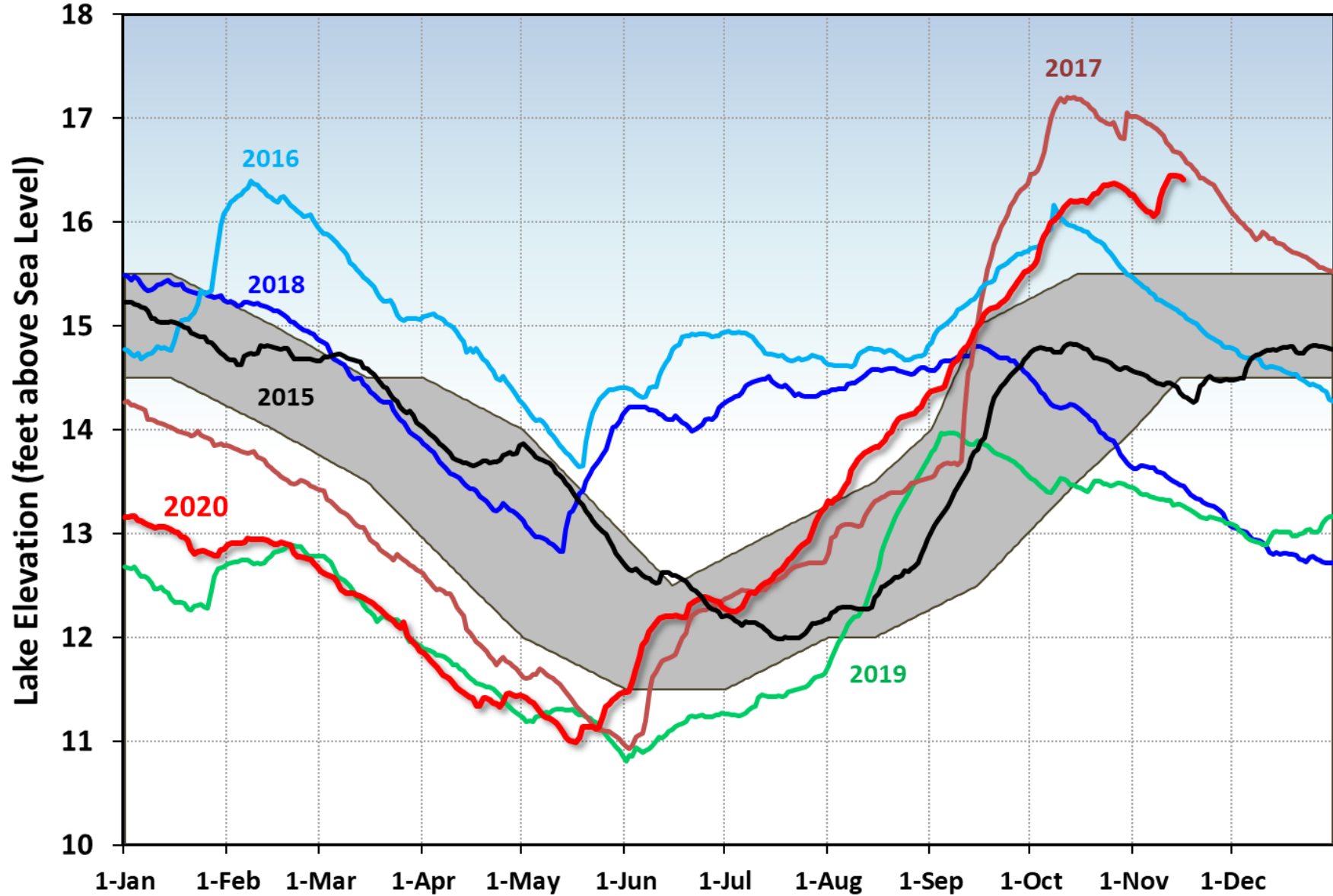
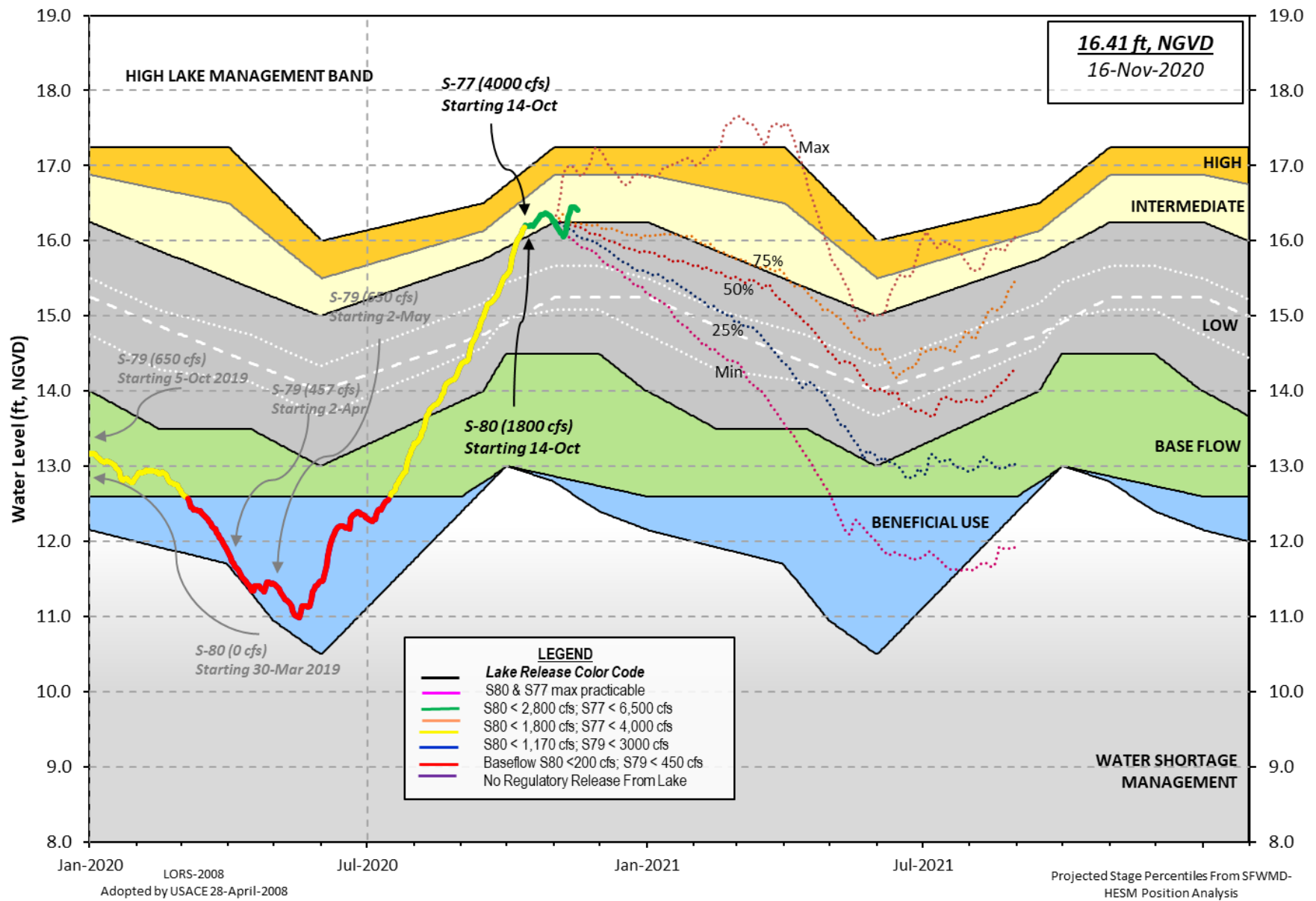


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated Ecological Envelope.

## Lake Okeechobee Water Level History and Projected Stages



**Figure 3.** Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.



SFWM D PROVISIONAL RAINDAR 7-DAY RAINFALL ESTIMATES  
FROM: 1000 EST, 11/10/2020 THROUGH: 1000 EST, 11/17/2020

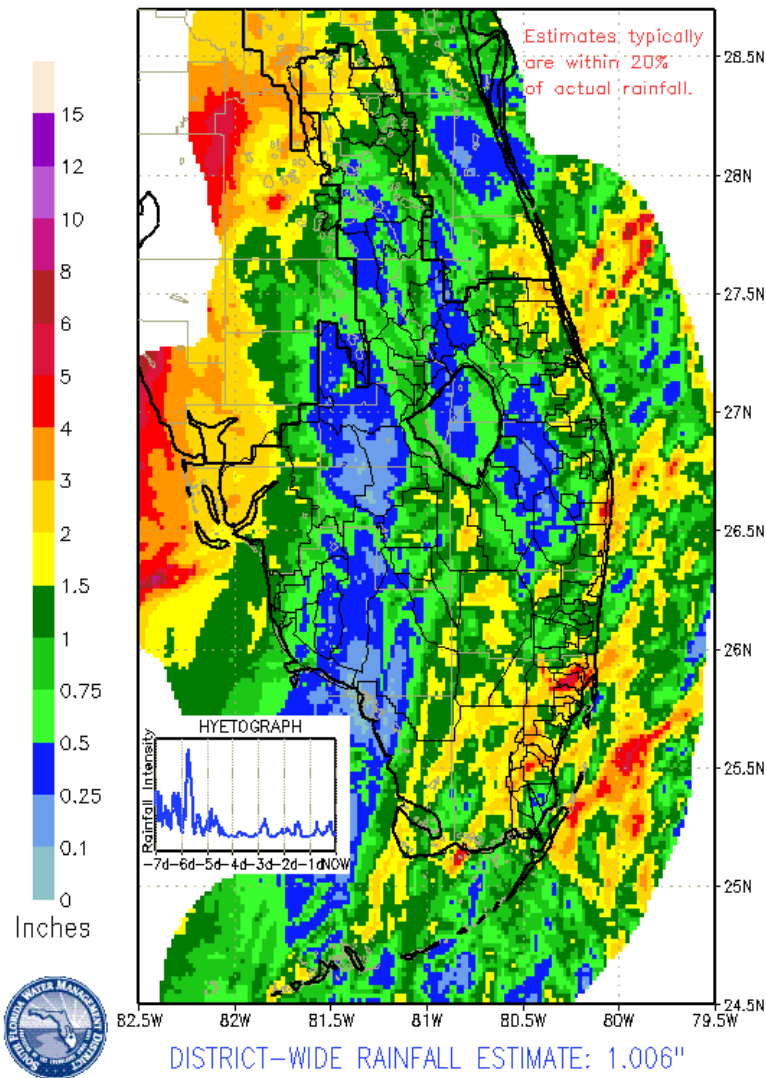


Figure 4. 7-Day rainfall estimates by RAINDAR.

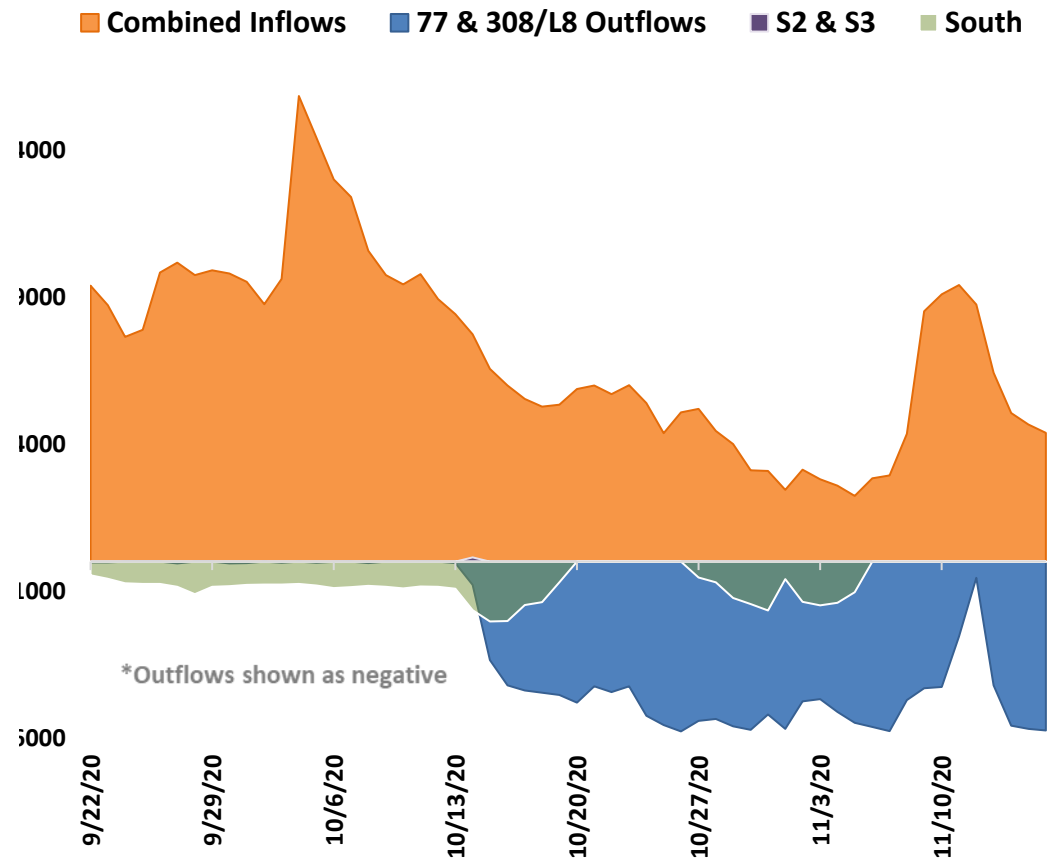
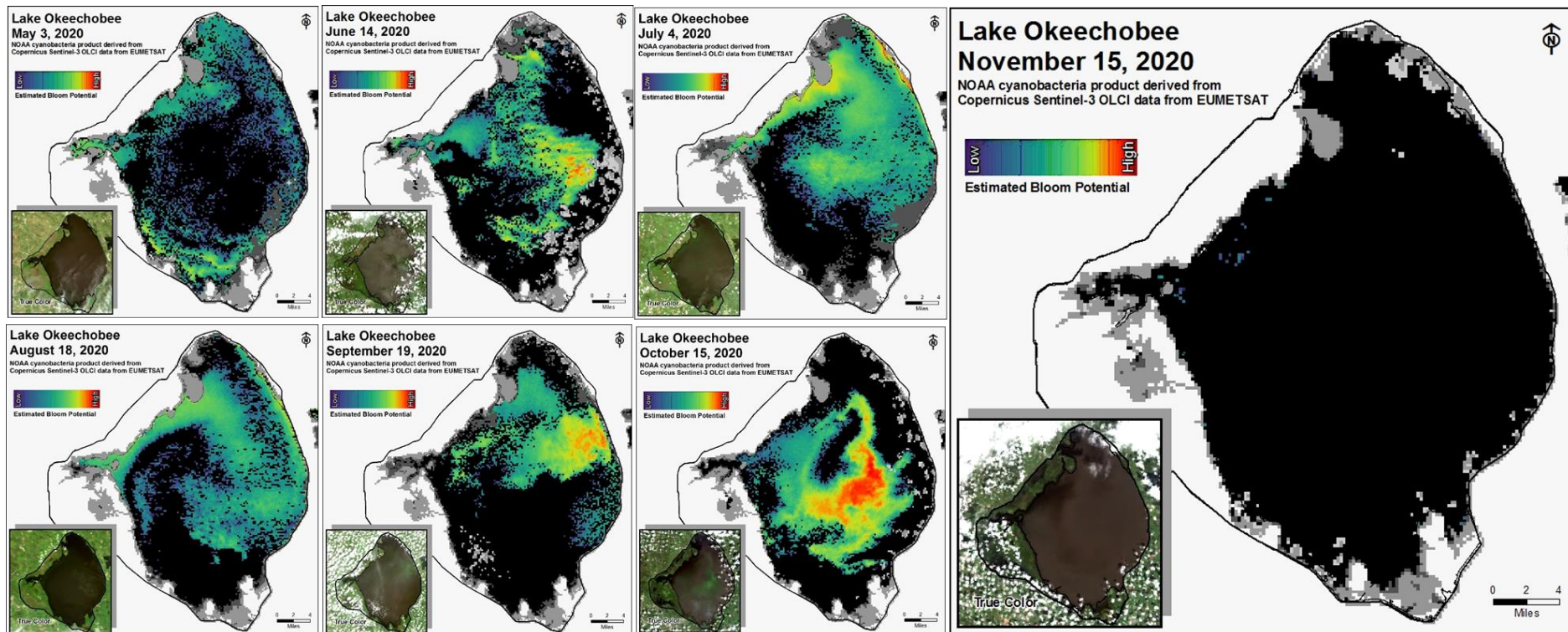


Figure 5. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive and negative, respectively, for visual purposes. Outflows through the S-77 and S-308 structures are shown based on their downstream gauges to account for lock openings for navigation.



**Figure 6.** Cyanobacteria bloom potential based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

## **ESTUARIES**

### **St. Lucie Estuary:**

Last week total inflow to the St. Lucie Estuary averaged more than 7,812 cfs (Figures 1 and 2) and last month inflow averaged more than 5,129 cfs. Note these numbers do not include contributions from the Gordy Road Structure due to missing data. Last week's provisional averaged inflows from the tidal basin and the structures are shown in Table 1. (Note: Recorder at Gordy Road structure was removed due to bridge construction)

**Table 1.** Weekly average inflows (data are provisional).

<b>Location</b>	<b>Flow (cfs)</b>
Tidal Basin Inflow	1471
S-80	2856
S-308	984
S-49 on C-24	1625
S-97 on C-23	1860
Gordy Rd. structure on Ten Mile Creek	Not reporting

Over the past week, salinity decreased throughout the estuary (Table 2, Figures 3 and 4). The seven-day moving average of the water column (an average of the surface and bottom salinity) at the US1 Bridge is 0.2. Salinity conditions in the middle estuary are estimated to be within the poor range for adult eastern oysters (Figure 3).

**Table 2.** Seven-day average salinity at three monitoring sites in the St. Lucie Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary.

<b>Sampling Site</b>	<b>Surface</b>	<b>Bottom</b>	<b>Envelope</b>
HR1 (North Fork)	<b>0.2</b> (0.3)	<b>0.2</b> (0.3)	NA <sup>1</sup>
US1 Bridge	<b>0.2</b> (0.4)	<b>0.2</b> (0.5)	10.0-26.0
A1A Bridge	<b>3.1</b> (6.1)	<b>8.0</b> (16.6)	NA <sup>1</sup>

<sup>1</sup>Envelope not applicable

### **Caloosahatchee Estuary:**

Last week total inflow to the Caloosahatchee Estuary averaged approximately 10,084 cfs (Figures 5 and 6), and last month inflow averaged about 7,759 cfs. Last week's provisional averaged inflows from the structures and the tidal basin are shown in Table 3.

**Table 3.** Weekly average inflows (data is provisional).

<b>Location</b>	<b>Flow (cfs)</b>
S-77	3,059
S-78	4,384
S-79	8,274
Tidal Basin Inflow	1,810

Over the past week in the estuary, salinity remained about the same to Cape Coral Bridge and increased downstream (Table 4, Figures 7 & 8). The seven-day average salinity values are within the poor range for adult eastern oysters at Cape Coral and in the good range at Shell Point and at Sanibel (Figure 9). The seven-day average surface salinities (Table 4) are in the good range (0-10) for tape grass at Val I-75 and at Ft. Myers.

**Table 4.** Seven-day average salinity at six monitoring stations in the Caloosahatchee Estuary. Current average is in bold, previous average in parentheses. The envelope at Val I-75 is for the protection of tape grass in the upper estuary and the envelope in the lower estuary reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*).

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	NA <sup>1</sup>
Val I75	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	0.0-5.0 <sup>2</sup>
Ft. Myers Yacht Basin	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	NA
Cape Coral	<b>1.1</b> (1.7)	<b>1.9</b> (2.7)	10.0-30.0
Shell Point	<b>15.0</b> (14.5)	<b>17.9</b> (17.1)	10.0-30.0
Sanibel	<b>26.1</b> (23.9)	<b>28.2</b> (26.1)	10.0-30.0

<sup>1</sup>Envelope not applicable and <sup>2</sup>Envelope is based on a 2-week forecast 30-day average

Forecast of surface salinity (Table 5 and Figure 10) at Val I-75 for the next two weeks using the autoregression model (Qiu and Wan, 2013) coupled with a linear reservoir model for the tidal basin predicts daily salinity to be 0.3 or lower at the end of the two week period for pulse release at S-79 ranging from 0 to 800 cfs and estimated Tidal Basin inflows of 800 cfs. The 30-day moving average surface salinity at Val I-75 is forecast to be 0.3 or lower (Table 5). The current salinity conditions at Val I-75 are within the envelope of salinity 0.0-5.0 for this site (Table 4).

**Table 5.** Predicted salinity at Val I-75 at the end of forecast period

Scenario	Q79 (cfs)	TB runoff (cfs)	Daily salinity	30 day Mean
A	0	800	0.3	0.3
B	300	800	0.3	0.3
C	450	800	0.3	0.3
D	650	800	0.3	0.3
E	800	800	0.3	0.3

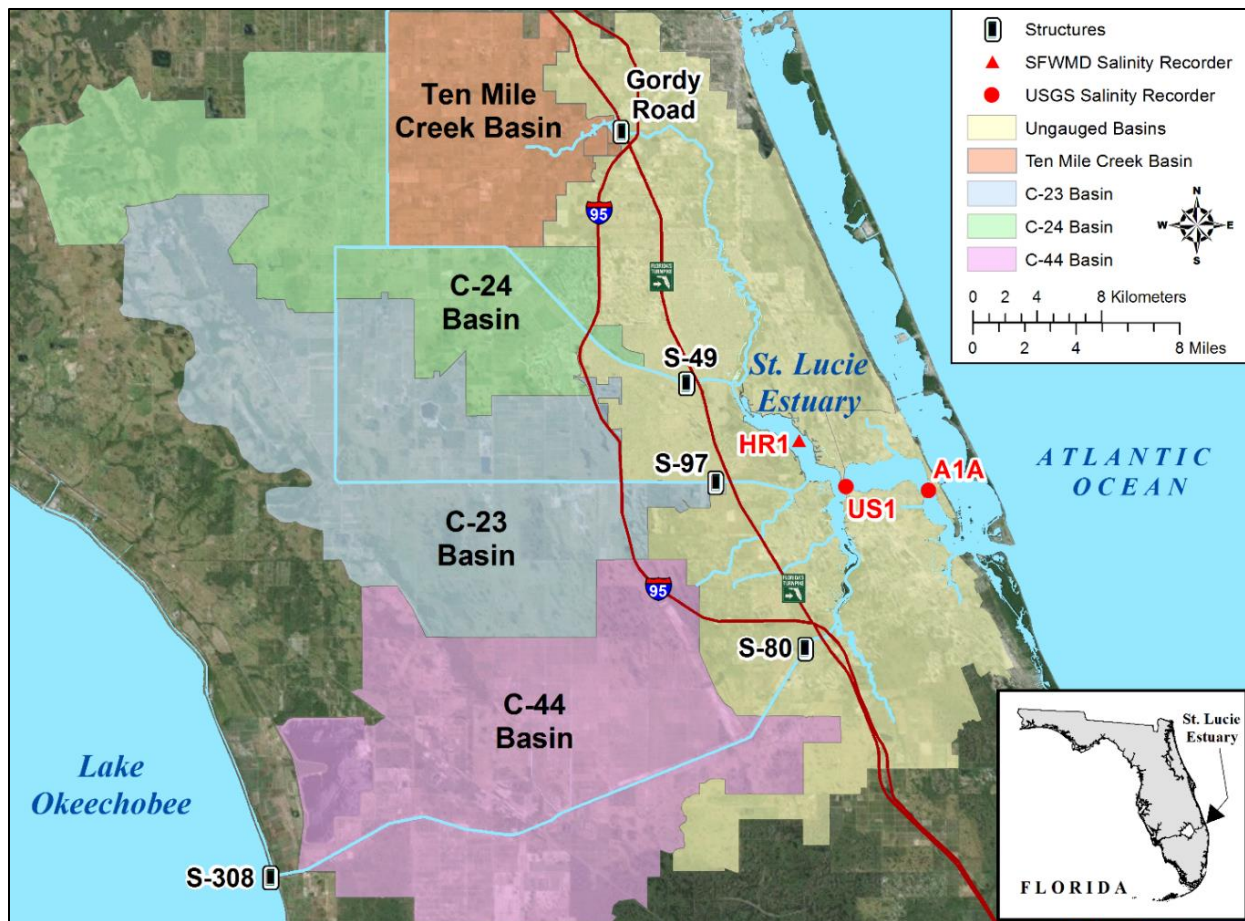
### Red tide

The Florida Fish and Wildlife Research Institute reported on November 13, 2020, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in samples collected from Lee, St. Lucie, Martin, or Palm Beach counties (no samples were analyzed this week from Broward or Miami-Dade counties).

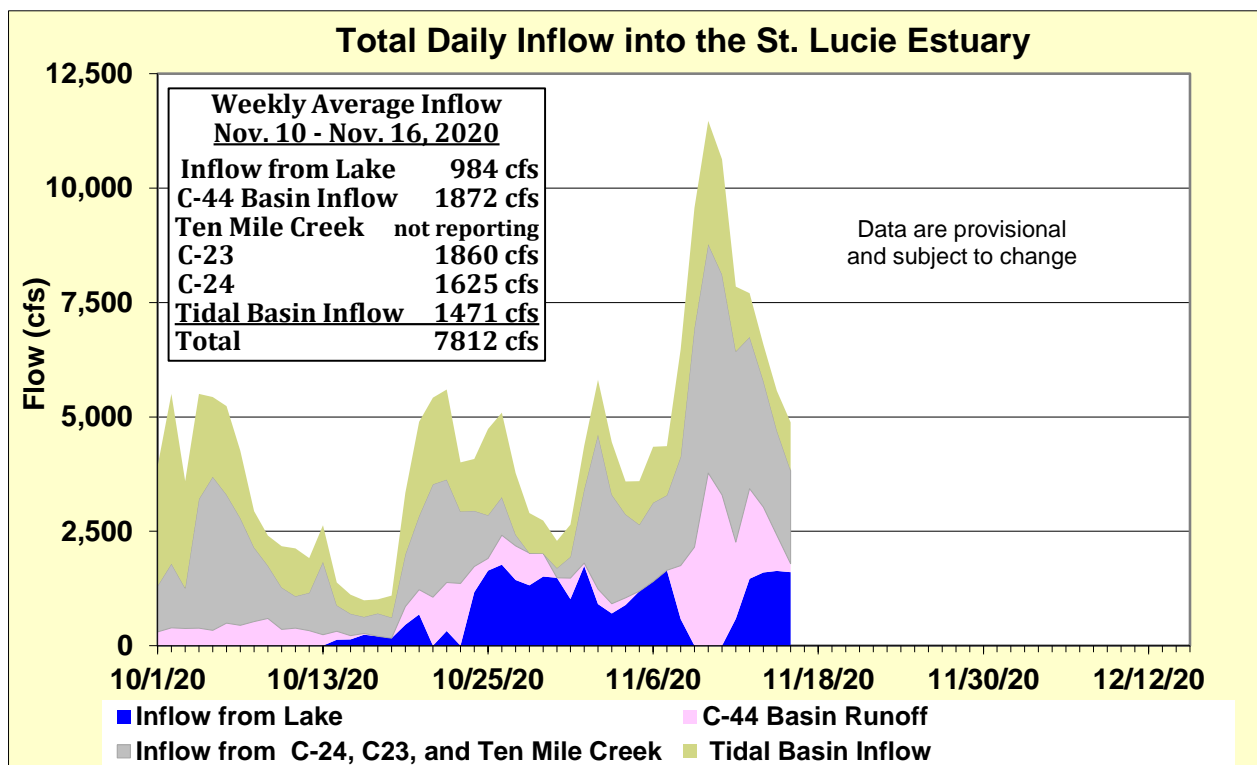
### Water Management Recommendations

Lake stage is in the Intermediate Sub-Band. Tributary conditions are very wet. The LORS2008 release guidance suggests up to 4000 cfs release at S-79 to the Caloosahatchee Estuary and up to 1800 cfs release at S-80 to the St. Lucie Estuary.

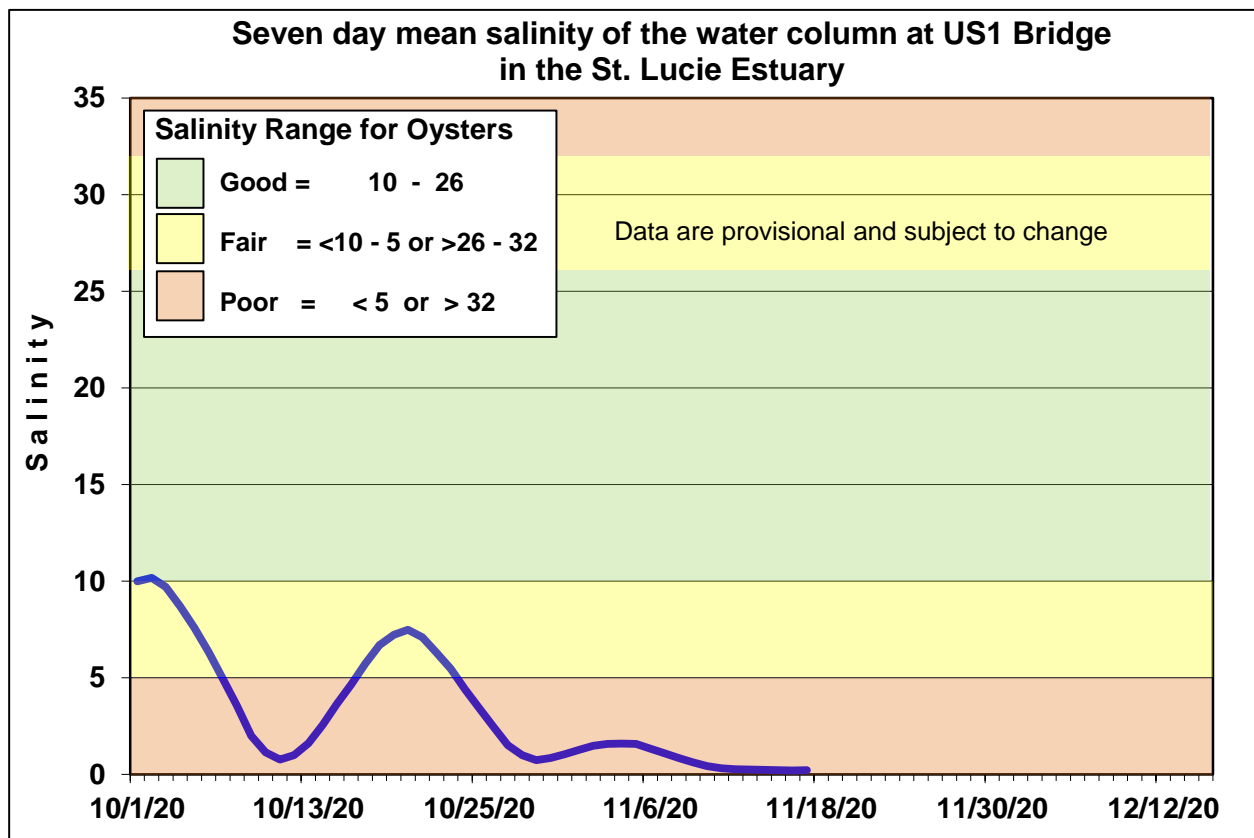




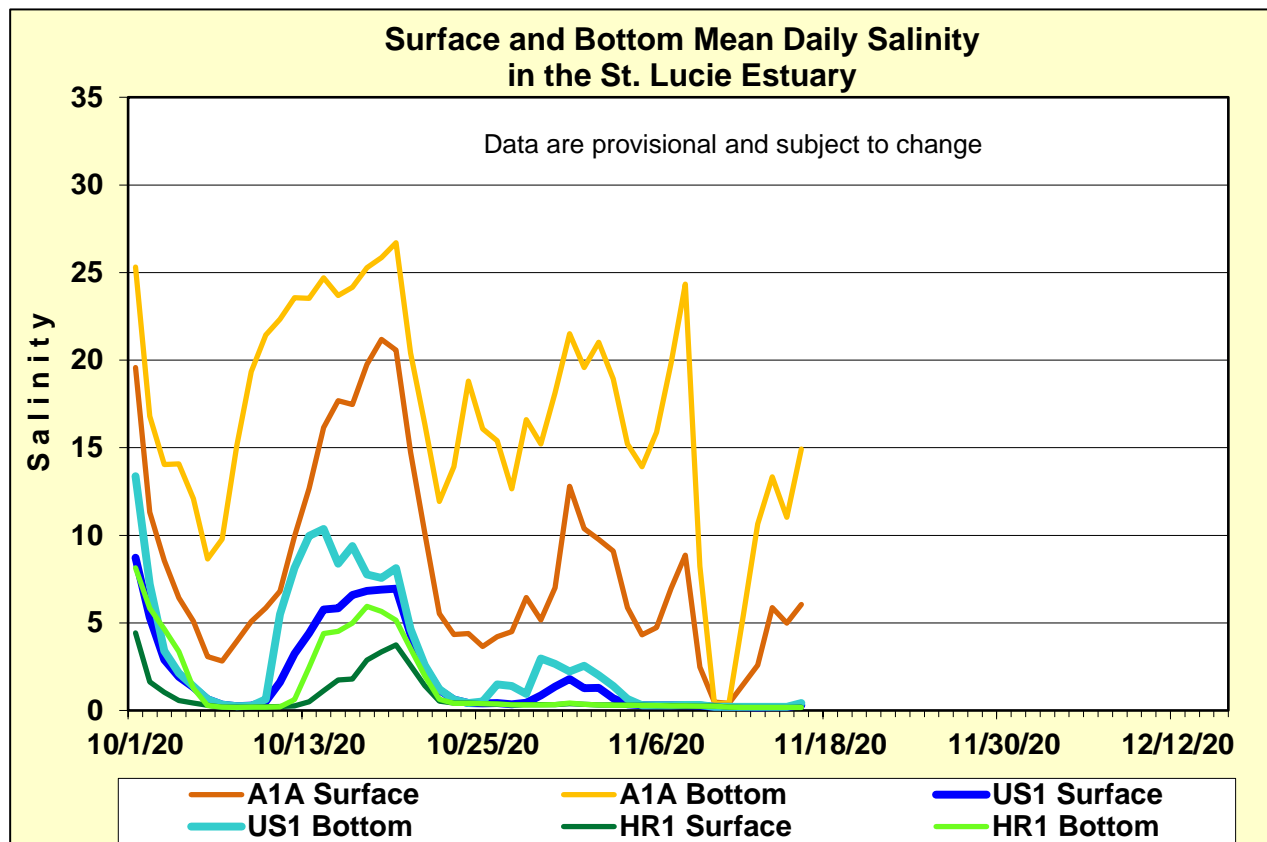
**Figure 1.** Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.



**Figure 2.** Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin into the St. Lucie Estuary.

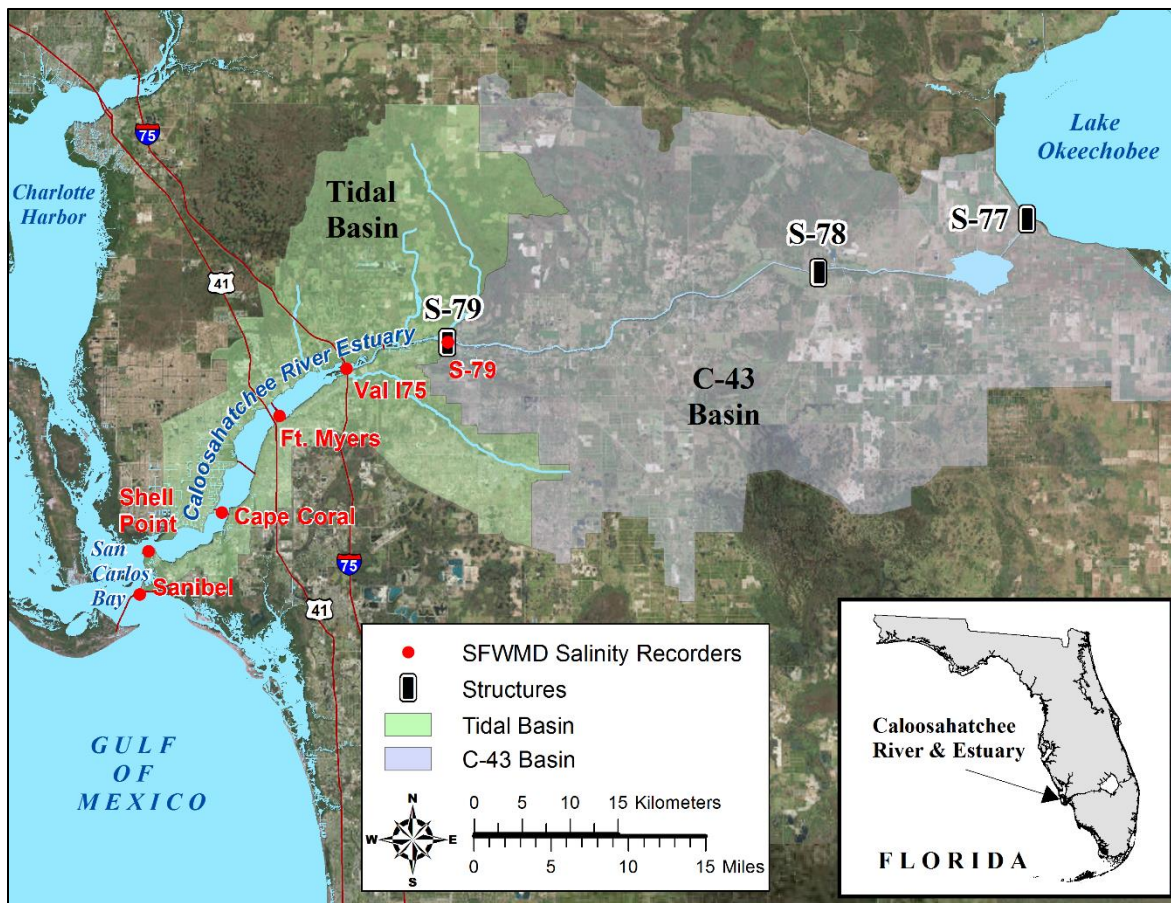


**Figure 3.** Seven-day mean salinity of the water column at the US1 Bridge.

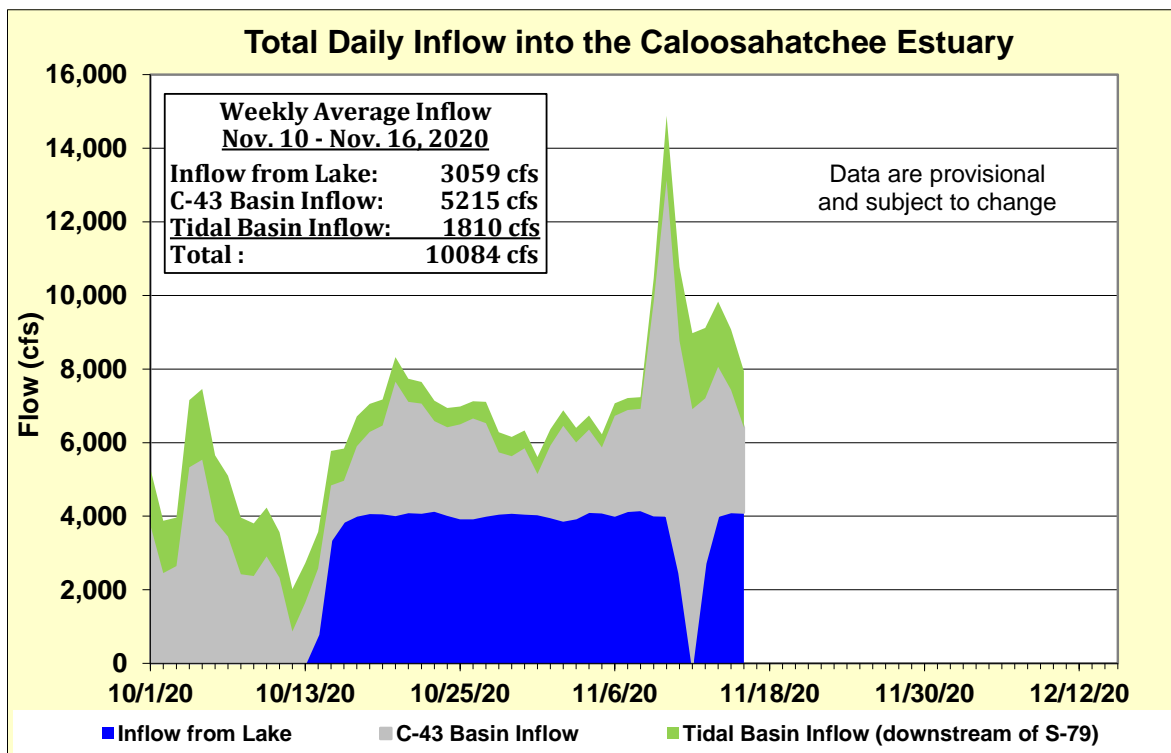


**Figure 4.** Daily mean salinity at the A1A, US1, and HR1 stations.

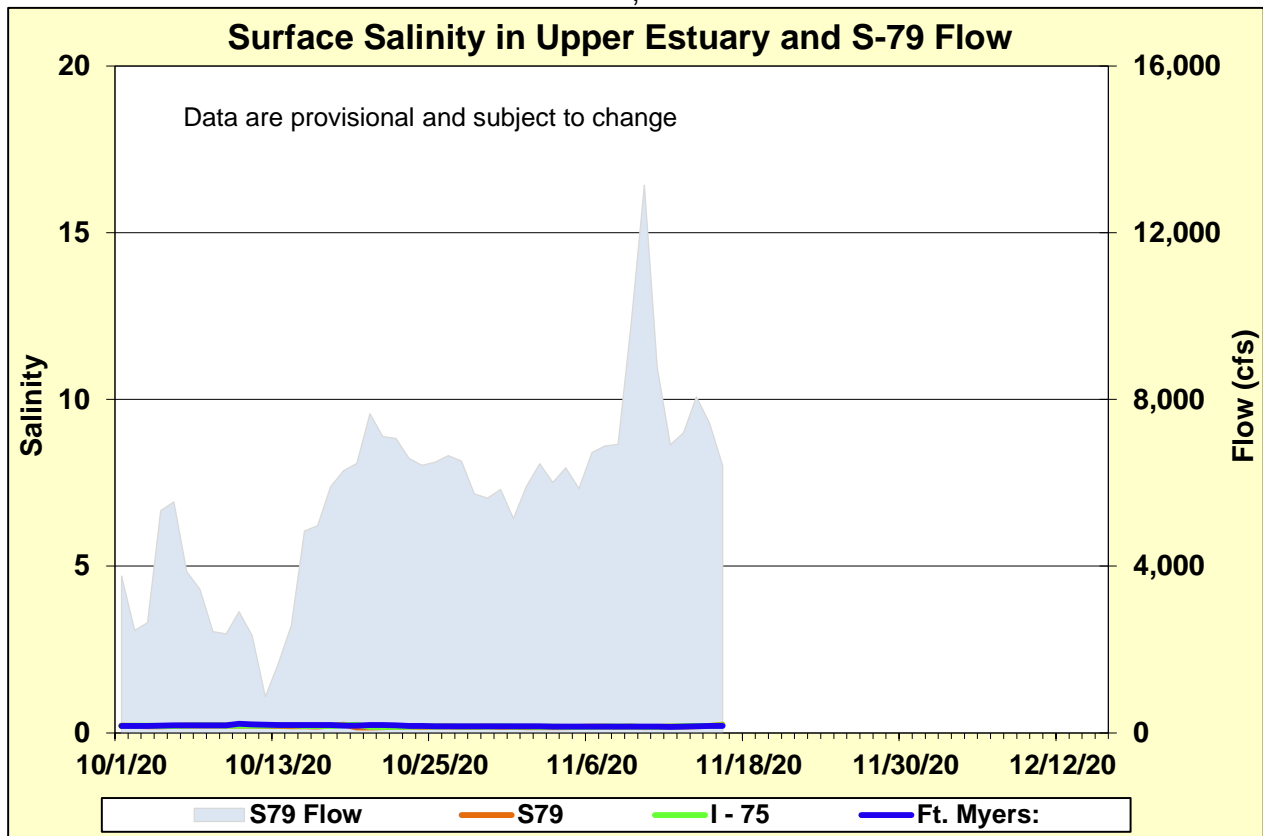




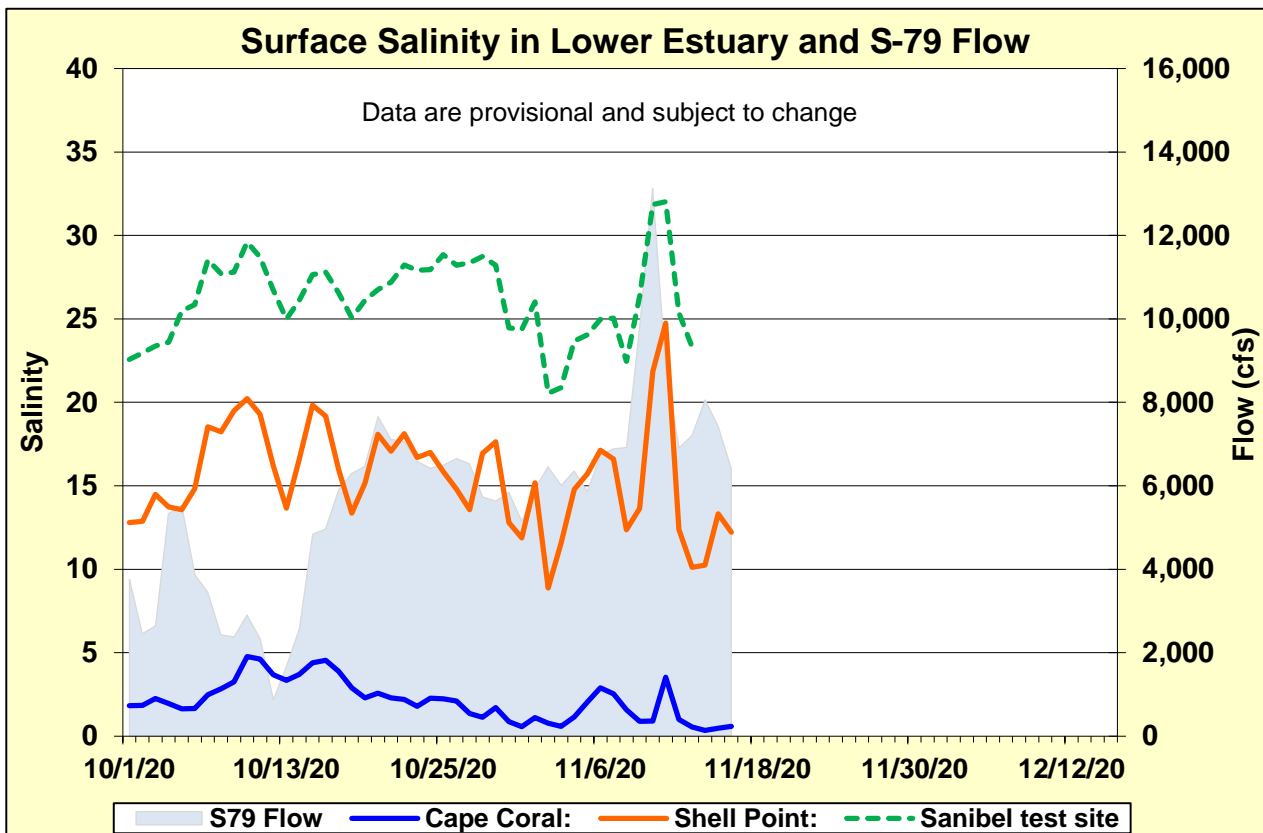
**Figure 5.** Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.



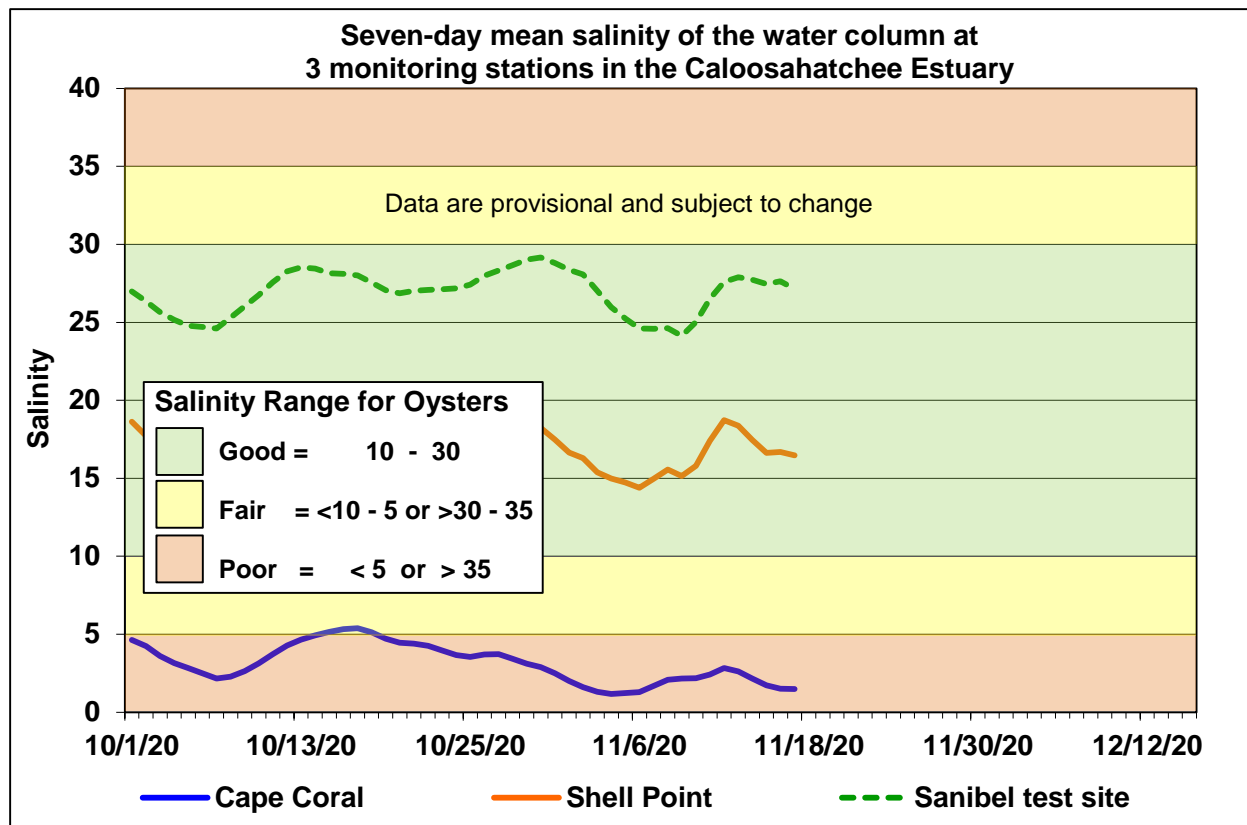
**Figure 6.** Total daily inflows from Lake Okeechobee, runoff from the C-43 basin



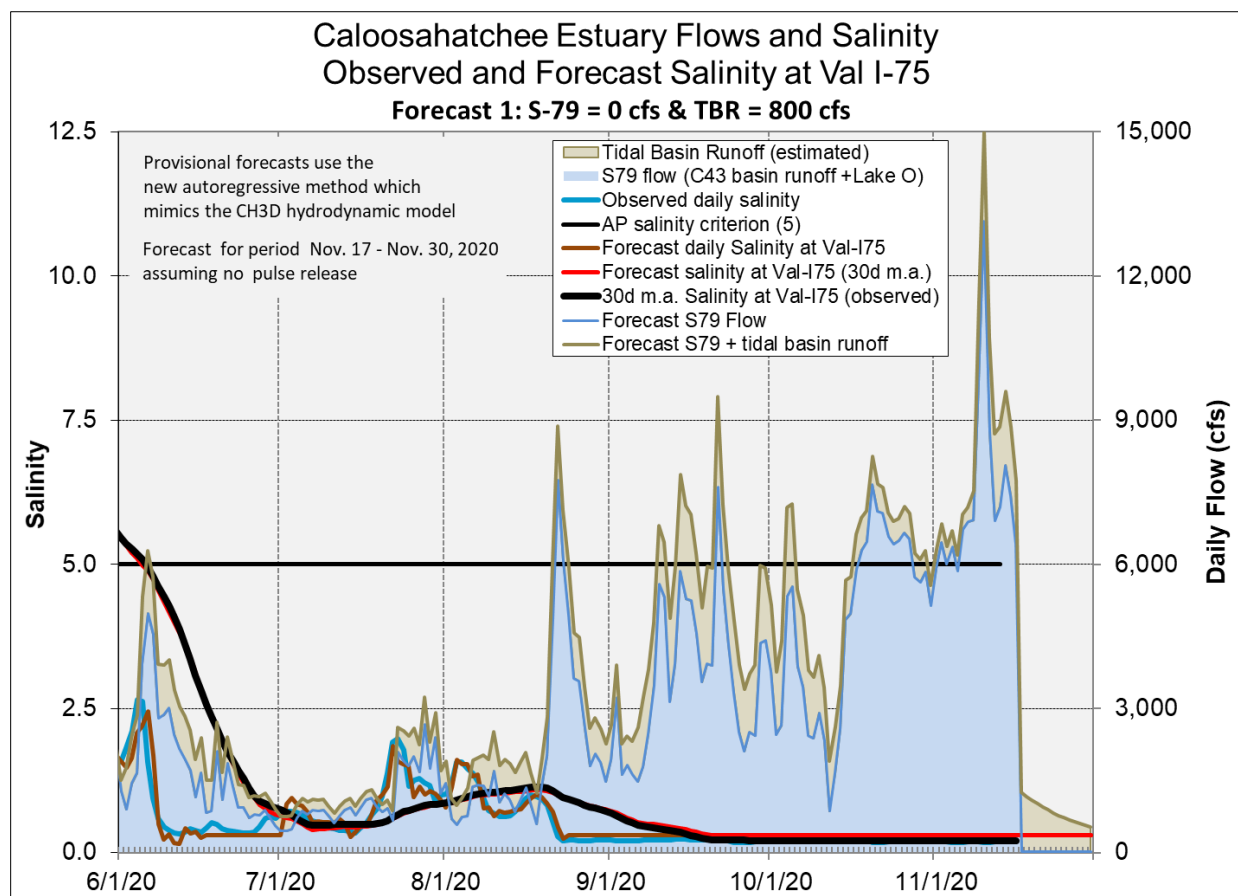
**Figure 7.** Daily mean flows at S-79 and salinity at upper estuary monitoring stations.



**Figure 8.** Daily mean flows at S-79 and salinity at lower estuary stations.



**Figure 9.** Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

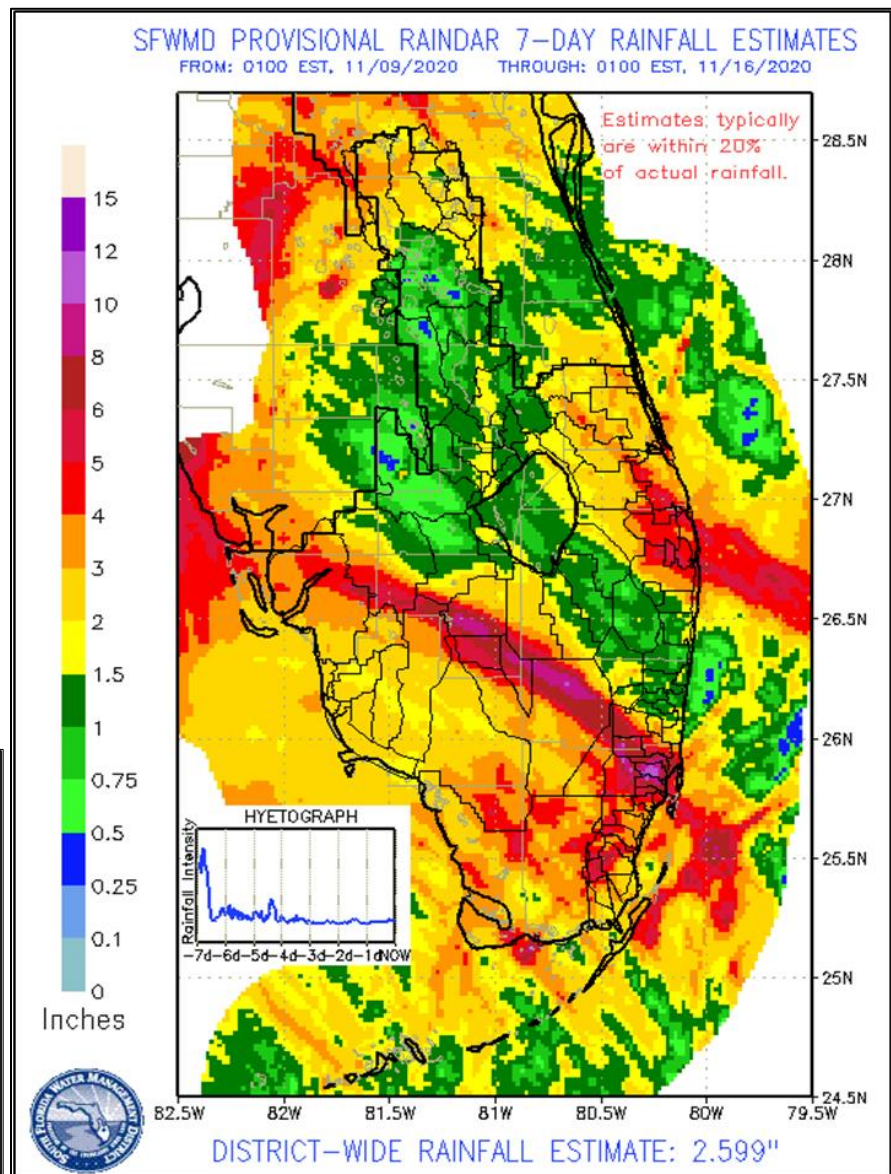


**Figure 10.** Forecasted Val I-75 surface salinity assuming no pulse release at S-79.

## EVERGLADES

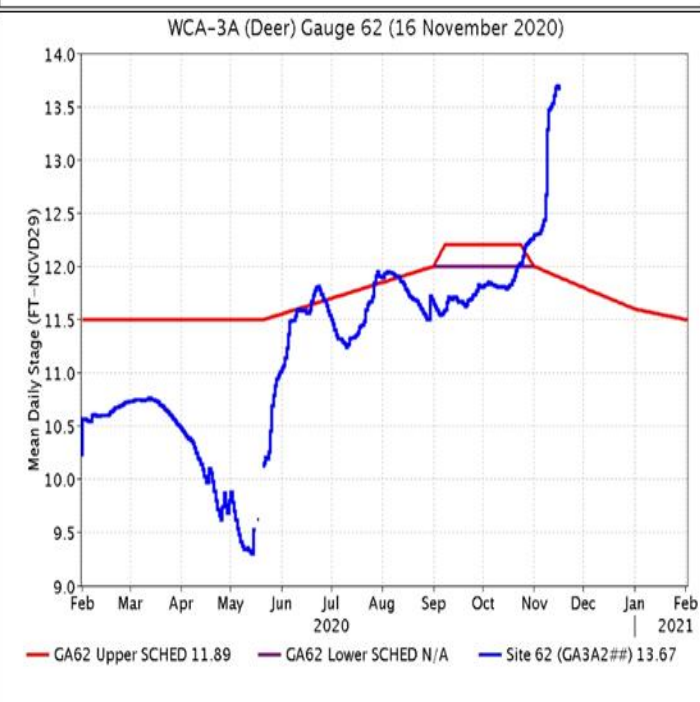
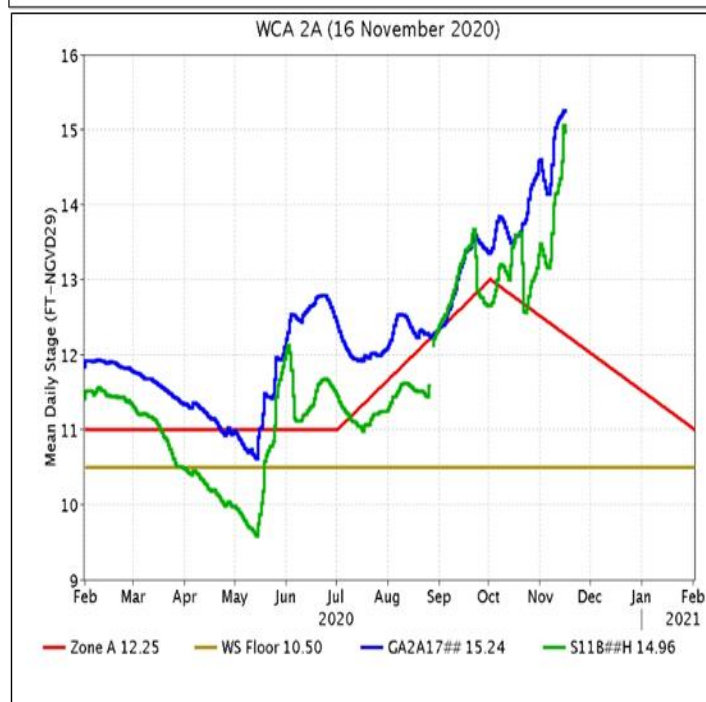
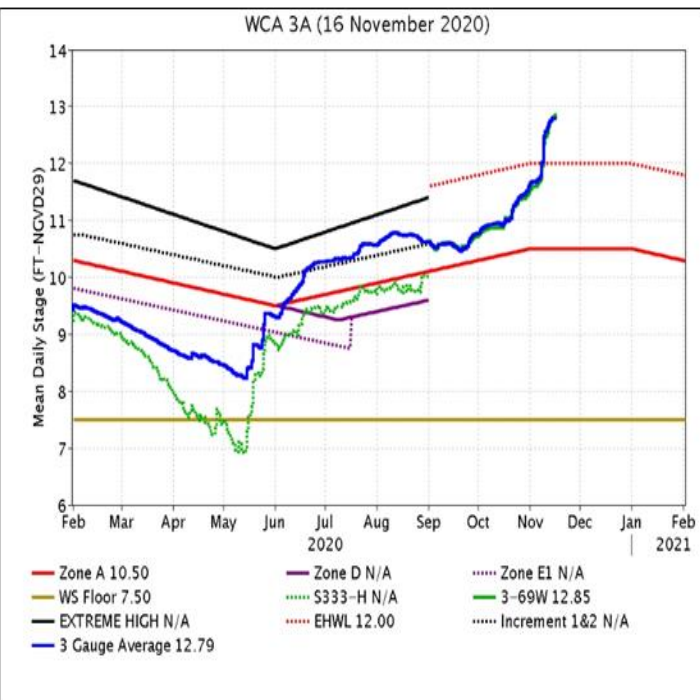
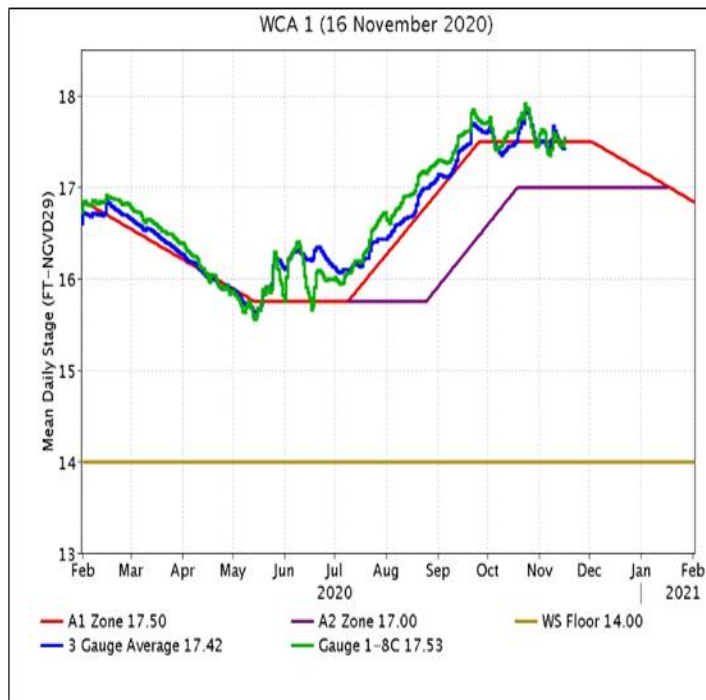
There was above average rainfall across the Everglades last week with a majority being recorded early in the week and highest in WCA-3A North. Outside of WCA-1, stages increased 0.38 feet on average. Evaporation was 0.68 inches last week, and the Tamiami Trail Flow Formula continues to call for maximum releases from WCA-3A.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	1.03	-0.24
WCA-2A	1.55	+0.51
WCA-2B	1.81	+0.03
WCA-3A	4.29	+0.58
WCA-3B	4.06	+0.40
ENP	3.27	+0.14

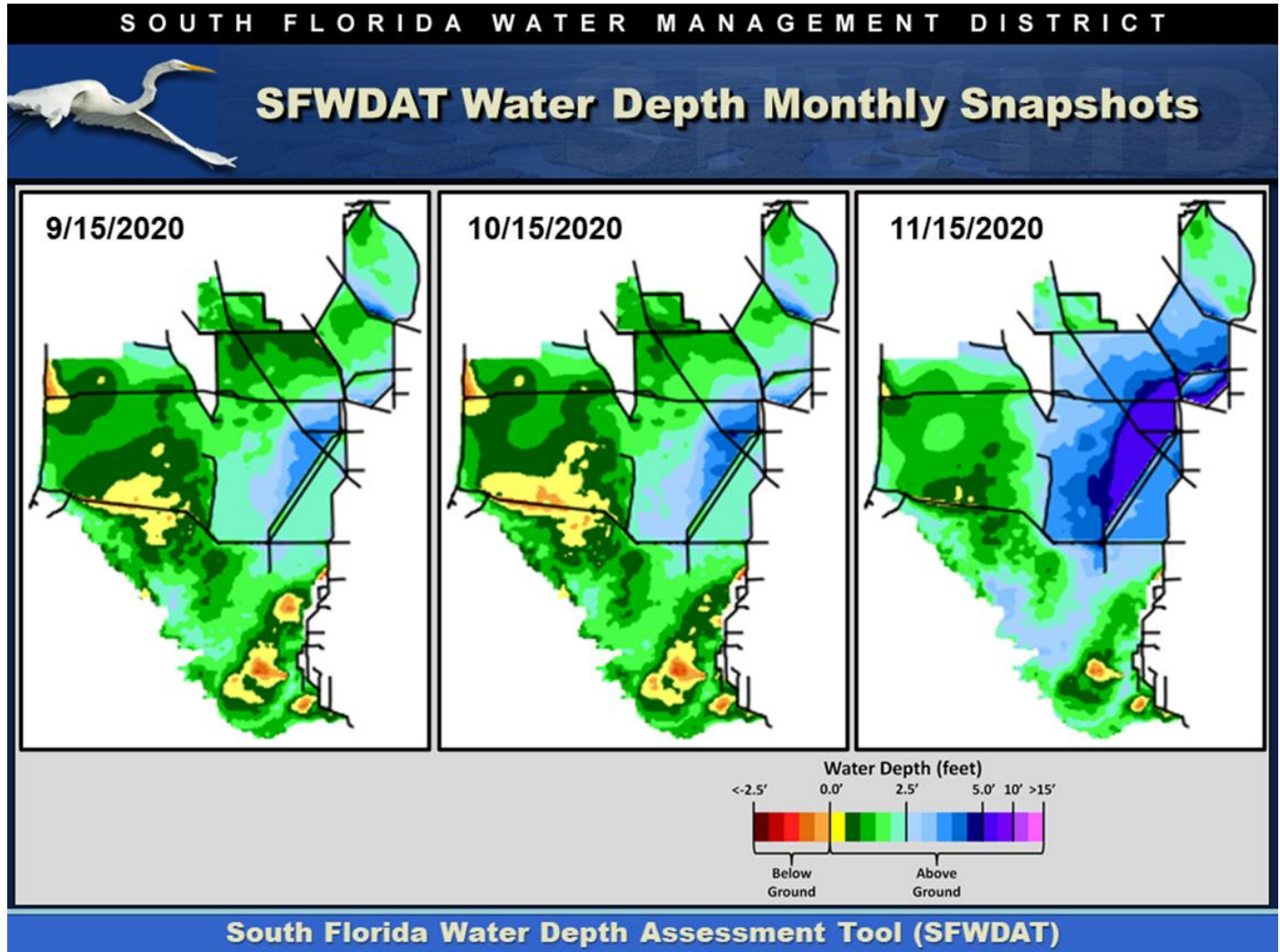




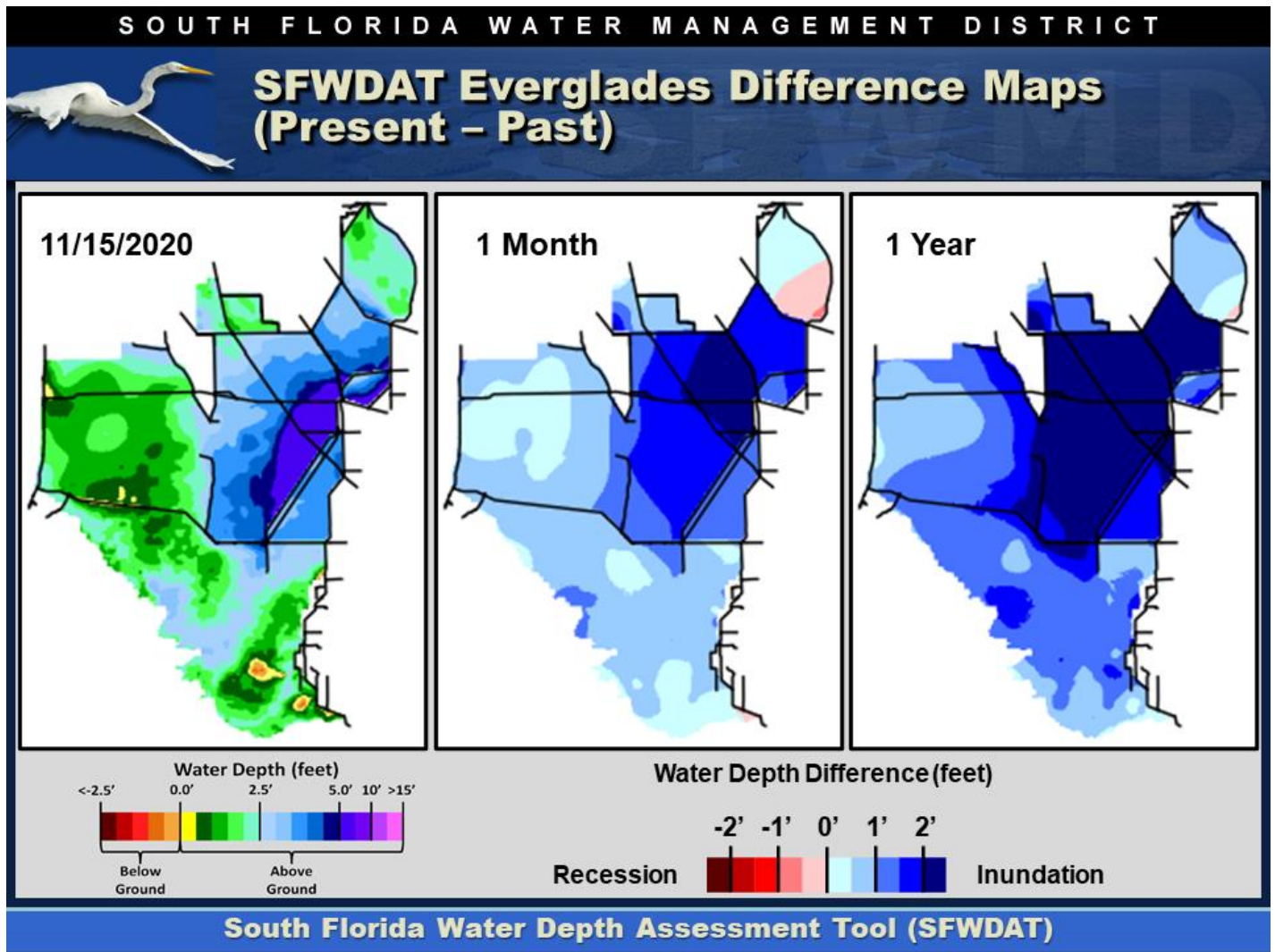
Regulation Schedules: WCA-1: Stage at the 1-8C Gauge is generally trending along the schedule, currently 0.03 feet above the stable Zone A1 regulation line. WCA-2A: Stages at Gauge 2-17 continued to climb quickly away from the regulation line last week and is now 2.99 feet above the falling schedule. WCA-3A: The Three Gauge Average stages climbed quickly up and away from the stable Zone A regulation line last week, currently 2.29 feet above and 0.79 feet above the Extreme High Water Line (EHWL). WCA-3A: Stage at gauge 62 (Northwest corner) continued to ascend last week and is currently 1.78 feet above the falling Upper Schedule.



Water Depths: The WDAT tool for spatial interpolation of depth monthly snapshots over the last two months indicate current depths in excess of 5.0 feet in WCA-3A South around the upper reaches of the L-67 canal, southern WCA-2B and extreme southwestern WCA-2A. Ponding depths (>2.5 feet) are found across WCA-2A, with the south side being much deeper. Hydrologic connectivity is well established within the major sloughs in Everglades National Park (ENP), and the depths have increased west of the L-28S levee, though the potential remains for some areas to have below ground stages in southern Big Cypress National Park.

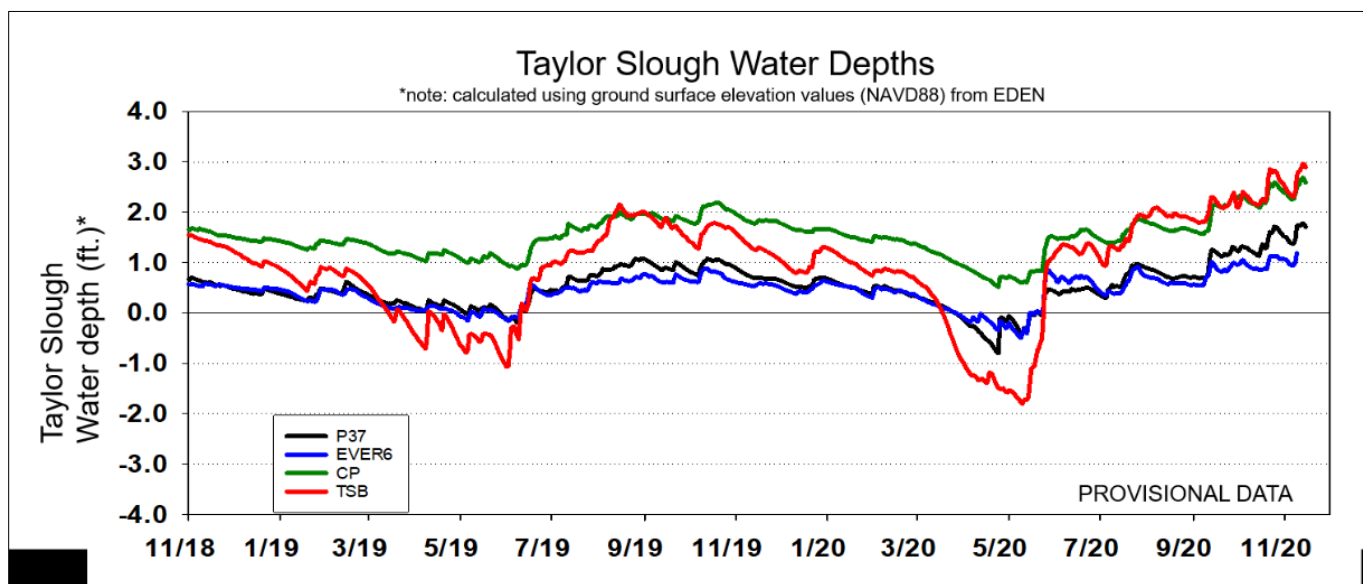
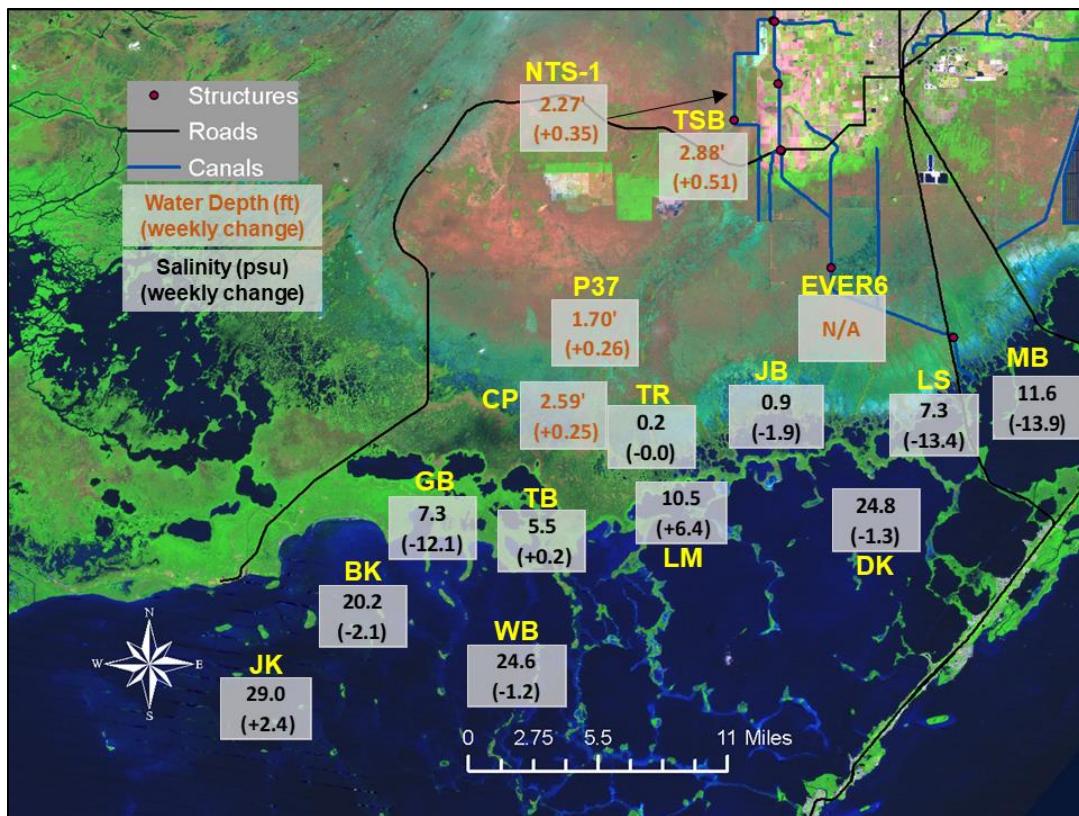






Tree island inundation in WCA-3A, WCA-3B and ENP: 371 Tree Islands of known elevation within WCA-3A, -3B, and Everglades National Park's Shark Slough. Current preliminary estimates using WDAT indicate that 91% or 338 of the tree islands are currently inundated, up from 78% the week prior. Initial islands inundated beginning 5/24/20, longest duration of continuous inundation is 166 days. Inundation for more than 90 days has the potential for ecological harm. Inundation for more than 120 days will cause ecological harm to sensitive islands (now 23% of islands).

Taylor Slough Water Levels: Tropical Storm Eta brought an average of 3.9 inches of rain to Taylor Slough and Florida Bay this past week which caused stages to increase 0.34 feet on average. Stages peaked on Friday (11/13) and have decreased slightly since then. The area is currently 10 inches above the historical average for this time of year.

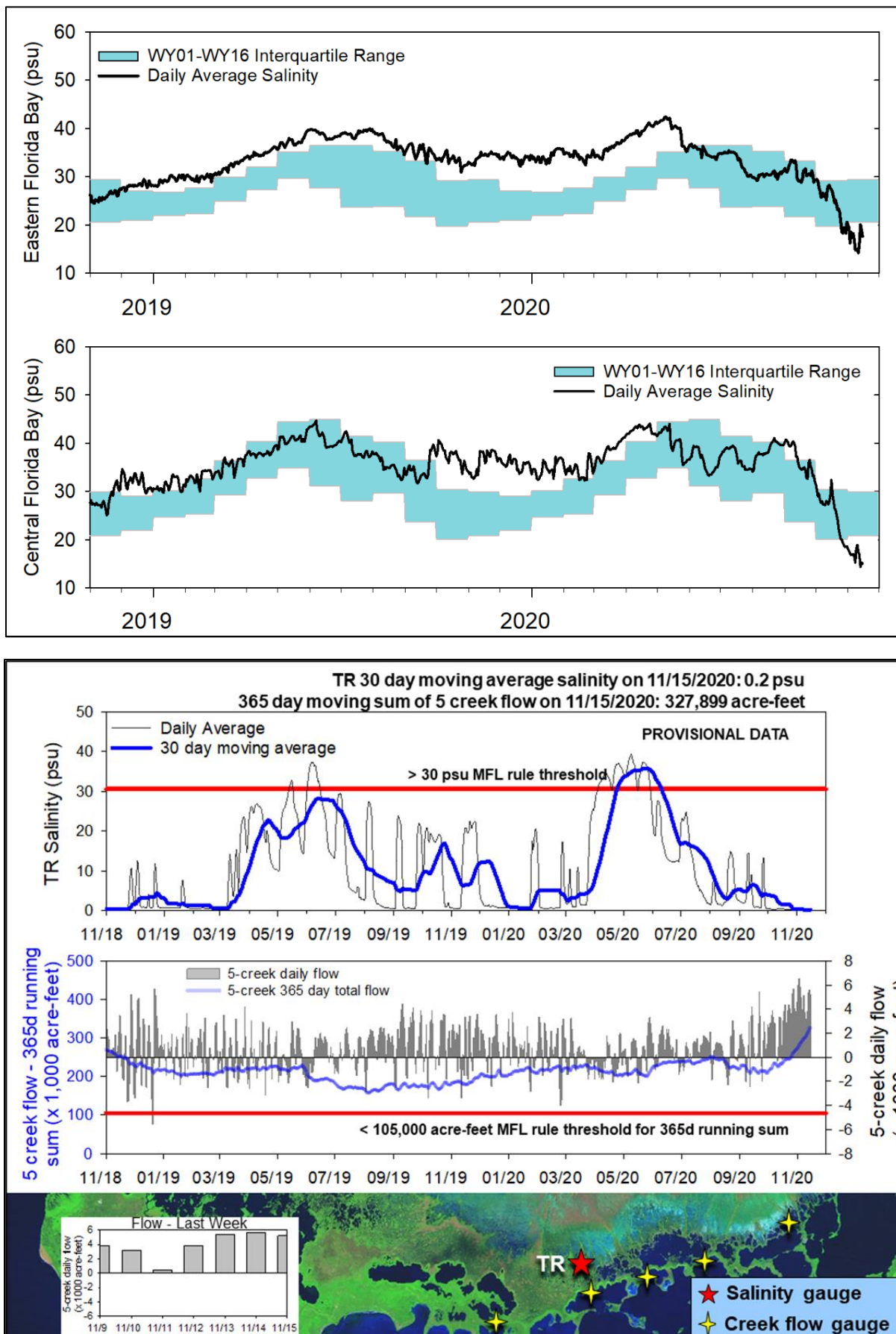


Florida Bay Salinities: Salinities in Florida Bay only averaged a 2.6 decrease over the week, but individual nearshore stations decreased as much as 13 due to the high flows. Of note, Manatee Bay (MB) decreased almost 14 due to the opening of S-197. This rapid freshening usually creates stratification that protects the benthic community from the shock of the change initially, but prolonged duration can cause oxygen imbalances which harm the benthic community.

Florida Bay MFL: The salinity at the Taylor River (TR) station in the mangrove zone (tracked for the Florida Bay MFL) has continued to be near fresh (less than 0.3) and the 30-day moving average is also low at 0.2. Weekly flow from the 5 creeks identified by yellow stars on the map totaled over 27,500 acre-feet with another full week of positive flow though not as high as last week's 36,000 acre-feet. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) ended at 327,899 acre-feet this week which is 28,000 acre-feet increase from last week. That is higher than



the 75th percentile of historical data (313,052 acre-feet). This is a value not seen since October of 2018. Creek flows are provisional USGS data.



### **Water Management Recommendations**

Moderating rapid increases in stage to within the preferred ecological rate of less than 0.25 feet per week or 0.50 feet per two weeks has ecological benefit. Extreme high-water conditions call for the utilization of any and all sources of discharge from WCA-2A and WCA-3A. Initiating a recession where possible in WCA-2A or WCA-3A has ecological benefit as long as there is no downstream ecological impact.

October's peak stages in northern WCA-3A suggest success for next season's wading bird nesting at the Alley north colony by providing adequate surface water that can protect it from terrestrial predators during the nesting season. In order to optimize foraging conditions for wading birds a recession would ideally begin soon.

Ponding along the L-67 canal/levee system has increased and inundation of the tree islands in that region and east into central WCA-3A South has now persisted for more than 120 days which creates ecological harm in regions containing sensitive islands. Managing inflows/outflows within that region that decreases ponding in both spatial extent and the amount of time the region is inundated has benefit to the ecology of tree islands. When considering the ecology of tree islands in WCA-3A as a whole, the last two years of low flooding stress create a resilience to flooding stress for a single wet season. If these high stages were to persist long into the dry season, ecological harm is likely. But given the low precipitation predictions for the upcoming dry season, this persistence seems unlikely and why SFWMD Everglades ecologists are recommending a careful conservation of water in WCA-3A at this time, once conditions allow for a dry season recession to begin.

Continued flows towards Taylor Slough and Florida Bay maintain hydration in the marshes and lower salinity conditions within the nearshore areas of Florida Bay and will provide a freshwater buffer against the drier than average dry season that is expected which would delay the start of the salinity increases that occur within the dry season and possibly prevent the occurrence of extreme hyper-salinity towards the end of the dry season.

More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

## SFWMD Everglades Ecological Recommendations, November 17th, 2020 (red is new)

Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.24'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks.	Protect upstream/downstream habitat and wildlife.
WCA-2A	Stage increased by 0.51'	Moderating the ascension rate to maintain marsh stage parallel to the falling regulation schedule. Maintaining current outflows into WCA-3A.	Protect upstream/downstream habitat and wildlife.
WCA-2B	Stage increased by 0.03'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks.	Protect upstream/downstream habitat and wildlife.
WCA-3A NE	Stage increased by 0.47'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks.	Protect upstream/downstream habitat and wildlife.
WCA-3A NW	Stage increased by 0.75'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks.	
Central WCA-3A S	Stage increased by 0.53'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks.	Protect upstream/downstream habitat and wildlife. Tree island ecology is diminished by flooding
Southern WCA-3A S	Stage increased by 0.55'		
WCA-3B	Stage increased by 0.40'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks.	Protect upstream/downstream habitat and wildlife.
ENP-SRS	Stage increased by 0.14'	Make discharges to the Park according to the current deviation with a return to COP protocol as soon as high water conditions are alleviated in the upstream WCAs	Protect upstream/downstream habitat and wildlife.
Taylor Slough	Stage changes ranged from +0.25' to +0.51'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -13.4 to +6.4 psu	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.