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 11, 2020

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Tropical Storm Eta is moving into the southeastern Gulf of Mexico, where it should slow and begin meandering. Heavy rainfall is associated with the main circulation across the southern and western portions of the District. Some bands of showers will affect the remainder of the District as well. Some outer bands may continue to enhance thunderstorm development over the District as the storm moves generally northward through the eastern Gulf of Mexico. The exact details of the long-term track of TS Eta remain uncertain, but the QPF follows the scenario of TS Eta weakening and moving into the northeastern Gulf of Mexico by Friday. Daily shower activity should then decrease over the District with breezy southeast winds focusing activity over the interior. Breezy southeast to south winds are forecast to continue to enhance tides Wednesday through Friday. Total rainfall is forecast to be well-above the historical average during the first 7-day period (Week 1) and then below the historical average for second 7-day period (Week 2).

Kissimmee

Tuesday morning stages were 58.0 feet NGVD (at schedule) in East Lake Toho, 55.0 feet NGVD (at schedule) in Toho, and 52.6 feet NGVD (0.1 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 45.9 feet NGVD at S-65A and 27.2 feet NGVD at S-65D. Tuesday morning discharges were 440 cfs at S-65, 590 cfs at S-65A, 1060 cfs at S-65D, and 1470 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 5.7 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 0.53 feet. Today's recommendation is to maintain minimum flow of 300 cfs +/- 50 cfs at S-65A.

Lake Okeechobee

Lake Okeechobee stage was 16.23 feet NGVD on November 9, 2020, 0.02 feet higher than the previous week and 0.14 feet higher than the previous month. The rain event associated with Tropical Storm Eta dumped 2.2 inches of rain directly on the Lake. The heaviest rainfall, however, occurred south and east of the Lake with some areas receiving up to 15 inches. Wind speeds over the Lake during Tropical Storm Eta reached 30+ mph from the northeast resulting in a seiche, decreasing stage in the north and east sides of the Lake and increasing stage in the south and west sides of the Lake; totaling nearly 2 feet in difference at the peak of the storm. The full effects of Tropical Storm Eta will not be known for a couple of weeks but will likely include increased turbidity for some time, as well as substantial inflow. Stage has been above or near the top of the envelope since August 1, 2020 and is currently 0.73 feet above. Water quality sampling on October 21—22, 2020 showed four stations had chlorophyll *a* levels above 40 ug/L, which indicates bloom conditions. Five stations had microcystin toxin levels above the EPA threshold of 8 μg/L. Satellite imagery has been mostly obscured by cloud cover over the past week, but the November 6, 2020 image showed bloom potential may have diminished in the central and northwest portions of the lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged more than 5,198 cfs with approximately 917 cfs coming from Lake Okeechobee. The seven-day average salinities remained the same at the North Fork and decreased at the US1 Bridge and A1A Bridge 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 7,336 cfs over the past week with approximately 4,076 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), increased at Cape Coral and Shell Point, and decreased at 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 Low Sub-Band of 2008 LORS. Tributary hydrological conditions are normal. The LORS2008 Release Guidance suggests up to 450 cfs release at S-79 to the Caloosahatchee Estuary and up to 200 cfs release at S-80 to the St. Lucie Estuary.

Stormwater Treatment Areas

Over the past week, 9,800 ac-ft of 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 1,228,000 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, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to the A-1 FEB/STA-3/4.

Everglades

Above average precipitation fell across the WCAs last week, particularly in WCA-2A. At the gauges monitored for this report WCA-1 is around 0.78 feet, central WCA-2A is around 2.0 foot, and WCA-3A is about 1.8 feet above the mean stage for this time of year. All the WCAs are above schedule and trending away from their respective regulation stages. WCA-1 is closest to schedule, while WCA-2A and 3A are in excess of 2.0 feet above schedule. Above average rainfall over Taylor Slough and Florida Bay (FB) last week and stages fell throughout the week but remain above average. Salinities decreased on average across Florida Bay and remain below the historical average. Salinities in the TR mangrove zone to the east remained near fresh as discharge rates from the creeks remain high. Conditions remain in a good position to start the dry season.

* *Data collected for this report covers Sunday to Sunday unless noted otherwise, and do not include Monday's rains*

Supporting Information

KISSIMMEE BASIN
Rainfall

The Upper Kissimmee Basin received 0.31 inches of rainfall in the past week and the Lower Basin received 1.39 inches (SFWMD Daily Rainfall Report 11/09/2020).

Upper Kissimmee

Table 1 lists stage and discharge for several Kissimmee Chain of Lakes (KCOL) water bodies using data from lake outfall structures. KCOL 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 KCOL flood regulation (R) or temporary schedules (T, A, or S); provisional, real-time data are from SFWMD.

Report Date: 11/10/2020

Water Body	Structure	7-day Average Discharge (cfs)[1]	Stage Monitoring Site[2]	Lake Stage (feet)	Schedule Type[3]	Schedule Stage (feet)	Daily Departure (feet)						
							11/8/20	11/1/20	10/25/20	10/18/20	10/11/20	10/4/20	9/27/20
Lakes Hart and Mary Jane	S-62	187	LKMJ	60.9	R	61.0	**-0.1**	0.0	0.0	0.1	0.1	0.0	0.1
Lakes Myrtle, Preston, and Joel	S-57	55	S-57	61.9	R	62.0	**-0.1**	0.0	0.0	0.2	0.2	0.1	0.0
Alligator Chain	S-60	0	ALLI	63.9	R	64.0	**-0.1**	-0.3	-0.1	-0.1	-0.1	0.0	0.0
Lake Gentry	S-63	15	LKGT	61.5	R	61.5	**0.0**	-0.1	-0.1	0.0	0.0	-0.1	0.1
East Lake Toho	S-59	494	TOHOE	58.0	R	58.0	**0.0**	-0.1	0.0	-0.2	0.0	0.2	0.3
Lake Toho	S-61	691	TOHOW, S-61	54.9	R	55.0	**-0.1**	-0.2	-0.1	-0.1	0.1	0.2	0.2
Lakes Kissimmee, Cypress, and Hatchineha	S-65	187	KUB011, LKIS5B	52.5	R	52.5	**0.0**	-0.1	0.1	0.2	0.5	0.6	0.4

[1] Seven-day average of weighted daily means through midnight.
[2] Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.
[3] 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: **11/10/2020**

Metric	Location	1-Day Average	Average for the Preceeding 7-Days[1]								
		11/8/2020	11/8/20	11/1/20	10/25/20	10/18/20	10/11/20	10/4/20	9/27/20	9/20/20	9/13/20
Discharge (cfs)	S-65	384	**187**	209	180	678	1,265	1,725	2,890	3,143	2,193
Discharge (cfs)	S-65A[2]	551	**361**	330	346	861	1,916	2,248	3,578	3,855	2,700
Discharge (cfs)	S-65D[2]	863	**797**	1,122	1,714	3,267	4,848	4,715	5,198	3,738	3,512
Headwater Stage (feet NGVD)	S-65D[2]	27.03	**26.94**	27.35	27.62	27.66	27.68	27.75	27.73	27.77	27.63
Discharge (cfs)	S-65E[2]	949	**895**	1,283	1,935	3,501	5,287	5,081	4,994	3,919	3,578
Discharge (cfs)	S-67	0	**0**	0	0	0	0	0	0	0	0
DO (mg/L)[3]	Phases I & II/III river channel	5.9	**5.7**	3.8	3.0	1.5	1.2	1.2	1.2	1.1	0.9
Mean depth (feet)[4]	Phase I floodplain	0.53	**0.52**	0.52	0.66	0.90	1.66	2.35	2.70	2.31	2.06

[1]Seven-day average of weighted daily means through Sunday midnight.
[2]S-65A discharge combines S-65A with auxillary strucutures; 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.
[3]DO is the average for sondes at KRBN, PC62, PC33, PD62R, and PD42R.
[4]1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).
DATA ARE PROVISIONAL; N/A indicates that data were not available.

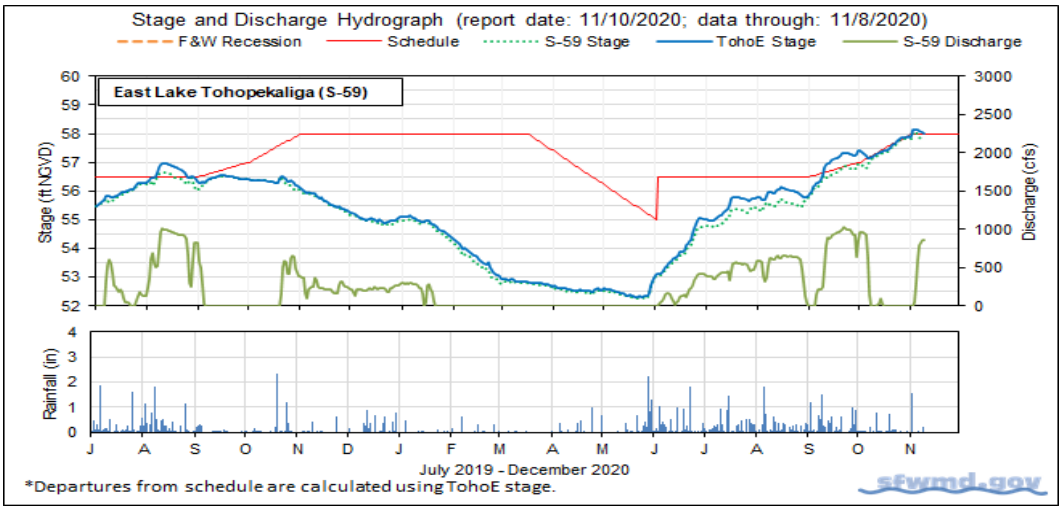


Figure 1. East Lake Toho regulation schedule, stage, discharge and rainfall.

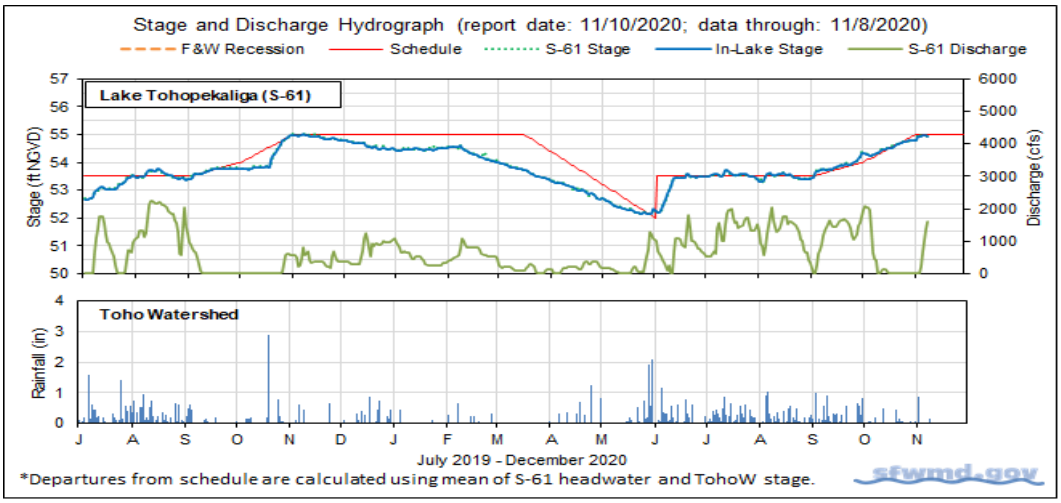


Figure 2. Lake Toho regulation schedule, stage, discharge and rainfall.

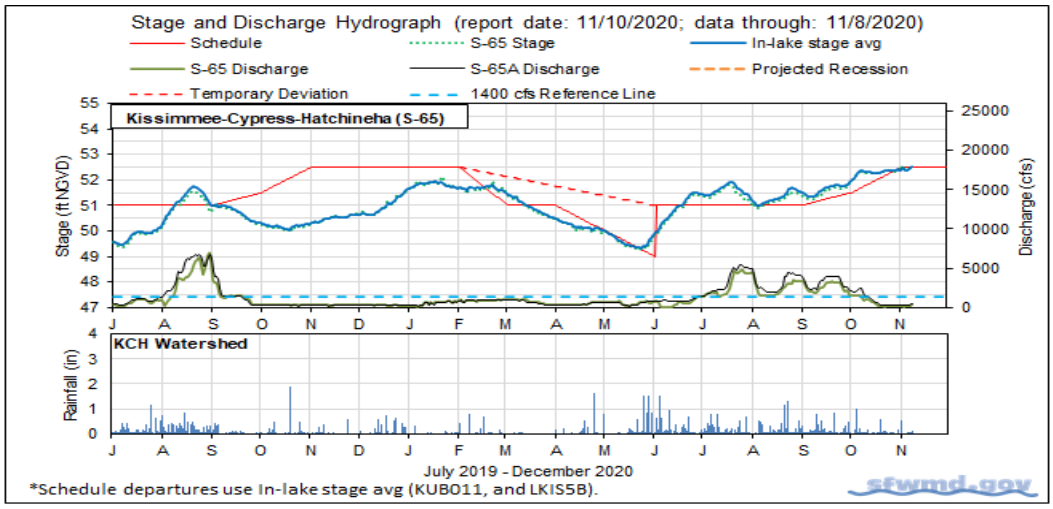


Figure 3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

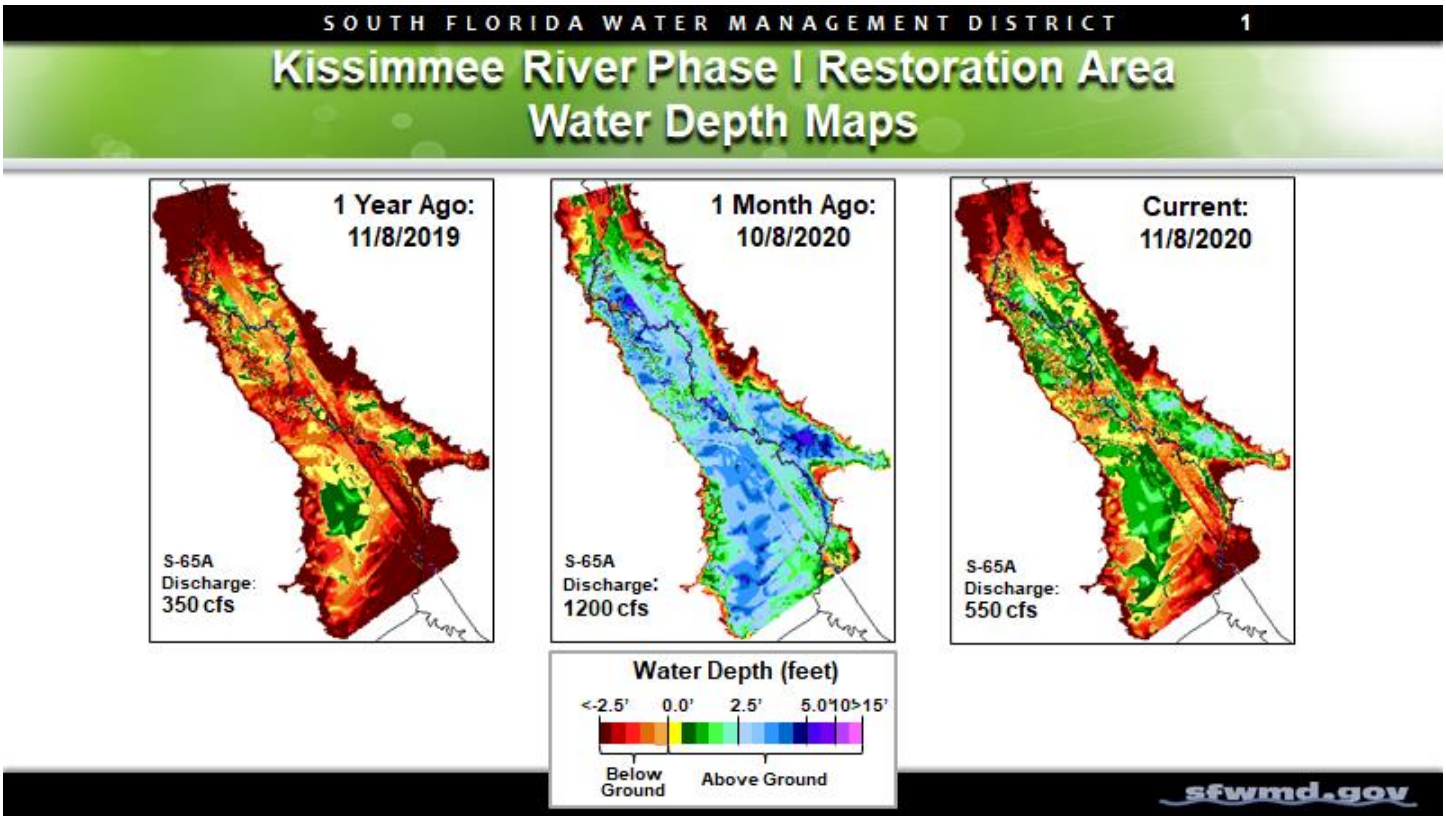


Figure 4. Phase I area floodplain water depths (from left to right) one year ago, one month ago and current. Color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

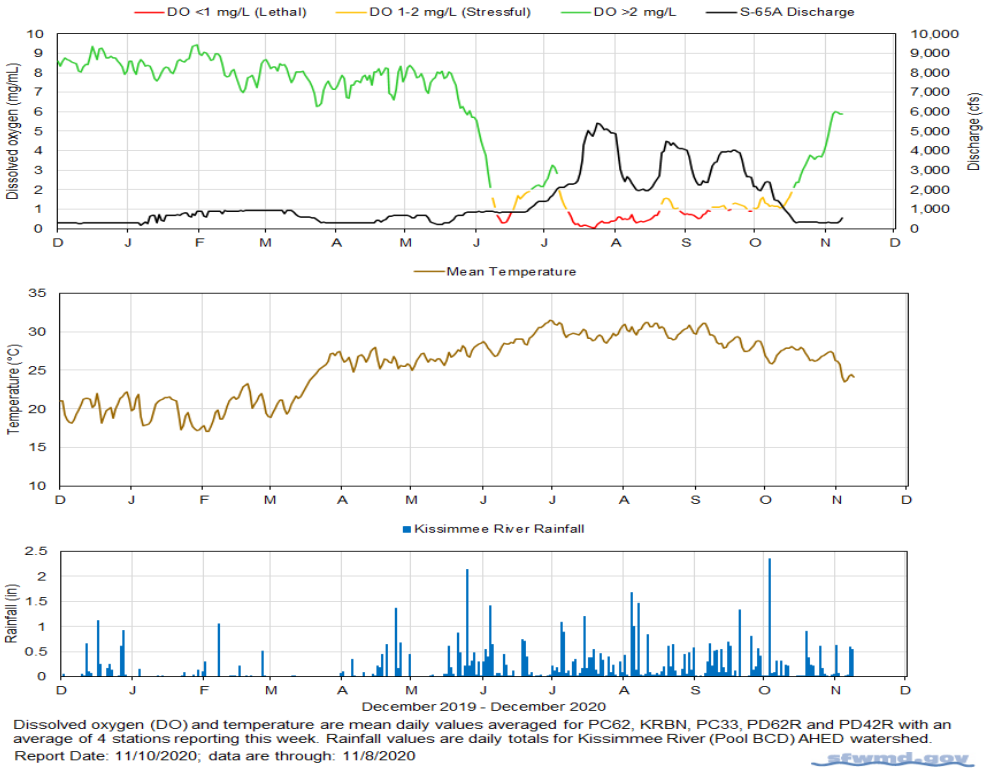


Figure 5. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches).

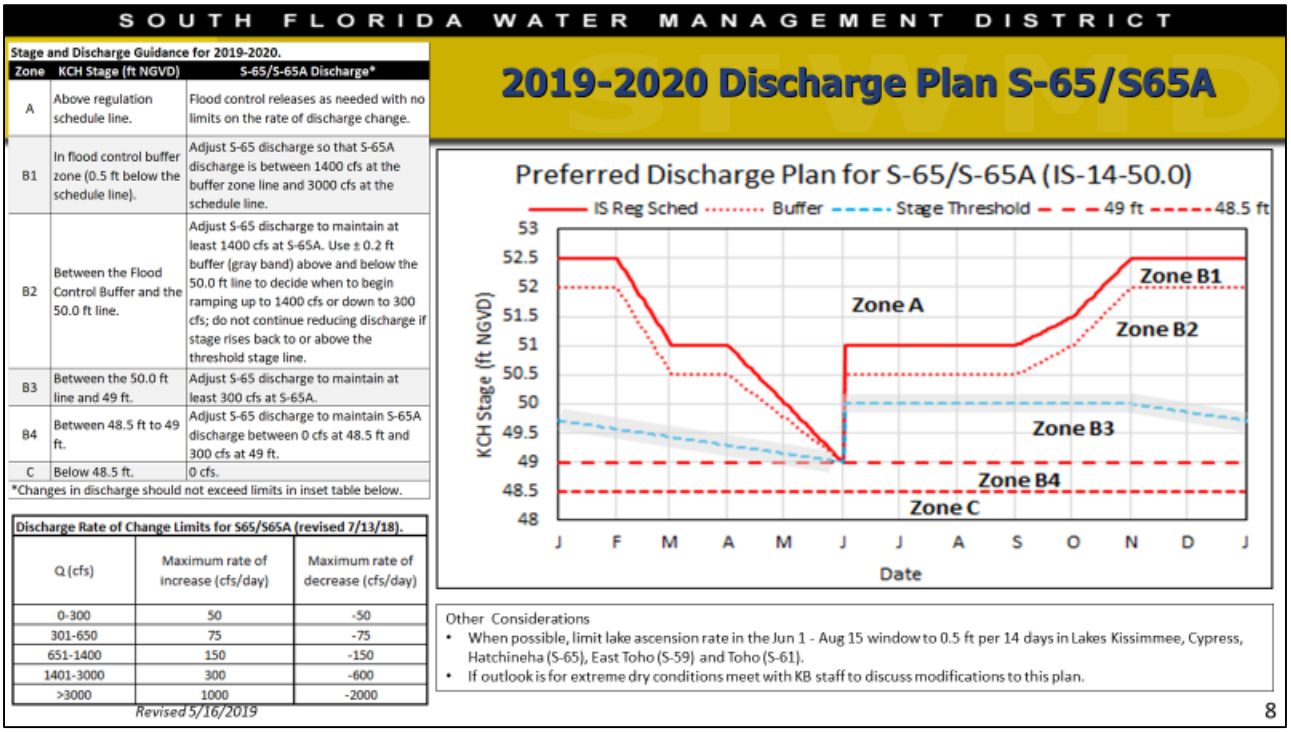


Figure 6. The 2019-2020 Discharge Plan for S-65/S-65A.

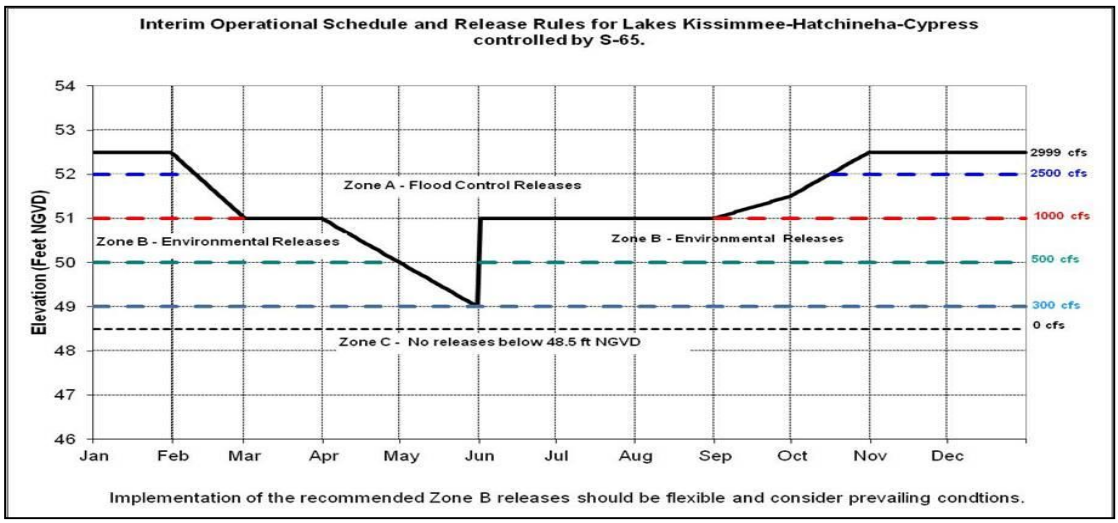


Figure 7. Interim operations schedule for S-65 (solid black line). The discharge schedule shown to the right has not been used in recent years.

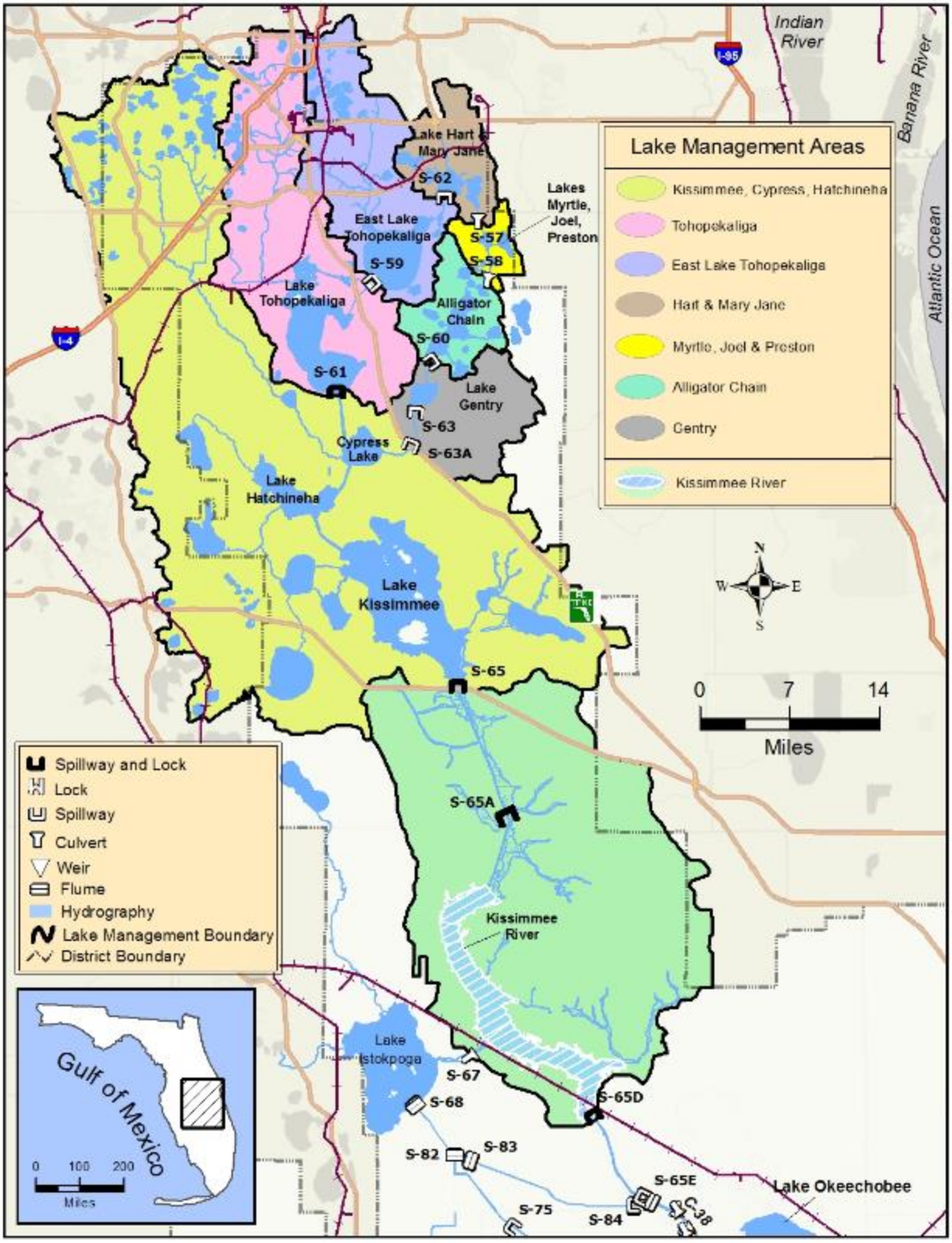


Figure 8. The Kissimmee Basin.

LAKE OKEECHOBEE

Lake Okeechobee stage is 16.23 feet NGVD, 0.14 feet higher than a month ago, and 2.90 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 0.73 feet above. Lake stage moved into the Beneficial Use sub-band on March 4, 2020, into the Base Flow sub-band in mid-July, into the Intermediate sub-band on October 7 but, with the recent releases, stage has dropped down into the Low sub-band (Figure 3). Lake stage reached a low of 10.99 feet on May 17 and rose to 16.37 feet by the end of October. Releases in early November resulted in a stage decline before rains associated with Tropical Storm Eta increased stages once again. According to RAINDAR, the Tropical Storm Eta rain event dumped 2.2 inches of rain directly over the Lake through the past week. Areas south and east of the Lake received more rainfall (up to 15.0 inches) while areas west and north of the Lake received similar or less rainfall (Figure 4).

Average daily inflows (excluding rainfall) were slightly higher than the previous week, going from 3,633 cfs to 3,856 cfs. Outflows (excluding evapotranspiration) decreased from 6,472 cfs to 5,611 cfs. Most of the inflows came from the C-41A canal (1,125 cfs through S-84 & S-84X) followed by the Kissimmee River (925 cfs through S-65E & S-65EX1), but there were substantial inflows from C-40 and C-41 canals (376 cfs through S-71 & S-72) and Fisheating Creek (324 cfs). Inflows from the C-59 canal via the S-191 structure increased from 78 cfs to 471 cfs and inflows from the S-154 structure were similar to the prior week at 95 cfs. Pumps contributed a combined 430 cfs of inflow, an increase of 116 cfs from the previous week. Releases to the west via S-77 were similar to the prior week at 4,076 cfs this past week, while releases east via S-308 decreased from 1,357 cfs to 974 cfs. Outflows south through the S-350 structures decreased from 1,075 cfs to 560 cfs. 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.

Wind speeds during Tropical Storm Eta reached 30+ mph from the northeast and pushed water from the north-northeast to the south-southeast. This phenomenon, known as a seiche, resulted in a decrease in stage in the north and east sides of the Lake and an increase in stage in the south and west sides of the Lake totaling nearly two feet in difference at the peak of the storm (Figure 6). The full effects of Tropical Storm Eta wind and rain won't be known for a couple of weeks but will likely include increased turbidity for some time, as well as substantial inflow.

Water quality sampling occurs twice-monthly at approximately 30 stations from May–October as part of expanded monitoring efforts to track and study Harmful Algal Blooms on the Lake. The second October sampling occurred on the 21st and 22nd (Figure 7). Of the 32 stations sampled, 4 stations had chlorophyll *a* levels above 40 ug/L, ranging from 41.8 to 47.7 μg/L, indicating bloom conditions. Cyanotoxins were detected at 10 of the 32 stations sampled, and five of these stations had microcystin levels higher than 8 μg/L (the EPA recommendation for recreational waters), ranging from 8.1 to 16.0 μg/L.

The most recent satellite image (November 6, 2020) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data is partially obscured by cloud cover but suggests diminished potential for cyanobacteria bloom in the central and northwest regions of the Lake (Figure 8). Staff reported bloom conditions along the northwest shore and at the L005 weather platform on the west side of the Lake on October 29, 2020 which agrees with the November 1st imagery.

Water Management Summary

Lake Okeechobee stage was 16.23 feet NGVD on November 9, 2020, 0.02 feet higher than the previous week and 0.14 feet higher than the previous month. The rain event associated with Tropical Storm Eta dumped 2.2 inches of rain directly on the Lake but most of the rainfall occurred south and east of the Lake with some areas receiving up to 15 inches of rain. Wind speeds during Tropical Storm Eta reached 30+ mph from the northeast resulting in a seiche, a decrease in stage in the north and east sides of the Lake and an increase in stage in the south and west sides of the Lake. The full effects of Tropical Storm Eta won't be known for a couple of weeks. Stage has been above or near the top of the envelope since August 1, 2020 and is currently 0.73 feet above. Water quality sampling on October 21—22, 2020 showed four stations had chlorophyll *a* levels above 40 ug/L, which indicates bloom conditions and five stations had microcystin toxin levels above the EPA threshold of 8 μg/L. Satellite imagery has been mostly obscured by cloud cover over the past week but the November 6, 2020 image showed bloom potential may have diminished in the central and northwest portions of the lake.

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	1256	925	0.4
S-71 & S-72	431	376	0.1
S-84 & S-84X	971	1125	0.4
Fisheating Creek	390	324	0.1
S-154	97	95	0.0
S-191	78	471	0.2
S-133 P	83	159	0.1
S-127 P	21	34	0.0
S-129 P	21	21	0.0
S-131 P	7	10	0.0
S-135 P	181	206	0.1
S-2 P	0	0	0.0
S-3 P	1	0	0.0
S-4 P	0	0	0.0
L-8 Backflow	96	110	0.0
Rainfall	1622	6026	2.3
Total	**5255**	**9883**	**3.8**

OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-77	4041	4076	1.5
S-308	1357	974	0.4
S-351	188	251	0.1
S-352	460	189	0.1
S-354	427	120	0.0
L-8 Outflow			
ET	1728	1794	0.7
Total	**8200**	**7405**	**2.8**

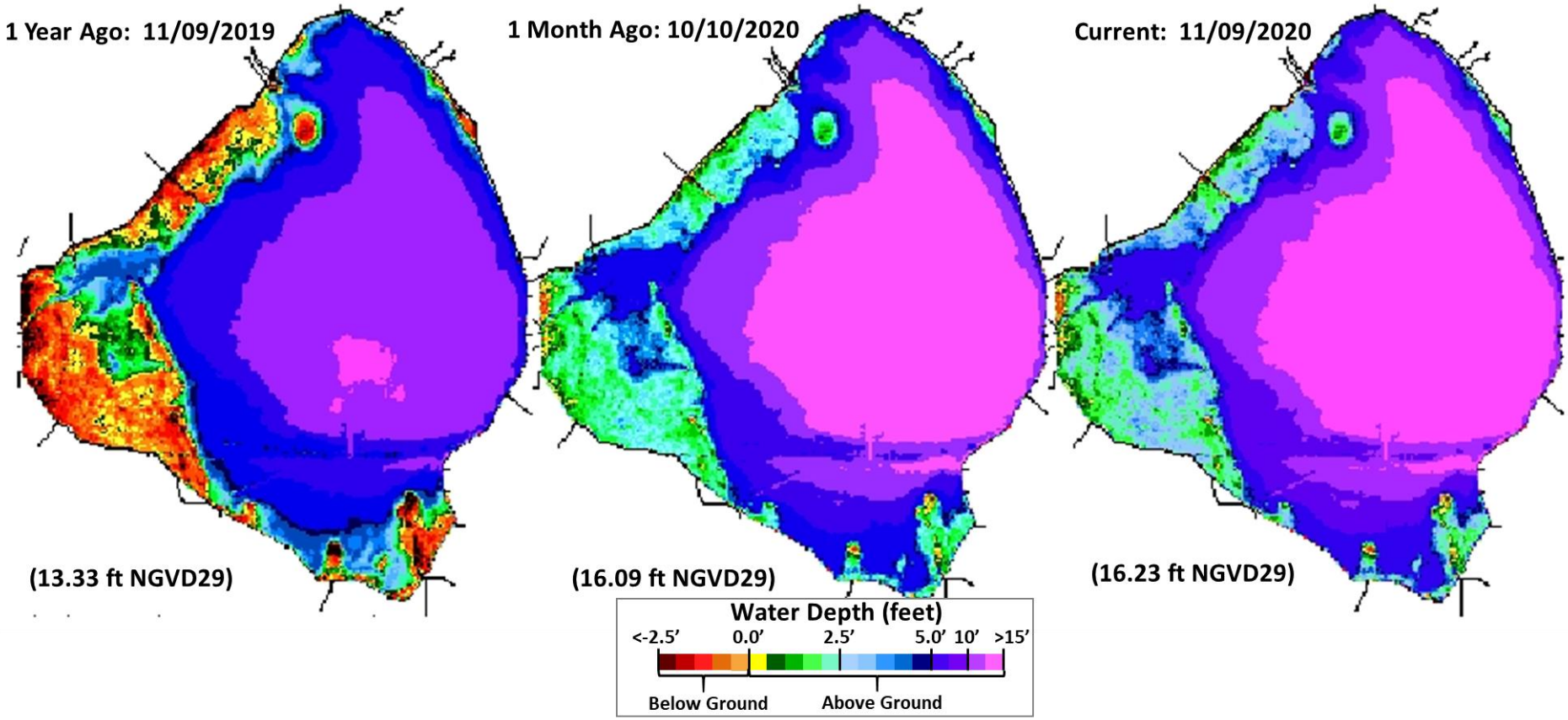


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

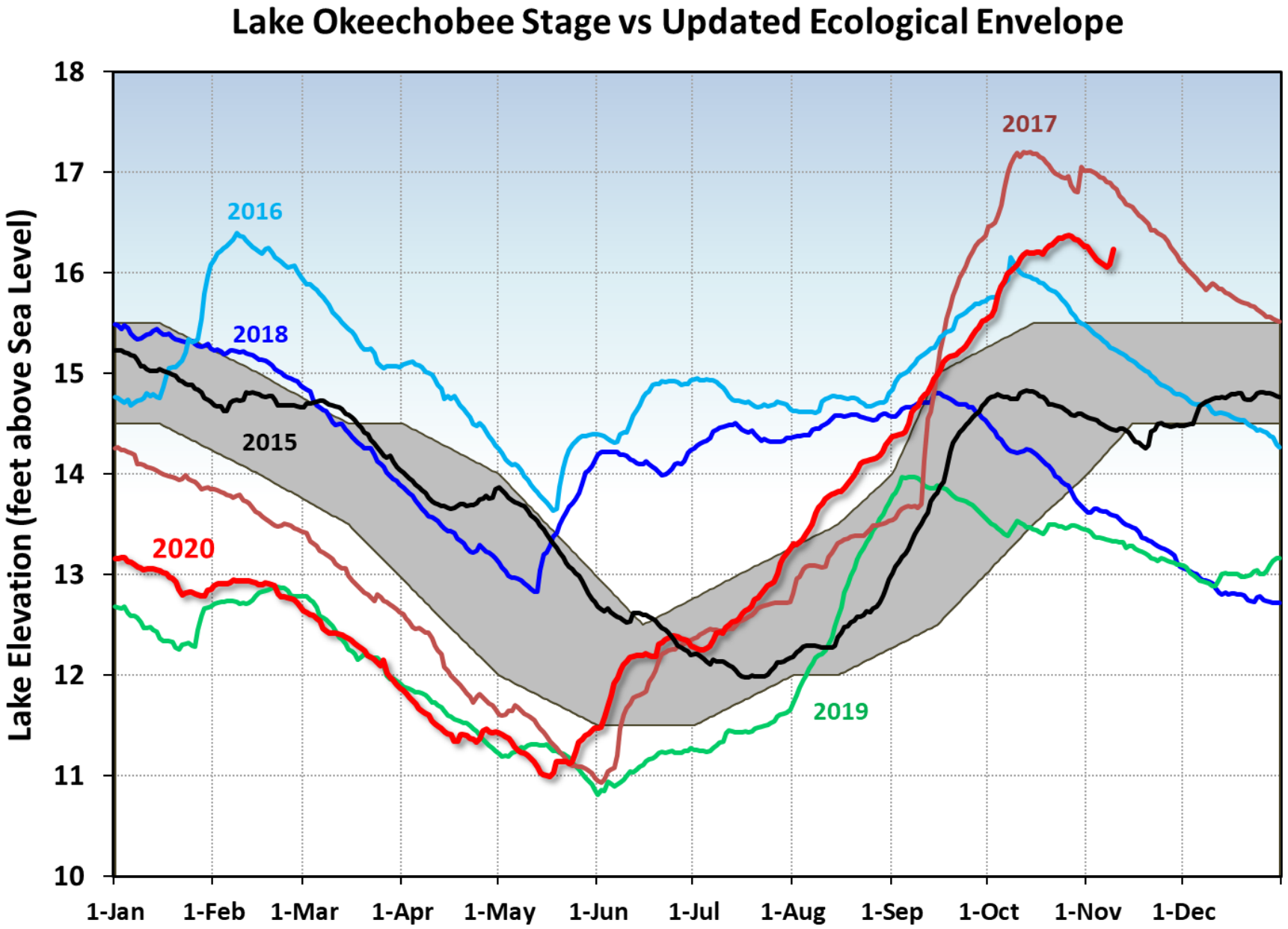


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated Ecological Envelope.

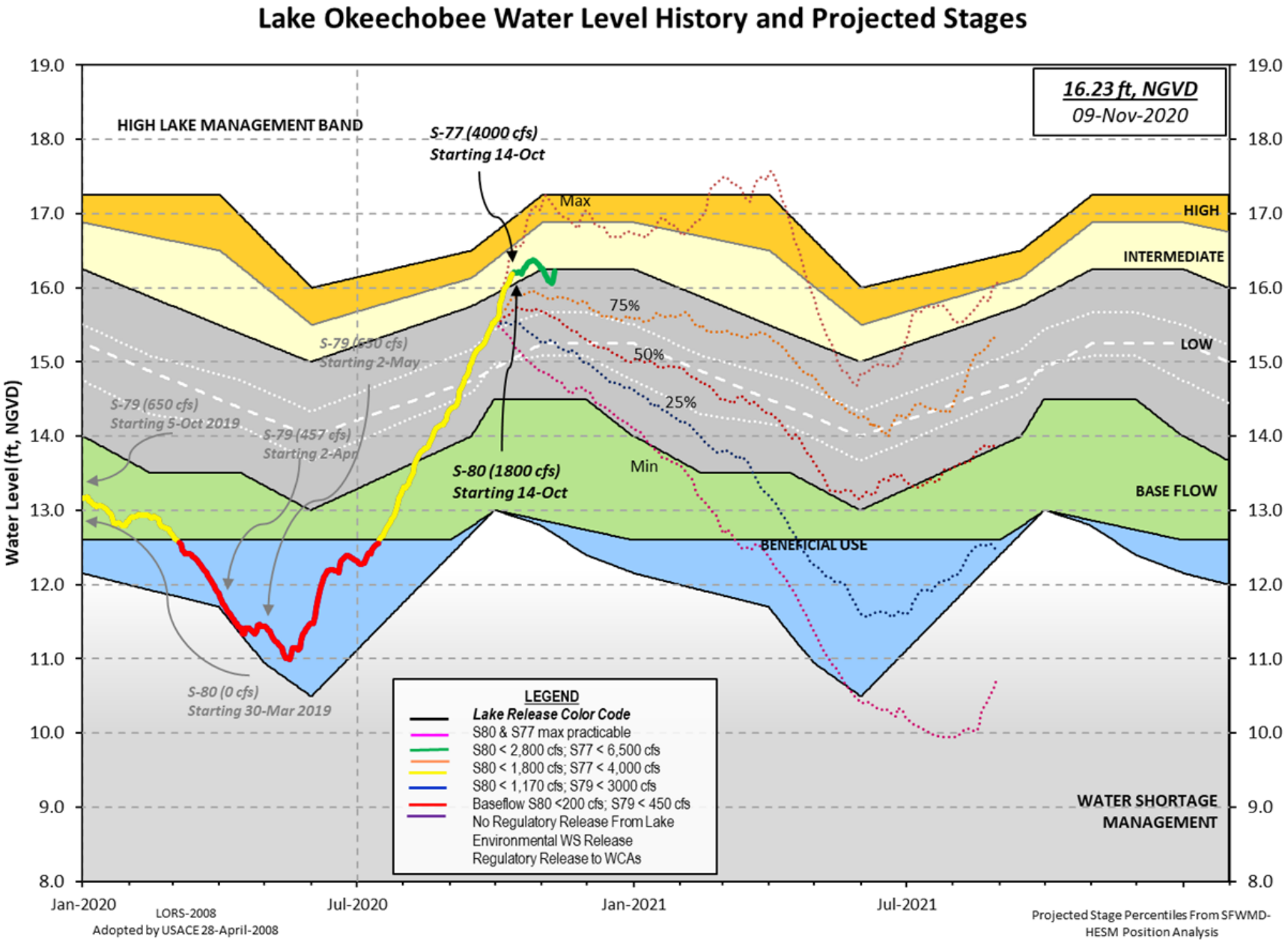


Figure 3. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

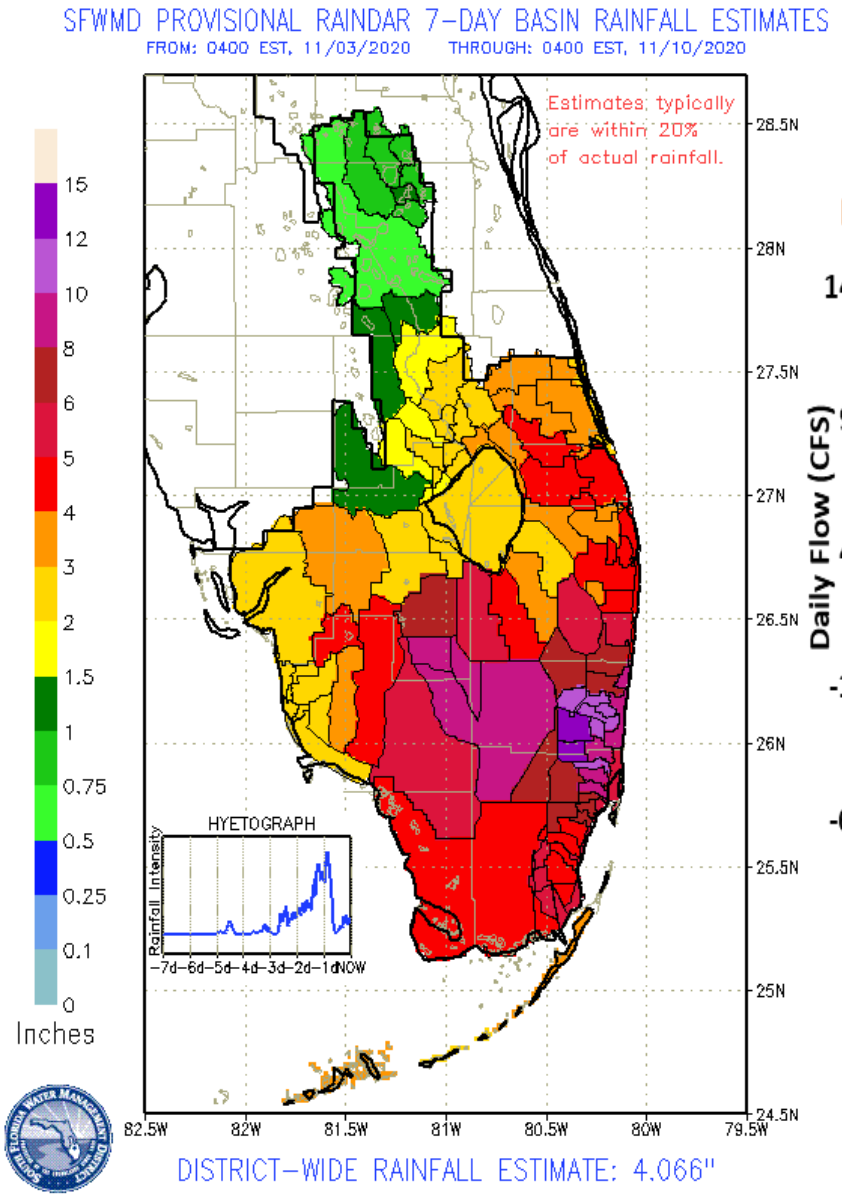


Figure 4. 7-Day rainfall estimates by RAINDAR.

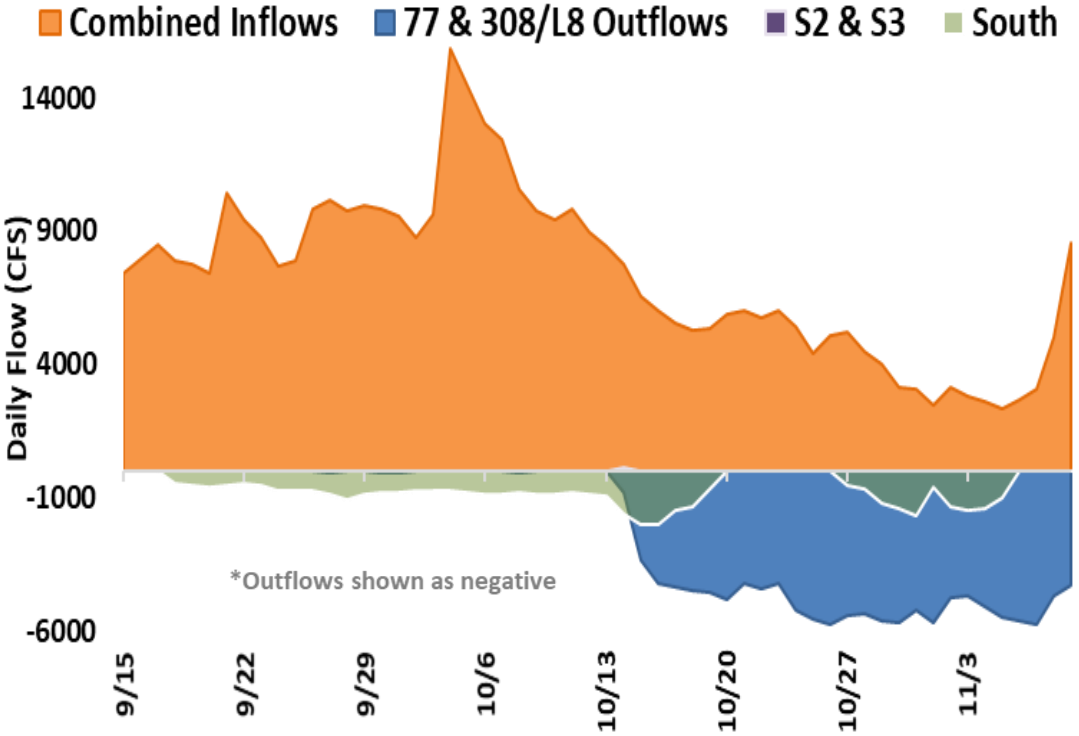


Figure 5. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive 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.

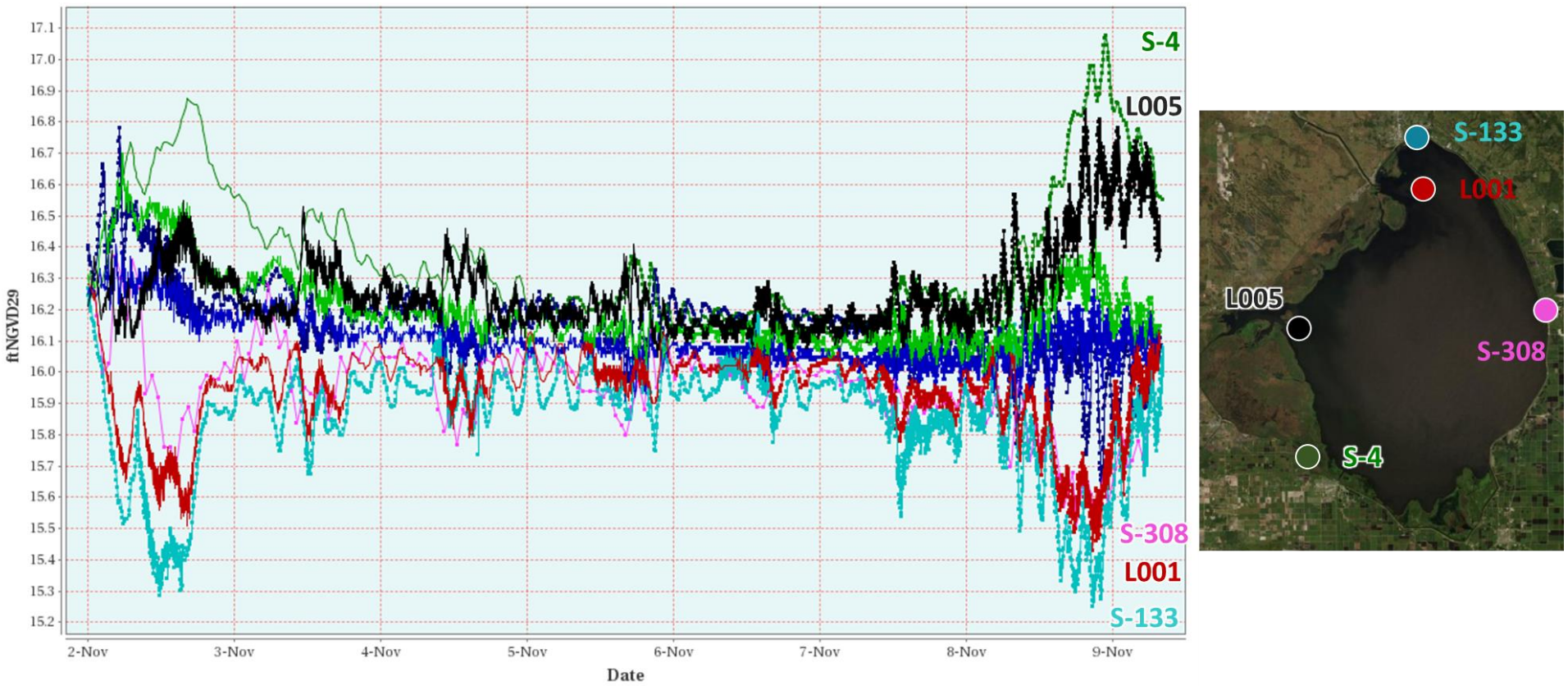


Figure 6. Wind driven stage differences (seiche) during Tropical Storm Eta (November 8–9, 2020).

Collection Date: October 21-22, 2020

Station	CHL*a* (ug/L)	TOXIN (ug/L)	TAXA
FEBIN			NS
FEBOUT			NS
KISSR0.0	8.2	BDL	*Micro/Micro*
L005	**45.0**	BDL	*Plank/Cylin*
LZ2	10.7	BDL	mixed
KBARSE	7.6	BDL	*Microcys*
RITTAE2	6.2	BDL	mixed
PELBAY3	2.5	BDL	mixed
POLE3S	4.6	BDL	mixed
LZ25A	3.0	BDL	mixed
PALMOUT			NS
PALMOUT1	**45.4**	**10.0**	*Microcys*
PALMOUT2	**35.1**	**13.0**	*Microcys*
PALMOUT3	14.2	**13.0**	*Microcys*
POLESOUT	**31.4**	BDL	*Microcys*
POLESOUT1	**22.7**	**0.6**	*Microcys*
POLESOUT2	12.8	BDL	*Microcys*
POLESOUT3	**47.7**	**5.0**	*Microcys*
EASTSHORE	2.9	BDL	mixed
NES135	9.2	BDL	mixed
NES191	3.7	BDL	mixed

Station	CHL*a* (ug/L)	TOXIN (ug/L)	TAXA
L001	9.9	BDL	mixed
L004	4.1	BDL	mixed
L006	**41.8**	**16.0**	*Microcys*
L007	3.0	**1.0**	*Microcys*
L008	**20.4**	**2.3**	*Microcys*
LZ30	17.5	**8.1**	*Microcys*
LZ40	**23.2**	**0.3**	*Microcys*
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*a*) an algal bloom
- BDL – Below Detectable Limit of **0.25** µg/L
- ND – No Dominant taxa
- P – Pending
- NS – Not Sampled
- Bold – crew observed possible BGA
- Chlorophyll *a* analyzed by SFWMD
- Toxin and Taxa analyzed by FDEP

  Cylindro = Cylindrospermopsis
  Planktol = Planktolyngbya
  Dolicho = Dolichospermum

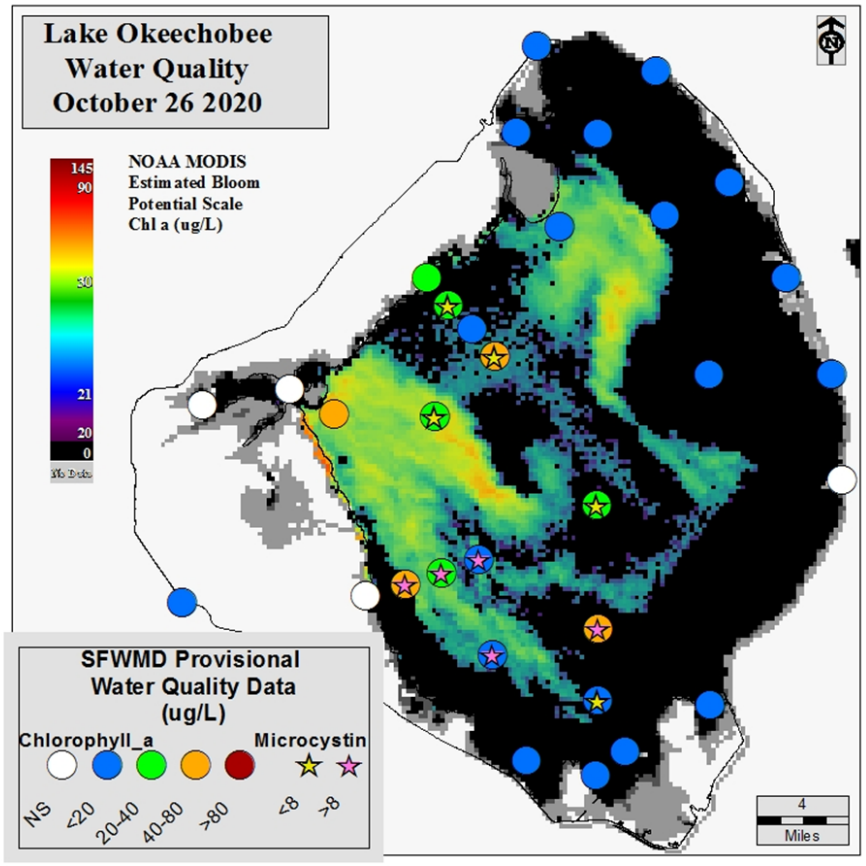


Figure 7. Provisional results from the expanded monitoring sampling trips on October 21–22, 2020.

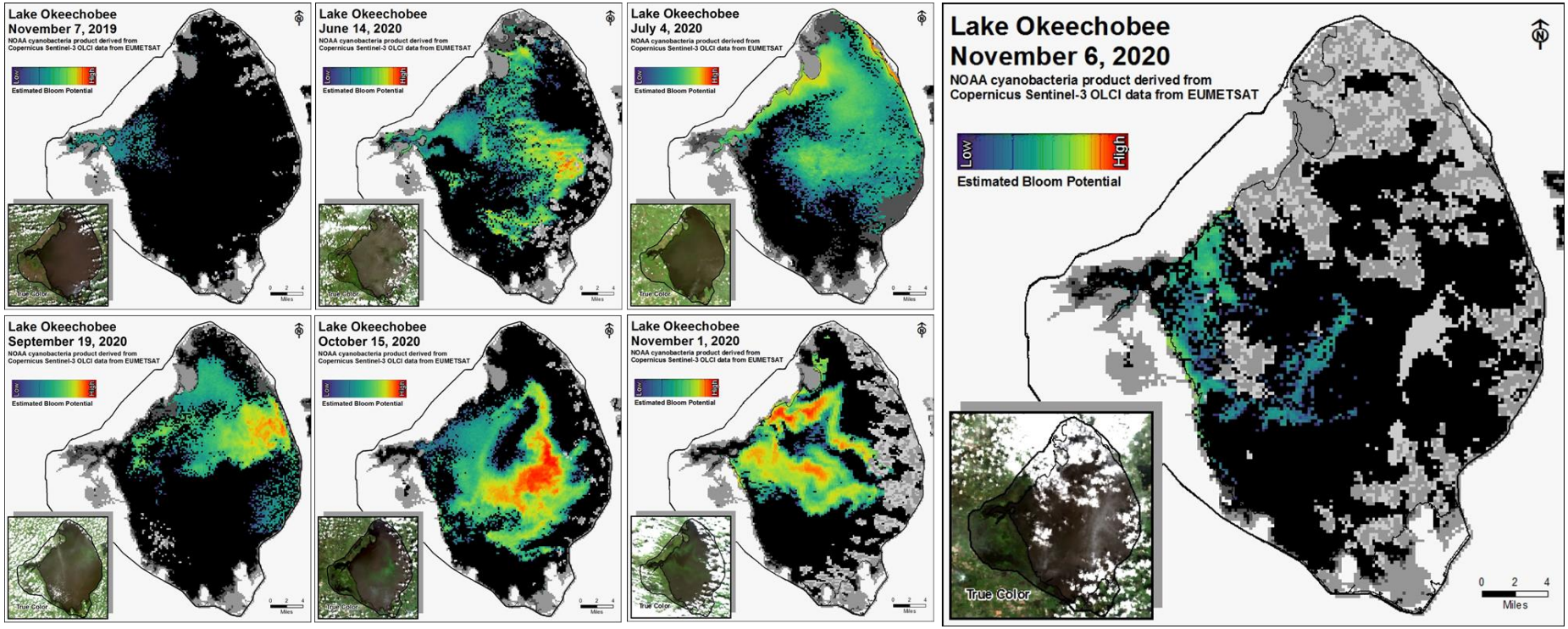


Figure 8. Cyanobacteria bloom potential based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged more than 5,198 cfs (Figures 1 and 2) and last month inflow averaged more than 3,676 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).

Location	Flow (cfs)
Tidal Basin Inflow	1,441
S-80	1,443
S-308	974
S-49 on C-24	1,171
S-97 on C-23	1,143
Gordy Rd. structure on Ten Mile Creek	Not reporting

Over the past week, salinity remained low in the North Fork and decreased at the US1 Bridge and A1A Bridge (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 0.4. 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.

Sampling Site	Surface	Bottom	Envelope
HR1 (North Fork)	**0.3** (0.3)	**0.3** (0.3)	NA[1]
US1 Bridge	**0.4** (1.1)	**0.5** (2.1)	10.0-26.0
A1A Bridge	**6.1** (8.0)	**16.6** (17.8)	NA[1]

[1]Envelope not applicable

Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged approximately 7,336 cfs (Figures 5 and 6) and last month inflow averaged about 6,413 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).

Location	Flow (cfs)
S-77	4,076
S-78	4,953
S-79	6,941
Tidal Basin Inflow	395

Over the past week in the estuary, salinity remained the same to Ft. Myers Yacht Basin, increased to Shell Point, and decreased 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)	**0.2** (0.2)	**0.2** (0.2)	NA[1]
Val I75	**0.2** (0.2)	**0.2** (0.2)	0.0-5.0[2]
Ft. Myers Yacht Basin	**0.2** (0.2)	**0.2** (0.2)	NA
Cape Coral	**1.7** (1.1)	**2.7** (1.5)	10.0-30.0
Shell Point	**14.5** (13.8)	**17.1** (16.9)	10.0-30.0
Sanibel	**23.9** (25.8)	**26.1** (28.2)	10.0-30.0

[1]Envelope not applicable and [2]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 1,300 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	1300	0.3	0.3
B	300	1300	0.3	0.3
C	450	1300	0.3	0.3
D	650	1300	0.3	0.3
E	800	1300	0.3	0.3

Red tide

The Florida Fish and Wildlife Research Institute reported on November 6, 2020, that *Karenia brevis,* the Florida red tide dinoflagellate, was not observed in samples collected from or offshore of Lee or Broward counties (no samples were analyzed this week from St. Lucie, Martin, Palm Beach, or Miami-Dade counties).

Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are normal. The LORS2008 release guidance suggests up to 450 cfs release at S-79 to the Caloosahatchee Estuary and up to 200 cfs release at S-80 to the St. Lucie Estuary.

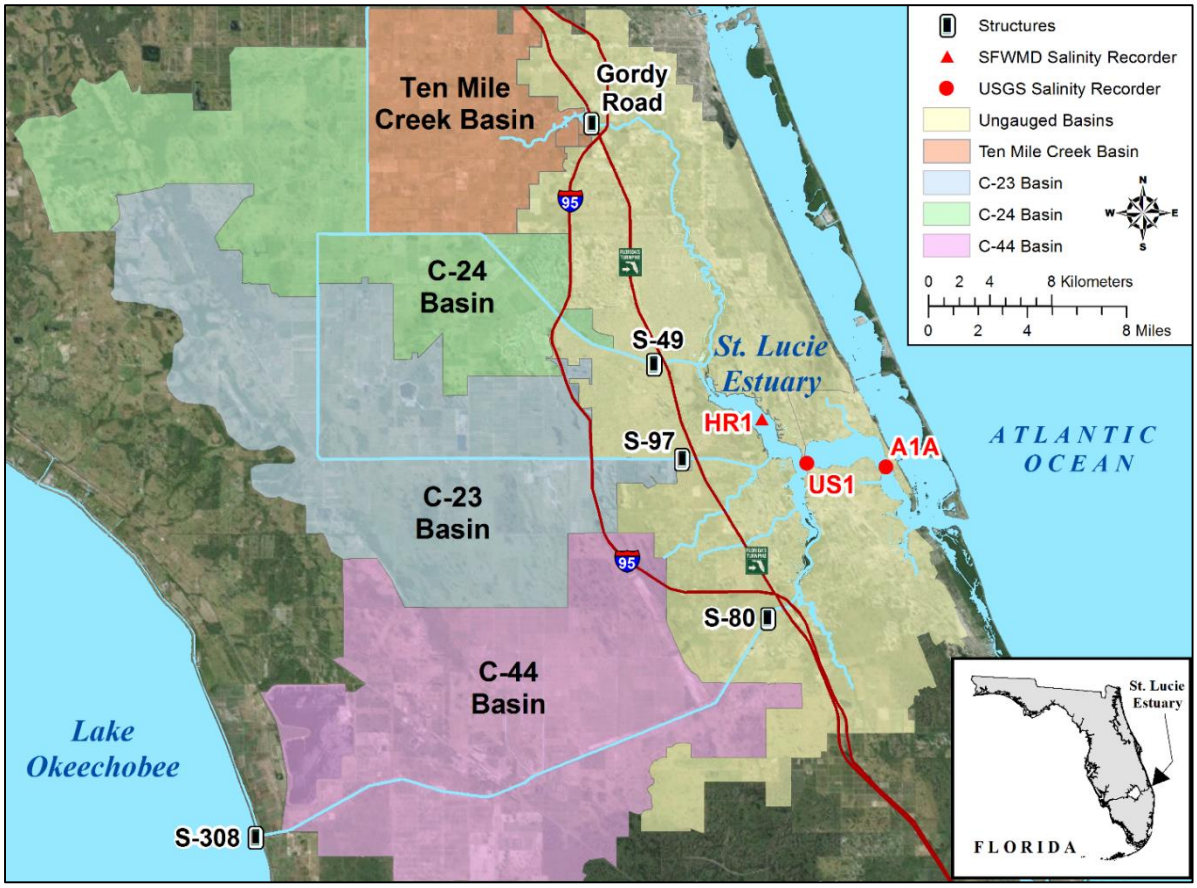


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

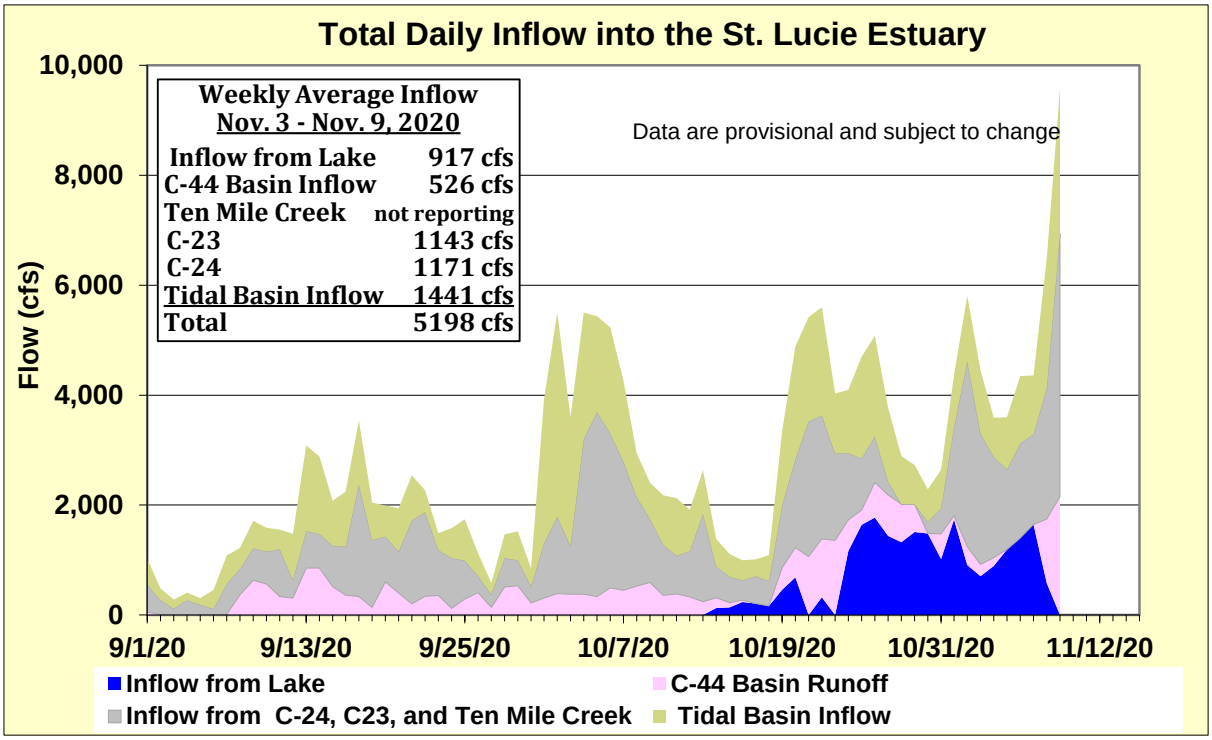


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin into the St. Lucie Estuary.

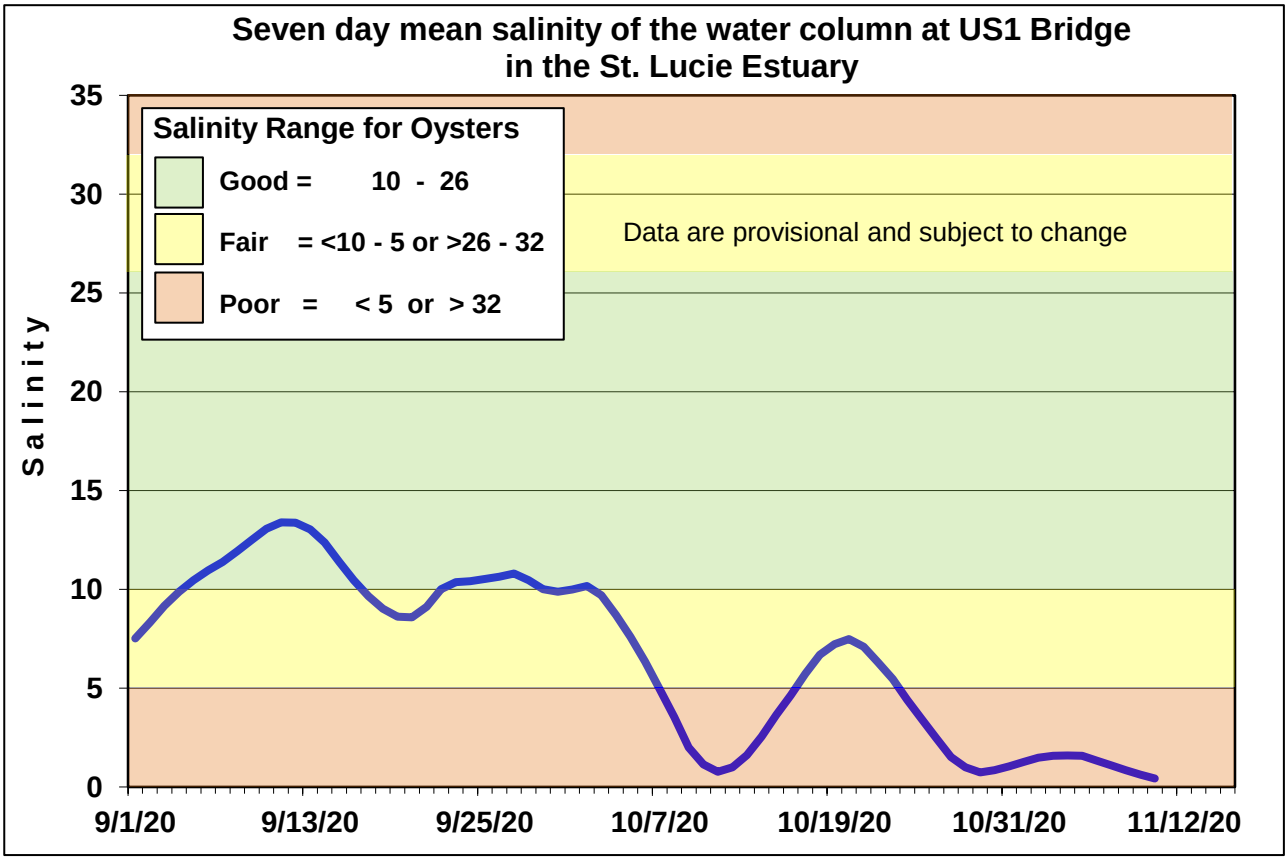


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

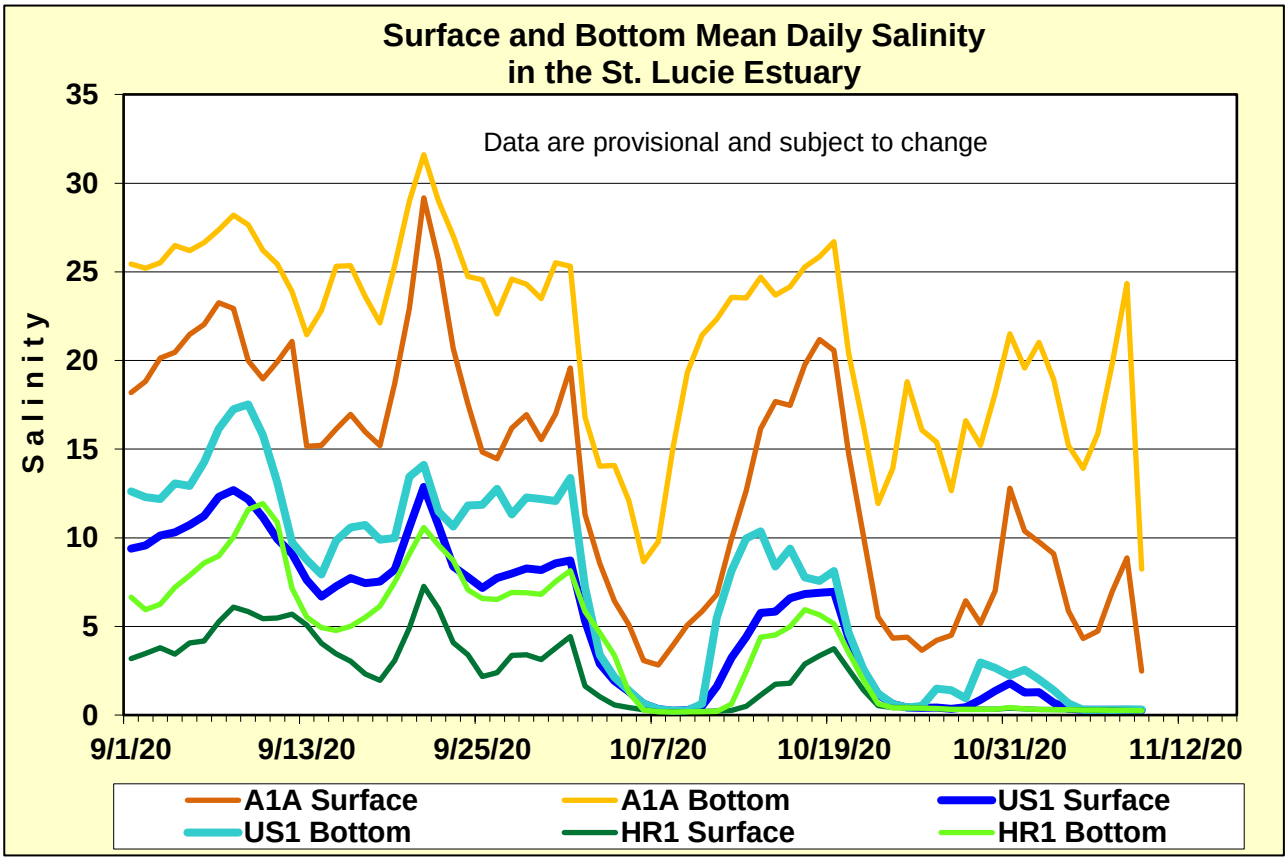


Figure 4. Daily mean salinity at the A1A, US1, and HR1 stations.

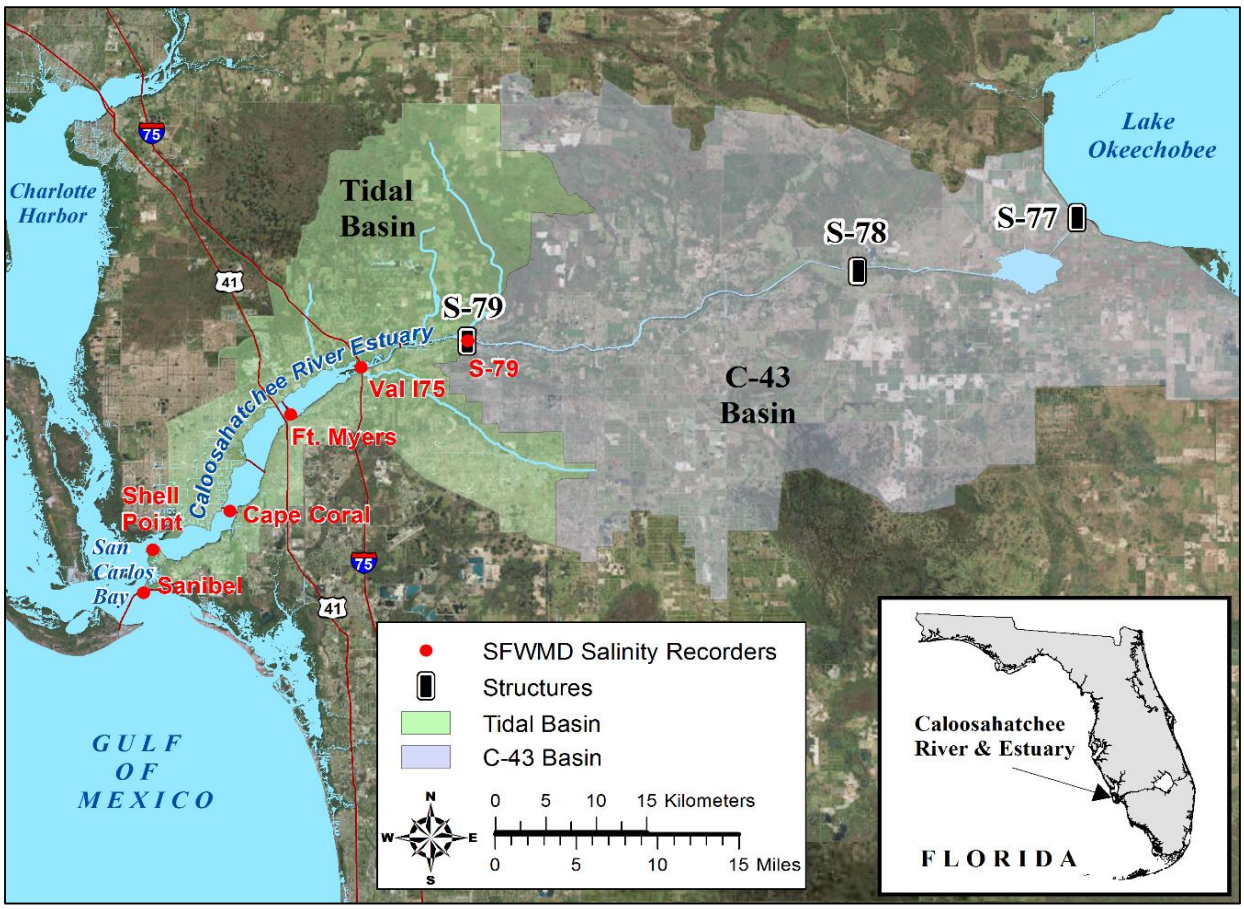


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

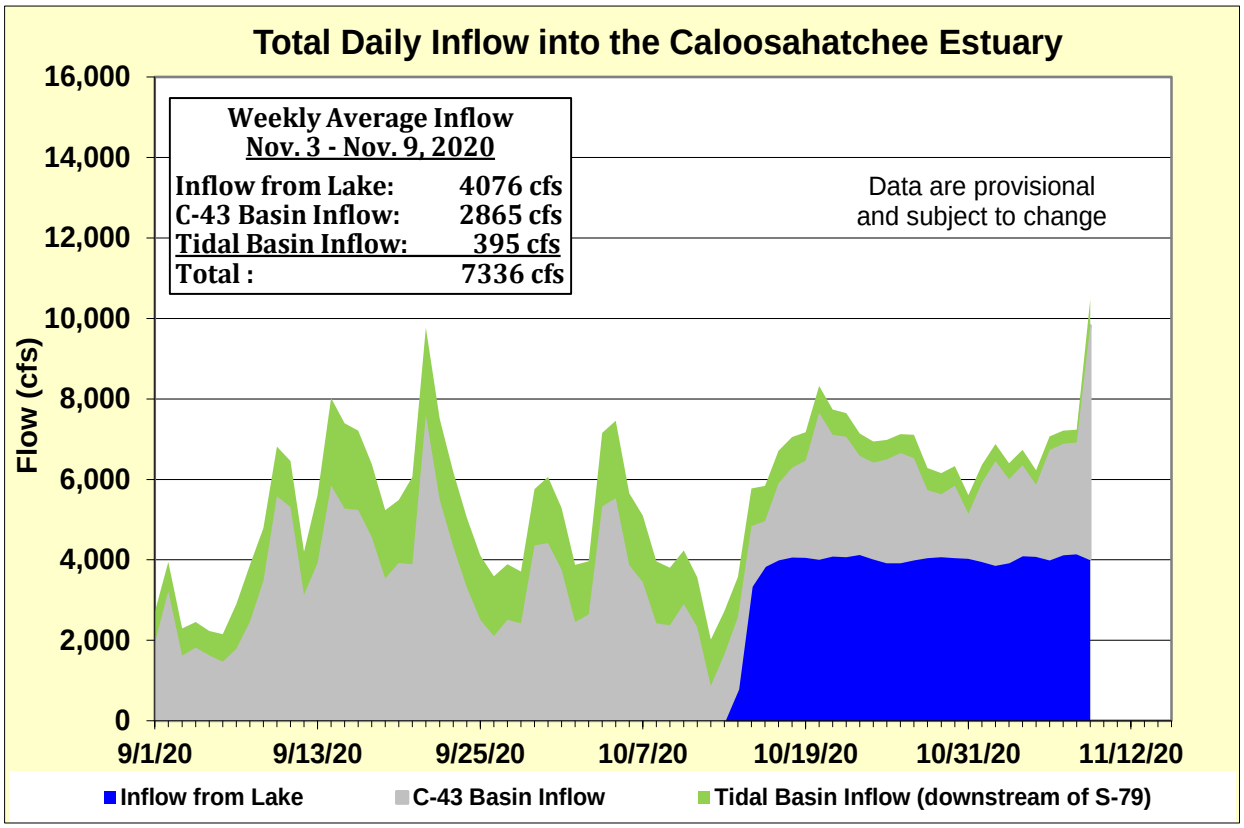


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin

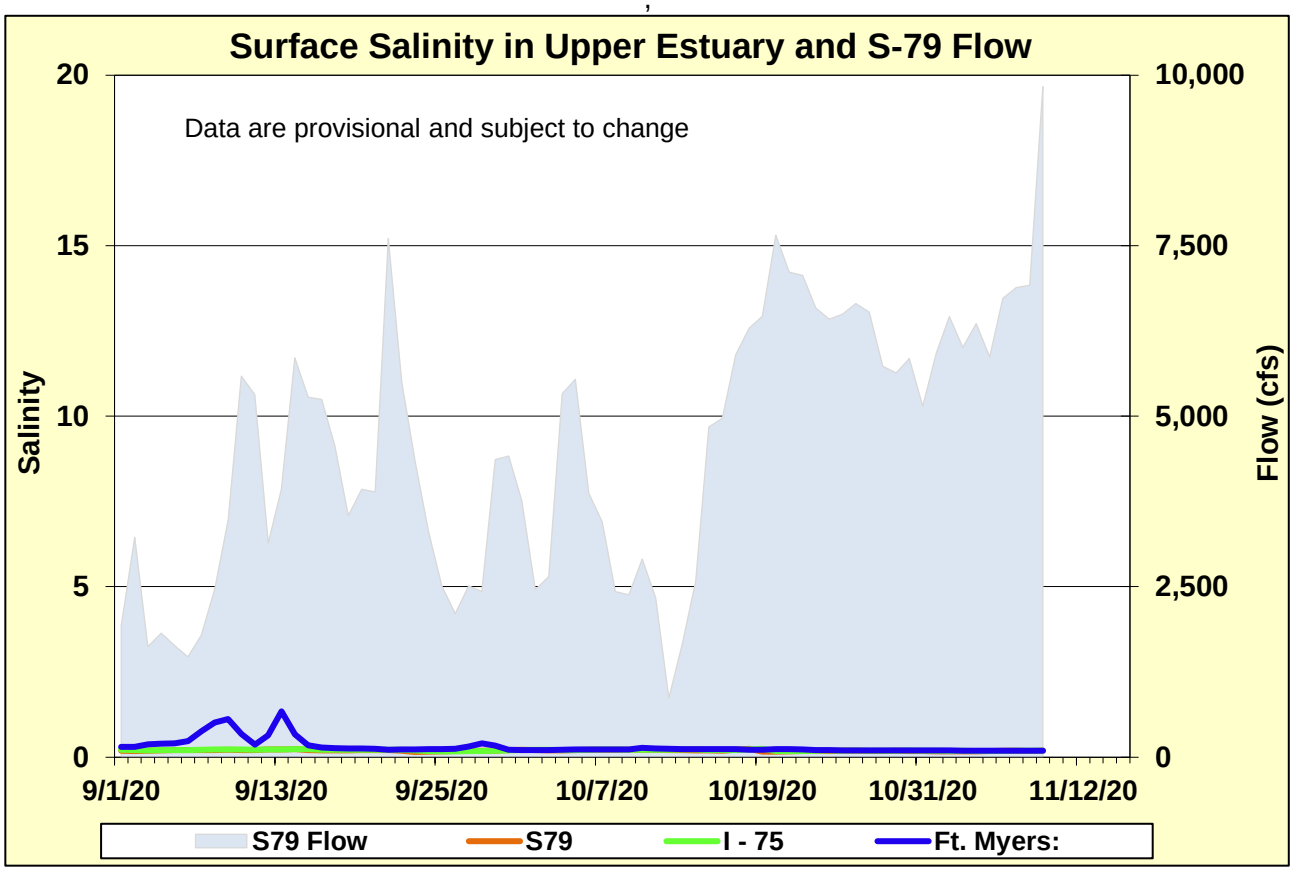


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

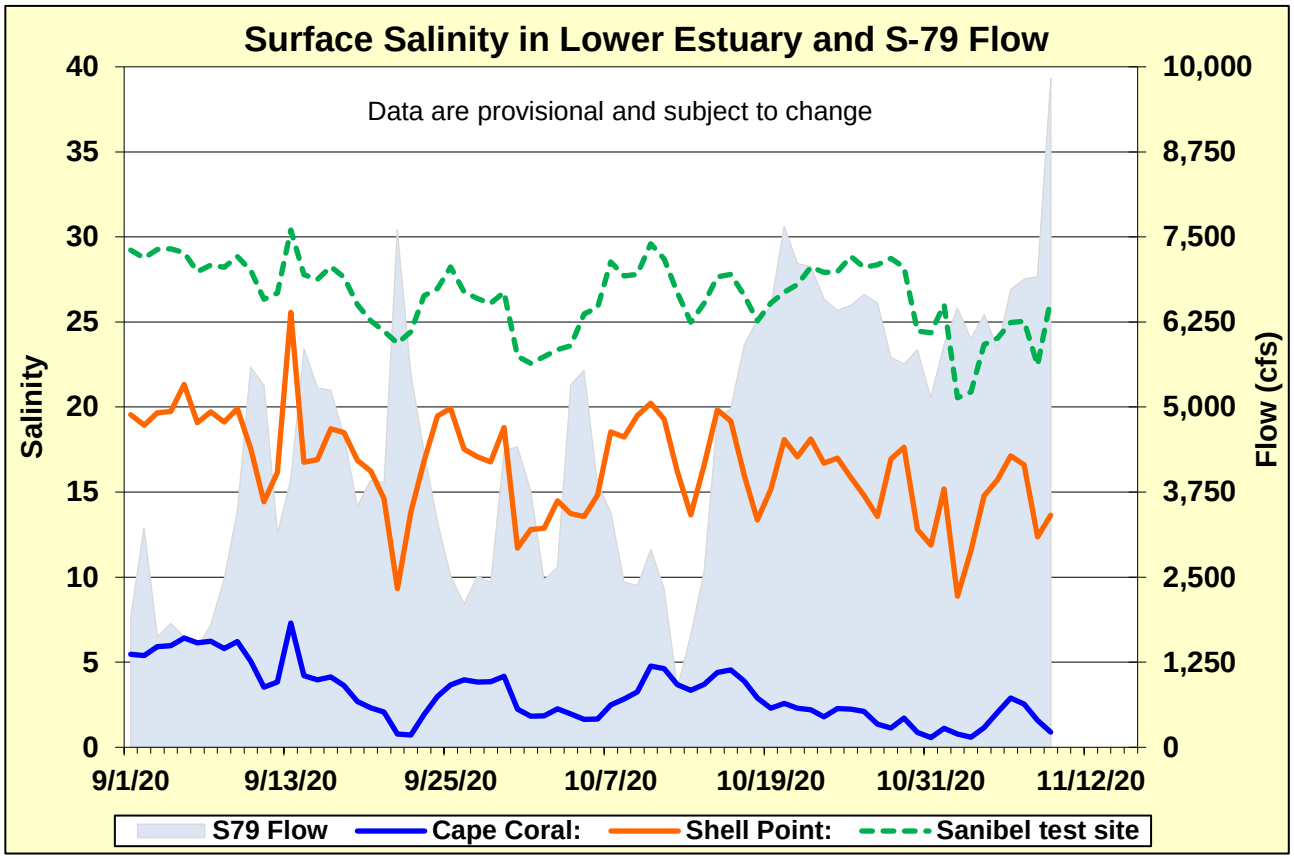


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

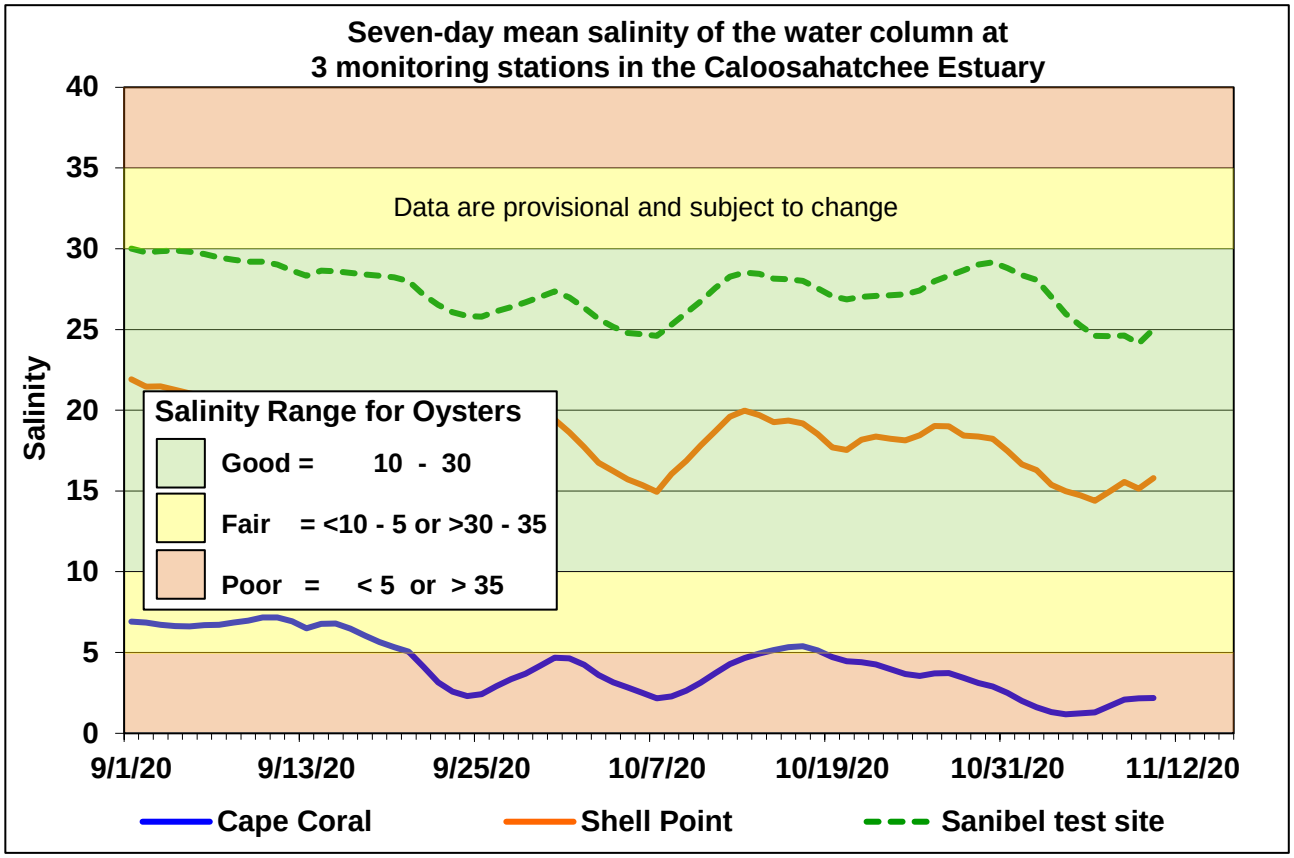


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

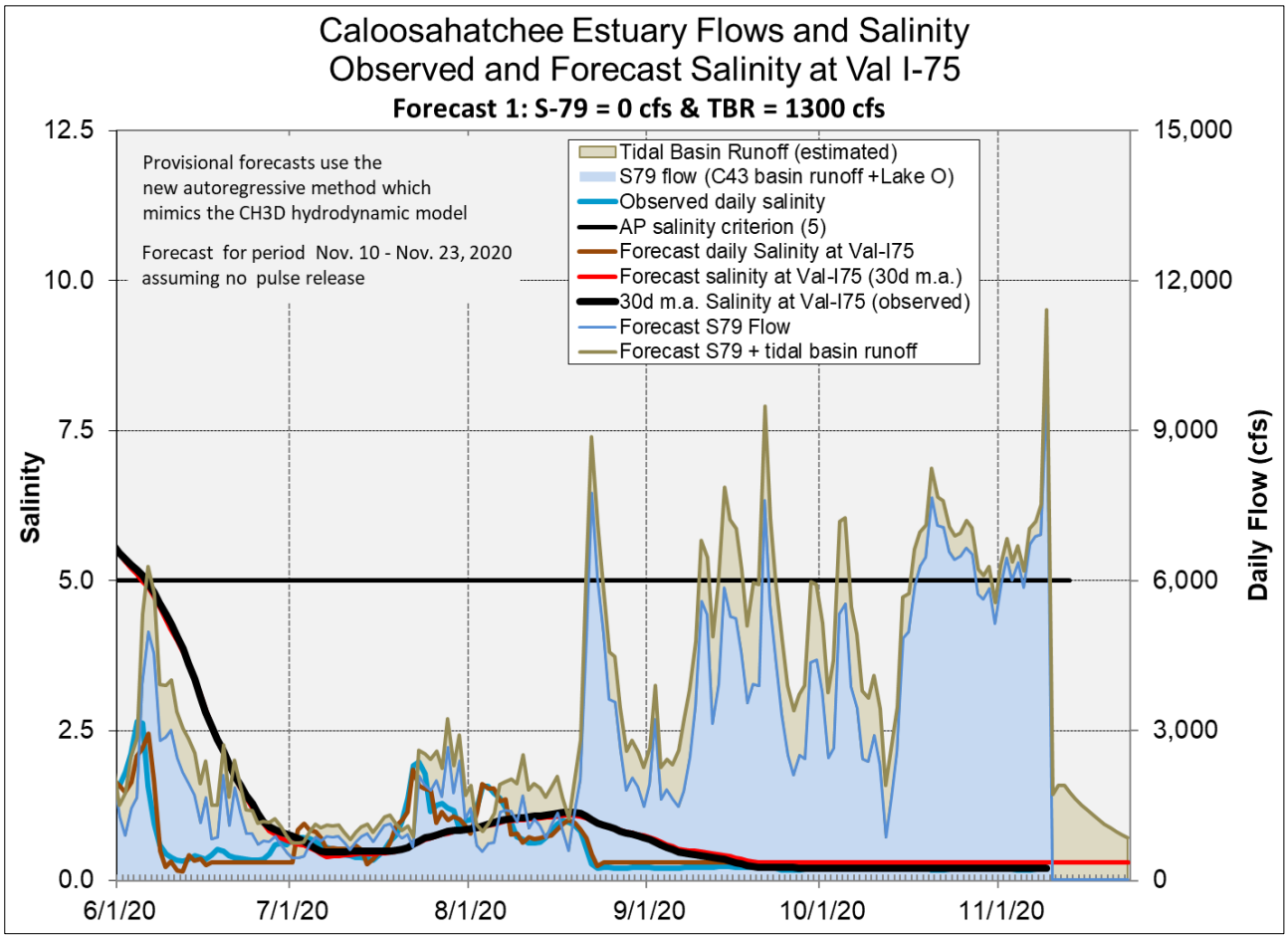
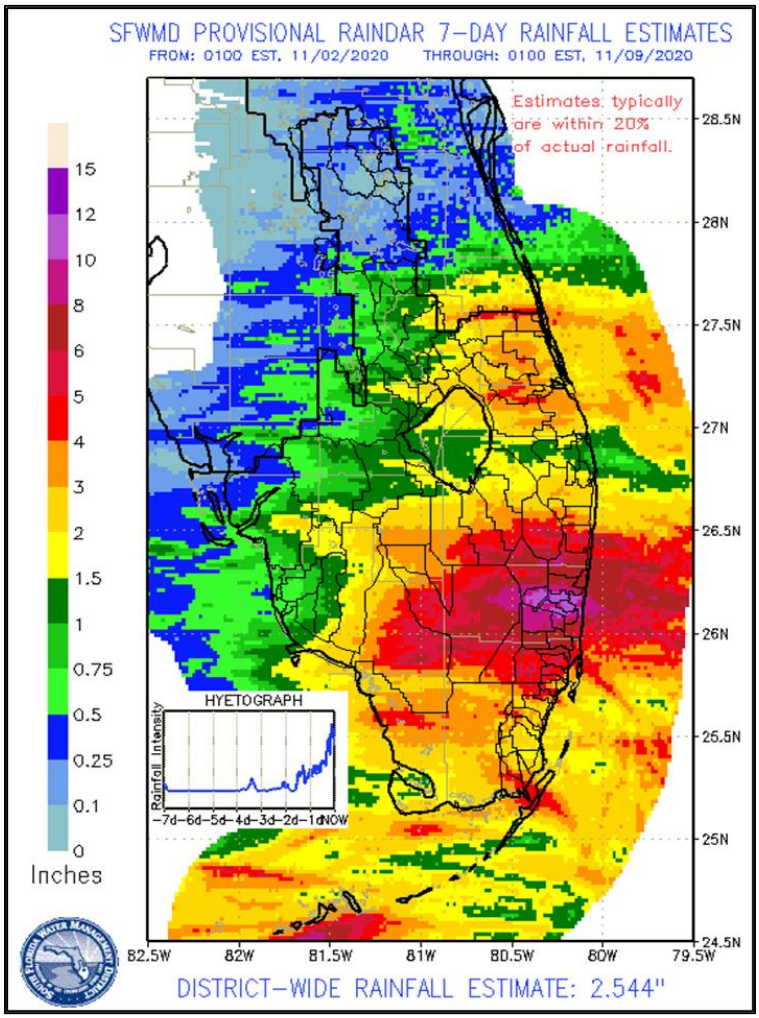


Figure 10. Forecasted Val I-75 surface salinity assuming no pulse release at S79.

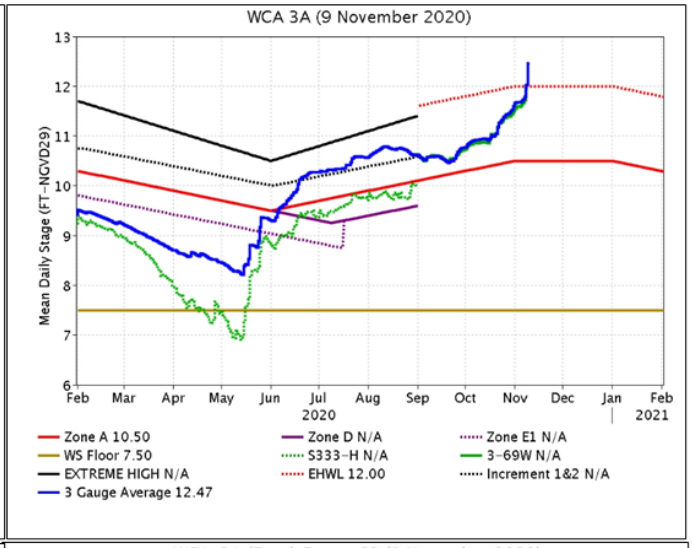
EVERGLADES

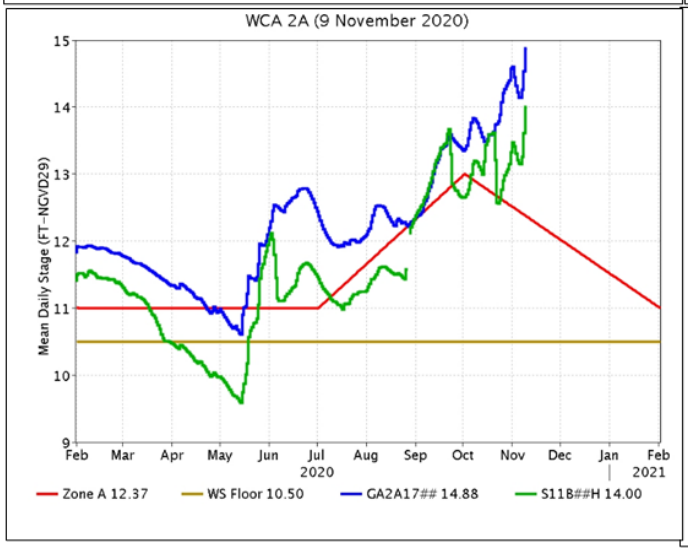
Above average rainfall fell across the Everglades last week, highest in WCA-2B lowest in ENP. At the gauges monitored for this report stages increased 0.42 feet on average. Evaporation was 0.83 inches last week, and the TTFF continues to call for maximum releases from WCA-3A.

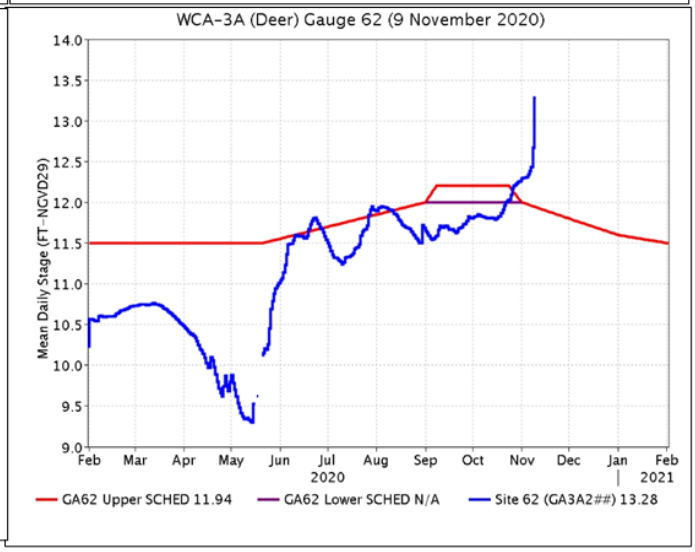
Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	5.02	+0.16
WCA-2A	6.73	+0.20
WCA-2B	10.12	+0.78
WCA-3A	6.32	+0.60
WCA-3B	5.65	+0.39
ENP	3.15	+0.12



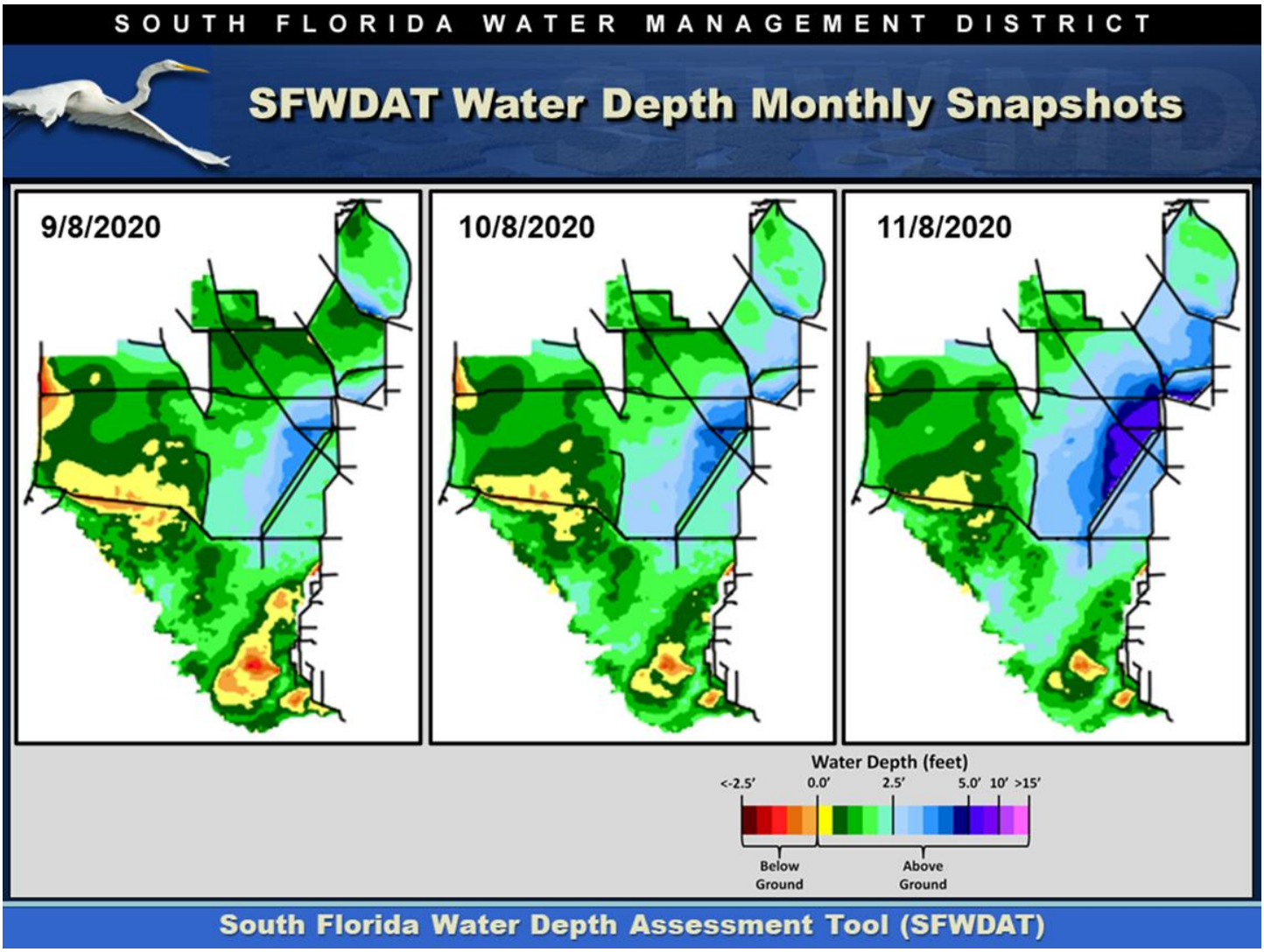
Regulation Schedules: WCA-1: Stage at the 1-8C Gauge is trending upwards, currently 0.16 feet above the stable Zone A1 regulation line. WCA-2A: Stages at Gauge 2-17 returned to climbing quickly away from the regulation line last week and is now 2.51 feet above the falling schedule. WCA-3A: The Three Gauge Average stages climbed quickly up and away from the stable Zone A regulation line last week, currently 1.97 feet above and 0.47 feet above the EHWL. WCA-3A: Stage at gauge 62 (Northwest corner) rose dramatically late last week and is currently 1.34 feet above the falling Upper Schedule.





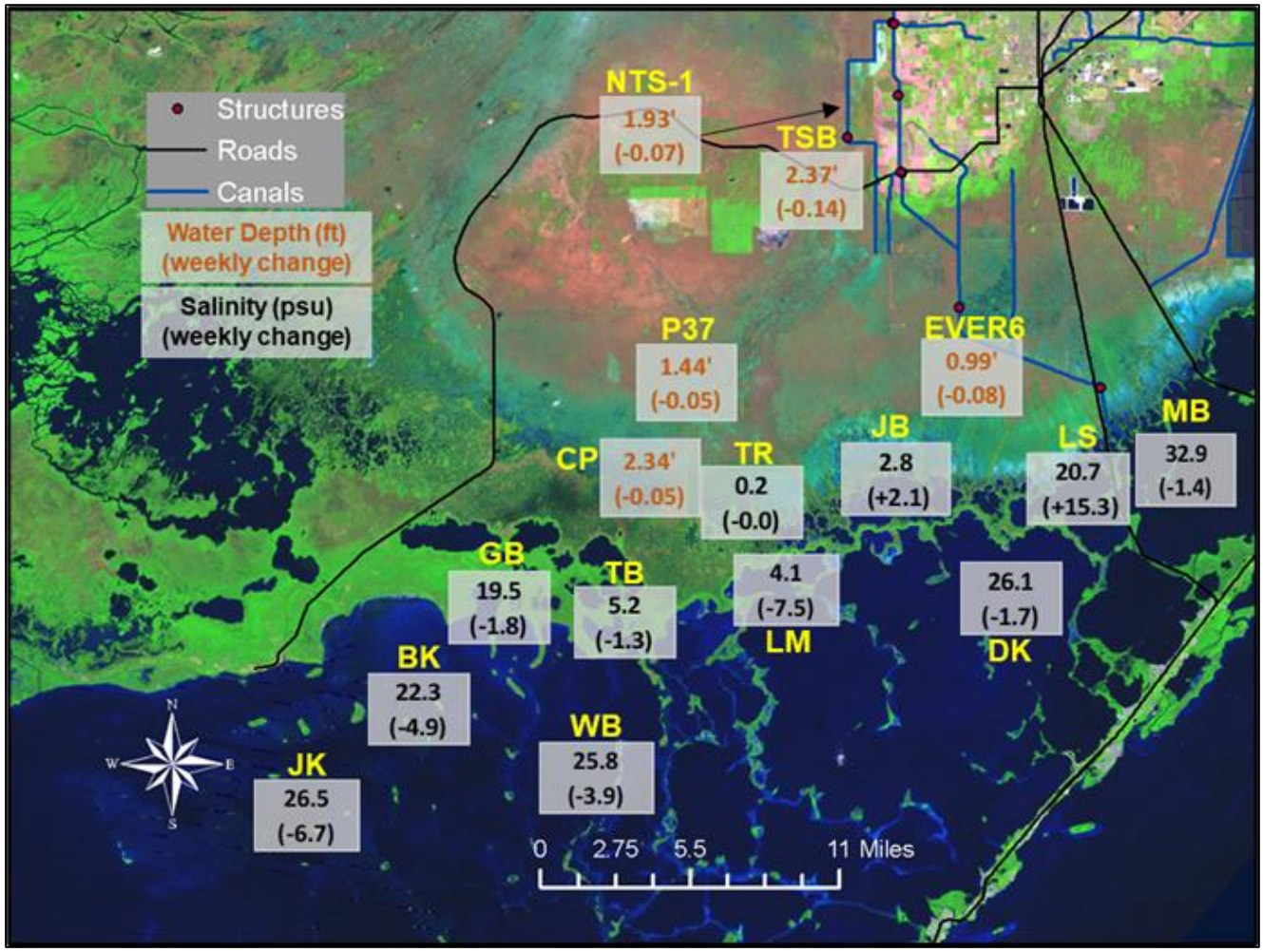


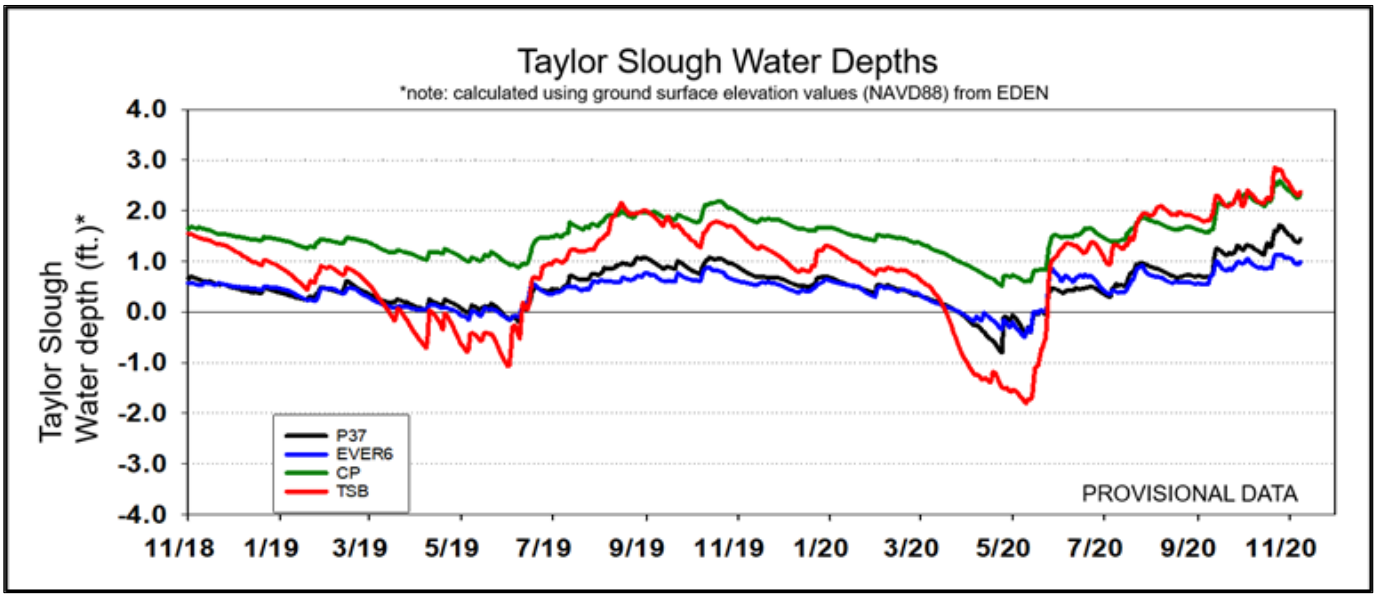
Water Depths: The WDAT tool for spatial interpolation of depth monthly snapshots over the last two months indicate current depths in excess of 5.0 feet in WCA-3A South around the upper reaches of the L-67 canal and southern WCA-2B. Ponding depths (>2.5 feet) are found across all of WCA-2A, the eastern side is much deeper (with that conditions persisting over the last two months). 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 below ground stages in southern BCNP.

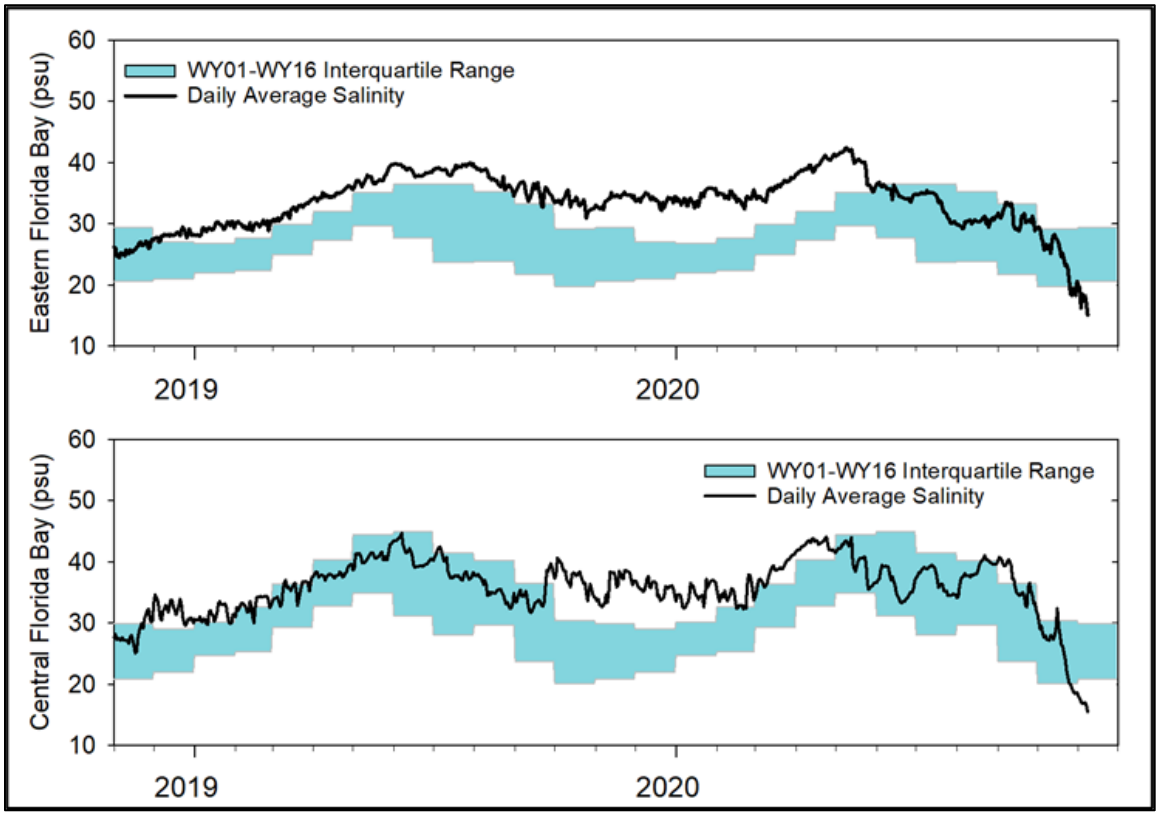


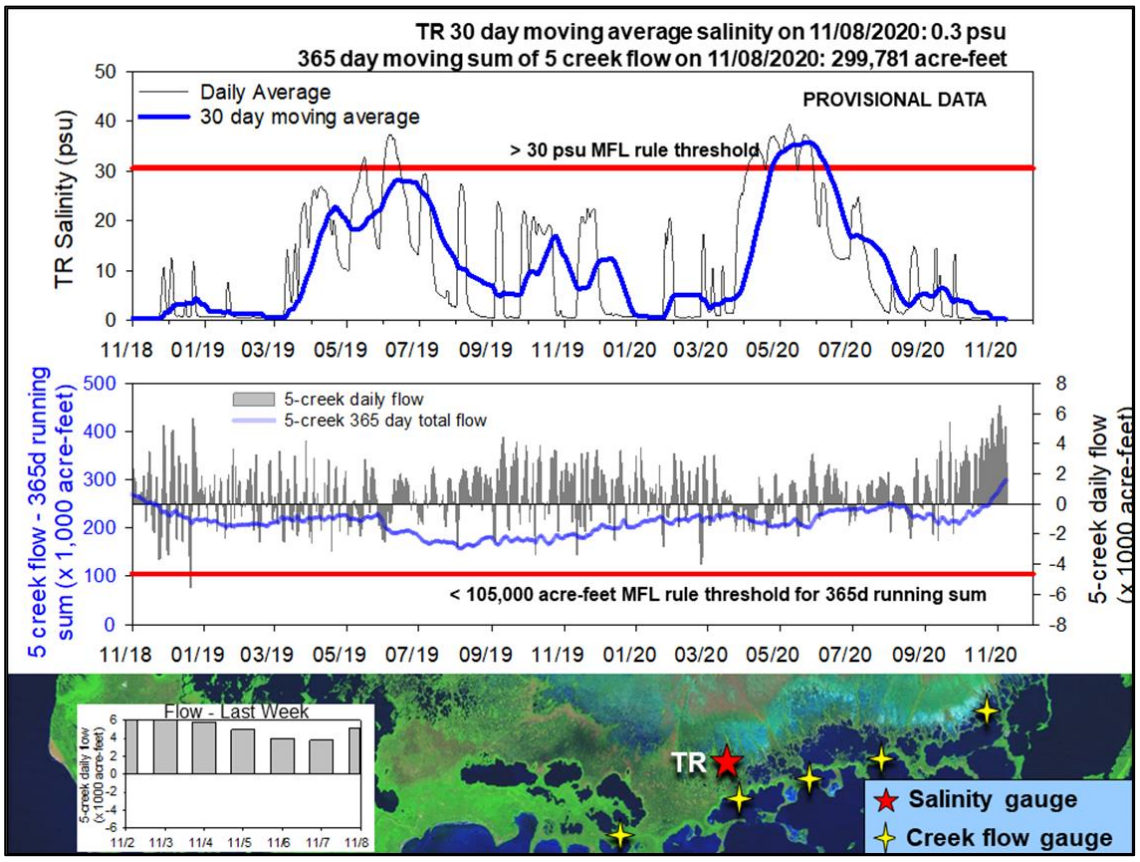
Tree island inundation in WCA-3A, WCA-3B and ENP: 371 Tree Islands of known elevation within WCA-3A, -3B, and Everglades National Park's Shark Slough. Current preliminary estimates using WDAT indicate that 79% or 293 of the tree islands are currently inundated, up from 68% the week prior. Initial islands inundated beginning May 24, 2020, 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 to sensitive islands (remains 16% of islands).

Taylor Slough Water Levels: An average of 3.2 inches of rain fell over Taylor Slough and Florida Bay this past week (does not include Monday's rains), and stages decreased 0.08 feet on average. Impacts of Tropical Storm Eta are not included in these numbers. After decreasing all week, stages were rising on Sunday and are expected to continue rising this week as the impacts of the local heavy rainfall are tallied.


Structures
Roads
Canals
Water Depth (ft)
(weekly change)
Salinity (psu)
(weekly change)
NTS-1
1.93'
(-0.07)
TSB
2.37'
(-0.14)
P37
1.44'
(-0.05)
EVER6
0.99'
(-0.08)
CP
2.34'
(-0.05)
TR
0.2
(-0.0)
JB
2.8
(+2.1)
LS
20.7
(+15.3)
MB
32.9
(-1.4)
GB
19.5
(-1.8)
TB
5.2
(-1.3)
4.1
(-7.5)
LM
26.1
(-1.7)
DK
BK
22.3
(-4.9)
WB
25.8
(-3.9)
JK
26.5
(-6.7)
N
W
E
S
0
2.75
5.5
11 Miles


Taylor Slough Water Depths
*note: calculated using ground surface elevation values (NAVD88) from EDEN
Taylor Slough
Water depth (ft.)*
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
11/18
1/19
3/19
5/19
7/19
9/19
11/19
1/20
3/20
5/20
7/20
9/20
11/20
P37
EVER6
CP
TSB
PROVISIONAL DATA





Florida Bay Salinities: Salinities in Florida Bay averaged a 1.3 psu decrease over the week with individual stations decreasing up to 7.5 psu. Average salinity in Florida Bay is now 7 psu below the historical average. Conditions are expected to continue freshening with this week's rainfall and freshwater deliveries. This is good positioning to start the dry season.

Florida Bay MFL: The salinity at the TR station in the mangrove zone (tracked for the Florida Bay MFL) has continued to be near fresh (less than 0.5 psu) and the 30-day moving average remains at 0.3 psu. Weekly flow from the 5 creeks identified by yellow stars on the map totaled over 36,000 acre-feet (new highest weekly flow for the year) with another full week of positive flows. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) ended at 299,781 acre-feet this week which is 26,000 acre-feet increase from last week. That is higher than the historical median (250,316 acre-feet) and approaching the 75th percentile (313,052 acre-feet). This is a value not seen in the last 2 years. Creek flows are provisional USGS data.

Water Management Recommendations

Conserving water in the WCAs and sending it southward has ecological benefit. Current climatic predictions for low rainfall amounts in the upcoming dry season makes this a particularly important time of year for conserving water.

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.

Depths in excess of 4.0 feet in WCA-2A are negatively impacting the ecology there. Water management that lessens the stress of high water at the southern and eastern would have ecological benefit. 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. Currently, SFWMD Everglades ecologists are recommending a careful conservation of water in WCA-2A until depth conditions return to pre-Tropical Storm Eta impacts.

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. 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, 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. Currently, SFWMD Everglades ecologists are recommending a careful conservation of water in WCA-3A once depth conditions return to pre-Tropical Storm Eta impacts.

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 hypersaljnity 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 10th, 2020 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.16'	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 0.20'	Moderating the recession rate to maintain marsh stage parellel and above the falling regulation schedule.	Protect upstream/downstream habitat and wildlife.
WCA-2B	Stage increased by 0.78'	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 0.63'	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 0.61'	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 0.71'	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 0.44'		
WCA-3B	Stage increased by 0.39'	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 decreased by 0.12'	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 −0.05' to −0.14'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −7.5 to +15.3 psu	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.