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: December 9, 2020

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

High pressure is building over the area behind Monday's cold front bringing chilly temperatures to the District. Dry conditions will persist through Thursday. Breezy east winds are forecast to bring some moisture and light showers east on Friday, and then scattered showers will pop up Saturday and Sunday mainly during the afternoons. After that, another cold front is forecast to move through the District, but there is a fair amount of uncertainty about its exact timing and the amount of rain it will produce. The current quantitative precipitation forecast (QPF) follows the scenario of the front pushing through the District Monday bringing some showers and thunderstorms north Sunday night and then through the remainder of the District during the day Monday. Confidence in the details of the front should improve over the next few days. Total rainfall is forecast to be near the historical average during the first 7-day period (Week 1) and then below the historical average again during the 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 52.7 feet NGVD (0.2 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.4 feet NGVD at S-65A and 26.6 feet NGVD at S-65D. Tuesday morning discharges were 1,530 cfs at S-65, 1,680 cfs at S-65A, 1,480 cfs at S-65D and 2,020 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 6.0 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 0.88 feet. Today's recommendation is to continue increasing flow at S-65/S-65A to 1,800 cfs, then hold to 1,800 cfs until stage in Lakes Kissimmee-Cypress-Hatchineha declines to or below the regulation line.

Lake Okeechobee

Lake Okeechobee stage was 16.06 feet NGVD on December 7, 2020, 0.06 feet lower than last week and the same as a month ago. The Lake is currently in the Low Sub-band. Stage has been above or near the top of the preferred ecological envelope since August 1, 2020 and is currently 0.56 feet above. Recent chlorophyll *a* and toxin results suggest little to no bloom activity on the Lake and satellite imagery suggests cyanobacterial bloom potential is low.

Estuaries

Total inflow to the St. Lucie Estuary averaged more than 1,933 cfs with approximately 1,009 cfs coming from Lake Okeechobee. The seven-day average salinities increased throughout the estuary over the past week. Salinity at the US1 Bridge is in the fair range (5-10) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 5,392 cfs over the past week with approximately 3,443 cfs coming from the Lake. Seven-day average salinities remained almost fresh (0.2 to 0.3) at the

three most upstream sites (S-79, Val I75 and Ft. Myers Yacht Basin) and decreased at Cape Coral, 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 Low Sub-Band of 2008 LORS. Tributary hydrological conditions are wet. 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, 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 95,000 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 1,439,000 ac-feet. Most STA cells are near or at target stage. STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7, and STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to discharge canal plug construction 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 STA-2.

Everglades

WCA-1 is at schedule and WCA-2A and 3A are well above schedule. At the gauges monitored for this report, WCA-1 remains around 0.6 feet, central WCA-2A is 1.2 feet , WCA-3A North remains near 2.0 feet and WCA-3A South remains around 1.8 feet above the mean stage at those locations for this time of year. Tens of thousands of wading birds (birds of all types) were observed foraging along the southern coastal margins and creeks, fewer birds were foraging in Big Cypress but could have been pulled to the coast. Some mixed flocks were noted in northwestern WCA-3A. Taylor Slough stages continued to decrease but levels in the northern slough are still well above average and ecologically beneficial. Salinities increased slightly on average across Florida Bay, but remain below average. Salinity at the TR station in the mangrove zone to the east remained near fresh as discharge rates from the creeks slowed but remained positive for most of the week.

Supporting Information

KISSIMMEE BASIN

Rainfall

The Upper Kissimmee Basin received 0.18 inches of rainfall in the past week and the Lower Basin received 0.51 inches (SFWMD Daily Rainfall Report 12/6/2020).

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: 12/8/2020

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)						
							12/6/20	11/29/20	11/22/20	11/15/20	11/8/20	11/1/20	10/25/20
Lakes Hart and Mary Jane	S-62	67	LKMJ	60.9	R	61.0	**-0.1**	0.0	0.1	0.1	-0.1	0.0	0.0
Lakes Myrtle, Preston, and Joel	S-57	30	S-57	61.9	R	62.0	**-0.1**	0.0	0.1	0.0	-0.1	0.0	0.0
Alligator Chain	S-60	37	ALLI	64.0	R	64.0	**0.0**	0.1	0.1	0.1	-0.1	-0.3	-0.1
Lake Gentry	S-63	75	LKGT	61.4	R	61.5	**-0.1**	0.1	0.1	0.0	0.0	-0.1	-0.1
East Lake Toho	S-59	160	TOHOE	58.0	R	58.0	**0.0**	0.0	0.0	0.1	0.0	-0.1	0.0
Lake Toho	S-61	329	TOHOW, S-61	55.0	R	55.0	**0.0**	0.0	0.0	0.0	-0.1	-0.2	-0.1
Lakes Kissimmee, Cypress, and Hatchineha	S-65	1,083	KUB011, LKIS5B	52.7	R	52.5	**0.2**	0.3	0.4	0.4	0.0	-0.1	0.1

[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: **12/8/2020**

Metric	Location	1-Day Average	Average for the Preceeding 7-Days[1]								
		12/6/2020	12/6/20	11/29/20	11/22/20	11/15/20	11/8/20	11/1/20	10/25/20	10/18/20	10/11/20
Discharge (cfs)	S-65	1,226	**1,083**	842	784	385	187	209	180	678	1,265
Discharge (cfs)	S-65A[2]	1,393	**1,275**	1,108	1,095	724	361	330	346	861	1,916
Discharge (cfs)	S-65D[2]	1,458	**1,497**	1,541	1,685	1,590	797	1,122	1,714	3,267	4,848
Headwater Stage (feet NGVD)	S-65D[2]	26.56	**26.82**	26.99	26.98	27.03	26.94	27.35	27.62	27.66	27.68
Discharge (cfs)	S-65E[2]	1,471	**1,545**	1,657	1,835	1,904	895	1,283	1,935	3,501	5,287
Discharge (cfs)	S-67	0	**0**	0	0	0	0	0	0	0	0
DO (mg/L)[3]	Phases I & II/III river channel	6.4	**6.0**	5.3	4.7	5.2	5.6	3.8	3.0	1.5	1.2
Mean depth (feet)[4]	Phase I floodplain	0.88	**0.90**	0.93	0.94	0.75	0.52	0.90	0.93	0.94	0.75

[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.

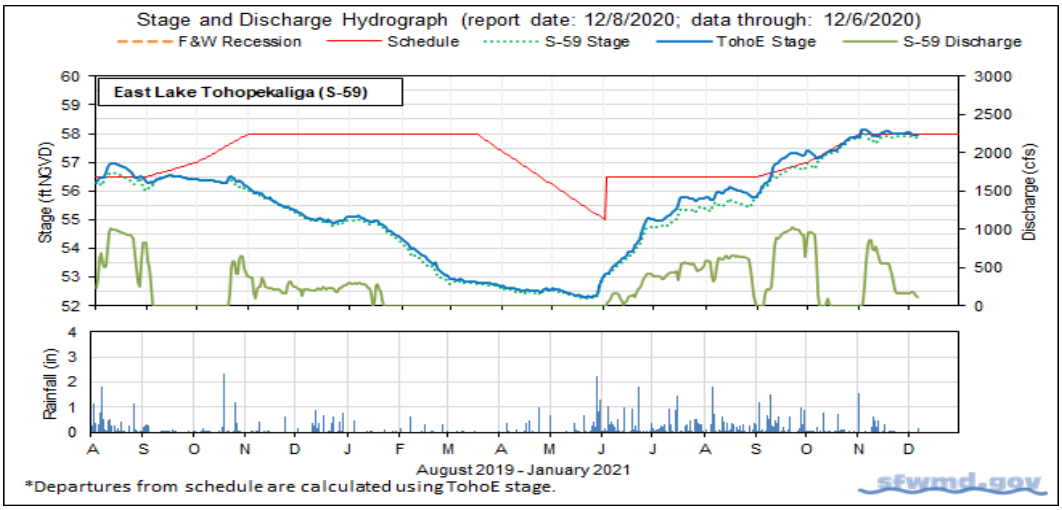


Figure 1. East Lake Toho regulation schedule, stage, discharge and rainfall.

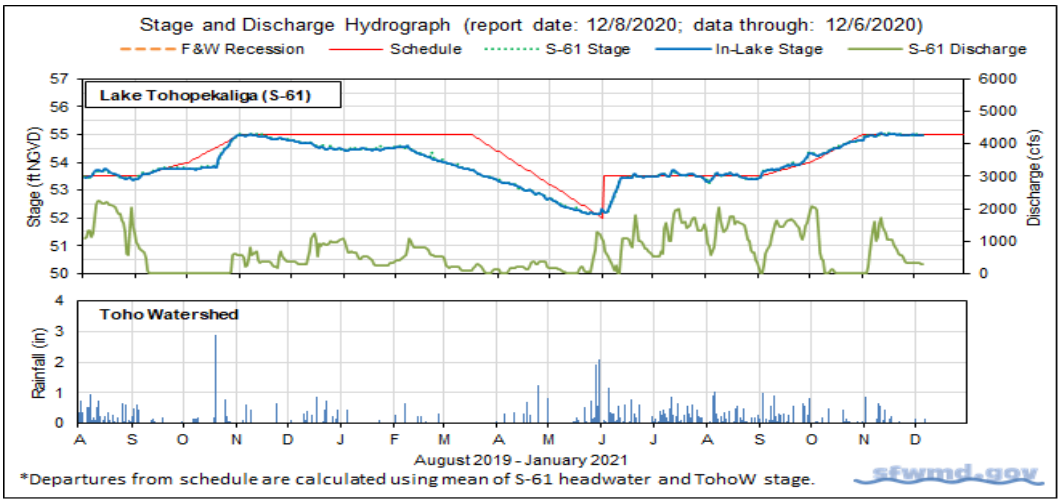


Figure 2. Lake Toho regulation schedule, stage, discharge and rainfall.

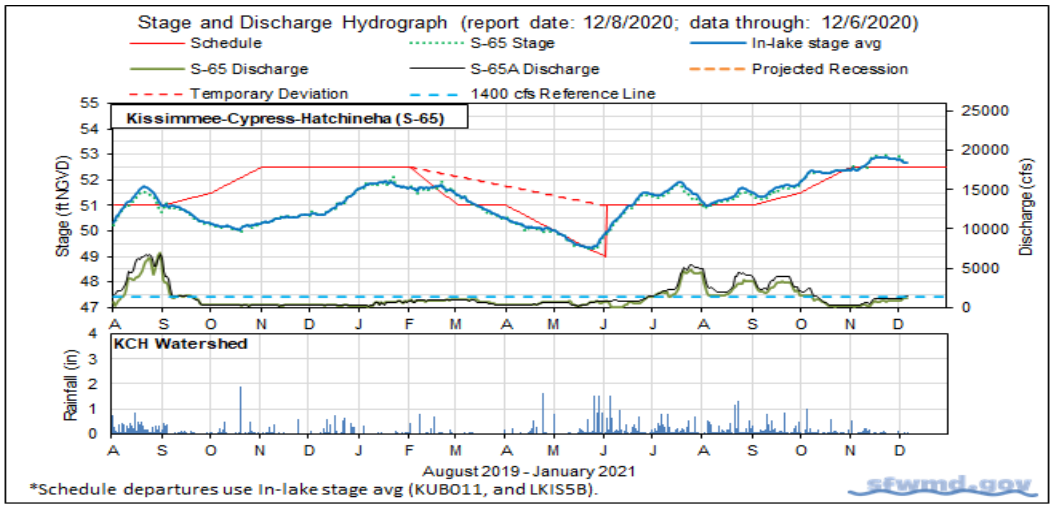


Figure 3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharged and rainfall.

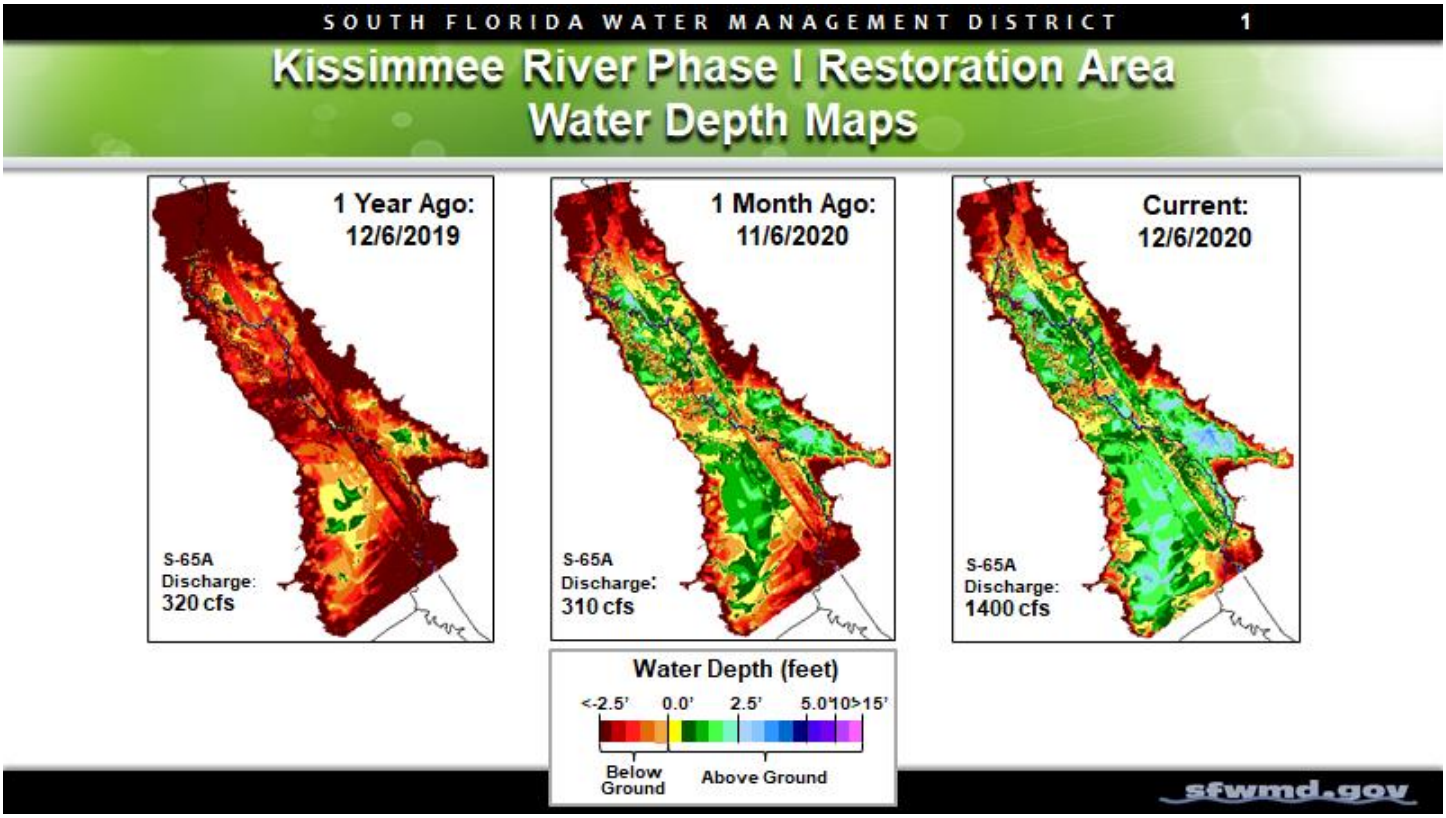


Figure 4. Phase I area floodplain water depths (from left to right) one year ago, one month ago and current. Color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

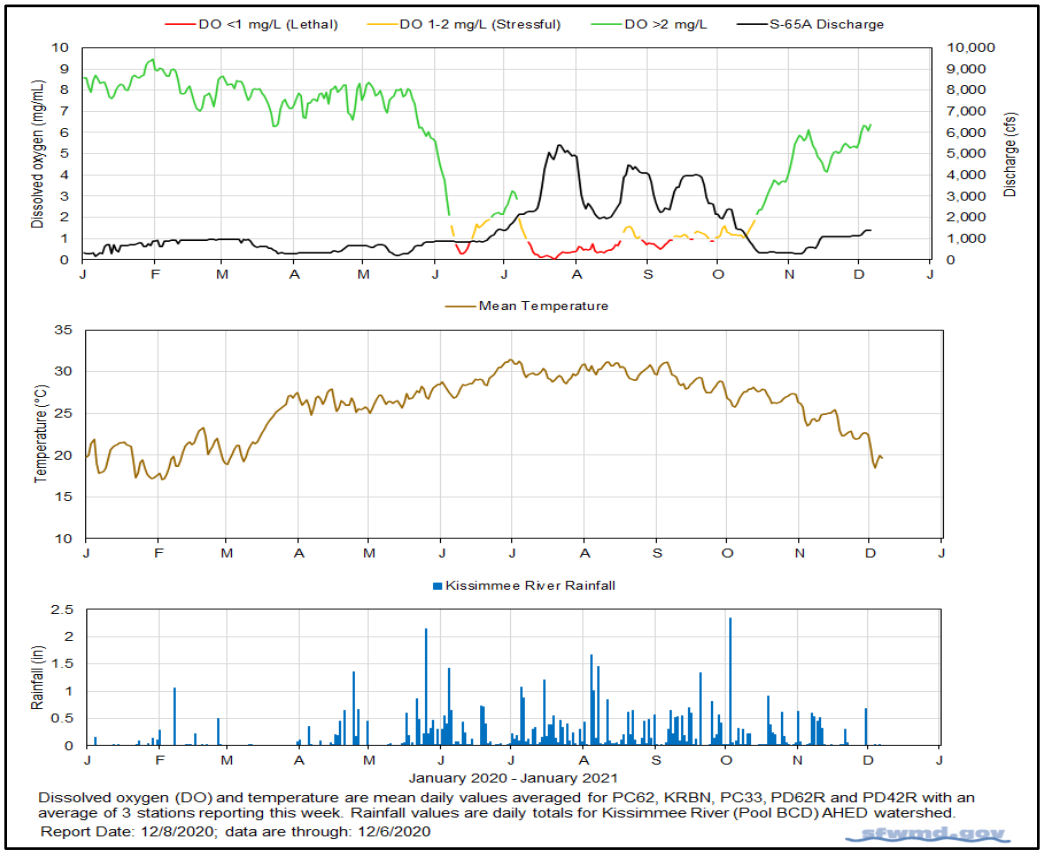


Figure 5. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches).

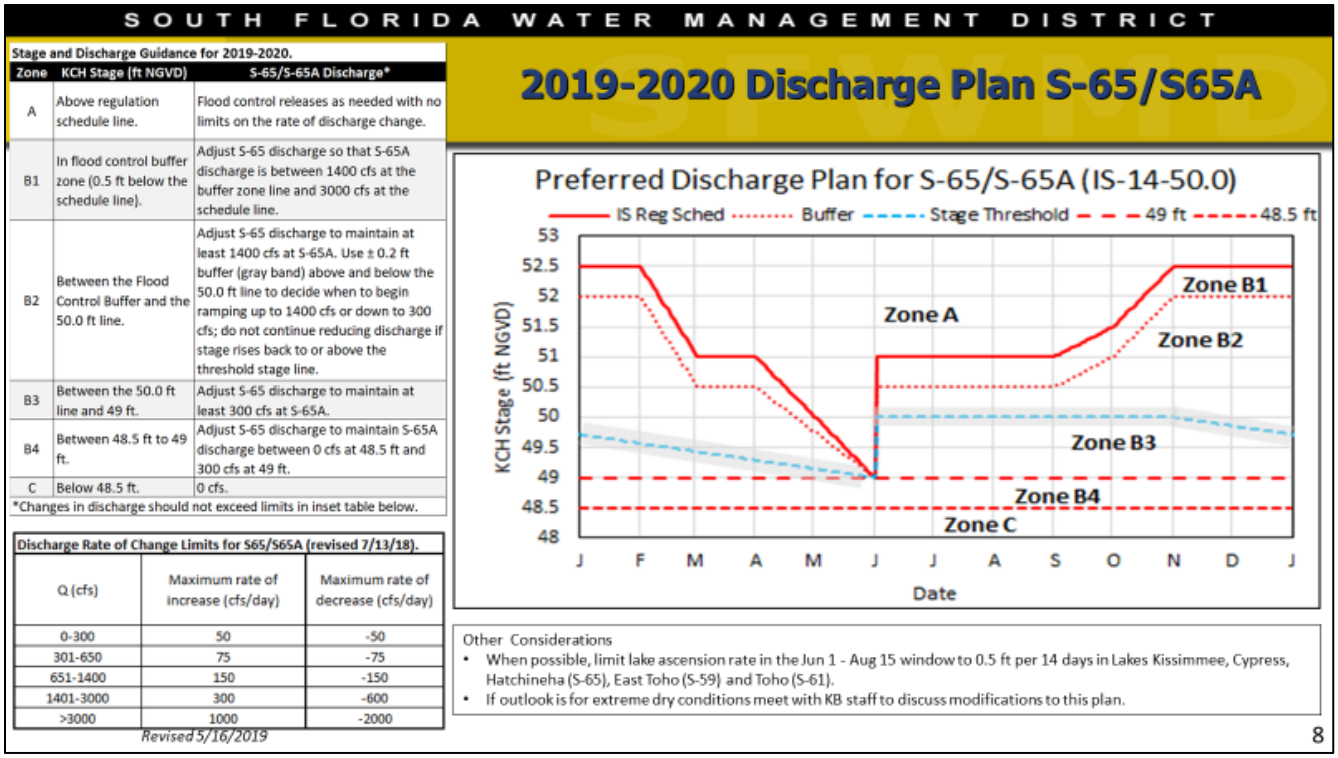


Figure 6. The 2019-2020 Discharge Plan for S-65/S-65A.

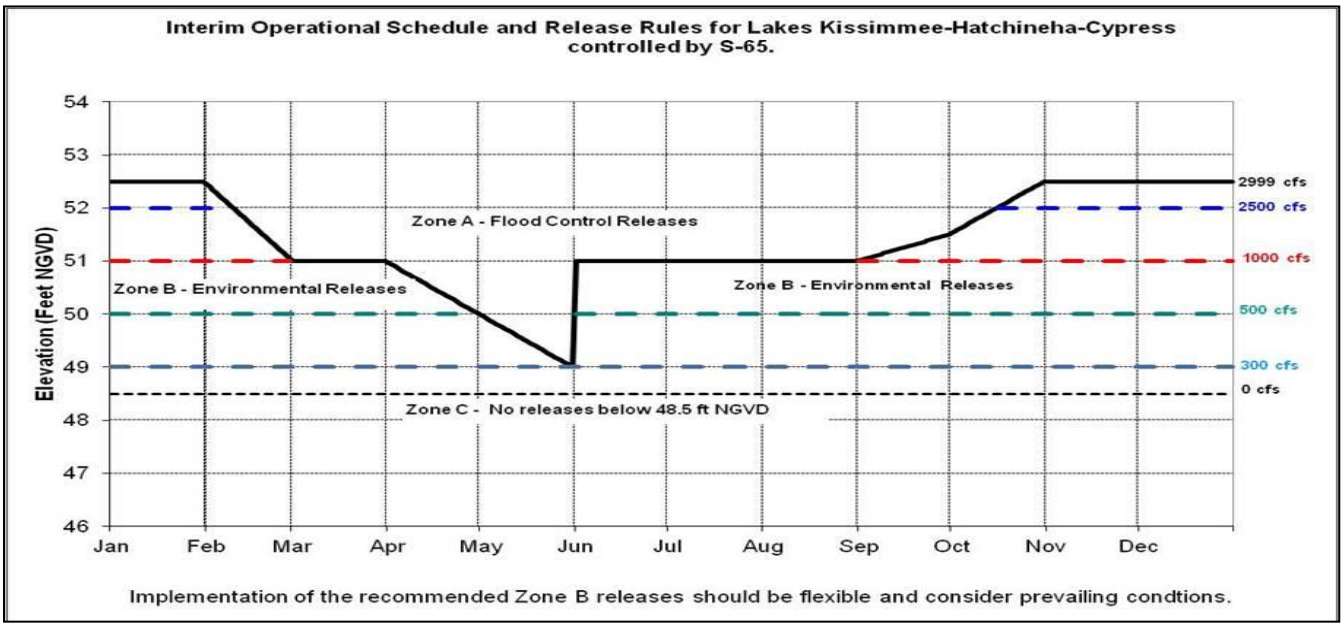


Figure 7. Interim operations schedule for S-65 (solid black line). The discharge schedule shown to the right has not been used in recent years.

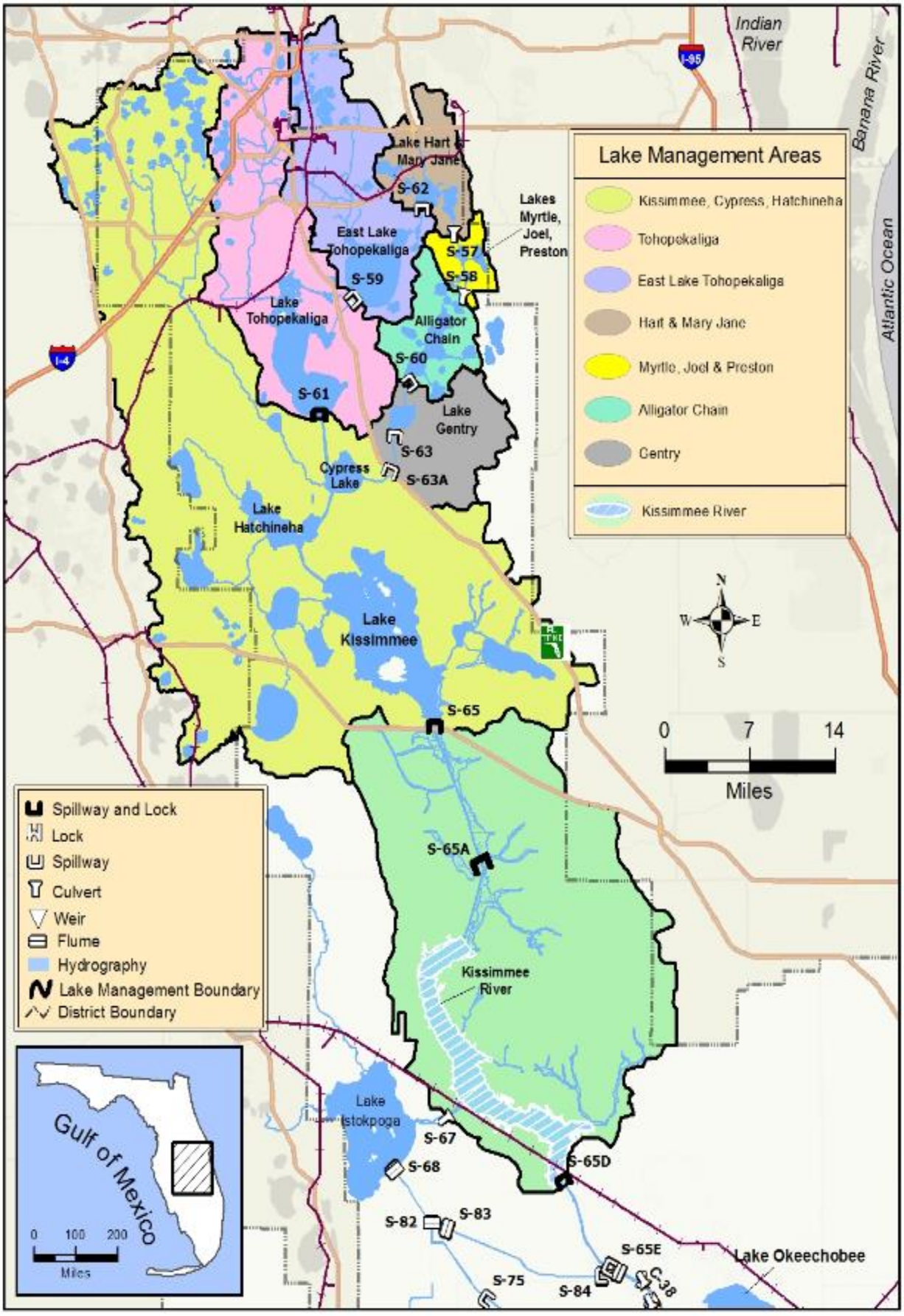


Figure 8. The Kissimmee Basin.

LAKE OKEECHOBEE

Lake Okeechobee stage is 16.06 feet NGVD, the same level as a month ago, and 3.13 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 0.56 feet above. Lake stage reached a low of 10.99 feet NGVD on May 17 and a high of 16.45 feet NGVD on November 12 (post Tropical Storm Eta), a difference of 5.5 feet (Figure 3). Lake stage has declined since mid-November and is currently in the Low sub-band. According to RAINDAR, approximately 1.40 inches of rain fell on the Lake last week. The Lower Kissimmee Basin and the southern tip of the watershed received similar amounts of rain, the Upper Kissimmee Basin received less than 0.5 inches, and the south-central areas received up to 4.0 inches of rain (Figure 4).

Average daily inflows (excluding rainfall) were higher than the previous week, going from 2,946 cubic feet per second (cfs) to 3,088 cfs. Outflows (excluding evapotranspiration) decreased from 5,616 cfs to 4,743 cfs. Over 75 percent of the inflows came from the Kissimmee River (1,562 cfs through S-65E & S-65EX1) and the C-41a canal (836 cfs through S-84 & S-84X) combined. Releases to the west via S-77 and east via S-308 both decreased from last week and contributed to 98 percent of the outflow. Average inflows and outflows through water control structures surrounding the Lake for the previous two weeks (cfs) are shown in Table 1. The resultant Lake elevation change (in) due to each structure's flow for the past week is also shown in Table 1. 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.

Water quality sampling is now on the non-bloom season schedule (November – April), occurring once monthly at approximately 30 stations for chlorophyll *a,* and at 9 stations for taxonomic identification and toxin analyses. The November sampling occurred on the 17th and 18th but 6 chlorophyll *a* results are still pending and six sites were not sampled due to unsafe conditions (Figure 6). Of the nineteen sites completed, all had chlorophyll *a* levels below the bloom threshold of 40 μg/L, the highest of which was 36.0 μg/L. All toxin samples have been completed and only three sites had toxin levels above detection, but still well below the EPA recreational waters recommendation of 8 μg/L.

The most recent satellite image (December 5, 2020) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed low bloom potential on the Lake (Figure 7).

Water Management Summary

Lake Okeechobee stage was 16.06 feet NGVD on December 7, 2020, 0.06 feet lower than last week and the same as a month ago. The Lake is currently in the Low Sub-band. Stage has been above or near the top of the preferred ecological envelope since August 1, 2020 and is currently 0.56 feet above. Recent chlorophyll *a* and toxin results suggest little to no bloom activity on the Lake and satellite imagery suggests cyanobacterial bloom potential is low.

Table 1. Average daily inflows and outflows for the most recent two weeks and 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	1615	1562	0.6
S-71 & S-72	237	238	0.1
S-84 & S-84X	495	836	0.3
Fisheating Creek	260	131	0.0
S-154	56	46	0.0
S-191	58	0	0.0
S-133 P	65	57	0.0
S-127 P	23	18	0.0
S-129 P	12	10	0.0
S-131 P	5	4	0.0
S-135 P	114	142	0.1
S-2 P	0	0	0.0
S-3 P	0	0	0.0
S-4 P	0	44	0.0
L-8 Backflow	6	1	0.0
Rainfall	510	3760	1.4
Total	**3456**	**6848**	**2.6**

OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-77	3968	3636	1.4
S-308	1615	1009	0.4
S-351	0	68	0.0
S-352	33	16	0.0
S-354	0	14	0.0
L-8 Outflow			
ET	1514	1395	0.5
Total	**7130**	**6138**	**2.3**

Provisional Data

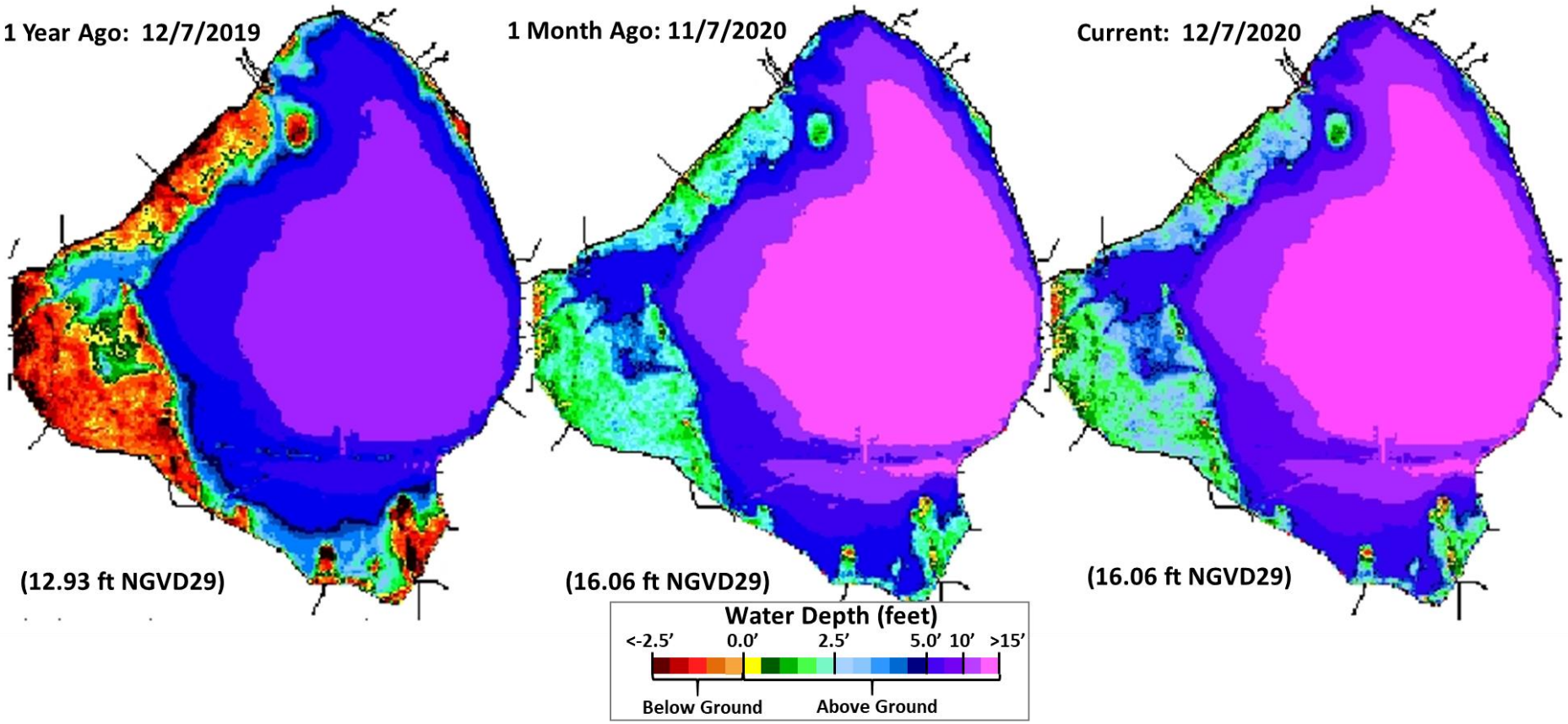


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

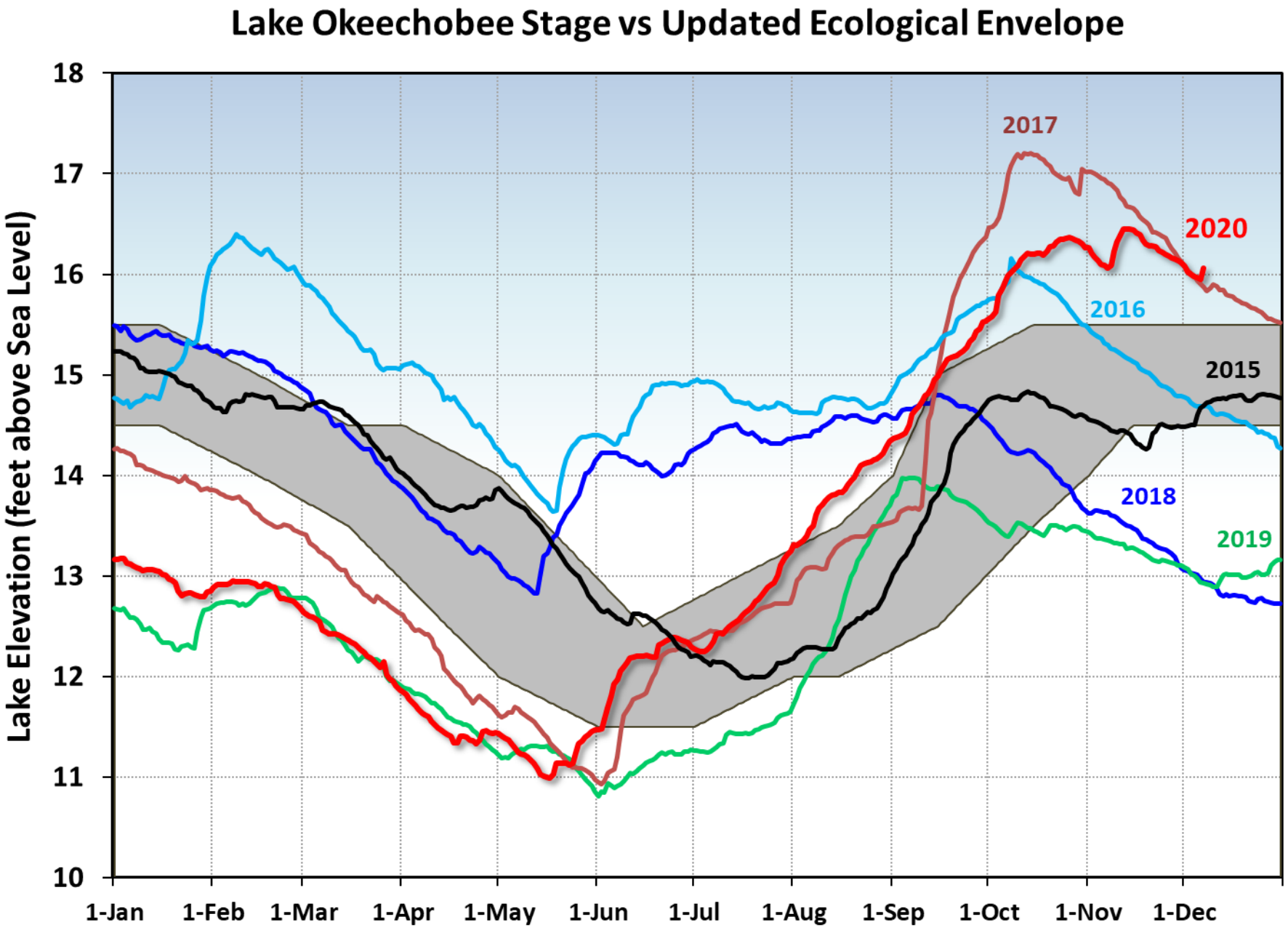


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated Ecological Envelope.

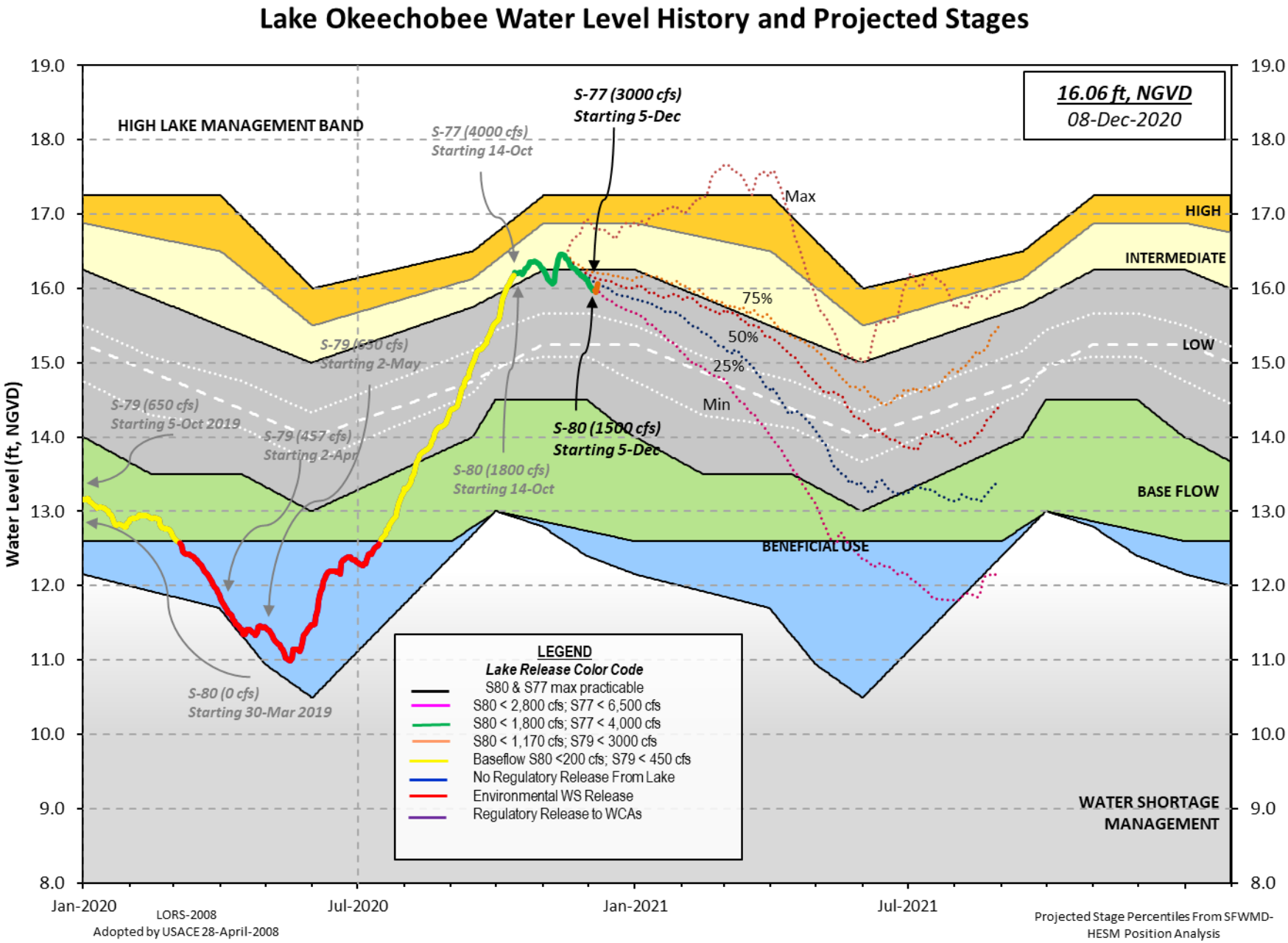


Figure 3. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

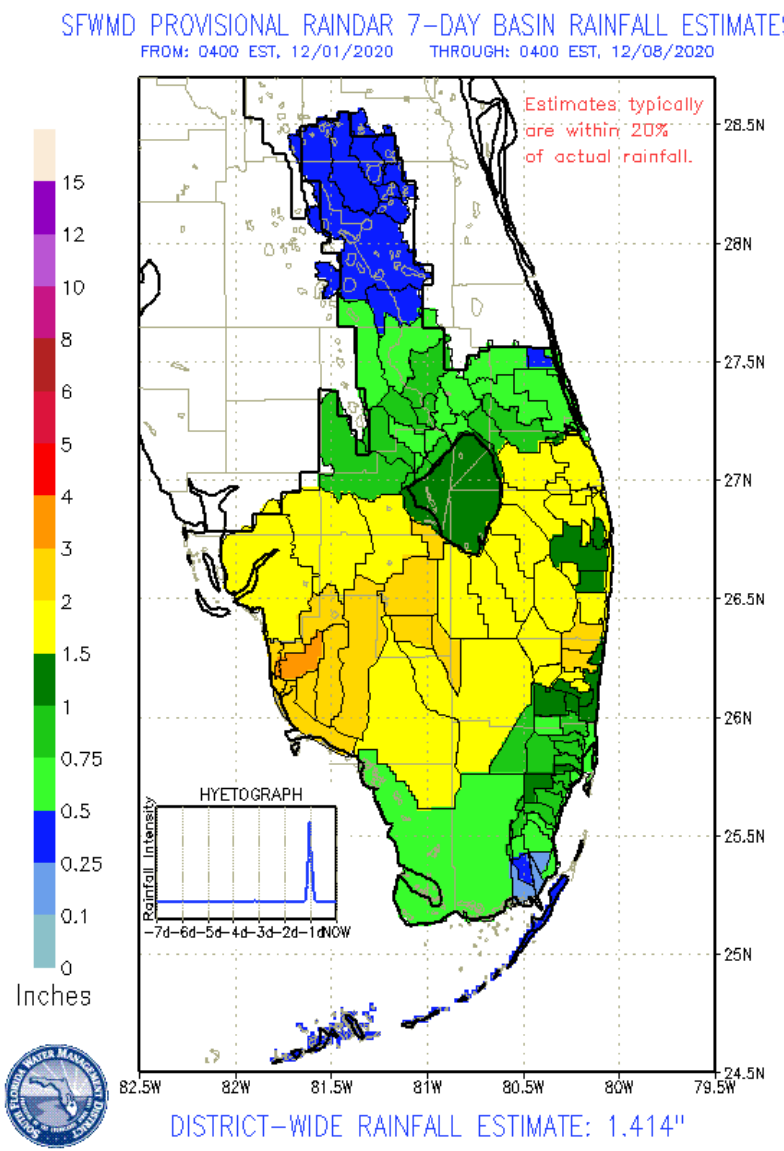


Figure 4. 7-Day rainfall estimates by RAINDAR.

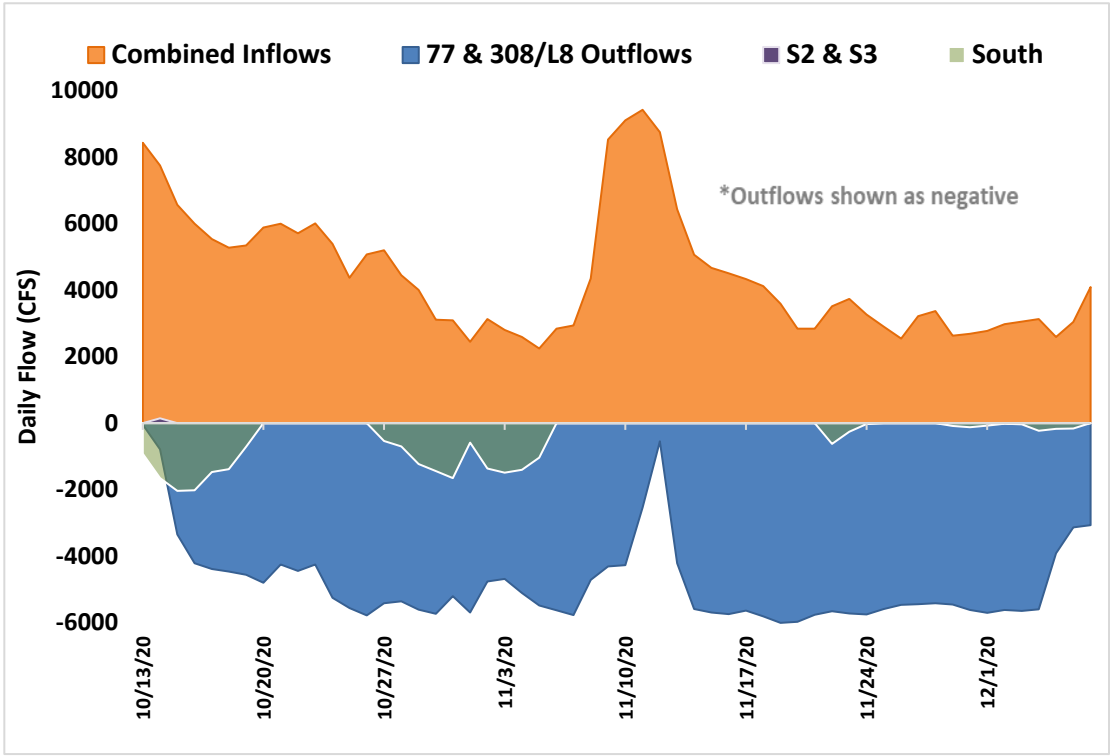


Figure 5. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive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

Collection Date: November 17-18, 2020

Station	CHL*a* (ug/L)	TOXIN (ug/L)	TAXA
FEBIN (11/2)	14.8		
FEBOUT (11/2)	**36.0**		
KISSR0.0	9.2	BDL	mixed
L005	18.3	**0.5**	*Microcys*
LZ2	18.0	BDL	*Microcys*
KBARSE	9.5		
RITTAE2	P	BDL	mixed
PELBAY3	P		
POLE3S	P		
LZ25A	P		
PALMOUT	-		NS
PALMOUT1	-		
PALMOUT2	-		
PALMOUT3	-		
POLESOUT	**35.9**	**0.5**	*Microcys*
POLESOUT1	**21.5**		
POLESOUT2	14.1		
POLESOUT3	14.4		
EASTSHORE	4.6		
NES135	6.9		
NES191	2.8		

Station	CHL*a* (ug/L)	TOXIN (ug/L)	TAXA
L001	9.5		
L004	6.0		
L006	P		
L007	P		
L008	9.6		
LZ30	P	BDL	*Microcys*
LZ40	-		
CLV10A	-		NS
NCENTER	11.3		
Sampled 11/16			
S308C	3.3	**1.0**	*Microcys*
S77	3.9	BDL	*Microcys*

- 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

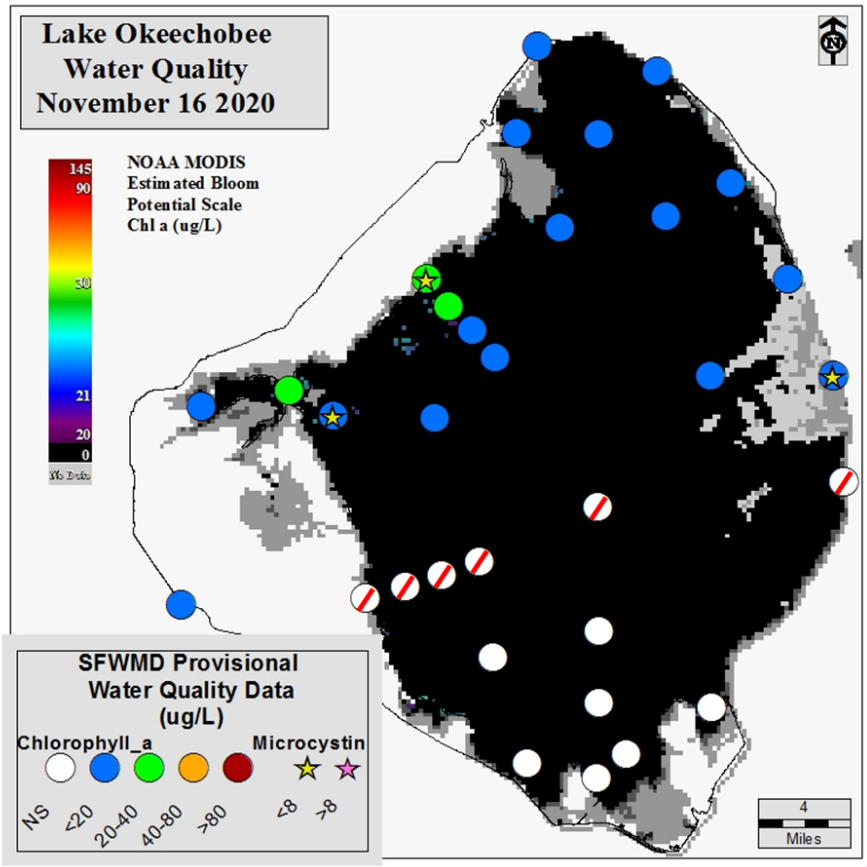


Figure 6. Provisional results from the expanded monitoring sampling trips on November 17 - 18, 2020. Sites on map with a red slash (*/*) were not sampled due to unsafe conditions.

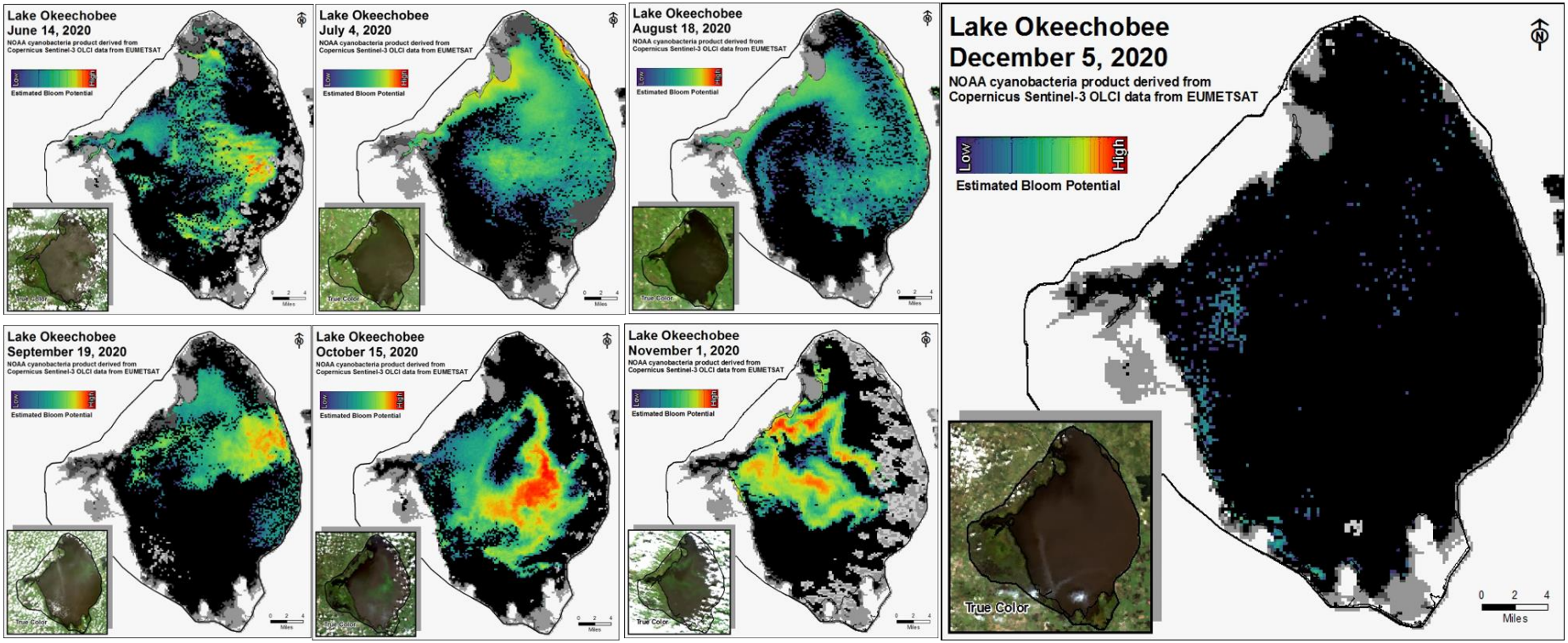


Figure 7. Cyanobacteria bloom potential based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged more than 1,933 cfs (Figures 1 and 2) and last month inflow averaged more than 4,197 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	234
S-80	1309
S-308	1009
S-49 on C-24	152
S-97 on C-23	243
Gordy Rd. structure on Ten Mile Creek	Not reporting

Over the past week, salinity increased 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 6.0. Salinity conditions in the middle estuary are estimated to be within the fair 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)	**1.7** (0.3)	**2.8** (0.4)	NA[1]
US1 Bridge	**4.2** (1.8)	**7.9** (4.0)	10.0-26.0
A1A Bridge	**11.3** (7.8)	**21.4** (18.0)	NA[1]

[1]Envelope not applicable

Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged approximately 5,392 cfs (Figures 5 and 6) and last month inflow averaged about 7,183 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	3,636
S-78	3,571
S-79	4,933
Tidal Basin Inflow	459

Over the past week in the estuary, salinity remained the same to Ft. Myers Yacht Basin 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	**1.6** (2.1)	**2.5** (3.0)	10.0-30.0
Shell Point	**14.2** (16.0)	**17.1** (18.7)	10.0-30.0
Sanibel	**23.7** (26.2)	**25.5** (27.9)	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 250 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	250	0.3	0.3
B	300	250	0.3	0.3
C	450	250	0.3	0.3
D	650	250	0.3	0.3
E	800	250	0.3	0.3

Red tide

The Florida Fish and Wildlife Research Institute reported on December 4, 2020, that *Karenia brevis,* the Florida red tide dinoflagellate, was observed in very low to medium concentrations in five samples collected from Lee County (no samples were analyzed this week from St. Lucie, Martin, Palm Beach, Broward, or Miami-Dade counties).

Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are wet. 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.

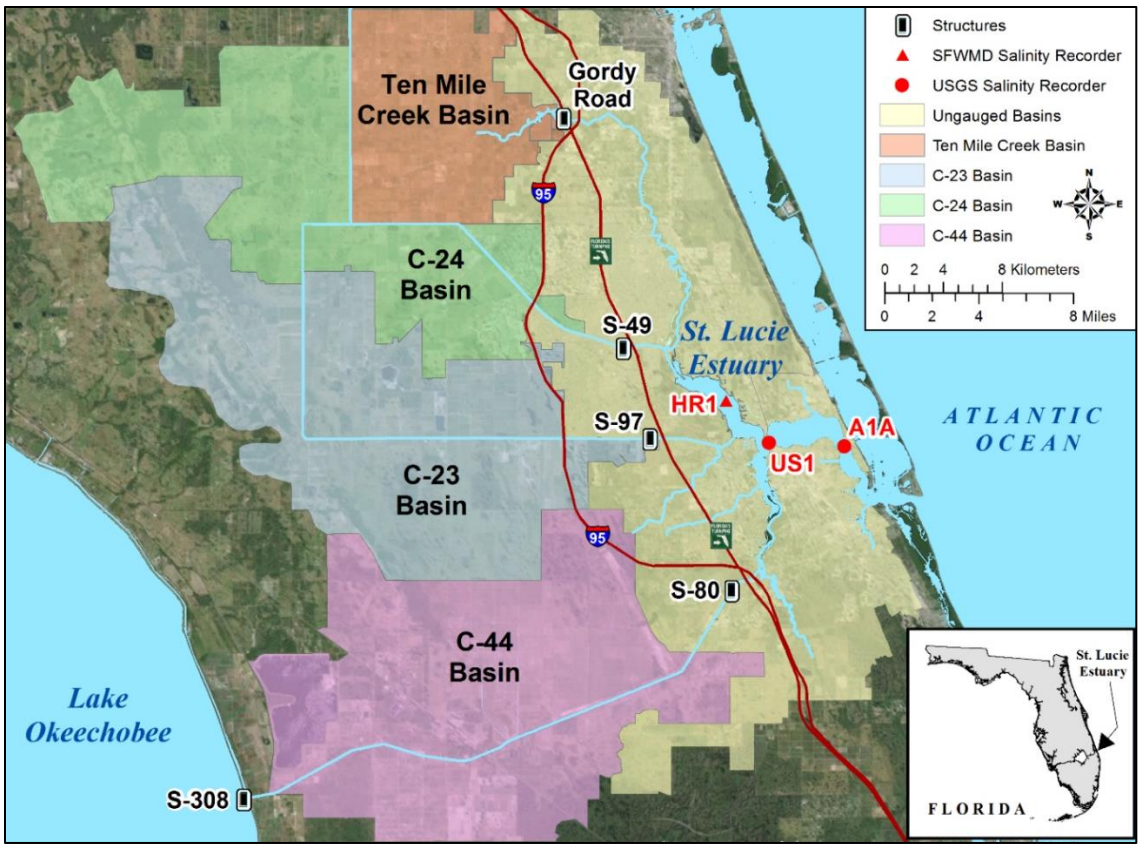


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

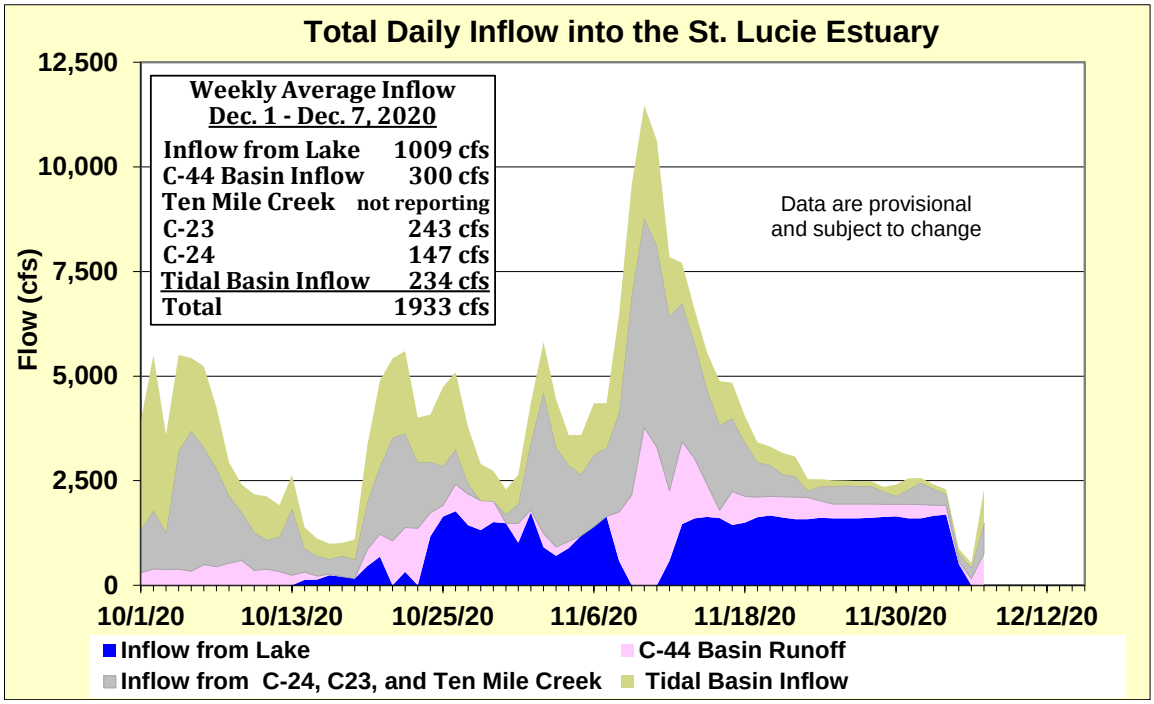


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin into the St. Lucie Estuary.

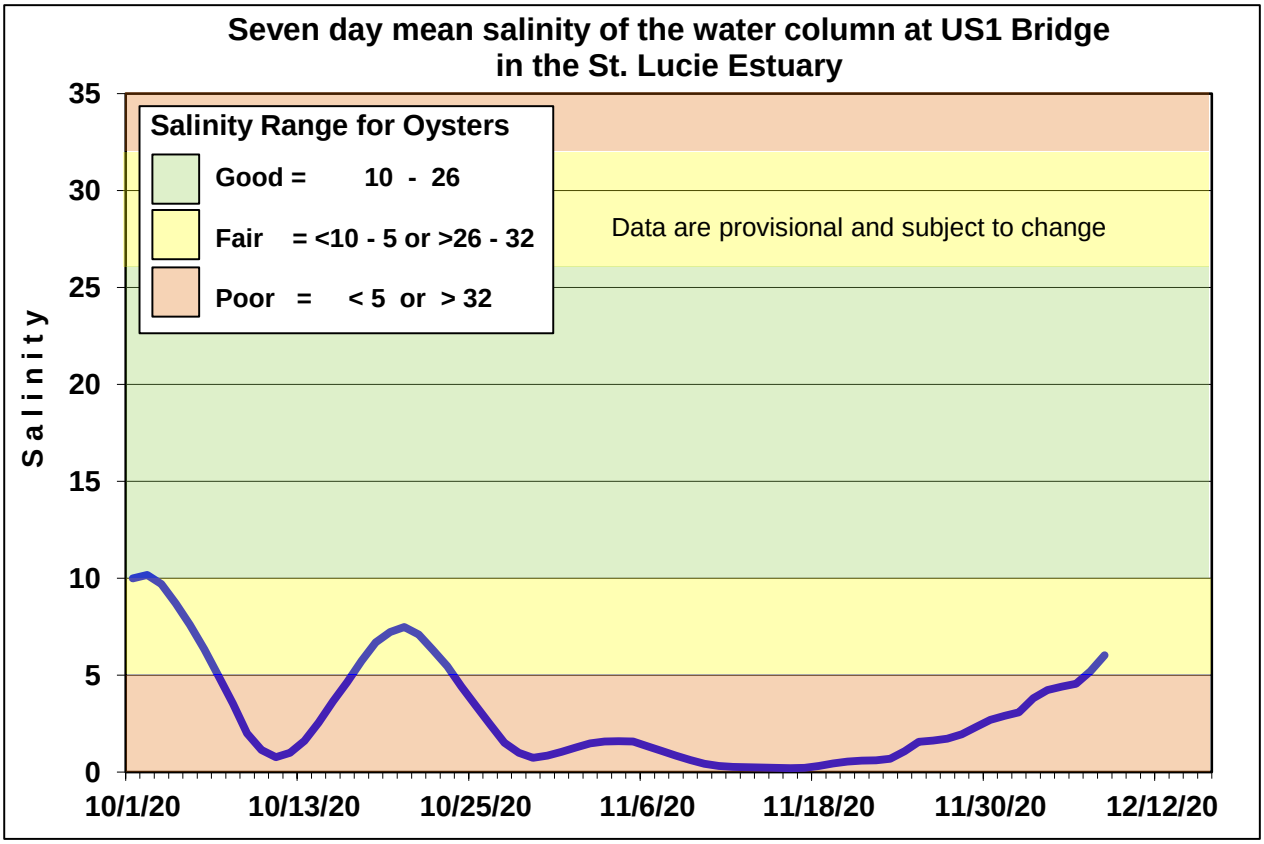


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

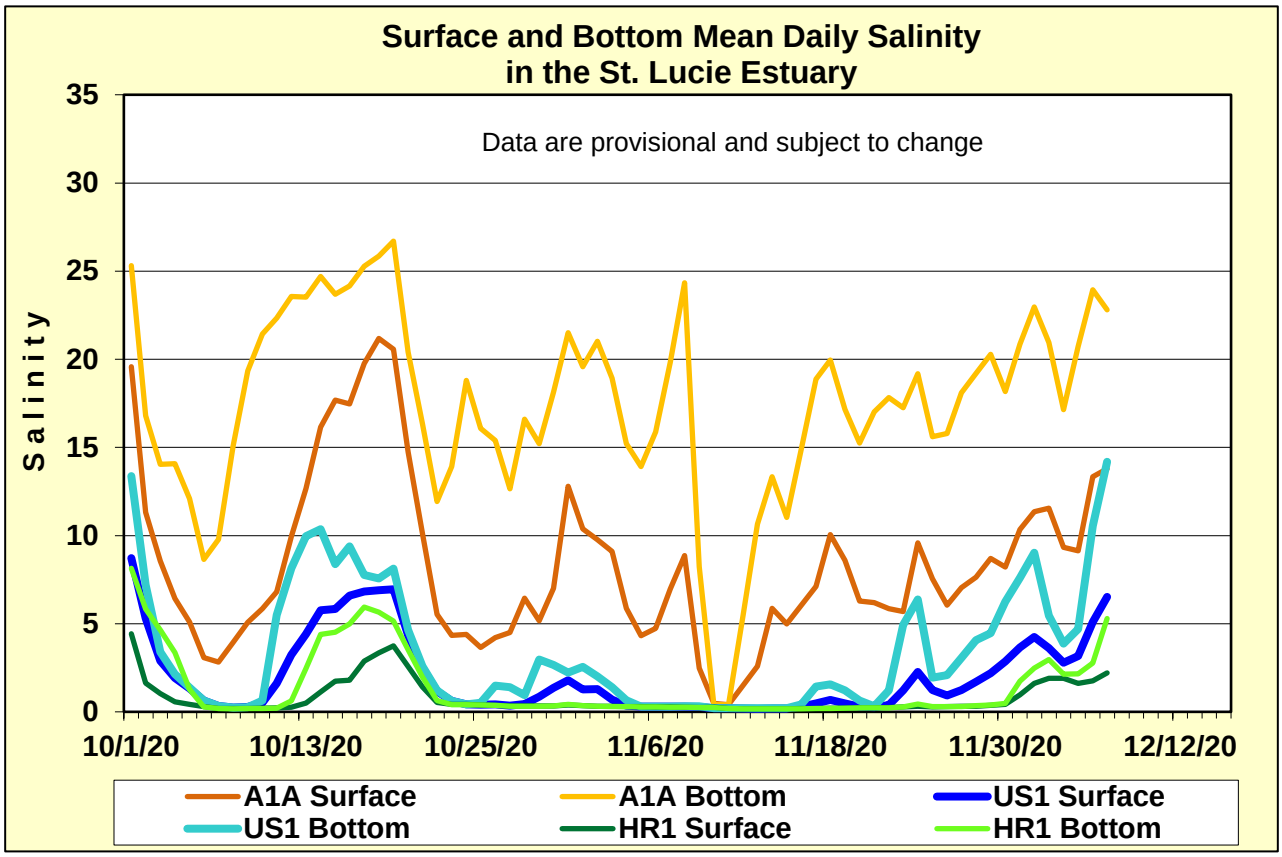


Figure 4. Daily mean salinity at the A1A, US1, and HR1 stations.

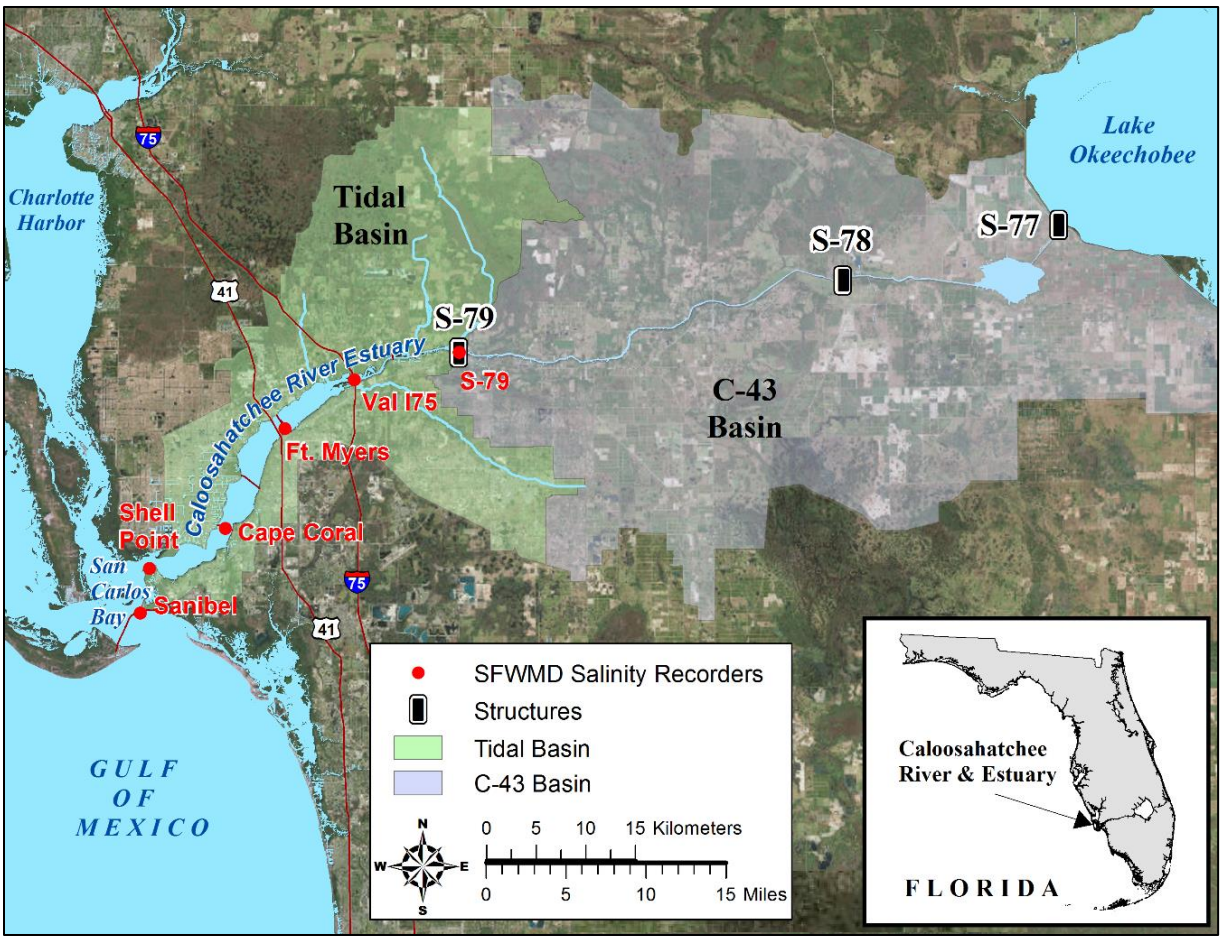


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

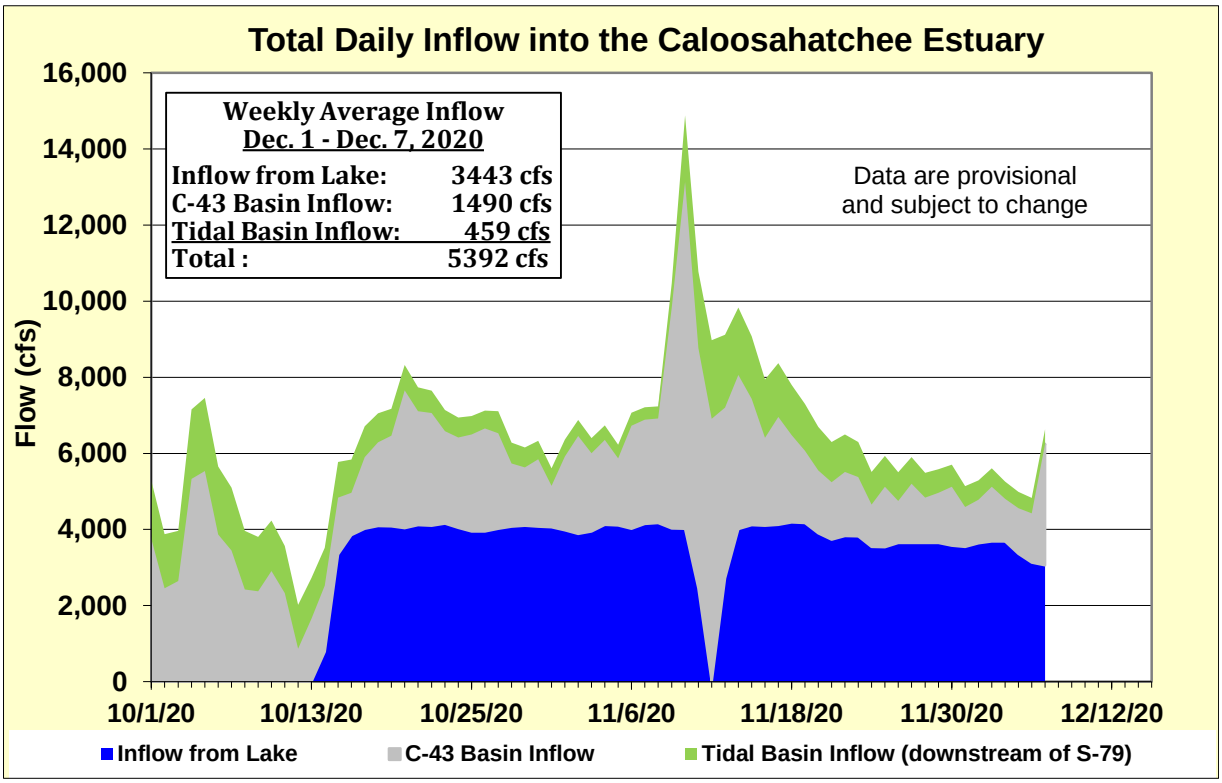


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin

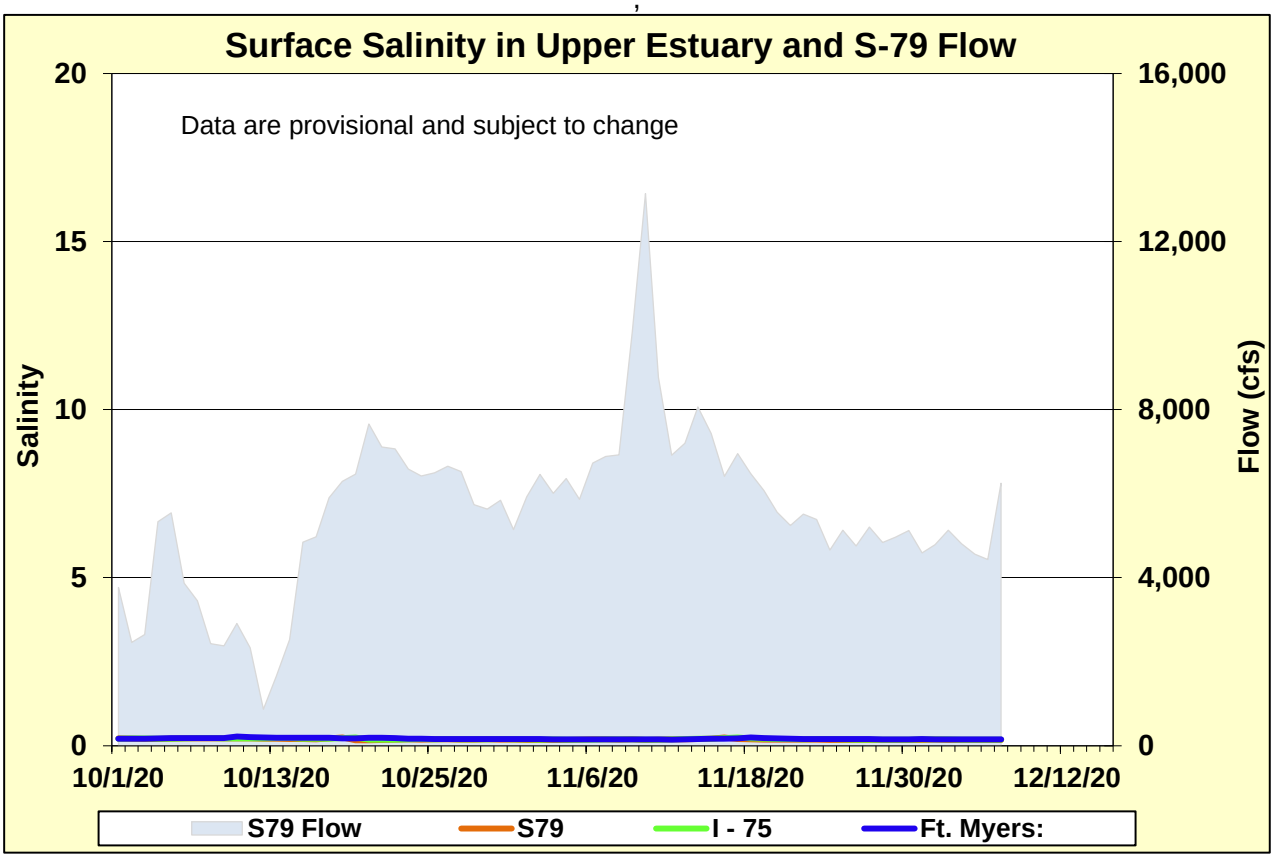


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

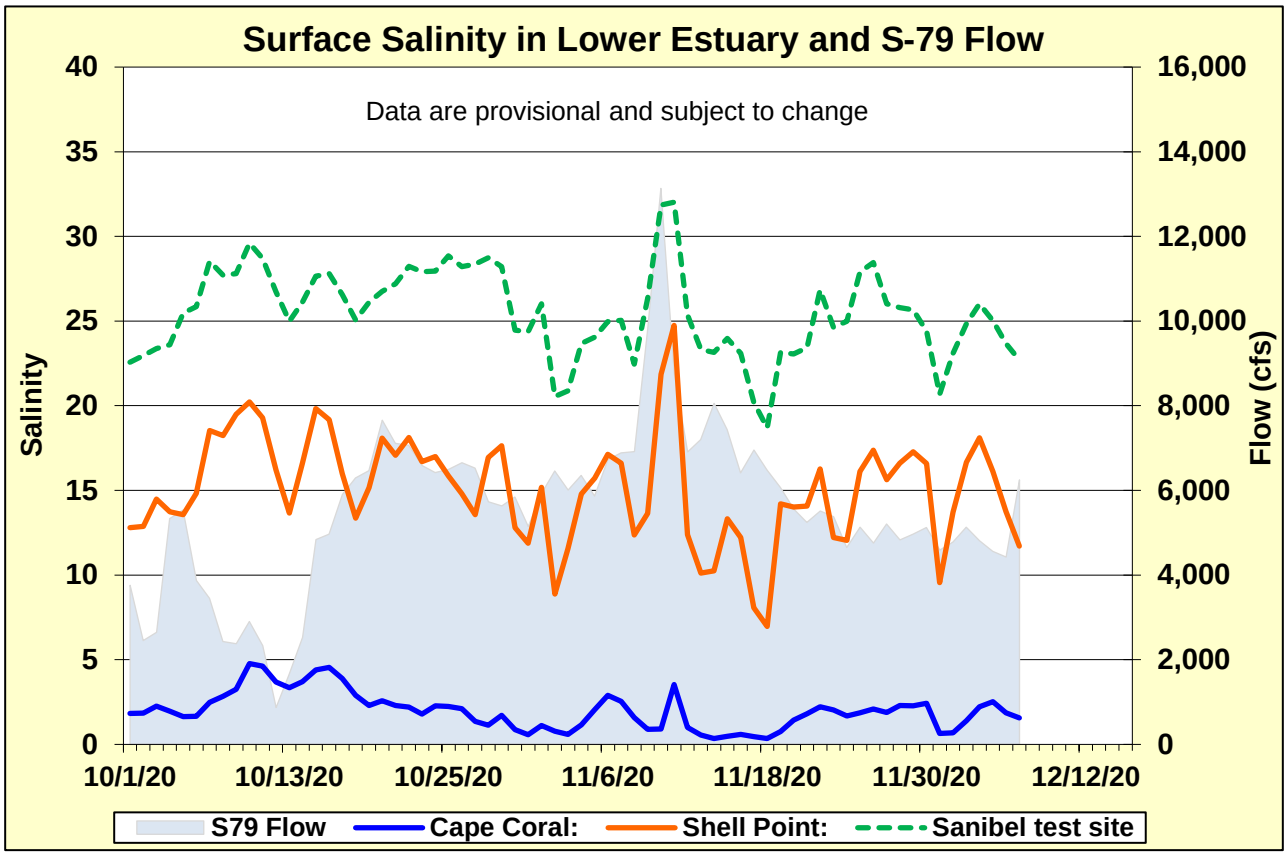


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

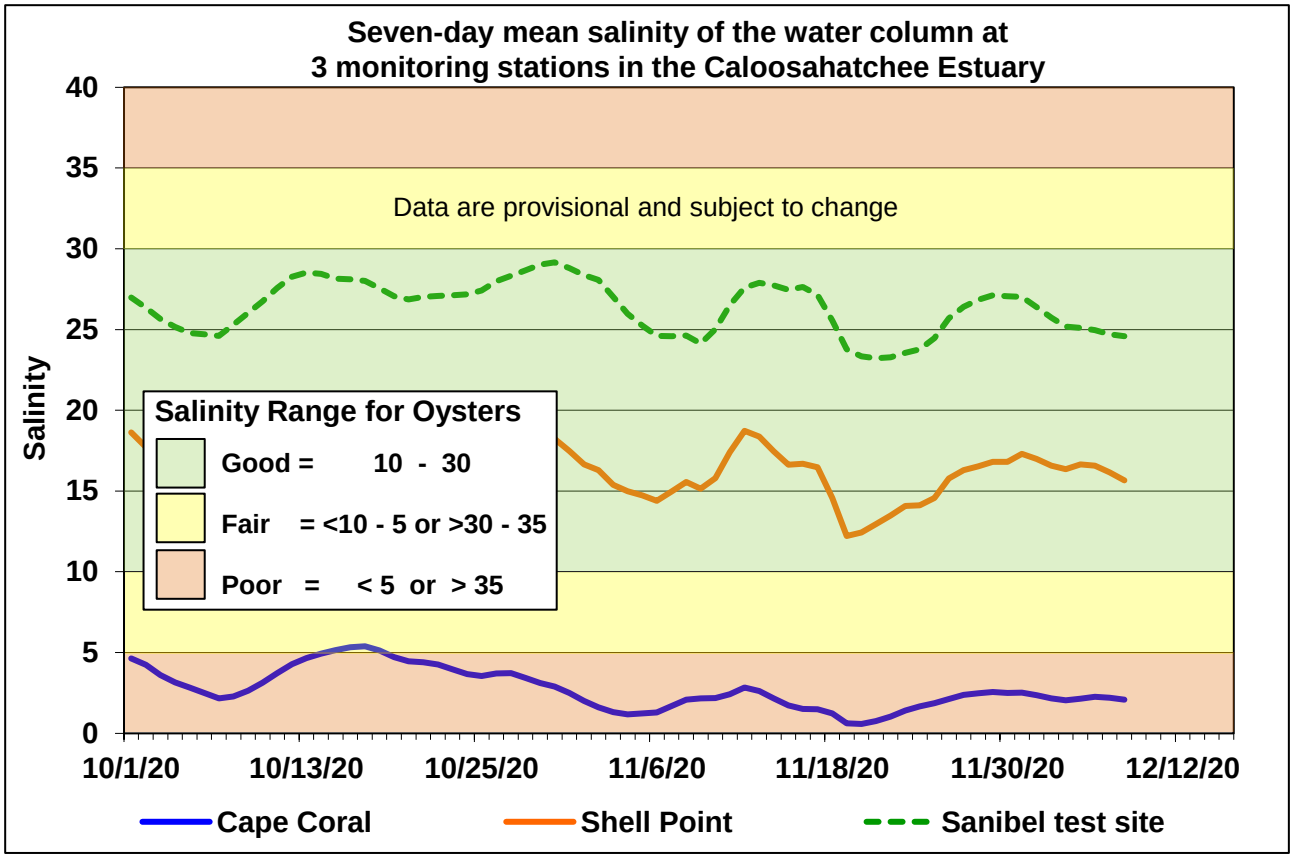


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

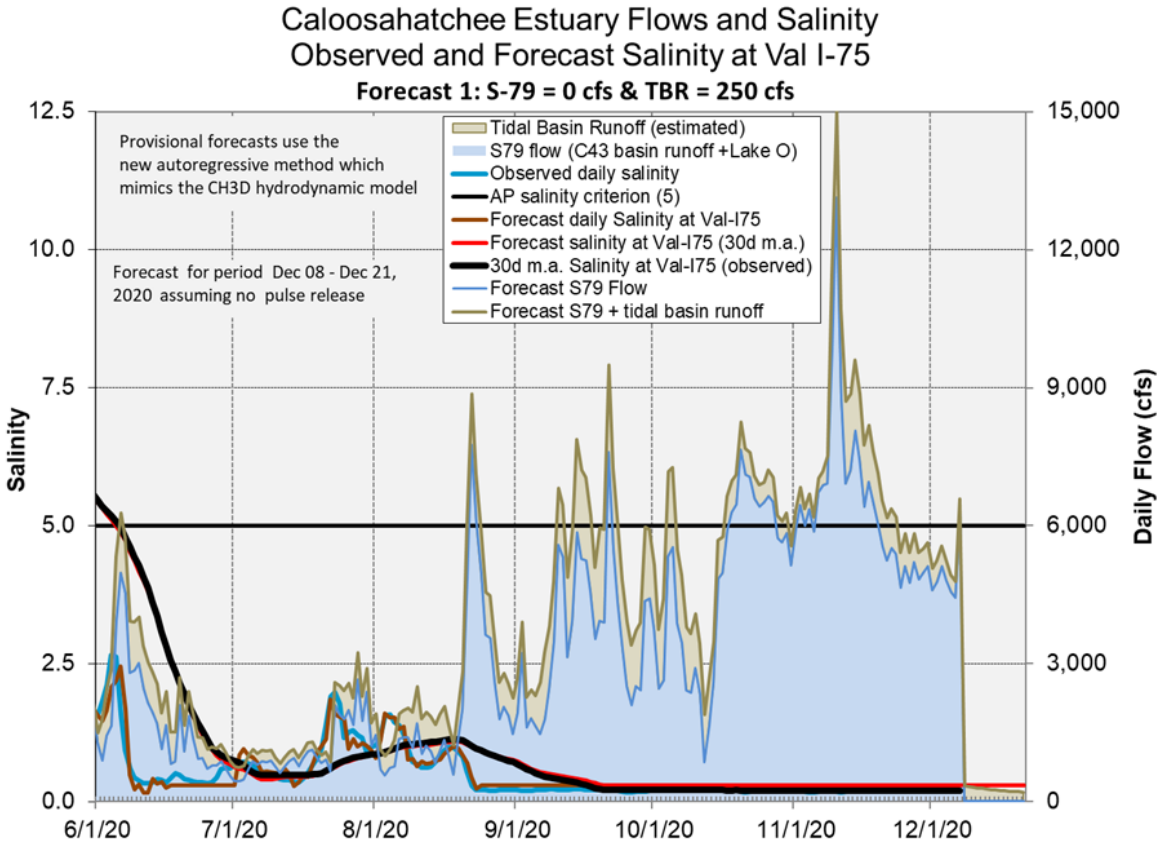
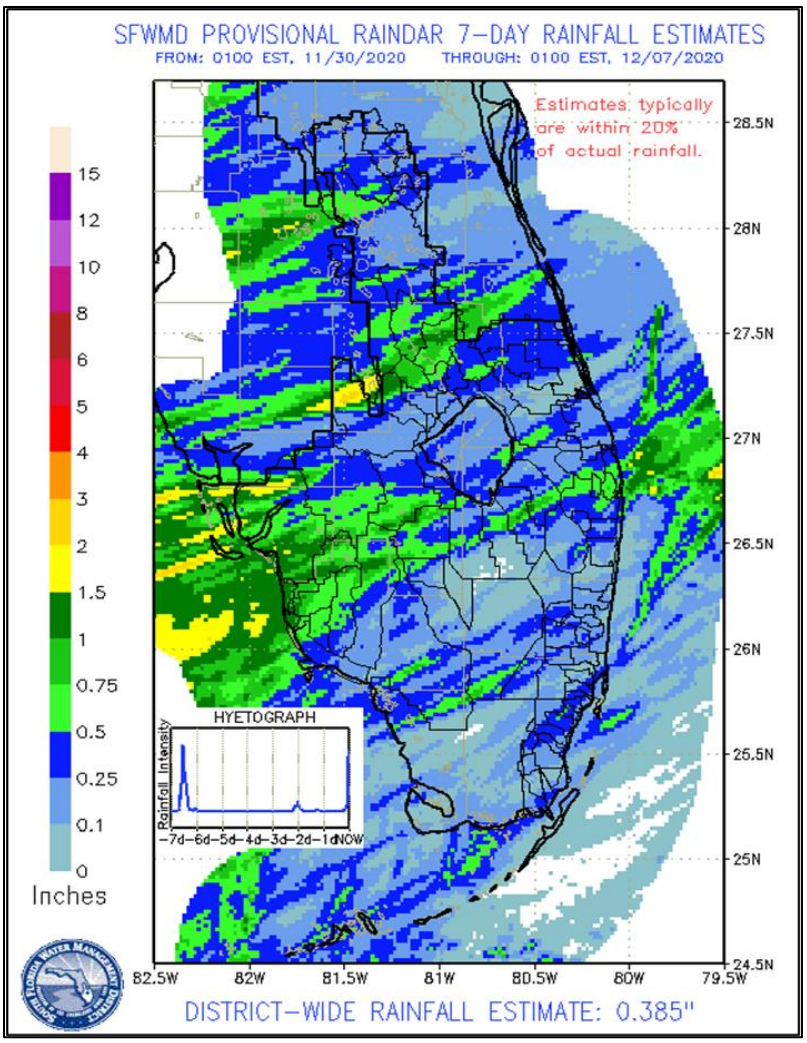


Figure 10. Forecasted Val I-75 surface salinity assuming no pulse release at S-79.

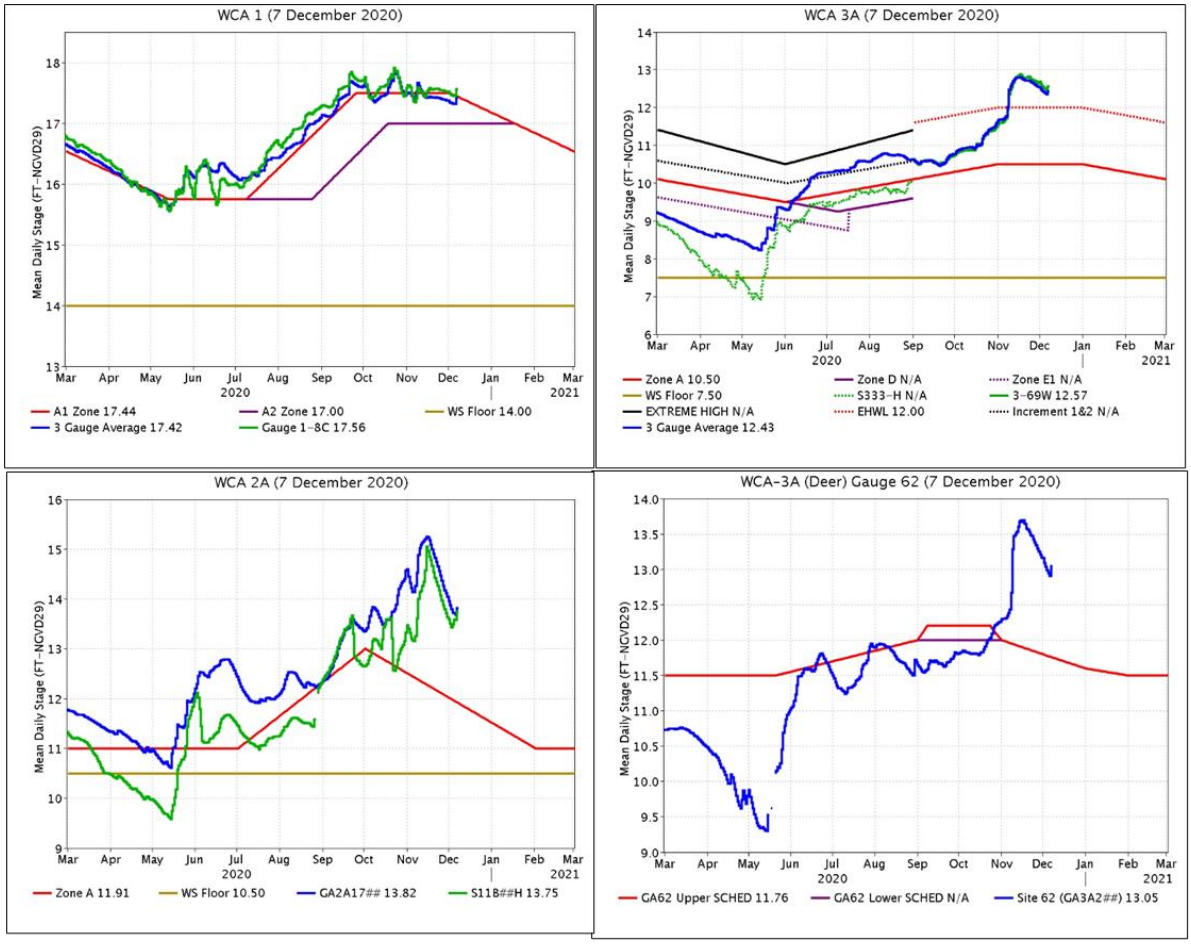
EVERGLADES

Consistent rain fell across the system last week. At the gauges monitored for this report stages fell 0.18 feet on average. Evaporation was 0.77 inches last week, and the TTFF continues to call for maximum releases from WCA-3A.

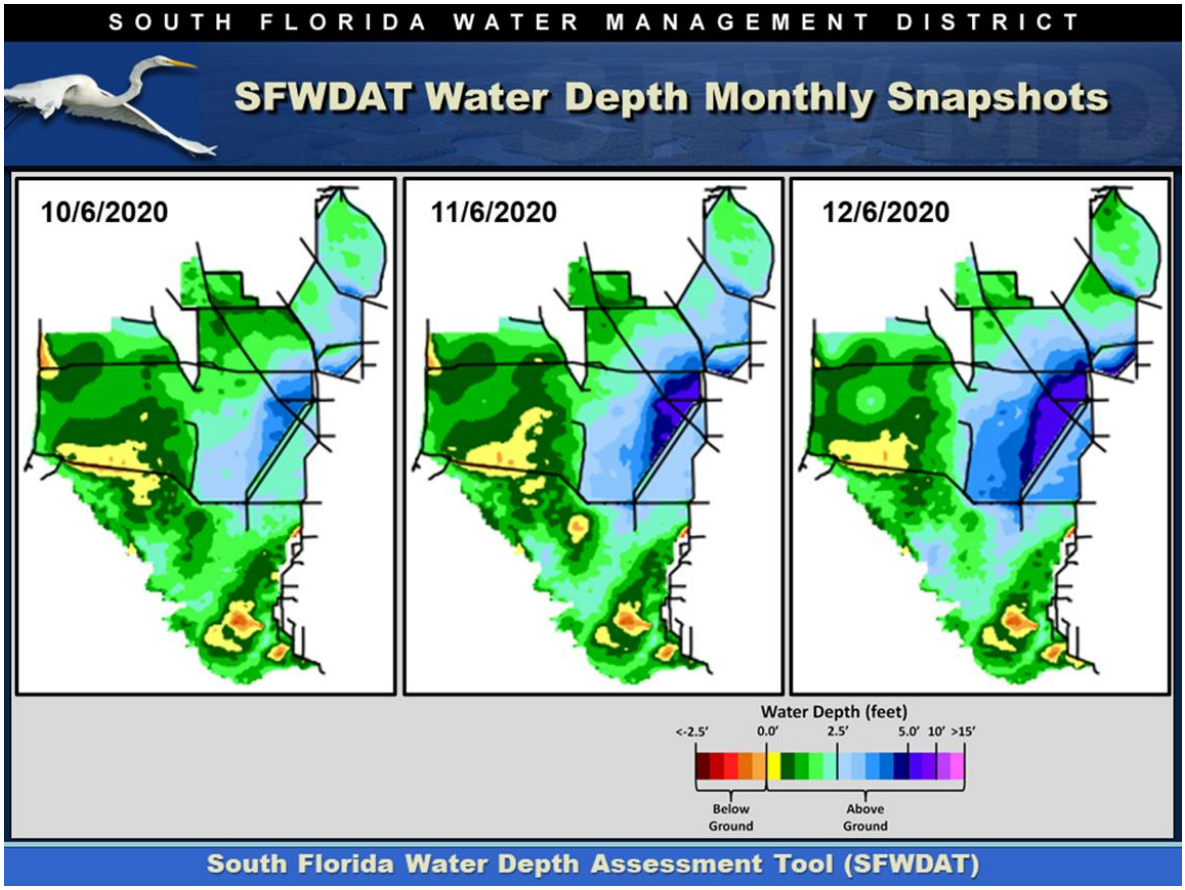
Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.22	−0.06
WCA-2A	0.11	−0.41
WCA-2B	0.29	−0.17
WCA-3A	0.20	−0.25
WCA-3B	0.26	−0.15
ENP	0.14	−0.10

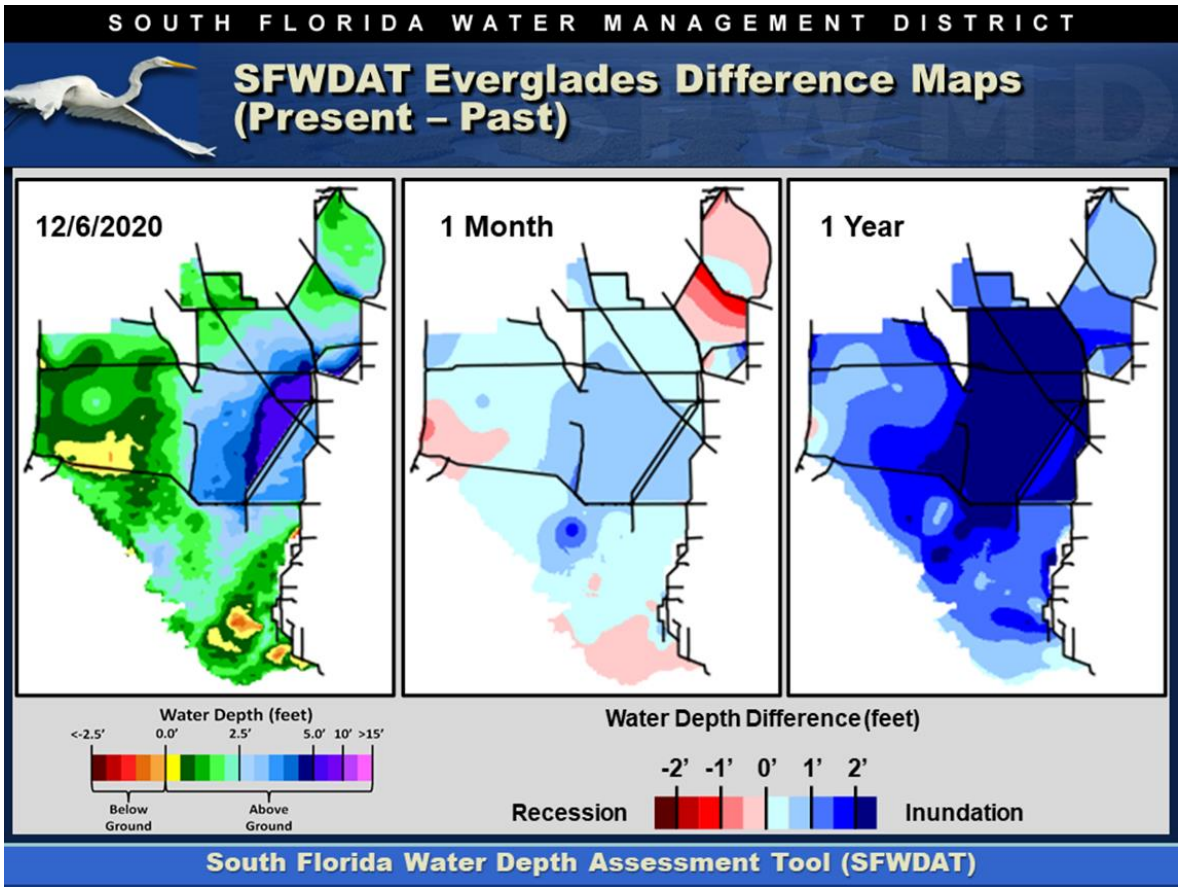


Regulation Schedules: WCA-1: Stage at the 1-8C Gauge is generally trending along with schedule, currently 0.12 feet above the stable Zone A1 regulation line. WCA-2A: Stage at Gauge 2-17 receded for most of the week towards the regulation line last week and is now 1.91 feet above the falling schedule. WCA-3A: The Three Gauge Average stage continued to recede towards the stable Zone A regulation line last week, currently 1.93 feet above it and 0.43 feet above the EHWL. WCA-3A: Stage at gauge 62 (Northwest corner) receded last week remaining above the falling Upper Schedule by 1.29 feet.



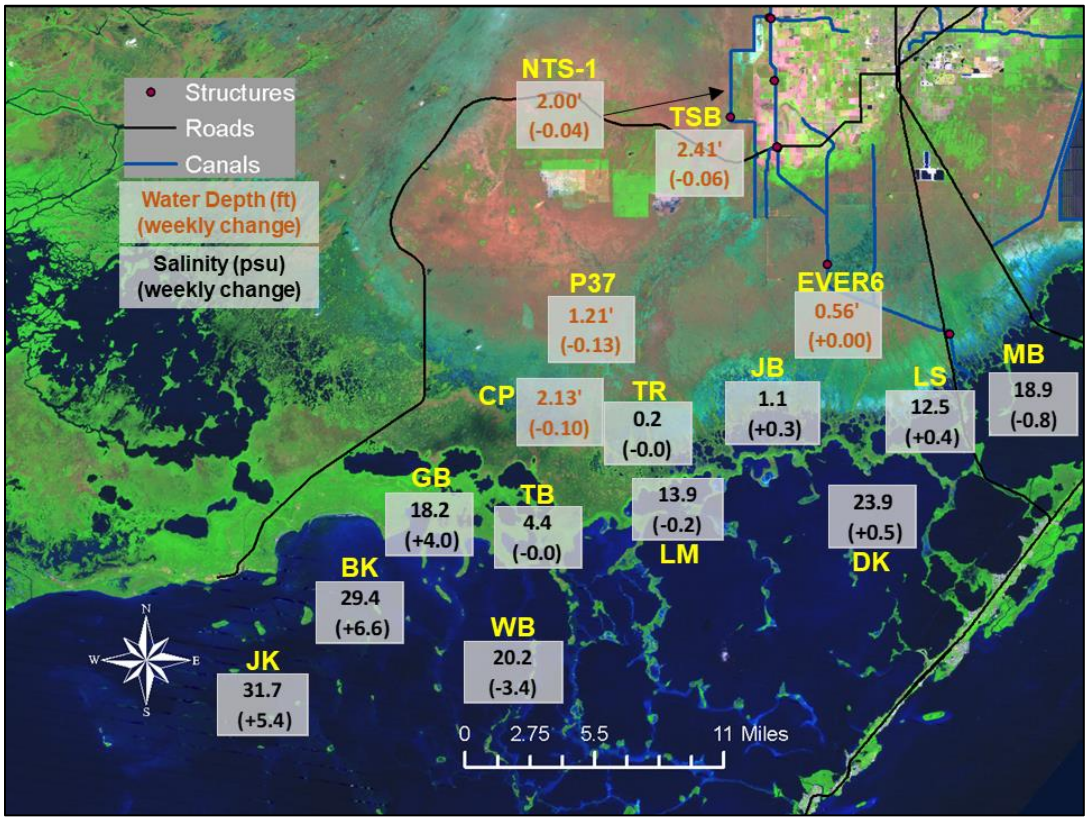
Water Depths: The WDAT tool for spatial interpolation of depth monthly snapshots over the last two months indicate current depths in excess of 5.0 feet in WCA-3A South around the upper reaches of the L-67 canal, and southern WCA-2B. Ponding depths (>2.5 feet) are found across the southern half of WCA-2A, and the northwest corner and along the northern border of WCA-3A has the potential to be lower than 2.5 feet. Hydrologic connectivity is well established within the major sloughs in ENP and the depths have increased west of the L-28S levee, though the potential remains for below ground stages in southern BCNP.

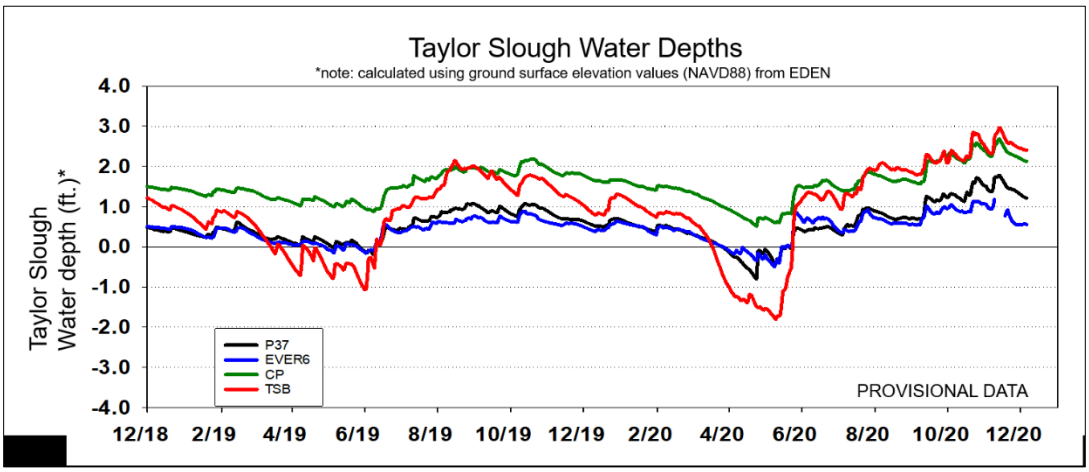

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
SFWDAT Water Depth Monthly Snapshots
10/6/2020
11/6/2020
12/6/2020
Water Depth (feet)
<-2.5'
0.0'
2.5'
5.0'
10'
>15'
Below Ground
Above Ground
South Florida Water Depth Assessment Tool (SFWDAT)

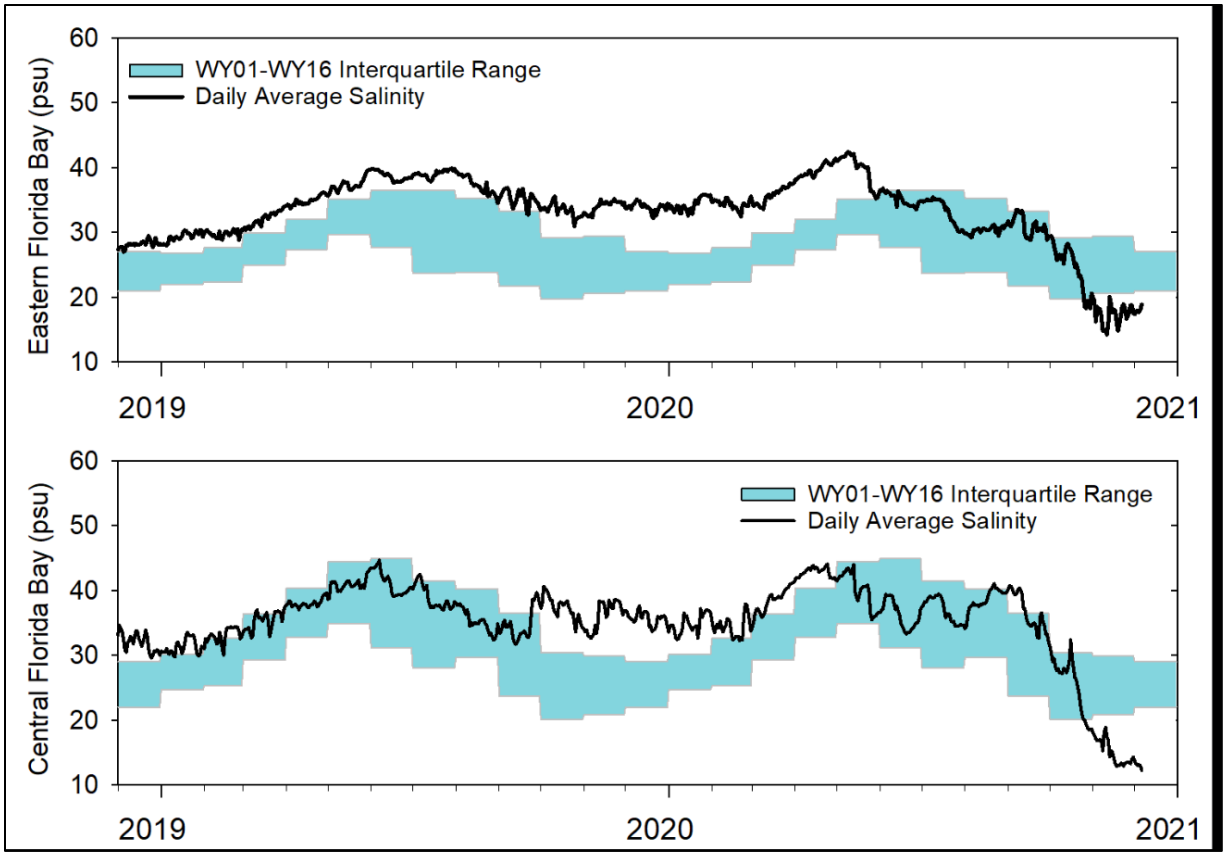

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
SFWDAT Everglades Difference Maps
(Present – Past)
12/6/2020
1 Month
1 Year
Water Depth (feet)
<-2.5'
0.0'
2.5'
5.0'
10'
>15'
Below Ground
Above Ground
Water Depth Difference (feet)
-2'
-1'
0'
1'
2'
Recession
Inundation
South Florida Water Depth Assessment Tool (SFWDAT)

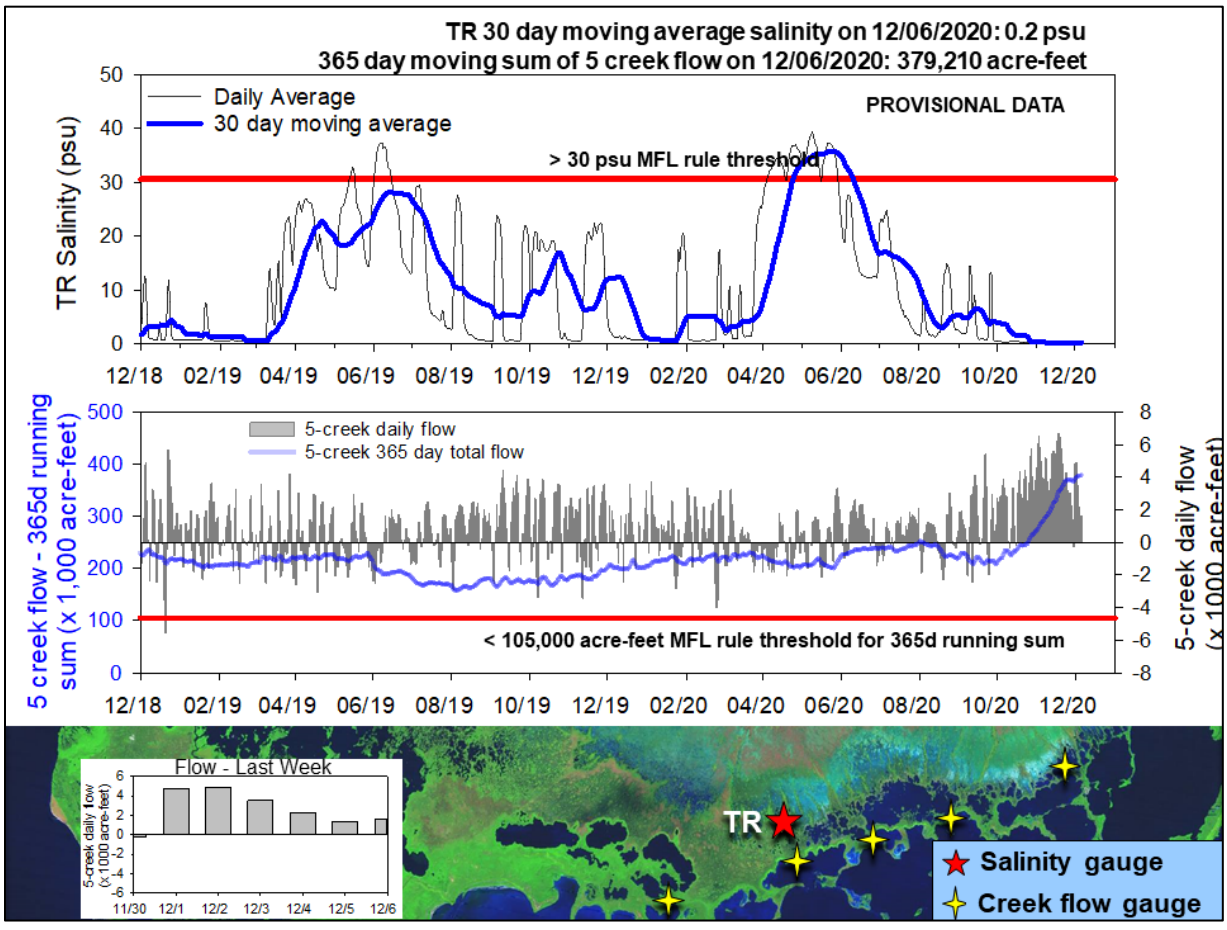
Tree island inundation in WCA-3A, WCA-3B and ENP: 371 Tree Islands of known elevation within WCA-3A, -3B, and Everglades National Park's Shark Slough. Current preliminary estimates using WDAT indicate that 88% or 328 of the tree islands are currently inundated, and 40% have been inundated for more than 120 days. Inundation for more than 120 days will cause ecological harm to sensitive islands.

Taylor Slough Water Levels: An average of 0.18 inches of rain fell over Taylor Slough and Florida Bay this past week which allowed stages to decrease 0.07 feet on average over the week. Taylor Slough is currently 9 inches above the historical average for this time of year, and the northern portion is 17 inches higher than the historical average.






Eastern Florida Bay (psu)
WY01-WY16 Interquartile Range
Daily Average Salinity
60
50
40
30
20
10
2019
2020
2021
Central Florida Bay (psu)
WY01-WY16 Interquartile Range
Daily Average Salinity
60
50
40
30
20
10
2019
2020
2021


TR 30 day moving average salinity on 12/06/2020: 0.2 psu
365 day moving sum of 5 creek flow on 12/06/2020: 379,210 acre-feet
TR Salinity (psu)
Daily Average
30 day moving average
PROVISIONAL DATA
> 30 psu MFL rule threshold
50
40
30
20
10
0
12/18
02/19
04/19
06/19
08/19
10/19
12/19
02/20
04/20
06/20
08/20
10/20
12/20
5 creek flow - 365d running sum (x 1,000 acre-feet)
5-creek daily flow
5-creek 365 day total flow
< 105,000 acre-feet MFL rule threshold for 365d running sum
500
400
300
200
100
0
8
6
4
2
0
-2
-4
-6
-8
5-creek daily flow (x 1000 acre-feet)
12/18
02/19
04/19
06/19
08/19
10/19
12/19
02/20
04/20
06/20
08/20
10/20
12/20
Flow - Last Week
5-creek daily flow (x 1000 acre-feet)
6
4
2
0
-2
-4
-6
11/30
12/1
12/2
12/3
12/4
12/5
12/6
TR
Salinity gauge
Creek flow gauge

Florida Bay Salinities: Salinities in Florida Bay averaged a 1.5 psu increase over the week as bay-wide salinities respond to less freshwater input. Average salinity for the Bay is 6 psu lower than the historical average for this time of year. Manatee Bay (MB) salinity is still depressed due to the flows from S-197. Flows at S-197 has decreased from around 700 cfs to around 220 cfs from Monday (11/30) to Monday (12/7).

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 0.3 psu) and the 30-day moving average has also remained low at 0.2 psu. Weekly flow from the 5 creeks identified by yellow stars on the map totaled just over 18,000 acre-feet. Daily flows had a single day of negative flows before resuming positive flows for the rest of the week. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) ended at 379,210 acre-feet this week which is a 10,000 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 2012. Creek flows are provisional USGS data.

Water Management Recommendations

At this early point in the dry season, maintaining the recession where possible in WCA-3A even when faster than traditional (between0.05 and0.09 feet per week) ecological recession rate recommendations has ecological benefit as long as there is no downstream deleterious ecological impact. Moderating rapid changes in stage to less than plus or minus 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-3A. Stages in WCA-2A have fallen nearly double that rate over the last two weeks, moderating and maintaining that recession rate to near 0.25 feet per week has ecological benefit.

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 at this time SFWMD Everglades ecologists are recommending a careful conservation of water in WCA-3A, once conditions move closer to average.

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, December 8th, 2020 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.06'	Maintain marsh stage slightly above and parellel to the regulation schedule.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage decreased by 0.41'	Moderate the recession rate to maintain marsh stage parellel to the falling regulation schedule.	Protect within basin and downstream habitat and wildlife from flooding stress.
WCA-2B	Stage decreased by 0.17'	Maintain the recession rate to lower marsh stage.	Protect within basin and downstream habitat and wildlife from flooding stress.
WCA-3A NE	Stage decreased by 0.35'	Maintain and moderate the recession rate to return marsh stage to more average conditions.	Protect within basin and downstream habitat and wildlife from flooding stress.
WCA-3A NW	Stage decreased by 0.29'	Maintain and moderate the recession rate to return marsh stage to more average conditions.	
Central WCA-3A S	Stage decreased by 0.21'	Maintain the recession rate to return marsh stage to more average conditions.	Protect within basin, upstream/downstream habitat and wildlife. Tree island ecology is diminished by flooding
Southern WCA-3A S	Stage decreased by 0.13'		
WCA-3B	Stage decreased by 0.15'	Maintain the recession rate to lower marsh stage.	Protect within basin and downstream habitat and wildlife from flooding stress.
ENP-SRS	Stage decreased by 0.10'	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 within basin and upstream habitat and wildlife from flooding stress.
Taylor Slough	Stage changes ranged from −0.00' to −0.13'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −3.4 to +6.6 psu.	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.