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: September 30, 2020

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A frontal system is pushing into central Florida Tuesday night and then progresses southward through the District Wednesday bringing moderate shower and thunderstorm activity. The frontal boundary is forecast to stall near the Florida Keys, then pull back north over south Florida Thursday. Breezy northeast winds interacting with this boundary should help develop showers and thunderstorms mainly southeast on Thursday. As moisture and energy spread northward from a tropical disturbance forecast to develop over the northwestern Caribbean, shower activity should increase with the potential for areas of heavy rain developing mainly south and east Friday, Saturday, and Sunday. During the first 7-day period (Week 1), total rainfall is forecast to be near the historical average north and above to well-above the historical average south. Above average rains are forecast for the second 7-day period (Week 2).

Kissimmee

Tuesday morning stages were 57.2 feet NGVD (0.2 feet above schedule) in East Lake Toho, 54.2 feet NGVD (0.2 feet above schedule) in Toho, and 51.8 feet NGVD (0.3 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.2 feet NGVD at S-65A and 27.9 feet NGVD at S-65D. Tuesday morning discharges were 2,140 cfs at S-65, 2,700 cfs at S-65A, 4,840 cfs at S-65D and 5,010 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 1.3 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 2.67 feet. Today's recommendation is to continue to use the IS-14-50 discharge plan through the 2020 wet season (the discharge rate of change limits for S-65 / S-65A may be adjusted for individual events after consultation with Kissimmee River Restoration Evaluation Program staff).

Lake Okeechobee

Lake Okeechobee stage was 15.47 feet NGVD on September 28, 2020, 0.28 feet higher than the previous week and 1.25 feet higher than the previous month. The Lake is in the Low sub-band. Lake stage moved into the ecological envelope (which varies seasonally from 12 – 15 feet NGVD +/- 0.5 feet) on June 2, 2020, after being up to 1.5 feet below since October 15, 2019. Stages have been above or near the top of the envelope since August 1, 2020 and are currently 0.25 feet above. Ascension rates have exceeded the recommended rate (<0.5 foot per 2 weeks) several times since the onset of the wet season but have generally remained close to one ft per month on average; potentially allowing submerged plant communities to keep up with rising stages. The cyanobacteria bloom risk potential remains moderate in the central portion of the Lake and sampling on September 24-25 showed three stations in the area having microcystin toxins detected above the EPA recreational waters recommendation of 8 μg/L.

Estuaries

Total inflow to the St. Lucie Estuary averaged 1,611 cfs with no flow 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 good range for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 4,864 cfs over the past week with no flow coming from the Lake. Seven-day average salinity remained almost fresh at Ft. Myers and upstream but increased in the lower estuary 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 for adult eastern oysters at Shell Point (10-30) and Sanibel, and in the poor range at Cape Coral (0-5).

Lake stage is in the Low sub-band of 2008 LORS. Tributary hydrological conditions are very wet. The LORS2008 Release Guidance suggests up to 3,000 cfs release at S-79 to the Caloosahatchee Estuary and up to 1,170 cfs release at S-80 to the St. Lucie Estuary.

Stormwater Treatment Areas

Over the past week, 9,500 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 24,300 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 872,000 ac-feet. Most STA cells are near or 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

Wide-spread average or above average (in the southeast) rainfall was experienced across the Everglades last week. Stages are above their historic mean for this time of year in both WCA-1 and WCA-2A but below in WCA-3A. WCA-1 and WCA-3A remain above schedule but are generally trending along with regulation. WCA-2A stages having ascended quickly over the prior three weeks reversed that trend last week and now trend towards the regulation schedule. All the stations in the Taylor Slough and Florida Bay area received at least an inch of rainfall last week and heavy rains fell in ENP. Stages increased on average and remain above average in Northern Taylor slough. Salinities decreased on average, but the weekly change ranged up to a positive 3.1 psu and remain above average in the nearshore. Another upstream push of saline water has caused the salinities in the mangrove zone to increase from the near-fresh condition to 14 psu this past week.

Supporting Information

KISSIMMEE BASIN

Rainfall

The Upper Kissimmee Basin received 1.03 inches of rainfall in the past week and the Lower Basin received 1.73 inches (SFWMD Daily Rainfall Report 09/29/2020).

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: 9/29/2020

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)						
							9/27/20	9/20/20	9/13/20	9/6/20	8/30/20	8/23/20	8/16/20
Lakes Hart and Mary Jane	S-62	352	LKMJ	60.1	R	60.0	**0.1**	0.4	0.0	0.0	0.0	0.0	0.2
Lakes Myrtle, Preston, and Joel	S-57	88	S-57	61.0	R	61.0	**0.0**	0.1	0.0	0.0	0.0	0.0	0.0
Alligator Chain	S-60	212	ALLI	63.2	R	63.2	**0.0**	0.0	0.2	0.1	0.0	0.1	0.1
Lake Gentry	S-63	309	LKGT	61.1	R	61.0	**0.1**	0.2	0.2	0.1	0.1	0.1	0.0
East Lake Toho	S-59	988	TOHOE	57.2	R	56.9	**0.3**	0.5	0.3	-0.3	-0.7	-0.5	-0.4
Lake Toho	S-61	1,375	TOHOW, S-61	54.1	R	53.9	**0.2**	0.1	0.1	0.1	-0.1	0.0	0.1
Lakes Kissimmee, Cypress, and Hatchineha	S-65	2,890	KUB011, LKIS5B	51.8	R	51.4	**0.4**	0.5	0.4	0.3	0.5	0.7	0.3

[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: **9/29/2020**

Metric	Location	1-Day Average	Average for the Preceeding 7-Days[1]								
		9/27/2020	9/27/20	9/20/20	9/13/20	9/6/20	8/30/20	8/23/20	8/16/20	8/9/20	8/2/20
Discharge (cfs)	S-65	2,121	**2,890**	3,143	2,193	2,631	3,273	2,506	1,611	1,760	4,215
Discharge (cfs)	S-65A[2]	2,665	**3,578**	3,855	2,700	3,176	4,247	3,173	1,990	2,554	4,851
Discharge (cfs)	S-65D[2]	5,847	**5,198**	3,738	3,512	4,262	3,420	3,067	4,360	5,466	5,538
Headwater Stage (feet NGVD)	S-65D[2]	27.69	**27.73**	27.77	27.63	27.74	27.75	27.59	27.57	27.70	27.75
Discharge (cfs)	S-65E[2]	4,960	**4,994**	3,919	3,578	4,317	3,444	3,079	4,484	5,703	5,462
Discharge (cfs)	S-67	0	**0**	0	0	0	0	0	0	0	0
DO (mg/L)[3]	Phases I & II/III river channel	1.2	**1.3**	1.1	0.9	0.7	1.1	1.0	0.4	0.5	0.4
Mean depth (feet)[4]	Phase I floodplain	2.67	**2.70**	2.31	2.06	2.42	2.27	1.76	2.06	2.60	3.02

[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.

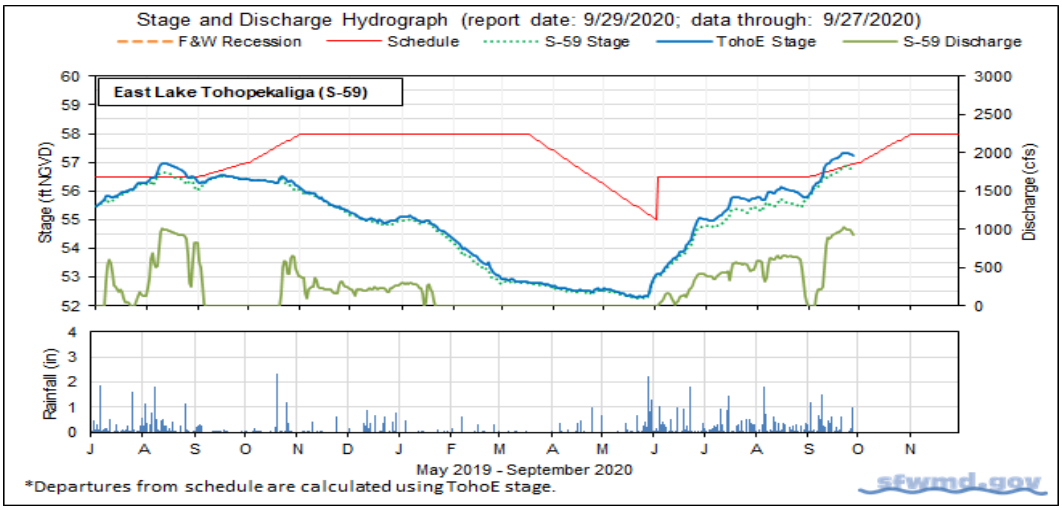


Figure 1. East Lake Toho regulation schedule, stage, discharge and rainfall.

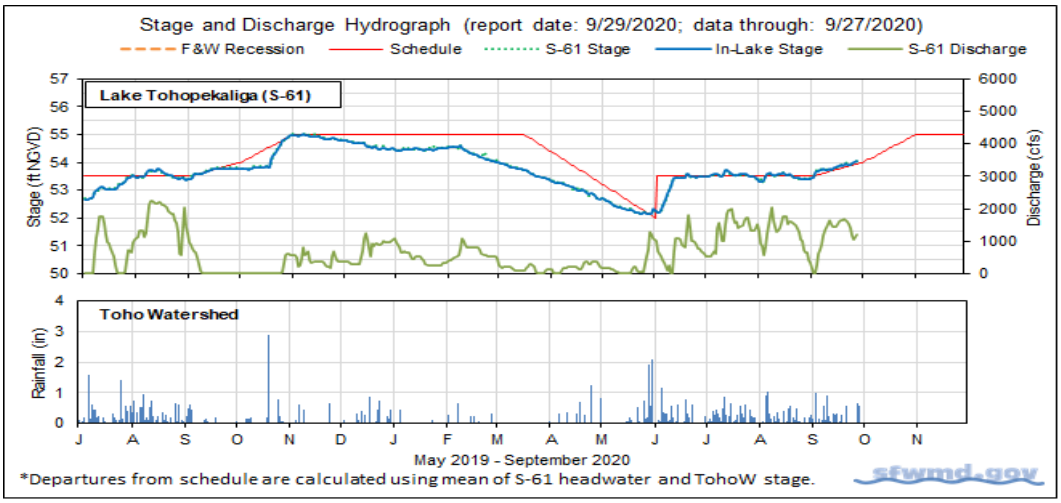


Figure 2. Lake Toho regulation schedule, stage, discharge and rainfall.

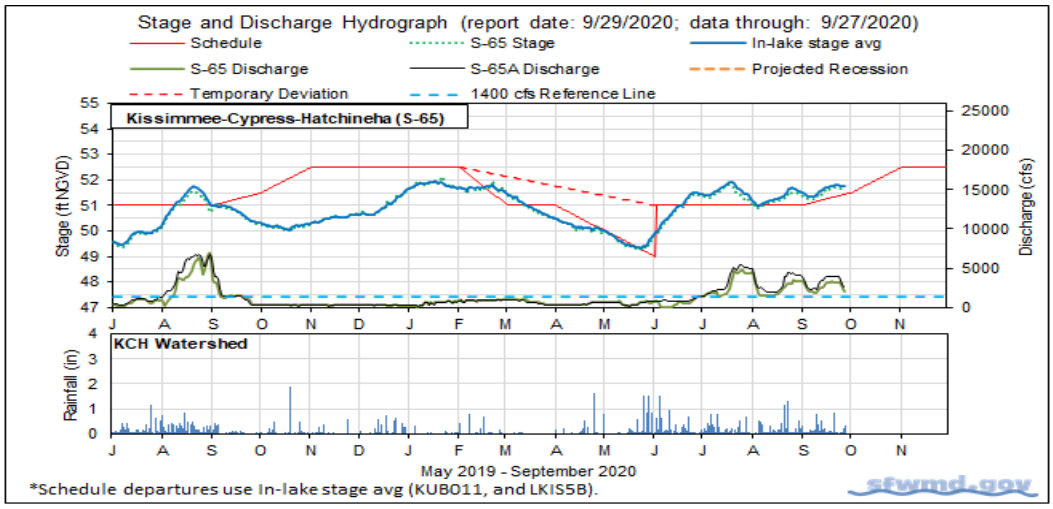


Figure 3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

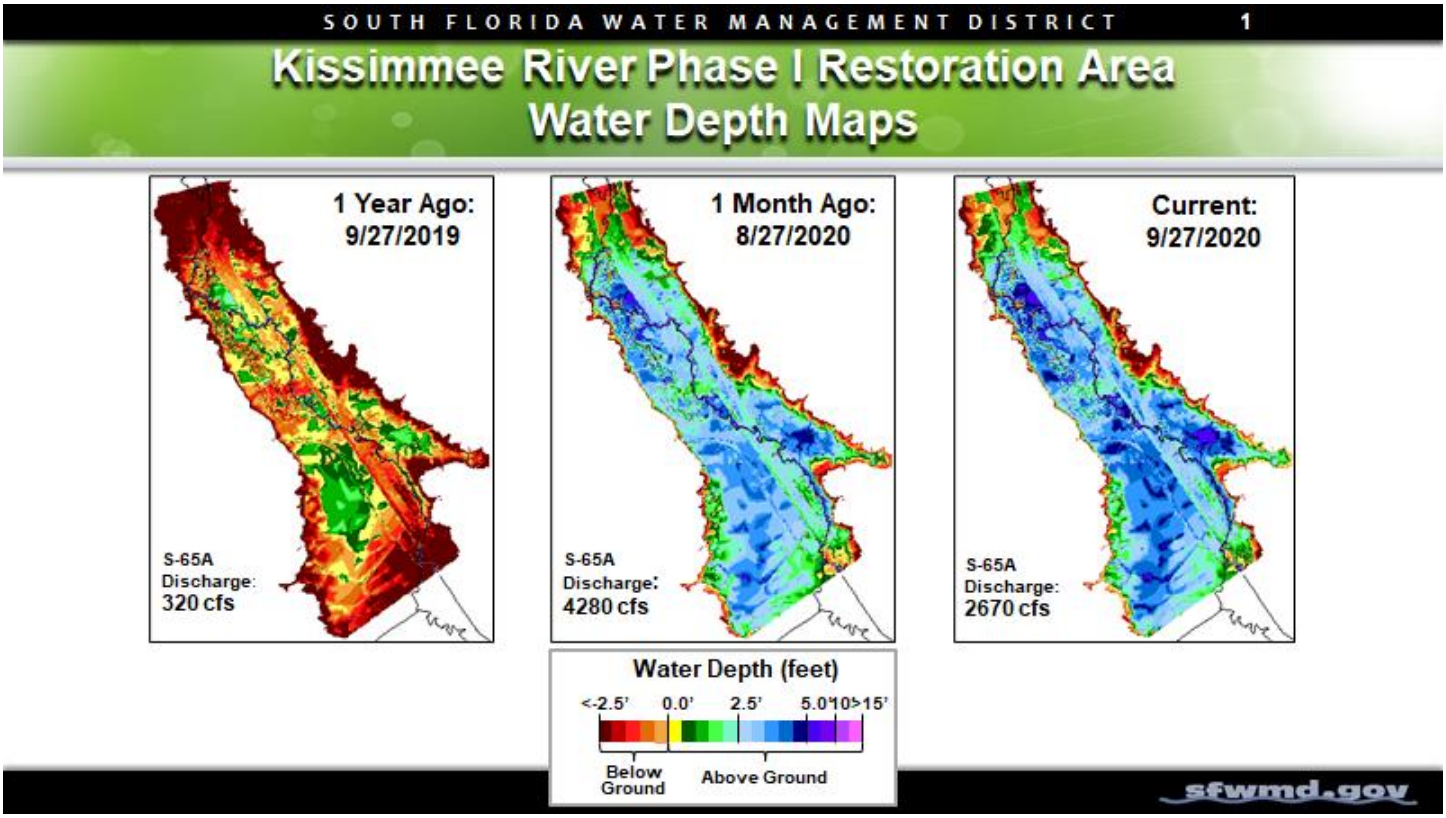


Figure 4. Phase I area floodplain water depths (from left to right) one year ago, one month ago and current. Color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

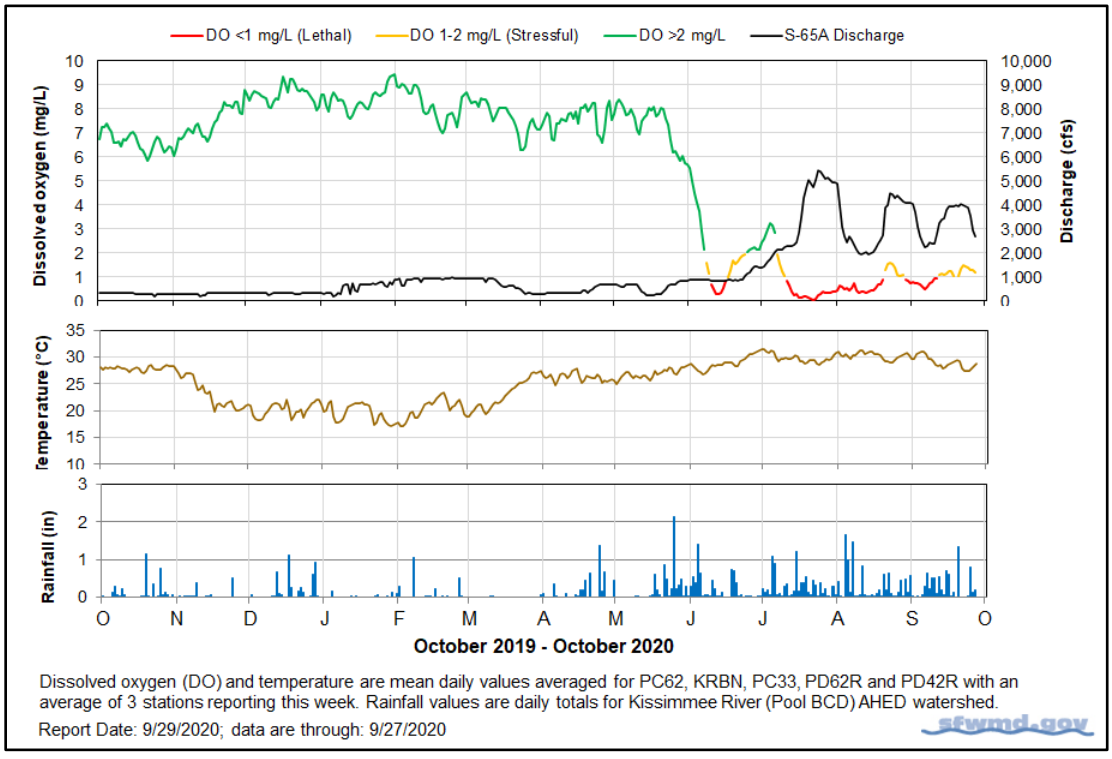


Figure 5. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches)

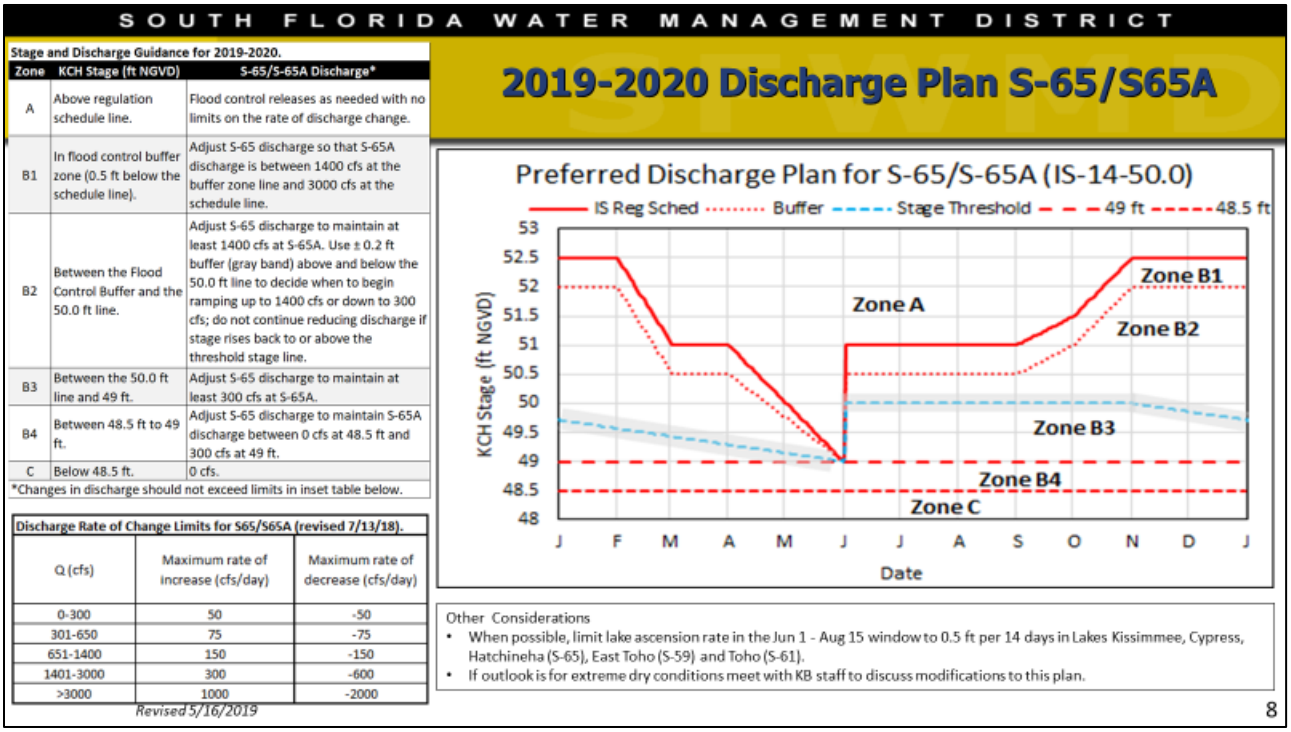


Figure 6. The 2019-2020 Discharge Plan for S-65/S-65A.

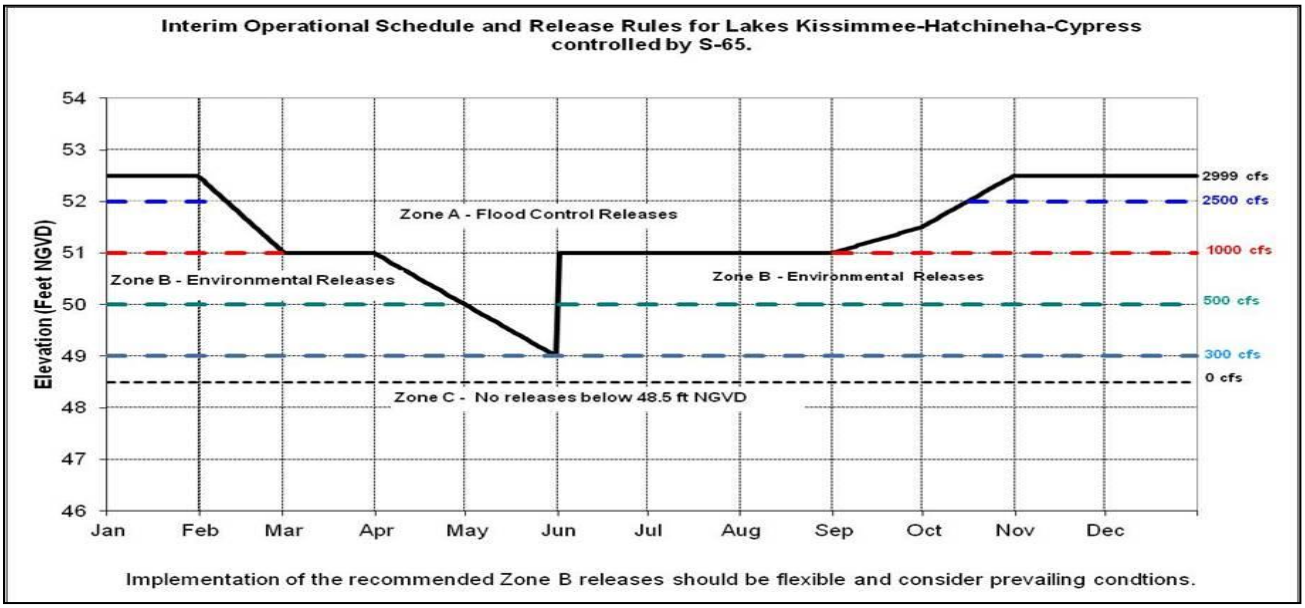


Figure 7. Interim operations schedule for S-65 (solid black line). The discharge schedule shown to the right has not been used in recent years.

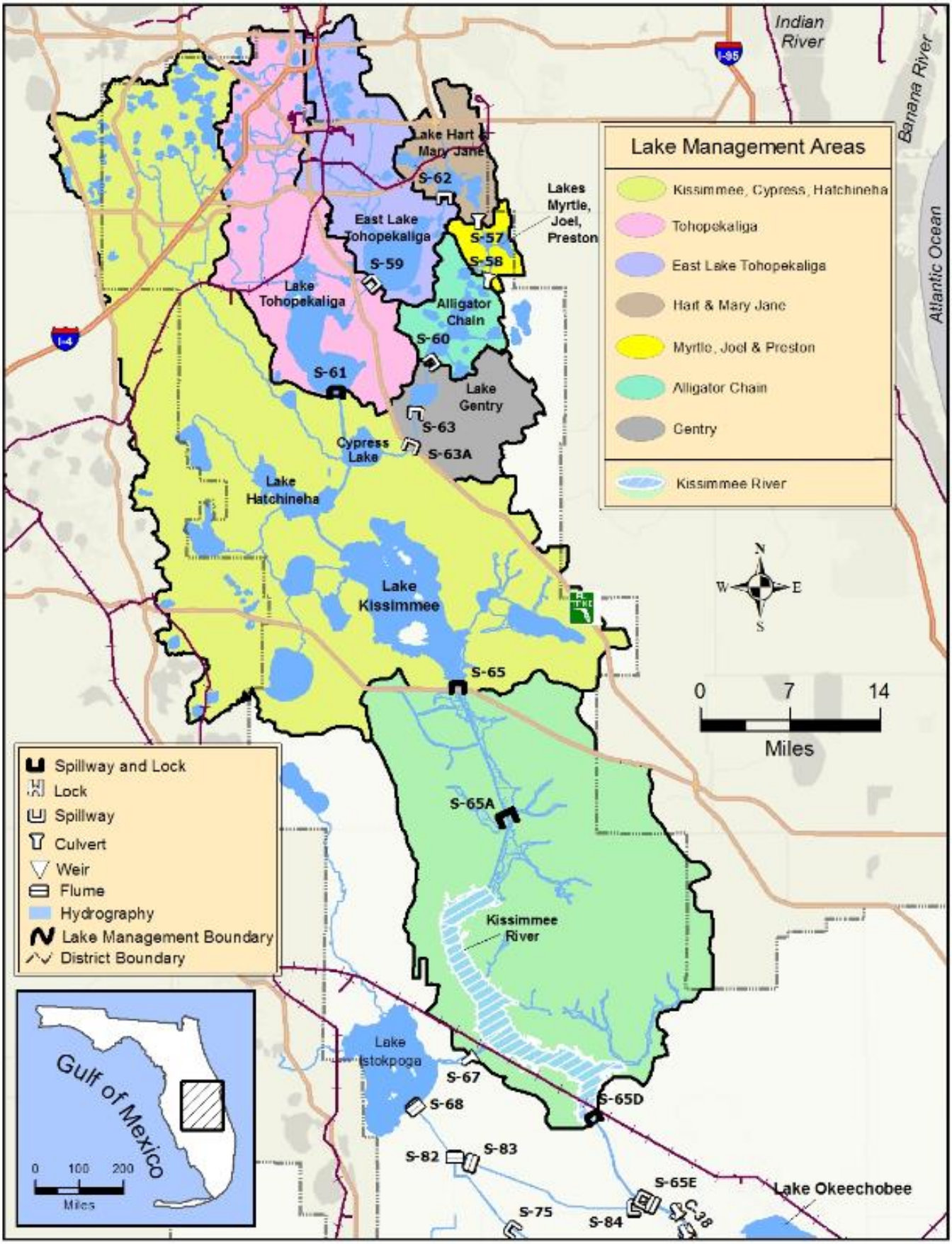


Figure 8. The Kissimmee Basin.

LAKE OKEECHOBEE

Lake Okeechobee stage is 15.47 feet NGVD, 1.25 feet higher than a month ago and 1.84 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. Lake stage moved into the Beneficial Use sub-band on March 4, 2020, into the Base Flow sub-band in mid-July, and is currently in the Low sub-band (Figure 3). Lake stage reached a low of 10.99 feet on May 17 and has been rising at a rate slightly faster than one foot per month since. According to RAINDAR, 1.22 inches of rain fell directly over the Lake through the past week, while much of the watershed received between 0.75 and 3.0 inches (Figure 4).

The average daily inflows (minus rainfall) increased from the previous week, from 8,191 cfs, to 9,060 cfs, and the outflows (minus evapotranspiration) increased from 317 to 751 cfs. More than 50% of the inflows came from the Kissimmee River (5,071 cfs through S-65E & S-65EX1), but notable flows also came from the C-59 canal via the S-191 structure (1,008 cfs), from the C-41a canal (884 cfs through S-84 & S-84X), and from Fisheating Creek (885 cfs). Outflows south through the S-350 structures increased this past week, from 317 cfs to 752 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.

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 September sampling occurred on the 24th and 25th (Figure 6). Chlorophyll-a results are still pending but 25 of 30 stations had detectable (>0.25 μg/L) microcystin toxin levels. Three of those had values higher than the EPA recreational waters recommendation of 8 μg/L; ranging from 12.0 – 46.0 μg/L, while the other 22 stations had values ranging between 0.3 and 7.5 μg/L.

The most recent clear satellite image (September 27, 2020) from NOAA's cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data suggested a continuation of the moderate cyanobacteria bloom risk in the central region of the Lake (Figure 7).

Water Management Summary

Lake Okeechobee stage was 15.47 feet NGVD on September 28, 2020, 0.28 feet higher than the previous week and 1.25 feet higher than the previous month. The Lake is in the Low sub-band. Lake stage moved into the ecological envelope (which varies seasonally from 12 – 15 feet NGVD +/- 0.5 feet) on June 2, 2020, after being up to 1.5 feet below since October 15, 2019. Stages have been above or near the top of the envelope since August 1, 2020 and are currently 0.25 feet above. Ascension rates have exceeded the recommended rate (<0.5 foot per 2 weeks) several times since the onset of the wet season but have generally remained close to one ft per month on average; potentially allowing submerged plant communities to keep up with rising stages. The cyanobacteria bloom risk potential remains moderate in the central portion of the Lake and sampling on September 24-25 showed three stations in the area having microcystin toxins detected above the EPA recreational waters recommendation of 8 μg/L.

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	4077	5071	1.9
S-71 & S-72	506	273	0.1
S-84 & S-84X	923	884	0.3
Fisheating Creek	853	885	0.3
S-154	118	175	0.1
S-191	1061	1008	0.4
S-133 P	116	264	0.1
S-127 P	44	24	0.0
S-129 P	38	18	0.0
S-131 P	18	7	0.0
S-135 P	265	273	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	171	178	0.1
Rainfall	3666	3199	1.2
Total	**11856**	**12260**	**4.7**

OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-77	0	0	0.0
S-308	0	0	0.0
S-351	279	468	0.2
S-352	38	250	0.1
S-354	0	34	0.0
L-8 Outflow			
ET	2186	2297	0.9
Total	**2503**	**3048**	**1.2**

Provisional Data

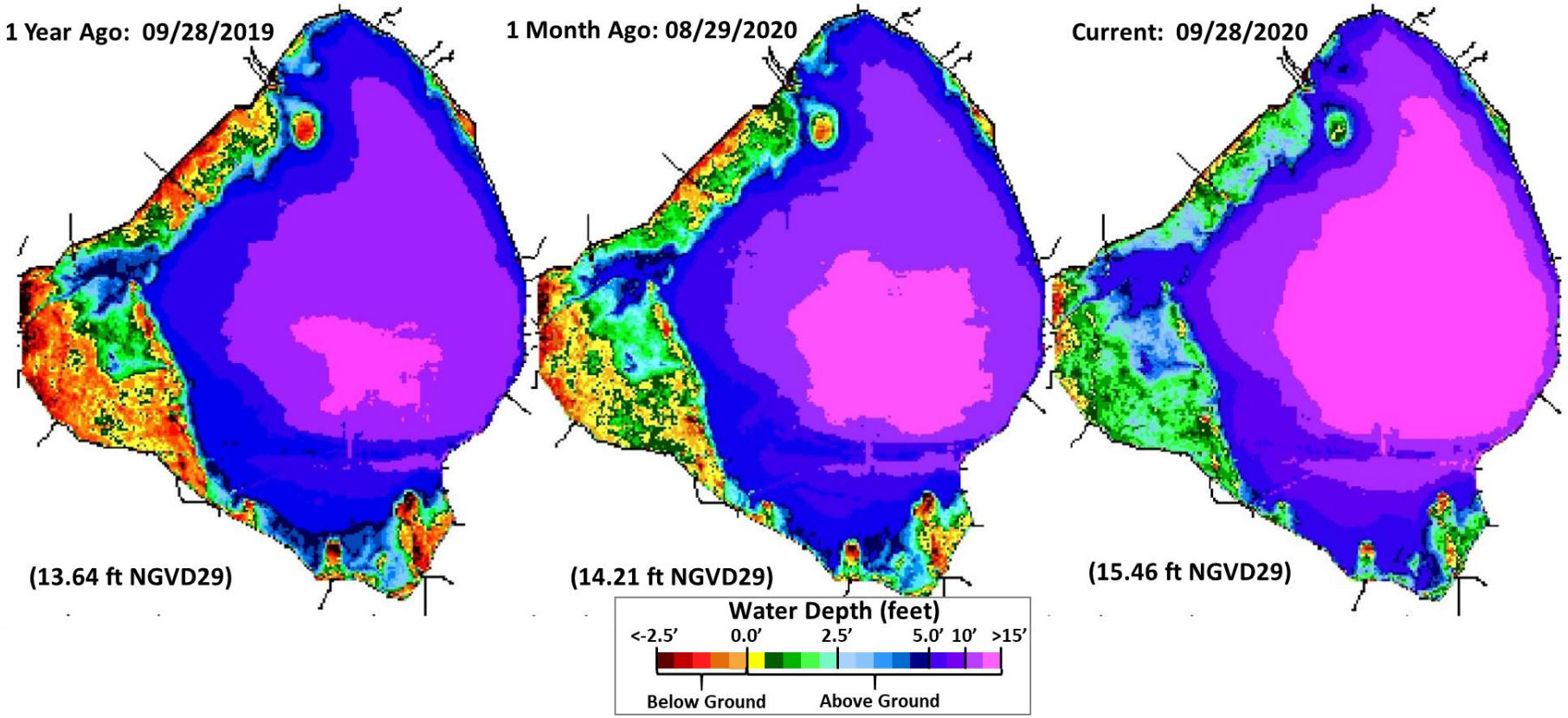


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

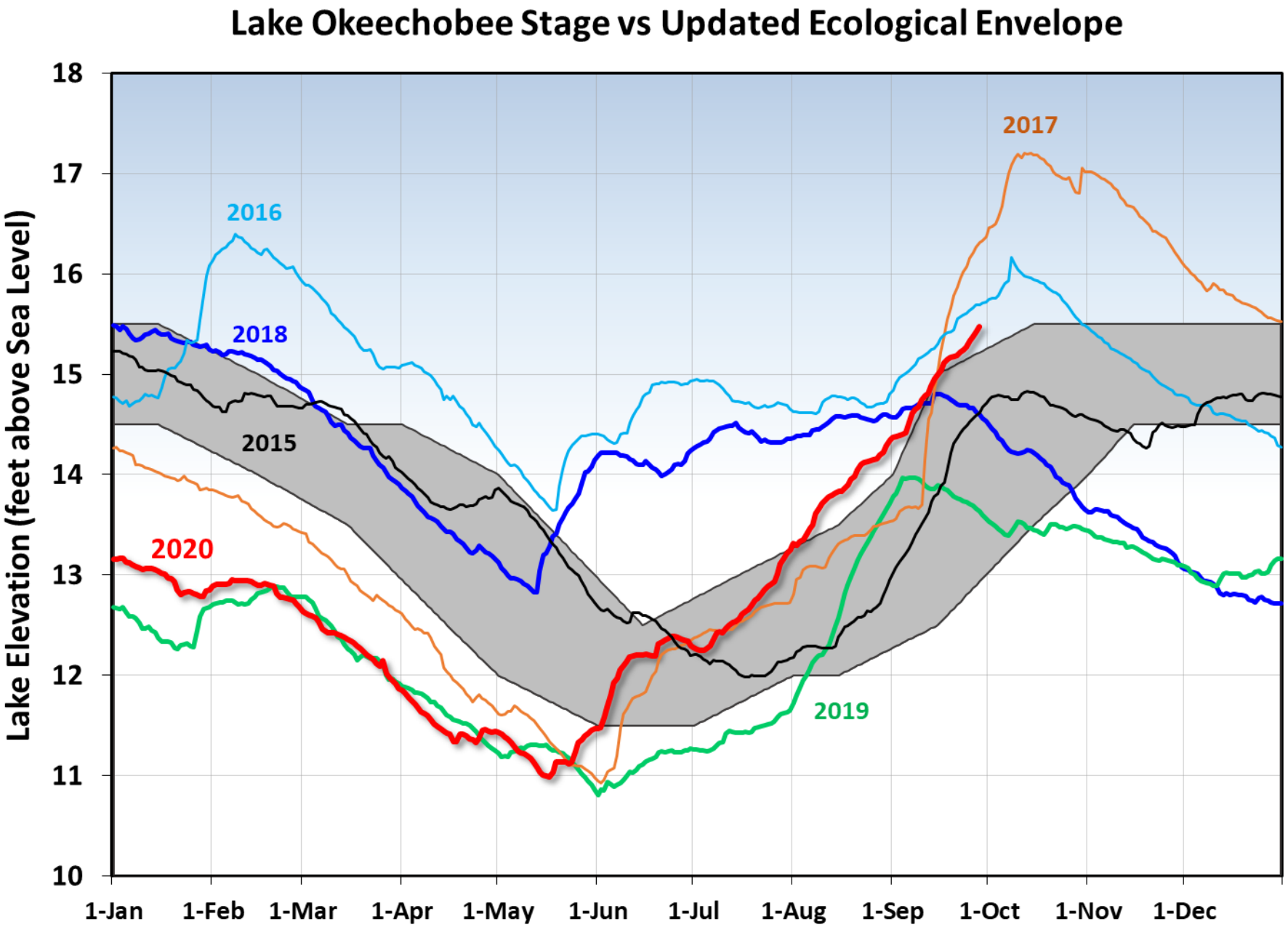


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated Ecological Envelope.

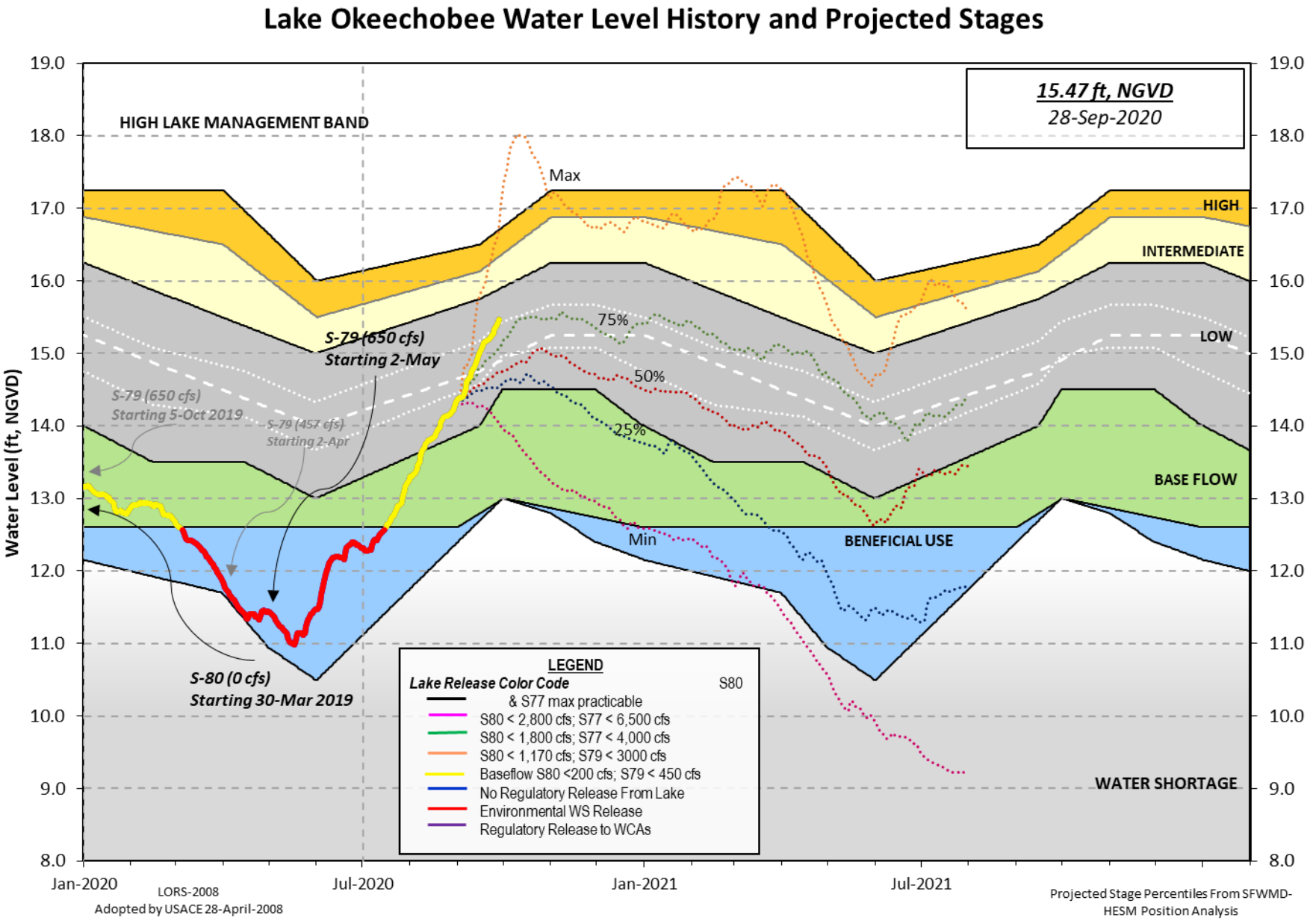


Figure 3. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

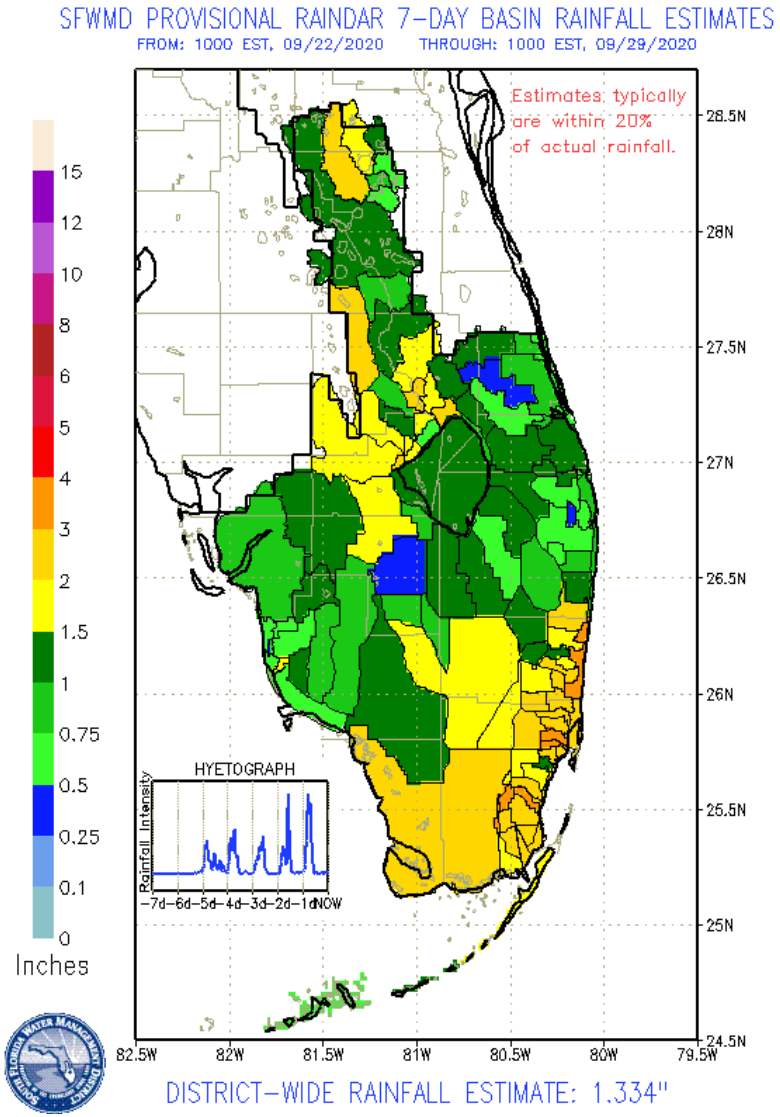


Figure 4. 7-Day rainfall estimates by RAINDAR.

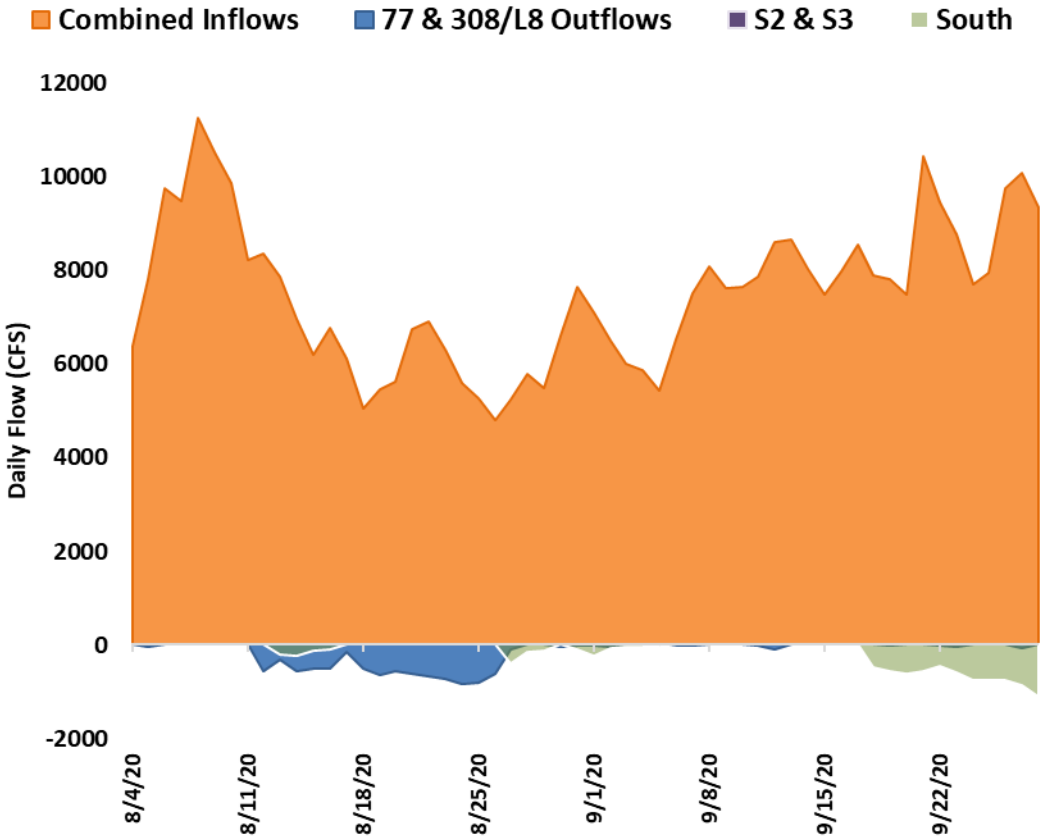


Figure 5. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive 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: September 24-25, 2020

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
FEBIN			*NS*
FEBOUT			*NS*
KISSR0.0	P	BDL	*mixed*
L005	P	**0.4**	*Microcys*
LZ2	P	BDL	*mixed*
KBARSE	P	**2.2**	*Microcys*
RITTAE2	P	**0.4**	*mixed*
PELBAY3	P	**0.5**	*mixed*
POLE3S	P	**0.5**	*mixed*
LZ25A	P	**0.3**	*mixed*
PALMOUT	P	**4.3**	*Microcys*
PALMOUT1	P	**0.6**	*Microcys*
PALMOUT2	P	**0.5**	*Not Analyzed*
PALMOUT3	P	**0.4**	*mixed*
POLESOUT	P	**0.4**	*Cylindro*
POLESOUT1	P	BDL	*Micro/Cylin*
POLESOUT2	P	**1.6**	*Micro/Cylin*
POLESOUT3	P	**20.0**	*Microcys*
EASTSHORE	P	**7.5**	*Microcys*
NES135	P	**3.2**	*Microcys*
NES191	P	BDL	*mixed*

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
L001	P	**0.3**	*mixed*
L004	P	**0.3**	*Microcys*
L006	P	**0.5**	*mixed*
L007	P	**0.3**	*mixed*
L008	P	**12.0**	*Microcys*
LZ30	P	**0.5**	*mixed*
LZ40	P	**2.9**	*Microcys*
CLV10A	P	**0.4**	*mixed*
NCENTER	P	**46.0**	*Microcys*

Sampled 9/21

S308C	P	**0.6**	*mixed*
S77	P	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

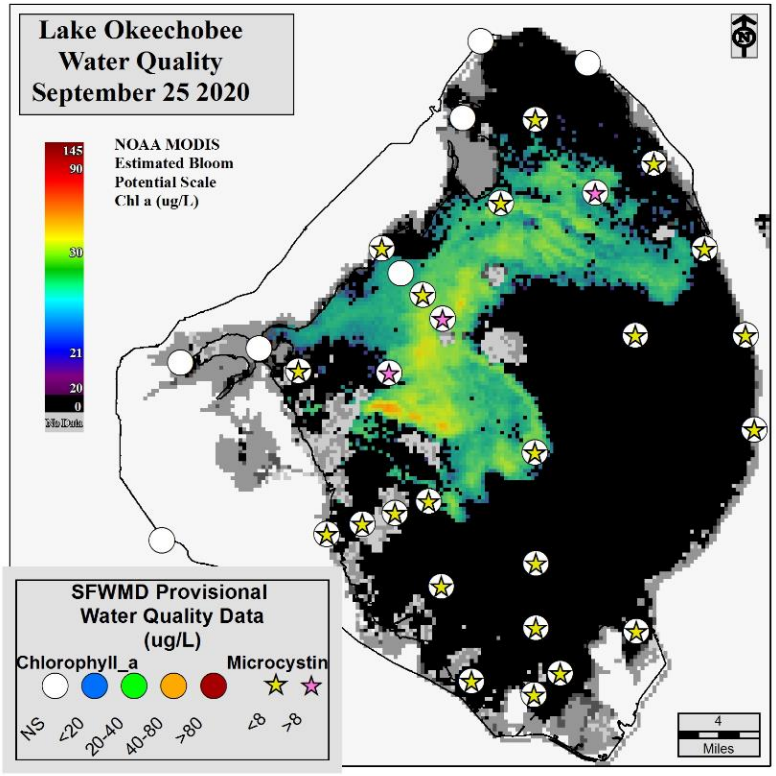


Figure 6. Provisional results from the expanded monitoring sampling trips on September 24-25, 2020

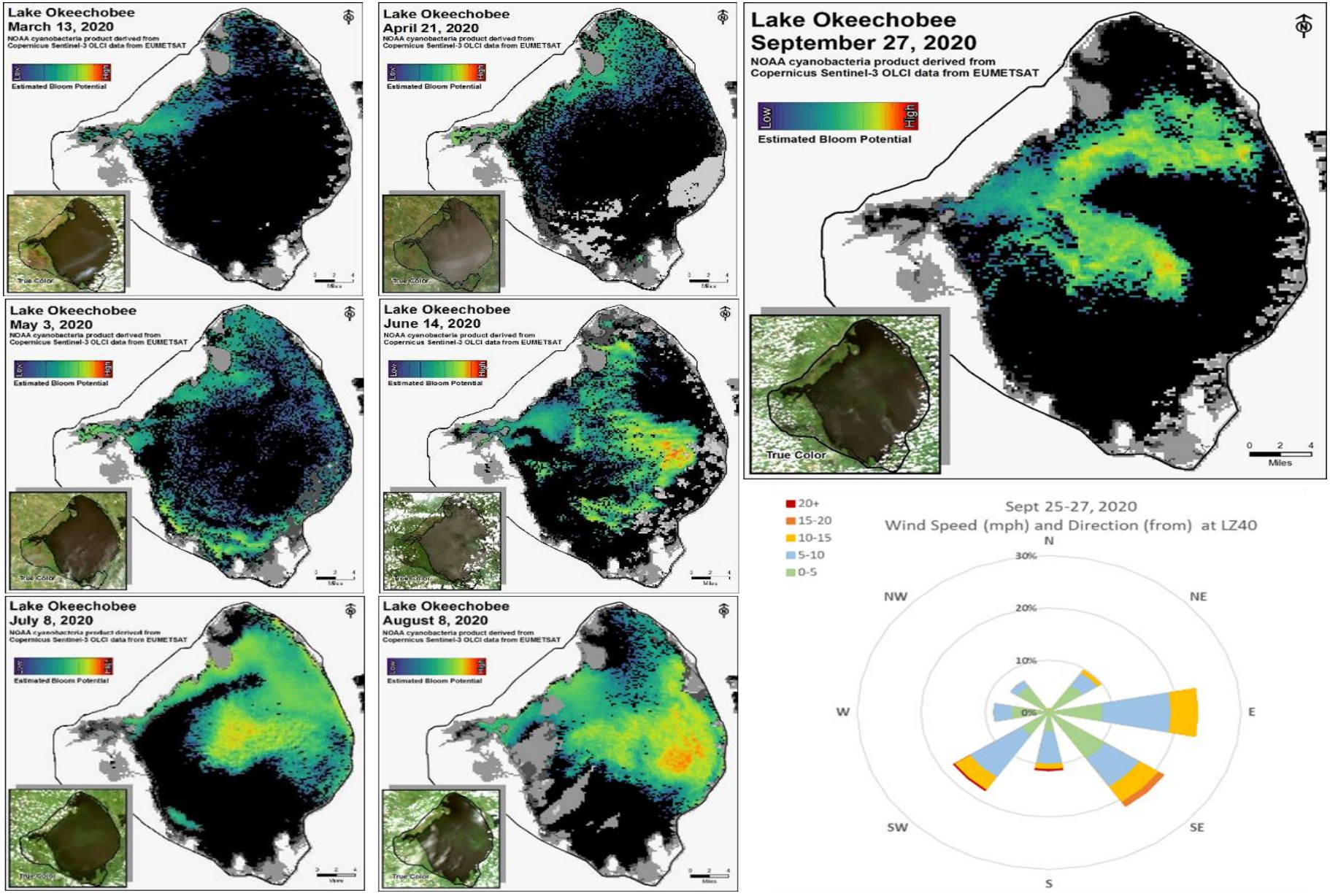


Figure 7. Potential for cyanobacterial blooms on Lake Okeechobee during 2020, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover. Wind speed and direction for the days prior to and on the date of the image are provided in the lower right panel.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged approximately 1,611 cfs (Figures 1 and 2) and last month inflow averaged about 1,711 cfs. Last week's provisional averaged inflows from the tidal basin and the structures are shown in Table 1.

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

Location	Flow (cfs)
Tidal Basin Inflow	508
S-80	365
S-308	0
S-49 on C-24	335
S-97 on C-23	273
Gordy Rd. structure on Ten Mile Creek	130

Over the past week, surface 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 10.0. Salinity conditions in the middle estuary are estimated to be just within the good 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)	**3.6** (3.7)	**7.5** (6.9)	NA[1]
US1 Bridge	**8.3** (8.8)	**11.7** (11.2)	10.0-26.0
A1A Bridge	**18.0** (19.3)	**25.3** (26.1)	NA[1]

[1]Envelope not applicable

Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged approximately 4,864 cfs (Figures 5 and 6) and last month inflow averaged about 4,888 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	0
S-78	548
S-79	3,243
Tidal Basin Inflow	1,621

Over the past week in the estuary, salinity remained the same to Ft. Myers Yacht Basin 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)	**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	**0.3** (0.3)	**0.3** (0.3)		NA
Cape Coral	**3.0** (2.8)	**5.4** (3.5)		10.0-30.0
Shell Point	**17.3** (15.9)	**20.3** (18.1)		10.0-30.0
Sanibel	**26.5** (26.1)	**27.6** (27.0)		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 700 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	700	0.3	0.3
B	300	700	0.3	0.3
C	450	700	0.3	0.3
D	650	700	0.3	0.3
E	800	700	0.3	0.3

Red tide

The Florida Fish and Wildlife Research Institute reported on September 25, 2020, that *Karenia brevis,* the Florida red tide dinoflagellate, was not observed in samples collected from or offshore of 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 Low sub-band. Tributary conditions are very wet. The LORS2008 release guidance suggests up to 3,000 cfs release at S-79 to the Caloosahatchee Estuary and up to 1,170 cfs release at S-80 to the St. Lucie Estuary.

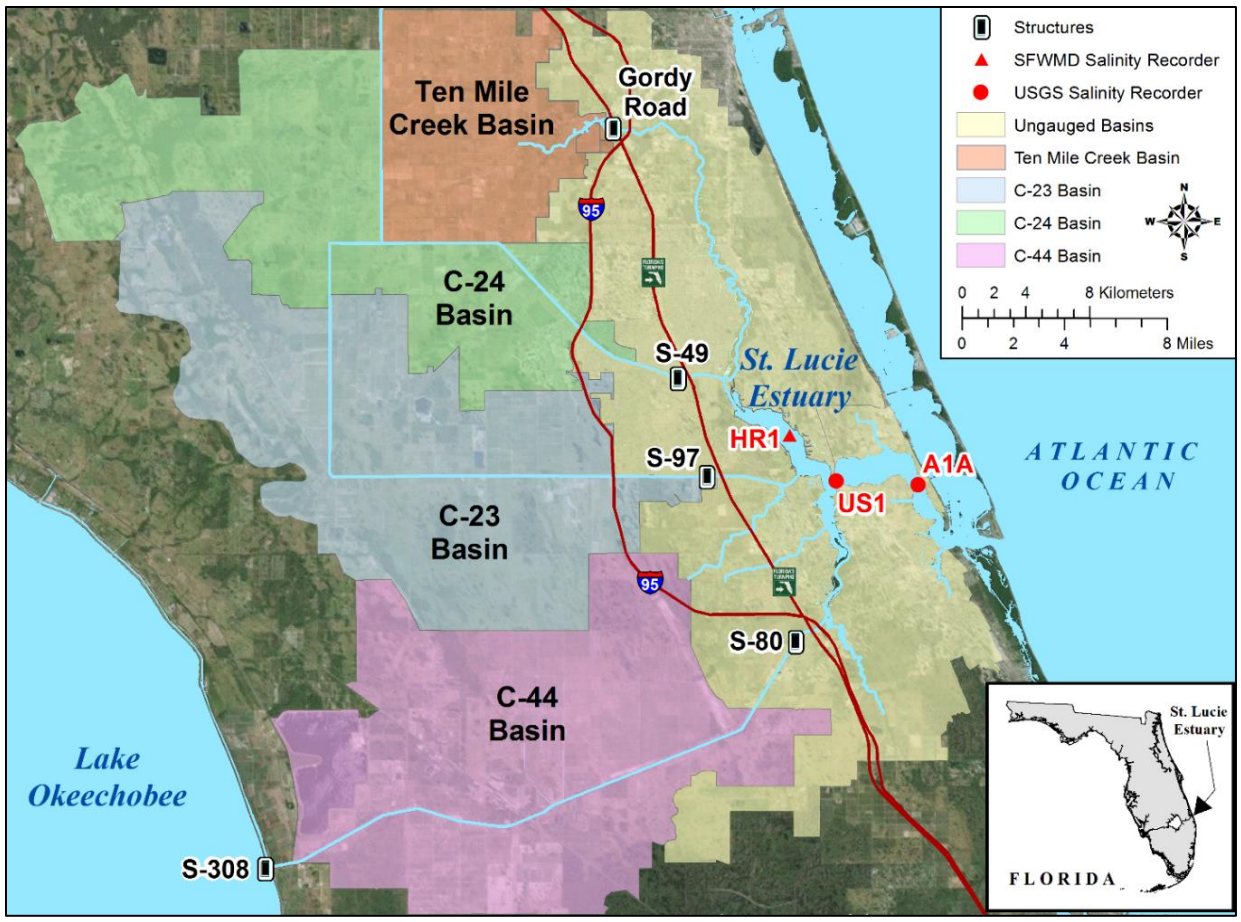


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

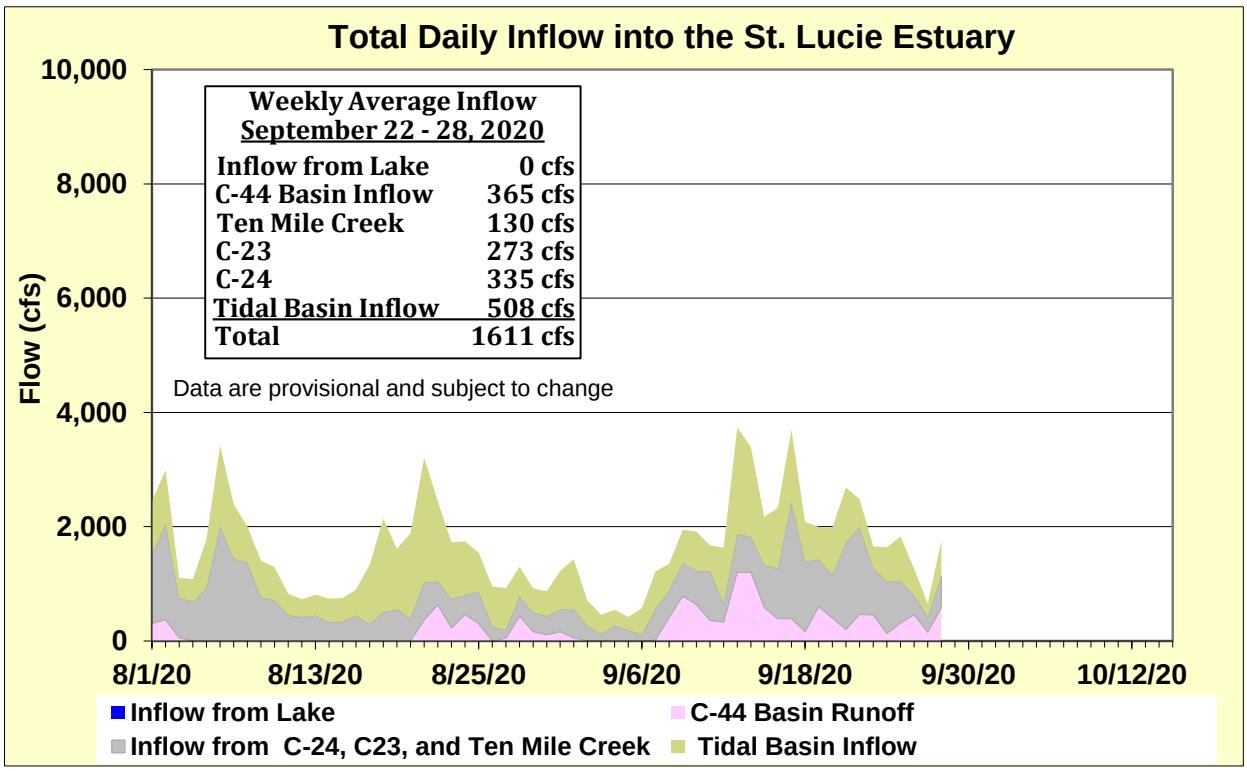


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin into the St. Lucie Estuary.

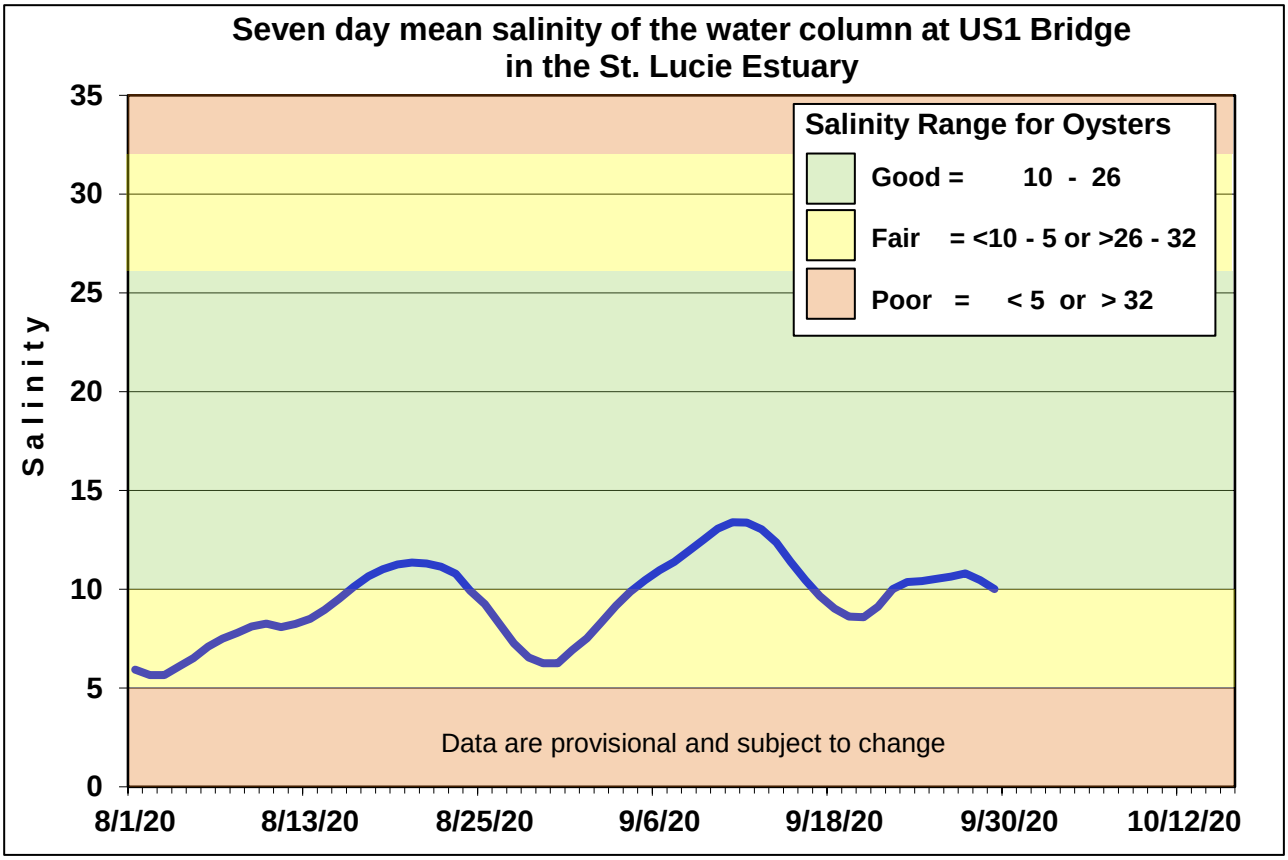


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

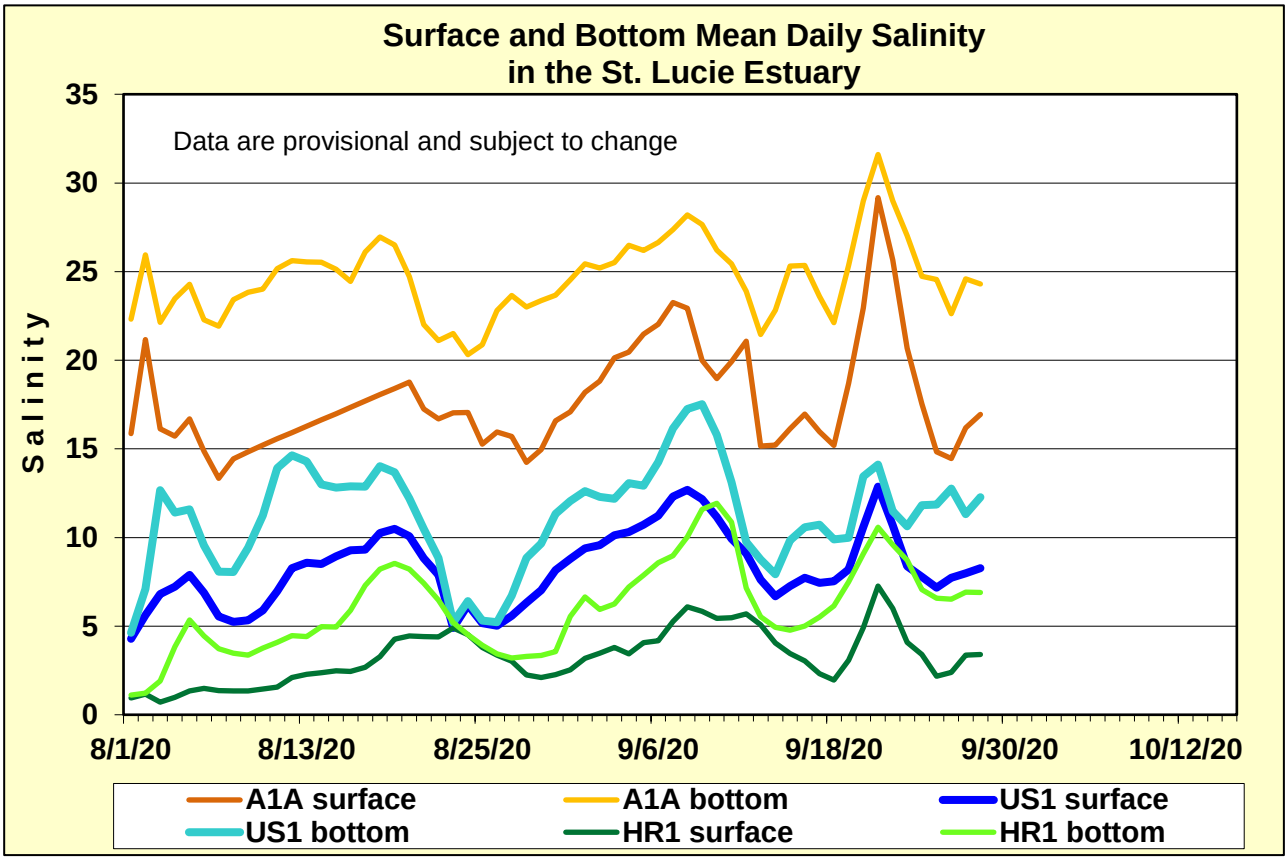


Figure 4. Daily mean salinity at the A1A, US1, and HR1 stations.

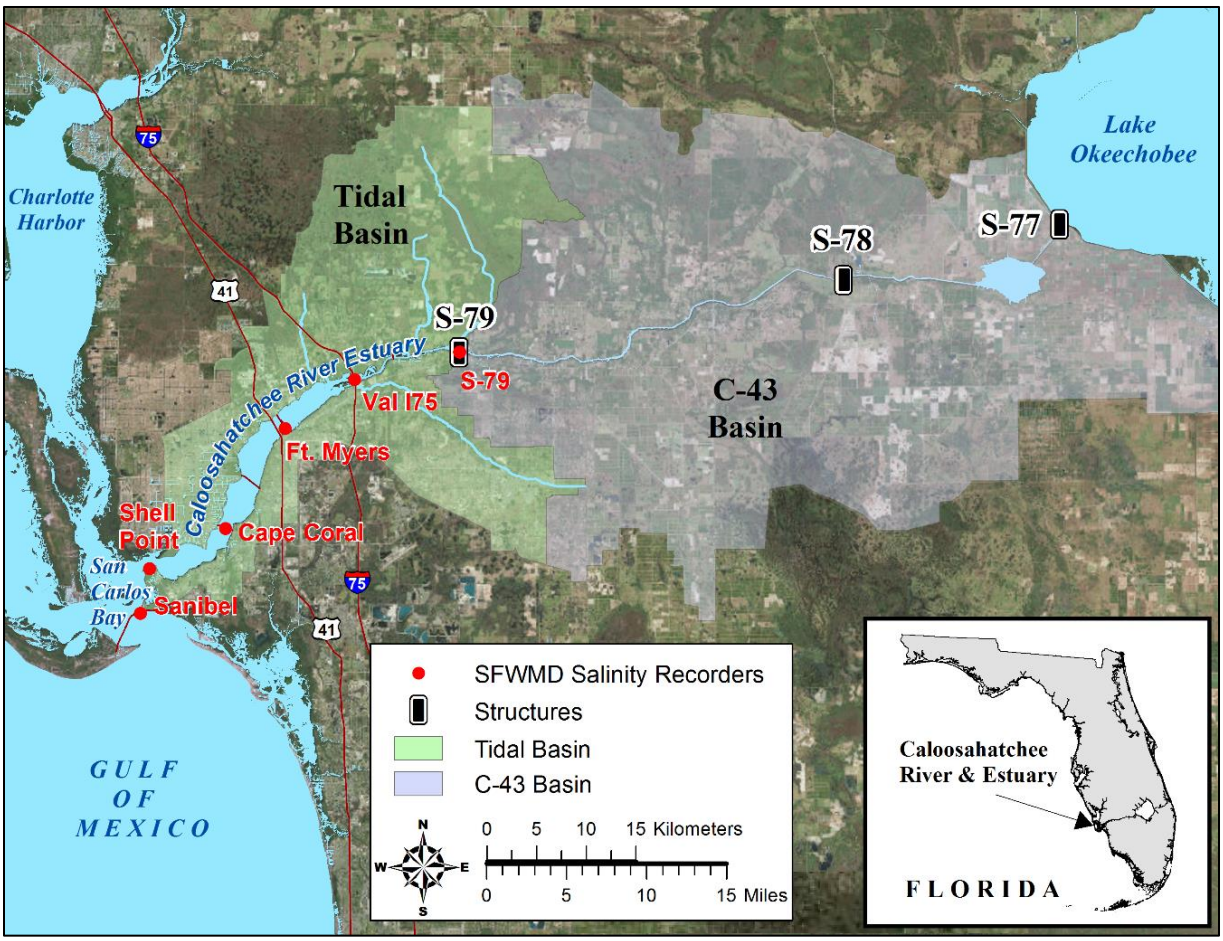


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

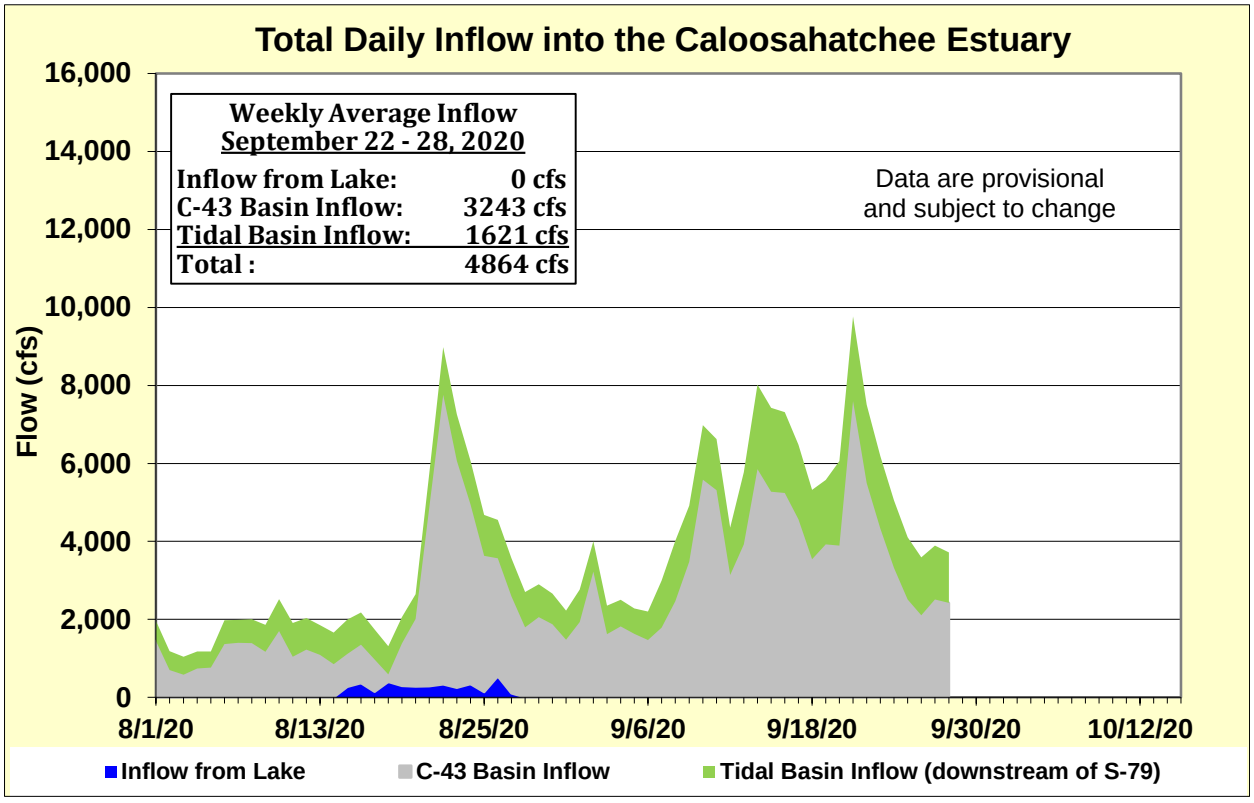


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin

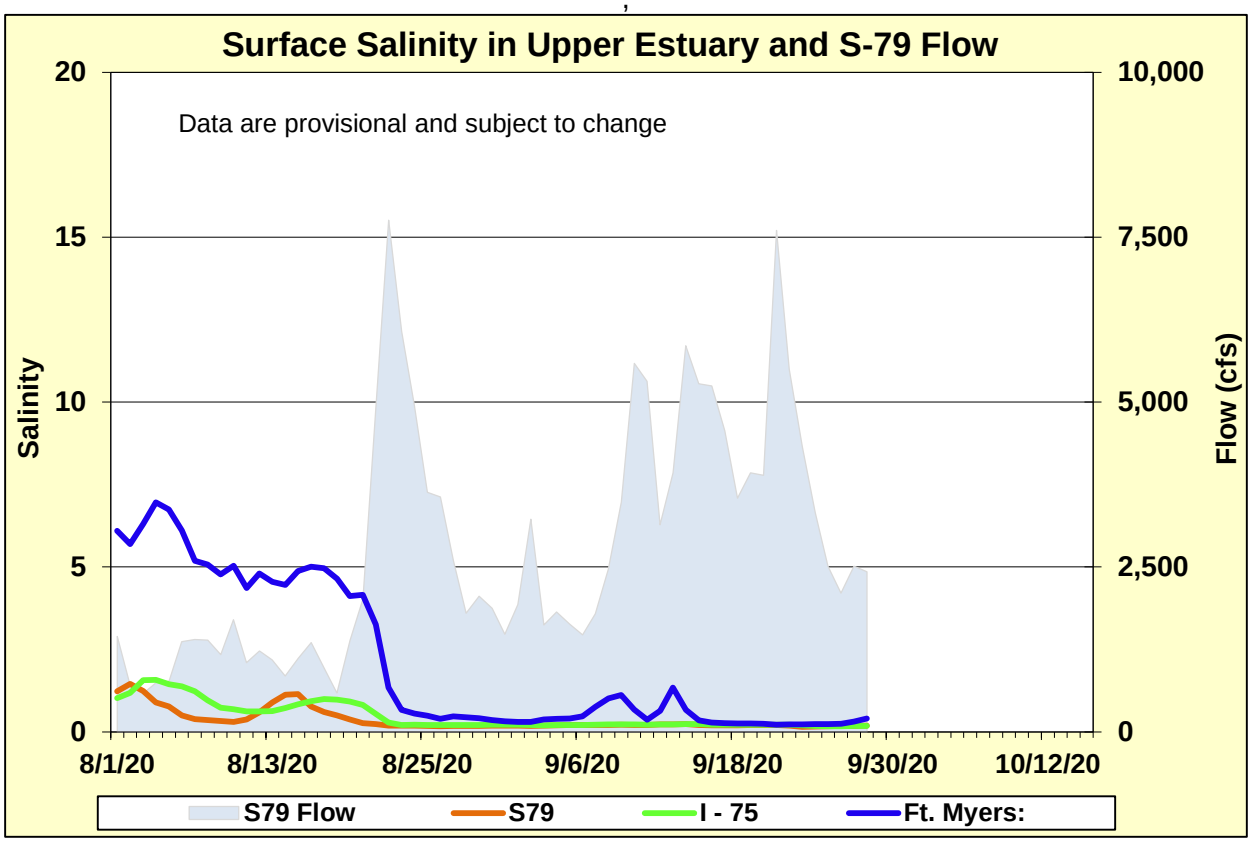


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

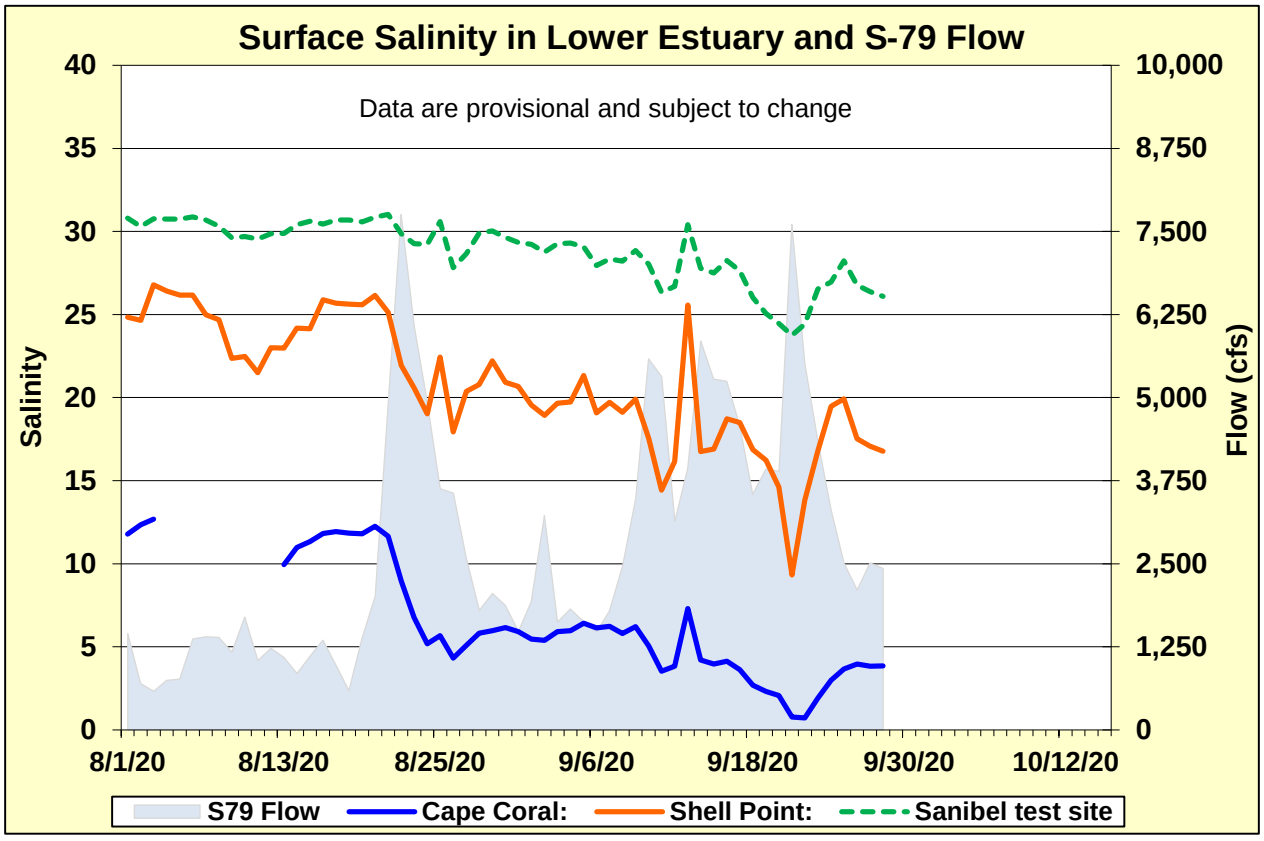


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

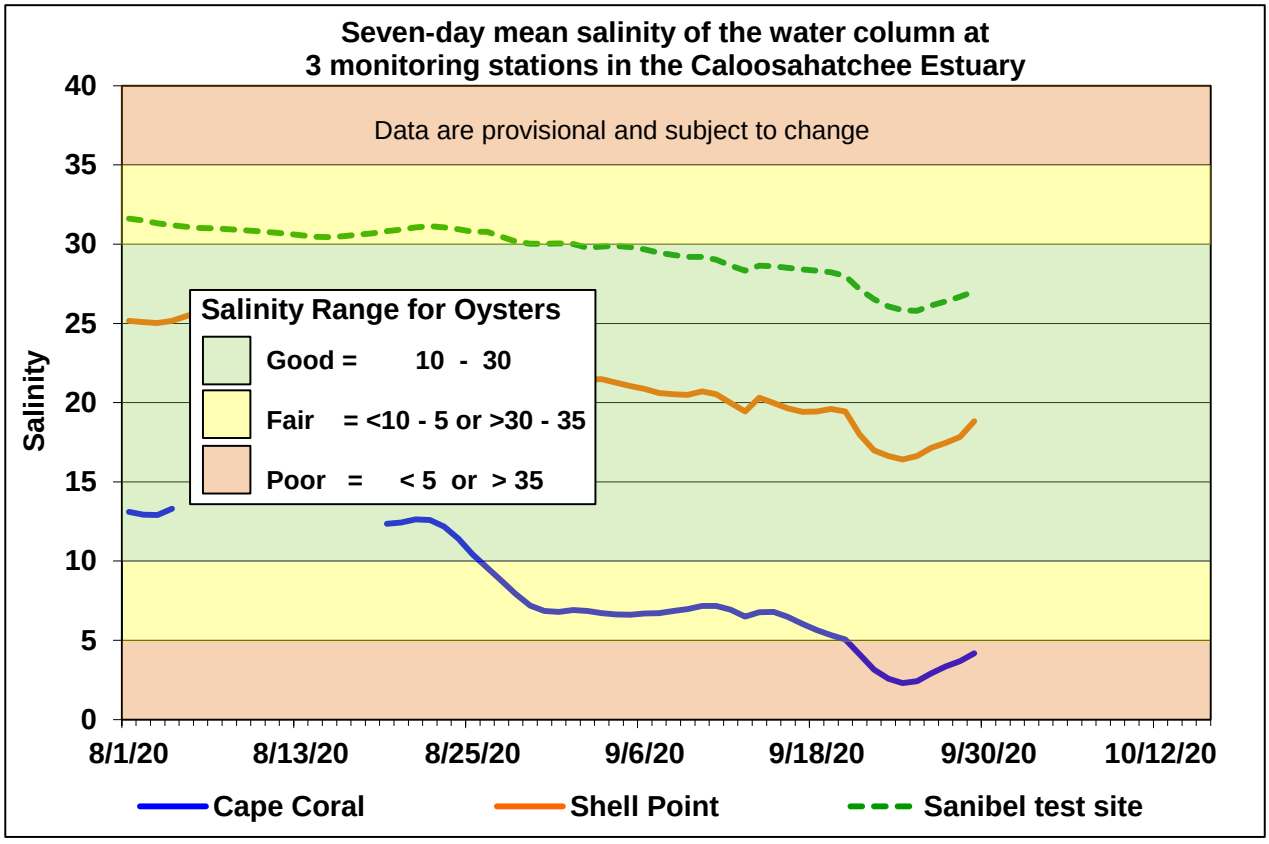


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

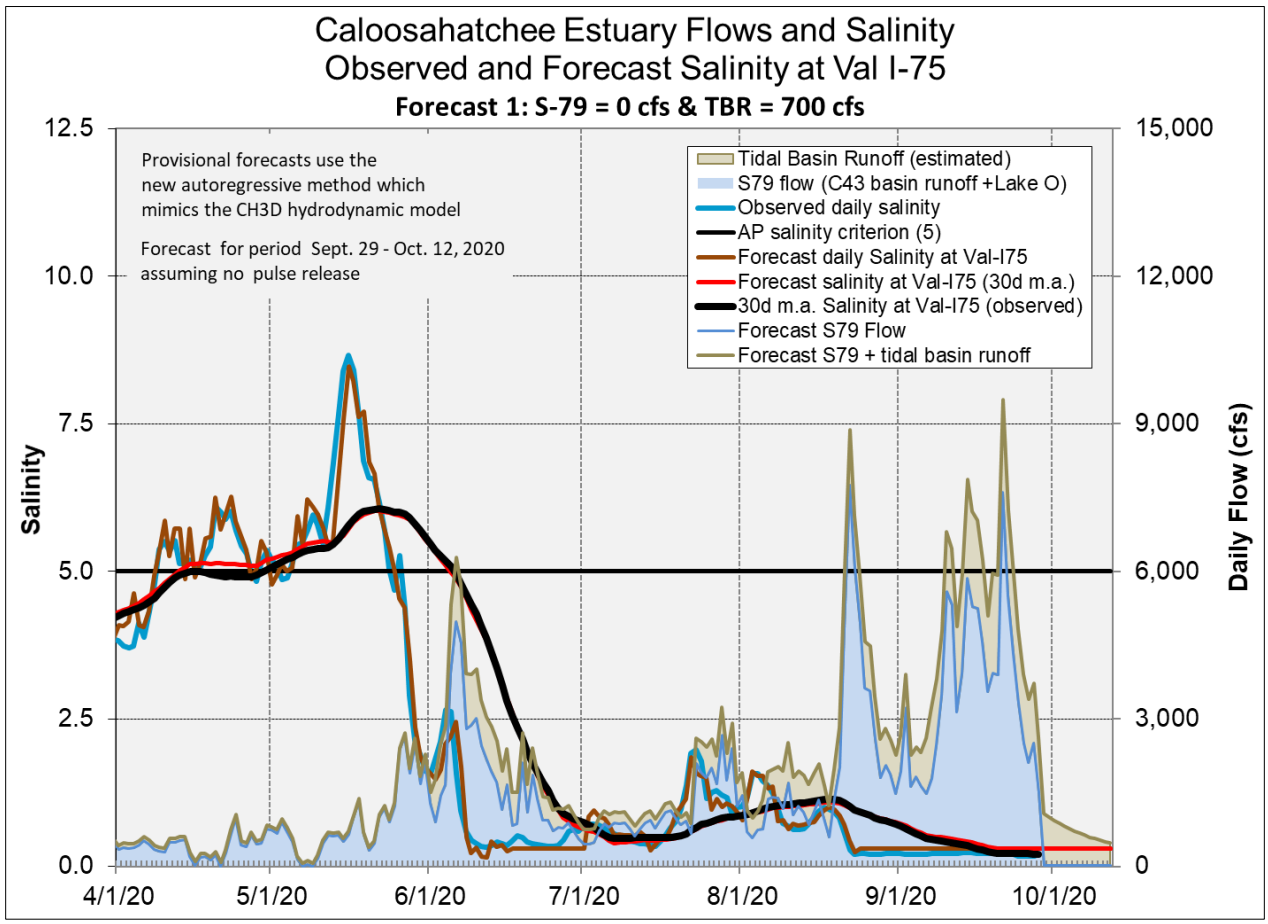
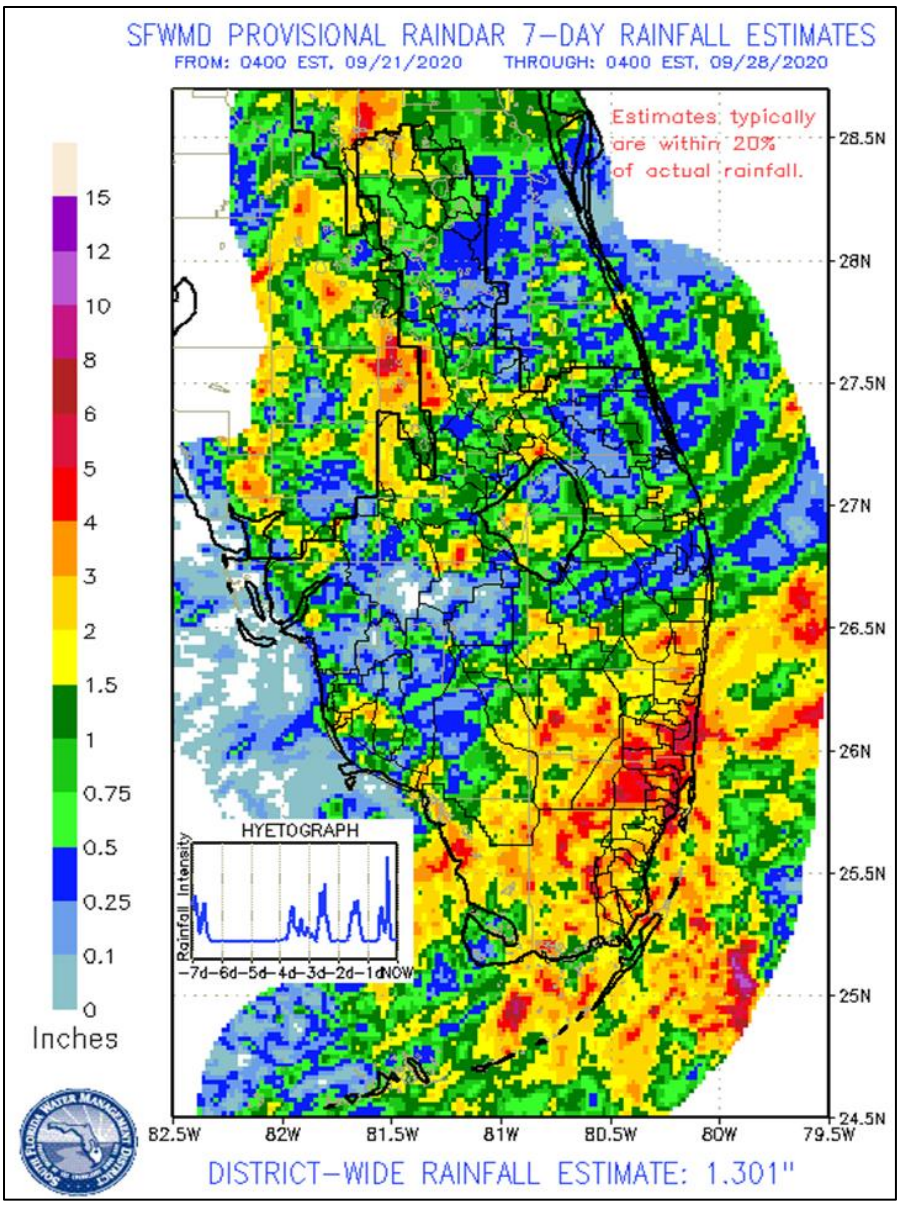


Figure 10. Forecasted Val I-75 surface salinity assuming no pulse release at S-79.

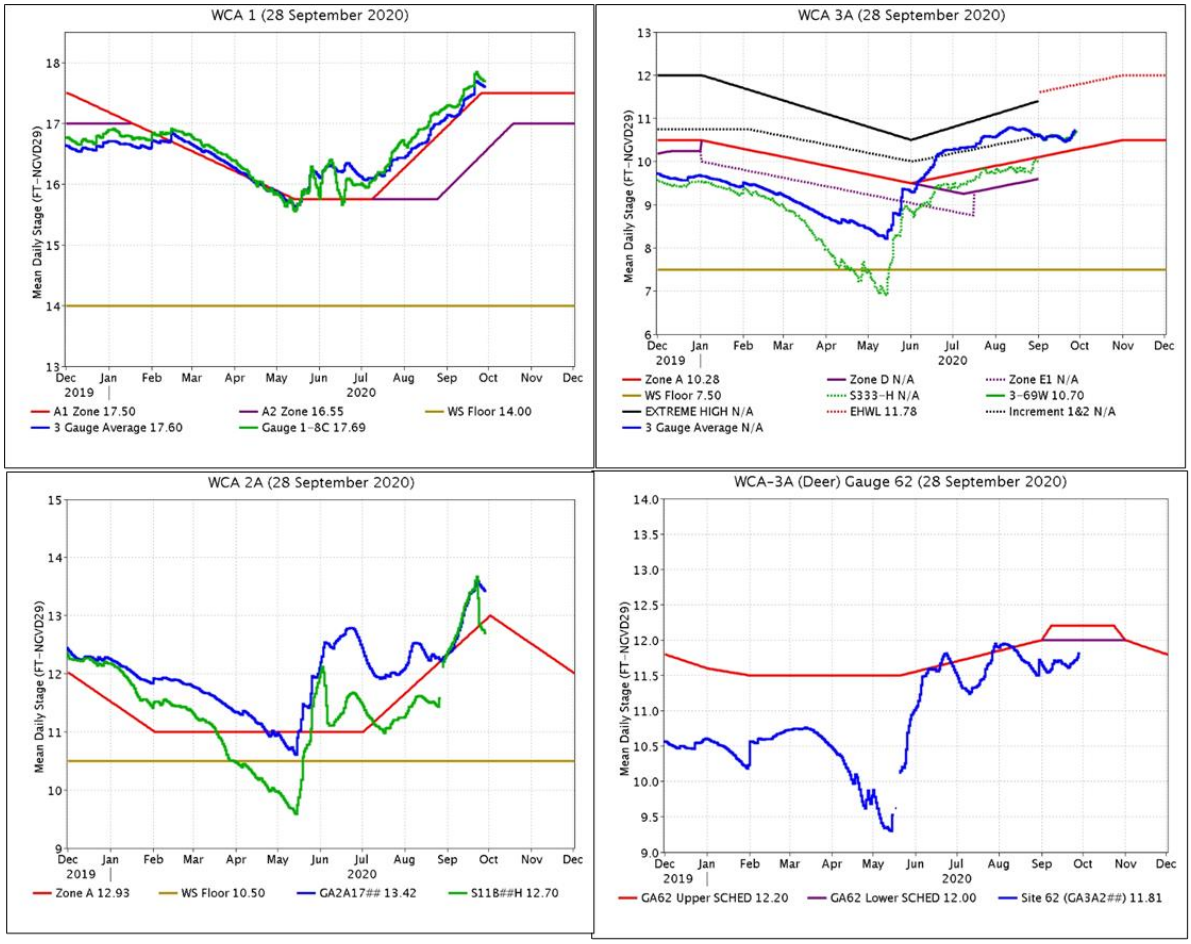
EVERGLADES

There was consistent widespread rainfall across the Everglades last week, just above average in the north with higher amounts to the south and east. At the gauges monitored for this report stages increased 0.17 feet on average, with only central WCA-2A and northern Everglades National Park experiencing a drop in stage. Evaporation was estimated at 0.91 inches last week.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	1.63	+0.05
WCA-2A	1.66	−0.01
WCA-2B	1.47	+0.31
WCA-3A	2.18	+0.27
WCA-3B	3.27	+0.21
ENP	2.36	−0.04



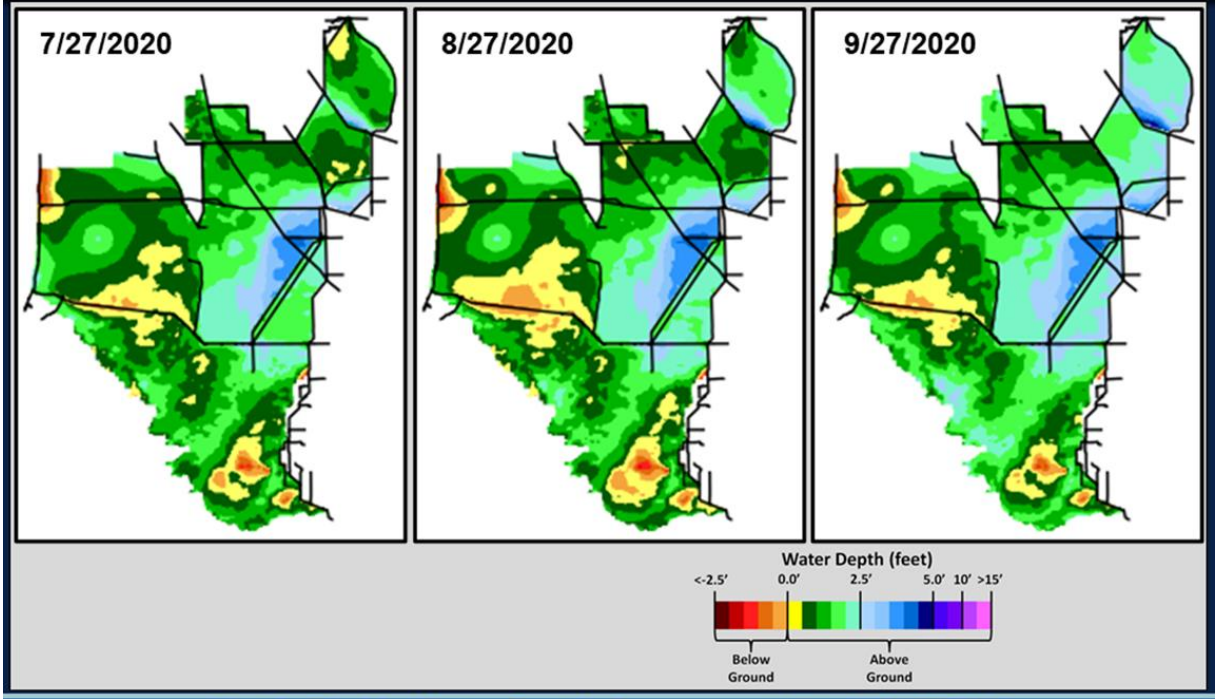
Regulation Schedules: WCA-1: Stage at the 1-8C Gauge turned down to the stable Zone A1 regulation line last week, currently 0.19 feet above and 0.09 feet above the 3-Gauge average. WCA-2A: Stage at Gauge 2-17 changed direction last week and now trends down to the rising regulation schedule, currently 0.49 feet above. WCA-3A: The Three Gauge Average trended upwards last week but generally along the rising Zone A regulation line, currently 0.48 feet above. WCA-3A: Stage at gauge 62 (Northwest corner) is currently 0.19 feet below the stable Lower Schedule and 0.39 feet below the Upper Schedule the Upper Schedule.



Water Depths: The WDAT tool for spatial interpolation of depth monthly snapshots over the last two months indicate ponding depths in WCA-3A South remain around the upper reaches of the L-67 canal. Ponding depths (>2.5') are being reached in both southern WCA-1 (for more than one month) and southern WCA-2A. Hydrologic connectivity is well established within the major sloughs in Everglades National Park, and in the west we see connections forming between Big Cypress National Preserve and Everglades National Park. Comparing WDAT water levels from present, over the last month stage changes were moderate across most the Everglades system. WCA-2A is significantly deeper in the east half of that basin. Looking back one year the stage difference patterns are generally deeper and more significant. WCA-1 and northern WCA-2A are both currently higher in stage by up to 1.5 foot.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

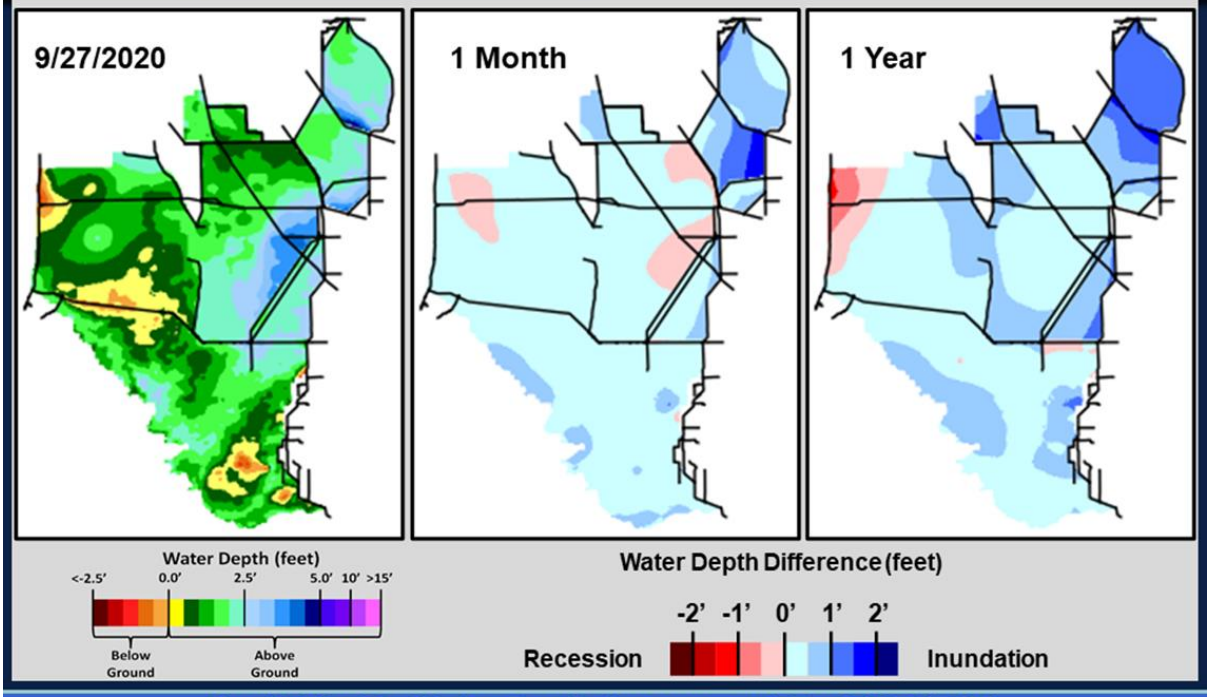
SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

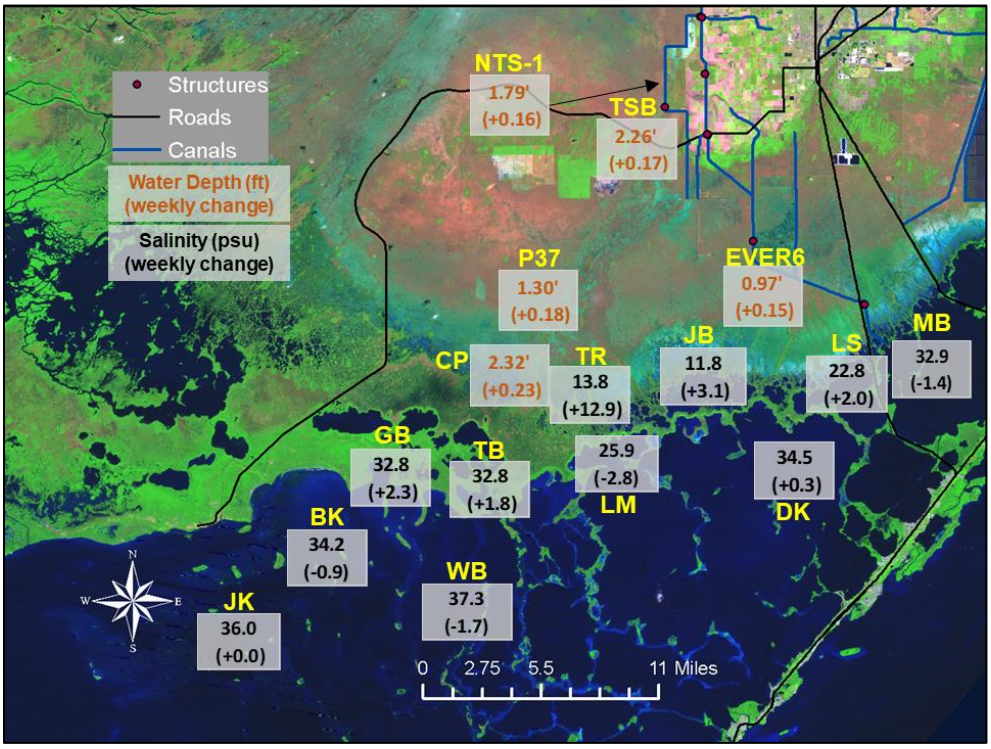
SFWDAT Everglades Difference Maps (Present – Past)

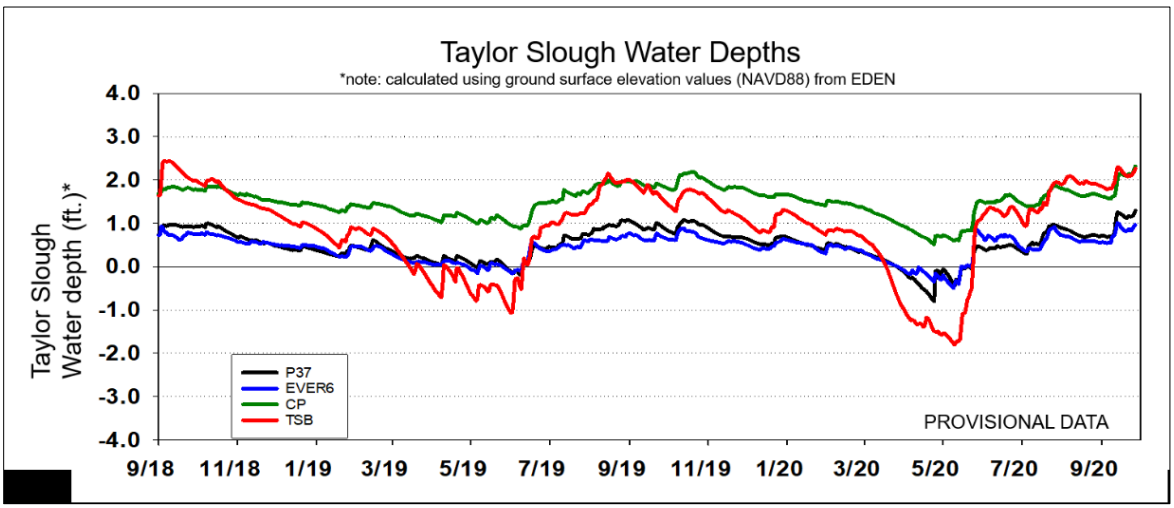


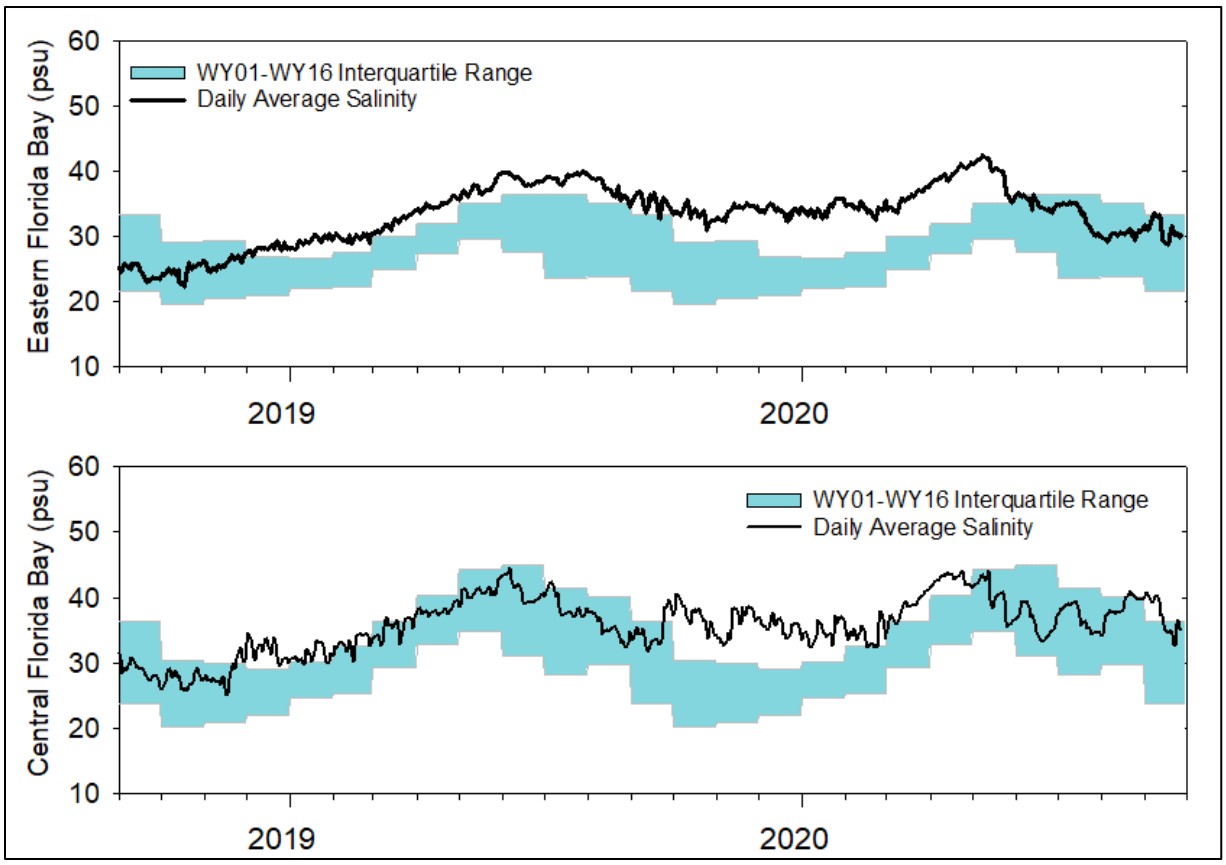
South Florida Water Depth Assessment Tool (SFWDAT)

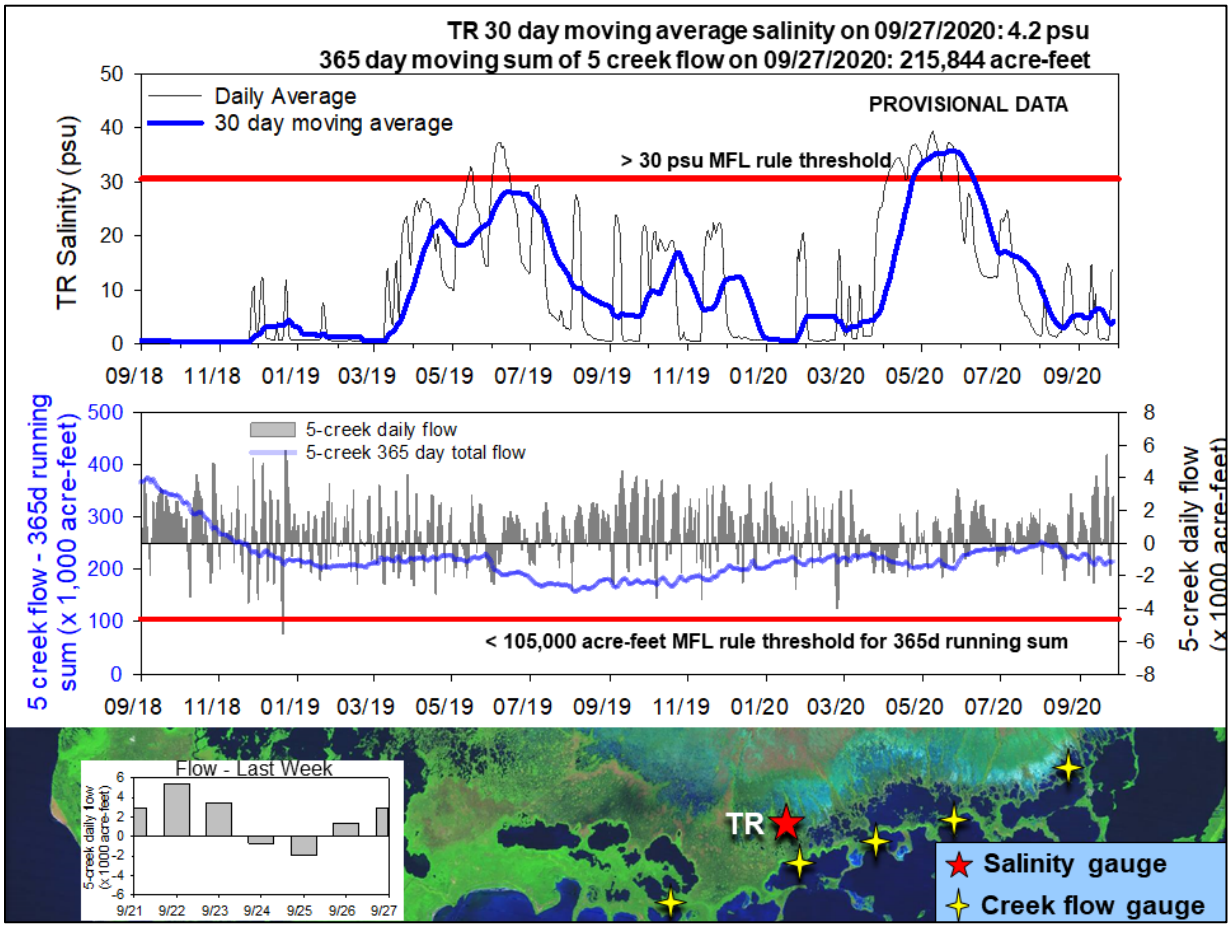
Tree island inundation in WCA-3A, WCA-3B and ENP: 371 Tree Islands of known elevation within WCA-3A, -3B, and Everglades National Park's Shark Slough. Current preliminary estimates using WDAT indicate that 49% or 183 of the tree islands are currently inundated, up from 43% the week prior. Initial islands were inundated beginning 5/24/20 and the longest duration of continuous inundation is 120 days. Inundation for more than 90 days has the potential for ecological harm, and more than 120 days increases that risk.

Taylor Slough Water Levels: An average of 2 inches of rain fell over Taylor Slough and Florida Bay this past week, and stages increased 0.18 feet on average. Northern Taylor Slough is 7 inches higher than the historical average (pre-Florida Bay Initiative) while the slough as a whole is 5 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
Central Florida Bay (psu)
WY01-WY16 Interquartile Range
Daily Average Salinity
60
50
40
30
20
10
2019
2020


TR 30 day moving average salinity on 09/27/2020: 4.2 psu
365 day moving sum of 5 creek flow on 09/27/2020: 215,844 acre-feet
TR Salinity (psu)
Daily Average
30 day moving average
PROVISIONAL DATA
> 30 psu MFL rule threshold
50
40
30
20
10
0
09/18
11/18
01/19
03/19
05/19
07/19
09/19
11/19
01/20
03/20
05/20
07/20
09/20
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)
09/18
11/18
01/19
03/19
05/19
07/19
09/19
11/19
01/20
03/20
05/20
07/20
09/20
Flow - Last Week
5-creek daily flow (x1000 acre-feet)
6
4
2
0
-2
-4
-6
9/21
9/22
9/23
9/24
9/25
9/26
9/27
TR
Salinity gauge
Creek flow gauge

Florida Bay Salinities: Salinities in Florida Bay averaged an increase of 0.5 psu with individual station changes ranging from −2.8 to +3.1 psu. Nearshore salinity is averaging 31 psu (9 psu higher than the historical average) as we move into the part of the year expected to have the lowest salinities. The 75th percentile of October in each region has the largest month to month decrease for the year so current salinities will be considered above the 75th percentile as of October 1st.

Florida Bay MFL: Another upstream push of saline water has caused the salinity at the TR station in the mangrove zone (tracked for the Florida Bay MFL) to increase from the near-fresh condition to 14 psu this past week. The 30-day moving average decreased 1.5 psu to end at 4.2 psu. Weekly flow from the 5 creeks identified by yellow stars on the map totaled +13,000 acre-feet despite the negative flows in the middle of the week. Tuesday's flow value was the highest since WY2019. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) increased 5,000 acre-feet this week to end at 215,844 acre-feet which is between the historical median (249,091 acre-feet) and the 25th percentile (192,885 acre-feet). Creek flows are provisional USGS data.

Water Management Recommendations

When water is discharged to tide its potential to benefit the ecology of the Everglades is lost. Conserving water in the WCAs and sending it southward has ecological benefit. Current climatic predictions for both tropical activity and for low rainfall amounts in the upcoming dry season makes this a particularly sensitive time of year for conserving water. Holding the water north in the system, during the historic peak creates conditions that could provide ecological benefit to the Everglades in the next season and beyond. 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. Peak stages in October in northern WCA-3A (11.5 feet NGVD 29 at gauge 3-63) provide improved conditions to support next season's wading bird nesting success at the Alley north colony by providing conditions for an increase in prey numbers as well as provide surface water that can protect it from terrestrial predators during the nesting season. Inflows or the conservation of water within this area has ecological benefit for peat soil conservation and wading bird foraging and nesting success. Ponding along the L-67 canal/levee system has increased and inundation of the tree islands in that region has now persisted for 120 days which indicates the potential to do 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. Flows towards Taylor Slough and Florida Bay freshen salinity conditions within the nearshore areas of Florida Bay and decrease the currently stressful conditions for seagrasses and fauna but require more freshwater to continue to decrease salinities in all areas of the bay towards a more ecologically preferred condition. More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

SFWMD Everglades Ecological Recommendations, September 29th, 2020 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.05'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks and conserving water in this basin has ecological benefit.	Protect upstream/downstream habitat and wildlife. Apple snail reproduction is hindered by rapidly increasing stage.
WCA-2A	Stage decreased by 0.01'	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. Apple snail reproduction is hindered by rapidly increasing stage.
WCA-2B	Stage increased by 0.31'	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. Apple snail reproduction is hindered by rapidly increasing stage.
WCA-3A NE	Stage increased by 0.48'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks. Conserving water in this region has ecological benefit.	Protect upstream/downstream habitat and wildlife. Apple snail reproduction is hindered by rapidly increasing stage.
WCA-3A NW	Stage increased by 0.24'	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 0.14'	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. Apple snail reproduction is hindered by rapidly increasing stage, and and tree island ecology is dimineshed by flooding
Southern WCA-3A S	Stage increased by 0.23'		
WCA-3B	Stage increased by 0.21'	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. Apple snail reproduction is hindered by rapidly increasing stage.
ENP-SRS	Stage decreased by 0.04'	Make discharges to the Park according to the 2012 WCP rainfall plan	Protect upstream/downstream habitat and wildlife. Apple snail reproduction is hindered by rapidly increasing stage.
Taylor Slough	Stage changes ranged from +0.15' to +0.23'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −2.8 to +3.1 psu	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.