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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: October 27, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A weak cold front located over north Florida will push southward through the northern half of the District by this evening and a little farther south by Wednesday morning. Drier and stable continental air spreading southward is already reaching the northern part of the District ahead of the cold front and will eventually overspread the remainder of the District by late today and tonight. Moisture levels over the southern third of the area should be high enough early today to cause limited, fast-moving shower activity but with generally little average rainfall expected. Very warm temperatures are also expected today with westerly winds and daytime maxima approaching 90 degrees along and near the east coast. After the weak frontal passage by Wednesday morning, a noticeable cooling should occur area wide that should extend through Wednesday. A vigorous upper-air disturbance crossing the southern and central Plains on Wednesday will emerge stronger over the lower to middle Mississippi River Valley on Thursday, preceded by a strong southern branch of the jet stream that will intersect the northern jet stream over the Gulf of Mexico. As the strengthening storm system taps Gulf moisture, strong atmospheric 'forcing' associated with the combined jet streams should produce an extensive area of rain, part of which could include a large thunderstorm complex and/or squall line racing across the Gulf of Mexico from late Wednesday through Thursday. Rains could begin reaching the west coast of the District overnight Wednesday, but the more substantial rains are likely to arrive over the western part of the District Thursday morning and afternoon, possibly accompanied by isolated severe weather. Elsewhere across the District scattered to locally numerous fast-moving showers and thunderstorms are likely by the afternoon but with rains beginning to diminish during the evening and confined to the southern half or two-thirds of the area. When the storm system moves into the mid-South on Friday, its associated cold front will push through the northwestern half of the District Friday morning and off the southeast coast of Florida Friday afternoon. Ahead of the front, windy and warm conditions are forecast, with west-southwesterly to westerly winds gusting as high as 30 to 35 mph. Following the frontal passage, cooler and generally drier weather will overspread the District with westerly to northwesterly winds of 20 to 30 mph gusting to as high as 40 mph in some areas. The cooler air crossing the warm Gulf of Mexico will generate enough low-level instability to produce fast-moving shower activity that could spread into the western

part of the District Friday afternoon. The rains could continue into the evening and overnight but should be confined to the coastal west. The west-coast rains should gradually diminish on Saturday as the coolest air mass so far this fall season settles in across the area by Sunday. The lack of moisture and high atmospheric stability should ensure no measurable total rainfall through at least Sunday. On Monday, an onshore wind flow and shallow moisture could induce some east-coast shower activity, but at this time range, little areal average rainfall is foreseen.

Kissimmee

Flow at S-65A continues to be too low for complete inundation of the Kissimmee River floodplain, and mean floodplain water depth declined to 0.84 feet by October 24, 2021. The concentration of dissolved oxygen in the Kissimmee River has been improving, with an average of 3.5 mg/L for the week ending on October 24, 2021.

Lake Okeechobee

Lake Okeechobee stage was 15.85 feet NGVD on October 24, 2021 and it was 0.54 feet higher than a month ago (**Figure LO-1**). Lake stage is currently 0.35 feet above the ecological envelope, having been either above or at the very top of the envelope for all of 2021 (**Figure LO-2**). Average daily outflows (excluding evapotranspiration) increased from the previous week going from 0 cfs to 260 cfs. Recent satellite imagery (October 21, 2021) showed low to medium bloom potential in the western part of the Lake (**Figure LO-6**).

Estuaries

Total inflow to the St. Lucie Estuary averaged approximately 430 cfs over the past week with no flow coming from Lake Okeechobee. Mean surface salinities increased at all sites in the estuary over the past week. Salinity at the US1 Bridge was in the good range (10-26) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 1,120 cfs over the past week with 40 cfs coming from the Lake. Mean surface salinities remained low at S-79 and increased at all remaining sites in the estuary over the past week. Salinities were in the good range (0-10) for tape grass at Val I-75 and Ft. Myers. Salinities were also in the good range (10-30) for adult eastern oysters at Sanibel and Shell Point and in the fair range at Cape Coral.

Stormwater Treatment Areas

For the week ending Sunday, October 24, 2021, 100 ac-feet of Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2022 (since May 1, 2021) is approximately 61,100 ac-feet. The total amount of inflows to the STAs in WY2022 is over 800,000 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, STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown, 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 for construction activities. Operational restrictions are in effect in STA-1E

Central Flow-way and STA-2 Flow-ways 3 and 4 vegetation management activities. This week, there is no capacity for Lake releases in the STAs.

Everglades

Rehydration rates were generally poor across the Everglades. Depths in WCA-3A North remain below the average for this time of the year and tree island model output indicate drier than average conditions. Florida Bay salinities increased over the last week and stages remained essentially the same on average in Taylor Slough. Both central and western Florida Bay remain above the 75th percentile of the historical average for this time and trended upwards last week. Most of the Bay remains marine, a bad position to start the dry season.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On October 24, 2021, lake stages were 57.2 feet NGVD (0.5 feet below schedule) in East Lake Toho, 54.0 feet NGVD (0.7 feet below schedule) in Lake Toho, and 50.3 feet NGVD (1.9 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

Discharges to the Kissimmee River on October 24, 2021 were 1,280 cfs at S-65 and 1,230 cfs at S-65A; discharges from the Kissimmee River were 1,660 cfs at S-65D and 1,710 cfs at S-65E (**Table KB-2**). Headwater stages were 46.2 feet NGVD at S-65A and 27.4 feet NGVD at S-65D on October 24, 2021. With lower water temperatures, little rainfall, and reduced discharge at S-65A, the concentration of dissolved oxygen in the Kissimmee River has been improving, with an average of 3.5 mg/L for the week ending on October 24, 2021 (**Table KB-2, Figure KB-4**). Flow at S-65A remains too low for complete inundation of the Kissimmee River floodplain, and mean floodplain depth decreased to 0.84 feet by October 24, 2021 (**Figure KB-5**).

Water Management Recommendations

Discharge was reduced by 200 cfs last week to slow the stage decline in KCH. Maintain at least 1200-1400 cfs at S65/S65A while stage in KCH is at or above 50 ft NGVD, per the IS-14-50 discharge plan (**Figure KB-6**).

Table KB-1. Average discharge for the preceding seven days and Sunday's average daily stage and departures from KCL flood regulation or temporary schedules. All data are provisional.

Water Body	Structure	Stage Monitoring Site	7-Day Average Discharge (cfs)	Lake Stage (feet NGVD) ^a	Schedule Type ^b	Schedule Stage (feet NGVD)	Departure from Regulation (feet)	
							10/24/21	10/17/21
Lakes Hart and Mary Jane	S-62	LKMJ	0	60.3	R	60.7	-0.4	-0.2
Lakes Myrtle, Preston and Joel	S-57	S-57	5	61.7	R	61.7	0.0	0.1
Alligator Chain	S-60	ALLI	0	63.6	R	63.8	-0.2	0.1
Lake Gentry	S-63	LKGT	0	61.3	R	61.4	-0.1	0.0
East Lake Toho	S-59	TOHOE	0	57.2	R	57.7	-0.5	-0.2
Lake Toho	S-61	TOHOW S-61	0	54.0	R	54.7	-0.7	-0.4
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	1,338	50.3	R	52.2	-1.9	-1.3

a. Names of in-lake monitoring sites and structures used to determine lake stage. If more than one site is listed, an average is reported.

b. A: projected recession line; R: USACE regulation schedule; S: temporary recession target line; T: temporary schedule; NA: not applicable or not available.

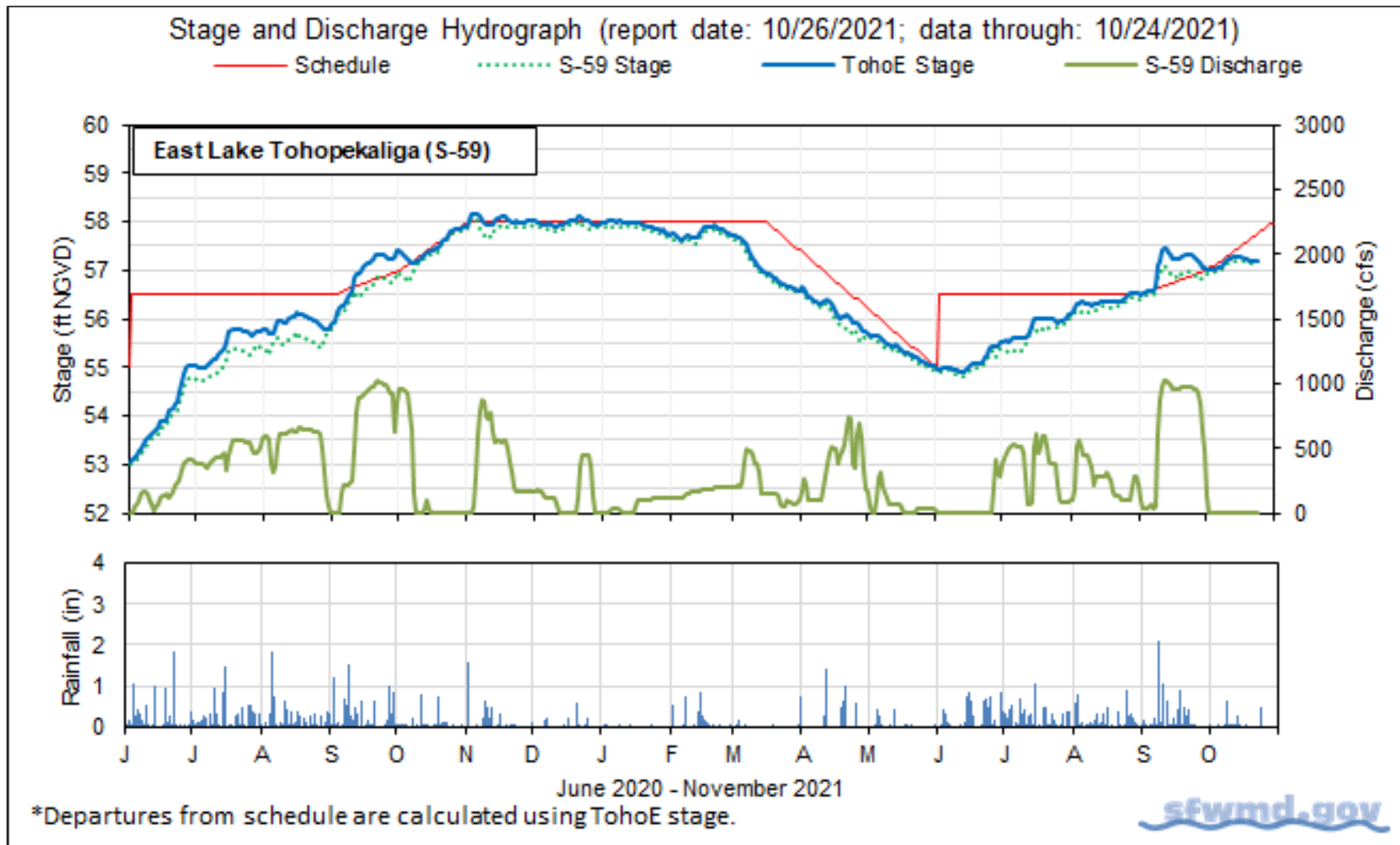


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

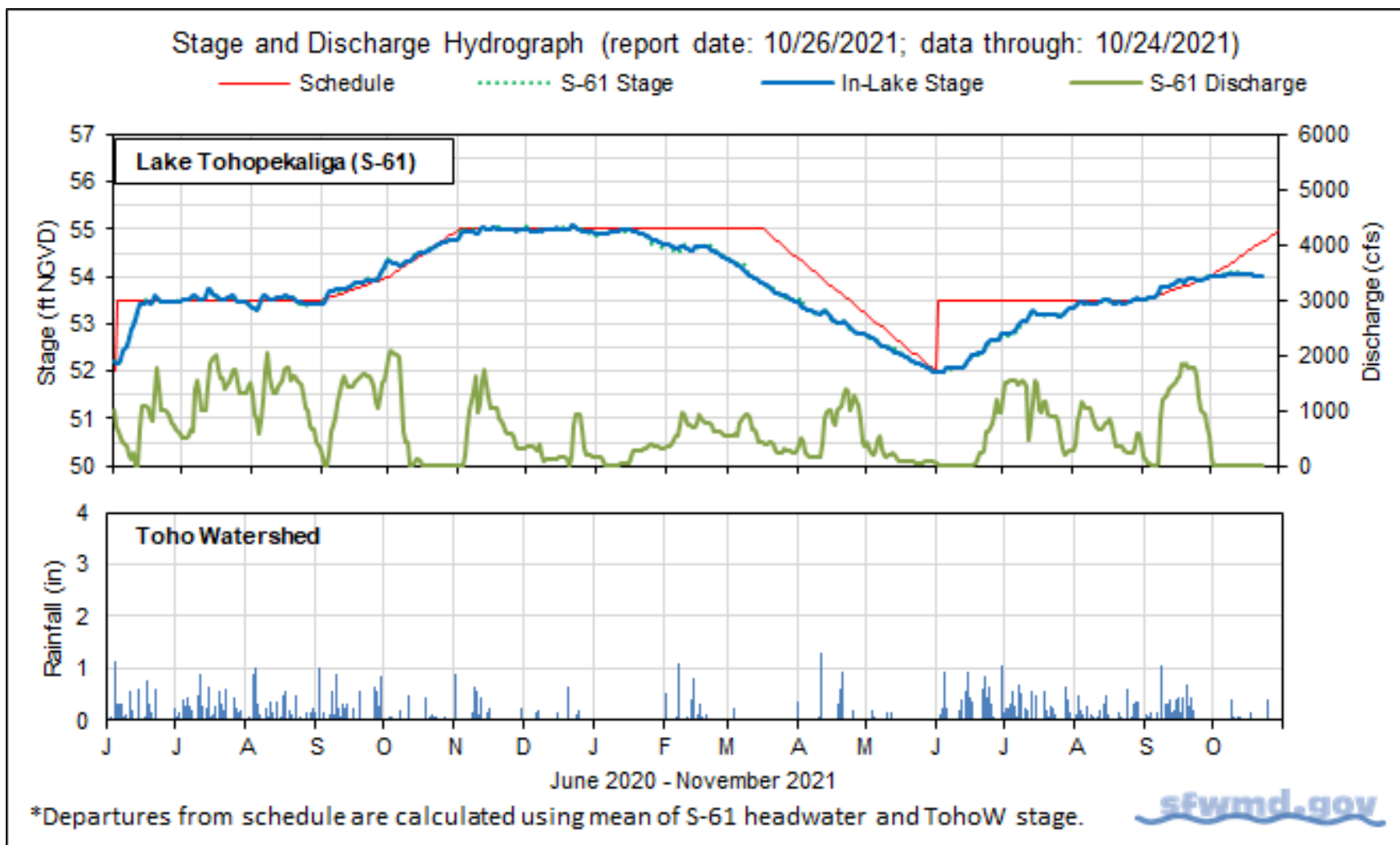


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

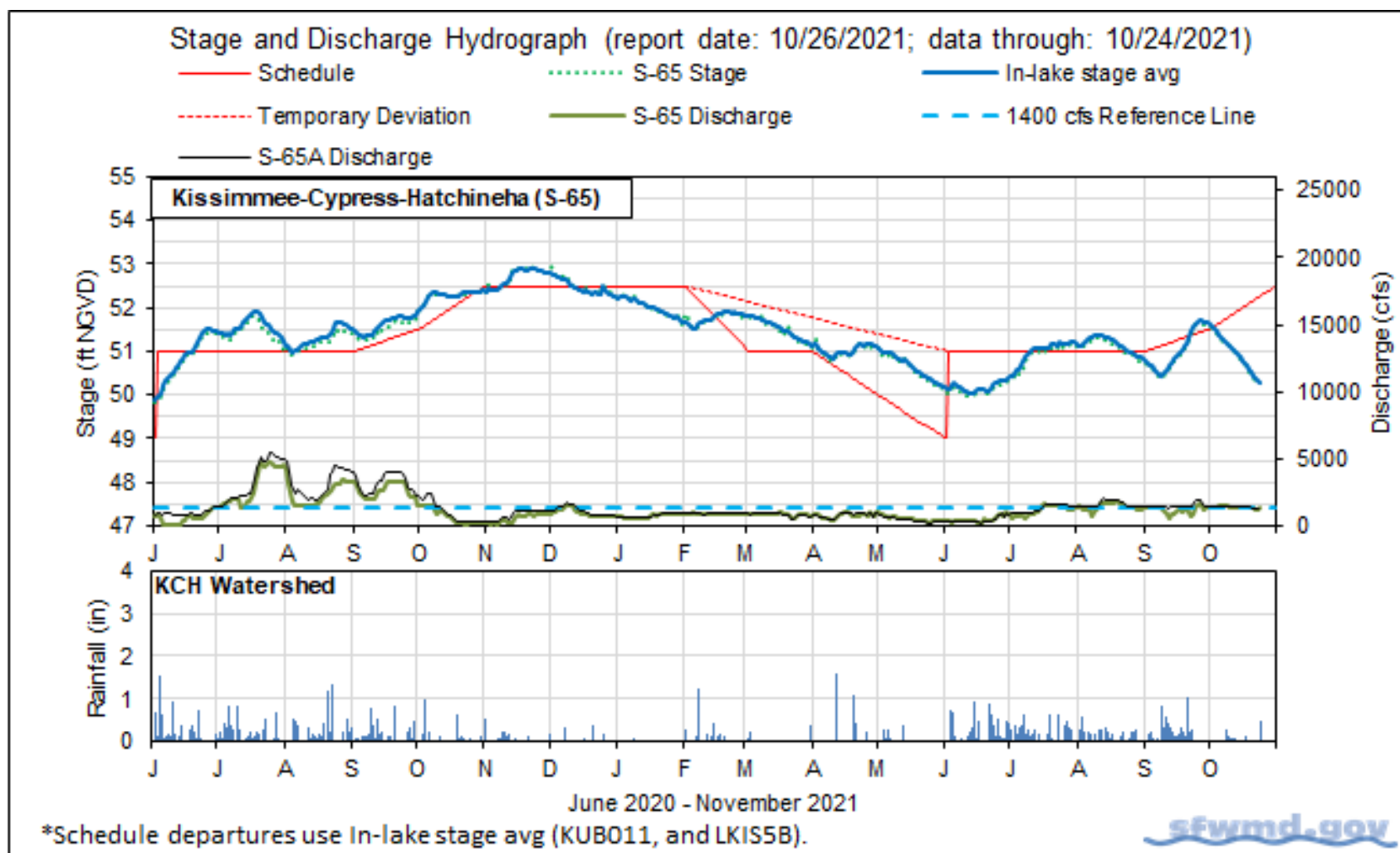


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

Table KB-2. One- and seven-day average discharge and stage at Lower Kissimmee basin structures, river channel dissolved oxygen concentrations and water depths in the Phase I area floodplain. All data are provisional.

Metric	Location	Daily Average	Average for Previous Seven Day Periods			
		10/24/21	10/24/21	10/17/21	10/10/21	10/3/21
Discharge	S-65	1,280	1,340	1,380	1,440	1,340
Discharge	S-65A ^a	1,230	1,310	1,410	1,460	1,500
Headwater Stage (feet NGVD)	S-65A	46.2	46.3	46.4	46.4	46.2
Discharge	S-65D ^b	1,660	1,680	1,760	2,030	2,880
Headwater Stage (feet NGVD)	S-65D ^c	27.4	27.7	28.5	28.5	28.6
Discharge (cfs)	S-65E ^d	1,710	1,740	1,850	2,150	3,010
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	3.5	3.5	2.7	2.1	0.9
Mean depth (feet) ^f	Phase I floodplain	0.84	0.86	0.96	1.07	1.40

a. Combined discharge from main and auxiliary structures.

b. Combined discharge from S-65D, S-65DX1 and S-65DX2.

c. Average stage from S-65D and S-65DX1.

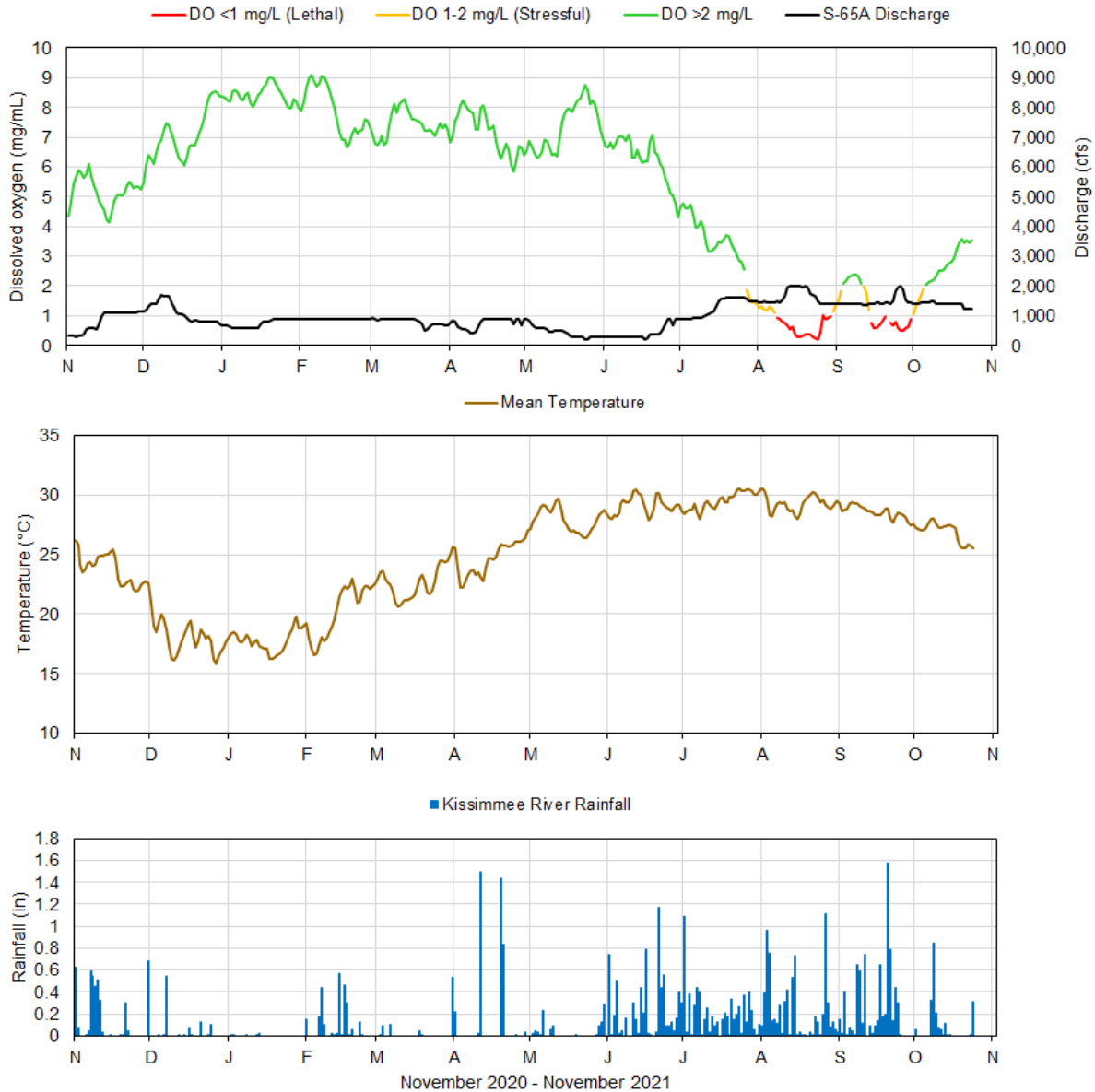
d. Combined discharge from S-65E and S-65EX1.

e. Dissolved oxygen is the average of values from sondes KRBN, PC62, PC63, PD62R and PD42R.

f. One-day spatial average obtained from the South Florida Water Depth Assessment Tool (SFWDAT).

Table KB-3. Discharge rate of change limits for S65/S-65A (revised 1/14/19).

Discharge (cfs)	Maximum Rate of Increase (cfs/day)	Maximum Rate of Decrease (cfs/day)
0-300	100	-50
301-650	150	-75
651-1,400	300	-150
1,401-3,000	600	-600
>3,000	1,000	-2,000



Report Date: 10/26/2021; data are through: 10/24/2021



Figure KB-4. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRBN, PC33, PD62R, and PD42R with an average of four stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

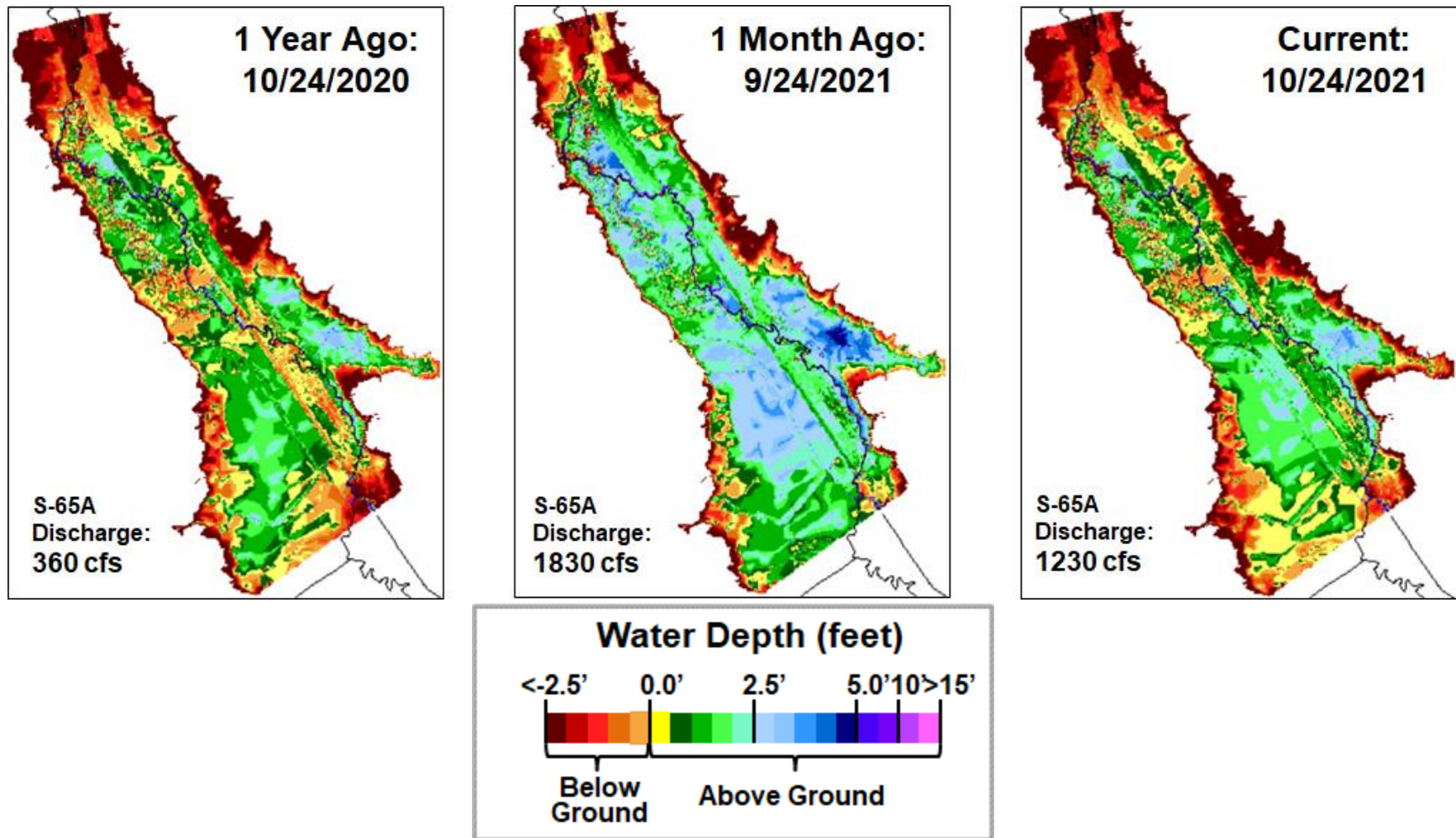


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Stage and Discharge Guidance for 2021-2022.

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

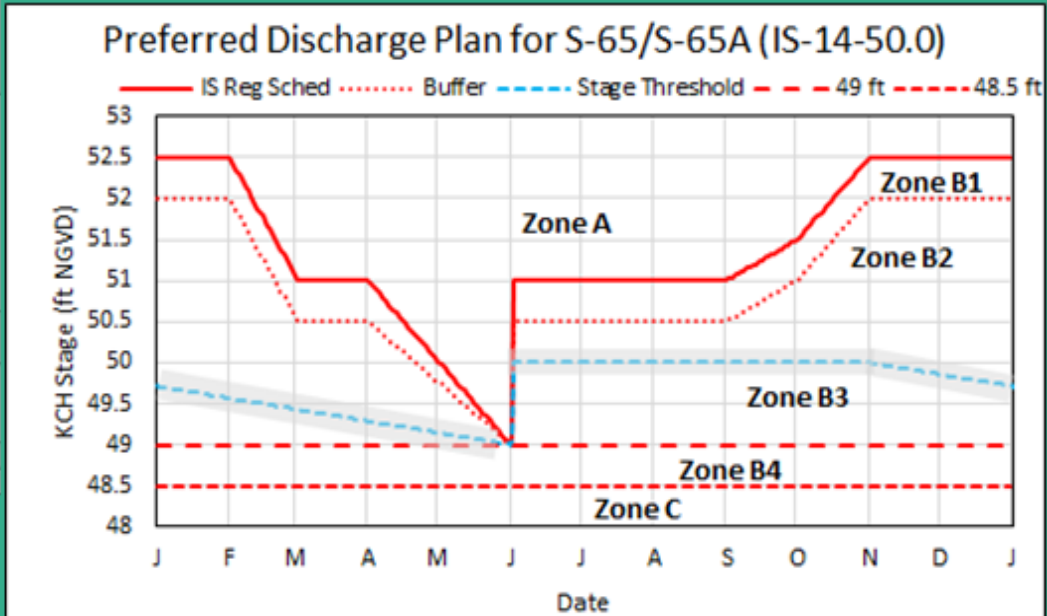
*Changes in discharge should not exceed limits in inset table below.

Table KB-3. Discharge Rate of Change Limits for S65/S65A (revised 1/14/19).

Q (cfs)	Maximum rate of INCREASE (cfs/day)	Maximum rate of DECREASE (cfs/day)
0-300	100	-50
301-650	150	-75
651-1400	300	-150
1401-3000	600	-600
>3000	1000	-2000

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2021-2022 Discharge Plan for S-65/S-65A



Other Considerations

- When possible, limit lake ascension rate in the Jun 1 - Aug 15 window to 0.25 ft per 7 days in Lakes Kissimmee, Cypress, Hatchineha (S-65), East Toho (S-59) and Toho (S-61).
- If outlook is for extreme dry conditions meet with KB staff to discuss modifications to this plan.

Slide Revised 6/1/2021

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Figure KB-6. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

Lake Okeechobee

Lake Okeechobee stage was 15.85 feet NGVD on October 24, 2021 and it was 0.54 feet higher than a month ago (**Figure LO-1**). Lake stage is currently 0.35 feet above the ecological envelope, having been either above or at the very top of the envelope for all of 2021 (**Figure LO-2**). Lake stage remained in the Low sub-band last week (**Figure LO-3**). According to NEXRAD, 0.22 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 4,310 cubic feet per second (cfs) to 2,960 cfs. Average daily outflows (excluding evapotranspiration) increased from the previous week going from 0 cfs to 260 cfs. Most of the inflows (1,740 cfs) came from the Kissimmee River through S-65E & S-65EX1 structures. The second and third highest inflows were received from the Indian Prairie basins (670 cfs) and Fisheating Creek (390 cfs), respectively. There was no outflow to the east via S-308, while outflow to the west via S-77 was 110 cfs and to the south via S-351, S-352 and S-354 was 200 cfs. There was a backflow from the L-8 canal via the S-271 structure at the average daily rate of 50 cfs. **Figures LO-4 and LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively. These data are provisional and are subject to change.

The most recent satellite image (October 21, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed low to medium bloom potential in the western part of the Lake (**Figure LO-6**). The October 18 - 20, 2021 survey results revealed that 69% of the sites had microcystin concentrations below detection levels. The highest concentration was detected at LZ30 (3.2 µg/L) in southwestern part of the Lake. Approximately 22% of the sites had communities dominated by *Microcystis aeruginosa*, while the rest of the sites had either mixed communities or communities co-dominated by *M. aeruginosa* and *Cylindrospermopsis raciborskii*. The October 18 - 20, 2021 survey results are shown in **Table LO-1** and **Figure LO-7**.

Changes in Water Depth

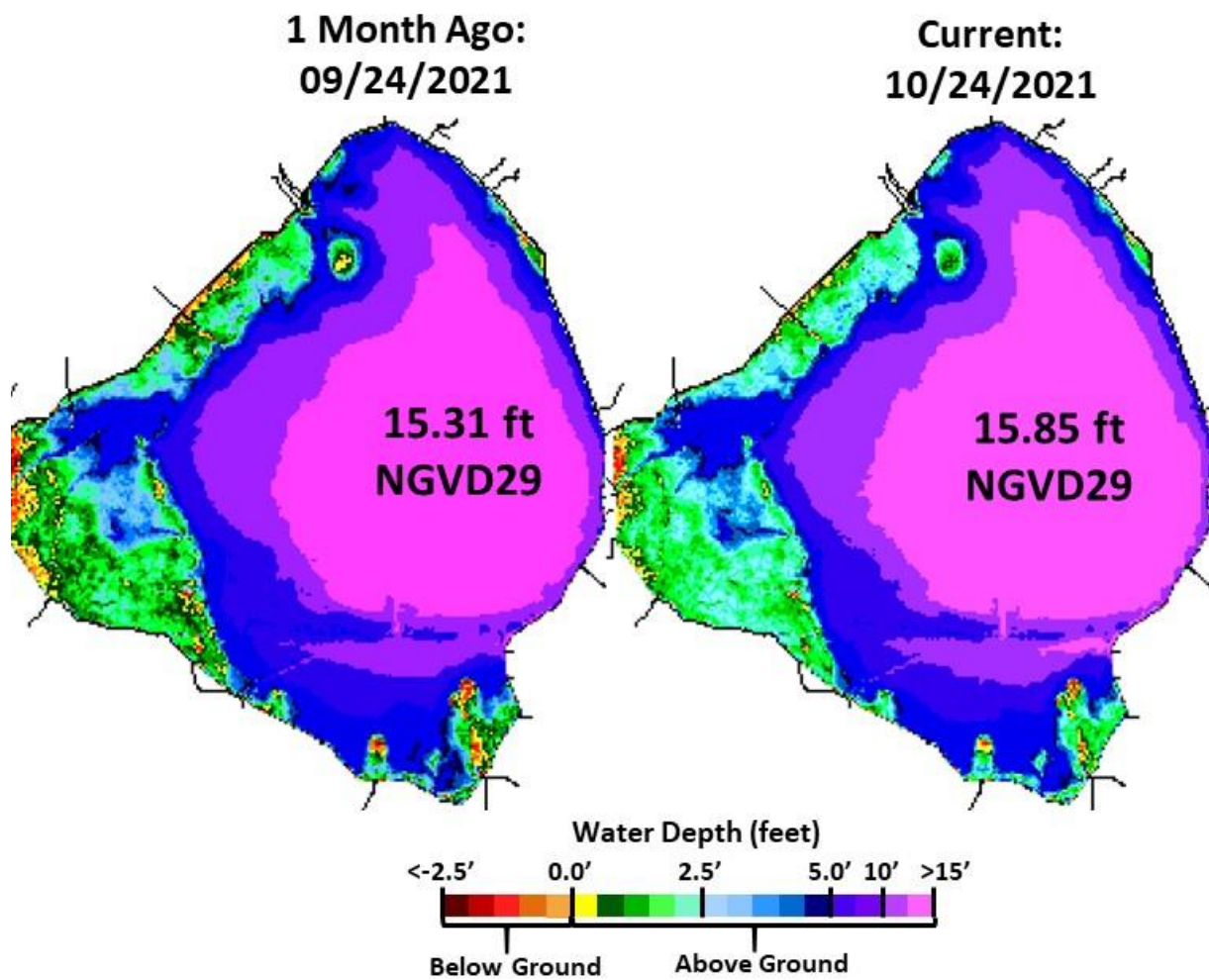


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

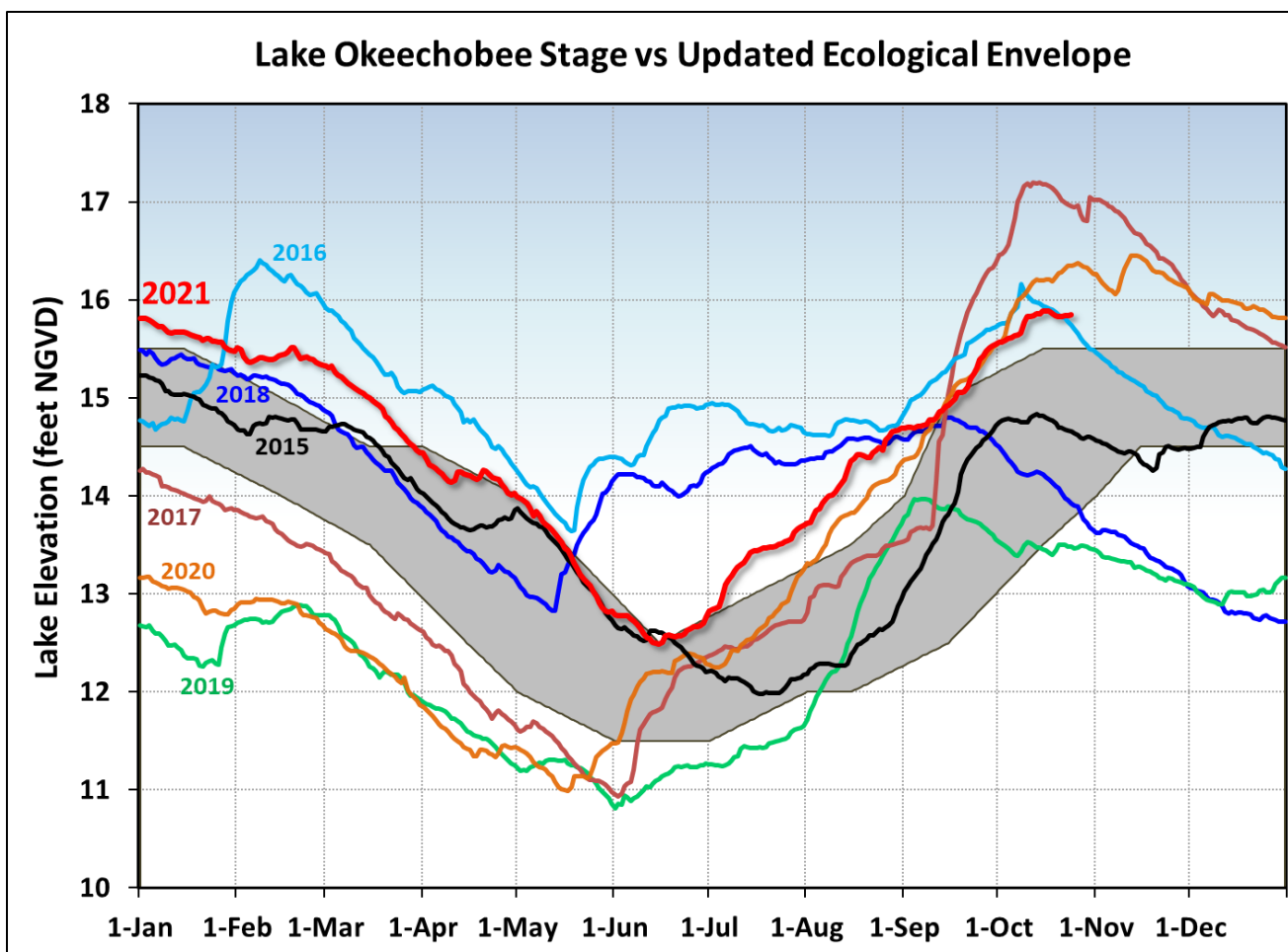


Figure LO-2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated ecological envelope.

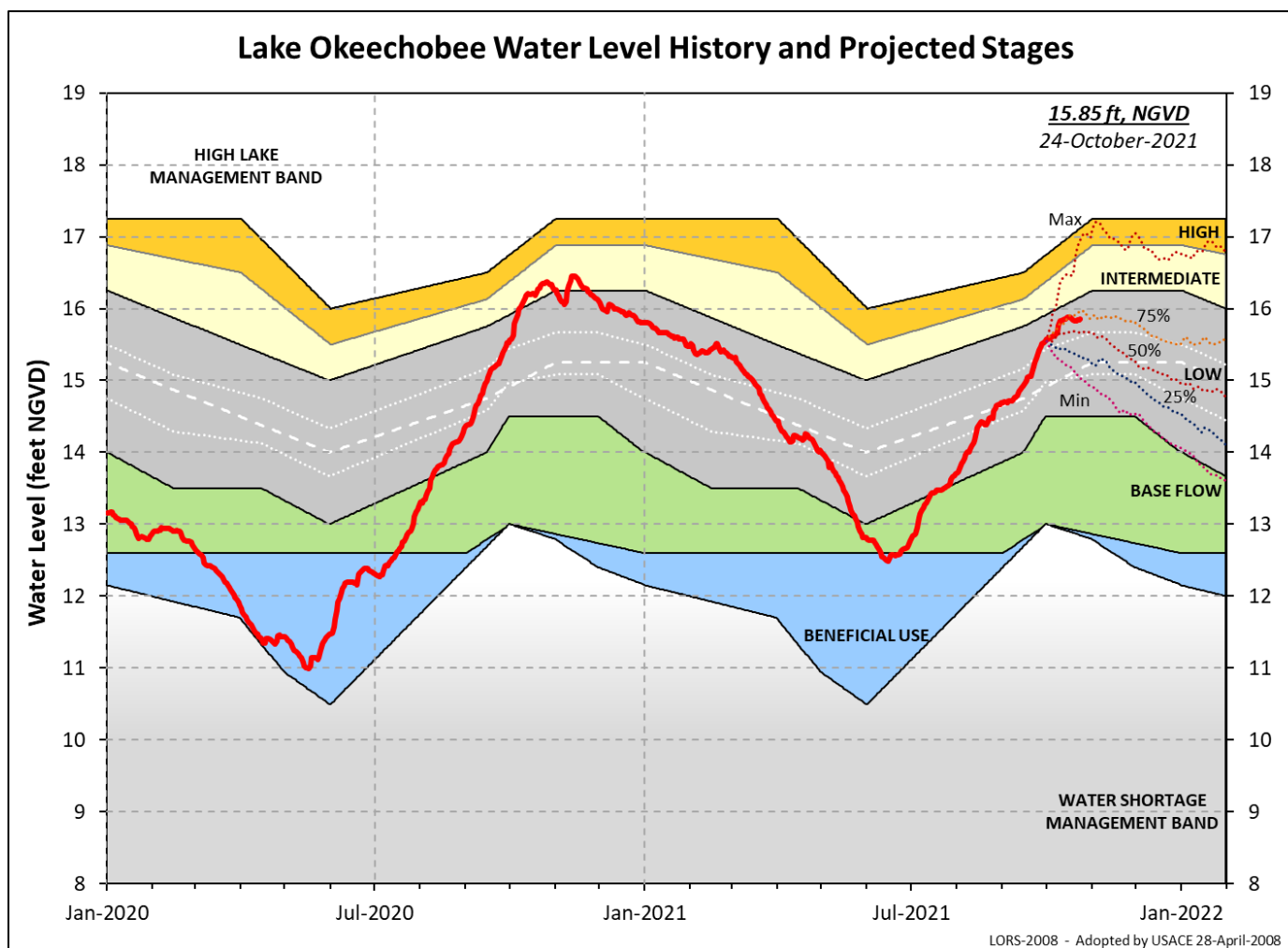


Figure LO-3. Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

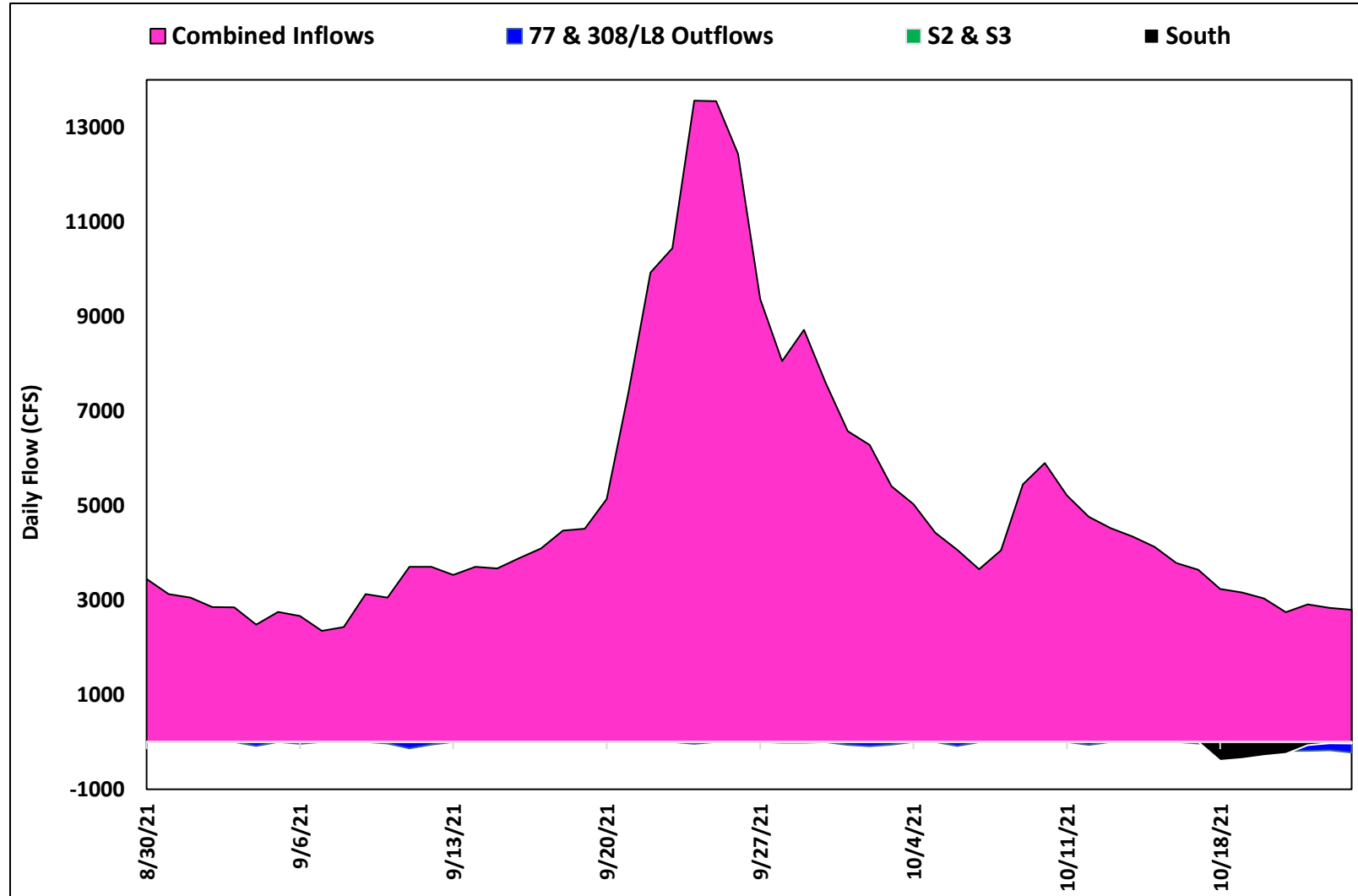
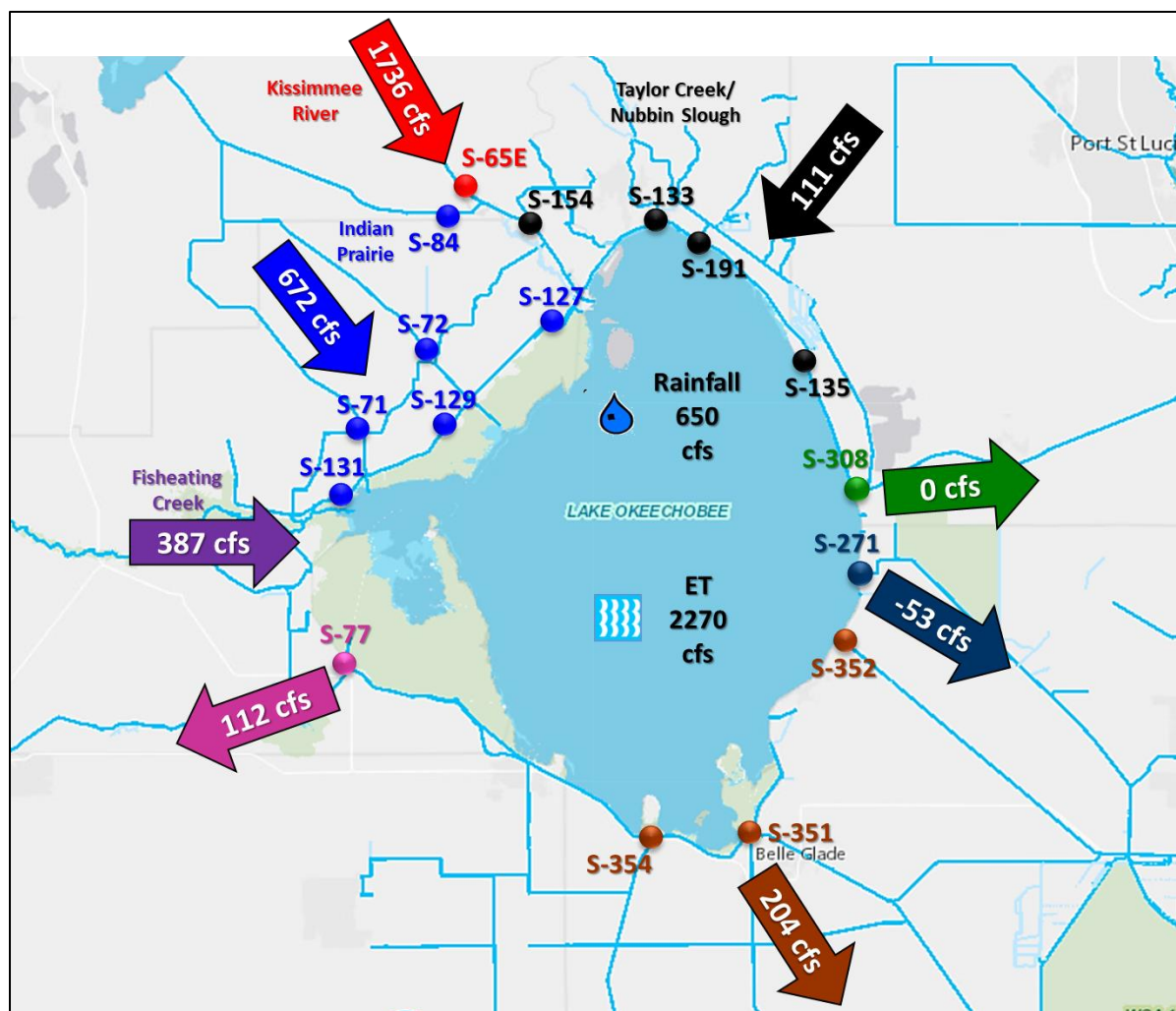


Figure LO-4. Major inflows (pink) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in black. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from Lake Okeechobee into the L-8 or C-44 canals are included with outflows. Inflows are shown as positive values; outflows are negative. Outflows through the S-77 (Caloosahatchee) and S-308 (C-44 Canal) structures are based on downstream gauges to include flows to lock openings for navigation.



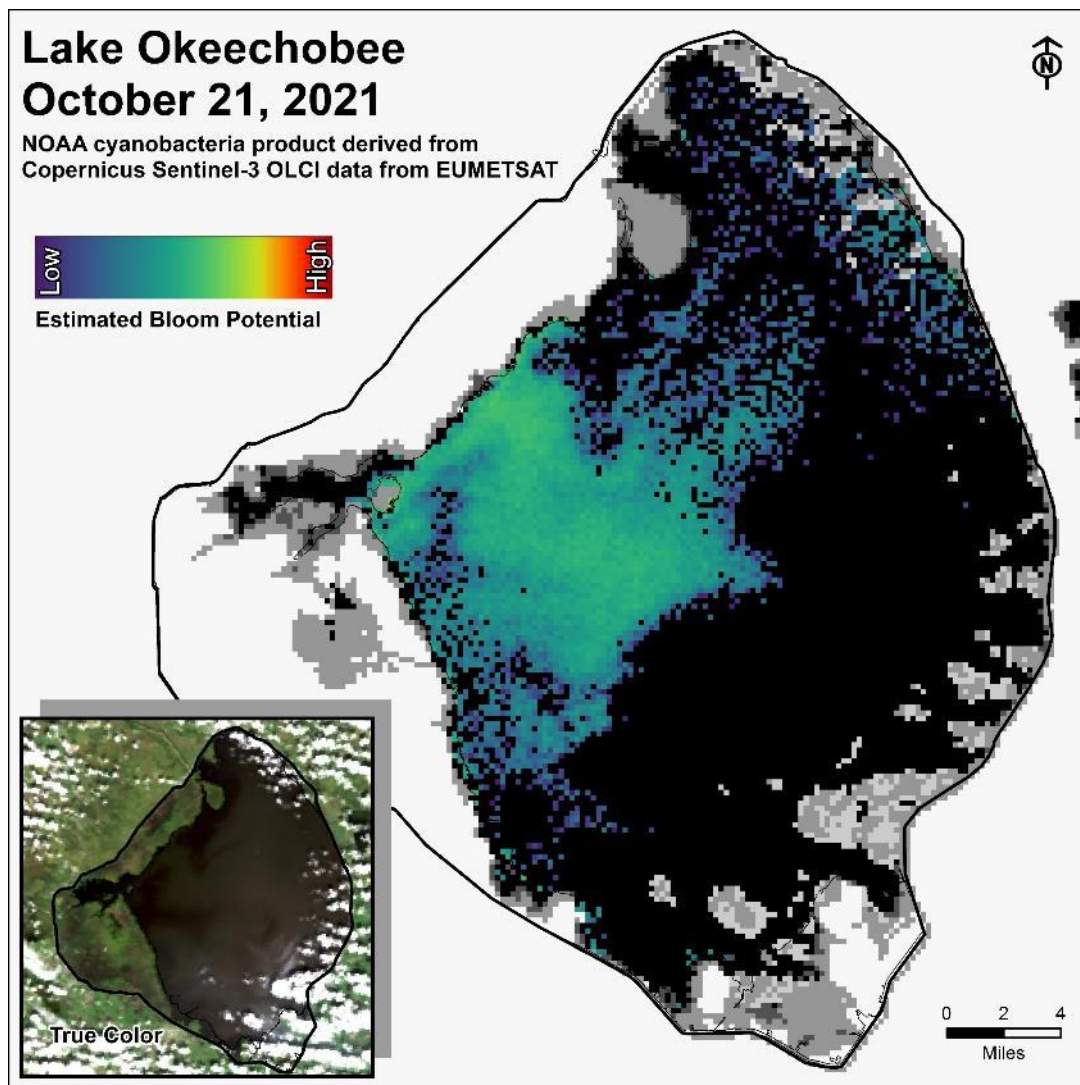


Figure LO-6. Cyanobacteria bloom potential on October 21, 2021 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Table LO-1. Provisional results of chlorophyll *a* concentrations and cyanobacteria taxa from sampling trips on October 18-20, 2021. Color coding generally follows the legend in **Figure LO-6**.

Collection Date: October 18-20, 2021

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA	Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
FEBIN	P	NS	NS	L001	P	BDL	mixed
FEBOU	P	NS	NS	L004	P	BDL	mixed
KISSR0.0	P	BDL	mixed	L006	P	0.5	Microcys
L005	P	BDL	mixed	L007	P	BDL	mixed
LZ2	P	BDL	mixed	L008	P	0.4	mixed
KBARSE	P	0.3	mixed	LZ30	P	3.2	Microcys
RITTAE2	P	BDL	Micro/Cylin	LZ40	P	BDL	Microcys
PELBAY3	P	BDL	Microcys	CLV10A	P	BDL	mixed
POLE3S	P	BDL	mixed	NCENTER	P	BDL	mixed
LZ25A	P	BDL	mixed				
PALMOUT	P	BDL	mixed	S308C	P	0.3	mixed
PALMOUT1	P	0.4	Microcys	S77	P	BDL	mixed
PALMOUT2	P	1.9	Microcys				
PALMOUT3	P	2.8	Microcys				
POLESOUT	P	BDL	mixed				
POLESOUT1	P	BDL	mixed				
POLESOUT2	P	BDL	mixed				
POLESOUT3	P	BDL	mixed				
EASTSHORE	P	BDL	mixed				
NES135	P	BDL	mixed				
NES191	P	BDL	mixed				

- SFWMD considers >40 µg/L Chlorophyll *a* (Chla) an algal bloom
- BDL – Below Detectable Limit of **0.25** µg/L
- ND – No Dominant taxa
- P – Pending
- NS – Not Sampled
- Station bold font – crew observed possible BGA
- Chlorophyll *a* analyzed by SFWMD
- Toxin and Taxa analyzed by FDEP:
 - Microcys* = *Microcystis*; *Cylindro* = *Cylindrospermopsis*; *Planktol* = *Planktolyngbya*;
 - Dolicho* = *Dolichospermum*

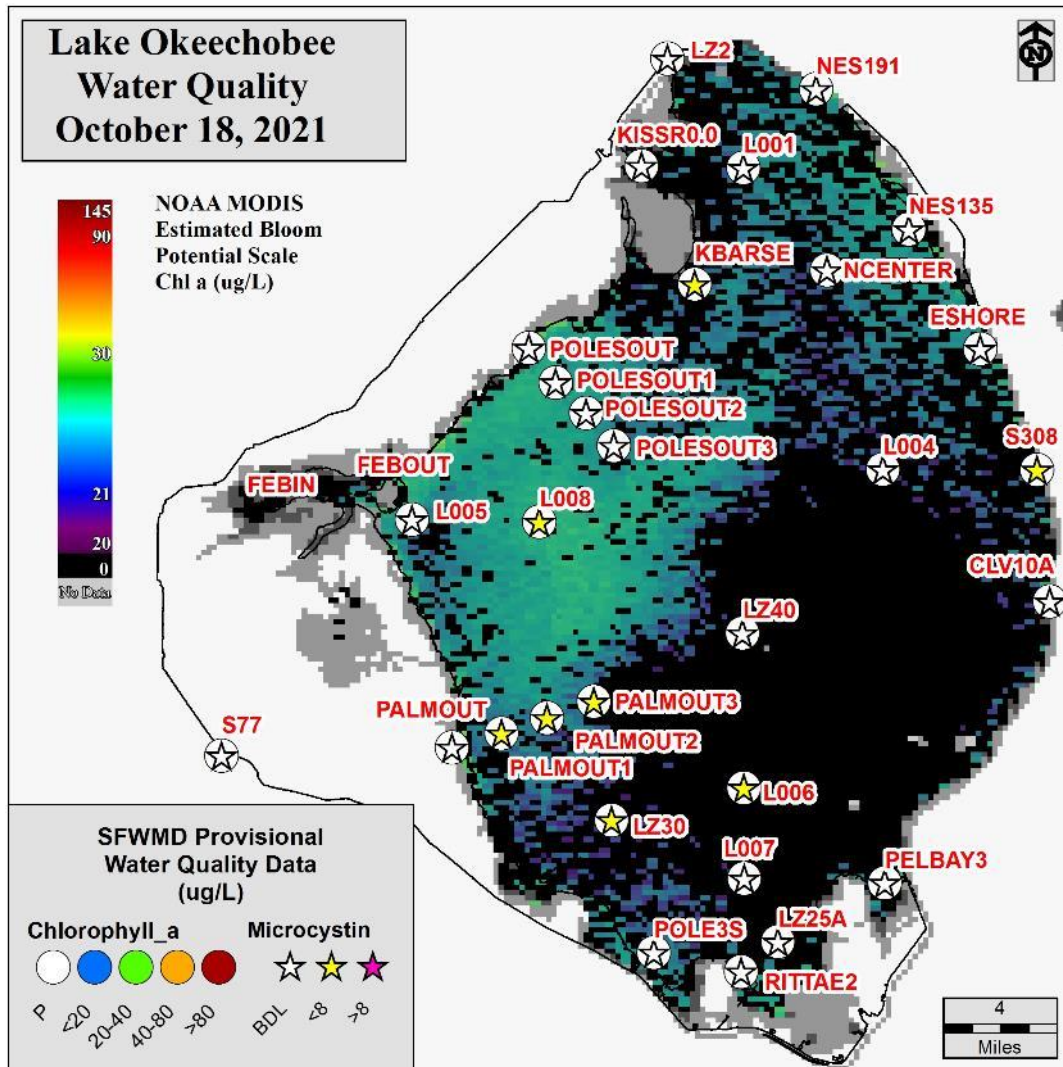


Figure LO-7. Expanded monitoring network and provisional results from samples collected October 18-20, 2021.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was approximately 430 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was approximately 1,030 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, surface salinities increased at all sites in the estuary (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 12.3. Salinity conditions in the middle estuary were estimated to be within the good range for adult eastern oysters (**Figure ES-4**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was approximately 1,120 cfs (**Figures ES-5 and ES-6**) and the previous 30-day mean inflow was approximately 3,640 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-6**.

Over the past week, salinities remained low at S-79 and increased at all remaining sites in the estuary (**Table ES-2 and Figures ES-7 and ES-8**). The seven-day mean surface salinities (**Table ES-2**) were in the good range (0-10) for tape grass at Val I-75 and at Ft. Myers. The seven-day mean surface salinity values were within the good range for adult eastern oysters at Cape Coral and Shell Point, and in the fair range at Sanibel (**Figure ES-9**).

Surface salinity at Val I-75 was forecasted for the next two weeks, using an autoregression model (Qiu and Wan, 2013¹) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1500 cfs and steady releases at 2,000 cfs with estimated tidal basin inflows of 255 cfs. Model results from all scenarios predict daily salinity to be 2.2 or lower and the 30-day moving average surface salinity to be 0.6 or lower at Val I-75 at the end of the two-week period (**Table ES-3 and Figure ES-10**). This keeps predicted salinities at Val I-75 within the LORS 2008 salinity range (0.0-5.0).

Red Tide

The Florida Fish and Wildlife Research Institute reported on October 22, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at very low concentrations in Charlotte County, and at background to medium concentrations in or

¹ Qiu, C., and Y. Wan. 2013. Time series modeling and prediction of salinity in the Caloosahatchee River Estuary. *Water Resources Research* 49:5804-5816.

offshore of Lee County. On the east coast, red tide was not observed in samples from St. Lucie, Martin, and Palm Beach counties.

Water Management Recommendations

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

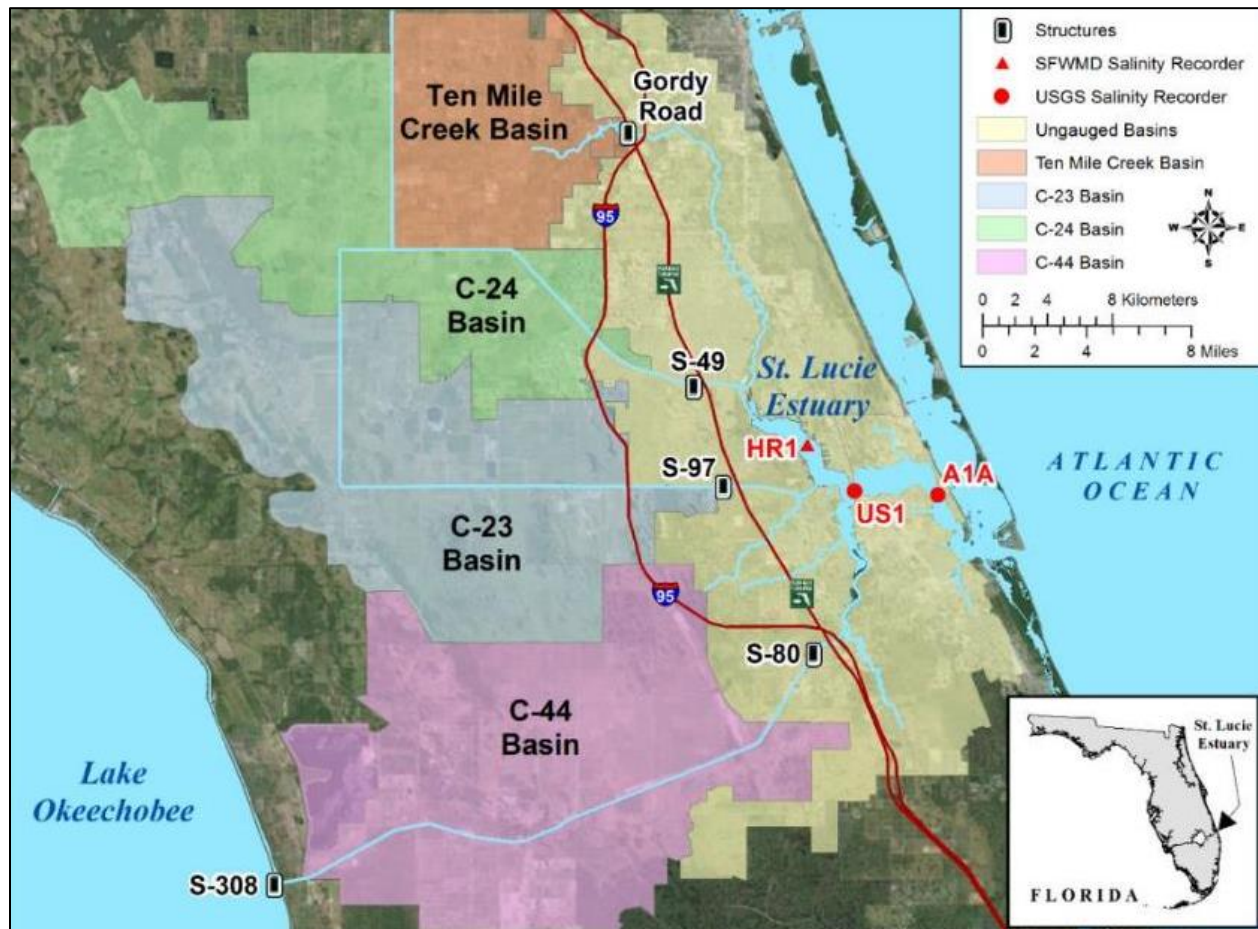


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

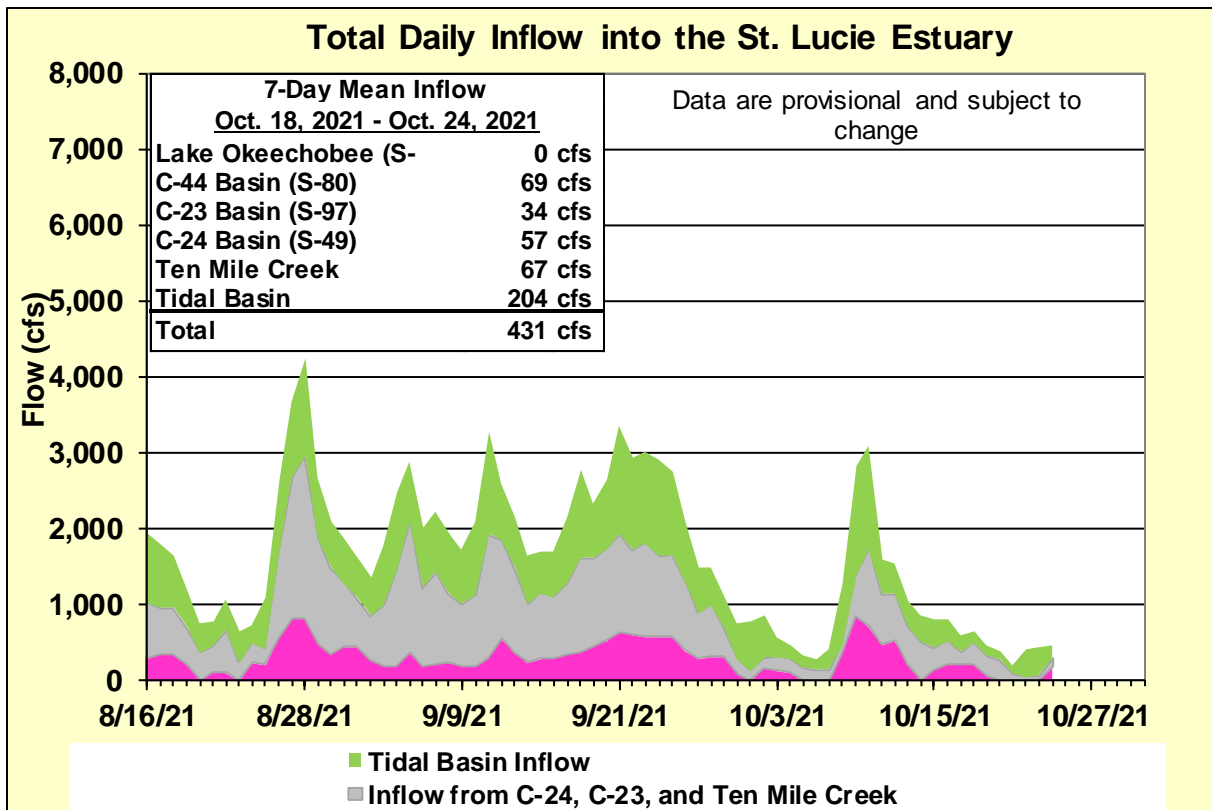


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

Table ES-1. Seven-day mean salinity at oyster monitoring sites in the St. Lucie Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary. Data are provisional.

Sampling Site	Surface	Bottom	Envelope
HR1 (North Fork)	7.8 (5.7)	9.8 (9.3)	NA ^a
US1 Bridge	11.6 (9.9)	12.9 (13.2)	10.0 – 26.0
A1A Bridge	22.3 (18.4)	26.3 (24.7)	NA ^a

a. The envelope is not applicable.

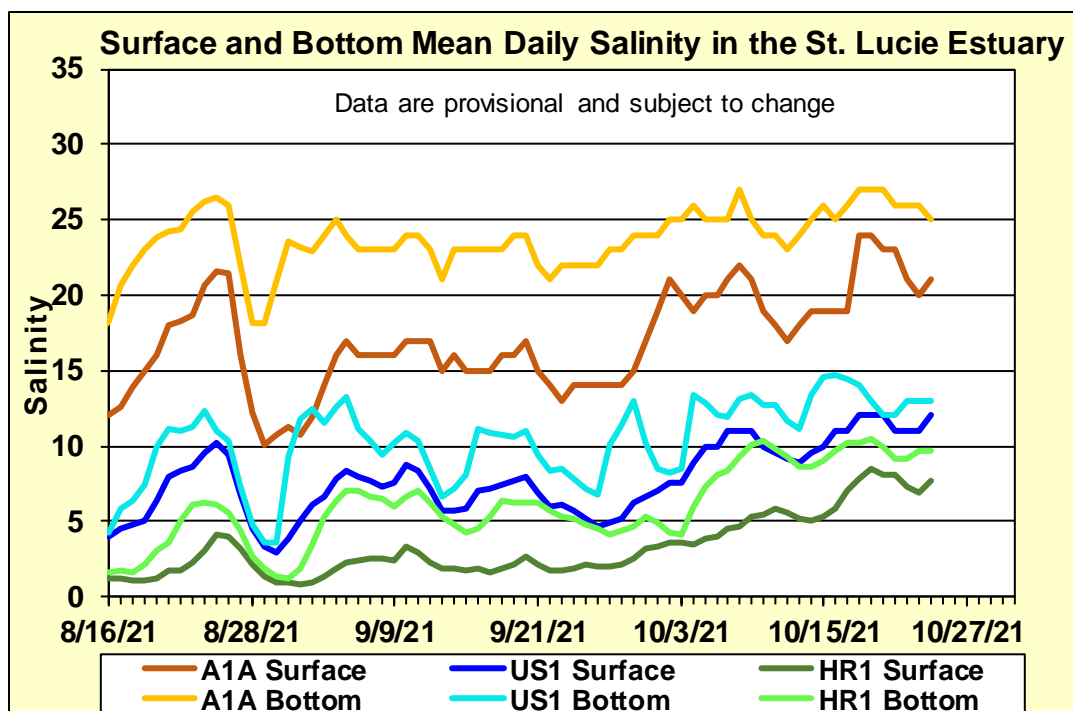


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

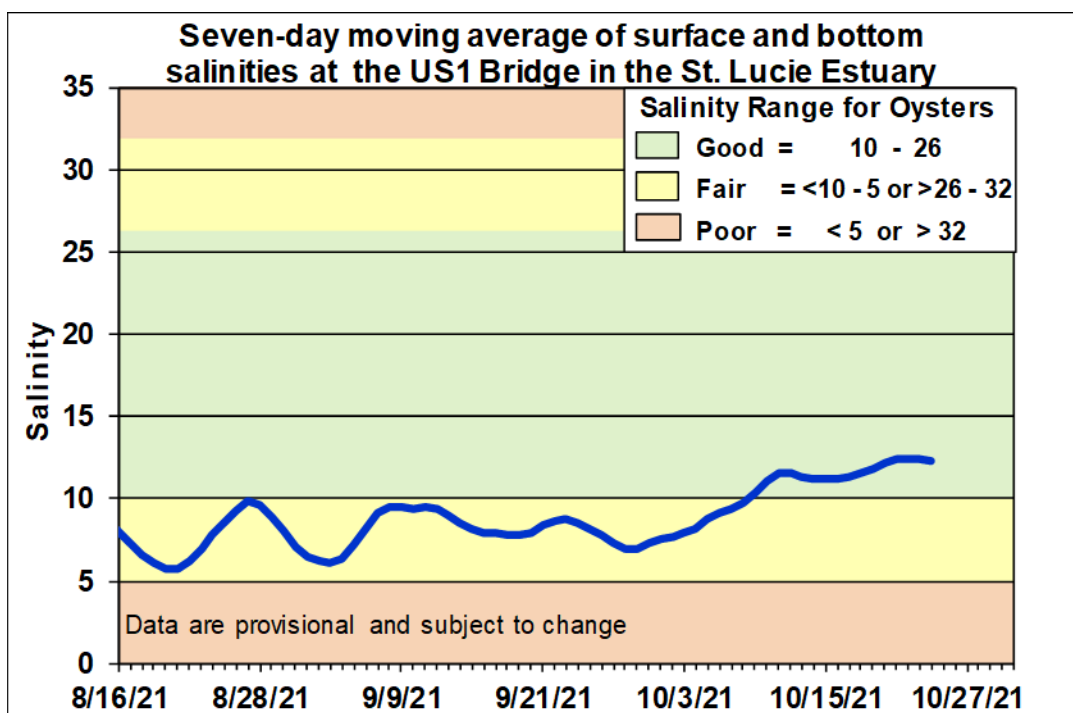


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

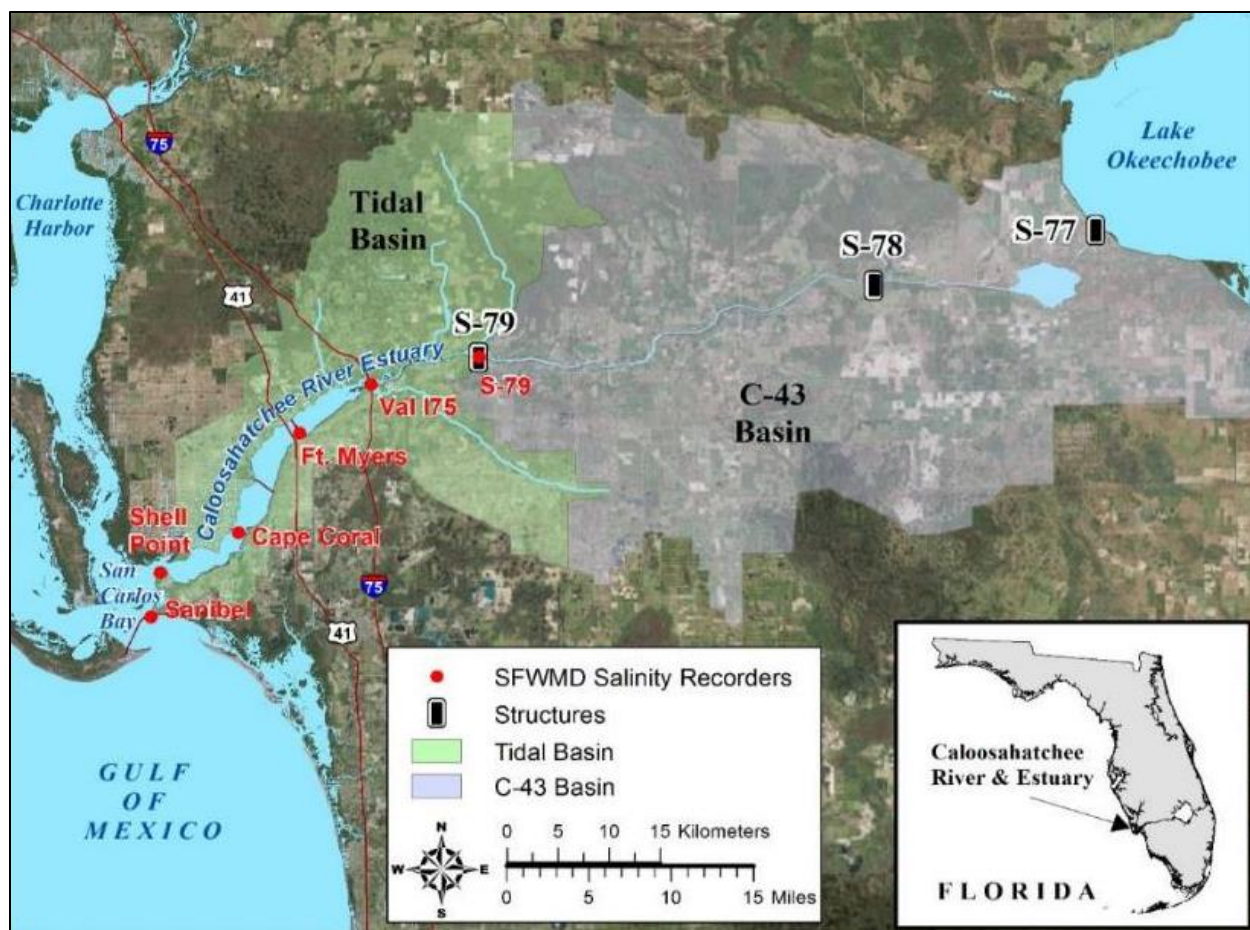


Figure ES-5. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

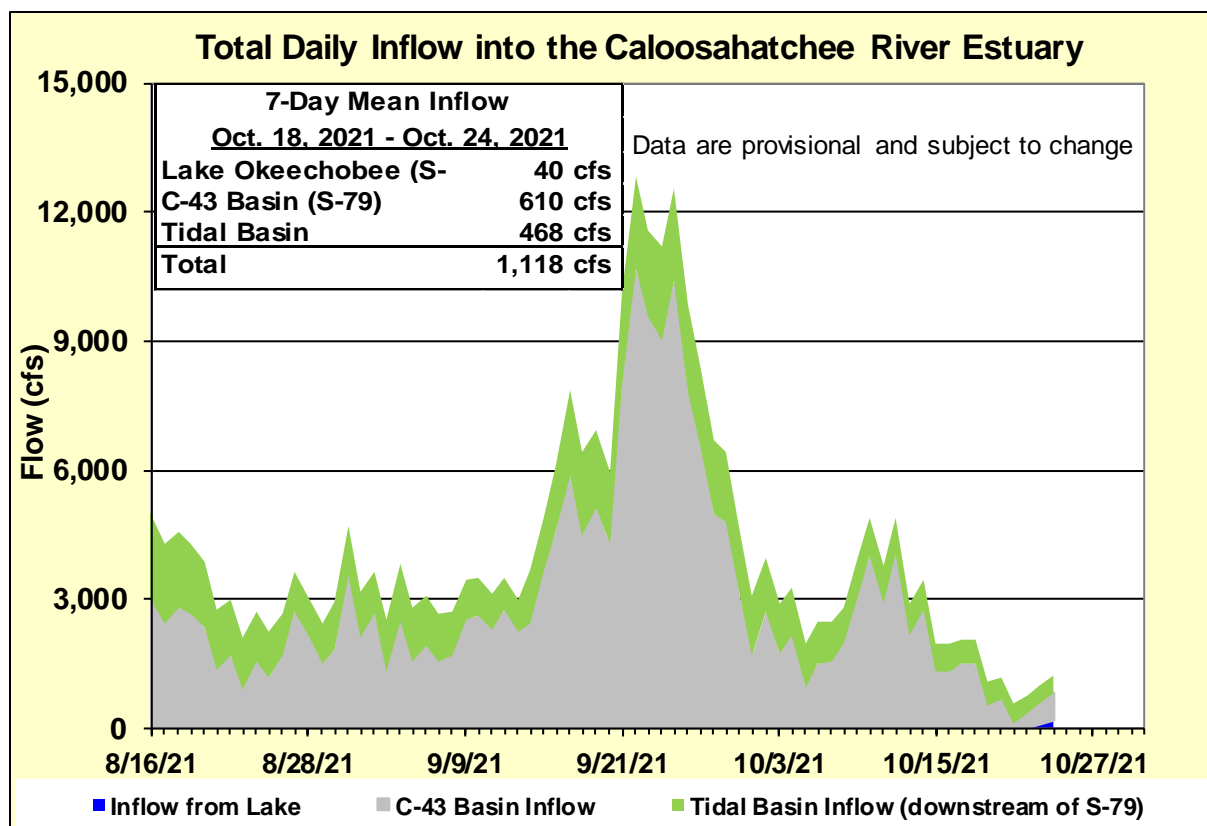


Figure ES-6. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

Table ES-2. Seven-day mean salinity at six monitoring sites in the Caloosahatchee River Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope at I-75 is for the protection of tape grass in the upper estuary and the envelope in the lower estuary is the preferred salinity range for adult eastern oysters (*Crassostrea virginica*). Data are provisional.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	0.1 (0.2)	0.1 (0.1)	NA ^a
Val I-75	0.4 (0.2)	0.8 (0.2)	0.0 – 5.0 ^b
Fort Myers Yacht Basin	3.8 (1.4)	4.9 (2.5)	NA ^a
Cape Coral	9.5 (6.0)	11.8 (8.6)	10.0 – 30.0
Shell Point	22.8 (19.8)	23.7 (21.4)	10.0 – 30.0
Sanibel	28.9 (27.3)	29.3 (29.0)	10.0 – 30.0

a. The envelope is not applicable.

b. The envelope is based on the predicted 30-day mean for the next two weeks.

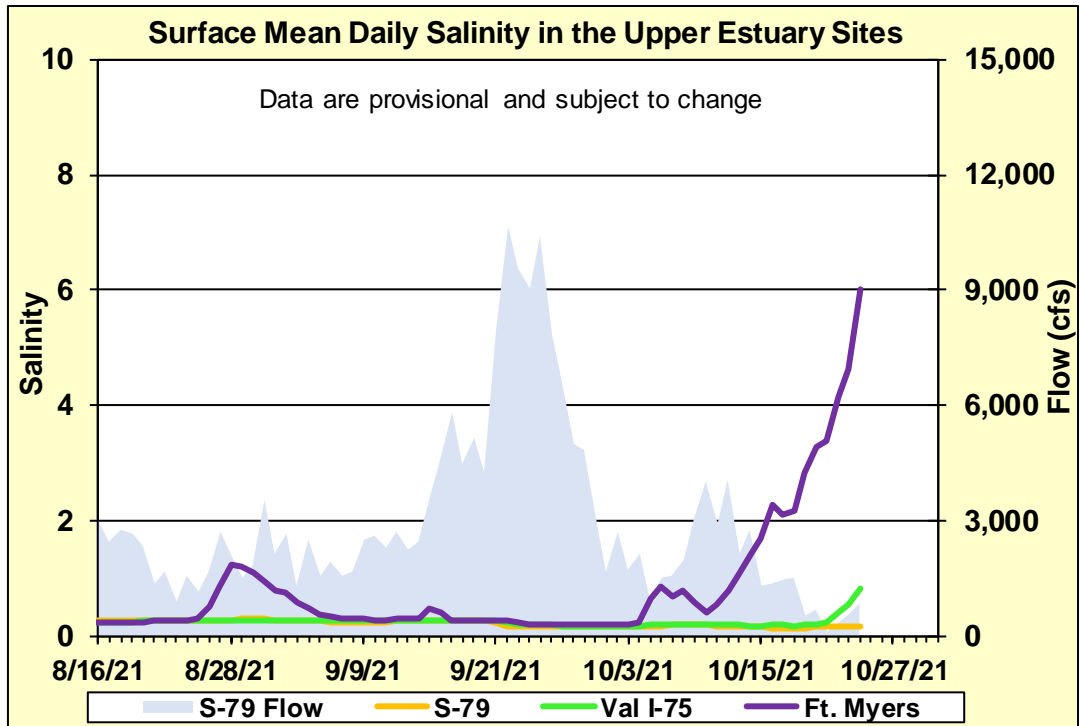


Figure ES-7. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

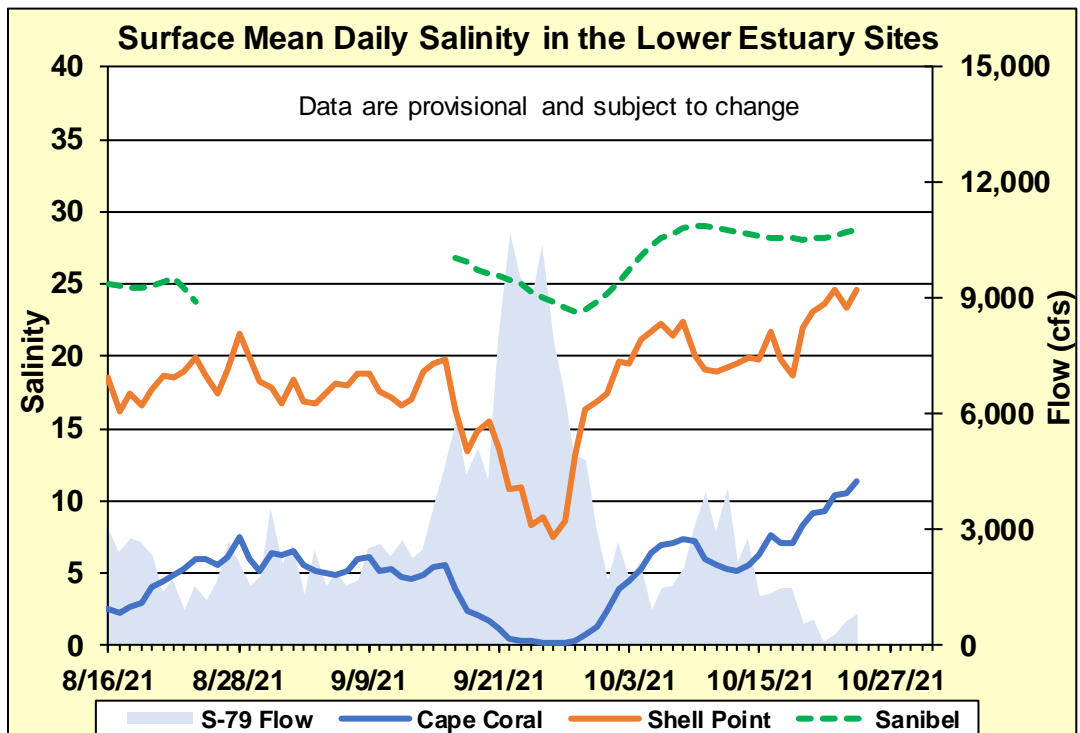


Figure ES-8. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

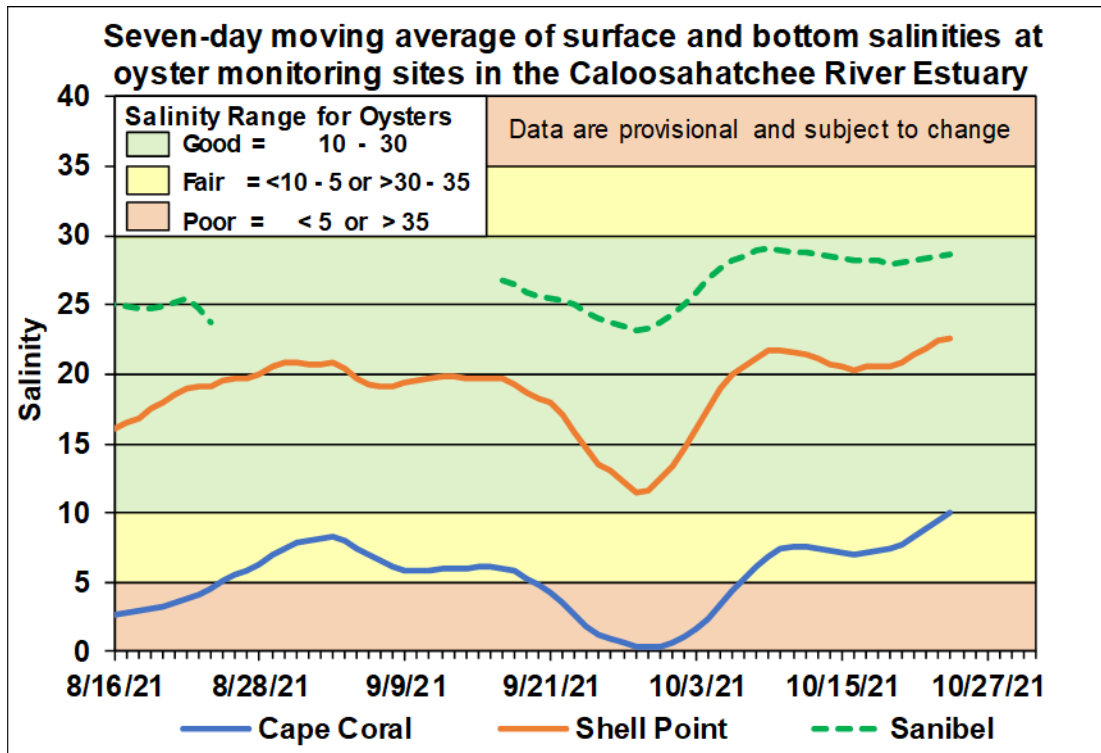


Figure ES-9. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

Table ES-3. Predicted salinity at Val I-75 in the Caloosahatchee River Estuary at the end of the forecast period for various S-79 flow release scenarios.

Scenario	Simulated S-79 Flow (cfs)	Tidal Basin Runoff (cfs)	Daily Salinity	30-Day Mean Salinity
A	0	255	2.2	0.6
B	450	255	0.9	0.4
C	800	255	0.4	0.4
D	1000	255	0.3	0.3
E	1500	255	0.3	0.3
F	2000	255	0.3	0.3

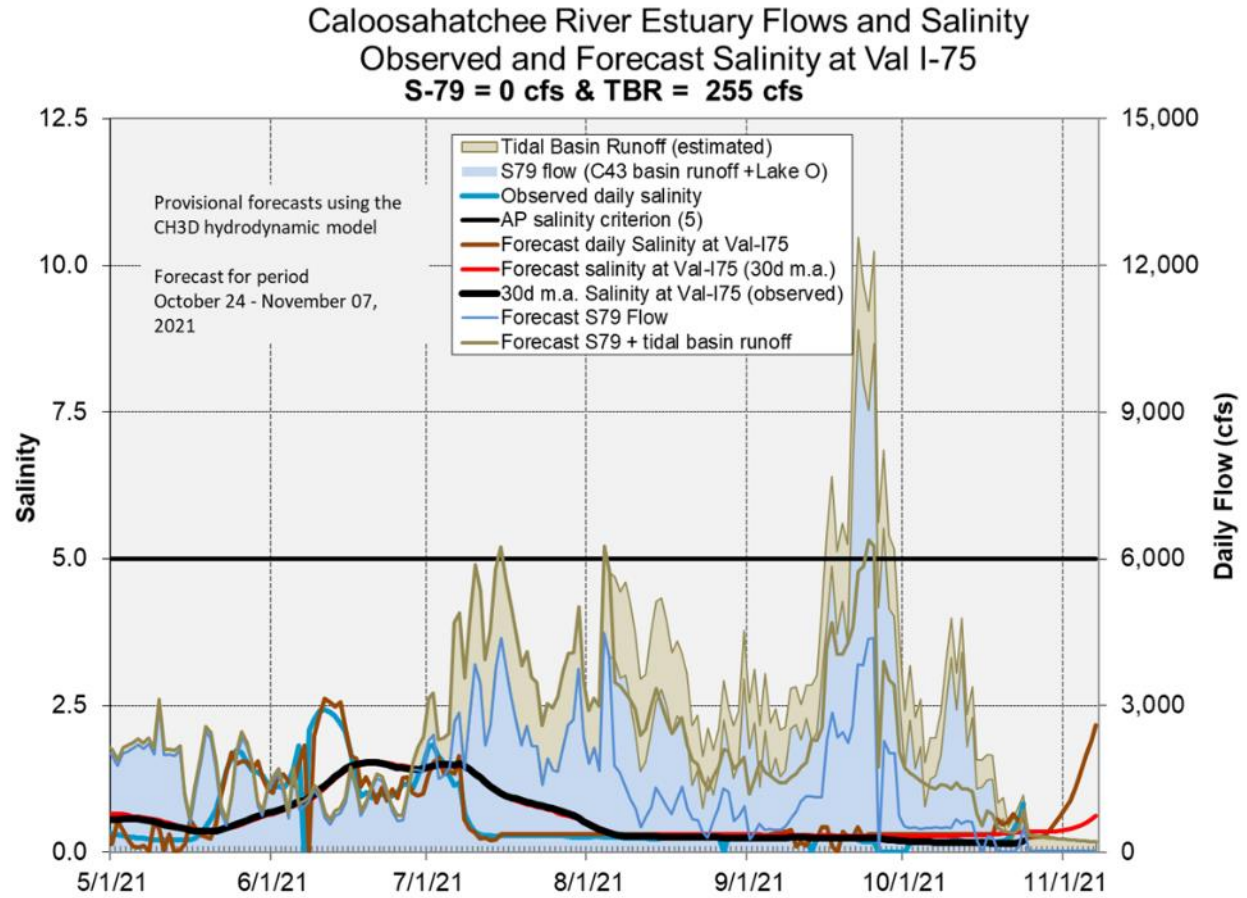


Figure ES-10. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

Stormwater Treatment Areas

STA-1E: 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-1E Central Flow-way for vegetation management activities. Online treatment cells are at or above target stage and vegetation in these cells is stressed and highly stressed. The 365-day phosphorus loading rate (PLR) is high for the Eastern Flow-way and very high for the Central Flow-way (**Figure S-1**).

STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to construction activities. Most treatment cells are at target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for the Northern and Western Flow-ways are below 1.0 g/m²/year. The 365-day PLR for the Eastern Flow-way is high (**Figure S-2**).

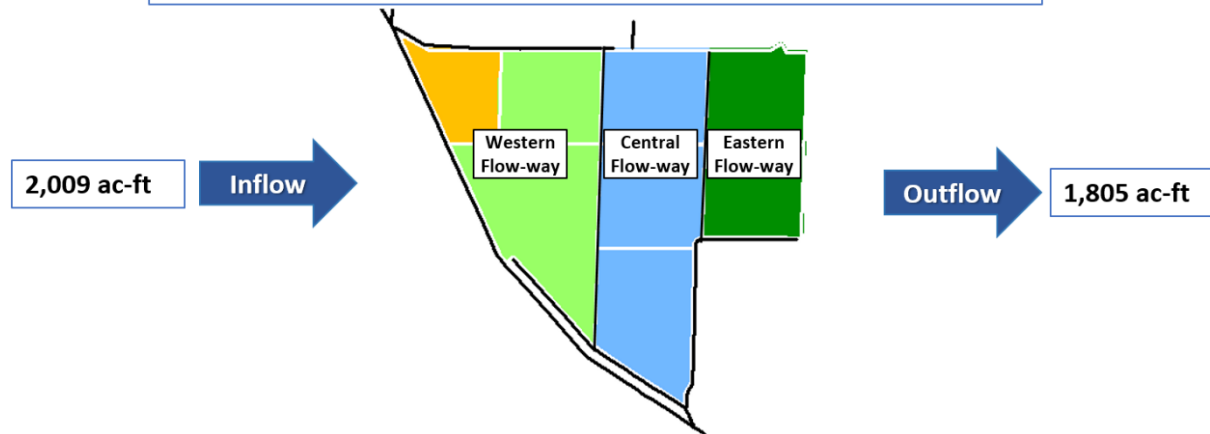
STA-2: STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Most treatment cells are above target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4 and 5 is highly stressed. The 365-day PLRs for Flow-ways 1, 4 and 5 are below 1.0 g/m²/year. The 365-day PLR for Flow-way 3 is high (**Figure S-3**).




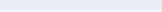
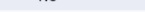
STA-3/4: STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Most online treatment cells are above target stage. Vegetation in the Eastern and Central Flow-ways is highly stressed and in the Western Flow-way is stressed. The 365-day PLR for the Western Flow-way is below 1.0 g/m²/year. The 365-day PLR for the Central Flow-way is high (**Figure S-4**).

STA-5/6: All Flow-ways are online. Most treatment cells are near target stage. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8 which are healthy. The 365-day PLRs for most flow-ways are high (**Figure S-5** and **S-6**).

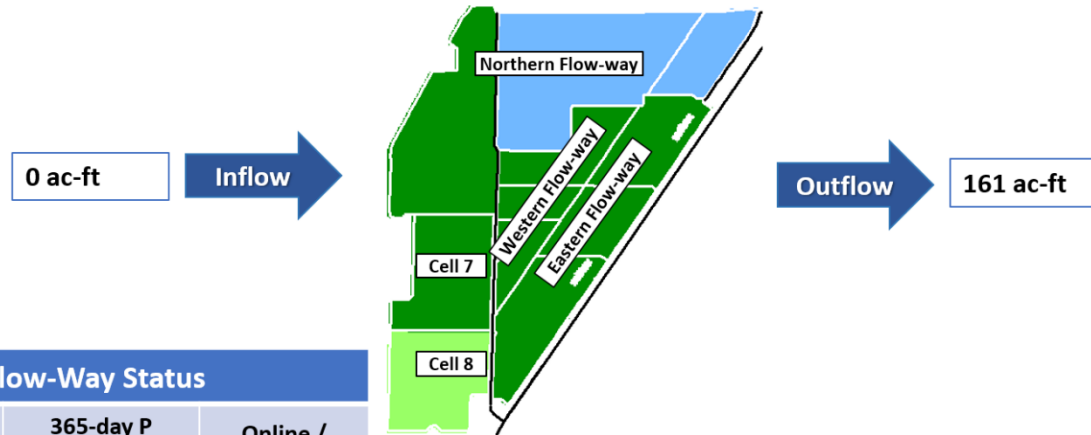
For definitions on STA operational language see glossary following figures.

STA-1E Weekly Status Report – 10/18/2021 through 10/24/2021



STA-1E Flow-Way Status				As of 10/24/2021				STA-1E Flow & Phosphorus Concentration				
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small> 	365-day P Loading Rate <small>(below 1.0 g P / m²/yr is optimal)</small>	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)					7-day	28-day	365-day	
				<div><div></div> Deep Water Level (> 2.8' above TS)</div> <div><div></div> High Water Level (1.5' – 2.8' above TS)</div> <div><div></div> 0.2' – 1.5' above TS</div> <div><div></div> Target Stage (TS +/- 0.2')</div> <div><div></div> Low Water Level (<0.2' below TS)</div>								
Eastern			Online	Depth / Area Based: Percent of Area Dry				Total Inflow, ac-ft	2,009	20,601	240,377	
Central			Vegetation Rehab	<div><div></div> 0-25% Dry</div> <div><div></div> 25-50% Dry</div>	<div><div></div> 50-75% Dry</div> <div><div></div> 75-100% Dry</div>	Total Outflow, ac-ft	1,805					20,338
Western	Offline, construction activities starting 11/01/2019							Inflow Conc., ppb	76	145	136	
								Outflow Conc., ppb	34	30	39	
								Includes Preliminary Data				

STA-1W Weekly Status Report – 10/18/2021 through 10/24/2021



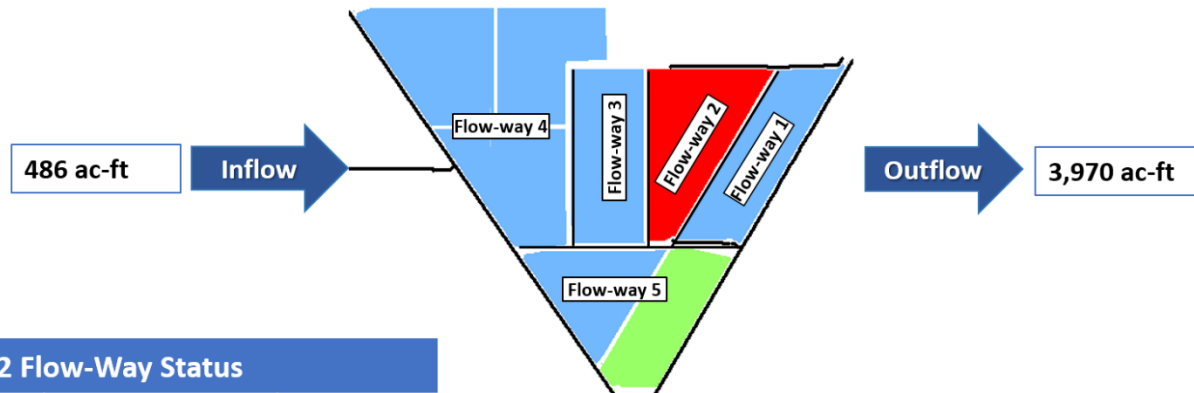
STA-1W Flow-Way Status			
Flow-Way	Vegetation Status Healthy --- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
Northern			Construction
Western			Construction
Eastern			Construction
Cell 7		N/A	Construction
Cell 8		N/A	Construction

As of 10/24/2021	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-1W Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	0	3,518	78,335
--Lake Inflow, ac-ft	0	N/A	4,600
Total Outflow, ac-ft	161	6,338	93,019
Inflow Conc., ppb	N/A	170	232
Outflow Conc., ppb	22	25	41
Includes Preliminary Data			

Figure S-2. STA-1W Weekly Status Report

STA-2 Weekly Status Report – 10/18/2021 through 10/24/2021



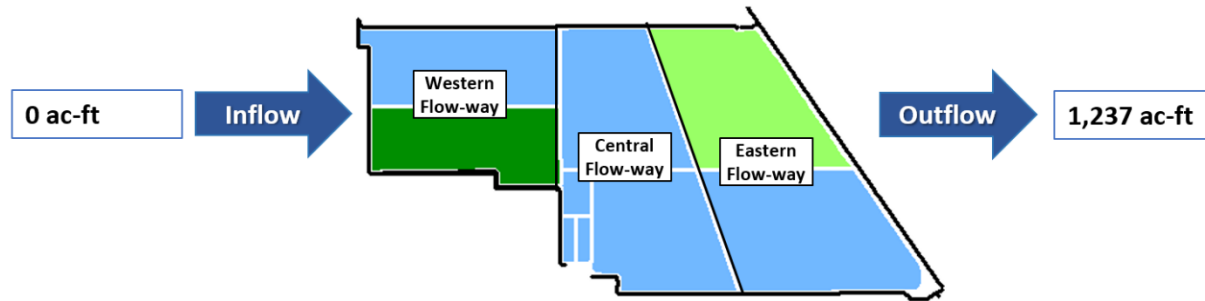
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P / m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2	Offline, construction activities as of 9/7/2021		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 10/24/2021	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-2 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	486	27,814	394,340
--Lake Inflow, ac-ft	0	N/A	70,800
Total Outflow, ac-ft	3,970	38,846	434,673
Inflow Conc., ppb	42	131	94
Outflow Conc., ppb	12	16	18
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

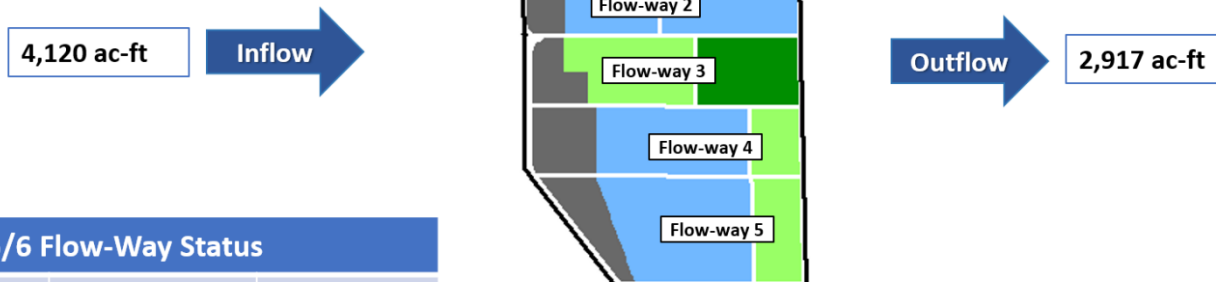
STA-3/4 Weekly Status Report – 10/18/2021 through 10/24/2021



STA-3/4 Flow-Way Status				STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P / m ² /yr is optimal)	Online / Offline / Restrictions	As of 10/24/2021			
				Stage Based: Relative to Target Stage (TS)			
Eastern	Offline, vegetation management drawdown as of 3/1/2021			<div>Deep Water Level (> 2.8' above TS)</div> <div>High Water Level (1.5' – 2.8' above TS)</div> <div>0.2' – 1.5' above TS</div> <div>Target Stage (TS +/- 0.2')</div> <div>Low Water Level (<0.2' below TS)</div>			
				Depth / Area Based: Percent of Area Dry			
Central			Online	0-25% Dry	50-75% Dry		
Western			Online	25-50% Dry	75-100% Dry		
				Includes Preliminary Data			
					7-day	28-day	365-day
Total Inflow, ac-ft					0	13,270	492,568
--Lake Inflow, ac-ft					0	N/A	46,400
Total Outflow, ac-ft					1,237	25,957	463,849
Inflow Conc., ppb					N/A	92	69
Outflow Conc., ppb					13	17	14

Figure S-4. STA-3/4 Weekly Status Report

STA-5/6 Weekly Status Report – 10/18/2021 through 10/24/2021



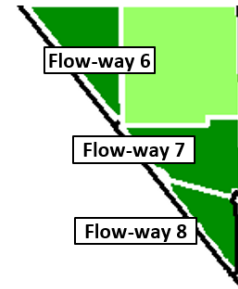
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1	← →		Online
2	← →	N/A	Online
3	← →	N/A	Online
4	← →		Online
5	← →		Online

As of 10/24/2021	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-5/6 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	4,120	46,977	221,277
--Lake Inflow, ac-ft	0	N/A	9,000
Total Outflow, ac-ft	2,917	46,606	230,016
Inflow Conc., ppb	169	245	292
Outflow Conc., ppb	31	57	73
Includes Preliminary Data			

Figure S-5. STA-5/6 Weekly Status Report (Flow-ways 1 – 5)

STA-5/6 Weekly Status Report – 10/18/2021 through 10/24/2021



STA-5/6 Flow-Way Status				As of 10/24/2021	
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)	
				<div>Deep Water Level (> 2.8' above TS)</div> <div>High Water Level (1.5' – 2.8' above TS)</div> <div>0.2' – 1.5' above TS</div> <div>Target Stage (TS +/- 0.2')</div> <div>Low Water Level (<0.2' below TS)</div>	Depth / Area Based: Percent of Area Dry
6			Online		
7			Online		
8			Online		

Figure S-6. STA-5/6 Weekly Status Report (Flow-ways 6 – 8)

Basic Concepts and Definitions for STA Weekly Status Report

- **Inflow:** Sum of flow volume at all inflow structures to an STA.
- **Lake Inflow:** Portion of the STA total inflow volume that originates from Lake Okeechobee.
- **Outflow:** Sum of flow volume at outflow structures from an STA.
- **Total Phosphorus (TP):** Total mass of phosphorus in all its forms; including particulate, dissolved, etc.
- **Inflow Concentration:** TP concentration is the mass of TP in micrograms per liter of water, $\mu\text{g/L}$ or ppb. Inflow concentration refers to the flow-weighted mean TP from all inflow structures over a period of time.
- **Outflow Concentration:** The flow-weighted mean TP from all outflow structures over a period of time. The outflow concentration represents the reduction of inflow TP achieved by STA treatment of the inflow water.
- **WQBEL:** The STA outflow concentration that is required upon completion of the Restoration Strategies projects by December 2025. The outflow concentration shall not exceed 13 ppb as an annual flow weighted mean in more than 3 out of 5 water years on a rolling basis and shall not exceed 19 ppb as an annual flow weighted in any water year.
- **Flow-Way (FW):** One or more treatment cells connected in series. Cells typically have emergent aquatic vegetation (EAV) in the front portion of the flow-way followed by a mix of EAV and submerged aquatic vegetation (SAV)
- **Vegetation Status:** Healthy means the vegetation condition is good and will allow the STA to perform as designed. Stressed means the vegetation is showing signs of poor health, such as browning or areas of vegetation die-off, or the cell contains undesirable vegetation such as floating exotic vegetation requiring treatment. The TP reduction capability of the STA is affected when the vegetation condition is poor.
- **Phosphorus Loading Rate (PLR):** Mass of inflow TP in grams, divided by total treatment area of STA in square meters, per year. In general, a 365-day value of less than 1.0 is needed for an STA to perform optimally. A PLR of 2.0 is considered very high and a PLR of 3.0 is considered extremely high. The TP reduction capability of the STA is affected when the PLR is high, very high and extremely high.
- **Online:** Online status means the FW can receive and treat inflow.
- **Online with Restriction:** The FW can receive and treat inflow, but the amount of flow or water level may be limited temporarily. For example, a vegetation rehabilitation effort may require reduced flows through an area while the new plants are establishing, or nesting by protected species may require a certain water level not to be exceeded.
- **Offline:** The FW is unable to receive and treat inflow due to repairs, construction, or other prohibitive reasons.
- **Depth:** Difference between the average surface water level in a cell and the average ground elevation in that cell. Target depths, or depths between flow events, are between 1.25 ft to 1.5 ft. As depth approaches or drops below zero, an increasing percentage of the cell is considered dry and STA conditions deteriorate. An increase in depth above target depth is expected with increasing flow. However, as depth increases much above the target depth and is sustained over a period of time, it can be detrimental to vegetation health and overall STA treatment performance.
- **Note:** The data provided in this summary report were developed using a combination of provisional and quality-assured flow and water quality data. In some cases, best professional judgment was used to estimate missing data and revise questionable data. Values provided are not considered final but are appropriate for use in STA operational decision-making.

Everglades

Water Conservation Area Regulation Schedules

WCA-1: The Three-gauge average stages remained just below the Zone A1 regulation line last week, the average on Sunday was 0.11 feet below that line. WCA-2A: Stage at 2A-17 declined in parallel with schedule last week, the average on Sunday was 1.13 feet higher than the falling Zone A regulation line. WCA-3A: The Three Gauge Average stage remained above the Zone A regulation line last for most of last week. Stage averaged 0.01 feet below the rising schedule line on Sunday. WCA-3A: Stage at gauge 62 (Northwest corner) fell then stabilized last week. The average on Sunday was 0.62 feet below the flat Upper Schedule. (**Figures EV-1 through EV-4**).

Water Depths

The WDAT tool indicates that water depths in the WCAs are lowest in northeastern WCA-3A and have fallen there over the last month. Depths have fallen below 2.0 feet across northern WCA-2A. North to South hydrologic connectivity remains within all of the sloughs in Everglades National Park (ENP); building in Shark River Slough, stable at Taylor Slough and diminishing to the west (**Figure EV-5**). Comparing WDAT water levels from present over the last month, stages generally increased in WCA-1, WCA-3A South and western ENP; significantly in WCA-2B. Looking back one year ago most of the Everglades is significantly lower in depth, with southern WCA-2A and western BCNP the exceptions. (**Figure EV-6**). Compared to the 20-year median depths, most of WCA-3A remains below the 50th percentile with parts of the northeast still significantly below. The western sloughs in ENP remain below the median; while western BCNP, WCA-1, -2A, eastern ENP are significantly above the median. (**Figure EV-7**).

Taylor Slough and Florida Bay

Taylor Slough and Florida Bay received an average of 1.37 inches of rain over the week ending Sunday (10/24). Stage increased an average of 0.02 feet over the week (Figure EV-8 and Figure EV-9). The increases in the east associated with the highest areas of rainfall countered the small weekly decreases elsewhere in the Slough. The Slough is 2.5 inches above the historical average for this time of year while the northern parts of the Slough are 4.4 inches above its historical average. It should be noted that Northern Taylor Slough historical averages are from before the alterations to the system to facilitate water movement and that this area is expected to be higher than the historical average as a result of these modifications even with less water directly delivered.

Salinities in Florida Bay averaged a 0.4 increase over the week ending 10/24, but individual stations had weekly changes ranging from -0.5 to +1.4 (Figure EV-8). The largest weekly increase was in the central nearshore area of the Bay. Both the central and western areas remain above their respective 75th percentiles and have increased again (Figure EV-10). Most of the Bay is still marine or higher and is averaging 7 higher than the historical average for this time of year. This is a bad position to start the dry season with given the expectation of a drier than average dry season.

Water Management Recommendations

Ascension rates that do not exceed 0.25 feet per week or 0.50 feet per two weeks are considered ecologically healthy. Conserving water in the northern basins like WCA-2A, then allowing that water to move downstream maximizes the ecological benefit of freshwater on the landscape. Flows into northeastern WCA-3A that move downstream continue to have an ecological benefit. Continued freshwater into Florida Bay will push the estuarine front further into the Bay helping to buffer potentially elevated dry season salinity conditions. Individual regional recommendations can be found in **Table EV-2**.

Table EV-2. Previous week's rainfall and water depth changes in Everglades regions.

Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	0.58	-0.02
WCA-2A	0.37	-0.17
WCA-2B	0.21	+0.09
WCA-3A	0.47	-0.10
WCA-3B	0.25	-0.05
ENP	0.67	+0.00

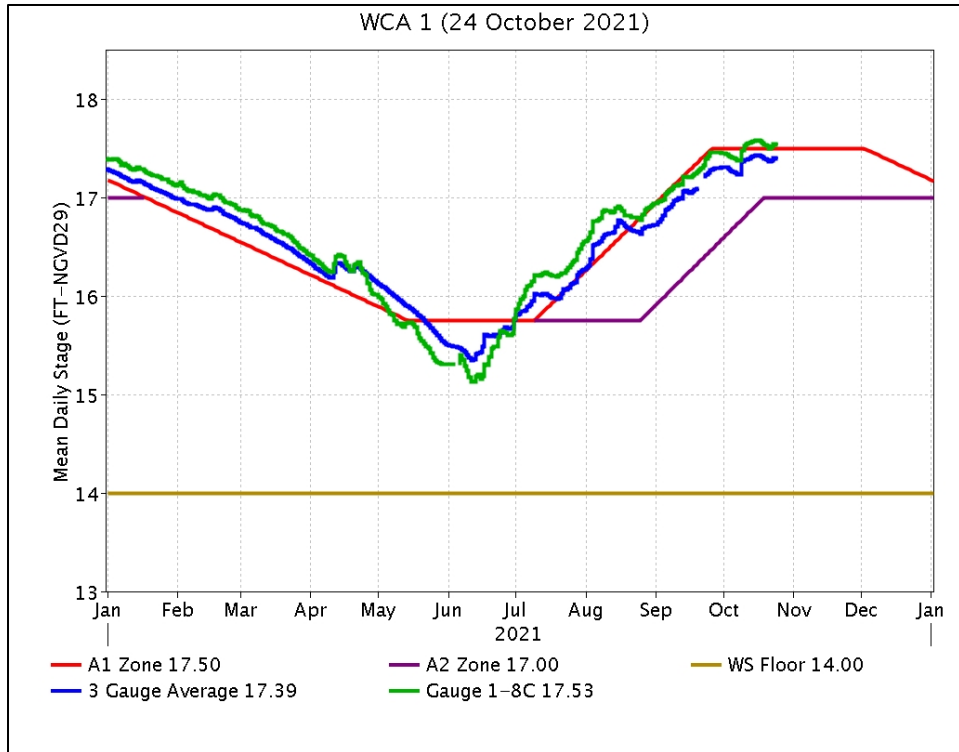


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

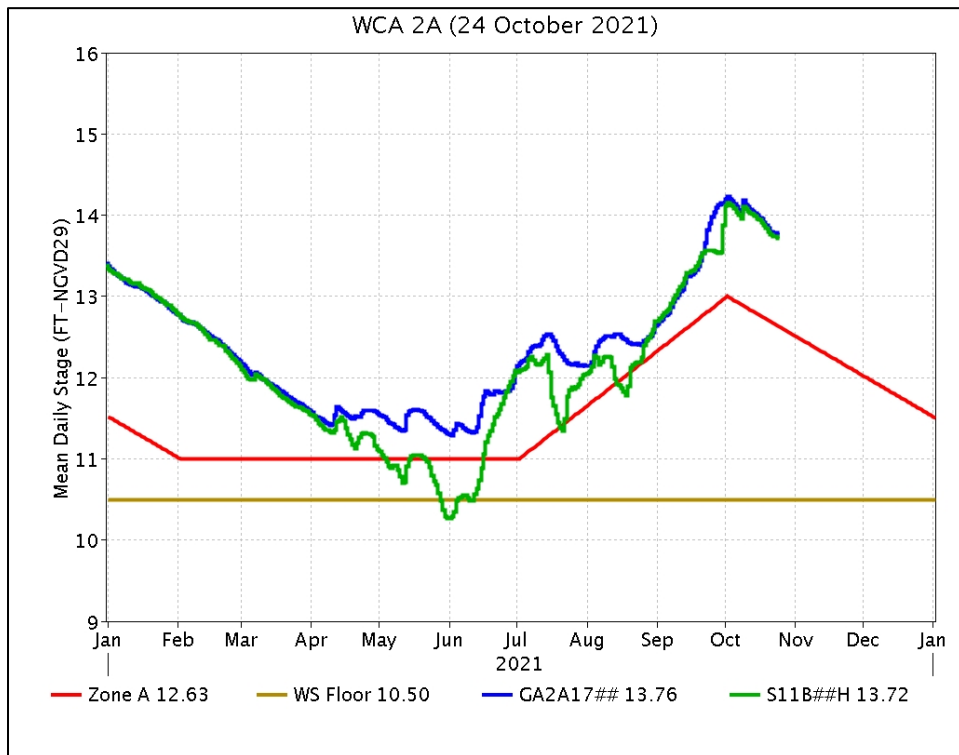


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

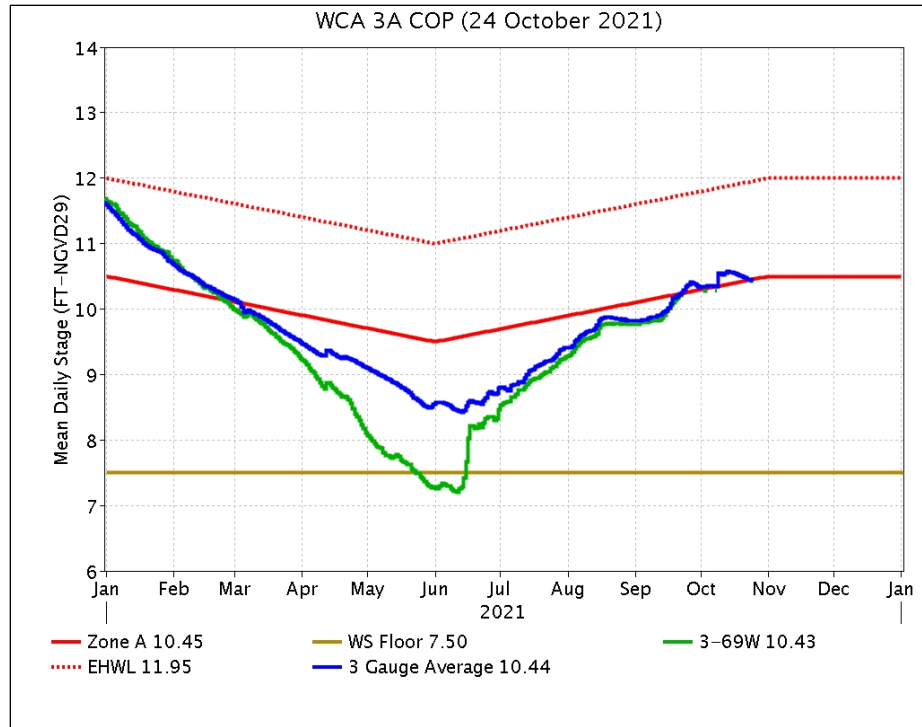


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

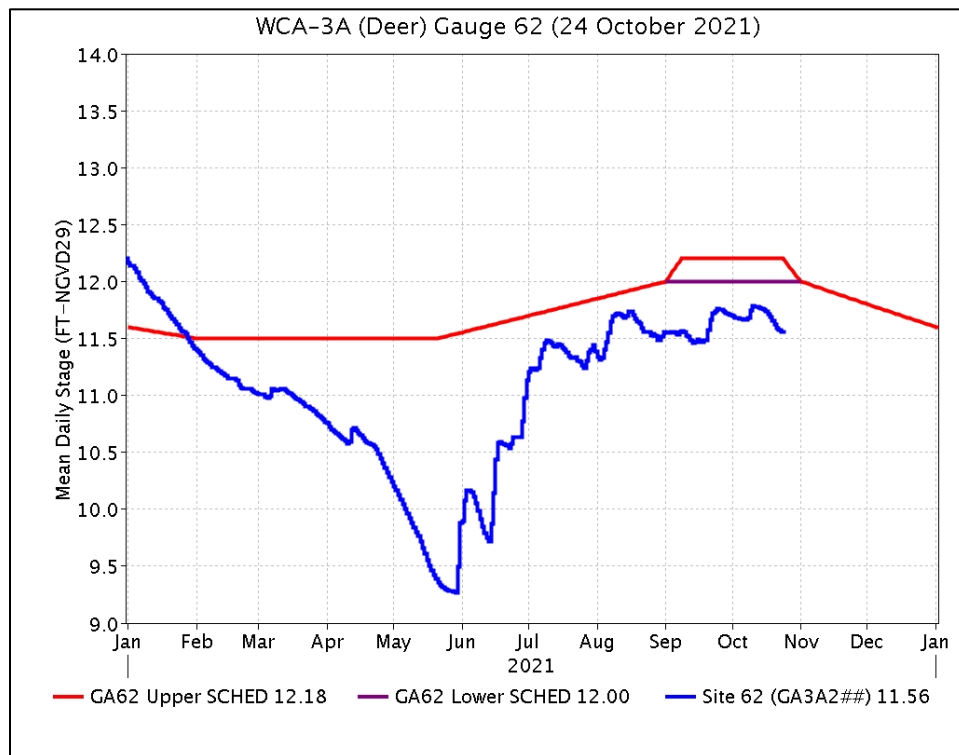


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

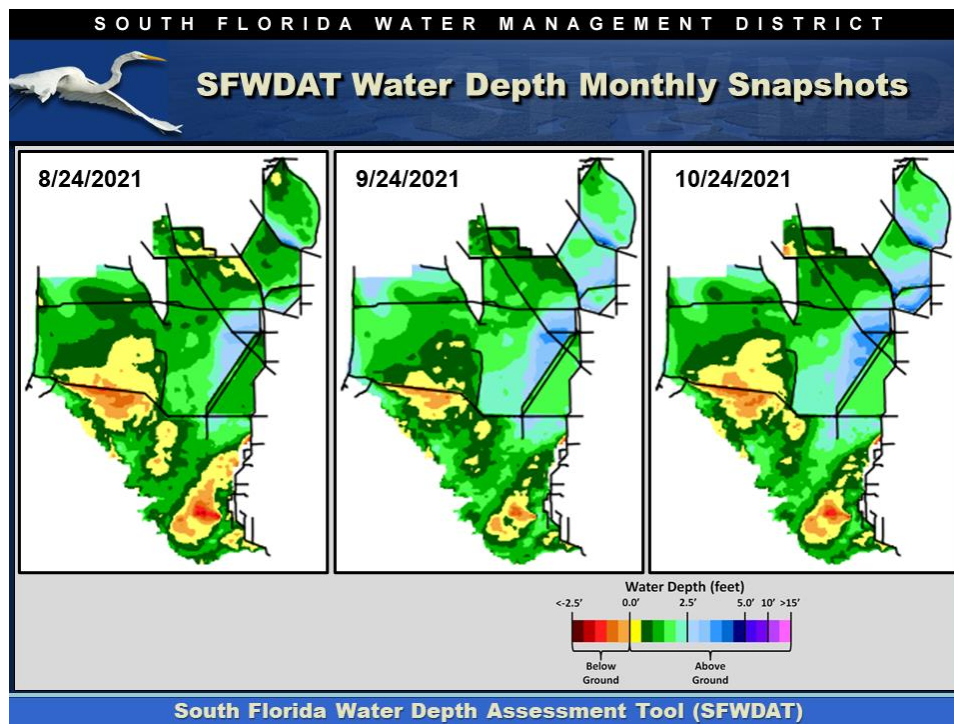


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

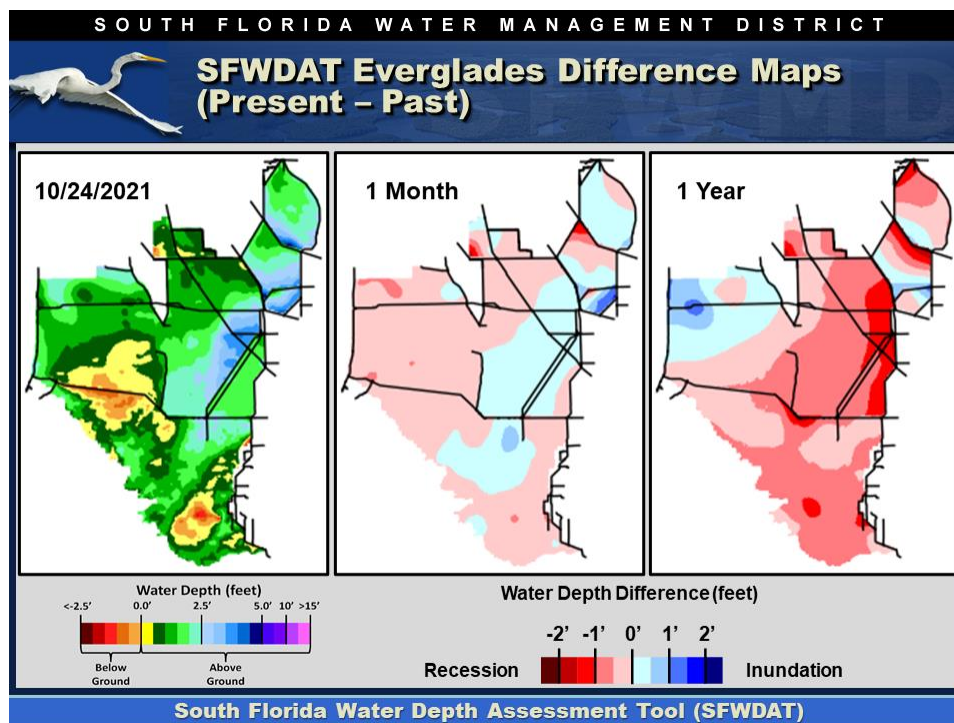


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

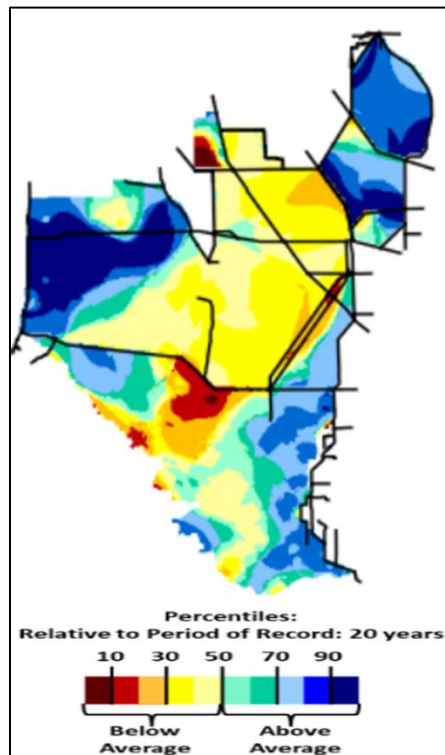


Figure EV-7. Present water depths compared to the day of year median over the previous 20 years.

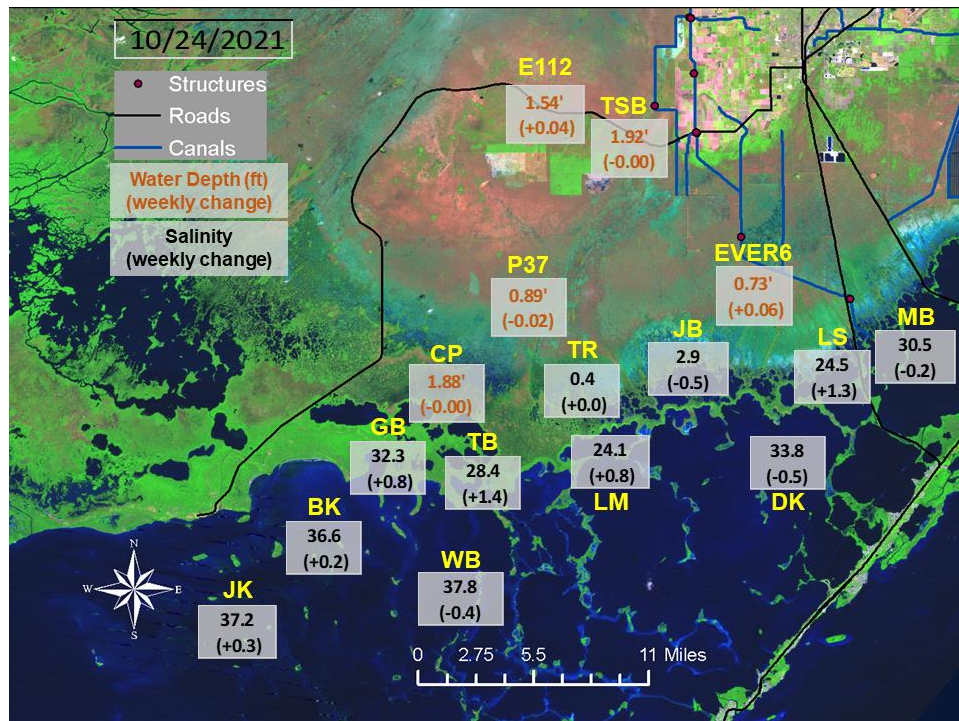


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

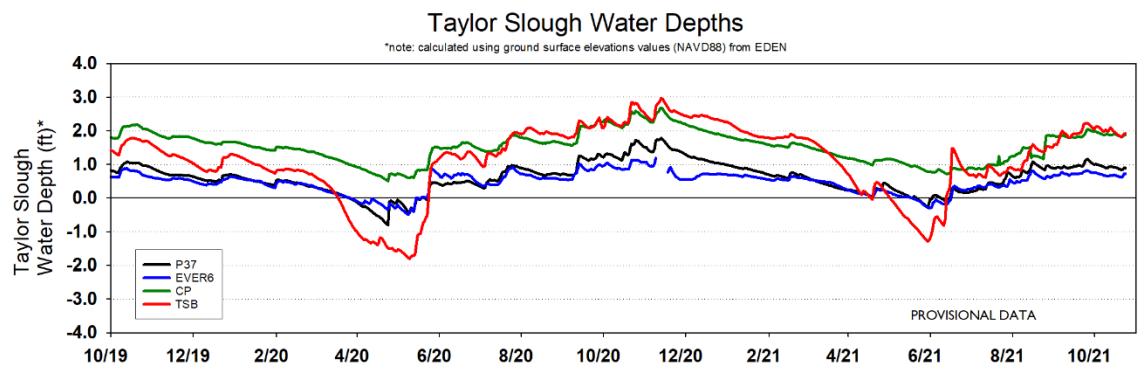


Figure EV-9. Taylor Slough water depth time series.

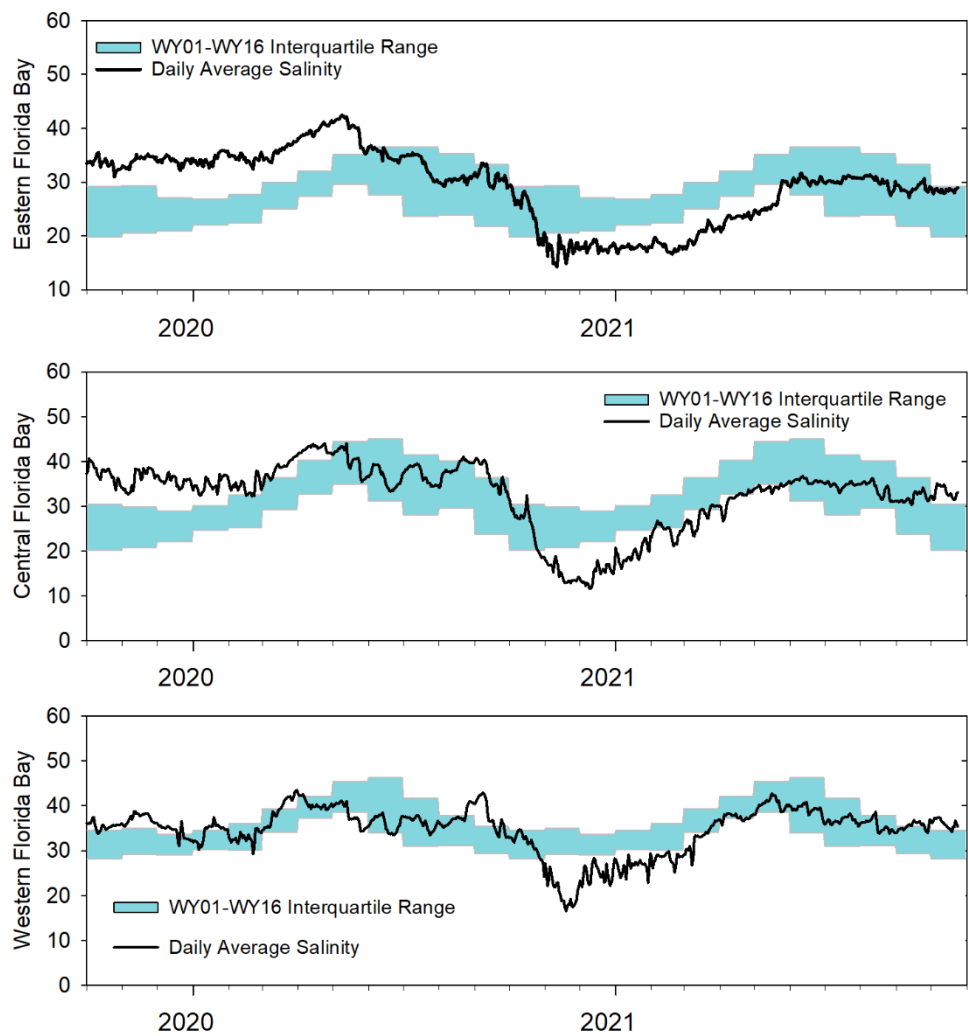


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

Table EV-2. Weekly water depth changes and water management recommendations

SFWMD Everglades Ecological Recommendations, October 26, 2021 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.02'	Initiate an ascension rates of less than 0.25 feet per week or 0.50 feet per two weeks.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage decreased by 0.17'	Hold stage above the regulation line, allowing a recession to begin November 1st.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage increased by 0.09'	Maintain ascension rates of less than 0.25 feet per week or 0.50 feet per two weeks.	Protect within basin and downstream habitat and wildlife. Depths in excess of 4.0 feet.
WCA-3A NE	Stage decreased by 0.06'	Initiate an ascension rate of less than 0.25 feet per week or 0.50 feet per two weeks, while moving water through the system.	Protect within basin peat soils and downstream habitat and wildlife.
WCA-3A NW	Stage decreased by 0.11'	Initiate an ascension rates of less than 0.25 feet per week or 0.50 feet per two weeks, while moving water through the system.	
Central WCA-3A S	Stage decreased by 0.08'	Initiate an ascension rates of less than 0.25 feet per week or 0.50 feet per two weeks, while moving water through the system.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage decreased by 0.14'		
WCA-3B	Stage decreased by 0.05'	Initiate an ascension rates of less than 0.25 feet per week or 0.50 feet per two weeks, while moving water through the system.	Protect within basin and downstream habitat and wildlife.
ENP-SRS	Stage remained unchanged	Make discharges to the Park according to COP and TTFF protocol while considering upstream and downstream ecological conditions.	Protect within basin and upstream habitat and wildlife.
Taylor Slough	Stage changes ranged from -0.02' to +0.06'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -0.5 to +1.4	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.