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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: November 17, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Moisture associated with an old frontal boundary will lift back north over the District Wednesday and Thursday. Moderate to locally heavy showers and thunderstorms are expected south and east Wednesday and Wednesday night as the old boundary lifts northward over the District. Shower activity should then increase in coverage with widespread areas of heavy rain up to 6" developing Thursday and Thursday night as the frontal wave moves across the area. As the wave exits to the east, a cold front is forecast to move into central Florida Friday and then stall and weaken over the area. This diffuse boundary should keep scattered showers over the area mainly over eastern portions of the District Friday, Saturday, and Sunday. A stronger, mostly dry front is then forecast to push through the District Monday night and Tuesday morning with just scattered shower activity followed by a return of dry conditions for a few days. During the first 7-day period (Week 1) total rainfall is forecast to be well above the historical average. Rainfall is forecast to be near the historical average during the second 7-day period (Week 2).

Kissimmee

Flow at S-65A continues to be too low for complete inundation of the Kissimmee River floodplain. Mean floodplain depth decreased to 0.79 feet as of November 14, 2021. The concentration of dissolved oxygen in the Kissimmee River has been improving, with an average of 5.6 mg/L for the week ending on November 14, 2021.

Lake Okeechobee

Lake Okeechobee stage was 16.03 feet NGVD on November 14, 2021, and it was 0.15 feet higher than a month ago (**Figure LO-1**). Lake stage is currently 0.53 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 inflows (excluding rainfall) decreased from the previous week, going from 3,460 cubic feet per second (cfs) to 3,118 cfs. Recent satellite imagery (November 13, 2021) showed medium bloom potential along the southern shorelines and offshore of Indian Prairie (**Figure LO-6**).

Estuaries

Total inflow to the St. Lucie Estuary averaged 610 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities increased at HR1 and US1 Bridge sites and remained the same at the A1A Bridge site 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 3,048 cfs over the past week with 225 cfs coming from the Lake. Mean surface salinities remained the same at S-79, decreased at Val I-75, Ft. Myers, and Cape Coral and increased at Shell Point and Sanibel 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 Shell Point and Sanibel and in the fair range at Cape Coral.

Stormwater Treatment Areas

For the week ending Sunday, November 14, 2021, no 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 approximately 914,000 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 for vegetation management activities. This week, there is no capacity for Lake releases in the STAs.

Everglades

Rates of change were generally characterized as good across the Everglades, with slightly elevated recessions in WCA-3A North. Depths in WCA-3A North remained above the historical median, and tree island model output indicates near average conditions. Wading bird surveys were conducted last week, and birds were foraging along the coast and northern WCA-3A. Florida Bay salinities increased over the last week, and stages fell but remained above average in Taylor Slough. The

central Florida Bay region remains above the 75th percentile of the historical average for this time of the year. Despite early dry season rains, conditions remain suboptimal in Florida Bay.

SUPPORTING INFORMATION

Kissimmee Basin

Upper Kissimmee

On November 14, 2021, lake stages were 57.9 feet NGVD (0.1 feet below schedule) in East Lake Toho, 54.9 feet NGVD (0.1 feet below schedule) in Lake Toho, and 49.7 feet NGVD (2.8 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

Discharges to the Kissimmee River on November 14, 2021 were 880 cfs at S-65 and 810 cfs at S-65A; discharges from the Kissimmee River were 1,430 cfs at S-65D and 1,480 cfs at S-65E (**Table KB-2**). Headwater stages were 46.3 feet NGVD at S-65A and 27.1 feet NGVD at S-65D on November 14, 2021. With lower water temperatures, little rainfall, and reduced discharge at S-65A, the concentration of dissolved oxygen in the Kissimmee River has continued to improve, with an average of 5.6 mg/L for the week ending on November 14, 2021 (**Table KB-2, Figure KB-4**). Flow at S-65A remains too low for complete inundation of the Kissimmee River floodplain. Mean floodplain depth decreased to 0.79 feet as of November 14, 2021 (**Figure KB-5**).

Water Management Recommendations

Due to dry conditions, we began slow discharge reductions at S-65A on Oct 30 per the IS-14-50 discharge plan (Slide 11). We will reach minimum discharge of 300 cfs this week

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)	
							11/14/21	11/7/21
Lakes Hart and Mary Jane	S-62	LKMJ	94	61.1	R	61.0	0.1	-0.1
Lakes Myrtle, Preston and Joel	S-57	S-57	59	62.1	R	62.0	0.1	0.0
Alligator Chain	S-60	ALLI	102	64.1	R	64.0	0.1	0.0
Lake Gentry	S-63	LKGT	133	61.5	R	61.5	0.0	0.0
East Lake Toho	S-59	TOHOE	0	57.9	R	58.0	-0.1	-0.4
Lake Toho	S-61	TOHOW S-61	0	54.9	R	55.0	-0.1	-0.5
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	908	49.7	R	52.5	-2.8	-2.6

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.

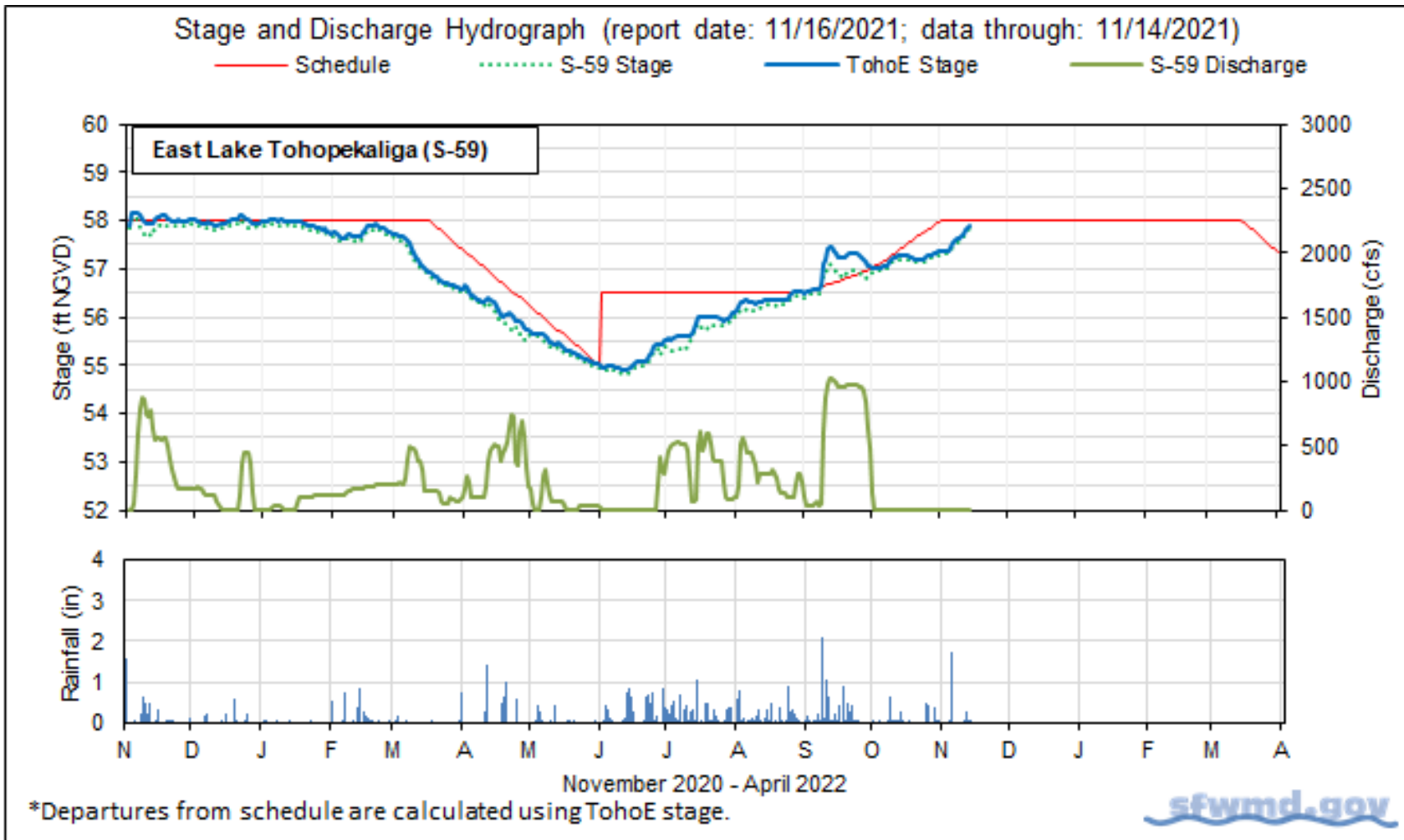


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

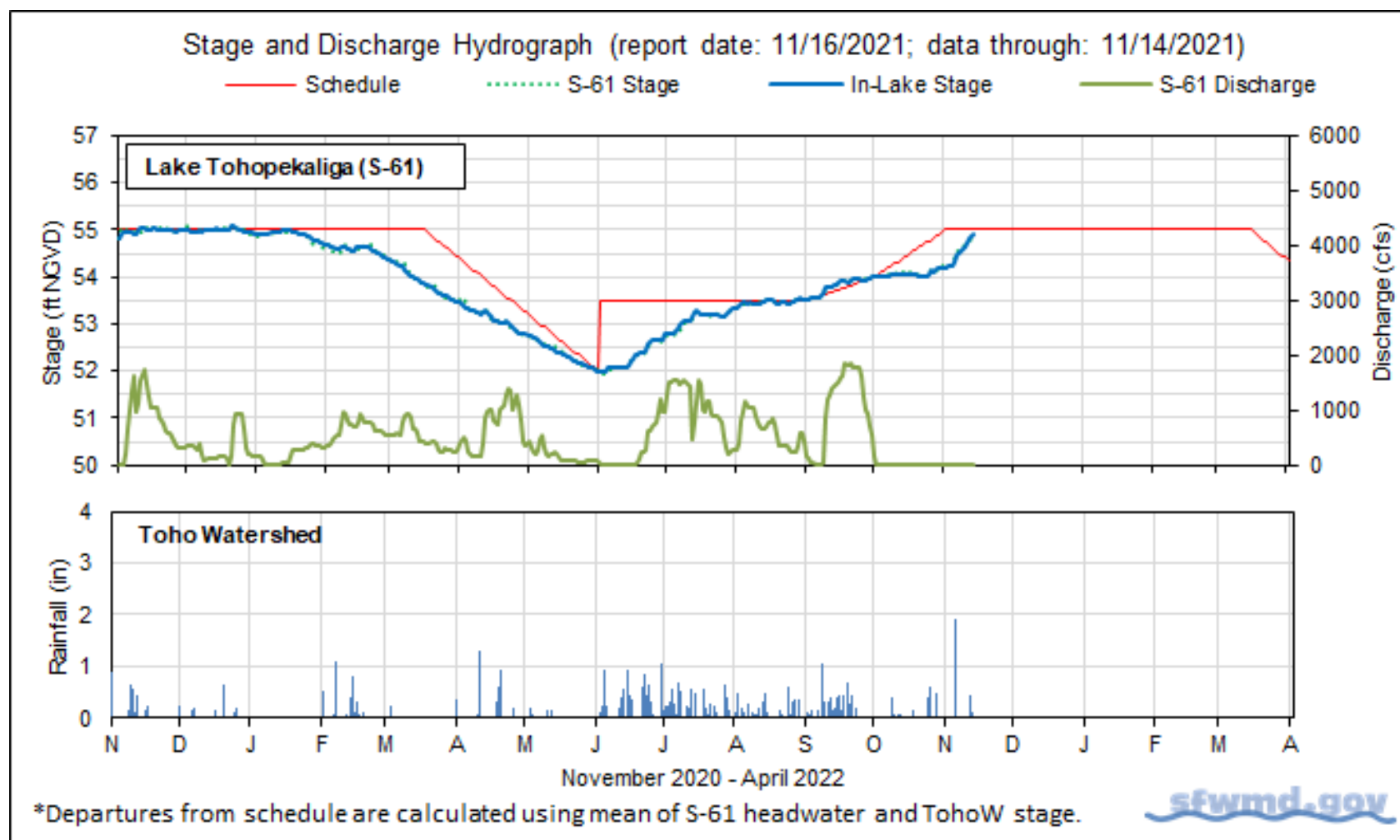


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

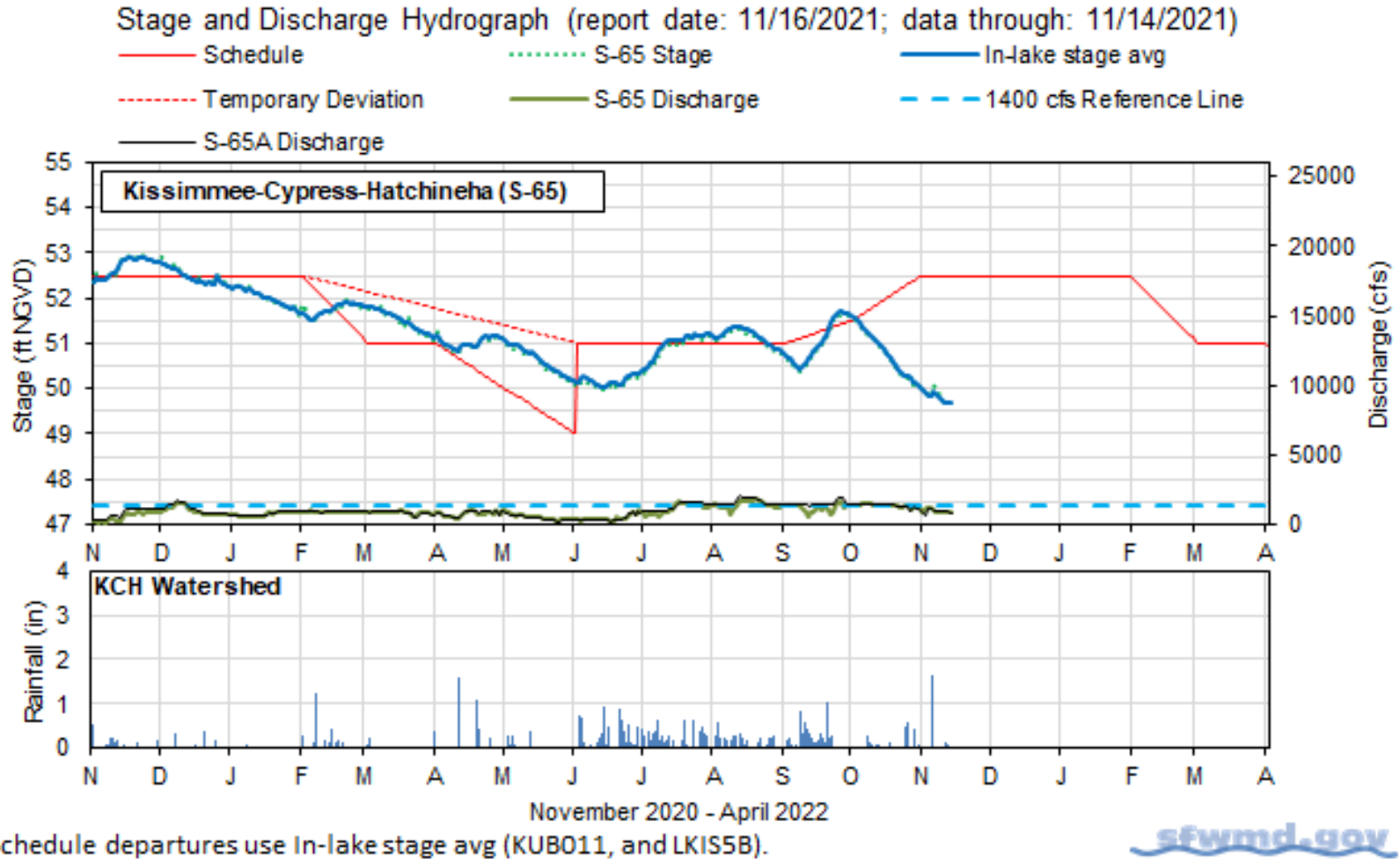


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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			
		11/14/21	11/14/21	11/7/21	10/31/21	10/24/21
Discharge	S-65	880	910	1,070	1,210	1,340
Discharge	S-65A ^a	810	900	960	1,160	1,310
Headwater Stage (feet NGVD)	S-65A	46.3	46.3	46.4	46.4	46.3
Discharge	S-65D ^b	1,430	1,410	1,390	1,550	1,680
Headwater Stage (feet NGVD)	S-65D ^c	27.1	27.0	27.0	27.1	27.7
Discharge (cfs)	S-65E ^d	1,480	1,470	1,460	1,600	1,740
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	5.7	5.6	5.1	4.1	3.6
Mean depth (feet) ^f	Phase I floodplain	0.79	0.82	0.77	0.83	0.87

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.

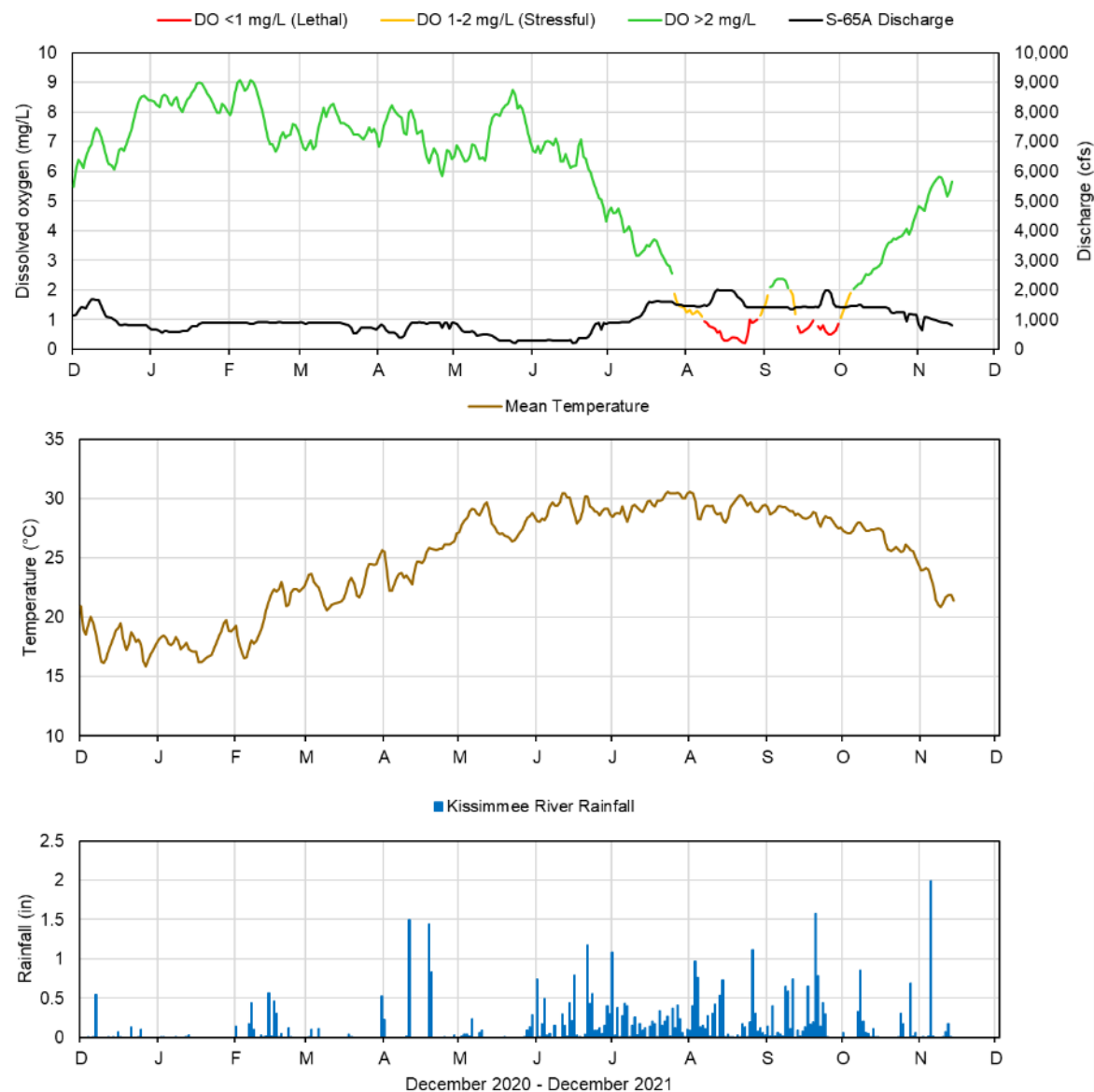
d. Combined discharge from S-65E and S-65EX1.

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: 11/16/2021; data are through: 11/14/2021

sfwmd.gov

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.

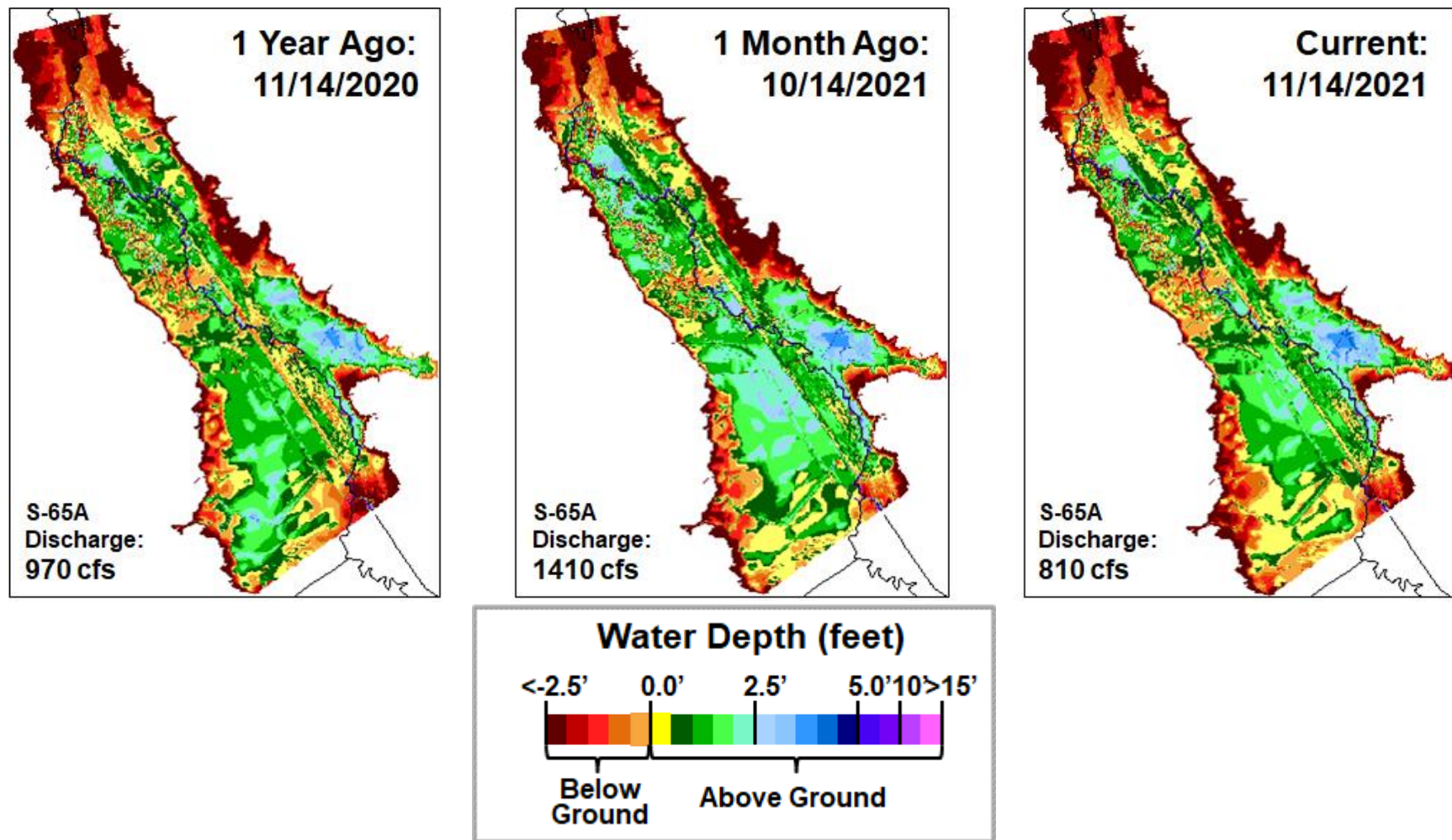


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

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.

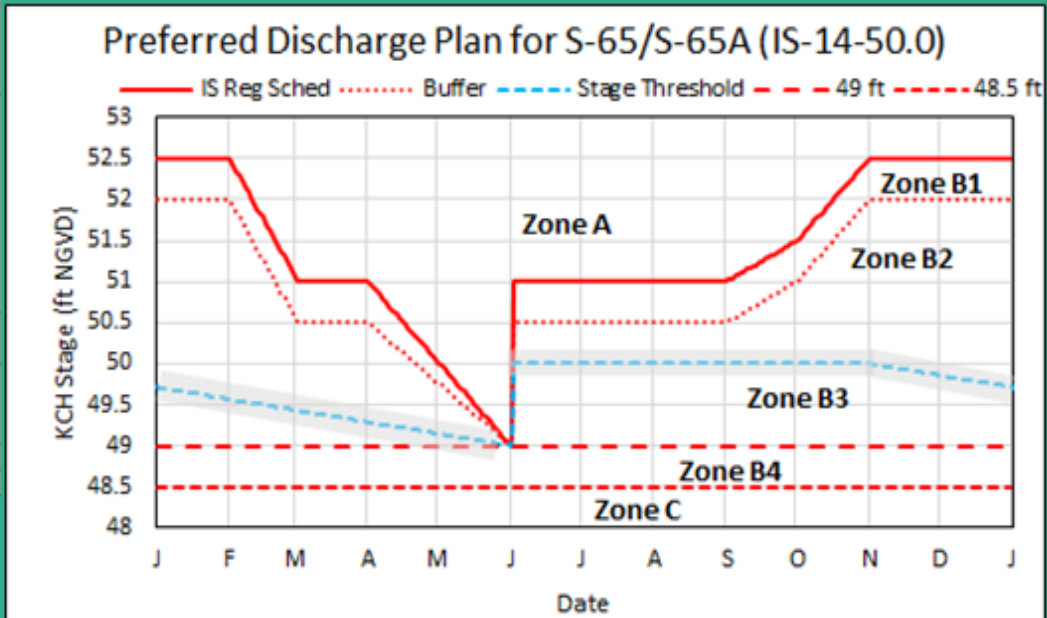
*Changes in discharge should not exceed limits in inset table below.

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

11

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 16.03 feet NGVD on November 14, 2021, with water levels 0.15 feet higher than a month ago (**Figure LO-1**). Lake stage was approximately 0.5 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 and was 0.22 feet below the Intermediate sub-band (**Figure LO-3**). According to NEXRAD, 0.17 inches of rain fell directly on the Lake last week, a decrease of 1.46 inches compared to the previous week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 3,460 cfs to 3,118 cfs. Average daily outflows (excluding evapotranspiration) also decreased from the previous week, going from 555 cfs to 225 cfs. Most of the inflows (1,472 cfs) came from the Kissimmee River through the S-65E & S-65EX1 structures. The second and third highest inflows were received from the Indian Prairie basin (1,015 cfs) and Taylor Creek/Nubbin Slough basin (224 cfs), respectively. There was an outflow of 225 cfs to the west via S-77, but zero outflow to the east via S-308, or to the south via the S-350 structures. There was a backflow from the L-8 canal via the S-271 structure at the average daily rate of 175 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 (November 13, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data is slightly obscured by clouds, but it showed medium bloom potential along the southern shorelines and offshore of Indian Prairie (**Figure LO-6**).

Water quality sampling is now on the non-bloom season schedule (November – April), occurring once monthly at approximately 30 stations for chlorophyll *a*, and at nine stations for toxin and taxonomic identification. Only one of the nine sites had detectable microcystin levels (0.6 µg/L at LZ30; **Table LO-1** and **Figure LO-7**) and was also the only site dominated by *Microcystis*. Four of the water quality samples had chlorophyll *a* value above 40 µg/L, the SFWMD bloom threshold, ranging from 47 to 63 µg/L. A further 10 sites had chlorophyll *a* value greater than 20 µg/L.

1 Month Ago:
10/15/2021

Current:
11/14/2021

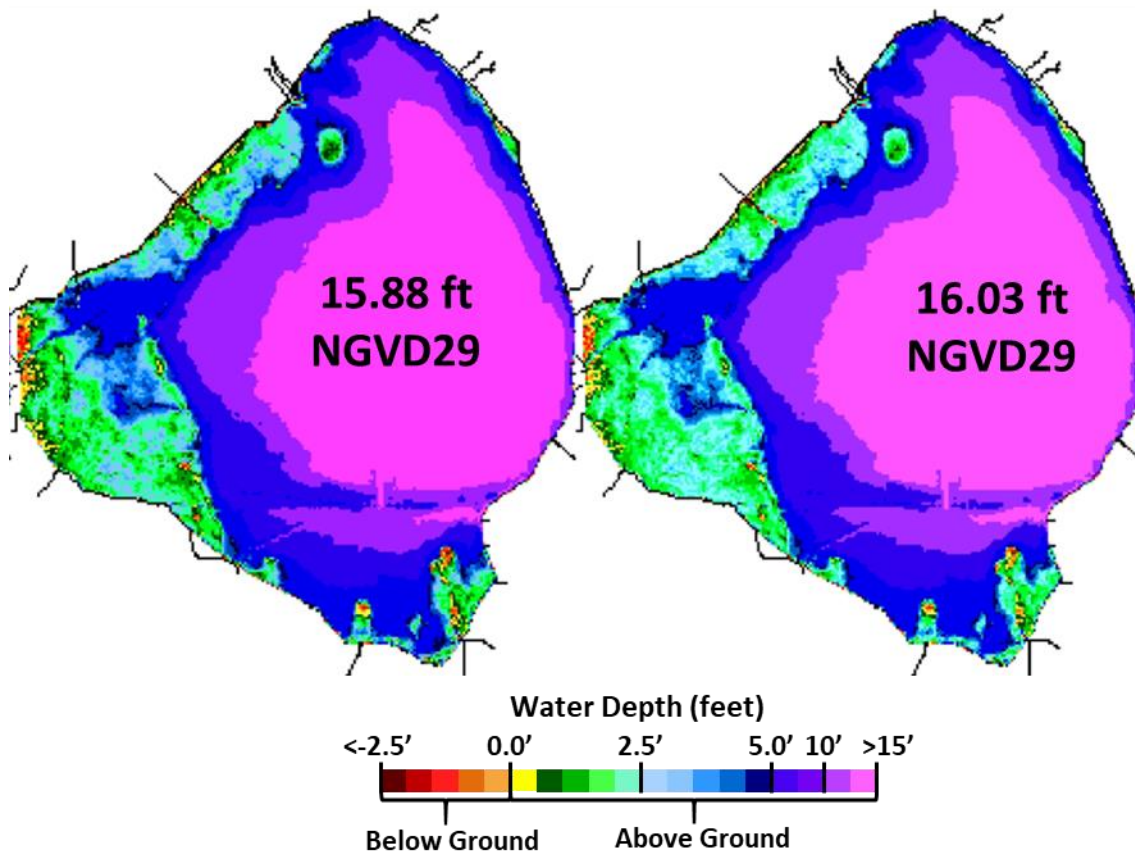


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Stage vs Updated Ecological Envelope

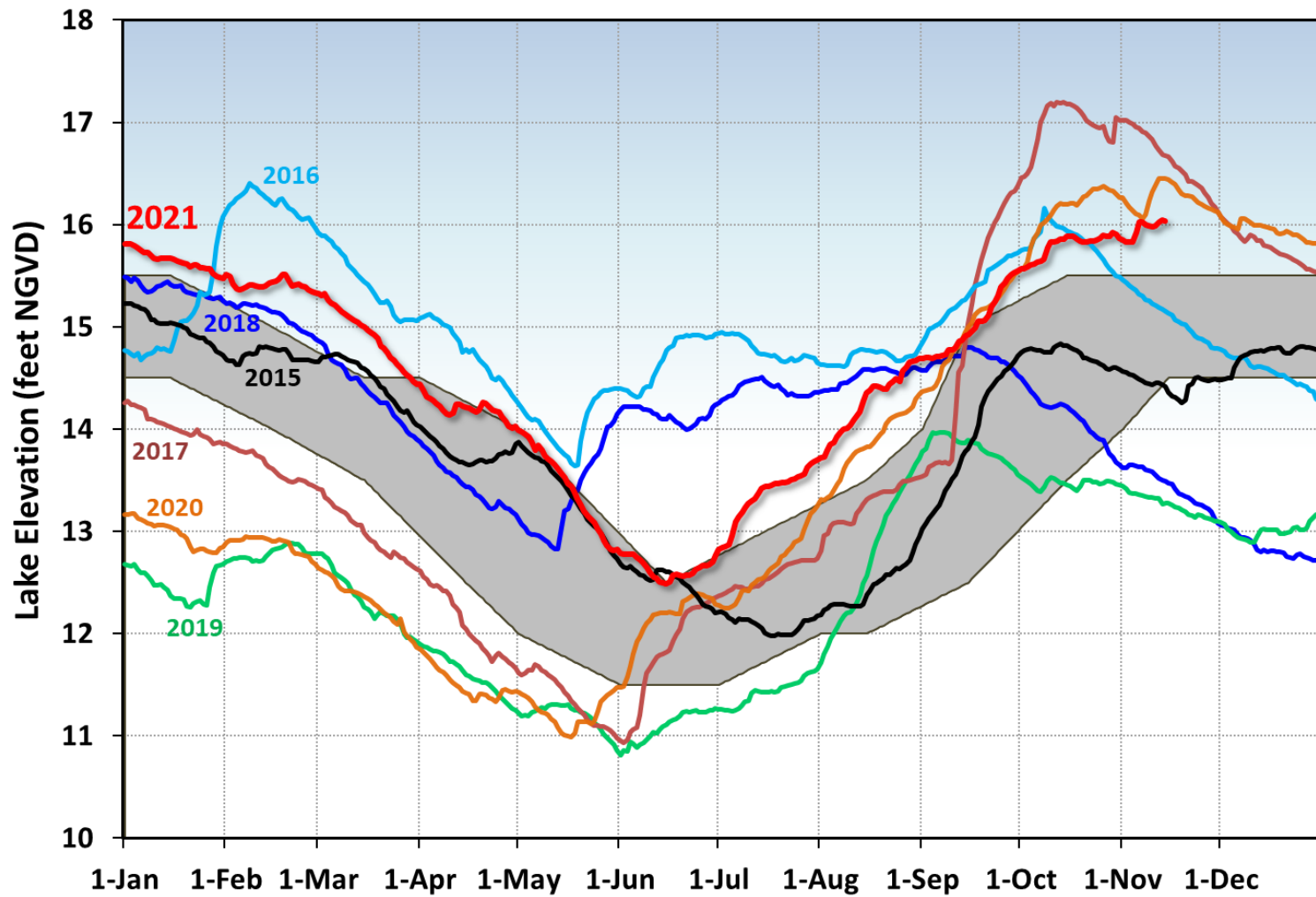
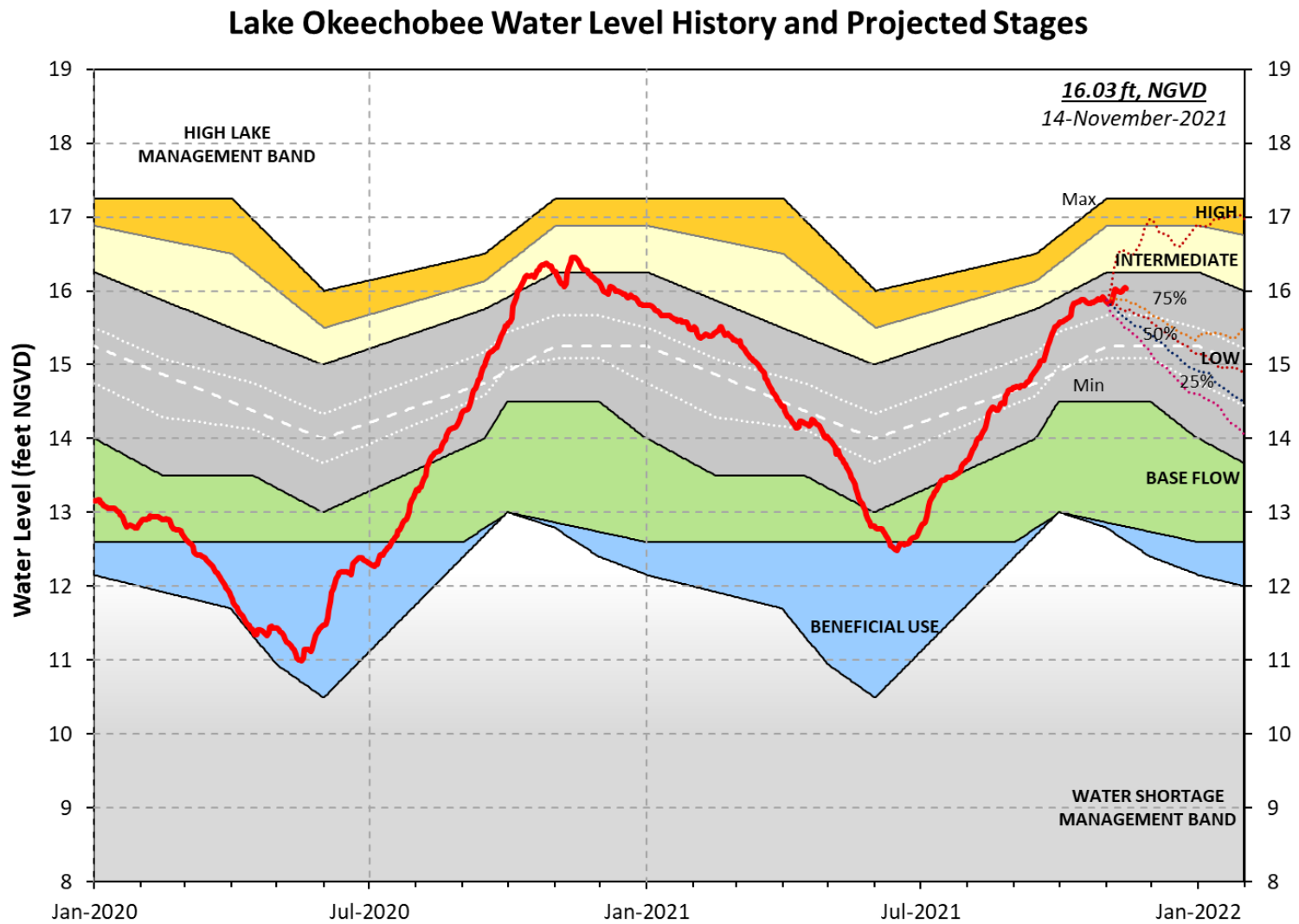


Figure LO-2. The prior seven years of annual stage hydrographs for Lake Okeechobee in comparison to the updated ecological envelope.



LORS-2008 - Adopted by USACE 28-April-2008

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

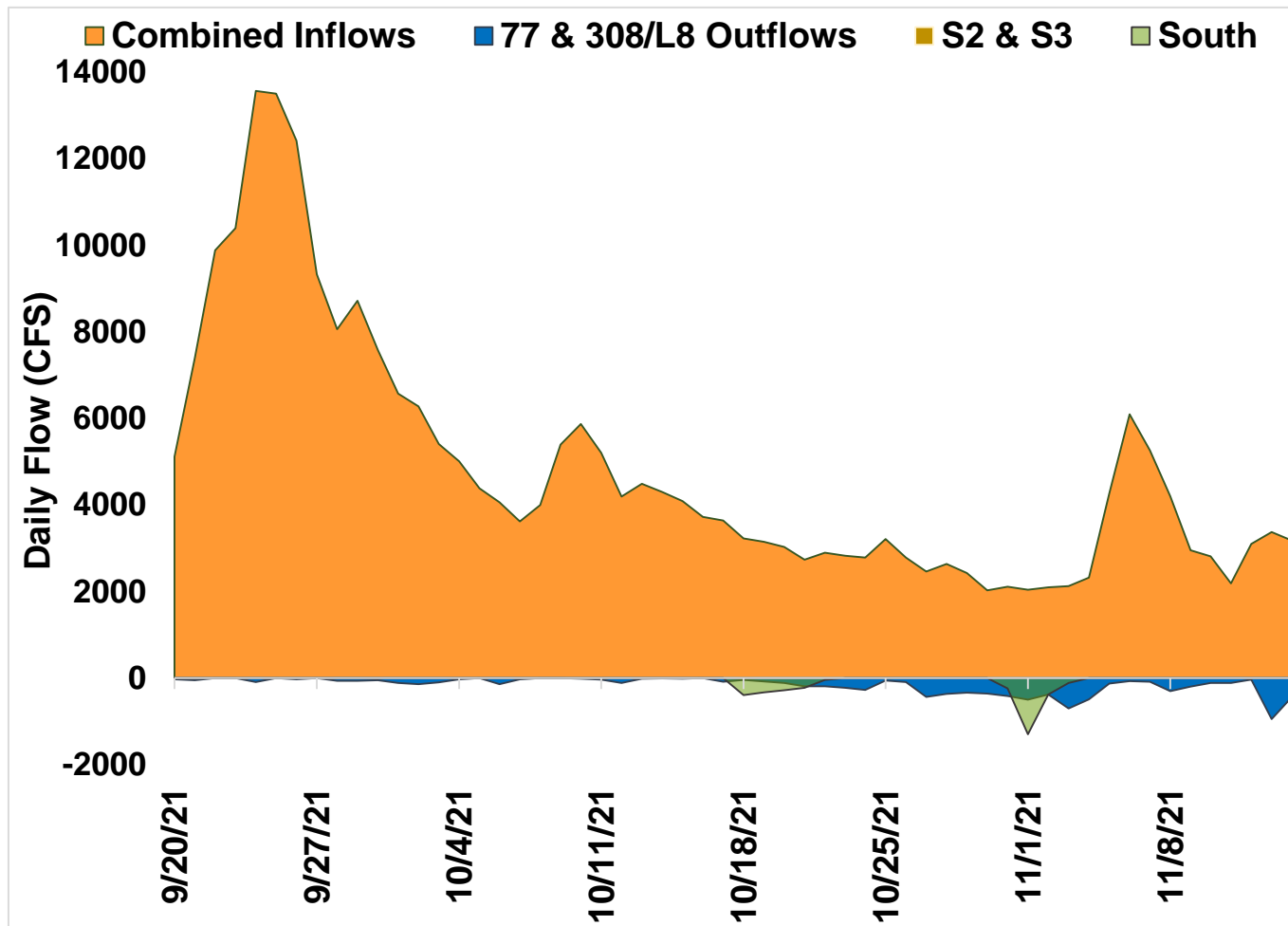


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from 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.

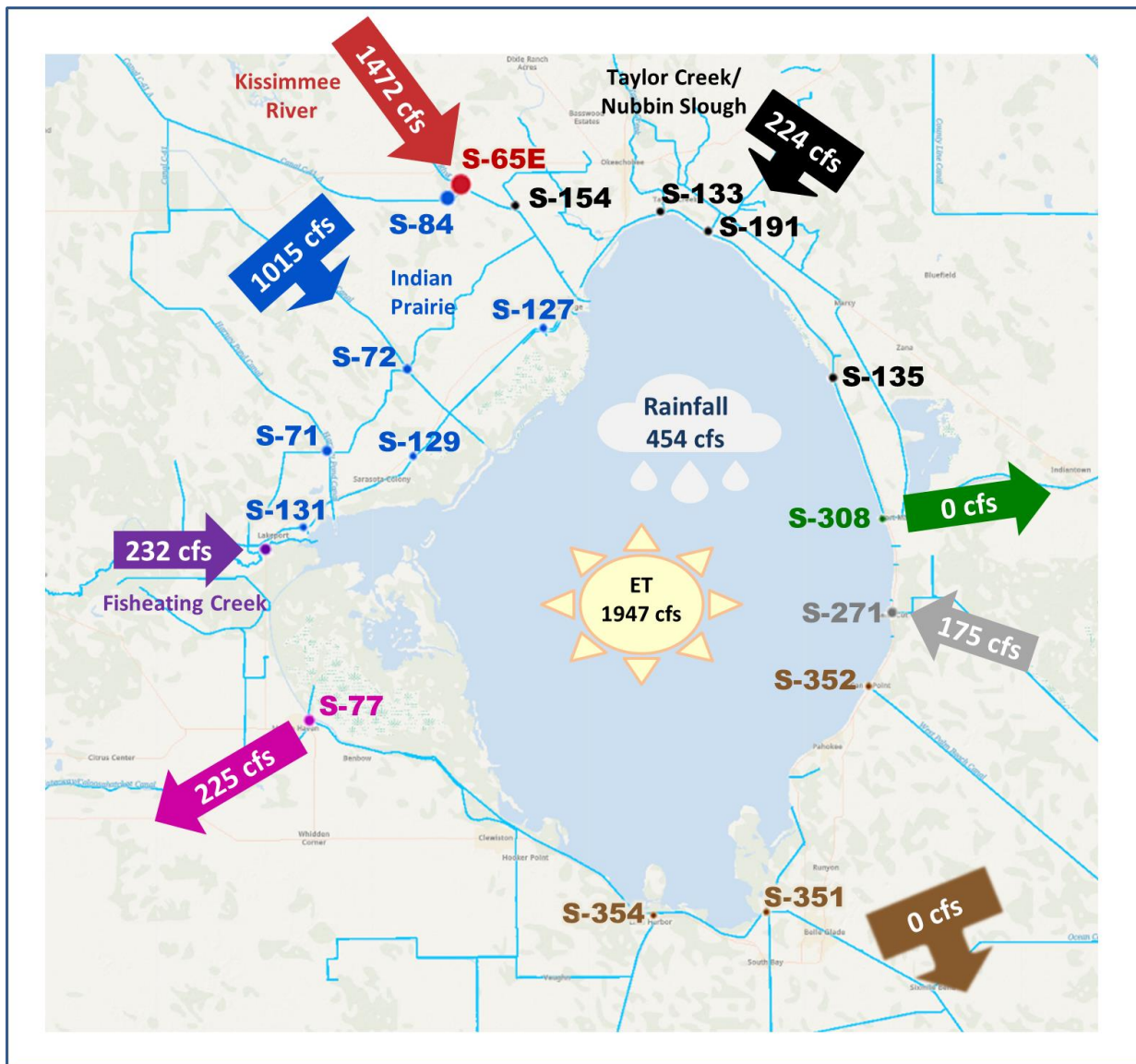


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A).

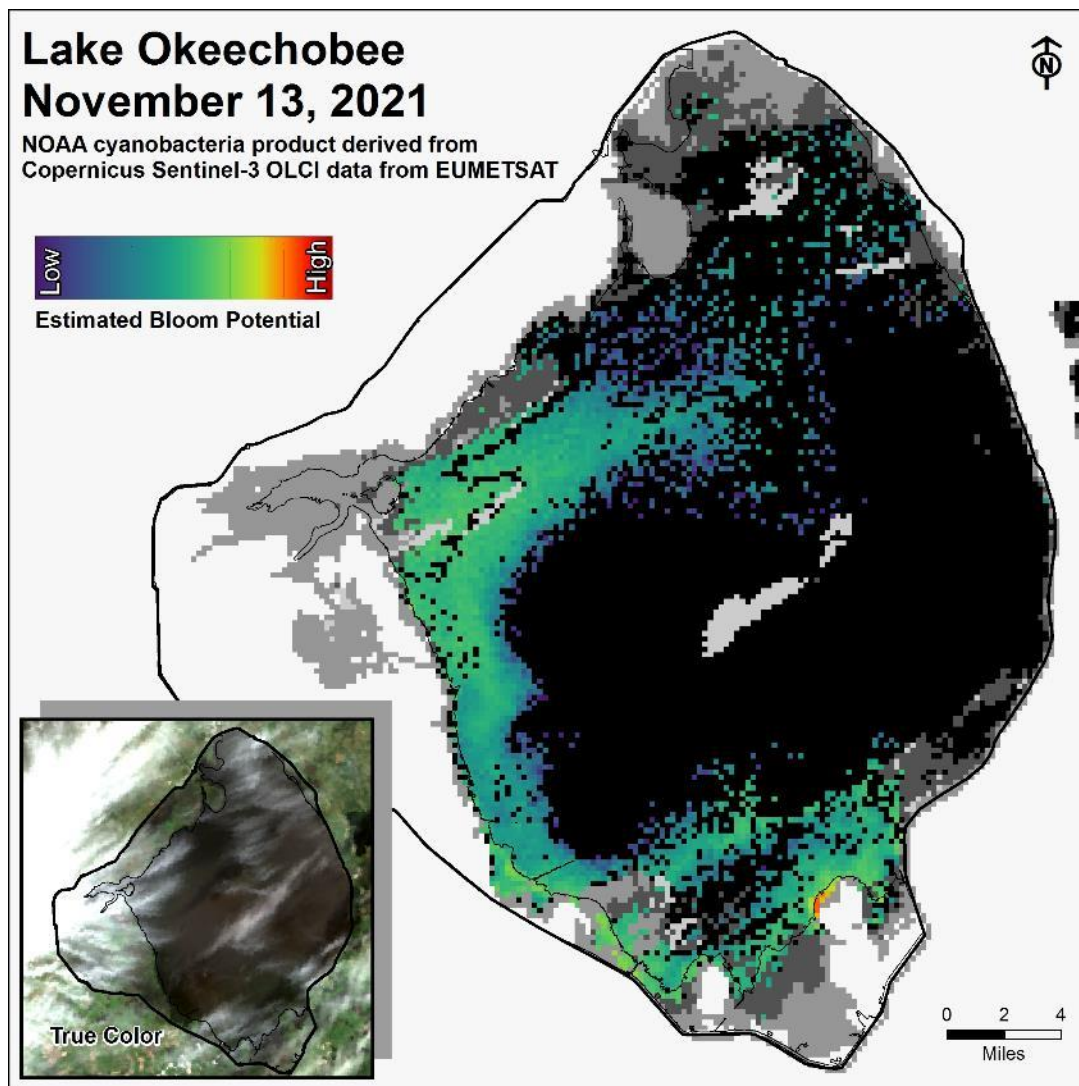


Figure LO-6. Cyanobacteria bloom potential on November 13, 2021 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Table LO-1. Provisional results of chlorophyll *a* concentrations and cyanobacteria taxa from sampling trips on November 1-3, 2021. Font colors follow legend for **Figure LO-7**.

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
FEBIN			
FEBOUT			
KISSR0.0	12.2	BDL	<i>mixed</i>
L005	23.8	BDL	<i>Cylin/Plank</i>
LZ2	19.3	BDL	<i>mixed</i>
KBARSE	28.5		
RITTAE2	30.4	BDL	<i>mixed</i>
PELBAY3	10.0		
POLE3S	28.4		
LZ25A	16.3		
PALMOUT	30.6	BDL	<i>mixed</i>
PALMOUT1	28.2		
PALMOUT2	P		
PALMOUT3	7.2		
POLESOUT	24.9	BDL	<i>Micro/Cylin</i>
POLESOUT1	62.7		
POLESOUT2	60.8		
POLESOUT3	58.8		
EASTSHORE	23.0		
NES135	21.0		
NES191	16.6		

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
L001	12.7		
L004	15.0		
L006	4.6		
L007	11.6		
L008	47.0		
LZ30	13.9	0.6	<i>Microcys</i>
LZ40	7.7		
CLV10A	8.1	BDL	<i>mixed</i>
NCENTER	20.3		

S308C	10.3	BDL	<i>mixed</i>
S77	4.0	BDL	<i>mixed</i>

- 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*

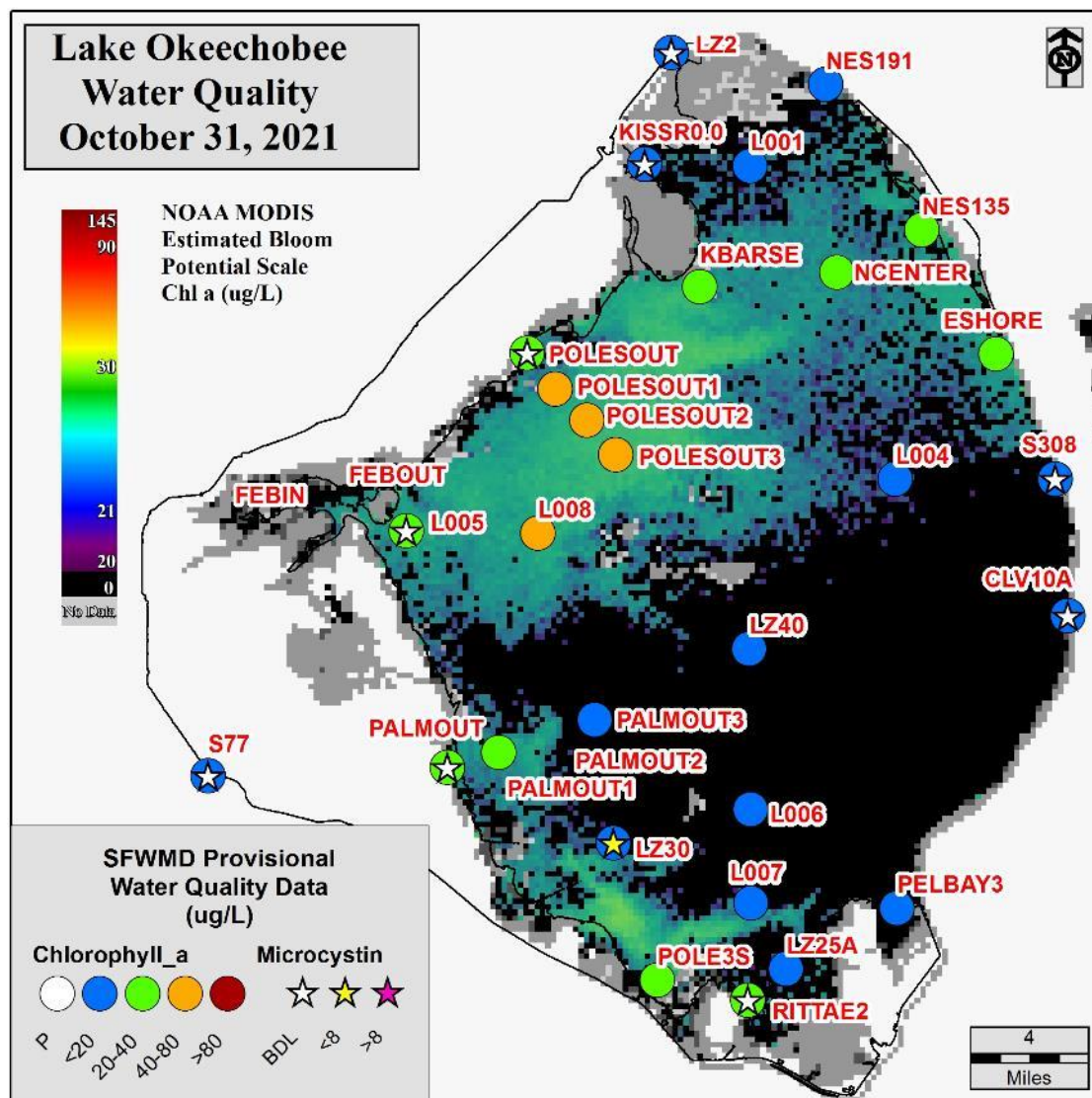


Figure LO-7. Expanded monitoring network and provisional results from samples collected November 1-3, 2021, overlaid onto the October 31 image from NOAA's harmful algal bloom monitoring system.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 610 cfs (**Figures ES-1 and ES-2**), and the previous 30-day mean inflow was approximately 532 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities increased at the HR1 and US1 Bridge sites and remained the same at A1A Bridge site (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 20.1. 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 3,048 cfs (**Figures ES-5 and ES-6**), and the previous 30-day mean inflow was approximately 2,217 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-6**.

Over the past week, surface salinities remained the same at S-79, decreased at Val I-75, Ft. Myers, and Cape Coral, and increased at Shell Point and Sanibel (**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 Sanibel and Shell Point, and in the fair range at Cape Coral (**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 324 cfs. Model results from all scenarios predict daily salinity to be 0.8 or lower and the 30-day moving average surface salinity to be 0.4 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 November 12, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at low to medium

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.

concentrations in offshore Collier County. On the east coast, red tide was not observed in samples from Martin and St. Lucie counties.

Water Management Recommendations

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

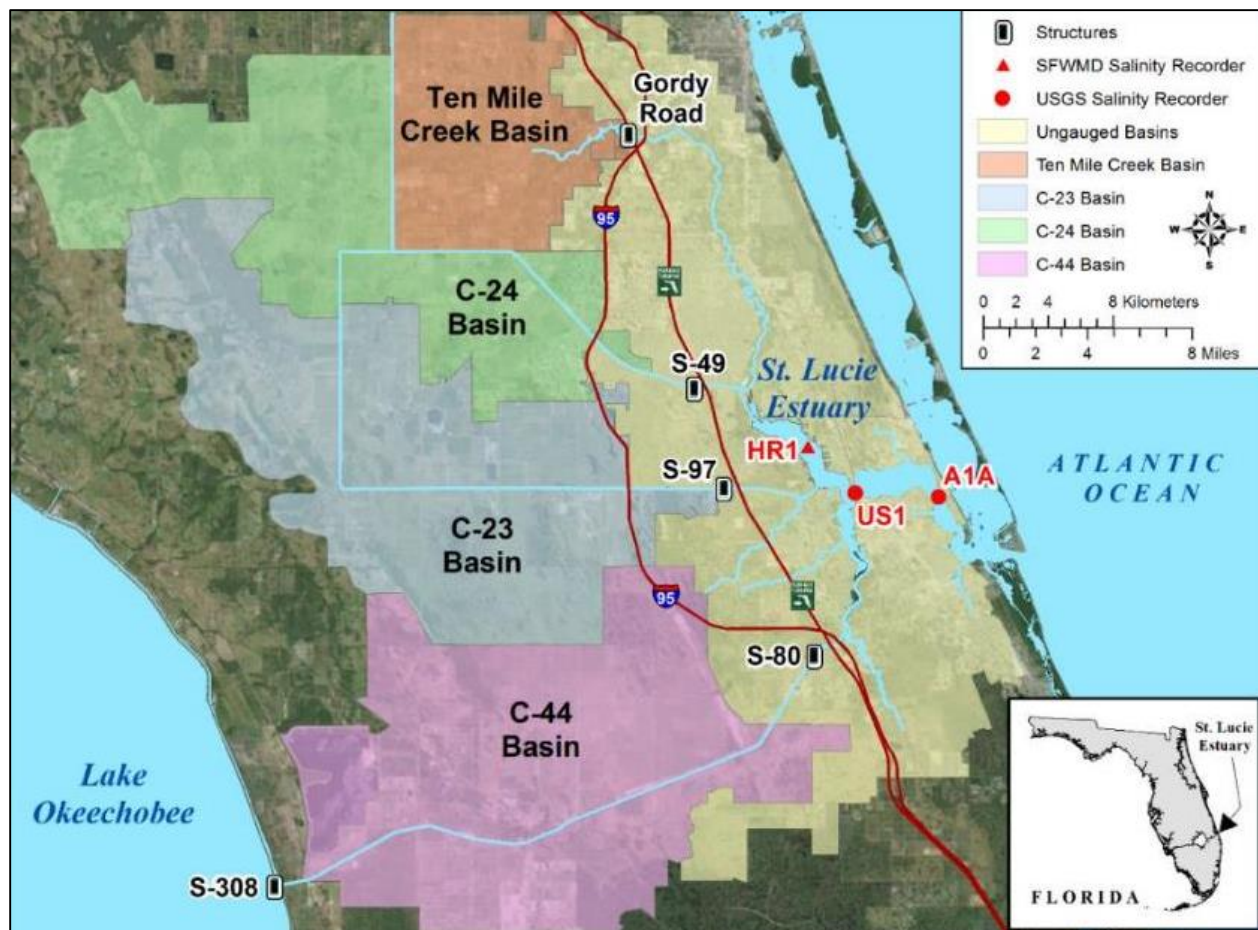


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

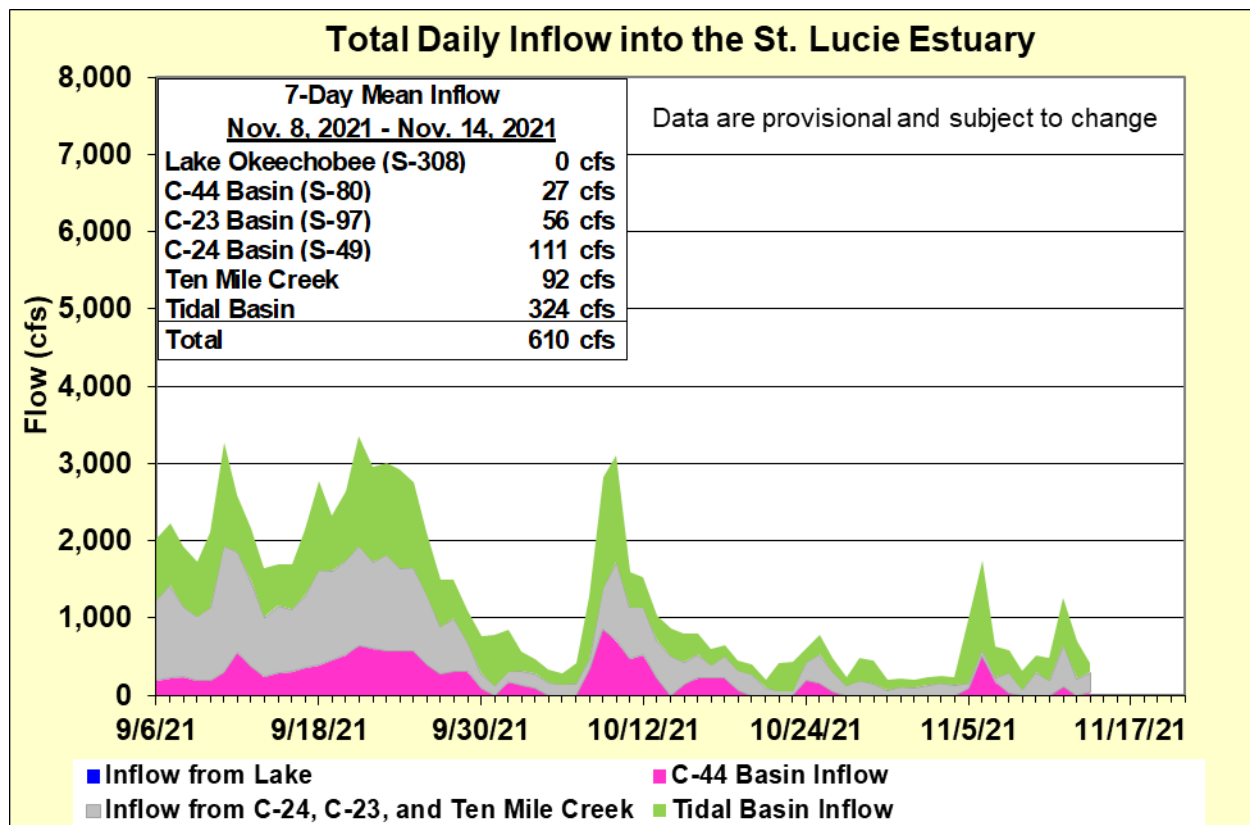


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	15.0 (13.6)	18.4 (16.0)	NA ^a
US1 Bridge	19.3 (17.4)	21.0 (19.1)	10.0 – 26.0
A1A Bridge	26.0 (26.3)	28.6 (28.4)	NA ^a

a. The envelope is not applicable.

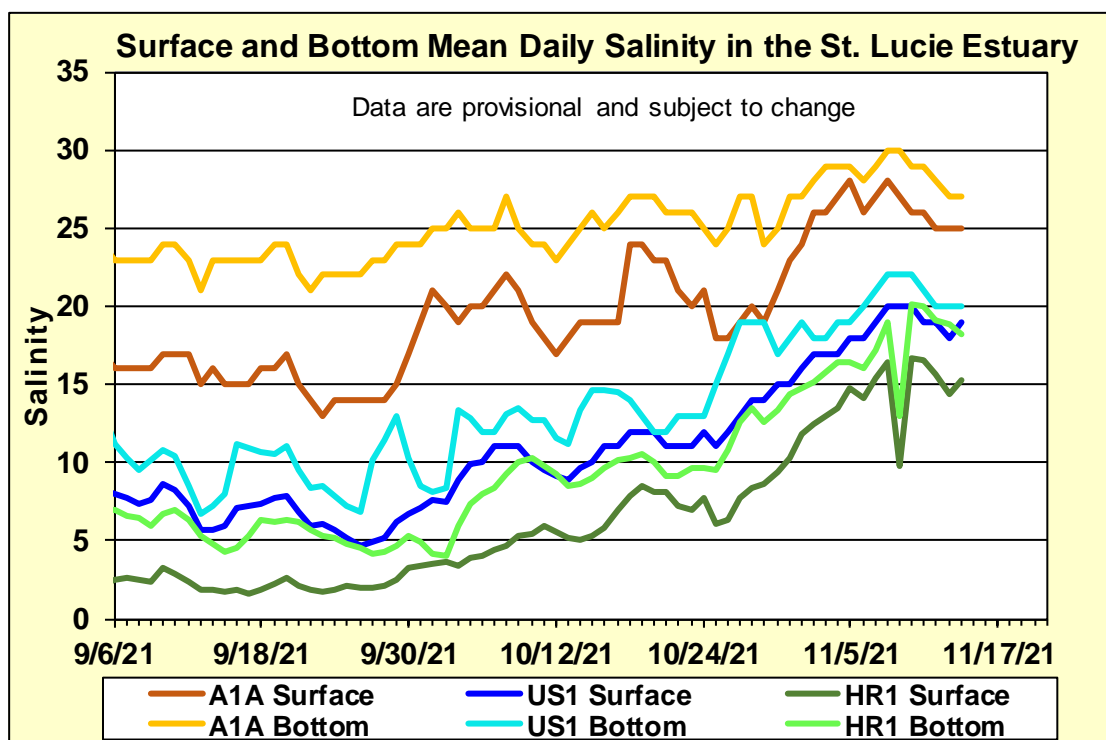


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

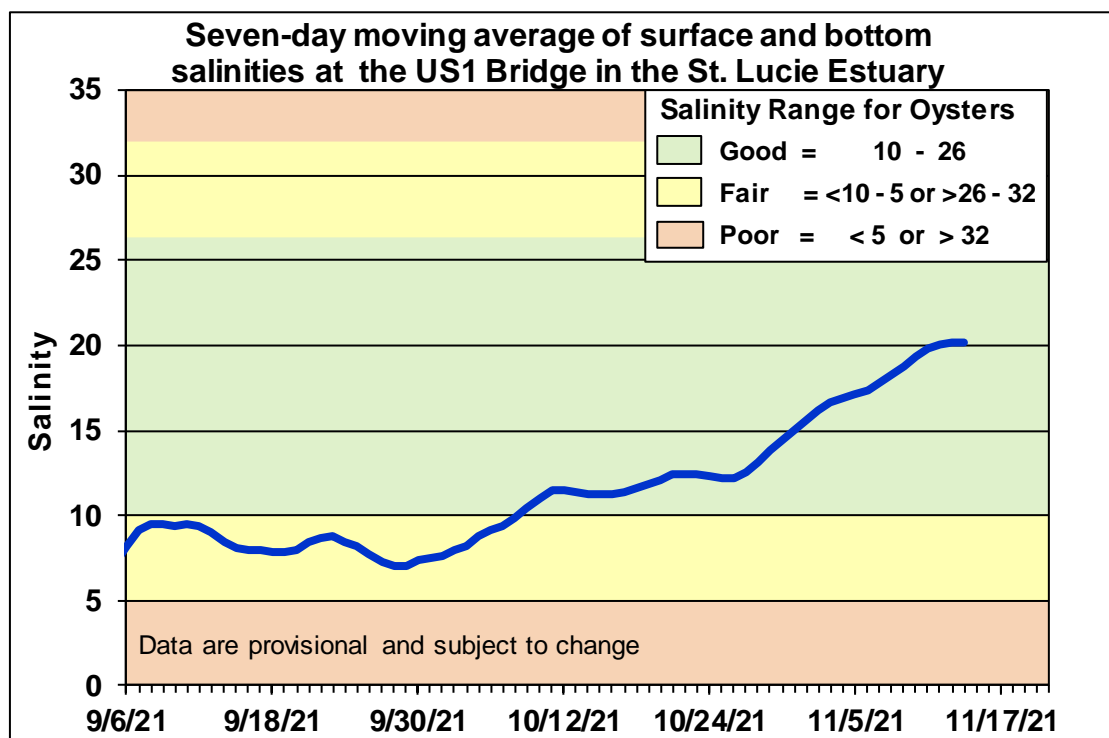


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

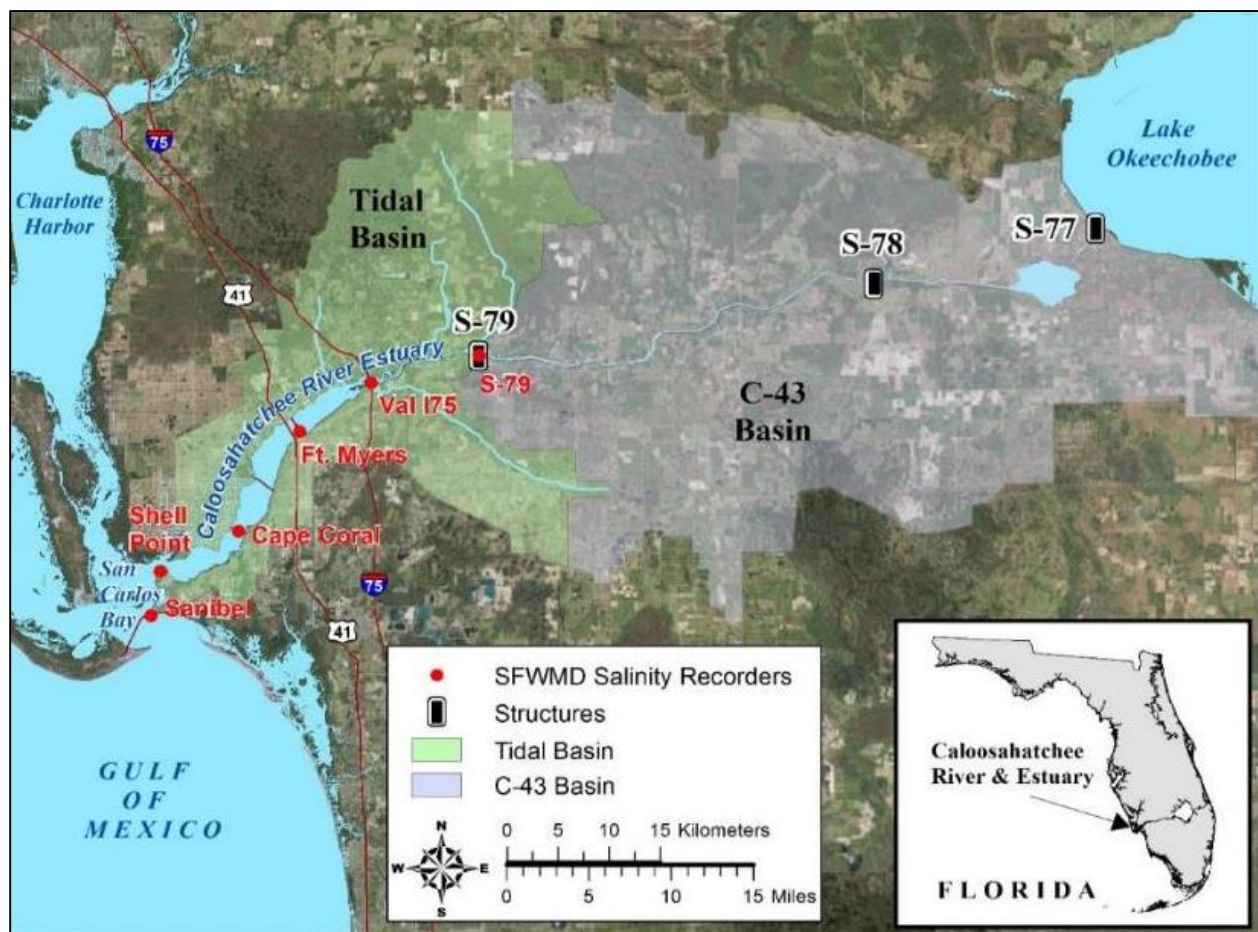


Figure ES-5. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

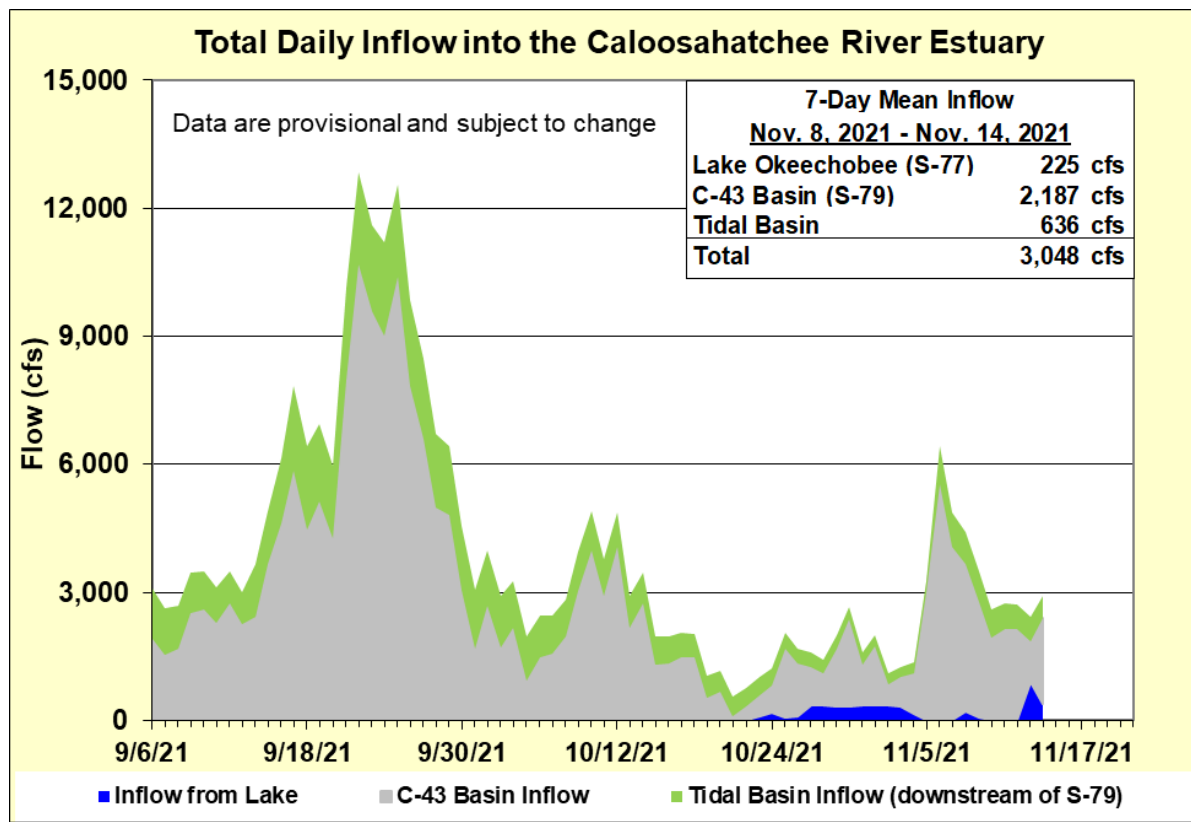


Figure ES-6. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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)	0.2 (0.2)	0.2 (0.2)	NA ^a
Val I-75	0.2 (0.3)	0.2 (0.3)	0.0 – 5.0 ^b
Fort Myers Yacht Basin	1.4 (2.6)	3.8 (3.3)	NA ^a
Cape Coral	7.4 (9.4)	10.4 (10.6)	10.0 – 30.0
Shell Point	20.1 (19.6)	21.1 (19.6)	10.0 – 30.0
Sanibel	27.4 (27.3)	29.1 (27.8)	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.

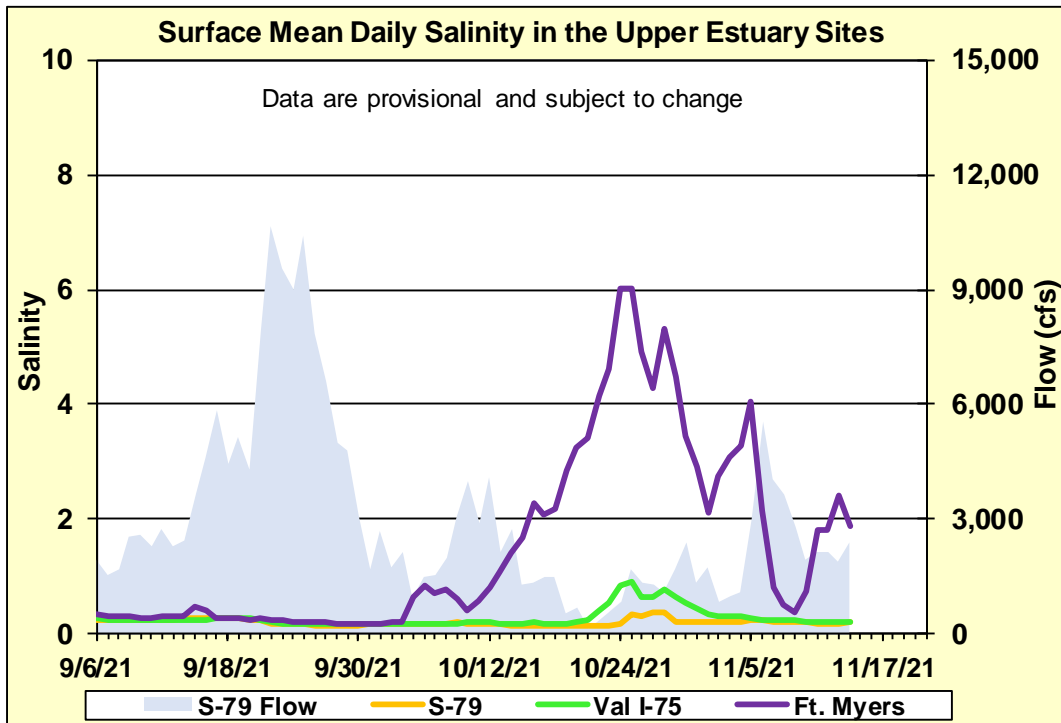


Figure ES-7. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

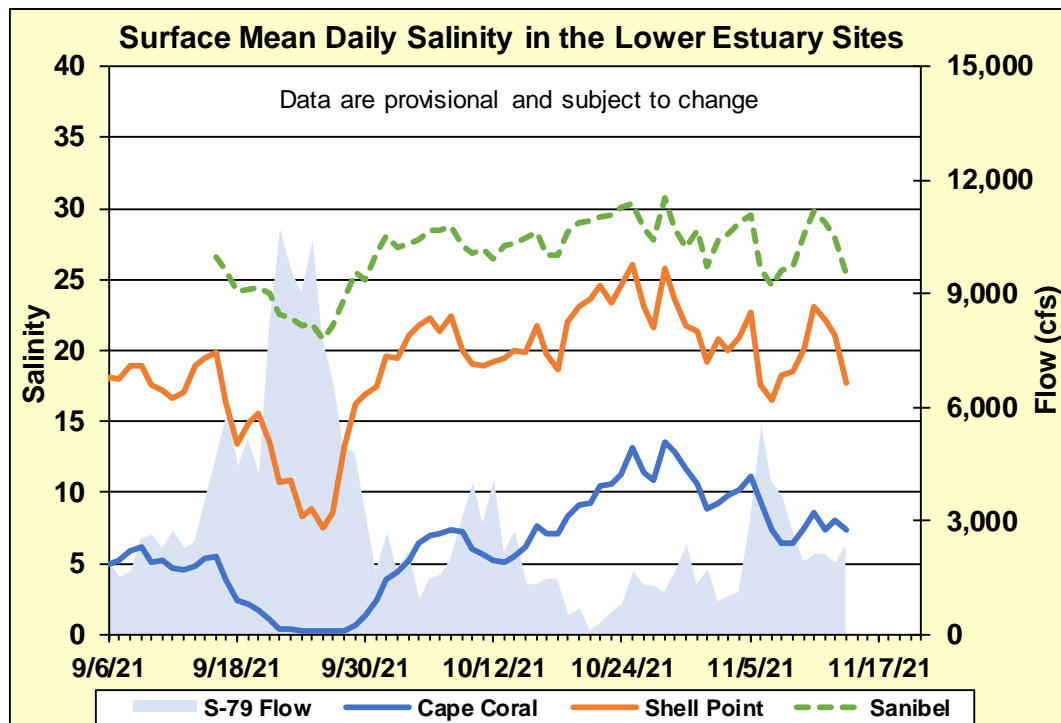


Figure ES-8. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

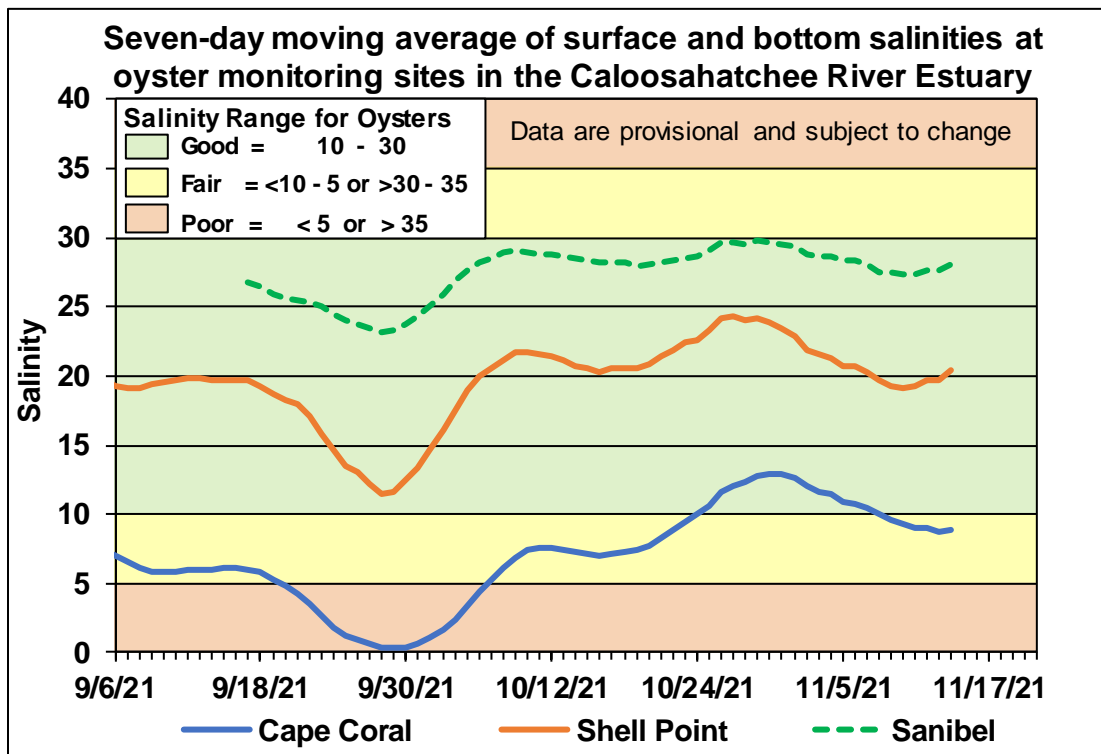


Figure ES-9. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

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	324	0.8	0.4
B	450	324	0.4	0.4
C	800	324	0.3	0.4
D	1000	324	0.3	0.4
E	1500	324	0.3	0.4
F	2000	324	0.3	0.4

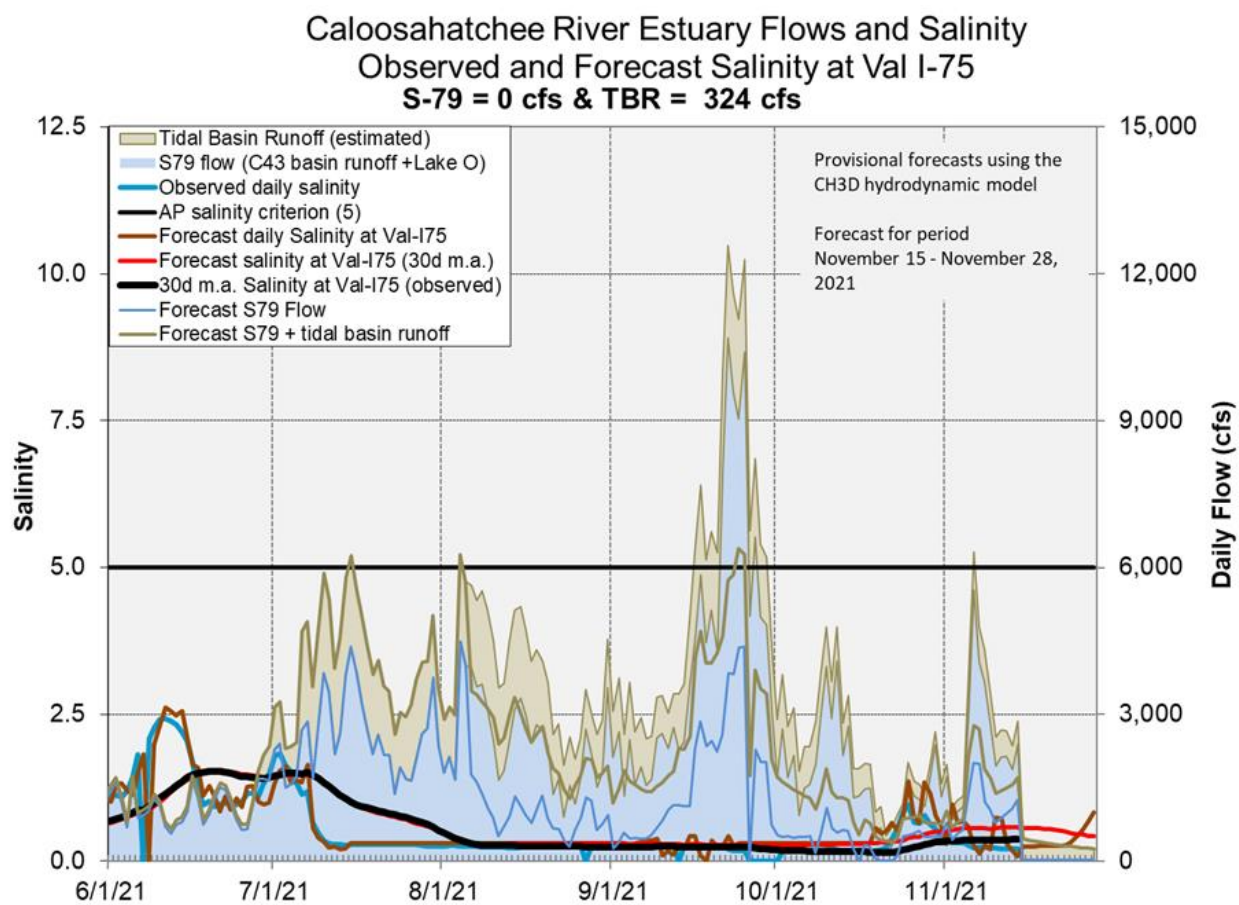


Figure ES-10. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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 rates (PLRs) are high for the Eastern and Central Flow-ways (**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, Western, and Eastern Flow-ways are below 1.0 g/m²/year (**Figure S-2**).

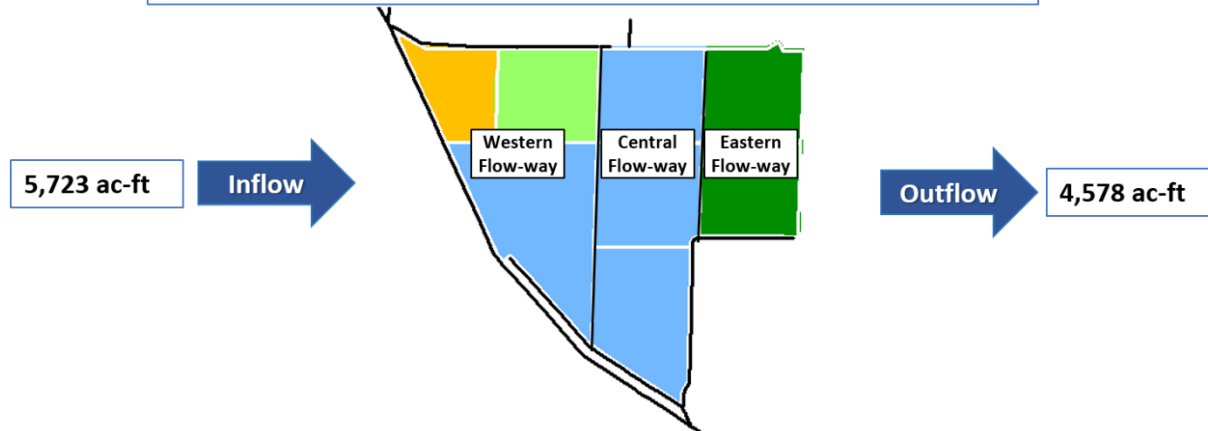
STA-2: STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Online treatment cells are at or above target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4, and 5 is highly 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 PLRs for the Central and Western Flow-ways are below 1.0 g/m²/year (**Figure S-4**).










STA-5/6: All Flow-ways are online. Most treatment cells are near or above 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 – 11/8/2021 through 11/14/2021



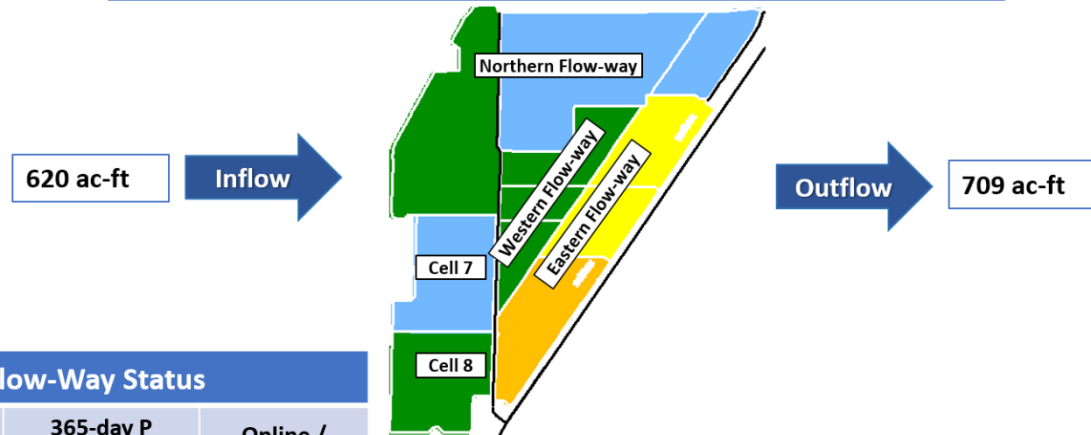
STA-1E Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P / m ² /yr is optimal)	Online / Offline / Restrictions
Eastern	←-----→ 		Online
Central	←-----→ 		Vegetation Rehab
Western	Offline, construction activities starting 11/01/2019		

As of 11/14/2021	
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-1E Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	5,723	13,095	195,050
--Lake Inflow, ac-ft	0	N/A	6,000
Total Outflow, ac-ft	4,578	9,963	163,876
Inflow Conc., ppb	102	100	122
Outflow Conc., ppb	23	24	31
Includes Preliminary Data			

Figure S-1. STA-1E Weekly Status Report

STA-1W Weekly Status Report – 11/8/2021 through 11/14/2021



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	← →	1.0	Construction
Western	← →	1.0	Construction
Eastern	← →	1.0	Construction
Cell 7	← →	N/A	Construction
Cell 8	← →	N/A	Construction

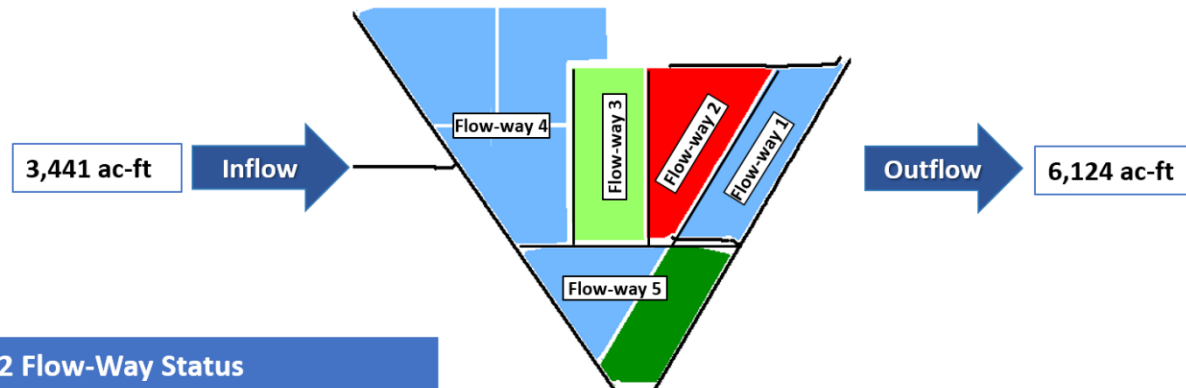
As of 11/14/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-1W Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	620	1,232	49,612
--Lake Inflow, ac-ft	0	N/A	4,100
Total Outflow, ac-ft	709	1,402	53,073
Inflow Conc., ppb	136	139	173
Outflow Conc., ppb	22	21	27
Includes Preliminary Data			

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

STA-2 Weekly Status Report – 11/8/2021 through 11/14/2021



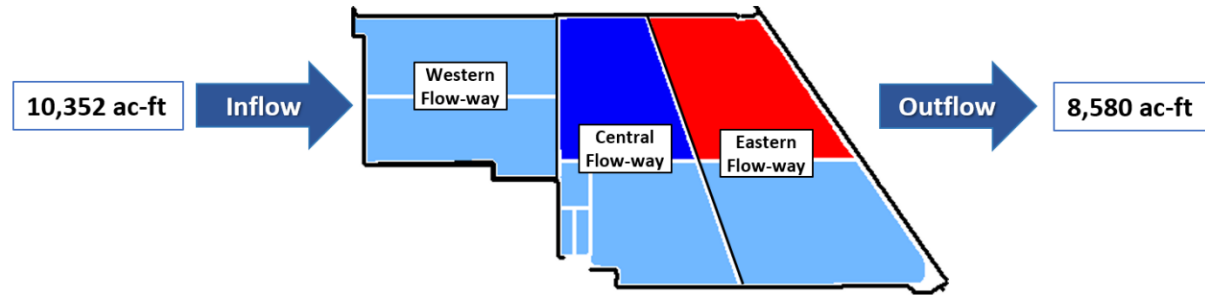
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2	Offline, construction activities as of 9/7/2021		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 11/14/2021	
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	3,441	12,126	337,526
--Lake Inflow, ac-ft	0	N/A	65,800
Total Outflow, ac-ft	6,124	15,647	368,538
Inflow Conc., ppb	52	63	89
Outflow Conc., ppb	11	14	17
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 11/8/2021 through 11/14/2021



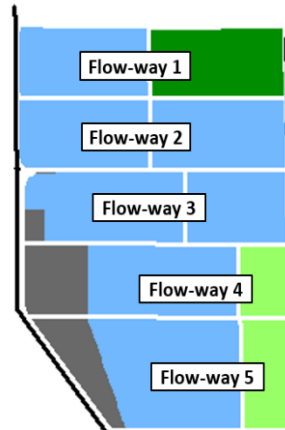
STA-3/4 Flow-Way Status				STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	As of 11/14/2021			
				Stage Based: Relative to Target Stage (TS)			
Eastern	Offline, vegetation 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	← Healthy →	1.0	Online	0-25% Dry	50-75% Dry		
Western	← Healthy →	1.0	Online	25-50% Dry	75-100% Dry		
				Includes Preliminary Data			
				<div>Total Inflow, ac-ft</div> <div>--Lake Inflow, ac-ft</div> <div>Total Outflow, ac-ft</div> <div>Inflow Conc., ppb</div> <div>Outflow Conc., ppb</div>			
				7-day	28-day	365-day	
				10,352	17,394	415,337	
				0	N/A	39,200	
				8,580	12,405	389,102	
				66	65	66	
				13	14	15	

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

STA-5/6 Weekly Status Report – 11/8/2021 through 11/14/2021

8,996 ac-ft

Inflow



Outflow

5,915 ac-ft

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 11/14/2021

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

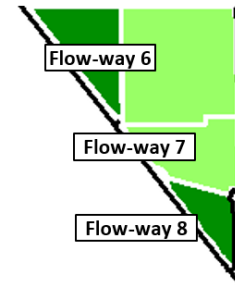
- 0-25% Dry
- 25-50% Dry
- 50-75% Dry
- 75-100% Dry

STA-5/6 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	8,996	21,961	217,979
--Lake Inflow, ac-ft	0	N/A	9,000
Total Outflow, ac-ft	5,915	15,773	222,459
Inflow Conc., ppb	159	161	272
Outflow Conc., ppb	17	24	73
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 11/8/2021 through 11/14/2021




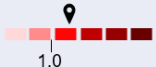



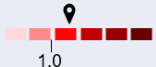



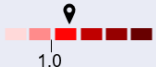


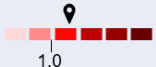




STA-5/6 Flow-Way Status				As of 11/14/2021	
Flow-Way	Vegetation Status Healthy ----- Stressed 	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal) 	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)	
				 Deep Water Level (> 2.8' above TS)	 High Water Level (1.5' – 2.8' above TS)
6			Online	 0.2' – 1.5' above TS	 Target Stage (TS +/- 0.2')
7			Online	 Low Water Level (<0.2' below TS)	
				Depth / Area Based: Percent of Area Dry	
8			Online	 0-25% Dry	 50-75% Dry
				 25-50% Dry	 75-100% Dry

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 1-8C stage rose then stabilized above the Zone A1 regulation line late last week, the average on Sunday was 0.11 feet above that stable line. WCA-2A: Stage at 2A-17 increased then receded last week, the average on Sunday was 1.34 feet higher than the falling Zone A regulation line. WCA-3A: The Three Gauge Average stages remained in parallel with the stable Zone A regulation line last week. Average stage matched the schedule line on Sunday. WCA-3A: Stage at gauge 62 (Northwest corner) rose then fell over the last week and remains below falling Upper Schedule. The average on Sunday was 0.41 feet below the regulation line. (**Figures EV-1 through EV-4**).

Water Depths

The WDAT tool indicates that water depths in the WCAs are lowest in northeastern WCA-3A but have been stable over the last month and deepest in the upper reaches of the L-67s in that basin. Depths have fallen below 1.5 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 and central ENP while falling in WCA-3A and significantly falling in northern WCA-2A. Looking back one year ago, most of the Everglades is significantly lower in depth, with southern WCA-1 the exception. (**Figure EV-6**). Compared to 20-year median depths, all of WCA-3A is now above the 50th percentile with southwest corner no longer below average. The western sloughs in ENP remain well below the median; while western Big Cypress National Preserve (BCNP), WCA-1, and northeastern ENP are significantly above the median. (**Figure EV-7**).

Taylor Slough and Florida Bay

Taylor Slough and Florida Bay received an average of 0.21 inches of rain over the week ending Sunday (11/14), which allowed stages to decrease an average of 0.05 feet (**Figure EV-8**). The most rapid decrease (0.09 feet) was in the central area of the slough with the northern part coming in a close second (0.08 feet). The Slough as a whole is 6.8 inches above the historical average for this time of year, while the northern parts of the Slough are 10 inches above its historical average. The early dry-season frontal rains have helped to maintain water levels in the Slough (**Figure EV-9**) and provide water downstream. Northern Taylor Slough historical averages are from before the alterations to the system to facilitate water movement, and 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 an increase of 1 over the week ending 11/14, but individual stations had weekly changes ranging from -0.9 to +4.7 (**Figure EV-8**). The largest changes were in the nearshore area like last week. The central Bay area continues to fluctuate above the 75th percentile of its historical data (**Figure EV-10**), while

the eastern area hovers around the 75th percentile. Nearly all the Bay is marine which is still suboptimal for the early dry season. Chlorophyll concentrations remain seasonally low.

Water Management Recommendations

Conserving water in the northern basins, then allowing that water to move downstream maximizes the ecological benefit of freshwater on the landscape. Flows into northern 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	0.16	-0.04
WCA-2A	0.03	-0.05
WCA-2B	0.02	-0.13
WCA-3A	0.10	-0.04
WCA-3B	0.04	-0.04
ENP	0.51	-0.19

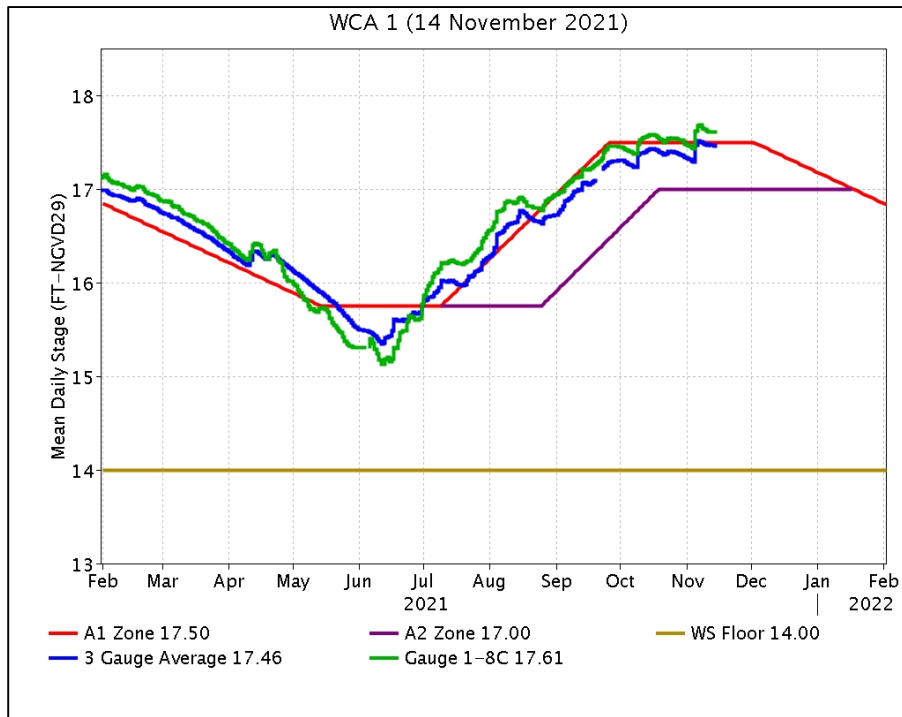


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

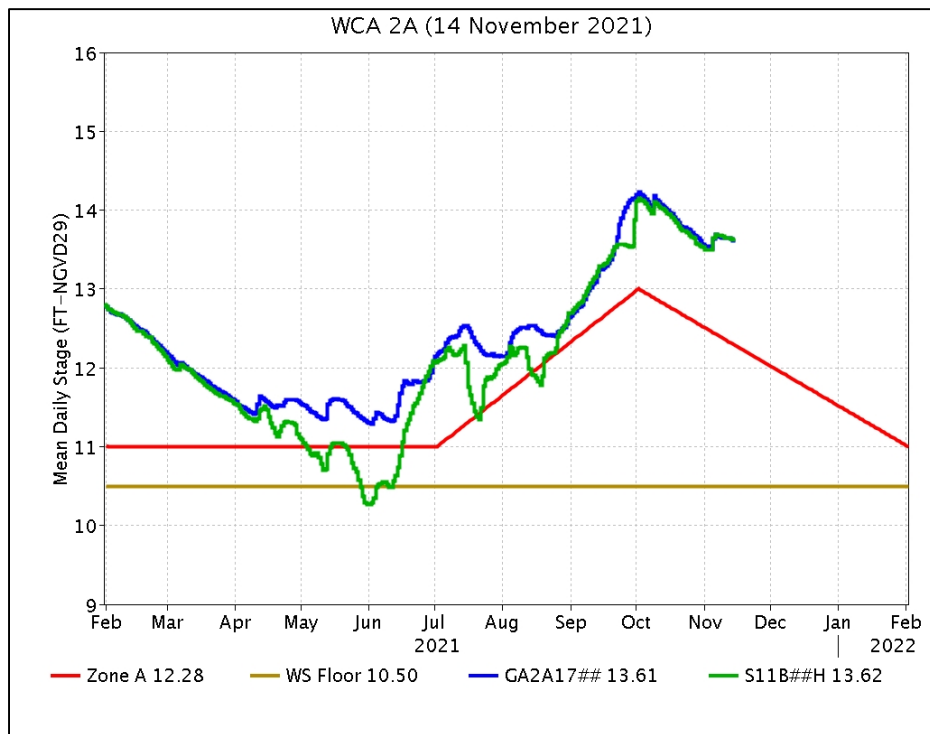


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

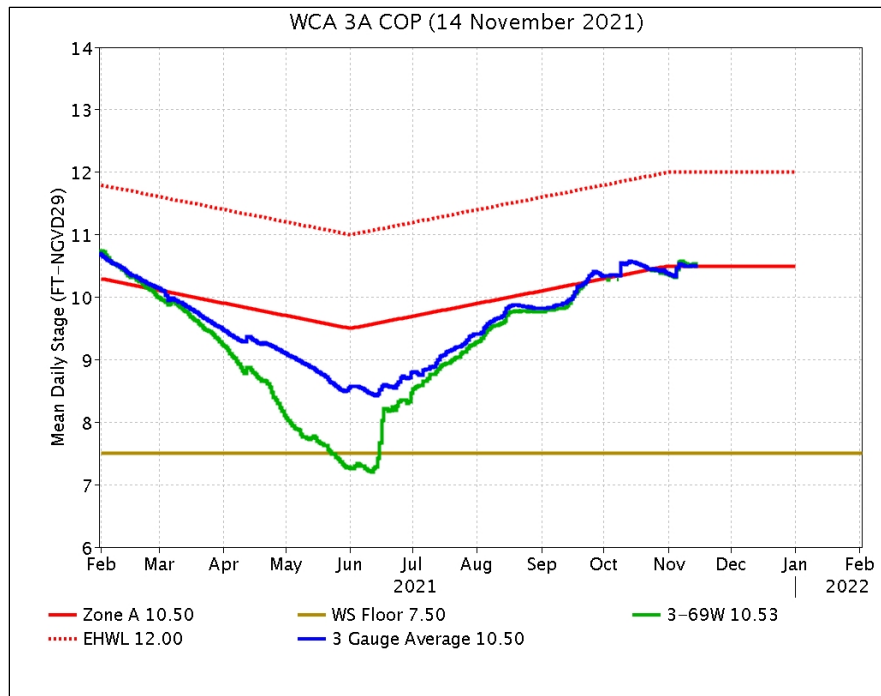


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

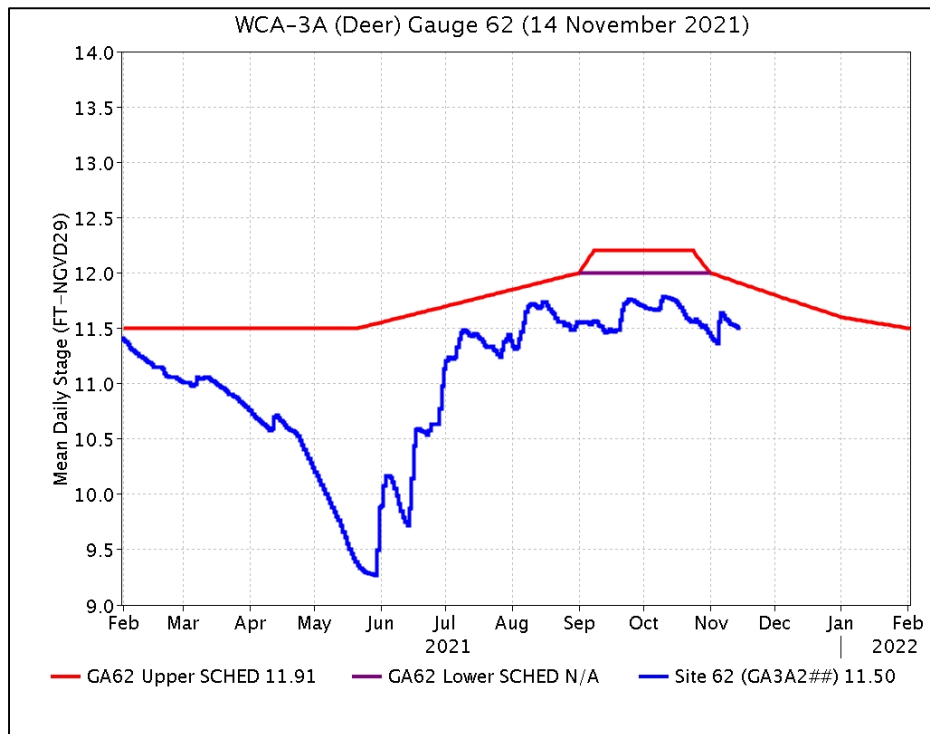


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

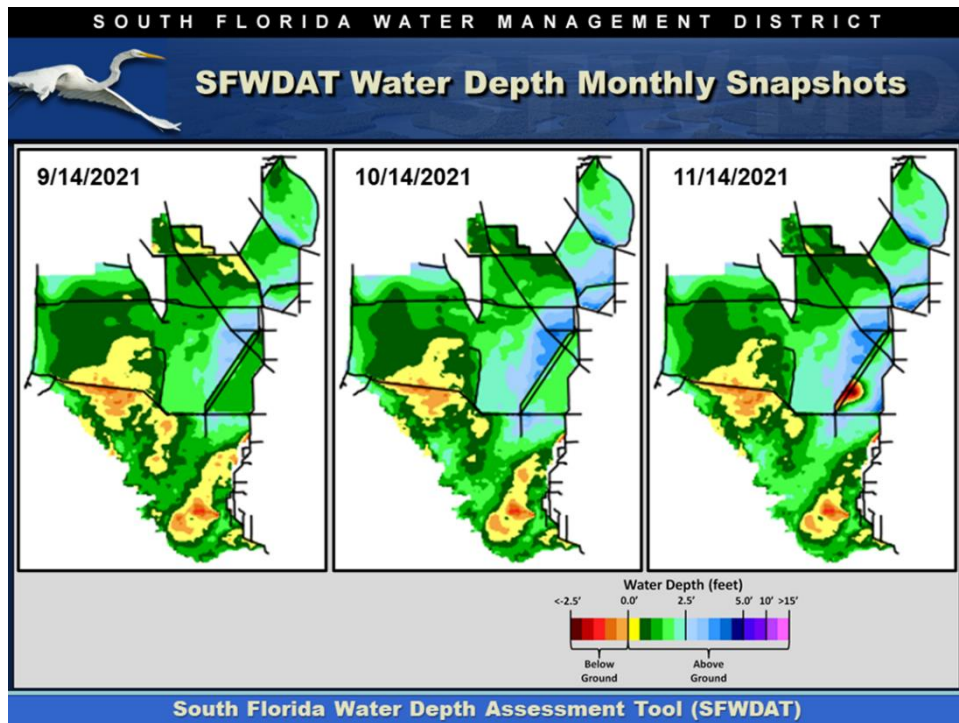


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

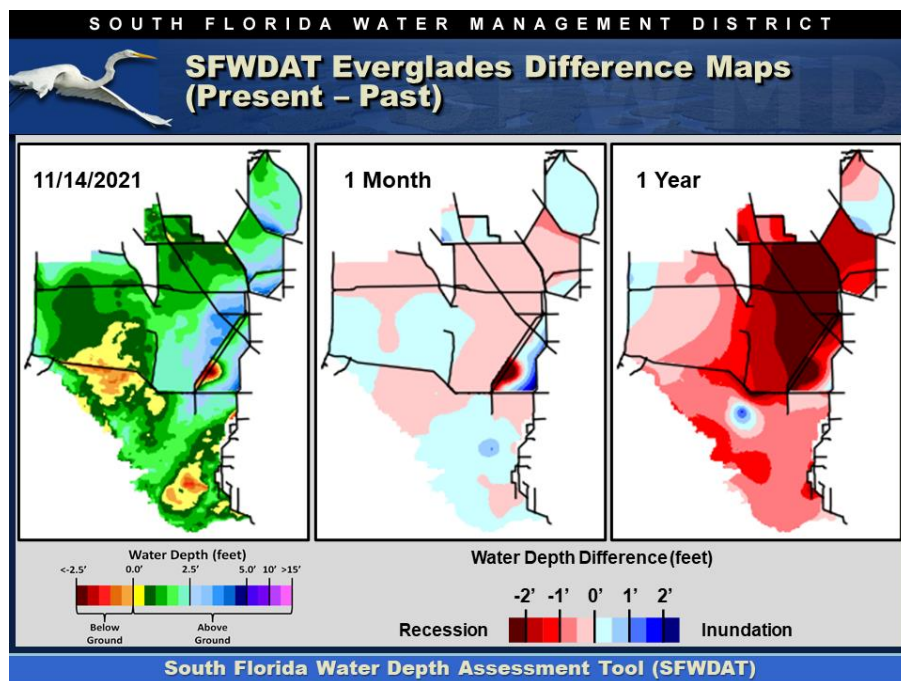


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

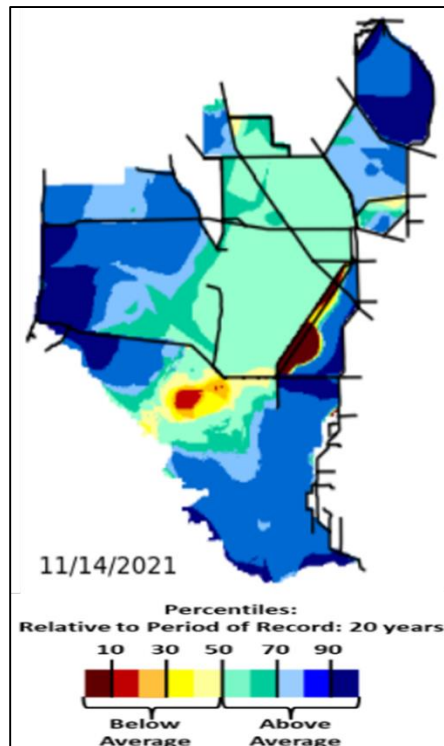


Figure EV-7. Present water depths compared to the day of year median over the previous 20 years.

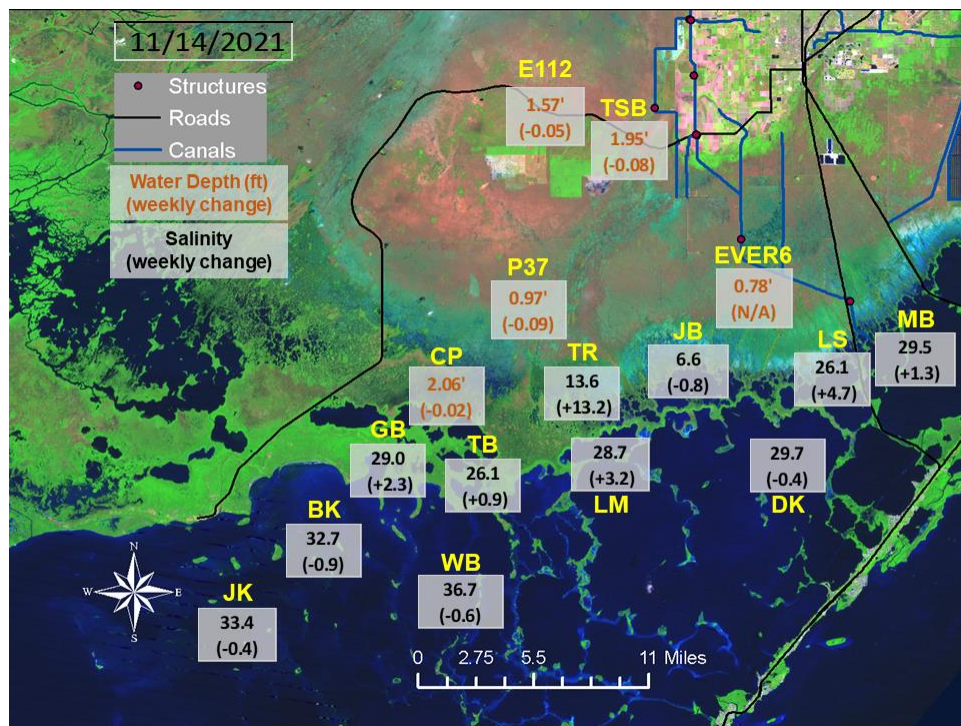


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

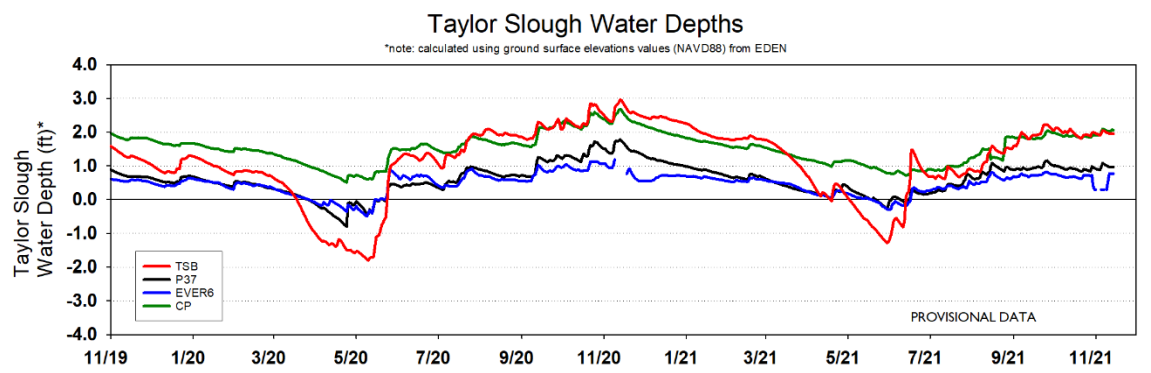


Figure EV-9. Taylor Slough water depth time series.

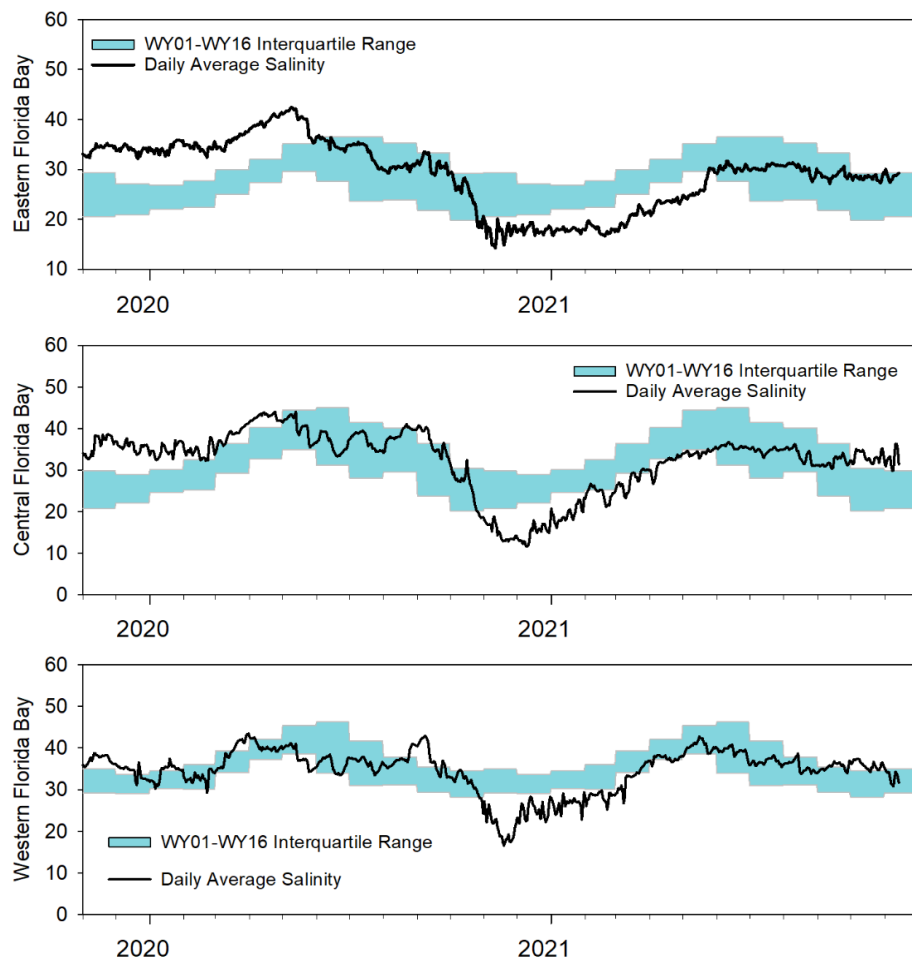


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, November 16, 2021 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.04'	Conserve water in this basin letting the water move south when conditions allow. Keeping a recession rate less than 0.10 feet per week has an ecological benefit.	Protect within basin and downstream habitat and wildlife. Anticipated La Nina dry season.
WCA-2A	Stage decreased by 0.05'	Conserve water in this basin letting the water move south when conditions allow. Keeping a recession rate less than 0.10 feet per week has an ecological benefit.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage decreased by 0.13'	Conserve water in this basin, maintain a minimum input to maintain stage while moving water south when conditions allow.	Protect within basin and downstream habitat and wildlife. Depths in excess of 4.0 feet.
WCA-3A NE	Stage decreased by 0.10'	Conserve water in this basin letting the water move south when conditions allow. Keeping a recession rate less than 0.10 feet per week has an ecological benefit.	Protect within basin peat soils and downstream habitat and wildlife.
WCA-3A NW	Stage decreased by 0.10'	Conserve water in this basin letting the water move south when conditions allow. Keeping a recession rate less than 0.10 feet per week has an ecological benefit.	
Central WCA-3A S	Stage decreased by 0.05'	Conserve water in this basin letting the water move south when conditions allow. Keeping a recession rate less than 0.10 feet per week has an ecological benefit.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage increased by 0.08'		
WCA-3B	Stage increased by 0.04'	Conserve water in this basin letting the water move south when conditions allow. Keeping a recession rate less than 0.10 feet per week has an ecological benefit.	Protect within basin and downstream habitat and wildlife.
ENP-SRS	Stage decreased by 0.19 feet	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 -0.09'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -0.9 to +4.7	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.