

Disclaimer: Information contained in the report addresses environmental conditions only and is not the official South Florida Water Management District operations recommendation or decision.

M E M O R A N D U M

TO: John Mitnik, Assistant Executive Director, Executive Office Staff

FROM: SFWMD Staff Environmental Advisory Team

DATE: December 15, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

The favorable large-scale conditions for rain suggest an increased risk of significant rainfall persisting over eastern basins, with additional rainfall on Wednesday falling on top of Tuesday's abundant rains, in some cases. Available moisture should decrease on Thursday, resulting in a net decrease of total rainfall. The rains that occur Thursday will be confined to the southeastern half of the District while areas north of Lake Okeechobee see a drying. While overall rainfall should be lower, pockets of enhanced rains will occur along and near the east coast. A surge of Atlantic moisture is forecast to reach Florida by late Friday. The influx of deep moisture and good instability will result in another increase of rains, with a primary focus along and near the east coast but with the rains probably extending over a much broader area on Saturday. The inland extent and heaviness of rains could depend on whether the area of moisture is partially deflected northward and northeastward on Saturday as shown in some model solutions ahead of the next weather system. A relative break with lower rainfall area wide is forecast on Sunday when a cold front pushes into north Florida and settles as far south as the northern part of the District on Monday morning. A second cold front and a large moisture increase could produce yet another increase of rains across the District Monday night and Tuesday, with the greatest rainfall amounts over the northern and western parts of the District. After Tuesday, a significant drying is most likely to last for at least a few days. For the week ending next Tuesday morning, total District rainfall is likely to be above normal, with the largest departures from normal probably in the east and scattered areas over the interior.

Kissimmee

Flow at S-65A has been reduced to minimum discharge (~300 cfs) and water depth on the Kissimmee River floodplain is declining. Mean depth decreased to 0.27 feet as of December 12, 2021. The concentration of dissolved oxygen in the Kissimmee River has remained well above the region of concern, with an average of 7.6 mg/L for the week ending on December 12, 2021.

Lake Okeechobee

Lake Okeechobee stage was 15.80 feet NGVD on December 12, 2021 and it was 0.22 feet lower than a month ago (**Figure LO-1**). Lake stage is currently 0.30 feet above the ecological envelope (**Figure LO-2**). Average daily inflows (excluding rainfall) decreased from the previous week, going from 984 cfs to 646 cfs. Average daily outflows (excluding evapotranspiration) decreased from the previous week, going from 2,213 cfs to 2,180 cfs. Recent satellite imagery (December 12, 2021) showed low to medium bloom potential along the southern and western shorelines (**Figure LO-6**).

Estuaries

Total inflow to the St. Lucie Estuary averaged approximately 364 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities increased at all sites within 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 2,241 cfs over the past week with 1,446 cfs coming from the Lake. Mean salinity decreased at S-79 and Val I-75 and increased at the remaining sites within 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 Shell Point and Cape Coral, and in the fair range at Sanibel.

Stormwater Treatment Areas

For the week ending Sunday, December 12, 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 942,000 ac-feet. Most STA cells are at or near 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 stage change were generally characterized as fair across the Everglades. Depths at the gauge in WCA-3A northwest fell below 1.0' as large wading bird flocks continue to forage there. Florida Bay salinities decreased over the last week as did stages in Taylor Slough. Salinities in the central region remain above the 75th percentile and conditions are not ideal to tolerate a less than average dry season rainfall amount.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On December 12, 2021, lake stages were 58.0 feet NGVD (at schedule) in East Lake Toho, 55.0 feet NGVD (at schedule) in Lake Toho, and 50.0 feet NGVD (2.5 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

Discharges to the Kissimmee River on December 12, 2021 were 370 cfs at S-65 and 310 cfs at S-65A; discharges from the Kissimmee River were 400 cfs at S-65D and 370 cfs at S-65E (**Table KB-2**). Headwater stages were 46.3 feet NGVD at S-65A and 26.6 feet NGVD at S-65D on December 12, 2021. With lower water temperatures, little rainfall, and reduced discharge at S-65A, the concentration of dissolved oxygen has remained well above the region of concern, with an average of 7.6 mg/L for the week ending on December 12, 2021 (**Table KB-2, Figure KB-4**). Flow at S-65A has been reduced to minimum discharge (~300 cfs) and water depth on the Kissimmee River floodplain is declining. Mean depth decreased to 0.27 feet as of December 12, 2021 (**Figure KB-5**).

Water Management Recommendations: Continue to maintain at least 300 cfs at S-65A 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)	
							12/12/21	12/5/21
Lakes Hart and Mary Jane	S-62	LKMJ	50	61.0	R	61.0	0.0	0.0
Lakes Myrtle, Preston and Joel	S-57	S-57	20	61.8	R	61.9	-0.1	-0.1
Alligator Chain	S-60	ALLI	0	64.0	R	64.0	0.0	0.0
Lake Gentry	S-63	LKGT	0	61.5	R	61.5	0.0	0.0
East Lake Toho	S-59	TOHOE	80	58.0	R	58.0	0.0	0.0
Lake Toho	S-61	TOHOW S-61	142	55.0	R	55.0	0.0	0.0
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	363	50.0	R	52.5	-2.5	-2.5

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.

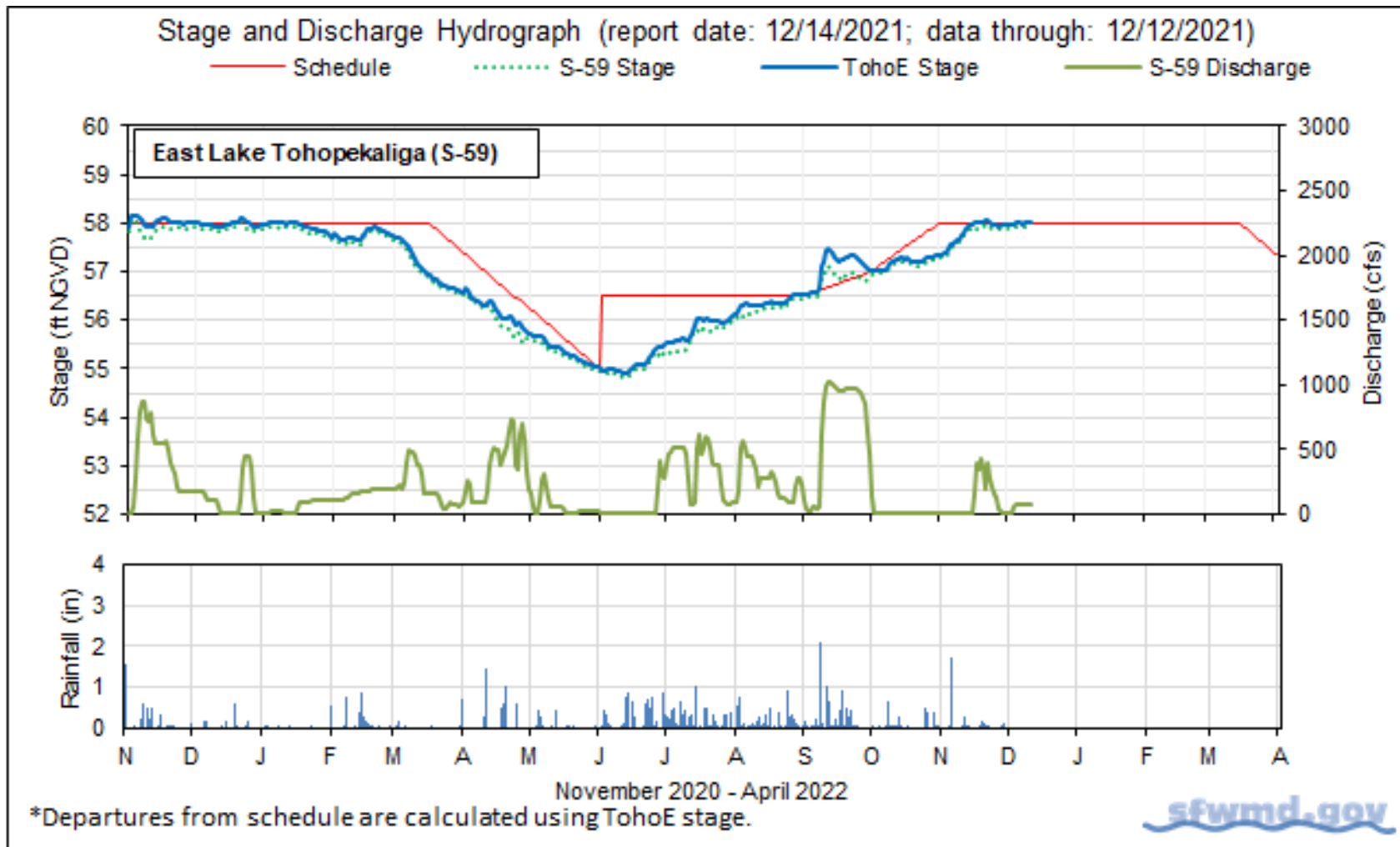


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

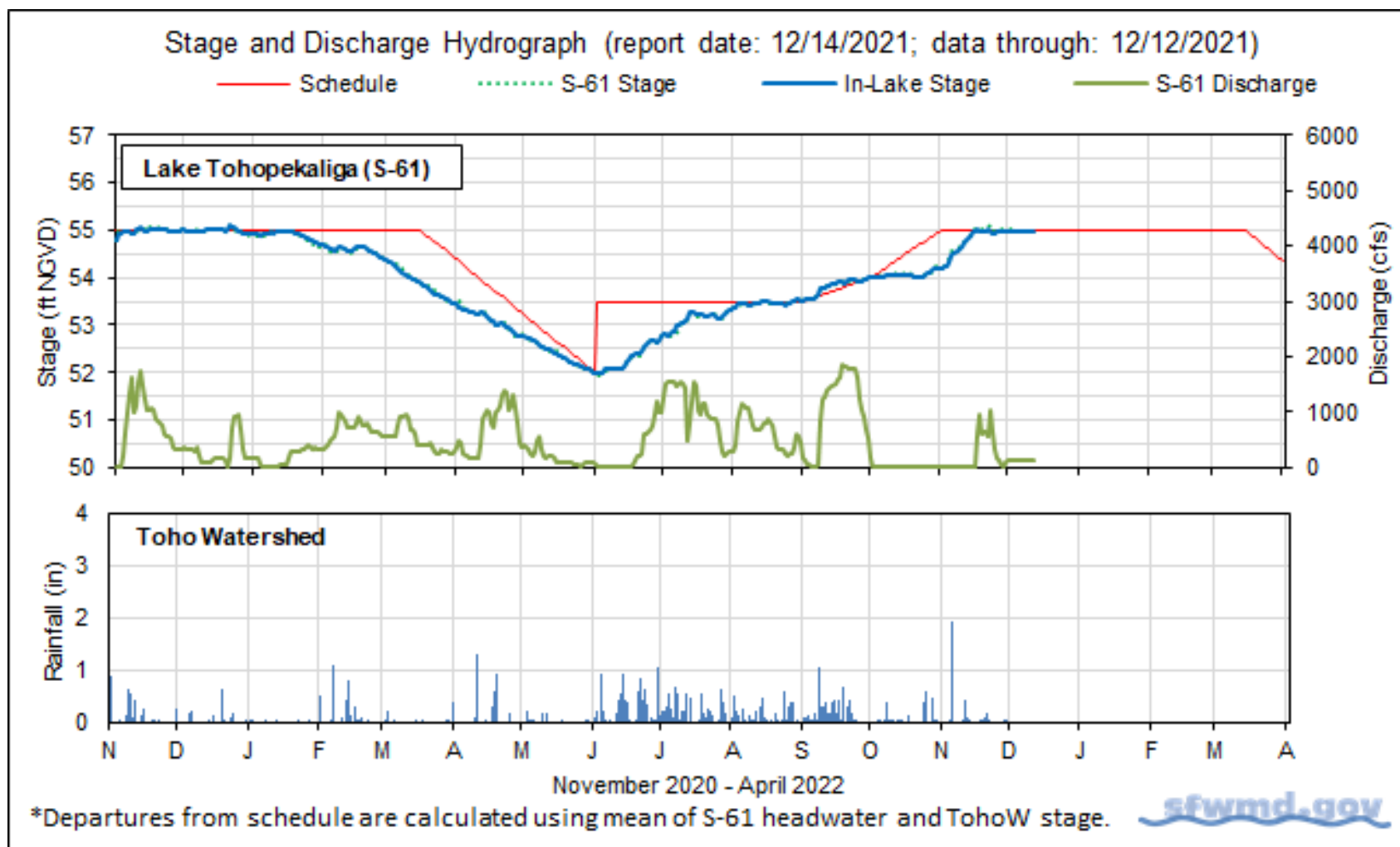


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

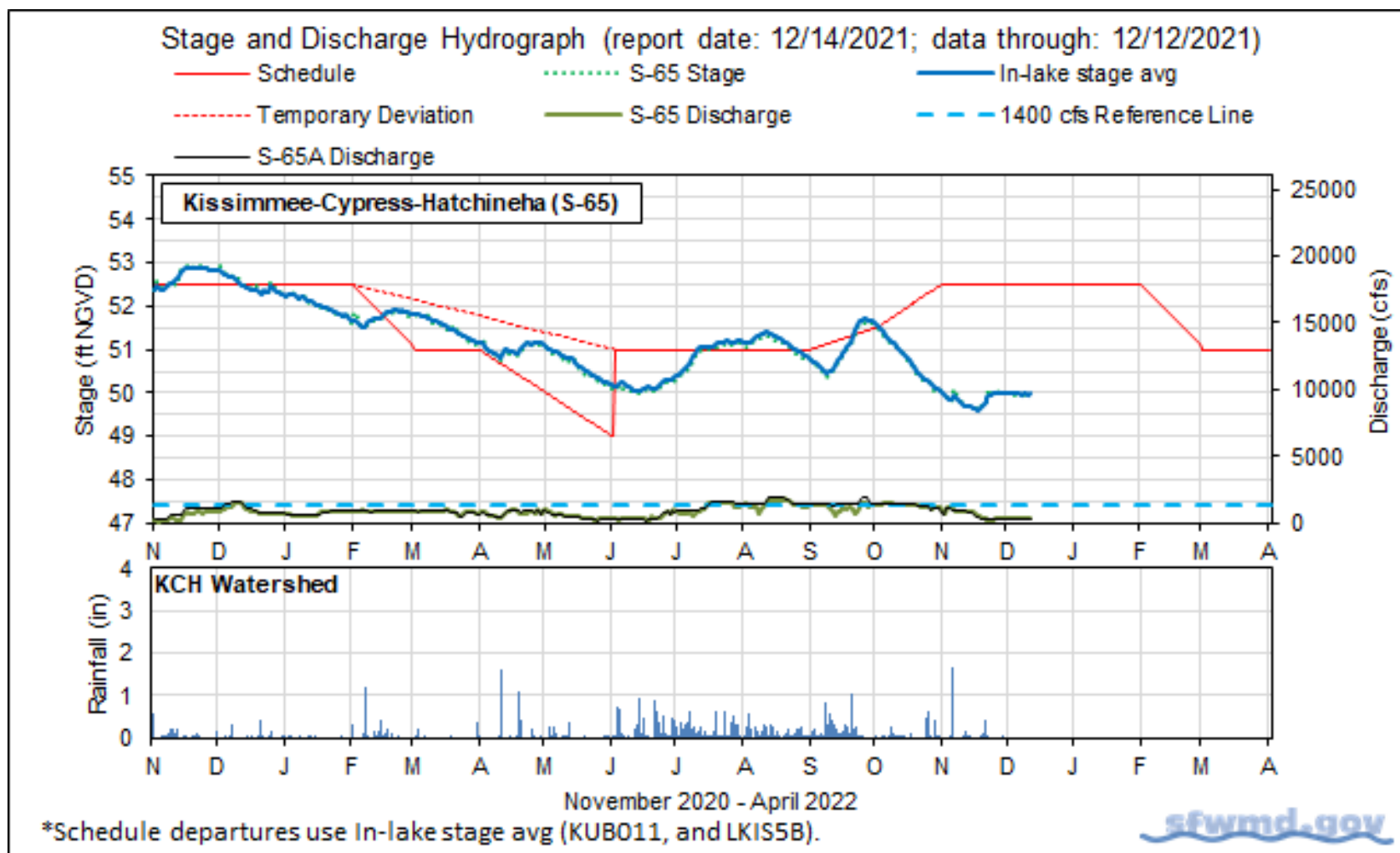


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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			
		12/12/21	12/12/21	12/5/21	11/28/21	11/21/21
Discharge	S-65	370	360	350	280	520
Discharge	S-65A ^a	310	310	310	310	460
Headwater Stage (feet NGVD)	S-65A	46.3	46.3	46.3	46.4	46.4
Discharge	S-65D ^b	400	440	540	630	1,120
Headwater Stage (feet NGVD)	S-65D ^c	26.6	26.6	26.8	27.0	27.0
Discharge (cfs)	S-65E ^d	370	420	530	590	1,210
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	7.9	7.6	7.4	6.9	6.1
Mean depth (feet) ^f	Phase I floodplain	0.27	0.29	0.32	0.39	0.55

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.

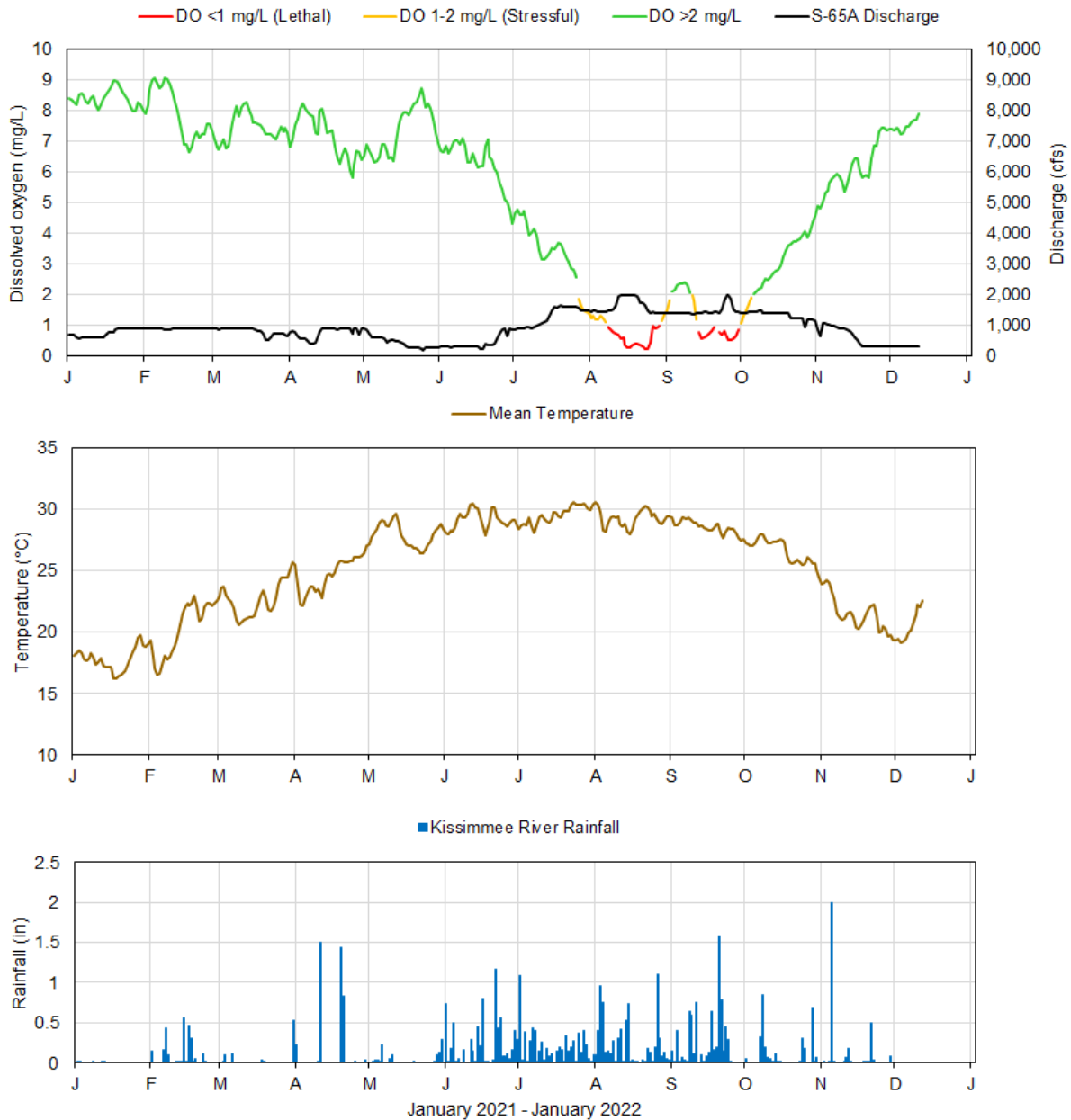
d. Combined discharge from S-65E and S-65EX1.

e. Dissolved oxygen is the average of values from sondes KRBN, PC62, PC33, 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: 12/14/2021; data are through: 12/12/2021



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 two stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

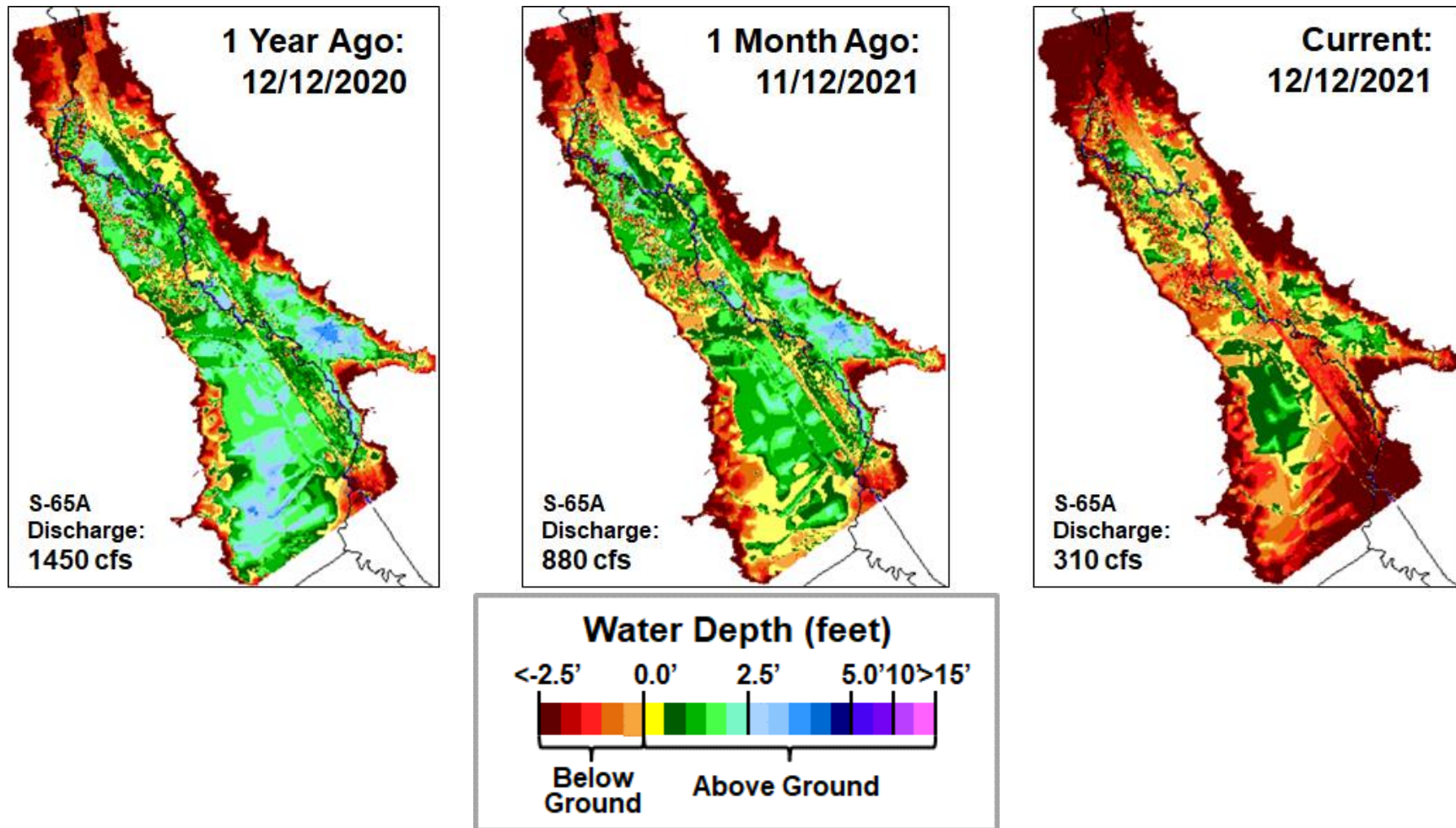


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

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.

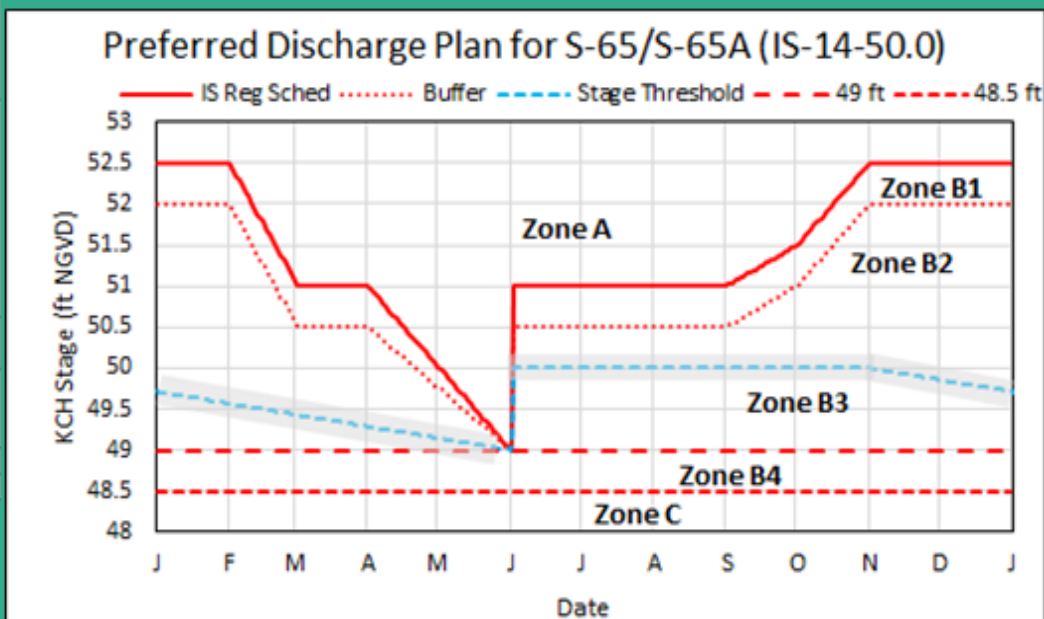
*Changes in discharge should not exceed limits in inset table below.

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

sfwmd.gov

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 15.80 feet NGVD on December 12, 2021, with water levels 0.22 feet lower than a month ago (**Figure LO-1**). Lake stage was approximately 0.30 feet above the ecological envelope (**Figure LO-2**). Lake stage remained in the Low sub-band (**Figure LO-3**). For the third consecutive week, very little rain fell directly on the Lake; less than 0.1 inches fell last week according to NEXRAD.

Average daily inflows (excluding rainfall) decreased again from the previous week, going from 984 cfs to 646 cfs. Average daily outflows (excluding evapotranspiration) decreased from the previous week, going from 2,213 cfs to 2,180 cfs. Highest inflows (530 cfs) came from the Kissimmee River through the S-65E structure (422 cfs). The second highest inflow (129 cfs) was via the C41A canal through the S-84/84X structures. Backflow through the S-271 structure from the L-8 canal decreased by 53 cfs since the previous week, and it was 24 cfs. There was an outflow of 1,544 cfs to the west via S-77, 619 cfs to the south via the S-350s, and 16 cfs to the east via the S-308 structure. **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 (December 12, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor showed low to medium bloom potential along the southern and western shorelines (**Figure LO-6**). The bloom potential decreased since the previous week.

Changes in Water Depth

1 Month Ago:
11/12/2021

Current:
12/12/2021

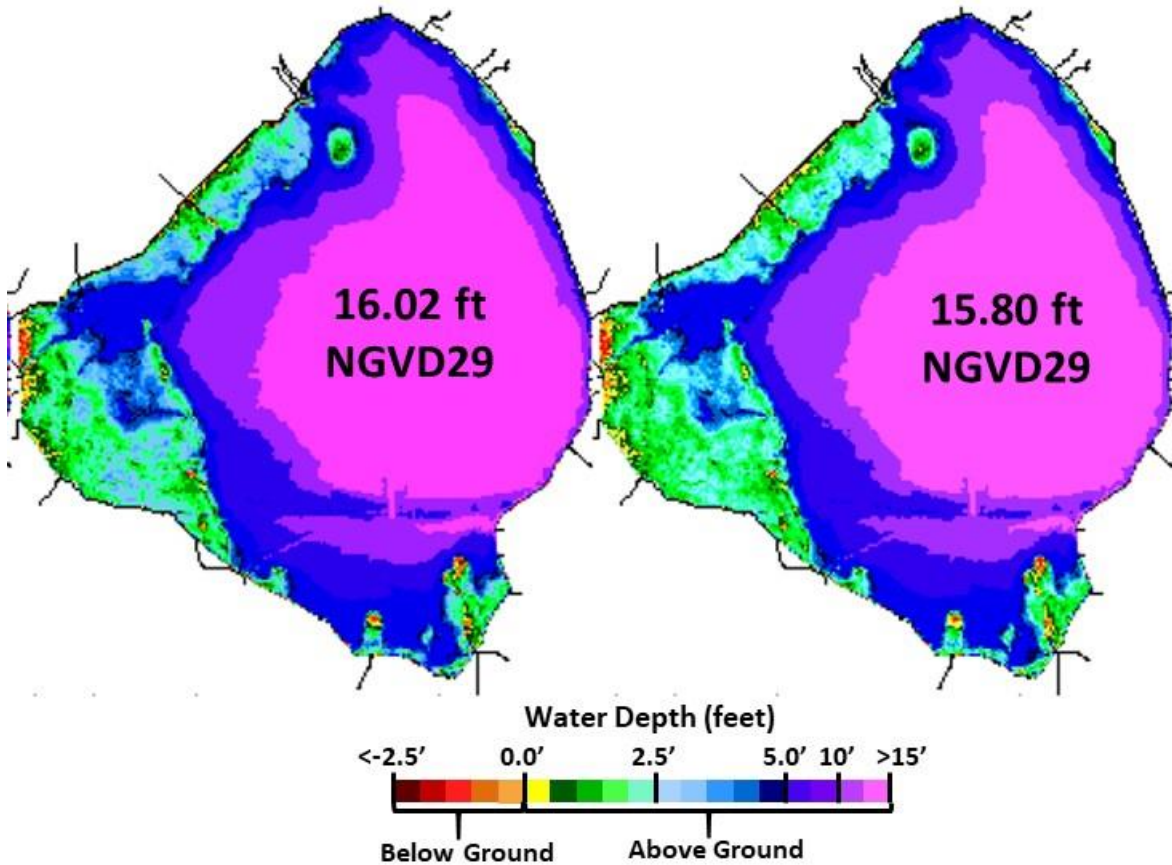


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

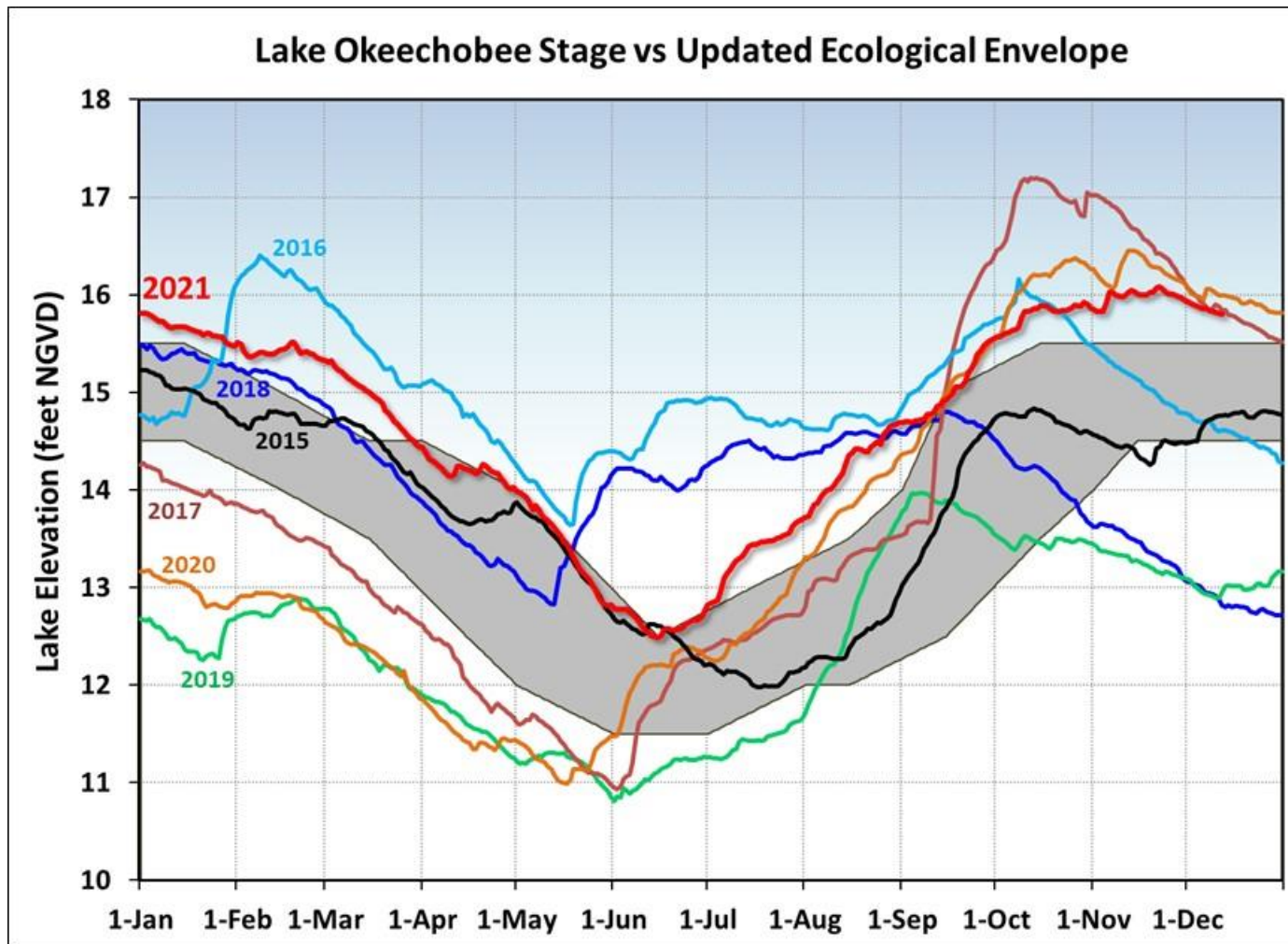


Figure LO-2. The prior seven years of annual stage hydrographs for Lake Okeechobee in comparison to the updated ecological envelope.

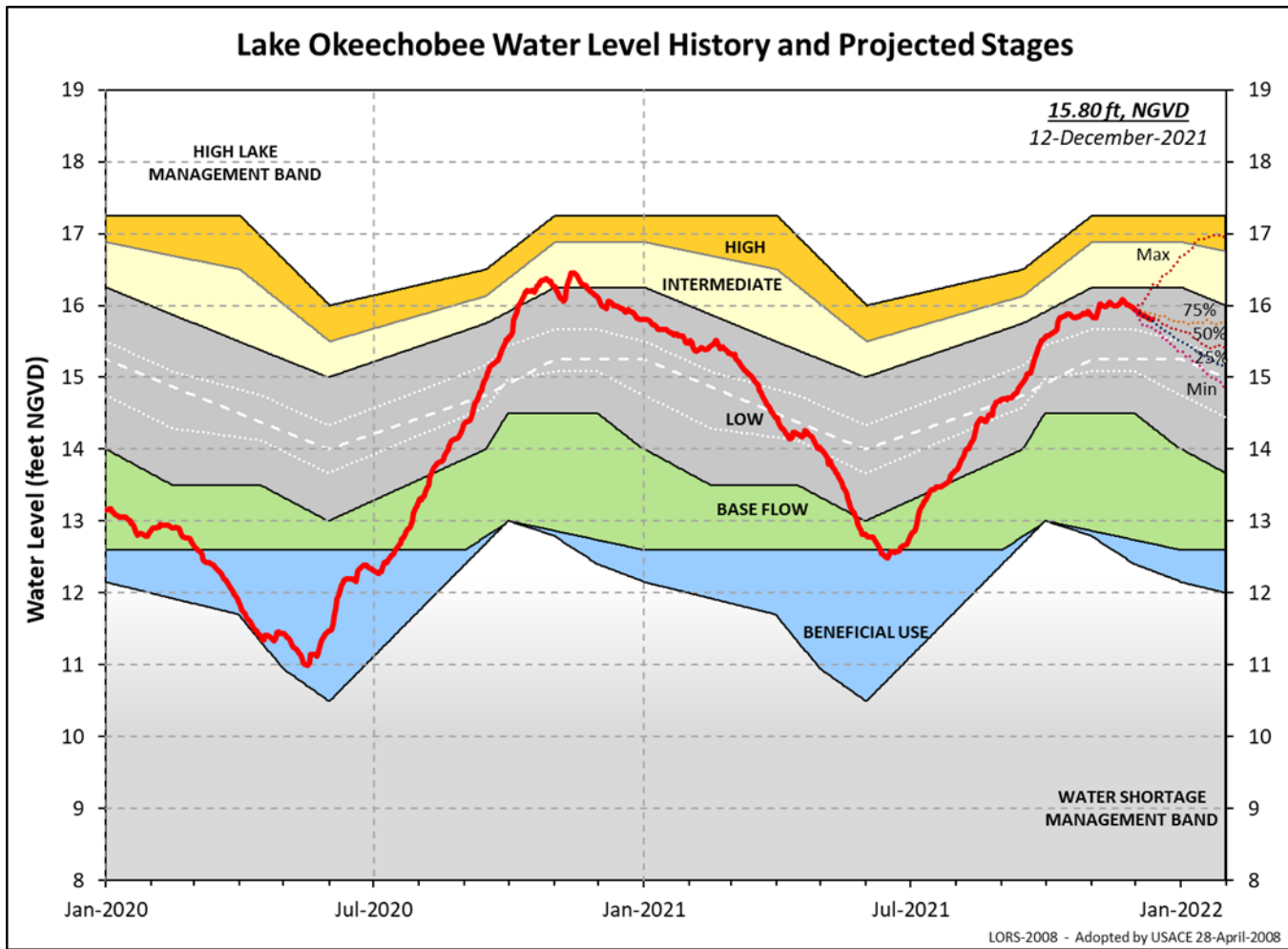


Figure LO-3. Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

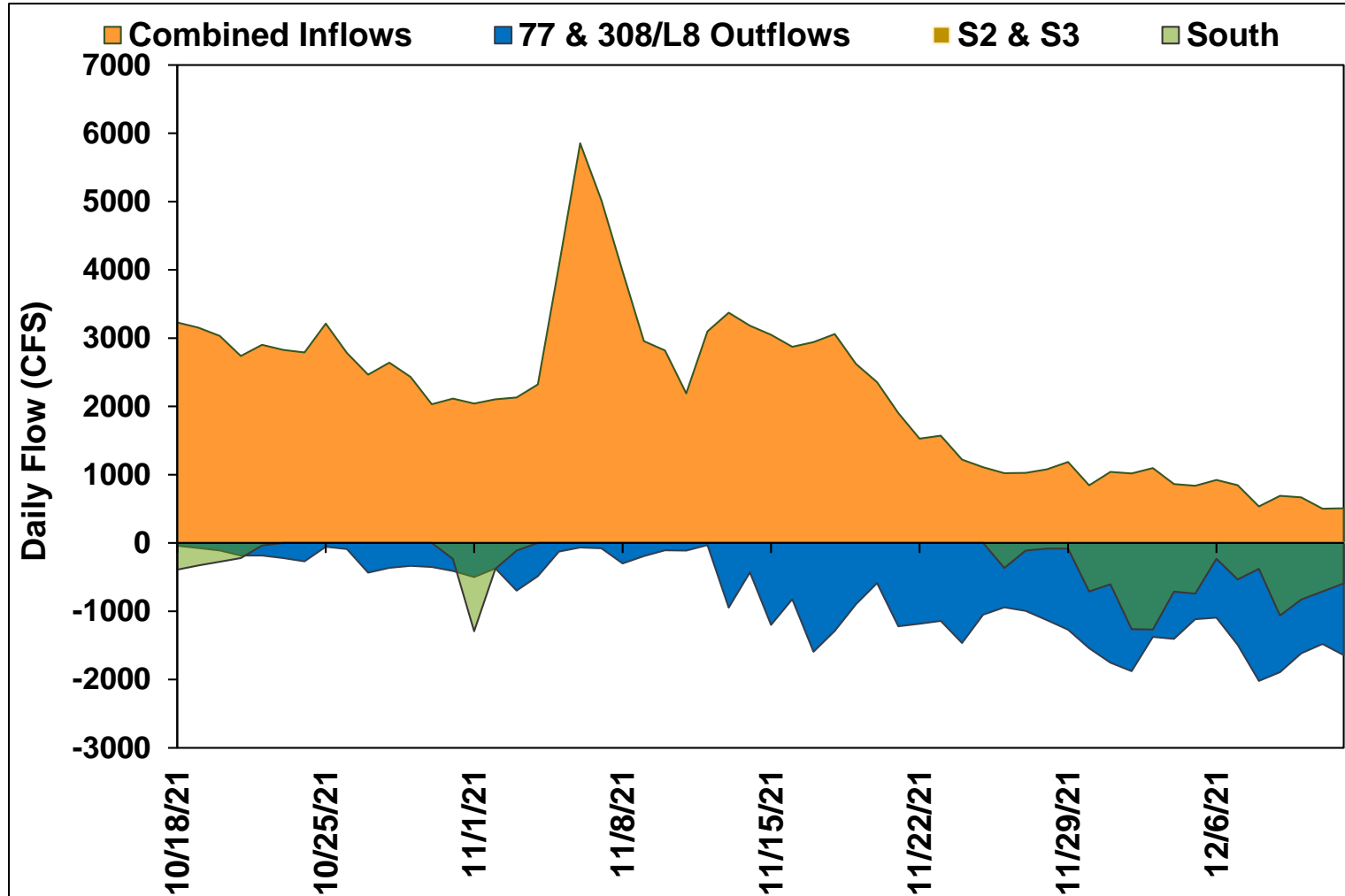


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

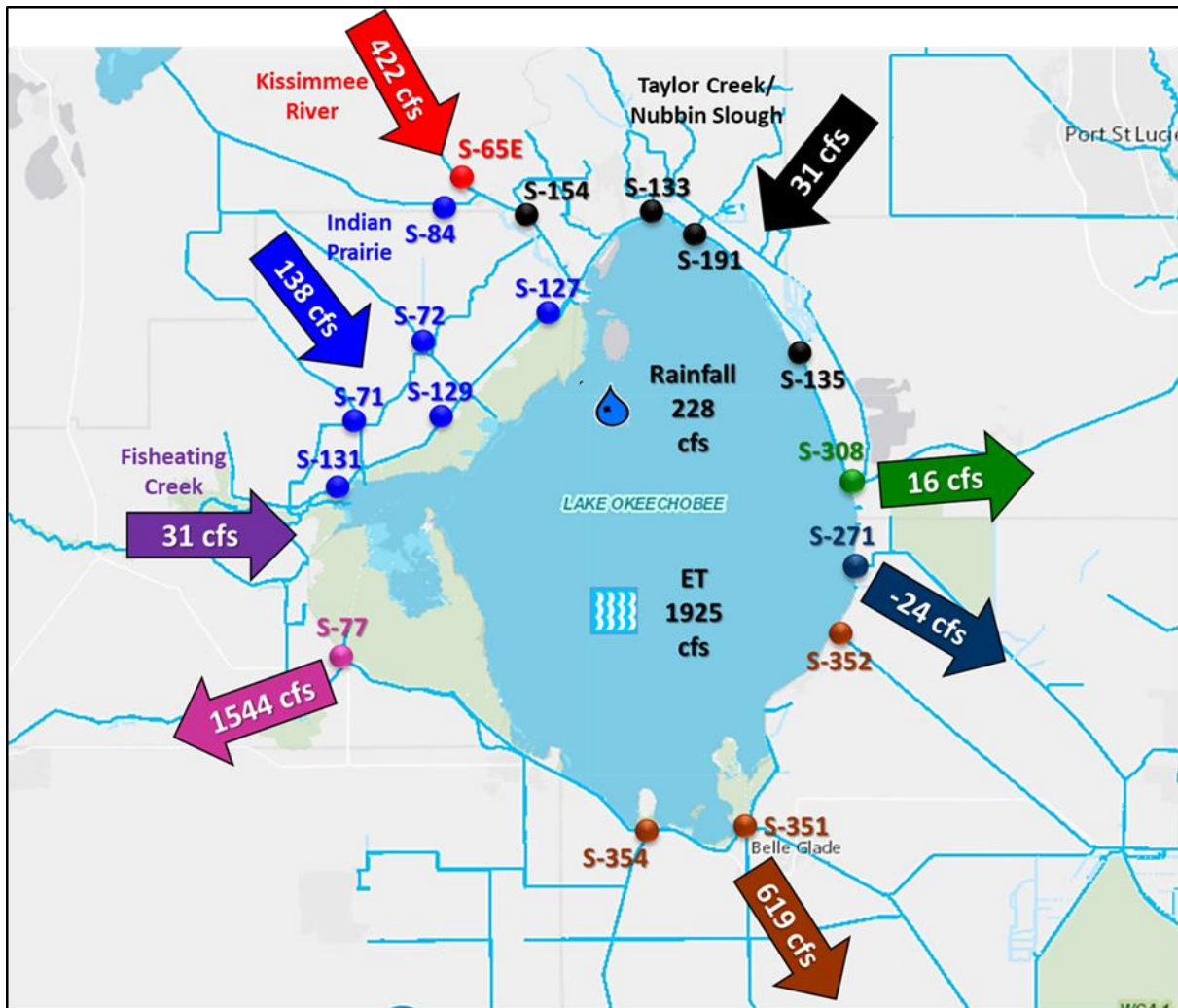


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of December 06 - 12, 2021.

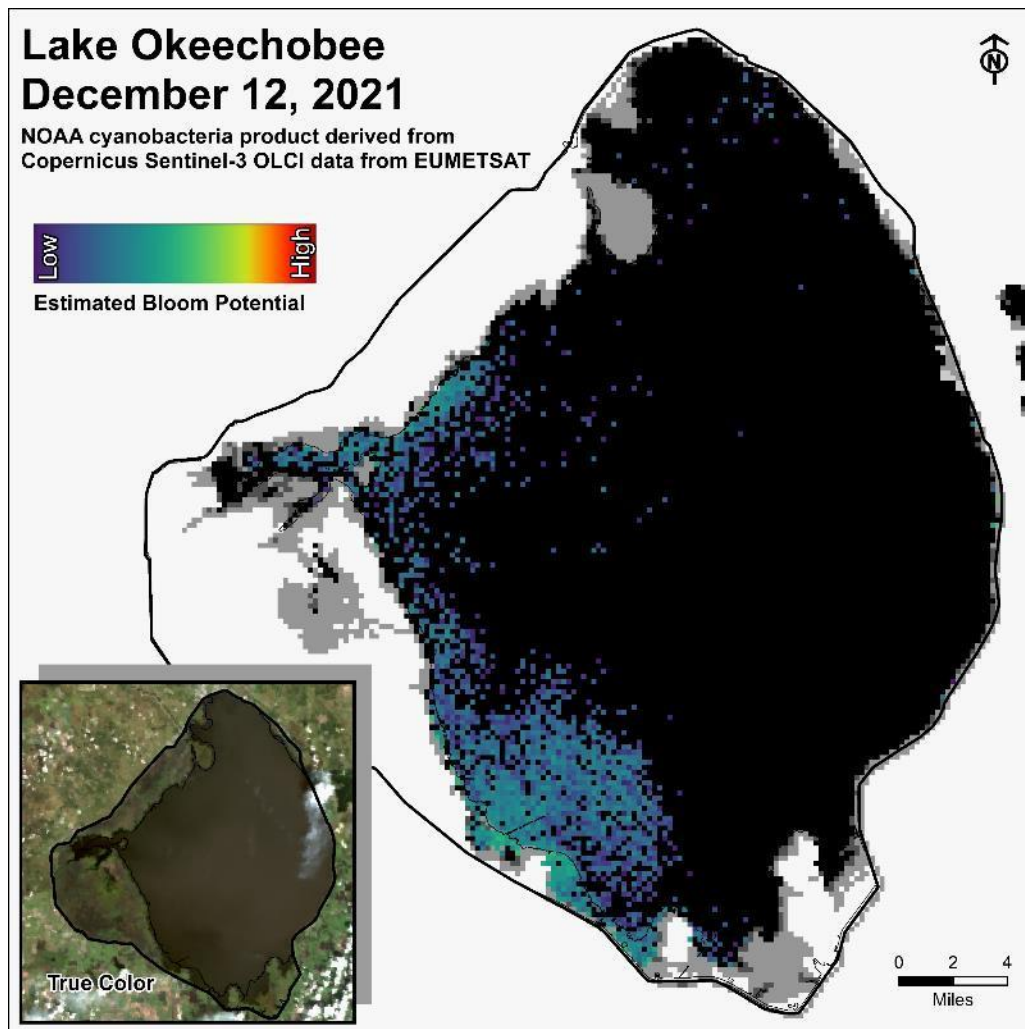


Figure LO-6. Cyanobacteria bloom potential on December 12, 2021 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was approximately 364 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was approximately 1,017 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 all sites within 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 17.3. 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 2,241 cfs (**Figures ES-5 and ES-6**) and the previous 30-day mean inflow was approximately 2,298 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-6**.

Over the past week, salinities decreased at S-79 and Val I-75 and increased at the 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 91 cfs. Model results from all scenarios predict daily salinity to be 1.2 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 December 10, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background and very

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.

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

Water Management Recommendations

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

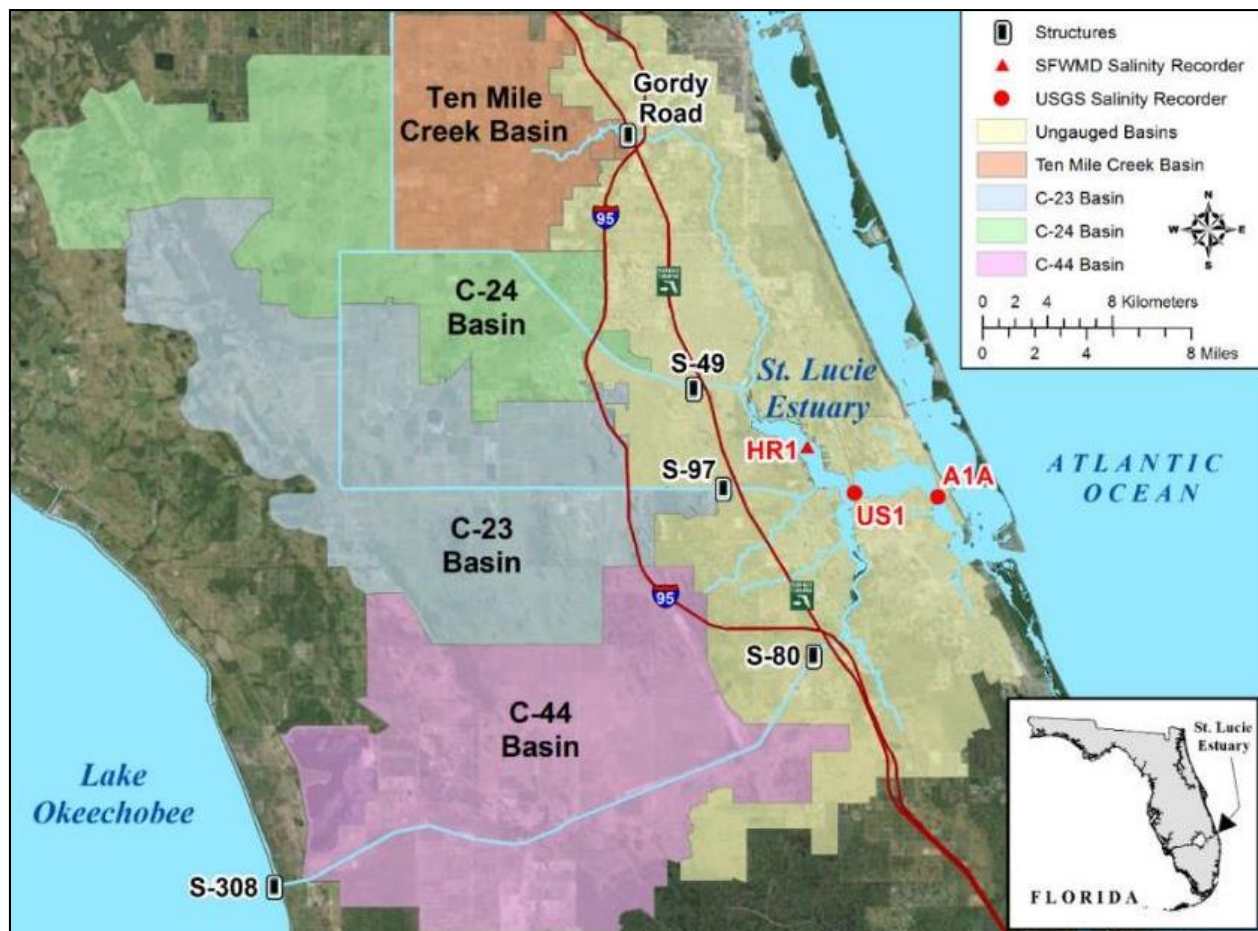


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

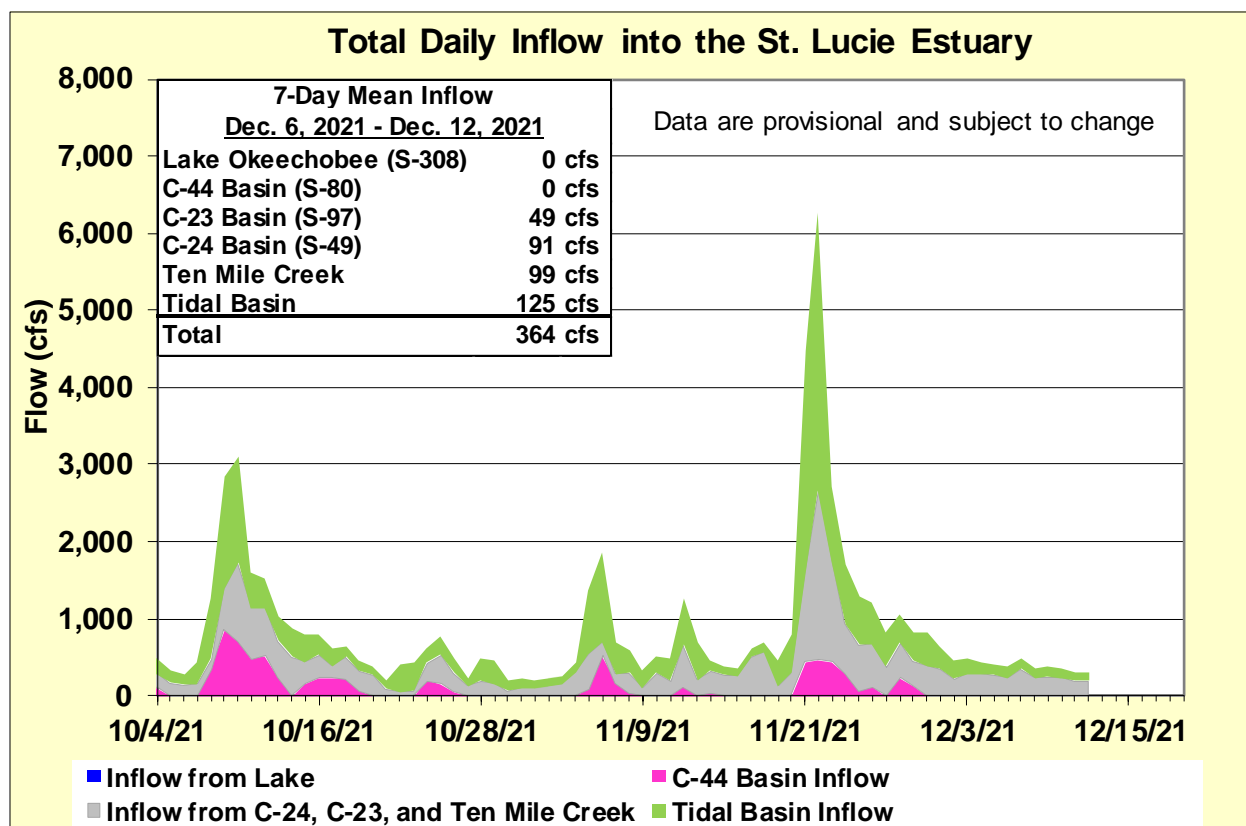


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	10.8 (7.6)	15.0 (11.6)	NA ^a
US1 Bridge	16.1 (12.3)	18.4 (15.4)	10.0 – 26.0
A1A Bridge	24.0 (20.7)	27.3 (25.4)	NA ^a

a. The envelope is not applicable.

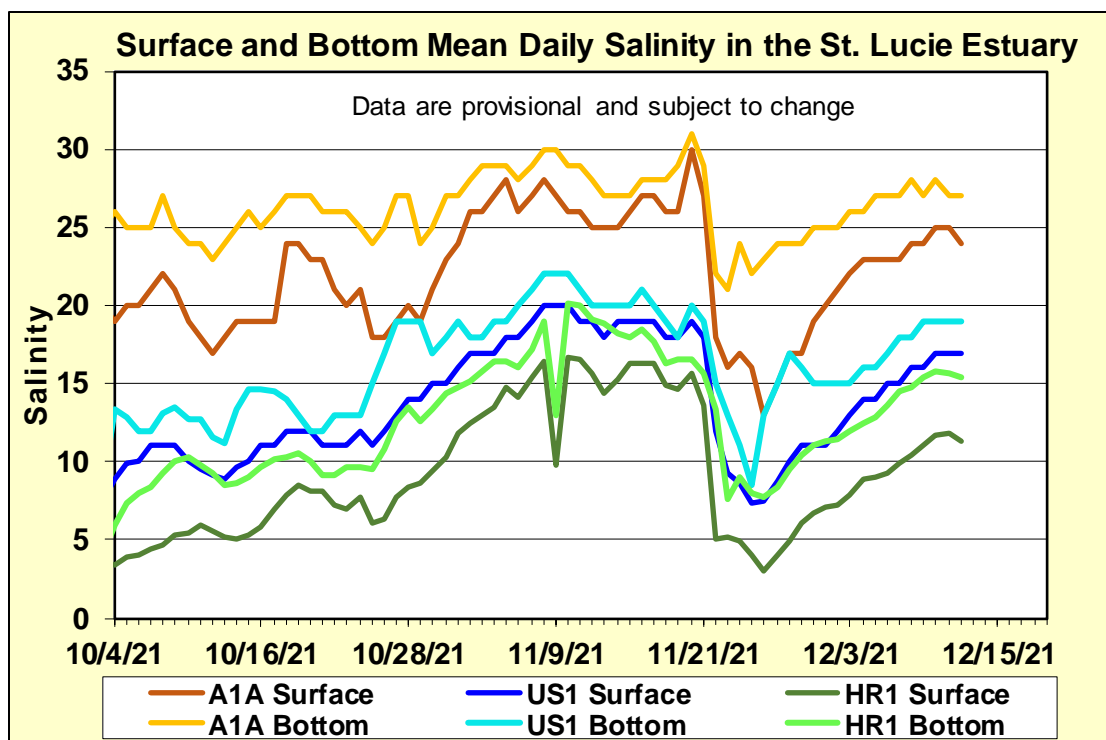


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

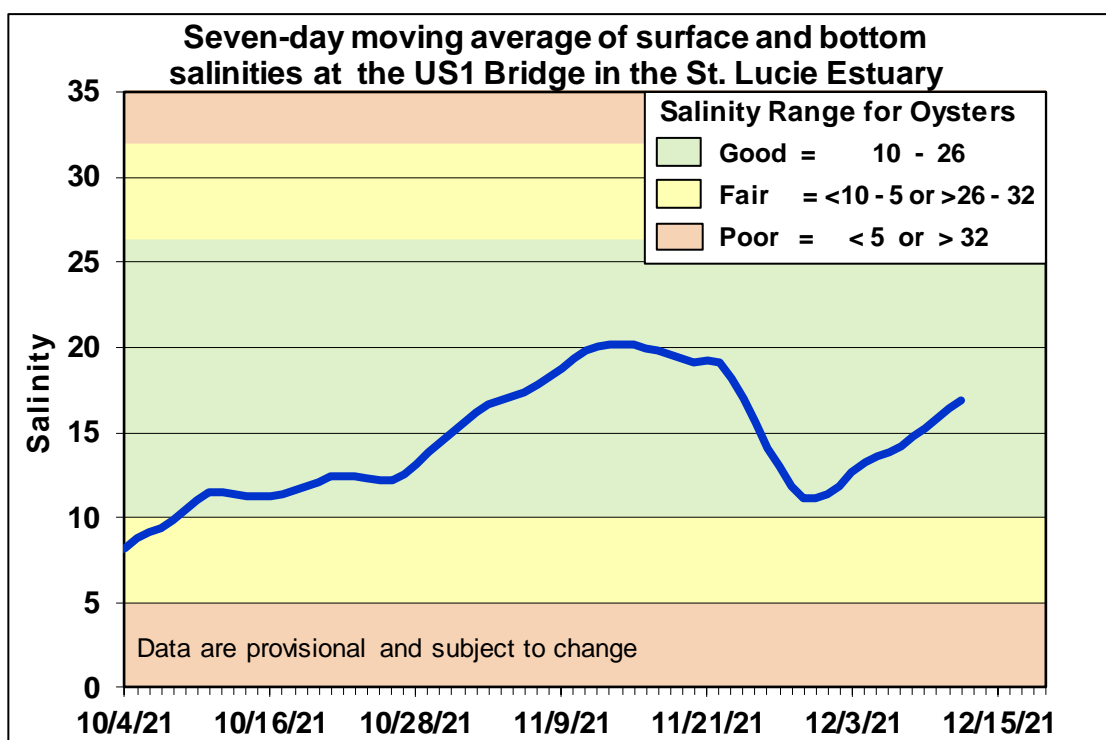


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

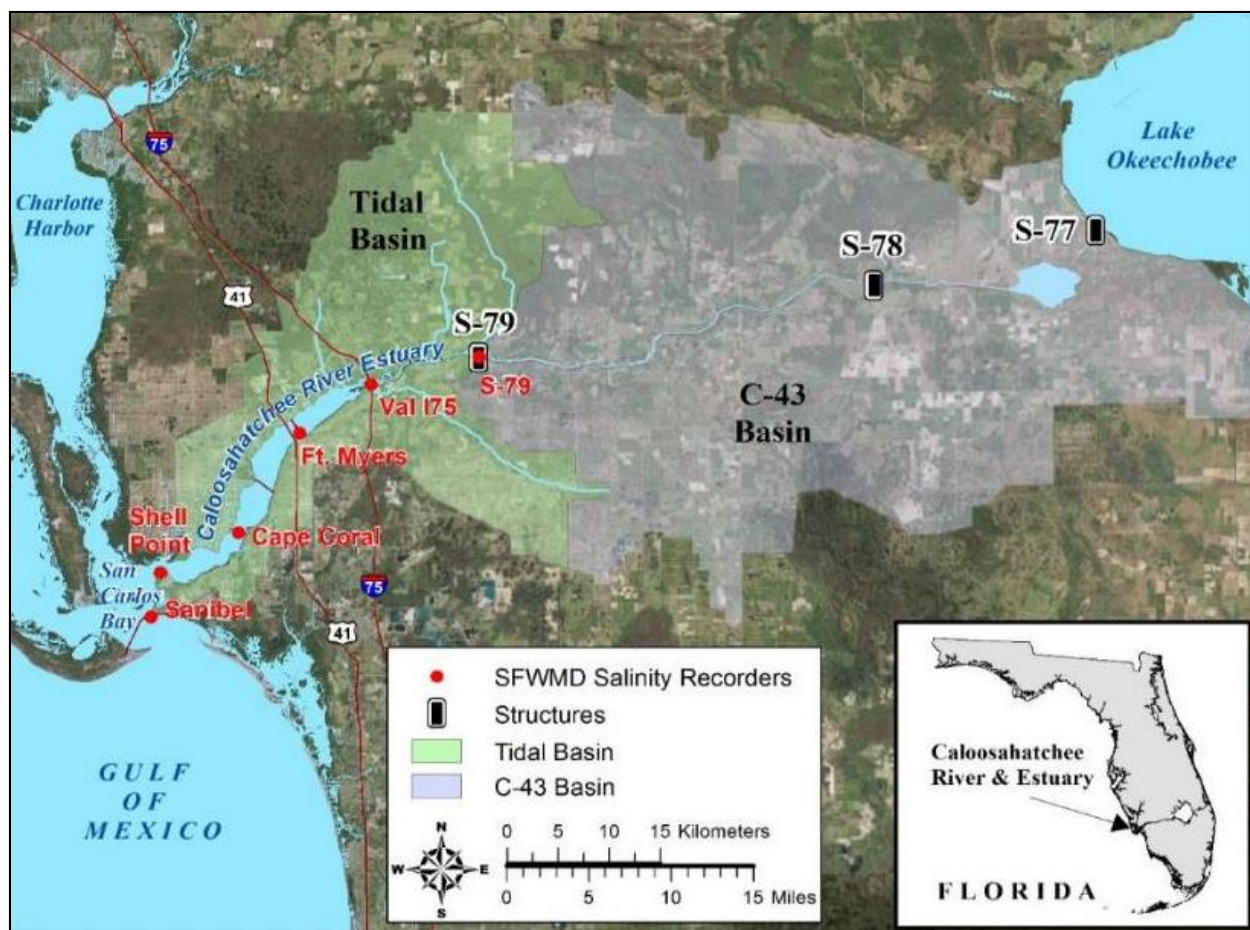


Figure ES-5. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

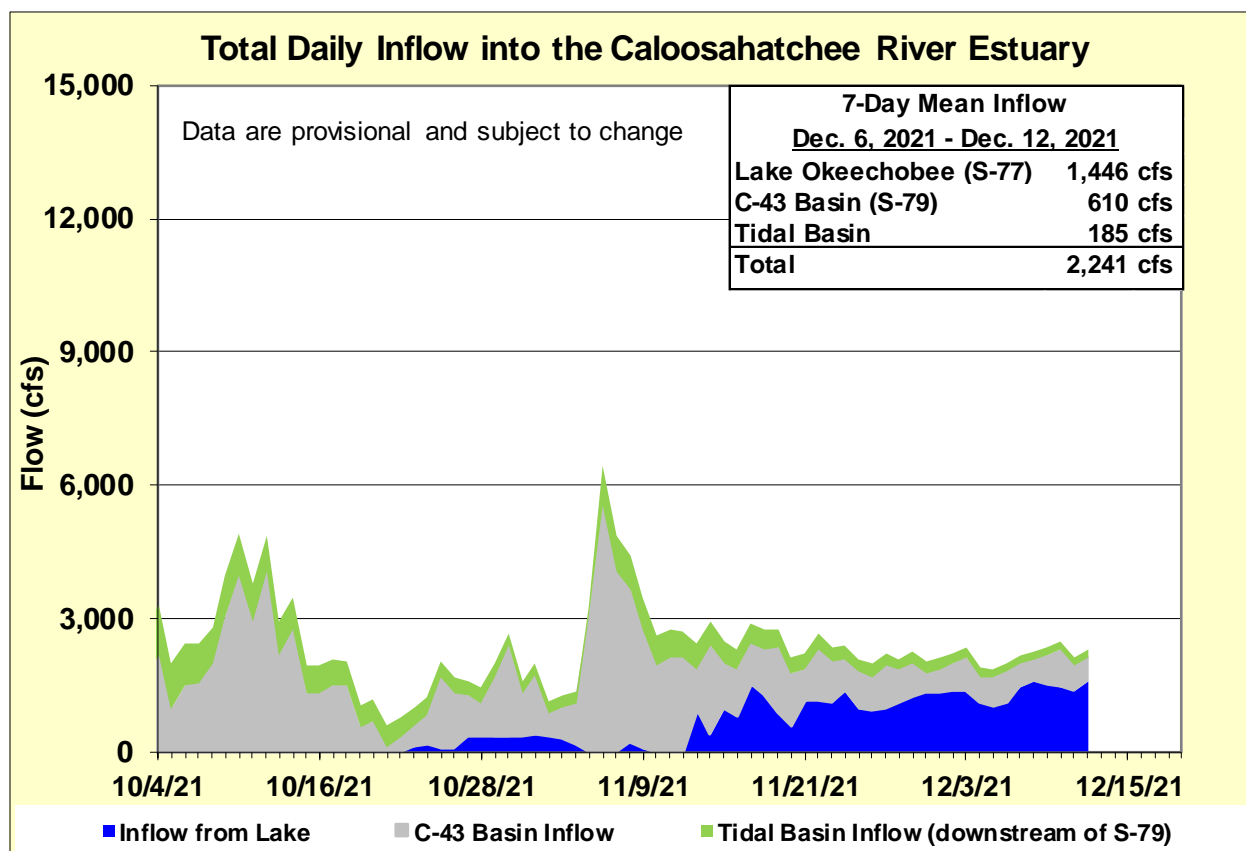


Figure ES-6. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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 (0.4)	0.2 (0.4)	NA ^a
Val I-75	0.4 (0.6)	0.4 (1.1)	0.0 – 5.0 ^b
Fort Myers Yacht Basin	3.8 (3.6)	5.6 (5.3)	NA ^a
Cape Coral	10.1 (9.2)	12.3 (10.5)	10.0 – 30.0
Shell Point	22.8 (21.2)	24.5 (21.8)	10.0 – 30.0
Sanibel	29.9 (27.5)	30.7 (29.1)	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.

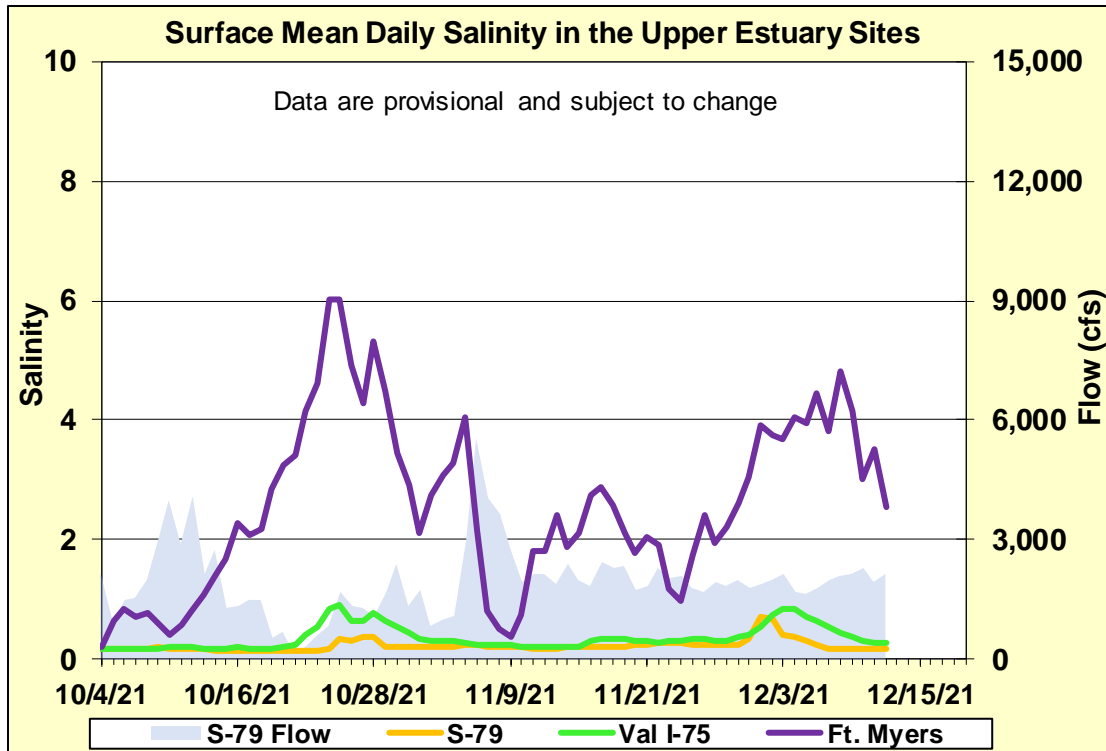


Figure ES-7. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

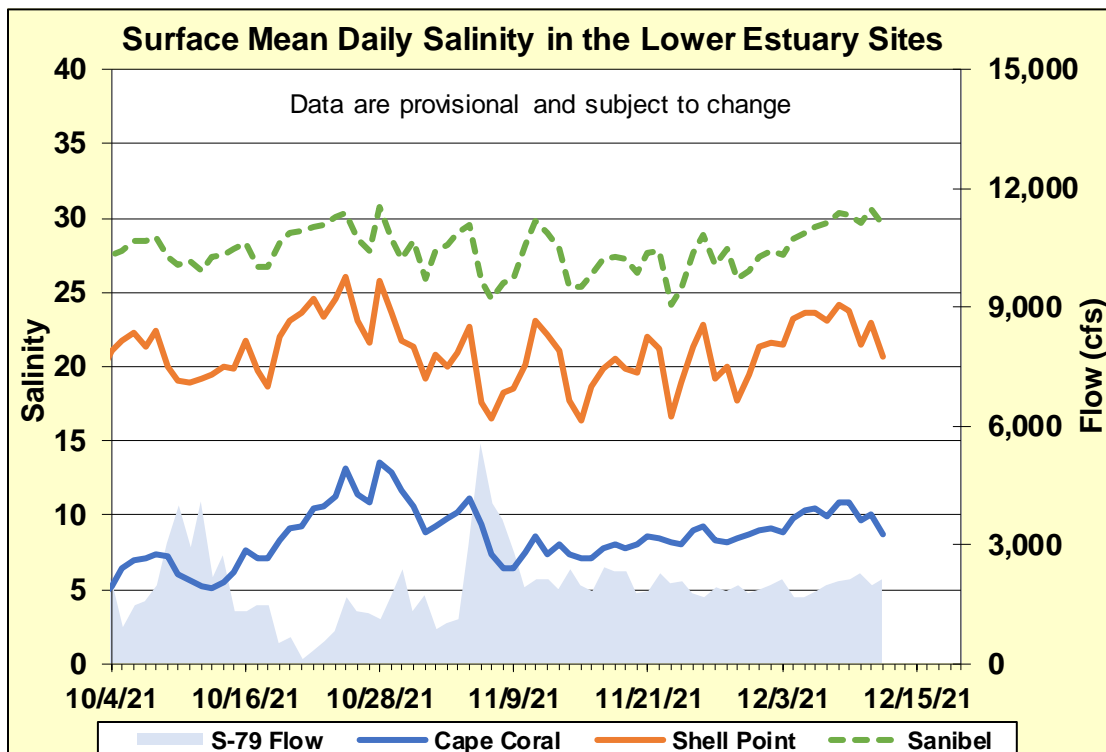


Figure ES-8. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

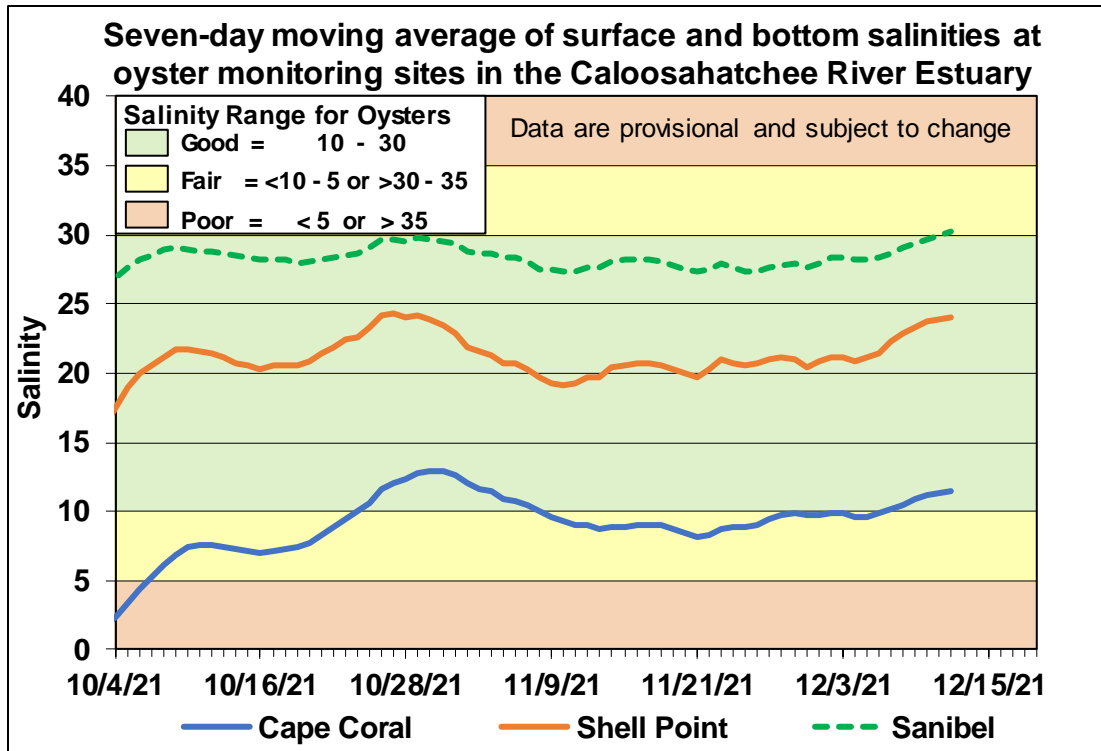


Figure ES-9. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

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	91	1.2	0.4
B	450	91	0.5	0.4
C	800	91	0.3	0.4
D	1000	91	0.3	0.4
E	1500	91	0.3	0.4
F	2000	91	0.3	0.4

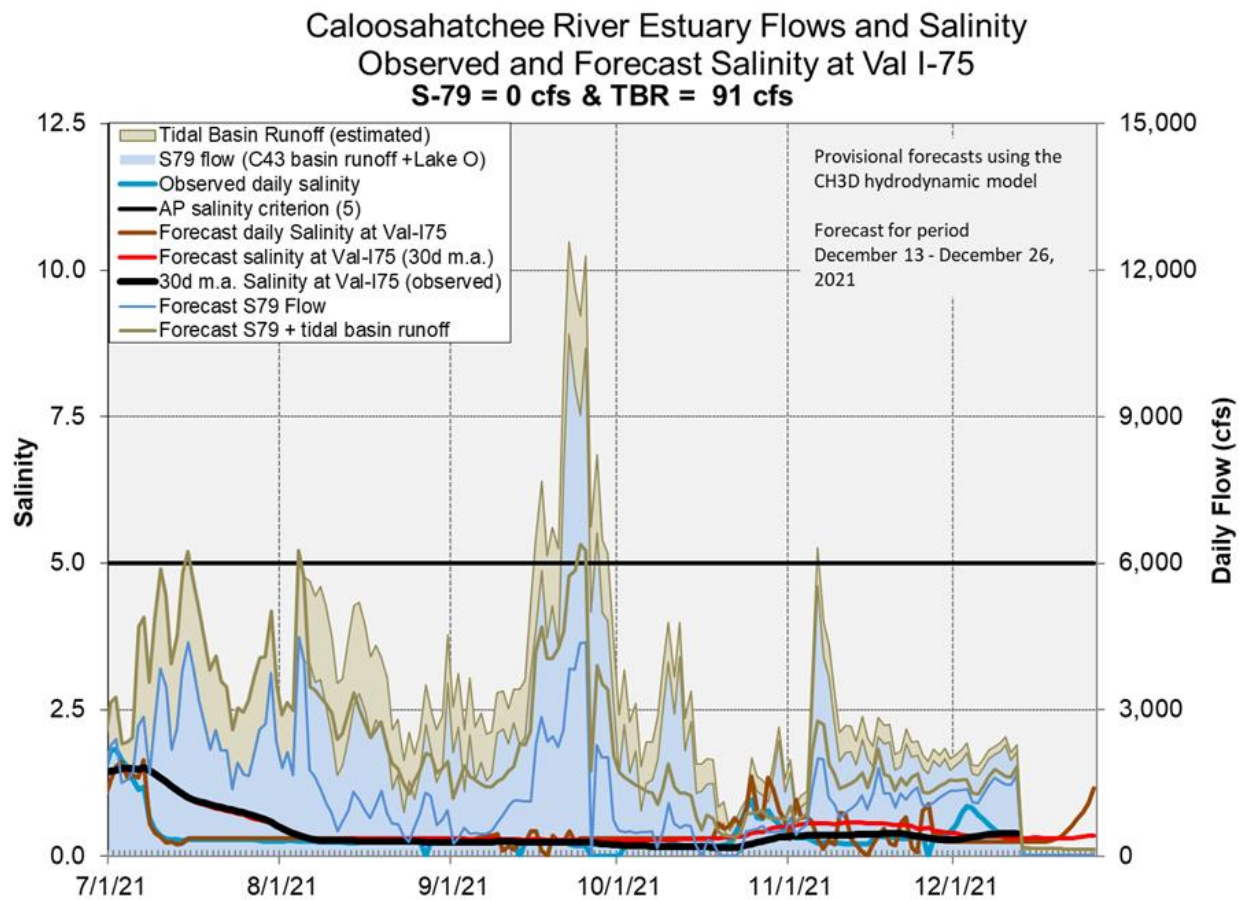


Figure ES-10. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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 or near 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**).

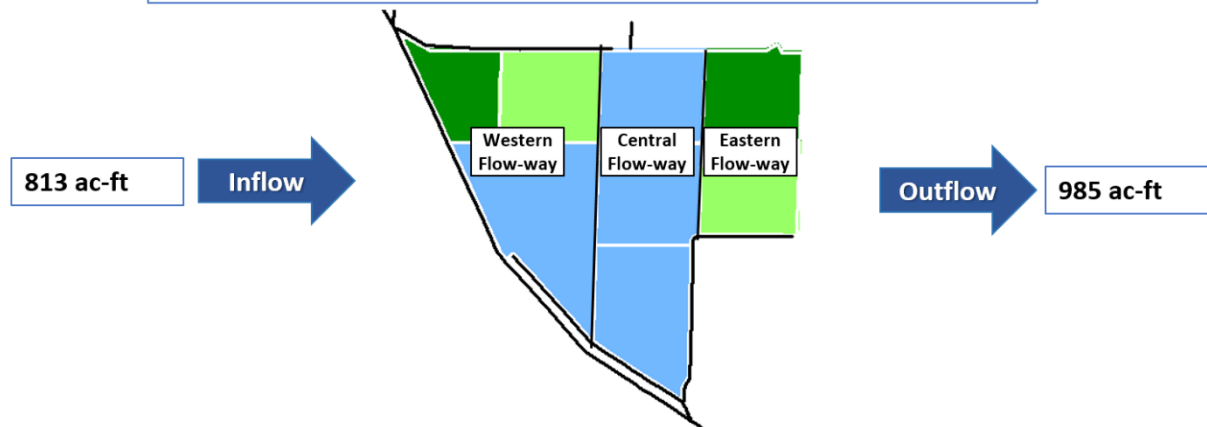
STA-2: STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Online treatment cells are at or near target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4 and 5 is highly 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 at or near 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 below target stage. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8 which are healthy. The 365-day PLRs for flow-ways 1, 6, 7, and 8 are below 1.0 g/m²/year. The 365-day PLRs for flow-ways 4 and 5 are high. (**Figure S-5** and **S-6**).

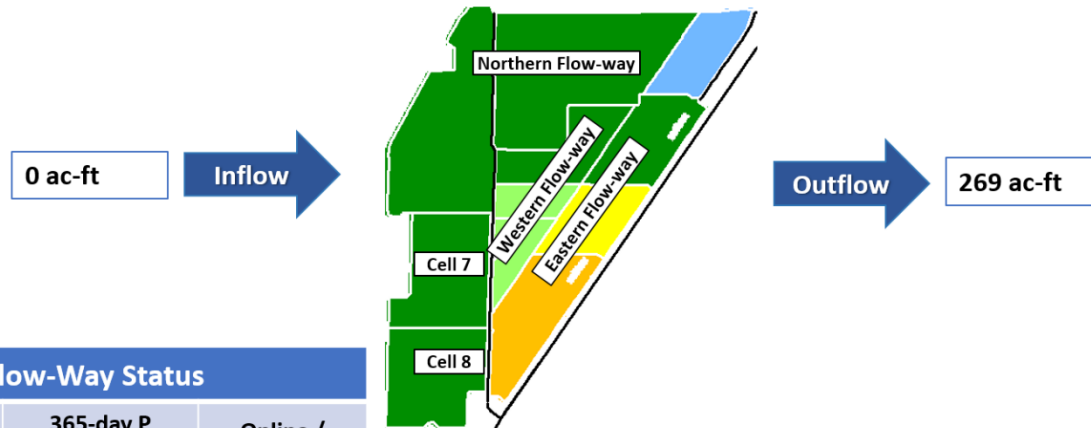
For definitions on STA operational language see glossary following figures.

STA-1E Weekly Status Report – 12/6/2021 through 12/12/2021



STA-1E Flow-Way Status				As of 12/12/2021				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
				 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')				
Eastern			Online	 Low Water Level (<0.2' below TS)	Depth / Area Based: Percent of Area Dry						
Central			Vegetation Rehab	 0-25% Dry	 25-50% Dry	 50-75% Dry	 75-100% Dry				
Western	Offline, construction activities starting 11/01/2019										
									Includes Preliminary Data		

STA-1W Weekly Status Report – 12/6/2021 through 12/12/2021



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

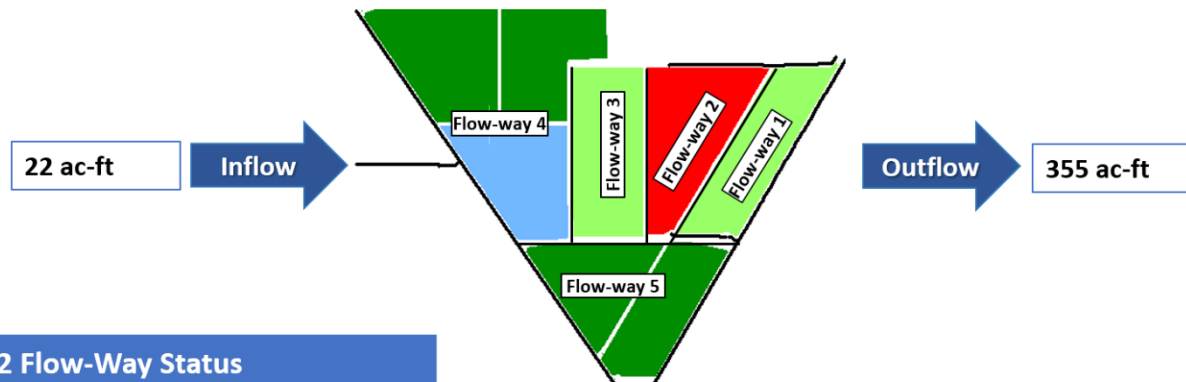
As of 12/12/2021	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-1W Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	0	1,308	50,186
--Lake Inflow, ac-ft	0	N/A	4,100
Total Outflow, ac-ft	269	1,803	51,288
Inflow Conc., ppb	N/A	158	172
Outflow Conc., ppb	19	25	24
Includes Preliminary Data			

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

STA-2 Weekly Status Report – 12/6/2021 through 12/12/2021



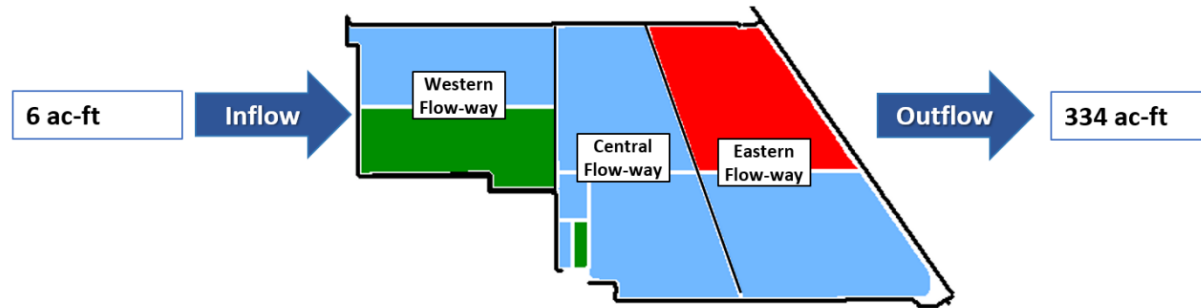
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2	Offline, construction activities as of 9/7/2021		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 12/12/2021	
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	22	5,118	322,442
--Lake Inflow, ac-ft	0	N/A	65,200
Total Outflow, ac-ft	355	9,598	338,625
Inflow Conc., ppb	14	50	87
Outflow Conc., ppb	13	14	16
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

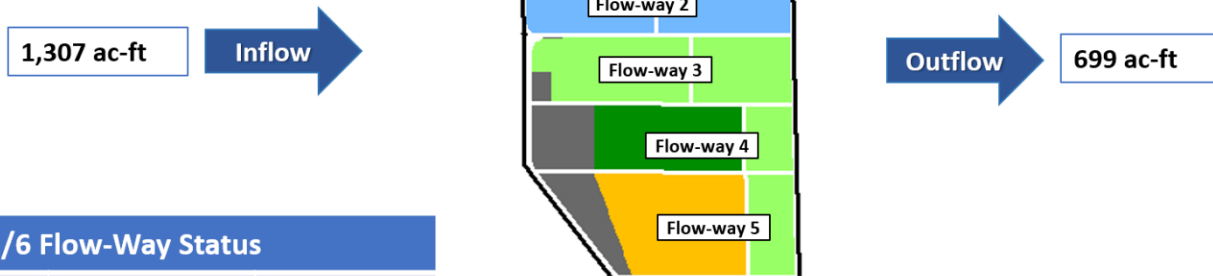
STA-3/4 Weekly Status Report – 12/6/2021 through 12/12/2021



STA-3/4 Flow-Way Status				As of 12/12/2021				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	Stage Based: Relative to Target Stage (TS)					7-day	28-day	365-day
Eastern	Offline, vegetation management drawdown as of 3/1/2021			Deep Water Level (> 2.8' above TS)				Total Inflow, ac-ft	6	2,607	368,259
				High Water Level (1.5' – 2.8' above TS)				--Lake Inflow, ac-ft	0	N/A	38,900
				0.2' – 1.5' above TS				Total Outflow, ac-ft	334	7,406	332,442
				Target Stage (TS +/- 0.2')				Inflow Conc., ppb	55	43	65
				Low Water Level (<0.2' below TS)				Outflow Conc., ppb	20	13	15
Central			Online	Depth / Area Based: Percent of Area Dry				Includes Preliminary Data			
				0-25% Dry		50-75% Dry					
				25-50% Dry		75-100% Dry					
Western			Online								

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

STA-5/6 Weekly Status Report – 12/6/2021 through 12/12/2021



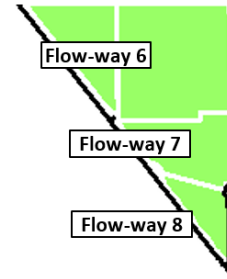
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P / m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2		N/A	Online
3		N/A	Online
4			Online
5			Online

As of 12/12/2021	
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	1,307	8,961	189,912
--Lake Inflow, ac-ft	0	N/A	9,000
Total Outflow, ac-ft	699	6,800	176,699
Inflow Conc., ppb	101	123	238
Outflow Conc., ppb	18	15	55
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 12/6/2021 through 12/12/2021



STA-5/6 Flow-Way Status				As of 12/12/2021	
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>	
6	←-----→		Online		
7	←-----→		Online		
8	←-----→		Online		
				Depth / Area Based: Percent of Area Dry	
				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 decreased slower than the slope of the Zone A1 regulation line last week. The average on Sunday was 0.10 feet above that falling line. WCA-2A: Stage at 2A-17 fell in parallel to the regulation line last week; the average on Sunday was 1.25 feet higher than the falling Zone A regulation line. WCA-3A: The Three Gauge Average stages fell away from the stable Zone A regulation line last week; average stage was 0.21 feet below the Zone A line on Sunday. WCA-3A: Stage at gauge 62 (Northwest corner) continues to fall faster than the slope of the falling Upper Schedule, the average on Sunday was 0.65 feet below the regulation line. (**Figures EV-1 through EV-4**).

Water Depths

The SFWDAT tool indicates that water depths in the WCAs are the lowest in northern WCA-3A, where a significant portion of the sub-basin has the potential for water at the ground surface. The spatial extent of depths in excess of 4.0' around the upper reaches of the L-67s has diminished. North to South hydrologic connectivity is diminishing within all of the sloughs in Everglades National Park and areas significantly below ground in western ENP and southern BCNP have increased in spatial extent. (**Figure EV-5**). Comparing WDAT water levels from present over the last month, stages are decreasing in most areas. Looking back one year, all of the EPA is significantly lower in depth. (**Figure EV-6**). Comparing depths over the past 20 years, most of the WCAs remains at or in the upper half of that historical range. Much of western ENP has fallen below the median, while WCA-1 and northeastern ENP are above 80th percentile. (**Figure EV-7**).

Taylor Slough and Florida Bay

A spatially averaged 0.23 inches of rain fell over Taylor Slough and Florida Bay over the week ending Sunday, 12/12, which allowed stages to decrease an average of 0.07 feet (Figure EV-8 and Figure EV-9). The Slough average is 5 inches above its historical average for this time of year while the northern parts of the Slough are 7.5 inches above its historical average from before the modifications to levies and structures in Upper Taylor Slough. Compared to this time last year after Tropical Storm Eta, stages now are still 5 inches lower suggesting less water available to buffer downstream conditions. Given the expectation of a drier than average dry season, maintaining water deliveries to the area would help to slow the recession in the slough so water movements south can be expedited when the wet season starts.

Salinities in Florida Bay averaged a decrease of 1 over the week ending 12/12, with individual station changes ranging from -2.2 to +0.4 (Figure EV-8). All regions averaged decreases over the past week. Only the central area remains above the 75th percentile and is continuing to decrease towards the median of its historical median (Figure EV-10). The nearshore areas of the Bay are 2 below the historical mean and remain polyhaline (18-30), but conditions are not as low as last year after Tropical Storm Eta and there is less water available from upstream compared to last year. Conditions are not ideal for enduring a drier than average dry season.

Water Management Recommendations

Conserving water in the northern basins, then allowing that water to move downstream as we transition into the dry season maximizes the ecological benefit of freshwater on the landscape. Flows into northern WCA-3A assist recession rates in that sub-basin then move downstream have an ecological benefit. Continued freshwater to the Taylor Slough area that maintains stage will help expedite deliveries to the south when the wet season starts. 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	0.33	-0.03
WCA-2A	0.22	-0.10
WCA-2B	0.49	-0.06
WCA-3A	0.05	-0.09
WCA-3B	0.12	+0.00
ENP	0.06	+0.04

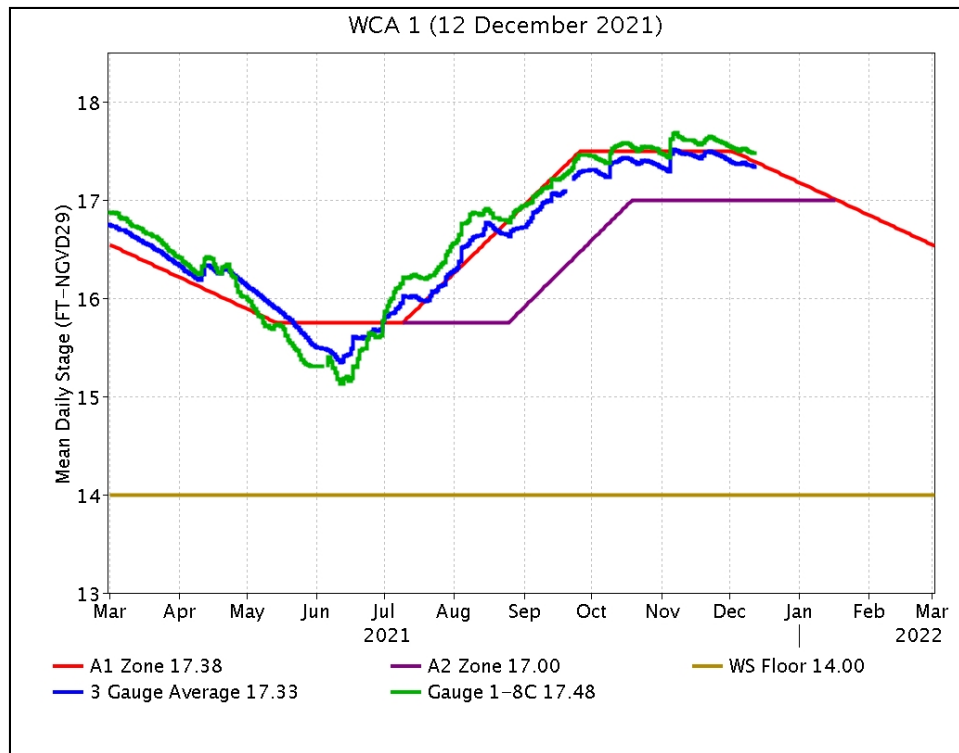


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

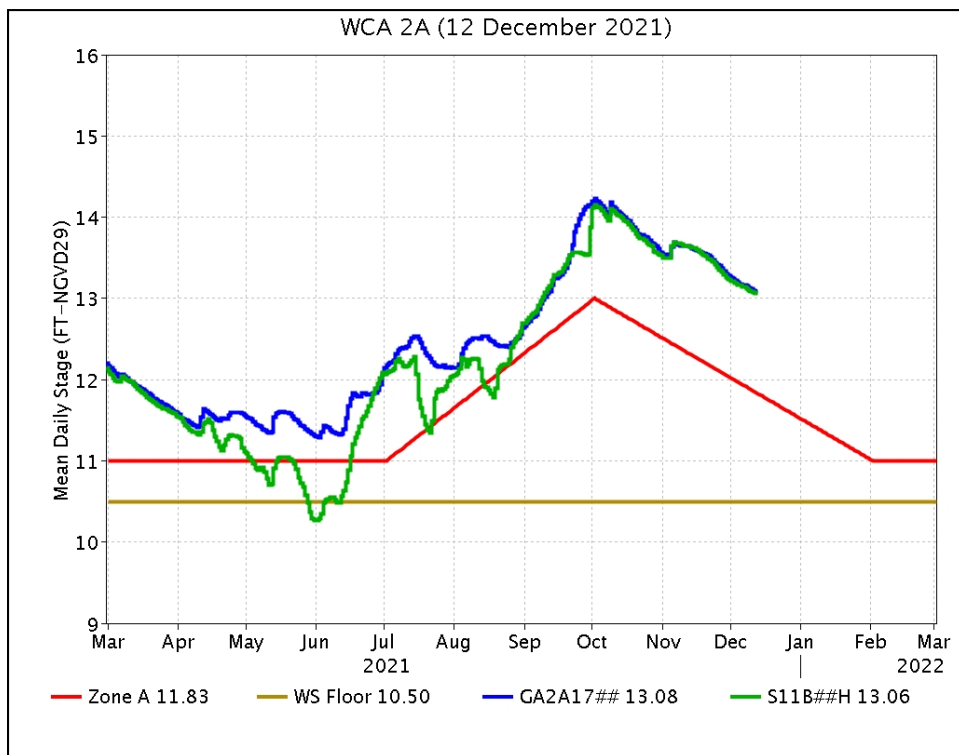


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

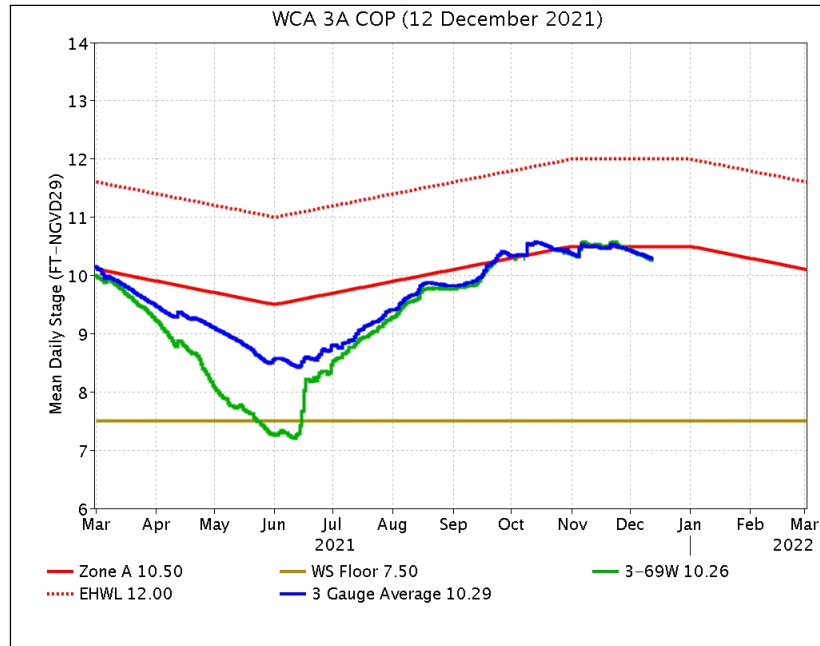


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

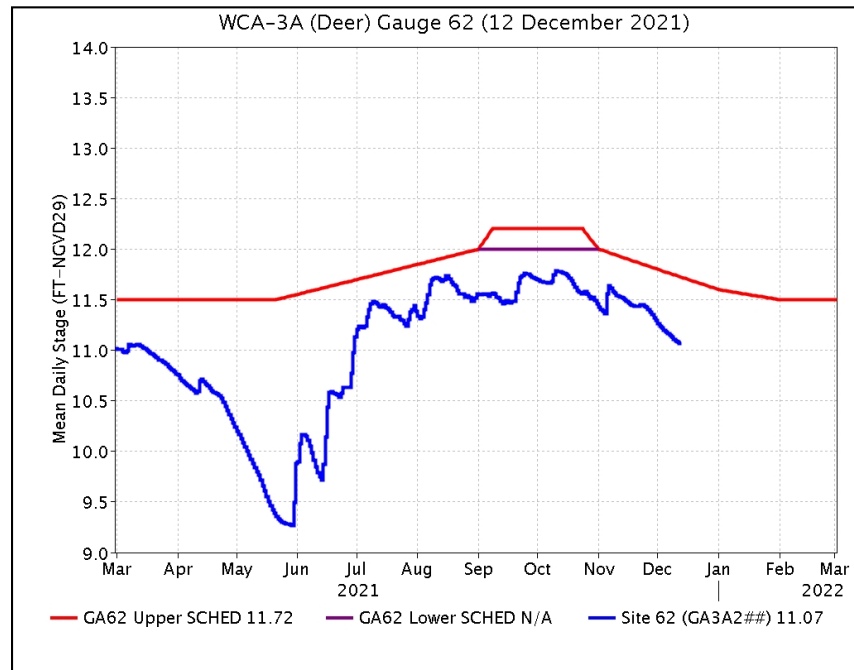


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

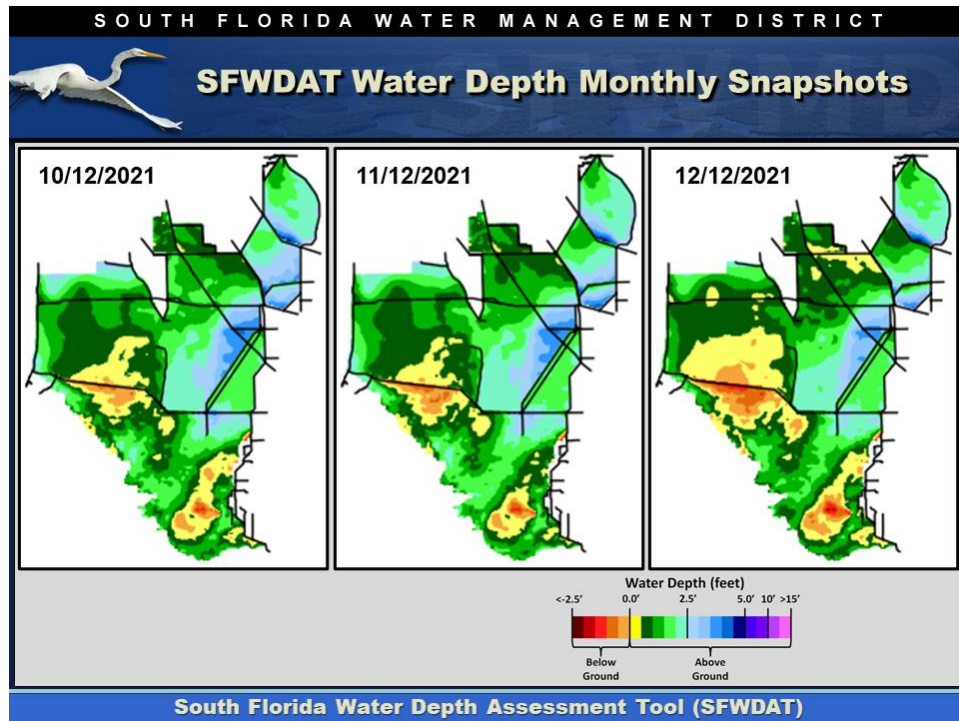


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

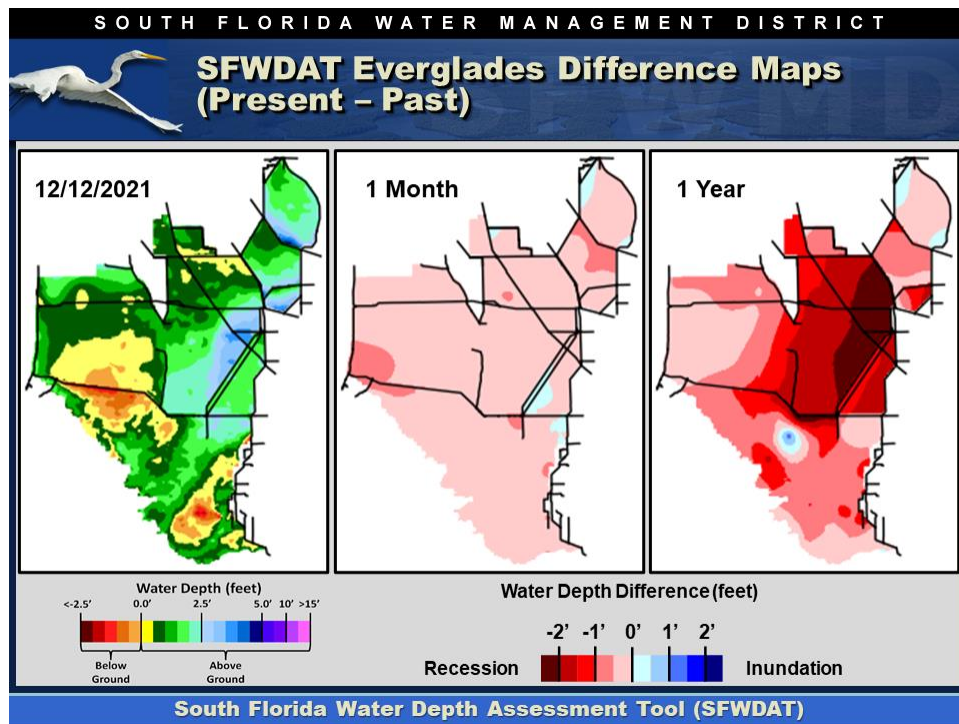


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

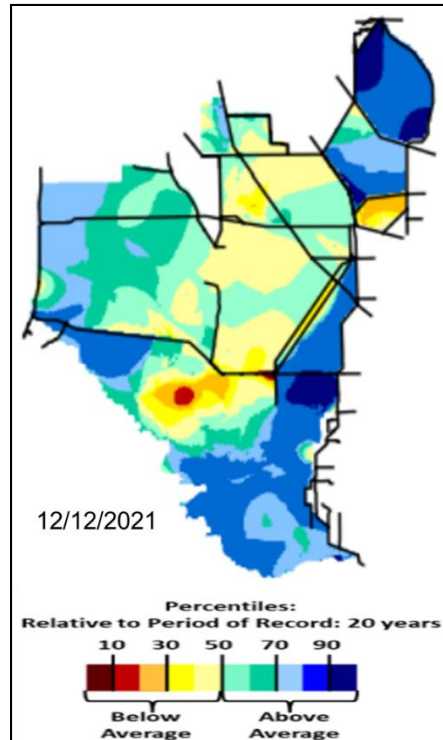


Figure EV-7. Present water depths compared to the day of year median over the previous 20 years.

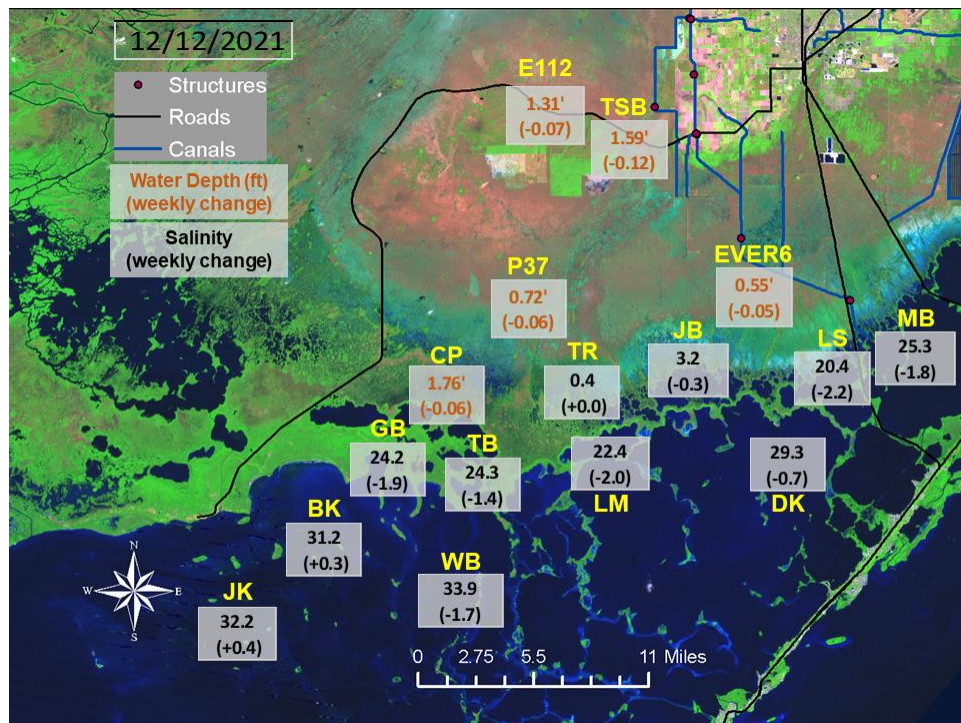


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

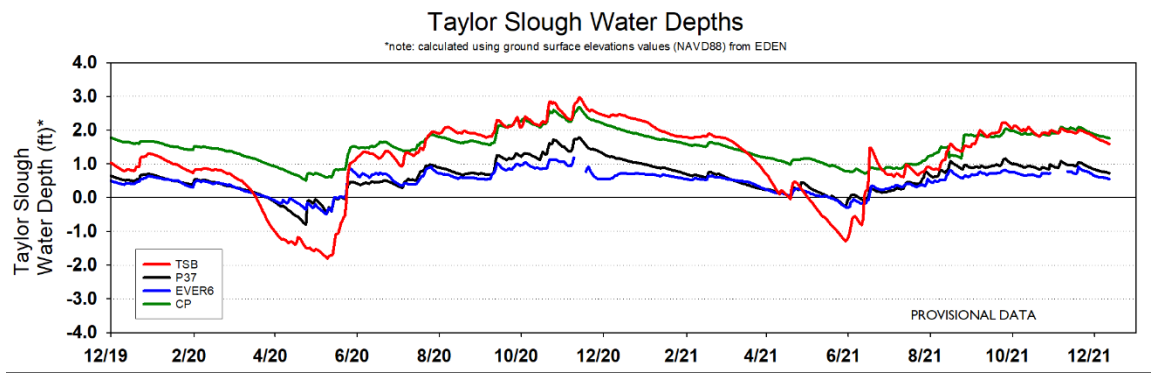


Figure EV-9. Taylor Slough water depth time series.

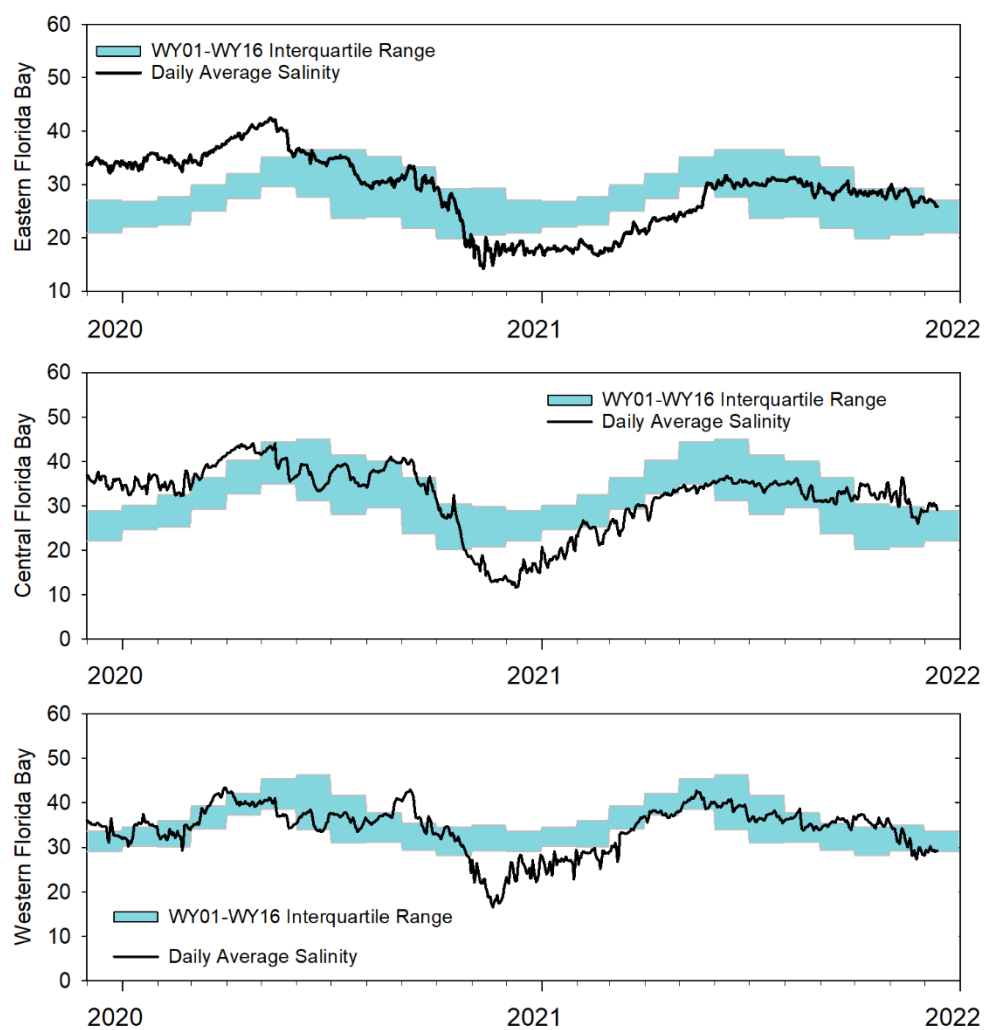


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, December 7, 2021 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.03'	Conserve water in this basin letting the water move south when conditions allow.	Protect within basin and downstream habitat and wildlife. Anticipated La Nina dry season.
WCA-2A	Stage decreased by 0.10'	Conserve water in this basin letting the water move south when conditions allow, with northern WCA-3A the priority for discharge. Keeping a recession rate less than 0.10 feet per week has an ecological benefit.	Protect within basin and downstream habitat and wildlife. Protect wading bird foraging conditions in WCA-3A North.
WCA-2B	Stage decreased by 0.06'	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 0.09'	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 0.11'	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 0.08'	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 decreased by 0.09'		
WCA-3B	Stage remained unchanged	Conserve water in this basin letting the water move south when conditions allow.	Protect within basin and downstream habitat and wildlife.
ENP-SRS	Stage increased by 0.04 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 -0.03' to -0.12'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -2.2 to +0.4	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.