

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 20, 2023

**SUBJECT:** Weekly Environmental Conditions for Systems Operations

### **Summary**

#### **Weather Conditions and Forecast**

A surface high-pressure area associated with a cool air mass will allow for some transport of relatively greater shallow moisture across the SFWMD on Thursday and Friday, but the strong stability of the atmosphere will generally keep the SFWMD dry while temperatures moderate slightly. However, the shallow moisture could be enough to generate a little bit of light shower activity along and near the east coast with a greater chance of a little more shower activity through the Florida Keys. On Saturday, an upper-air disturbance will pass through the southeastern U.S. while exerting minimal influence on the SFWMD's weather. Finally, an upper-air disturbance will result in an influx of enhanced moisture, which will probably lead to a further increase of shower activity along and near the east coast, with some potential for isolated or widely scattered areas seeing some moderately heavy rainfall both days. In some model solutions, the passage of this upper-air disturbance causes a further increase of rainfall across the SFWMD on Monday. However, there are just as many model solutions showing little substantive increase. Thus, the Monday QPF depicts some increase of rainfall area-wide but is necessarily of low-confidence as a result of the poor model agreement. For the week ending next Tuesday morning, total SFWMD rainfall is most likely to be below normal. However, if the rainfall Monday next week is greater than currently forecast, total weekly rainfall could be near-normal.

#### **Kissimmee**

Releases were made from East Lake Toho and Lake Toho to keep lake stage from exceeding the regulation schedules due to rainfall and to begin lowering lake stage in preparation for spring recessions to low pool. Weekly average discharge on December 17, 2023, was 760 cfs and 750 cfs at S-65 and S-65A, respectively. Mean weekly water depth on the Kissimmee River floodplain decreased by 0.01 feet to 0.16 feet over the week ending December 17, 2023. The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 8.7 mg/L last week to 8.9 mg/L for the week ending December 17, 2023, which is well above the potentially lethal and stressful levels for largemouth bass and other sensitive species.

## **Lake Okeechobee**

Lake Okeechobee stage was 16.03 feet NGVD on December 17, 2023, which was 0.14 feet higher than the previous week and 0.09 feet lower than a month ago. Average daily inflows (excluding rainfall) increased from the previous week, going from 900 cfs to 1,380 cfs. Average daily outflows (excluding evapotranspiration) decreased from the previous week, going from 1,890 cfs to 1,280 cfs. The cyanobacteria index level was low to moderate in the western region of the Lake according to the December 18, 2023, satellite image from NOAA's Harmful Algal Bloom Monitoring System.

## **Estuaries**

Total inflow to the St. Lucie Estuary averaged 860 cfs over the past week with no flow coming from Lake Okeechobee. Mean surface salinities increased at all three sites in the estuary over the past week. Salinity in the middle estuary was in the optimal range (10-25) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 2,190 cfs over the past week with 1,137 cfs coming from Lake Okeechobee. Mean surface salinities decreased at S-79, Ft. Myers and Sanibel and increased at the remaining sites in the estuary over the past week. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the optimal range for adult eastern oysters at Cape Coral, and in the upper stressed range at Shell Point and Sanibel (>25).

## **Stormwater Treatment Areas**

For the week ending Sunday, December 17, 2023, 400 ac-ft of Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2024 (since May 1, 2023) is approximately 7,500 ac-feet. The total amount of inflows to the STAs in WY2024 is approximately 1,110,000 ac-feet. Most STA cells are near or above target stage. STA-1E Western Flow-way is offline for post-construction vegetation grow in. Operational restrictions are in effect in STA-1W Northern Flow-way, STA-2 Flow-ways 2 and 4, STA-3/4 Eastern Flow-way, and STA-5/6 Flow-way 4 for vegetation management activities. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2 and the A-1 FEB/STA-3/4.

## **Everglades**

Last week's rates of stage changes were elevated in WCA-1 but the ecological impact of a rapid ascension was likely lessened by the previous three weeks of "good" recession rates in that basin. While deeper than average conditions in central and southern WCA-3A do have ecological tradeoffs, conditions continue to suggest hope for an improved Wood Stork nesting if recession rates are such that water remains in the sloughs of WCA-3A at the end of the upcoming wading bird nesting season. Stages increased across Taylor Slough last week and remain well above the recent average. Salinity increased slightly on average in Florida Bay last week however falls below the 25th percentile for this time of year in all regions. Wading bird recon flights have started to be conducted weekly on Fridays. 4,500 White Ibis were detected in southern BCNP. A mixed flock of 4,000 wading birds were also seen in WCA-3A North. "Conditions were too windy to

survey along the coast but given the 12-14k observed in that region last week, (overall observations suggest) this is a good start to the wading bird nesting season.”

## **Biscayne Bay**

Total inflow to Biscayne Bay averaged 786 cfs and the previous 30-day mean inflow averaged 1,168 cfs. The seven-day mean salinity was 24.0 at BBCW8 and 20.7 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data provided by Biscayne National Park.

## **Supporting Information**

### **Kissimmee Basin**

#### ***Upper Kissimmee***

On December 17, 2023, mean daily lake stages were 57.8 feet NGVD (0.2 feet below schedule) in East Lake Toho, 54.9 feet NGVD (0.1 feet below schedule) in Lake Toho, and 51.8 feet NGVD (0.7 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

#### ***Lower Kissimmee***

For the week ending December 17, 2023, mean weekly discharge was 760 cfs and 750 cfs at S-65 and S-65A, respectively. Mean weekly discharge from the Kissimmee River was 860 cfs at S-65D and 810 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 46.0 feet NGVD at S-65A and 26.4 feet NGVD at S-65D on December 17, 2023, a reduction of about 0.2 feet at S-65D. Mean weekly river channel stage increased by 0.1 feet to 35.5 feet NGVD over the week ending on December 17, 2023 (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain decreased by 0.01 feet to 0.16 feet over the week ending December 17, 2023 (**Table KB-2, Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 8.7 mg/L the previous week to 8.9 mg/L for the week ending December 17, 2023 (**Table KB-2, Figure KB-6**).

#### ***Water Management Recommendations***

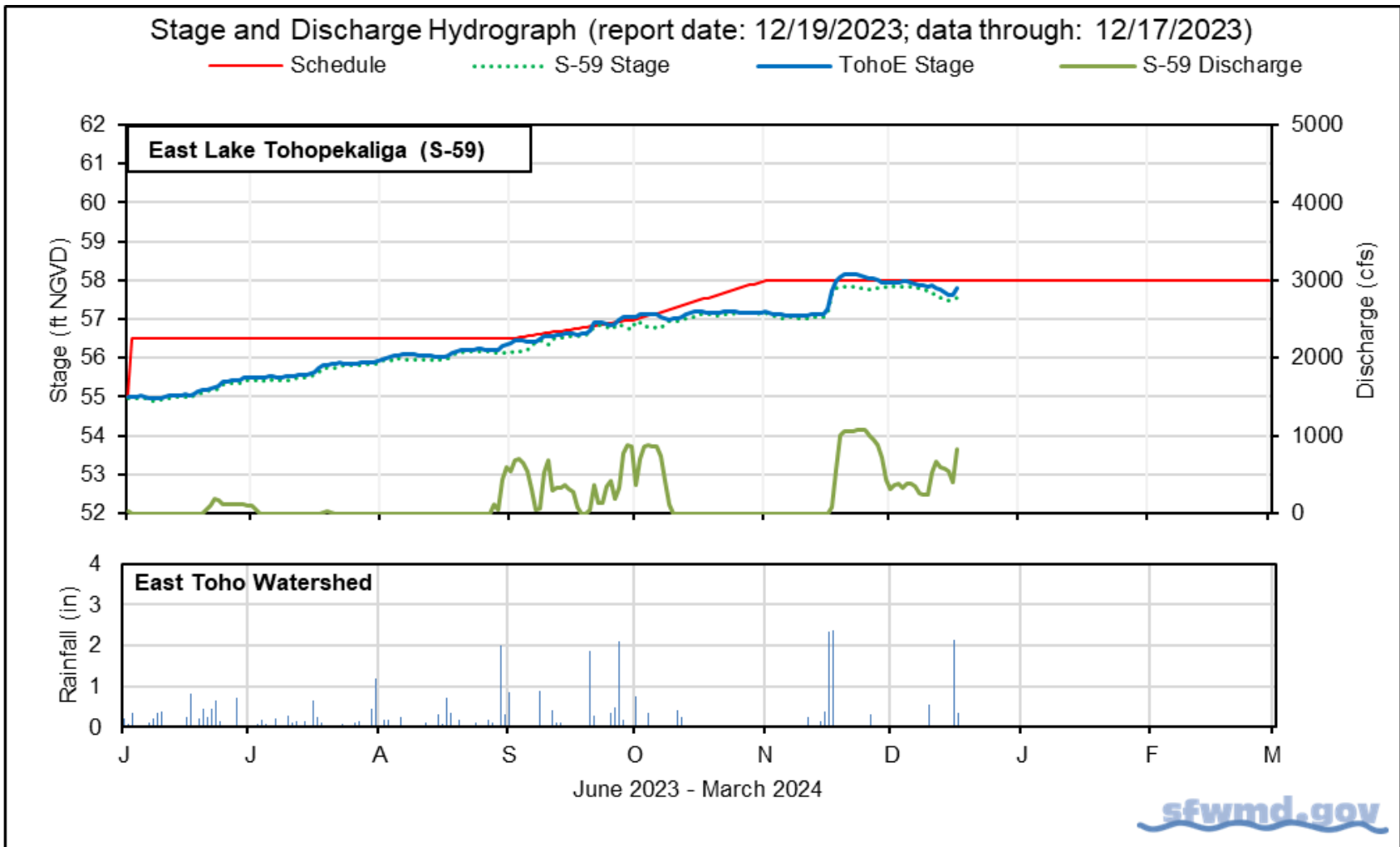
Lower Lakes East Toho and Toho to 0.5 ft below their regulation schedules by January 1, 2024, then begin stage recessions to reach their low pools on May 31, 2024. Follow the Hybrid A discharge plan for S-65/S-65A (Fig. KB-7) through May 31, 2024, to facilitate S-69 repairs. Maintain at least minimum flow (250-300 cfs) at S-65A. Continue the stage recession at S-65D headwater to reach 25.8 ft NGVD in early January 2024 at a recession rate of approximately 0.2 ft/week.

**Table KB-1.** Average discharge for the preceding seven days, Sunday’s average daily stage and Sunday’s average daily departure from KCOL flood regulation lines or temporary schedules. All data are provisional.

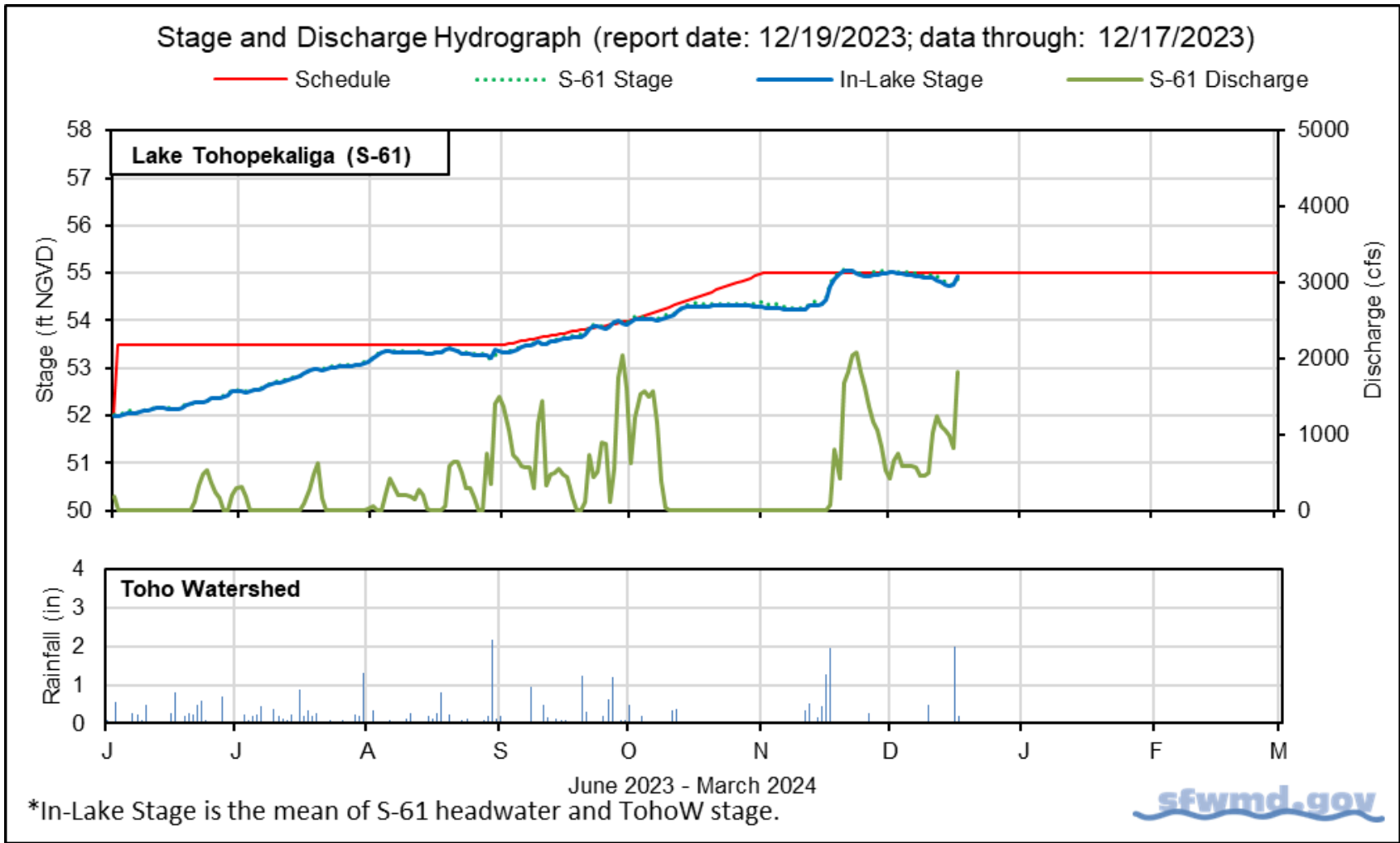
Water Body	Structure	Stage Monitoring Site	Weekly (7-Day) Average Discharge (cfs)	Sunday Lake Stage (feet NGVD) <sup>a</sup>	Schedule Type <sup>b</sup>	Sunday Schedule Stage (feet NGVD)	Sunday Departure from Regulation (feet)	
							12/17/23	12/10/23
Lakes Hart and Mary Jane	S-62	LKMJ	220	61.1	R	61.0	0.1	-0.1
Lakes Myrtle, Preston and Joel	S-57	S-57	85	61.9	R	61.8	0.1	-0.1
Alligator Chain	S-60	ALLI	160	64.1	R	64.0	0.1	-0.1
Lake Gentry	S-63	LKGT	230	61.5	R	61.5	0.0	-0.1
East Lake Toho	S-59	TOHOE	590	57.8	R	58.0	-0.2	-0.2
Lake Toho	S-61	TOHOW S-61	1200	54.9	R	55.0	-0.1	-0.1
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	750	51.8	R	52.5	-0.7	-0.9

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.

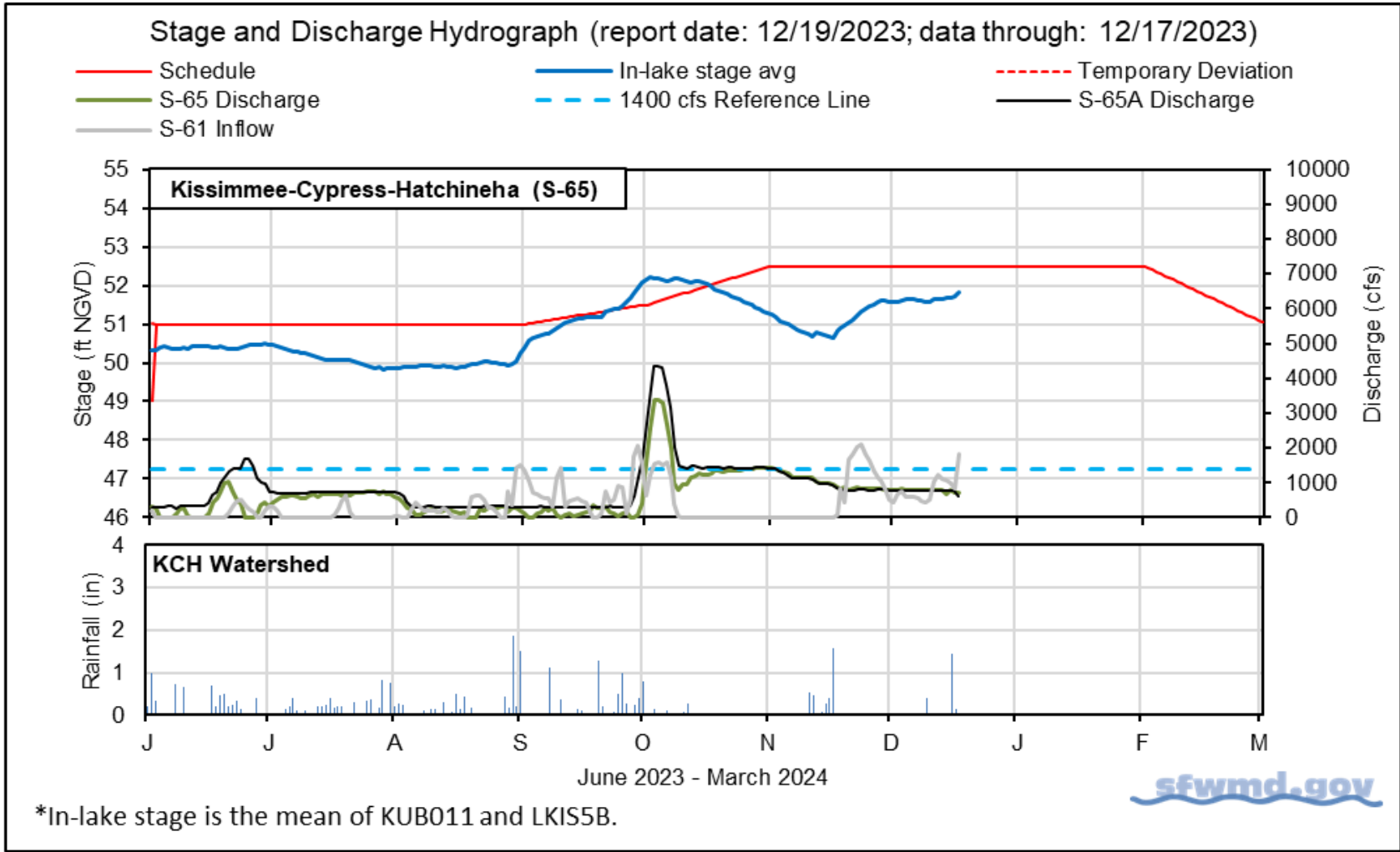
b. A: projected recession line; R: USACE regulation schedule; S: temporary recession target line; T: temporary schedule; NA: not applicable or not available.



**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	Sunday Daily Average	Weekly Average for Previous Seven Day Periods			
		12/17/23	12/17/23	12/10/23	12/3/23	11/26/23
Discharge	S-65	730	760	800	810	820
Discharge	S-65A <sup>a</sup>	620	750	790	790	790
Headwater Stage (feet NGVD)	S-65A	45.8	46.0	46.3	46.3	46.3
Discharge	S-65D <sup>b</sup>	910	860	860	870	970
Headwater Stage (feet NGVD)	S-65D <sup>c</sup>	26.3	26.4	26.6	26.8	26.9
Discharge (cfs)	S-65E <sup>d</sup>	960	810	790	810	1,000
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) <sup>e</sup>	Phase I, II/III river channel	8.7	8.9	8.7	7.9	7.0
River channel mean stage <sup>f</sup>	Phase I river channel	35.6	35.5	35.4	35.5	35.7
Mean depth (feet) <sup>g</sup>	Phase I floodplain	0.18	0.16	0.17	0.23	0.29

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.

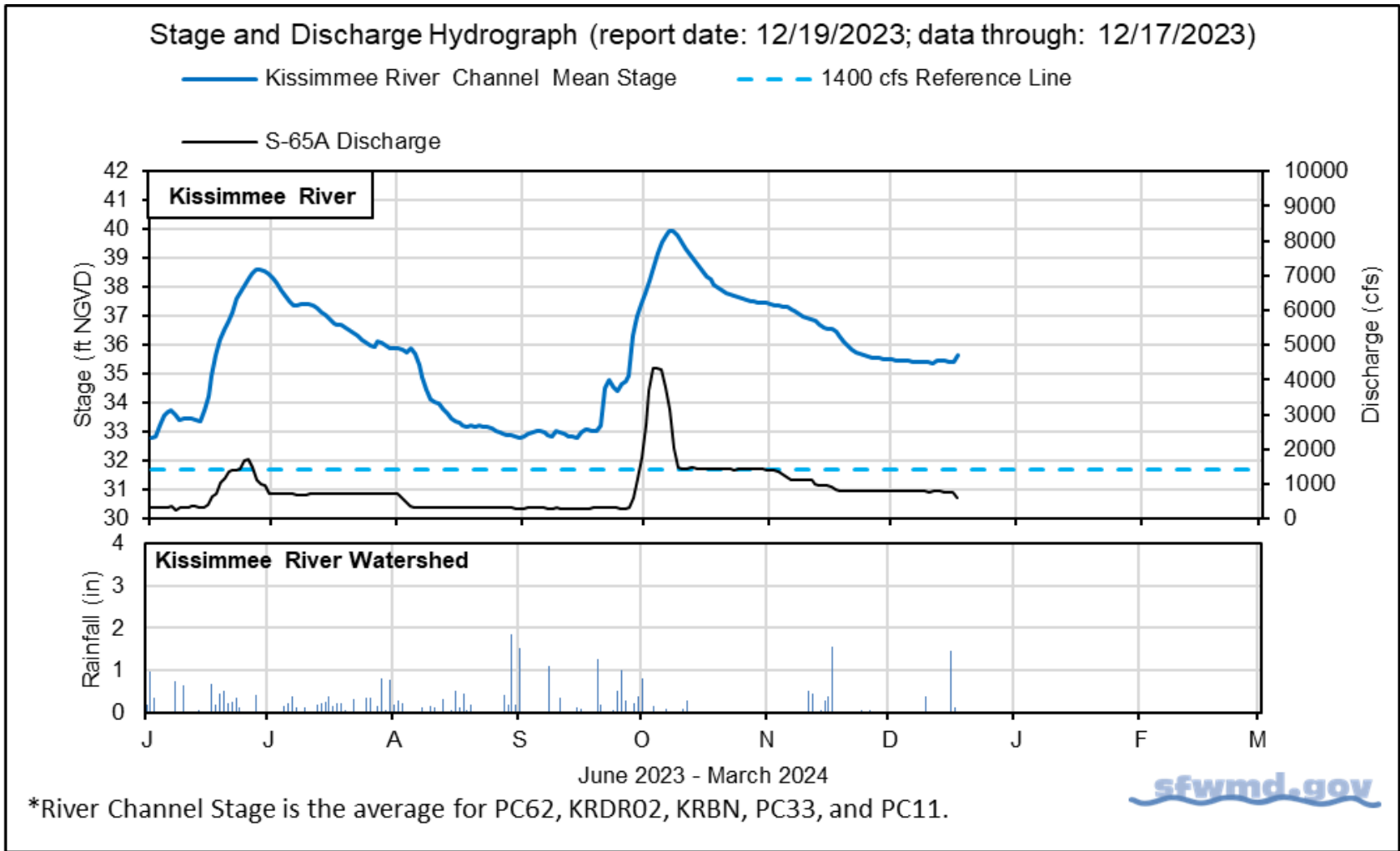
d. Combined discharge from S-65E and S-65EX1.

e. Dissolved oxygen is the average of values from sondes KRBN, PC62, PC33, PD62R and PD42R.

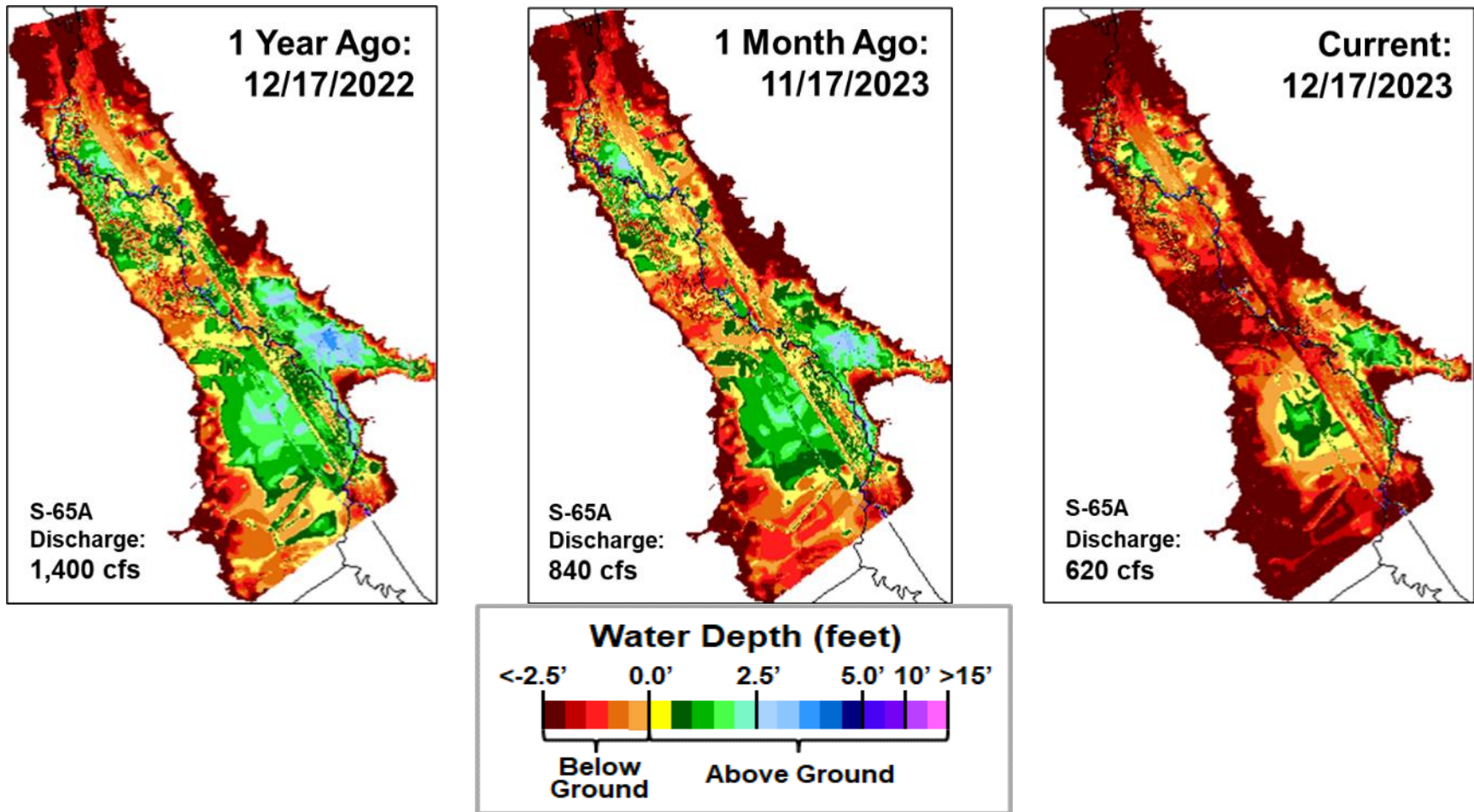
f. Mean of five river channel stations (PC62, KRDR02, KRBN, PC33, PC11) in the Phase I area.

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

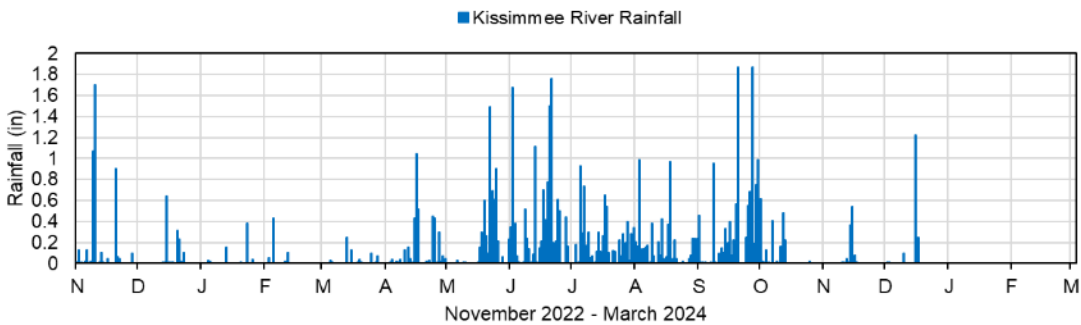
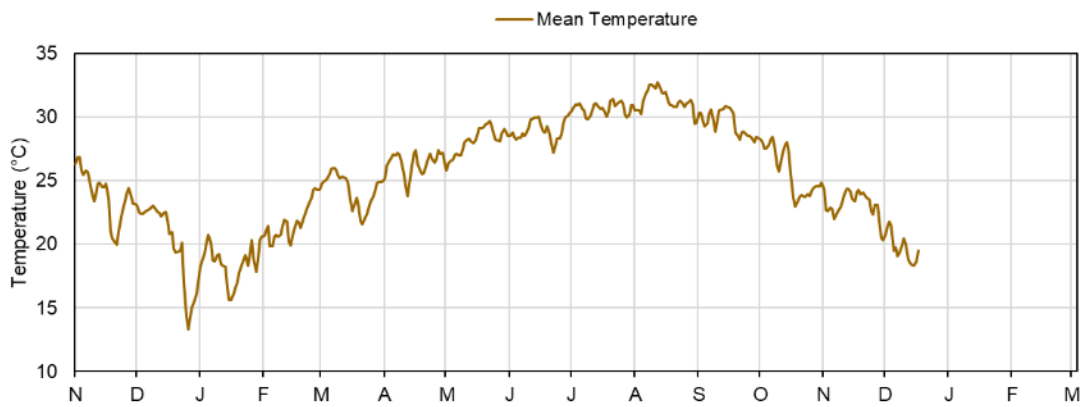
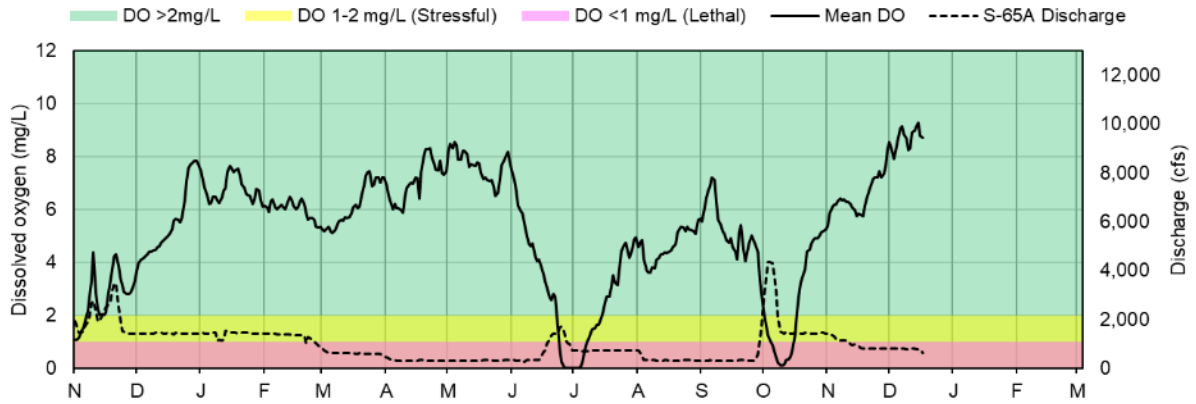




**Figure KB-4.** Kissimmee River stage, discharge and rainfall.



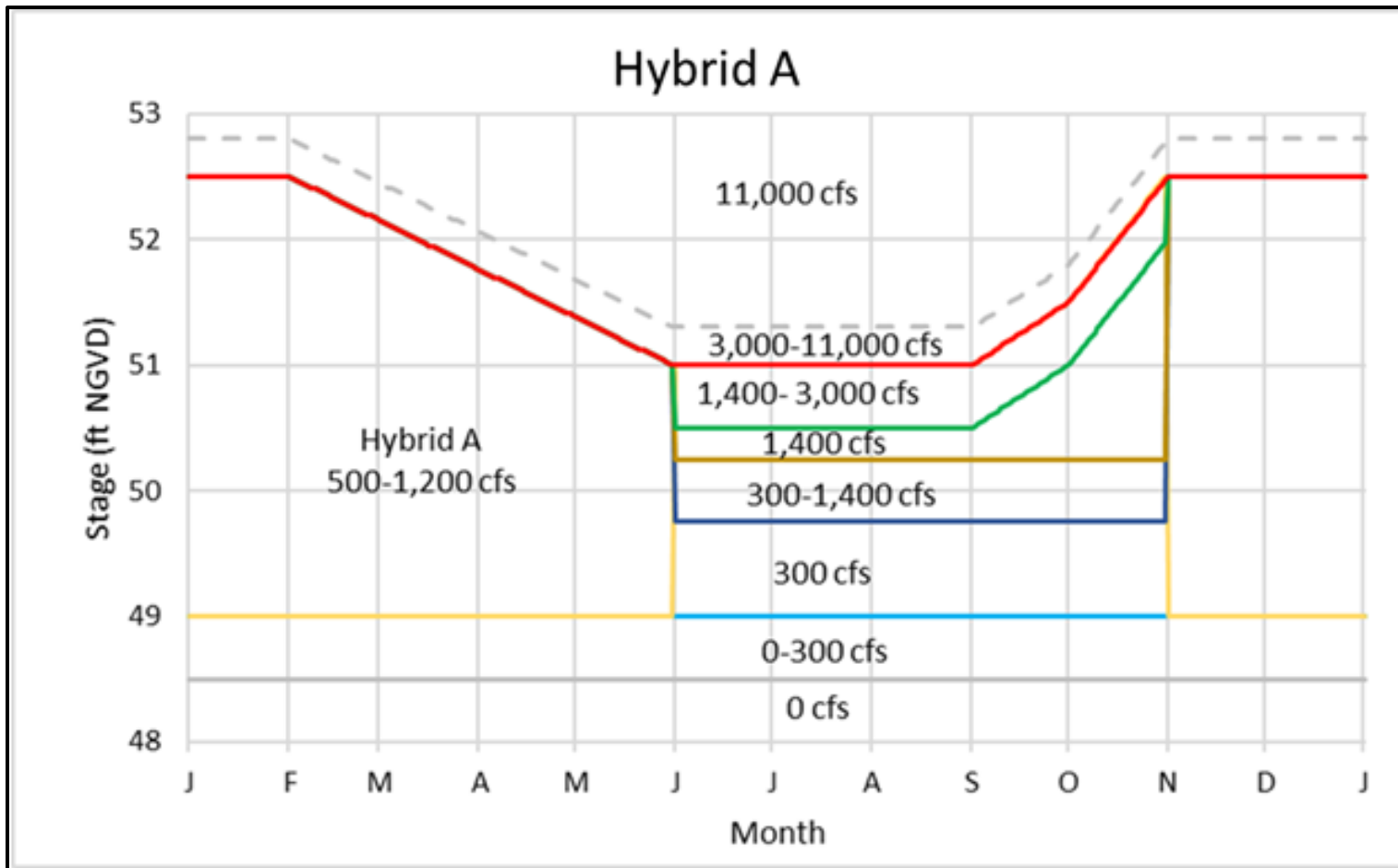
**Figure KB-5.** Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.



Report Date: 12/19/2023; data are through: 12/17/2023



**Figure KB-6.** 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, KRDR02, KRBN, PC33, PC11, PD62R, and PD42R with an average of six stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.



**Figure KB-7.** Hybrid A Discharge Plan for S-65/S-65A. Use discharge rate of change limits from IS-14-50 (Fig. KB-8).

**Stage and Discharge Guidance for 2021-2023.**

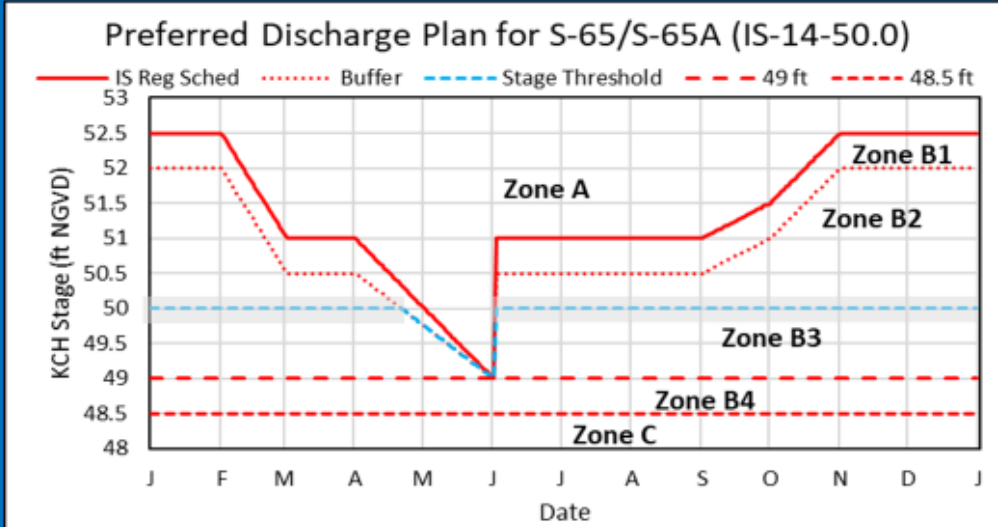
Zone	KCH Stage (ft NGVD)	S-65/S-65A Discharge*
A	Above regulation schedule line.	Flood control releases as needed with no limits on the rate of discharge change.
B1	In flood control buffer zone (0.5 ft below the schedule line).	Adjust S-65 discharge so that S-65A discharge is between 1400 cfs at the 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

## 2021-2023 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 1/3/2022

**Figure KB-8.** IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

## Lake Okeechobee

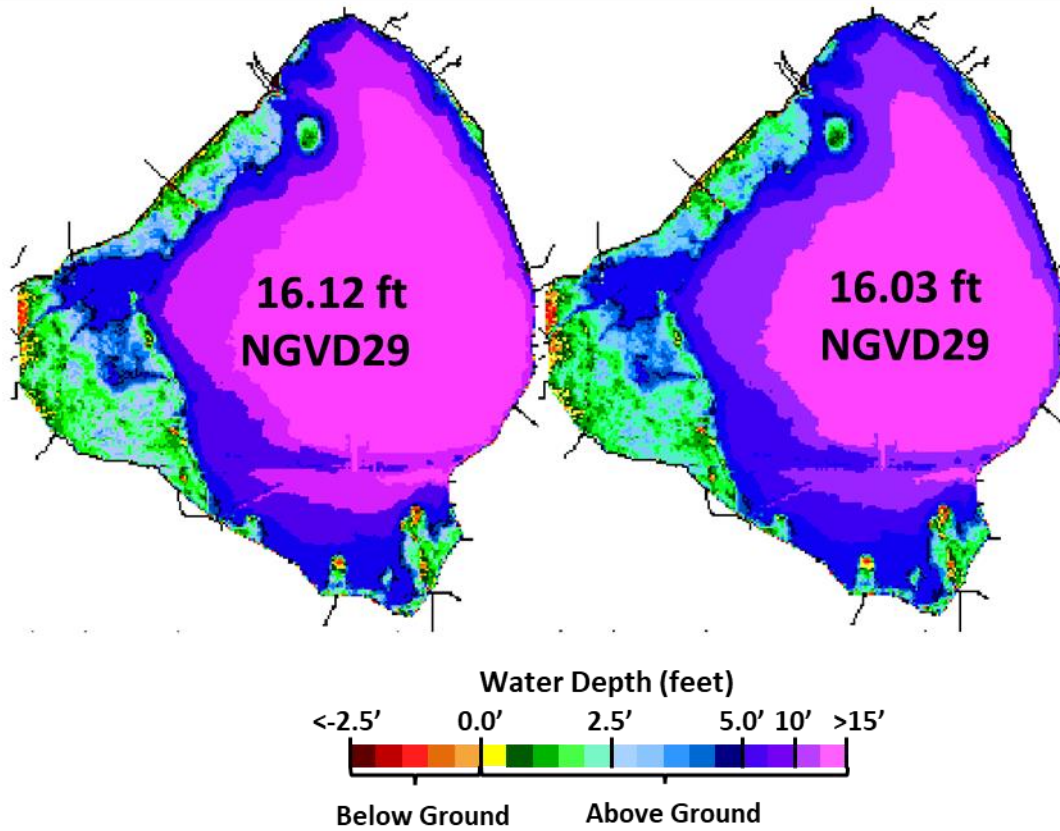
Lake Okeechobee stage was 16.03 feet NGVD on December 17, 2023, which was 0.14 feet higher than the previous week and 0.09 feet lower than a month ago (**Figure LO-1**). Lake stage was in the low sub-band on December 17<sup>th</sup> (**Figure LO-2**) and was 0.53 feet above the upper limit of the ecological envelope (**Figure LO-3**). According to NEXRAD, 1.42 inches of rain fell directly over the Lake.

Average daily inflows (excluding rainfall) increased from the previous week, going from 900 cfs to 1,380 cfs. The highest structure inflow came from the C-38 Canal via the S-65E/65EX1 structure (810 cfs). Average daily outflows (excluding evapotranspiration) decreased from the previous week, going from 1,890 cfs to 1,280 cfs. The highest average single structure outflow was recorded at the S-77 structure into the C-43 Canal (1,240 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 cyanobacteria index level was low to moderate in the western region of the Lake according to the December 18, 2023, satellite image from NOAA's Harmful Algal Bloom Monitoring System (**Figure LO-6**). All data presented in this report are provisional and are subject to change.

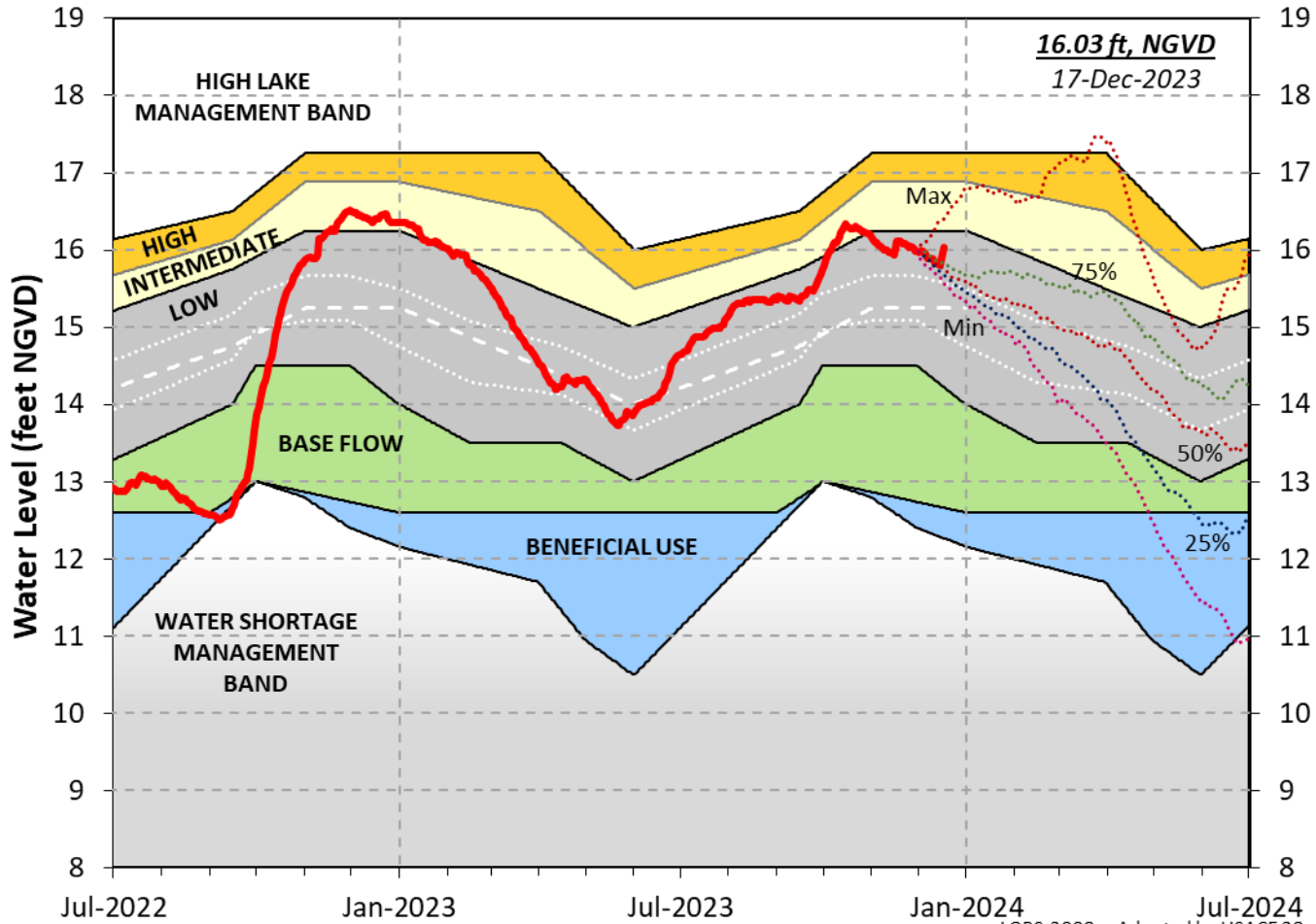
**1 Month Ago:  
11/17/2023**

**Current:  
12/17/2023**



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

## Lake Okeechobee Water Level History and Projected Stages

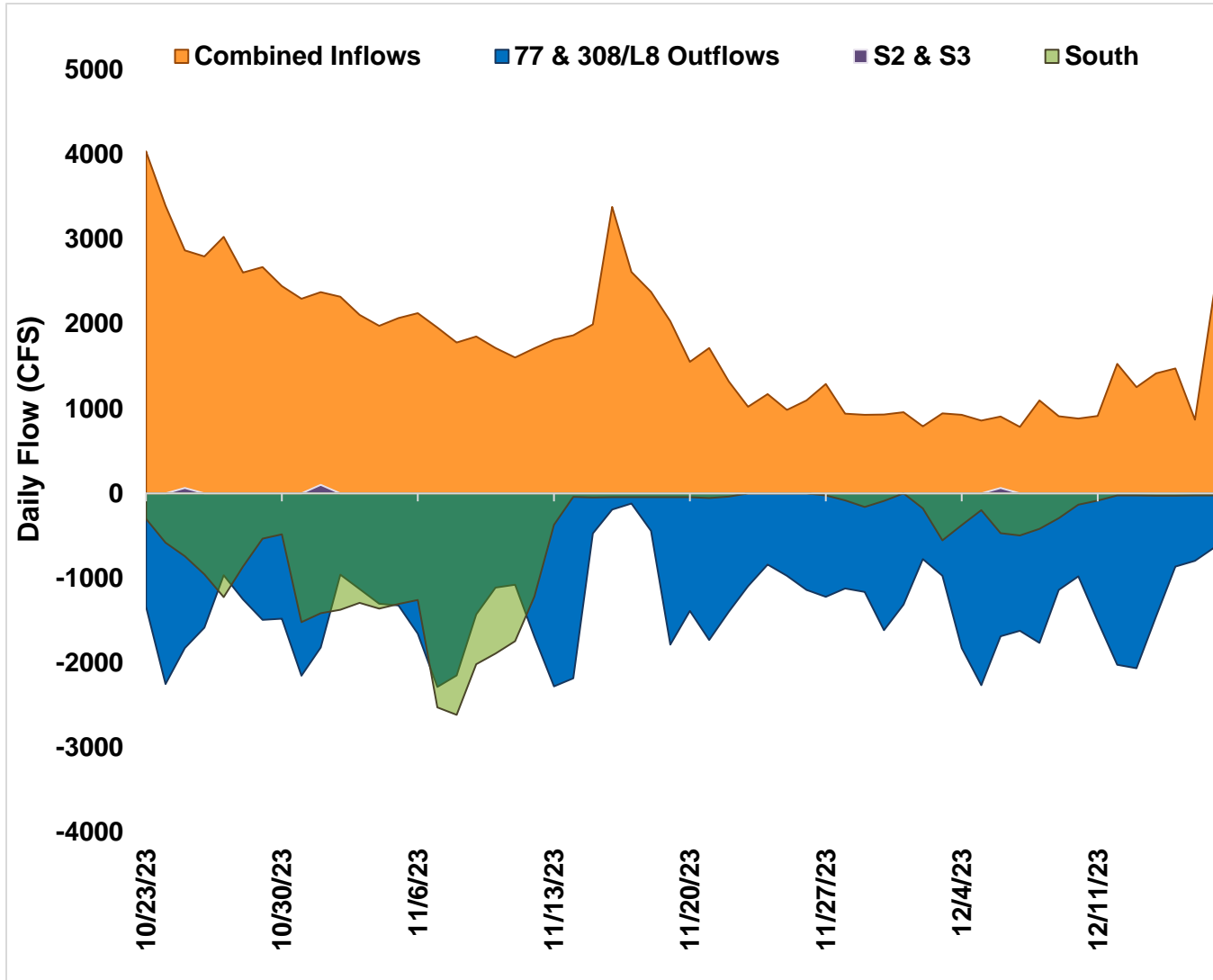


**Figure LO-2.** Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

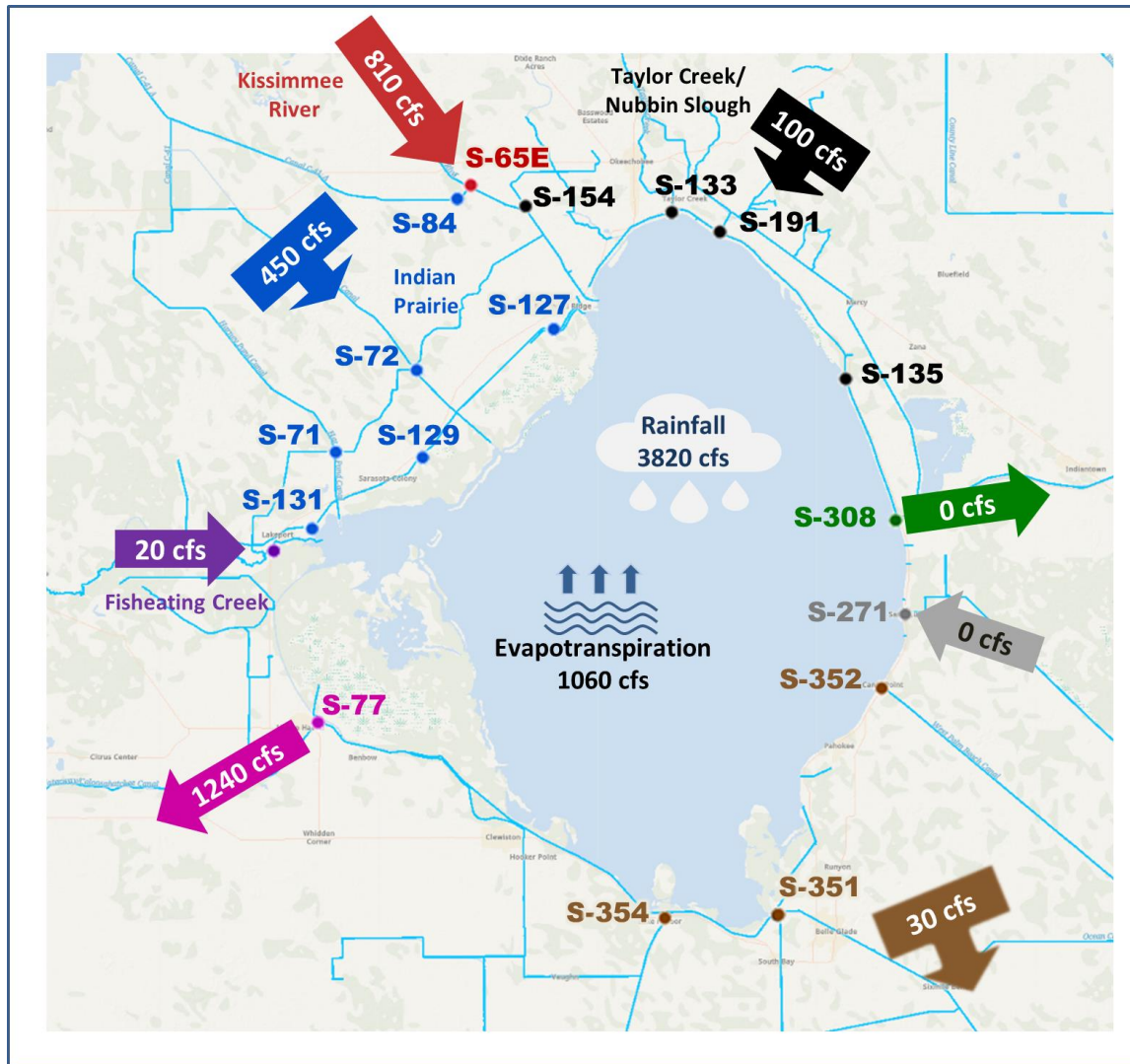
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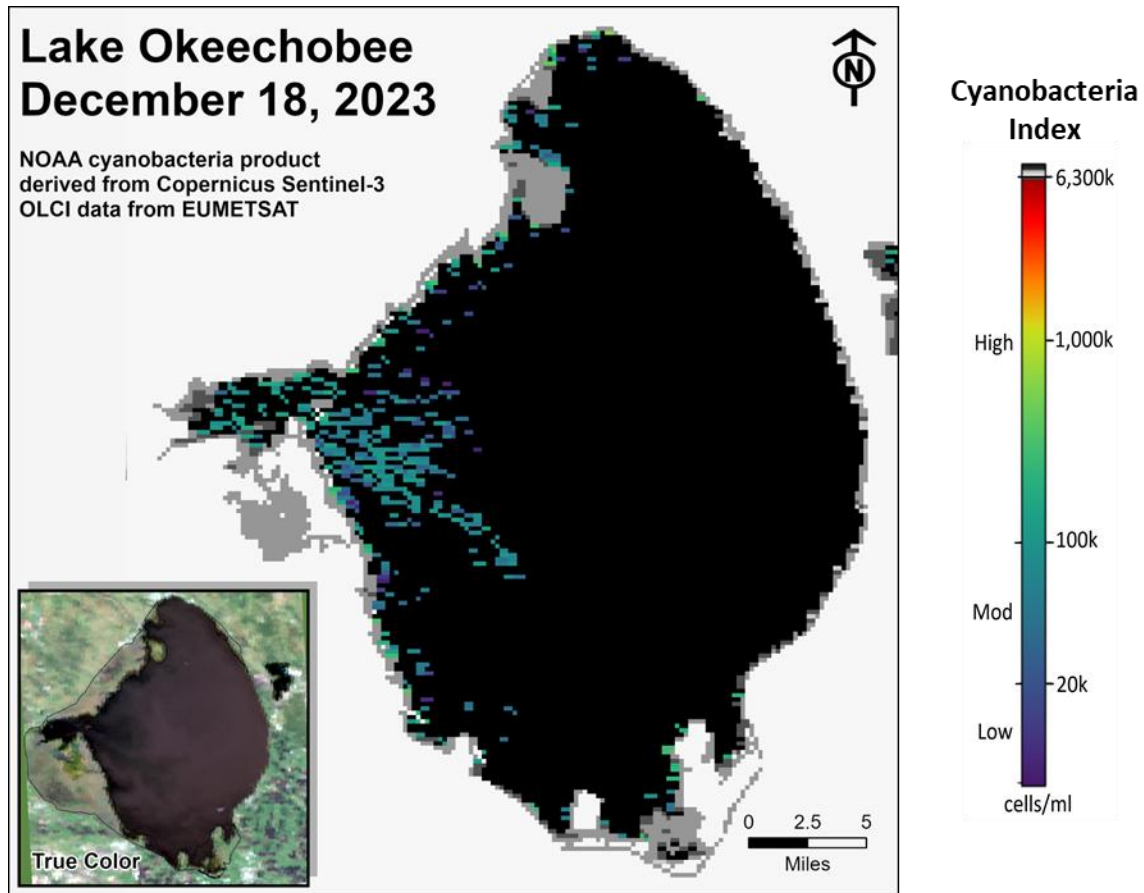




**Figure LO-4.** Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows 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 11 -17, 2023.



**Figure LO-6.** Cyanobacteria bloom index level on December 18, 2023, 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 860 cfs (**Figures ES-1 and ES-2**), and the previous 30-day mean inflow was 386 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 23.0. Salinity conditions in the middle estuary were estimated to be within the optimal range for adult eastern oysters (**Figure ES-4**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute (FWRI) was 0.4 spat/shell for November, which is a decrease from the previous month (**Figure ES-5**).

### ***Caloosahatchee River Estuary***

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 2,190 cfs (**Figures ES-6 and ES-7**), and the previous 30-day mean inflow was 2,049 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, surface salinities decreased at S-79, Ft. Myers, and Sanibel, and increased at the remaining sites in the estuary (**Table ES-2 and Figures ES-8 and ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Cape Coral and in the upper stressed range at Shell Point and Sanibel (**Figure ES-10**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute was 2.9 spat/shell at Iona Cove and 6.7 spat/shell at Bird Island for November, both an increase from rates recorded in October (**Figures ES-11 and ES-12**).

Surface salinity at Val I-75 was forecasted for the next two weeks using an autoregression model (Qiu and Wan, 2013<sup>1</sup>) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1,500 cfs, and a steady release at 2,000 cfs with estimated tidal basin inflows of 130 cfs. Model results from all scenarios predict daily salinity to be 2.0 or lower and the 30-day moving average surface salinity to be 1.5 or lower at Val I-75 at the end of the two-week period (**Table ES-3 and Figure ES-13**). This keeps predicted salinities in the upper estuary within the optimal salinity range (0-10) for tape grass.

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

### Red Tide

The Florida Fish and Wildlife Research Institute reported on December 15, 2023, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in any samples collected within the District region. On the east coast, red tide was not observed in samples from Palm Beach or Miami-Dade counties.

### Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are near normal. The LORS2008 release guidance suggests up to 3,000 cfs release at S-79 to the Caloosahatchee River Estuary and up to 1,170 cfs release at S-80 to the St. Lucie Estuary.

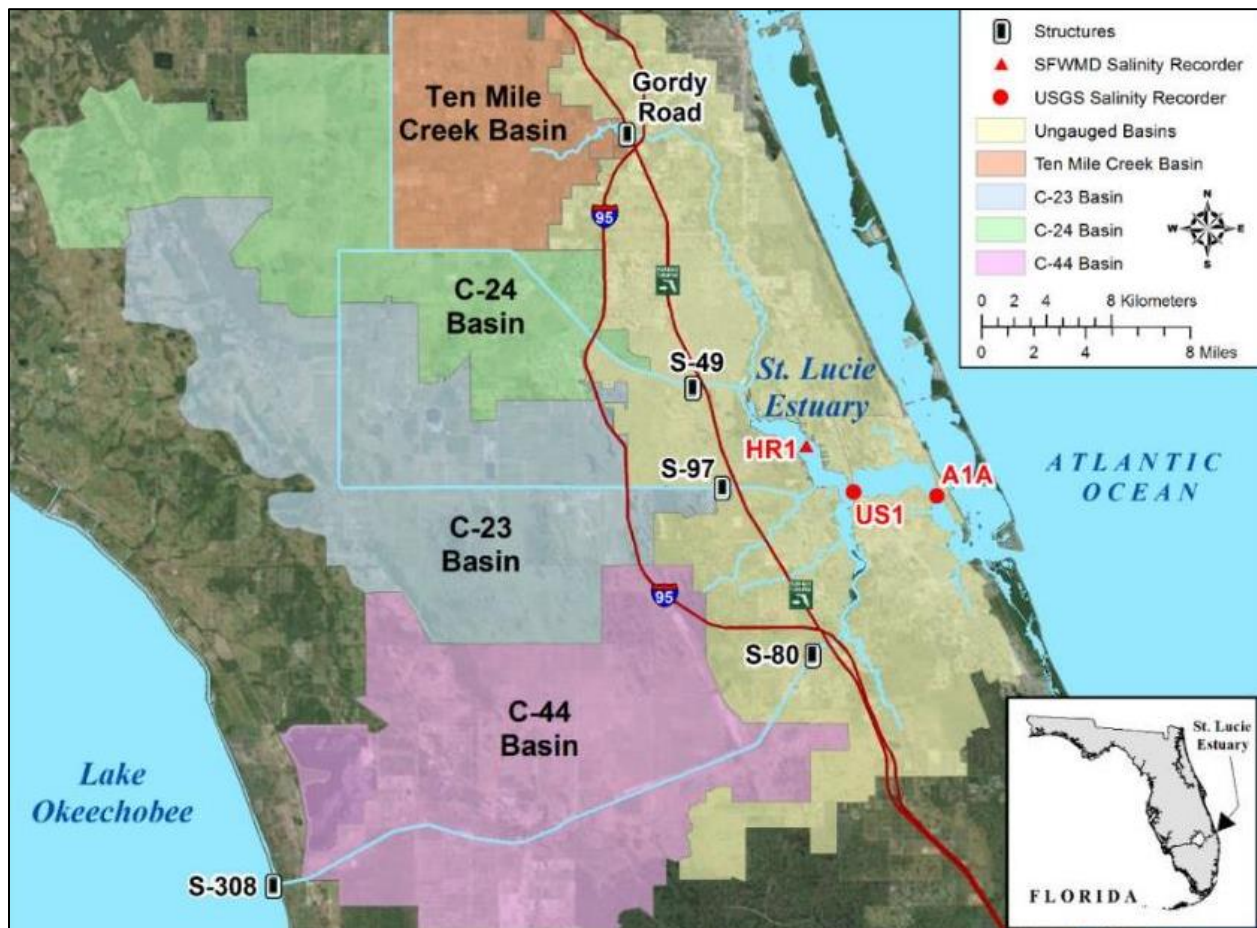
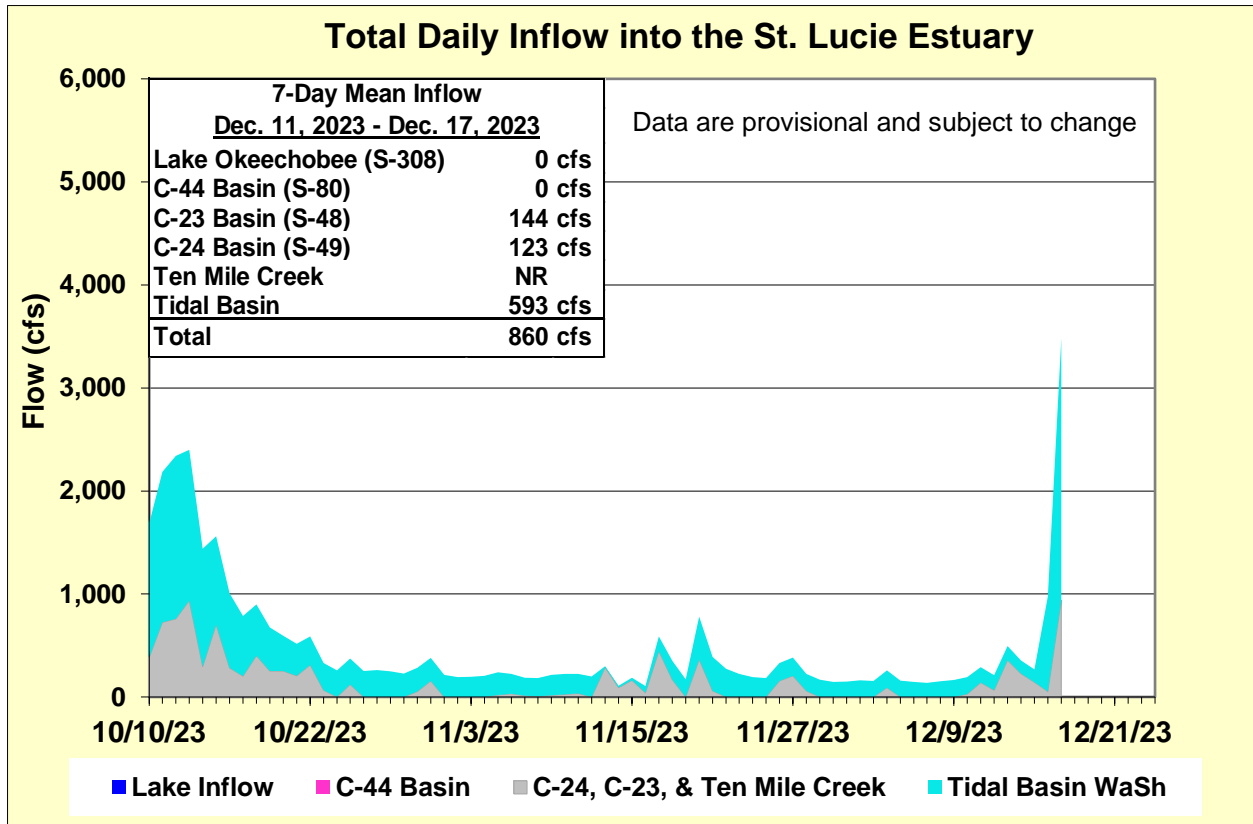


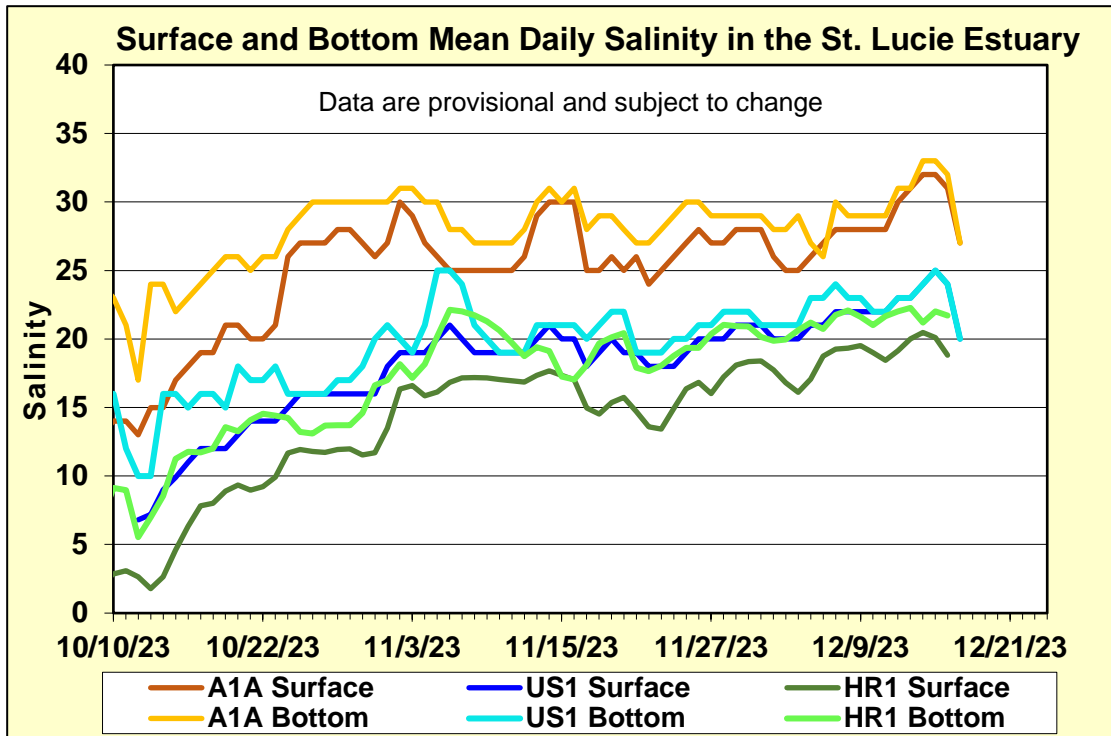
Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.



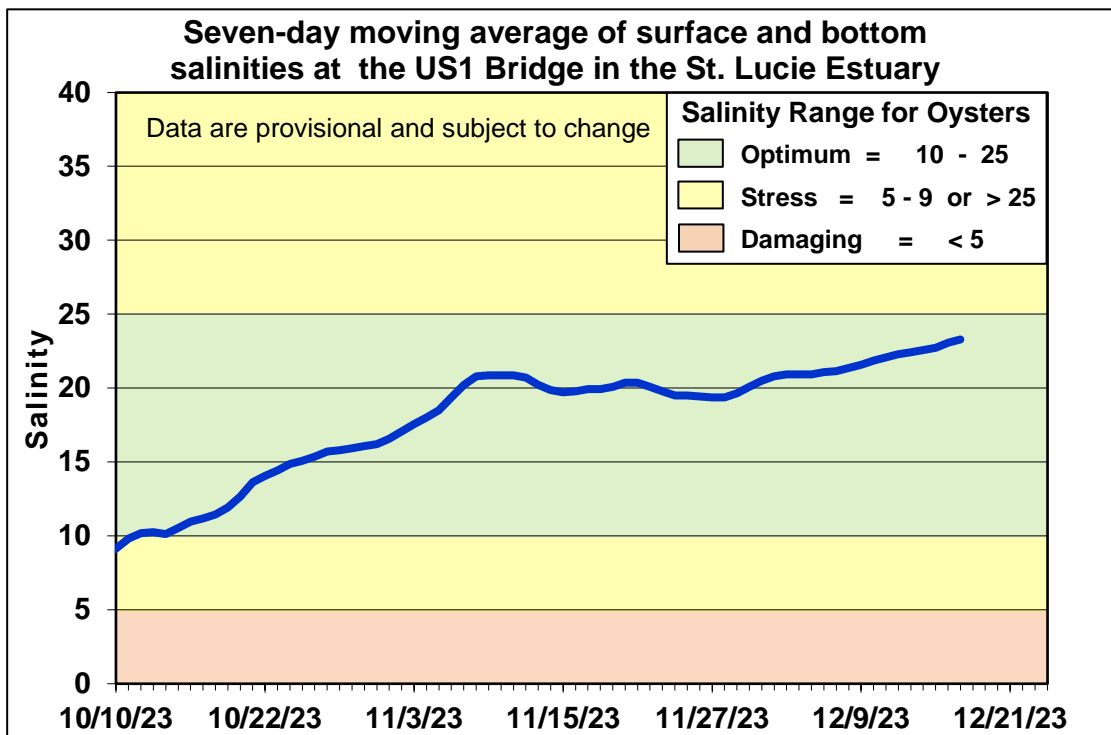
**Figure ES-2.** Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

**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 optimum salinity range for adult eastern oysters (*Crassostrea virginica*) in the estuary. Data are provisional.

Sampling Site	Surface	Bottom	Optimum Envelope
HR1 (North Fork)	<b>19.5</b> (18.4)	<b>21.8</b> (21.3)	10.0 – 25.0
US1 Bridge	<b>23.0</b> (21.4)	<b>23.0</b> (22.7)	10.0 – 25.0
A1A Bridge	<b>30.1</b> (27.1)	<b>30.9</b> (28.4)	10.0 – 25.0

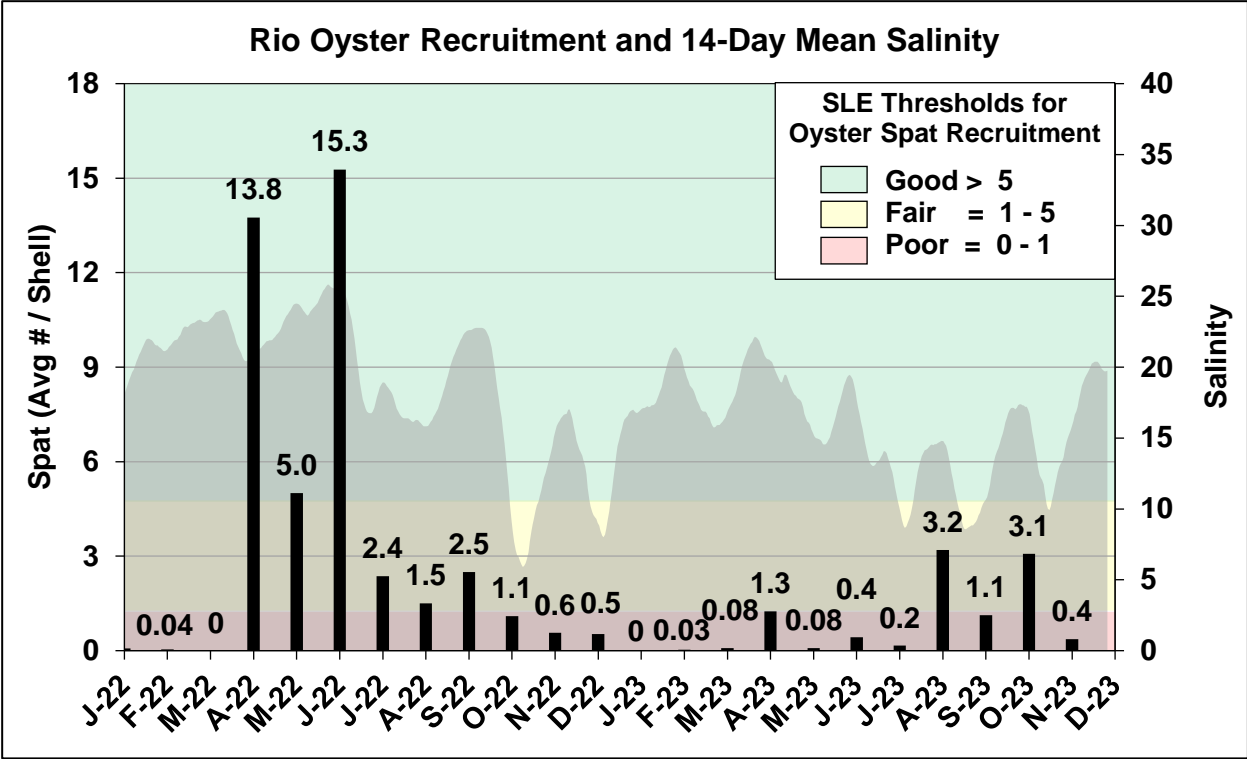


**Figure ES-3.** Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

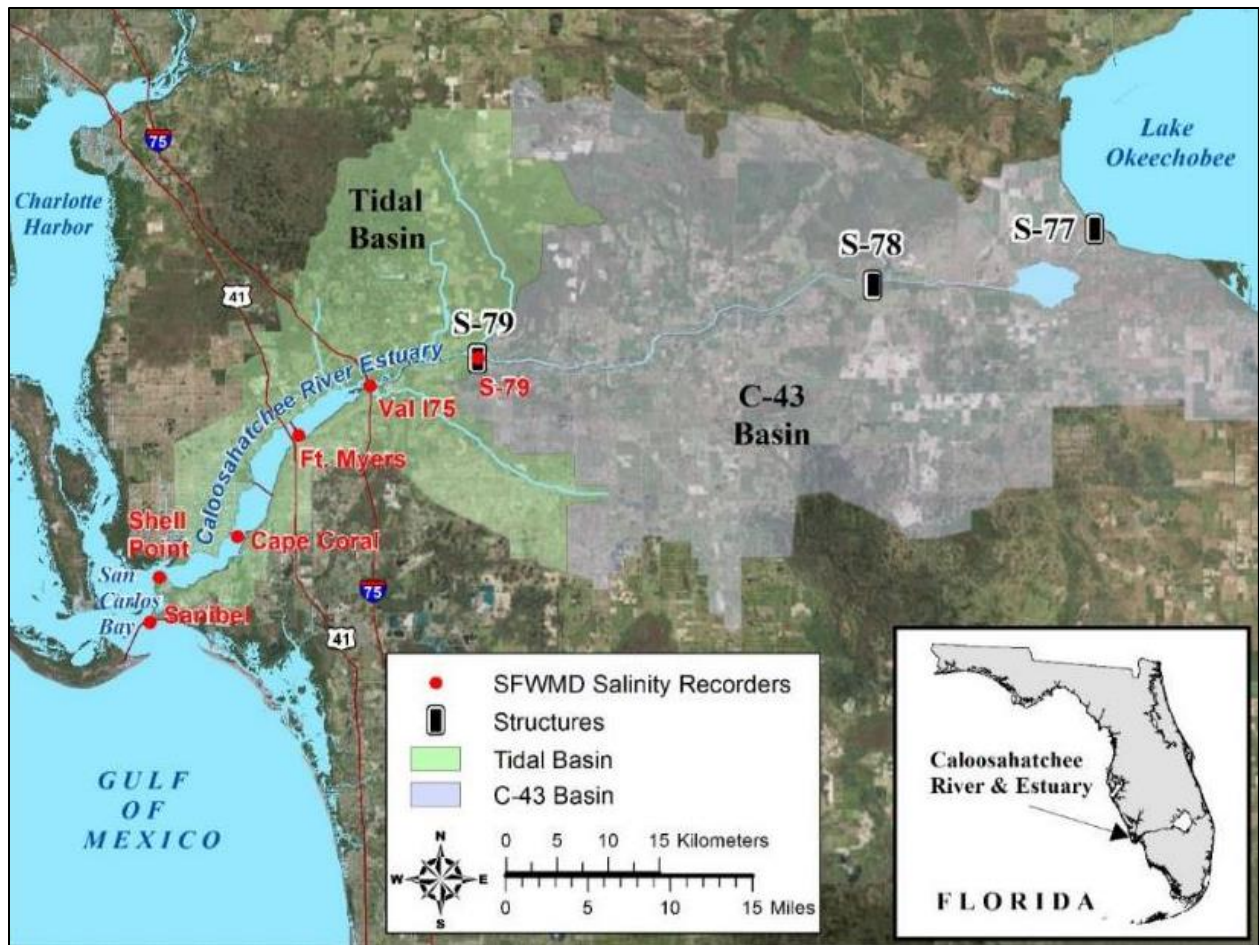


**Figure ES-4.** Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

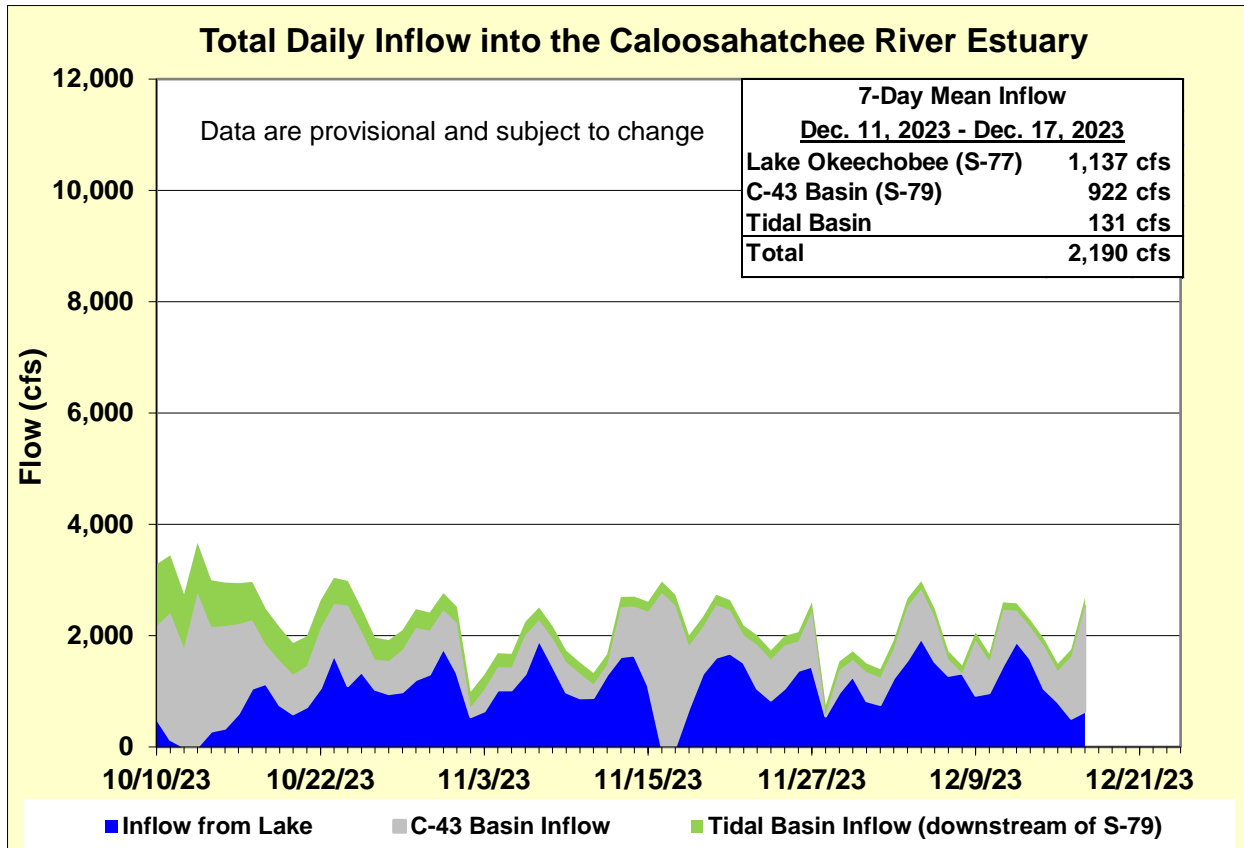




**Figure ES-5.** Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.



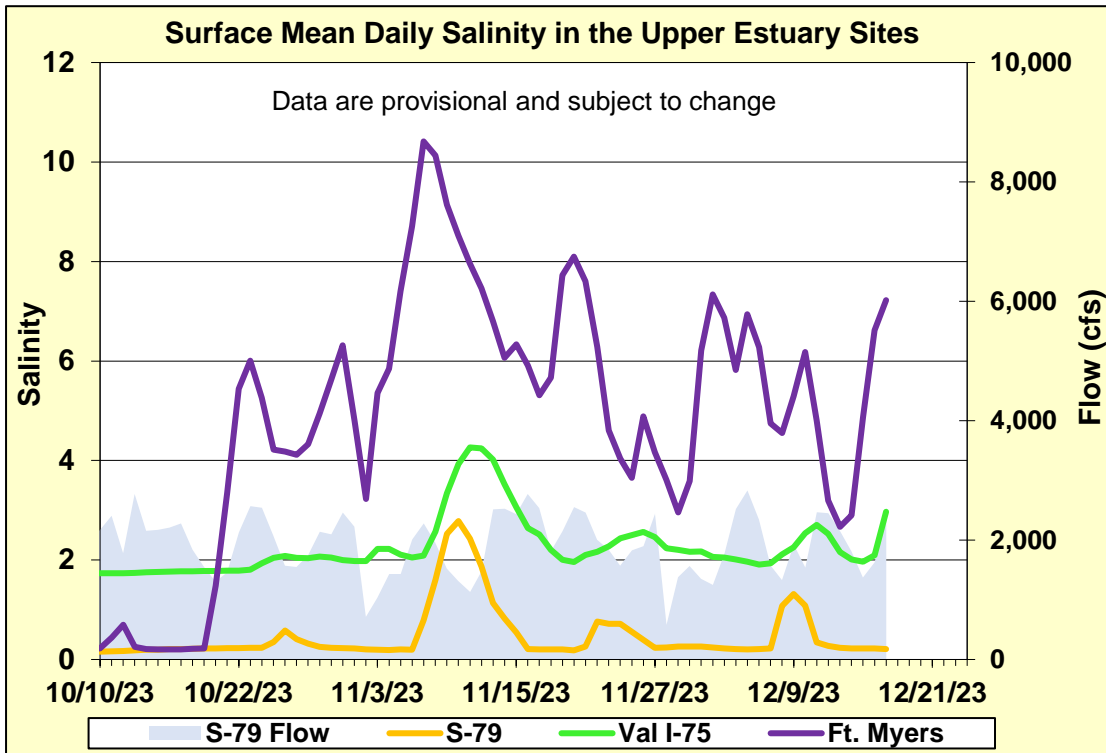
**Figure ES-6.** Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.



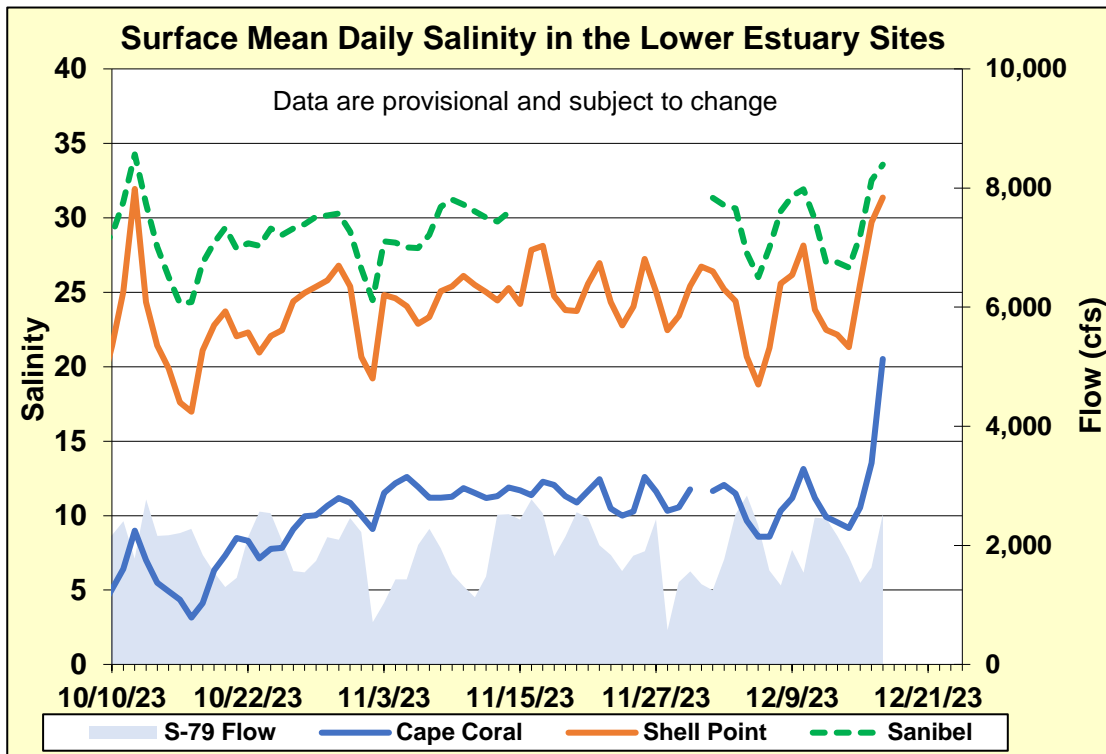
**Figure ES-7.** Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

**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 in the upper estuary sites is for the protection of tape grass and the envelope in the lower estuary is the optimum salinity range for adult eastern oysters (*Crassostrea virginica*). Data are provisional.

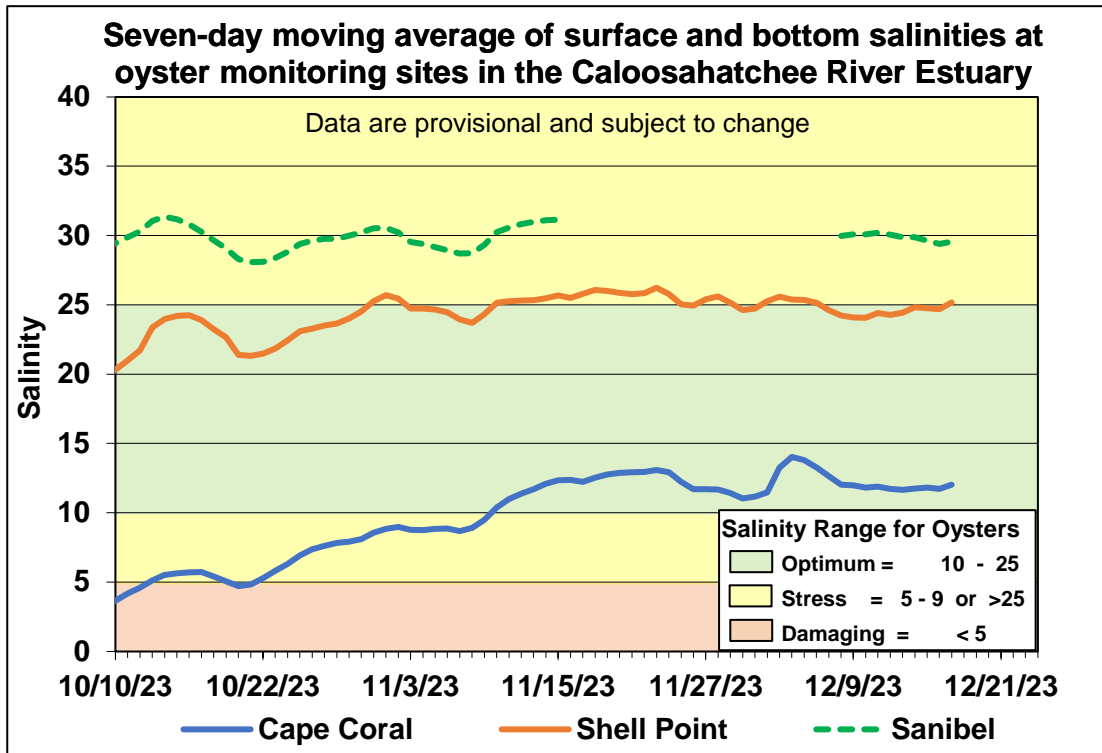
Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	<b>0.2</b> (0.6)	<b>0.2</b> (0.6)	0.0 – 10.0
Val I-75	<b>2.3</b> (2.1)	<b>2.5</b> (2.7)	0.0 – 10.0
Fort Myers Yacht Basin	<b>4.6</b> (5.7)	<b>5.6</b> (8.7)	0.0 – 10.0
Cape Coral	<b>12.1</b> (10.4)	<b>14.3</b> (13.3)	10.0 – 25.0
Shell Point	<b>25.2</b> (23.6)	<b>26.0</b> (25.2)	10.0 – 25.0
Sanibel	<b>29.3</b> (29.4)	<b>30.2</b> (30.9)	10.0 – 25.0



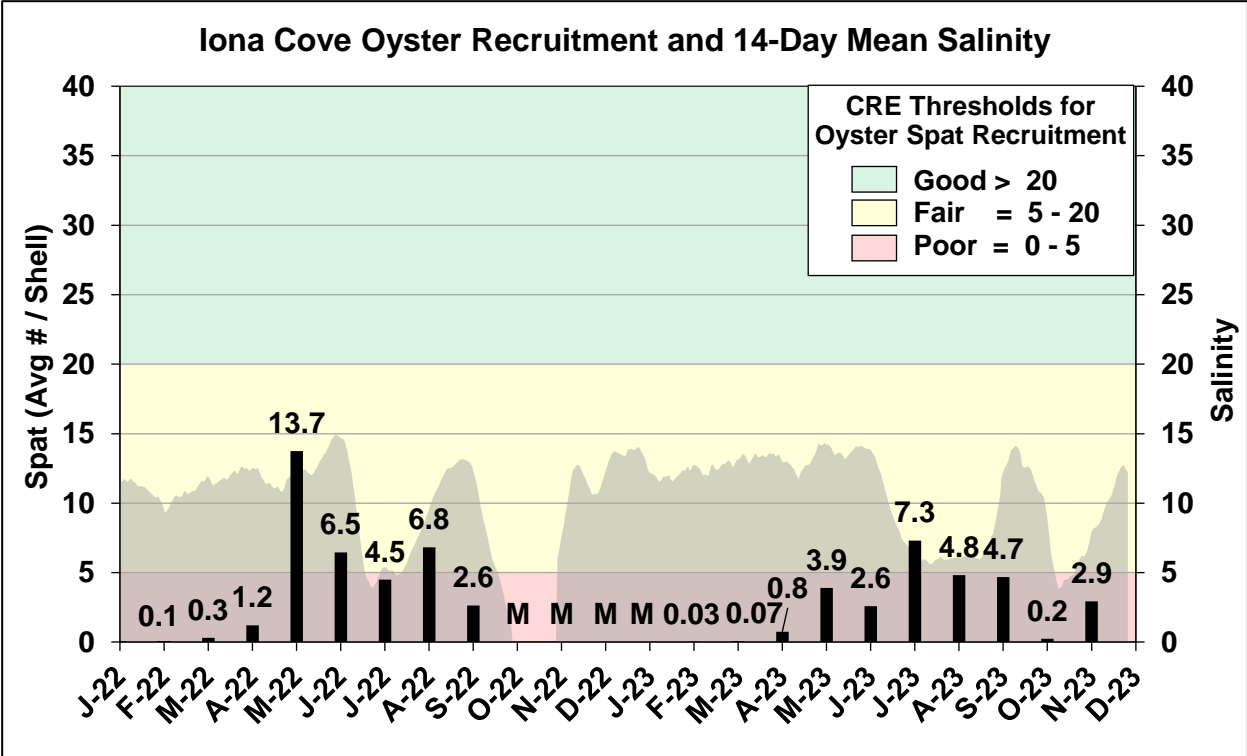
**Figure ES-8.** Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.



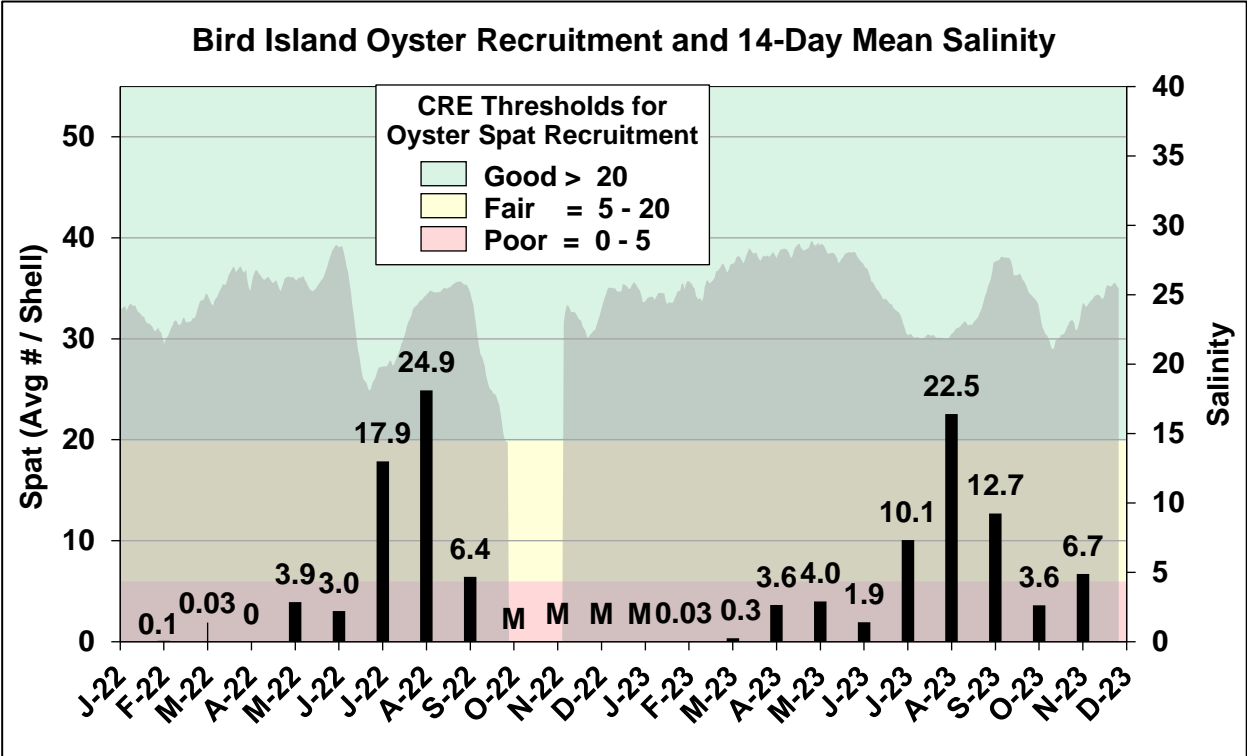
**Figure ES-9.** Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.



**Figure ES-10.** Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.



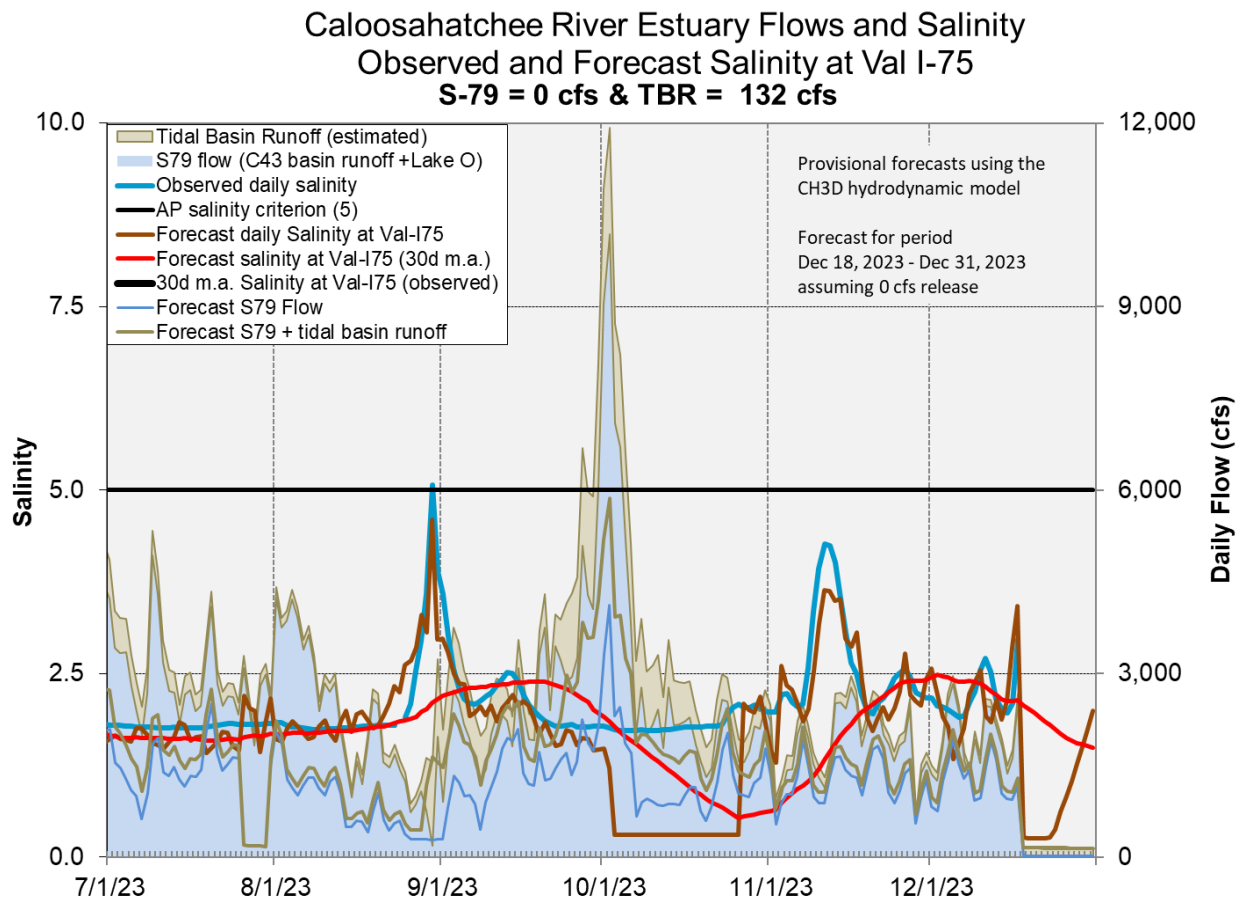
**Figure ES-11.** Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.



**Figure ES-12.** Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

**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	132	2.0	1.5
B	450	132	1.4	1.4
C	750	132	0.7	1.3
D	1,000	132	0.3	1.3
E	1,500	132	0.3	1.3
F	2,000	132	0.3	1.3



**Figure ES-13.** 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 post-construction vegetation grow in. Online treatment cells are at or above target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day phosphorus loading rate (PLR) for the Central and Eastern Flow-ways are high. (**Figure S-1**).

**STA-1W:** An operational restriction is in place in STA-1W Northern Flow-way for vegetation management activities. Treatment cells are near or above target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLR for the Eastern Flow-way is high, and the 365-day PLRs for the Western and Northern Flow-ways are below 1.0 g/m<sup>2</sup>/year (**Figure S-1**).

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

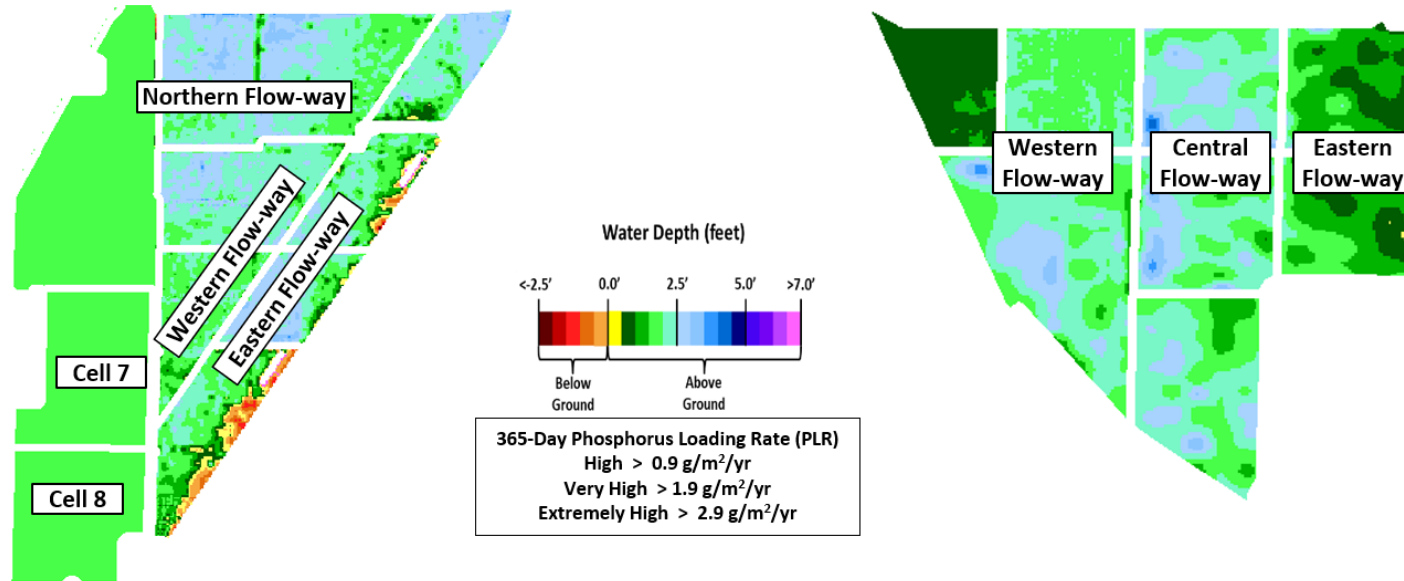
**STA-3/4:** An operational restriction is in place in the Eastern Flow-way for post-drawdown vegetation grow-in. Treatment cells are at or above target stage. Vegetation in the Central Flow-way is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for the Central and Western Flow-ways are below 1.0 g/m<sup>2</sup>/year (**Figure S-2**).

**STA-5/6:** An operational restriction is in place in Flow-way 4 for vegetation management (prescribed burn). Treatment cells are near or above target stage. All treatment cells have highly stressed or stressed vegetation conditions except Flow-ways 7 which is healthy. The 365-day PLRs for Flow-ways 1, 4, 6, 7, and 8 are below 1.0 g/m<sup>2</sup>/year, and the 365-day PLRs for Flow-ways 2, 3, and 5 are high. (**Figure S-3**).

For definitions on STA operational language see glossary following figures.



## Eastern Flow Path Weekly Status Report – 12/11/2023 through 12/17/2023

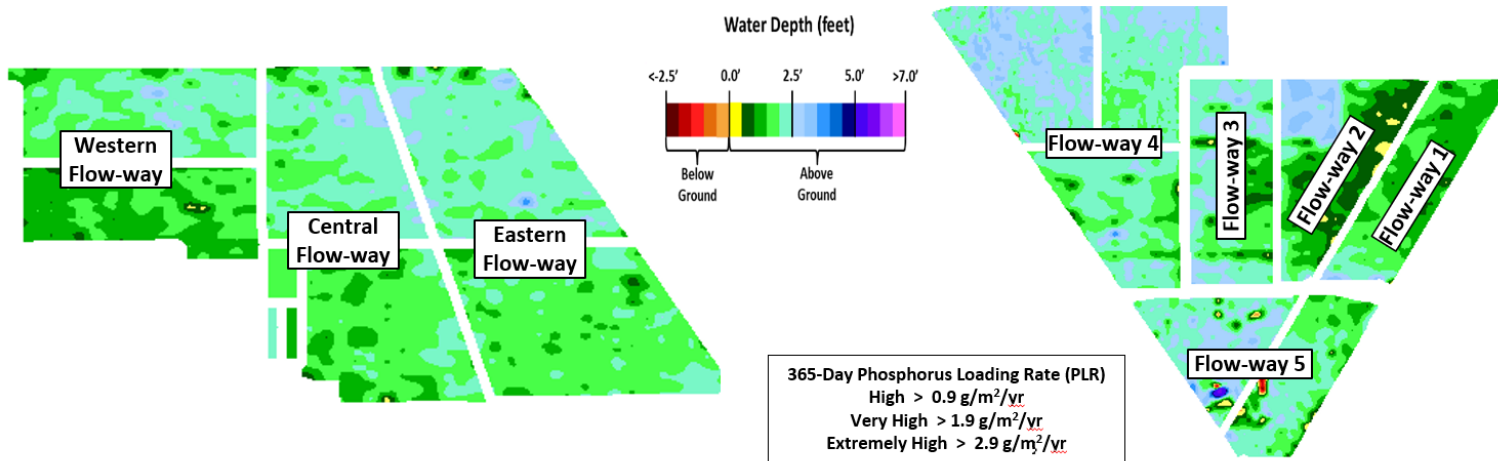


STA-1W	Flow-way Status
Western	<ul style="list-style-type: none"> <li>• High 365-day PLR</li> <li>• Highly stressed vegetation conditions</li> </ul>
Eastern	<ul style="list-style-type: none"> <li>• High 365-day PLR</li> <li>• Highly stressed vegetation conditions</li> </ul>
Northern	<ul style="list-style-type: none"> <li>• Highly stressed vegetation conditions</li> <li>• Planting emergent vegetation</li> </ul>
Cell 7	<ul style="list-style-type: none"> <li>• Stressed vegetation conditions</li> </ul>
Cell 8	<ul style="list-style-type: none"> <li>• Construction activities</li> </ul>

STA-1E	Flow-way Status
Western	<ul style="list-style-type: none"> <li>• Offline for post-construction vegetation grow-in</li> </ul>
Central	<ul style="list-style-type: none"> <li>• High 365-day PLR</li> <li>• Highly stressed vegetation conditions</li> </ul>
Eastern	<ul style="list-style-type: none"> <li>• High 365-day PLR</li> <li>• Stressed vegetation conditions</li> </ul>

**Figure S-1.** Eastern Flow Path Weekly Status Report

## Central Flow Path Weekly Status Report – 12/11/2023 through 12/17/2023

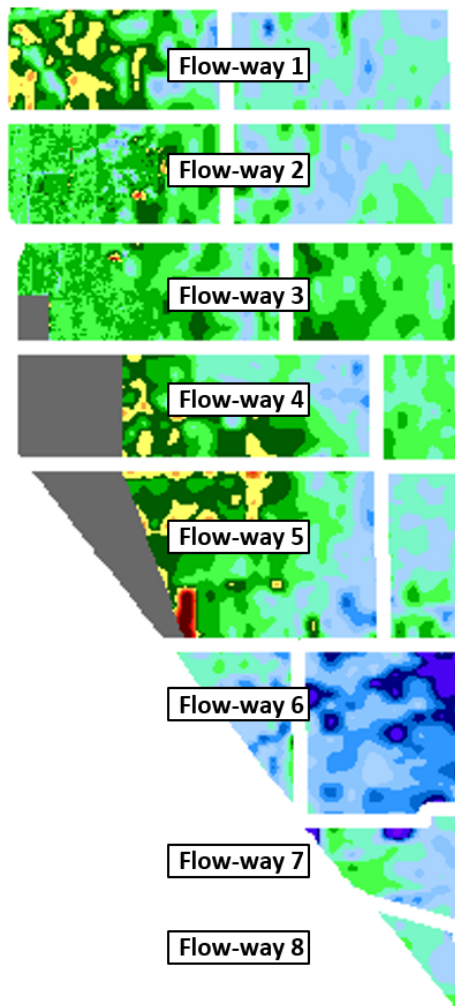


STA-3/4	Flow-way Status
Western	<ul style="list-style-type: none"> <li>Stressed vegetation conditions</li> </ul>
Central	<ul style="list-style-type: none"> <li>Highly stressed vegetation conditions</li> <li>Removal of floating tussocks</li> </ul>
Eastern	<ul style="list-style-type: none"> <li>Post-drawdown vegetation grow-in</li> </ul>

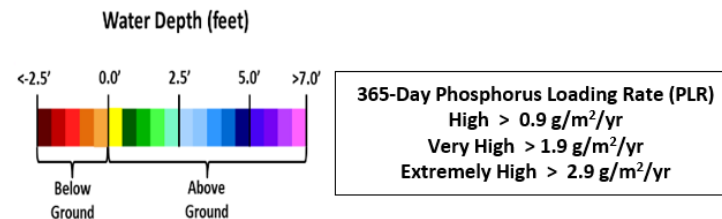
STA-2	Flow-way Status
Flow-way 1	<ul style="list-style-type: none"> <li>High 365-day PLR</li> <li>Stressed vegetation conditions</li> </ul>
Flow-way 2	<ul style="list-style-type: none"> <li>Post-construction vegetation grow-in</li> <li>Planting emergent vegetation</li> </ul>
Flow-way 3	<ul style="list-style-type: none"> <li>Stressed vegetation conditions</li> </ul>
Flow-way 4	<ul style="list-style-type: none"> <li>Planting emergent vegetation</li> <li>Nuisance vegetation control</li> <li>Highly stressed vegetation conditions</li> </ul>
Flow-way 5	<ul style="list-style-type: none"> <li>Highly stressed vegetation conditions</li> </ul>

**Figure S-2.** Central Flow Path Weekly Status Report

## Western Flow Path Weekly Status Report – 12/11/2023 through 12/17/2023



STA-5/6	Flow-way Status
Flow-way 1	<ul style="list-style-type: none"> <li>Highly stressed vegetation conditions</li> </ul>
Flow-way 2	<ul style="list-style-type: none"> <li>Highly stressed vegetation conditions</li> <li>High 365-day PLR</li> </ul>
Flow-way 3	<ul style="list-style-type: none"> <li>Highly stressed vegetation conditions</li> <li>High 365-day PLR</li> </ul>
Flow-way 4	<ul style="list-style-type: none"> <li>Highly stressed vegetation conditions</li> <li>Vegetation management (prescribed burn)</li> </ul>
Flow-way 5	<ul style="list-style-type: none"> <li>Highly stressed vegetation conditions</li> <li>High 365-day PLR</li> </ul>
Flow-way 6	<ul style="list-style-type: none"> <li>Highly stressed vegetation conditions</li> </ul>
Flow-way 7	
Flow-way 8	<ul style="list-style-type: none"> <li>Stressed vegetation conditions</li> </ul>



**Figure S-3.** Western Flow Path Weekly Status Report

## 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***

Increased rainfall compared to the previous week but stage change ascension was relatively moderate. WCA-1: Stage rose sharply last week within the Refuge going above the falling Zone A1 regulation line, stage on Monday at the 1-8C gauge was 0.35 feet above that line. WCA-2A: Stage recession at the 2-17 trended along with the falling schedule last week. The average on Sunday was 1.44 feet above the falling regulation line. WCA-3A: The 3-Gauge average stage trended away from schedule late last week. The average stage on Monday was 0.30 feet above the flat Zone A regulation line. WCA-3A North: Stage at Gauge 62 (NW corner) rose to the Upper schedule late last week, average on Monday was 11.68 at the schedule line. See figures **EV-1** through **EV-4** (due to data exchange issues the figures for 2A and Gauge 62 did not update correctly).

### ***Water Depths***

The SFWDAT tool illustrates very similar inundation patterns as a month ago in WCA-1 and WCA-2A, while depths and the spatial extent of ponded conditions in the ponded southern portions of WCA-3A have lessened. Hydrologic connectivity remains robust within all the major sloughs of ENP, although depths have decreased compared to a month ago. WDAT water depth predictions for 12/17/23 are somewhat drier compared to one month ago across most of the EPA, with WCA-1 the exception. Looking back a year ago, current conditions are somewhat deeper across most the EPA most significantly in northwestern WCA-3A, with WCA-1 again the exception (**Figure EV-5** and **Figure EV-6**).

Comparing current conditions to the 20-year average on December 17th: Above average depths conditions remain across most of the EPA. Depths remain nearer to average in southwestern WCA-3A, and WCA-3B remains in the 90th percentile (**Figure EV-7**).

### ***Taylor Slough and Florida Bay***

Total weekly rainfall averaged 4.03 inches in Taylor Slough and Florida Bay over the past week (Monday-Sunday) based on the 18 gauges used for this report. Total rainfall ranged from 0.0 inches at Joe Bay (JB) to 7.57 inches at Long Sound (LS), both in the eastern nearshore region. All stages increased across Taylor Slough, with an average increase of +0.13 feet. Stage changes ranged from +0.09 feet at P33 in the north, to +0.17 feet at P37 in the southern slough (**Figure EV-8** and **Figure EV-9**). Taylor Slough water levels remain above the recent average for this time of year by +10.9 inches compared to before the Florida Bay initiative (starting in 2017), an increase of +1.7 inches relative to last week.

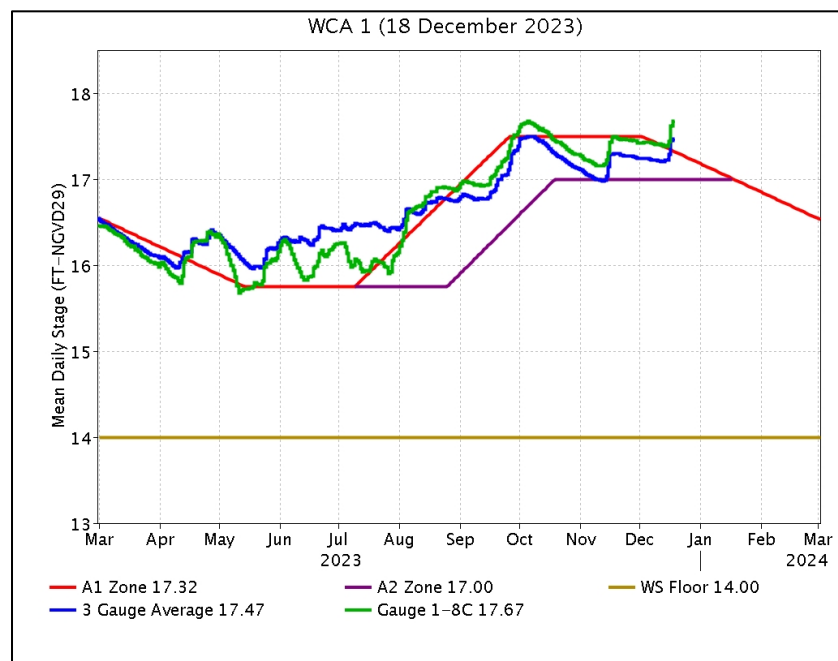
Average Florida Bay salinity was 19.5, an increase of +0.5 from last week. High tides, winds and heavy rain created variable salinity changes across sites. Changes ranged from -7.9 at Garfield Bight (GB) in the western nearshore region to +7.3 at Terrapin Bay (TB) in the central nearshore region (**Figure EV-8**). Salinities in all three regions are now below the 25<sup>th</sup> percentile (**Figure EV-10**). Average Florida Bay salinity remains below its recent average for this time of year by -4.5, a decrease of -1.3 from last week.

### Water Management Recommendations

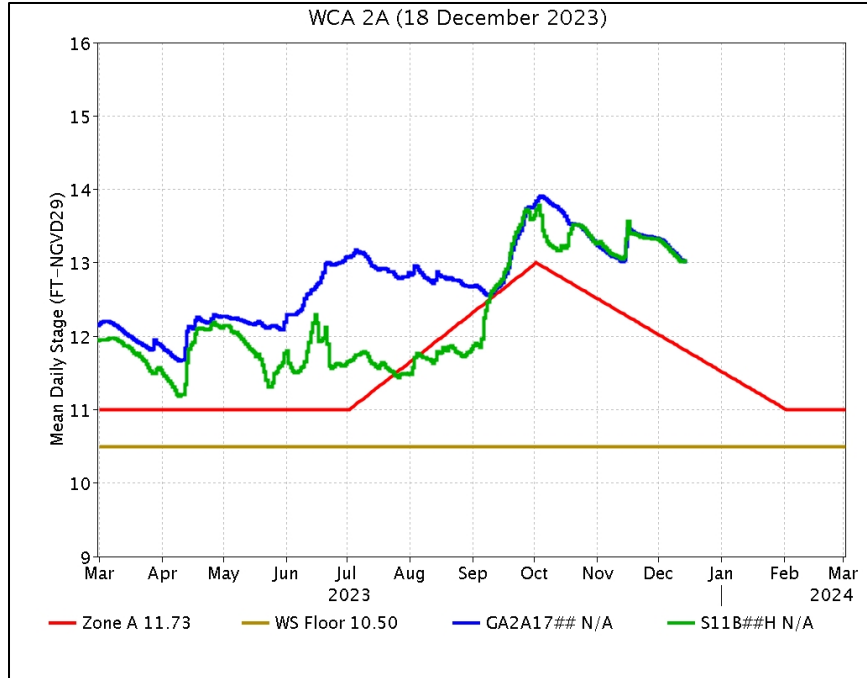
The ecology of WCA-3A and WCA-2A would continue to benefit from “slow” recession rates, as conserving depths in those regions could prove important in providing foraging habitat necessary for the upcoming wading bird nesting season (more important this year after two successive years of below average nesting). As conditions remain above the 90th percentile in NESRS, continuing strong positive TS creek flows to avoid salinity swings in the nearshore areas is showing to be ecologically beneficial. Individual regional recommendations can be found in **Table EV-2**.

**Table EV-2.** Previous week’s rainfall and water depth changes in Everglades basins.

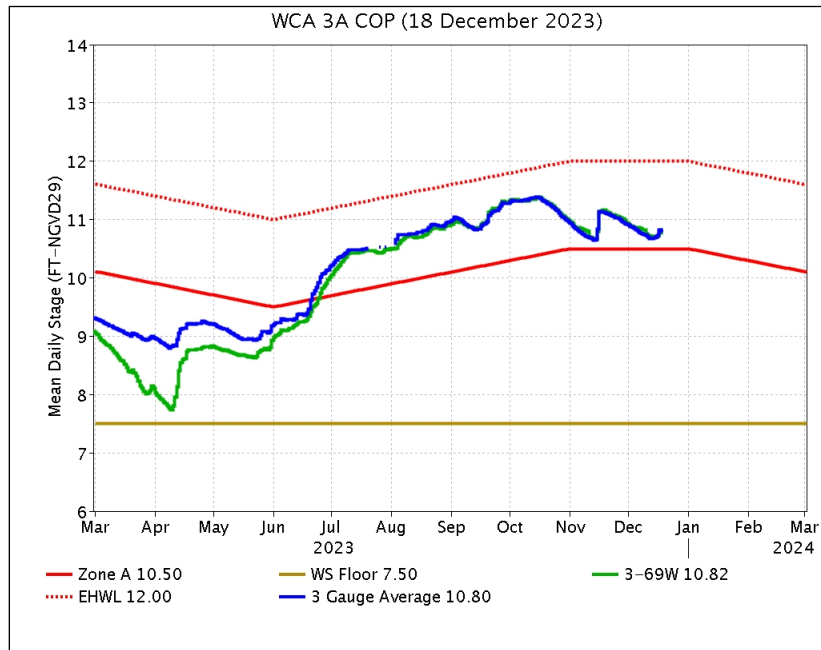
Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	2.98	+0.25
WCA-2A	2.69	+0.04
WCA-2B	2.51	+0.08
WCA-3A	1.92	+0.11
WCA-3B	1.84	+0.09
ENP	2.24	-0.08



**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, 3-69W) and regulation schedule.

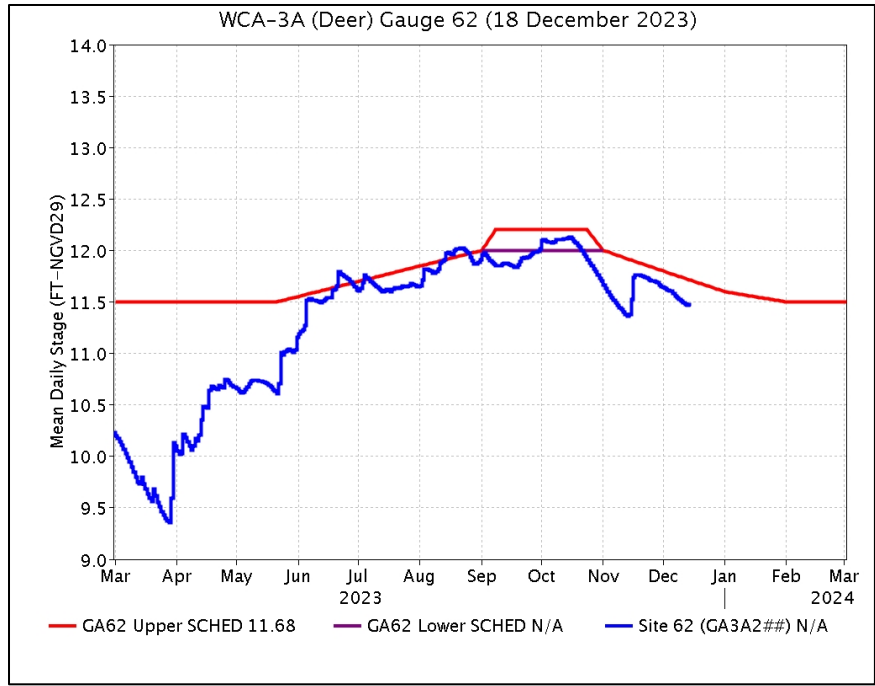


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and GA62 regulation schedule.

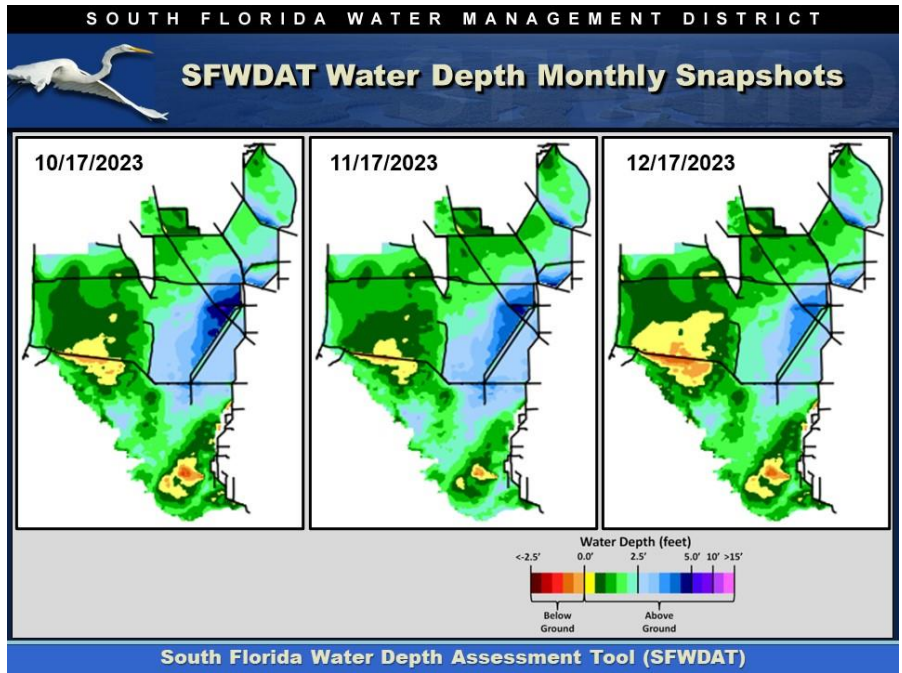
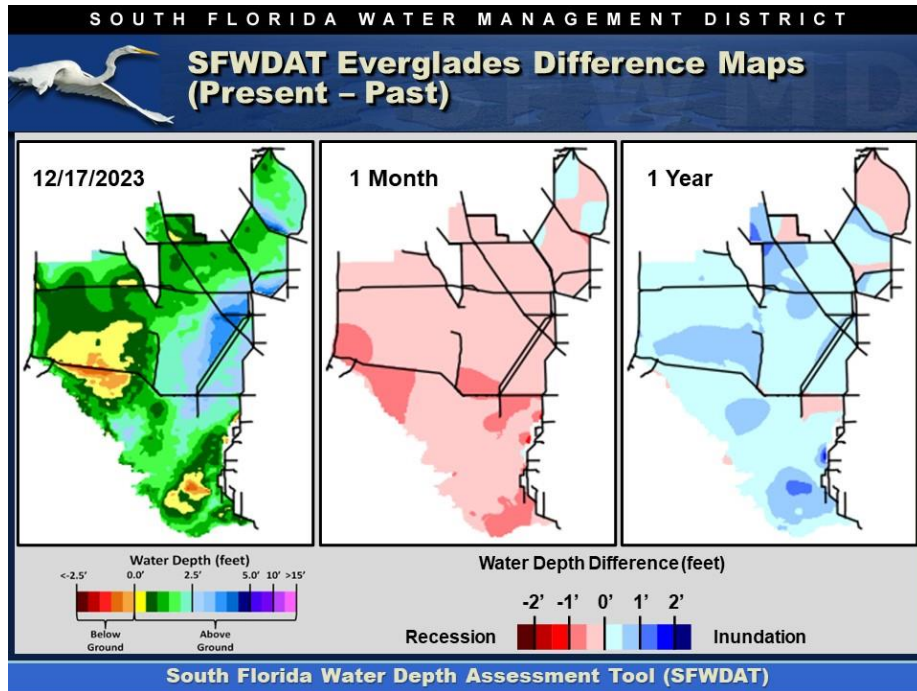
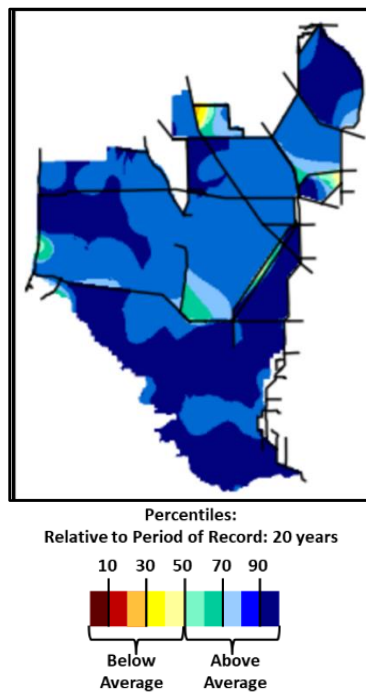


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

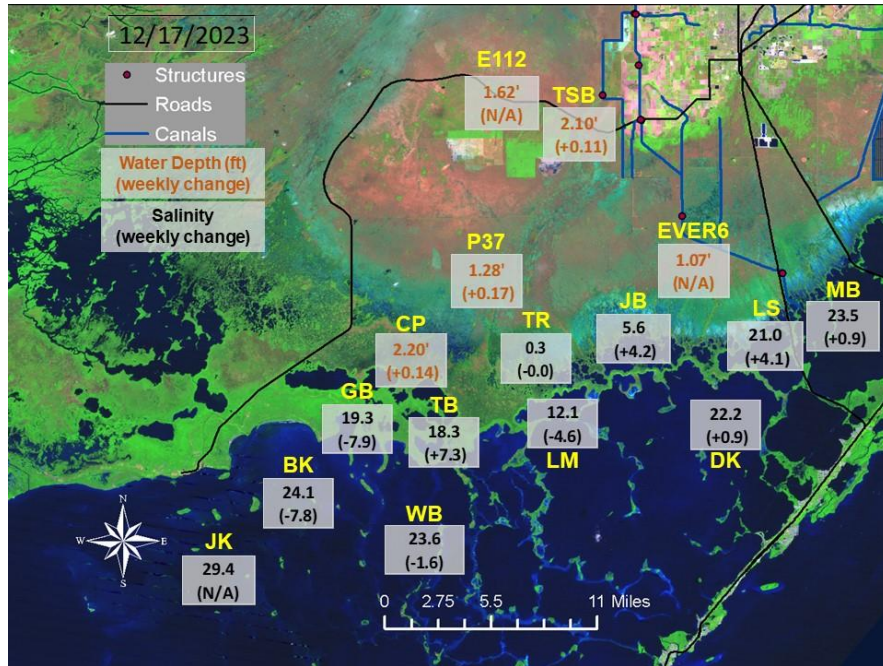




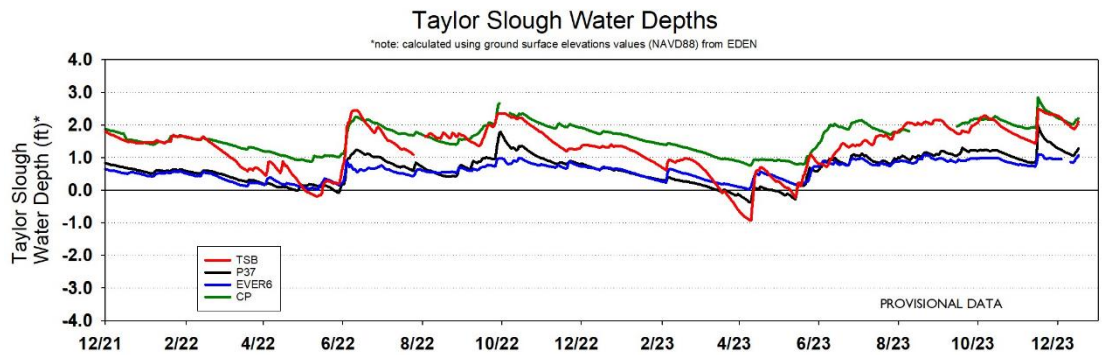
**Figure EV-6.** Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.



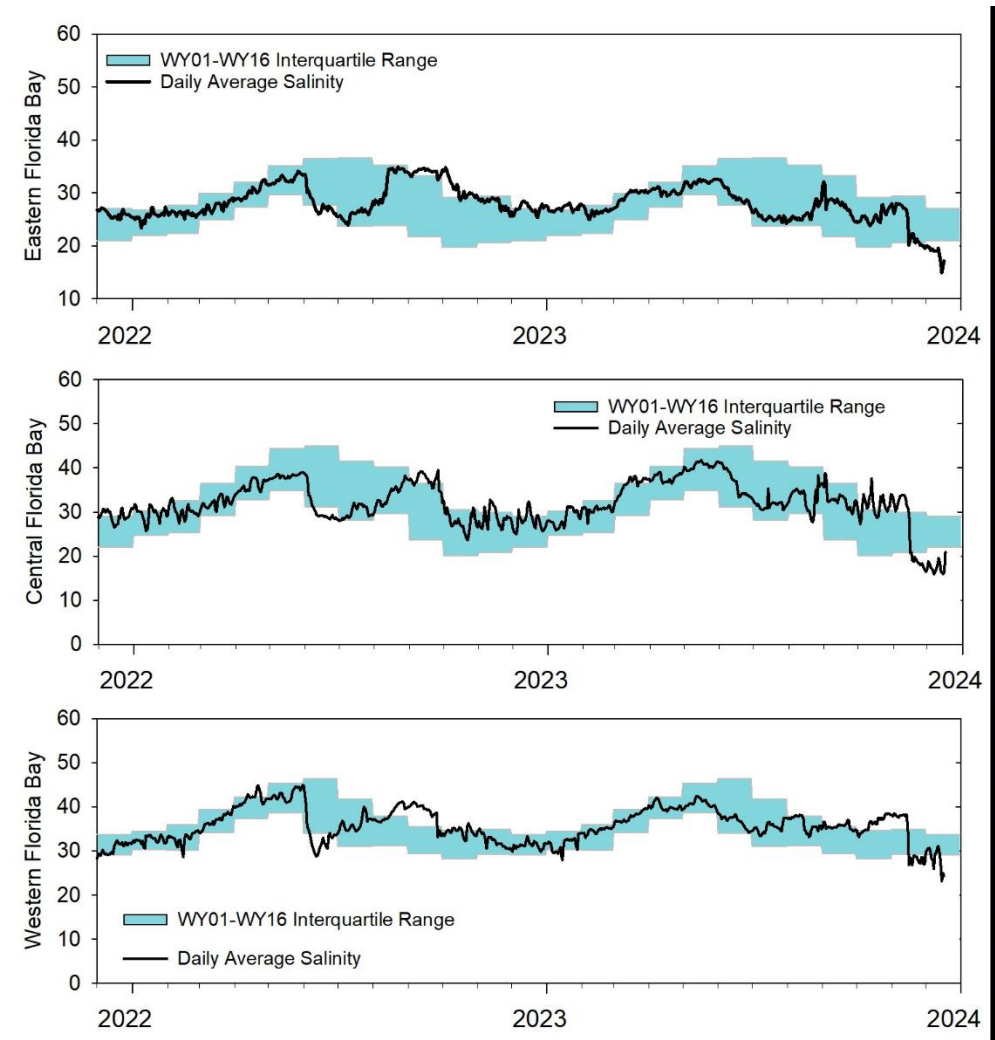
**Figure EV-7.** Present water depths (12/17/2023) compared to the day of year average over the previous 20 years.



**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.



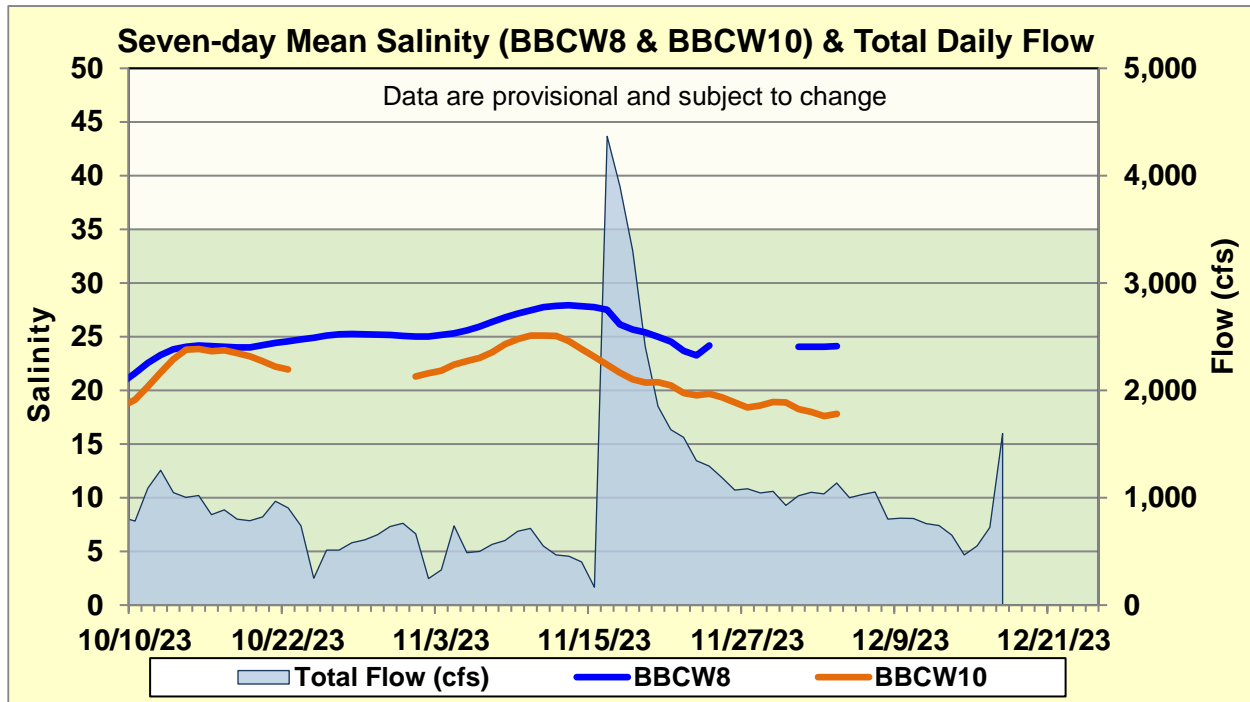
**Figure EV-10.** Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

<b>SFWMD Everglades Ecological Recommendations, December 19, 2023 (red is new)</b>			
	Weekly change	Recommendation	Reasons
<b>WCA-1</b>	Stage increased by 0.25'	Recession rate of less than 0.12' per week.	Protect within basin and downstream habitat and wildlife.
<b>WCA-2A</b>	Stage increased by 0.04'	Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife. Recent rapid stage change.
<b>WCA-2B</b>	Stage increased by 0.08'	Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife.
<b>WCA-3A NE</b>	Stage increased by 0.11'	Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat (peat soils) and wildlife (fish/crayfish reproduction, wading bird foraging). Recent rapid stage change.
<b>WCA-3A NW</b>	Stage increased by 0.15'	Recession rate of less than 0.05' per week.	
<b>Central WCA-3A S</b>	Stage increased by 0.06'	Recession rate of less than 0.05' per week.	
<b>Southern WCA-3A S</b>	Stage increased by 0.10'		
<b>WCA-3B</b>	Stage increased by 0.10'	Recession rate of less than 0.12' per week.	Protect within basin (sensitive tree islands) and downstream habitat and wildlife. Allow for flow through.
<b>ENP-SRS</b>	Stage decreased by 0.08'	Make discharges to ENP according to COP and TTF protocol while adaptively considering upstream and downstream ecological conditions.	Protect within basin and upstream habitat and wildlife (wading bird nesting).
<b>Taylor Slough</b>	Stage changes ranged from +0.09' to +0.11'	Move water southward as possible.	When available, provide freshwater to promote water movement.
<b>FB- Salinity</b>	Salinity changes ranged from -7.9 to +7.3	Move water southward as possible.	When available, provide freshwater to promote water movement.

## Biscayne Bay

As shown in **Figure BB-1**, mean total inflow to Biscayne Bay was 786 cfs, and the previous 30-day mean inflow was 1,168 cfs. The seven-day mean salinity was 24.0 at BBCW8 and 20.7 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data were provided by Biscayne National Park.



**Figure BB-1.** Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.