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 13, 2023

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Shower activity will increase along the lower east coast and Florida Keys early Wednesday morning as a cold front returns to the area. Northeasterly winds of 20-25 mph are likely Wednesday through Friday, with gusts as high as 40 mph possible along the immediate coast. These winds will intensify the surface and moisture convergence along the frontal boundary. In addition, the relatively cool air passing over the warm waters of the western Atlantic will create high instability. As a result, heavy east shower activity will be possible Wednesday through Friday, with the potential for 1” or more of area averaged rainfall each day. On Friday or Saturday, an upper-level disturbance over Texas will dig southward into the northern Gulf of Mexico, inducing the formation of an area of low pressure along the frontal boundary. The leading computer models all seem to agree that an area of low pressure will develop, but there is considerable uncertainty regarding the timing and location of this feature. Regardless, there is a growing signal for heavy, possibly extreme, rainfall on Saturday while the area of low pressure rapidly develops over the Gulf of Mexico and moves into Florida. For the 7-day period ending next Tuesday morning, much above average SFWMD total rainfall is expected.

Kissimmee

Releases were made from East Lake Toho and Lake Toho to keep lake stage from exceeding the regulation schedules due to rainfall. Weekly average discharge on December 10, 2023 was 800 cfs and 790 cfs at S-65 and S-65A, respectively. Mean weekly water depth on the Kissimmee River floodplain decreased by 0.05 feet to 0.16 feet over the week ending December 10, 2023. The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 7.9 mg/L last week to 8.7 mg/L for the week ending December 10, 2023, which is well above the potentially lethal and stressful levels for largemouth bass and other sensitive species.

Lake Okeechobee

Lake Okeechobee stage was 15.89 feet NGVD on December 10, 2023, which was 0.10 feet lower than the previous week and 0.11 feet lower than a month ago. Average daily

inflows (excluding rainfall) decreased from the previous week, going from 940 cfs to 900 cfs. Average daily outflows (excluding evapotranspiration) increased from the previous week, going from 1,420 cfs to 1,890 cfs. The first wading bird survey of the 2024 breeding season (conducted December 7, 2023) reported approximately 2,690 foraging wading birds on the Lake. The cyanobacteria index level was low and patchy along the western shoreline of the Lake according to the December 10, 2023 satellite image from NOAA's Harmful Algal Bloom Monitoring System**.**

Estuaries

Total inflow to the St. Lucie Estuary averaged 180 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 2,150 cfs over the past week with 1,370 cfs coming from Lake Okeechobee. Mean surface salinities increased at S-79 and Ft. Myers and decreased 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 Shell Point (10-25), and in the upper stressed range at Sanibel (>25).

Stormwater Treatment Areas

For the week ending Sunday, December 10, 2023, no 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 7,300 ac-feet. The total amount of inflows to the STAs in WY2024 is approximately 1,093,000 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.

Everglades

Stages decreased across Taylor Slough last week but remain well above the historical average. Salinity decreased on average in Florida Bay last week and remains below the historical average in all regions. Last week's stage changes were elevated in WCA-3A and –2A but remained moderate in WCA-1. While deeper than average conditions in central and southern WCA-3A do have ecological tradeoffs, conditions continue to suggest hope for an improved upcoming Wood Stork nesting season if recession rates are such that water remains in the sloughs of WCA-3A at the end of the upcoming wading bird nesting season.

Biscayne Bay

Total inflow to Biscayne Bay averaged 950 cfs and the previous 30-day mean inflow averaged 1,330 cfs. The seven-day mean salinity was 24.3 at BBCW8 and 18.3 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 10, 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 51.6 feet NGVD (0.9 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1**, **Figures KB-1-3**).

Lower Kissimmee

For the week ending December 10, 2023, mean weekly discharge was 800 cfs and 790 cfs at S-65 and S-65A, respectively. Mean weekly discharge from the Kissimmee River was 800 cfs at S-65D and 790 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 46.3 feet NGVD at S-65A and 26.6 feet NGVD at S-65D on December 10, 2023, a reduction of about 0.2 feet at S-65D. Mean weekly river channel stage decreased by 0.1 feet to 35.5 feet NGVD over the week ending on December 10, 2023 (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain decreased by 0.05 feet to 0.16 feet over the week ending December 10, 2023 (**Table KB-2**, **Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 7.9 mg/L the previous week to 8.7 mg/L for the week ending December 10, 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)[a]	Schedule Type[b]	Sunday Schedule Stage (feet NGVD)	Sunday Departure from Regulation (feet)	
							12/10/23	*12/3/23*
Lakes Hart and Mary Jane	S-62	LKMJ	150	60.9	R	61.0	-0.1	-0.1
Lakes Myrtle, Preston and Joel	S-57	S-57	110	61.8	R	61.9	-0.1	0.3
Alligator Chain	S-60	ALLI	87	63.9	R	64.0	-0.1	0.0
Lake Gentry	S-63	LKGT	130	61.4	R	61.5	-0.1	0.0
East Lake Toho	S-59	TOHOE	320	57.8	R	58.0	-0.2	0.0
Lake Toho	S-61	TOHOW S-61	540	54.9	R	55.0	-0.1	0.0
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	800	51.6	R	52.5	-0.9	-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.

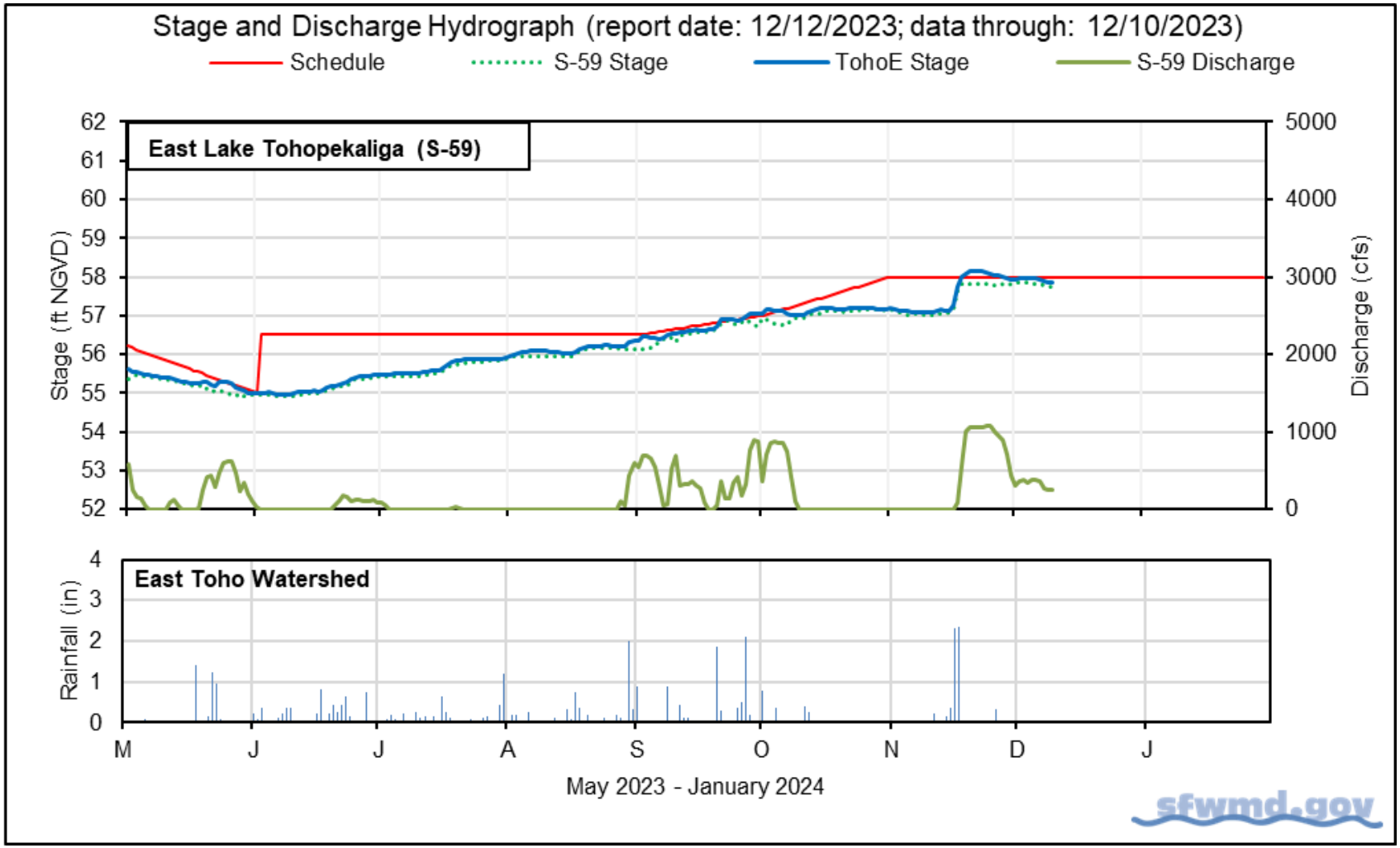


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

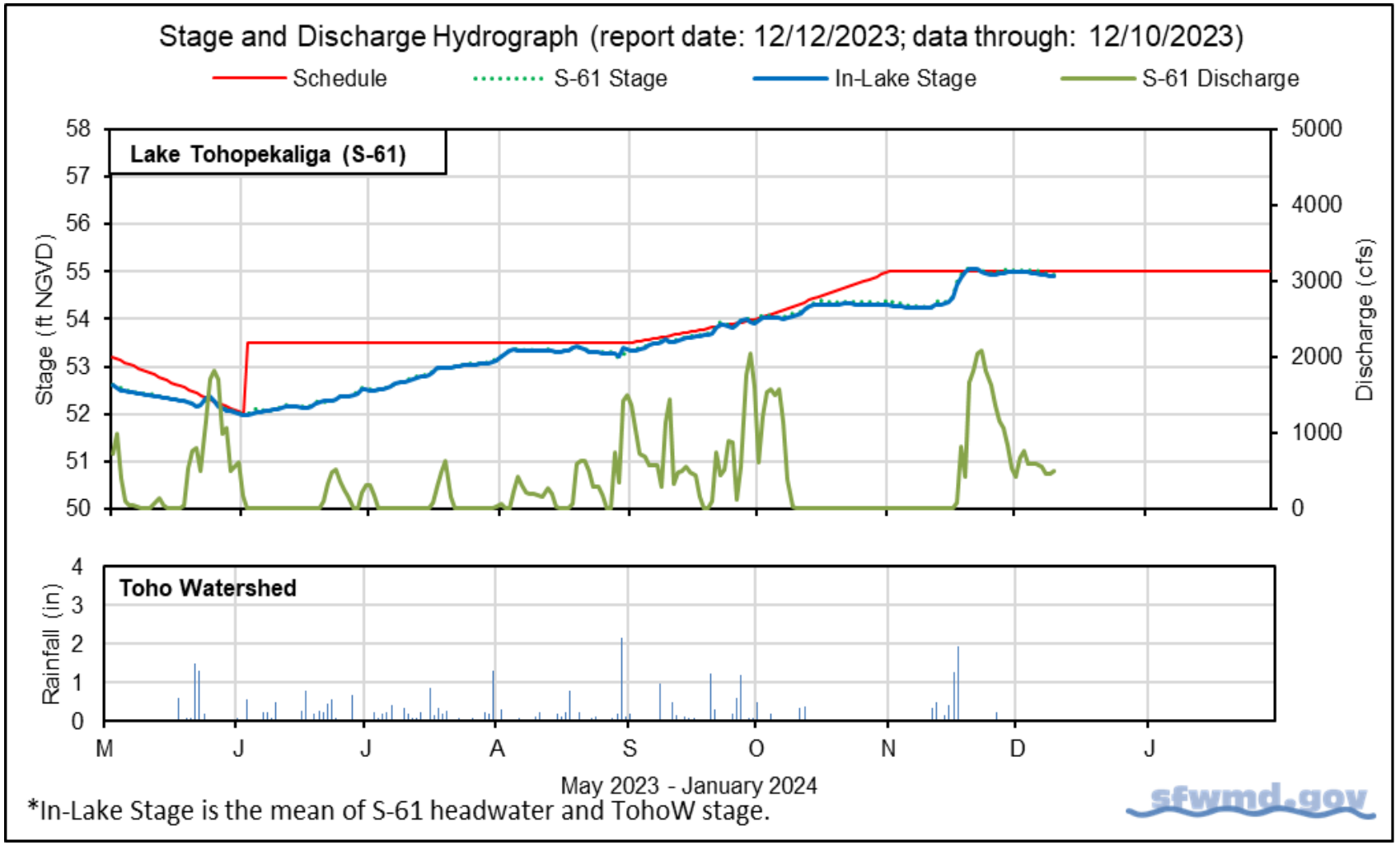


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

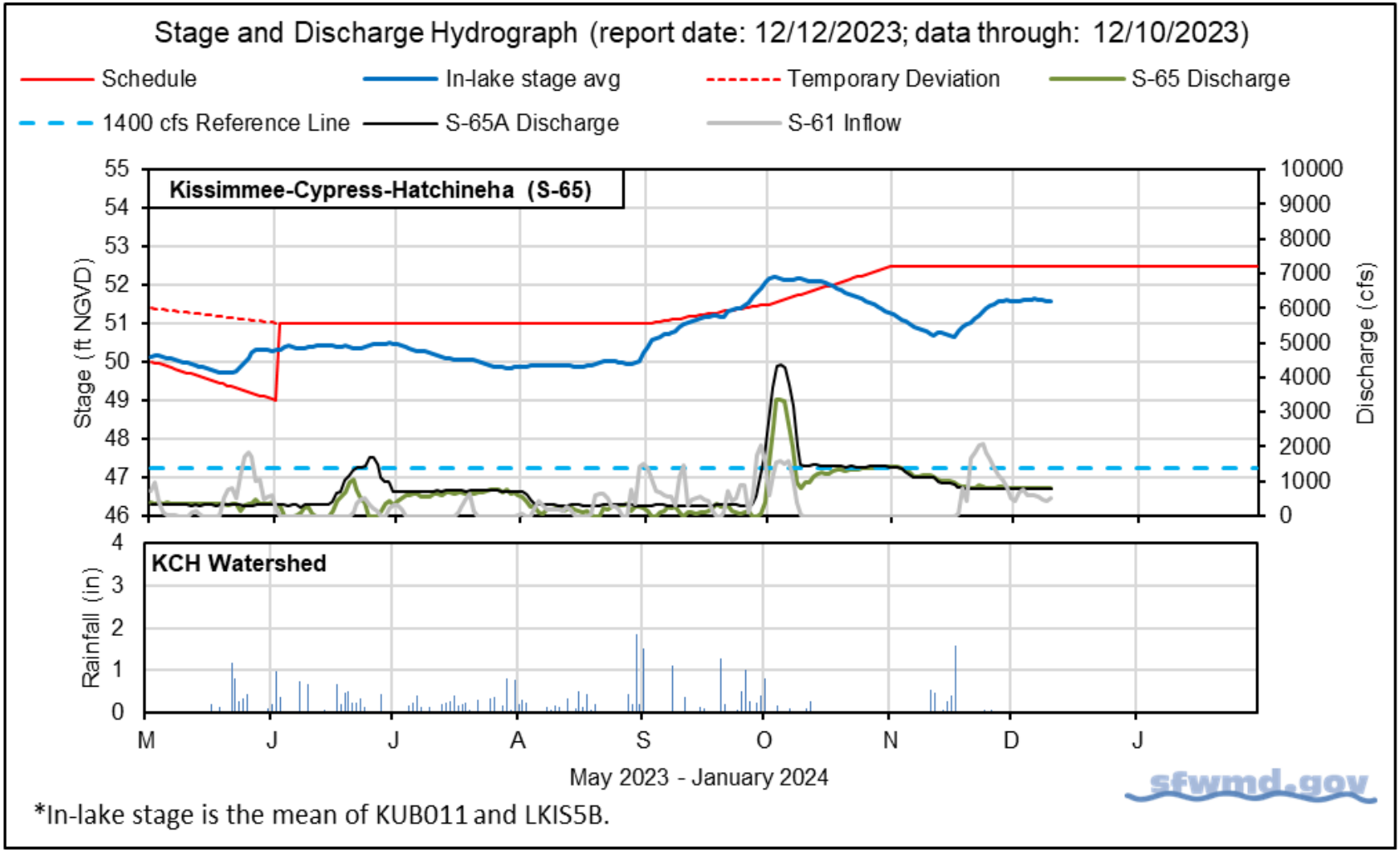


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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			
		12/10/23	12/10/23	12/3/23	11/26/23	11/19/23
Discharge	S-65	790	800	810	820	940
Discharge	S-65A[a]	780	790	790	790	890
Headwater Stage (feet NGVD)	S-65A	46.2	46.3	46.3	46.3	46.2
Discharge	S-65D[b]	860	860	870	970	1,300
Headwater Stage (feet NGVD)	S-65D[c]	26.6	26.6	26.8	26.9	27.2
Discharge (cfs)	S-65E[d]	790	790	810	1,000	1,500
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) [e]	Phase I, II/III river channel	8.2	8.7	7.9	7.0	5.9
River channel mean stage[f]	Phase I river channel	35.5	35.5	35.6	35.8	36.5
Mean depth (feet) [g]	Phase I floodplain	0.16	0.16	0.21	0.29	0.42

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).

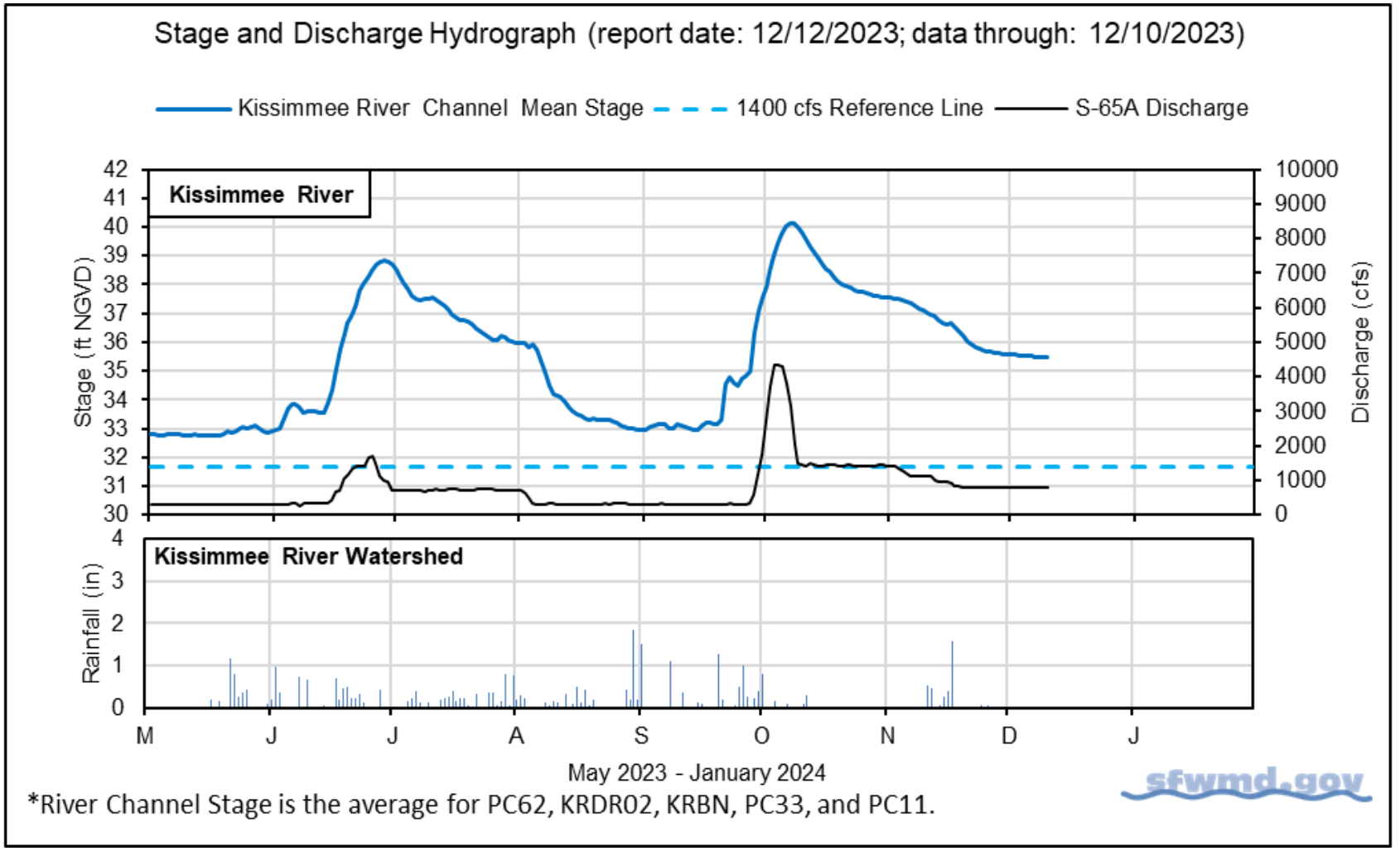


Figure KB-4. Kissimmee River stage, discharge and rainfall.

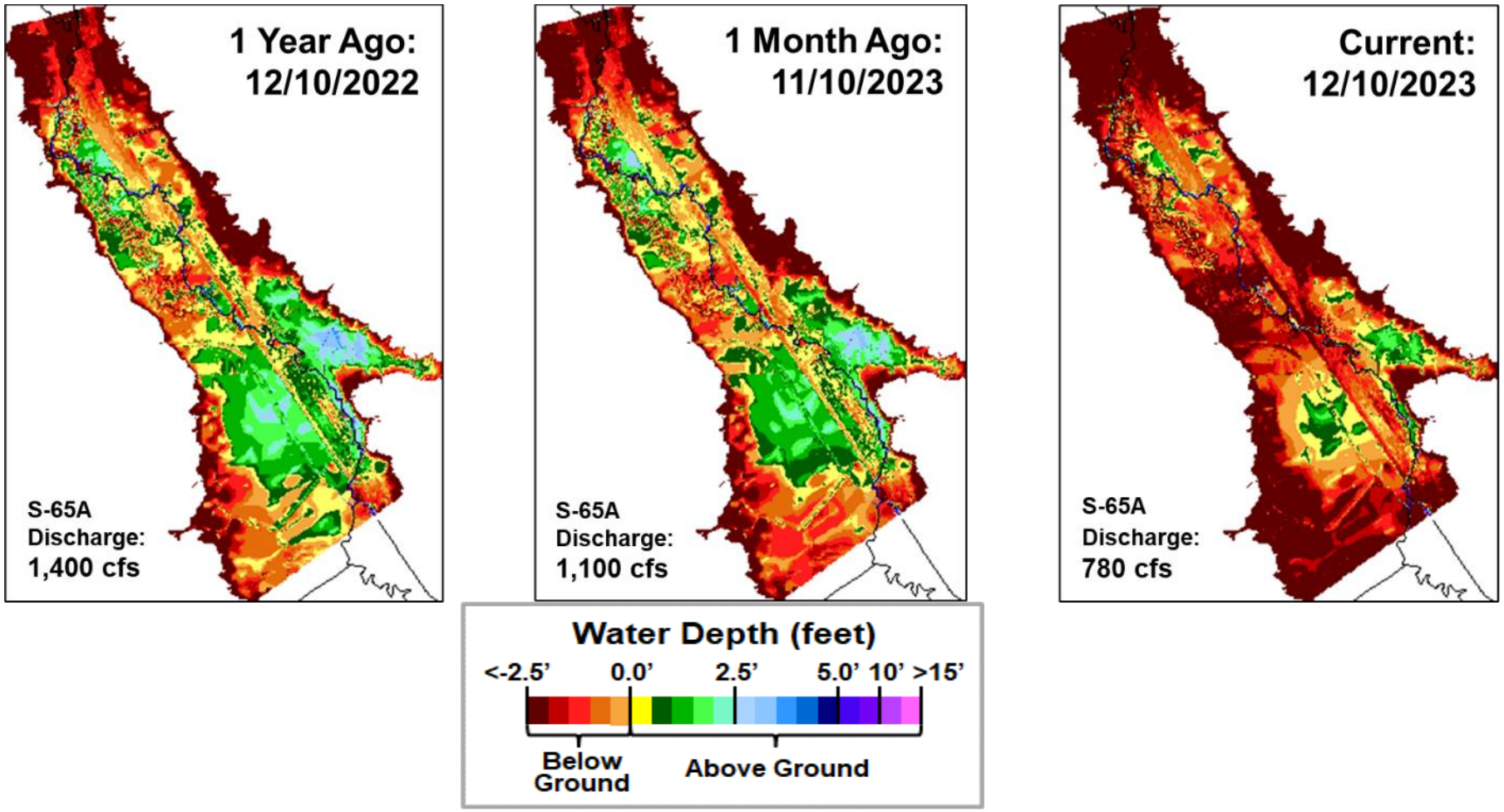


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

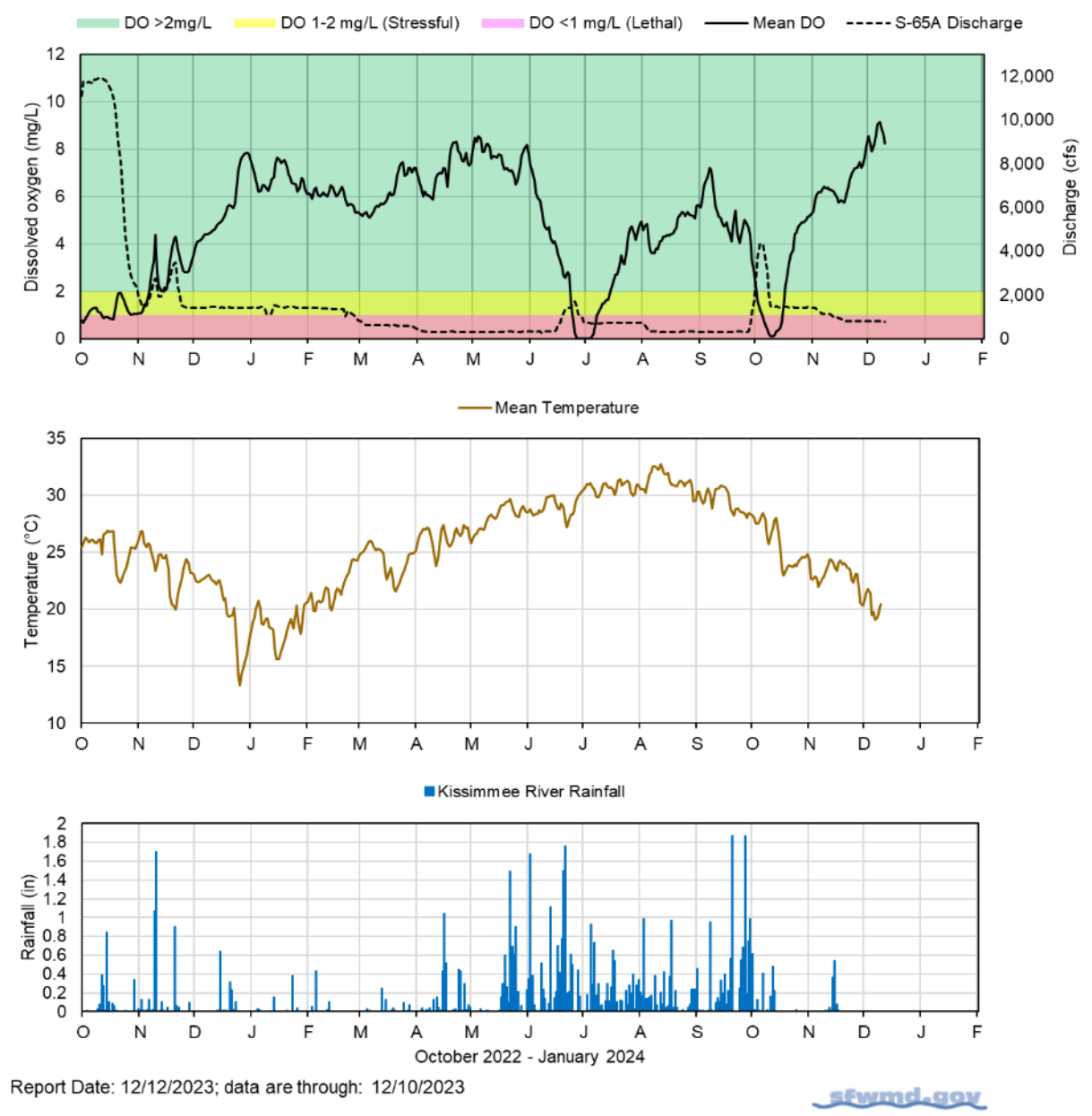


Figure KB-6. Kissimmee River channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRDR02, KRBN, PC33, PC11, PD62R, and PD42R with an average of six stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

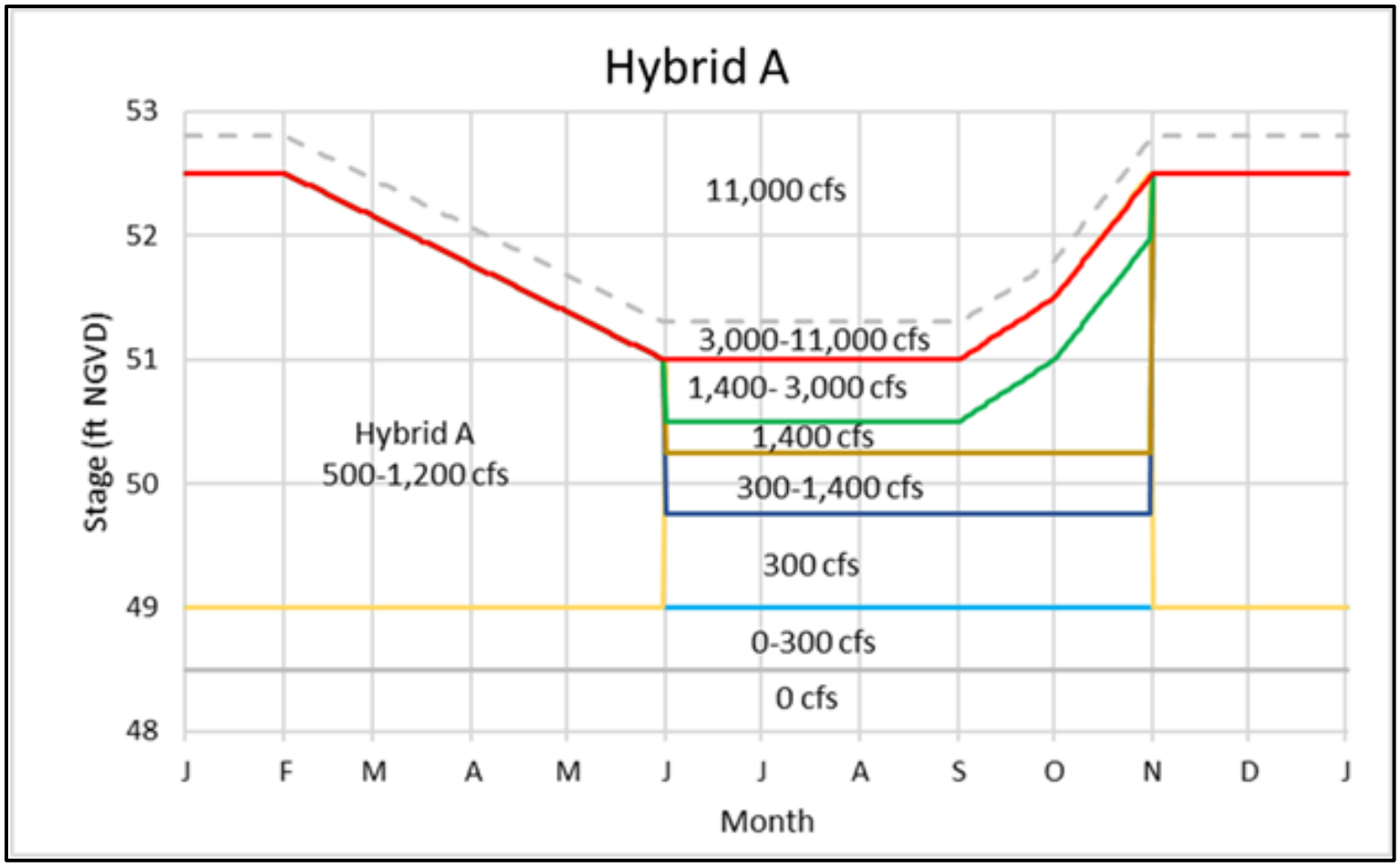


Figure KB-7. Hybrid A Discharge Plan for S-65/S-65A. Use discharge rate of change limits from IS-14-50 (Fig. KB-8).

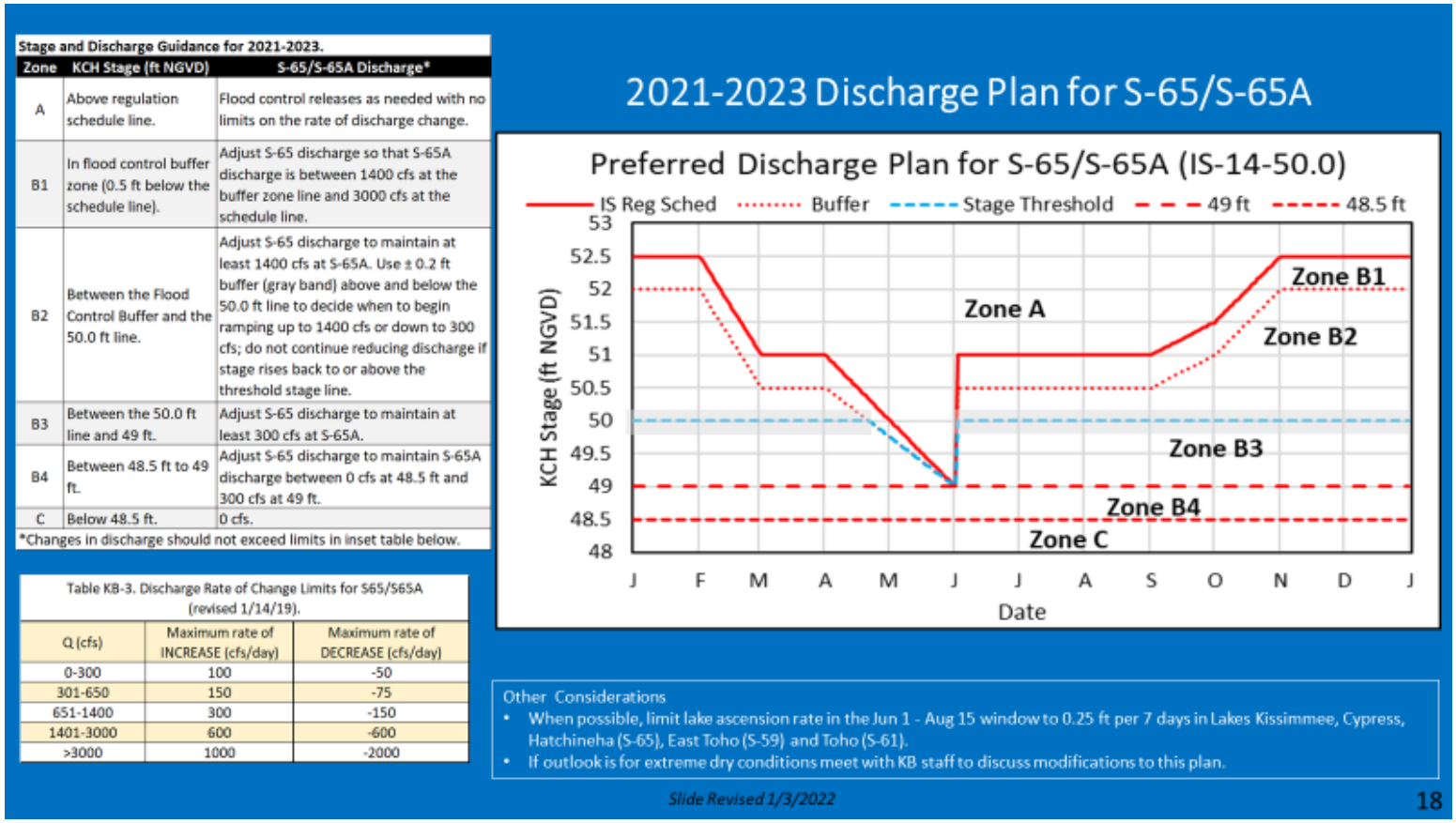


Figure KB-8. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

Lake Okeechobee

Lake Okeechobee stage was 15.89 feet NGVD on December 10, 2023, which was 0.10 feet lower than the previous week and 0.11 feet lower than a month ago (**Figure LO-1**). Lake stage was in the low sub-band on December 10th (**Figure LO-2**) and was 0.39 feet above the upper limit of the ecological envelope (**Figure LO-3**). According to NEXRAD, 0.11 inches of rain fell directly over the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 940 cfs to 900 cfs. The highest structure inflow came from the C-38 Canal via the S-65E/65EX1 structure (790 cfs). Average daily outflows (excluding evapotranspiration) increased from the previous week, going from 1,420 cfs to 1,890 cfs. The highest average single structure outflow was recorded at the S-77 structure into the C-43 Canal (1,550 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 first wading bird survey of the 2024 breeding season (conducted December 7, 2023) reported approximately 2,690 foraging wading birds on the Lake (**Figure LO-6**). Compared to last year at this time, when lake stage was over 0.50 feet higher, this is an increase of approximately 1,500 wading birds. If Lake stage continues to decline and ends up within the ecological envelope throughout the spring, there should be good foraging and nesting conditions for wading birds on the Lake this breeding season.

Recent satellite images are obscured by clouds or of poor quality. In the most recent usable image, December 10, 2023, the cyanobacteria index level was low and patchy along the western shoreline of the Lake according to the satellite image from NOAA's Harmful Algal Bloom Monitoring System (**Figure LO-7**). All data presented in this report are provisional and are subject to change.

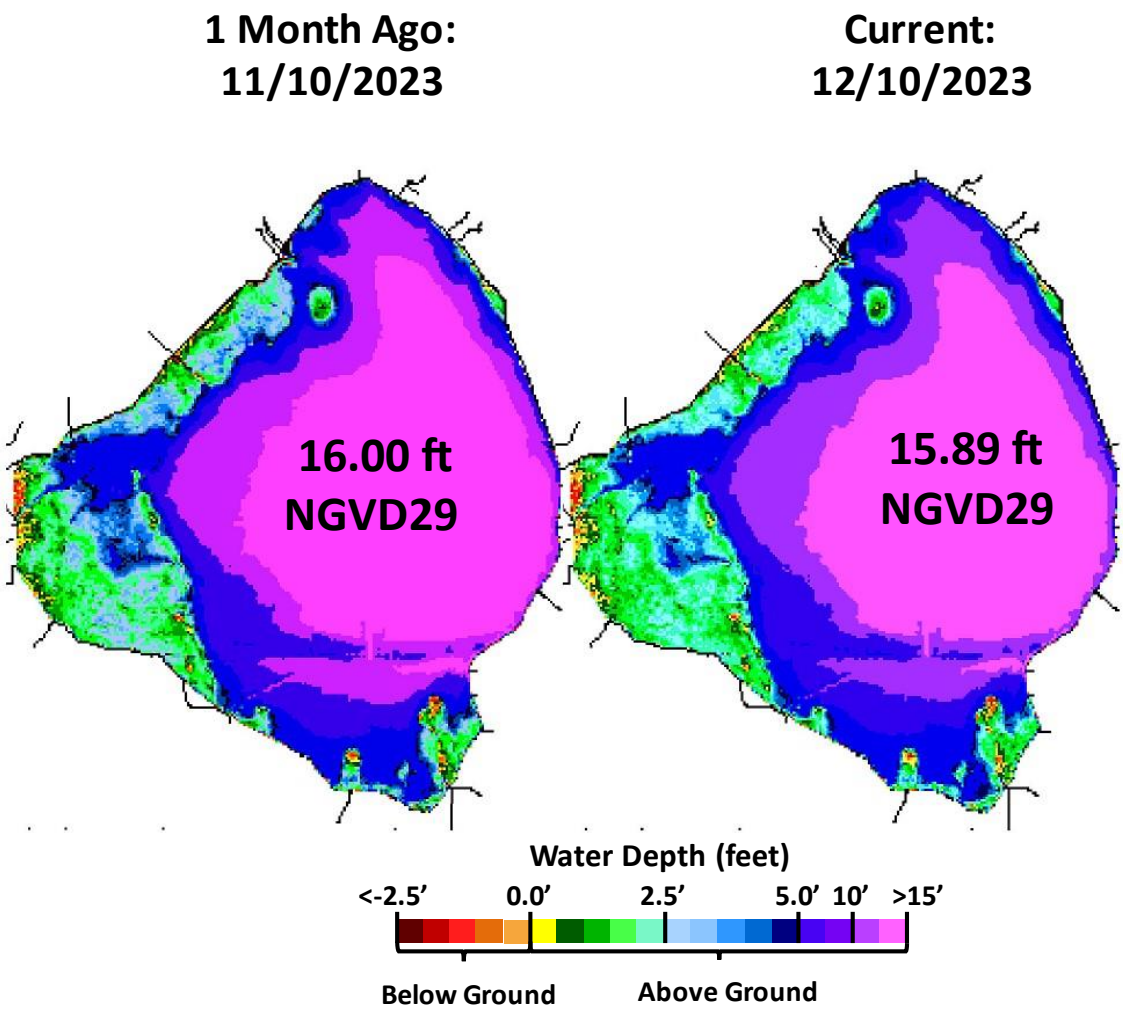


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

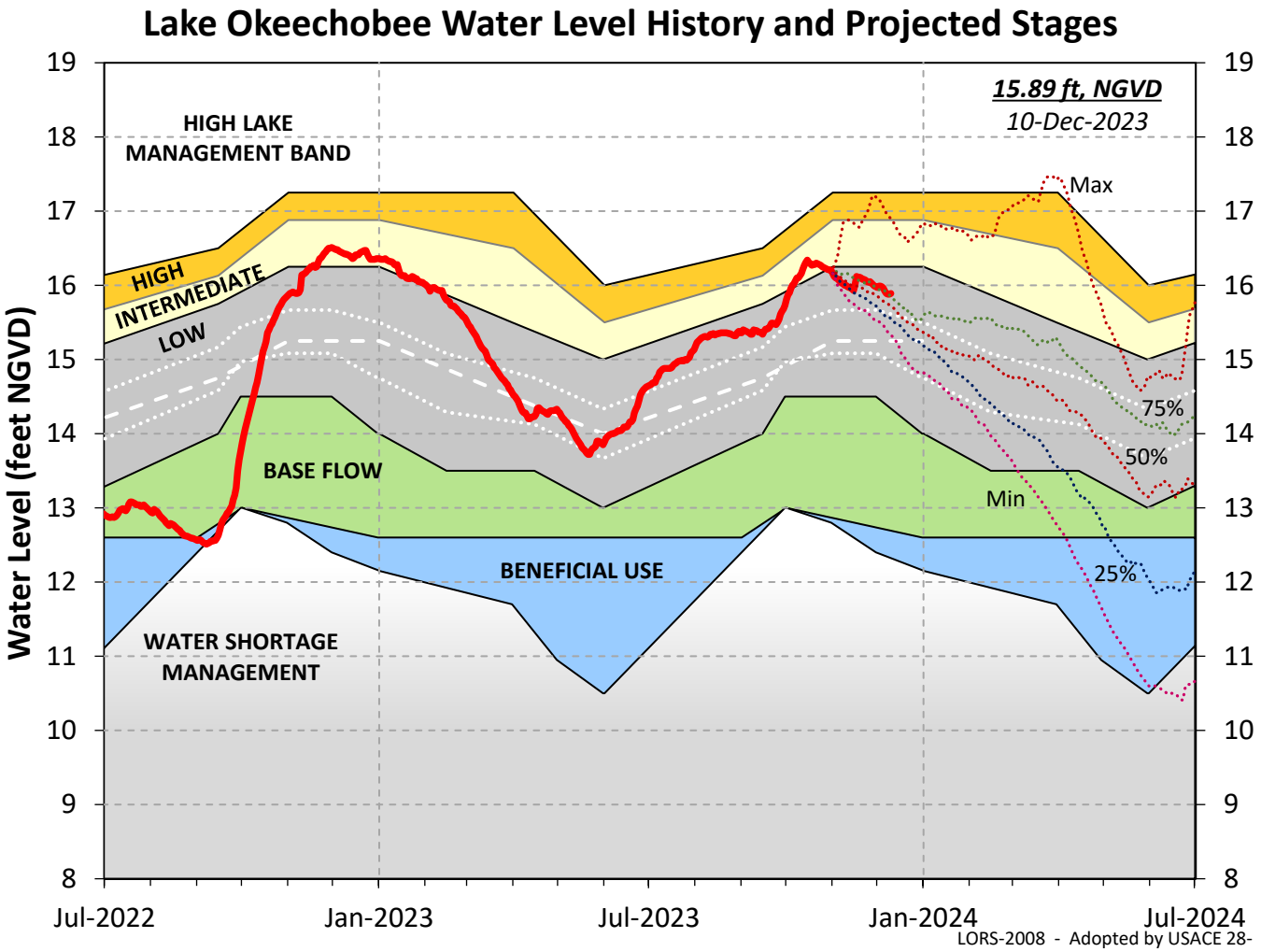


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

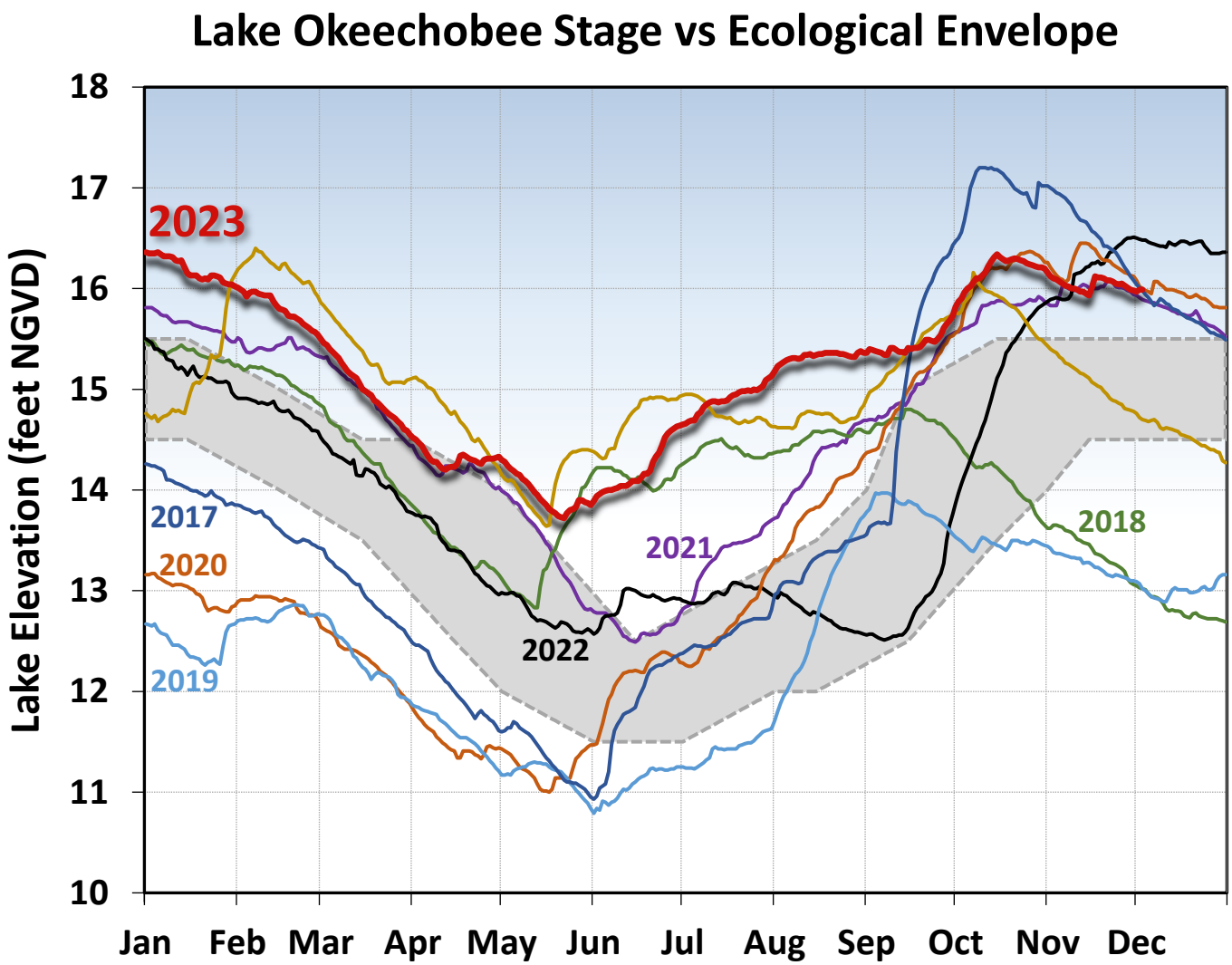


Figure LO-3. The selected prior years within the ten-year period of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

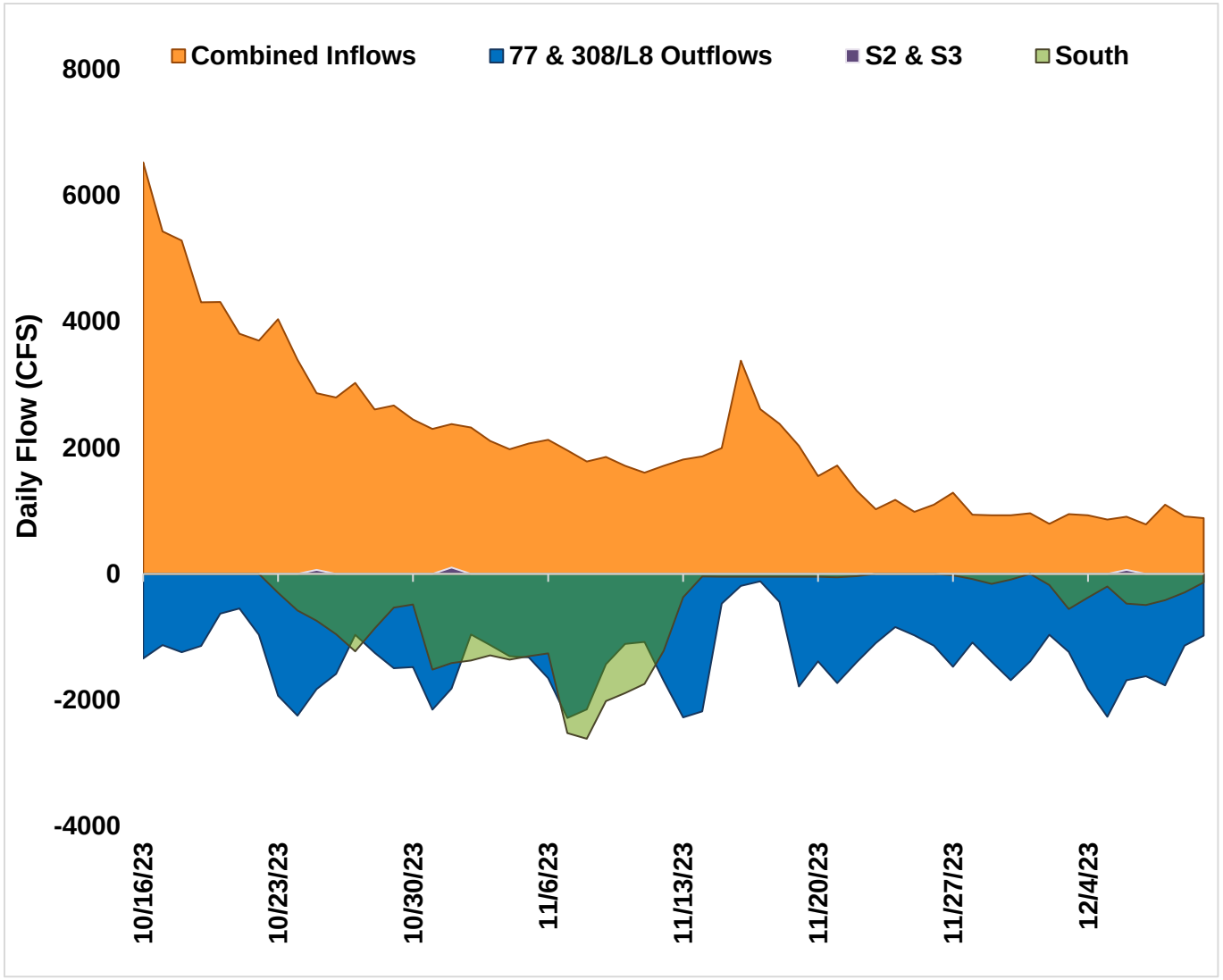


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

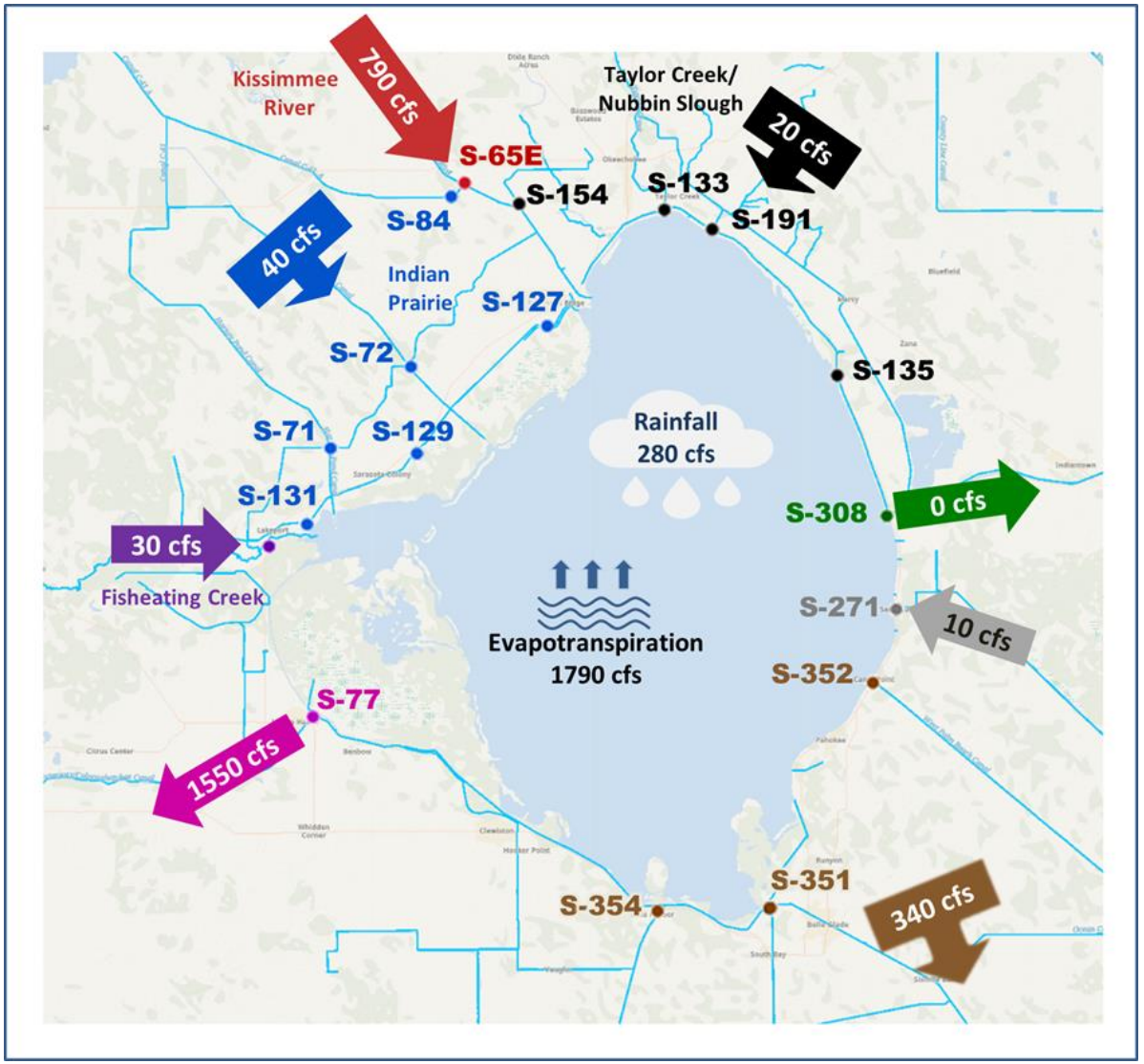


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of December 04 – December 10, 2023.

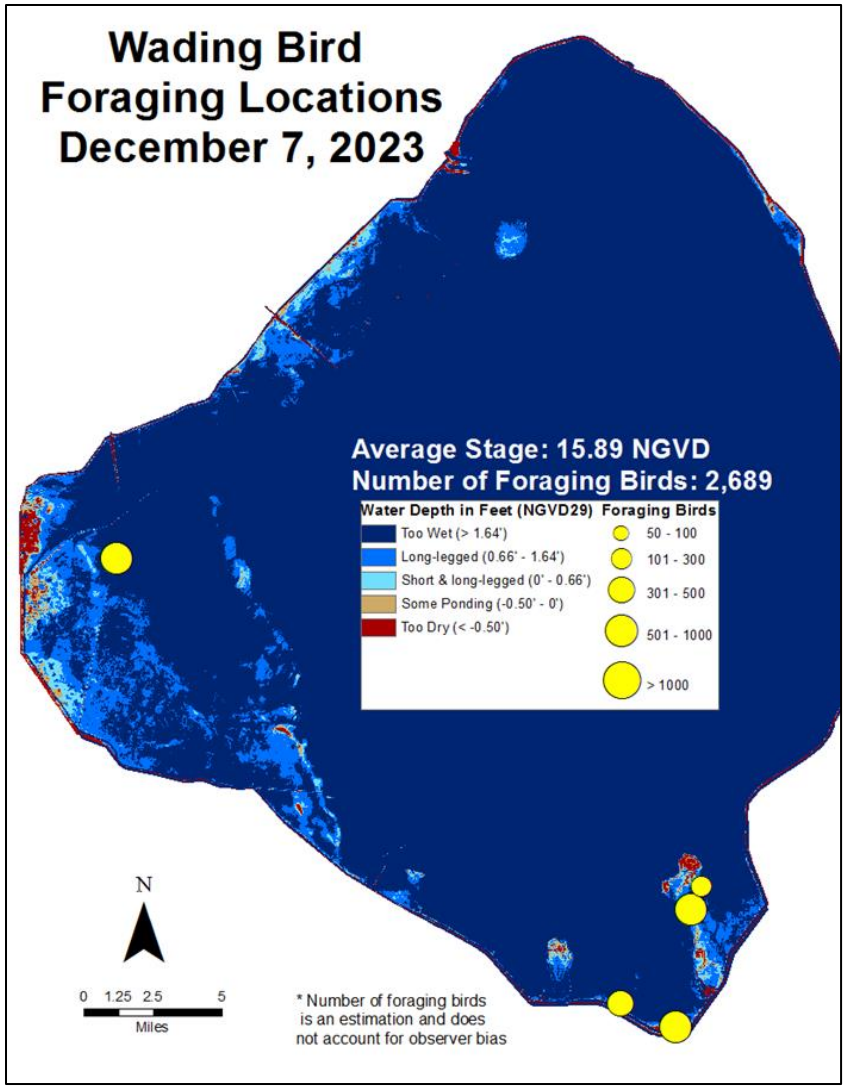


Figure LO-6. Locations of foraging flocks of wading birds observed during a monitoring flight on December 7, 2023 are shown in yellow (circle sizes represents the flock size).

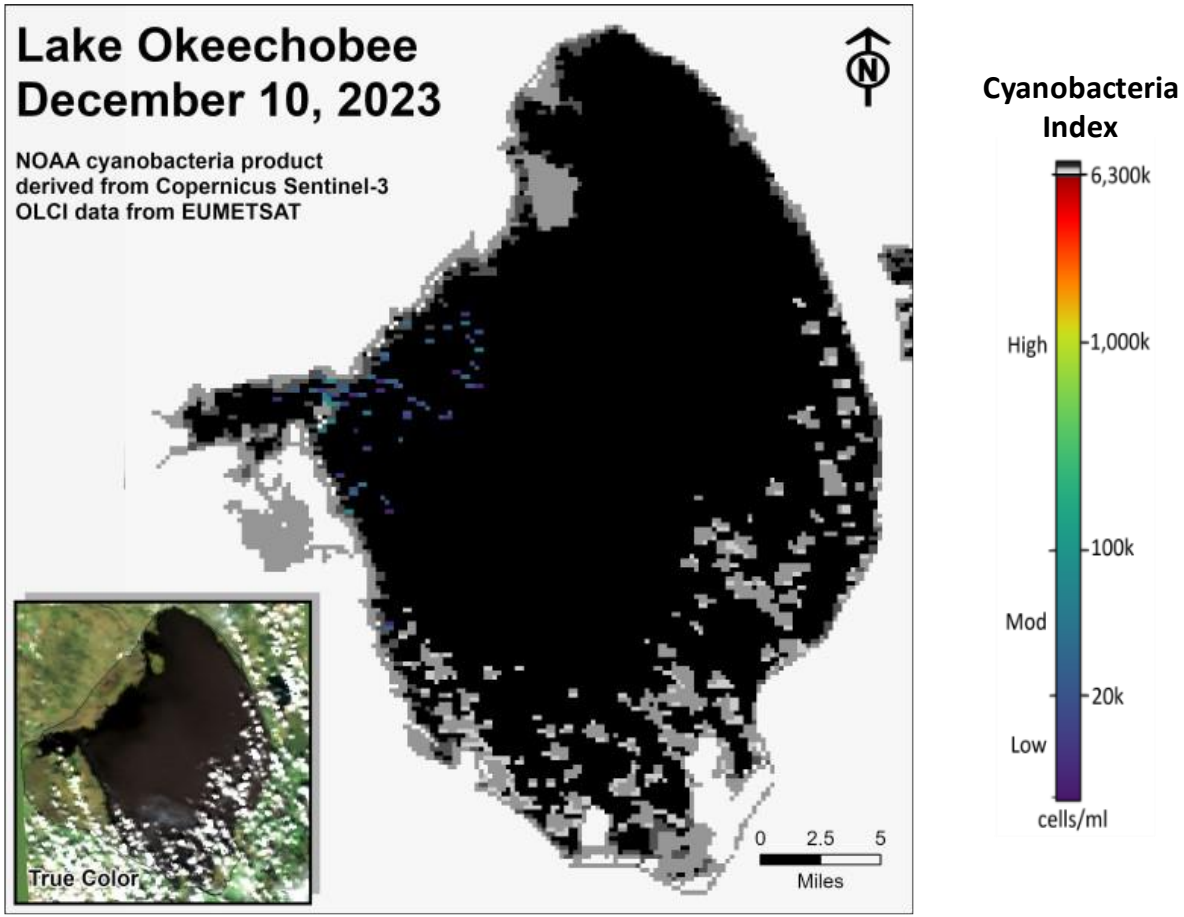


Figure LO-7. Cyanobacteria bloom index level on December 10, 2023, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 180 cfs (**Figures ES-1** and **ES-2**), and the previous 30-day mean inflow was 240 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, surface salinities increased at all sites 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 22.1. 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 2,150 cfs (**Figures ES-6** and **ES-7**), and the previous 30-day mean inflow was 2,100 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, surface salinities increased at S-79 and Ft. Myers and decreased 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 Shell Point, and in the upper stressed range at 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[1]) 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 120 cfs. Model results from all scenarios predict daily salinity to be 3.0 or lower and the 30-day moving average surface salinity to be 1.8 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.

[1] 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 8, 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 St. Lucie, Martin, 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.

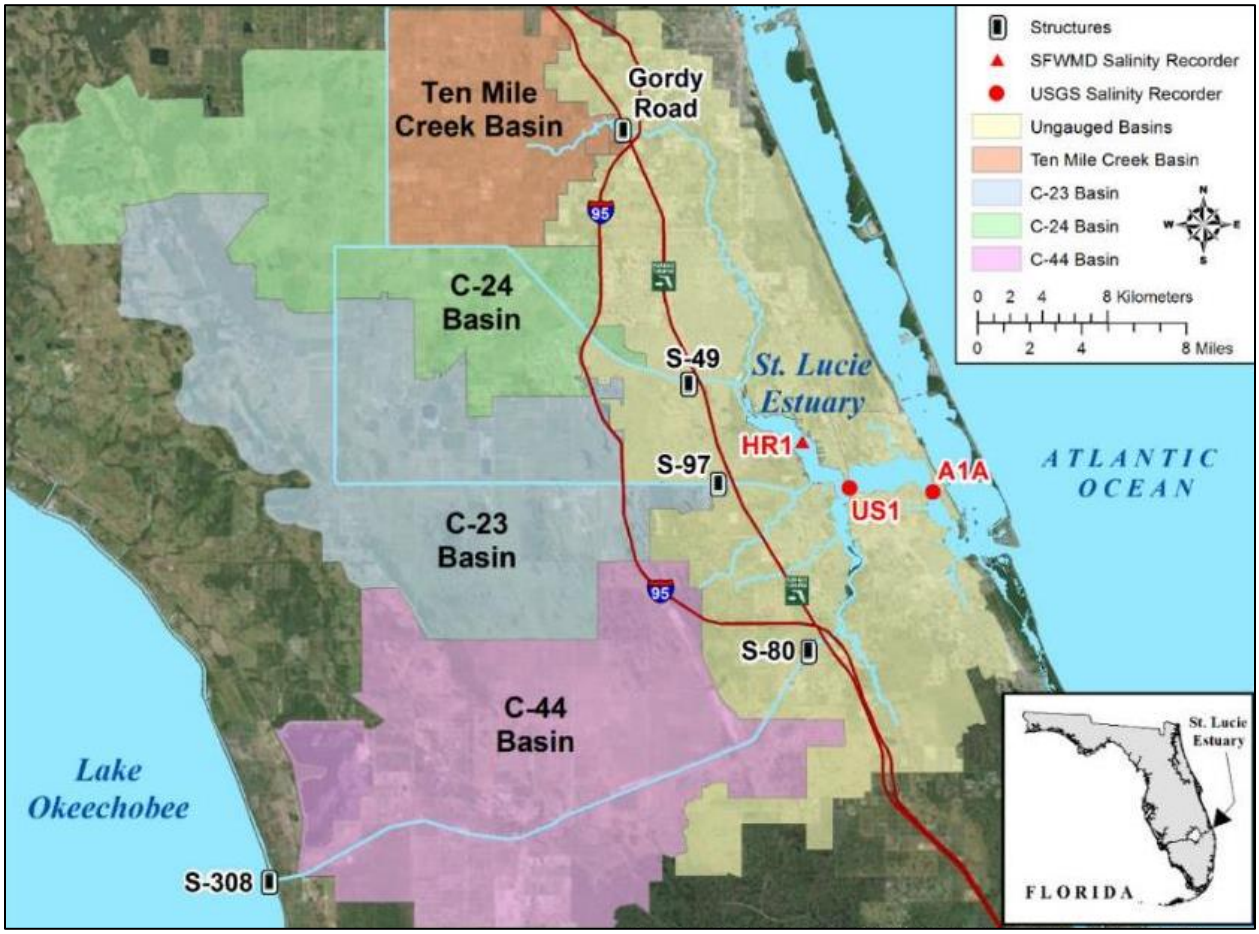


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

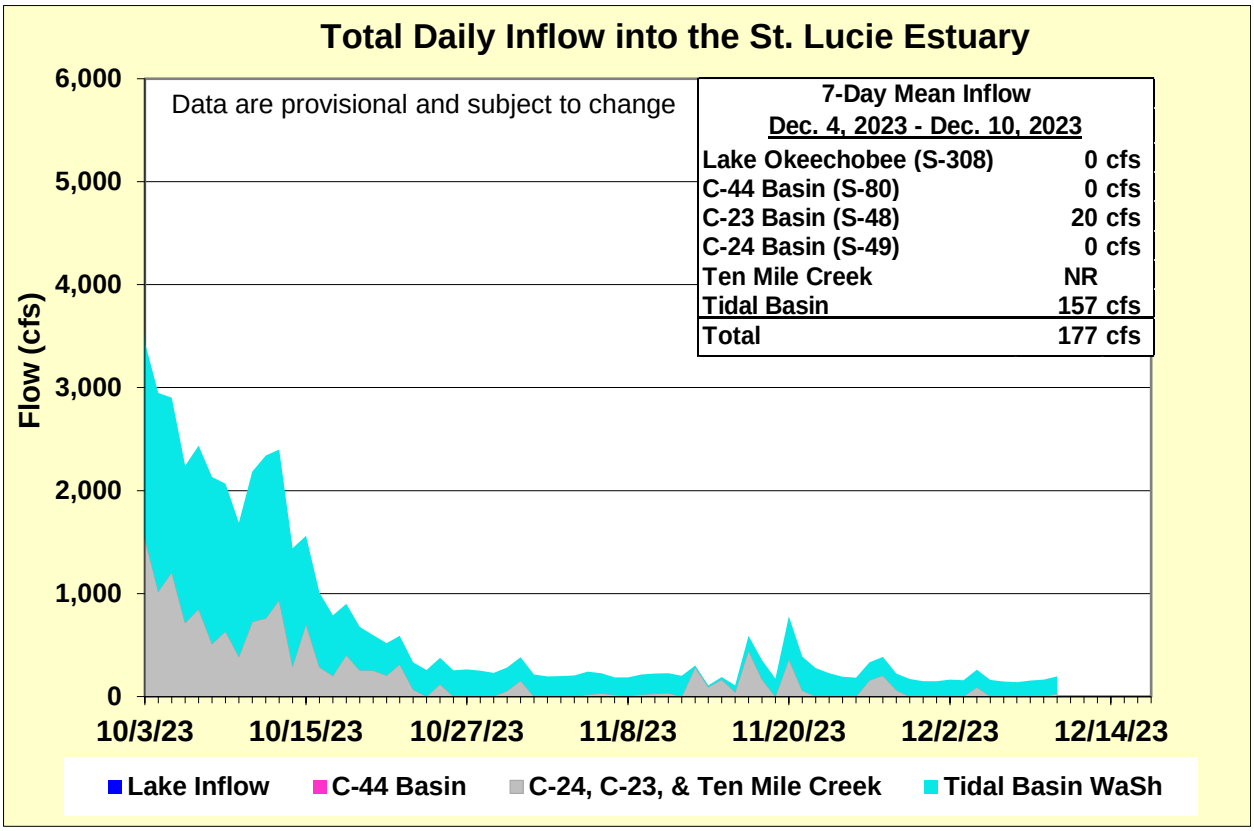


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	**18.4** (17.5)	**21.3** (20.5)	10.0 – 25.0
US1 Bridge	**21.4** (20.4)	**22.7** (21.4)	10.0 – 25.0
A1A Bridge	**27.1** (27.0)	**28.4** (28.7)	10.0 – 25.0

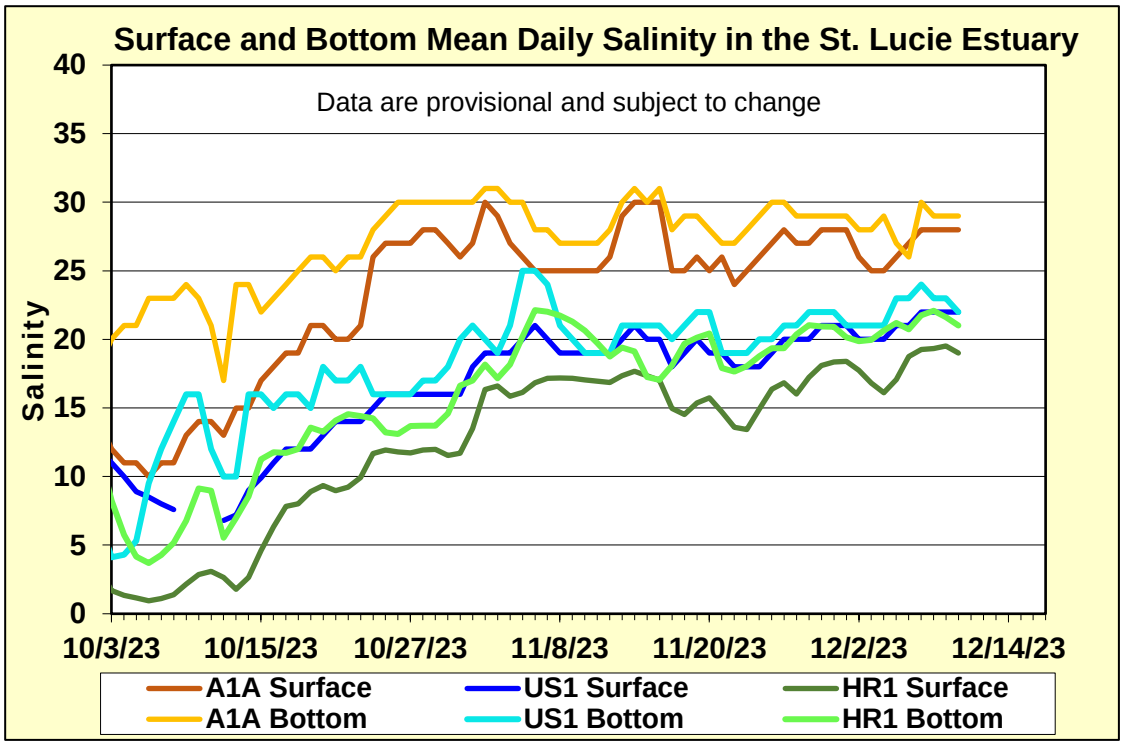


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

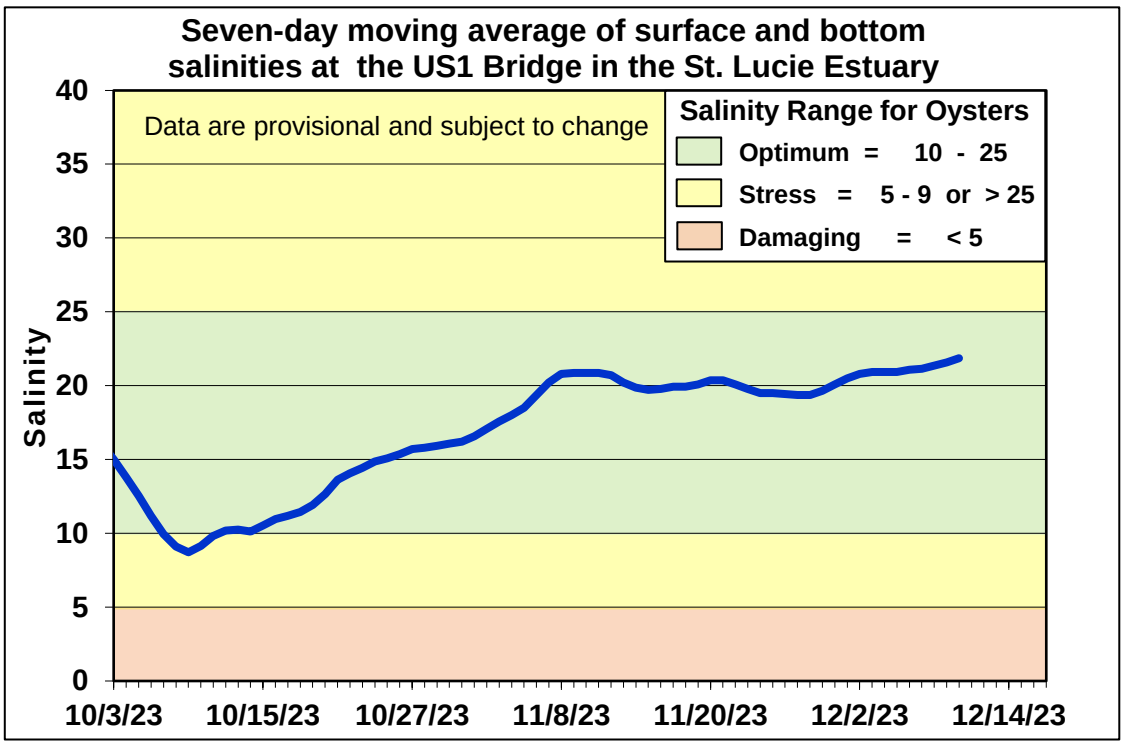


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

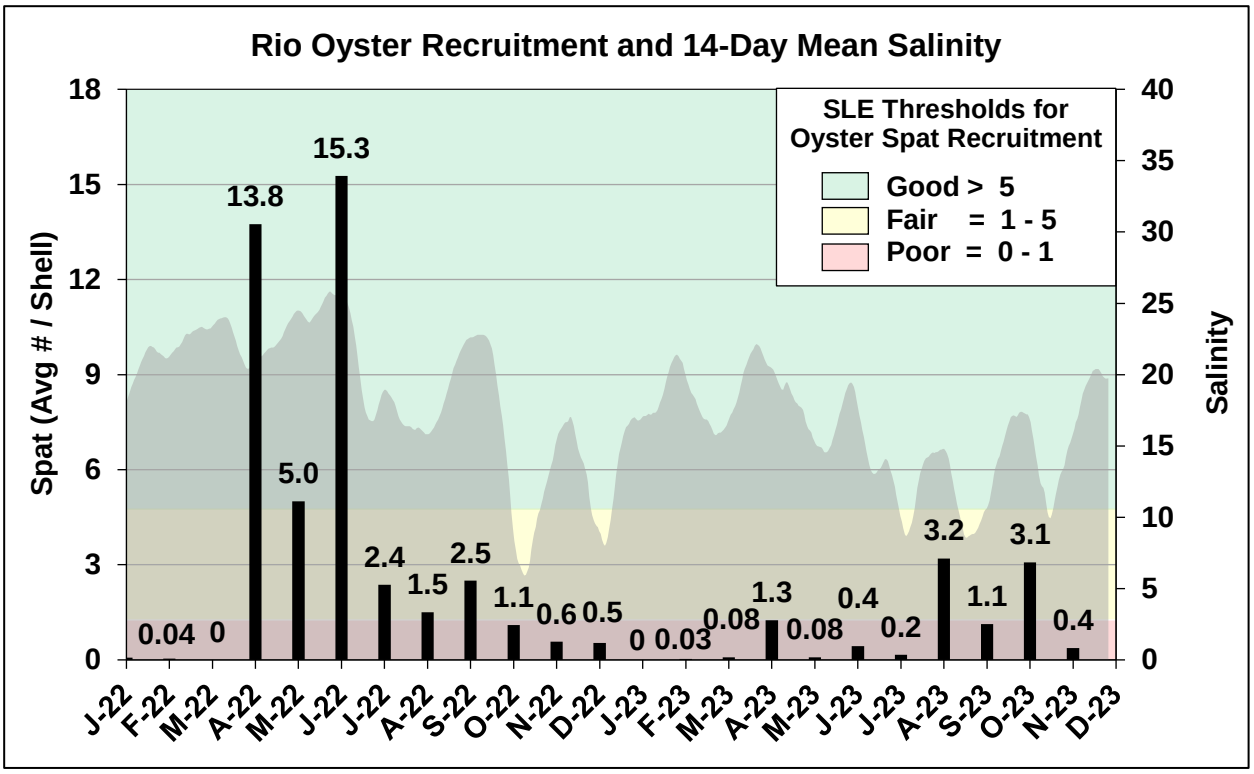


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

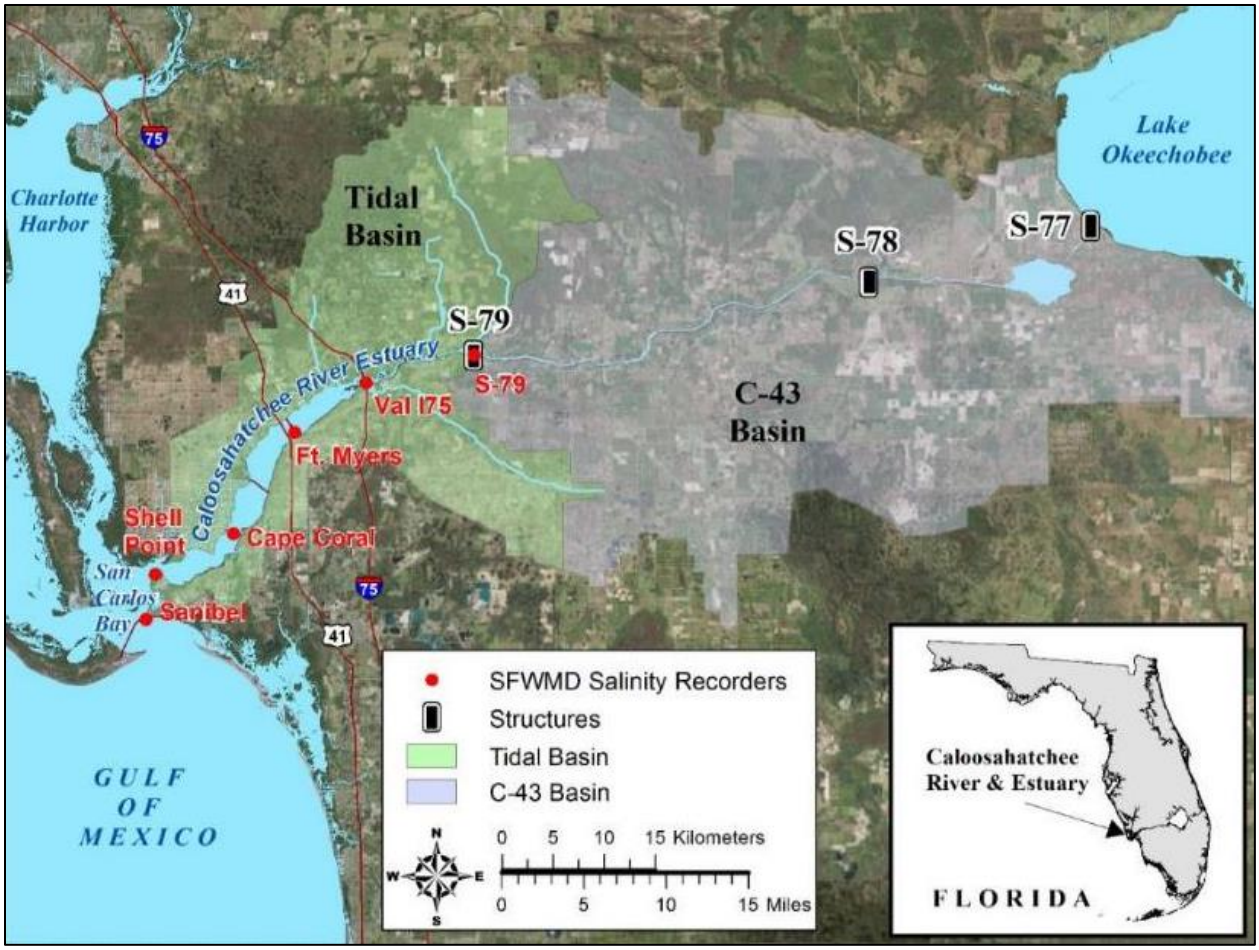


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

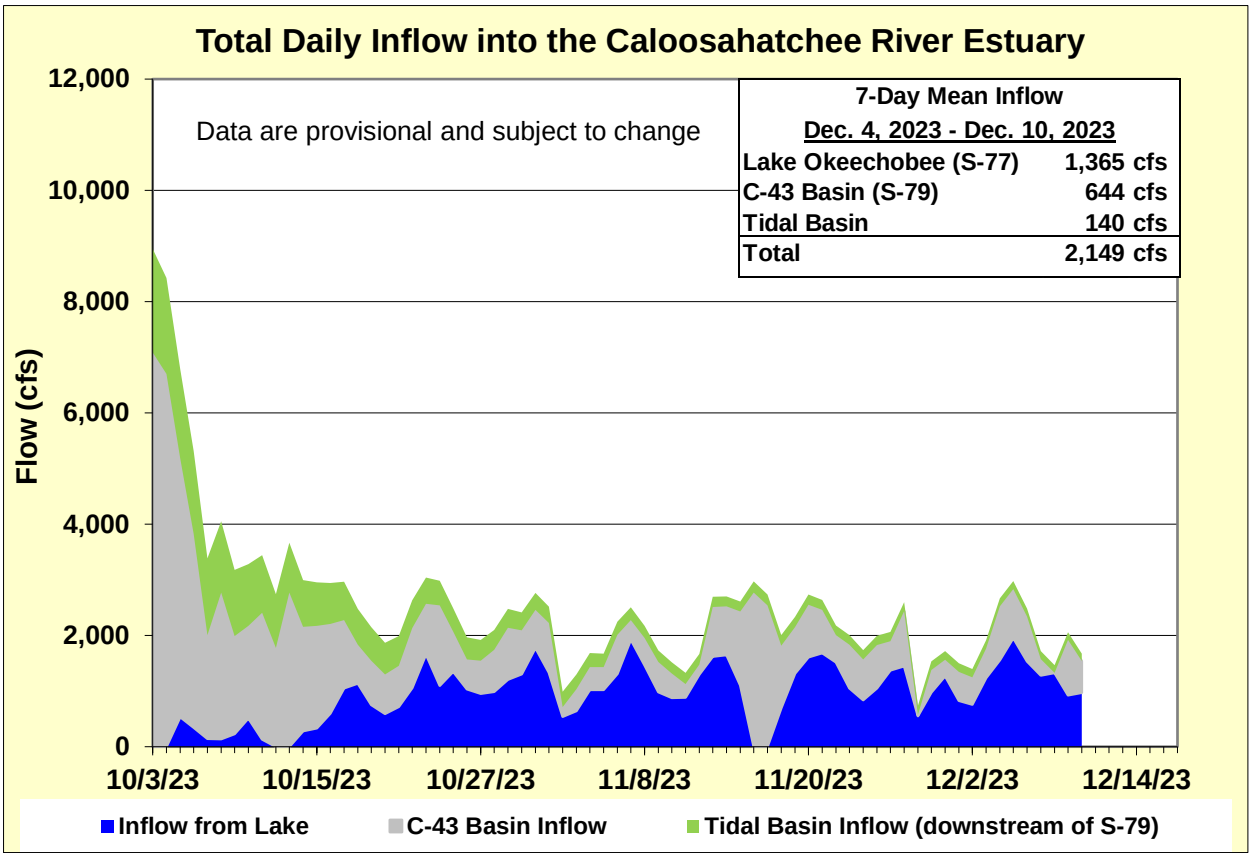


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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)	**0.6** (0.2)	**0.6** (0.2)	0.0 – 10.0
Val I-75	**2.1** (2.2)	**2.7** (2.3)	0.0 – 10.0
Fort Myers Yacht Basin	**5.7** (5.0)	**8.7** (6.7)	0.0 – 10.0
Cape Coral	**10.4** (11.3)	**13.3** (16.7)	10.0 – 25.0
Shell Point	**23.6** (24.9)	**25.2** (25.8)	10.0 – 25.0
Sanibel	**29.4** (31.1)	**30.9** (32.0)	10.0 – 25.0

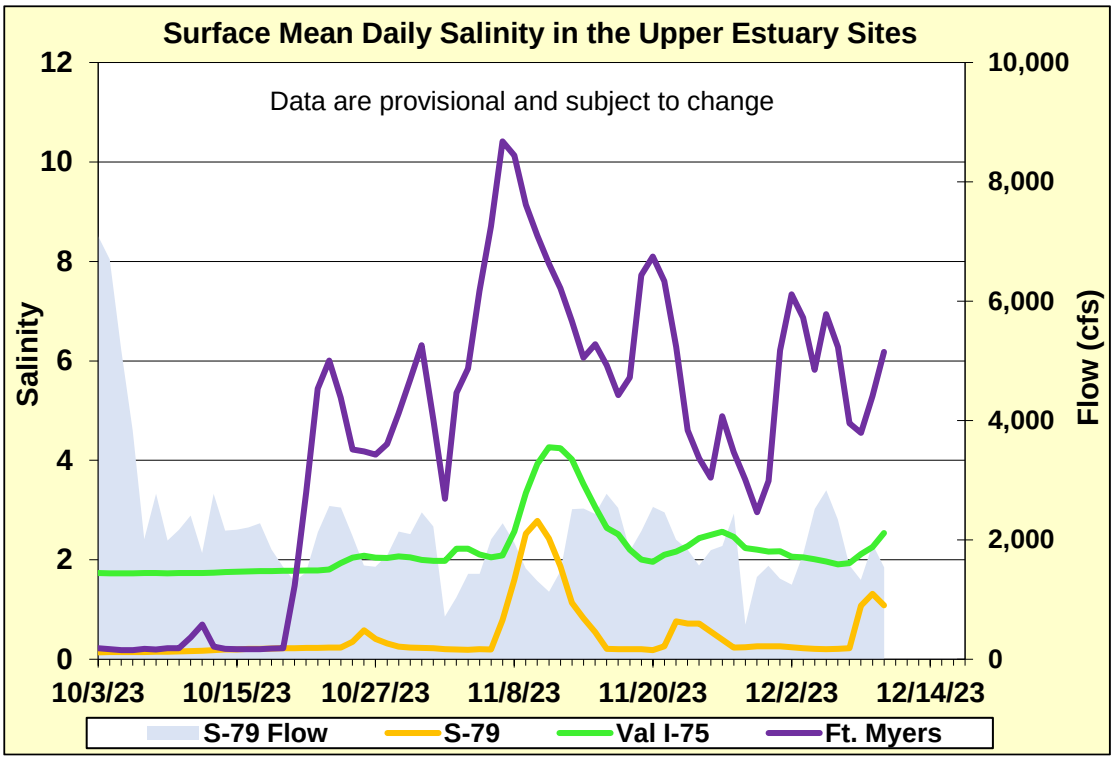


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

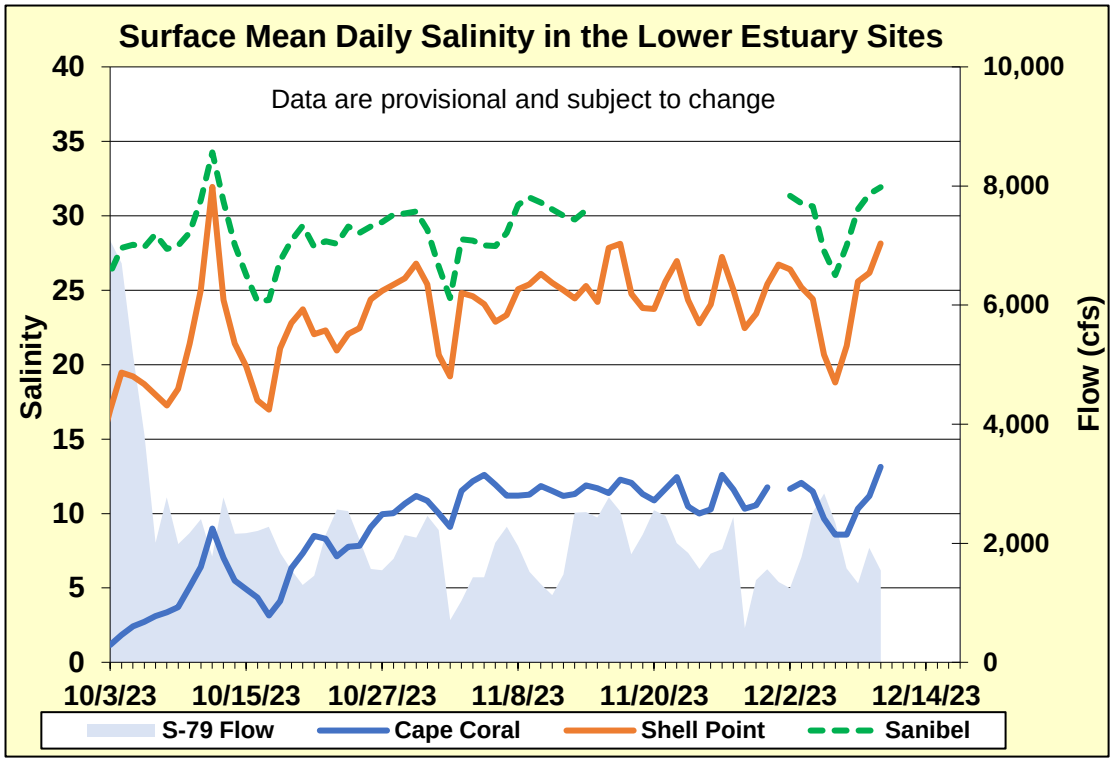


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

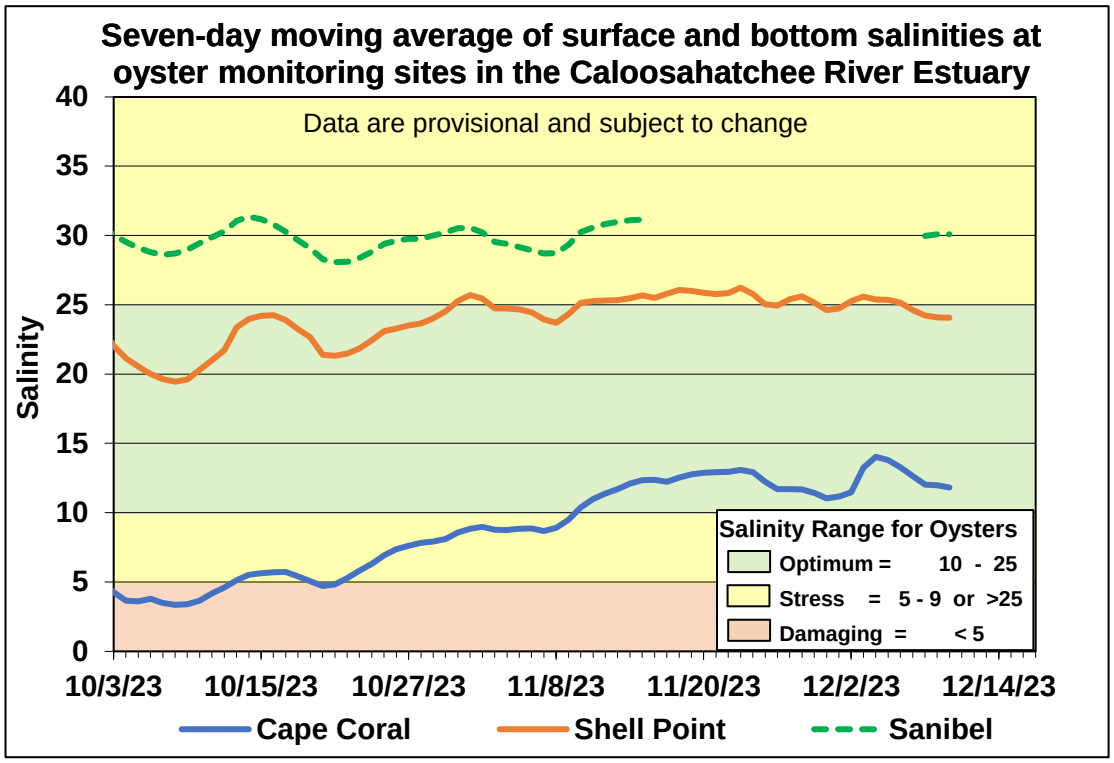


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

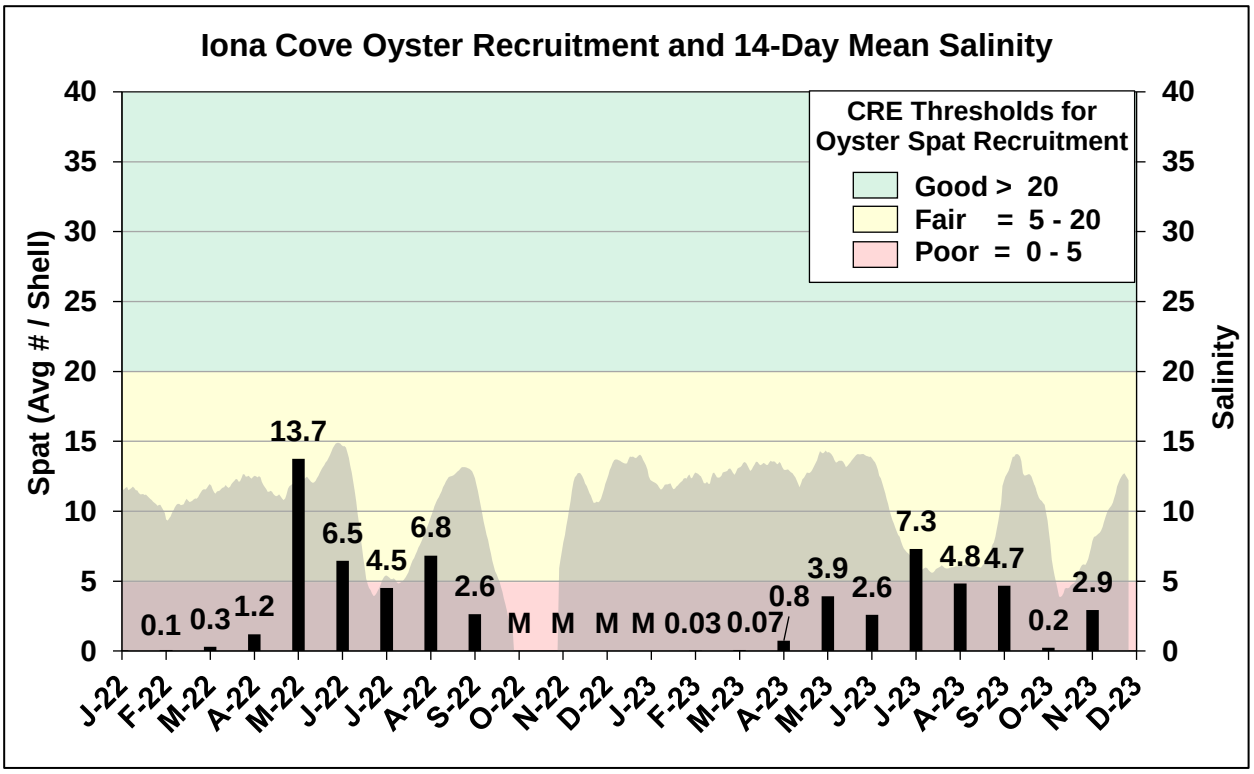


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

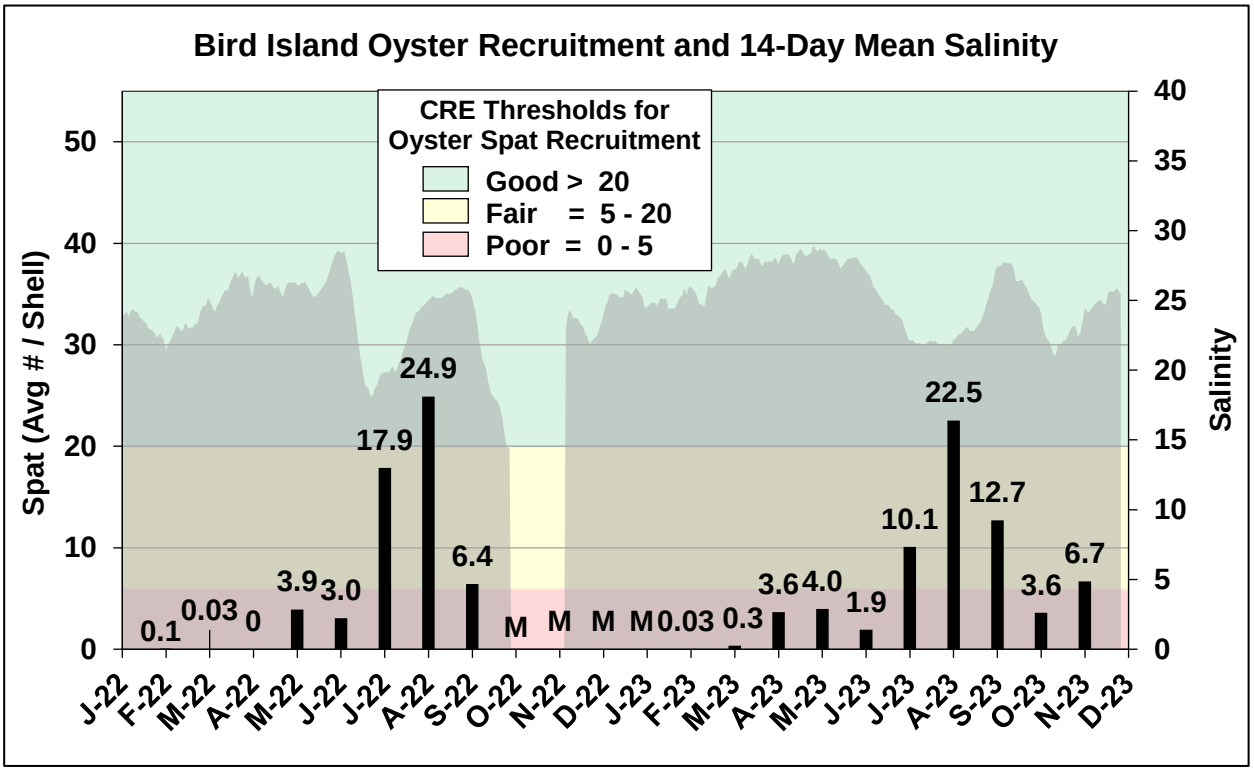


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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	117	3.0	1.8
B	450	117	2.0	1.7
C	750	117	1.3	1.5
D	1,000	117	0.7	1.4
E	1,500	117	0.3	1.3
F	2,000	117	0.3	1.3

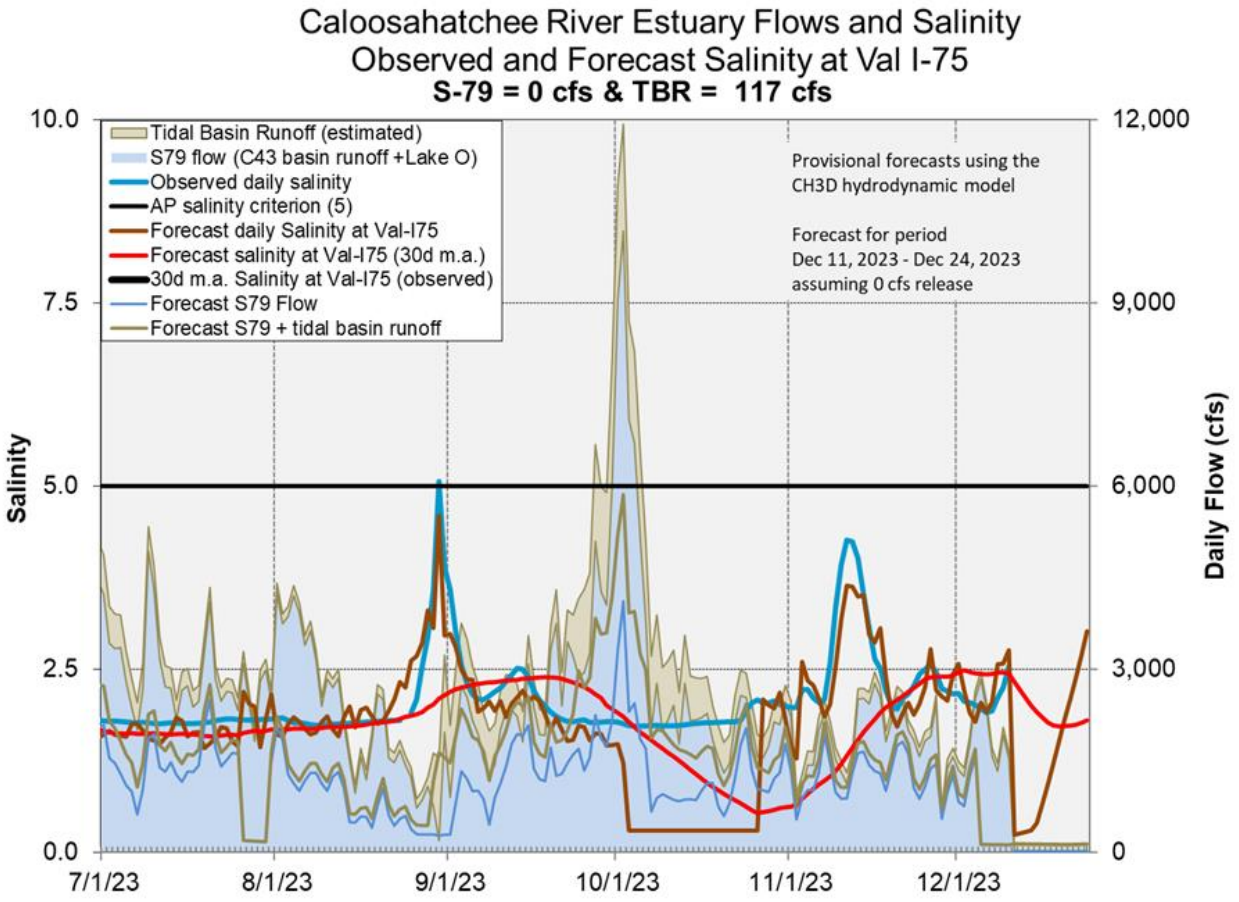


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

Stormwater Treatment Areas

STA-1E: STA-1E Western Flow-way is offline for post-construction vegetation grow in. Online treatment cells are 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**).

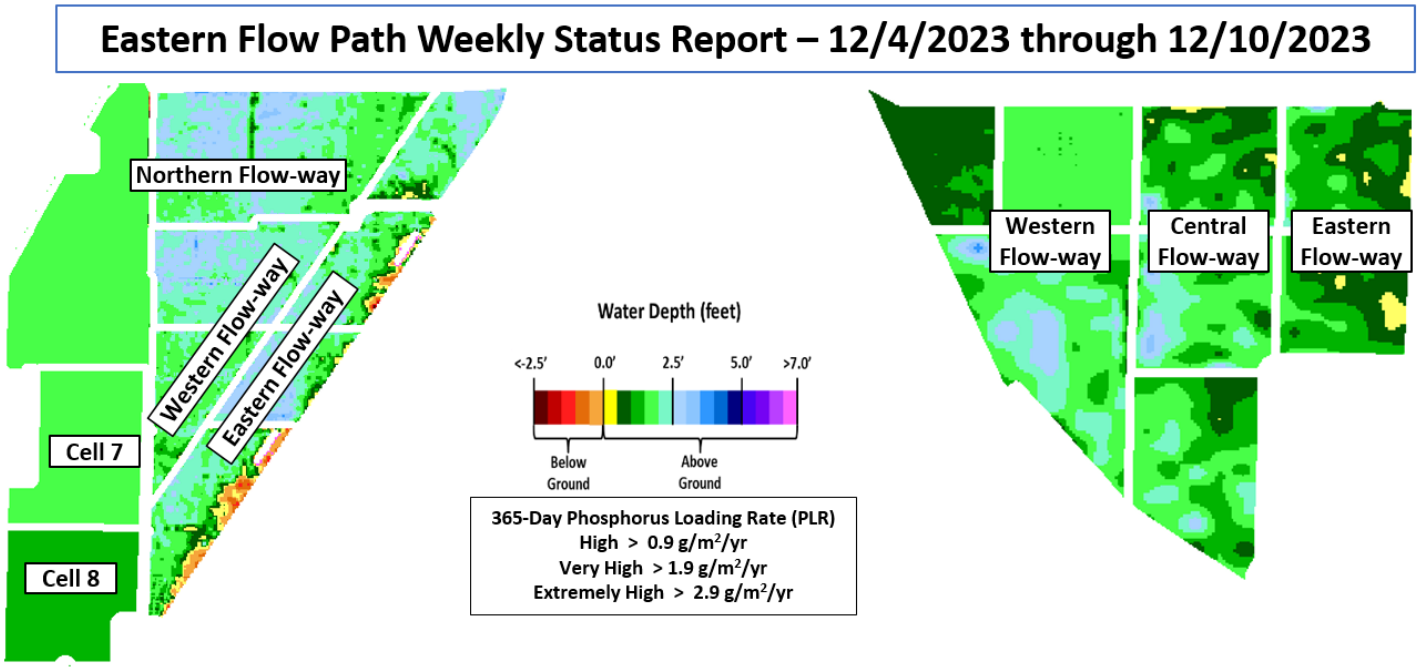
STA-1W: An operational restriction is in place in STA-1W Northern Flow-way for vegetation management activities. Treatment cells are near or above target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLR for the Eastern Flow-way is high, and the 365-day PLRs for the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

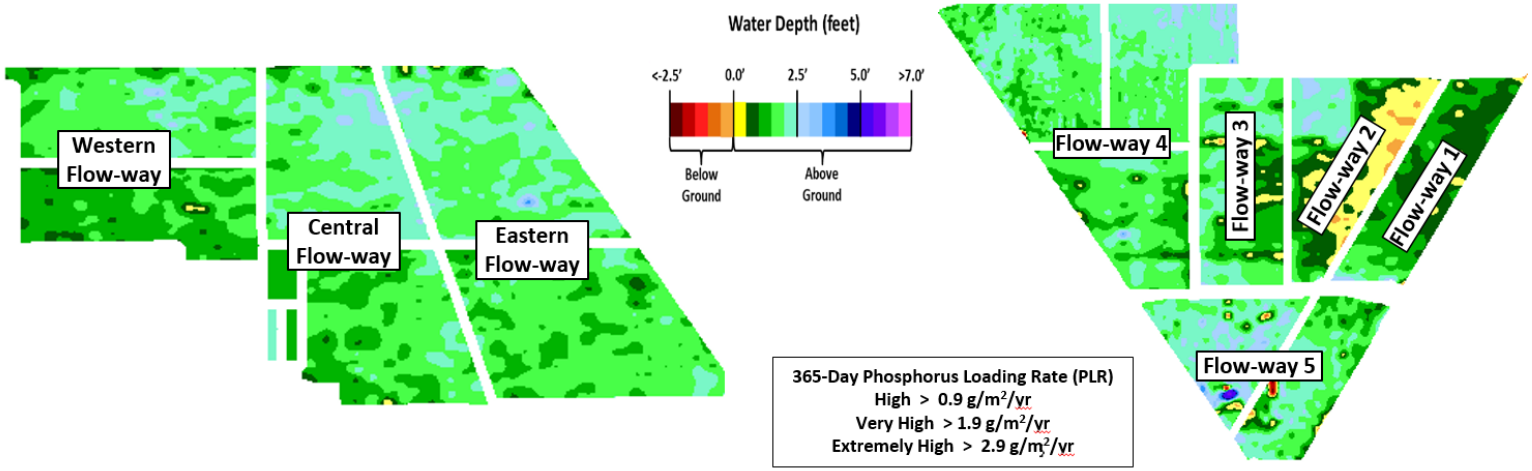


STA-1W	Flow-way Status
Western	• High 365-day PLR • Highly stressed vegetation conditions
Eastern	• High 365-day PLR • Highly stressed vegetation conditions
Northern	• Highly stressed vegetation conditions • Planting emergent vegetation
Cell 7	• Stressed vegetation conditions
Cell 8	• Construction activities

STA-1E	Flow-way Status
Western	• Offline for post-construction vegetation grow-in
Central	• High 365-day PLR • Highly stressed vegetation conditions
Eastern	• High 365-day PLR • Stressed vegetation conditions

Figure S-1. Eastern Flow Path Weekly Status Report

Central Flow Path Weekly Status Report – 12/4/2023 through 12/10/2023

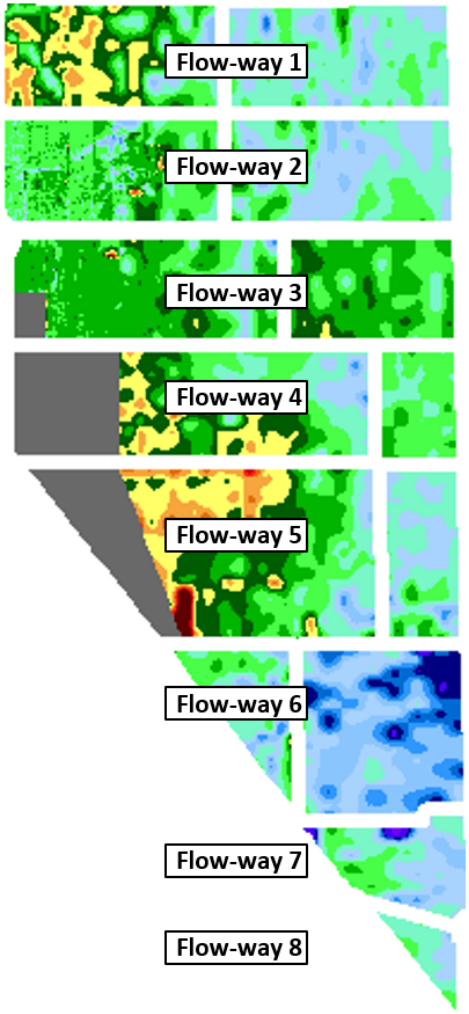


STA-3/4	Flow-way Status
Western	• Stressed vegetation conditions • Nuisance vegetation control within inflow canal
Central	• Highly stressed vegetation conditions • Removal of floating tussocks • Nuisance vegetation control within inflow canal
Eastern	• Post-drawdown vegetation grow-in • Nuisance vegetation control within inflow canal

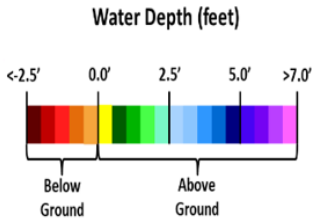
STA-2	Flow-way Status
Flow-way 1	• High 365-day PLR • Stressed vegetation conditions
Flow-way 2	• Post-construction vegetation grow-in • Planting emergent vegetation
Flow-way 3	• Stressed vegetation conditions
Flow-way 4	• Planting emergent vegetation • Nuisance vegetation control • Highly stressed vegetation conditions
Flow-way 5	• Highly stressed vegetation conditions

Figure S-2. Central Flow Path Weekly Status Report

Western Flow Path Weekly Status Report – 12/4/2023 through 12/10/2023



STA-5/6	Flow-way Status
Flow-way 1	• Highly stressed vegetation conditions
Flow-way 2	• Highly stressed vegetation conditions • High 365-day PLR
Flow-way 3	• Highly stressed vegetation conditions • High 365-day PLR
Flow-way 4	• Highly stressed vegetation conditions • Vegetation management (prescribed burn)
Flow-way 5	• Highly stressed vegetation conditions • High 365-day PLR
Flow-way 6	• Highly stressed vegetation conditions
Flow-way 7	
Flow-way 8	• Stressed vegetation conditions



365-Day Phosphorus Loading Rate (PLR)
High > 0.9 g/m²/yr
Very High > 1.9 g/m²/yr
Extremely High > 2.9 g/m²/yr

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, µg/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

Slightly more rainfall across the Everglades Protection Area (EPA) last week compared to the week prior but recession rates remained similar. WCA-1: Over the last three weeks stage has receded slowly within the Refuge to remain below the falling Zone A2 regulation line, stage on Sunday at the 1-8C gauge was 0.15 feet below that line.WCA-2A: Stage recession at the 2-17 trended much faster towards schedule last week. The average on Sunday was 1.24 feet above the falling regulation line. WCA-3A: The 3-Gauge average recession rate remained elevated last week. The average stage on Sunday was 0.22 feet above the flat Zone A regulation line.WCA-3A North: Stage recession at Gauge 62 (NW corner) continues to follow the slope of the Upper schedule, average on Sunday was 0.21 feet below that line. See figures **EV-1** through **EV-4**.

Water Depths

The SFWDAT tool illustrates ponded conditions remain in the upper reaches of the L-67s with depth conditions very similar to one month ago. Similar conditions in the ponded southern portions of WCA-3A where the spatial extent of areas with depths more than 2.5' is slightly less than one month ago. Comparing current WDAT water depths to one month ago conditions are slightly deeper across most of the EPA. Looking back a year ago, conditions are also slightly deeper across most the EPA with WCA-1 and Holeyland Wildlife Management Area the exceptions. (**Figure EV-5 and Figure EV-6)**.

Comparing current conditions to the 20-year average on December 10th: Above average depths conditions remain across a majority of the EPA. Depths again moved closer last week 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 0.04 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 10 stations to 0.41 inches at Long Sound (LS) in the eastern nearshore region. All recorded stages decreased across Taylor Slough, with an average decrease of 0.14 feet. Stage changes ranged from −0.25 feet at Taylor Slough Bridge (TSB), to −0.05 feet at EPSW in the southern C-111 area (**Figure EV-8 and Figure EV-9**). Taylor Slough water levels remain above the recent average for this time of year by 9.2 inches compared to before the Florida Bay initiative (starting in 2017), a decrease of 1.5 inches relative to last week.

Average Florida Bay salinity was 19.0, a decrease of 1.7 from last week. Salinity changes were variable across sites and ranged from –1.4 at Highway Creek in the eastern nearshore region to 3.4 at Garfield Bight (GB) in the western nearshore region (**Figure EV-8**). Western salinities are at the 25th percentile, while Eastern and Central salinities remain below it (**Figure EV-10**). Average Florida Bay salinity remains below its recent average for this time of year by 3.2, with no change from the previous 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 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	<0.01	−0.02
WCA-2A	<0.01	−0.19
WCA-2B	0.03	−0.15
WCA-3A	0.04	−0.13
WCA-3B	0.03	−0.12
ENP	0.03	−0.02

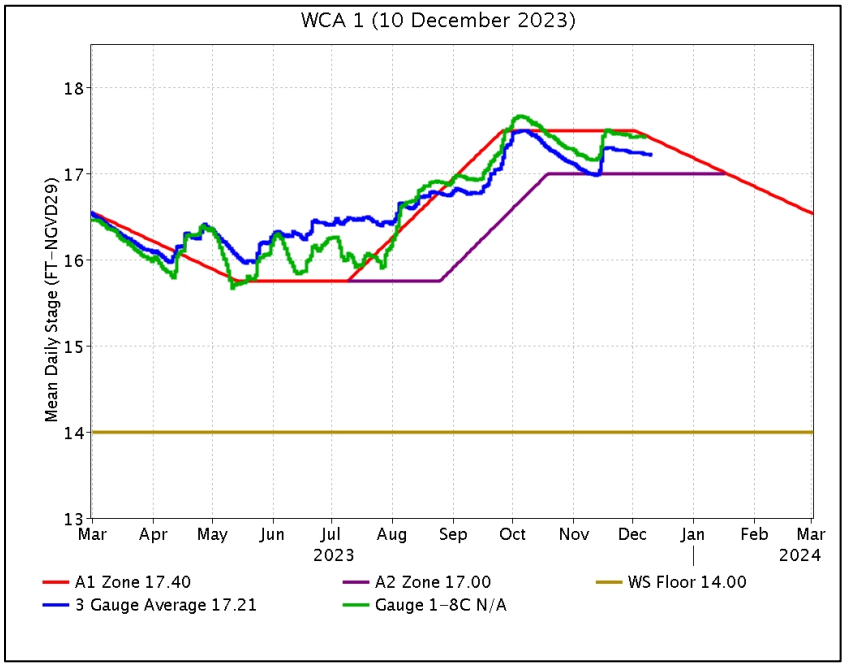


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

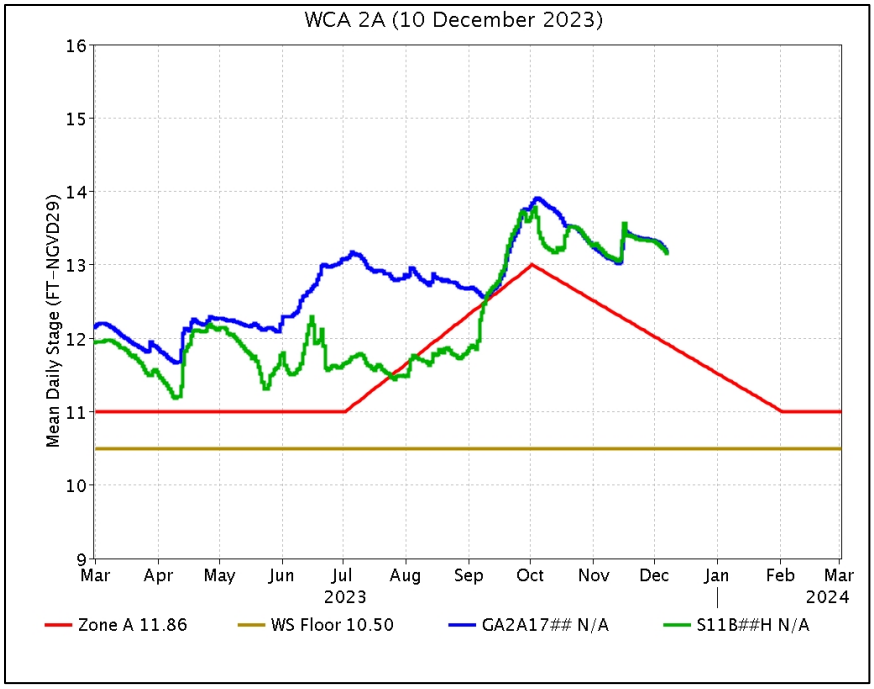


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

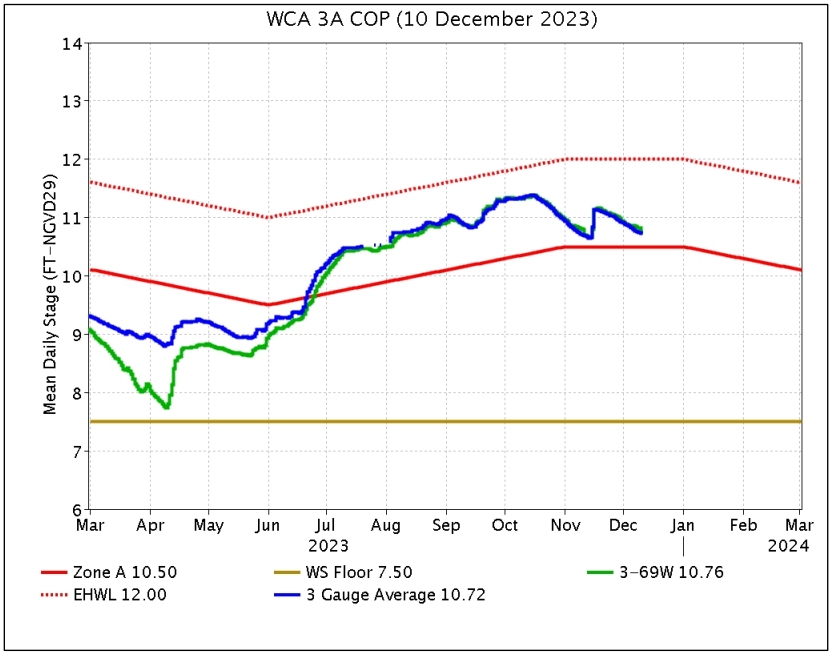


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, 3-69W) and regulation schedule.

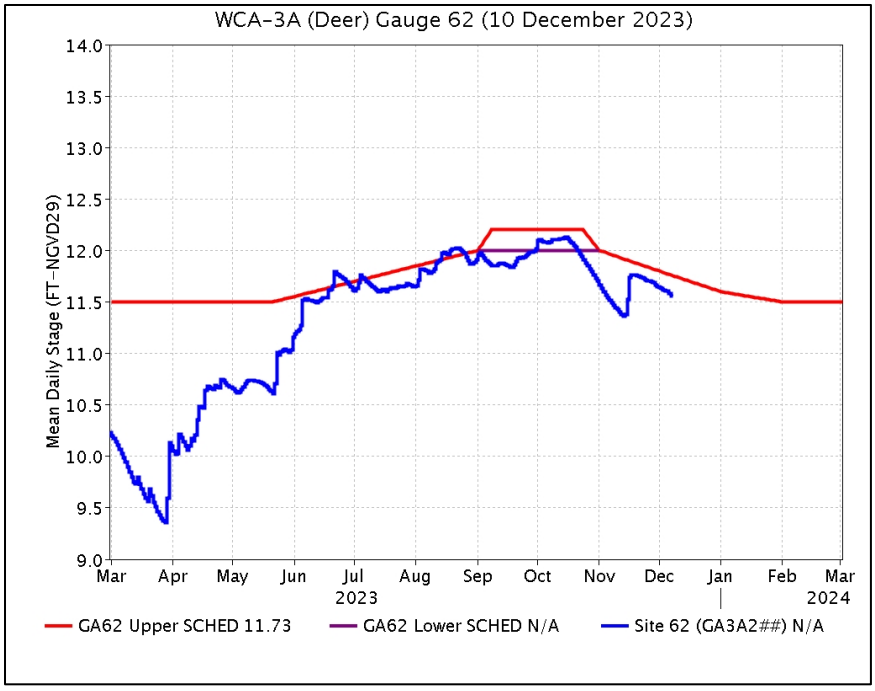


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and GA62 regulation schedule.

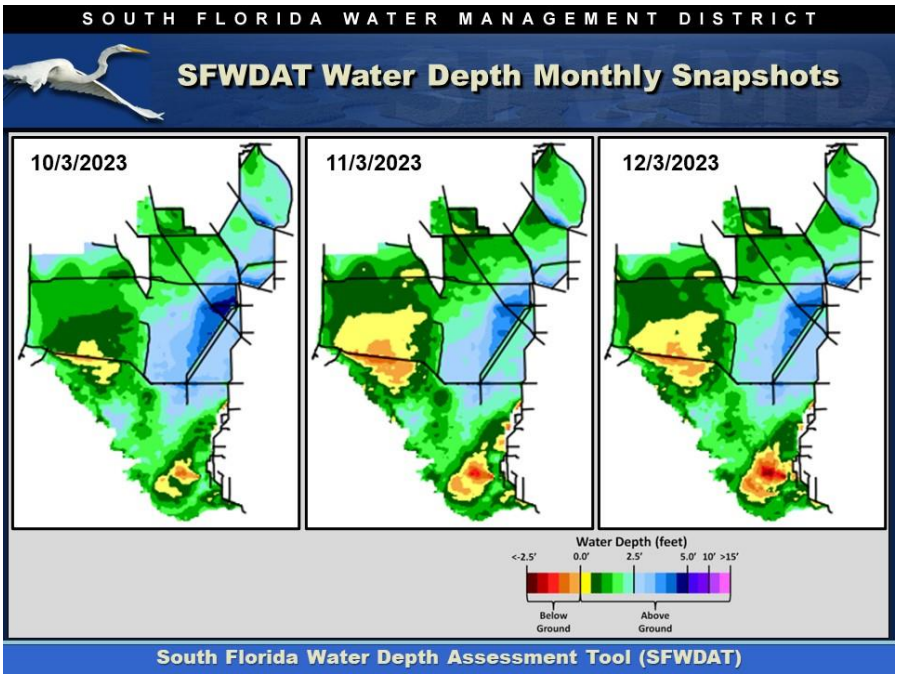


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

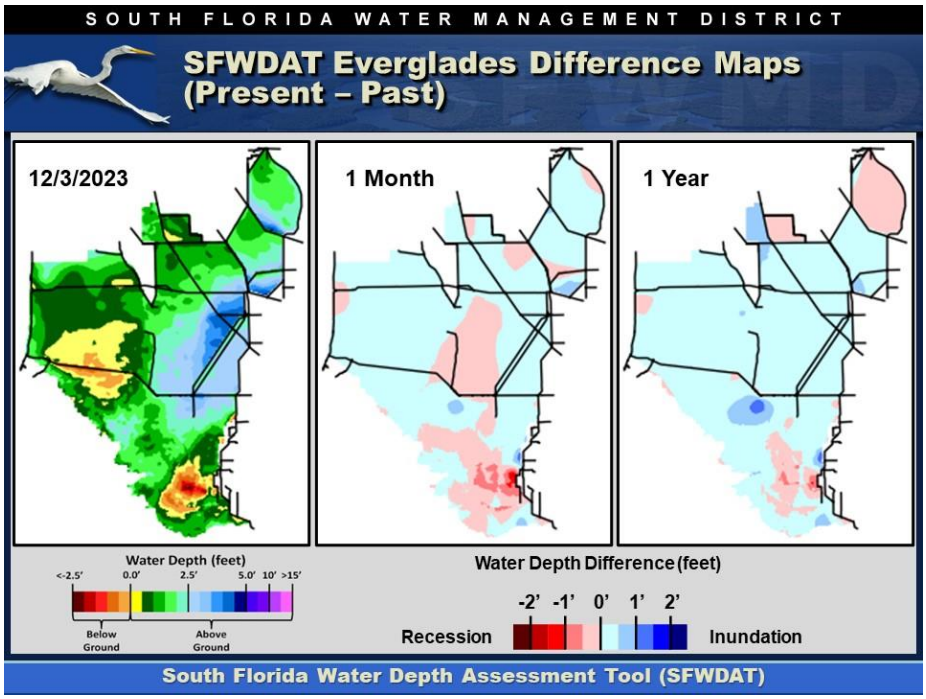


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

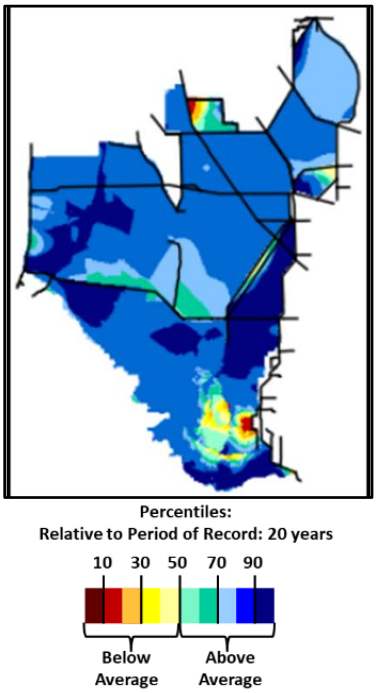


Figure EV-7. Present water depths (12/11/2023) compared to the day of year average over the previous 20 years.

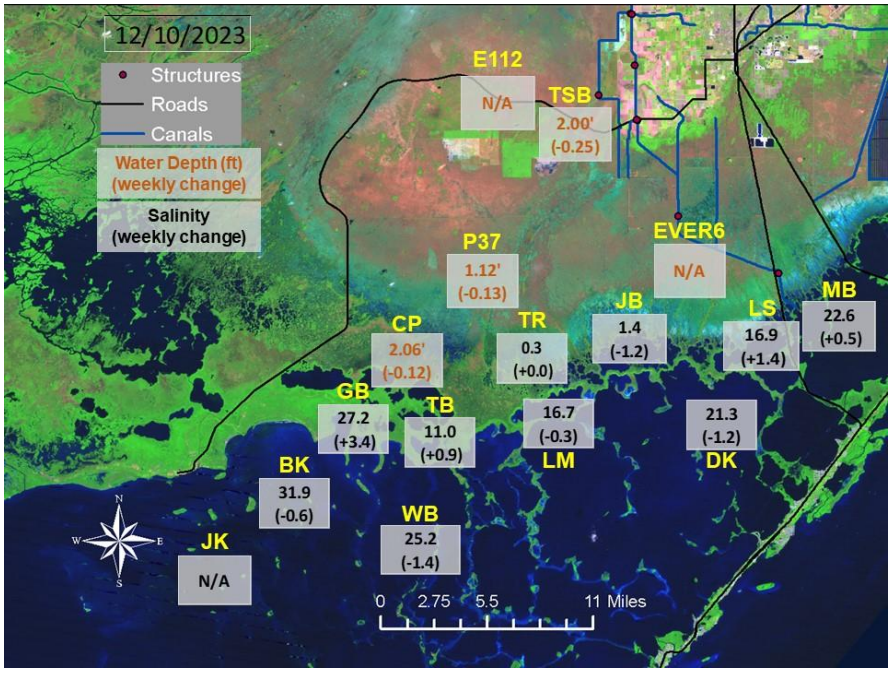


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

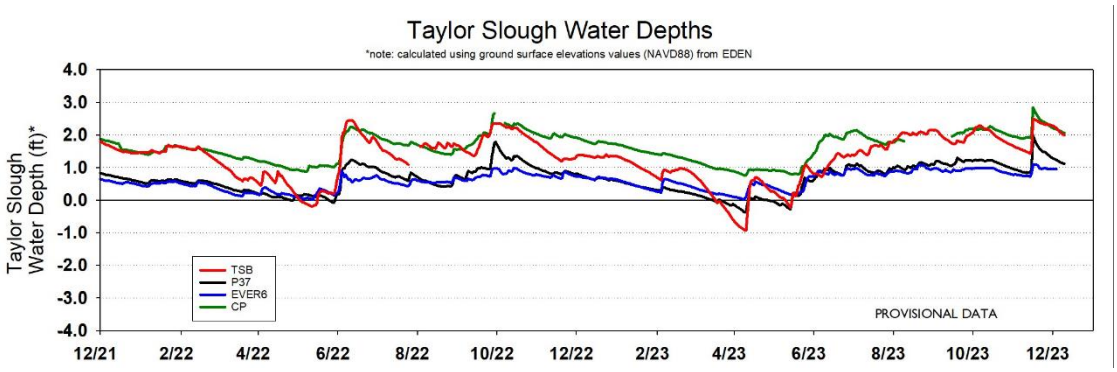


Figure EV-9. Taylor Slough water depth time series.

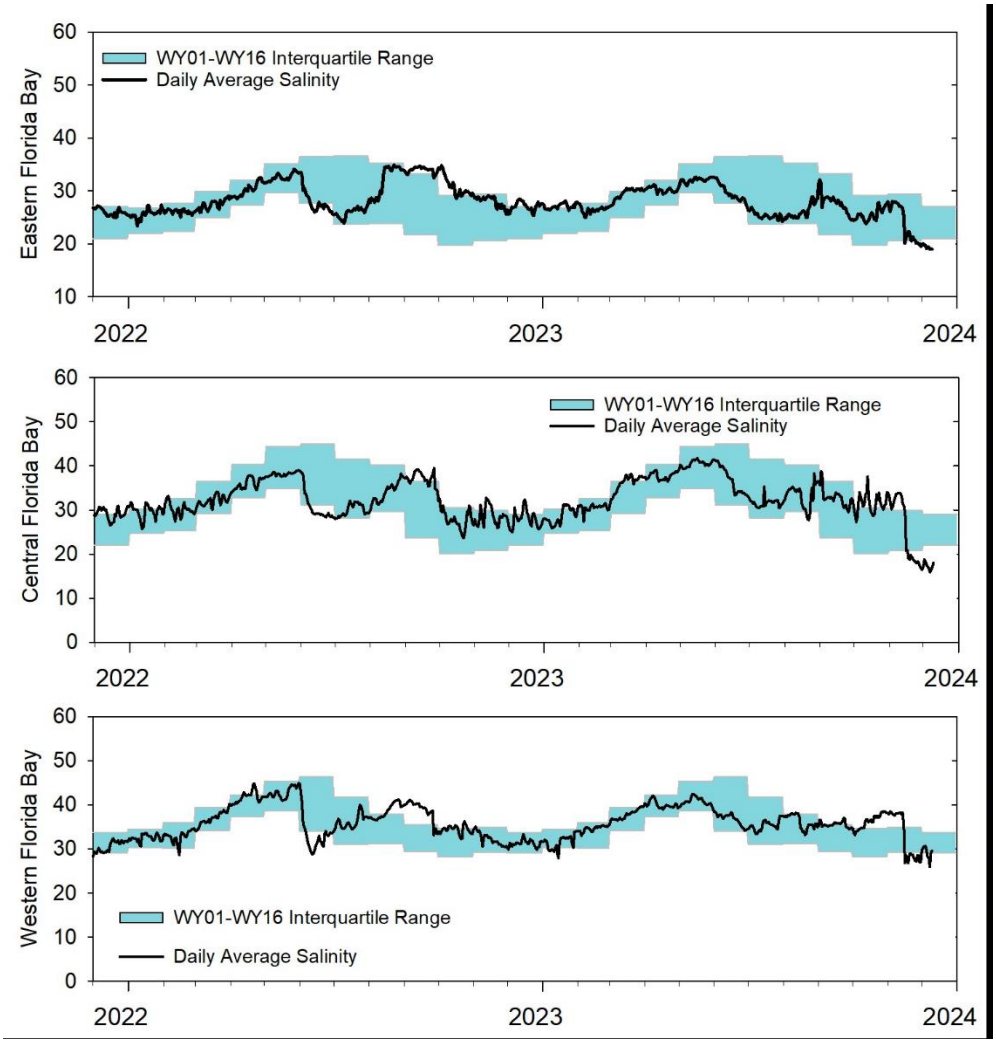


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, December 12, 2023 (red is new)			
	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.02’	Recession rate of less than 0.05’ per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage decreased by 0.19’	Recession rate of less than 0.05’ per week.	Protect within basin and downstream habitat and wildlife. Recent rapid stage change.
WCA-2B	Stage decreased by 0.15’	Recession rate of less than 0.12’ per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage decreased by 0.14’	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.
WCA-3A NW	Stage decreased by 0.09’	Recession rate of less than 0.05’ per week.	
Central WCA-3A S	Stage decreased by 0.14’	Recession rate of less than 0.05’ per week.	Protect within basin wildlife (fish/crayfish reproduction, wading bird foraging). Recent rapid stage change.
Southern WCA-3A S	Stage decreased by 0.14’		
WCA-3B	Stage decreased by 0.12’	Recession rate of less than 0.12’ per week.	Protect within basin (sensitive tree islands) and downstream habitat and wildlife. Allow for flow through.
ENP-SRS	Stage decreased by 0.02’	Make discharges to ENP according to COP and TTFF protocol while adaptively considering upstream and downstream ecological conditions.	Protect within basin and upstream habitat and wildlife (wading bird nesting).
Taylor Slough	Stage changes ranged from −0.12’ to +0.02’	Move water southward as possible.	When available, provide freshwater to promote water movement.
FB- Salinity	Salinity changes ranged from −1.2 to +5.2	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 950 cfs, and the previous 30-day mean inflow was 1,330 cfs. The seven-day mean salinity was 24.3 at BBCW8 and 18.3 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.

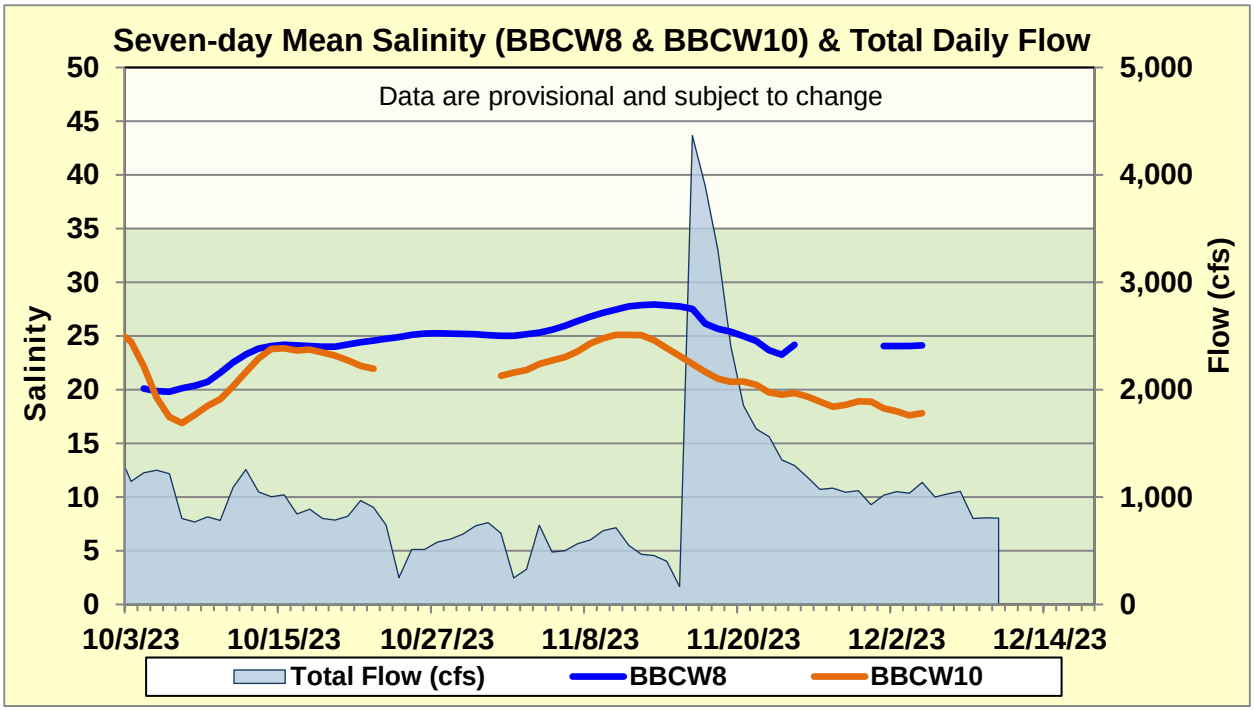


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.