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: March 27, 2024

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A dry weather pattern and warming trend are anticipated to persist through Wednesday evening. A narrow swath of moisture, slightly enhanced instability, and forced ascent associated with an approaching cold front will overspread Florida, resulting in light to moderately heavy showers and isolated thunderstorms north and west of Lake Okeechobee Thursday morning. These rains will quickly shift southeastward diminishing in intensity by early or mid-afternoon. Although a good coverage of rainfall is possible, it will generally keep area-averaged rainfall to fifteen hundredths of an inch. Isolated areas around and north/west of Lake Okeechobee could see locally heavier rainfall. By Thursday evening, the cold front will usher in a cooler and stable air mass with substantially lower moisture across the SFWMD, leading to below-normal temperatures and dry conditions on Friday. This dry and relatively cool weather pattern is anticipated to persist into Saturday. Subsequently, a warming trend will begin early next week. Given the slow rebound of moisture and strong atmospheric stability forecast, dry conditions are also expected to persist. Overall, total rainfall for the week ending next Tuesday morning in the SFWMD is likely to be significantly below normal.

Kissimmee

Releases were made from East Lake Toho and Lake Toho to continue spring lake stage recessions to low pool. Weekly average discharge on March 24, 2024, was 970 cfs and 950 cfs at S-65 and S-65A, respectively. Mean weekly water depth on the Kissimmee River floodplain decreased by 0.06 feet to 0.30 feet over the week ending March 24, 2024. The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 7.0 mg/L last week to 7.1 mg/L for the week ending March 24, 2024, which is well above the potentially lethal and stressful levels for largemouth bass and other sensitive species.

Lake Okeechobee

Lake Okeechobee stage was 15.47 feet NGVD on March 24, 2024, which was 0.28 feet lower than the previous week and 0.84 feet lower than a month ago. Average daily inflows

(excluding rainfall) decreased from 1,590 cfs the previous week to 1,180 cfs. Average daily outflows (excluding evapotranspiration) increased from 4,210 cfs the previous week to 6,920 cfs. During the March monthly water quality sampling, bloom conditions (>40 µg/L chlorophyll *a*) were recorded at one southwestern site (PALMOUT) and one northwestern site (POLESOUT). Six sites also had chlorophyll *a* value >20 µg/L but <40 µg/L. The March 19, 2024, satellite image from NOAA's Harmful Algal Bloom Monitoring System suggested a moderate bloom risk along most of the north, west, and south shorelines of the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged 1,787 cfs over the past week with most of the flow coming from Lake Okeechobee. Mean salinities increased at all three sites within 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 6,556 cfs over the past week with 4,700 cfs coming from Lake Okeechobee. Mean surface salinities remained the same at S-79, Val I-75, and Ft. Myers, and decreased slightly at the remaining sites over the past week. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the damaging range (0-5) for adult eastern oysters at Cape Coral, in the optimal range (10-25) at Shell Point, and in the upper stressed range (> 25) at Sanibel.

Stormwater Treatment Areas

For the week ending Sunday, March 24, 2024, 3,600 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 47,600 ac-feet. The total amount of inflows to the STAs in WY2024 is approximately 1,410,000 ac-feet. Most STA cells are near or above target stage. STA-1E Eastern Flow-way is offline for rehydration and vegetation establishment following erosion repair. Operational restrictions are in effect in STA-1E Western Flow-way, 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 the A-1 FEB, STA-3/4, or STA-5/6.

Everglades

Last week's rates of stage change (Sunday to Sunday) were generally unfavorable for wading bird foraging and dry season Everglades ecology. Stages increased in Taylor Slough last week, and depths remain well above the recent average. Salinity decreased on average in Florida Bay last week, and conditions are below historical estimates for this time of year. The 365-day moving average for the 5-creek flow remains well above the minimum flow and level (MFL) volume. On last Friday's recon flight about 5,000 White Ibis (WHIB) were detected pairing up at Alley N and another 5,000 - 7,000 WHIB were detected at what may be a new colony about 1 mile west of Venus (approx. 26.40401, -80.26799). Some of these birds are nesting.

Biscayne Bay

Total inflow to Biscayne Bay averaged 1,086 cfs and the previous 30-day mean inflow averaged 726 cfs. The seven-day mean salinity was 25.3 at BBCW8 and 23.1 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.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On March 24, 2024, mean daily lake stages were 56.2 feet NGVD (1.5 feet below schedule) in East Lake Toho, 53.1 feet NGVD (1.6 feet below schedule) in Lake Toho, and 51.4 feet NGVD (0.5 feet below the temporary deviation schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1**, **Figures KB-1-3**).

Lower Kissimmee

For the week ending March 24, 2024, mean weekly discharge was 970 cfs and 950 cfs at S-65 and S-65A, respectively. Mean weekly discharge from the Kissimmee River was 1,000 cfs at S-65D and 920 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 46.1 feet NGVD at S-65A and 25.8 feet NGVD at S-65D. Mean weekly river channel stage decreased by 0.2 feet to 36.1 feet NGVD (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain decreased by 0.06 feet to 0.30 feet (**Table KB-2**, **Figure KB-5**). The weekly average dissolved oxygen concentration in the Kissimmee River increased from 7.0 mg/L the previous week to 7.1 mg/L (**Table KB-2**, **Figure KB-6**).

Water Management Recommendations

Continue the stage recessions in Lakes East Toho and Toho to reach their low pools on May 31, 2024. Follow the Hybrid A discharge plan for S-65/S-65A (**Figure KB-7**) through May 31, 2024, except as otherwise indicated. Maintain at least minimum flow (250-300 cfs) at S-65A. Maintain S-65/S-65A flow at ~950 cfs to facilitate S-69 repairs. To the extent possible, modify S-65D headwater stage to meet USACE's objectives for S-69 repairs.

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)	
							3/24/24	*3/17/24*
Lakes Hart and Mary Jane	S-62	LKMJ	52	60.4	R	60.8	-0.4	-0.5
Lakes Myrtle, Preston and Joel	S-57	S-57	20	60.7	R	60.8	-0.1	0.0
Alligator Chain	S-60	ALLI	110	63.8	R	63.8	0.0	0.0
Lake Gentry	S-63	LKGT	170	61.2	R	61.3	-0.1	0.0
East Lake Toho	S-59	TOHOE	170	56.2	R	57.7	-1.5	-1.7
Lake Toho	S-61	TOHOW S-61	460	53.1	R	54.7	-1.6	-1.7
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	970	51.4	T	51.9	-0.5	0.4

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.

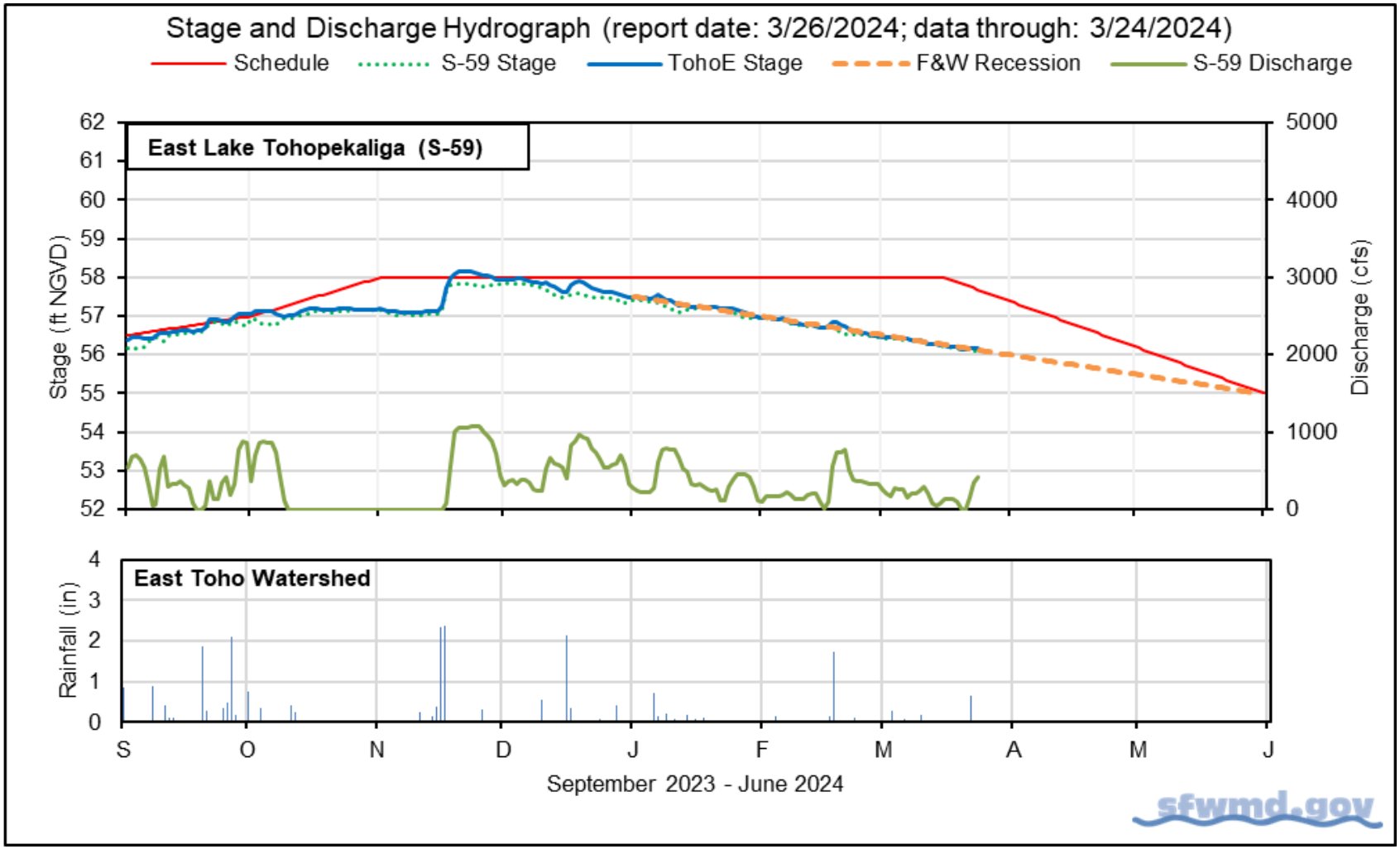


Figure KB-1. East Lake Toho regulation schedule, stage, discharge, and rainfall.

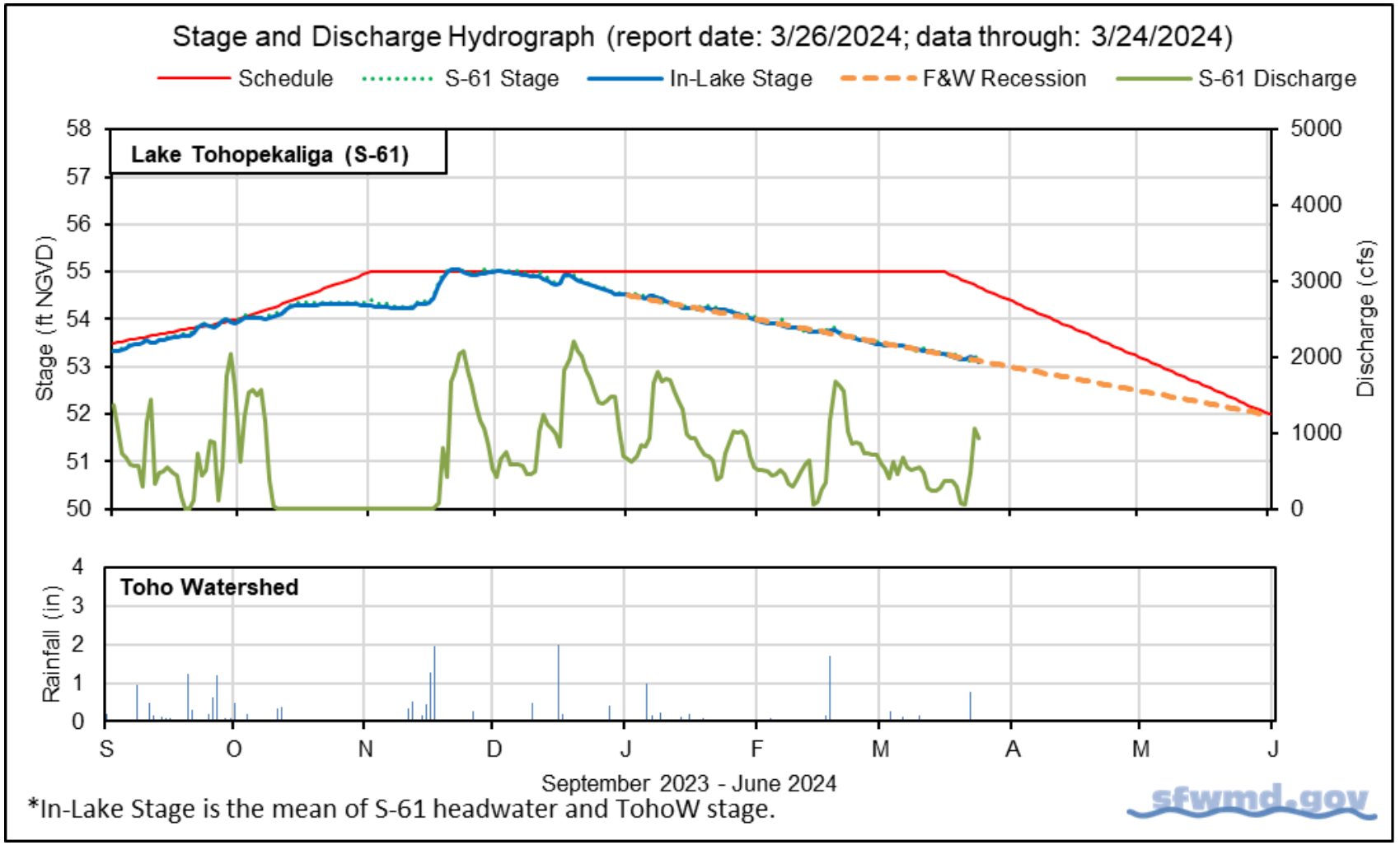


Figure KB-2. Lake Toho regulation schedule, stage, discharge, and rainfall.

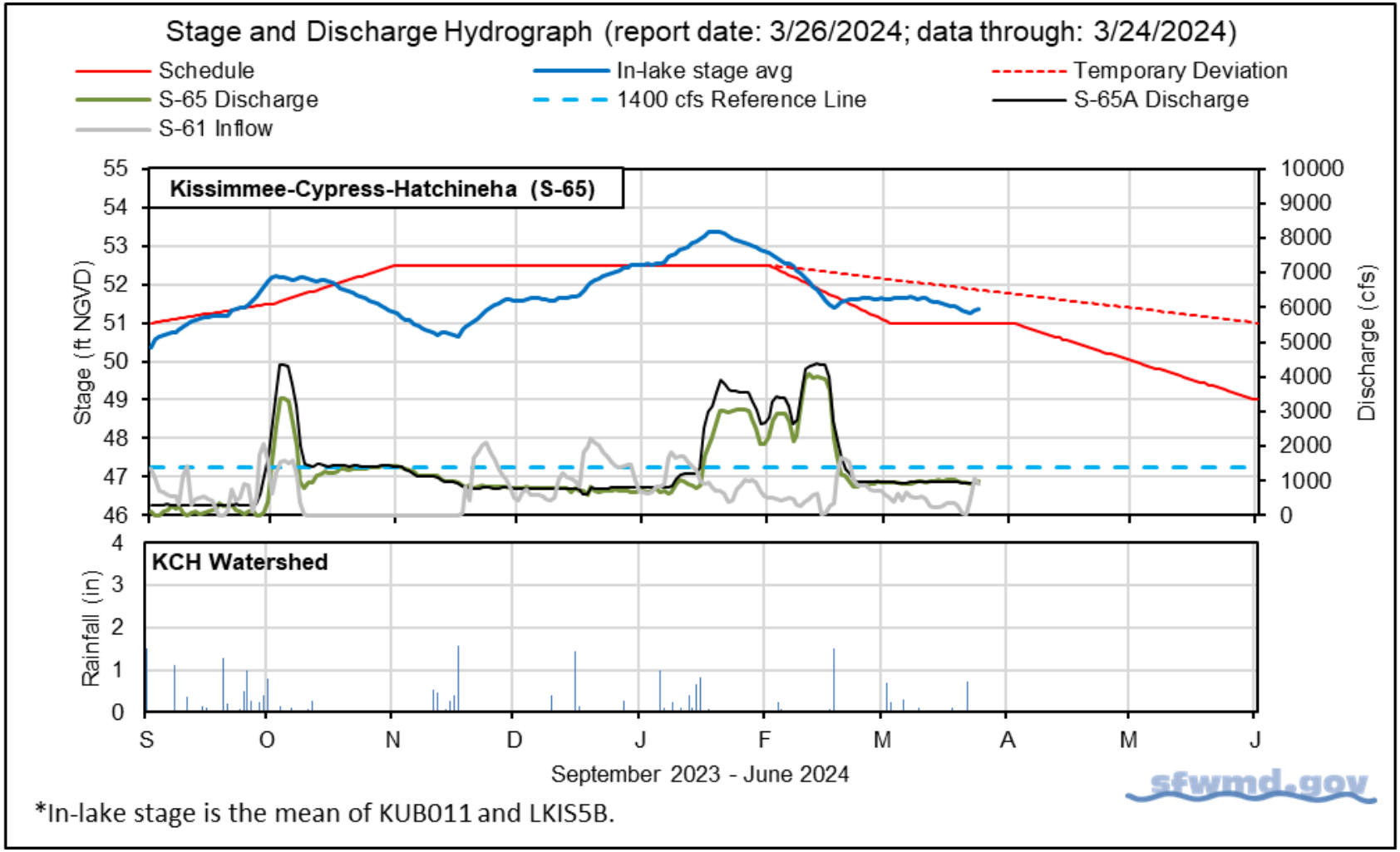


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge, and rainfall.

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			
		3/24/24	3/24/24	3/17/24	3/10/24	3/3/24
Discharge	S-65	1,000	970	1,000	950	950
Discharge	S-65A[a]	930	950	970	960	970
Headwater Stage (feet NGVD)	S-65A	45.9	46.1	46.3	46.3	46.3
Discharge	S-65D[b]	1,000	1,000	1,100	1,400	2,300
Headwater Stage (feet NGVD)	S-65D[c]	25.8	25.8	25.8	25.9	26.6
Discharge (cfs)	S-65E[d]	900	920	1,000	1,300	2,300
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) [e]	Phase I, II/III river channel	7.2	7.1	7.0	6.5	6.7
River channel mean stage[f]	Phase I river channel	36.0	36.1	36.3	36.6	37.2
Mean depth (feet) [g]	Phase I floodplain	0.31	0.30	0.36	0.48	0.66

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).

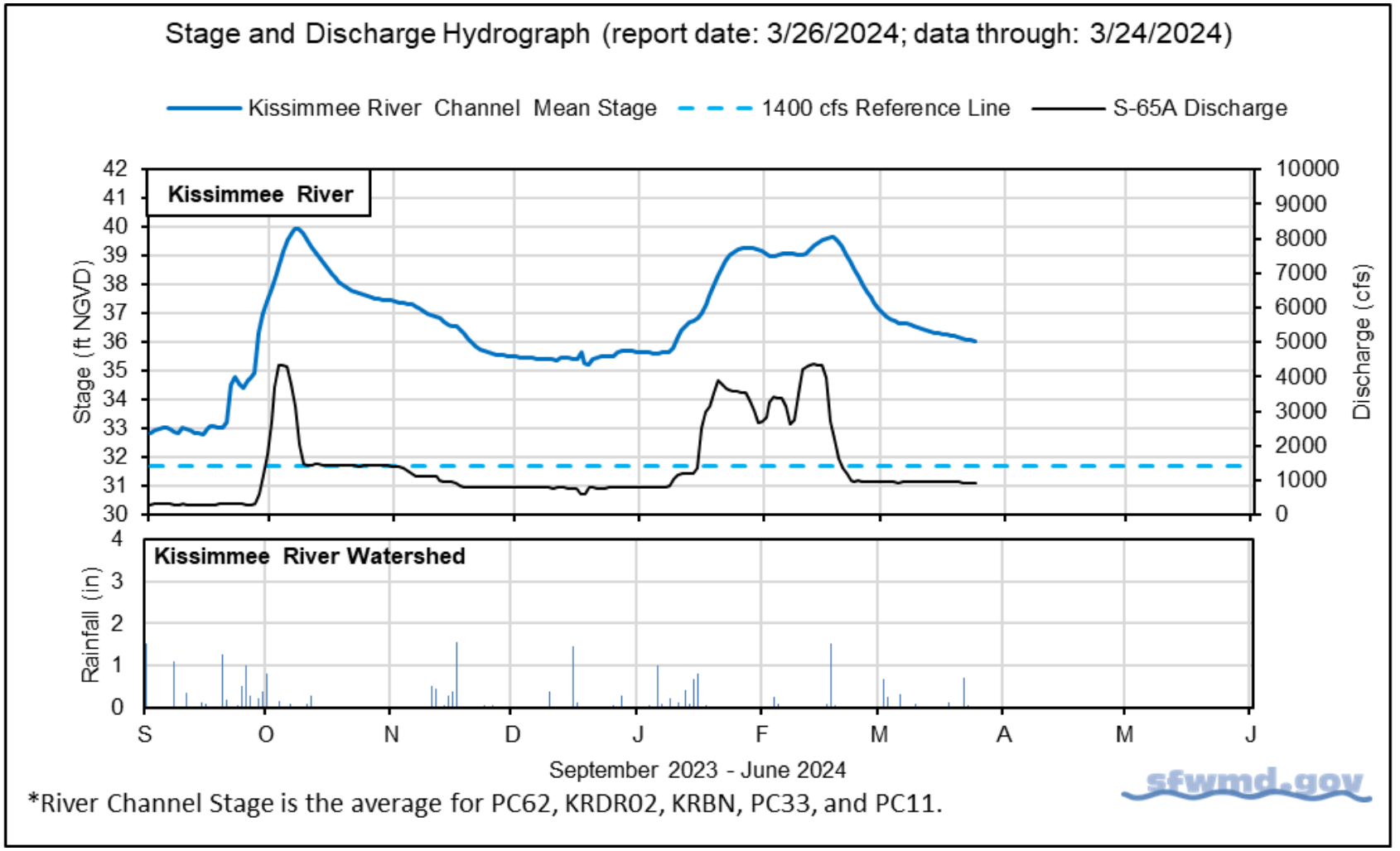


Figure KB-4. Kissimmee River stage, discharge, and rainfall.

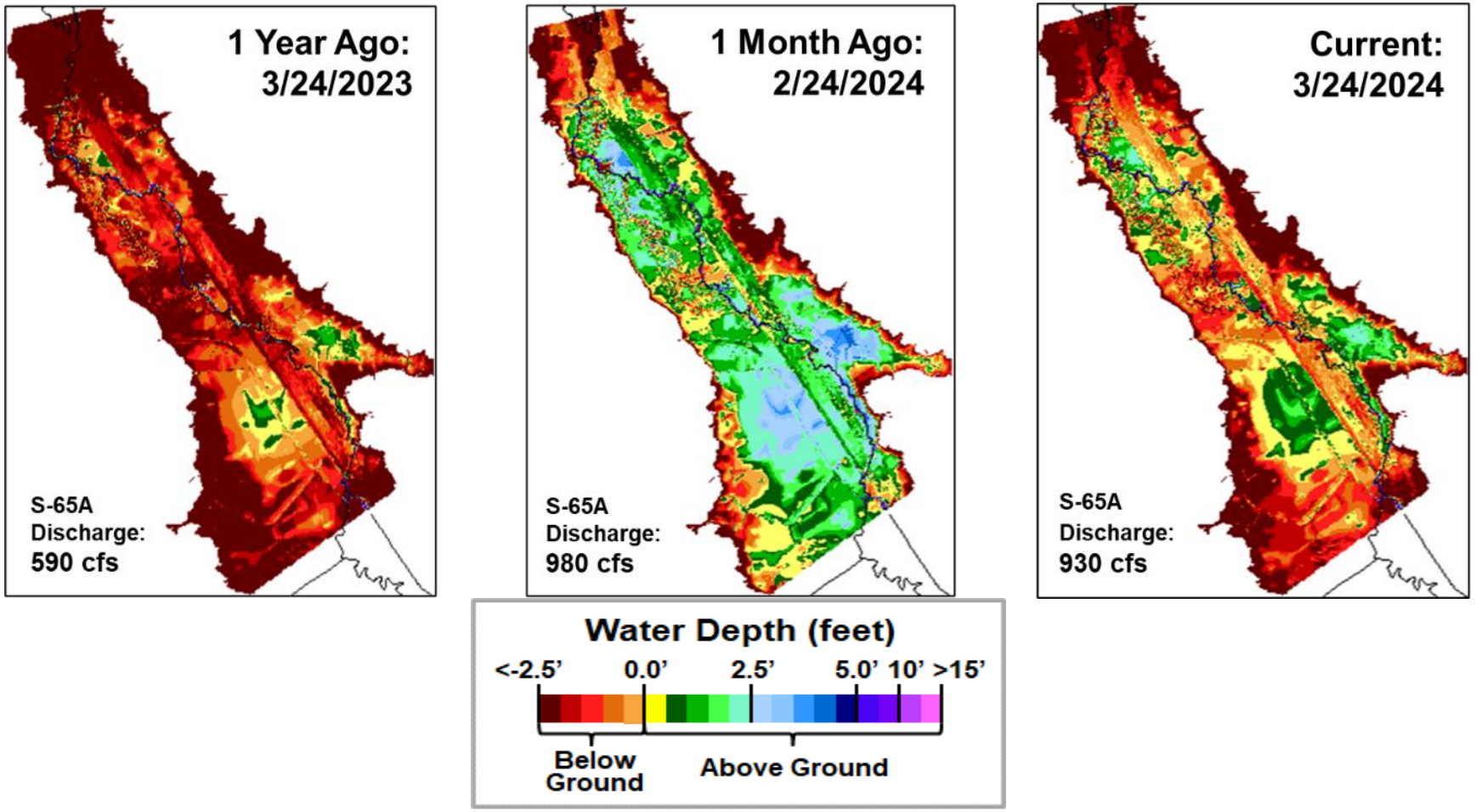


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago, and current.

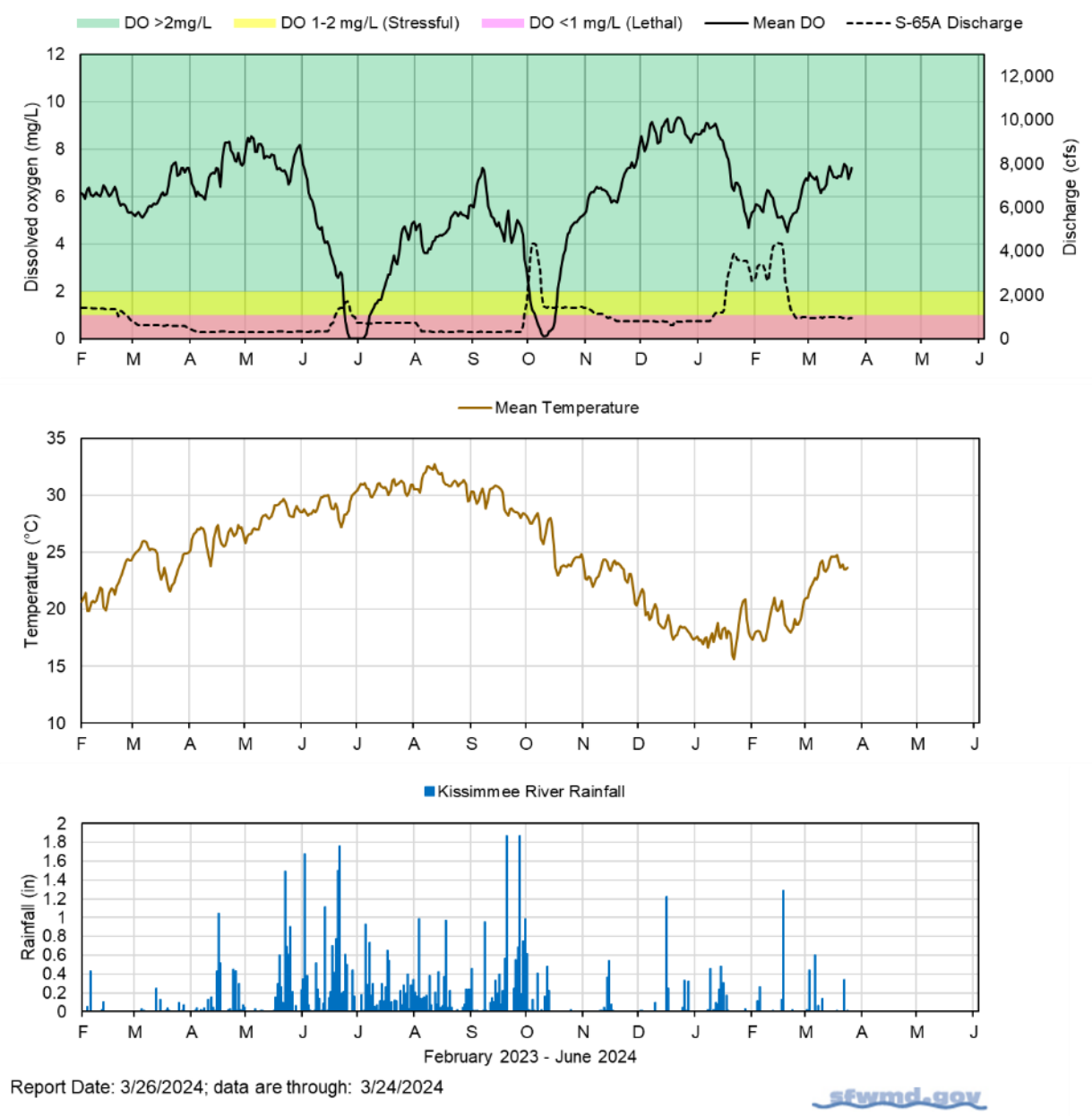


Figure KB-6. Kissimmee River channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C), and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRDR02, KRBN, PC33, PC11, PD62R, and PD42R with an average of six stations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

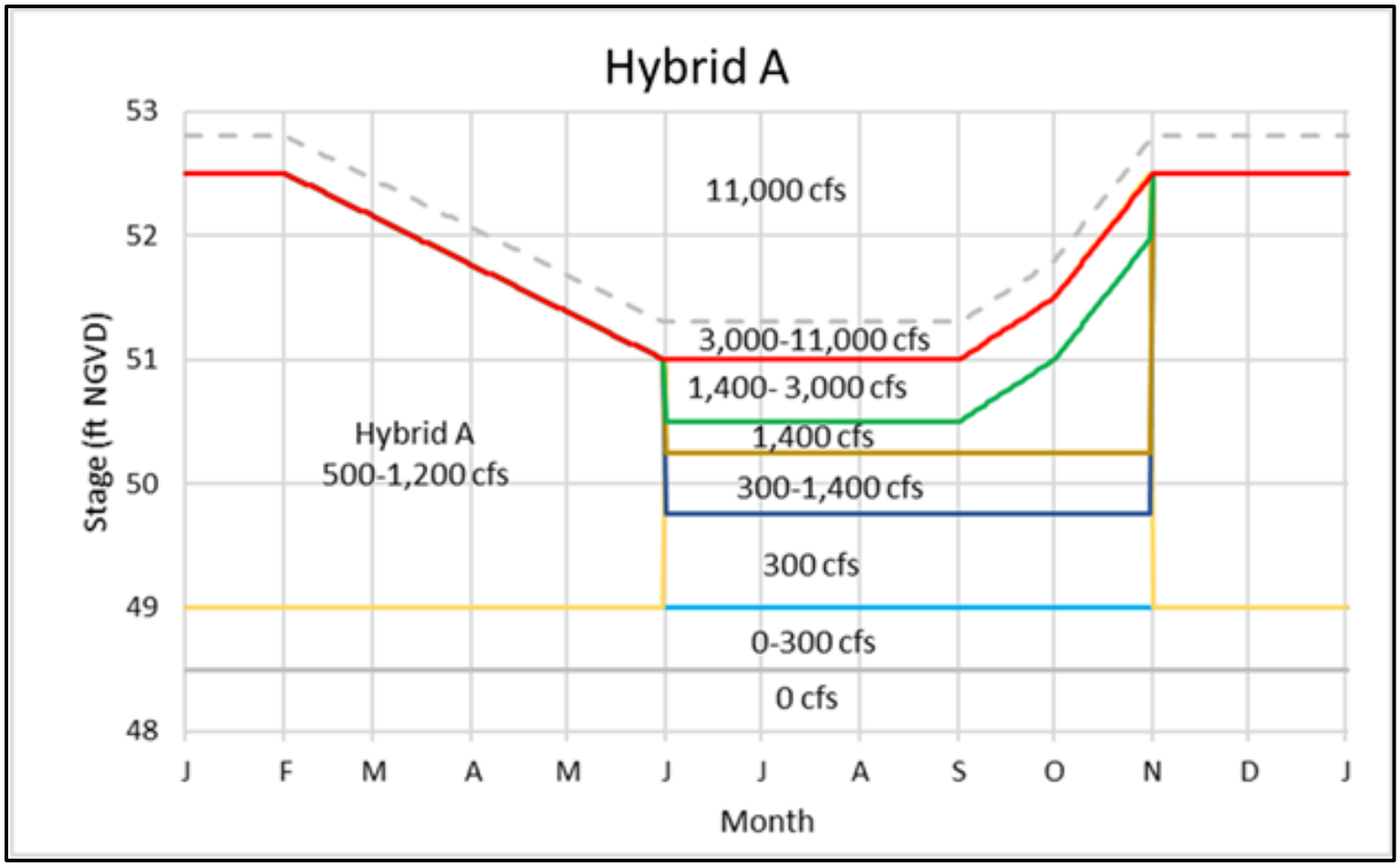


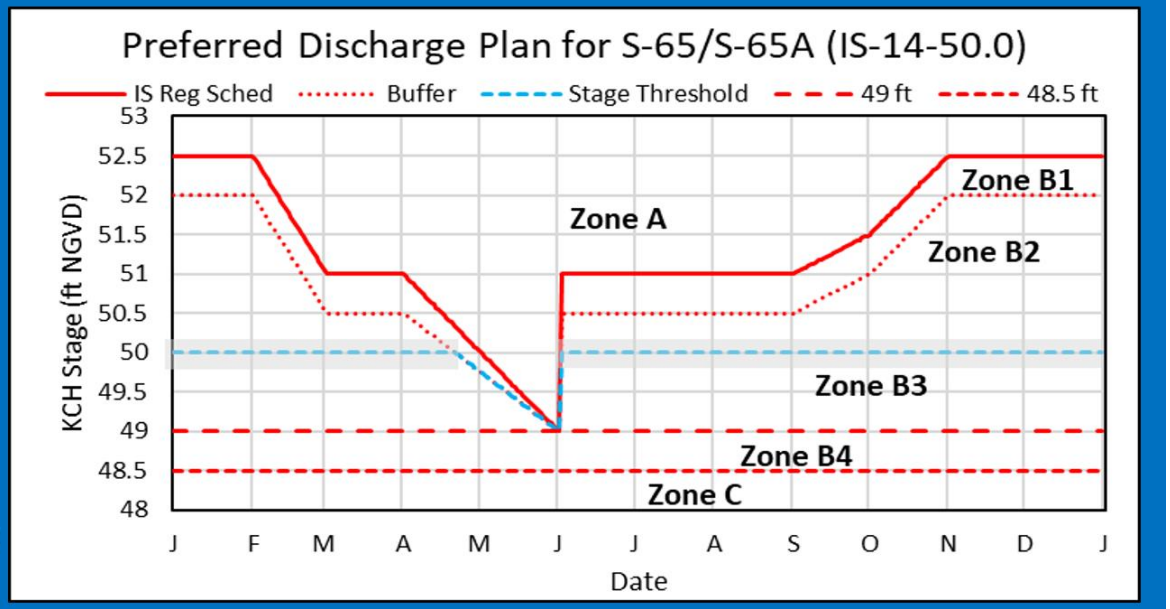
Figure KB-7. Hybrid A Discharge Plan for S-65/S-65A. Use discharge rate of change limits from IS-14-50 (Fig. KB-8).

2021-2023 Discharge Plan for S-65/S-65A

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



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

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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 15.47 feet NGVD on March 24, 2024, which was 0.28 feet lower than the previous week and 0.84 feet lower than a month ago (**Figure LO-1**). Lake stage crossed into the Low sub-band (**Figure LO-2**) and was 1.97 feet above the upper limit of the recovery ecological envelope (**Figure LO-3**). According to NEXRAD, 0.88 inches of rain fell directly over the Lake last week.

Average daily inflows (excluding rainfall) decreased from 1,590 cfs the previous week to 1,180 cfs. The highest structure inflow came from the C-38 Canal via the S-65E/65EX1 structure (920 cfs). Average daily outflows (excluding evapotranspiration) increased from 4,210 cfs the previous week to 6,920 cfs. The highest average single structure outflow was recorded at the S-77 structure into the C-43 canal (4,680 cfs), while an average of 1,590 cfs was released through S-308 into the C-44 canal and an average of 490 cfs was released to the south through the S-350 structures. **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.

As of November 1st, the routine water quality and phytoplankton monitoring is on the off-bloom season schedule, with samples collected once per month at all in-lake sites, and cyanobacteria taxa/toxins samples collected at 9 sites. Provisional results from the March 12 -13, 2024 sampling show *Microcystis aeruginosa* dominated communities at 5 of the 9 sites sampled for toxins and 2 of those sites had toxin levels above the 0.25 µg/L method's detection threshold (**Figure LO-6**). Bloom conditions (>40 µg/L chlorophyll *a*) were recorded at one southwestern site (PALMOUT) and one northwestern site (POLESOUT). Six sites also had chlorophyll *a* value >20 µg/L but <40 µg/L (**Figure LO-6**).

In the most recent non-obscured satellite image from March 19, 2024, NOAA's Harmful Algal Bloom Monitoring System suggested a moderate bloom risk along most of the north, west, and south shorelines of the Lake (**Figure LO-7**).

Note: All data presented in this report are provisional and are subject to change.

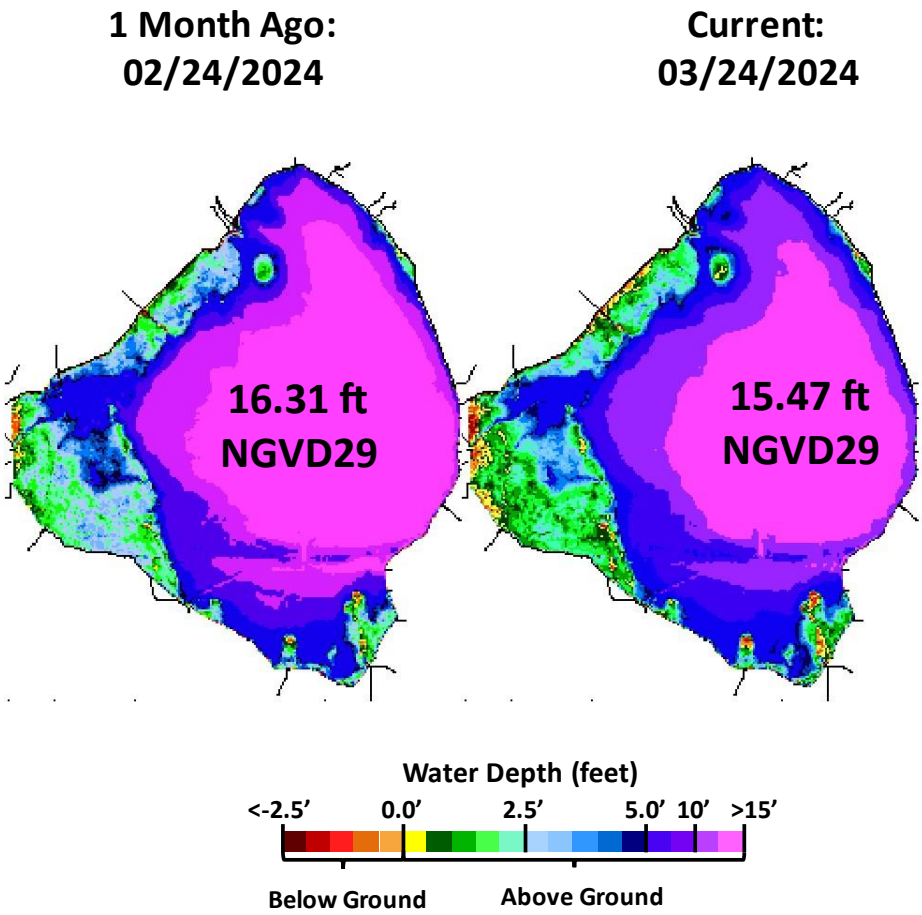


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

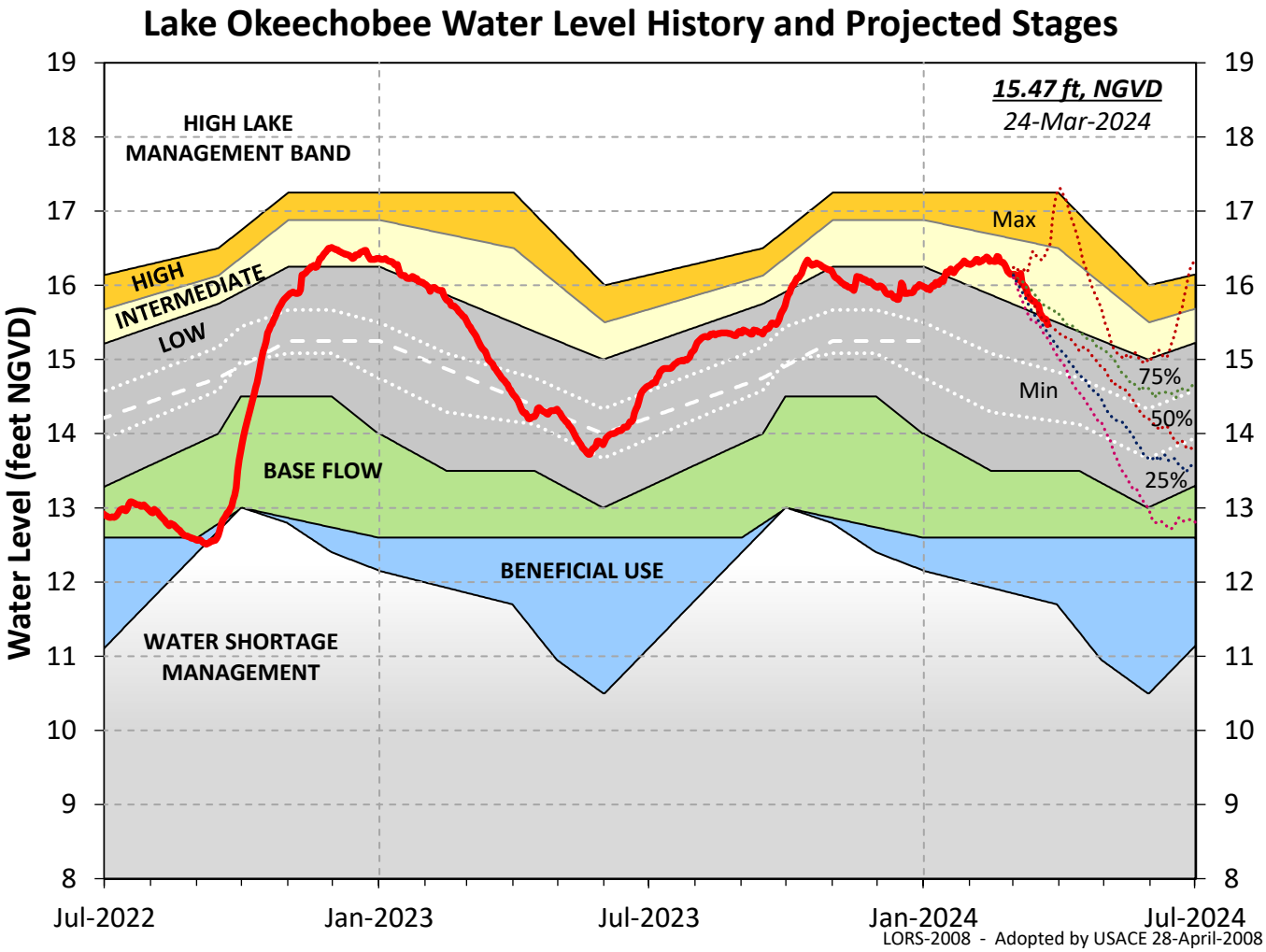


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

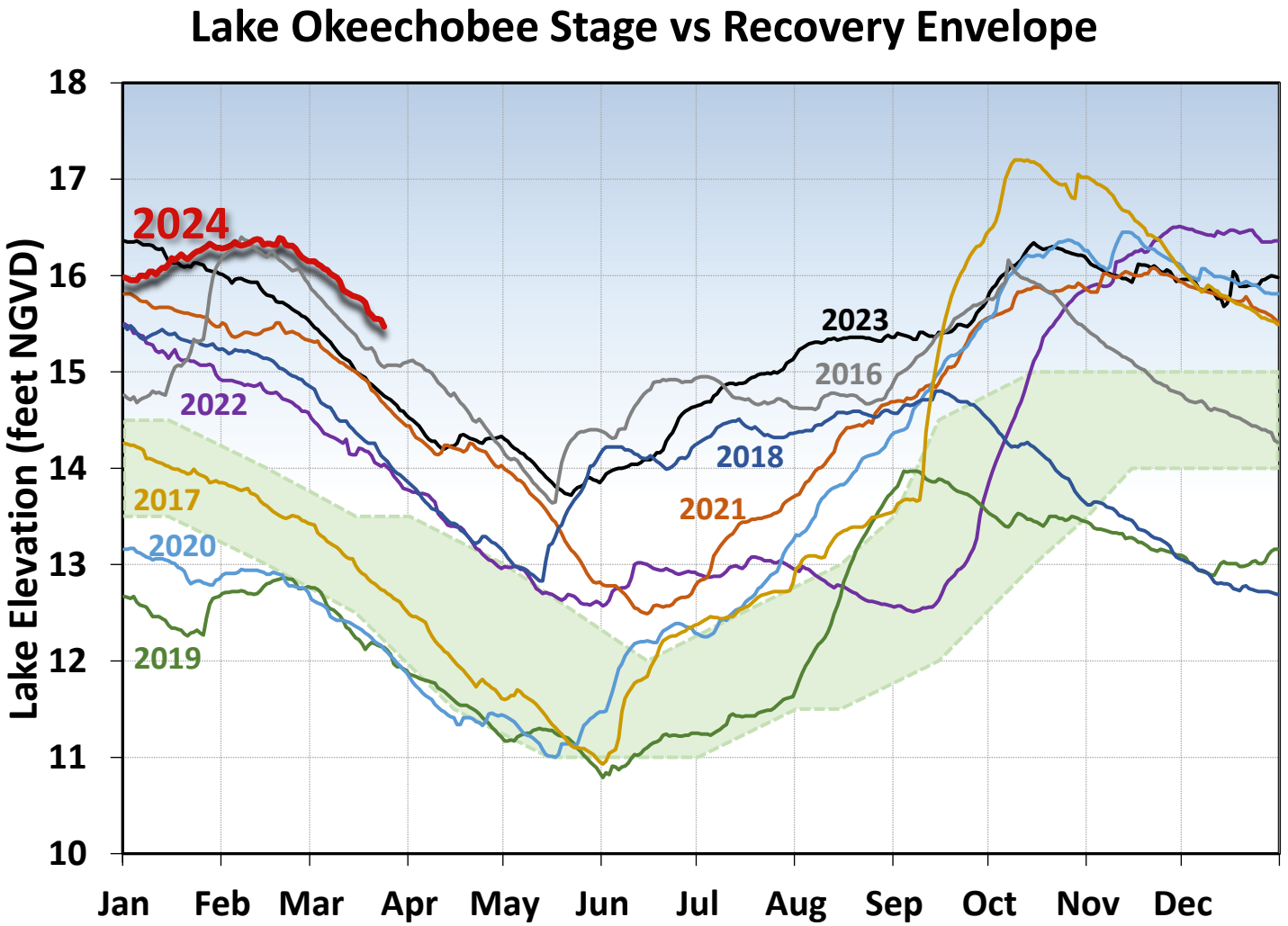


Figure LO-3. The current and eight prior year's annual stage hydrographs for Lake Okeechobee in comparison to the recovery envelope (light green). A shift from the normal ecological envelope to the recovery envelope occurred because the 30-day minimum lake stage (elevations exposed for at least 30 days, nonconsecutively) in the June 1 – July 31, 2023, window was >13.0 ft (3.96 m).

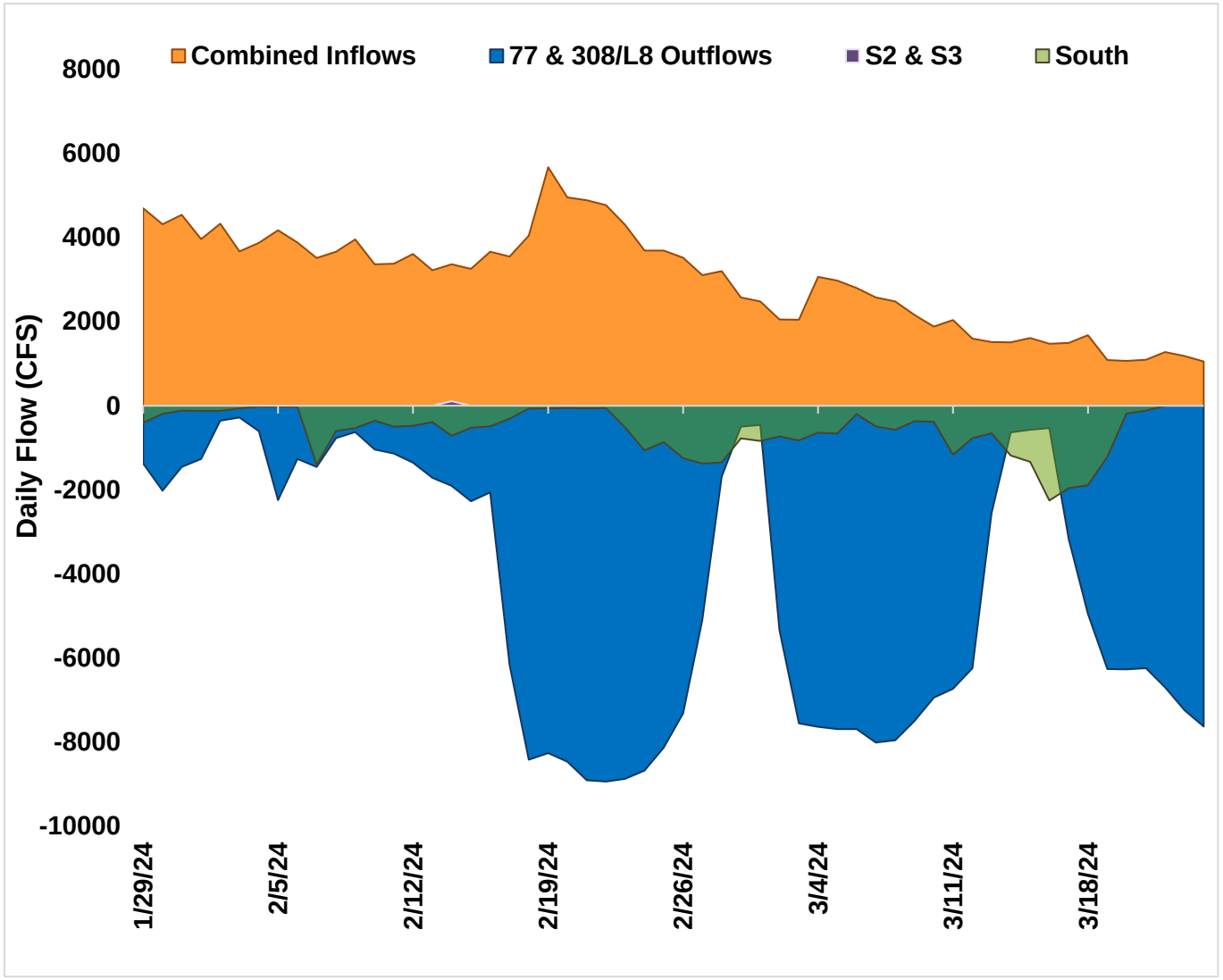


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

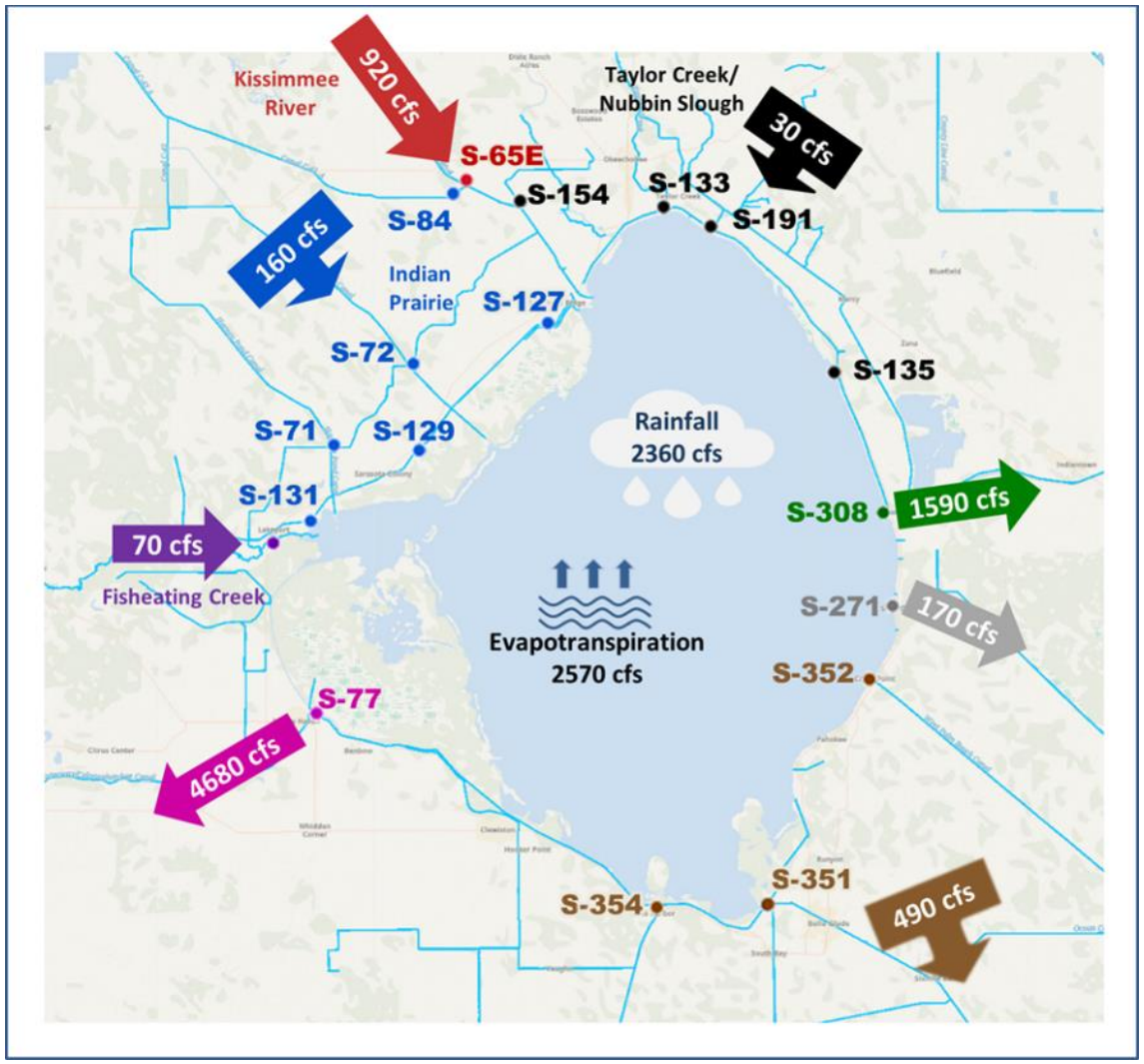


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of March 18 – March 24, 2024.

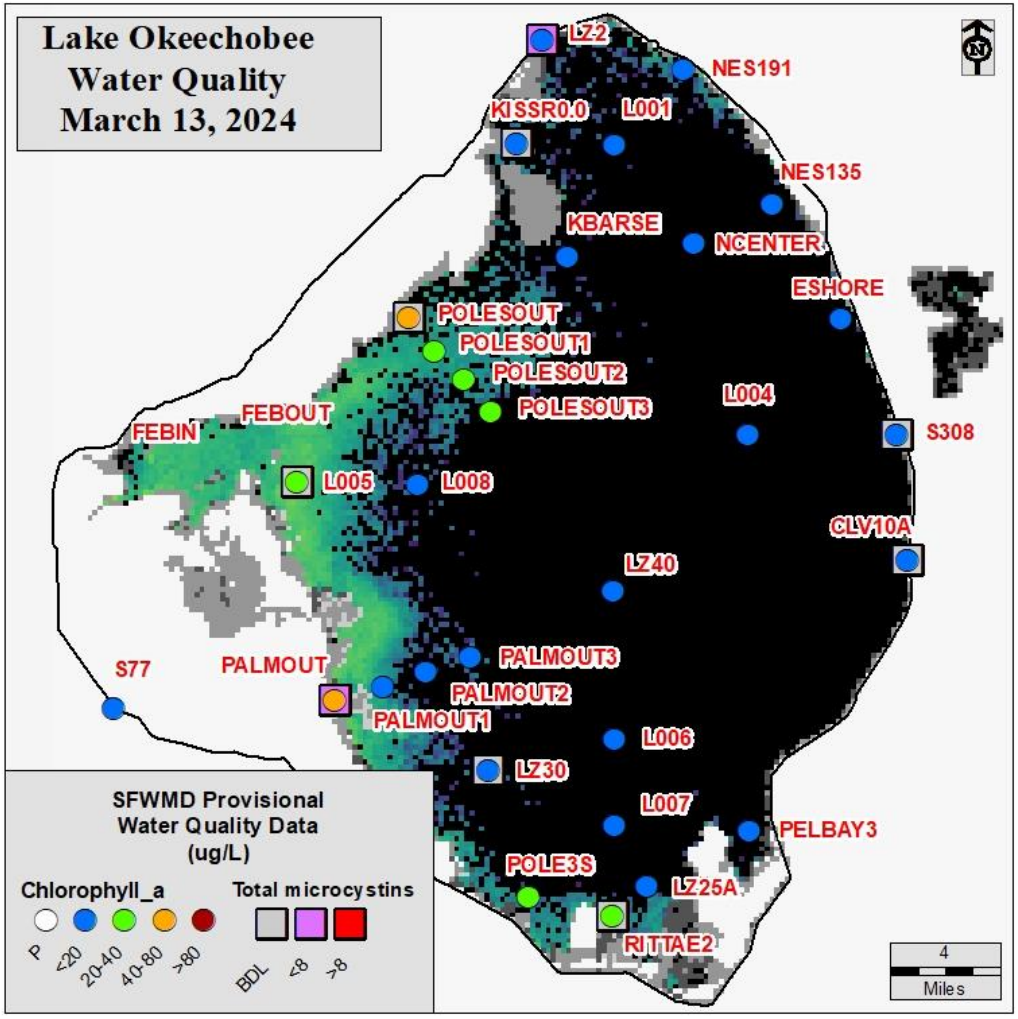


Figure LO-6. Total microcystins (µg/L) and chlorophyll *a* (µg/L) data from March 12 - 13, 2024 survey. Sampling locations are overlaid on the March 13, 2024, image from NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

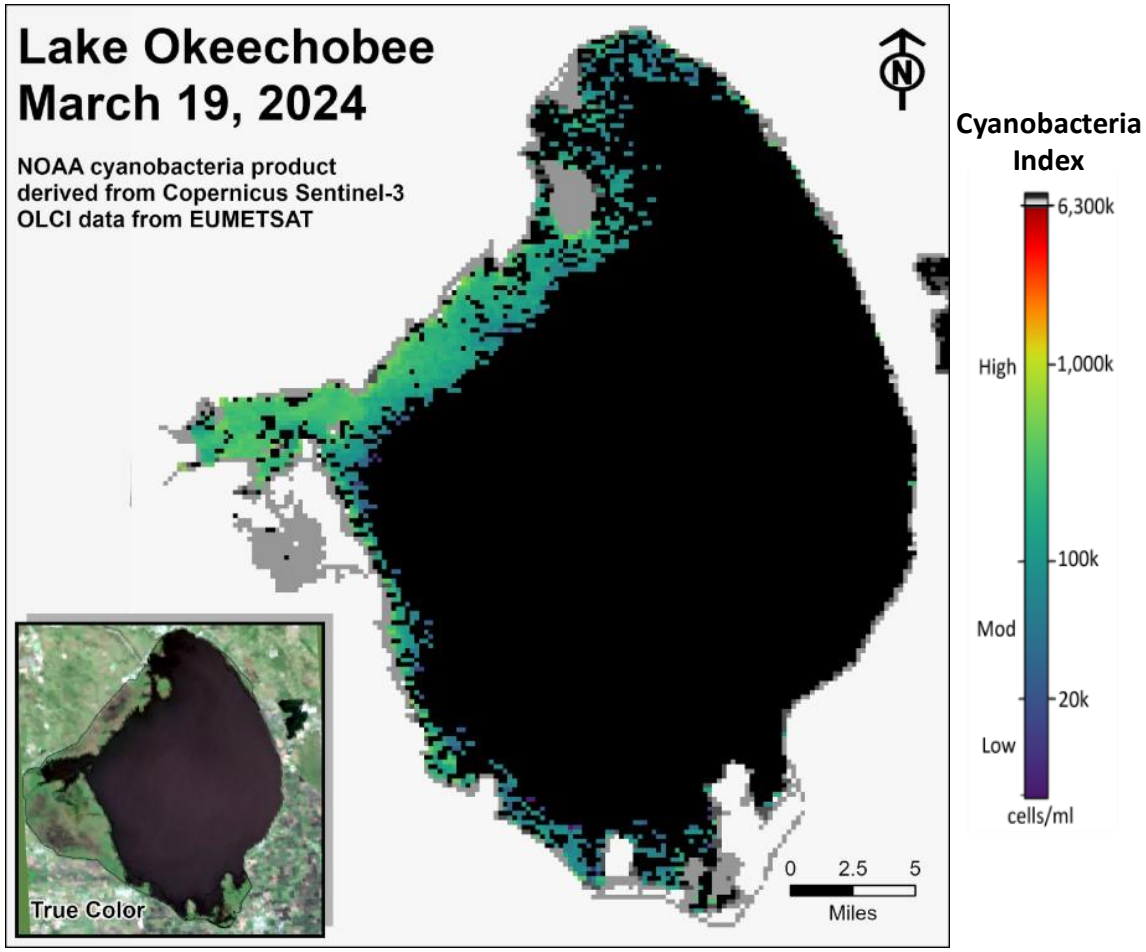


Figure LO-7. Cyanobacteria bloom index level on March 19, 2024, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover. *Provisional NOAA image, subject to change*

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 1,787 cfs (**Figures ES-1** and **ES-2**), and the previous 30-day mean inflow was 263 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 13.4. 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 0.0 spat/shell for February indicating that the spring spawning season had not yet started (**Figure ES-5**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 6,556 cfs (**Figures ES-6** and **ES-7**), and the previous 30-day mean inflow was 5,114 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, surface salinities remained the same at S-79, Val I-75, and Ft. Myers, and decreased slightly 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 damaging range for adult eastern oysters at Cape Coral, in the optimal range at 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 0.0 spat/shell at Iona Cove and Bird Island for February indicating that the spring spawning season had not yet started (**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 450 and 750 pulse releases, and 2000 and 4000 steady releases with estimated tidal basin inflows of 145 cfs. Model results from all scenarios predict daily salinity to be 0.2 or lower and the 30-day moving average surface salinity to be 0.3 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 March 22, 2024, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in any samples collected within the District region.

Water Management Recommendations

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

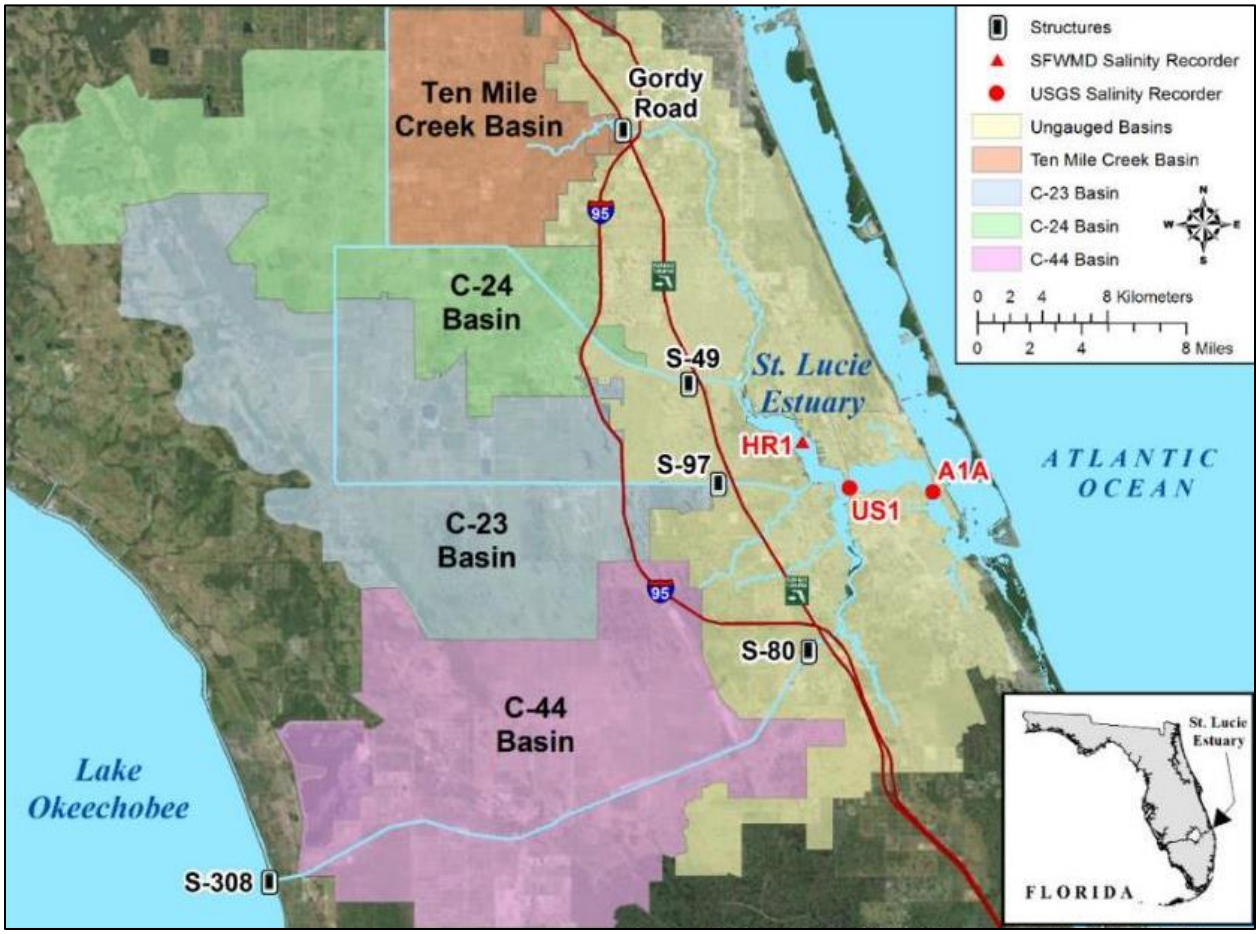


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

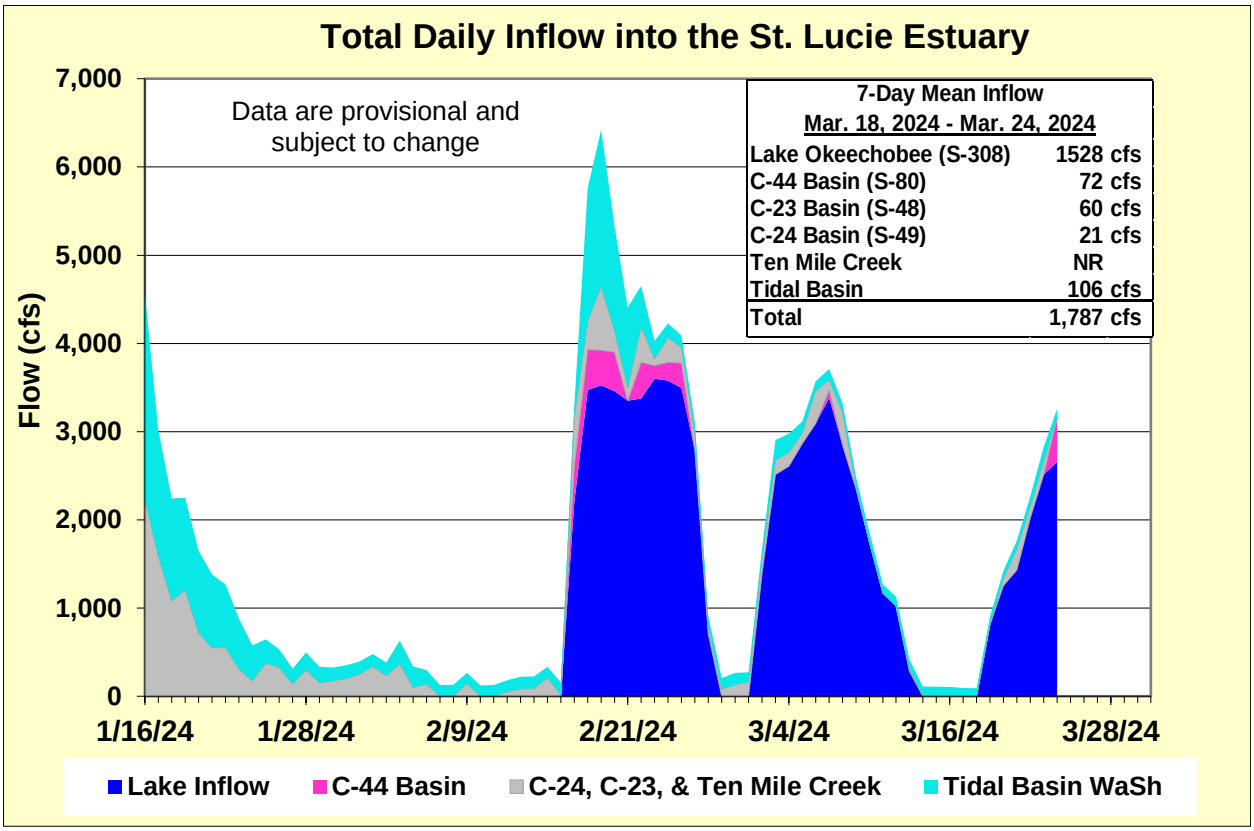


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	**9.5** (4.4)	**13.1** (7.1)	10.0 – 25.0
US1 Bridge	**11.3** (8.8)	**15.4** (11.2)	10.0 – 25.0
A1A Bridge	**19.7** (18.1)	**25.1** (24.4)	10.0 – 25.0

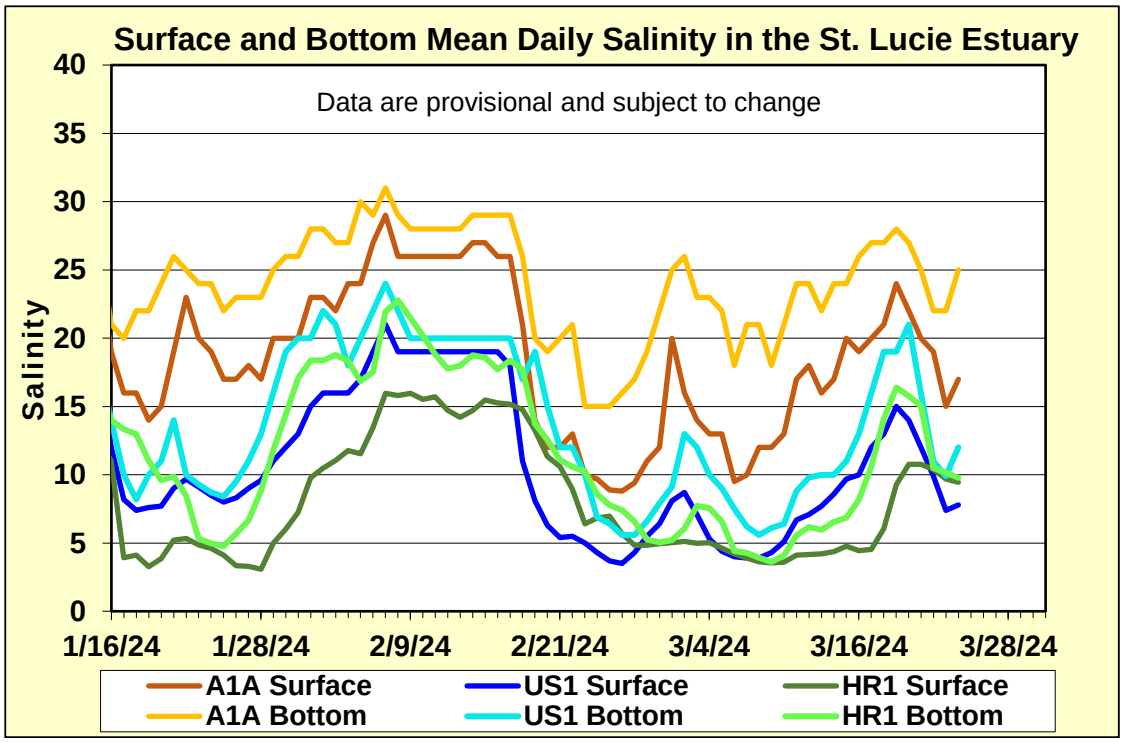


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

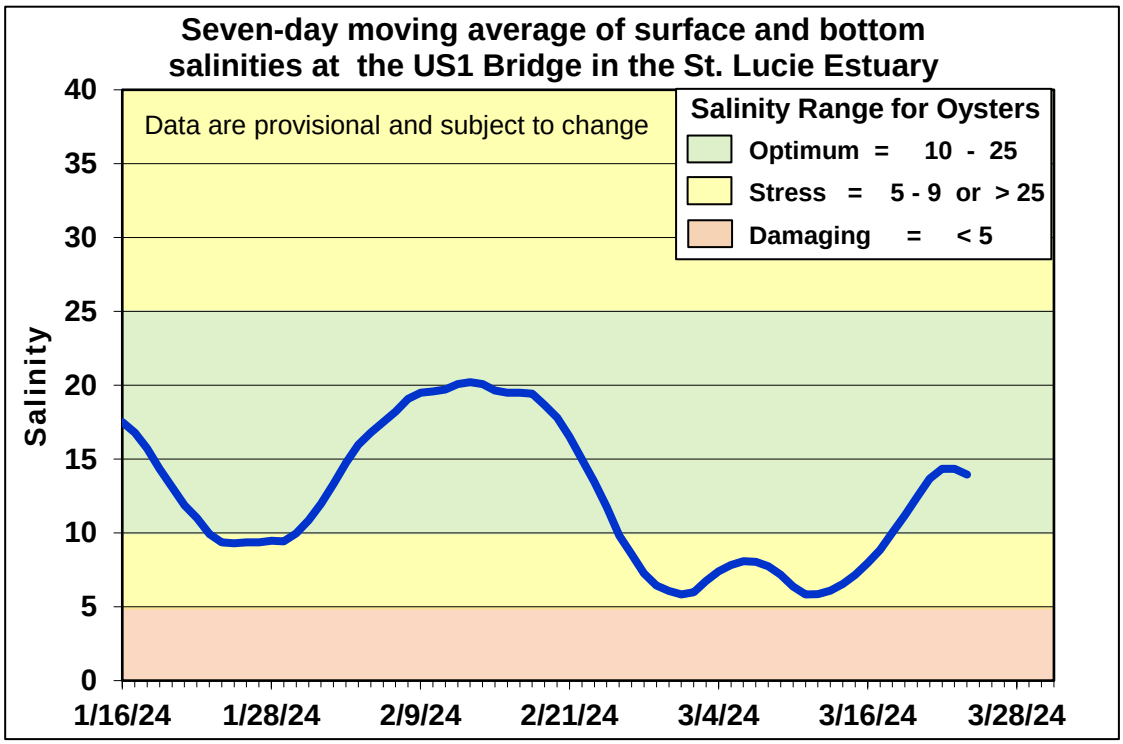


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

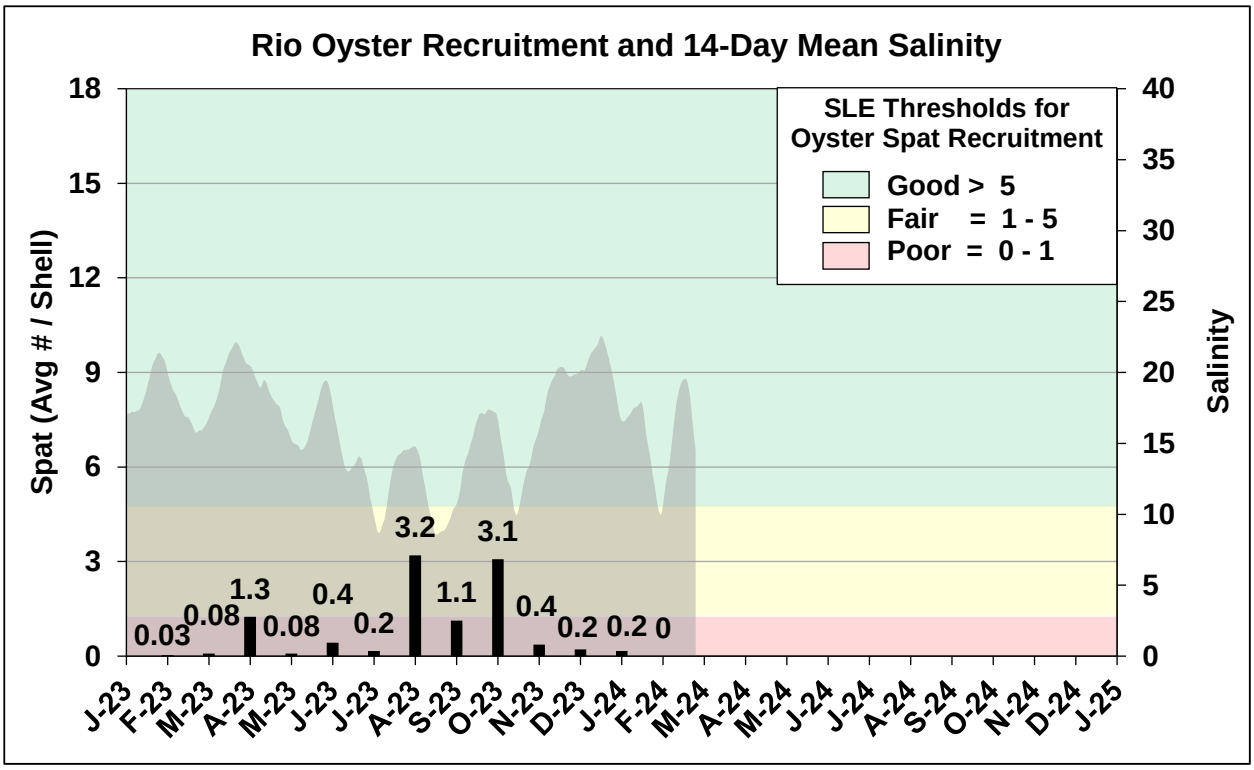


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

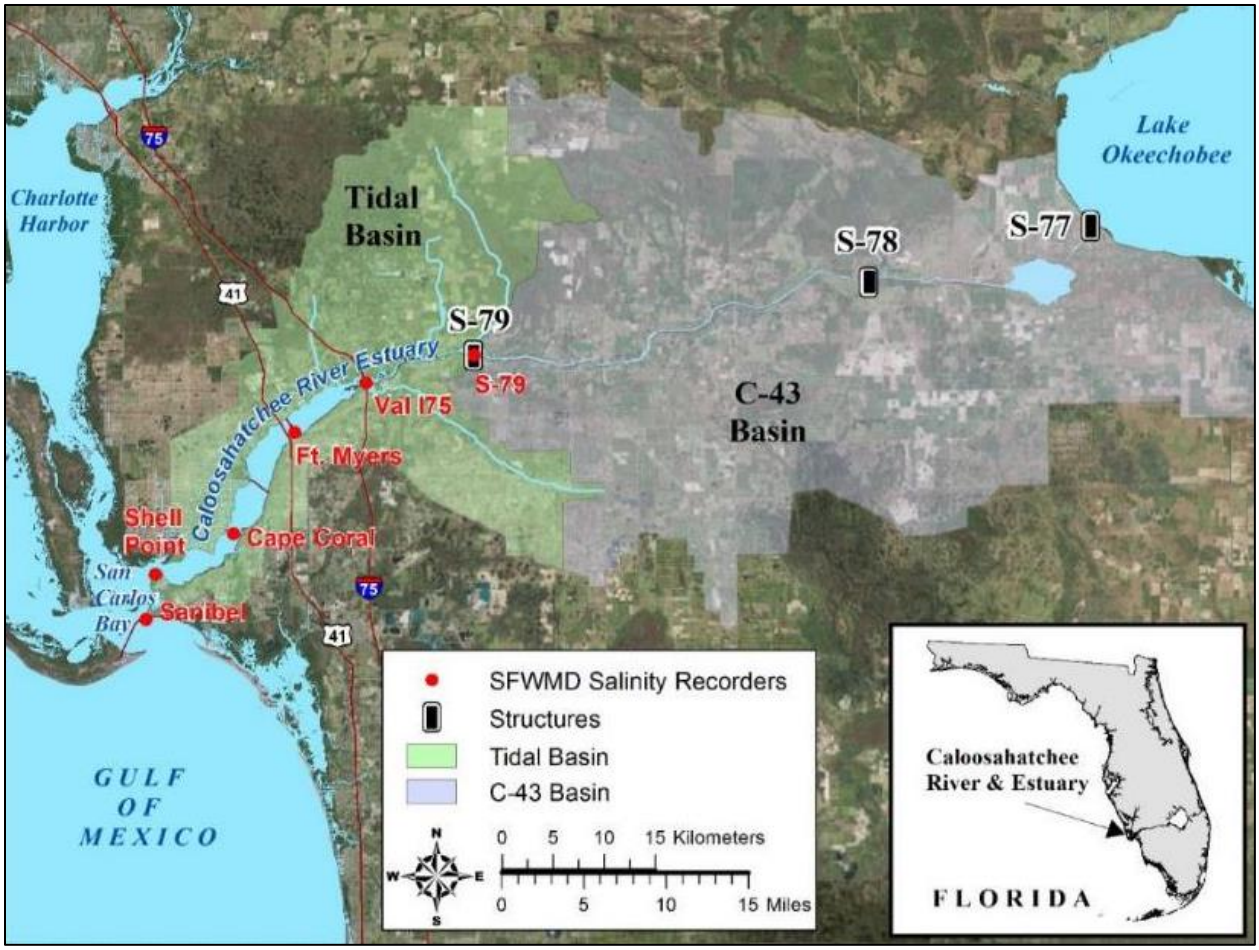


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

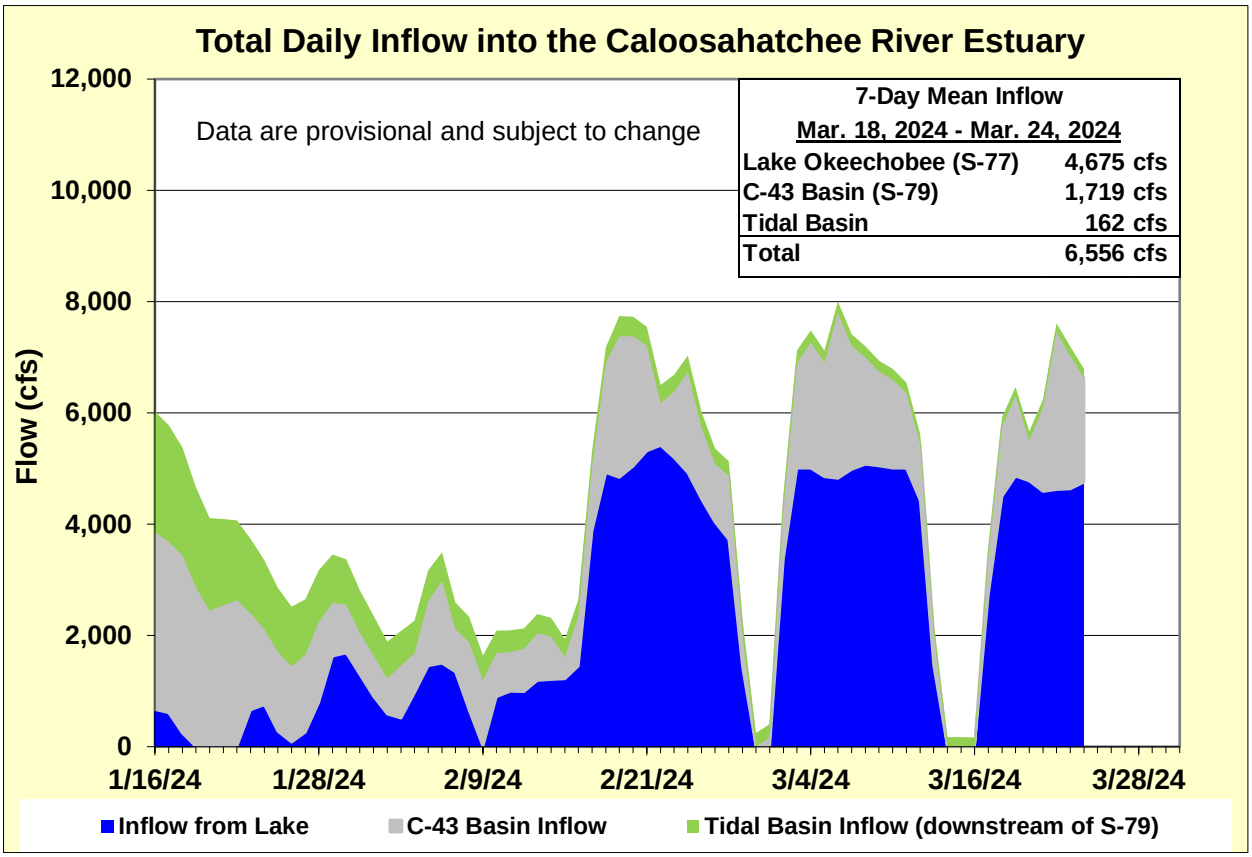


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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)	**0.2** (0.2)	**0.2** (0.2)	0.0 – 10.0
Val I-75	**0.2** (0.2)	**0.2** (0.2)	0.0 – 10.0
Fort Myers Yacht Basin	**0.2** (0.2)	**0.2** (0.2)	0.0 – 10.0
Cape Coral	**2.6** (2.7)	**3.0** (3.8)	10.0 – 25.0
Shell Point	**16.5** (17.5)	**18.4** (19.3)	10.0 – 25.0
Sanibel	**24.9** (25.0)	**27.0** (26.2)	10.0 – 25.0

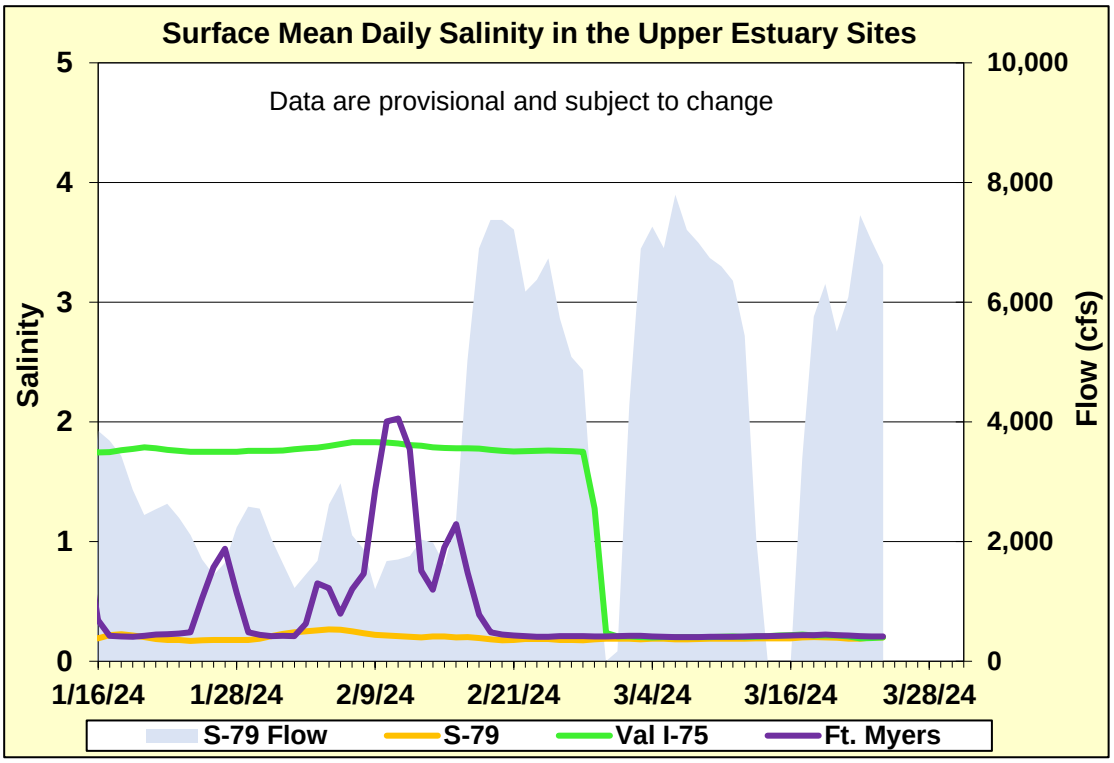


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

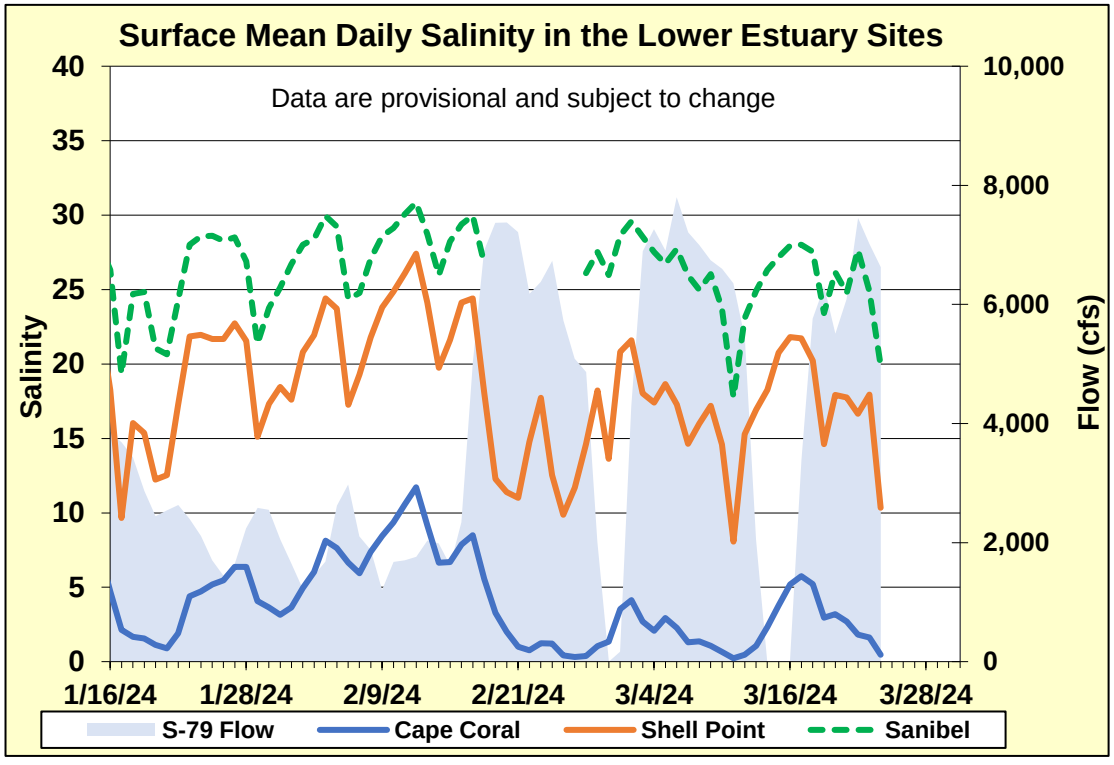


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

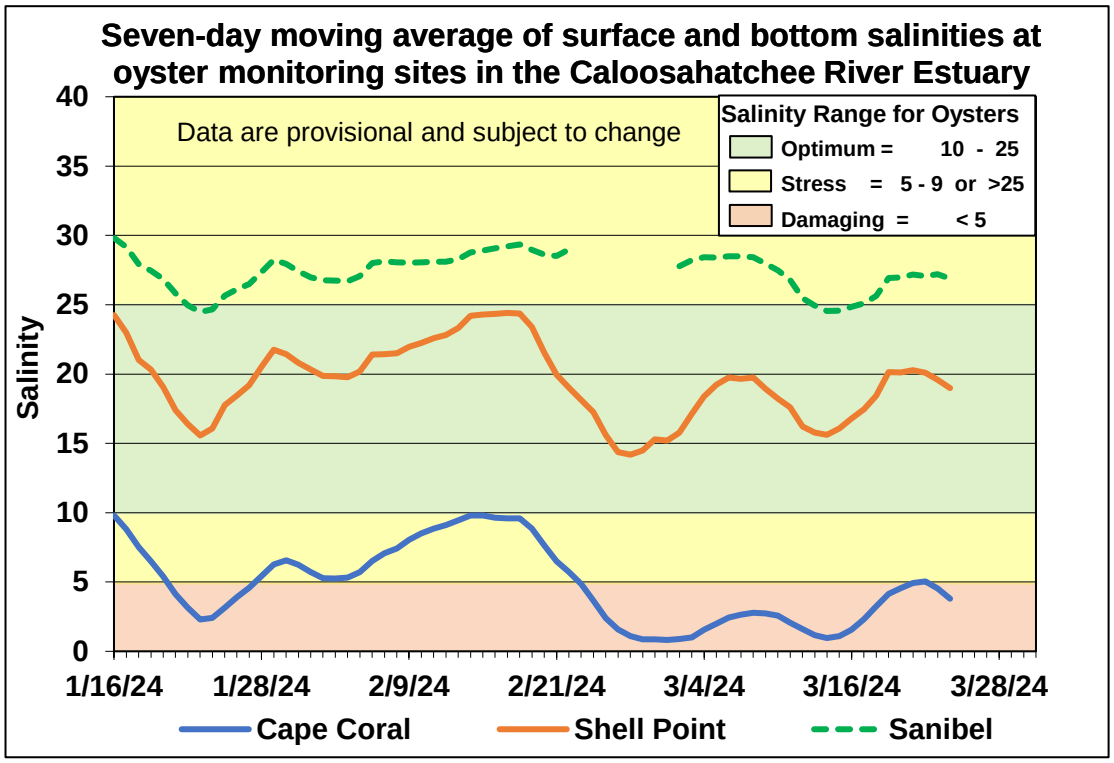


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

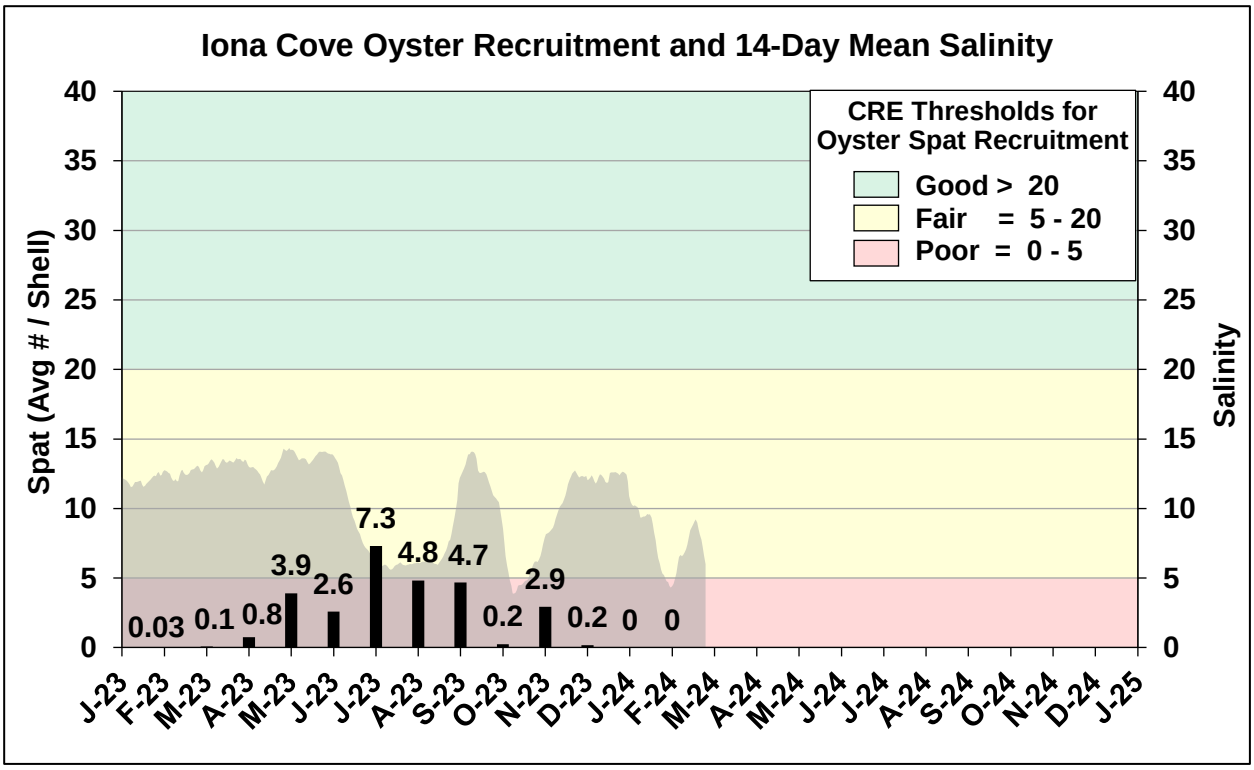


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

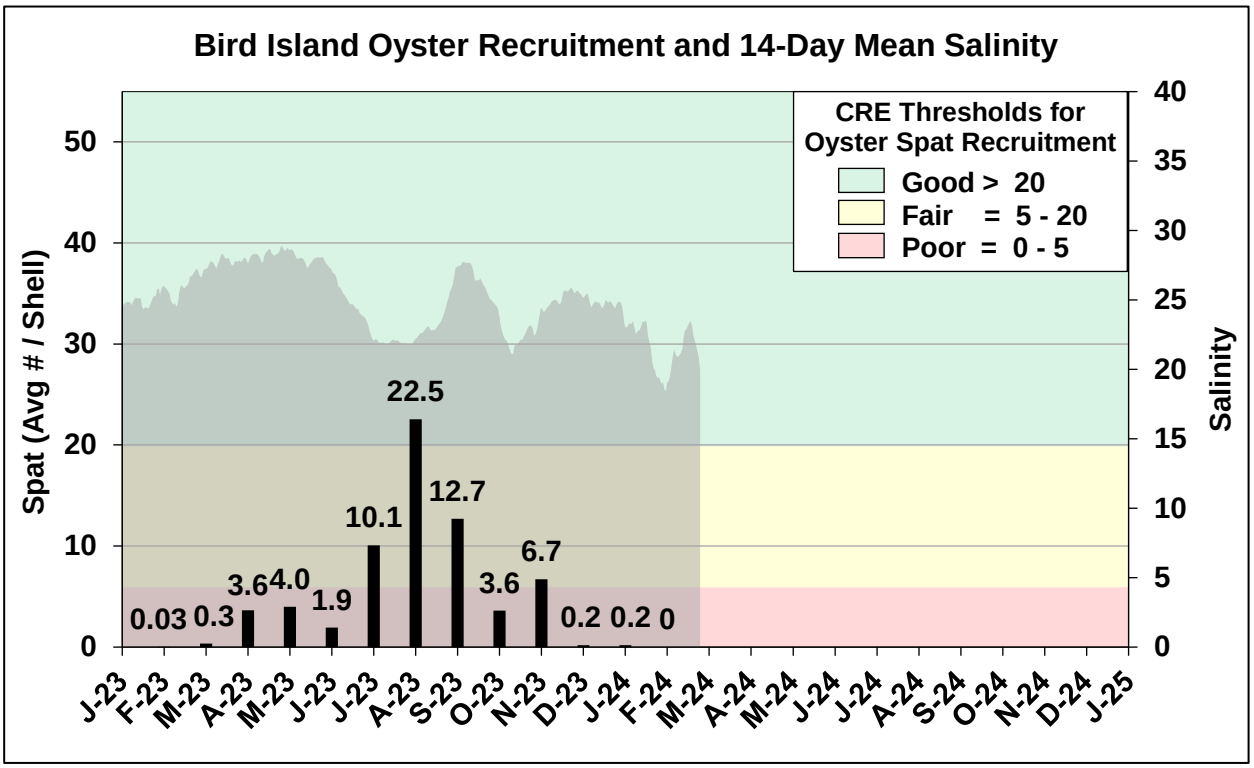


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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	450	145	0.2	0.3
B	750	145	0.2	0.3
C	2000	145	0.2	0.3
D	4000 + C43 Basin	145	0.2	0.3

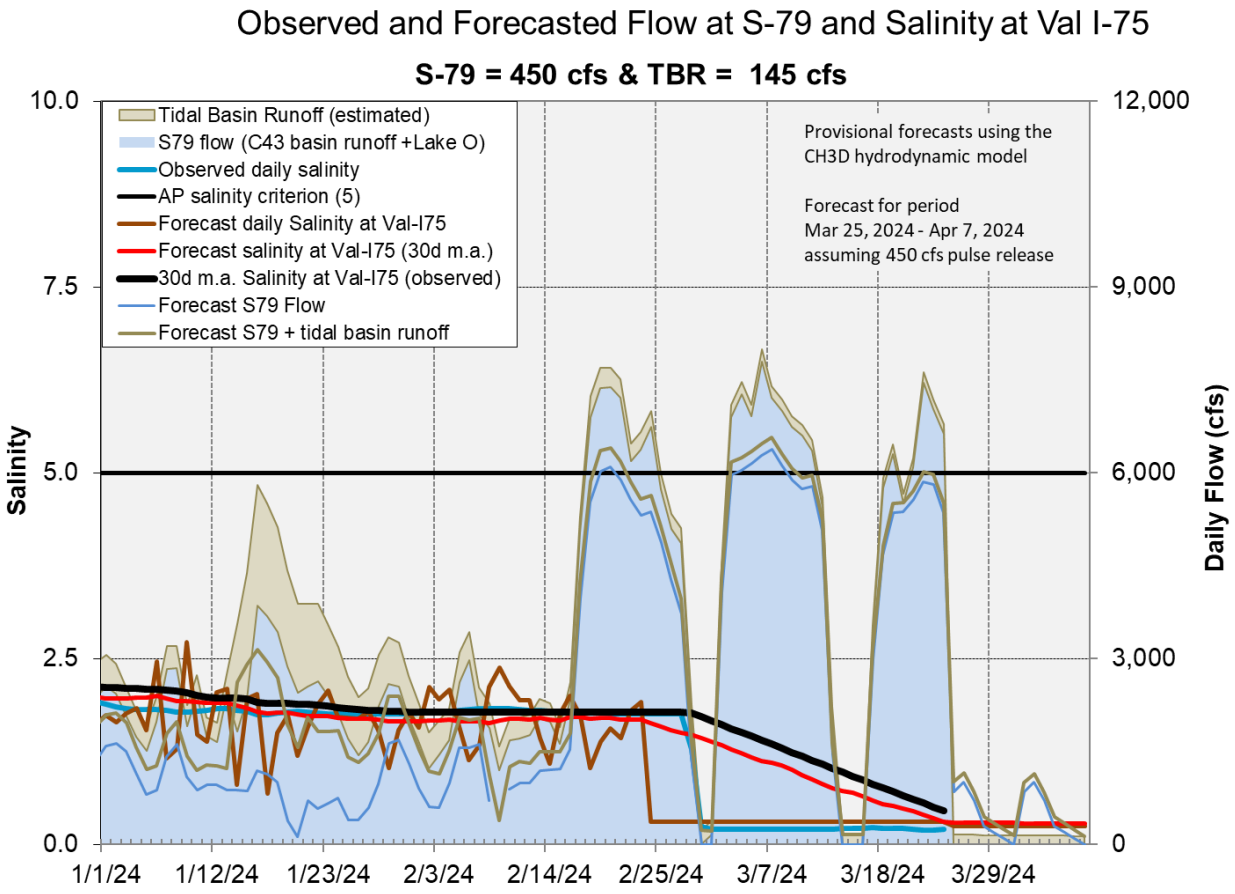


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

Stormwater Treatment Areas

STA-1E: STA-1E Eastern Flow-way is offline for rehydration and vegetation establishment following erosion repair. An operational restriction is in place in STA-1E Western Flow-way for post-construction vegetation grow-in. Online treatment cells are at or above target stage. Vegetation in the Central flow-way is highly stressed. The 365-day phosphorus loading rate (PLR) for the Central Flow-way is 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 highly stressed. The 365-day PLR for the Eastern Flow-way is very high, the 365-day PLR for the Western Flow-way is high, and the 365-day PLR for the Northern Flow-ways is below 1.0 g/m^2/year (**Figure S-1**).

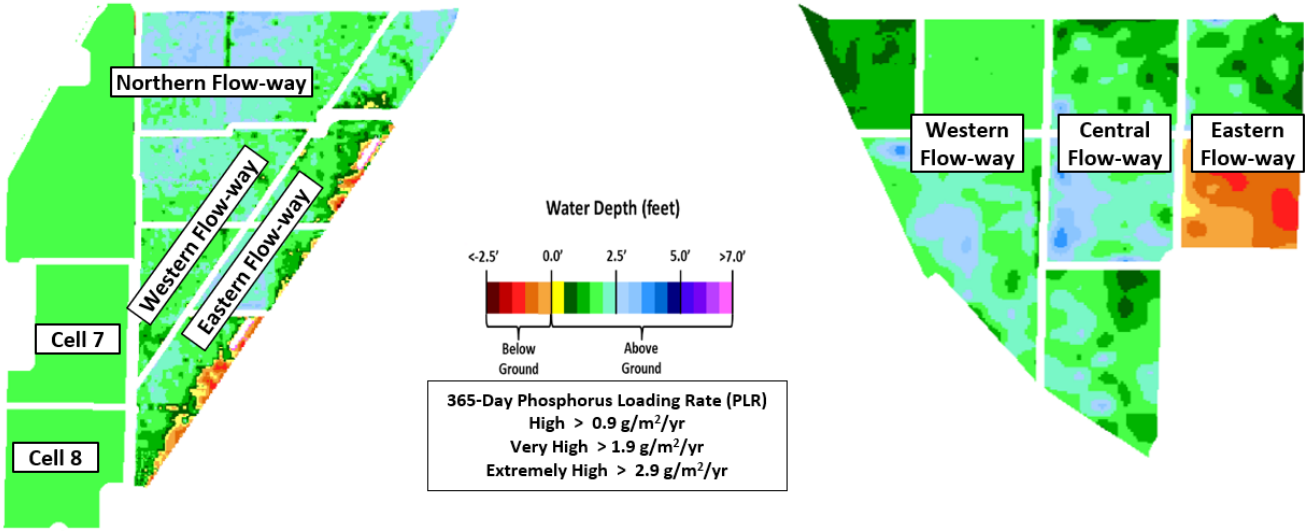
STA-2: Operational restrictions are in place in Flow-ways 2 and 4 for vegetation management activities. Online treatment cells are near or above target stage. Vegetation in Flow-ways 2, 3, and 4 is stressed, and in 5 is highly stressed. The 365-day PLRs for Flow-ways 3, 4, and 5 are below 1.0 g/m^2/year. 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 Eastern 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. 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.

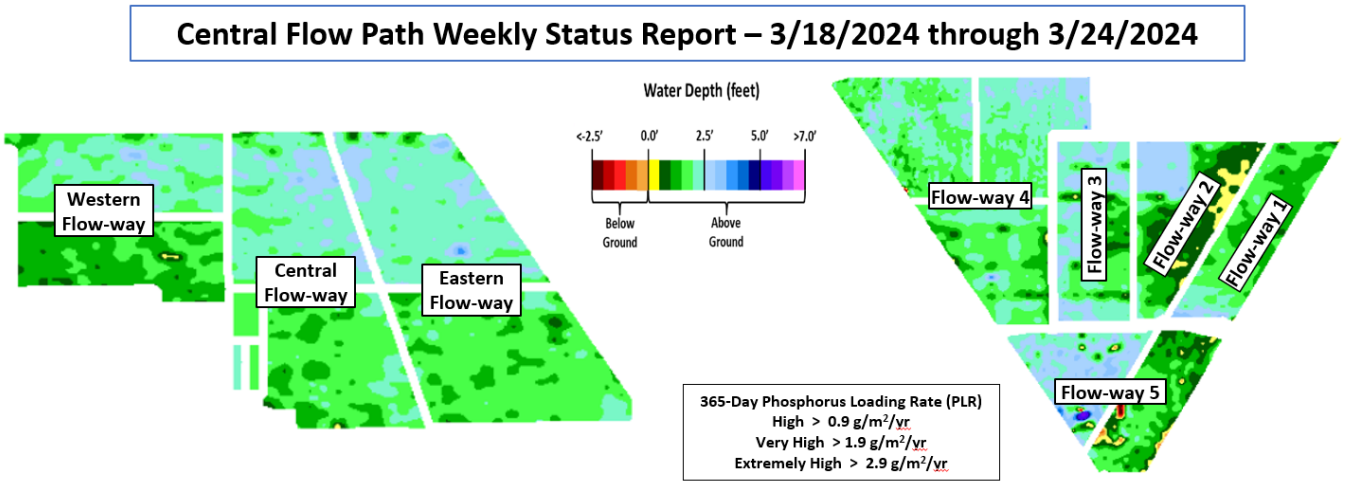
Eastern Flow Path Weekly Status Report – 3/18/2024 through 3/24/2024



STA-1W	Flow-way Status
Western	• High 365-day PLR • Highly stressed vegetation conditions
Eastern	• Very High 365-day PLR • Highly stressed vegetation conditions
Northern	• Highly stressed vegetation conditions • Planting emergent vegetation
Cell 6	
Cell 7+8	

STA-1E	Flow-way Status
Western	• Post-construction vegetation grow-in
Central	• High 365-day PLR • Highly stressed vegetation conditions
Eastern	• Rehydration and vegetation establishment

Figure S-1. Eastern Flow Path Weekly Status Report

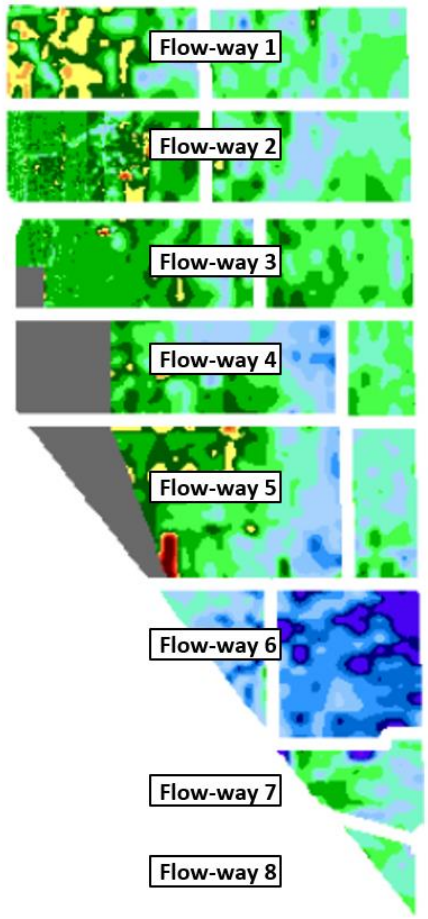


STA-3/4	Flow-way Status
Western	
Central	• Highly stressed vegetation conditions
Eastern	• Post-drawdown vegetation grow-in • Stressed vegetation conditions

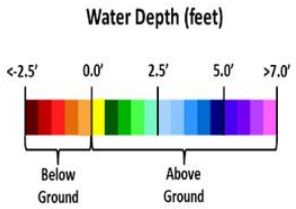
STA-2	Flow-way Status
Flow-way 1	• High 365-day PLR • Upstream nuisance vegetation control
Flow-way 2	• Post-construction vegetation grow-in • Planting emergent vegetation • Stressed vegetation conditions • Upstream nuisance vegetation control
Flow-way 3	• Stressed vegetation conditions • Upstream nuisance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

Figure S-2. Central Flow Path Weekly Status Report

Western Flow Path Weekly Status Report – 3/18/2024 through 3/24/2024



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	• Stressed vegetation conditions
Flow-way 8	• Stressed vegetation conditions



365-Day Phosphorus Loading Rate (PLR)
High > 0.9 g/m^2/yr
Very High > 1.9 g/m^2/yr
Extremely High > 2.9 g/m^2/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

Up to 8 inches of dry season rain fell across the Everglades Protection Area (EPA) late last week, particularly in the south. WCA-1: Stage within the Refuge remained above schedule trending away from the A1 zone line late last week. Stage on Sunday at the 1-8C gauge was 0.45 feet above that line. WCA-2A: Stage at the S-11B_H gauge trended away from schedule last week. The average on Sunday was 0.97 feet above the flat regulation line. WCA-3A: The 3-Gauge average stage ascended away from the schedule line late last week. The average stage on Sunday was 0.38 feet above the falling Zone A regulation line. WCA-3A North: Stage at Gauge 62 (NW corner) remained below the Upper schedule last week and was 0.14 feet below that schedule line on Sunday (**Figures EV-1** through **EV-4)**.

Water Depths

The SFWDAT model output for March 24, 2024, illustrates a very similar hydropattern in WCA-3A North over the last month and drier conditions in western WCA-2A. Ponded conditions remain along the northern reaches of the L-67s in WCA-3A. In southern WCA-3A the spatial extent of flooding there is very similar compared to one month ago. Hydrologic connectivity remains within all the major sloughs of Everglades National Park (ENP). Current WDAT water depth estimates are drier when compared to one month ago across most of the WCA-3A, WCA-2A, and the Refuge. Conditions are somewhat wetter in the west and in the ENP. The comparison to modeled conditions a year ago continue to show significantly wetter conditions across the EPA most significantly within the Big Cypress basin and in the upper reaches of the L-67s (**Figure EV-5 and Figure EV-6)**.

Comparing current conditions to the 20-year average on March 24th; depth conditions remain above the 90th percentile for this time of the year across the EPA. Only portions of WCA-2A approaches the average (**Figure EV-7**).

Taylor Slough and Florida Bay

All stages increased across Taylor Slough (TS) over the past week ending March 24, 2024, with an average increase of 0.37 feet. Stage increases ranged from +0.17 feet at E112 in the northern slough, to +0.53 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 16.6 inches compared to before the Florida Bay initiative (starting in 2017), an increase of 4.9 inches relative to last week's comparison. Stages at Craighead Pond (CP) and Taylor Slough Bridge (TSB) are now above estimated historical levels (Marshall and Wingard, 2014[2]) by 0.31 and 0.26 feet, respectively.

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[2] Marshall, F.E., and Wingard, G.L., 2014, Florida Bay salinity and Everglades wetlands hydrology circa 1900 CE; A compilation of paleoecology-based statistical modeling analyses (ver. 1.1, August 2014): U.S. Geological Survey Open-File Report 2012–1054, 32 p. plus appendix, available only online at http://pubs.usgs.gov/of/2012/1054. (Supersedes ver. 1.0 released in 2012.)

Average Florida Bay salinity was 21.5, a decrease of 1.2 from last week. Following heavy rain, salinity decreased at most stations throughout the bay, with changes ranging from –7.3 at Garfield Bight (GB) in the western nearshore region, to +2.1 at Little Madeira Bay (LM) in the eastern nearshore region (**Figure EV-8**). Salinity remains below the 25th percentile for all three regions and is now below estimated historical levels as well (Marshall and Wingard, 2014; **Figure EV-10**). Average Florida Bay salinity remains below its recent average for this time of year by 8.4, a decrease of 1.8 from last week.

Salinity at the TR station in the mangrove zone (tracked for the Florida Bay MFL) was 0.4. The 30-day moving average was 0.5, remaining well below the MFL threshold of 30 (**Figure EV-11**). The 365-day moving sum of flow from the five creeks was 429,286 acre-feet, well above the 105,000 acre-feet MFL threshold (**Figure EV-11**).

Total weekly rainfall averaged 4.7 inches in Taylor Slough and Florida Bay based on the 18 gauges used for this report. Total rainfall ranged from 1.7 inches at Trout Cove (TC) in the eastern nearshore region to 7.7 inches in the southern C-111 area (**Figure EV-12**). Wind directions and speeds in Florida Bay ranged from 1.1 mph NW on March 18th to 22.3 mph E on March 22nd (**Figure EV-12**).

Average daily flow from the five major creeks (McCormick, Taylor, Mud, Trout, West Highway) totaled 695 acre-feet last week, with net positive flows for the week. Total daily creek flow ranged from –789 acre-feet on March 18th to 3,630 acre-feet on March 24th (**Figure EV-13**). Average daily flow for the week was 2,526 acre-feet below estimated historical levels (~1900 ac-ft; Marshall and Wingard, 2014).

Implications for water management

The ecology of WCA-3A will benefit from recession rates in the upper “good” or “fair” range, this type of recession increases foraging opportunities for wading birds and lessen the flooding stress on tree islands. A continuation of the current recession rate at the 2-17 gauge would be beneficial for the marsh and tree island ecology in WCA-2A. As conditions remain above the 90th percentile in NE Shark River Slough, 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	2.40	+0.05
WCA-2A	2.09	+0.07
WCA-2B	2.18	+0.02
WCA-3A	2.96	+0.13
WCA-3B	3.75	+0.17
ENP	5.36	+0.29

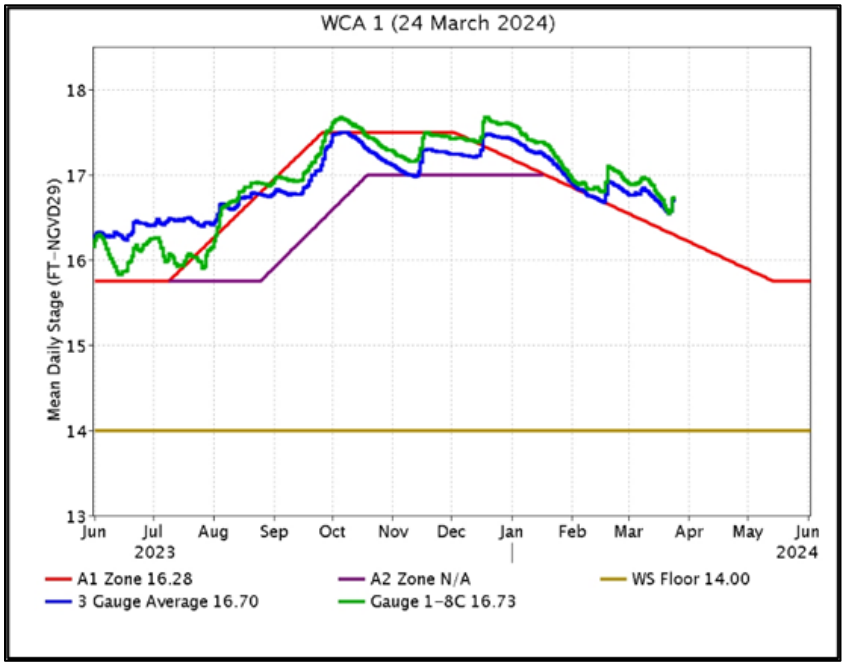

Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

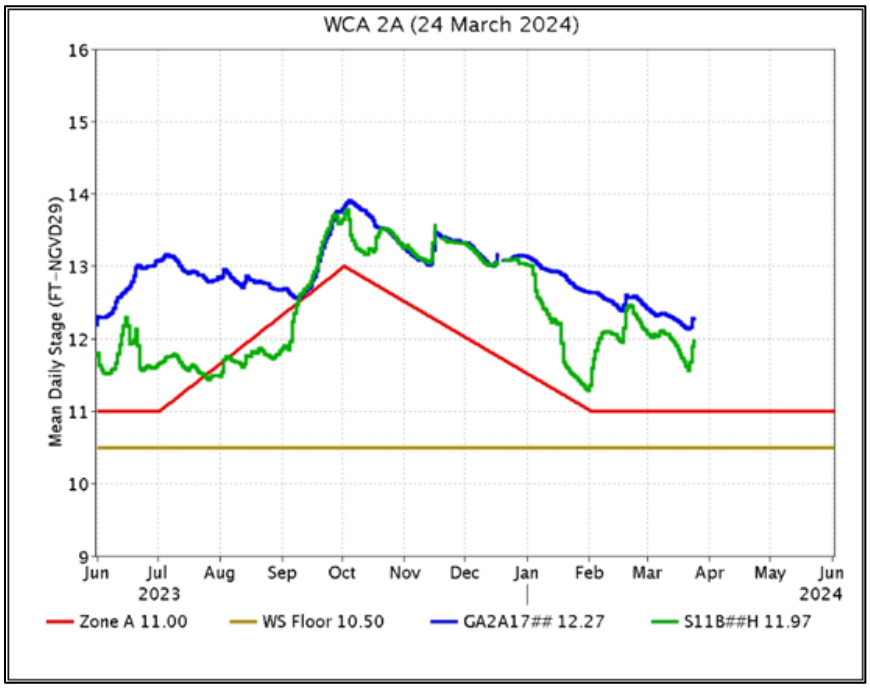

Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

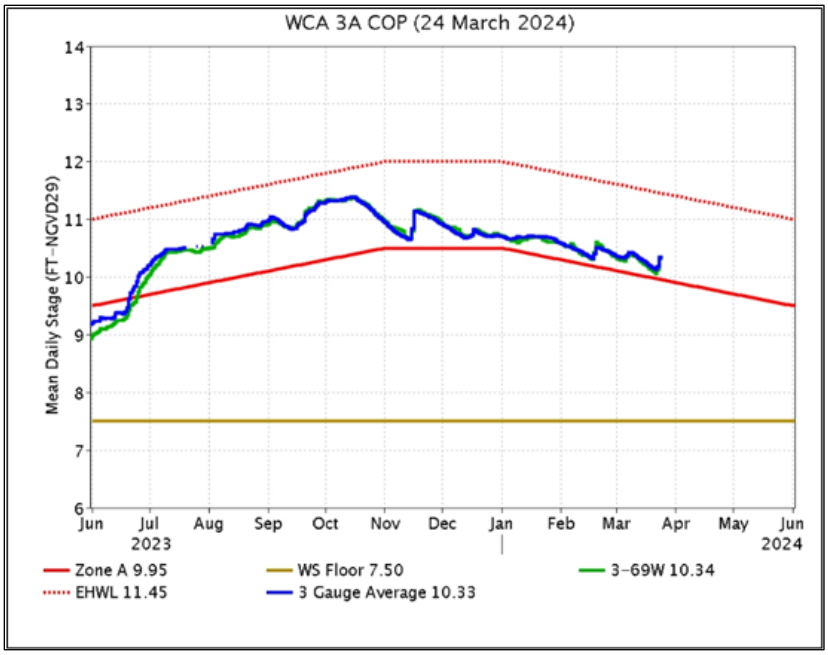

Figure EV-3. WCA-3A stage hydrographs (three-gauge average, 3-69W) and regulation schedule.

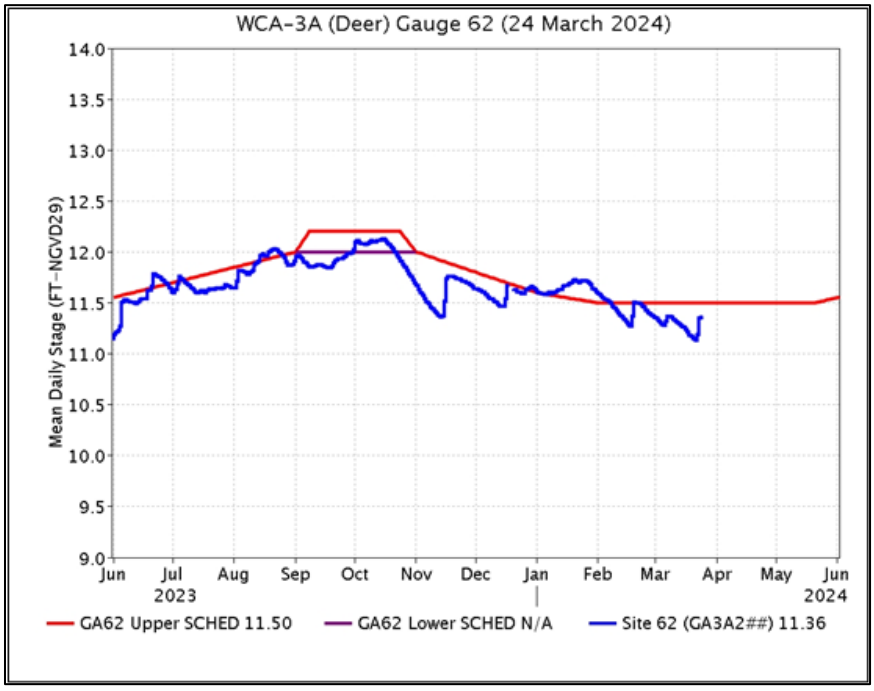

Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and GA62 regulation schedule.

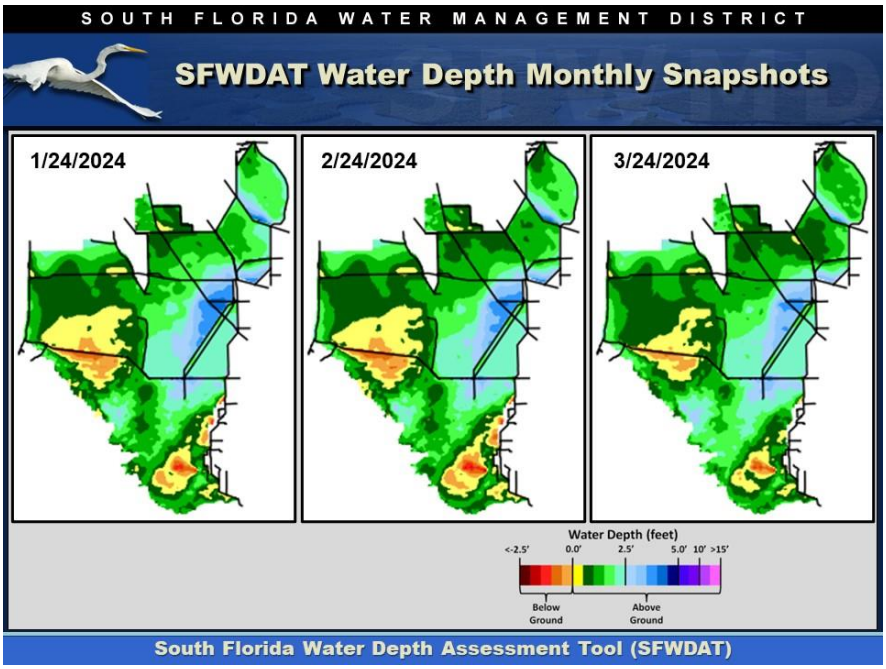

Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

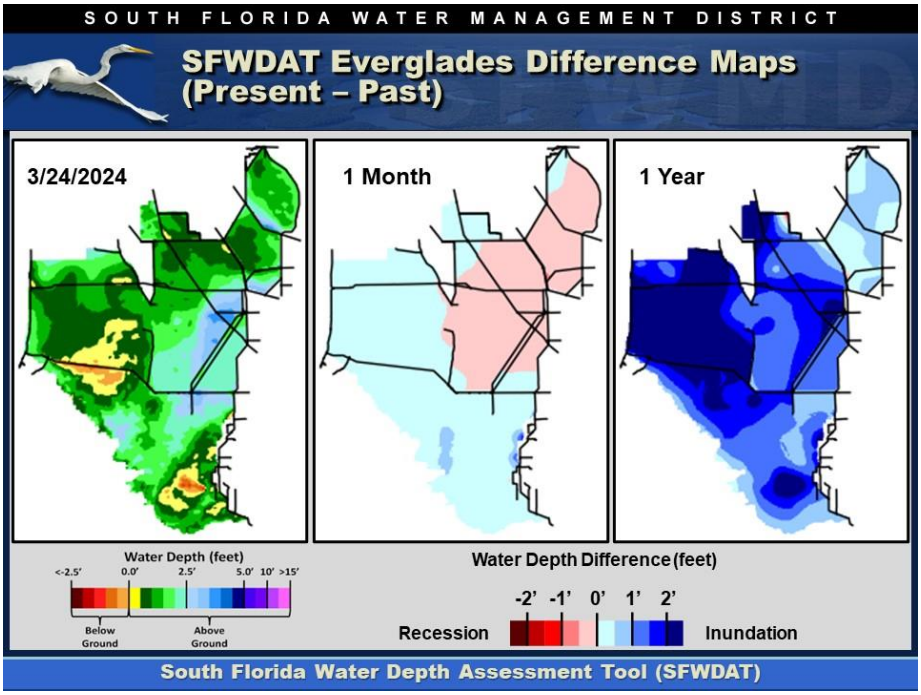

Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

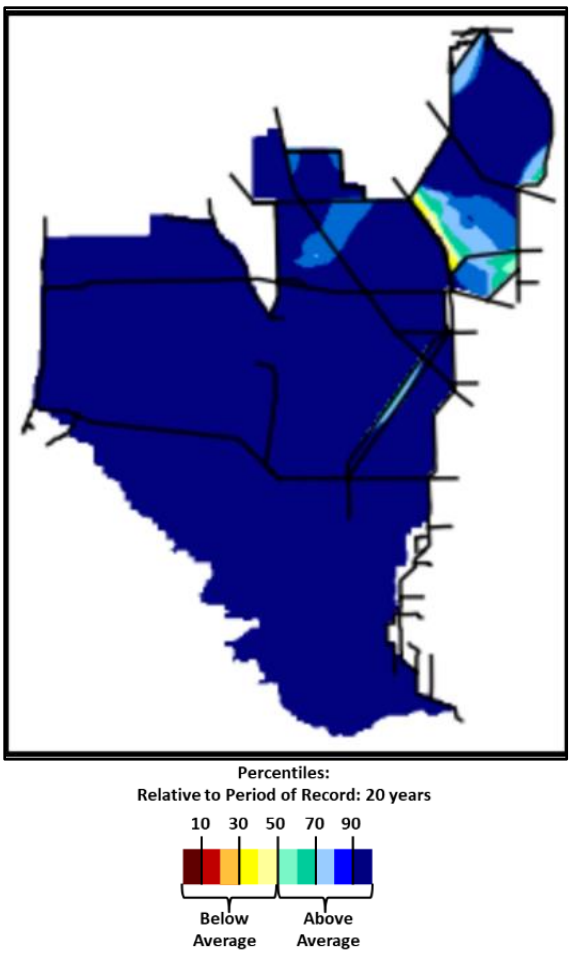

Figure EV-7. Present water depths (3/24/2024) compared to the day of year average over the previous 20 years.

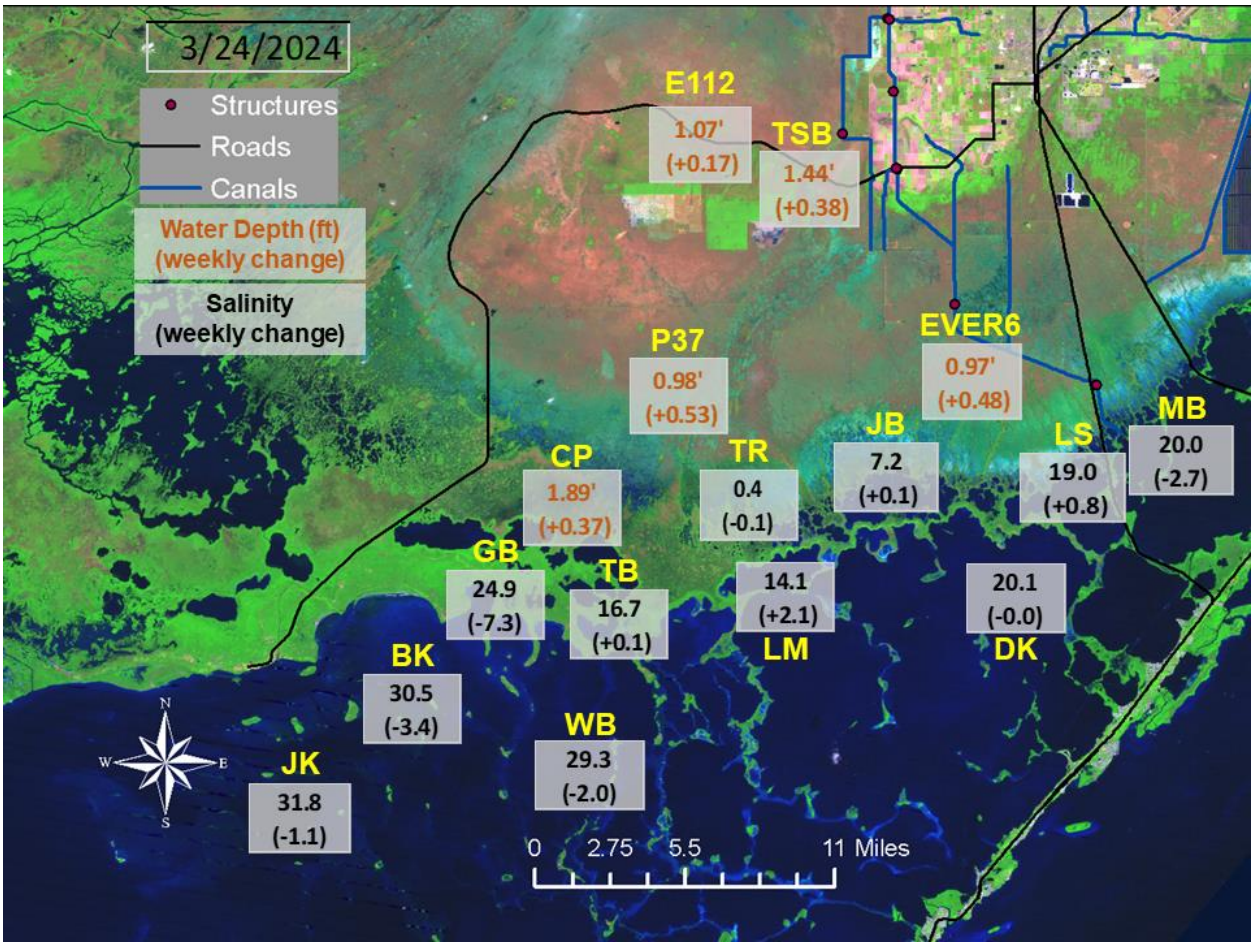

Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

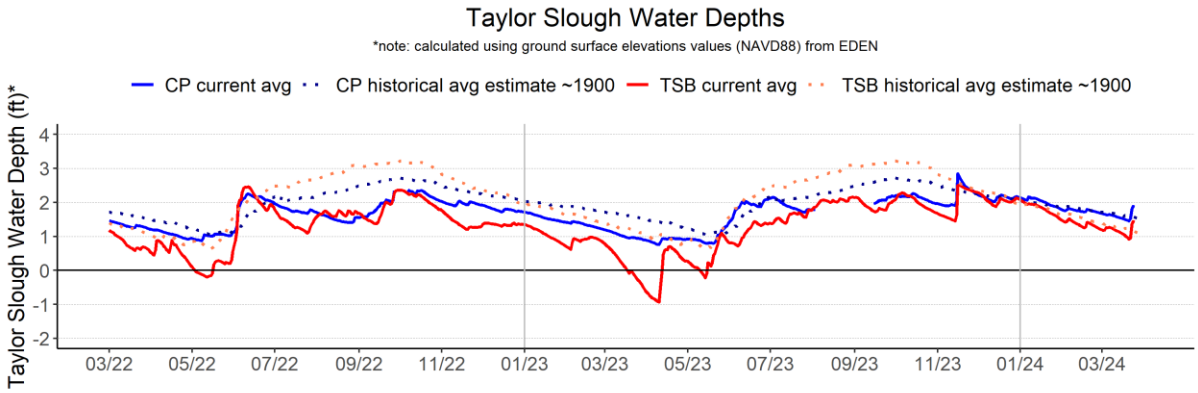

Figure EV-9. Taylor Slough water depth time series for Taylor Slough Bridge (TSB; northern slough) and Craighead Pond (CP; southern slough). Historical time series were calculated using estimates given by Marshall and Wingard (2014).

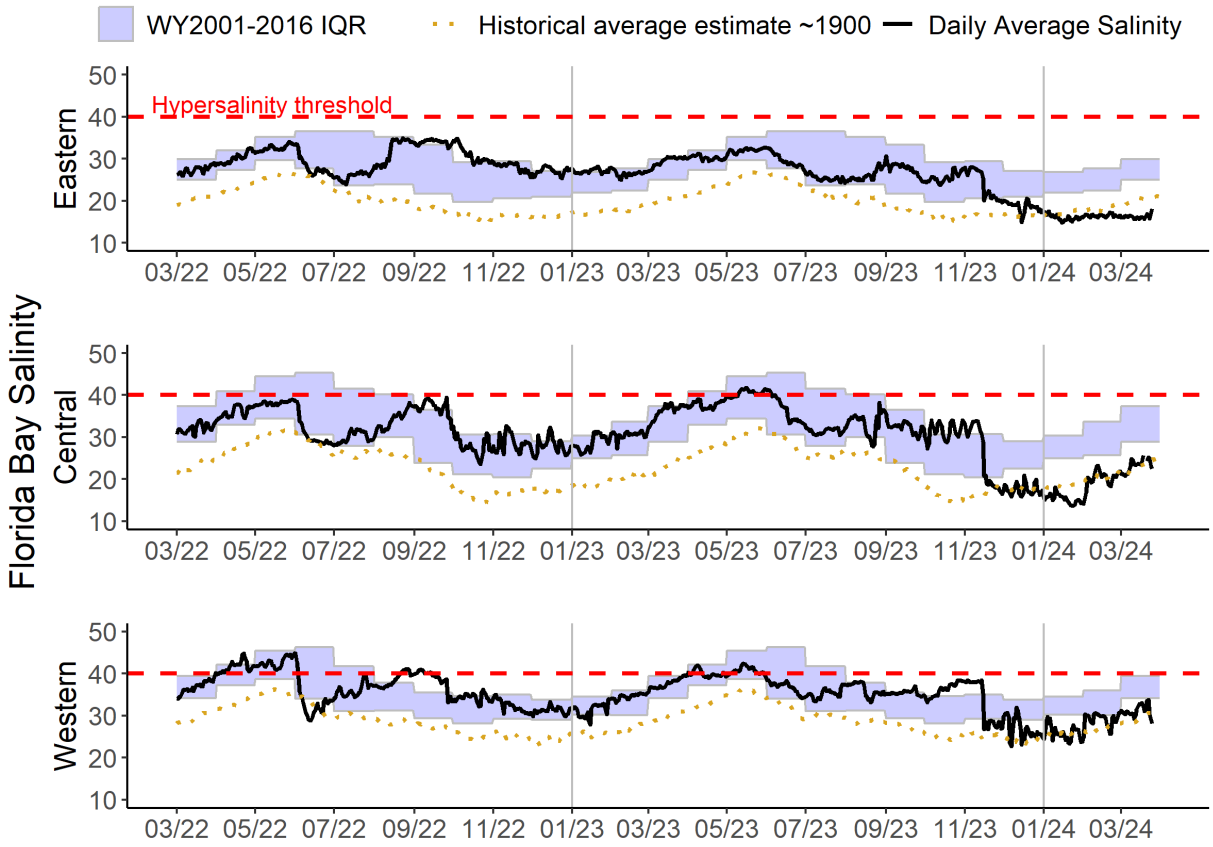

Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with WY2001-2016 interquartile (25-75 percentile) ranges and estimated historical daily average salinities (~1900 ac-ft). Historical time series were calculated using estimates given by Marshall and Wingard (2014). The hypersalinity threshold indicates the level at which salinities start to become harmful to seagrass.

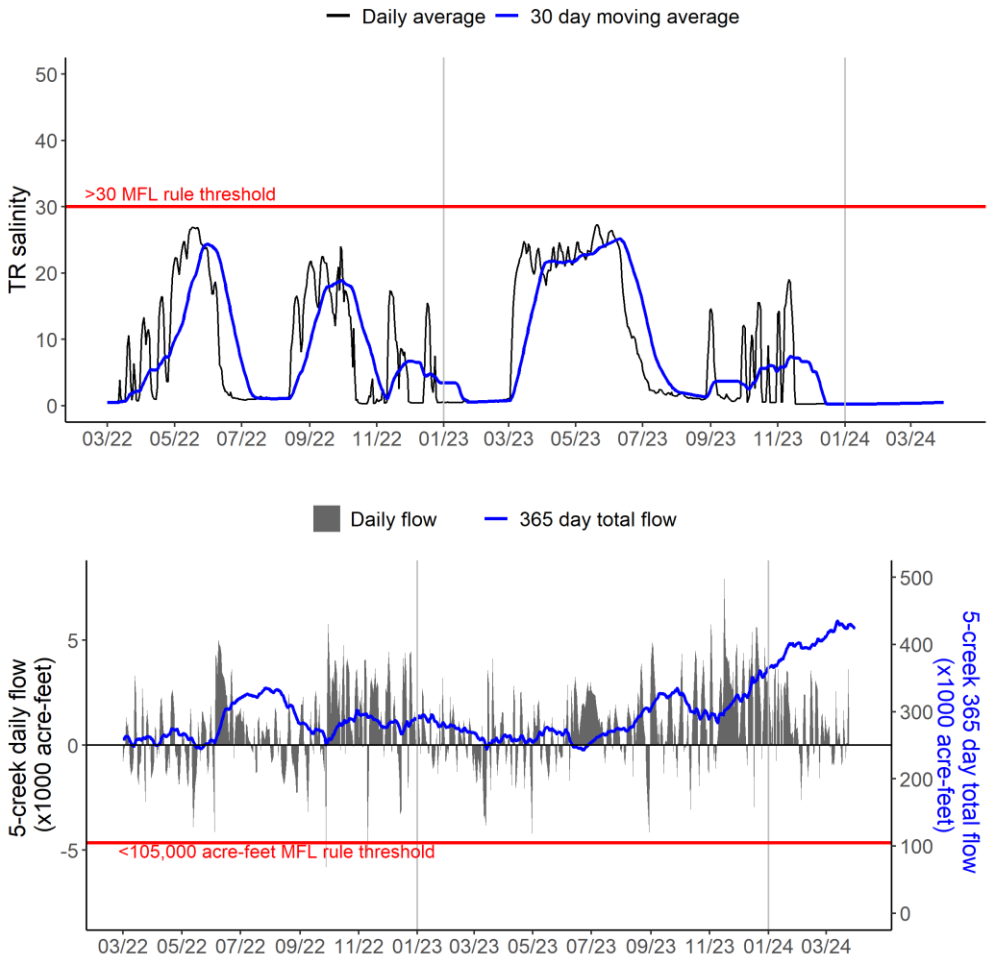

Figure EV-11. Salinity at Taylor River (TR; top) and creek inflow to Florida Bay (bottom) from the five major creeks (McCormick Creek, Taylor River, Mud Creek, Trout Creek, and West Highway Creek). The 30-day moving average salinity and 365-day total creek flow are tracked for the Florida Bay MFL criteria.

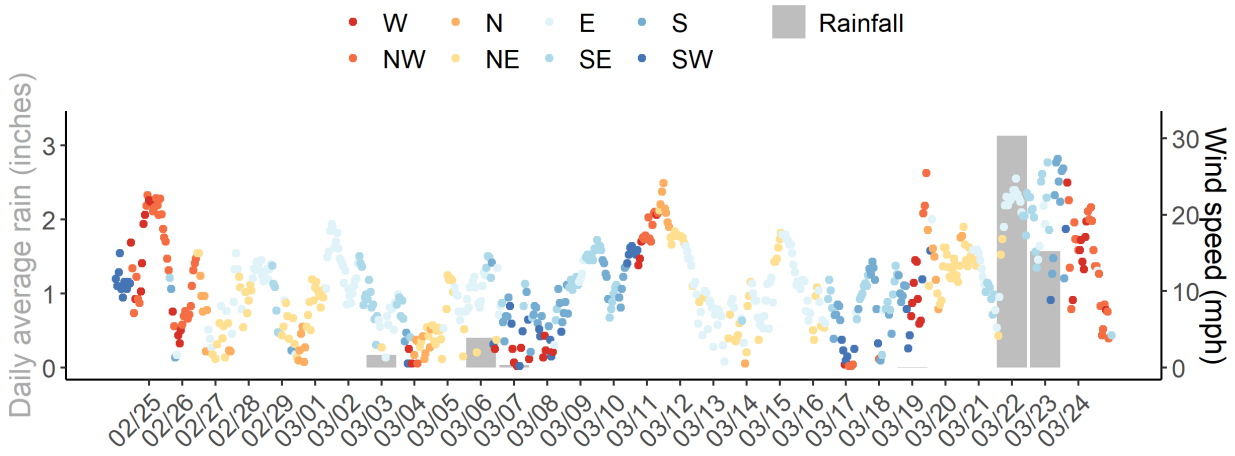

Figure EV-12. Daily average rain across Taylor Slough and Florida Bay, along with hourly average wind speed and direction (measured at Long Key) in Florida Bay over the past four weeks.

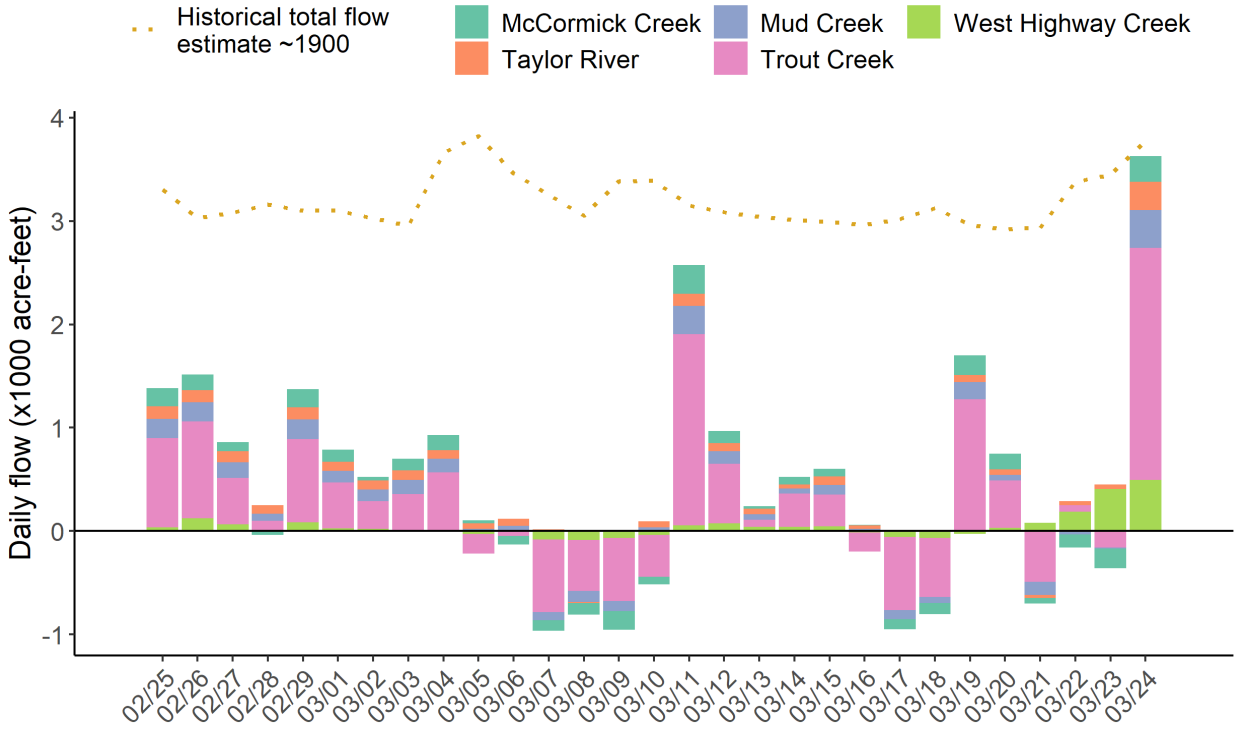

Figure EV-13. Daily average creek flow summed between five creeks with estimated historical daily flow (~1900 ac-ft) over the past four weeks. Historical time series were calculated using estimates given by Marshall and Wingard (2014).

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

SFWMD Everglades Ecological Recommendations, March 26, 2024 (red is new)			
	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.05’	Recession rate of less than 0.12’ per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage increased by 0.07’	Recession rate of less than 0.16’ per week.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage increased by 0.02’	Recession rate of less than 0.12’ per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage increased by 0.05’	Recession rate of less than 0.12’ per week.	Protect within basin and downstream habitat and wildlife (fish/crayfish reproduction, wading bird foraging and nesting).
WCA-3A NW	Stage increased by 0.17’	Recession rate of less than 0.12’ per week.	
Central WCA-3A S	Stage increased by 0.10’	Recession rate of less than 0.12’ per week.	Protect within basin wildlife (fish/crayfish reproduction, wading bird foraging).
Southern WCA-3A S	Stage increased by 0.21’		
WCA-3B	Stage increased by 0.17’	Recession rate of less than 0.12’ per week.	Protect within basin (sensitive tree islands) and downstream habitat and wildlife.
ENP-SRS	Stage increased by 0.29’	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 +0.17’ to +0.53’	Move water southward as possible.	When available, provide freshwater to promote water movement.
FB- Salinity	Salinity changes ranged from −7.3 to +2.1	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 1,086 cfs, and the previous 30-day mean inflow was 726 cfs. The seven-day mean salinity was 25.3 at BBCW8 and 23.1 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.

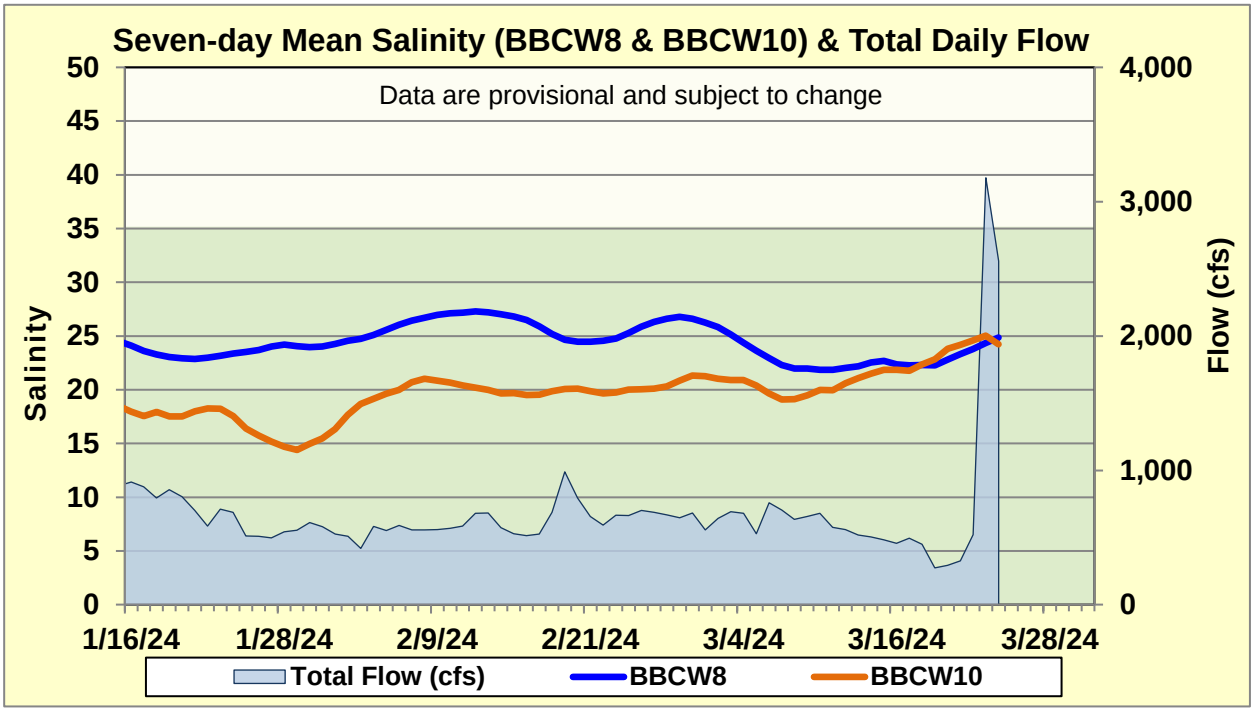

Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.