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M E M O R A N D U M

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

FROM: SFWMD Staff Environmental Advisory Team

DATE: March 20, 2024

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A cold front brought light rains to the SFWMD on Monday and early Tuesday morning. Cooler and drier conditions following the frontal passage will preclude any rainfall Tuesday and Wednesday. An upper-air disturbance located over the southwest U.S. will merge with a weaker upper-air disturbance to its south when the disturbances enter New Mexico on Thursday. The merged disturbance is then forecast to dig southward over the northwestern Gulf of Mexico on Friday, sending a cold front into the central Gulf of Mexico. Strong thunderstorms are then likely to develop along the frontal boundary, leading to the development of an area of low pressure over the north-central Gulf of Mexico. The leading computer models suggest that this area of low pressure could send its heavy rainfall into south Florida on Friday, with lighter rainfall entering the southwest coast and western Kissimmee Valley late Thursday night or early Friday morning. The heavy rainfall is likely to begin along the southwest coast on Friday afternoon and enter the lower east coast by the late afternoon or early evening. The heaviest rains are likely to occur near or over the Florida Keys. The rains will diminish Friday night, with only light rain and drizzle likely on Saturday. A frontal passage afterwards will lead to drier conditions with no rainfall on Sunday and Monday. Much above average total SFWMD rainfall is likely for the 7-day period ending next Tuesday morning.

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 17, 2024, was 1,000 cfs and 970 cfs at S-65 and S-65A, respectively. Mean weekly water depth on the Kissimmee River floodplain decreased by 0.11 feet to 0.37 feet over the week ending March 17, 2024. The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 6.5 mg/L last week to 7.0 mg/L for the week ending March 17, 2024, which is well above the potentially lethal and stressful levels for largemouth bass and other sensitive species.

Lake Okeechobee

Lake Okeechobee stage was 15.75 feet NGVD on March 17, 2024, which was 0.19 feet lower than the previous week and 0.58 feet lower than a month ago. Average daily inflows (excluding rainfall) decreased from the previous week, going from 2,530 cfs to 1,570 cfs. Average daily outflows (excluding evapotranspiration) also decreased from the previous week, going from 8,410 cfs to 4,210 cfs. The seventh wading bird foraging survey of the 2024 breeding season (conducted March 14, 2024) reported approximately 4,300 wading birds actively foraging on the Lake. The March 14, 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 470 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 lower stressed range (5-10) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 2,640 cfs over the past week with 1,950 cfs coming from Lake Okeechobee. Mean surface salinities remained the same at S-79, Val I-75, and Ft. Myers, increased at Cape Coral and Shell Point, and increased at Sanibel 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 17, 2024, 5,700 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 43,600 ac-feet. The total amount of inflows to the STAs in WY2024 is approximately 1,390,000 ac-feet. Most STA cells are near or above target stage. STA-1E Eastern Flow-way is offline for erosion repair in Cell 2. 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 favorable for wading bird foraging and dry season Everglades ecology. Numbers of foraging wading birds continued to decline, and nesting is limited due to repeated reversals. The decrease in stage change in Taylor Slough was minimal again last week, but depths remain well above the recent average. Salinity change increased slightly in Florida Bay again last week, however conditions remain below or near the historical estimates for this time of year and below the IQR. The 365 day moving average for the 5 creek flow is more than 4X the minimum flow and level volume.

Biscayne Bay

Total inflow to Biscayne Bay averaged 500 cfs and the previous 30-day mean inflow averaged 640 cfs. The seven-day mean salinity was 22.3 at BBCW8 and 22.4 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 March 17, 2024, mean daily lake stages were 56.2 feet NGVD (1.8 feet below schedule) in East Lake Toho, 53.2 feet NGVD (1.8 feet below schedule) in Lake Toho, and 51.4 feet NGVD (0.6 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 17, 2024, mean weekly discharge was 1,000 cfs and 970 cfs at S-65 and S-65A, respectively. Mean weekly discharge from the Kissimmee River was 1,100 cfs at S-65D and 1,000 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 46.3 feet NGVD at S-65A and 25.8 feet NGVD at S-65D on March 17, 2024. Mean weekly river channel stage decreased by 0.3 feet to 36.3 feet NGVD over the week ending on March 17, 2024 (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain decreased by 0.11 feet to 0.37 feet over the week ending March 17, 2024 (**Table KB-2, Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 6.5 mg/L the previous week to 7.0 mg/L for the week ending March 17, 2024 (**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 (Fig. KB-7) through May 31, 2024 except as otherwise indicated. Maintain at least minimum flow (250-300 cfs) at S-65A. Continue the S-65/S-65A flow ramp-down to ~700 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)	
							3/17/24	3/10/24
Lakes Hart and Mary Jane	S-62	LKMJ	32	60.5	R	61.0	-0.5	-0.4
Lakes Myrtle, Preston and Joel	S-57	S-57	22	60.8	R	60.8	0.0	0.0
Alligator Chain	S-60	ALLI	10	64.0	R	64.0	0.0	0.0
Lake Gentry	S-63	LKGT	24	61.4	R	61.5	-0.1	0.0
East Lake Toho	S-59	TOHOE	140	56.2	R	58.0	-1.8	-1.6
Lake Toho	S-61	TOHOW S-61	320	53.2	R	55.0	-1.8	-1.6
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	1000	51.4	T	52.0	-0.6	0.7

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.

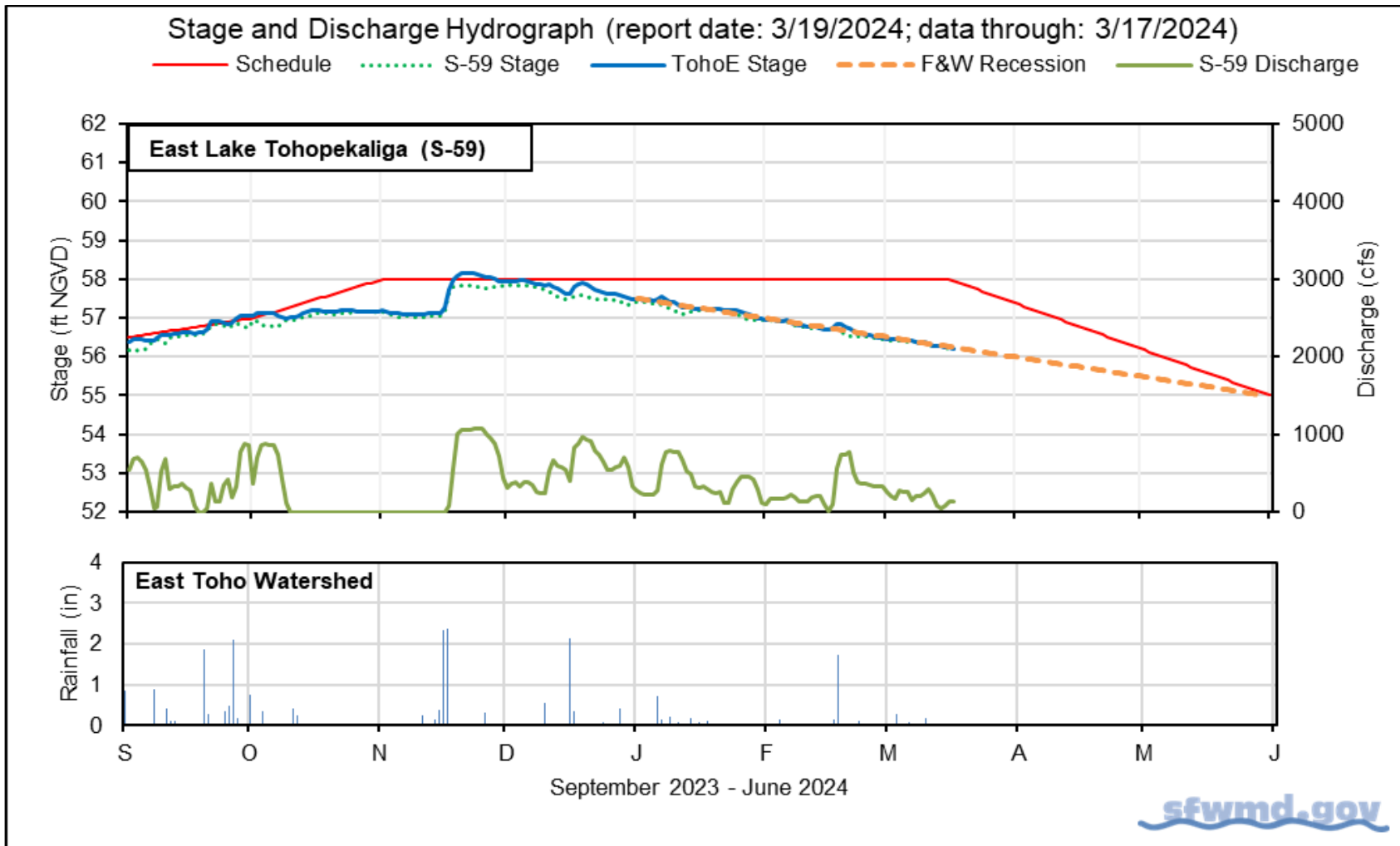


Figure KB-1. East Lake Toho regulation schedule, stage, discharge, and rainfall.

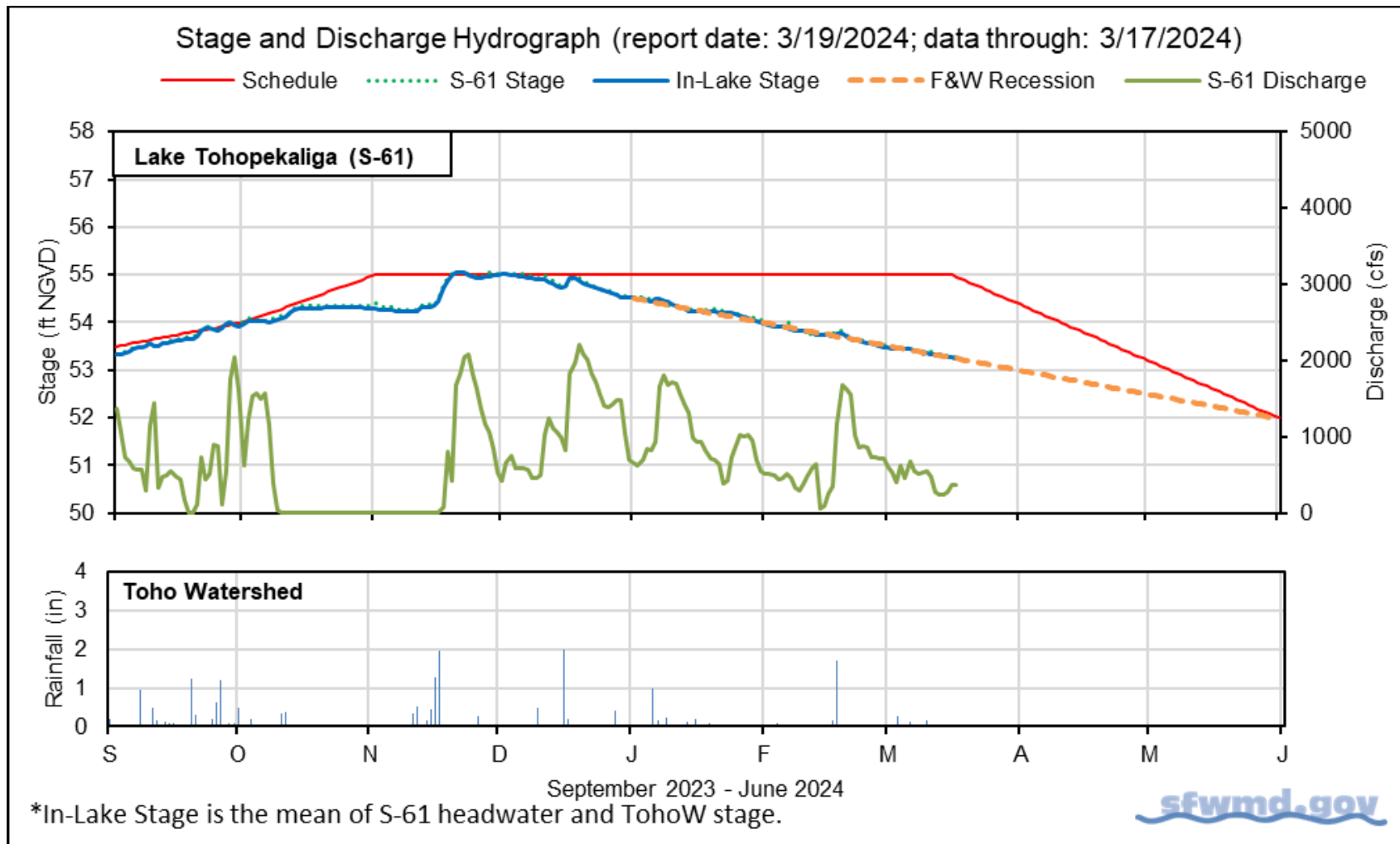


Figure KB-2. Lake Toho regulation schedule, stage, discharge, and rainfall.

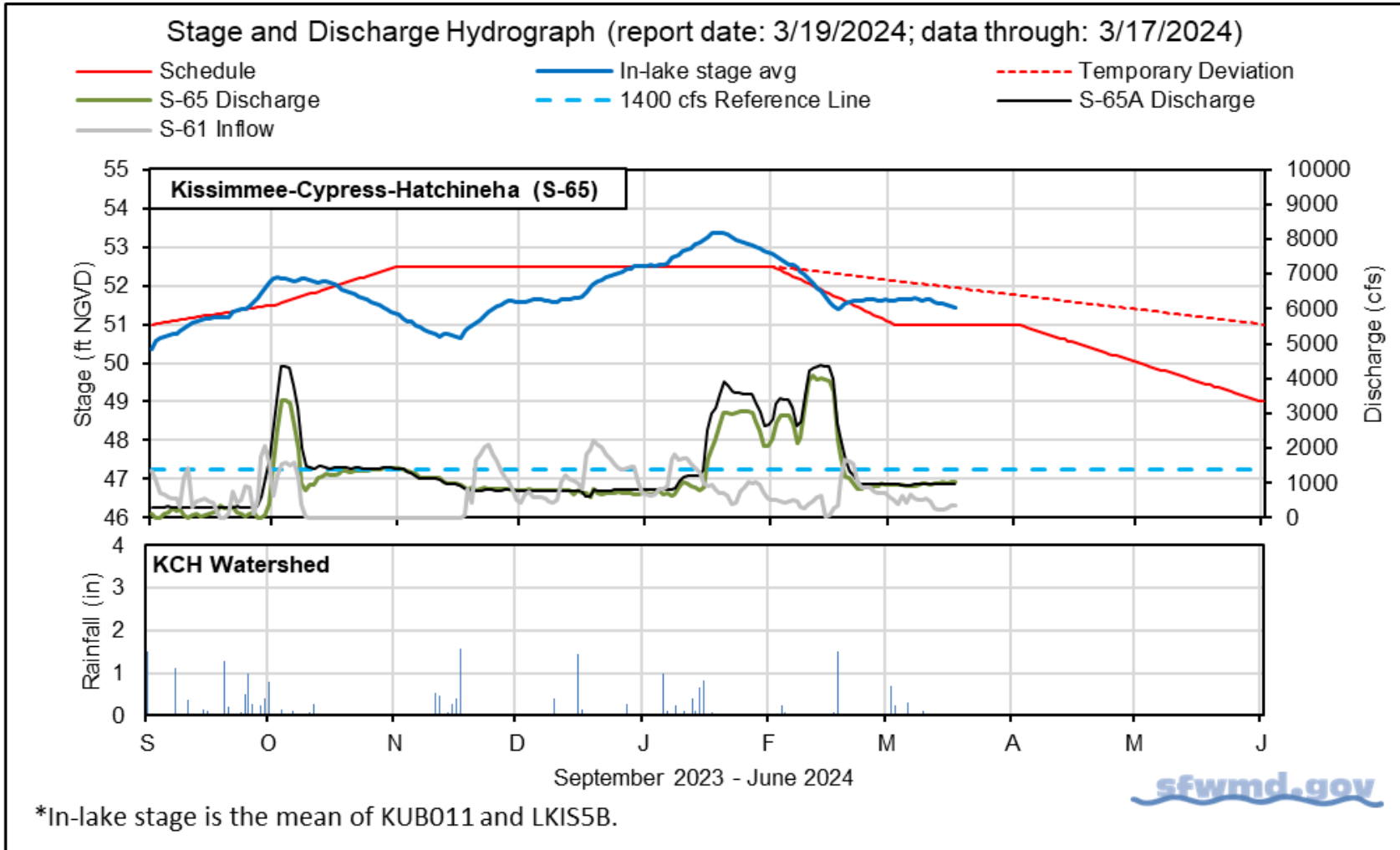


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge, and rainfall.

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			
		3/17/24	3/17/24	3/10/24	3/3/24	2/25/24
Discharge	S-65	1,000	1,000	950	950	980
Discharge	S-65A ^a	980	970	960	970	1,200
Headwater Stage (feet NGVD)	S-65A	46.3	46.3	46.3	46.3	46.1
Discharge	S-65D ^b	1,100	1,100	1,400	2,300	3,400
Headwater Stage (feet NGVD)	S-65D ^c	25.8	25.8	25.9	26.6	27.7
Discharge (cfs)	S-65E ^d	990	1,000	1,300	2,300	3,400
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	6.9	7.0	6.5	6.7	5.3
River channel mean stage ^f	Phase I river channel	36.2	36.3	36.6	37.2	38.8
Mean depth (feet) ^g	Phase I floodplain	0.33	0.37	0.48	0.66	1.58

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).

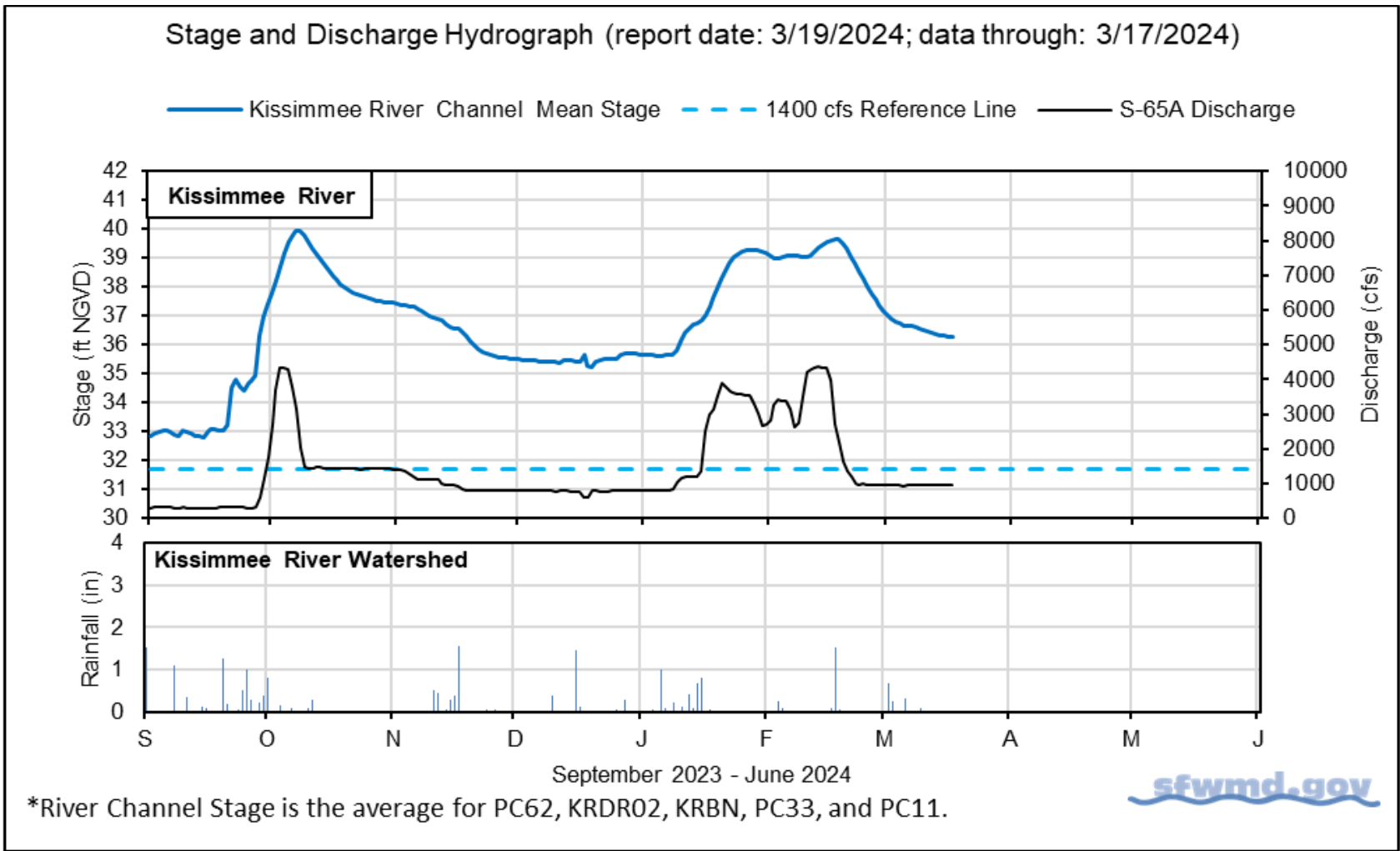


Figure KB-4. Kissimmee River stage, discharge, and rainfall.

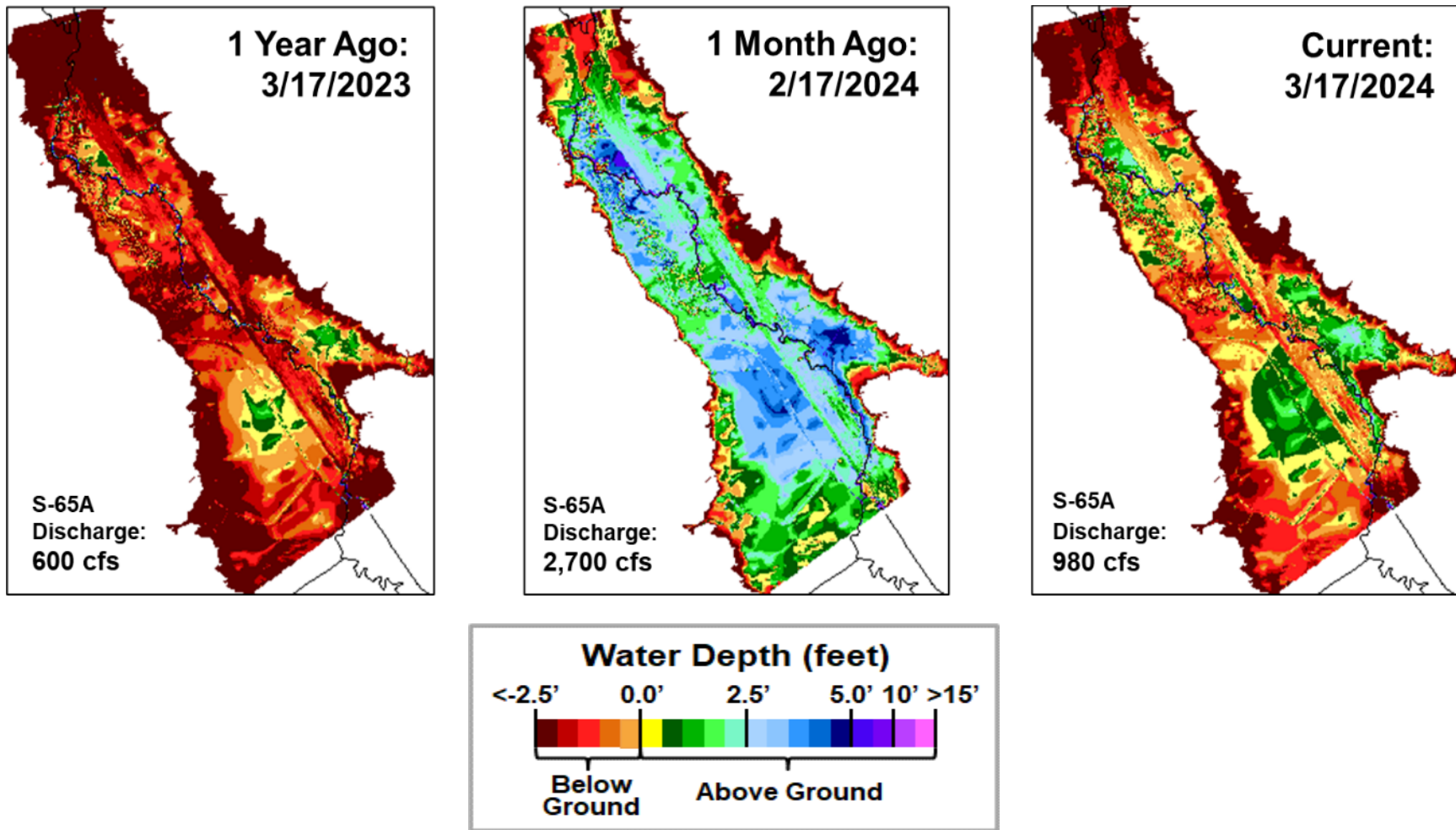


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

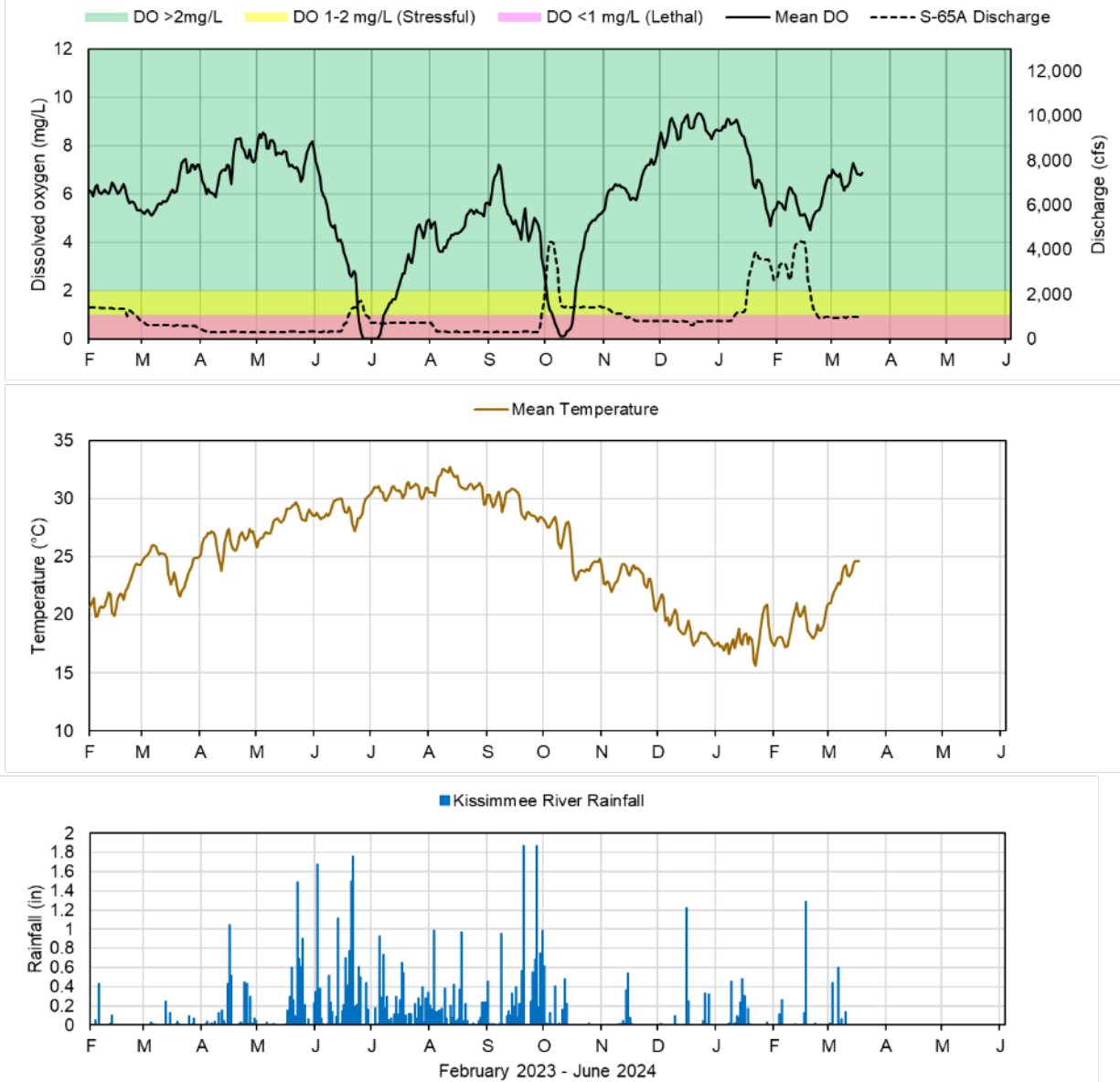


Figure KB-6. Kissimmee River channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRDR02, KRBN, PC33, PC11, PD62R, and PD42R with an average of six stations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

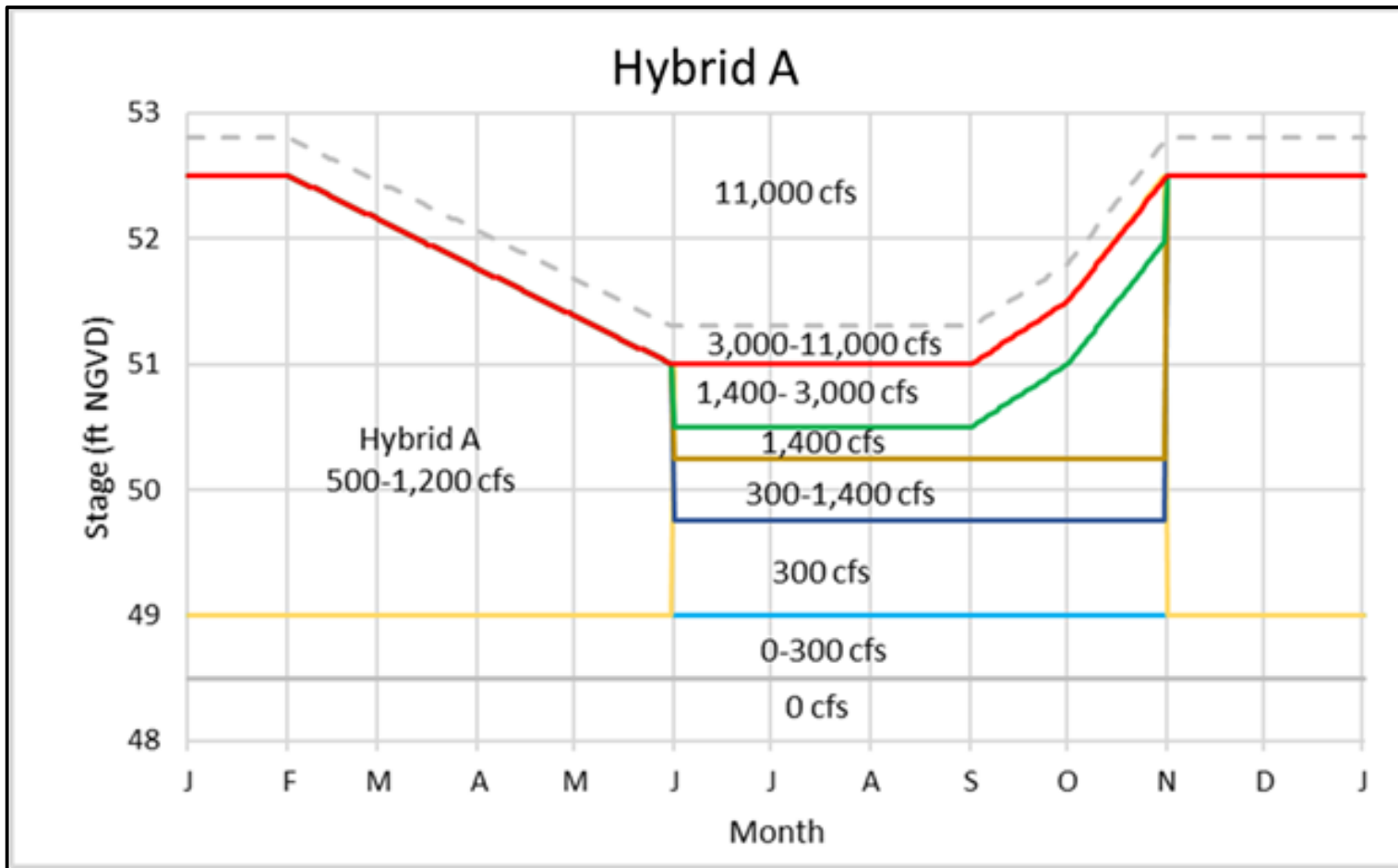


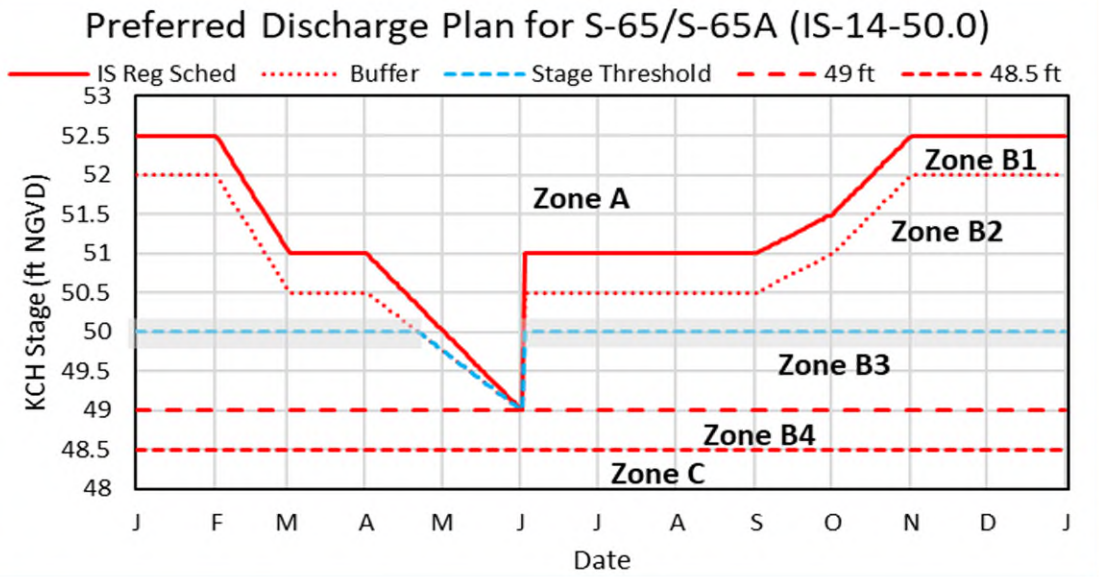
Figure KB-7. Hybrid A Discharge Plan for S-65/S-65A. Use discharge rate of change limits from IS-14-50 (Fig. KB-8).

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

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 15.75 feet NGVD on March 17, 2024, which was 0.19 feet lower than the previous week and 0.58 feet lower than a month ago (**Figure LO-1**). Lake stage remained in the intermediate sub-band (**Figure LO-2**) and was 2.25 feet above the upper limit of the recovery ecological envelope (**Figure LO-3**). According to NEXRAD, no rain fell directly over the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 2,530 cfs to 1,570 cfs. The highest structure inflow came from the C-38 Canal via the S-65E/65EX1 structure (1,040 cfs). Average daily outflows (excluding evapotranspiration) also decreased from the previous week, going from 8,410 cfs to 4,210 cfs. The highest average single structure outflow was recorded at the S-77 structure into the C-43 canal (2,010 cfs), while an average of 1,330 cfs was released to the south through the S-350 structures and an average of 450 cfs was released through S-308 into the C-44 canal. **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.

The seventh wading bird foraging survey of the 2024 breeding season (conducted March 14, 2024) reported approximately 4,300 wading birds actively foraging on the Lake (**Figure LO-6**). This is the highest number of foraging birds recorded this season, but it is still well below the 5-year average for this time of year (approximately 7,500). Lake levels declined about 0.5 feet since the last survey but are still unseasonably high, and a continued recession is necessary to provide suitable prey availability for nesting wading birds.

In the most recent non-obscured satellite image from March 14th, 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.

**1 Month Ago:
02/16/2024**

**Current:
03/17/2024**

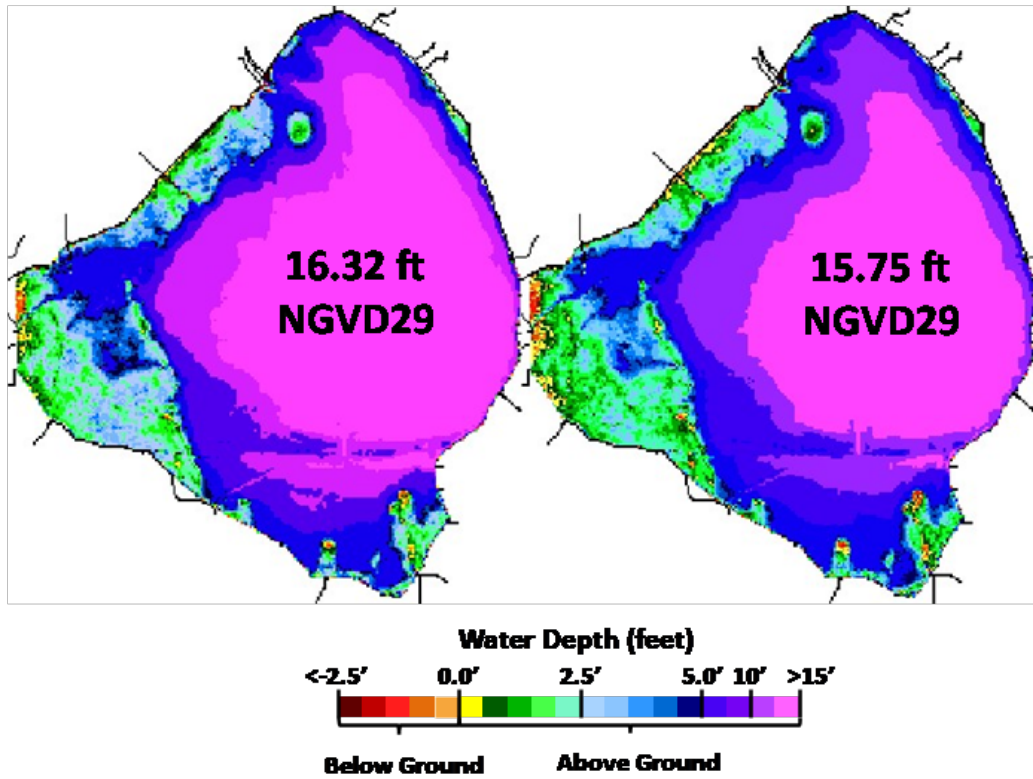


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Water Level History and Projected Stages

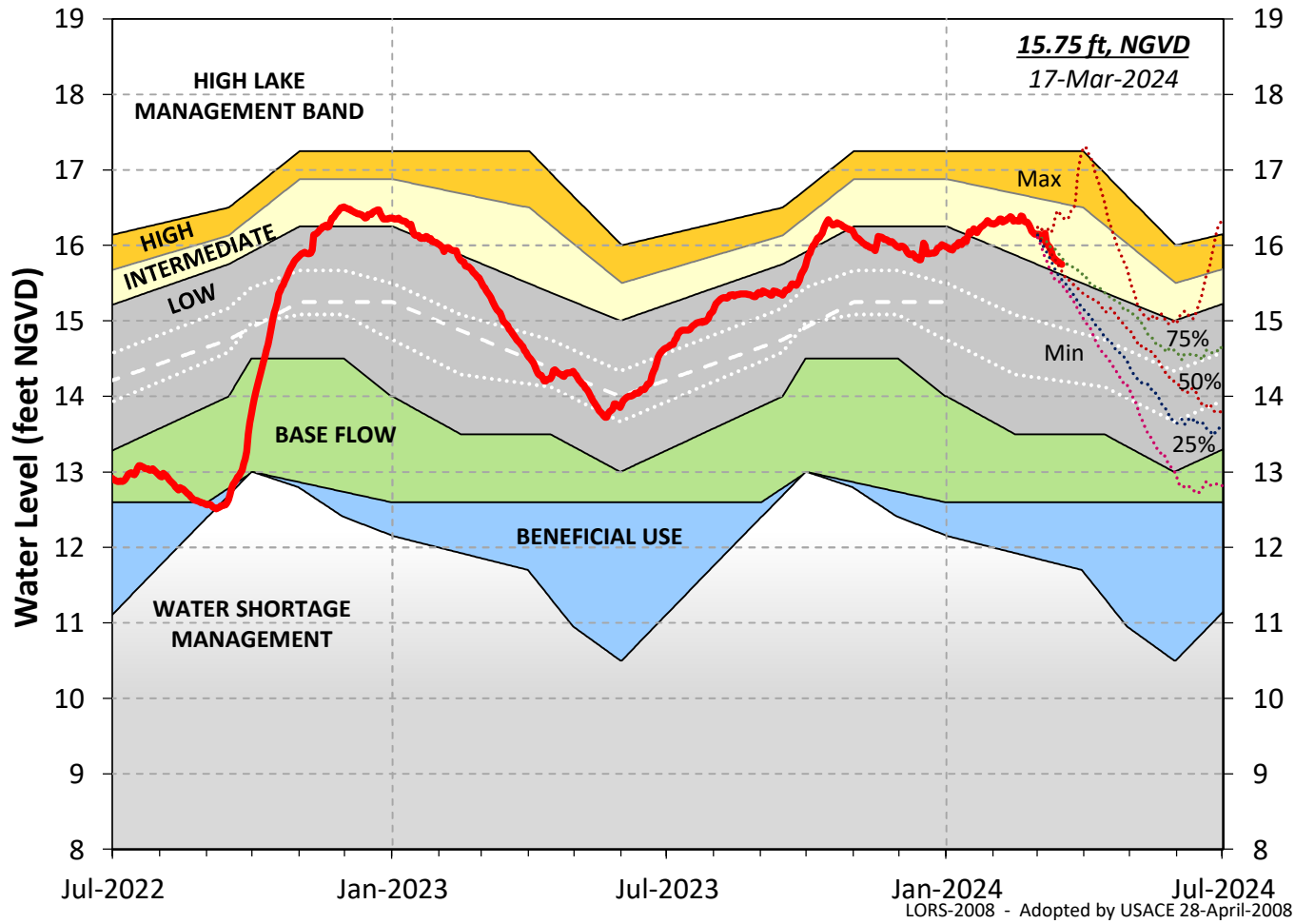


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

Lake Okeechobee Stage vs Recovery Envelope

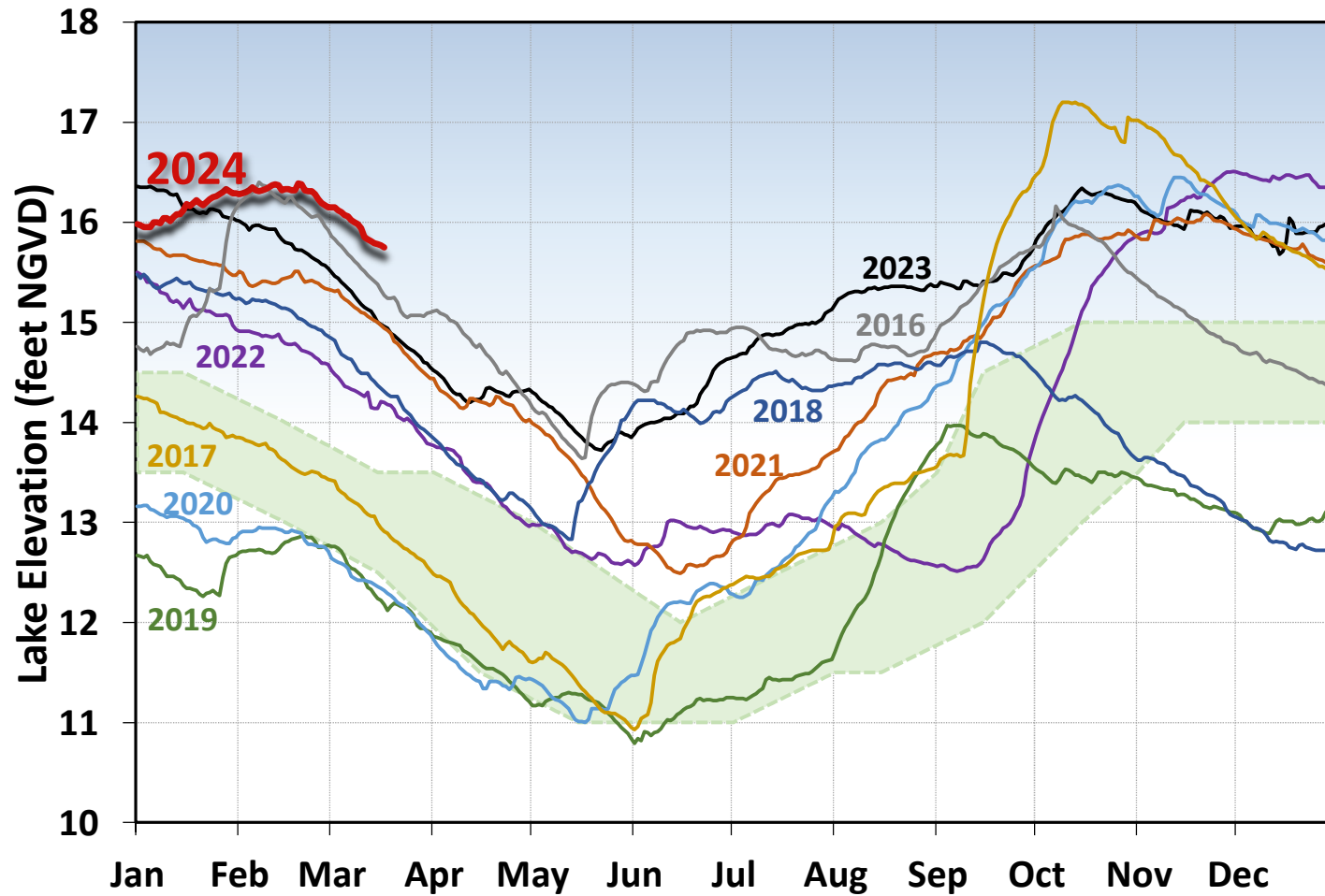


Figure LO-3. The current and eight prior year's annual stage hydrographs for Lake Okeechobee in comparison to the recovery envelope (light green). A shift from the normal ecological envelope to the recovery envelope occurred because the 30-day minimum lake stage (elevations exposed for at least 30 days,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

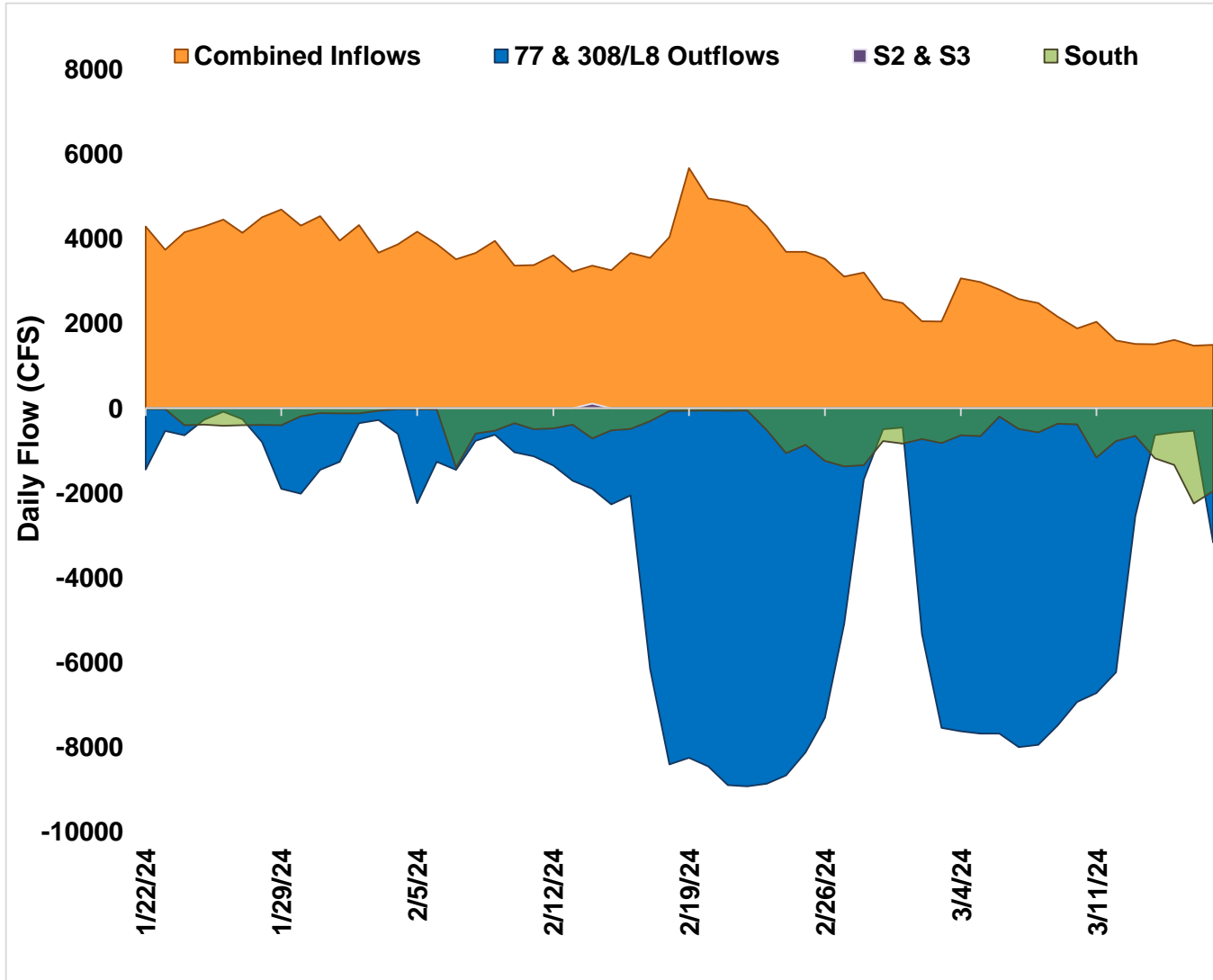


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

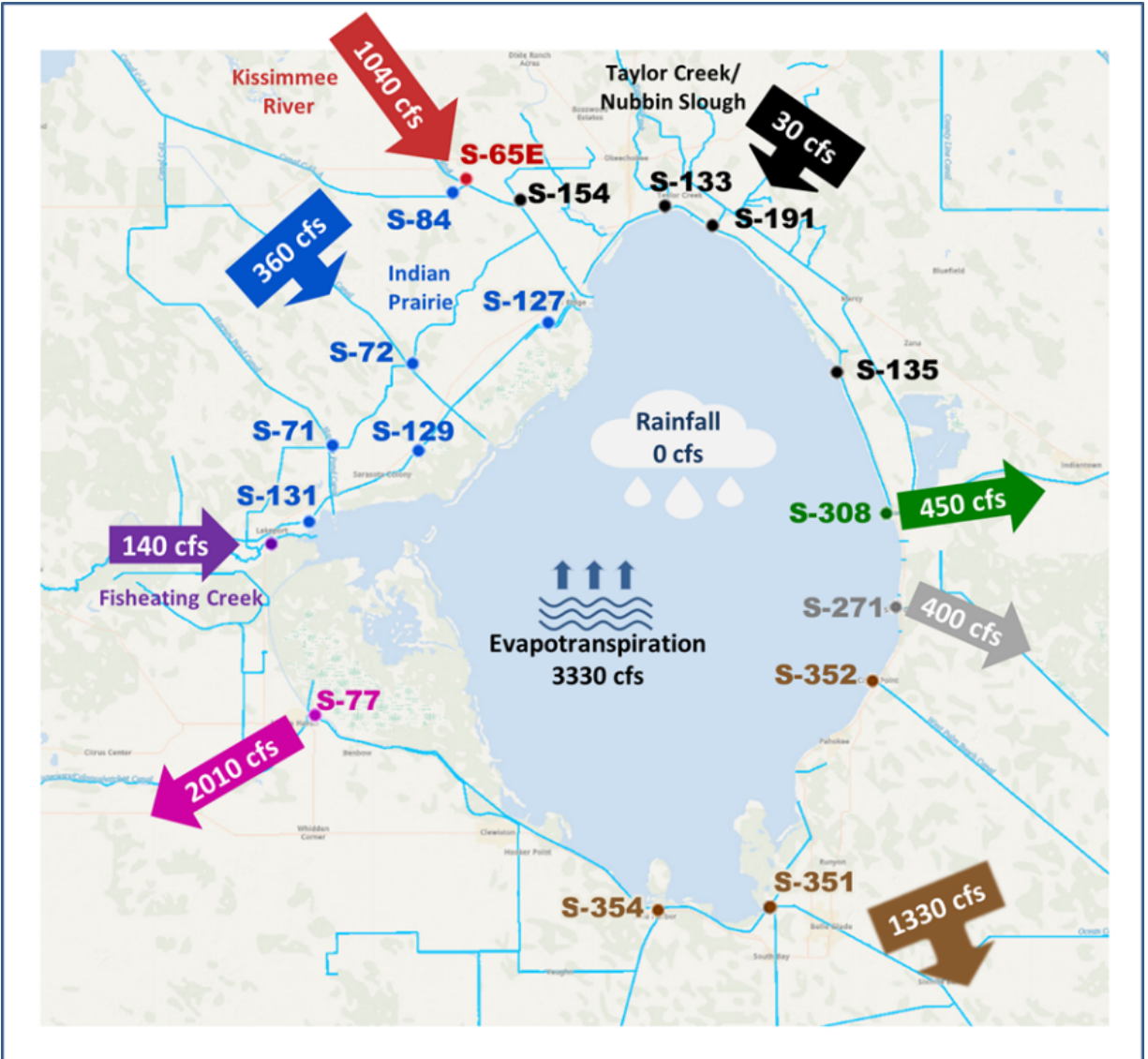


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of March 11 – March 17, 2024.

Wading Bird Foraging Locations March 14, 2024

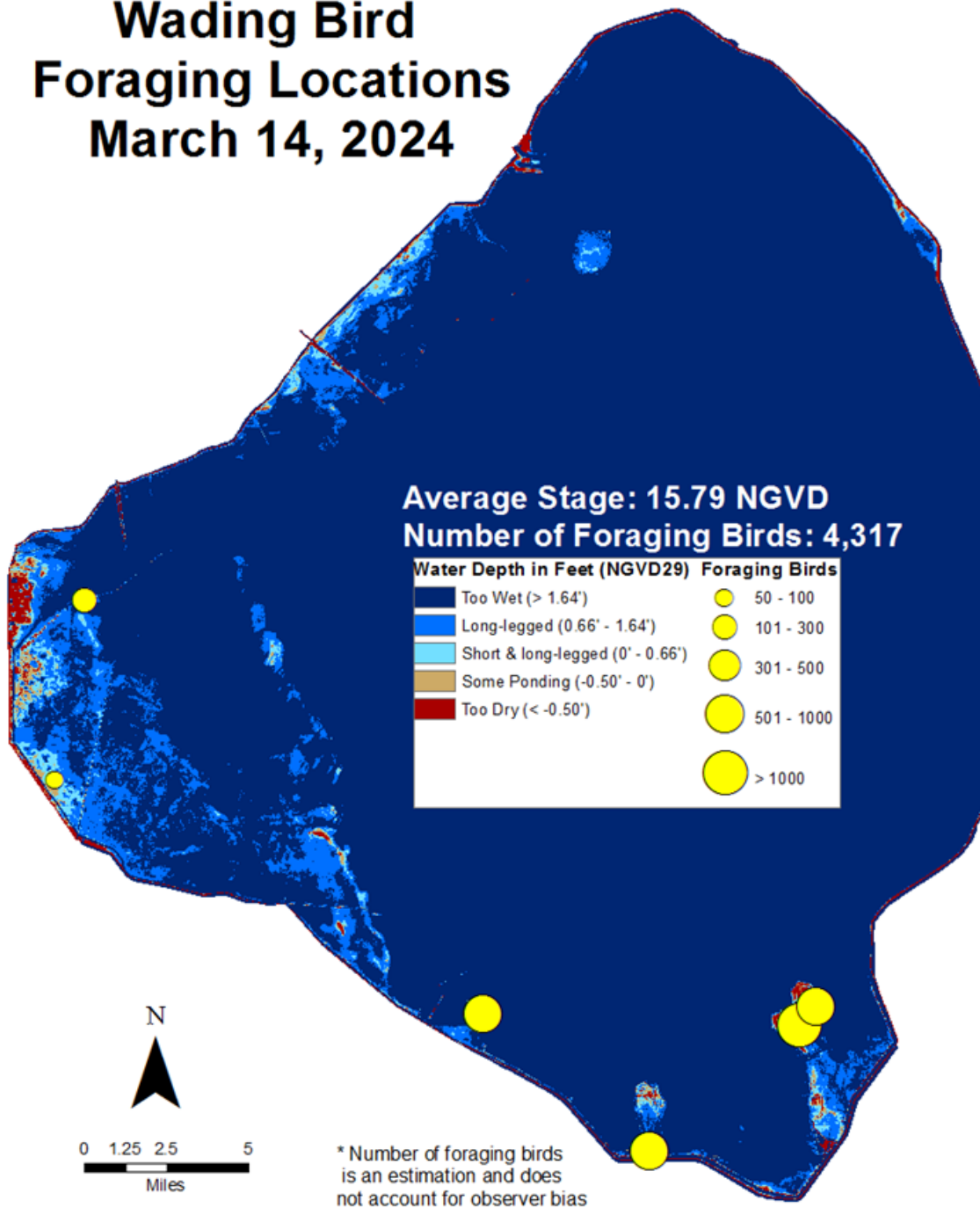


Figure LO-6. Locations of foraging flocks of wading birds observed during a monitoring flight on March 14, 2024 are shown in yellow (circle sizes represents the flock size).

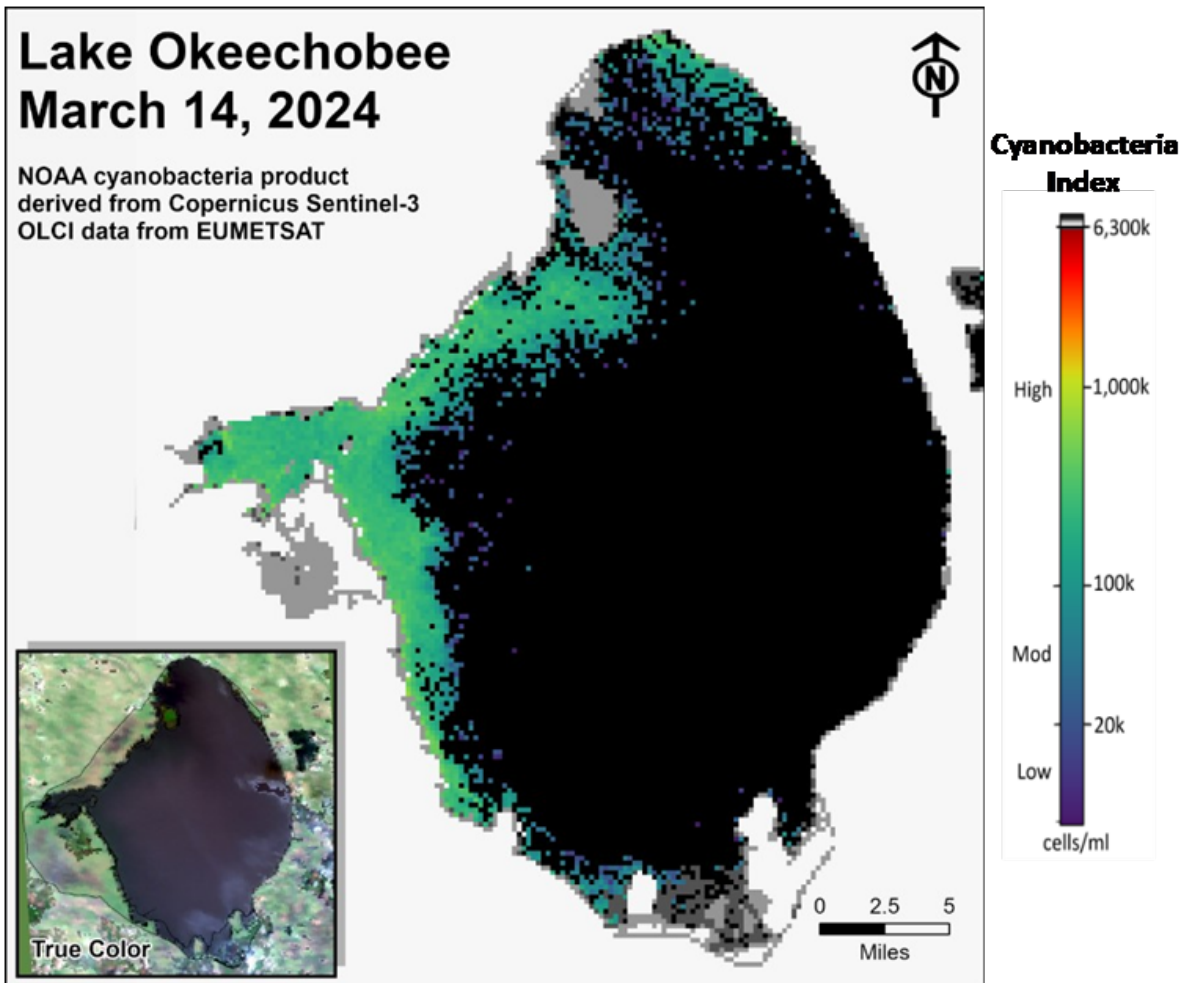


Figure LO-7. Cyanobacteria bloom index level on March 14, 2024 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover. *Provisional NOAA image, subject to change*

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 466 cfs (**Figures ES-1 and ES-2**), and the previous 30-day mean inflow was 566 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 10.0. Salinity conditions in the middle estuary were estimated to be within the lower 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 has not yet started (**Figure ES-5**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 2,640 cfs (**Figures ES-6 and ES-7**), and the previous 30-day mean inflow was 5,210 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, salinities remained the same at S-79, Val I-75, and Ft. Myers, increased at Cape Coral and Shell Point, and decreased at Sanibel (**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 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 has 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, 2013¹) 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 138 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 15, 2024, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed at bloom concentrations in any samples collected within the District region. On the east coast, red tide was observed in background concentrations in one sample from Miami-Dade County.

Water Management Recommendations

Lake stage is in the Intermediate Sub-Band. Tributary conditions are normal. The LORS2008 release guidance suggests up to 4,000 cfs release at S-77 to the Caloosahatchee River Estuary and up to 1,800 cfs release at S-80 to the St. Lucie Estuary.

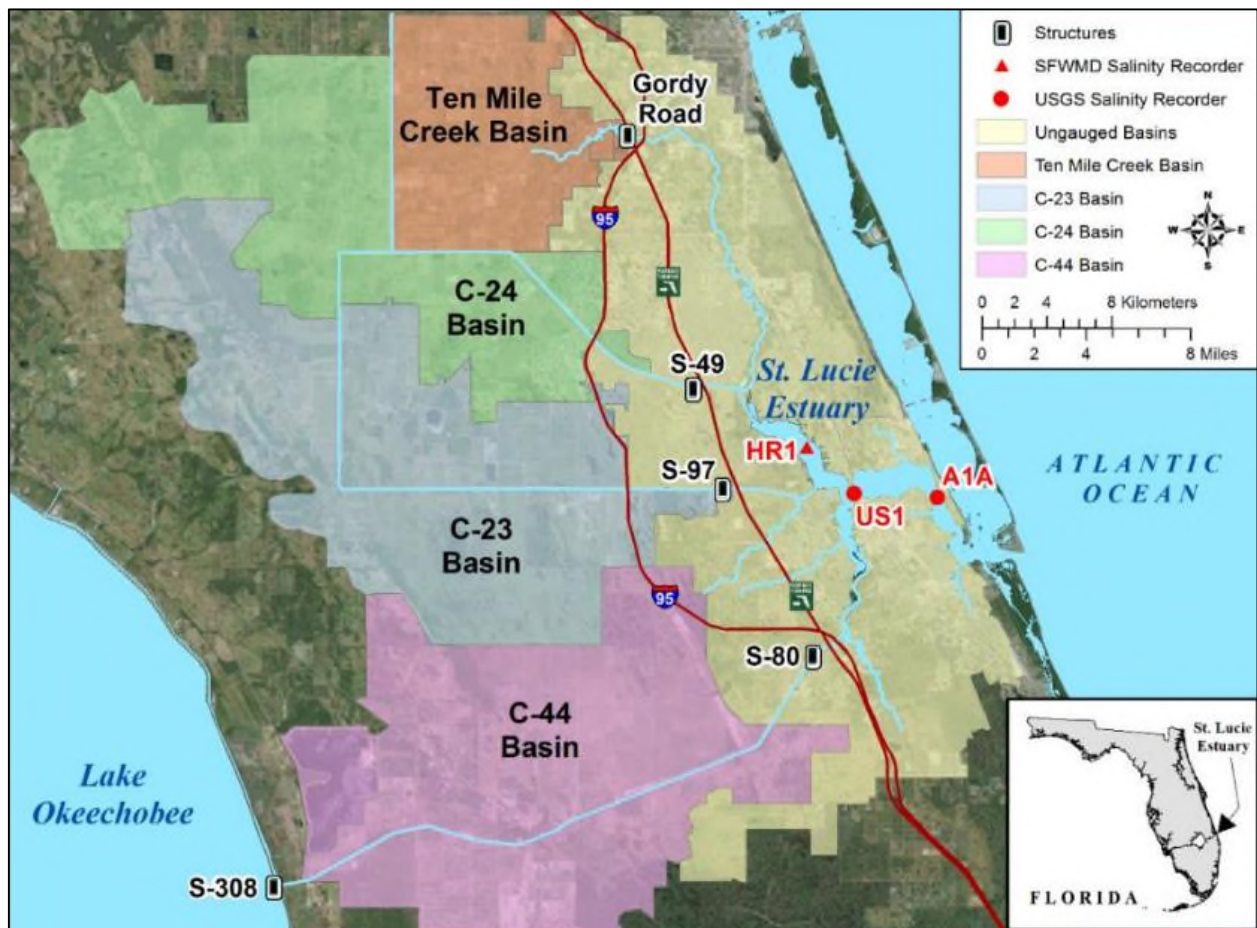


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

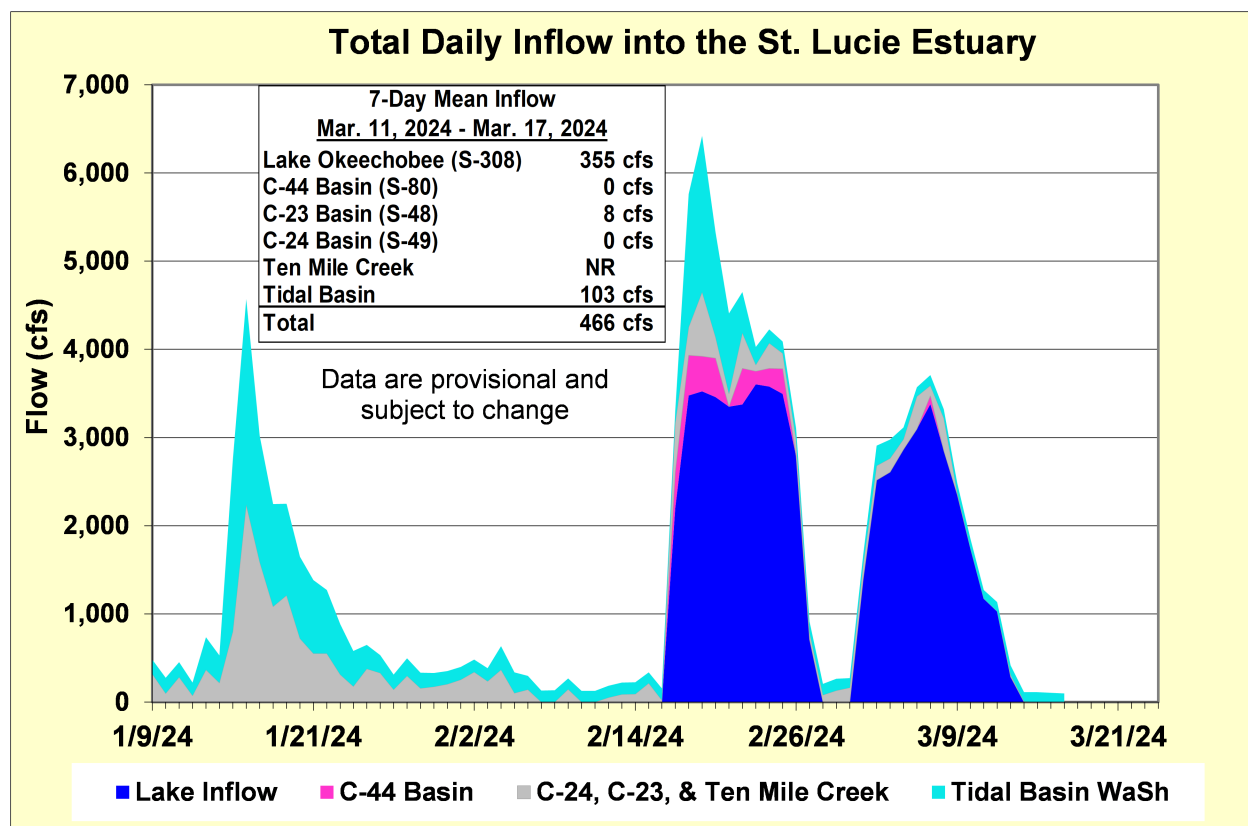


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	4.4 (4.1)	7.1 (4.9)	10.0 – 25.0
US1 Bridge	8.8 (4.4)	11.2 (7.3)	10.0 – 25.0
A1A Bridge	18.1 (11.8)	24.4 (20.6)	10.0 – 25.0

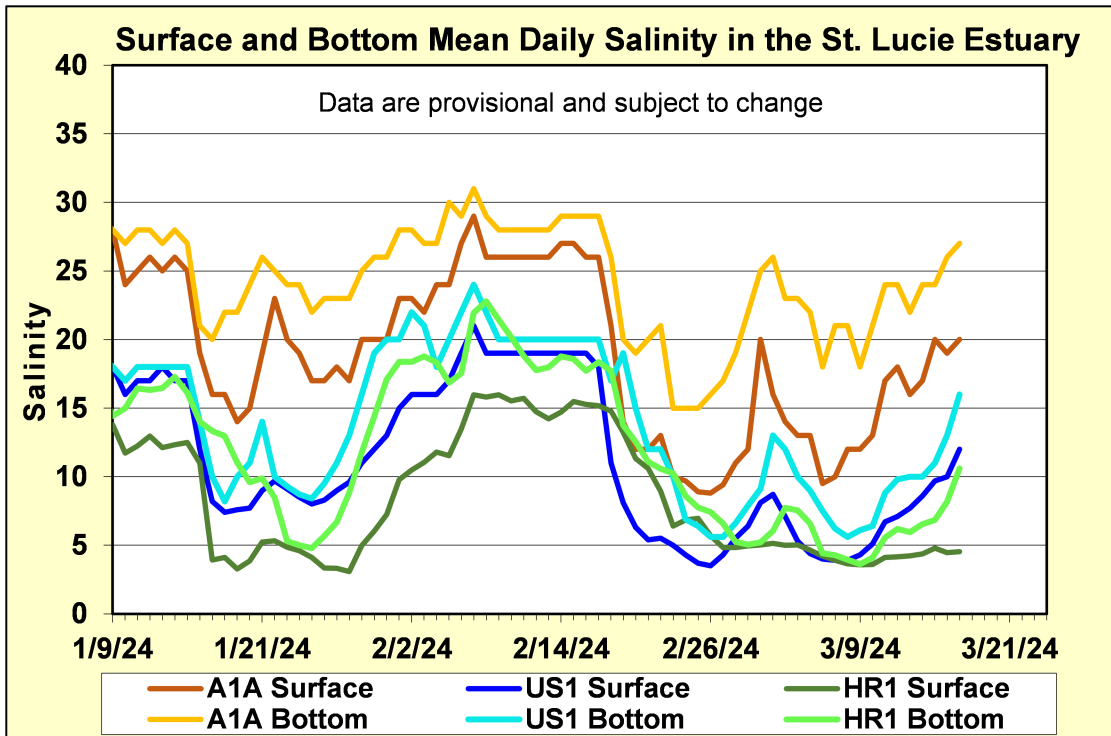


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

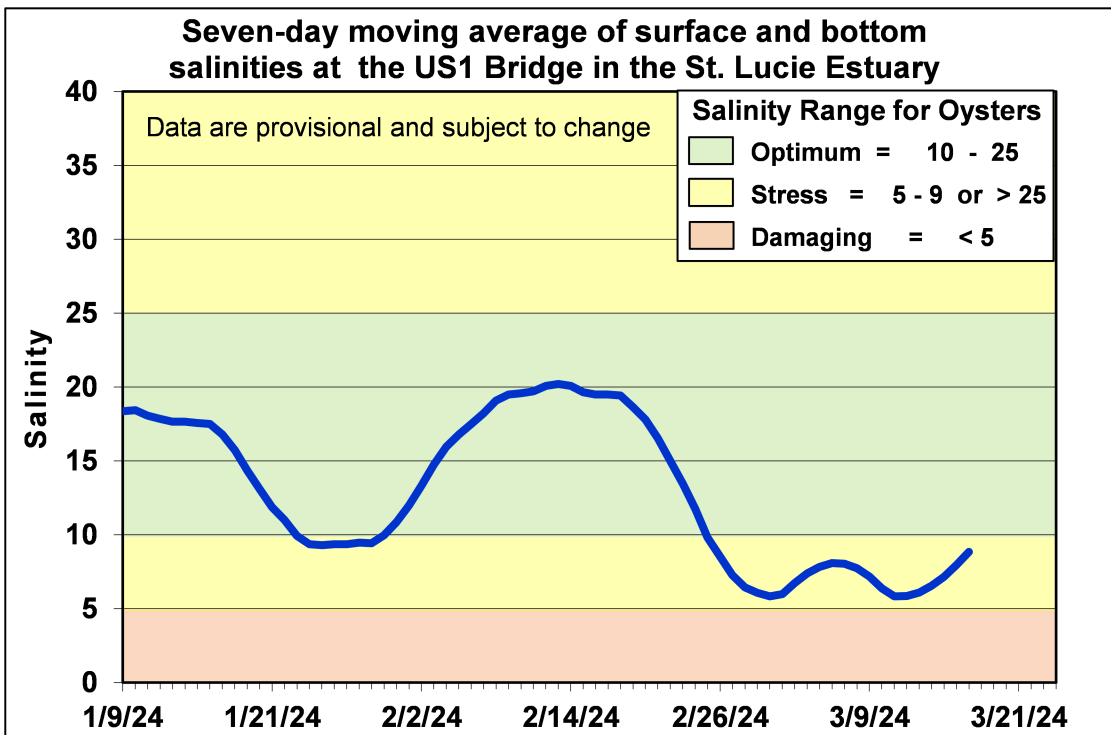


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

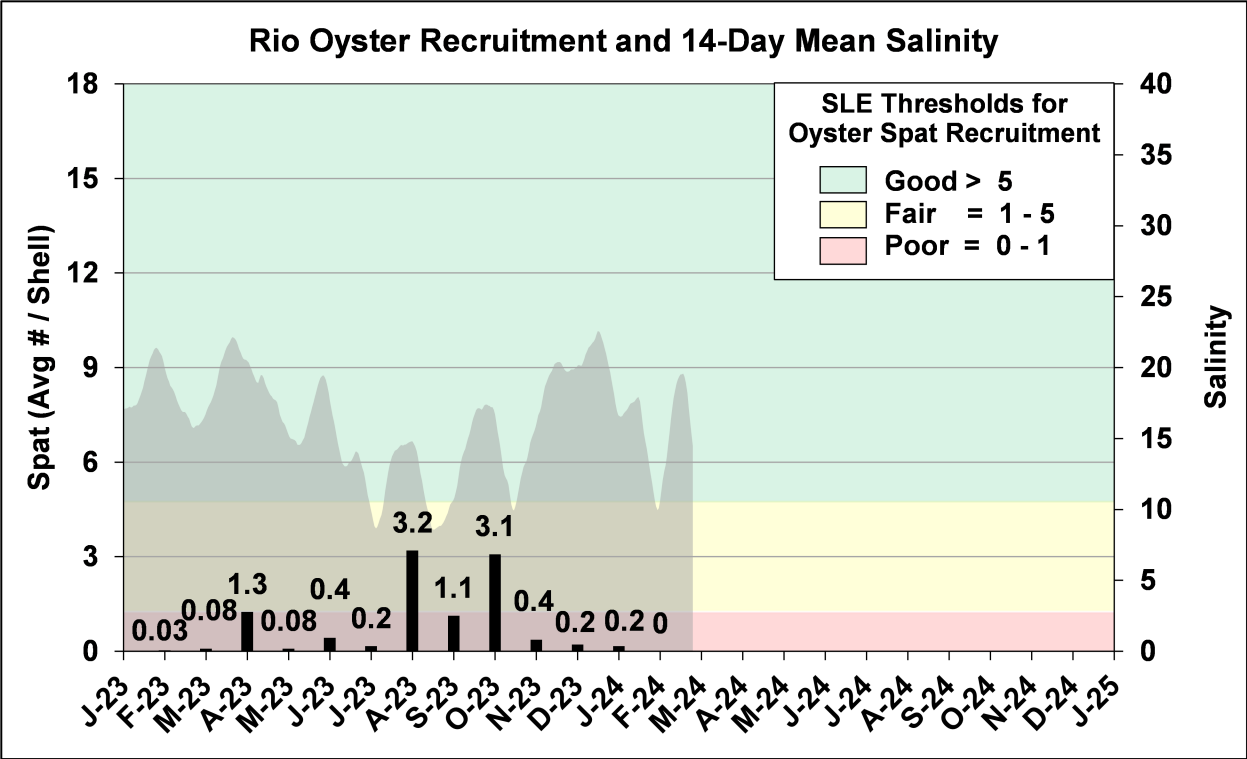


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

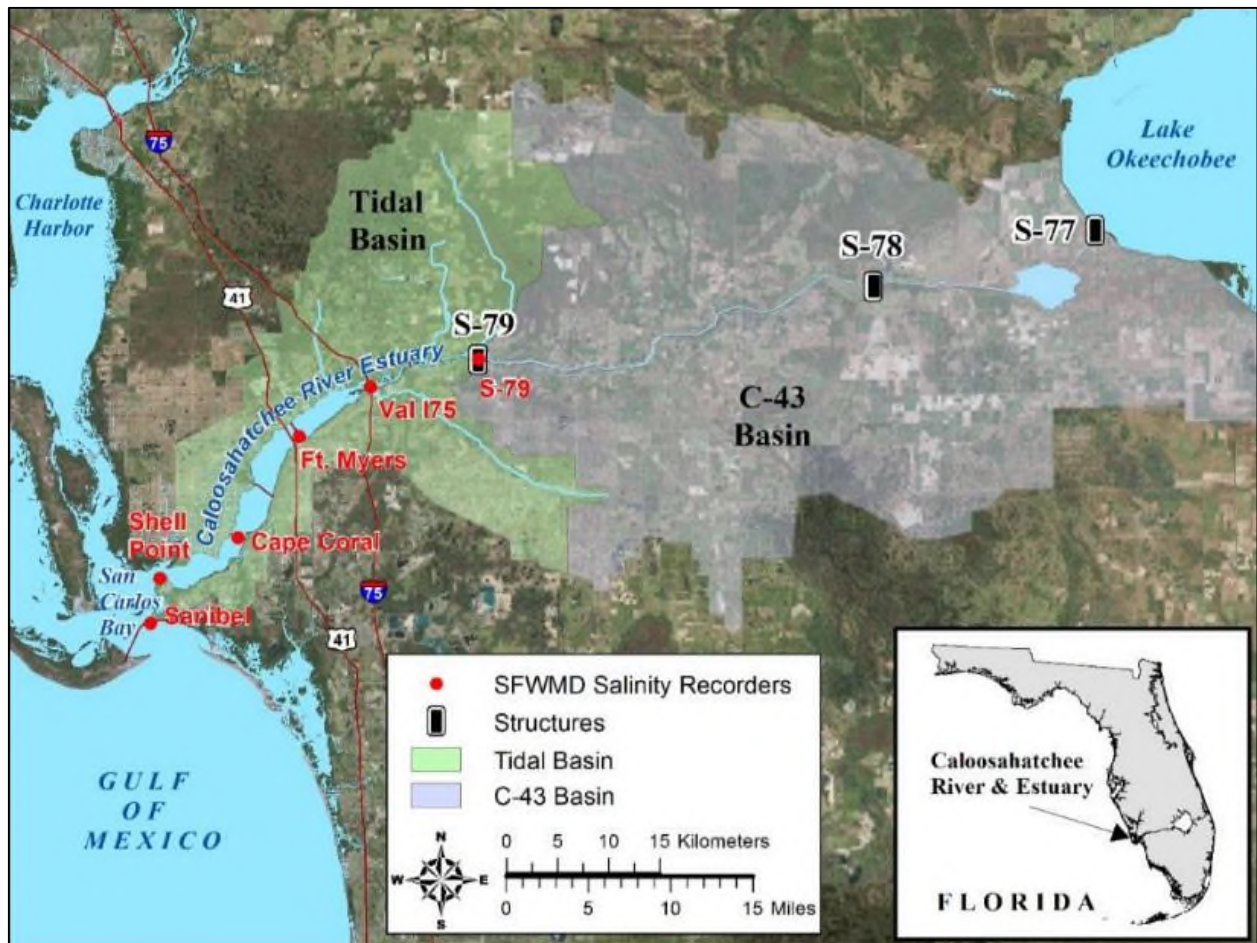


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

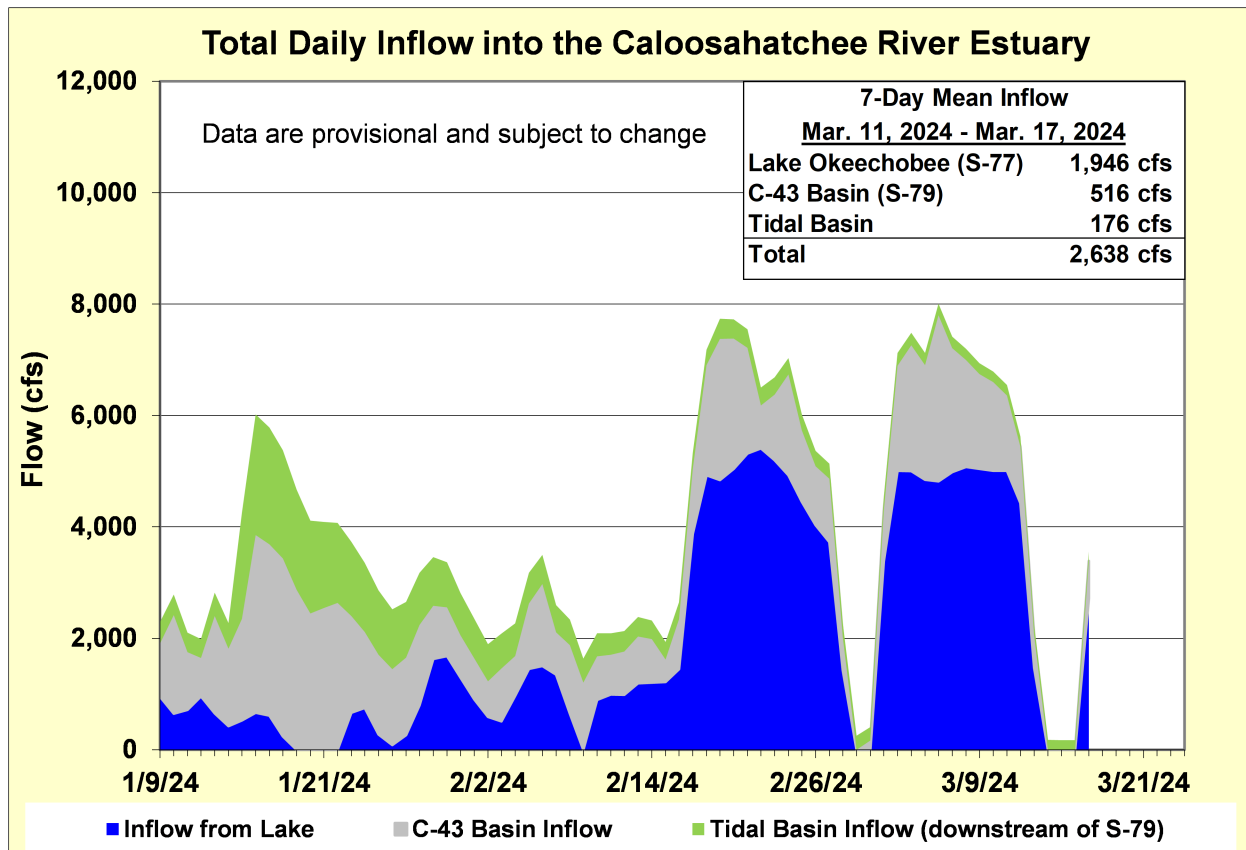


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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	2.7 (1.7)	3.8 (2.5)	10.0 – 25.0
Shell Point	17.5 (16.5)	19.3 (18.7)	10.0 – 25.0
Sanibel	25.0 (26.1)	26.2 (27.5)	10.0 – 25.0

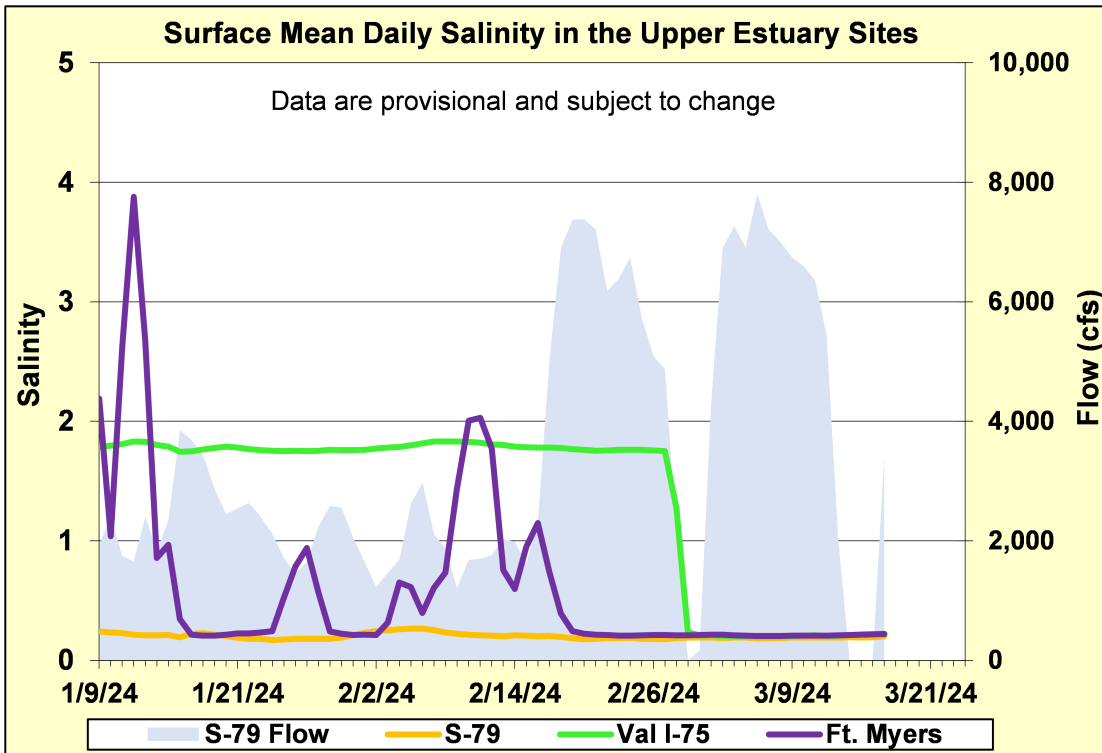


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

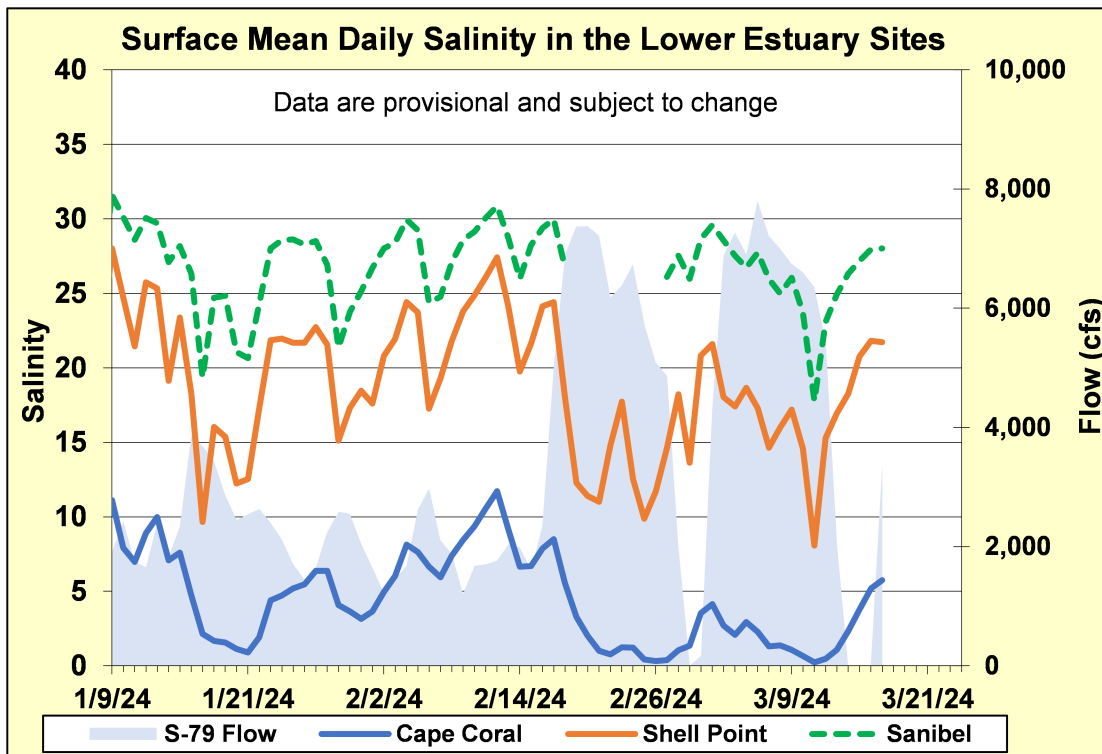


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

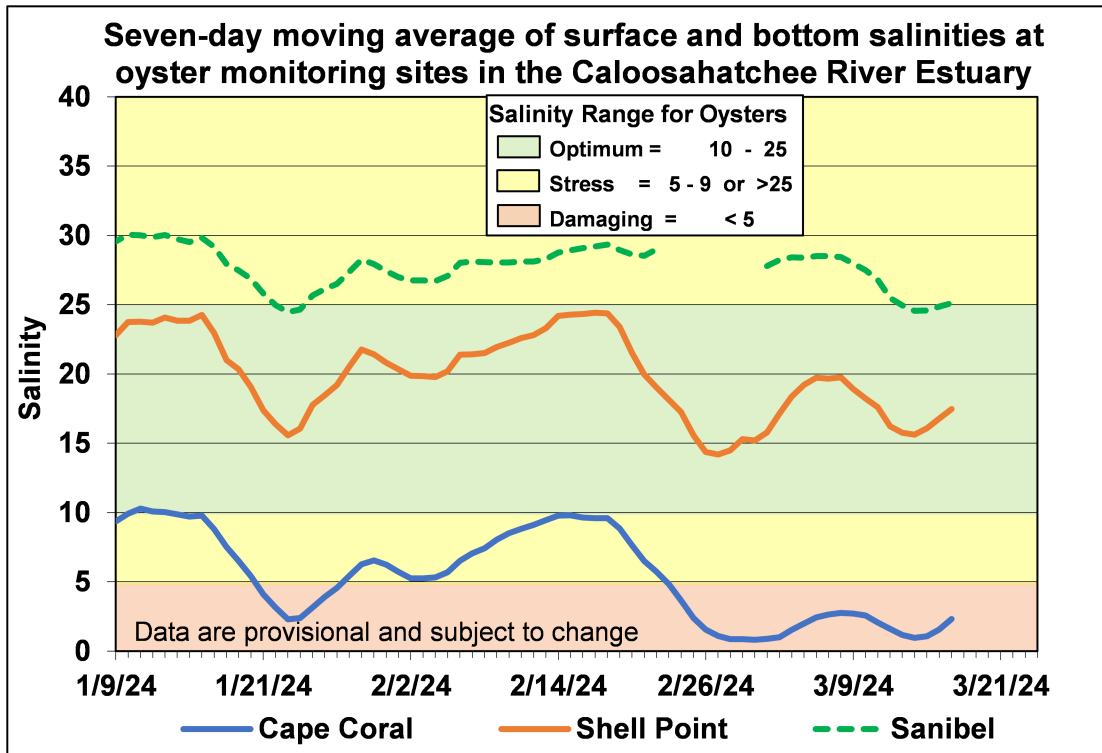


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

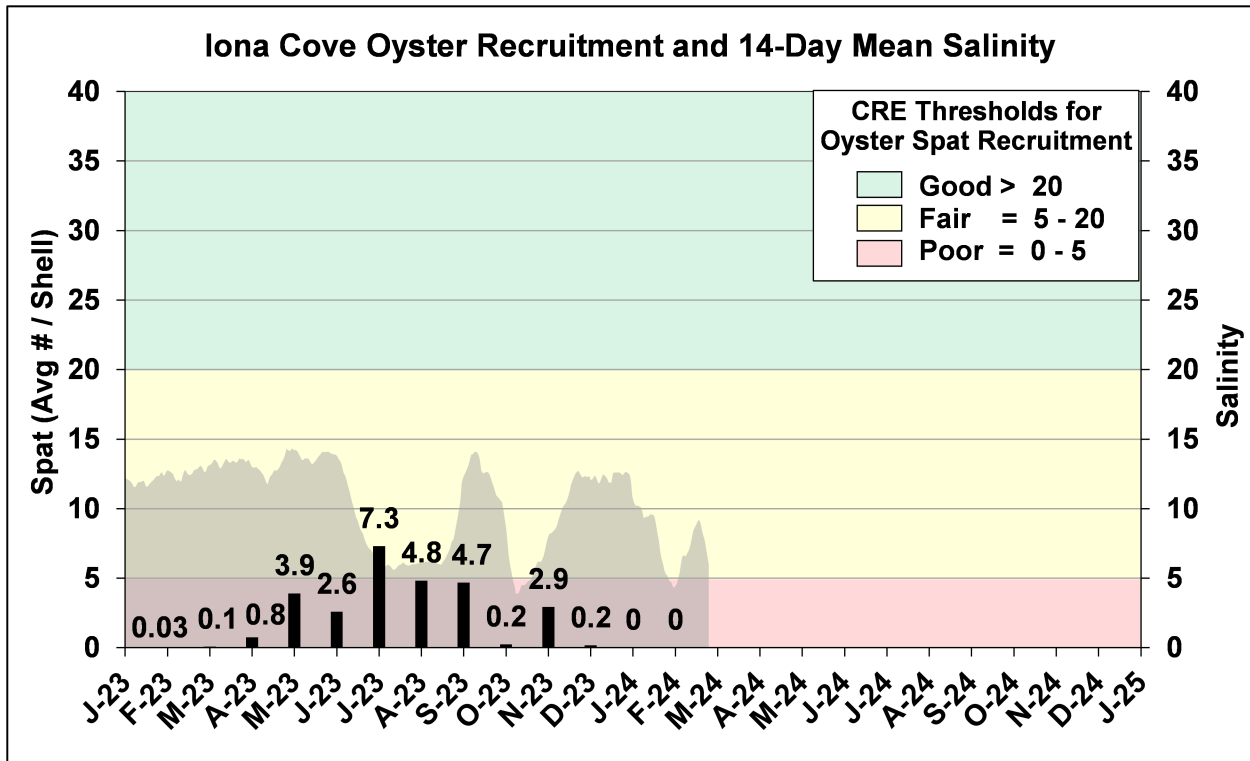


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

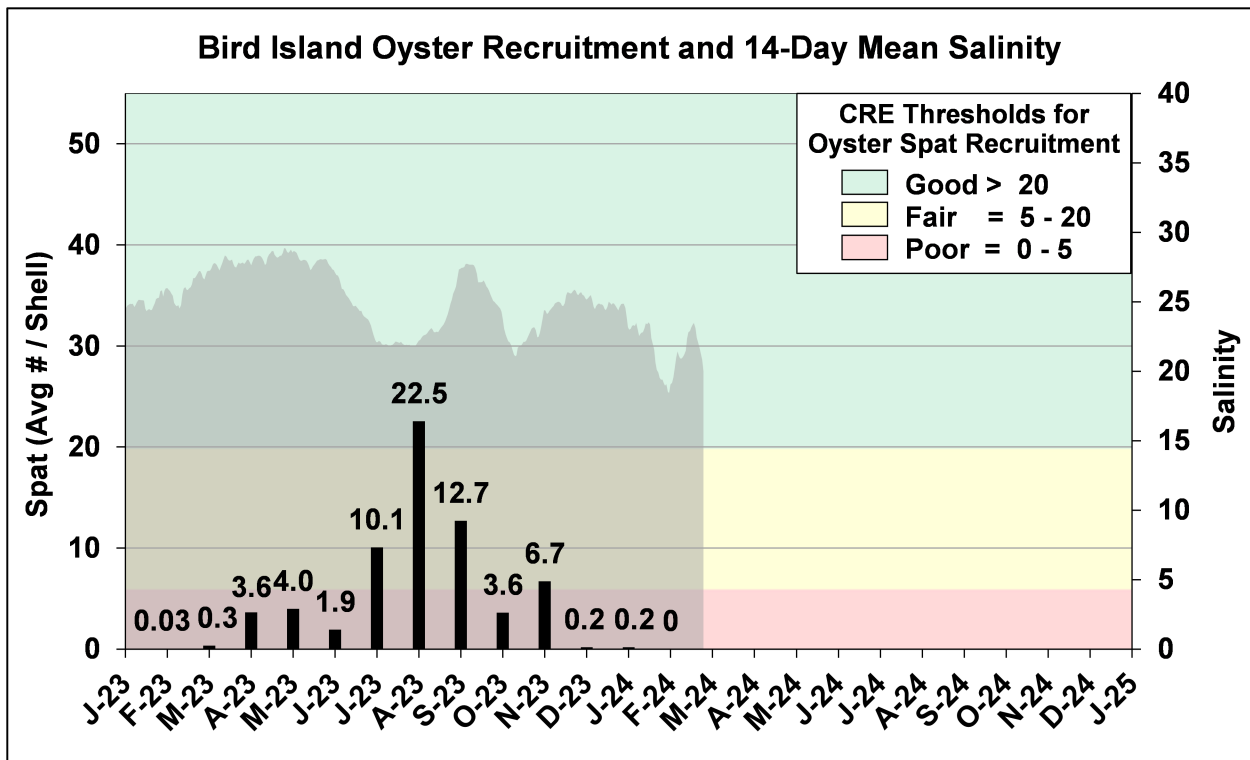


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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	138	0.2	0.3
B	750	138	0.2	0.3
C	2000	138	0.2	0.3
D	4000	138	0.2	0.3

Observed and Forecasted Flow at S-79 and Salinity at Val I-75

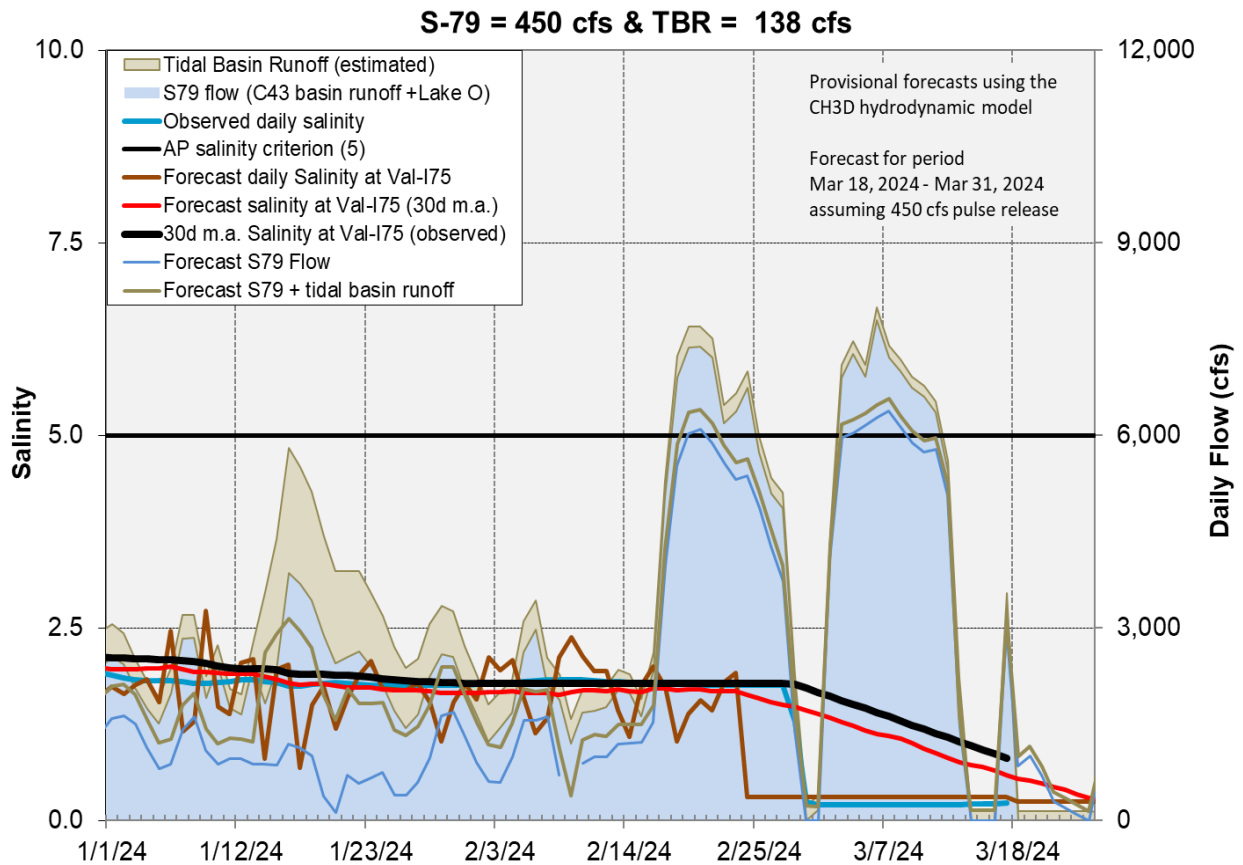


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

Stormwater Treatment Areas

STA-1E: STA-1E Eastern Flow-way is offline for erosion repair in Cell 2. 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/m²/year (**Figure S-1**).

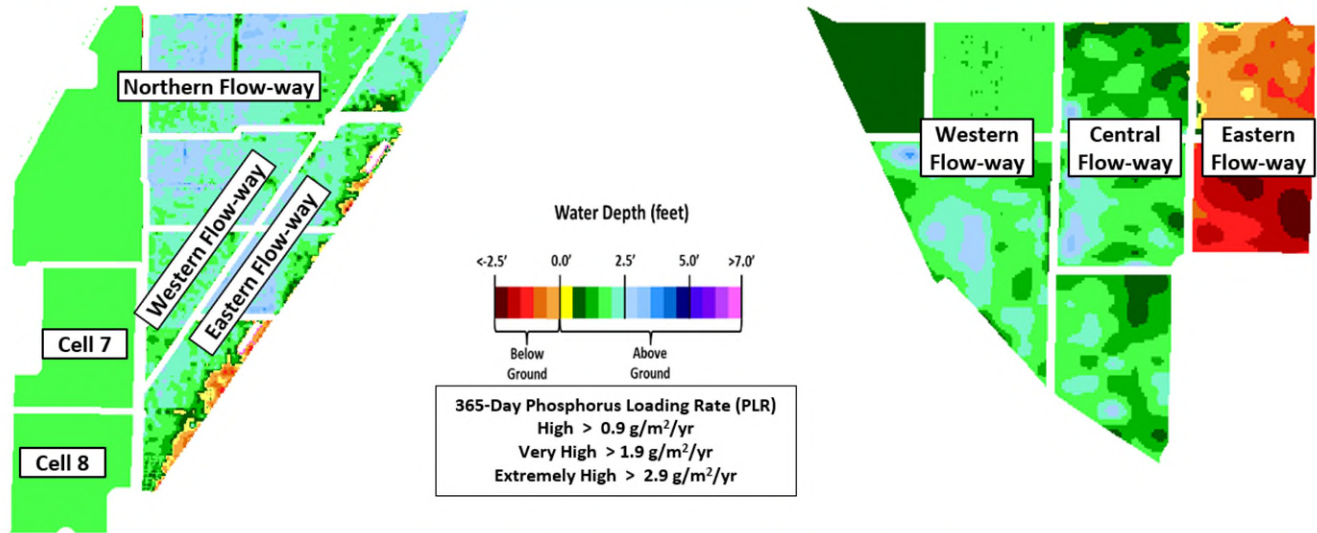
STA-2: Operational restrictions are in place in Flow-ways 2 and 4 for vegetation management activities. Online treatment cells are near or above target stage. Vegetation in Flow-ways 2, 3, and 4 is stressed, and in 5 is highly stressed. The 365-day PLRs for Flow-ways 3, 4, and 5 are below 1.0 g/m²/year. 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/m²/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/m²/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 – 3/11/2024 through 3/17/2024

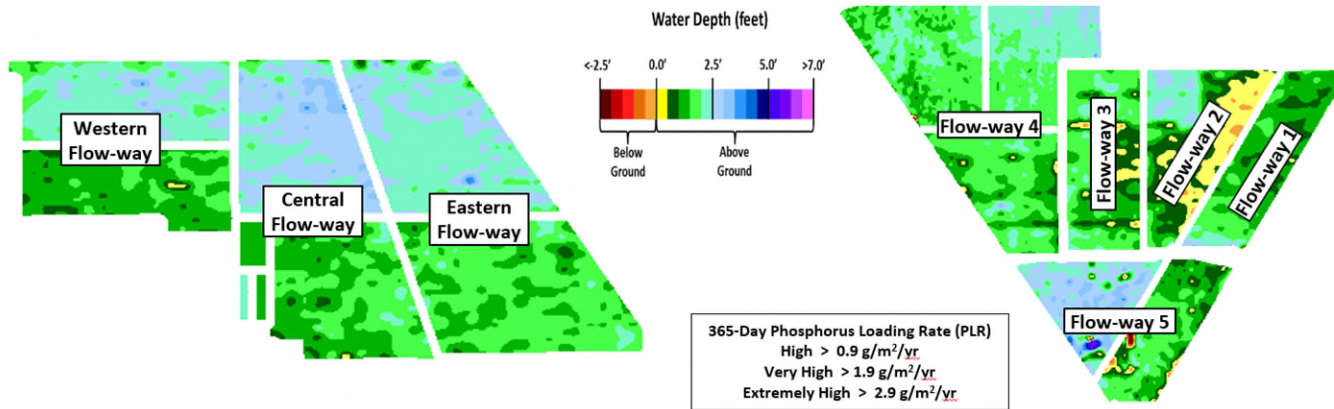


STA-1W	Flow-way Status
Western	<ul style="list-style-type: none"> • High 365-day PLR • Highly stressed vegetation conditions
Eastern	<ul style="list-style-type: none"> • Very High 365-day PLR • Highly stressed vegetation conditions
Northern	<ul style="list-style-type: none"> • Highly stressed vegetation conditions • Planting emergent vegetation
Cell 6	
Cell 7+8	

STA-1E	Flow-way Status
Western	<ul style="list-style-type: none"> • Post-construction vegetation grow-in
Central	<ul style="list-style-type: none"> • High 365-day PLR • Highly stressed vegetation conditions
Eastern	<ul style="list-style-type: none"> • Offline for Cell 2 erosion repair

Figure S-1. Eastern Flow Path Weekly Status Report

Central Flow Path Weekly Status Report – 3/11/2024 through 3/17/2024



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

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

Figure S-2. Central Flow Path Weekly Status Report

Western Flow Path Weekly Status Report – 3/11/2024 through 3/17/2024

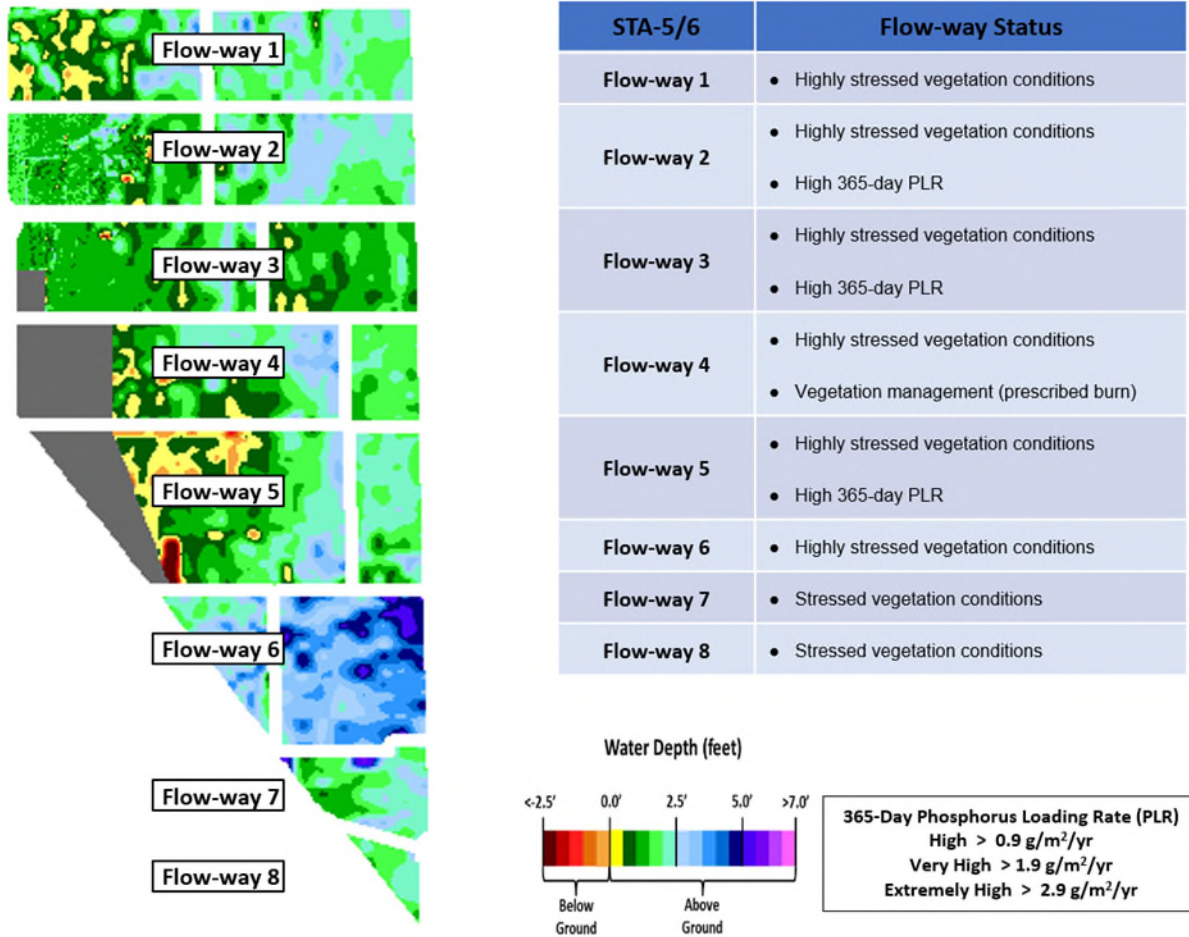


Figure S-3. Western Flow Path Weekly Status Report

Basic Concepts and Definitions for STA Weekly Status Report

- **Inflow:** Sum of flow volume at all inflow structures to an STA.
- **Lake Inflow:** Portion of the STA total inflow volume that originates from Lake Okeechobee.
- **Outflow:** Sum of flow volume at outflow structures from an STA.
- **Total Phosphorus (TP):** Total mass of phosphorus in all its forms; including particulate, dissolved, etc.
- **Inflow Concentration:** TP concentration is the mass of TP in micrograms per liter of water, $\mu\text{g/L}$ or ppb. Inflow concentration refers to the flow-weighted mean TP from all inflow structures over a period of time.
- **Outflow Concentration:** The flow-weighted mean TP from all outflow structures over a period of time. The outflow concentration represents the reduction of inflow TP achieved by STA treatment of the inflow water.
- **WQBEL:** The STA outflow concentration that is required upon completion of the Restoration Strategies projects by December 2025. The outflow concentration shall not exceed 13 ppb as an annual flow weighted mean in more than 3 out of 5 water years on a rolling basis and shall not exceed 19 ppb as an annual flow weighted in any water year.
- **Flow-Way (FW):** One or more treatment cells connected in series. Cells typically have emergent aquatic vegetation (EAV) in the front portion of the flow-way followed by a mix of EAV and submerged aquatic vegetation (SAV)
- **Vegetation Status:** Healthy means the vegetation condition is good and will allow the STA to perform as designed. Stressed means the vegetation is showing signs of poor health, such as browning or areas of vegetation die-off, or the cell contains undesirable vegetation such as floating exotic vegetation requiring treatment. The TP reduction capability of the STA is affected when the vegetation condition is poor.
- **Phosphorus Loading Rate (PLR):** Mass of inflow TP in grams, divided by total treatment area of STA in square meters, per year. In general, a 365-day value of less than 1.0 is needed for an STA to perform optimally. A PLR of 2.0 is considered very high and a PLR of 3.0 is considered extremely high. The TP reduction capability of the STA is affected when the PLR is high, very high and extremely high.
- **Online:** Online status means the FW can receive and treat inflow.
- **Online with Restriction:** The FW can receive and treat inflow, but the amount of flow or water level may be limited temporarily. For example, a vegetation rehabilitation effort may require reduced flows through an area while the new plants are establishing, or nesting by protected species may require a certain water level not to be exceeded.
- **Offline:** The FW is unable to receive and treat inflow due to repairs, construction, or other prohibitive reasons.
- **Depth:** Difference between the average surface water level in a cell and the average ground elevation in that cell. Target depths, or depths between flow events, are between 1.25 ft to 1.5 ft. As depth approaches or drops below zero, an increasing percentage of the cell is considered dry and STA conditions deteriorate. An increase in depth above target depth is expected with increasing flow. However, as depth increases much above the target depth and is sustained over a period of time, it can be detrimental to vegetation health and overall STA treatment performance.
- **Note:** The data provided in this summary report were developed using a combination of provisional and quality-assured flow and water quality data. In some cases, best professional judgment was used to estimate missing data and revise questionable data. Values provided are not considered final but are appropriate for use in STA operational decision-making.

Everglades

Water Conservation Area Regulation Schedules

No meaningful amount of rain fell across the EPA last week and stages dropped in every basin. WCA-1: Stage within the Refuge remained above schedule but continues to trend towards the A1 zone line, with stage on Sunday at the 1-8C gauge 0.37 feet above that line. WCA-2A: Stage at the S-11B_H gauge trended sharply towards schedule last week. The average on Sunday was 0.79 feet above the flat regulation line. WCA-3A: The 3-Gauge average stage receded faster than the slope of the schedule line. The average stage on Sunday was 0.23 feet above the falling Zone A regulation line. WCA-3A North: Stage at Gauge 62 (NW corner) remained below the Upper schedule last week, with the average on Sunday 0.29 feet below that schedule line. See figures **EV-1** through **EV-4**.

Water Depths

The SFWDAT model output for 3/17/24 illustrates a drying hydropattern in WCA-3A North over the last month. 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 but is trending shallower within all the major sloughs of ENP less so to the west. Current WDAT water depth estimates are drier when compared to one month ago across most of the WCA-3A and WCA-2A. Conditions are somewhat wetter in the west and across central ENP. The comparison to modeled conditions a year ago continue to show significantly wetter conditions across most of the EPA most significant within the Big Cypress basin. WCA-2A output suggests a mix of drier conditions in the east and wetter in the northwest (**Figure EV-5** and **Figure EV-6**).

Comparing current conditions to the 20-year average on March 17th: Depth conditions remain above the 90th percentile for this time of the year across the EPA. Only northeastern WCA-2A approaches the average (**Figure EV-7**).

Taylor Slough and Florida Bay

All stages decreased across Taylor Slough over the past week (3/11-3/17), ranging from -0.15 feet at Taylor Slough Bridge (TSB) in the northern slough, to -0.04 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 11.6 inches compared to before the Florida Bay initiative (starting in 2017), a decrease of 0.8 inches relative to last week's comparison. Stages at Craighead Pond (CP) and Taylor Slough Bridge (TSB) are slightly below estimated historical levels (~1900; Marshall and Wingard, 2014) by 0.08 and 0.16 feet, respectively.

Average Florida Bay salinity was 22.7, an increase of 0.3 from last week. Salinity increased at most stations throughout the bay, with changes ranging from -4.6 at Joe Bay (JB) in the eastern nearshore region, to +4.8 at Garfield Bight (GB) in the western nearshore region (**Figure EV-8**). Salinity remains below the 25th percentile for all three regions (**Figure EV-10**). Average Florida Bay salinity remains below its recent average for this time of year by 6.6, an increase of 0.1 from last week. Eastern salinities are below

estimated historical levels (~1900; Marshall and Wingard, 2014) by 4.5, and Central and Western salinities are above estimated historical levels by 0.5 and 2.9, respectively.

Total weekly rainfall averaged approximately 0.0 inches in Taylor Slough and Florida Bay based on the 18 gauges used for this report. Total rainfall ranged from 0.0 inches at 17 stations to 0.02 inches at Long Sound (LS) in the eastern nearshore region (**Figure EV-11**). Wind directions and speeds in Florida Bay ranged from 0.9 mph SW on 3/17 to 17.2 mph NE on 3/12 (**Figure EV-11**).

Average daily flow from the five major creeks (McCormick, Taylor, Mud, Trout, West Highway) totaled 546 acre-feet last week, with net positive flows for the week. Total daily creek flow ranged from -946 acre-feet on 3/17 to 2,575 acre-feet on 3/11 (**Figure EV-12**). Weekly average flow was 2,491 acre-feet below estimated historical levels (~1900; 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 lessens 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 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	0.00	-0.16
WCA-2A	<0.01	-0.13
WCA-2B	<0.01	-0.16
WCA-3A	<0.01	-0.16
WCA-3B	<0.01	-0.11
ENP	<0.01	-0.08



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



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

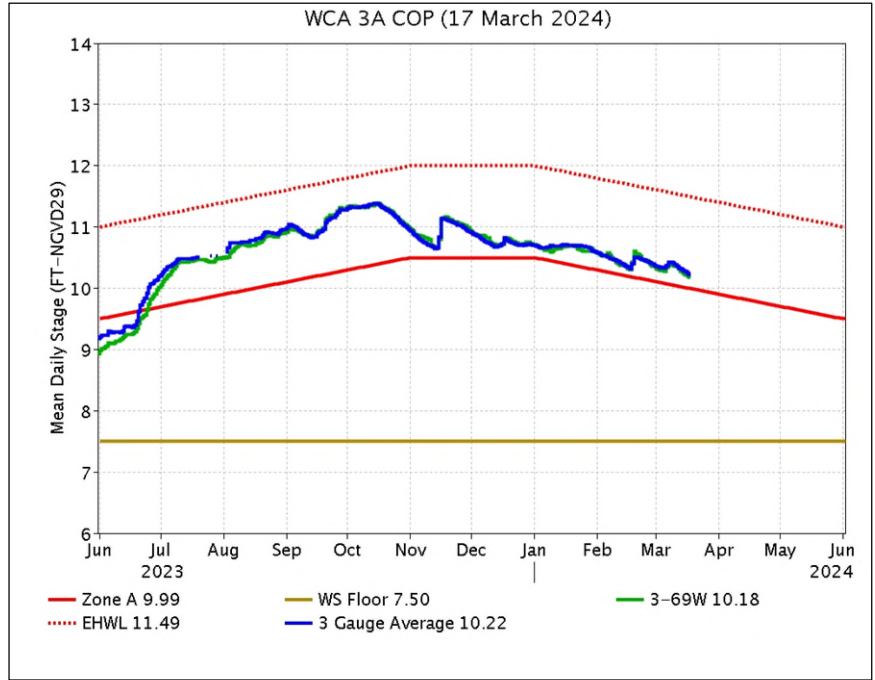


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, 3-69W) and regulation schedule.

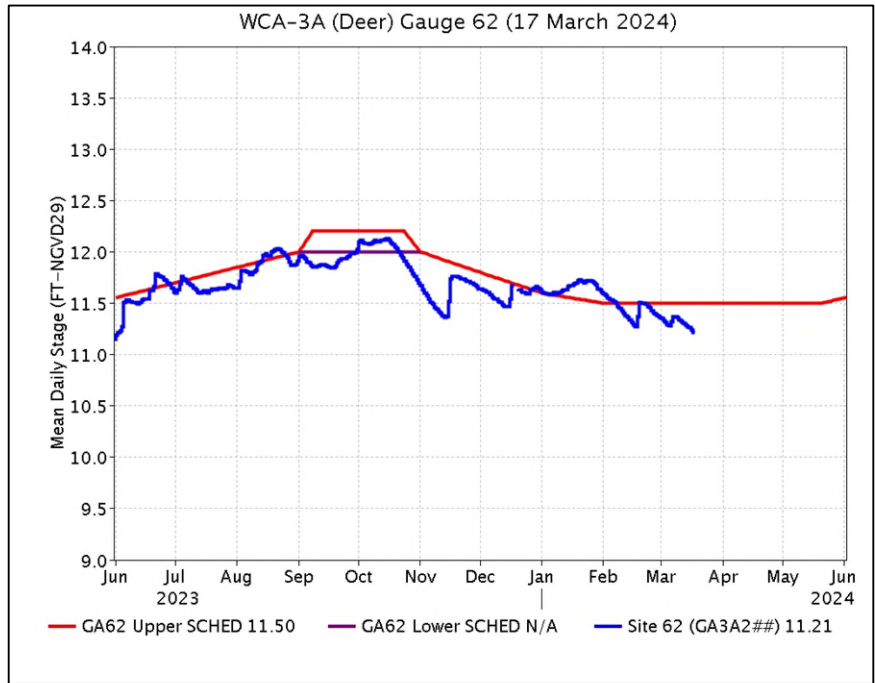


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and GA62 regulation schedule.

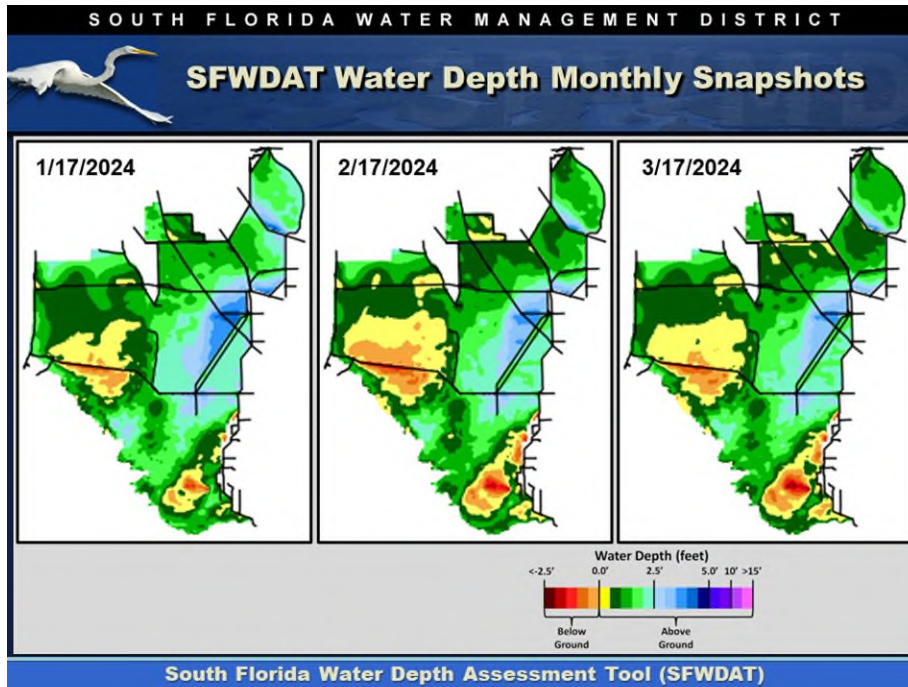


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

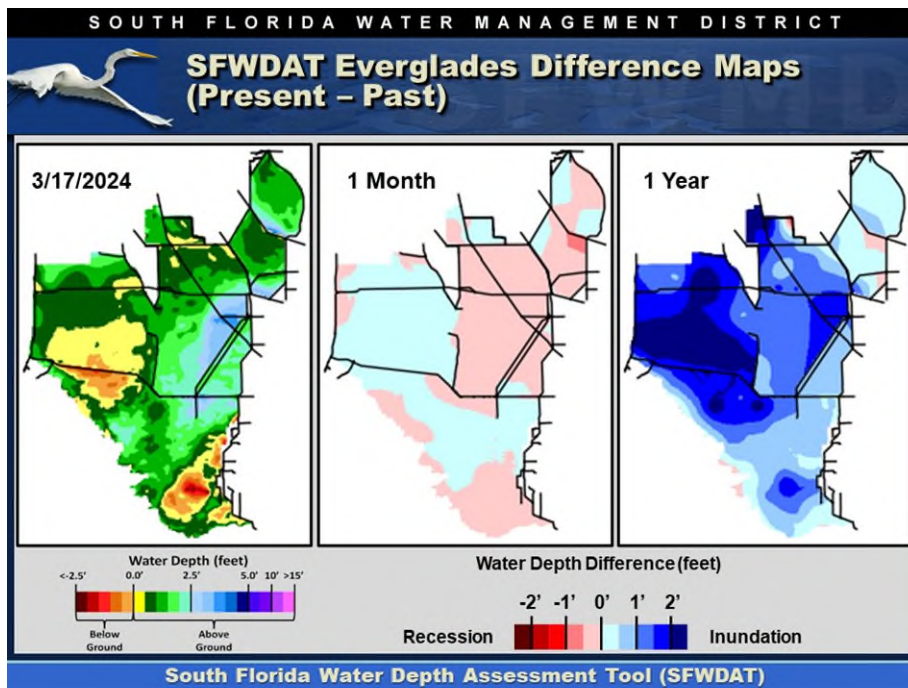


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

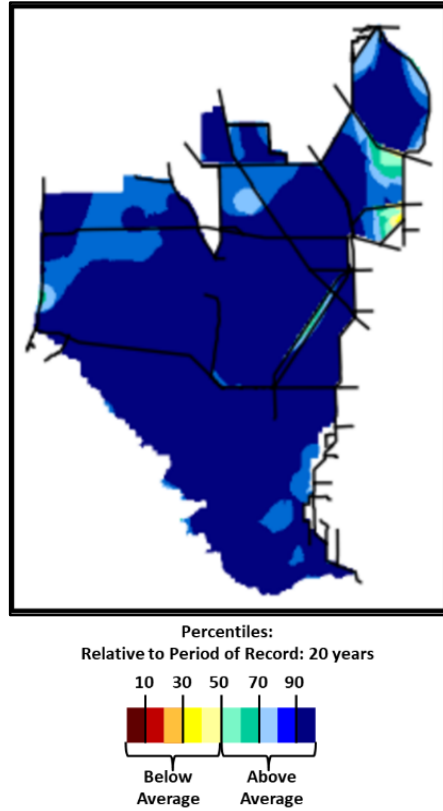


Figure EV-7. Present water depths (3/17/2024) compared to the day of year average over the previous 20 years.

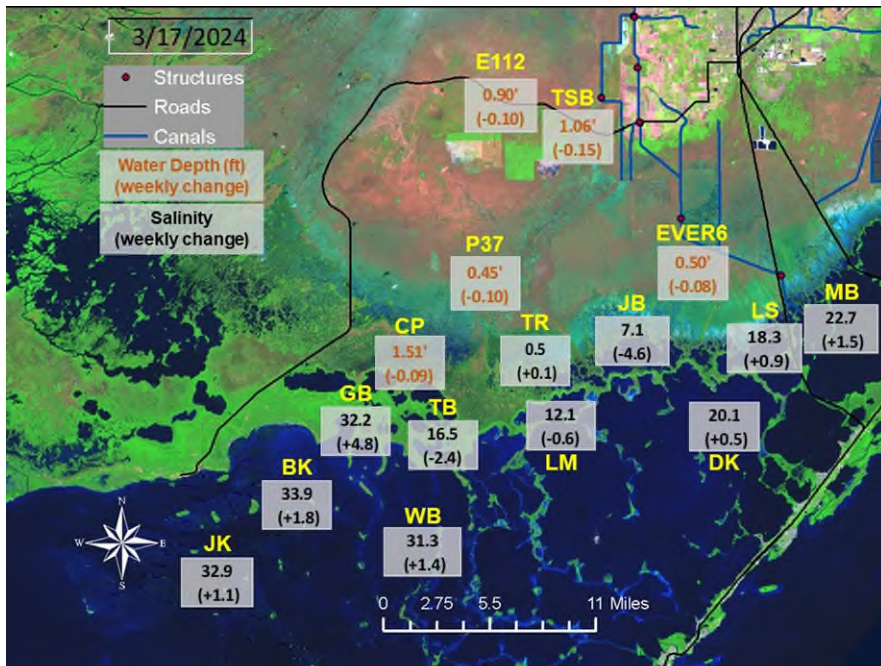


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

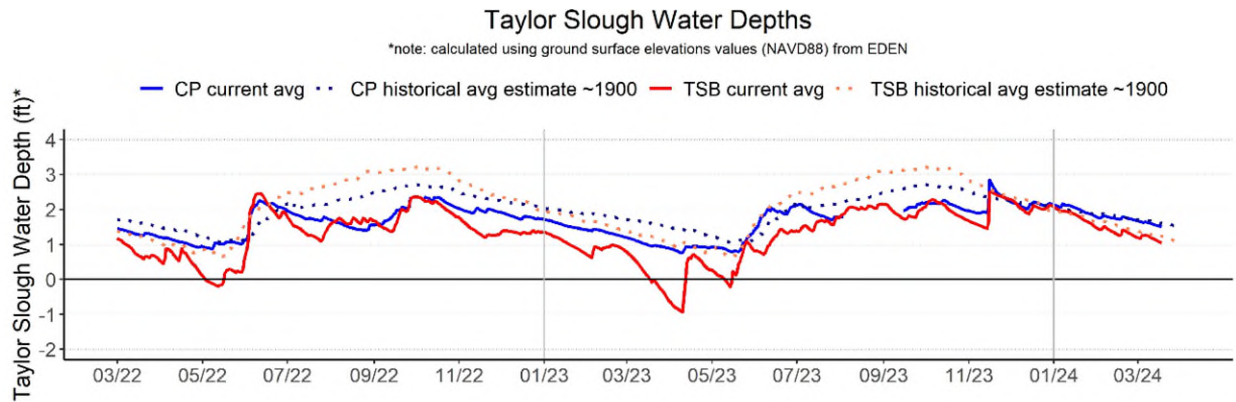


Figure EV-9. Taylor Slough water depth time series for Taylor Slough Bridge (TSB; northern slough) and Craighead Pond (CP; southern slough). Historical time series were calculated using estimates given by Marshall and Wingard (2014).

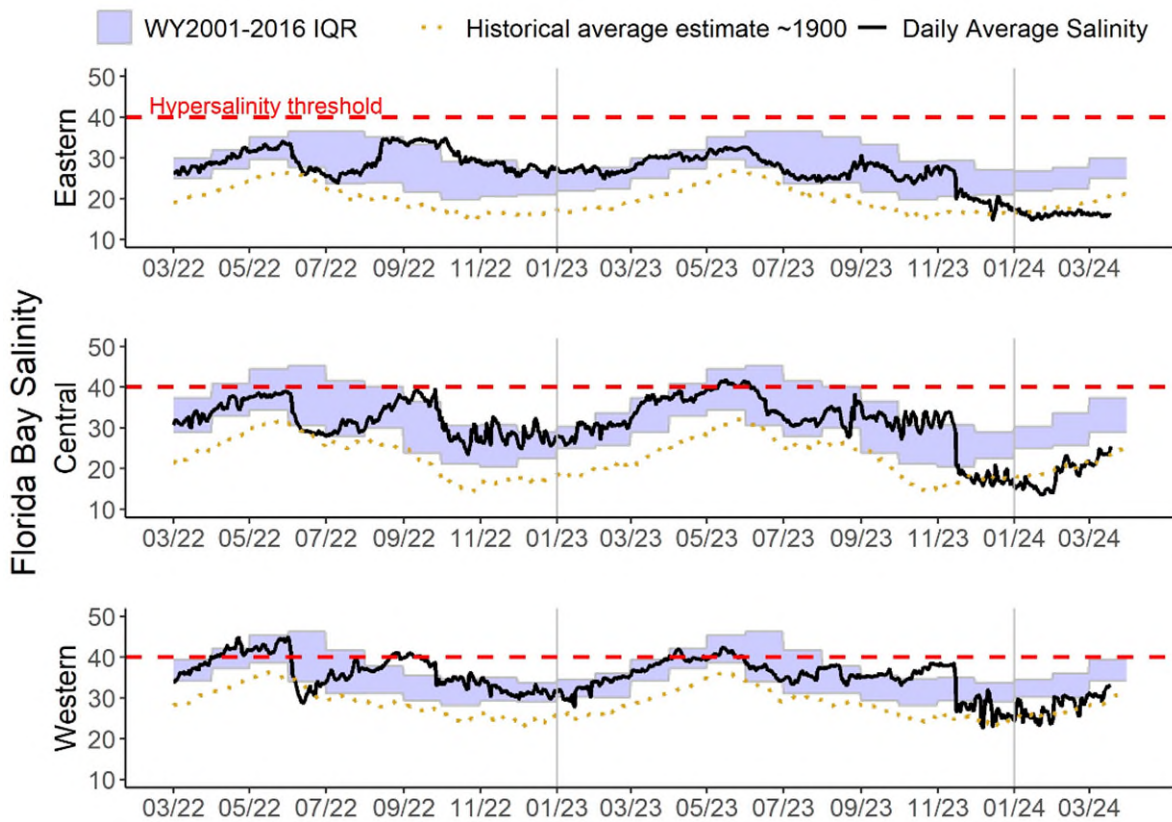


Figure EV-10. Eastern (top panel), Central (middle panel), and Western (bottom panel) Florida Bay daily average salinities with WY2001-2016 interquartile (25-75 percentile) ranges and estimated historical daily average salinities (~1900). Historical time series were calculated using estimates given by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

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

SFWMD Everglades Ecological Recommendations, March 19, 2024 (red is new)			
	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.16'	Recession rate of less than 0.12' per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage decreased by 0.13'	Recession rate of less than 0.16' per week.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage decreased by 0.16'	Recession rate of less than 0.12' per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage decreased by 0.18'	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 decreased by 0.14'	Recession rate of less than 0.12' per week.	
Central WCA-3A S	Stage decreased by 0.13'	Recession rate of less than 0.12' per week.	Protect within basin wildlife (fish/crayfish reproduction, wading bird foraging).
Southern WCA-3A S	Stage decreased by 0.18'		
WCA-3B	Stage decreased by 0.11'	Recession rate of less than 0.12' per week.	Protect within basin (sensitive tree islands) and downstream habitat and wildlife.
ENP-SRS	Stage decreased by 0.08'	Make discharges to ENP according to COP and TFFF 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 -0.15' to -0.04'	Move water southward as possible.	When available, provide freshwater to promote water movement.
FB- Salinity	Salinity changes ranged from -4.6 to +4.8	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 510 cfs, and the previous 30-day mean inflow was 640 cfs. The seven-day mean salinity was 22.3 at BBCW8 and 22.4 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.

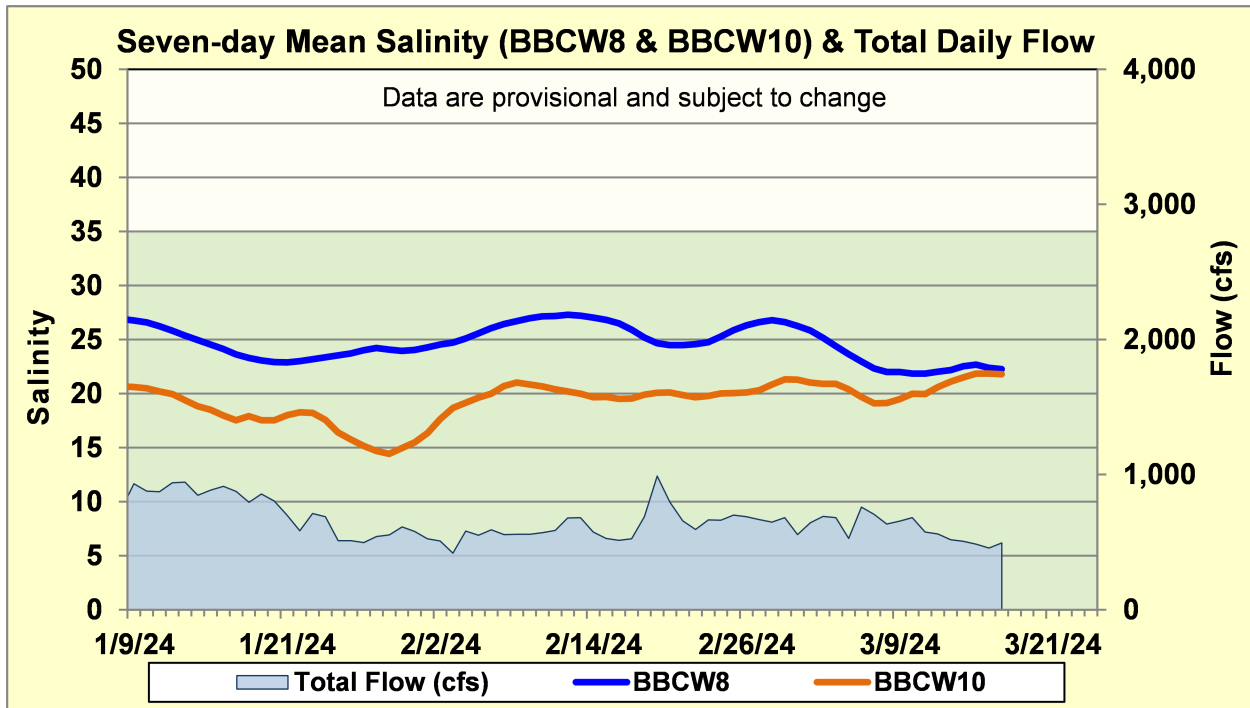


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.