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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: January 10, 2024

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A cold front will quickly enter the region, delivering drier conditions on Wednesday. On Thursday, a large low-pressure system moving through the central US will cause a front to lift northwards into the SFWMD as a warm front. Scattered showers and thunderstorms could be possible late Thursday night, especially over the north, while the warm front moves through. These showers could continue into Friday morning before pausing during the middle of the day, followed by light shower activity over the northwestern half of the SFWMD from another approaching cold front. The front is forecast to move slowly southward on Saturday, bringing light rains to areas south of Lake Okeechobee and along the lower east coast. The front will cross through the area Saturday night, ushering in dry conditions on Sunday. Yet another area of low pressure developing over the central US could bring frontal rains to the northern interior on Monday. For the 7-day period ending next Tuesday morning, above normal SFWMD total rainfall is likely.

Kissimmee

Releases were made from East Lake Toho and Lake Toho to begin spring lake stage recessions to low pool targets by May 31. Weekly average discharge on January 7, 2024, was 700 cfs and 810 cfs at S-65 and S-65A, respectively. Mean weekly water depth on the Kissimmee River floodplain decreased by 0.05 feet to 0.20 feet over the week ending January 7, 2024. The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 8.5 mg/L last week to 8.9 mg/L for the week ending January 7, 2024, which is well above the potentially lethal and stressful levels for largemouth bass and other sensitive species.

Lake Okeechobee

Lake Okeechobee stage was 16.00 feet NGVD on January 7, 2024, which was 0.02 feet higher than the previous week and 0.16 feet higher than a month ago. Average daily inflows (excluding rainfall) decreased from the previous week, going from 1,810 cfs to 1,660 cfs. Average daily outflows (excluding evapotranspiration) increased from the previous week, going from 1,080 cfs to 1,170 cfs. The third wading bird survey (conducted

January 4) of the 2024 breeding season found just one flock of approximately 75 foraging wading birds on the Lake. The cyanobacteria index level was low and patchy along the western shoreline of the Lake according to the January 5, 2024 satellite image from NOAA's Harmful Algal Bloom Monitoring Systems.

Estuaries

Total inflow to the St. Lucie Estuary averaged 260 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities increased at all three sites in the estuary over the past week. Salinity in the middle estuary was in the optimal range (10-25) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 2,660 cfs over the past week with 1,090 cfs coming from Lake Okeechobee. Mean surface salinity increased at Sanibel and decreased at all remaining sites in the estuary over the past week. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the lower stressed range for adult eastern oysters at Shell Point (5-10), in the optimal range at Cape Coral (10-25), and in the upper stressed range at Sanibel (>25).

Stormwater Treatment Areas

For the week ending Sunday, January 1, 2024, 100 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 8,200 ac-feet. The total amount of inflows to the STAs in WY2024 is approximately 1,173,000 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 STA-2 and the A-1 FEB/STA-3/4.

Everglades

The rates of change in last week's stages were in the "good" or "fair" range across the Everglades Protection Area (EPA). All the WCAs remained above schedule but trended towards their respective regulation lines over the week. Stage change within WCA-2A was variable but fast in the region near the 2-17 gauge. Of the tree islands with known elevations classified as dry (169), only islands in WCA-3B are currently inundated. Stages decreased throughout Taylor Slough last week but remained well above average for this time of year. Salinity decreased slightly on average in Florida Bay compared to December 17th and remained below the 25th percentile for this time of year in all regions. Wading bird survey flights continue to be conducted weekly on Fridays, and so far suggest much better foraging conditions than in the last two years at this time. Large flocks were noted feeding in the southern coastal ecotone, as well as just upstream of that region in southern BCNP and WCA-3A North. Wood stork nesting has not been detected yet, though this species requires a relatively long incubation period and January nest initiation is an Everglades restoration goal.

Biscayne Bay

Total inflow to Biscayne Bay averaged 930 cfs over the previous week, which was the same as the previous 30-day mean inflow. The seven-day mean salinity was 26.9 at BBCW8 and 20.7 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (< 35). Data provided by Biscayne National Park.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On January 7, 2024, mean daily lake stages were 57.5 feet NGVD (0.5 feet below schedule) in East Lake Toho, 54.5 feet NGVD (0.5 feet below schedule) in Lake Toho, and 52.7 feet NGVD (0.2 feet above schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

For the week ending January 7, 2024, mean weekly discharge was 700 cfs and 810 cfs at S-65 and S-65A, respectively. Mean weekly discharge from the Kissimmee River was 950 cfs at S-65D and 900 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 46.4 feet NGVD at S-65A and 25.8 feet NGVD at S-65D on January 7, 2024, a reduction of about 0.2 feet at S-65D. Mean weekly river channel stage decreased by 0.1 feet to 35.6 feet NGVD over the week ending on January 7, 2024 (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain decreased by 0.05 feet to 0.20 feet over the week ending January 7, 2024 (**Table KB-2, Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 8.5 mg/L the previous week to 8.9 mg/L for the week ending January 7, 2024 (**Table KB-2, Figure KB-6**).

Water Management Recommendations

Continue spring stage recessions on Lakes East Toho and Toho from 0.5 ft below their regulation schedules on January 1 to their low pool targets on May 31, 2024 (**Figures KB-1, 2**). Follow the Hybrid A discharge plan for S-65/S-65A (**Figure KB-7**) through May 31, 2024 to facilitate S-69 repairs. Maintain at least minimum flow (250-300 cfs) at S-65A. Continue the stage recession at S-65D headwater to reach 25.8 feet NGVD in early January 2024 at a recession rate of approximately 0.2 ft/week.

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

Water Body	Structure	Stage Monitoring Site	Weekly (7-Day) Average Discharge (cfs)	Sunday Lake Stage (feet NGVD) ^a	Schedule Type ^b	Sunday Schedule Stage (feet NGVD)	Sunday Departure from Regulation (feet)	
							1/7/24	12/31/23
Lakes Hart and Mary Jane	S-62	LKMJ	120	61.0	R	61.0	0.0	-0.1
Lakes Myrtle, Preston and Joel	S-57	S-57	68	61.6	R	61.6	0.0	0.0
Alligator Chain	S-60	ALLI	83	64.1	R	64.0	0.1	-0.1
Lake Gentry	S-63	LKGT	140	61.6	R	61.5	0.1	-0.1
East Lake Toho	S-59	TOHOE	300	57.5	R	58.0	-0.5	-0.5
Lake Toho	S-61	TOHOW S-61	900	54.5	R	55.0	-0.5	-0.5
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	700	52.7	R	52.5	0.2	0.0

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.

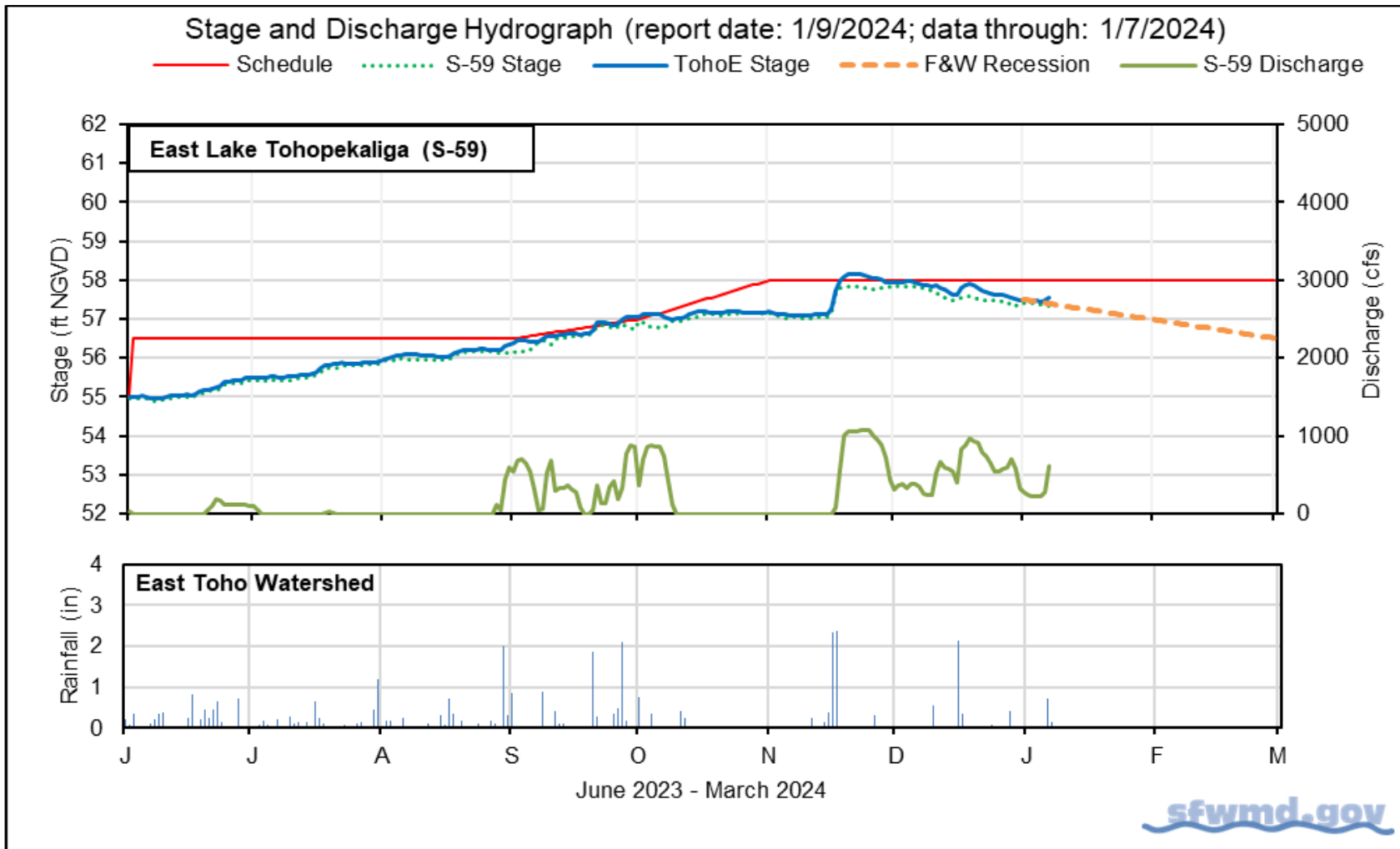


Figure KB-1. East Lake Toho regulation schedule, stage, discharge, and rainfall.

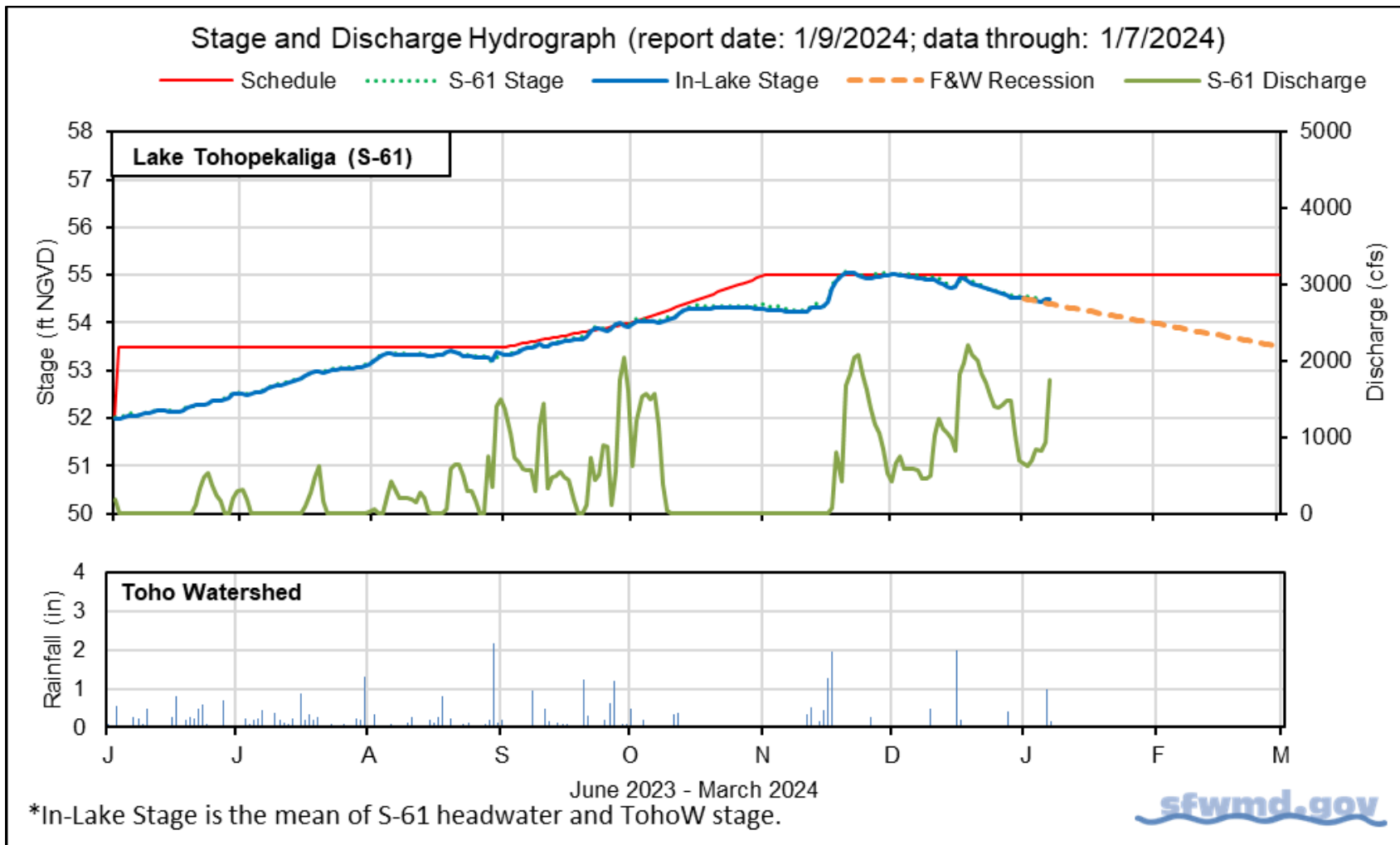


Figure KB-2. Lake Toho regulation schedule, stage, discharge, and rainfall.

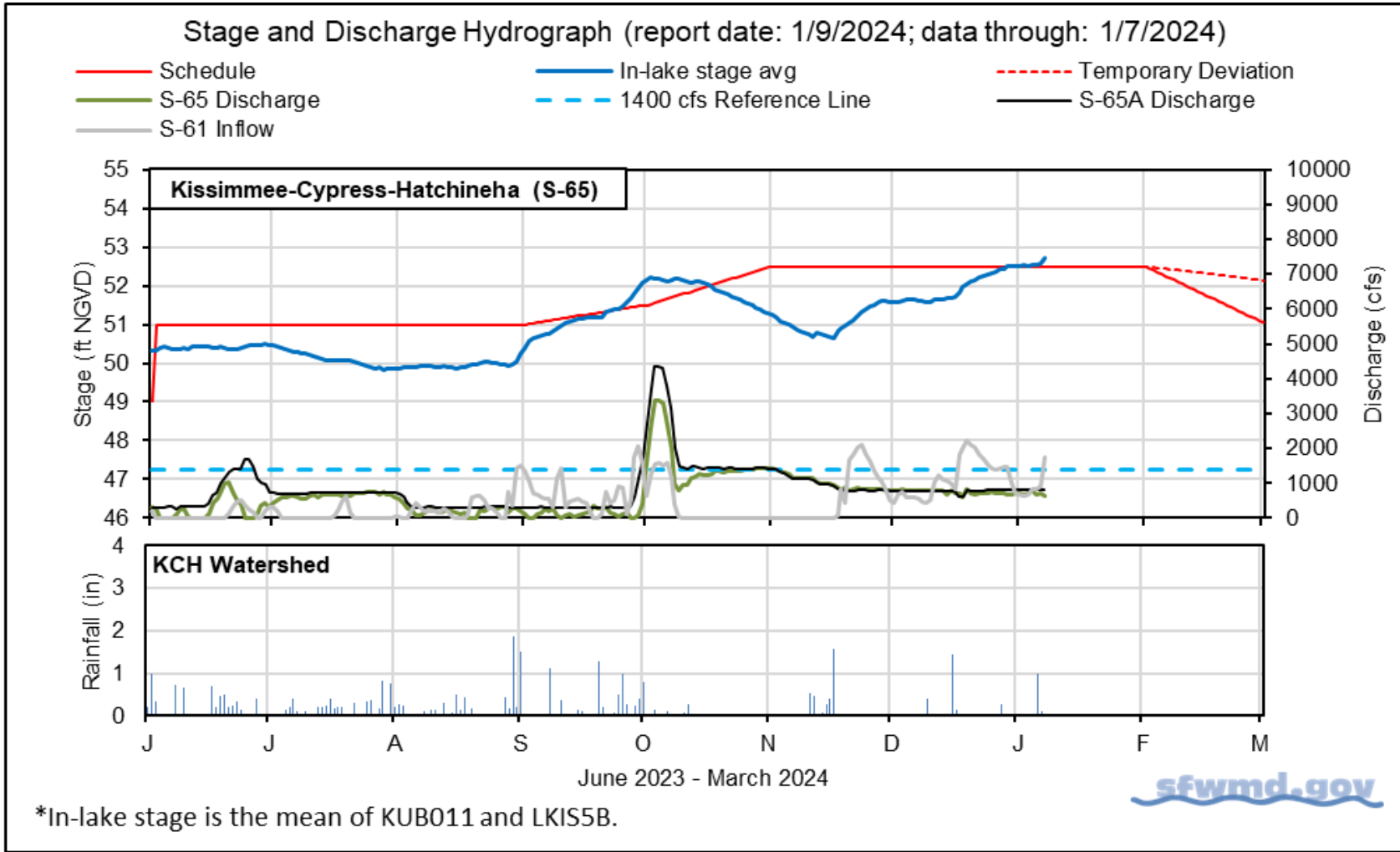


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge, and rainfall.

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			
		1/7/24	1/7/24	12/31/23	12/24/23	12/17/23
Discharge	S-65	620	700	700	700	760
Discharge	S-65A ^a	810	810	810	760	750
Headwater Stage (feet NGVD)	S-65A	46.4	46.4	46.3	46.4	46.0
Discharge	S-65D ^b	940	950	940	860	860
Headwater Stage (feet NGVD)	S-65D ^c	25.8	25.8	26.0	26.2	26.4
Discharge (cfs)	S-65E ^d	890	900	910	780	810
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	8.9	8.9	8.5	9.1	8.9
River channel mean stage ^f	Phase I river channel	35.7	35.6	35.7	35.4	35.5
Mean depth (feet) ^g	Phase I floodplain	0.19	0.20	0.25	0.23	0.18

a. Combined discharge from main and auxiliary structures.

b. Combined discharge from S-65D, S-65DX1 and S-65DX2.

c. Average stage from S-65D and S-65DX1.

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

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

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

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

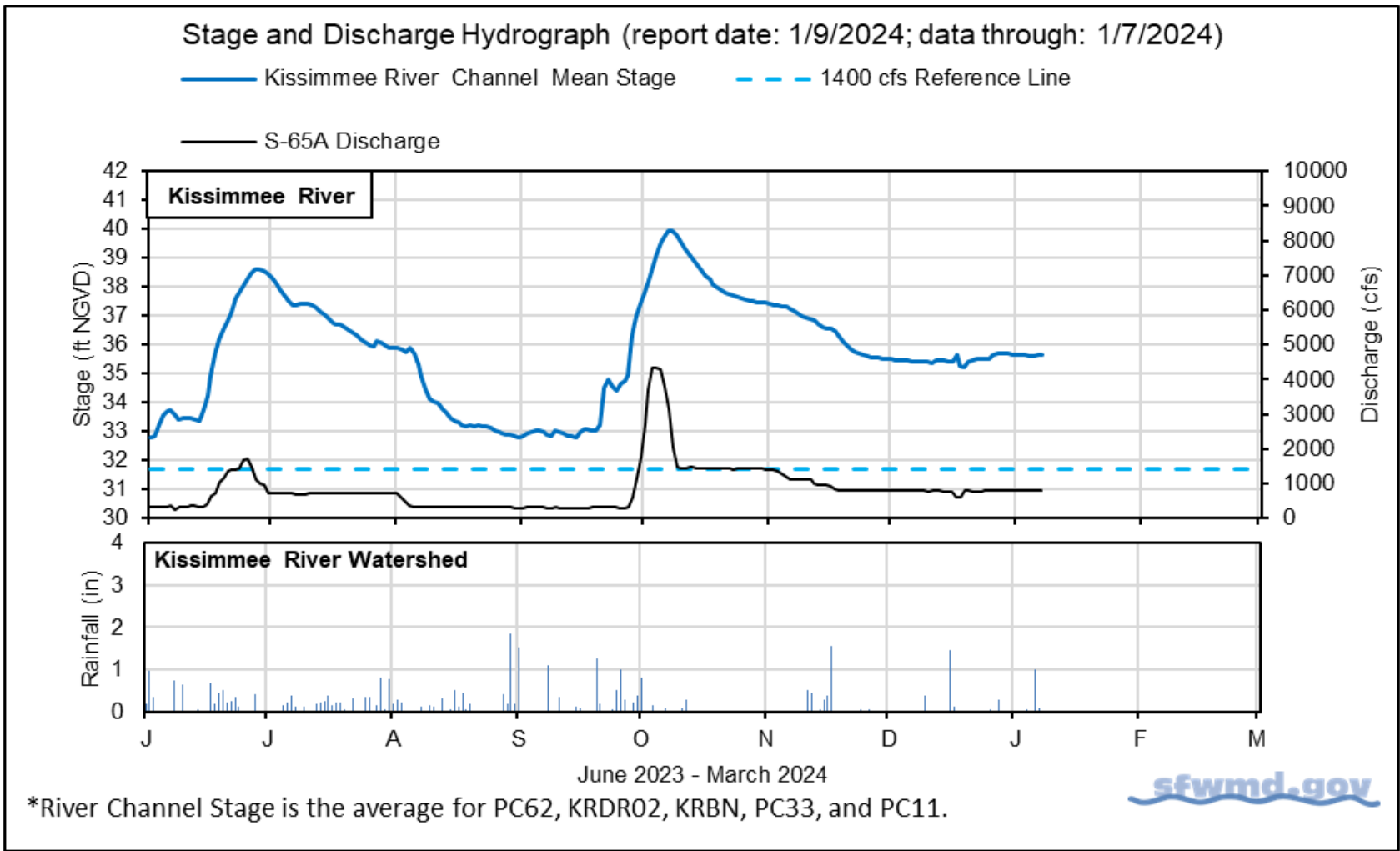


Figure KB-4. Kissimmee River stage, discharge, and rainfall.

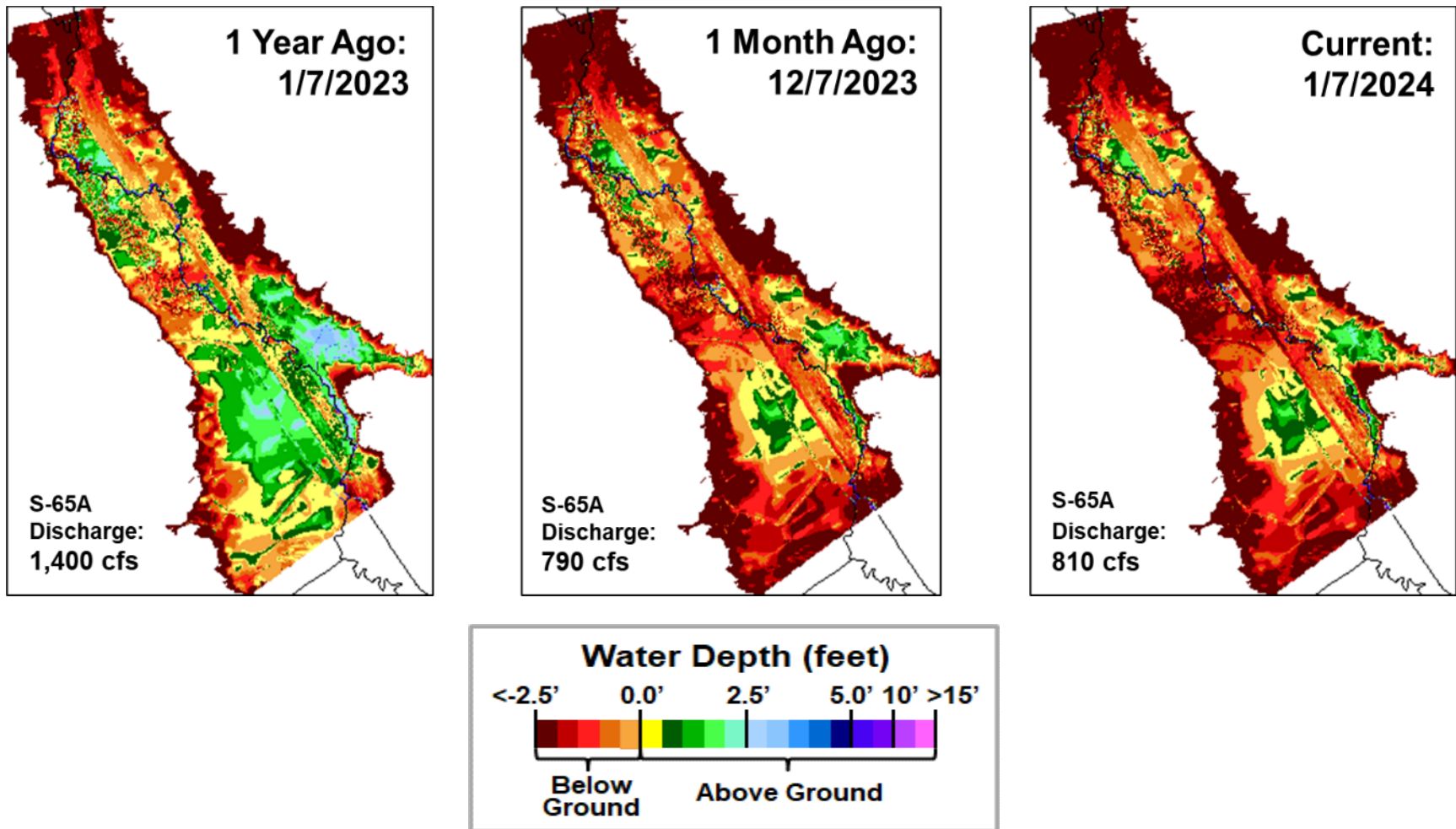
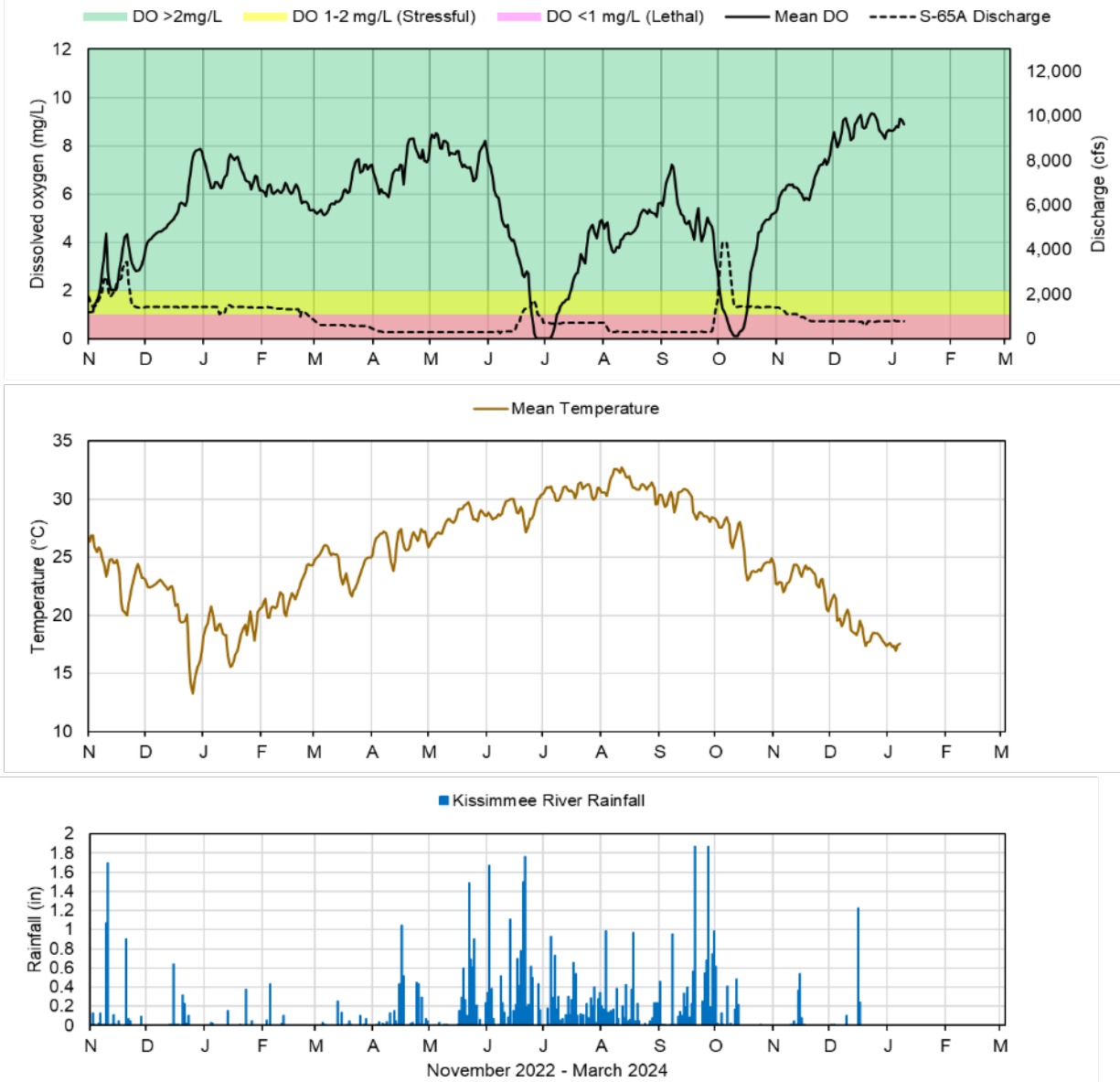


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago, and current.



Report Date: 1/9/2024; data are through: 1/7/2024



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

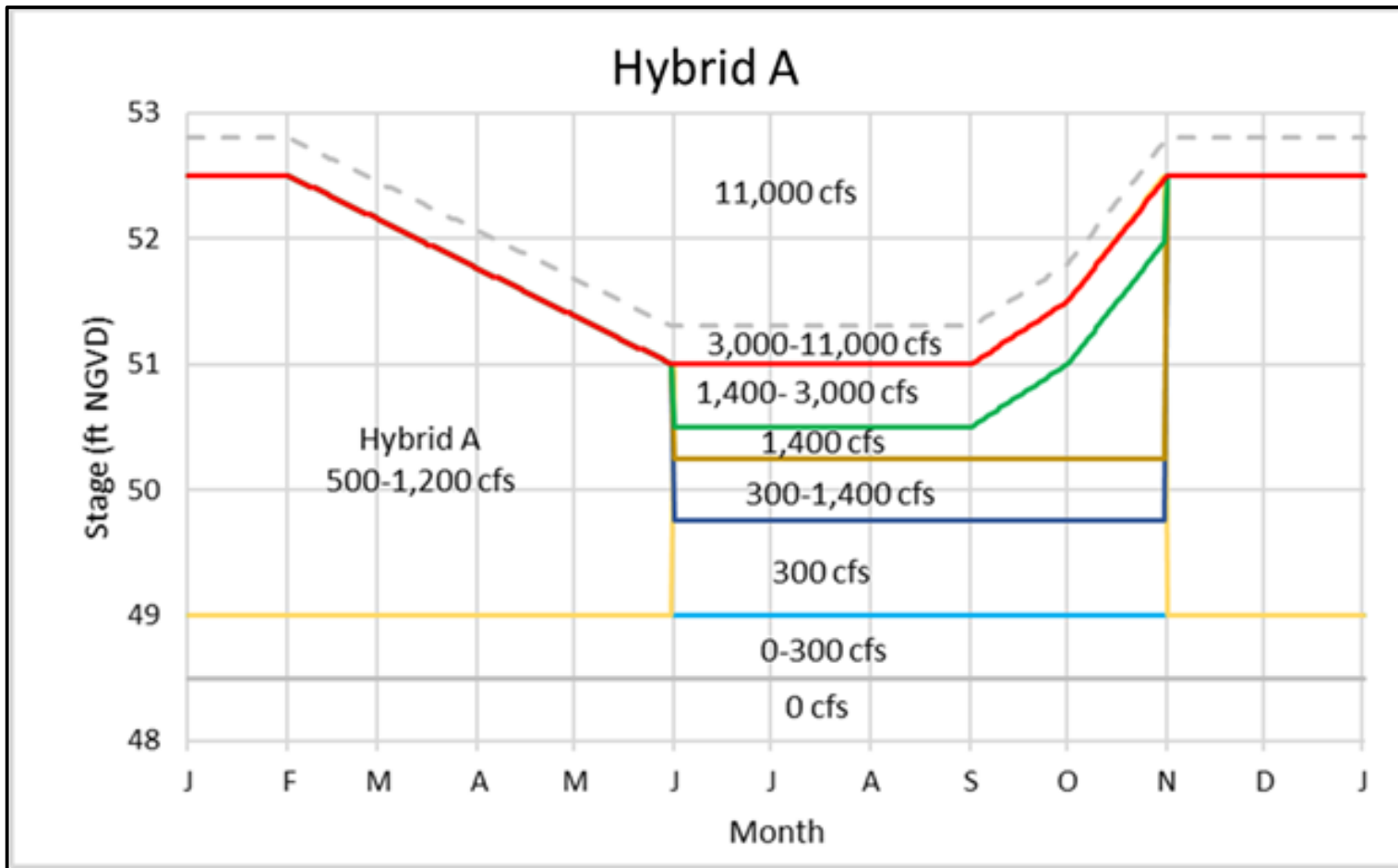


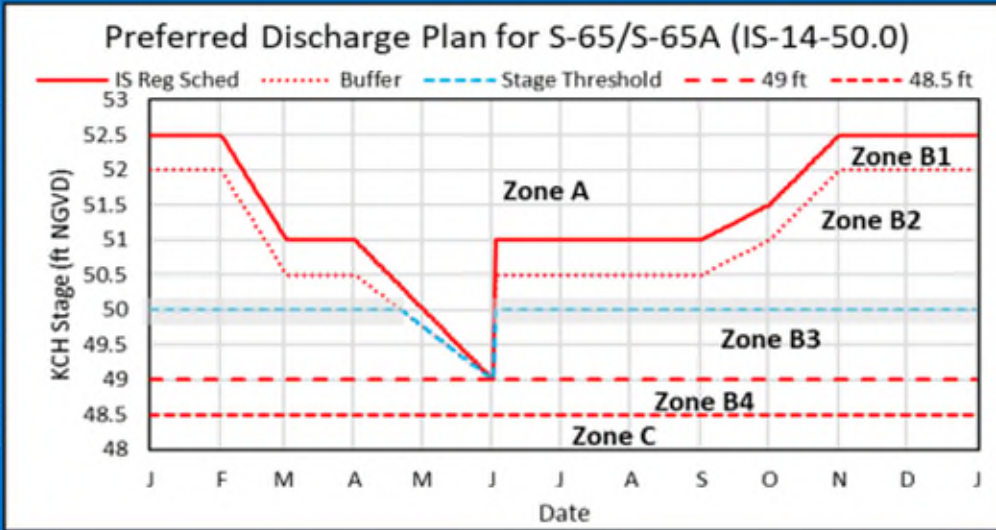
Figure KB-7. Hybrid A Discharge Plan for S-65/S-65A. Use discharge rate of change limits from IS-14-50 (Fig. KB-8).

Stage and Discharge Guidance for 2021-2023.		
Zone	KCH Stage (ft NGVD)	S-65/S-65A Discharge*
A	Above regulation schedule line.	Flood control releases as needed with no limits on the rate of discharge change.
B1	In flood control buffer zone (0.5 ft below the schedule line).	Adjust S-65 discharge so that S-65A discharge is between 1400 cfs at the buffer zone line and 3000 cfs at the schedule line.
B2	Between the Flood Control Buffer and the 50.0 ft line.	Adjust S-65 discharge to maintain at least 1400 cfs at S-65A. Use ± 0.2 ft buffer (gray band) above and below the 50.0 ft line to decide when to begin ramping up to 1400 cfs or down to 300 cfs; do not continue reducing discharge if stage rises back to or above the threshold stage line.
B3	Between the 50.0 ft line and 49 ft.	Adjust S-65 discharge to maintain at least 300 cfs at S-65A.
B4	Between 48.5 ft to 49 ft.	Adjust S-65 discharge to maintain S-65A discharge between 0 cfs at 48.5 ft and 300 cfs at 49 ft.
C	Below 48.5 ft.	0 cfs.

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

Q (cfs)	Maximum rate of INCREASE (cfs/day)	Maximum rate of DECREASE (cfs/day)
0-300	100	-50
301-650	150	-75
651-1400	300	-150
1401-3000	600	-600
>3000	1000	-2000

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



- Other Considerations**
- When possible, limit lake ascension rate in the Jun 1 - Aug 15 window to 0.25 ft per 7 days in Lakes Kissimmee, Cypress, Hatchineha (S-65), East Toho (S-59) and Toho (S-61).
 - If outlook is for extreme dry conditions meet with KB staff to discuss modifications to this plan.

Slide Revised 1/3/2022

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

Lake Okeechobee

Lake Okeechobee stage was 16.00 feet NGVD on January 7, 2024, which was 0.02 feet higher than the previous week and 0.16 feet higher than a month ago (**Figure LO-1**). Lake stage was in the low sub-band on January 7th (**Figure LO-2**) and was 0.50 feet above the upper limit of the ecological envelope (**Figure LO-3**), or 1.5 feet above the Recovery ecological envelope, the latter of which defines lower stage targets that would aid recovery of submerged aquatic vegetation after hurricanes and high-water events. Lake stage was above the ecological envelope for 97% of calendar year 2023. According to NEXRAD, 0.41 inches of rain fell directly over the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 1,810 cfs to 1,660 cfs. The highest inflows came from the C-38 Canal via the S-65E/65EX1 structure (880 cfs). Average daily outflows (excluding evapotranspiration) increased from the previous week, going from 1,080 cfs to 1,170 cfs. The highest average outflow was recorded at the S-77 structure into the C-43 Canal (1,100 cfs). **Figures LO-4** and **LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively. These data are provisional and are subject to change.

The third wading bird survey of the 2024 breeding season (conducted January 4) recorded just one flock of approximately 75 foraging wading birds on the Lake (**Figure LO-6**), lower than the 25th percentile of the previous 5 years for this time of year. Lake stages need to decline throughout the spring for there to be good foraging and nesting conditions for wading birds on the Lake this breeding season.

In the most recent usable satellite image from January 5th, 2024, the cyanobacteria index level was low and patchy along the western shoreline of the Lake according to the satellite image from NOAA's Harmful Algal Bloom Monitoring System (**Figure LO-7**). All data presented in this report are provisional and are subject to change.

1 Month Ago:
12/07/2023

Current:
01/07/2024

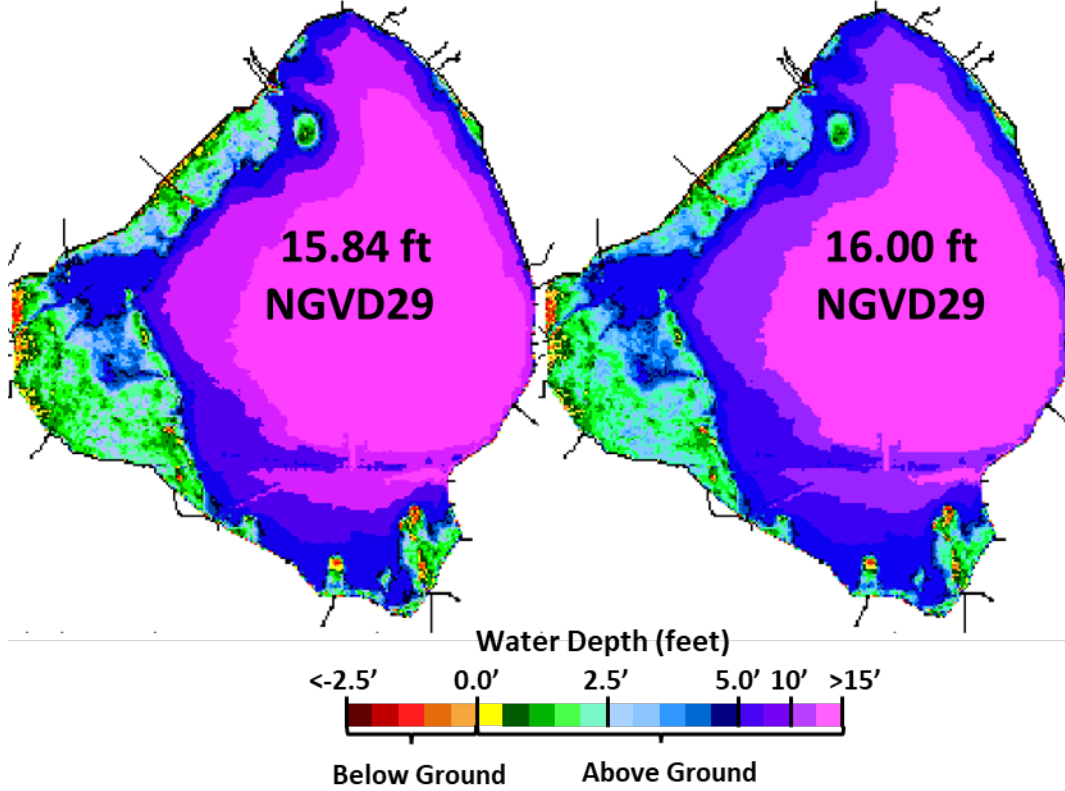


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Water Level History and Projected Stages

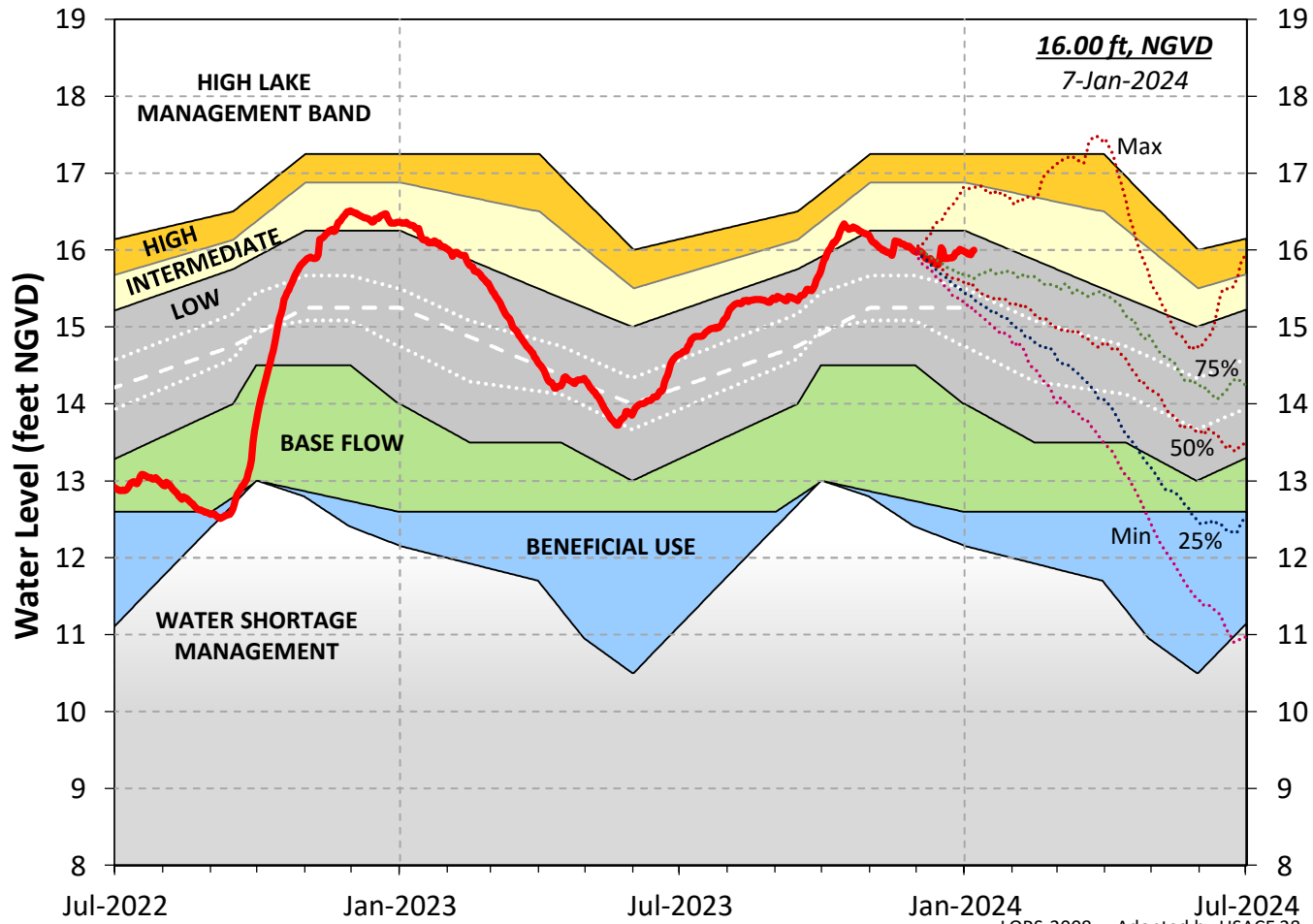


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

LORS-2008 - Adopted by USACE 28-

Lake Okeechobee Stage vs Ecological Envelope

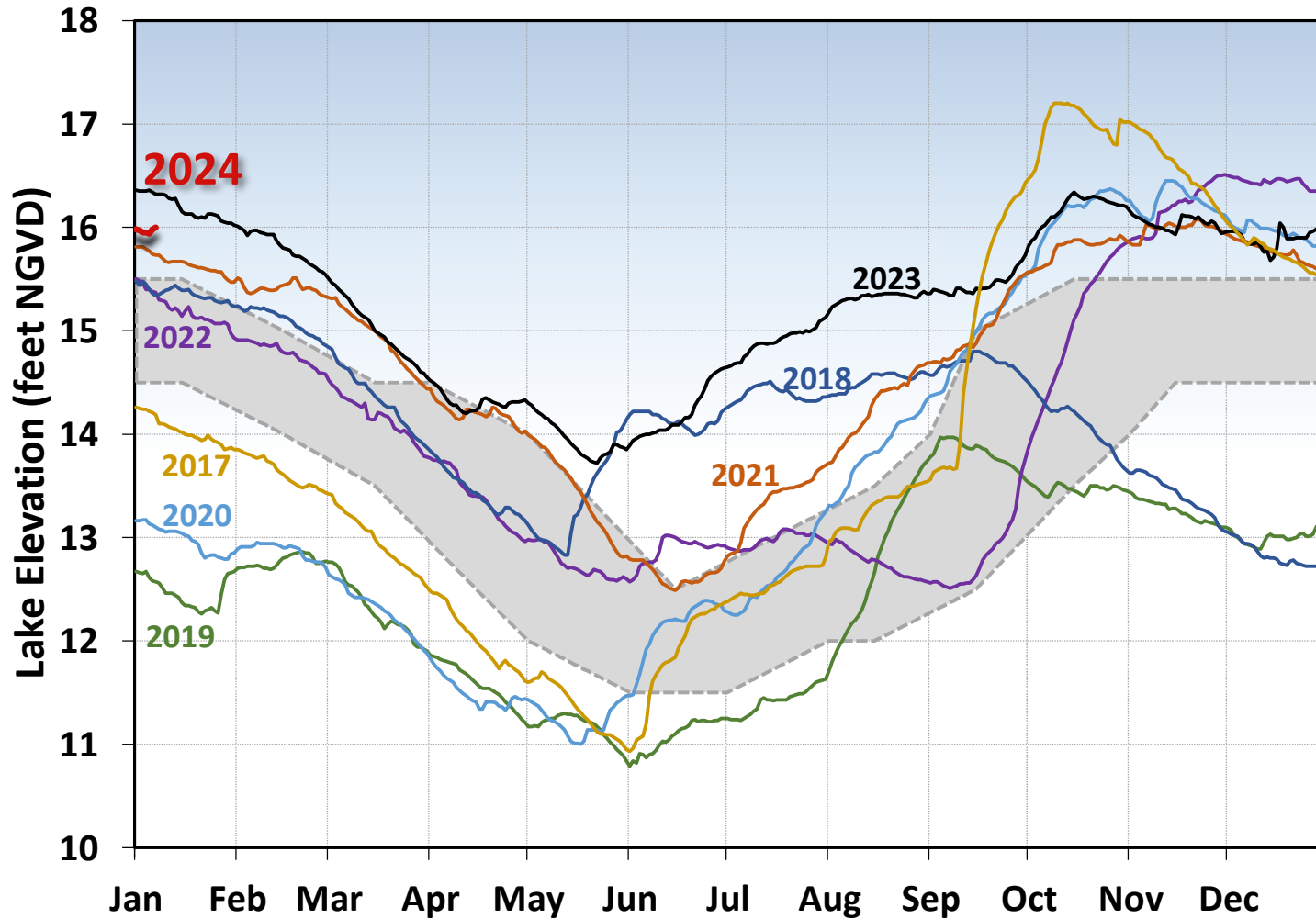


Figure LO-3. The current and seven prior year's annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

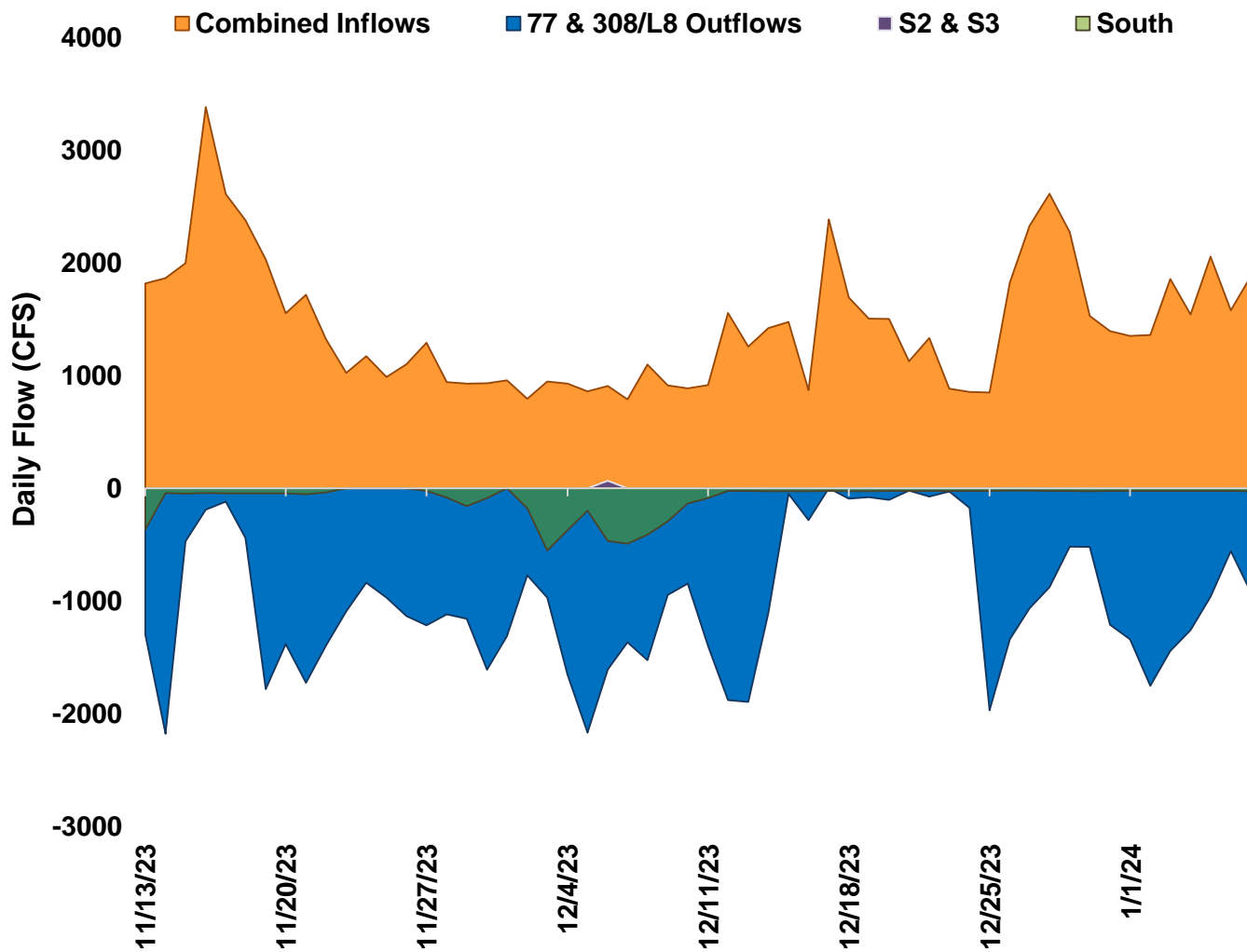


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from Lake Okeechobee into the L-8 or C-44 canals are included with outflows. Inflows are shown as positive values; outflows are negative. Outflows through the S-77 (Caloosahatchee) and S-308 (C-44 Canal) structures are based on downstream gauges to include flows to lock openings for navigation.

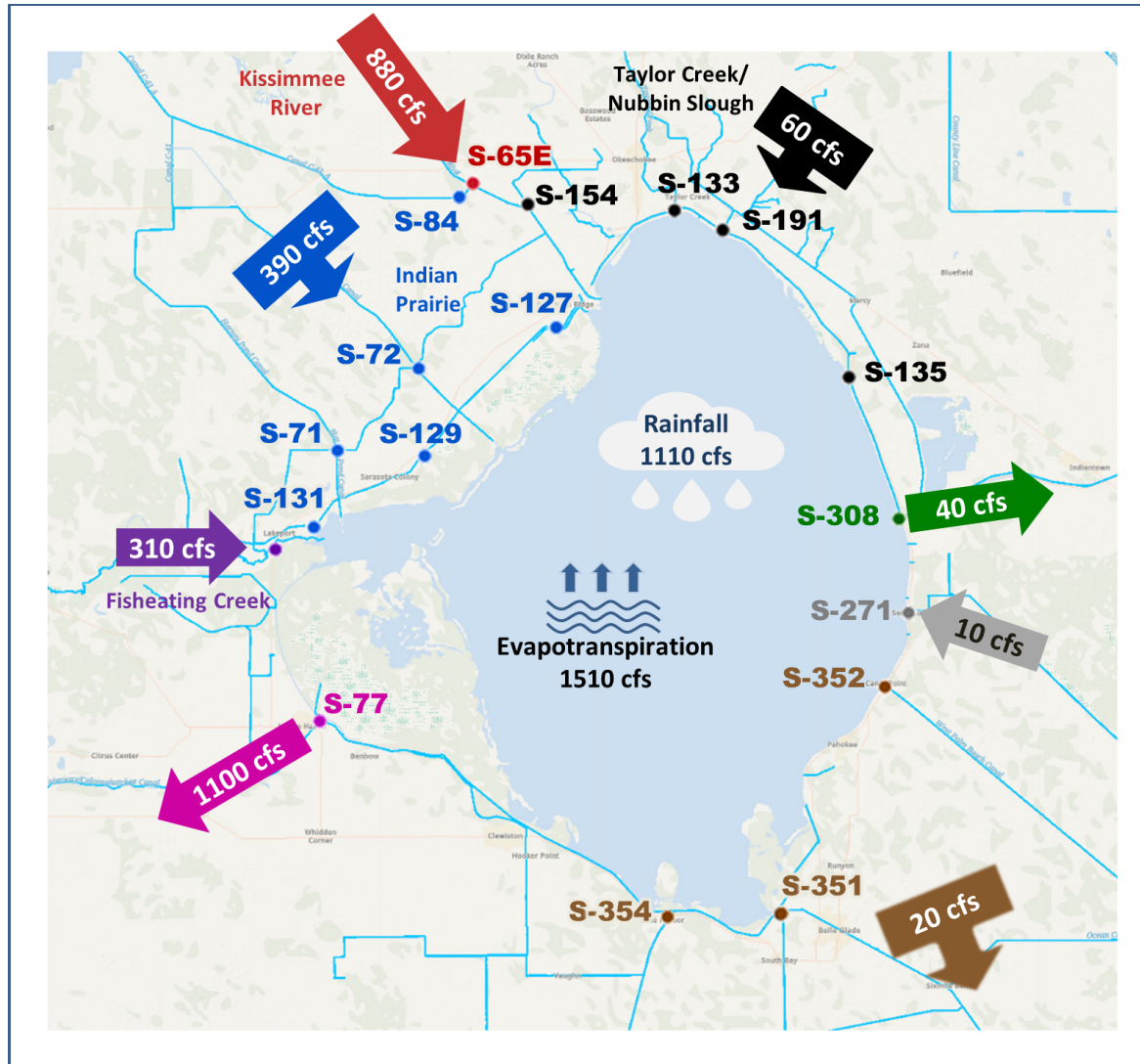


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of January 01 – 07, 2024.

Wading Bird Foraging Locations January 4, 2024

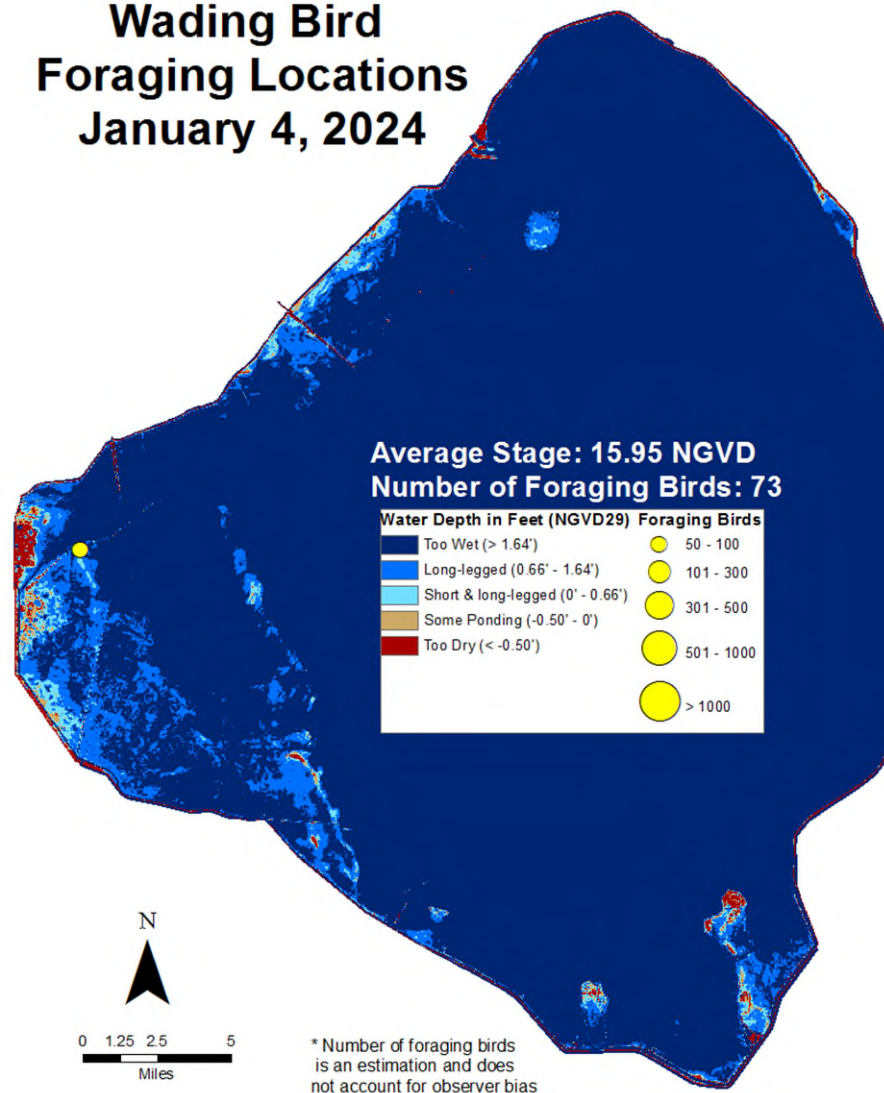


Figure LO-6. Locations of foraging flocks of wading birds observed during a monitoring flight on January 4, 2024 are shown in yellow (circle sizes represents the flock size).

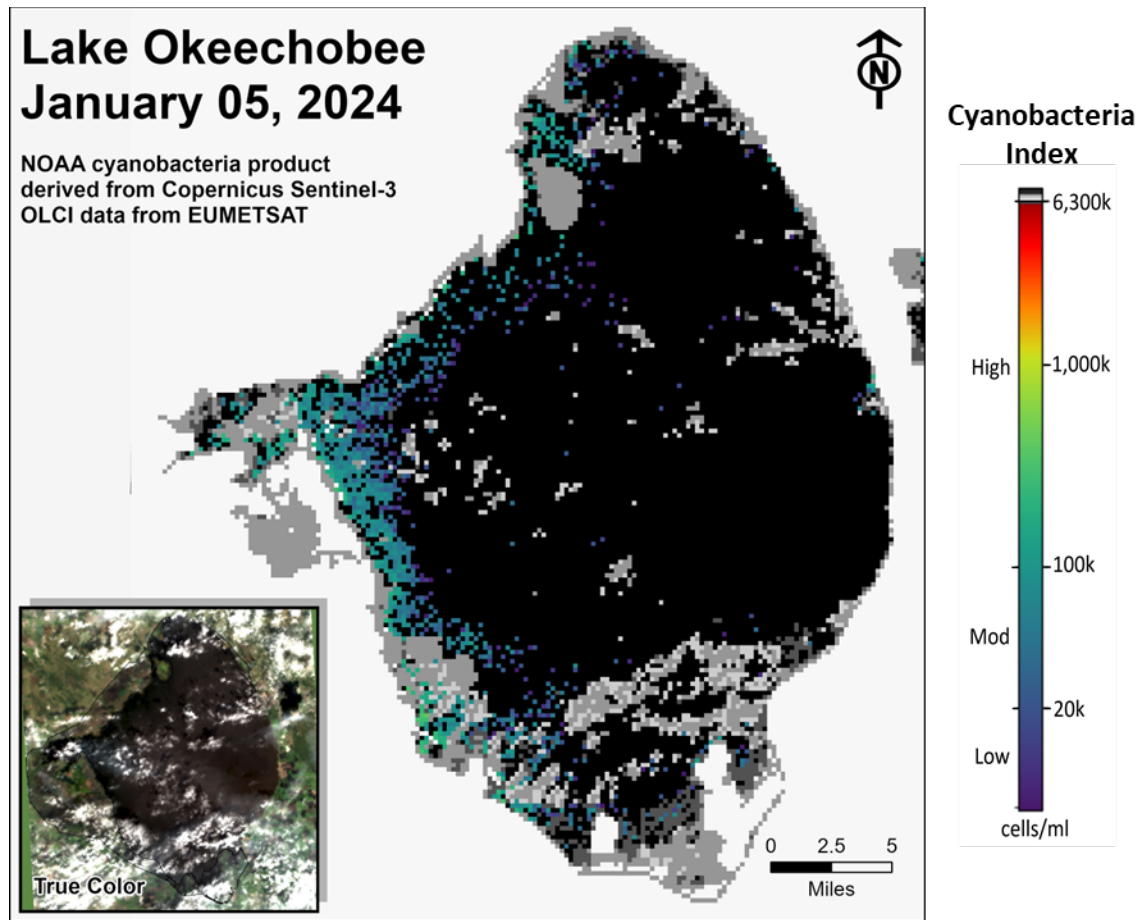


Figure LO-7. Cyanobacteria bloom index level on January 5, 2024, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 258 cfs (**Figures ES-1 and ES-2**), and the previous 30-day mean inflow was 613 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 18.1. Salinity conditions in the middle estuary were estimated to be within the optimal range for adult eastern oysters (**Figure ES-4**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute (FWRI) was 0.2 spat/shell for December, indicating the end of spawning season (**Figure ES-5**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 2,660 cfs (**Figures ES-6 and ES-7**), and the previous 30-day mean inflow was 2,340 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, salinities increased at Sanibel and decreased at the remaining sites in the estuary (**Table ES-2 and Figures ES-8 and ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the lower stressed 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 0.2 spat/shell at both Iona Cove and Bird Island for December, indicating the end of spawning season (**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 280 cfs. Model results from all scenarios predict daily salinity to be 2.2 or lower and the 30-day moving average surface salinity to be 1.3 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 Qiu, 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 January 5, 2024, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in any samples collected within the District region. On the east coast, red tide was not observed in samples from St. Lucie, Martin, Broward or Miami-Dade counties.

Water Management Recommendations

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

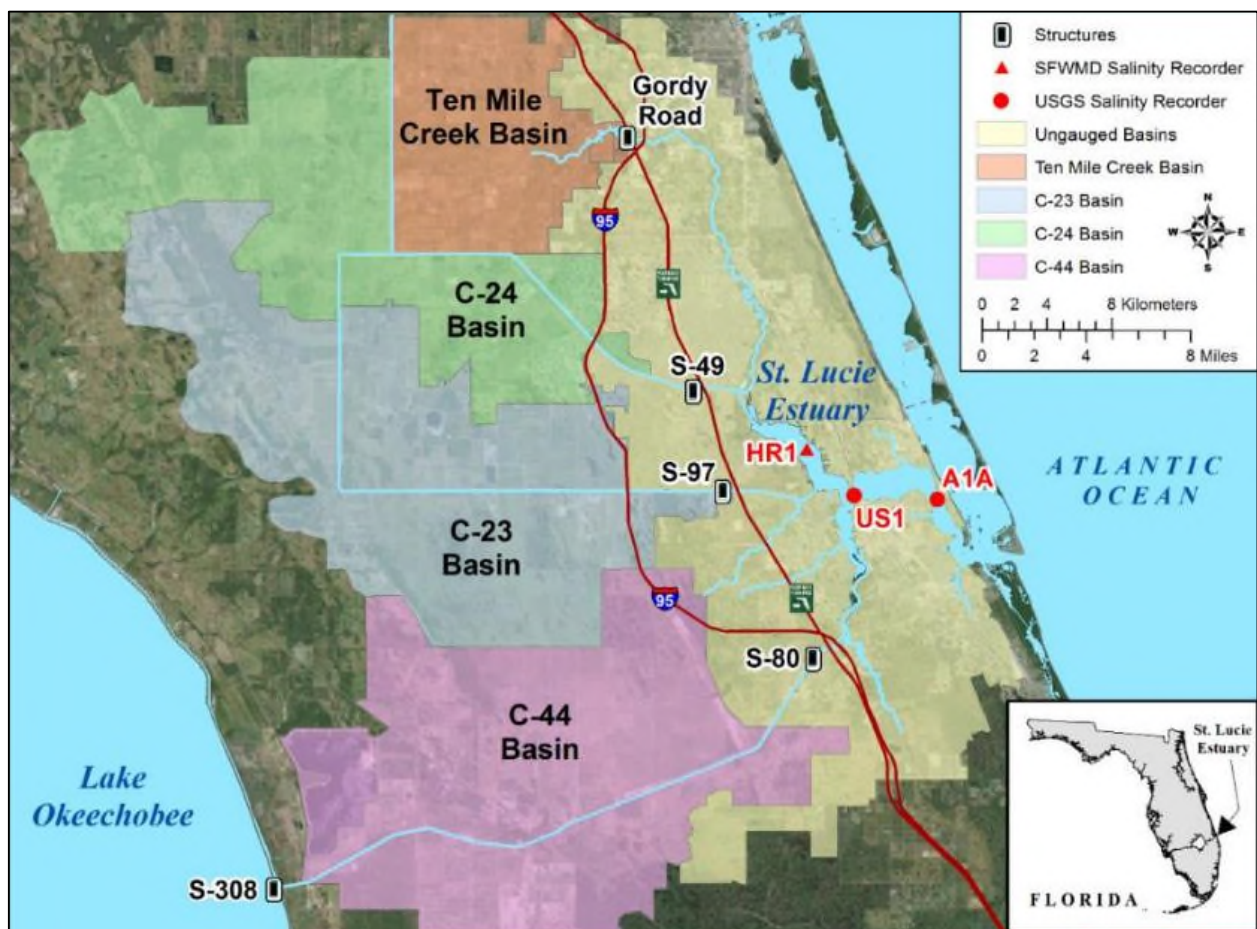


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

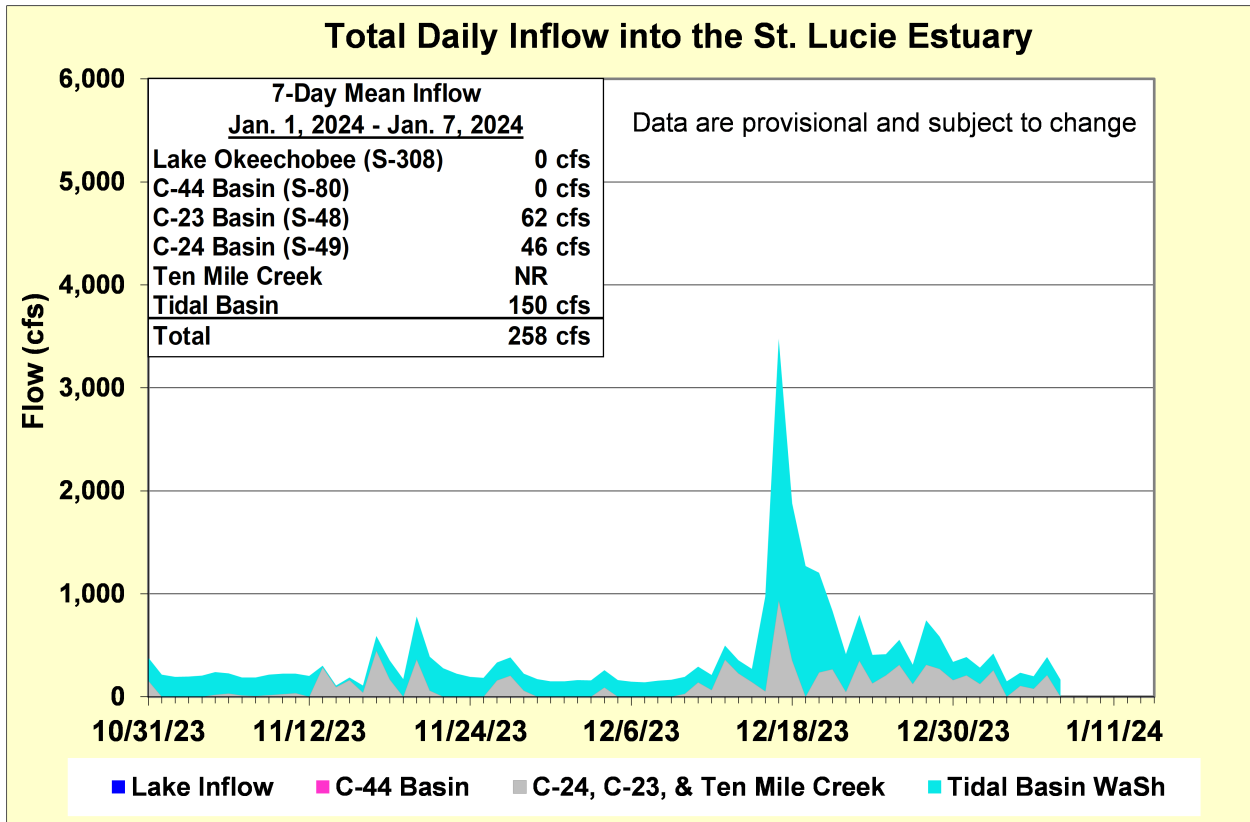


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	12.1 (10.0)	16.6 (15.1)	10.0 – 25.0
US1 Bridge	16.7 (15.0)	19.6 (17.1)	10.0 – 25.0
A1A Bridge	23.6 (21.7)	27.3 (25.6)	10.0 – 25.0

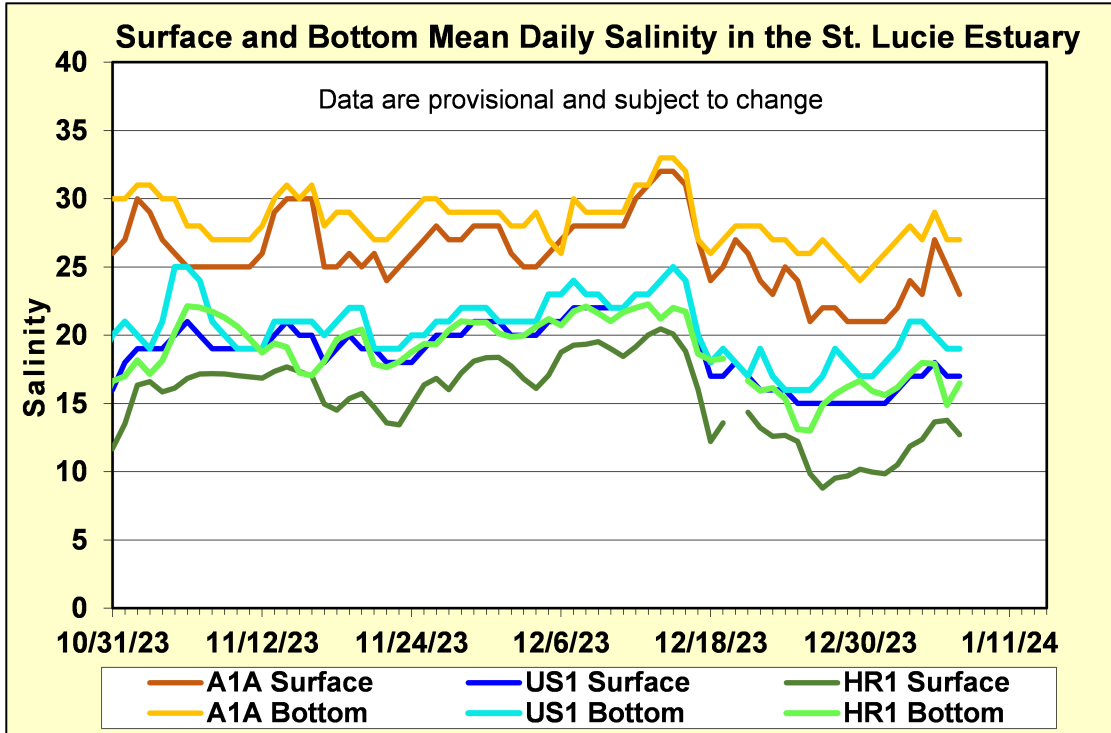


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

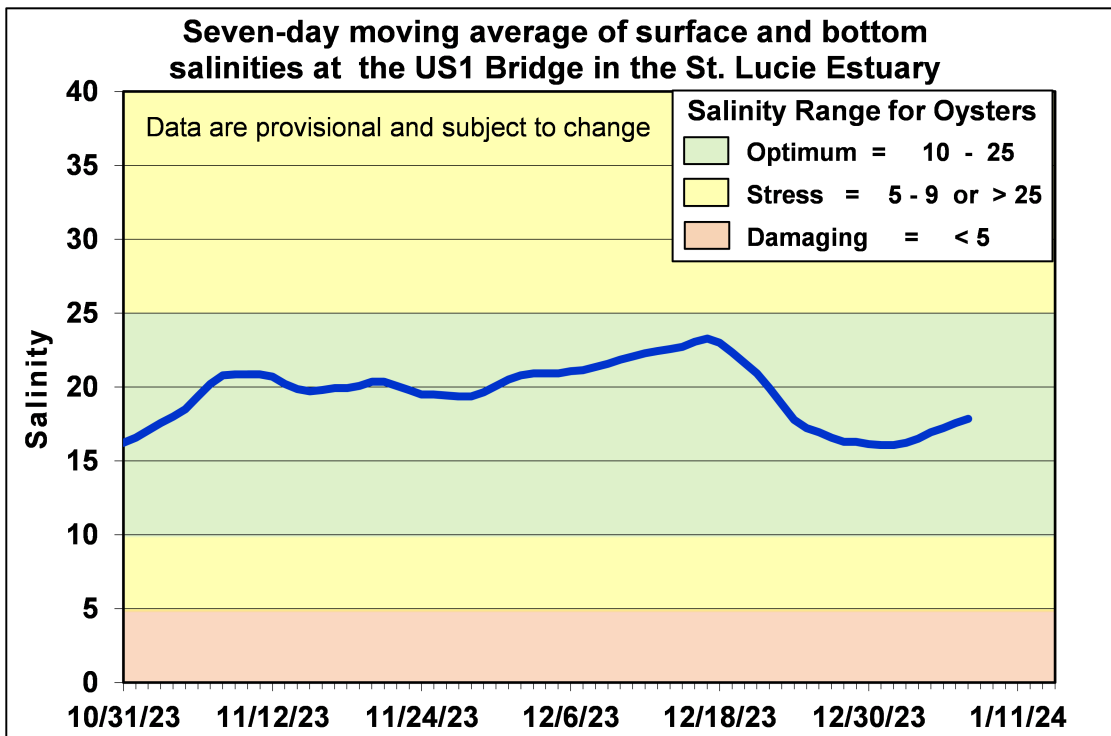


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

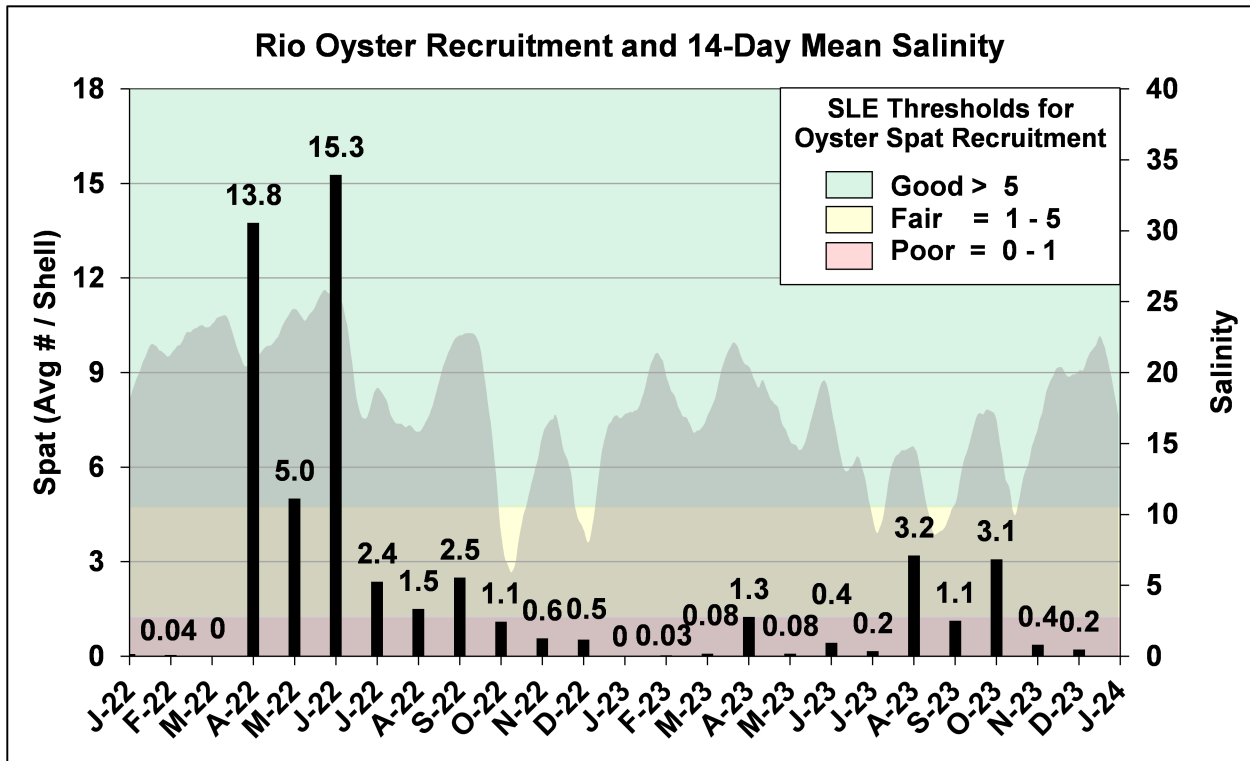


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

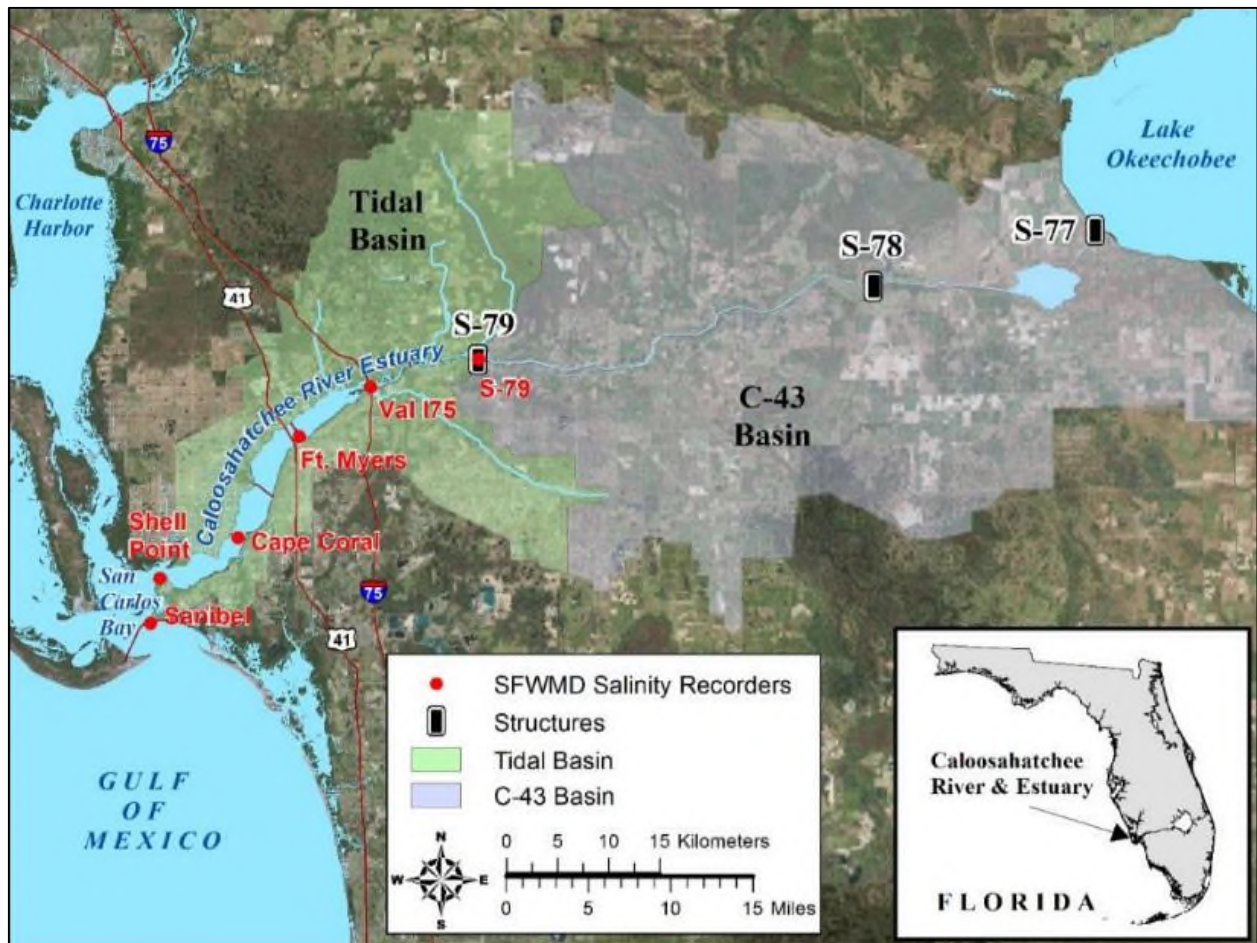


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

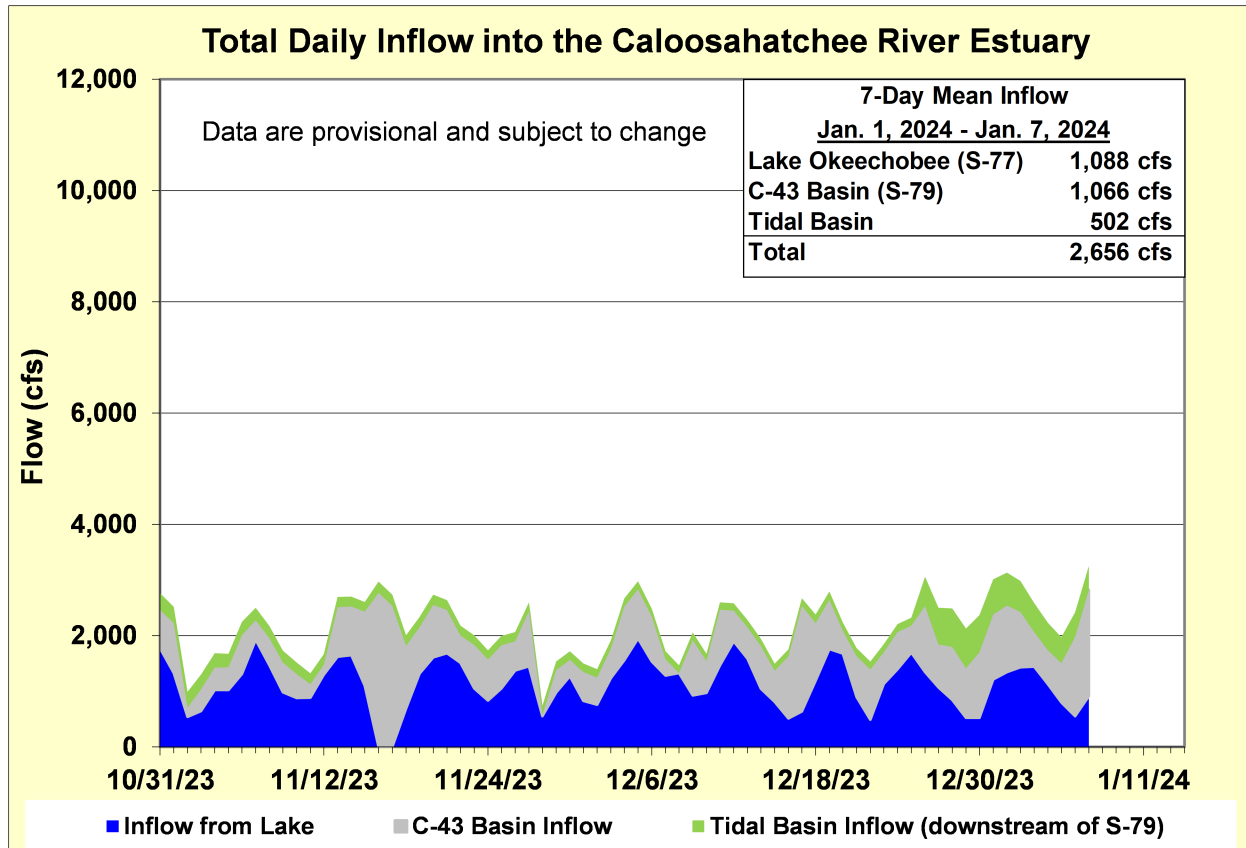


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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 (0.3)	0.2 (0.3)	0.0 – 10.0
Val I-75	1.8 (2.1)	1.9 (2.3)	0.0 – 10.0
Fort Myers Yacht Basin	2.2 (5.3)	3.3 (7.3)	0.0 – 10.0
Cape Coral	7.6 (8.7)	11.3 (11.8)	10.0 – 25.0
Shell Point	22.4 (23.0)	23.4 (23.3)	10.0 – 25.0
Sanibel	29.2 (28.4)	30.4 (29.4)	10.0 – 25.0

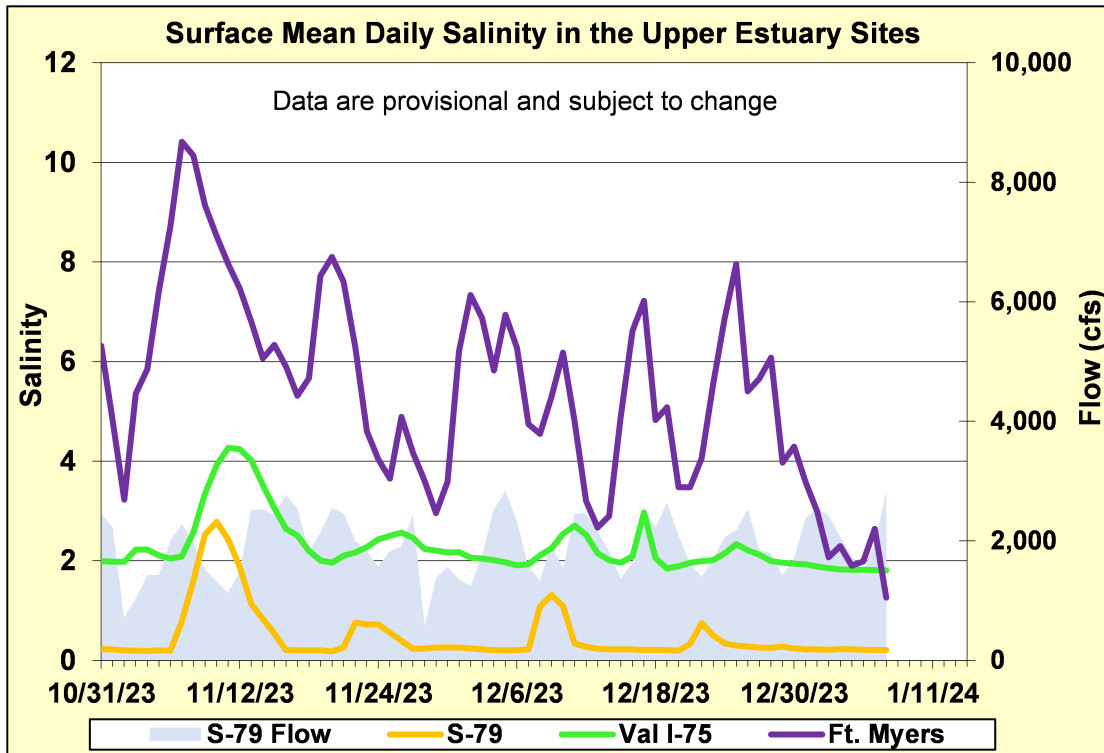


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

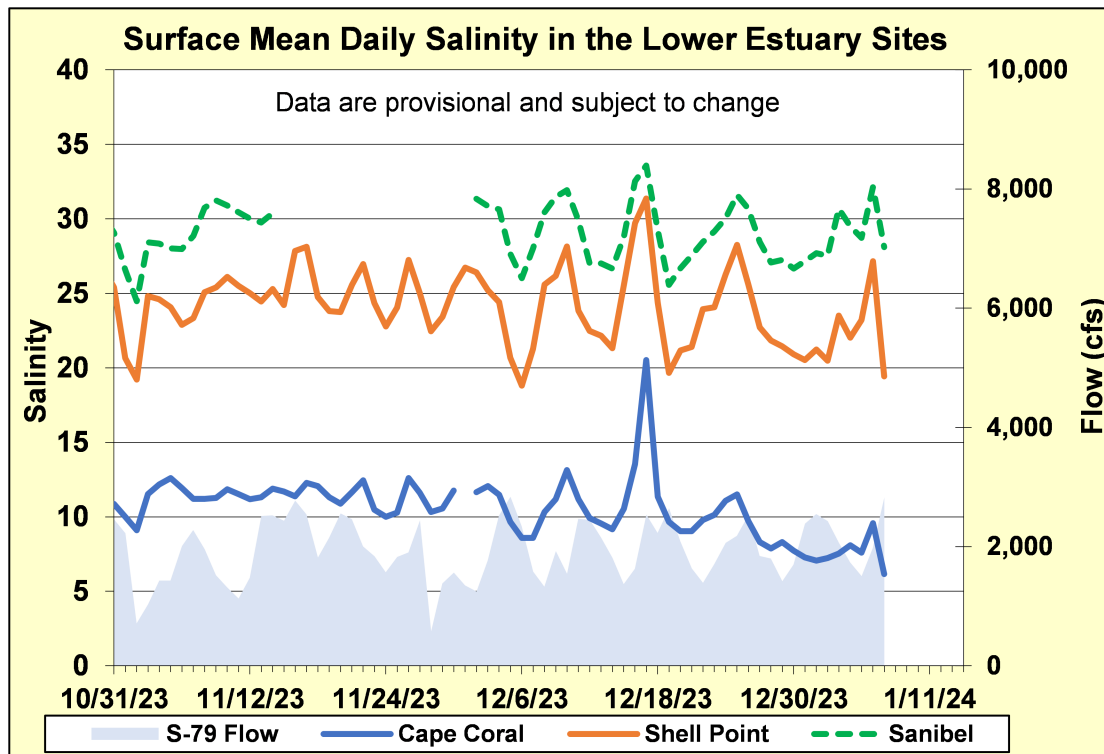


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

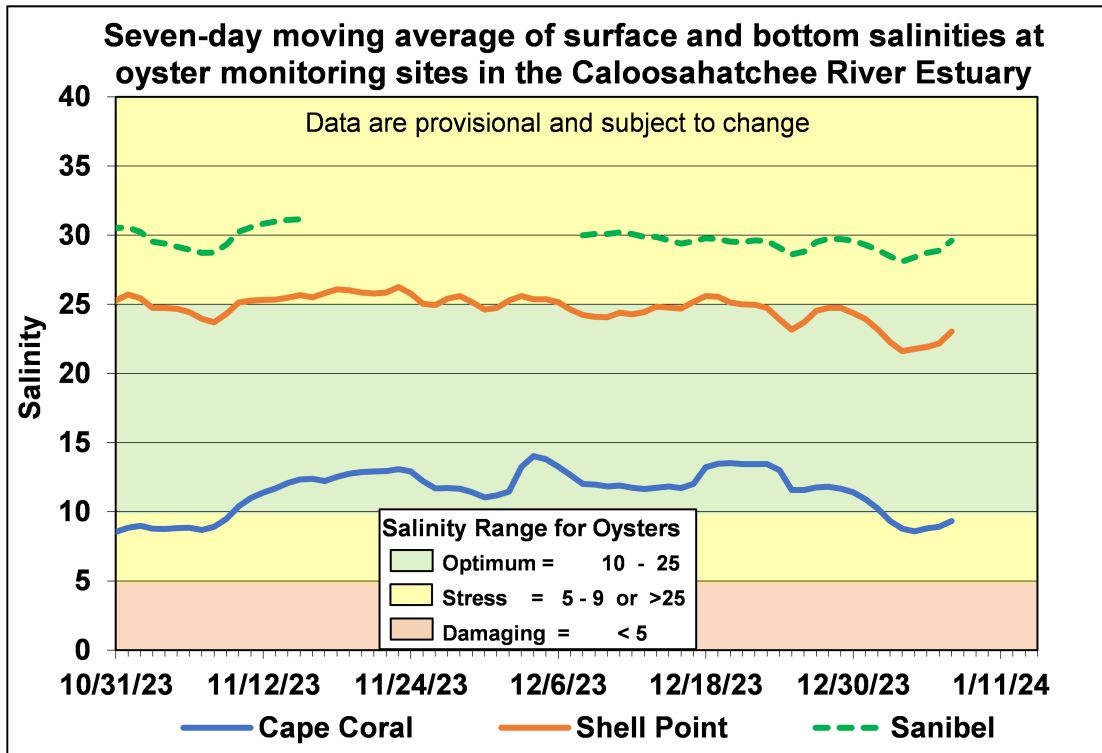


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

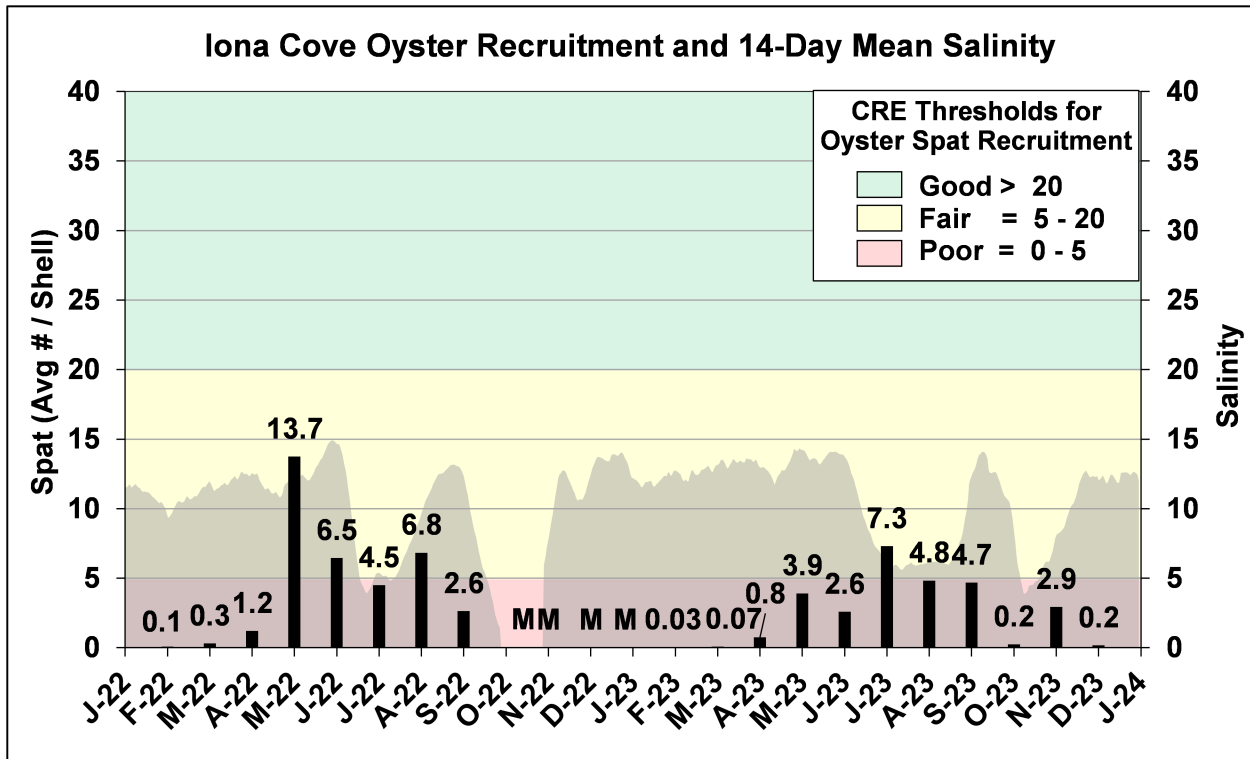


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

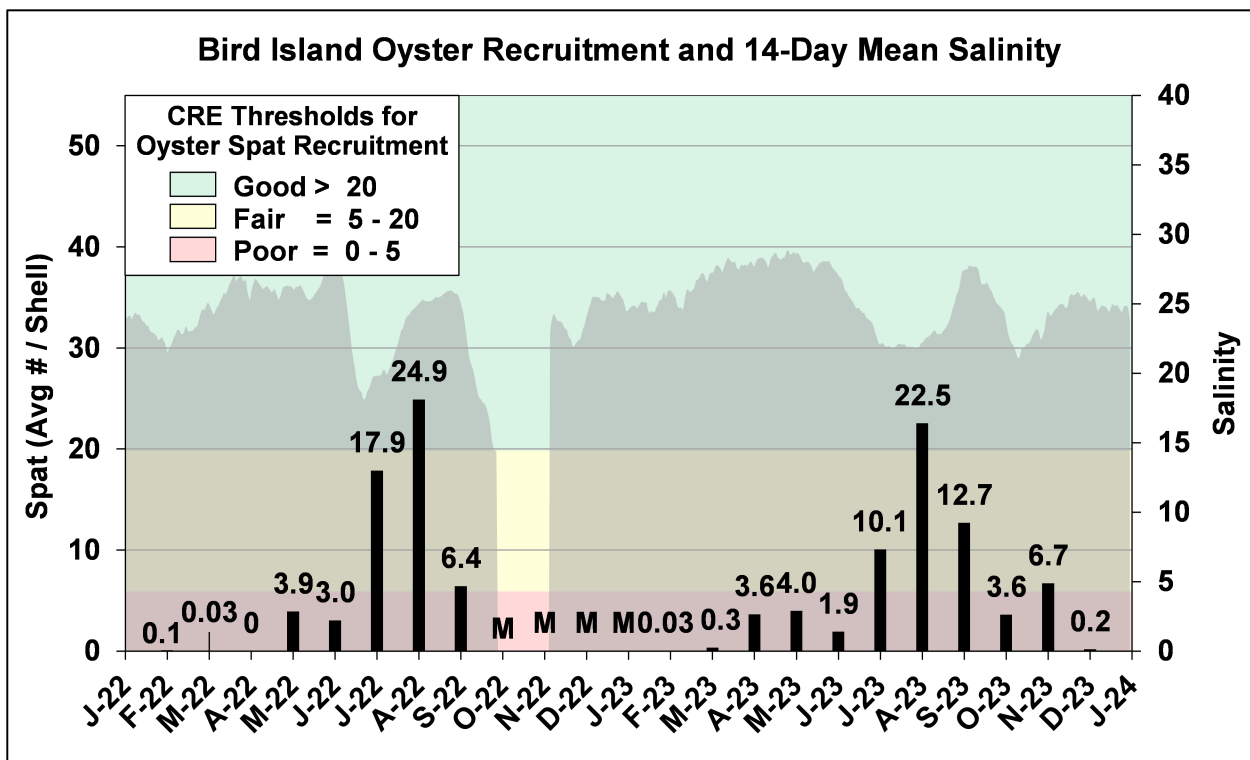


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

Table ES-3. Predicted salinity at Val I-75 in the Caloosahatchee River Estuary at the end of the forecast period for various S-79 flow release scenarios.

Scenario	Simulated S-79 Flow (cfs)	Tidal Basin Runoff (cfs)	Daily Salinity	30-Day Mean Salinity
A	0	284	2.2	1.3
B	450	284	1.3	1.2
C	750	284	0.6	1.1
D	1,000	284	0.3	1.1
E	1,500	284	0.3	1.1
F	2,000	284	0.3	1.1

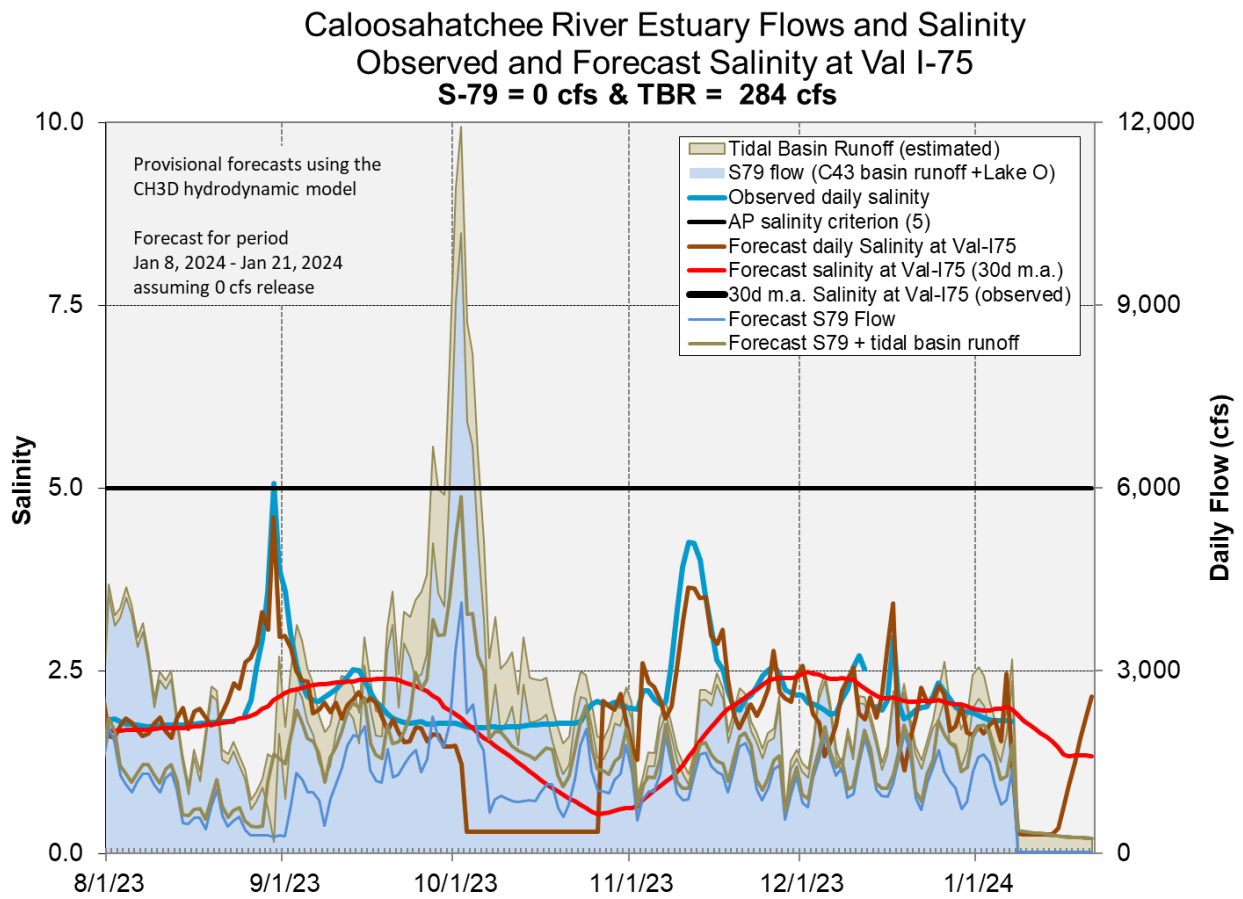


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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 flow-ways is stressed and highly stressed. The 365-day phosphorus loading rate (PLR) for the Central and 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 stressed and highly stressed. The 365-day PLR for the Eastern Flow-way is high, and the 365-day PLRs for the Western and Northern Flow-ways are below $1.0 \text{ g/m}^2/\text{year}$ (**Figure S-1**).

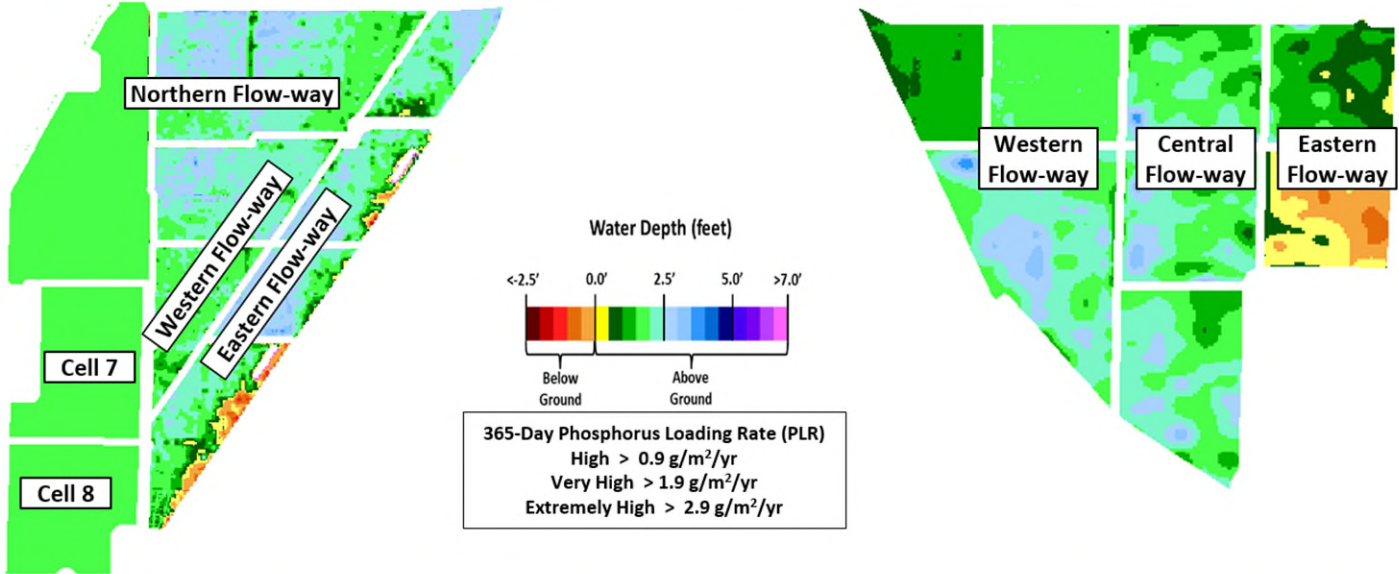
STA-2: Operational restrictions are in place in Flow-ways 2 and 4 for vegetation management activities. Online treatment cells are near or above target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 4 and 5 is highly stressed. The 365-day PLRs for Flow-ways 3, 4, and 5 are below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

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

STA-5/6: An operational restriction is in place in Flow-way 4 for vegetation management (prescribed burn). Treatment cells are near or above target stage. All treatment cells have highly stressed or stressed vegetation conditions except Flow-ways 7 which is healthy. The 365-day PLRs for Flow-ways 1, 4, 6, 7, and 8 are below $1.0 \text{ g/m}^2/\text{year}$, 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 – 1/1/2024 through 1/7/2024

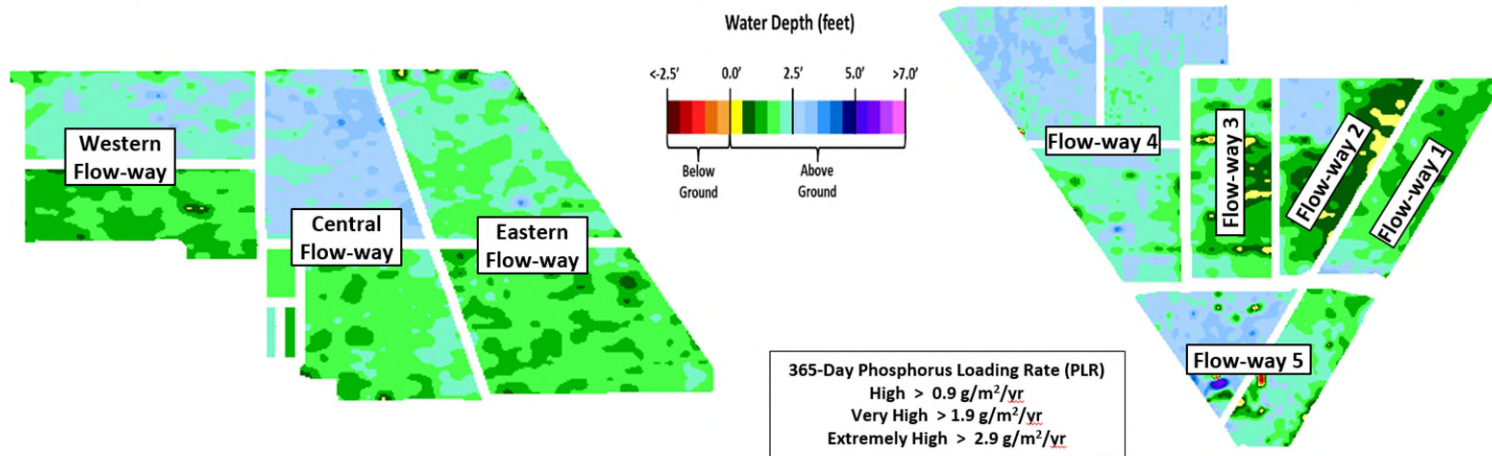


STA-1W	Flow-way Status
Western	<ul style="list-style-type: none"> Highly stressed vegetation conditions
Eastern	<ul style="list-style-type: none"> High 365-day PLR Highly stressed vegetation conditions
Northern	<ul style="list-style-type: none"> Highly stressed vegetation conditions Planting emergent vegetation
Cell 7	<ul style="list-style-type: none"> Stressed vegetation conditions
Cell 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 – 1/1/2024 through 1/7/2024

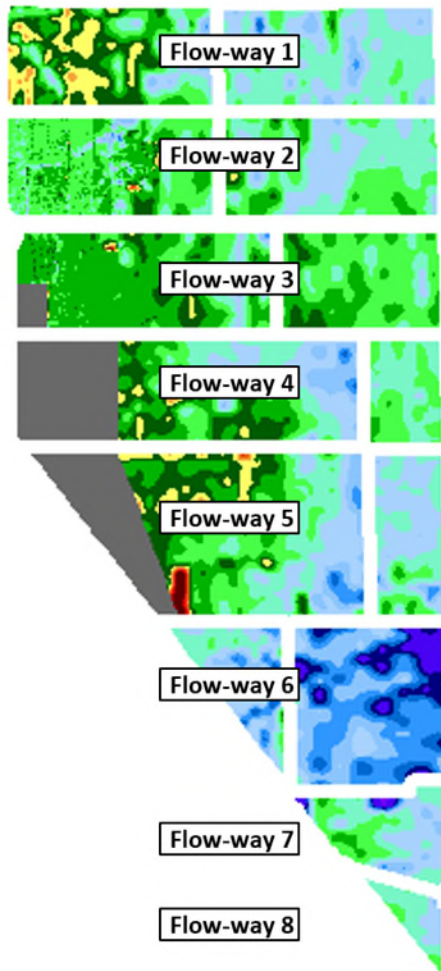


STA-3/4	Flow-way Status
Western	<ul style="list-style-type: none"> Stressed vegetation conditions
Central	<ul style="list-style-type: none"> Highly stressed vegetation conditions Removal of floating tussocks
Eastern	<ul style="list-style-type: none"> Post-drawdown vegetation grow-in

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

Figure S-2. Central Flow Path Weekly Status Report

Western Flow Path Weekly Status Report – 1/1/2024 through 1/7/2024



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

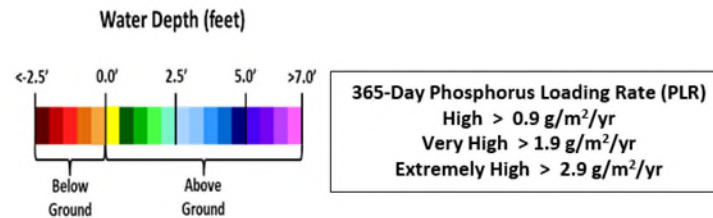


Figure S-3. Western Flow Path Weekly Status Report

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

There was less rainfall in the EPA than the week previous and stages fell across the system. WCA-1: Stage within the Refuge declined at a rate similar to the A1 zone schedule line, though stage on Sunday at the 1-8C gauge was still 0.37 feet above that line. WCA-2A: Stage recession at the 2-17 gauge trended quickly toward schedule last week, with the average on Sunday still 1.59 feet above the regulation line. WCA-3A: The 3-Gauge average stage trended generally towards schedule last week. The average stage on Sunday was 0.13 feet above the now falling Zone A regulation line. WCA-3A North: Stage at Gauge 62 (NW corner) remained just above the upper schedule last week, with a Sunday average of 0.03 feet above (**Figures EV-1 through EV-4**).

Water Depths

The SFWDAT illustrates very similar inundation patterns as a month ago across the WCAs. Ponded conditions remained in southern WCA-3A, but the spatial extent of those conditions have contracted some. Hydrologic connectivity remained robust within all the major sloughs of ENP. WDAT water depth estimates for January 7th were somewhat drier compared to one month ago across most of the EPA, with WCA-1 and northern WCA-2A the exception. Looking back a year ago, current conditions were deeper across most the EPA, most significantly in northwestern WCA-3A and northern WCA-2A (**Figure EV-5 and Figure EV-6**).

Comparing current conditions to the 20-year average on January 7th: Above the 90th percentile depths conditions for this time of the year remain across most of the EPA. Depths remain nearer to average in southwestern WCA-3A (**Figure EV-7**).

Taylor Slough and Florida Bay

Total weekly rainfall averaged 1.43 inches in Taylor Slough and Florida Bay over the past week (Monday-Sunday) based on the 18 gauges used for this report. Total rainfall ranged from 0.0 inches at Joe Bay (JB) to 2.14 inches at Long Sound (LS), both in the eastern nearshore region. Stages decreased across Taylor Slough, with an average decline of 0.10 feet. Stage changes ranged from -0.15 feet at Taylor Slough Bridge (TSB) in the northern slough to -0.04 feet at Craighead Pond (CP) in the south (**Figure EV-8 and Figure EV-9**). Taylor Slough water levels remained above the recent average for this time of year by 12.4 inches compared to before the Florida Bay initiative (starting in 2017), an increase of 1.5 inches relative to December 17, 2023 (date of last conditions report).

Average Florida Bay salinity was 18.2, a decrease of 1.9 from December 17, 2023. Salinity decreased at most sites, with changes ranging from -9.0 at Terrapin Bay (TB) in the central nearshore region to +5.9 at Buoy Key (BK) in the western region (**Figure EV-8**). Salinities in all three regions remained below the 25th percentile (**Figure EV-10**). Average Florida Bay salinity remained below its recent average for this time of year by 6.5, a decrease of 2.0 from December 17.

Water Management Recommendations

The ecology of WCA-3A and WCA-2A will benefit from “ideal” recession rates, as those regions could prove important in providing foraging habitat necessary for the upcoming wading bird nesting season (more important this year after two successive years of below average nesting). As stages remain above the 90th percentile in NESRS, continuing strong 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	0.40	-0.09
WCA-2A	0.40	-0.15
WCA-2B	0.46	-0.09
WCA-3A	0.49	-0.03
WCA-3B	0.27	-0.07
ENP	0.73	-0.04

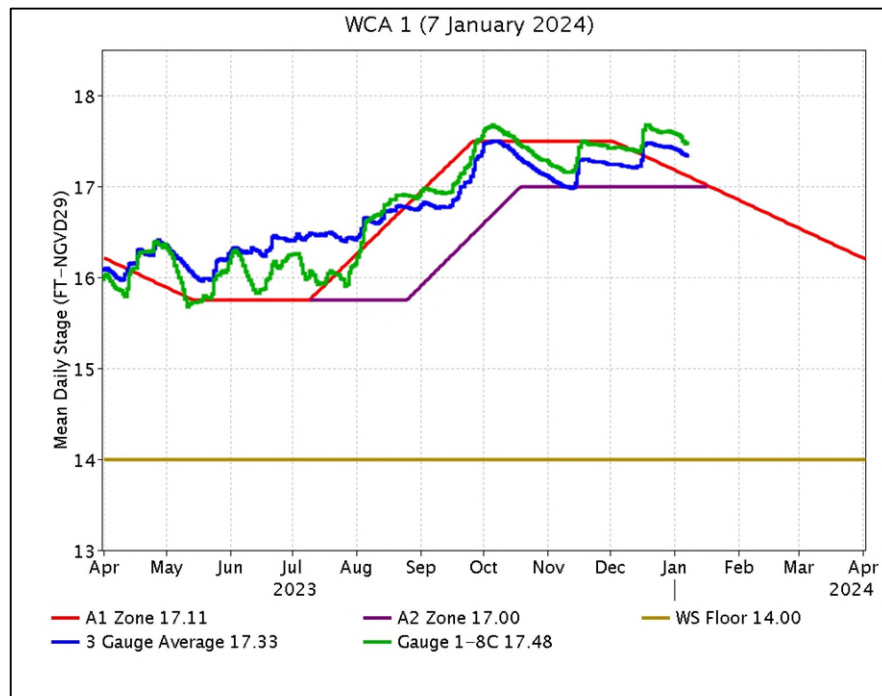


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.



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

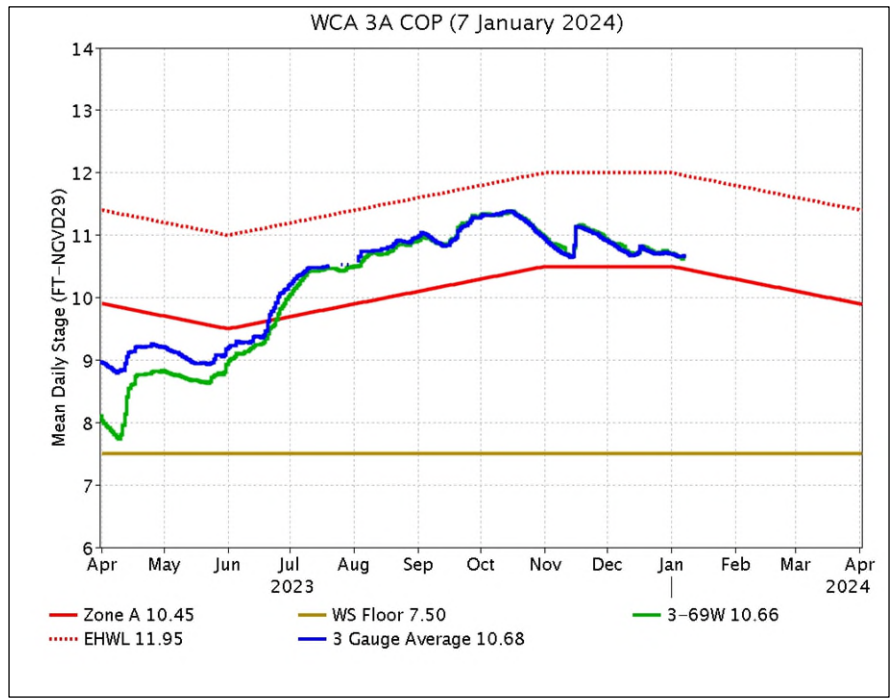


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, 3-69W) and regulation schedule.

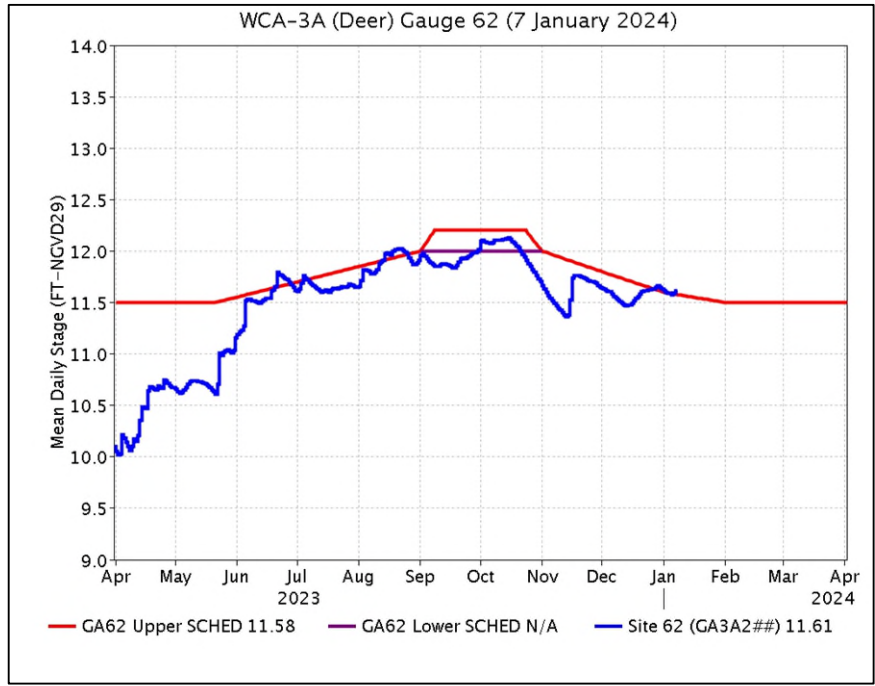


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and GA62 regulation schedule.

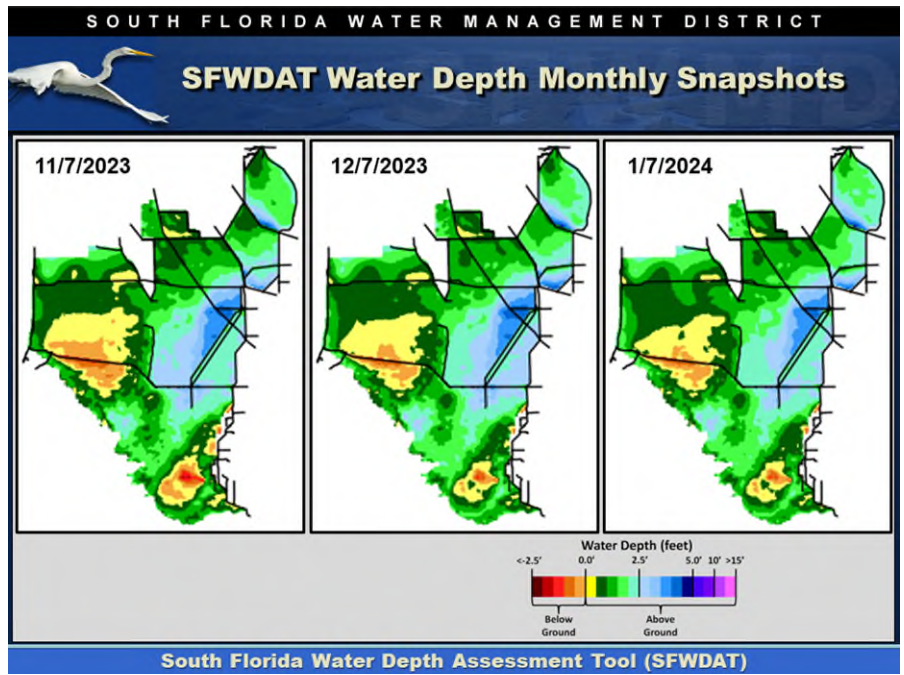


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

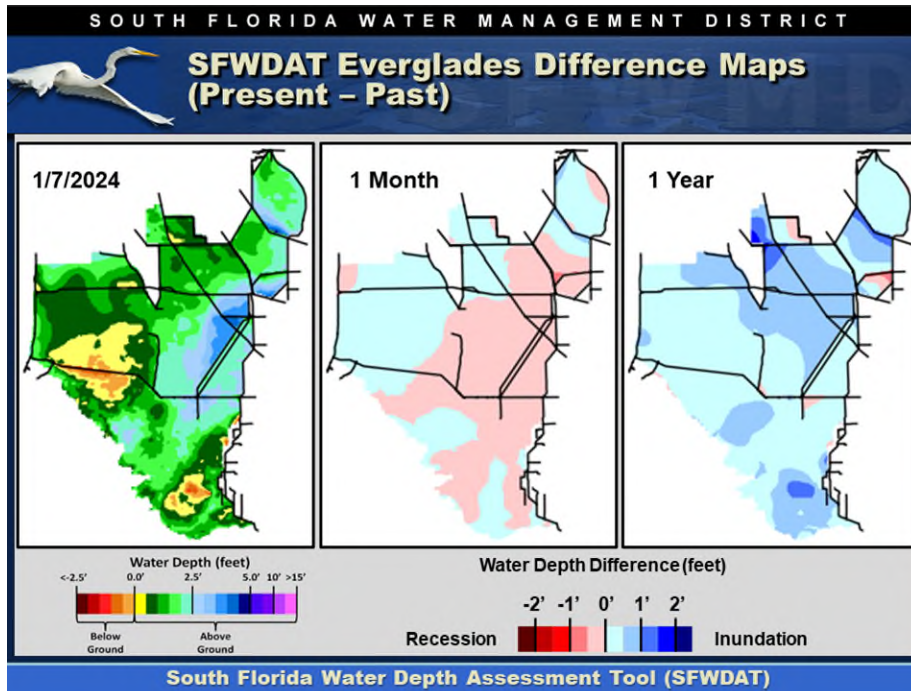


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

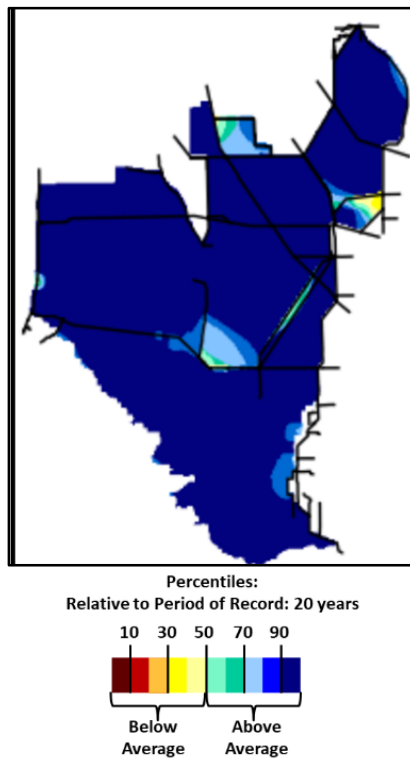


Figure EV-7. Present water depths (1/7/2024) compared to the day of year average over the previous 20 years.

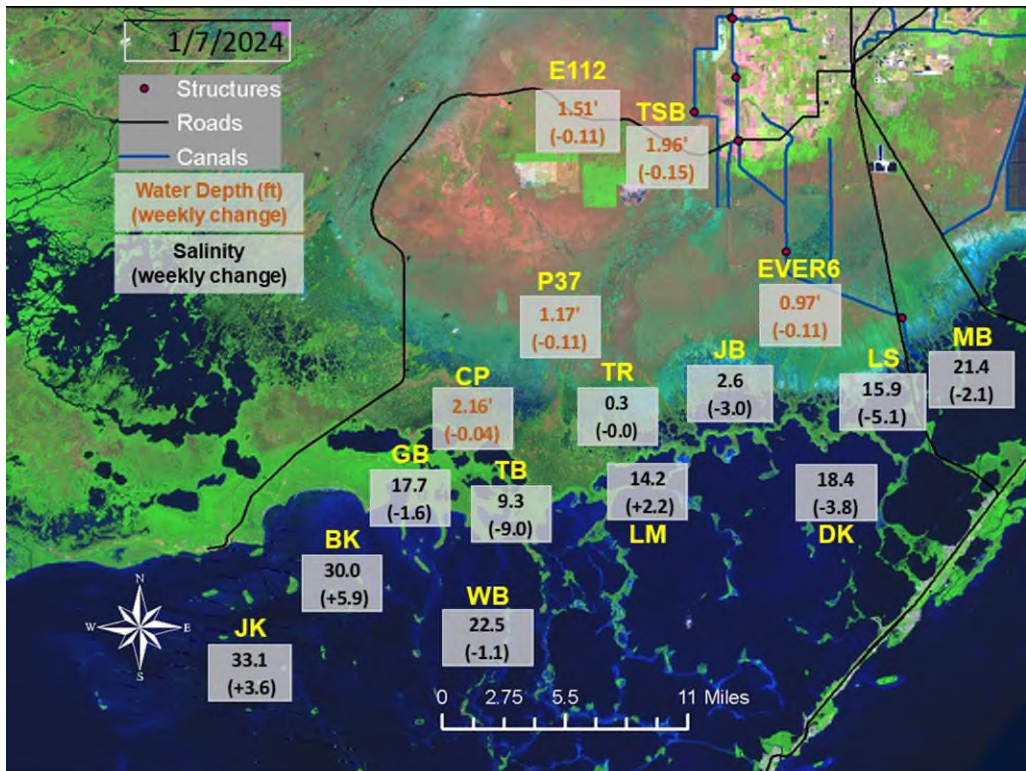


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

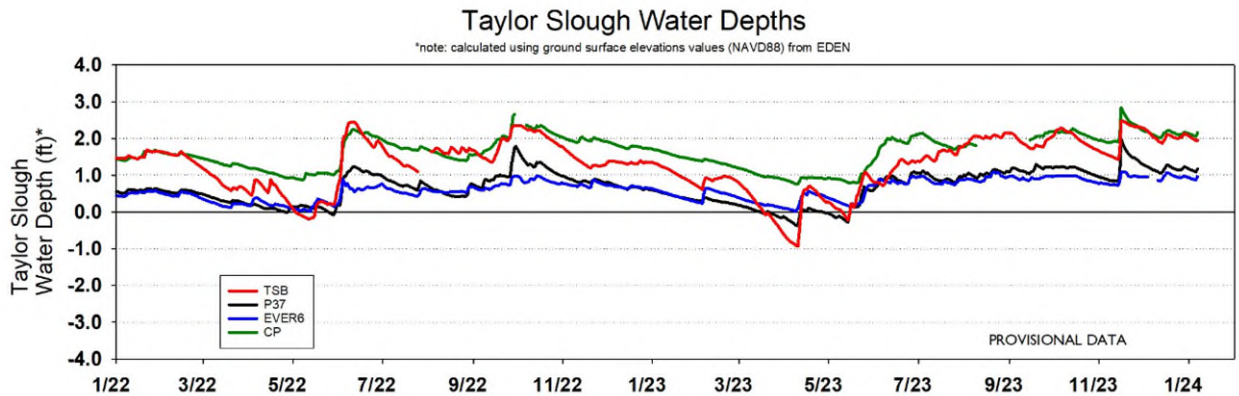


Figure EV-9. Taylor Slough water depth time series.

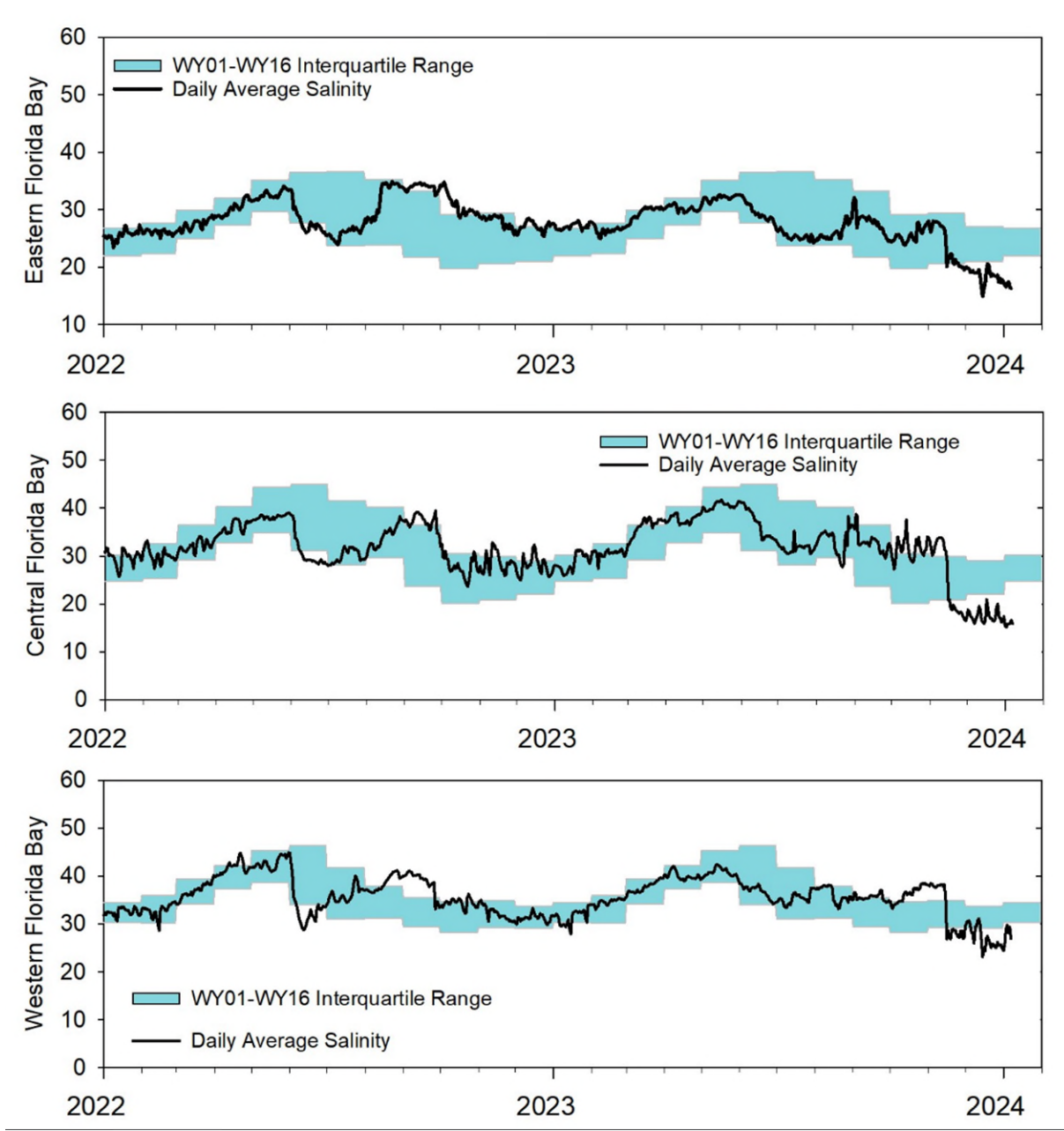


Figure EV-10. Eastern (top panel), Central (middle panel), and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, January 9, 2024 (red is new)			
	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.09'	Recession rate of less than 0.12' per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage decreased by 0.15'	Recession rate of less than 0.12' per week.	Protect within basin and downstream habitat and wildlife. Recent rapid stage change.
WCA-2B	Stage decreased by 0.09'	Recession rate of less than 0.12' per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage increased by 0.06'	Recession rate of less than 0.08' per week.	Protect within basin and downstream habitat (peat soils) and wildlife (fish/crayfish reproduction, wading bird foraging). Recent rapid stage change.
WCA-3A NW	Stage decreased by 0.03'	Recession rate of less than 0.08' per week.	
Central WCA-3A S	Stage decreased by 0.06'	Recession rate of less than 0.12' per week.	Protect within basin wildlife (fish/crayfish reproduction, wading bird foraging). Recent rapid stage change.
Southern WCA-3A S	Stage decreased by 0.08'		
WCA-3B	Stage decreased by 0.07'	Recession rate of less than 0.12' per week.	Protect within basin (sensitive tree islands) and downstream habitat and wildlife. Allow for flow through.
ENP-SRS	Stage decreased by 0.04'	Make discharges to ENP according to COP and TTF protocol while adaptively considering upstream and downstream ecological conditions.	Protect within basin and upstream habitat and wildlife (wading bird nesting).
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 -9.0 to +5.9	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 930 cfs, the same as the previous 30-day mean inflow. The seven-day mean salinity was 26.9 at BBCW8 and 20.7 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data were provided by Biscayne National Park.

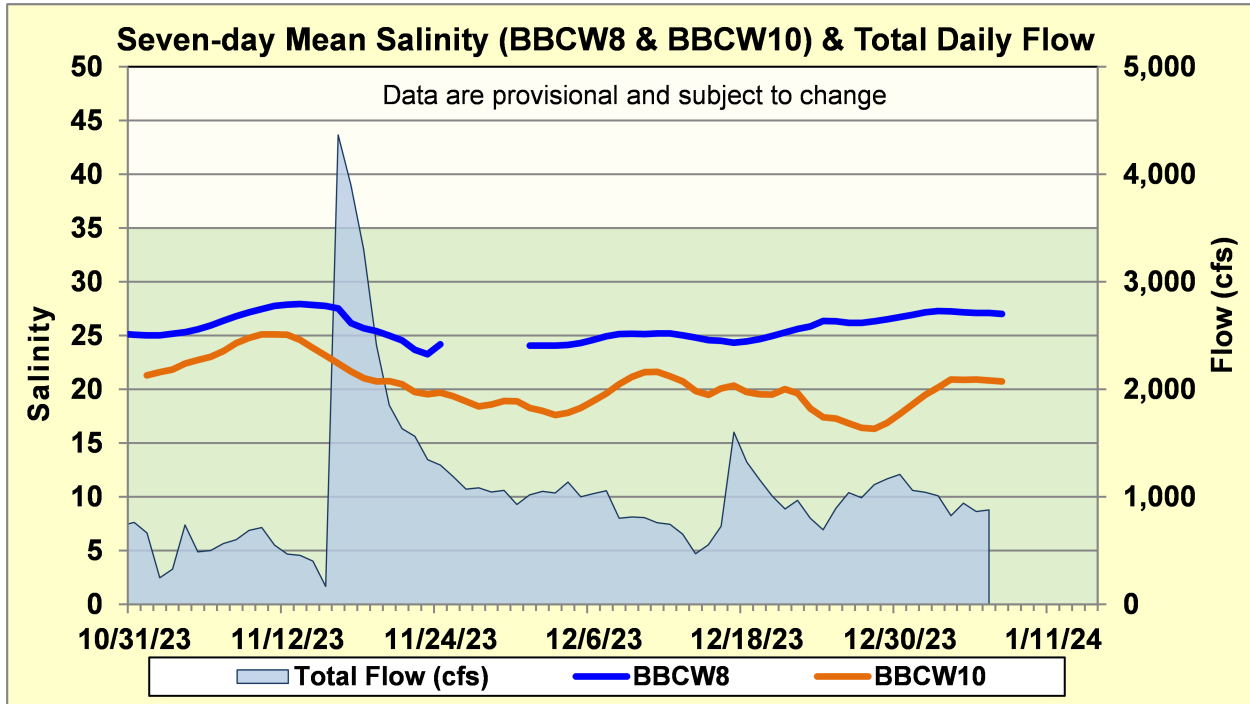


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.