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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 24, 2024

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A strong stabilizing area of high pressure is located over the western Atlantic and extends into Florida, keeping the SFWMD mostly dry and breezy throughout the week. A few light showers or drizzle could move onshore portions of the east coast, but only a trace to a tenth of an inch of localized rainfall is expected. A few showers could move into the northern interior on Thursday but are unlikely to produce significant rainfall. A cold front will enter the SFWMD on Sunday, triggering light shower activity mainly along the lower east coast. Afterwards, a cold front will push through the entire SFWMD, ushering in cooler and drier conditions on Monday. For the 7-day period ending next Tuesday morning, much below normal SFWMD total rainfall is expected.

Kissimmee

Releases were made from East Lake Toho and Lake Toho to continue spring lake stage recessions to low pool. Weekly average discharge on January 21, 2024, was 2,200 cfs and 3,000 cfs at S-65 and S-65A, respectively. Mean weekly water depth on the Kissimmee River floodplain increased by 0.15 feet to 0.45 feet over the week ending January 21, 2024. The weekly average concentration of dissolved oxygen in the Kissimmee River decreased from 8.8 mg/L last week to 7.1 mg/L for the week ending January 21, 2024, which is well above the potentially lethal and stressful levels for largemouth bass and other sensitive species.

Lake Okeechobee

Lake Okeechobee stage was 16.17 feet NGVD on January 21, 2024, which was 0.12 feet higher than the previous week and 0.28 feet higher than a month ago. Average daily inflows (excluding rainfall) increased from the previous week, going from 2,220 cfs to 4,030 cfs. Average daily outflows (excluding evapotranspiration) decreased from the previous week, going from 850 cfs to 320 cfs. The fourth wading bird survey of the 2024 breeding season (conducted January 18, 2024) reported approximately 2,300 wading birds actively foraging on the Lake. The cyanobacteria index level was low and patchy

along the western shoreline of the Lake according to the January 21, 2024 satellite image from NOAA's Harmful Algal Bloom Monitoring System

Estuaries

Total inflow to the St. Lucie Estuary averaged 2,522 cfs over the past week with no flow coming from Lake Okeechobee. Mean surface salinities decreased 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 4,899 cfs over the past week with 292 cfs coming from Lake Okeechobee. Mean surface salinities remained the same at S-79 and Val I-75 and decreased at the remaining sites in the estuary over the past week. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the optimal range for adult eastern oysters at Shell Point (10-25), in the upper stressed range at Sanibel (>25), and in the damaging range (<5) at Cape Coral.

Stormwater Treatment Areas

For the week ending Sunday, January 21, 2024, 200 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 8,800 ac-feet. The total amount of inflows to the STAs in WY2024 is approximately 1,261,000 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, the A-1 FEB/STA-3/4, and/or STA-5/6.

Everglades

Last week's rates of stage changes were in the "good" or "fair" range across the Everglades Protection Area (EPA). Stages are currently deeper than the 20-year average and deeper than conditions one year ago. All stages continue to decrease in Taylor Slough but remain well above the recent average. Salinity also decreased on average in Florida Bay compared to last week and remain below the 25th percentile for this time of year in all regions. Wading bird recon flights suggests much better stage conditions for wading birds compared to the last two years at this time with the caveat that stages will need to begin receding soon in order to provide adequate foraging conditions during the wading bird nesting window.

Biscayne Bay

Total inflow to Biscayne Bay averaged 836 cfs and the previous 30-day mean inflow averaged 921 cfs. The seven-day mean salinity was 23.0 at BBCW8 and 18.3 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data provided by Biscayne National Park.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On January 21, 2024, mean daily lake stages were 57.2 feet NGVD (0.8 feet below schedule) in East Lake Toho, 54.2 feet NGVD (0.8 feet below schedule) in Lake Toho, and 53.3 feet NGVD (0.8 feet above schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

For the week ending January 21, 2024, mean weekly discharge was 2,200 cfs and 3,000 cfs at S-65 and S-65A, respectively. Mean weekly discharge from the Kissimmee River was 1,400 cfs at S-65D and 1,400 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 47.3 feet NGVD at S-65A and 25.9 feet NGVD at S-65D on January 21, 2024. Mean weekly river channel stage increased by 1.4 feet to 37.7 feet NGVD over the week ending on January 21, 2024 (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain increased by 0.15 feet to 0.45 feet over the week ending January 21, 2024 (**Table KB-2, Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River decreased from 8.8 mg/L the previous week to 7.1 mg/L for the week ending January 21, 2024 (**Table KB-2, Figure KB-6**).

Water Management Recommendations

Continue 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 to facilitate S-69 repairs. Maintain at least minimum flow (250-300 cfs) at S-65A. Raise S-65D headwater stage to 26.0 +/- 0.2 ft NGVD.

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)	
							1/21/24	1/14/24
Lakes Hart and Mary Jane	S-62	LKMJ	110	61.0	R	61.0	0.0	-0.1
Lakes Myrtle, Preston and Joel	S-57	S-57	73	61.4	R	61.4	0.0	-0.1
Alligator Chain	S-60	ALLI	180	63.9	R	64.0	-0.1	-0.1
Lake Gentry	S-63	LKGT	260	61.4	R	61.5	-0.1	-0.1
East Lake Toho	S-59	TOHOE	290	57.2	R	58.0	-0.8	-0.8
Lake Toho	S-61	TOHOW S-61	820	54.2	R	55.0	-0.8	-0.8
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	2200	53.3	R	52.5	0.8	0.6

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.

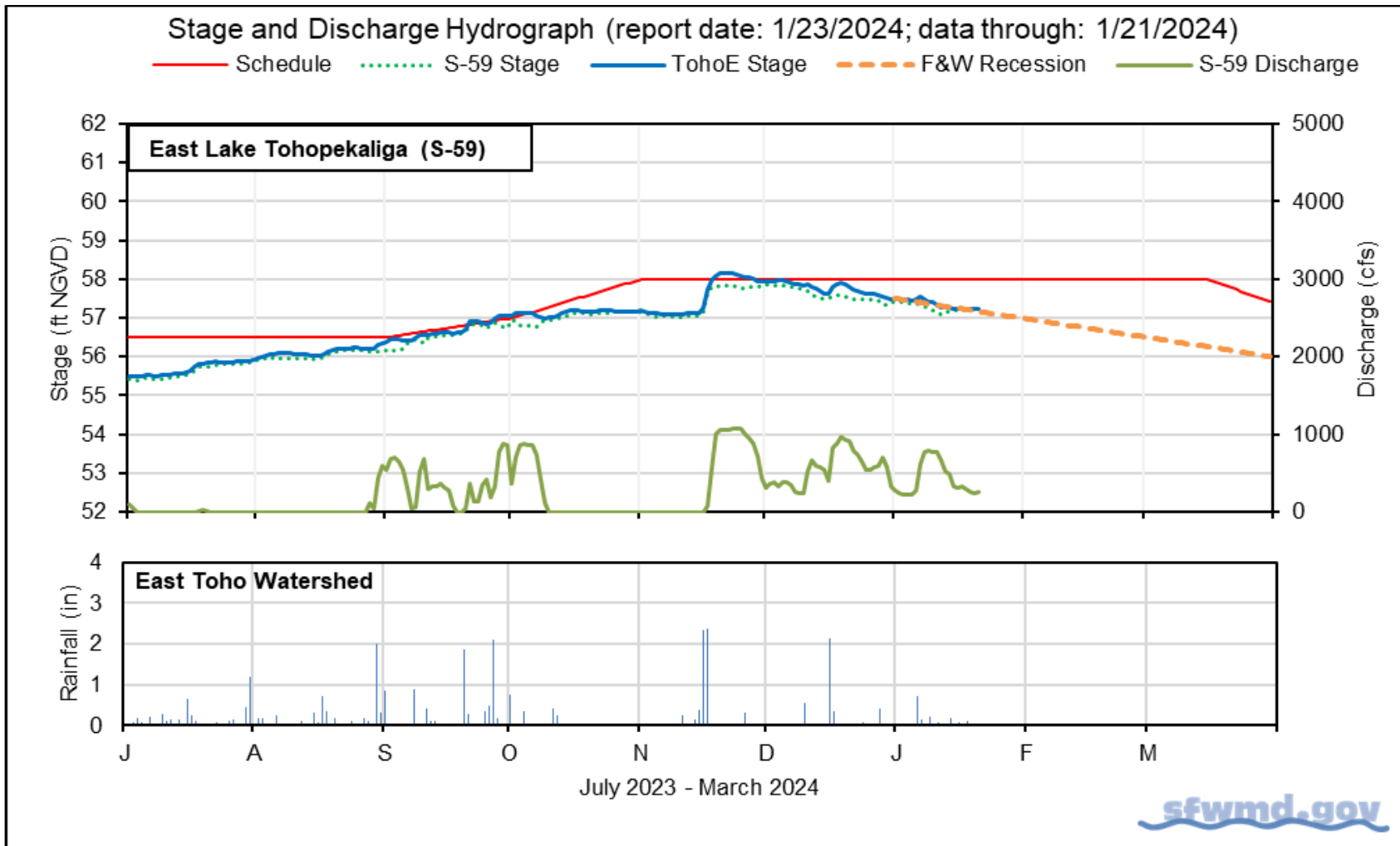


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

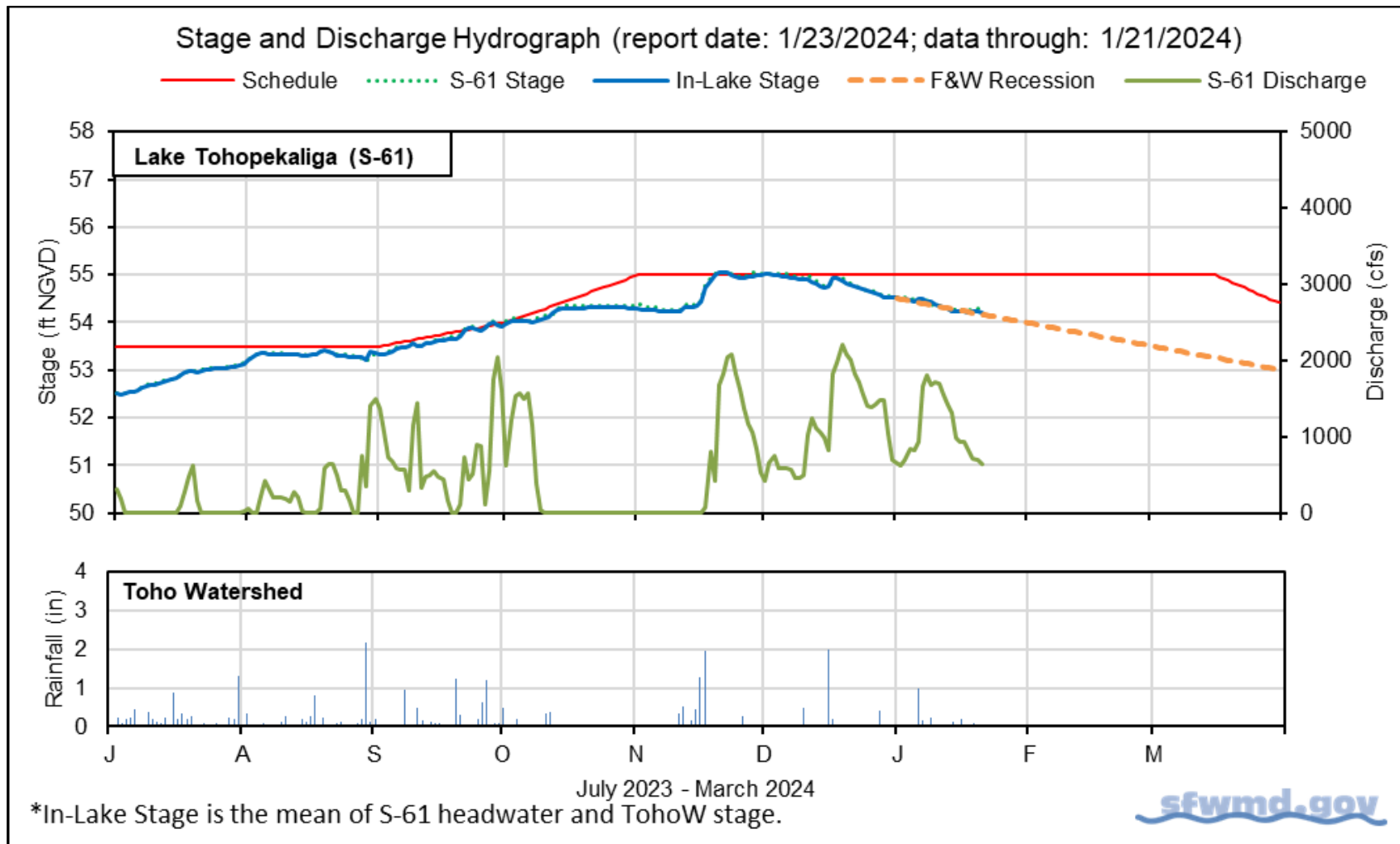


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

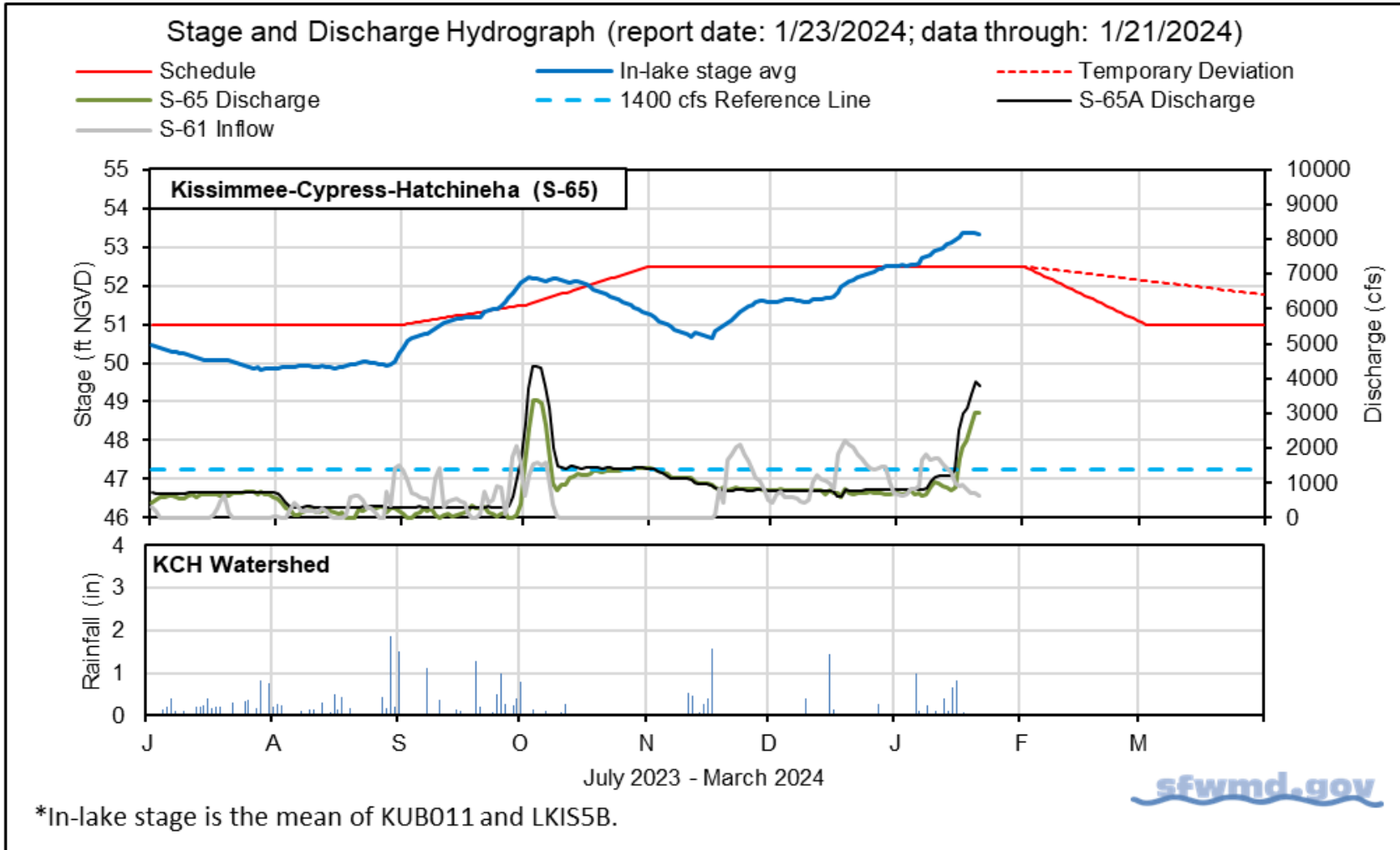


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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			
		1/21/24	1/21/24	1/14/24	1/7/24	12/31/23
Discharge	S-65	3,000	2,200	880	700	700
Discharge	S-65A ^a	3,800	3,000	1,100	810	810
Headwater Stage (feet NGVD)	S-65A	47.7	47.3	46.4	46.4	46.3
Discharge	S-65D ^b	1,400	1,400	1,000	930	940
Headwater Stage (feet NGVD)	S-65D ^c	26.1	25.9	25.8	26.0	26.0
Discharge (cfs)	S-65E ^d	1,400	1,400	1,000	890	910
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	6.6	7.1	8.8	8.9	8.5
River channel mean stage ^f	Phase I river channel	38.6	37.7	36.3	35.6	35.7
Mean depth (feet) ^g	Phase I floodplain	0.60	0.45	0.30	0.24	0.27

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).

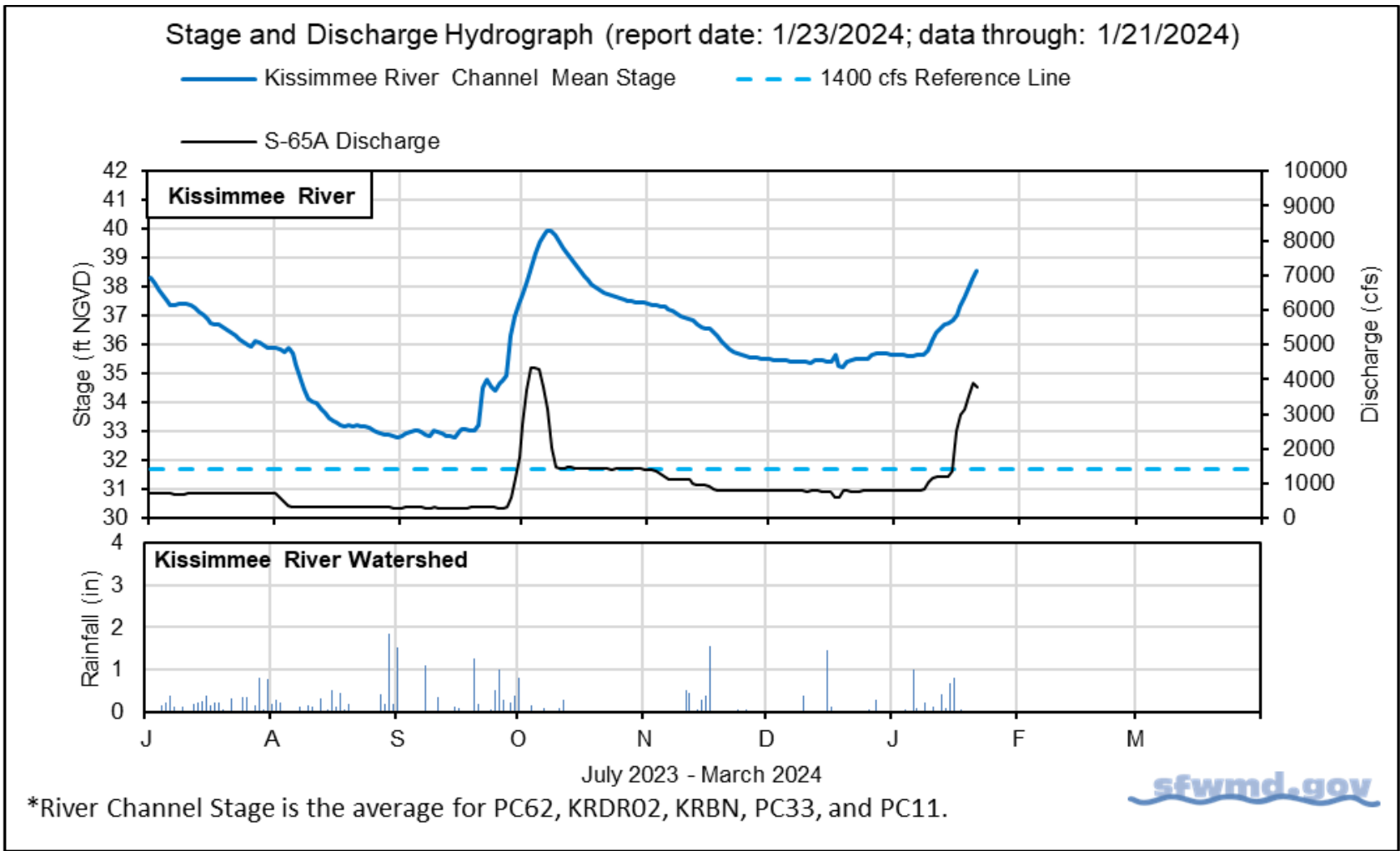


Figure KB-4. Kissimmee River stage, discharge and rainfall.

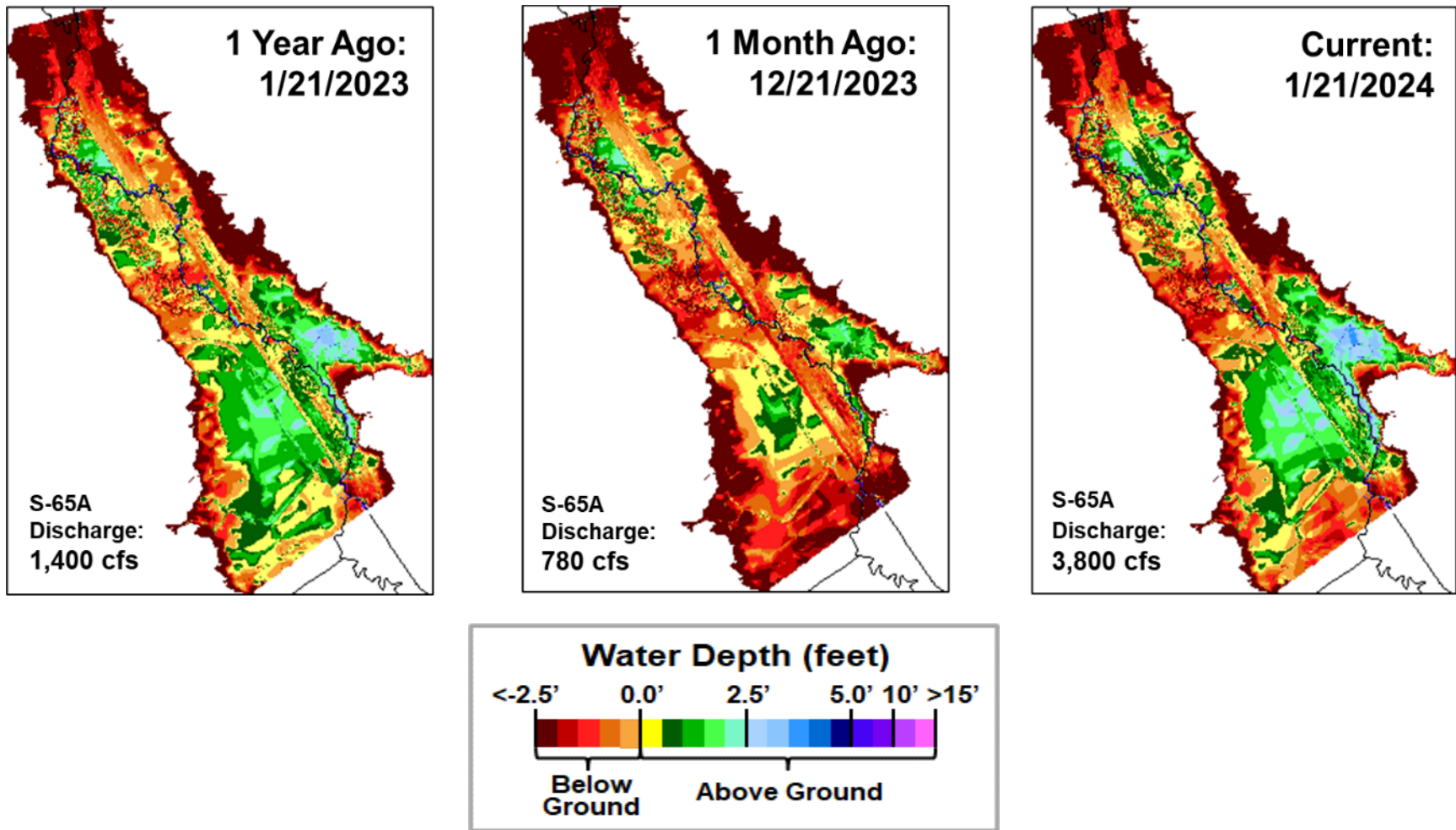
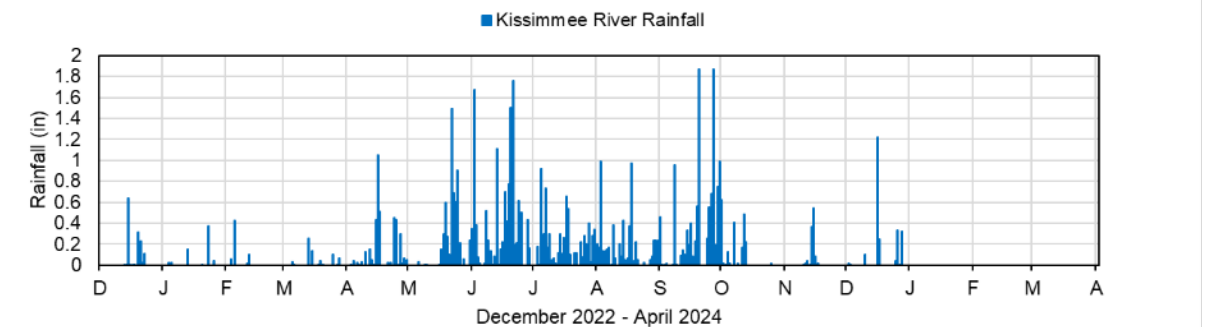
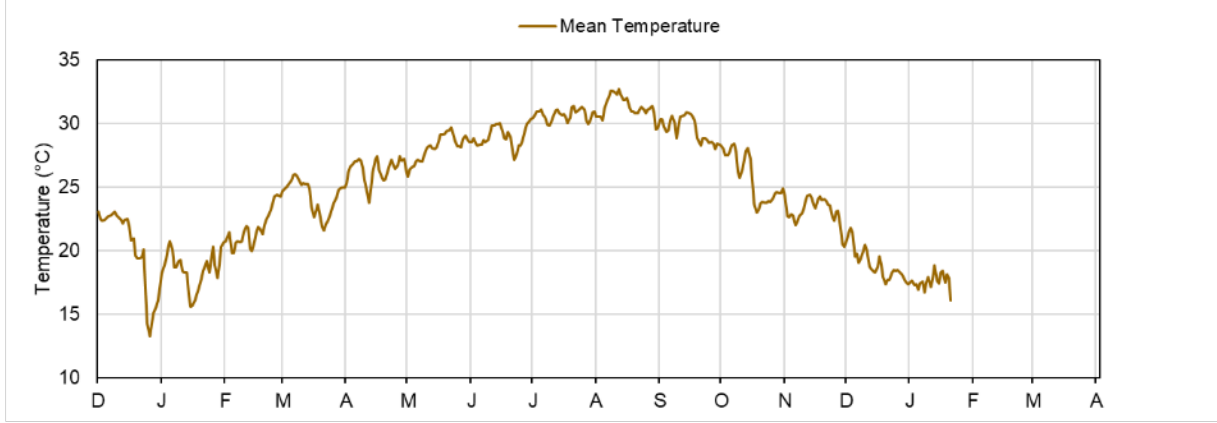
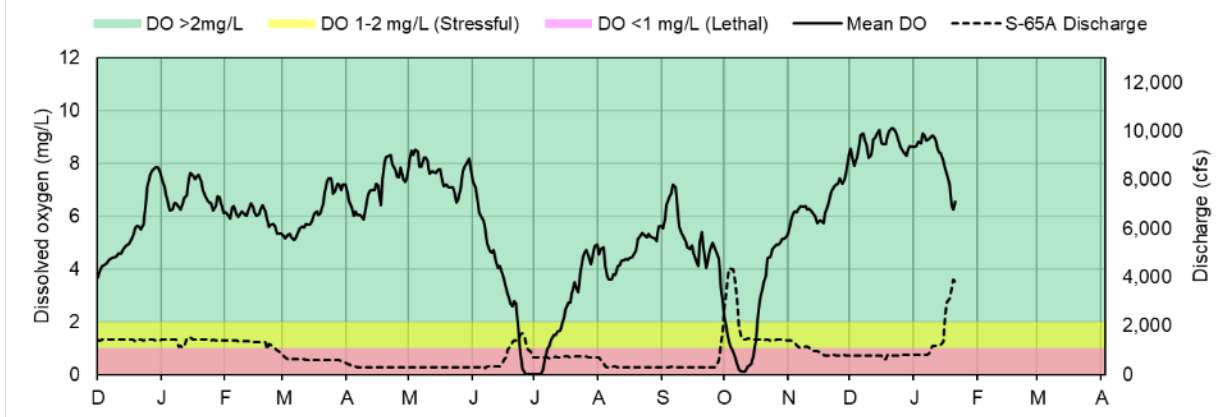


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.



Report Date: 1/23/2024; data are through: 1/21/2024



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

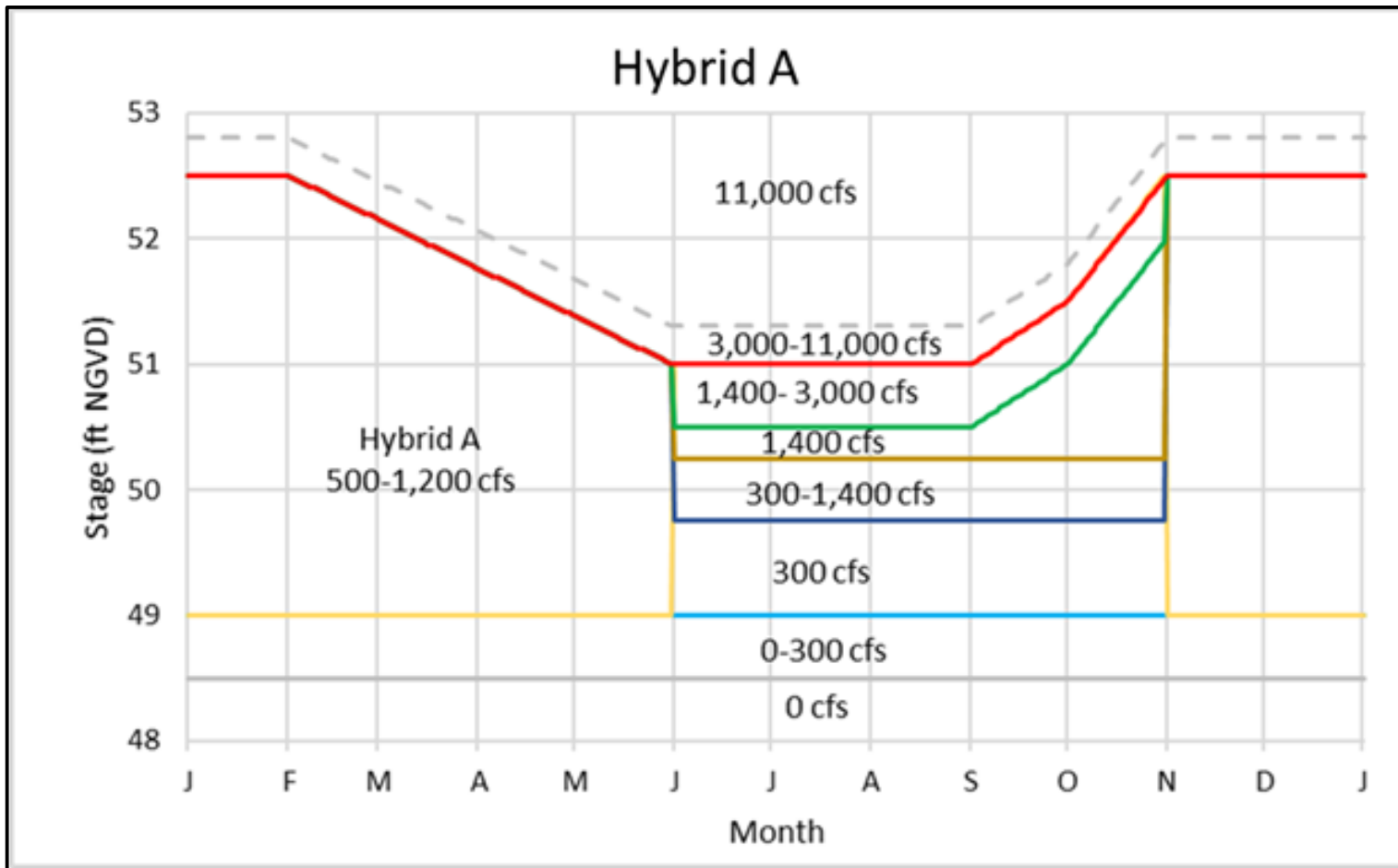


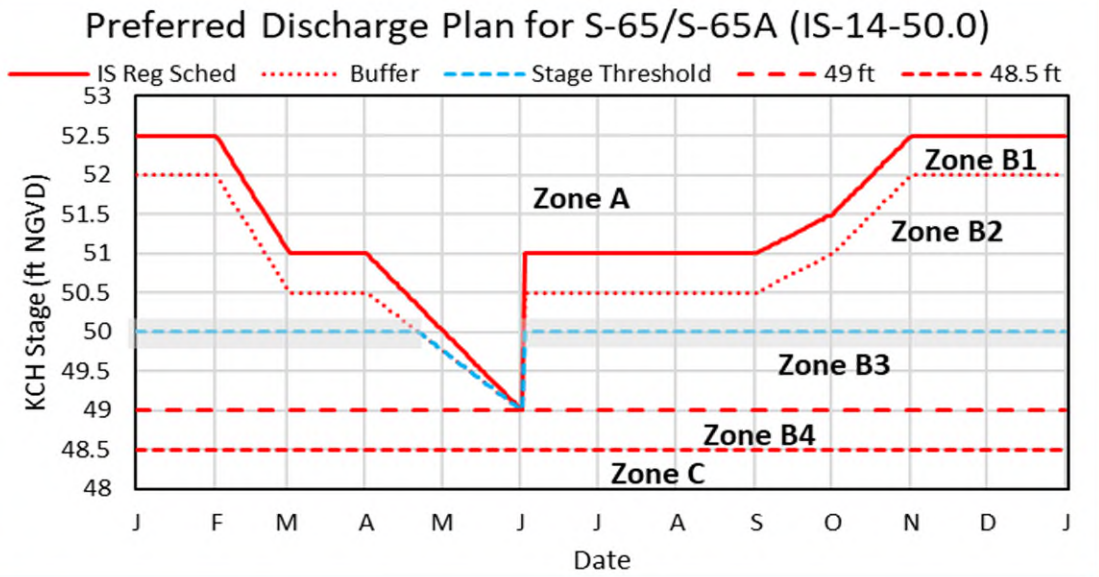
Figure KB-7. Hybrid A Discharge Plan for S-65/S-65A. Use discharge rate of change limits from IS-14-50 (Fig. KB-8).

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 16.17 feet NGVD on January 21, 2024, which was 0.12 feet higher than the previous week and 0.28 feet higher than a month ago (**Figure LO-1**). Lake stage moved into the intermediate sub-band on January 16th (**Figure LO-2**) and was 0.77 feet above the upper limit of the ecological envelope (**Figure LO-3**). According to NEXRAD, 0.69 inches of rain fell directly over the Lake last week.

Average daily inflows (excluding rainfall) increased from the previous week, going from 2,220 cfs to 4,030 cfs. The highest structure inflow came from the C-38 Canal via the S-65E/65EX1 structure (1,360 cfs). Average daily outflows (excluding evapotranspiration) decreased from the previous week, going from 850 cfs to 320 cfs. The highest average single structure outflow was recorded at the S-77 structure into the C-43 Canal (290 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 fourth wading bird survey of the 2024 breeding season (conducted January 18, 2024) reported approximately 2,300 wading birds actively foraging on the Lake (**Figure LO-6**). This is well below the 5-year average for this time of year (approximately 8,400), but is not surprising given the continued high lake stages.

In the most recent satellite image from January 21st, 2024, the cyanobacteria index level was low and patchy along the western shoreline of the Lake according to 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:
12/21/2023**

**Current:
01/21/2024**

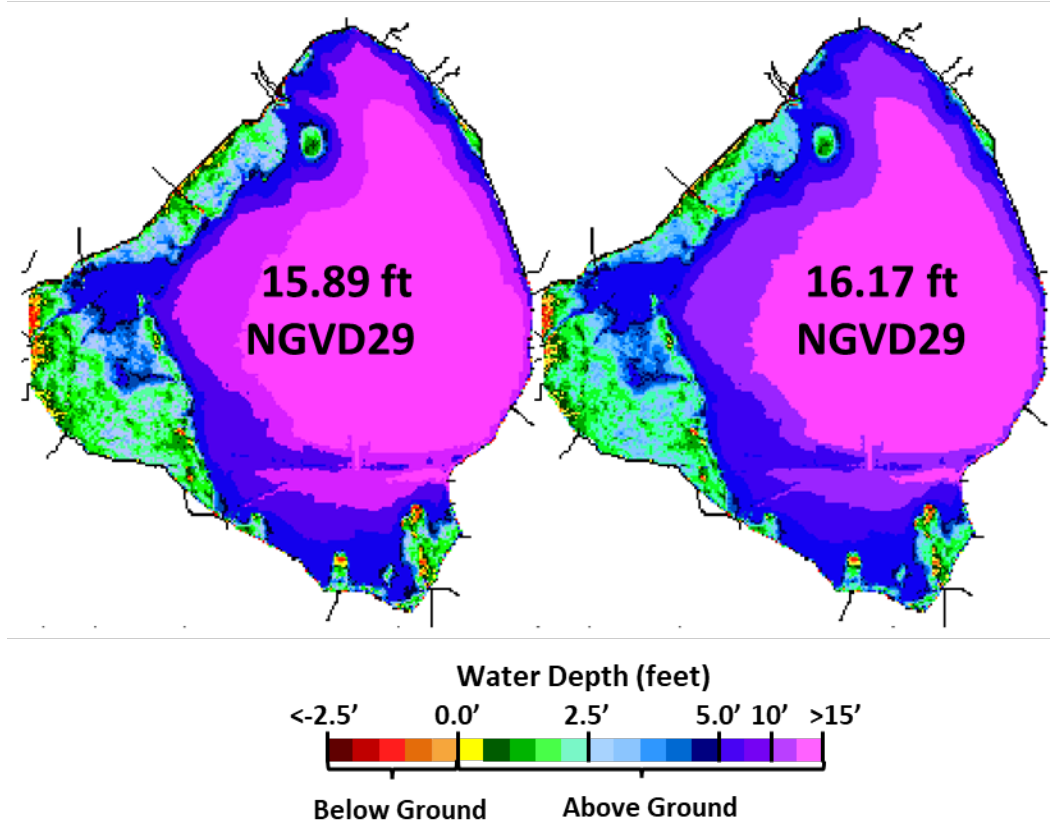


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Water Level History and Projected Stages

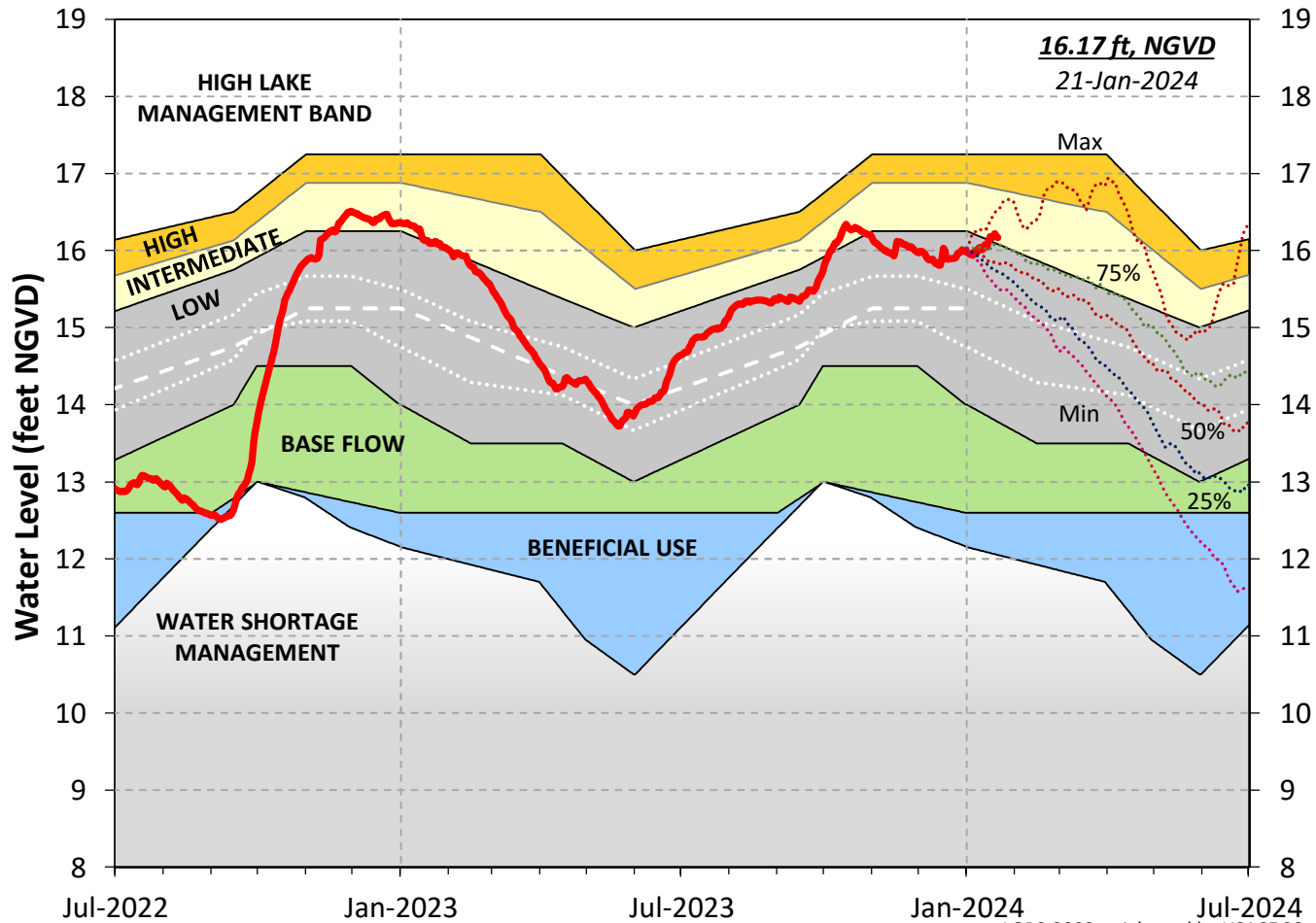


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

LORS-2008 - Adopted by USACE 28-

Lake Okeechobee Stage vs Ecological Envelope

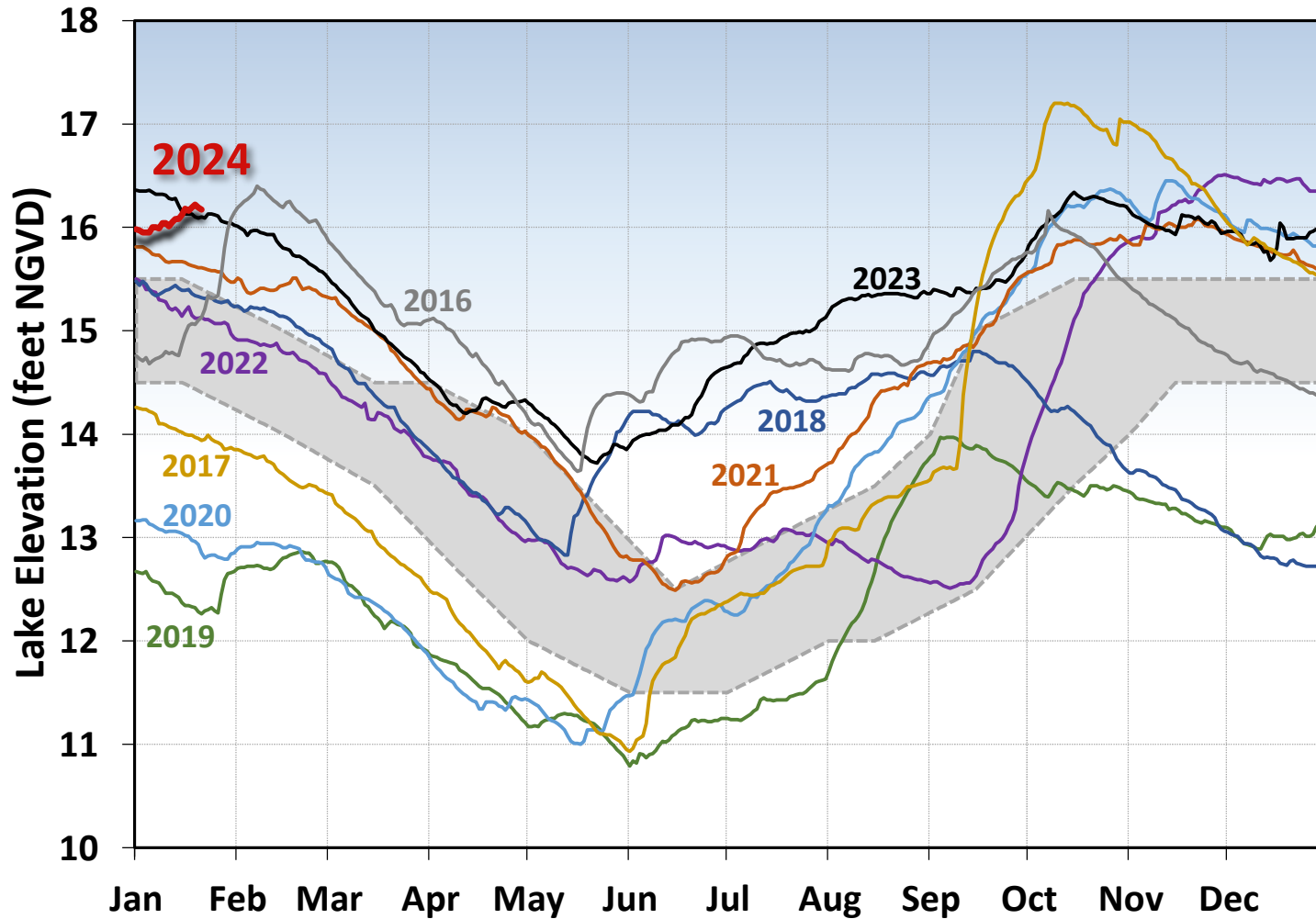


Figure LO-3. The current and eight prior year's annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

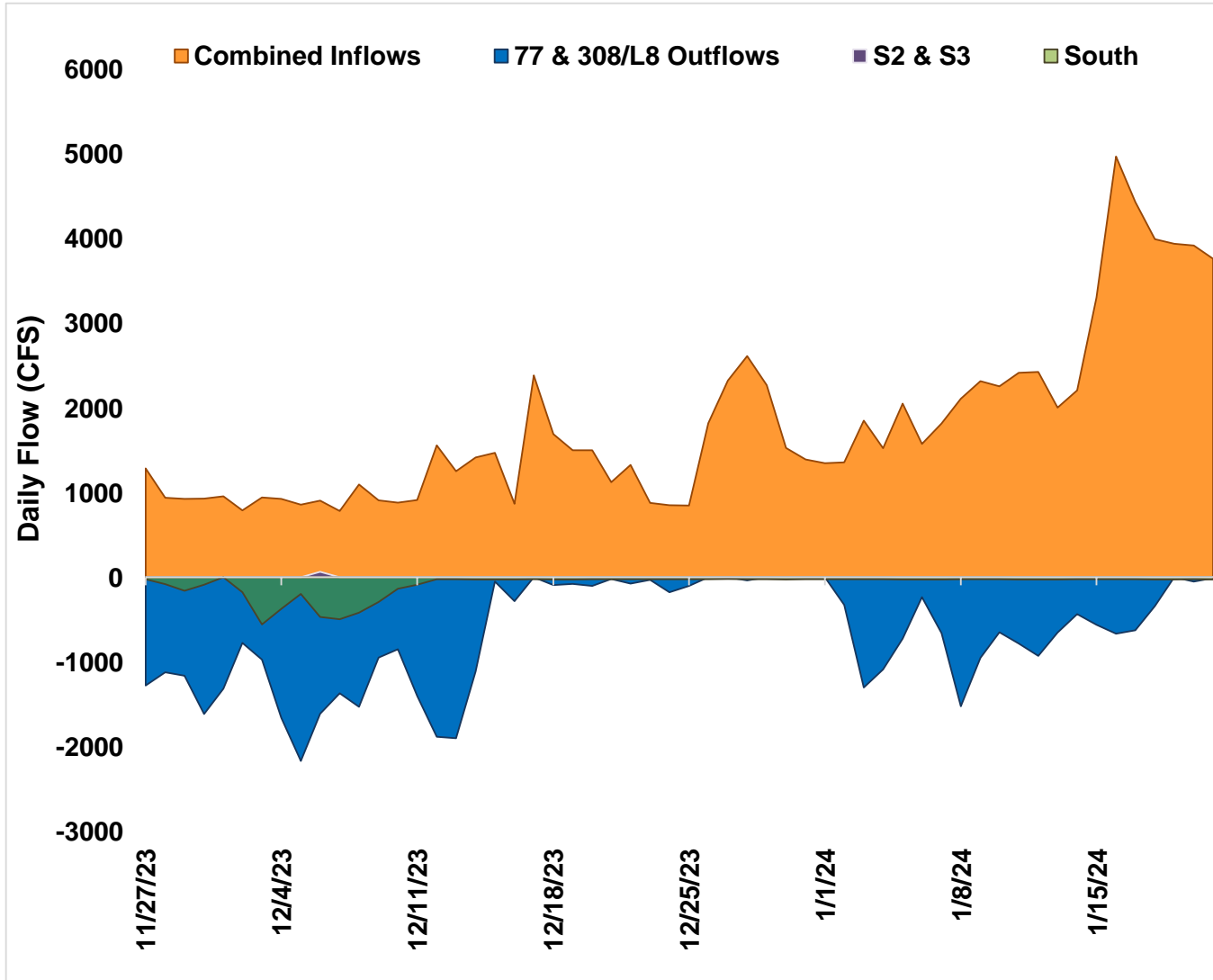


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

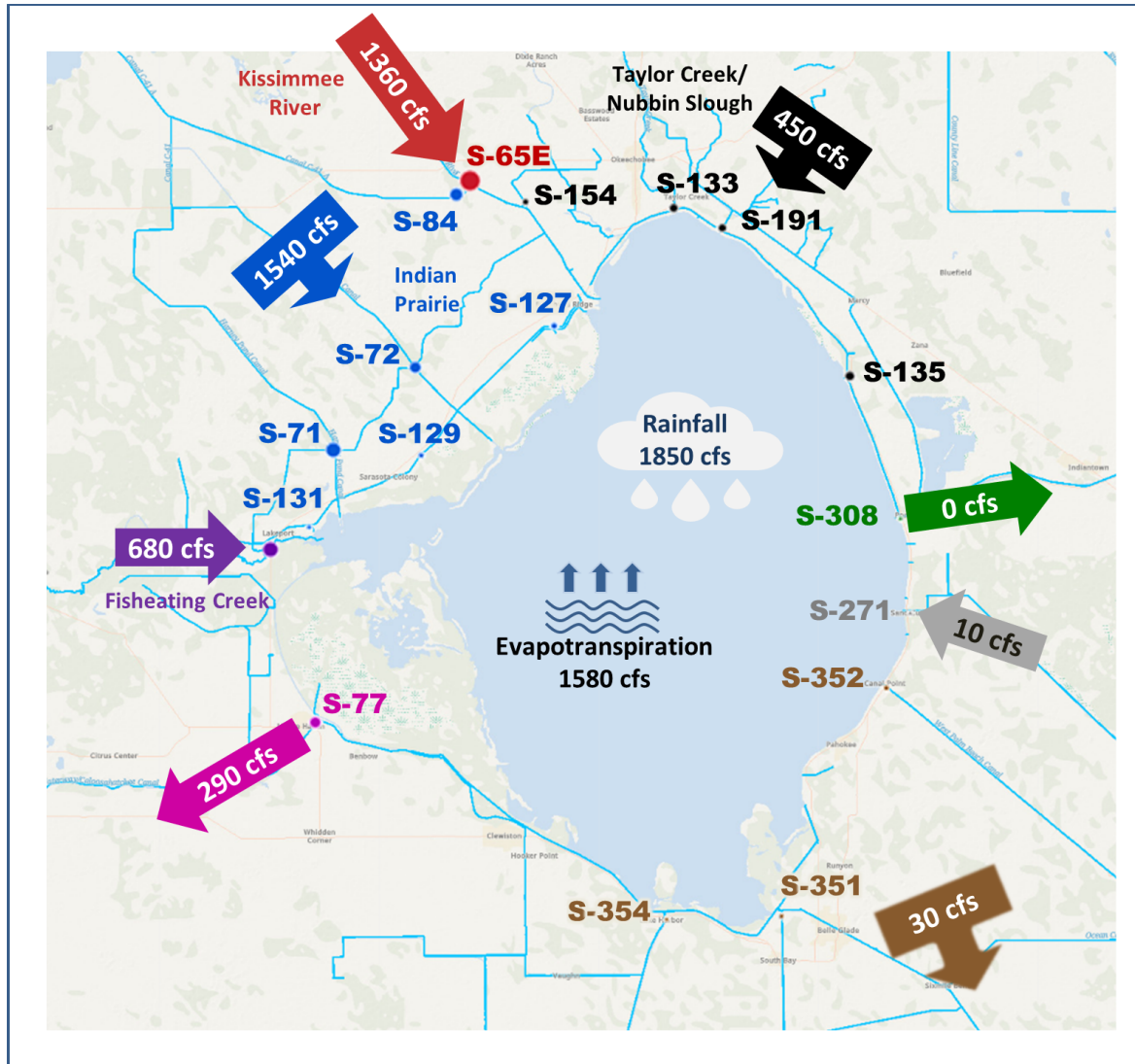


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of January 15 – 21, 2024.

Wading Bird Foraging Locations January 18, 2024

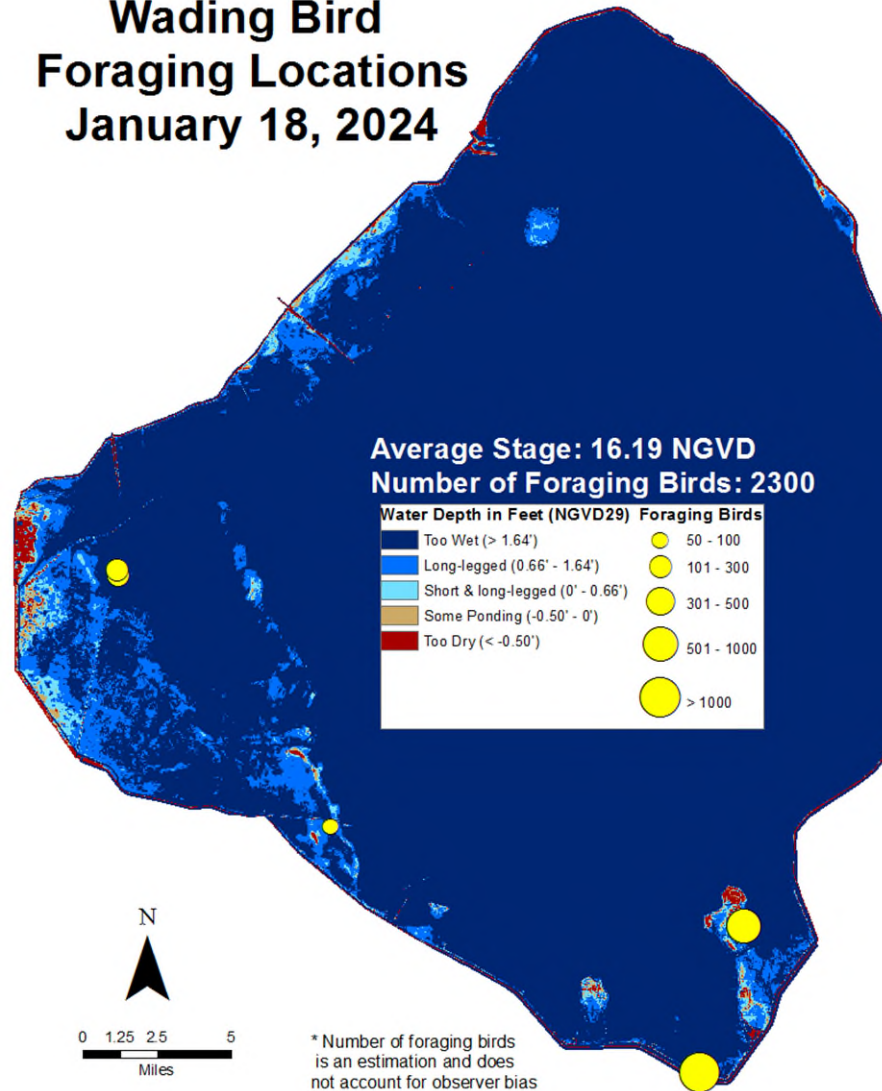


Figure LO-6. Locations of foraging flocks of wading birds observed during a monitoring flight on January 18, 2024 are shown in yellow (circle sizes represents the flock size).

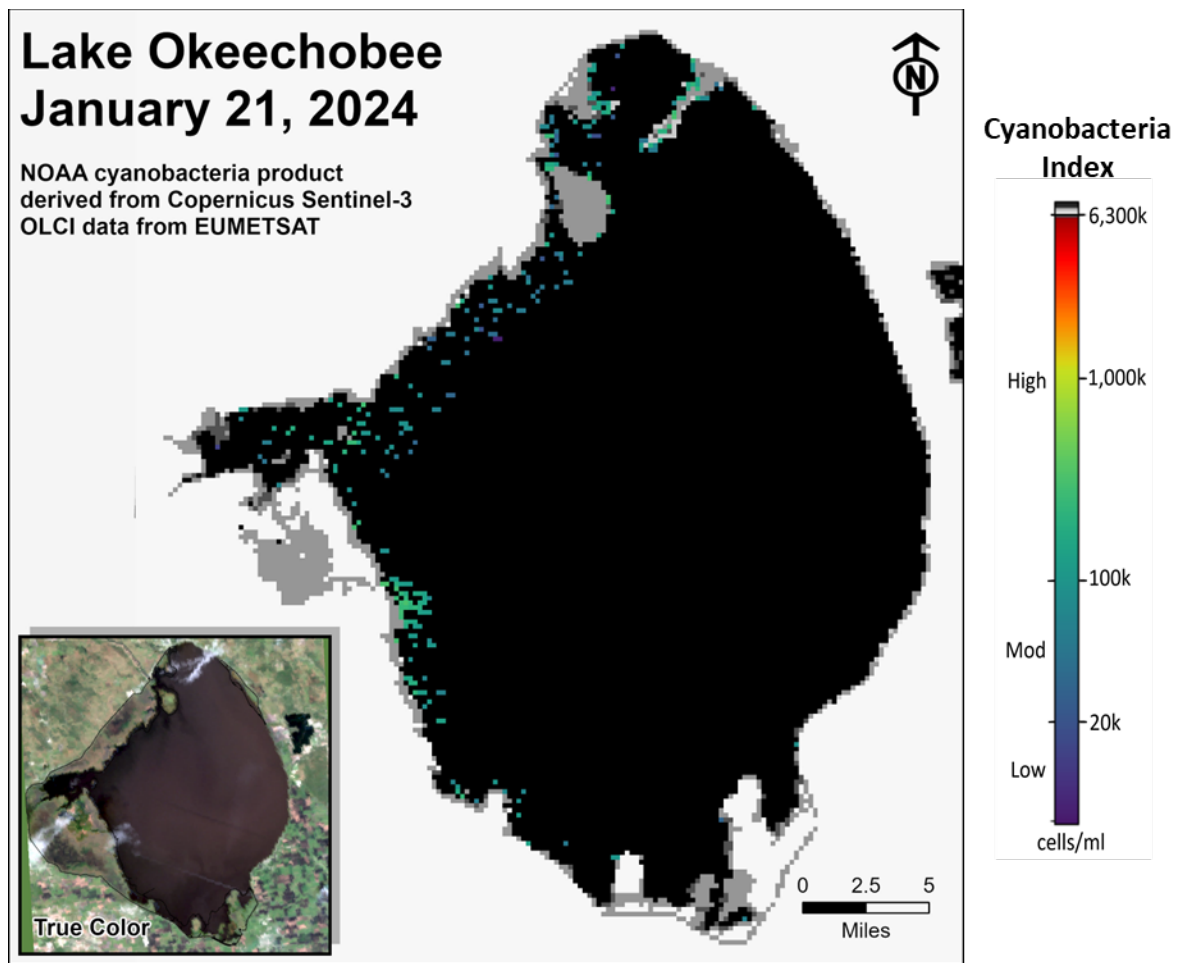


Figure LO-7. Cyanobacteria bloom index level on January 21, 2024, based on NOAA’s harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 2,522 cfs (**Figures ES-1 and ES-2**), and the previous 30-day mean inflow was 903 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities decreased 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 11.0. Salinity conditions in the middle estuary were estimated to be within the optimal range for adult eastern oysters (**Figure ES-4**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute (FWRI) was 0.2 spat/shell for December, indicating the spawning season is ending (**Figure ES-5**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 4,899 cfs (**Figures ES-6 and ES-7**), and the previous 30-day mean inflow was 3,077 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 and Val I-75 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 damaging range for adult eastern oysters at Cape Coral, in the optimal range at Shell Point, and in the upper stressed range at Sanibel (**Figure ES-10**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute was 0.2 spat/shell at both Iona Cove and Bird Island for December, indicating the spawning season is ending (**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 823 cfs. Model results from all scenarios predict daily salinity to be 1.1 or lower and the 30-day moving average surface salinity to be 1.0 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 January 19, 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 Palm Beach County.

Water Management Recommendations

Lake stage is in the Intermediate Sub-Band. Tributary conditions are wet. The LORS2008 release guidance suggests up to 4000 cfs release at S-77 to the Caloosahatchee River Estuary and up to 1800 cfs release at S-80 to the St. Lucie Estuary.

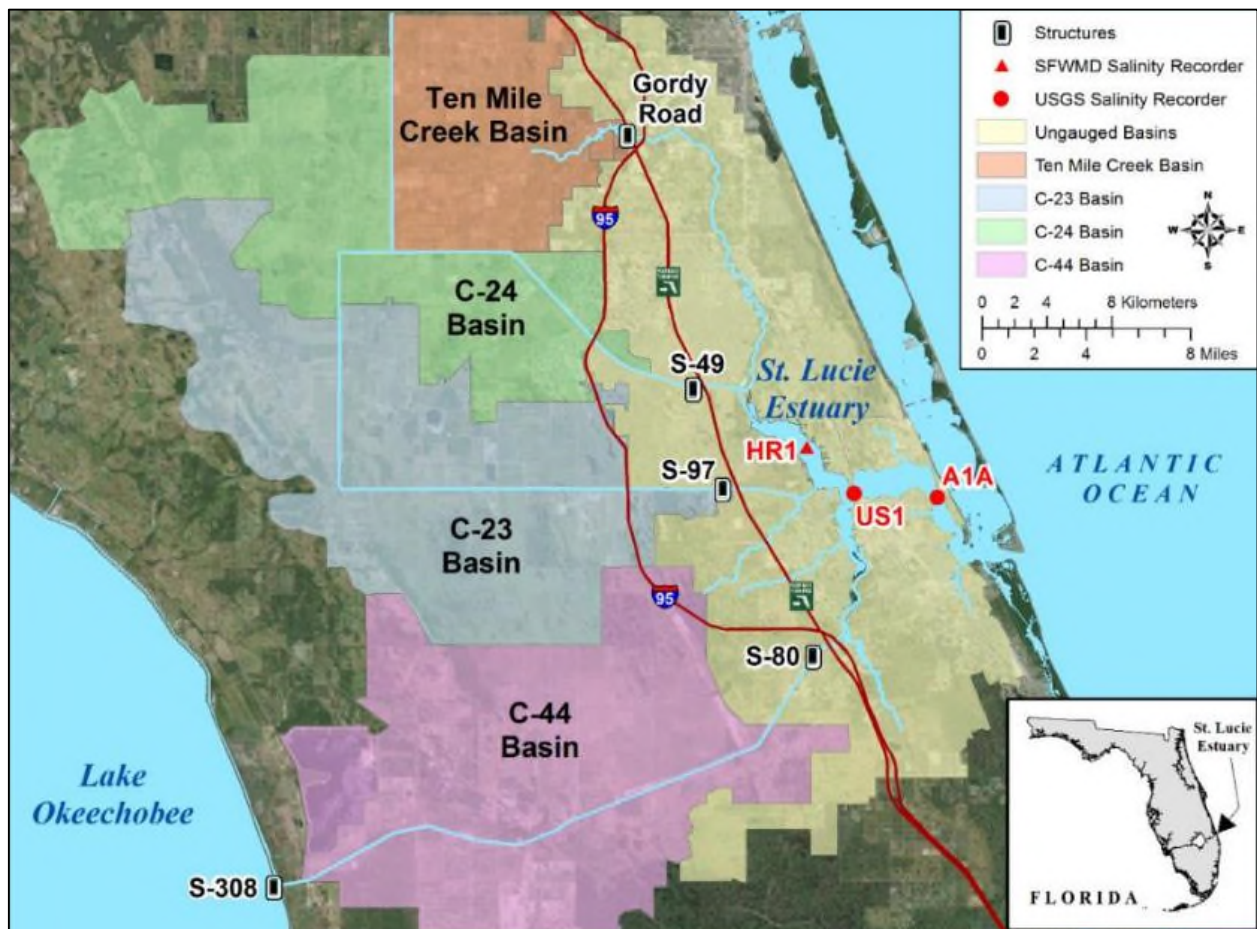


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

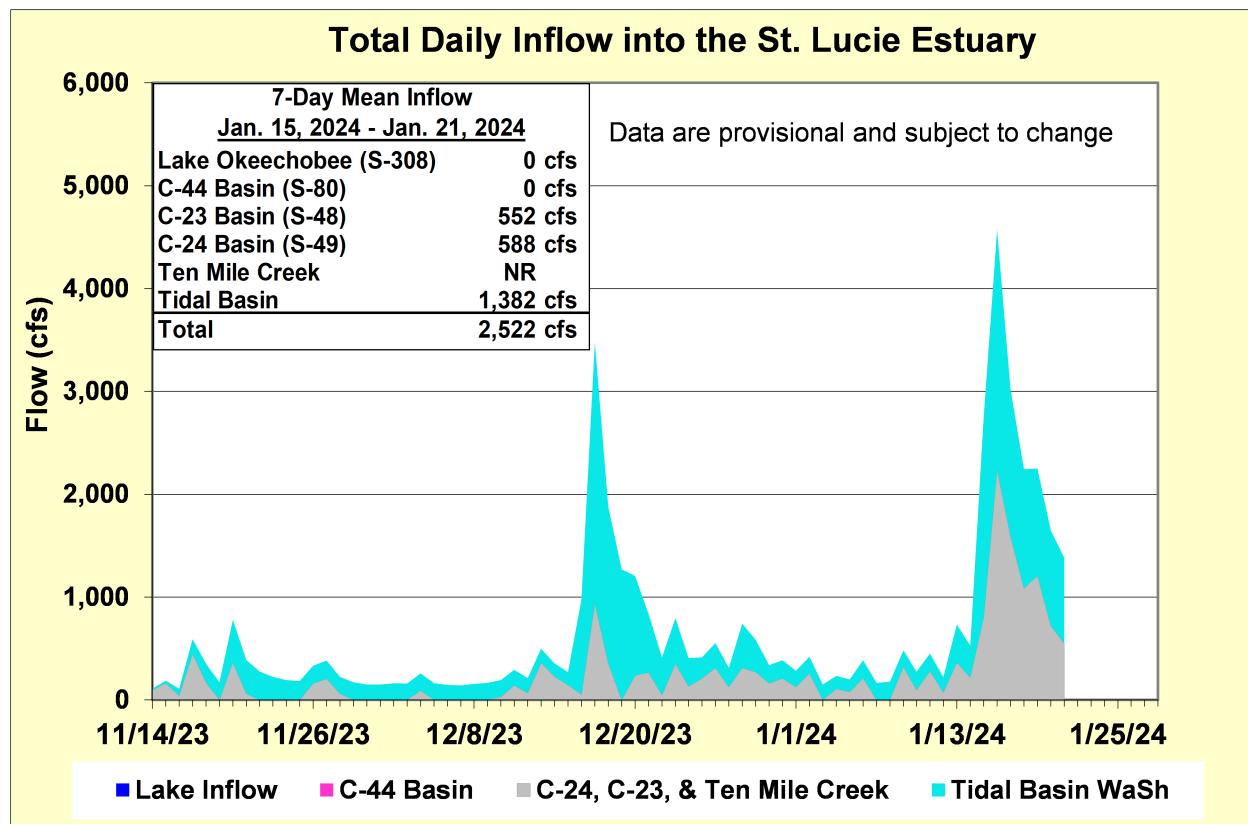


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	6.3 (12.6)	12.4 (16.1)	10.0 – 25.0
US1 Bridge	9.8 (17.1)	12.2 (18.0)	10.0 – 25.0
A1A Bridge	17.7 (25.7)	23.1 (27.9)	10.0 – 25.0

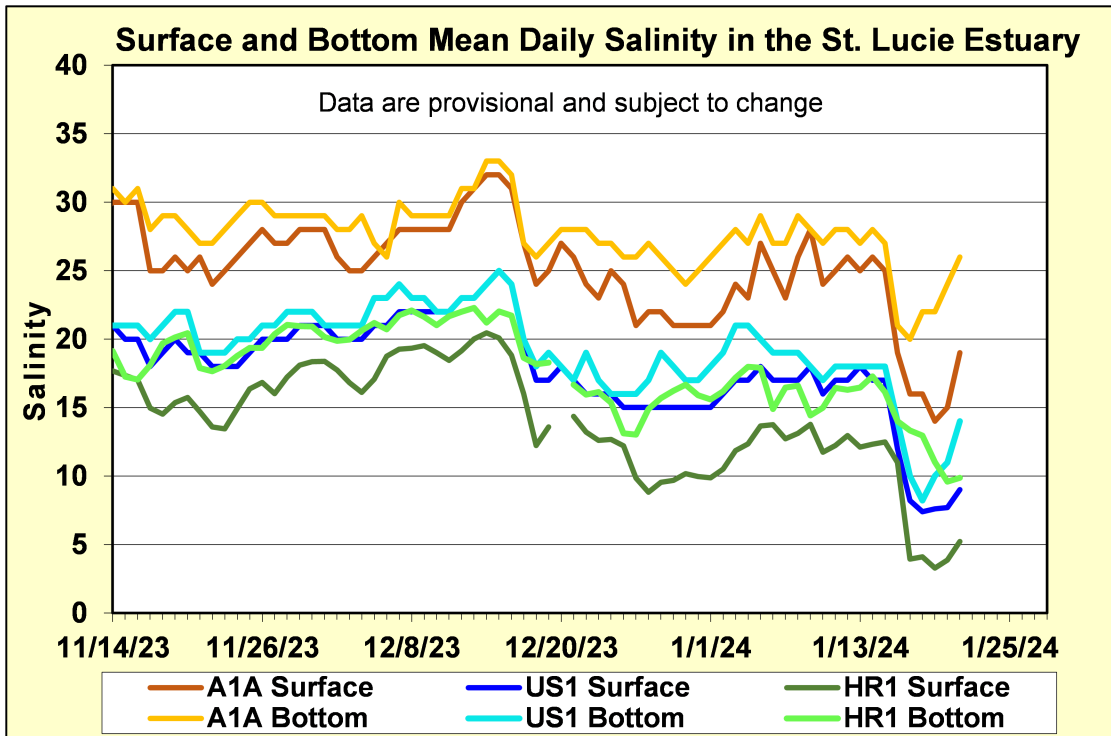


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

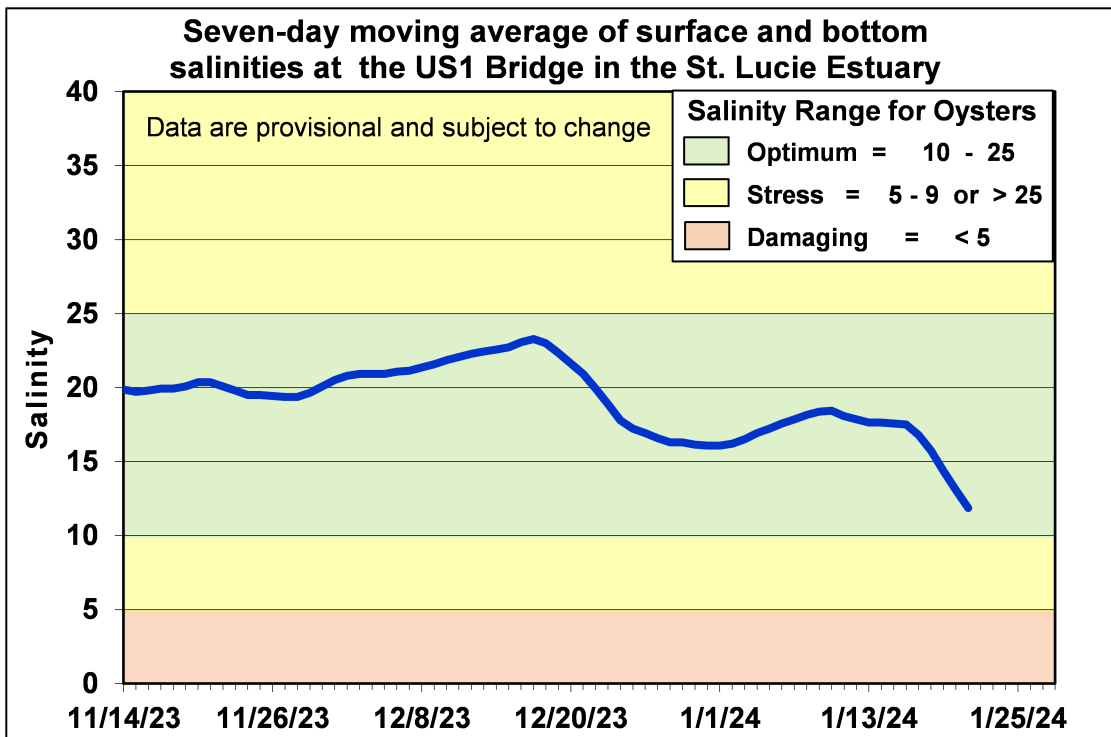


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

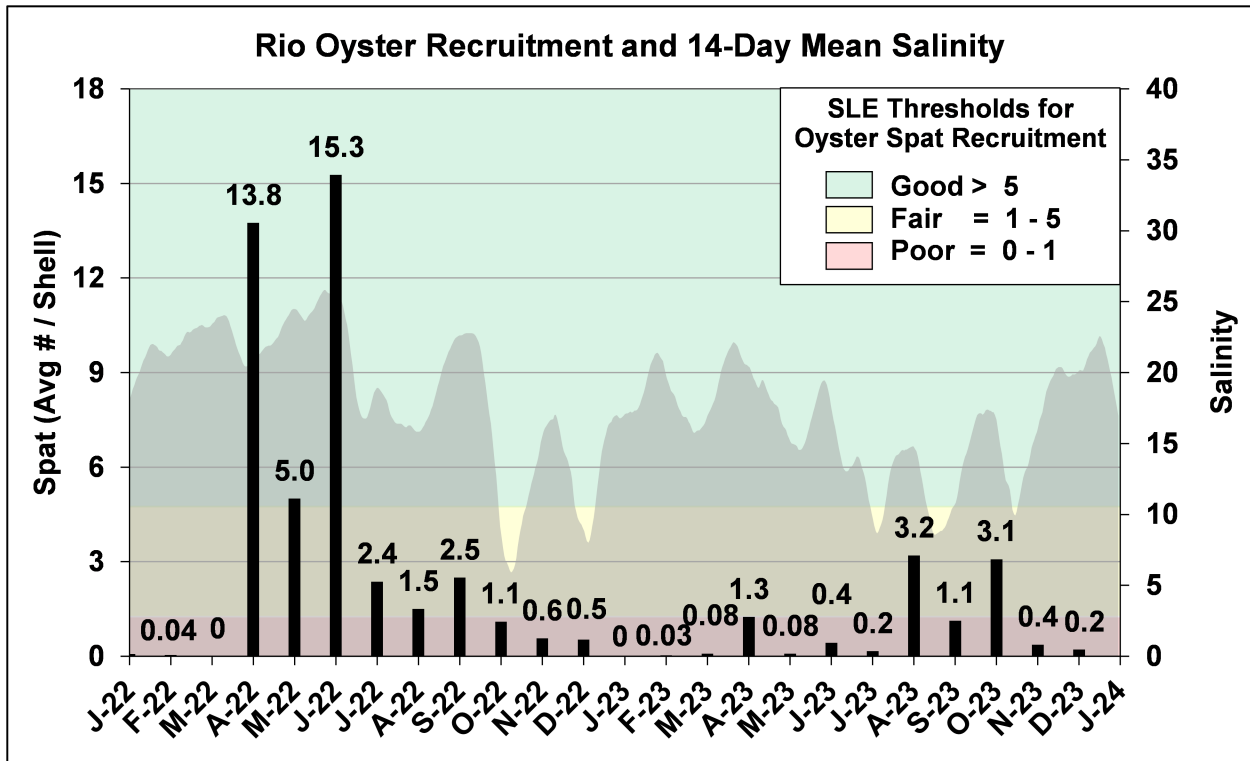


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

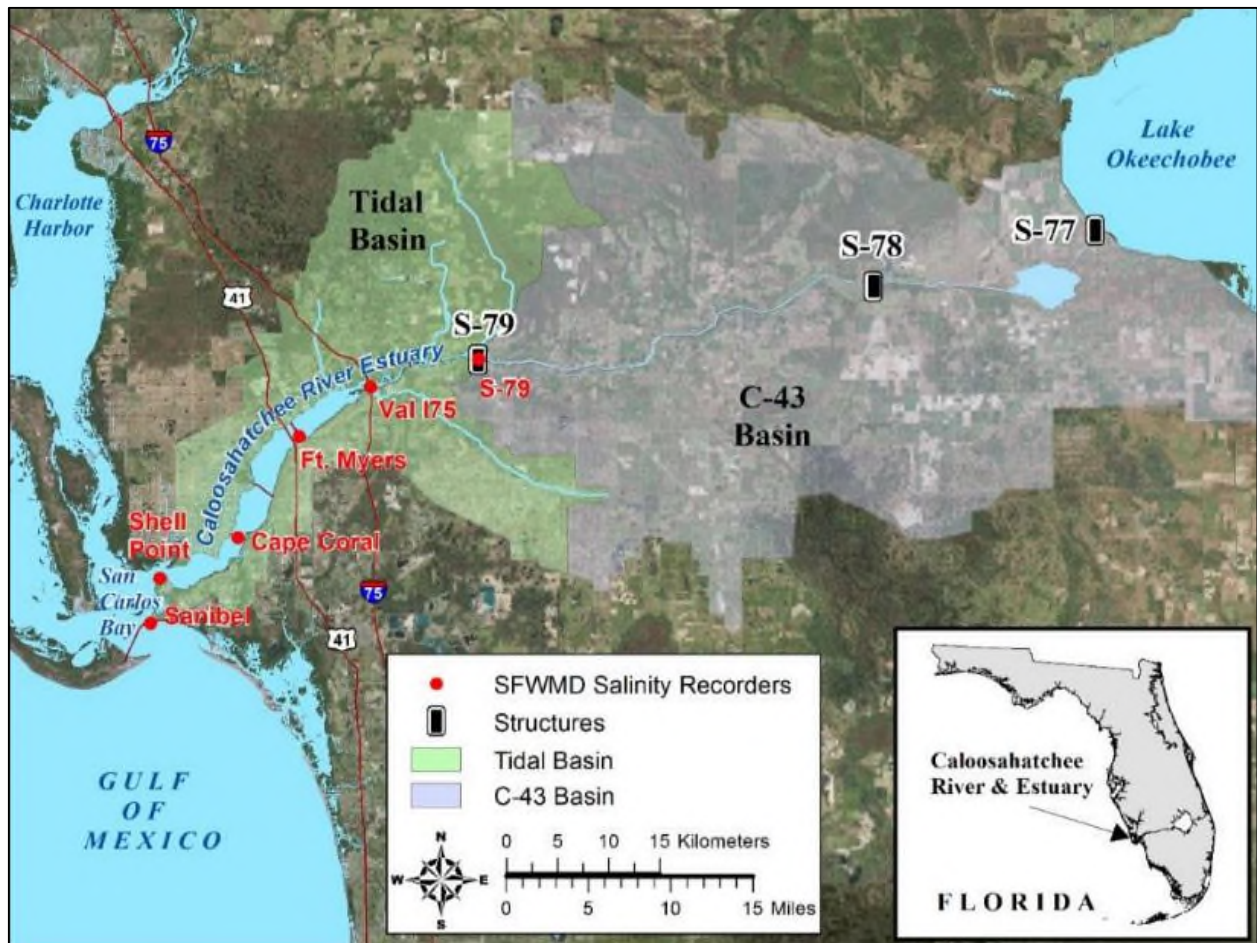


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

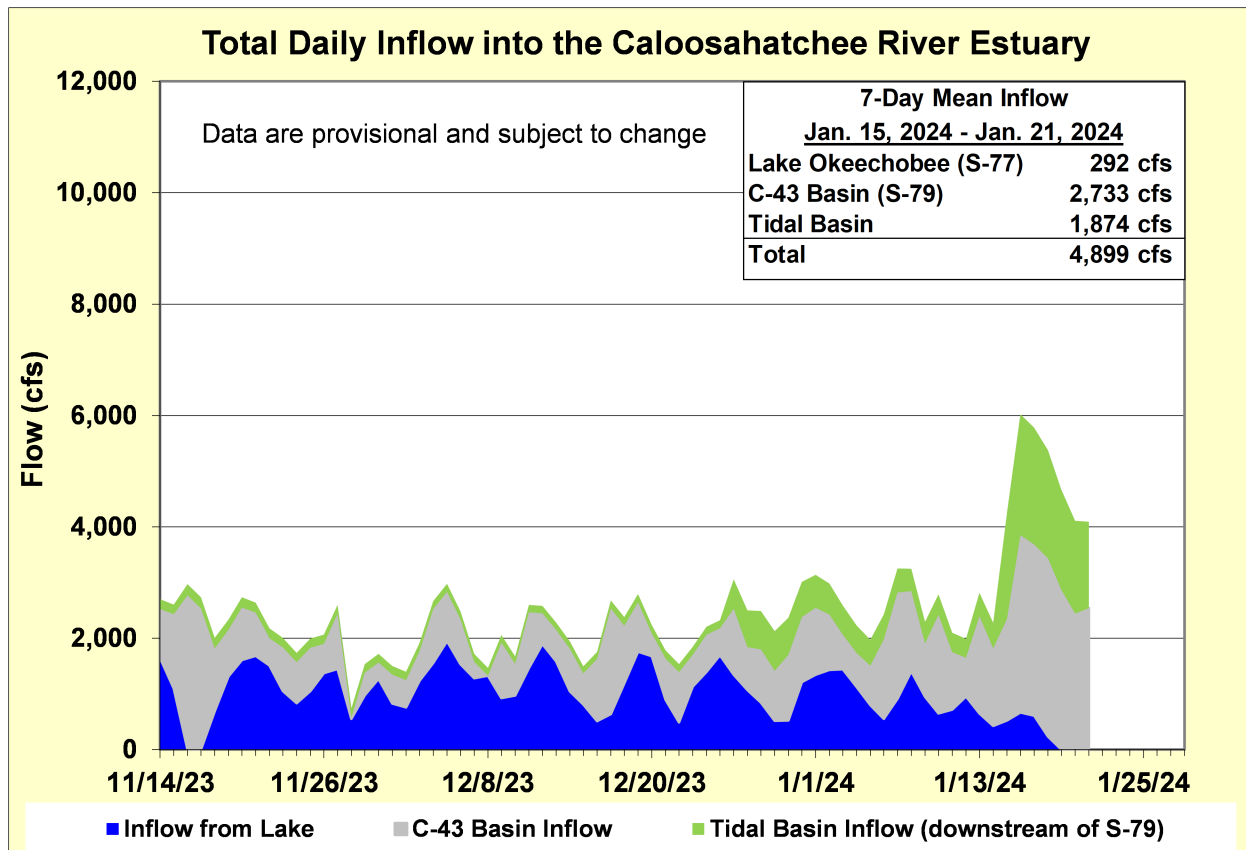


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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	1.8 (1.8)	1.8 (1.8)	0.0 – 10.0
Fort Myers Yacht Basin	0.3 (2.1)	0.4 (3.5)	0.0 – 10.0
Cape Coral	2.8 (8.3)	3.5 (11.1)	10.0 – 25.0
Shell Point	15.4 (23.6)	17.4 (24.1)	10.0 – 25.0
Sanibel	23.6 (29.0)	26.4 (30.0)	10.0 – 25.0

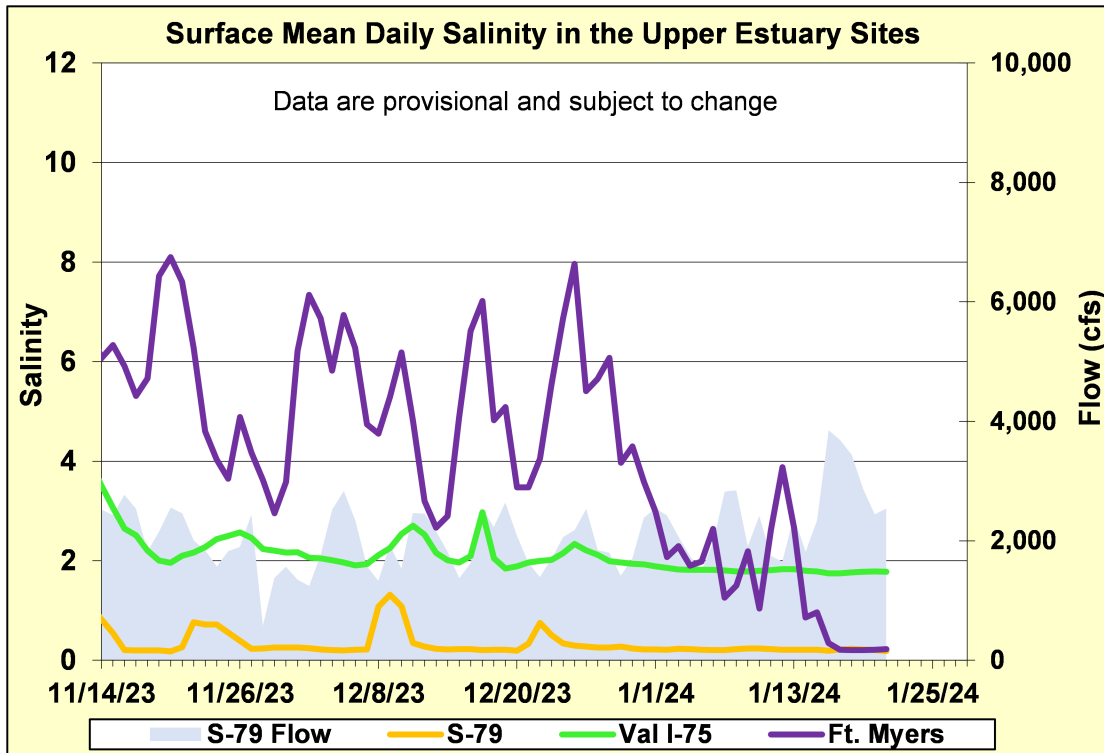


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

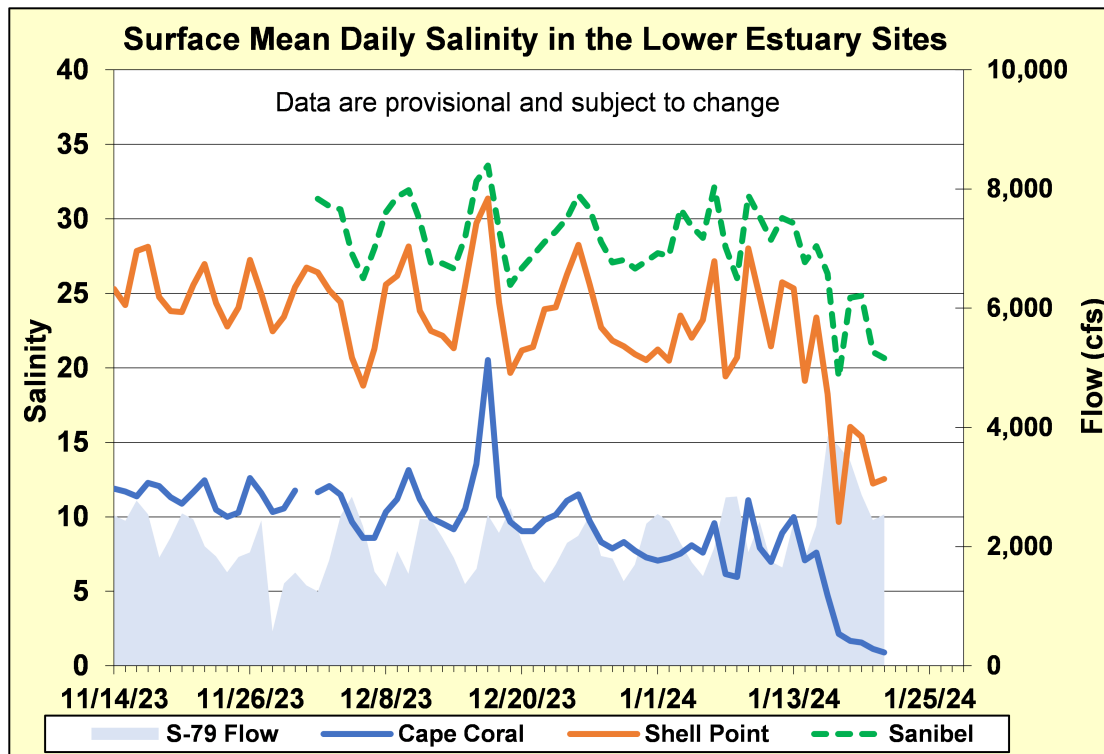


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

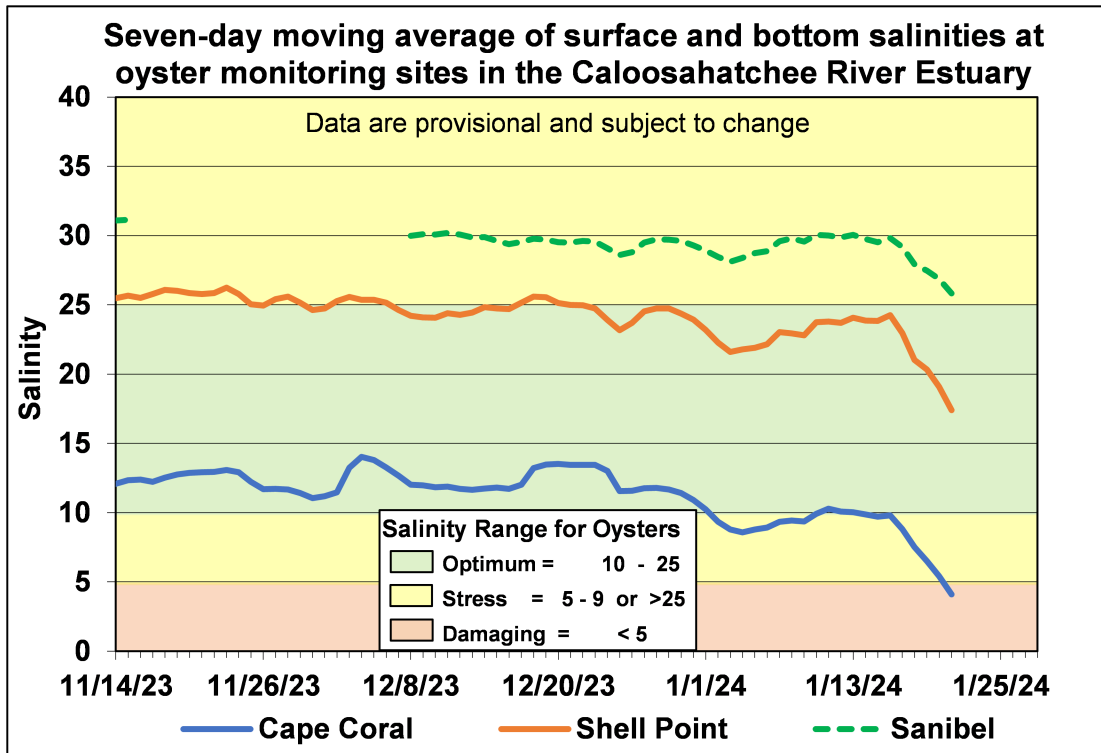


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

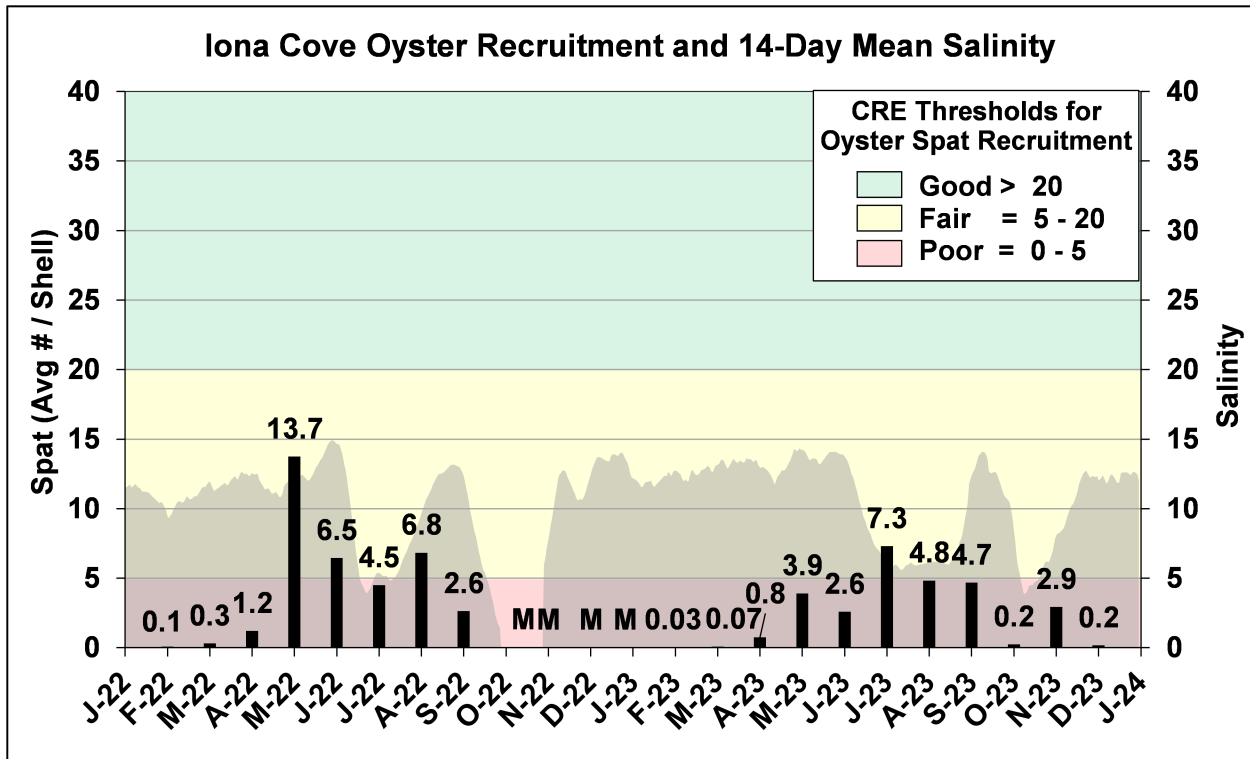


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

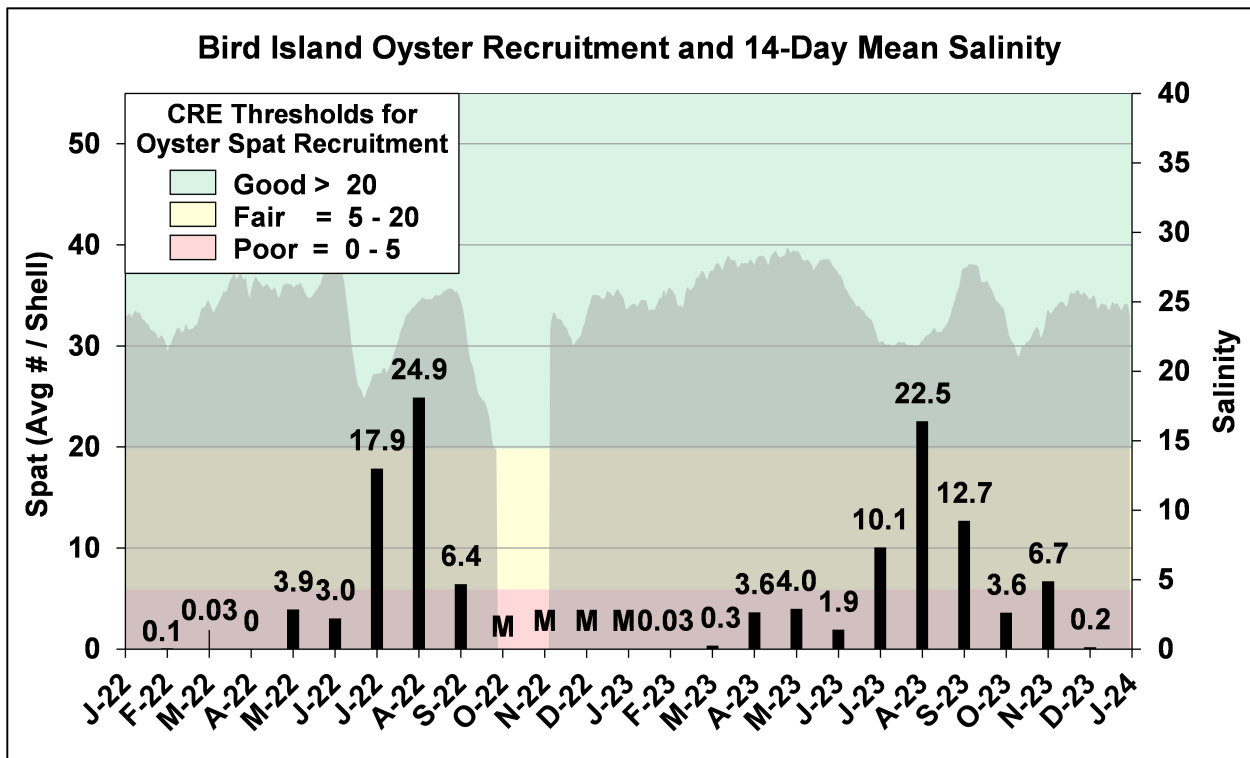


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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

Scenario	Simulated S-79 Flow (cfs)	Tidal Basin Runoff (cfs)	Daily Salinity	30-Day Mean Salinity
A	0	823	1.1	1.0
B	450	823	0.3	1.0
C	750	823	0.3	1.0
D	1,000	823	0.3	1.0
E	1,500	823	0.3	1.0
F	2,000	823	0.3	1.0

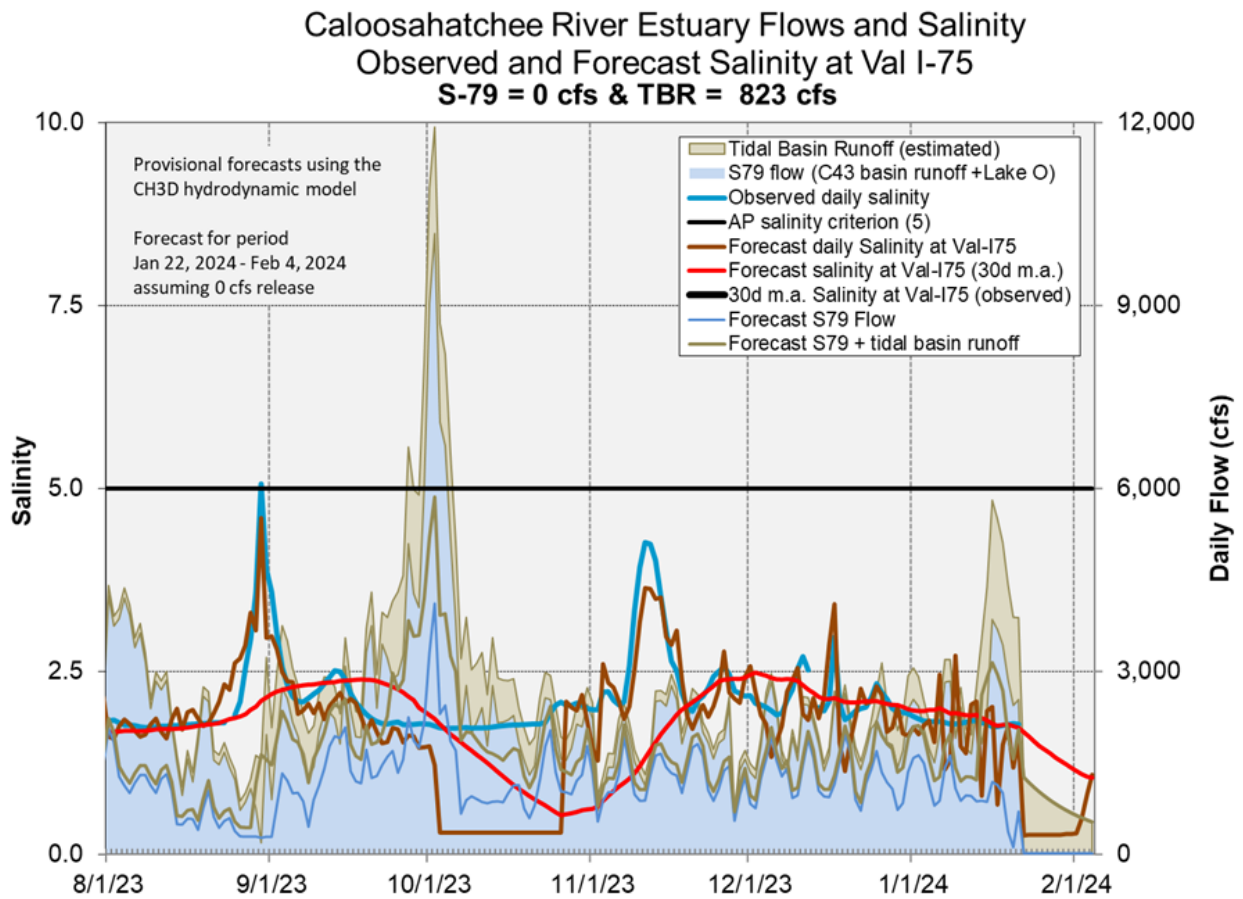


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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**).

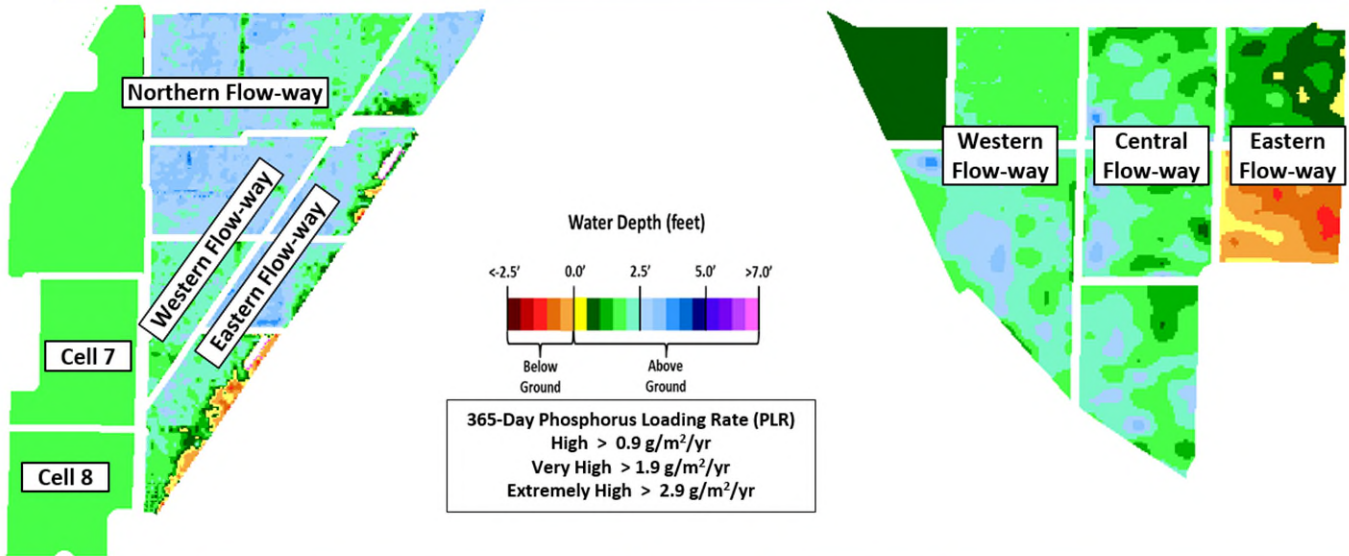
STA-2: Operational restrictions are in place in Flow-ways 2 and 4 for vegetation management activities. Online treatment cells are near or above target stage. Vegetation in Flow-ways 2, 3, and 4 is stressed, and in 5 is highly stressed. The 365-day PLRs for Flow-ways 3, 4, and 5 are below 1.0 g/m²/year. 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 – 1/15/2024 through 1/21/2024

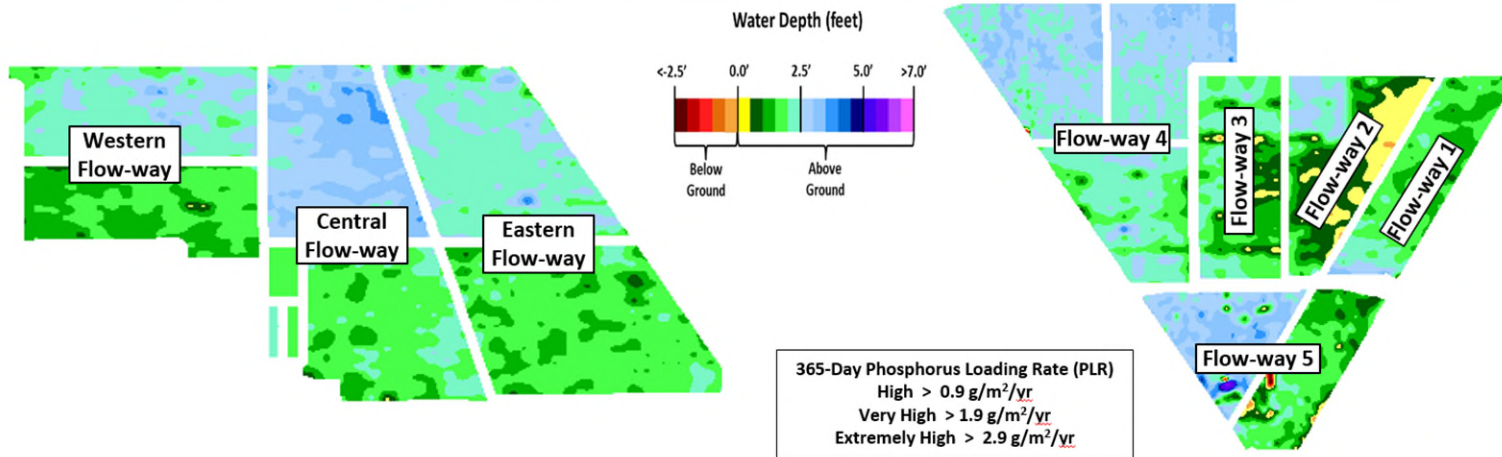


STA-1W	Flow-way Status
Western	<ul style="list-style-type: none"> • High 365-day PLR • Highly stressed vegetation conditions
Eastern	<ul style="list-style-type: none"> • Very High 365-day PLR • Highly stressed vegetation conditions
Northern	<ul style="list-style-type: none"> • Highly stressed vegetation conditions • Planting emergent vegetation
Cell 7	
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 – 1/15/2024 through 1/21/2024



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
Flow-way 2	<ul style="list-style-type: none"> Post-construction vegetation grow-in Planting emergent vegetation Stressed vegetation conditions
Flow-way 3	<ul style="list-style-type: none"> Stressed vegetation conditions
Flow-way 4	<ul style="list-style-type: none"> Planting emergent vegetation 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 – 1/15/2024 through 1/21/2024

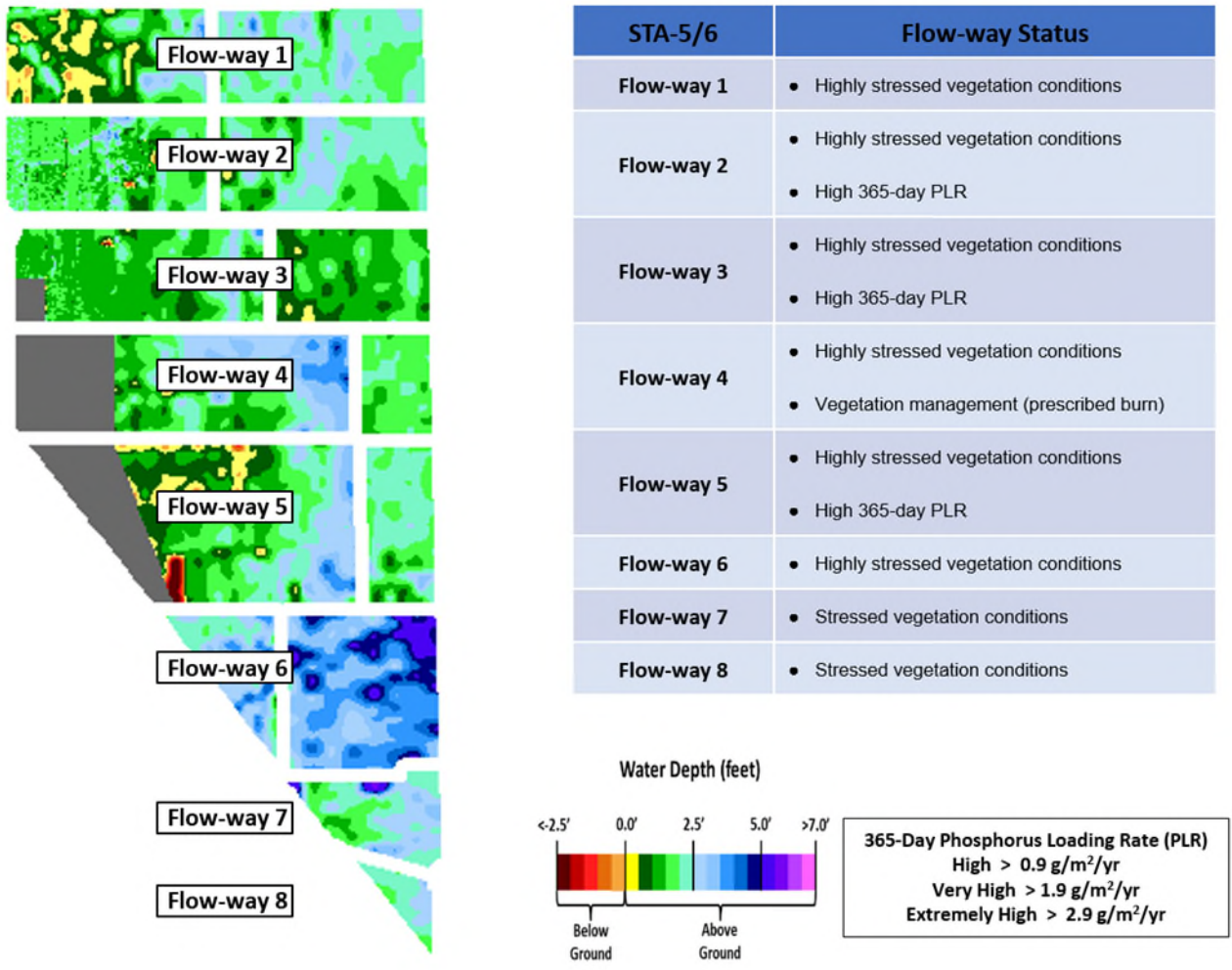


Figure S-3. Western Flow Path Weekly Status Report

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

The WCAs received less rainfall compared to the previous week and recession rates increased across the system. WCA-1: Stage within the Refuge continues to recede but is above the A1 zone schedule line, stage on Sunday at the 1-8C gauge was 0.33 feet above that line, which is the same as the previous week. WCA-2A: Stage recession at the 2-17 gauge trended toward schedule last week. The average on Sunday was again 1.63 feet above the regulation line. WCA-3A: The 3-Gauge average stage trended away from the schedule line over the last week. The average stage on Sunday was 0.33 feet above the falling Zone A regulation line. WCA-3A North: Stage change at Gauge 62 (NW corner) also trended above and away from the Upper schedule last week, average on Sunday was 0.22 feet above that schedule line. See figures **EV-1** through **EV-4**.

Water Depths

The SFWDAT model output for 1/21/23 illustrates a very similar somewhat drier inundation pattern over the last month within in the Everglades Protection Area. Pondered conditions remain along the northern reaches of the L-67s in WCA-3A and in southern WCA-3A. Hydrologic connectivity remains robust within all the major sloughs of ENP. Current WDAT water depth predictions are somewhat drier compared to one month ago across most of the EPA (WCA-1 and ENP). Looking back a year ago, current conditions are deeper across most the EPA most significantly in WCA-3A, and northern WCA-2A and eastern ENP (**Figure EV-5** and **Figure EV-6**).

Comparing current conditions to the 20-year average on January 21st: Above the 90th percentile, depth conditions for this time of the year remain across most of the EPA. Depths remain nearer to average in southwestern WCA-3A and WCA-2B (**Figure EV-7**).

Taylor Slough and Florida Bay

Total weekly rainfall averaged 0.11 inches in Taylor Slough and Florida Bay over the past week (1/16-1/21) based on the 17 gauges used for this report. Total rainfall ranged from 0.02 inches at EPSW in the southern C-111 area to 0.51 at Duck Key (DK) in the eastern bay. All stages continued to decrease across Taylor Slough, with an average decrease of 0.10 feet. Stage changes ranged from -0.14 feet at Taylor Slough Bridge (TSB) in the northern slough, to -0.05 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 11.4 inches compared to before the Florida Bay initiative (starting in 2017), a decrease of 0.9 inches relative to last week.

Average Florida Bay salinity was 16.0, a decrease of 0.8 from last week. Salinity changes were variable across the bay and ranged from -6.9 at Garfield Bight (GB) in the western nearshore region to +2.0 at Duck Key (DK) in the eastern region (**Figure EV-8**). Salinities in all three regions remain below the 25th percentile (**Figure EV-10**). Average Florida Bay salinity remains below its recent average for this time of year by 9.5, a decrease of 1.1 from last week.

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 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	0.16	-0.13
WCA-2A	0.17	-0.15
WCA-2B	0.05	-0.12
WCA-3A	0.18	-0.01
WCA-3B	0.08	-0.06
ENP	0.14	-0.04

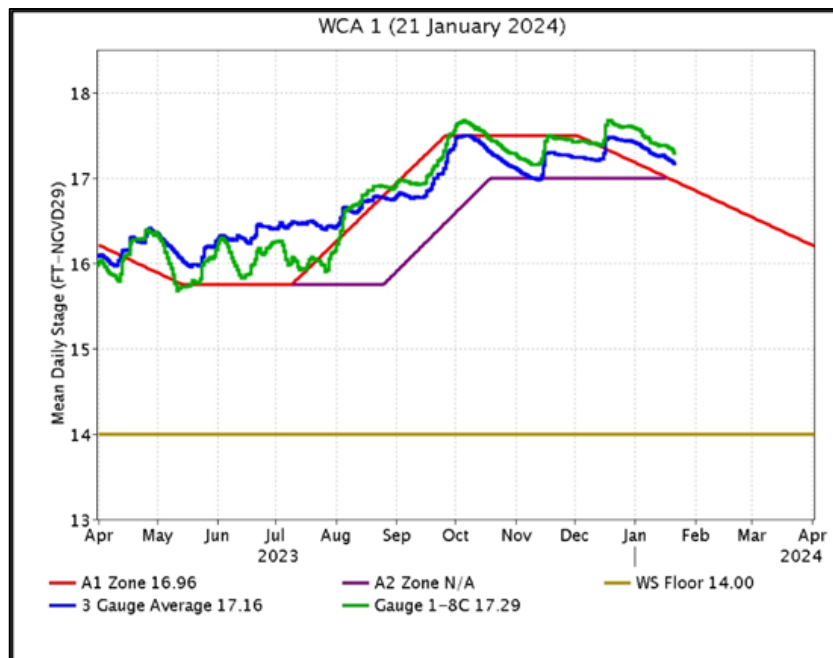


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

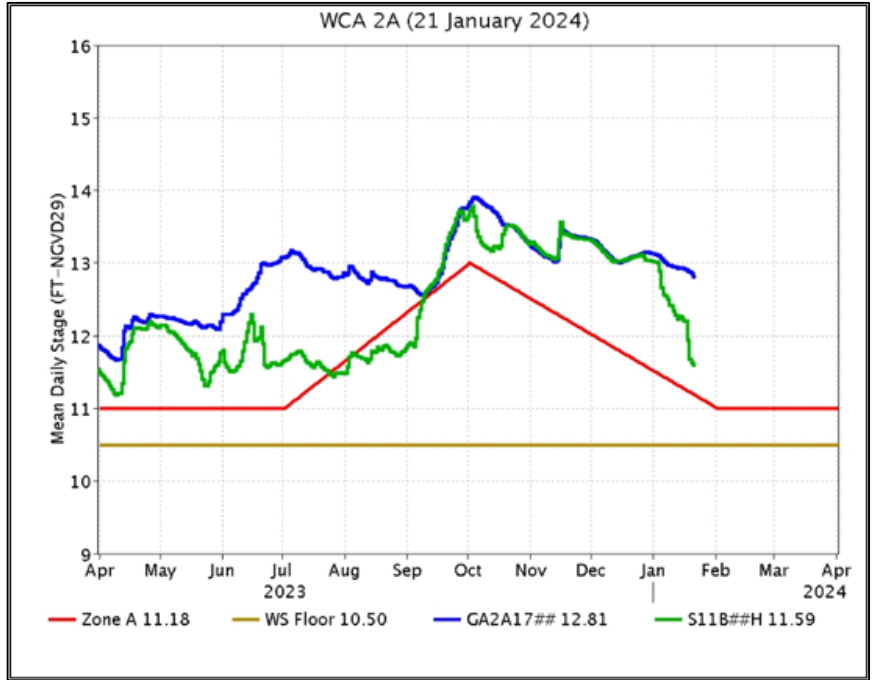


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

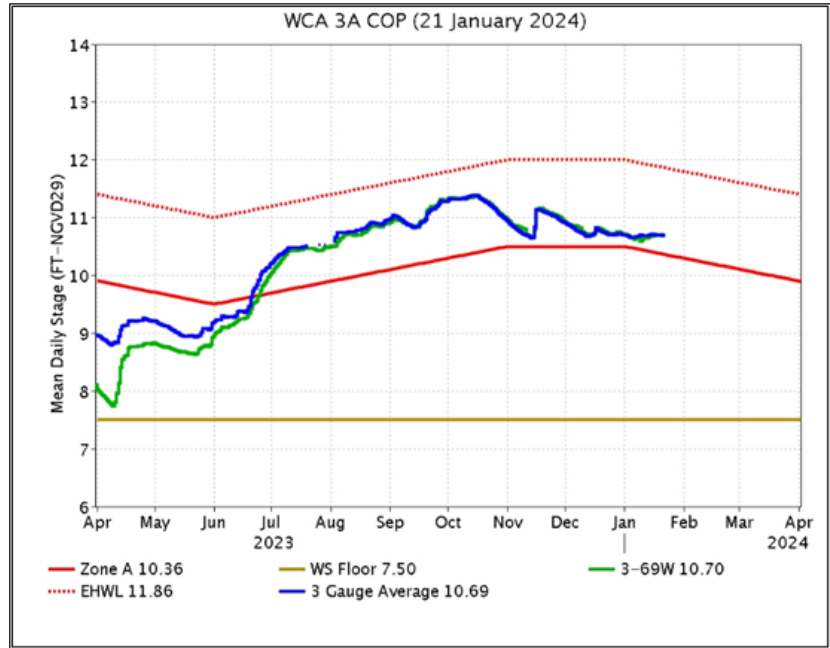


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, 3-69W) and regulation schedule.

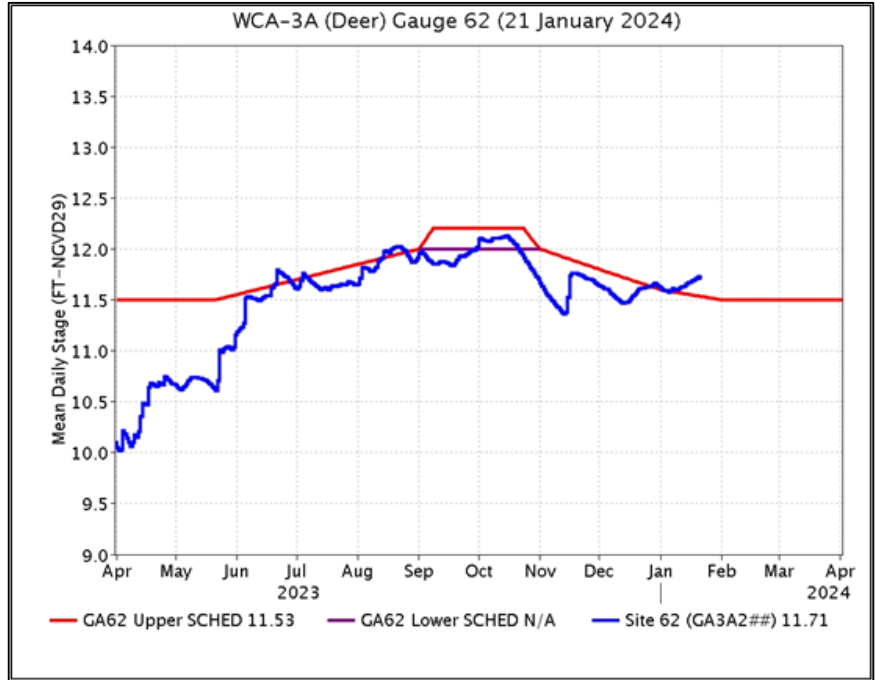


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and GA62 regulation schedule.

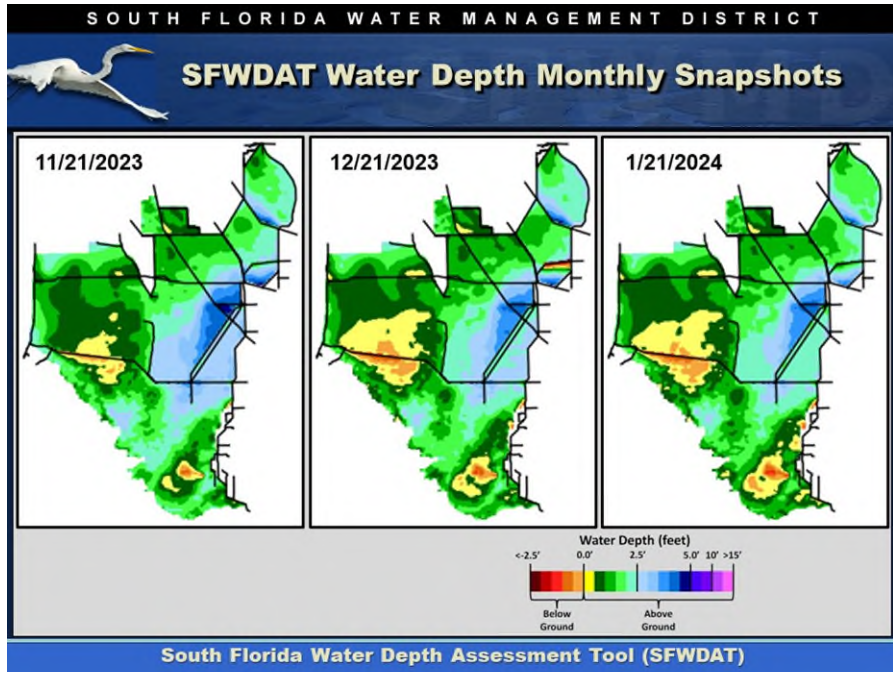


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

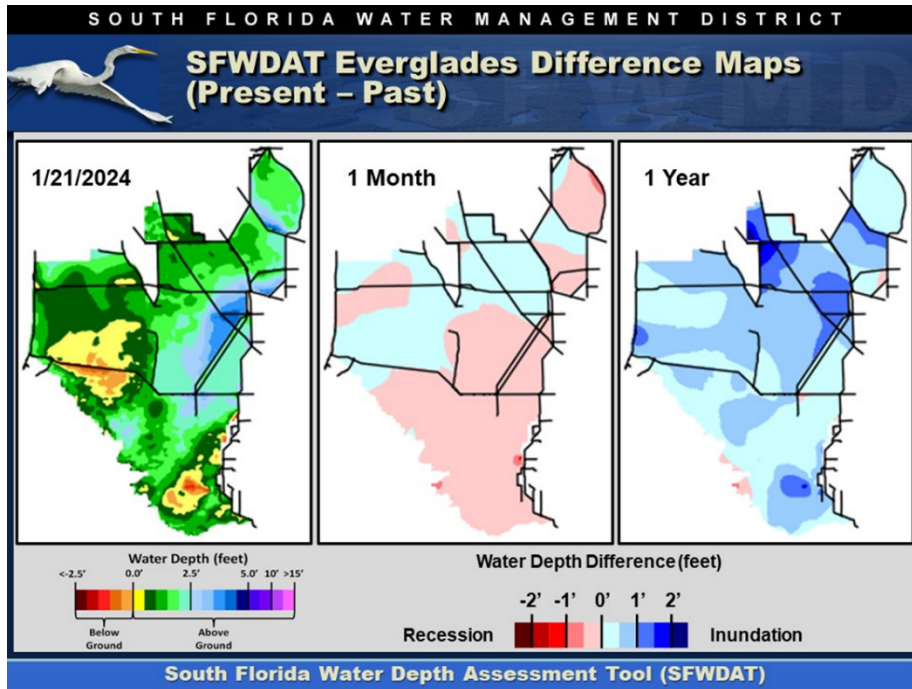


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

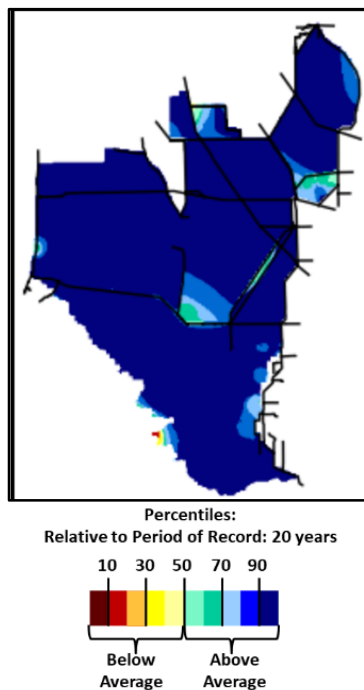


Figure EV-7. Present water depths (1/21/2024) compared to the day of year average over the previous 20 years.

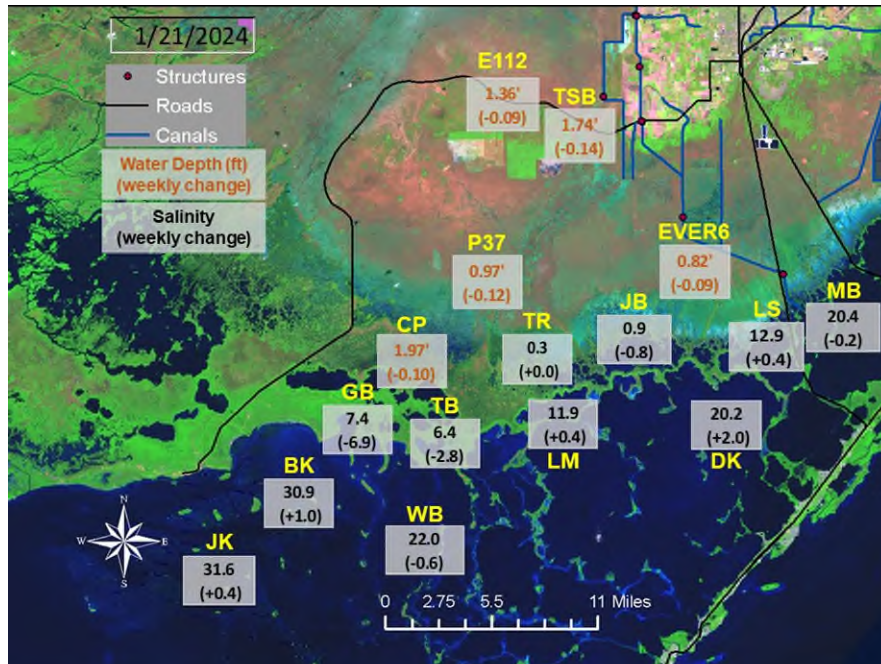


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

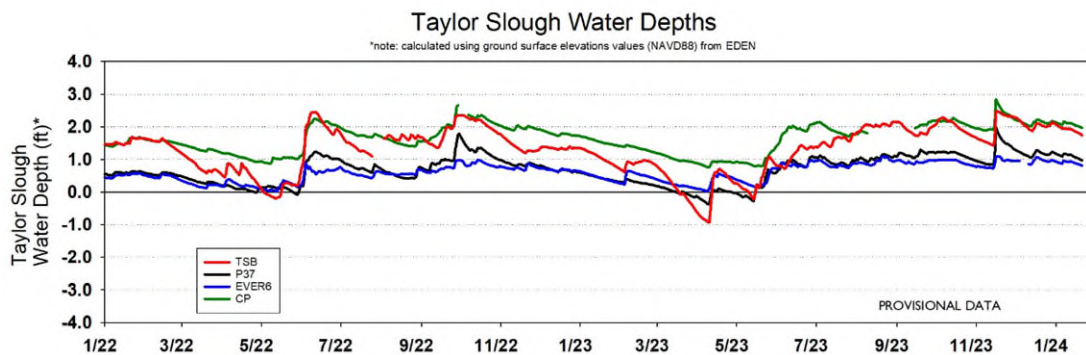


Figure EV-9. Taylor Slough water depth time series.

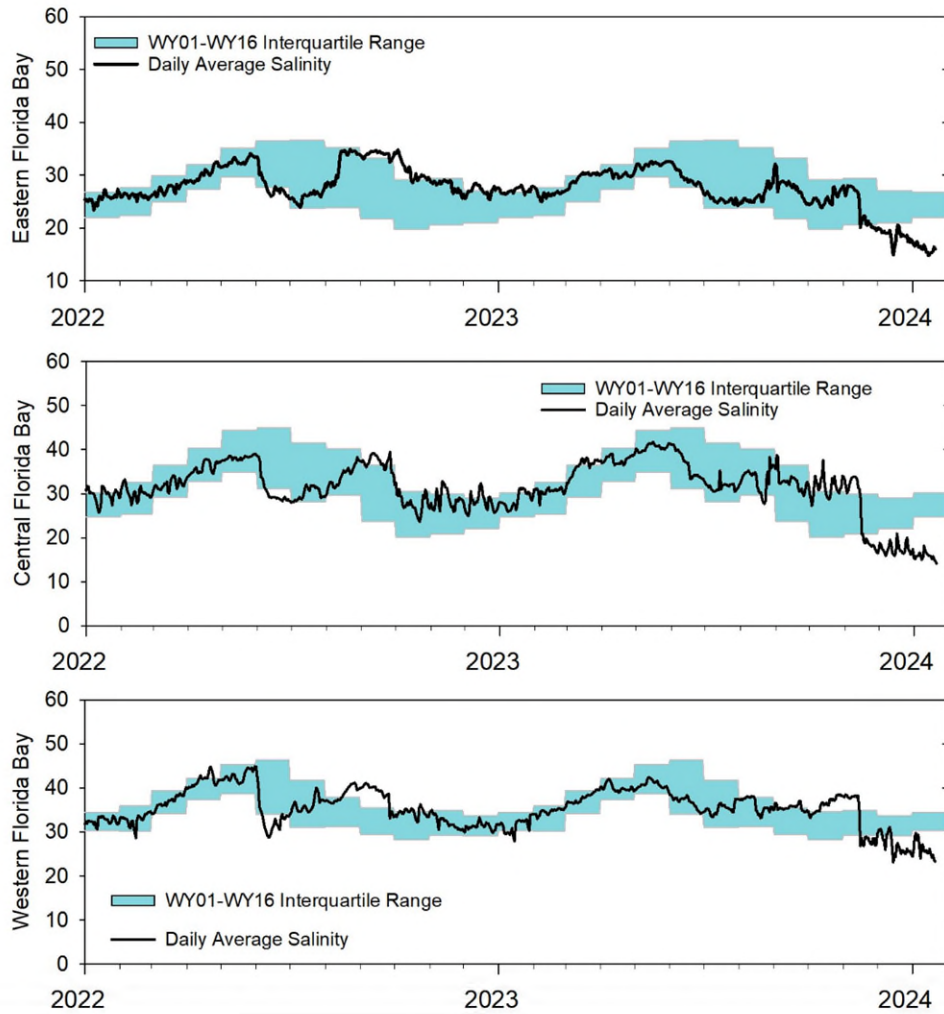


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, January 23, 2024 (red is new)			
	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.13'	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 0.12'	Recession rate of less than 0.12' per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage increased by 0.01'	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 increased by 0.04'	Recession rate of less than 0.08' per week.	
Central WCA-3A S	Stage decreased by 0.05'	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 0.02'		
WCA-3B	Stage decreased by 0.06'	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 -0.10' to -0.03'	Move water southward as possible.	When available, provide freshwater to promote water movement.
FB- Salinity	Salinity changes ranged from -3.4 to +0.1	Move water southward as possible.	When available, provide freshwater to promote water movement.

Biscayne Bay

As shown in **Figure BB-1**, mean total inflow to Biscayne Bay was 836 cfs, and the previous 30-day mean inflow was 921 cfs. The seven-day mean salinity was 23.0 at BBCW8 and 18.3 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data were provided by Biscayne National Park.

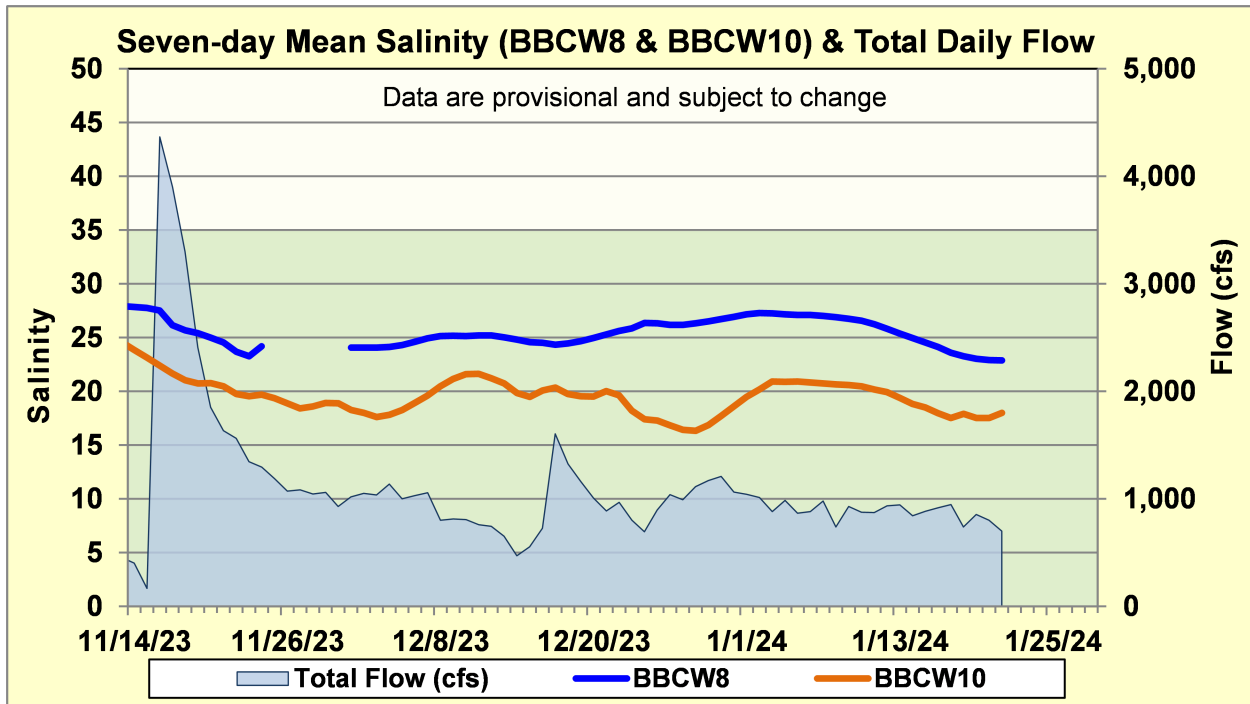


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.