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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: July 17, 2024

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A dry region offshore of the southeastern coast of Florida, associated with the Saharan Air Layer (SAL), will gradually move onshore late Tuesday. Meanwhile, deep tropical moisture over the northwestern half of the SFWMD could fuel scattered to numerous heavy showers and thunderstorms this Tuesday afternoon, mainly in the northwest due to southeasterly steering currents. By Wednesday, the SAL will completely move into the SFWMD, stopping daily rainfall mainly over the central interior. However, this patch of dry air will quickly move out, allowing some moisture to rebound along the east coast late Wednesday afternoon, fueling a few isolated showers and thunderstorms. The models suggest that by late in the week, moisture levels will gradually return to normal over the northwestern half of the SFWMD. As a result, scattered showers and thunderstorms could return on Thursday and Friday, particularly in and around Lake Okeechobee, though with only light rainfall along the east coast due to prevailing southeasterly steering currents. A robust tropical wave is forecast to enter southern Florida on Monday, but environmental conditions do not look conducive for development, so this tropical disturbance has a low chance of developing. However, a surge of deep tropical moisture is expected with the wave passage, potentially resulting in widespread heavy rains over the southern portion of the SFWMD on Monday. After the wave passage, it is unclear how much moisture will remain. Below to near normal total SFWMD rainfall is likely for the 7-day period ending next Tuesday morning.

Kissimmee

Lake stage in East Lake Toho and Lake Toho is being allowed to rise with rainfall. Releases were made from East Lake Toho and Lake Toho in the last seven days to slow the rate of lake stage rise. Weekly average discharge on July 14, 2024, was 350 cfs and 390 cfs at S-65 and S-65A, respectively. Mean weekly water depth on the Kissimmee River floodplain for the week ending July 14th decreased by 0.01 feet from the previous week to 0.09 feet. The weekly average concentration of dissolved oxygen in the Kissimmee River decreased from 3.5 mg/L the previous week to 3.1 mg/L, which is above the potentially lethal and stressful levels for largemouth bass and other sensitive species.

Lake Okeechobee

Lake Okeechobee stage was 12.22 feet NAVD88 (13.53 ft NGVD29) on July 15, 2024, which was 0.03 feet higher than the previous week and 0.23 feet higher than a month ago. Average daily inflows (excluding rainfall) decreased from 2,710 cfs the previous week to 1,960 cfs. Average daily outflows (excluding evapotranspiration) increased slightly from 420 cfs the previous week to 520 cfs. Provisional taxa and toxin results from the July 08-10 phytoplankton monitoring trip showed *Microcystis aeruginosa* dominated communities at 18 of the 32 sites sampled. Eighteen sites had toxin levels above the 0.25 µg/L method's detection threshold, and 7 of those exceeded the EPA recreational standard of 8 µg/L. In the most recent non-obscured satellite image from July 15, 2024, NOAA's Harmful Algal Bloom Monitoring System suggested moderate to high cyanobacteria concentrations across most of the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged 928 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities increased at HR1 and the US1 Bridge sites and decreased at the A1A Bridge site 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 3,180 cfs over the past week with 445 cfs coming from Lake Okeechobee. Mean salinities remained the same at S-79 and Val I-75 and increased 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 damaging range for adult oysters at Cape Coral, in the optimal range at Shell Point, and in the upper stressed range at Sanibel.

Stormwater Treatment Areas

For the week ending Sunday, July 14, 2024, no Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2025 (since May 1, 2024) is approximately 68,900 ac-feet. The total amount of inflows to the STAs in WY2025 is approximately 377,000 ac-feet. STA cells are near or above target stage. STA-1E Central Flow-way is offline for construction activities. Operational restrictions are in effect in STA-1E Western and Eastern Flow-ways, STA-2 Flow-ways 2 and 4, and STA-3/4 Eastern Flow-way for vegetation management activities. An operational restriction is in effect for STA-2 Flow-way 5 for construction activities. This week, there is no capacity for Lake releases in the STAs.

Everglades

Rates of stage change over the week were generally good with recessions in some areas like WCA-2A which is above schedule. Stages are above average for this time of year across the Everglades Protection Area. Average stage changes in Taylor Slough showed a slight decrease again this week but remained above the average for this time of year. Average salinity increased slightly in Florida Bay last week and remains within the inter-quartile range and above historical estimates in the central and western regions. Florida Bay MFL metrics remain well outside thresholds of harm.

Biscayne Bay

Total inflow to Biscayne Bay averaged 658 cfs and the previous 30-day mean inflow averaged 1,251cfs. The seven-day mean salinity was 22.6 at BBCW8 and 21.4 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data were provided by Biscayne National Park.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On July 14, 2024, mean daily lake stages were 54.6 feet NAVD (0.9 feet below schedule) in East Lake Toho, 51.6 feet NAVD (0.7 feet below schedule) in Lake Toho, and 48.0 feet NAVD (1.8 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

For the week ending July 14, 2024, mean weekly discharge was 350 cfs and 390 cfs at S-65 and S-65A, respectively. Mean weekly discharge from the Kissimmee River was 520 cfs and 470 cfs at S-65D and S-65E, respectively (**Table KB-2**). Mean weekly headwater stages were 45.2 feet NAVD at S-65A and 24.6 feet NAVD at S-65D. Mean weekly river channel stage decreased by 0.2 feet from the previous week to 32.6 feet NAVD (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain decreased by 0.01 feet from the previous week to 0.09 feet (**Table KB-2, Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River decreased from 3.5 mg/L the previous week to 3.1 mg/L (**Table KB-2, Figure KB-6**).

Water Management Recommendations

Follow the Hybrid A discharge plan for S-65/S-65A (**Figure KB-7**) until further notice. Maintain at least minimum flow (250-300 cfs) at S-65A. Allow stages to rise in Lakes East Toho, Toho, and Kissimmee, but keep ascension rates slower than 0.25 feet/week to the extent possible. Avoid sudden increases in KCH stage to help protect recent plantings.

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 NAVD) ^a	Schedule Type ^b	Sunday Schedule Stage (feet NAVD)	Sunday Departure from Regulation (feet)	
							7/14/24	7/7/24
Lakes Hart and Mary Jane	S-62	LKMJ	22	58.9	R	58.9	0.0	0.0
Lakes Myrtle, Preston and Joel	S-57	S-57	0	59.1	R	60.0	-0.9	-1.1
Alligator Chain	S-60	ALLI	0	61.0	R	62.2	-1.2	-1.3
Lake Gentry	S-63	LKGT	0	58.2	R	59.9	-1.7	-1.8
East Lake Toho	S-59	TOHOE	170	54.6	R	55.5	-0.9	-1.1
Lake Toho	S-61	TOHOW S-61	470	51.6	R	52.3	-0.7	-1.0
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	340	48.0	R	49.8	-1.8	-2.0

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.

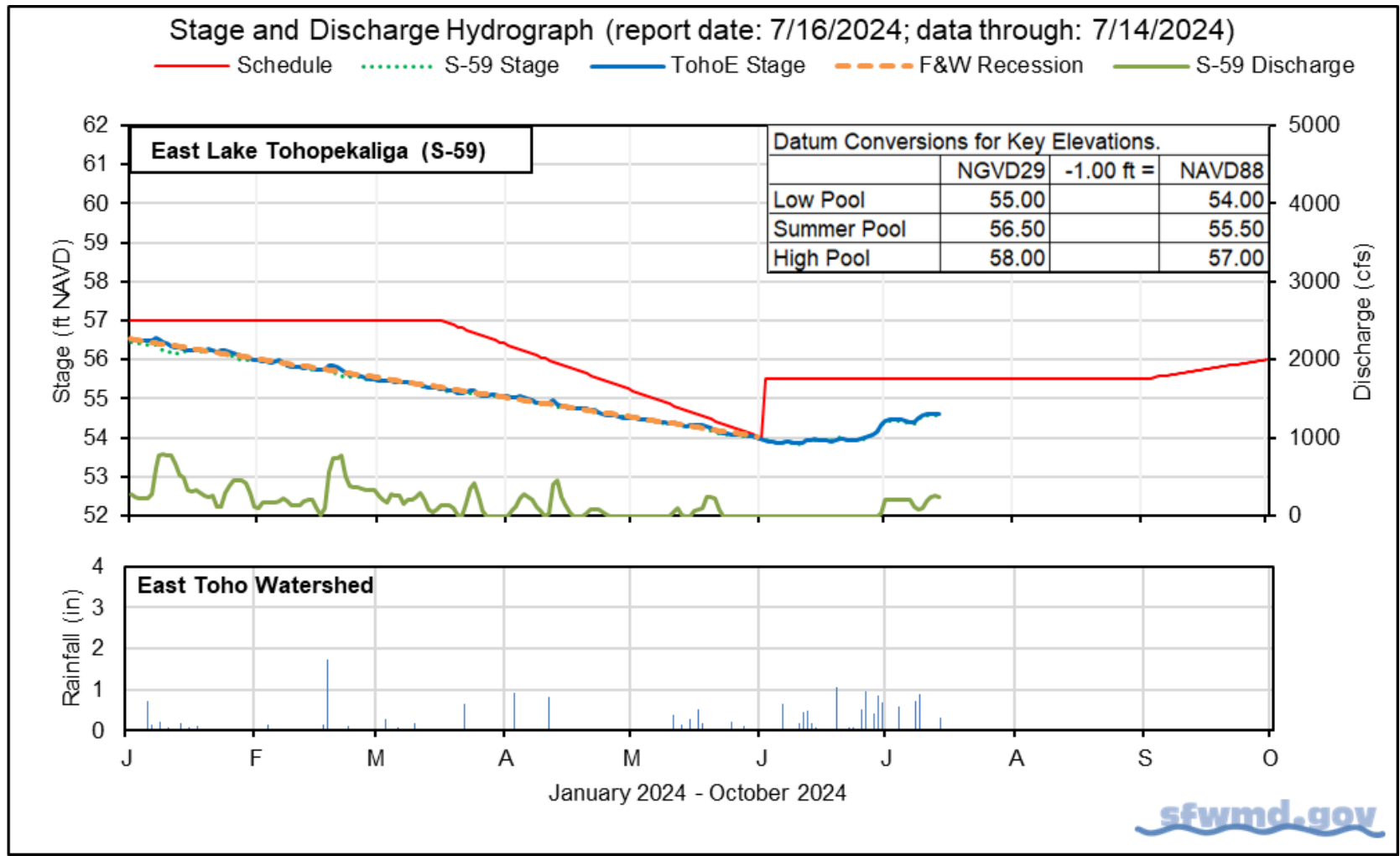


Figure KB-1. East Lake Toho regulation schedule, stage, discharge, and rainfall.

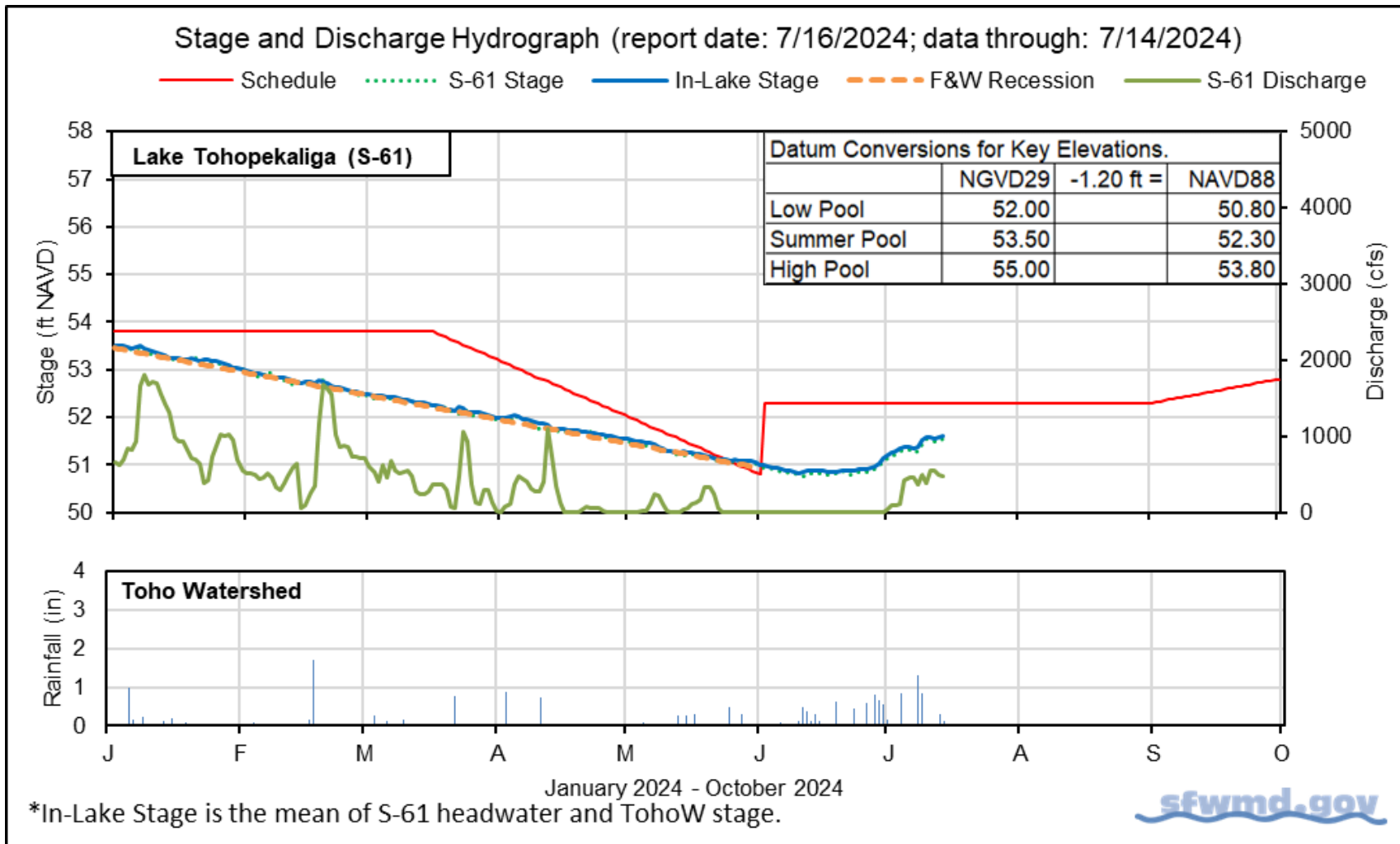


Figure KB-2. Lake Toho regulation schedule, stage, discharge, and rainfall.

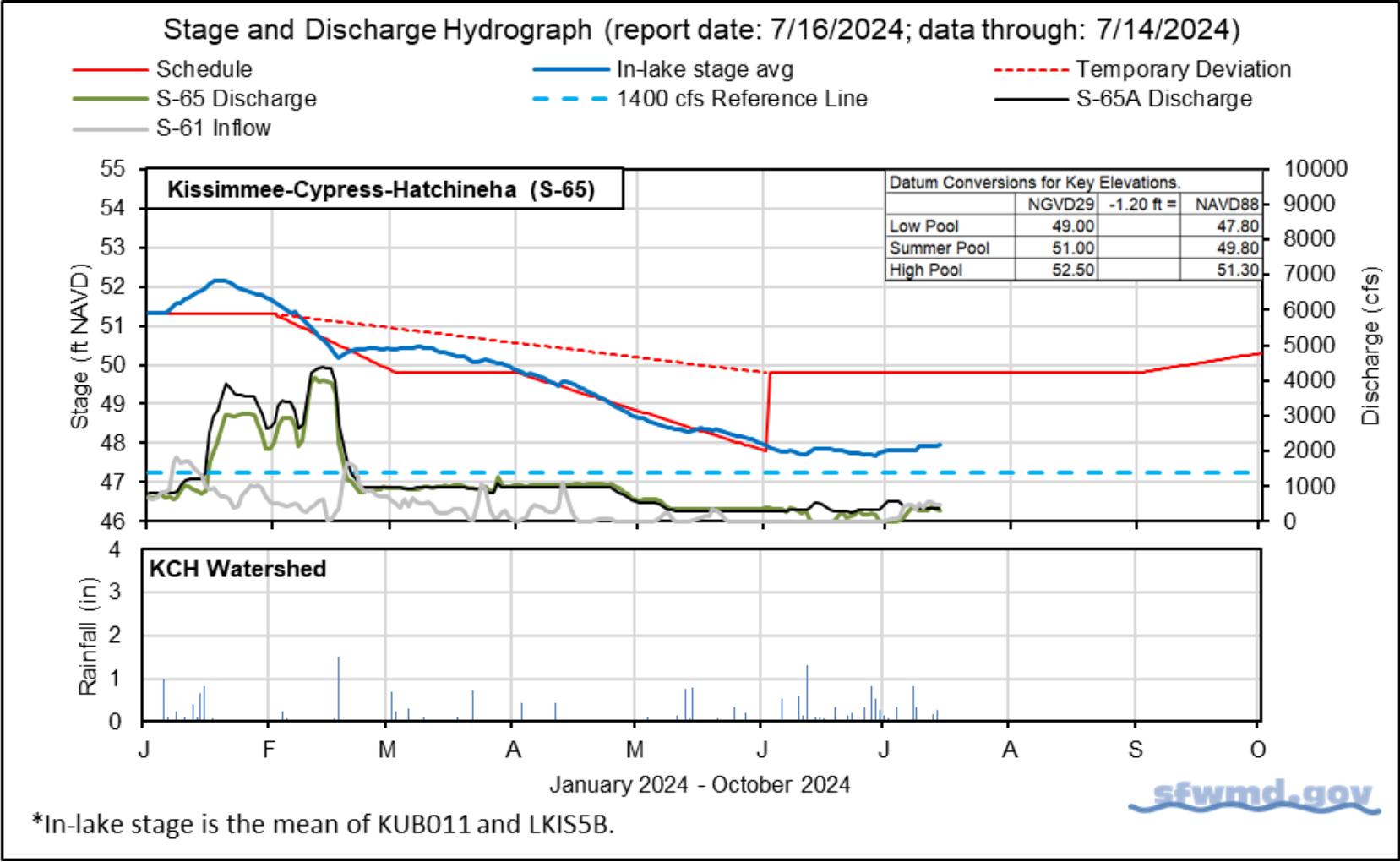


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge, and rainfall.

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 7/14/24	Weekly Average for Previous Seven Day Periods			
			7/14/24	7/7/24	6/30/24	6/23/24
Discharge	S-65	300	350	120	160	130
Discharge	S-65A ^a	370	390	530	350	300
Headwater Stage (feet NAVD)	S-65A	45.2	45.2	45.3	44.8	45.0
Discharge	S-65D ^b	470	520	650	350	440
Headwater Stage (feet NAVD)	S-65D ^c	24.5	24.6	24.6	24.6	24.6
Discharge (cfs)	S-65E ^d	440	470	610	350	430
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	3.4	3.1	3.5	4.1	5.0
River channel mean stage ^f	Phase I river channel	32.3	32.6	32.8	31.3	31.6
Mean depth (feet) ^g	Phase I floodplain	0.09	0.09	0.10	0.09	0.09

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.

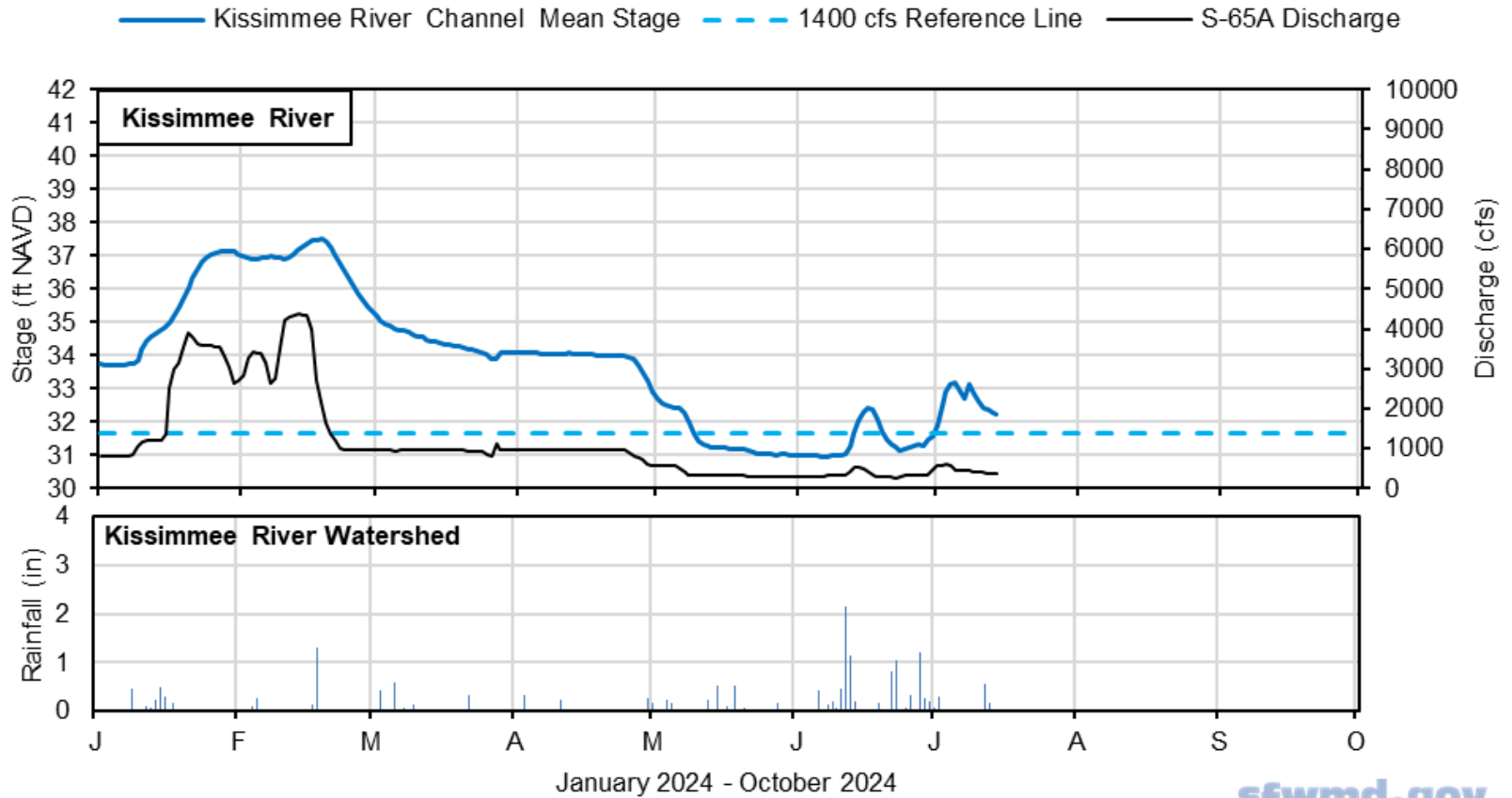
d. Combined discharge from S-65E and S-65EX1.

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).

Stage and Discharge Hydrograph (report date: 7/16/2024; data through: 7/14/2024)



*River Channel Stage is the average for PC62, KRDR02, KRBN, PC33, and PC11.



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

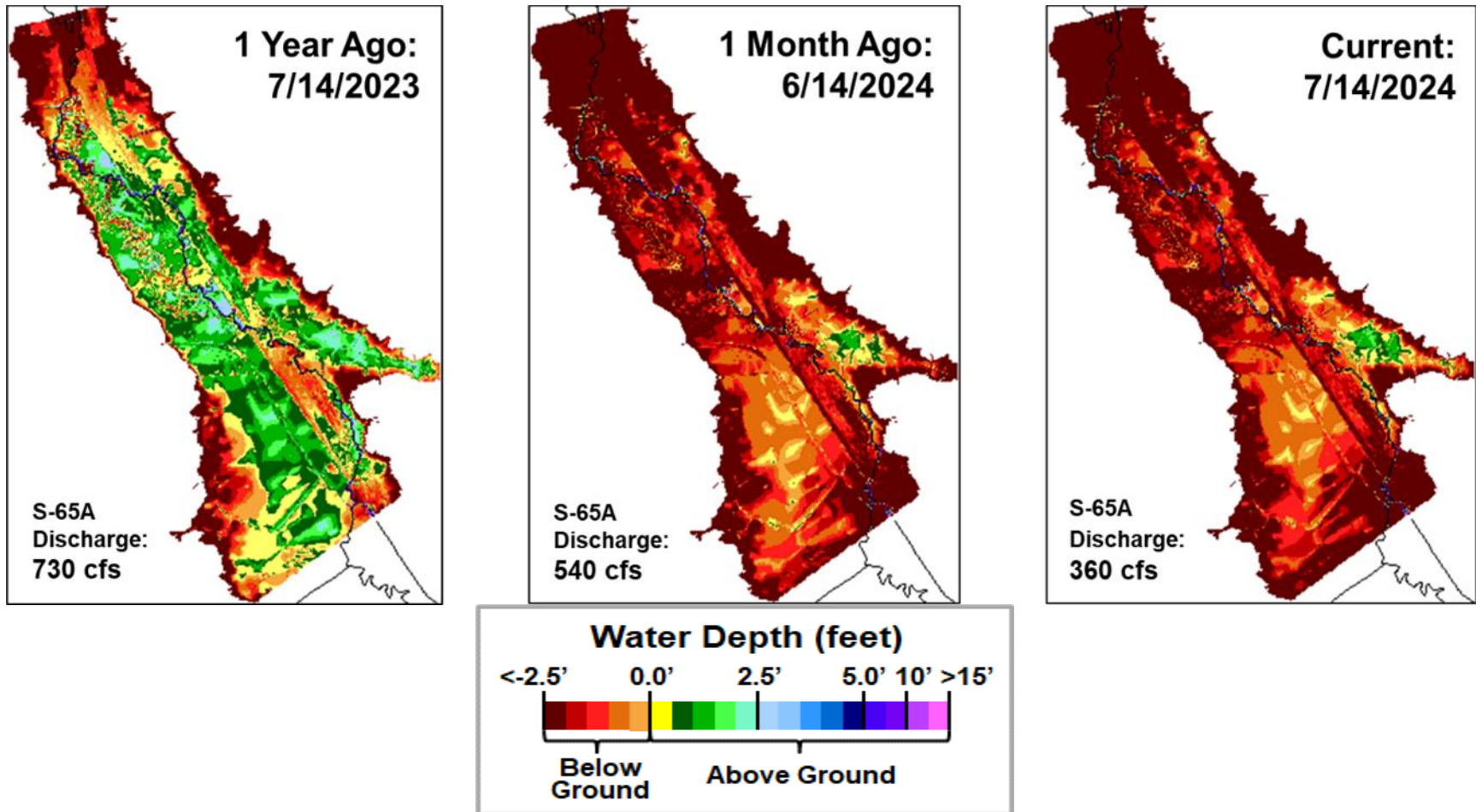
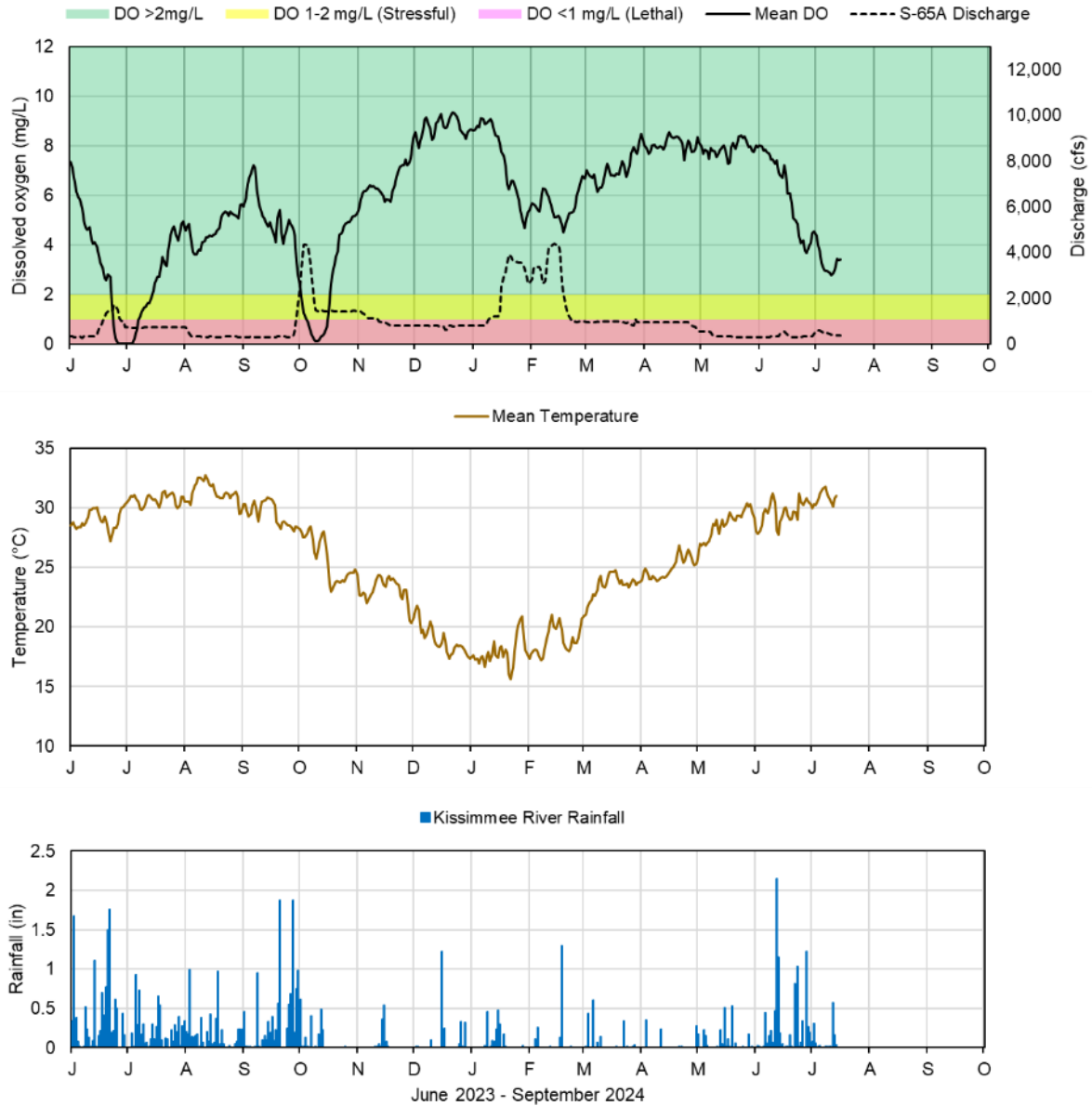


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago, and current.



Report Date: 7/16/2024; data are through: 7/14/2024



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

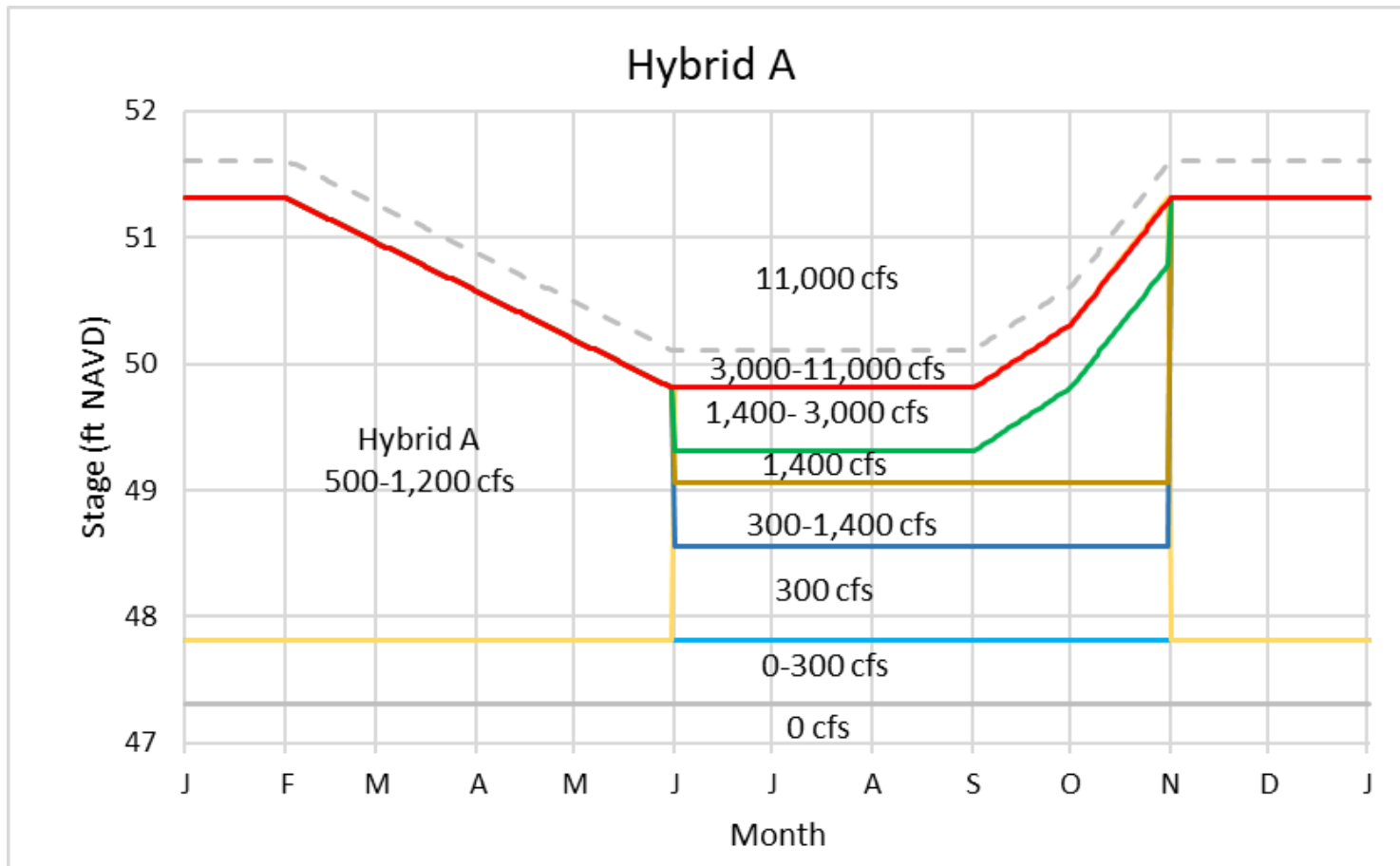


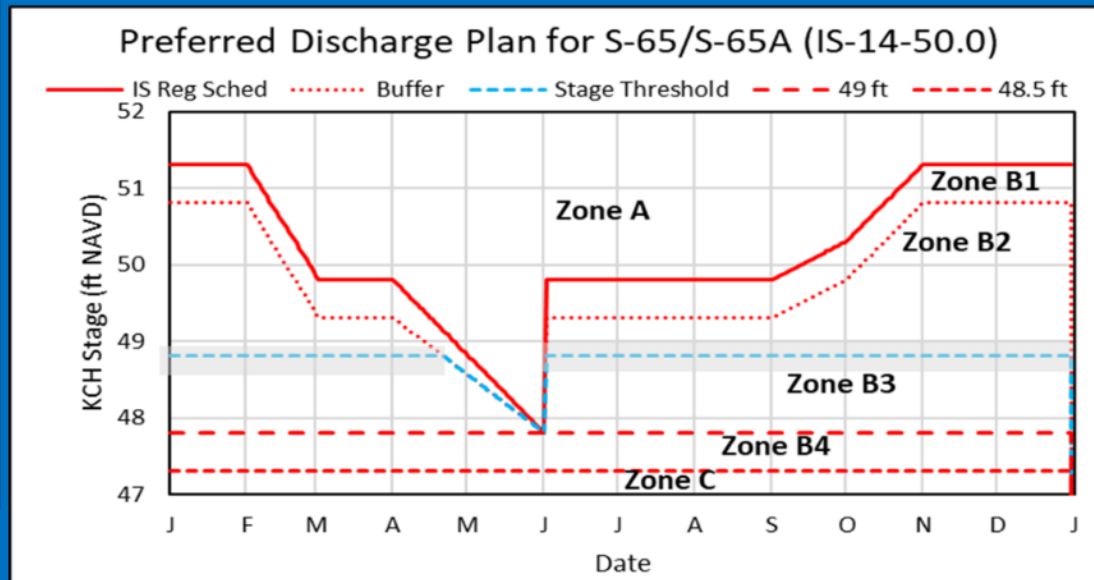
Figure KB-7. Hybrid A Discharge Plan for S-65/S-65A. Use discharge rate of change limits from IS-14-50 (Fig. KB-8).

Stage and Discharge Guidance for 2021-2023.		
Zone	KCH Stage (ft NAVD)	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 48.8 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 48.8 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 48.8 ft line and 47.8 ft.	Adjust S-65 discharge to maintain at least 300 cfs at S-65A.
B4	Between 47.3 ft to 47.8 ft.	Adjust S-65 discharge to maintain S-65A discharge between 0 cfs at 47.3 ft and 300 cfs at 47.8 ft.
C	Below 47.3 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

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 12.22 feet NAVD88 (13.53 ft NGVD29) on July 14, 2024, which was 0.03 feet higher than the previous week and 0.23 feet higher than a month ago (**Figure LO-1**). Lake stage is in the Low sub-band (**Figure LO-2**) and was 1.55 feet above the upper limit of the recovery ecological envelope (**Figure LO-3**). According to NEXRAD, 1.36 inches of rain fell directly over the Lake last week.

Average daily inflows (excluding rainfall) decreased from 2,710 cfs the previous week to 1,960 cfs. The largest single structure inflow came from Fisheating Creek at 820 cfs. Average daily outflows (excluding evapotranspiration) increased slightly from 420 cfs the previous week to 520 cfs, with an average of 460 cfs released to the C-44 canal through the S-77 structure. No releases were made to the south through the S-350 structures, or to the east through S-308. **Figures LO-4 and LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively.

The provisional taxa and toxin results from the July 08-10 routine water quality and phytoplankton monitoring sampling trips showed *Microcystis aeruginosa* dominated communities at 18 of the 32 sites sampled. One site was co-dominated by *Microcystis* and *Pseudanabaena*, and one by *Dolichospermum* and *Planktolyngbya*. The remaining 12 sites were mixed. Eighteen sites had microcystin toxin levels above the 0.25 µg/L method's detection threshold, and 7 of those exceeded the EPA recreational standard of 8 µg/L (**Figure LO-6**). The highest value was 70 µg/L at S-308 (**Figure LO-6**).

In the most recent non-obscured satellite image from July 15, 2024, NOAA's Harmful Algal Bloom Monitoring System suggested moderate to high cyanobacteria concentrations across most of the Lake (**Figure LO-7**).

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

1 Month Ago:
06/14/2024

Current:
07/14/2024

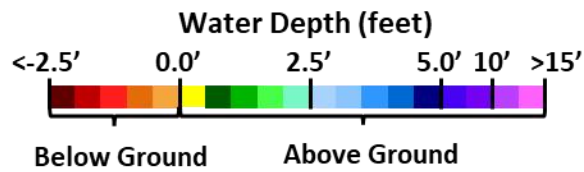
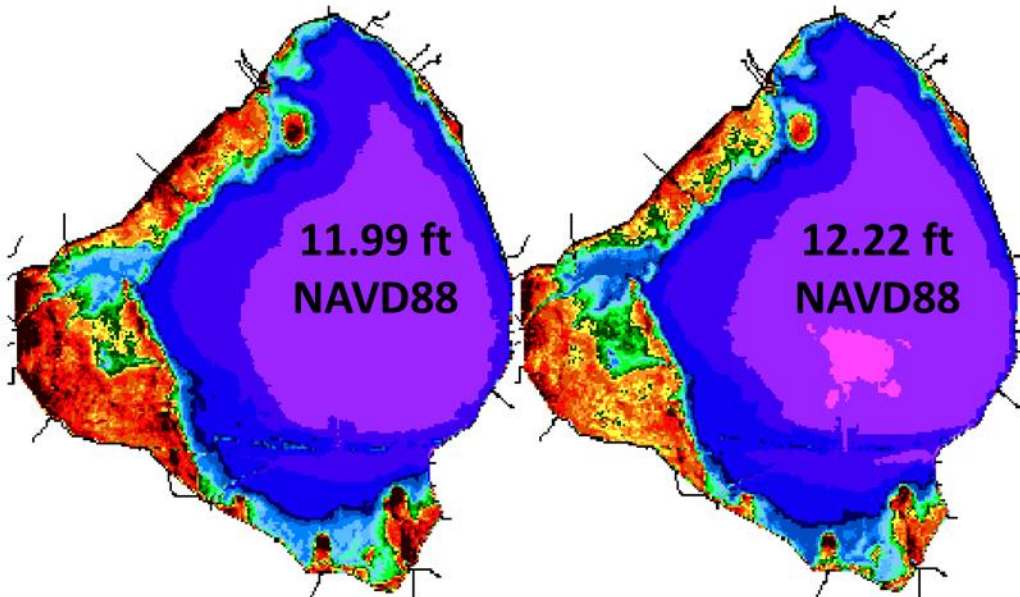
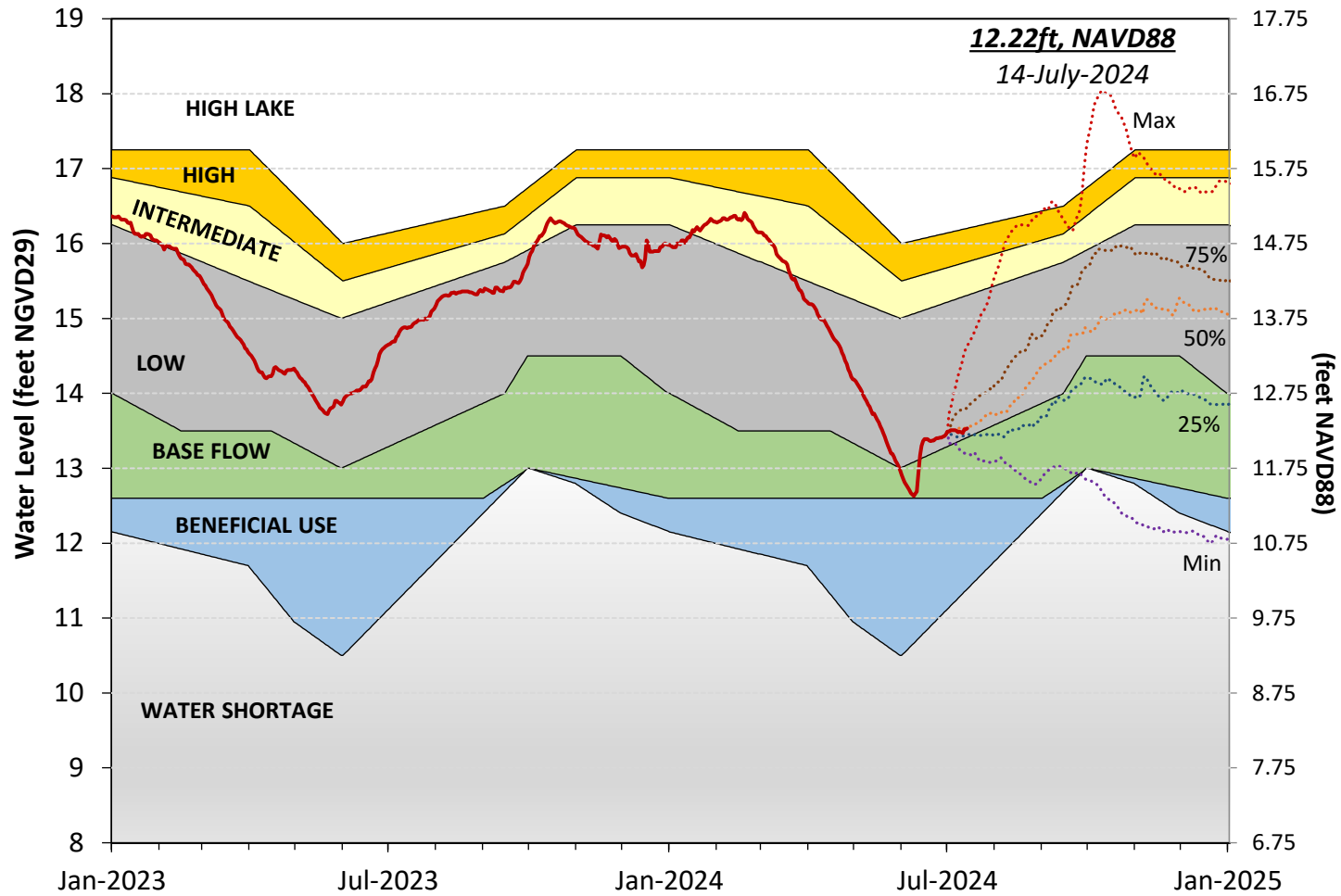


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Water Level History and Projected Stages



LORS-2008 - Adopted by USACE 28-April-

Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.
Note: stages are in NGVD29, approximate NAVD88 values are shown for reference.

Lake Okeechobee Stage vs Recovery Ecological Envelope

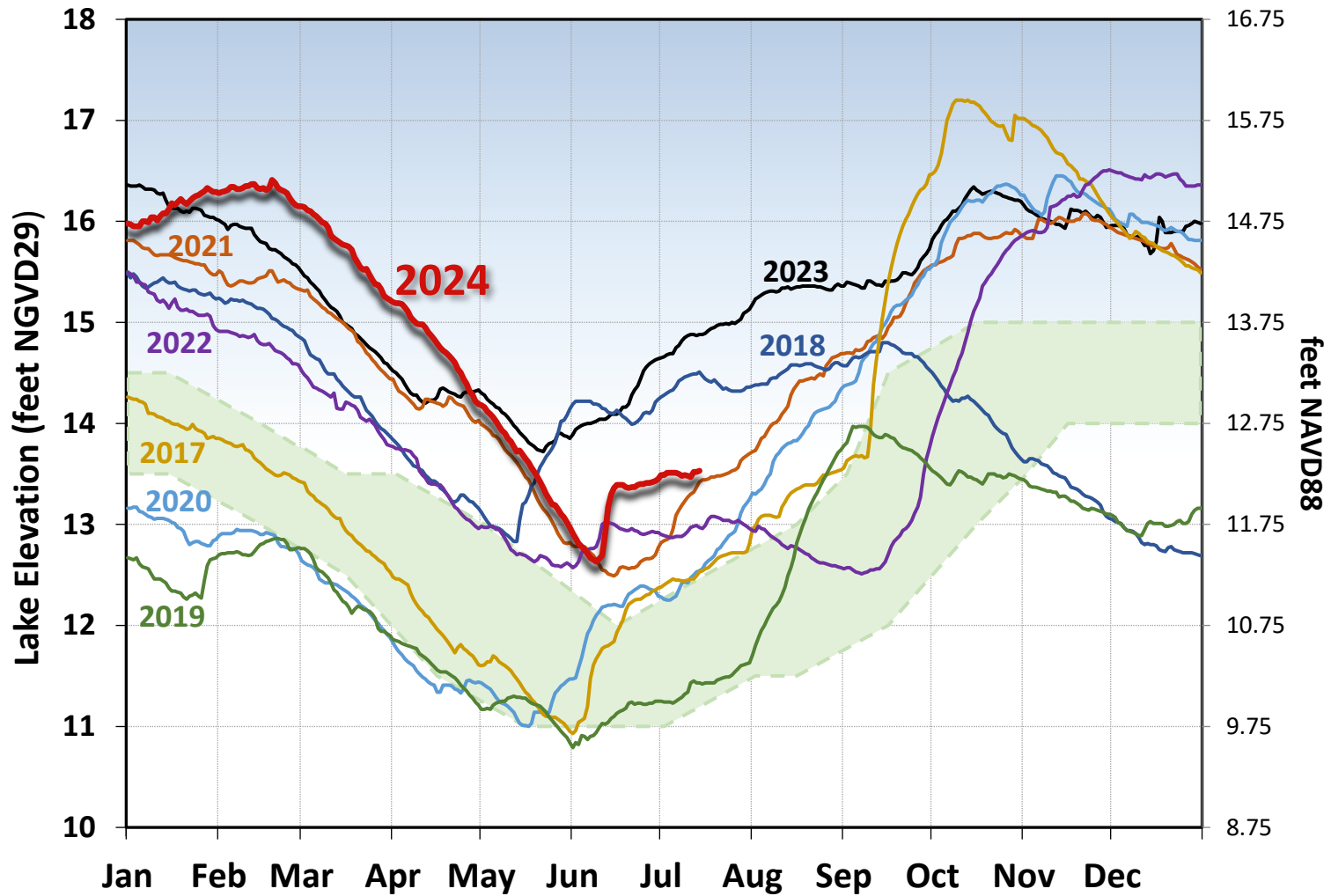


Figure LO-3. The current and seven prior year's annual stage hydrographs for Lake Okeechobee in comparison to the recovery envelope (light green). A shift from the normal ecological envelope to the recovery envelope occurred because the 30-day minimum lake stage (elevations exposed for at least 30 days, nonconsecutively) in the June 1 – July 31, 2023, window was >13 ft NGVD29 (11.75 ft NAVD88).

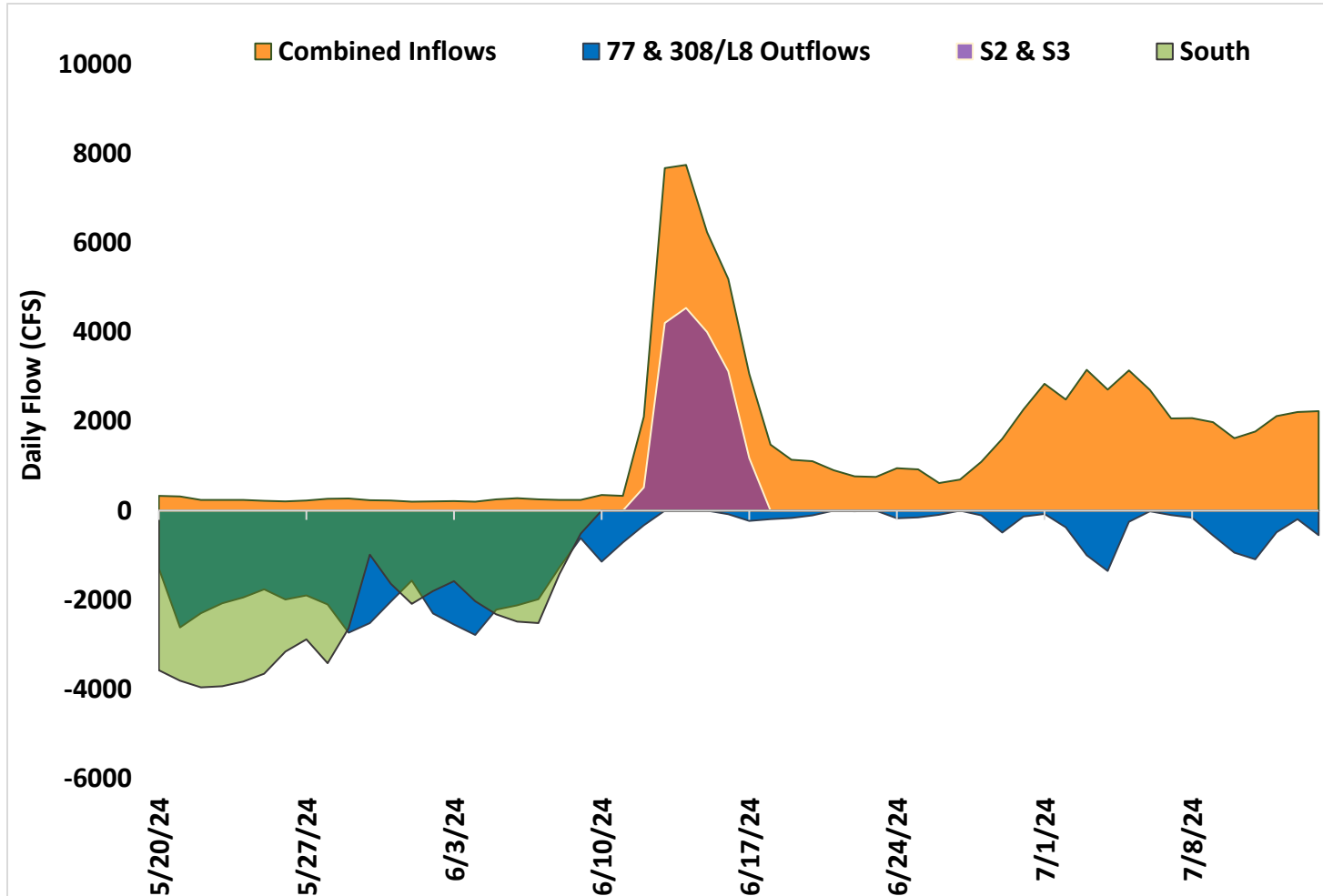


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

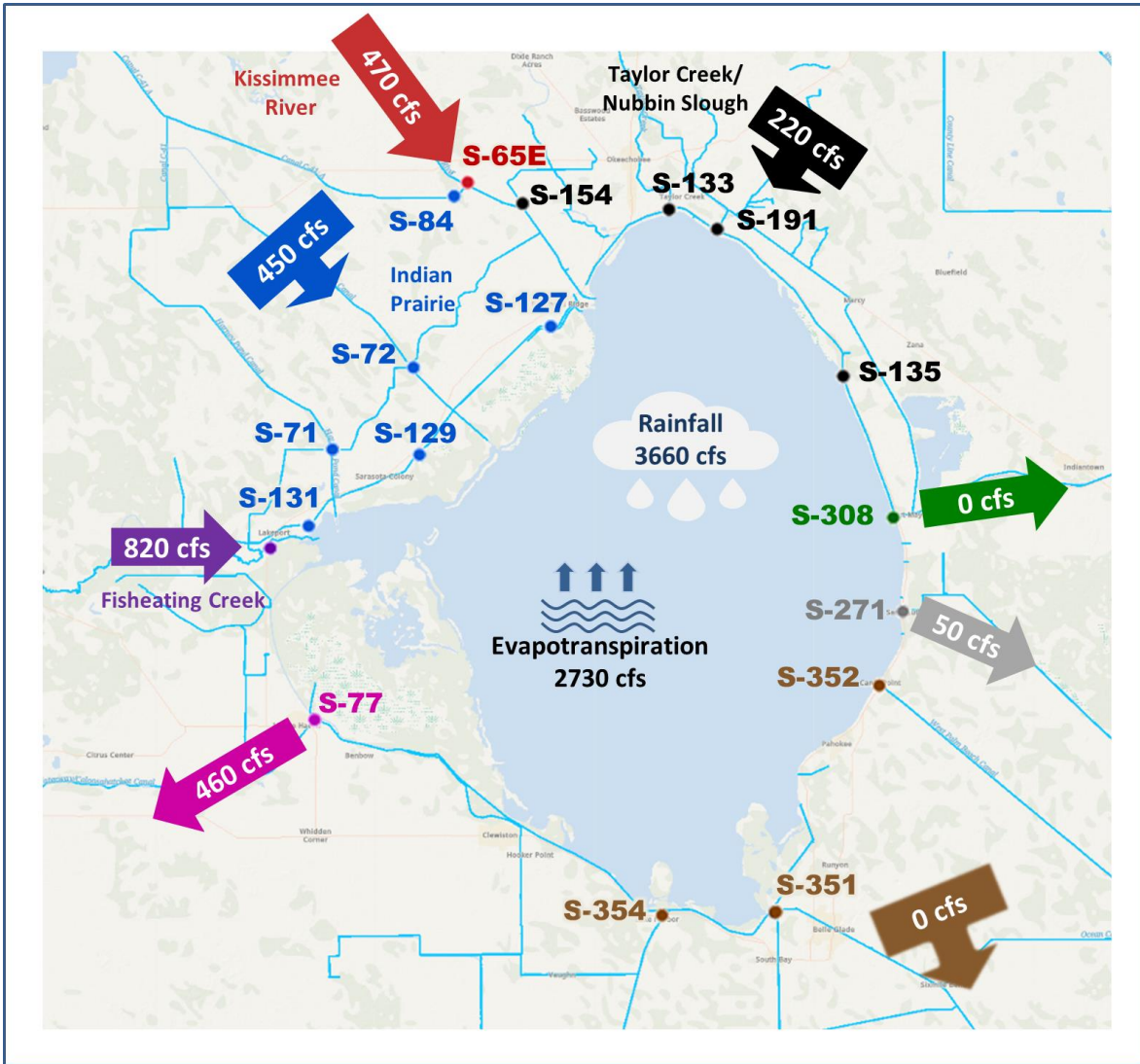


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of July 08 – 14, 2024.

Collection Date: July 08-10, 2024

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA	Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
FEBIN		BDL	<i>mixed</i>	L001		BDL	<i>Microcys</i>
FEBOUT		BDL	<i>mixed</i>	L004		8.7	<i>Microcys</i>
KISSR0.0		BDL	<i>mixed</i>	L006		6.3	<i>Microcys</i>
L005		BDL	<i>Dolic/Plank</i>	L007		0.4	<i>Microcys</i>
LZ2		BDL	<i>mixed</i>	L008		16.0	<i>Microcys</i>
KBARSE		BDL	<i>mixed</i>	LZ30		4.8	<i>Microcys</i>
RITTAE2		0.3	<i>Microcys</i>	LZ40		15.0	<i>Microcys</i>
PELBAY3		BDL	<i>mixed</i>	CLV10A		5.6	<i>Microcys</i>
POLE3S		0.3	<i>Microcys</i>	NCENTER		44.0	<i>Microcys</i>
LZ25A		0.5	<i>Microcys</i>				
PALMOUT		0.3	<i>mixed</i>	S308C		70.0	<i>mixed</i>
PALMOUT1		2.4	<i>Micro/Pseud</i>	S77		BDL	<i>mixed</i>
PALMOUT2		16.0	<i>Microcys</i>				
PALMOUT3		6.8	<i>Microcys</i>				
POLESOUT		BDL	<i>mixed</i>				
POLESOUT1		BDL	<i>Microcys</i>				
POLESOUT2		BDL	<i>Microcys</i>				
POLESOUT3		BDL	<i>mixed</i>				
EASTSHORE		10.0	<i>Microcys</i>				
NES135		2.1	<i>Microcys</i>				
NES191		BDL	<i>mixed</i>				

- SFWMD considers >40 µg/L Chlorophyll a (Chla) an algal bloom
- BDL – Below Detectable Limit of 0.25 µg/L
- ND – No Dominant taxa
- P – Pending (white squares)
- NS – Not Sampled
- Station bold font – crew observed possible BGA
- Chlorophyll a analyzed by SFWMD
- Toxin and Taxa analyzed by FDEP:
 - Microcys* = *Microcystis*; *Cylindro* = *Cylindrospermopsis*;
 - Planktol* = *Planktolyngbya*; *Dolicho* = *Dolichospermum*;
 - Pseud* = *Pseudanabaena*; *Raphi* = *Raphidiopsis*

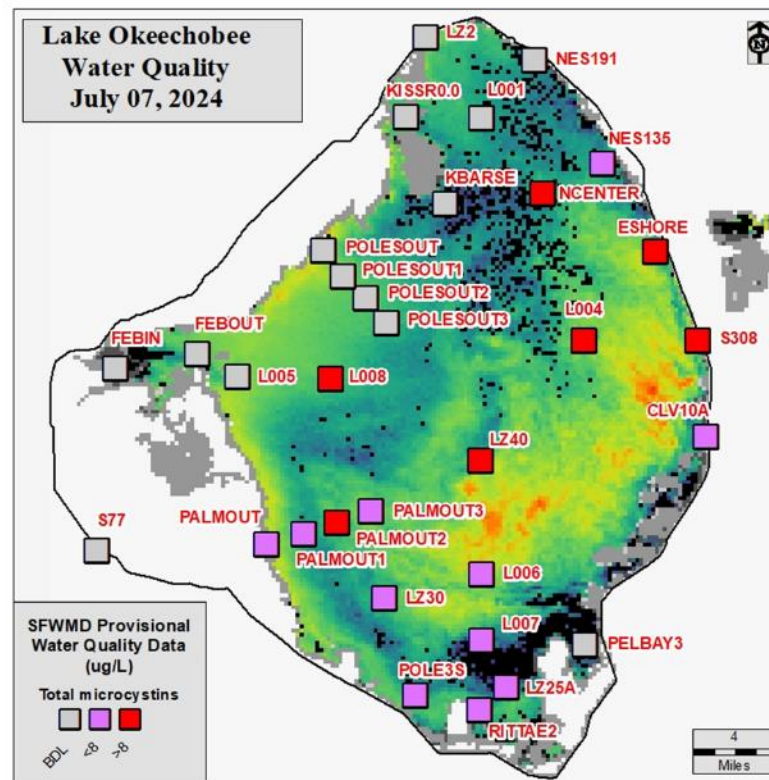


Figure LO-6. Dominant taxa, total microcystin (µg/L) and chlorophyll a (µg/L) data from July 08-10, 2024. Sampling locations, chlorophyll a, and total microcystin concentrations are overlaid on the July 07, 2024 image from NOAA’s harmful algal bloom monitoring system. Gray color indicates cloud cover.

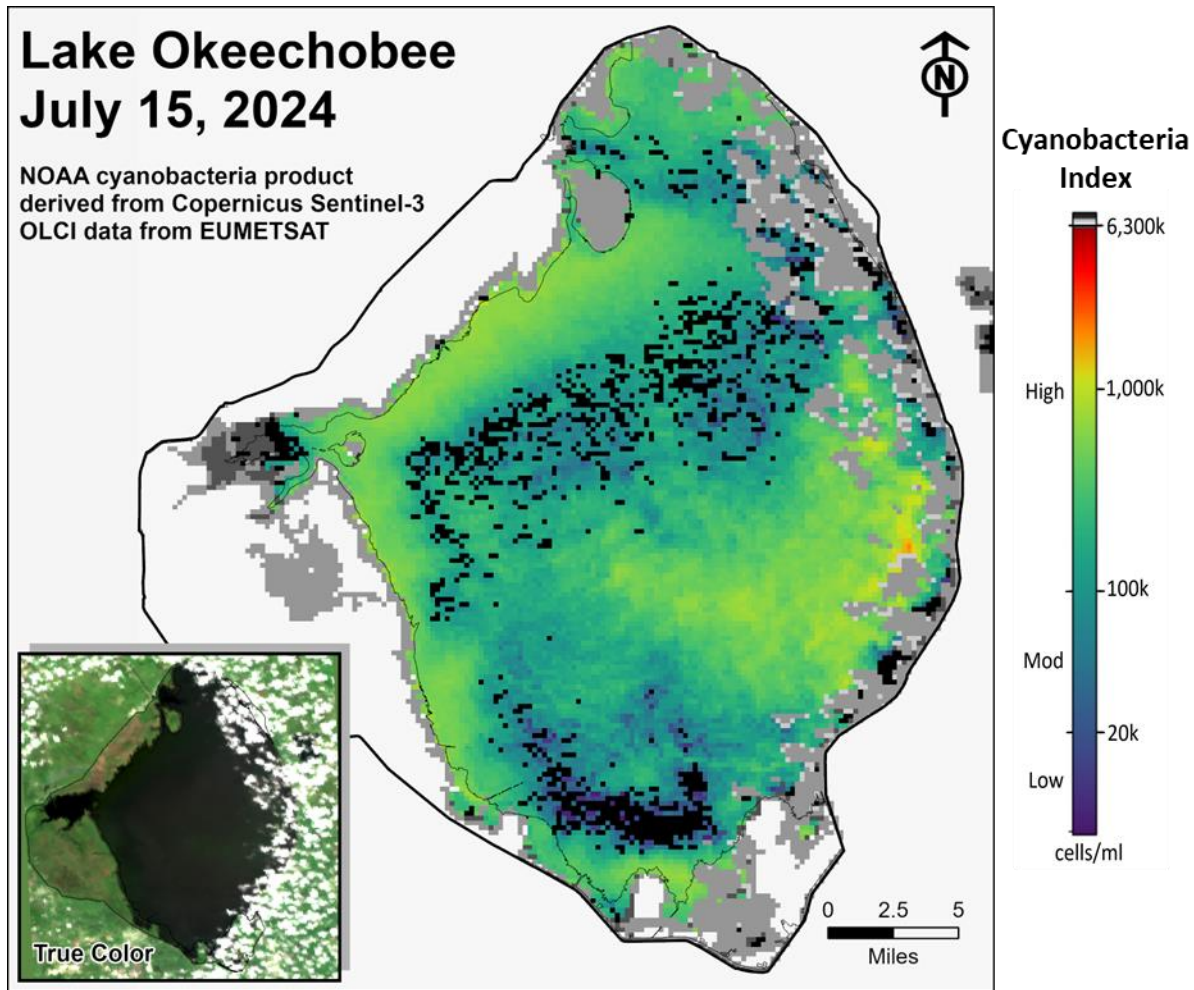


Figure LO-7. Cyanobacteria bloom index level on July 15, 2024, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover. *Provisional NOAA image, subject to change*.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 928 cfs (**Figures ES-1 and ES-2**), and the previous 30-day mean inflow was 1,330 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 the HR1 and US1 Bridge sites and decreased at the A1A Bridge site (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 14.6. 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 2.8 spat/shell for June, which is similar to the previous month (**Figure ES-5**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 3,180 cfs (**Figures ES-6 and ES-7**), and the previous 30-day mean inflow was 4,955 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 increased 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 in 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 rates for June reported by the FWRI were 24.4 spat/shell at Iona Cove, which is an increase from the previous month, and 18.8 spat/shell at Bird Island, which is a decrease from the previous month (**Figures ES-11 and ES-12**).

Surface salinity at Val I-75 was forecast 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 2,000 cfs, with estimated tidal basin inflows of 466 cfs. Model results from all scenarios predict daily salinity to be 0.3 and the 30-day moving average surface salinity to be 0.3 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 FWRI reported on July 12, 2024, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in any samples collected statewide over the past week.

Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are near normal. The LORS2008 release guidance suggests up to 450 cfs release at S-79 to the Caloosahatchee River Estuary and up to 200 cfs release at S-80 to the St. Lucie Estuary.

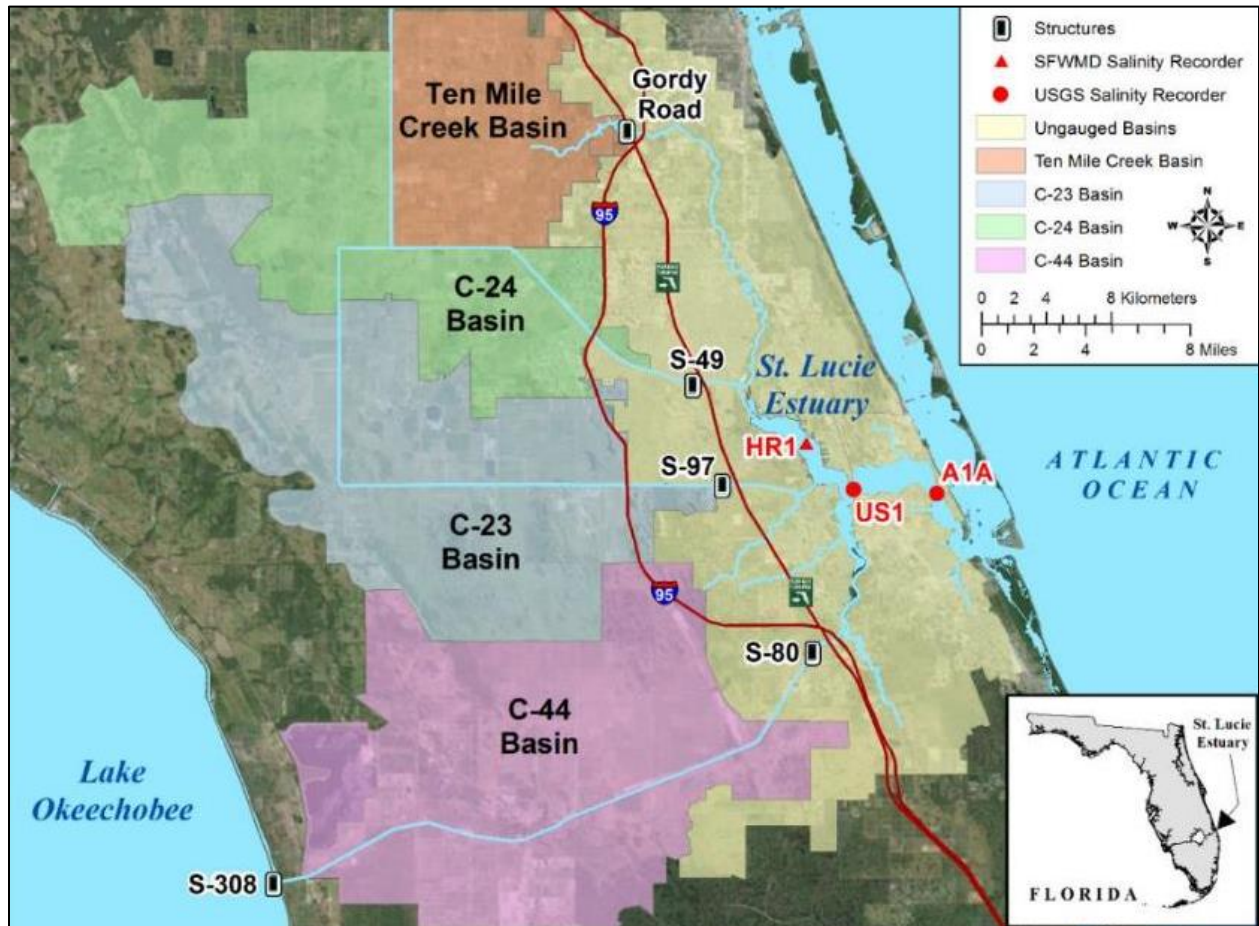


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

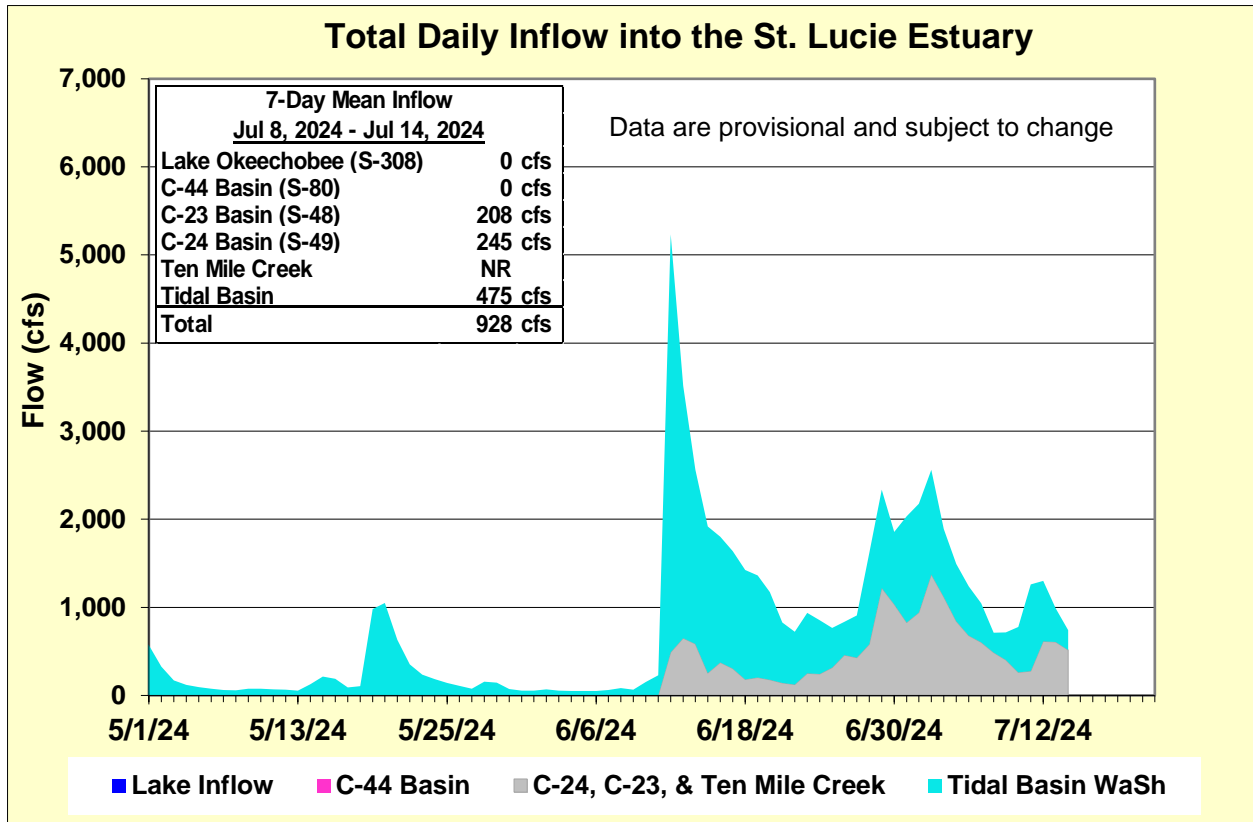


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	6.7 (5.5)	13.6 (13.5)	10.0 – 25.0
US1 Bridge	13.3 (13.0)	15.9 (15.4)	10.0 – 25.0
A1A Bridge	20.6 (22.1)	26.3 (27.3)	10.0 – 25.0

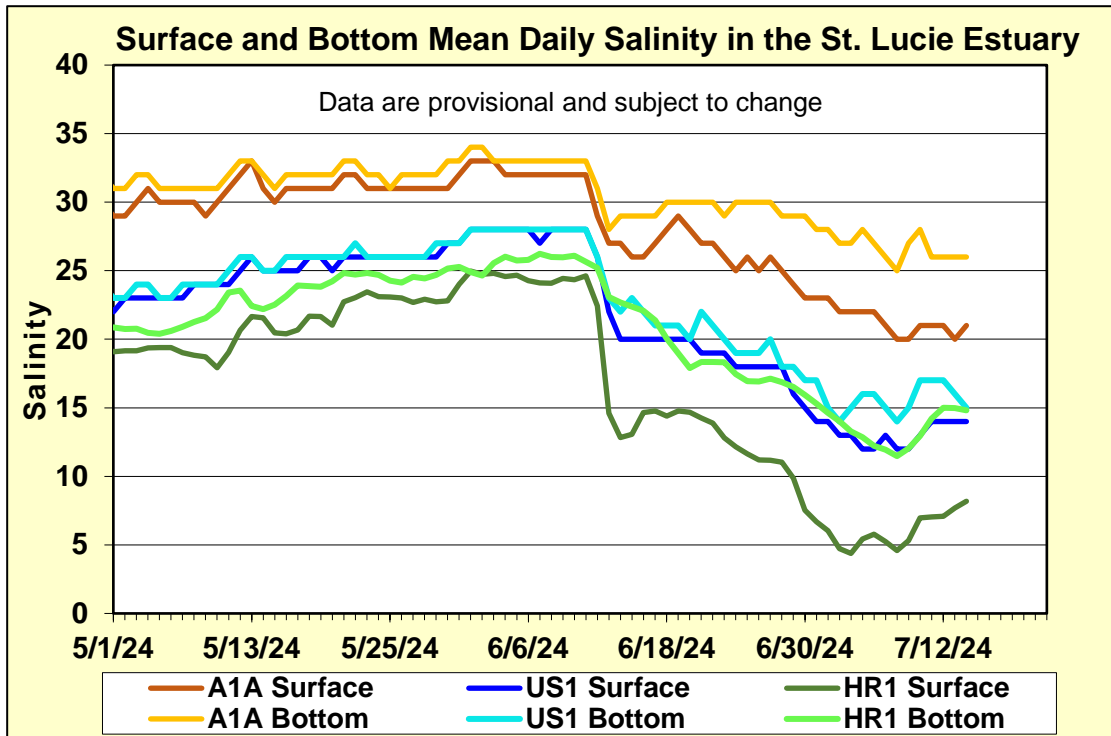


Figure ES-3. Mean daily salinity at the A1A, US1, and HR1 sites in the St. Lucie Estuary.

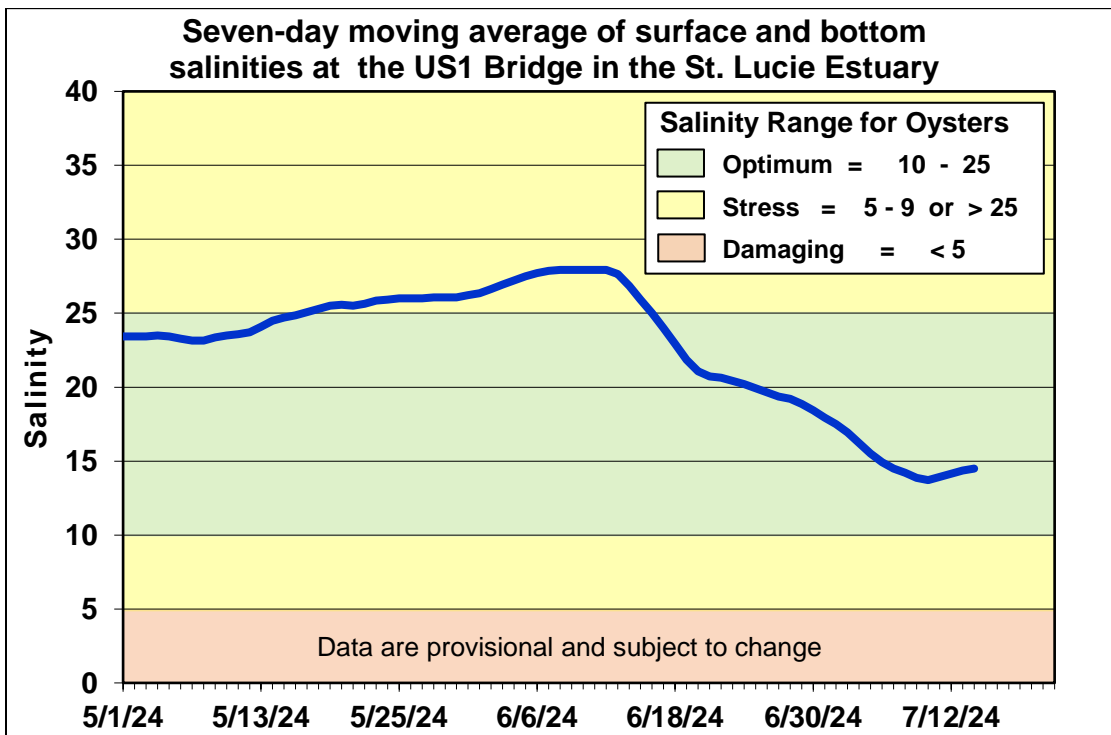


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

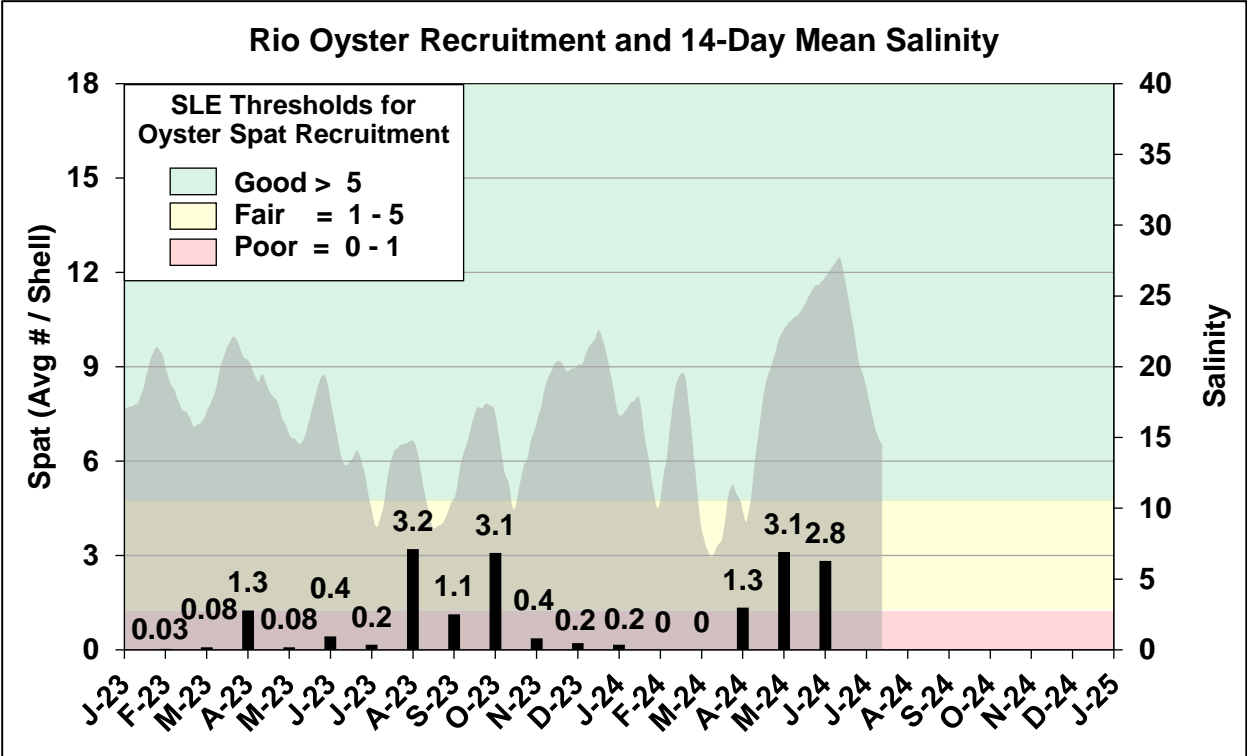


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

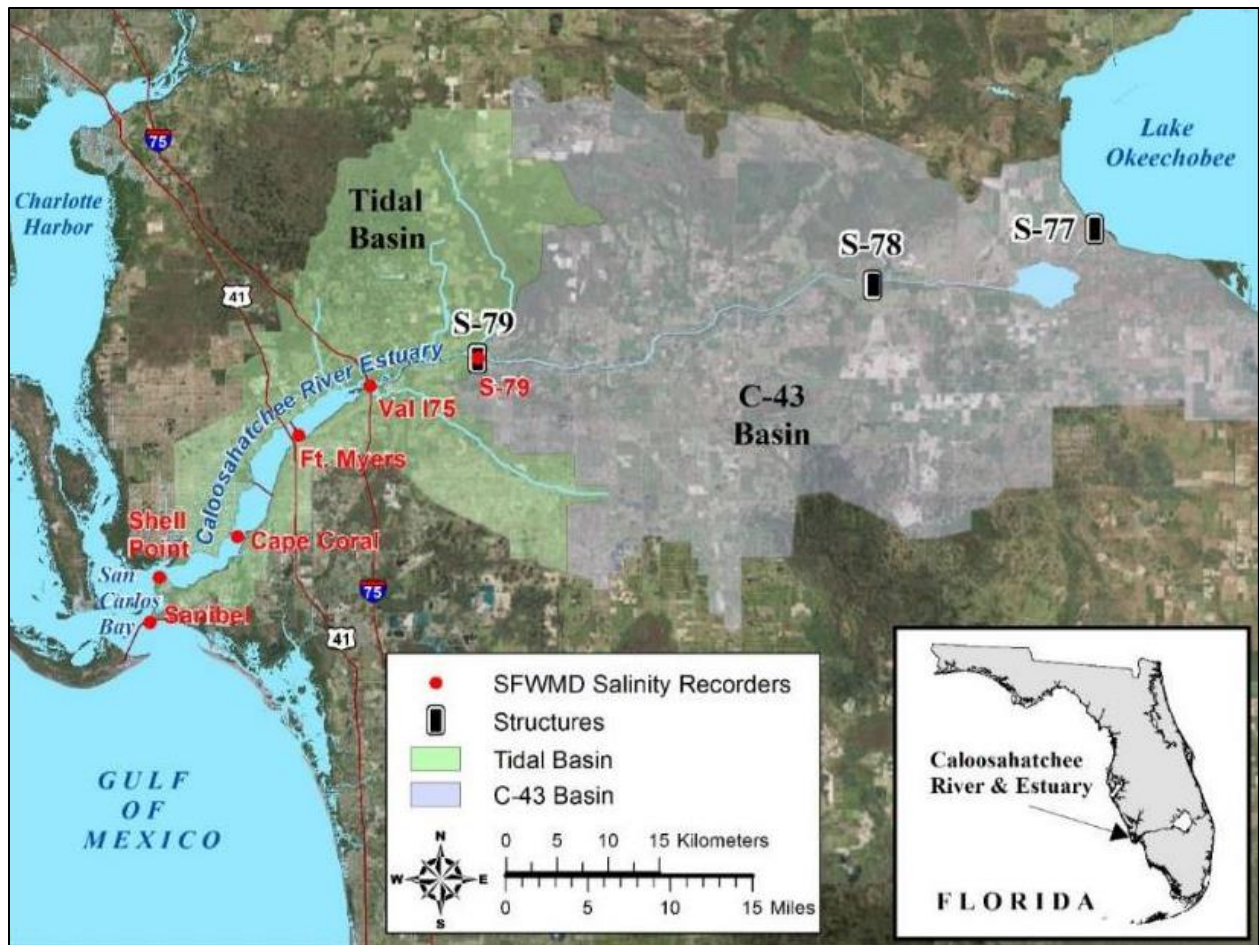


Figure ES-6. Basins, water control structures, and salinity monitoring sites in the Caloosahatchee River Estuary.

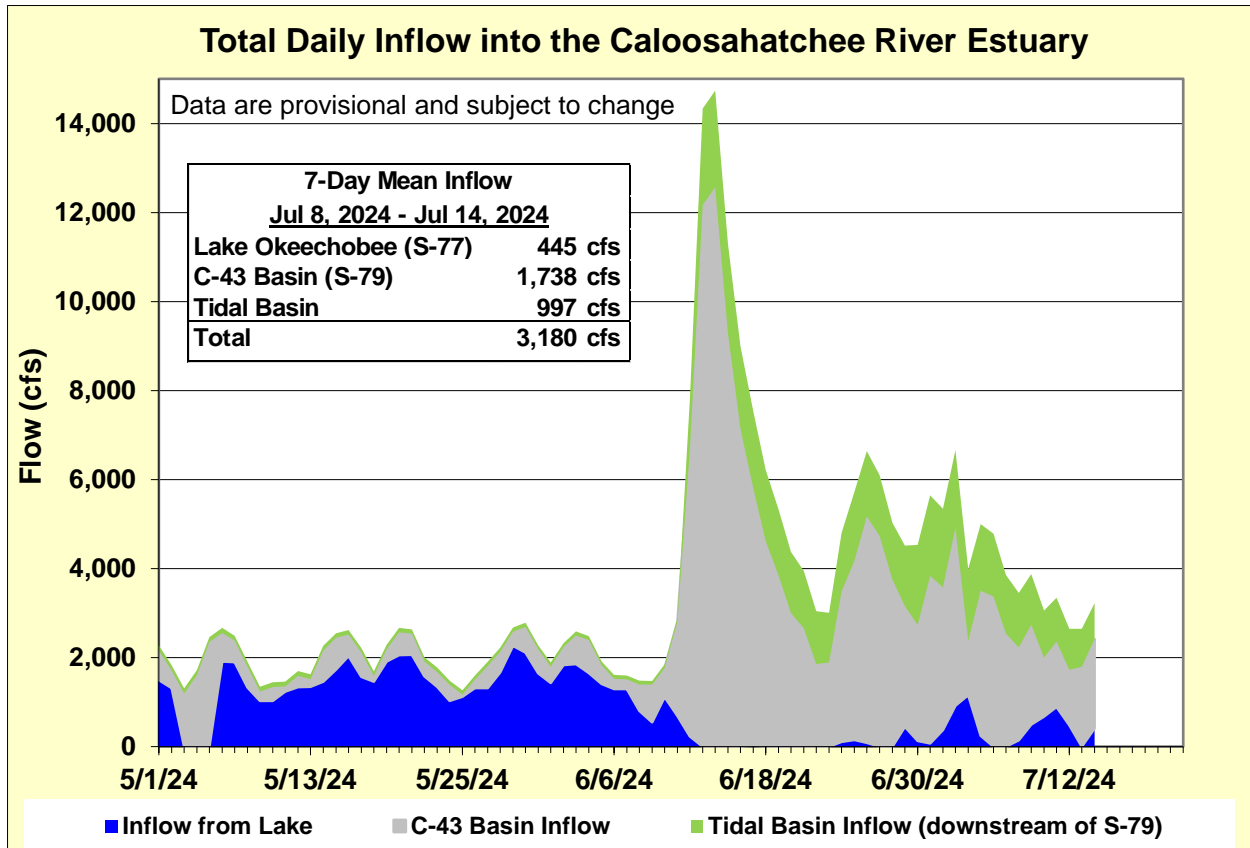


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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)	0.3 (0.3)	0.3 (0.3)	0.0 – 10.0
Val I-75	0.3 (0.3)	0.3 (0.3)	0.0 – 10.0
Fort Myers Yacht Basin	0.3 (0.2)	0.3 (0.2)	0.0 – 10.0
Cape Coral	2.8 (1.8)	3.8 (2.5)	10.0 – 25.0
Shell Point	17.6 (16.4)	19.7 (19.5)	10.0 – 25.0
Sanibel	25.8 (25.3)	28.0 (27.0)	10.0 – 25.0

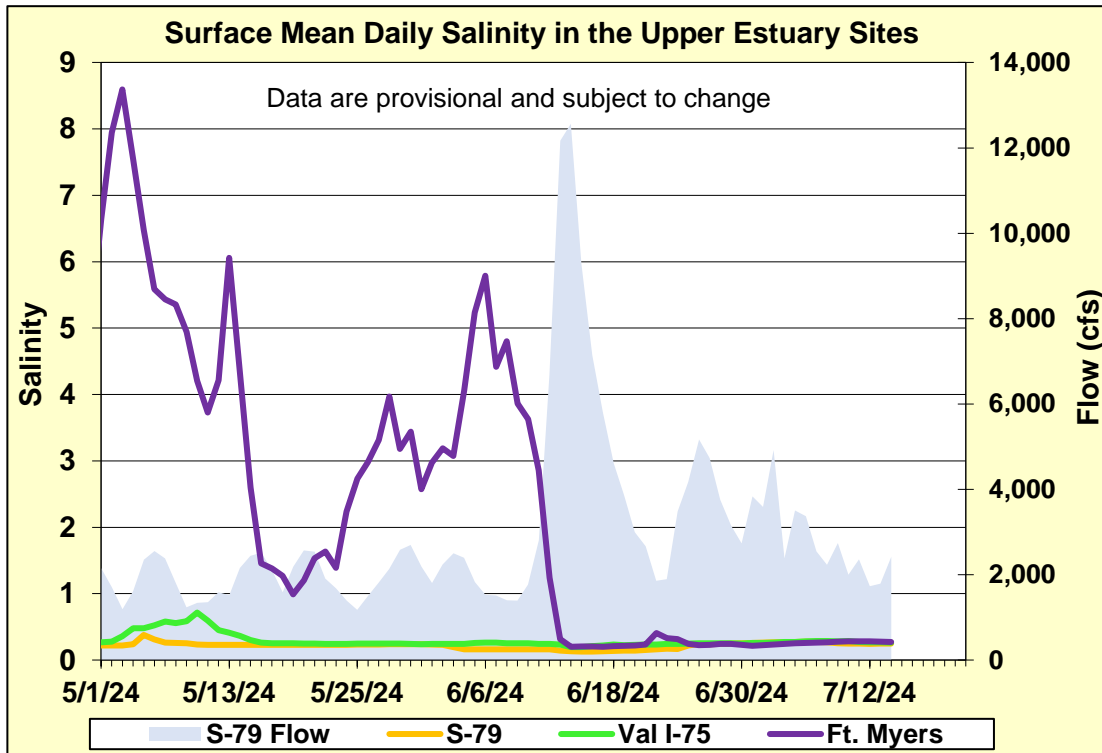


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

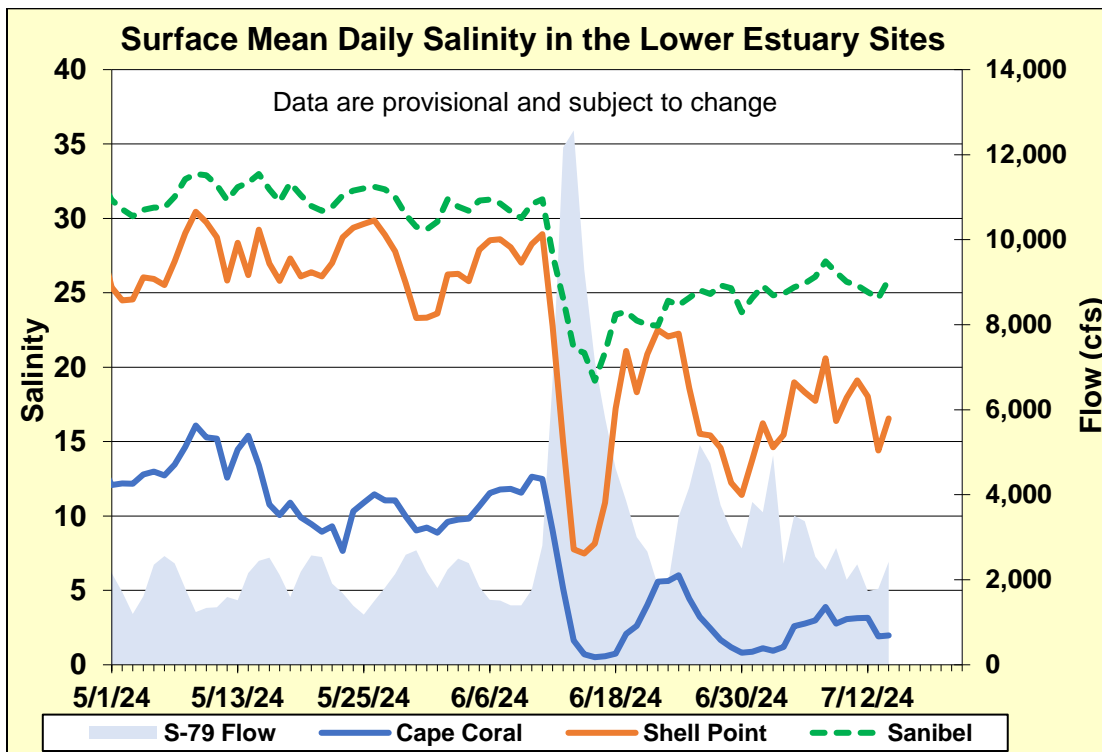


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

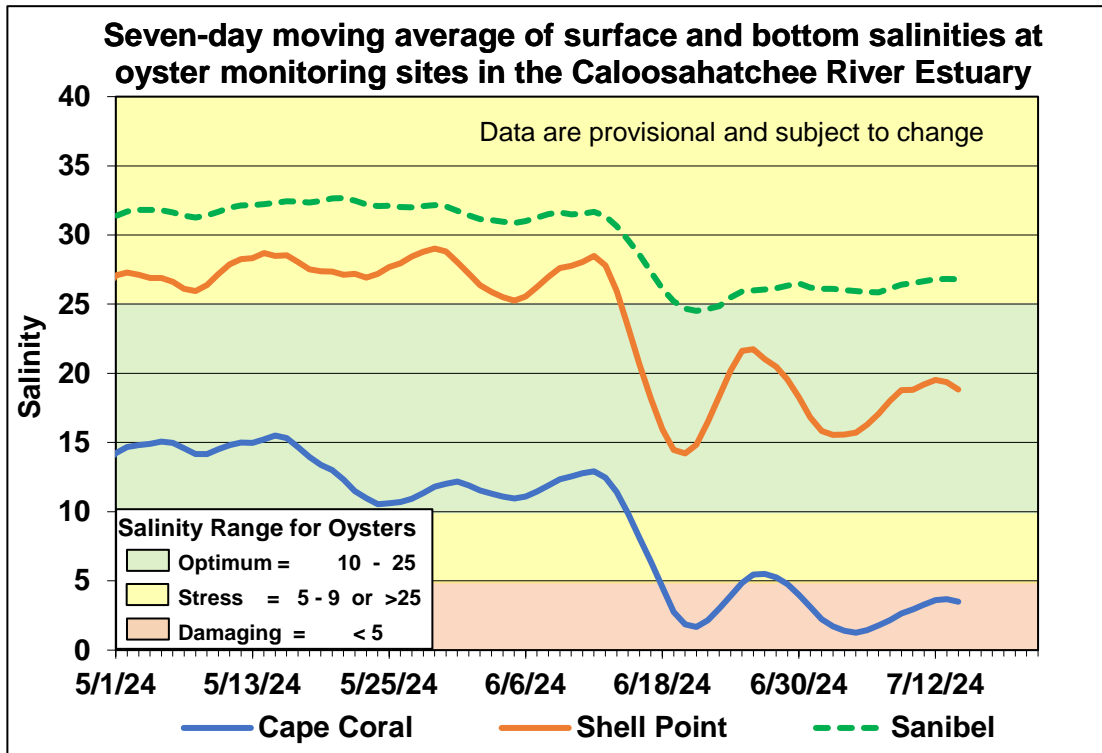


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point, and Sanibel monitoring sites in the Caloosahatchee River Estuary.

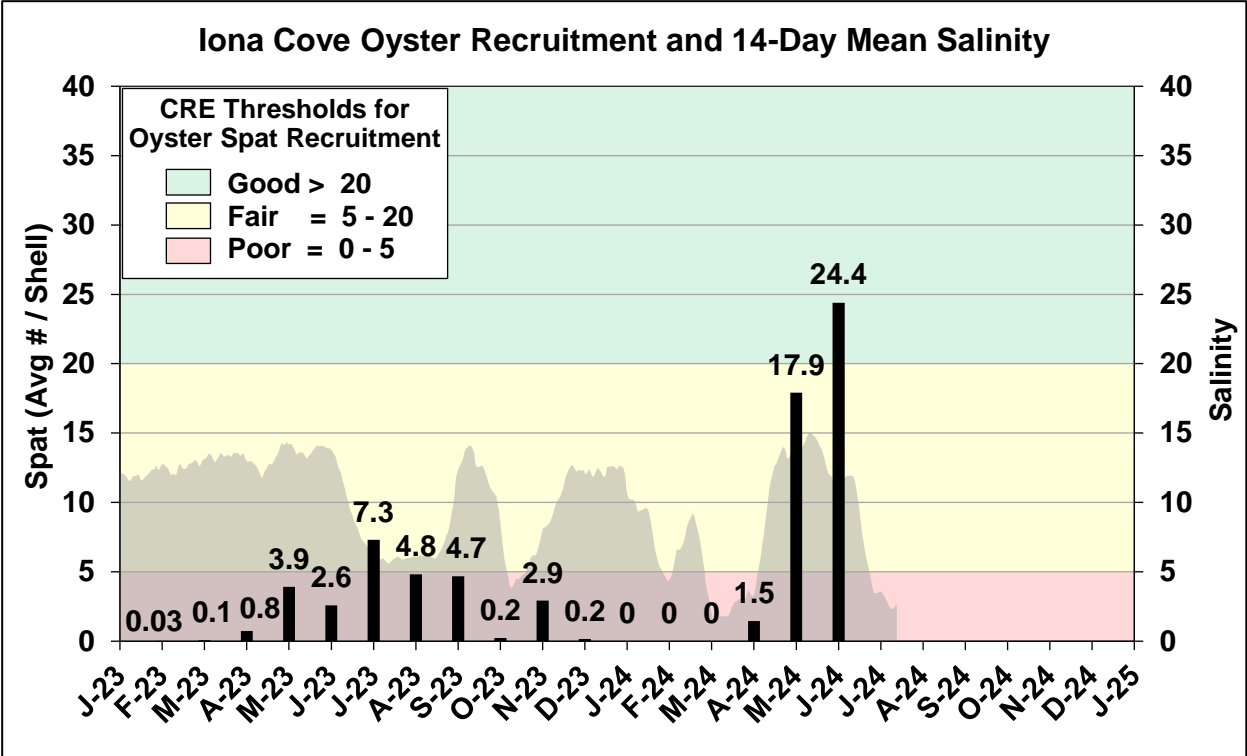


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

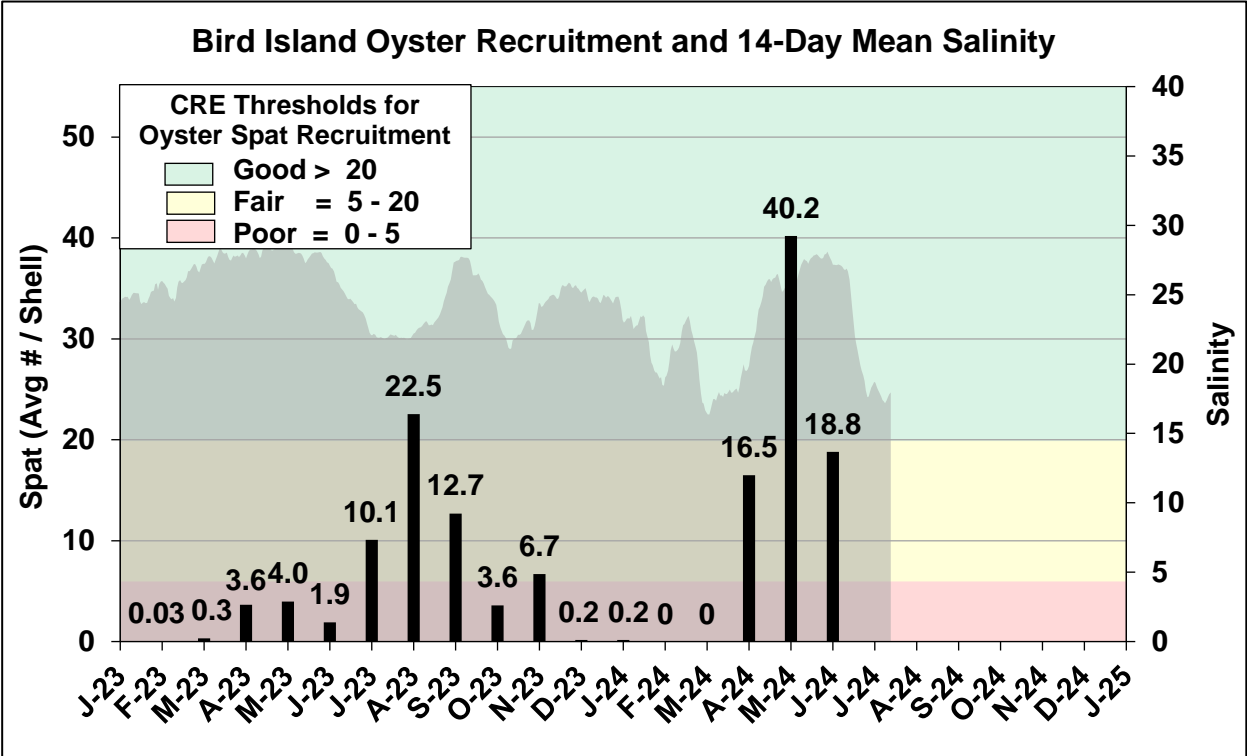


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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	450	466	0.3	0.3
B	650	466	0.3	0.3
C	1,200	466	0.3	0.3
D	2,000	466	0.3	0.3

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

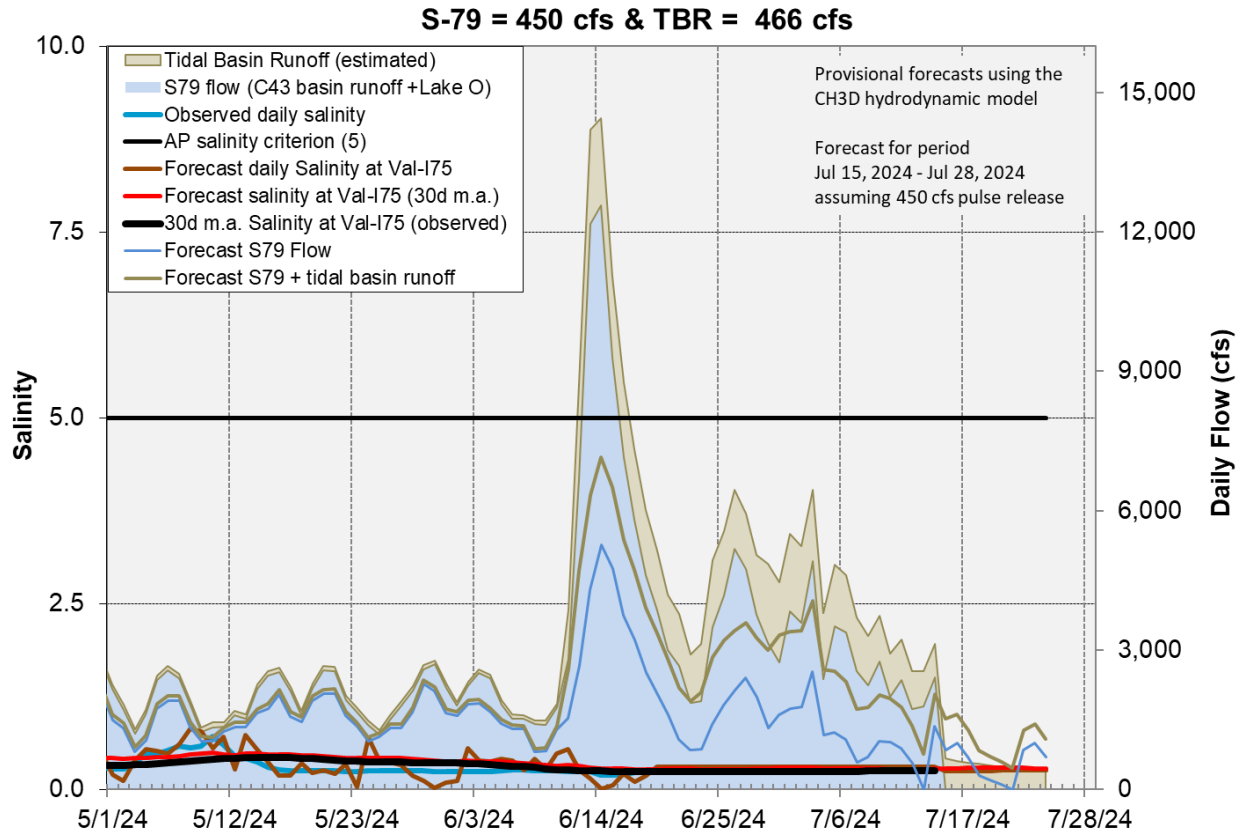


Figure ES-13. Surface salinity forecast at the Val I-75 site assuming no pulse release at S-79.

Stormwater Treatment Areas

STA-1E: STA-1E Central Flow-way is offline for construction activities. An operational restriction is in place in the Western Flow-way for post-construction vegetation grow-in and in the Eastern Flow-way for vegetation establishment following erosion repair. Online treatment cells are near or above target stage. (**Figure S-1**).

STA-1W: Treatment cells are near or above target stage. Vegetation in the flow-ways is highly stressed. The 365-day phosphorus loading rates (PLR) for the Eastern and Western Flow-ways are high, and the 365-day PLR for the Northern Flow-ways is below $1.0 \text{ g/m}^2/\text{year}$ (**Figure S-1**).

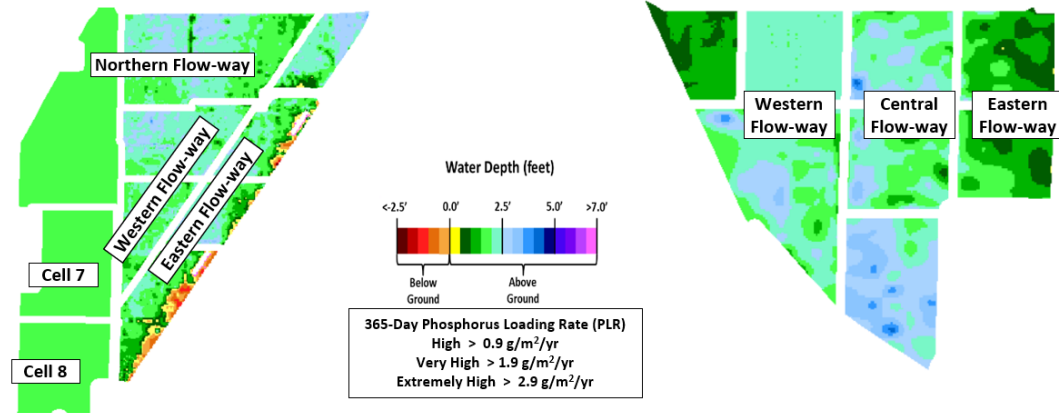
STA-2: Operational restrictions are in place in Flow-ways 2 and 4 for vegetation management activities, and in Flow-way 5 for construction activities. Online treatment cells are near or above target stage. Vegetation in Flow-ways 2, 3, and 4 is stressed, and in 5 is highly stressed. The 365-day PLRs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

STA-5/6: 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 $1.0 \text{ g/m}^2/\text{year}$, 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 – 7/8/2024 through 7/14/2024



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"> • High 365-day PLR • Highly stressed vegetation conditions
Northern	<ul style="list-style-type: none"> • Highly stressed vegetation conditions
Cell 6	
Cell 7+8	

STA-1E	Flow-way Status
Western	<ul style="list-style-type: none"> • Post-construction vegetation grow-in
Central	<ul style="list-style-type: none"> • Offline for construction activities
Eastern	<ul style="list-style-type: none"> • Online with restrictions for vegetation grow-in following erosion repair

Figure S-1. Eastern Flow Path Weekly Status Report

Central Flow Path Weekly Status Report – 7/8/2024 through 7/14/2024

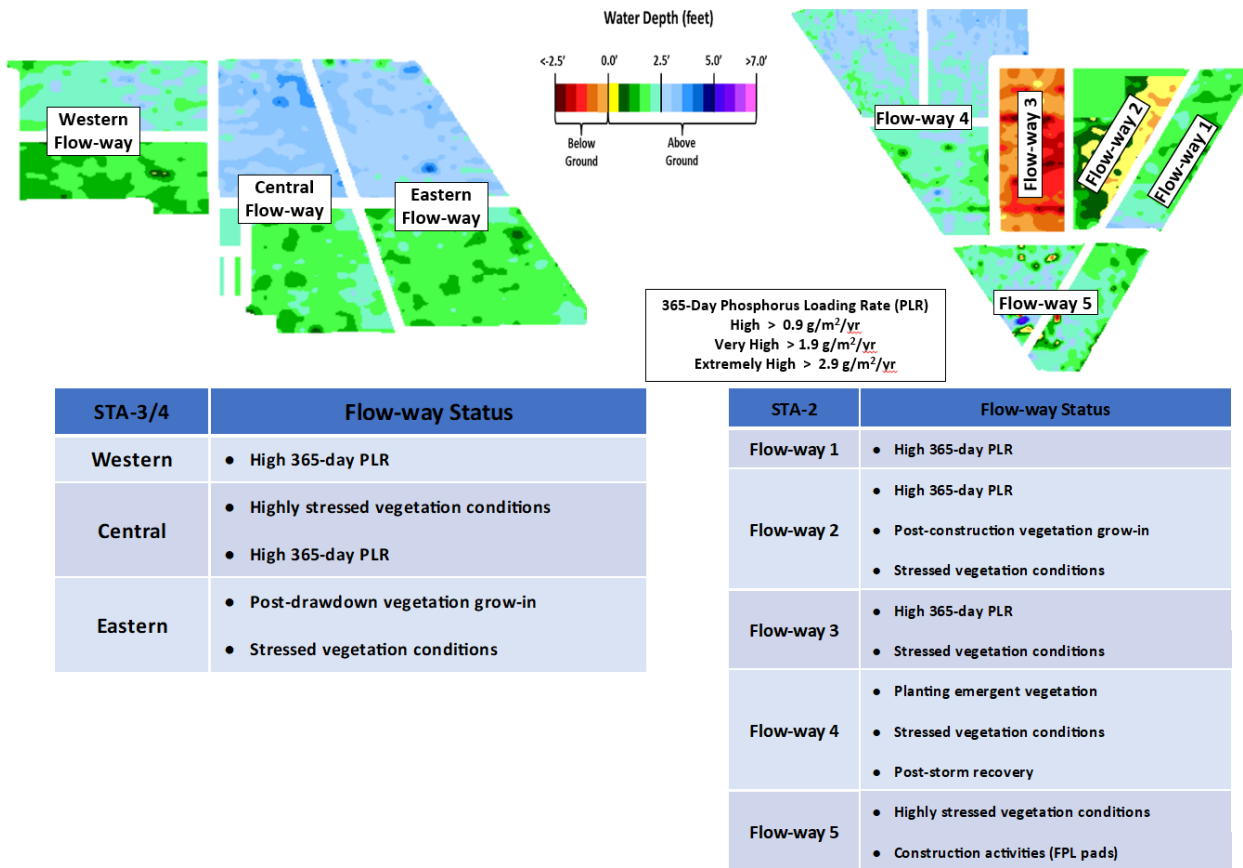


Figure S-2. Central Flow Path Weekly Status Report

Western Flow Path Weekly Status Report – 7/8/2024 through 7/14/2024

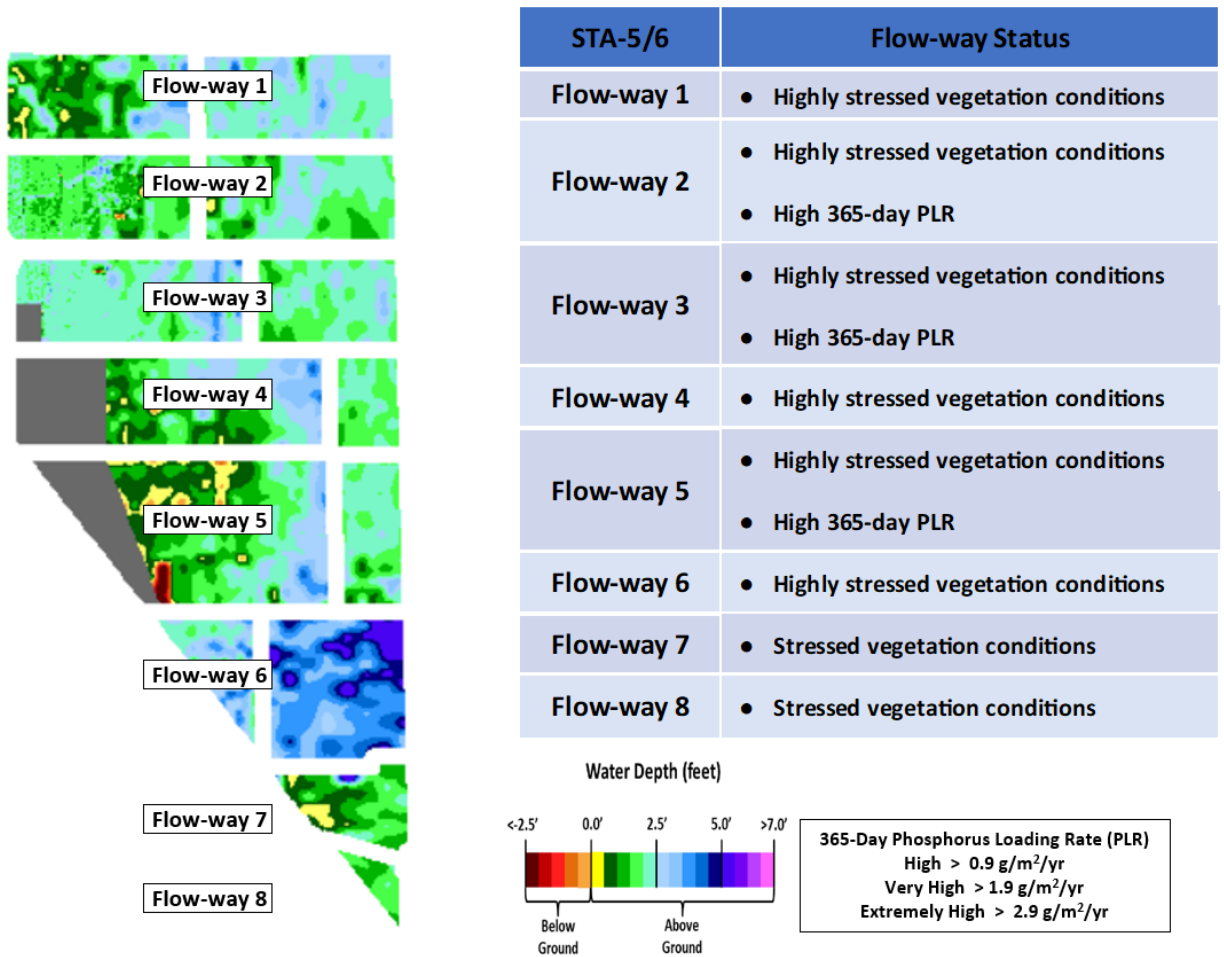


Figure S-3. Western Flow Path Weekly Status Report

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

Daily rainfall occurred throughout the Everglades last week with lower amounts compared to the previous week. WCA-1: Stage within the Arthur R. Marshall Loxahatchee Refuge remains above schedule and remained steady over the week. On Sunday the 3-Gauge average was 0.64 feet above the rising Zone A1 regulation line. WCA-2A: Stage at gauge 2A-17 also remains above schedule but continued a recession. The average on Sunday was 1.13 feet above the rising regulation line. WCA-3A: The 3-Gauge average stage continued a moderate ascension over the week, remaining above the Zone A regulation line by 1.02 feet on Sunday. WCA-3A North: Stage at Gauge 62 (NW corner) continues to fall but on Sunday remains above the increasing Upper Schedule line by 0.18 feet. See figures **EV-1** through **EV-4**.

Water Depths

The SFWDAT model output for 7/14/24 shows a hydro pattern that is dramatically deeper than two months ago, especially in Big Cypress National Preserve (BCNP). Pondered conditions continue to expand from the upper reaches of the L-67s south into the historically pondered region of southern WCA-3A and northern Everglades National Park (ENP). The northern end of the Refuge still has some potential for water at ground surface. Hydrologic connectivity is being maintained within the major sloughs of ENP. Current WDAT water depth estimates are wetter when compared to one month ago across the EPA, less so in WCA-1 and WCA-2B. The comparison to modeled conditions a year ago illustrates a mix of slightly deeper and drier conditions. Portions of WCA-1, southern ENP and most of WCA-2A are significantly lower in depth, with the rest of system being deeper, particularly to the west.

Comparing current conditions to the 20-year percentiles on July 14th, depth conditions remain near the 90th percentile for this time of the year for much of WCA-3B, ENP and BCNP. In WCA-1 and WCA-2A, conditions remain variable (**Figure EV-7**).

Taylor Slough and Florida Bay

Most stages decreased across Taylor Slough over the past week, with an average decrease of 0.03 feet. Changes ranged from -0.10 feet at Taylor Slough Bridge (TSB) to +0.01 at EVER6 in the 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 6.4 inches compared to before the Florida Bay initiative (starting in 2017), a decrease of 0.5 inches relative to last week's comparison. Both the Craighead Pond (CP) and TSB stages are below estimated historical levels by 0.34 and 0.78 feet, respectively.

Average Florida Bay salinity was 25.0, a decrease of 0.2 from last week. Salinity changes were minimal at most sites, ranging from -2.1 at Terrapin Bay (TB) in the central nearshore region to +1.1 at Whipray Basin (WB) in the central offshore region (**Figure EV-8**). Salinity remains within the WY2001-2016 Interquartile Range (IQR) and above estimated historical levels in the western and central regions and is below the IQR and at historical levels in the eastern region (**Figure EV-10**). Average Florida Bay salinity

remains below its recent average for this time of year by 5.0, with no change from last week.

Salinity at the Taylor River (TR) station in the mangrove zone (tracked for the Florida Bay MFL) was 1.3. The 30-day moving average was 4.6, a decrease of 3.3 from last week (**Figure EV-11**). The 365-day moving sum of flow from the five creeks was unable to be assessed this week due to missing data (**Figure EV-11**).

Average rainfall across Taylor Slough and Florida Bay was 1.43 inches over the past week, based on the 18 gauges used for this report. Rainfall ranged from 0.44 inches at WB in the central region to 2.93 inches at Royal Palm Lake (RPL) in the north (**Figure EV-12**). Wind directions and speeds in Florida Bay ranged from 0.4 mph W on July 11th to 22.5 mph NE on July 14th (**Figure EV-12**).

Total creek flow for the week was unable to be assessed due to missing data, but flows appear to be net positive (**Figure EV-13**). Considering the data available, average daily flow from the five major creeks (McCormick, Taylor, Mud, Trout, West Highway) totaled 1,838 acre-feet.

Implications for water management

The ecology of the Everglades benefits from ascension rates of less than 0.18 feet per week. Dynamic Position Analysis modeling for gauge 3-63 in northeast WCA-3A indicates a low probability of reaching the threshold depths required for an above average nesting event at the Alley North colony. Continued freshwater inputs to the park and into Florida Bay are helping to maintain ecologically desirable salinities, and maintaining inputs of water southward will help prevent ecologically undesirable salinity swings in Florida Bay nearshore areas. 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	0.97	+0.05
WCA-2A	0.70	-0.16
WCA-2B	0.62	-0.13
WCA-3A	0.85	+0.00
WCA-3B	0.28	-0.03
ENP	0.79	-0.04

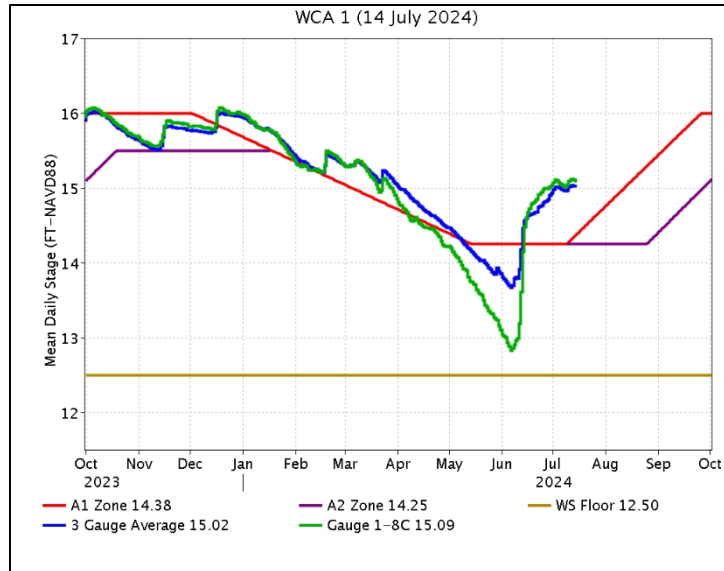


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

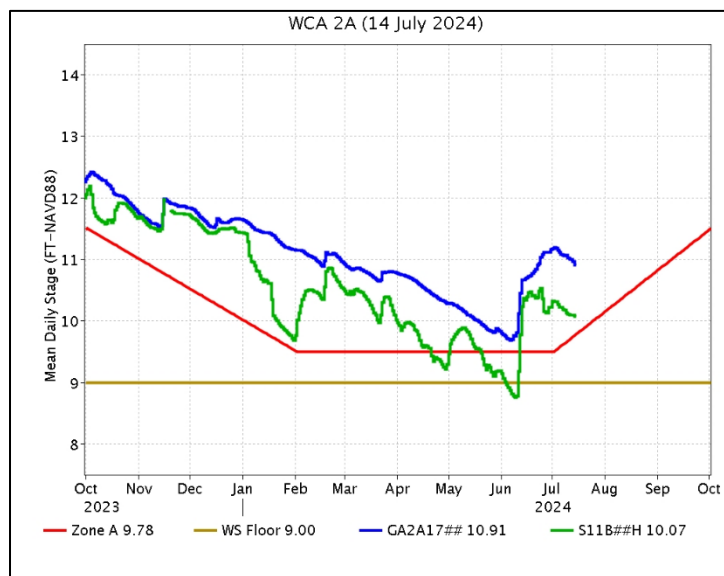


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

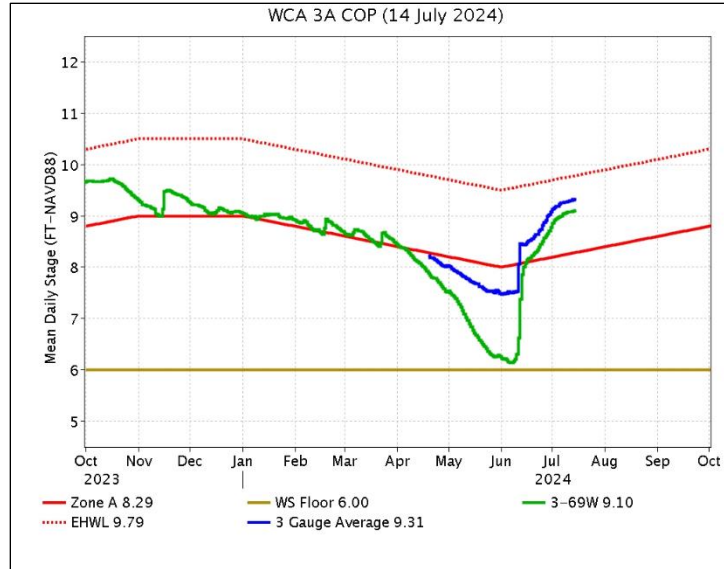


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, 3-69W) and regulation schedule.

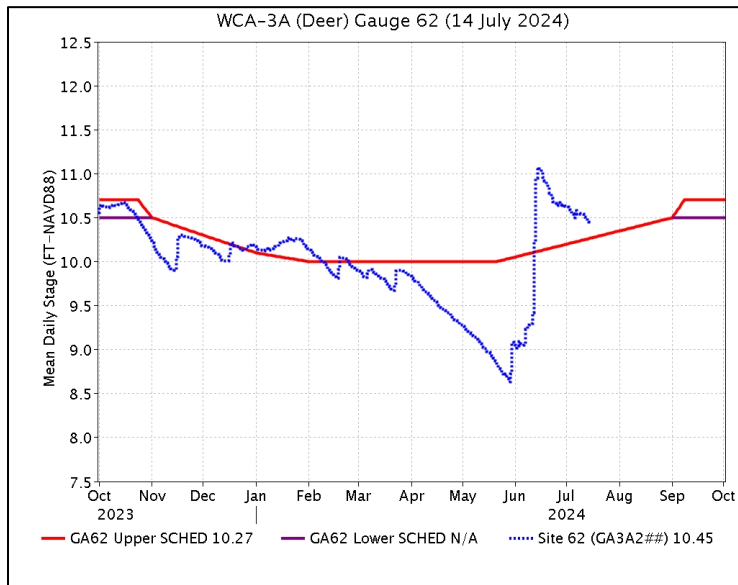


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and GA62 regulation schedule.

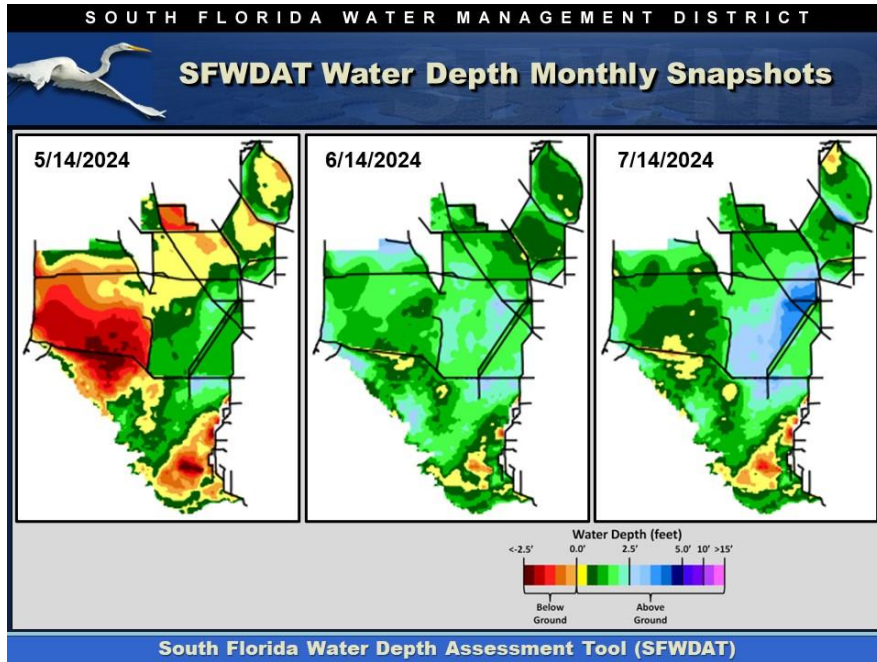


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

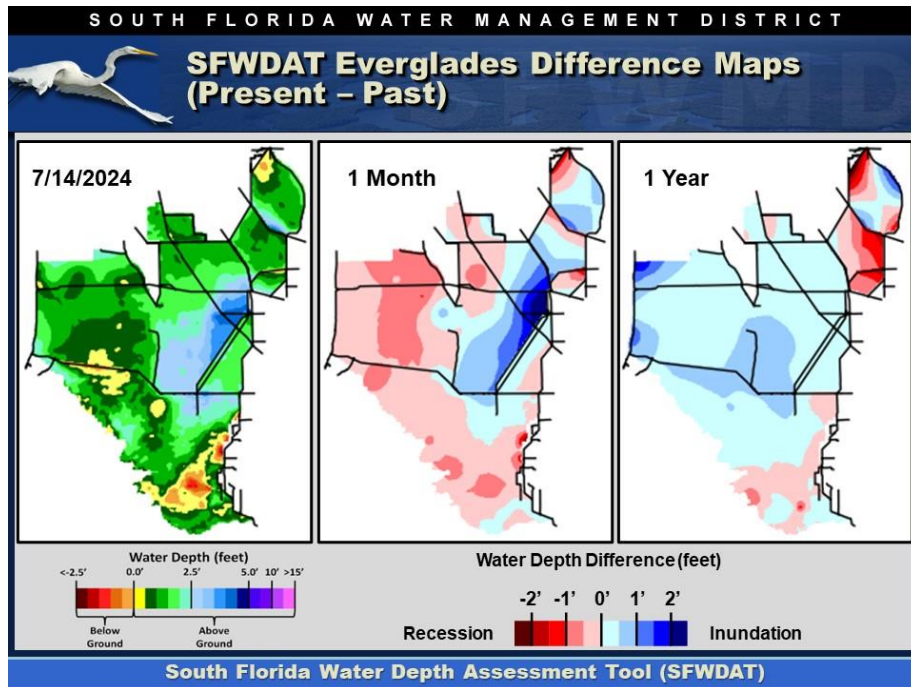


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

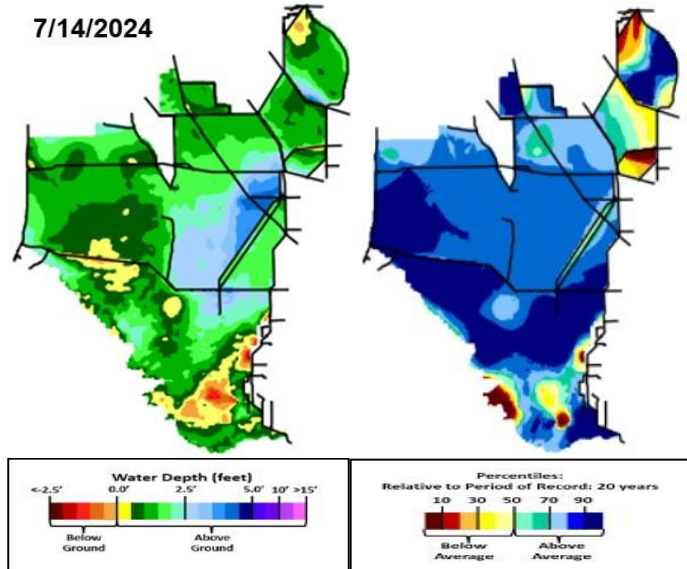


Figure EV-7. Present water depths (7/7/2024) compared to the day of year average over the previous 20 years.

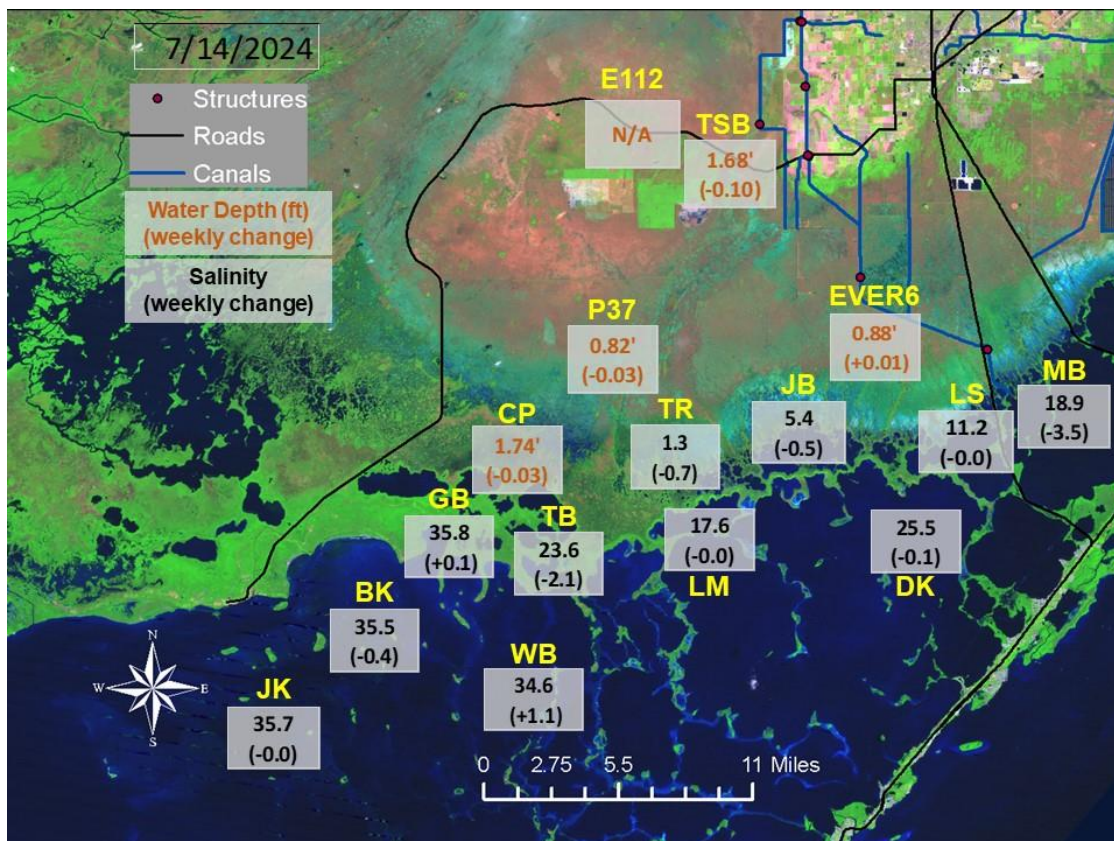


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

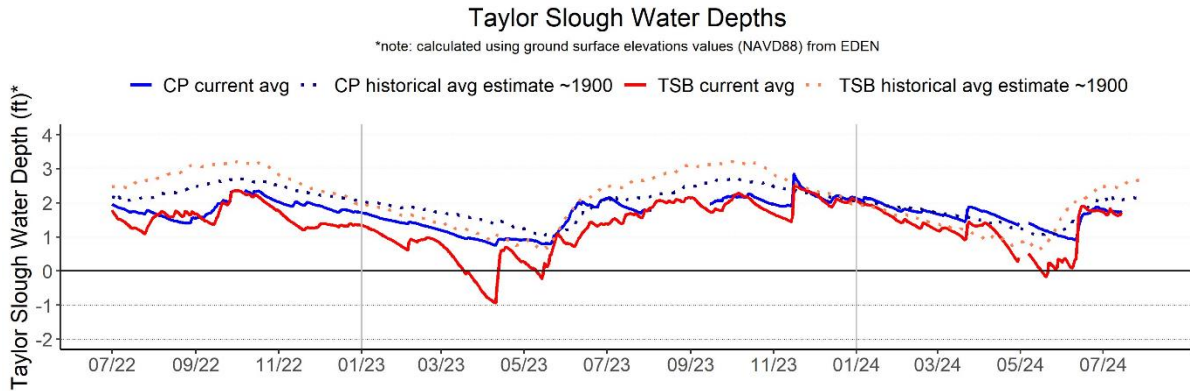


Figure EV-9. Taylor Slough water depth time series for Taylor Slough Bridge (TSB; northern slough) and Craighead Pond (CP; southern slough).

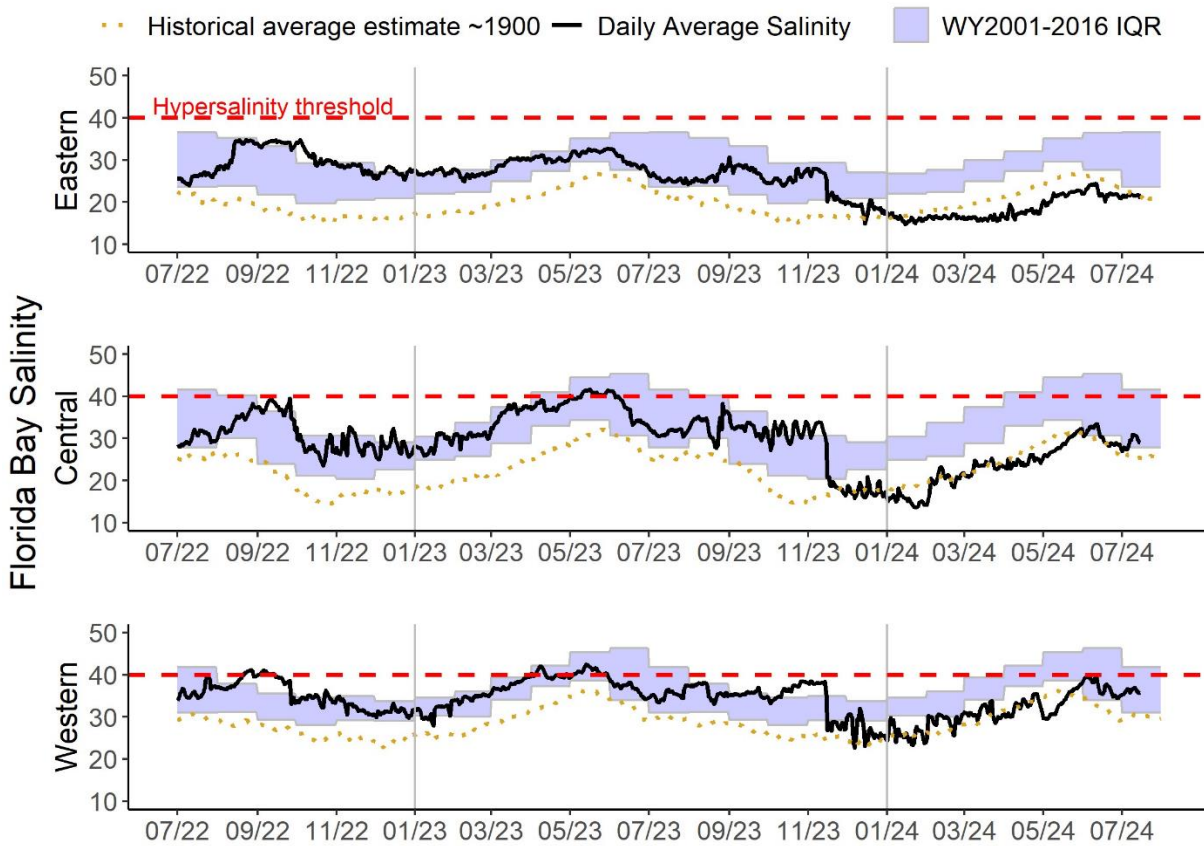


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with WY2001-2016 interquartile (25-75 percentile) ranges and estimated historical daily average salinities. The hypersalinity threshold indicates the level at which salinities start to become harmful to seagrass.

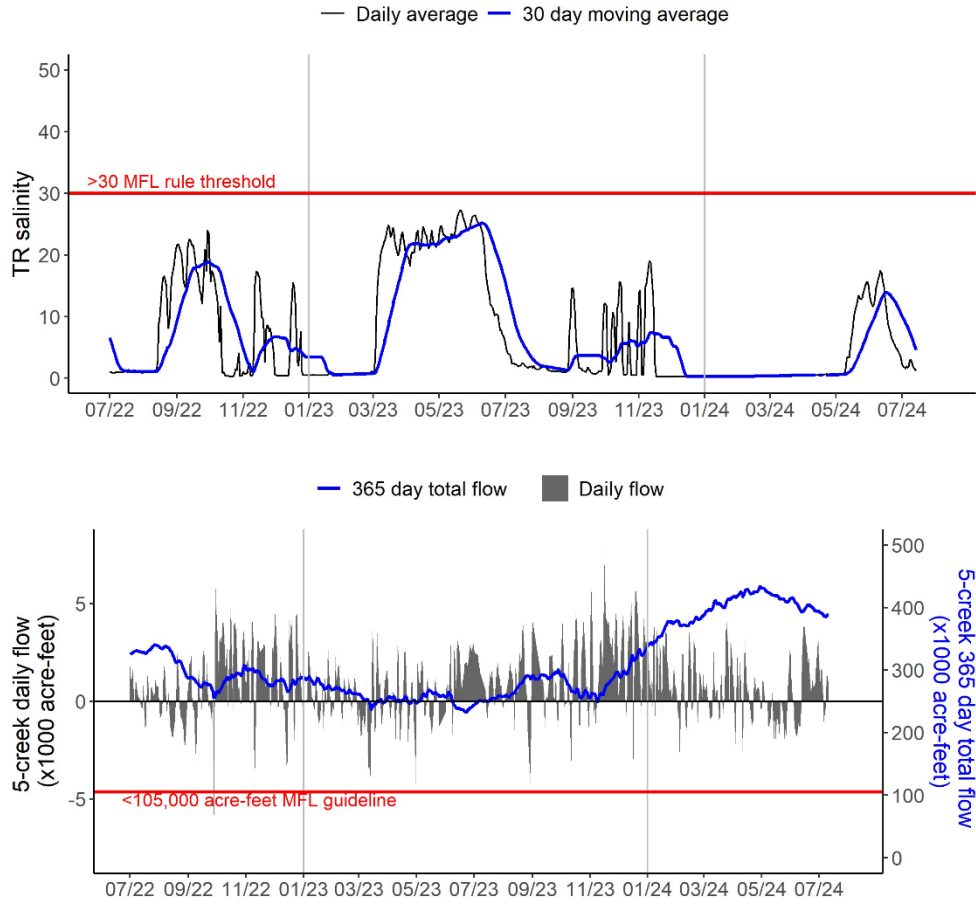


Figure EV-11. Salinity at Taylor River (TR; top) and creek inflow to Florida Bay (bottom) from the five major creeks (McCormick Creek, Taylor River, Mud Creek, Trout Creek, and West Highway Creek). The 30-day moving average salinity and 365-day total creek flow are tracked for the Florida Bay MFL criteria.

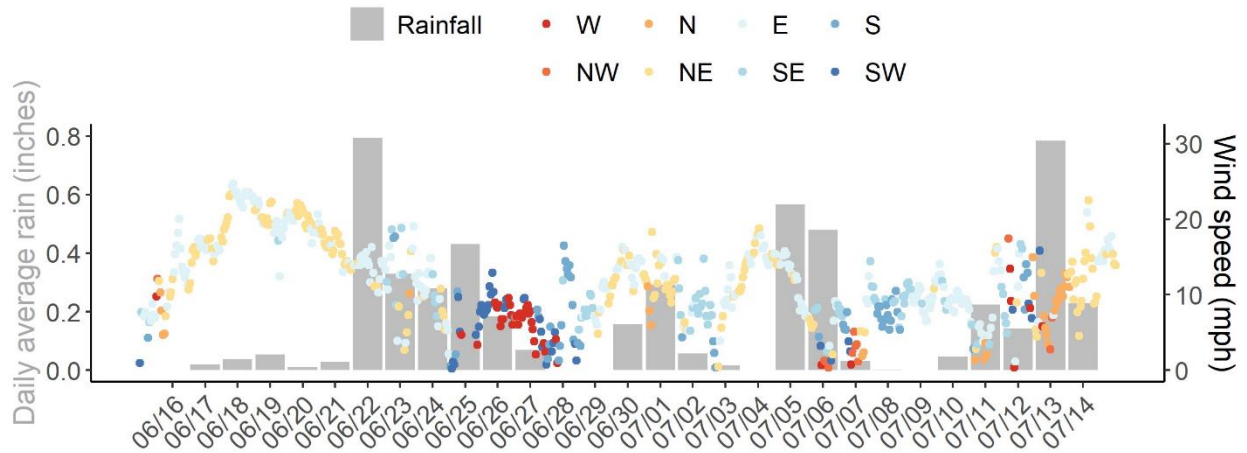


Figure EV-12. Daily average rain across Taylor Slough and Florida Bay, along with hourly average wind speed and direction (measured at Long Key) in Florida Bay over the past four weeks.

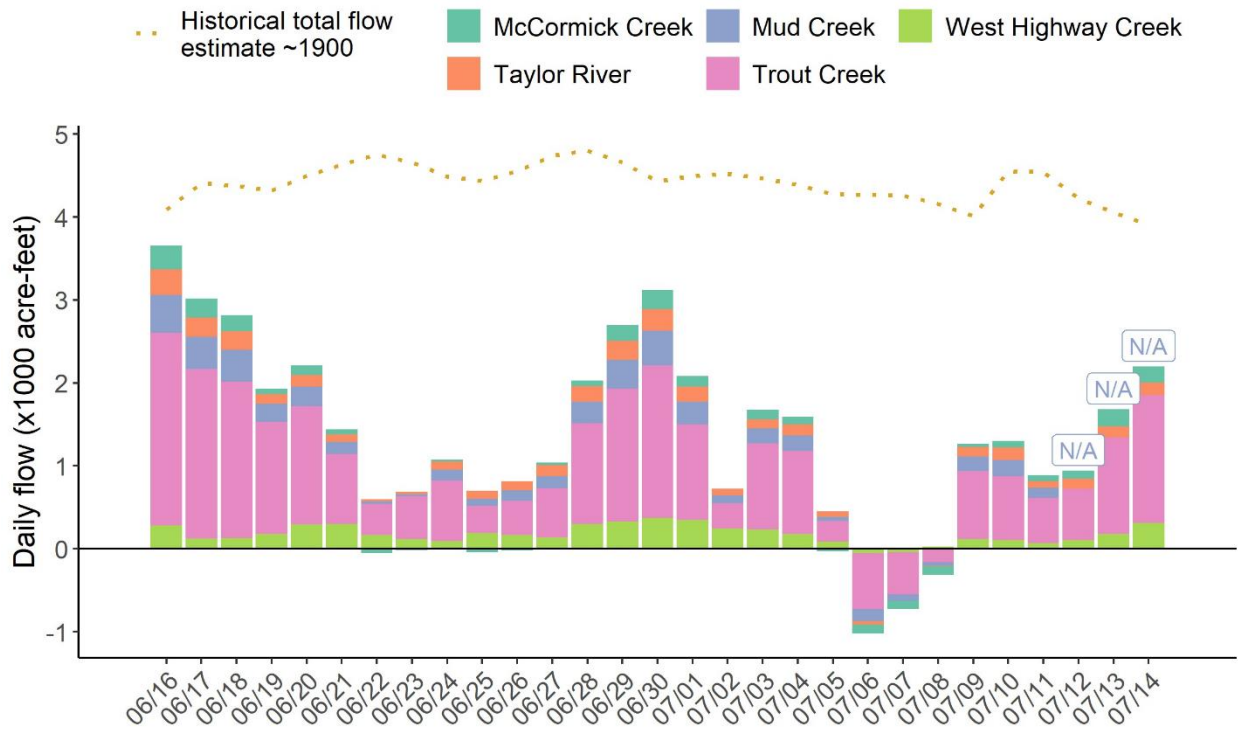


Figure EV-13. Daily average creek flow summed between five creeks with estimated historical daily flow over the past four weeks.

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

SFWMD Everglades Ecological Recommendations, July 16, 2024 (red is new)			
	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.05'	Ascension rate of less than 0.18' per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage decreased by 0.16'	Ascension rate less than 0.18' per week.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage decreased by 0.12'	Ascension rate of less than 0.18' per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage increased by 0.03'	Ascension rate of less than 0.18' per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NW	Stage decreased by 0.13'	Ascension rate of less than 0.18' per week.	
Central WCA-3A S	Stage increased by 0.05'	Ascension rate of less than 0.18' per week.	Protect within basin wildlife.
Southern WCA-3A S	Stage increased by 0.06'	Ascension rate of less than 0.18' per week.	
WCA-3B	Stage decreased by 0.03'	Ascension rate of less than 0.18' per week.	Protect within basin and downstream habitat and wildlife.
ENP-SRS	Stage decreased by 0.04'	Make discharges to ENP according to COP and TTFP protocol while adaptively considering upstream and downstream ecological conditions.	Protect within basin and upstream habitat and wildlife.
Taylor Slough	Stage changes ranged from -0.10' to +0.01'	Move water southward as possible.	When available, provide freshwater to promote water movement.
FB- Salinity	Salinity changes ranged from -2.1 to +1.1	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 658 cfs, and the previous 30-day mean inflow was 1,251 cfs. The seven-day mean salinity was 22.6 at BBCW8 and 21.4 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data were provided by Biscayne National Park.

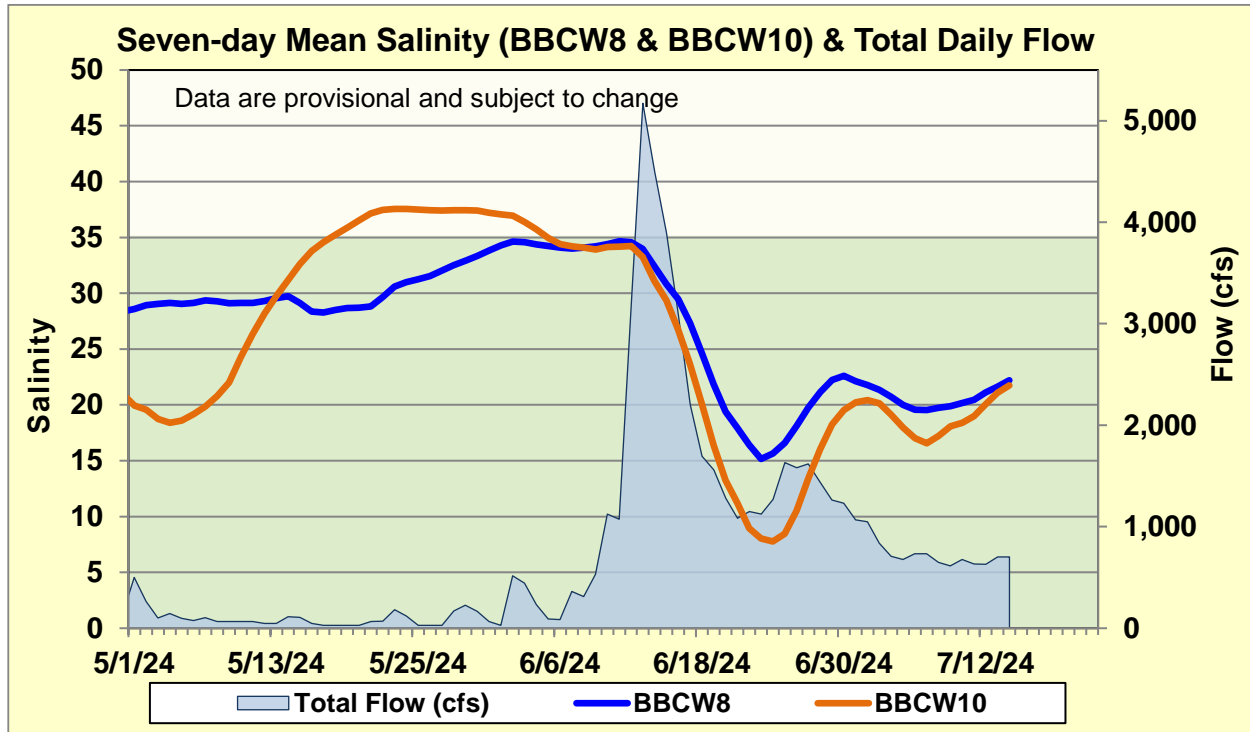


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.