

Disclaimer: Information contained in the report addresses environmental conditions only and is not the official South Florida Water Management District operations recommendation or decision.

## **M E M O R A N D U M**

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

**FROM:** SFWMD Staff Environmental Advisory Team

**DATE:** June 26, 2024

**SUBJECT:** Weekly Environmental Conditions for Systems Operations

### **Summary**

#### **Weather Conditions and Forecast**

On Wednesday, the shower and thunderstorm activity are expected in and around Lake Okeechobee due to the approach of an upper-air disturbance. Drier conditions on Thursday will lead to a substantial reduction in daily rainfall, with isolated to scattered showers and thunderstorms concentrated over the center and eastern interior. By Saturday, mid-level high pressure will cause the wind direction to veer easterly and concentrate most of the afternoon showers and thunderstorms along the southwest coast. Below 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. No releases were made in the last seven days to slow the rate of lake stage rise. Weekly average discharge on June 23, 2024, was 140 cfs and 300 cfs at S-65 and S-65A, respectively. Mean weekly water depth on the Kissimmee River floodplain for the week ending June 23, 2024 remained unchanged from the previous week at 0.08 feet. The weekly average concentration of dissolved oxygen in the Kissimmee River decreased from 6.9 mg/L the previous week to 5.0 mg/L for the week ending June 23, 2024, which is well above the potentially lethal and stressful levels for largemouth bass and other sensitive species.

#### **Lake Okeechobee**

Lake Okeechobee stage was 12.11 feet NAVD88 (13.39 ft NGVD29) on June 23, 2024, which was 0.03 feet higher than the previous week and 0.14 feet higher than a month ago. Average daily inflows (excluding rainfall) decreased from the previous week, at 1,300 cfs, compared to 4,190 cfs, with back-pumping reduced to 170 cfs from 2,340 cfs. Average daily outflows (excluding evapotranspiration) decreased from the previous week, from 300 cfs to 0 cfs. The last wading bird survey of the 2024 breeding season (conducted June 20, 2024) reported approximately 800 wading birds actively foraging on the Lake. In the most recent non-obscured satellite image from June 24<sup>th</sup>, 2024, NOAA's Harmful

Algal Bloom Monitoring System suggested moderate to high cyanobacteria concentrations throughout much of the Lake.

### **Estuaries**

Total inflow to the St. Lucie Estuary averaged 1,155 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities decreased at all 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 4,780 cfs over the past week with 5 cfs coming from Lake Okeechobee. Mean salinities remained the same at S-79 and Val I-75, increased at Shell Point, 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 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, June 23, 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 69,300 ac-feet. The total amount of inflows to the STAs in WY2025 is approximately 258,000 ac-feet. STA cells are above target stage. STA-1E Eastern Flow-way is offline for rehydration and vegetation establishment following erosion repair. Operational restrictions are in effect in STA-1E Western Flow-way, STA-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 throughout the Everglades are returning to ecologically beneficial states for apple snail reproduction compared to the previous week, however, WCA-1 was still showing high ascension rates which can reduce success of apple snail reproduction. Taylor Slough stage changes were variable over the past week with slightly increasing trends in the southern portion of Taylor Slough and slightly decreasing trends in the northern portion. Average salinity in Florida Bay showed a slight decrease with overall reductions across all regions. The eastern and central regions of the bay fall below and level, respectively, with the historical salinity estimates for this time of year. The western region is at the lower end of the 15-year pre-Florida bay initiative IQR. Florida Bay MFL metrics remain well outside thresholds of harm. Taylor slough stage reductions, steadily decreasing creek flows and slightly reduced salinity levels in the bay this week may be remnant affects from the record rain event throughout the park in the previous week.

### **Biscayne Bay**

Total inflow to Biscayne Bay averaged 3,107 cfs and the previous 30-day mean inflow averaged 1,567 cfs. The seven-day mean salinity was 15.7 at BBCW8 and 7.7 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 June 23, 2024, mean daily lake stages were 54.0 feet NAVD (1.5 feet below schedule) in East Lake Toho, 50.9 feet NAVD (1.4 feet below schedule) in Lake Toho, and 47.8 feet NAVD (2.0 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

#### *Lower Kissimmee*

For the week ending June 23, 2024, mean weekly discharge was 140 cfs and 300 cfs at S-65 and S-65A, respectively. Mean weekly discharge from the Kissimmee River was 440 cfs and 430 cfs at S-65D and S-65E, respectively (**Table KB-2**). Mean weekly headwater stages were 45.0 feet NAVD at S-65A and 24.6 feet NAVD at S-65D on June 23, 2024. Mean weekly river channel stage for the week ending on June 23, 2024 decreased by 0.1 feet from the previous week to 31.6 feet NAVD (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain for the week ending June 23, 2024 remained unchanged from the previous week at 0.08 feet (**Table KB-2, Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River decreased from 6.9 mg/L the previous week to 5.0 mg/L for the week ending June 23, 2024 (**Table KB-2, Figure KB-6**).

#### **Water Management Recommendations**

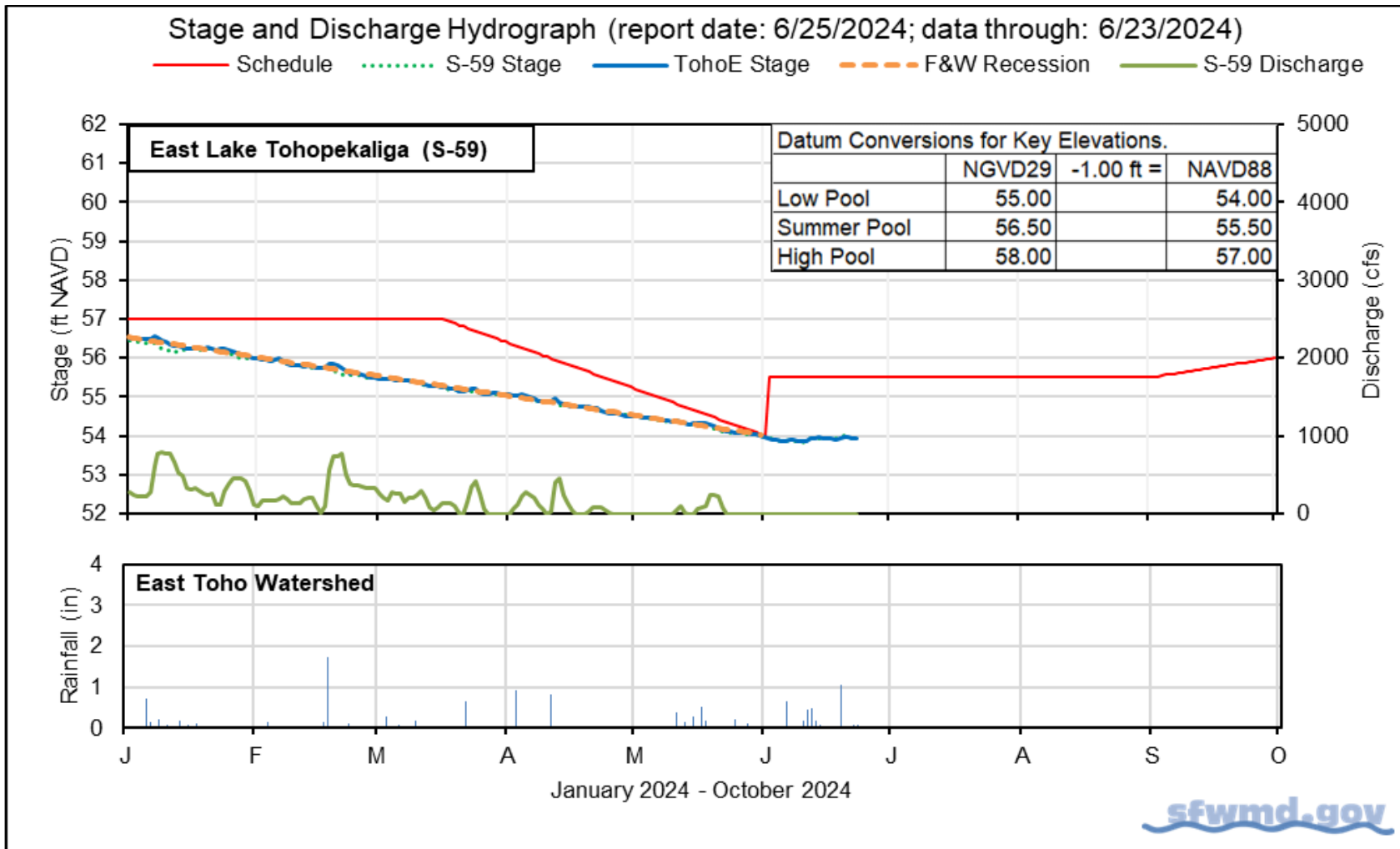
Follow the Hybrid A discharge plan for S-65/S-65A (**Figure KB-7**) until further notice. Maintain at least minimum flow (250-300 cfs) at S-65A. Allow stages to rise in Lakes East Toho, Toho and Kissimmee, but keep ascension rates slower than 0.25 ft/week to the extent possible. Avoid sudden increases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

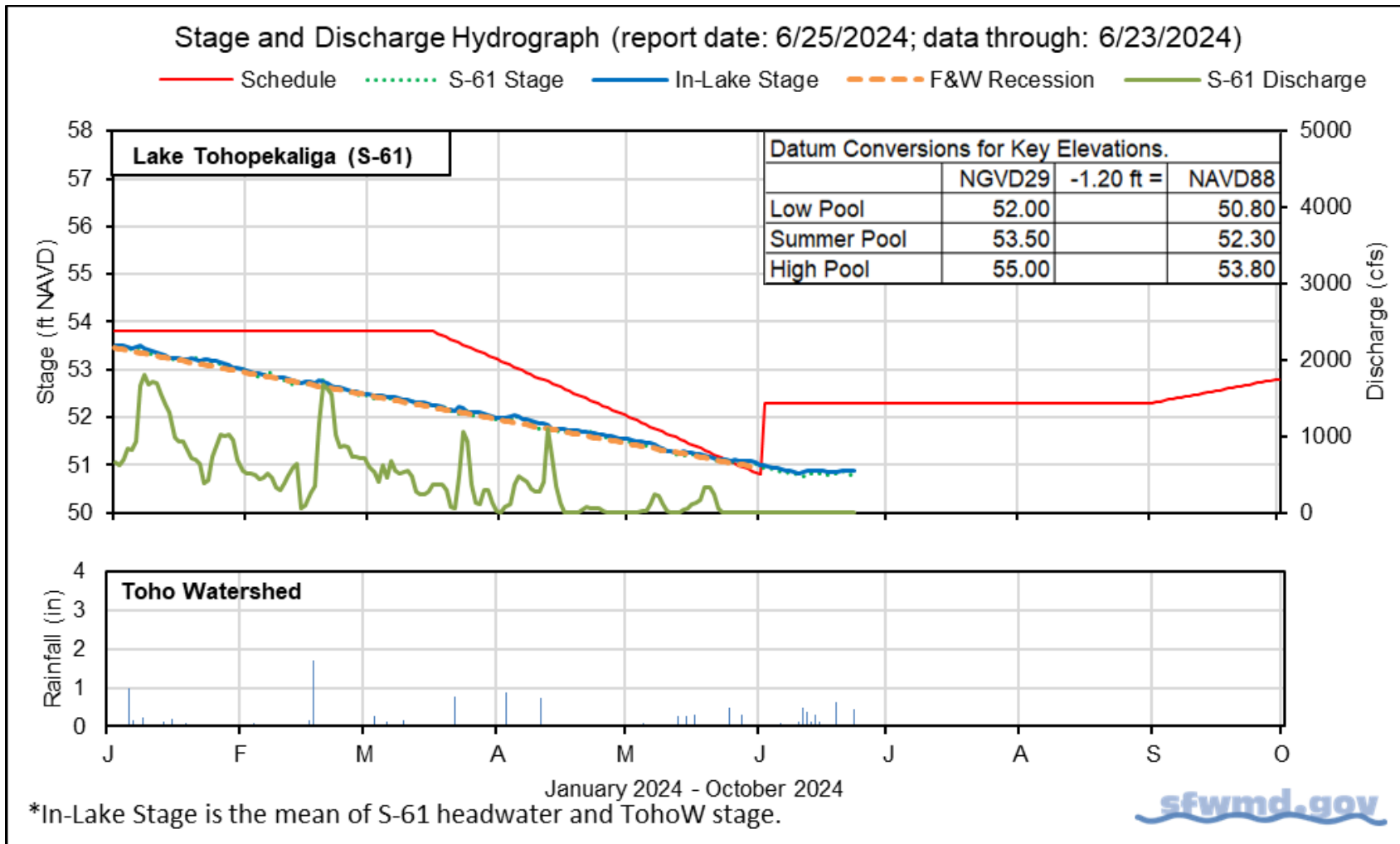
Water Body	Structure	Stage Monitoring Site	Weekly (7-Day) Average Discharge (cfs)	Sunday Lake Stage (feet NAVD) <sup>a</sup>	Schedule Type <sup>b</sup>	Sunday Schedule Stage (feet NAVD)	Sunday Departure from Regulation (feet)	
							6/23/24	6/16/24
Lakes Hart and Mary Jane	S-62	LKMJ	0	58.2	R	58.9	-0.7	-0.7
Lakes Myrtle, Preston and Joel	S-57	S-57	0	58.8	R	60.0	-1.2	-1.3
Alligator Chain	S-60	ALLI	0	60.9	R	62.2	-1.3	-1.3
Lake Gentry	S-63	LKGT	0	58.2	R	59.9	-1.7	-1.6
East Lake Toho	S-59	TOHOE	0	54.0	R	55.5	-1.5	-1.6
Lake Toho	S-61	TOHOW S-61	0	50.9	R	52.3	-1.4	-1.4
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	140	47.8	R	49.8	-2.0	-1.9

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.

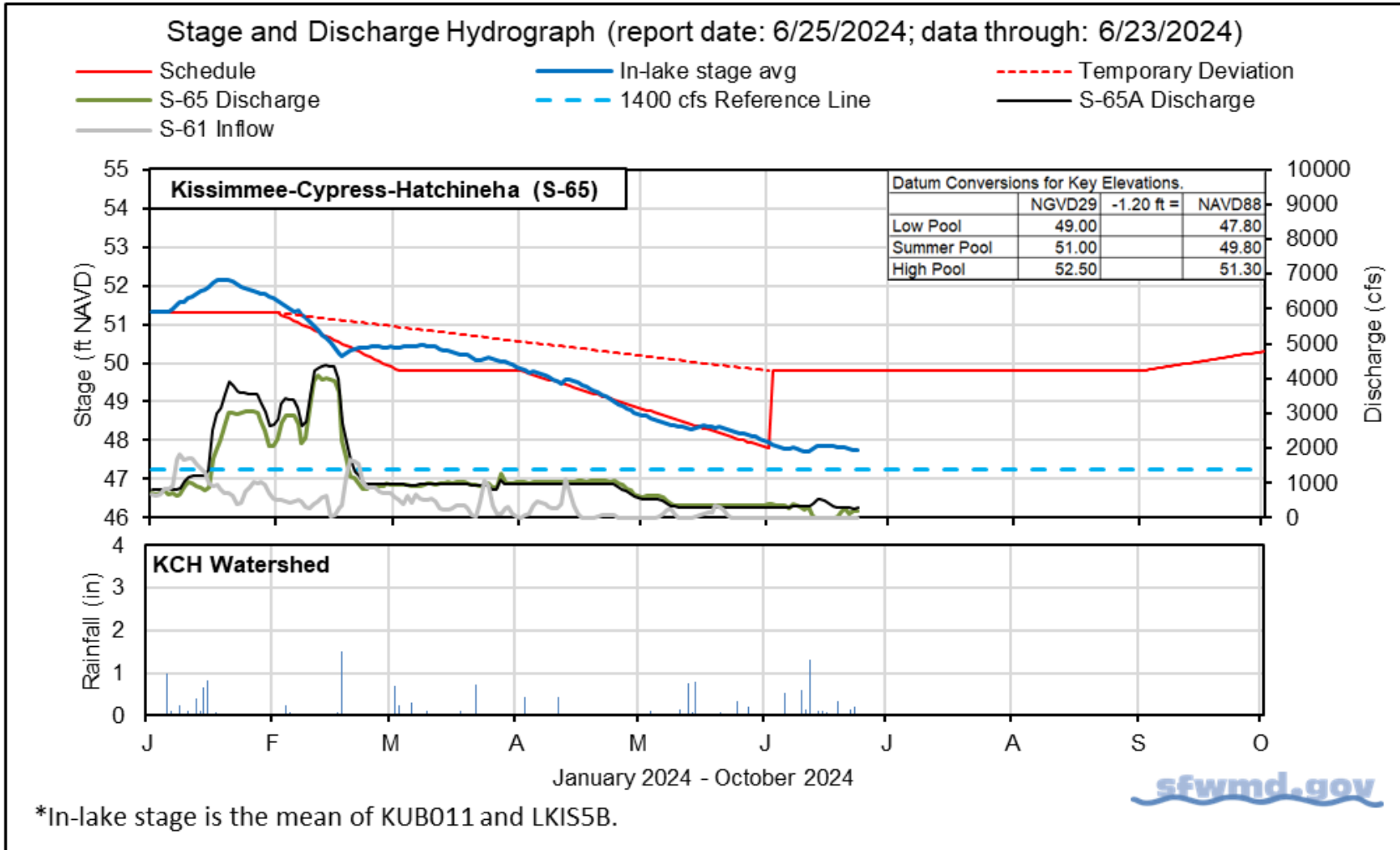
b. A: projected recession line; R: USACE regulation schedule; S: temporary recession target line; T: temporary schedule; NA: not applicable or not available.



**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			
		6/23/24	6/23/24	6/16/24	6/9/24	6/2/24
Discharge	S-65	180	140	86	340	360
Discharge	S-65A <sup>a</sup>	290	300	430	310	310
Headwater Stage (feet NAVD)	S-65A	44.6	45.0	45.5	45.1	45.1
Discharge	S-65D <sup>b</sup>	370	440	450	260	270
Headwater Stage (feet NAVD)	S-65D <sup>c</sup>	24.5	24.6	24.6	24.6	24.5
Discharge (cfs)	S-65E <sup>d</sup>	390	430	450	220	230
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) <sup>e</sup>	Phase I, II/III river channel	4.1	5.0	6.9	7.6	7.9
River channel mean stage <sup>f</sup>	Phase I river channel	31.1	31.6	31.7	31.0	31.0
Mean depth (feet) <sup>g</sup>	Phase I floodplain	0.08	0.08	0.08	0.07	0.07

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.

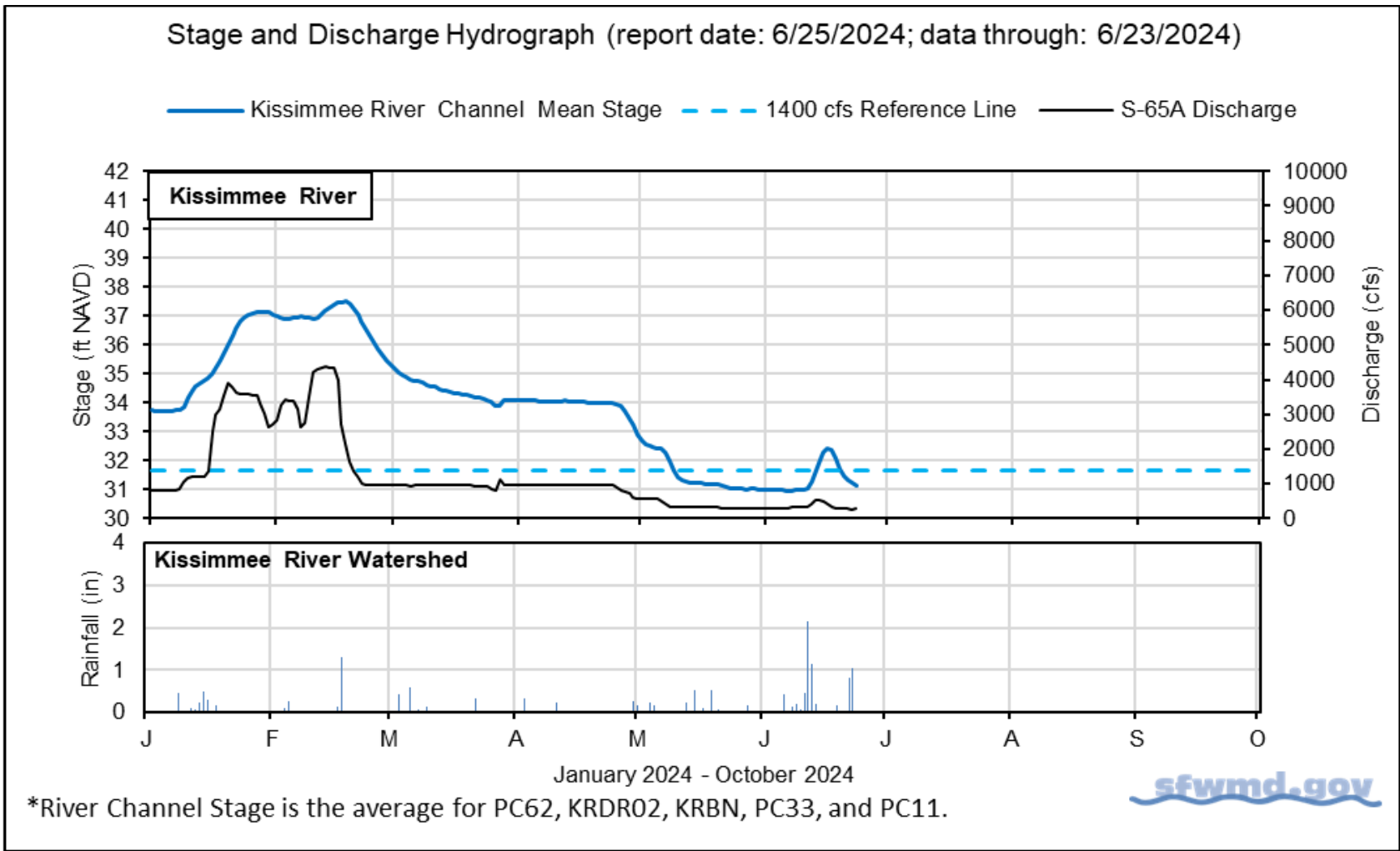
d. Combined discharge from S-65E and S-65EX1.

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

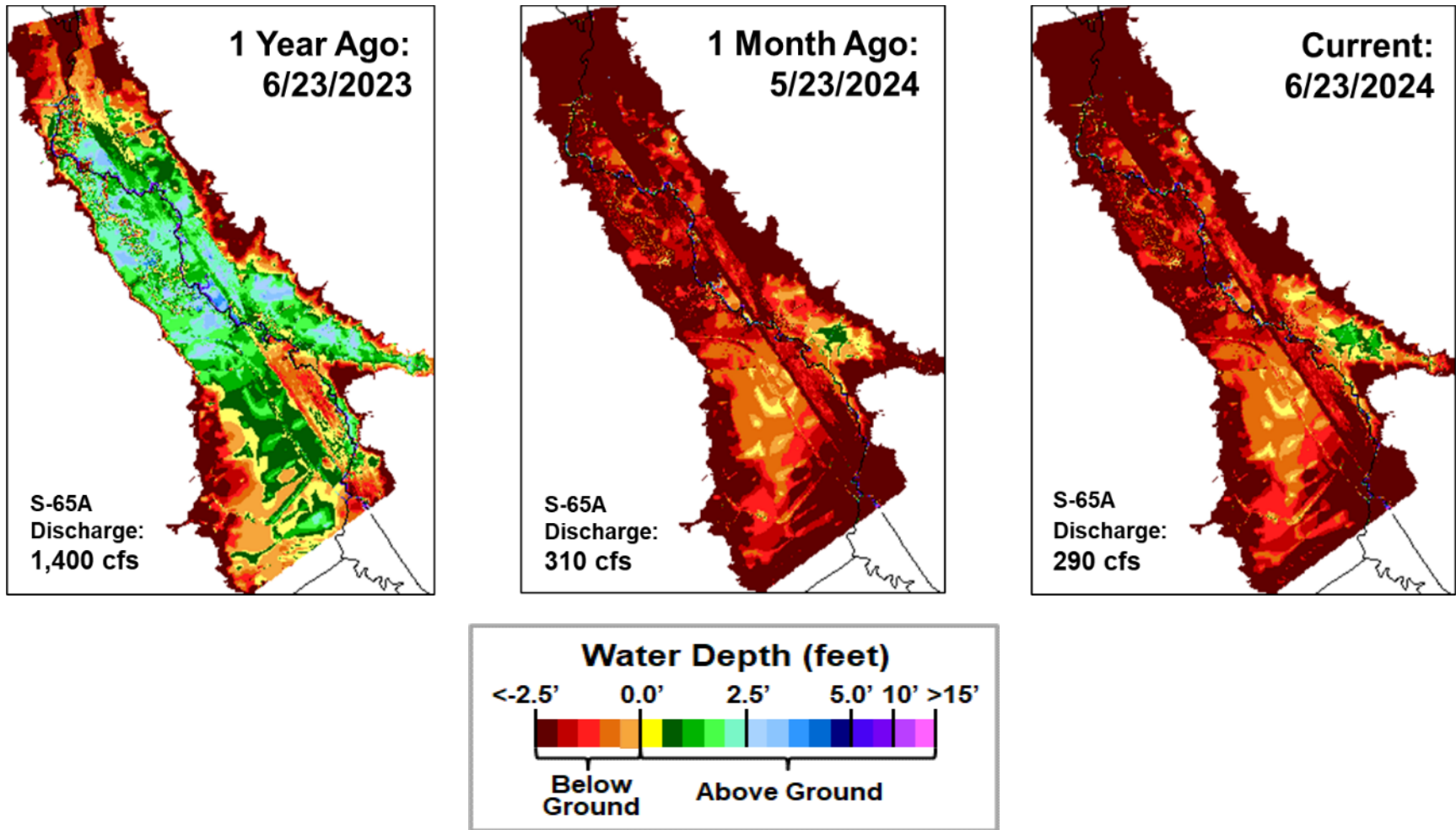
f. Mean of five river channel stations (PC62, KRDR02, KRBN, PC33, PC11) in the Phase I area.

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

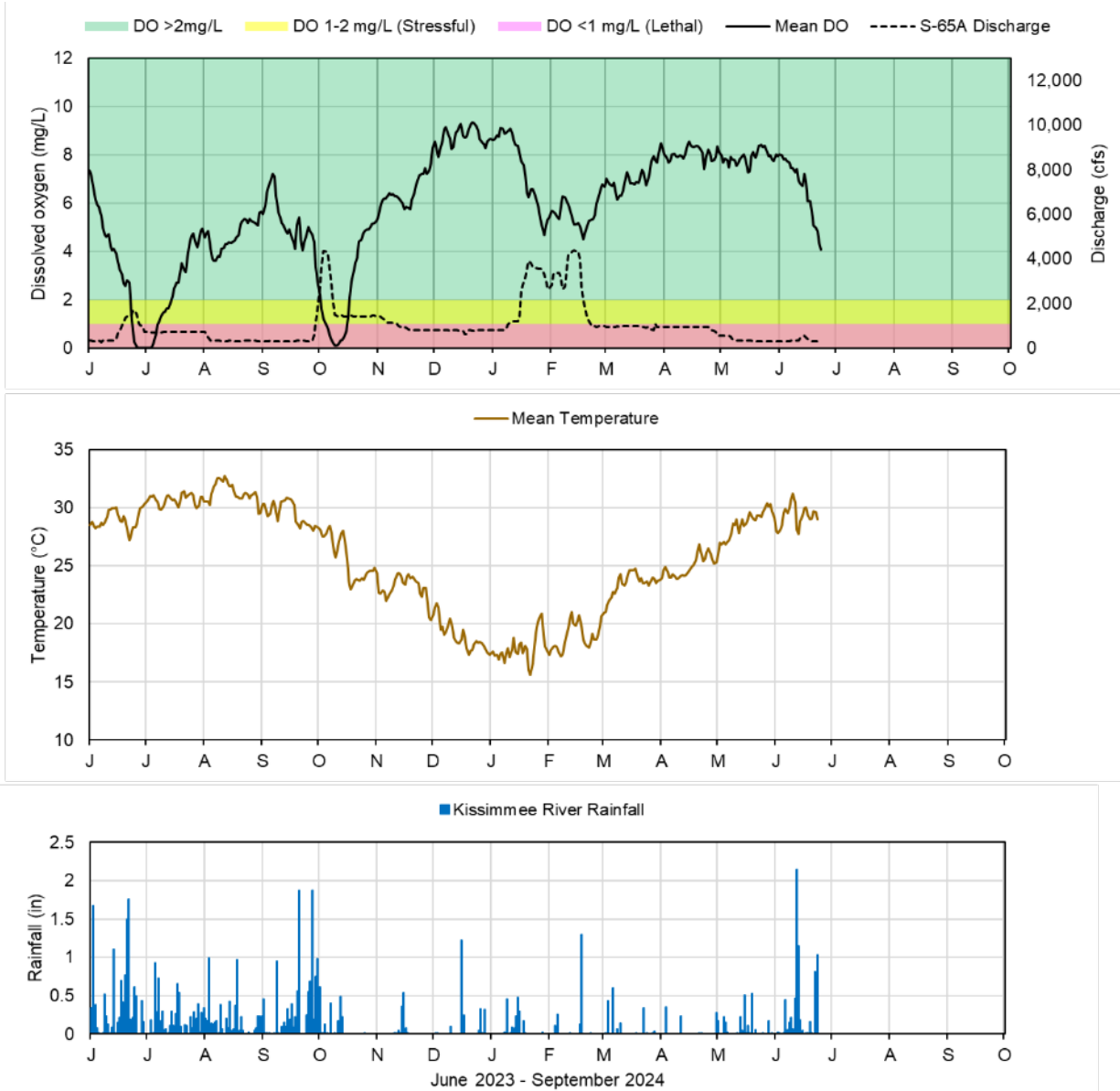




**Figure KB-4.** Kissimmee River stage, discharge and rainfall.



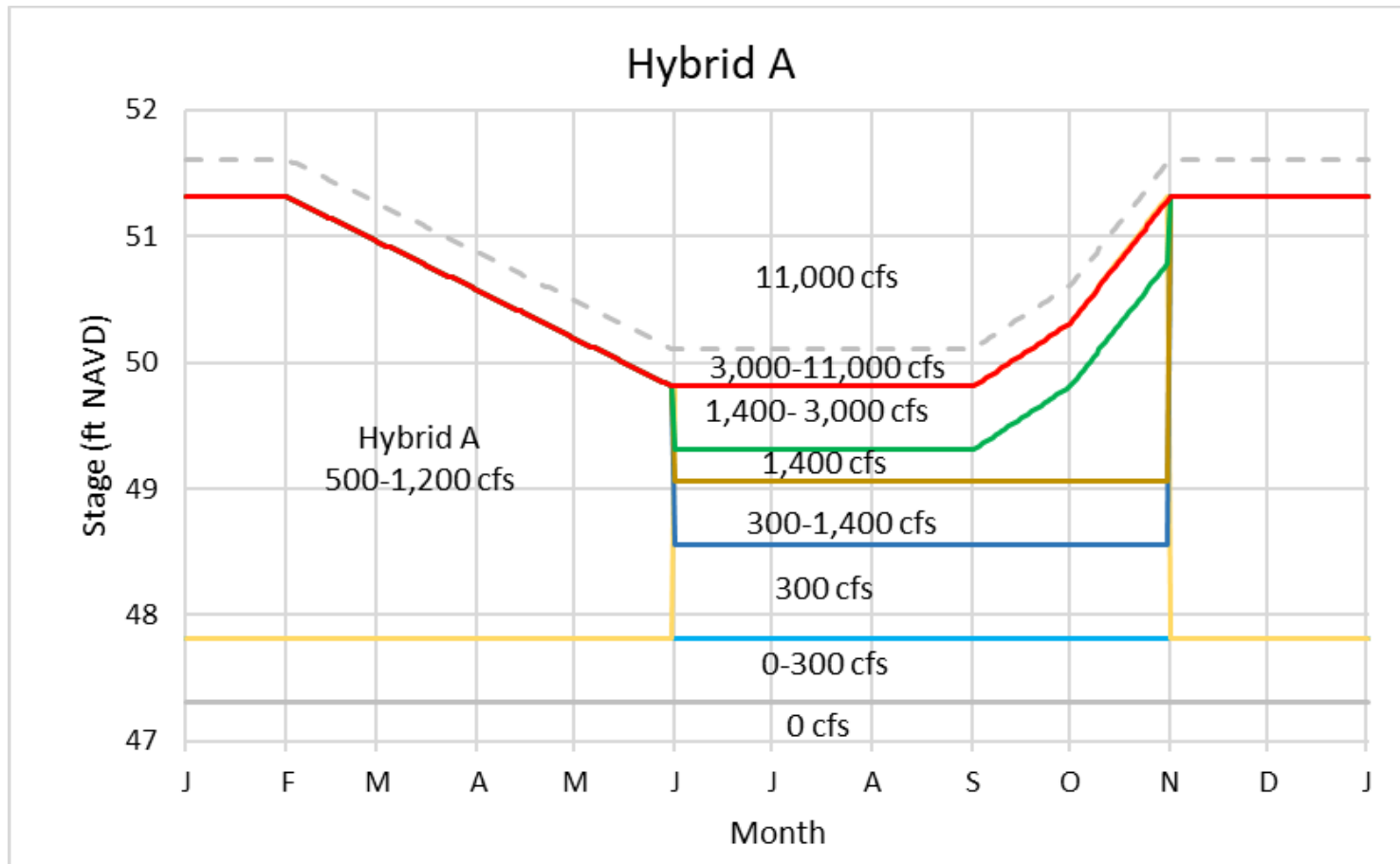
**Figure KB-5.** Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.



Report Date: 6/25/2024; data are through: 6/23/2024



**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.



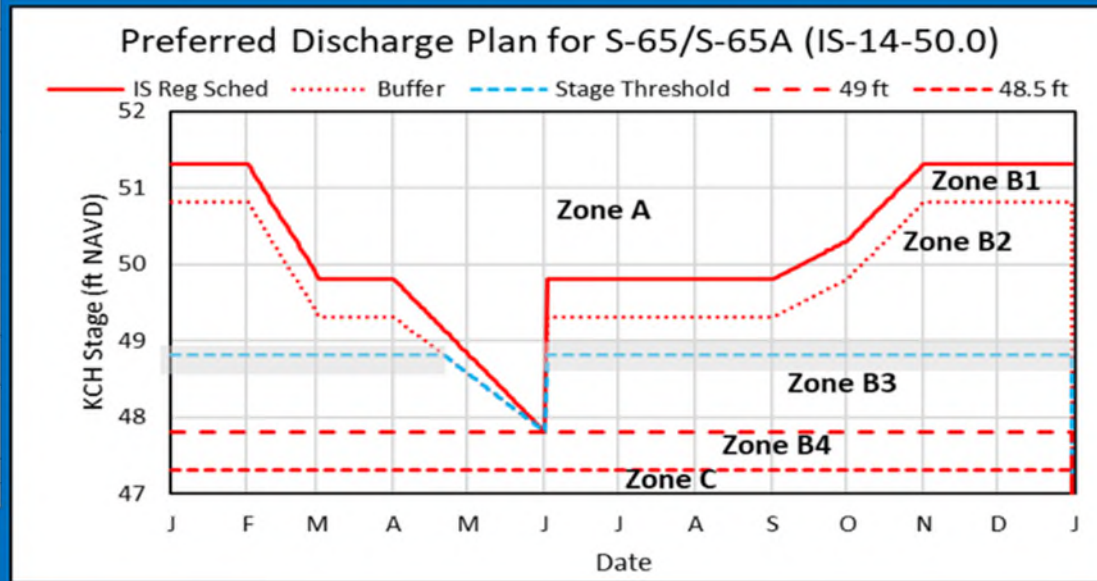
**Figure KB-7.** Hybrid A Discharge Plan for S-65/S-65A. Use discharge rate of change limits from IS-14-50 (Fig. KB-8).

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 $\pm 0.2$ 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 12.11 feet NAVD88 (13.39 ft NGVD29) on June 23, 2024, which was 0.03 feet higher than the previous week and 0.14 feet higher than a month ago (**Figure LO-1**). Lake stage is in the Low sub-band (**Figure LO-2**) and was 0.76 feet above the upper limit of the recovery ecological envelope (**Figure LO-3**). According to NEXRAD, 0.86 inches of rain fell directly over the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, at 1,300 cfs, compared to 4,190 cfs. The majority of inflows came from the Kissimmee River at 430 cfs; with 320 cfs from the Indian Prairie watershed, 230 cfs of backflow at S-271, 130 cfs from the Taylor Creek/Nubbin Slough watershed, and 20 cfs from Fisheating Creek. Back-pumping from S2 and S3 at the S-354 and S-351 structures, respectively, slowed considerably from the previous week, down from 2,340 average daily cfs to 170 cfs. Average daily outflows (excluding evapotranspiration) decreased from the previous week, from 300 cfs to 0 cfs. No releases were made in any direction. **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.

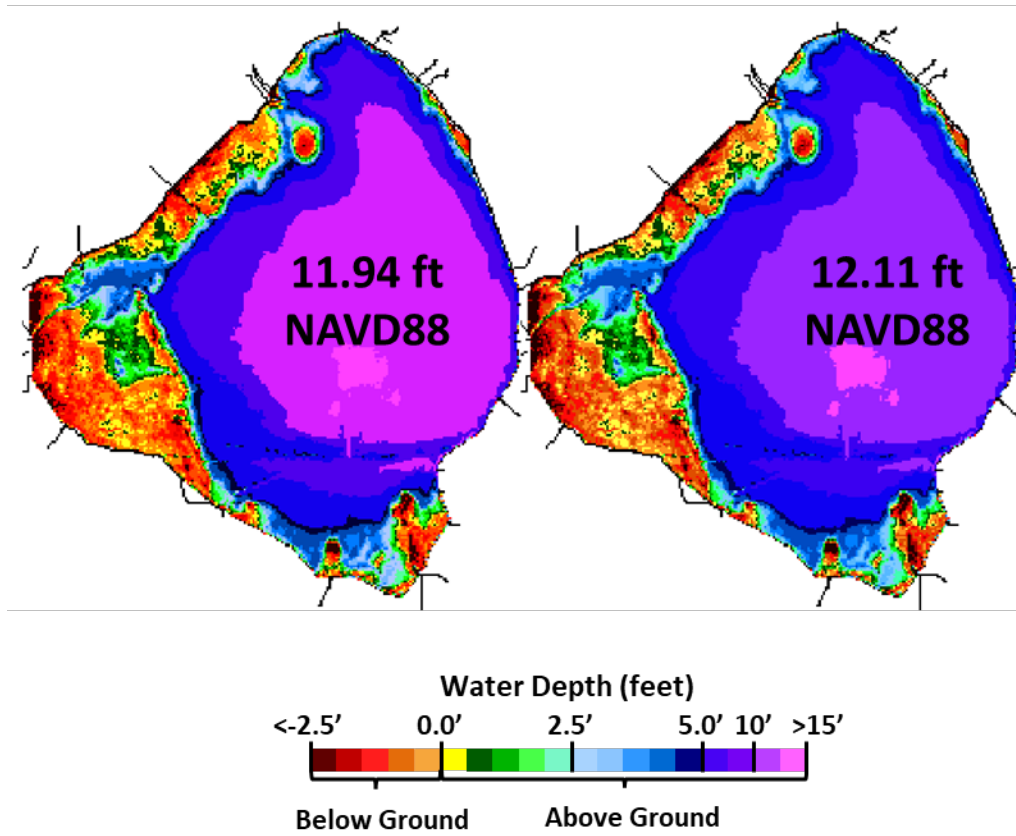
The last wading bird survey of the 2024 breeding season (conducted June 20, 2024) reported approximately 800 wading birds actively foraging on the Lake (**Figure LO-6**). This is typical for this time of year and not surprising given the major Lake stage reversal event that occurred two weeks ago.

In the most recent non-obscured satellite image from June 24<sup>th</sup>, 2024, NOAA's Harmful Algal Bloom Monitoring System suggested moderate to high cyanobacteria concentrations throughout much of the Lake (**Figure LO-7**).

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

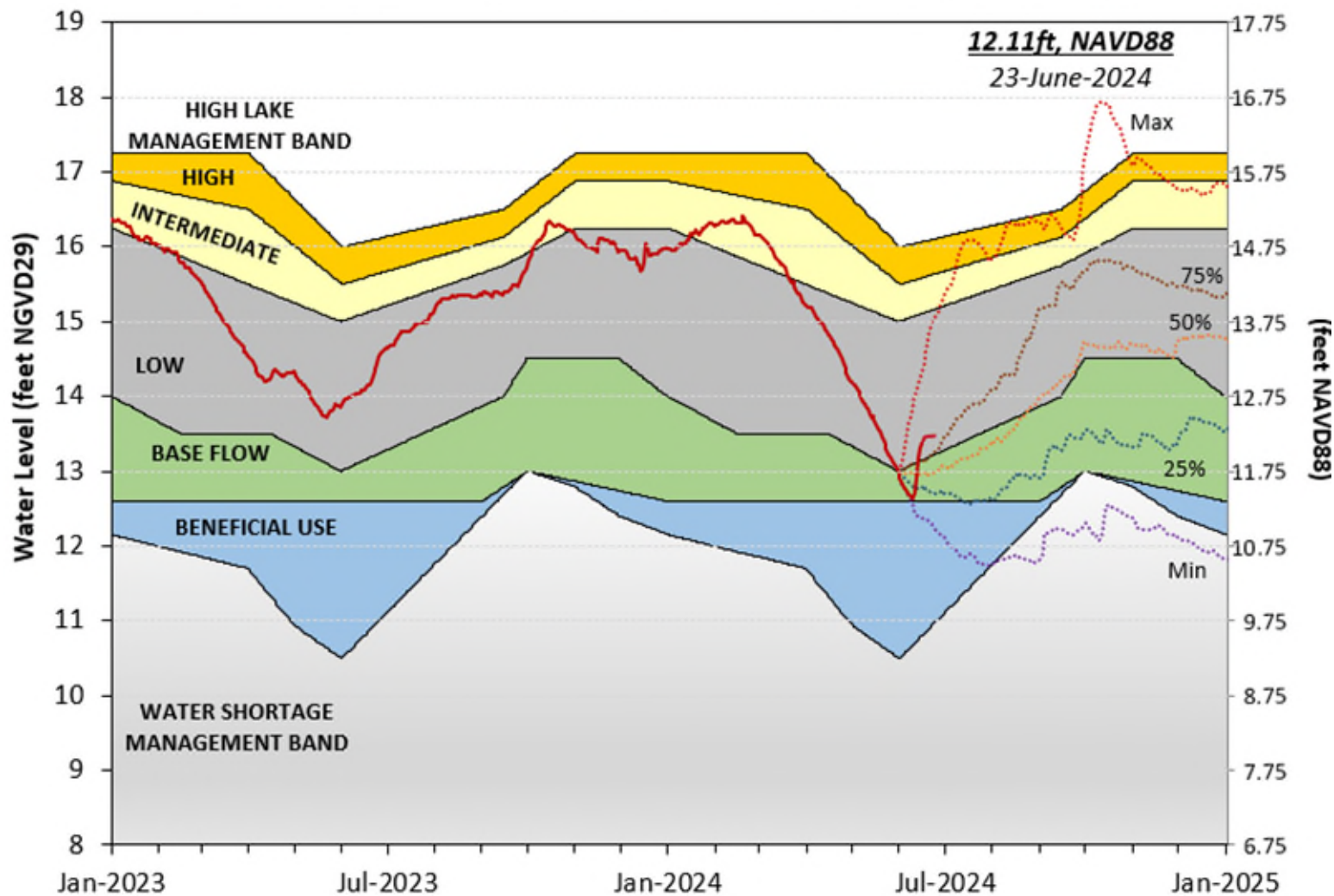
1 Month Ago:  
05/23/2024

Current:  
06/23/2024



**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

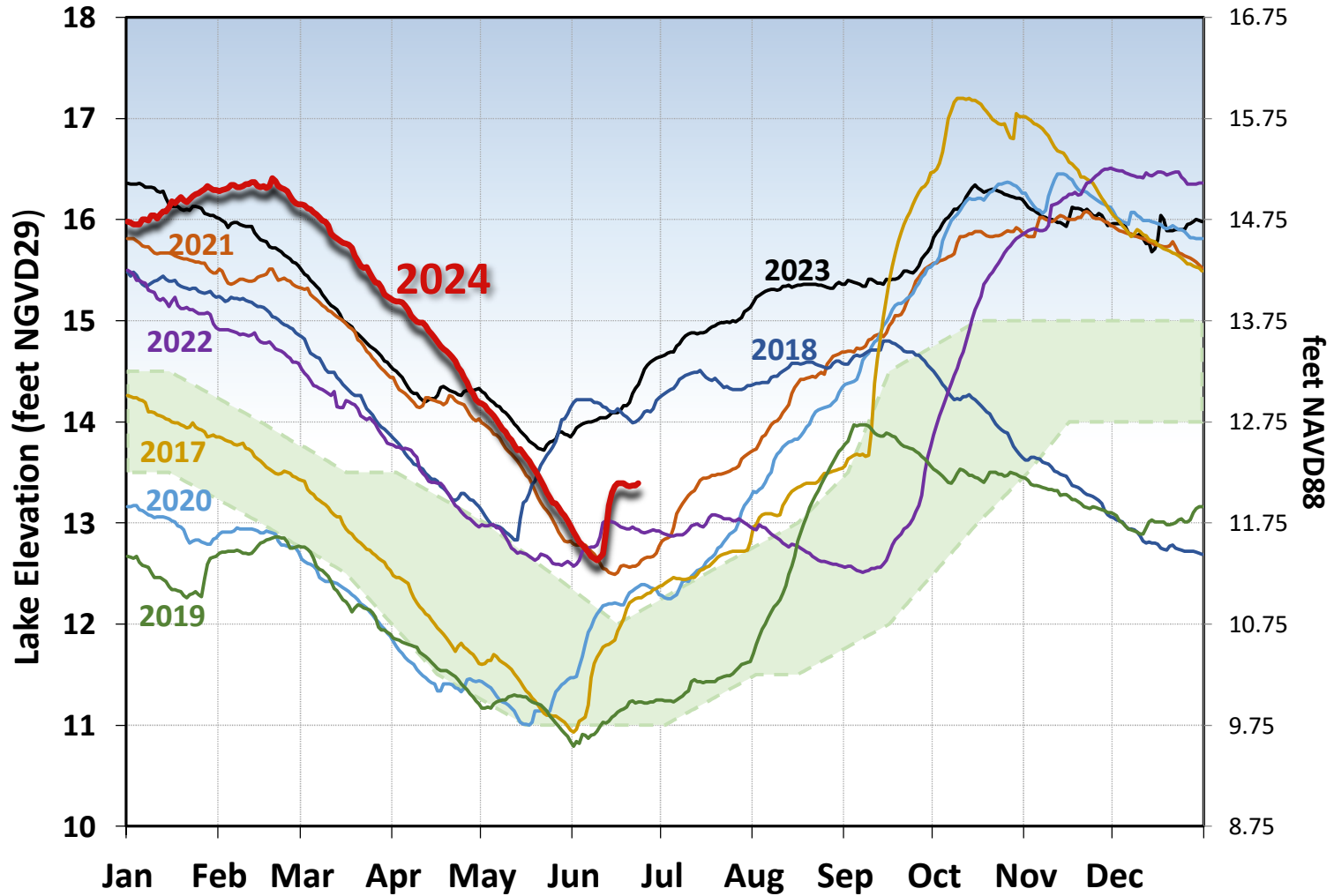


LORS-2008 - Adopted by USACE 28-April

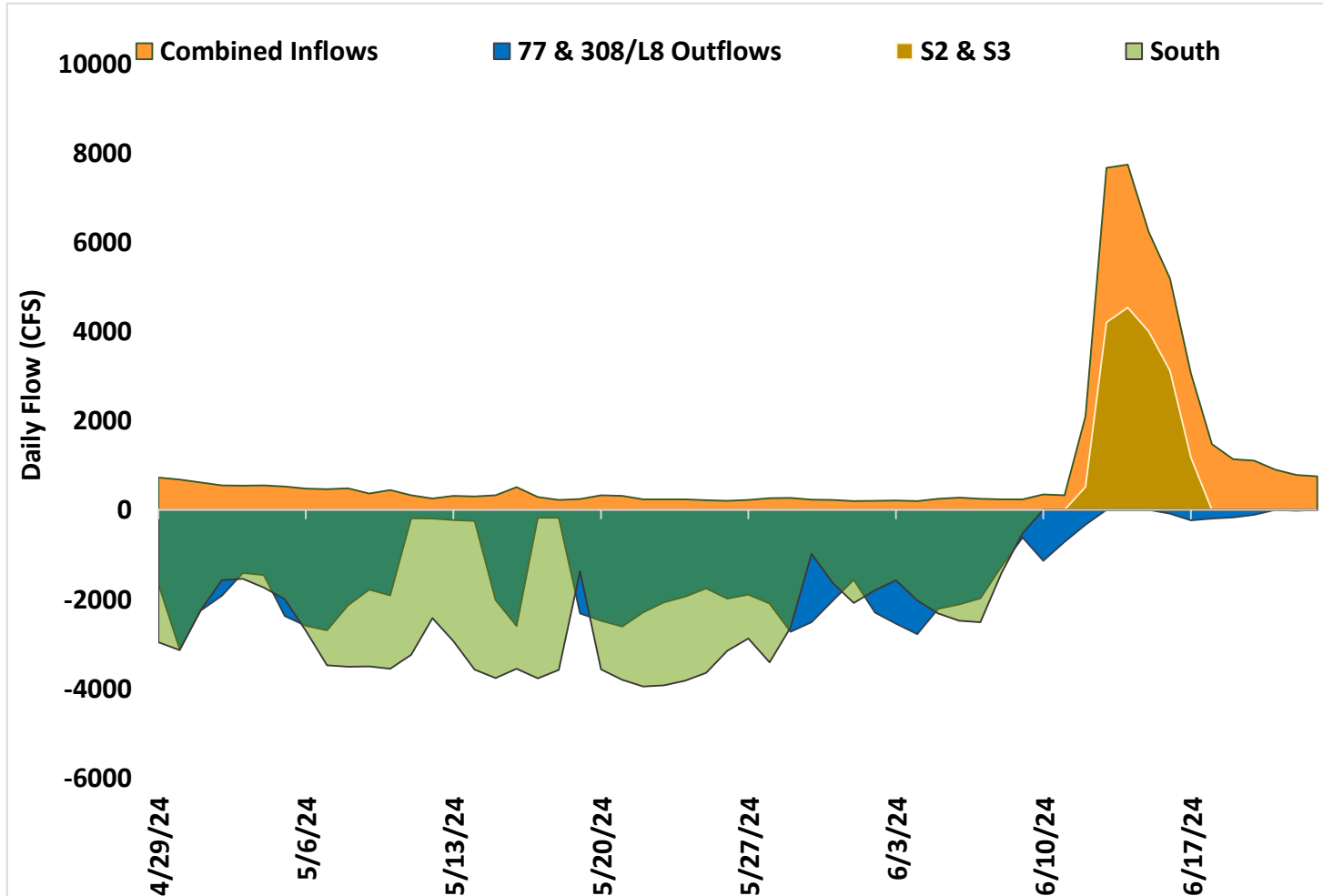
**Figure LO-2.** Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.  
 Note: stages are in NGVD29, approximate NAVD88 values are shown for reference.



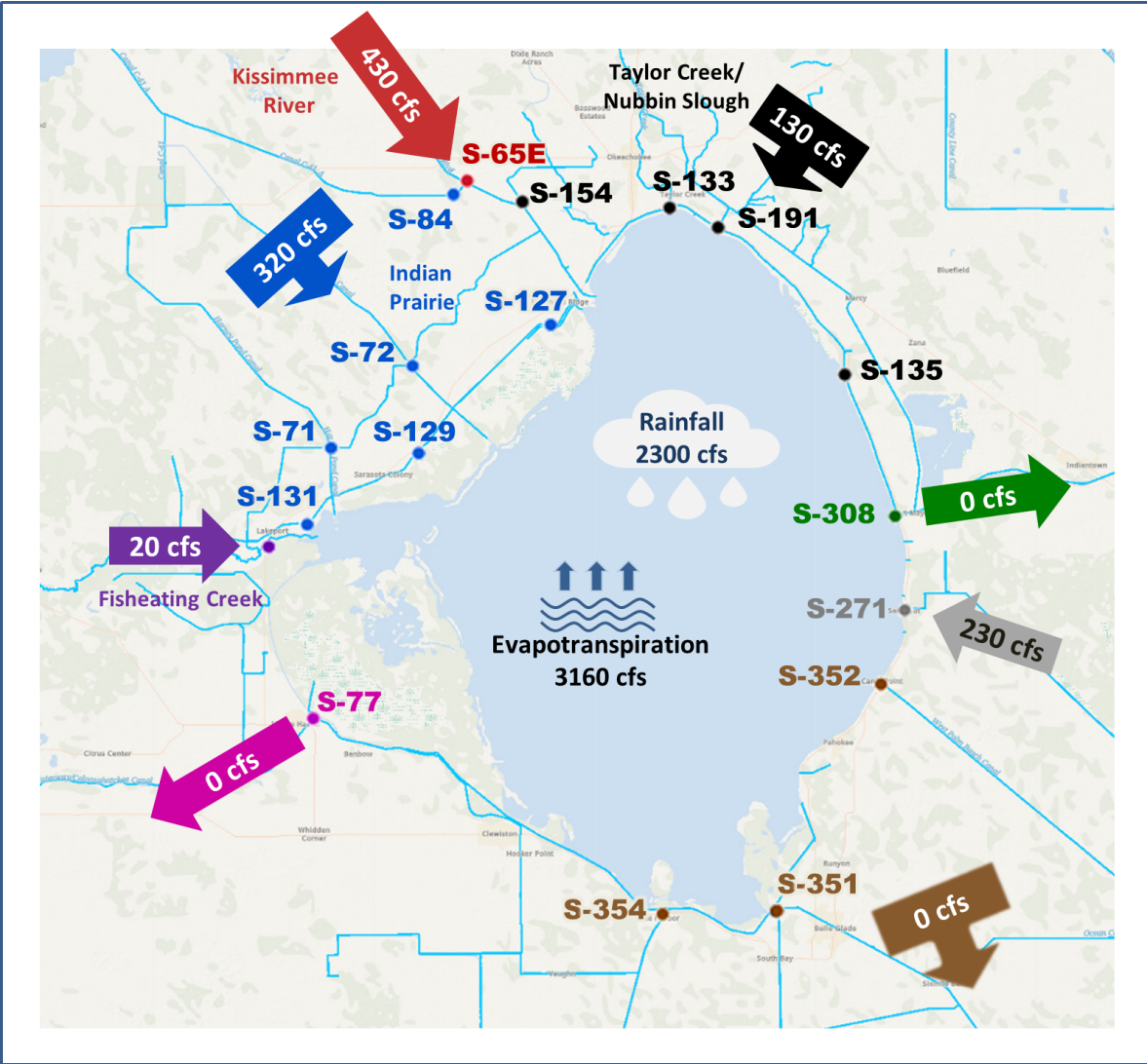
## Lake Okeechobee Stage vs Recovery Ecological Envelope



**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).

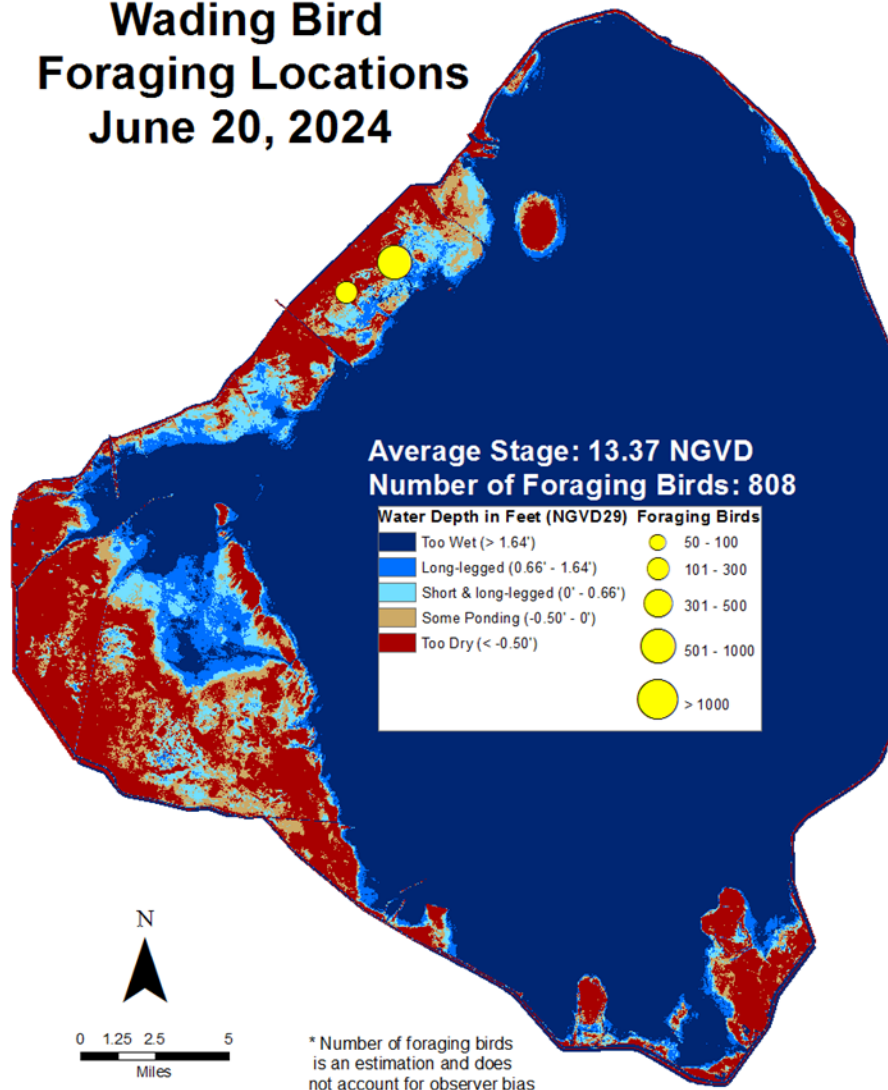


**Figure LO-4.** Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows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

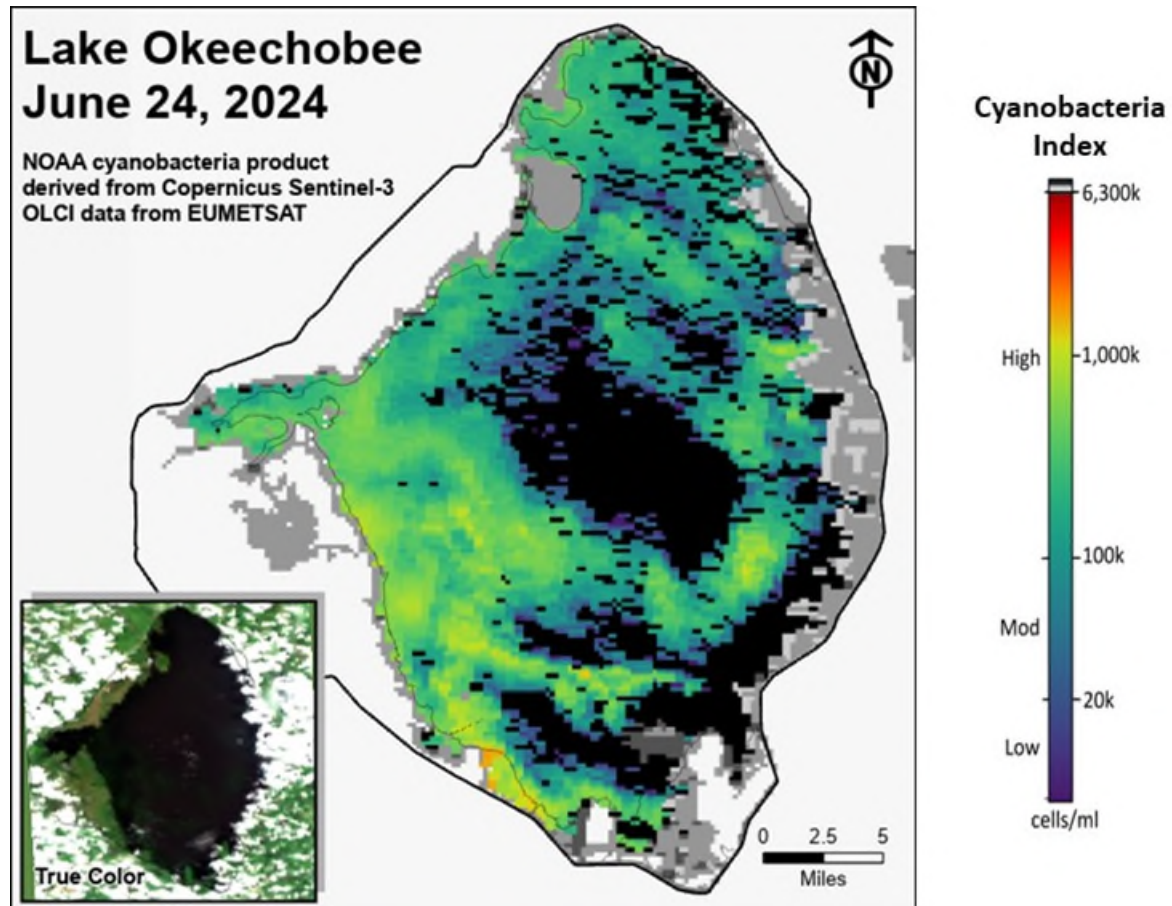


**Figure LO-5.** Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of June 17 – 23, 2024.

# Wading Bird Foraging Locations June 20, 2024



**Figure LO-6.** Locations of foraging flocks of wading birds observed during a monitoring flight on June 20, 2024, are shown in yellow (circle sizes represents the flock size).



**Figure LO-7.** Cyanobacteria bloom index level on June 24, 2024, based on NOAA’s harmful algal bloom monitoring system. Gray color indicates cloud cover. \*Provisional NOAA image, subject to change\*.

## Estuaries

### *St. Lucie Estuary*

Over the past week, mean total inflow to the St. Lucie Estuary was 1,155 cfs (**Figures ES-1 and ES-2**), and the previous 30-day mean inflow was 924 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 in 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 20.2. 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 3.1 spat/shell for May, which is an increase from the previous month (**Figure ES-5**).

### *Caloosahatchee River Estuary*

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 4,780 cfs (**Figures ES-6 and ES-7**), and the previous 30-day mean inflow was 4,250 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, increased at Shell Point, 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 17.9 spat/shell at Iona Cove and 40.2 spat/shell at Bird Island for May, which is a substantial increase from the previous month (**Figures ES-11 and ES-12**).

Surface salinity at Val I-75 was forecasted for the next two weeks using an autoregression model (Qiu and Wan, 2013<sup>1</sup>) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 450 to 2,000 cfs with estimated tidal basin inflows of 830 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.

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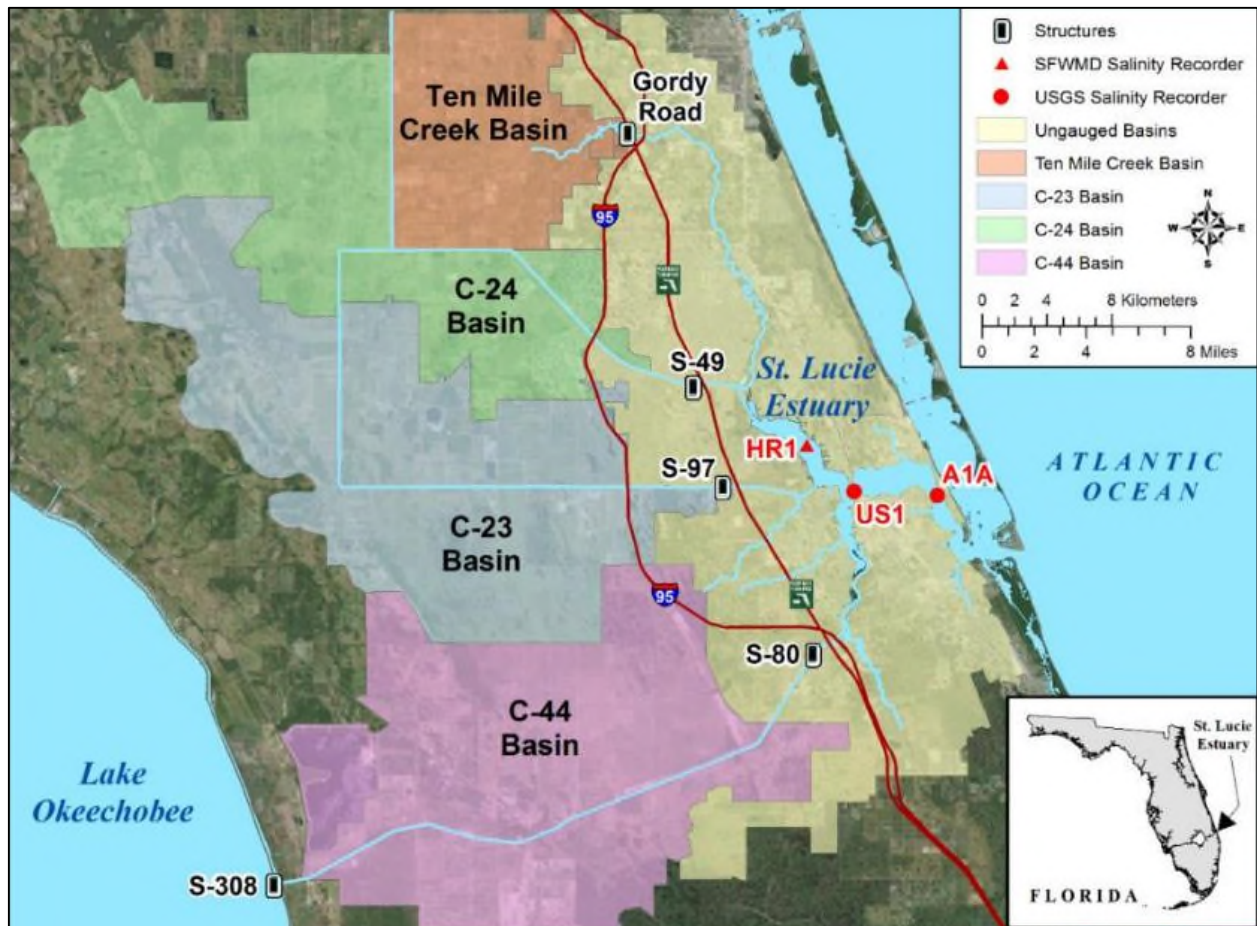
<sup>1</sup> Qiu, C., and Y. Wan. 2013. Time series modeling and prediction of salinity in the Caloosahatchee River Estuary. *Water Resources Research* 49:5804-5816.

## Red Tide

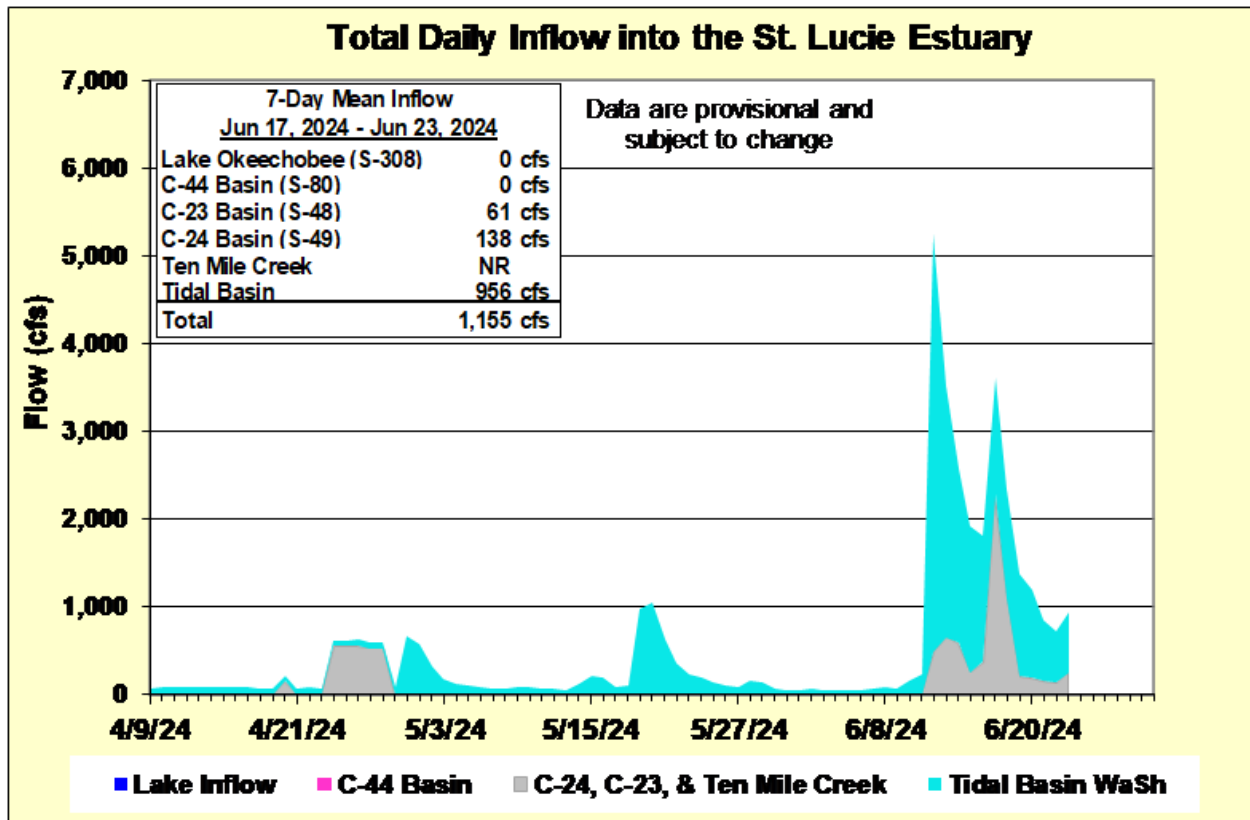
The Florida Fish and Wildlife Research Institute reported on June 21, 2024, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in any samples collected statewide over the past week.

## Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are very wet. The LORS2008 release guidance suggests up to 3,000 cfs release at S-79 to the Caloosahatchee River Estuary and up to 1,170 cfs release at S-80 to the St. Lucie Estuary.



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



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

**Table ES-1.** Seven-day mean salinity at oyster monitoring sites in the St. Lucie Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope reflects the optimum salinity range for adult eastern oysters (*Crassostrea virginica*) in the estuary. Data are provisional.

Sampling Site	Surface	Bottom	Optimum Envelope
HR1 (North Fork)	<b>14.2</b> (18.1)	<b>19.0</b> (23.9)	10.0 – 25.0
US1 Bridge	<b>19.6</b> (23.4)	<b>20.9</b> (24.6)	10.0 – 25.0
A1A Bridge	<b>27.4</b> (28.4)	<b>29.7</b> (30.3)	10.0 – 25.0



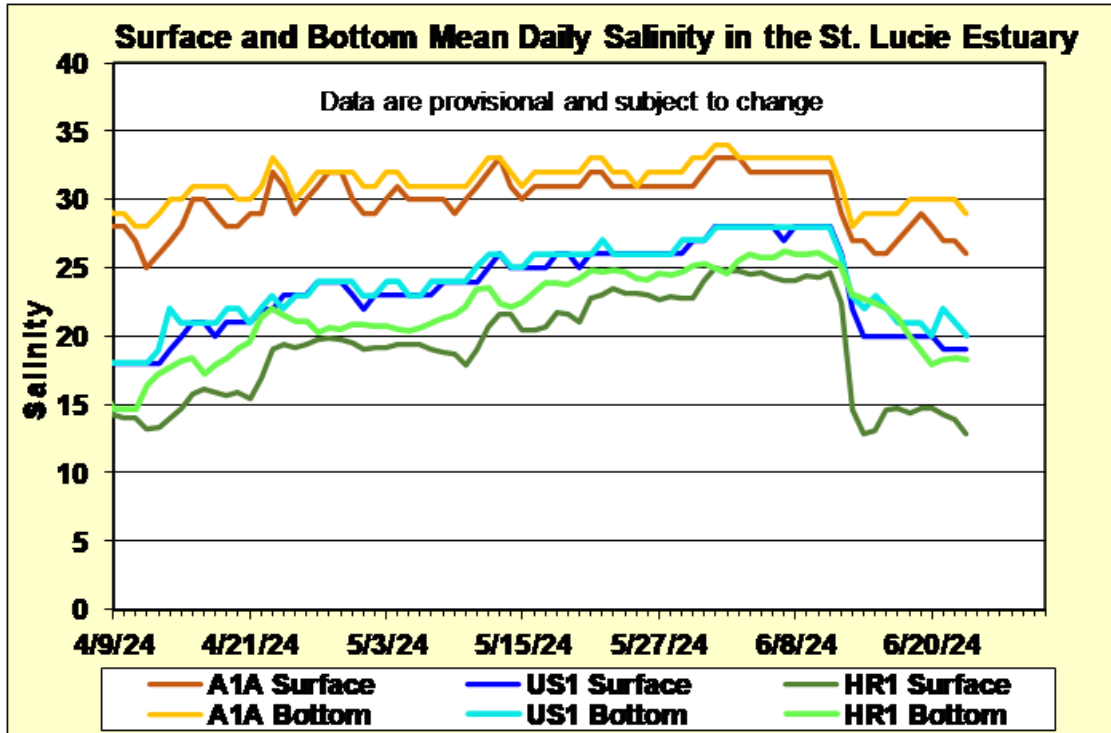


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

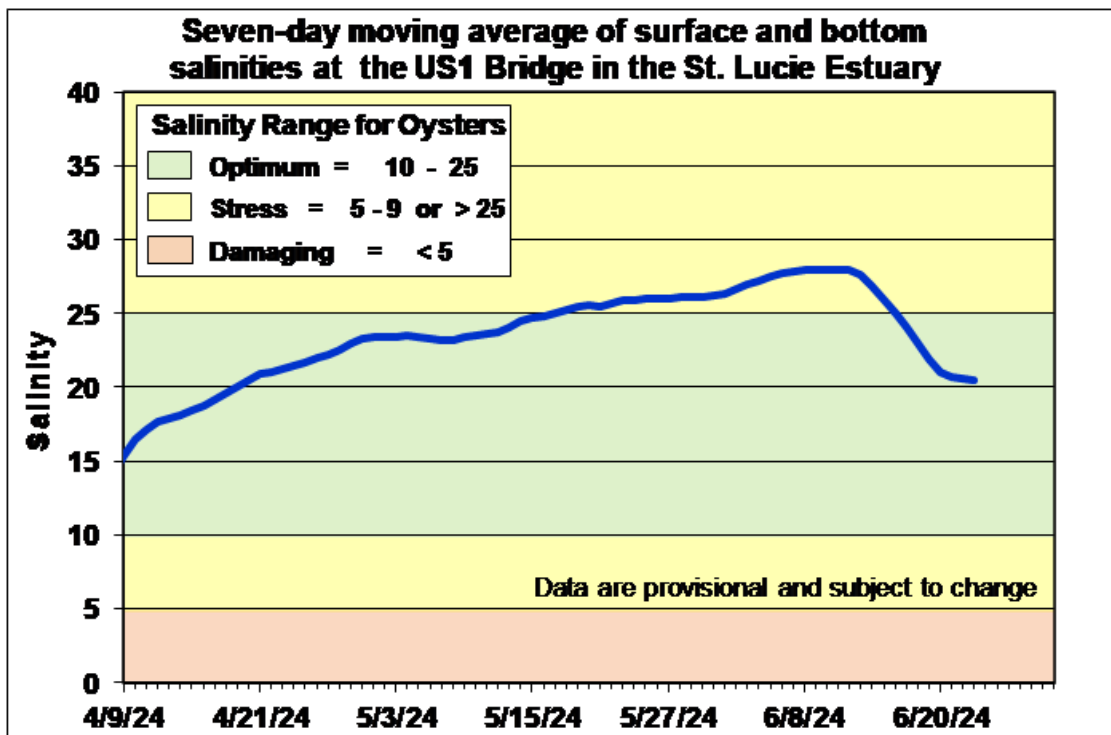
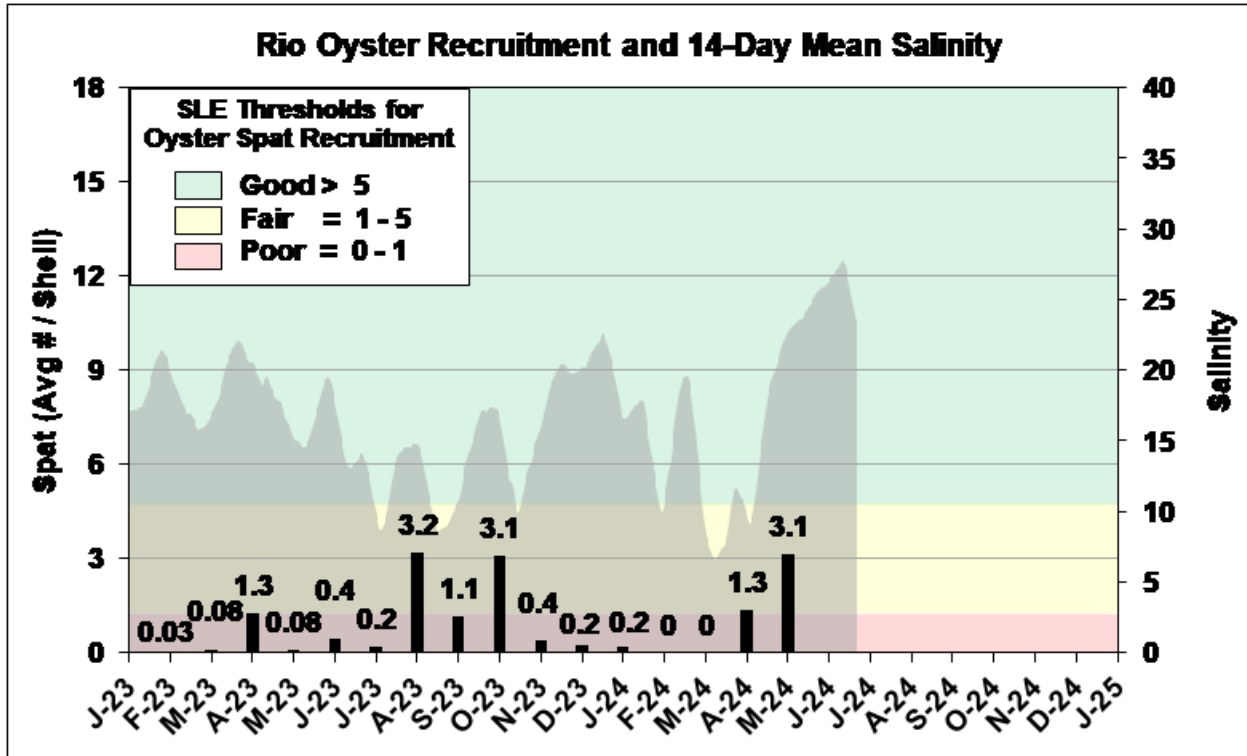
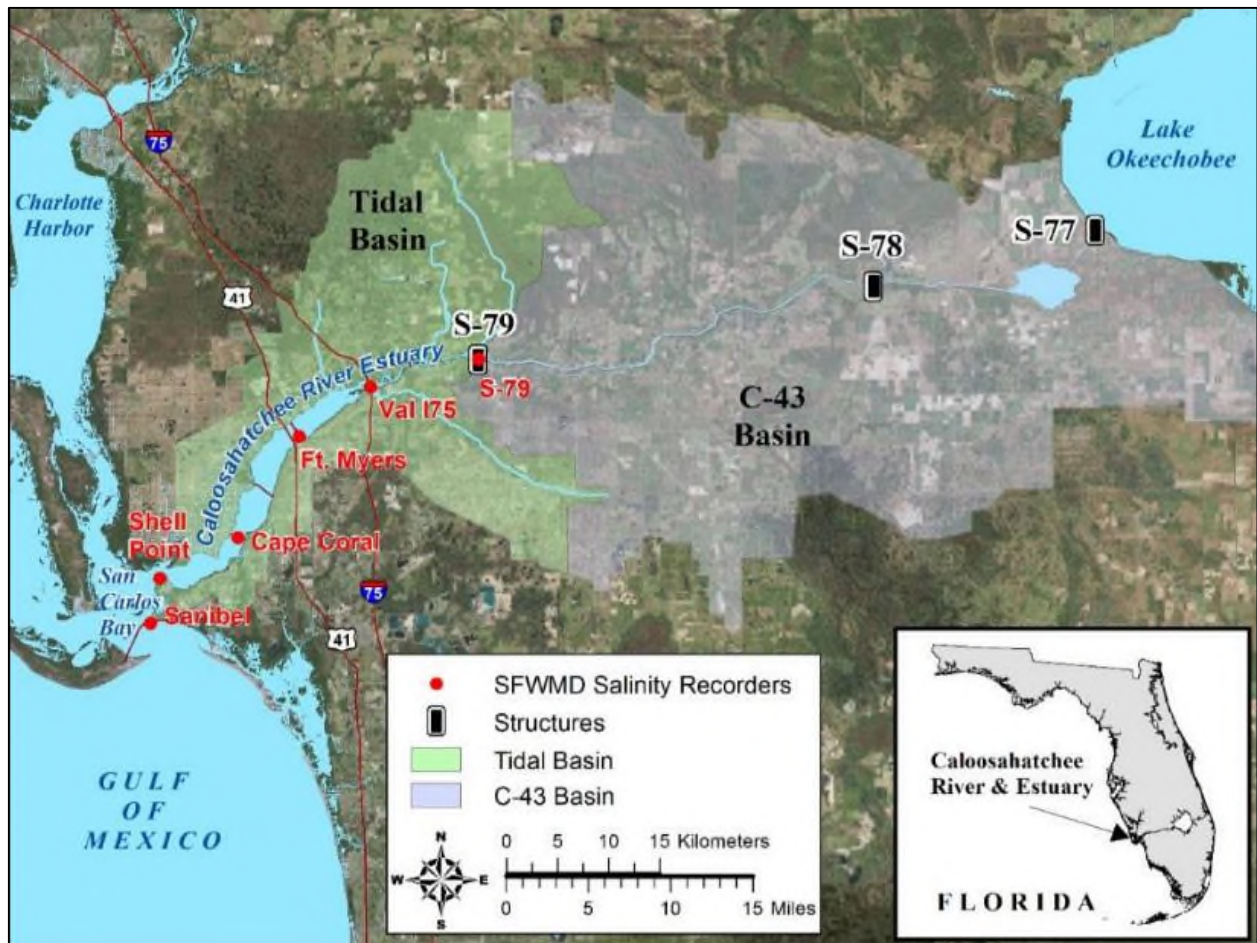


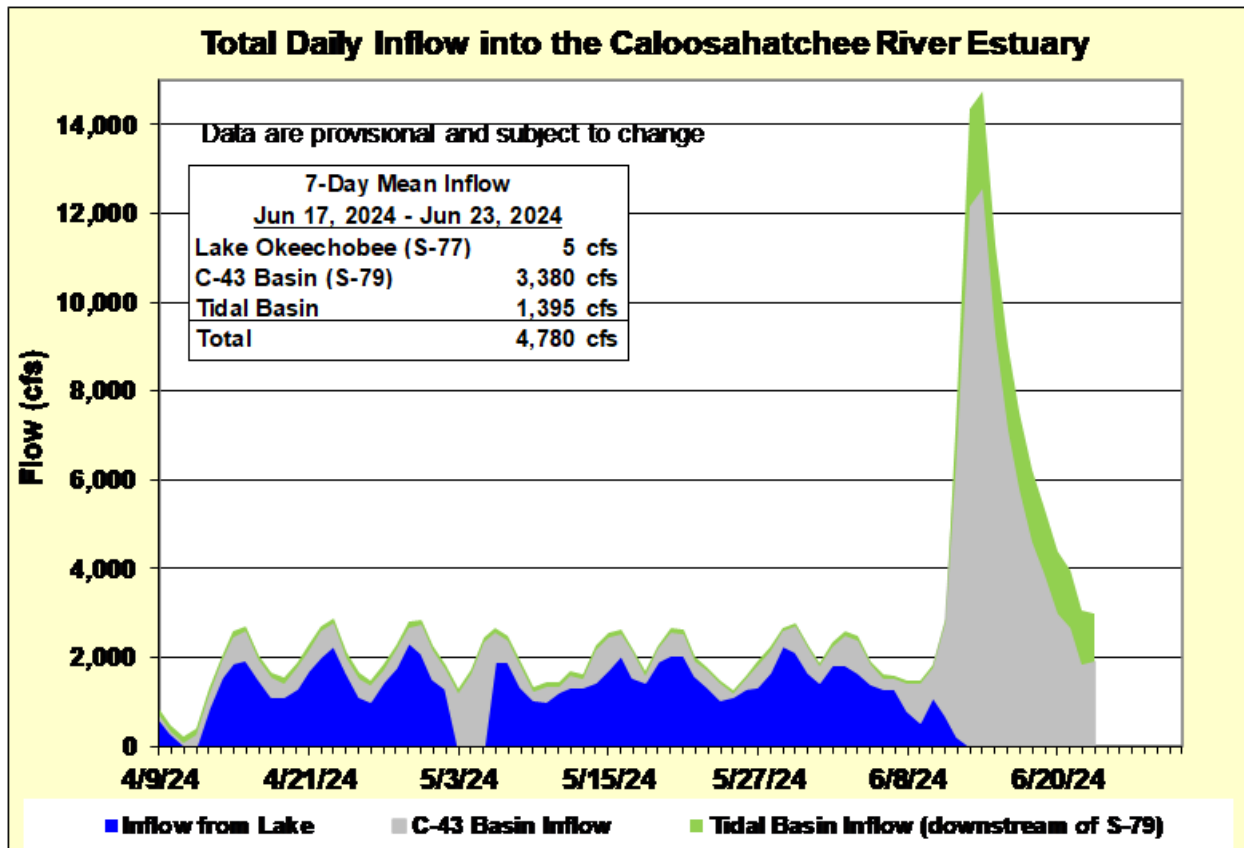
Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.



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



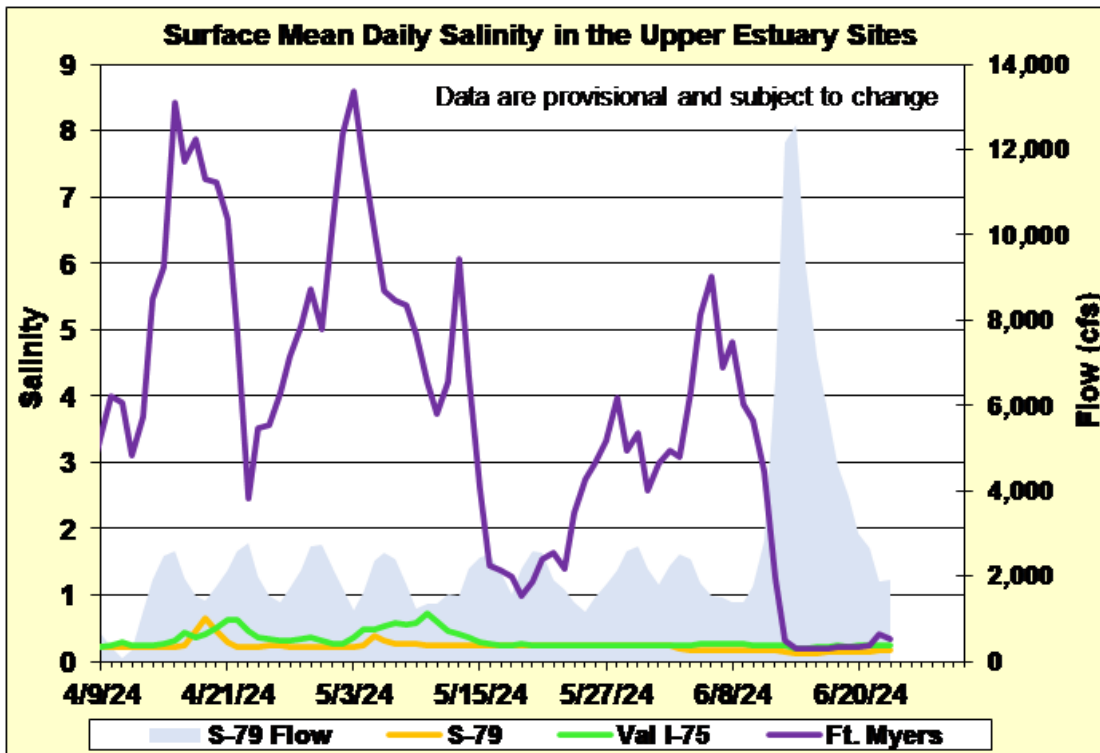
**Figure ES-6.** Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.



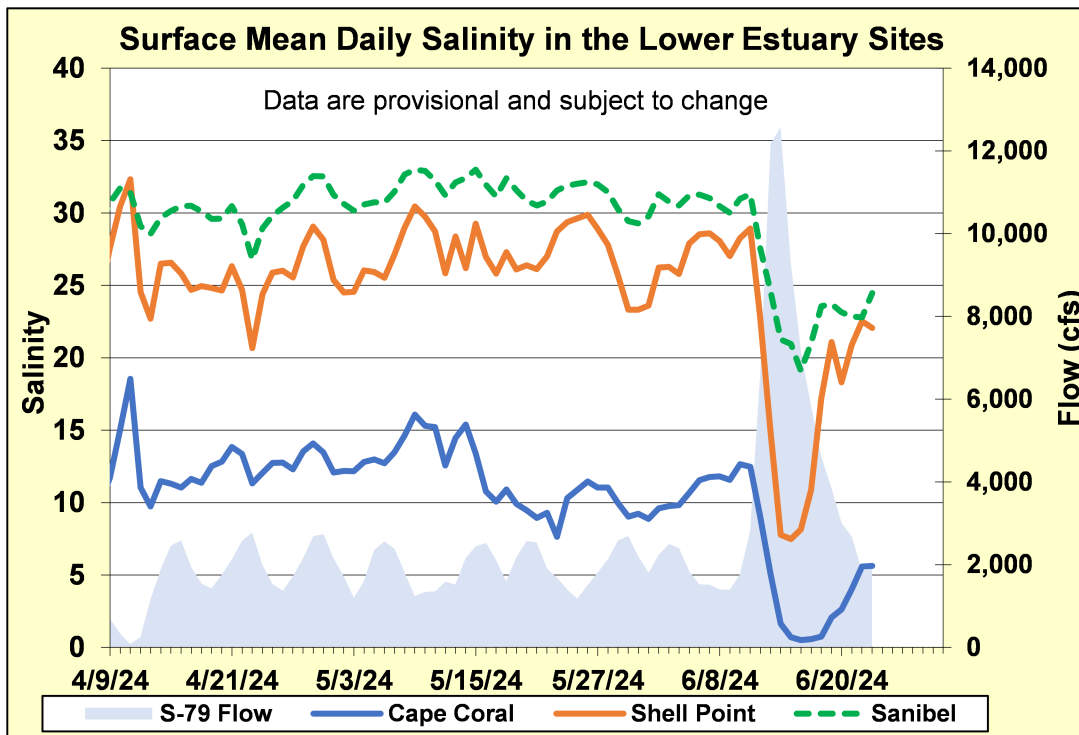
**Figure ES-7.** Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

**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.

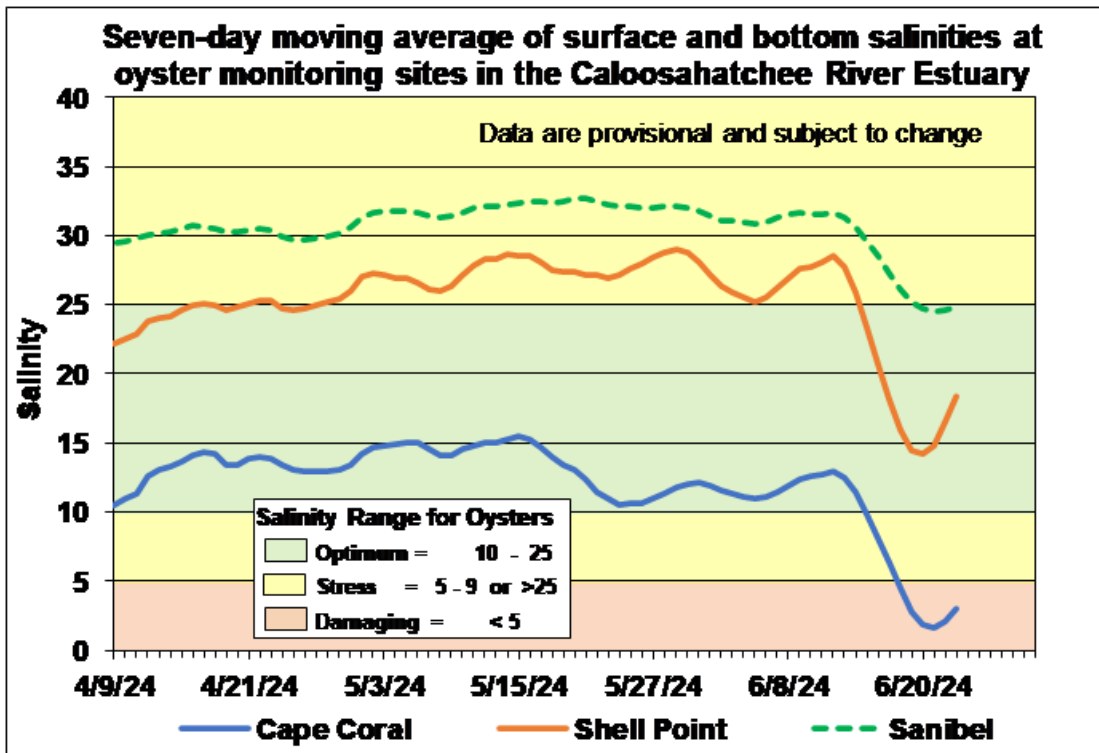
Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	<b>0.1</b> (0.1)	<b>0.2</b> (0.2)	0.0 – 10.0
Val I-75	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	0.0 – 10.0
Fort Myers Yacht Basin	<b>0.3</b> (1.2)	<b>0.3</b> (1.3)	0.0 – 10.0
Cape Coral	<b>3.0</b> (6.0)	<b>4.8</b> (6.8)	10.0 – 25.0
Shell Point	<b>19.0</b> (16.9)	<b>21.4</b> (19.4)	10.0 – 25.0
Sanibel	<b>23.1</b> (25.1)	<b>27.9</b> (29.5)	10.0 – 25.0



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



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



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

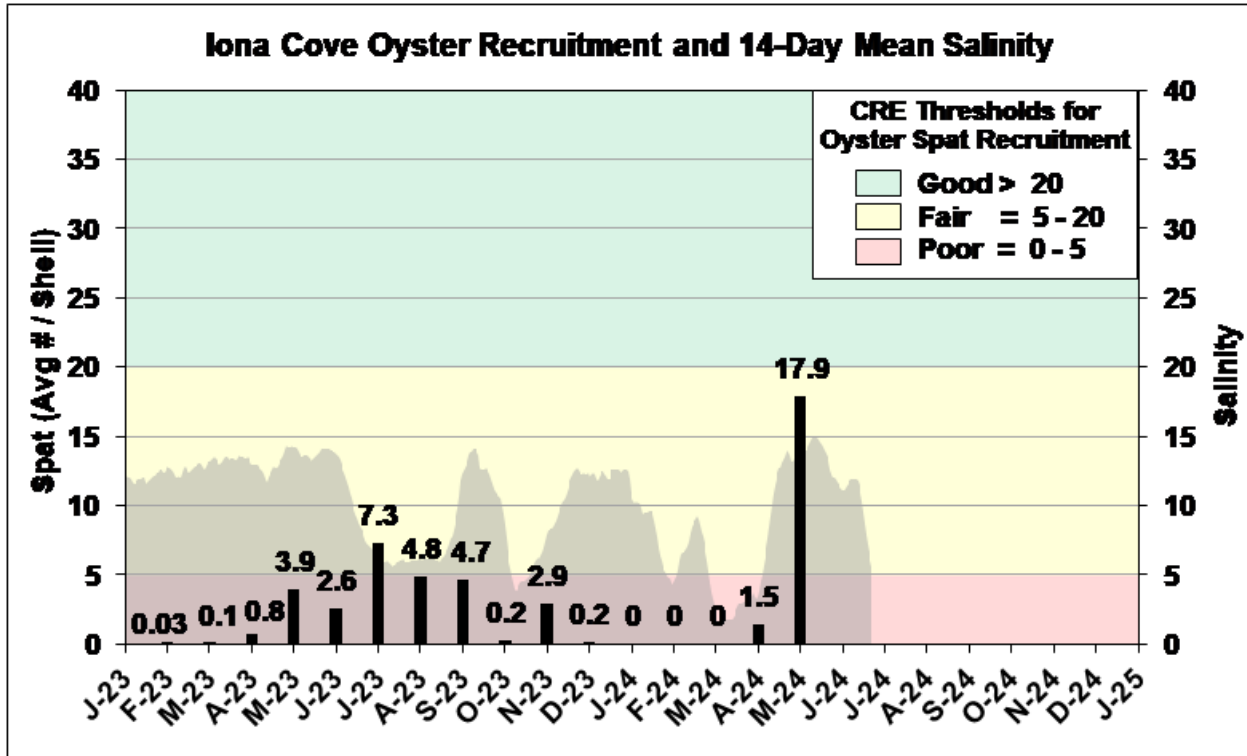


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

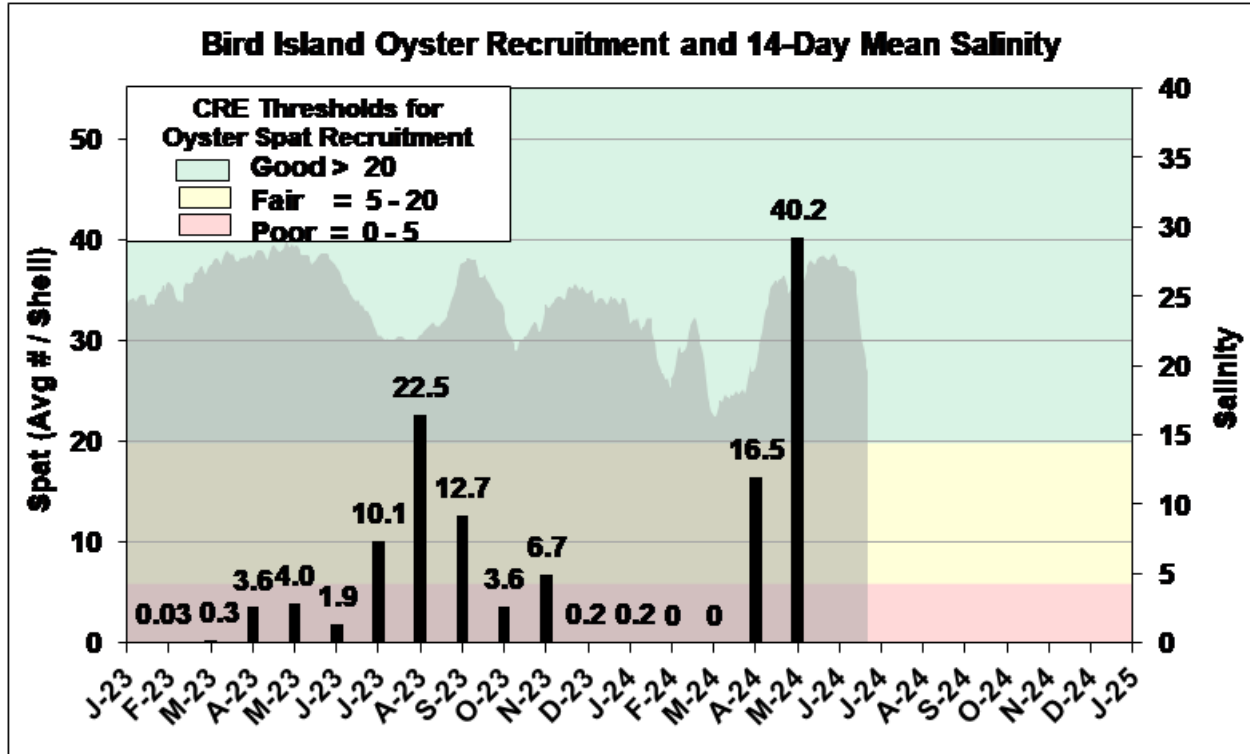
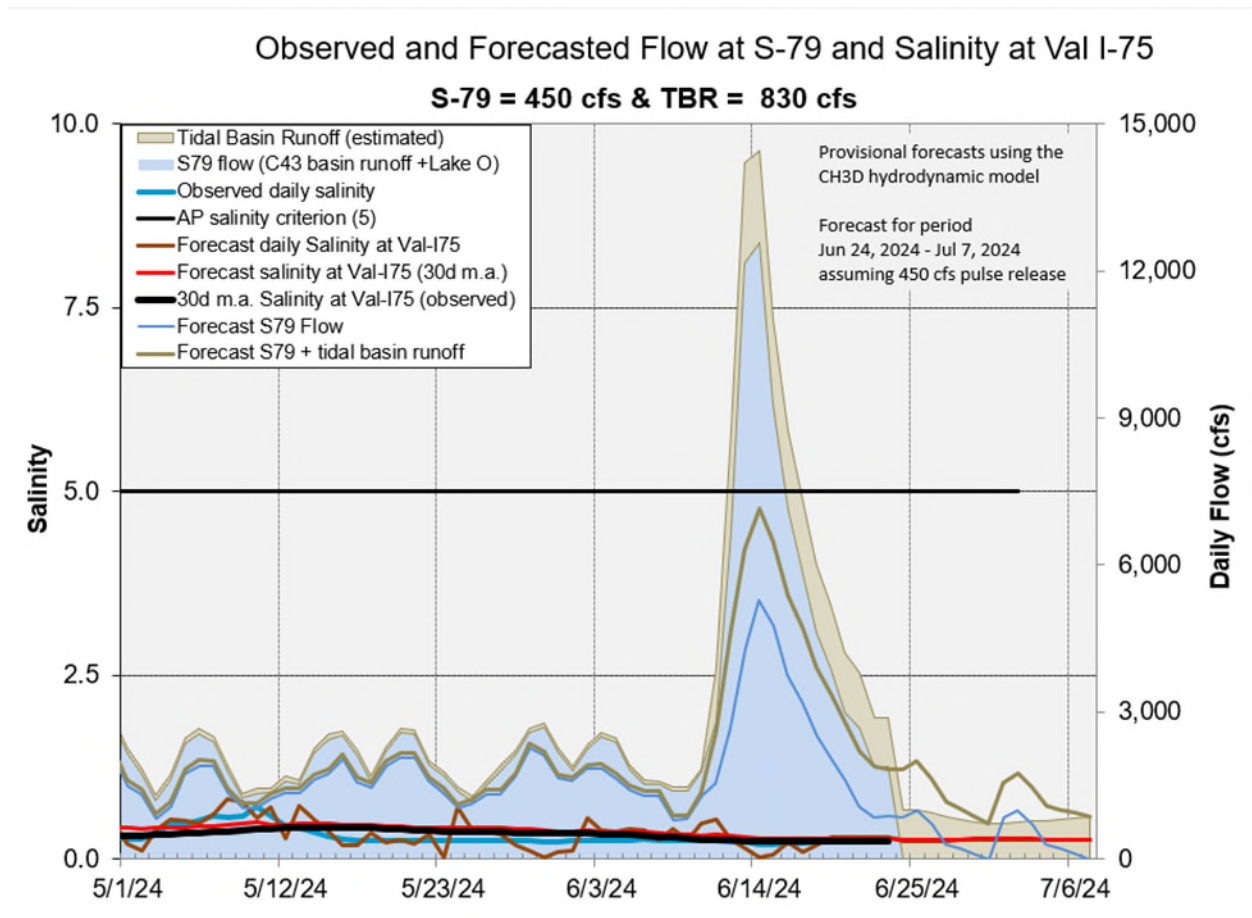


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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

Scenario	Simulated S-79 Flow (cfs)	Tidal Basin Runoff (cfs)	Daily Salinity	30-Day Mean Salinity
A	450	830	0.3	0.3
B	650	830	0.3	0.3
C	1,200	830	0.3	0.3
D	2,000	830	0.3	0.3



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



## Stormwater Treatment Areas

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

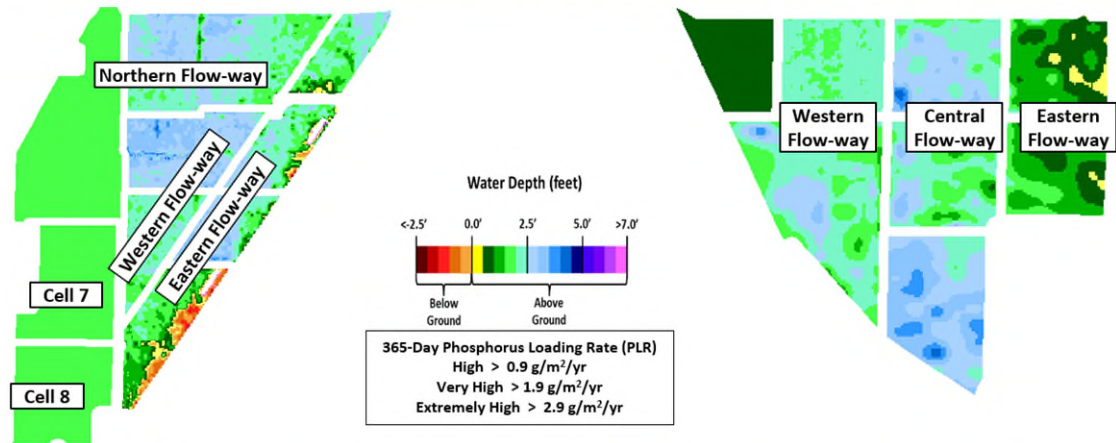
**STA-2:** Operational restrictions are in place in Flow-ways 2 and 4 for vegetation management activities, and in Flow-way 5 for construction activities. Online treatment cells are above target stage, and Flow-way 4 has extended deep water conditions. Vegetation in Flow-ways 2, 3, and 4 is stressed, and in 5 is highly stressed. The 365-day PLRs for Flow-ways 1, 3, 4, and 5 are below 1.0 g/m<sup>2</sup>/year. The 365-day PLR for Flow-way 2 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 above target stage, and the Central Flow-way has extended deep water conditions. 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 above target stage. All treatment cells have highly stressed or stressed vegetation conditions. The 365-day PLRs for Flow-ways 1, 4, 6, 7, and 8 are below 1.0 g/m<sup>2</sup>/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 – 6/17/2024 through 6/23/2024

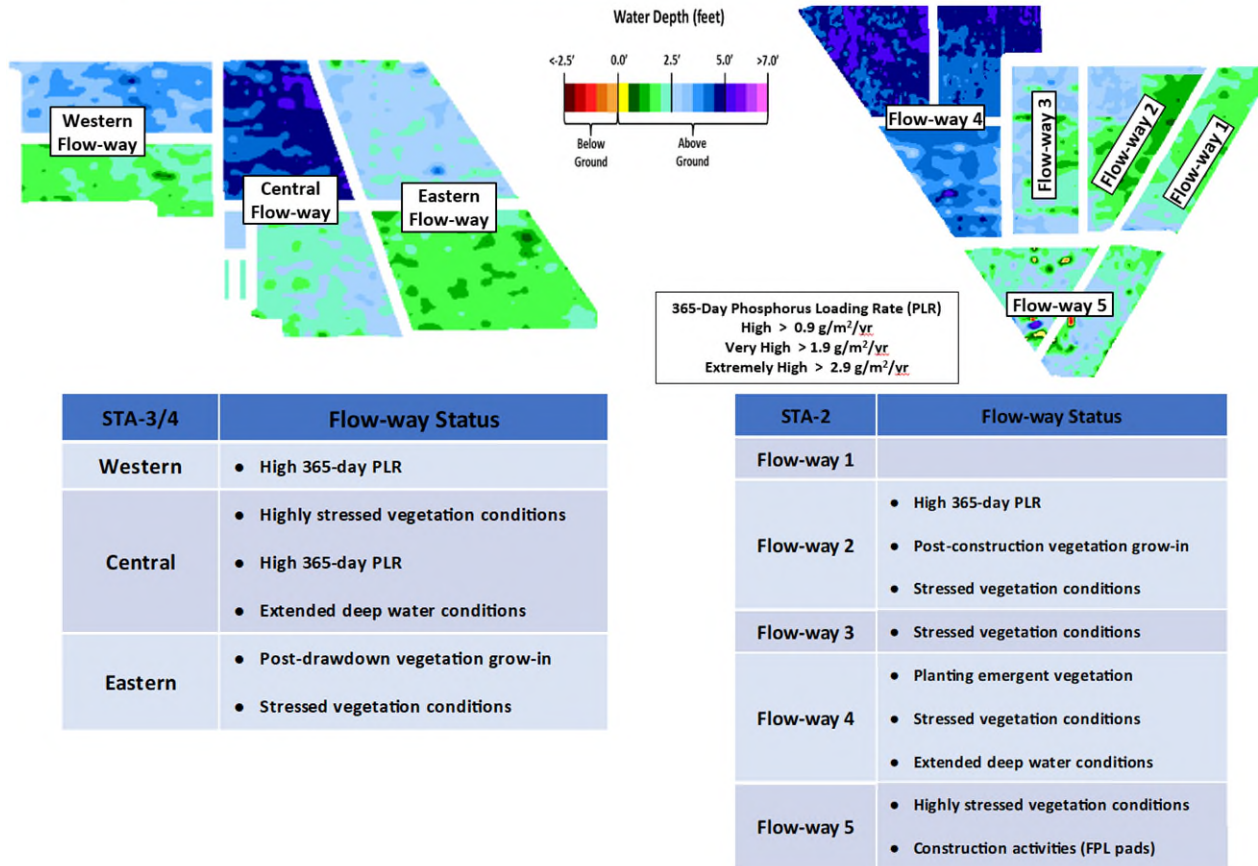


STA-1W	Flow-way Status
Western	<ul style="list-style-type: none"> <li>High 365-day PLR</li> <li>Highly stressed vegetation conditions</li> </ul>
Eastern	<ul style="list-style-type: none"> <li>Very High 365-day PLR</li> <li>Highly stressed vegetation conditions</li> </ul>
Northern	<ul style="list-style-type: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

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

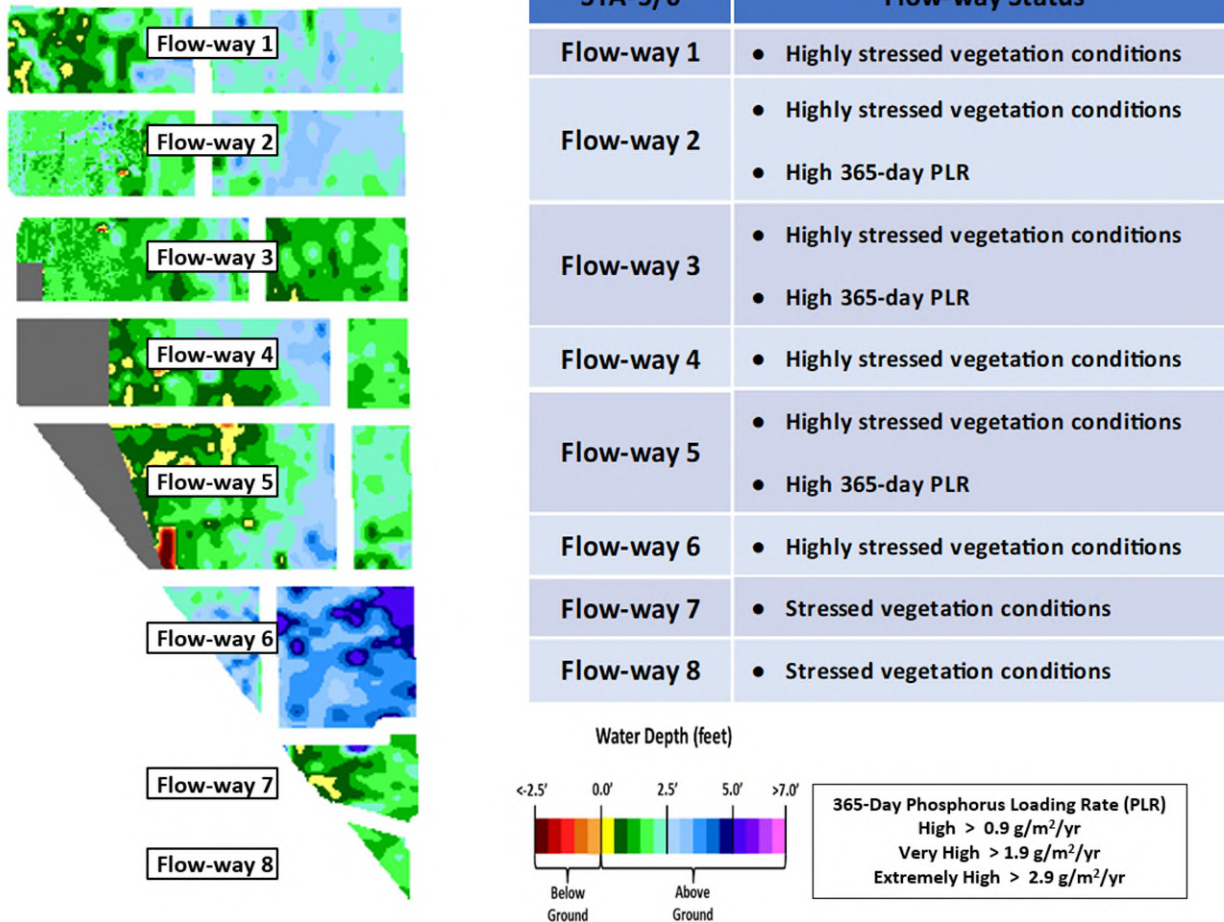
**Figure S-1.** Eastern Flow Path Weekly Status Report

## Central Flow Path Weekly Status Report – 6/17/2024 through 6/23/2024



**Figure S-2.** Central Flow Path Weekly Status Report

## Western Flow Path Weekly Status Report – 6/17/2024 through 6/23/2024



**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***

Stage in the WCAs are starting to level out or decrease following the record rain event that occurred throughout the Everglades in the previous week. WCA-1: Stage within the Refuge stayed above schedule last week. On Sunday stage at the 3-Gauge average was 0.43 feet above the flat Zone A1 regulation line. WCA-2A: Stage at the S-11B\_H gauge also remained above schedule last week. The average on Sunday was 1.1 feet above the flat regulation line. WCA-3A: The 3-Gauge average stage remains above the Zone A regulation line and still shows a slight increase. The average stage remains above the regulation line by approximately 0.5 ft. WCA-3A North: Stage at Gauge 62 (NW corner) has begun to show a declining trend. On Sunday stage there was 0.69 feet above the Upper schedule line. See figures **EV-1** through **EV-4**.

### ***Water Depths***

The SFWDAT model output for 6/23/24 shows a hydropattern that is dramatically deeper than one month ago, less so in WCA-1. Ponded conditions return to the upper reaches of the L-67s, and look to be forming in Mullet Slough. Depths in southern WCA-3A are maintaining at 2.0 - 2.5 feet. Hydrologic connectivity is maintaining across ENP, and BCNP remains almost completely inundated. Current WDAT water depth estimates are wetter when compared to one month ago across the EPA, less so in WCA-1. The comparison to modeled conditions a year ago illustrates a mix of deeper and drier conditions. WCA-1 and WCA-2A are significantly lower in depth in portions of those basins, with the rest of system deeper particularly to the west. (**Figure EV-5** and **Figure EV-6**).

Comparing current conditions to the 20-year percentiles on June 23: Depth conditions are now above the 90th percentile for this time of the year for the entirety of WCA-3B, ENP and BCNP. WCA-1 and WCA-2A are closer the 50th percentile, and the model still predicts the potential for stages to be below ground in those basins. (**Figure EV-7**).

### ***Taylor Slough and Florida Bay***

Stage changes were variable across Taylor Slough over the past week, with an average increase of 0.05 feet. Changes ranged from -0.11 feet at Taylor Slough Bridge (TSB) in the northern slough, to +0.21 feet 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 9.6 inches compared to before the Florida Bay initiative (starting in 2017), a decrease of 1.6 inches relative to last week's comparison. Both the Craighead Pond (CP) and TSB stages are below estimated historical levels (~1900; Marshall and Wingard, 2014) by 0.16 and 0.52 feet, respectively.

Average Florida Bay salinity was 25.9, a decrease of 1.1 from last week. Salinity changes were variable, ranging from -6.2 at Joe Bay (JB) in the eastern nearshore region, to +1.9 at Johnson Key (JK) in the western region (**Figure EV-8**). Salinity remains within the WY2001-2016 IQR and above estimated historical levels (~1900; Marshall and Wingard, 2014) in the western region, below both metrics in the eastern region, and is now below

the 25<sup>th</sup> percentile and at historical levels in the central region (**Figure EV-10**). Average Florida Bay salinity remains below its recent average for this time of year by 6.1, an increase of 0.9 from last week's comparison.

Salinity at the TR station in the mangrove zone (tracked for the Florida Bay MFL) was 5.8. The 30-day moving average was 12.8, a decrease of 1.1 from last week (**Figure EV-11**). The 365-day moving sum of flow from the five creeks was 401,514 acre-feet, an increase of 3,376 acre-feet from last week (**Figure EV-11**).

Average rainfall across Taylor Slough and Florida Bay was 1.33 inches over the past week (6/17-6/23), based on the 18 gauges used for this report. Rainfall ranged from 0.31 inches at Highway Creek (HC) in the eastern nearshore region to 3.68 inches at Johnson Key (JK) in the western region (**Figure EV-12**). Wind directions and speeds in Florida Bay ranged from 3.9 mph E on 6/22 to 24.7 mph E on 6/17 (**Figure EV-12**).

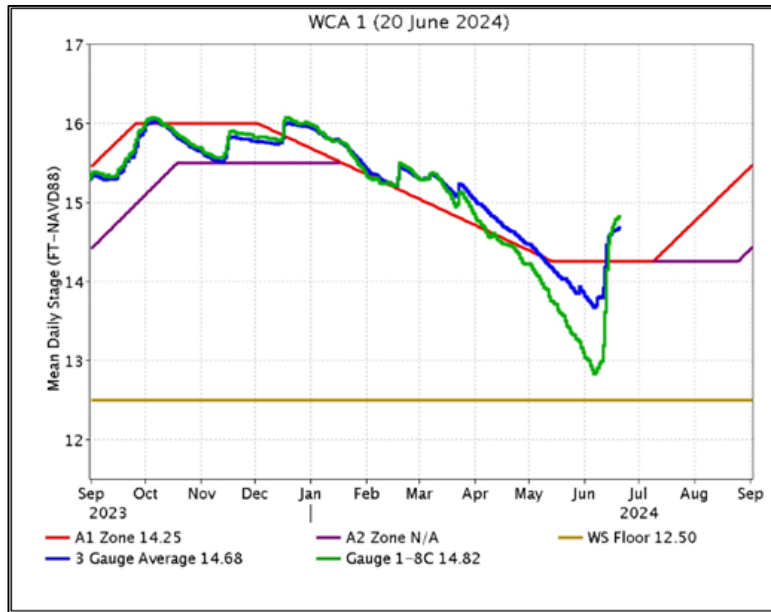
Average daily flow from the five major creeks (McCormick, Taylor, Mud, Trout, West Highway) totaled 1,805 acre-feet last week, with net positive flows for the week. Total daily creek flow ranged from 542 acre-feet on 6/22 to 3,019 acre-feet on 6/17 (**Figure EV-13**). Average daily flow for the week was 2,718 acre-feet below estimated historical levels (~1900; Marshall and Wingard, 2014).

#### ***Implications for water management***

The ecology of the Everglades would benefit from a reduction in ascension rate in WCA-1. Given that the wet season rains would have had to hold off until July in order to successfully fledge WOST chicks; continued rain events and higher water levels has most likely encouraged abandonment of nesting for this season. This would be a good thing to reduce unnecessary energy use for the adults while also providing good water conditions for high wading bird prey abundance in the following year. Continued freshwater inputs to the park and into Florida Bay is helping to maintain ecologically desirable salinities, and maintaining inputs of water southward will help to prevent ecologically undesirable salinity swings in Florida Bay nearshore areas. Individual regional recommendations can be found in **Table EV-2**.

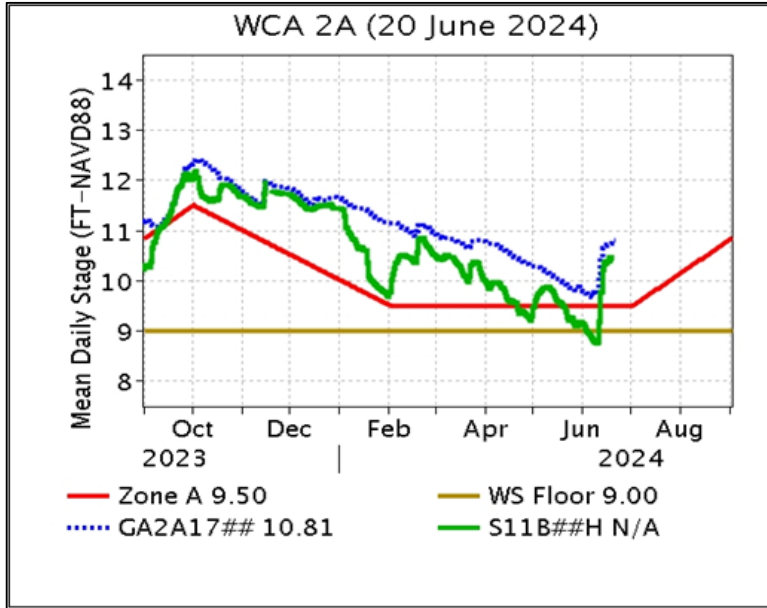
**Table EV-2.** Previous week’s rainfall and water depth changes in Everglades basins.

Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	1.04	+1.18
WCA-2A	0.84	+0.39
WCA-2B	0.39	+0.55
WCA-3A	0.83	-0.17
WCA-3B	0.60	+0.12
ENP	1.93	+0.00

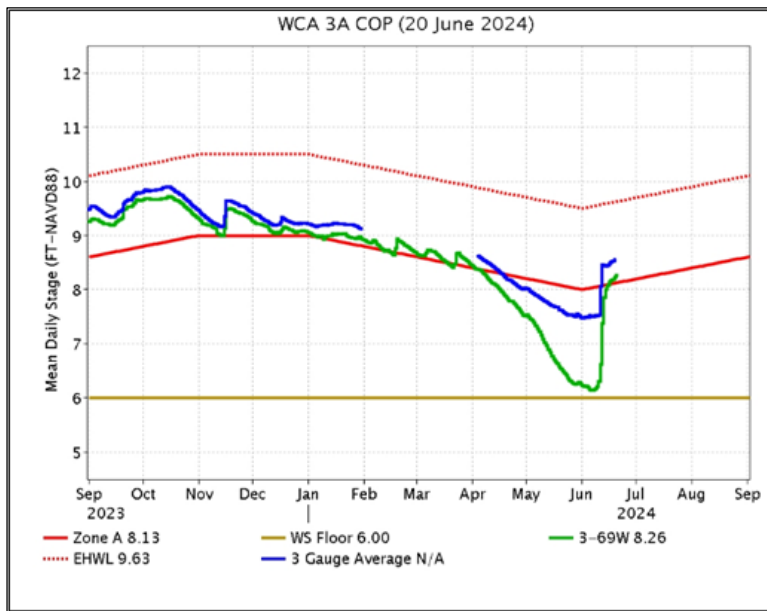


**Figure EV-1.** WCA-1 stage hydrographs and regulation schedule.

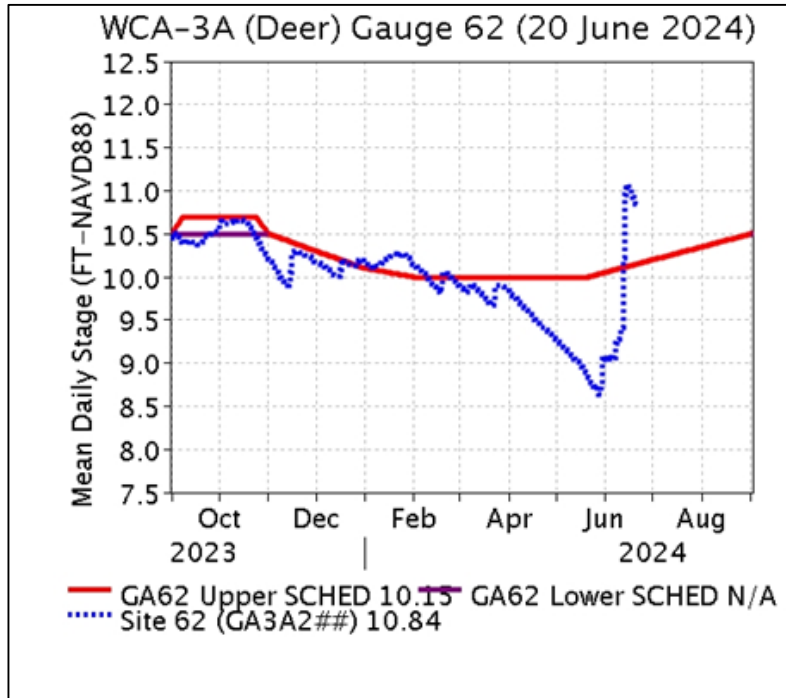




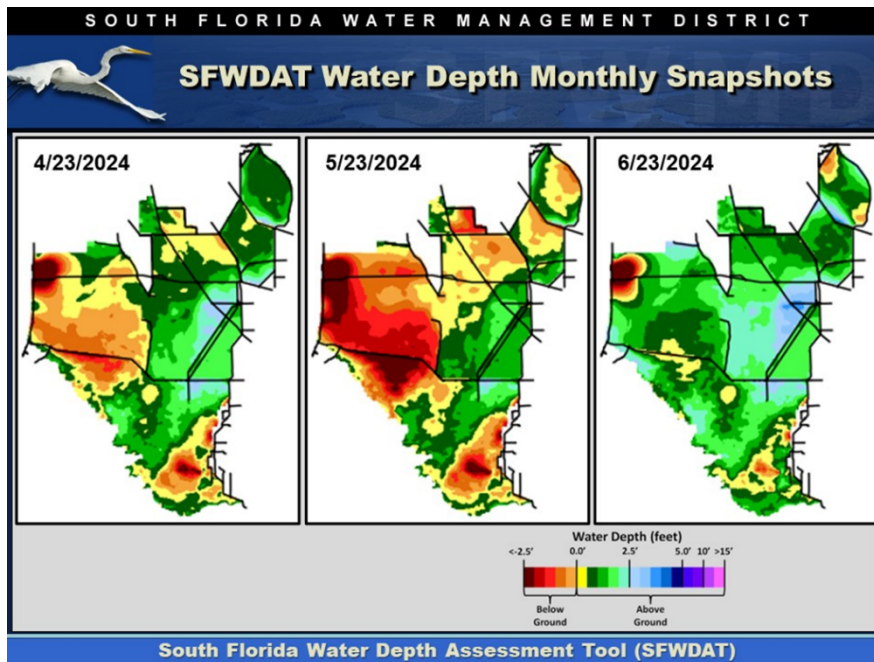
**Figure EV-2.** WCA-2A stage hydrographs and regulation schedule.



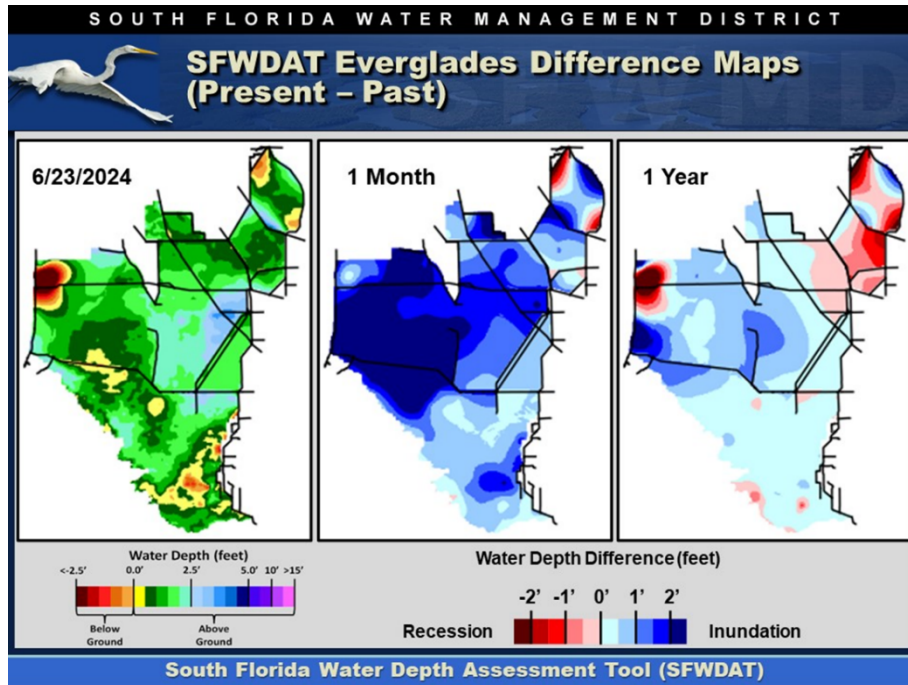
**Figure EV-3.** WCA-3A stage hydrographs (three-gauge average, 3-69W) and regulation schedule.



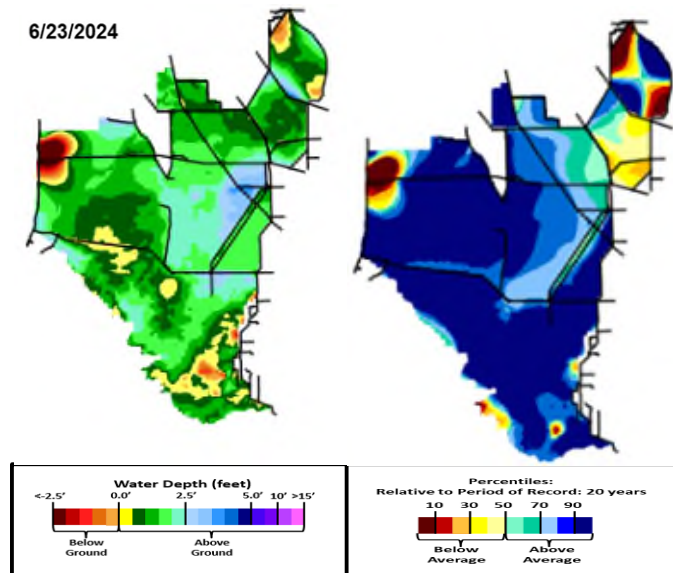
**Figure EV-4.** WCA-3A stage hydrograph (Deer gauge; Site 62) and GA62 regulation schedule. Figure has not been updating due to data issues. Star represents stage on Sunday.



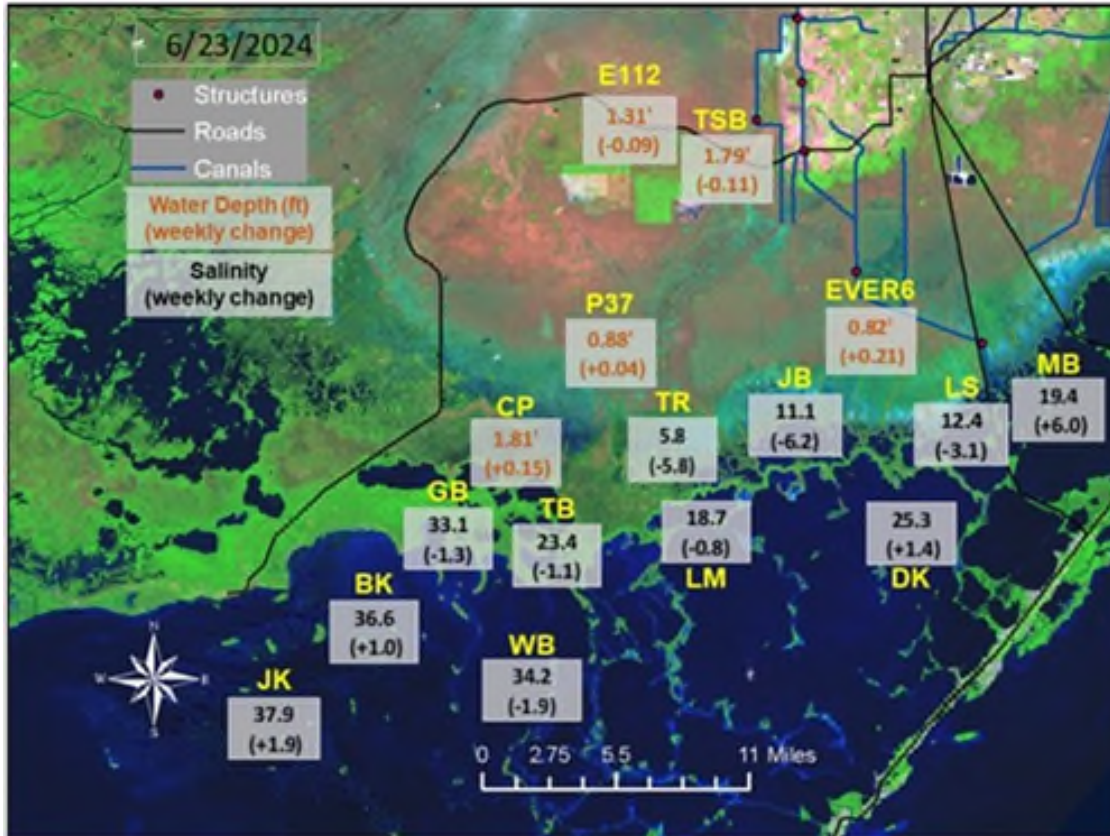
**Figure EV-5.** Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.



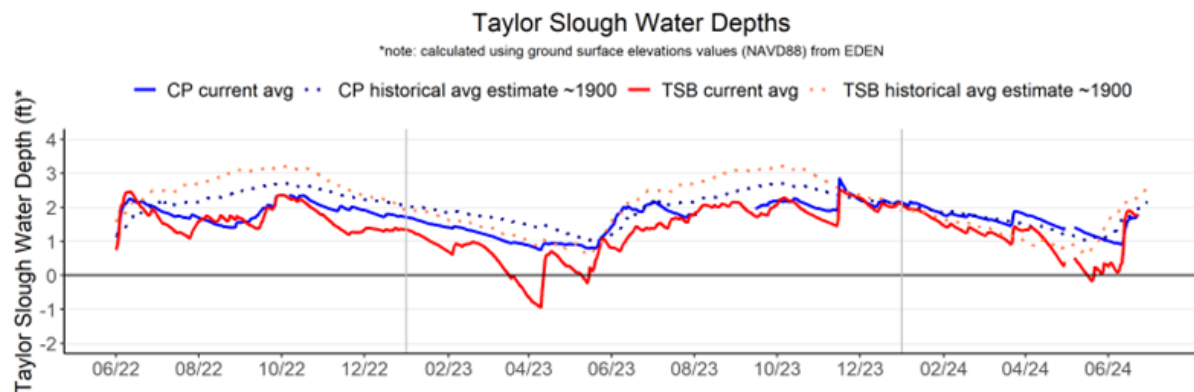
**Figure EV-6.** Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.



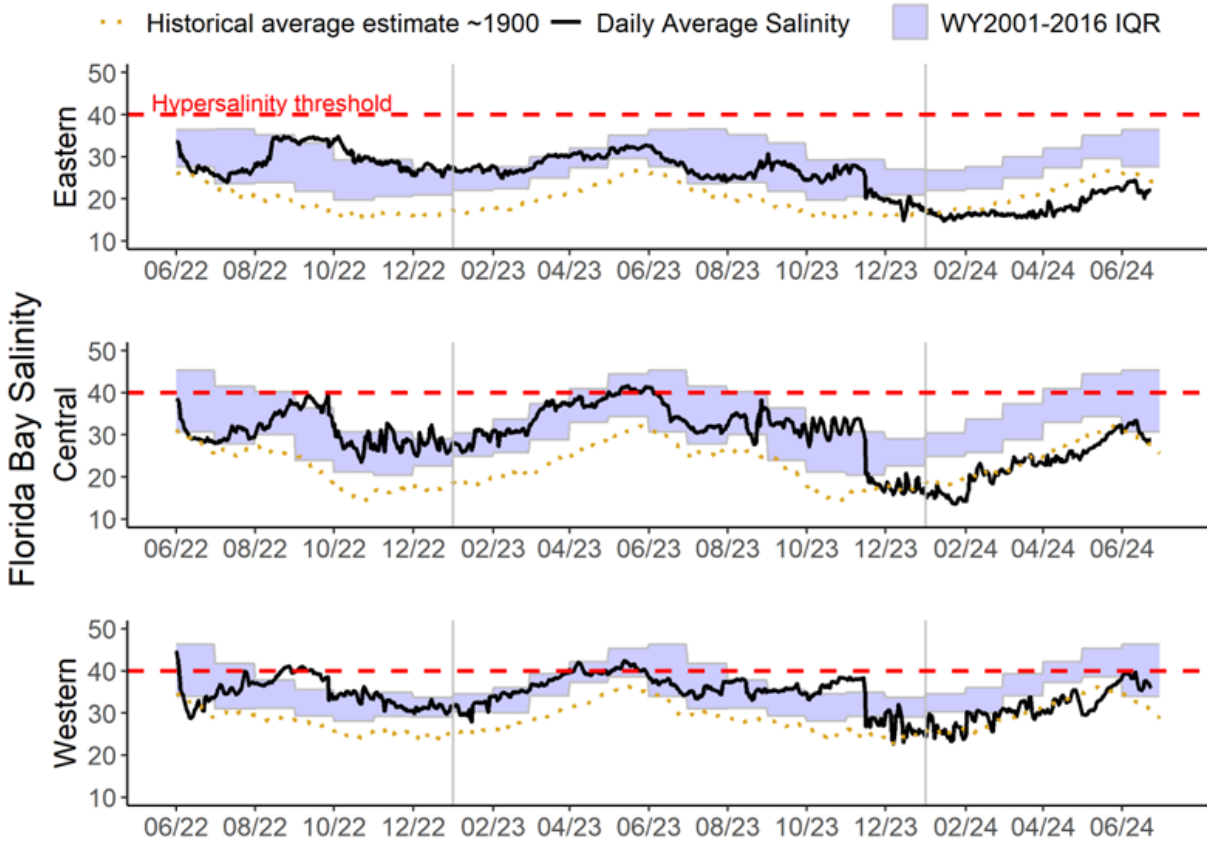
**Figure EV-7.** Present water depths (6/16/2024) compared to the day of year average over the previous 20 years.



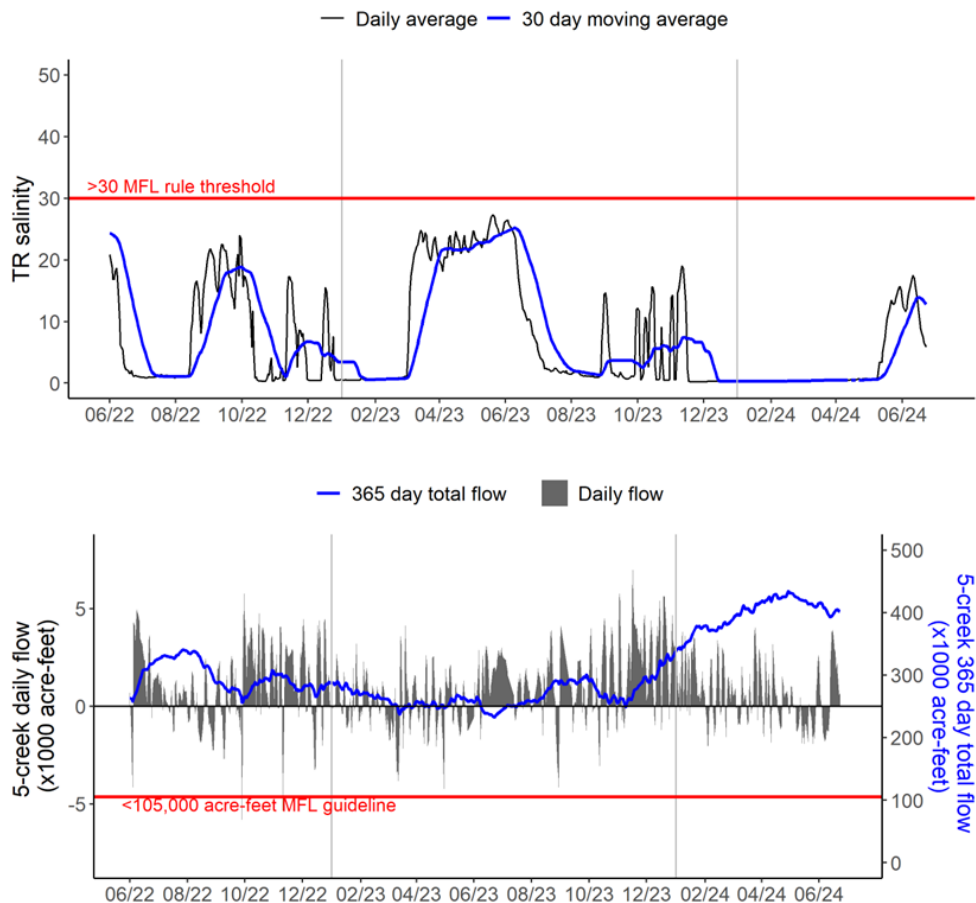
**Figure EV-8.** Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.



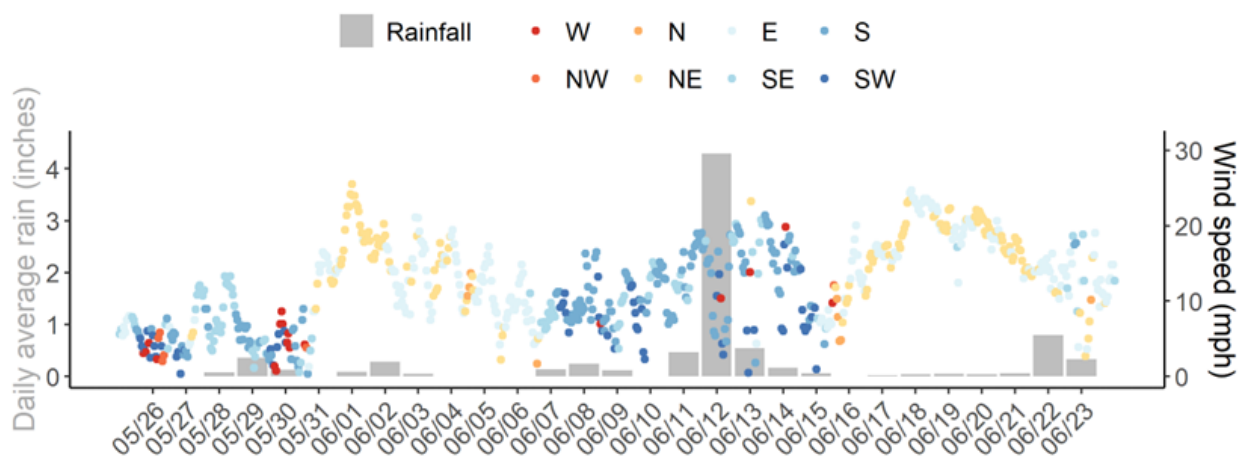
**Figure EV-9.** Taylor Slough water depth time series for Taylor Slough Bridge (TSB; northern slough) and Craighead Pond (CP; southern slough).



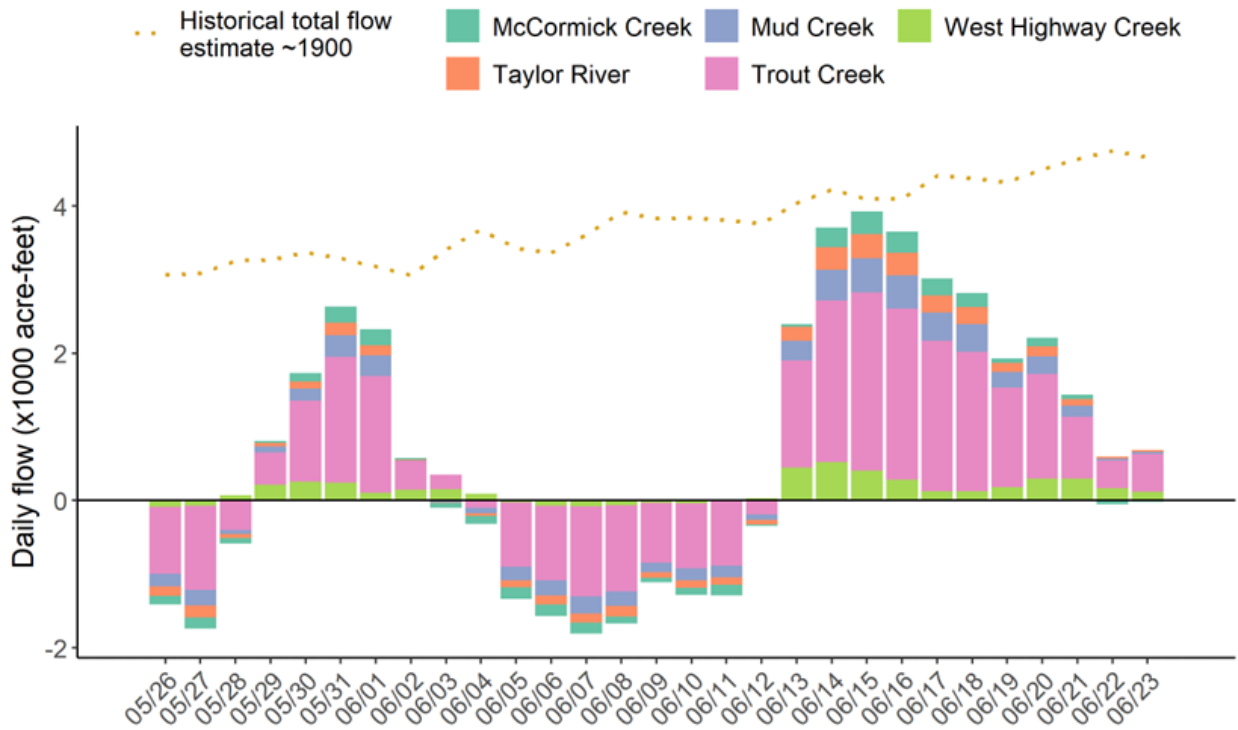
**Figure EV-10.** Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with WY2001-2016 interquartile (25-75 percentile) ranges and estimated historical daily average salinities (~1900 CE). The hypersalinity threshold indicates the level at which salinities start to become harmful to seagrass.



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



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



**Figure EV-13.** Daily average creek flow summed between five creeks with estimated historical daily flow (~1900 CE) over the past four weeks.

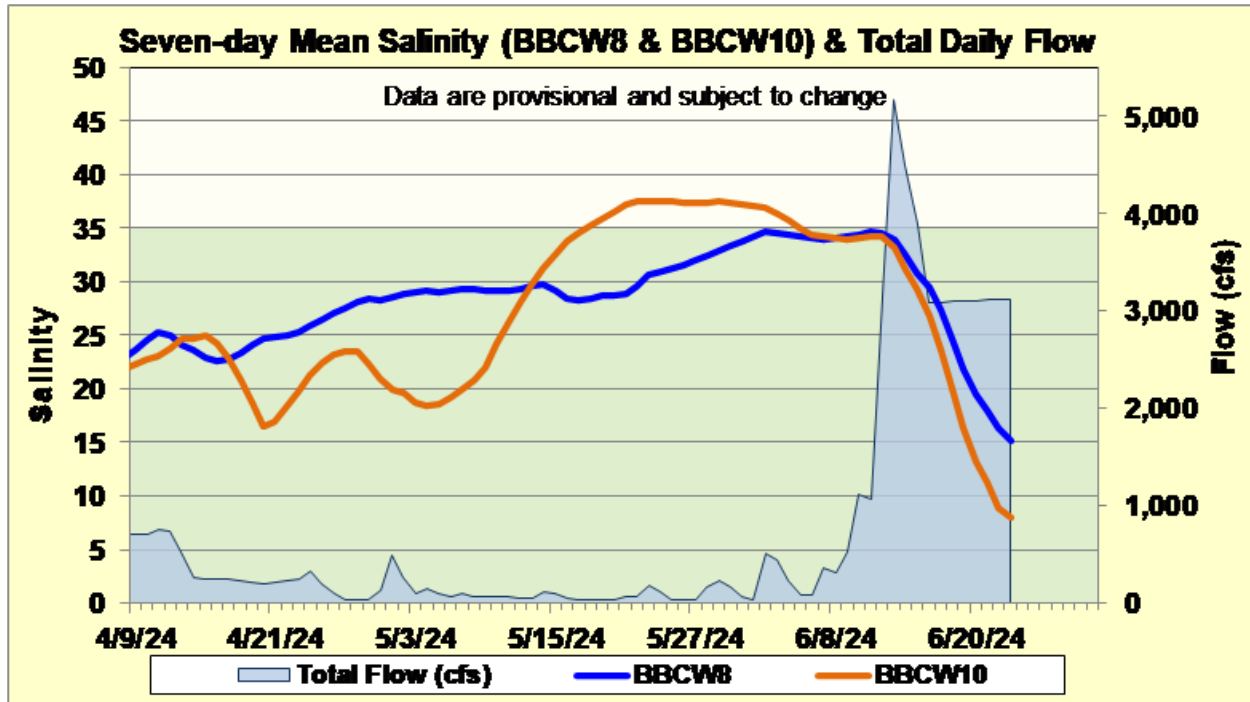
**Table EV-2.** Weekly water depth changes and water management recommendations

<b>SFWMD Everglades Ecological Recommendations, June 25, 2024 (red is new)</b>			
	Weekly change	Recommendation	Reasons
<b>WCA-1</b>	Stage increased by 1.18'	Ascension rate of less than 0.18' per week.	Protect within basin and downstream habitat and wildlife.
<b>WCA-2A</b>	Stage increased by 0.39'	Ascension rate less than 0.18' per week.	Protect within basin and downstream habitat and wildlife.
<b>WCA-2B</b>	Stage increased by 0.55'	Ascension rate of less than 0.18' per week.	Protect within basin and downstream habitat and wildlife.
<b>WCA-3A NE</b>	Stage increased by 0.16'	Maintain the current ascension rate of less than 0.18' per week.	Protect within basin and downstream habitat and wildlife.
<b>WCA-3A NW</b>	Stage increased by -1.47'	Ascension rate of less than 0.18' per week.	
<b>Central WCA-3A S</b>	Stage increased by 0.17'	Maintain the current ascension rate of less than 0.18' per week	Protect within basin wildlife.
<b>Southern WCA-3A S</b>	Stage increased by 0.45'	Ascension rate of less than 0.18' per week.	
<b>WCA-3B</b>	Stage increased by 0.69'	Ascension rate of less than 0.18' per week.	Protect within basin and downstream habitat and wildlife.
<b>ENP-SRS</b>	Stage increased by -0.03'	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.
<b>Taylor Slough</b>	Stage changes ranged from -0.11' to +0.21'	Move water southward as possible.	When available, provide freshwater to promote water movement.
<b>FB- Salinity</b>	Salinity changes ranged from -6.2 to +6.0	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 3,107 cfs, and the previous 30-day mean inflow was 1,567 cfs. The seven-day mean salinity was 15.7 at BBCW8 and 7.7 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data were provided by Biscayne National Park.



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