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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: April 26, 2023

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Wednesday's forecasted afternoon to early evening rains could fall over areas that have already received generous rainfall. On Thursday, a warm front will lift north across the SFWMD Thursday afternoon. The front's moisture should support widely scattered afternoon showers and thunderstorms around Lake Okeechobee northward and westward. On Friday, strong low pressure will form resulting in very breezy southwesterly to westerly winds Friday afternoon, with wind gusts potentially as high as 40 mph. An increase of deeper moisture could also result in widespread coverage of moderately heavy to heavy showers and thunderstorms around and north of Lake Okeechobee Friday afternoon and evening while relatively drier conditions prevail over the far southern part of the SFWMD. Additional heavy rains are likely across the SFWMD Saturday and Sunday, although how much and the exact spatial distribution of rain is of low confidence at this time. The rains will fall on top of the impressive rains earlier this week and those observed earlier in the month, probably resulting in net monthly SFWMD rainfall close to the greatest ever observed in April in records dating back to 1932 and a minimum in the top five wettest. A cold front will push through the SFWMD late Sunday and early on Monday, followed by a secondary and stronger cold front late Monday. This fundamentally different weather pattern developing this weekend and early next week will result in significant drying and an unusually cool air mass for early May by Tuesday next week. For the week ending next Tuesday morning, total SFWMD rainfall is very likely to be much above normal.

Kissimmee

Releases were made as needed from East Lake Toho and Lake Toho to continue their recessions to their respective low pools on June 1. Weekly average discharges on April 23, 2023, at S-65 and S-65A were 340 cfs and 310 cfs, respectively. Mean weekly water depth on the Kissimmee River floodplain of 0.09 ft was essentially unchanged from the previous week. The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 6.9 mg/L last week to 7.8 mg/L for the week ending April 23; above both the potentially lethal level and the physiologically stressful range for largemouth bass and other sensitive species.

Lake Okeechobee

Lake Okeechobee stage was 14.27 feet NGVD on April 23, 2023, which is 0.01 feet higher than the previous week and 0.48 feet lower than a month ago. Average daily inflows (excluding rainfall) increased from 320 cfs the previous week to 393 cfs this week. Average daily outflows (excluding evapotranspiration) decreased from 1,413 cfs the previous week to 434 cfs this week. Recent satellite imagery (April 22, 2023) showed low to moderate bloom potential along the northwestern nearshore regions. On April 13, 2023, the seventh wading bird survey of the season reported five flocks with an estimated total of 2,514 birds actively foraging on the Lake. Water quality samples collected on April 3-5 revealed two samples with chlorophyll *a* values above 40 µg/L and seven samples with chlorophyll *a* values between 20 µg/L and 40 µg/L. No site had detectable toxin levels. As of mid-April, 108 snail kite nests have been counted in the western region of Lake Okeechobee, 46 of which have been deemed successful. This is the highest total of successful nests through mid-April. There are 343 snail kites utilizing the Lake suggesting that Lake Okeechobee is currently a very important refuge for the kites.

Estuaries

Total inflow to the St. Lucie Estuary averaged 1,151 cfs over the past week with 0 cfs coming from Lake Okeechobee. Mean surface salinities decreased at all sites within the estuary. Salinity in the middle estuary was in the optimal range (10-25) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 1,997 cfs over the past week with 380 cfs coming from Lake Okeechobee. Mean surface salinities remained the same at S-79, increased at Val I-75, Ft. Myers, and Cape Coral, and decreased slightly at Shell Point and Sanibel. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the optimal range for adult eastern oysters at Cape Coral (10-25) and in the upper stressed range at Shell Point and Sanibel (>25).

Stormwater Treatment Areas

For the week ending Sunday, April 23, 2023, no Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2023 (since May 1, 2022) is approximately 43,700 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 1,048,000 ac-feet. Most STA cells are at or near target stage, except the Eastern Flow-way of STA-1E and STA-5/6 where cells are below target. STA-1E Western Flow-way is offline for post-construction vegetation grow in, STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown, and STA-2 Flow-way 2 is offline for post-construction vegetation grow in. Operational restrictions are in effect in STA-1E Central and Eastern Flow-ways, STA-1W Eastern, Western, and Northern Flow-ways, and STA-2 Flow-ways 3 and 4 for vegetation management activities. STA-1E Eastern Flow-way and STA-1W Northern Flow-way contain nests of Migratory Bird Treaty Act protected species. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2.

Everglades

Rates of stage change within many regions of the Everglades Protection Area moved into the optimal or fair range. White Ibis have abandoned nests (currently 4,000 down from 15,000) across the Everglades, and the cause is unknown. Nesting at Alley north is about 10% of what the March numbers were. Wood Storks with older fledglings continue to nest but as many as two-thirds of those counted in April have abandoned their nest. Taylor slough stages changed little last week and remained well above average after falling below average two weeks ago. Average salinity increased slightly last week in Florida Bay and while above average, all regions remain within their interquartile ranges.

Biscayne Bay

Total inflow to Biscayne Bay averaged 734 cfs, and the previous 30-day mean inflow averaged 674 cfs. The seven-day mean salinity was 26.7 at BBCW8 and 21.8 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data are provided by Biscayne National Park.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On April 23, 2023, mean daily lake stages were 55.7 feet NGVD (0.8 feet below schedule) in East Lake Toho, 52.7 feet NGVD (0.8 feet below schedule) in Lake Toho, and 50.0 feet NGVD (1.5 feet below the approved temporary deviation schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

For the week ending April 23, 2023, mean weekly discharge was 340 cfs at S-65 and 310 cfs at S-65A. Mean weekly discharge from the Kissimmee River was 290 cfs at S-65D and 280 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 46.4 feet NGVD at S-65A and 28.4 feet NGVD at S-65D on April 23, 2023. Mean weekly river channel stage of 32.9 feet NGVD on April 23, 2023, was 0.1 feet lower than the previous week's mean (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain of 0.09 feet for the week ending April 23, 2023 and was essentially unchanged from the previous week's mean (**Table KB-2, Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 6.9 mg/L the previous week to 7.8 mg/L for the week ending April 23, 2023 (**Table KB-2, Figure KB-6**).

Water Management Recommendations

Continue stage recessions in Lake Toho and East Lake Toho to their June 1 low pools. Maintain at least 300 cfs discharge at S-65A.

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

Water Body	Structure	Stage Monitoring Site	Weekly (7-Day) Average Discharge (cfs)	Sunday Lake Stage (feet NGVD) ^a	Schedule Type ^b	Sunday Schedule Stage (feet NGVD)	Sunday Departure from Regulation (feet)	
							4/23/23	4/16/23
Lakes Hart and Mary Jane	S-62	LKMJ	18	60.0	R	60.3	-0.3	-0.3
Lakes Myrtle, Preston and Joel	S-57	S-57	0	60.1	R	60.4	-0.3	-0.5
Alligator Chain	S-60	ALLI	130	63.0	R	63.0	0.0	0.0
Lake Gentry	S-63	LKGT	160	60.5	R	60.5	0.0	0.0
East Lake Toho	S-59	TOHOE	210	55.7	R	56.5	-0.8	-0.9
Lake Toho	S-61	TOHOW S-61	640	52.7	R	53.5	-0.8	-0.9
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	340	50.0	T	51.5	-1.5	-0.7

a. Names of in-lake monitoring sites and structures used to determine lake stage. If more than one site is listed, an average is reported.

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

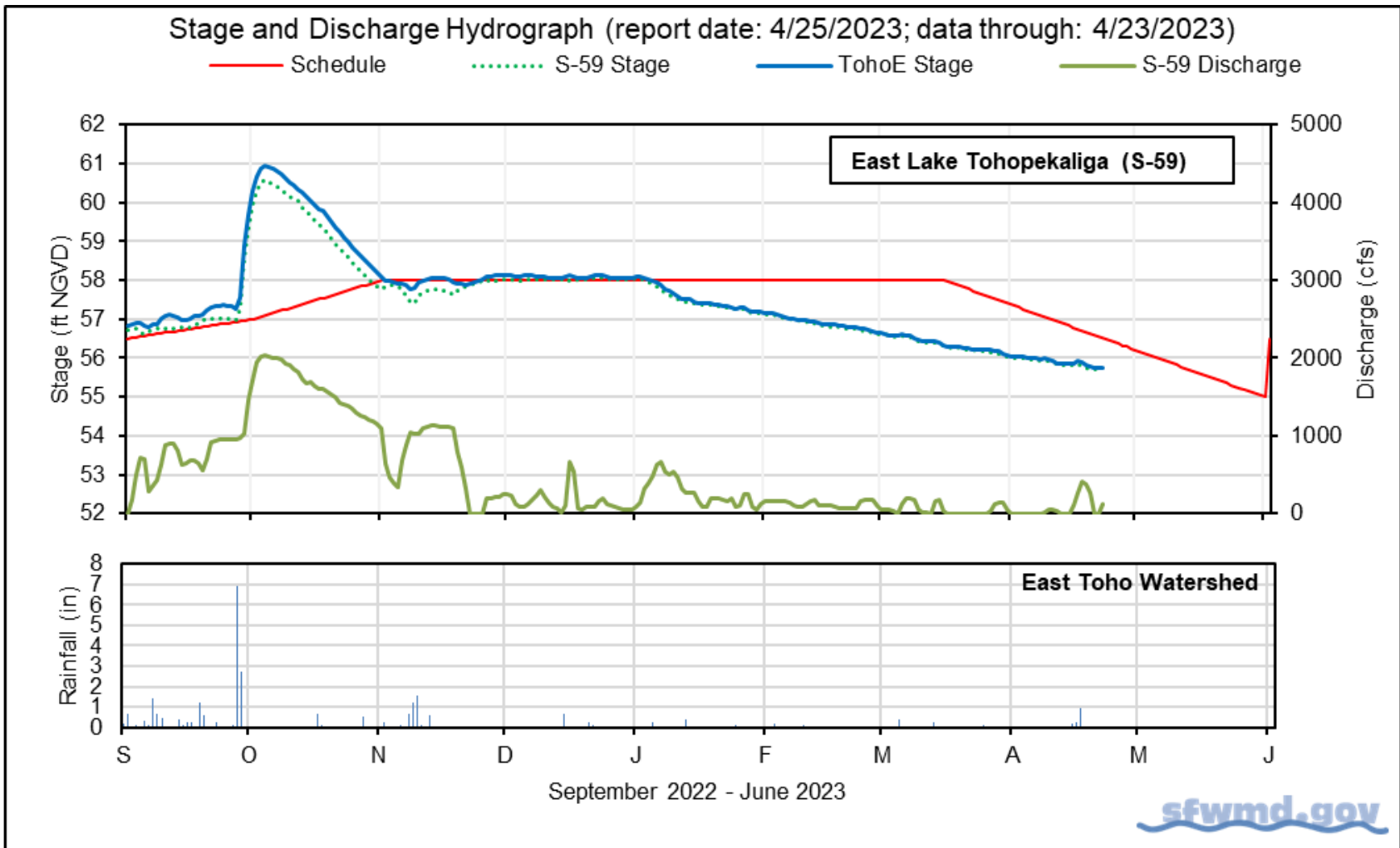


Figure KB-1. East Lake Toho regulation schedule, stage, discharge, and rainfall.

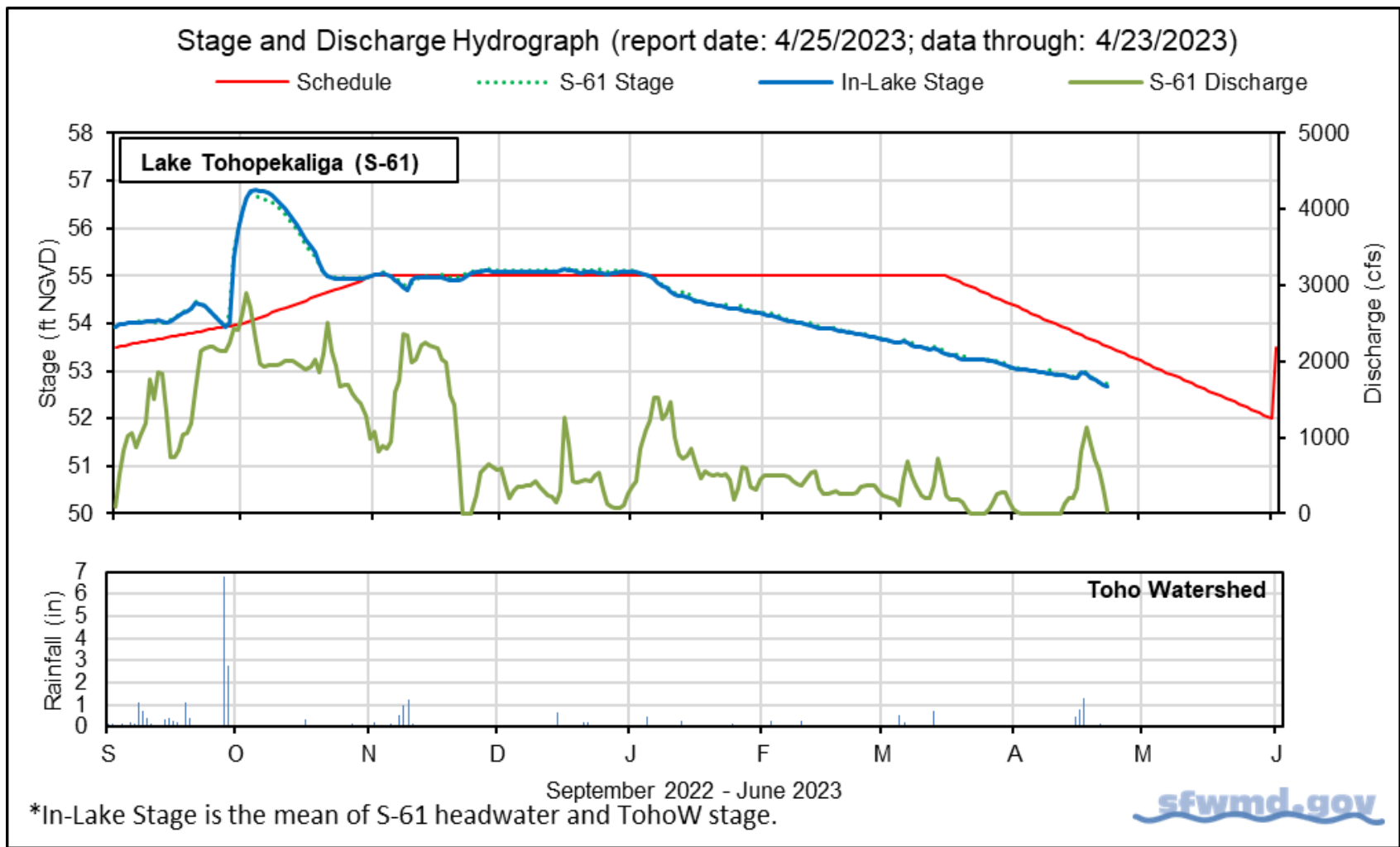


Figure KB-2. Lake Toho regulation schedule, stage, discharge, and rainfall.

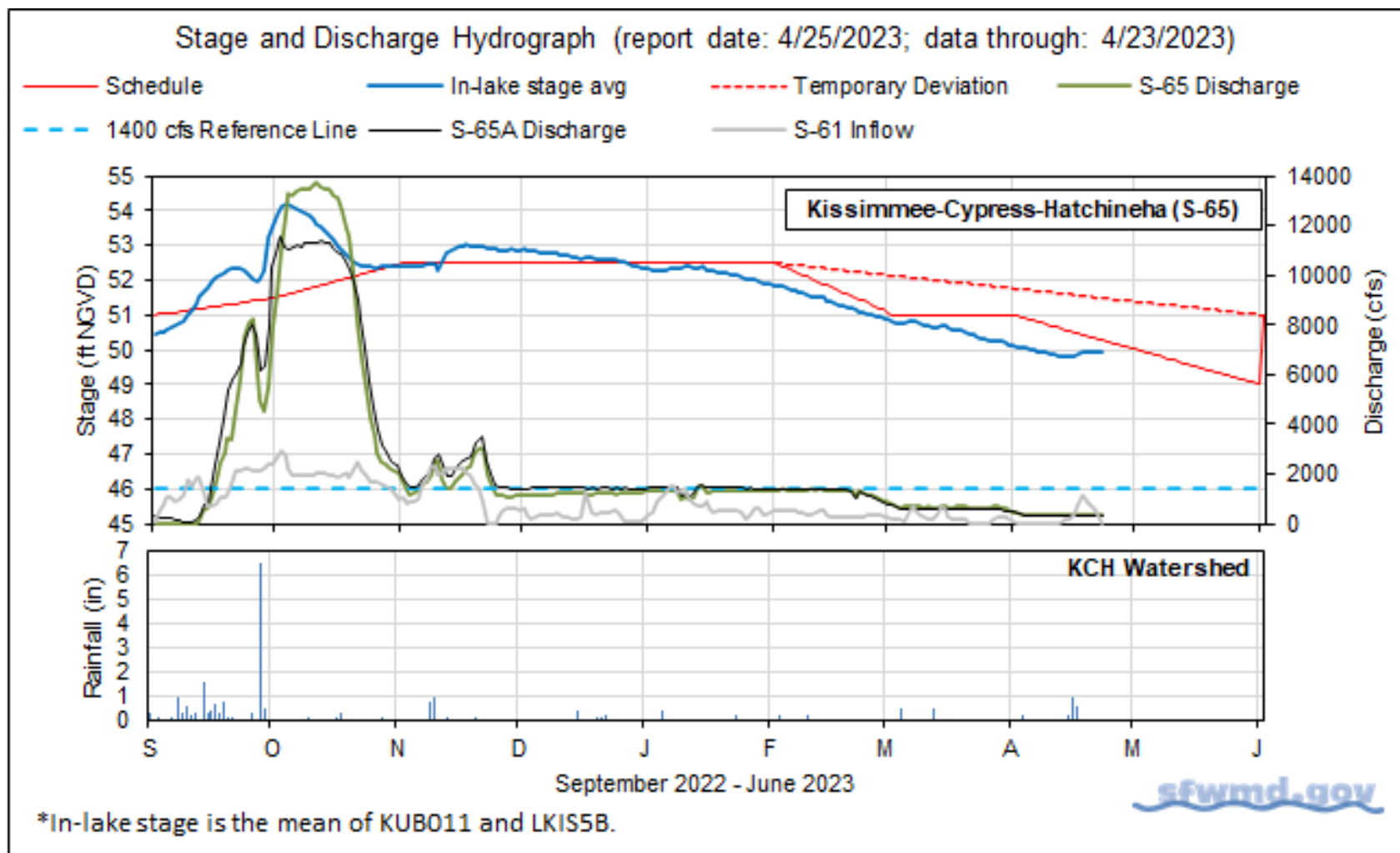


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge, and rainfall.

Table KB-2. One- and seven-day average discharge and stage at Lower Kissimmee basin structures, river channel dissolved oxygen concentrations and water depths in the Phase I area floodplain. All data are provisional.

Metric	Location	Sunday Daily Average 4/23/23	Weekly Average for Previous Seven Day Periods			
			4/23/23	4/16/23	4/9/23	4/2/23
Discharge	S-65	340	340	350	370	580
Discharge	S-65A ^a	310	310	310	320	520
Headwater Stage (feet NGVD)	S-65A	46.4	46.4	46.4	46.4	46.4
Discharge	S-65D ^b	260	290	270	330	530
Headwater Stage (feet NGVD)	S-65D ^c	28.4	28.4	28.3	28.3	28.3
Discharge (cfs)	S-65E ^d	220	280	280	340	550
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	7.9	7.8	6.9	6.1	7.0
River channel mean stage ^f	Phase I river channel	32.8	32.9	33.0	33.2	34.5
Mean depth (feet) ^g	Phase I floodplain	0.09	0.09	0.08	0.08	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).

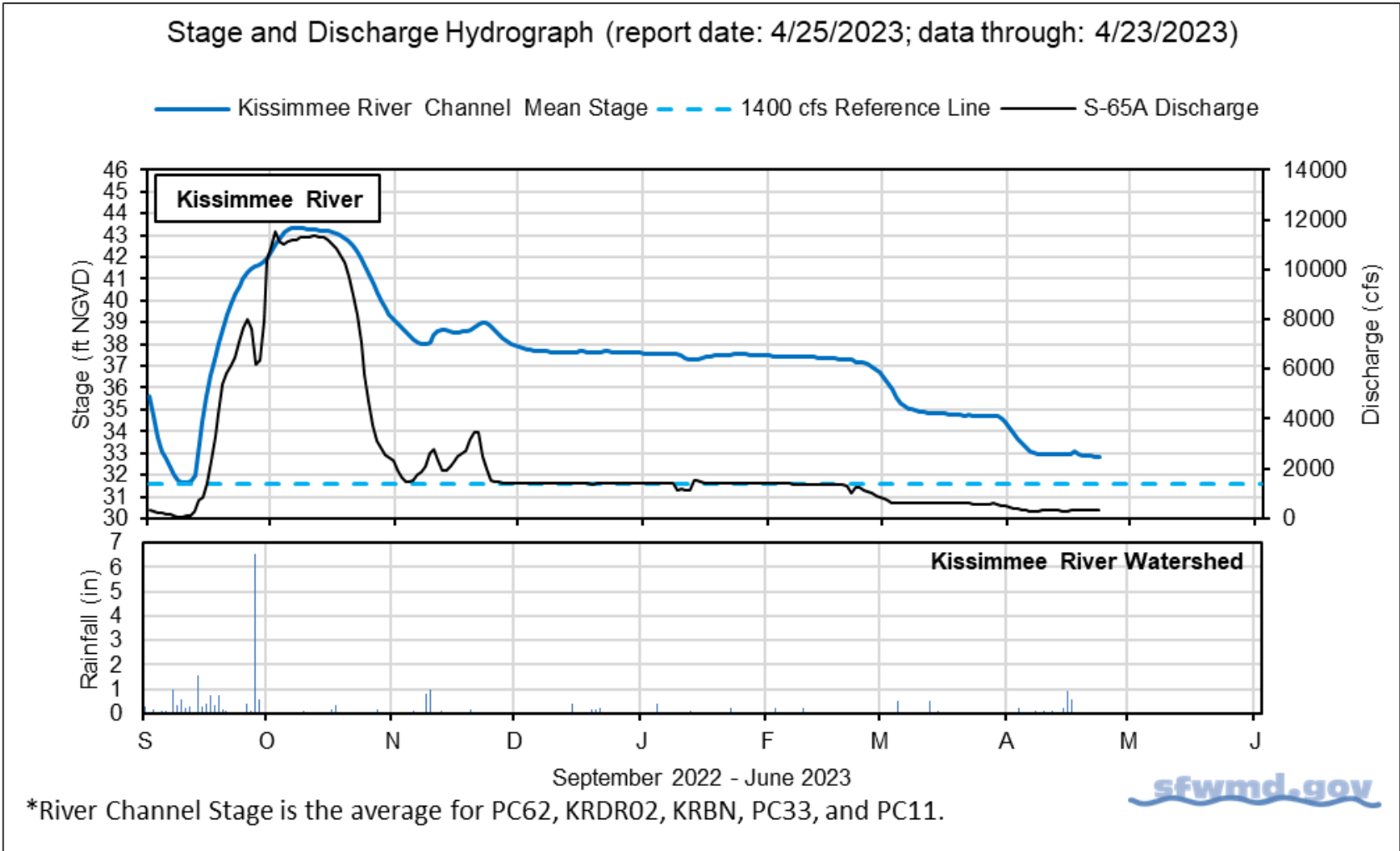


Figure KB-4. Kissimmee River stage, discharge, and rainfall.

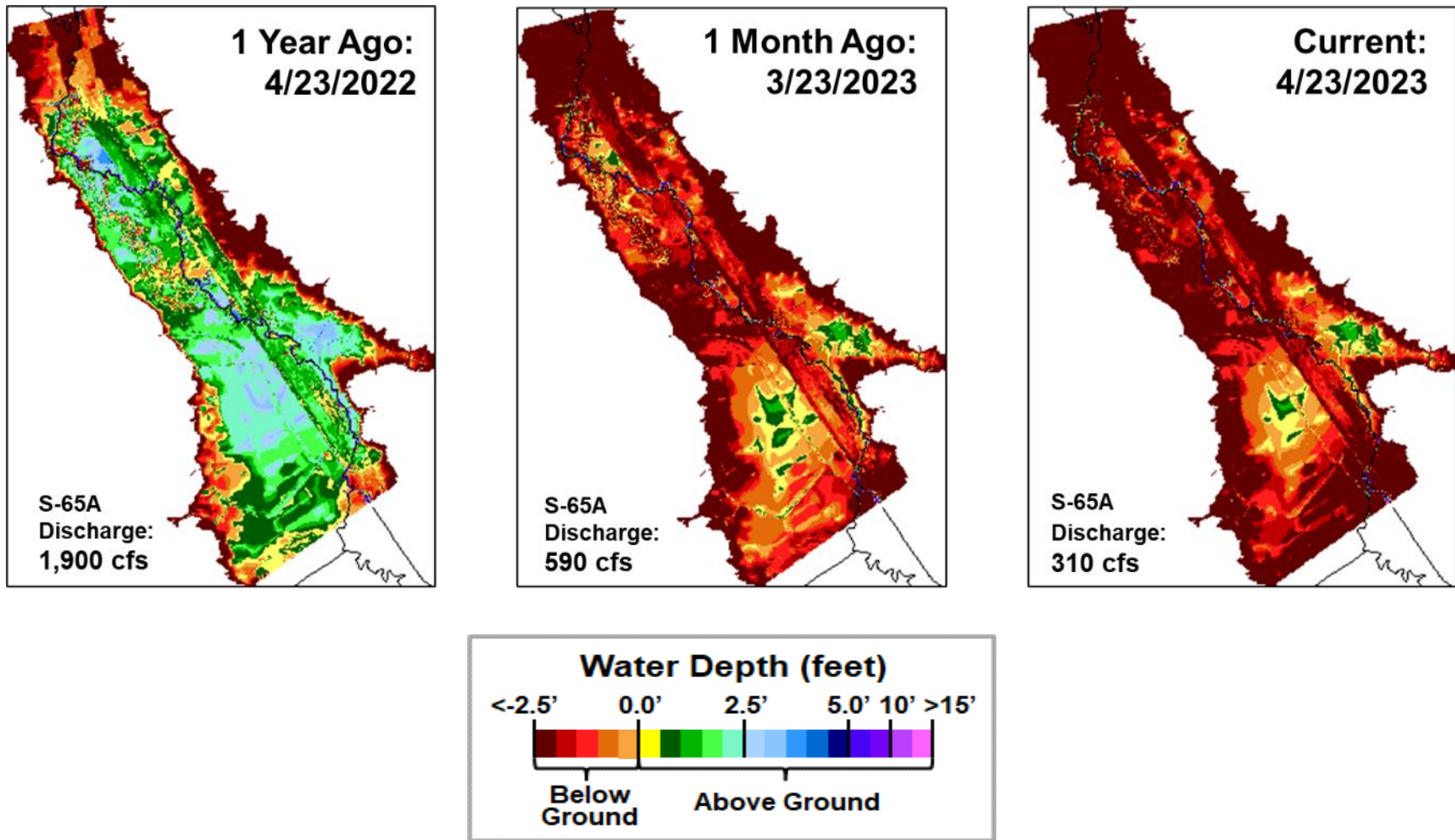
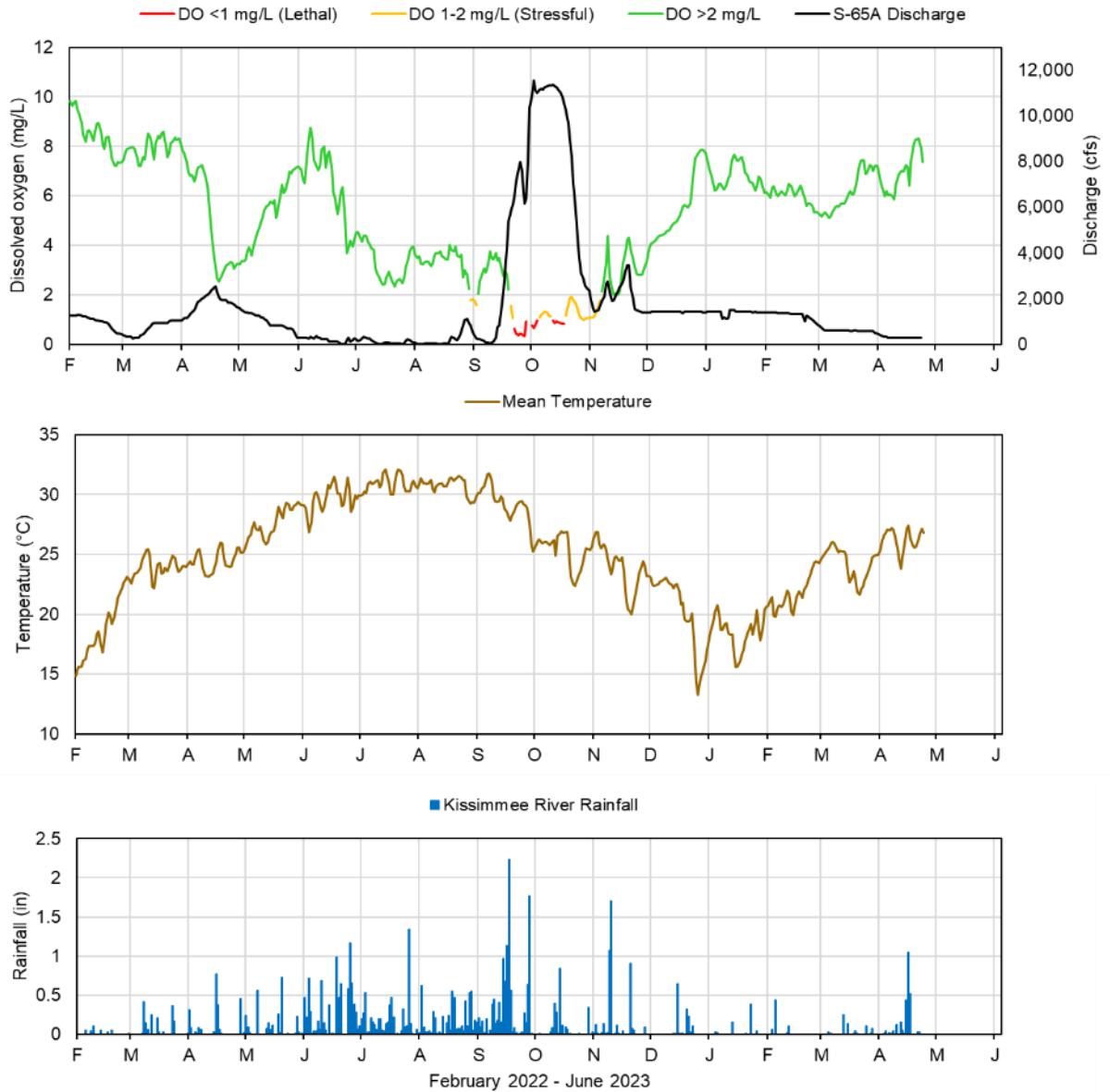


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago, and current.



Report Date: 4/25/2023; data are through: 4/23/2023



Figure KB-6. Restored 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.

Stage and Discharge Guidance for 2021-2022.

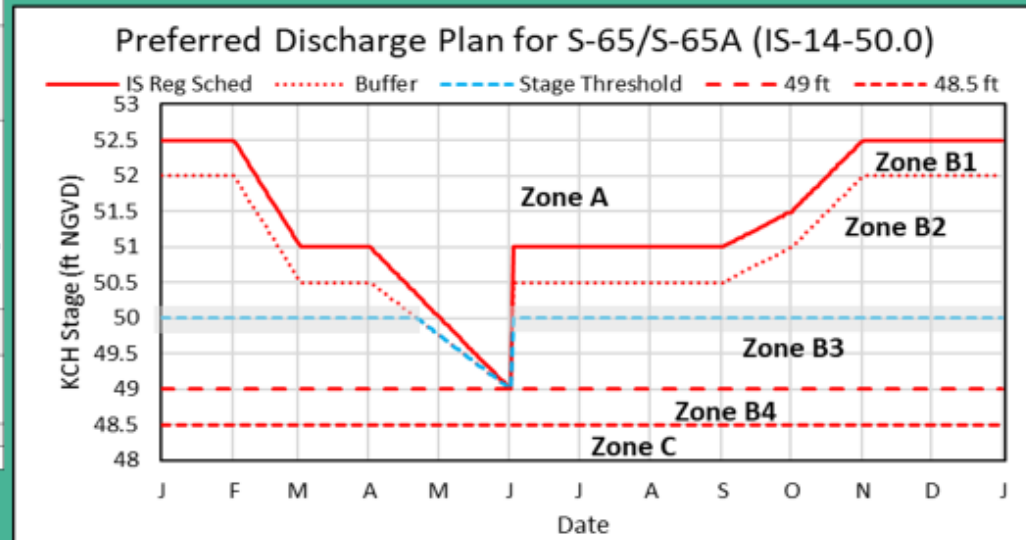
Zone	KCH Stage (ft NGVD)	S-65/S-65A Discharge*
A	Above regulation schedule line.	Flood control releases as needed with no limits on the rate of discharge change.
B1	In flood control buffer zone (0.5 ft below the schedule line).	Adjust S-65 discharge so that S-65A discharge is between 1400 cfs at the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

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

Table KB-3. Discharge Rate of Change Limits for S65/S65A (revised 1/14/19).

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

2021-2022 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.

Figure KB-7. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

Lake Okeechobee

Lake Okeechobee stage was 14.27 feet NGVD on April 23, 2023, which is 0.01 feet higher than the previous week and 0.48 feet lower than a month ago (**Figure LO-1**). Lake stage remained in the Low sub-band (**Figure LO-2**) and was 0.14 feet above the upper limit of the ecological envelope (**Figure LO-3**). According to NEXRAD, 0.79 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) increased slightly from 320 cfs the previous week to 393 cfs this week. Average daily outflows (excluding evapotranspiration) decreased considerably from 1,413 cfs the previous week to 434 cfs this week. Most of the inflow came from the Kissimmee River (C-38 Canal; 276 cfs). Outflows to the west via the S-77 structure averaged 380 cfs for the week. There were no outflows to the east via the S-308 structure nor to the south via the S-350 structures. **Figures LO-4 and LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively. These data are provisional and are subject to change.

The most recent satellite image (April 22, 2023) from NOAA's Harmful Algal Bloom Monitoring System showed low to moderate bloom potential along the northwestern nearshore regions of the Lake and in Fisheating Bay, and still no activity in the pelagic region (**Figure LO-6**).

The seventh wading bird survey of the season was conducted on April 13, 2023. Five flocks, with an estimated total of 2,514 birds were seen actively foraging on the Lake (**Figure LO-7**). Water levels during most of the 2023 surveys have been too high to provide suitable foraging habitat across much of the Lake, with all but the first March 2023 survey having numbers in the lowest quartile of the previous five years (**Figure LO-8**).

Water sampling is on the non-bloom season schedule but will switch to bloom season sampling next month. The non-bloom monthly water quality samples are collected at approximately 32 stations and taxa/toxin data are collected from 9 of the 32 stations. For samples collected on April 3-5, two samples had chlorophyll *a* values above 40 µg/L, and seven samples had chlorophyll *a* values between 20 µg/L and 40 µg/L; one site is still pending. No sites had detectable toxin levels, and one site had cyanobacteria communities dominated by *Microcystis aeruginosa* (**Figure LO-9**).

As of mid-April, 108 snail kite nests have been counted in the western region of Lake Okeechobee, 46 of which have been deemed successful. This is the highest total of successful nests through mid-April. Only seventeen nests are still active indicating nesting activities may be slowing. However, there are 343 snail kites utilizing the Lake, which is the third highest total since surveys began, suggesting that the Lake is currently a very important refuge for the kites.

**1 Month Ago:
03/24/2023**

**Current:
04/23/2023**

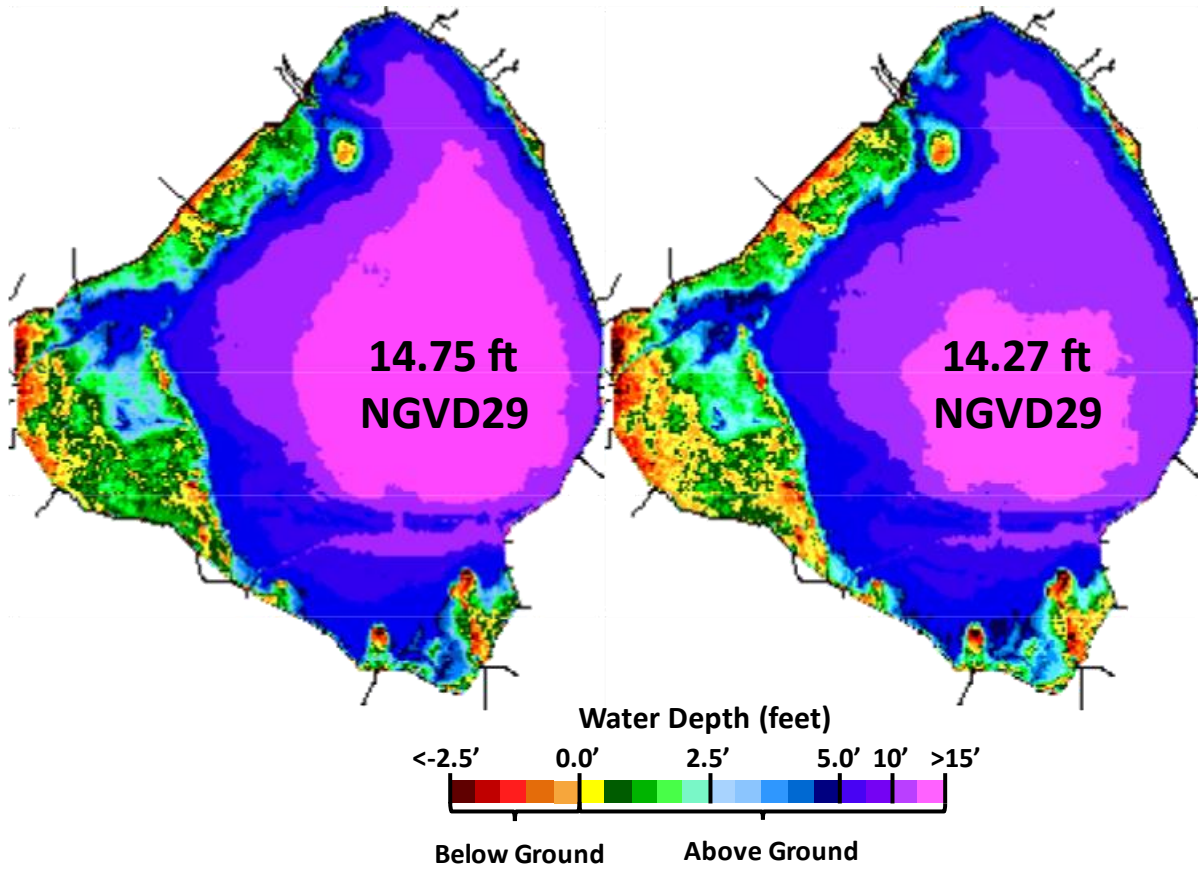


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Water Level History and Projected Stages

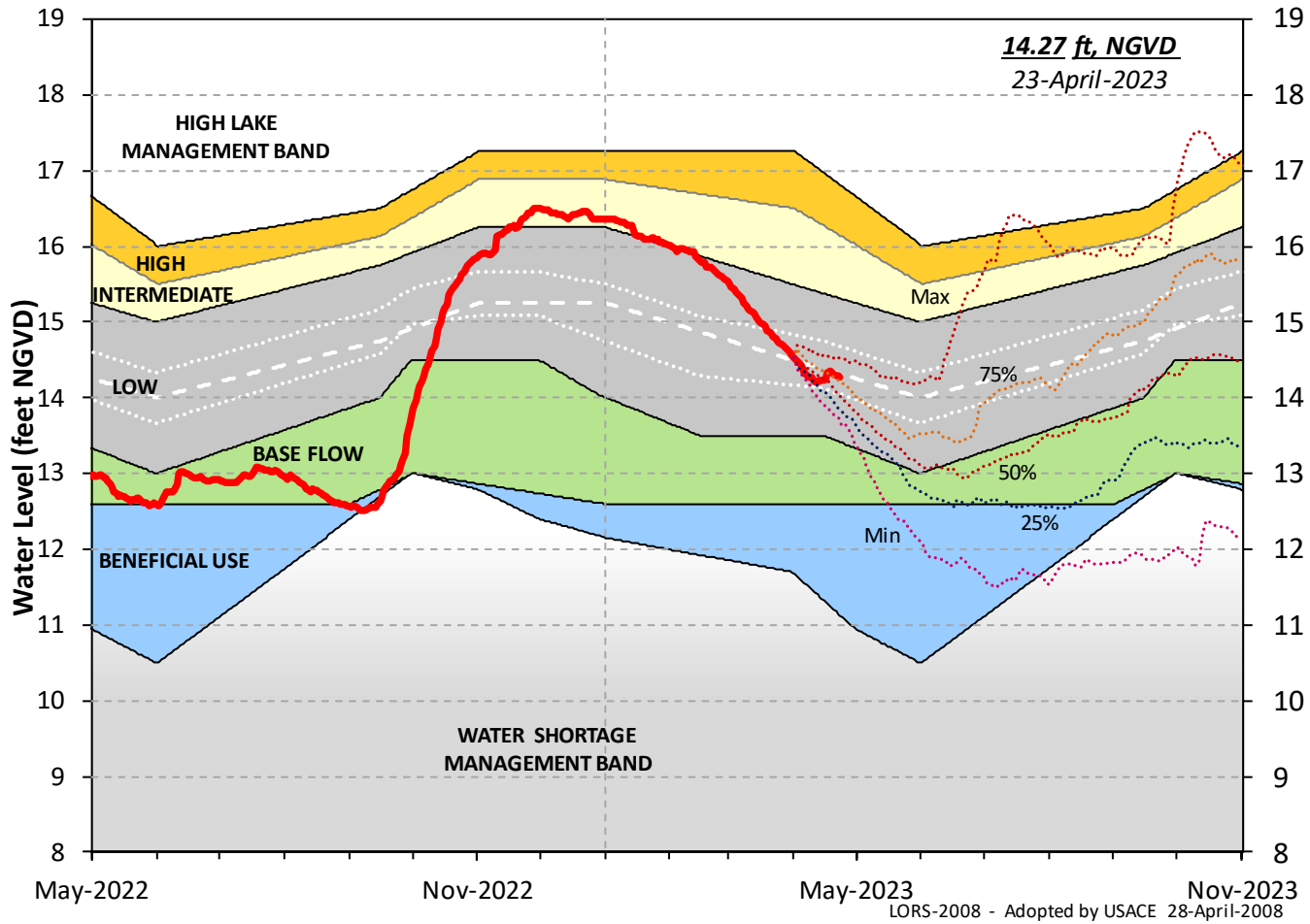


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

Lake Okeechobee Stage vs Ecological Envelope

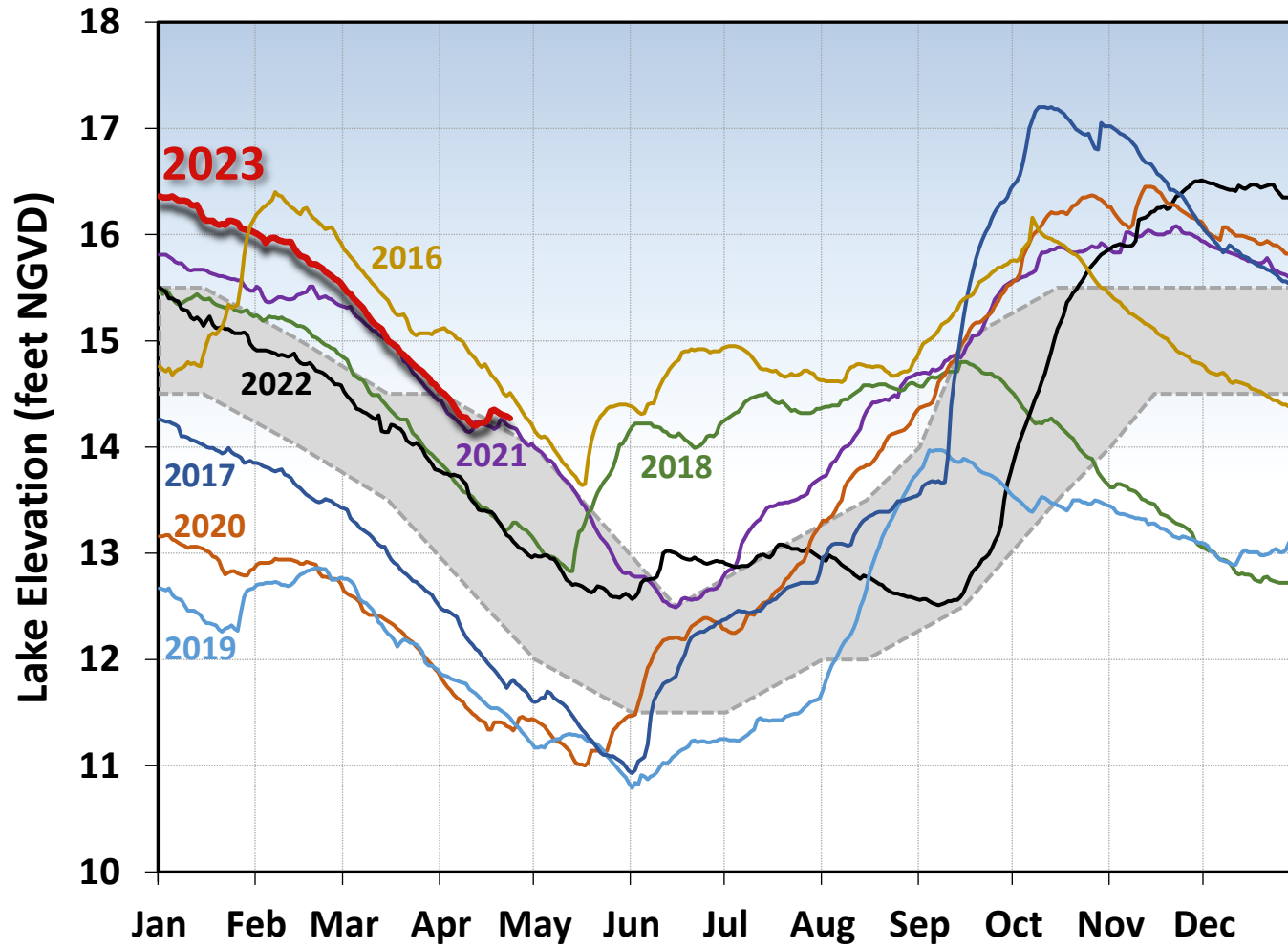


Figure LO-3. The prior seven years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

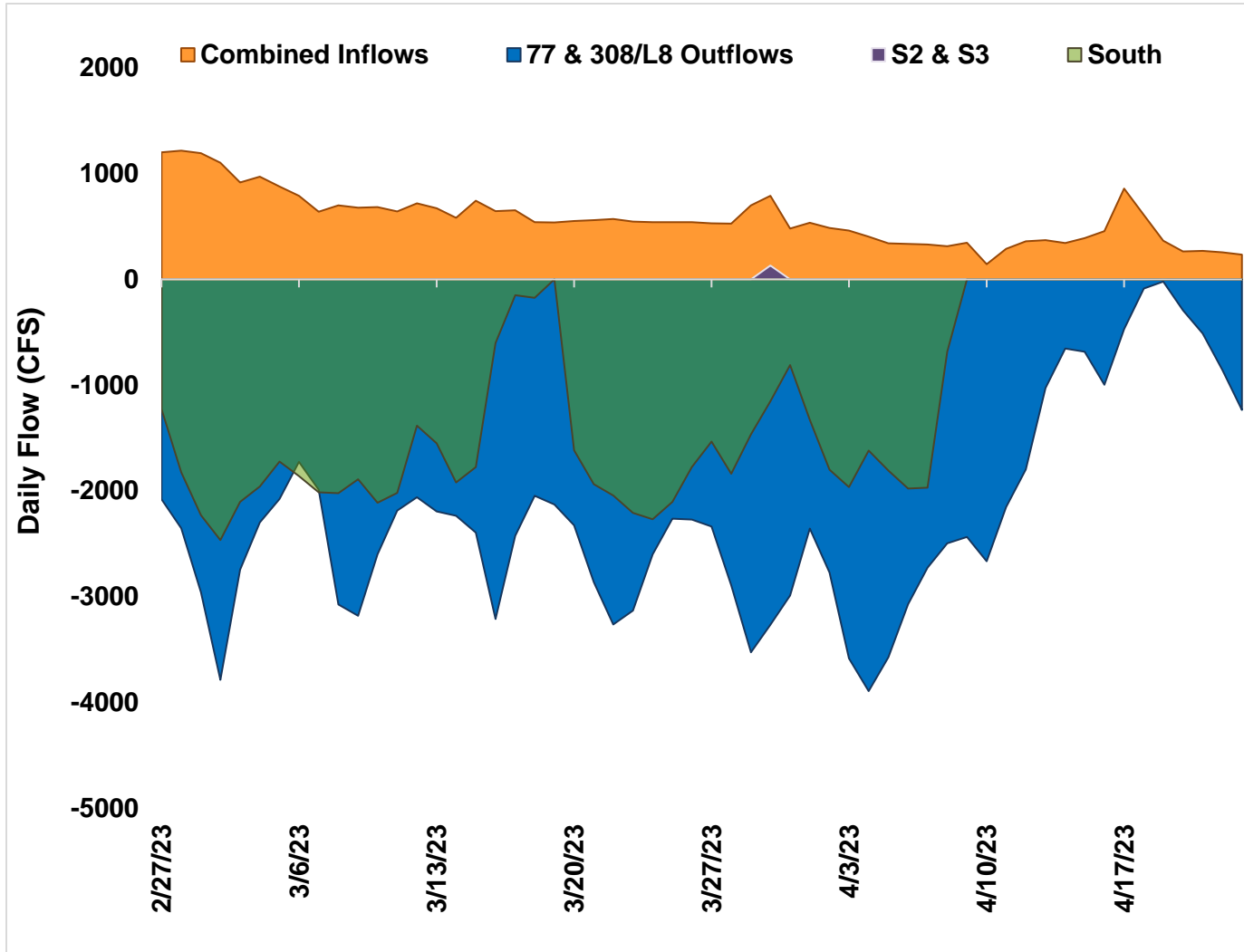


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

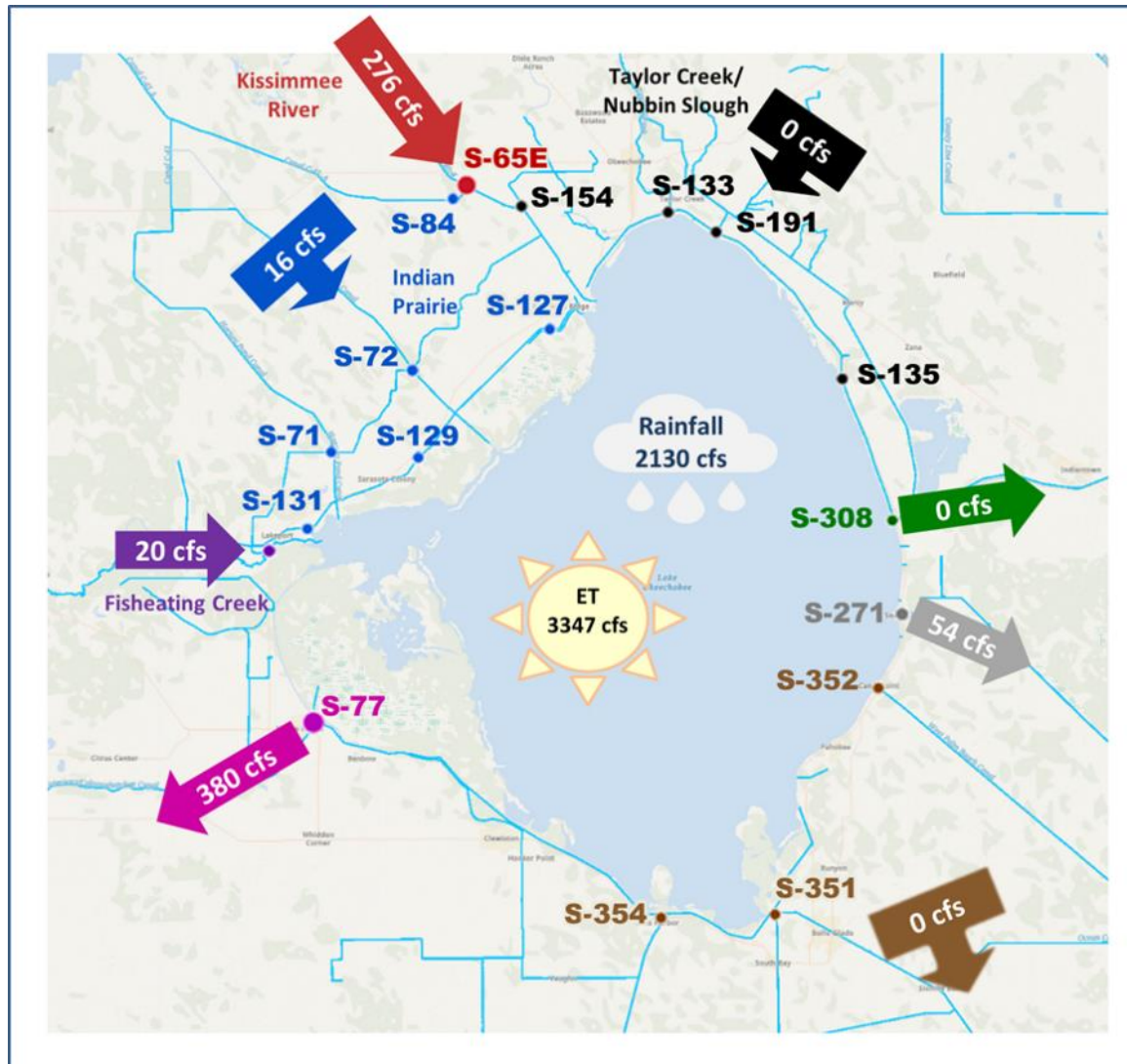


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of April 17 – 23, 2023.

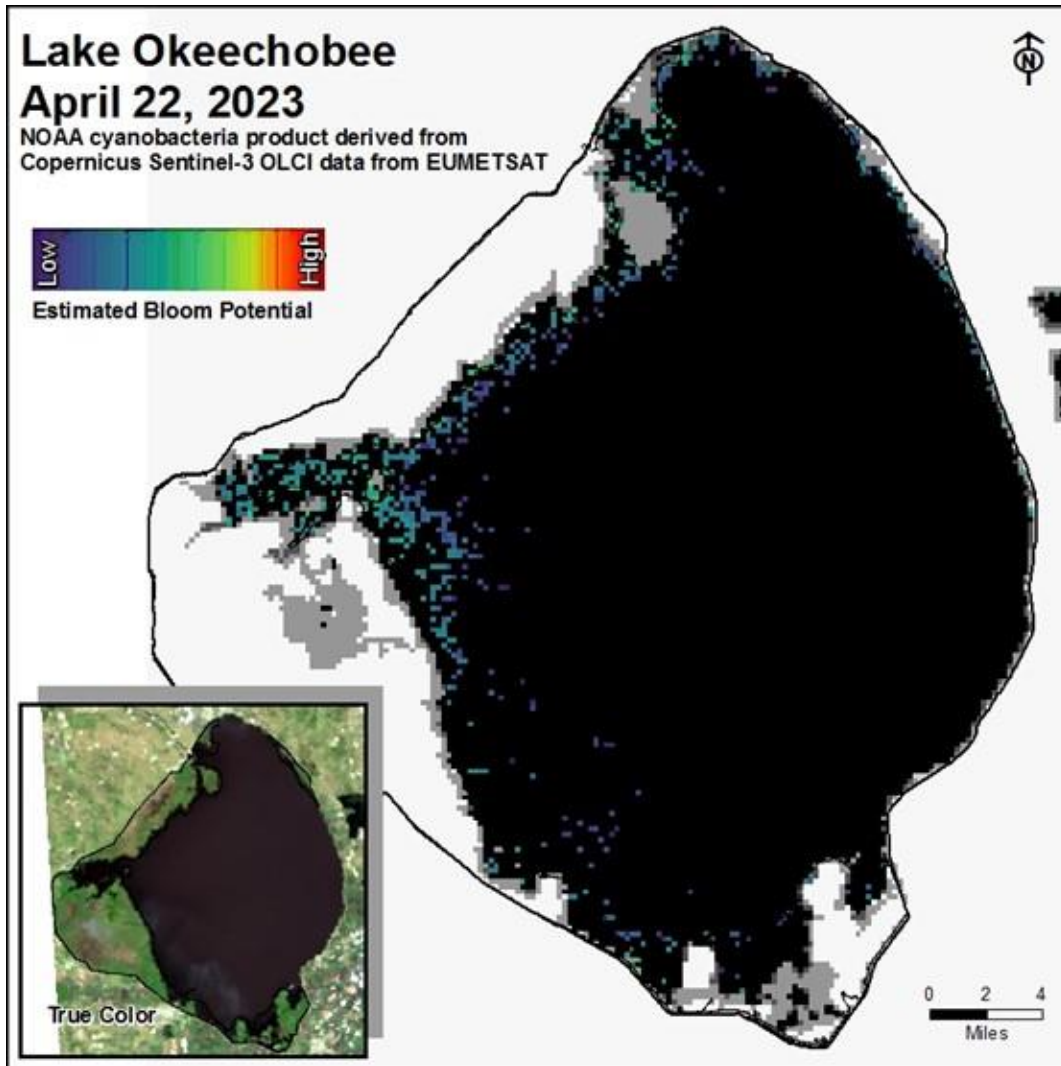


Figure LO-6. Cyanobacteria bloom potential on April 22, 2023, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Wading Bird Foraging Locations April 13, 2023

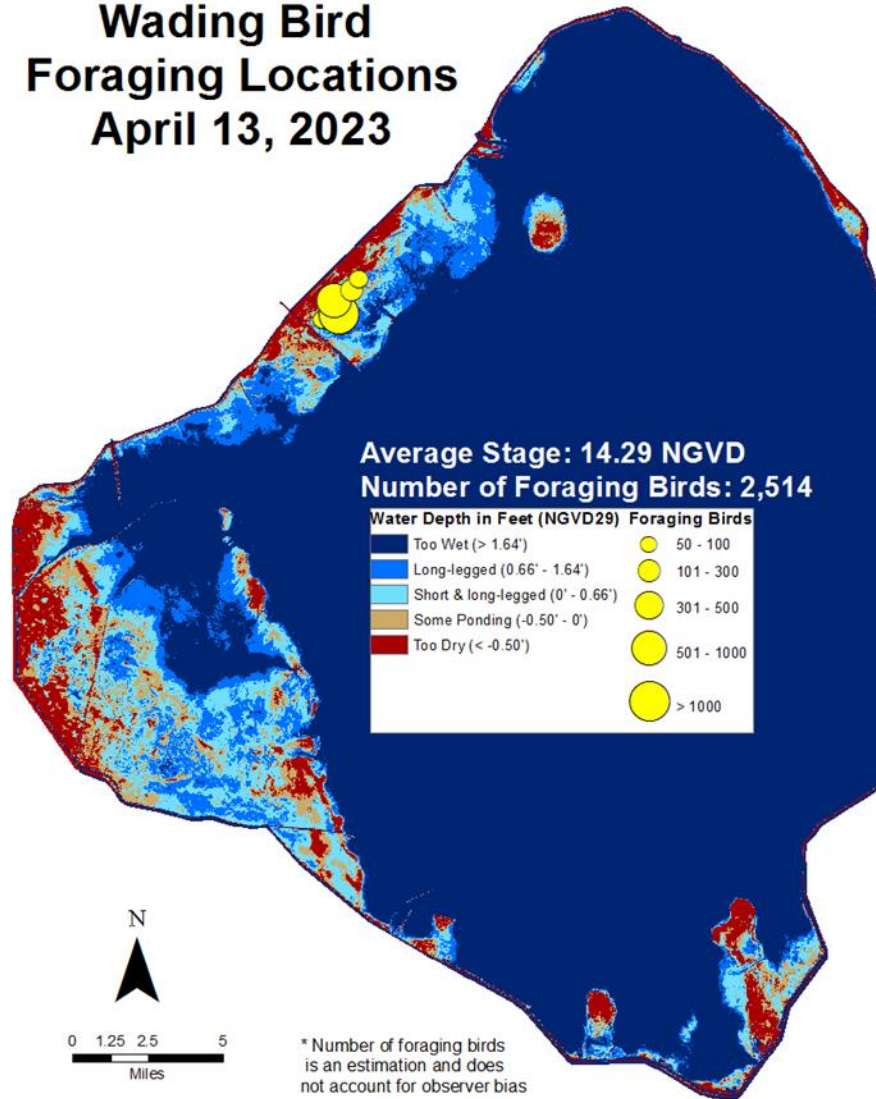


Figure LO-7. Results from the Wading Bird surveys conducted on April 13, 2023. Image shows the location of flocks and the estimated total number of birds seen actively foraging on Lake Okeechobee.

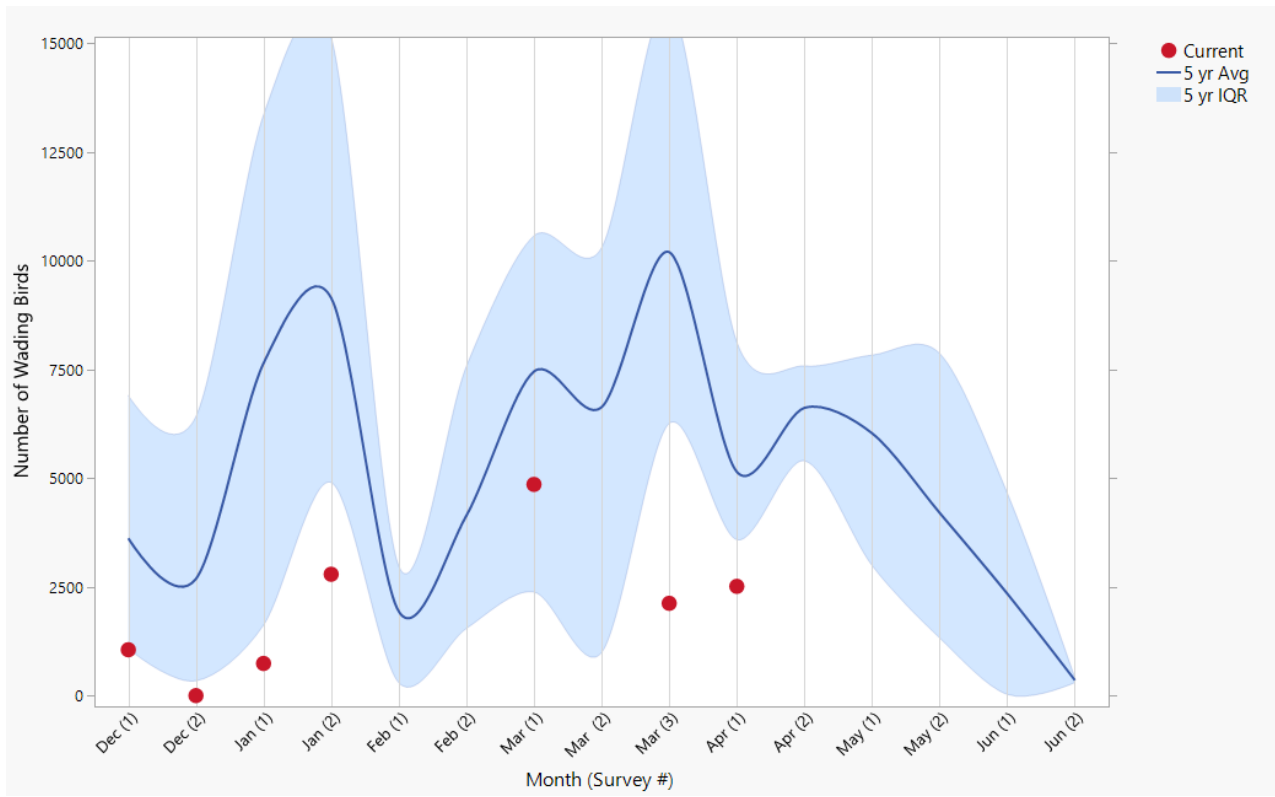


Figure LO-8. Results from the 2023 Wading Bird surveys (red dots) relative to the interquartile range (shaded area) and the average (blue line) of the previous five years (2018-2022).

Collection Date: April 3-5, 2023

Station	CHL _a (ug/L)	TOXIN (ug/L)	TAXA	Station	CHL _a (ug/L)	TOXIN (ug/L)	TAXA
FEBIN	NS			L001	8.9		
FEBOUT	17.6			L004	14.2		
KISSR0.0	17.4	BDL	mixed	L006	5.3		
L005	15.5	BDL	mixed	L007	6.2		
LZ2	22.2	BDL	mixed	L008	56.3		
KBARSE	25.2			LZ30	9.4	BDL	mixed
RITTAE2	22.8	BDL	mixed	LZ40	5.9		
PELBAY3	6.0			CLV10A	10.3	BDL	mixed
POLE3S	15.7			NCENTER	9.1		
LZ25A	10.4						
PALMOUT	17.9	BDL	mixed	S308C	24.8	BDL	mixed
PALMOUT1	11.6			S77	P		
PALMOUT2	7.3						
PALMOUT3	6.1						
POLESOUT	42.5	BDL	<i>Microcys</i>				
POLESOUT1	14.0						
POLESOUT2	32.9						
POLESOUT3	36.4						
EASTSHORE	21.2						
NES135	17.1						
NES191	13.6						

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

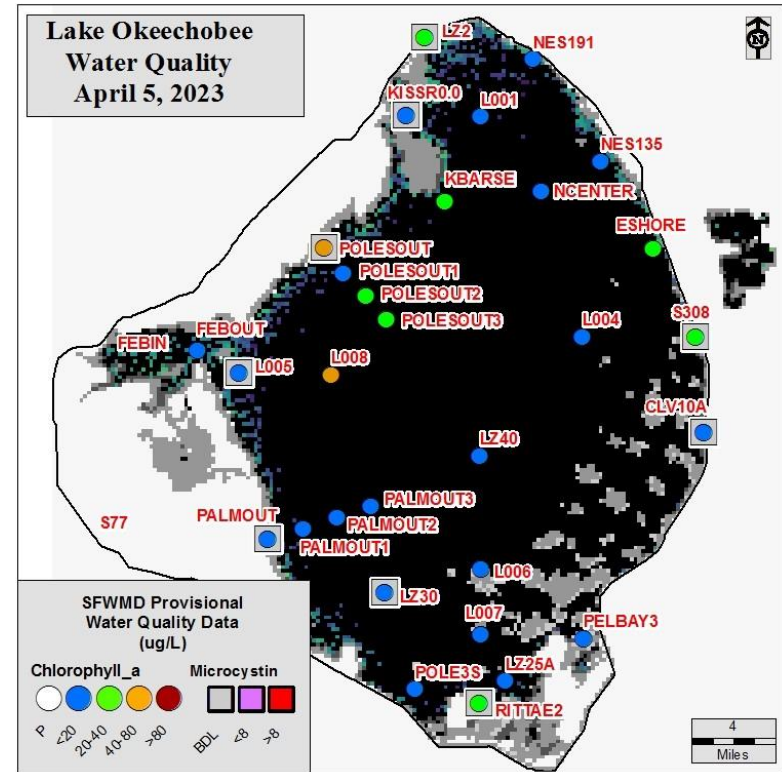


Figure LO-9. Preliminary water quality data from April 3 - 5, 2023, including chlorophyll *a*, dominant cyanobacterial taxa (where available), and microcystin toxin concentrations (where available). Sampling locations and select water quality parameters are overlaid on the April 5, 2023 image from NOAA’s harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 1,151 cfs (**Figures ES-1 and ES-2**), and the previous 30-day mean inflow was 449 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities decreased at all sites within the estuary (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 15.9. Salinity conditions in the middle estuary were estimated to be within the optimal range for adult eastern oysters (**Figure ES-4**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute (FWRI) was 0.08 spat/shell for March, which is normal for this time of year (**Figure ES-5**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 1,997 cfs (**Figures ES-6 and ES-7**), and the previous 30-day mean inflow was 2,050 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, surface salinities remained the same at S-79, increased at Val I-75, Ft. Myers, and Cape Coral, and decreased at Shell Point and Sanibel (**Table ES-2 and Figures ES-8 and ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Cape Coral and in the stressed range at Shell Point and Sanibel (**Figure ES-10**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute was 0.07 spat/shell at Iona Cove and 0.33 spat/shell at Bird Island for March, which is normal for this time of year (**Figures ES-11 and ES-12**).

Surface salinity at Val I-75 was forecasted for the next two weeks using an autoregression model (Qiu and Wan, 2013¹) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1,500 cfs, and a steady release at 2,000 cfs with estimated tidal basin inflows of 60 cfs. Model results from all scenarios predict daily salinity to be 1.8 or lower and the 30-day moving average surface salinity to be 0.5 or lower at Val I-75 at the end of the two-week period (**Table ES-3 and Figure ES-13**). This keeps predicted salinities in the upper estuary within the optimal salinity range (0-10) for tape grass.

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

Red Tide

The Florida Fish and Wildlife Research Institute reported on April 21, 2023, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at bloom concentrations in one sample collected from Lee County over the past week. On the east coast, red tide was not observed in samples from St. Lucie, Martin, or Broward counties.

Water Management Recommendations

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

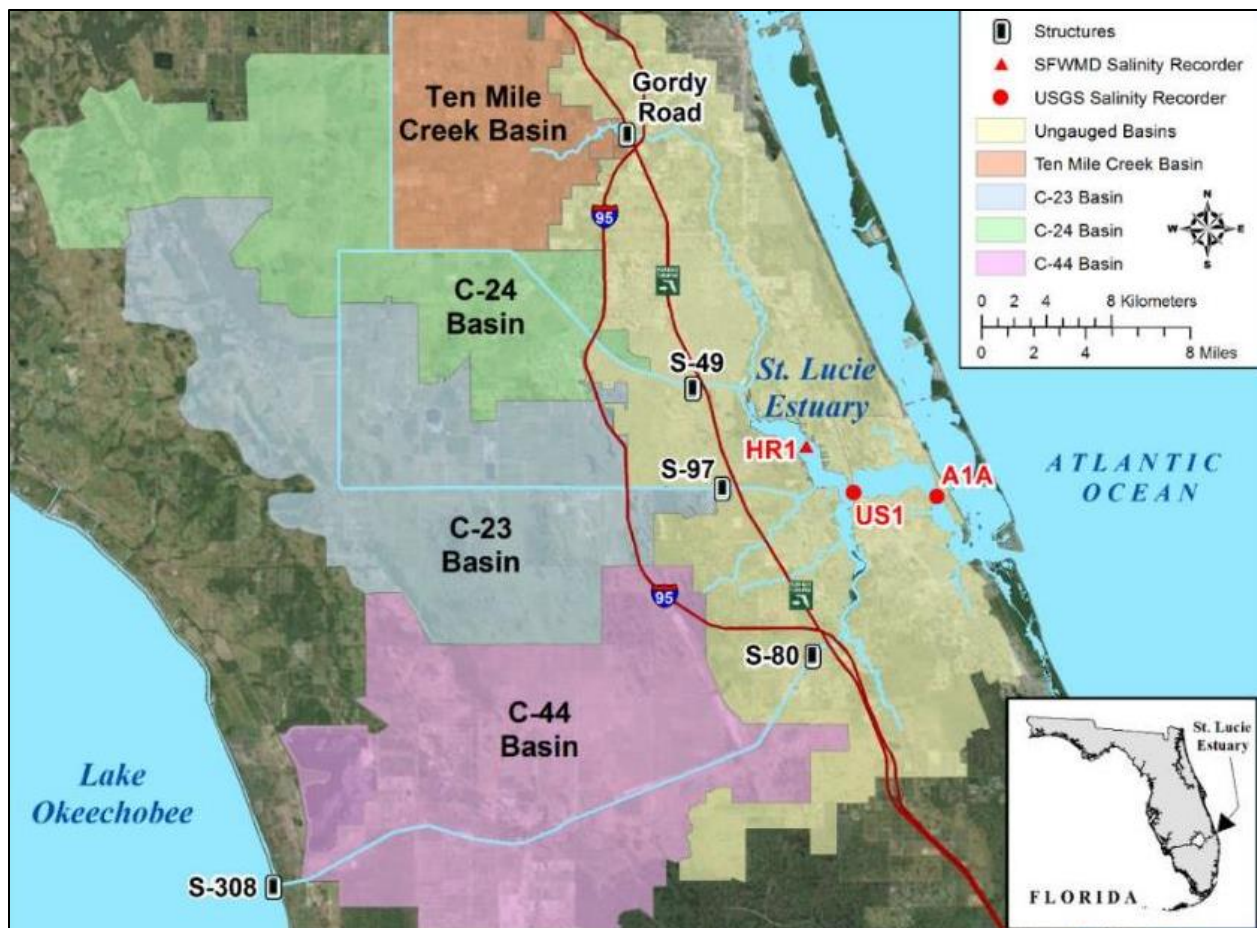


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

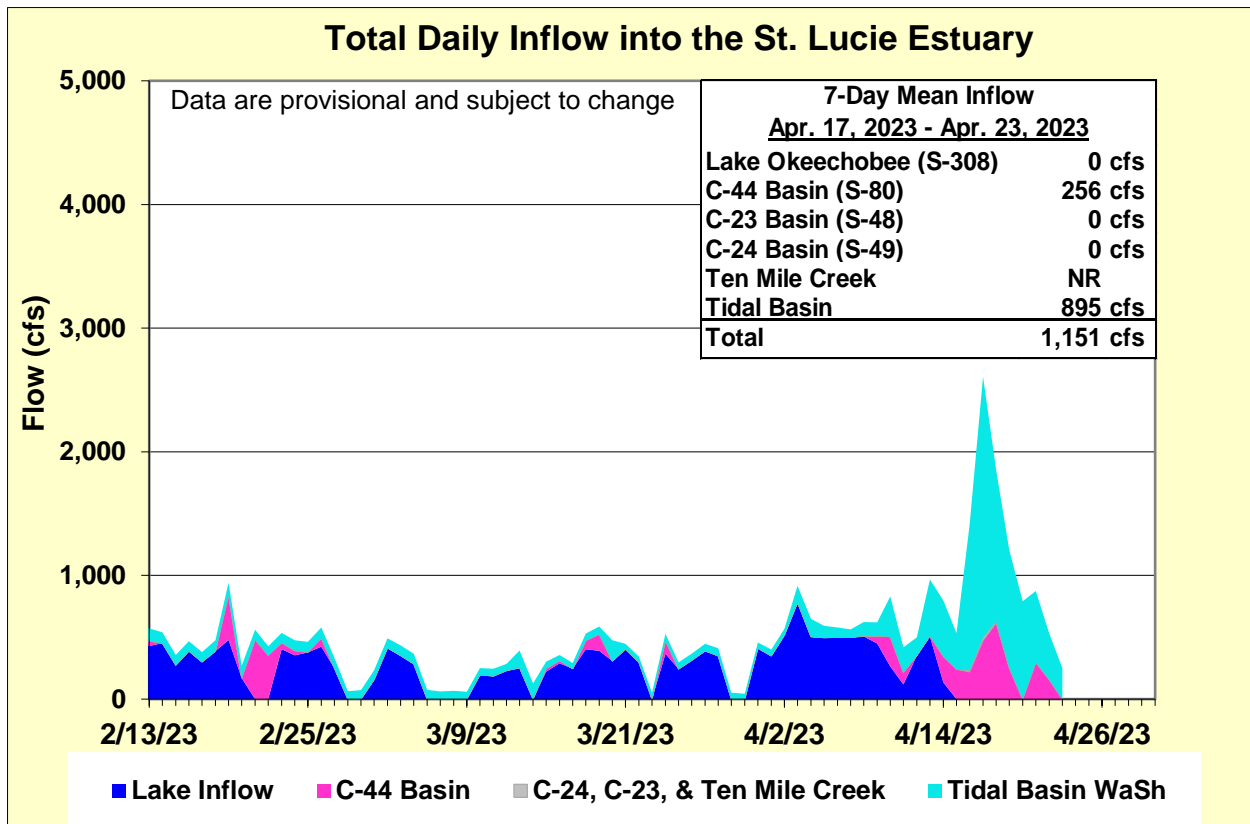


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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

Sampling Site	Surface	Bottom	Optimum Envelope
HR1 (North Fork)	12.6 (16.3)	14.2 (16.9)	10.0 – 25.0
US1 Bridge	15.4 (18.6)	16.4 (19.7)	10.0 – 25.0
A1A Bridge	24.1 (27.6)	27.1 (29.6)	10.0 – 25.0

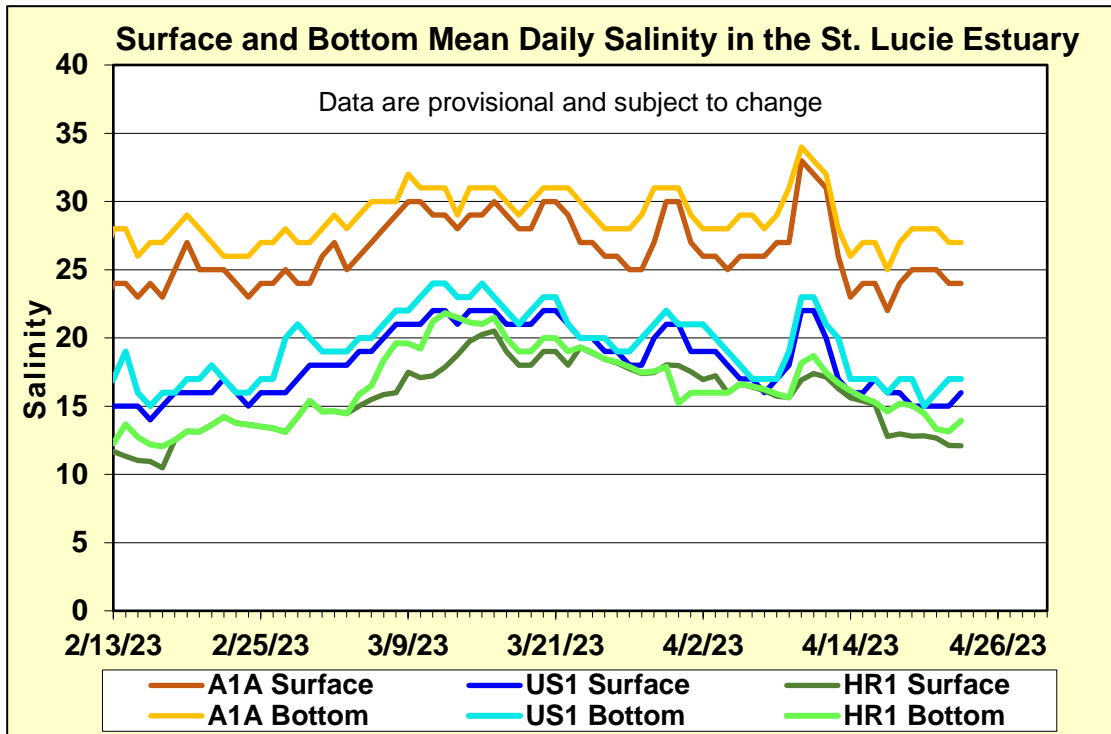


Figure ES-3. Mean daily salinity at the A1A, US1, and HR1 sites in the St. Lucie Estuary.

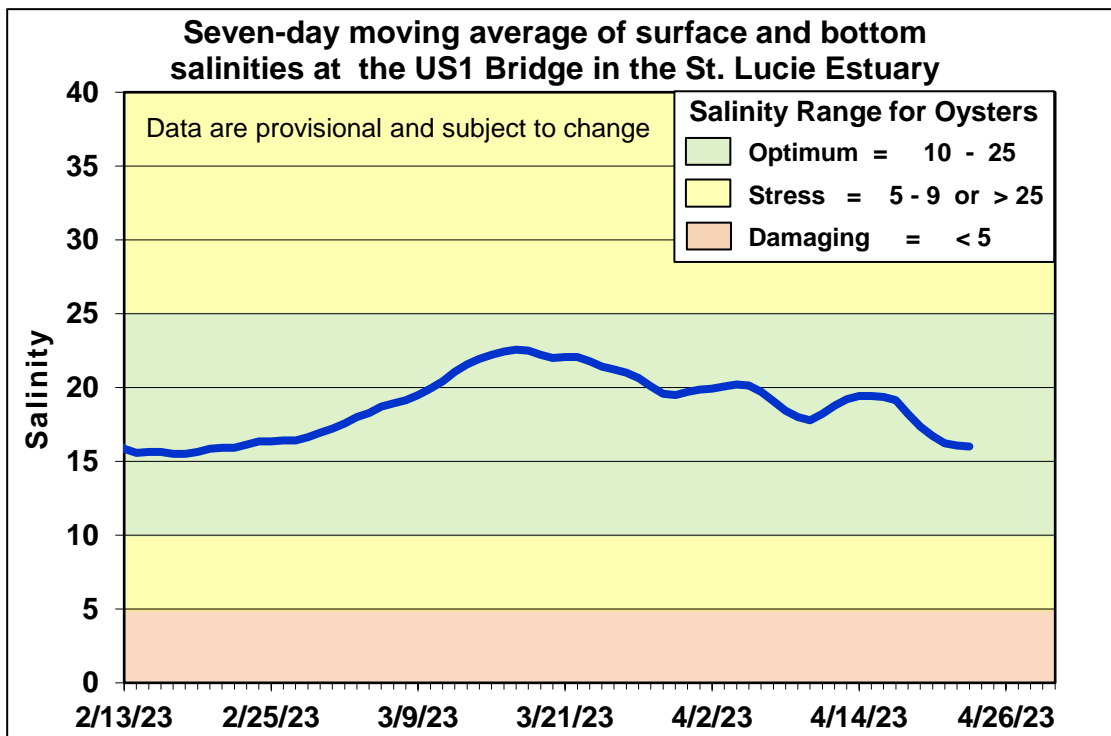


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

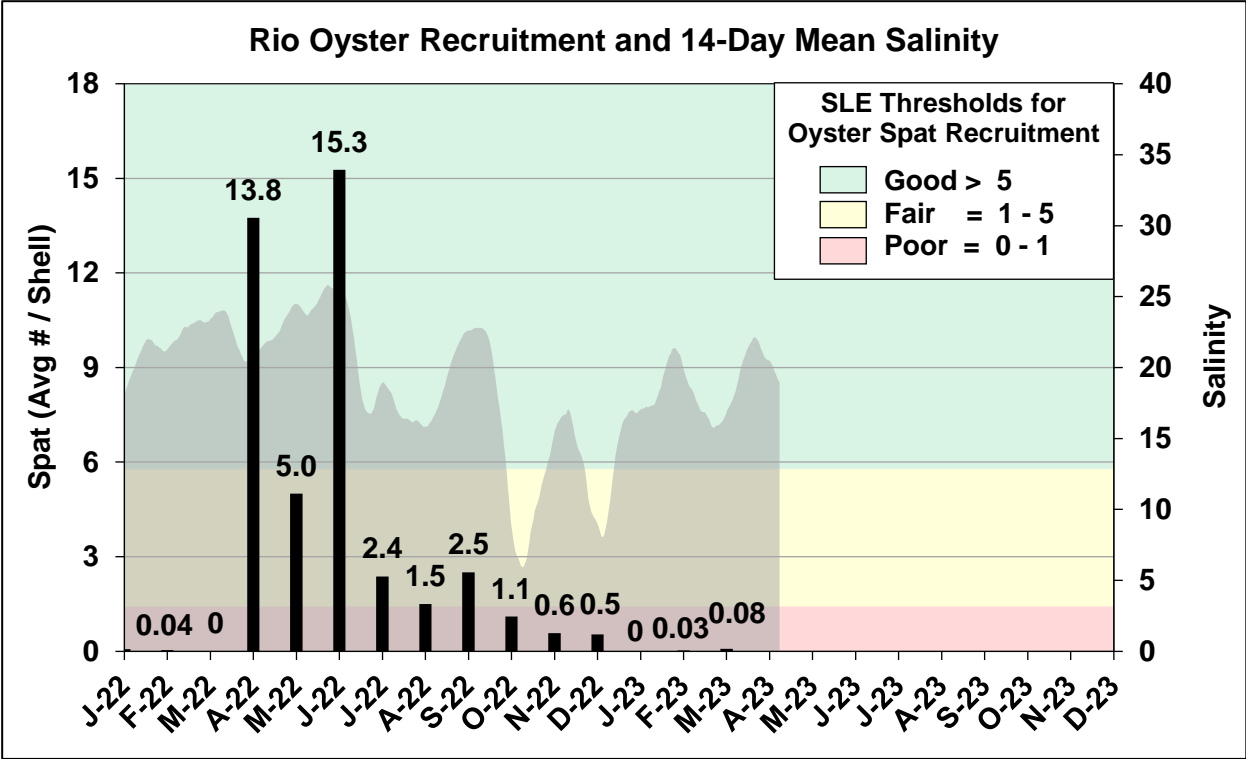


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

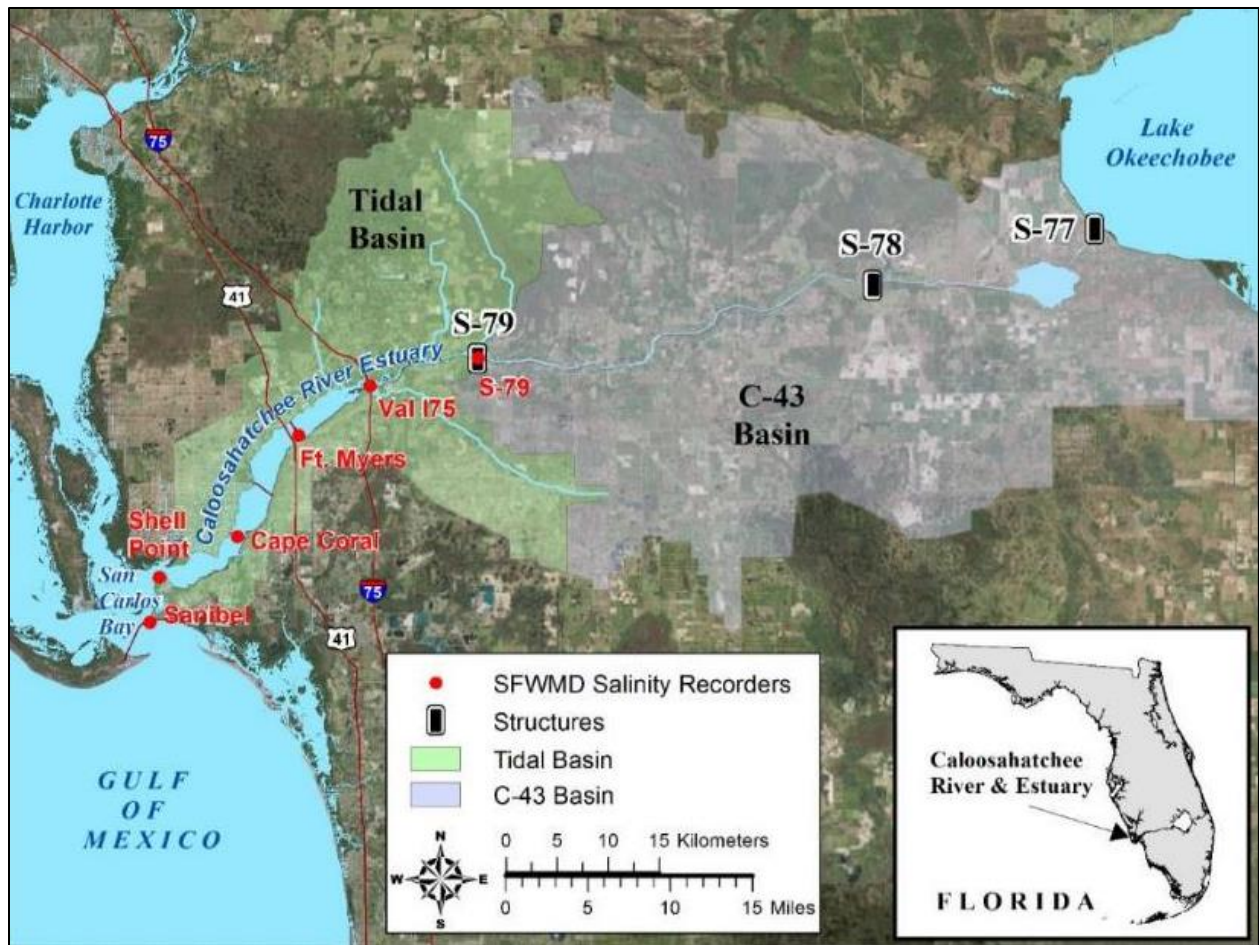


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

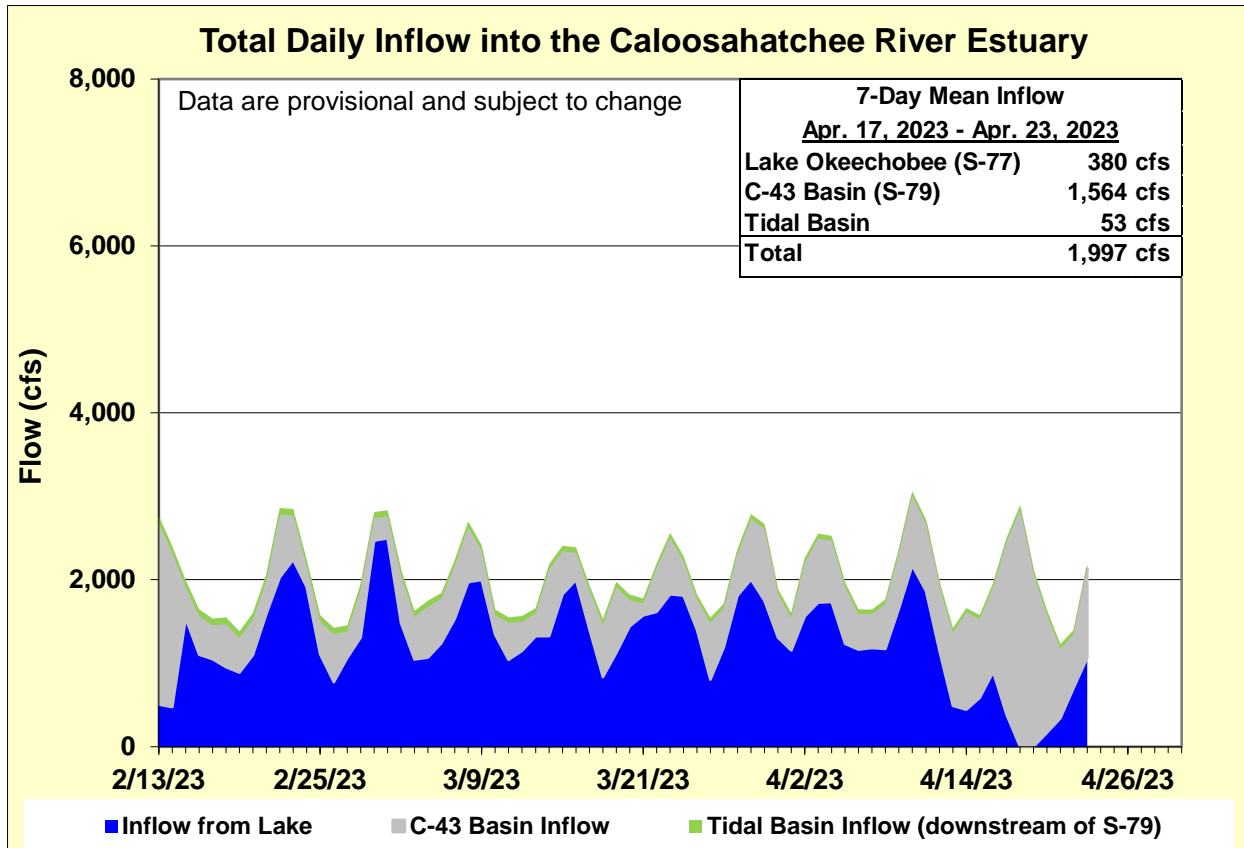


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

Table ES-2. Seven-day mean salinity at six monitoring sites in the Caloosahatchee River Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope in the upper estuary sites is for the protection of tape grass and the envelope in the lower estuary is the optimum salinity range for adult eastern oysters (*Crassostrea virginica*). Data are provisional.

Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	0.2 (0.2)	0.2 (0.2)	0.0 – 10.0
Val I-75	0.3 (0.2)	0.3 (0.3)	0.0 – 10.0
Fort Myers Yacht Basin	4.9 (4.8)	6.3 (7.1)	0.0 – 10.0
Cape Coral	12.6 (11.3)	14.7 (15.1)	10.0 – 25.0
Shell Point	27.6 (28.0)	28.3 (29.2)	10.0 – 25.0
Sanibel	33.5 (35.1)	33.2 (34.4)	10.0 – 25.0

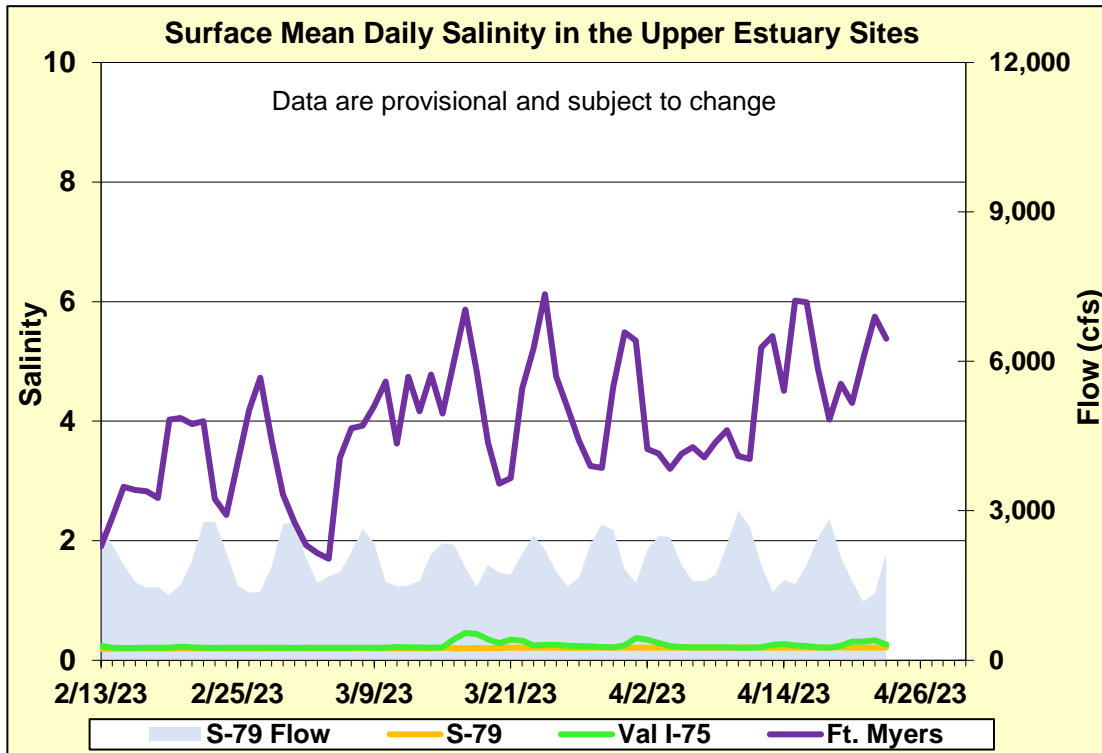


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

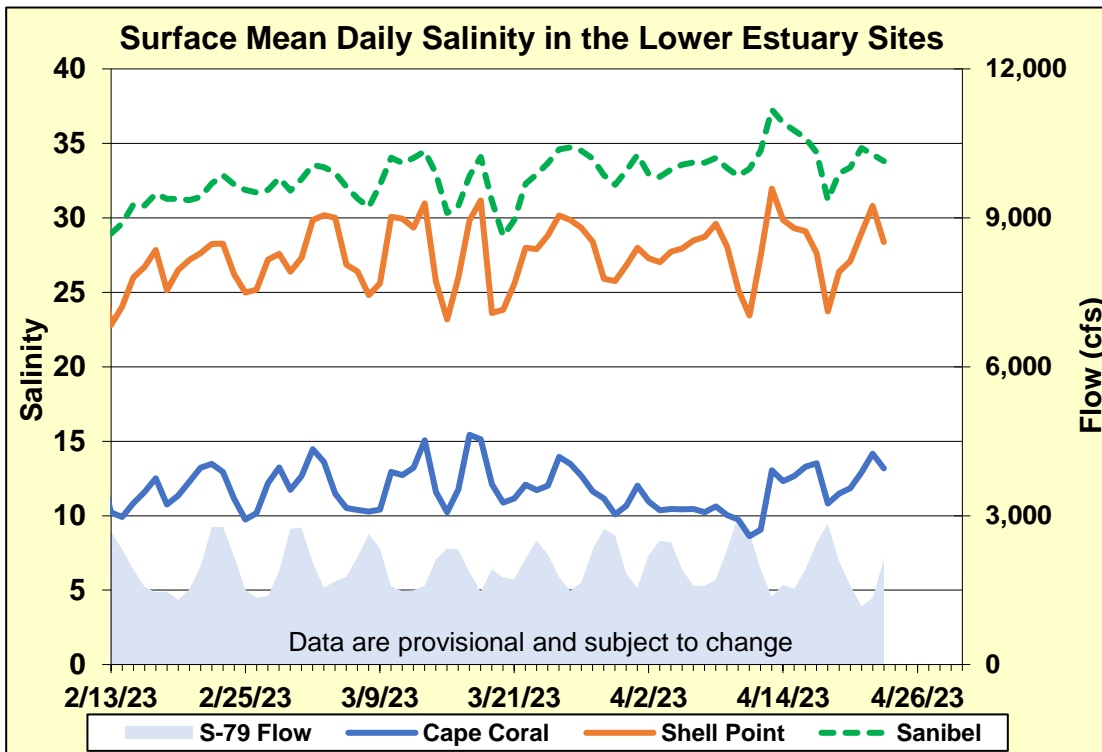


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

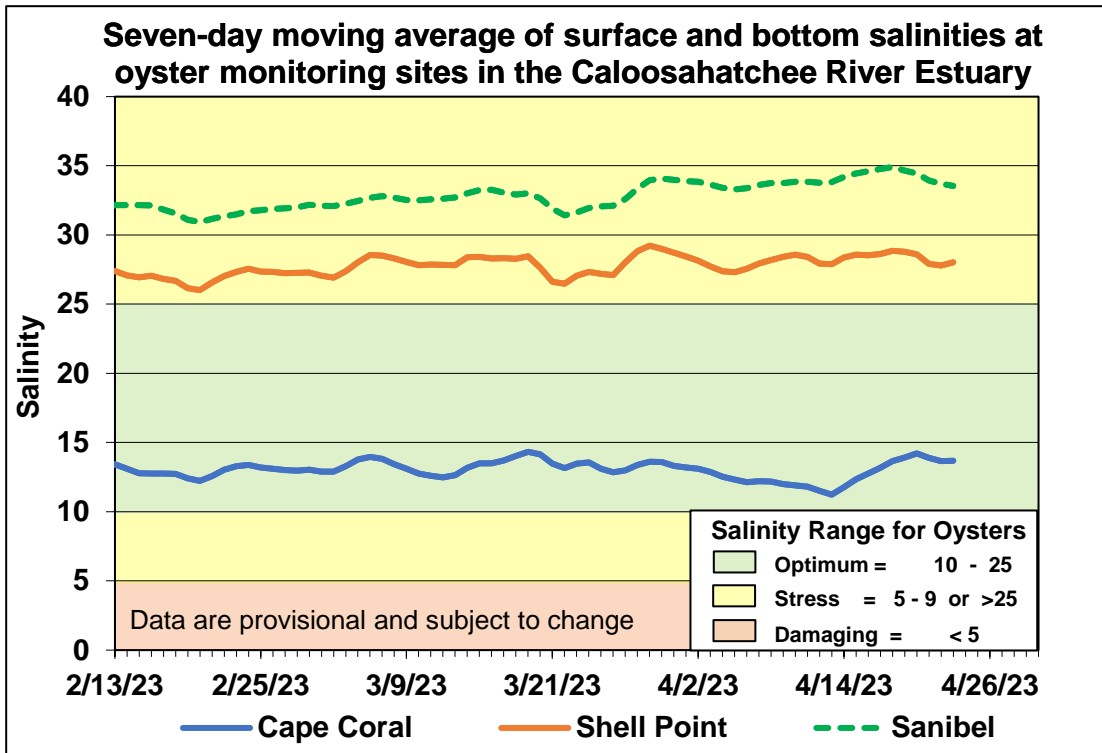


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

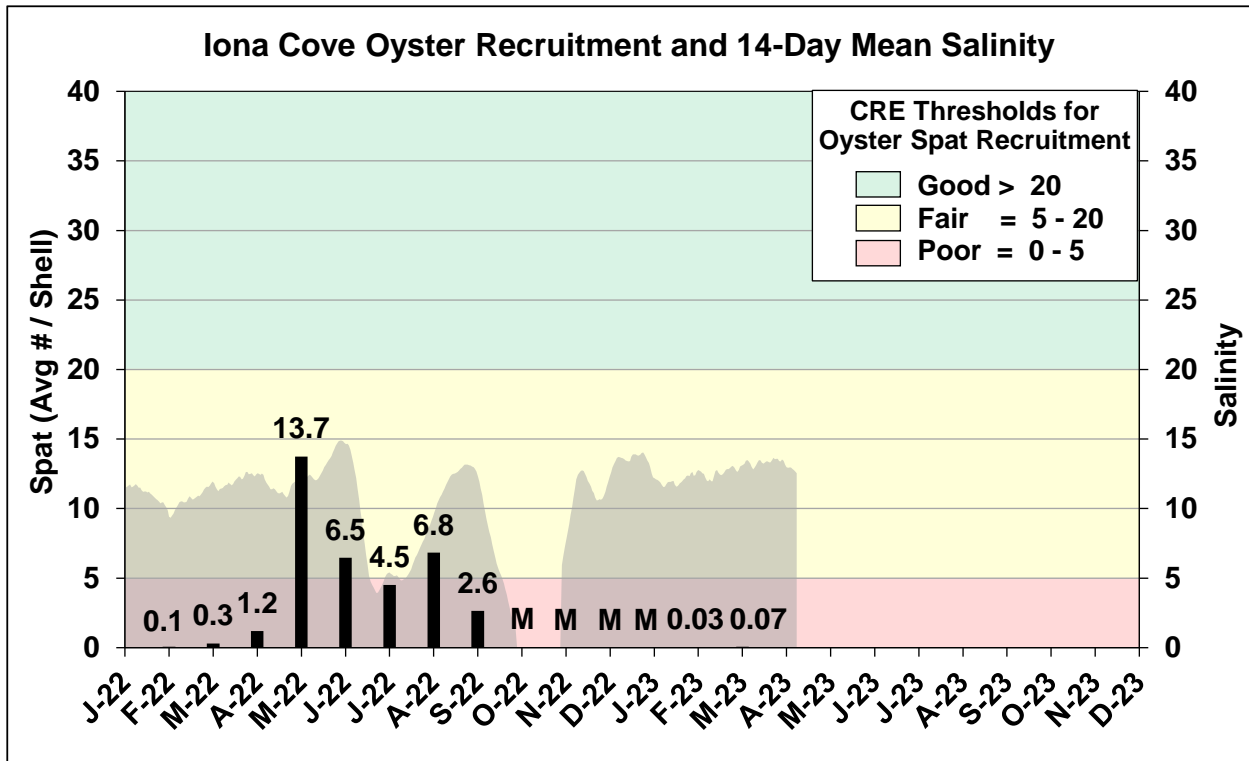


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

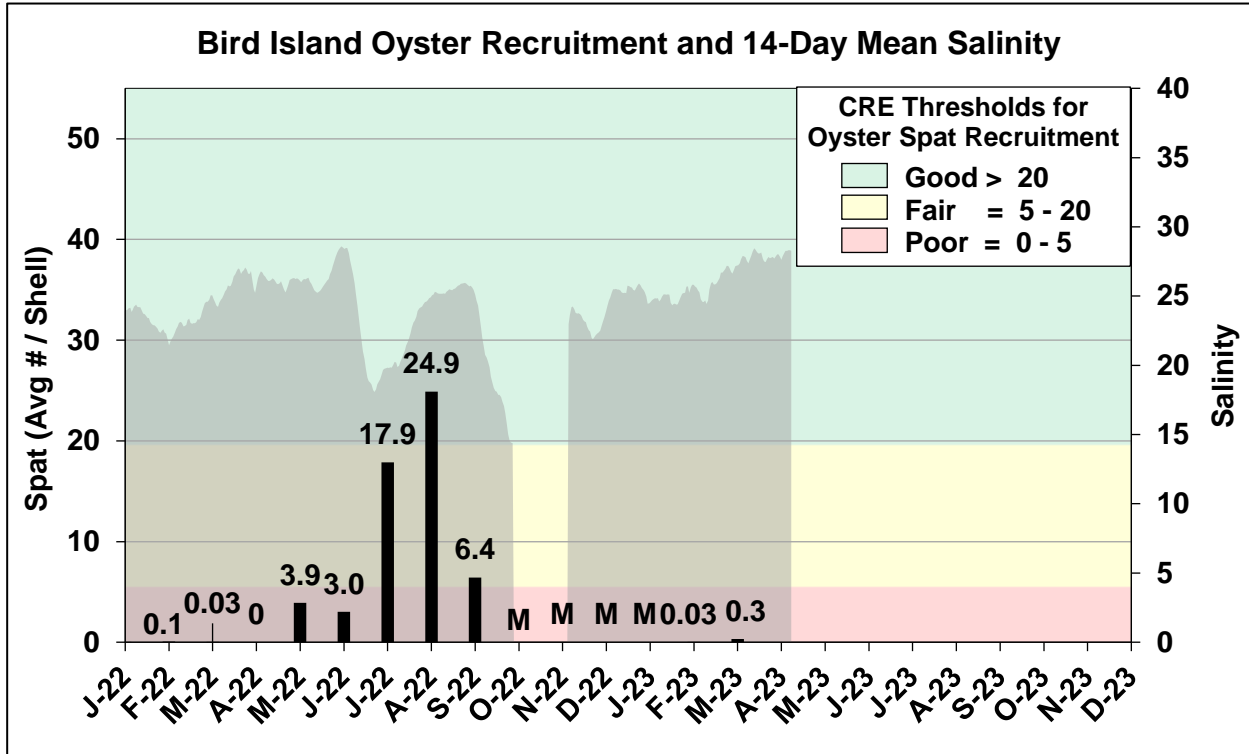


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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

Scenario	Simulated S-79 Flow (cfs)	Tidal Basin Runoff (cfs)	Daily Salinity	30-Day Mean Salinity
A	0	60	1.8	0.5
B	450	60	0.9	0.4
C	750	60	0.6	0.4
D	1,000	60	0.3	0.3
E	1,500	60	0.3	0.3
F	2,000	60	0.3	0.3

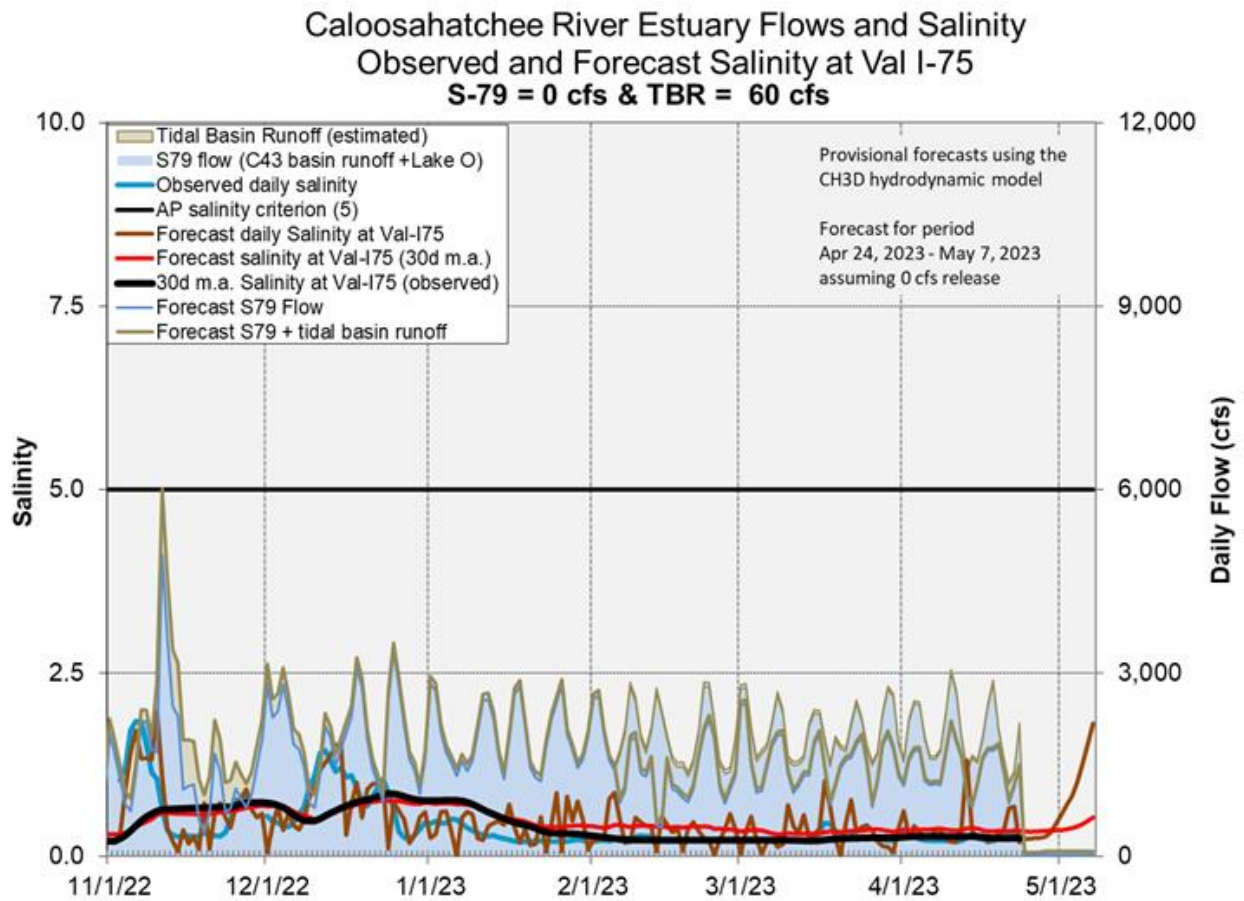


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

Stormwater Treatment Areas

STA-1E: STA-1E Western Flow-way is offline for post-construction vegetation grow in. Operational restrictions are in place in STA-1E Central and Eastern Flow-ways for vegetation management activities. The Eastern Flow-way contains nests of Migratory Bird Treaty Act protected species. Online treatment cells are at or near target stage, except for the Eastern flow-way which is below target. Vegetation in the flow-ways is stressed and highly stressed. The 365-day phosphorus loading rate (PLR) for the Eastern Flow-way is below 1.0 g/m²/year. The 365-day PLR for the Central Flow-way is high (**Figure S-1**).

STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways for vegetation management activities. The Northern Flow-way contains nests of Migratory Bird Treaty Act protected species. Treatment cells are at target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLR for the Eastern Flow-way is below 1.0 g/m²/year. The 365-day PLRs for the Northern and Western Flow-way are high (**Figure S-2**).

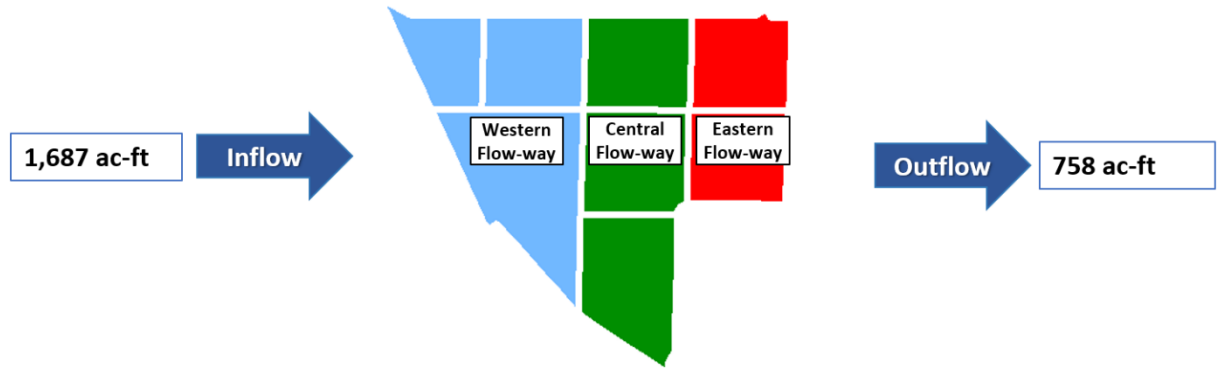
STA-2: STA-2 Flow-way 2 is offline for post-construction vegetation grow in. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Online treatment cells are at or near target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4 and 5 is highly stressed. The 365-day PLRs for Flow-ways 4 and 5 are below 1.0 g/m²/year. The 365-day PLR for Flow-ways 1 and 3 are high (**Figure S-3**).

STA-3/4: STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Online treatment cells are at or near target stage. Vegetation in the Eastern and Central Flow-ways is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for the Central and Western Flow-ways are below 1.0 g/m²/year (**Figure S-4**).

STA-5/6: All flow-ways in STA-5/6 are online. Most treatment cells are below target stage. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8, which are healthy. The 365-day PLRs for most flow-ways are at or below 1.0 g/m²/year, except Flow-ways 3 and 4 which are high (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

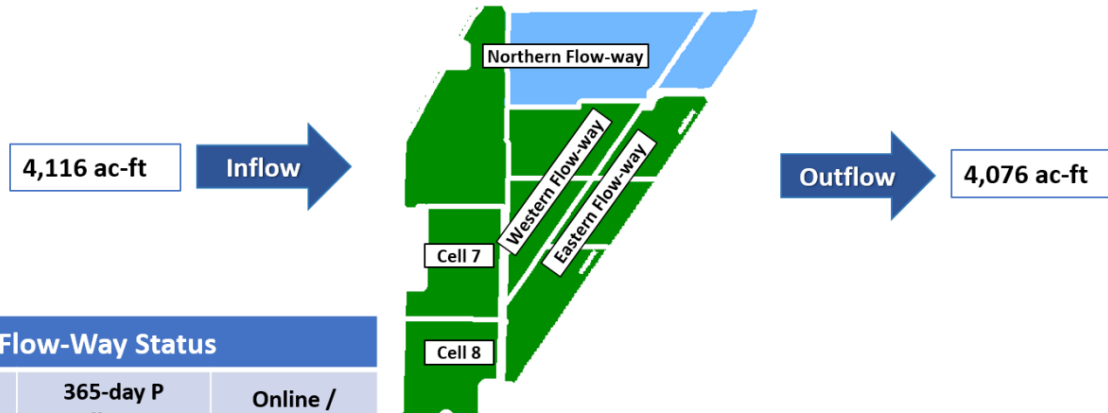
STA-1E Weekly Status Report – 4/17/2023 through 4/23/2023



STA-1E Flow-Way Status				As of 4/23/2023		STA-1E Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)		7-day	28-day	365-day	
				<ul style="list-style-type: none"> ■ Deep Water Level (> 2.8' above TS) ■ High Water Level (1.5' – 2.8' above TS) ■ 0.2' – 1.5' above TS ■ Target Stage (TS +/- 0.2') ■ 0.2' – 0.5' below TS ■ 0.5' – 1.0' below TS ■ Low Water Level (1.0' – 1.2' below TS) ■ Extreme Low Water (> 1.2' below TS) 					
Eastern	← →	 1.0	Vegetation management / Avian nesting			Total Inflow, ac-ft	1,687	2,415	123,856
Central	← →	 1.0	Vegetation rehabilitation			--Lake Inflow, ac-ft	0	N/A	2,200
Western	Offline, post-construction grow in starting 3/28/2022					Total Outflow, ac-ft	758	758	100,503
						Inflow Conc., ppb	182	186	117
						Outflow Conc., ppb	18	18	25
Includes Preliminary Data									

Figure S-1. STA-1E Weekly Status Report

STA-1W Weekly Status Report – 4/17/2023 through 4/23/2023



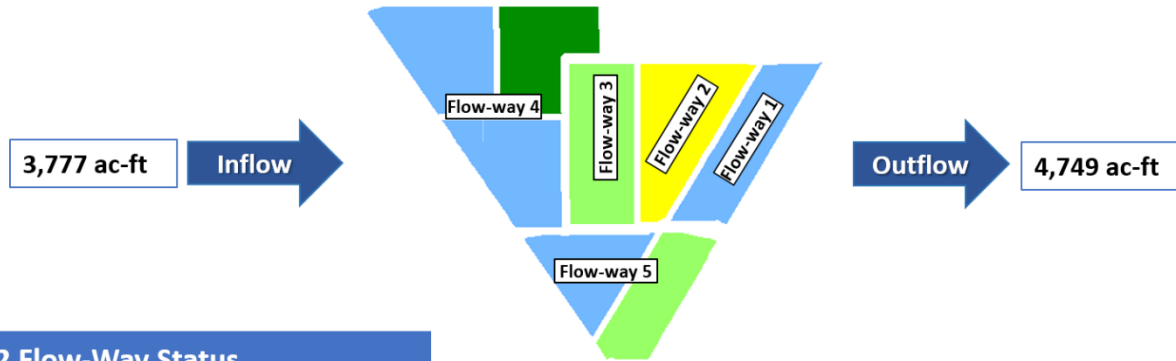
STA-1W Flow-Way Status			
Flow-Way	Vegetation Status Healthy --- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
Northern	← →		Vegetation management / Avian Nesting
Western	← →		Vegetation management
Eastern	← →		Vegetation management
Cell 7	← →	N/A	Online
Cell 8	← →	N/A	Construction

As of 4/23/2023	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	0.2' – 0.5' below TS
	0.5' – 1.0' below TS
	Low Water Level (1.0' – 1.2' below TS)
	Extreme Low Water (> 1.2' below TS)

STA-1W Flow & Phosphorus Concentration				
	7-day	28-day	365-day	
Total Inflow, ac-ft	4,116	5,722	147,439	
--Lake Inflow, ac-ft	0	N/A	9,100	
Total Outflow, ac-ft	4,076	4,076	151,512	
Inflow Conc., ppb	171	167	201	
Outflow Conc., ppb	18	18	20	
Includes Preliminary Data				

Figure S-2. STA-1W Weekly Status Report

STA-2 Weekly Status Report – 4/17/2023 through 4/23/2023



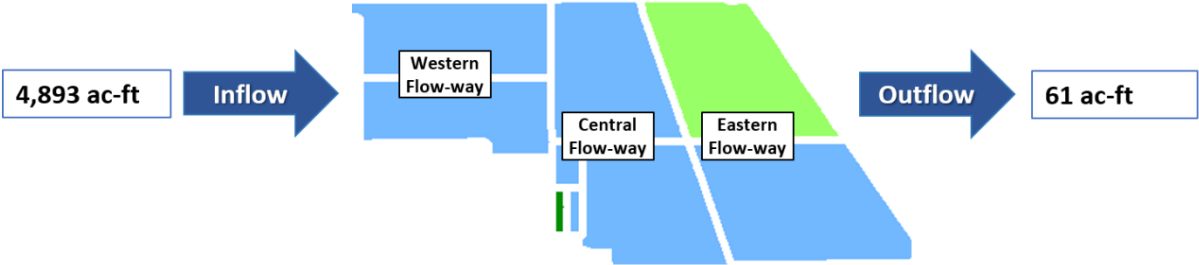
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small>	365-day P Loading Rate <small>(below 1.0 g P /m²/yr is optimal)</small>	Online / Offline / Restrictions
1			Online
2	Offline, post-construction grow in starting 1/23/2023		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 4/23/2023	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	0.2' – 0.5' below TS
	0.5' – 1.0' below TS
	Low Water Level (1.0' – 1.2' below TS)
	Extreme Low Water (> 1.2' below TS)

STA-2 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	3,777	10,428	322,650
--Lake Inflow, ac-ft	0	N/A	29,800
Total Outflow, ac-ft	4,749	9,431	342,924
Inflow Conc., ppb	47	53	113
Outflow Conc., ppb	14	14	29
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

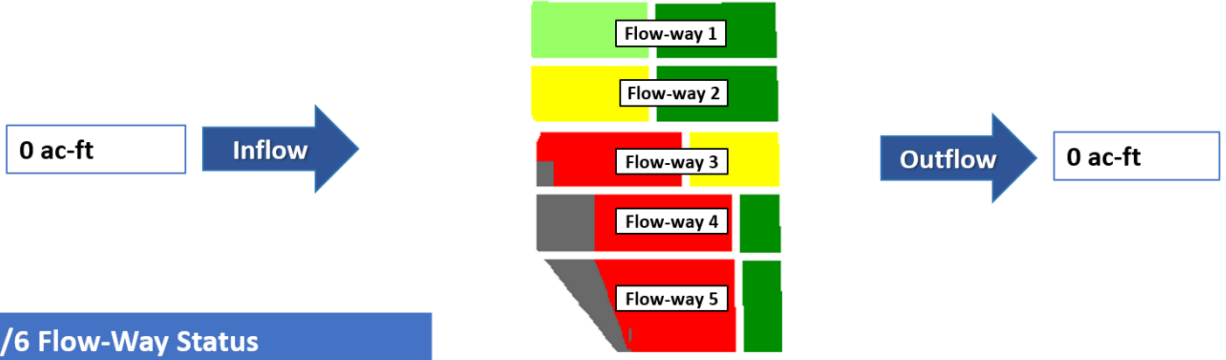
STA-3/4 Weekly Status Report – 4/17/2023 through 4/23/2023



STA-3/4 Flow-Way Status				As of 4/23/2023	STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)		7-day	28-day	365-day
Eastern	Offline, vegetation management drawdown as of 3/1/2021			<ul style="list-style-type: none"> Deep Water Level (> 2.8' above TS) High Water Level (1.5' – 2.8' above TS) 0.2' – 1.5' above TS Target Stage (TS +/- 0.2') 0.2' – 0.5' below TS 0.5' – 1.0' below TS Low Water Level (1.0' – 1.2' below TS) Extreme Low Water (> 1.2' below TS) 	Total Inflow, ac-ft	4,893	4,904	304,548
Central			Online		--Lake Inflow, ac-ft	0	N/A	2,800
Western			Online		Total Outflow, ac-ft	61	61	291,695
					Inflow Conc., ppb	73	80	93
					Outflow Conc., ppb	11	11	16
					Includes Preliminary Data			

Figure S-4. STA-3/4 Weekly Status Report

STA-5/6 Weekly Status Report – 4/17/2023 through 4/23/2023



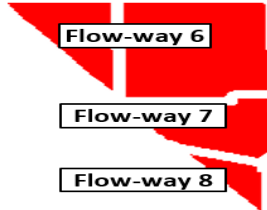
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1	← →		Online
2	← →		Online
3	← →		Online
4	← →		Online
5	← →		Online

As of 4/23/2023	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	0.2' – 0.5' below TS
	0.5' – 1.0' below TS
	Low Water Level (1.0' – 1.2' below TS)
	Extreme Low Water (> 1.2' below TS)

STA-5/6 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	0	5	152,477
--Lake Inflow, ac-ft	0	N/A	0
Total Outflow, ac-ft	0	0	148,183
Inflow Conc., ppb	N/A	265	289
Outflow Conc., ppb	N/A	N/A	40
Includes Preliminary Data			

Figure S-5. STA-5/6 Weekly Status Report (Flow-ways 1 – 5)

STA-5/6 Weekly Status Report – 4/17/2023 through 4/23/2023



STA-5/6 Flow-Way Status				As of 4/23/2023
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)
6	←-----→	 1.0	Online	<ul style="list-style-type: none"> Deep Water Level (> 2.8' above TS) High Water Level (1.5' – 2.8' above TS) 0.2' – 1.5' above TS Target Stage (TS +/- 0.2') 0.2' – 0.5' below TS 0.5' – 1.0' below TS Low Water Level (1.0' – 1.2' below TS) Extreme Low Water (> 1.2' below TS)
7	←-----→	 1.0	Online	
8	←-----→	 1.0	Online	

Figure S-6. STA-5/6 Weekly Status Report (Flow-ways 6 – 8)

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

Last week the Everglades Protection Area (EPA) received about one-third the rainfall as it did the very wet week prior. WCA-1: Last week stage at the 1-8C remained stable. The average on Sunday was 0.32 feet above the falling Zone A1 regulation line. WCA-2A: Stage began to recede near the midpoint of last week at the 2-17 gauge. The average on Sunday was 1.18 feet above the flat regulation line. WCA-3A: The Three Gauge Average stage was relatively flat last week. The average stage was 0.53 feet below the falling regulation line on Sunday. WCA-3A North: At gauge 62 (Northwest corner), stage ascended last week, the average on Sunday was 0.83 feet below the flat Upper schedule line (**Figures EV-1 through EV-4**).

Water Depths

The SFWDAT illustrates current stages in the EPA remain low in the west, but the spatial extent of areas with belowground conditions has contracted in northwestern WCA-3A and Big Cypress National Preserve (BCNP). Depths in eastern WCA-3A South, along the L-67s, increased again and a small region returns to 2.0 to 2.5 feet. Hydrologic connectivity strengthened in Shark River Slough (SRS) and more so in Taylor Slough in Everglades National Park (ENP). Comparing current SFWDAT water depths to one month ago conditions within the EPA continues to trend deeper especially in central BCNP and northern WCA-3A. Looking back a year ago, conditions are wetter in the east especially in northeastern WCA-3A, and only dryer in northeastern and southwestern BCNP (**Figure EV-5 and Figure EV-6**). Comparing current conditions to the 20-year average on April 23, depths are above average in central Big Cypress Basin and the northern half WCA-3A. Conditions remain above average in WCAs-1 and -2A, ENP and WCA-3B (**Figure EV-7**).

Taylor Slough and Florida Bay

Total weekly rainfall averaged 1.1 inches in Taylor Slough and Florida Bay over the past week (Monday-Sunday) based on the 18 gauges used for this report. Rainfall ranged from 0.5 inches at Royal Palm Lake in northeastern Taylor Slough to 1.7 inches at EPSW in the south C-111 area. There was little change in stages in Taylor Slough, averaging a decrease of 0.04 feet and ranging from a decrease of 0.20 feet at E112 in northwestern Taylor Slough to an increase of 0.03 feet in the south C-111 area (**Figure EV-8 and Figure EV-9**). Water levels at nearly all sites are aboveground, and Taylor Slough water levels are above the historical average for this time of year by 9.8 inches, following the rains two weeks ago, compared to before the Florida Bay initiative (starting in 2017), an increase of 0.3 inches from last week.

Average Florida Bay salinity was 34.0, 0.2 higher than the previous week. Salinity changes ranged from -1.8 in Joe Bay (JB) to +1.2 in Terrapin Bay (TB), in the eastern and western nearshore, respectively (**Figure EV-8**). As of April 23, salinity remains within the interquartile range (IQR) for the Eastern, Central and Western regions of the bay

(Figure EV-10). Florida Bay salinity is 0.5 above its historical average for this time of year, down 0.5 from last week.

Water Management Recommendations

Conserving water in WCA3A North remains critical for the remaining wading bird nesting in that region. The focus for available inflows should remain on the northeast for another week, as it is expected operations will require additional flows to northwest of that sub-basin that will curtail the current flows through the S150. Dry conditions remain. Maintaining an optimal rate of stage recession within the marshes of WCAs and conserving water north in the system while allowing flows south has an ecological benefit. As conditions remain at the 90th percentile in SRS, when water is available, flow through Taylor slough has ecological benefits downstream. 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	-0.04
WCA-2A	1.47	+0.07
WCA-2B	1.04	-0.02
WCA-3A	1.43	+0.06
WCA-3B	1.34	-0.02
ENP	1.21	+0.01

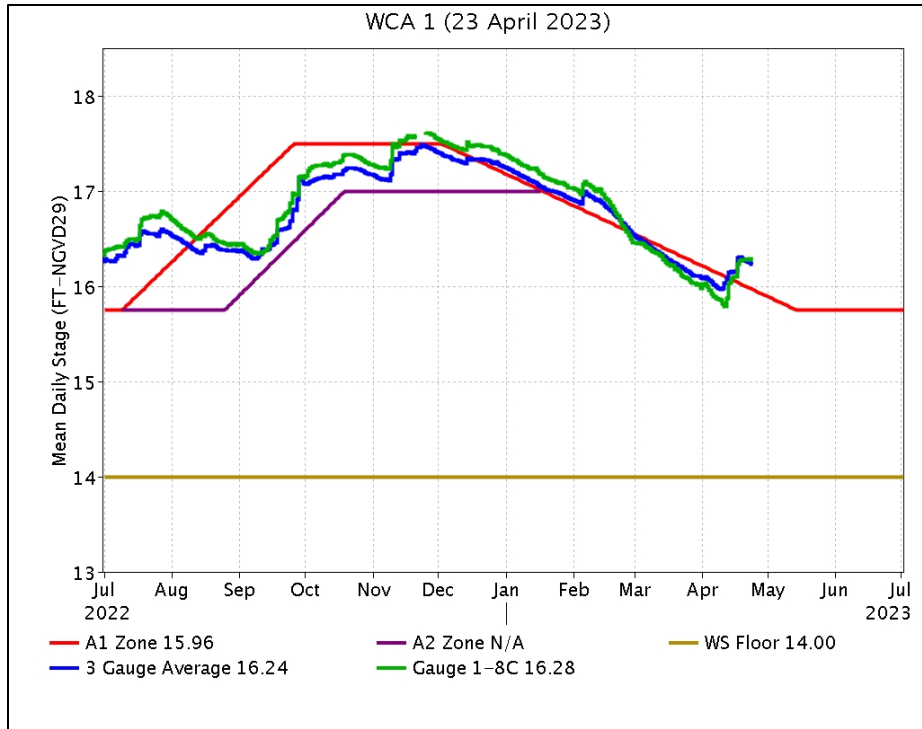


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

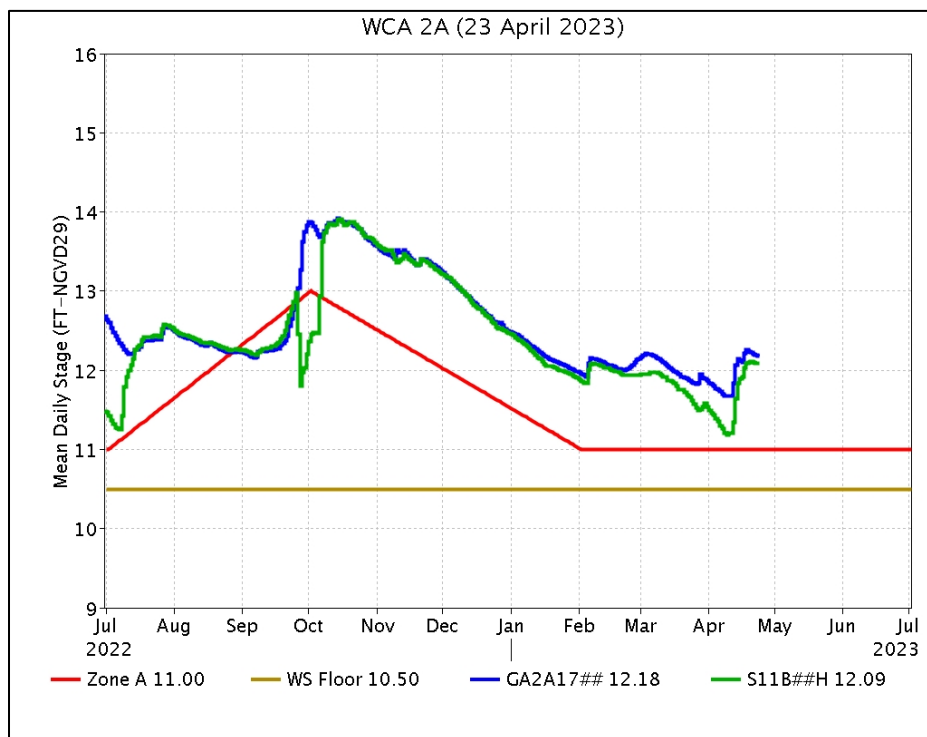


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

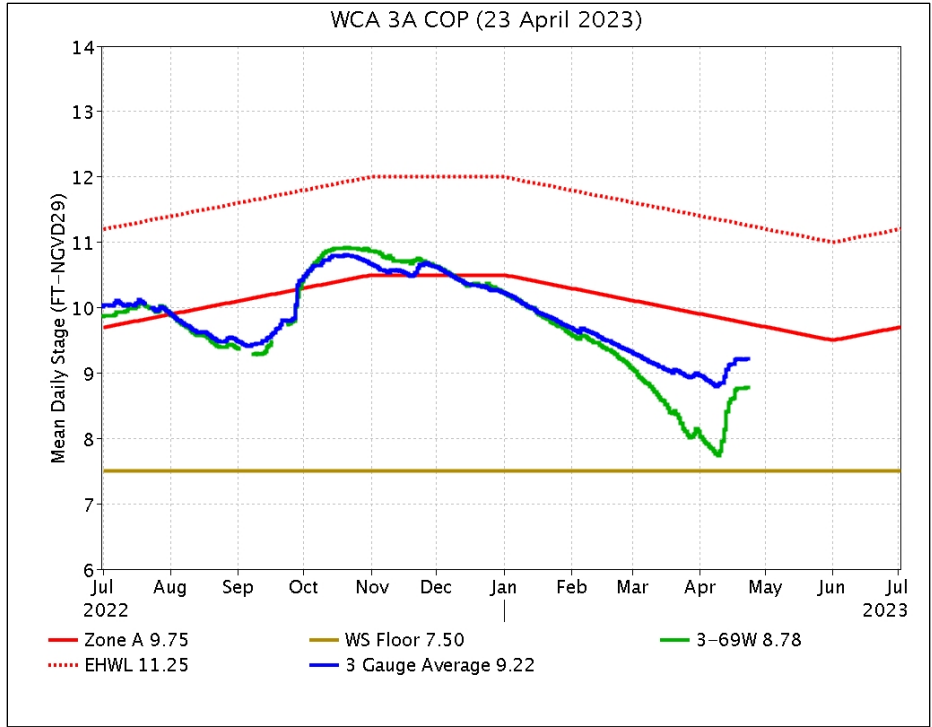


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, 3-69W) and regulation schedule.

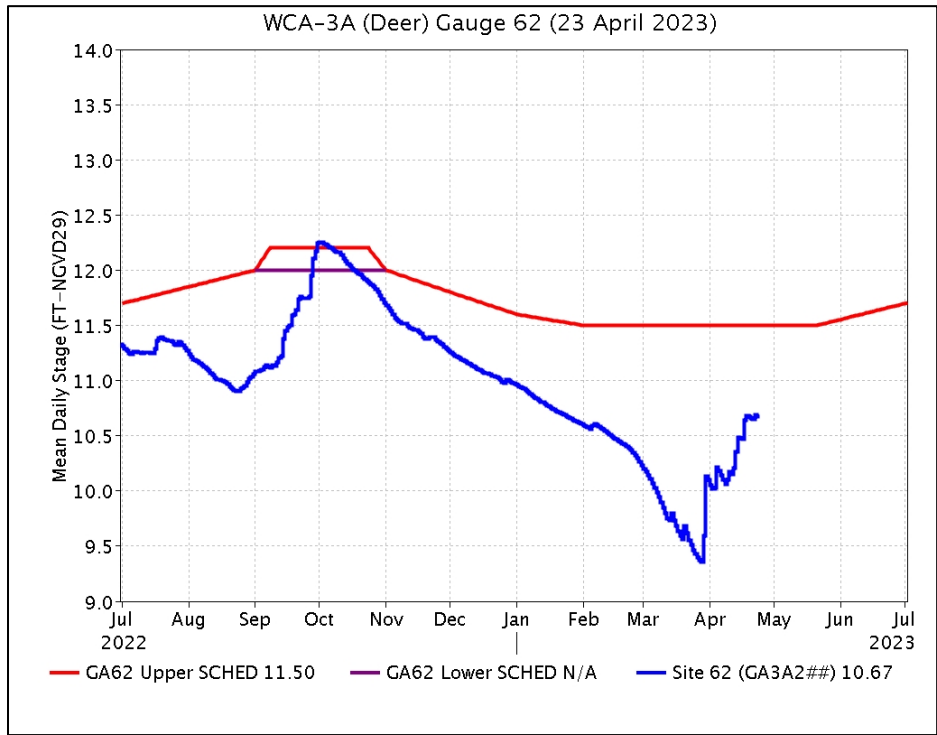


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

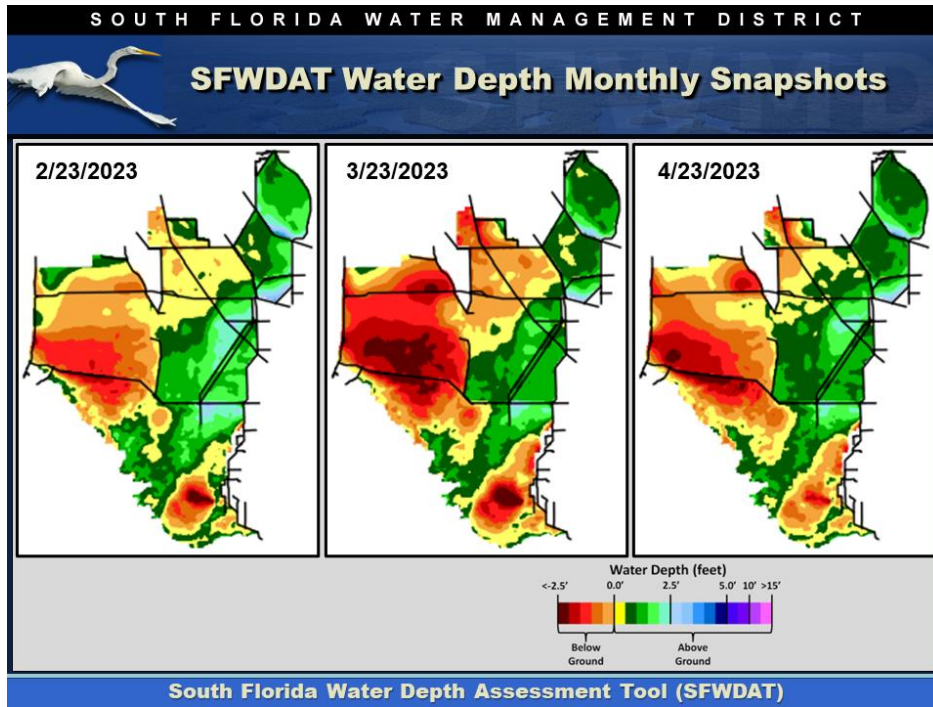


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

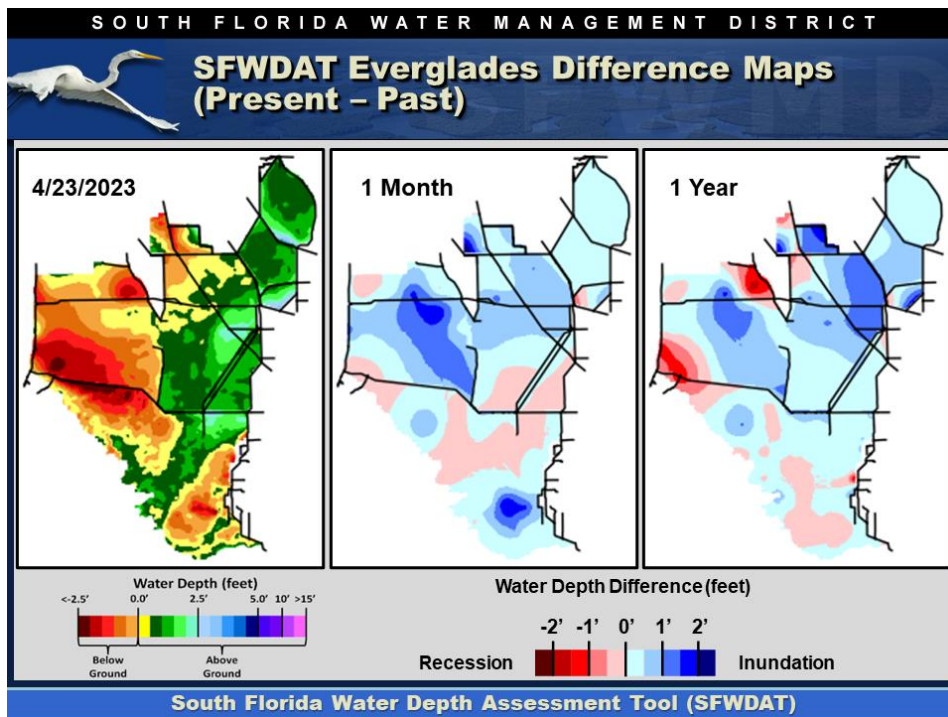


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

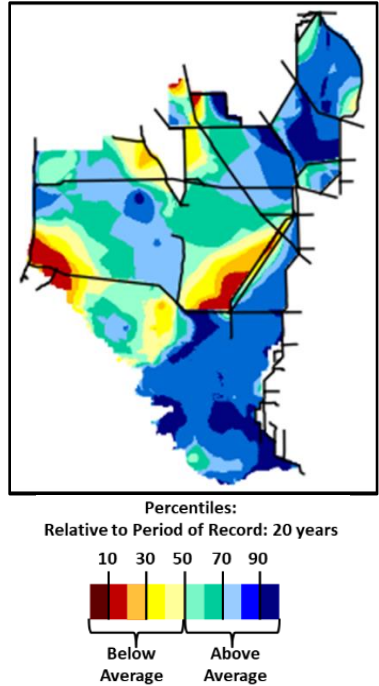


Figure EV-7. Present water depths (4/23/2023) compared to the day of year average over the previous 20 years.

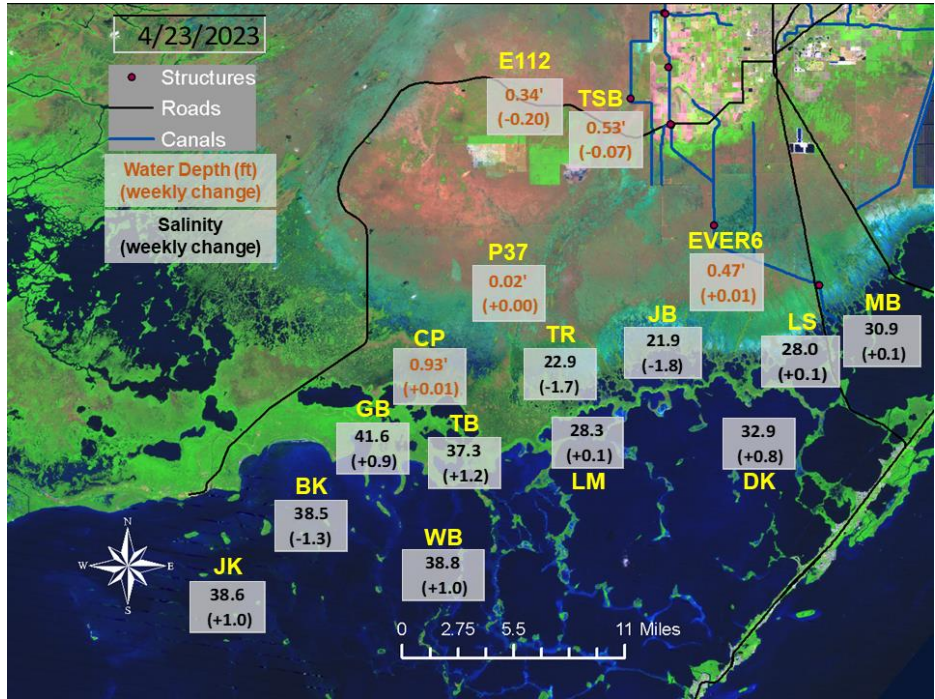


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

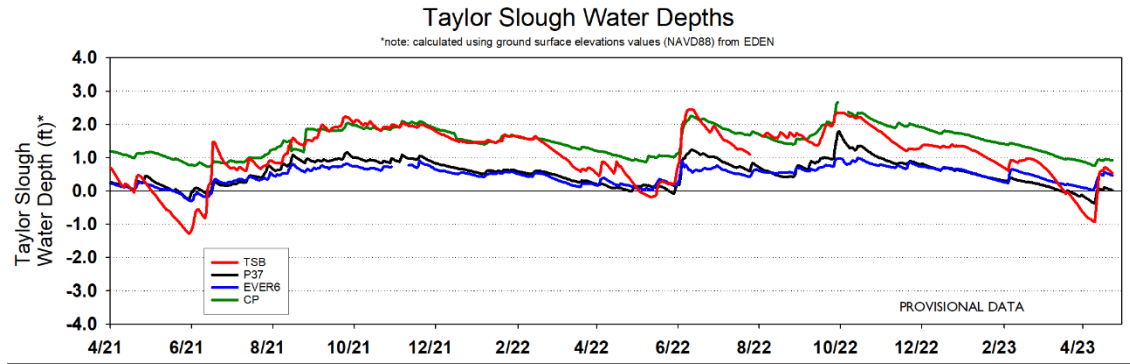


Figure EV-9. Taylor Slough water depth time series.

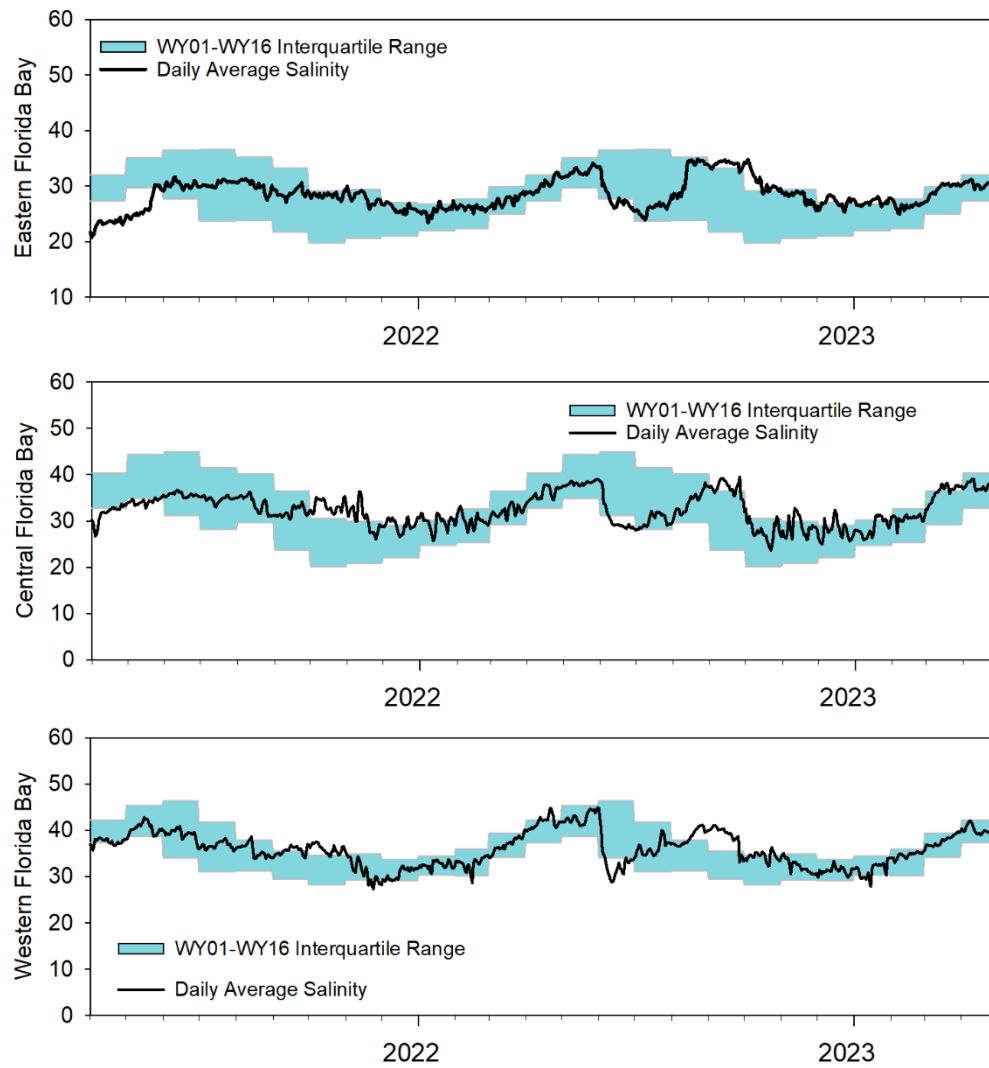


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, April 25, 2023 (red is new)			
	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.04'	Allow water to flow south from this basin until the regulation schedule is reached. Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage increased by 0.07'	Allow water to flow south from this basin until 0.5 feet above the regulation schedule. Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife
WCA-2B	Stage decreased by 0.02'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage decreased by 0.10'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NW	Stage increased by 0.13'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week.	
Central WCA-3A S	Stage increased by 0.16'	Conserve water in this basin as possible. Recession rate of less than 0.10' per week.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage increased by 0.06'		
WCA-3B	Stage decreased by 0.02'	Recession rate of less than 0.10' per week.	Protect within basin and downstream habitat and wildlife.
ENP-SRS	Stage increased by 0.01'	Make discharges to ENP according to COP and TTFF protocol while adaptively considering upstream and downstream ecological conditions.	Protect within basin and upstream habitat and wildlife.
Taylor Slough	Stage changes ranged from -0.20' to +0.03'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged from -1.8 to +1.2	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.

Biscayne Bay

As shown in **Figure BB-1**, mean total inflow to Biscayne Bay was 734 cfs, and the previous 30-day mean inflow was 674 cfs. The seven-day mean salinity was 26.7 at BBCW8 and 21.8 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.

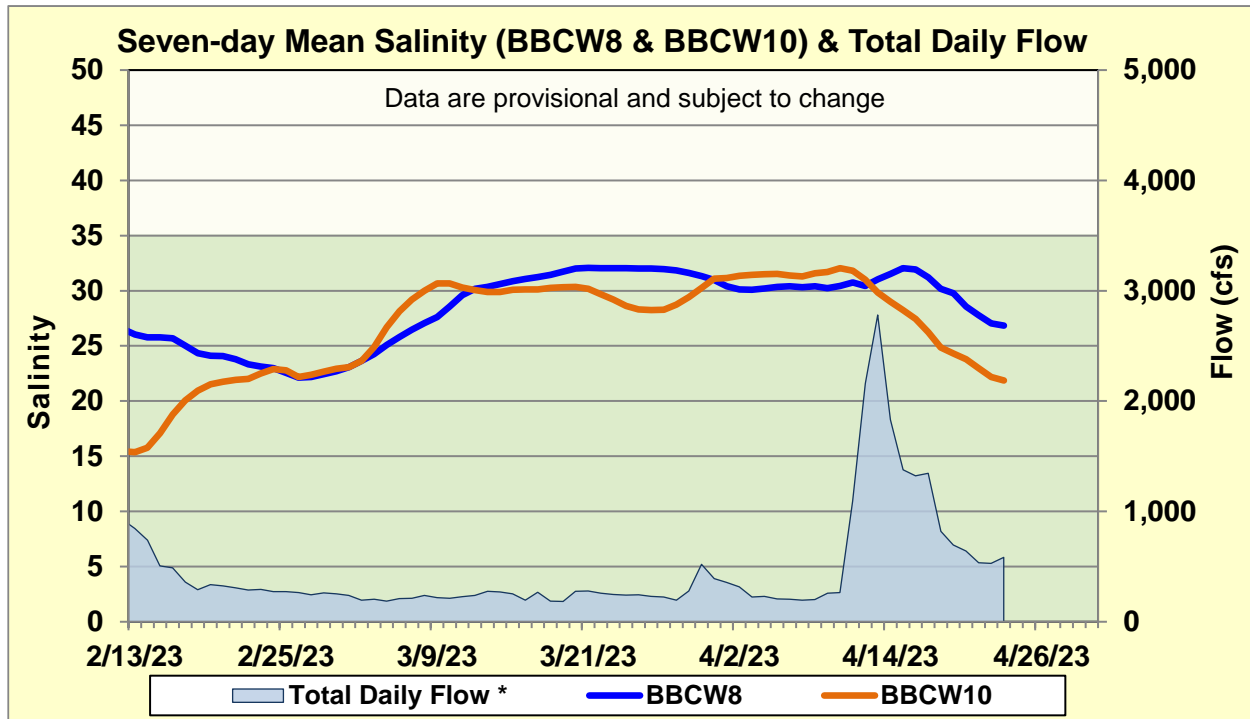


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.