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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: June 15, 2022

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A benign weather pattern with warm temperatures, less cloud cover, and below average rainfall is in store for the SFWMD this week as a large area of high pressure sets in. The area of high pressure will deflect any rain-producing upper disturbances away from the SFWMD resulting in high rates of evapotranspiration for this time of the year. In addition, a plume of African dust, conventionally known as the Saharan Air Layer (SAL) is currently present over central and south Florida but will move out of the area on Thursday. The dry air mass associated with the SAL will further reduce rain chances across the SFWMD. Brief isolated thunderstorms are expected under this type of environment, with most of the rainfall concentrated towards the coasts. The area of high pressure will weaken on Friday and shift back westward over the central US as an upper trough digs in over the eastern US. There are indications that a late-season front associated with this upper trough could dive into north and central Florida this weekend, which would enhance rain chances across the SFWMD. This has been reflected in Days 5-7 of the QPF. Despite this upcoming pattern change, the total average District rainfall ending next Tuesday morning is likely to be well below the climatological average for this time of the year.

Kissimmee

Flow at S-59 and S-61 is being adjusted to allow stage to rise slowly in East Toho and Toho, respectively. Flow at S-65/S-65A is being reduced to below the minimum for the Kissimmee River (300 cfs) to slow the stage decline in KCH. Water depth on the Kissimmee River floodplain has remained fairly steady with a mean depth of 0.28 feet as of June 12, 2022. With the S-65/S-65A discharge reductions, the concentration of dissolved oxygen in the Kissimmee River has continued to rise, with an average of 7.9 mg/L for the week ending on June 12, 2022.

Lake Okeechobee

Lake Okeechobee (Lake) stage was 13.02 feet NGVD on June 12, 2022, with water levels 0.32 feet higher than a month ago (**Figure LO-1**). Lake stage on June 12, 2022 was in the Base Flow sub-band (**Figure LO-2**) and 0.42 feet above the ecological envelope. (**Figure LO-3**). This was the first week Lake stage has been above ecological envelope, after 22 weeks within it. Average daily inflows (excluding rainfall) increased from the previous week, going from 587 cfs to 978 cfs. Average daily outflows (excluding evapotranspiration) decreased, going from 912 cfs to 0 cfs. The most recent satellite image (June 13, 2022) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor showed that bloom potential remains highest in Fisheating Bay (western part of the Lake) and the northwestern part of the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged 1,538 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities decreased at all sites within the estuary over the past week. Salinity in the middle estuary was within the optimal range (10-25) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 5,703 cfs over the past week with no flow coming from the Lake. Mean salinities decreased at all sites within the estuary over the past week. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the optimal range (10-25) for adult eastern oysters at Shell Point and in the stressed range at Cape Coral and Sanibel.

Stormwater Treatment Areas

For the week ending Sunday, June 12, 2022, 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 12,400 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 207,000 ac-feet. Most STA cells are above target stage, except STA-5/6 cells that are near or below target. STA-1E Western Flow-way is offline for post-construction vegetation grow in. Additionally, STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown, STA-2 Flow-way 2 is offline for construction activities, and STA-5/6 Flow-way 4 is offline for vegetation management activities. 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. This week, there is no capacity for Lake releases in the STAs.

Everglades

Rainfall continued this week adding to the wet conditions resulting from TS Alex, but many regions fell within good ascension rate category. The very dry conditions WCA-3A prior to the rains probably limited the aquatic prey production for next season. Wading bird nesting numbers were moderate to low in the WCAs this year also due to dry conditions, and nesting numbers, as expected, was lower than average. CSSS subpopulation regions now have water depths in excess of 14 cm, likely curtailing nesting for this season but with drier conditions. Stages continued to increase in Taylor slough last week and remain well above average. Salinities on average decreased again last week in Florida Bay, conditions remain ideal to move water south as rains continue.

Biscayne Bay

Total inflow to Biscayne Bay averaged 5,193 cfs and the previous 30-day mean inflow averaged 2,013 cfs. The seven-day mean salinity was 20.5 at BBCW8 and 12.4 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Salinity data provided as a courtesy by Biscayne National Park.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On June 12, 2022, lake stages were 55.0 feet NGVD (1.5 feet below schedule) in East Lake Toho, 52.3 feet NGVD (1.2 feet below schedule) in Lake Toho, and 48.5 feet NGVD (2.5 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

Discharges to the Kissimmee River on June 12, 2022 were 360 cfs at S-65 and 310 cfs at S-65A; discharges from the Kissimmee River were 310 cfs at S-65D and 340 cfs at S-65E (**Table KB-2**). Headwater stages were 46.3 feet NGVD at S-65A and 26.9 feet NGVD at S-65D on June 12, 2022. With the S-65/S-65A discharge reductions, the concentration of dissolved oxygen in the Kissimmee River has continued to rise, with an average of 7.9 mg/L for the week ending on June 12, 2022 (**Table KB-2, Figure KB-5**). Over the week ending June 12, 2022, Kissimmee River mean stage has been fairly steady (**Figure KB-5**) as was water depth on the Kissimmee River floodplain, which had a mean depth of 0.28 feet as of June 12, 2022 (**Figure KB-6**).

Water Management Recommendations

When possible, limit stage ascension rates in Lakes East Toho, Toho and KCH to a preferred maximum of 0.5 ft/14 days. With stage declining in KCH below 48.5 ft, begin to reduce S-65 and S-65A below minimum flow.

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

Water Body	Structure	Stage Monitoring Site	7-Day Average Discharge (cfs)	Lake Stage (feet NGVD) ^a	Schedule Type ^b	Schedule Stage (feet NGVD)	Departure from Regulation (feet)	
							6/12/22	6/5/22
Lakes Hart and Mary Jane	S-62	LKMJ	0	59.4	R	60.0	-0.6	-0.6
Lakes Myrtle, Preston and Joel	S-57	S-57	0	60.0	R	61.0	-1.0	-1.1
Alligator Chain	S-60	ALLI	0	62.1	R	63.2	-1.1	-1.2
Lake Gentry	S-63	LKGT	0	59.6	R	61.0	-1.4	-1.6
East Lake Toho	S-59	TOHOE	0	55.0	R	56.5	-1.5	-1.5
Lake Toho	S-61	TOHOW S-61	0	52.3	R	53.5	-1.2	-1.4
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	336	48.5	R	51.0	-2.5	-2.4

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.

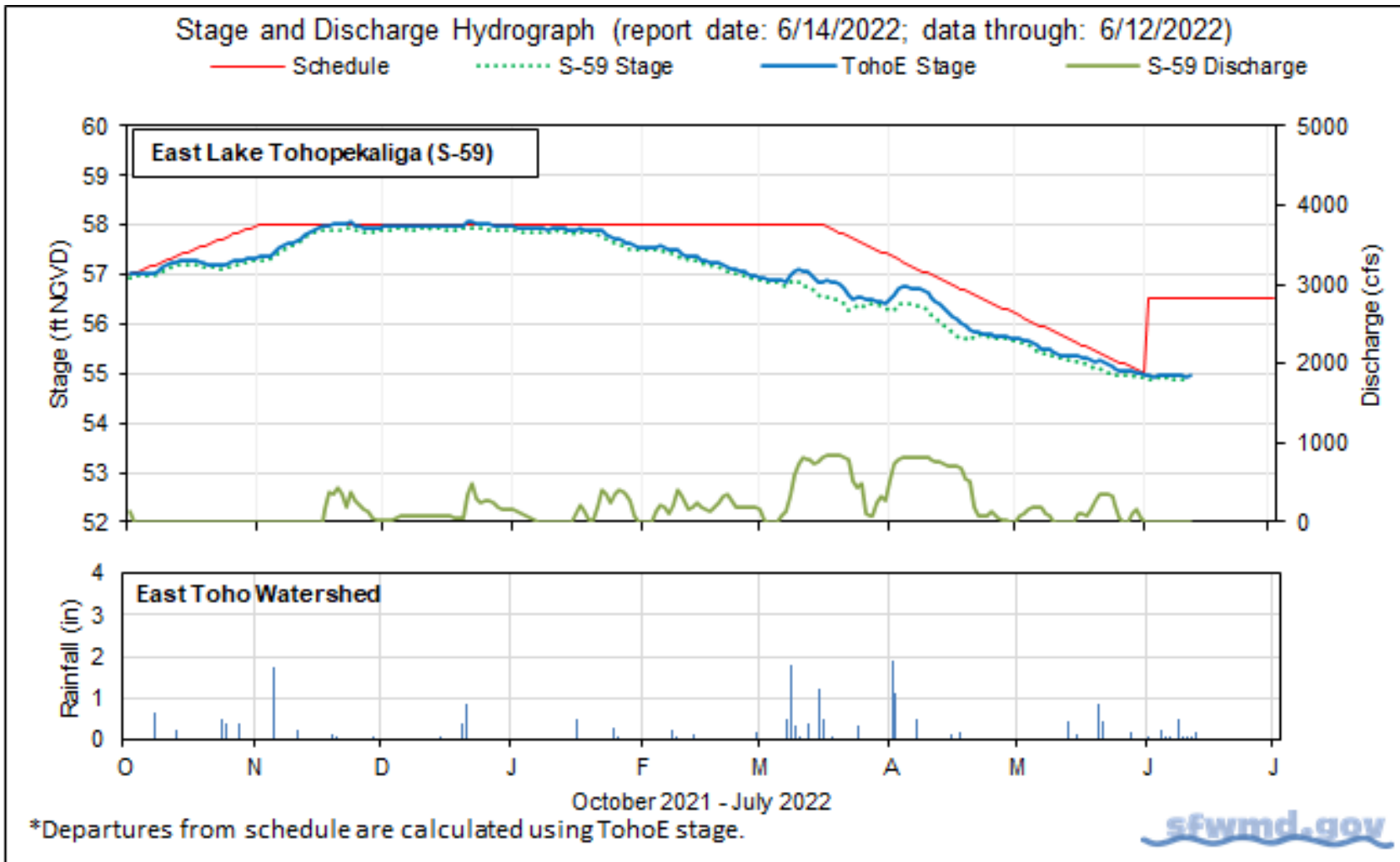


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

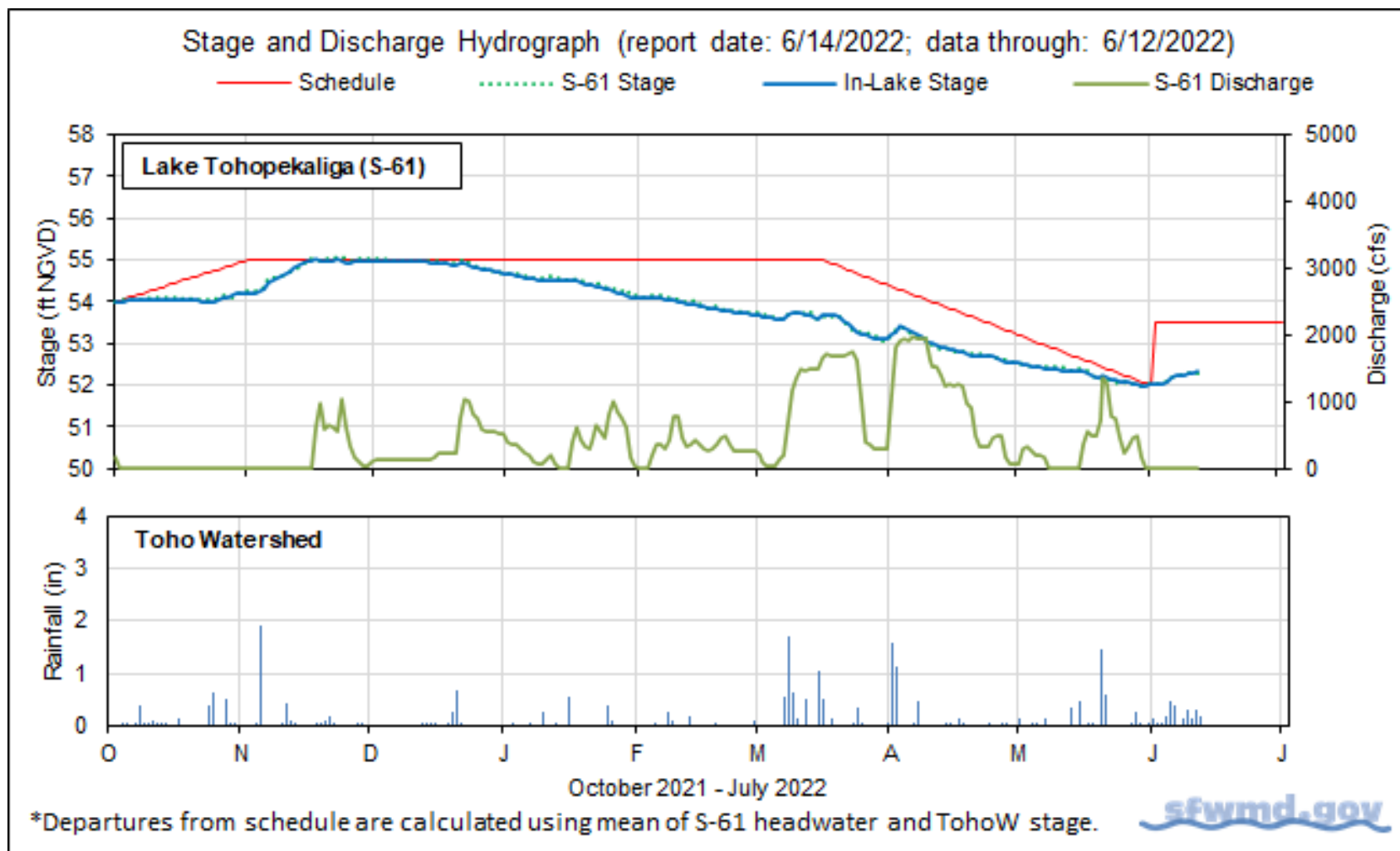


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

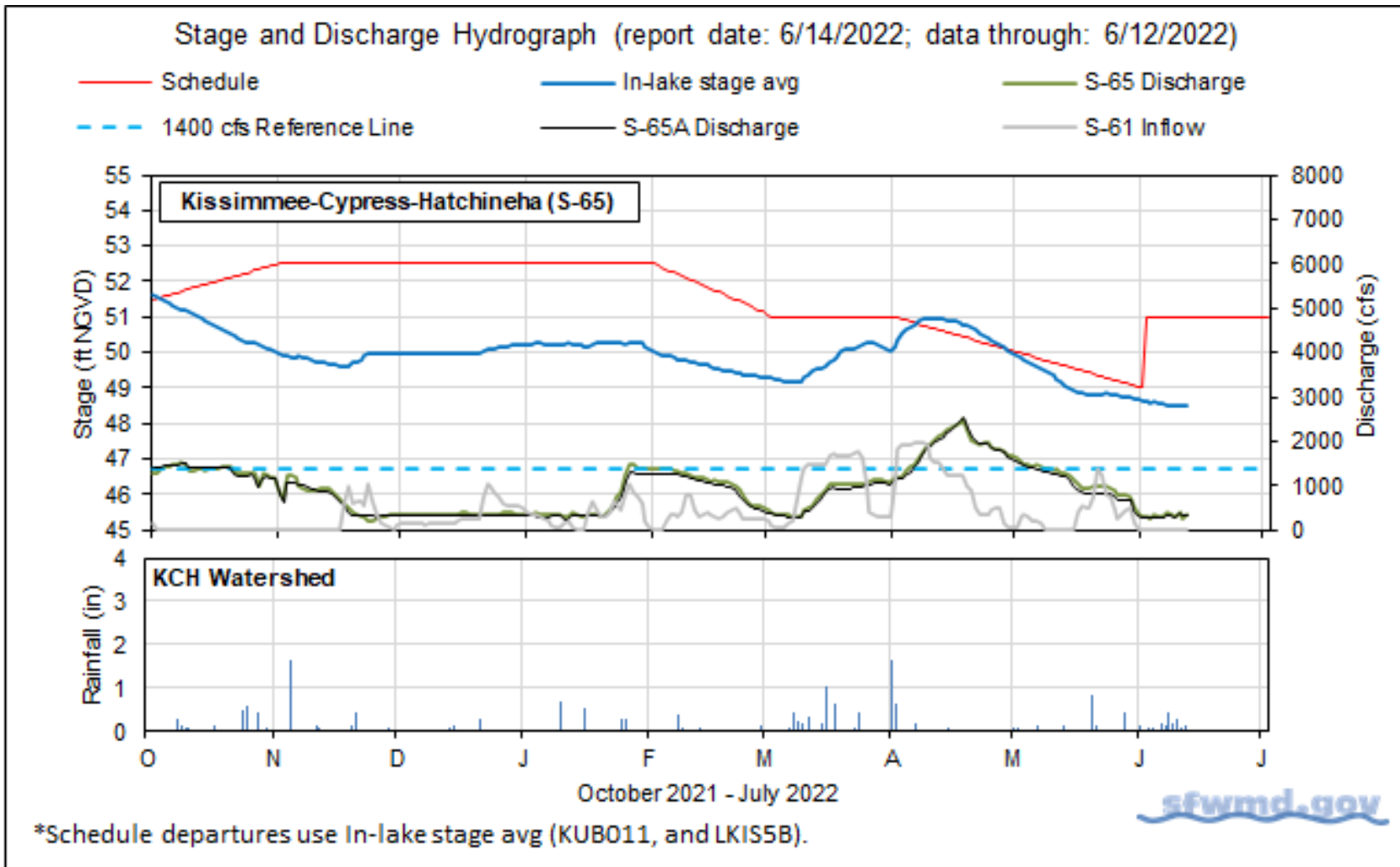


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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	Daily Average	Average for Previous Seven Day Periods			
		6/12/22	6/12/22	6/5/22	5/29/22	5/22/22
Discharge	S-65	360	340	340	850	970
Discharge	S-65A ^a	310	300	310	730	850
Headwater Stage (feet NGVD)	S-65A	46.3	46.3	46.3	46.3	46.2
Discharge	S-65D ^b	310	330	480	870	1,240
Headwater Stage (feet NGVD)	S-65D ^c	26.9	26.8	26.8	26.8	26.9
Discharge (cfs)	S-65E ^d	340	330	420	770	1,100
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	7.3	7.9	7.1	6.7	5.6
Mean depth (feet) ^f	Phase I floodplain	0.28	0.27	0.26	0.33	0.48

a. Combined discharge from main and auxiliary structures.

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

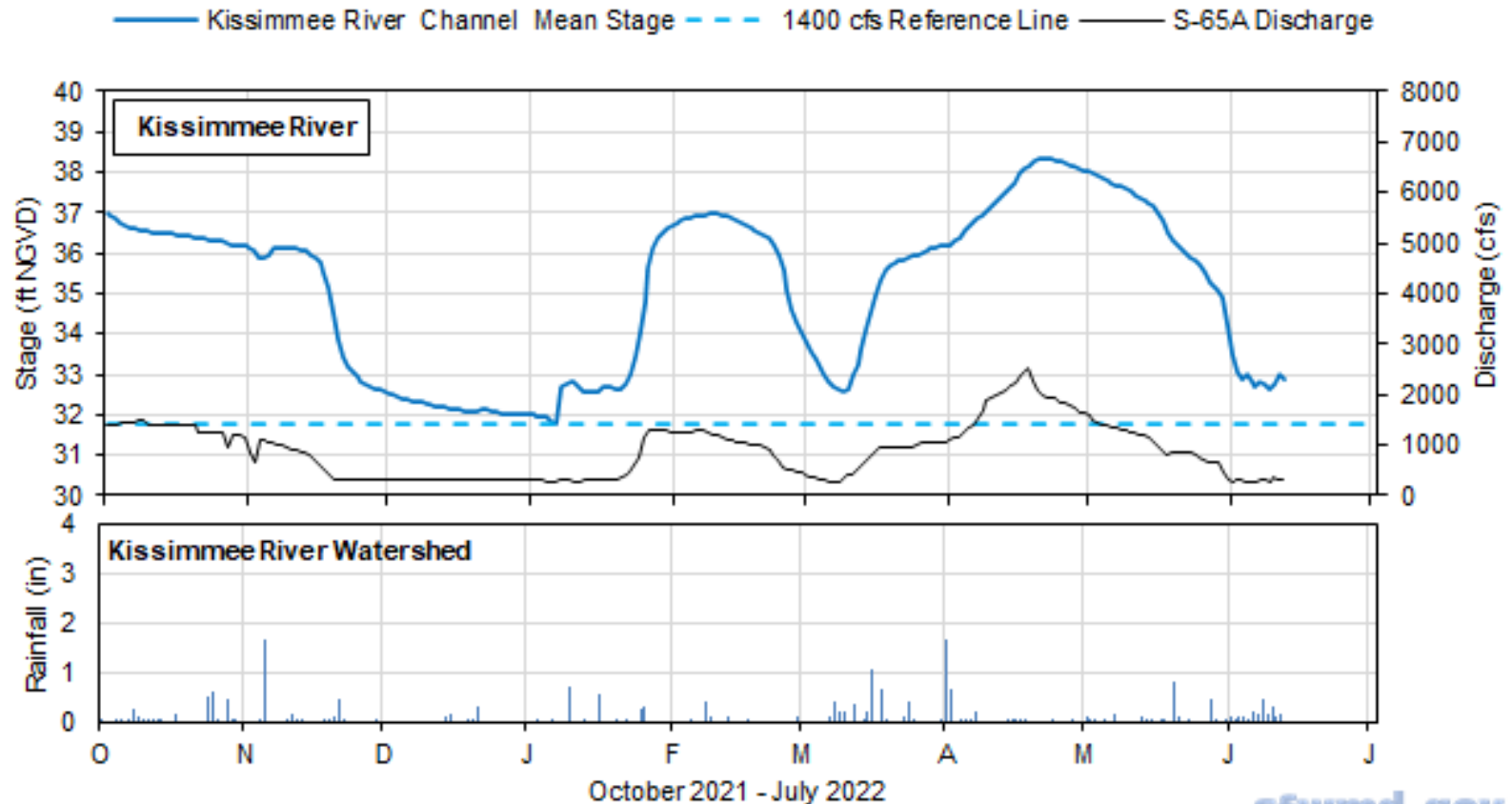
c. Average stage from S-65D and S-65DX1.

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

Stage and Discharge Hydrograph (report date: 6/14/2022; data through: 6/12/2022)

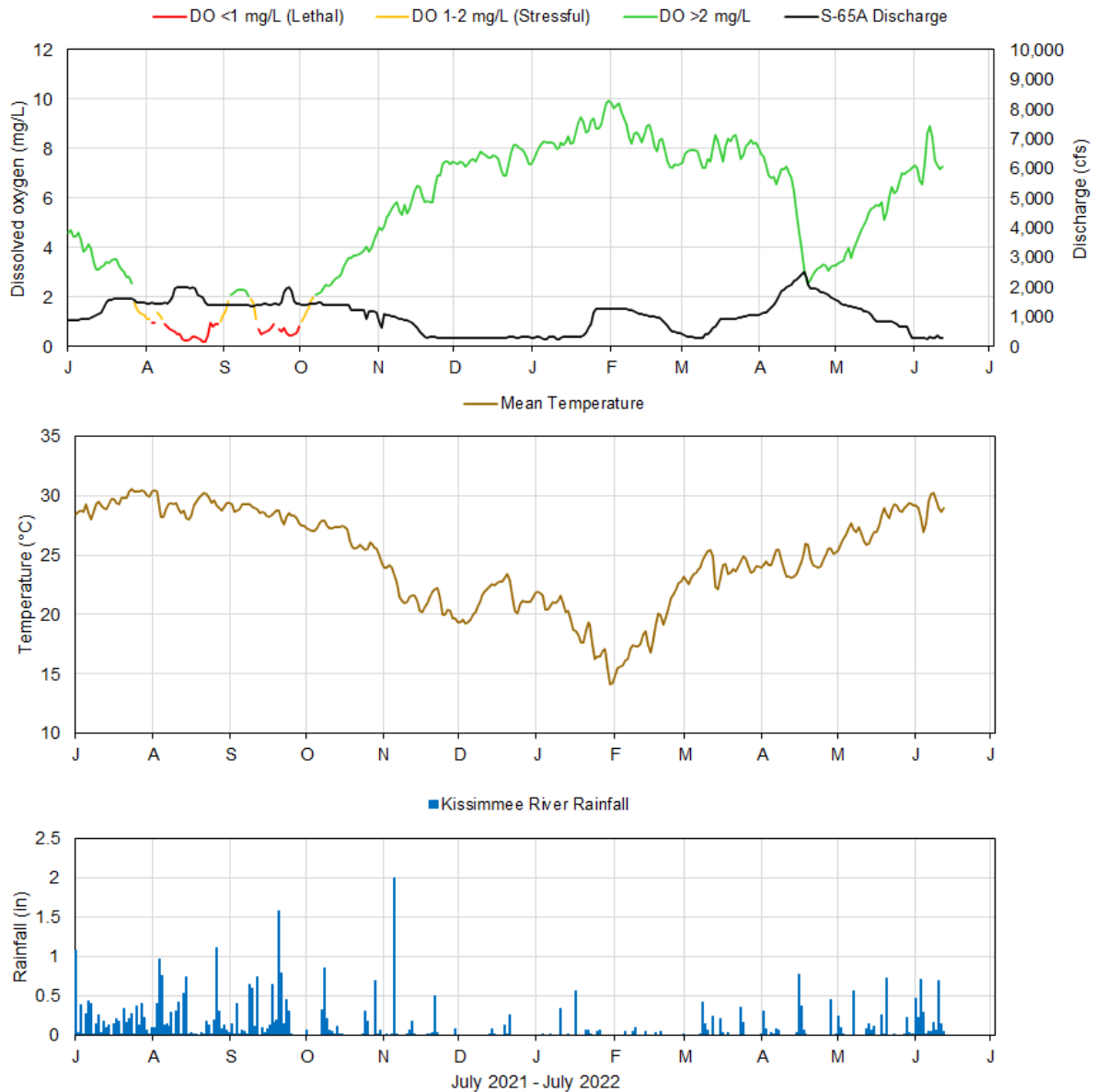


*River Channel Stage is the average for PC62, KRDR02, KRBN, PC33, and PC11.

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

Table KB-3. Discharge rate of change limits for S65/S-65A (revised 1/14/19).

Discharge (cfs)	Maximum Rate of Increase (cfs/day)	Maximum Rate of Decrease (cfs/day)
0-300	100	-50
301-650	150	-75
651-1,400	300	-150
1,401-3,000	600	-600
>3,000	1,000	-2,000



Report Date: 6/14/2022; data are through: 6/12/2022

sfwmd.gov

Figure KB-5. 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 five stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

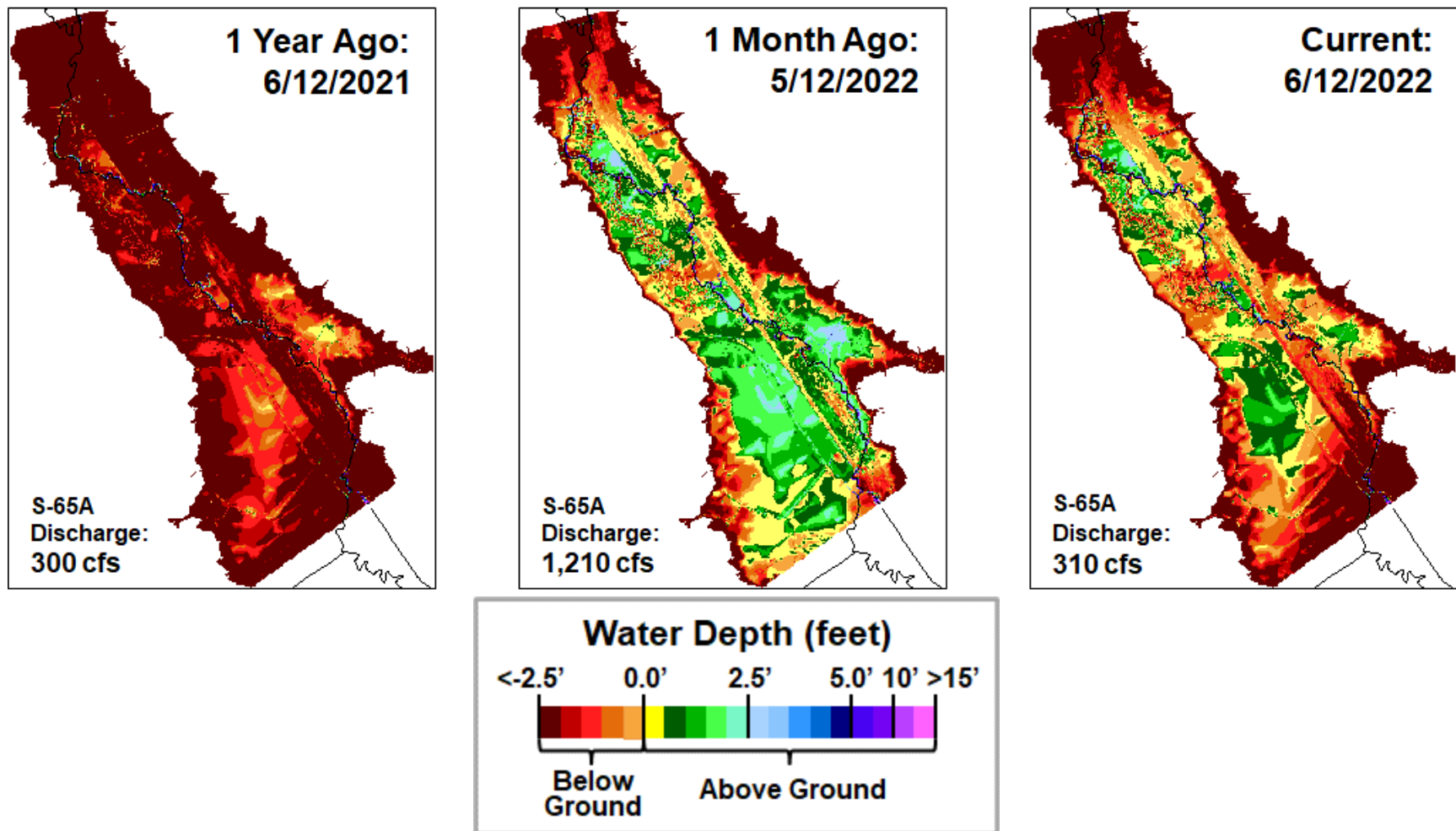


Figure KB-6. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

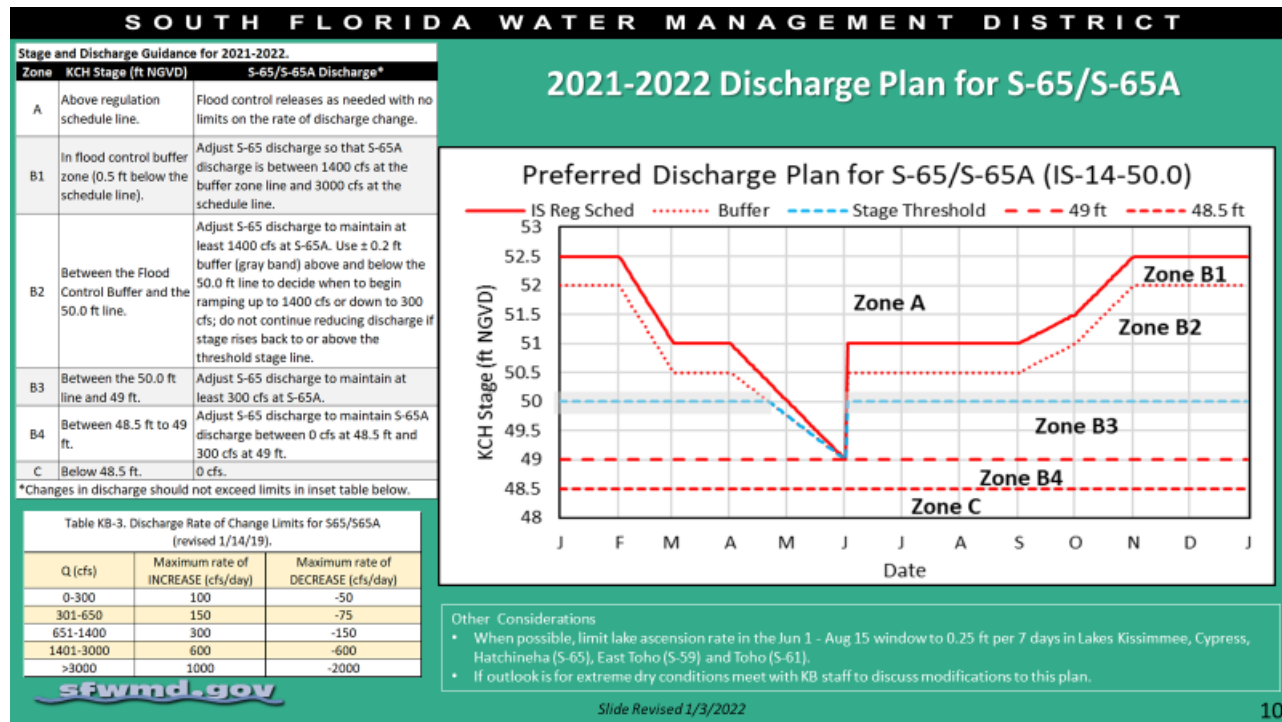


Figure KB-7. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

Lake Okeechobee

Lake Okeechobee stage was 13.02 feet NGVD on June 12, 2022, with water levels 0.32 feet higher than a month ago (**Figure LO-1**). Lake stage was in the Base Flow sub-band (**Figure LO-2**) and was on average 0.42 feet above the ecological envelope last week (**Figure LO-3**). This was the first week of 2022 where Lake stage rose above the ecological envelope, after 22 weeks within it. According to NEXRAD, 3.37 inches of rain fell directly on the Lake last week, which was more than 78% more than the previous week.

Average daily inflows (excluding rainfall) increased from the previous week, going from 587 cfs to 978 cfs. Average daily outflows (excluding evapotranspiration) decreased, going from 912 cfs to 0 cfs. Highest inflow came from the Kissimmee River/C-38 Canal through the S-65E structure (328 cfs). There was no outflow south or west last week. Back flows into the Lake were recorded from the L-8 Canal via S-271 and the C-44 Canal via S-308, at average daily rates of 160 cfs and 62 cfs, respectively. **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 (June 13, 2022) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor showed that bloom potential remains highest in Fisheating Bay (western part of the Lake) and the northwestern part of the Lake. The bloom potential increased in the northern region of the Lake, while western and southern nearshore areas were similar to the previous week (**Figure LO-6**).

The June 6-8, 2022 routine monitoring on the Lake revealed that microcystins toxins were detected at 50% of the sites, mostly in the northern and northwestern parts of the Lake, but they were all below the EPA recommended standard for recreational waters (8 µg/L). The highest concentration (0.87 µg/L) was detected at POLESOUT2 in the northwestern nearshore region. *Microcystis aeruginosa* dominated communities at 9% of the sites, and *Cylindrospermopsis raciborskii* at 13% of the sites. *M. aeruginosa*/*C. raciborskii* co-dominated communities at 12% of the sites. Over 63% of the sites had mixed communities.

Changes in Water Depth

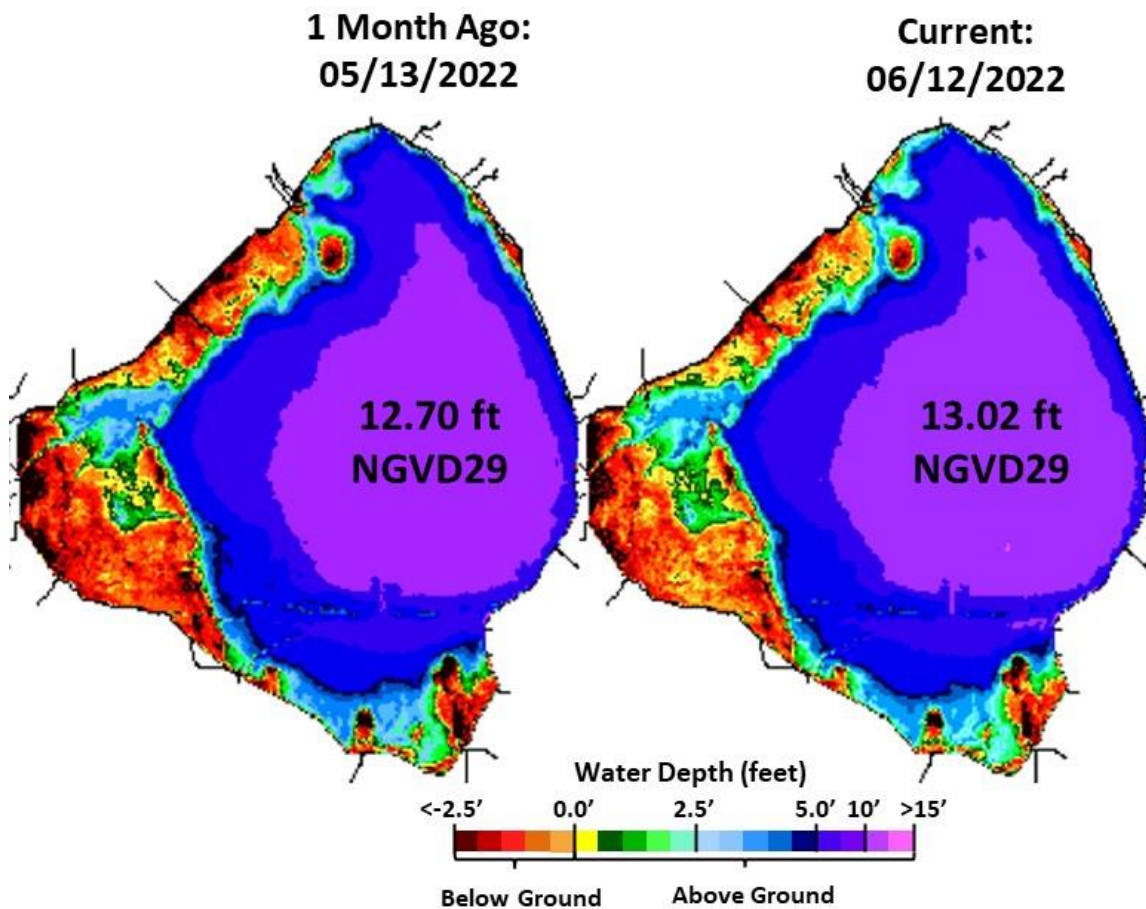
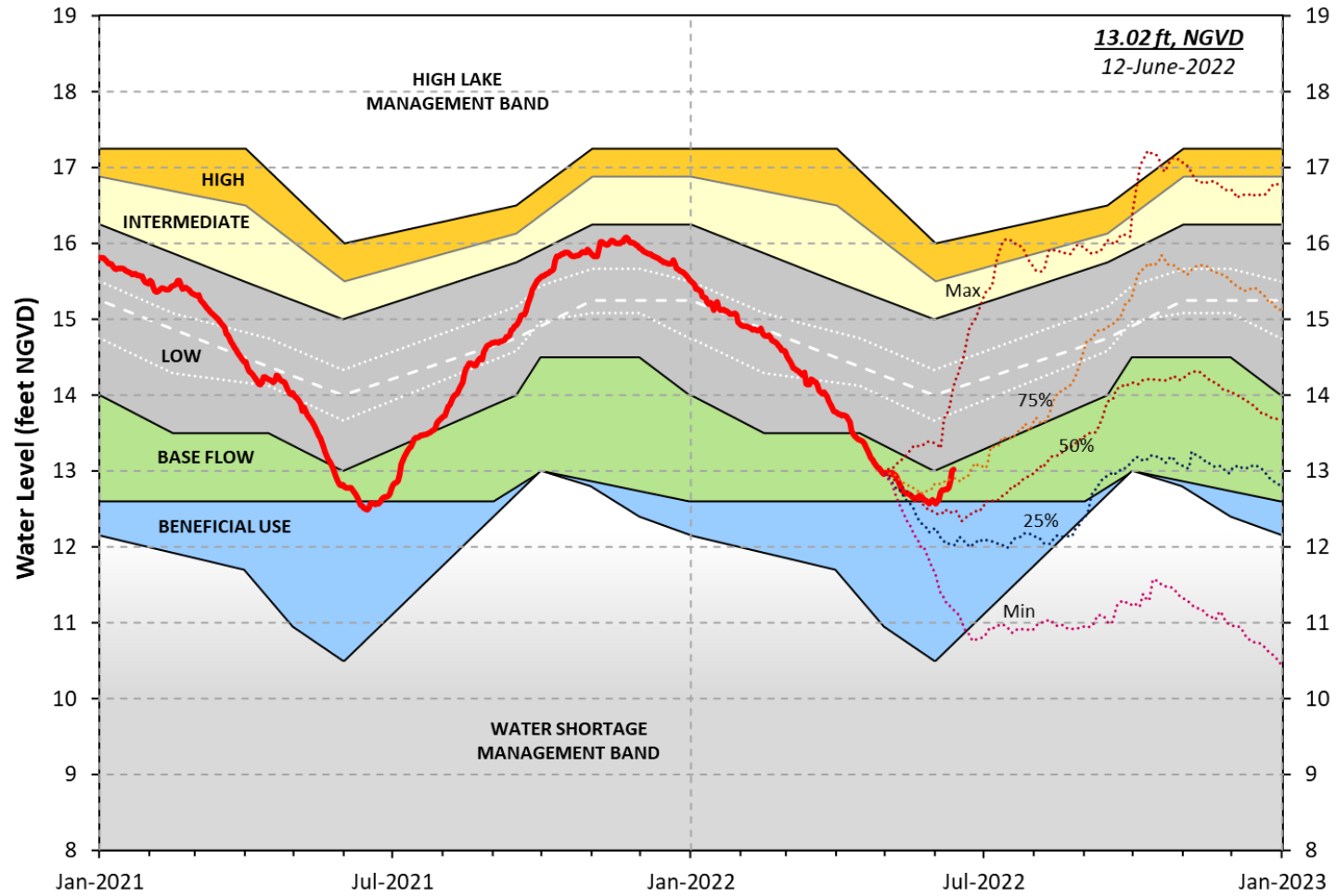


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Water Level History and Projected Stages



LORS-2008 - Adopted by USACE 28-April-2008

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

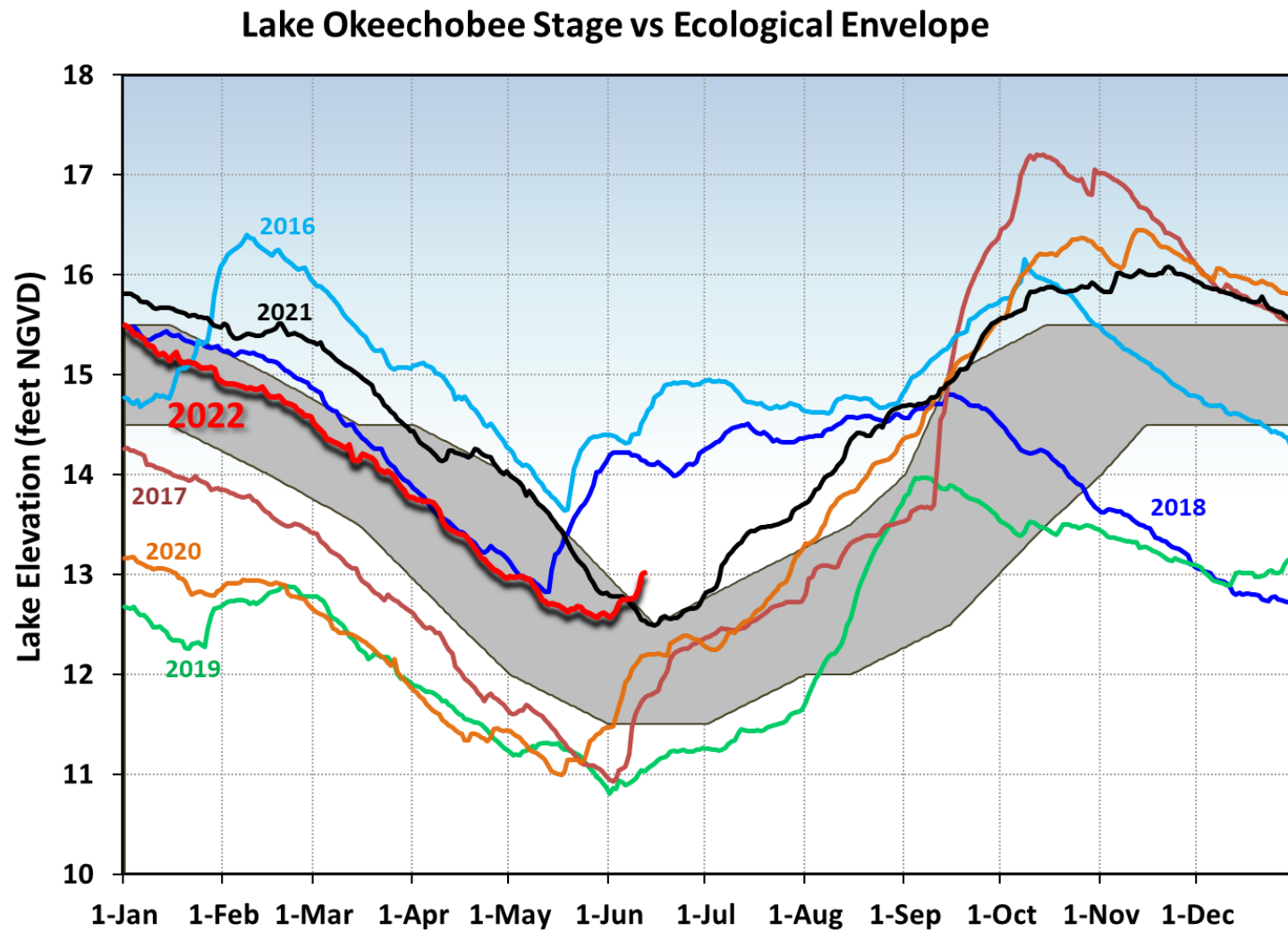


Figure LO-3. The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

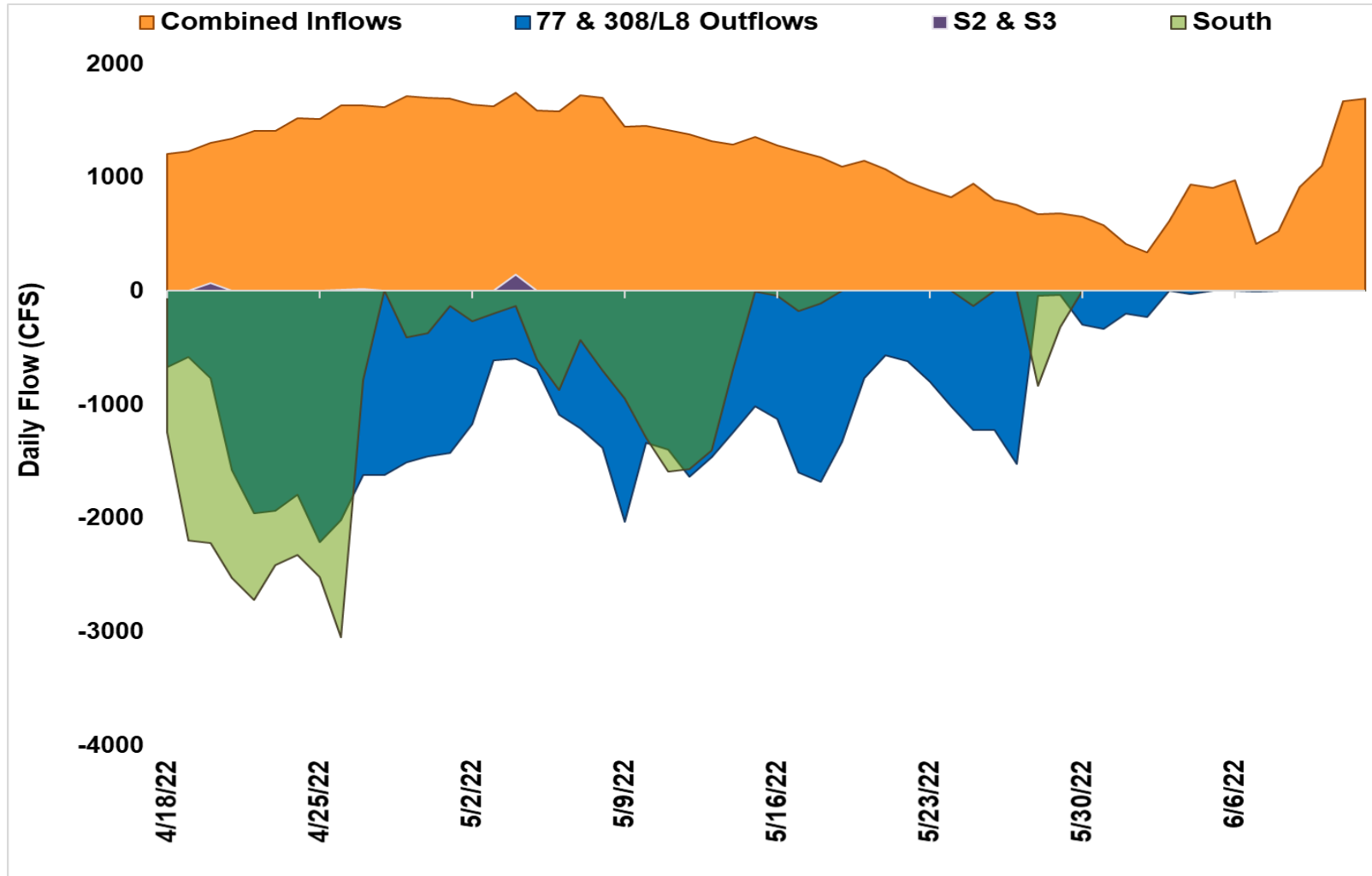


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from 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. Flow calculation for the period between June 6 - 12, 2022 are based on limited data points and should be interpreted with caution.

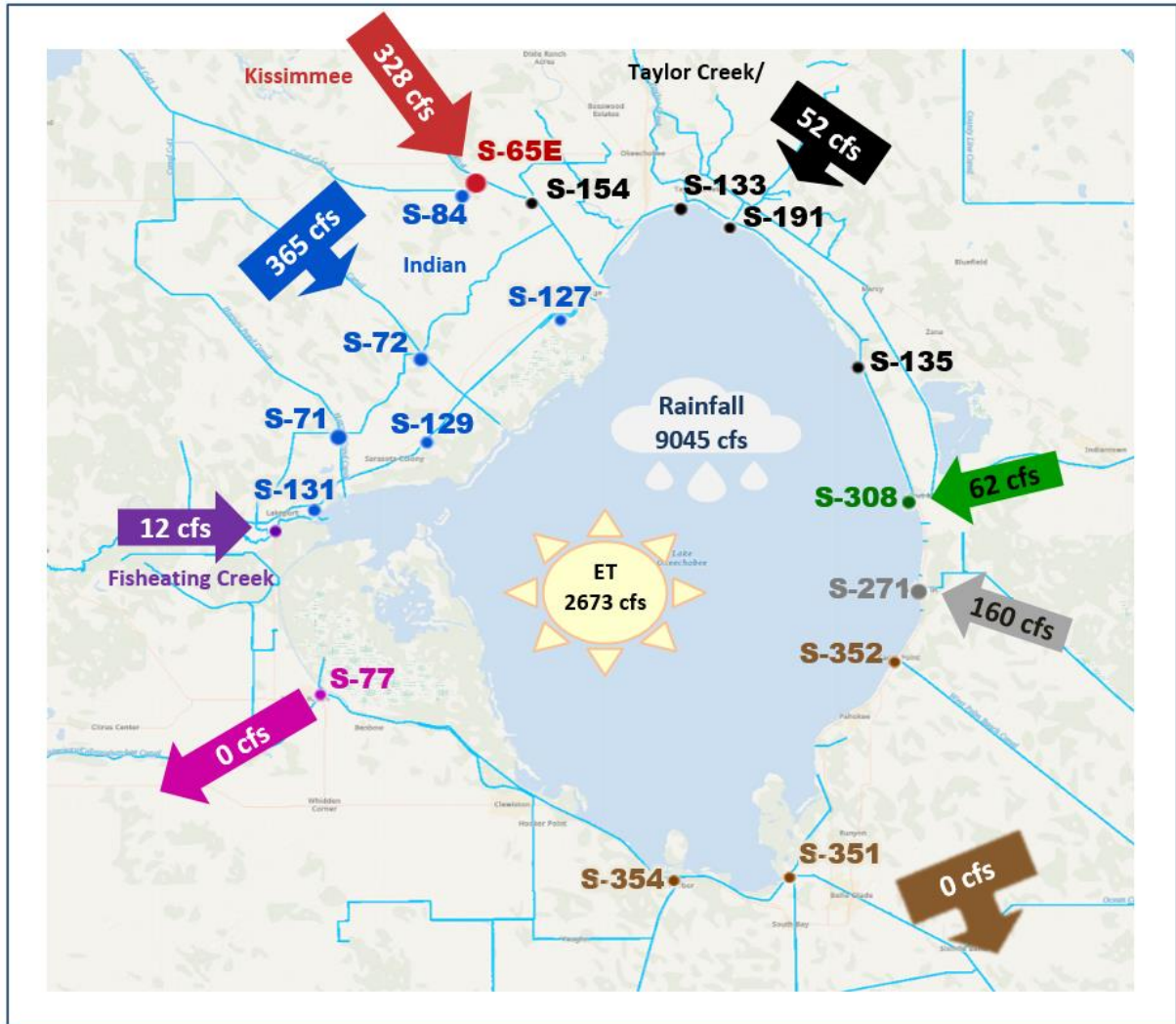


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of June 6 - 12, 2022.

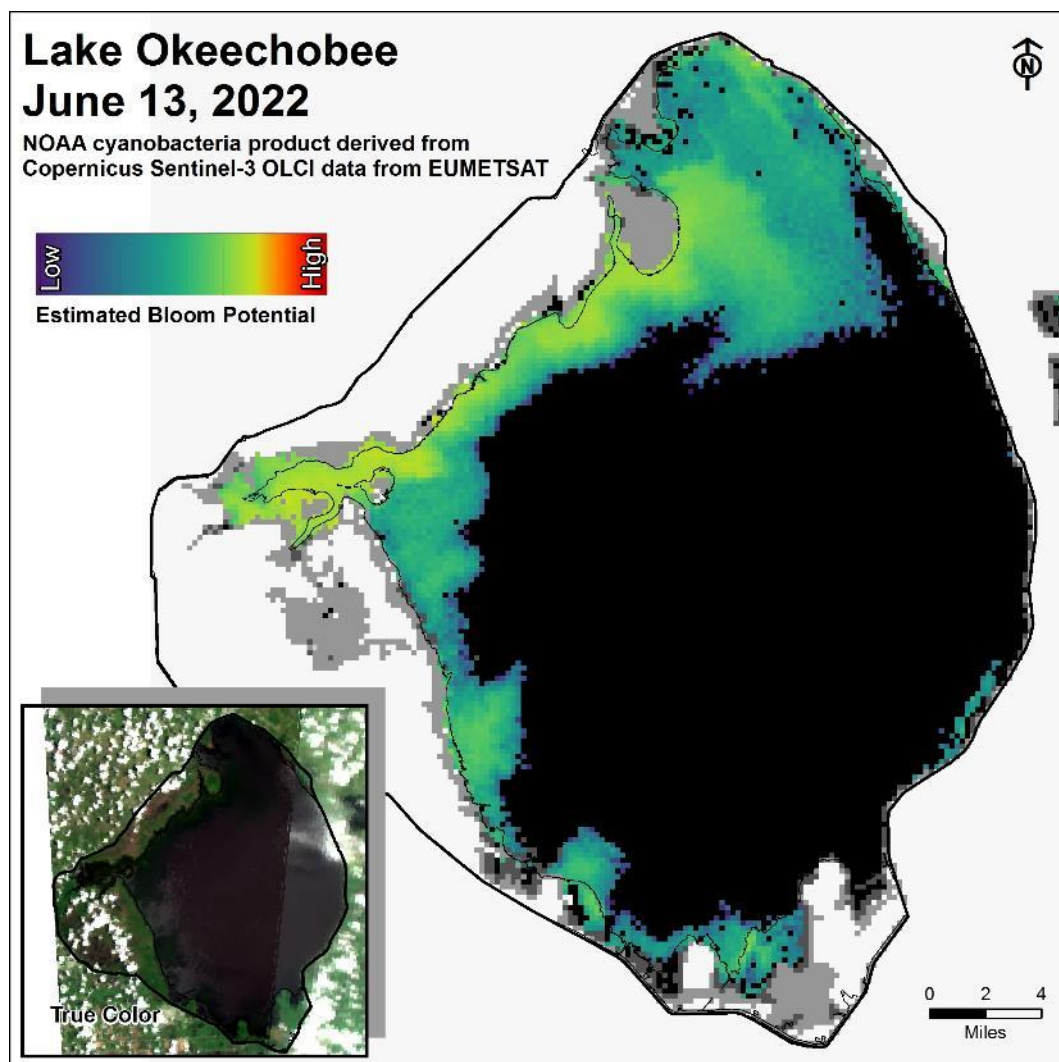


Figure LO-6. Cyanobacteria bloom potential on June 13, 2022 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 1,538 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was 771 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 18.1. Salinity conditions in the middle estuary were estimated to be within the optimal range for adult eastern oysters (**Figure ES-4**). The most recent mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute was 5.0 spat/shell for May (**Figure ES-5**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 5,703 cfs (**Figures ES-6 and ES-7**) and the previous 30-day mean inflow was 2,532 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 decreased at all 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 optimal range for adult eastern oysters at Shell Point, and in the stressed range at Cape Coral and Sanibel. (**Figure ES-10**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute in May was 13.7 spat/shell at Iona Cove and was 3.9 spat/shell at Bird Island (**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 1500 cfs, and steady releases at 2,000 cfs with estimated tidal basin inflows of 631 cfs. Model results from all scenarios predict daily salinity to be 0.6 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 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 10, 2022, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed at bloom concentrations within the District region. One sample offshore of Lee County was reported having very low concentrations (not bloom concentrations). On the east coast, red tide was not observed in samples from St Lucie, Martin or Palm Beach counties.

Water Management Recommendations

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

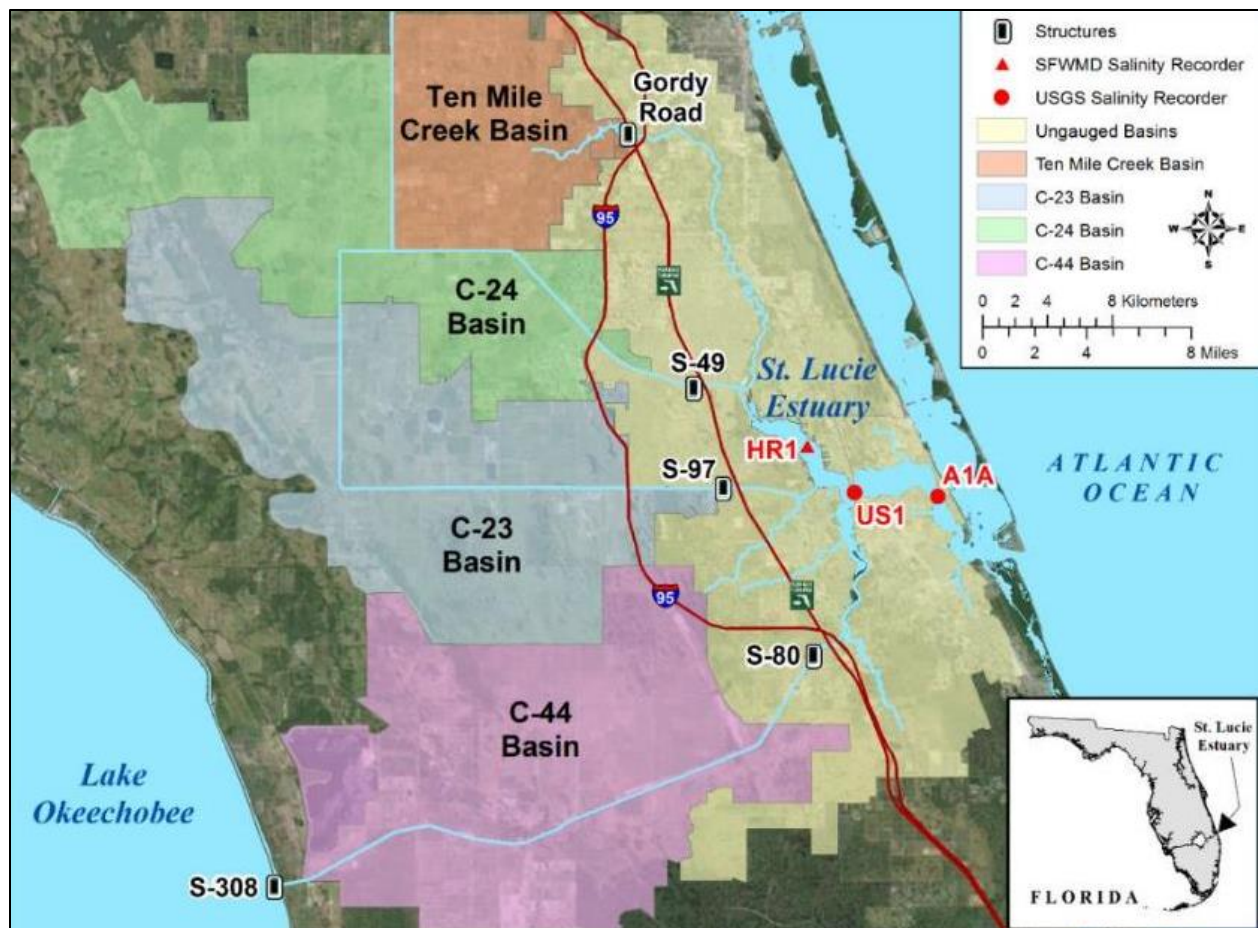


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

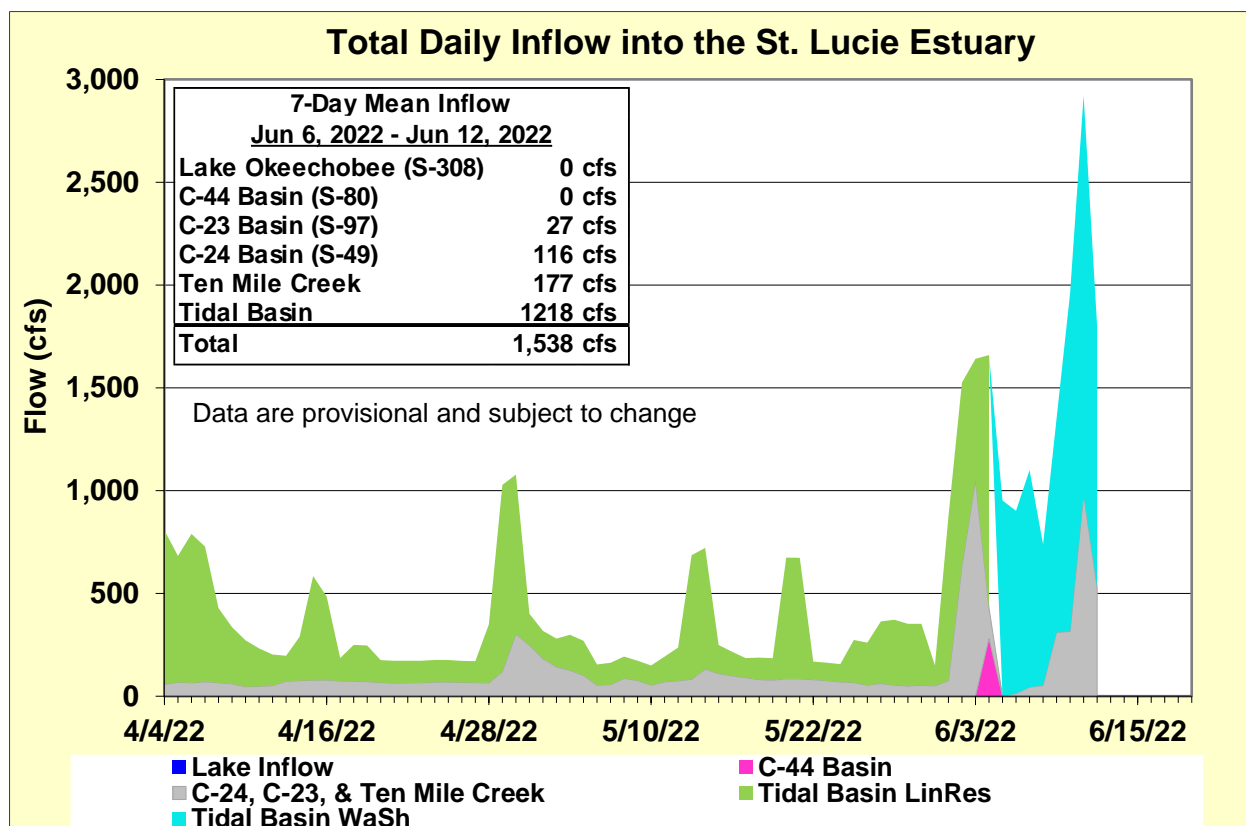


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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

Sampling Site	Surface	Bottom	Optimum Envelope
HR1 (North Fork)	10.9 (18.5)	17.4 (21.7)	10.0 – 25.0
US1 Bridge	17.4 (24.0)	18.9 (24.9)	10.0 – 25.0
A1A Bridge	23.7 (30.1)	25.9 (31.0)	10.0 – 25.0

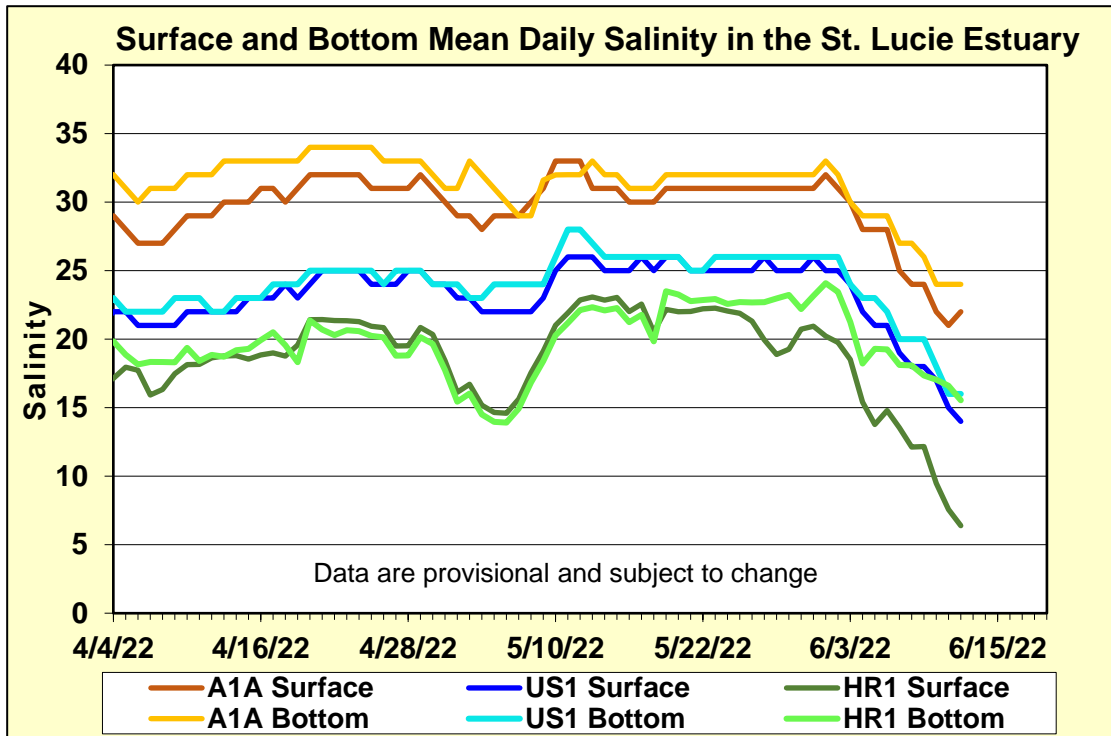


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

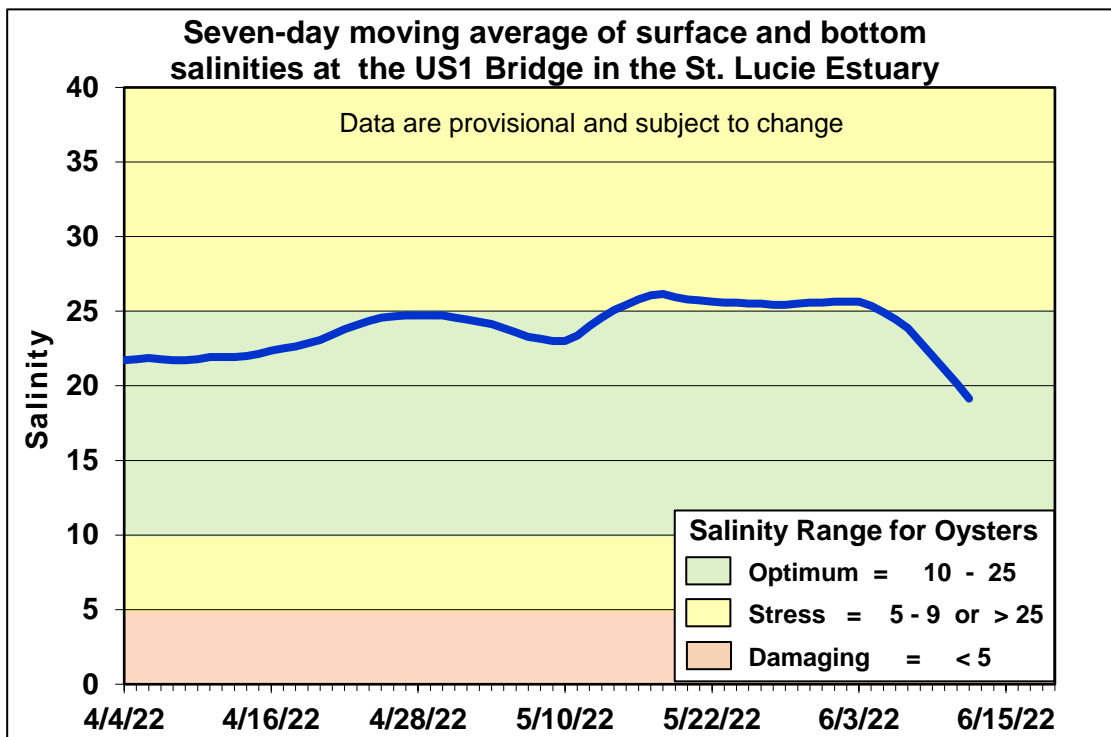


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

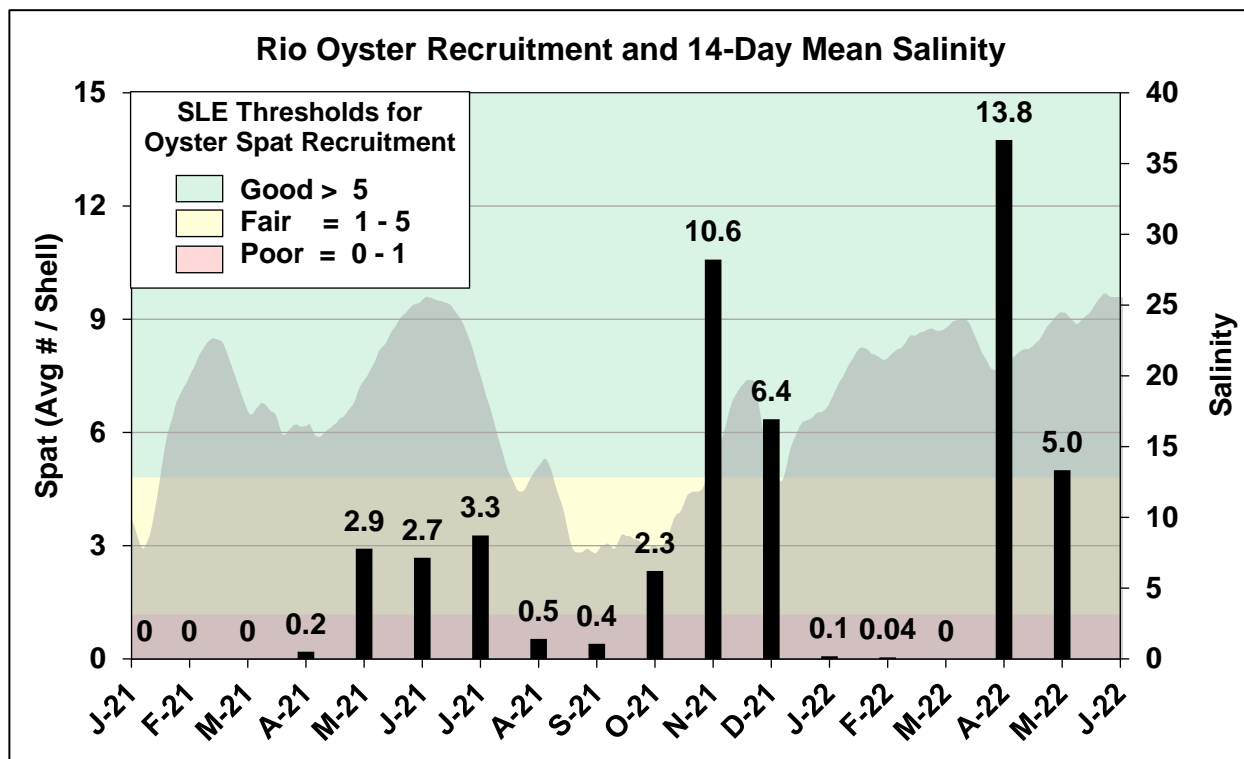


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

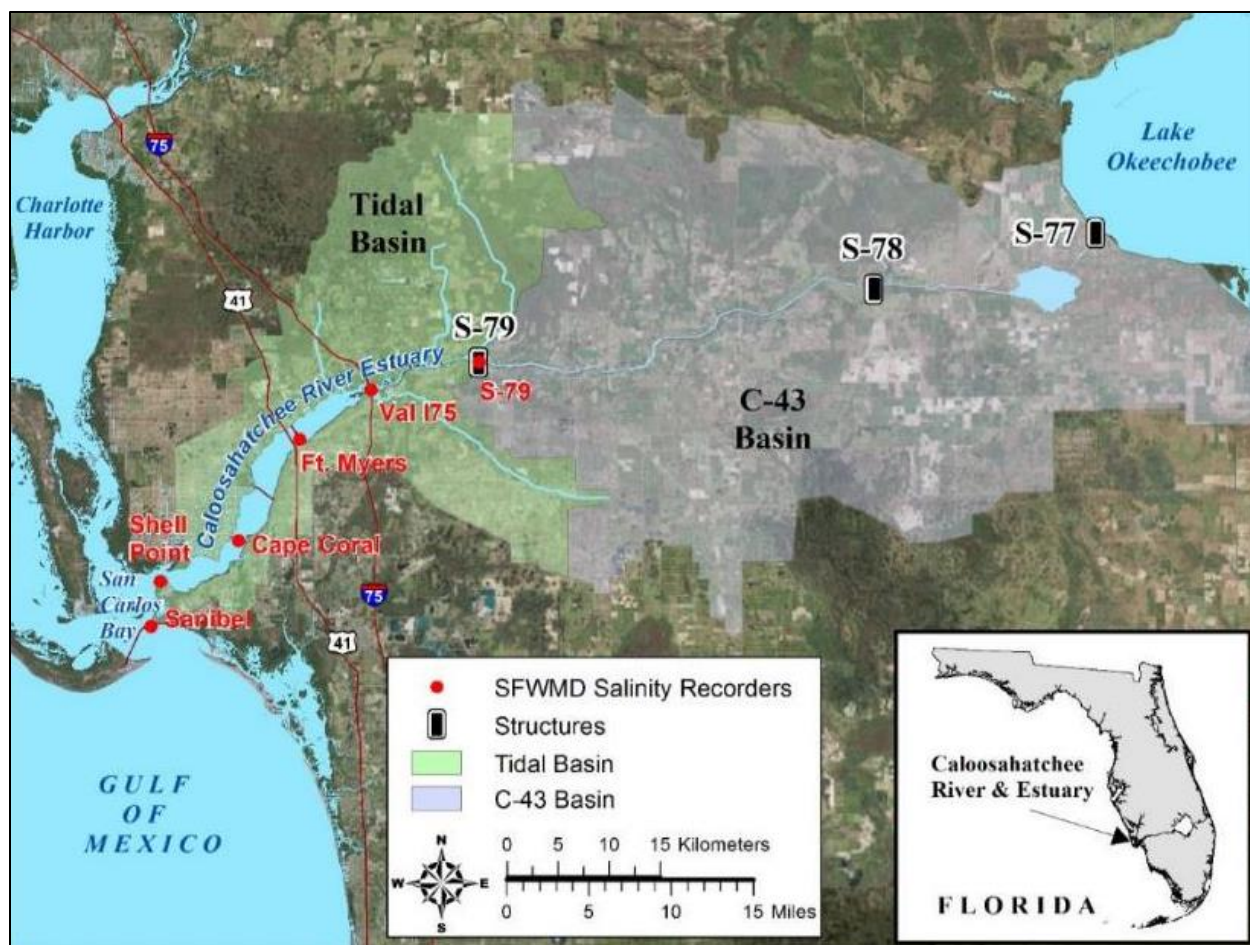


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

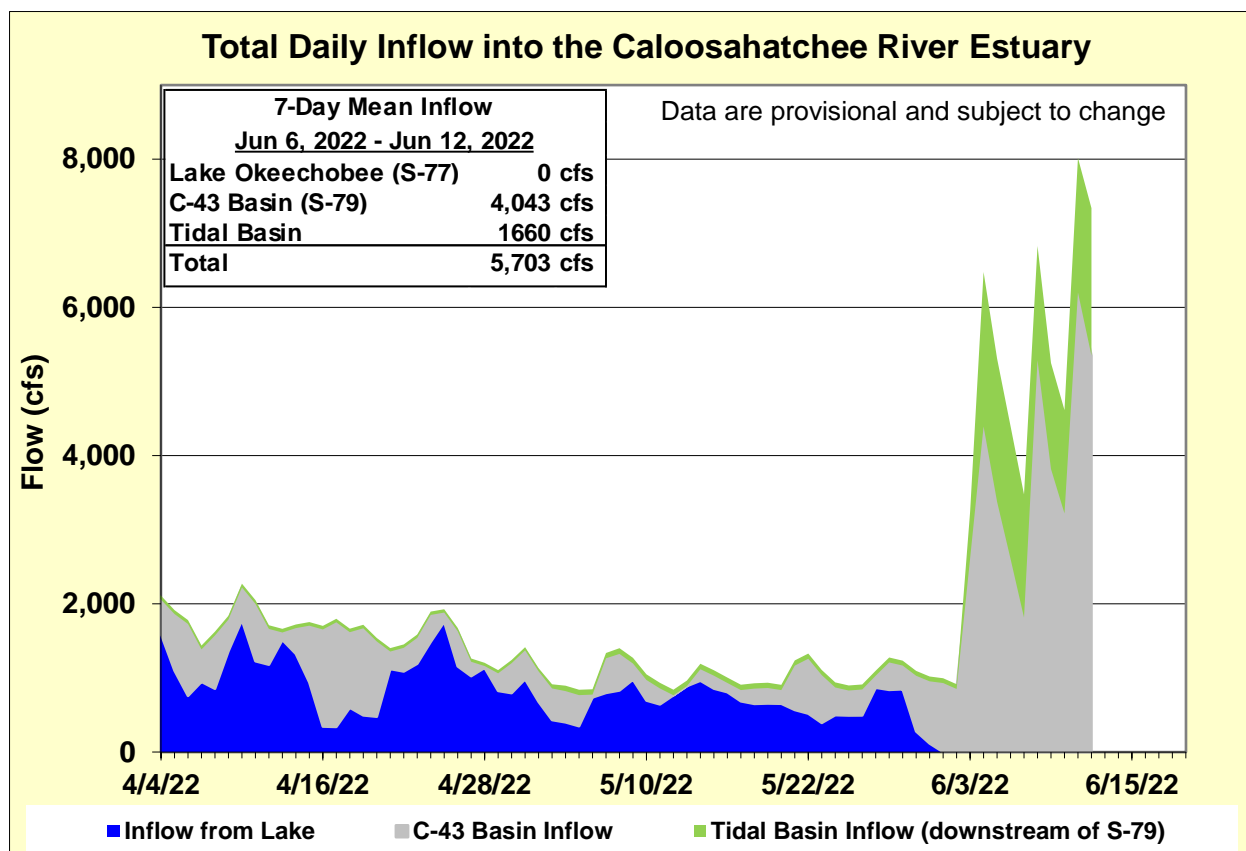


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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 (0.3)	0.0 – 10.0
Val I-75	0.2 (0.5)	0.2 (0.6)	0.0 – 10.0
Fort Myers Yacht Basin	0.9 (4.3)	1.4 (6.3)	0.0 – 10.0
Cape Coral	5.4 (11.9)	5.8 (13.3)	10.0 – 25.0
Shell Point	17.8 (25.7)	19.9 (27.3)	10.0 – 25.0
Sanibel	27.3 (31.4)	29.0 (32.0)	10.0 – 25.0

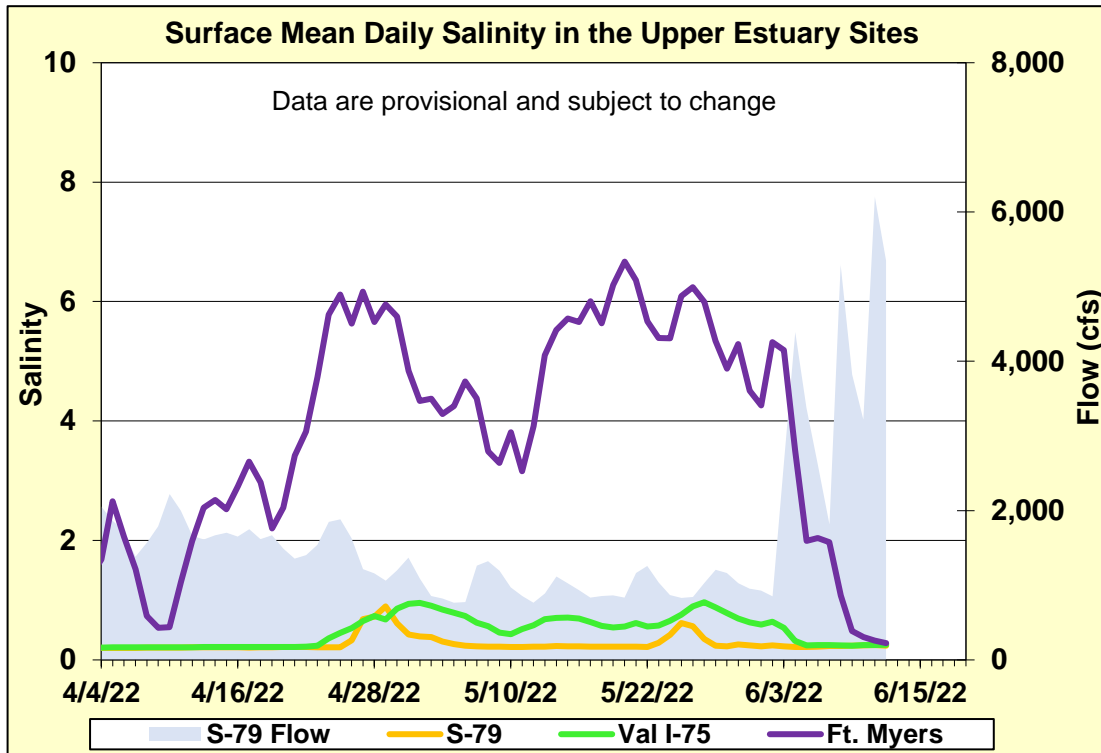


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

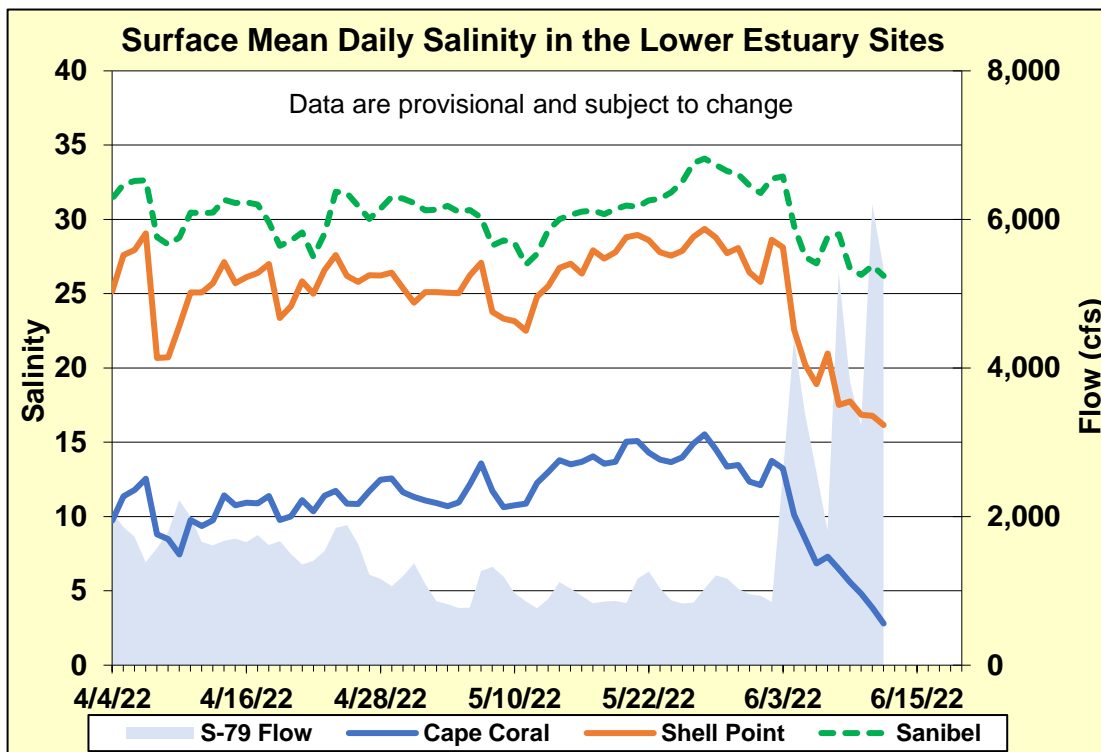


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

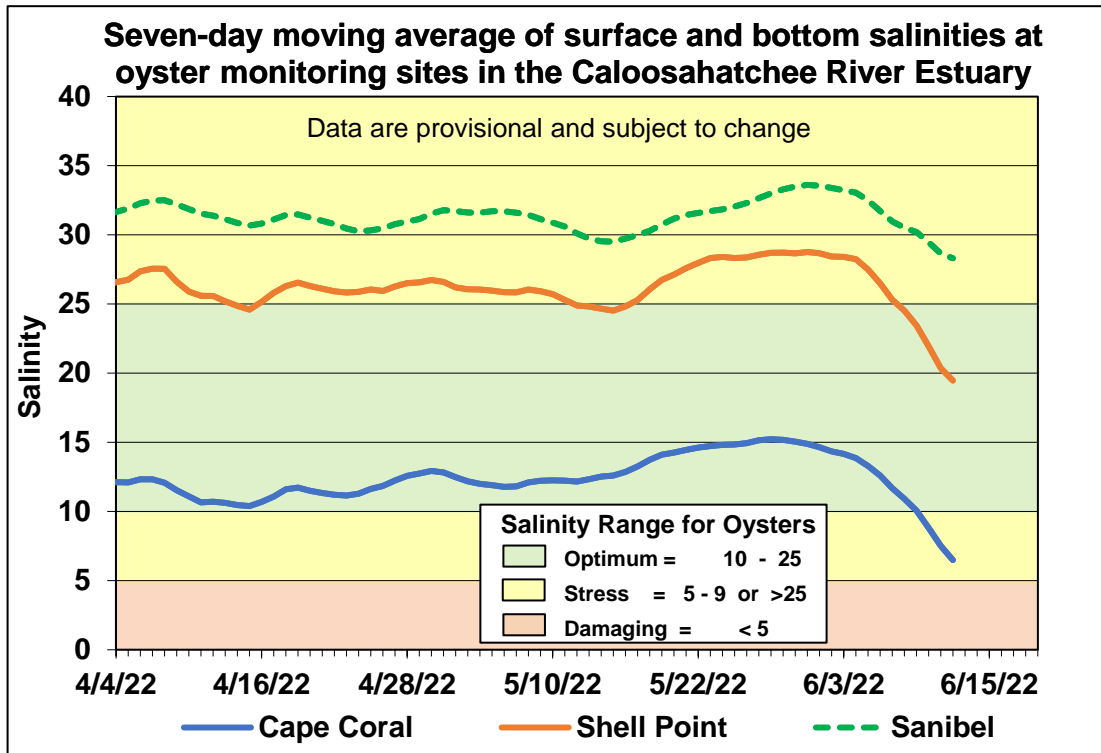


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

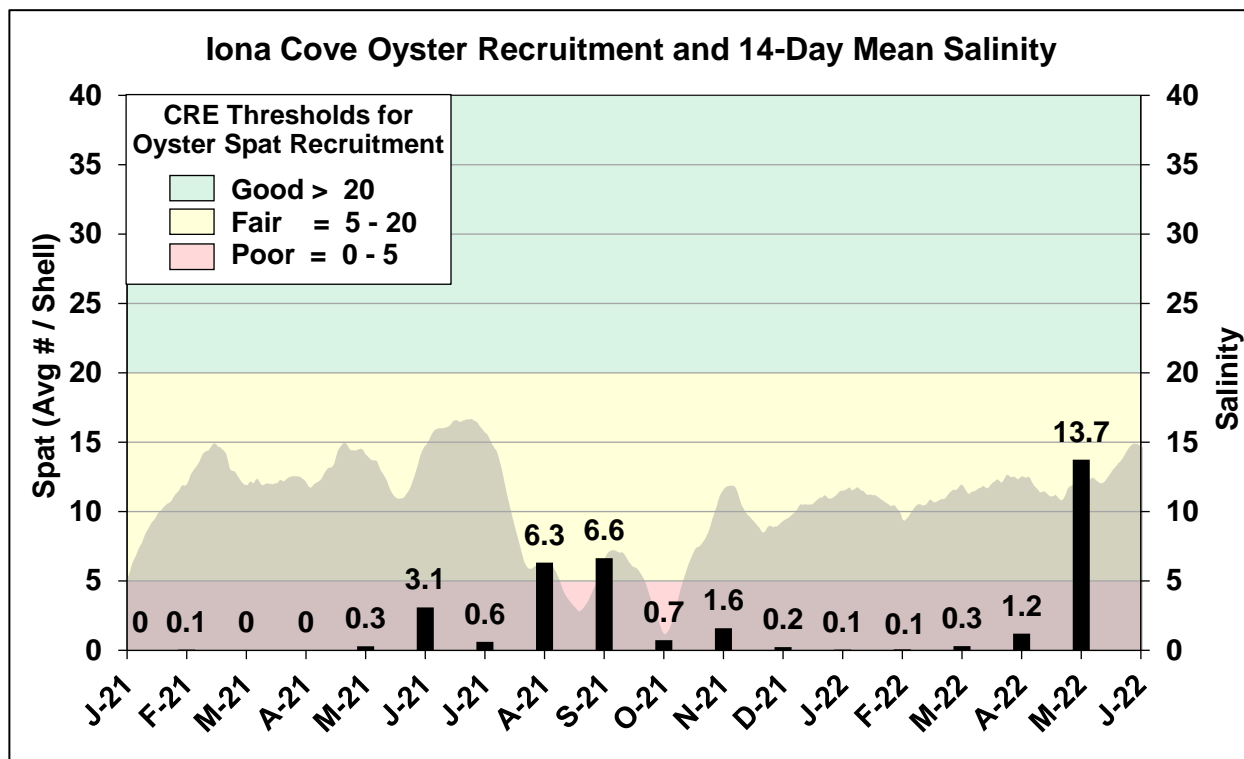


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

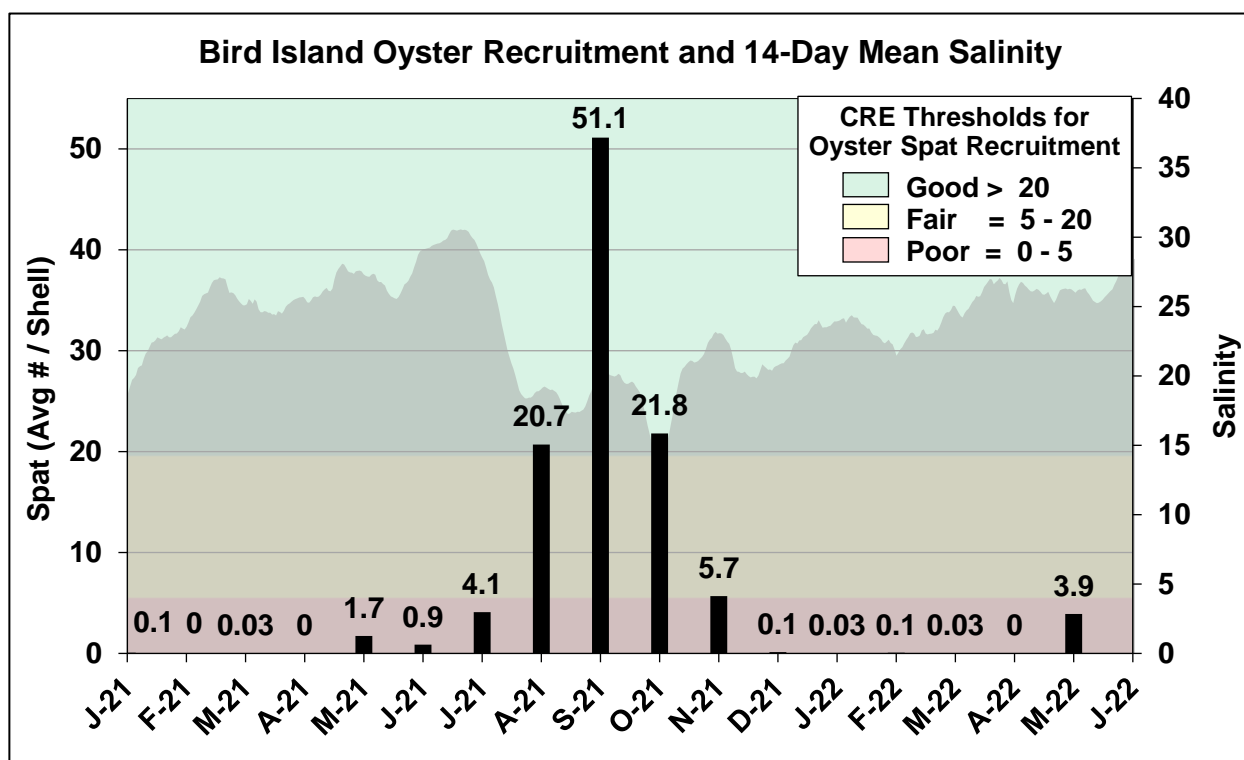


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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

Scenario	Simulated S-79 Flow (cfs)	Tidal Basin Runoff (cfs)	Daily Salinity	30-Day Mean Salinity
A	0	631	0.6	0.5
B	450	631	0.4	0.4
C	800	631	0.3	0.4
D	1000	631	0.3	0.4
E	1500	631	0.3	0.4
F	2000	631	0.3	0.4

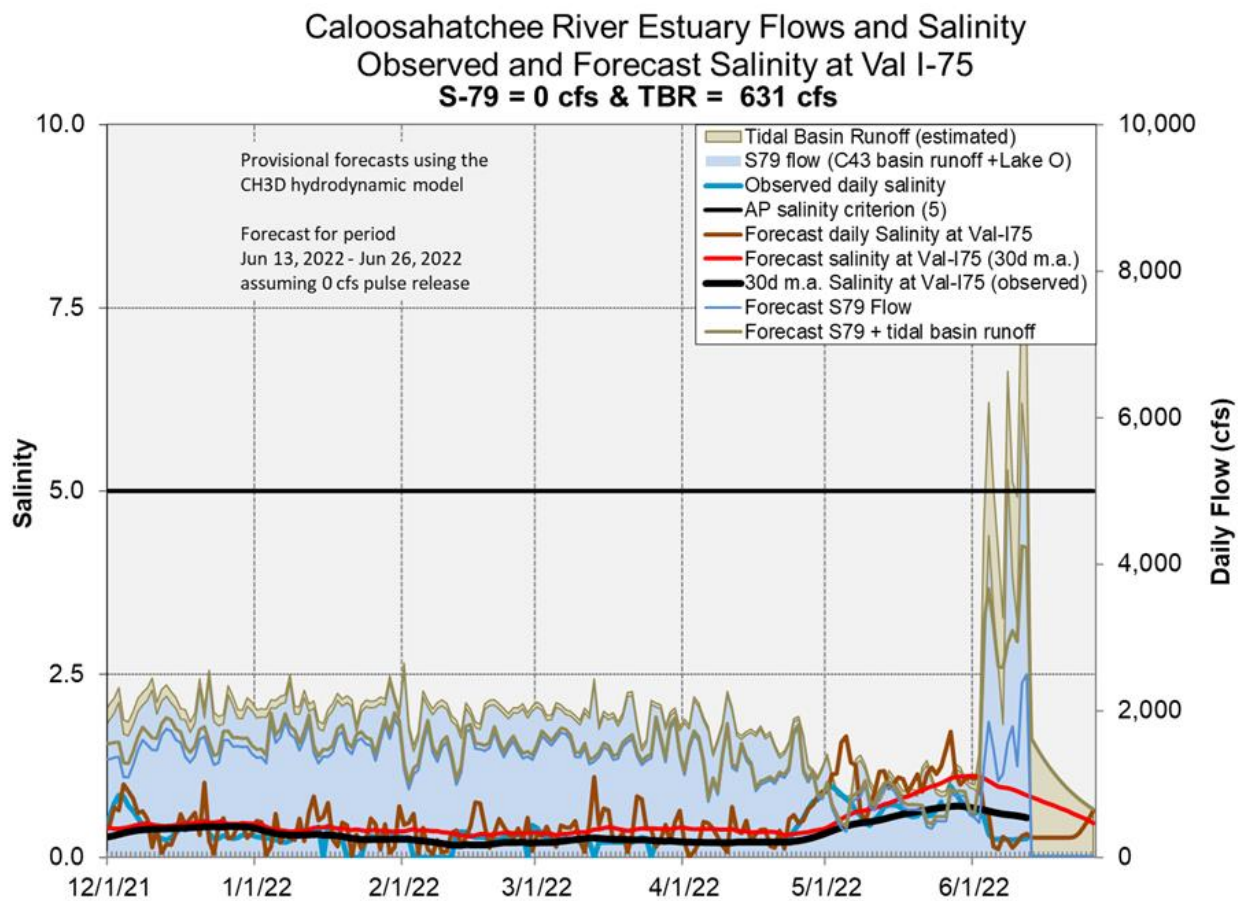


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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. Online treatment cells are above target stage and vegetation in the flow-ways is stressed and highly stressed. The 365-day phosphorus loading rates (PLRs) are high for the Central and Eastern Flow-ways (**Figure S-1**).

STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways for vegetation management activities. Treatment cells are above target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for the Northern and Western, and Eastern Flow-ways are below 1.0 g/m²/year (**Figure S-2**).

STA-2: STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Online treatment cells are above 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 1, 4 and 5 are below 1.0 g/m²/year. The 365-day PLR for Flow-way 3 is high (**Figure S-3**).

STA-3/4: STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Online treatment cells are above 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: STA-5/6 Flow-way 4 is offline for vegetation management activities. Treatment cells are near or 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 below 1.0 g/m²/year, except Flow-way 5 which is high. (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

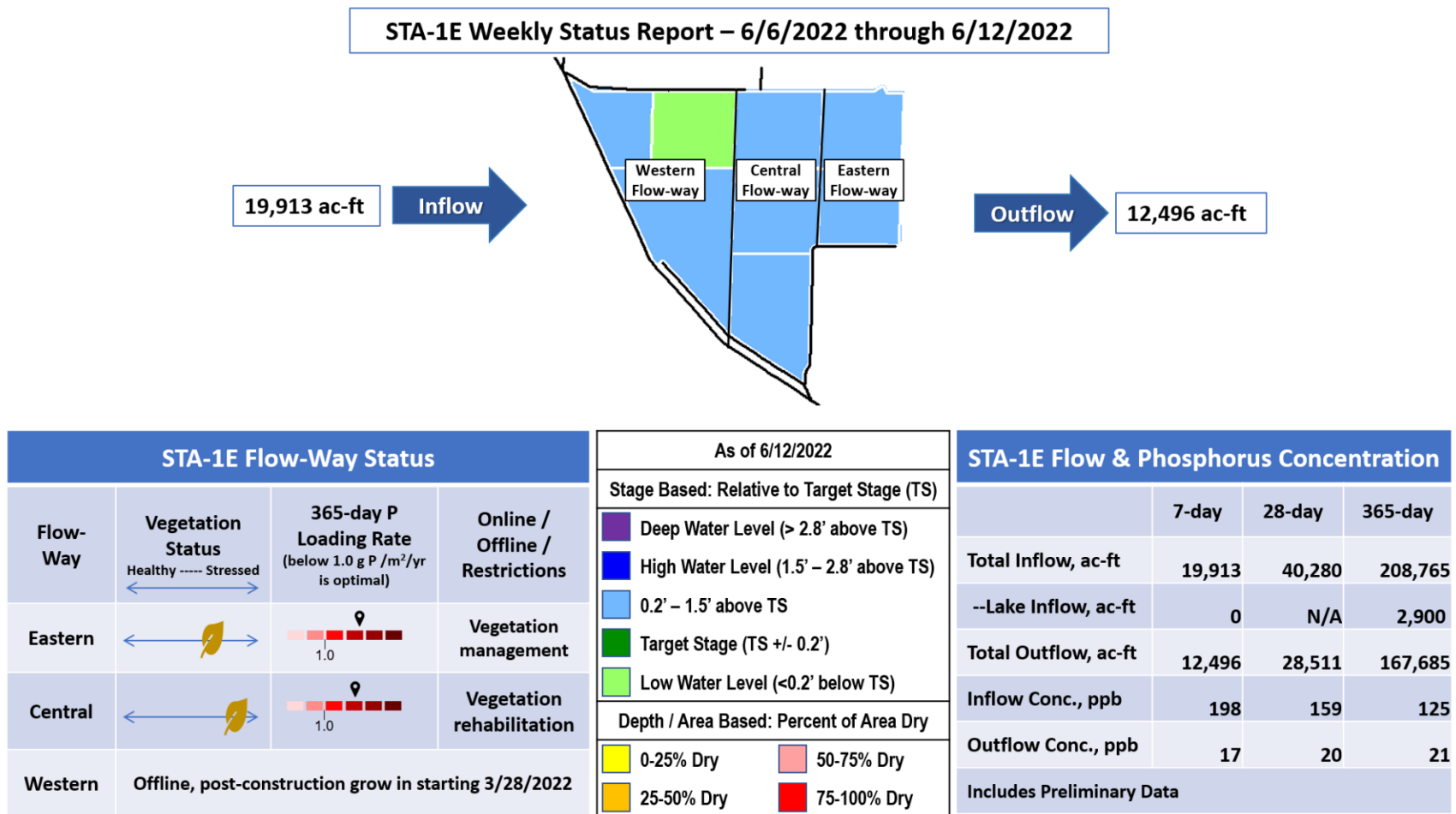
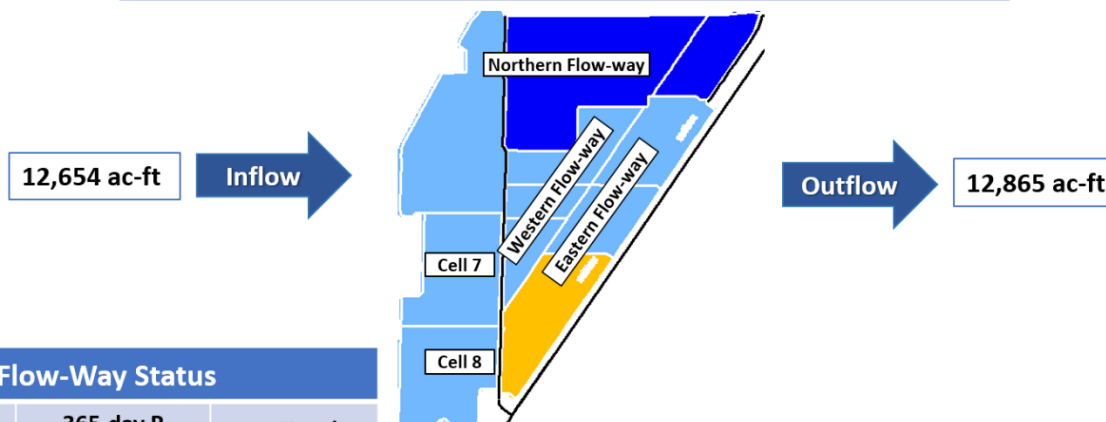


Figure S-1. STA-1E Weekly Status Report

STA-1W Weekly Status Report – 6/6/2022 through 6/12/2022



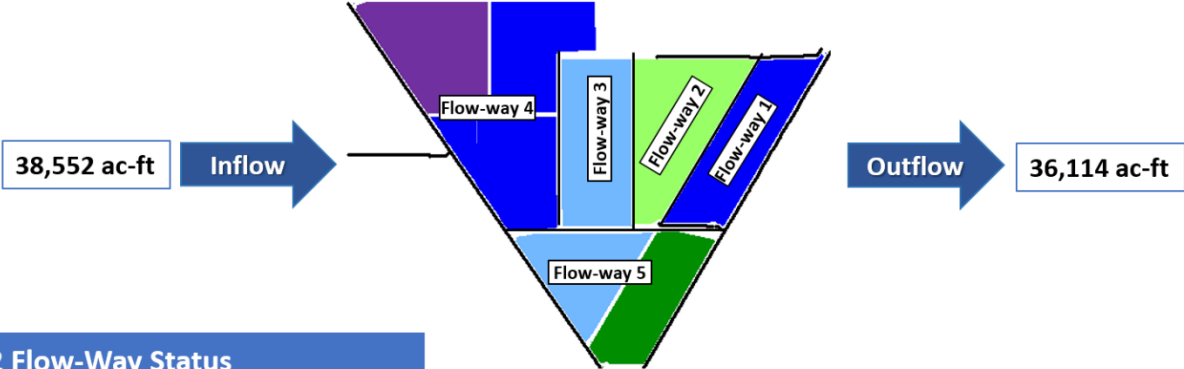
STA-1W Flow-Way Status			
Flow-Way	Vegetation Status Healthy --- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
Northern			Vegetation management
Western			Vegetation management
Eastern			Vegetation management
Cell 7		N/A	Online
Cell 8		N/A	Construction

As of 6/12/2022	
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')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-1W Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	12,654	17,848	74,305
--Lake Inflow, ac-ft	0	N/A	3,100
Total Outflow, ac-ft	12,865	12,907	65,681
Inflow Conc., ppb	105	138	153
Outflow Conc., ppb	25	25	24
Includes Preliminary Data			

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

STA-2 Weekly Status Report – 6/6/2022 through 6/12/2022



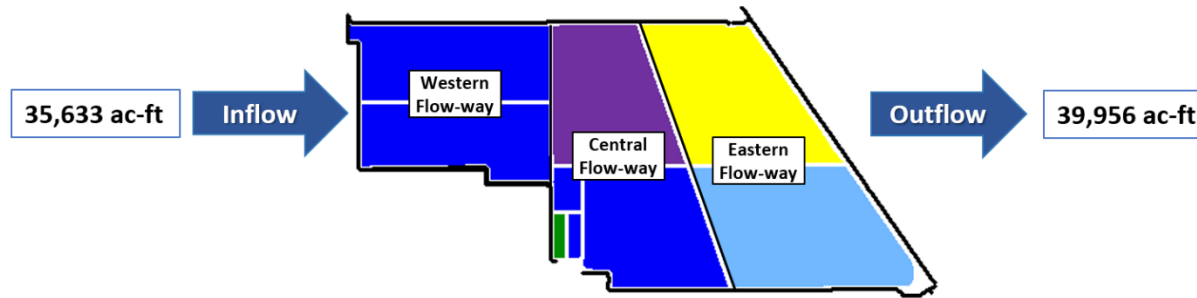
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2	Offline, construction activities as of 9/7/2021		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 6/12/2022	
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')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-2 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	38,552	76,747	351,545
--Lake Inflow, ac-ft	0	N/A	32,100
Total Outflow, ac-ft	36,114	70,830	359,717
Inflow Conc., ppb	165	122	96
Outflow Conc., ppb	25	24	17
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

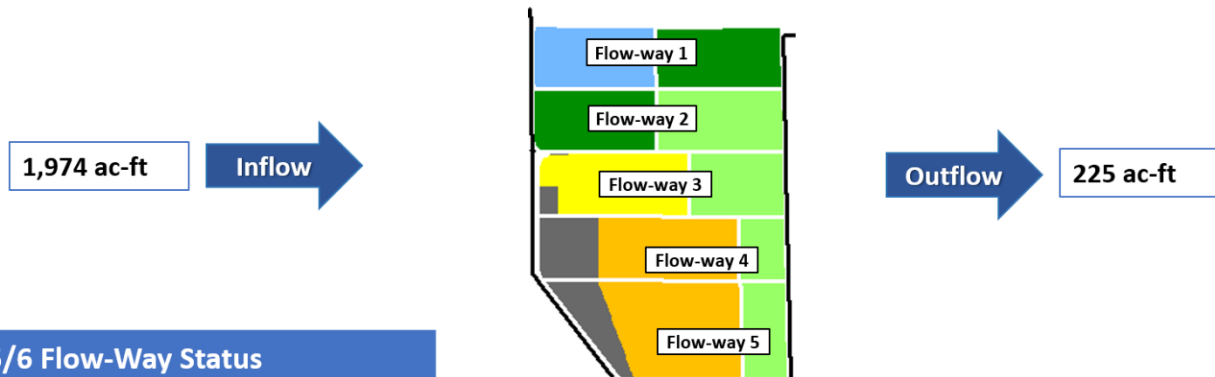
STA-3/4 Weekly Status Report – 6/6/2022 through 6/12/2022



STA-3/4 Flow-Way Status				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	As of 6/12/2022			
				Stage Based: Relative to Target Stage (TS)			
Eastern	Offline, vegetation management drawdown as of 3/1/2021			<div> <div>Deep Water Level (> 2.8' above TS)</div> <div>High Water Level (1.5' – 2.8' above TS)</div> <div>0.2' – 1.5' above TS</div> <div>Target Stage (TS +/- 0.2')</div> <div>Low Water Level (<0.2' below TS)</div> </div>			
				Depth / Area Based: Percent of Area Dry			
Central			Online	<div> <div>0-25% Dry</div> <div>25-50% Dry</div> <div>50-75% Dry</div> <div>75-100% Dry</div> </div>			
Western			Online				
					7-day		
					28-day		
					365-day		
Total Inflow, ac-ft					35,633	53,884	373,961
--Lake Inflow, ac-ft					0	N/A	12,000
Total Outflow, ac-ft					39,956	52,102	341,532
Inflow Conc., ppb					84	77	87
Outflow Conc., ppb					13	15	15
Includes Preliminary Data							

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

STA-5/6 Weekly Status Report – 6/6/2022 through 6/12/2022



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	Offline, vegetation management starting 01/24/2022		
5			Online

Flow-way 5

As of 6/12/2022

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')

Low Water Level (<0.2' below TS)

Depth / Area Based: Percent of Area Dry

0-25% Dry

25-50% Dry

50-75% Dry

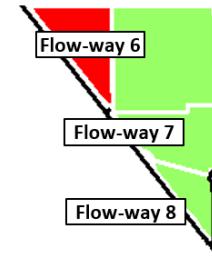
75-100% Dry

STA-5/6 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	1,974	2,548	180,332
--Lake Inflow, ac-ft	0	N/A	1,200
Total Outflow, ac-ft	225	225	169,380
Inflow Conc., ppb	148	147	242
Outflow Conc., ppb	16	16	50
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 6/6/2022 through 6/12/2022



STA-5/6 Flow-Way Status				As of 6/12/2022	
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)	
				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')	
				Low Water Level (<0.2' below TS)	
				Depth / Area Based: Percent of Area Dry	
				0-25% Dry	50-75% Dry
				25-50% Dry	75-100% Dry
6	←-----→	1.0	Online		
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

WCA-1: the ascent in stage at the 1-8C slowed over the week. The average on Sunday was 0.93 feet above the flat Zone A1 regulation line. WCA-2A: Stage fell quickly at the S11B headwater last week, then rebounded. The average at that gauge on Sunday was 0.42 feet above the flat regulation line. WCA-3A: Last week the Three Gauge Average stages continued to ascend but at a slower rate than the previous week. The average stage was 0.05 feet below the rising regulation line on Friday. WCA-3A: Stage continued a rapid ascent at gauge 62 (Northwest corner) last week, the average on Sunday was 0.25 feet below the rising Upper schedule line. (**Figures EV-1 through EV-4**).

Water Depths

The SFWDAT tool indicates that stages are recovering east of the Miami Canal in WCA-3A North but still remain the shallowest in the WCAs. WCA-2A stages got significantly deeper over the last month. The upper reaches of the L-67s are beginning to pond once again. BCNP stages have come up above ground in most of that basin. North to South hydrologic connectivity remains within the sloughs of Everglades National Park. (**Figure EV-5**). Comparing current WDAT water depths to the depth one month ago, stages are significantly deeper across South Florida. Looking back one year, the EPA is deeper, significantly so in BCNP and to the east and west of Shark River Slough in ENP. (**Figure EV-6**). Comparing current depths to the past 20 years, WCA-3A North is now above the 50th percentile but in the east water depths are still likely below ground. BCNP and ENP are around the 90th percentile. The typically flooded area in eastern WCA-3A South is now approaching the 50th percentile. (**Figure EV-7**).

Taylor Slough and Florida Bay

Taylor Slough received just under 3 inches of rain in the past week. Following last weekend's tropical activity and some additional precipitation over this past week, stages in Taylor Slough continued to increase, with an average increase of 0.153 feet (**Figure EV-8 and Figure EV-9**). Individual stage gauge changes ranged from -0.303 to +0.552 feet at Taylor Slough Bridge in the northern Slough area. The Slough is now 16.2 inches higher than its historical average for this time of year (pre-Florida Bay initiative which started in 2017). Conditions are highly favorable for moving water downstream through the Slough this year as the rains continue.

Salinities in Florida Bay continued to decline, with an average decrease of nearly 7 over the week ending 6/12. Individual station changes ranged from -14.4 to -0.60 (**Figure EV-8**). The largest changes occurred in the northeastern and nearshore areas where salinities are highly influenced by inflows. All 3 regions of the bay continued to show a drop in salinity with all regions decreasing below the 25th percentile (**Figure EV-10**). However, on 6/13, average salinities in the western region increased to 33, moving back into the interquartile range. The Bay, as a whole, is about 8 lower than its historical average for this time of year.

Water Management Recommendations

Balancing inflows with outflows in WCA-2A in a way that moderates the recent ascension in that basin would have ecological benefit in particular to the area most recently impacted by wildfire. Distributing WCA-2A outflows both into the northern perimeter of WCA-3A and making use of the S-11s is ecologically better than using one or the other. Flows as long as possible into the northern WCA-3A that safely build depth in that sub-basin have an ecological benefit. When conditions allow, discharge via S-150 would benefit the downstream ecology as conditions remain dry in northeastern WCA-3A. Continued rain and freshwater flows to the Taylor Slough area have prolonged the hydroperiod there, if stage can be maintained it will help expedite deliveries to the south when the wet season begins. 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	3.25	+0.08
WCA-2A	3.27	+0.46
WCA-2B	2.18	+0.09
WCA-3A	3.07	+0.31
WCA-3B	3.33	+0.01
ENP	3.06	+0.23

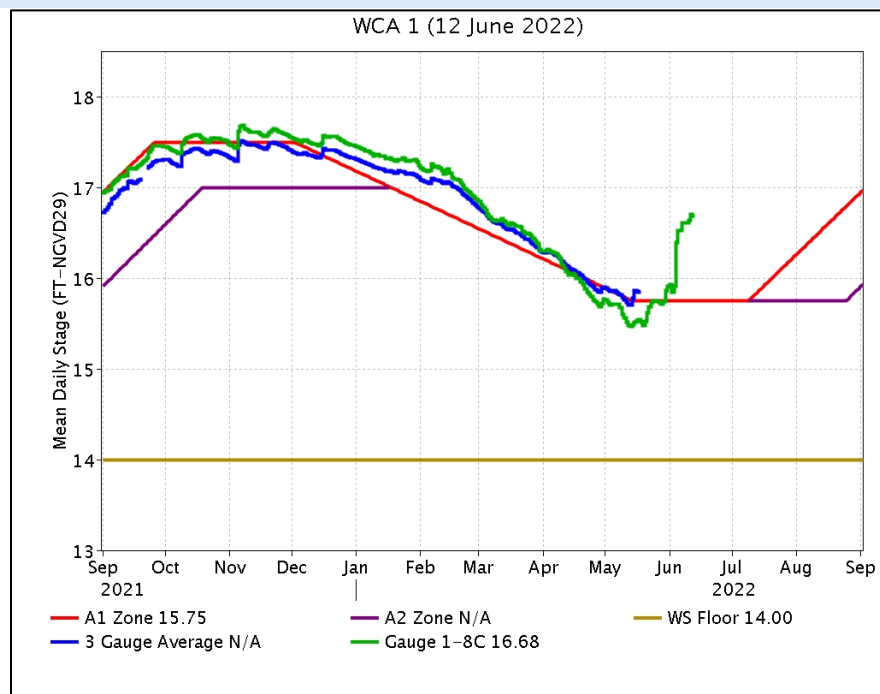


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

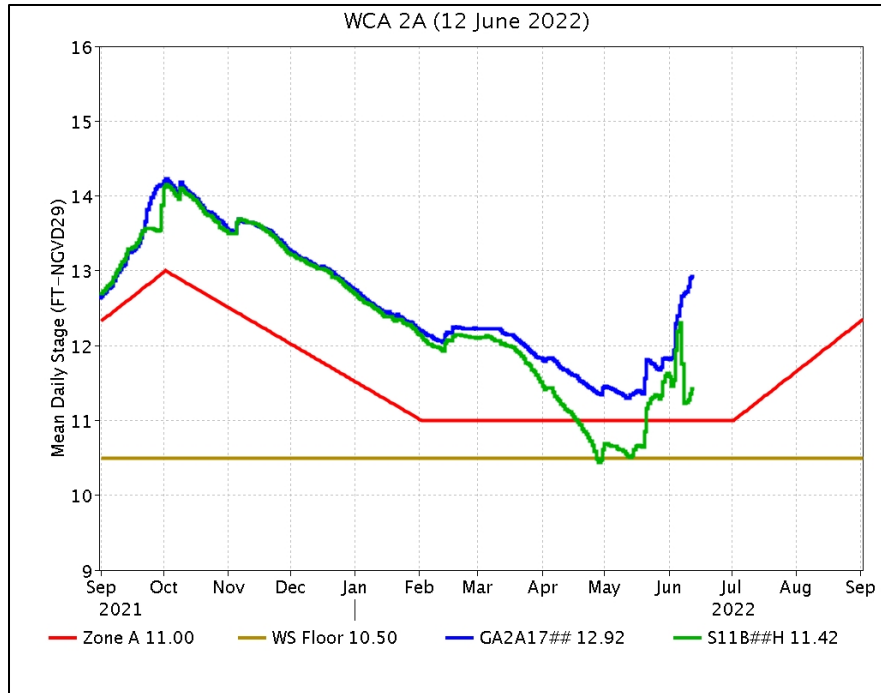


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

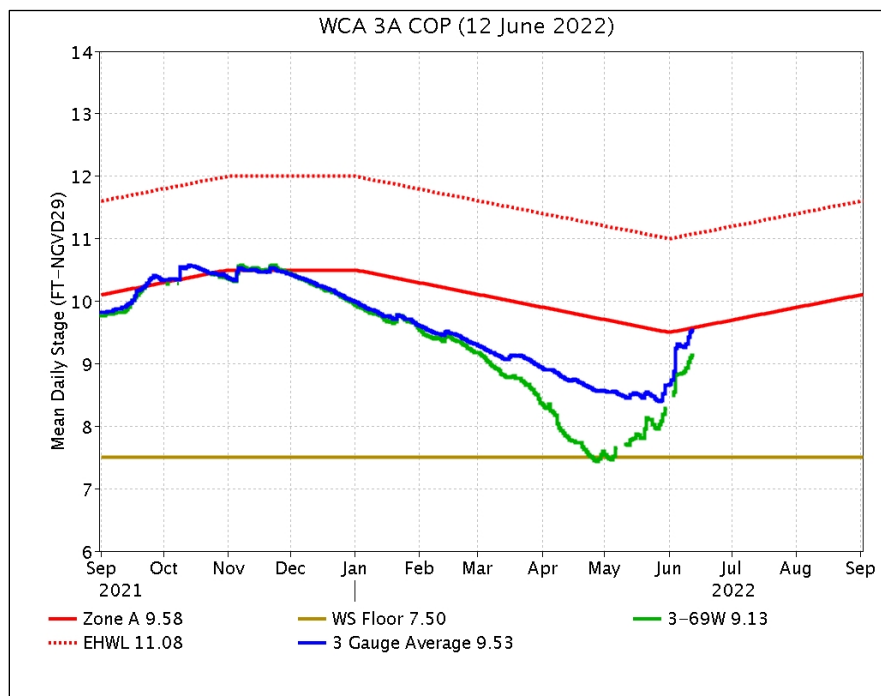


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

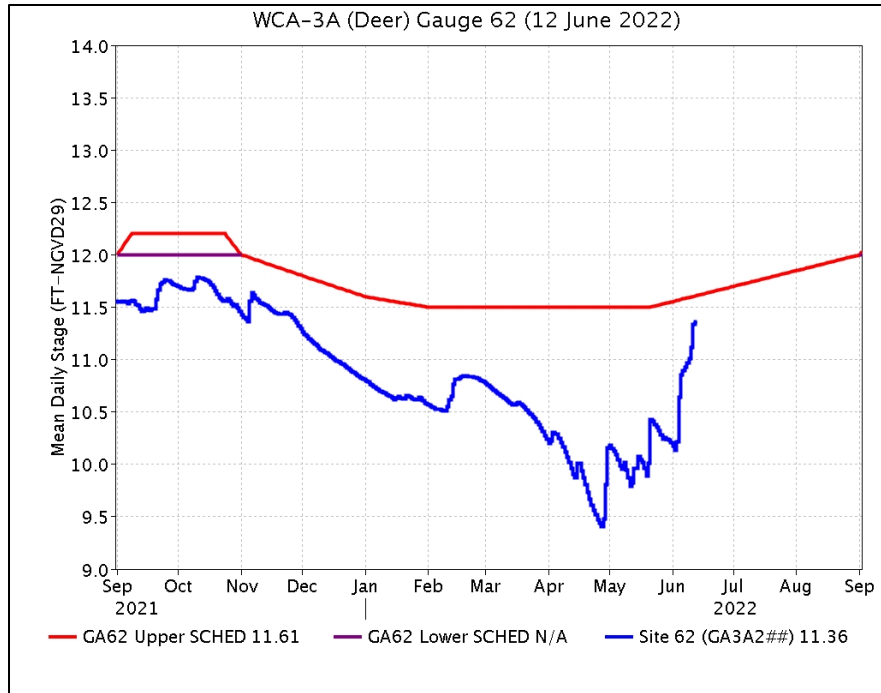


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

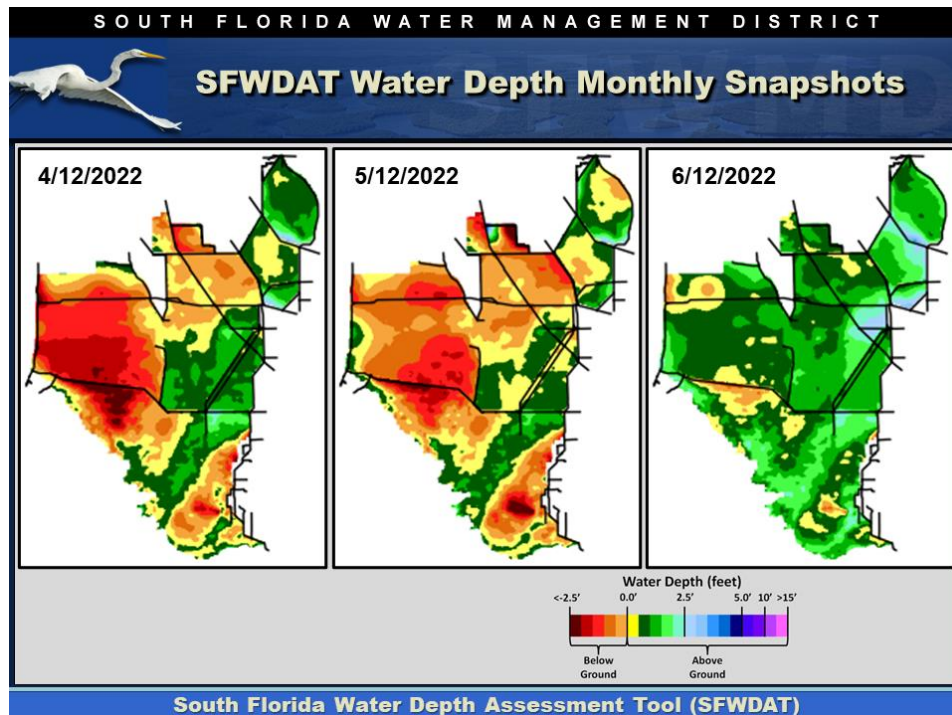


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

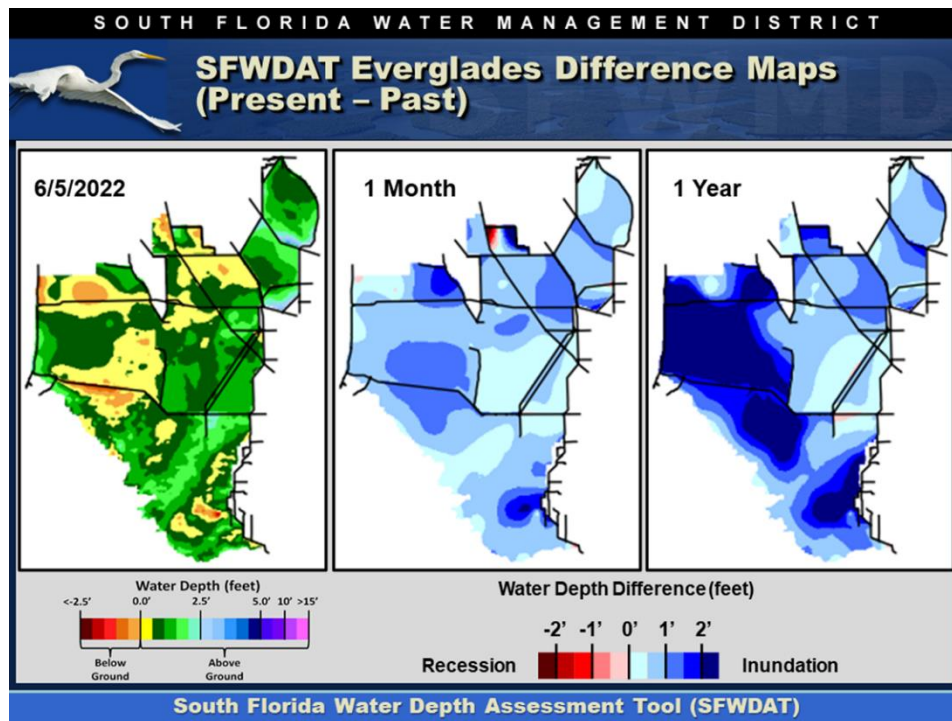


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

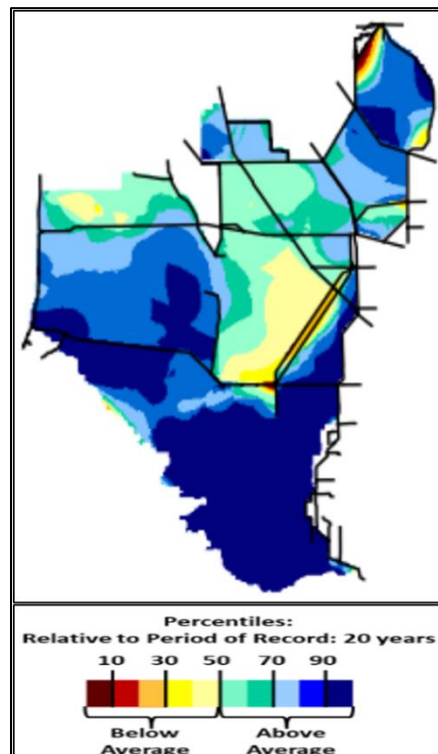


Figure EV-7. Present water depths (6/12/2022) compared to the day of year median over the previous 20 years.

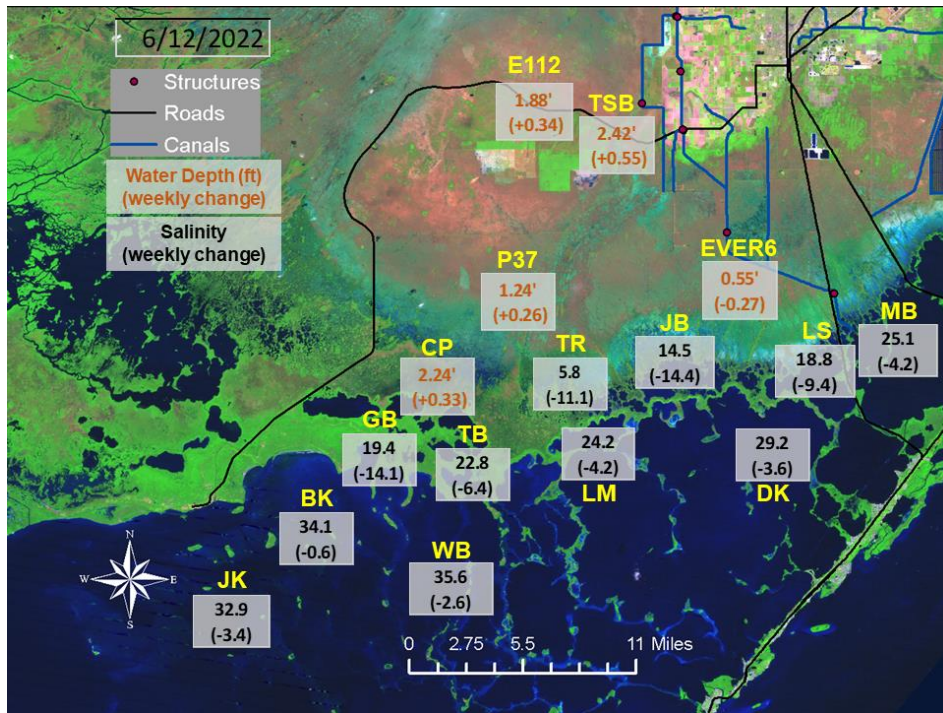


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

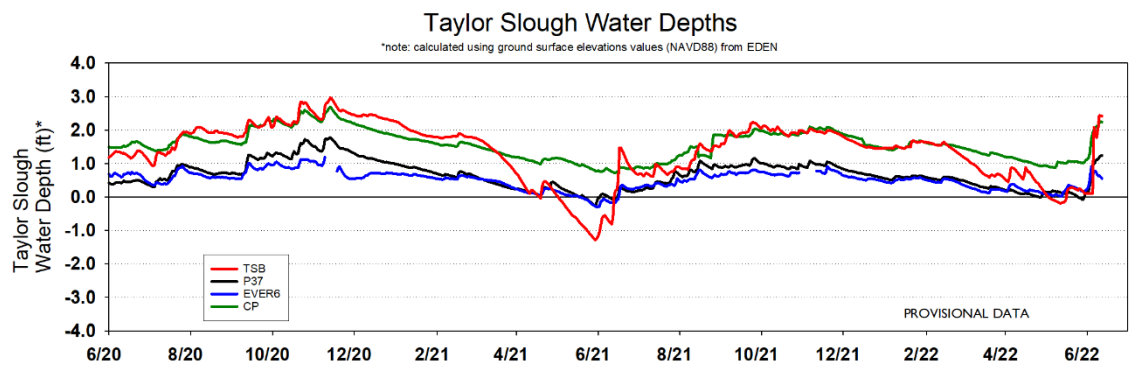


Figure EV-9. Taylor Slough water depth time series.

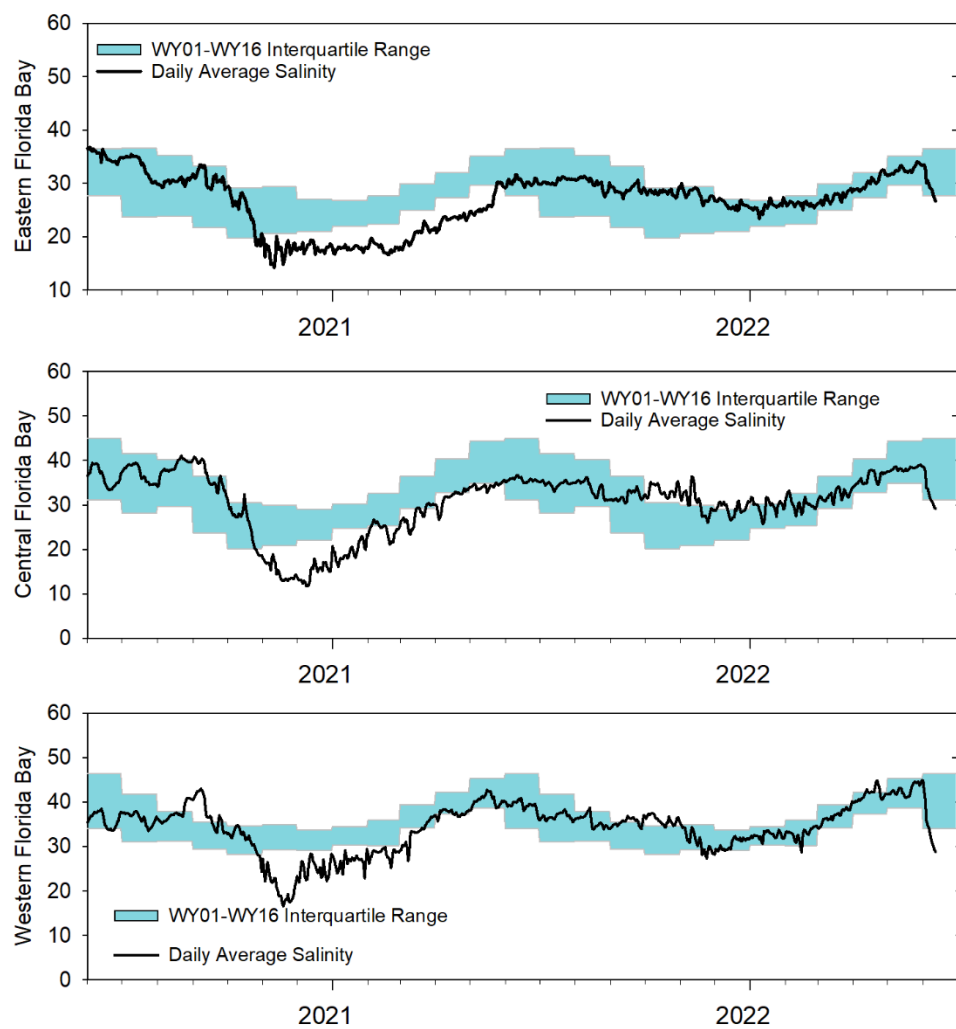


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, June 14, 2022 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.08'	Maintain an ascension of less than 0.5 feet per two weeks.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage increased by 0.46'	Moderate ascension to less than 0.5 feet per two weeks.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage increased by 0.09'	Maintain an ascension of less than 0.5 feet per two weeks.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage increased by 0.49'	Moderate ascension to less than 0.5 feet per two weeks. Conserve water in this basin, while letting the water move south when conditions allow.	Protect within basin peat soils, and downstream habitat and wildlife.
WCA-3A NW	Stage increased by 0.50'	Moderate ascension to less than 0.5 feet per two weeks. Conserve water in this basin letting the water move south when conditions allow.	
Central WCA-3A S	Stage increased by 0.08'	Maintain an ascension of less than 0.5 feet per two weeks, letting the water move south when conditions allow.	Protect within basin and downstream habitat and wildlife. Foraging and nesting wading birds.
Southern WCA-3A S	Stage increased by 0.17'		
WCA-3B	Stage increased by 0.01'	Maintain an ascension of less than 0.5 feet per two weeks in this basin, letting the water move south when conditions allow.	Protect within basin and downstream habitat and wildlife. Lower fire risk.
ENP-SRS	Stage changes ranged from -0.303' to +0.552'	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	Salinity changes ranged -14.4 to -0.60	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -12.0 to -1.8	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 5,193 cfs and the previous 30-day mean inflow was 2,013 cfs. The seven-day mean salinity was 20.5 at BBCW8 and 12.4 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Data provided by Biscayne National Park.

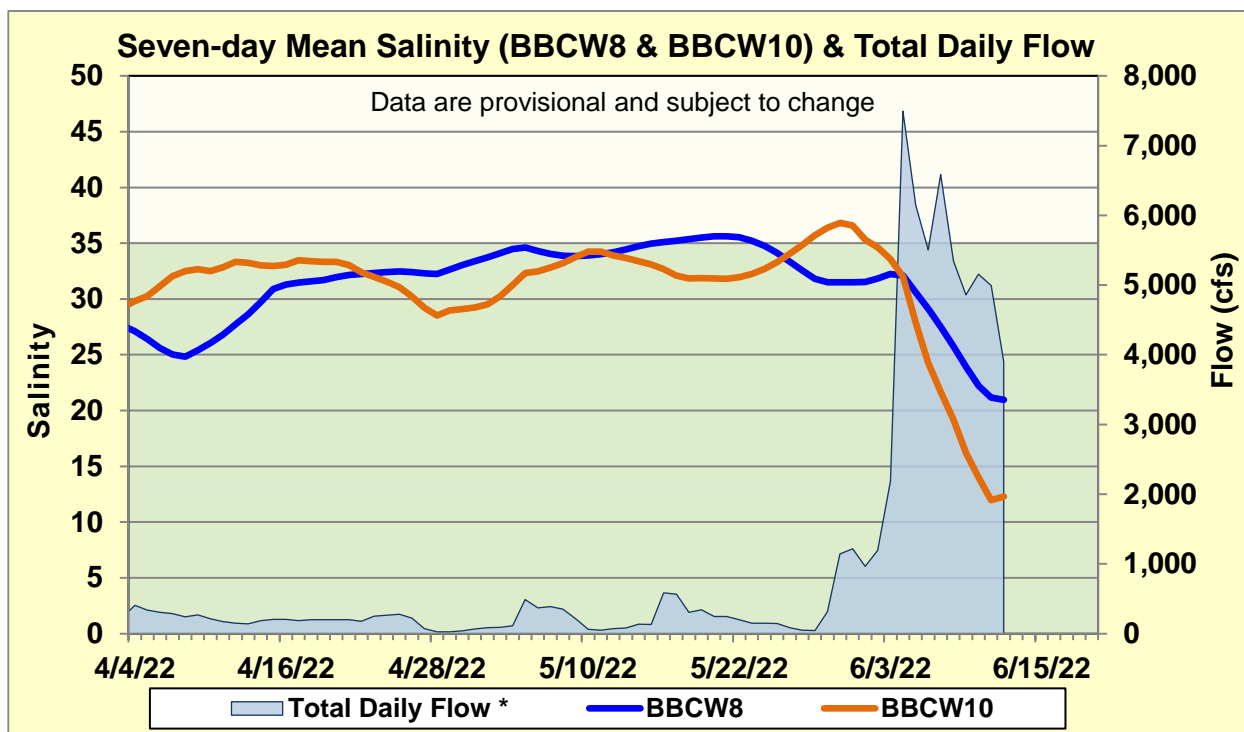


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.