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

M E M O R A N D U M

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

FROM: SFWMD Staff Environmental Advisory Team

DATE: May 25, 2022

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A Saharan Air Layer, with its dry air and warmer-than-average temperatures/lower instability will dominate across the SFWMD for several days resulting in greatly suppressed rainfall, except over the far west, where afternoon to early evening rains are possible. Widely scattered shower activity will affect the Florida Keys and the southeast coast of Florida, but little areal average rainfall is expected. On Thursday, a greater coverage of interior and western rains is anticipated, where some rains could be heavy and continue into the evening. A cold front will enter into north Florida by Friday morning resulting in an increased coverage of afternoon and evening rains over the interior and the northeastern to eastern half of the SFWMD. Over the weekend, total SFWMD rainfall will increase to above or well above the daily climatological average into early next week. The focus of afternoon-to-evening rains could be in the southeast or east, and then generally concentrate around and south of Lake Okeechobee. For the week ending next Tuesday morning, total SFWMD rainfall is predicted to be near the long-term average, but if the upper quartile of model runs verify, total rainfall could be much greater-than-average. For the week-2 period, a trough of low pressure across Florida and the Gulf of Mexico will combine with copious moisture from a tropical disturbance or developing tropical cyclone to potentially produce above- to much-above normal rainfall. However, forecast confidence in exactly how much rain would fall is low.

Kissimmee

Flow at S-59 and S-61 is being adjusted to keep East Toho and Toho on their respective recession lines. With stage in KCH declining, flow at S-65/S-65A is being reduced. Water depth on the Kissimmee River floodplain has decreased, with a mean depth of 0.42 feet as of May 22, 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 5.7 mg/L for the week ending on May 22, 2022.

Lake Okeechobee

Lake Okeechobee stage was 12.71 feet NGVD on May 22, 2022, with water levels 0.46 feet lower than a month ago (**Figure LO-1**). Lake stage remains in the Baseflow sub-band and has been within the ecological envelope for 20 weeks (**Figure LO-3**). Average daily inflows (excluding rainfall) decreased from the previous week, going from 1,369 cfs to 1,115 cfs. Average daily outflows (excluding evapotranspiration) decreased, going from 4,087 cfs to 2,083 cfs. The mid-May 2022 snail kite nesting survey revealed a total of 44 nests thus far, including 11 successes and 28 failures. Nests have also been recorded on Lake Hicpochee impoundments (26 nests; 12 active) and the C-44 canal impoundments (13 nests; 10 active). The most recent satellite image (May 18, 2022) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor showed high bloom potential in Fisheating Bay, and the NW and NE nearshore regions (**Figure LO-6**). The May 16-18, 2022 routine water quality monitoring survey on the Lake revealed that 63% of the sites had concentrations of total microcystins below detection level. The highest concentration (0.4 µg/L) was recorded at CLV10A. The number of sites with total microcystins above detection limit increased by 31% since last survey, but all concentrations remain below the EPA recreational standards (8 µg/L). Approximately 72% of the sites had mixed phytoplankton communities and 19% of the sites had communities dominated by *Microcystis aeruginosa*. The number of sites with phytoplankton communities dominated by *M. aeruginosa* decreased by 6% since last early May.

Estuaries

Total inflow to the St. Lucie Estuary averaged 329 cfs over the past week with no flow coming from Lake Okeechobee. Mean surface salinities remained similar at HR and US1 and decreased at A1A. Salinity in the middle estuary was just within the stressed range (10-25) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 1,035 cfs over the past week with 648 cfs coming from the Lake. Mean surface salinities remained the same at S-79 and Val I-75, increased at the remaining 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 Cape Coral and in the stressed range at Shell Point and Sanibel.

Stormwater Treatment Areas

For the week ending Sunday, May 22, 2022, approximately 700 ac-ft of 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 11,200 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 31,000 ac-feet. Most STA cells are above or near target stage, except STA-5/6 cells that are drying out. 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 place in STA-1E Central Flow-way, STA-1W Eastern and Northern Flow-ways, STA-2 Flow-way 3, and STA-3/4 Central Flow-way for nesting by Migratory Bird Treaty Act protected species. 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, as well as STA-2 Flow-way 1 following dryout conditions. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2 and STA-3/4.

Everglades

Many regions of the Everglades experienced a reversal in stage last week, favorable in WCA-3A North but in areas where wading birds are foraging/nesting this could cause nest abandonment. A 20,000+ acre Rx burn was successfully conducted within WCA-1. FWC rescinded restrictions on public access to WCA-3A North. Expectations for wading bird nesting success remain low. CSSS subpopulation regions remain within the % dry targets but are lagging in consecutive dry nesting days. Stages increased in Taylor slough last week and remain above average. Salinities also increased on average in Florida Bay last week, but conditions are ideal to move water south once the wet season begins in earnest.

Biscayne Bay

Total inflow to Biscayne Bay averaged 375 cfs and the previous 30-day mean inflow averaged 216 cfs. The seven-day mean salinity was 35.2 at BBCW8 and 32.2 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 May 22, 2022, lake stages were 55.2 feet NGVD (0.2 feet below schedule) in East Lake Toho, 52.2 feet NGVD (0.2 feet below schedule) in Lake Toho, and 48.8 feet NGVD (0.5 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1**, **Figures KB-1-3**). All lakes are near their annual low pool points of the regulation schedules, which occur at the end of the dry season (May 31).

Lower Kissimmee

Discharges to the Kissimmee River on May 22, 2022 were 970 cfs at S-65 and 840 cfs at S-65A; discharges from the Kissimmee River were 1,010 cfs at S-65D and 950 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 May 22, 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 5.7 mg/L for the week ending on May 22, 2022 (**Table KB-2**, **Figure KB-4**). Water depth on the Kissimmee River floodplain has decreased with a mean depth of 0.42 feet as of May 22, 2022 (**Figure KB-5**).

Water Management Recommendations

Continue following the stage recession lines in Lakes East Toho and Toho. In KCH, continue the slow rampdown in flow at S-65/S-65A.

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)	
							5/22/22	*5/15/22*
Lakes Hart and Mary Jane	S-62	LKMJ	14	59.6	R	59.7	-0.1	-0.2
Lakes Myrtle, Preston and Joel	S-57	S-57	5	60.1	R	60.1	0.0	0.0
Alligator Chain	S-60	ALLI	106	62.2	R	62.3	-0.1	0.0
Lake Gentry	S-63	LKGT	156	59.8	R	59.8	0.0	0.0
East Lake Toho	S-59	TOHOE	201	55.2	R	55.4	-0.2	-0.3
Lake Toho	S-61	TOHOW S-61	756	52.2	R	52.4	-0.2	-0.3
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	967	48.8	R	49.3	-0.5	-0.6

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

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

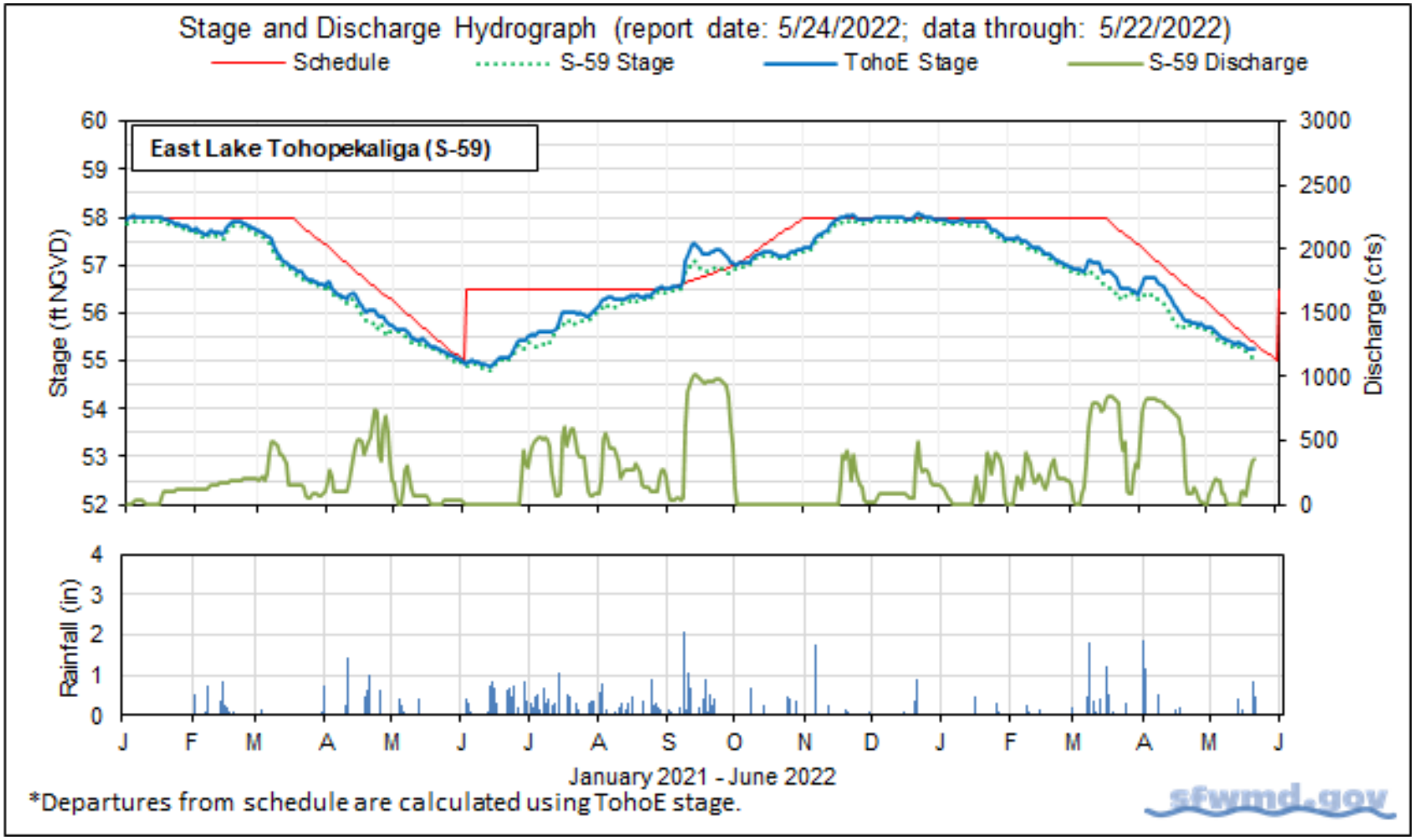


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

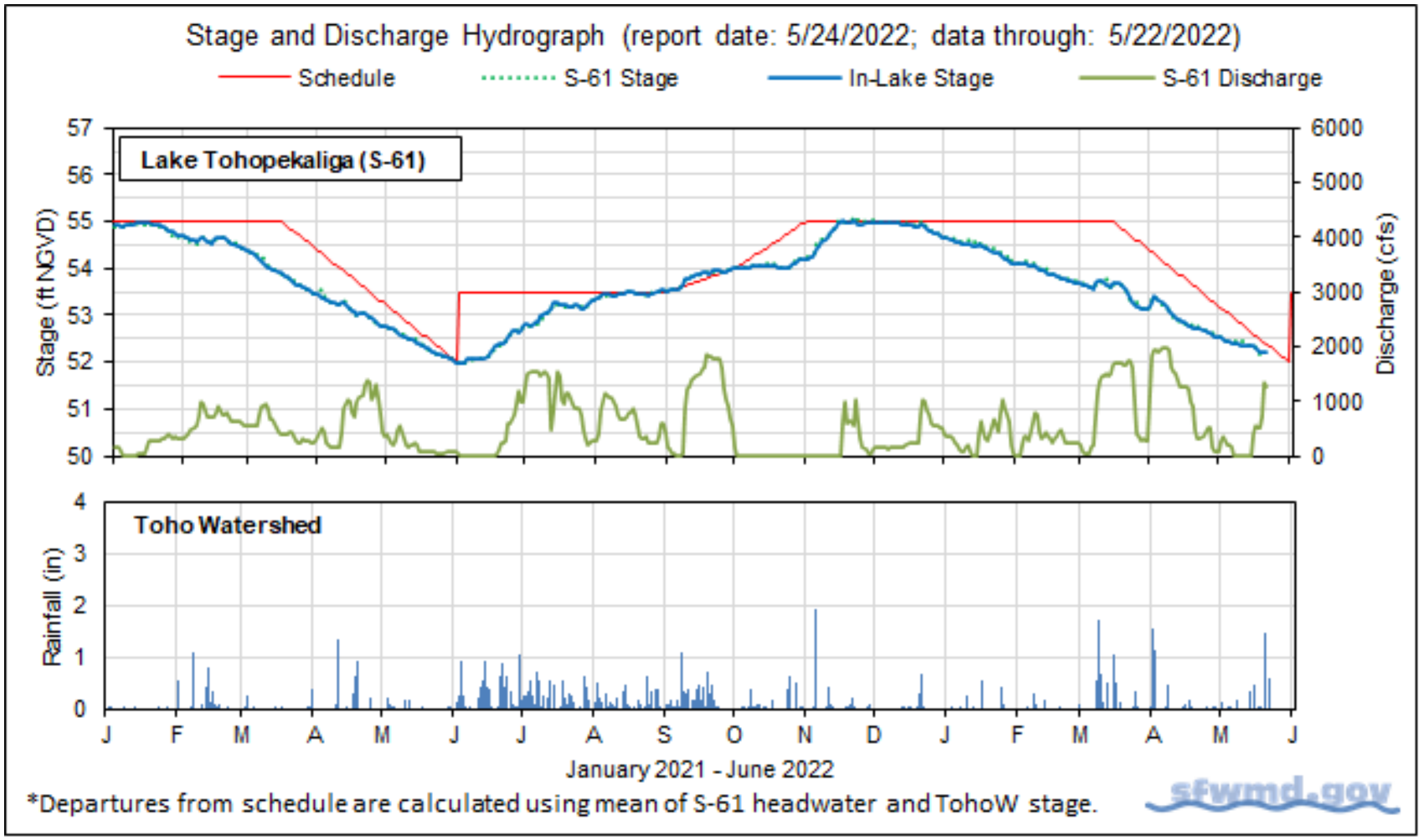


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

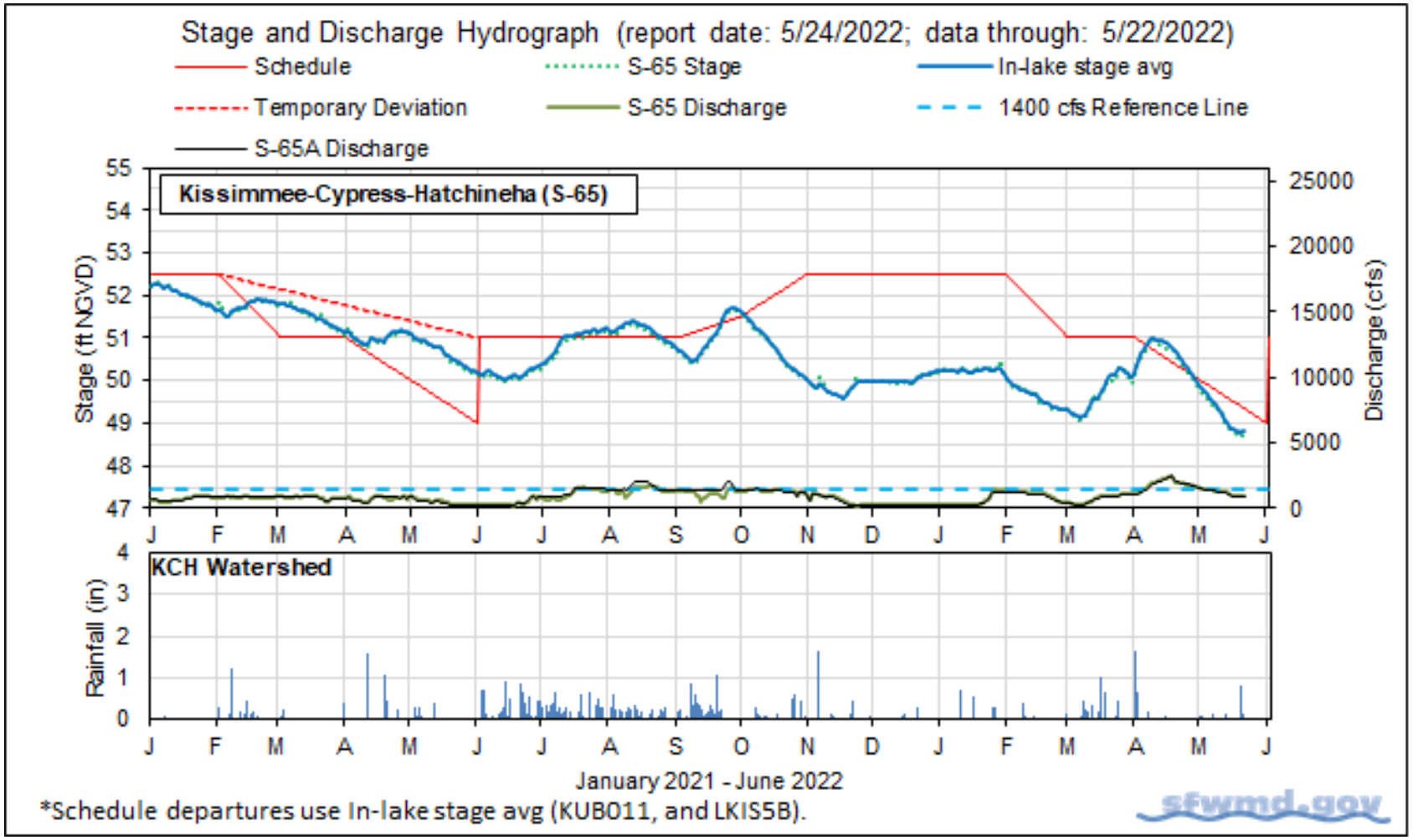


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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

Metric	Location	Daily Average	Average for Previous Seven Day Periods			
		5/22/22	5/22/22	5/15/22	5/8/22	5/1/22
Discharge	S-65	970	970	1,300	1,460	1,750
Discharge	S-65A[a]	840	850	1,200	1,400	1,720
Headwater Stage (feet NGVD)	S-65A	46.3	46.2	46.2	46.2	46.2
Discharge	S-65D[b]	1,010	1,240	1,540	1,770	1,820
Headwater Stage (feet NGVD)	S-65D[c]	26.9	26.9	27.1	27.1	27.1
Discharge (cfs)	S-65E[d]	950	1,100	1,360	1,570	1,630
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) [e]	Phase I, II/III river channel	6.2	5.7	4.9	3.6	3.2
Mean depth (feet) [f]	Phase I floodplain	0.42	0.48	0.68	0.85	0.97

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).

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

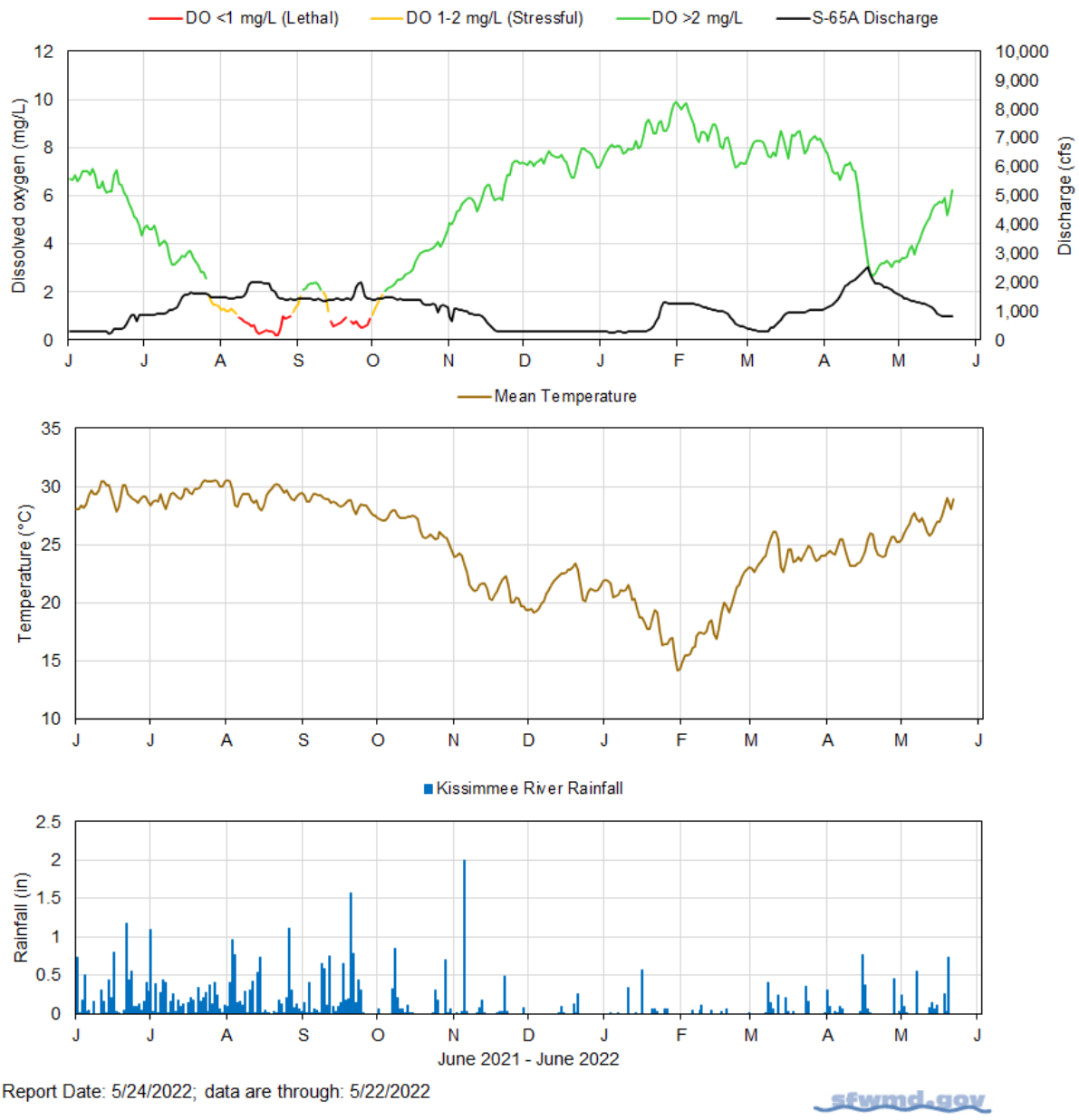


Figure KB-4. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRBN, PC33, PD62R, and PD42R with an average of four stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

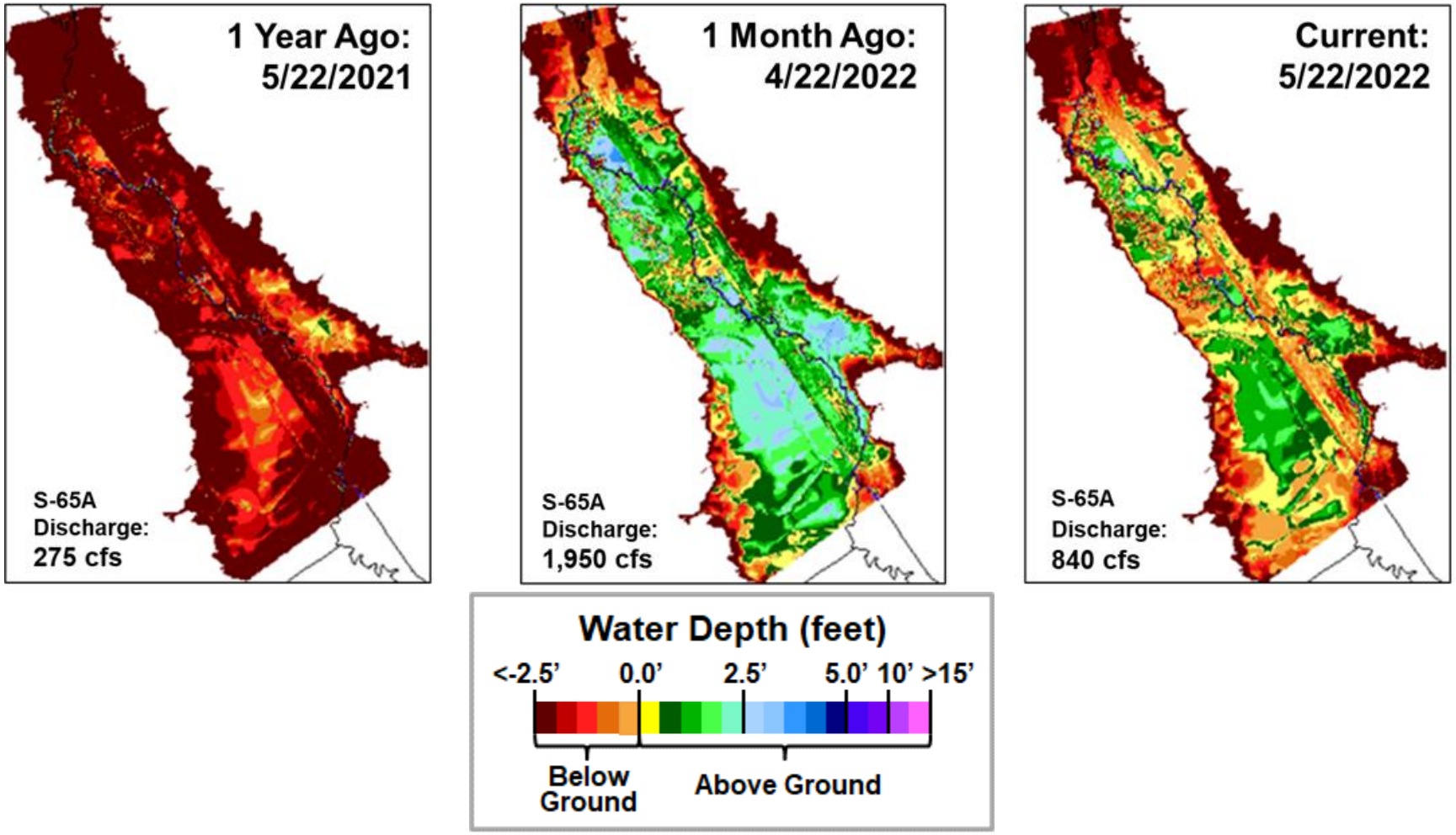


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

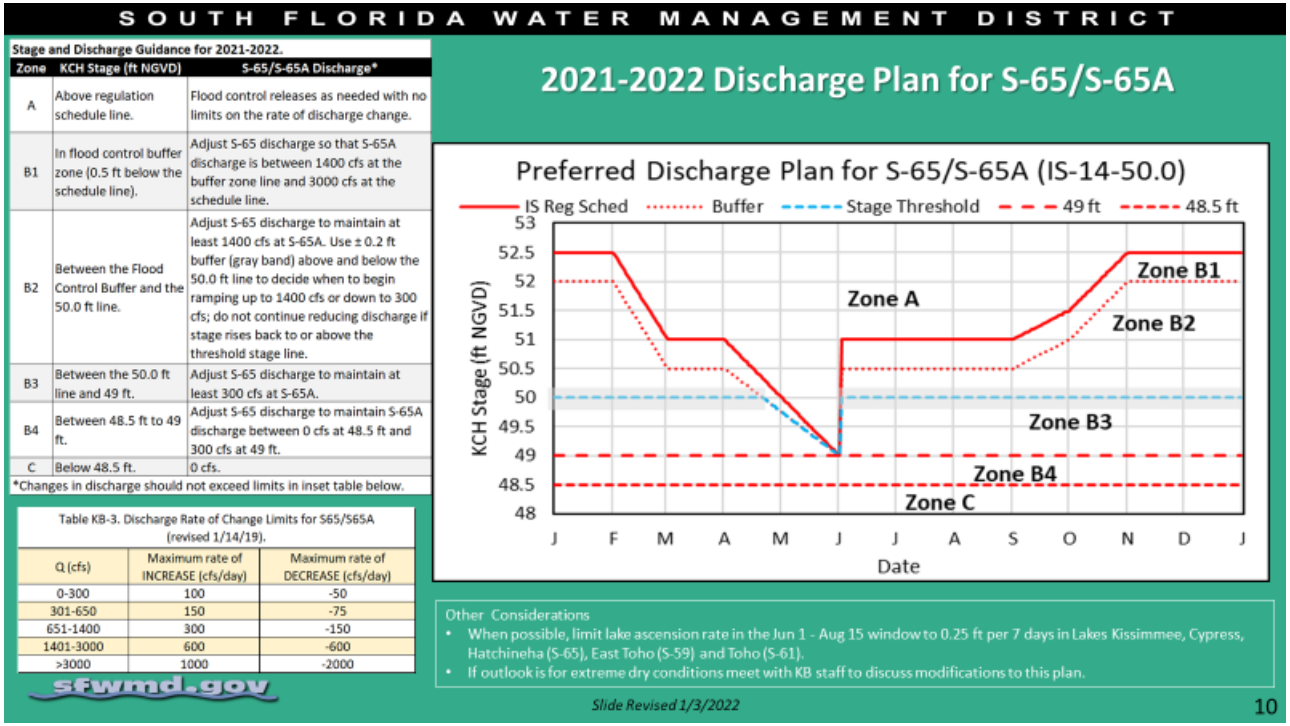


Figure KB-6. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

Lake Okeechobee

Lake Okeechobee stage was 12.71 feet NGVD on May 22, 2022, with water levels 0.46 feet lower than a month ago (**Figure LO-1**). Lake stage remains in the Baseflow sub-band (**Figure LO-2**) and has been within the ecological envelope for 20 weeks (**Figure LO-3**). According to NEXRAD, 1.09 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 1,369 cfs to 1,115 cfs. Average daily outflows (excluding evapotranspiration) decreased, going from 4,087 cfs to 2,083 cfs. Highest inflows came from the Kissimmee River through the S-65E structure (1,100 cfs). The outflow to the west via the S-77 structure into the C-43 Canal was 936 cfs and outflows south via the S-350 structures totaled 297 cfs. Flows east were 743 cfs via the S-308 structure into the C-44 Canal. Outflow via the S-271 was 106 cfs last week. **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 mid-May 2022 snail kite nesting survey revealed a total of 44 nests thus far, including 11 successes and 28 failures. Nests have also been recorded on Lake Hicpochee impoundments (26 nests; 12 active) and the C-44 canal impoundments (13 nests; 10 active).

The most recent satellite image (May 18, 2022) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor showed high bloom potential in Fisheating Bay, and the NW and NE nearshore regions (**Figure LO-6**). The May 16-18, 2022 routine water quality monitoring surveys on the Lake revealed that 63% of the sites had concentrations of total microcystins below detection level. The highest concentration (0.4 µg/L) was recorded at CLV10A. The number of sites with total microcystins above detection limit increased by 31% since last survey, but all concentrations remain below the EPA recreational standards (8 µg/L). Approximately 72% of the sites had mixed phytoplankton communities and 19% of the sites had communities dominated by *Microcystis aeruginosa*. The number of sites with phytoplankton communities dominated by *M. aeruginosa* decreased by 6% since last early May.

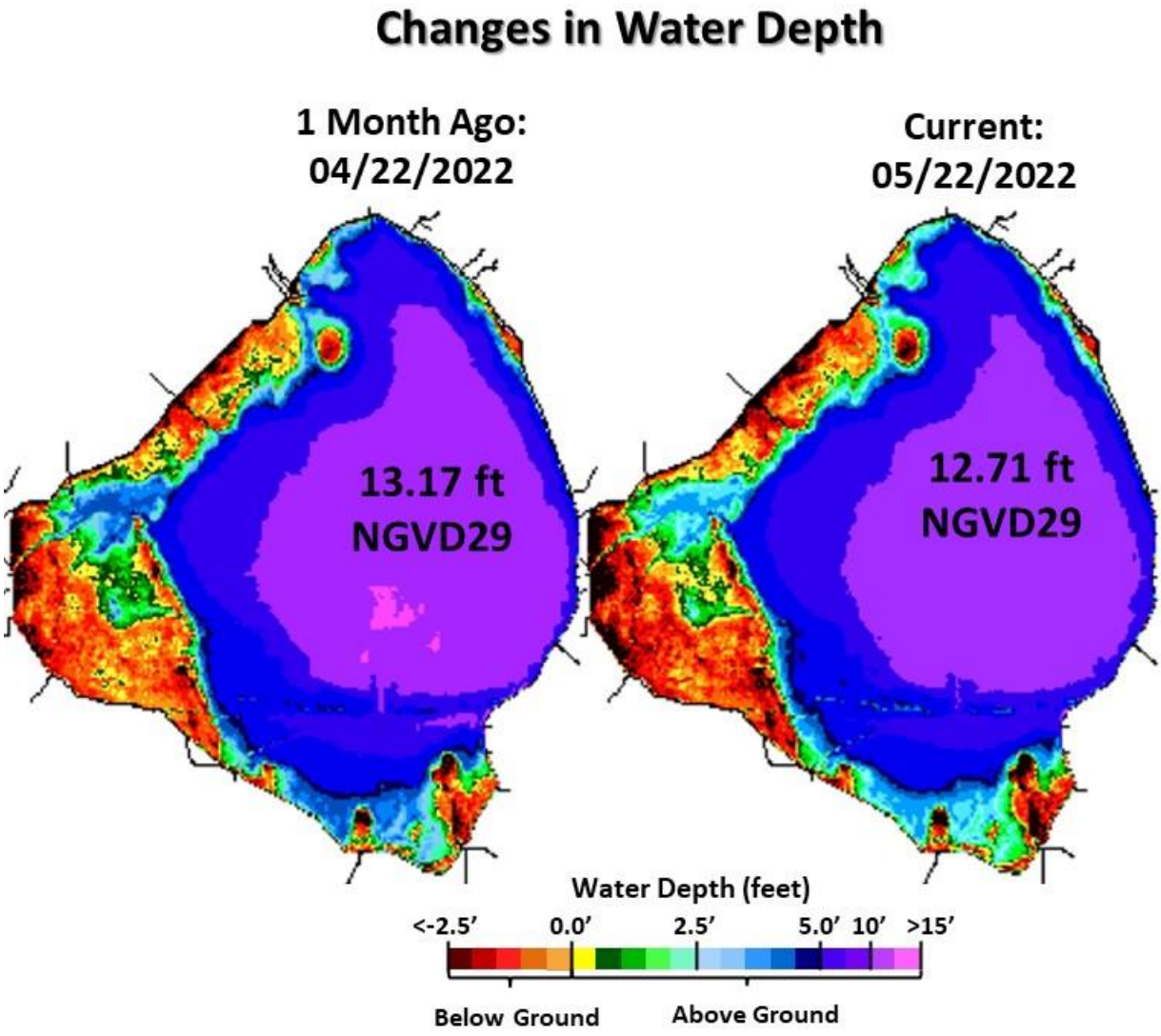


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

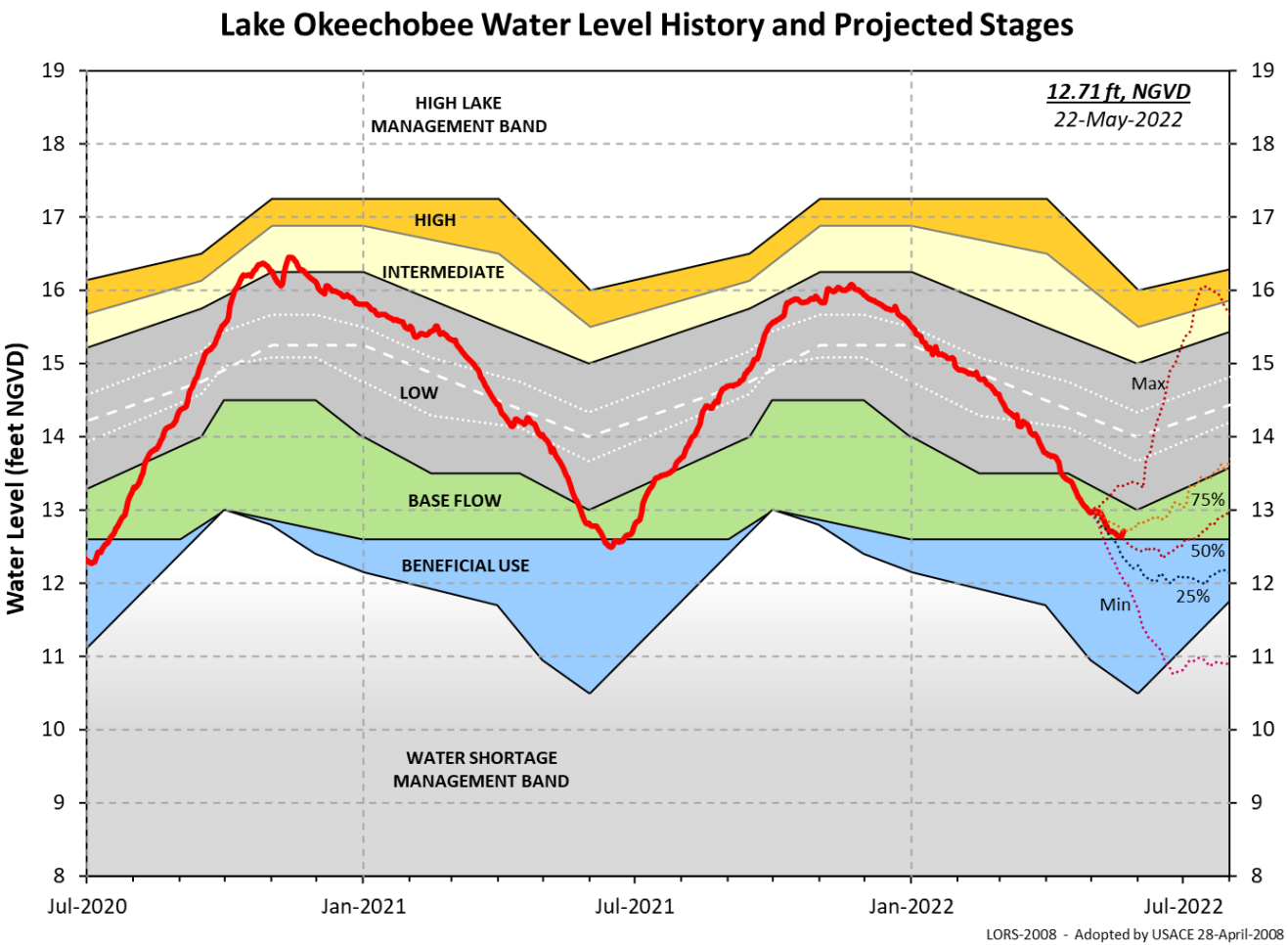


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

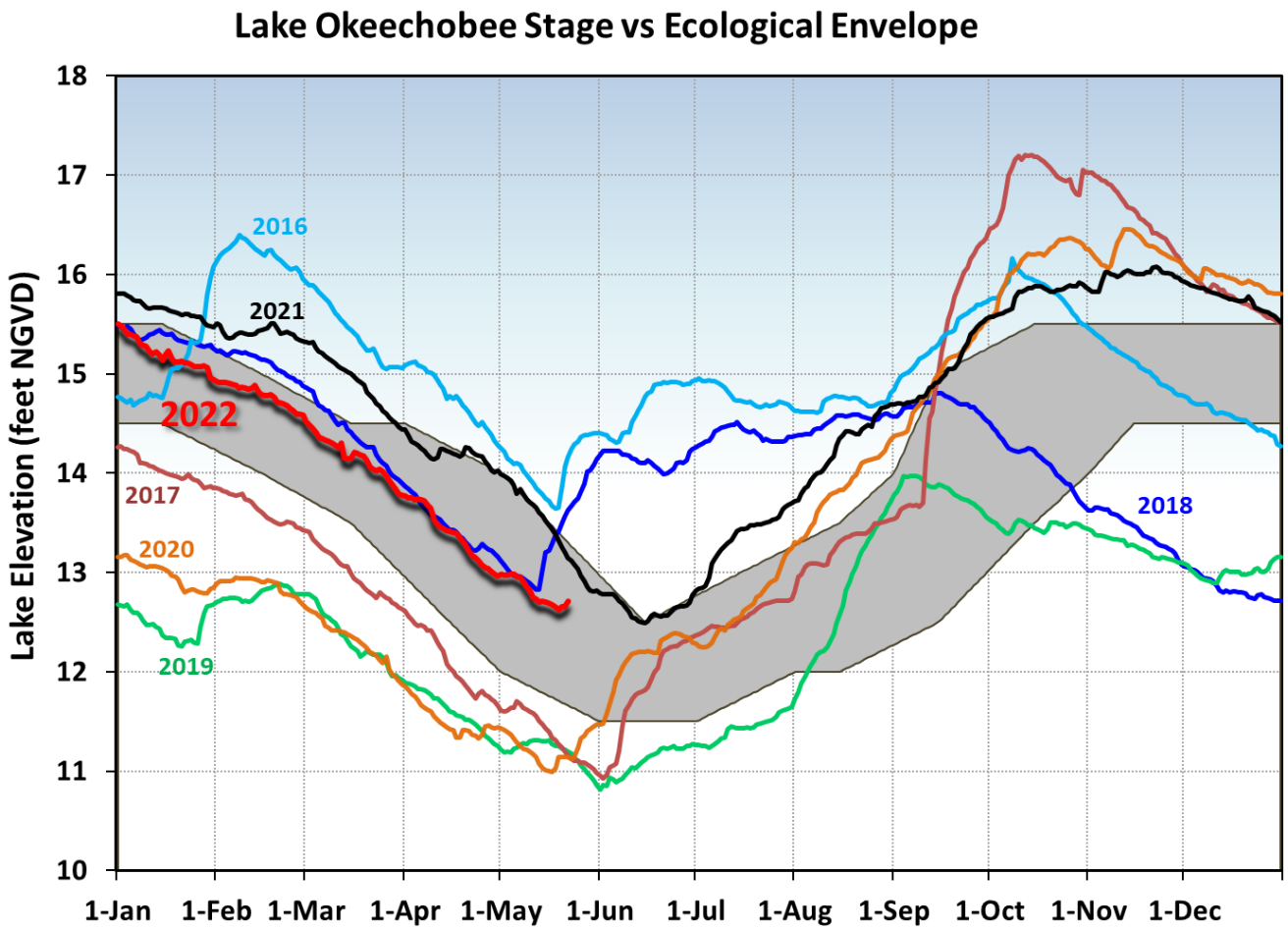


Figure LO-3. The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

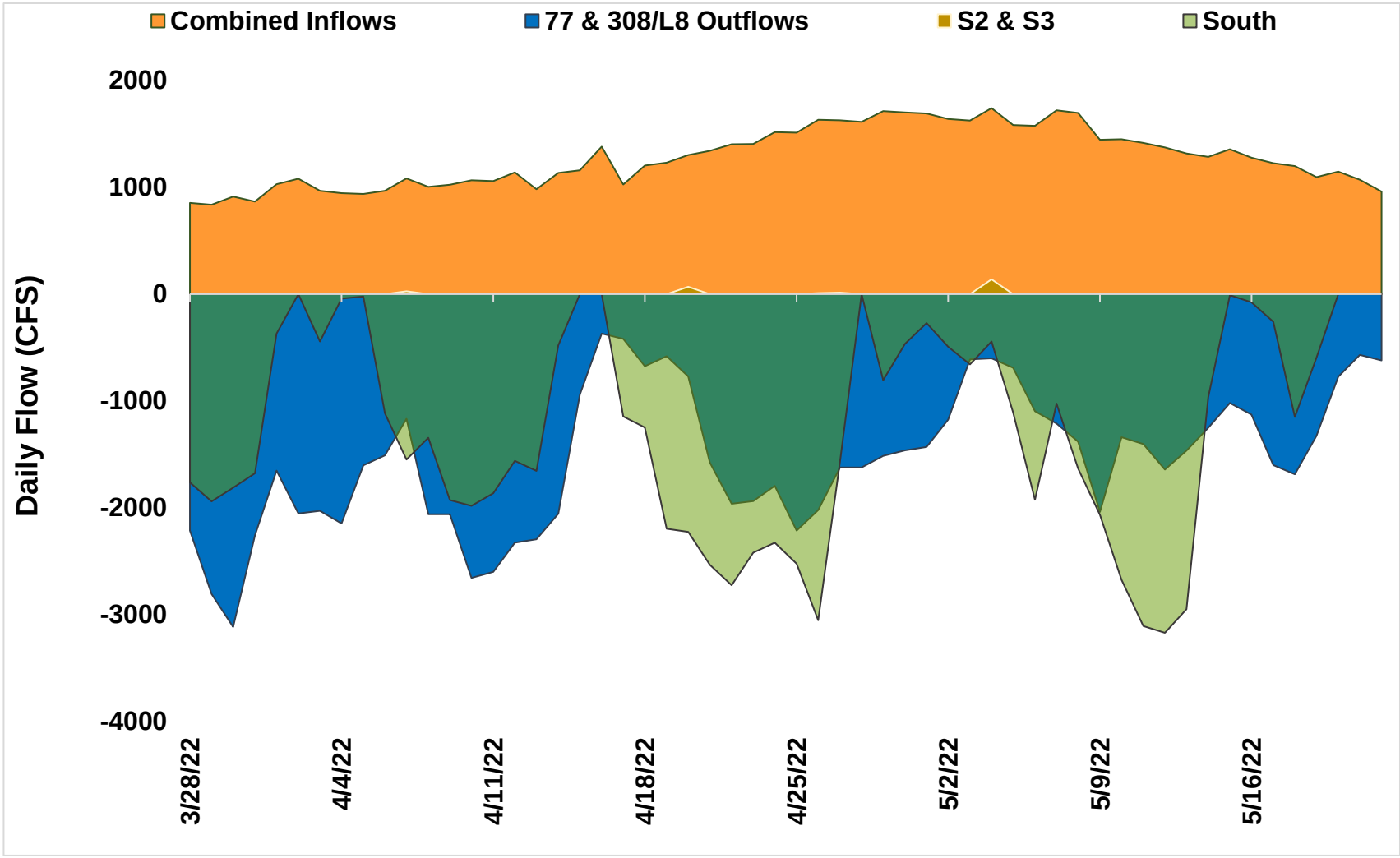


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

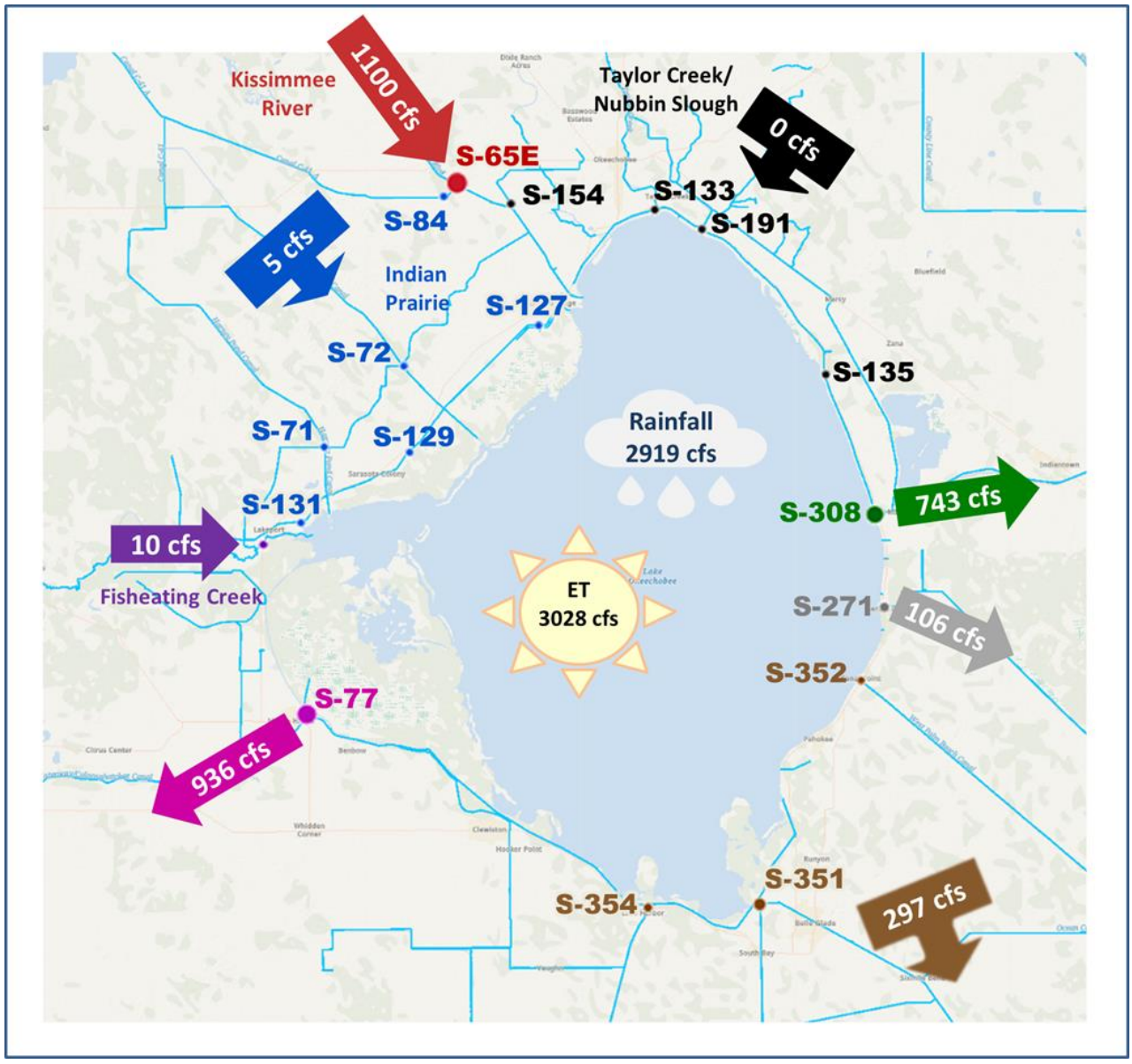


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of May 16-22, 2022.

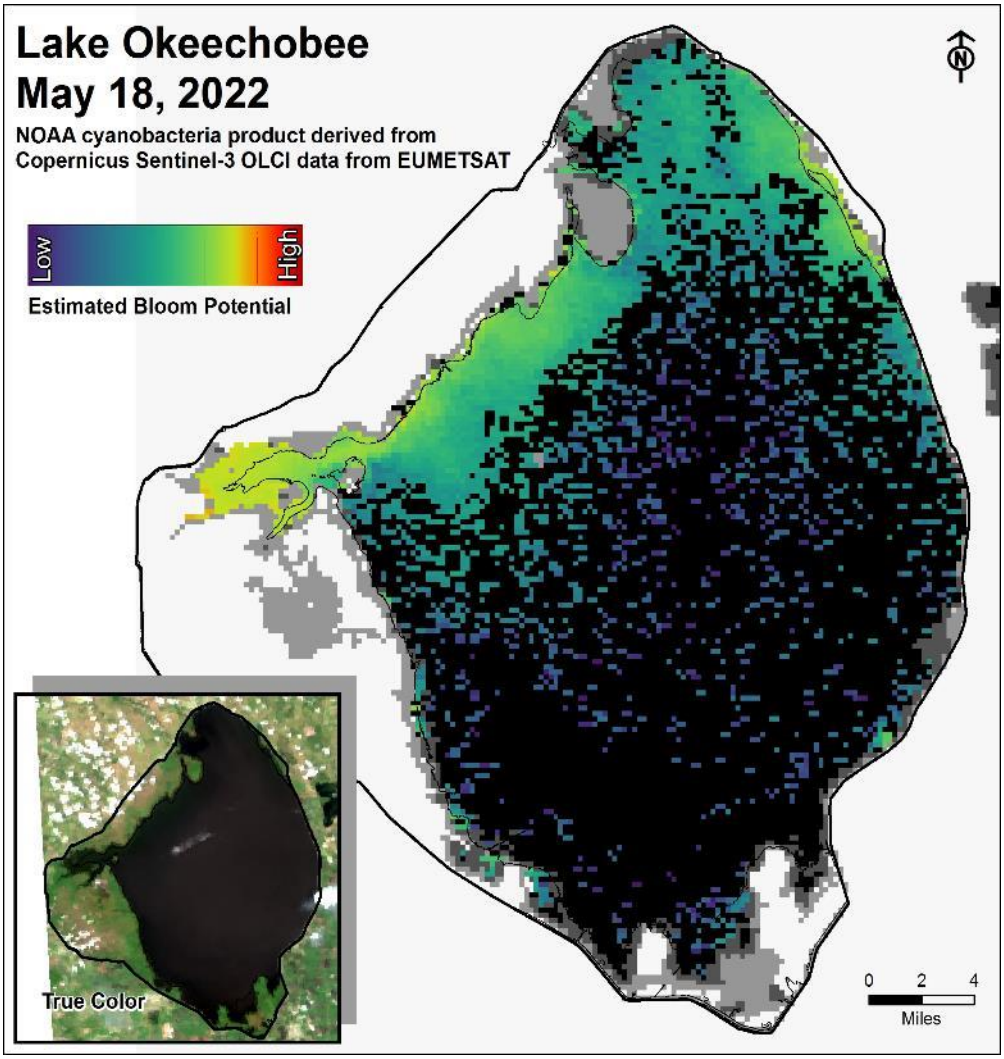


Figure LO-6. Cyanobacteria bloom potential on May 18, 2022 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 329 cfs (**Figures ES-1** and **ES-2**) and the previous 30-day mean inflow was 337 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, surface salinities remained similar at HR1 and US1 Bridge sites and decreased at the A1A Bridge site (**Table ES-1** and **Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 25.6. Salinity conditions in the middle estuary were within the stressed range for adult eastern oysters (**Figure ES-4**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute was 13.8 spat/shell for April and was higher than any recruitment rate reported in the past two years (**Figure ES-5**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 1,035 cfs (**Figures ES-6** and **ES-7**) and the previous 30-day mean inflow was 1,176 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, salinities remained the same at S-79 and Val I-75 and increased at the remaining sites in the estuary (**Table ES-2** and **Figures ES-8** and **ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were 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 1.2 spat/shell at Iona Cove in April. Recruitment rates remained low 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, 2013[1]) 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 steady releases at 2,000 cfs with estimated tidal basin inflows of 62 cfs. Model results from all scenarios predict daily salinity to be 5.4 or lower and the 30-day moving average surface salinity to be 2.0 or lower at Val I-75 at the end of the two-week period (**Table ES-3** and **Figure ES-13**). This keeps predicted salinities in the upper estuary within the optimal salinity range (0-10) for tape grass.

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

Red Tide

The Florida Fish and Wildlife Research Institute reported on May 20, 2022, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in any samples collected within the District region. On the east coast, red tide was not observed in samples from Palm Beach or Miami-Dade counties.

Water Management Recommendations

Lake stage is in the Base Flow Sub-Band. Tributary conditions are dry. 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.

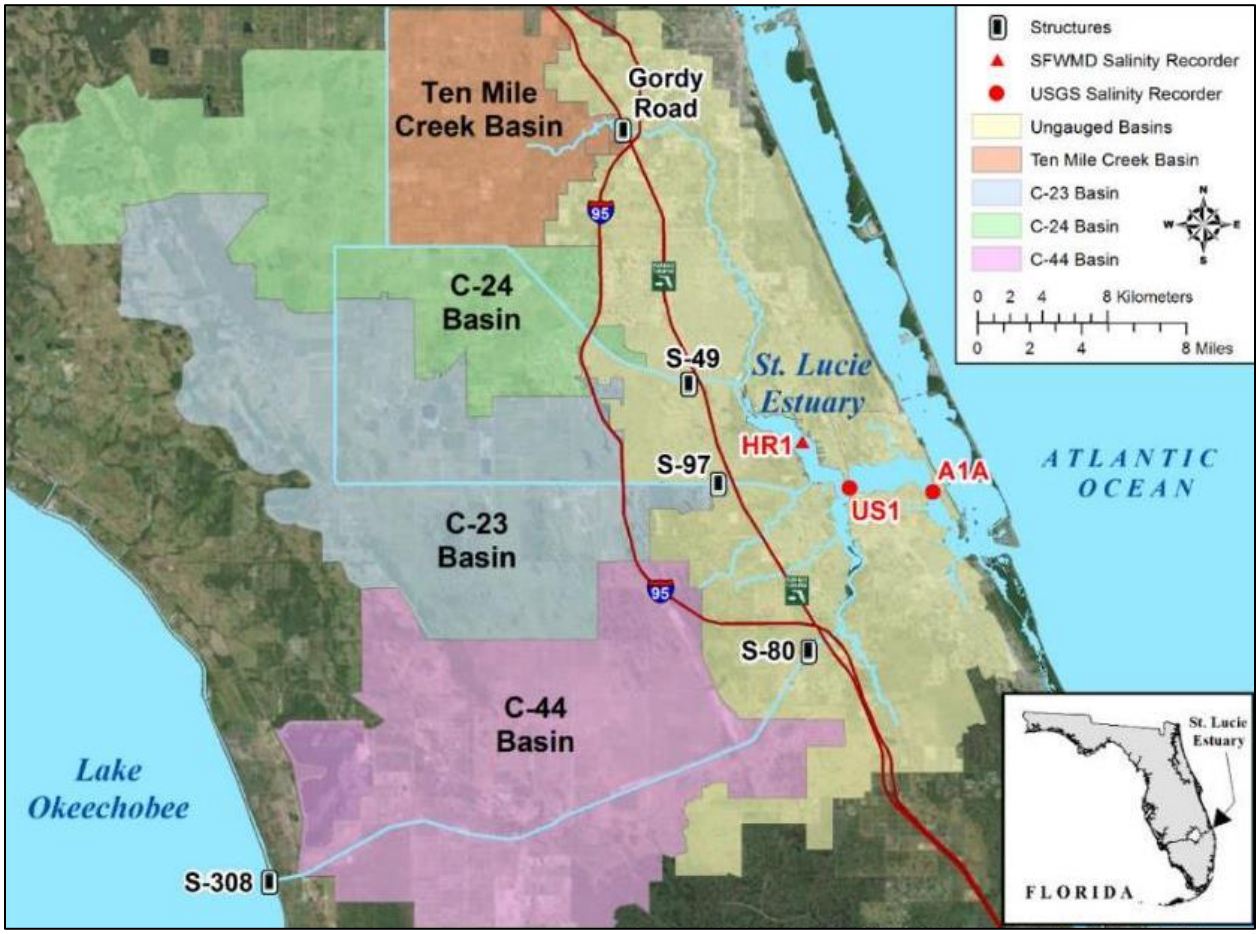


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

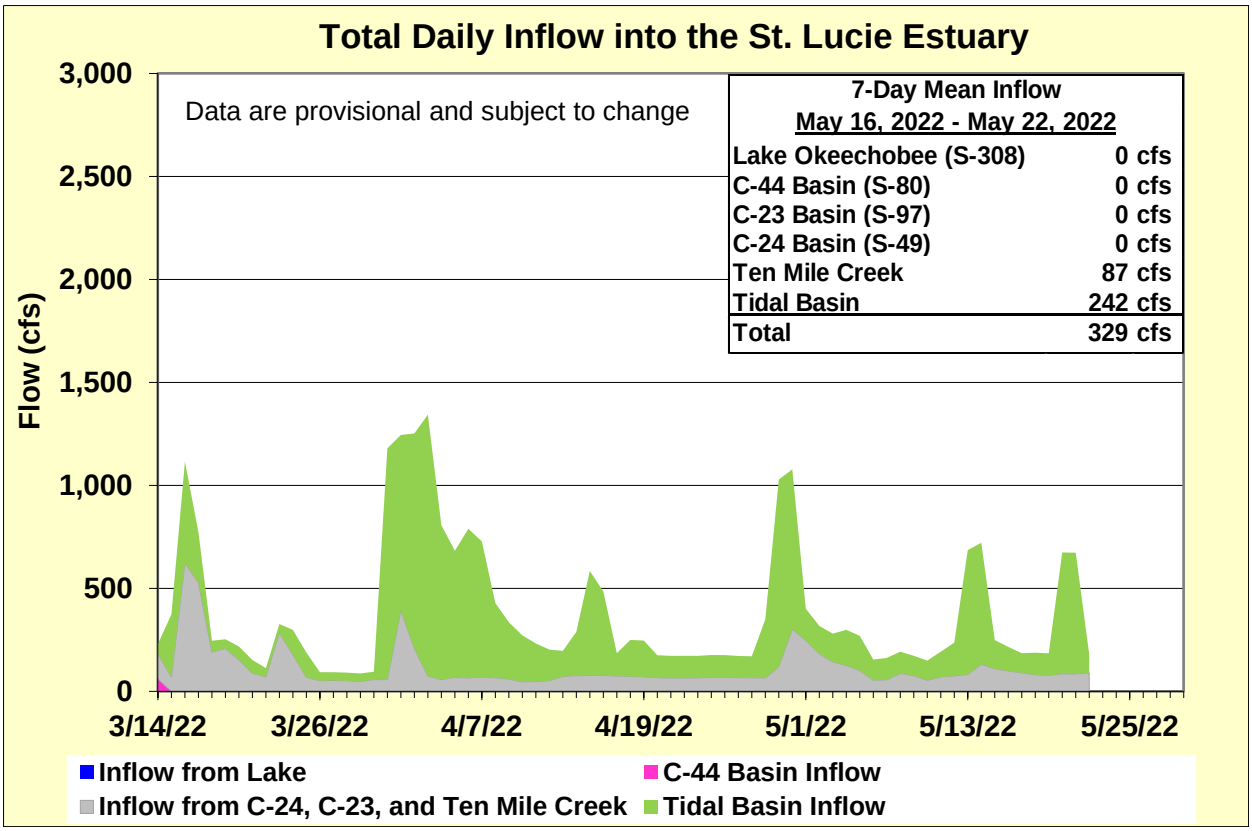


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	**21.9** (22.0)	**22.2** (21.2)	10.0 – 25.0
US1 Bridge	**25.4** (25.1)	**25.7** (26.4)	10.0 – 25.0
A1A Bridge	**30.6** (31.9)	**31.6** (32.1)	10.0 – 25.0

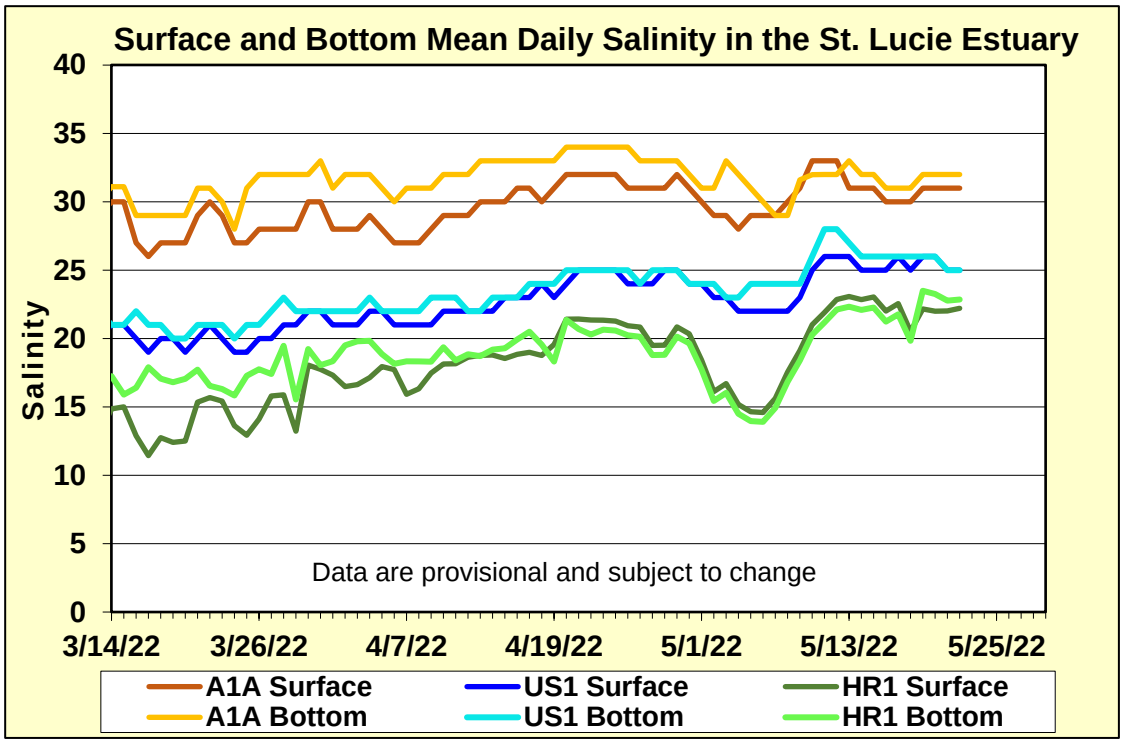


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

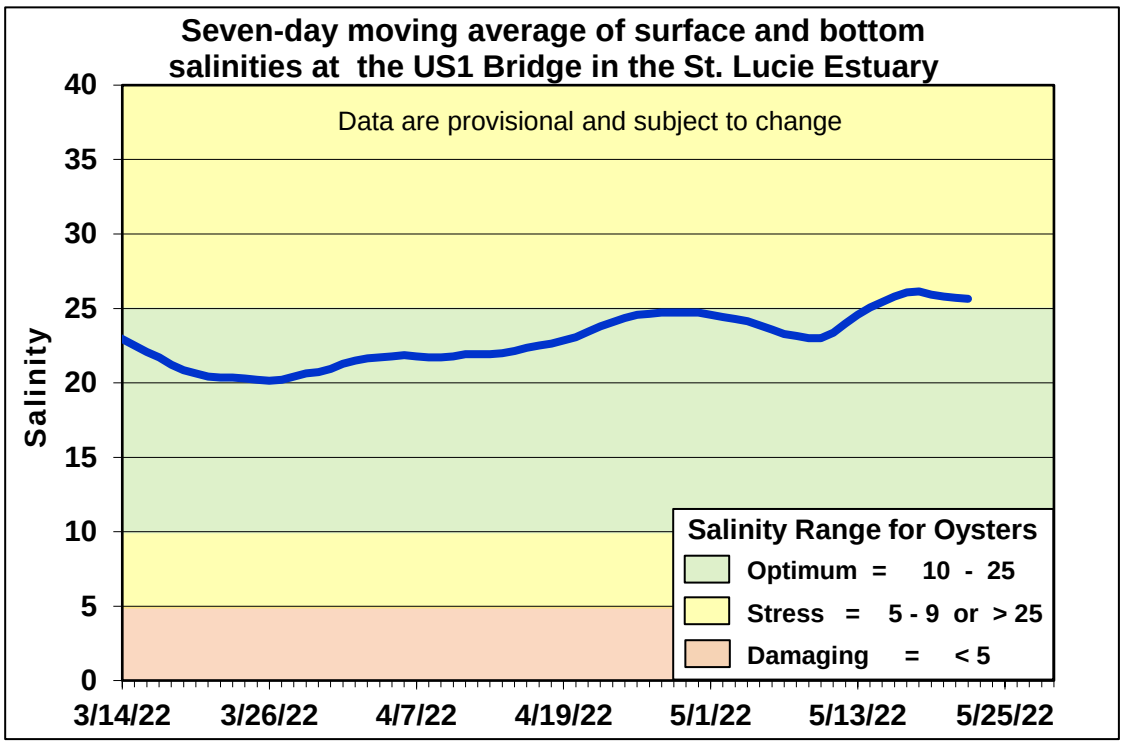


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

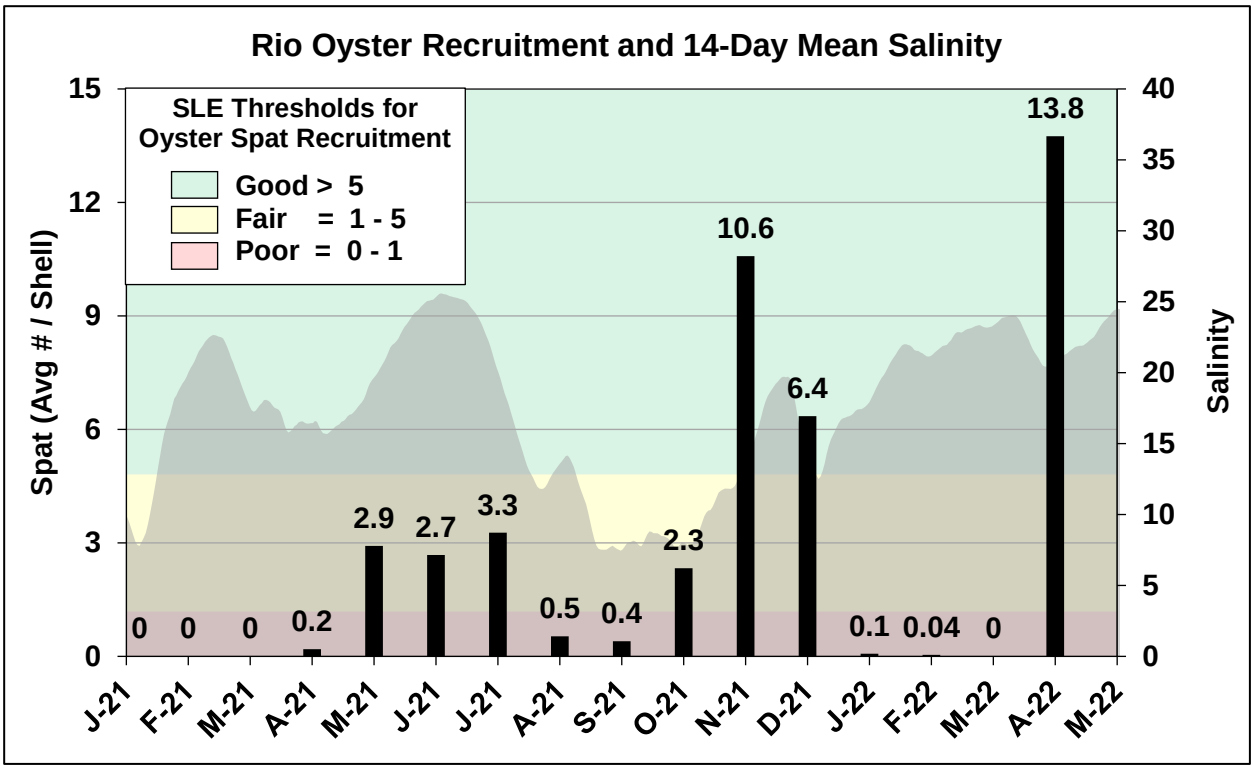


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

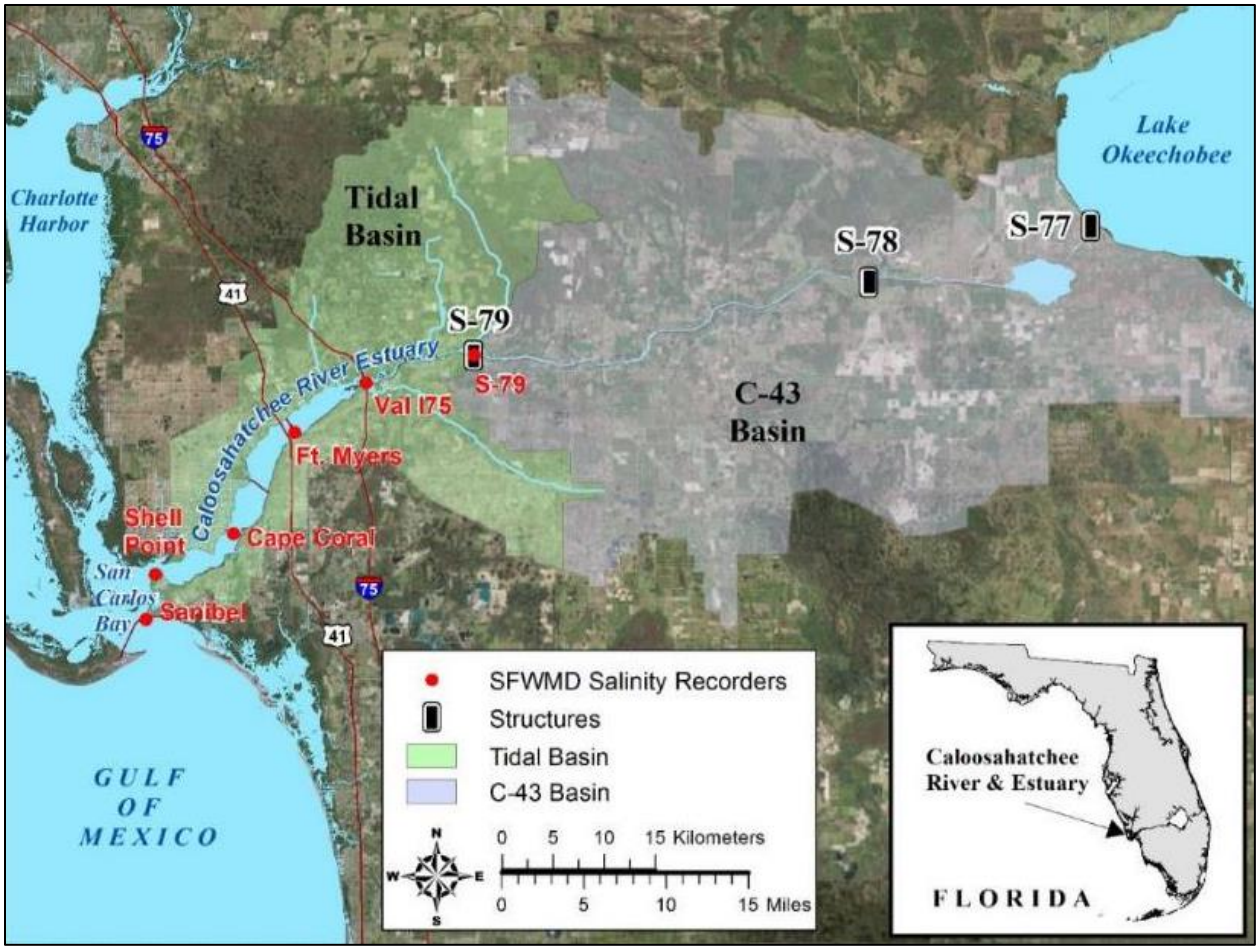


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

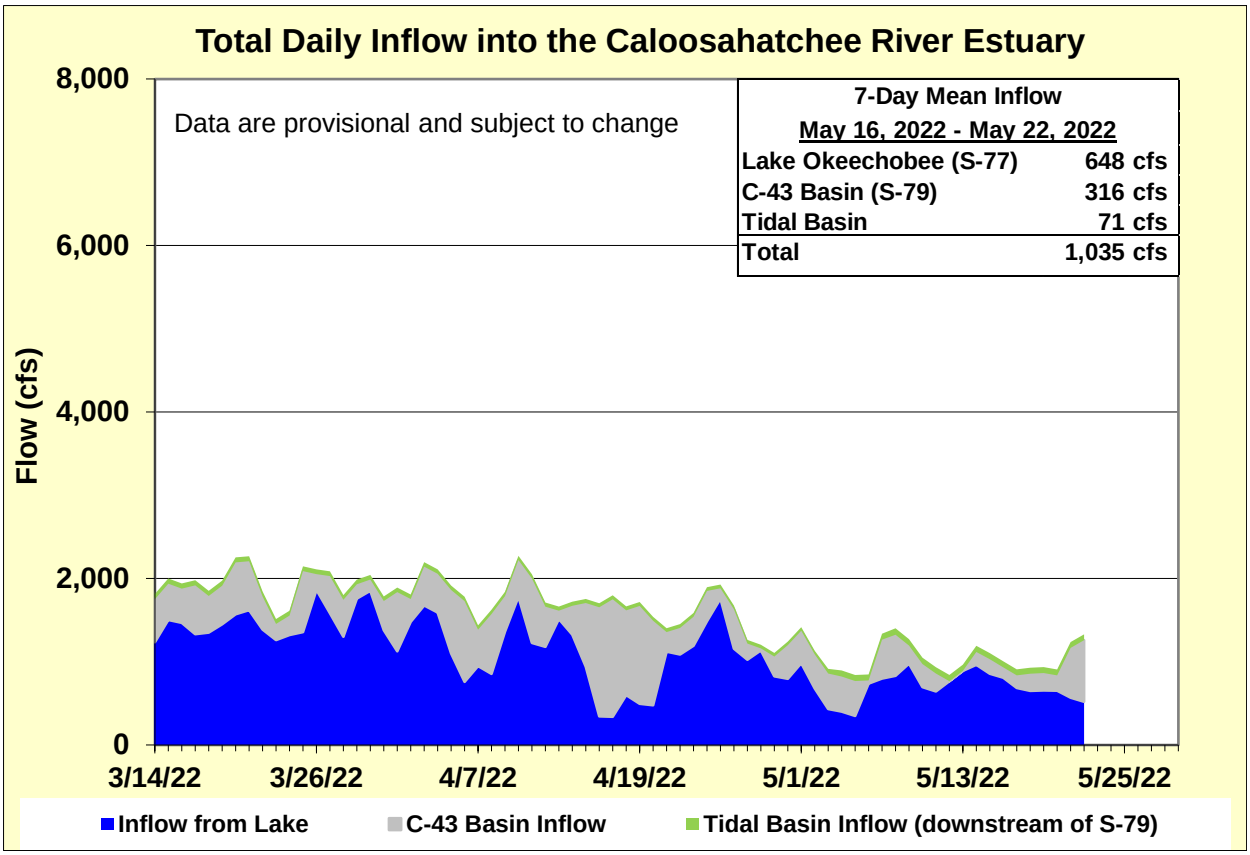


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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	**0.6** (0.6)	**0.8** (0.8)	0.0 – 10.0
Fort Myers Yacht Basin	**6.0** (4.4)	**6.9** (5.9)	0.0 – 10.0
Cape Coral	**14.2** (12.1)	**15.3** (13.6)	10.0 – 25.0
Shell Point	**28.0** (24.7)	**28.7** (24.9)	10.0 – 25.0
Sanibel	**30.7** (28.7)	**32.7** (30.7)	10.0 – 25.0

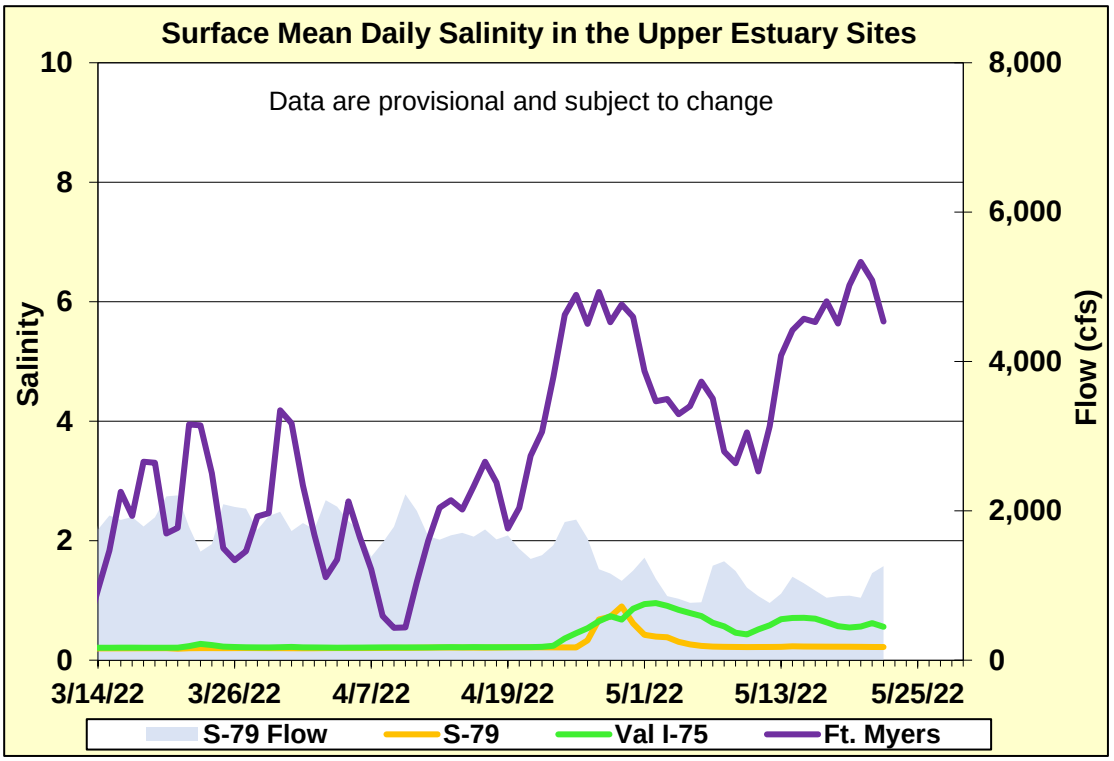


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

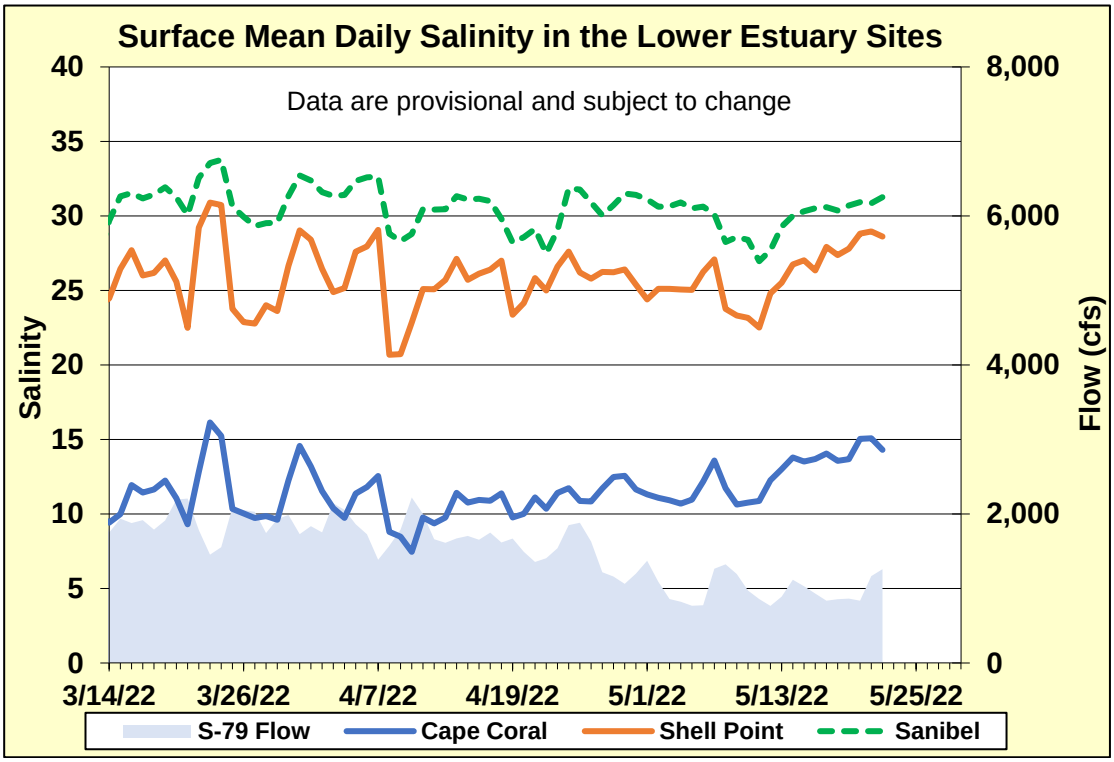


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

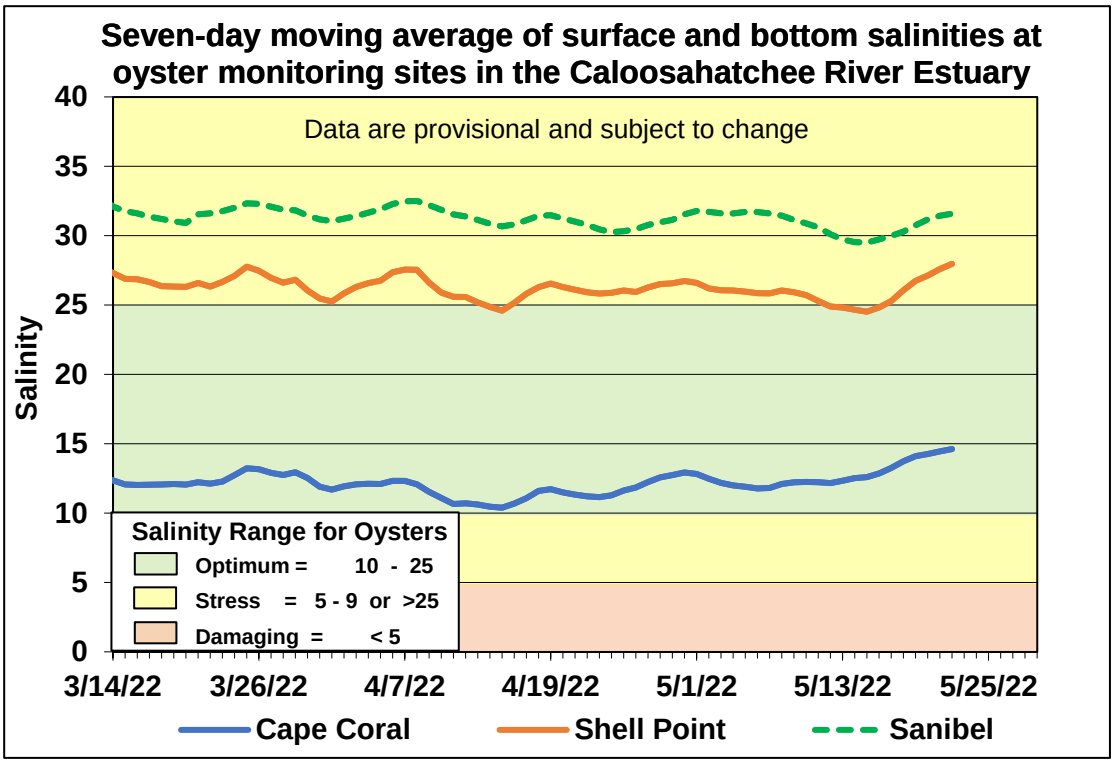


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

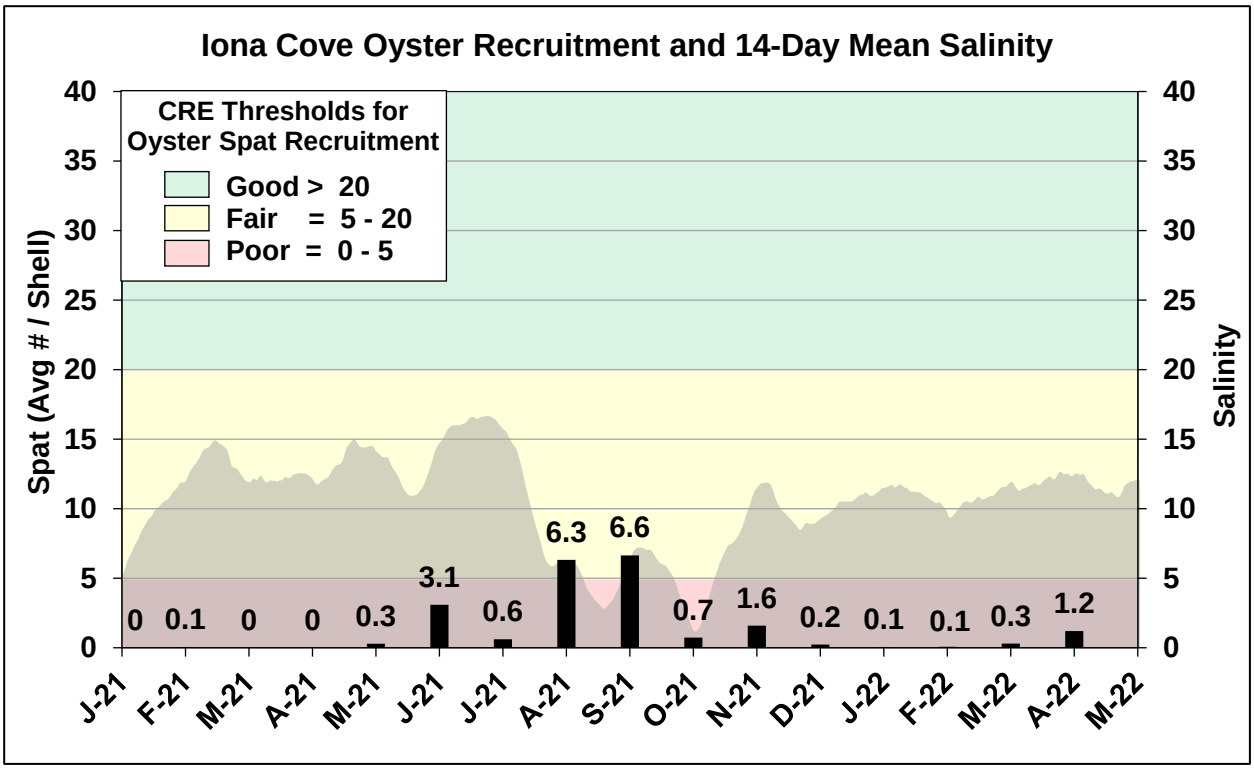


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

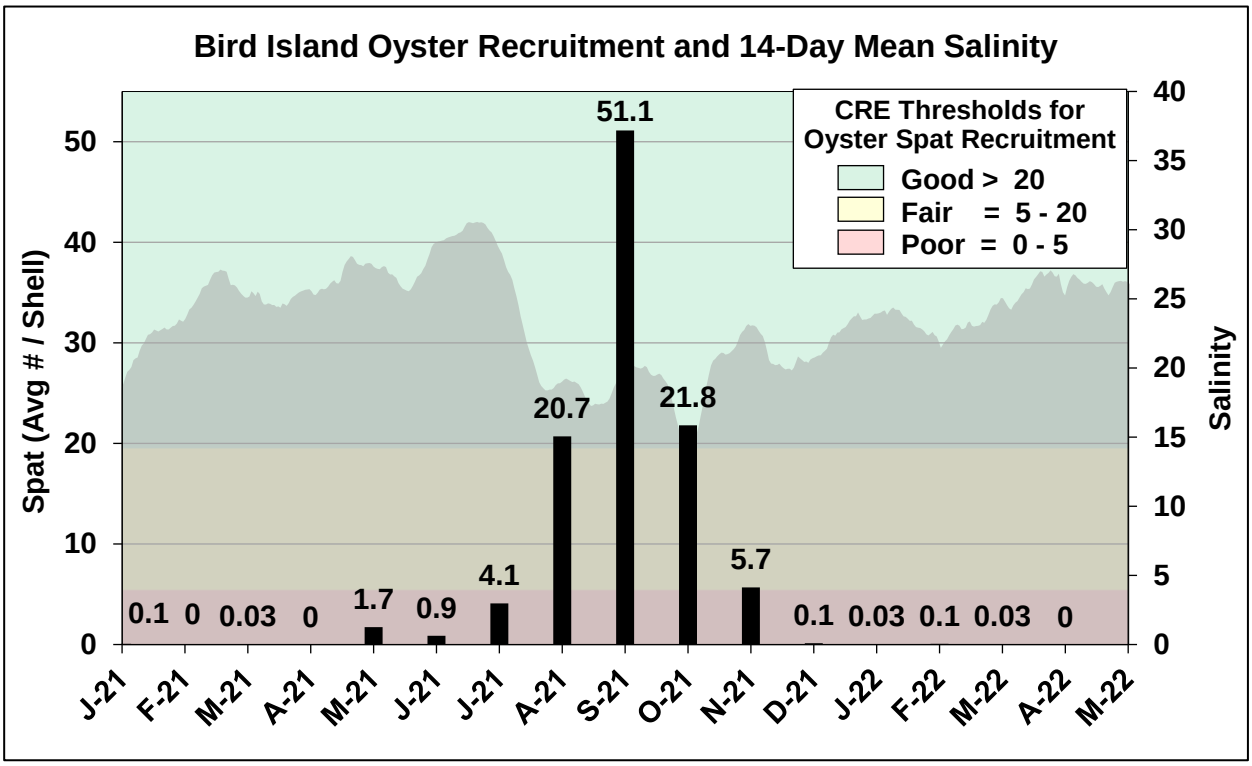


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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	62	5.4	2.0
B	450	62	3.9	1.6
C	800	62	2.8	1.4
D	1,000	62	1.9	1.2
E	1,500	62	1.0	1.0
F	2,000	62	0.4	0.8

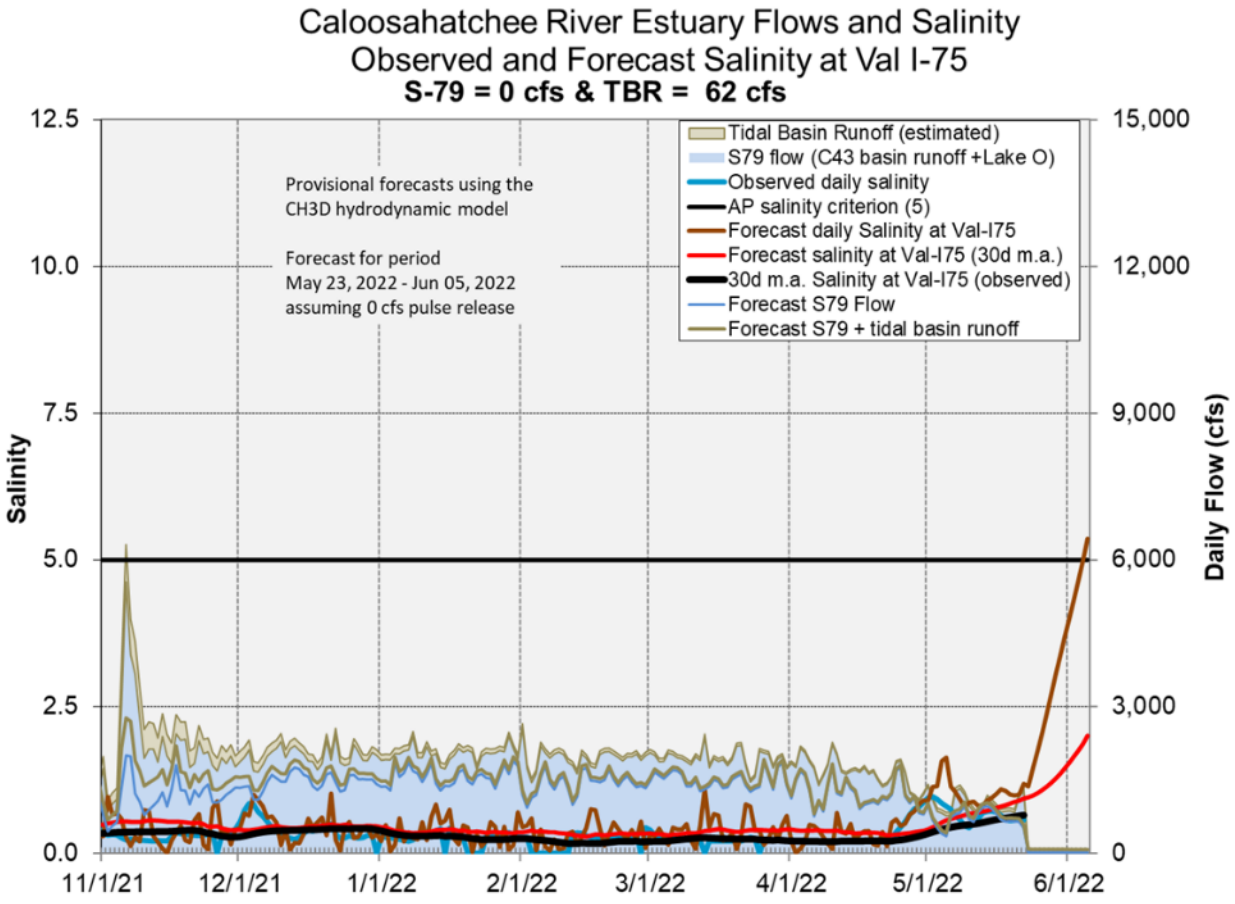


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

Stormwater Treatment Areas

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

STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways for vegetation management activities. The Eastern and Northern Flow-ways contain nests of Migratory Bird Treaty Act protected species. Most treatment cells are at or near 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/m^2/year (**Figure S-2**).

STA-2: STA-2 Flow-way 2 is offline for construction activities. Flow-way 3 contains nests of Migratory Bird Treaty Act protected species. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities, and in Flow-way 1 following dryout conditions. 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/m^2/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. The Central Flow-way contains nests of Migratory Bird Treaty Act protected species. Most 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/m^2/year (**Figure S-4**).

STA-5/6: STA-5/6 Flow-way 4 is offline for vegetation management activities. All 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 below 1.0 g/m^2/year, except Flow-way 5 which is high. (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

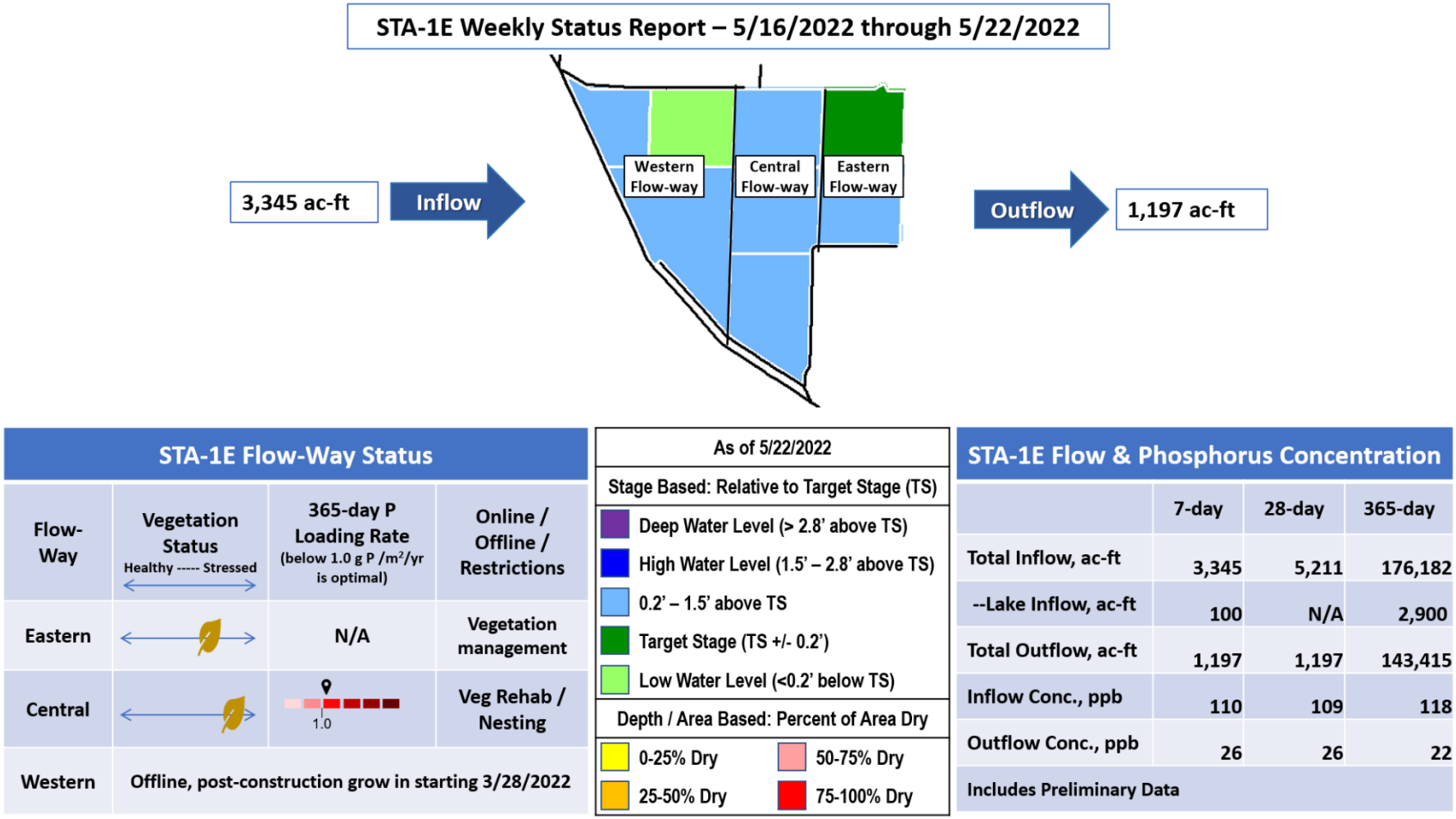


Figure S-1. STA-1E Weekly Status Report

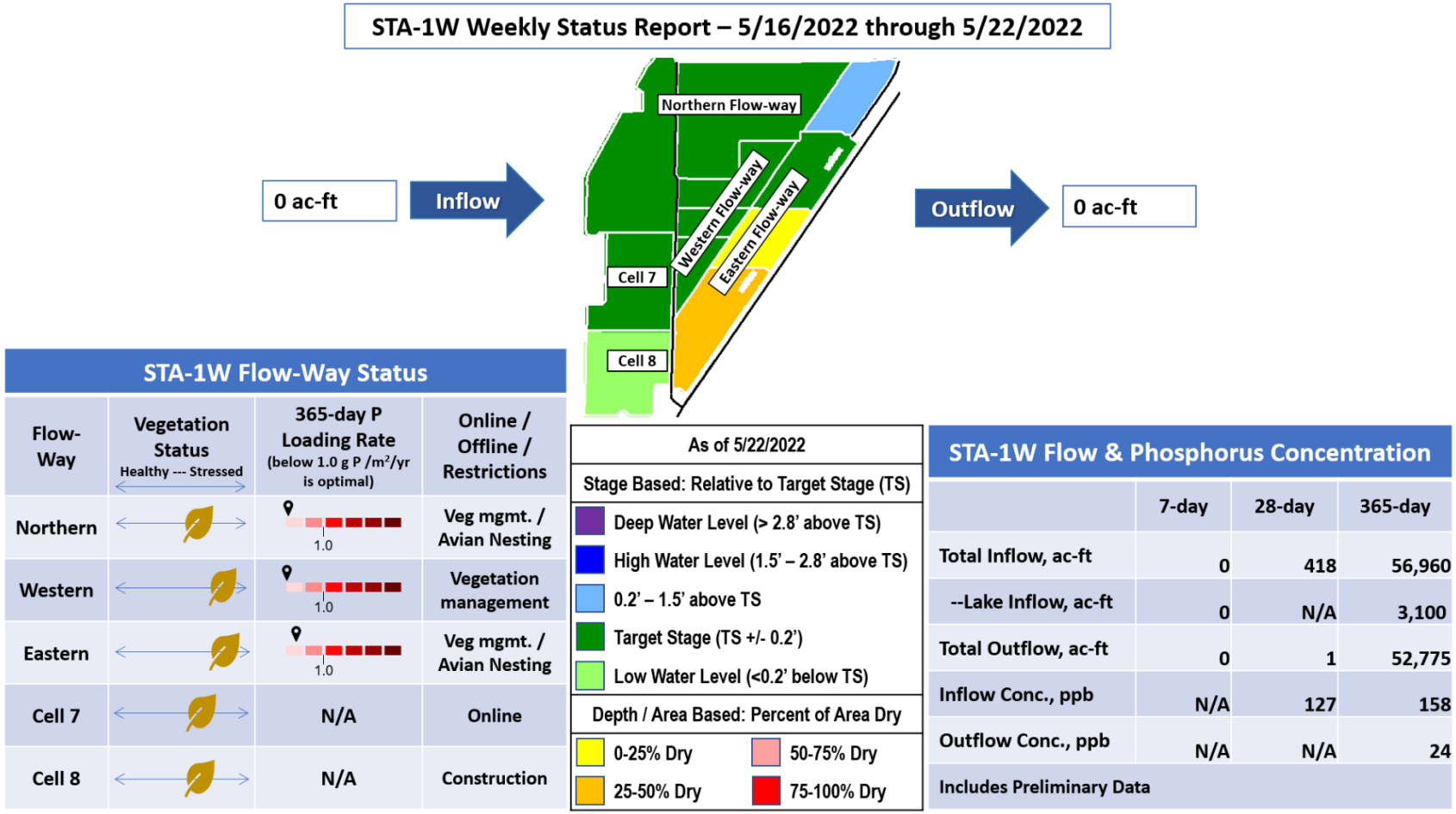
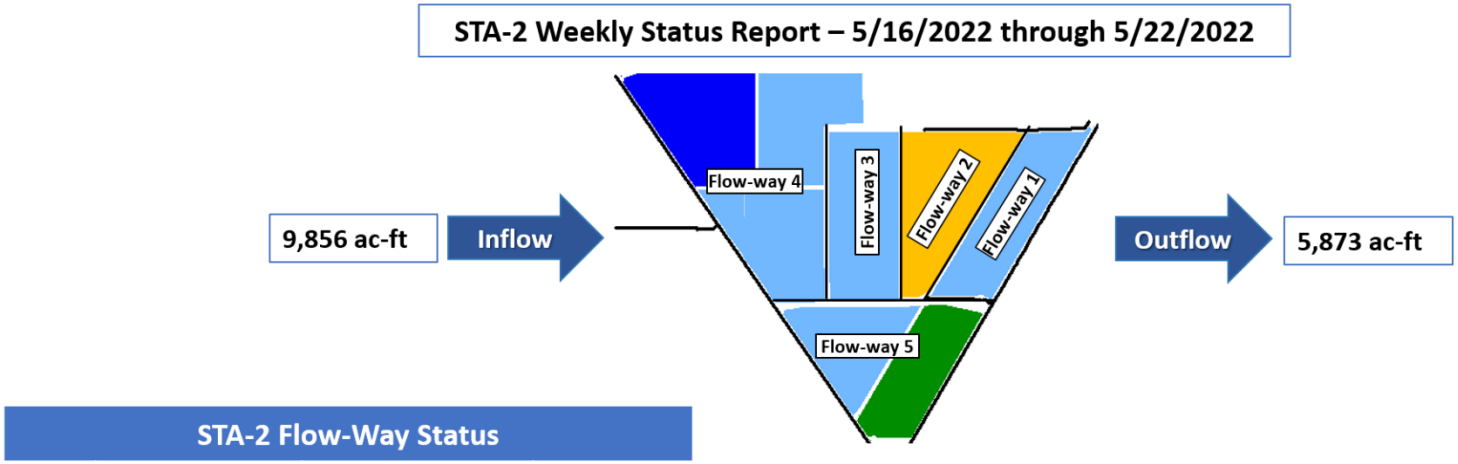


Figure S-2. STA-1W Weekly Status Report



STA-2 Flow-Way Status

Flow-Way	Vegetation Status (Healthy ------ Stressed)	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
1		1.0	Post Dryout
2	Offline, construction activities as of 9/7/2021		
3		1.0	Veg Rehab / Nesting
4		1.0	Vegetation Rehab
5		1.0	Online

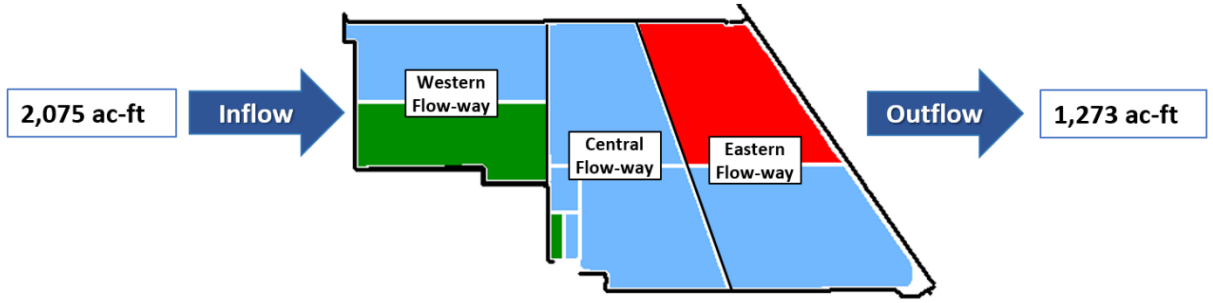
As of 5/22/2022	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-2 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	9,856	19,920	294,631
--Lake Inflow, ac-ft	600	N/A	34,900
Total Outflow, ac-ft	5,873	12,728	302,884
Inflow Conc., ppb	27	40	87
Outflow Conc., ppb	15	16	15
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 5/16/2022 through 5/22/2022



STA-3/4 Flow-Way Status

Flow-Way	Vegetation Status (Healthy ------ Stressed)	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
Eastern	Offline, vegetation management drawdown as of 3/1/2021		
Central		1.0	Avian Nesting
Western		1.0	Online

As of 5/22/2022	
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	50-75% Dry
25-50% Dry	75-100% Dry

STA-3/4 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	2,075	7,599	335,543
--Lake Inflow, ac-ft	0	N/A	19,600
Total Outflow, ac-ft	1,273	2,729	301,414
Inflow Conc., ppb	54	55	90
Outflow Conc., ppb	16	20	15
Includes Preliminary Data			

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

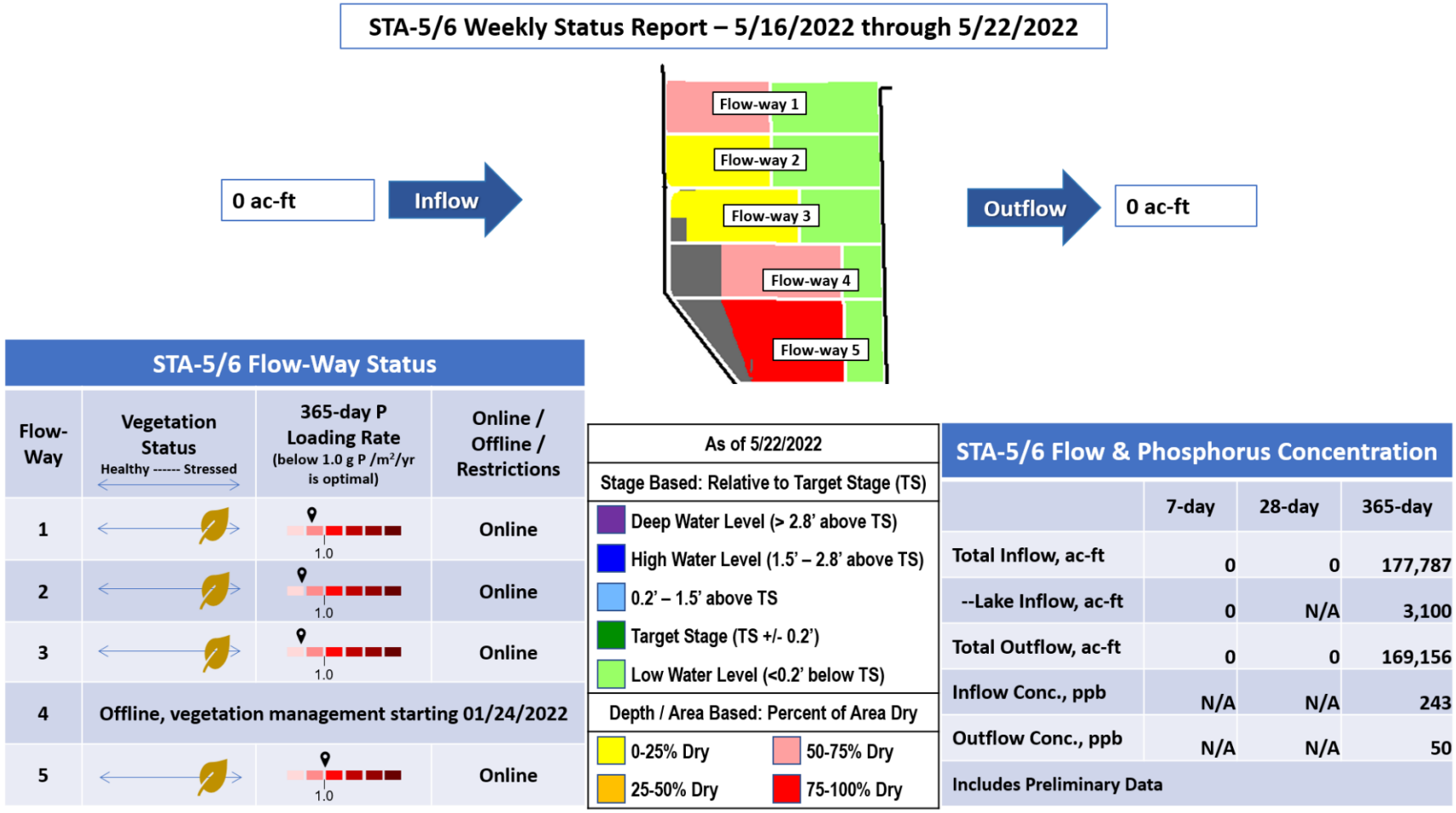
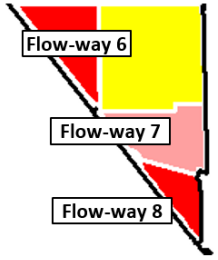


Figure S-5. STA-5/6 Weekly Status Report (Flow-ways 1 – 5)

STA-5/6 Weekly Status Report – 5/16/2022 through 5/22/2022



STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ------ Stressed	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
6		1.0	Online
7		1.0	Online
8		1.0	Online

As of 5/22/2022	
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	50-75% Dry
25-50% Dry	75-100% Dry

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, µg/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: Stage at the 1-8C gauge rose last week. The average on Sunday was 0.24 feet below the flat Zone A1 regulation line. WCA-2A: Stage ascended rapidly at the S-11B headwater gauge last week. The average on Sunday was 0.23 feet above the flat regulation line. WCA-3A: Last week the Three Gauge Average stages were steady; average stage was 1.04 feet below the falling regulation line on Sunday. WCA-3A: Stage ascended quickly at gauge 62 (Northwest corner) last week, the average on Sunday was 1.10 feet below the flat Upper schedule line (**Figures EV-1** through **EV-4**).

Water Depths

The SFWDAT indicates that stages are recovering east of the Miami Canal in WCA-3A North. WCA-1 continues to dry down while WCA-2A stages are higher. Southern WCA-3A along the L-67s potentially drying down to soil surface is a rare event. North to South hydrologic connectivity remains within Everglades National Park's Shark River Slough (**Figure EV-5**). Comparing current WDAT water depths to the depth one month ago, stages decreased across WCA-3A South, while they were deeper in central BCNP. Looking back one-year, western BCNP is much wetter while southeastern WCA-3A is significantly lower in depth compared to one year ago (**Figure EV-6)**. Comparing current depths to the past 20 years, the eastern half WCA-3A North is slightly wetter. BCNP is above the 50th percentile but below the soil surface, typical for this time of year but not favorable. Eastern WCA-3A South is within the 10th to 20th percentile, a good thing for that historically ponded region. Everglades National Park's Shark River Slough remains above the 70th percentile (**Figure EV-7**).

Taylor Slough and Florida Bay

Stages in Taylor Slough increased an average of 0.17 feet over this past week, and the northern area of the Slough now has stages above ground. Individual stage gauge changes ranged from −0.02 feet in the central Slough area to +0.41 feet in the north (**Figure EV-8** and **Figure EV-9**). The Slough is now 9 inches higher than its historical average driven in large part by the northern areas which are a foot higher than the 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 soon as the wet season rains begin. Some positive flows have been seeping out of the five main creeks feeding Florida Bay this week with four of the last seven days having positive flow into the Bay after a full week of negative flows the previous week. Net flow volume was around 1,000 acre-feet for the week.

Salinities in Florida Bay averaged an increase of 0.4 over the week ending 5/22, with individual station changes ranging from −2.1 to +3.8 (**Figure EV-8**). The largest changes (both positive and negative) occurred in the nearshore areas again. Each region is still in the middle of its respective interquartile range (**Figure EV-10**), and the Bay as a whole, is only 1 higher than its historical average. The western Bay area showed a rapid increase in salinity driven by the very shallow Garfield Bight (GB) station. This station can increase very quickly due to evaporation, but it also freshens very quickly through flows and rain when they occur.

Water Management Recommendations

If conditions require discharges from WCA-2A, distributing those flows both into the northern perimeter of WCA-3A and making use of the S-11s is ecologically better than using one or the other. Putting water into northern WCA-3A that reduces recession rates in that sub-basin have an ecological benefit by protecting particularly fragile peat soils from oxidation and lowering the risk of muck fires as we move into the driest part of the year. When conditions allow, discharge via S-150 would benefit the downstream ecology as conditions are very 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	2.27	NA
WCA-2A	3.49	+0.40
WCA-2B	4.69	+0.32
WCA-3A	1.86	+0.07
WCA-3B	1.37	+0.10
ENP	0.62	−0.12

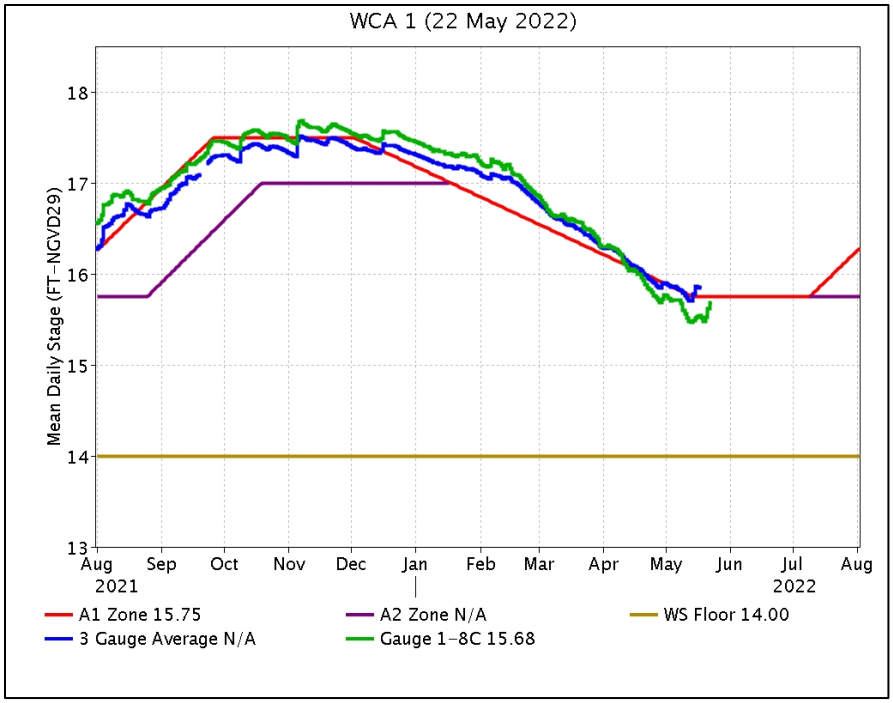


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

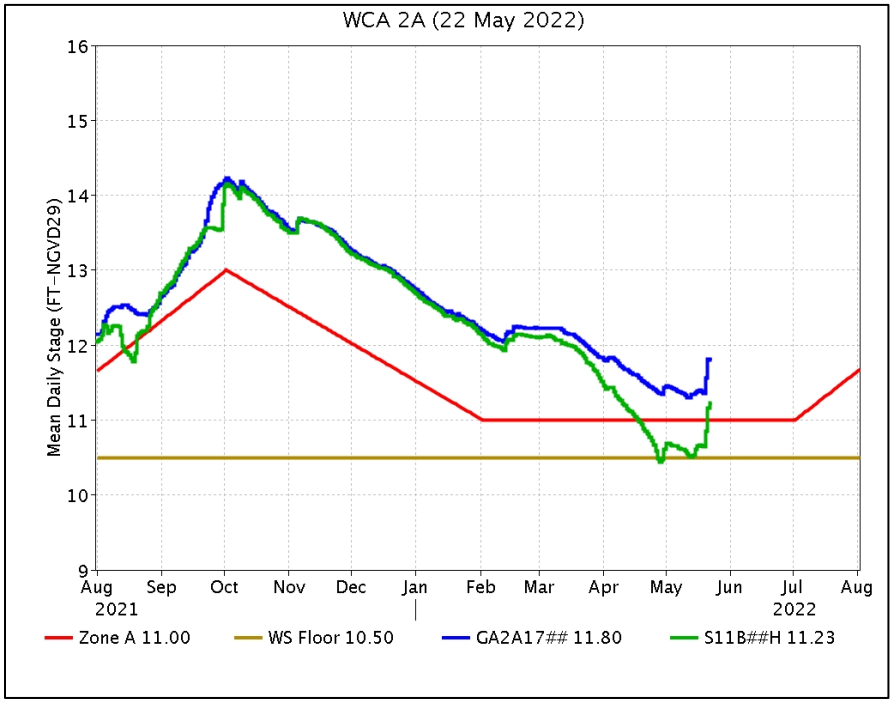


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

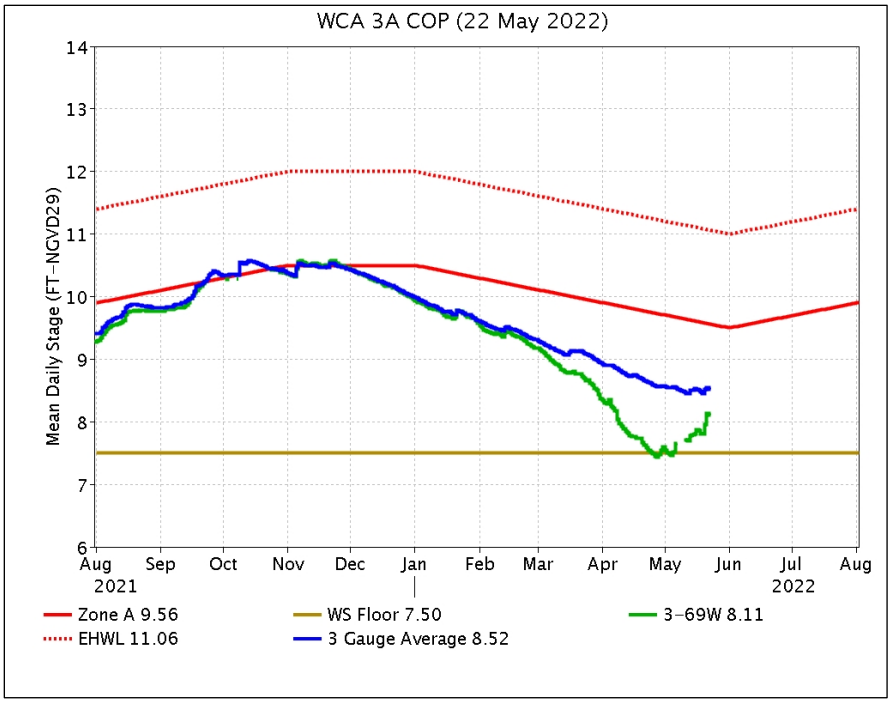


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

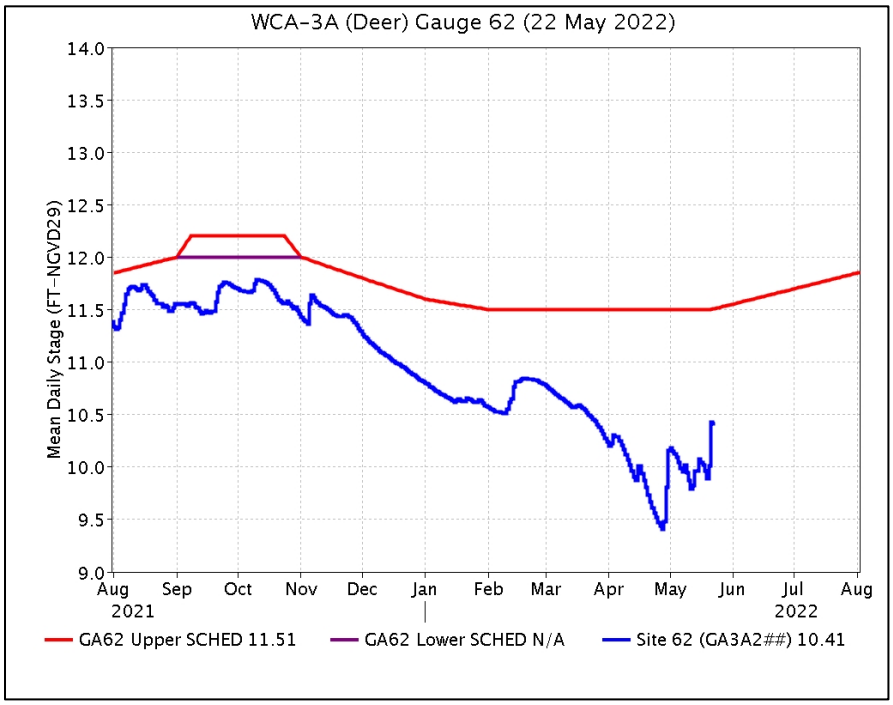


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

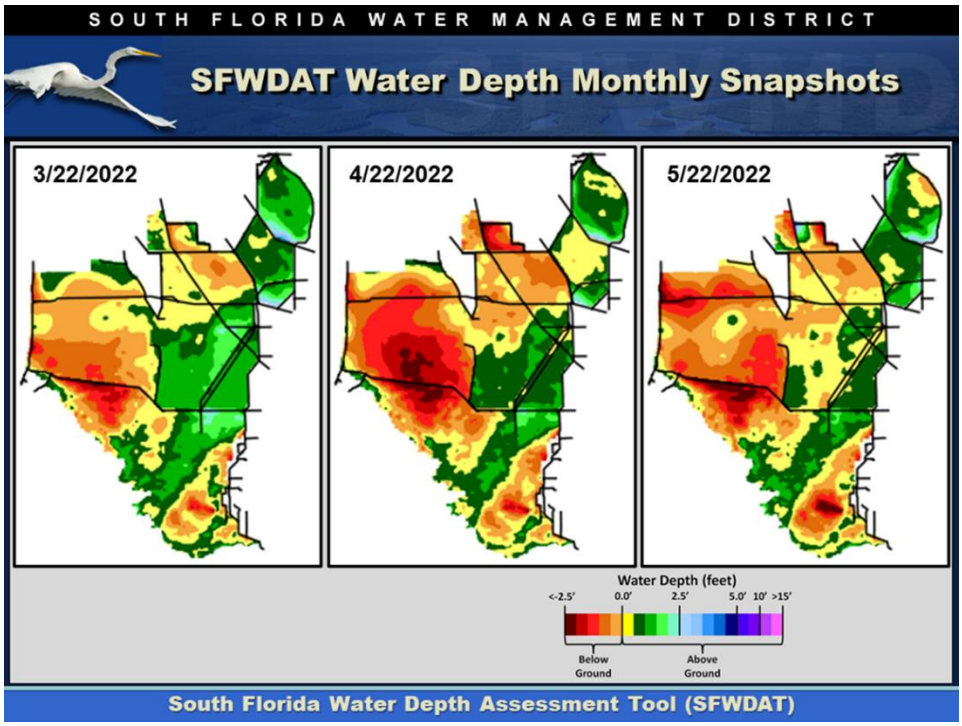


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

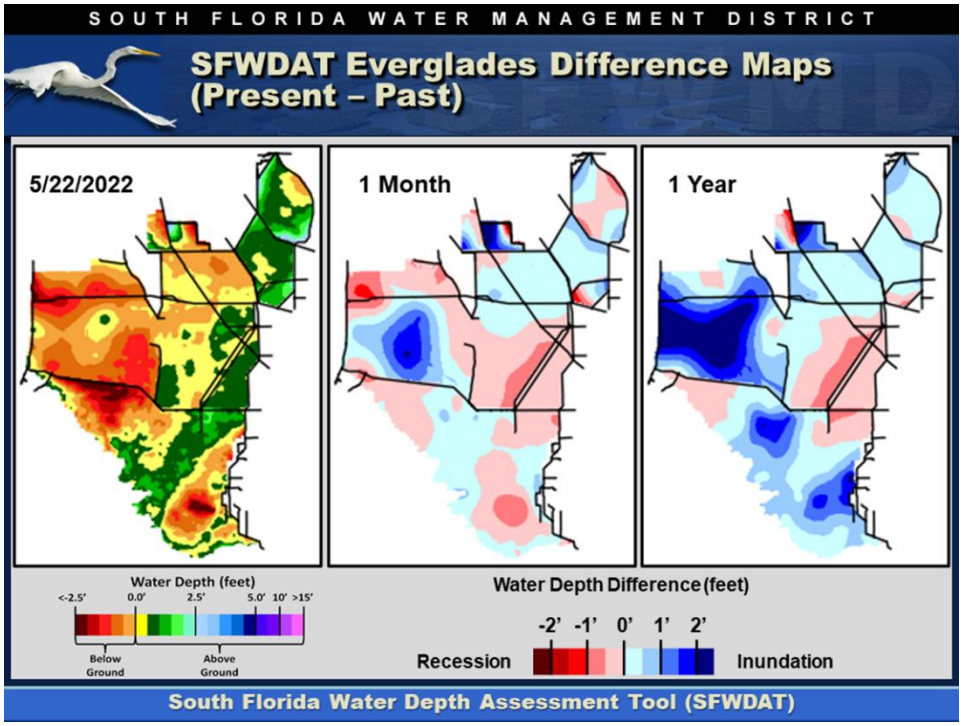


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

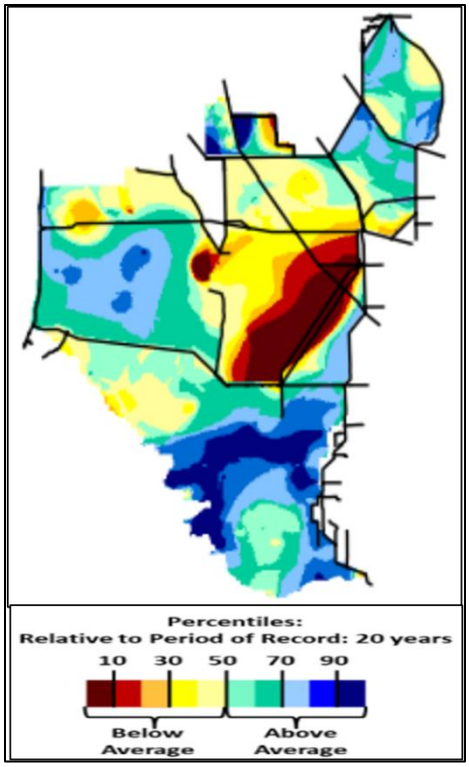


Figure EV-7. Present water depths (5/8/2022) compared to the day of year median over the previous 20 years.

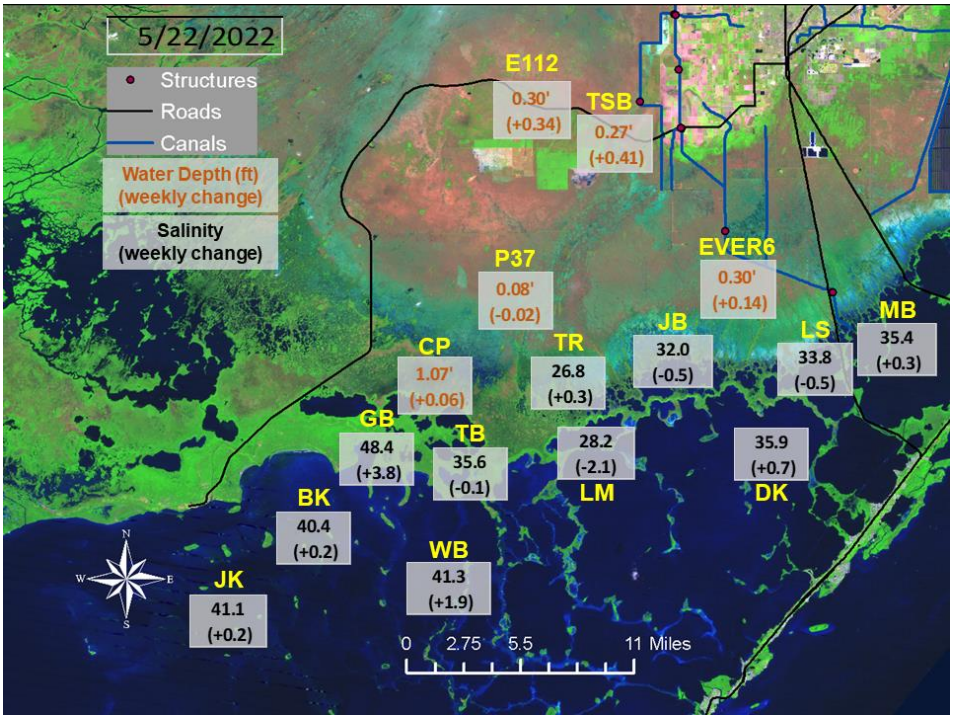


Figure EV-8. Taylor Slough water depths and Florida Bay salinities, with weekly changes for both in parentheses.

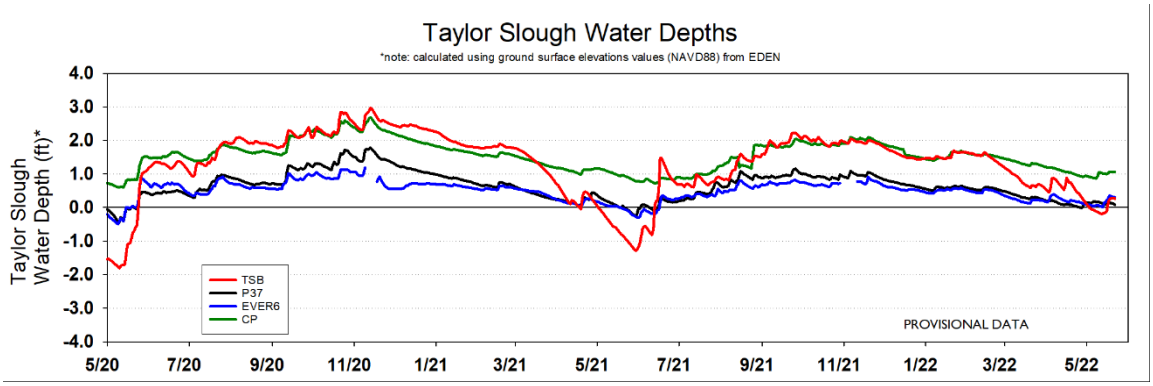


Figure EV-9. Taylor Slough water depth time series.

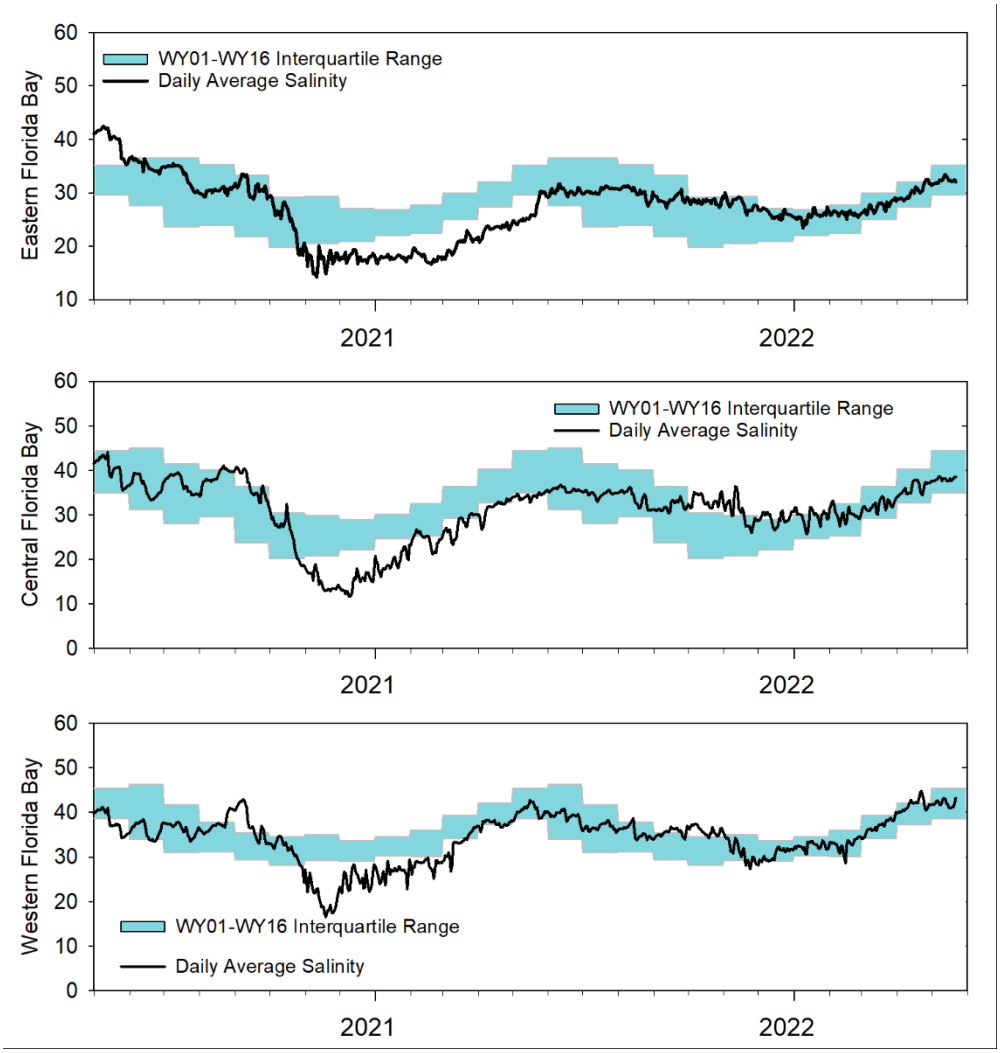


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, May 17, 2022 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.03'	Resume a recession rate at less than 0.10 feet per week.	Protect within basin and downstream habitat and wildlife. Foraging and nesting wading birds.
WCA-2A	Stage increased by 0.40'	Conserve water in this basin letting the water move south when conditions allow.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage increased by 0.32'	Conserve water in this basin, maintain a minimum input to maintain stage while moving water south when conditions allow.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage increased by 0.22'	Conserve water in this basin, while letting the water move south when conditions allow.	Protect within basin peat soils, and downstream habitat and wildlife. Lower fire risk.
WCA-3A NW	Stage increased by 0.34'	Conserve water in this basin letting the water move south when conditions allow.	
Central WCA-3A S	Stage decreased by 0.16'	Resuming a recession rate of less than 0.10 feet per week has an ecological benefit.	Protect within basin and downstream habitat and wildlife. Lower fire risk. Foraging and nesting wading birds.
Southern WCA-3A S	Stage decreased by 0.11'		
WCA-3B	Stage increased by 0.10'	Maintain the recession rate to less than 0.10 feet per week 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 decreased by 0.12'	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 −0.02' to +0.41'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −2.1 to +3.8	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 375 cfs and the previous 30-day mean inflow was 216 cfs. The seven-day mean salinity was 35.2 at BBCW8 and 32.2 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Data provided by Biscayne National Park.

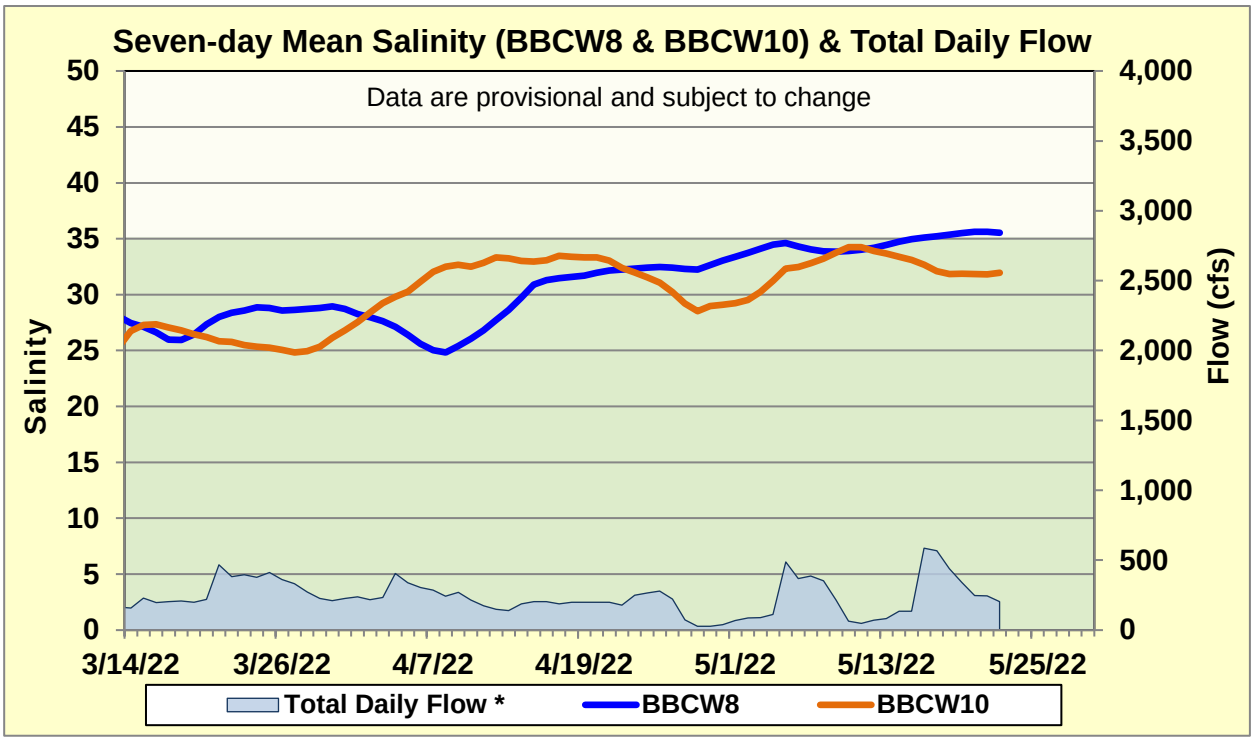


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.