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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: May 18, 2022

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

An upper-air trough passing east of Florida will continue eastward through Wednesday with large-scale subsidence behind it resulting in suppressed rainfall. The median areal average rainfall is less than a tenth of an inch area wide, but the median is a quarter to a third of an inch around Miami-Dade County where afternoon showers are possible. A tropical wave located over the central Caribbean Sea is forecast to pass through the western Caribbean Thursday and Friday. Moisture associated with the wave will stream northeastward through the Florida Keys and far southern part of the SFWMD late Thursday and through the remainder of the SFWMD through Saturday. The tropical wave will cause a drastic increase of rains across the Florida Keys overnight Thursday and the far southern part of the SFWMD on Friday. A large increase of rain coverage and total rainfall on Friday is expected, especially by peak heating during the afternoon. The rainfall maximum will be somewhere over the interior of the SFWMD, with a strong model signal for significant rainfall from the western interior through the Kissimmee Valley. Although the moisture could be decreasing by Saturday, additional enhanced rains are likely but mainly focused over the interior and the west. By early next week the tropical wave will no longer be affecting the SFWMD's weather. However, isolated or widely scattered early-day rains in the east are possible, followed by decreasing rain chances by the afternoon. At peak heating Sunday and Monday afternoons, greater rains over the interior and the west, especially from the western interior to the Kissimmee Valley are possible. For the week next ending next Tuesday morning, total SFWMD rainfall is forecast to be somewhat below normal. However, areas west and north of Lake Okeechobee stand a good chance of seeing above normal rainfall, while areas in the southeast or east are most likely to see below normal rainfall and near normal rainfall.

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 0.61 feet as of May 15, 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 4.9 mg/L for the week ending on May 15, 2022.

Lake Okeechobee

Lake Okeechobee stage was 12.70 feet NGVD on May 15, 2022, with water levels 0.70 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 19 weeks (**Figure LO-3**). Average daily inflows (excluding rainfall) decreased from the previous week, going from 1,584 cfs to 1,376 cfs. Average daily outflows (excluding evapotranspiration) increased, going from 2,622 cfs to 4,078 cfs. The most recent snail kite nesting survey on the Lake revealed a total of 44 nests thus far, including 28 failures. The most recent satellite image (May 16, 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 2 - 4, 2022 routine water quality monitoring survey revealed that ~16% of the sites (or 5 sites) had chlorophyll *a* concentrations above 40 µg/L, with highest concentrations (103 µg/L) recorded at FEBIN (western region) and NES191 (northeastern region) locations (**Figure LO-6 and Figure LO-7**).

Estuaries

Total inflow to the St. Lucie Estuary averaged 342 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities increased at all sites in the estuary over the past week. Salinity at the US1 Bridge was in the stressed range (> 25) for adult eastern oysters. Total inflow to the Caloosahatchee Estuary averaged 1,050 cfs over the past week with 827 cfs coming from the Lake. Mean salinities increased at Ft. Myers and Cape Coral and decreased at the remaining sites in the estuary over the past week. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the optimal range (10-25) for adult eastern oysters at Cape Coral and Shell Point and in the stressed range at Sanibel.

Stormwater Treatment Areas

For the week ending Sunday, May 15, 2022, approximately 5,600 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 10,500 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 15,700 ac-feet. Most STA cells are at 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 although that was not observed last week. Numbers and locations of wading bird foraging was very similar to the previous week, expectations for nesting success remain low especially for the Wood Stork which continued to initiate very late nesting. 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 increased on average in Florida Bay last week and as a whole is 1 higher than the average for this time of year.

Biscayne Bay

total inflow to Biscayne Bay was 106 cfs and the previous 30-day mean inflow was 174 cfs. The seven-day mean salinity was 35.1 at BBCW8, which exceeded the preferred maximum salinity of 35. The seven-day mean salinity at BBCW10 was 32.7, below the preferred maximum salinity of 35. Data provided by Biscayne National Park.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On May 15, 2022, lake stages were 55.4 feet NGVD (0.3 feet below schedule) in East Lake Toho, 52.4 feet NGVD (0.3 feet below schedule) in Lake Toho, and 48.9 feet NGVD (0.7 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

Discharges to the Kissimmee River on May 15, 2022 were 1,150 cfs at S-65 and 1,040 cfs at S-65A; discharges from the Kissimmee River were 1,490 cfs at S-65D and 1,300 cfs at S-65E (**Table KB-2**). Headwater stages were 46.2 feet NGVD at S-65A and 27.0 feet NGVD at S-65D on May 15, 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 4.9 mg/L for the week ending on May 15, 2022 (**Table KB-2, Figure KB-4**). Water depth on the Kissimmee River floodplain has decreased with a mean depth of 0.61 feet as of May 15, 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)	
							5/15/22	5/8/22
Lakes Hart and Mary Jane	S-62	LKMJ	0	59.6	R	59.8	-0.2	-0.2
Lakes Myrtle, Preston and Joel	S-57	S-57	0	60.2	R	60.2	0.0	0.0
Alligator Chain	S-60	ALLI	0	62.5	R	62.4	0.1	-0.1
Lake Gentry	S-63	LKGT	2	59.9	R	59.9	0.0	0.0
East Lake Toho	S-59	TOHOE	16	55.4	R	55.7	-0.3	-0.5
Lake Toho	S-61	TOHOW S-61	0	52.4	R	52.7	-0.3	-0.5
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	1,295	48.9	R	49.6	-0.7	-0.3

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.

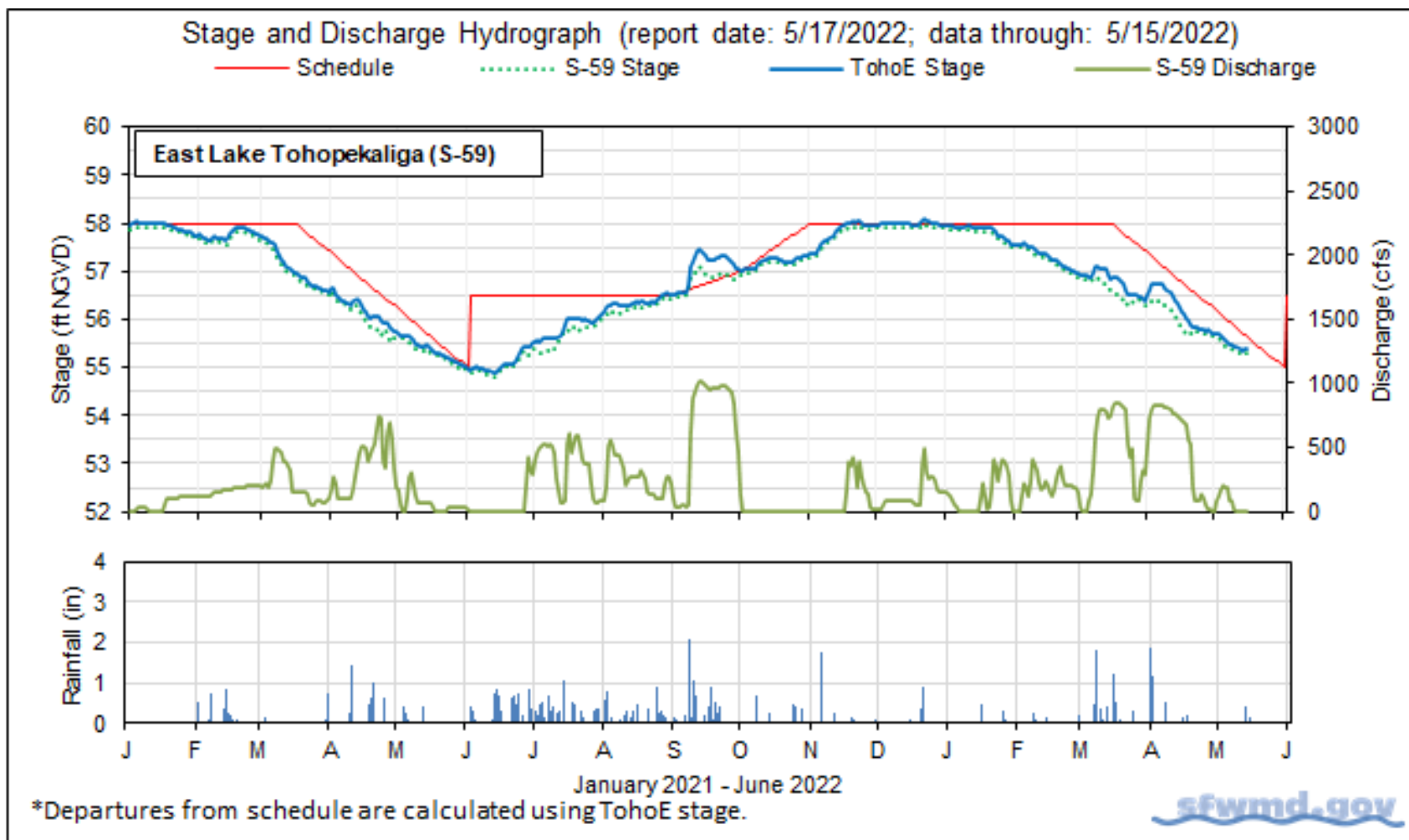


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

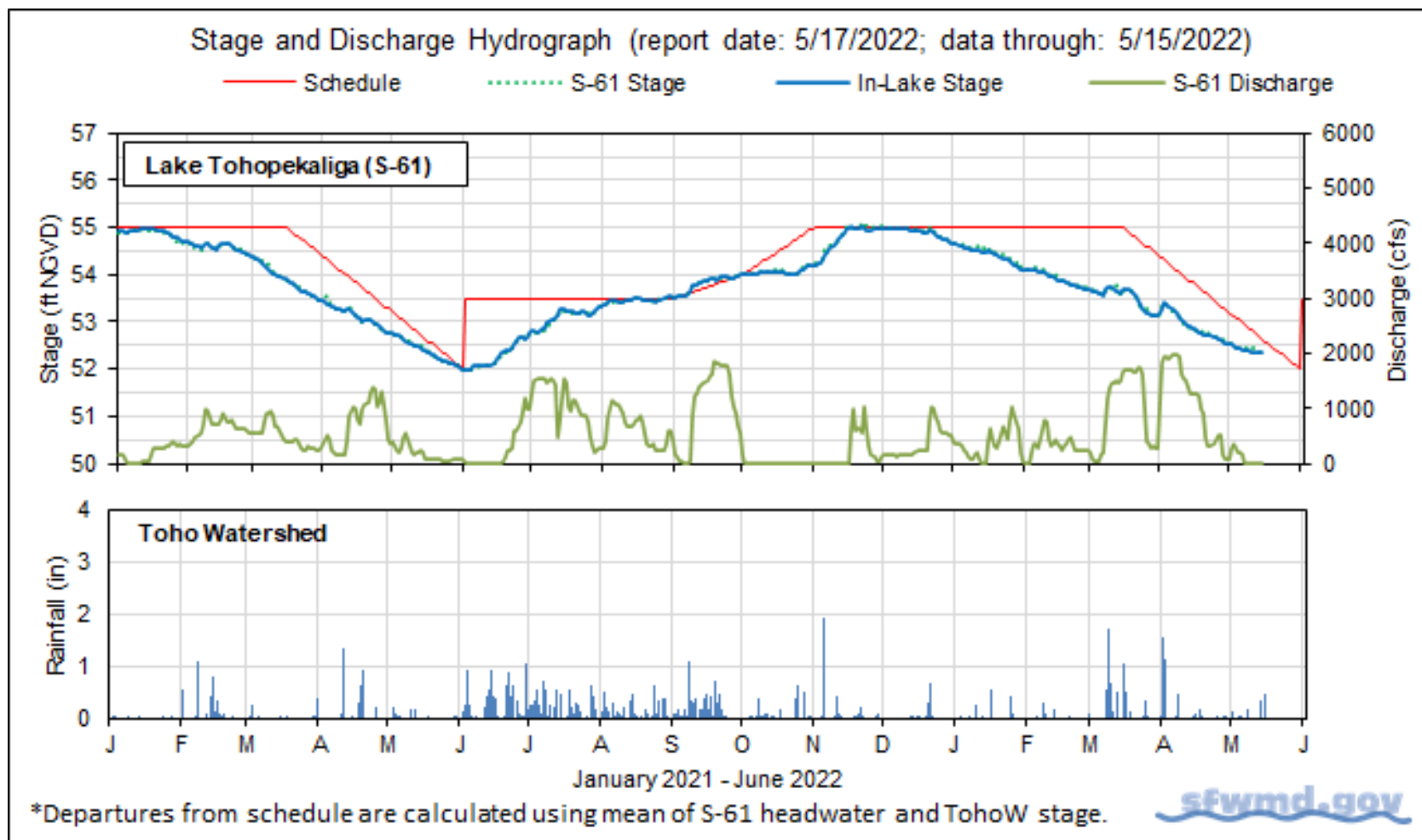


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

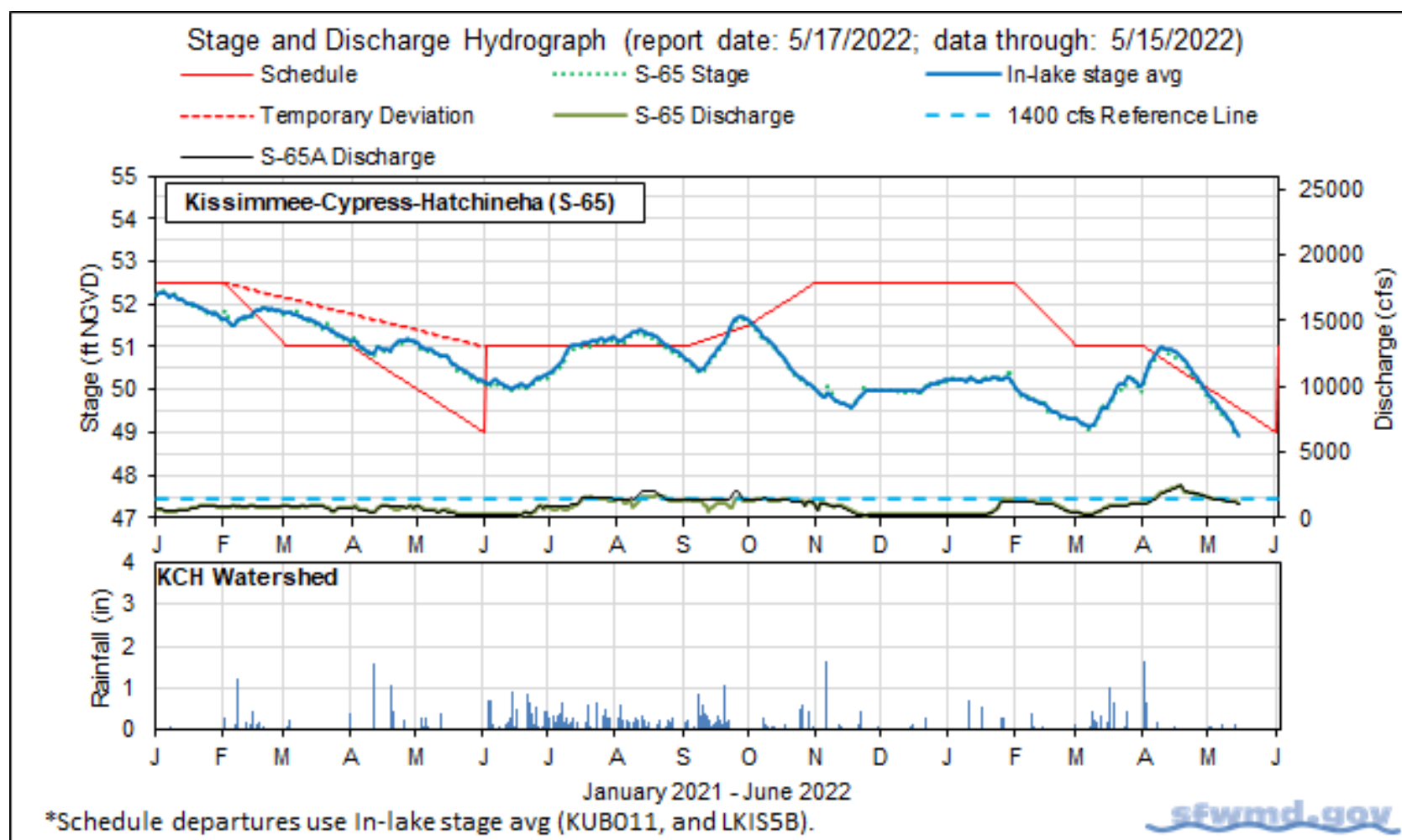


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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			
		5/15/22	5/15/22	5/8/22	5/1/22	4/24/22
Discharge	S-65	1,150	1,300	1,460	1,750	2,090
Discharge	S-65A ^a	1,040	1,200	1,400	1,720	2,100
Headwater Stage (feet NGVD)	S-65A	46.2	46.2	46.2	46.2	46.4
Discharge	S-65D ^b	1,490	1,540	1,770	1,820	1,500
Headwater Stage (feet NGVD)	S-65D ^c	27.0	27.1	27.1	27.1	27.0
Discharge (cfs)	S-65E ^d	1,300	1,360	1,570	1,630	1,310
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	5.6	4.9	3.6	3.2	3.0
Mean depth (feet) ^f	Phase I floodplain	0.61	0.67	0.84	0.97	0.98

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.

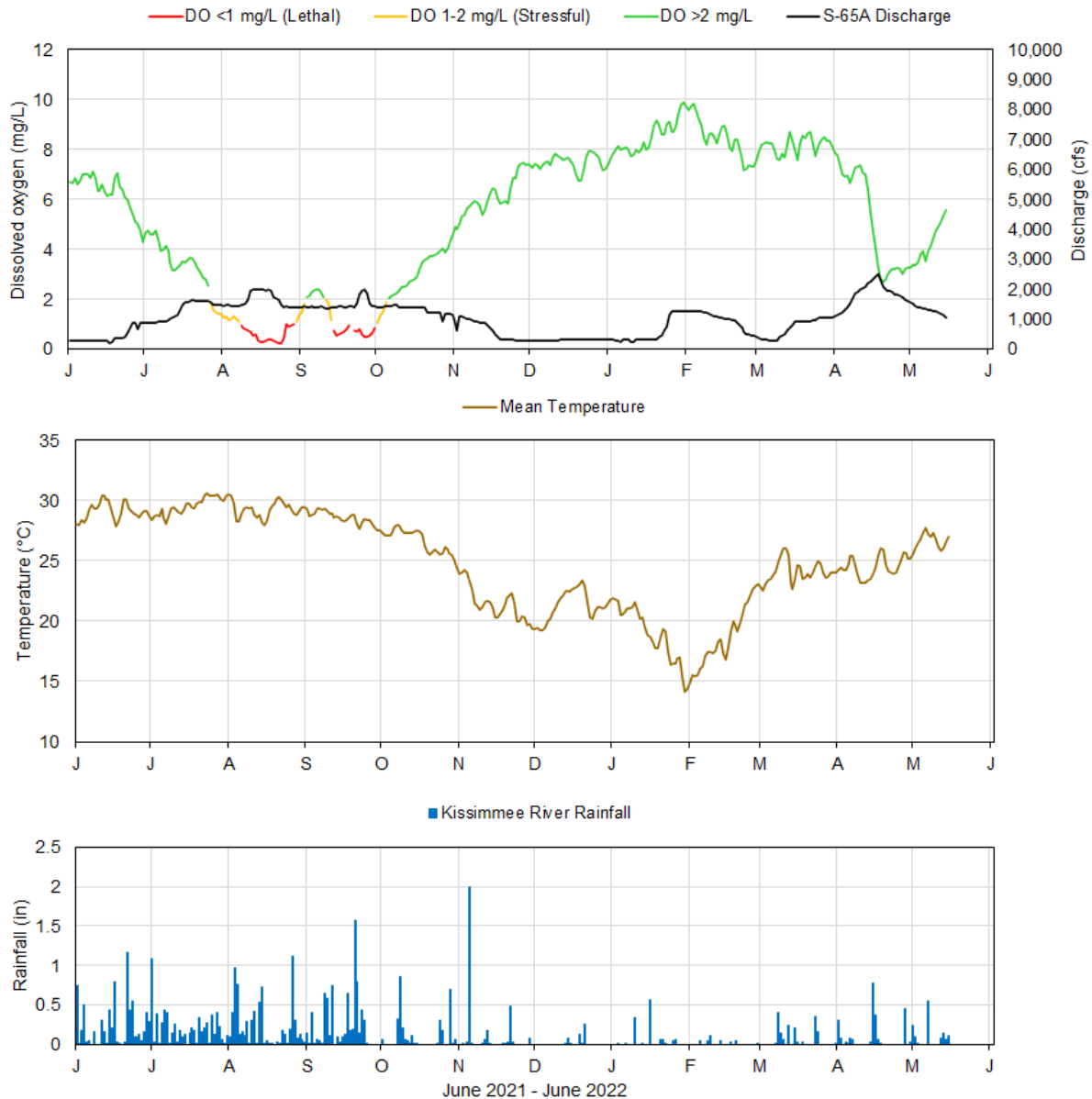
d. Combined discharge from S-65E and S-65EX1.

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



Report Date: 5/17/2022; data are through: 5/15/2022

sfwmd.gov

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.

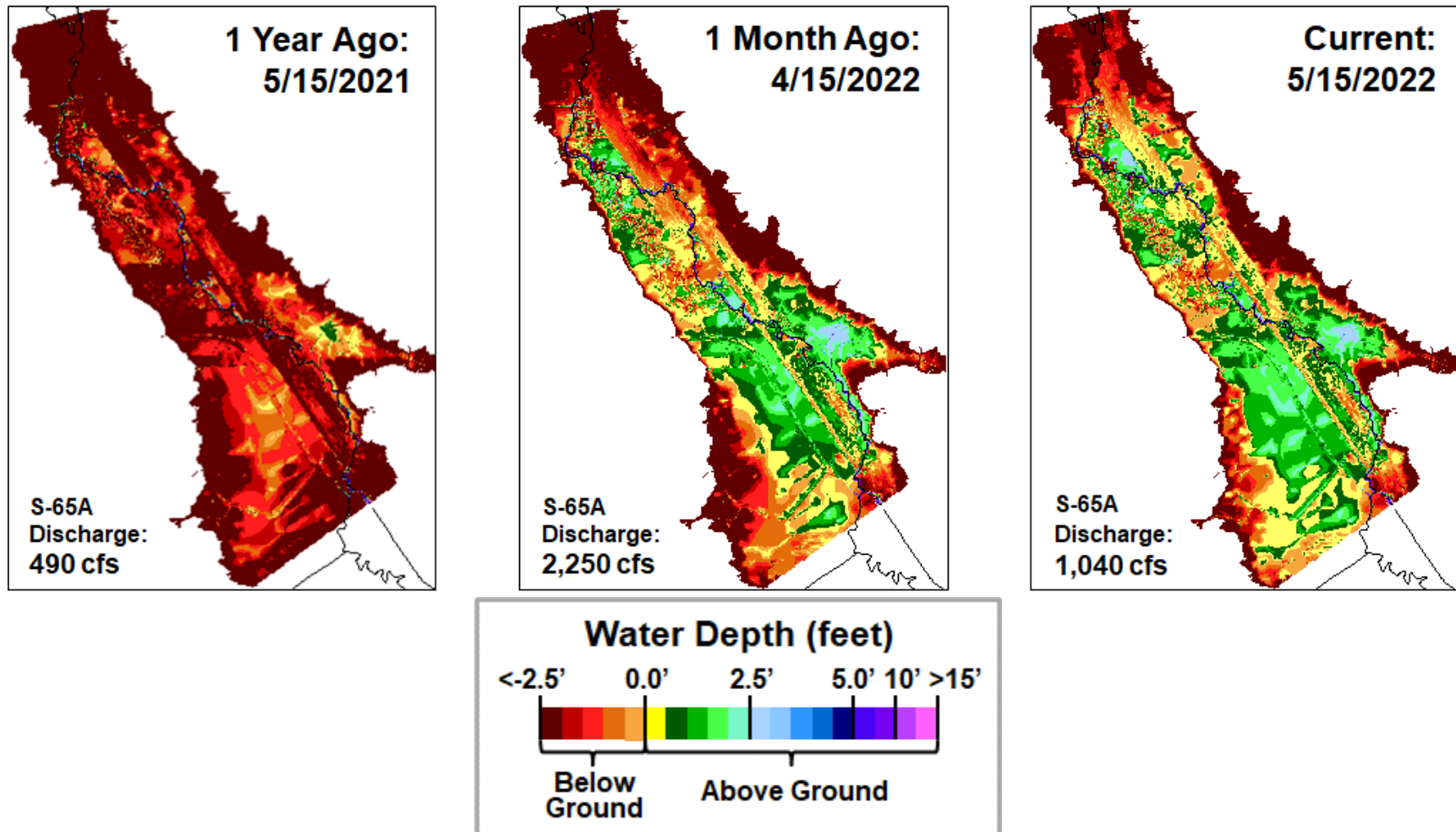


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

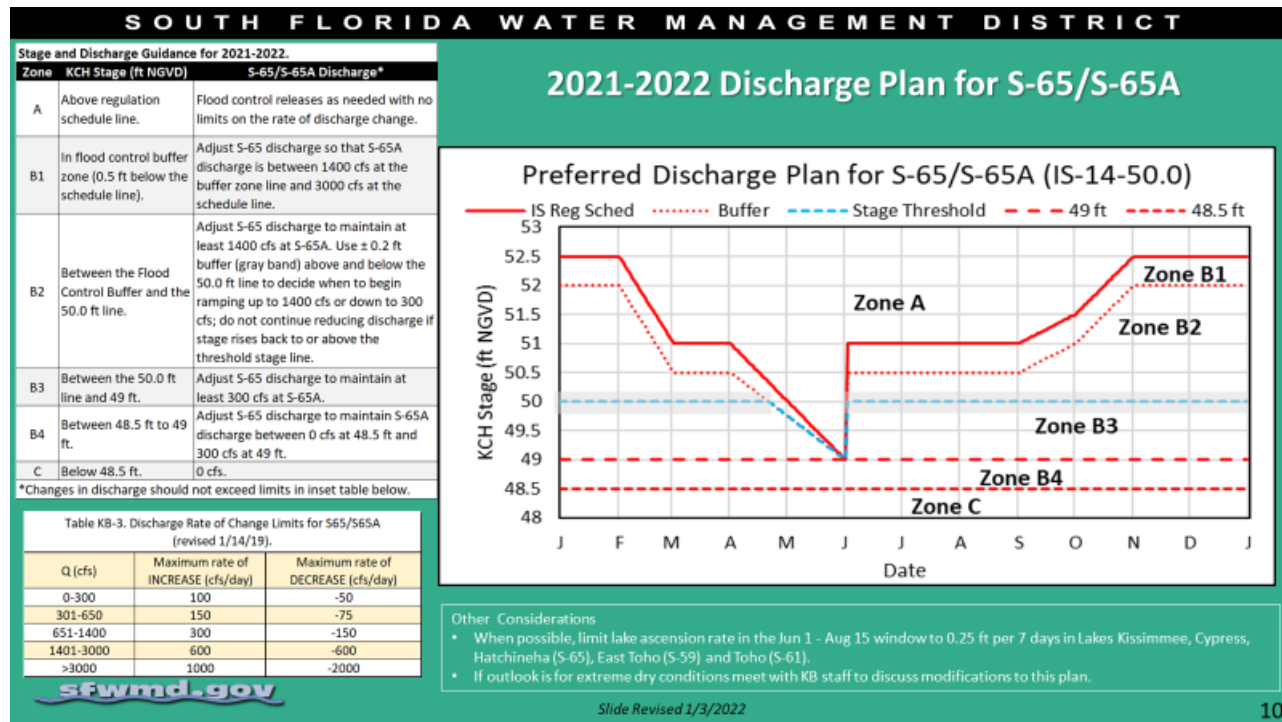


Figure KB-6. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

Lake Okeechobee

Lake Okeechobee stage was 12.70 feet NGVD on May 15, 2022, with water levels 0.70 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 19 weeks (**Figure LO-3**). According to NEXRAD, 0.29 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 1,584 cfs to 1,376 cfs. Average daily outflows (excluding evapotranspiration) increased, going from 2,622 cfs to 4,078 cfs. Highest inflows came from the Kissimmee River through the S-65E structure (1,359 cfs). The outflow to the west via the S-77 structure into the C-43 Canal was 1,135 cfs and outflows south via the S-350 structures totaled 2,124 cfs. Flows east were 675 cfs via the S-308 structure into the C-44 Canal. Outflow via S-271 was 143 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 early May 2022 snail kite nesting survey revealed a total of 44 nests thus far, including 28 failures and 8 successes. 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 16, 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**). Continuous monitoring stations (six) on the Lake show optimal surface water temperatures ($> 25^{\circ}\text{C}$) for cyanobacterial and algal growth. The May 2 - 4, 2022 routine water quality monitoring survey on the Lake revealed that ~16% of the sites (or 5 sites) had chlorophyll *a* concentrations above 40 $\mu\text{g/L}$ (Lake-wide bloom threshold), with highest concentrations (103 $\mu\text{g/L}$) recorded at FEBIN (western region) and NES191 (northeastern region) locations (**Figure LO-7**).

Changes in Water Depth

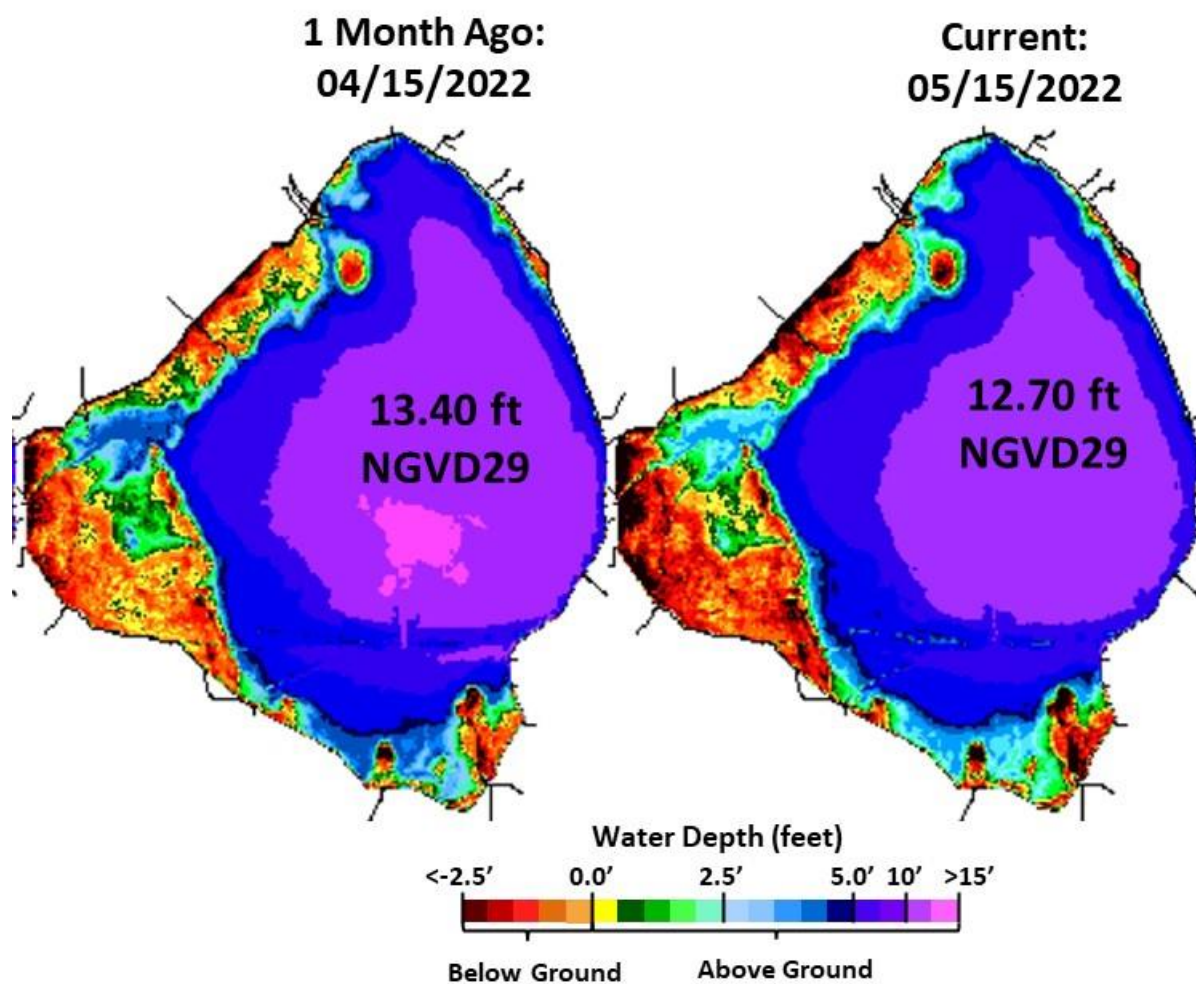


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

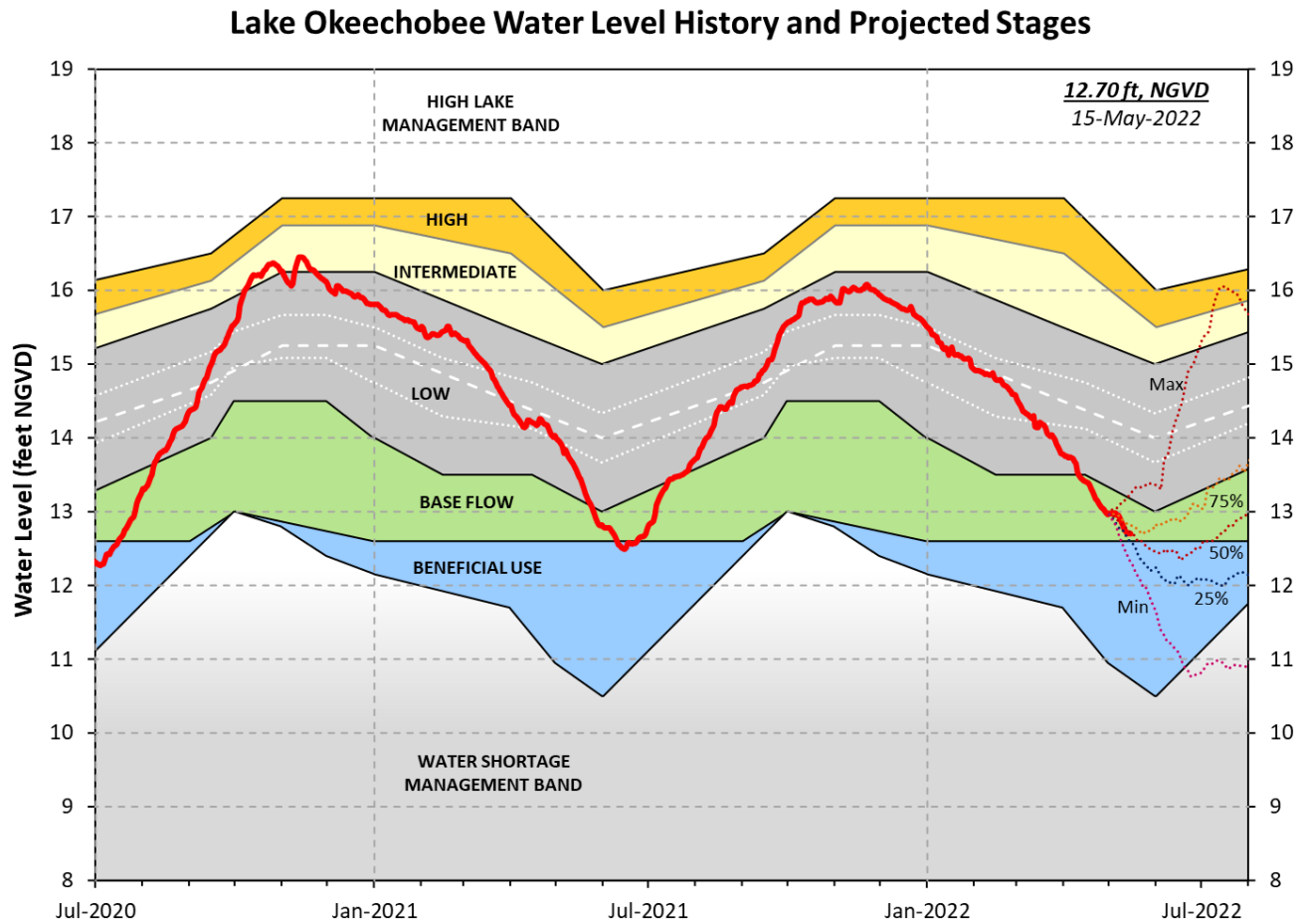


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

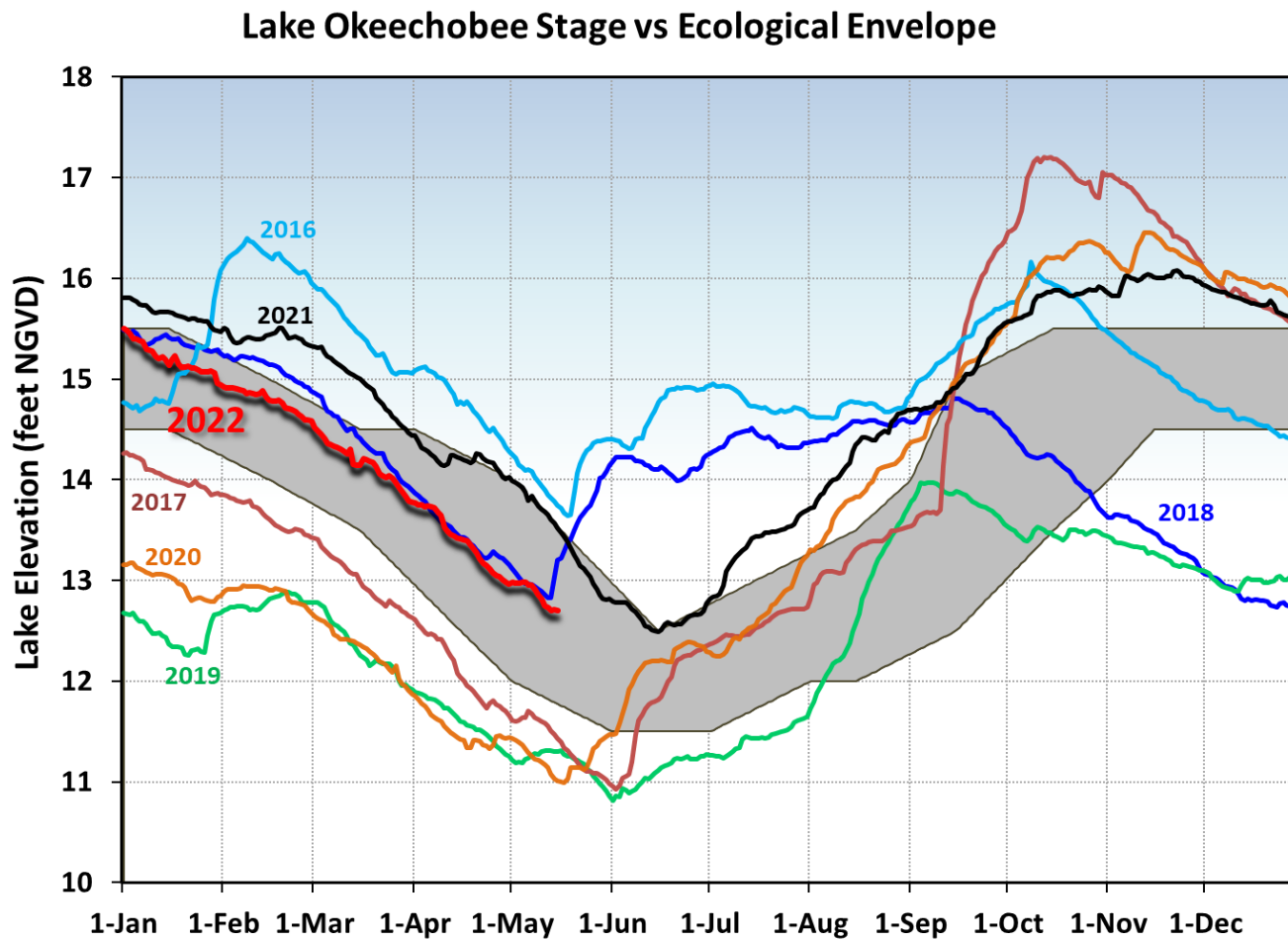


Figure LO-3. The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

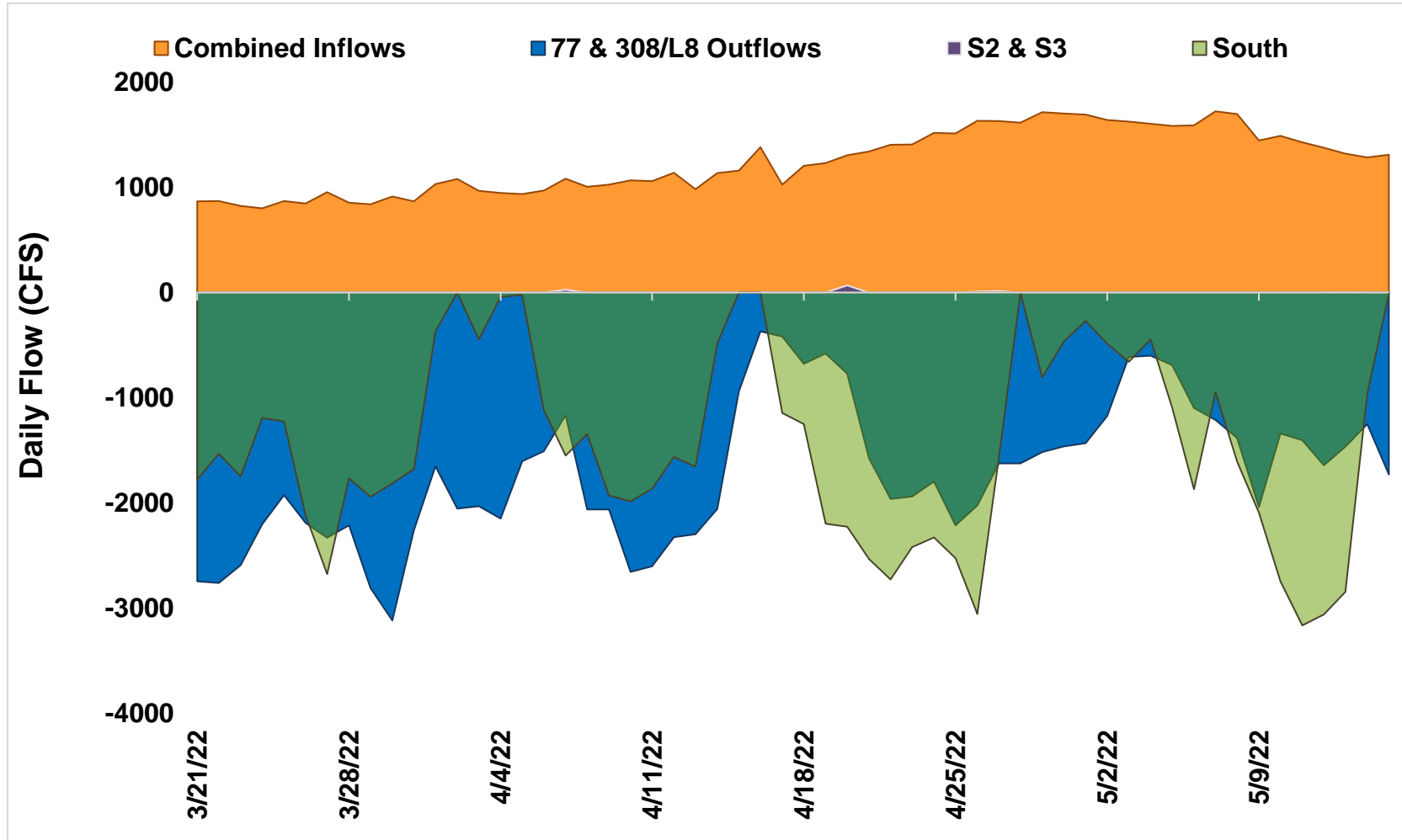


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

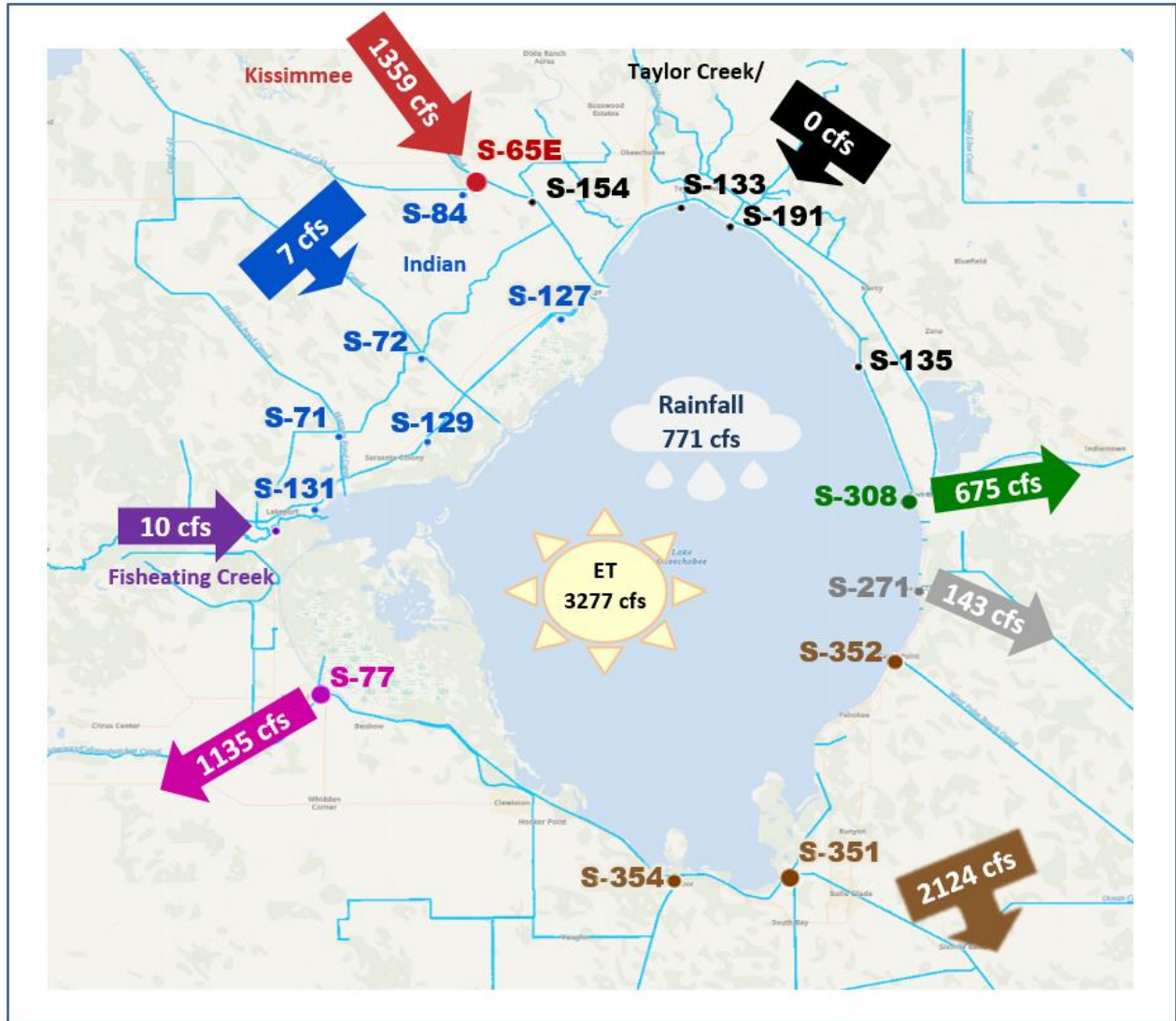


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of May 9 - 15, 2022.

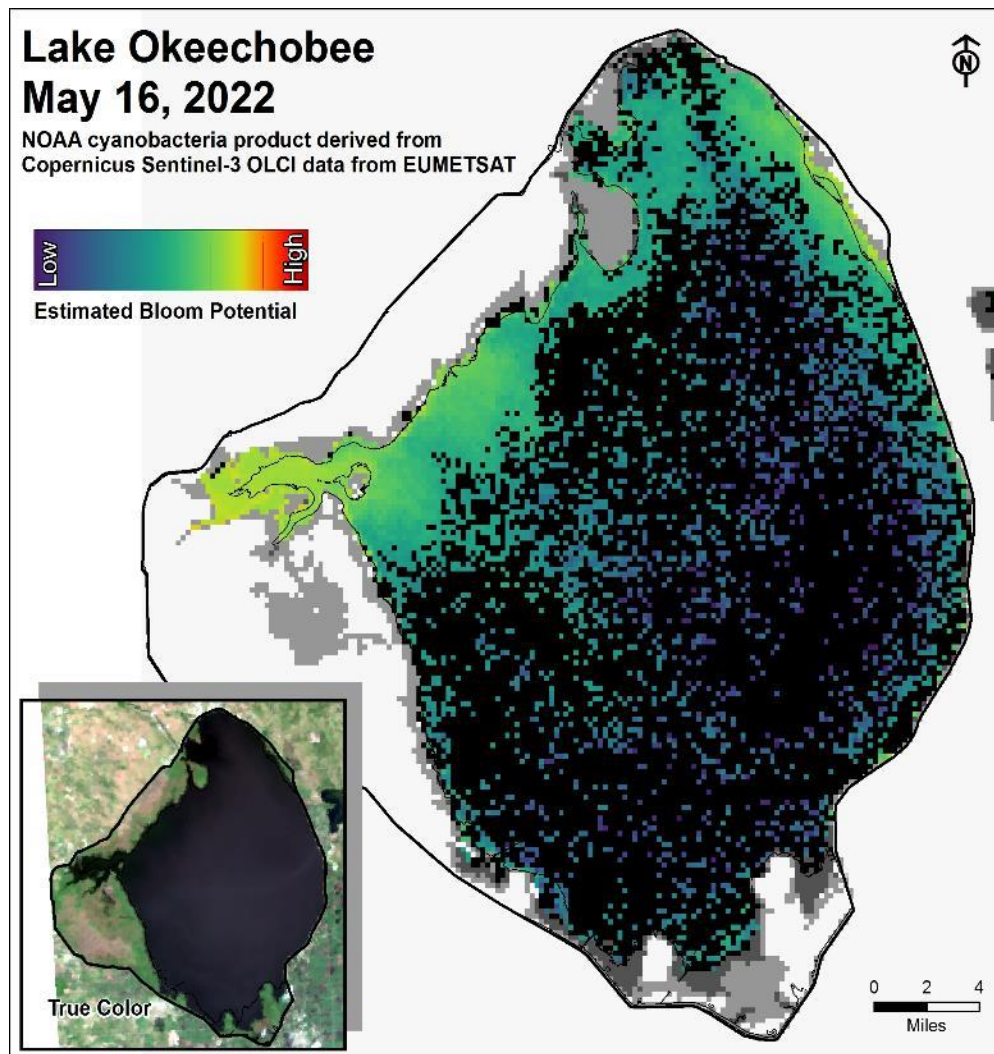


Figure LO-6. Cyanobacteria bloom potential on May 16, 2022 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

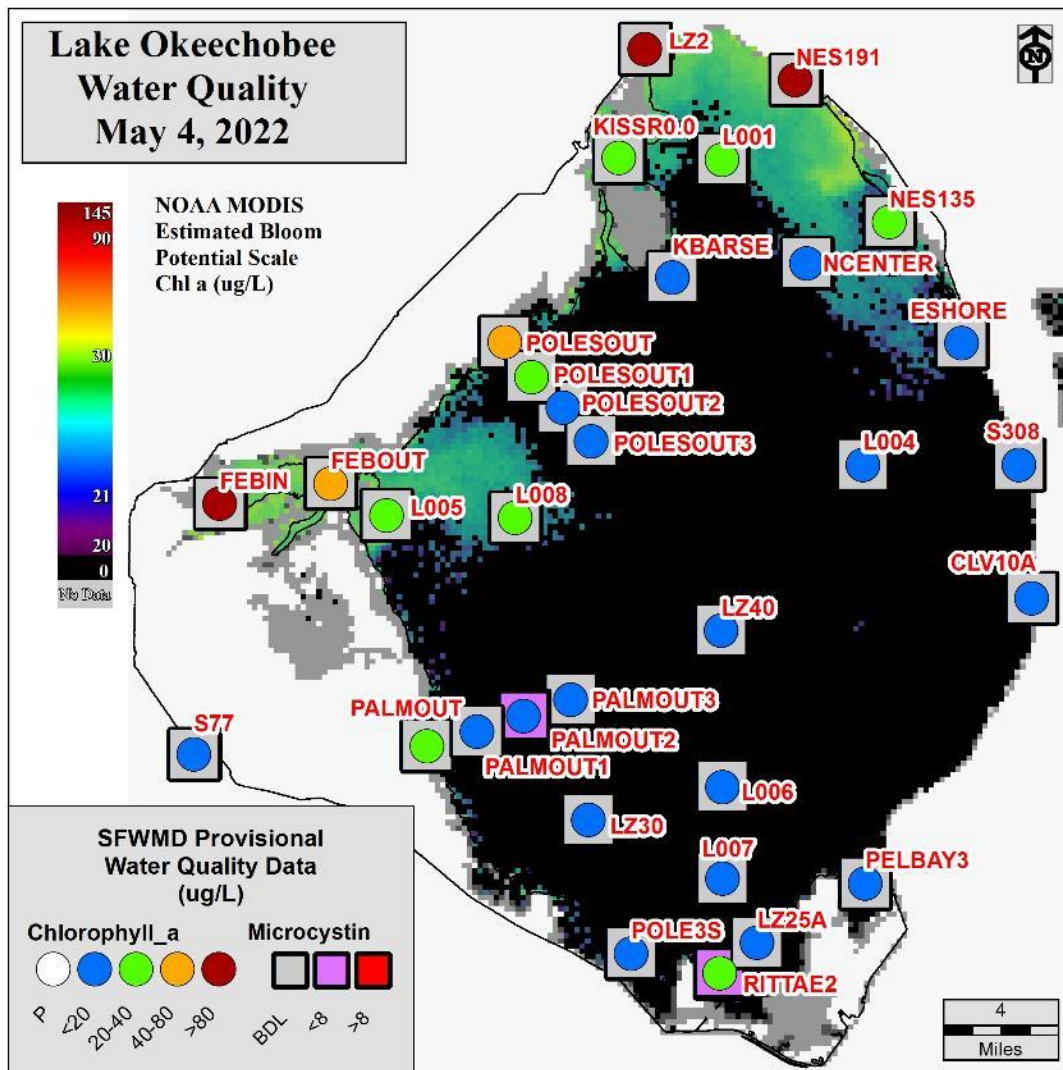


Figure LO-7. Expanded monitoring network and provisional chlorophyll *a* ($\mu\text{g/L}$) and total microcystins ($\mu\text{g/L}$) concentrations results from samples collected May 2 – 4, 2022.

Estuaries

Northern Estuaries

Over the past week, mean total inflow to the St. Lucie Estuary was 342 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was 316 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities increased at all sites within the estuary (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 25.8. Salinity conditions in the middle estuary have increased enough to be just 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 1,050 cfs (**Figures ES-6 and ES-7**) and the previous 30-day mean inflow was 1,310 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, salinities increased at Ft. Myers and Cape Coral and decreased at the remaining sites in the estuary (**Table ES-2 and Figures ES-8 and ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Cape Coral and Shell Point, and in the stressed range at 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, 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 a steady release of 2,000 cfs with estimated tidal basin inflows of 65 cfs. Model results from all scenarios predict daily salinity to be 4.9 or lower and the 30-day moving average surface salinity to be 1.8 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 13, 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 St. Lucie, Martin, or Palm Beach 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.

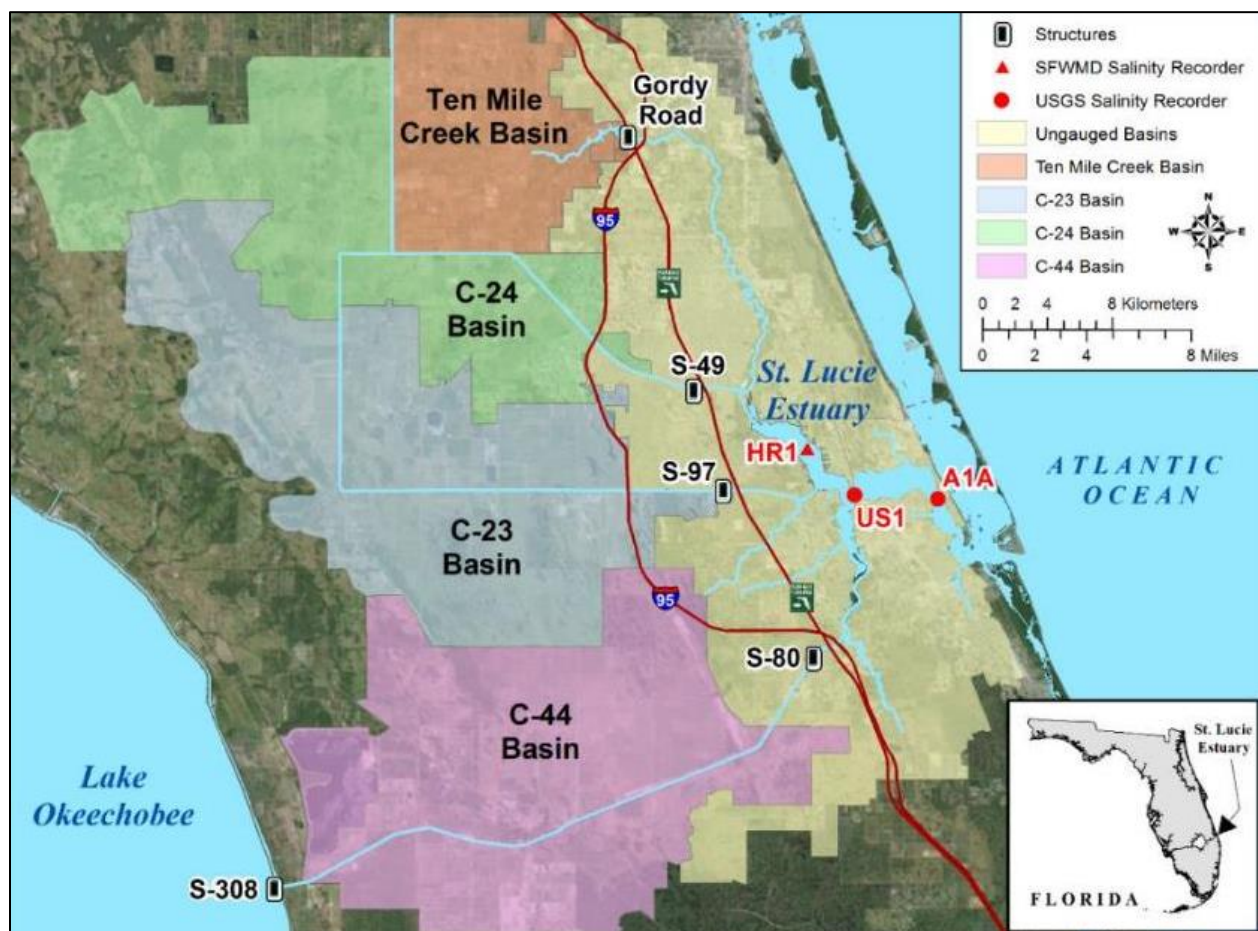


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

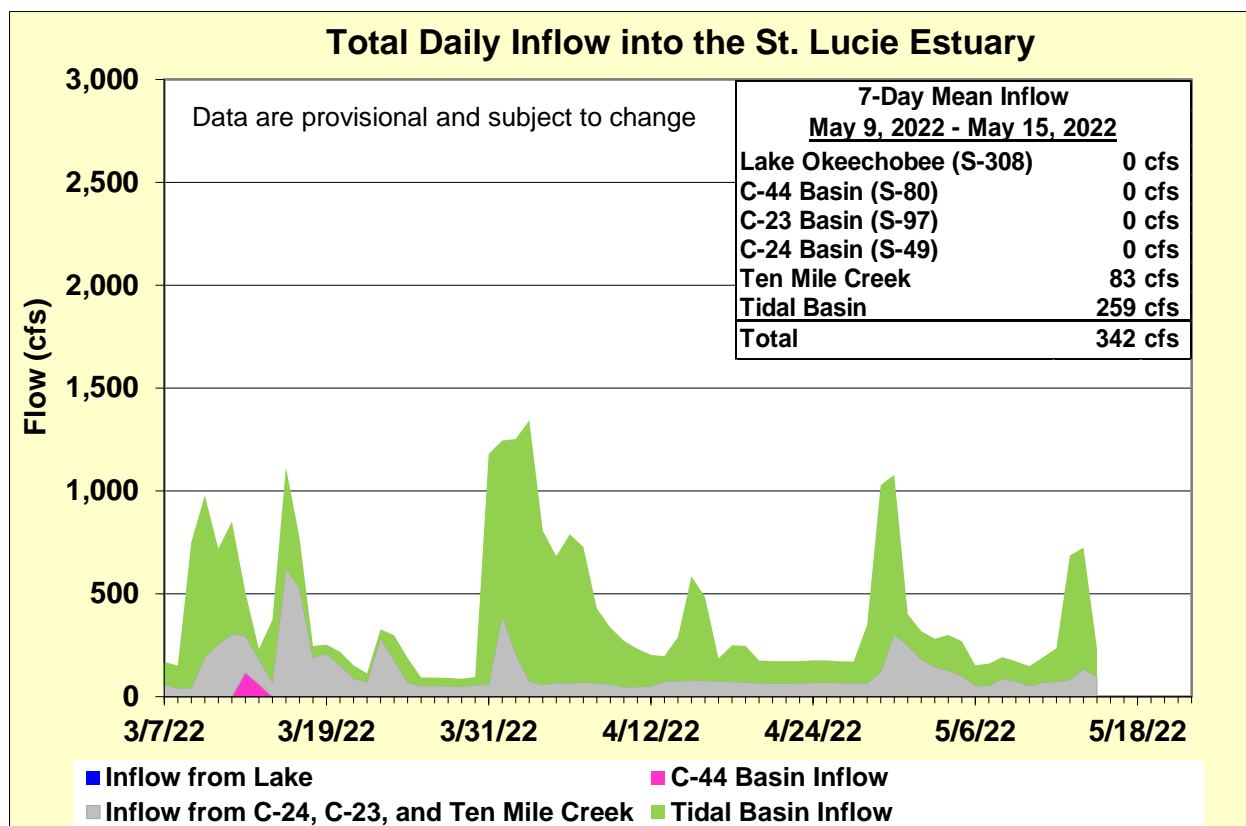


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	22.0 (15.8)	21.2 (15.1)	10.0 – 25.0
US1 Bridge	25.1 (22.3)	26.4 (23.7)	10.0 – 25.0
A1A Bridge	31.9 (29.0)	32.1 (30.7)	10.0 – 25.0

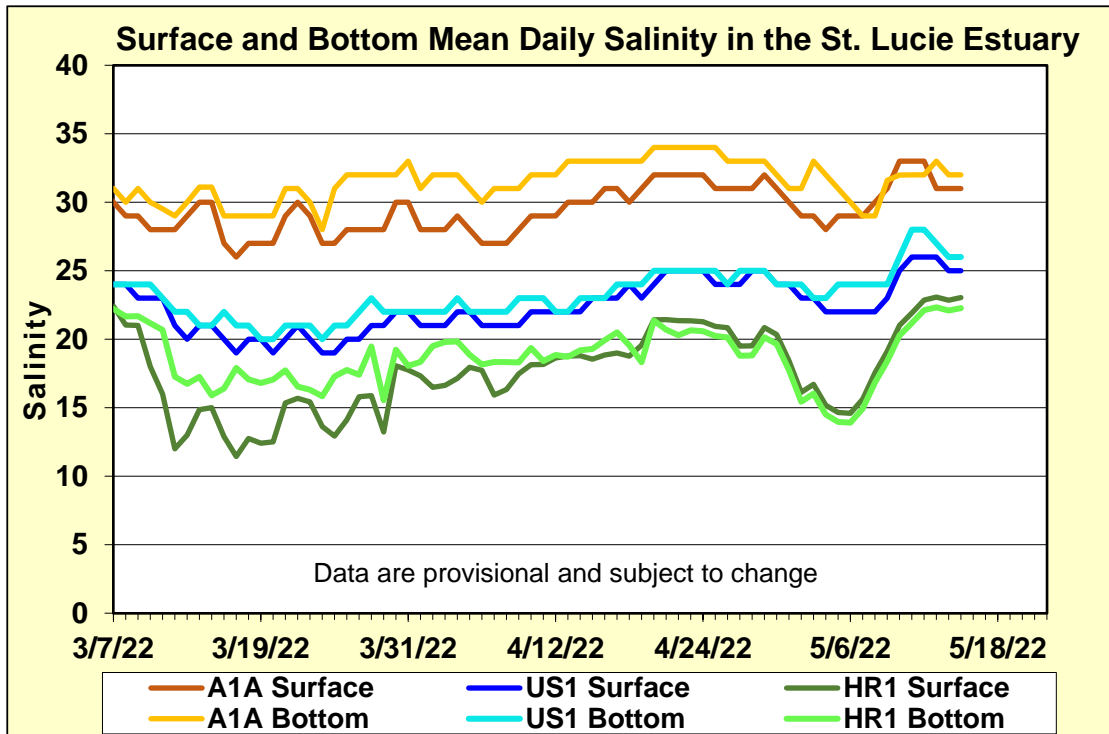


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

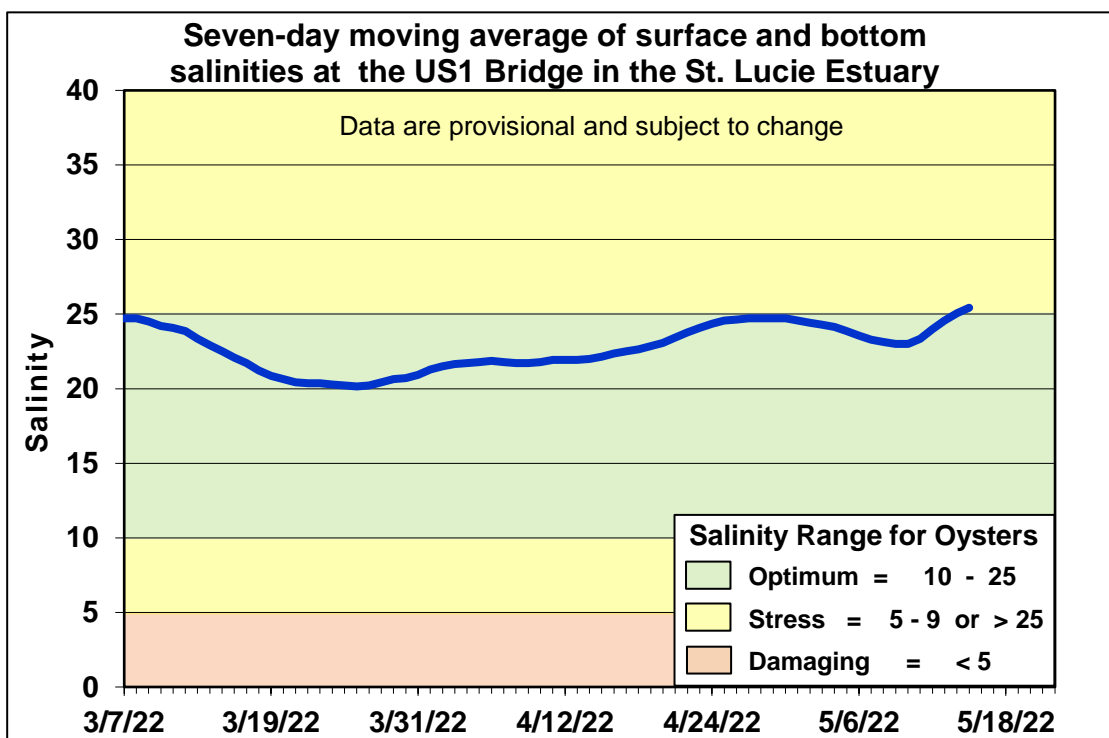


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

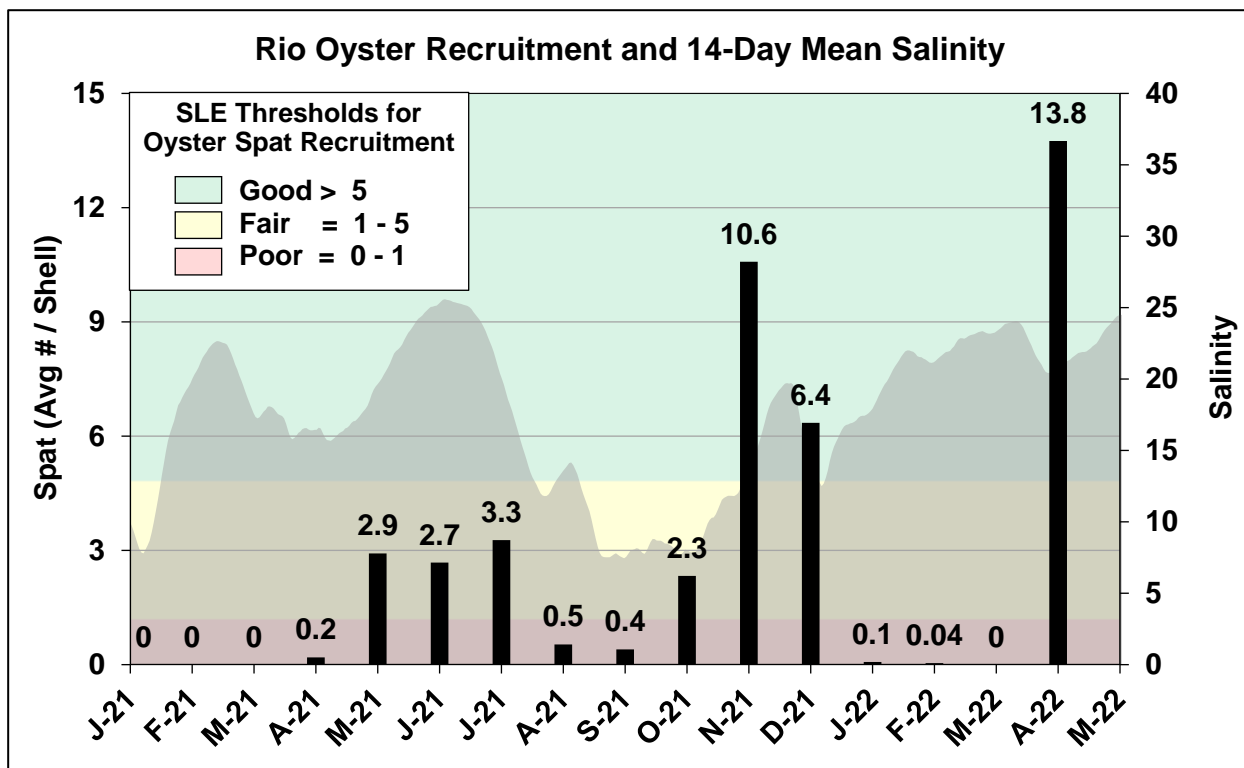


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

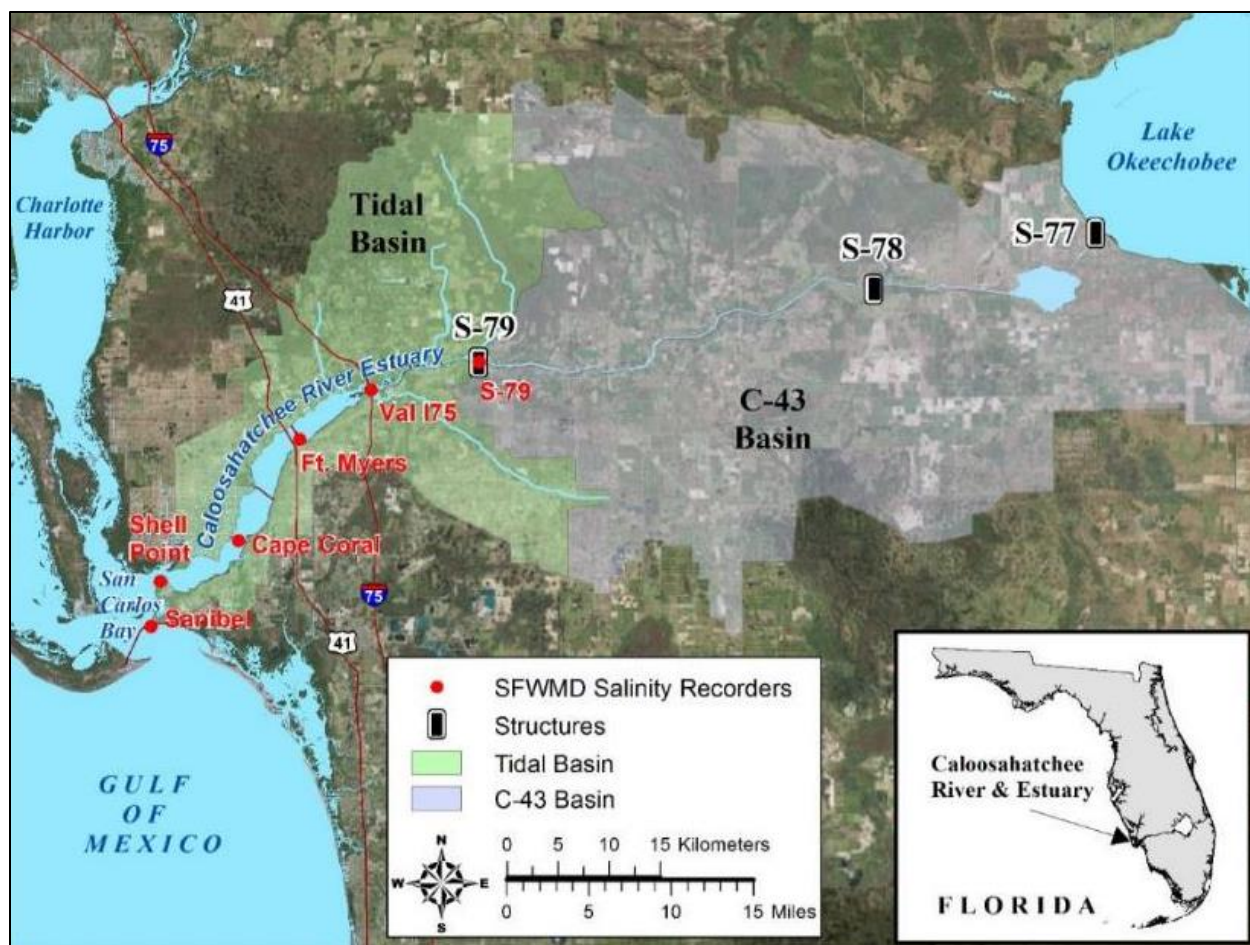


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

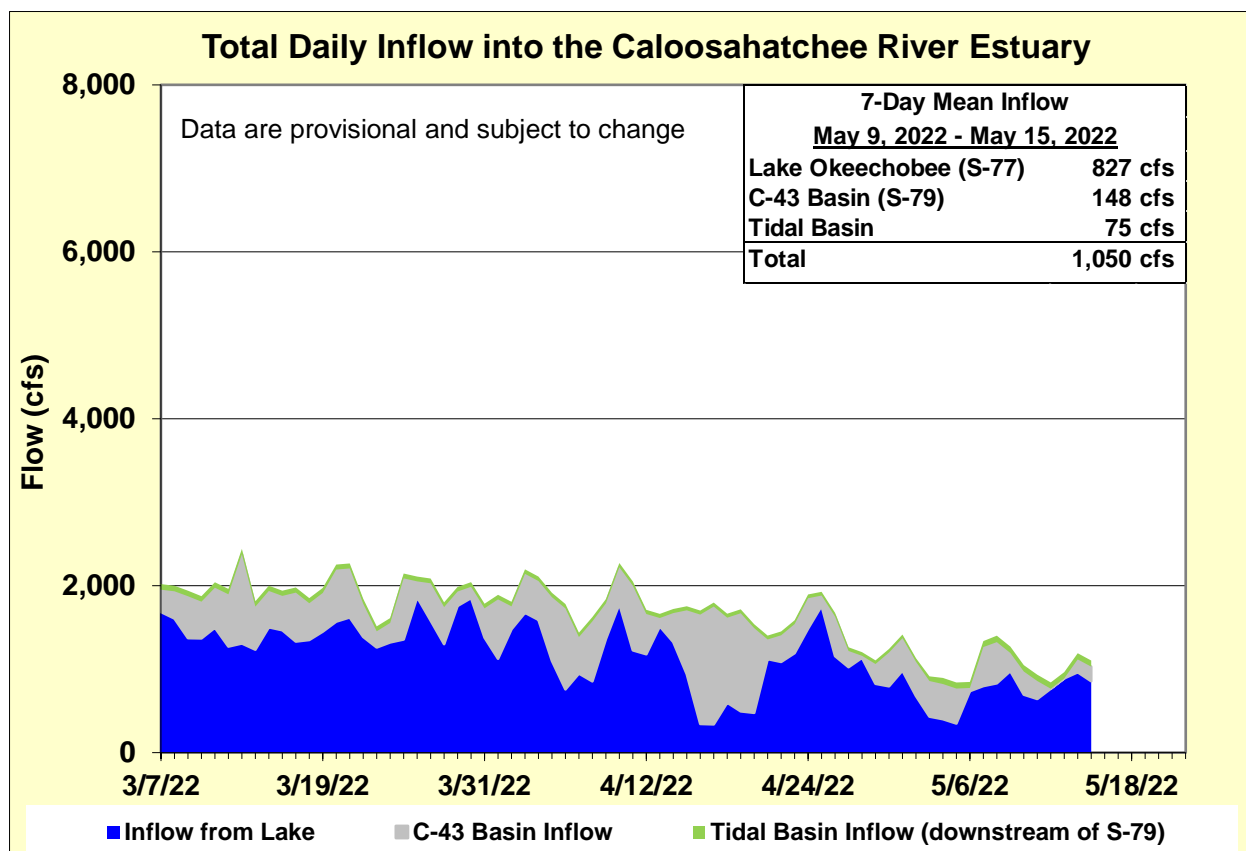


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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 (0.3)	0.2 (0.3)	0.0 – 10.0
Val I-75	0.6 (0.8)	0.8 (0.9)	0.0 – 10.0
Fort Myers Yacht Basin	4.4 (4.2)	5.9 (4.9)	0.0 – 10.0
Cape Coral	12.1 (11.6)	13.6 (12.8)	10.0 – 25.0
Shell Point	24.7 (25.3)	24.9 (26.5)	10.0 – 25.0
Sanibel	28.7 (30.2)	30.7 (32.0)	10.0 – 25.0

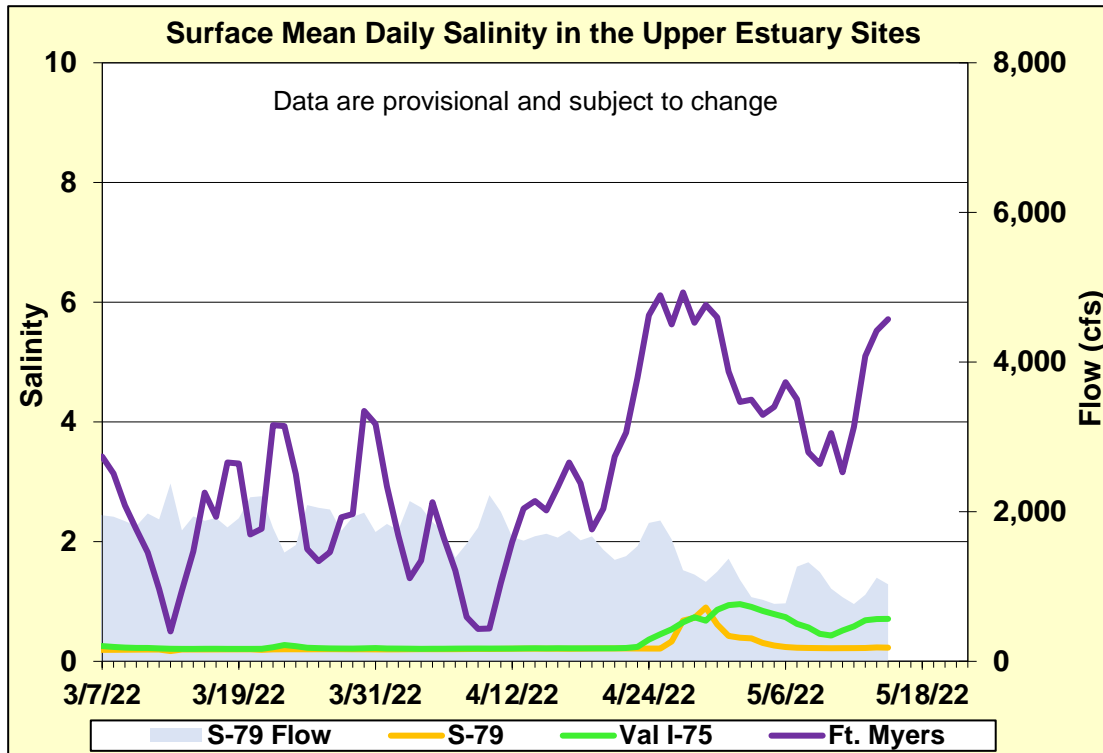


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

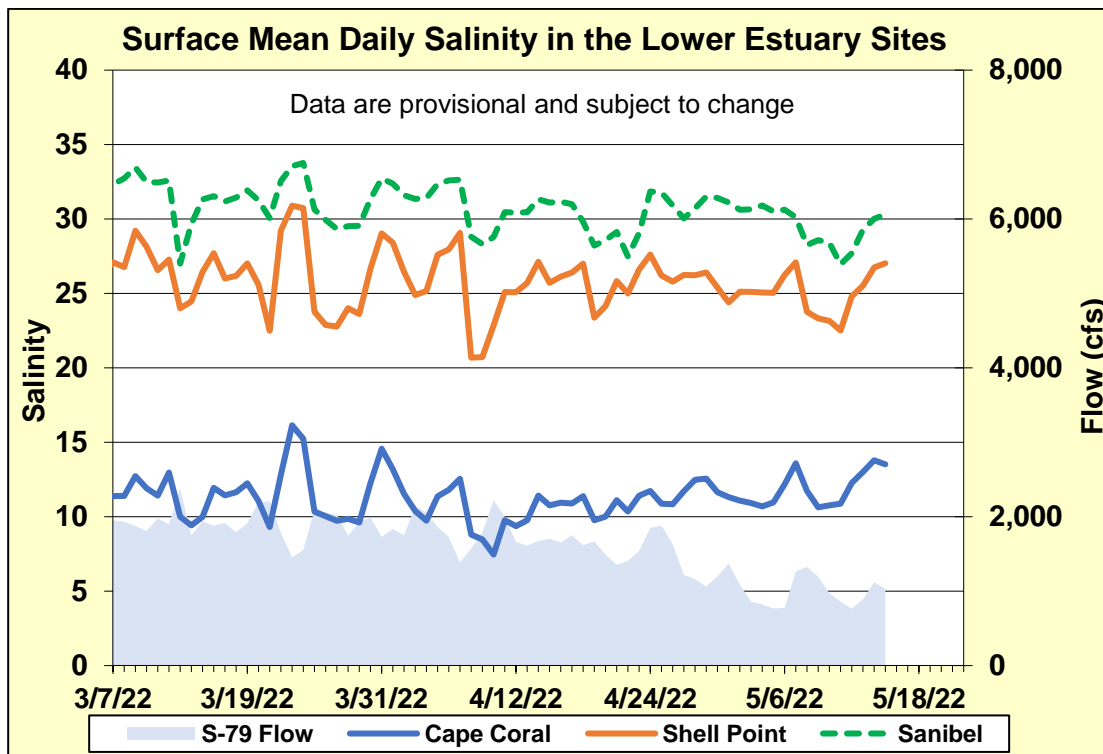


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

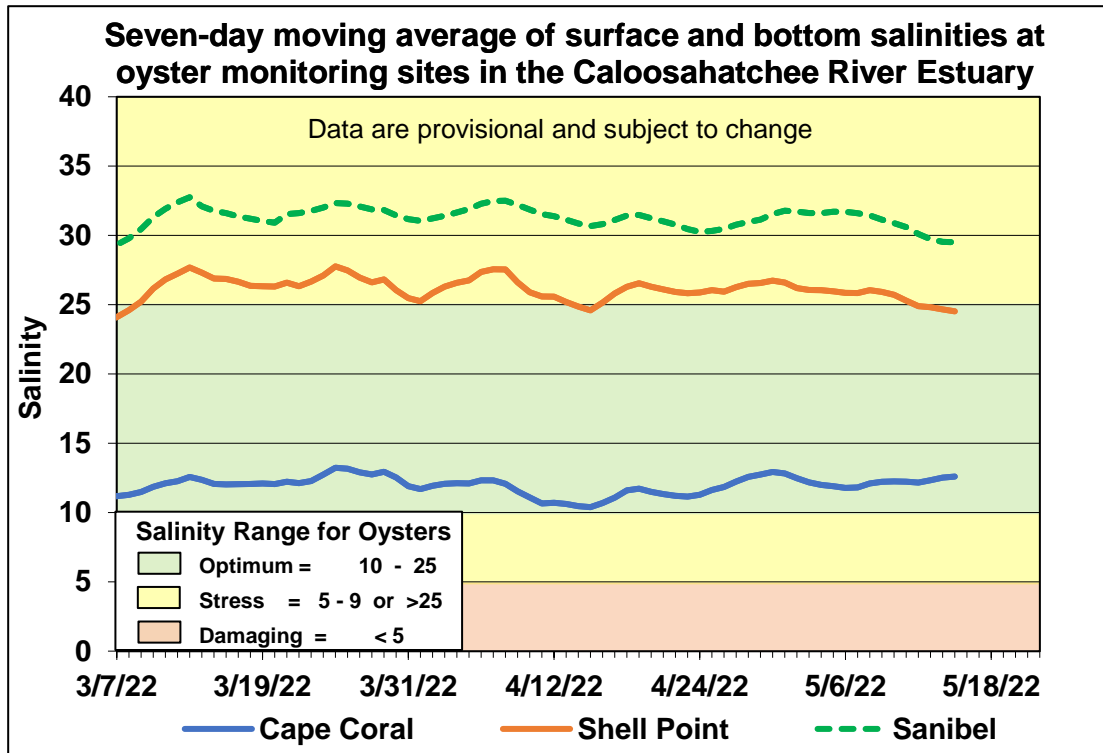


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

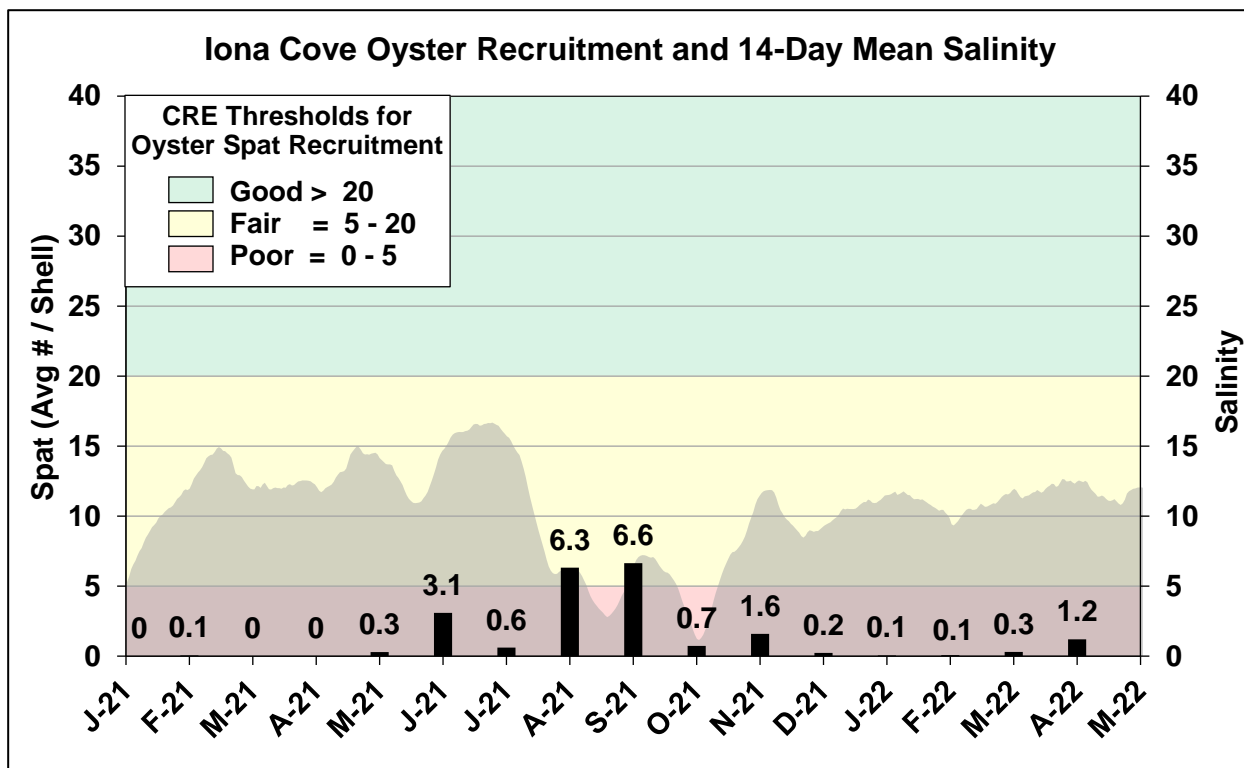


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

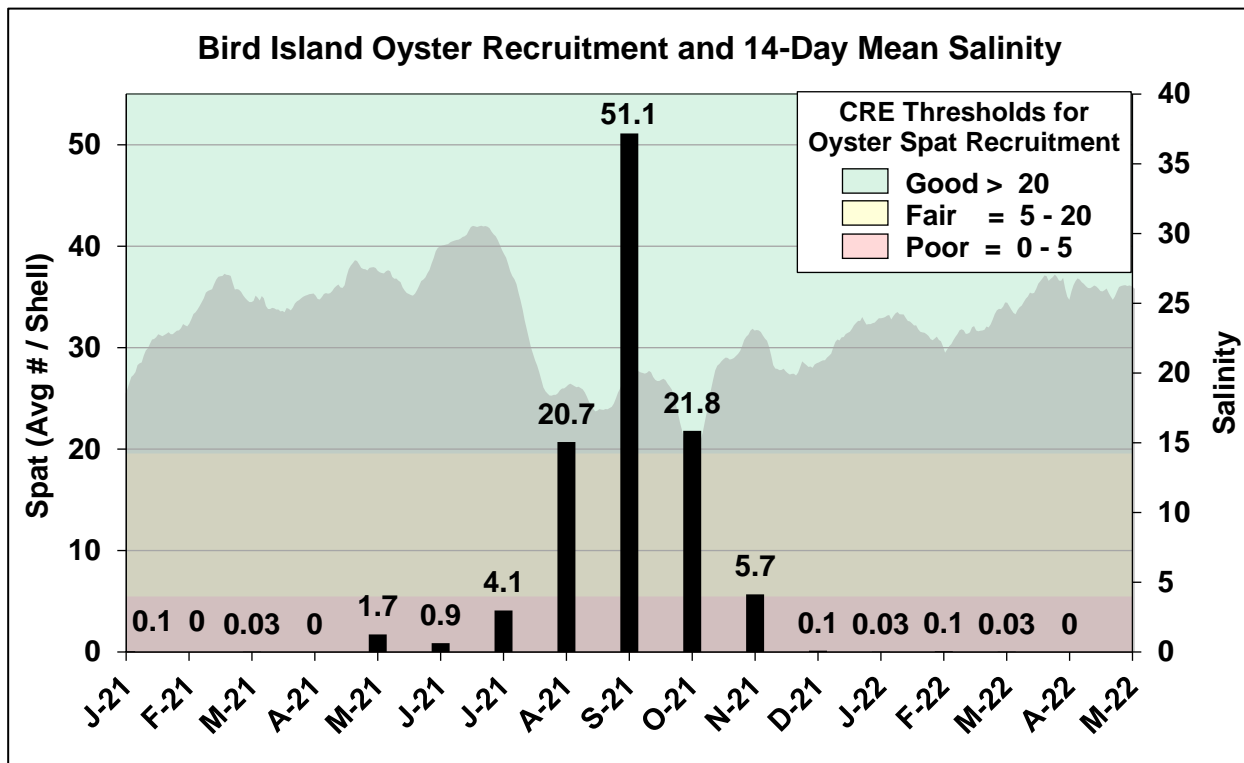


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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	65	4.9	1.8
B	450	65	3.5	1.4
C	800	65	2.4	1.2
D	1000	65	1.7	1.1
E	1500	65	0.8	0.9
F	2000	65	0.3	0.8

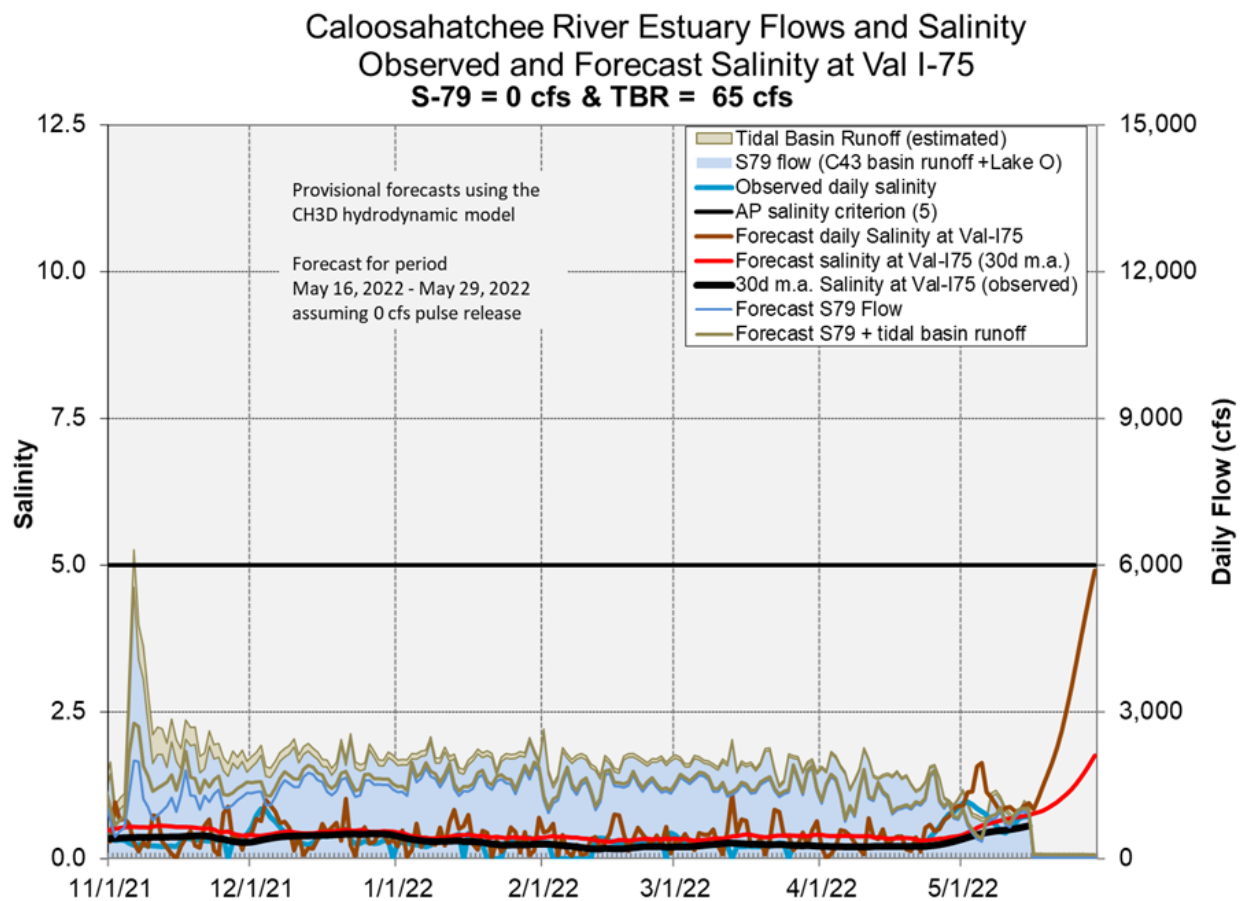


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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/m²/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 near or below 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. The Central Flow-way contains nests of Migratory Bird Treaty Act protected species. Most online treatment cells are at or near target stage. Vegetation in the Eastern and Central Flow-ways is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for the Central and Western Flow-ways are below 1.0 g/m²/year (**Figure S-4**).

STA-5/6: 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/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.

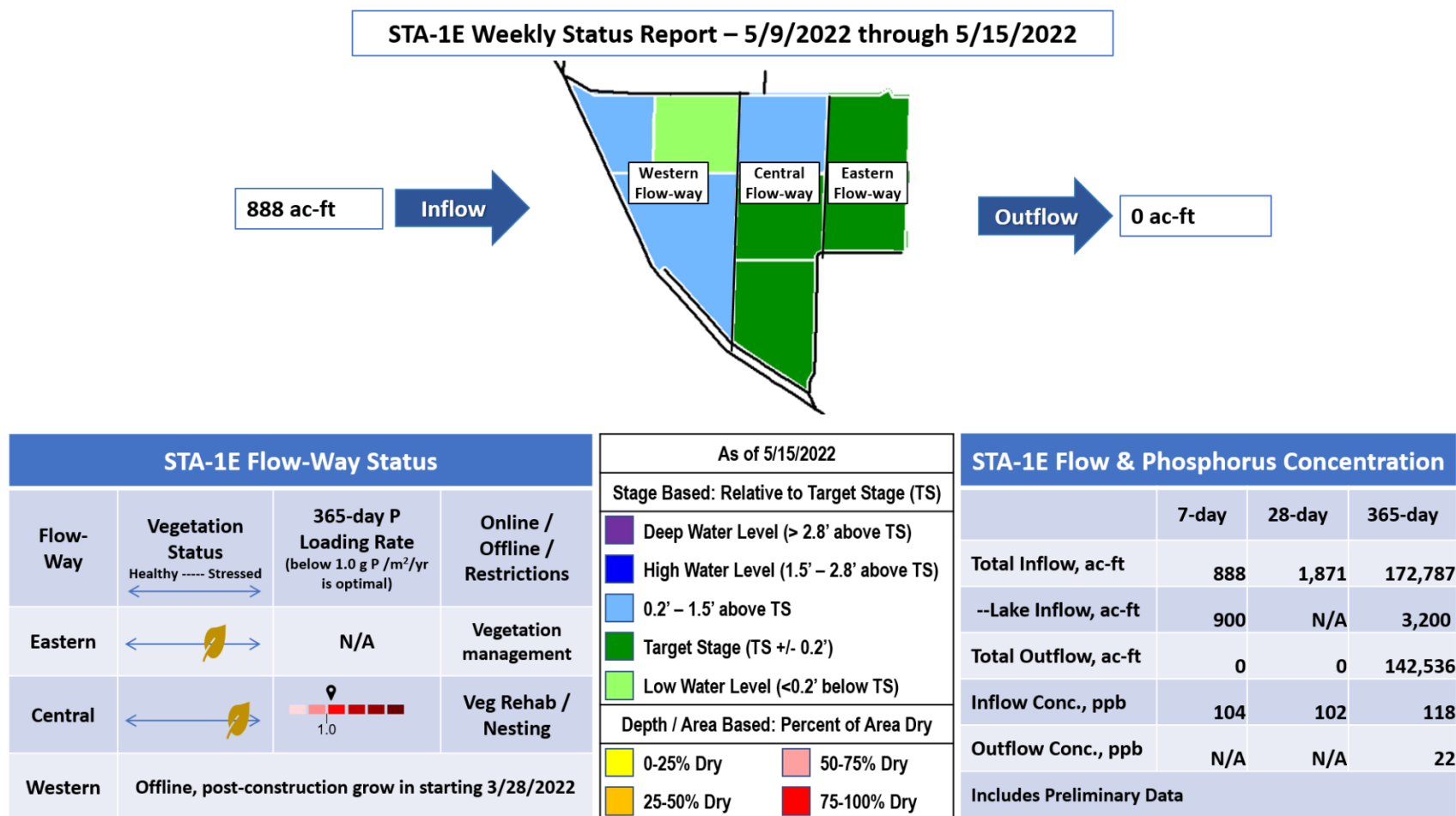
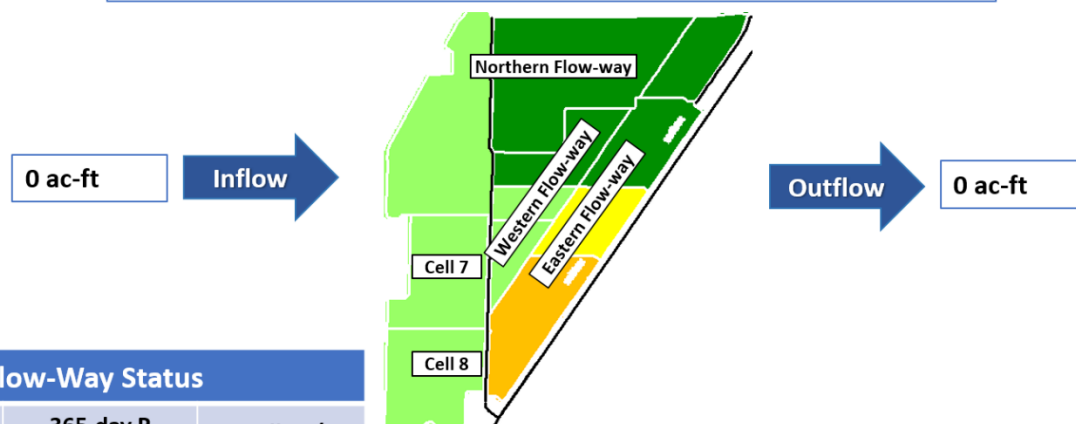


Figure S-1. STA-1E Weekly Status Report

STA-1W Weekly Status Report – 5/9/2022 through 5/15/2022



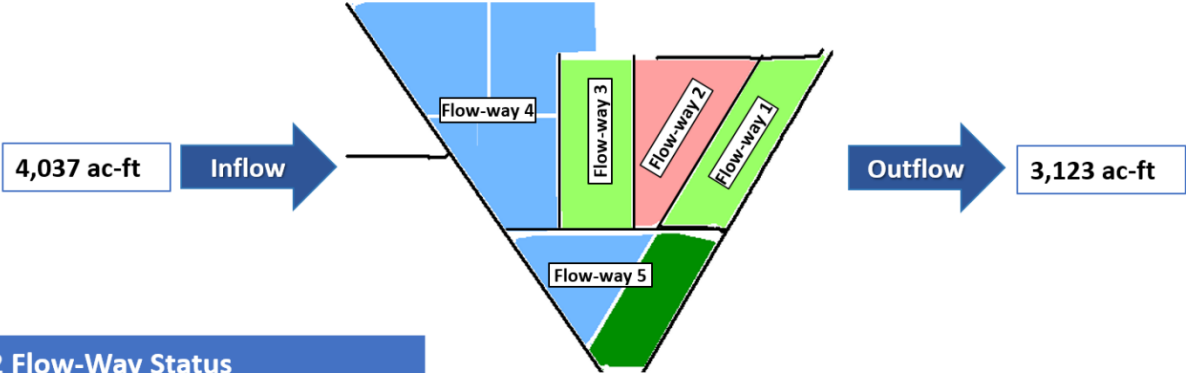
STA-1W Flow-Way Status			
Flow-Way	Vegetation Status Healthy --- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
Northern	← →	1.0	Veg mgmt. / Avian Nesting
Western	← →	1.0	Vegetation management
Eastern	← →	1.0	Veg mgmt. / Avian Nesting
Cell 7	← →	N/A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

As of 5/15/2022	
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-1W Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	0	583	56,960
--Lake Inflow, ac-ft	0	N/A	3,100
Total Outflow, ac-ft	0	0	52,971
Inflow Conc., ppb	N/A	127	158
Outflow Conc., ppb	N/A	N/A	24
Includes Preliminary Data			

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

STA-2 Weekly Status Report – 5/9/2022 through 5/15/2022



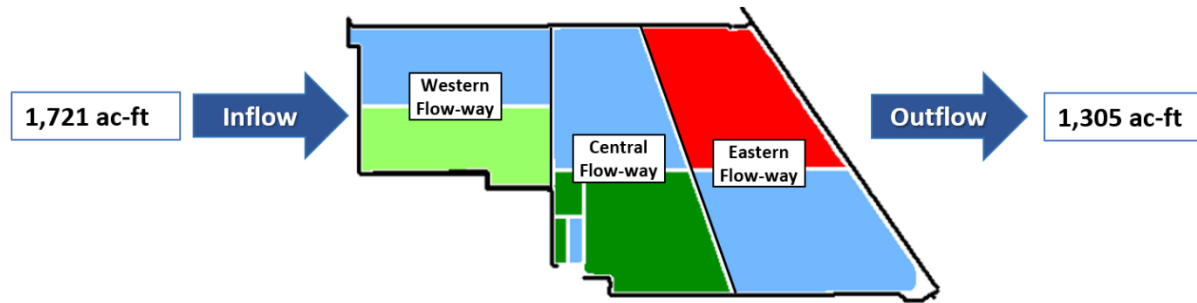
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1			Post Dryout
2	Offline, construction activities as of 9/7/2021		
3			Veg Rehab / Nesting
4			Vegetation Rehab
5			Online

As of 5/15/2022	
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	4,037	12,438	288,552
--Lake Inflow, ac-ft	3,700	N/A	38,100
Total Outflow, ac-ft	3,123	7,950	300,207
Inflow Conc., ppb	57	47	89
Outflow Conc., ppb	17	17	15
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

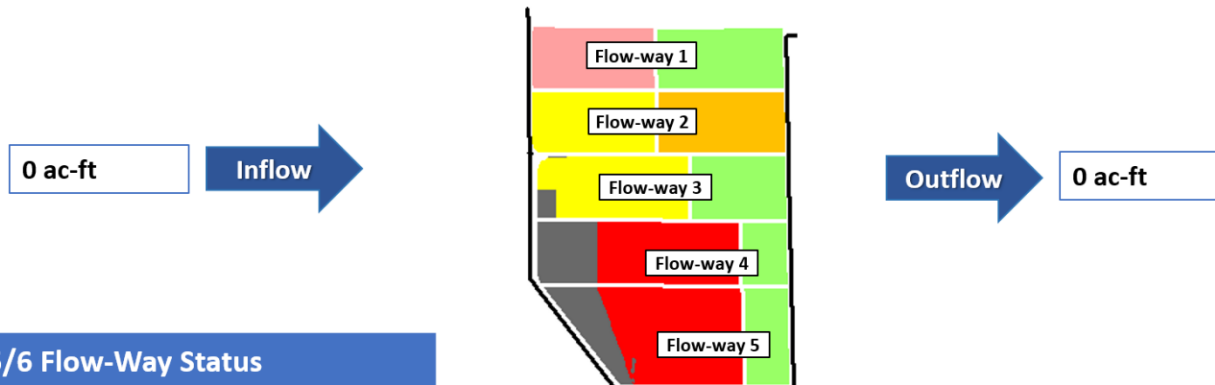
STA-3/4 Weekly Status Report – 5/9/2022 through 5/15/2022



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 5/15/2022			
				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>			
				<div>Depth / Area Based: Percent of Area Dry</div> <div> <div>0-25% Dry</div> <div>25-50% Dry</div> <div>50-75% Dry</div> <div>75-100% Dry</div> </div>			
Central	← →	1.0	Avian Nesting				
Western	← →	1.0	Online				
				Total Inflow, ac-ft	1,721	5,525	338,288
				--Lake Inflow, ac-ft	800	N/A	23,600
				Total Outflow, ac-ft	1,305	1,461	303,462
				Inflow Conc., ppb	34	52	91
				Outflow Conc., ppb	19	21	15
				Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 5/9/2022 through 5/15/2022



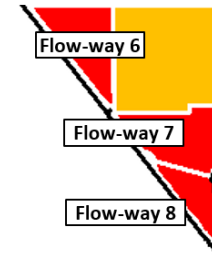
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2			Online
3			Online
4	Offline, vegetation management starting 01/24/2022		
5			Online

As of 5/15/2022	
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	0	0	177,784
--Lake Inflow, ac-ft	0	N/A	4,200
Total Outflow, ac-ft	0	0	169,156
Inflow Conc., ppb	N/A	N/A	243
Outflow Conc., ppb	N/A	N/A	50
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 5/9/2022 through 5/15/2022



STA-5/6 Flow-Way Status				As of 5/15/2022	
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)	
				<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>	
6	←-----→	 1.0	Online		
7	←-----→	 1.0	Online		
8	←-----→	 1.0	Online		
				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, $\mu\text{g/L}$ 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: Stage at the 1-8C fell quickly then reversed late last week. The average on Sunday was 0.24 feet below the flat Zone A1 regulation line. WCA-2A: Stage receded then reversed at the S11B headwater last week. The average at that gauge on Sunday remained 0.39 feet below the flat regulation line, and 0.11 feet above the water supply floor. WCA-3A: Last week the Three Gauge Average stages ascended gradually; average stage was 1.08 feet below the falling regulation line on Sunday. (3-69W is +0.31'). WCA-3A: Stage ascended at gauge 62 (Northwest corner) last week, the average on Sunday was 1.42 feet below the flat Upper schedule line. (**Figures EV-1 through EV-4**).

Water Depths

The SFWDAT tool indicates that stages are falling significantly below ground east of the Miami Canal in WCA-3A North. WCA-1 and WCA-2A are drying down. 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 the eastern Everglades Protection Area, while deeper in western BCNP and ENP. Looking back one year, south-eastern and central WCA-3A is significantly lower in depth compared to one year ago, while western BCNP is much wetter. (**Figure EV-6**). Comparing current depths to the past 20 years, the eastern half WCA-3A North remains below the 30th percentile. BCNP is above the 50th percentile but below the soil surface both of these dry conditions are typical for this time of year but not favorable. Eastern WCA-3A South is within the 10 to 20th percentile, a good thing for that historically ponded region. Eastern Everglades National Park remains above the 70th percentile. (**Figure EV-7**).

Taylor Slough and Florida Bay

Stages in Taylor Slough increased an average of 0.07 feet over this past week while receiving 1.11 inches of weekly rain and an increase of westward water movement through multiple structures. Individual stage gauge changes ranged from -0.07 to +0.25 feet (**Figure EV-8**). The Slough is now 8 inches higher than its historical average driven in large part by the northern areas which are 10 inches higher than the historical average for this time of year (pre-Florida Bay initiative which started in 2017). Based upon water deliveries that started over the weekend and the heavy end of week rainfall, these water levels are expected to increase more, at least, in the beginning of this coming week. The southern gauges in the Slough still have not dried out completely this year (**Figure EV-9**) which is a positive for being able to move water to Florida Bay when the wet season starts.

Salinities in Florida Bay averaged an increase of 0.3 over the week ending 5/15, with individual station changes ranging from -1.6 to +2.1 (**Figure EV-8**). The largest changes (both positive and negative) occurred in the nearshore areas. 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. This is the time of year that salinities rise rapidly

due to increased evaporation and the lack of precipitation/flow, but the start of the wet season can also rapidly lower salinities.

Water Management Recommendations

Conserving water in the northern basins, then allowing that water to move downstream as we transition further into the dry season maximizes the ecological benefit of freshwater on the landscape. Flows as long as possible into the northern WCA-3A that assist 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. *If conditions allow discharges into the northeastern corner of WCA-3A North would have great ecological benefit.* 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	1.39	+0.05
WCA-2A	1.38	+0.02
WCA-2B	1.01	-0.17
WCA-3A	0.69	+0.04
WCA-3B	1.19	+0.12
ENP	1.04	-0.07

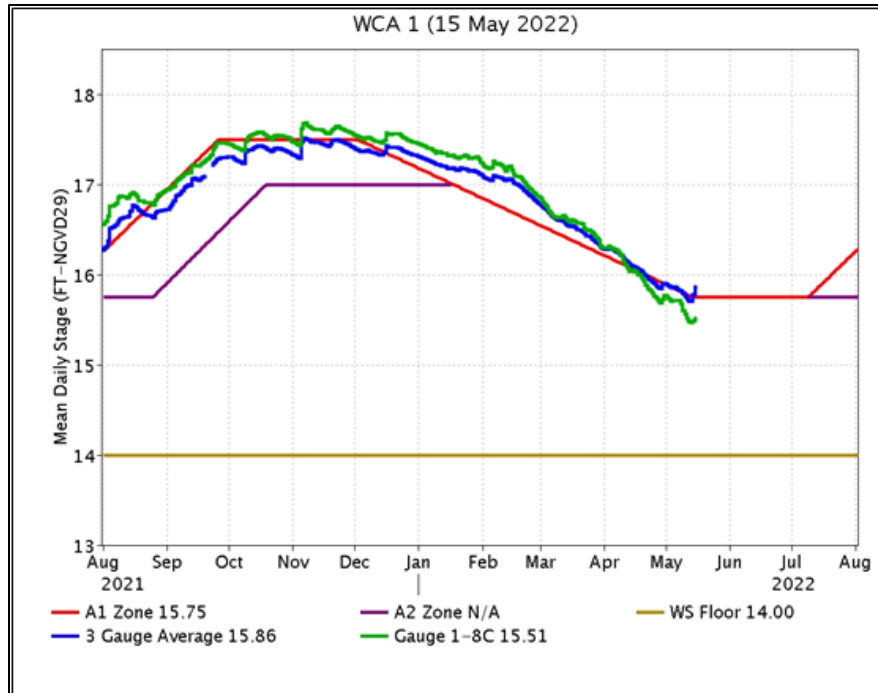


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

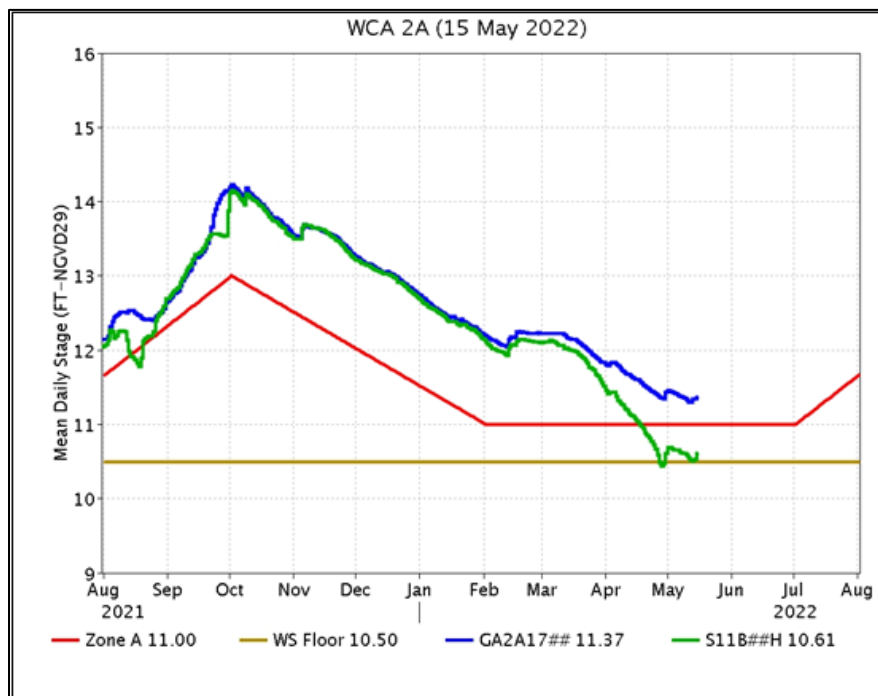


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

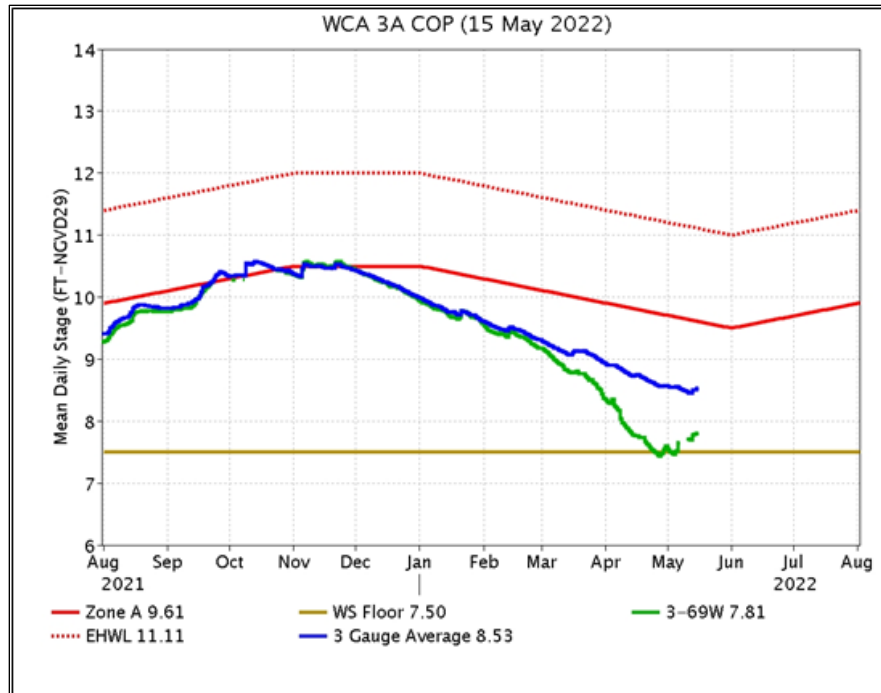


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

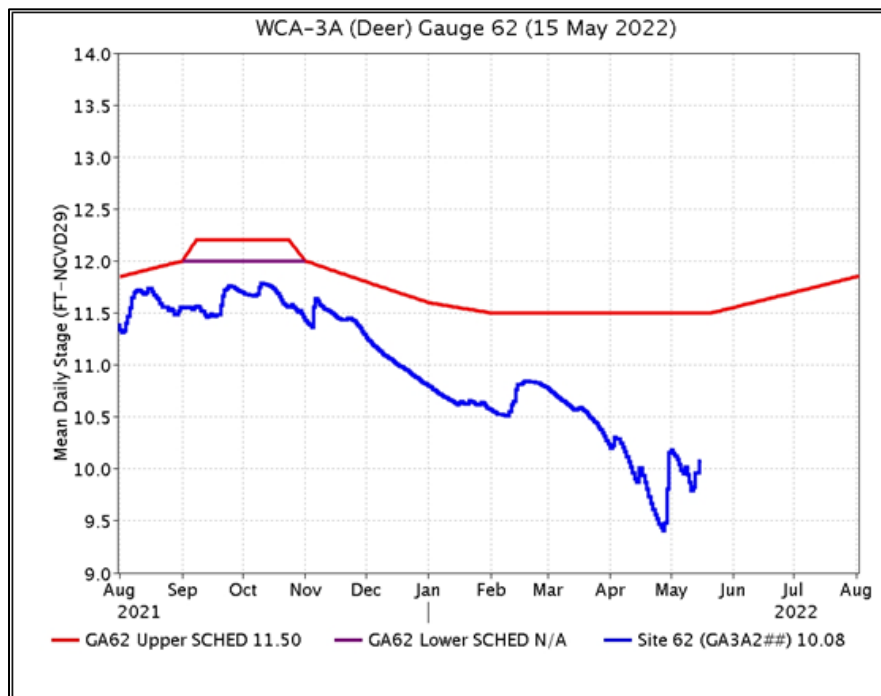


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

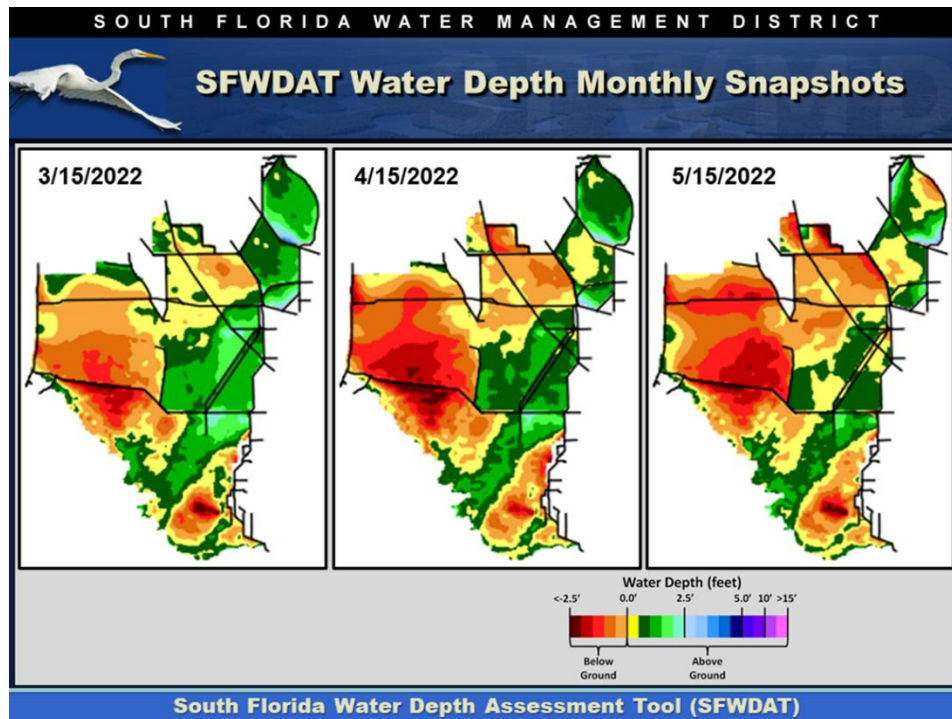


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

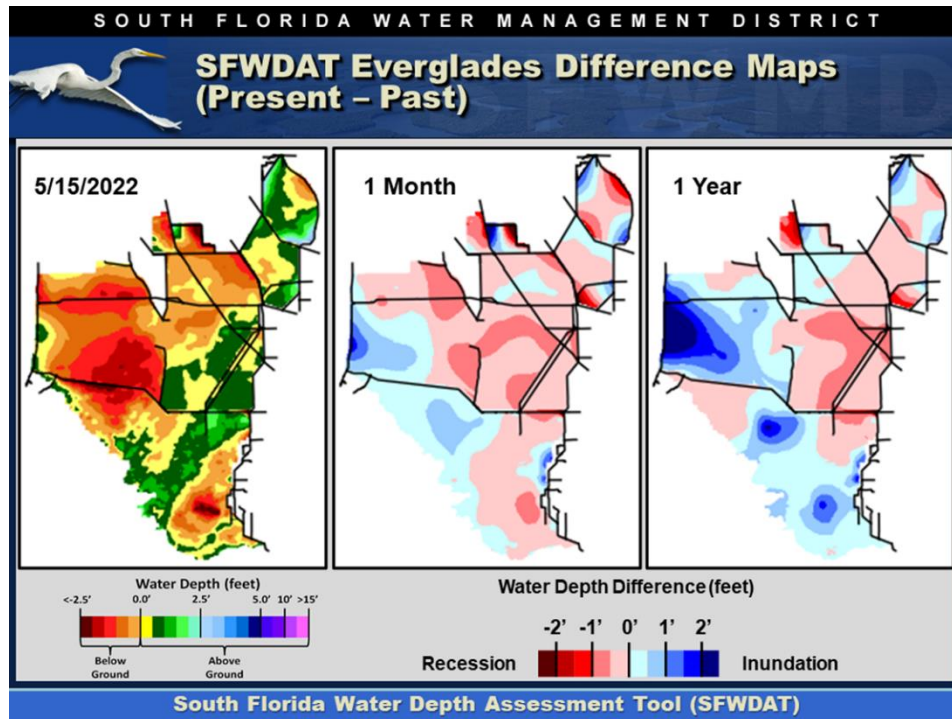


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

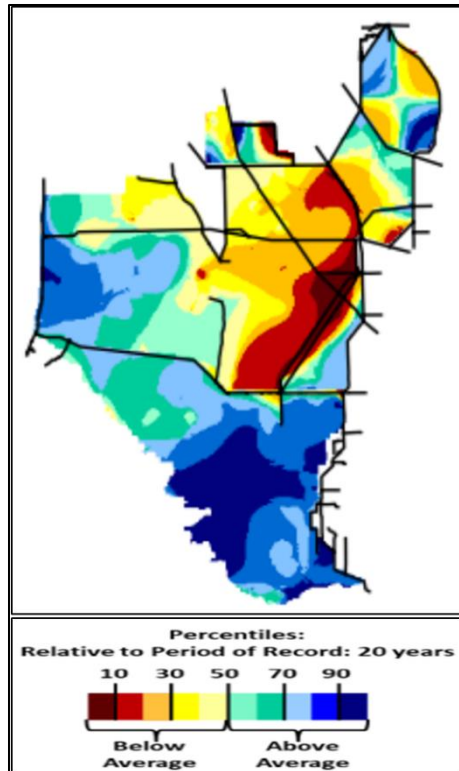


Figure EV-7. Present water depths (5/8/2022) compared to the day of year median over the previous 20 years.

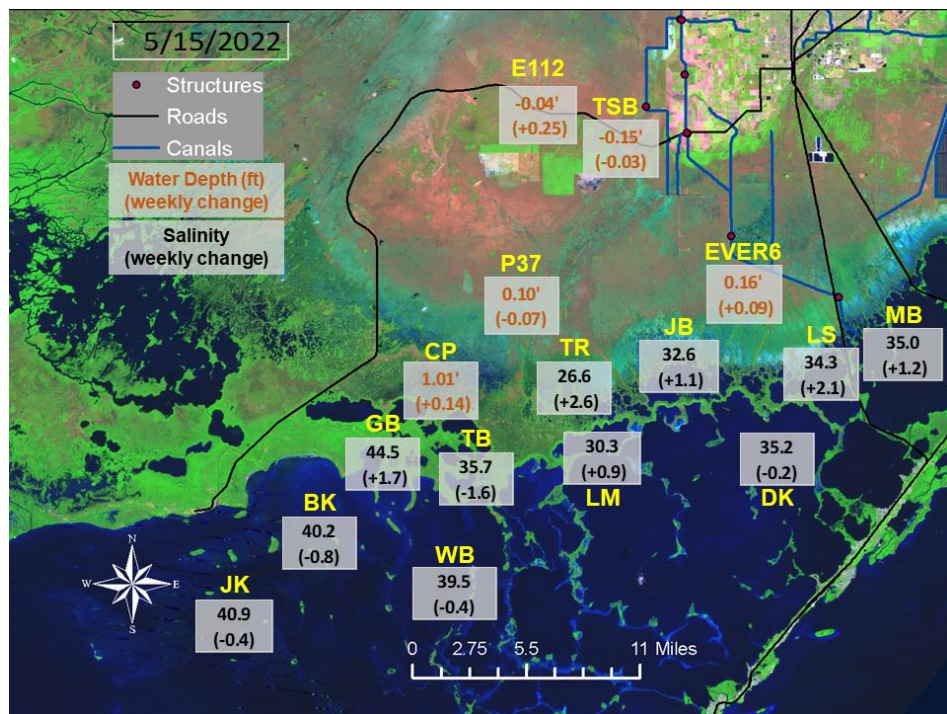


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

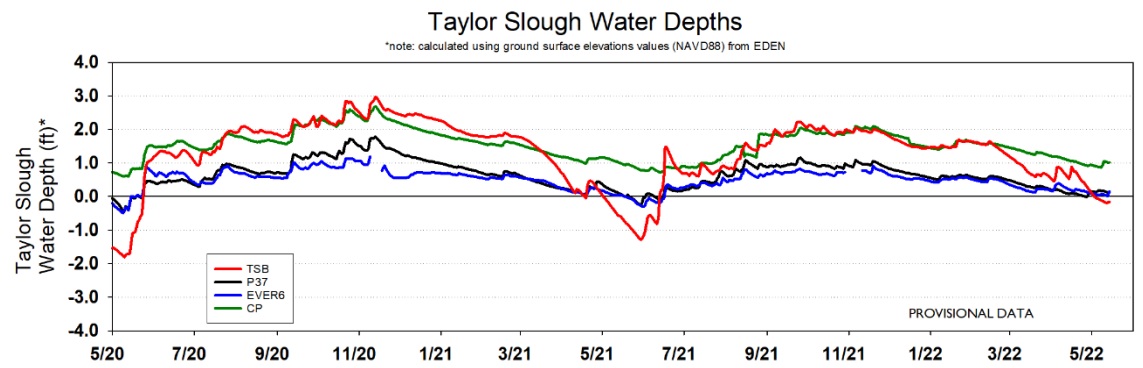


Figure EV-9. Taylor Slough water depth time series.

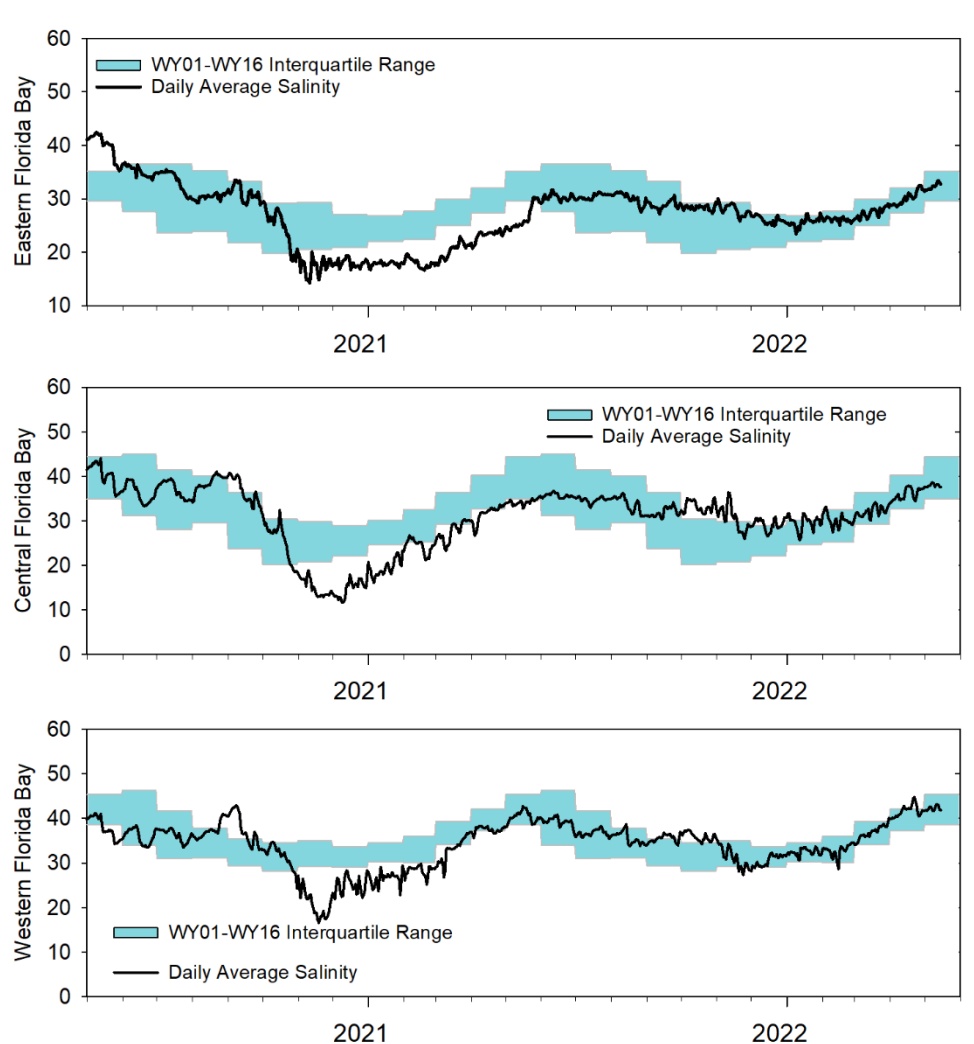


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, May 17, 2022 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.05'	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 0.02'	Conserve water in this basin letting the water move south when conditions allow.	Protect within basin and downstream habitat and wildlife. Protect peat soil and future wading bird forage as the dry season progresses.
WCA-2B	Stage decreased by 0.17'	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 0.15'	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 0.08'	Conserve water in this basin letting the water move south when conditions allow.	
Central WCA-3A S	Stage increased by 0.06'	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 0.13'		
WCA-3B	Stage decreased by 0.04'	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 0.07'	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 -0.07' to +0.25'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -1.6 to +2.1	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 106 cfs and the previous 30-day mean inflow was 174 cfs. The seven-day mean salinity was 35.1 at BBCW8, which exceeded the preferred maximum salinity of 35. The seven-day mean salinity at BBCW10 was 32.7, below the preferred maximum salinity of 35. Data provided by Biscayne National Park.

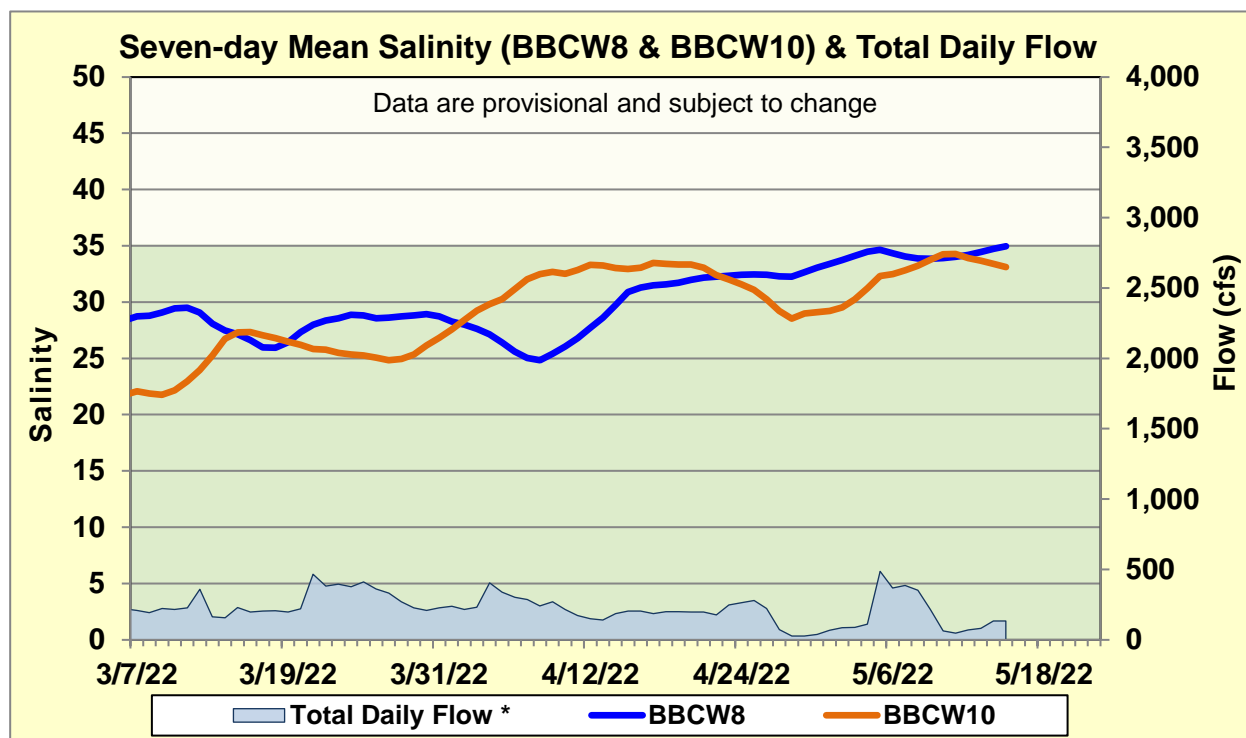


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.