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: April 20, 2022

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A large region of high pressure will inhibit rainfall over most inland areas throughout the week. The low relativity humidity, breezy conditions, and sunny skies will lead to high rates of evapotranspiration across the District. As this region of high pressure shifts towards the mid-Atlantic, the low level winds within the SFWMD will veer more northeasterly and easterly with time. With stiff onshore winds in place, an occasional shower cannot be ruled out Wednesday. On Thursday, the persistent easterly flow will transport remnant pockets of moisture towards Florida, increasing rainfall chances along the east coast. Rainfall chances will further increase on Friday-Sunday as deeper moisture is transported towards the coast. However, there is considerable divergence within the global computer models regarding the amount of moisture that will return to Florida late in the week. The 7-day total District rainfall ending next Tuesday will likely be much below the historical average for this time of the year.

Kissimmee

Flow at S-59 and S-61 is being reduced as stages in East Toho and Toho return to their respective recession lines. With stage in KCH now declining, flow at S-65/S-65A is being reduced; water depth on the Kissimmee River floodplain has increased, with a mean depth of 0.73 feet as of April 17, 2022. The concentration of dissolved oxygen in the Kissimmee River is declining. Despite averaging 6.0 mg/L for the week ending on April 17, 2022, dissolved oxygen has continued to decline since Sunday. As of Tuesday morning, DO is averaging below 3 mg/L in the Phase I area and is continuing to decline.

Lake Okeechobee

Lake Okeechobee stage was 13.41 feet NGVD on April 17, 2022, with water levels 0.77 feet lower than a month ago (**Figure LO-1**). Lake stage crossed into the Baseflow sub-band and has been within the ecological envelope for 15 weeks (**Figure LO-3**). Average daily inflows (excluding rainfall) increased from the previous week, going from 987 cfs to 1,110 cfs. Average daily outflows (excluding evapotranspiration) decreased, going from 3,550 cfs to 2,949 cfs. There have been thirty-seven snail kite nests recorded on the Lake thus far. April water quality results showed three sites from Fisheating Bay to the Kissimmee River had chlorophyll-*a* values above the bloom threshold of 40 µg/L, and eight sites were between 20 µg/L and 40 µg/L. Three samples also had detectable levels of cyanotoxins, and all samples had mixed algal communities (**Table LO-1** and **Figure**

Northern Estuaries

Total inflow to the St. Lucie Estuary averaged 312 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities increased at all sites within the estuary over the past week. Salinity at the US1 Bridge was in the optimal range (10-25) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 1,771 cfs over the past week with 981 cfs coming from the Lake. Mean salinities remained the same at S-79 and Val I-75, bottom salinity decreased slightly at Sanibel, and salinity increased at the remaining sites in the estuary over the past week. Salinities were in the optimal range (0-10) for tape grass at Val I-75 and Ft. Myers. 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, April 17, 2022, approximately 900 ac-ft of Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2022 (since May 1, 2021) is approximately 107,700 ac-feet. The total amount of inflows to the STAs in WY2022 is approximately 1,022,000 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, and STA-1E Eastern Flow-way is offline for vegetation management activities related to Tropical Storm Eta. 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-1W Western, Eastern, and Northern Flow-ways for construction activities. Operational restrictions are in effect in STA-1E Central Flow-way and STA-2 Flow-ways 3 and 4 for vegetation management activities, and in 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.

Everglades

Stage changes within most of the WCAs elevated into the “poor” rate of change category. Average wading bird nesting expectations continue to fall with heavy predation evident at the Alley North colony; conditions are better in WCA-1 with about 4,000 nests but overall the nesting effort is low for this time of year and Wood Storks have abandoned nesting in WCA-3A. All of the CSSS subpopulation percent dry conditions have reached the target of 40% dry, except sub population Echo where recessions remain slow to reach the % dry and the dry nesting days target. Stages receded last week but remain high in Taylor Slough especially in the north. Salinities rose on average within Florida Bay with negative creek flow. This is the time of year that salinities rise rapidly due to increased evaporation and the lack of precipitation/flow.

Biscayne Bay

Total inflow to Biscayne Bay averaged 233 cfs and the previous 30-day mean inflow averaged 282 cfs. The seven-day mean salinity was 31.6 at BBCW8 and 33.4 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Salinity data provided as a courtesy by Biscayne National Park.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On April 17, 2022, lake stages were 56.1 feet NGVD (0.7 feet below schedule) in East Lake Toho, 52.8 feet NGVD (1.0 feet below schedule) in Lake Toho, and 50.8 feet NGVD (0.3 feet above schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1**, **Figures KB-1-3**).

Lower Kissimmee

Discharges to the Kissimmee River on April 17, 2022 were 2,420 cfs at S-65 and 2,430 cfs at S-65A; discharges from the Kissimmee River were 1,300 cfs at S-65D and 1,000 cfs at S-65E (**Table KB-2**). Headwater stages were 46.5 feet NGVD at S-65A and 26.9 feet NGVD at S-65D on April 17, 2022. Water temperature has begun to rise, and with higher flows to the river the concentration of dissolved oxygen is declining; despite an average of 6.0 mg/L for the week ending on April 17, 2022 (**Table KB-2**, **Figure KB-4**), it has continued to decline since Sunday. With stage in KCH now declining, flow at S-65/S-65A is being reduced starting Monday April 18, 2022. Water depth on the Kissimmee River floodplain has increased with a mean depth of 0.73 feet as of April 17, 2022 (**Figure KB-5**).

Water Management Recommendations

Adjust discharge from East Toho and Toho to resume following their respective recession lines. With stage in KCH now declining, begin a slow rampdown in flow at S-65/S-65A tomorrow (April 20, 2022) after an initial reduction of 400 cfs today (April 19, 2022) to help address the developing hypoxic event on the Kissimmee River.

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)	
							4/17/22	*4/10/22*
Lakes Hart and Mary Jane	S-62	LKMJ	157	60.1	R	60.4	-0.3	-0.2
Lakes Myrtle, Preston and Joel	S-57	S-57	55	60.5	R	60.5	0.0	0.1
Alligator Chain	S-60	ALLI	220	63.1	R	63.2	-0.1	0.0
Lake Gentry	S-63	LKGT	321	60.6	R	60.7	-0.1	0.0
East Lake Toho	S-59	TOHOE	741	56.1	R	56.8	-0.7	-0.4
Lake Toho	S-61	TOHOW S-61	1,351	52.8	R	53.8	-1.0	-1.0
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	2,239	50.8	R	50.5	0.3	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.

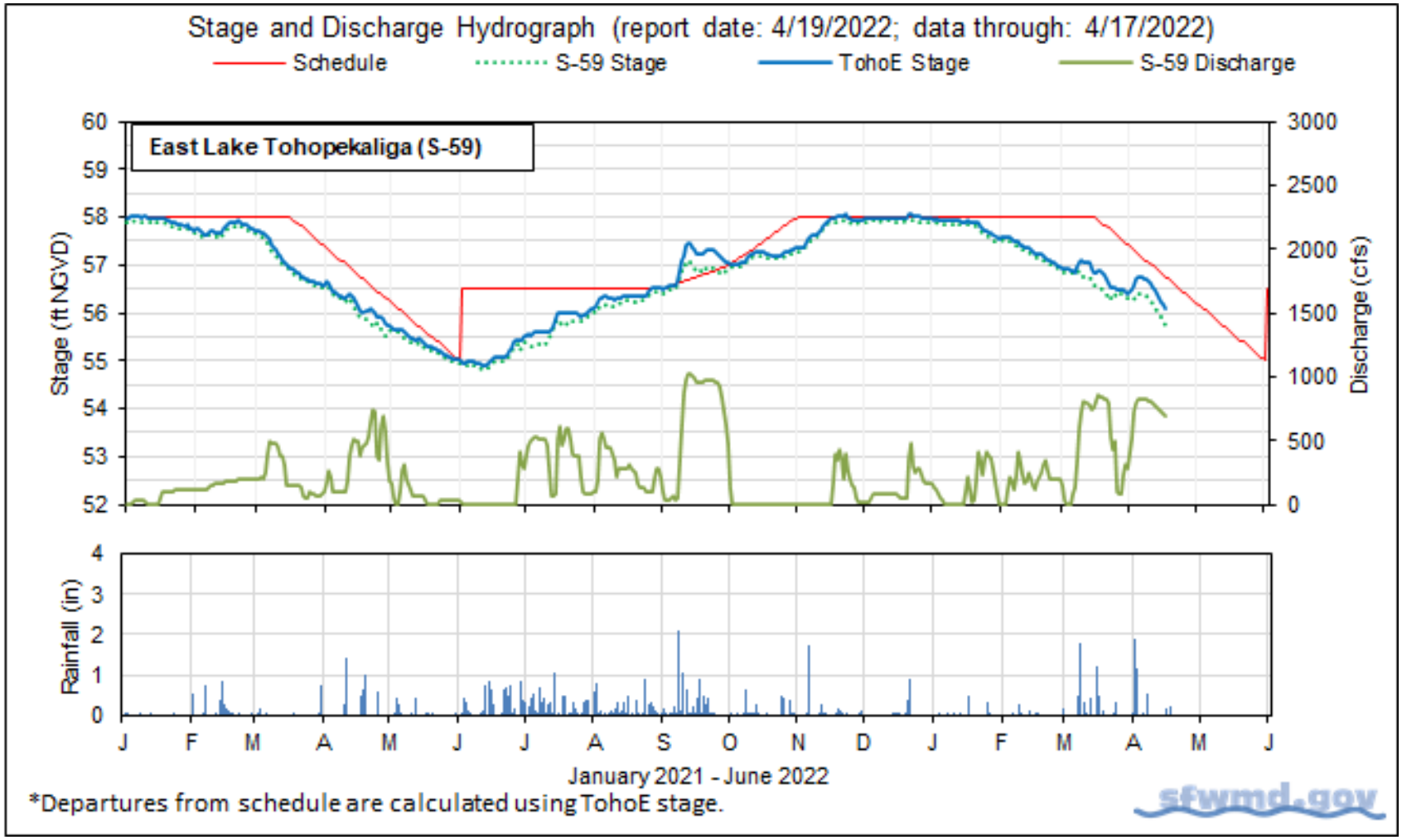


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

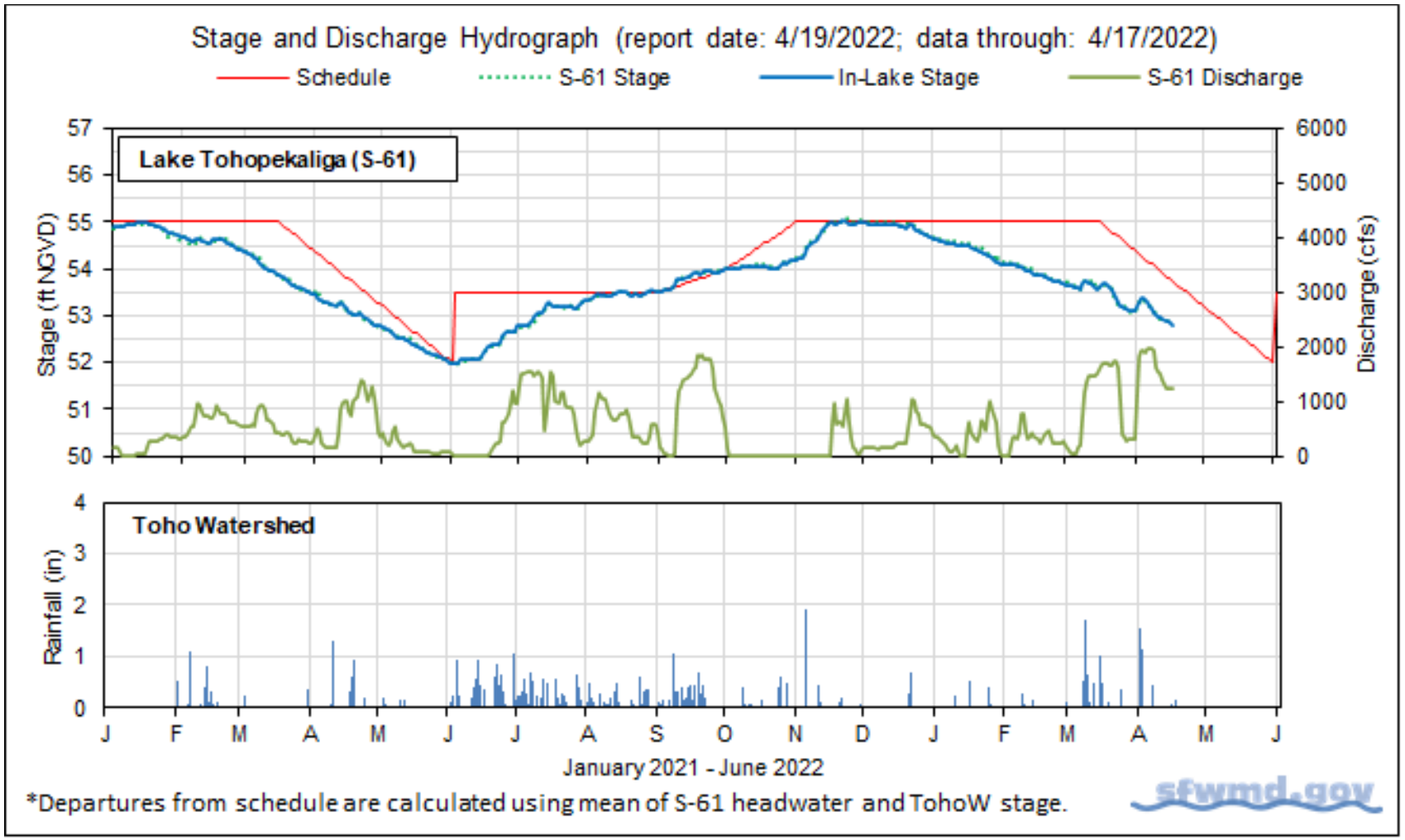


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

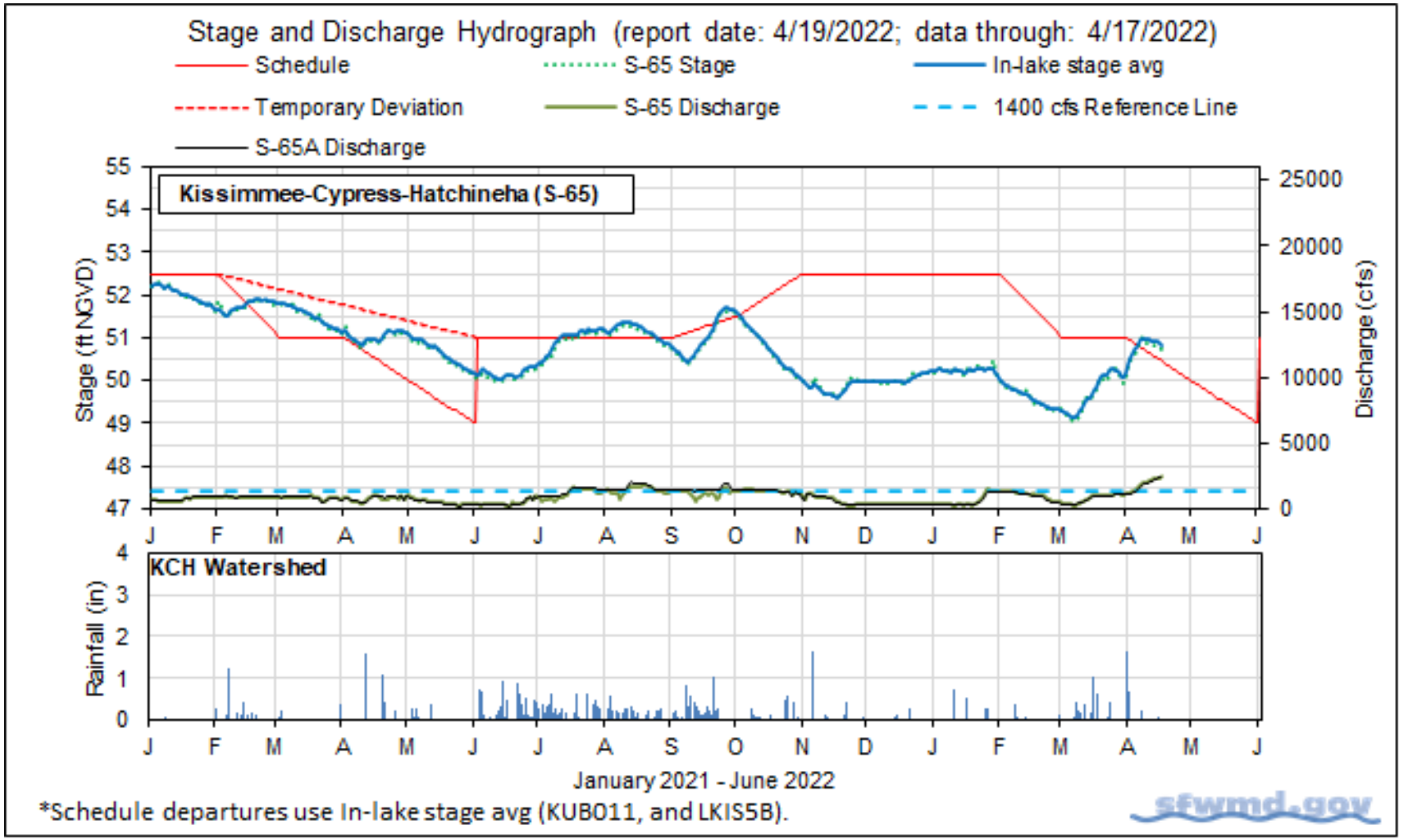


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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			
		4/17/22	4/17/22	4/10/22	4/3/22	3/27/22
Discharge	S-65	2,420	2,240	1,640	1,140	1,050
Discharge	S-65A[a]	2,430	2,200	1,570	1,080	980
Headwater Stage (feet NGVD)	S-65A	46.5	46.5	46.5	46.3	46.4
Discharge	S-65D[b]	1,300	1,220	1,090	980	950
Headwater Stage (feet NGVD)	S-65D[c]	26.9	26.8	26.8	26.8	26.6
Discharge (cfs)	S-65E[d]	1,000	1,090	970	860	830
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) [e]	Phase I, II/III river channel	4.0	6.0	7.0	8.1	8.3
Mean depth (feet) [f]	Phase I floodplain	0.73	0.46	0.23	0.24	0.28

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

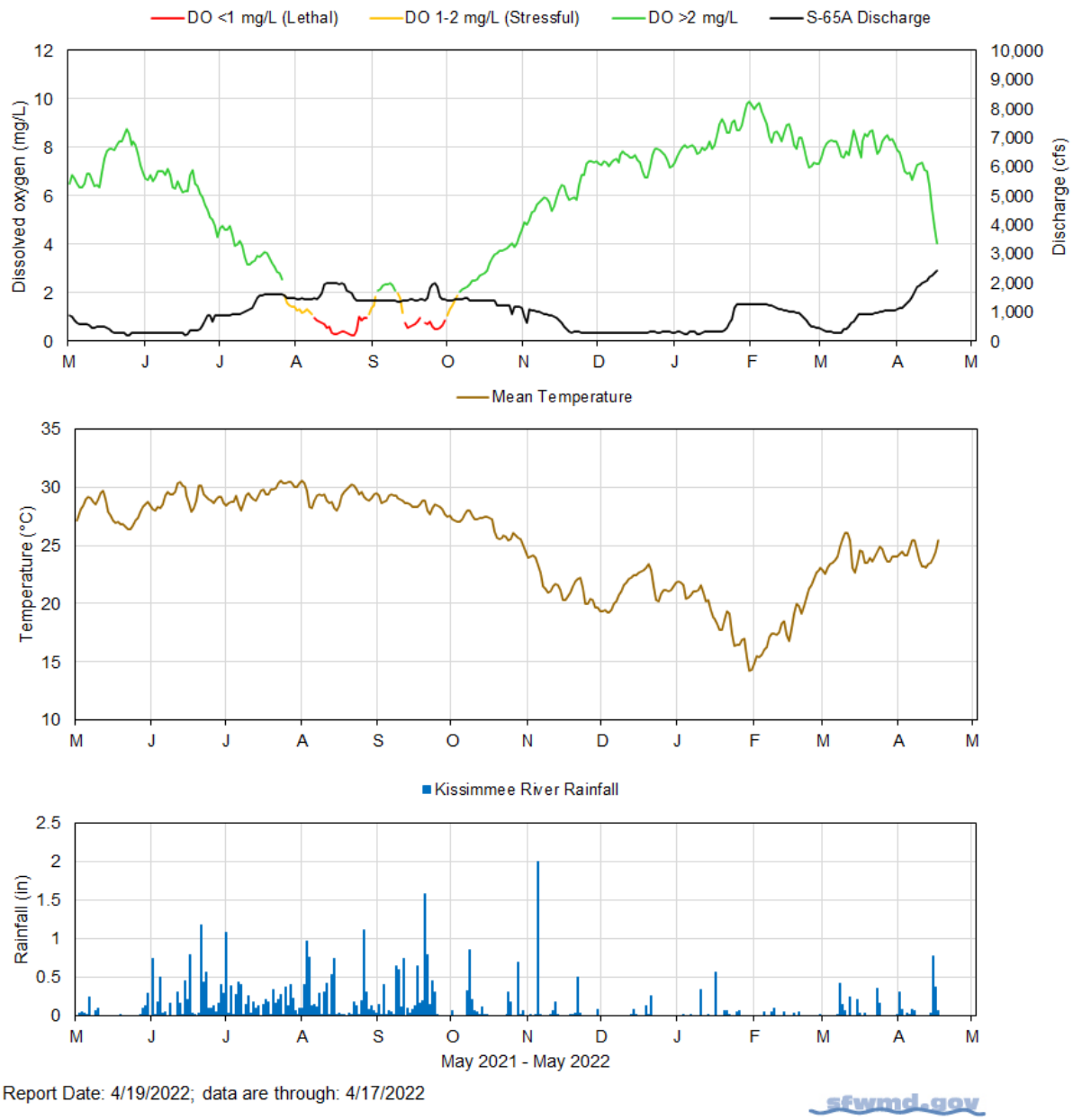


Figure KB-4. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRBN, PC33, PD62R, and PD42R with an average of four stations reporting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

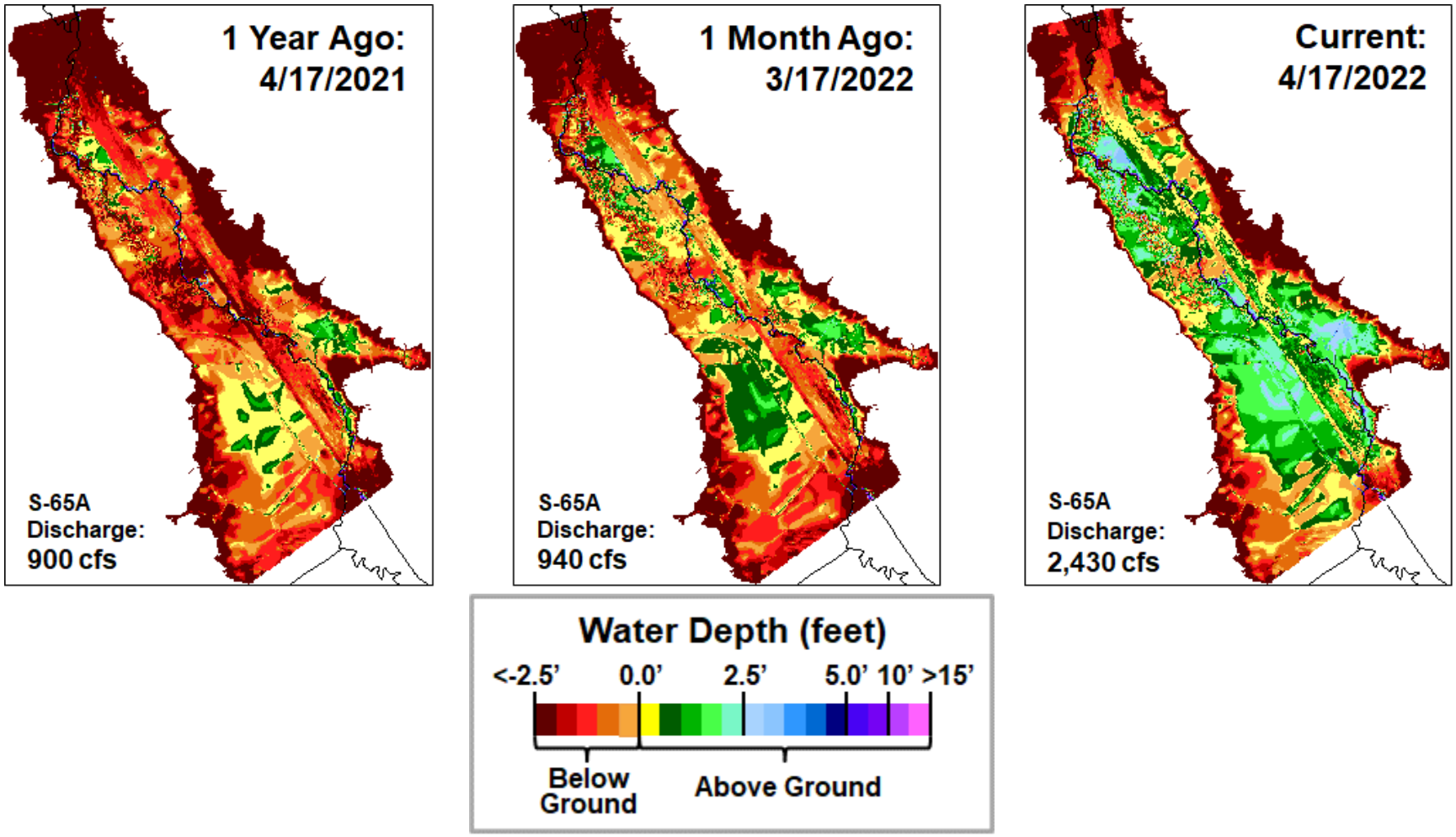


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

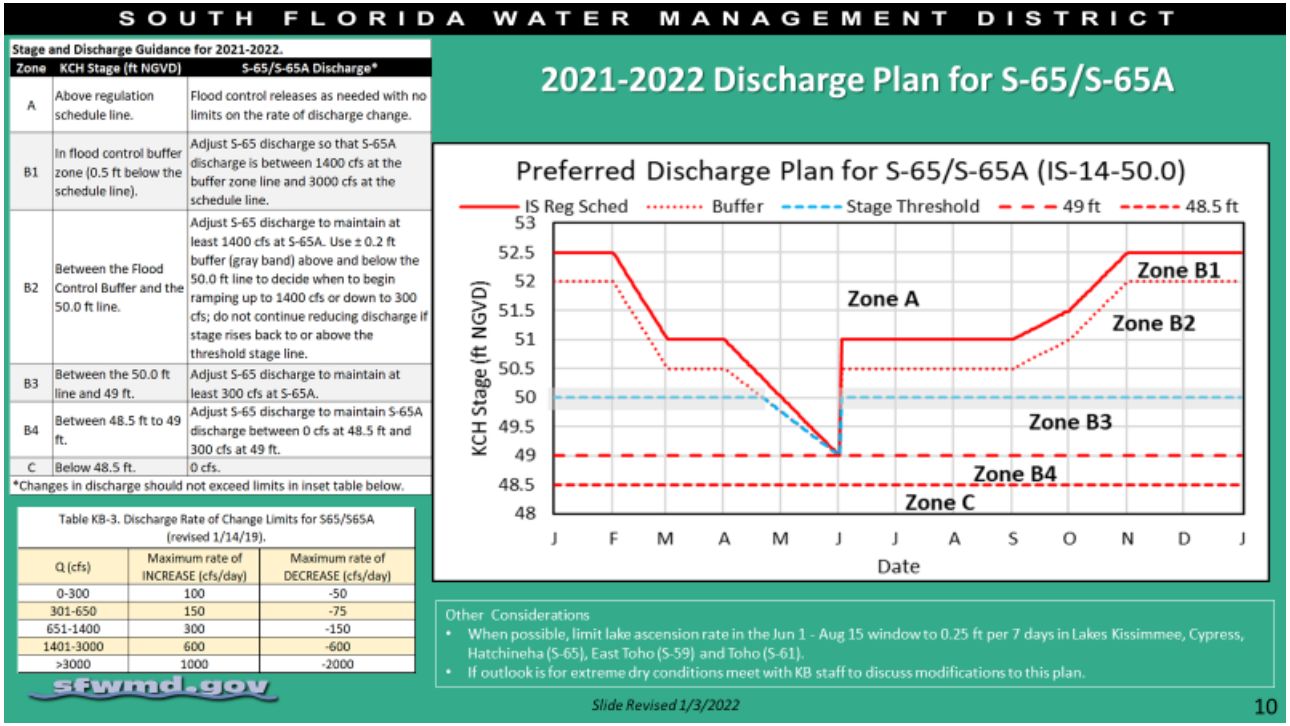


Figure KB-6. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

Lake Okeechobee

Lake Okeechobee stage was 13.41 feet NGVD on April 17, 2022, with water levels 0.77 feet lower than a month ago (**Figure LO-1**). Lake stage crossed into the Baseflow sub-band (**Figure LO-2**) and has been within the ecological envelope for 15 weeks (**Figure LO-3**). According to NEXRAD, 0.18 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) increased from the previous week, going from 987 cfs to 1,110 cfs. Average daily outflows (excluding evapotranspiration) decreased, going from 3,550 cfs to 2,949 cfs. Highest inflows came from the Kissimmee River through the S-65E structure (1,088 cfs). The highest outflow (1,271 cfs) was to the west via the S-77 structure, while flows south via the S-350 structures was 957 cfs (S-351 318 cfs; S-352 318 cfs; S-354 321 cfs). Flows east were 643 cfs and 78 cfs via the S-308 structure and the L-8 canal through the S-271 structure (formerly Culvert 10A), respectively. **Figures LO-4 and LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively. These data are provisional and are subject to change.

Water quality sampling is on the non-bloom season schedule (November – April), occurring once monthly at approximately 32 stations for chlorophyll-*a,* and at 9 stations for taxonomic identification and toxin analyses. The April sampling occurred on the 4th through the 6th. Results showed three sites from Fisheating Bay to the Kissimmee River had chlorophyll-*a* values above the bloom threshold of 40 µg/L, and eight sites were between 20 µg/L and 40 µg/L. Three samples also had detectable levels of cyanotoxins, and all samples had mixed algal communities (**Table LO-1** and **Figure LO-6**).

The most recent snail kite nesting survey recorded three more nests on Lake Okeechobee, for a total of thirty-seven nests thus far, including fifteen failures. Nests are spread across Indian Prairie marsh, Moonshine Bay and Observation Island.

The most recent satellite image (April 17, 2022) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor showed areas of moderate bloom potential in Fisheating Bay and along the northern shoreline (**Figure LO-7**).

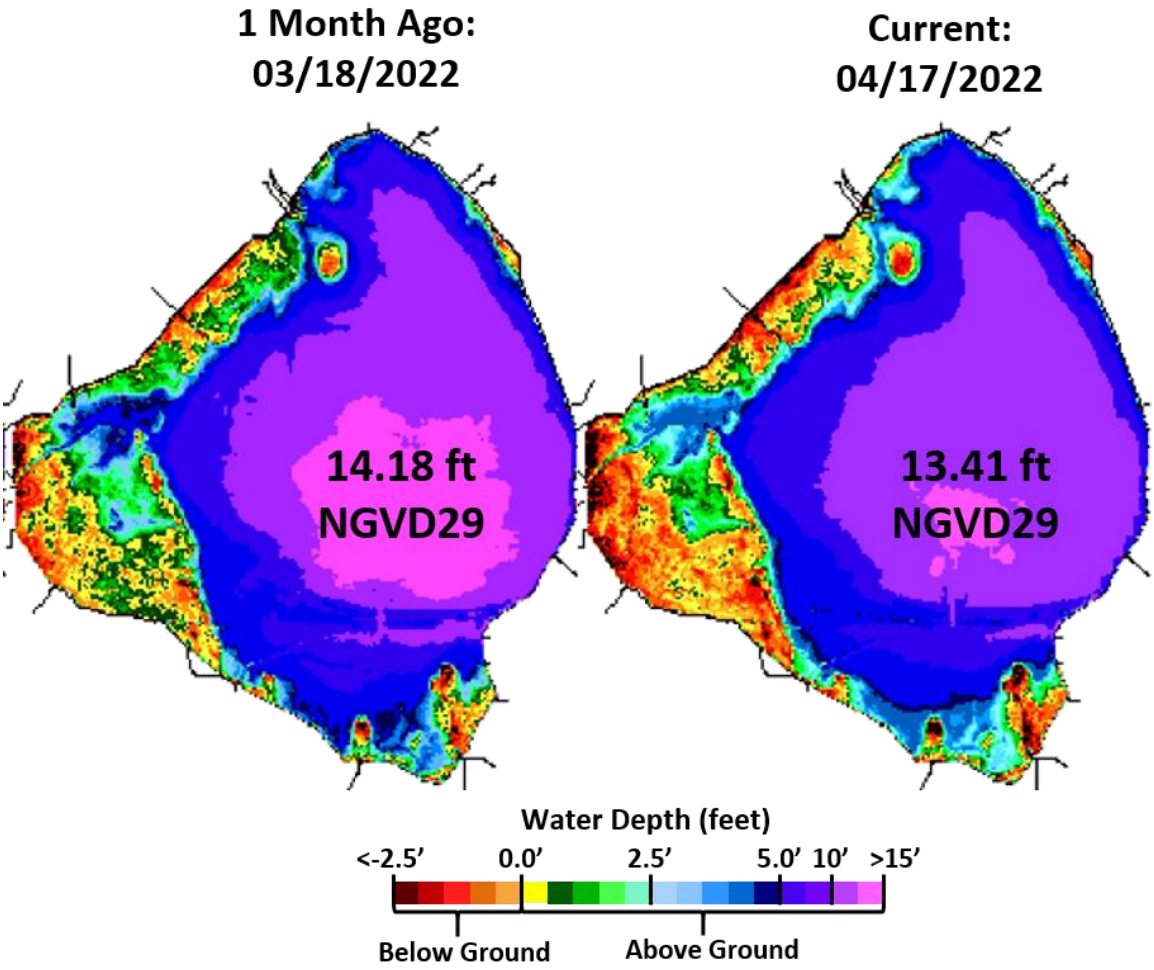


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

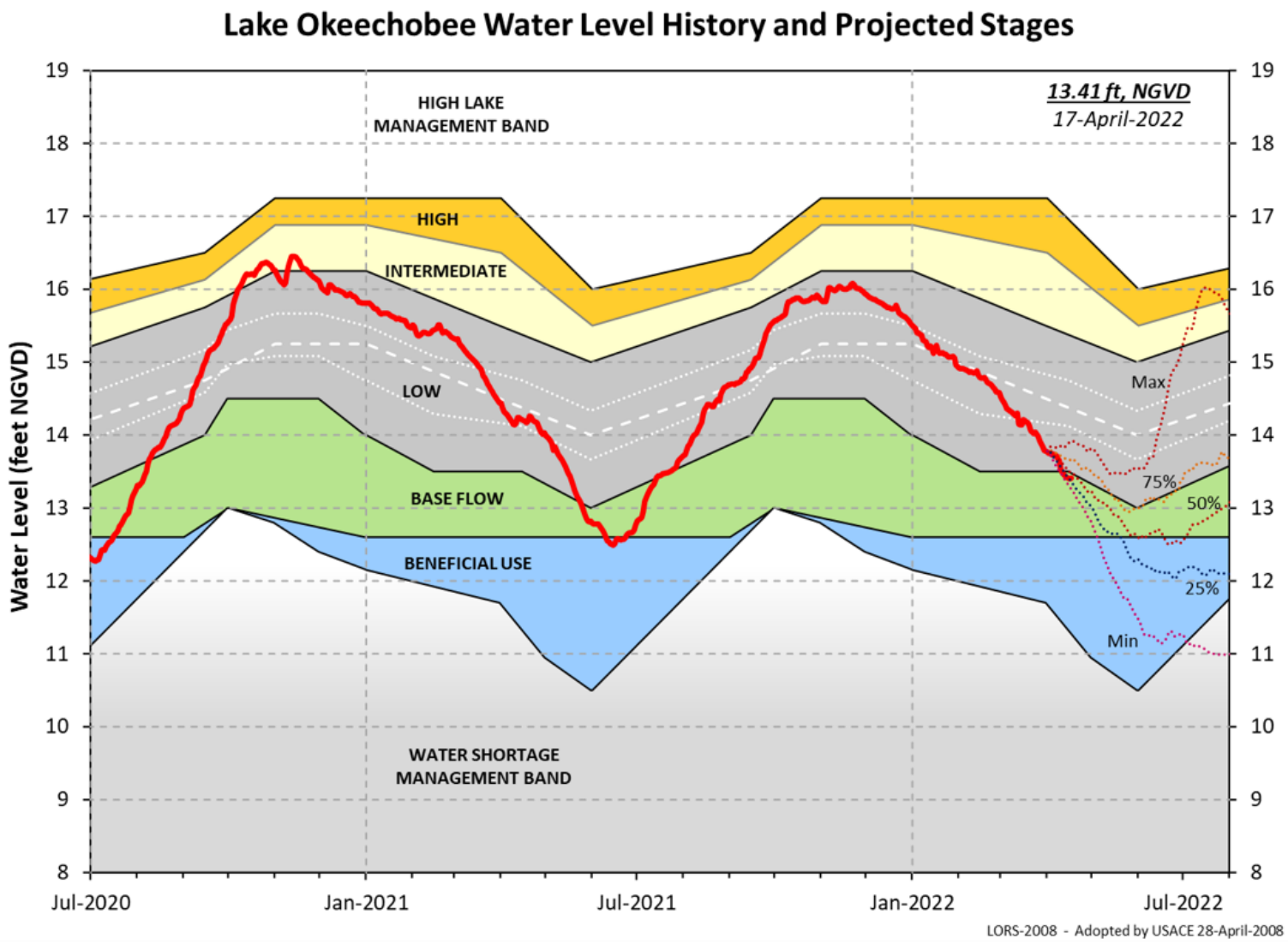


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

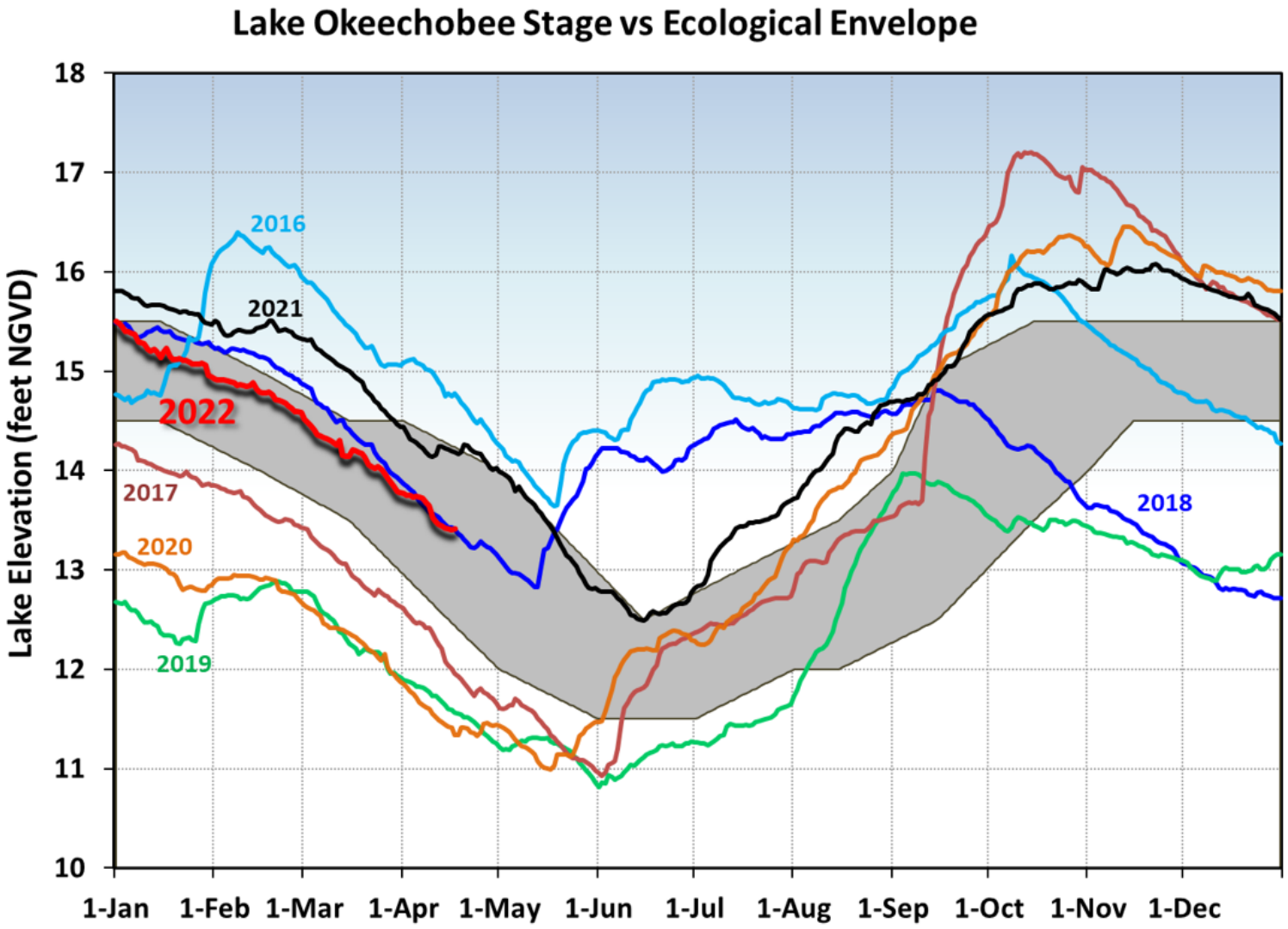


Figure LO-3. The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

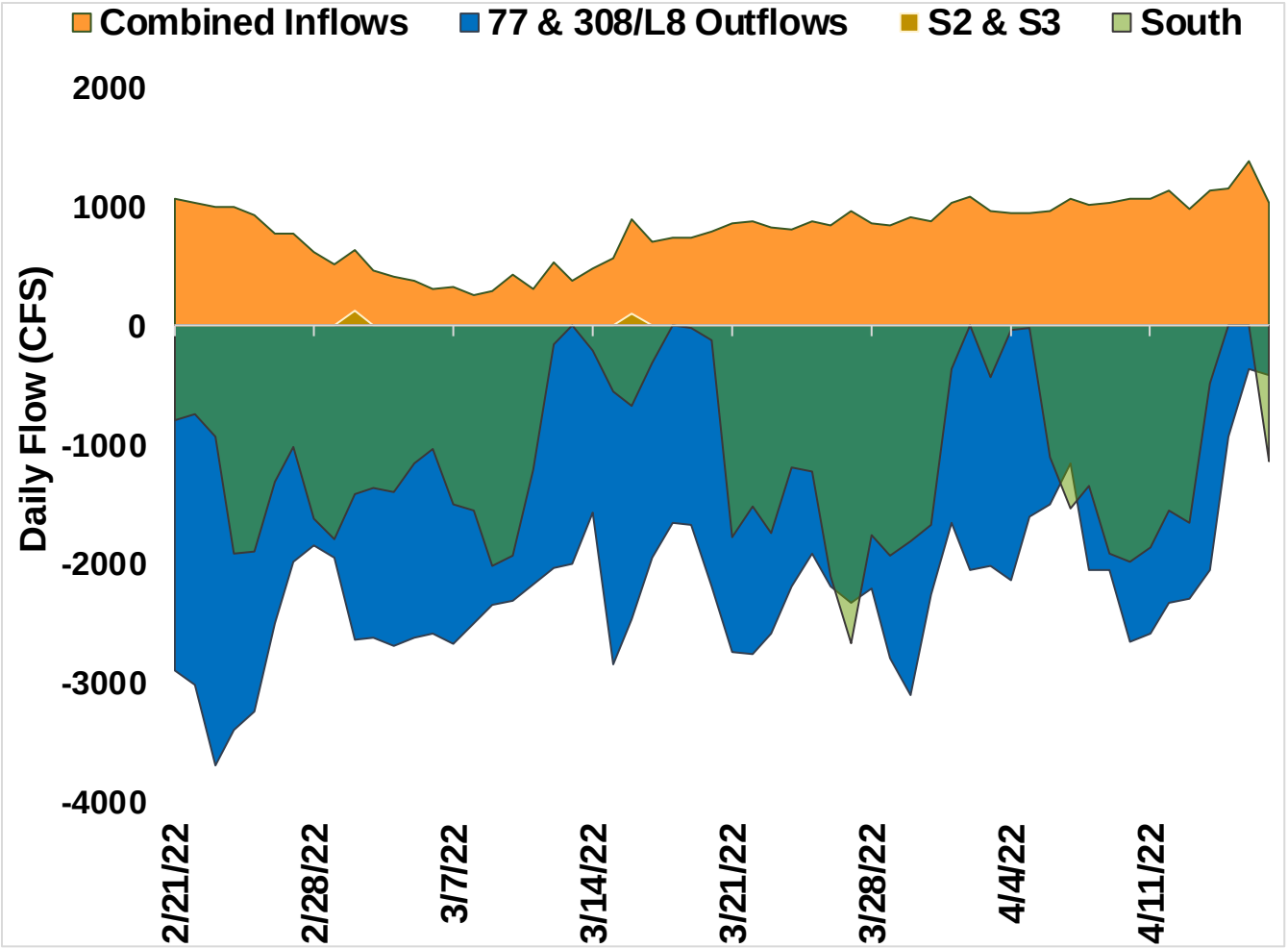


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

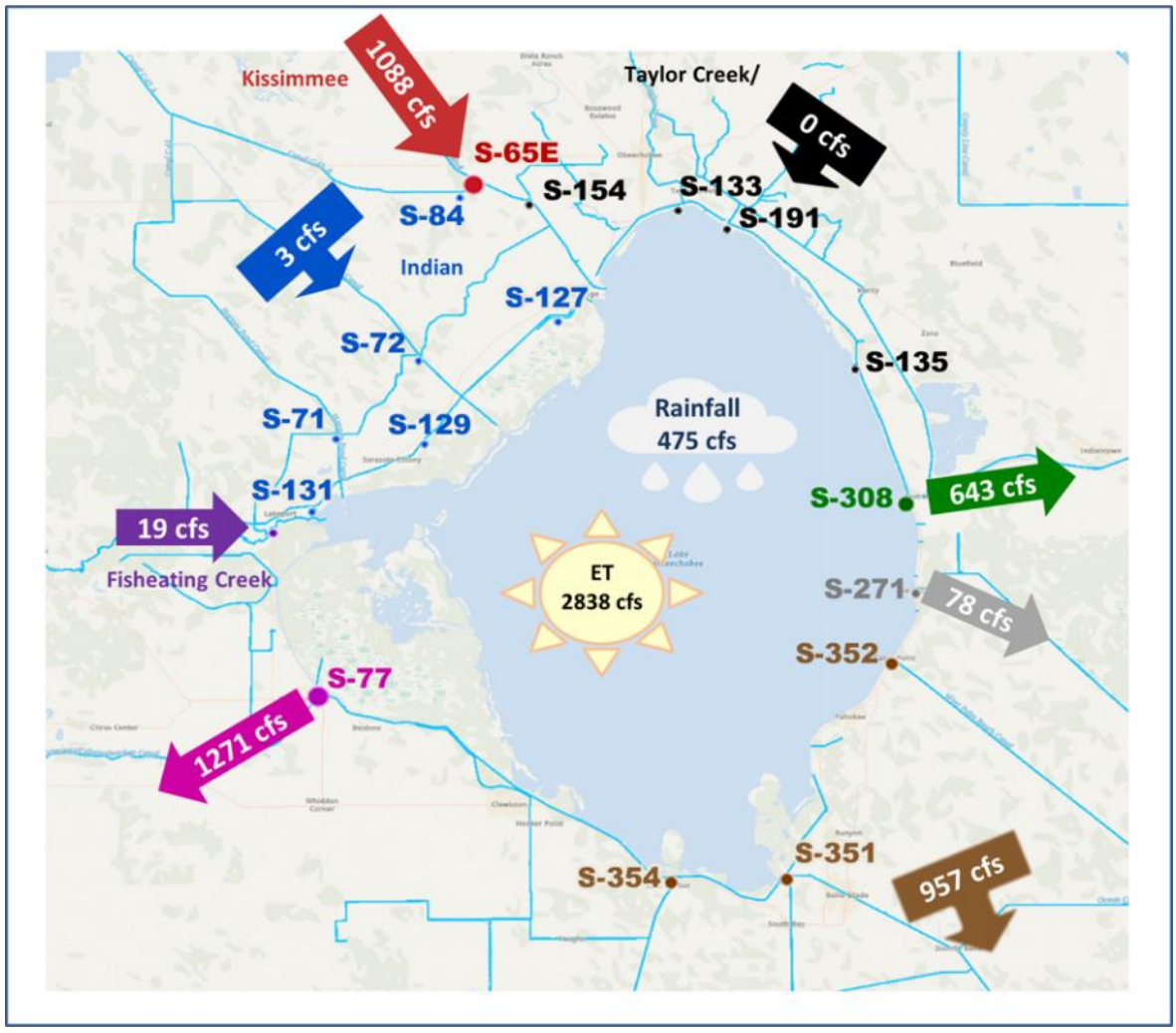


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of April 11, 2022 – April 17, 2022.

Table LO-1. Provisional results of chlorophyll *a* and toxin concentrations and cyanobacteria taxa from sampling trips on April 4-6, 2022. Color coding is the same as on **Figure LO-6**.

Station	CHL*a* (ug/L)	TOXIN (ug/L)	TAXA
FEBIN	NS		
FEBOUT	**60.2**		
KISSR0.0	**41.3**	**0.3**	*mixed*
L005	14.8	BDL	*mixed*
LZ2	**27.6**	BDL	*mixed*
KBARSE	**24.0**		
RITTAE2	**22.4**	BDL	*mixed*
PELBAY3	5.1		
POLE3S	**22.3**		
LZ25A	8.1		
PALMOUT	**20.1**	BDL	*mixed*
PALMOUT1	5.8		
PALMOUT2	4.5		
PALMOUT3	7.6		
POLESOUT	**41.3**	BDL	*mixed*
POLESOUT1	**25.2**		
POLESOUT2	11.0		
POLESOUT3	10.2		
EASTSHORE	8.6		
NES135	6.9		
NES191	17.1		

Station	CHL*a* (ug/L)	TOXIN (ug/L)	TAXA
L001	**26.8**		
L004	6.7		
L006	5.5		
L007	6.0		
L008	9.2		
LZ30	5.7	BDL	*mixed*
LZ40	8.5		
CLV10A	8.0	BDL	*mixed*
NCENTER	14.3		

S308C	8.4	**0.4**	*mixed*
S77	**23.3**	**0.3**	*mixed*

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

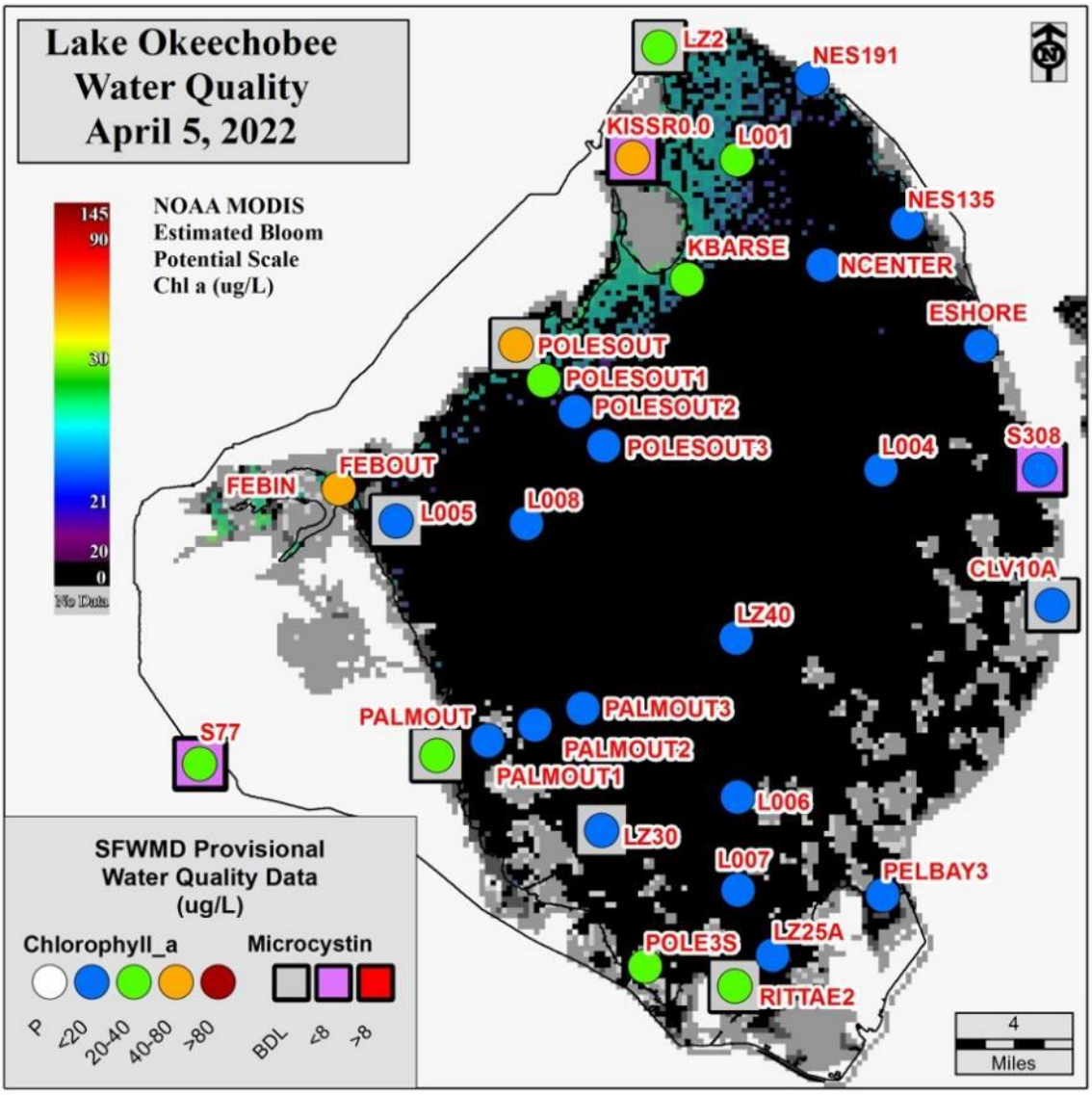


Figure LO-6. Expanded monitoring network and provisional results from samples collected April 4-6, 2022

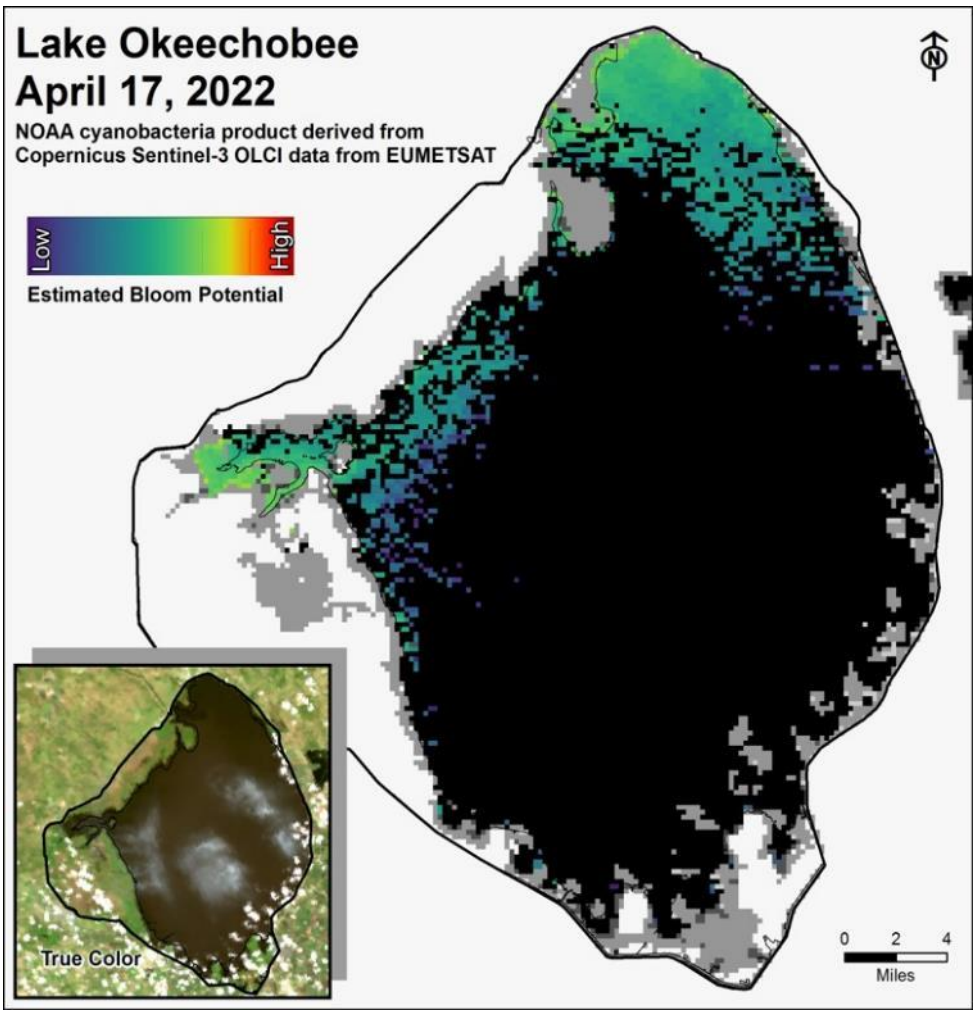


Figure LO-7. Cyanobacteria bloom potential on April 17, 2022 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Northern Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 312 cfs (**Figures ES-1** and **ES-2**) and the previous 30-day mean inflow was 442 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 22.6. Salinity conditions in the middle estuary were estimated to be within the optimal range for adult eastern oysters (**Figure ES-4**). Larval oyster recruitment rates reported by the Fish and Wildlife Research Institute were low in March, as expected during the cooler months when most oysters are not spawning (**Figure ES-5**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 1,771 cfs (**Figures ES-6** and **ES-7**) and the previous 30-day mean inflow was 1,889 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, bottom salinity decreased slightly at Sanibel, and salinities increased at the remaining sites in the estuary (**Table ES-2** and **Figures ES-8** and **ES-9**). The seven-day mean surface salinities (**Table ES-2**) were in the good range (0-10) for tape grass at Val I-75 and at Ft. Myers. The seven-day mean surface 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**). Larval oyster recruitment rates reported by the Fish and Wildlife Research Institute were low at Iona Cove and Bird Island in March, as expected during the cooler months when most oysters are not spawning (**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 1500 cfs and steady releases at 2,000 cfs with estimated tidal basin inflows of 42 cfs. Model results from all scenarios predict daily salinity to be 2.4 or lower and the 30-day moving average surface salinity to be 0.6 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 at Val I-75 within the LORS 2008 salinity range (0.0-5.0).

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

Red Tide

The Florida Fish and Wildlife Research Institute reported on April 15, 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 County.

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.

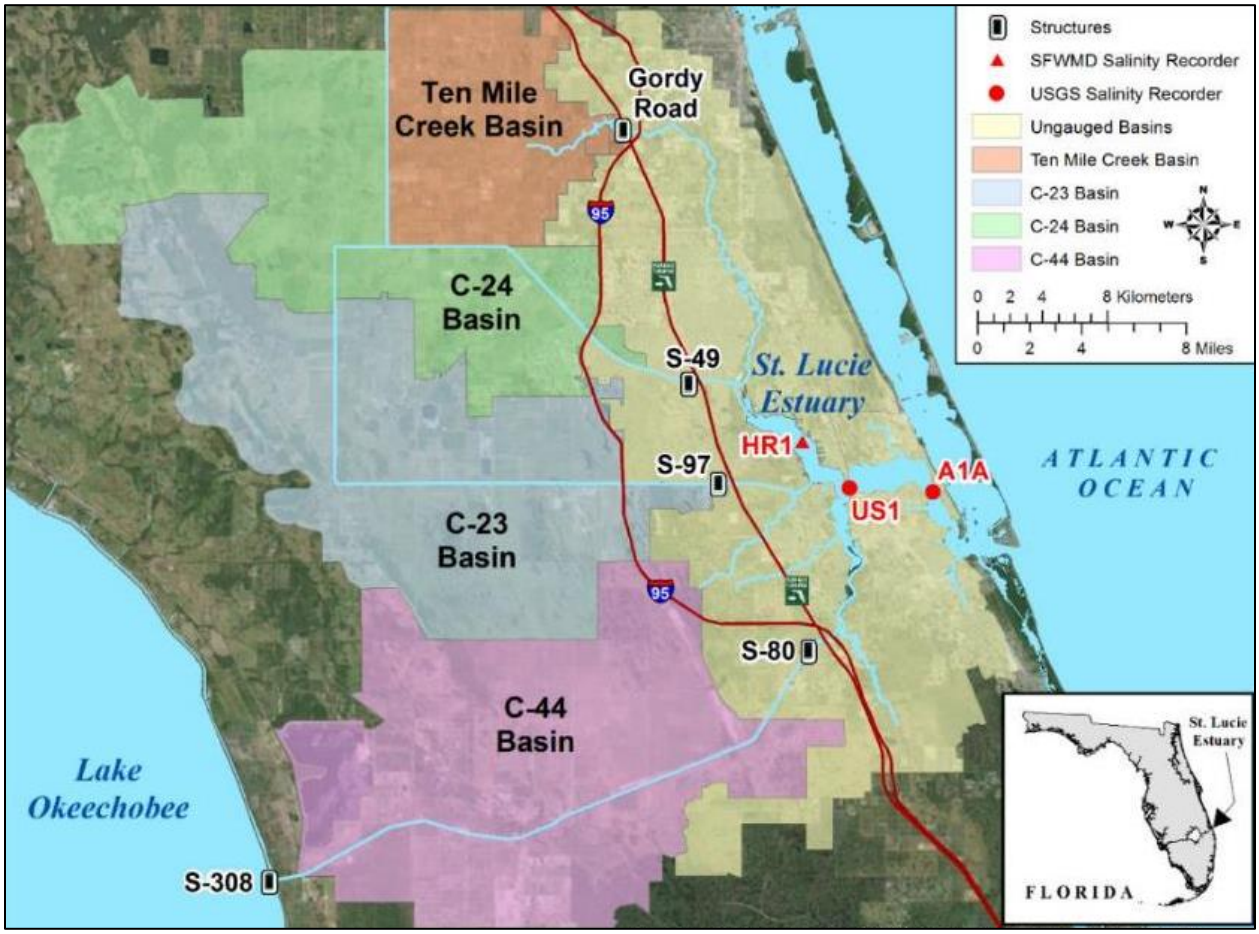


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

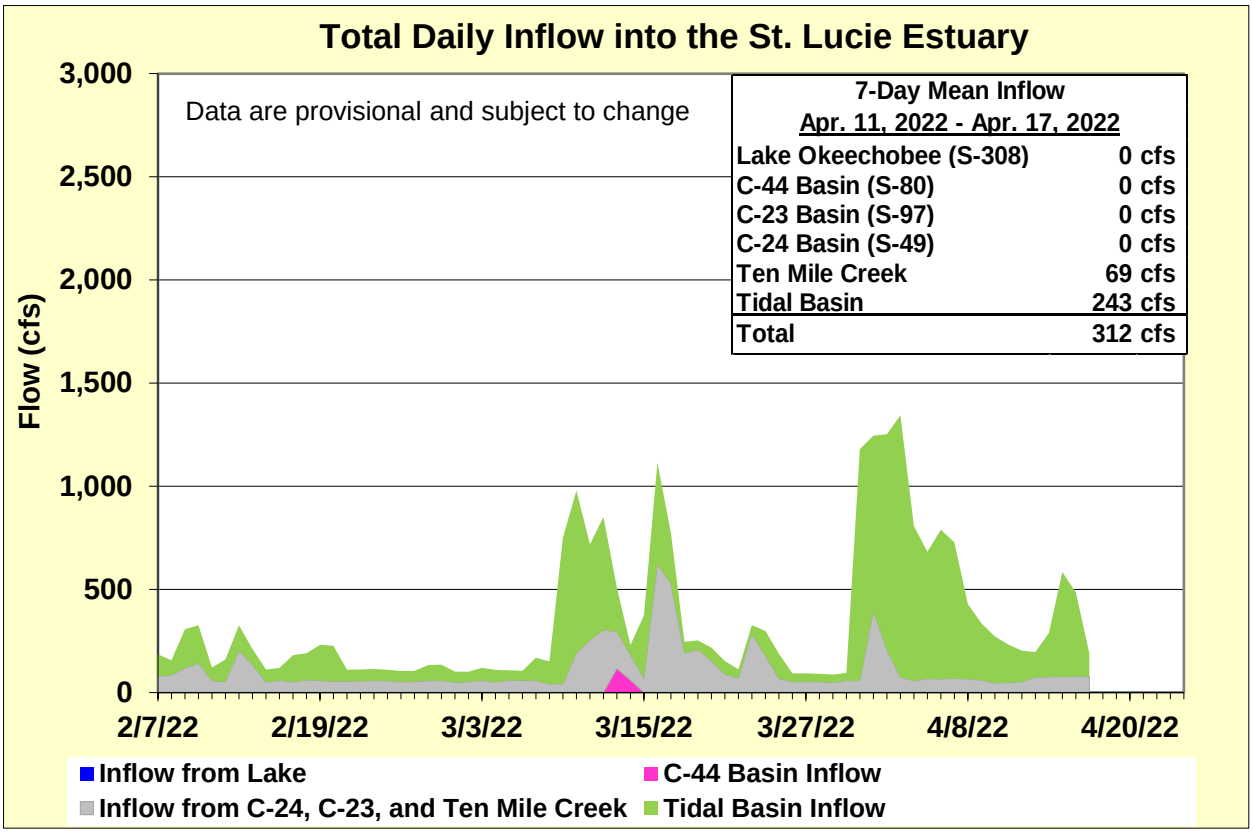


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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 middle estuary. Data are provisional.

Sampling Site	Surface	Bottom	Envelope
HR1 (North Fork)	**18.7** (17.2)	**19.3** (18.7)	10.0 – 25.0
US1 Bridge	**22.4** (21.4)	**22.9** (22.4)	10.0 – 25.0
A1A Bridge	**30.0** (27.9)	**32.7** (31.1)	10.0 – 25.0

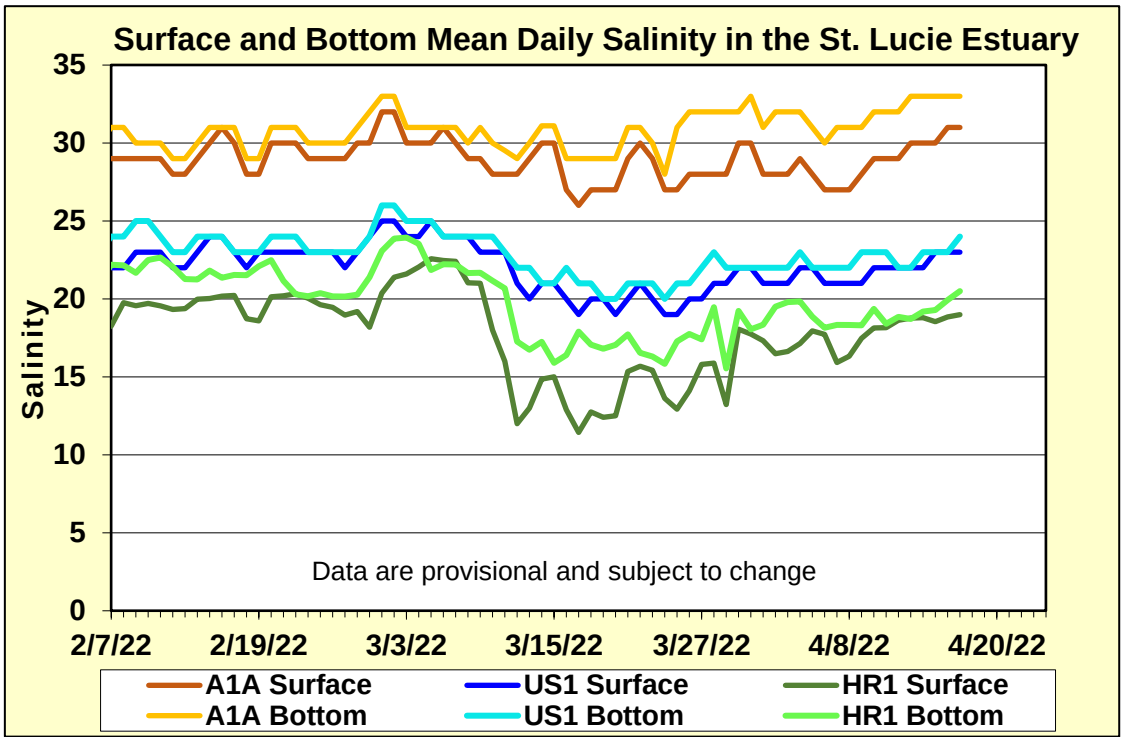


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

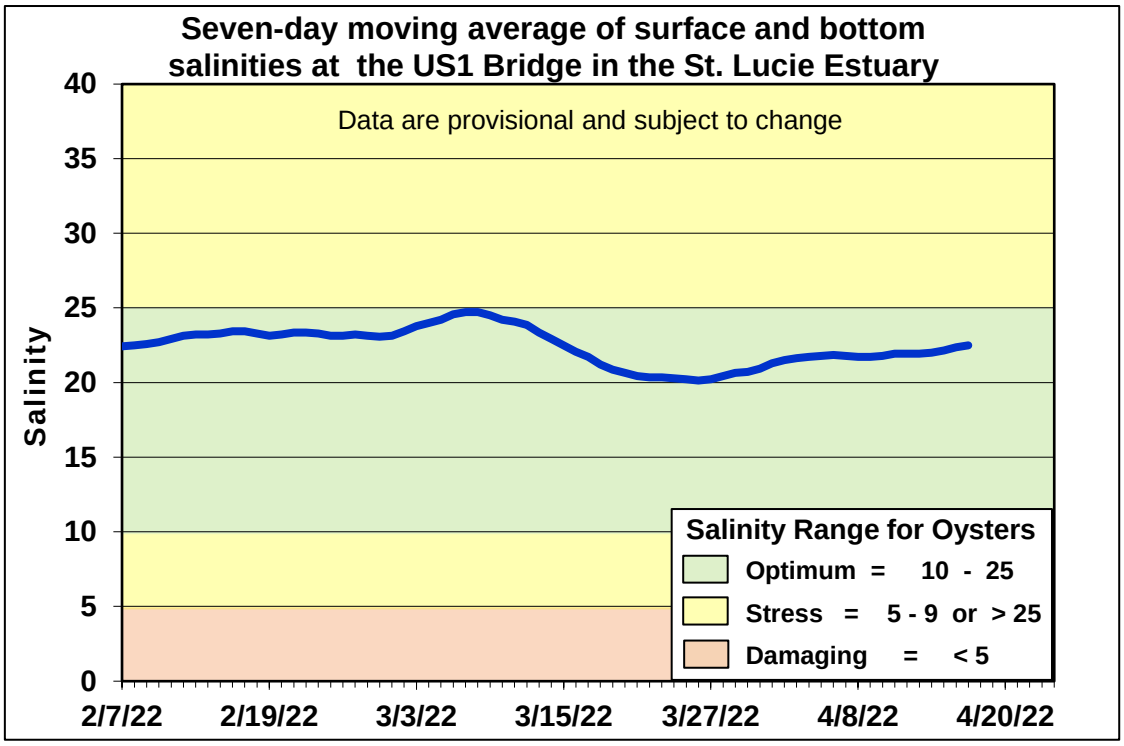


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

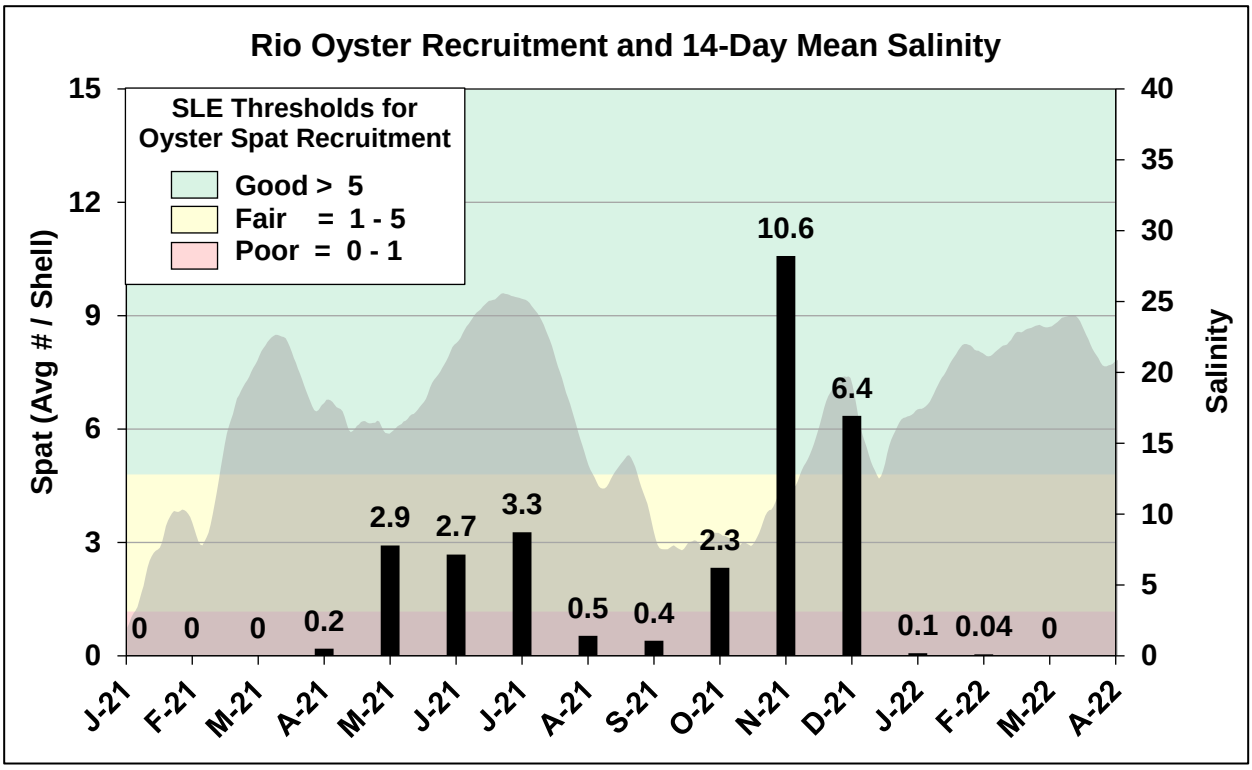


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

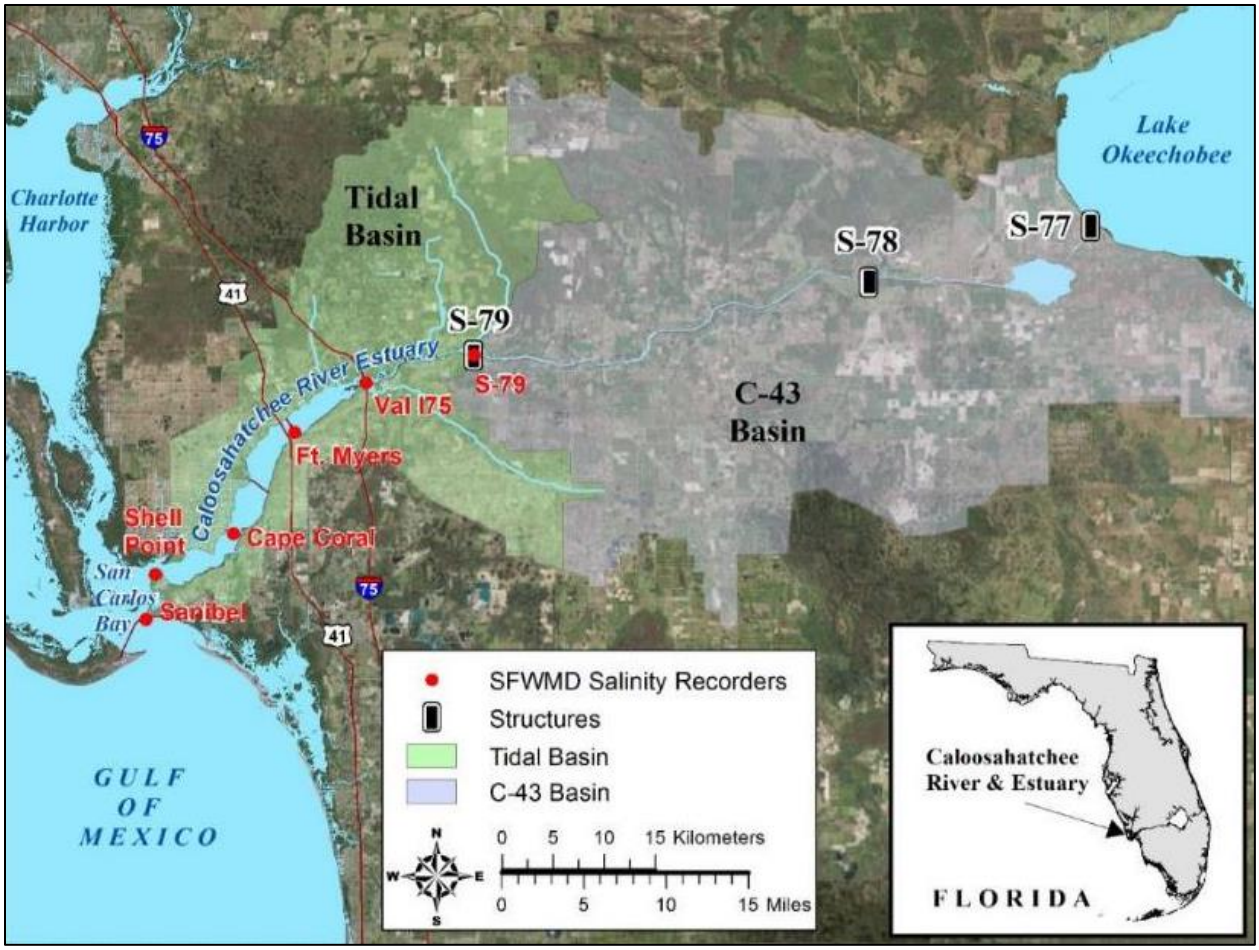


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

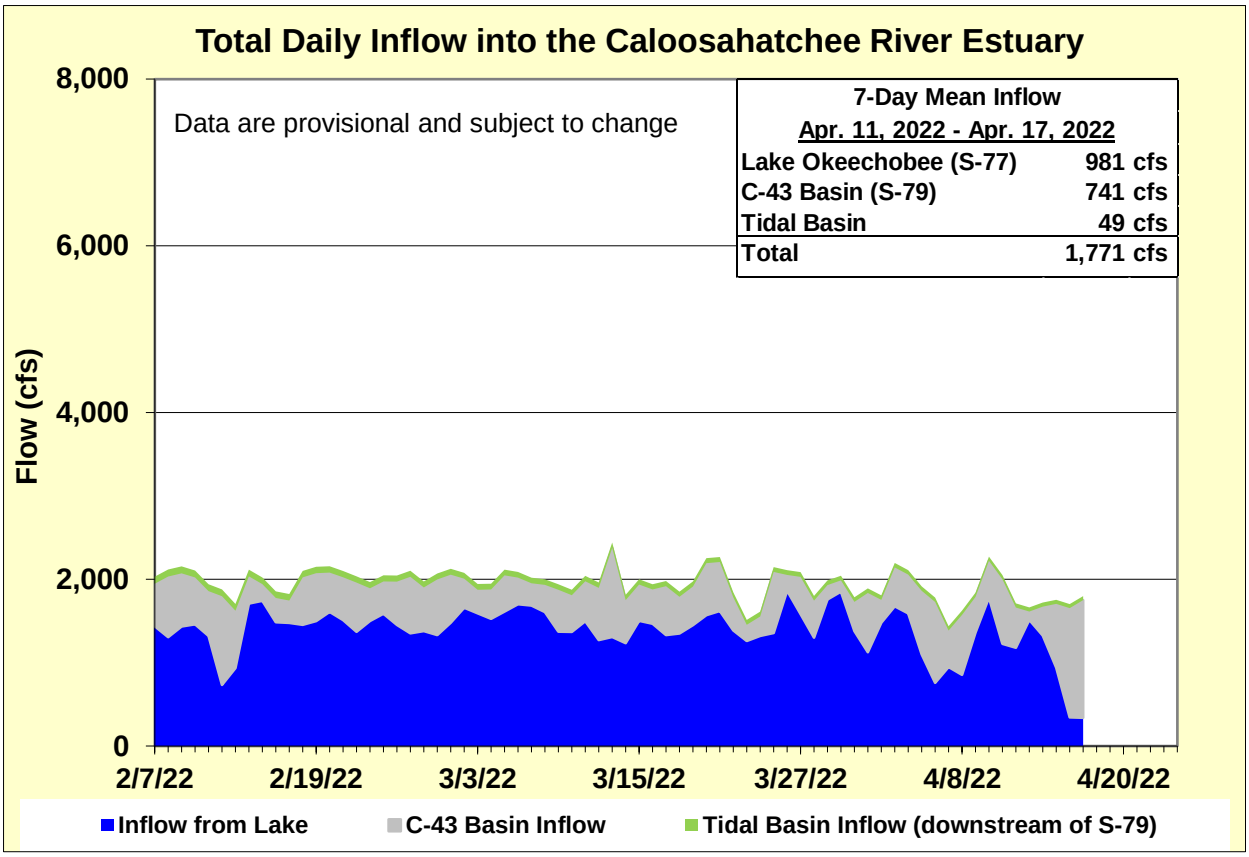


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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 at I-75 is for the protection of tape grass in the upper estuary 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	Envelope
S-79 (Franklin Lock)	**0.2** (0.2)	**0.2** (0.2)	NA [a]
Val I-75	**0.2** (0.2)	**0.2** (0.2)	0.0 – 5.0 [b]
Fort Myers Yacht Basin	**2.5** (1.4)	**3.9** (2.1)	NA [a]
Cape Coral	**10.4** (10.0)	**12.8** (11.3)	10.0 – 25.0
Shell Point	**25.9** (24.9)	**26.7** (26.3)	10.0 – 25.0
Sanibel	**30.8** (30.7)	**32.0** (32.4)	10.0 – 25.0

a. The envelope is not applicable.
b. The envelope is based on the predicted 30-day mean for the next two weeks.

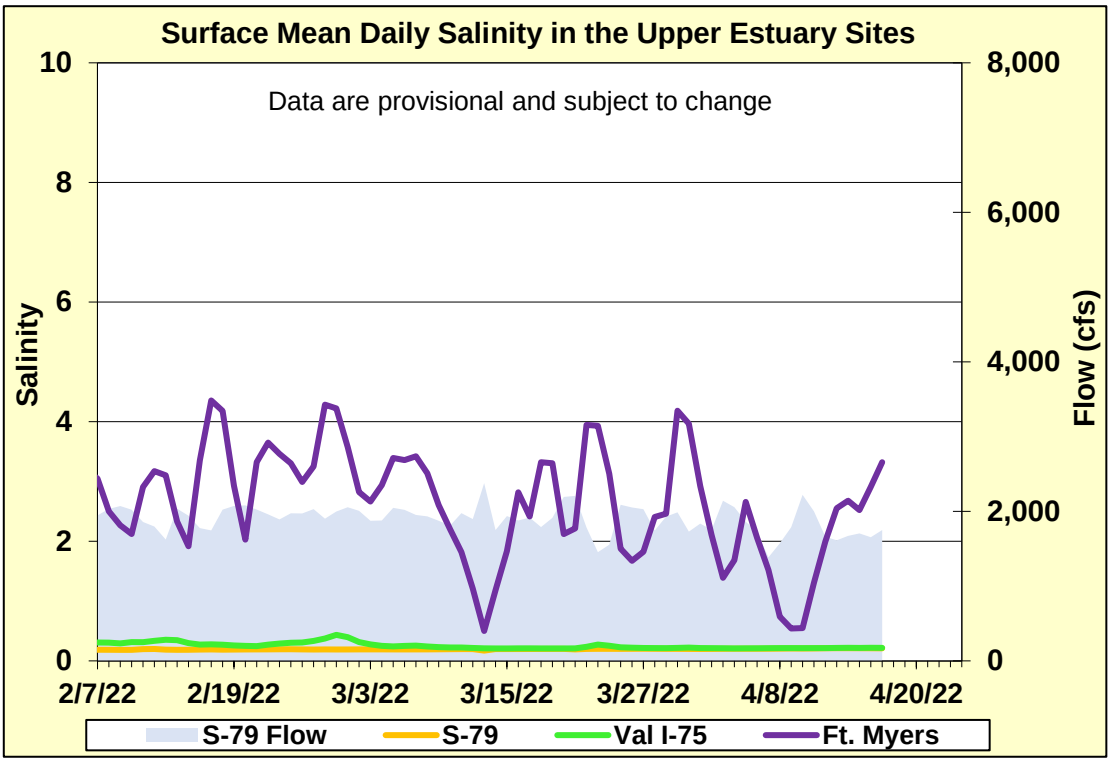


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

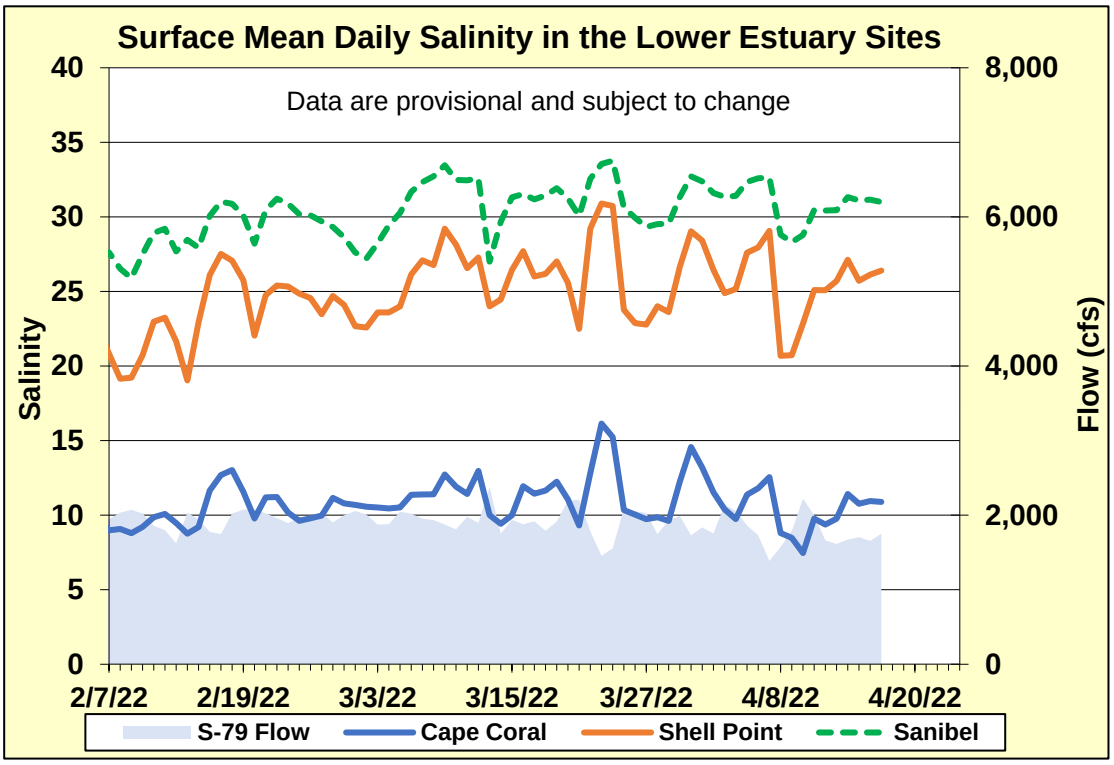


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

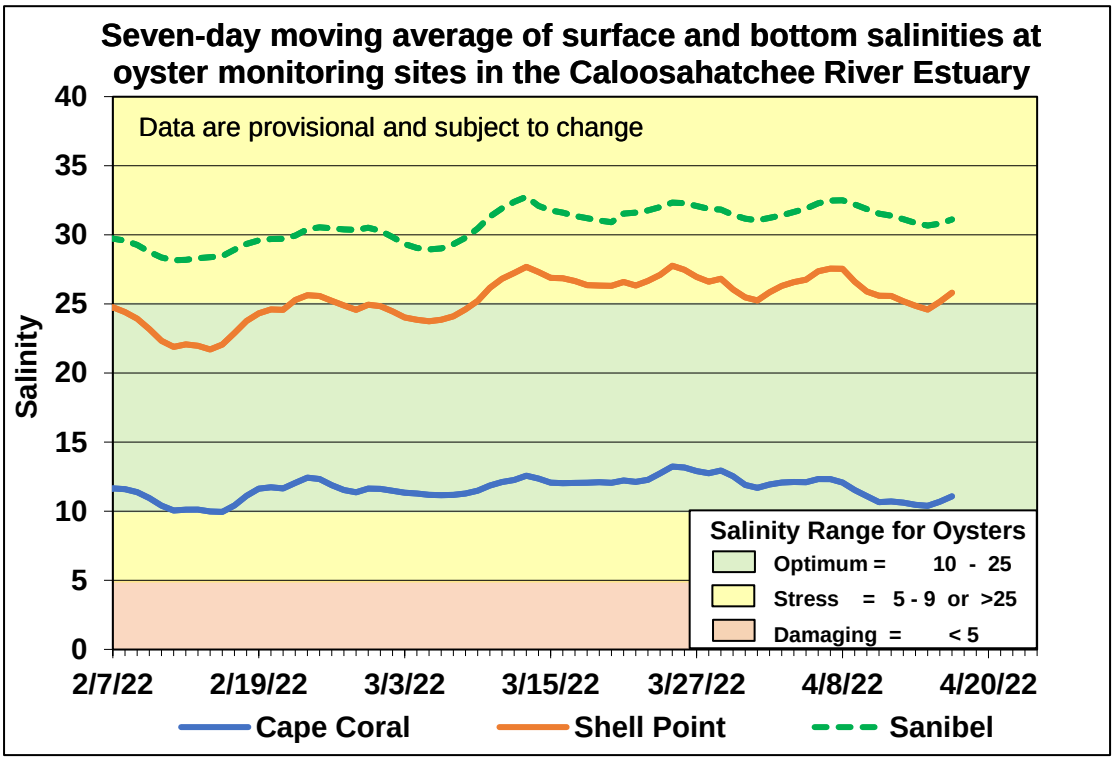


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

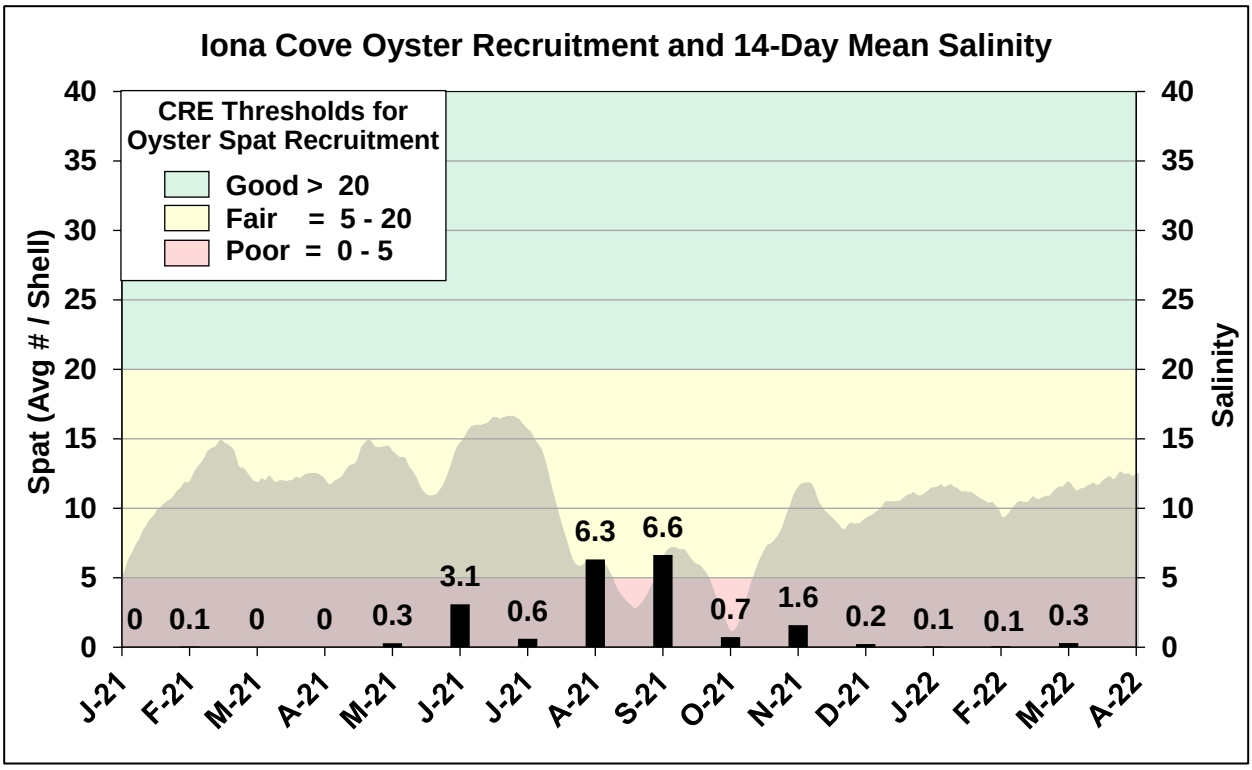


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

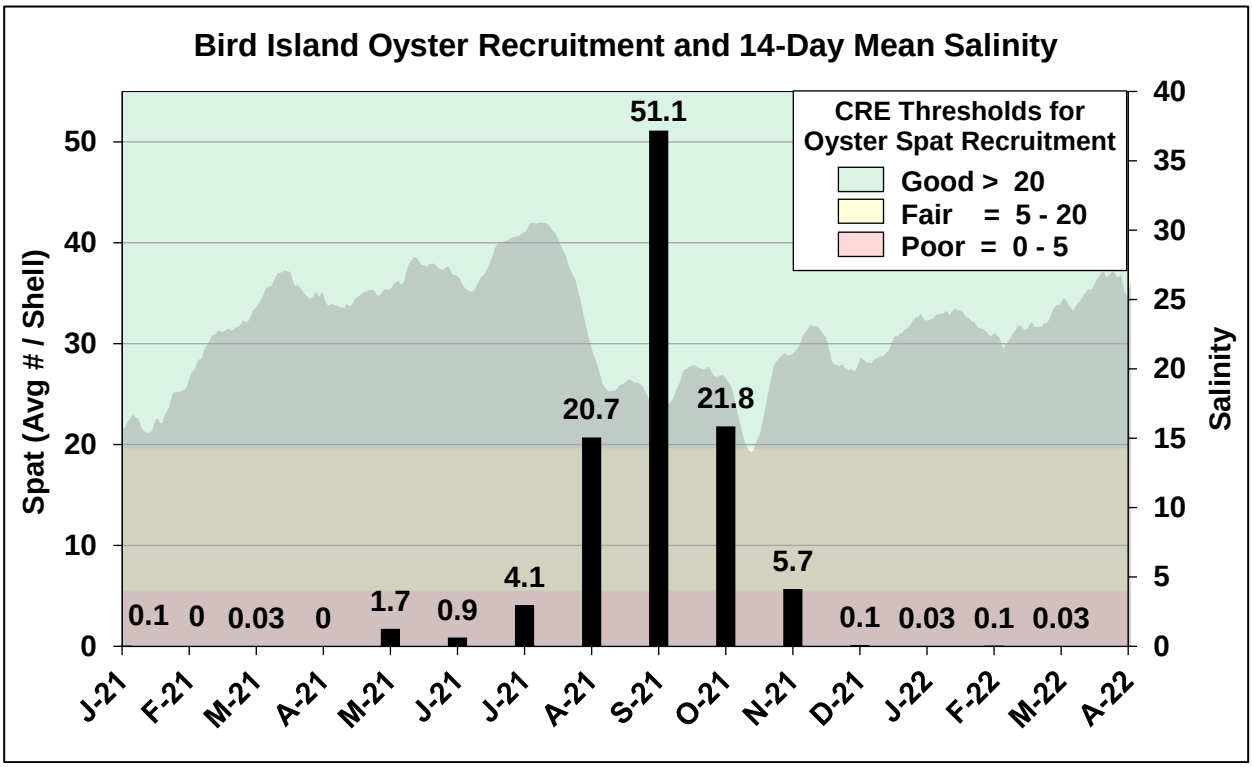


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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	42	2.4	0.6
B	450	42	1.3	0.4
C	800	42	0.8	0.4
D	1000	42	0.5	0.3
E	1500	42	0.3	0.3
F	2000	42	0.3	0.3

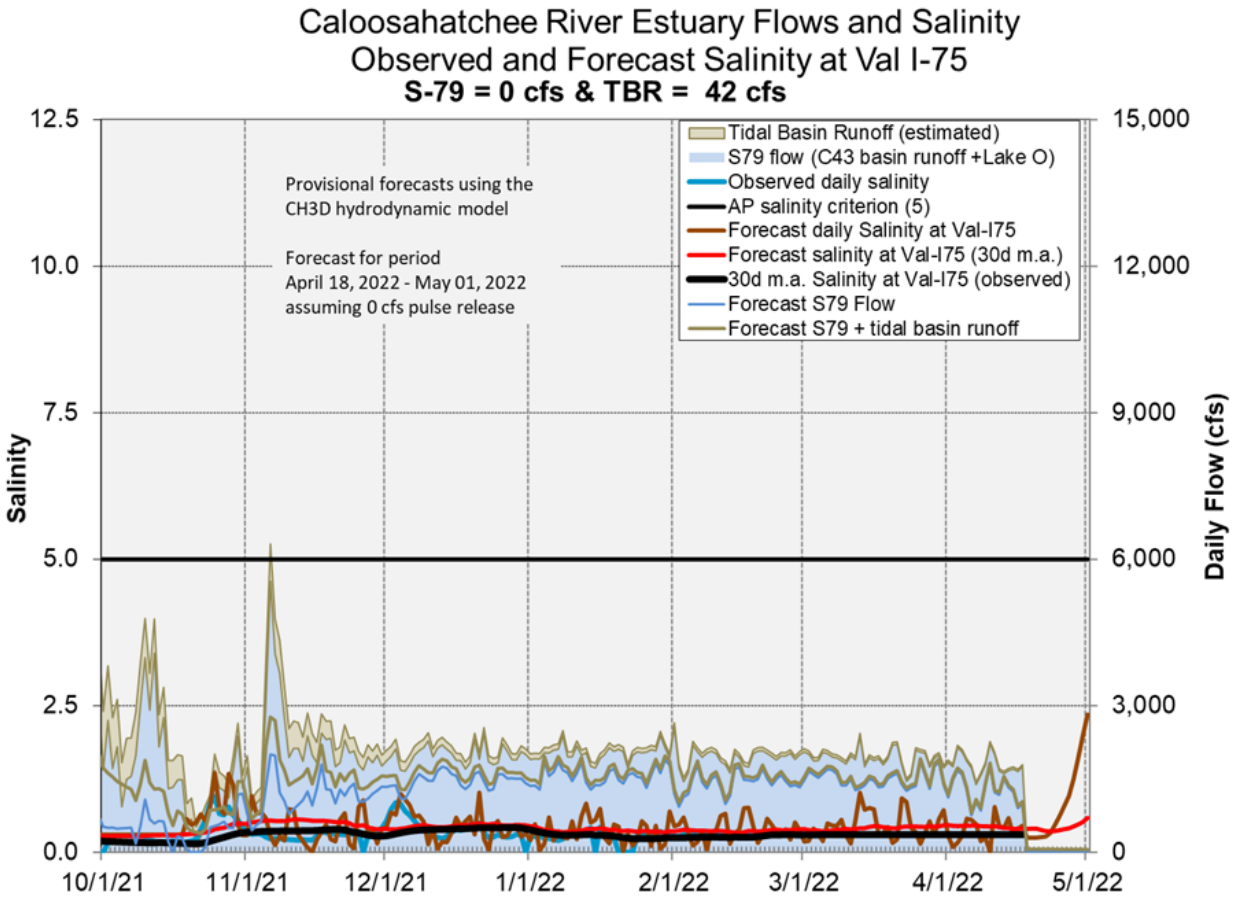


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

Stormwater Treatment Areas

STA-1E: STA-1E Western Flow-way is offline for post-construction vegetation grow in, and the Eastern Flow-way is offline for vegetation management activities related to Tropical Storm Eta. Operational restrictions are in place in STA-1E Central Flow-way 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**).

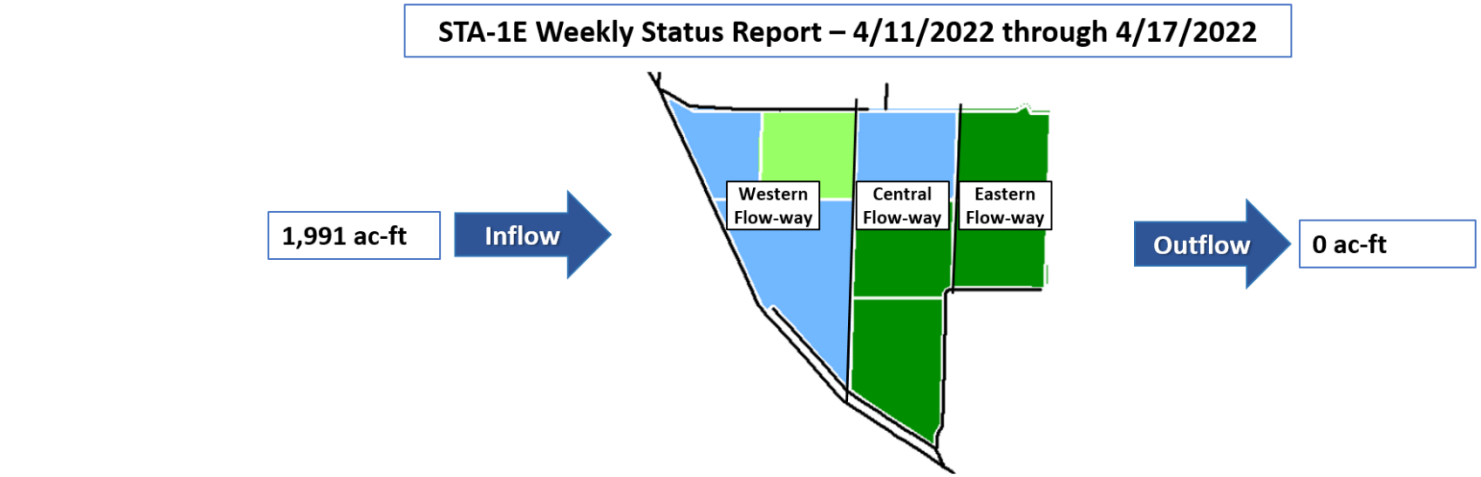
STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to construction activities. Most treatment cells are at or near target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for the Northern and Western, and Eastern Flow-ways are below 1.0 g/m^2/year (**Figure S-2**).

STA-2: STA-2 Flow-way 2 is offline for construction activities. 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/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. 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/m^2/year (**Figure S-4**).

STA-5/6: STA-5/6 Flow-way 4 is offline for vegetation management activities. Most treatment cells are below target stage. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8 which are healthy. The 365-day PLRs for flow-ways 1, 6, 7, and 8 are below 1.0 g/m^2/year. The 365-day PLRs for flow-ways 4 and 5 are high. (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.



STA-1E 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, Tropical Storm Eta repairs starting 01/24/2022		
Central		1.0	Vegetation Rehab
Western	Offline, post-construction grow in starting 3/28/2022		

As of 4/17/2022	
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-1E Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	1,991	4,511	176,942
--Lake Inflow, ac-ft	700	N/A	4,500
Total Outflow, ac-ft	0	226	146,453
Inflow Conc., ppb	100	96	120
Outflow Conc., ppb	N/A	31	23
Includes Preliminary Data			

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

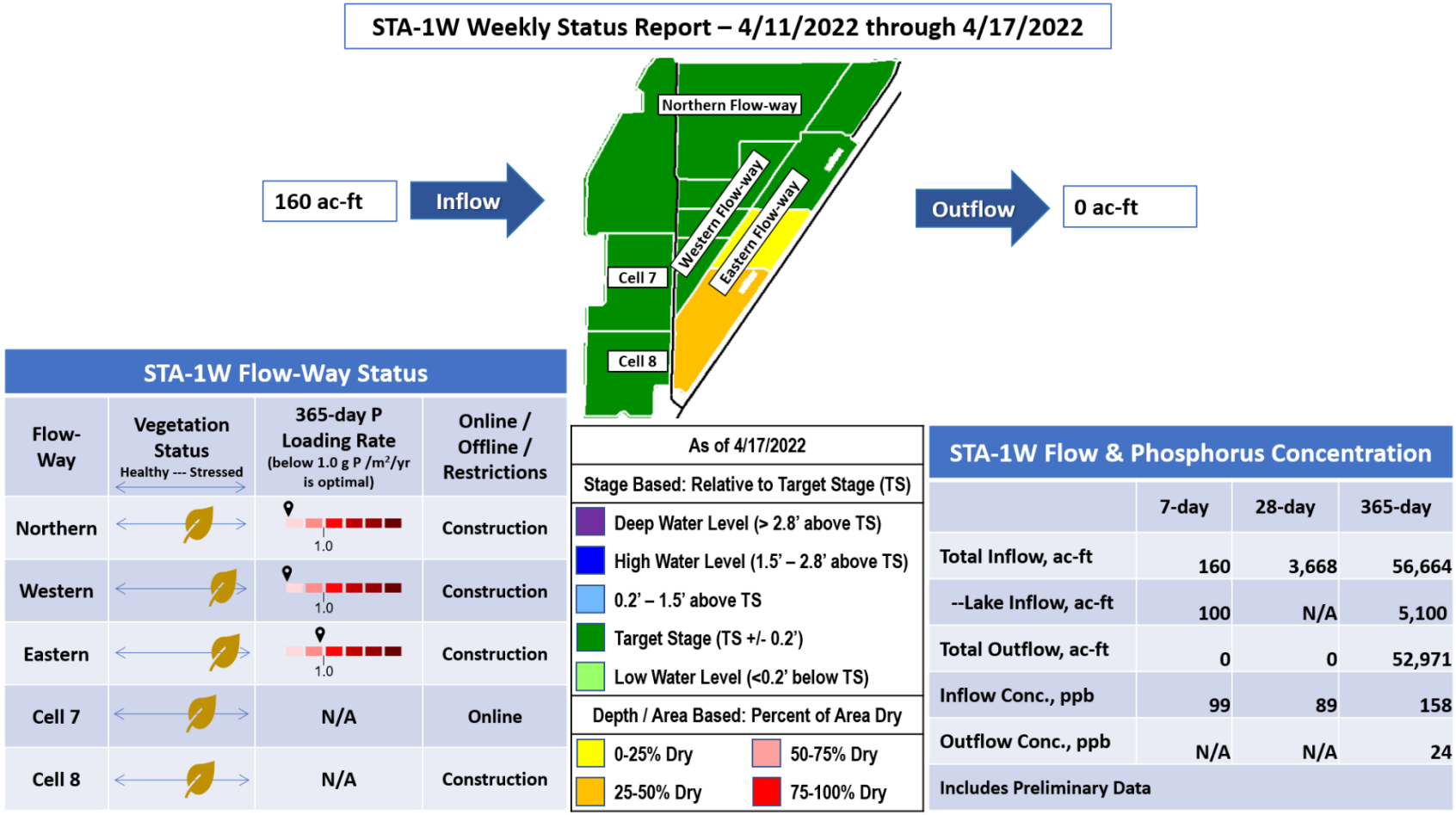
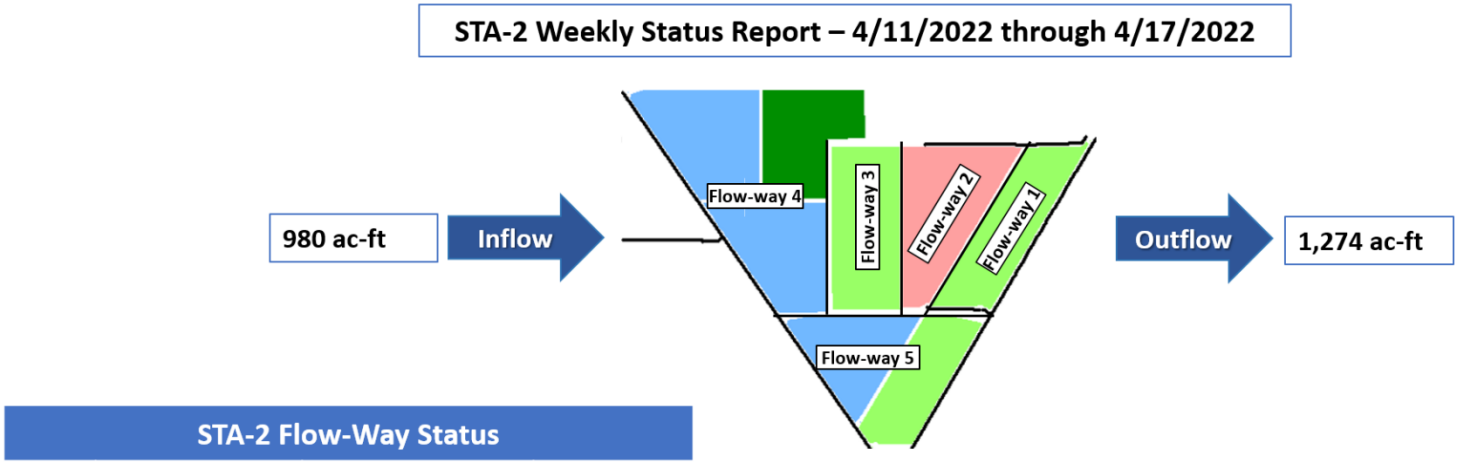


Figure S-2. STA-1W Weekly Status Report



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	Vegetation Rehab
4		1.0	Vegetation Rehab
5		1.0	Online

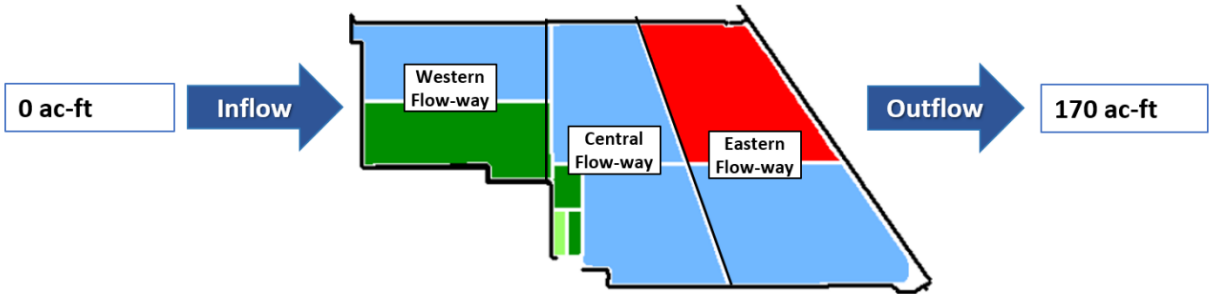
As of 4/17/2022	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-2 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	980	11,455	296,955
--Lake Inflow, ac-ft	100	N/A	46,200
Total Outflow, ac-ft	1,274	5,045	307,493
Inflow Conc., ppb	17	43	90
Outflow Conc., ppb	14	20	15
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 4/11/2022 through 4/17/2022



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	Online
Western		1.0	Online

As of 4/17/2022	
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	0	58	355,093
--Lake Inflow, ac-ft	0	N/A	37,800
Total Outflow, ac-ft	170	170	316,451
Inflow Conc., ppb	N/A	31	66
Outflow Conc., ppb	19	19	15
Includes Preliminary Data			

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

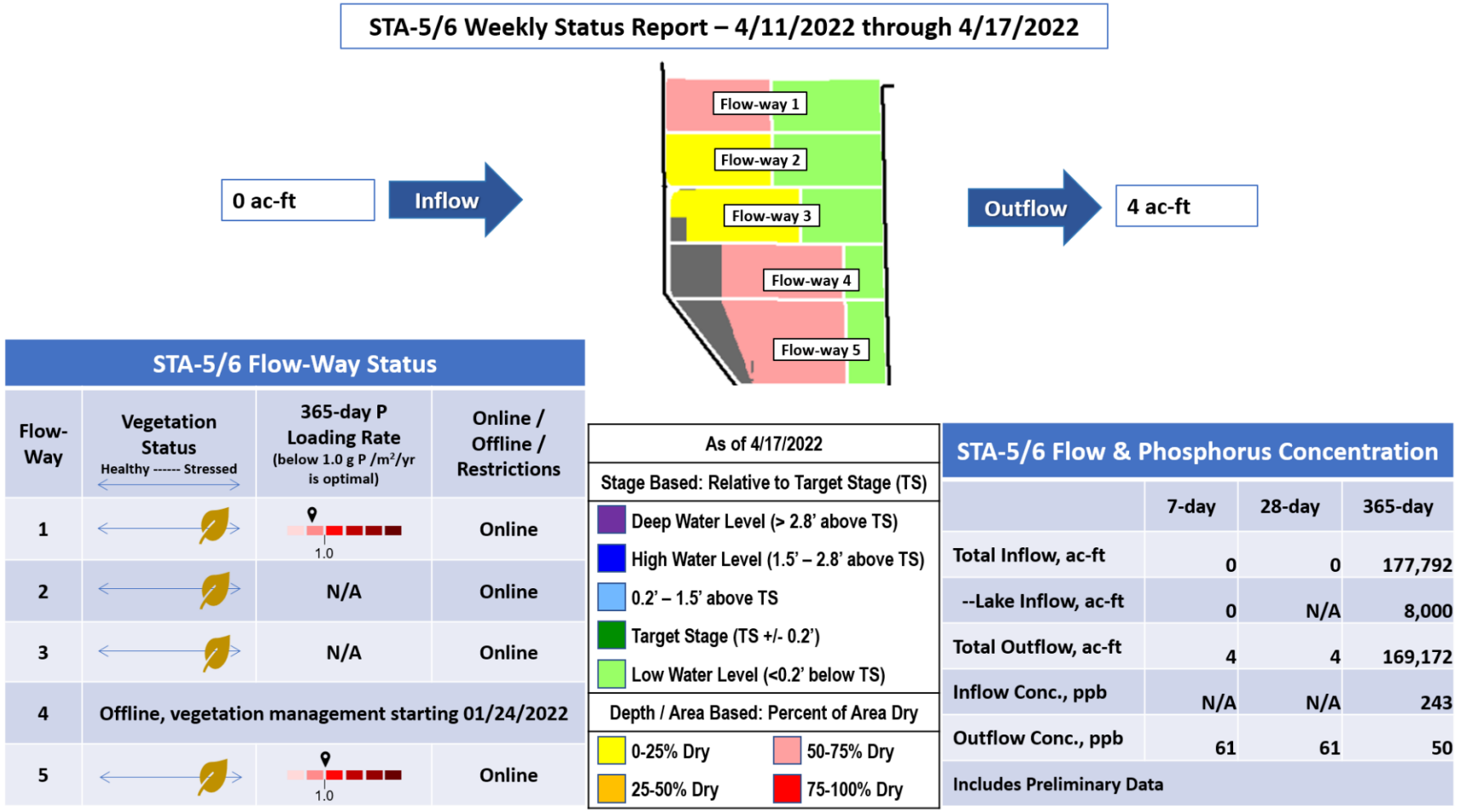
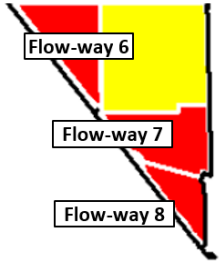
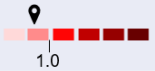
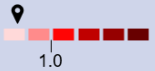


Figure S-5. STA-5/6 Weekly Status Report (Flow-ways 1 – 5)

STA-5/6 Weekly Status Report – 4/11/2022 through 4/17/2022



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			Online
7			Online
8			Online

As of 4/17/2022	
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: The 1-8C fell faster than the slope of the regulation line last week, falling below the regulation line. The average on Sunday was 0.03 feet below the falling Zone A1 regulation line. WCA-2A: Stage continues to drop quickly at the S11B headwater. The average at that gauge on Sunday was 0.01 feet higher than the flat regulation line. WCA-3A: Last week the Three Gauge Average stages declined slower than the previous week; average stage was 1.06 feet below the falling regulation line on Sunday. (3-69W is +0.23'). WCA-3A: Stage rose then fell at gauge 62 (Northwest corner), the average on Sunday was 1.56 feet below the flat Upper schedule line. (**Figures EV-1** through **EV-4**).

Water Depths

The SFWDAT tool indicates that water depths are below the soil surface across most of BCNP (especially south of US41, but conditions improved last week) and WCA-3A North (west of the Miami canal) as is typical but not favorable for this time of year. Ponding in the upper reaches of the L-67 is no longer present. North to South hydrologic connectivity continues to diminish but remains within Everglades National Park's Shark River Slough and Taylor Slough. (**Figure EV-5**). Comparing current WDAT water depths to the depth one month ago, stages decreased across the EPA, significantly so in central BCNP and eastern WCA-3A and -2A. Looking back one year, eastern WCA-3A is significantly lower in depth compared to one year ago. Southern WCA-2A, central BCNP and portions of ENP are slightly wetter than a year ago. (**Figure EV-6)**. Comparing current depths to the past 20 years, portions of the eastern half WCA-3A North remain in the 10th percentile. BCNP remains above the median but below the soil surface. Western WCA-3A is within the 10 to 20th percentile, a good thing for that historically ponded region. The eastern side of ENP remains above the 70th percentile. (**Figure EV-7**).

Taylor Slough and Florida Bay

A spatial average of 0.44 inches of rain fell over Taylor Slough and Florida Bay over the week ending Sunday, 4/17. Stages in Taylor Slough decreased an average of 0.08 feet over this past week with only the Taylor Slough Bridge site (TSB) receiving enough rain to overcome evaporation (**Figure EV-8**). The Slough, as a whole, is now 9.5 inches higher than average driven in large part by the northern areas which are 16 inches higher than the historical average for this time of year (pre-Florida Bay initiative which started in 2017). If current recession rates continue, the Slough will be mostly dry in less than 2 weeks. Water depths in the northern area of the Slough remain higher than in the central and southern areas (**Figure EV-9**) which is unusual for this time of year especially since the northern parts of the Slough would have typically been dry for roughly 2 months.

Salinities in Florida Bay averaged an increase of 1.6 over the week ending 4/17, with individual station changes ranging from −2.1 to +6.5 (**Figure EV-8**). The flow-through spatial mapping conducted last week confirmed that much of the central Bay area is over 40 (highest value of 47). Negative flows persisted for most of the week causing increased salinities in the nearshore areas and upstream. The eastern and central Bay areas are in the upper half of their historical interquartile ranges while the western Bay is near its 75th

percentile (**Figure EV-10**). This is the time of year that salinities rise rapidly due to increased evaporation and the lack of precipitation/flow.

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.

Continued inflows via the S-150 seem to be having a positive result on stages in northeastern WCA-3A as seen from the air and in recent modeling results. If conditions allow continued flow through S-150 is recommended due to its potentially having great ecological benefit by slowing recessions near the Alley North colony and the White Ibis nesting there. If conditions at all allow operational discharges into both the western and the eastern WCA-3A water control structures, this operation has greater benefit than discharges to the west alone. 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	0.22	−0.11
WCA-2A	0.23	−0.12
WCA-2B	0.27	−0.17
WCA-3A	0.72	−0.08
WCA-3B	0.19	−0.06
ENP	0.70	−0.11

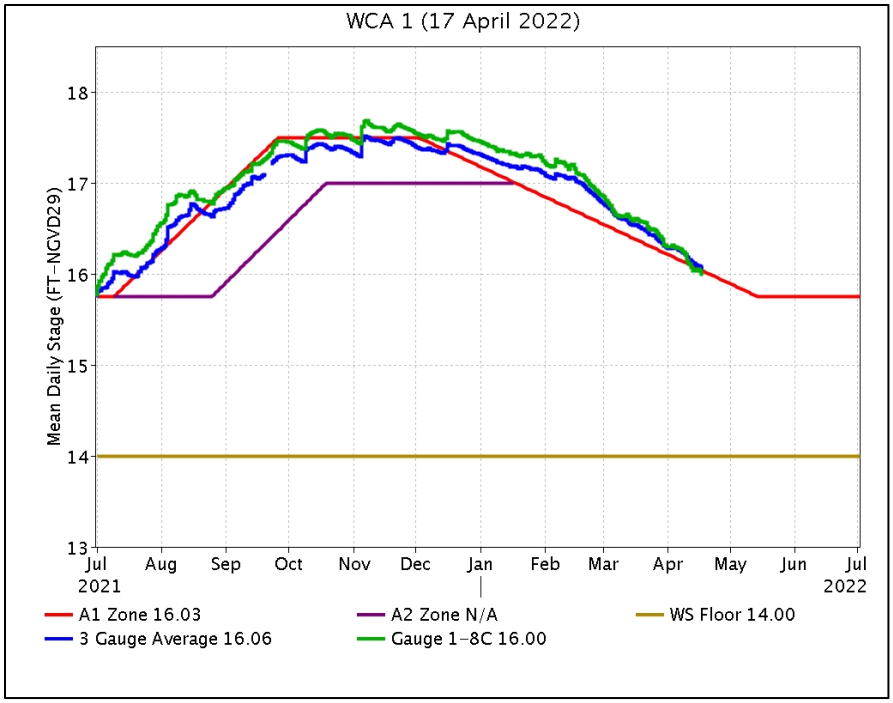


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

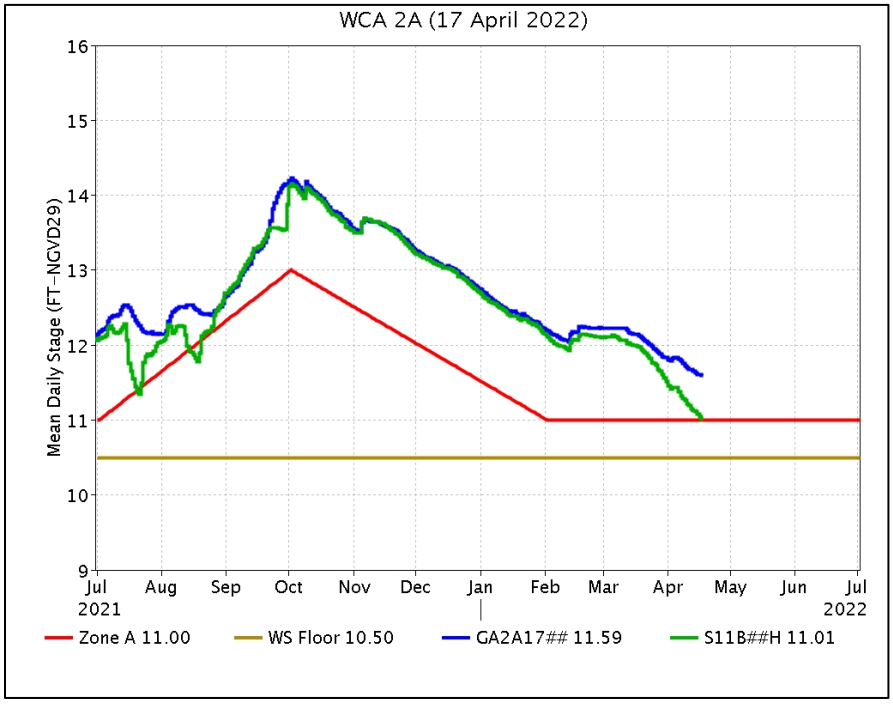


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

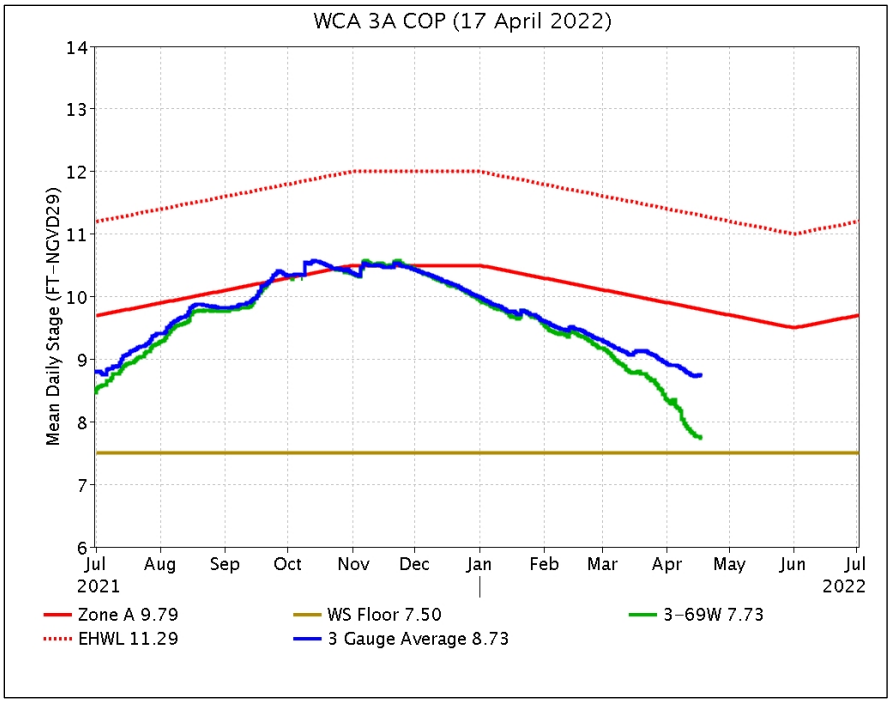


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

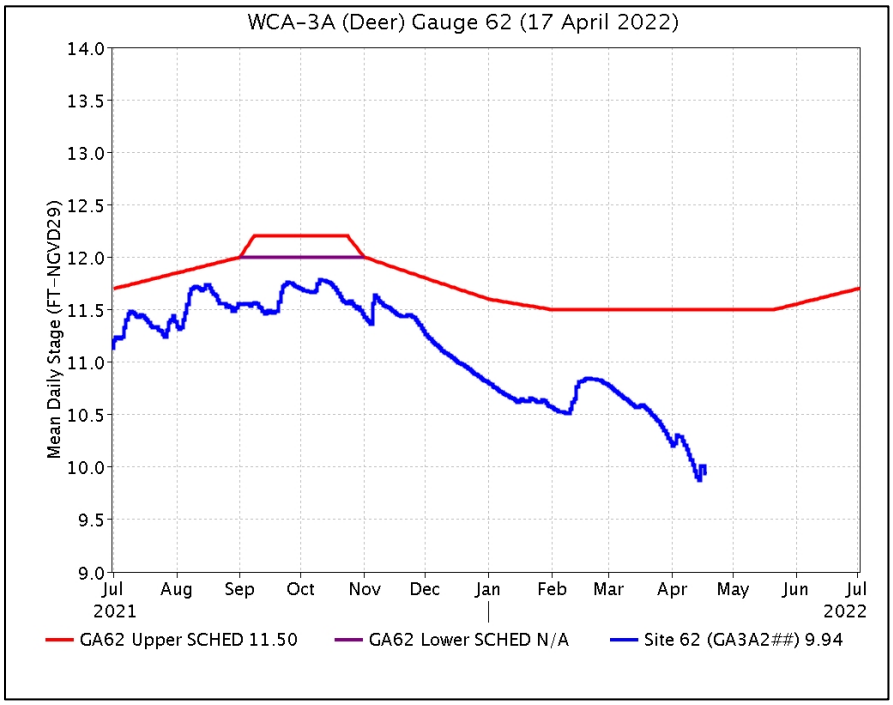


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

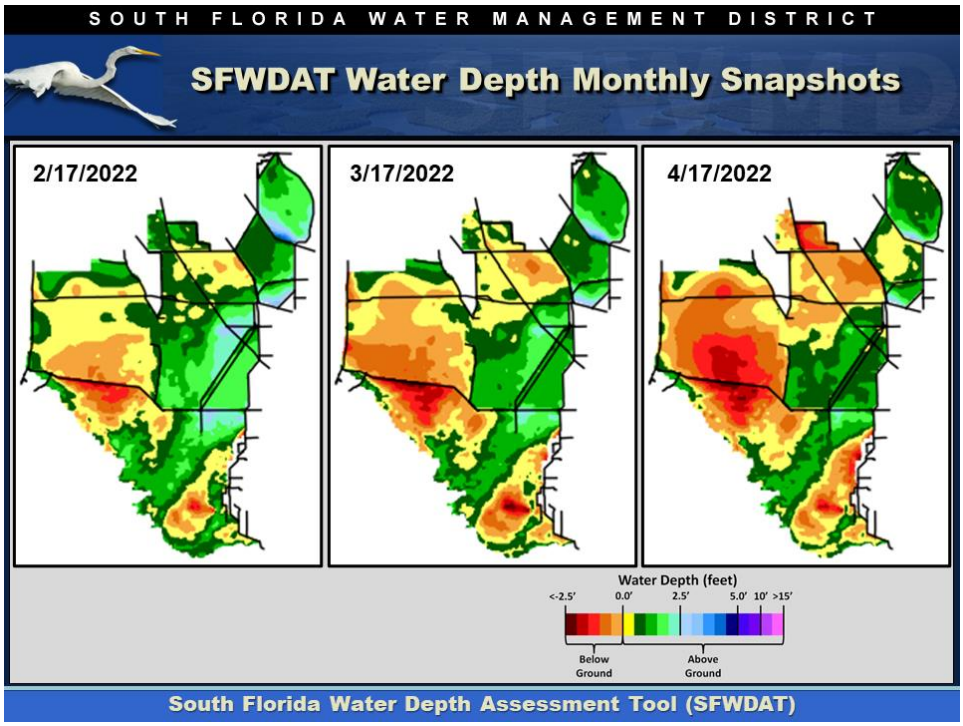


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

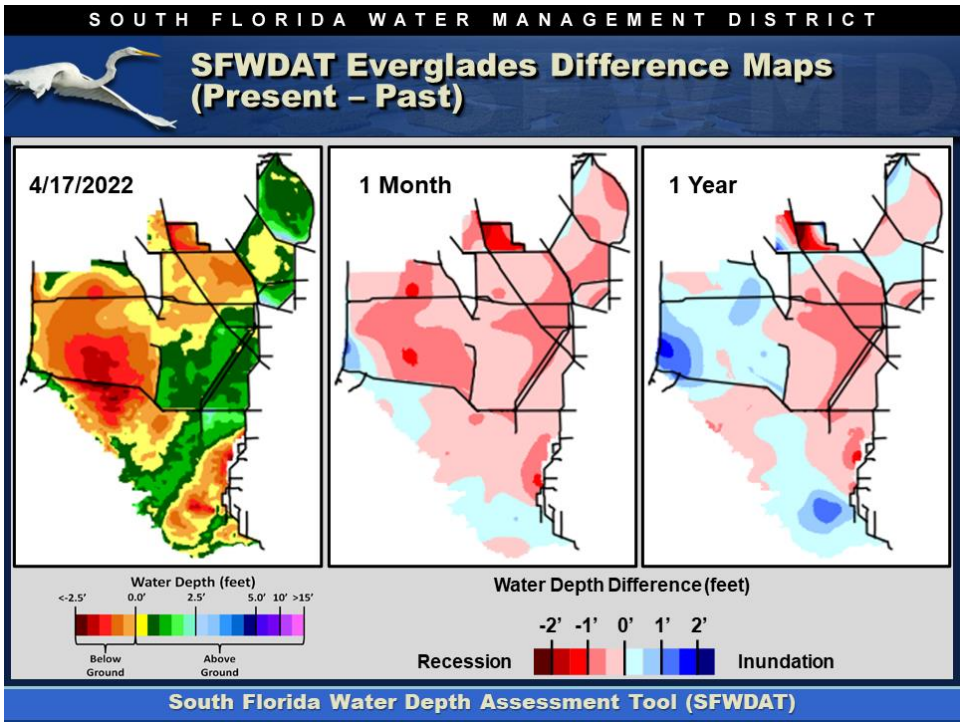


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

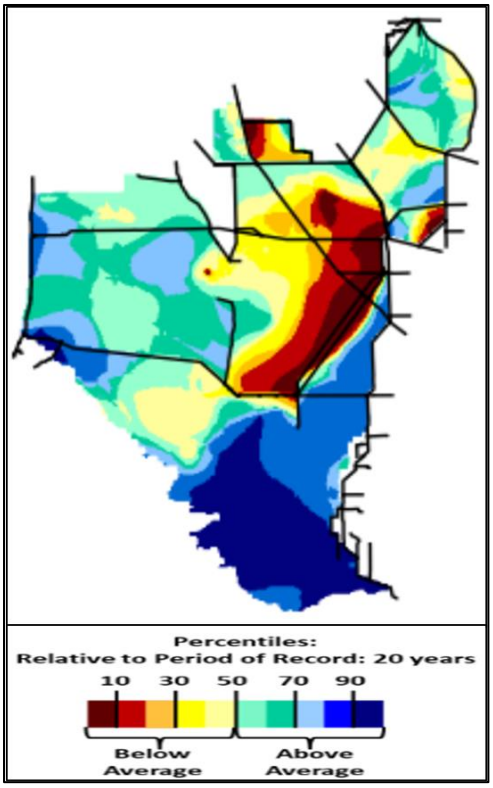


Figure EV-7. Present water depths (4/17/2022) compared to the day of year median over the previous 20 years.

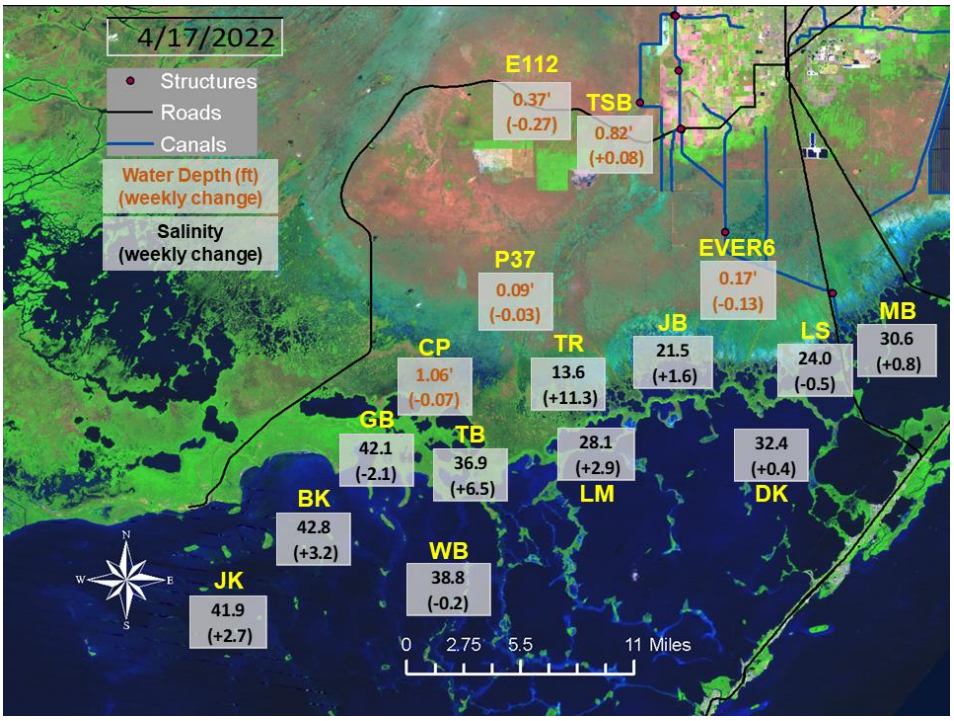


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

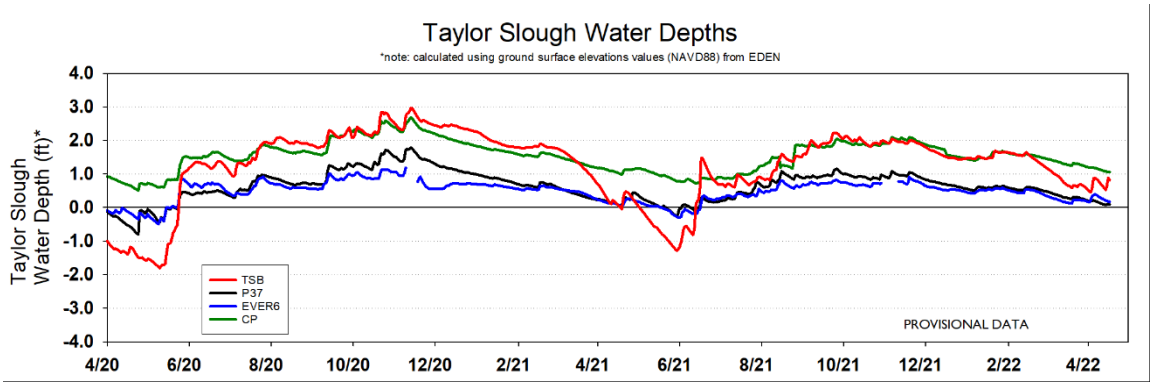


Figure EV-9. Taylor Slough water depth time series.

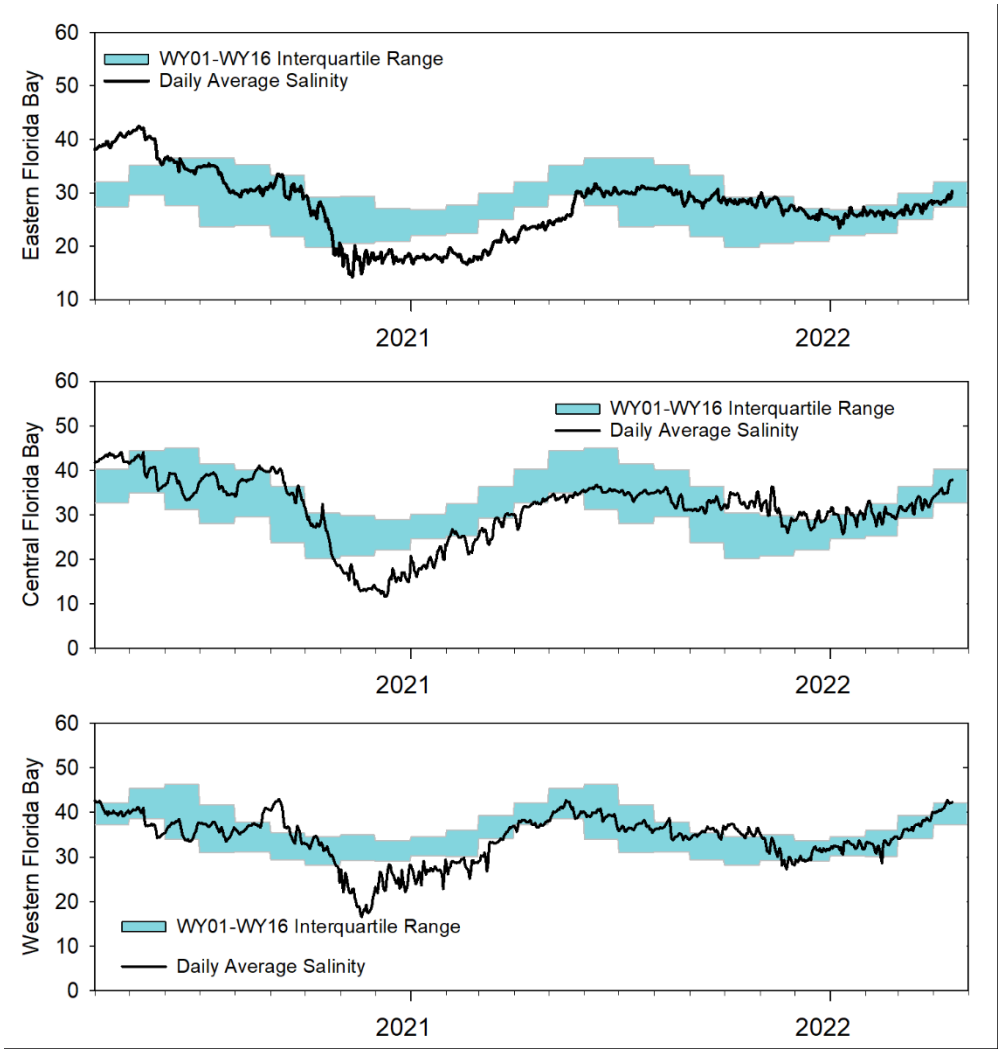


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, April 19, 2022 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.11'	Allow water to move south from this basin until stages reach the regulation schedule. Moderate the recession rate to less than 0.10 feet per week.	Protect within basin and downstream habitat and wildlife. Stages are above the 90th percentile.
WCA-2A	Stage decreased by 0.12'	Conserve water in this basin letting the water move south when conditions allow, with northern WCA-3A as the priority for receiving discharge. Moderate the recession rate to less than 0.10 feet per week.	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 decreased by 0.09'	Conserve water in this basin, while letting the water move south when conditions allow. Maintaining a recession rate less than 0.10 feet per week has an ecological benefit.	Protect within basin peat soils, and downstream habitat and wildlife. Inflows via the S-150 are anecdotally observed to be positively impacting stages in NE WCA-3A North. Lower fire risk.
WCA-3A NW	Stage decreased by 0.14'	Conserve water in this basin letting the water move south when conditions allow. Returning to a recession rate less than 0.10 feet per week has an ecological benefit.	
Central WCA-3A S	Stage increased by 0.01'	Returning to a recession rate less than 0.10 feet per week has an ecological benefit.	Protect within basin and downstream habitat and wildlife. Lower fire risk.
Southern WCA-3A S	Stage decreased by 0.10'		
WCA-3B	Stage decreased by 0.06'	Maintaining a recession rate of around 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 0.11'	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 +0.29'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −5.6 to +2.8	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 233 cfs and the previous 30-day mean inflow was 282 cfs. The seven-day mean salinity was 31.6 at BBCW8 and 33.4 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Data provided by Biscayne National Park.

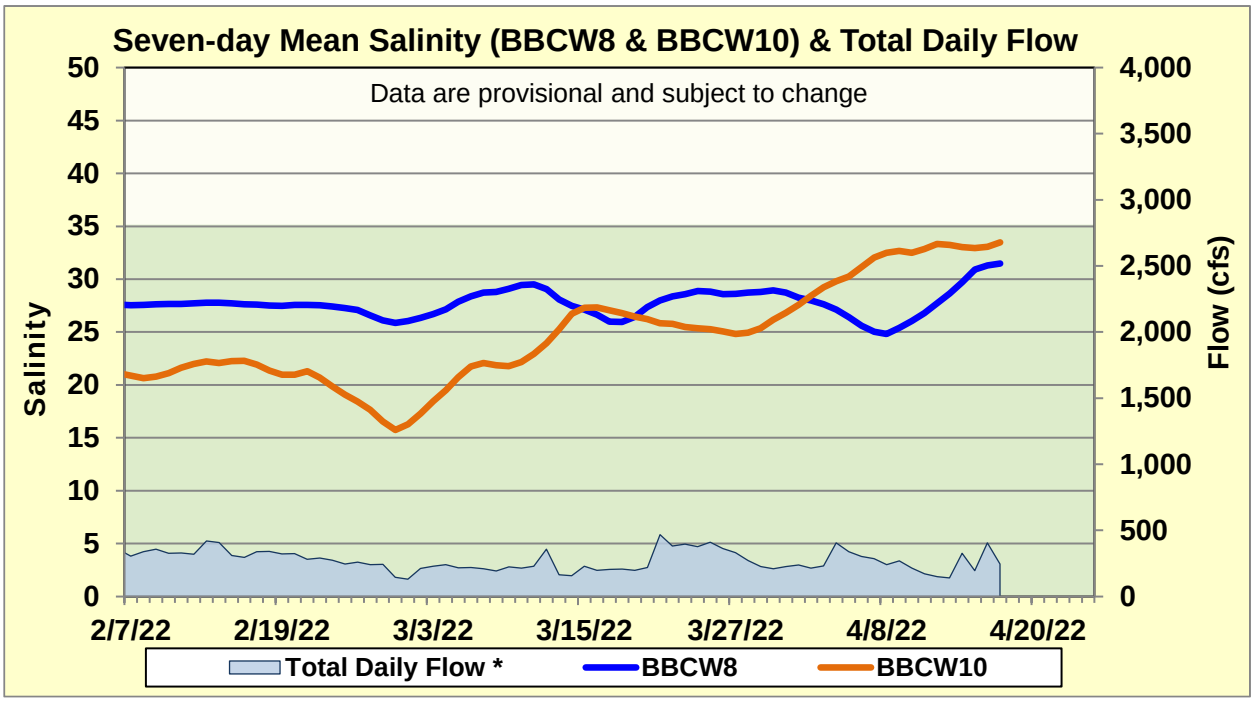


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.