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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: March 30, 2022

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A high-pressure area over the Gulf of Mexico will shift eastward into the western Atlantic Ocean during the next 24 hours causing the low-level winds to veer easterly by this afternoon and southeasterly by Wednesday morning. The change in wind direction will result in a warming across the area during the next couple of days. The significantly warmer daytime maximum temperatures, coupled with low afternoon relative humidity, will result in very high rates of evapotranspiration and a high fire danger, especially since a large part of the SFWMD has been drier than average. A storm system forming over the Great Plains today will move into the Midwest on Wednesday and the Great Lakes on Thursday, carrying with it a cold front into the western Florida Panhandle Thursday morning. Ahead of it, southerly steering winds will draw moisture northward to fuel some rains across the SFWMD Thursday afternoon, primarily over the southern interior or southeast. The stable atmosphere will likely keep the coverage isolated or widely scattered at best and any large areal average rainfall light. A line of heavy showers and thunderstorms preceding the cold front in north Florida Thursday afternoon will then push rapidly southeastward, likely reaching the Kissimmee Valley Thursday evening before quickly diminishing overnight. The cold front located in north Florida late Thursday will then press southward into the northern part of the SFWMD Friday morning to around or just north of Lake Okeechobee by sunset. Considerable moisture pooling ahead of the boundary, the lift of the front, favorable jet stream dynamics and daytime heating should contribute to a good coverage of rains over the central and northern parts of the SFWMD by Thursday evening. While some of the rains are likely to be heavy, the relatively fast movement of rain areas could help to reduce local maxima. While the front could temporarily slip south of Lake Okeechobee Saturday morning, the approach of a weaker storm system crossing the central Plains and Midwest on Saturday will reactivate the front, causing it to retreat as a warm front to the northern half of the SFWMD by Saturday afternoon. Substantial moisture, convergence associated with the front, and good daytime surface heating/instability should promote the development of widespread rains across the northeastern half of the SFWMD Saturday afternoon and evening and lesser rains elsewhere. The rains should then diminish by Saturday night. The arrival of the weak storm system in the eastern U.S. and western

Atlantic Ocean by Sunday will cause the front, then north of the area, to return on Sunday, resulting in additional rainfall but mainly from Lake Okeechobee southward. Westerly steering winds could help to focus some locally heavier rains Sunday afternoon over the southeastern part of SFWMD before the rains diminish when the front reaches the far southern part of the area Sunday evening. More than likely, a drying with cooler weather will occur after the frontal passage on Monday, except for the possibility of generally lighter rains over the far south near the stationary frontal boundary. A lower-probability, alternate scenario would be for greater rains associated with the stalled front across the southern half of the SFWMD. For the week ending next Tuesday morning, total SFWMD rainfall is likely to be above normal, with the largest departures from normal from the Kissimmee Valley to east/southeast of Lake Okeechobee where the heaviest rains are likely. While western areas are likely to be much wetter than the recent weeks, total rainfall there could still be below normal the long-term weekly average and near normal at best.

Kissimmee

Flow at S-59 and S-61 is being decreased as stage in East Toho and Toho return to their respective recession lines. Flow at S-65/S-65A is being increased slowly to manage the stage reversals on KCH and the Kissimmee River; water depth on the Kissimmee River floodplain has changed slightly, with a mean depth of 0.27 feet as of March 27, 2022. The concentration of dissolved oxygen in the Kissimmee River has remained well above the region of concern, with an average of 8.3 mg/L for the week ending on March 27, 2022.

Lake Okeechobee

Lake Okeechobee stage was 13.92 feet NGVD on March 27, 2022, with water levels 0.71 feet lower than a month ago (**Figure LO-1**). Lake stage and has been within the ecological envelope for over 12 weeks, having spent a total of 279 days (79%) in 2021 above the envelope (**Figure LO-3**). Average daily inflows (excluding rainfall) increased from the previous week, going from 704 cfs to 843 cfs. Average daily outflows (excluding evapotranspiration) increased from the previous week, going from 2,439 cfs to 4,322 cfs. Approximately 8,380 wading birds were seen foraging on the Lake on March 25, 2022. March water quality data revealed 3 of 32 sites had chlorophyll-a values greater than 40 µg/L. Recent satellite imagery (March 27, 2022) showed a few scattered areas of low to moderate bloom potential, in Fisheating Bay and along the northwestern shoreline (**Figure LO-8**).

Estuaries

Total inflow to the St. Lucie Estuary averaged 179 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities remained the same at the US1 Bridge site and increased at HR1 and A1A Bridge sites over the past week. Salinity at the US1 Bridge was in the good range (10-26) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 1,939 cfs over the past week with 1,484 cfs coming from the Lake. Mean surface salinities remained the same at S-79, Val I-75, and Shell Point, and increased at the remaining sites in the estuary over the past

week. Salinities were in the good range (0-10) for tape grass at Val I-75 and Ft. Myers. Salinities were in the good range (10-30) for adult eastern oysters at Cape Coral and Shell Point, and in the fair range at Sanibel.

Stormwater Treatment Areas

For the week ending Sunday, March 27, 2022, approximately 6,200 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 104,200 ac-feet. The total amount of inflows to the STAs in WY2022 is approximately 1,009,000 ac-feet. Most STA cells are at or near target stage, except portions of 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 were elevated into the poor range. While depths in WCA-2A remain above schedule continued discharges from that basin into WCA-3A North via the northern perimeter of that basin are benefitting the ecology of that particularly sensitive region. However elevated recessions last week in both WCA-2A and WCA-3A North indicate reduced wading bird foraging and nesting potential. Wading bird foraging and nesting expectations remain at best average this year. Most of the eastern CSSS subpopulation percent dry conditions have returned to the target of 40% dry, but recessions in sub population Echo remain low. Stages came up in Taylor Slough and the conditions remain fair within Florida Bay as salinities in the central and eastern bay rise slowly while the western bay nears the 75th percentile.

Biscayne Bay

Total inflow to Biscayne Bay averaged 368 cfs and the previous 30-day mean inflow averaged 248 cfs. The seven-day mean salinity was 28.7 at BBCW8 and 24.9 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 March 27, 2022, lake stages were 56.5 feet NGVD (1.1 feet below schedule) in East Lake Toho, 53.2 feet NGVD (1.4 feet below schedule) in Lake Toho, and 50.3 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 March 27, 2022 were 1,120 cfs at S-65 and 1,050 cfs at S-65A; discharges from the Kissimmee River were 970 cfs at S-65D and 820 cfs at S-65E (**Table KB-2**). Headwater stages were 46.4 feet NGVD at S-65A and 26.7 feet NGVD at S-65D on March 27, 2022. With lower water temperatures, the concentration of dissolved oxygen is well above the region of concern, with an average of 8.3 mg/L for the week ending on March 27, 2022 (**Table KB-2, Figure KB-4**). Flow at S-65/S-65A is being increased slowly to manage the stage reversals on KCH and the Kissimmee River, and water depth on the Kissimmee River floodplain has changed slightly with a mean depth of 0.27 feet as of March 27, 2022 (**Figure KB-5**).

Water Management Recommendations

Managed stage recessions for snail kite nesting season were started on Lakes Toho and East Toho on January 15, 2022 to gradually reduce lake stages to their low pools by June 1. Following the recent stage reversals, flow at S-59 and S-61 was adjusted to return lake stages to their projected recession lines. In Kissimmee-Cypress-Hatchineha, flow was increased at S-65 to help control its stage reversals, and stage has begun declining again.

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)	
							3/27/22	3/20/22
Lakes Hart and Mary Jane	S-62	LKMJ	110	60.4	R	60.8	-0.4	-0.5
Lakes Myrtle, Preston and Joel	S-57	S-57	44	60.8	R	60.7	0.1	0.0
Alligator Chain	S-60	ALLI	133	63.7	R	63.7	0.0	0.0
Lake Gentry	S-63	LKGT	179	61.2	R	61.2	0.0	-0.1
East Lake Toho	S-59	TOHOE	464	56.5	R	57.6	-1.1	-1.0
Lake Toho	S-61	TOHOW S-61	1,228	53.2	R	54.6	-1.4	-1.2
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	1,052	50.3	R	51.0	-0.7	-0.9

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.

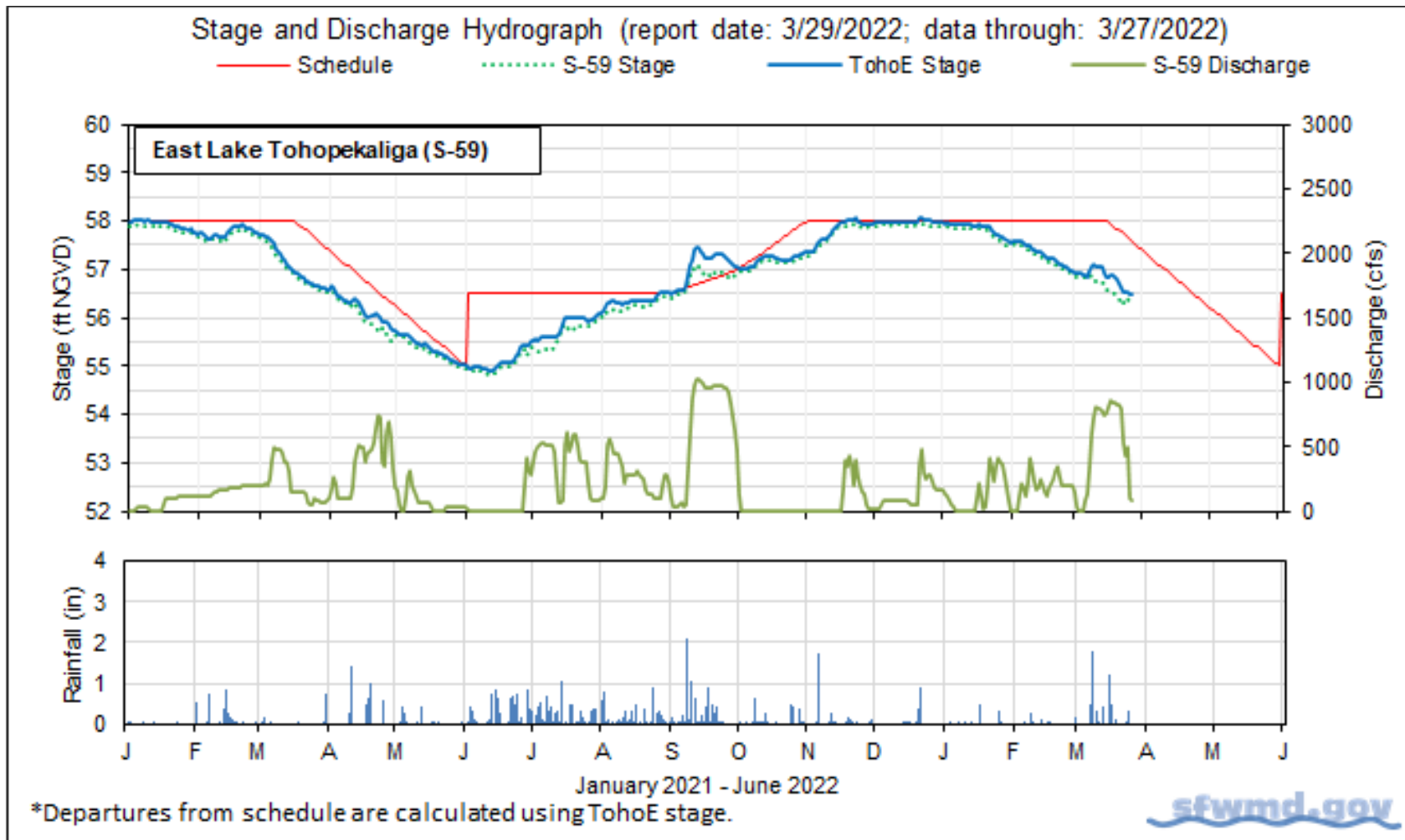


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

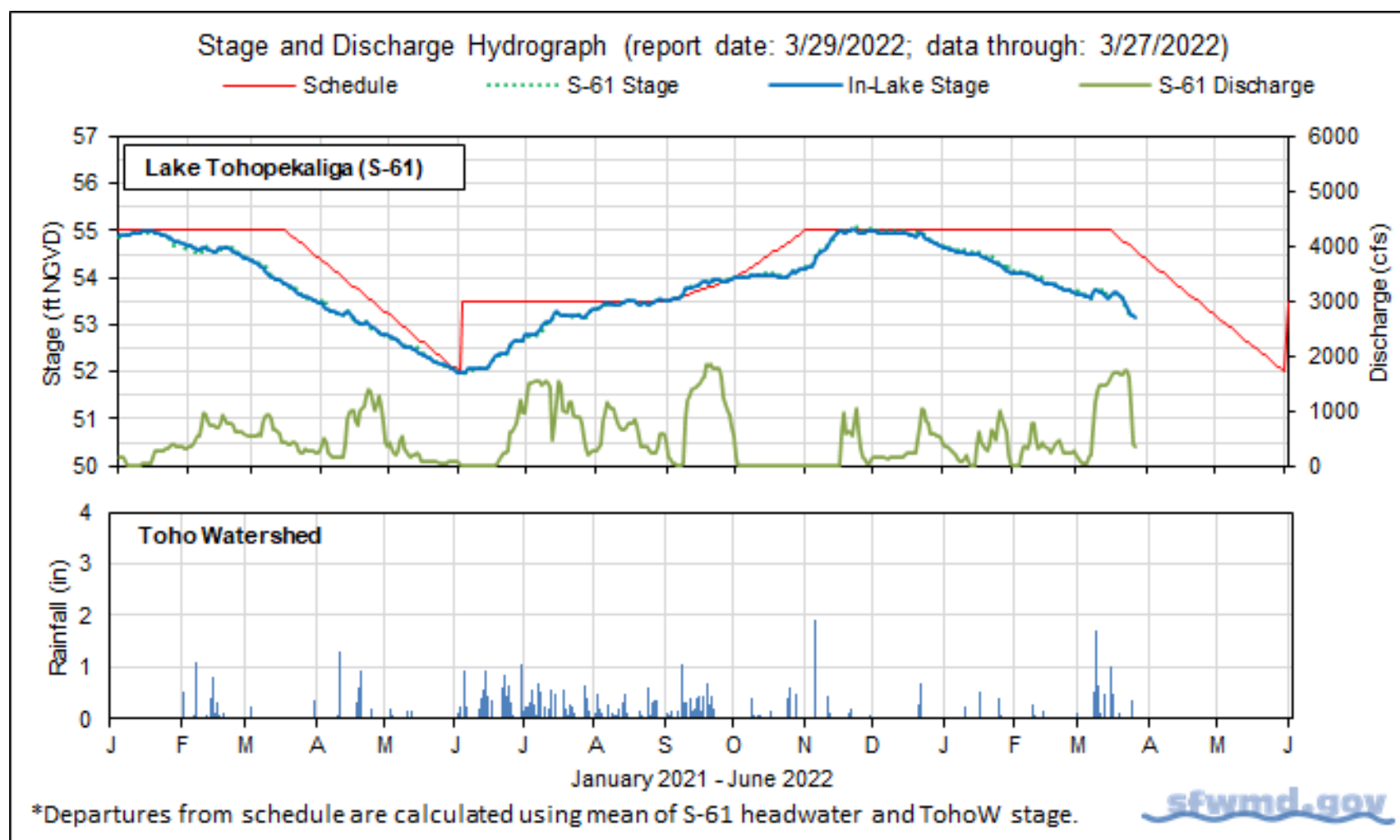


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

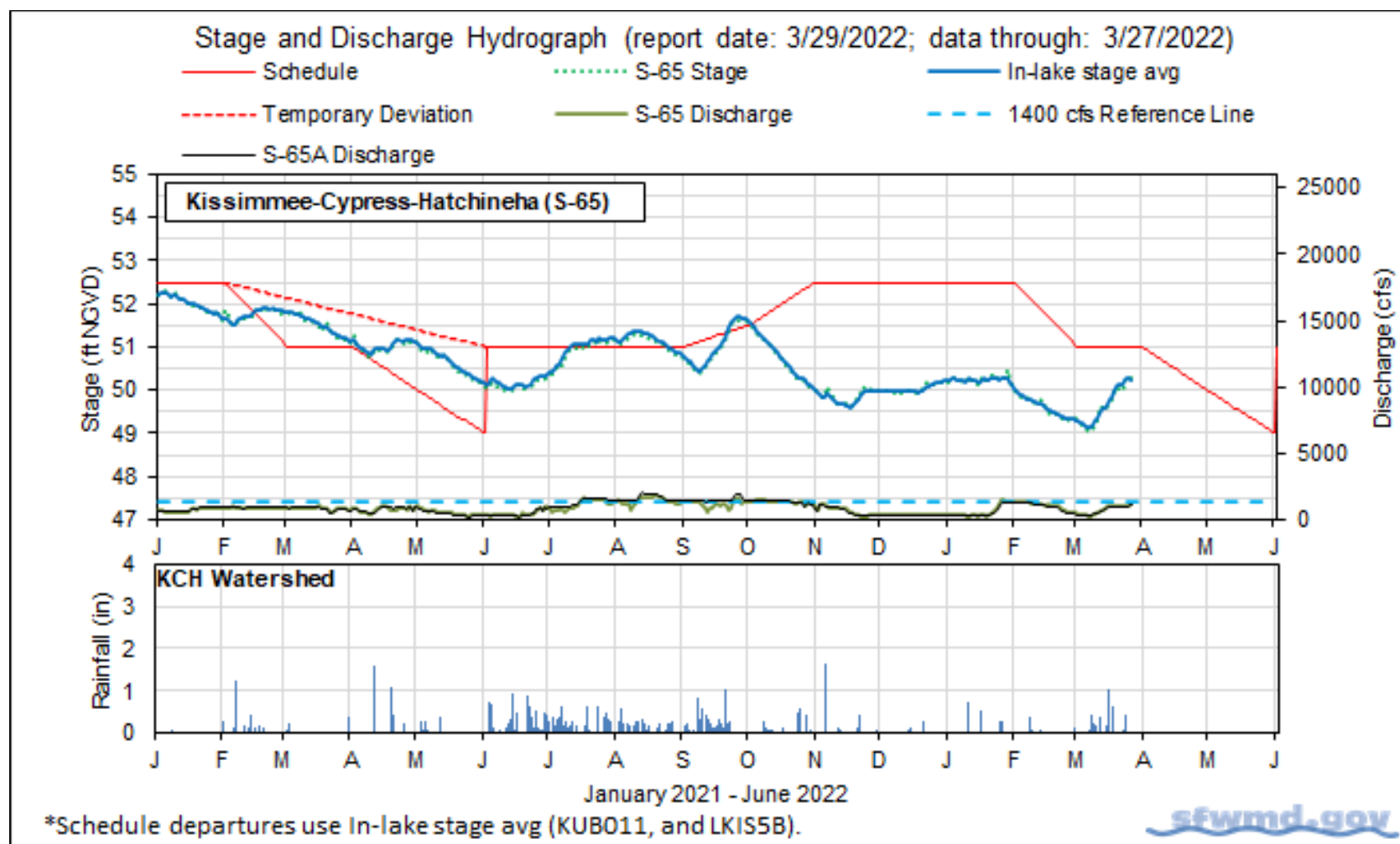


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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 3/27/22	Average for Previous Seven Day Periods			
			3/27/22	3/20/22	3/13/22	3/6/22
Discharge	S-65	1,120	1,050	980	440	400
Discharge	S-65A ^a	1,050	980	880	410	360
Headwater Stage (feet NGVD)	S-65A	46.4	46.4	46.4	46.4	46.4
Discharge	S-65D ^b	970	950	770	380	470
Headwater Stage (feet NGVD)	S-65D ^c	26.7	26.6	26.6	26.5	26.5
Discharge (cfs)	S-65E ^d	820	830	660	310	430
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	8.4	8.3	8.3	7.9	8.0
Mean depth (feet) ^f	Phase I floodplain	0.27	0.28	0.28	0.24	0.24

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.

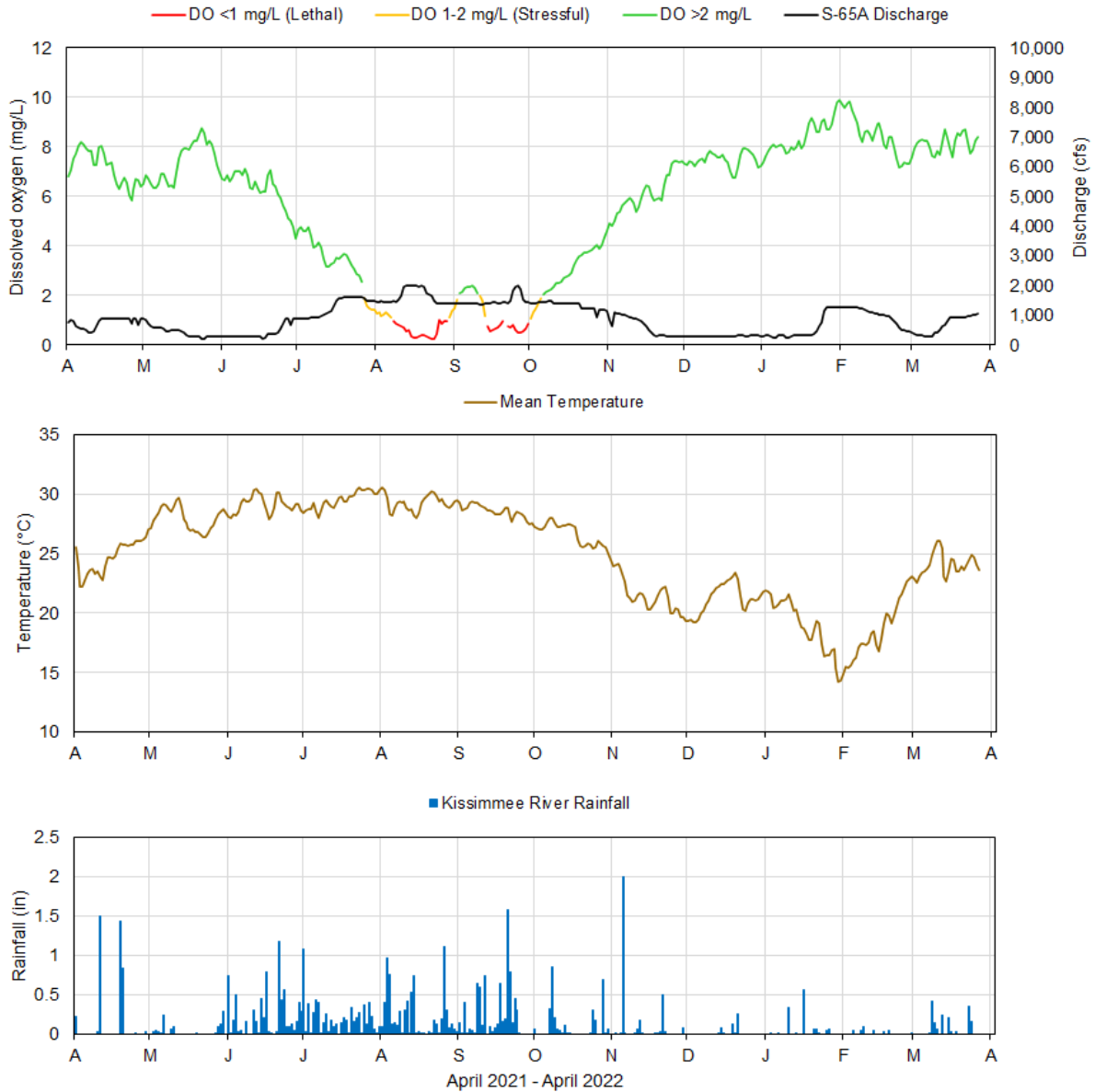
d. Combined discharge from S-65E and S-65EX1.

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: 3/29/2022; data are through: 3/27/2022

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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 three stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

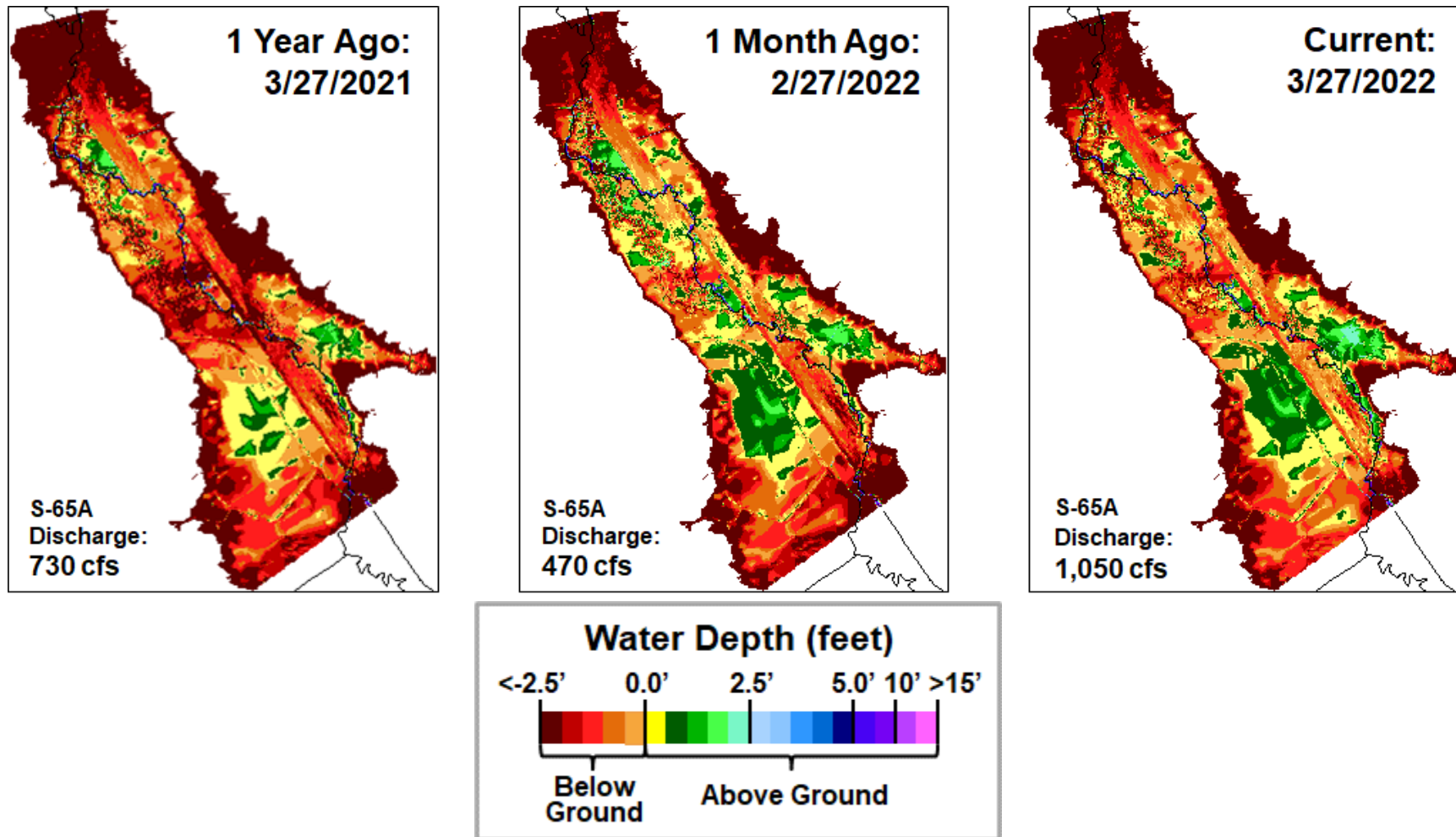


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

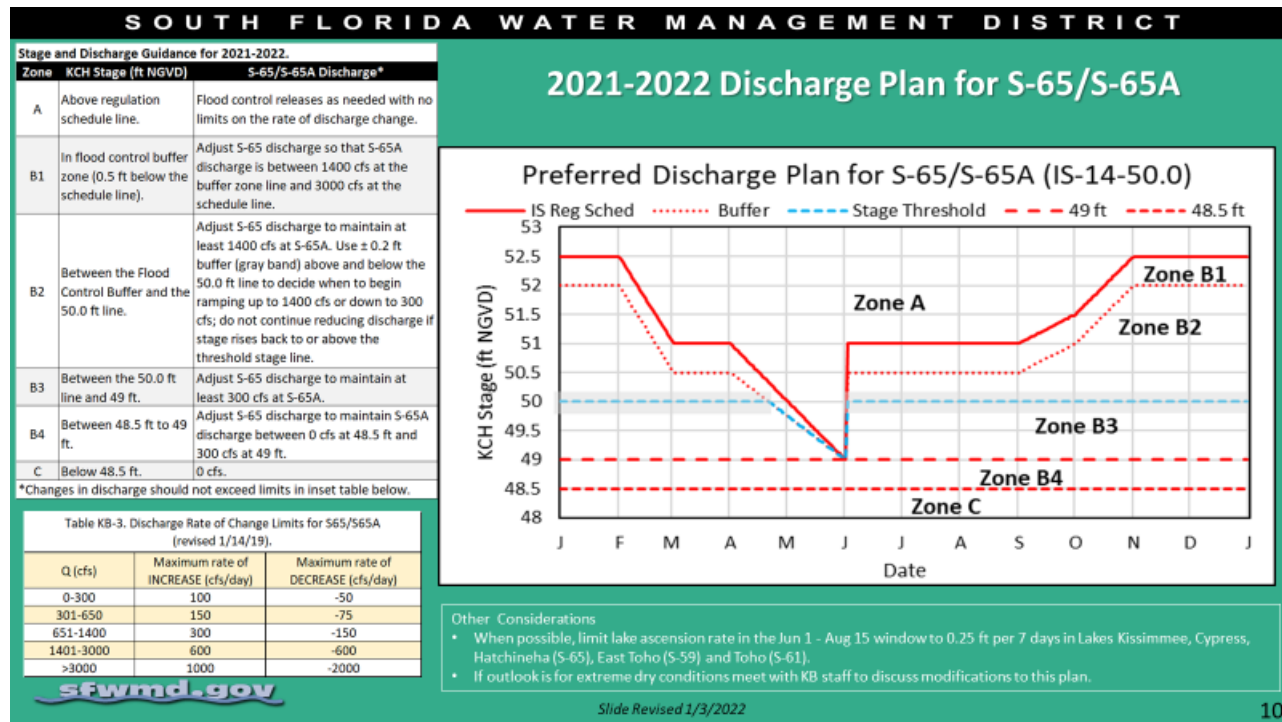


Figure KB-6. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

Lake Okeechobee

Lake Okeechobee stage was 13.92 feet NGVD on March 27, 2022, with water levels 0.71 feet lower than a month ago (**Figure LO-1**). Lake stage remains in the Low sub-band (**Figure LO-2**) and has been within the ecological envelope for over 12 weeks (**Figure LO-3**). According to NEXRAD, 0.20 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) increased from the previous week, going from 704 cfs to 843 cfs. Average daily outflows (excluding evapotranspiration) also increased, going from 2,439 cfs to 4,322 cfs. Highest inflows came from the Kissimmee River through the S-65E structure (828 cfs). The highest outflow (1,889 cfs) was to the west via the S-77 structure, while flows south via the S-350 structures increased from 274 cfs to 1,751 cfs (S-351 1,131 cfs; S-352 161 cfs; S-354 460 cfs). Flows east were 492 cfs and 190 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.

The most recent wading bird survey (March 25, 2022) reported approximately 8,380 foraging wading birds on the Lake, spread across 21 flocks. This total is similar to the 5-year average of around 9,000 birds (**Figure LO-6**).

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 March sampling occurred on the 7th, through the 9th. Results showed three sites in and around Fisheating Bay had chlorophyll-a values above the bloom threshold of 40 µg/L, and six sites were between 20 µg/L and 40 µg/L. All samples had below detectable levels of cyanotoxins, and mixed algal communities (**Table LO-1** and **Figure LO-7**).

The most recent satellite image (March 27, 2022) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor showed scattered areas of low to moderate bloom potential, in Fisheating Bay and along the northwestern shoreline (**Figure LO-8**).

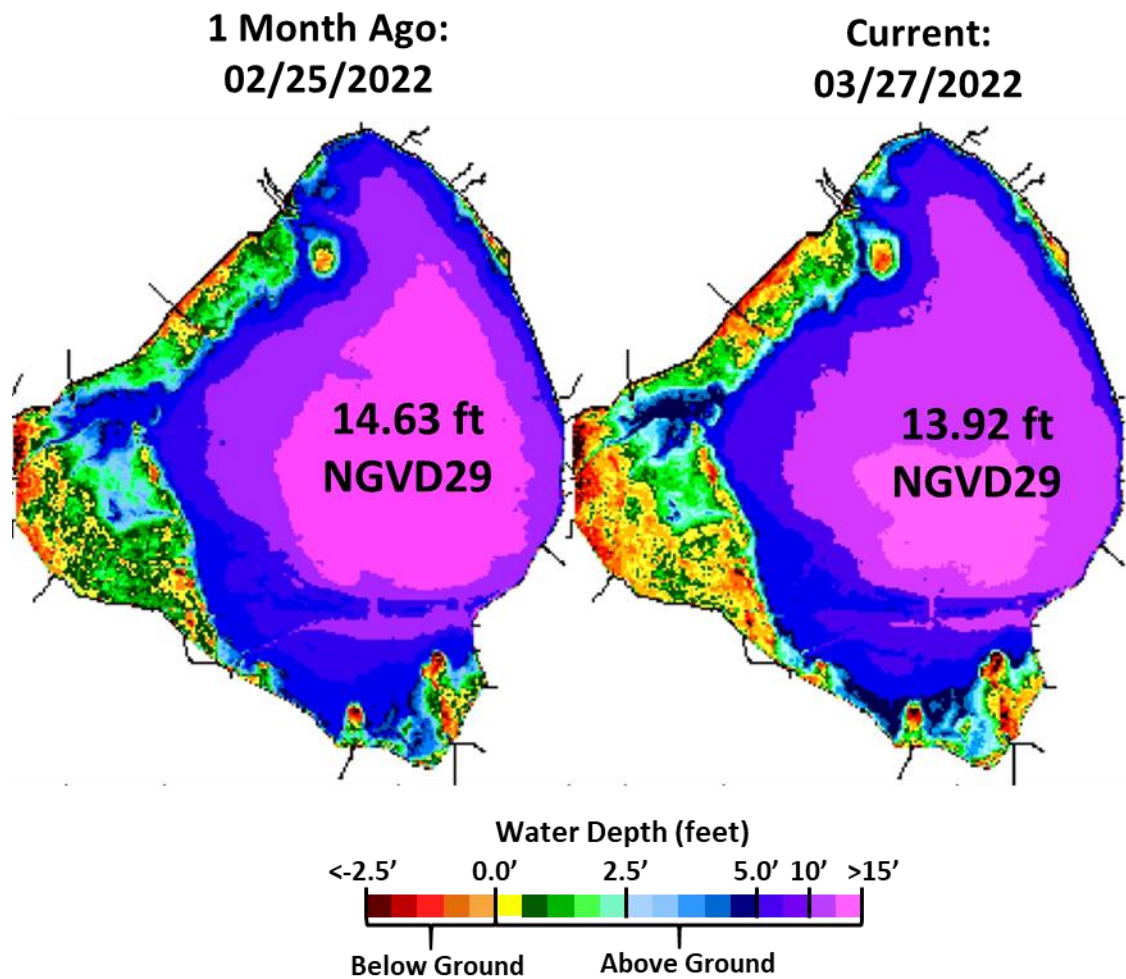
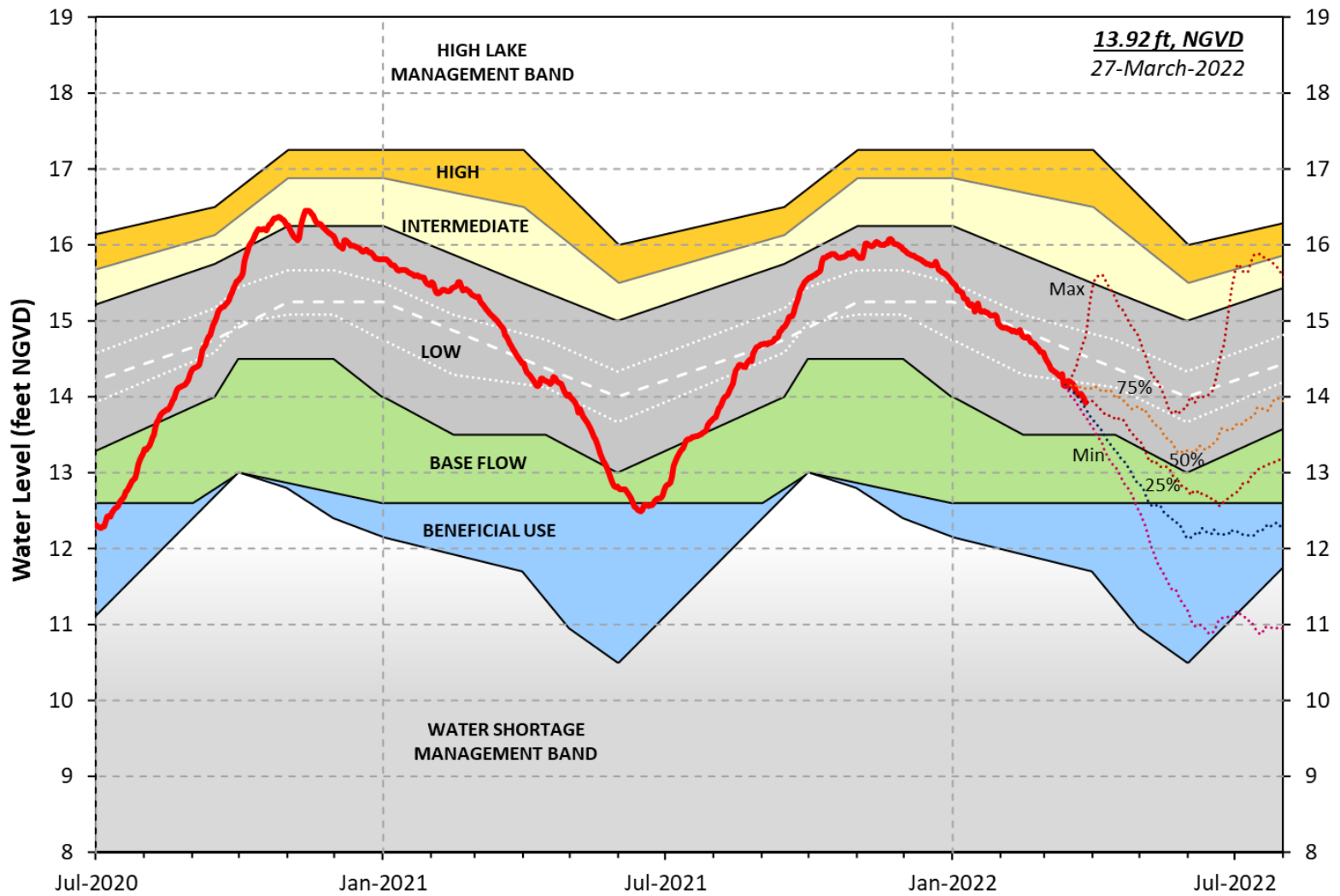


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Water Level History and Projected Stages



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

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

Lake Okeechobee Stage vs Ecological Envelope

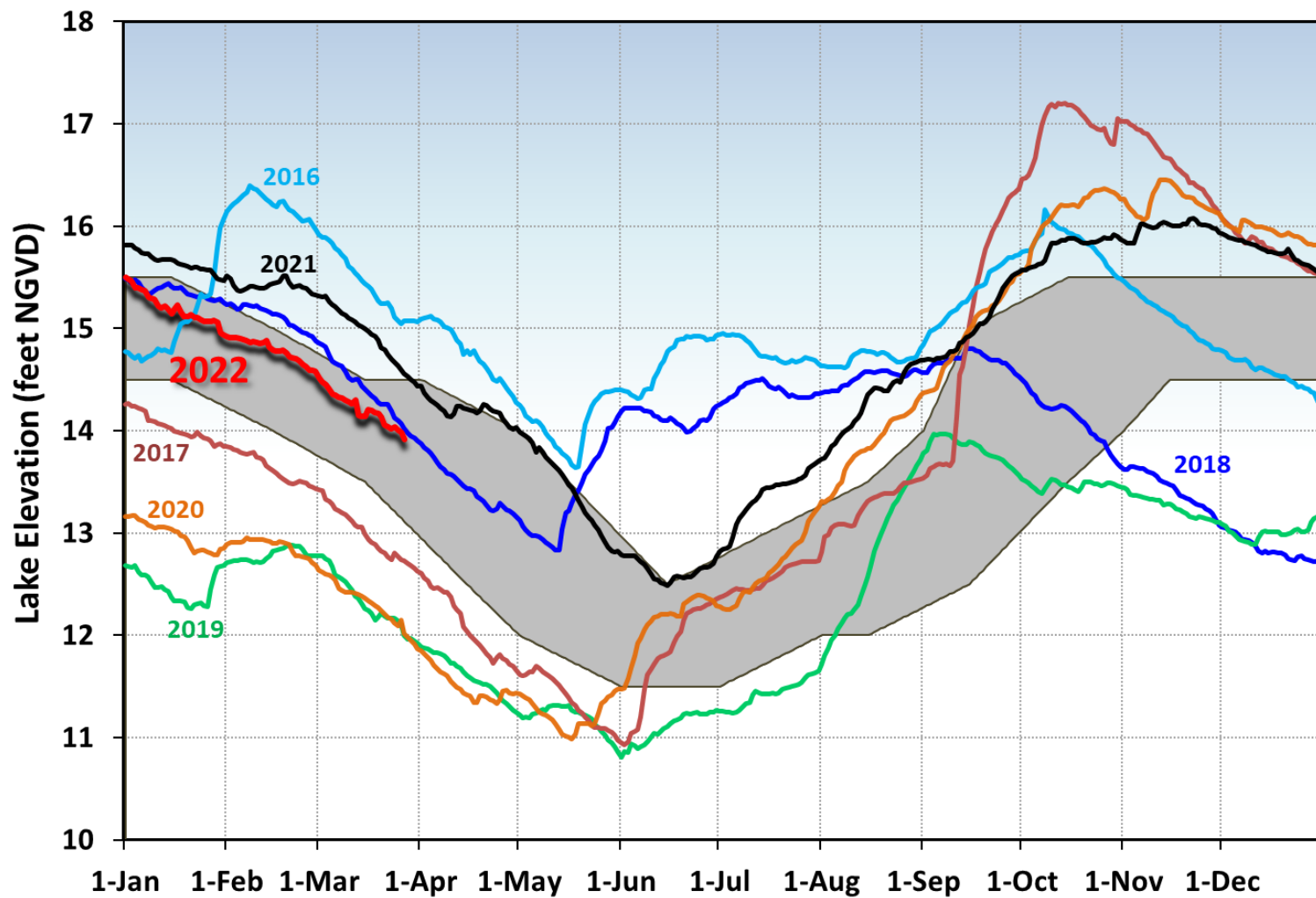


Figure LO-3. The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

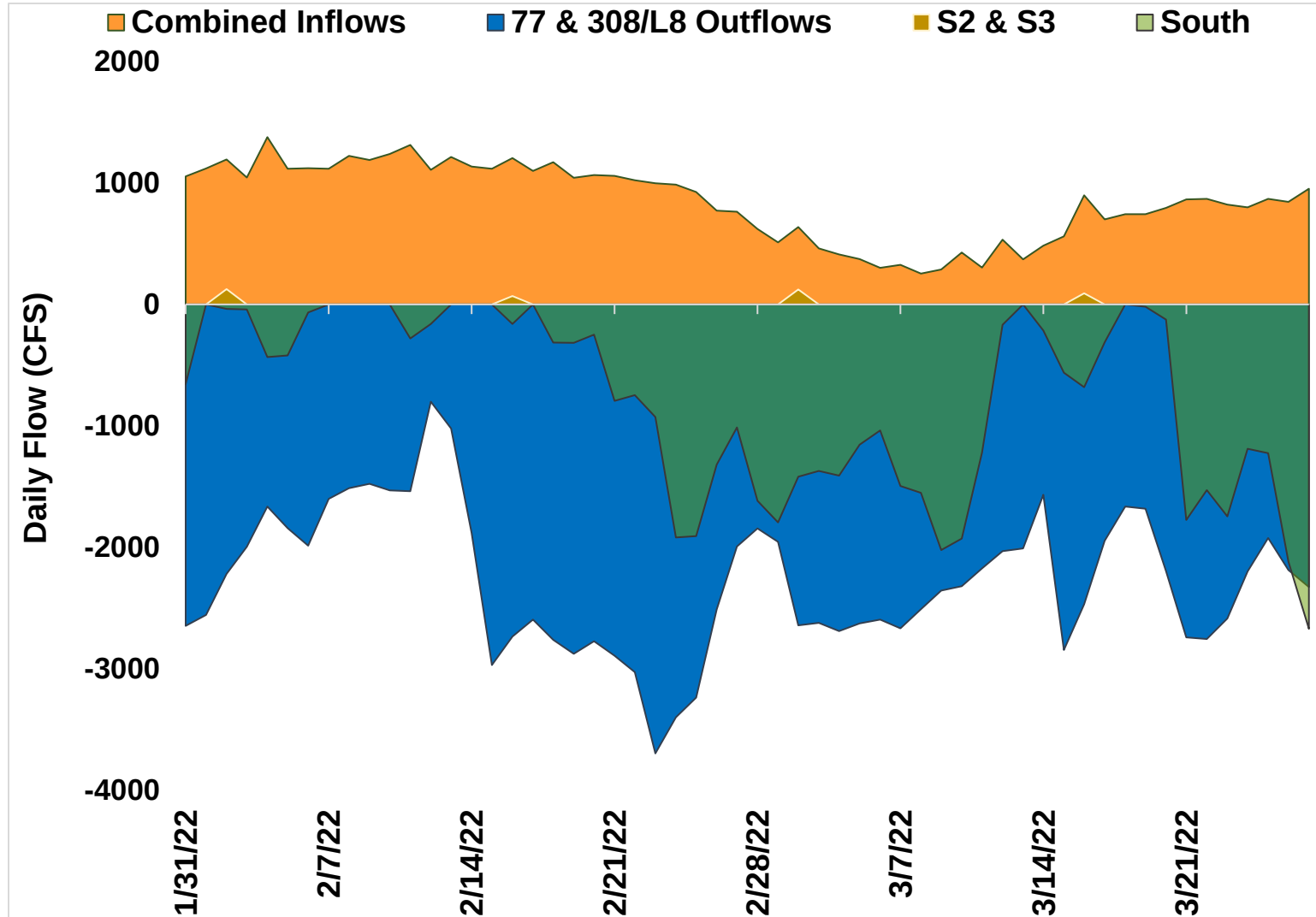


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

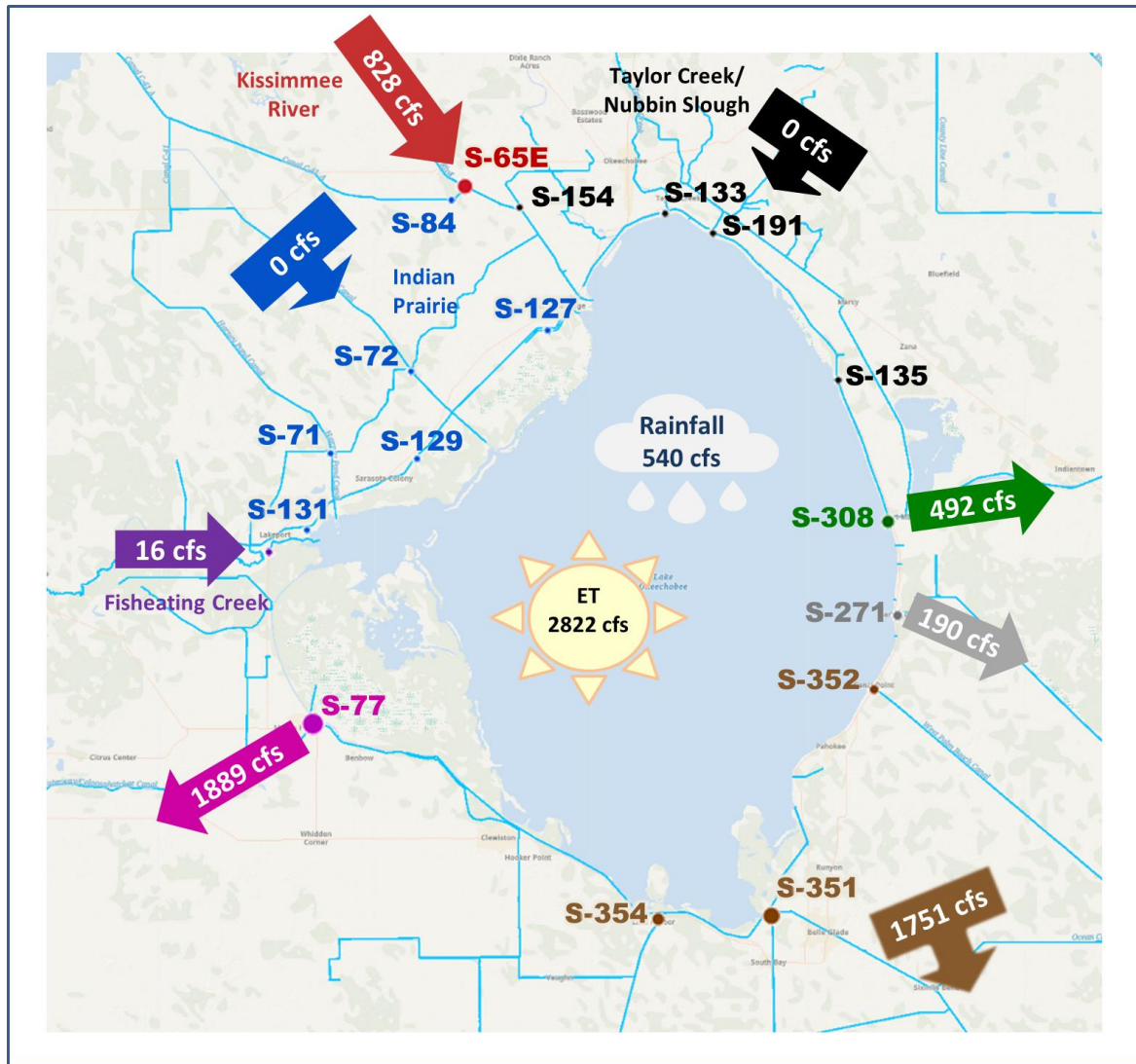
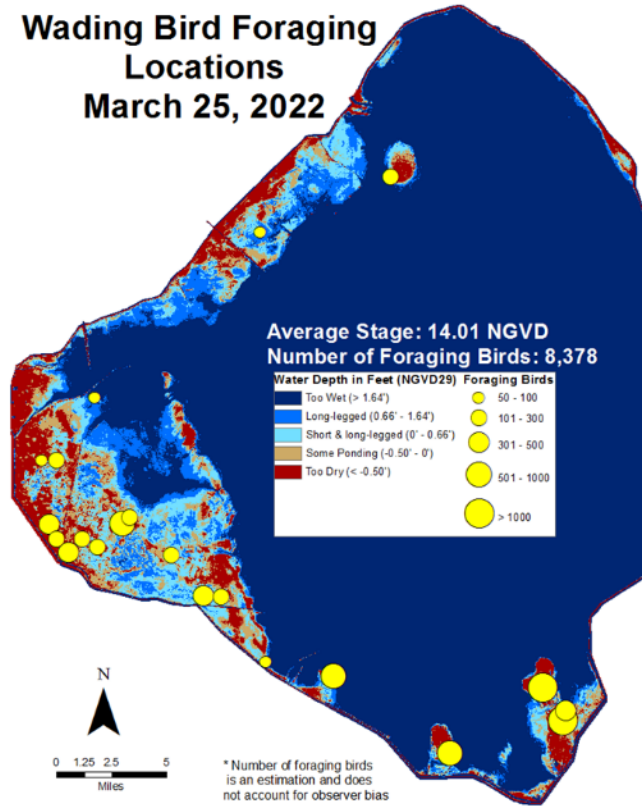


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of March 21, 2022 – March 27, 2022.

Wading Bird Foraging Locations March 25, 2022



Lake Okeechobee 2021 & 2022 Wading Bird Foraging by Survey

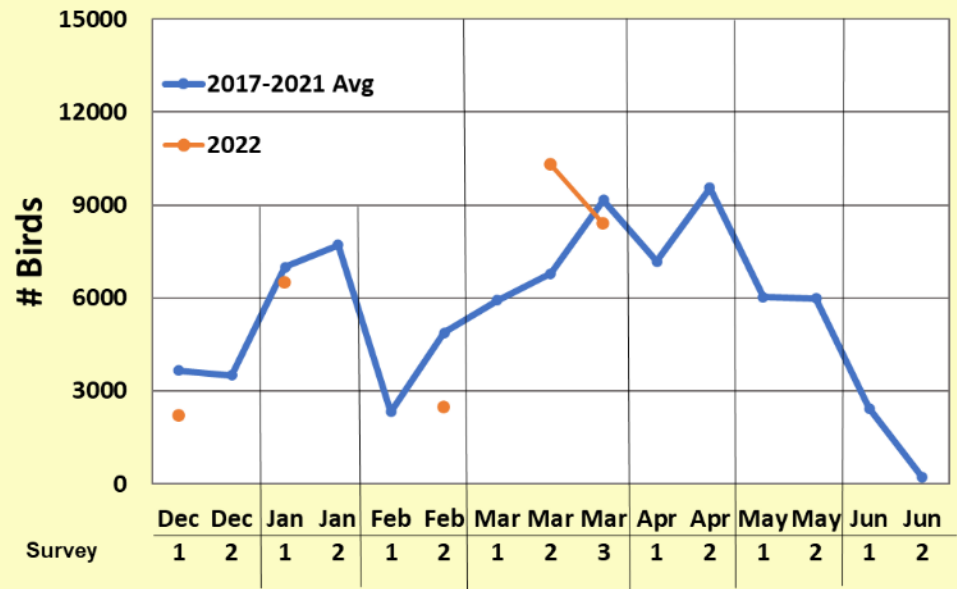


Figure LO-6. Locations of foraging flocks of wading birds observed during a monitoring flight on March 25, 2022 (map on left) are shown in yellow (circle sizes represents the flock size). Previous survey averages from the last five breeding seasons (blue line) compared to the 2022 breeding season (orange dots) thus far is seen in the graph on the right.

Table LO-1. Provisional results of chlorophyll *a* and toxin concentrations and cyanobacteria taxa from sampling trips on March 7-9, 2022. Color coding is the same as on **Figure LO-7**.

Station	CHL <i>a</i> (ug/L)	TOXIN (ug/L)	TAXA
FEBIN	74.6		
FEBOUT	40.8		
KISSR0.0	26.4	BDL	<i>mixed</i>
L005	32.8	BDL	<i>mixed</i>
LZ2	13.3	BDL	<i>mixed</i>
KBARSE	6.9		
RITTAE2	22.0	BDL	<i>mixed</i>
PELBAY3	3.7		
POLE3S	16.7		
LZ25A	3.6		
PALMOUT	17.9	BDL	<i>mixed</i>
PALMOUT1	4.8		
PALMOUT2	3.8		
PALMOUT3	8.2		
POLESOUT	23.6	BDL	<i>mixed</i>
POLESOUT1	15.9		
POLESOUT2	14.1		
POLESOUT3	11.2		
EASTSHORE	7.3		
NES135	7.3		
NES191	7.4		

Station	CHL <i>a</i> (ug/L)	TOXIN (ug/L)	TAXA
L001	24.8		
L004	7.1		
L006	6.6		
L007	4.1		
L008	46.0		
LZ30	5.4	BDL	<i>mixed</i>
LZ40	13.6		
CLV10A	5.1	BDL	<i>mixed</i>
NCENTER	6.1		
S308C	4.6	BDL	<i>mixed</i>
S77 (3/14/22)	20.9	BDL	<i>mixed</i>

- 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*;
Pseud = *Pseudanabaena*; *Dolicho* = *Dolichospermum*

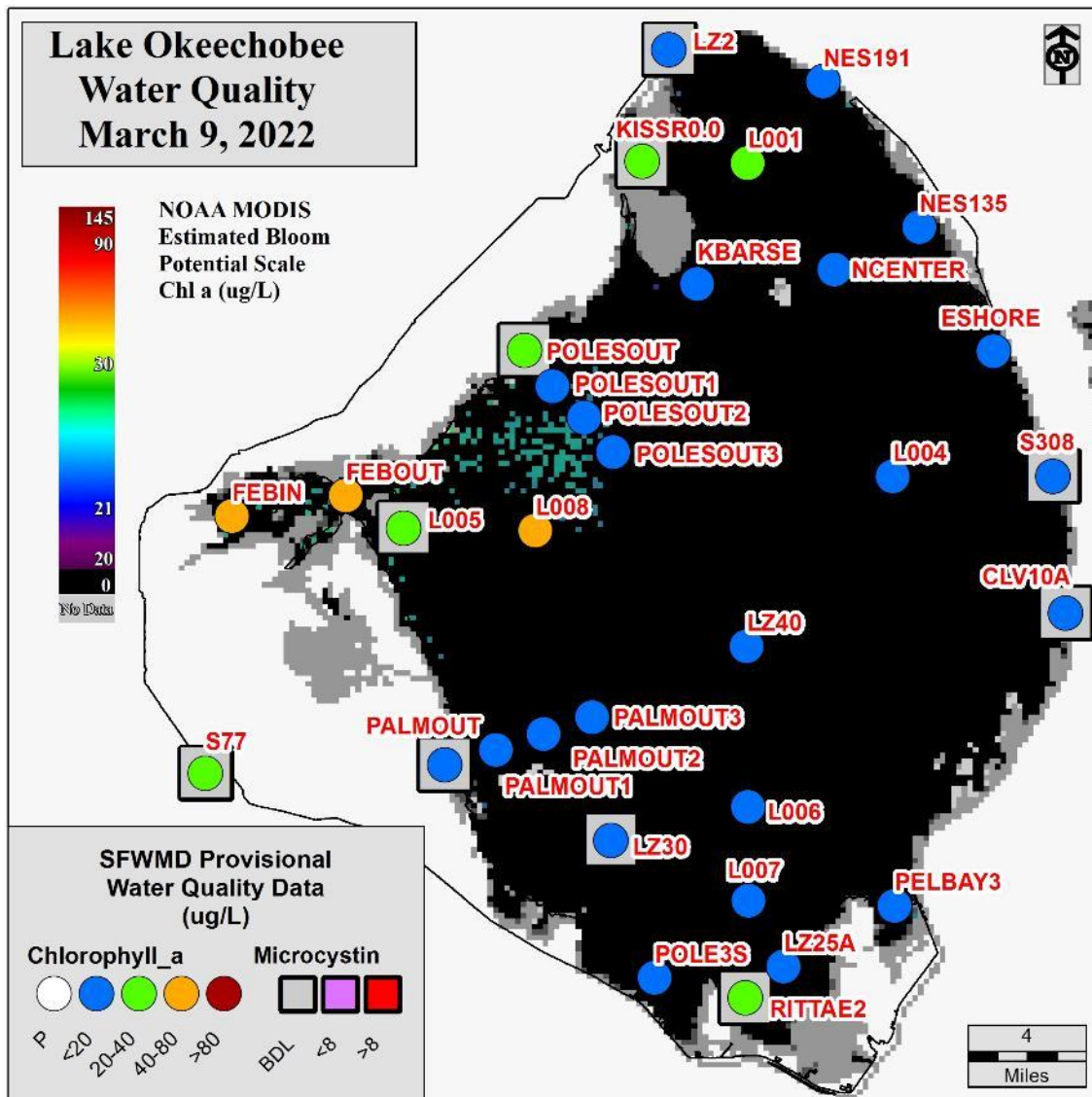


Figure LO-7. Expanded monitoring network and provisional results from samples collected March 7-9, 2022.

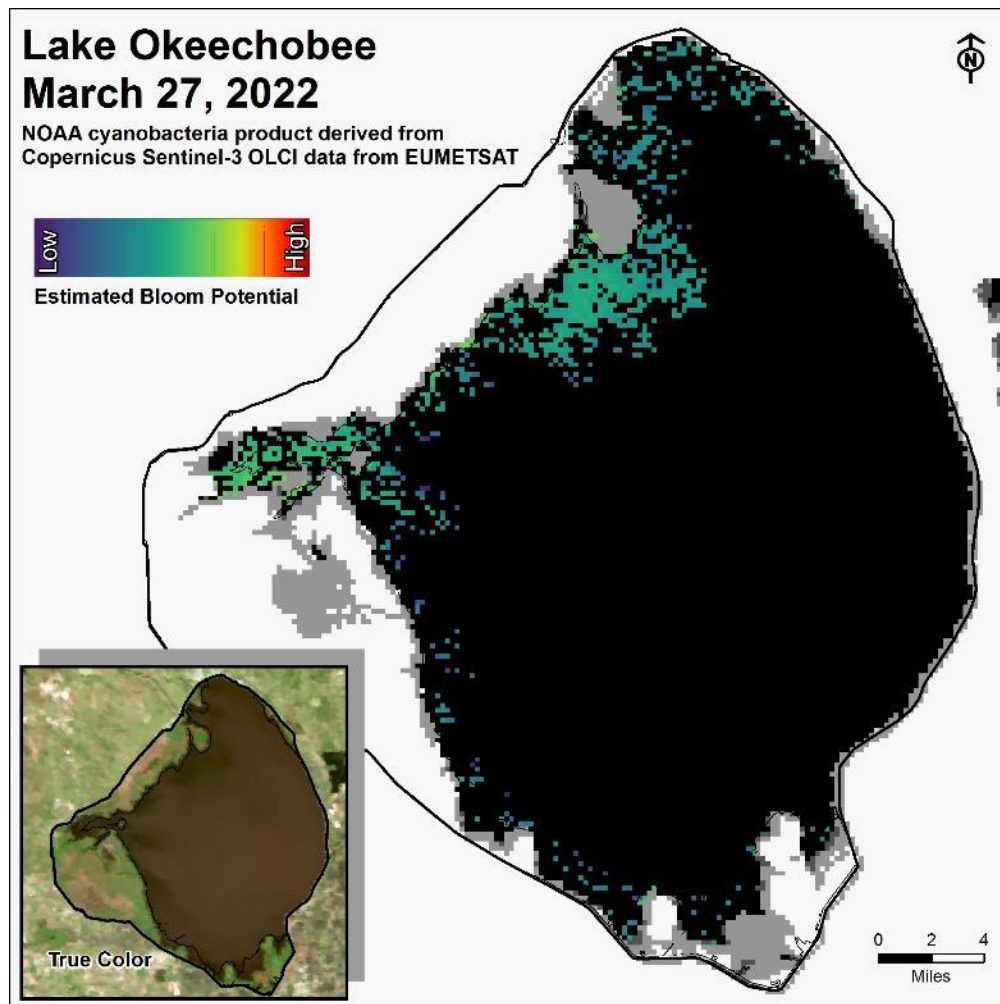


Figure LO-8. Cyanobacteria bloom potential on March 27, 2022 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 179 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was 320 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities remained the same at US1 Bridge and increased at the HR1 and A1A Bridge sites (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 20.4. Salinity conditions in the middle estuary were estimated to be within the good range for adult eastern oysters (**Figure ES-4**). Larval oyster recruitment rates reported by the Fish and Wildlife Research Institute were low in February, 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 1,939 cfs (**Figures ES-6 and ES-7**) and the previous 30-day mean inflow was 2,003 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, Val I-75, and Shell Point and 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 good range for adult eastern oysters at Cape Coral and Shell Point, and in the fair range at 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 February, 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, 2013¹) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1500 cfs and steady releases at 2,000 cfs with estimated tidal basin inflows of 50 cfs. Model results from all scenarios predict daily salinity to be 0.9 or lower and the 30-day moving average surface salinity to be 0.5 or lower at Val I-75 at the end of the two-week period (**Table ES-3 and Figure ES-13**). This keeps predicted salinities at Val I-75 within the LORS 2008 salinity range (0.0-5.0).

Red Tide

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

The Florida Fish and Wildlife Research Institute reported on March 25, 2022, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background concentrations in one sample from Collier County. On the east coast, red tide was not observed in samples from St. Lucie, Martin, Palm Beach or Miami-Dade counties.

Water Management Recommendations

Lake stage is in the Low 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.

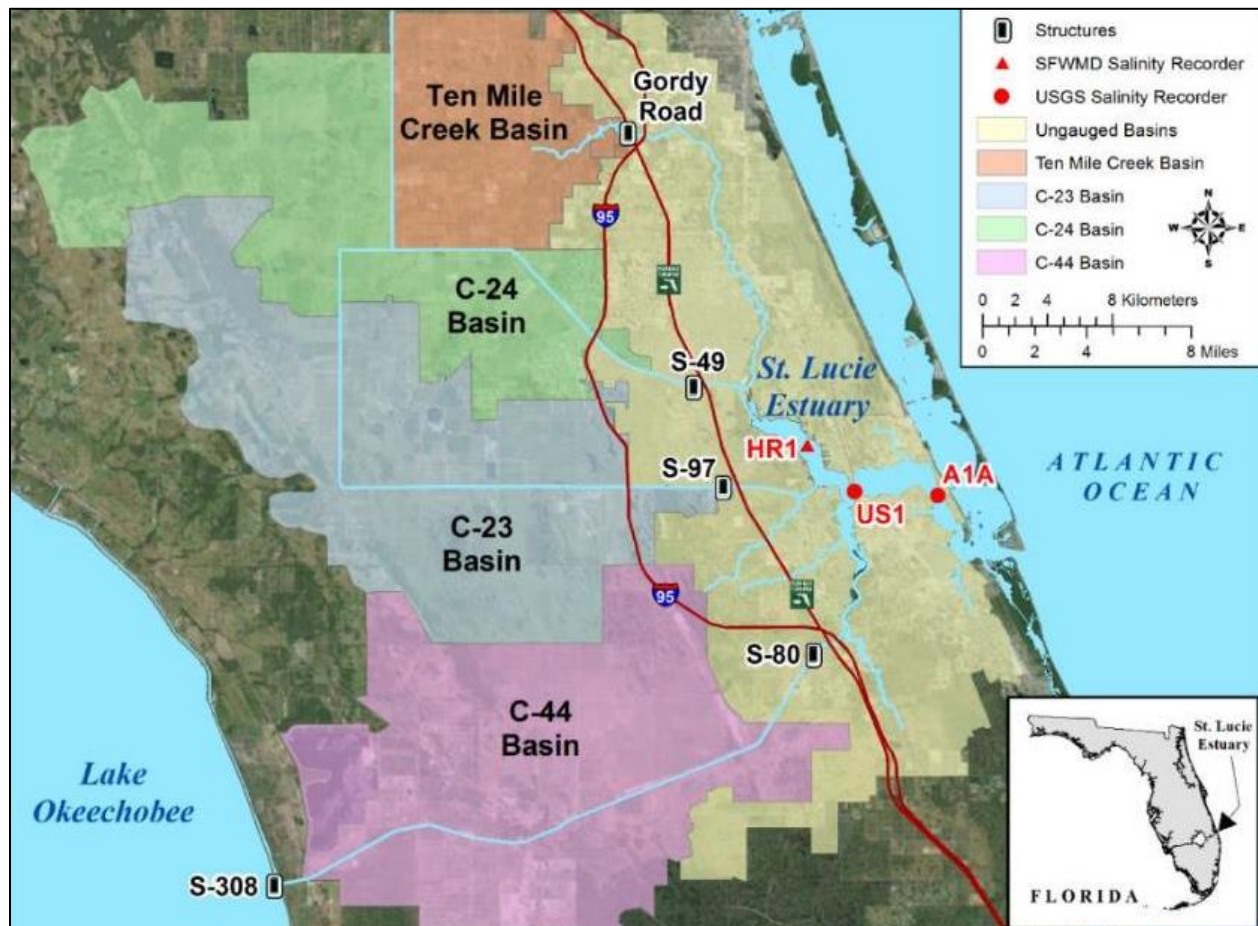


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

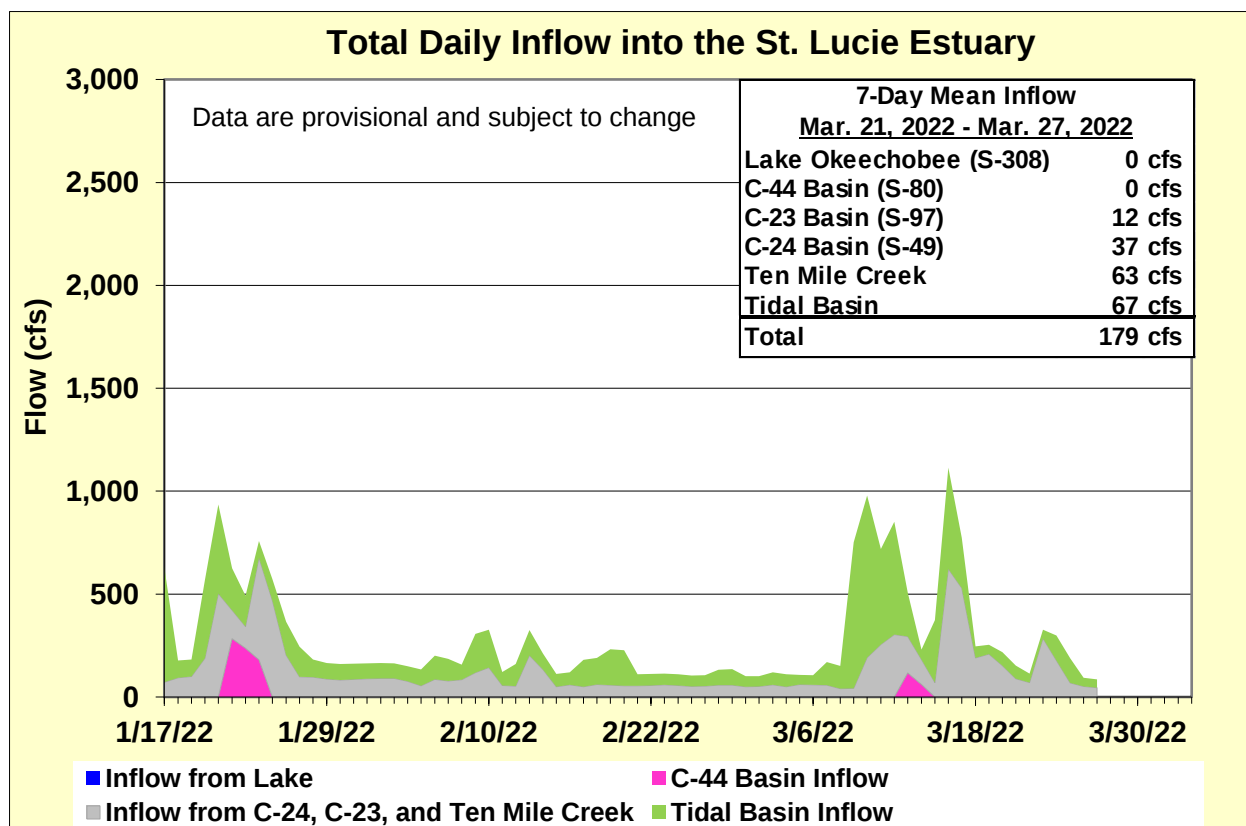


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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 preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary. Data are provisional.

Sampling Site	Surface	Bottom	Envelope
HR1 (North Fork)	14.7 (13.1)	17.0 (16.9)	NA ^a
US1 Bridge	19.9 (20.0)	21.0 (20.9)	10.0 – 26.0
A1A Bridge	28.3 (27.7)	30.7 (29.6)	NA ^a

a. The envelope is not applicable.

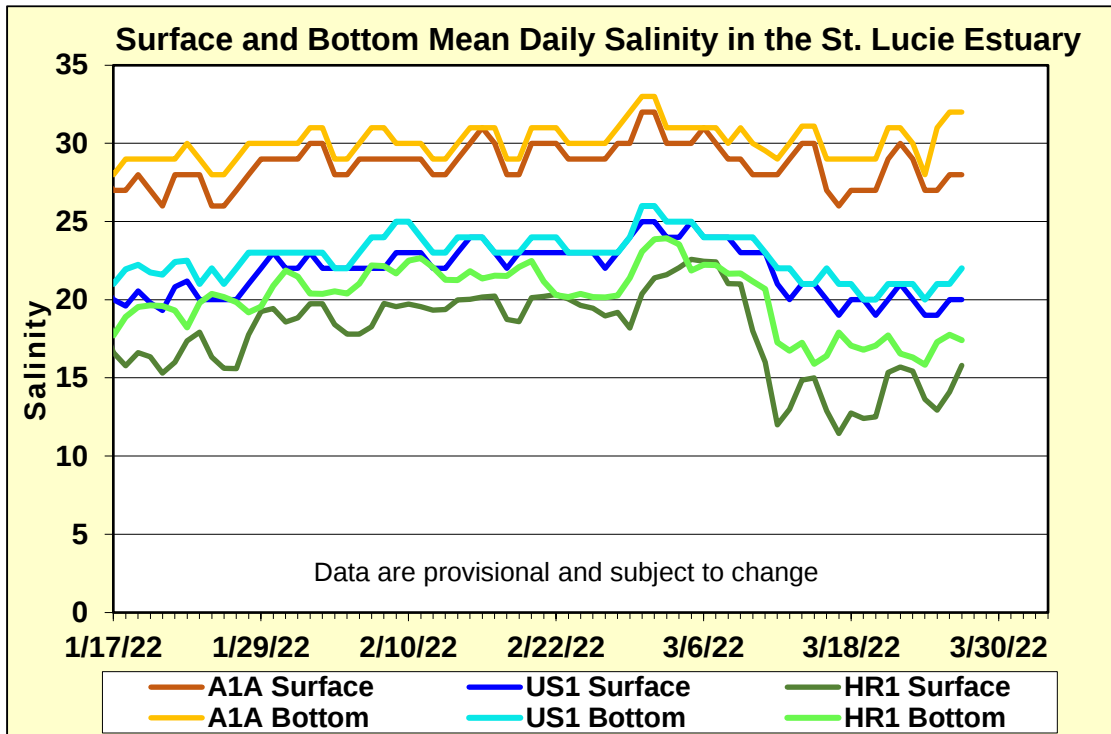


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

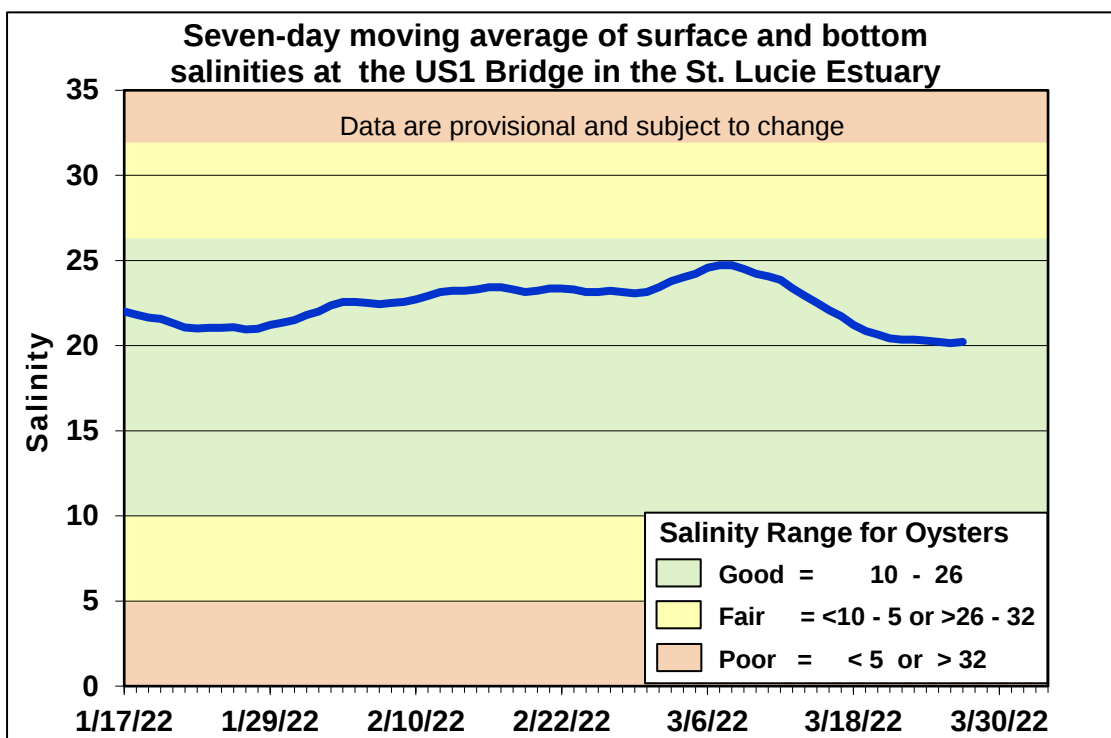


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

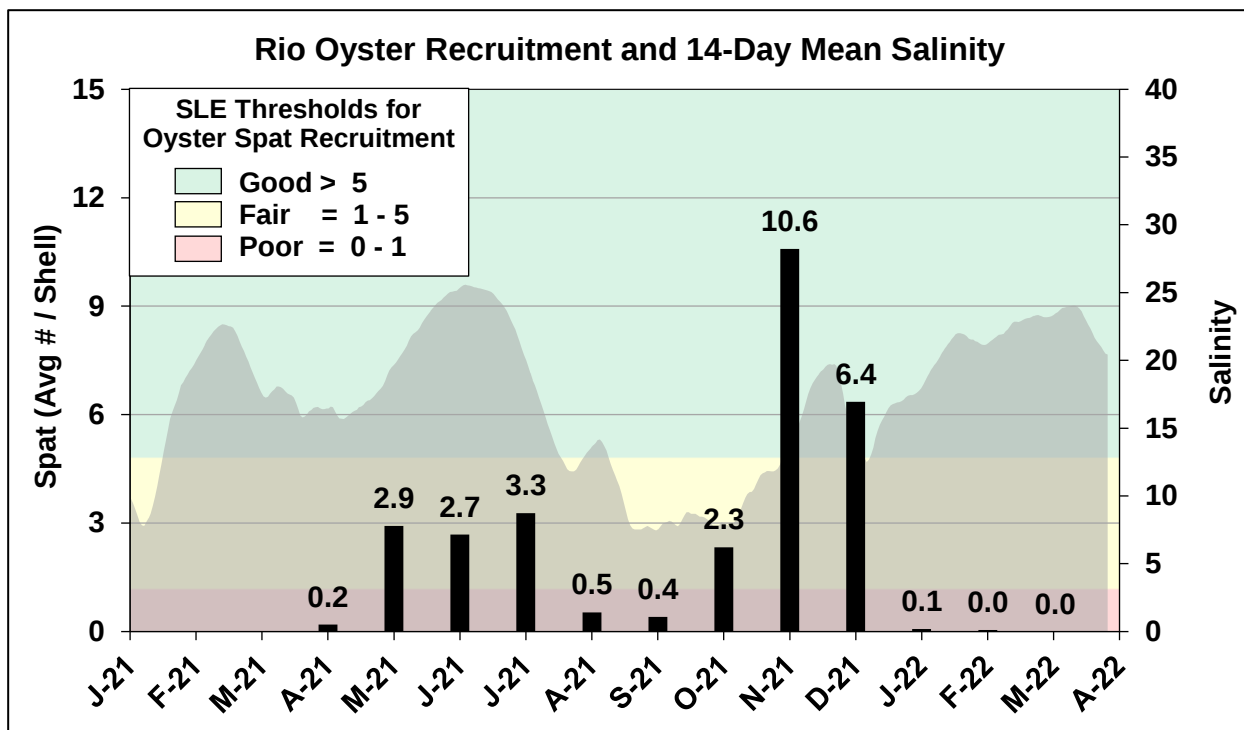


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

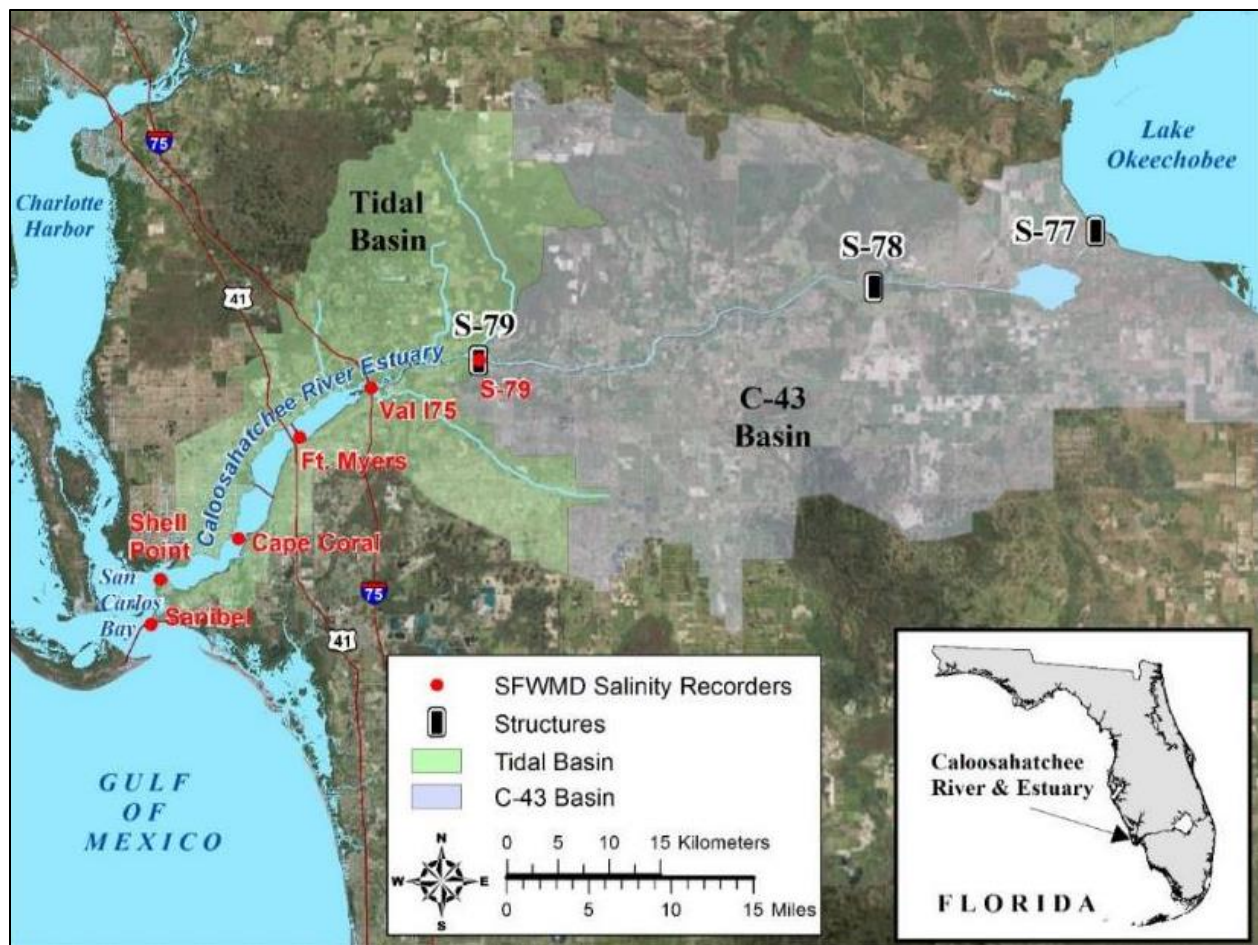


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

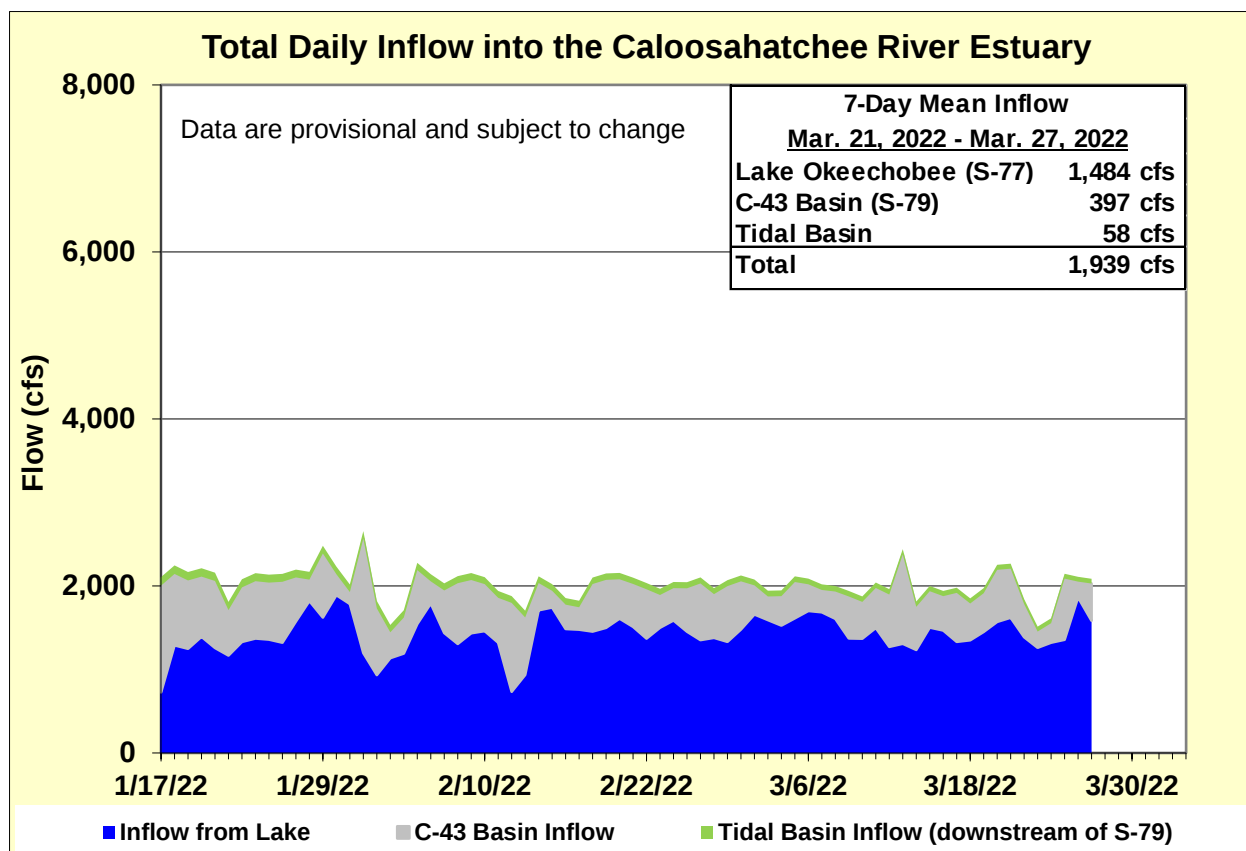


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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 preferred 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	2.7 (2.4)	4.8 (3.8)	NA ^a
Cape Coral	11.9 (11.1)	13.6 (13.3)	10.0 – 30.0
Shell Point	26.1 (26.2)	27.1 (27.0)	10.0 – 30.0
Sanibel	31.4 (31.2)	32.3 (31.9)	10.0 – 30.0

a. The envelope is not applicable.

b. The envelope is based on the predicted 30-day mean for the next two weeks.

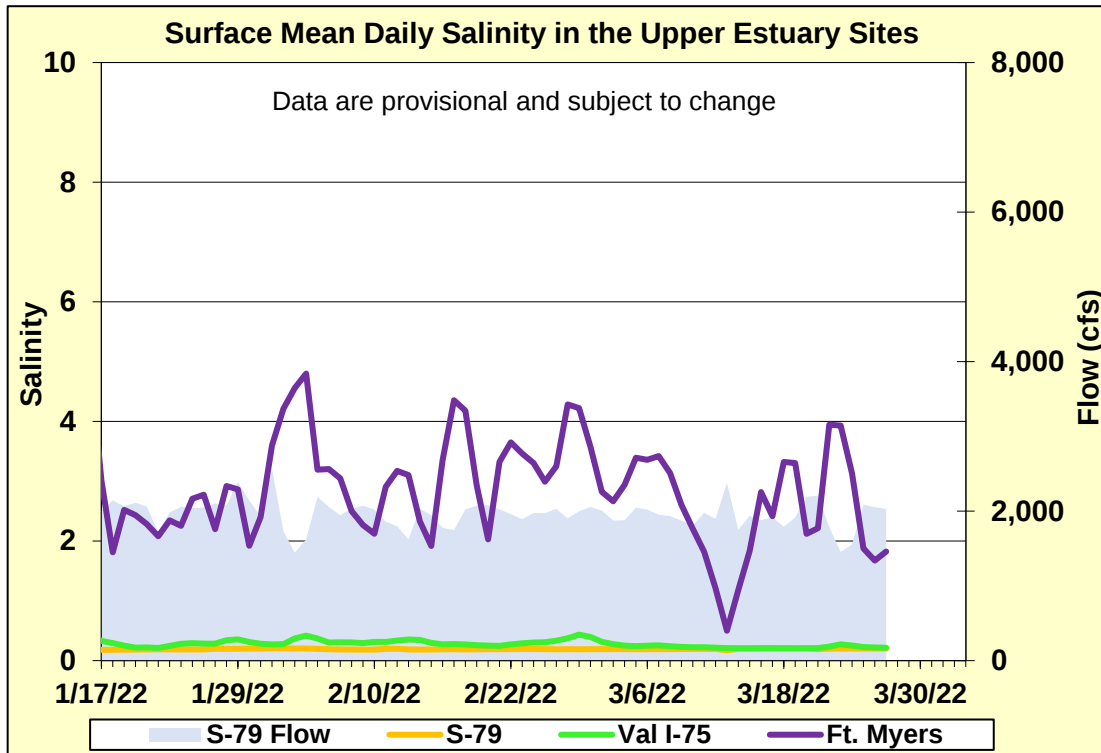


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

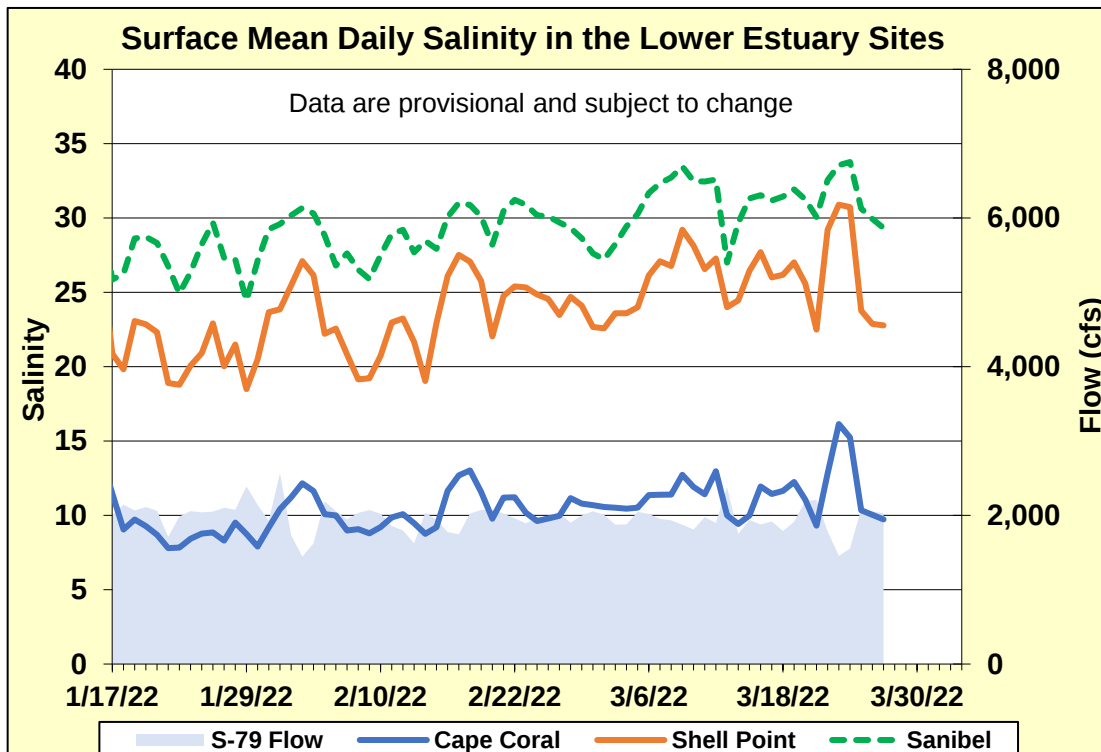


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

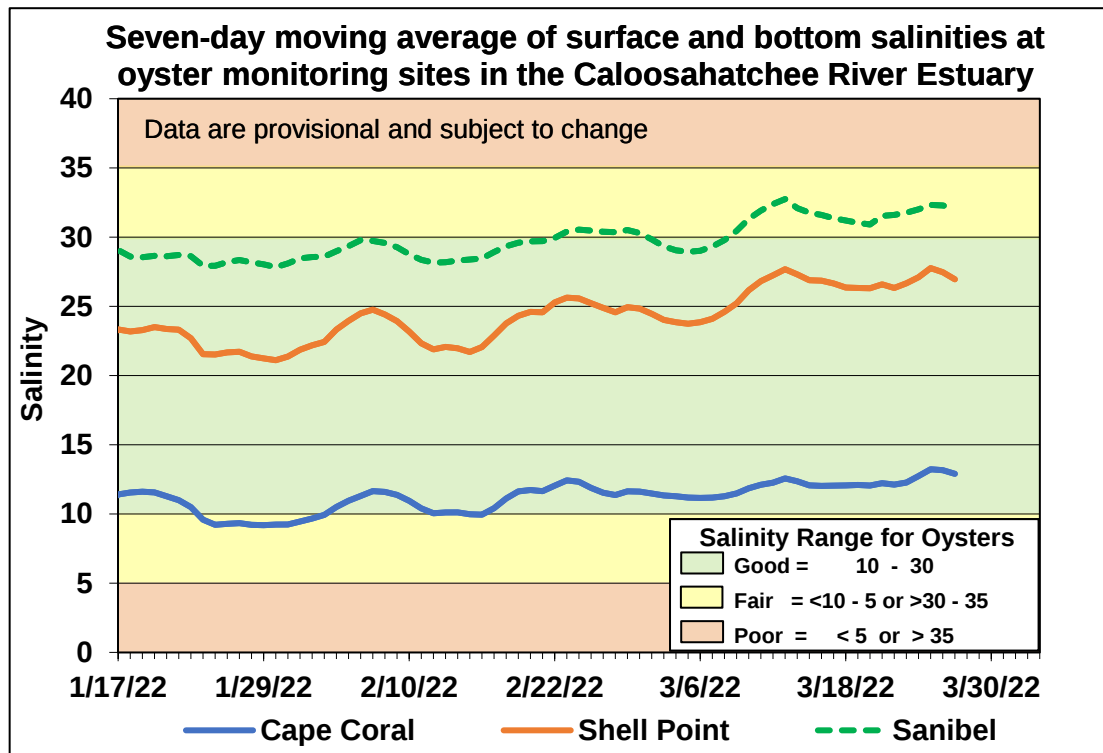


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

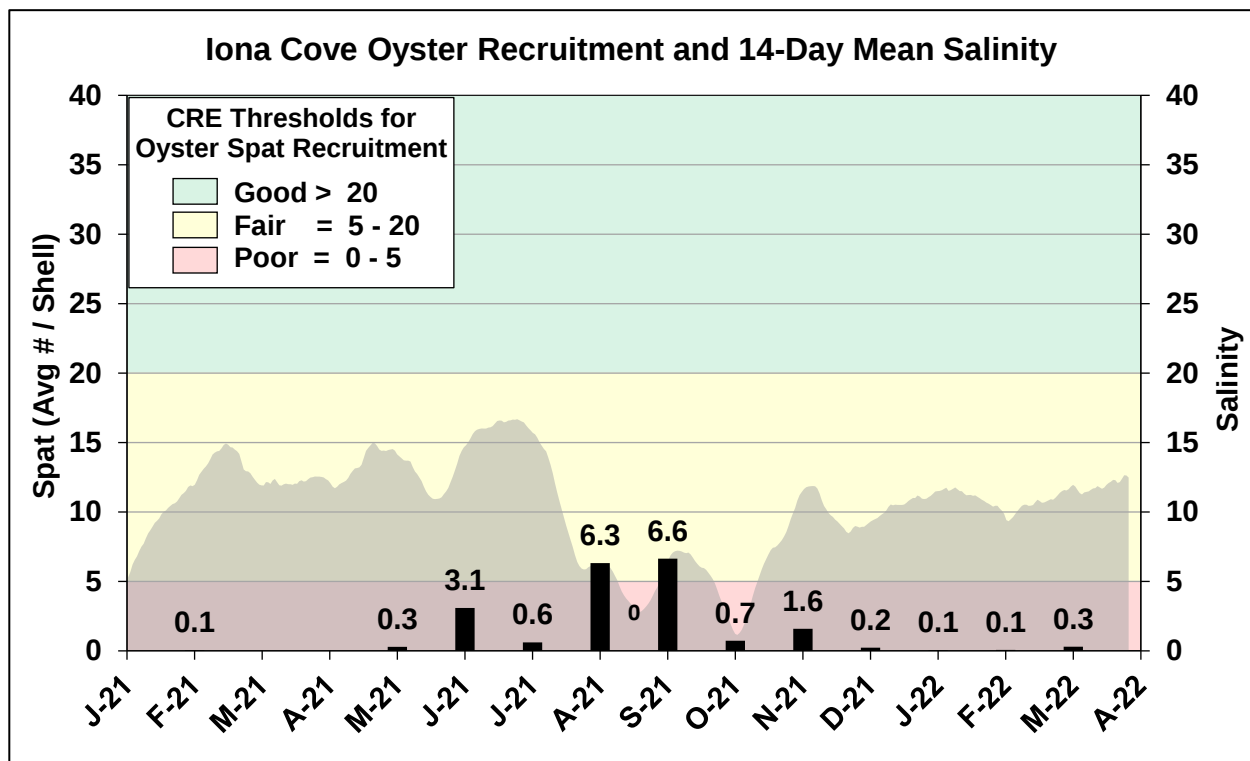


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

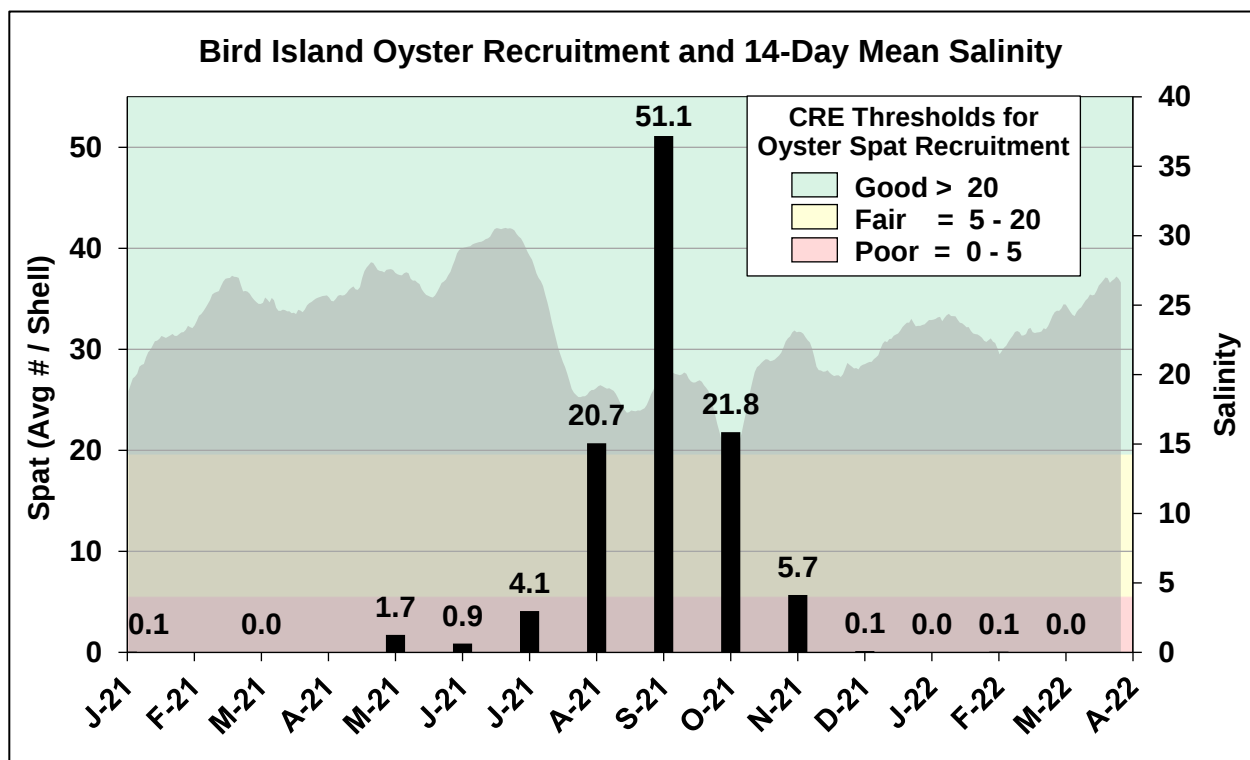


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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	50	0.9	0.5
B	450	50	0.8	0.4
C	800	50	0.5	0.4
D	1000	50	0.4	0.4
E	1500	50	0.3	0.4
F	2000	50	0.3	0.3

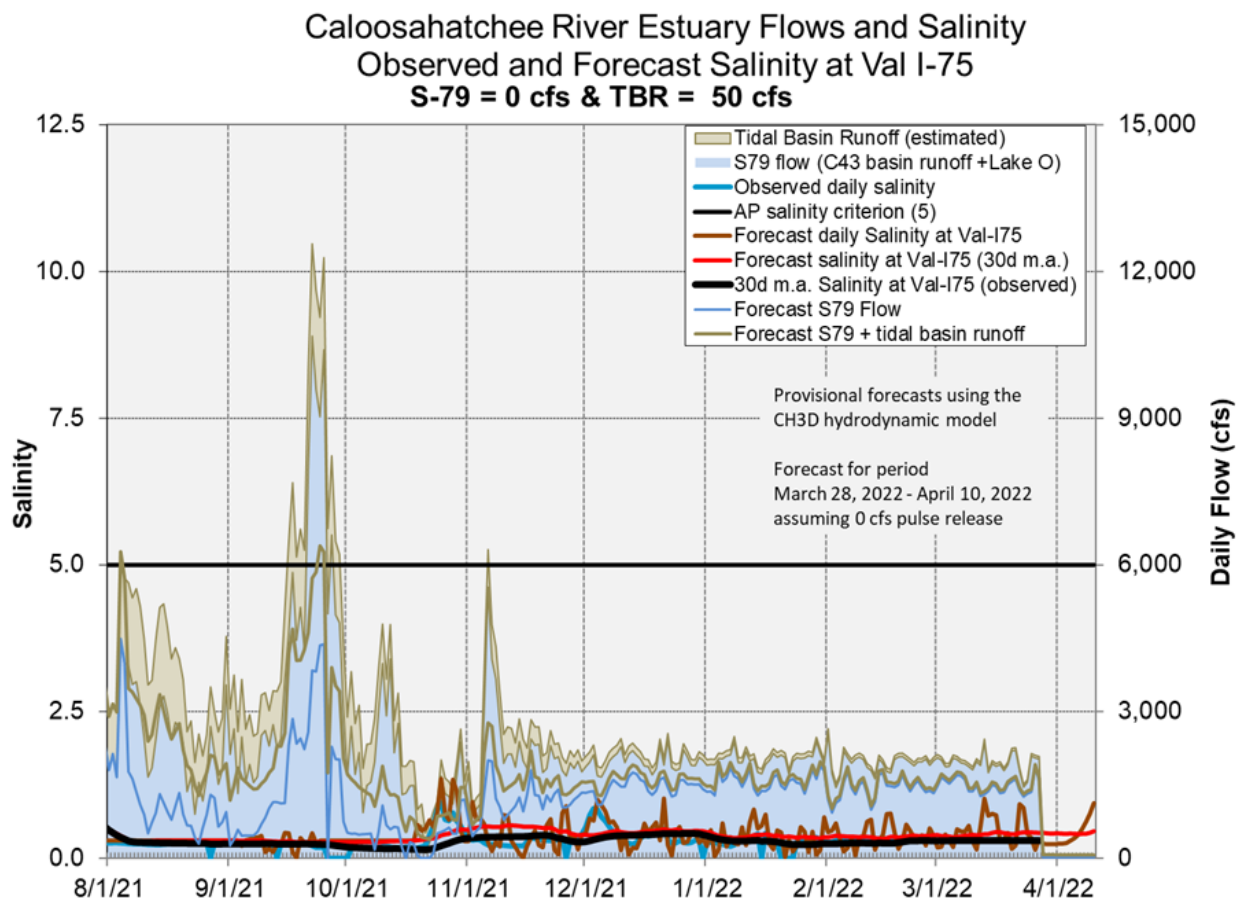


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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 $1.0 \text{ g/m}^2/\text{year}$ or lower (**Figure S-2**).

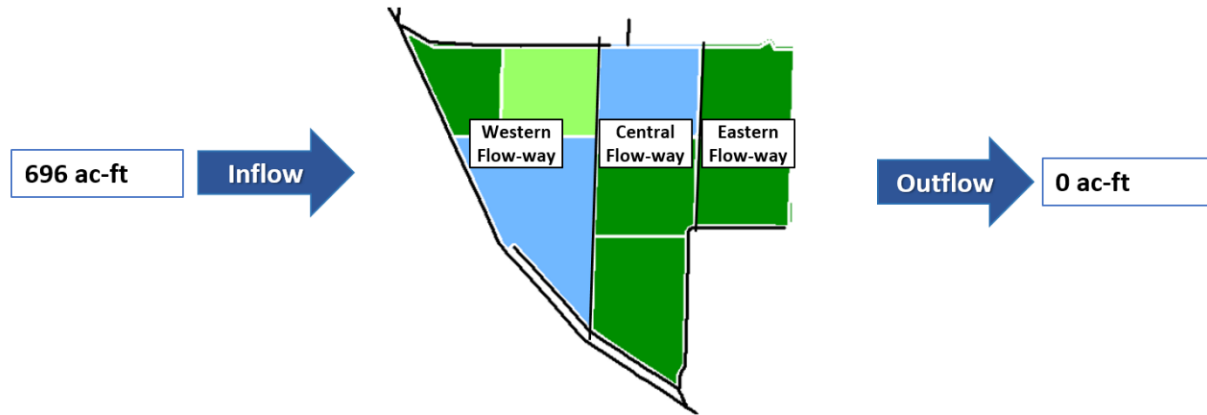
STA-2: STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities, and in Flow-way 1 following dryout conditions. Online treatment cells are near or below target stage. Vegetation in Flow-ways 1 and 3 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 $1.0 \text{ g/m}^2/\text{year}$. 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 $1.0 \text{ g/m}^2/\text{year}$ (**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 $1.0 \text{ g/m}^2/\text{year}$. 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.

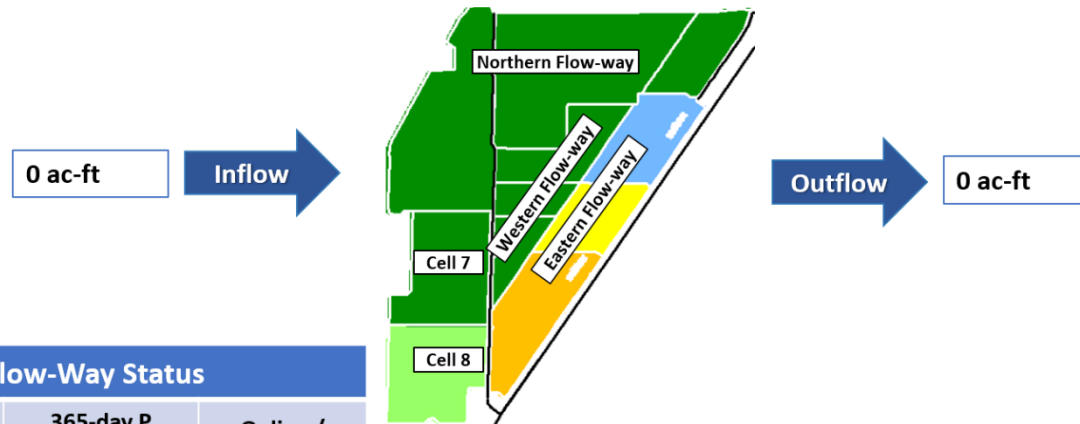
STA-1E Weekly Status Report – 3/21/2022 through 3/27/2022



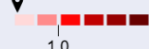
STA-1E Flow-Way Status				As of 3/27/2022		STA-1E Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed 	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)			7-day	28-day	365-day
				 Deep Water Level (> 2.8' above TS)	 0.2' – 1.5' 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					
Eastern	Offline, Tropical Storm Eta repairs starting 01/24/2022			 0-25% Dry	 50-75% Dry				
				 25-50% Dry	 75-100% Dry				
Central		 1.0	Vegetation Rehab						
Western	Offline, post-construction grow in starting 3/28/2022								
						Total Inflow, ac-ft	696	2,061	177,520
						--Lake Inflow, ac-ft	0	N/A	3,300
						Total Outflow, ac-ft	0	227	149,695
						Inflow Conc., ppb	59	74	121
						Outflow Conc., ppb	N/A	32	23
						Includes Preliminary Data			

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

STA-1W Weekly Status Report – 3/21/2022 through 3/27/2022



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	←  →		Construction
Western	←  →		Construction
Eastern	←  →		Construction
Cell 7	←  →	N/A	Construction
Cell 8	←  →	N/A	Construction

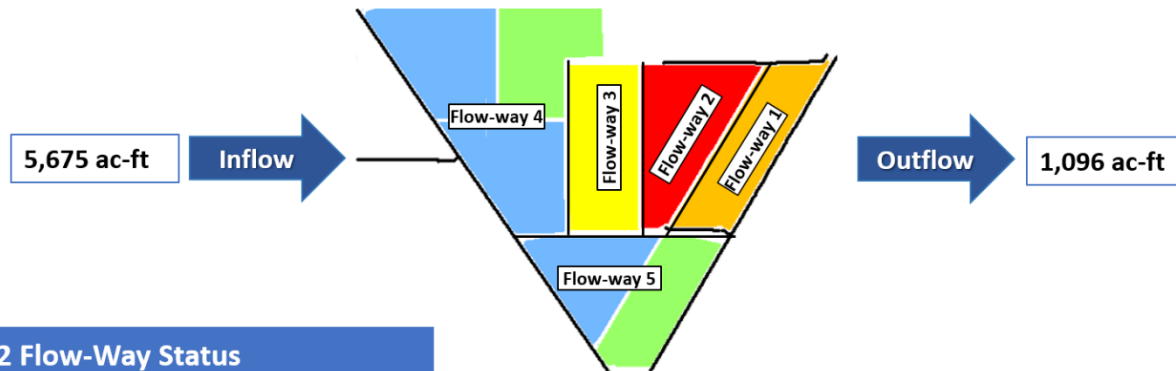
As of 3/27/2022	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-1W Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	0	1,488	57,503
--Lake Inflow, ac-ft	0	N/A	5,400
Total Outflow, ac-ft	0	0	52,974
Inflow Conc., ppb	N/A	77	162
Outflow Conc., ppb	N/A	N/A	24
Includes Preliminary Data			

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

STA-2 Weekly Status Report – 3/21/2022 through 3/27/2022



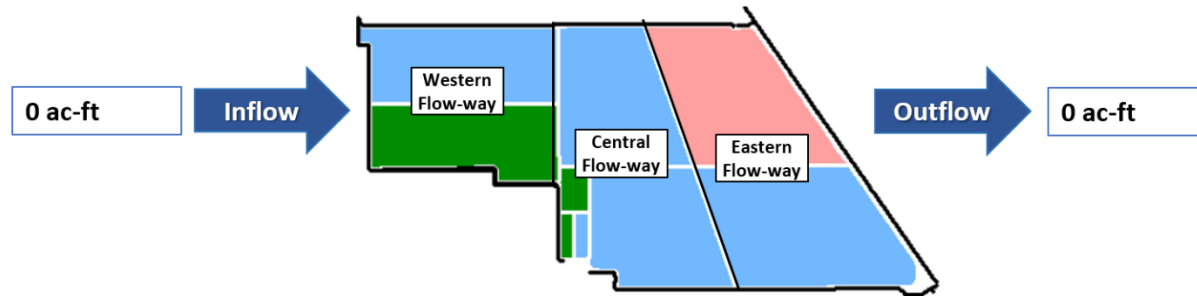
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1	← →		Post Dryout
2	Offline, construction activities as of 9/7/2021		
3	← →		Vegetation Rehab
4	← →		Vegetation Rehab
5	← →		Online

As of 3/27/2022	
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	5,675	13,781	315,324
--Lake Inflow, ac-ft	4,200	N/A	56,800
Total Outflow, ac-ft	1,096	4,674	323,977
Inflow Conc., ppb	64	68	89
Outflow Conc., ppb	13	14	15
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 3/21/2022 through 3/27/2022



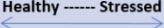
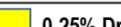
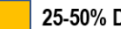
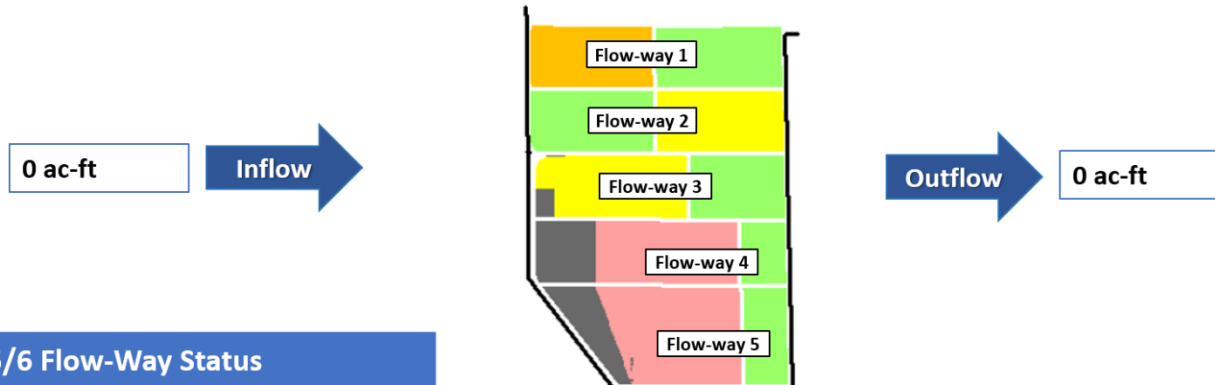
STA-3/4 Flow-Way Status				As of 3/27/2022				STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed 	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)					7-day	28-day	365-day
				 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)			
Eastern	Offline, vegetation management drawdown as of 3/1/2021			Depth / Area Based: Percent of Area Dry							
Central			Online	 0-25% Dry	 50-75% Dry						
Western			Online	 25-50% Dry	 75-100% Dry						
Includes Preliminary Data											

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

STA-5/6 Weekly Status Report – 3/21/2022 through 3/27/2022



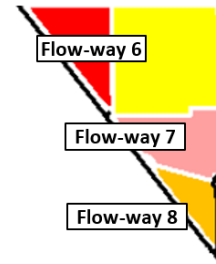
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2		N/A	Online
3		N/A	Online
4	Offline, vegetation management starting 01/24/2022		
5			Online

As of 3/27/2022	
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	23	177,794
--Lake Inflow, ac-ft	0	N/A	8,800
Total Outflow, ac-ft	0	0	169,234
Inflow Conc., ppb	N/A	66	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 – 3/21/2022 through 3/27/2022



STA-5/6 Flow-Way Status				As of 3/27/2022	
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)	
				Deep Water Level (> 2.8' above TS) High Water Level (1.5' – 2.8' above TS) 0.2' – 1.5' above TS Target Stage (TS +/- 0.2') Low Water Level (<0.2' below TS)	
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: The 1-8C fell slightly faster than the slope of the regulation line last week. The average on Sunday was 0.19 feet above the falling Zone A1 regulation line. WCA-2A: Stage dropped quickly at the S11B headwater last week. The average at that gauge on Sunday was 0.68 feet higher than the flat regulation line. WCA-3A: Last week the Three Gauge Average stages also declined rapidly; average stage was 0.91 feet below the falling regulation line on Sunday. WCA-3A: Stage continued a recession at gauge 62 (Northwest corner) last week, the average on Sunday was 1.12 feet below the flat Upper schedule line. (**Figures EV-1** through **EV-4**).

Water Depths

The SFWDAT tool indicates that water depths have been showing a fairly stable recession in WCAs 1 and 2 over the last two months while conditions further south are drying out more rapidly. The effects of the water inputs to northeastern WCA-3A are now visible as slightly increased water levels. North to South hydrologic connectivity continues to diminish but remains within Everglades National Park's Shark River Slough. Stages are well below ground across southern BCNP as is typical but not favorable for this time of year. (**Figure EV-5**). Comparing current WDAT water depths to the depth one month ago, stages are decreasing across the EPA. Looking back one year, WCA-3A is lower in depth compared to one year ago. WCA-2A, WCA-1 and central BCNP are slightly wetter than a year ago. (**Figure EV-6**). Comparing current depths to the past 20 years, the eastern half WCA-3A is below the 20th percentile. Recent rainfall shows an impact over much of BCNP with that basin now above the median depths. Recent improvements in WDAT modeling shows the positive impact from flows into NE WCA-3A. (**Figure EV-7**).

Taylor Slough and Florida Bay

A spatial average of 0.25 inches of rain fell over Taylor Slough and Florida Bay during the week ending Sunday, 3/27. Stages in Taylor Slough increased an average of 0.06 feet over this past week with the largest weekly change of +0.10 feet in the northern Taylor Slough area (**Figure EV-8**). The Slough, as a whole, is still 9 inches higher than average while the northern parts are 16 inches higher than the historical average for this time of year (pre-Florida Bay initiative which started in 2017). This reversal is not ideal for wading birds and other animals foraging in the area, but it does prolong the dry down of the Slough which can aid in expediting the movement of freshwater towards Florida Bay once the wet season begins. If the previous recession rates resume, the Slough would be mostly dry after 3 weeks now (**Figure EV-9**).

Salinities in Florida Bay averaged a decrease of 0.1 over the week ending 3/27, with individual station changes ranging from -4.8 to +2.2 (**Figure EV-8**). Most of the Bay stations increased, while the central nearshore station (Terrapin Bay; TB) and the far northeastern embayment of Joe Bay decreased about 4 over the week. Creek flow from the 5 main creeks averaged about 600 acre-feet per day over the week and helped to

moderate the salinities in the eastern and central Bay areas; however, western Bay salinity is approaching the 75th percentile of its historical data for March (**Figure EV-10**).

Water Management Recommendations

Conserving water in the northern basins, then allowing that water to move downstream as we transition into the dry season maximizes the ecological benefit of freshwater on the landscape. This recommendation is currently being epitomized with STA2 discharges hydrating northern WCA-2A, being picked up by S7 which then supplies NE and NW WCA-3A North.

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 potentially having great ecological benefit by slowing recessions near the Alley North colony and the 6,000 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 freshwater to the Taylor Slough area, a discharge amount that maintains stage 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	0.07	-0.12
WCA-2A	0.07	-0.18
WCA-2B	0.19	-0.17
WCA-3A	0.12	-0.15
WCA-3B	0.29	-0.10
ENP	0.73	-0.01

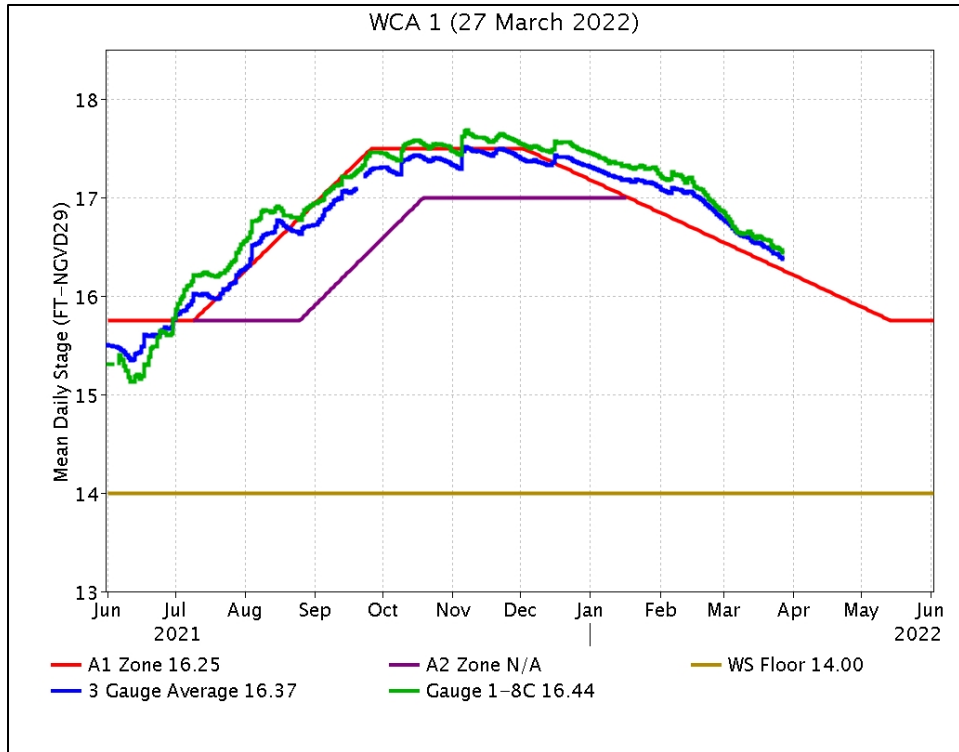


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

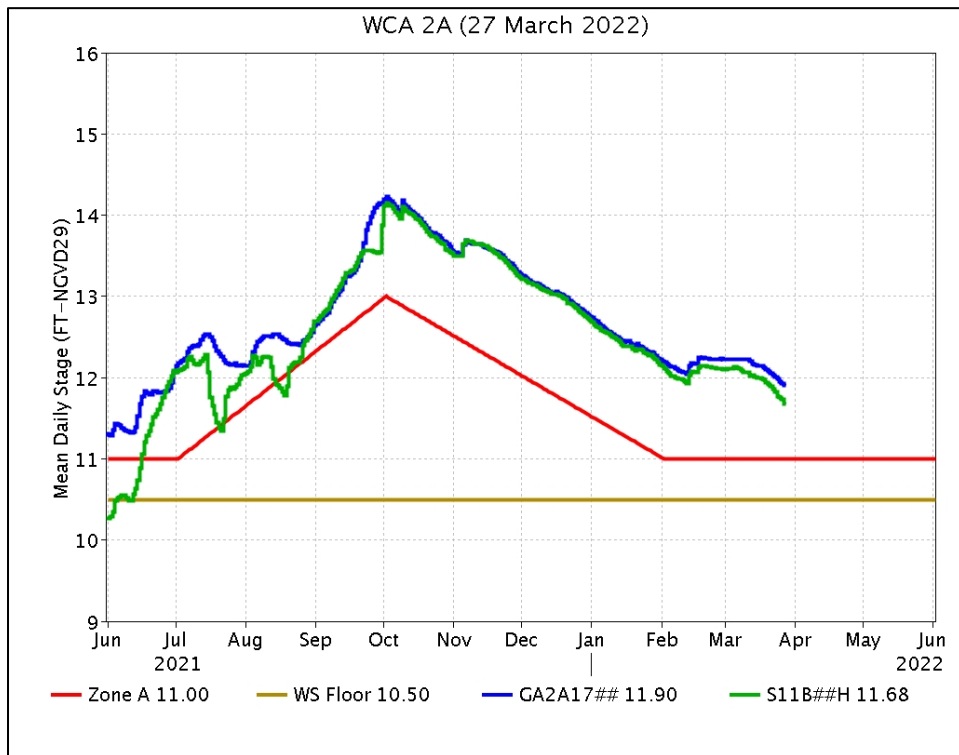


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

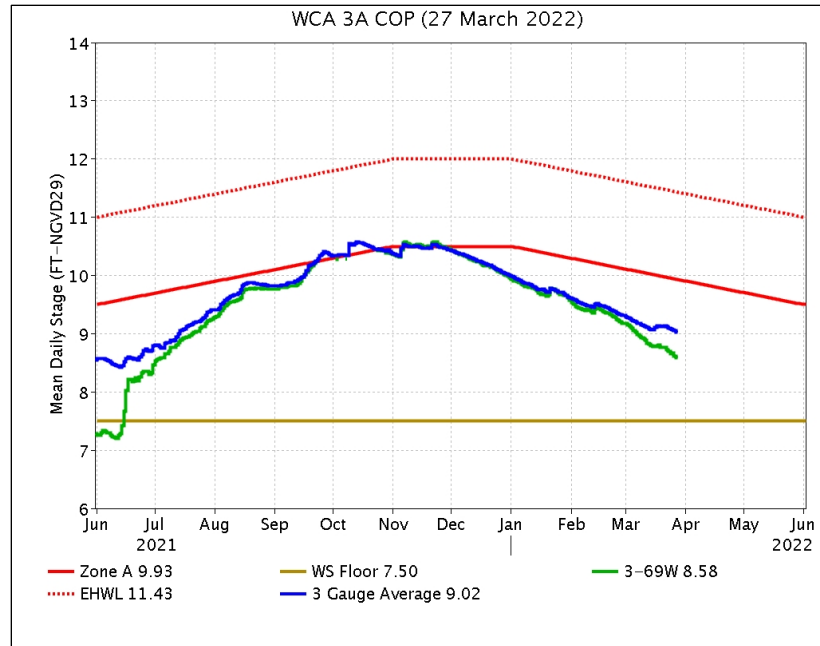


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

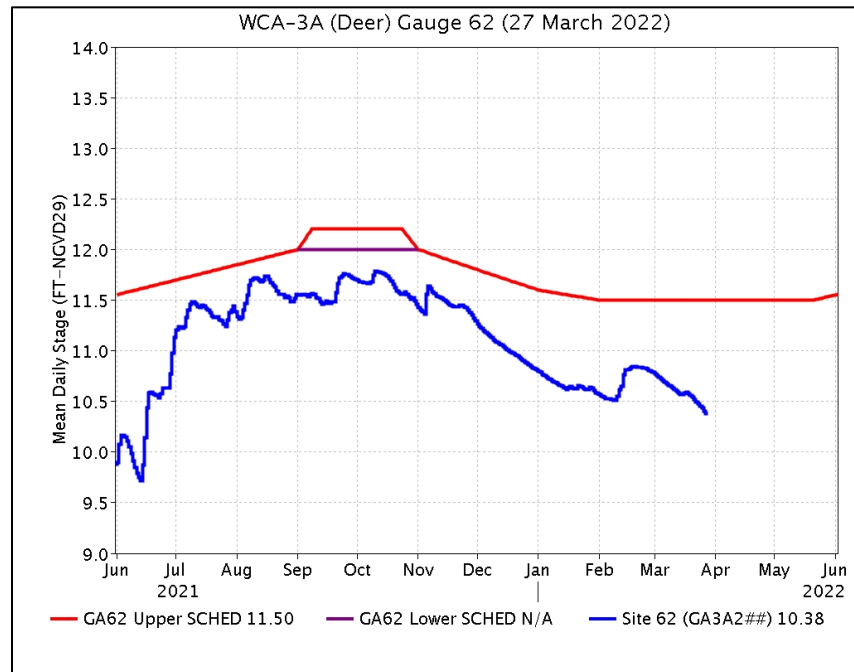


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

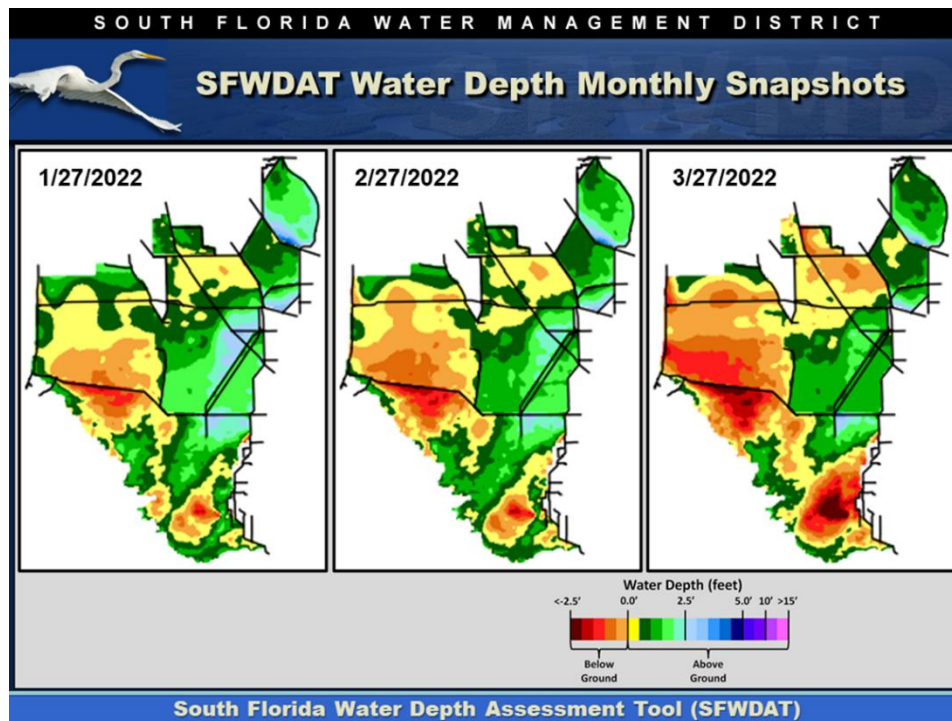


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

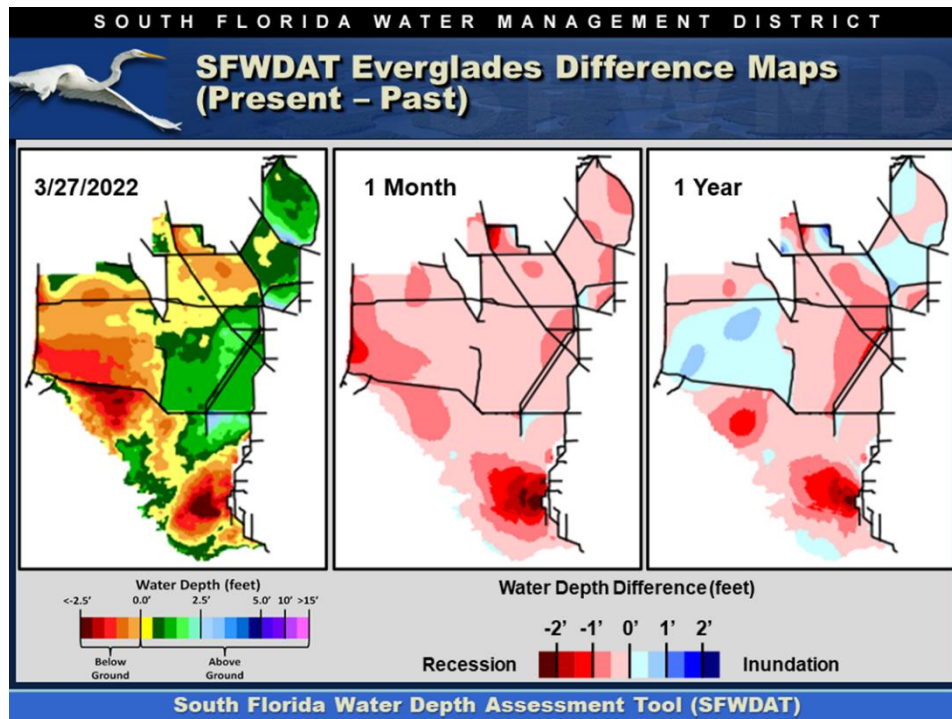


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

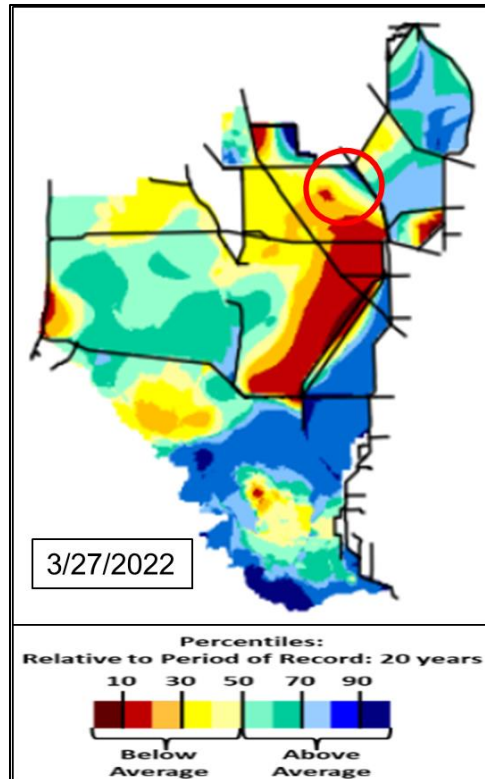


Figure EV-7. Present water depths compared to the day of year median over the previous 20 years.

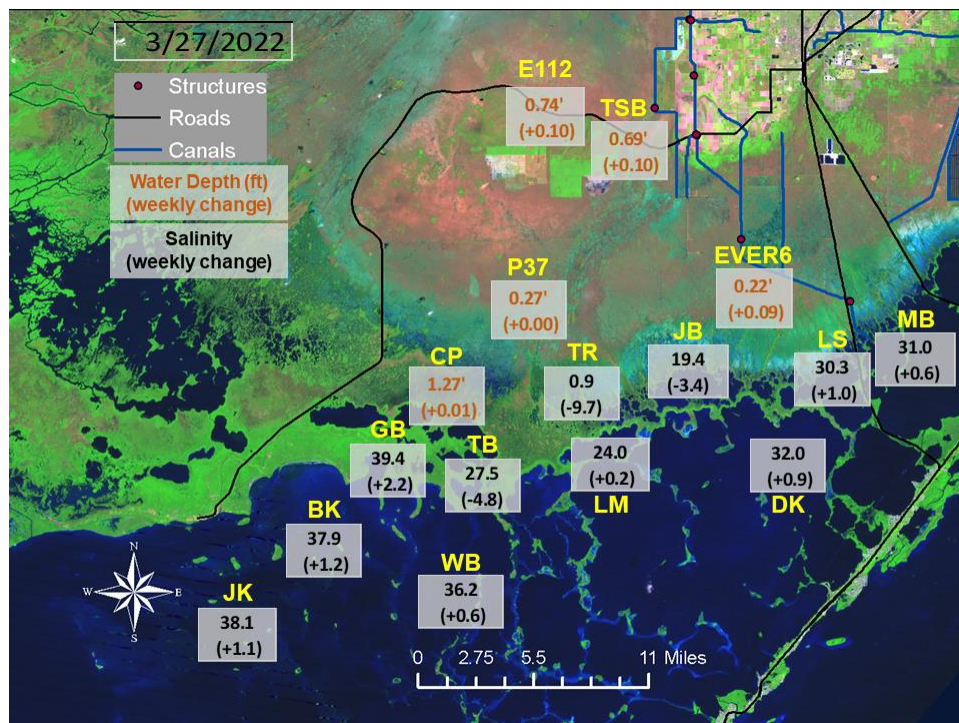


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

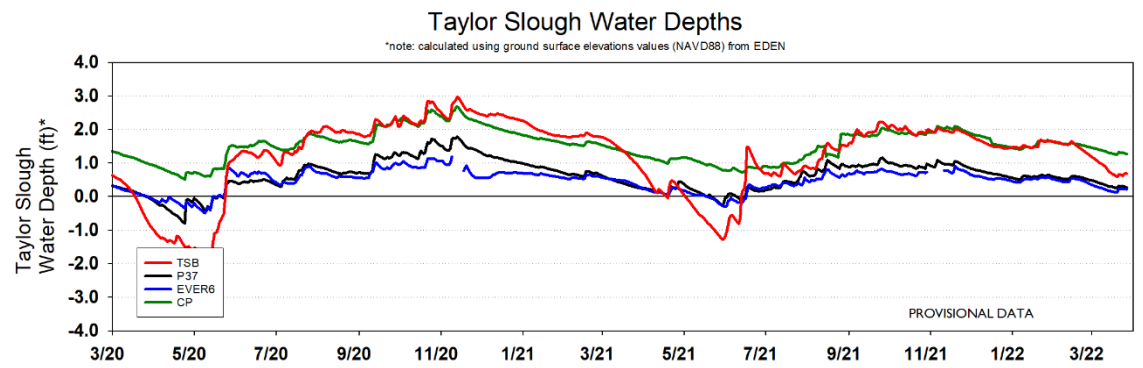


Figure EV-9. Taylor Slough water depth time series.

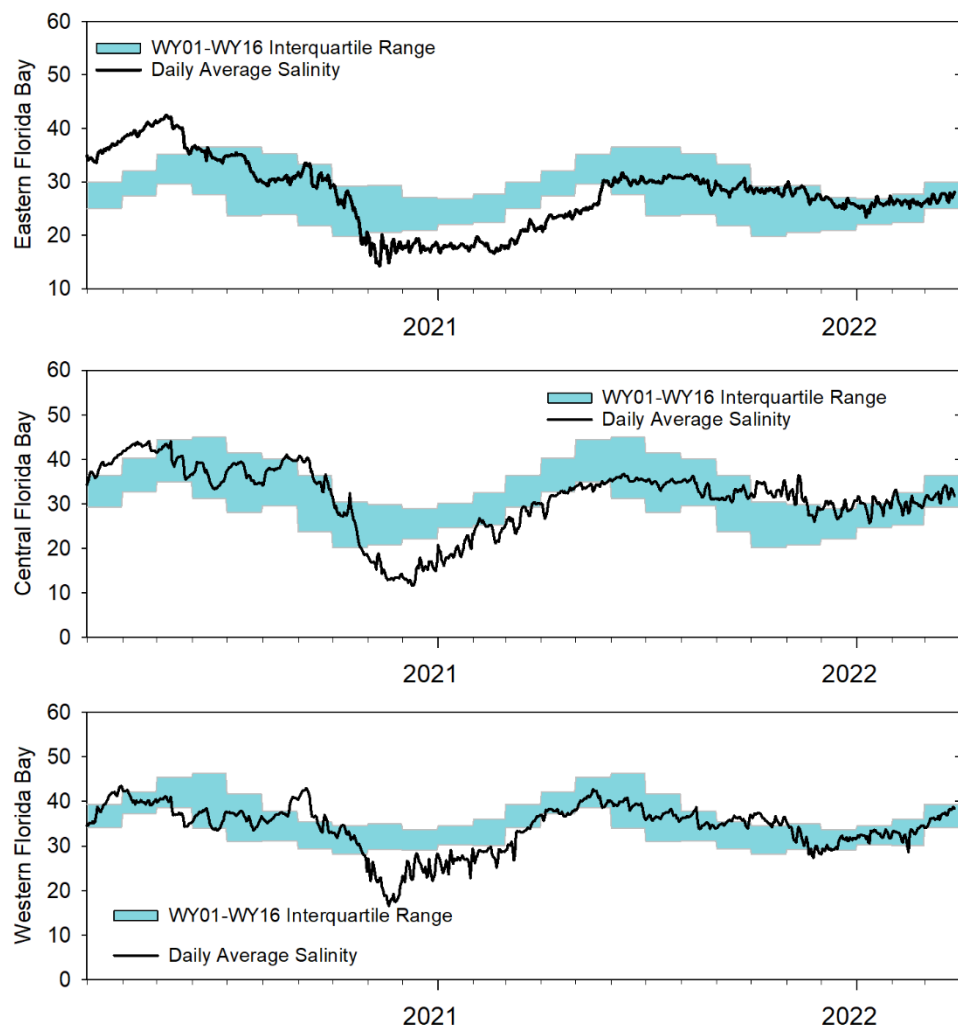


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, February 22, 2022 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.12'	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 90 th percentile.
WCA-2A	Stage decreased by 0.18'	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 0.17'	Conserve water in this basin, while letting the water move south when conditions allow. Returning to 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.
WCA-3A NW	Stage decreased by 0.17'	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 decreased by 0.10'	Returning to a recession rate less than 0.10 feet per week has an ecological benefit.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage decreased by 0.16'		
WCA-3B	Stage decreased by 0.10'	Maintain 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.
ENP-SRS	Stage decreased by 0.01'	Make discharges to ENP according to COP and TTFF protocol while adaptively considering upstream and downstream ecological conditions.	Protect within basin and upstream habitat and wildlife.
Taylor Slough	Stage changes ranged from +0.00' to +0.10'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -4.8 to +2.2	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.

Biscayne Bay

As shown in **Figure BB-1**, mean total inflow to Biscayne Bay was 368 cfs and the previous 30-day mean inflow was 248 cfs. The seven-day mean salinity was 28.7 at BBCW8 and 24.9 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Data provided by Biscayne National Park.

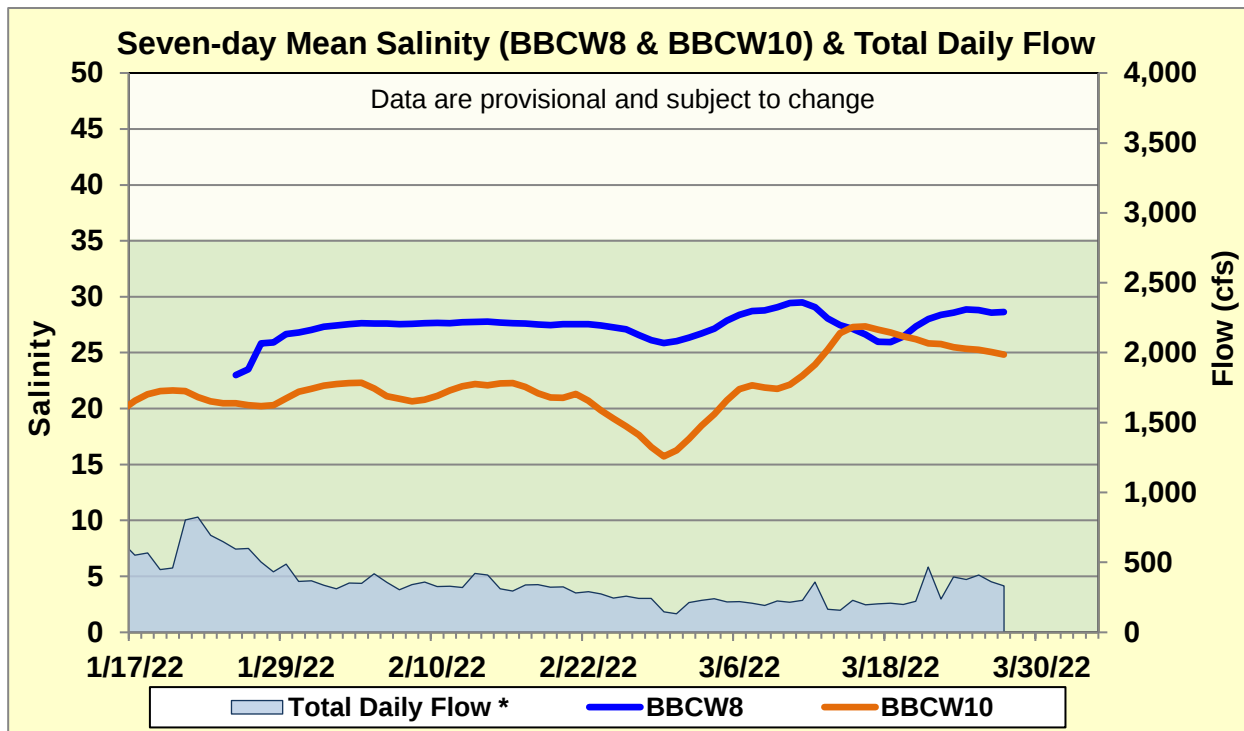


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.