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M E M O R A N D U M

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

FROM: SFWMD Staff Environmental Advisory Team

DATE: June 2, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

On Wednesday, a moist and unstable southeasterly wind flow should favor widespread coverage of rain, including the Kissimmee Valley. The southeasterly wind regime will favor overnight and early-day rains in the east and then heavier rains over the interior and the west, with a possible maximum of rainfall along and near the west coast. The confluence of a trough, tropical wave, and unstable air should result in enhanced rains area wide Thursday and Friday and over the interior and the west on Saturday. The rains on Friday could be heavy over a broad enough area to cause a significant District rain event, mostly from the central and western interior to the west coast where significant rainfall accumulations could occur. Early next week, total rainfall and rain coverage will decrease, probably to below climatological levels for early June. The greatest rains would tend to occur over the interior and especially the west. For the week ending next Tuesday morning, total District rainfall is most likely to be below to near normal with a lower chance that it would result slightly above the long-term mean of about two inches. Of note is a strong signal in the model guidance for above normal rainfall from the western interior of the District through the west coast that could stretch into portions of the southern interior, due to the predominant easterly to southeasterly wind regime expected this entire week.

Kissimmee

With minor departures, stages in East Lake Toho and Toho followed their target recession lines over the past week and will end the season approximately at their regulation low stages. Kissimmee-Cypress-Hatchineha receded at an average rate of 0.19 feet/week over the past week with S-65A discharge continuing slightly below its minimum of 300 cfs; Kissimmee-Cypress-Hatchineha will end the season approximately 1.2 feet above their regulation low stage of 49 feet. Flow at S-65A continues to be too low for extensive inundation of the Kissimmee River floodplain, and mean floodplain depth remains at 0.07 feet on May 30. Dissolved oxygen concentration in the Kissimmee River averaged 8.3 mg/L for the week, well above the 2.0 mg/L threshold considered harmful to sportfish.

Lake Okeechobee

Lake Okeechobee stage was 12.81 feet NGVD on May 30, 2021, 0.31 feet lower than last week and 1.22 feet lower than a month ago. The Lake is currently in the Base Flow Sub-band. Lake stages were above the ecological envelope from August 1, 2020 to March 30, 2021, but are currently following along the upper threshold of the envelope. The Lake has been within the envelope only ~25% of the time since January 1, 2021. Recession rates have been high recently, with stages declining over two feet since mid-March. Recent satellite imagery (May 28, 2021) shows a medium to high bloom potential in the western, northeastern, and south-central parts of the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged approximately 103 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities decreased at decreased at the HR1 and A1A Bridge sites and increased at the US1 Bridge site 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 1,685 cfs over the past week with approximately 1,000 cfs coming from the Lake. Mean surface salinities decreased at S-79 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 also 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, May 30, 2021, approximately 7,900 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 36,200 ac-feet. The total amount of inflows to the STAs in WY2022 is approximately 38,000 ac-feet. Most STA cells are near target stage, with the exception of several cells in STA-5/6 that are drying out. STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7, and STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways, and STA-2 Flow-way 2 for construction activities. Operational restrictions are in effect in STA-1E Central Flow-way, STA-2 Flow-ways 3 and 4, and STA-3/4 Western Flow-way for vegetation management activities. Operational restrictions are also in effect in STA-5/6 Flow-ways 2 and 3 following the Restoration Strategies project to grade non-effective treatment areas. Nests of Migratory Bird Treaty Act (MBTA) protected species have been observed in STA-1W and STA-5/6. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2 and STA-3/4.

Everglades

Record numbers of wading birds continue to nest as foraging remains excellent in WCA-1, WCA-3A South and in Everglades National Park. Dry conditions continue to dominate in WCA-3A North as public access remains closed to that area. Salinities are gradually increasing in Florida Bay, but conditions remain well positioned to minimize extreme hypersalinity before the wet season begins.

Supporting Information

Kissimmee Basin

Lake stages on May 30, 2021 were 55.0 feet NGVD (0.1 feet below schedule) in East Lake Toho, 52.0 feet NGVD (0.1 feet below schedule) in Lake Toho, and 50.2 feet NGVD (1.1 feet above schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**). With minor departures, stages in East Lake Toho and Toho followed their target recession lines over the past week and will end the season approximately at their regulation low stages. Kissimmee-Cypress-Hatchineha receded at an average rate of 0.19 feet/week over the past week with S-65A discharge continuing slightly below its minimum of 300 cfs; Kissimmee-Cypress-Hatchineha will end the season approximately 1.2 feet above their regulation low stage of 49 feet.

Lower Kissimmee

Kissimmee River (headwater) stages were 46.4 feet NGVD at S-65A and 25.9 feet NGVD at S-65D on May 30, 2021, while discharges were 370 cfs at S-65, 290 cfs at S-65A, 280 cfs at S-65D and 280 cfs at S-65E (**Table KB-2**). Dissolved oxygen concentration in the Kissimmee River averaged 8.3 mg/L for the week ending May 30, well above the 2.0 mg/L threshold considered harmful to sportfish (**Figure KB-4**). Flow at S-65A remains too low for extensive inundation of the Kissimmee River floodplain, and mean floodplain depth remains at 0.07 feet on May 30 (**Figure KB-5**).

Water Management Recommendations

Continue to follow the USACE request to hold S-65A discharge below 800-900 cfs to facilitate construction for the Kissimmee River Restoration Project. Follow the recommended S-65A discharge rate of change limits (**Table KB-3**) as possible when adjustments to discharges are made. With the onset of the rainy season, limit ascension (stage rise) rates to 0.5 ft/14 days in East Lake Toho, Toho, and Lakes Kissimmee-Cypress-Hatchineha, as possible, while maintaining discharge rate of change limits.

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

Water Body	Structure	Stage Monitoring Site	7-Day Average Discharge (cfs)	Lake Stage (feet NGVD) ^a	Schedule Type ^b	Schedule Stage (feet NGVD)	Departure from Regulation (feet)	
							5/30/21	5/23/21
Lakes Hart and Mary Jane	S-62	LKMJ	0	59.5	R	59.5	0.0	-0.1
Lakes Myrtle, Preston and Joel	S-57	S-57	0	59.9	R	60.0	-0.1	-0.1
Alligator Chain	S-60	ALLI	26	62.1	R	62.1	0.0	0.0
Lake Gentry	S-63	LKGT	26	59.6	R	59.6	0.0	0.0
East Lake Toho	S-59	TOHOE	28	55.0	R	55.1	-0.1	-0.2
Lake Toho	S-61	TOHOW S-61	64	52.0	R	52.1	-0.1	-0.2
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	353	50.2	R	49.1	1.1	1.1

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.

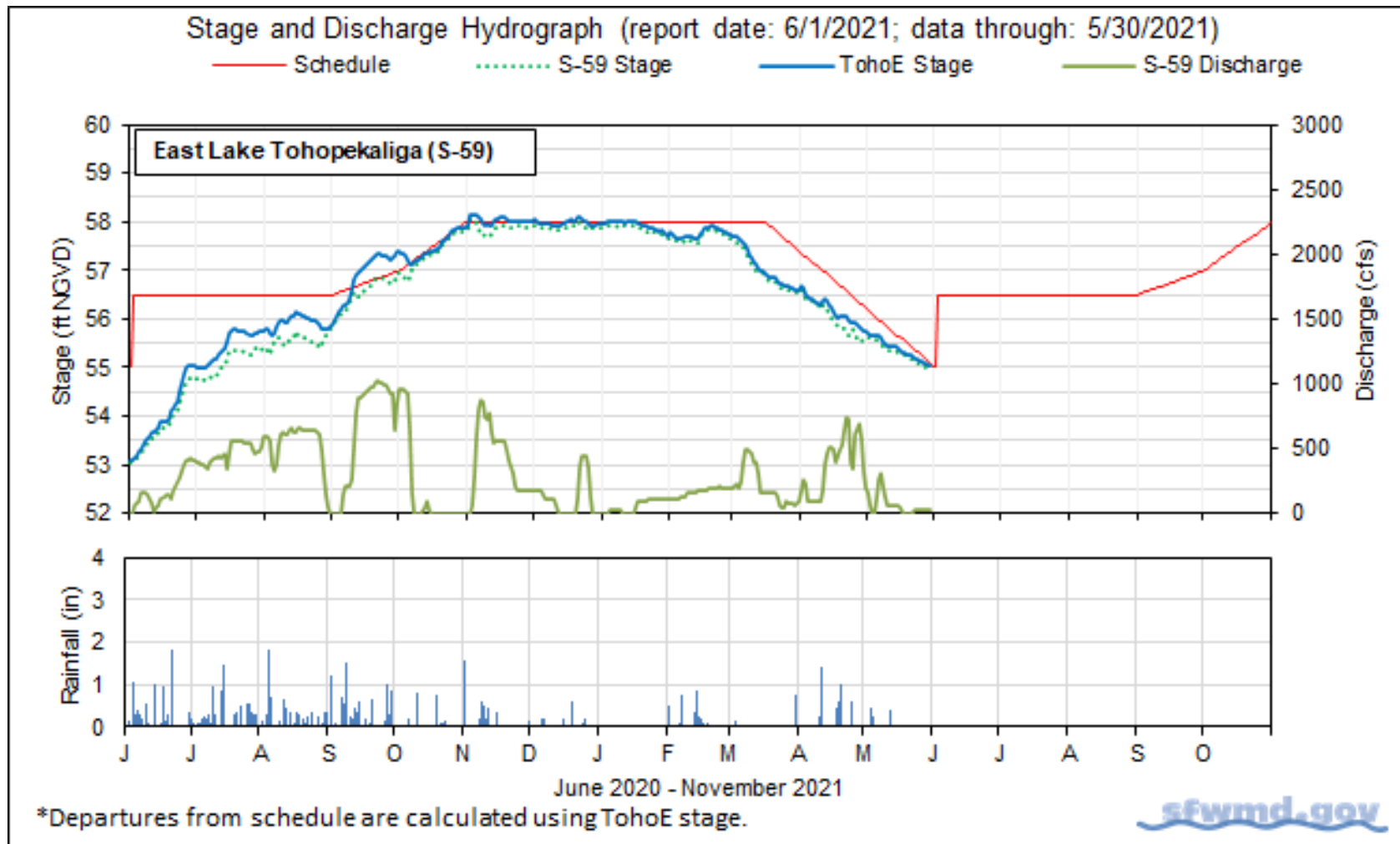


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

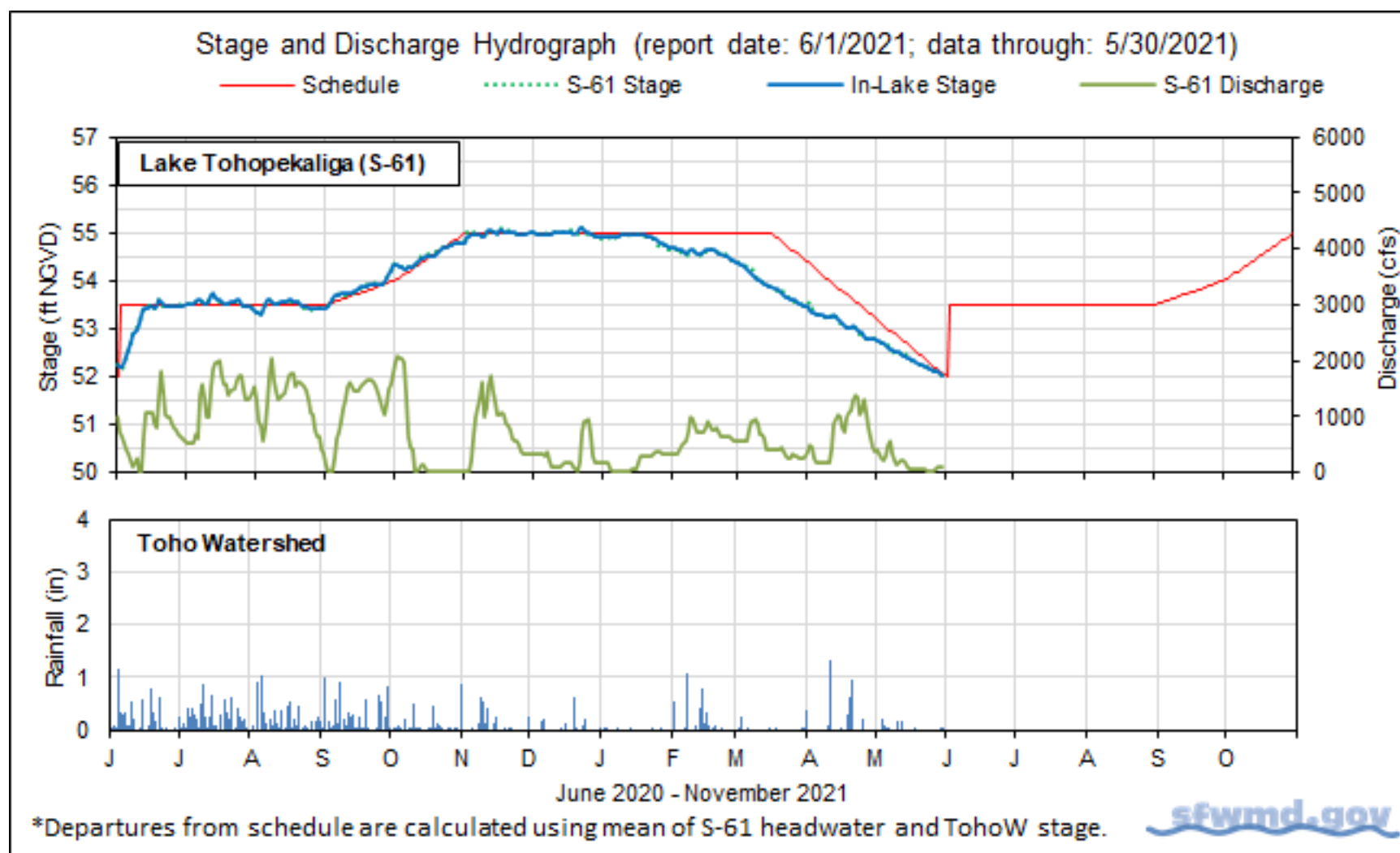


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

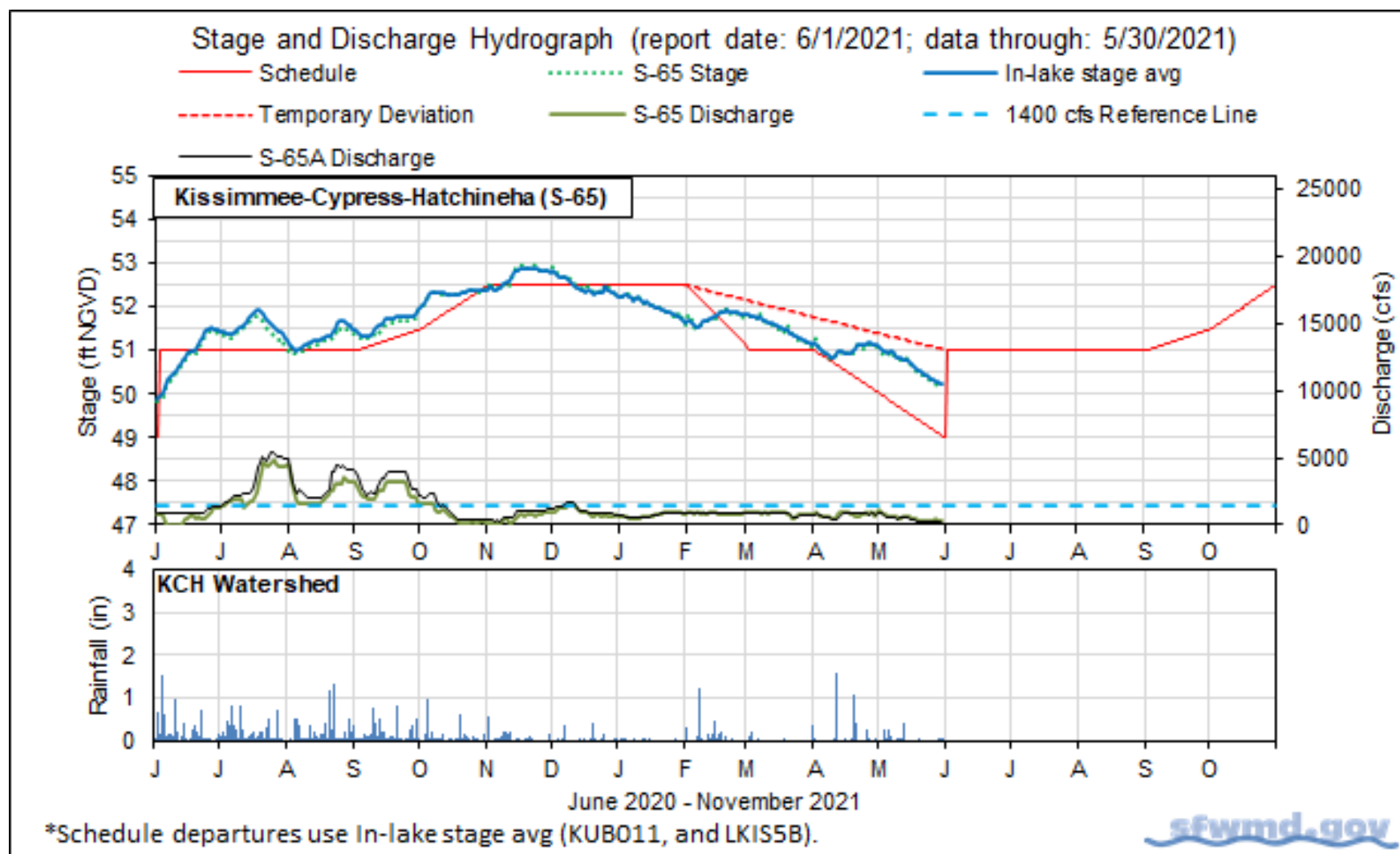


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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 5/30/21	Average for Previous Seven Day Periods			
			5/30/21	5/23/21	5/16/21	5/9/21
Discharge	S-65	369	353	393	570	692
Discharge	S-65A ^a	292	267	303	483	613
Headwater Stage (feet NGVD)	S-65A	46.40	46.30	46.27	46.30	46.37
Discharge	S-65D ^b	278	262	379	549	771
Headwater Stage (feet NGVD)	S-65D ^c	25.89	25.76	25.75	25.73	25.74
Discharge (cfs)	S-65E ^d	284	245	369	531	756
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	8.0	8.3	8.1	6.9	6.6
Mean depth (feet) ^f	Phase I floodplain	0.07	0.07	0.08	0.09	0.12

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.

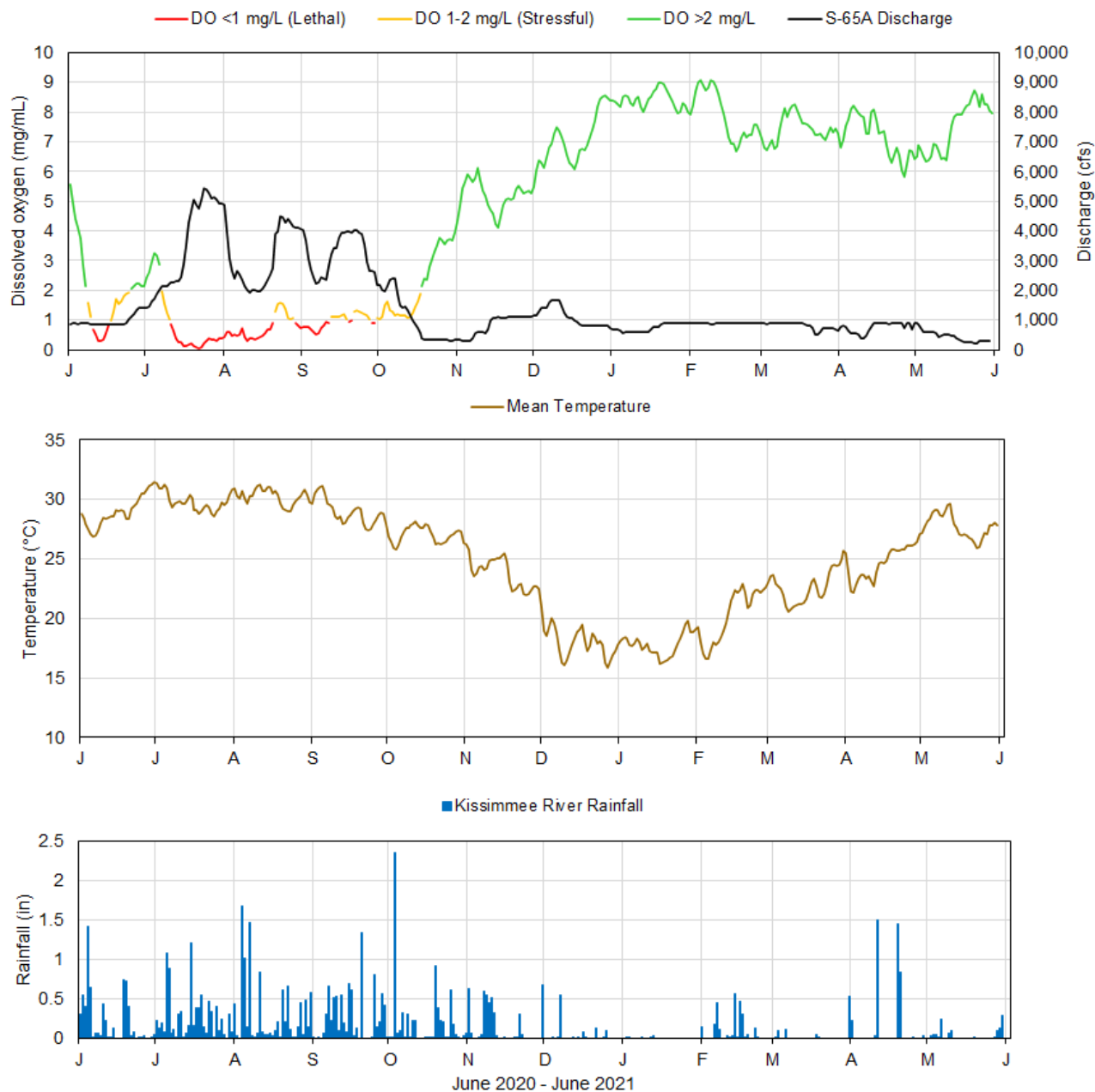
d. Combined discharge from S-65E and S-65EX1.

e. Dissolved oxygen is the average of values from sondes KRBN, PC62, PC63, 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 7/13/18).

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



Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRBN, PC33, PD62R and PD42R with an average of 3 stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

Report Date: 6/1/2021; data are through: 5/30/2021

sfwmd.gov

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

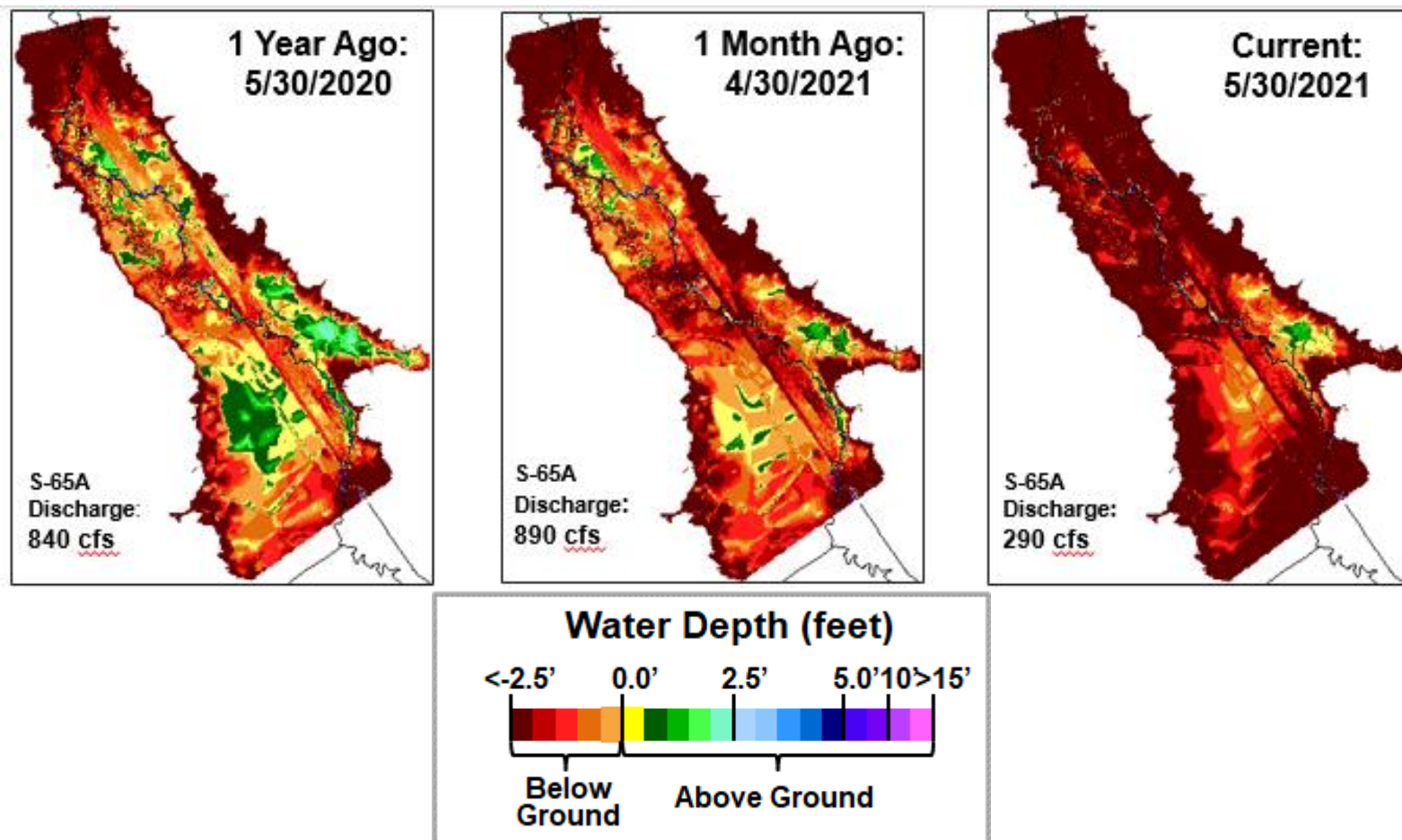


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

Lake Okeechobee

Lake Okeechobee stage was 12.81 feet NGVD on May 30, 2021, 1.22 feet lower than a month ago, and 1.36 feet higher than one year ago (**Figure LO-1**). Lake stages were above the ecological envelope from August 1, 2020 to March 30, 2021, but are currently following along the upper threshold of the envelope (**Figure LO-2**). The Lake has been within the envelope only ~25% of the time since January 1, 2021. Lake stage declined slowly from mid-November, 2020 through mid-February, 2021, before recession rates increased; stage has declined over two feet since mid-March (**Figure LO-3**). According to NEXRAD, 0.69 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 388 cubic feet per second (cfs) to 263 cfs. Outflows (excluding evapotranspiration) increased, going from 5,247 cfs to 5,771 cfs. The majority of the inflow came from the Kissimmee River (245 cfs through S-65E & S-65EX1). Releases to the west via S-77 decreased from 1,887 cfs to 1,619 cfs, and releases east via S-308 slightly increased, going from 133 cfs to 159 cfs. Releases south through the S-350 structures increased from 3,123 cfs to 3,866 cfs. Average inflows and outflows through water control structures surrounding the Lake for the previous two weeks (cfs) are shown in **Table LO-1**, as is the resultant Lake elevation change in inches (in) due to each structure's flow for the past week. **Figure LO-4** shows the combined average daily cfs for inflows and outflows for the Lake over the past eight weeks. These data are provisional and are subject to change.

The most recent satellite image (May 28, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed medium to high bloom potential along the western and northeastern parts of the Lake, and south-central part of the Lake. Overall, the bloom potential increased in western and northeastern parts of the Lake (**Figure LO-5**). Toxin concentration decreased across the Lake since early May and only 6 out of 32 samples (or ~19%) had toxin concentration above the EPA recommended 8 µg/L threshold (**Table LO-2 and Figure LO-6**). The highest toxin concentration (19 µg/L) was recorded at POLESOUT site in the northwestern part of the Lake. Phytoplankton communities were still dominated by *Microcystis aeruginosa*. Only 3 nearshore sites (FEBIN, FEBOUT and PALMOUT) in the western part of the Lake had mixed communities.

Table LO-1. Weekly Lake Okeechobee inflows and outflows (cfs) and as change in elevation (in).
Provisional data.

Inflows	Previous Week's Average Daily Flow (cfs)	This Week's Average Daily Flow (cfs)	Equivalent Depth Week Total (in)	Outflows	Previous Week's Average Daily Flow (cfs)	This Week's Average Daily Flow (cfs)	Equivalent Depth Week Total (in)
S-65E & S-65EX1	369	245	0.1	S-77	1887	1619	0.7
S-71 & S-72	0	0	0.0	S-308	133	159	0.1
S-84 & S-84X	0	0	0.0	S-351	1338	1736	0.8
Fisheating Creek	10	18	0.0	S-352	606	868	0.4
S-154	0	0	0.0	S-354	1179	1262	0.6
S-191	0	0	0.0	L-8 Outflow	103	125	0.1
S-133 P	0	0	0.0	Evapotranspiration	2901	3118	1.4
S-127 P	0	0	0.0	Totals	8148	8889	3.9
S-129 P	0	0	0.0				
S-131 P	0	0	0.0				
S-135 P	0	0	0.0				
S-2 P	0	0	0.0				
S-3 P	10	0	0.0				
S-4 P	0	0	0.0				
L-8 Backflow							
Rainfall	5	1840	0.8				
Totals	394	2103	0.9				

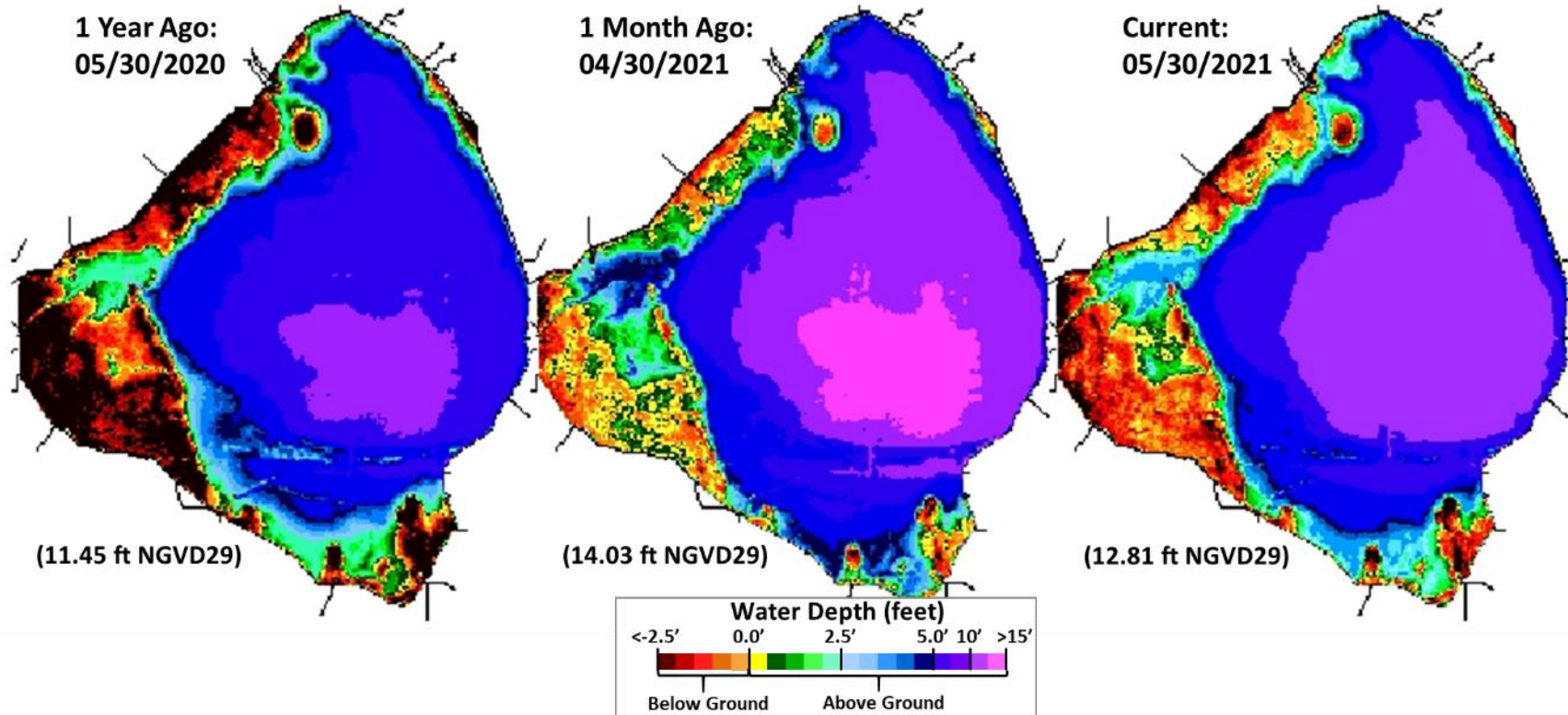


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

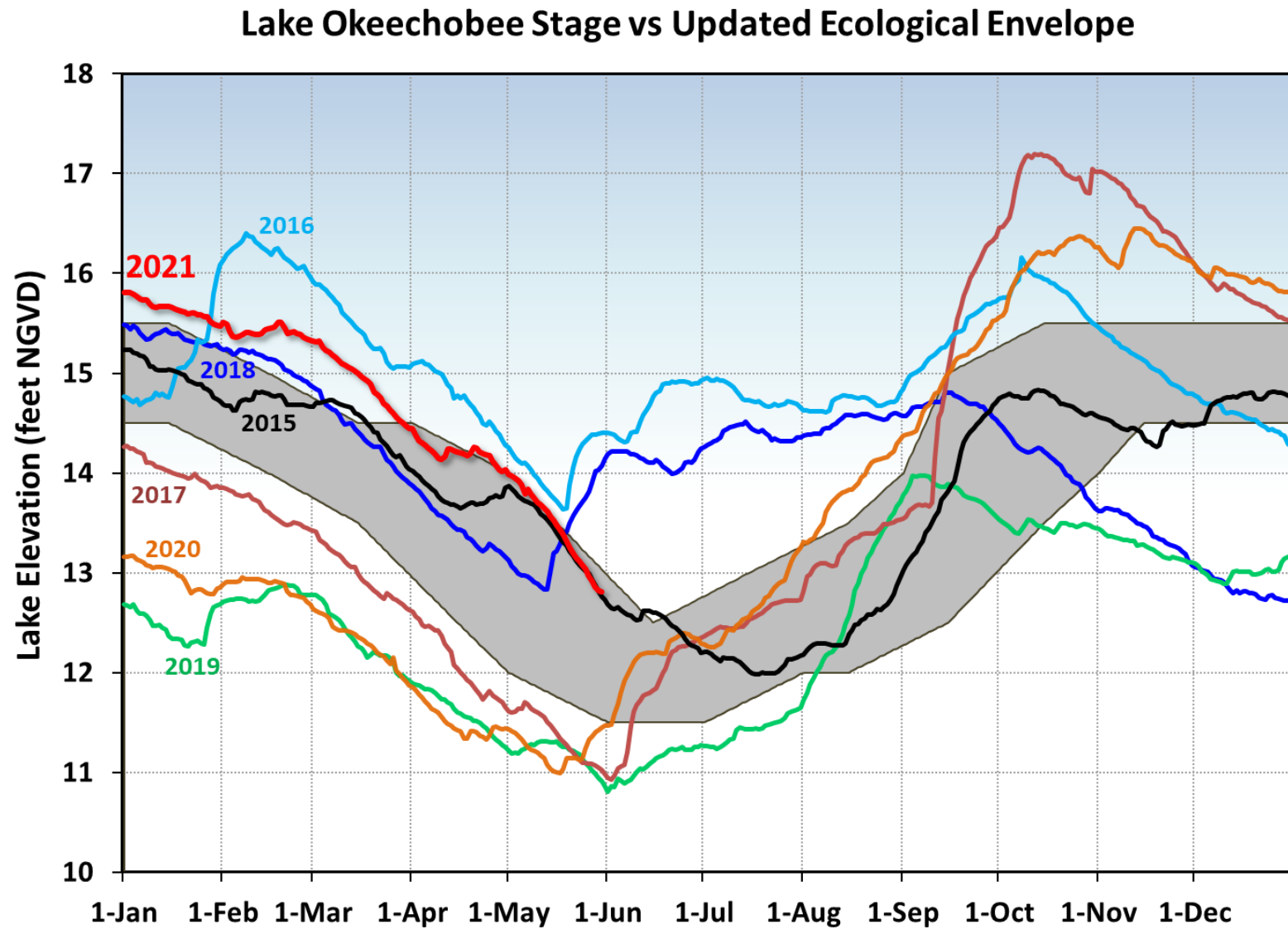
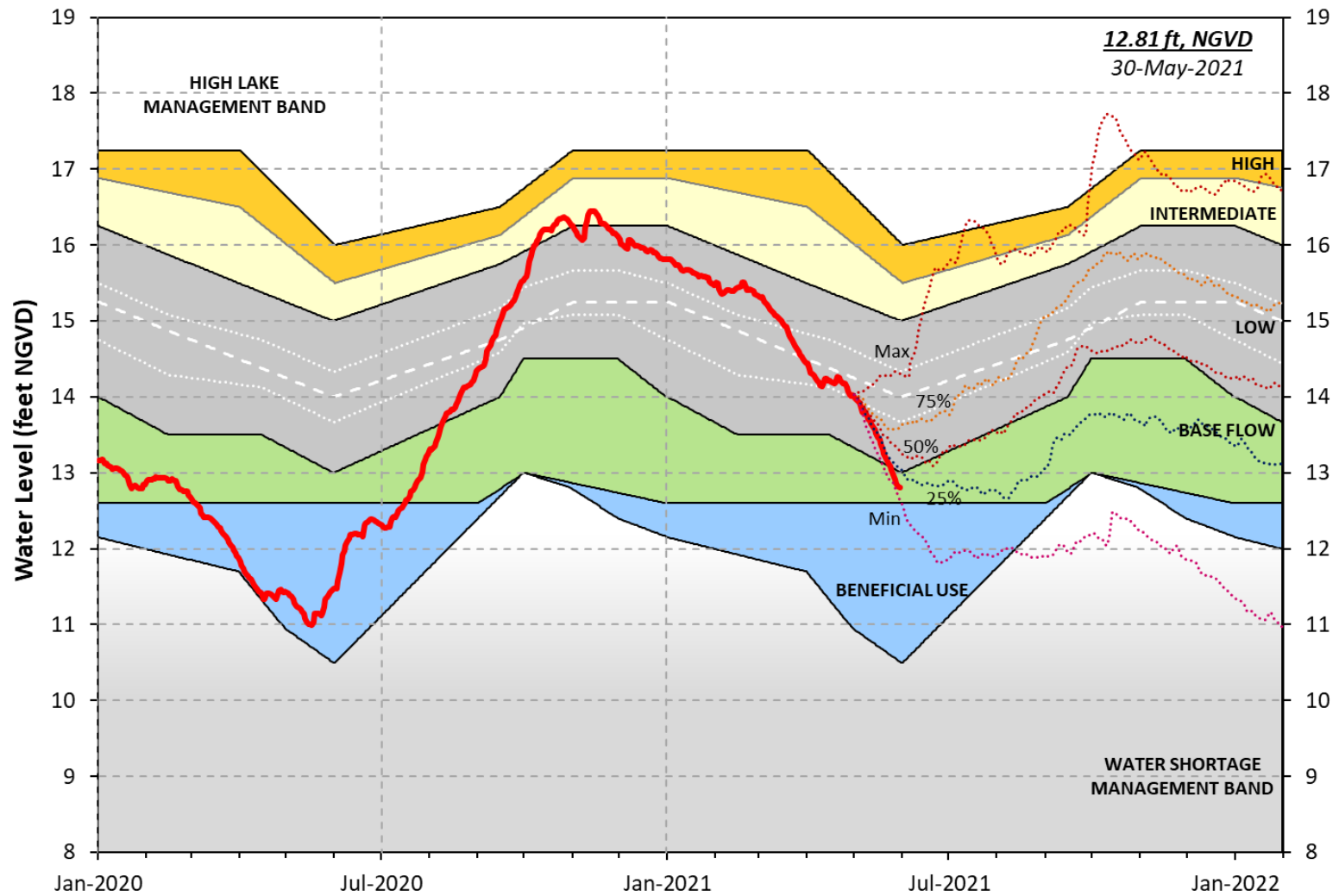


Figure LO-2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated ecological envelope.

Lake Okeechobee Water Level History and Projected Stages



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

Figure LO-3. Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

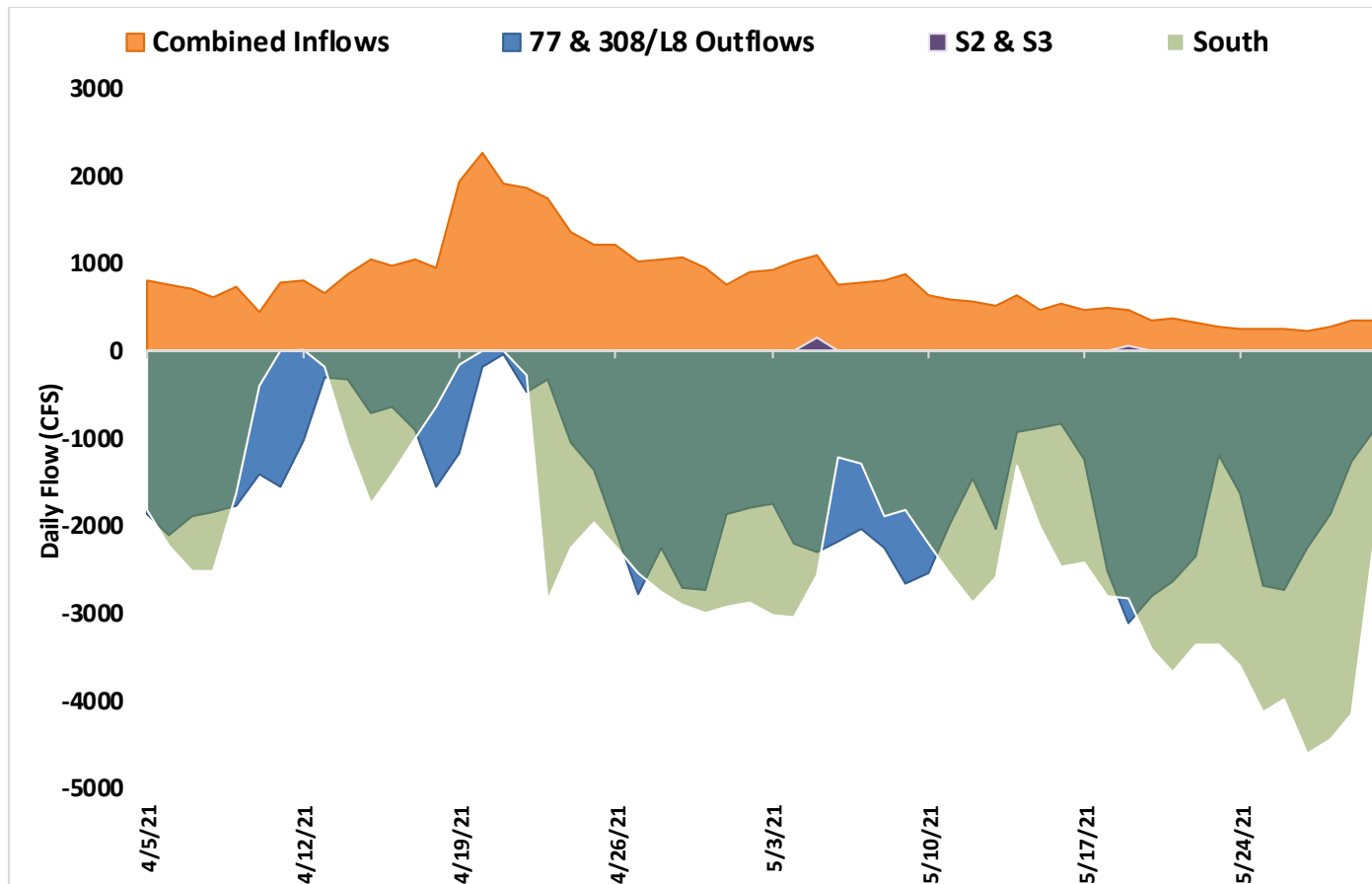


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) are included as inflows. Conversely, flows from Lake Okeechobee into the L-8 Canal are included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

Table LO-2. Provisional results of chlorophyll *a* concentrations and cyanobacteria taxa from sampling trips on May 17-19, 2021.

Station	Chl <i>a</i> (µg/L)	Toxin (µg/L)	Taxa	Station	Chl <i>a</i> (µg/L)	Toxin (µg/L)	Taxa
FEBIN	P	BDL	mixed	L001	P	3.3	<i>Microcys</i>
FEBOUT	P	0.9	mixed	L004	P	3.2	<i>Microcys</i>
KISSR0.0	P	1.0	<i>Microcys</i>	L006	8.4	1.4	<i>Microcys</i>
L005	P	3.0	<i>Microcys</i>	L007	9.8	1.5	<i>Microcys</i>
LZ2	P	1.3	<i>Microcys</i>	L008	P	5.5	<i>Microcys</i>
KBARSE	P	4.5	<i>Microcys</i>	LZ30	7.8	16.0	<i>Microcys</i>
RITTAE2	31.8	9.1	<i>Microcys</i>	LZ40	11.8	4.3	<i>Microcys</i>
PELBAY3	18.0	2.8	<i>Microcys</i>	CLV10A	4.2	BDL	<i>Microcys</i>
POLE3S	38.6	11.0	<i>Microcys</i>	NCENTER	P	1.2	<i>Microcys</i>
LZ25A	7.9	0.9	<i>Microcys</i>	Outflow Structures			
PALMOUT	60.7	1.6	mixed	S308C	P	2.2	<i>Microcys</i>
PALMOUT1	14.3	7.3	<i>Microcys</i>	S77	P	11.0	<i>Microcys</i>
PALMOUT2	7.7	1.7	<i>Microcys</i>	<ul style="list-style-type: none"> SFWMD considers > 40 µg/L chlorophyll <i>a</i> (Chl<i>a</i>) an algal bloom. BDL: below detectable limit of 0.25 µg/L ND: no dominant taxa P: pending NS: not sampled Bold font: crew observed possible blue-green algae Chl<i>a</i> analyzed by SFWMD Toxin and taxa analyzed by FDEP <p> <i>Cylindro</i>: <i>Cylindrospermopsis</i> <i>Planktal</i>: <i>Planktalyngbya</i> <i>Dolicho</i>: <i>Dolichospermum</i> <i>Microcys</i>: <i>Microcystis</i> </p>			
PALMOUT3	12.0	9	<i>Microcys</i>				
POLESOUT	P	19.0	<i>Microcys</i>				
POLESOUT1	P	5.0	<i>Microcys</i>				
POLESOUT2	P	7.6	<i>Microcys</i>				
POLESOUT3	P	3.0	<i>Microcys</i>				
EASTSHORE	P	1.4	<i>Microcys</i>				
NES135	P	2.9	<i>Microcys</i>				

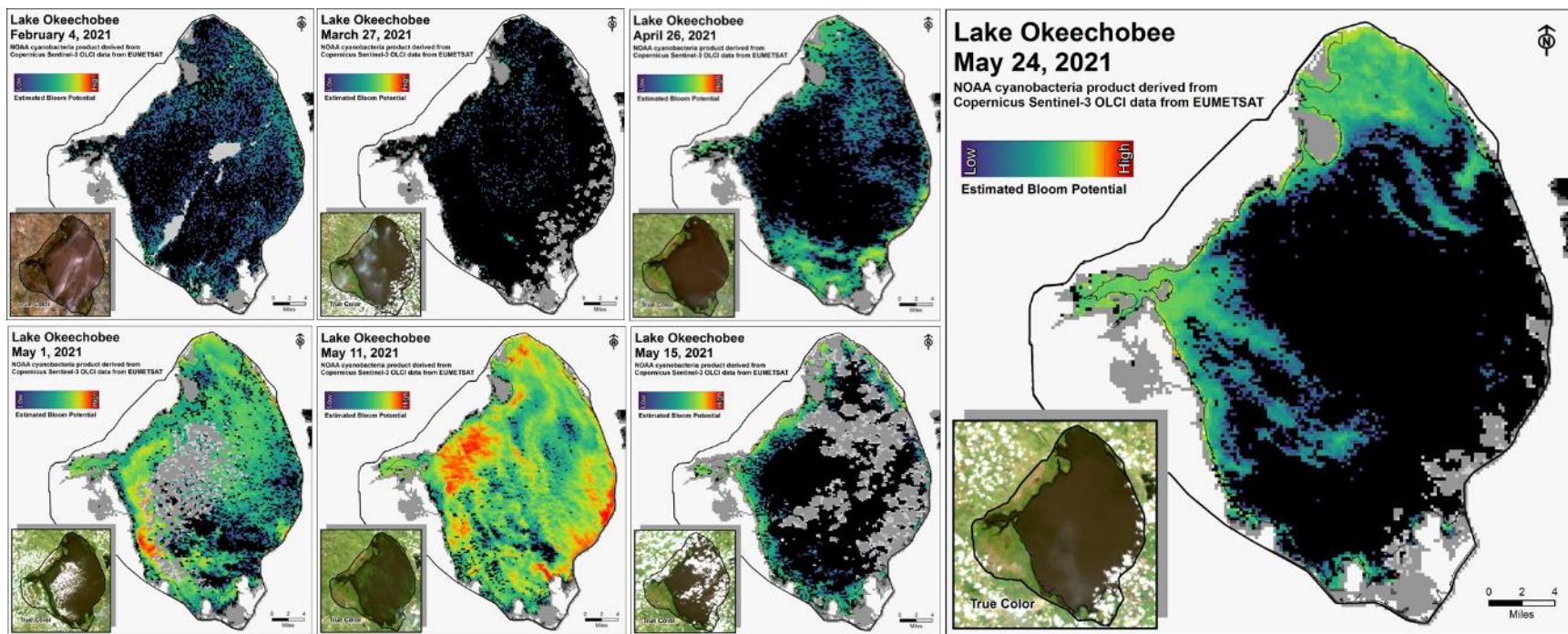


Figure LO-5. Cyanobacteria bloom potential based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

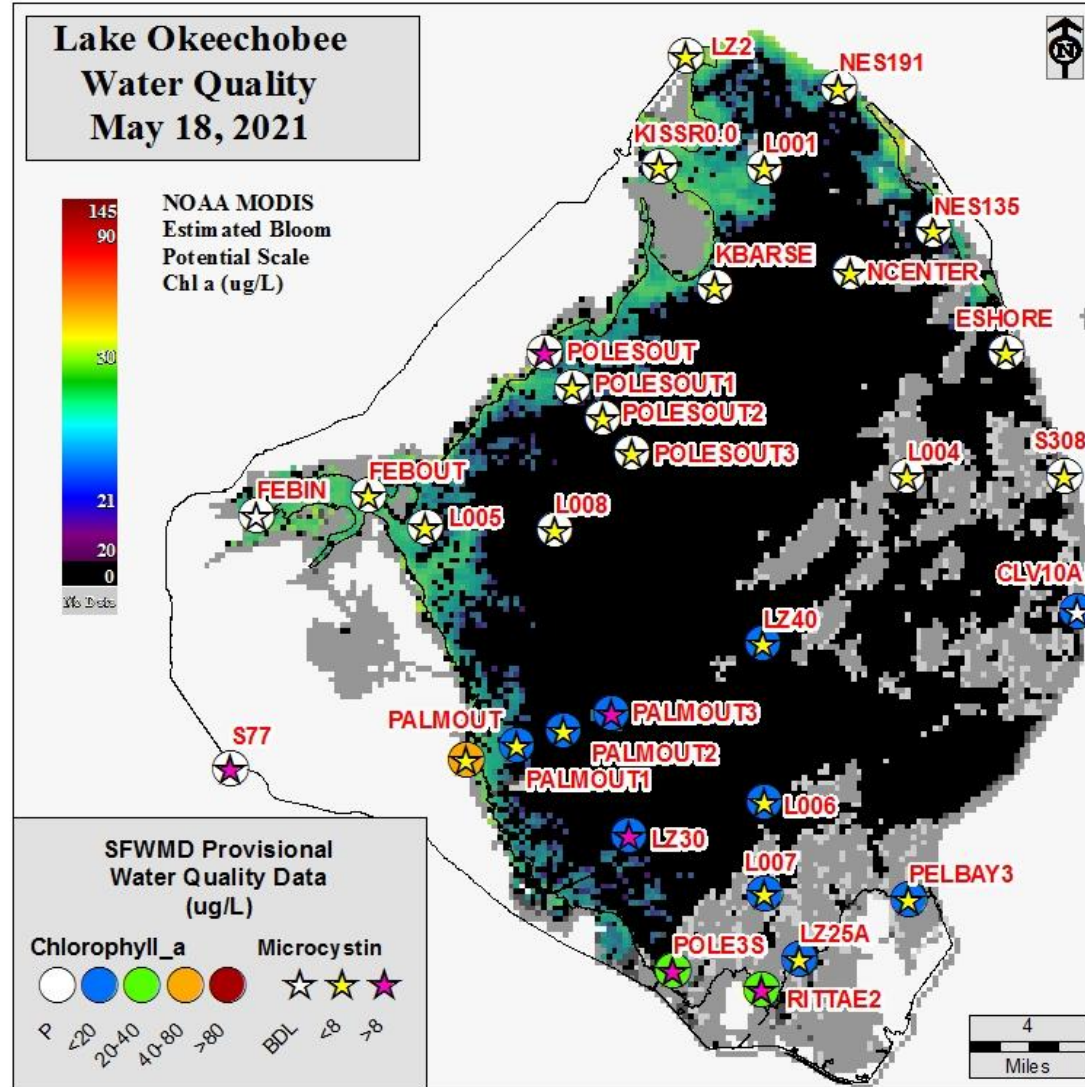


Figure LO-6. Expanded monitoring network and provisional results from samples collected May 17-19, 2021.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was approximately 103 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was approximately 131 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, mean surface salinity decreased at the HR1 and A1A Bridge sites and increased at the US1 Bridge site (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 25.4. Salinity conditions in the middle estuary were estimated to be within the good range for adult eastern oysters (**Figure ES-4**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was approximately 1,685 cfs (**Figures ES-5 and ES-6**) and the previous 30-day mean inflow was approximately 1,851 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-6**.

Over the past week, surface salinities decreased at S-79 and increased at the remaining sites in the estuary (**Table ES-2 and Figures ES-7 and ES-8**). 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-9**).

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 96 cfs. Model results from all scenarios predict daily salinity to be 4.9 or lower and the 30-day moving average surface salinity to be 1.6 or lower at Val I-75 at the end of the two-week period (**Table ES-3 and Figure ES-10**). This keeps predicted salinities at Val I-75 within the LORS 2008 salinity range (0.0-5.0).

Red Tide

The Florida Fish and Wildlife Research Institute reported on May 28, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background to low concentrations in Charlotte County, background to medium concentrations in Lee County,

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.

and low to high concentrations in Collier County. On the east coast, red tide was not observed in samples from Palm Beach or Broward counties.

Water Management Recommendations

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

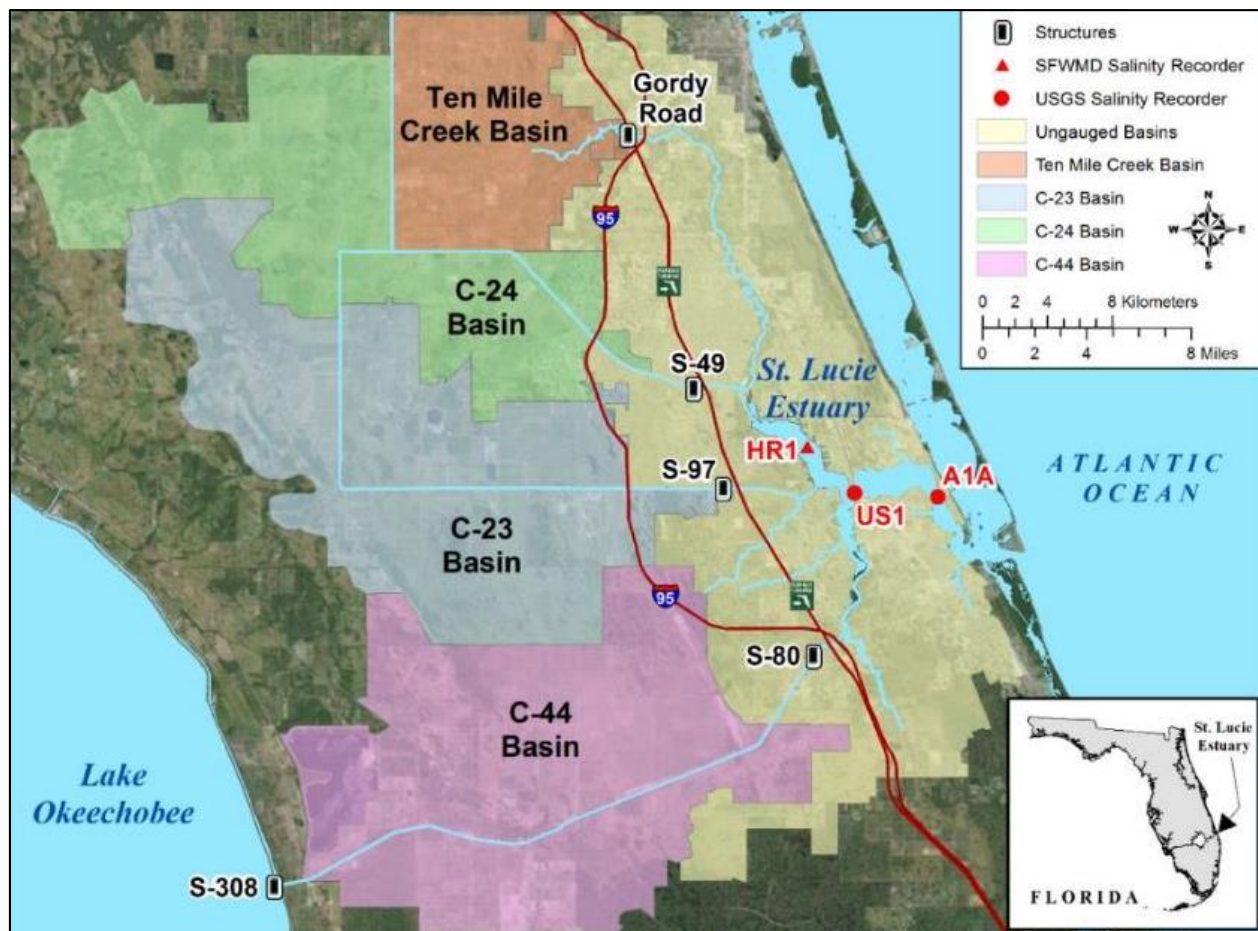


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

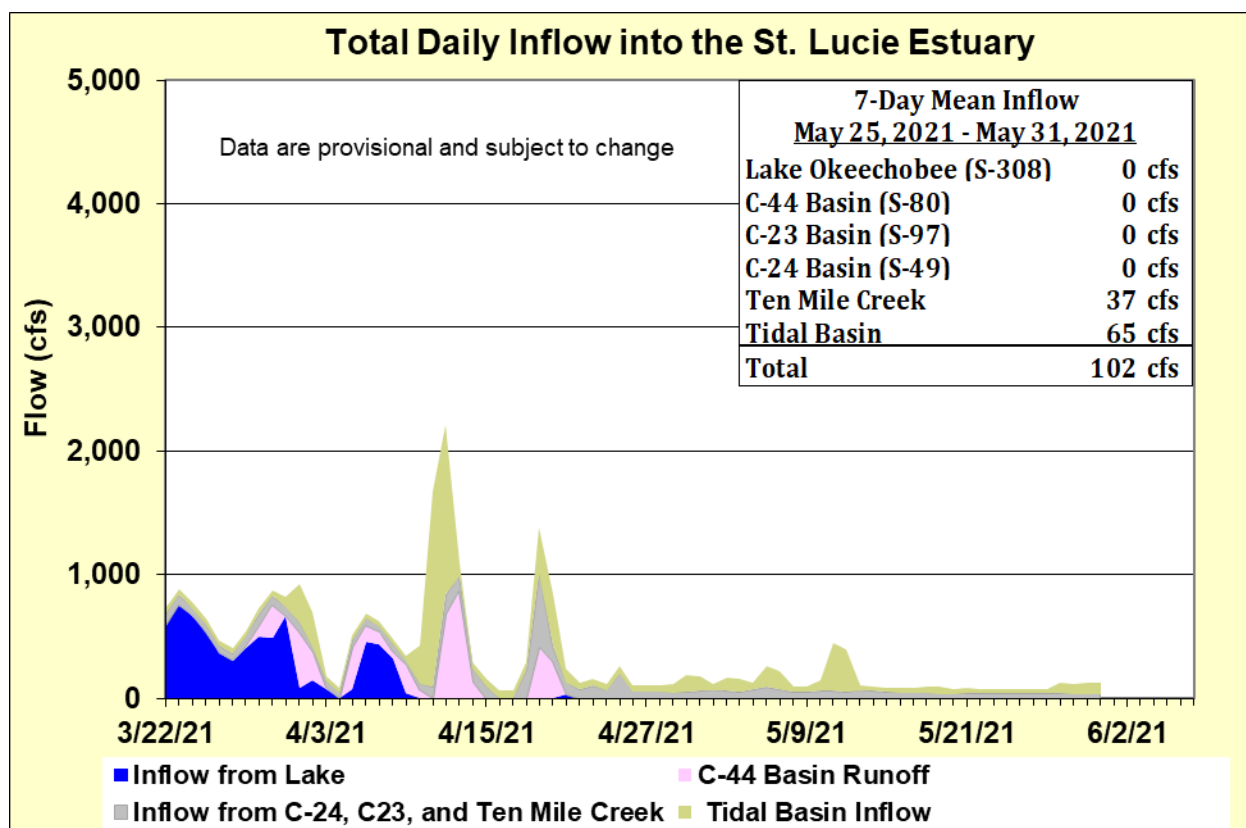


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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

Sampling Site	Surface	Bottom	Envelope
HR1 (Nork Fork)	21.9 (22.2)	22.4 (22.2)	NA ^a
US1 Bridge	25.2 (24.9)	25.6 (25.3)	10.0 – 26.0
A1A Bridge	31.3 (32.5)	31.8 (33.0)	NA ^a

a. The envelope is not applicable.

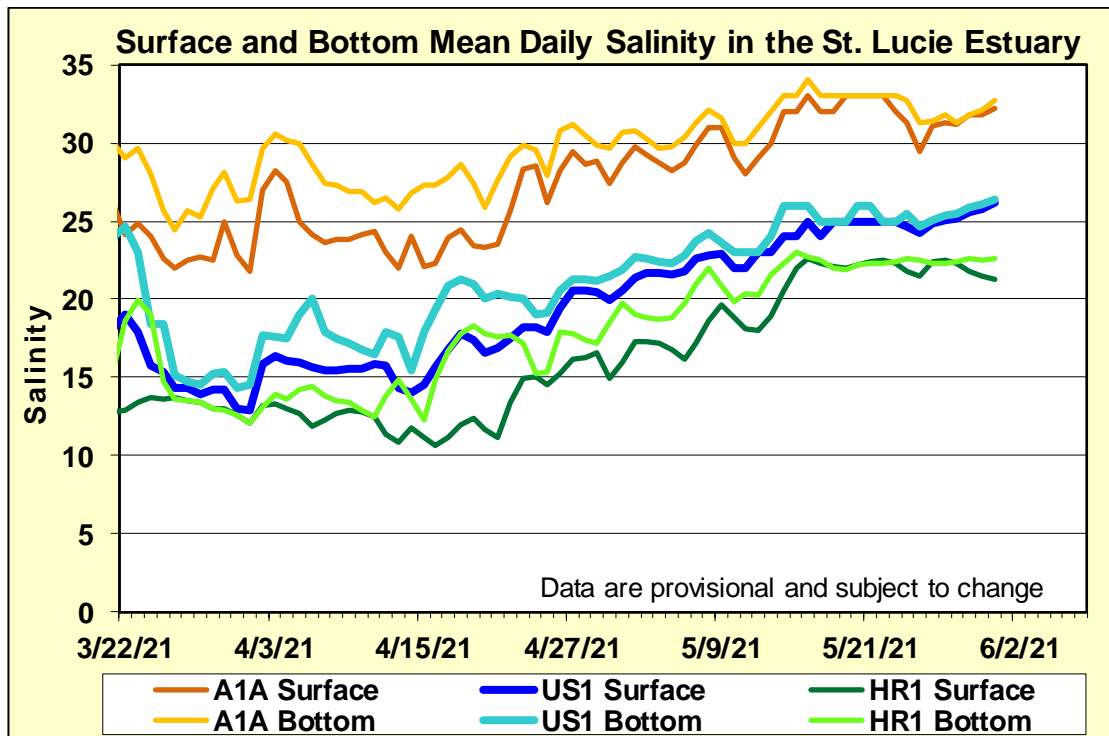


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

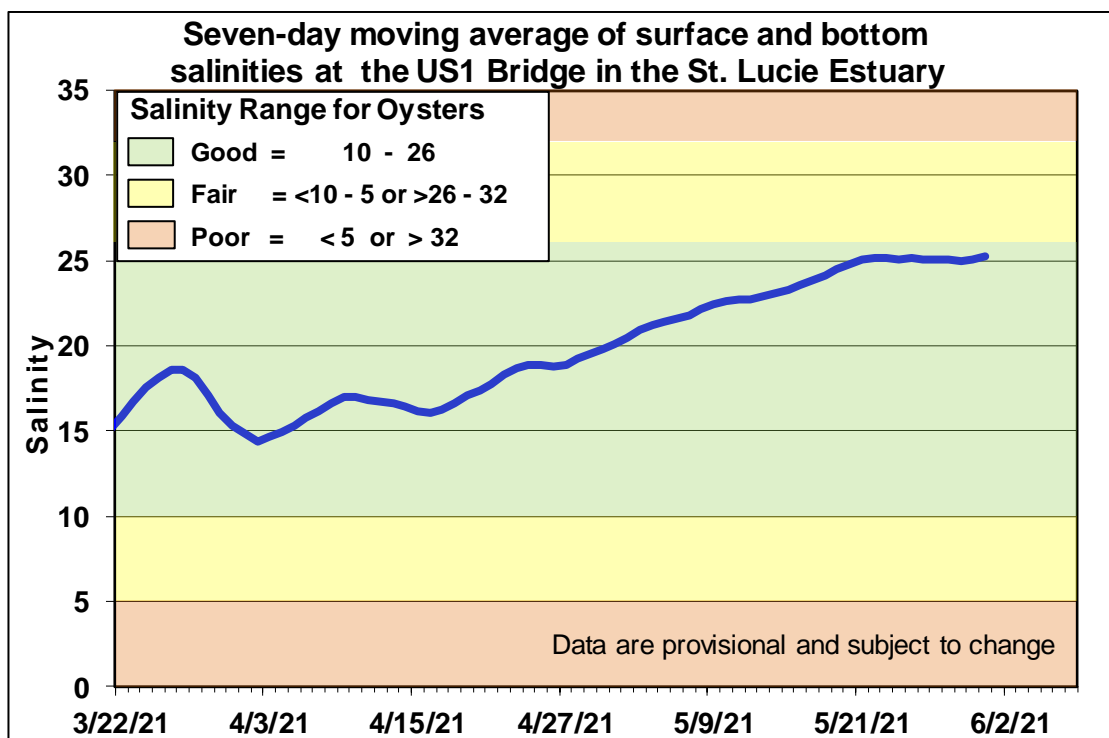


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

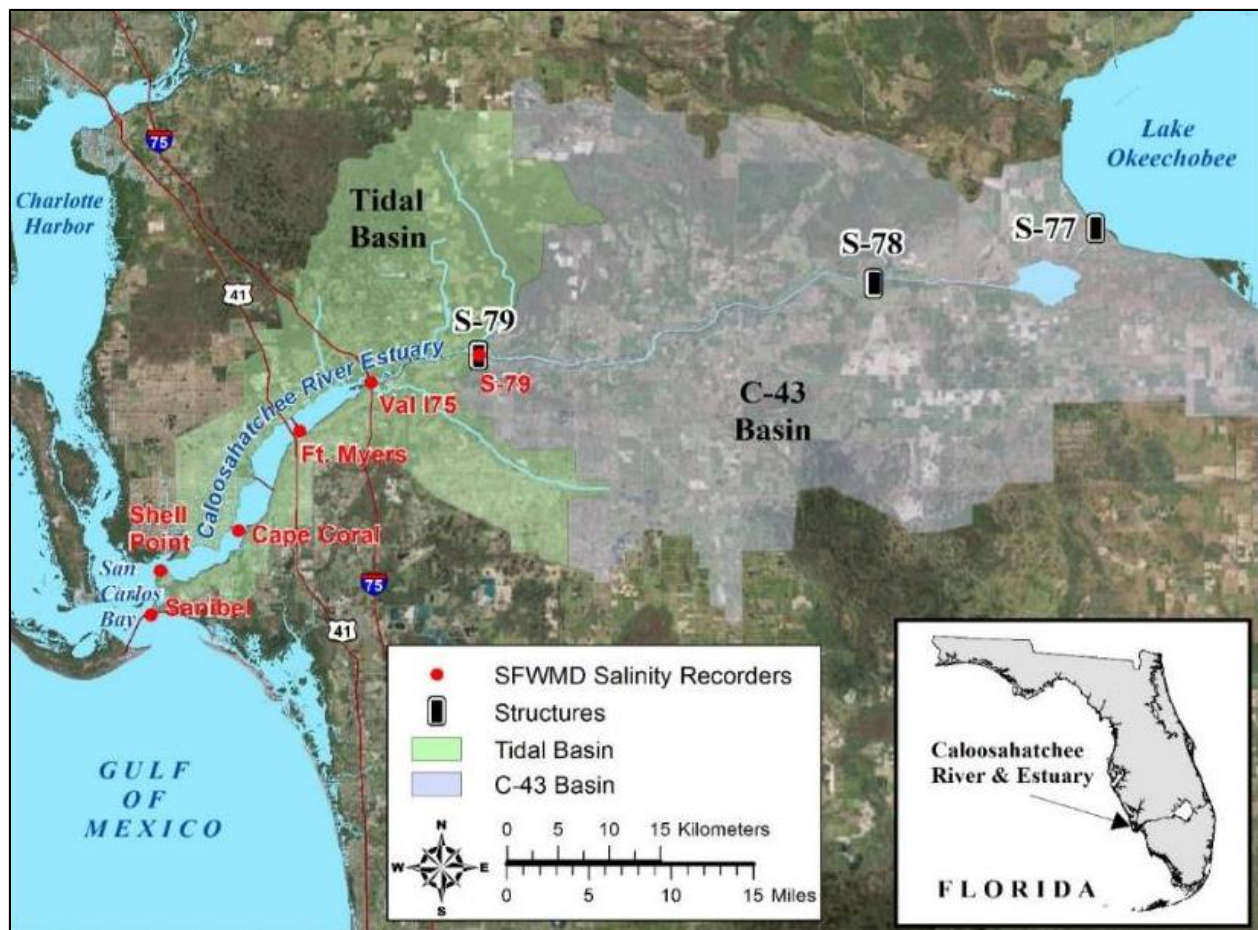


Figure ES-5. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

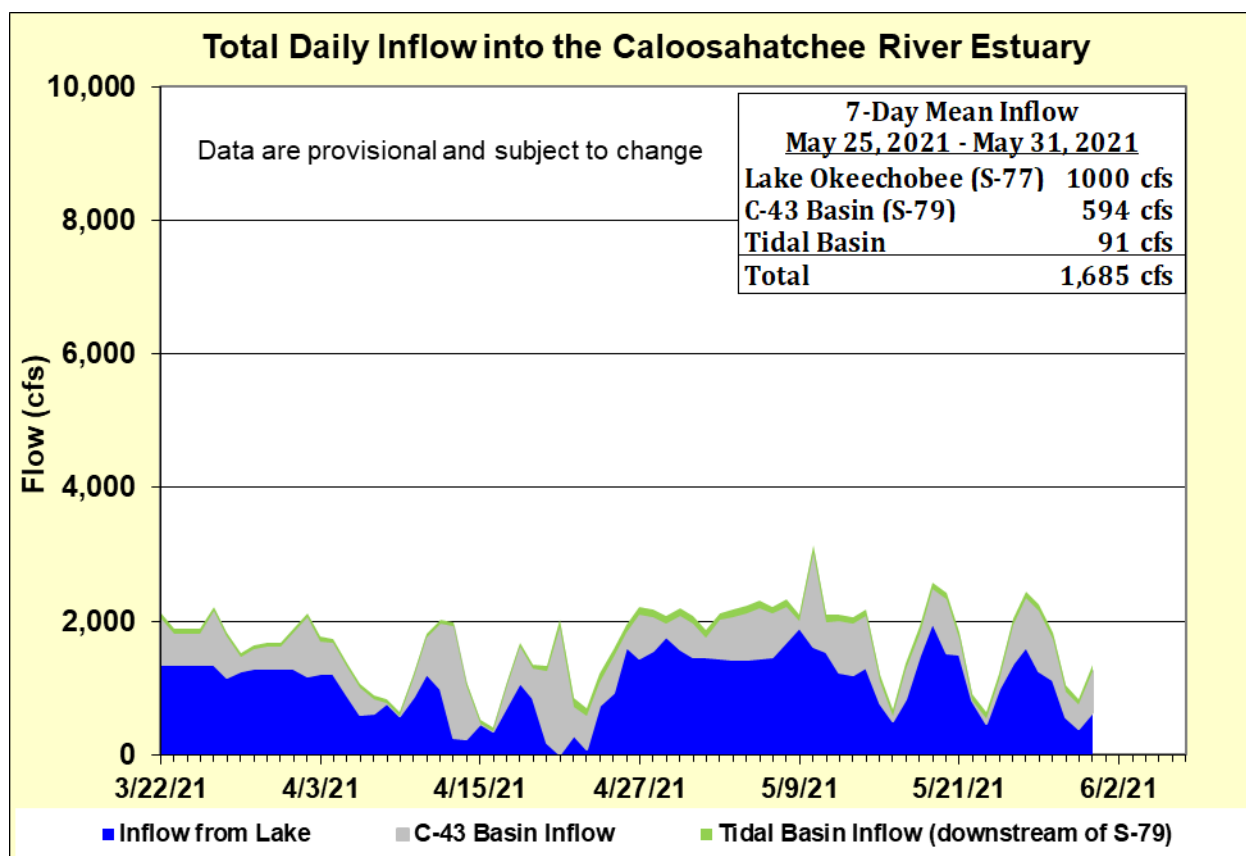


Figure ES-6. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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)	0.7 (0.8)	0.7 (0.8)	NA ^a
Val I-75	1.5 (0.9)	1.8 (1.3)	0.0 – 5.0 ^b
Fort Myers Yacht Basin	7.4 (6.8)	8.6 (8.9)	NA ^a
Cape Coral	15.2 (11.9)	16.9 (14.7)	10.0 – 30.0
Shell Point	29.8 (27.8)	30.1 (28.6)	10.0 – 30.0
Sanibel	33.7 (33.5)	34.2 (34.3)	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.

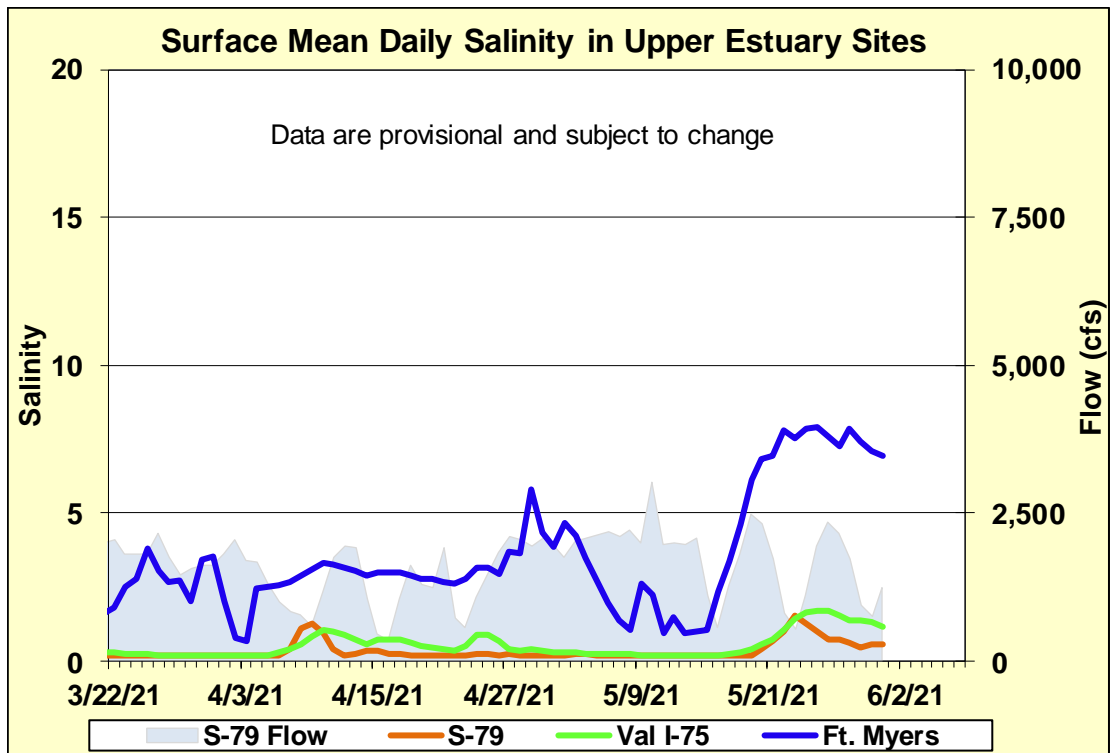


Figure ES-7. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

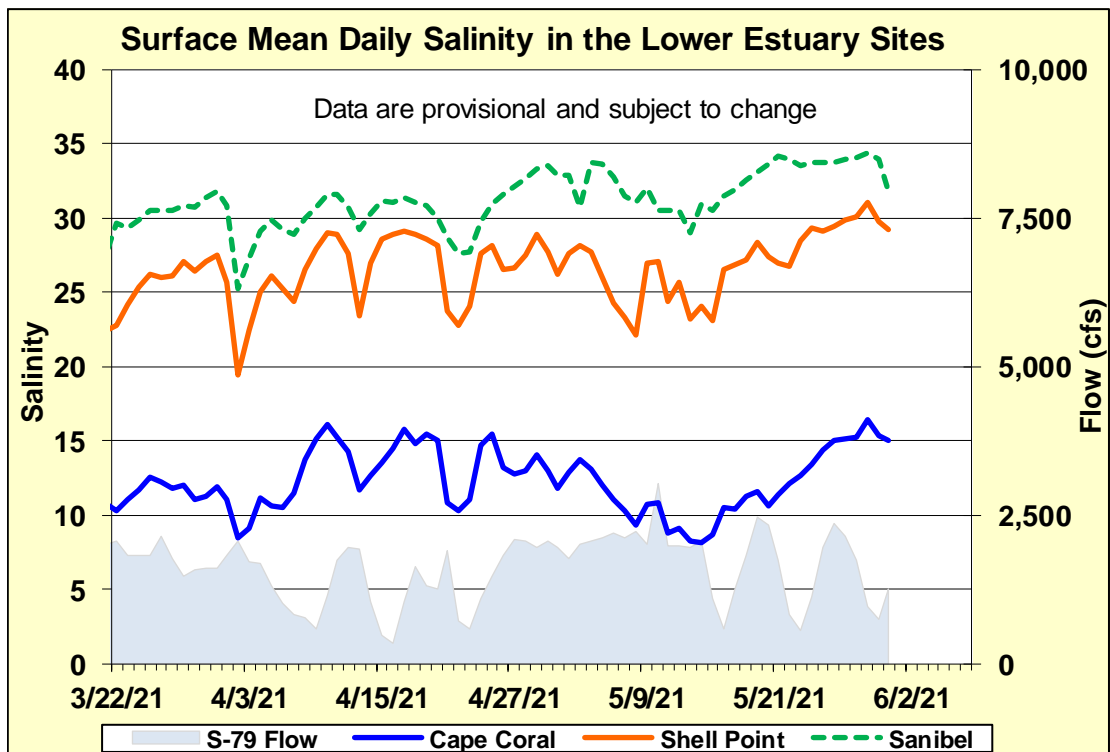


Figure ES-8. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

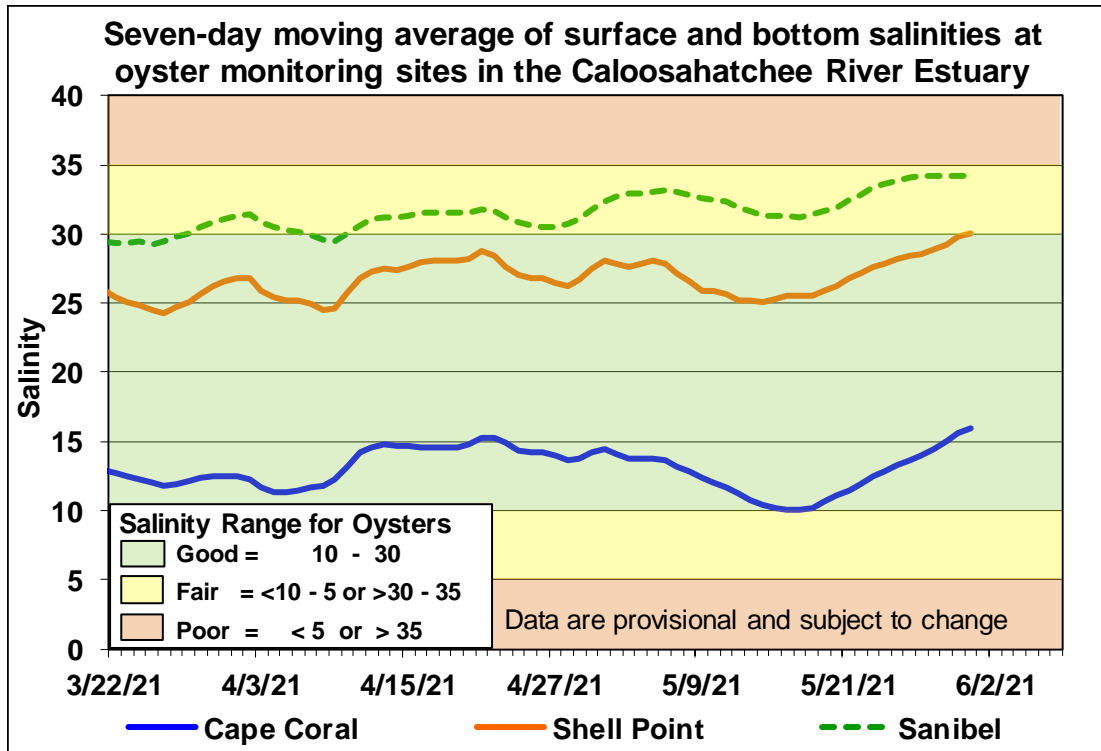


Figure ES-9. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

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	96	4.9	1.6
B	450	96	2.7	1.0
C	650	96	1.9	0.8
D	800	96	1.4	0.7
E	1000	96	0.9	0.6
F	1500	96	0.4	0.5
G	2000	96	0.3	0.4

Caloosahatchee River Estuary Flows and Salinity Observed and Forecast Salinity at Val I-75

S-79 = 0 cfs & TBR = 96 cfs

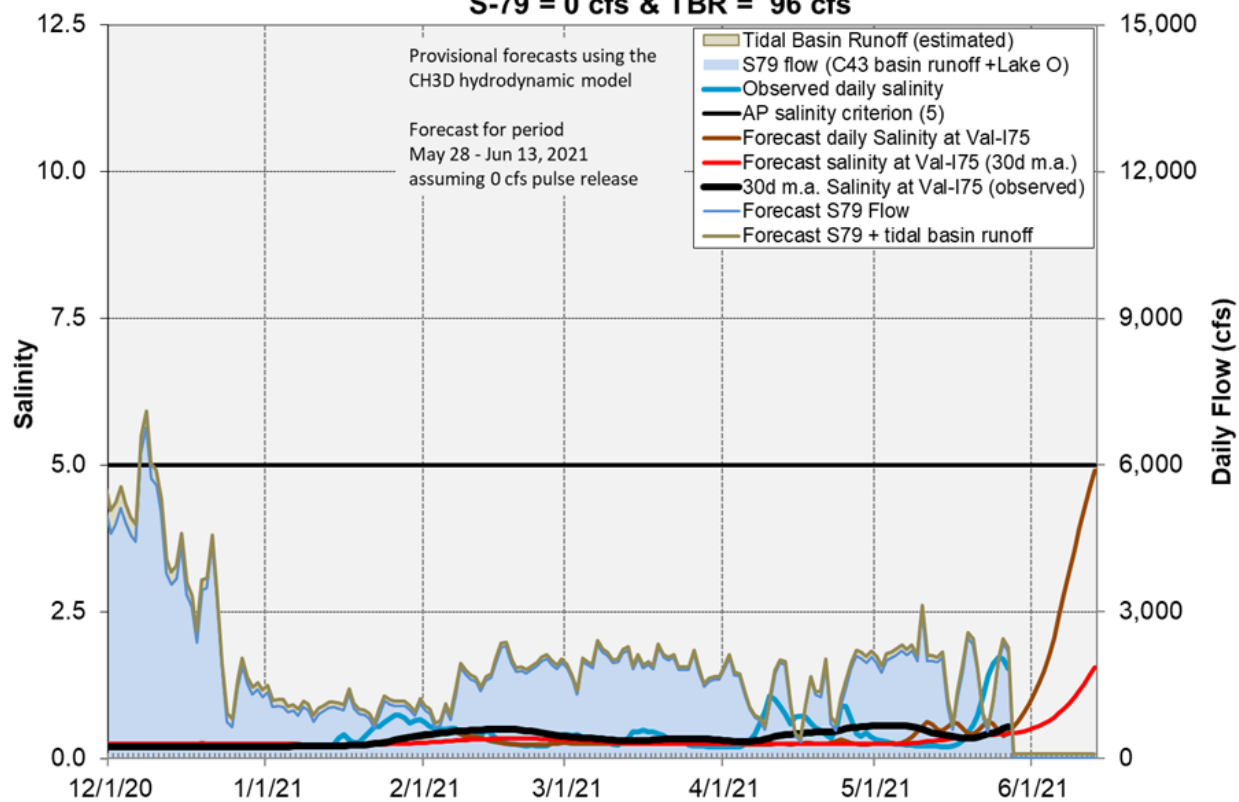


Figure ES-10. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

Stormwater Treatment Areas

STA-1E: STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7. Operational restrictions are in place in STA-1E Central Flow-way for vegetation management activities. Online treatment cells are at target stage, vegetation in these cells is highly stressed and the 365-day phosphorus loading rates (PLR) for these flow-ways are very high and extremely high (**Figure S-1**).

STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to construction activities. The Northern and Western Flow-ways and Cell 8 contain nests of Migratory Bird Treaty Act protected species. Treatment cells are at or below target stage. Vegetation in all flow-ways is highly stressed. The 365-day PLRs for all flow-ways are high to very high (**Figure S-2**).

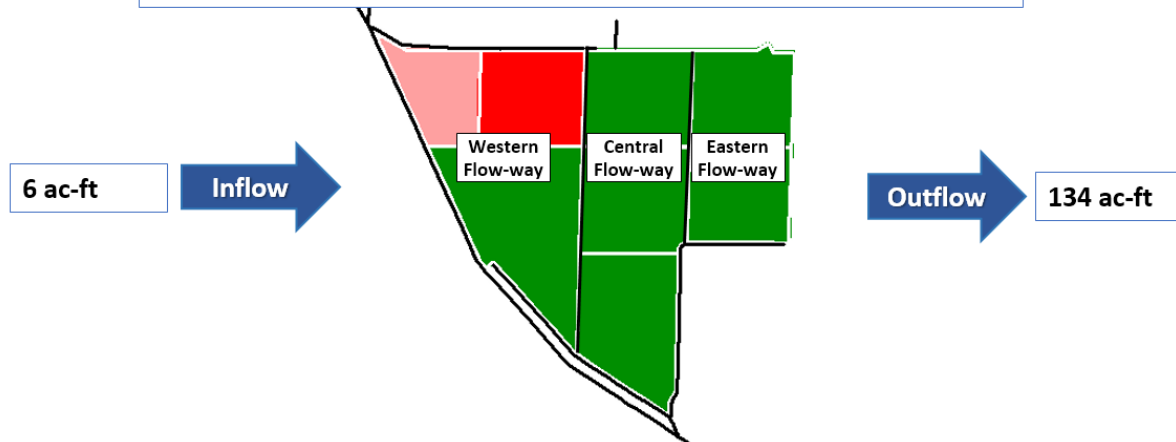
STA-2: Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities and in Flow-way 2 for construction activities. Most treatment cells are at or near target stage. Vegetation in Flow-ways 1, 2 and 3 is stressed, and in Flow-ways 4 and 5 is highly stressed. The 365-day PLRs for the flow-ways are at or below 1.0 g/m²/year except Flow-way 1 which is high and Flow-way 2 which is very high (**Figure S-3**).

STA-3/4: STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Operational restrictions are in place in STA-3/4 Western Flow-way for vegetation management activities. 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 all flow-ways are below 1.0 g/m²/year (**Figure S-4**).

STA-5/6: Operational restrictions are in place in STA-5/6 Flow-ways 2 and 3 following the Restoration Strategies project to grade non-effective treatment areas. Flow-way 6 contains a nest of a Migratory Bird Treaty Act protected species. Some treatment cells are at or near target stage while several cells are drying out. The 365-day PLRs for most flow-ways are near 1.0 g/m²/year. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8 which are healthy (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

STA-1E Weekly Status Report – 5/24/2021 through 5/30/2021












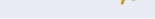
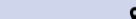




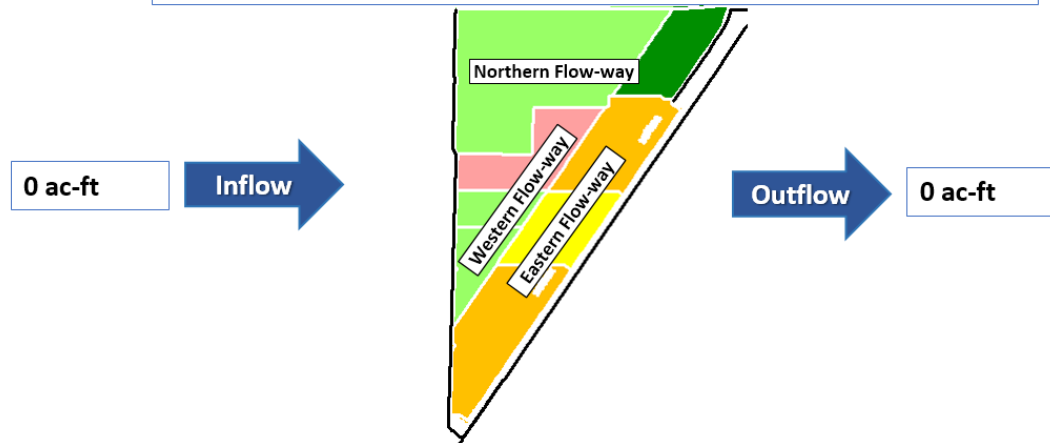
STA-1E Flow-Way Status				As of 5/30/2021				STA-1E Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed 	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal) 	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)					7-day	28-day	365-day
				 Deep Water Level (> 2.8' above TS)  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			Online	Depth / Area Based: Percent of Area Dry							
Central			Vegetation Rehab	 0-25% Dry	 50-75% Dry						
Western	Offline, construction activities starting 11/01/2019			 25-50% Dry	 75-100% Dry			Includes Preliminary Data			
								Total Inflow, ac-ft	6	2,077	308,085
								--Lake Inflow, ac-ft	0	N/A	25,700
								Total Outflow, ac-ft	134	735	268,956
								Inflow Conc., ppb	21	165	140
								Outflow Conc., ppb	26	33	38

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

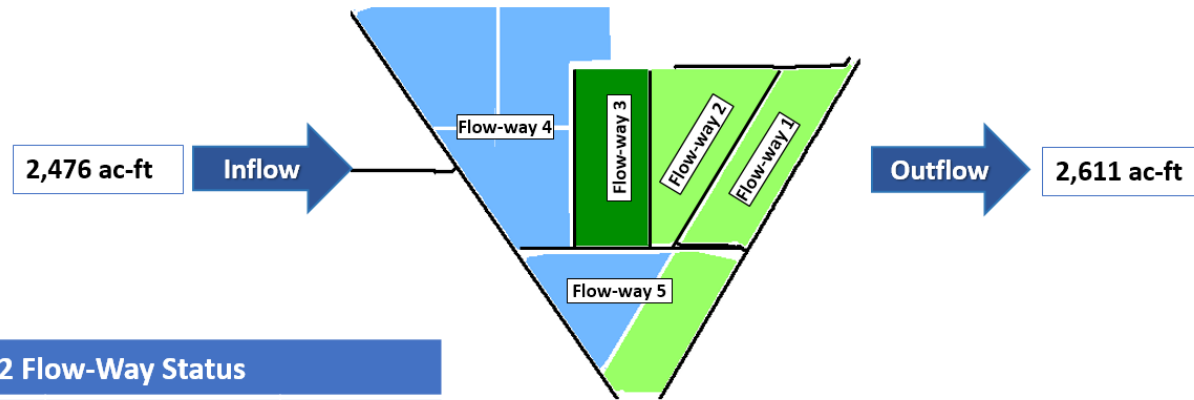
STA-1W Weekly Status Report – 5/24/2021 through 5/30/2021



STA-1W Flow-Way Status				As of 5/30/2021				STA-1W Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status <small>Healthy --- Stressed</small>	365-day P Loading Rate <small>(below 1.0 g P /m²/yr is optimal)</small>	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)					7-day	28-day	365-day
Northern			Construction / Avian Nesting		Deep Water Level (> 2.8' above TS)			Total Inflow, ac-ft	0	287	171,041
					High Water Level (1.5' – 2.8' above TS)						
					0.2' – 1.5' above TS						
Western			Construction / Avian Nesting		Target Stage (TS +/- 0.2')			Total Outflow, ac-ft	0	197	194,890
					Low Water Level (<0.2' below TS)						
				Depth / Area Based: Percent of Area Dry							
Eastern			Construction		0-25% Dry			Inflow Conc., ppb	N/A	120	259
					25-50% Dry						
					50-75% Dry						
					75-100% Dry			Outflow Conc., ppb	N/A	25	39
Includes Preliminary Data											

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

STA-2 Weekly Status Report – 5/24/2021 through 5/30/2021



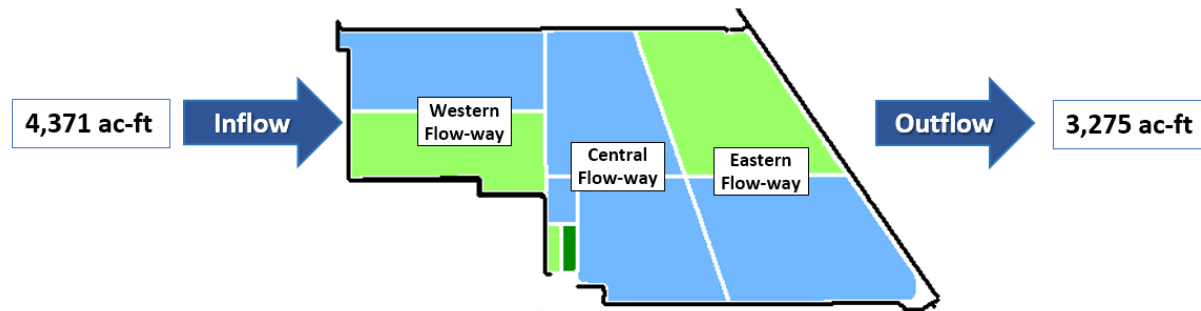
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P / m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2			Construction
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 5/30/2021	
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	2,476	14,651	426,997
--Lake Inflow, ac-ft	2,500	N/A	85,800
Total Outflow, ac-ft	2,611	11,485	488,985
Inflow Conc., ppb	91	81	97
Outflow Conc., ppb	13	16	21
Includes Preliminary Data			

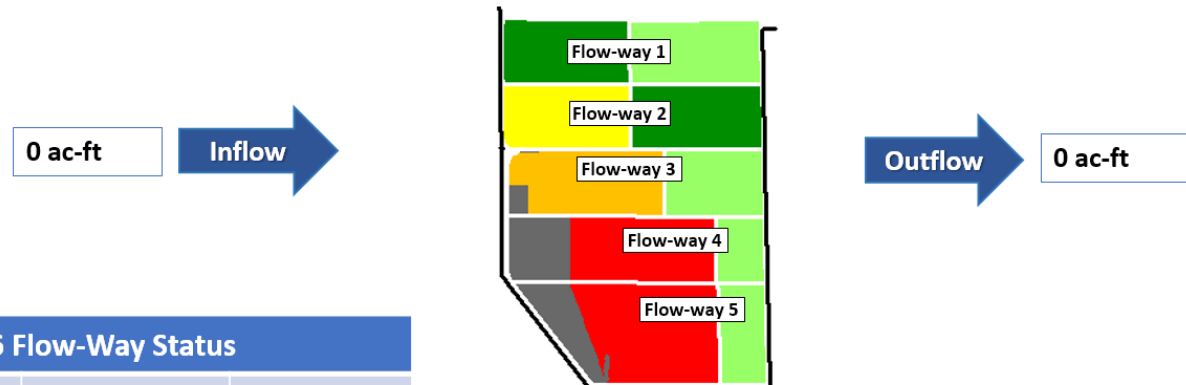
Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 5/24/2021 through 5/30/2021



STA-3/4 Flow-Way Status				STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status <div>Healthy ----- Stressed</div>	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	As of 5/30/2021			
				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			
Eastern	<div>Offline, vegetation management drawdown as of 3/1/2021</div>			Depth / Area Based: Percent of Area Dry			
				Target Stage (TS +/- 0.2')			
				Low Water Level (<0.2' below TS)			
				0-25% Dry			
				25-50% Dry			
Central	<div></div>	<div>1.0</div>	Online	50-75% Dry			
				75-100% Dry			
				Includes Preliminary Data			
Western	<div></div>	<div>1.0</div>	Vegetation Rehab				

STA-5/6 Weekly Status Report – 5/24/2021 through 5/30/2021



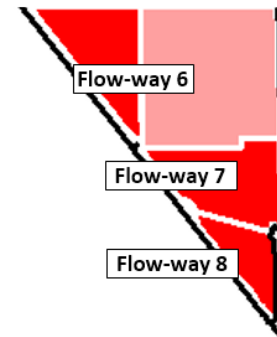
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1	← →		Online
2	← →	N/A	Post-construction
3	← →	N/A	Post-construction
4	← →		Online
5	← →		Online

As of 5/30/2021	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-5/6 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	0	0	130,114
--Lake Inflow, ac-ft	N/A	N/A	N/A
Total Outflow, ac-ft	0	15	152,543
Inflow Conc., ppb	N/A	N/A	281
Outflow Conc., ppb	N/A	24	79
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 5/24/2021 through 5/30/2021



STA-5/6 Flow-Way Status				As of 5/30/2021	
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)	
				<div style="display: flex; flex-direction: column; align-items: center;"> <div style="width: 15px; height: 15px; background-color: purple; margin-bottom: 5px;"></div> Deep Water Level (> 2.8' above TS) <div style="width: 15px; height: 15px; background-color: blue; margin-bottom: 5px;"></div> High Water Level (1.5' – 2.8' above TS) <div style="width: 15px; height: 15px; background-color: lightblue; margin-bottom: 5px;"></div> 0.2' – 1.5' above TS <div style="width: 15px; height: 15px; background-color: green; margin-bottom: 5px;"></div> Target Stage (TS +/- 0.2') <div style="width: 15px; height: 15px; background-color: lightgreen; margin-bottom: 5px;"></div> Low Water Level (<0.2' below TS) </div>	
6	←-----→		Online / Avian Nesting	Depth / Area Based: Percent of Area Dry <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div> <div style="width: 15px; height: 15px; background-color: yellow; margin-bottom: 5px;"></div> 0-25% Dry <div style="width: 15px; height: 15px; background-color: orange; margin-bottom: 5px;"></div> 25-50% Dry </div> <div> <div style="width: 15px; height: 15px; background-color: pink; margin-bottom: 5px;"></div> 50-75% Dry <div style="width: 15px; height: 15px; background-color: red; margin-bottom: 5px;"></div> 75-100% Dry </div> </div>	
7	←-----→		Online		
8	←-----→		Online		

Figure S-6. STA-5/6 Weekly Status Report (Flow-ways 6 – 8)

Basic Concepts and Definitions for STA Weekly Status Report

- **Inflow:** Sum of flow volume at all inflow structures to an STA.
- **Lake Inflow:** Portion of the STA total inflow volume that originates from Lake Okeechobee.
- **Outflow:** Sum of flow volume at outflow structures from an STA.
- **Total Phosphorus (TP):** Total mass of phosphorus in all its forms; including particulate, dissolved, etc.
- **Inflow Concentration:** TP concentration is the mass of TP in micrograms per liter of water, $\mu\text{g/L}$ or ppb. Inflow concentration refers to the flow-weighted mean TP from all inflow structures over a period of time.
- **Outflow Concentration:** The flow-weighted mean TP from all outflow structures over a period of time. The outflow concentration represents the reduction of inflow TP achieved by STA treatment of the inflow water.
- **WQBEL:** The STA outflow concentration that is required upon completion of the Restoration Strategies projects by December 2025. The outflow concentration shall not exceed 13 ppb as an annual flow weighted mean in more than 3 out of 5 water years on a rolling basis and shall not exceed 19 ppb as an annual flow weighted in any water year.
- **Flow-Way (FW):** One or more treatment cells connected in series. Cells typically have emergent aquatic vegetation (EAV) in the front portion of the flow-way followed by a mix of EAV and submerged aquatic vegetation (SAV)
- **Vegetation Status:** Healthy means the vegetation condition is good and will allow the STA to perform as designed. Stressed means the vegetation is showing signs of poor health, such as browning or areas of vegetation die-off, or the cell contains undesirable vegetation such as floating exotic vegetation requiring treatment. The TP reduction capability of the STA is affected when the vegetation condition is poor.
- **Phosphorus Loading Rate (PLR):** Mass of inflow TP in grams, divided by total treatment area of STA in square meters, per year. In general, a 365-day value of less than 1.0 is needed for an STA to perform optimally. A PLR of 2.0 is considered very high and a PLR of 3.0 is considered extremely high. The TP reduction capability of the STA is affected when the PLR is high, very high and extremely high.
- **Online:** Online status means the FW can receive and treat inflow.
- **Online with Restriction:** The FW can receive and treat inflow, but the amount of flow or water level may be limited temporarily. For example, a vegetation rehabilitation effort may require reduced flows through an area while the new plants are establishing, or nesting by protected species may require a certain water level not to be exceeded.
- **Offline:** The FW is unable to receive and treat inflow due to repairs, construction, or other prohibitive reasons.
- **Depth:** Difference between the average surface water level in a cell and the average ground elevation in that cell. Target depths, or depths between flow events, are between 1.25 ft to 1.5 ft. As depth approaches or drops below zero, an increasing percentage of the cell is considered dry and STA conditions deteriorate. An increase in depth above target depth is expected with increasing flow. However, as depth increases much above the target depth and is sustained over a period of time, it can be detrimental to vegetation health and overall STA treatment performance.
- **Note:** The data provided in this summary report were developed using a combination of provisional and quality-assured flow and water quality data. In some cases, best professional judgment was used to estimate missing data and revise questionable data. Values provided are not considered final but are appropriate for use in STA operational decision-making.

Everglades

Water Conservation Area Regulation Schedules

WCA-1: Stage at the 1-8C Gauge continued on its previous track last week. On Sunday stage was below the flat Zone A1 regulation line by 0.44 feet. WCA-2A: Stage at S11B-HW fell sharply last week, 0.71 feet below the regulation line on Sunday. WCA-3A: The Three Gauge Average continue to fall away from the Zone A regulation line last week. On Sunday stage was 1.0 feet below the falling Zone A line and the 3-69W gauge remains below the water supply floor. WCA-3A: Stage at gauge 62 (Northwest corner) made a sharp upwards turn last week. The average on Sunday was 2.06 feet below the rising Upper Schedule. (**Figures EV-1 through EV-4**).

Water Depths

The WDAT tool for spatial interpolation of water depth monthly snapshots indicate that WCA-3A North is getting very dry, nearly all of the sub-basin has water depths significantly below ground. North to South hydrologic connectivity remains in Shark River Slough (SRS) in Everglades National Park (ENP) as conditions are dry in the Taylor Slough area and in Big Cypress National Preserve (BCNP). (**Figure EV-5**). Comparing WDAT water levels from present, over the last month stages fell significantly in central WCA-1 and WCA-3A from Mullet Slough in the west to the upper reaches of the L-67 levees. Looking back one year conditions are trending significantly drier in the central WCAs, BCNP and ENP on either side of SRS. (**Figure EV-6**).

Wading Birds

Nesting continues and foraging conditions near all the major colonies are currently excellent. Tens of thousands of birds are currently foraging in WCA-3A South. The likely only constraint to nesting success will be the timing of the start of the wet season and the first major reversal. In ENP juvenile Wood Storks and Roseate Spoonbills are now beginning to leave their nests for the nearby marshes. The provisional estimate of total nests in the Everglades in 2021 is approximately 81,000 nests, which is more than double the 10-year average and early nesting success looks very favorable.

Taylor Slough and Florida Bay

Next to no rain fell over Taylor Slough and Florida Bay for the week ending Sunday (5/30). The Slough averaged a 0.25 foot decrease over the week with the Upper Taylor Slough area approaching 2 feet below ground level (**Figures EV-7 and EV-8**). Depths are now at 2.5 inches below average overall with the northern areas approaching 18 inches below average. The drier that the Slough gets, the longer it will take to rehydrate the marsh to facilitate transference of freshwater to Florida Bay once the wet season starts. As of now, it will likely take 2 to 3 weeks to facilitate flow to the Florida Bay shoreline.

Salinities in Florida Bay averaged an increase of 2 over the week ending Sunday (5/30) and was still 2 lower than the average condition for this time of year. However, an eastern nearshore embayment (JB) increased as much as 8 psu over the week likely aided by

upstream flows (**Figure EV-7**). The Bay is still positioned very well to minimize hypersalinity extremes and duration before the rainy season begins (**Figure EV-9**).

Florida Bay MFL: The TR station in the mangrove zone (tracked for the Florida Bay MFL) rose rapidly from 3 to 15 over the week ending 5/30 (**Figure EV-10**). The 30-day moving average decreased 0.2 over the week to end at 5.0. Weekly flow from the 5 creeks monitored for the Florida Bay MFL totaled about -7,700 acre-feet with negative flows persisting all week (see inset on **Figure EV-10**). The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) decreased 10,000 acre-feet over the week to end at 420,221 acre-feet on Sunday, 5/30. The 365-day cumulative flows remain higher than the 95th percentile of historical data (390,830 acre-feet). Creek flows are provisional USGS data.

Water Management Recommendations (Table EV-2)

Moderating reversals in WCA-1 and WCA-3A South for the duration of the wading bird nesting season will prevent potential large-scale nestling mortality. Flows into northern WCA-3A, with a particular focus on the northeastern region downstream of S -150 have a great ecological benefit at this time in the dry season. Maintaining and moderating the current recession rates in WCA-3A South will continue to provide good foraging conditions for wading birds nesting in the colonies within that basin as the drying front moves from the northwest to the southeast, concentrating prey. Maintaining a moderate recession in WCA-2B may prove important to wading birds over the next few weeks as they remain foraging in that basin last week. Flows that initiate a rehydration of northern Taylor Slough have within and downstream ecological benefit.

Table EV-2. Previous week's rainfall and water depth changes in Everglades regions.

Everglades Region	Rainfall (inches)	Stage (feet)	change
WCA-1	0.11	-0.17	
WCA-2A	0.37	-0.16	
WCA-2B	0.05	-0.25	
WCA-3B	0.68	+0.09	
ENP	0.19	-0.16	

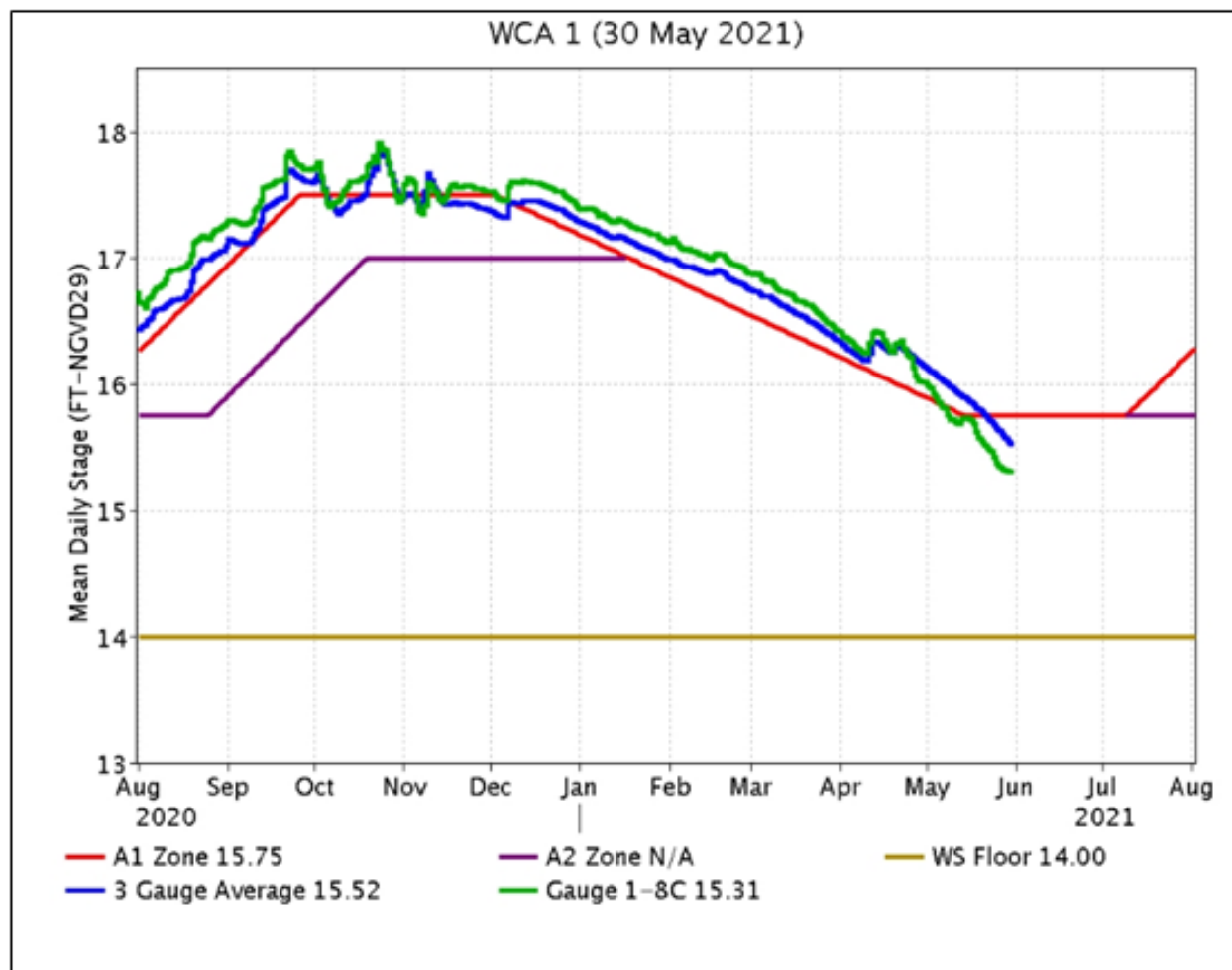


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.



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

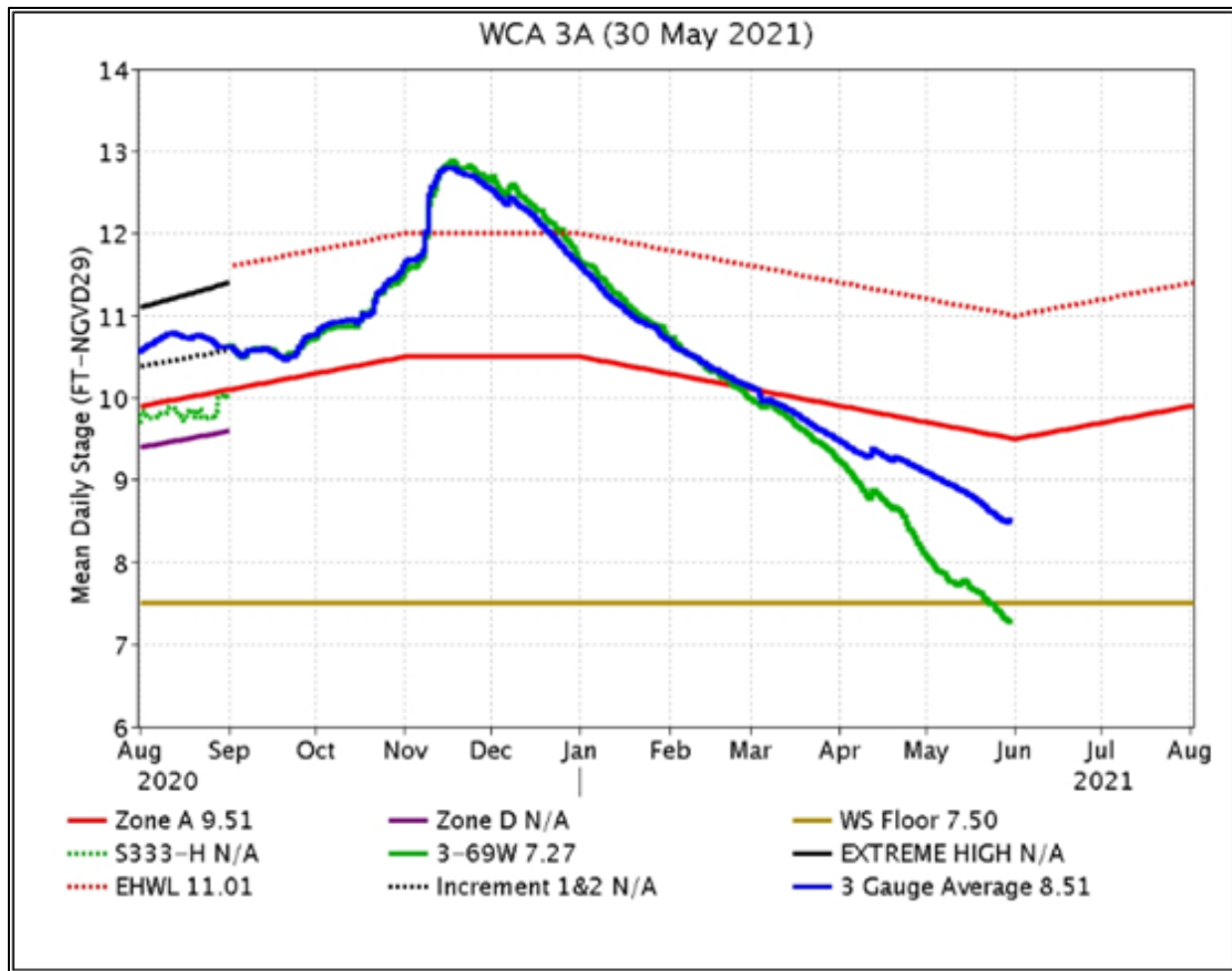


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

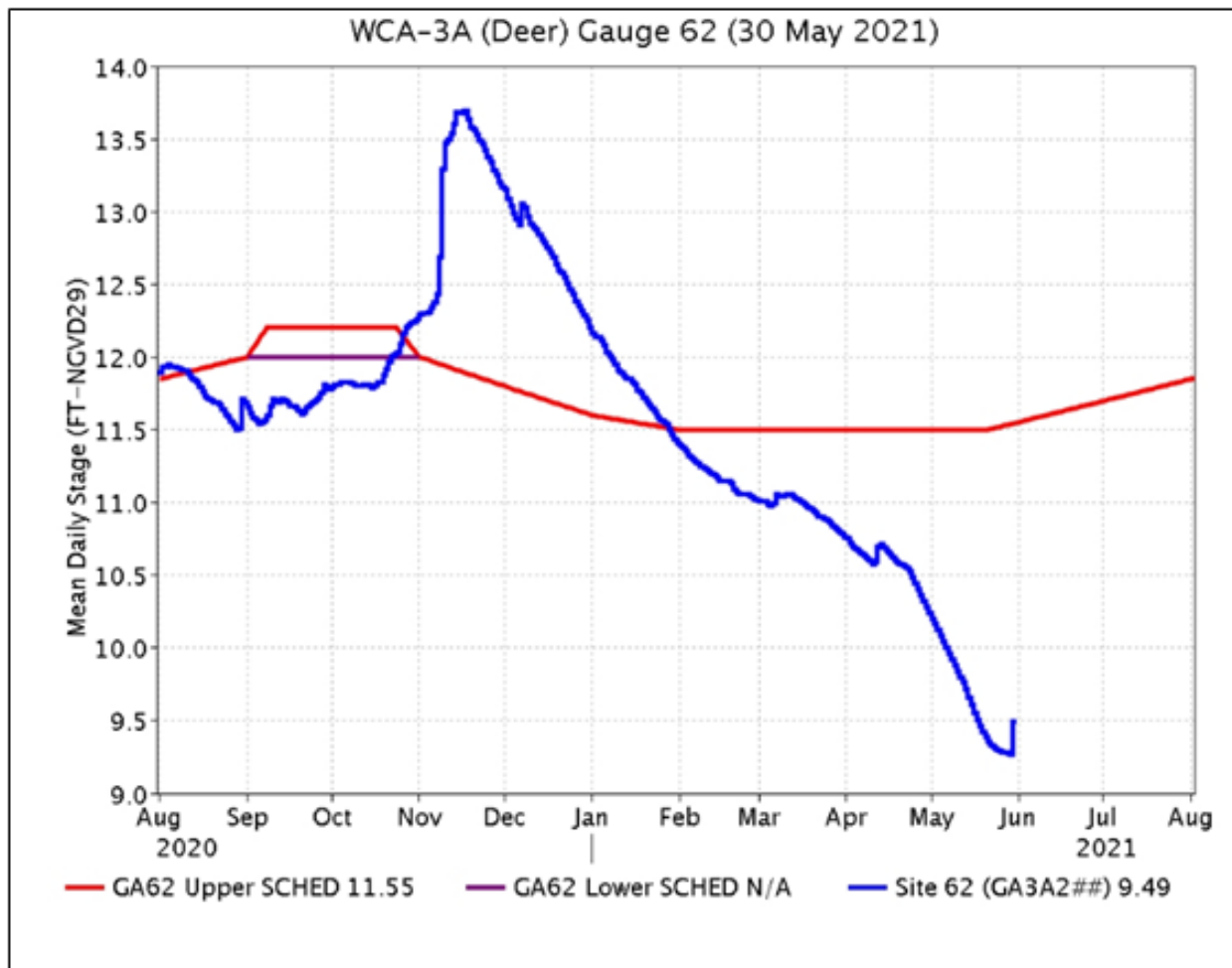


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

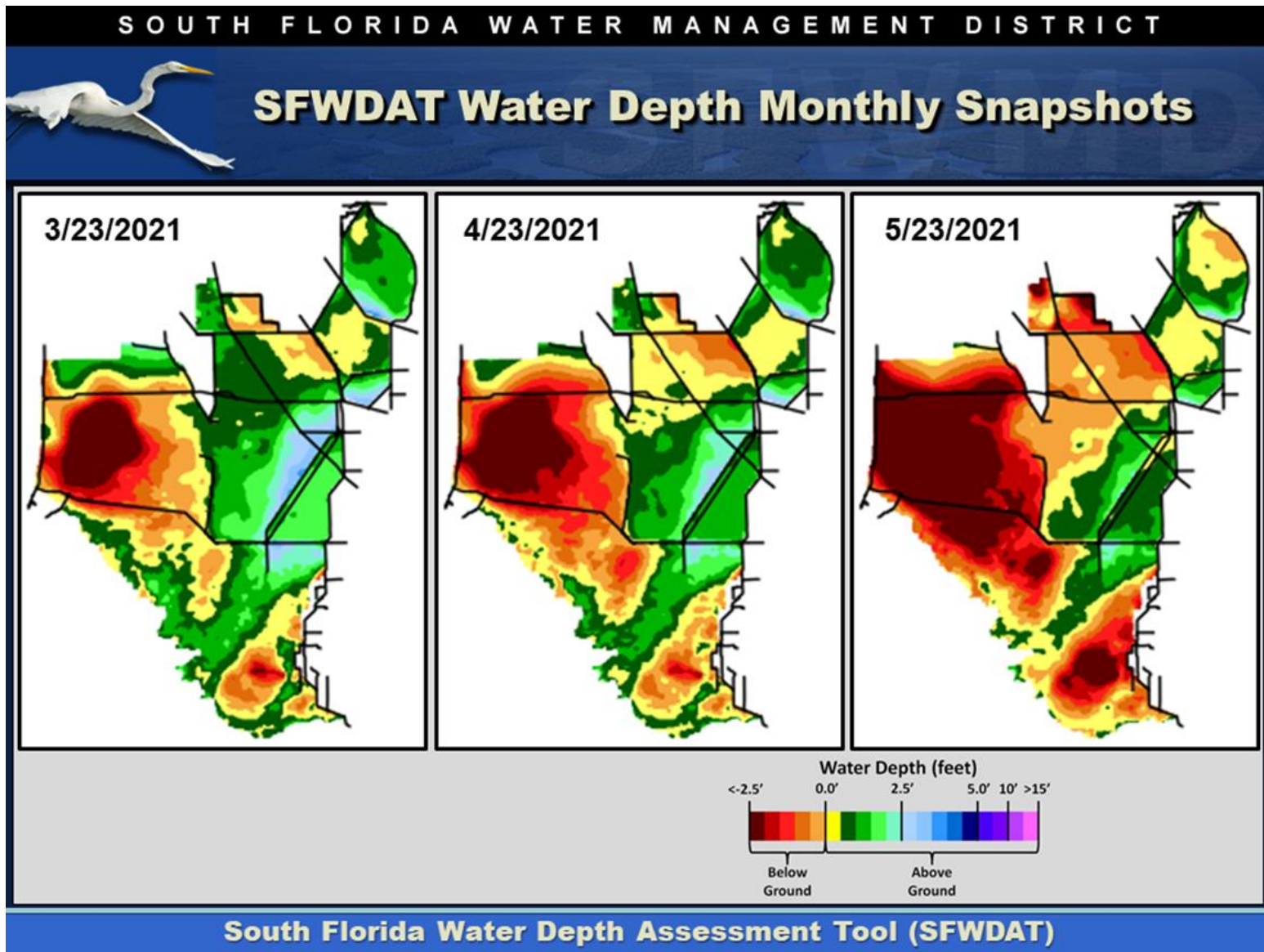


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

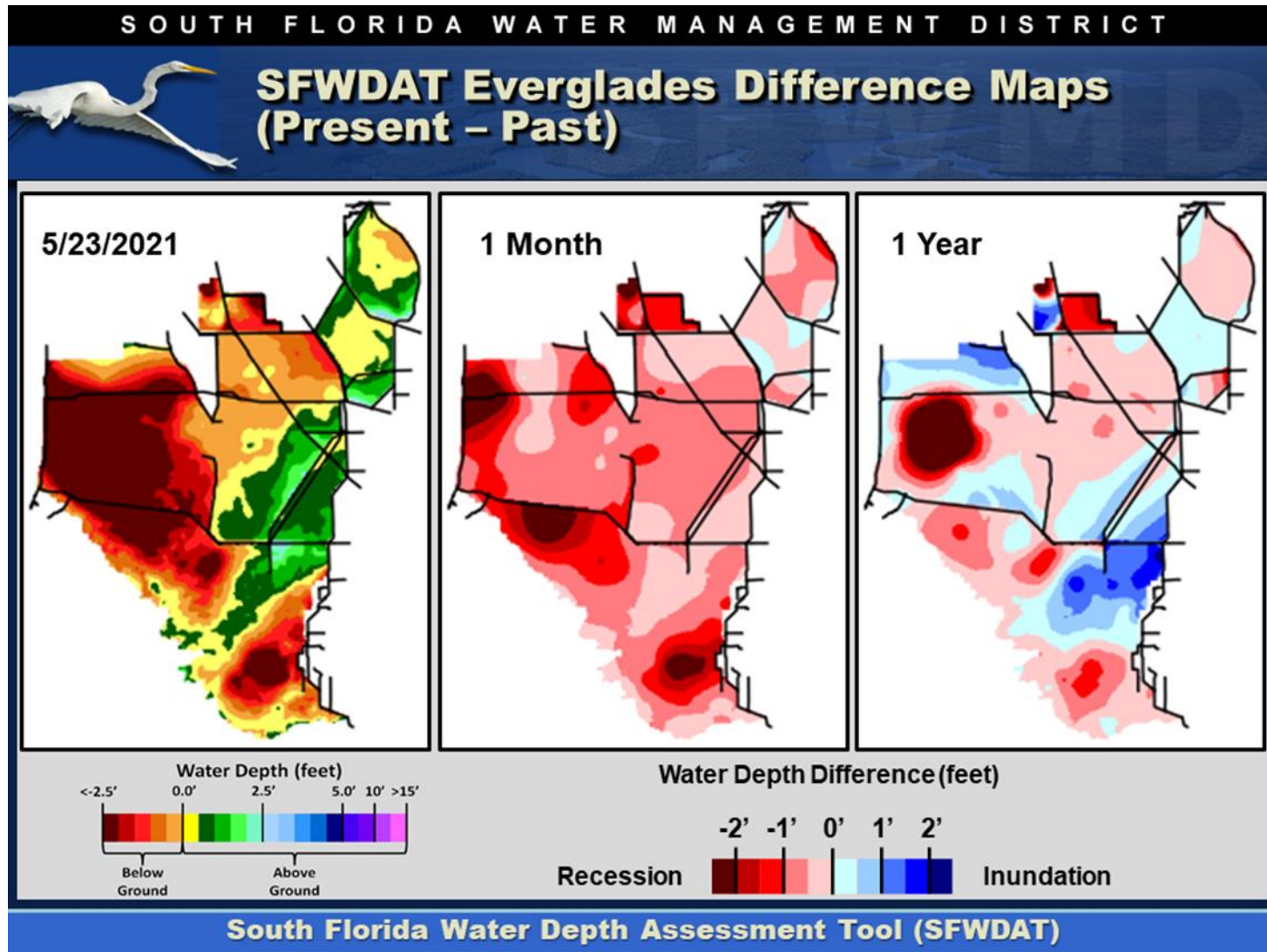


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

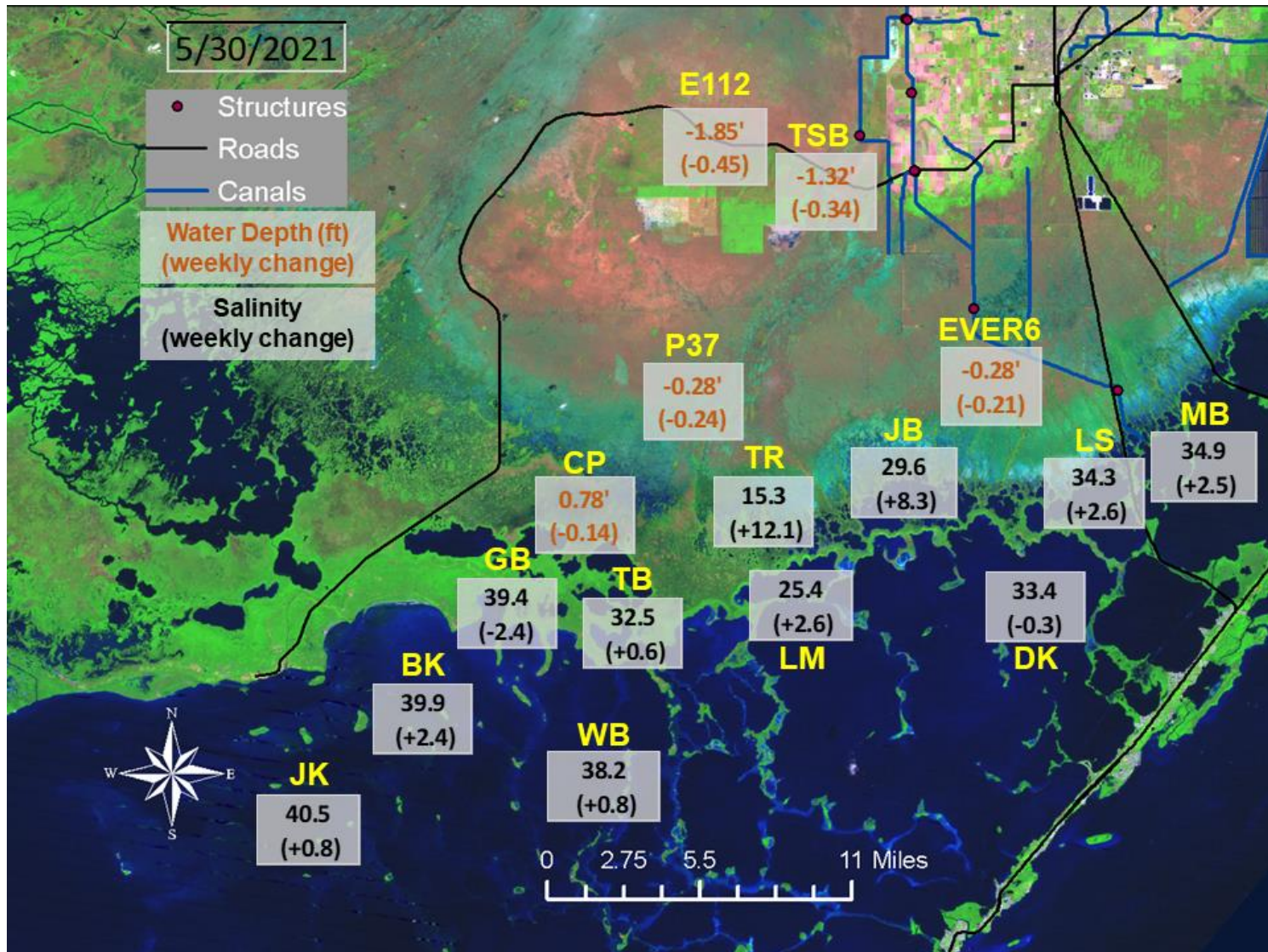


Figure EV-7. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

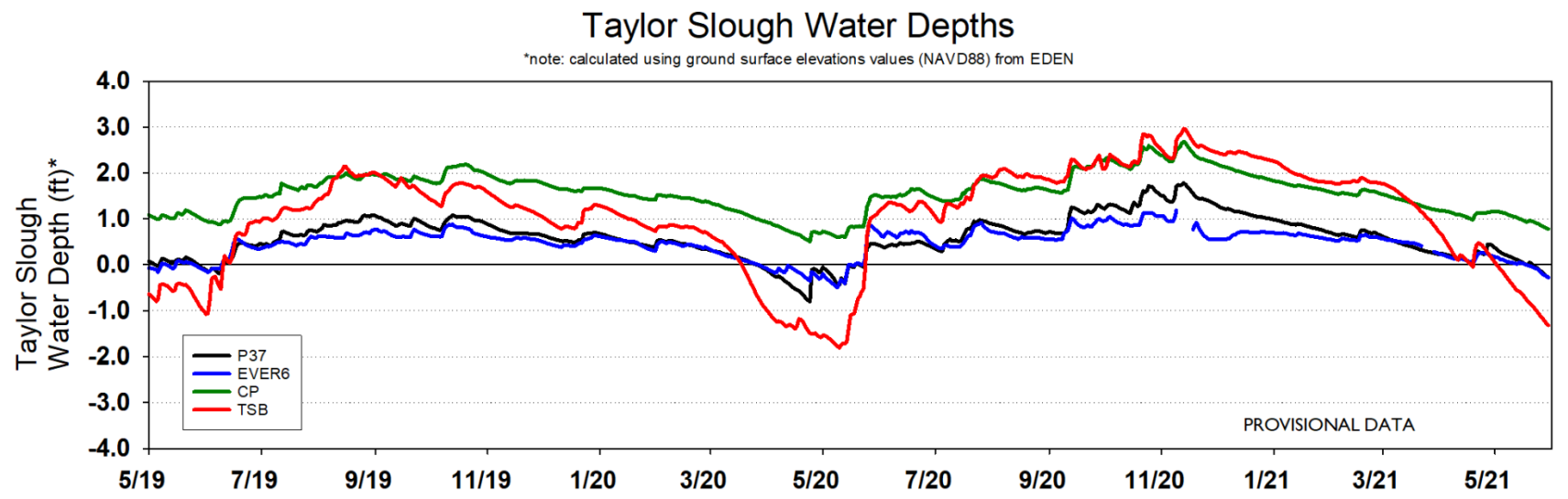


Figure EV-8. Taylor Slough water depth time series.

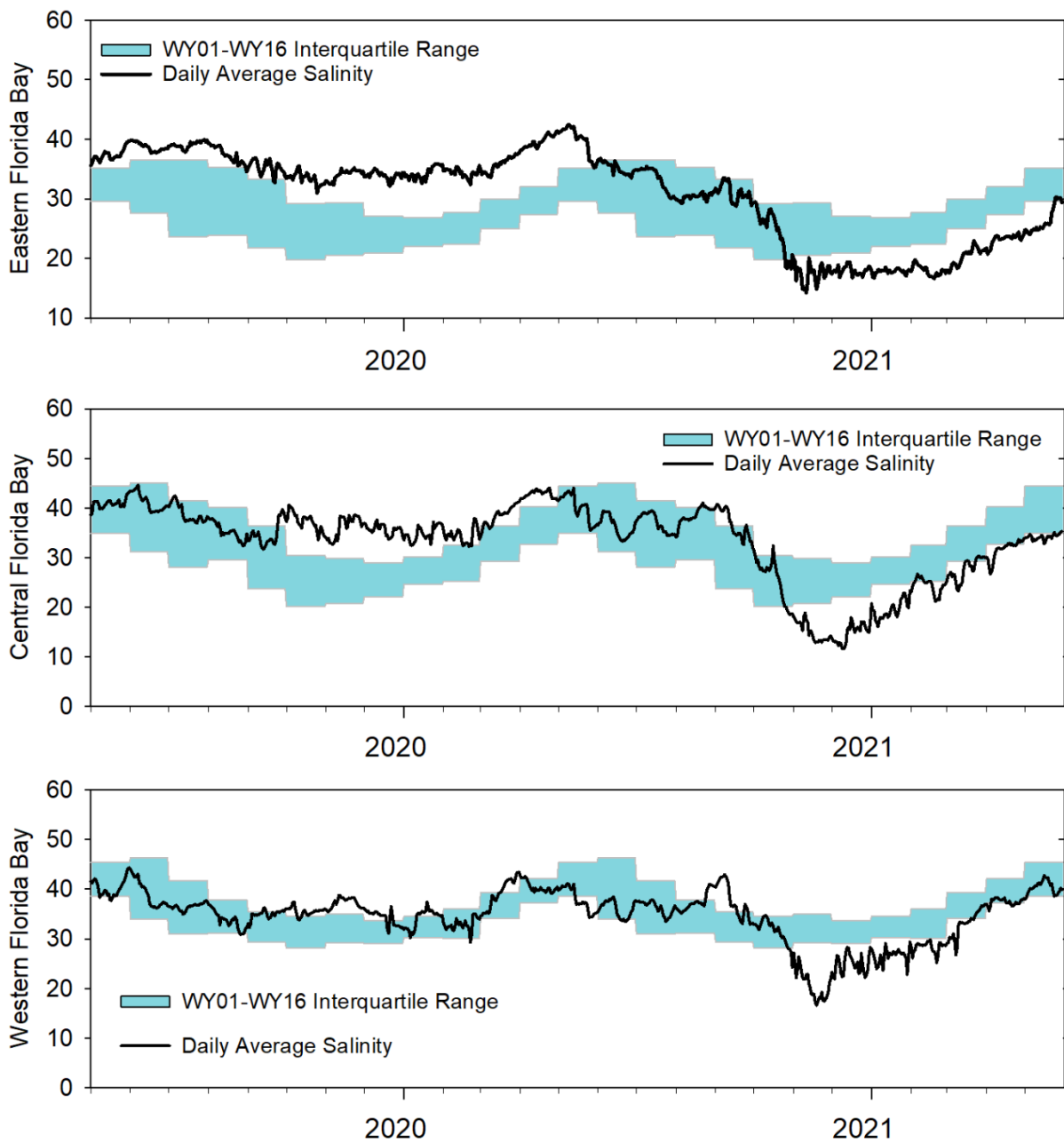


Figure EV-9. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

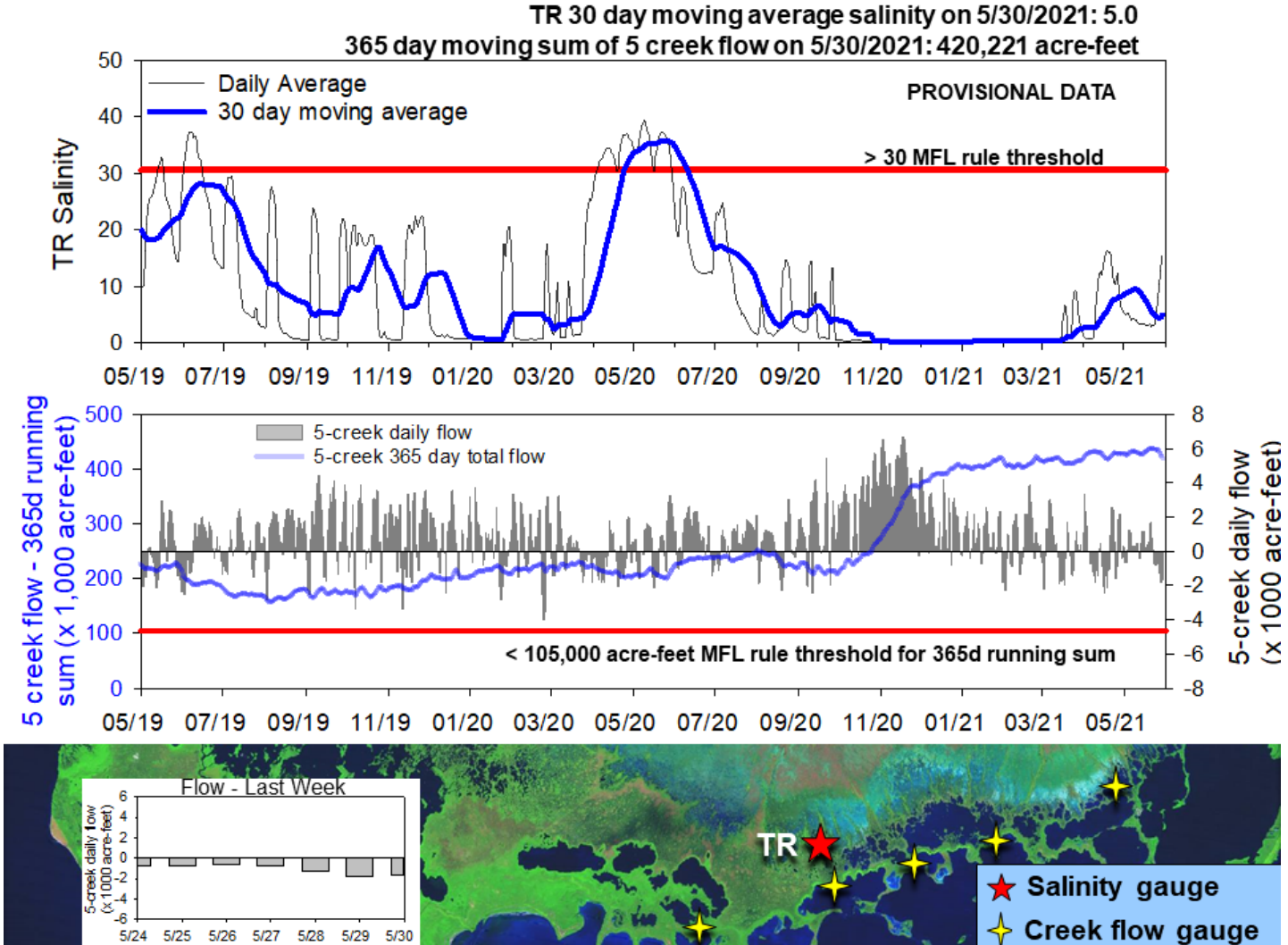


Figure EV-10. Top panel: Taylor River 30-day moving average salinity (blue), daily average salinity (gray) with salinity threshold; middle panel: Five-creek total flow for past 365 days (blue), daily flow (gray) with 365-day flow threshold; bottom panel: map of monitoring locations for the five creeks.

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

SFWMD Everglades Ecological Recommendations, June 1st, 2021 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.17'	Maintain marsh stage slightly above and parallel to the regulation schedule. Moderate any reversal as possible.	Protect within basin and downstream habitat and wildlife. Protect wading bird foraging.
WCA-2A	Stage decreased by 0.16'	Maintain marsh stage 0.5 feet above and parallel to the regulation schedule.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage decreased by 0.25'	Moderate the recession rate to near 0.05 to 0.07 feet per week.	Protect within basin wading bird foraging.
WCA-3A NE	Stage decreased by 0.11'	Moderate the recession rate to near 0.05 to 0.07 feet per week.	Protect within basin habitat and wildlife. Inflows and optimal recession rates preserve peat soils.
WCA-3A NW	Stage increased by 0.62	Moderate the recession rate to near 0.05 to 0.07 feet per week.	
Central WCA-3A S	Stage decreased by 0.09'	Maintain the recession rate at near .10 feet per week.	Protect within basin wading bird foraging.
Southern WCA-3A S	Stage decreased by 0.08'		
WCA-3B	Stage decreased by 0.16'	Moderate the recession rate to near .05 to .07 feet per week.	Protect within basin habitat and wildlife.
ENP-SRS	Stage decreased by 0.17'	Make discharges to the Park according to COP and TTF protocol while considering upstream and downstream ecological conditions.	Protect within basin and upstream habitat and wildlife from flooding stress.
Taylor Slough	Stage changes ranged from -0.14' to -0.45'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -2.4 to +8.3	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.