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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 9, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

The combination of an upper level high pressure ridge extending over the Florida peninsula from the southwest and an upper level trough east of the Bahamas is bringing a dry pattern to the area. Steering winds from the southeast and east will produce a cycle of widely scattered night and morning light showers east and scattered afternoon and evening showers and a few thunderstorms west. Some moisture will begin to return to the area Thursday and Friday as an upper level low develops in the western and central Gulf of Mexico. Daily thunderstorm coverage will decrease some Thursday and Friday. A weak upper level low is forecast to move from north Florida to off the east-central coast of Florida Saturday, followed by a trough digging into southeast US and Florida Sunday and early next week. Daily thunderstorm coverage is forecast to increase Saturday and Sunday and then increase to near seasonal levels Monday and Tuesday. Total rainfall over the first 7-day period (Week 1) is forecast to be below the historical average. While daily thunderstorm coverage is forecast to increase during the second 7-day period (Week 2), total rainfall is forecast to be below the historical average during Week 2.

Kissimmee

Stages in East Lake Toho, Toho and Kissimmee-Cypress-Hatchineha have begun to rise over the first week of wet season. 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 June 6. Dissolved oxygen concentration in the Kissimmee River averaged 7.5 mg/L for the week, well above the 2.0 mg/L threshold considered harmful to sportfish.

Lake Okeechobee

Lake Okeechobee stage was 12.75 feet NGVD on June 6, 2021, 0.06 feet lower than last week and 1.09 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 about 30% of the time since January 1, 2021. Recession rates decreased recently. Recent satellite imagery (June 5, 2021) shows a medium to high bloom potential in the northwestern to northeastern parts of the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged approximately 485 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities increased at the US1 Bridge and remained similar at HR1 and the 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 1,341 cfs over the past week with approximately 646 cfs coming from the Lake. Mean surface salinities increased at S-79 and decreased 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, June 6, 2021, approximately 5,800 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 42,100 ac-feet. The total amount of inflows to the STAs in WY2022 is approximately 50,700 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 nesting continues as White Ibis fledge and Wood Storks move into marshes near colonies. Foraging conditions remain good in WCA-3A South, central WCA-1 and in Shark River Slough (SRS) and Taylor Slough (TS) within Everglades National Park (ENP). The likely only constraint to the nesting season will be the timing of the start of the wet season, which usually results in reduced nesting efforts. Dry conditions dominate WCA3A North, that area was closed to public access May 18, 2021 and the closure was extended to Holey Land and Rotenberger WMAs on June 1. Florida Bay remains well positioned to minimize hyper-salinity before the wet season begins.

Supporting Information

Kissimmee Basin

Upper Kissimmee

Lake stages on June 6, 2021 were 55.0 feet NGVD (1.5 feet below schedule) in East Lake Toho, 52.1 feet NGVD (1.4 feet below schedule) in Lake Toho, and 50.2 feet NGVD (0.8 feet above schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**). Lake stages have begun to rise over the first week of wet season.

Lower Kissimmee

Kissimmee River (headwater) stages were 46.5 feet NGVD at S-65A and 25.7 feet NGVD at S-65D on June 6, 2021, while discharges were 390 cfs at S-65, 300 cfs at S-65A, 270 cfs at S-65D and 270 cfs at S-65E (**Table KB-2**). Dissolved oxygen concentration in the Kissimmee River averaged 7.5 mg/L for the week ending on June 6, 2021, 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 June 6 (**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 KCH, 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)	
							6/6/21	5/30/21
Lakes Hart and Mary Jane	S-62	LKMJ	0	59.4	R	60.0	-0.6	0.0
Lakes Myrtle, Preston and Joel	S-57	S-57	0	59.9	R	61.0	-1.1	-0.1
Alligator Chain	S-60	ALLI	10	62.0	R	63.2	-1.2	0.0
Lake Gentry	S-63	LKGT	17	59.5	R	61.0	-1.5	0.0
East Lake Toho	S-59	TOHOE	6	55.0	R	56.5	-1.5	-0.1
Lake Toho	S-61	TOHOW S-61	21	52.1	R	53.5	-1.4	-0.1
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	355	50.2	R	51.0	-0.8	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.

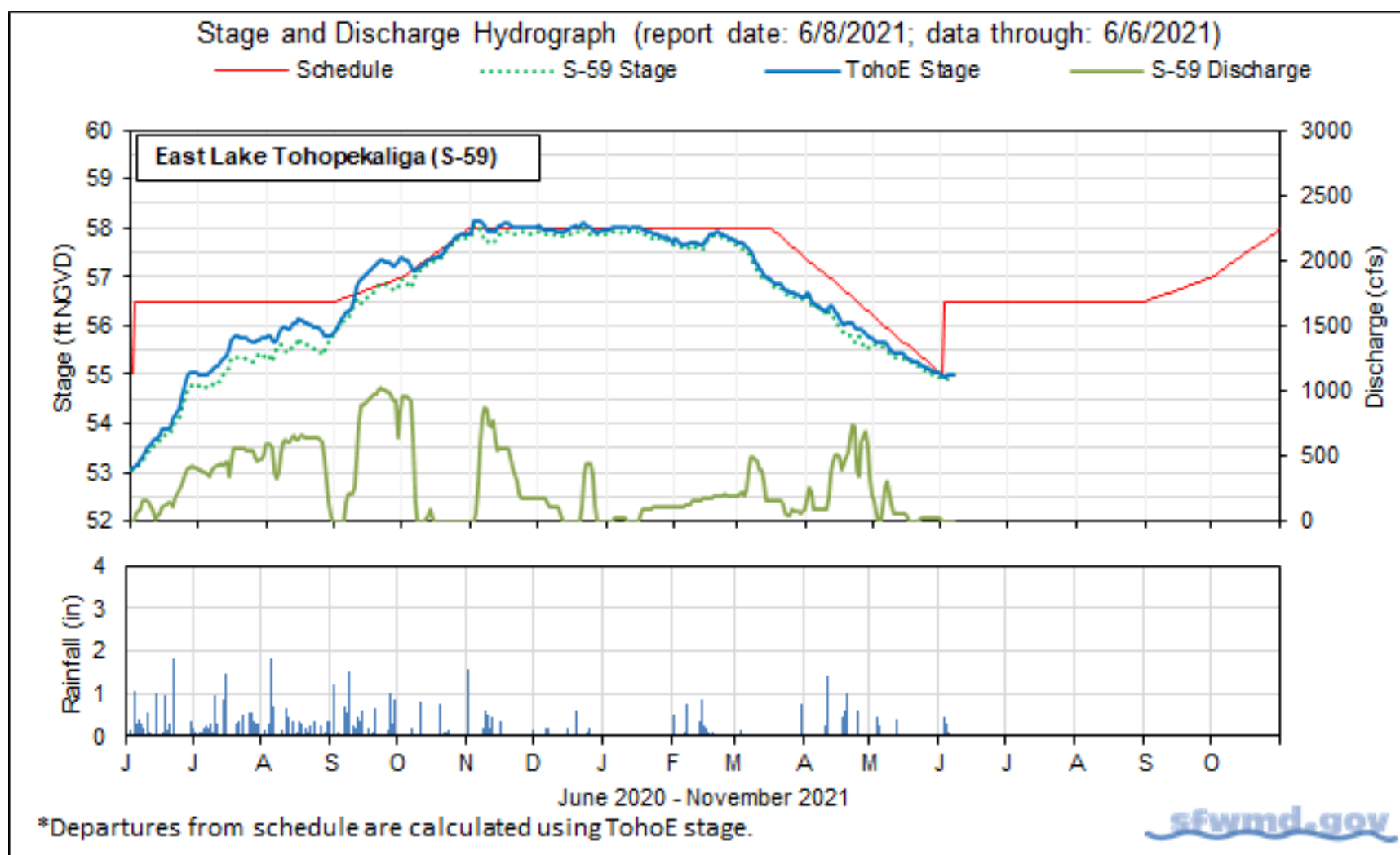


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

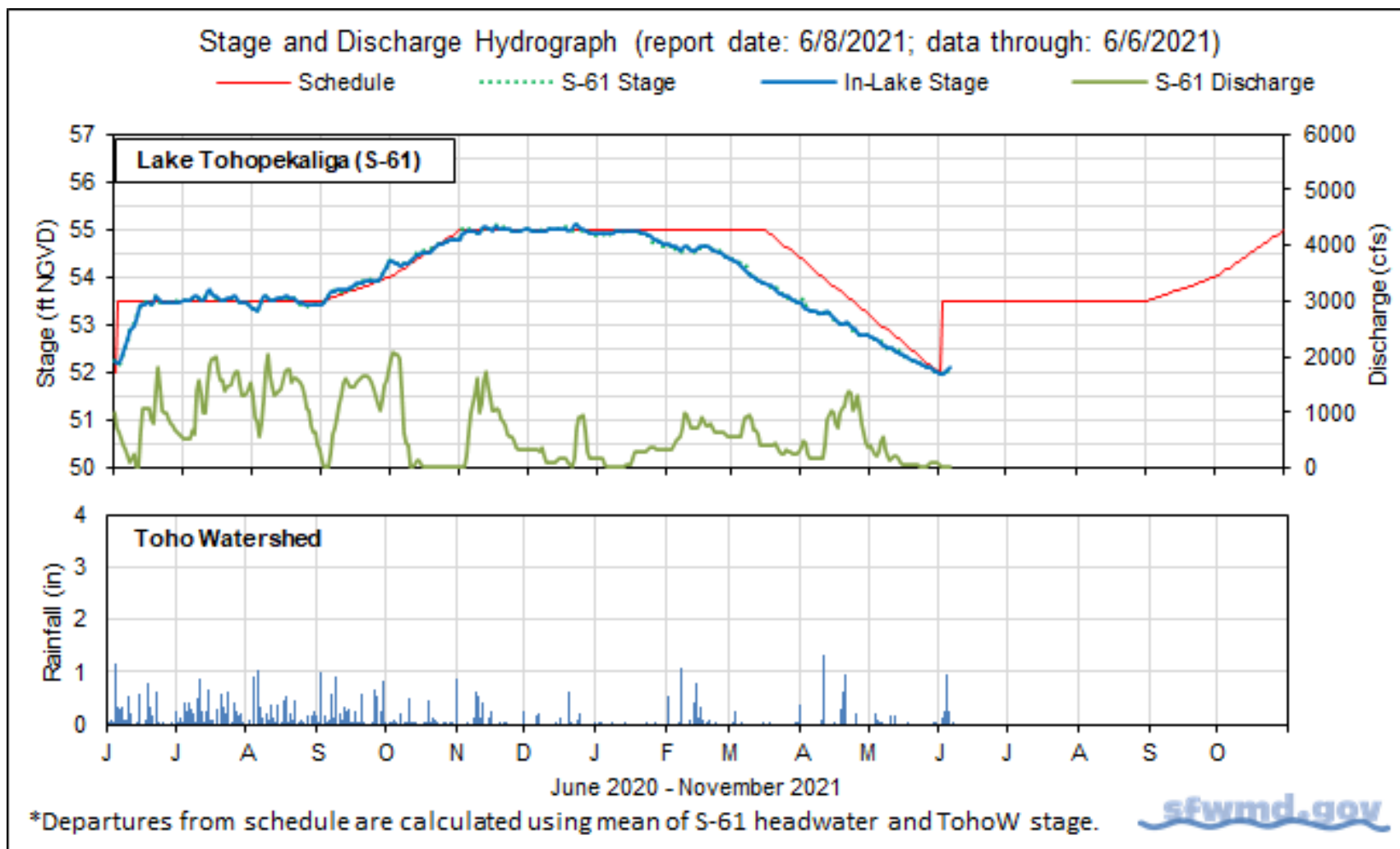


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

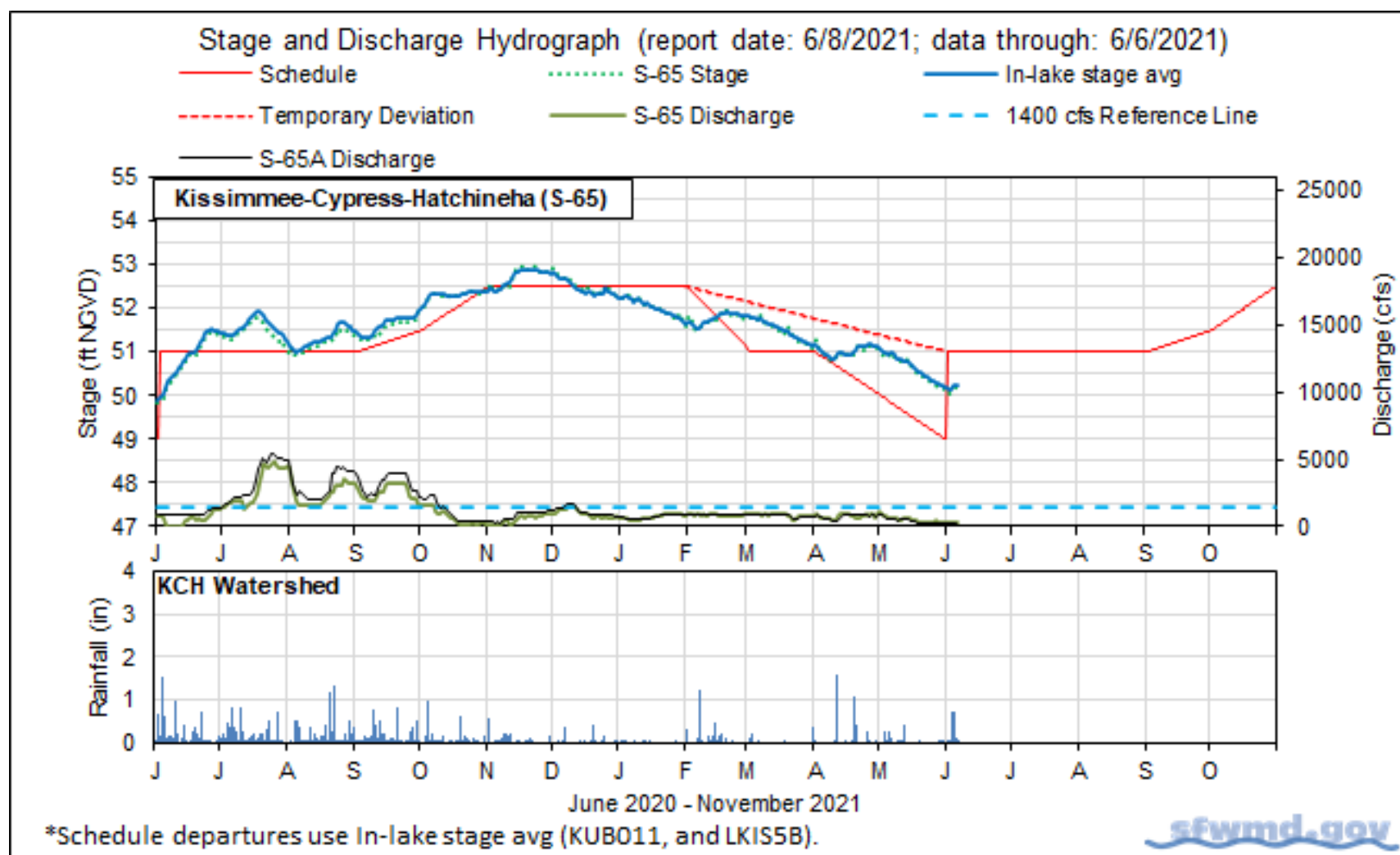


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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 6/6/21	Average for Previous Seven Day Periods			
			6/6/21	5/30/21	5/23/21	5/16/21
Discharge	S-65	392	355	353	393	570
Discharge	S-65A ^a	298	296	267	303	483
Headwater Stage (feet NGVD)	S-65A	46.45	46.41	46.30	46.27	46.30
Discharge	S-65D ^b	273	314	262	379	549
Headwater Stage (feet NGVD)	S-65D ^c	25.71	25.71	25.76	25.75	25.73
Discharge (cfs)	S-65E ^d	268	302	245	369	531
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	7.5	7.5	8.3	8.1	6.9
Mean depth (feet) ^f	Phase I floodplain	0.07	0.07	0.07	0.08	0.09

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

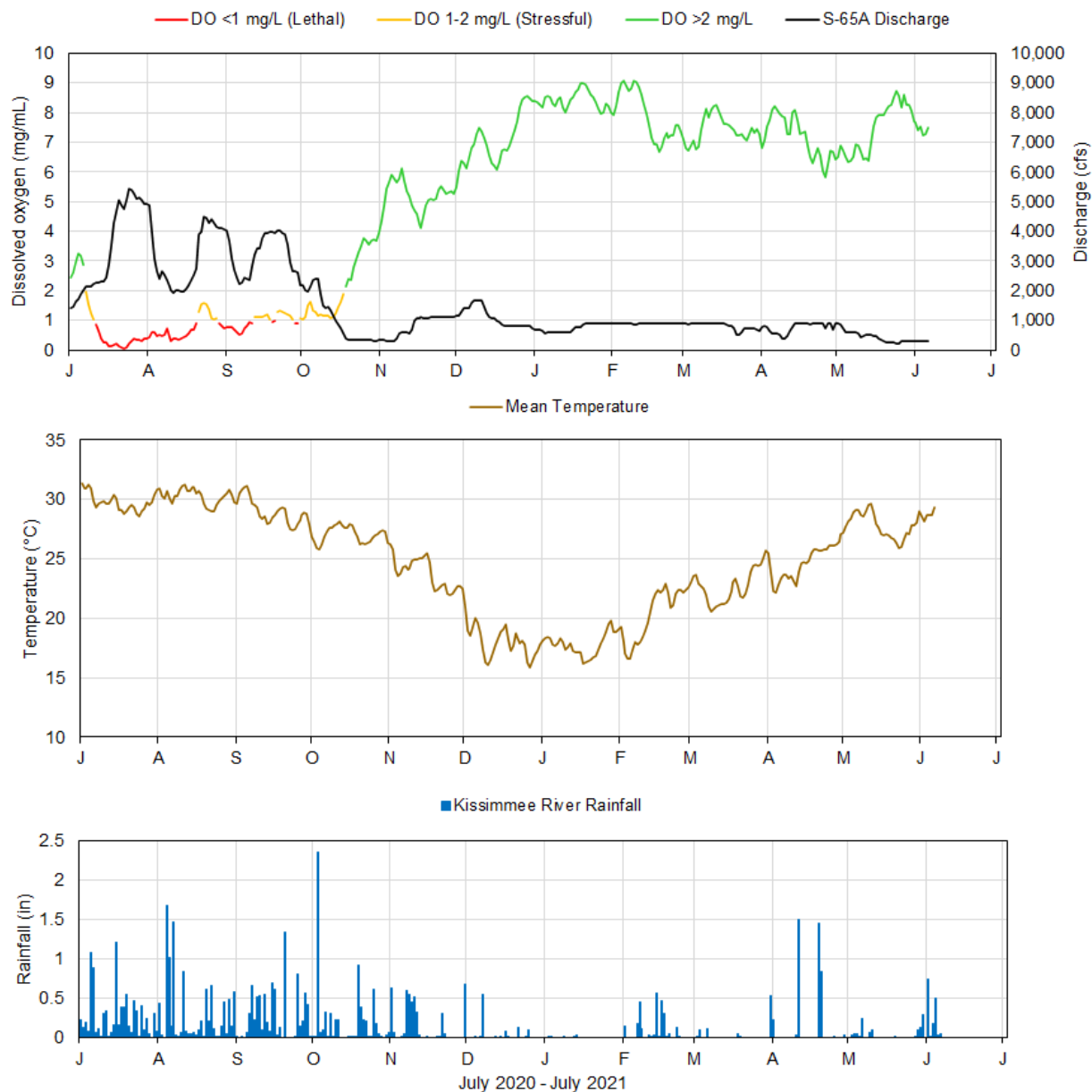


Figure KB-4. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRBN, PC33, PD62R, and PD42R with an average of four stations reporting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

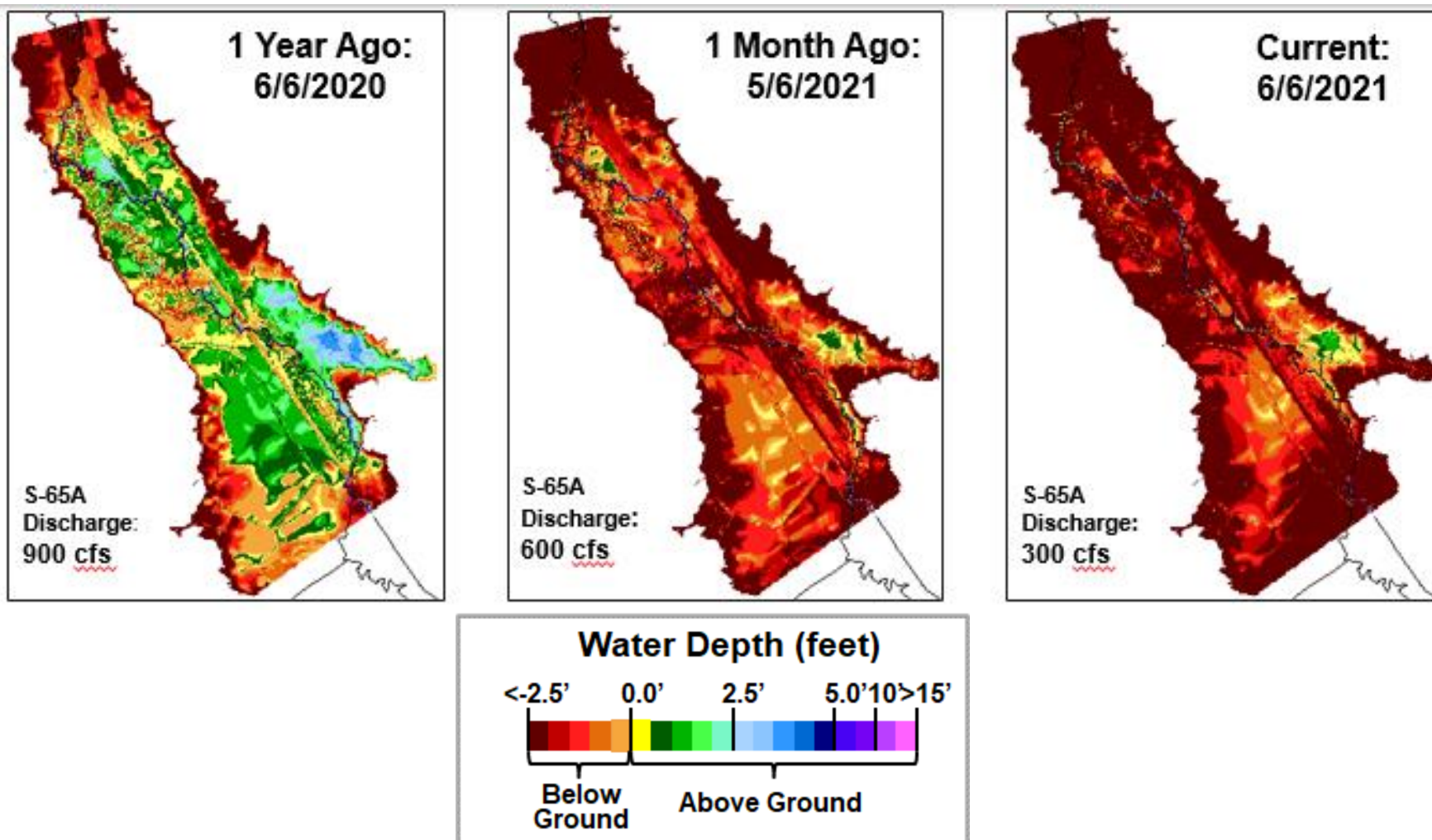


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

Lake Okeechobee

Lake Okeechobee stage was 12.75 feet NGVD on June 6, 2021, 1.09 feet lower than a month ago, and 0.83 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 about 30% 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 about 2.25 feet since mid-March though recession rates have slowed over the last two weeks (**Figure LO-3**). According to NEXRAD, 1.02 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) increased from the previous week, going from 263 cubic feet per second (cfs) to 373 cfs. Outflows (excluding evapotranspiration) decreased, going from 5,771 cfs to 2,840 cfs. The majority of the inflow came from the Kissimmee River (302 cfs through S-65E & S-65EX1). Releases to the west via S-77 decreased from 1,619 cfs to 972 cfs and releases east via S-308 stopped. Water is currently flowing back from the C-44 canal into the Lake (back flow) via S-308 at the average daily rate of 112 cfs, and from the L-8 via S-271 at a rate of 48 average daily cfs. Releases south through the S-350 structures decreased from 3,866 cfs to 1,980 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 (June 5, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed medium to high bloom potential along the northwestern and northeastern parts of the Lake. Overall, the bloom potential decreased in south-central part 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 the POLESOUT site in the northwestern part of the Lake. Phytoplankton communities were dominated by *Microcystis aeruginosa*. Only 3 nearshore sites (FEBIN, FEBOUT and PALMOUT) in the western part of the Lake had mixed (e.g. no dominant genera) algal communities. Chlorophyll *a* concentration was highest at the FEBIN site in the western part of the Lake (187 µg/L). The highest chlorophyll *a* concentrations were recorded in the western and northern parts of the Lake, where the cyanobacteria bloom potential was also the highest, based on the satellite imagery.

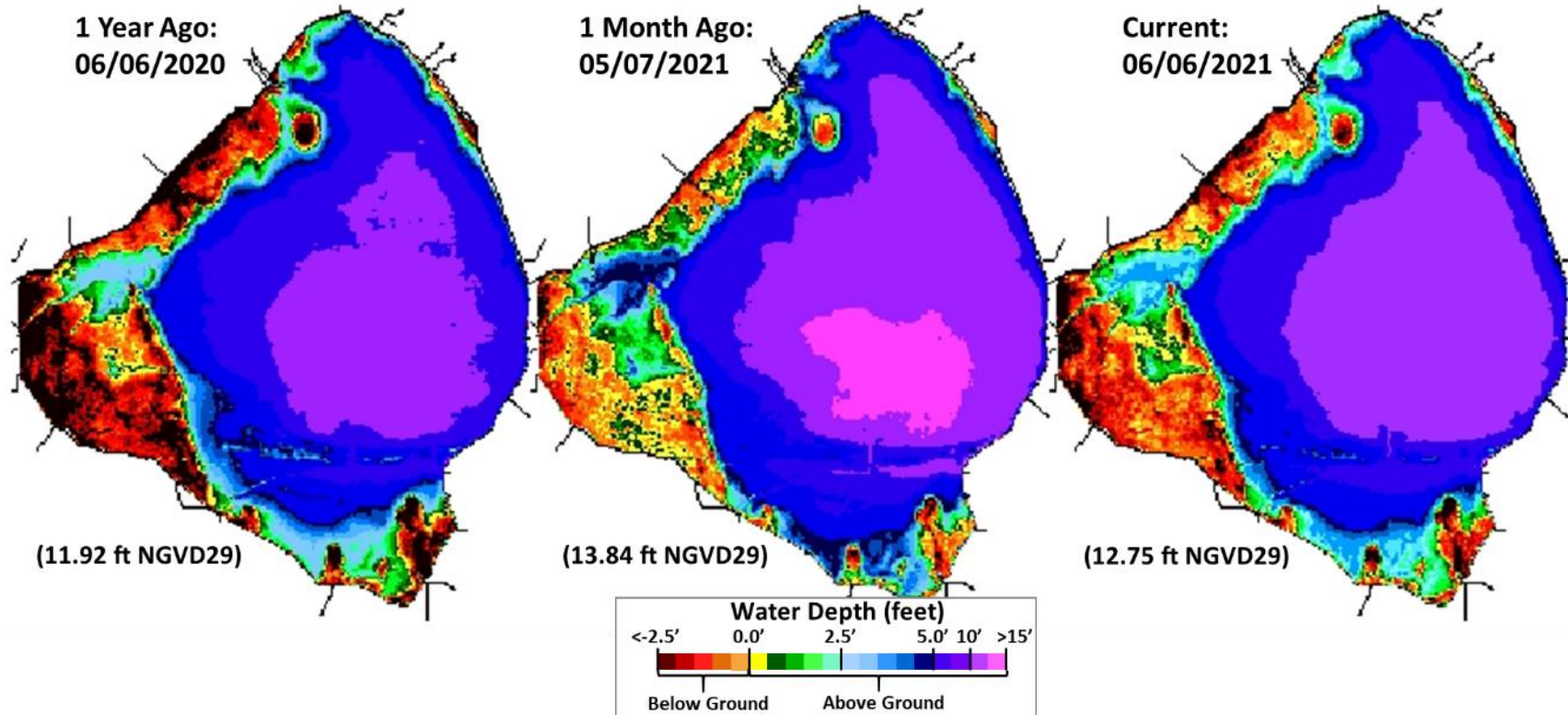


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Stage vs Updated Ecological Envelope

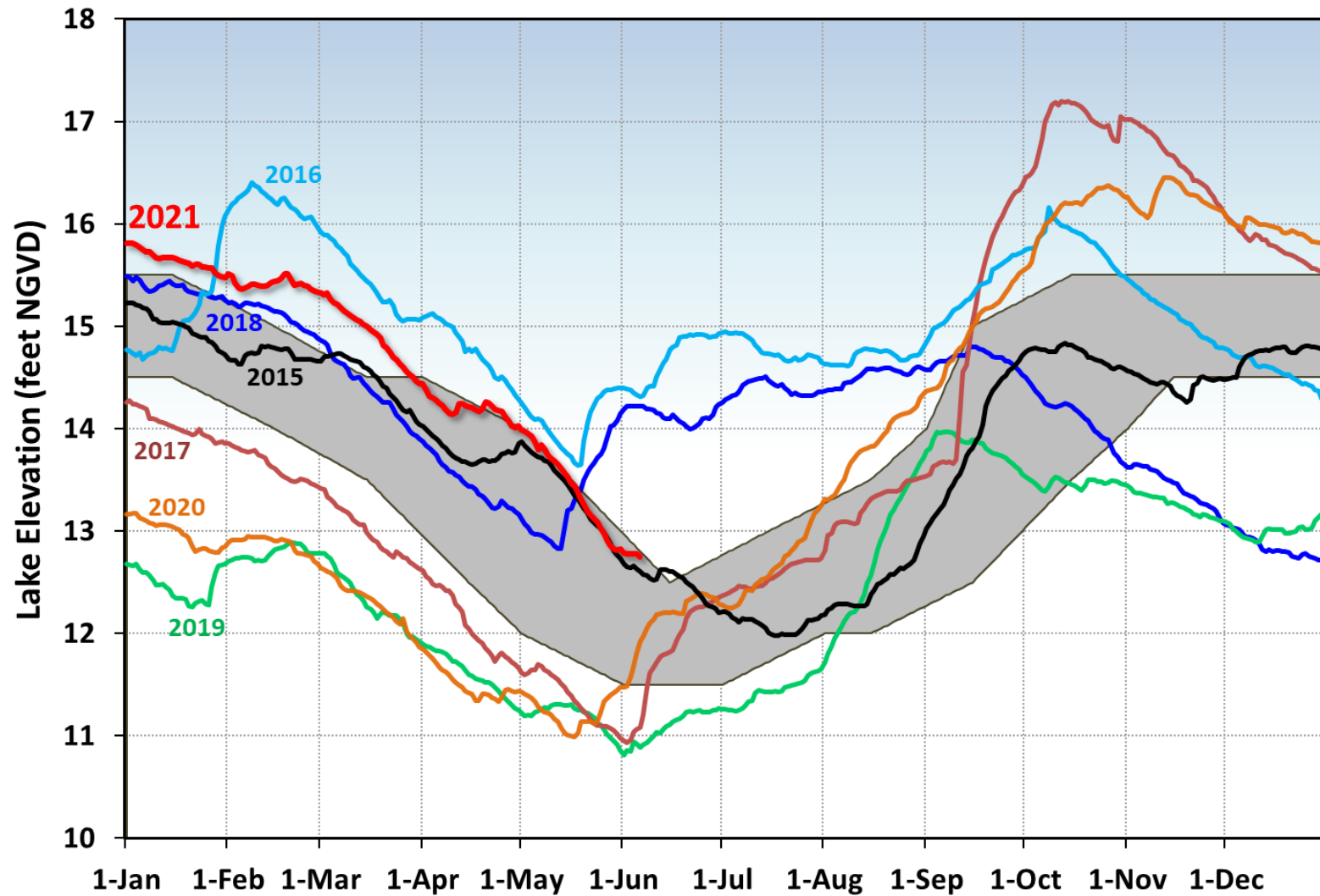
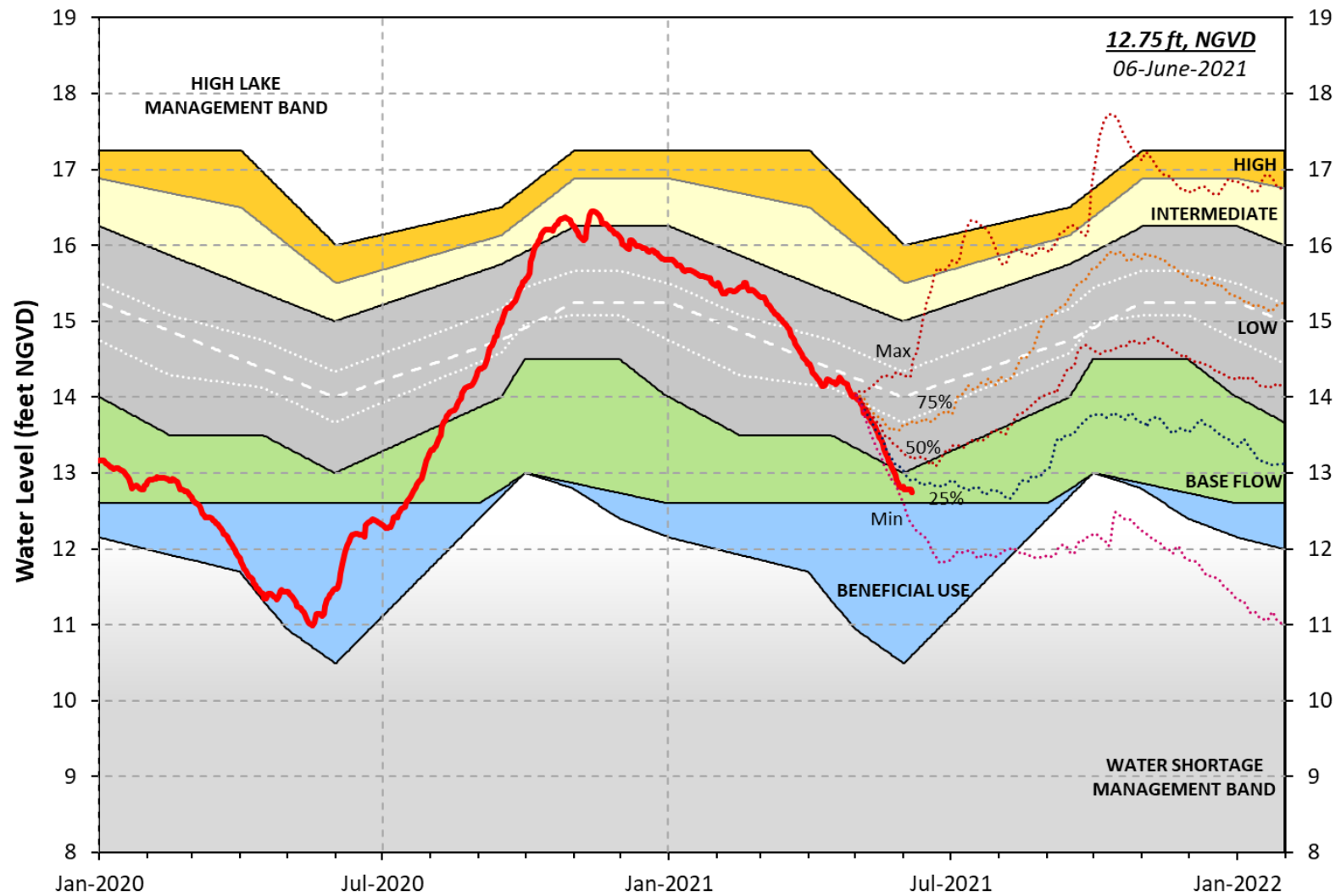


Figure LO-2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated ecological envelope.

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.

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	245	302	0.1	S-77	1619	972	0.4
S-71 & S-72	0	0	0.0	S-308	159	-112	0.0
S-84 & S-84X	0	0	0.0	S-351	1736	597	0.3
Fisheating Creek	18	11	0.0	S-352	868	219	0.1
S-154	0	0	0.0	S-354	1262	1164	0.5
S-191	0	0	0.0	L-8 Outflow	125		
S-133 P	0	0	0.0	Evapotranspiration	3118	2536	1.1
S-127 P	0	0	0.0	Totals	8889	5376	2.4
S-129 P	0	0	0.0				
S-131 P	0	12	0.0				
S-135 P	0	0	0.0				
S-2 P	0	0	0.0				
S-3 P	0	0	0.0				
S-4 P	0	0	0.0				
L-8 Backflow		48	0.0				
Rainfall	1840	2726	1.2				
Totals	2103	3099	1.4				

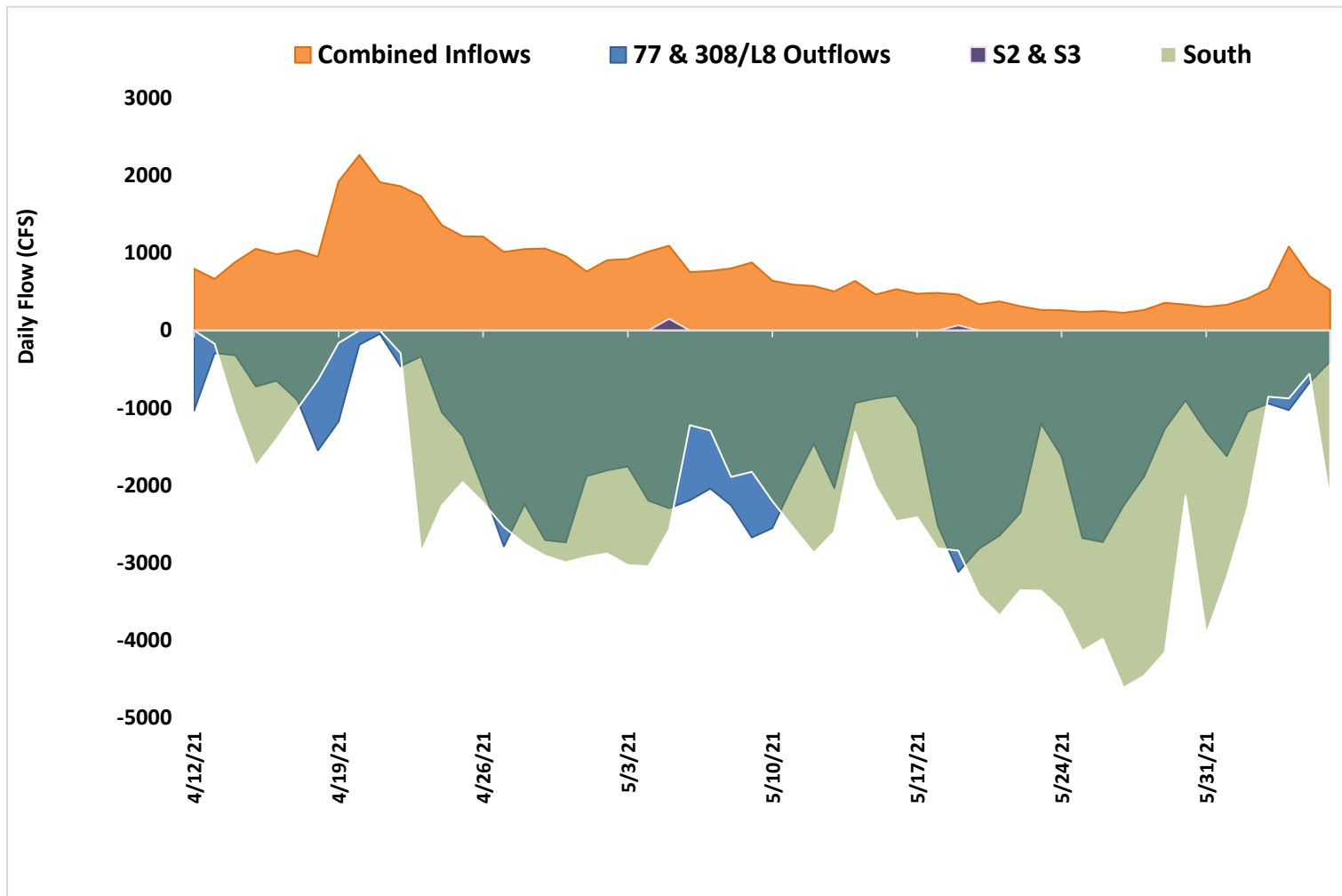


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) are included as inflows. Conversely, flows from Lake Okeechobee into the L-8 Canal are included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

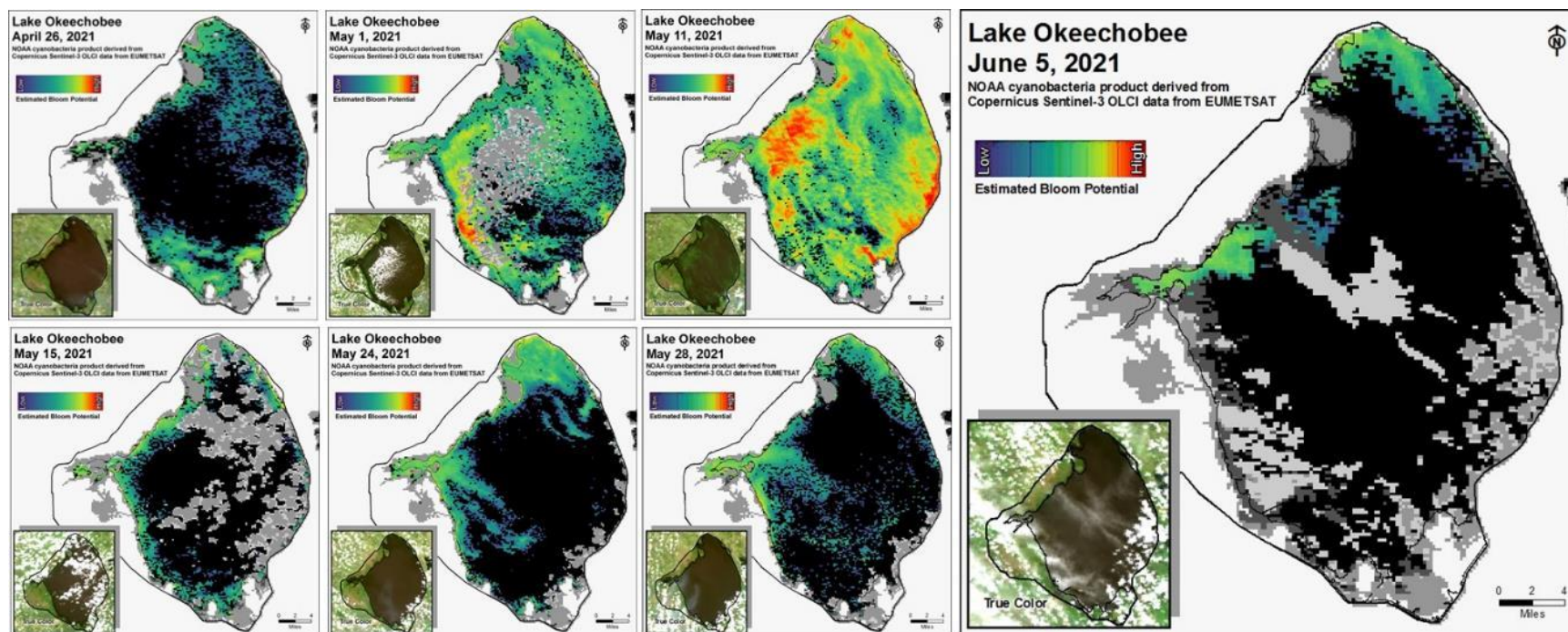


Figure LO-5. Cyanobacteria bloom potential based on NOAA’s harmful algal bloom monitoring system. Gray color indicates cloud cover.

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	187.0	BDL	mixed	L001	37.9	3.3	<i>Microcys</i>
FEBOUT	60.6	0.9	mixed	L004	16.6	3.2	<i>Microcys</i>
KISSR0.0	119.0	1.0	<i>Microcys</i>	L006	8.4	1.4	<i>Microcys</i>
L005	28.9	3.0	<i>Microcys</i>	L007	9.8	1.5	<i>Microcys</i>
LZ2	99.0	1.3	<i>Microcys</i>	L008	15.8	5.5	<i>Microcys</i>
KBARSE	28.9	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	16.1	1.2	<i>Microcys</i>
LZ25A	7.9	0.9	<i>Microcys</i>	Outflow Structures			
PALMOUT	60.7	1.6	mixed	S308C	27.5	2.2	<i>Microcys</i>
PALMOUT1	14.3	7.3	<i>Microcys</i>	S77	17.3	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>			
POLESOUT	79.7	19.0	<i>Microcys</i>				
POLESOUT1	51.2	5.0	<i>Microcys</i>				
POLESOUT2	27.3	7.6	<i>Microcys</i>				
POLESOUT3	13.5	3.0	<i>Microcys</i>				
EASTSHORE	14.1	1.4	<i>Microcys</i>				
NES135	19.4	2.9	<i>Microcys</i>				

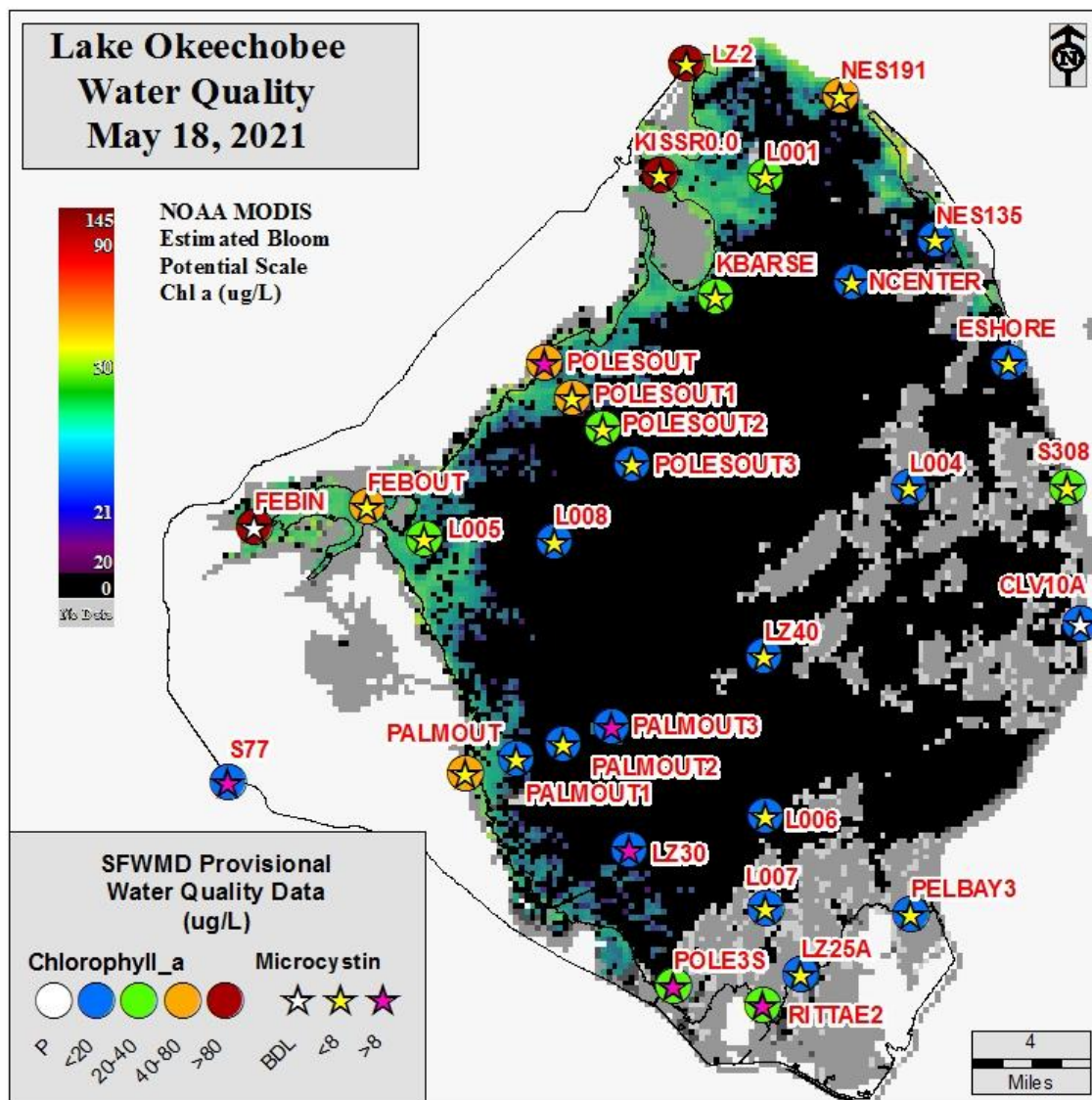


Figure LO-6. Expanded monitoring network and provisional results from samples collected May 17-19, 2021.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was approximately 485 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was approximately 206 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 increased at the US1 Bridge site and remained similar 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 25.7. 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 1,341 cfs (**Figures ES-5 and ES-6**) and the previous 30-day mean inflow was approximately 1,687 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-6**.

Over the past week, surface salinities increased at S-79 and decreased 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 1,500 cfs and steady releases at 2,000 cfs with estimated tidal basin inflows of 98 cfs. Model results from all scenarios predict daily salinity to be 4.2 or lower and the 30-day moving average surface salinity to be 1.2 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 June 4, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background to low concentrations in and offshore of Lee County, and background to medium concentrations

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.

in and offshore of Collier County. On the east coast, red tide was not observed in samples from Palm Beach County.

Water Management Recommendations

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

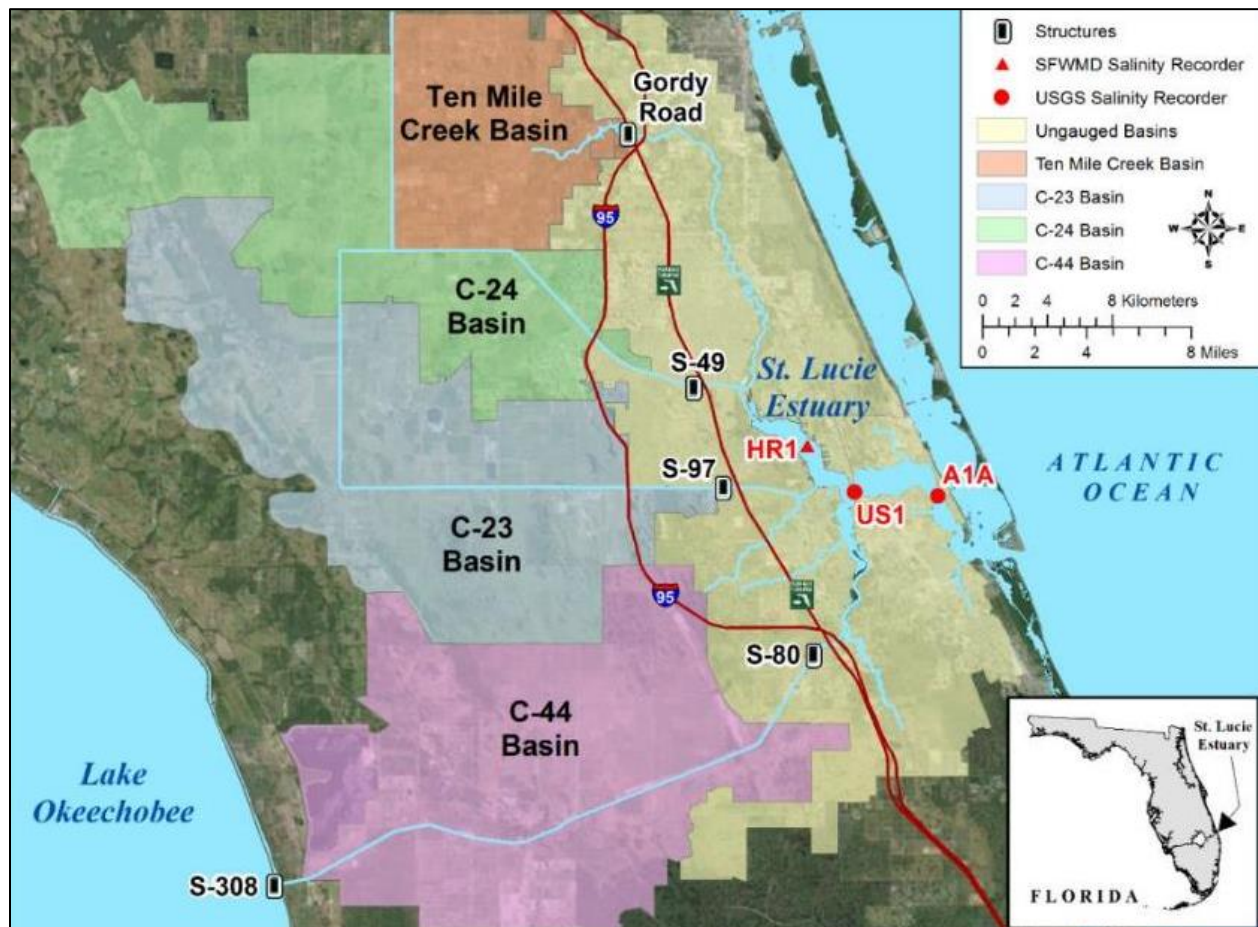


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

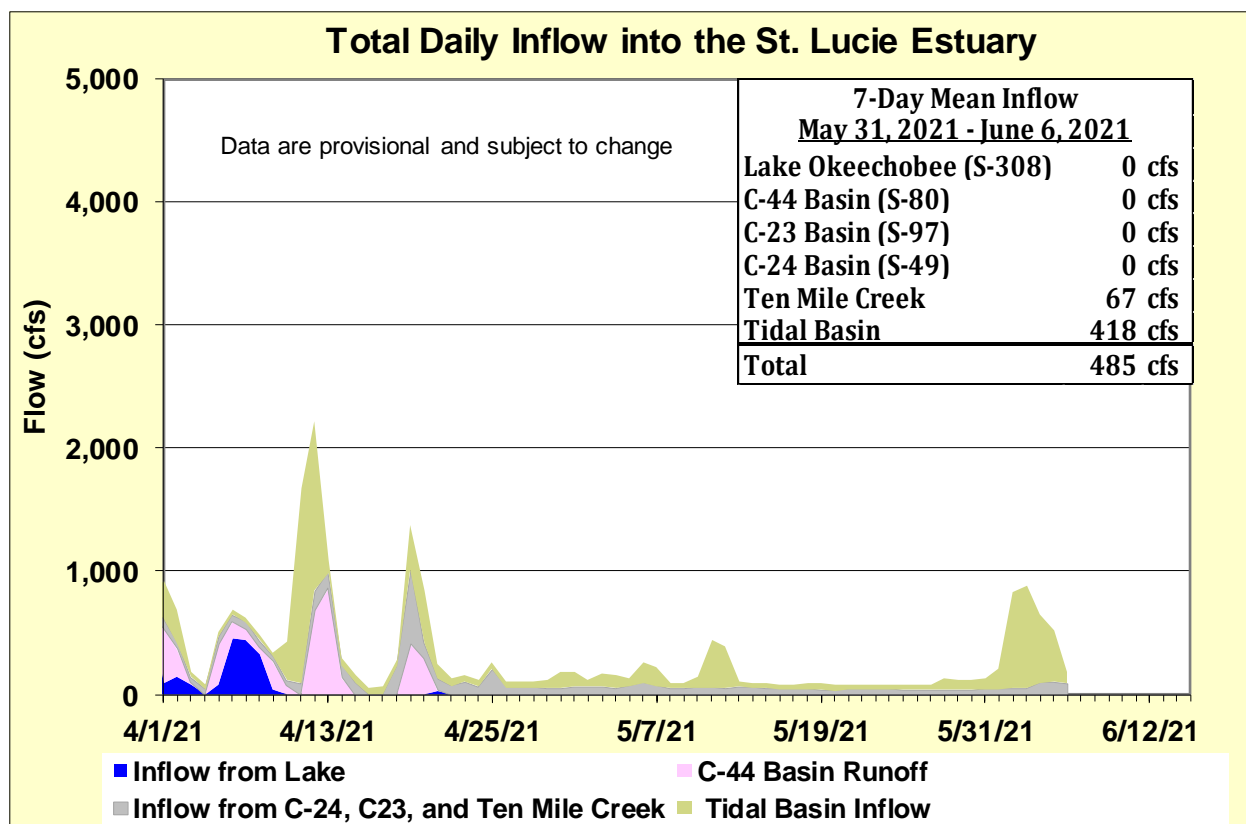


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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

Sampling Site	Surface	Bottom	Envelope
HR1 (Nork Fork)	21.6 (21.9)	22.6 (22.4)	NA ^a
US1 Bridge	25.6 (25.0)	25.9 (25.4)	10.0 – 26.0
A1A Bridge	31.3 (31.1)	31.7 (31.8)	NA ^a

a. The envelope is not applicable.

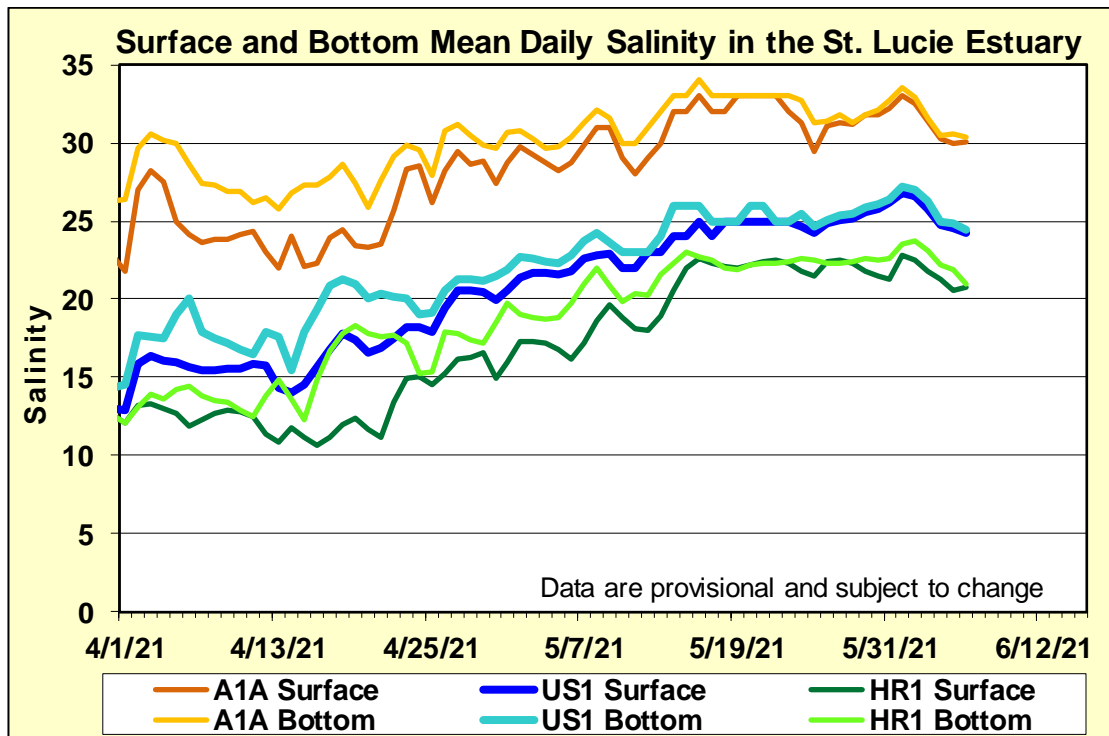


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

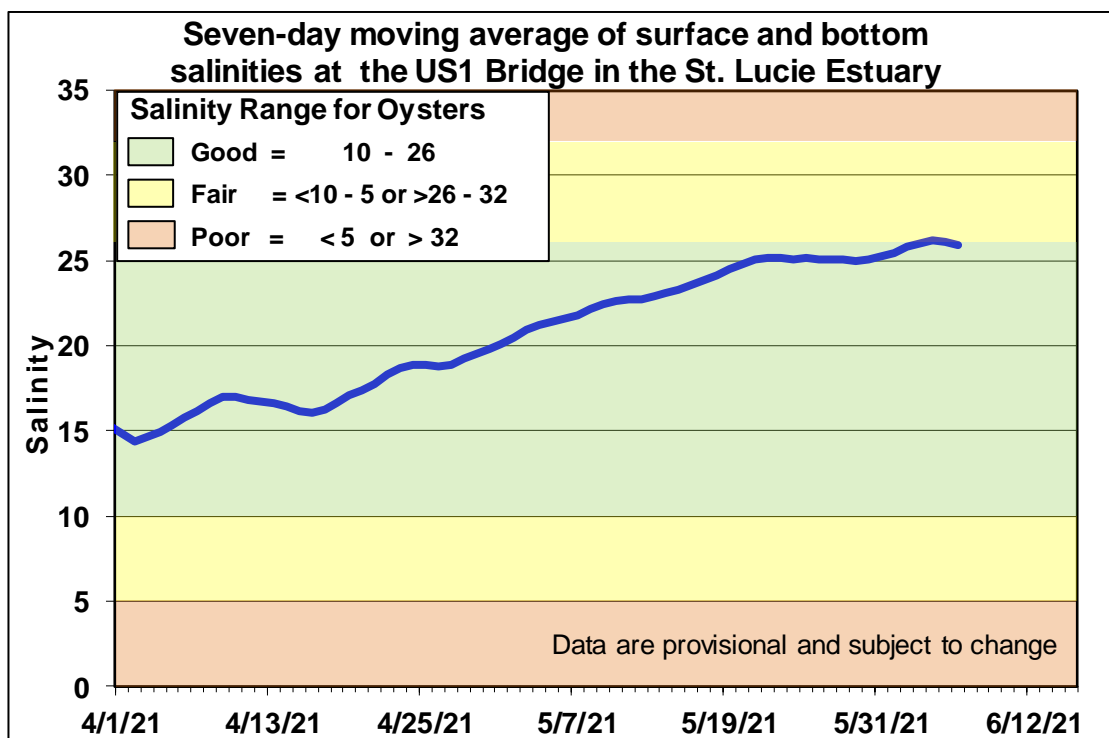


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

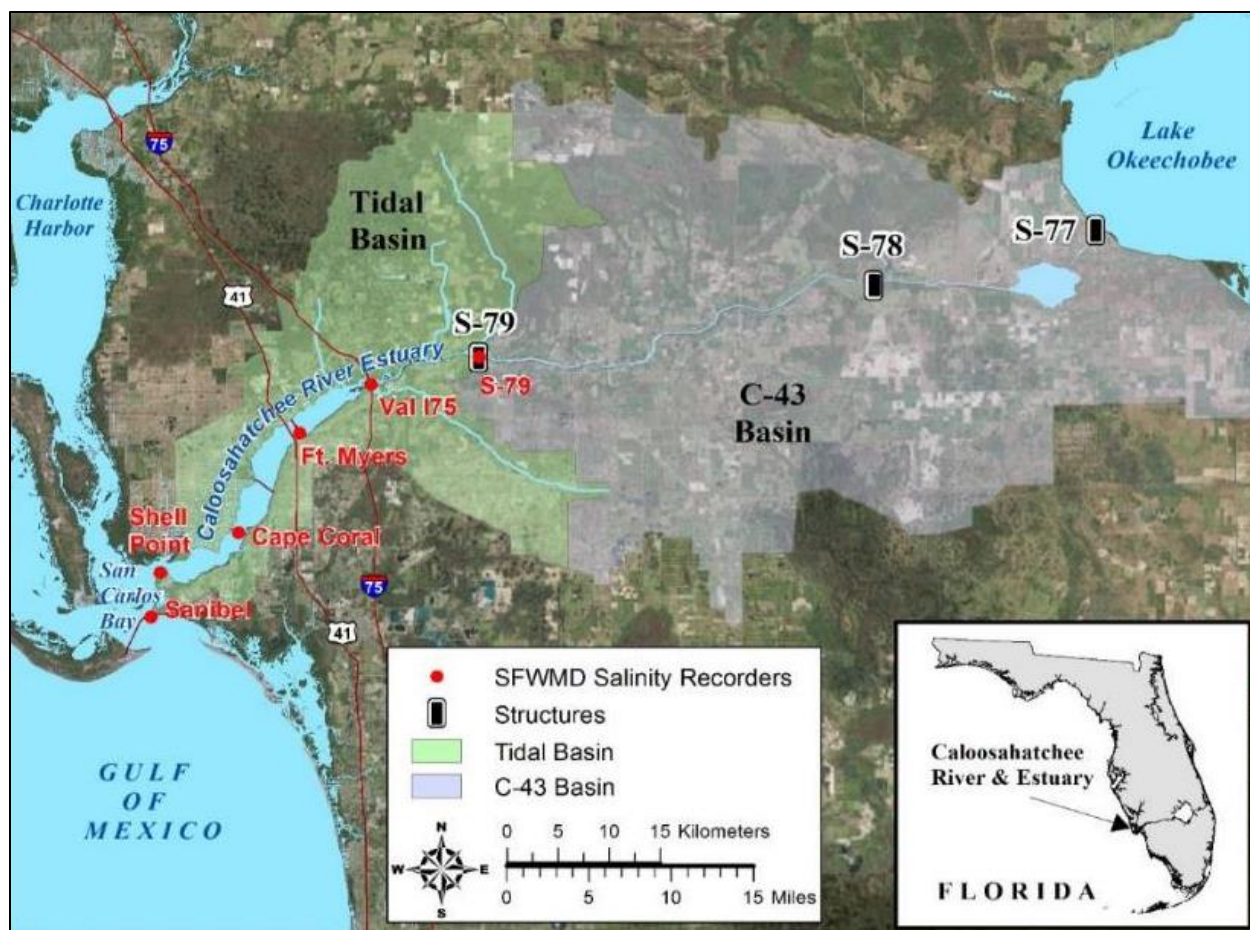


Figure ES-5. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

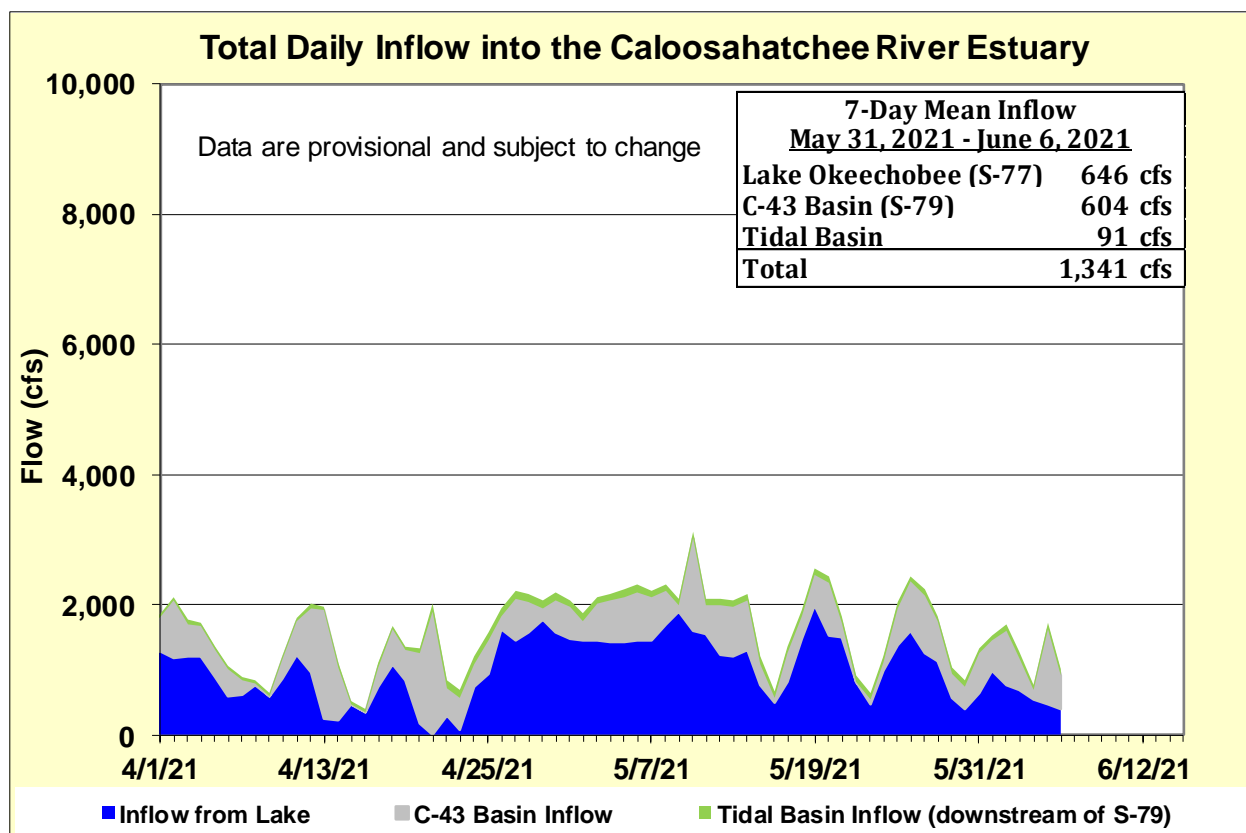


Figure ES-6. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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)	1.3 (0.8)	1.4 (0.8)	NA ^a
Val I-75	1.3 (1.5)	2.4 (2.0)	0.0 – 5.0 ^b
Fort Myers Yacht Basin	7.3 (7.6)	9.1 (8.6)	NA ^a
Cape Coral	14.6 (15.0)	17.3 (16.9)	10.0 – 30.0
Shell Point	28.5 (29.8)	29.1 (30.3)	10.0 – 30.0
Sanibel	33.8 (33.9)	34.5 (34.5)	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.

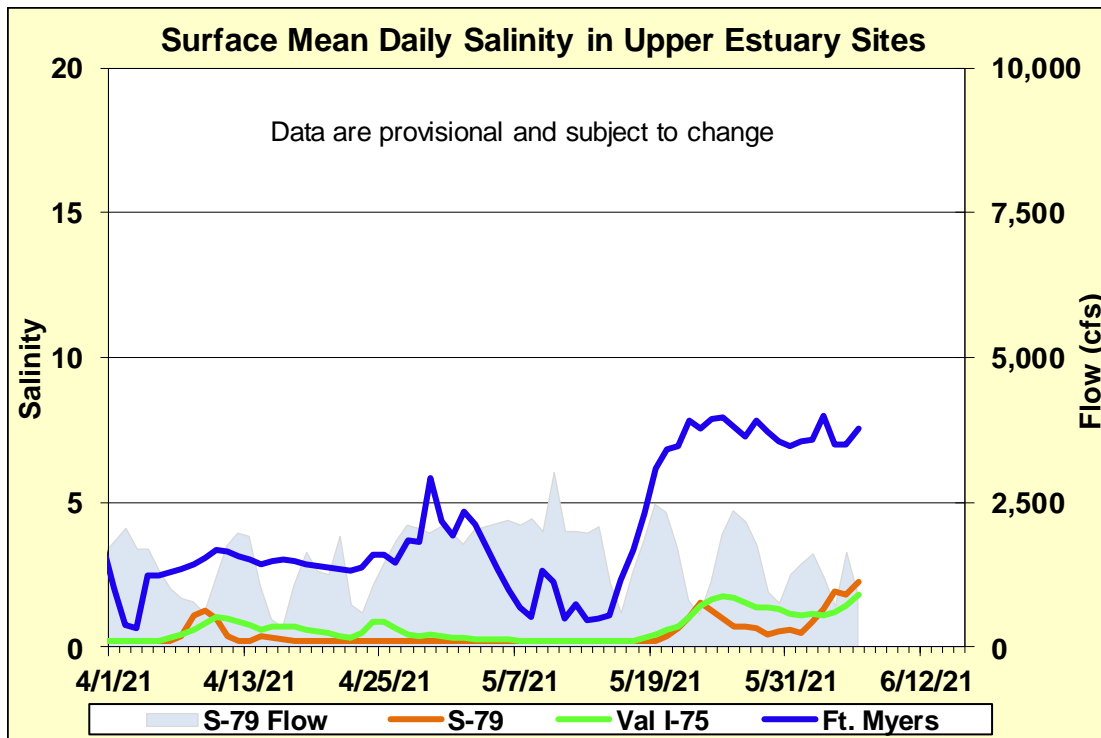


Figure ES-7. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

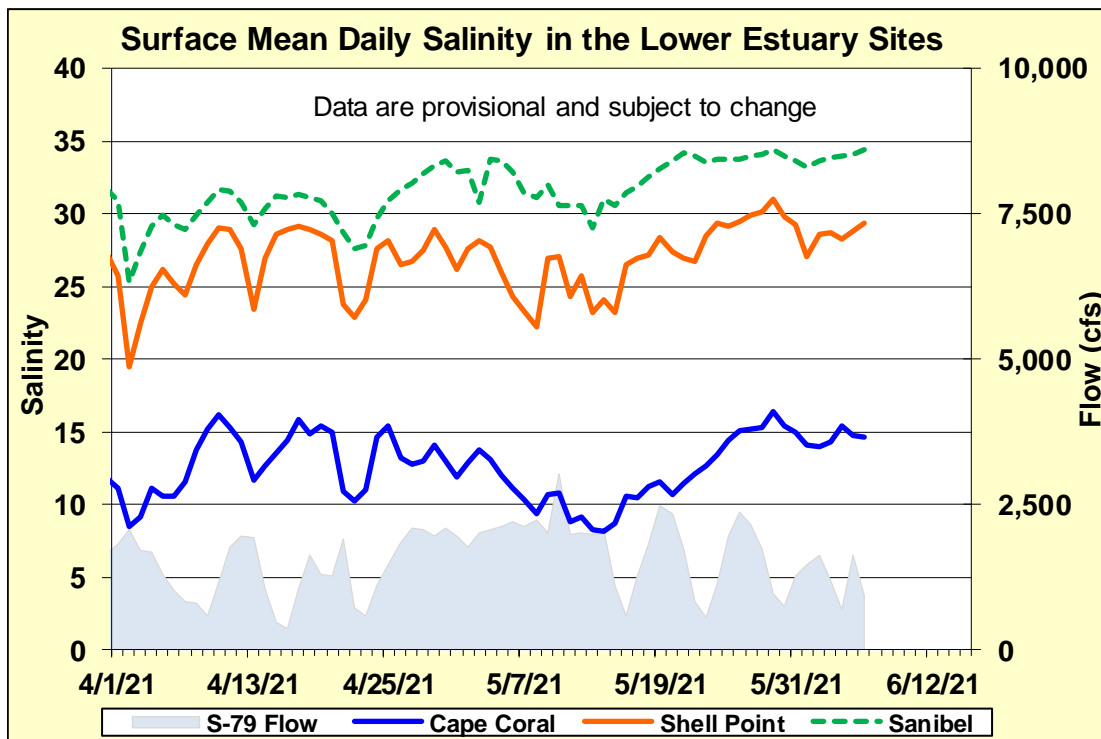


Figure ES-8. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

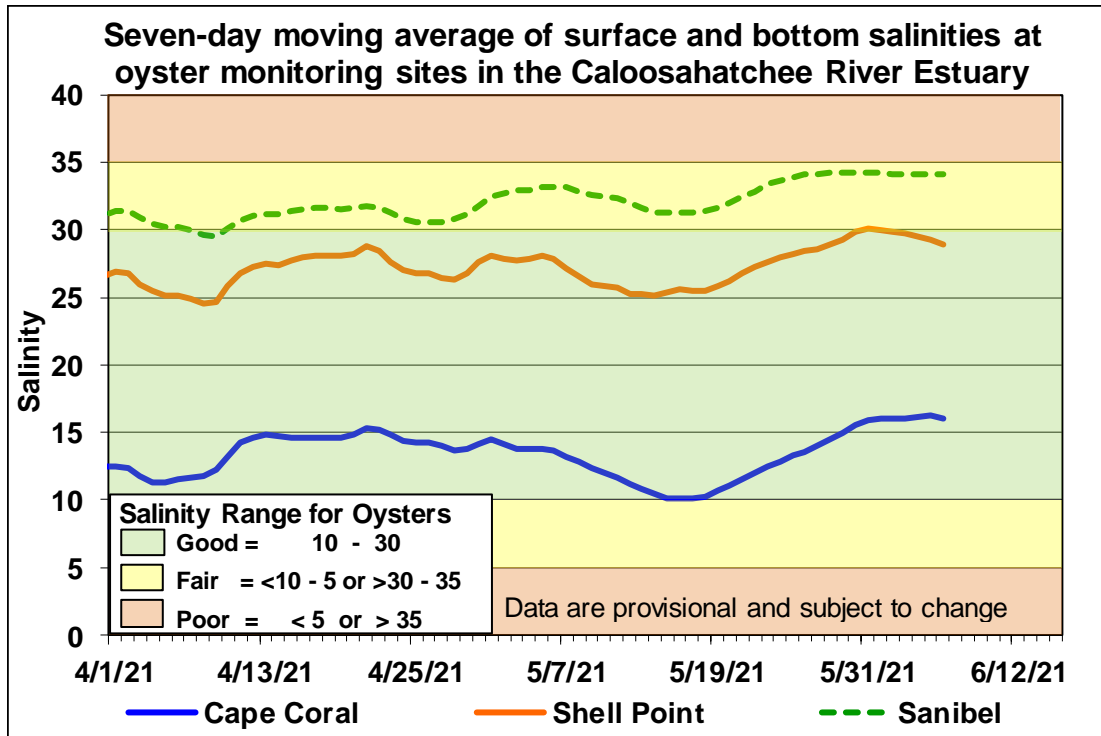


Figure ES-9. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

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	98	4.2	1.2
B	450	98	2.2	0.9
C	800	98	1.2	0.7
D	1000	98	0.9	0.6
E	1500	98	0.4	0.4
F	2000	98	0.3	0.4

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

S-79 = 0 cfs & TBR = 98 cfs

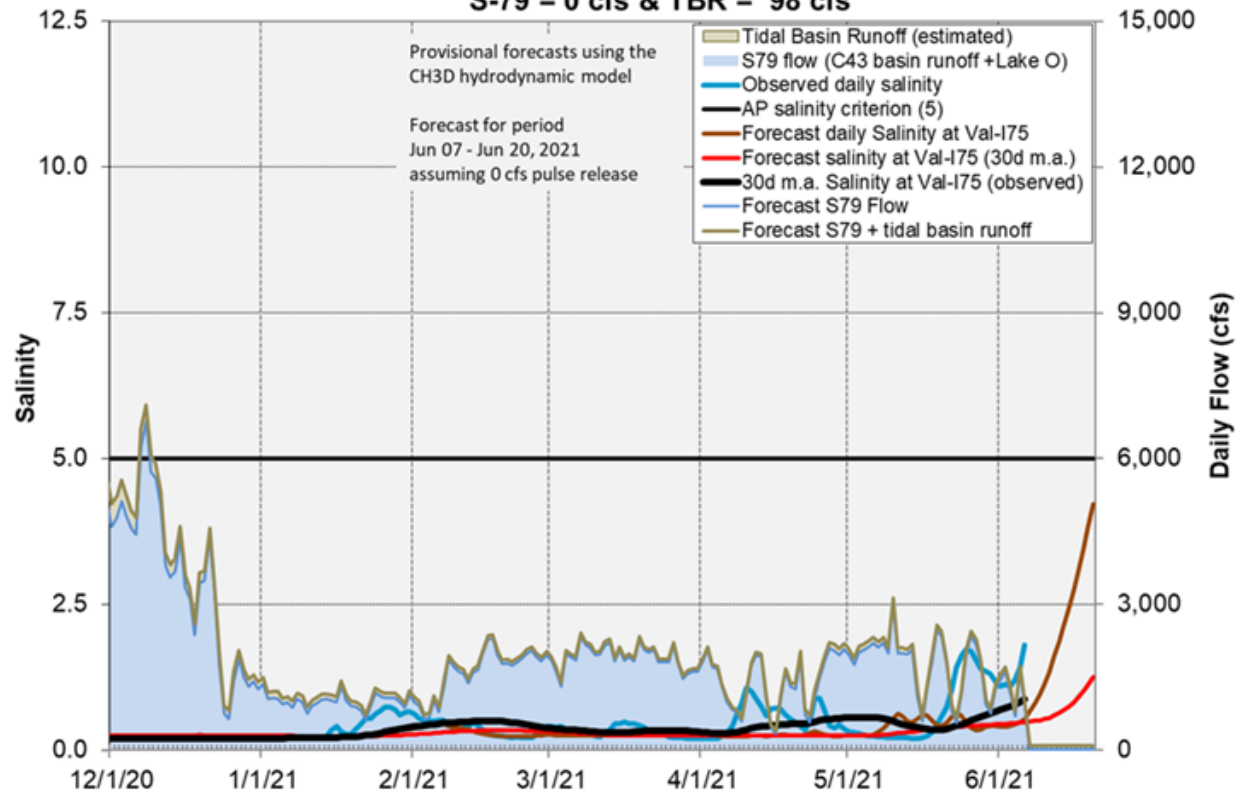


Figure ES-10. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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 or above 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.

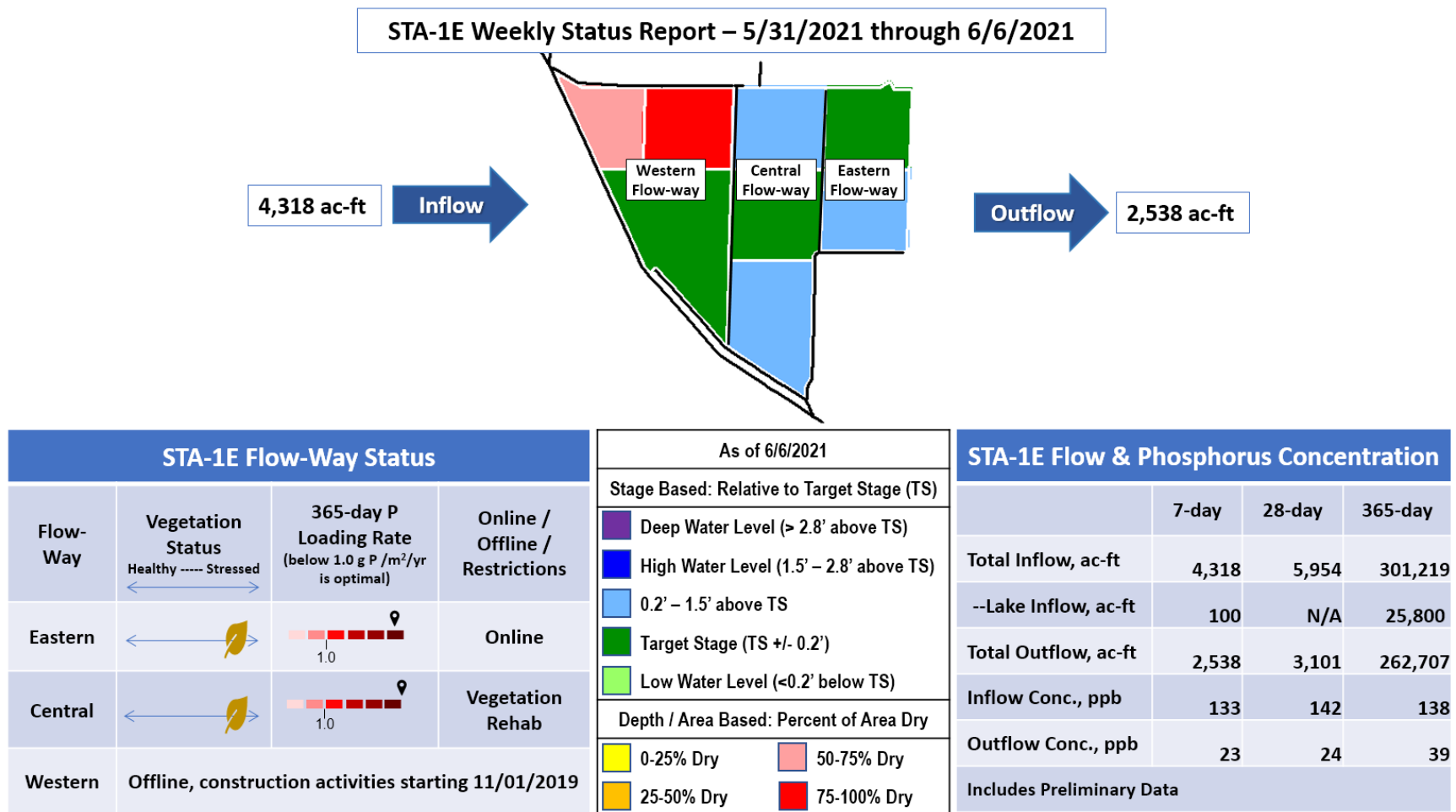
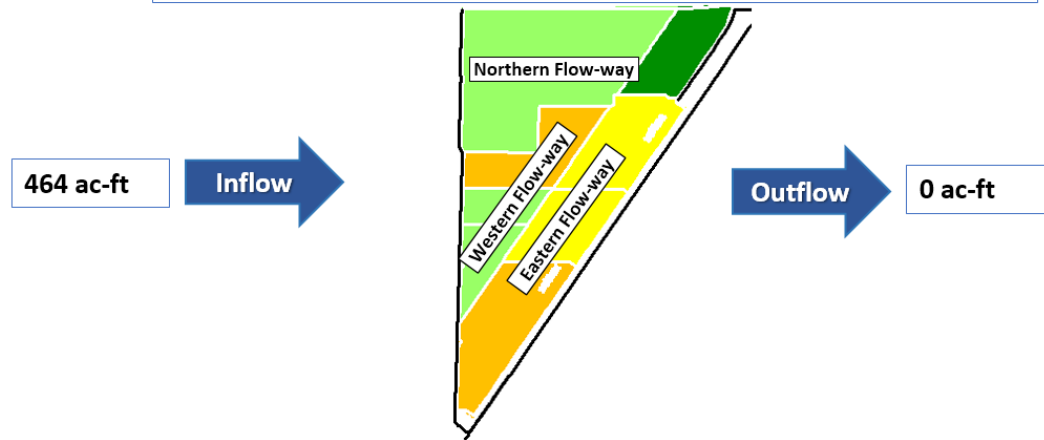


Figure S-1. STA-1E Weekly Status Report

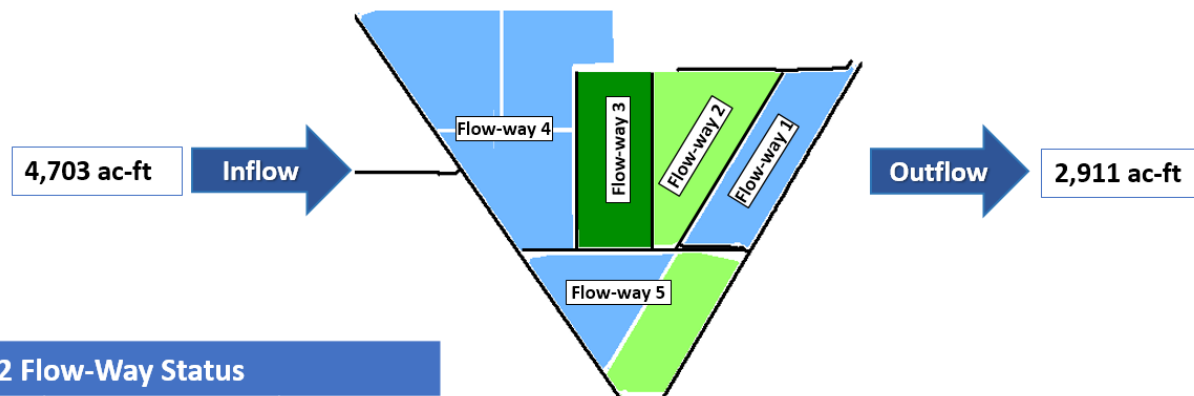
STA-1W Weekly Status Report – 5/31/2021 through 6/6/2021



STA-1W Flow-Way Status				STA-1W 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	As of 6/6/2021			
				Stage Based: Relative to Target Stage (TS)			
Northern			Construction / Avian Nesting	Deep Water Level (> 2.8' above TS)			
				High Water Level (1.5' – 2.8' above TS)			
				0.2' – 1.5' above TS			
Western			Construction / Avian Nesting	Target Stage (TS +/- 0.2')			
Eastern			Construction	Low Water Level (<0.2' below TS)			
				Depth / Area Based: Percent of Area Dry			
				0-25% Dry	50-75% Dry		
				25-50% Dry	75-100% Dry		
				7-day	28-day	365-day	
Total Inflow, ac-ft				464	750	154,713	
--Lake Inflow, ac-ft				0	N/A	8,100	
Total Outflow, ac-ft				0	197	180,056	
Inflow Conc., ppb				122	121	254	
Outflow Conc., ppb				N/A	25	40	
Includes Preliminary Data							

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

STA-2 Weekly Status Report – 5/31/2021 through 6/6/2021



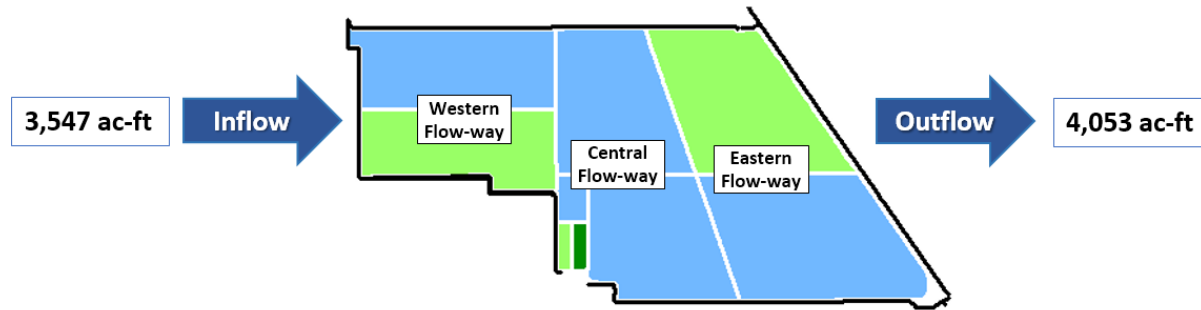
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P / m ² /yr is optimal)	Online / Offline / Restrictions
1	← →	1.0	Online
2	← →	1.0	Construction
3	← →	1.0	Vegetation Rehab
4	← →	1.0	Vegetation Rehab
5	← →	1.0	Online

As of 6/6/2021	
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	4,703	15,310	412,889
--Lake Inflow, ac-ft	1,100	N/A	86,900
Total Outflow, ac-ft	2,911	11,575	475,119
Inflow Conc., ppb	92	86	95
Outflow Conc., ppb	15	15	21
Includes Preliminary Data			

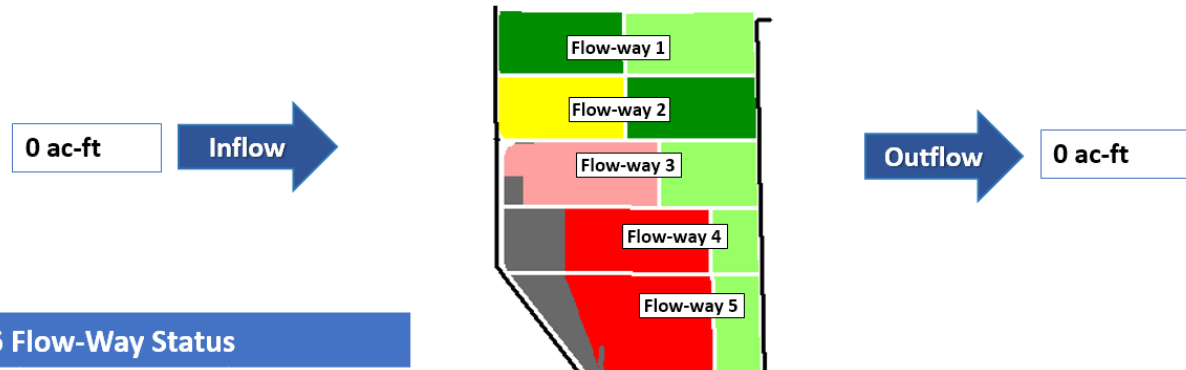
Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 5/31/2021 through 6/6/2021



STA-3/4 Flow-Way Status				STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status <div>Healthy ----- Stressed</div> <div>↔</div>	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	As of 6/6/2021			
				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 50-75% Dry			
				25-50% Dry 75-100% Dry			
Central	<div>↔</div> <div>🍂</div>	<div>📍</div> <div>1.0</div> <div>▬▬▬▬▬</div>	Online				
Western	<div>↔</div> <div>🍃</div>	<div>📍</div> <div>1.0</div> <div>▬▬▬▬▬</div>	Vegetation Rehab				
				Includes Preliminary Data			

STA-5/6 Weekly Status Report – 5/31/2021 through 6/6/2021



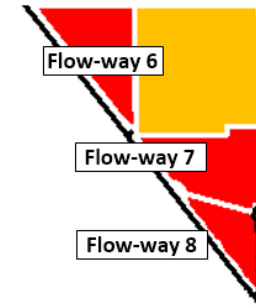
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1	←-----→	1.0	Online
2	←-----→	N/A	Post-construction
3	←-----→	N/A	Post-construction
4	←-----→	1.0	Online
5	←-----→	1.0	Online

As of 6/6/2021	
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	50-75% Dry
25-50% Dry	75-100% Dry

STA-5/6 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	0	0	128,321
--Lake Inflow, ac-ft	N/A	N/A	N/A
Total Outflow, ac-ft	0	13	152,541
Inflow Conc., ppb	N/A	N/A	281
Outflow Conc., ppb	N/A	25	79
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 5/31/2021 through 6/6/2021



STA-5/6 Flow-Way Status				As of 6/6/2021	
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)	
6			Online / Avian Nesting	Deep Water Level (> 2.8' above TS)	
7			Online	High Water Level (1.5' – 2.8' above TS)	
8			Online	0.2' – 1.5' above TS	
				Target Stage (TS +/- 0.2')	
				Low Water Level (<0.2' below TS)	
				Depth / Area Based: Percent of Area Dry	
				0-25% Dry	50-75% Dry
				25-50% Dry	75-100% Dry

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

Basic Concepts and Definitions for STA Weekly Status Report

- **Inflow:** Sum of flow volume at all inflow structures to an STA.
- **Lake Inflow:** Portion of the STA total inflow volume that originates from Lake Okeechobee.
- **Outflow:** Sum of flow volume at outflow structures from an STA.
- **Total Phosphorus (TP):** Total mass of phosphorus in all its forms; including particulate, dissolved, etc.
- **Inflow Concentration:** TP concentration is the mass of TP in micrograms per liter of water, $\mu\text{g/L}$ 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: Falling stage at the 1-8C Gauge flattened out late last week. On Sunday stage was below the flat Zone A1 regulation line by 0.35 feet. WCA-2A: Stage at S11B-HW rose then flattened out last week just above the WS floor, 0.47 feet below the flat regulation line on Sunday. WCA-3A: The Three Gauge Average began to rise slightly to the Zone A regulation line last week. On Sunday stage remained 1.0 feet below the now rising Zone A line and the 3-69W gauge remains below the water supply floor. WCA-3A: Stage at gauge 62 (Northwest corner) continued trending upwards last week before turning down over the last day or two. The average on Sunday was 1.47 feet below the rising Upper Schedule (**Figures EV-1 through EV-4**).

Water Depths

The WDAT tool for spatial interpolation of water depth indicates that WCA-3A North continues to dry down, all 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), though conditions are dry in the Taylor Slough area and significantly so in Big Cypress National Preserve (BCNP) (**Figure EV-5**). Over the last month stages fell significantly in central WCA-3A south of I-75 within the upper reaches of the L-67s, and northeastern WCA-1. The Everglades are significantly drier than one year ago with the perimeter of WCA-1, and SRS in ENP, the only exceptions as rains had begun by this time last year. WCA-3B and SRS continue to experience above average depths for this time of year. (**Figure EV-6**).

Wading Birds

Record nesting continues and foraging conditions in WCA-1, WCA-3A South and both SRS and Taylor sloughs remain optimal. The likely only constraint to nesting success will be the timing of the start of the wet season and the first major reversal. Early indications are positive for fledging success as juveniles are experiencing late season conditions that remain optimal. Juvenile Wood Storks and White Ibis have now mostly left their nests for the nearby marshes, this behavior revealed previously uncounted small egret and heron nests. The provisional estimate of total nests in the Everglades in 2021 is approximately 81,000 nests and may increase as more of the smaller wading bird nests are counted.

Taylor Slough and Florida Bay

An average of 1.22 inches of rain fell over Taylor Slough and Florida Bay over the week ending Sunday (5/30). The Slough averaged a 0.4 foot increase over the week (**Figure EV-7**) with the Upper Taylor Slough area seeing a 0.8 foot increase. Depths (**Figure EV-8**) are still 8 to 9 inches below the historical average in the northern areas with the slough as a whole being an inch below average for this time of year. Once water deliveries to the slough begin, it will likely take 2 to 3 weeks to facilitate flow to the Florida Bay shoreline. However, the areas near the most western structures (S-328 and G-737) are mostly dry and will likely have elevated levels of phosphorus initially after

rewetting. These structures should not be opened until the phosphorus levels return to below 8 ppb at these locations.

Salinities in Florida Bay averaged no change over the week ending Sunday (6/6), but individual stations had weekly changes ranging from -2.6 to +1.3 (**Figure EV-7**). The Bay is still positioned very well to minimize hyper-salinity extremes and duration before the freshwater front arrives (**Figure EV-9**). The central and eastern Bay areas experienced slight increases while the shallow western areas experienced the decreases in daily salinity.

Florida Bay MFL: The TR station in the mangrove zone (tracked for the Florida Bay MFL) rose from 15 to 20 over the week ending 6/6 (**Figure EV-10**). The 30-day moving average increased 3.3 over the week to end at 8.3. Weekly flow from the 5 creeks monitored for the Florida Bay MFL totaled about -2,200 acre-feet with negative flows persisting most of the 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 5,000 acre-feet over the week to end at 415,494 acre-feet on Sunday, 6/6. 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

Moderating reversals in WCA-1 and WCA-3A South for the remainder of the wading bird nesting season will extend the already very productive nesting/fledging effort. Maintaining and moderating the current recession rates in WCA-3A South will continue to provide good foraging within that basin as the drying front moves from the northwest to the southeast. 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. Flows that initiate a rehydration of northern Taylor Slough have within and downstream ecological benefit, however the most western structures (S-328 and G-737) are mostly dry and will likely have elevated levels of phosphorus initially after rewetting. These structures should not be opened until the phosphorus levels return to below 8 ppb at these locations.

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

Everglades Region	Rainfall (inches)	Stage (feet)	change
WCA-1	1.00	-0.05	
WCA-2A	1.75	+0.07	
WCA-2B	2.03	+0.01	
WCA-3B	1.02	+0.05	
ENP	0.84	+0.00	

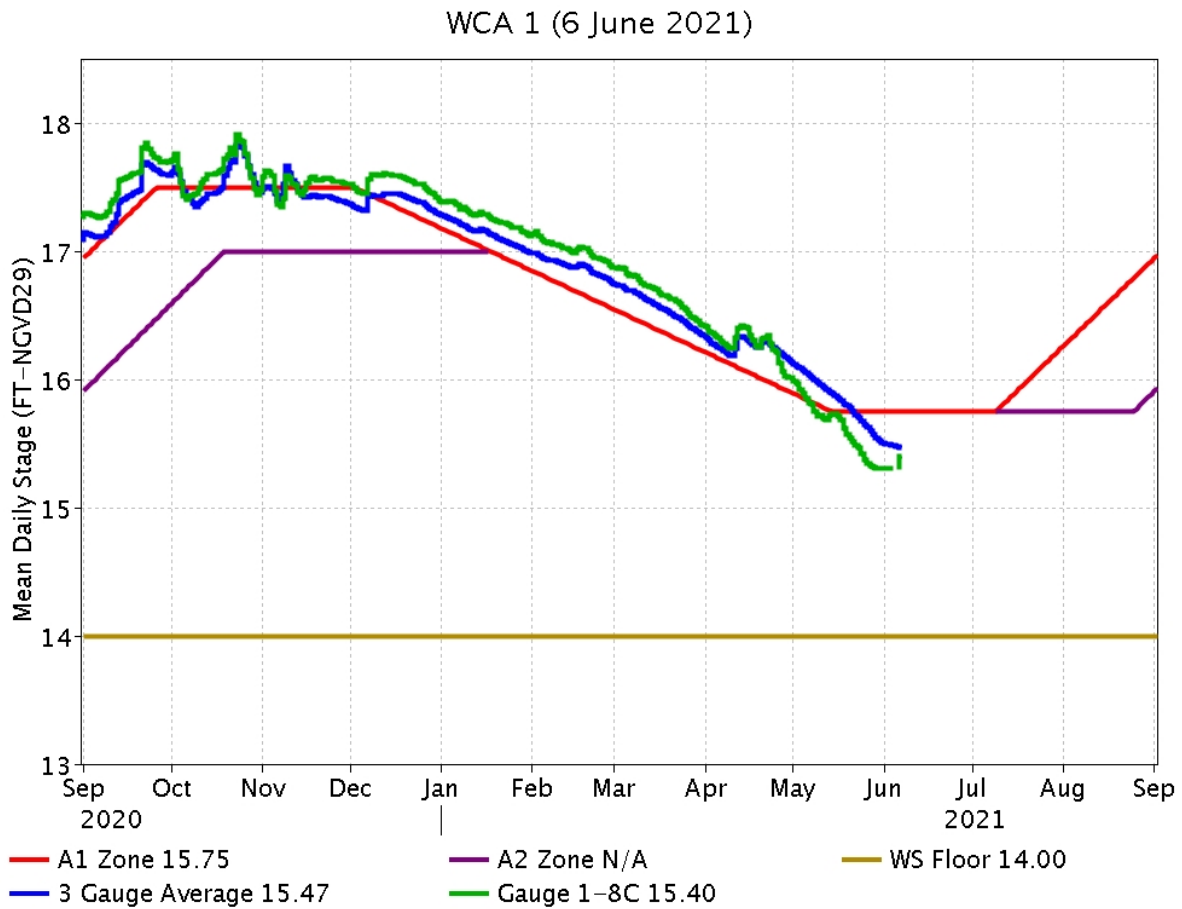


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

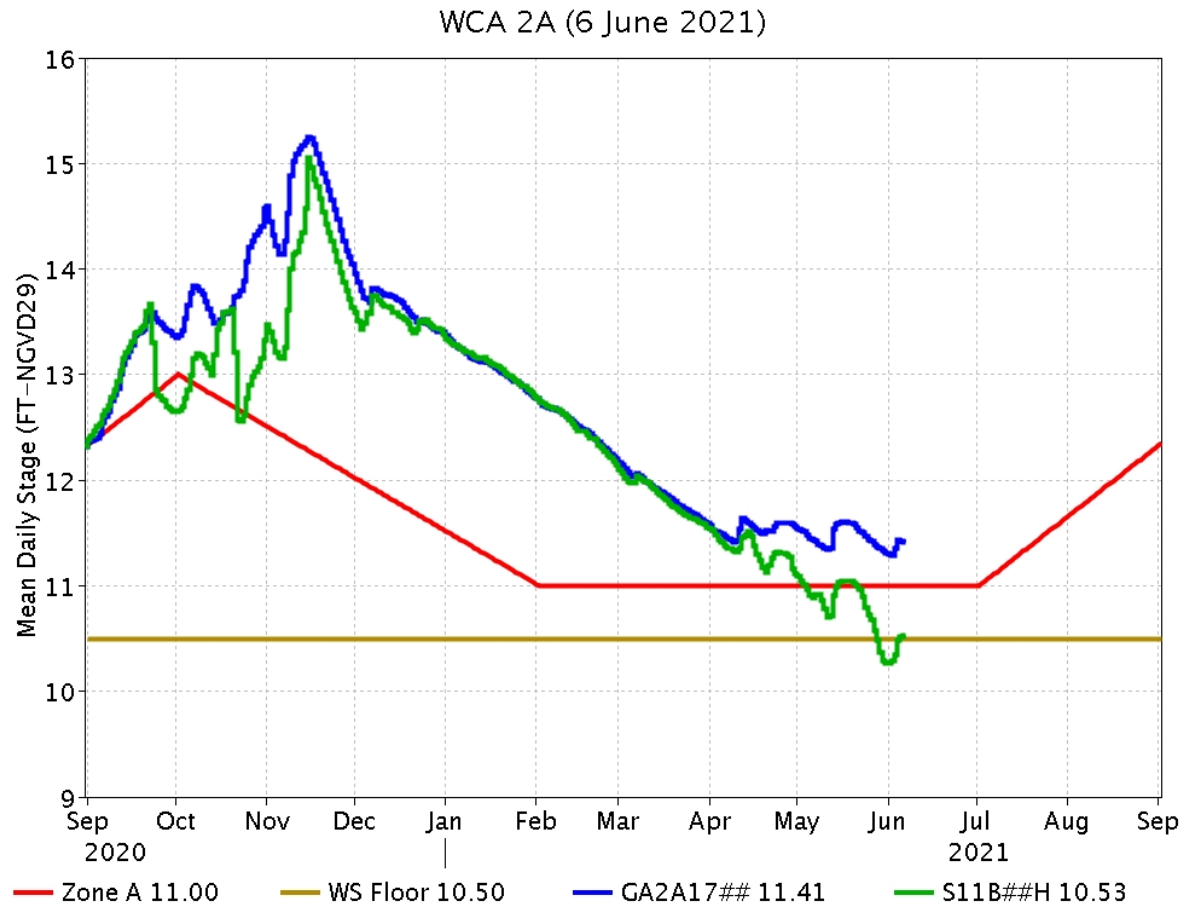


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

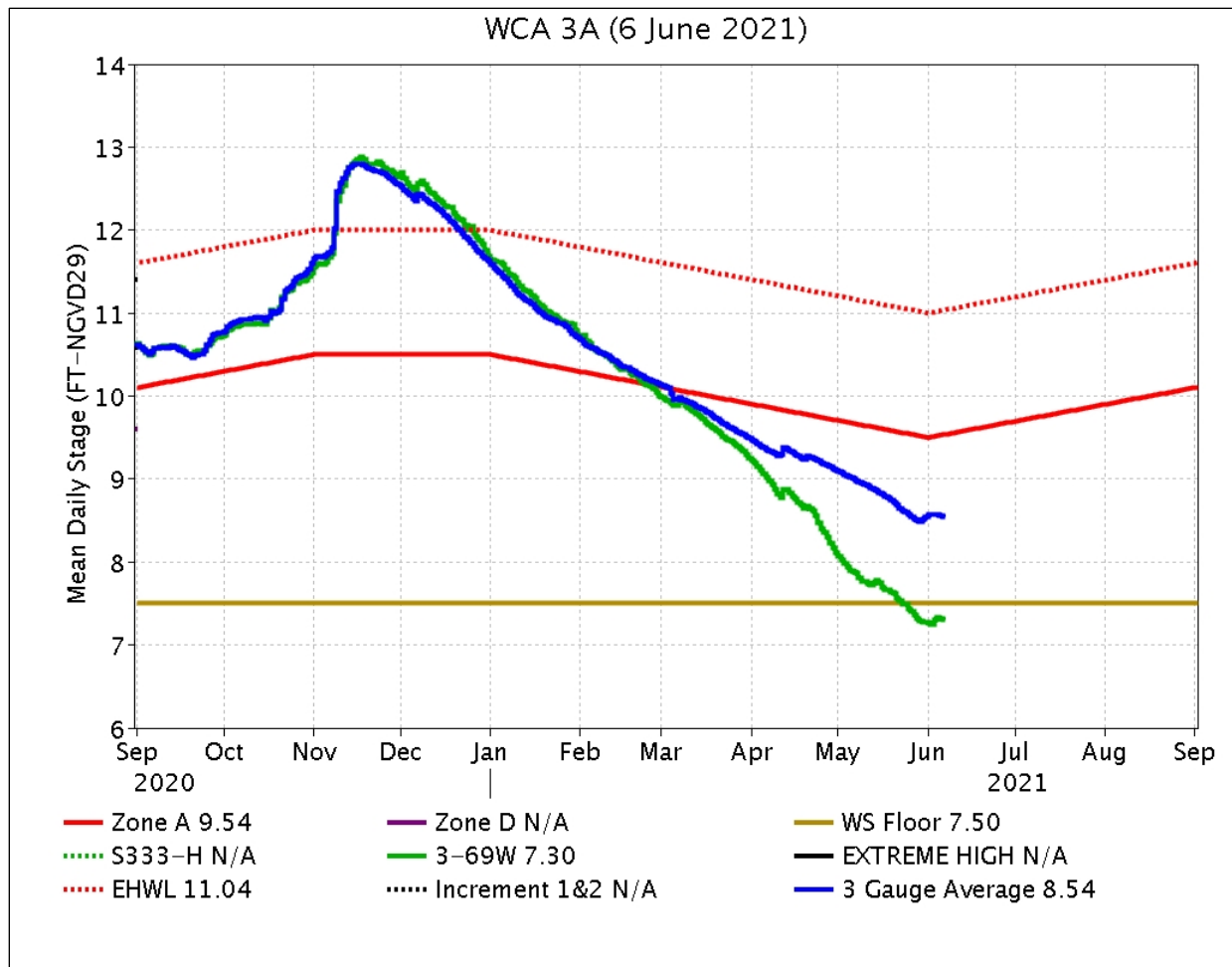


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

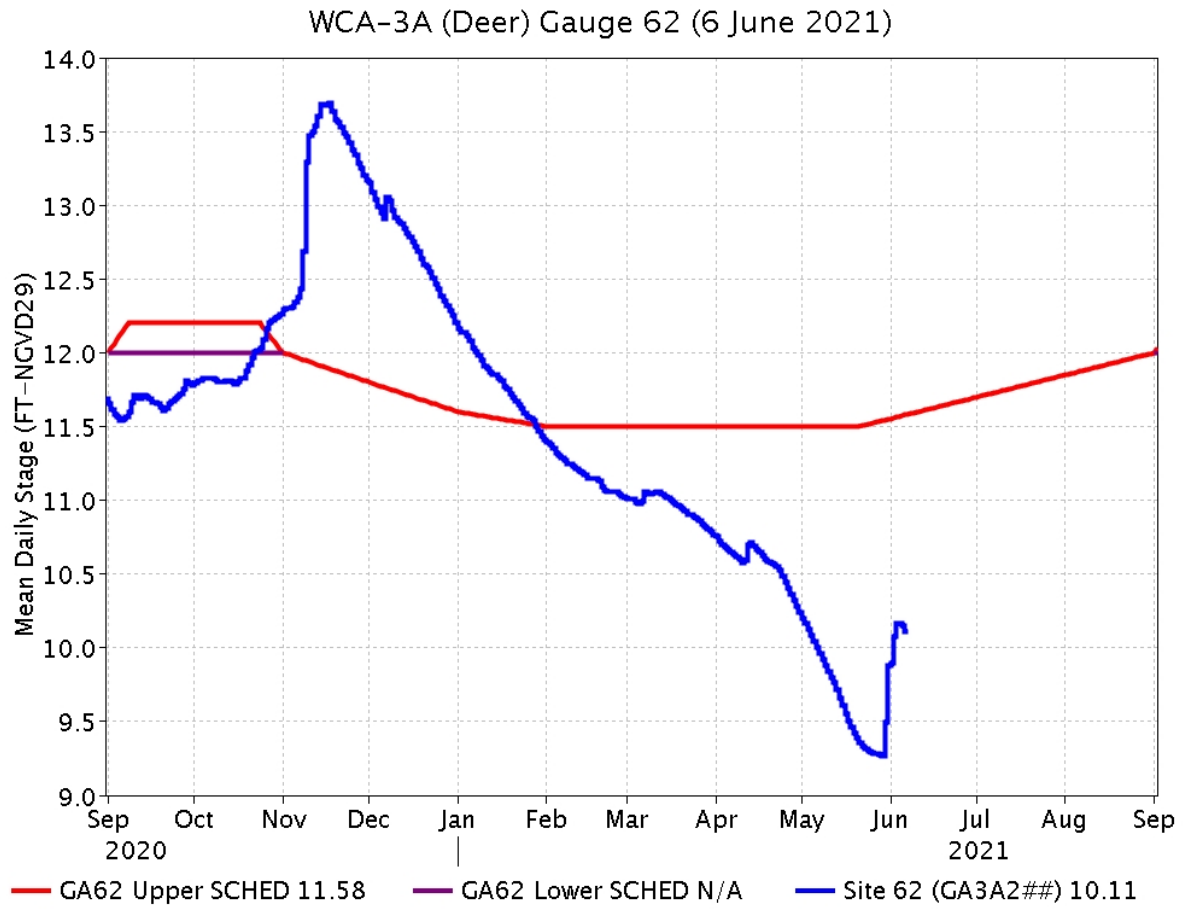


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

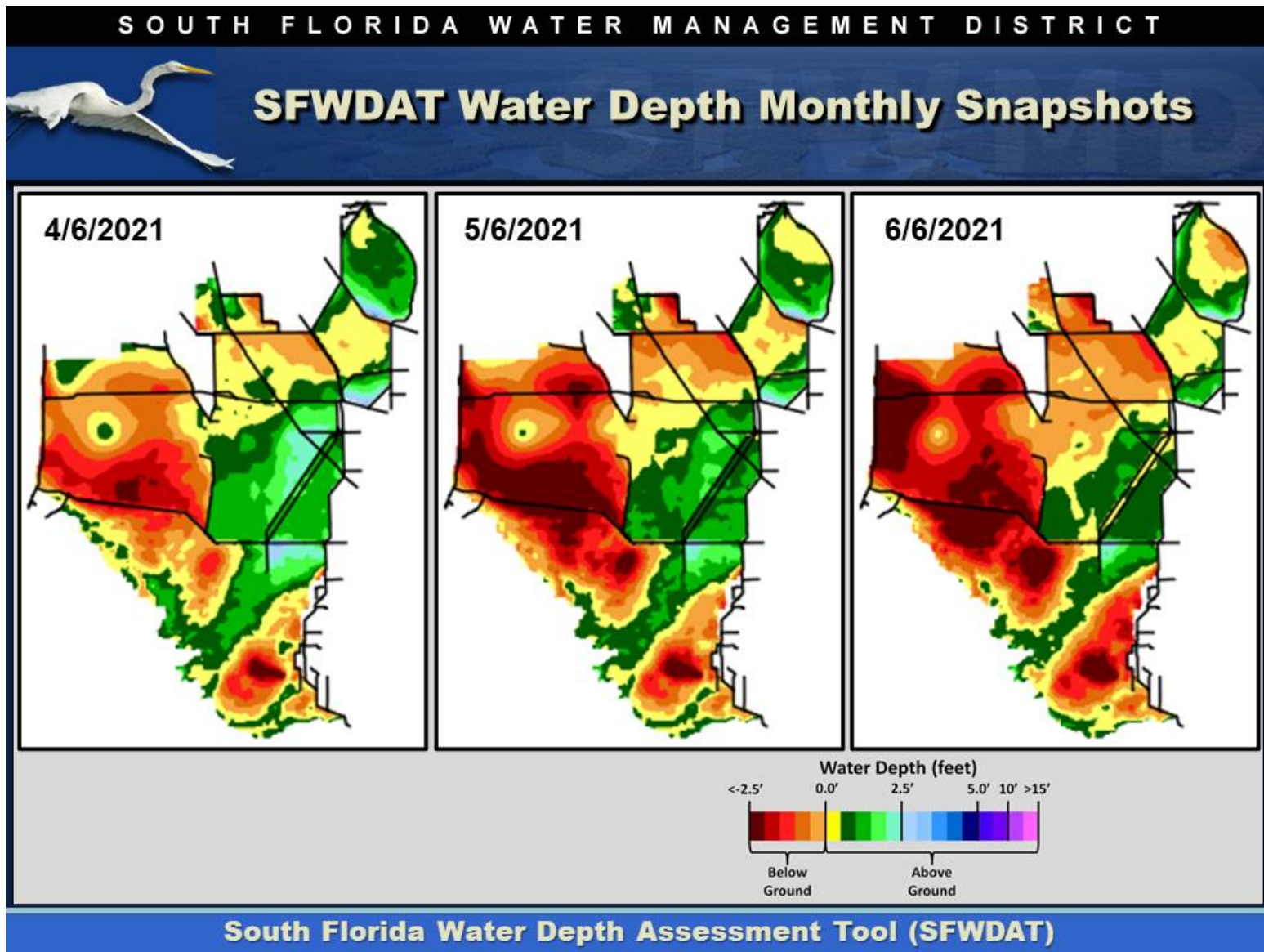


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

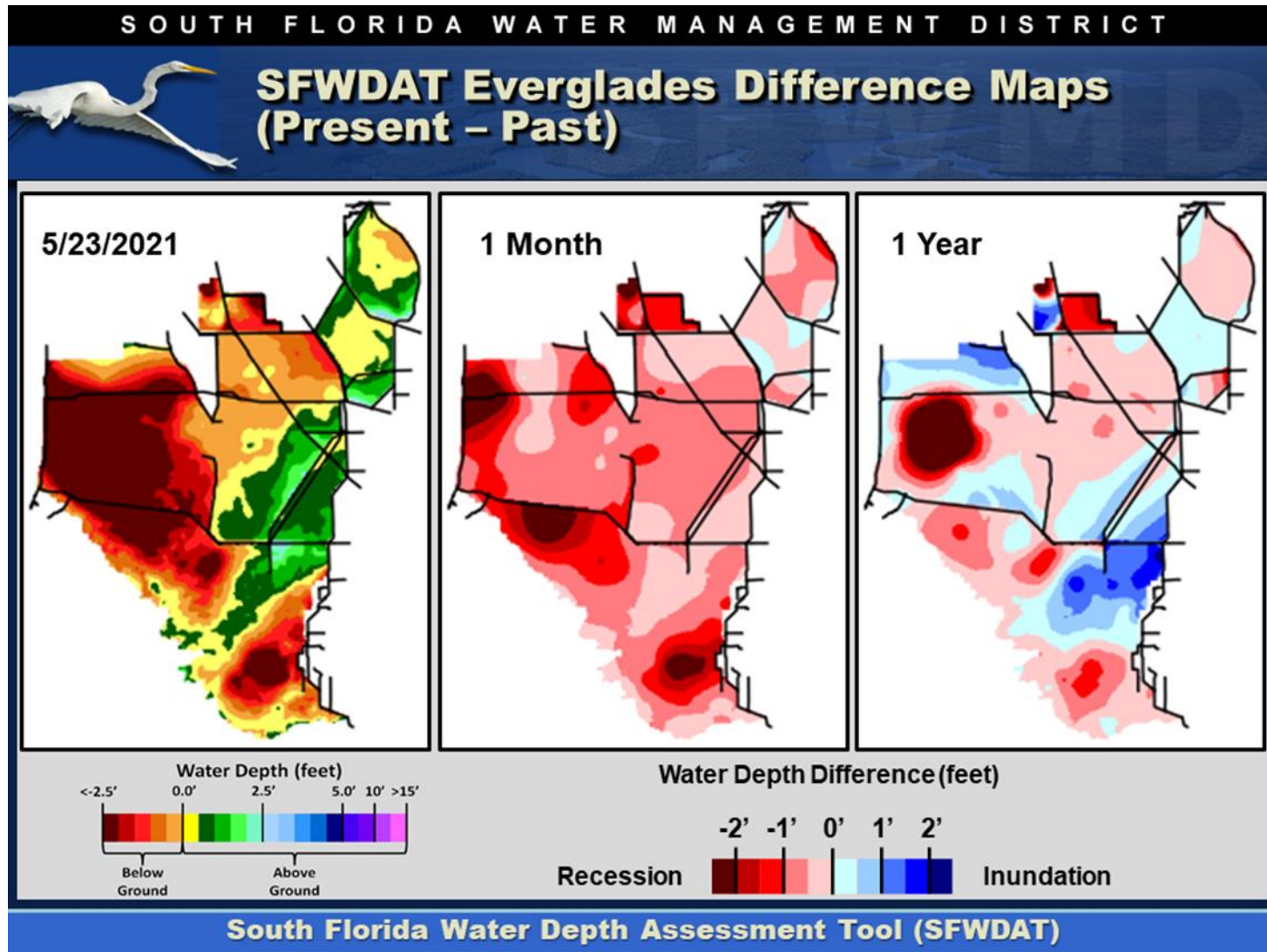


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

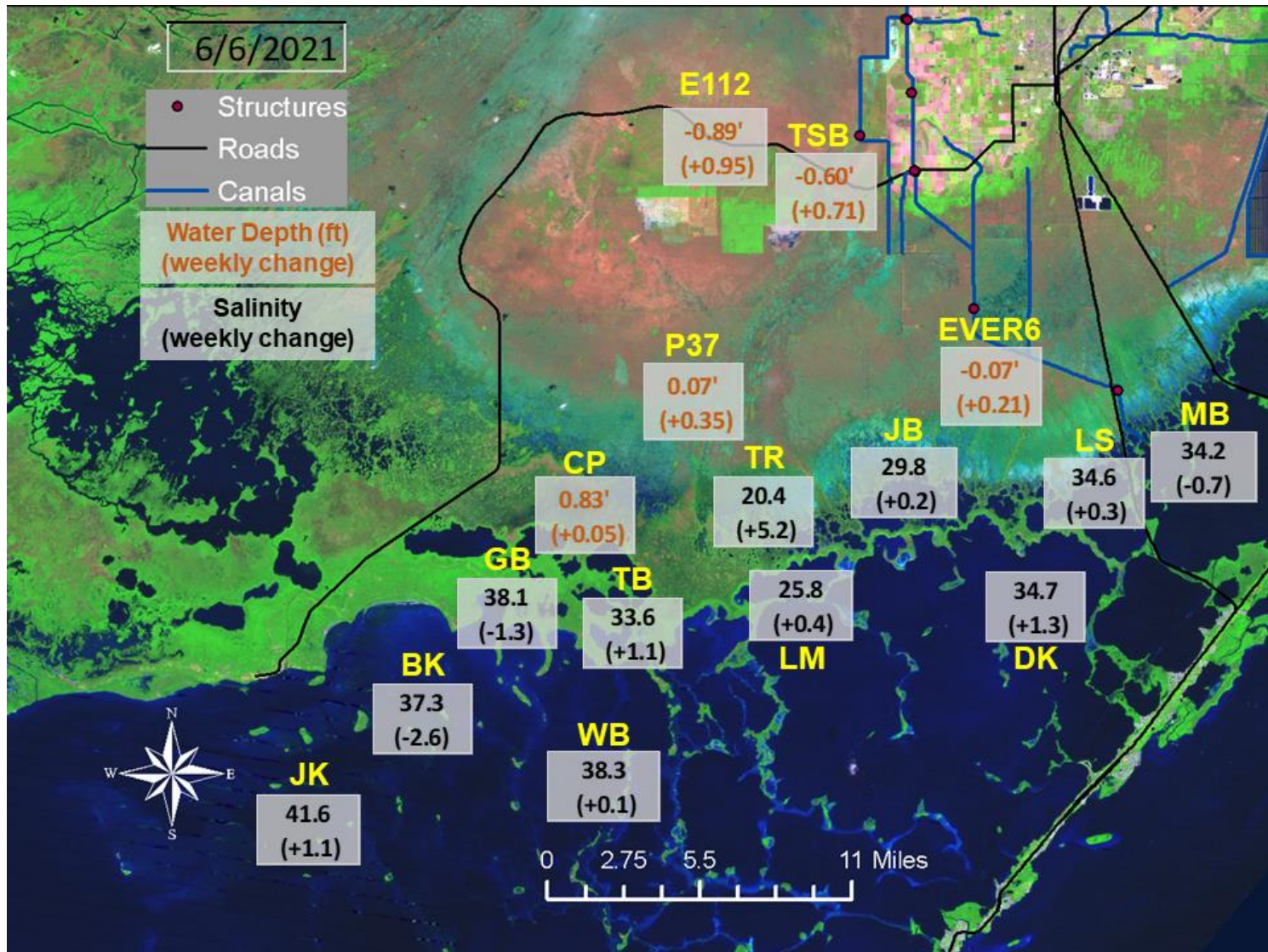


Figure EV-7. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

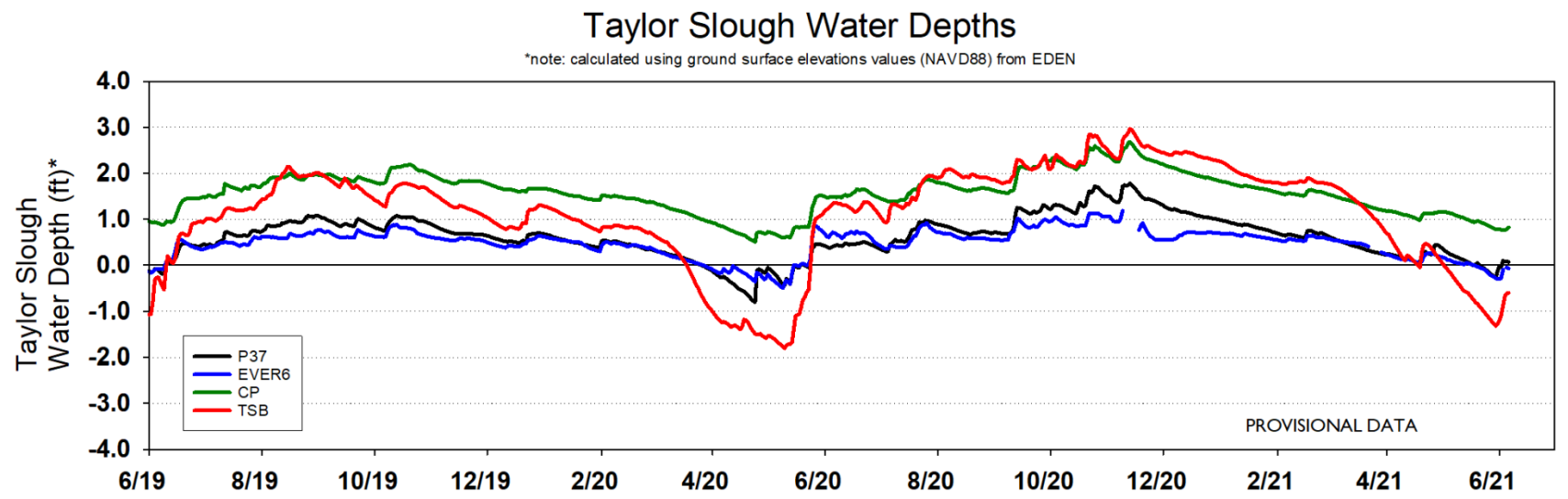


Figure EV-8. Taylor Slough water depth time series.

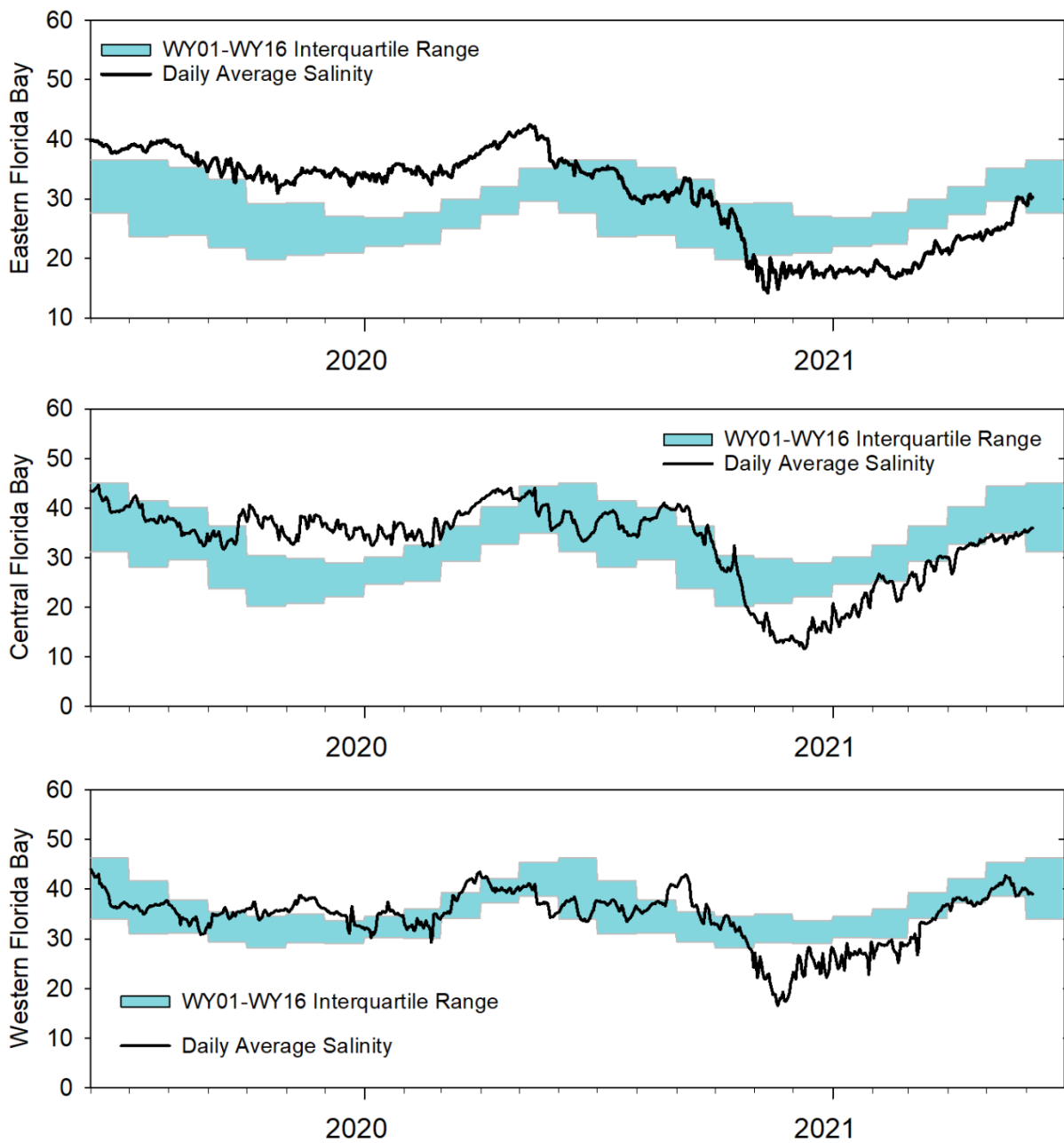


Figure EV-9. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

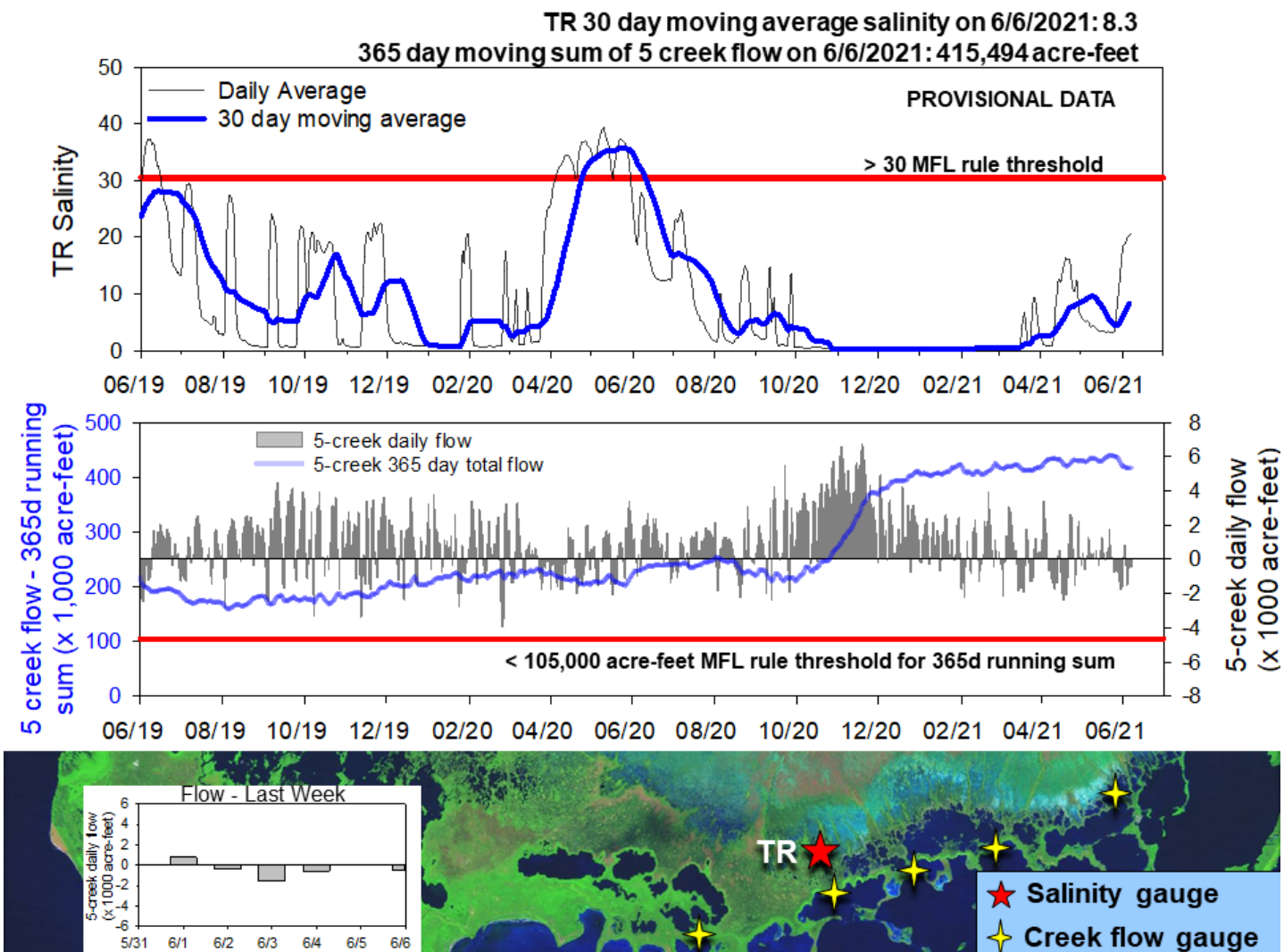


Figure EV-10. Top panel: Taylor River 30-day moving average salinity (blue), daily average salinity (gray) with salinity threshold; middle panel: Five-creek total flow for past 365 days (blue), daily flow (gray) with 365-day flow threshold; bottom panel: map of monitoring locations for the five creeks.

Table EV-11. Weekly water depth changes and water management recommendations

SFWMD Everglades Ecological Recommendations, June 8th, 2021 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.05'	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 increased by 0.07'	Maintain marsh stage 0.5 feet above and parallel to the regulation schedule.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage increased by 0.01'	Maintain a recession rate to near 0.05 to 0.07 feet per week.	Protect within basin wading bird foraging.
WCA-3A NE	Stage decreased by 0.02'	Initiate ascension up to 0.25 feet per week.	Protect within basin habitat and wildlife. Inflows and rehydration preserve peat soils and prevents wildfire.
WCA-3A NW	Stage increased by 0.16	Initiate ascension up to 0.25 feet per week.	
Central WCA-3A S	Stage increased by 0.16'	Maintain the recession rate at near .10 feet per week. Moderate any reversal as possible.	Protect within basin wading bird foraging.
Southern WCA-3A S	Stage decreased by 0.08'		
WCA-3B	Stage remained unchanged	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 TTFF 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.