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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 16, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

On Wednesday, a small-scale mid-level disturbance rising out of the Gulf of Mexico could move over Florida in an environment of deep and abundant moisture associated with a Gulf of Mexico tropical disturbance. The small-scale feature could produce a significant District rain event. Most indications are for a broad area of a half of an inch or more covering most of the southwestern half of the District. A reasonable worst-case scenario is around or above an inch of large areal average rainfall over this region, focused along and near the southwest coast. A change in weather pattern on Thursday will decrease total rainfall, although additional rains could occur over the central and southern parts of the District. Unfortunately, the transitional weather pattern on Thursday makes the forecast on that day of low confidence at this time. By Friday, a strongly convergent upper-level wind flow will usher in an unfavorable large-scale pattern for rain. This will occur while a layer of Saharan dust moving out of the central and northwestern Caribbean Sea overspreads Florida. The combination of the unfavorable upper-air pattern, increased instability, and reduced moisture of the Saharan air layer is likely to sharply reduce rainfall, with very little rain on Friday and no rain on Saturday. Likely, the western Gulf of Mexico tropical disturbance will develop into a weak tropical cyclone pushing onshore over the lower Mississippi Valley and southeastern U.S. This will likely change the steering pattern over Florida from easterly or southeasterly on Sunday to southerly and southwesterly on Monday removing the Saharan air layer. The moisture supply will replenish with rains expected to redevelop on Sunday with a focus over the interior and the west on Sunday and over the interior and around Lake Okeechobee on Monday.

Kissimmee

Stages in East Lake Toho, Toho and Kissimmee-Cypress-Hatchineha began to rise over the first week of wet season but have levelled off or declined in the second week. 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 13. Dissolved oxygen concentration in the Kissimmee River averaged 6.9 mg/L for the week, well above the 2.0 mg/L threshold considered harmful to sportfish.

Lake Okeechobee

Lake Okeechobee stage was 12.51 feet NGVD on June 13, 2021, 1.06 feet lower than a month ago, and 0.31 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 around a third of the time since January 1, 2021. Recent satellite imagery (June 13, 2021) shows a medium to high bloom potential in the northwestern and northeastern parts of the Lake, and increased bloom potential in central part of the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged approximately 182 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities decreased at all sites in the estuary 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 1,008 cfs over the past week with approximately 593 cfs coming from the Lake. Mean surface salinities increased at all 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 in the fair range at Shell Point and Sanibel.

Stormwater Treatment Areas

For the week ending Sunday, June 13, 2021, approximately 10,000 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 52,100 ac-feet. The total amount of inflows to the STAs in WY2022 is approximately 58,600 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 and STA-2 flow-ways 3 and 4 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

Summary - Record nesting continues as the larger wading birds move out of the nest to forage nearby, foraging conditions remain good. The likely only constraint to the nesting season will be the timing of the start of significant wet season rainfall. Dry conditions dominate northern WCA-3A; that area remains closed to public access. A wildfire in Holeyland WMA burned a majority of that area over the last two weeks. Florida Bay remains well positioned to minimize hypersalinity before the wet season begins.

Supporting Information

Kissimmee Basin

Upper Kissimmee

Lake stages on June 13, 2021 were 54.9 feet NGVD (1.6 feet below schedule) in East Lake Toho, 52.1 feet NGVD (1.4 feet below schedule) in Lake Toho, and 50.0 feet NGVD (1.0 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**). Stages in East Lake Toho, Toho and Kissimmee-Cypress-Hatchineha began to rise over the first week of wet season but have levelled off or declined in the second week.

Lower Kissimmee

Kissimmee River (headwater) stages were 46.3 feet NGVD at S-65A and 25.8 feet NGVD at S-65D on June 13, 2021, while discharges were 350 cfs at S-65, 300 cfs at S-65A, 260 cfs at S-65D and 230 cfs at S-65E (**Table KB-2**). Dissolved oxygen concentration in the Kissimmee River averaged 6.9 mg/L for the week ending on June 13, 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 13 (**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) when adjustments to discharges are made. Limit ascension (stage rise) rates to 0.5 ft/14 days in East Lake Toho, Toho and Kissimmee-Cypress-Hatchineha to the extent possible while maintaining the discharge rate of change limits. If lake stages begin to decline, attempt to limit the recession rate to 0.18 ft/week.

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)	
							6/13/21	6/6/21
Lakes Hart and Mary Jane	S-62	LKMJ	0	59.3	R	60.0	-0.7	-0.6
Lakes Myrtle, Preston and Joel	S-57	S-57	0	59.8	R	61.0	-1.2	-1.1
Alligator Chain	S-60	ALLI	0	62.0	R	63.2	-1.2	-1.2
Lake Gentry	S-63	LKGT	0	59.6	R	61.0	-1.4	-1.5
East Lake Toho	S-59	TOHOE	0	54.9	R	56.5	-1.6	-1.5
Lake Toho	S-61	TOHOW S-61	0	52.1	R	53.5	-1.4	-1.4
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	341	50.0	R	51.0	-1.0	-0.8

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.

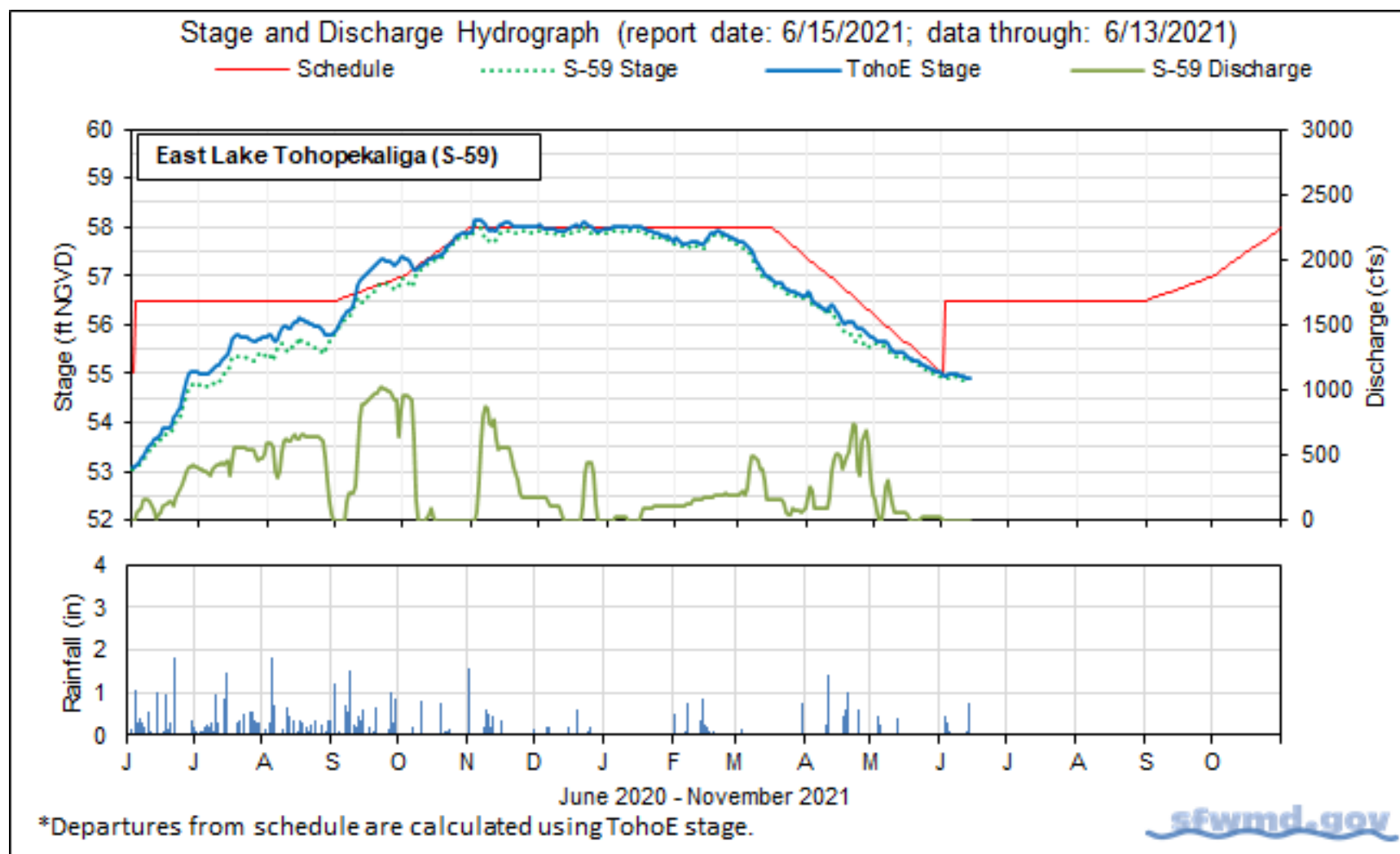


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

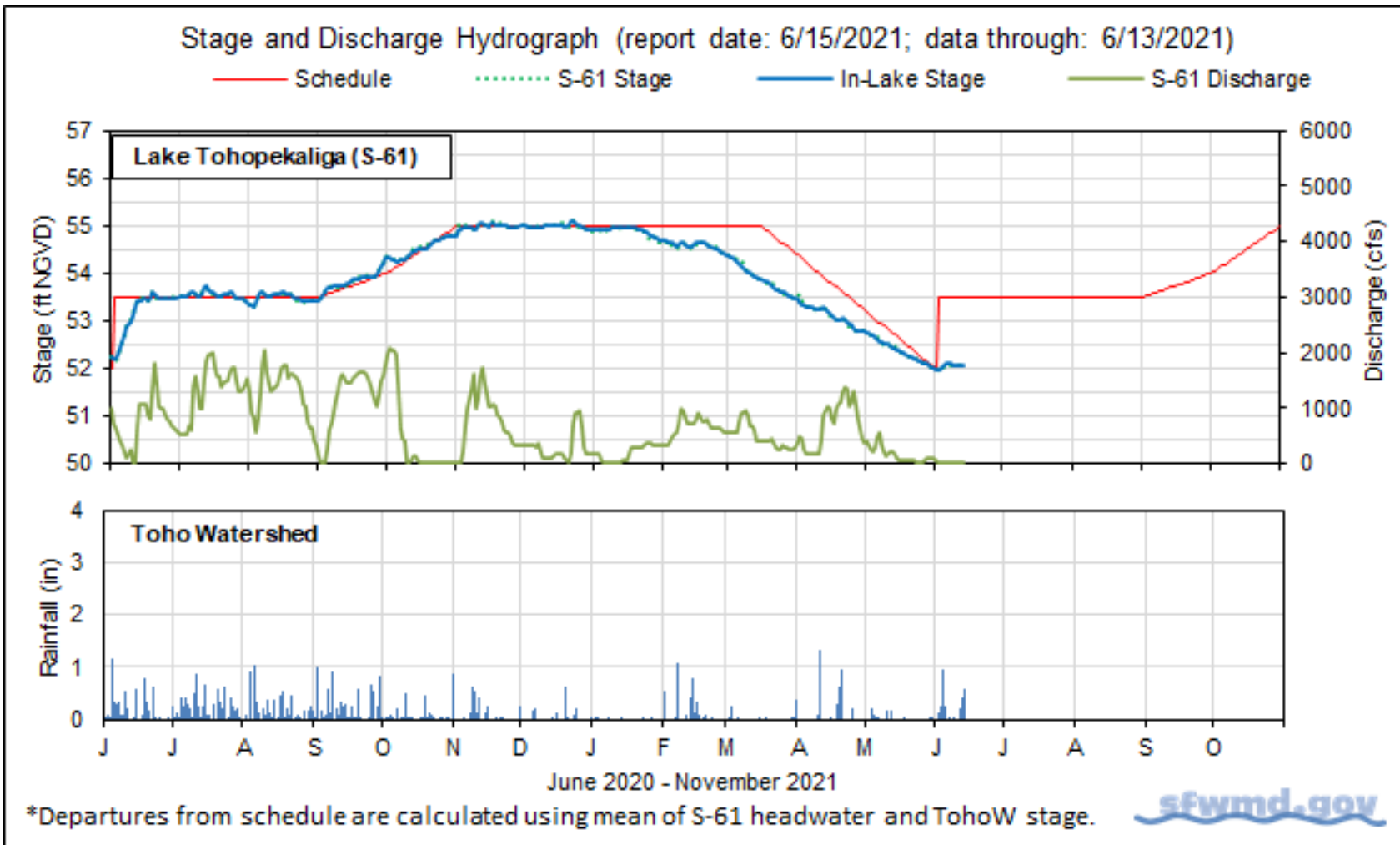


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

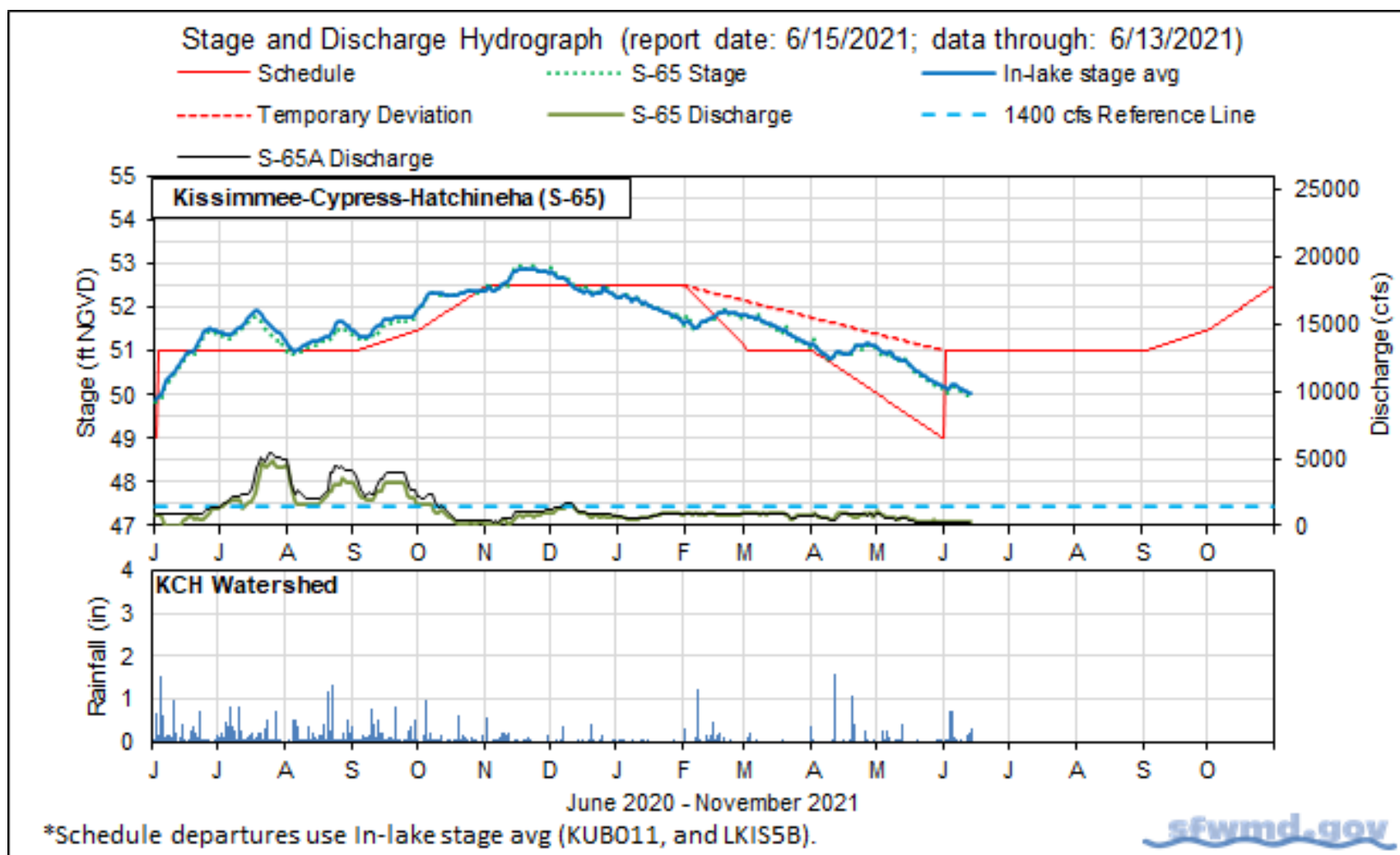


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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 6/13/21	Average for Previous Seven Day Periods			
			6/13/21	6/6/21	5/30/21	5/23/21
Discharge	S-65	348	341	355	353	393
Discharge	S-65A ^a	297	299	296	267	303
Headwater Stage (feet NGVD)	S-65A	46.33	46.47	46.41	46.30	46.27
Discharge	S-65D ^b	264	266	314	262	379
Headwater Stage (feet NGVD)	S-65D ^c	25.76	25.70	25.71	25.76	25.75
Discharge (cfs)	S-65E ^d	225	253	302	245	369
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	6.4	6.9	6.6	7.9	8.0
Mean depth (feet) ^f	Phase I floodplain	0.07	0.07	0.07	0.07	0.08

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.

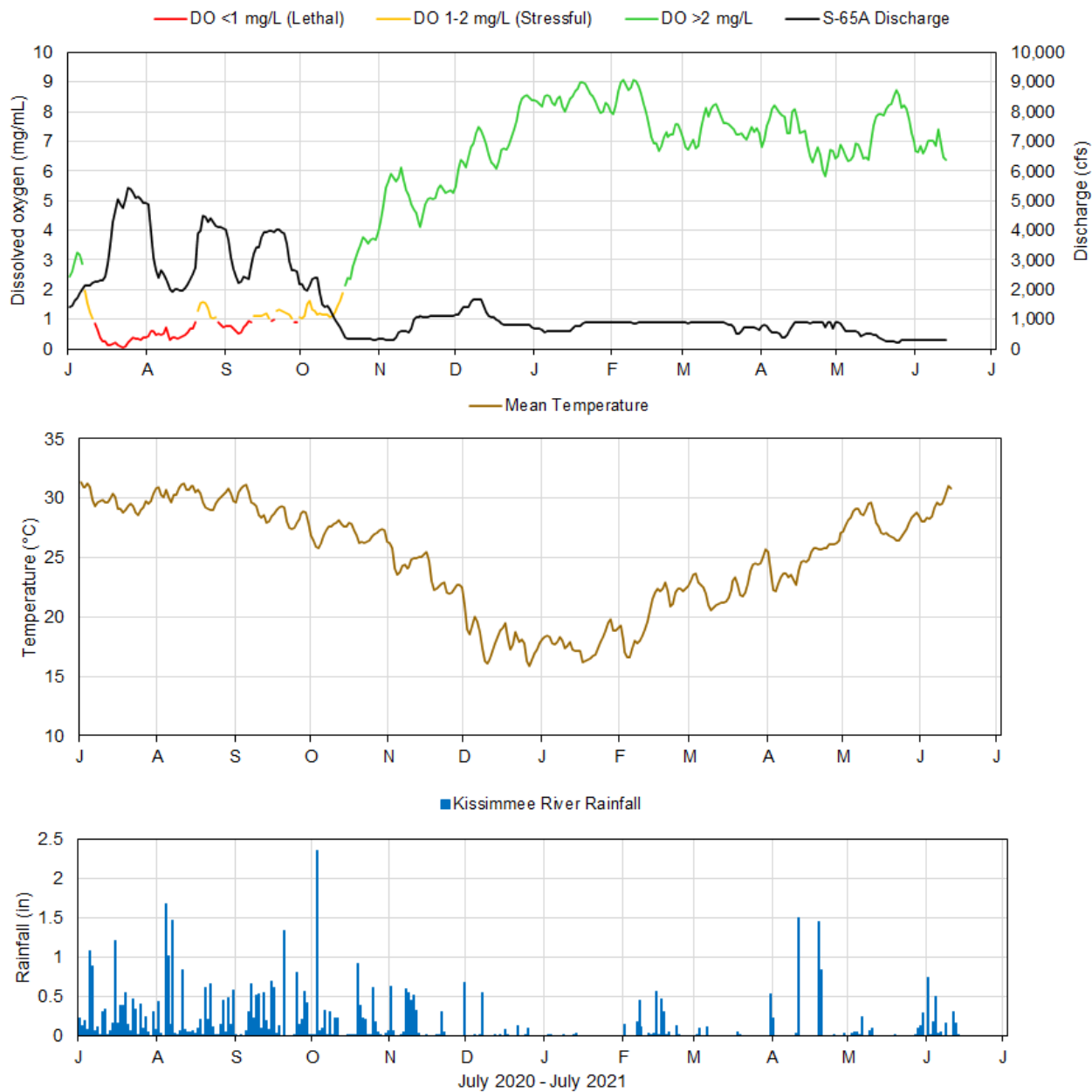
d. Combined discharge from S-65E and S-65EX1.

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



Report Date: 6/15/2021; data are through: 6/13/2021

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

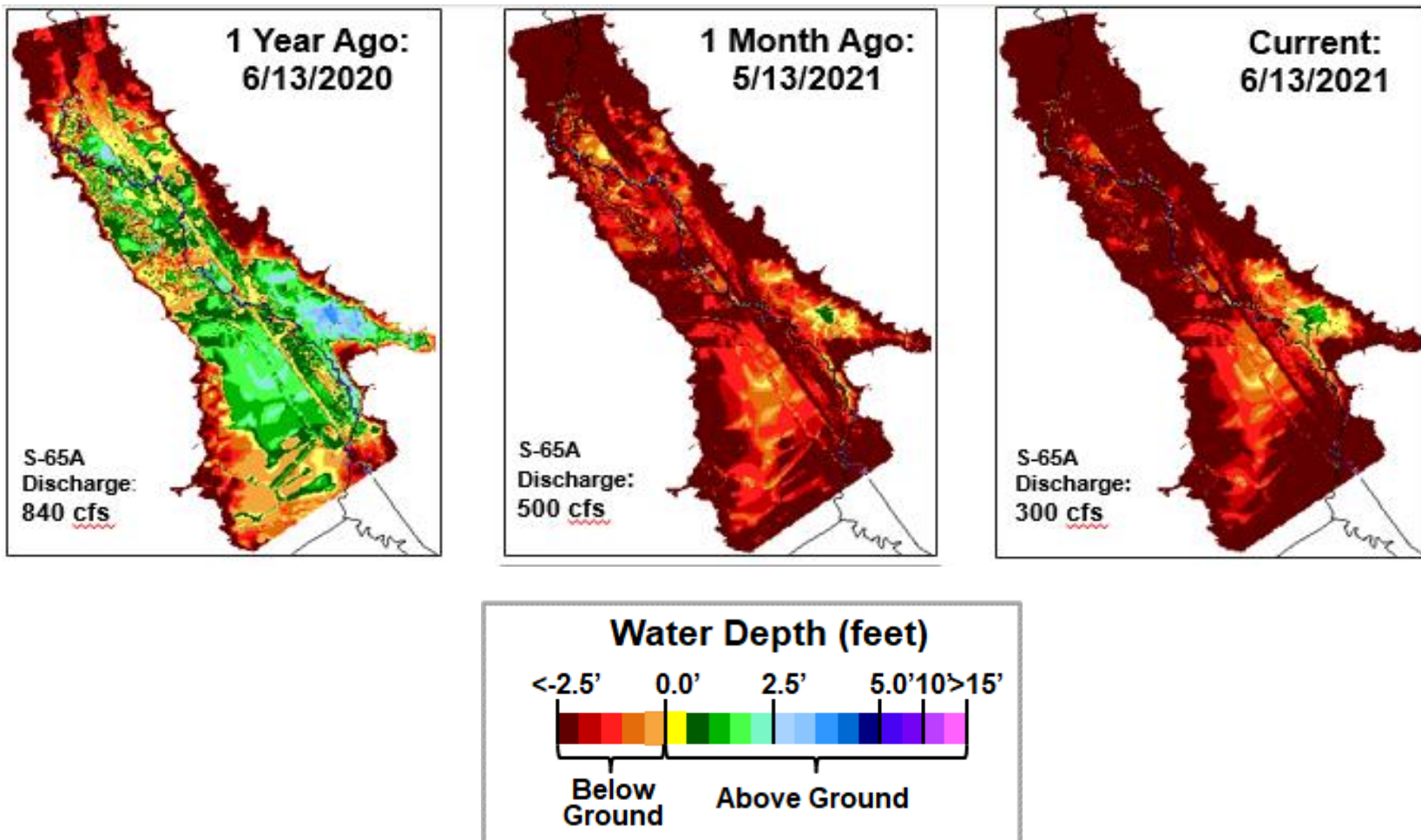


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

Lake Okeechobee

Lake Okeechobee stage was 12.51 feet NGVD on June 13, 2021, 1.06 feet lower than a month ago, and 0.31 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 around a third 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 2.5 feet since mid-March, averaging a roughly 0.19 feet per week recession rate (**Figure LO-3**). According to NEXRAD, 0.41 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 395 cubic feet per second (cfs) to 285 cfs. Outflows (excluding evapotranspiration) increased, going from 2,842 cfs to 3,486 cfs. The majority of the inflow came from the Kissimmee River (253 cfs through S-65E & S-65EX1). Releases to the west via S-77 decreased from 972 cfs to 790 cfs and releases east via S-308 increased to 11 cfs. Releases south through the S-350 structures increased from 1,981 cfs to 2,612 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 13, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed increased bloom potential in central part of the Lake and medium to high bloom potential along the northwestern and northeastern parts of the Lake. Overall, the bloom potential increased on the Lake from the previous week (**Figure LO-5**).

A total of 20 out of 32 samples (or 97%) had microcystin concentrations below the EPA recommended human health recreational standard (8 µg/L) and 34% had toxin concentrations below detection limits (**Table LO-2** and **Figure LO-6**). The highest microcystin concentration (13 µg/L) was detected at POLESOUT1 in the NW part of the Lake. Overall, toxin concentration gradually decreased since early May, especially in the southern part of the Lake. 63% of the sites had communities dominated by *Microcystis aeruginosa*. The remaining 37% had mixed communities. The percentage of samples with mixed communities gradually increased since early May.

Wading bird numbers decreased over the last several weeks, which is normal for this time of the year as available marsh habitat dries, reducing suitable foraging areas for birds (**Figure LO-7**). About 90% of active snail kite nests failed between mid-May and early June, coinciding with rapid recession rates and a drying of areas where nesting activity was occurring (**Figure LO-8**). There are now 4 active nests on the lake, down from 54 in mid-May.

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	302	253	0.1	S-77	972	790	0.4
S-71 & S-72	0	0	0.0	S-308	-112	11	0.0
S-84 & S-84X	0	0	0.0	S-351	597	1144	0.5
Fisheating Creek	11	12	0.0	S-352	218	481	0.2
S-154	0	0	0.0	S-354	1166	987	0.4
S-191	0	0	0.0	L-8 Outflow		72	0.0
S-133 P	0	0	0.0	Evapotranspiration	2536	2923	1.3
S-127 P	0	0	0.0	Totals	5378	6409	2.9
S-129 P	0	0	0.0				
S-131 P	12	20	0.0				
S-135 P	0	0	0.0				
S-2 P	22	0	0.0				
S-3 P	0	0	0.0				
S-4 P	0	0	0.0				
L-8 Backflow	48						
Rainfall	2726	1090	0.5				
Totals	3121	1376	0.6				

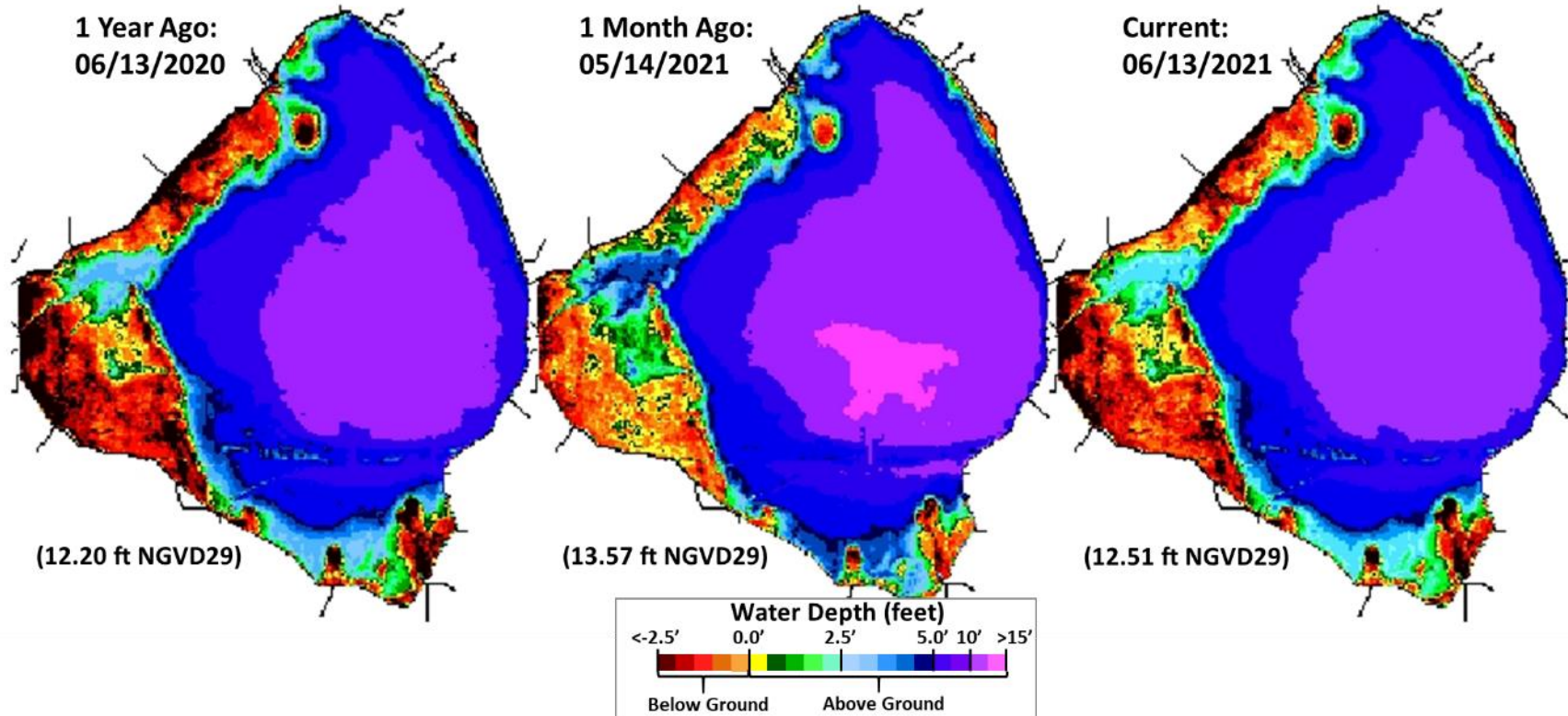


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Stage vs Updated Ecological Envelope

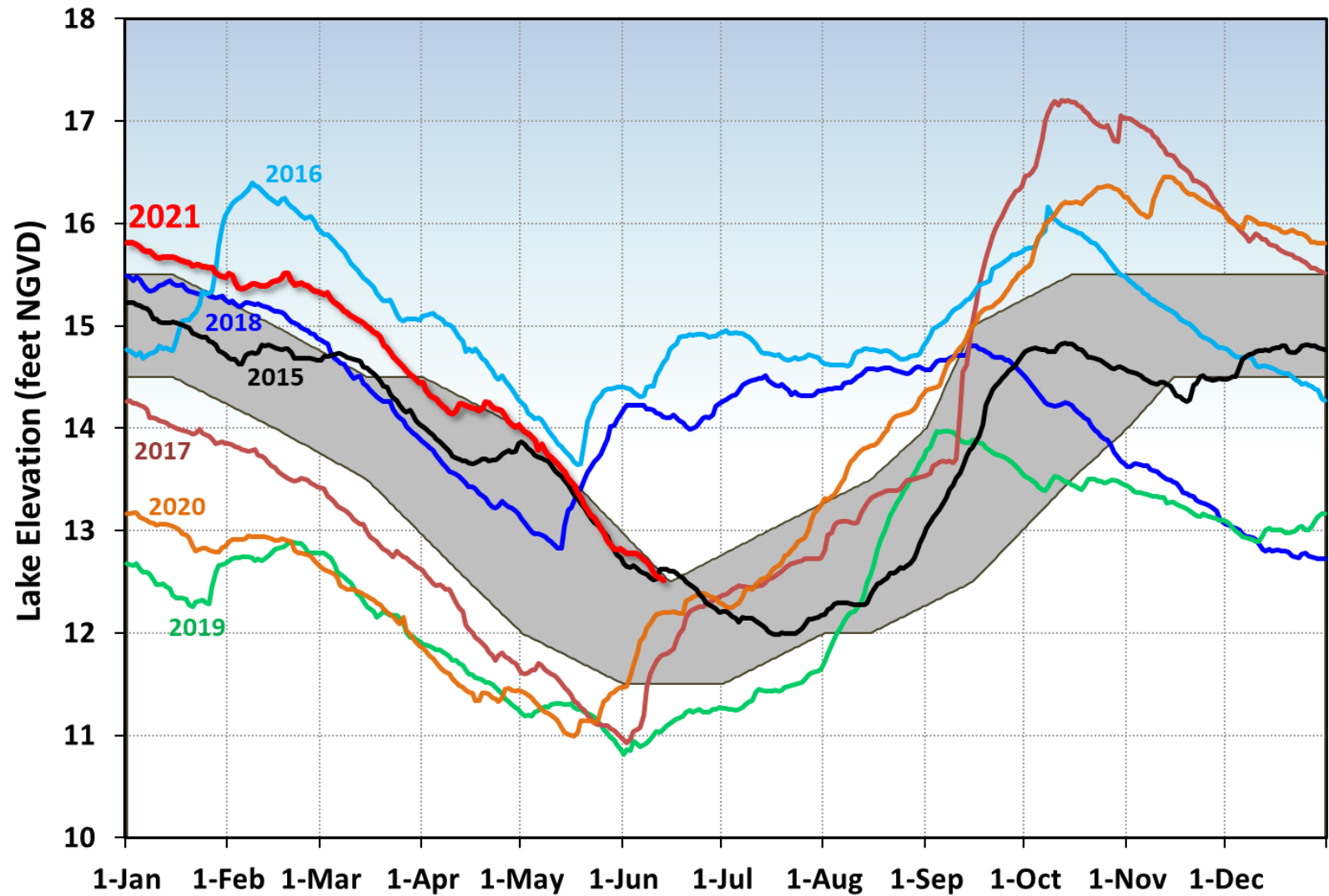
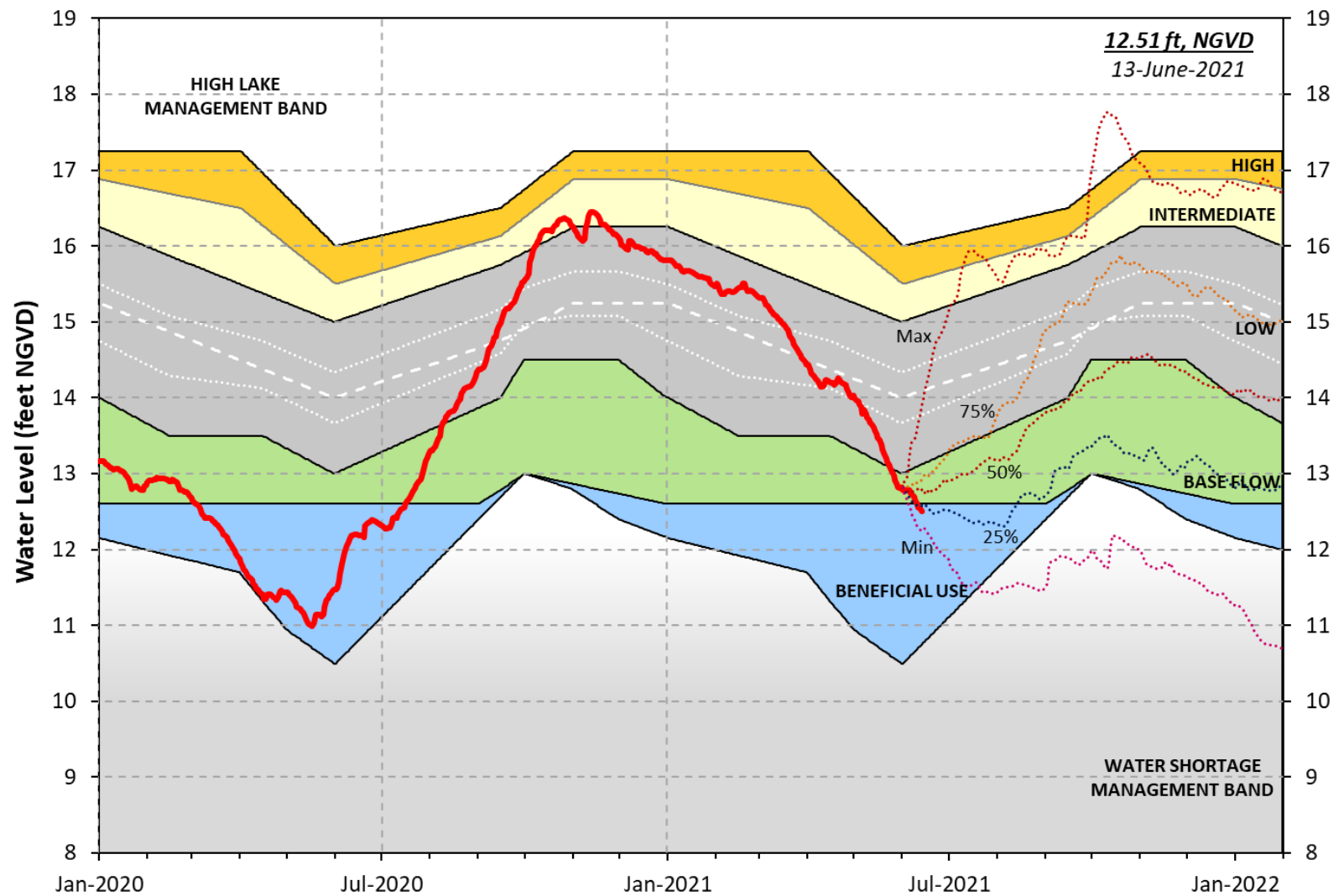


Figure LO-2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated ecological envelope.

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.

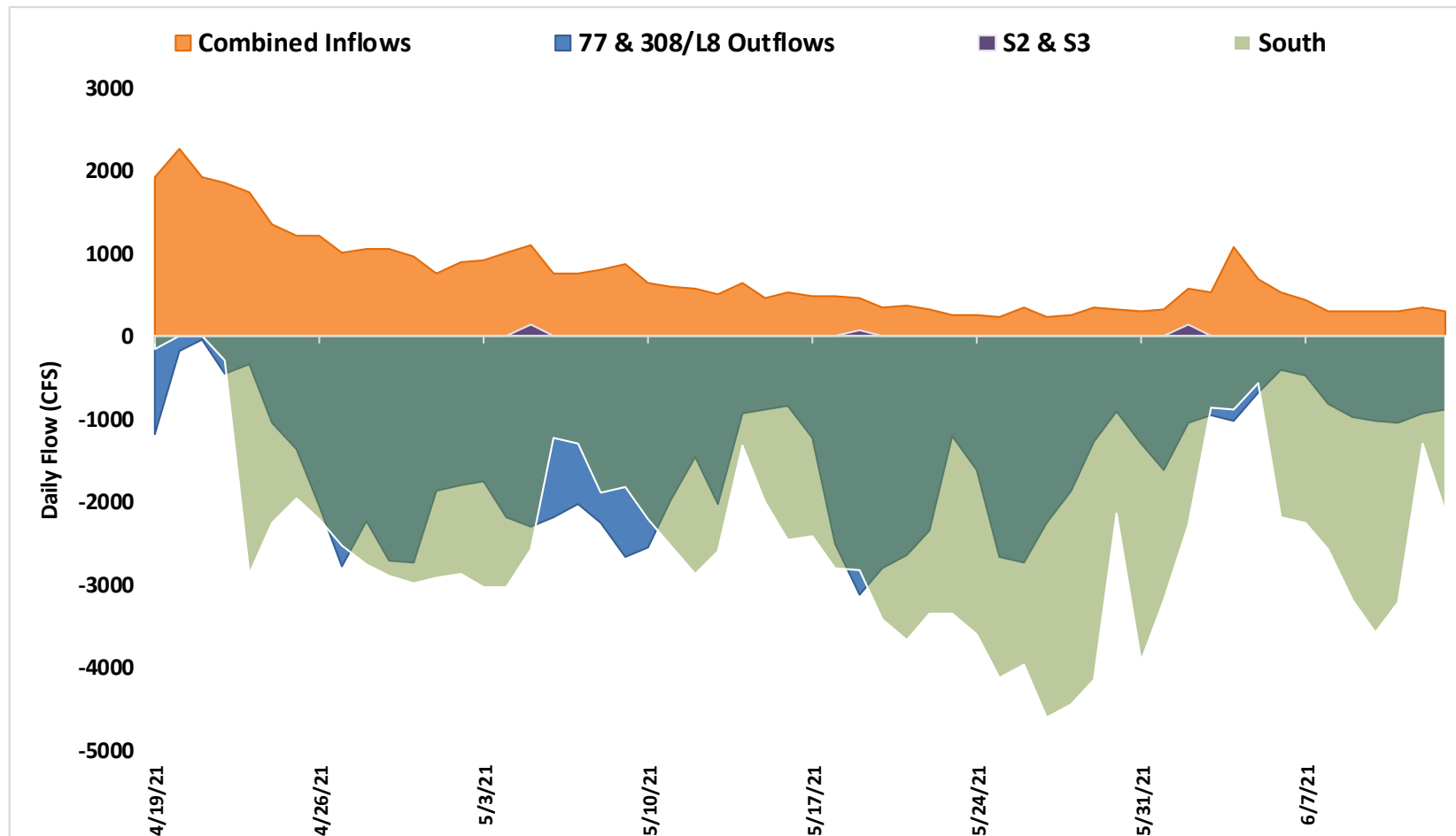
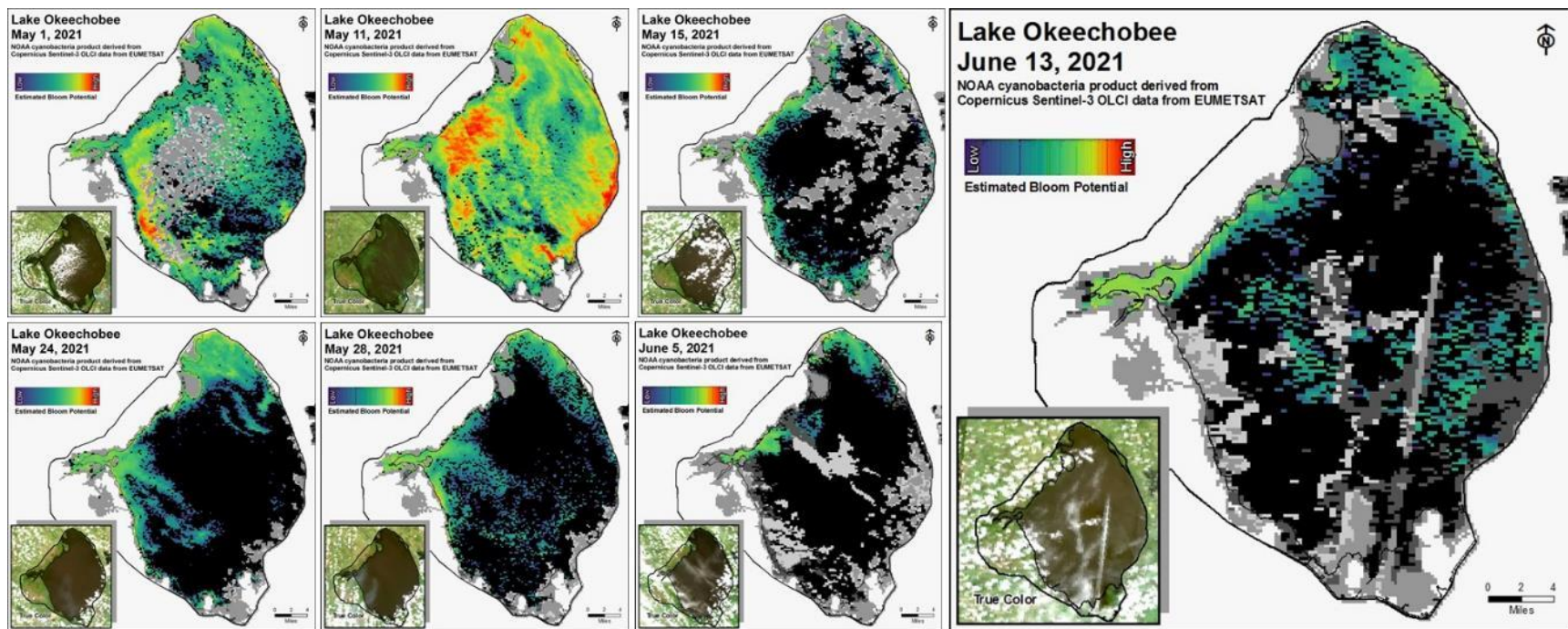


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) are included as inflows. Conversely, flows from Lake Okeechobee into the L-8 Canal are included 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 June 7-9, 2021.

Station	Chl <i>a</i> (µg/L)	Toxin (µg/L)	Taxa	Station	Chl <i>a</i> (µg/L)	Toxin (µg/L)	Taxa
FEBIN	96.4	BDL	mixed	L001	13.7	5.2	<i>Microcys</i>
FEBOUT	122.0	0.3	mixed	L004	8.3	0.3	mixed
KISSR0.0	31.8	7.4	<i>Microcys</i>	L006	P	0.3	<i>Microcys</i>
L005	16.4	2.2	<i>Microcys</i>	L007	P	BDL	mixed
LZ2	117.0	0.7	mixed	L008	9.3	0.5	mixed
KBARSE	46.4	2.0	<i>Microcys</i>	LZ30	P	BDL	<i>Microcys</i>
RITTAE2	P	BDL	mixed	LZ40	P	BDL	<i>Microcys</i>
PELBAY3	P	BDL	mixed	CLV10A	P	BDL	<i>Microcys</i>
POLE3S	P	BDL	mixed	NCENTER	9.7	1.4	mixed
LZ25A	P	BDL	mixed	Outflow Structures			
PALMOUT	P	1.5	<i>Microcys</i>	S308C	P	0.8	<i>Microcys</i>
PALMOUT1	P	1.9	<i>Microcys</i>	S77	P	0.4	<i>Microcys</i>
PALMOUT2	P	BDL	<i>Microcys</i>	<ul style="list-style-type: none"> SFWMD considers > 40 µg/L chlorophyll <i>a</i> (Chla) 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 Chla 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	P	1	<i>Microcys</i>				
POLESOUT	48.1	0.6	<i>Microcys</i>				
POLESOUT1	57.4	13.0	<i>Microcys</i>				
POLESOUT2	14.9	0.8	<i>Microcys</i>				
POLESOUT3	10.9	2.3	<i>Microcys</i>				
EASTSHORE	15.6	0.8	<i>Microcys</i>				
NES135	30.1	1.2	<i>Microcys</i>				



NOAA cyanobacteria product derived from Copernicus Sentinel-3 OLCI data from EUMETSAT

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

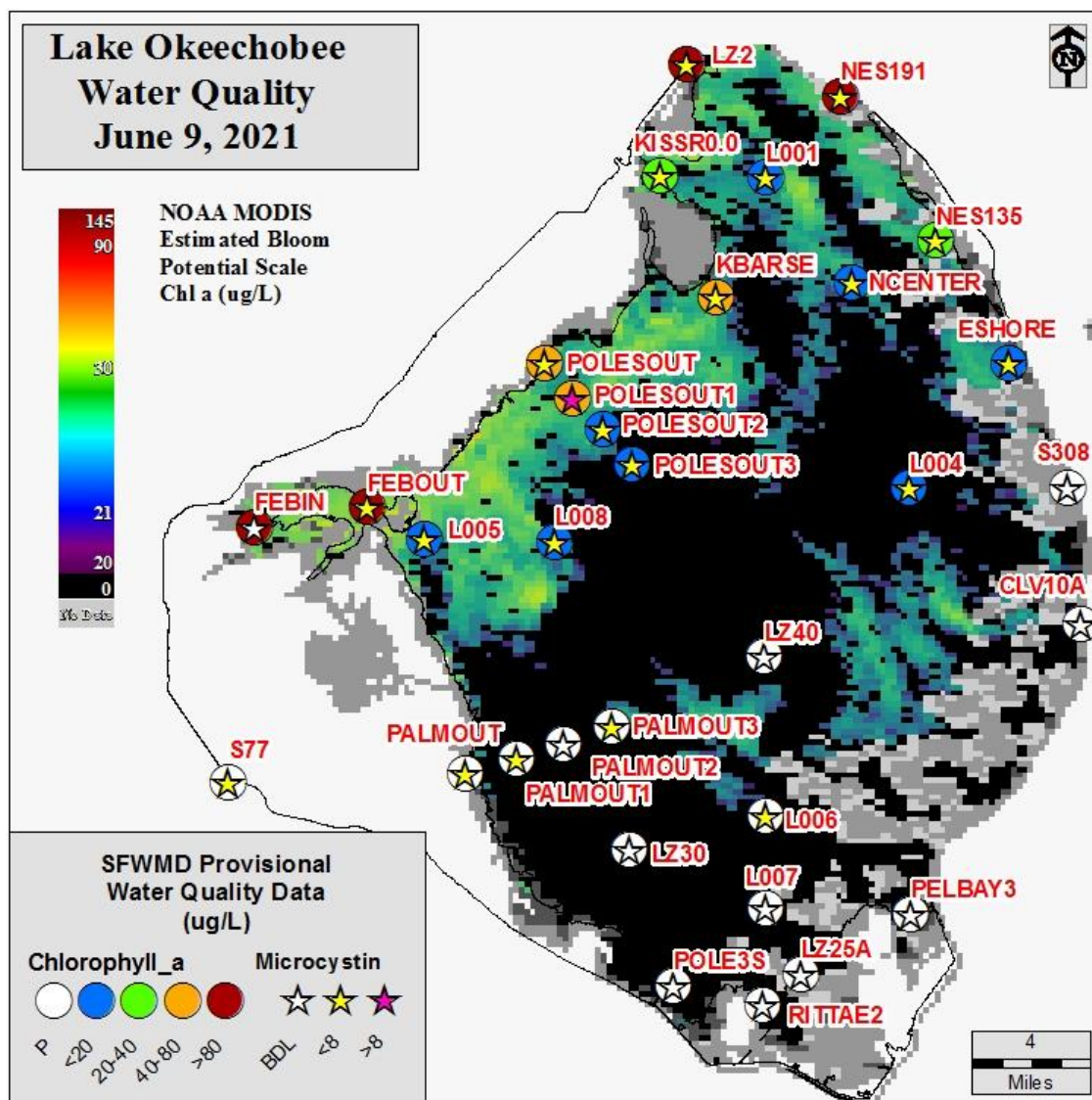


Figure LO-6. Expanded monitoring network and provisional results from samples collected June 7-9, 2021.

Wading Bird Foraging Locations June 10, 2021

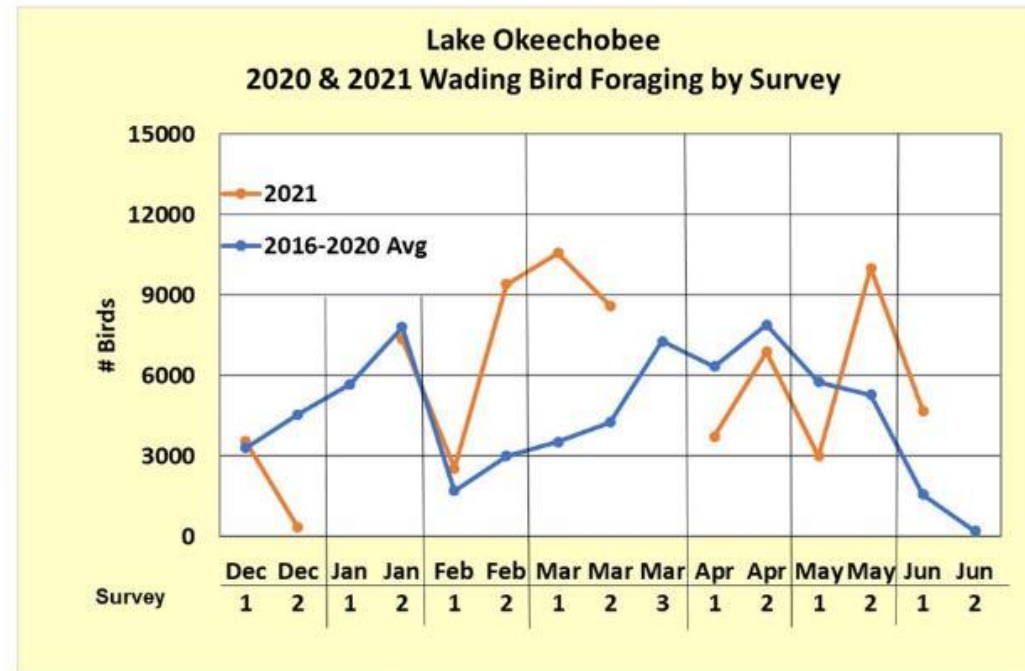
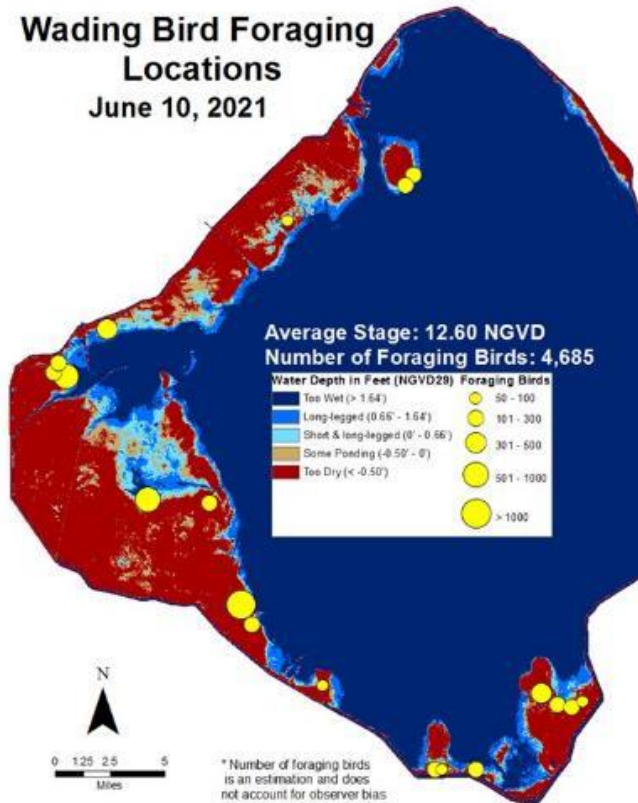


Figure LO-7. Wading bird foraging abundance during the June 10, 2021 survey of Lake Okeechobee.

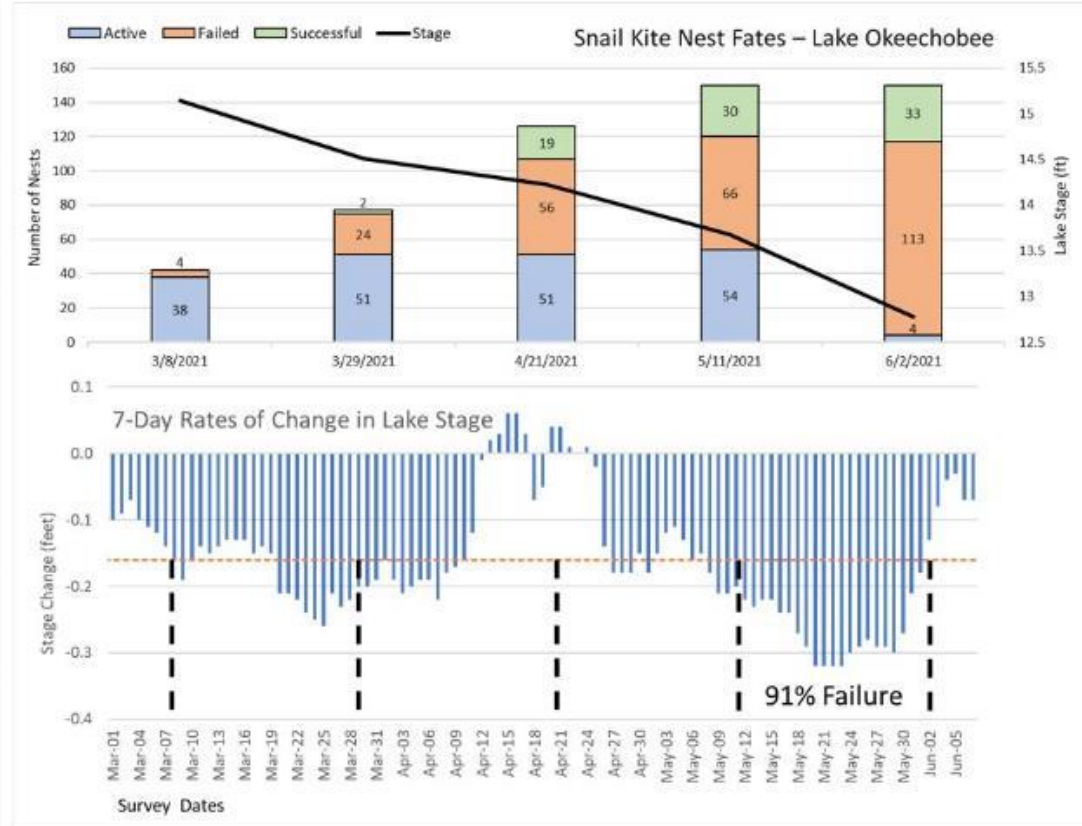
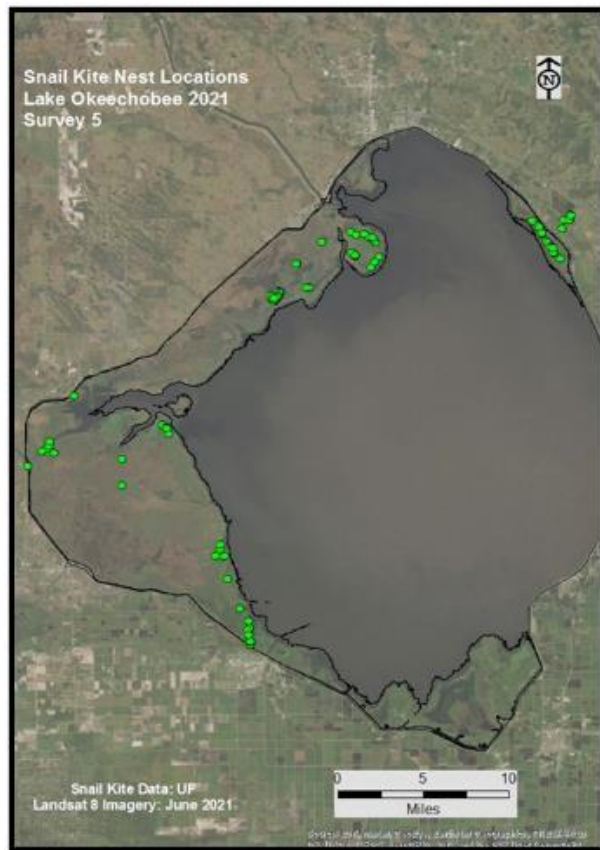


Figure LO-8. Changes in snail kite nest numbers and fates, Lake stages, and 7-day recession rates since March 2021. The dashed orange line represents the maximum recommended recession rate for snail kites on Lake Okeechobee by the US Fish and Wildlife Service (0.16 feet per week)

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was approximately 182 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was approximately 202 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities decreased at all sites within the estuary (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 24.6. 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 1,008 cfs (**Figures ES-5 and ES-6**) and the previous 30-day mean inflow was approximately 1,388 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-6**.

Over the past week, surface salinity increased at all 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 in the fair range at Shell Point and 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 93 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 2.2 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 11, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at low concentrations in Charlotte County, and background to medium concentrations in Lee and Collier counties. On the east coast, red tide was not observed in samples from St. Lucie, Martin or Palm Beach counties.

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.

Water Management Recommendations

Lake stage is in the Beneficial Use Sub-Band. Tributary conditions are dry. The LORS2008 release guidance suggests no releases to the Caloosahatchee River Estuary or the St. Lucie Estuary unless the SFWMD Governing Board recommends otherwise.

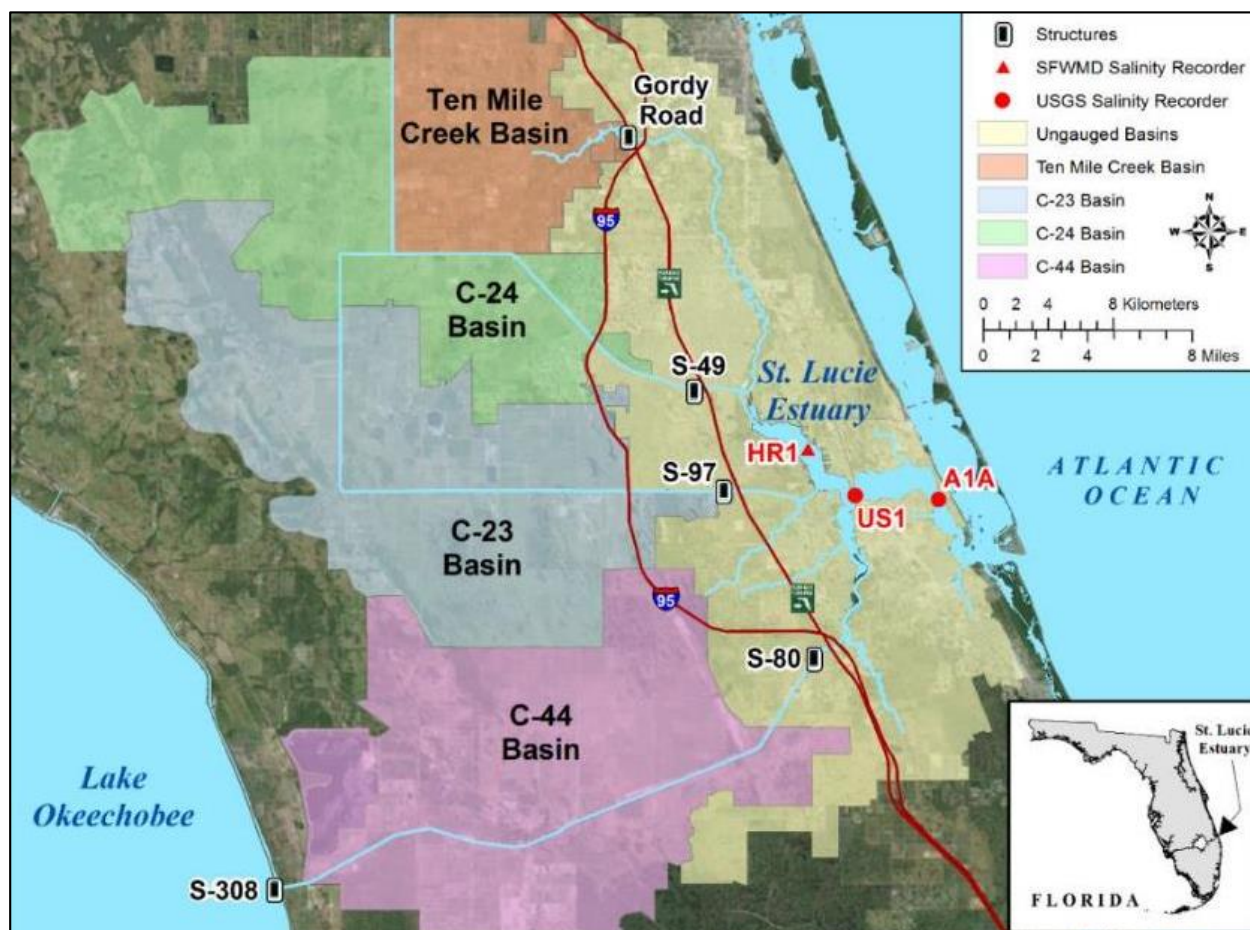


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

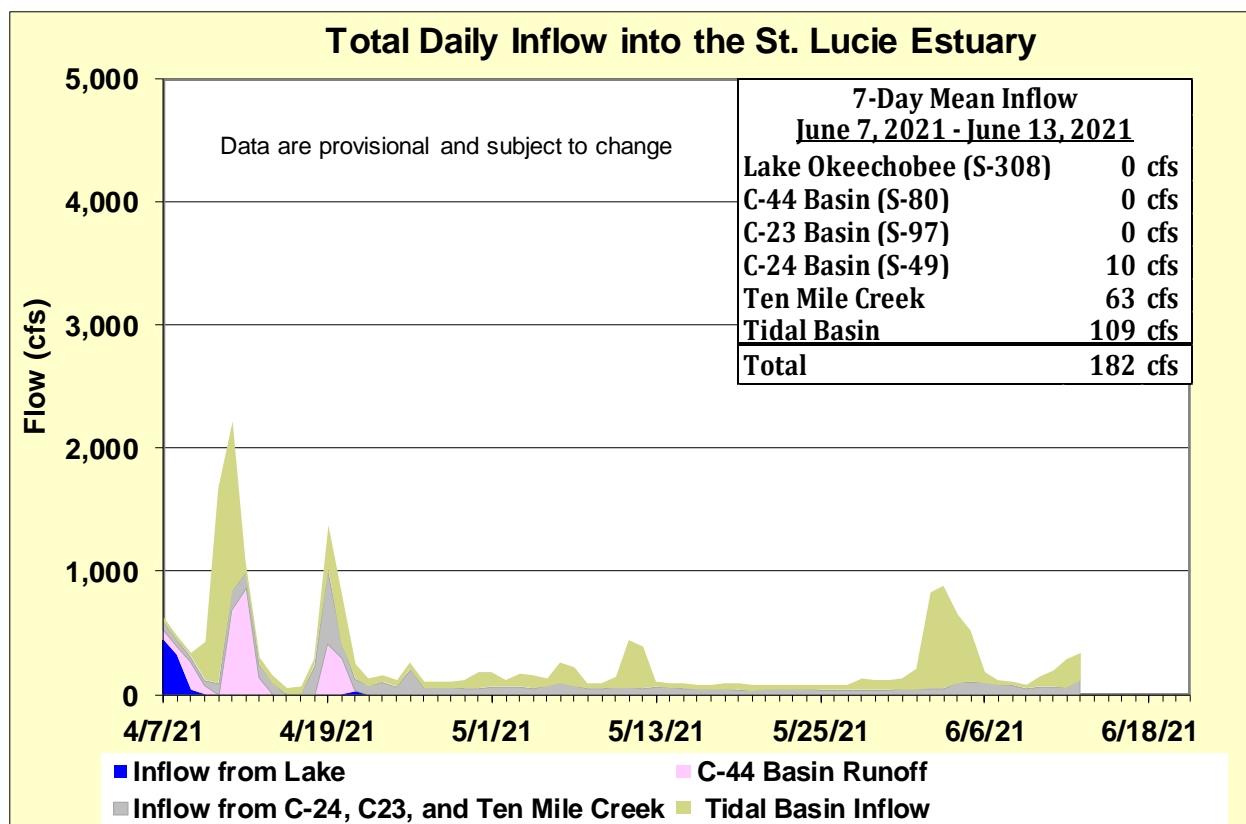


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C -44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	19.2 (21.6)	21.4 (22.6)	NA ^a
US1 Bridge	24.3 (25.6)	24.9 (25.9)	10.0 – 26.0
A1A Bridge	30.6 (31.3)	31.1 (31.7)	NA ^a

a. The envelope is not applicable.

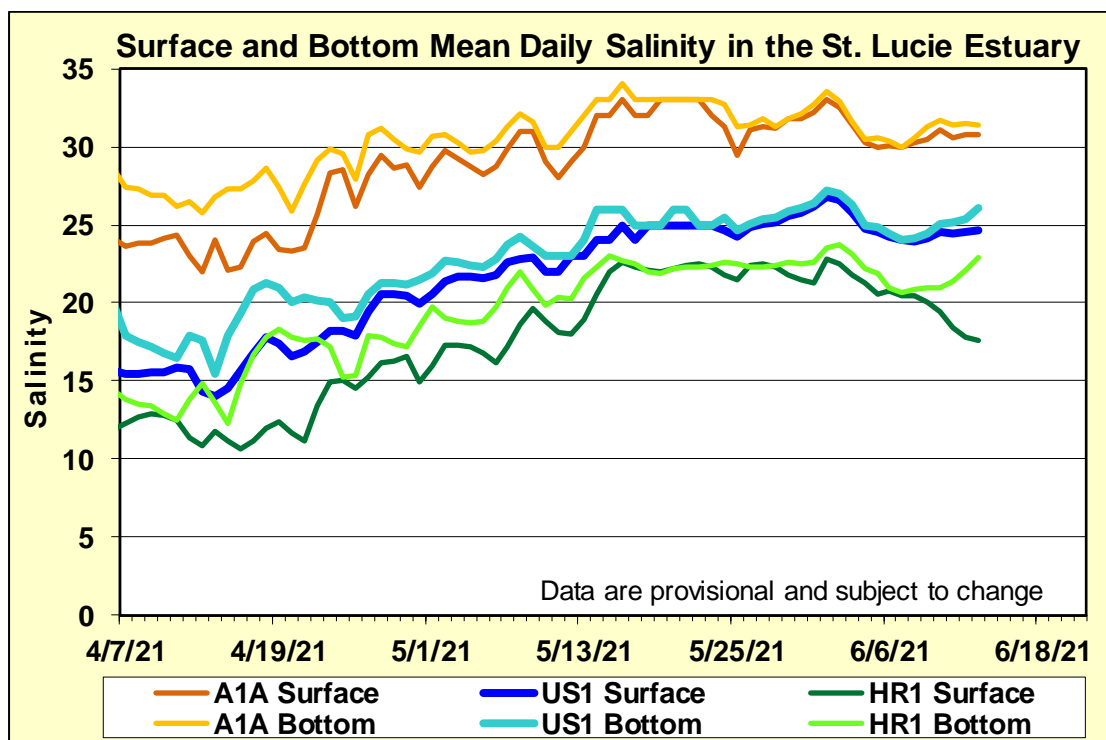


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

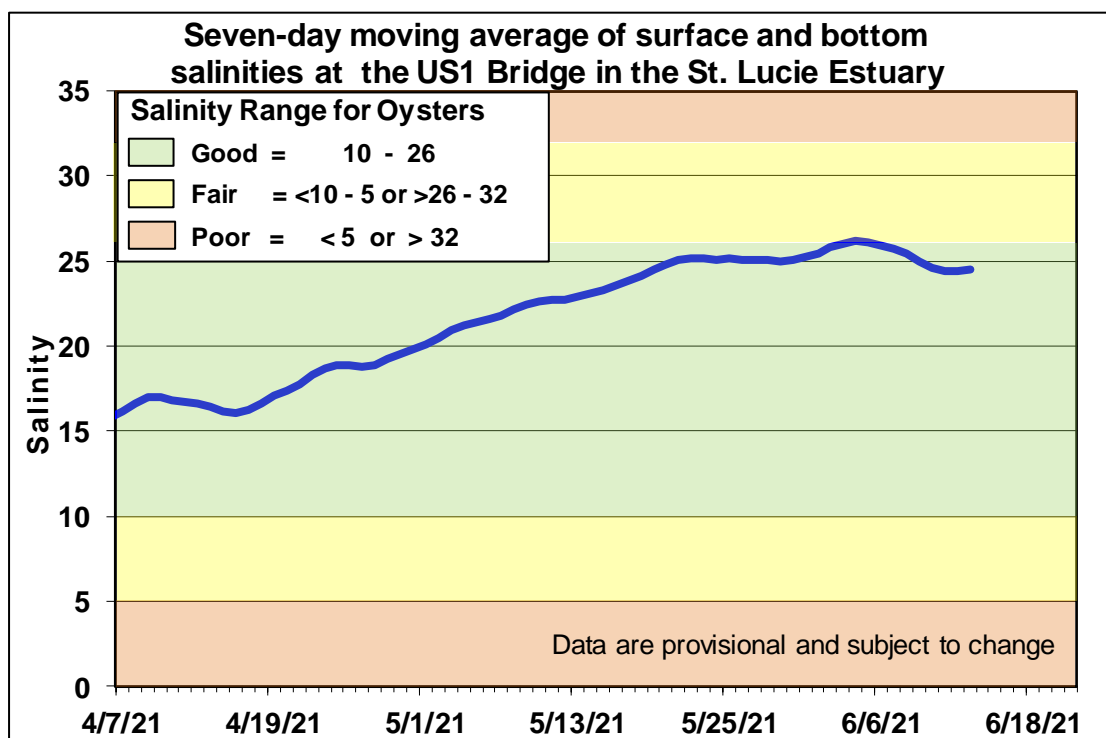


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

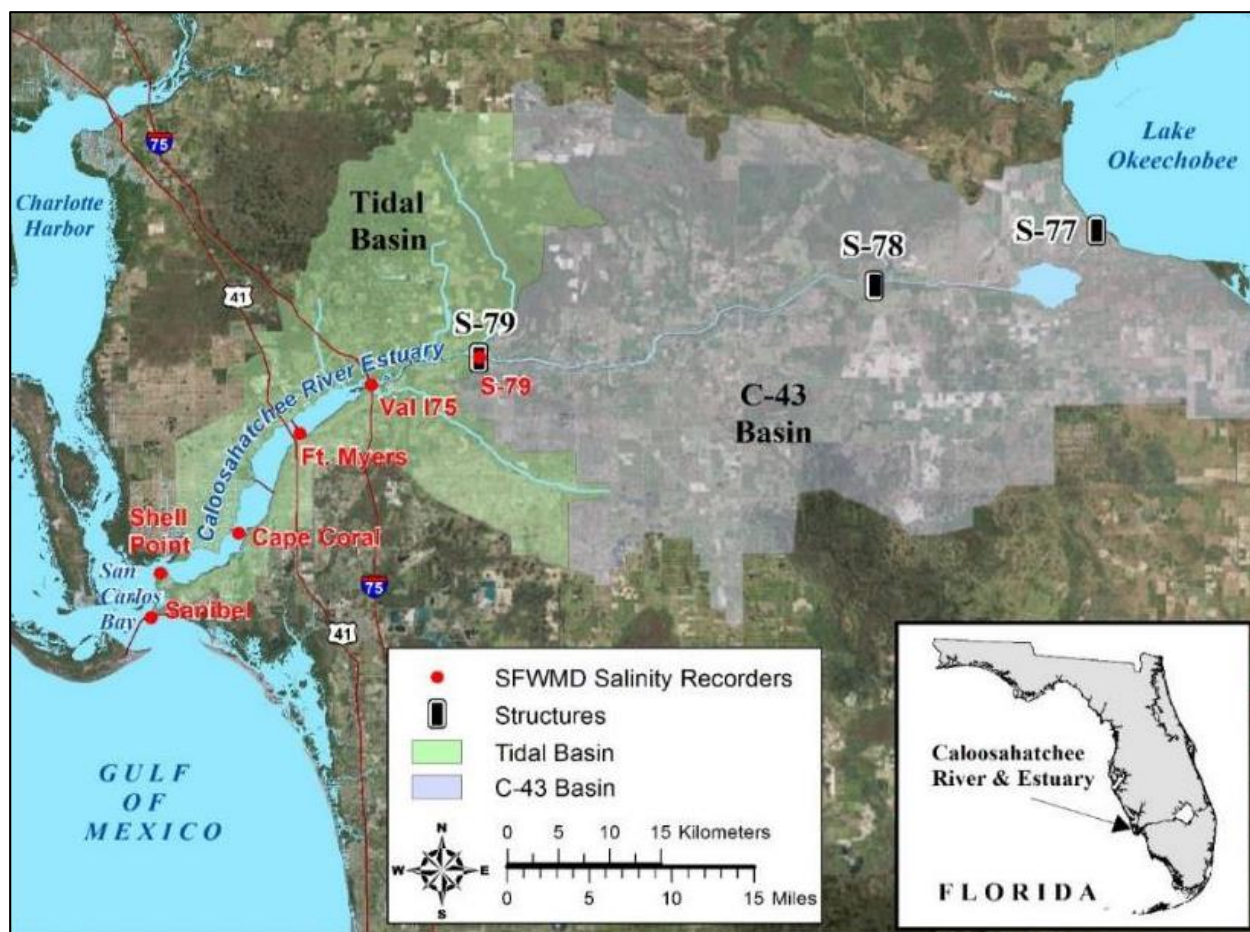


Figure ES-5. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

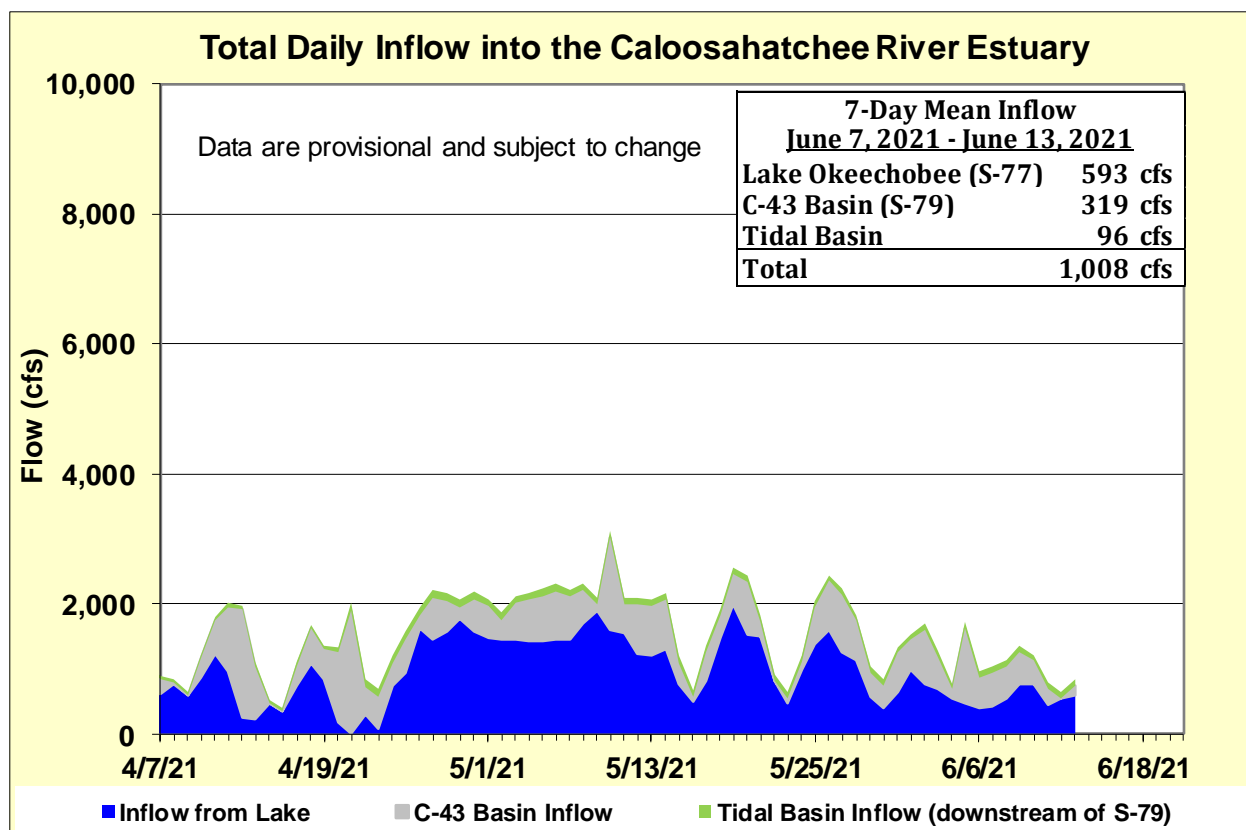


Figure ES-6. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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)	1.5 (1.3)	1.5 (1.4)	NA ^a
Val I-75	2.3 (1.3)	2.7 (2.4)	0.0 – 5.0 ^b
Fort Myers Yacht Basin	7.5 (7.3)	8.0 (9.1)	NA ^a
Cape Coral	15.5 (14.6)	17.4 (17.3)	10.0 – 30.0
Shell Point	30.7 (28.5)	31.3 (29.1)	10.0 – 30.0
Sanibel	34.4 (33.8)	34.9 (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.

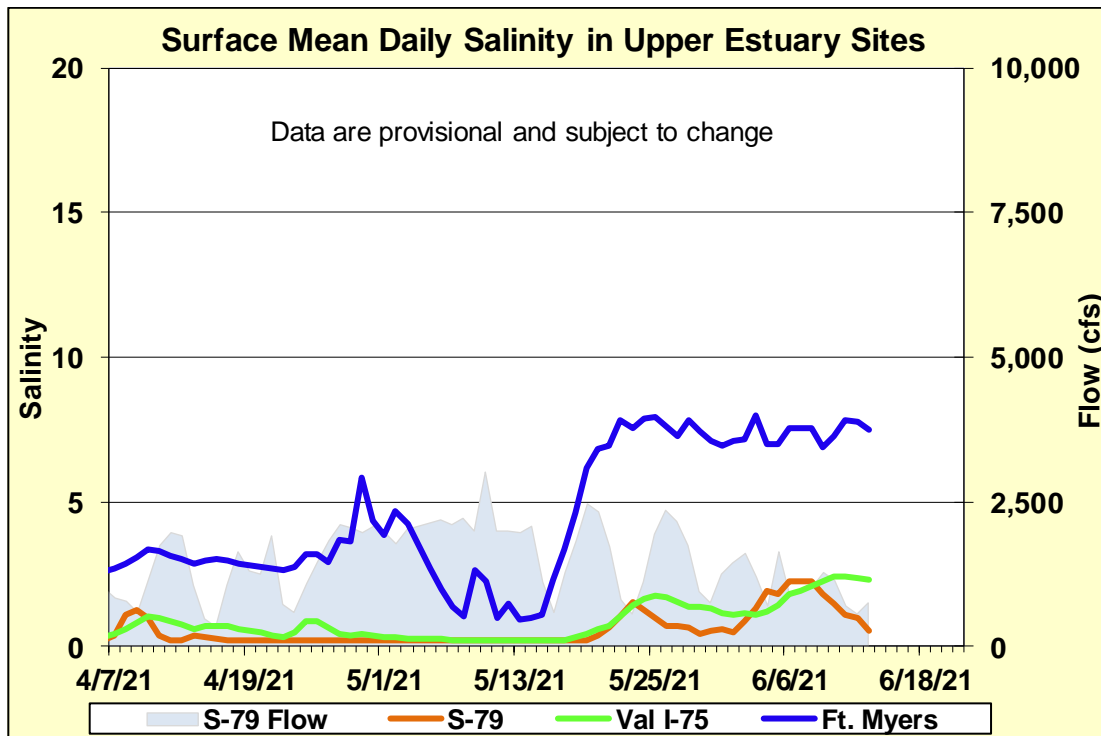


Figure ES-7. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

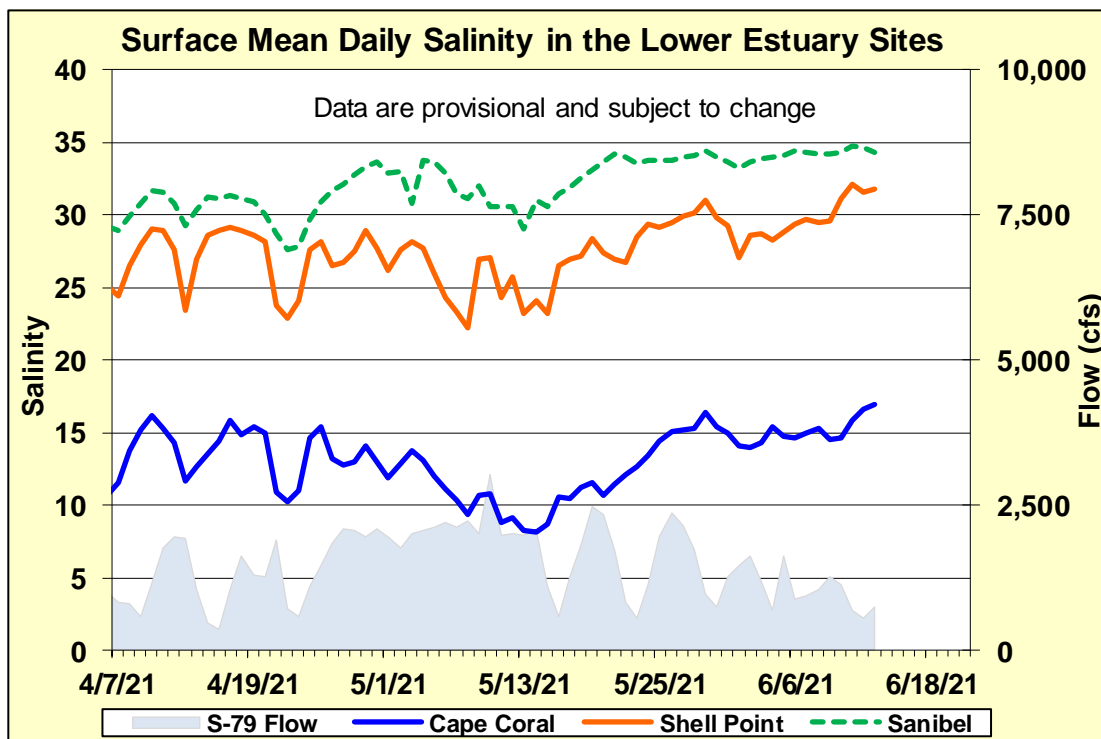


Figure ES-8. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

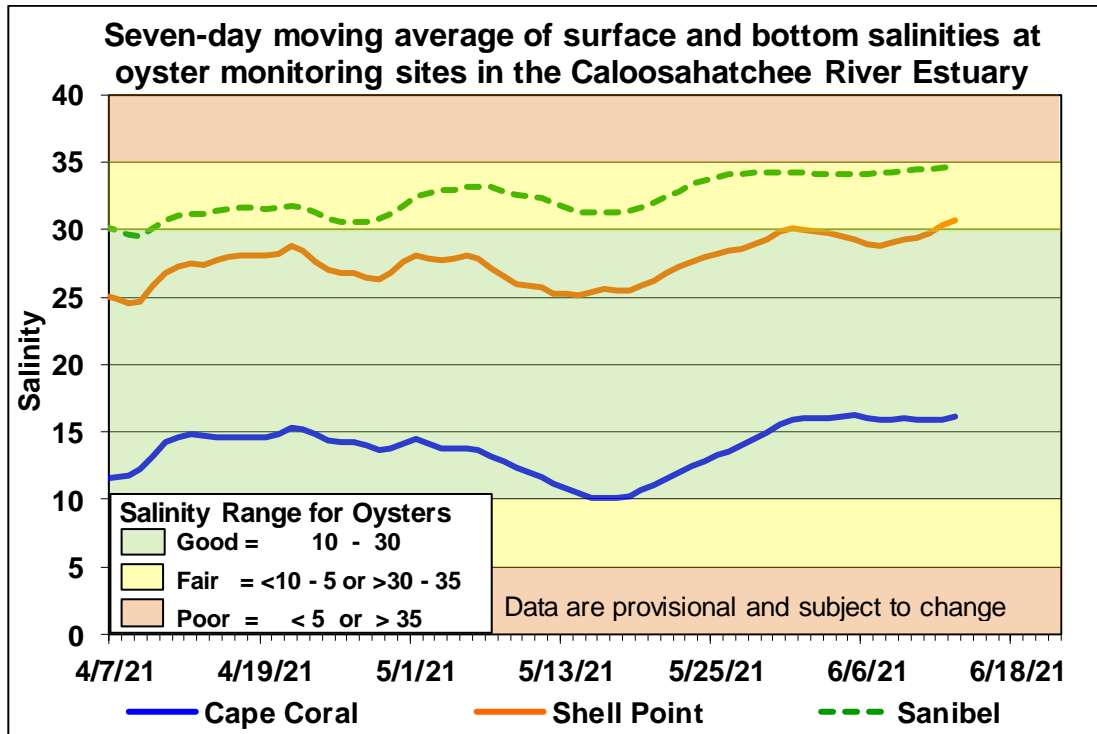


Figure ES-9. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

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	93	4.9	2.2
B	450	93	2.6	1.7
C	800	93	1.5	1.5
D	1000	93	1.1	1.3
E	1500	93	0.4	1.1
F	2000	93	0.3	1.1



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 (**Figure S-1**).

STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to construction activities. All three flow-ways as well as Cell 7 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 (**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. Online treatment cells are at or above 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-ways 3 and 6 contain nests 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.

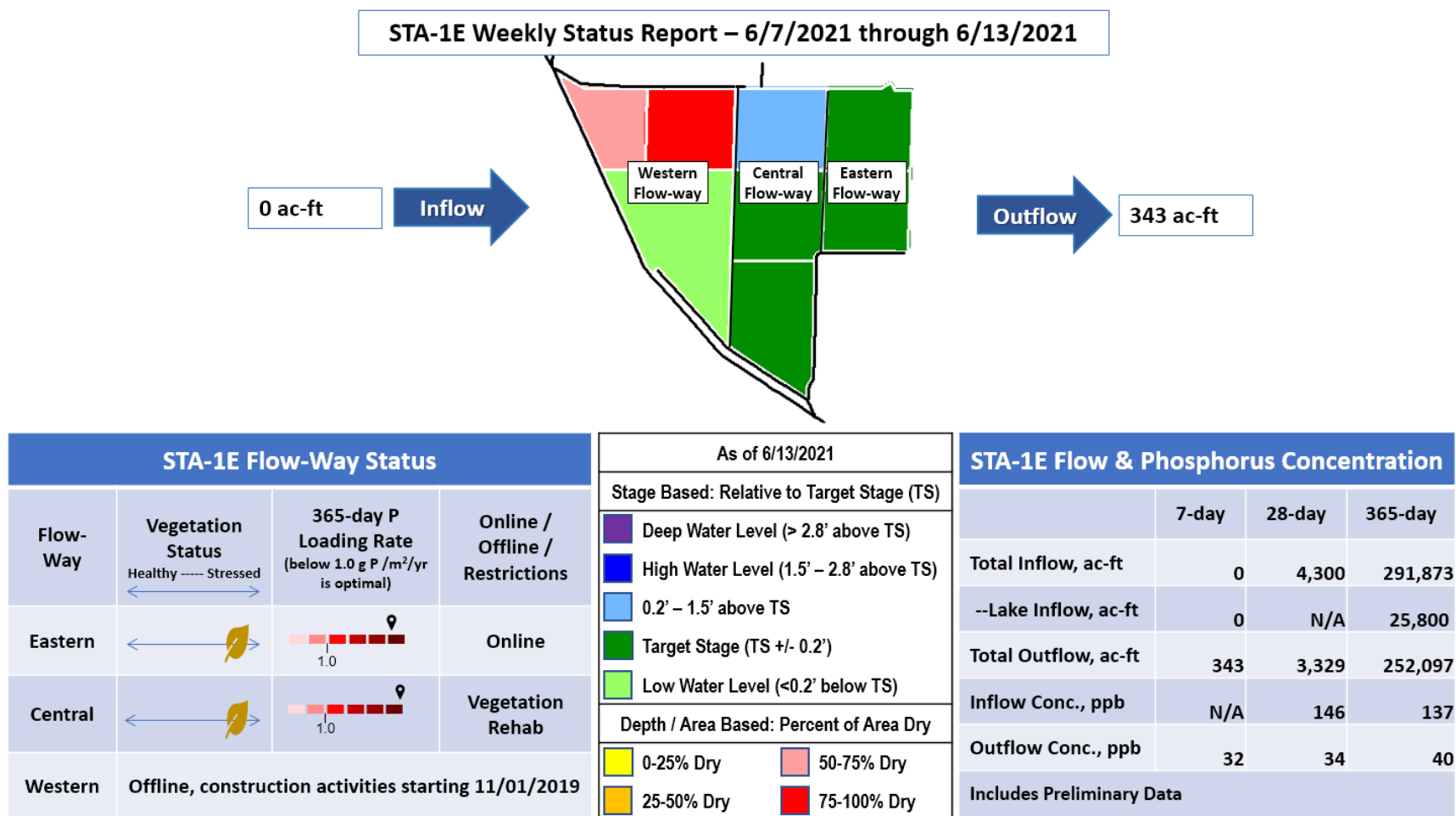
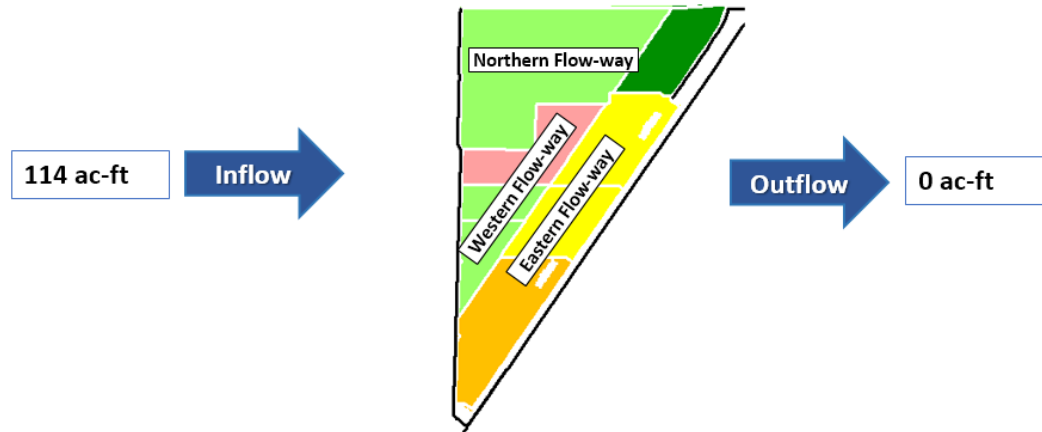


Figure S-1. STA-1E Weekly Status Report

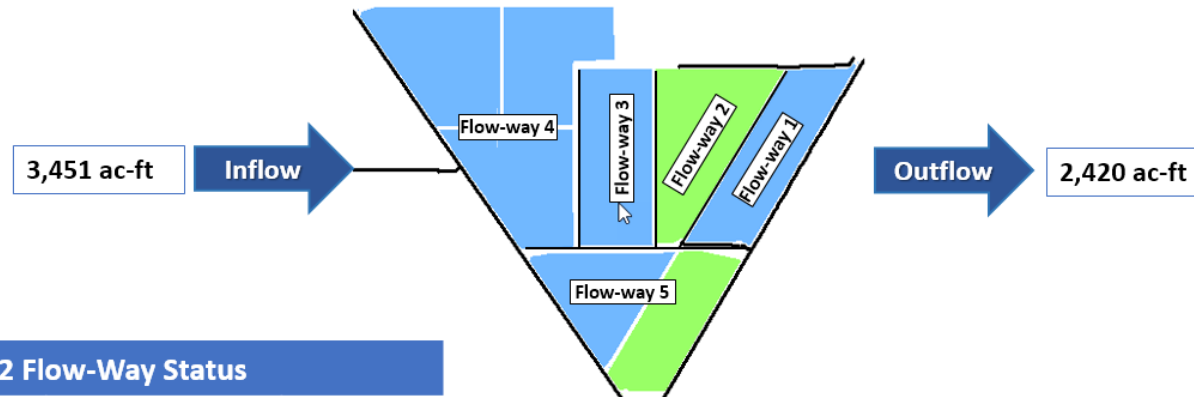
STA-1W Weekly Status Report – 6/7/2021 through 6/13/2021



STA-1W Flow-Way Status				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	As of 6/13/2021			
				Stage Based: Relative to Target Stage (TS)			
				<div></div> Deep Water Level (> 2.8' above TS)			
				<div></div> High Water Level (1.5' – 2.8' above TS)			
				<div></div> 0.2' – 1.5' above TS			
Northern	<div></div>	<div></div> <div>1.0</div>	Construction / Avian Nesting	<div></div> Target Stage (TS +/- 0.2')			
				<div></div> Low Water Level (<0.2' below TS)			
				Depth / Area Based: Percent of Area Dry			
				<div></div> 0-25% Dry	<div></div> 50-75% Dry		
				<div></div> 25-50% Dry	<div></div> 75-100% Dry		
Western	<div></div>	<div></div> <div>1.0</div>	Construction / Avian Nesting				
Eastern	<div></div>	<div></div> <div>1.0</div>	Construction / Avian Nesting				
				7-day	28-day	365-day	
Total Inflow, ac-ft				114	578	139,254	
--Lake Inflow, ac-ft				100	N/A	8,200	
Total Outflow, ac-ft				0	197	157,550	
Inflow Conc., ppb				148	148	249	
Outflow Conc., ppb				N/A	25	41	
Includes Preliminary Data							

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

STA-2 Weekly Status Report – 6/7/2021 through 6/13/2021



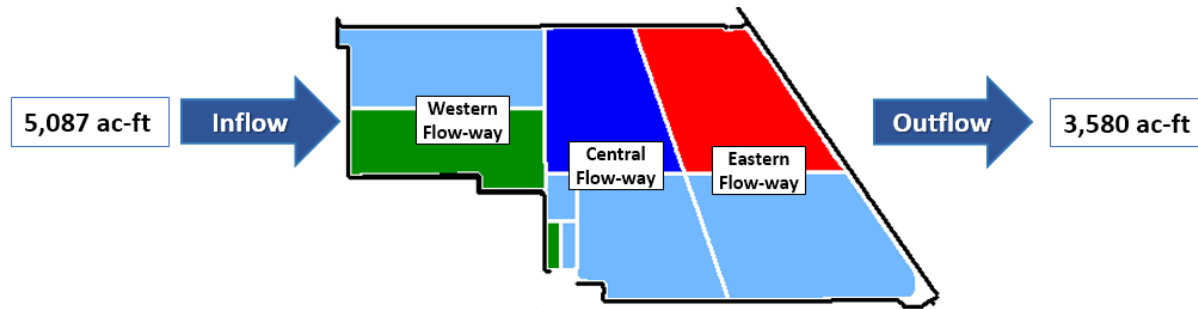
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2			Construction
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 6/13/2021	
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	3,451	13,524	395,243
--Lake Inflow, ac-ft	3,500	N/A	90,300
Total Outflow, ac-ft	2,420	11,026	447,281
Inflow Conc., ppb	90	90	93
Outflow Conc., ppb	17	16	21
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

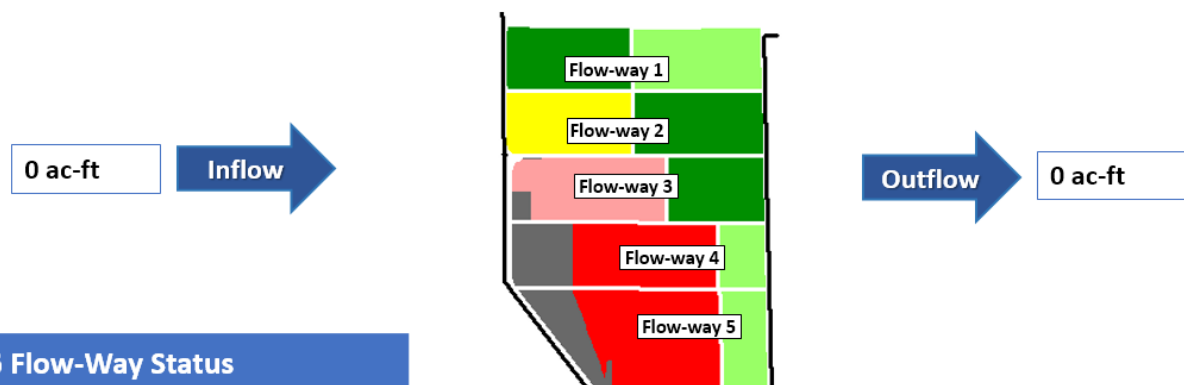
STA-3/4 Weekly Status Report – 6/7/2021 through 6/13/2021



STA-3/4 Flow-Way Status				As of 6/13/2021				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	Stage Based: Relative to Target Stage (TS)					7-day	28-day	365-day
Eastern	<div></div>	<div></div>	Offline, vegetation management drawdown as of 3/1/2021	Deep Water Level (> 2.8' above TS)				Total Inflow, ac-ft	5,087	17,723	526,812
				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)							
Central	<div></div>	<div></div>	Online	Depth / Area Based: Percent of Area Dry				Inflow Conc., ppb	101	93	55
Western	<div></div>	<div></div>	Online	0-25% Dry		50-75% Dry		Outflow Conc., ppb	13	14	12
				25-50% Dry		75-100% Dry					
Includes Preliminary Data											

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

STA-5/6 Weekly Status Report – 6/7/2021 through 6/13/2021



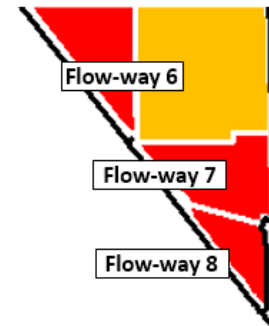
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1	← →		Online
2	← →	N/A	Post-construction
3	← →	N/A	Post-construction & Avian Nesting
4	← →		Online
5	← →		Online

As of 6/13/2021	
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	123,391
--Lake Inflow, ac-ft	N/A	N/A	N/A
Total Outflow, ac-ft	0	0	152,542
Inflow Conc., ppb	N/A	N/A	277
Outflow Conc., ppb	N/A	N/A	79
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 6/7/2021 through 6/13/2021


















STA-5/6 Flow-Way Status				As of 6/13/2021	
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)	 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)
7	←-----→ 		Online		
8	←-----→ 		Online		
				Depth / Area Based: Percent of Area Dry	
				 0-25% Dry	 50-75% Dry
				 25-50% Dry	 75-100% Dry

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

Basic Concepts and Definitions for STA Weekly Status Report

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

Everglades

Water Conservation Area Regulation Schedules

WCA-1: Stage at the 1-8C gauge turned upwards late last week. On Sunday stage was below the flat Zone A1 regulation line by 0.57 feet. WCA-2A: Stage at S11B-HW rose late last week to above the WS floor, 0.37 feet below the flat regulation line on Sunday. WCA-3A: The three gauge average resumed trending slightly away from the Zone A regulation line last week. On Sunday stage was 1.15 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) made a hard downwards turn last week. The average on Sunday was 1.91 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 continues to dry down, particularly along the upper reach of the L-38W. North-to-south hydrologic connectivity remains in Shark River Slough in Everglades National Park (ENP) while 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-1 and WCA-3A; even more so to the east and west of SRS in ENP. The Everglades are significantly drier than one year ago, with SRS the exception, as wet season rains had begun by this time last year. WCA-3B and SRS continue to experience above average depths but less than the model output from last week. (**Figure EV-6**).

Wading Birds

Record nesting continues and the provisional estimate of total nests in the Everglades in 2021 is approximately 81,000 nests. This number may be revised upwards as more of the smaller wading bird nests are counted.

Taylor Slough and Florida Bay

An average of 0.41 inches fell over Taylor Slough and Florida Bay over the week ending Sunday (6/13), but 2.5 inches fell over the northern Taylor Slough area which caused an average increase of 0.9 feet in that area (**Figure EV-7**). The Slough, overall, averaged a 0.22-foot increase over the last week (**Figure EV-8**). Depths are still 3 inches lower than the historical average for this time of year. The areas near the most western structures (S-328 and G-737) are mostly dry and have phosphorus levels as high as 89 ppb. These structures should not be opened until the phosphorus levels return to below 8 ppb at these locations. In previous years, it took about 3 weeks after westward water movements began for this level to be met.

Salinities in Florida Bay averaged an increase of 1 for the week ending 6/13, but individual stations had weekly changes ranging from -0.5 to +3.3 (**Figure EV-7**). The Bay is still positioned very well to minimize hypersalinity extremes and duration before the freshwater front arrives (**Figure EV-9**) with the current bay-wide average being only 1 higher than the historical average for this time of year.

Florida Bay MFL: The TR station in the mangrove zone (tracked for the Florida Bay MFL) started the week ending 6/13 at 20, decreased to 18, and then returned to 20 by end the week (**Figure EV-10**). The 30-day moving average increased 3.6 over the week to end at 11.9. Weekly flow from the five creeks monitored for the Florida Bay MFL totaled about -2,200 acre-feet again with negative flows resuming for the second half 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 13,000 acre-feet over the week to end at 401,985 acre-feet on Sunday, 6/13. 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 change (feet)
WCA-1	0.94	-0.05
WCA-2A	1.62	+0.06
WCA-2B	0.59	-0.24
WCA-3B	0.87	-0.19
ENP	0.88	-0.04

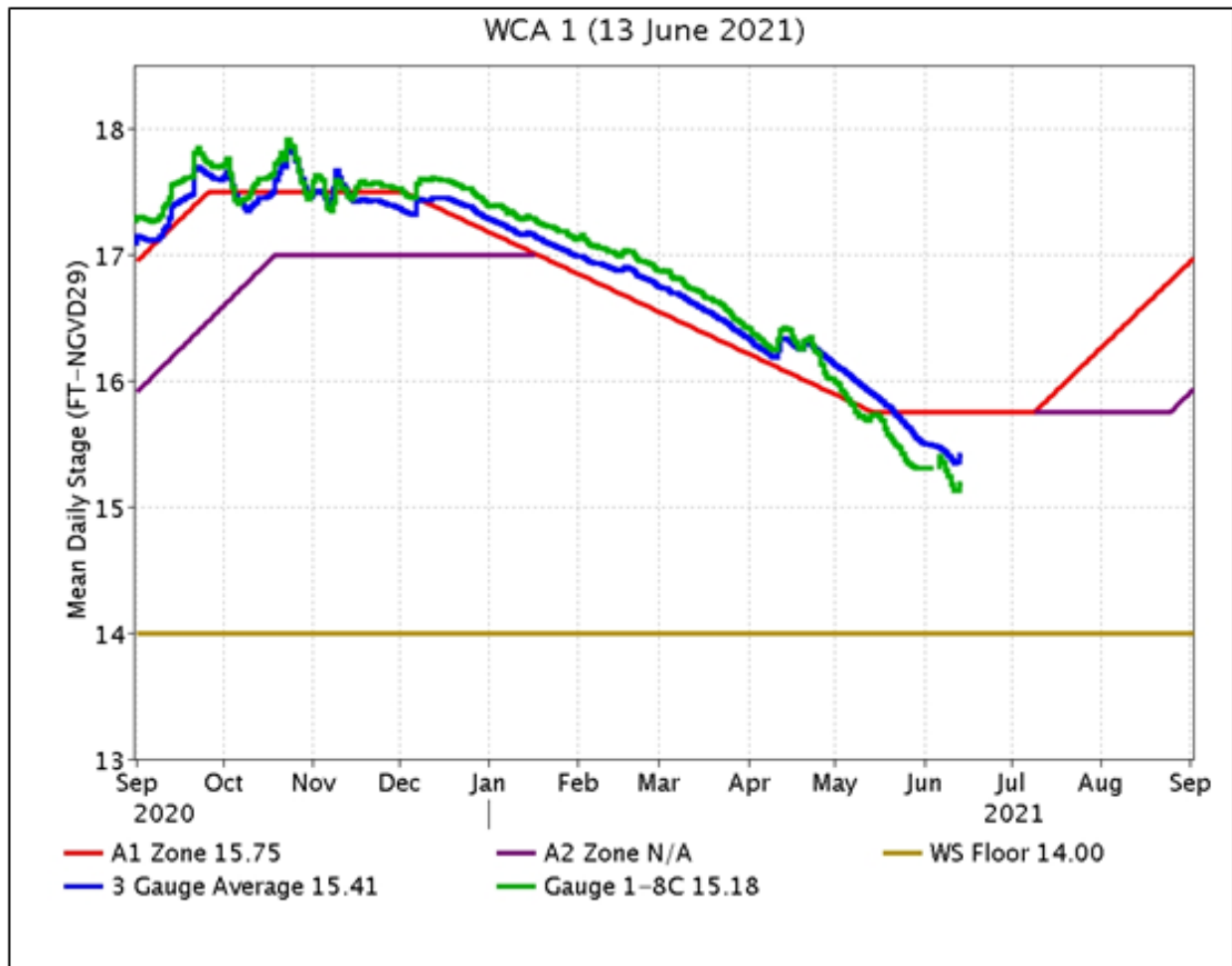


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

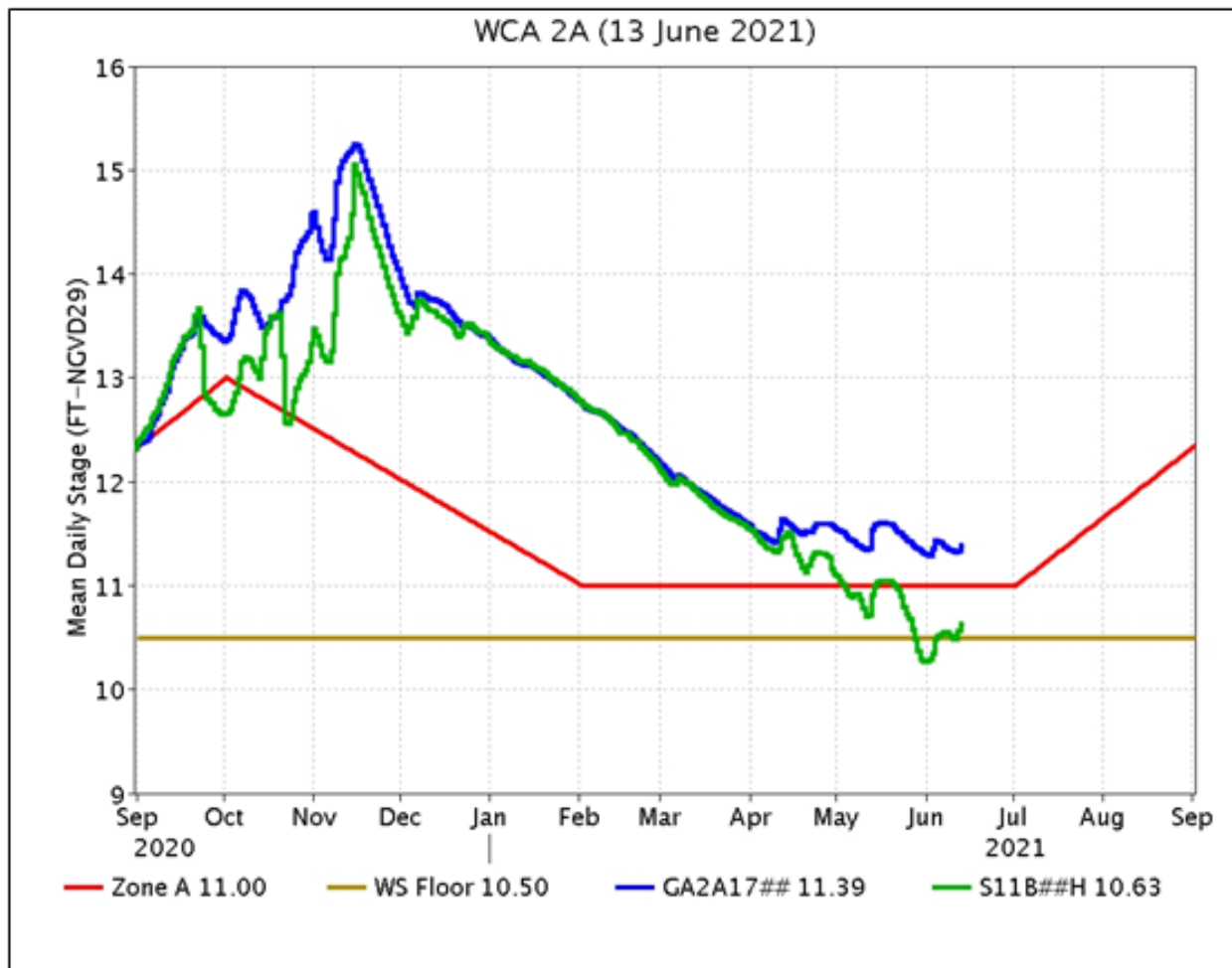


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

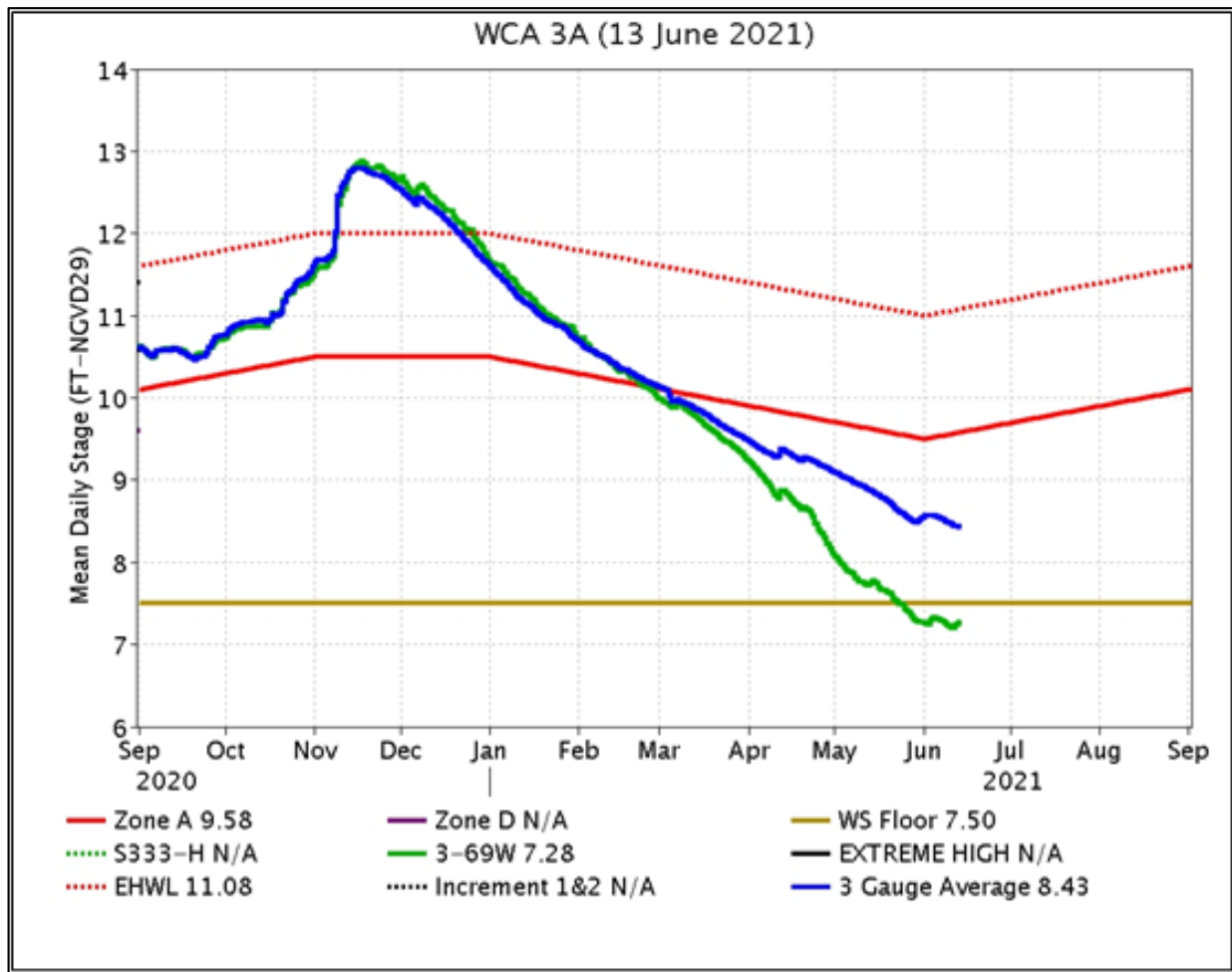


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

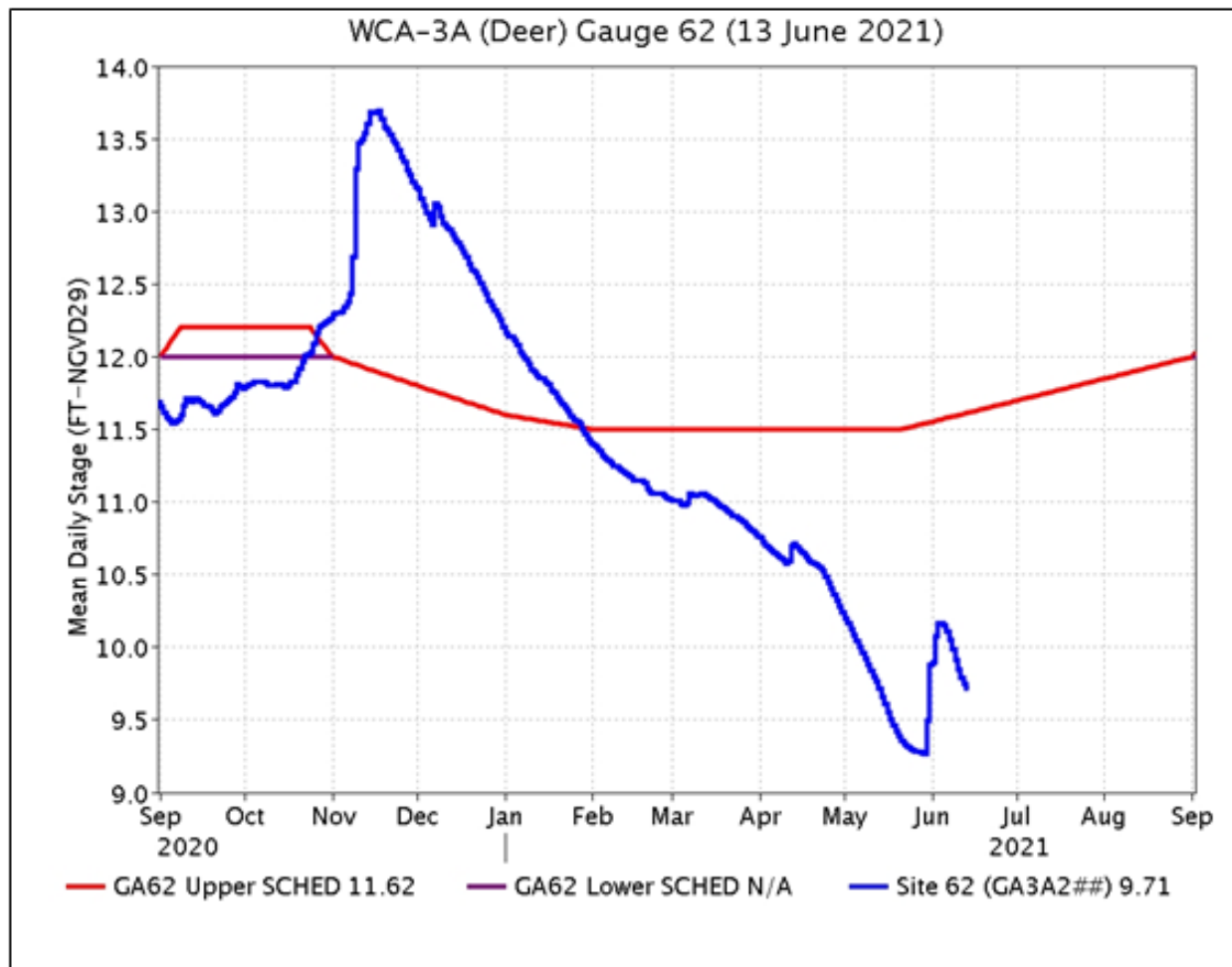


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

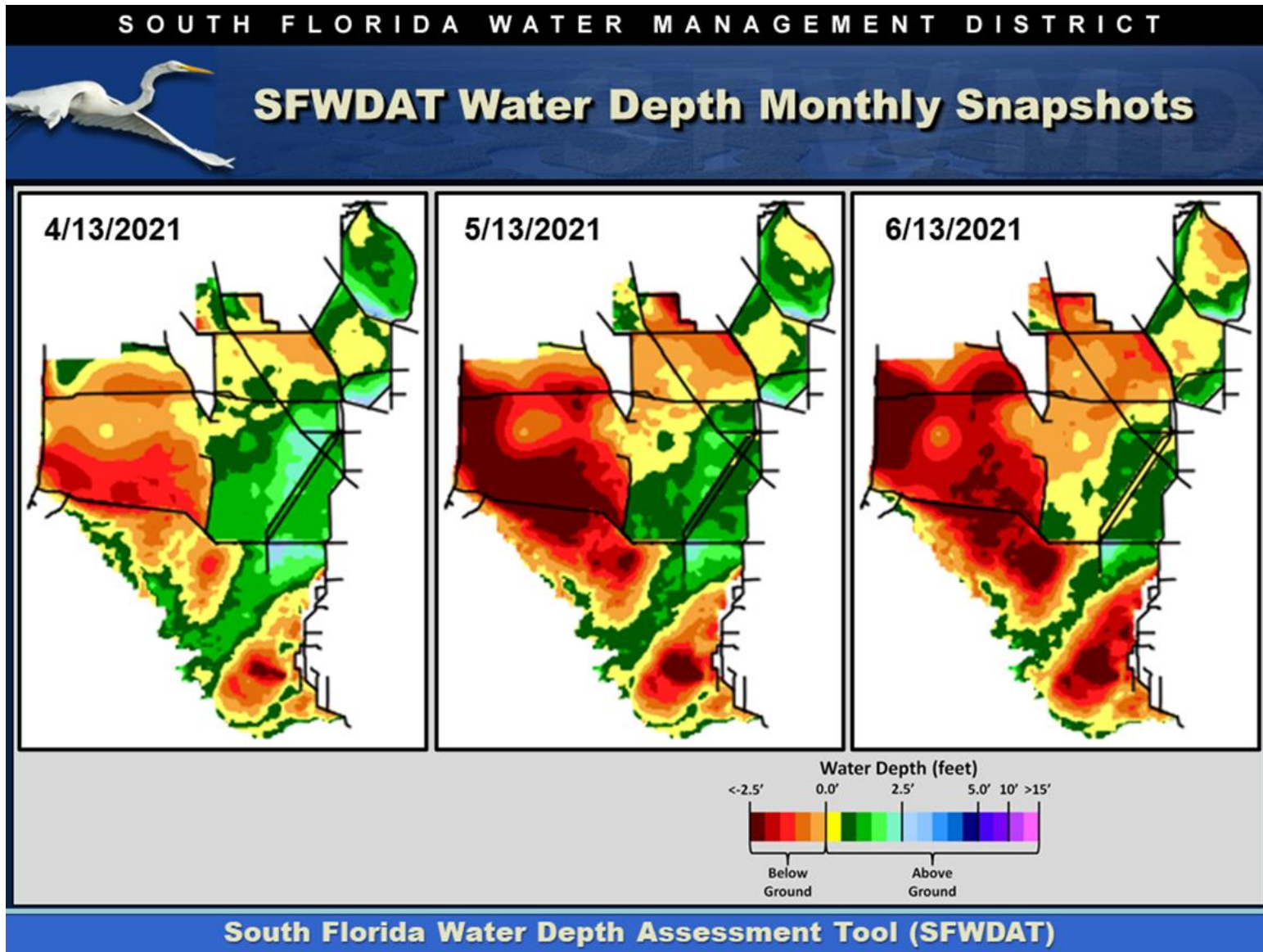


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

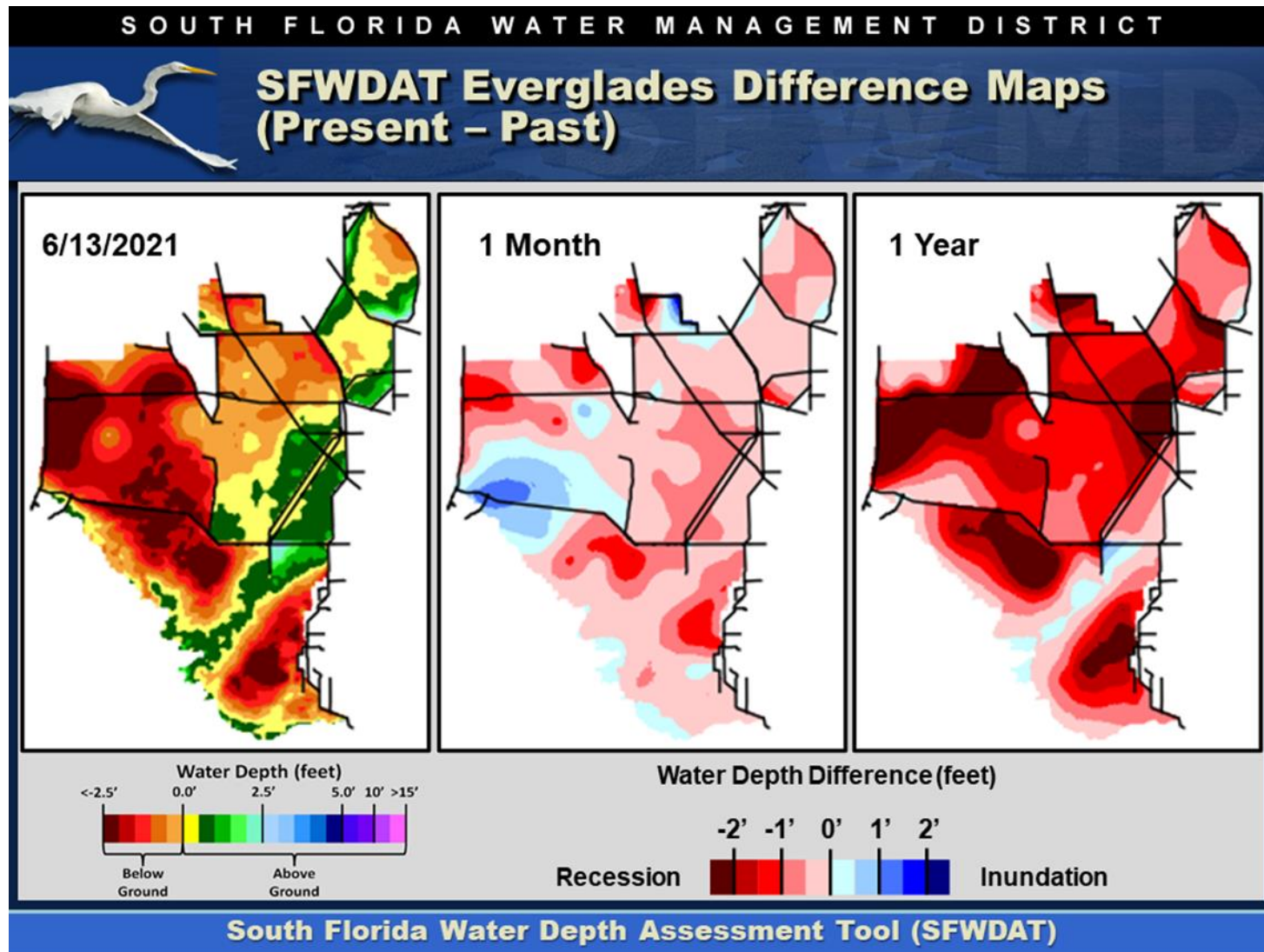


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

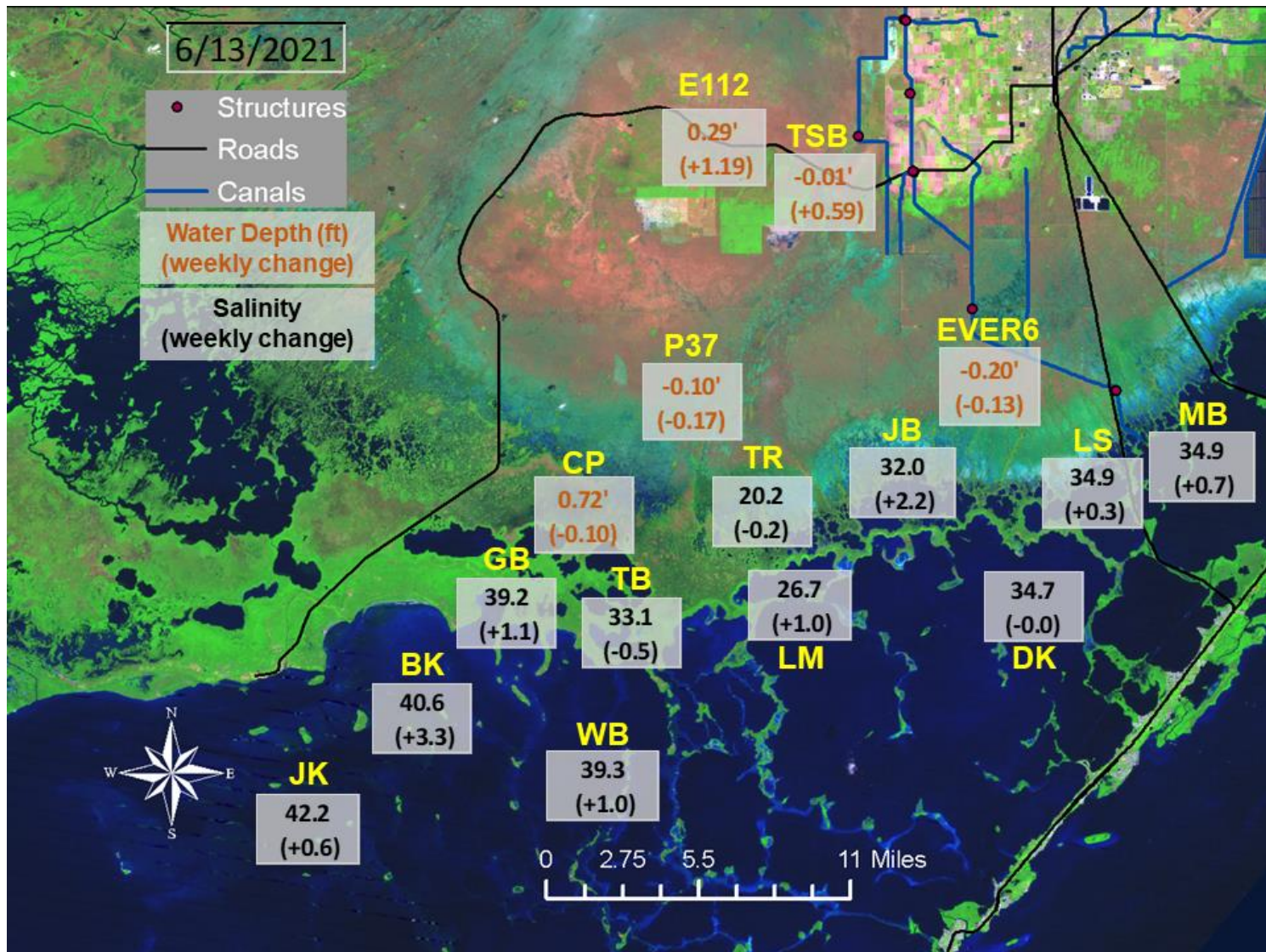


Figure EV-7. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

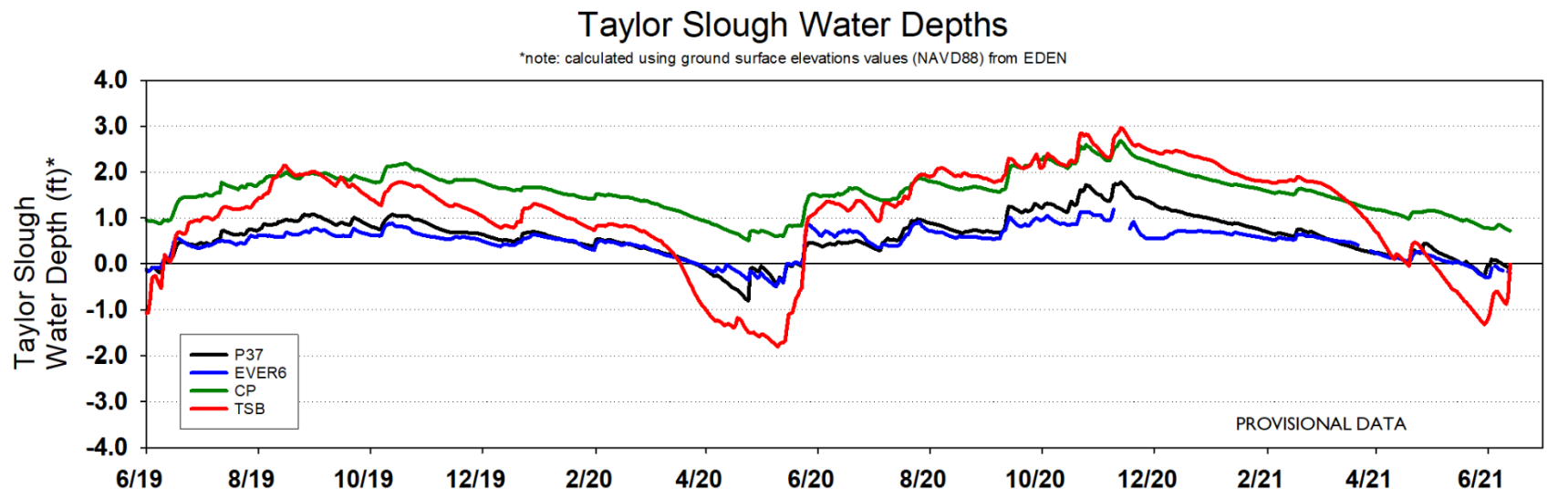


Figure EV-8. Taylor Slough water depth time series.

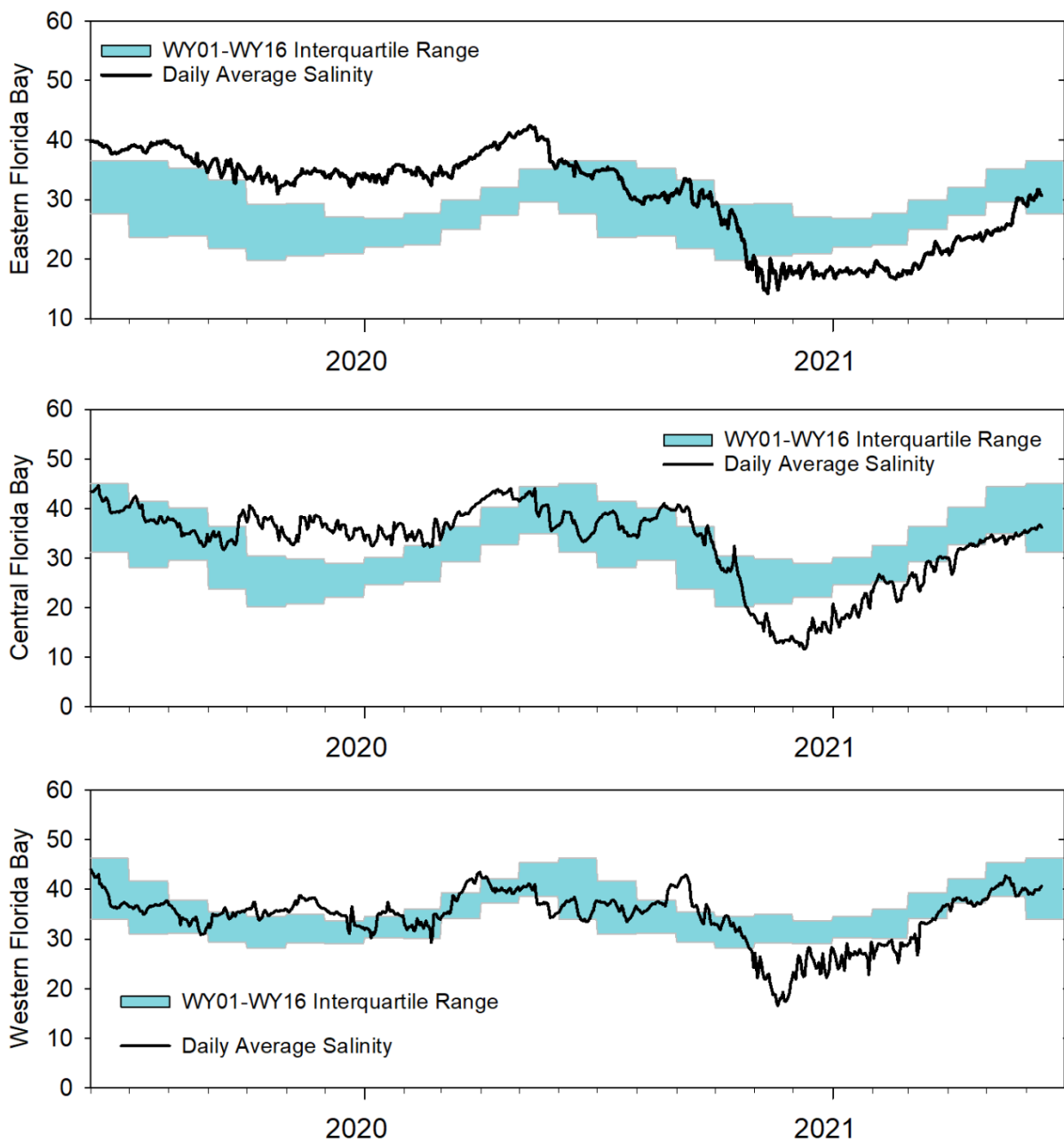


Figure EV-9. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

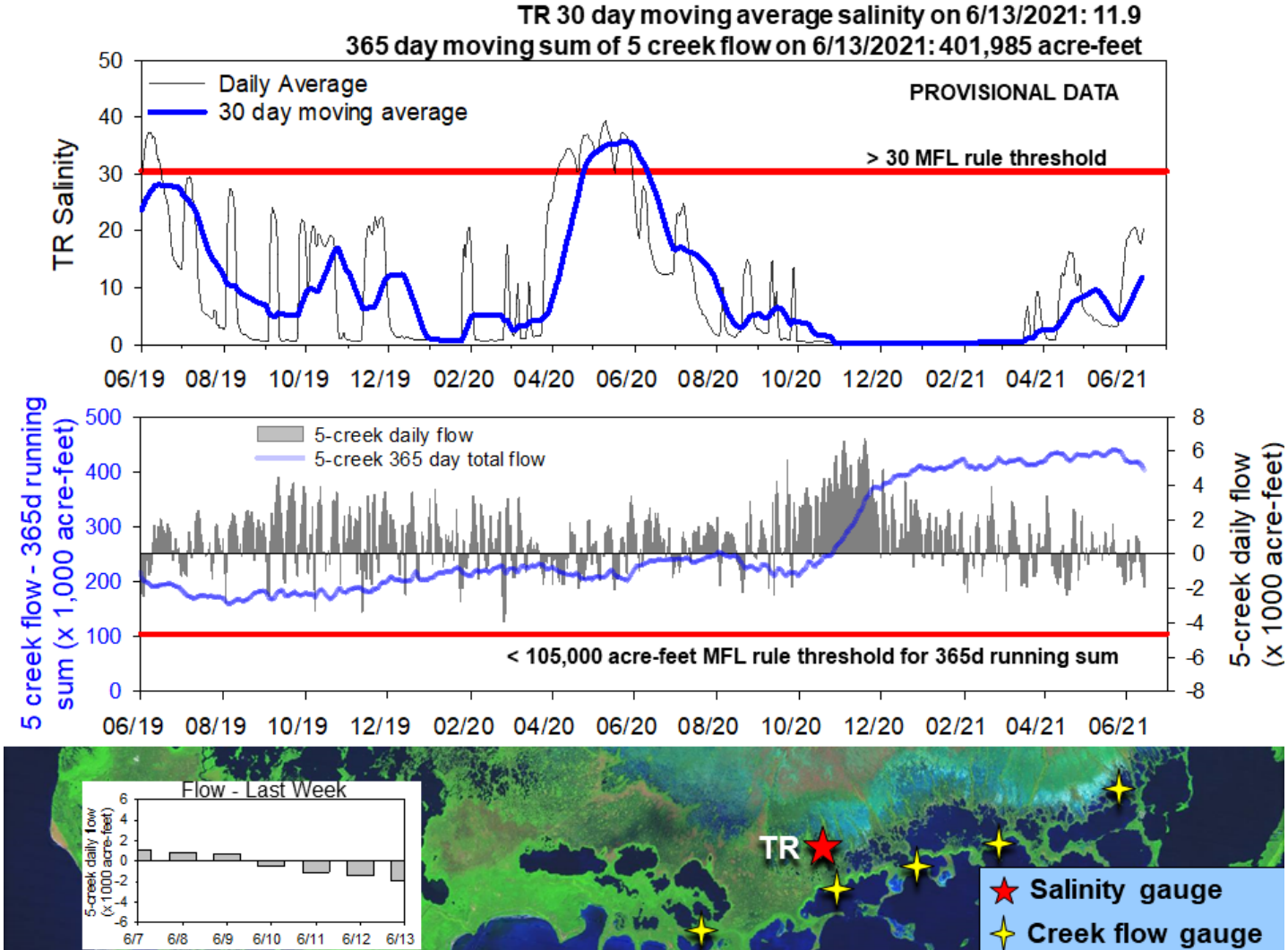


Figure EV-10. Top panel: Taylor River 30-day moving average salinity (blue), daily average salinity (gray) with salinity threshold; middle panel: Five-creek total flow for past 365 days (blue), daily flow (gray) with 365-day flow threshold; bottom panel: map of monitoring locations for the five creeks.

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

SFWMD Everglades Ecological Recommendations, June 15th, 2021 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.05'	Maintain current marsh stage. Moderate any reversal as possible.	Protect within basin and downstream habitat and wildlife. Protect wading bird foraging.
WCA-2A	Stage increased by 0.06'	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 0.24'	Maintain current marsh stage. Moderate any reversal as possible	Protect within basin wading bird foraging.
WCA-3A NE	Stage decreased by 0.40'	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 decreased by 0.02	Initiate ascension up to 0.25 feet per week.	
Central WCA-3A S	Stage decreased by 0.19'	Moderate the recession rate to near .10 feet per week. Moderate any reversal as possible.	Protect within basin wading bird foraging.
Southern WCA-3A S	Stage decreased by 0.14'		
WCA-3B	Stage decreased by 0.04'	Maintain the recession rate at near .05 to .07 feet per week.	Protect within basin habitat and wildlife and perhaps very late season wading bird foraging.
ENP-SRS	Stage decreased by 0.05'	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.