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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: July 21, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A frontal boundary moving into Georgia will nudge the high-pressure ridge currently over Florida southward bringing southwesterly steering winds Tuesday and Wednesday. Afternoon thunderstorm activity is forecast to shift to the interior and east Tuesday and Wednesday. Some drier conditions are expected to move over the District Thursday bringing a decrease in daily thunderstorm activity Thursday and Friday, and northwesterly and northerly steering winds are forecast to focus activity east on Thursday and then the southern interior Friday. A mid-level trough forecast to move into north and central Florida Saturday would bring an increase in daily thunderstorm activity this weekend with activity focused over the interior and east. Total rainfall is forecast to be near the historical average during the first 7-day period (Week 1) and then below the historical average during the second 7-day period (Week 2).

Kissimmee

Flow at S-65A continues to be too low for extensive inundation of the Kissimmee River floodplain, but mean floodplain depth increased to 0.24 feet on July 18. Dissolved oxygen concentration in the Kissimmee River continued its recent decline to an average of 3.6 mg/L for the week but rose slightly at the end of the week; DO is still above the 2.0 mg/L threshold considered harmful to sportfish.

Lake Okeechobee

Lake Okeechobee stage was 13.47 feet NGVD on July 18, 2021, 0.89 feet higher than a month ago, and 0.81 feet higher than one year ago (**Figure LO-1**). Lake stages were above the ecological envelope from August 1, 2020 to March 30, 2021, and near or within the upper threshold of the envelope until mid-June. Lake stages have been above the ecological envelope since early-July (**Figure LO-2**). Recent satellite imagery (July 17, 2021) shows a medium to high bloom potential in the NW and NE parts of the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged 1,113 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities decreased at the HR1 and US1 Bridge sites and increased at the A1A Bridge site over the past week. Salinity at the US1 Bridge was in the good range (10-26) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 5,218 cfs over the past week with 75 cfs coming from the Lake. Mean surface salinities remained the same 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 Shell Point and Sanibel and in the fair range at Cape Coral.

Stormwater Treatment Areas

For the week ending Sunday, July 18, 2021, no 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 53,000 ac-feet. The total amount of inflows to the STAs in WY2022 is approximately 268,000 ac-feet. Most STA cells are near target stage. 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 the 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. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2.

Everglades

Water levels declined in WCAs 1, 2A, and 3A northeast corner and increased in the rest of WCA 3A. Preliminary 2021 CSSS demographics suggest Subpopulation D was once again relatively productive. In Florida Bay, salinities are generally stable, and stages are increasing in Taylor Slough. Overall conditions remain good in the Southern systems.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On July 18, 2021, lake stages were 56.0 feet NGVD (0.5 feet below schedule) in East Lake Toho, 53.2 feet NGVD (0.3 feet below schedule) in Lake Toho, and 51.1 feet NGVD (0.1 feet above schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

Kissimmee River (headwater) stages were 46.3 feet NGVD at S-65A and 27.6 feet NGVD at S-65D on July 18, 2021, while discharges were 1,500 cubic feet per second (cfs) at S-65, 1,580 cfs at S-65A, 1,100 cfs at S-65D and 1,150 cfs at S-65E (**Table KB-2**). The decline in weekly average dissolved oxygen (DO) concentration in the Kissimmee River continued for the week ending on July 18, 2021 with an average for the week of 3.6 mg/L (**Table KB-2**). Small increases in the daily means at the end of the week suggest that DO is stabilizing or increasing (**Figure KB-4**). Discharge at S-65/S-65A is being increased slowly to avert a DO crash in the Kissimmee River. Flow at S-65A remains too low for extensive inundation of the Kissimmee River floodplain, but mean floodplain depth increased to 0.24 feet on July 18, 2021 (**Figure KB-5**).

Water Management Recommendations

Due to the recent decline in DO in the Kissimmee River, we are continuing to make recommendations daily to adaptively manage flow at S-65 and S-65A. The objective is to raise flow slowly above bankfull discharge (>1,400 cfs) without causing a persistent DO decline. We are also balancing the rates of stage rise in Lakes KCH, Toho, and East Toho by modifying flow at S-61 and S-59.

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)	
							7/18/21	7/11/21
Lakes Hart and Mary Jane	S-62	LKMJ	314	60.0	R	60.0	0.0	0.0
Lakes Myrtle, Preston and Joel	S-57	S-57	67	60.9	R	61.0	-0.1	-0.1
Alligator Chain	S-60	ALLI	175	63.2	R	63.2	0.0	-0.1
Lake Gentry	S-63	LKGT	150	0.0	R	61.0	-61.0	-61.0
East Lake Toho	S-59	TOHOE	327	56.0	R	56.5	-0.5	-0.9
Lake Toho	S-61	TOHOW S-61	1,060	53.2	R	53.5	-0.3	-0.4
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	1,272	51.1	R	51.0	0.1	0.0

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.

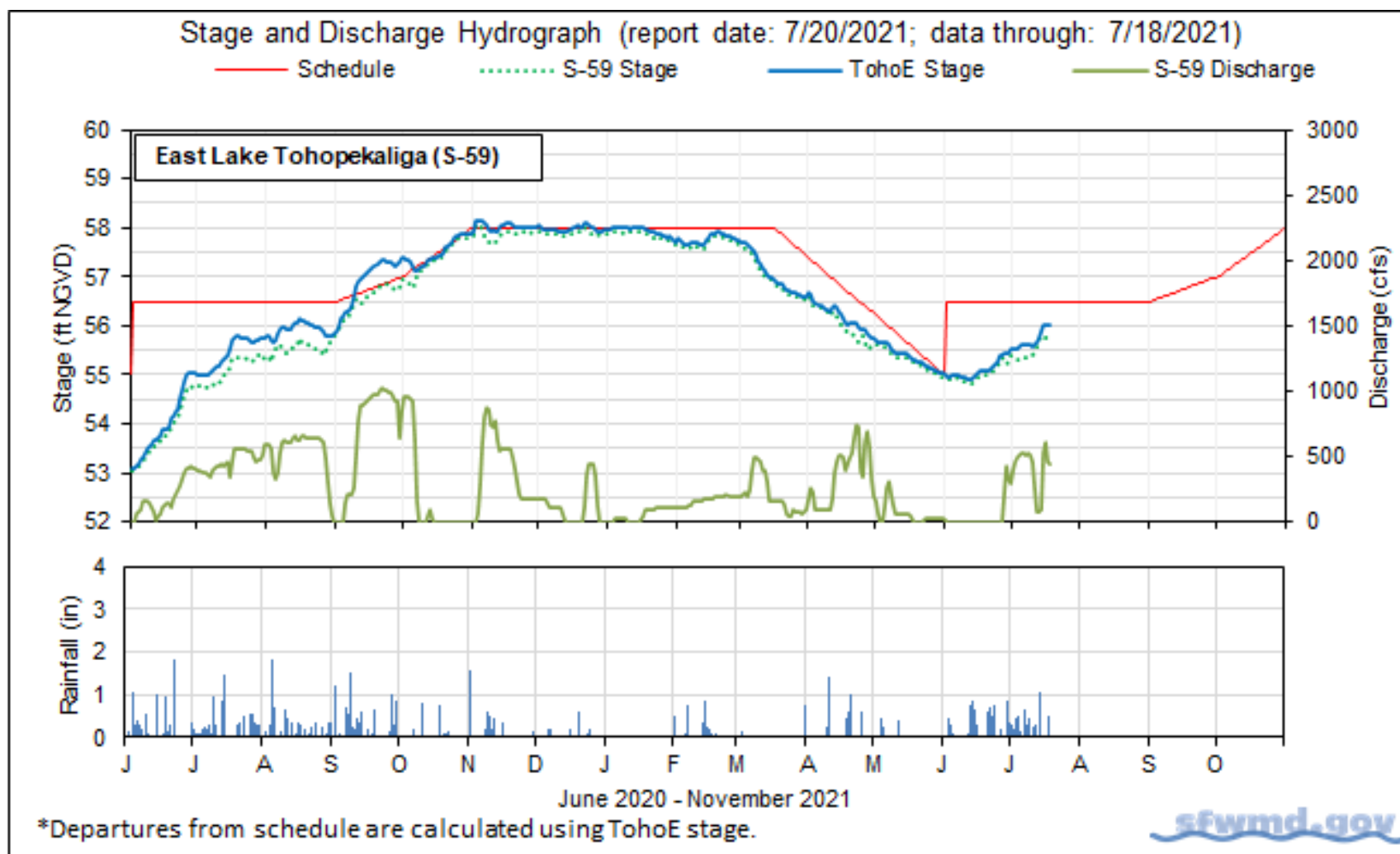


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

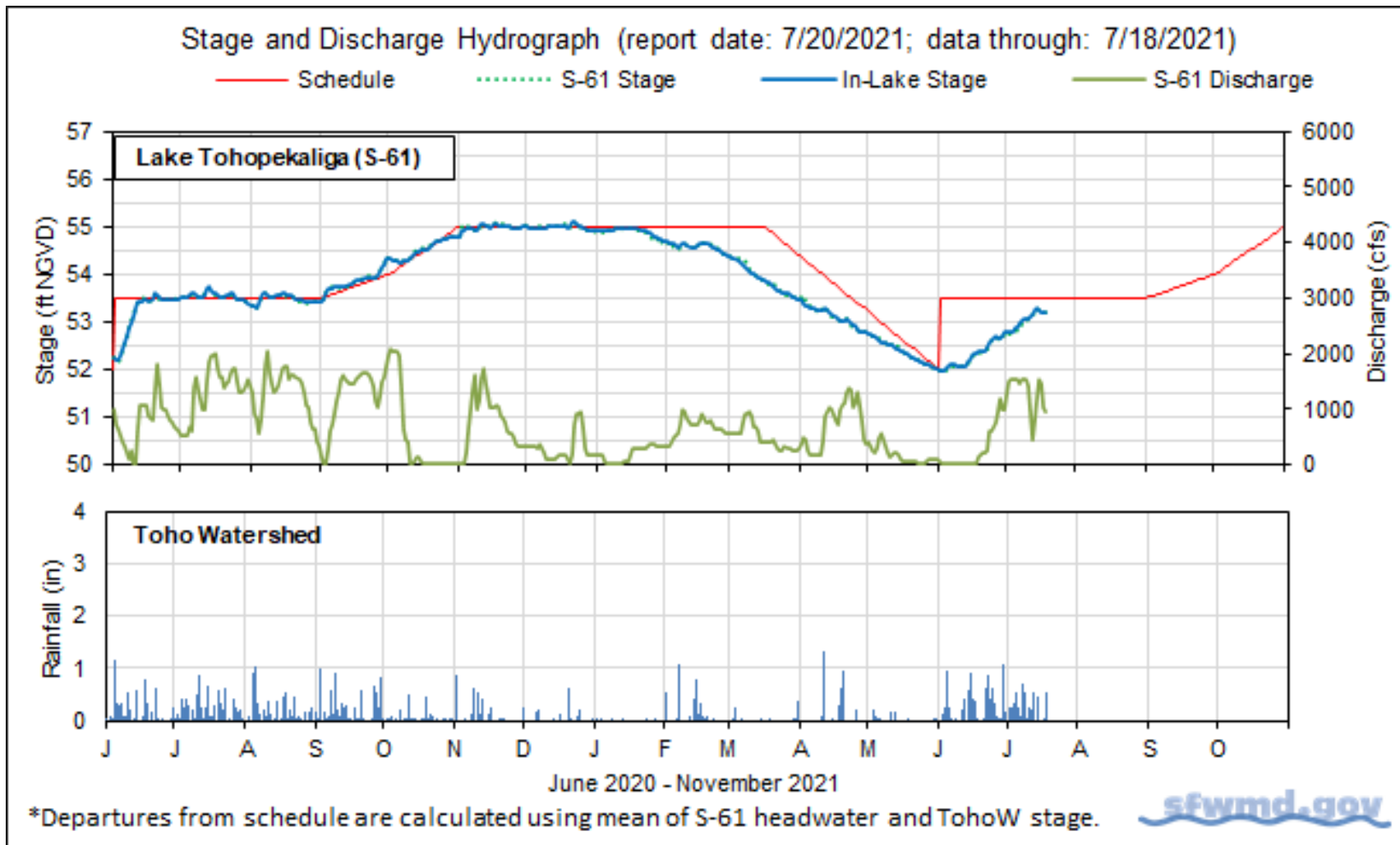


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

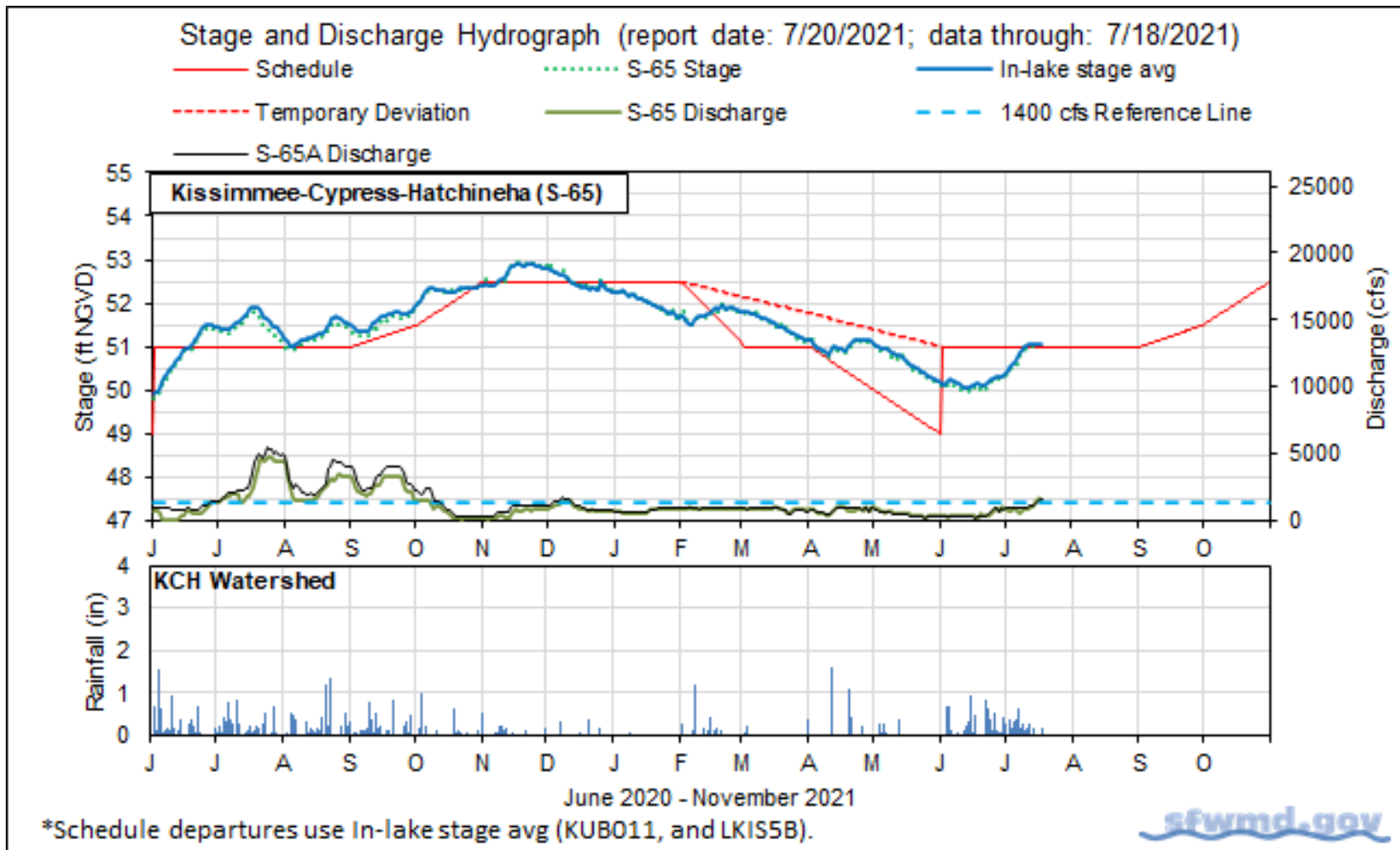


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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 7/18/21	Average for Previous Seven Day Periods			
			7/18/21	7/11/21	7/4/21	6/27/21
Discharge	S-65	1,500	1,270	760	770	620
Discharge	S-65A ^a	1,580	1,320	940	850	600
Headwater Stage (feet NGVD)	S-65A	46.3	46.2	46.2	46.2	46.2
Discharge	S-65D ^b	1,100	1,120	970	840	480
Headwater Stage (feet NGVD)	S-65D ^c	27.6	27.5	27.4	26.3	25.8
Discharge (cfs)	S-65E ^d	1,150	1,200	1,070	880	470
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	3.8	3.6	4.3	4.7	5.9
Mean depth (feet) ^f	Phase I floodplain	0.24	0.20	0.19	0.11	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.

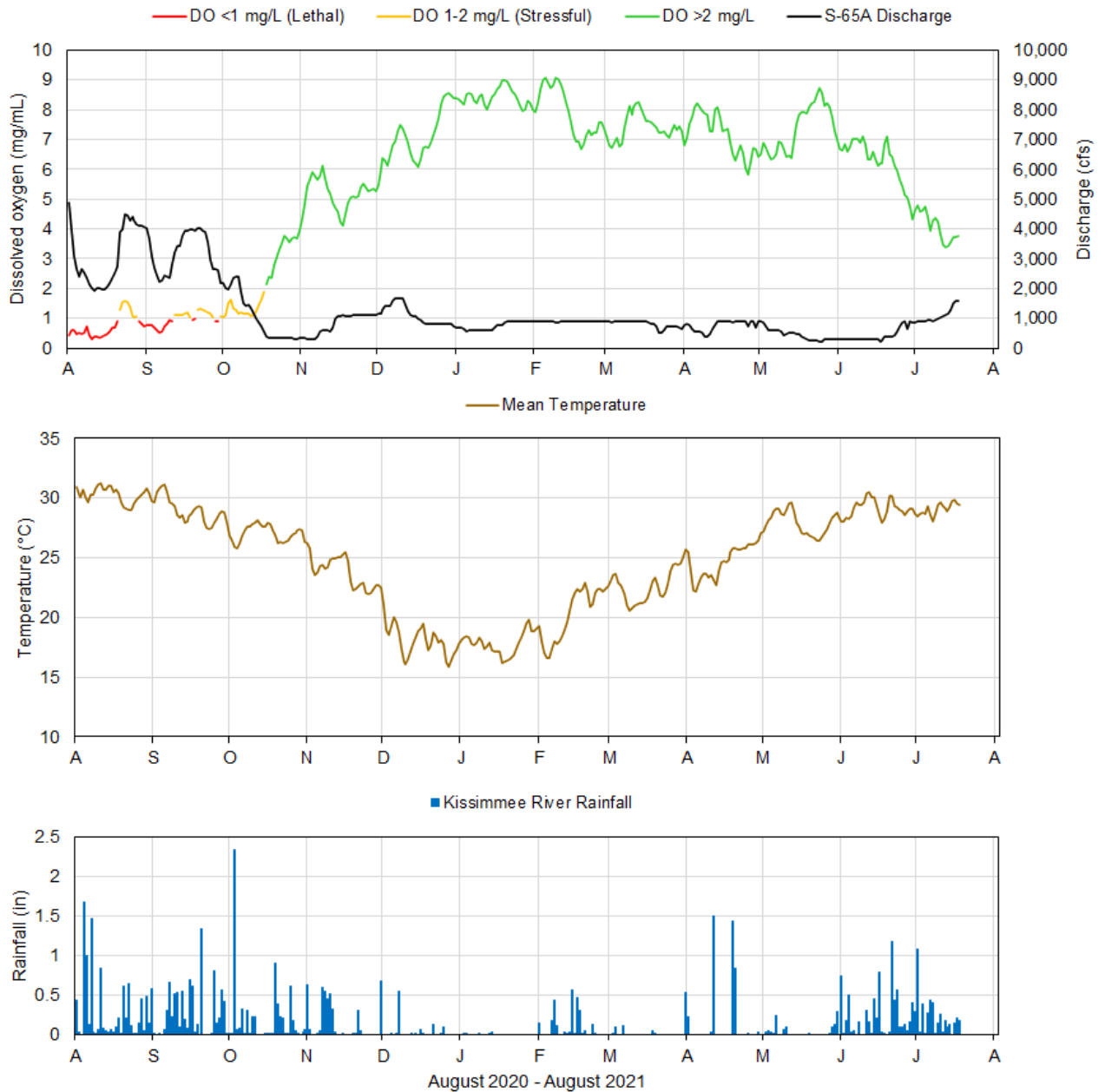
d. Combined discharge from S-65E and S-65EX1.

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 1/14/19).

Discharge (cfs)	Maximum Rate of Increase (cfs/day)	Maximum Rate of Decrease (cfs/day)
0-300	100	-50
301-650	150	-75
651-1,400	300	-150
1,401-3,000	600	-600
>3,000	1,000	-2,000



Report Date: 7/20/2021; data are through: 7/18/2021

sfwmd.gov

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

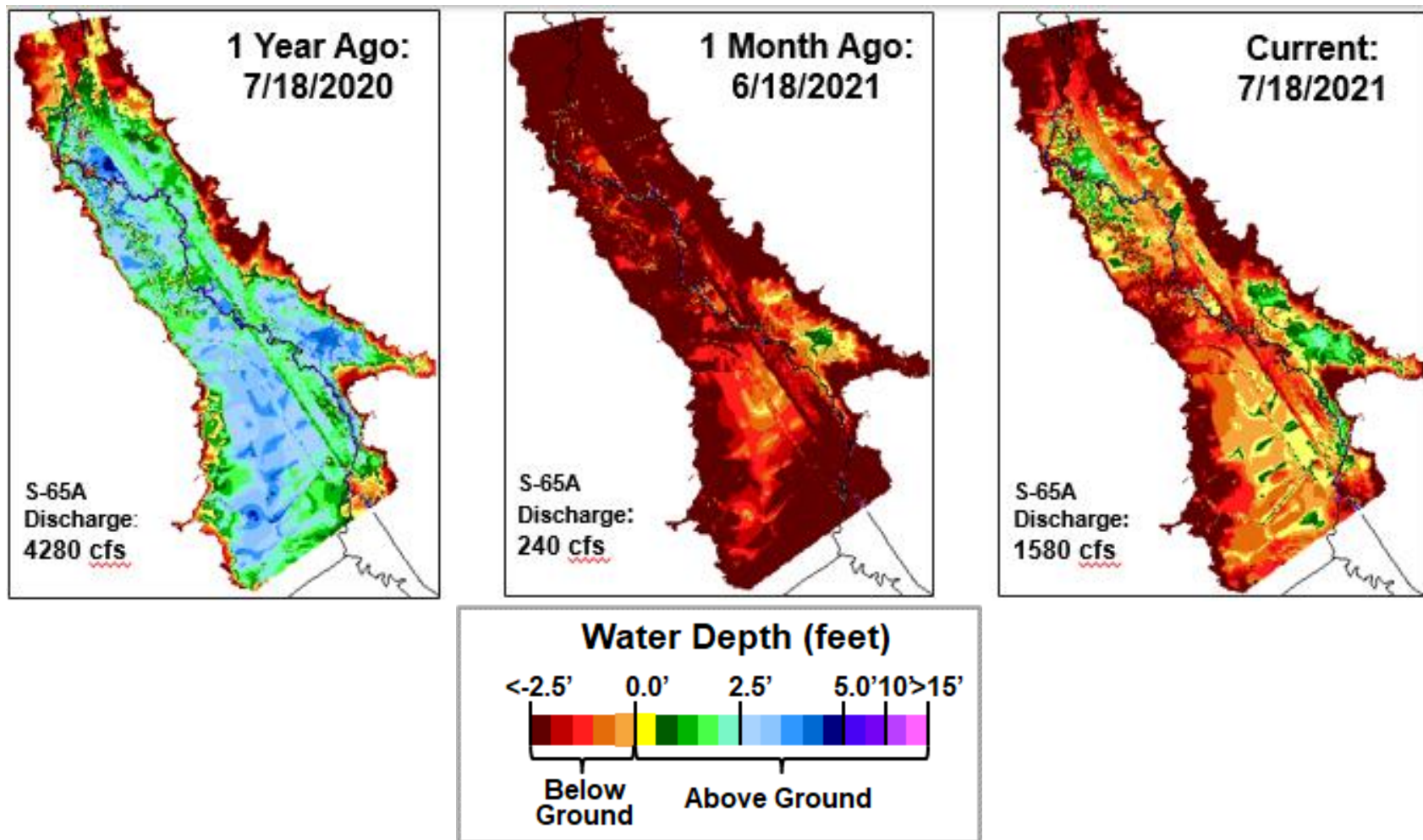


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

Lake Okeechobee

Lake Okeechobee stage was 13.47 feet NGVD on July 18, 2021, 0.89 feet higher than a month ago, and 0.81 feet higher than one year ago (**Figure LO-1**). Lake stages were above the ecological envelope from August 1, 2020 to March 30, 2021, and near or within the upper threshold of the envelope until late June 2021. Lake stages have increased recently with the onset of the rainy season and have been above the ecological envelope since early-July (**Figure LO-2**). Lake stage entered the Low flow sub-band last week (**Figure LO-3**). According to NEXRAD, 1.22 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 4,260 cfs to 2,953 cfs. Outflows (excluding evapotranspiration) increased, going from 0 cfs to 107 cfs. Most of the inflows came from the Kissimmee River (1,198 cfs through S-65E & S-65EX1) and S-84 and S-84X structures (623 cfs). Water flowed back from the C-44 canal into the Lake (backflow) via S-308 at an average rate of 245 cfs over the past week. Releases to the west via S-77 increased from 0 cfs to 75 cfs and there were no releases south through the S-350 structures last week. Average inflows and outflows through water control structures surrounding the Lake for the previous two weeks 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 (July 17, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed medium to high bloom potential in the northwestern and northern parts of the Lake. Overall, bloom potential increased in the northern part of the Lake from the previous week and remains very low in the southern part of the Lake (**Figure LO-5**).

The latest water quality survey results from July 7 - 8, 2021 revealed that chlorophyll a concentration (phytoplankton biomass proxy) were highest in the NE and NW parts of the Lake. Bloom conditions (chl a > 40 µg/L) were recorded at 8 (25%) sites. The highest biomass (82.2 µg/L) was recorded at NES135 in the NE part of the Lake (**Table LO-2** and **Figure LO-6**). The number of sites with bloom conditions decreased by 6% (from 10 to 8 sites) since late June.

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	1069	1198	0.5	S-77	0	75	0.0
S-71 & S-72	782	327	0.1	S-308	-314	-245	-0.1
S-84 & S-84X	1244	623	0.3	S-351	0	0	0.0
Fisheating Creek	96	165	0.1	S-352	0	0	0.0
S-154	62	71	0.0	S-354	0	0	0.0
S-191	277	178	0.1	L-8 Outflow		32	0.0
S-133 P	241	107	0.0	Evapotranspiration	2232	2661	1.1
S-127 P	91	54	0.0	Totals	1917	2524	1.1
S-129 P	52	22	0.0				
S-131 P	54	25	0.0				
S-135 P	240	182	0.1				
S-2 P	0	0	0.0				
S-3 P	0	0	0.0				
S-4 P	0	0	0.0				
L-8 Backflow	53						
Rainfall	9179	3274	1.4				
Totals	13440	6227	2.6				

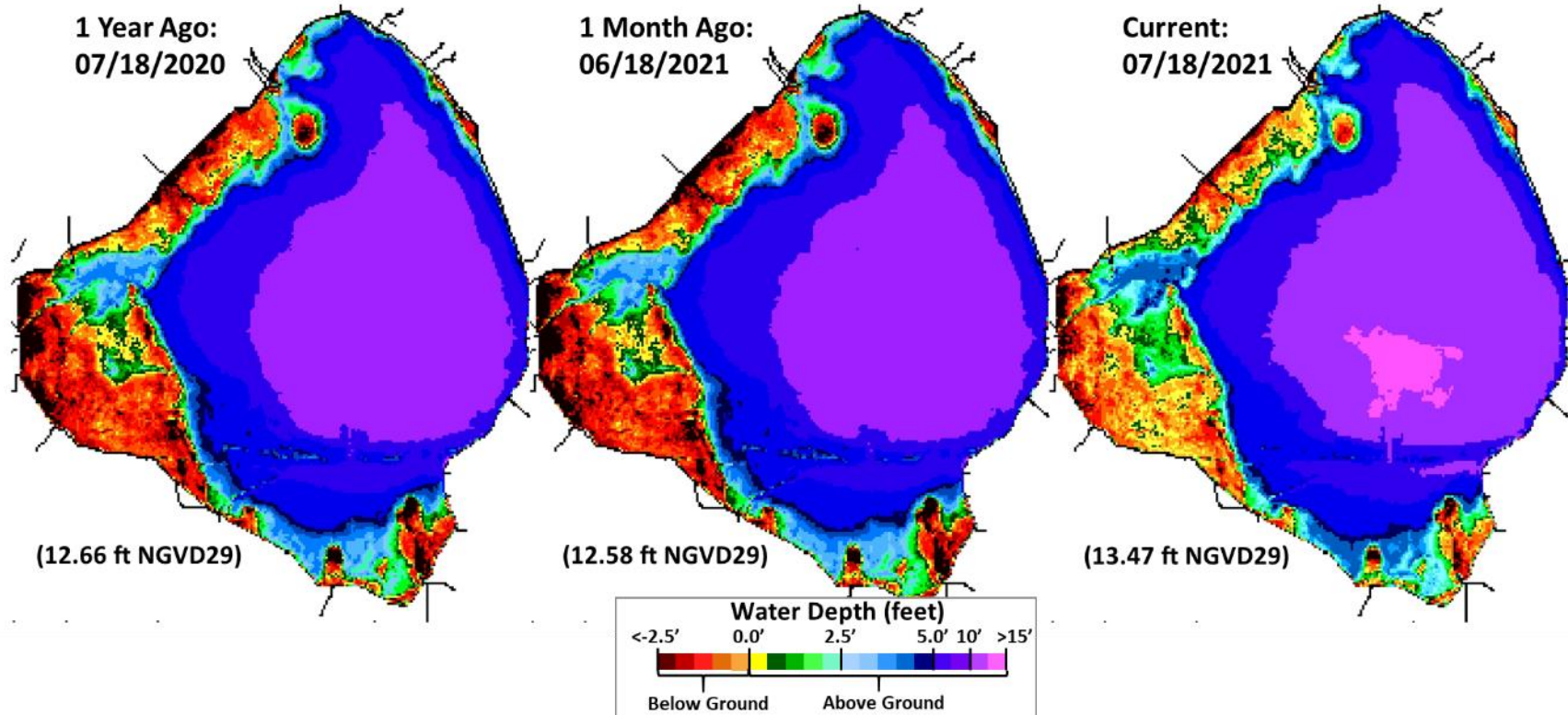


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Stage vs Updated Ecological Envelope

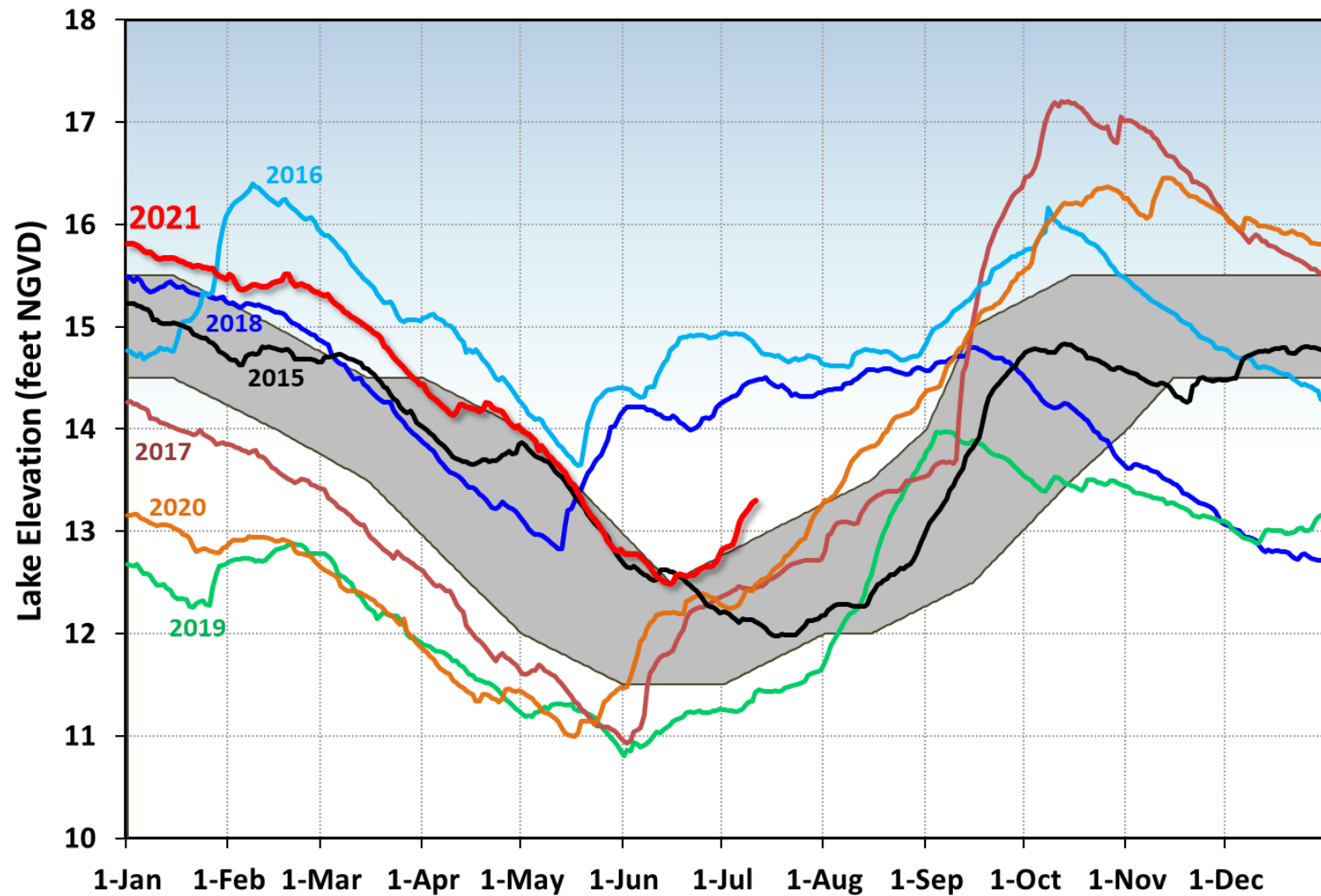


Figure LO-2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated ecological envelope.

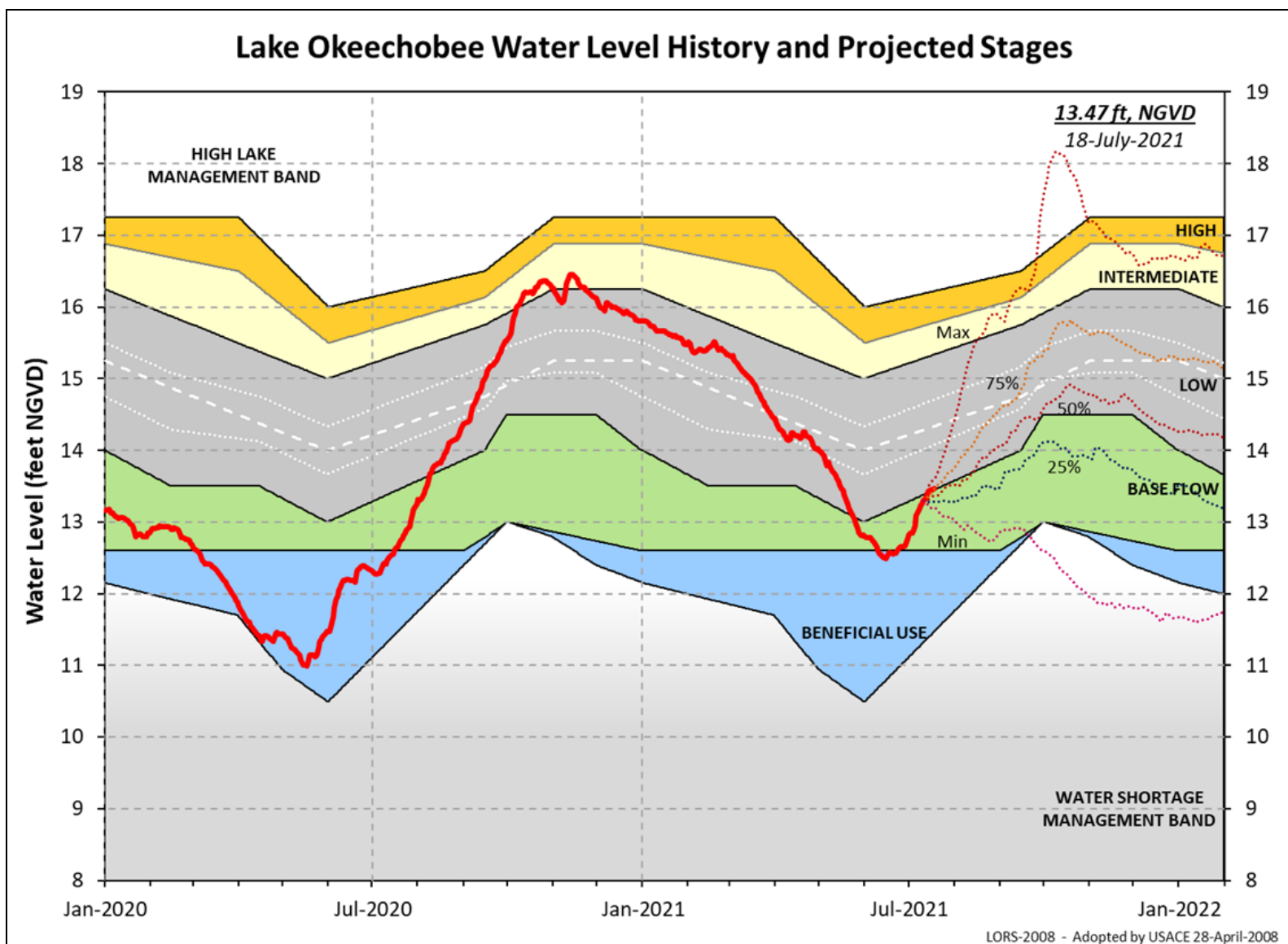


Figure LO-3. Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

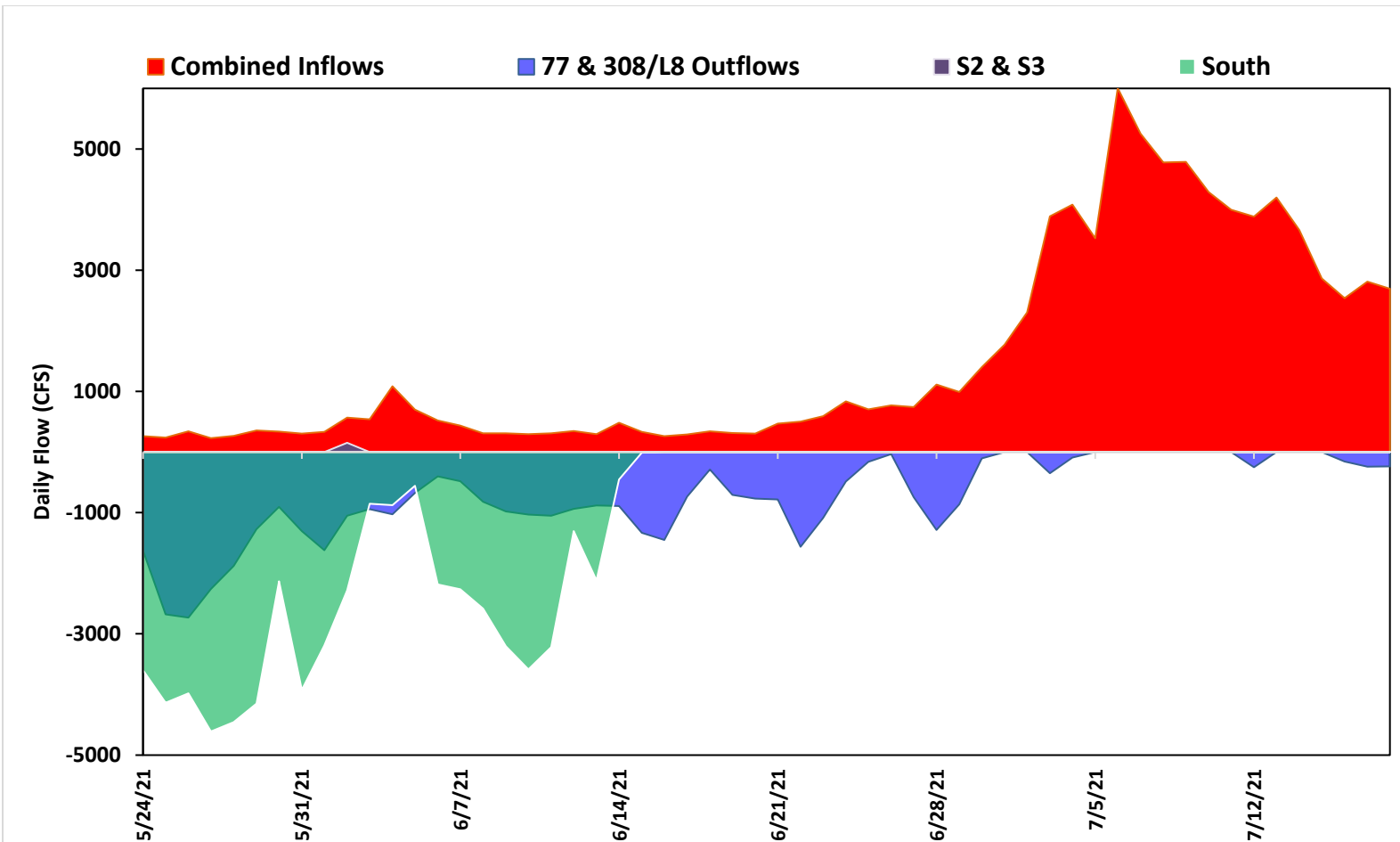


Figure LO-4. Major inflows (red) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) are included as inflows. Conversely, flows from Lake Okeechobee into the L-8 Canal are included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

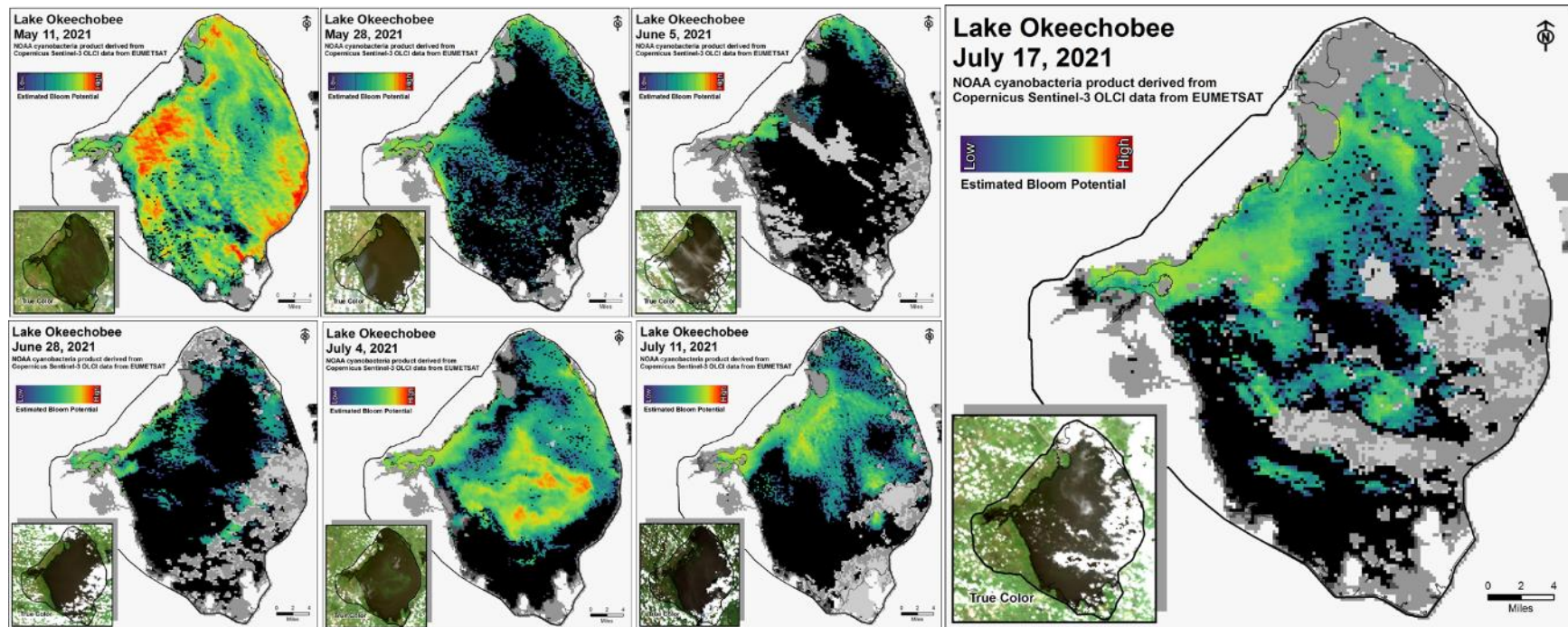
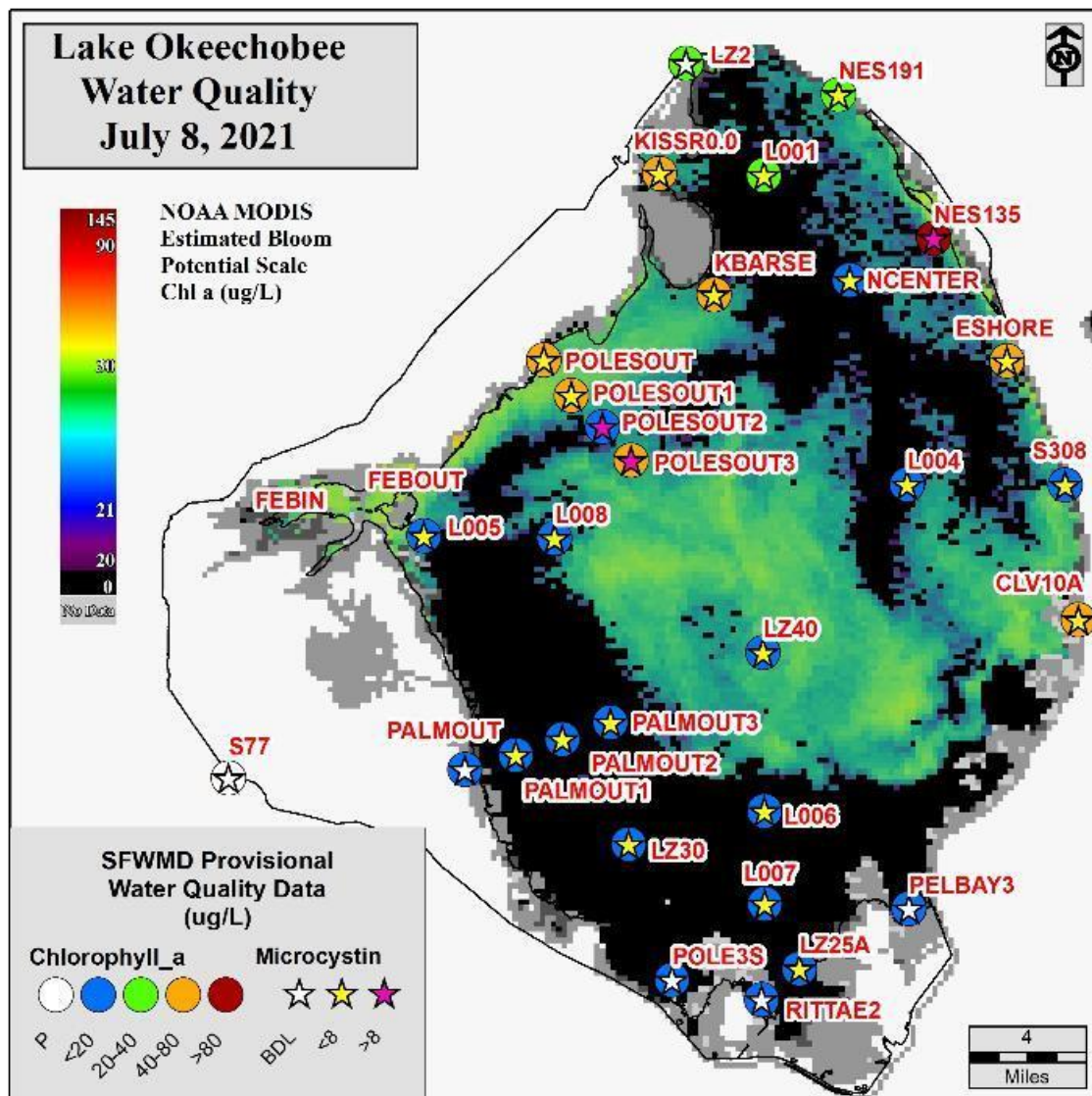


Figure LO-5. Cyanobacteria bloom potential based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover

Table LO-2. Provisional results of chlorophyll *a* concentrations and cyanobacteria taxa from sampling trips on July 7 - 8, 2021.

Station	Chl <i>a</i> (µg/L)	Toxin (µg/L)	Taxa	Station	Chl <i>a</i> (µg/L)	Toxin (µg/L)	Taxa
FEBIN	NS	NS	NS	L001	22.0	1.7	<i>Microcys</i>
FEBOUT	NS	NS	NS	L004	16.6	0.7	<i>Microcys</i>
KISSR0.0	61.5	0.4	mixed	L006	8.5	0.3	<i>Microcys</i>
L005	18.2	0.5	mixed	L007	9.5	0.3	mixed
LZ2	36.7	BDL	mixed	L008	12.8	7.5	<i>Microcys</i>
KBARSE	72.3	0.7	<i>Micro/Cylin</i>	LZ30	7.8	0.8	<i>Microcys</i>
RITTAE2	4.0	BDL	mixed	LZ40	14.0	5.3	<i>Microcys</i>
PELBAY3	3.8	BDL	mixed	CLV10A	40.4	7.3	<i>Microcys</i>
POLE3S	3.9	BDL	mixed	NCENTER	19.1	0.8	<i>Microcys</i>
LZ25A	3.0	0.3	mixed	Outflow Structures (sampled 7/12)			
PALMOUT	10.9	BDL	mixed	S308C	5.7	0.4	<i>mixed</i>
PALMOUT1	4.8	2.3	<i>Microcys</i>	S77	P	BDL	<i>mixed</i>
PALMOUT2	7.7	0.5	<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	5.4	2	<i>Microcys</i>				
POLESOUT	43.3	0.3	<i>Cylindro</i>				
POLESOUT1	68.6	2.5	<i>Micro/Cylin</i>				
POLESOUT2	16.7	12.0	<i>Microcys</i>				
POLESOUT3	45.5	37.0	<i>Microcys</i>				
EASTSHORE	42.8	5.2	<i>Microcys</i>				
NES135	82.2	21.0	<i>Microcys</i>				
NES191	36.6	0.4	<i>Microcys</i>				



Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was approximately 1,113 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was approximately 1,089 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, mean salinities decreased at the HR1 and US1 Bridge sites and increased at the A1A Bridge site (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 11.7. 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 5,218 cfs (**Figures ES-5 and ES-6**) and the previous 30-day mean inflow was 3,157 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-6**.

Over the past week, salinities remained the same 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 Shell Point and Sanibel and in the fair range at Cape Coral (**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 a steady release at 2,000 cfs with estimated tidal basin inflows of 1,182 cfs. Model results from all scenarios predict daily salinity to be 0.5 or lower and the 30-day moving average surface salinity to be 0.5 or lower at Val I-75 at the end of the two-week period (**Table ES-3 and Figure ES-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 July 16, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background to low

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

concentrations in Lee County. On the east coast, red tide was not observed in samples from Palm Beach County.

Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are Very Wet. The LORS2008 release guidance suggests up to 3,000 cfs release at S-79 to the Caloosahatchee River Estuary and up to 1,170 cfs release at S-80 to the St. Lucie Estuary.

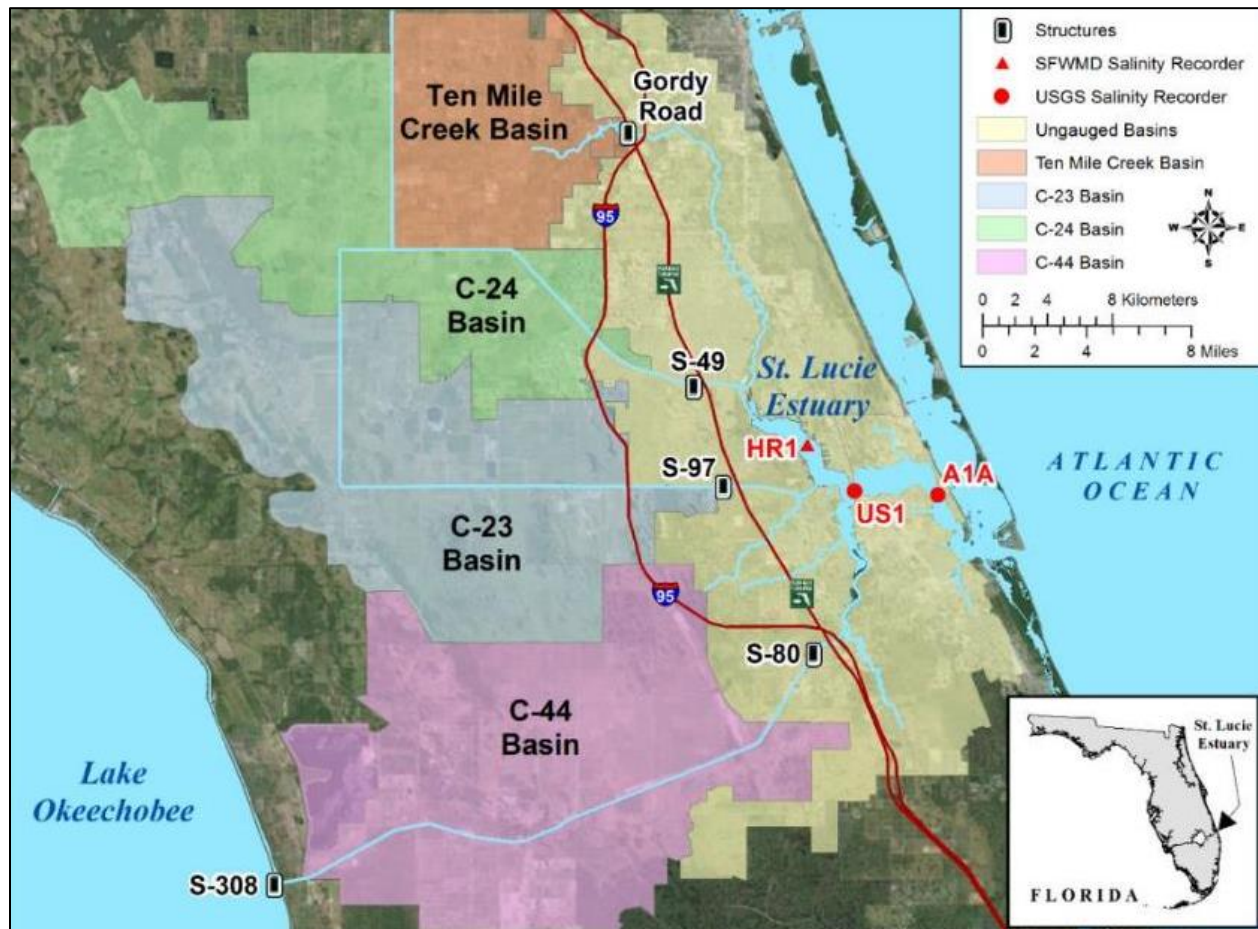


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

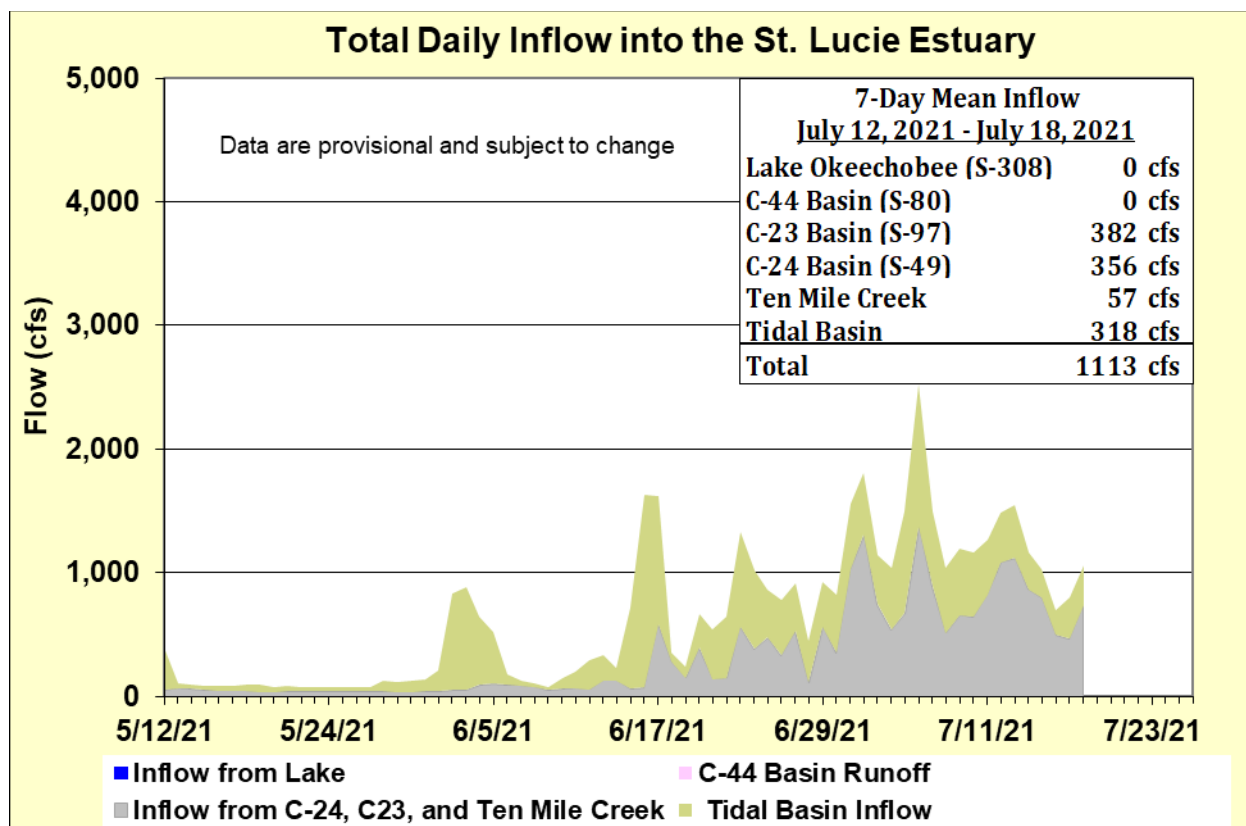


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	4.4 (6.4)	7.2 (9.4)	NA ^a
US1 Bridge	11.0 (12.5)	12.4 (14.5)	10.0 – 26.0
A1A Bridge	22.1 (21.5)	25.6 (25.1)	NA ^a

a. The envelope is not applicable.

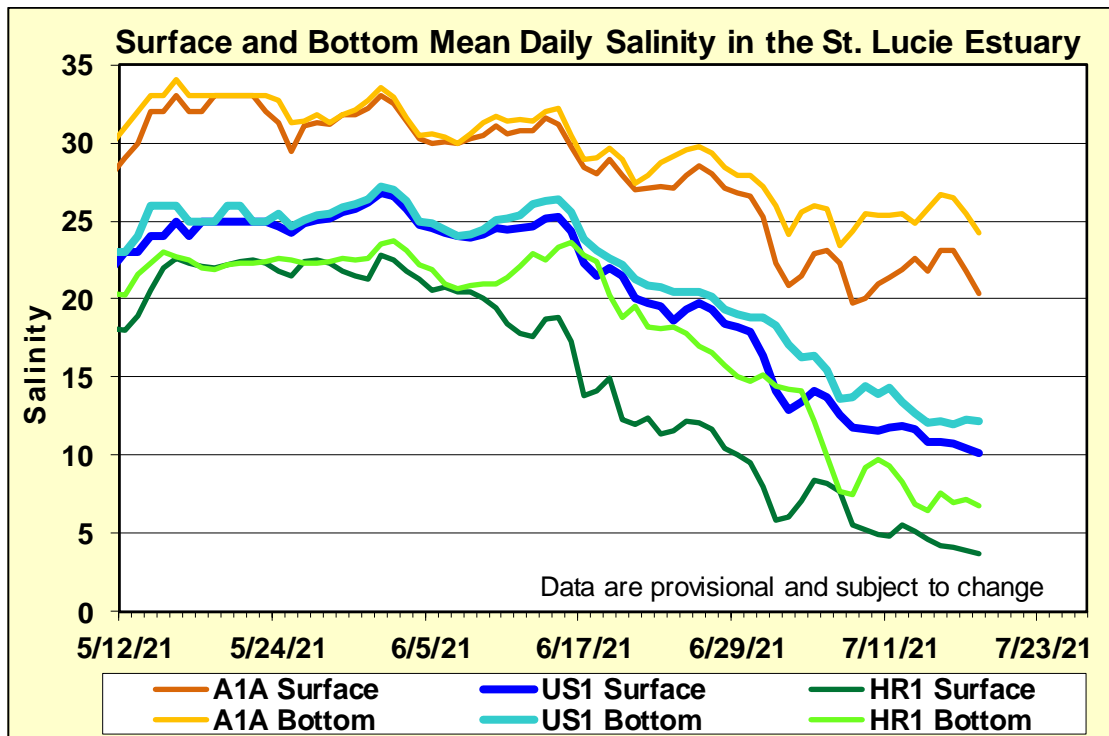


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

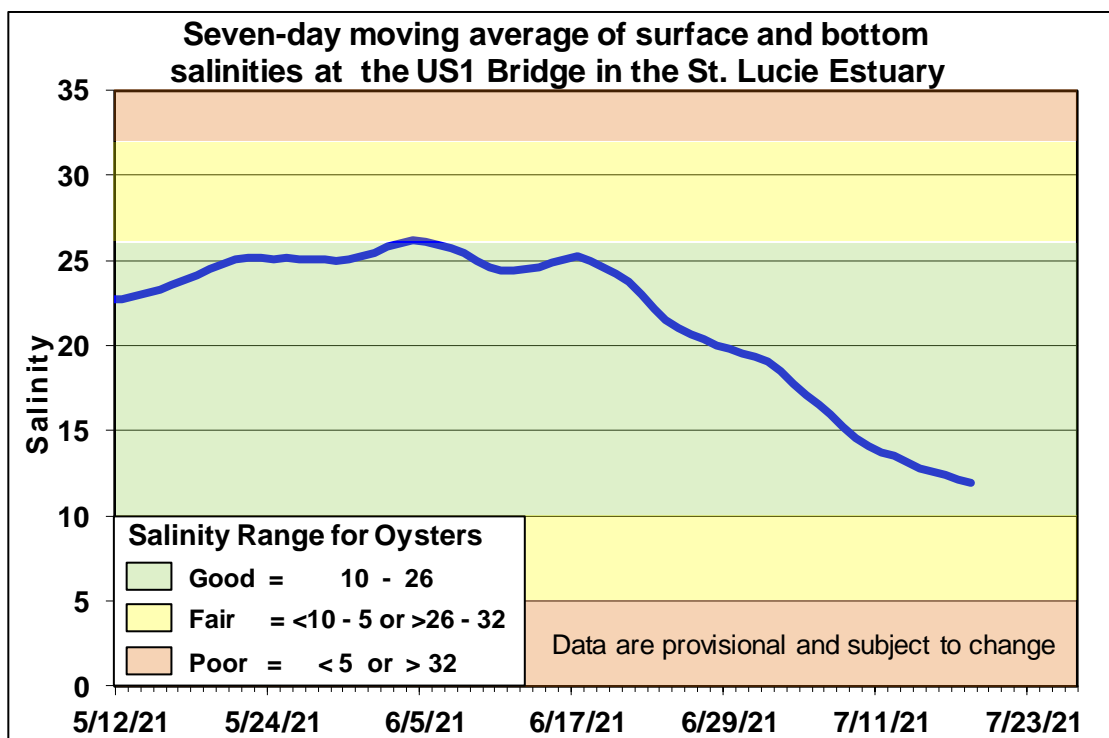


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

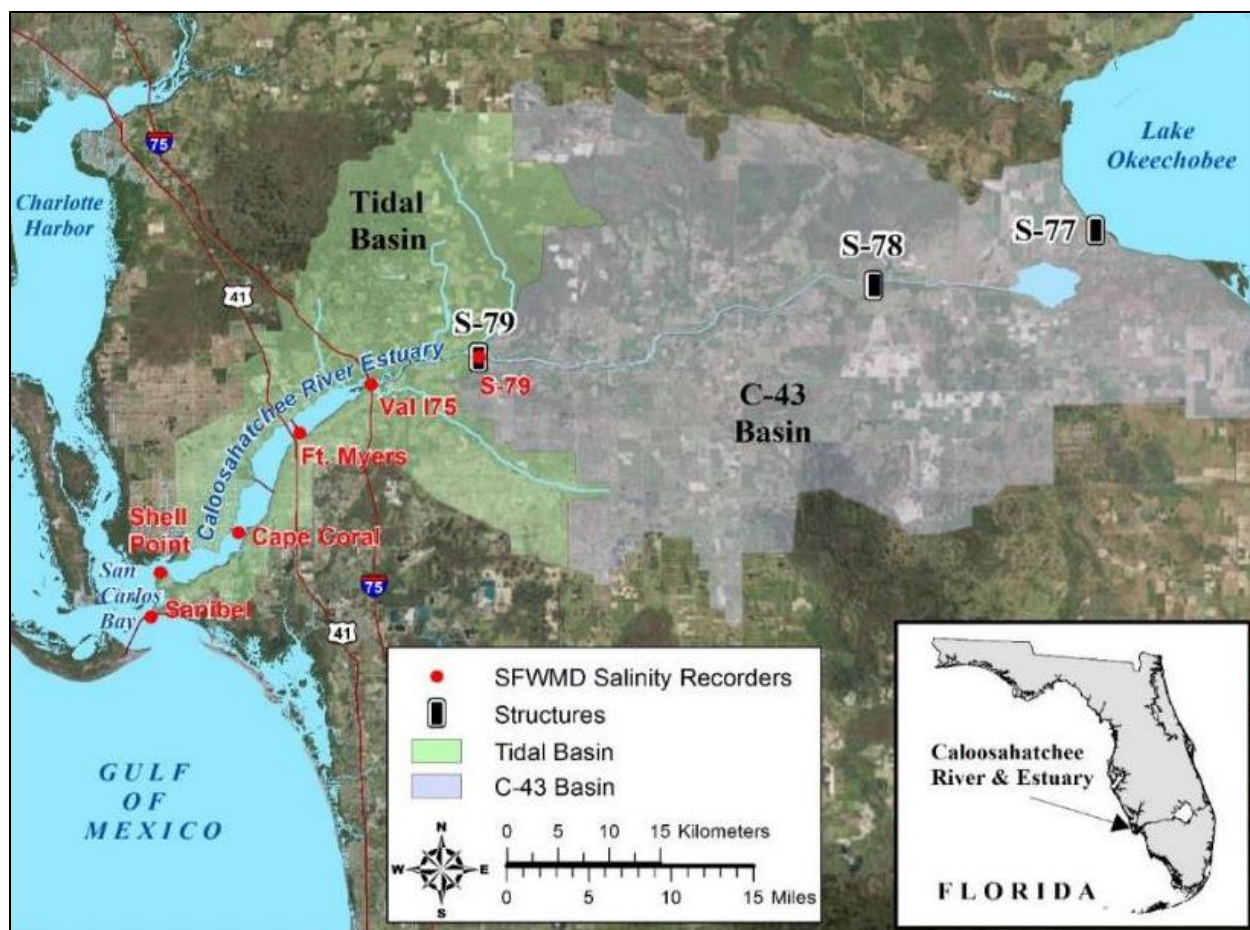


Figure ES-5. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

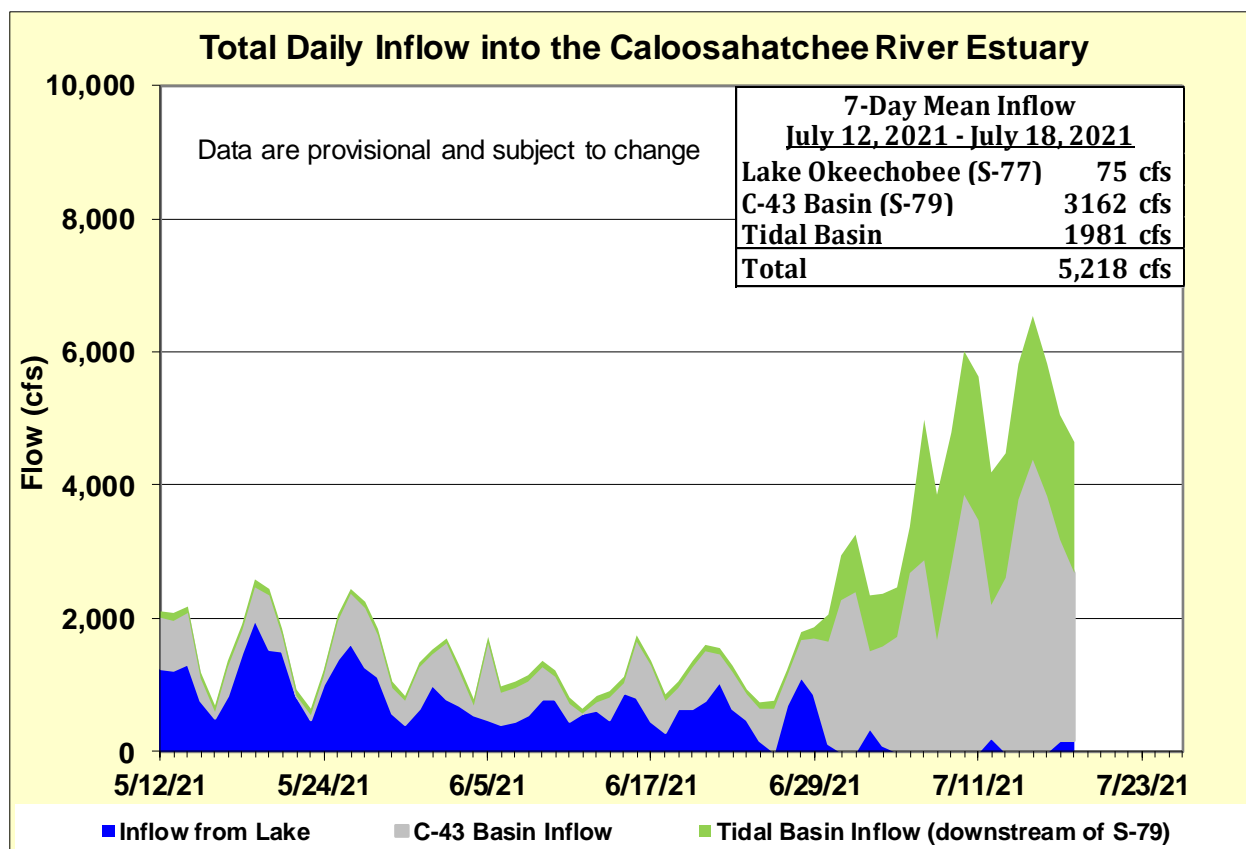


Figure ES-6. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

Table ES-2. Seven-day mean salinity at six monitoring sites in the Caloosahatchee River Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope at I-75 is for the protection of tape grass in the upper estuary and the envelope in the lower estuary is the preferred salinity range for adult eastern oysters (*Crassostrea virginica*). Data are provisional.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	0.3 (0.3)	0.3 (0.3)	NA ^a
Val I-75	0.3 (0.8)	0.3 (0.9)	0.0 – 5.0 ^b
Fort Myers Yacht Basin	0.7 (3.5)	4.9 (8.3)	NA ^a
Cape Coral	5.0 (9.8)	6.5 (10.7)	10.0 – 30.0
Shell Point	17.5 (21.5)	17.8 (23.4)	10.0 – 30.0
Sanibel	27.0 (28.4)	28.7 (29.5)	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.

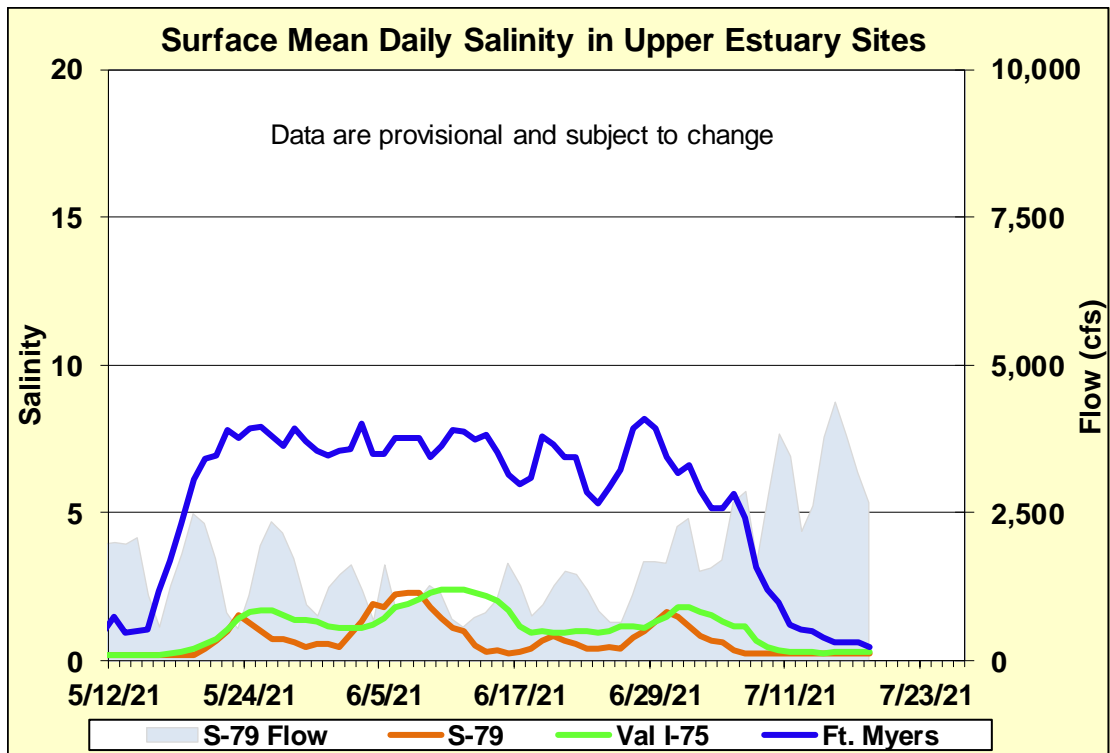


Figure ES-7. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

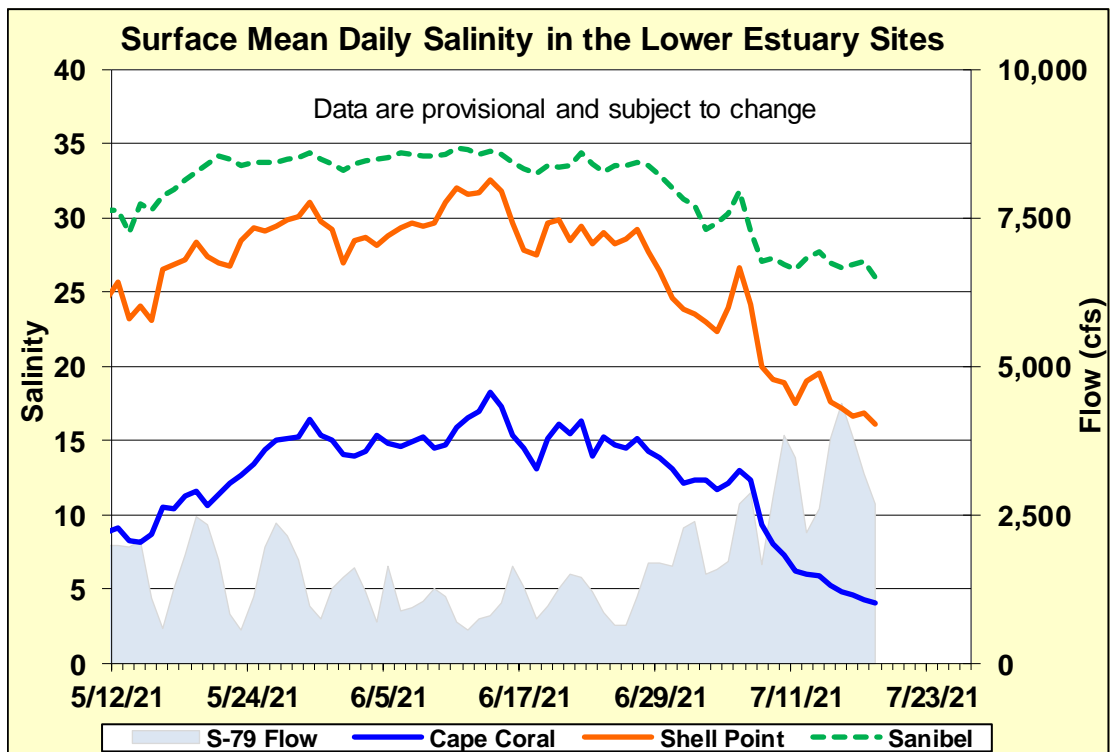


Figure ES-8. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

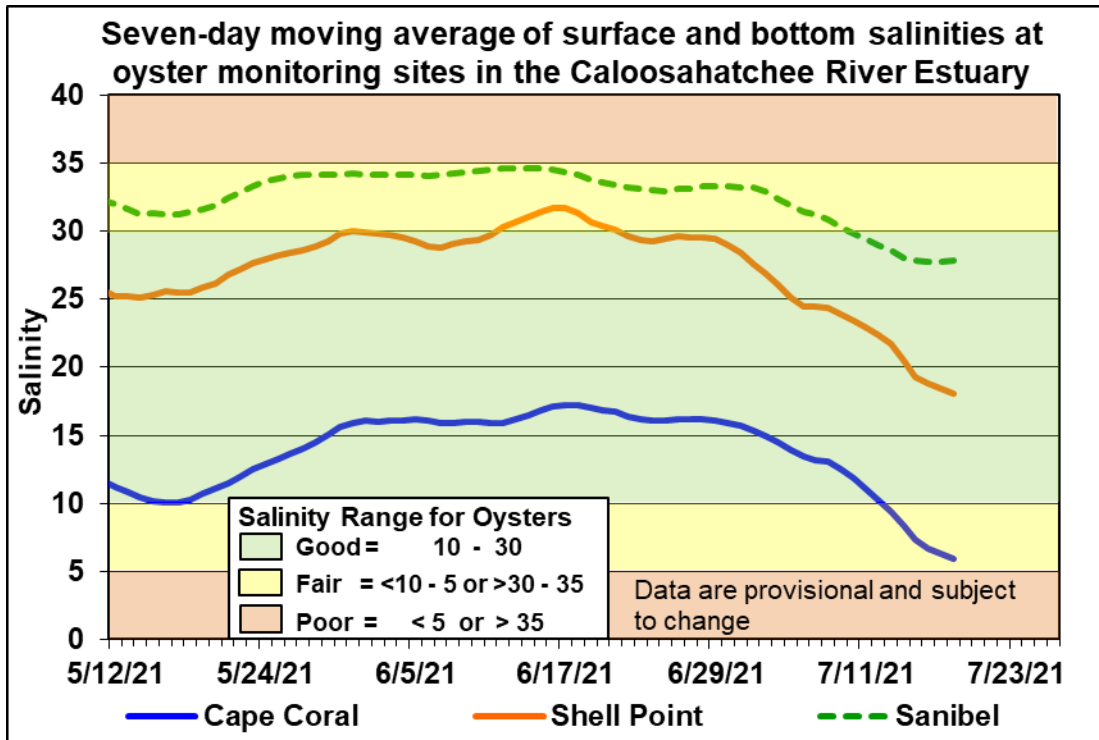


Figure ES-9. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

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	1182	0.5	0.5
B	450	1182	0.3	0.5
C	800	1182	0.3	0.5
D	1000	1182	0.3	0.5
E	1500	1182	0.3	0.5
F	2000	1182	0.3	0.5

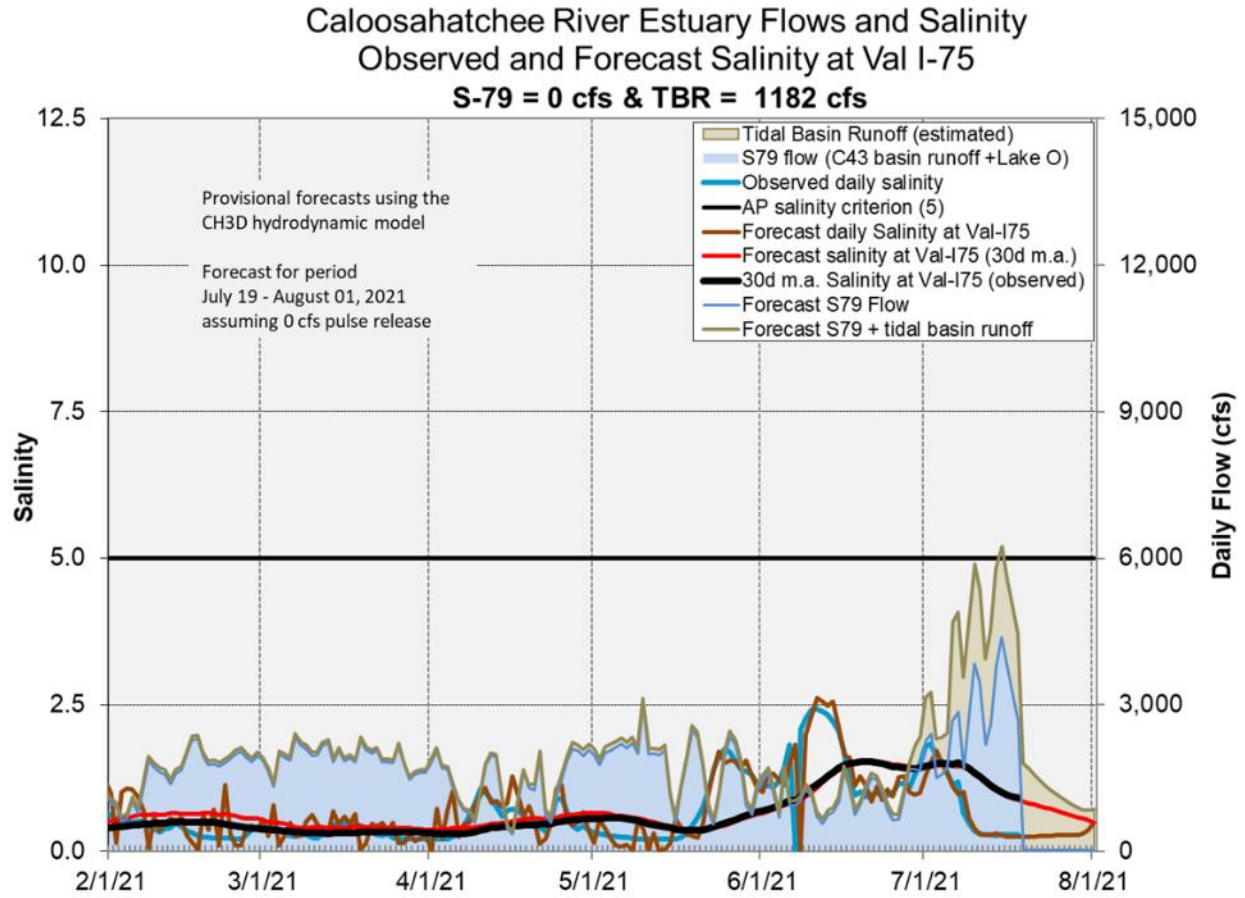


Figure ES-10. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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 stressed and highly stressed and the 365-day phosphorus loading rates (PLR) for these flow-ways are very high to 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. Most treatment cells are at or near target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for all flow-ways are high (**Figure S-2**).

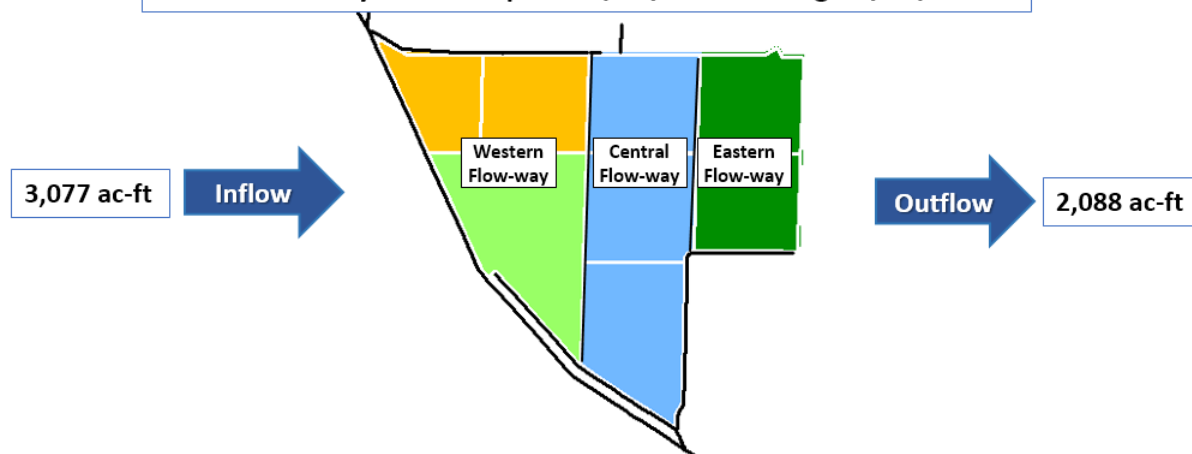
STA-2: Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities and in Flow-way 2 for construction activities. Most treatment cells are at or above target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4 and 5 is highly stressed. The 365-day PLRs for Flow-ways 4 and 5 are below 1.0 g/m²/year and for Flow-ways 1 and 3 are high; the 365-day PLR for Flow-way 2 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 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. Most treatment cells are at or above target stage. The 365-day PLRs for most flow-ways are near 1.0 g/m²/year. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8 which are healthy (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

STA-1E Weekly Status Report –7/12/2021 through 7/18/2021









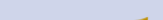








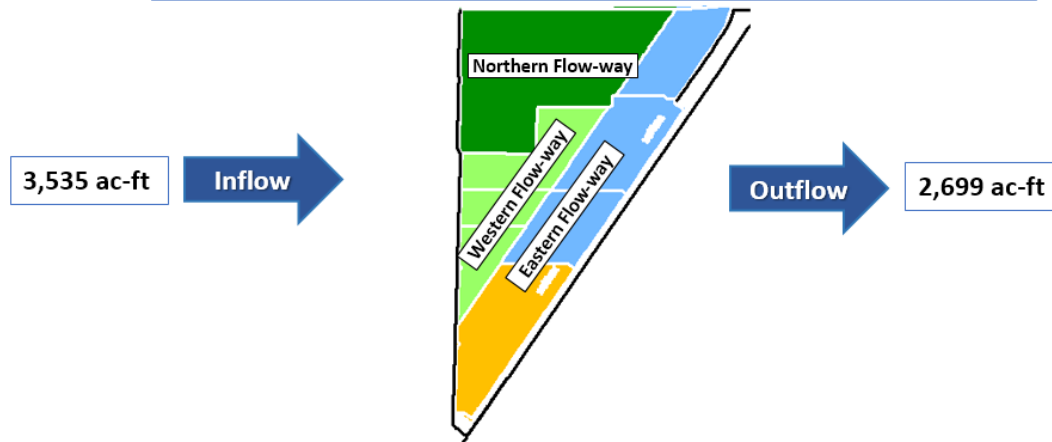
STA-1E Flow-Way Status				As of 7/18/2021		STA-1E Flow & Phosphorus Concentration				
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small> 	365-day P Loading Rate <small>(below 1.0 g P / m²/yr is optimal)</small> 	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)			7-day	28-day	365-day	
Eastern			Online	 Deep Water Level (> 2.8' above TS)	 High Water Level (1.5' – 2.8' above TS)	Total Inflow, ac-ft	3,077	14,012	298,695	
Central			Vegetation Rehab	 0.2' – 1.5' above TS	 Target Stage (TS +/- 0.2')	--Lake Inflow, ac-ft	0	N/A	26,200	
Western	Offline, construction activities starting 11/01/2019			 Low Water Level (<0.2' below TS)	Depth / Area Based: Percent of Area Dry		Total Outflow, ac-ft	2,088	12,878	257,356
				 0-25% Dry	 50-75% Dry	Inflow Conc., ppb	62	90	137	
				 25-50% Dry	 75-100% Dry	Outflow Conc., ppb	15	20	40	
						Includes Preliminary Data				

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

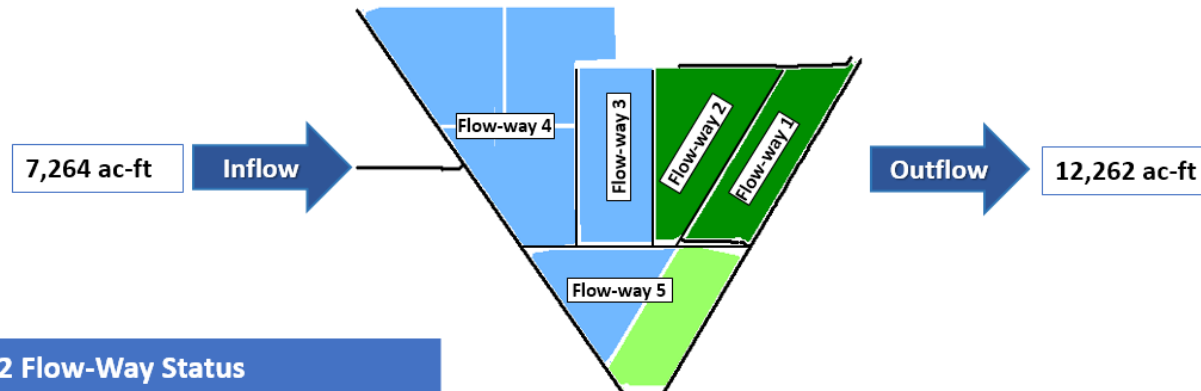
STA-1W Weekly Status Report – 7/12/2021 through 7/18/2021



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 7/18/2021			
				Stage Based: Relative to Target Stage (TS)			
Northern			Construction	Deep Water Level (> 2.8' above TS)	7-day		
				High Water Level (1.5' – 2.8' above TS)	28-day		
				0.2' – 1.5' above TS	365-day		
Western			Construction	Target Stage (TS +/- 0.2')	Total Inflow, ac-ft		
				Low Water Level (<0.2' below TS)	--Lake Inflow, ac-ft		
				Depth / Area Based: Percent of Area Dry			
Eastern			Construction	0-25% Dry	Total Outflow, ac-ft		
				25-50% Dry	Inflow Conc., ppb		
				50-75% Dry	Outflow Conc., ppb		
				75-100% Dry	Includes Preliminary Data		

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

STA-2 Weekly Status Report – 7/12/2021 through 7/18/2021



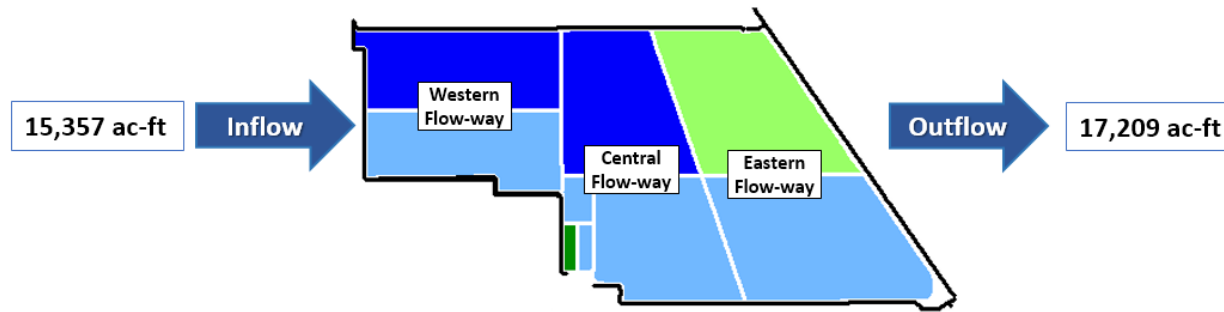
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2			Construction
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

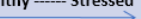






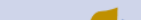




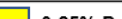



As of 7/18/2021	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-2 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	7,264	54,675	428,130
--Lake Inflow, ac-ft	0	N/A	90,300
Total Outflow, ac-ft	12,262	63,114	474,672
Inflow Conc., ppb	89	98	94
Outflow Conc., ppb	12	14	20
Includes Preliminary Data			

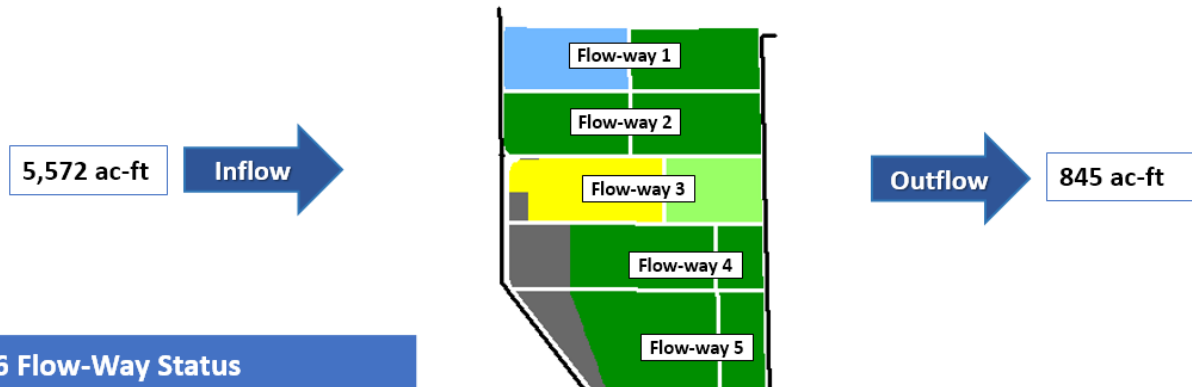
Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 7/12/2021 through 7/18/2021



STA-3/4 Flow-Way Status				STA-3/4 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 7/18/2021			
				Stage Based: Relative to Target Stage (TS)			
Eastern			Offline, vegetation management drawdown as of 3/1/2021	 Deep Water Level (> 2.8' above TS)	7-day	28-day	365-day
				 High Water Level (1.5' – 2.8' above TS)			
				 0.2' – 1.5' above TS			
				 Target Stage (TS +/- 0.2')			
Central			Online	 Low Water Level (<0.2' below TS)	15,357	102,078	567,443
				Depth / Area Based: Percent of Area Dry			
Western			Online	 0-25% Dry	0	N/A	61,400
				 25-50% Dry			
				 50-75% Dry	17,209	84,957	523,207
				 75-100% Dry			
				Includes Preliminary Data			

STA-5/6 Weekly Status Report – 7/12/2021 through 7/18/2021



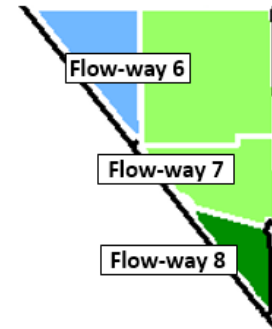
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P / m ² /yr is optimal)	Online / Offline / Restrictions
1	← →		Online
2	← →	N/A	Post-construction
3	← →	N/A	Post-construction
4	← →		Online
5	← →		Online

As of 7/18/2021	
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	5,572	8,675	119,350
--Lake Inflow, ac-ft	N/A	N/A	N/A
Total Outflow, ac-ft	845	1,005	141,185
Inflow Conc., ppb	158	159	274
Outflow Conc., ppb	30	30	75
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 7/12/2021 through 7/18/2021



STA-5/6 Flow-Way Status				As of 7/18/2021	
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)	
				Deep Water Level (> 2.8' above TS)	
6	←-----→		Online	High Water Level (1.5' – 2.8' above TS)	
				0.2' – 1.5' above TS	
7	←-----→		Online	Target Stage (TS +/- 0.2')	
				Low Water Level (<0.2' below TS)	
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 trended towards schedule last week. Stage on Sunday was above the rising Zone A1 regulation line by 0.23 feet. WCA-2A: Stage at 2A-17 changed direction last week falling to 1.02 feet above the rising regulation line. WCA-3A: The Three Gauge Average continued to trend faster than the slope of the Zone A regulation line last week. Stage ended the week at 0.67 feet below the rising Zone A line. WCA-3A: Stage change at Gauge 62 (Northwest corner) declined slightly last week. The Sunday average was 0.42 feet below the upwards sloping Upper Schedule. (**Figures EV-1 through EV-4**).

Water Depths

The WDAT tool indicates that water levels continue to rise across the Everglades Protection Area. Northeastern WCA-3A is recovering but still drier than the surrounding regions and is in need of water as the wet season continues. Downstream in the upper reaches of the L-67, depths are approaching 2.5 feet. North to South hydrologic connectivity is present within Everglades National Park (ENP). However, much of ENP and Big Cypress National Preserve (BCNP) are either still dry or have water levels just at the ground surface (**Figure EV-5**). Comparing WDAT water levels from present to last month, stages increased in most places. The largest increases occurred on the western side of the Everglades Protection Area, and along the northern perimeter of WCA-3A. Compared to a year ago, WCA-3 is significantly drier, especially in the east. ENP continues to be drier than a year ago, while WCA-2A is wetter (**Figure EV-6**). Compared to the 20-year average water depths, one area of note is northeastern ENP, which is much wetter than average. (**Figure EV-7**).

Taylor Slough and Florida Bay

An average of 1.5 inches of rain fell over Taylor Slough and Florida Bay over the week ending Sunday (7/18), with the largest volumes over northern Taylor Slough and eastern Florida Bay. Stage increased by an average of 0.24 feet over the week with the largest weekly change of 0.77 feet in southwestern Taylor Slough (CP) (**Figure EV-8 & Figure EV-9**). Depths are averaging 0.6 inches higher than the historical average for this time of year due to the rapid increase. Phosphorus levels at the S-328 are still elevated at 36 µg/L. That phosphorus level is higher than the 8 µg/L threshold needed to begin water movements towards Everglades National Park from that structure.

Salinities in Florida Bay averaged only a 0.3 increase for the week ending 7/18, but individual stations had weekly changes ranging from -1.3 to +2.3 (**Figure EV-8**). Most nearshore and Bay stations changed less than 1, but JK in the west and LM in the northeast both increased 2 over the week. Some locally heavy rainfall helped to keep salinities from rising this past week. Freshwater deliveries will still be needed to freshen the nearshore area, but conditions are staying near average out in the Bay. (**Figure EV-10**).

Water Management Recommendations

Ascension rates that do not exceed 0.25 feet per week or 0.50 feet per two weeks are considered ecologically healthy. Flows into northern WCA-3A, with a focus on the northeastern region downstream of S -150 would have an ecological benefit. Rehydration of northern Taylor Slough has begun, and the most western structures (S-328 and G-737) continue to have phosphorus levels above 8 µg/L. These structures should not be opened until the phosphorus levels return to below that criteria at these locations. Individual regional recommendations can be found in **Table EV-2**.

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

Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	0.71	-0.02
WCA-2A	0.86	-0.06
WCA-2B	0.90	-0.07
WCA-3A	1.06	+0.17
WCA-3B	1.74	+0.04
ENP	1.35	+0.05



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

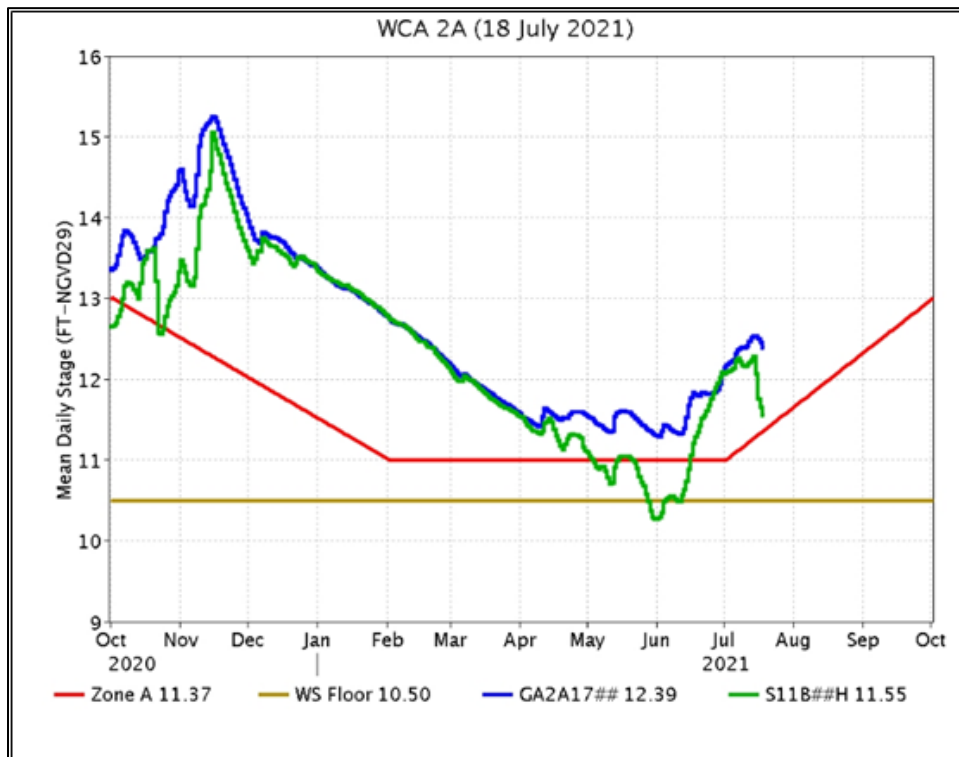


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

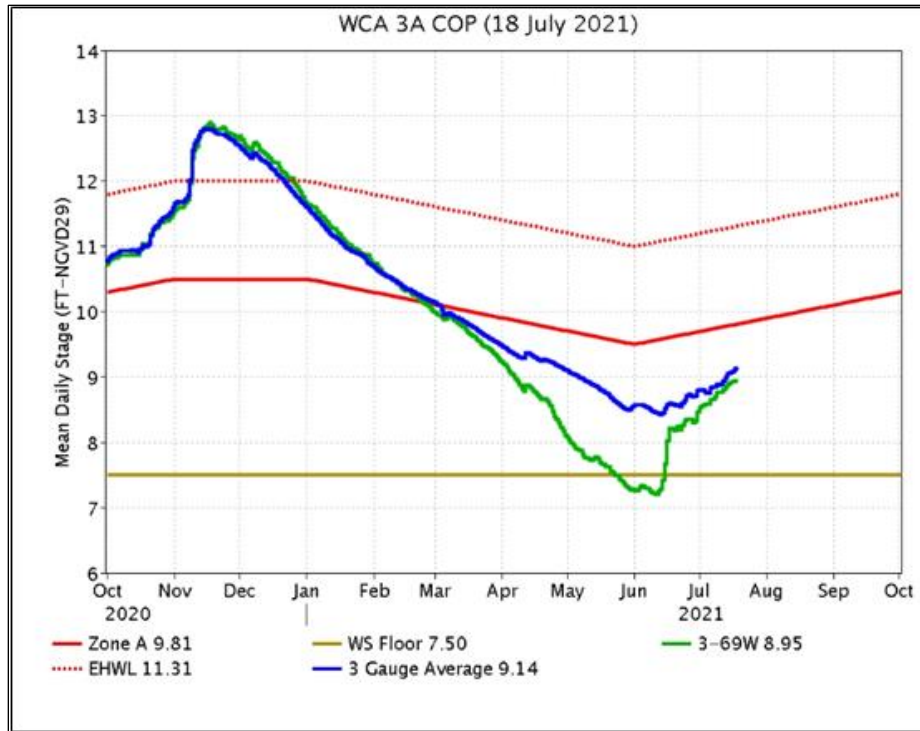


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

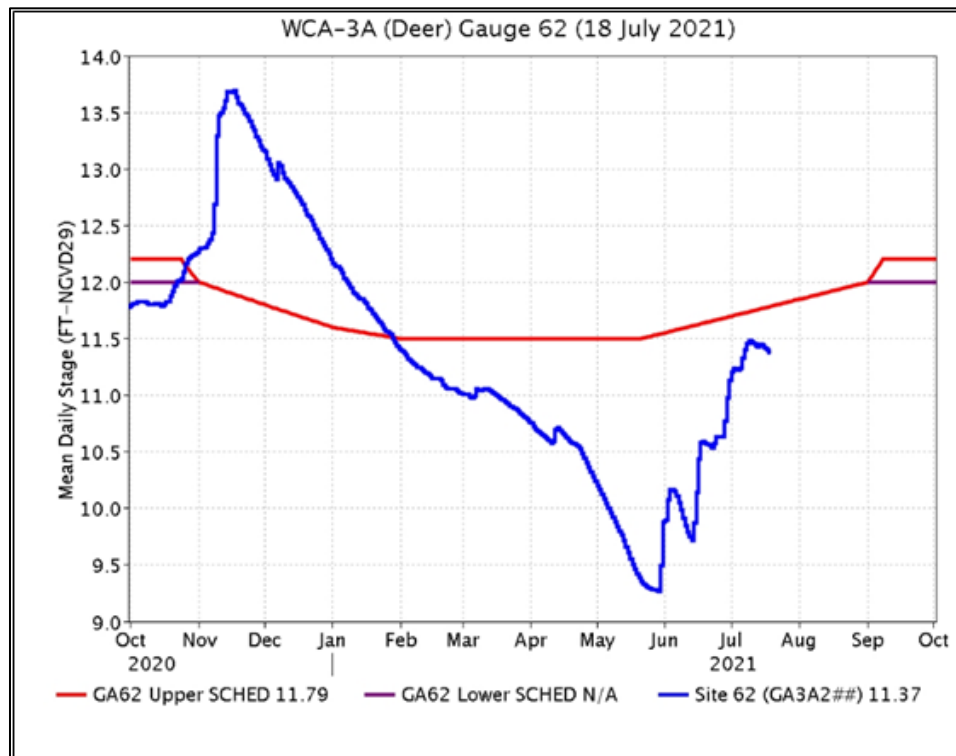


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

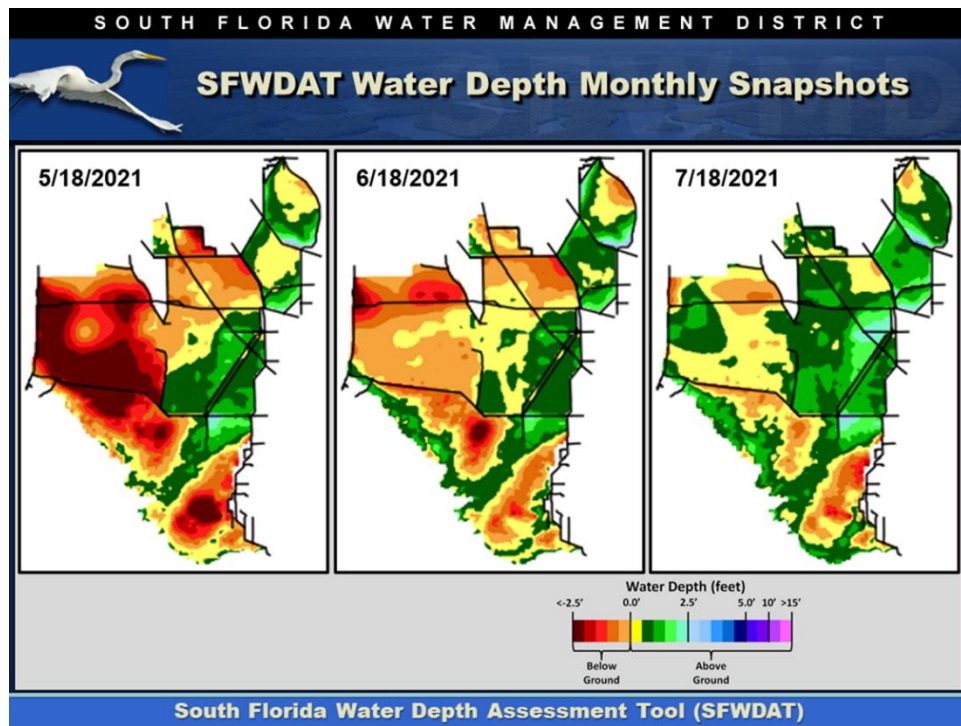


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

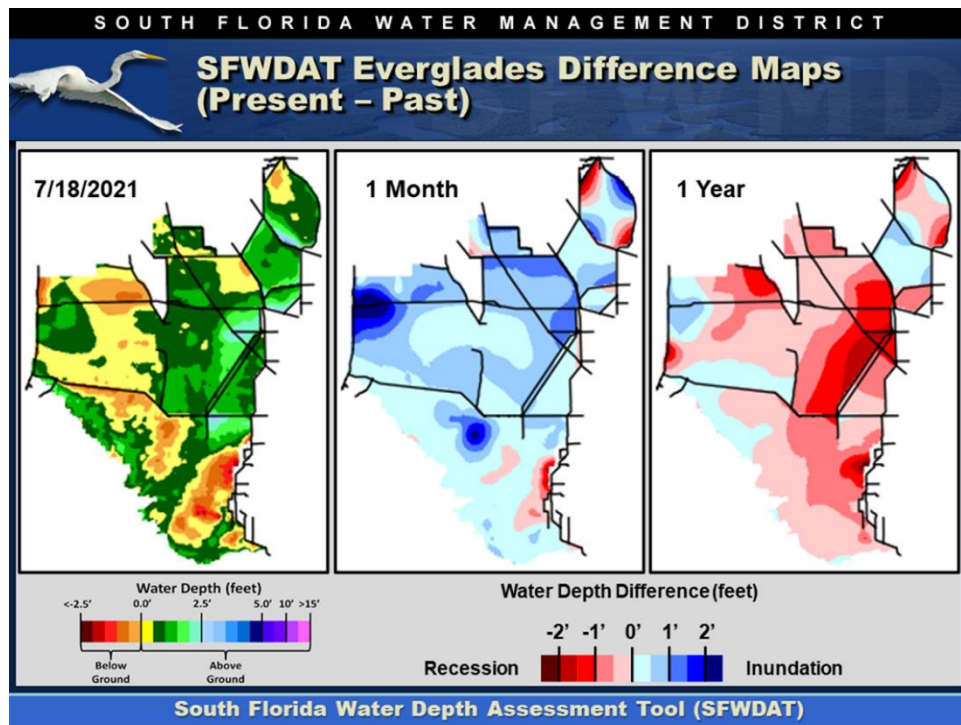


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

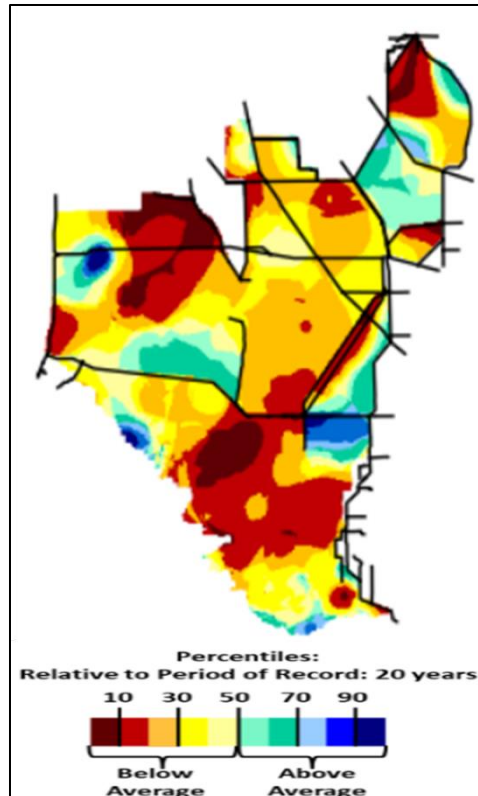


Figure EV-7. Present water depths compared to the day of year average over the previous 20 years.

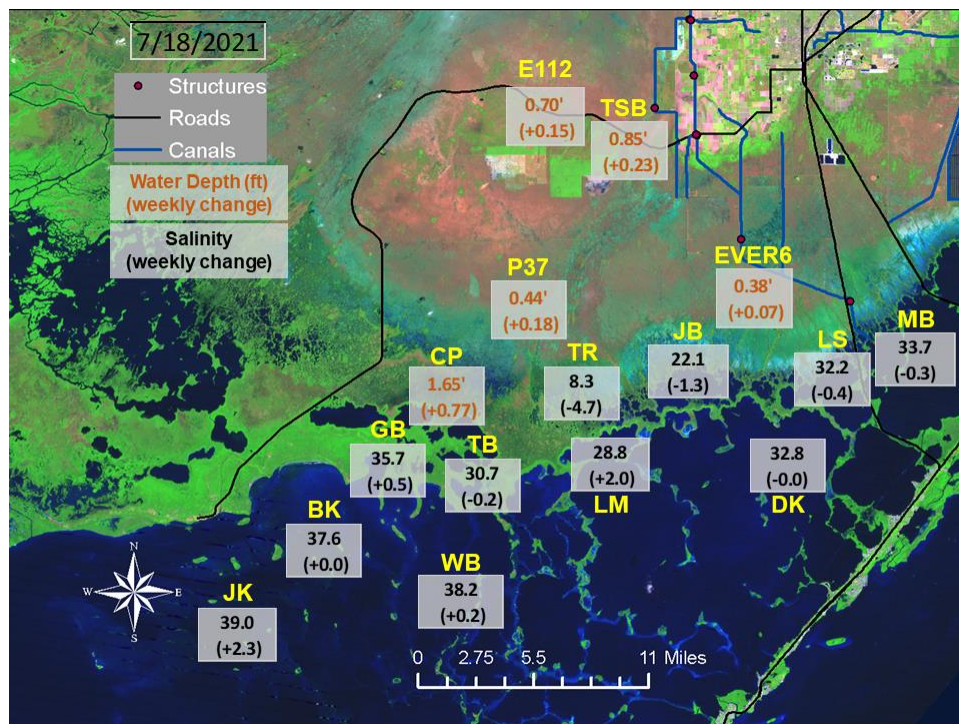


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

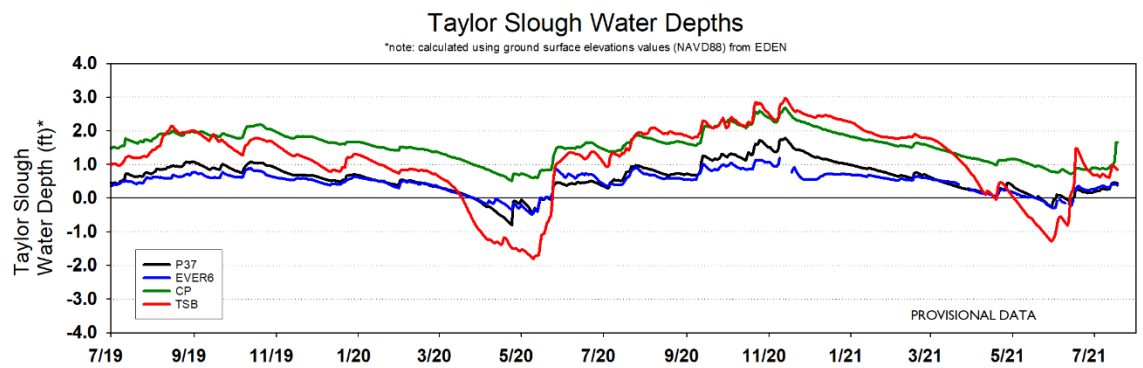


Figure EV-9. Taylor Slough water depth time series.

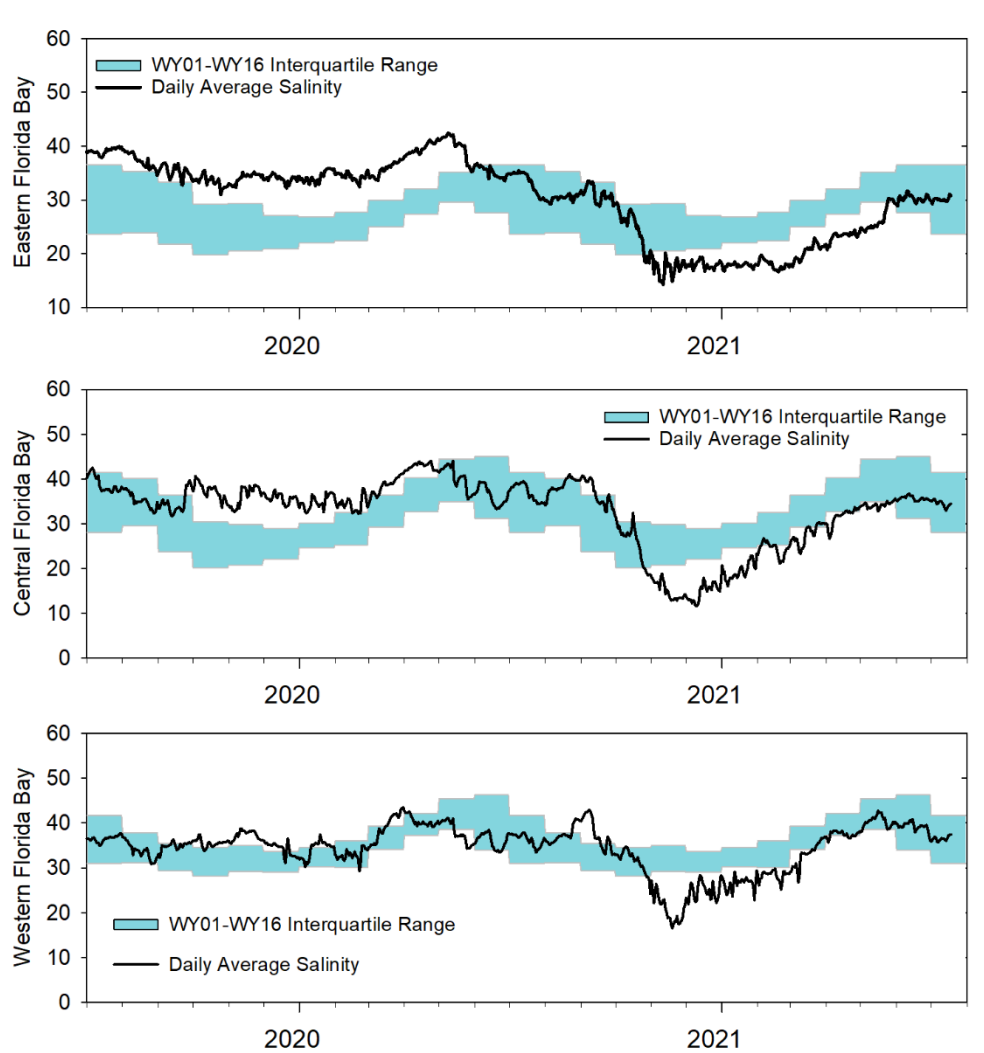


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, July 20th, 2021 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.02'	Maintain ascension rates between 0.01 and 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage decreased by 0.06'	Maintain ascension rate to between 0.01 and 0.25 feet per week	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage decreased by 0.07'	Maintain ascension rate to between 0.01 and 0.25 feet per week	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage increased by 0.60'	Moderate ascension rates between 0.01 and 0.25 feet per week now that surface water is present.	Protect within basin and downstream habitat and wildlife.
WCA-3A NW	Stage decreased by 0.09	Maintain ascension rate to between 0.01 and 0.25 feet per week	
Central WCA-3A S	Stage increased by 0.12'	Moderate ascension rate to between 0.01 and 0.25 feet per week	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage increased by 0.04'		
WCA-3B	Stage increased by 0.04'	Maintain ascension rates between 0.01 and 0.25 feet per week	Protect within basin and downstream habitat and wildlife.
ENP-SRS	Stage increased 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.
Taylor Slough	Stage changes ranged from +0.05' to +0.77'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -1.3 to +2.3	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.