Disclaimer: Information contained in the report addresses environmental conditions only and is not the official South Florida Water Management District operations recommendation or decision.

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: May 26, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A very dry and stable air mass is expected to dominate the District's weather through Wednesday. A patch of shallow moisture could generate some light shower activity Wednesday evening and overnight in the east. The shower activity could continue near the middle and upper east coasts Thursday morning and expand inland over the central part of the District during the day. Elsewhere, dry conditions across the District on Thursday, except for the possibility of a late-day shower or two over the southwestern interior. Little areal average rainfall is forecast. Moisture and instability profiles are forecast to be more conducive for rain on Saturday, the result of which should be an increase in coverage and intensity of rain over the interior of the District in the afternoon. While a tenth to a quarter of an inch of large areal average rainfall is most likely over this region, there is a non-trivial chance that a basin or two could register a third to almost half of an inch of rain (90^{th} percentile). With a cold front Sunday, there is an increasing chance of rain, with the heaviest rains falling in the afternoon to the early evening. Widespread coverage of rain is expected but localized, significant rainfall is possible interior and east. Normal to above normal rains are forecast for Monday, with greater rains over the interior and west, with some of the late-day rains potentially intense. The probable increase of rains beginning late this weekend and early next week is likely to herald the beginning of the District's wet season. For the week ending next Tuesday morning, total rainfall is likely to be below or much below normal, even with the increase of rains late in the forecast period.

Kissimmee

With minor departures, stages in East Lake Toho and Toho are following their target recession lines, which are projected to bring lake stages to their regulation lows on June 1 at a rate of approximately 0.17 feet/week. Kissimmee-Cypress-Hatchineha receded at an average rate of 0.25 feet/week over the past week with S-65A discharge on Sunday below its minimum of 300 cfs. Flow at S-65A continues to be too low for extensive inundation of the Kissimmee River floodplain, and mean floodplain depth decreased to 0.07 feet on May 23, down from 0.09 feet the week before. Dissolved oxygen concentration in the Kissimmee River averaged 8.2 mg/L for the week, well above the 2.0 mg/L threshold considered harmful to sportfish.

Lake Okeechobee

Lake Okeechobee stage was 13.12 feet NGVD on May 23, 2021, 0.35 feet lower than last week and 1.07 feet lower than a month ago. The Lake is currently in the Low Sub-band. Lake stages were above the ecological envelope from August 1, 2020 to March 30, 2021 but are currently following along the upper threshold of the envelope. The Lake has been within the envelope ~20% of the time since January 1, 2021. Recent satellite imagery (May 24, 2021) shows a medium to high bloom potential in western and northern parts of the Lake, and low to no bloom potential along the eastern part of the Lake. Recent Snail Kite surveys found 144 total nests around the Lake; 54 active, 27 successful and 63 failed. The May 20, 2021 wading bird survey counted 10,008 birds around the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged 81 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities increased at all sites within 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 1,669 cfs over the past week with 1,231 cfs coming from the Lake. Mean 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 Shell Point, and in the fair range at Sanibel.

Stormwater Treatment Areas

For the week ending Sunday, May 23, 2021, approximately 8,300 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 28,300 ac-feet. The total amount of inflows to the STAs in WY2022 is approximately 30,000 ac-feet. Most STA cells are near target stage, except for several cells in STA-5/6 that are drying out. STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7, and STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways, and STA-2 Flow-way 2 for construction activities. Operational restrictions are in effect in STA-1E Central Flow-way, STA-2 Flow-ways 3 and 4, and STA-3/4 Western Flow-way for vegetation management activities. Operational restrictions are also in effect in STA-5/6 Flow-ways 2 and 3 following the Restoration Strategies project to grade non-effective treatment areas. Nests of Migratory Bird Treaty Act (MBTA) protected species have been observed in STA-1W and STA-5/6. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2 and STA-3/4.

Everglades

Record nesting continues as White Ibis fledge at all colonies and foraging conditions remain good in WCA-3A South, WCA-1 and Everglades National Park (ENP). The likely only constraint to nesting success will be the timing of the start of the wet season and the first major reversal. Dry conditions dominate WCA3A North, that area was closed to public access May 18, 2021. Salinities in Florida Bay and Taylor Slough are gradually increasing, but the Bay remains well positioned to minimize hyper-salinity before the wet season.

Supporting Information

Kissimmee Basin

Upper Kissimmee

Lake stages on May 23, 2021 were 55.2 feet NGVD (0.2 feet below schedule) in East Lake Toho, 52.2 feet NGVD (0.2 feet below schedule) in Lake Toho, and 50.4 feet NGVD (1.1 feet above schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1**, **Figures KB-1-3**). With minor departures, stages in East Lake Toho and Toho are following their target recession lines, which are projected to bring lake stages to their regulation lows on June 1 at a rate of approximately 0.17 feet/week. Kissimmee-Cypress-Hatchineha receded at an average rate of 0.25 feet/week over the past week with S-65A discharge on Sunday below its minimum of 300 cfs.

Lower Kissimmee

Kissimmee River (headwater) stages were 46.3 feet NGVD at S-65A and 25.7 feet NGVD at S-65D on May 23, 2021, while discharges were 370 cfs at S-65, 280 cfs at S-65A, 300 cfs at S-65D and 250 cfs at S-65E (**Table KB-2**). Dissolved oxygen concentration in the Kissimmee River averaged 8.2 mg/L for the week ending May 23, 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 decreased to 0.07 feet on May 23, down from 0.09 feet the week before (**Figure KB-5**).

Water Management Recommendations

In Lakes East Toho and Toho, continue to reduce stage along their target recession lines (recession rates of 0.17 feet/week) to reach their regulation schedule low stages on June 1. Continue to follow the USACE request to hold S-65A discharge below 800-900 cfs to facilitate construction for the Kissimmee River Restoration Project. Allow stage to recede in Kissimmee-Cypress-Hatchineha while not exceeding 0.18 feet/week.

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

Water Body	Structure	Stage Monitoring Site	7-Day Average Discharge (cfs)	Lake Stage (feet NGVD)[a]	Schedule Type[b]	Schedule Stage (feet NGVD)	Departure from Regulation (feet)	
							5/23/21	5/16/21
Lakes Hart and Mary Jane	S-62	LKMJ	9	59.6	R	59.7	-0.1	-0.1
Lakes Myrtle, Preston and Joel	S-57	S-57	3	60.0	R	60.1	-0.1	0.0
Alligator Chain	S-60	ALLI	24	62.2	R	62.2	0.0	0.0
Lake Gentry	S-63	LKGT	32	59.7	R	59.7	0.0	0.0
East Lake Toho	S-59	TOHOE	5	55.2	R	55.4	-0.2	-0.3
Lake Toho	S-61	TOHOW S-61	69	52.2	R	52.4	-0.2	-0.2
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	393	50.4	R	49.3	1.1	1.2

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.

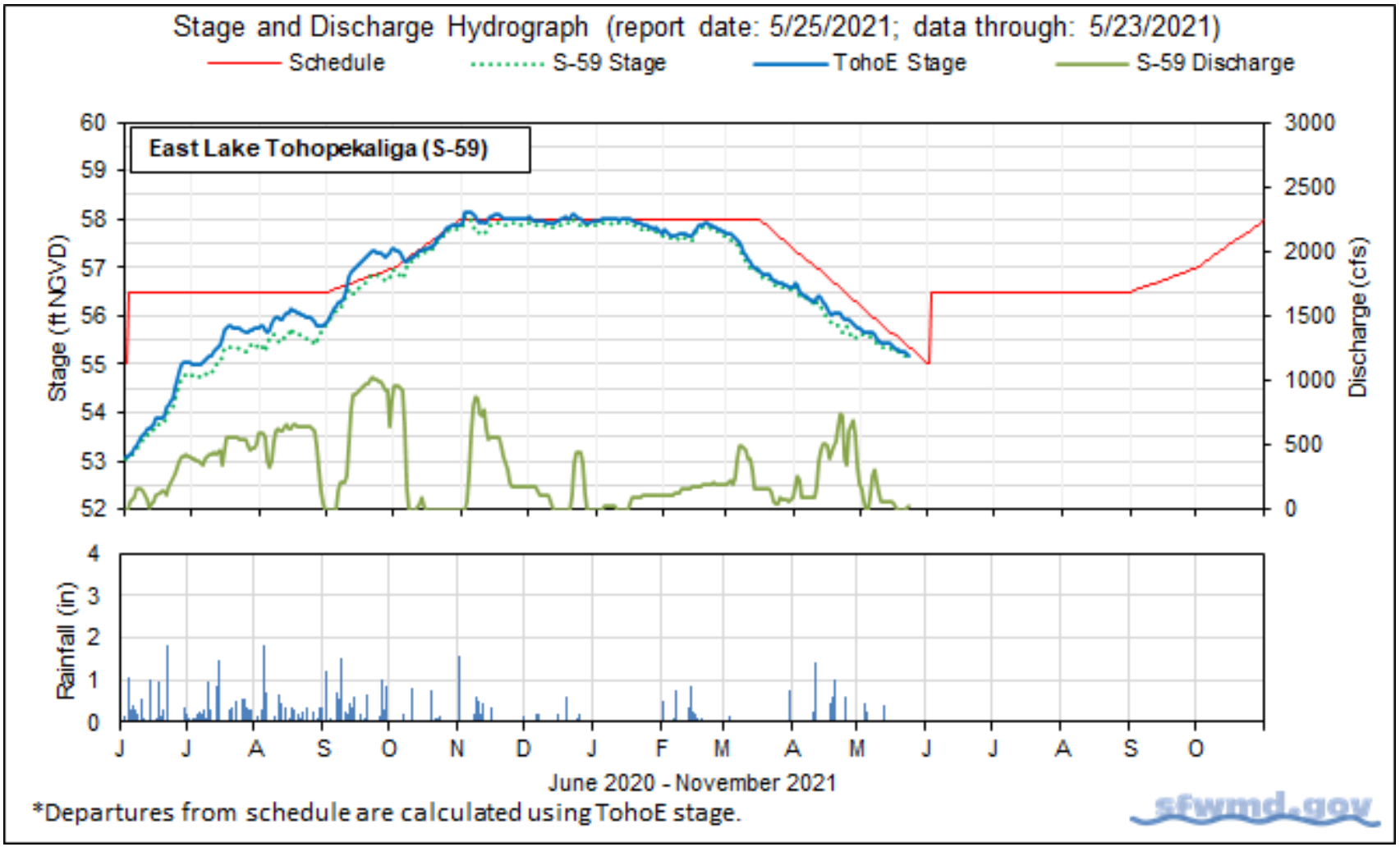


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

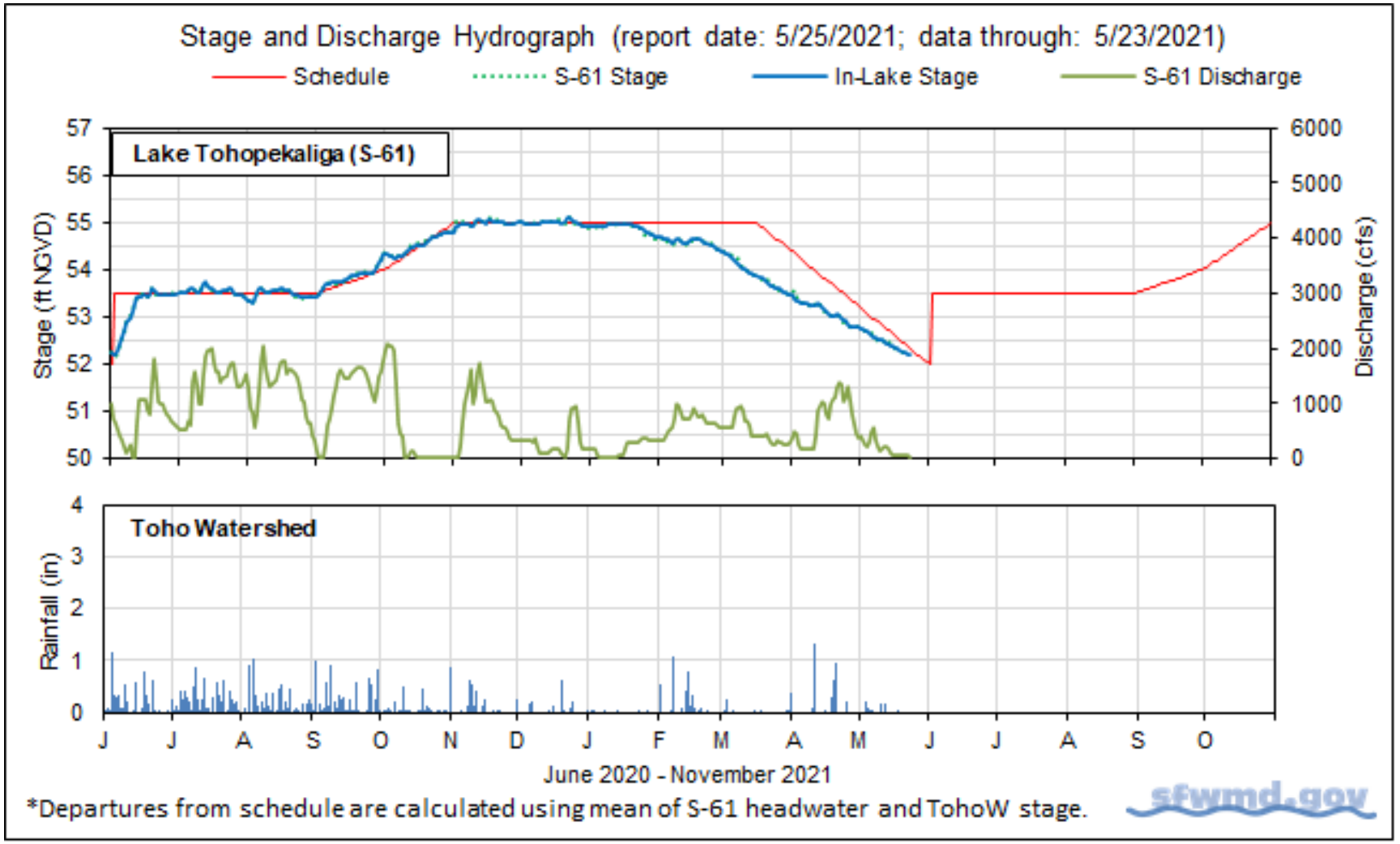


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

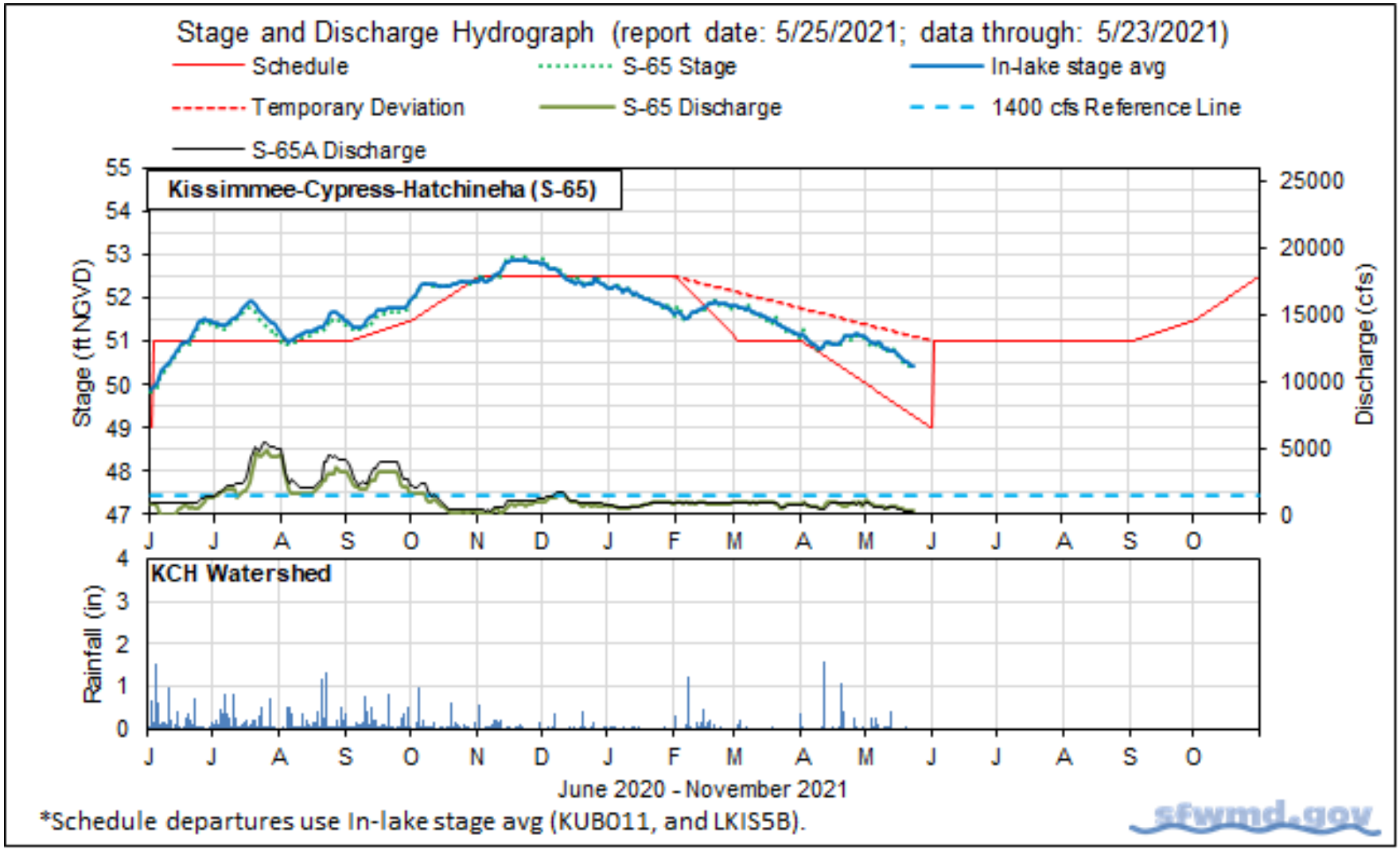


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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	Average for Previous Seven Day Periods			
		5/23/21	5/23/21	5/16/21	5/9/21	5/2/21
Discharge	S-65	373	393	570	692	902
Discharge	S-65A[a]	275	303	483	613	836
Discharge	S-65D[b]	299	379	549	771	941
Headwater Stage (feet NGVD)	S-65D[c]	25.68	25.75	25.73	25.74	25.85
Discharge (cfs)	S-65E[d]	254	369	531	756	857
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) [e]	Phase I, II/III river channel	8.7	8.2	6.9	6.6	6.5
Mean depth (feet) [f]	Phase I floodplain	0.07	0.08	0.09	0.12	0.19

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).

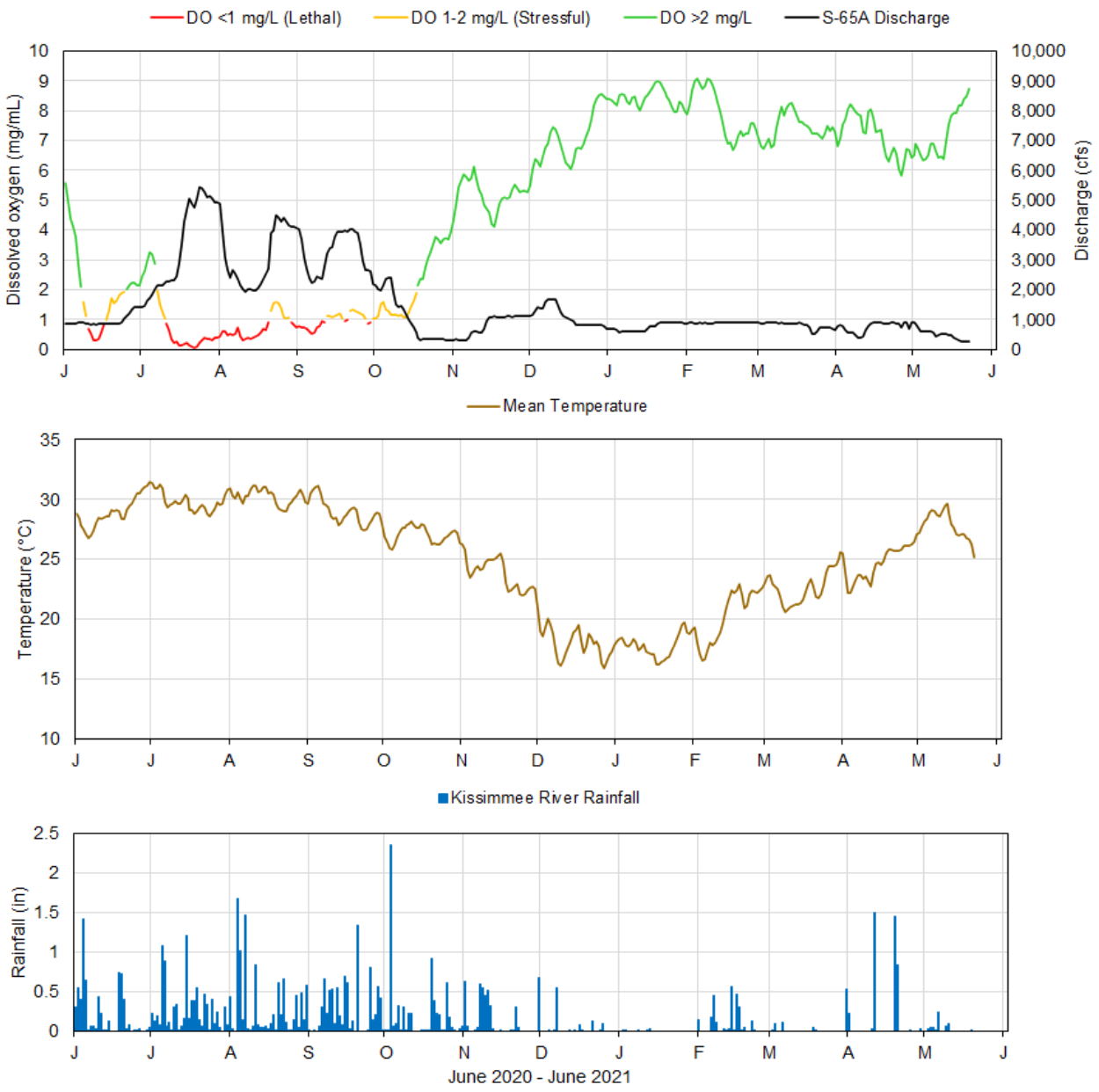


Figure KB-4. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRBN, PC33, PD62R, and PD42R with an average of four stations reporting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

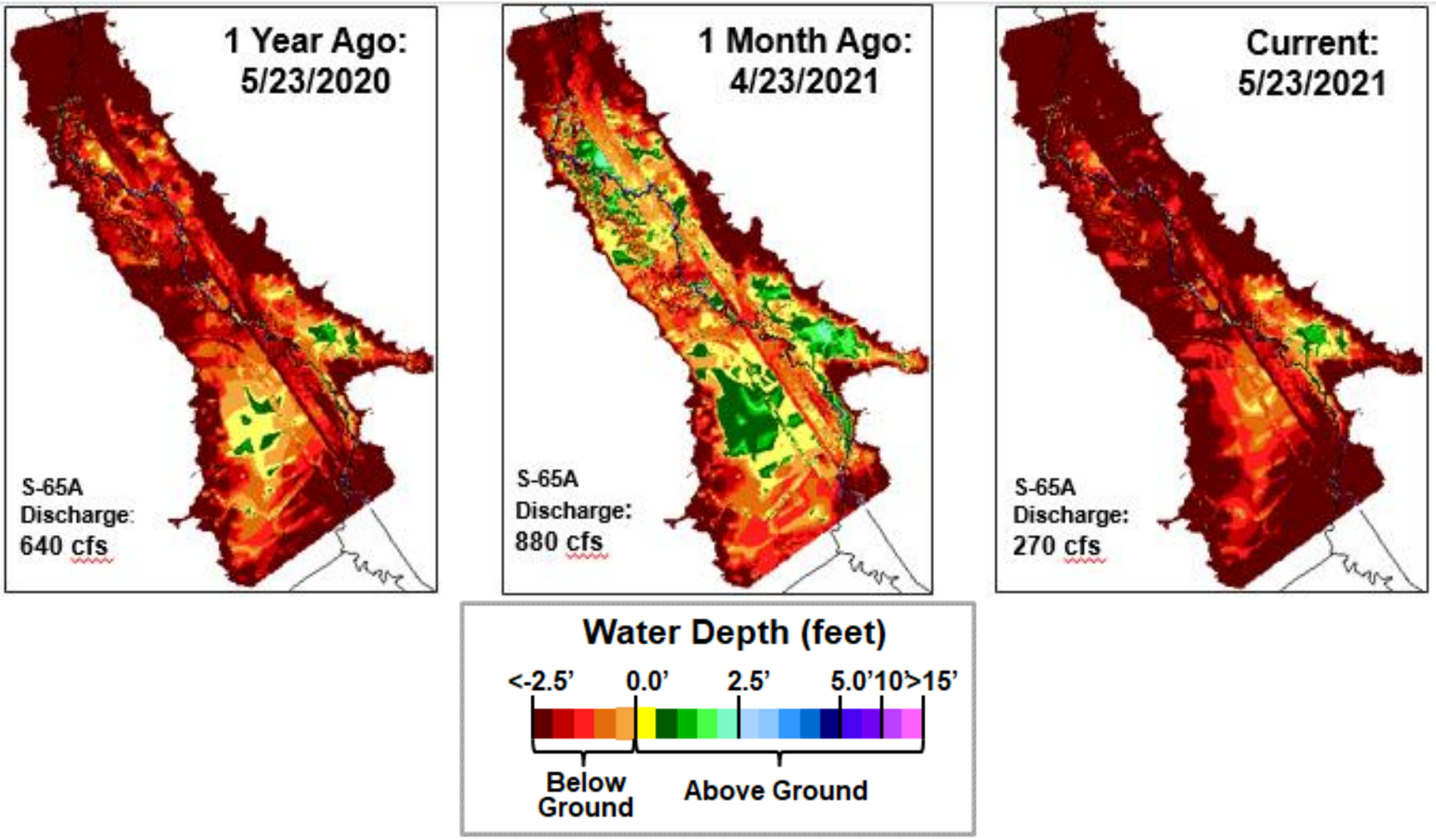


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

Lake Okeechobee

Lake Okeechobee stage was 13.12 feet NGVD on May 23, 2021, 1.07 feet lower than a month ago, and 2.00 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 ~20% of the time since January 1, 2021. Lake stage reached a low of 10.99 feet on May 17, 2020 at the end of last year's dry season, and a high of 16.45 feet on November 12, 2020 (post Tropical Storm Eta) at the end of the wet season, a difference of 5.5 feet (**Figure LO-3**). Lake stage declined slowly from mid-November through mid-February, recession rates then increased, and Lake stage has declined over two feet since mid-March. According to NEXRAD, 0.20 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 556 cubic feet per second (cfs) to 379 cfs. Outflows (excluding evapotranspiration) increased, going from 3,789 cfs to 5,247 cfs. The majority of the inflow came from the Kissimmee River (369 cfs through S-65E & S-65EX1). Releases to the west via S-77 increased from 1,384 cfs to 1,887 cfs, and releases east via S-308 also slightly increased, going from 120 cfs to 133 cfs. Releases south through the S-350 structures increased from 2,285 cfs to 3,125 cfs. Average inflows and outflows through water control structures surrounding the Lake for the previous two weeks (cfs) are shown in **Table LO-1**, as is the resultant Lake elevation change in inches (in) due to each structure's flow for the past week. **Figure LO-4** shows the combined average daily cfs for inflows and outflows for the Lake over the past eight weeks. These data are provisional and are subject to change.

The most recent satellite image (May 24, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed low to no bloom potential along the eastern part of the Lake and medium to high bloom potential along the western and northern parts of the Lake. Overall, the bloom potential increased in western and northern parts of the Lake and decreased along the eastern part of the Lake (**Figure LO-5**).

There are now 54 active Snail Kite nests on Lake Okeechobee for a total of 144 nests (27 successful, 63 failed). On May 20, 2021, 10,008 wading birds were observed around Lake Okeechobee (**Figure LO-6**). The number of wading birds foraging on the Lake increased since last survey by approximately 7,000 birds, and they were mostly concentrated in the Indian Prairie area in the northwestern part of the Lake. Although the most recent number of wading birds exceeds the 5-year average for this time of the year, preliminary nesting abundance on the Lake is still well below average. But with the recent influx of birds there is some potential for an increase in nesting.

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)
S-65E & S-65EX1	531	369	0.2
S-71 & S-72	2	0	0.0
S-84 & S-84X	0	0	0.0
Fisheating Creek	18	10	0.0
S-154	0	0	0.0
S-191	0	0	0.0
S-133 P	0	0	0.0
S-127 P	0	0	0.0
S-129 P	0	0	0.0
S-131 P	4	0	0.0
S-135 P	0	0	0.0
S-2 P	0	0	0.0
S-3 P	0	0	0.0
S-4 P	0	0	0.0
L-8 Backflow			
Rainfall	642	534	0.2
Totals	**1197**	**913**	**0.4**

Outflows	Previous Week's Average Daily Flow (cfs)	This Week's Average Daily Flow (cfs)	Equivalent Depth Week Total (in)
S-77	1384	1887	0.8
S-308	120	133	0.1
S-351	936	1339	0.6
S-352	360	607	0.3
S-354	989	1179	0.5
L-8 Outflow	1	103	0.0
Evapotranspiration	2907	2901	1.3
Totals	**6696**	**8149**	**3.5**

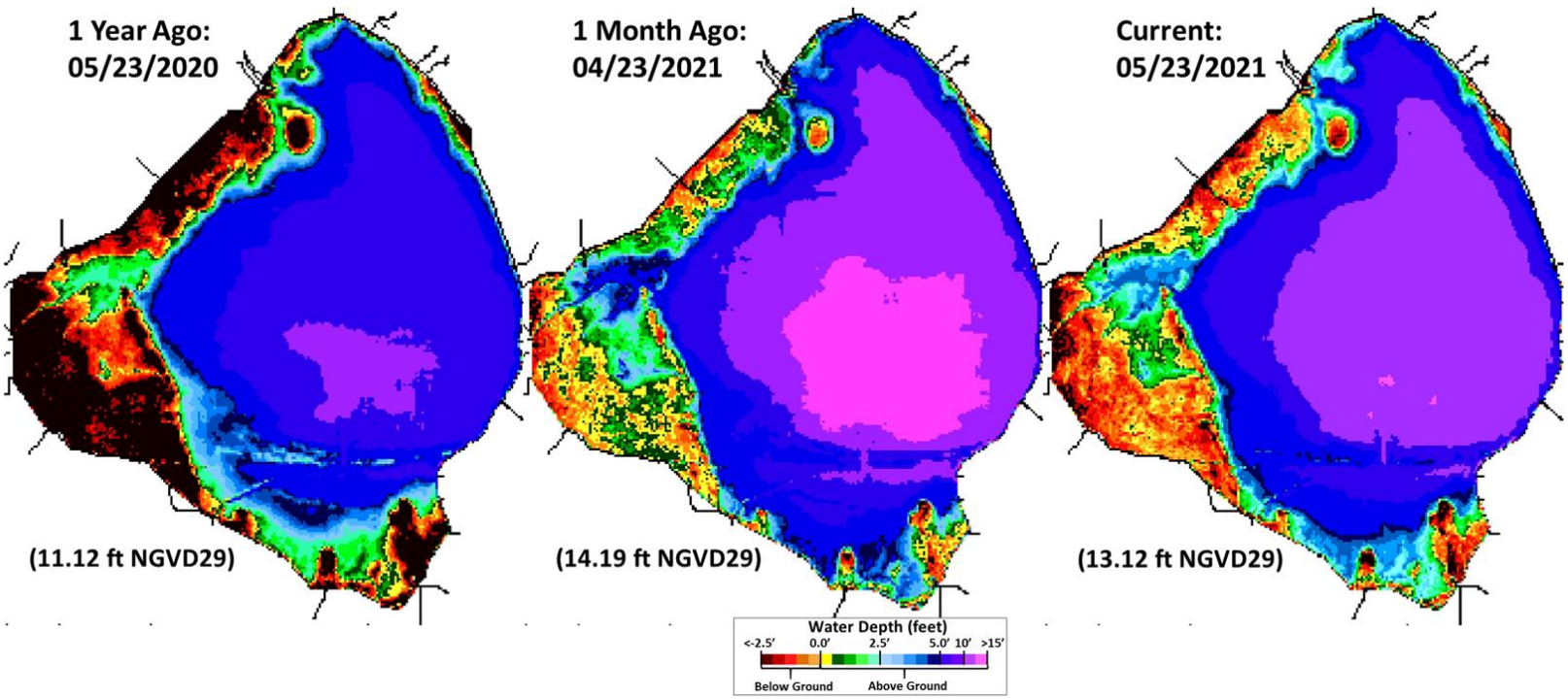


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

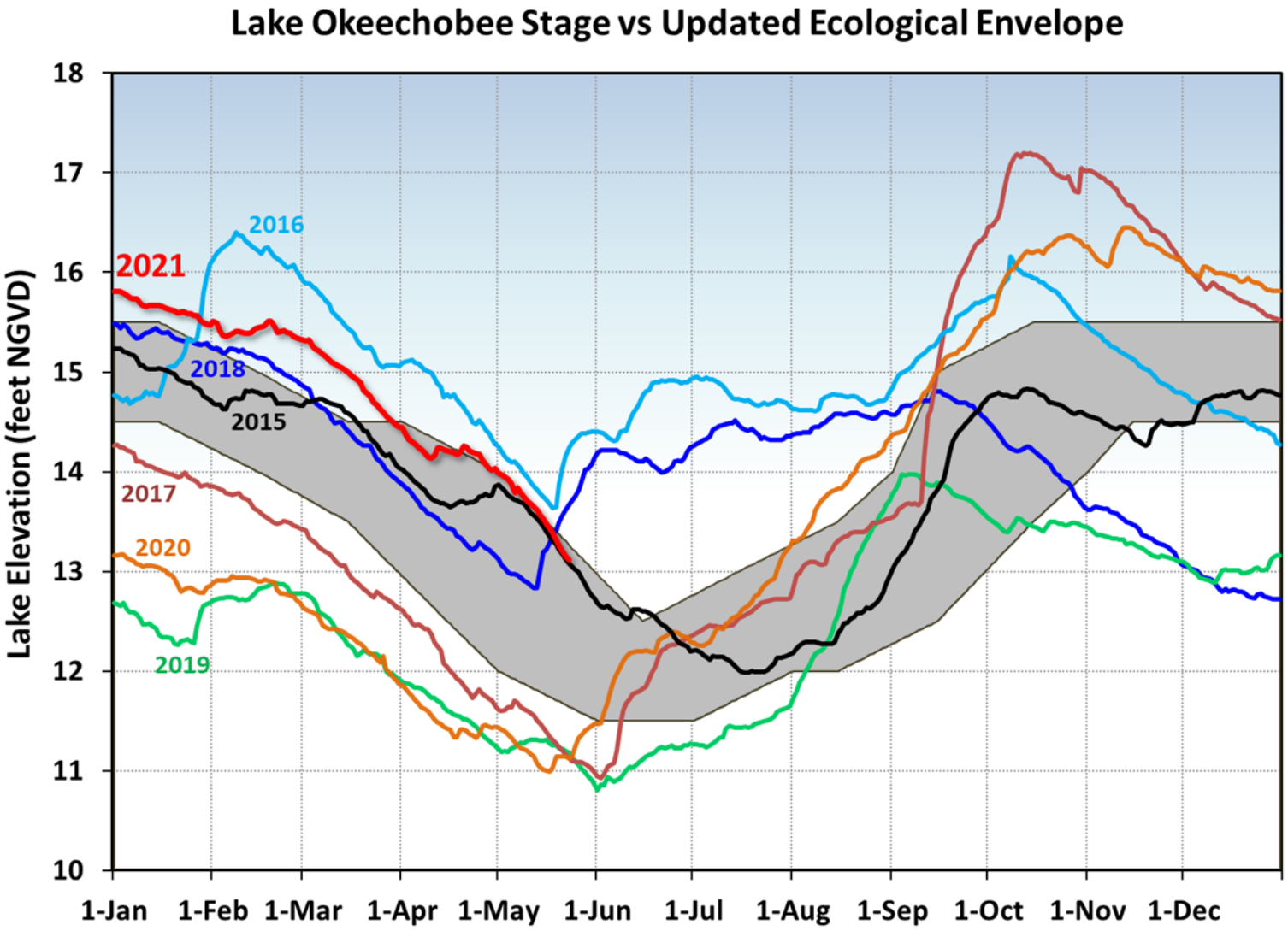


Figure LO-2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated ecological envelope.

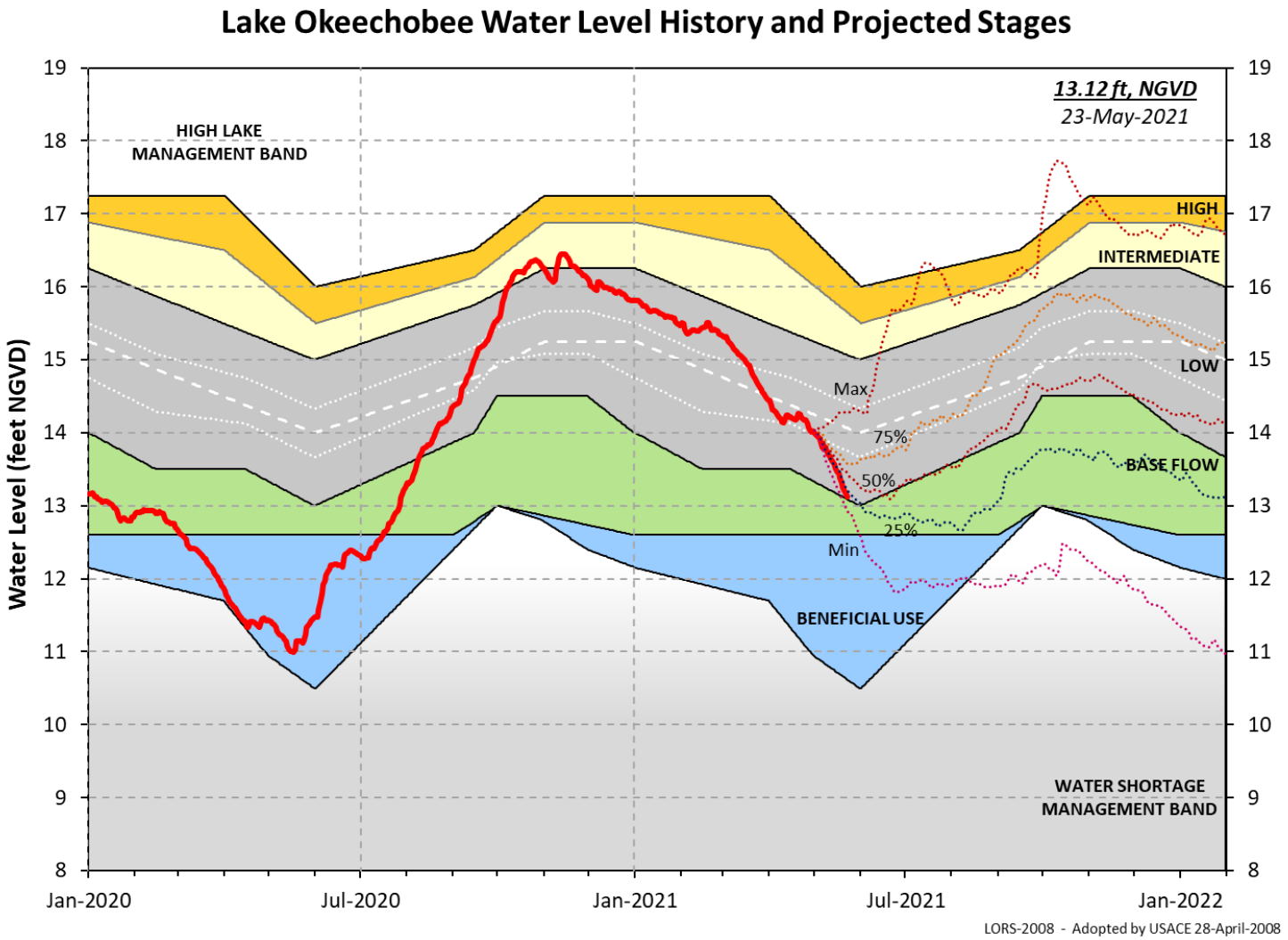


Figure LO-3. Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

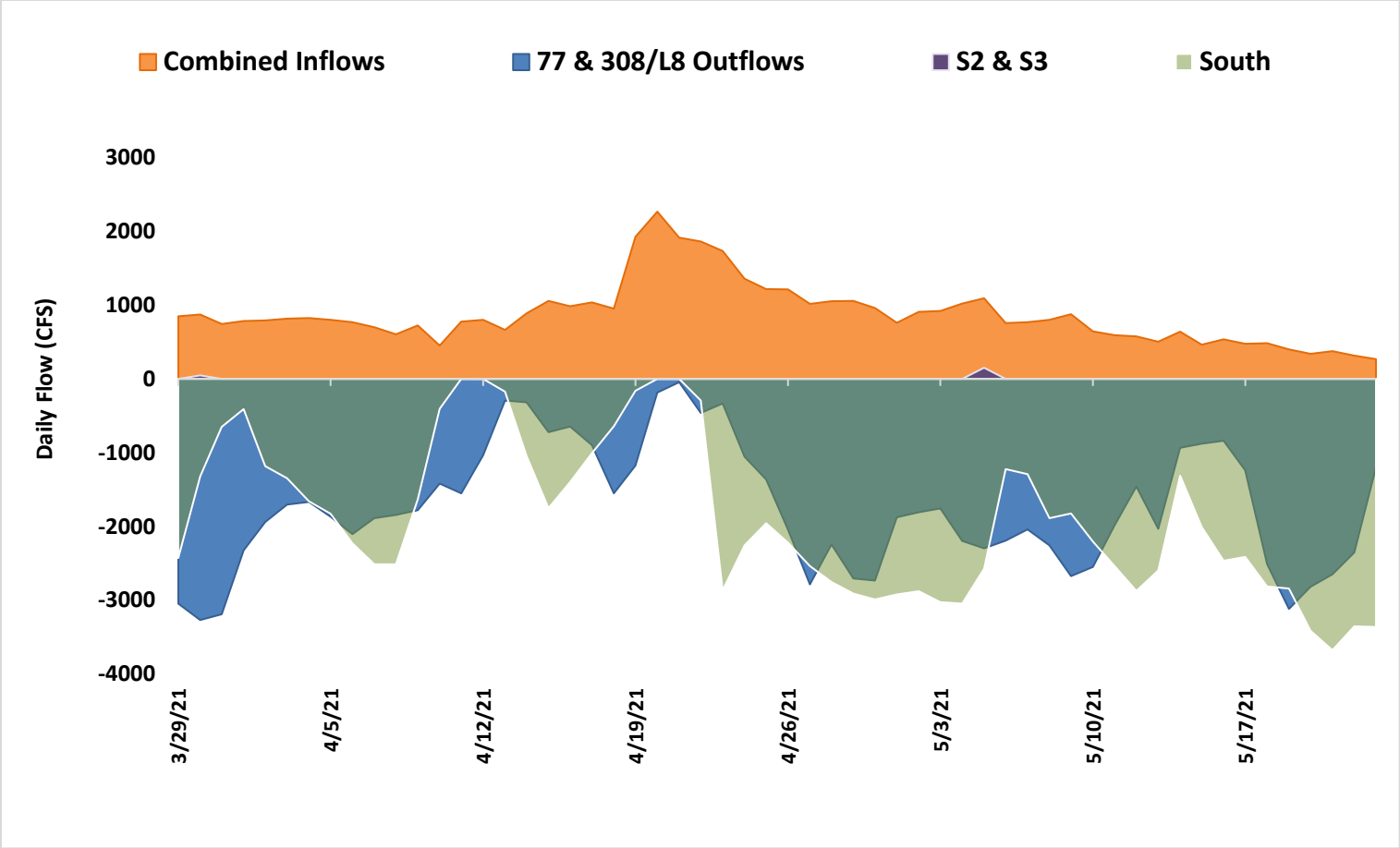


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) are included as inflows. Conversely, flows from Lake Okeechobee into the L-8 Canal are included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

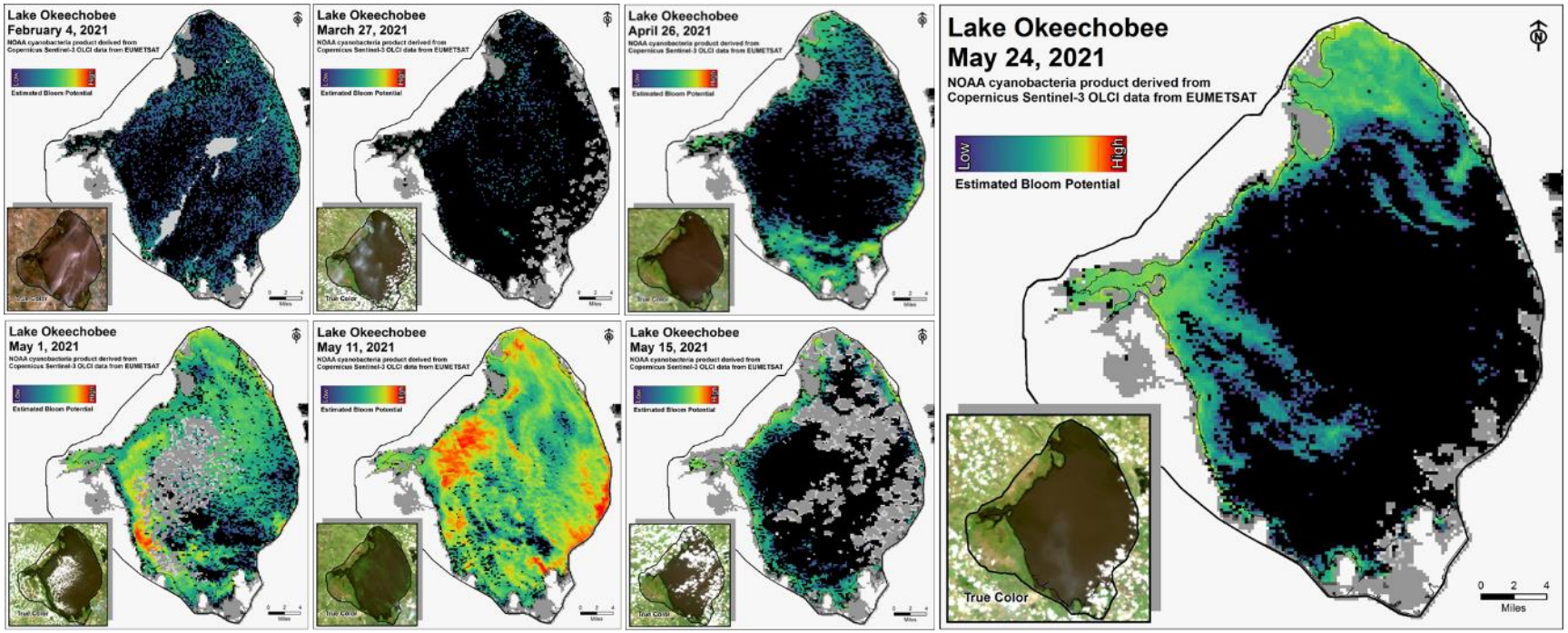


Figure LO-5. Cyanobacteria bloom potential based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

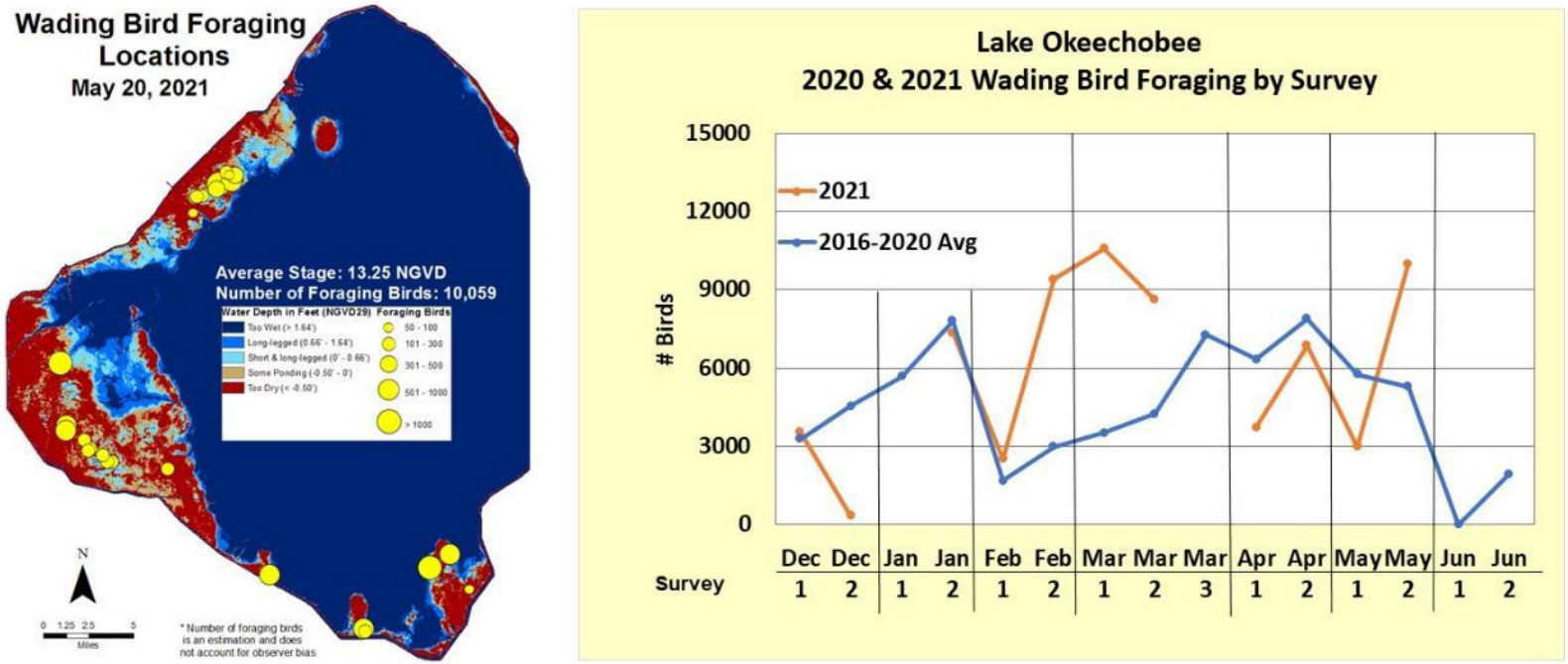


Figure LO-6. Wading bird foraging abundance during May 20, 2021 survey of Lake Okeechobee.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 81 cfs (**Figures ES-1** and **ES-2**), and the previous 30-day mean inflow was 144 cfs. The historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities increased 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 25.1. 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 Estuary was 1,669 cfs (**Figures ES-5** and **ES-6**), and the previous 30-day mean inflow was 1,933 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-6**.

Over the past week, salinities increased at all sites within the estuary (**Table ES-2** and **Figures ES-7** and **ES-8**). The seven-day mean surface salinities (**Table ES-2**) were in the good range (0-10) for tape grass at Val I-75 and at Ft. Myers. The seven-day mean surface salinity values were within the good range for adult eastern oysters at Cape Coral and Shell Point and in the fair range at Sanibel (**Figure ES-9**).

Surface salinity at Val I-75 was forecasted for the next two weeks, using an autoregression model (Qiu and Wan, 2013[1]) 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 and 3,000 cfs with estimated tidal basin inflows of 97 cfs. Model results from all scenarios predict daily salinity to be 4.4 or lower and the 30-day moving average surface salinity to be 1.3 or lower at Val I-75 at the end of the two-week period (**Table ES-3** and **Figure ES-10**). This keeps predicted salinities at Val I-75 within the LORS 2008 salinity range (0.0-5.0).

Red Tide

The Florida Fish and Wildlife Research Institute reported on May 21, 2021 that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at low to medium concentrations in Charlotte County, and background to high concentrations in Lee and Collier counties. On the east coast, red tide was not observed in samples from St. Lucie, Martin, Palm Beach or Miami-Dade counties.

[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.

Water Management Recommendations

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

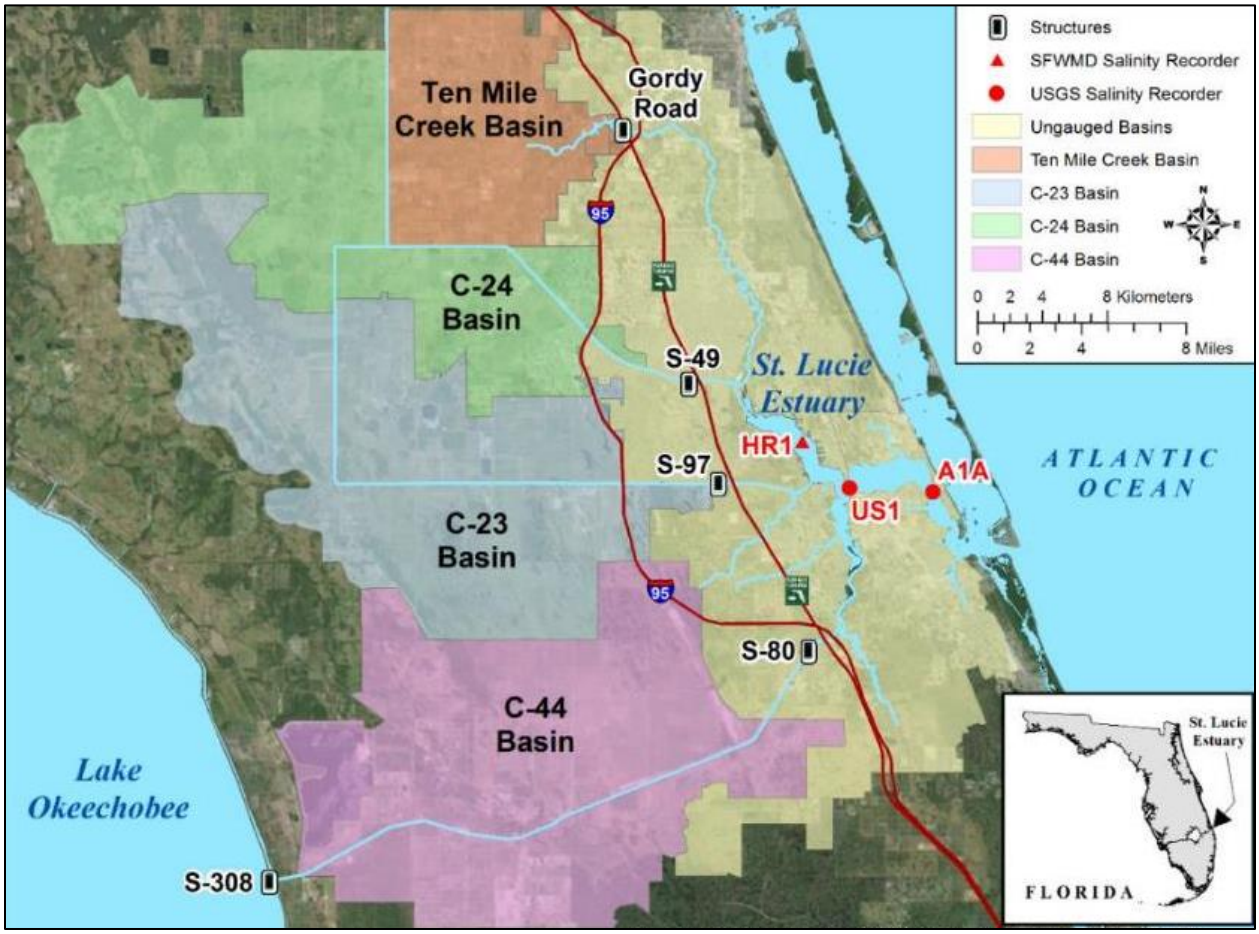


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

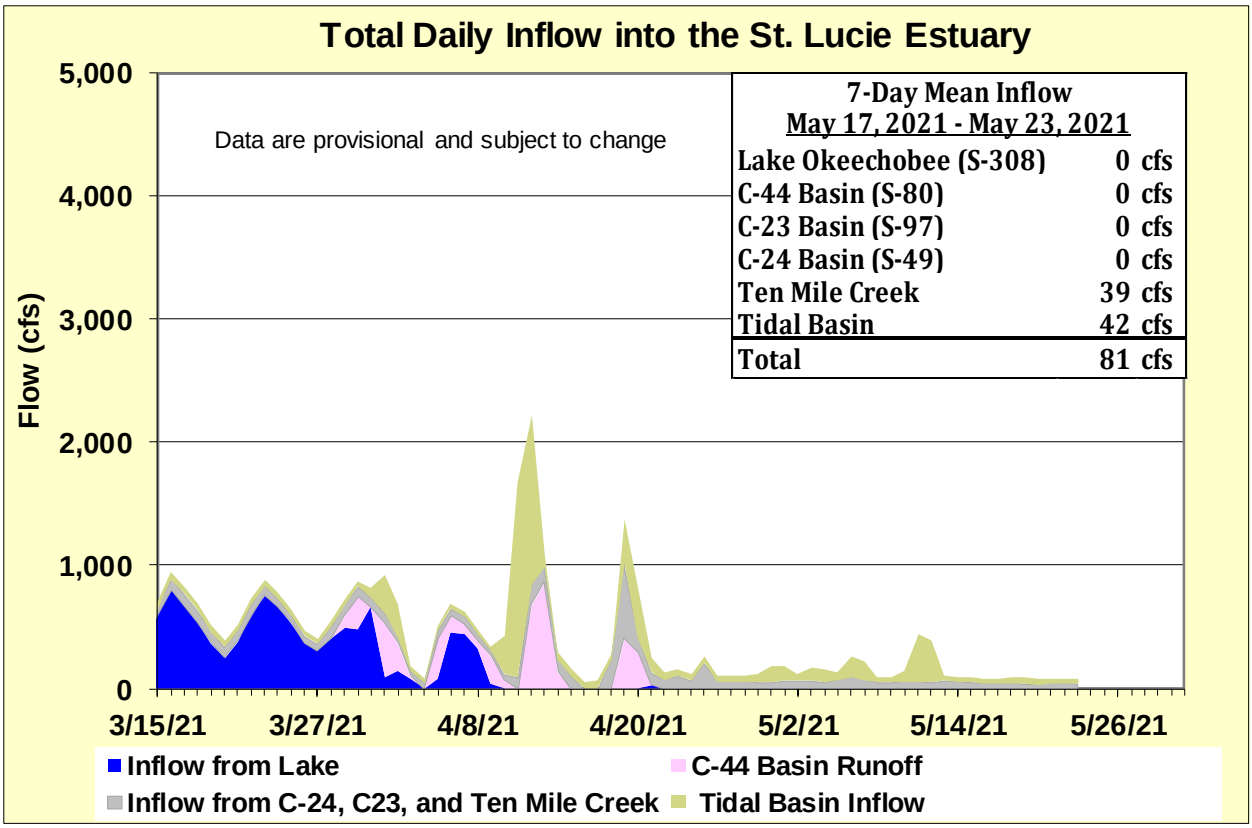


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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

Sampling Site	Surface	Bottom	Envelope
HR1 (Nork Fork)	**22.2** (19.8)	**22.2** (21.4)	NA [a]
US1 Bridge	**24.9** (23.3)	**25.3** (24.4)	10.0 – 26.0
A1A Bridge	**32.6** (30.4)	**33.0** (31.9)	NA [a]

a. The envelope is not applicable.

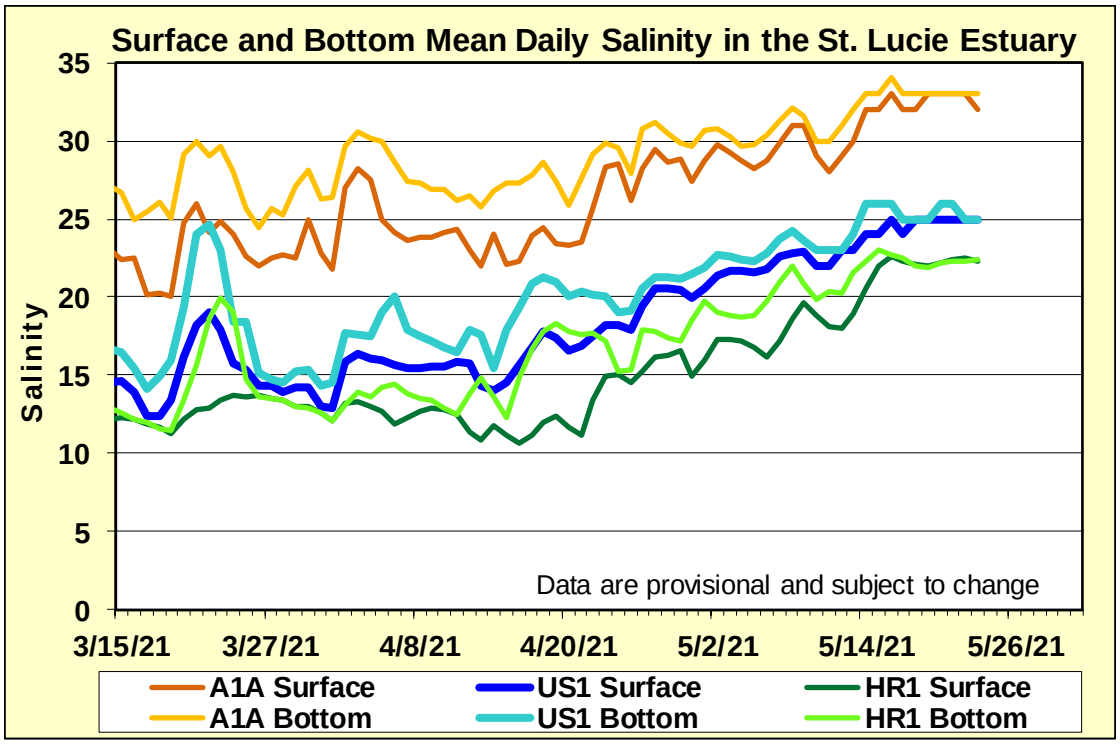


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

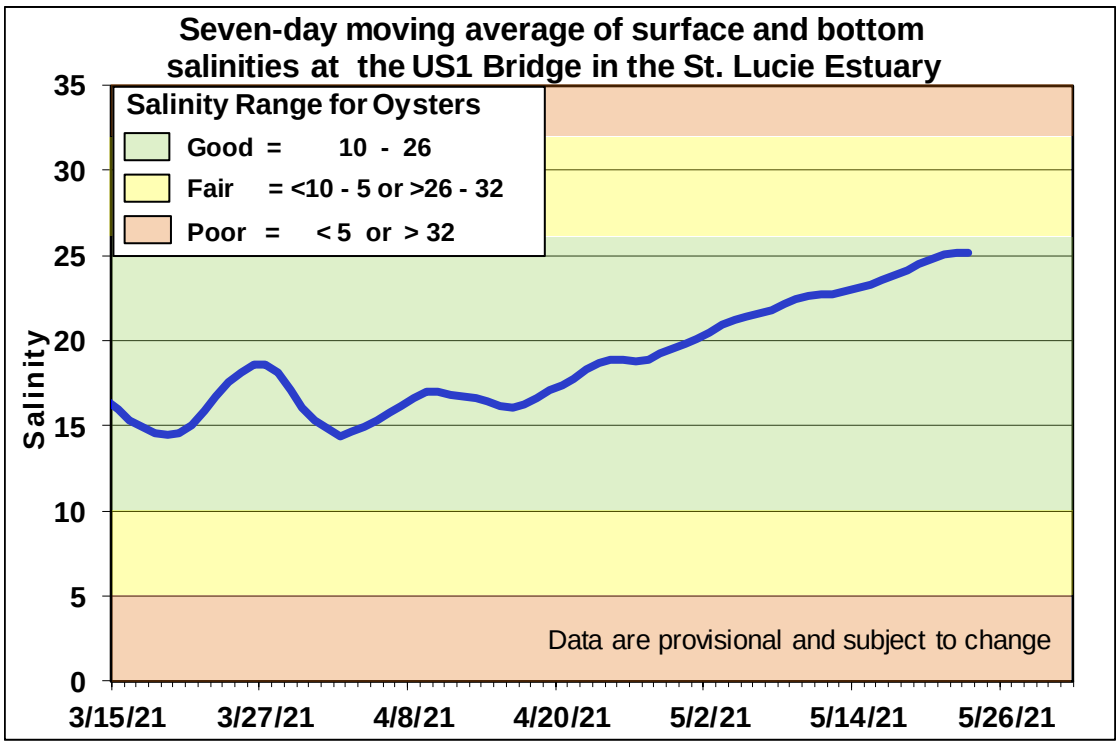


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

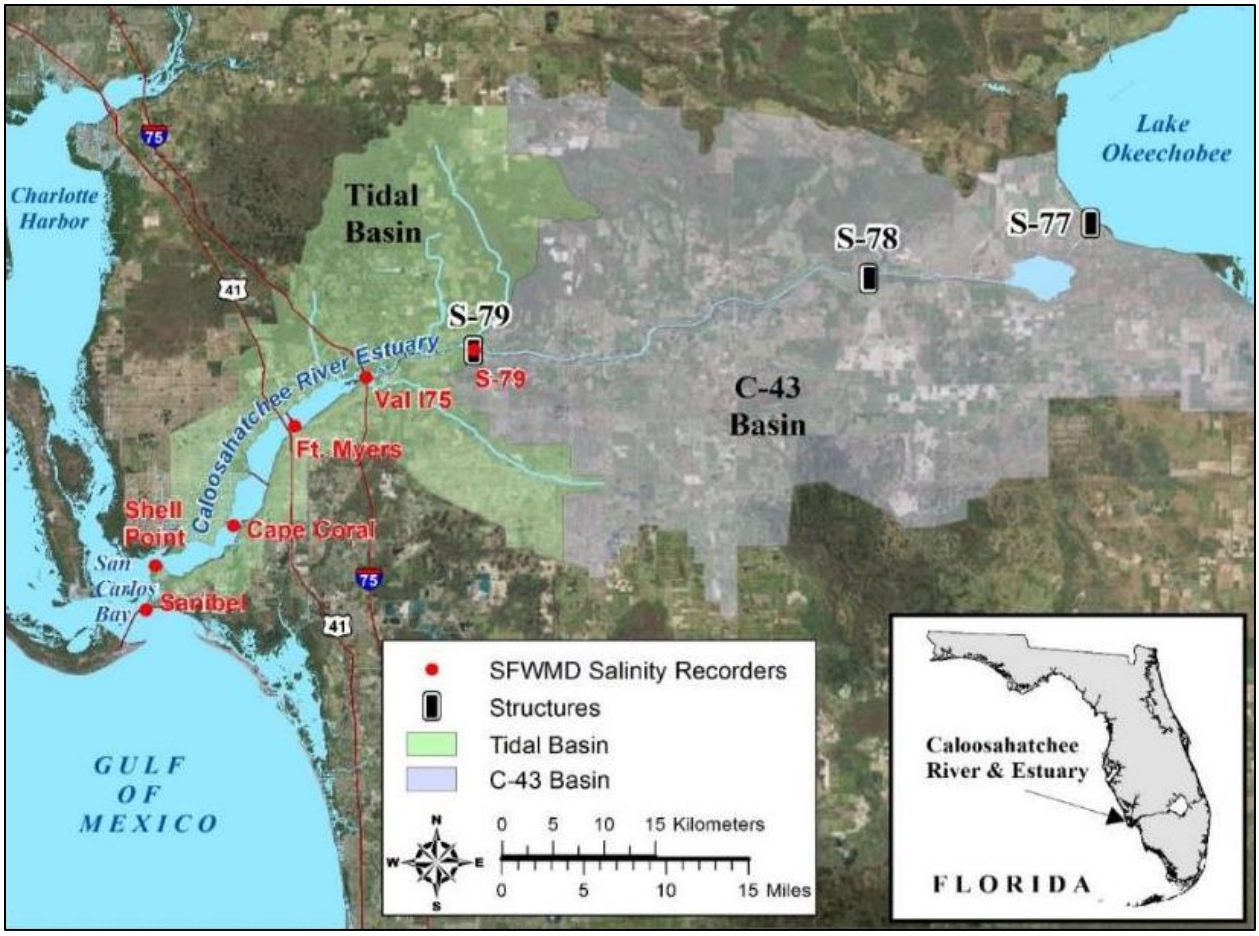


Figure ES-5. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

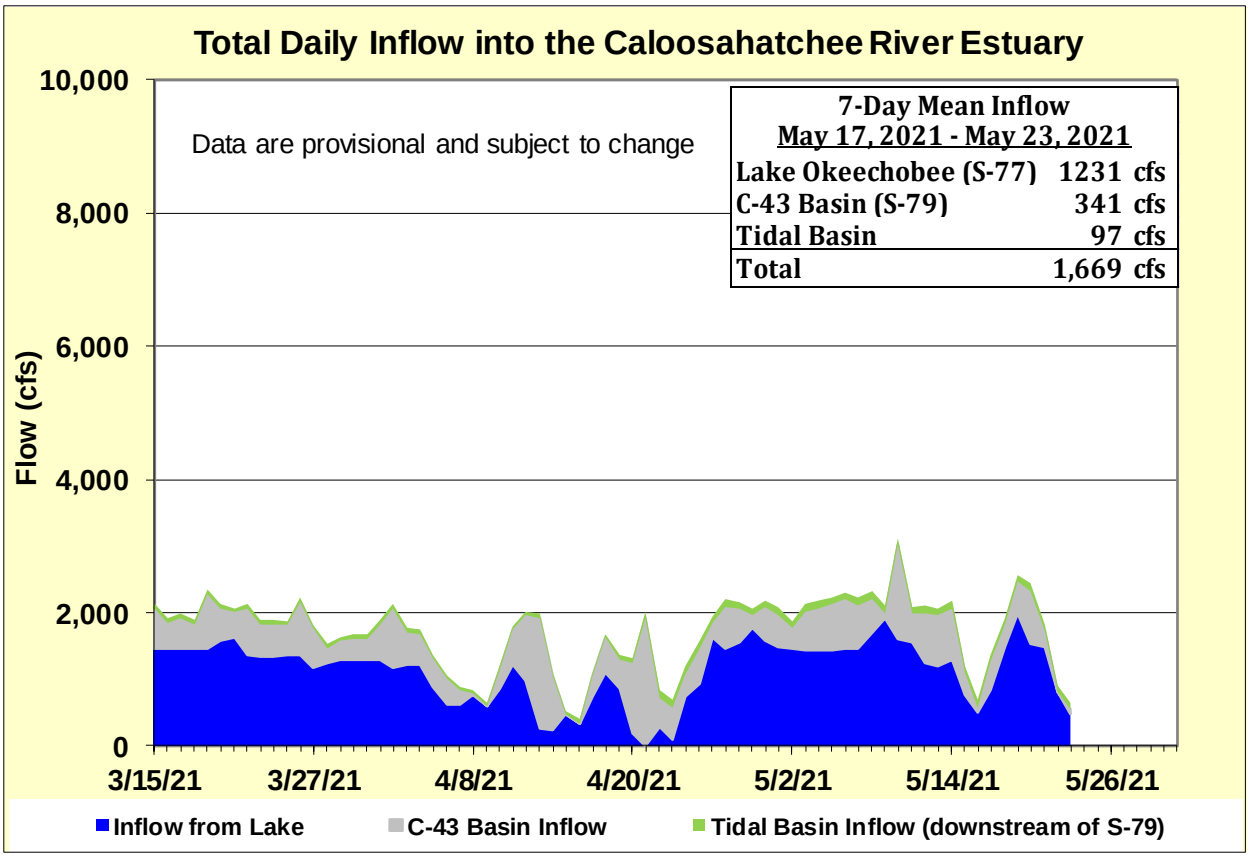


Figure ES-6. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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)	**0.6** (0.2)	**0.6** (0.2)	NA [a]
Val I-75	**0.7** (0.2)	**1.0** (0.2)	0.0 – 5.0 [b]
Fort Myers Yacht Basin	**6.2** (1.4)	**8.5** (2.3)	NA [a]
Cape Coral	**11.4** (9.2)	**14.3** (11.0)	10.0 – 30.0
Shell Point	**27.4** (24.8)	**28.4** (26.1)	10.0 – 30.0
Sanibel	**33.3** (30.5)	**34.1** (32.0)	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.

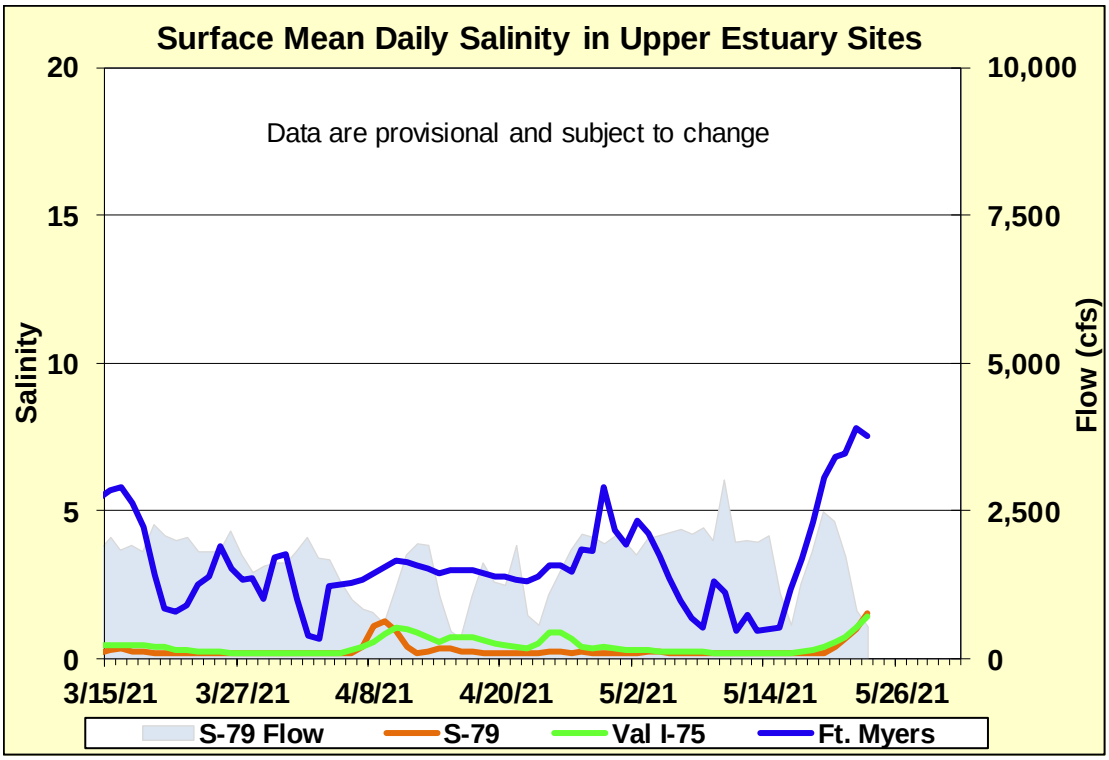


Figure ES-7. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

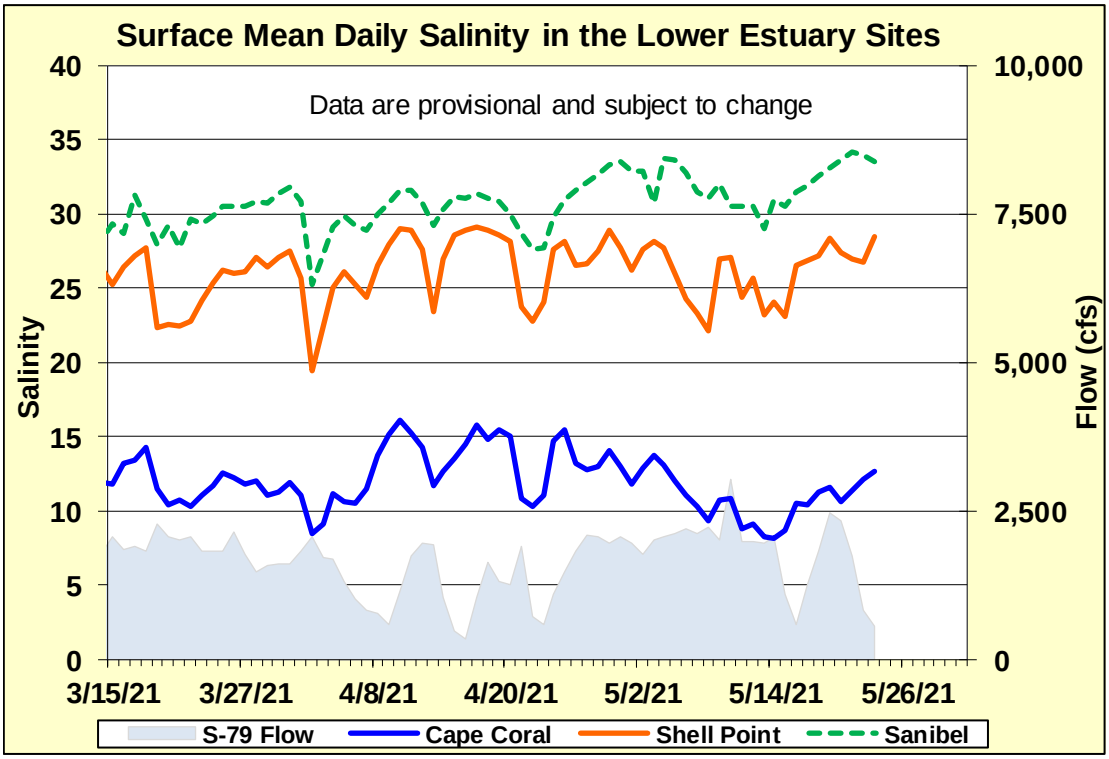


Figure ES-8. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

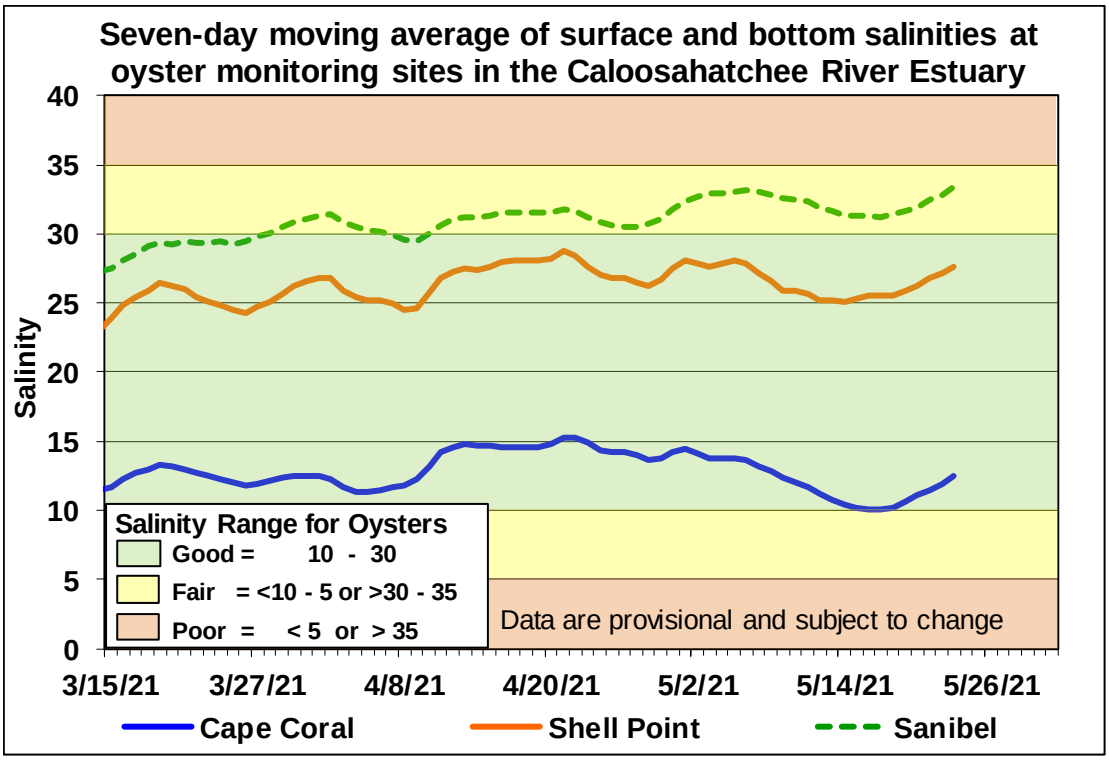


Figure ES-9. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

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	97	4.4	1.3
B	450	97	2.3	1.0
C	1000	97	0.9	0.6
D	1500	97	0.4	0.5
E	2000	97	0.3	0.4
F	3000	97	0.3	0.3

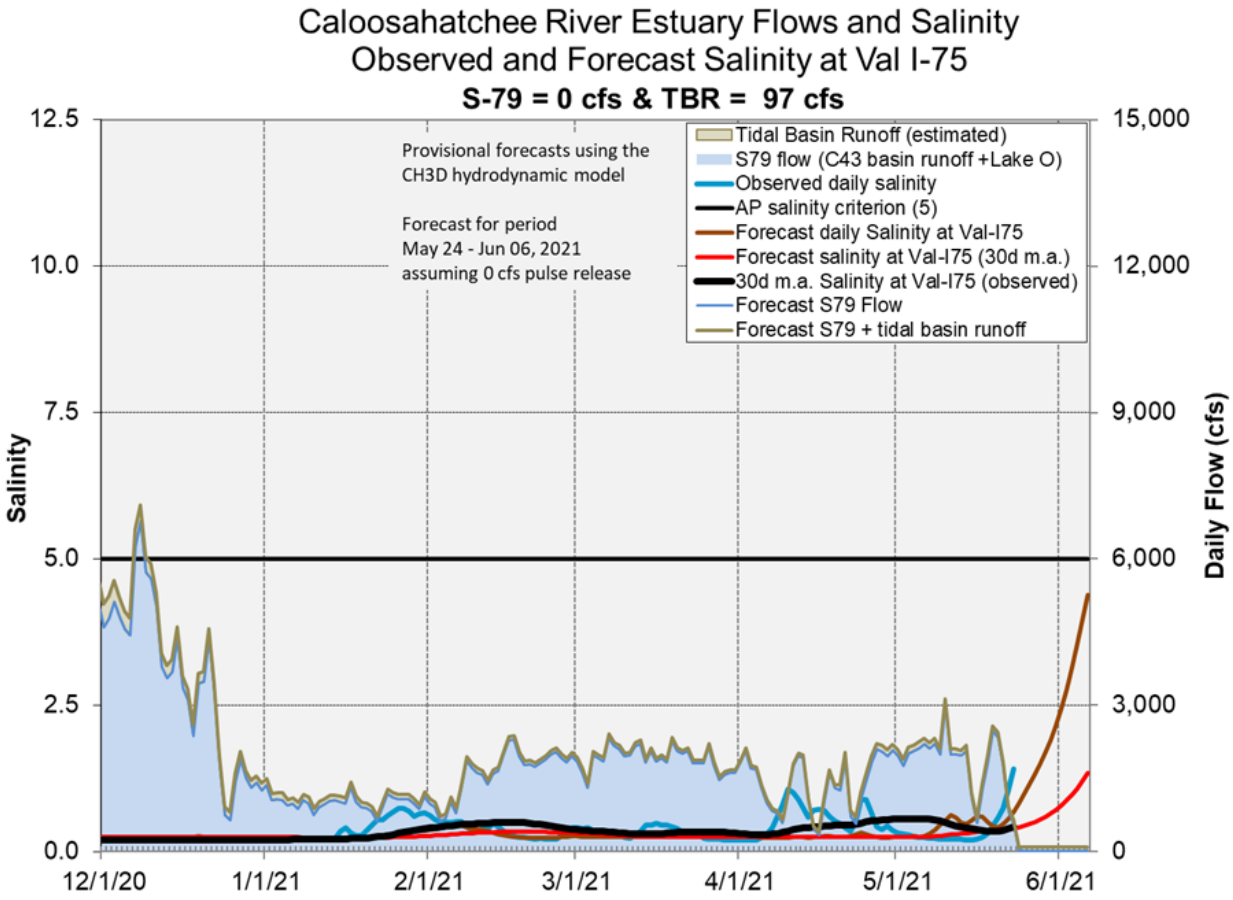


Figure ES-10. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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 extremely high (**Figure S-1**).

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

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

STA-3/4: STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Operational restrictions are in place in STA-3/4 Western Flow-way for vegetation management activities. Online treatment cells are at or near target stage. Vegetation in the Eastern and Central Flow-ways is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for all flow-ways are below 1.0 g/m^2/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. 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/m^2/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.

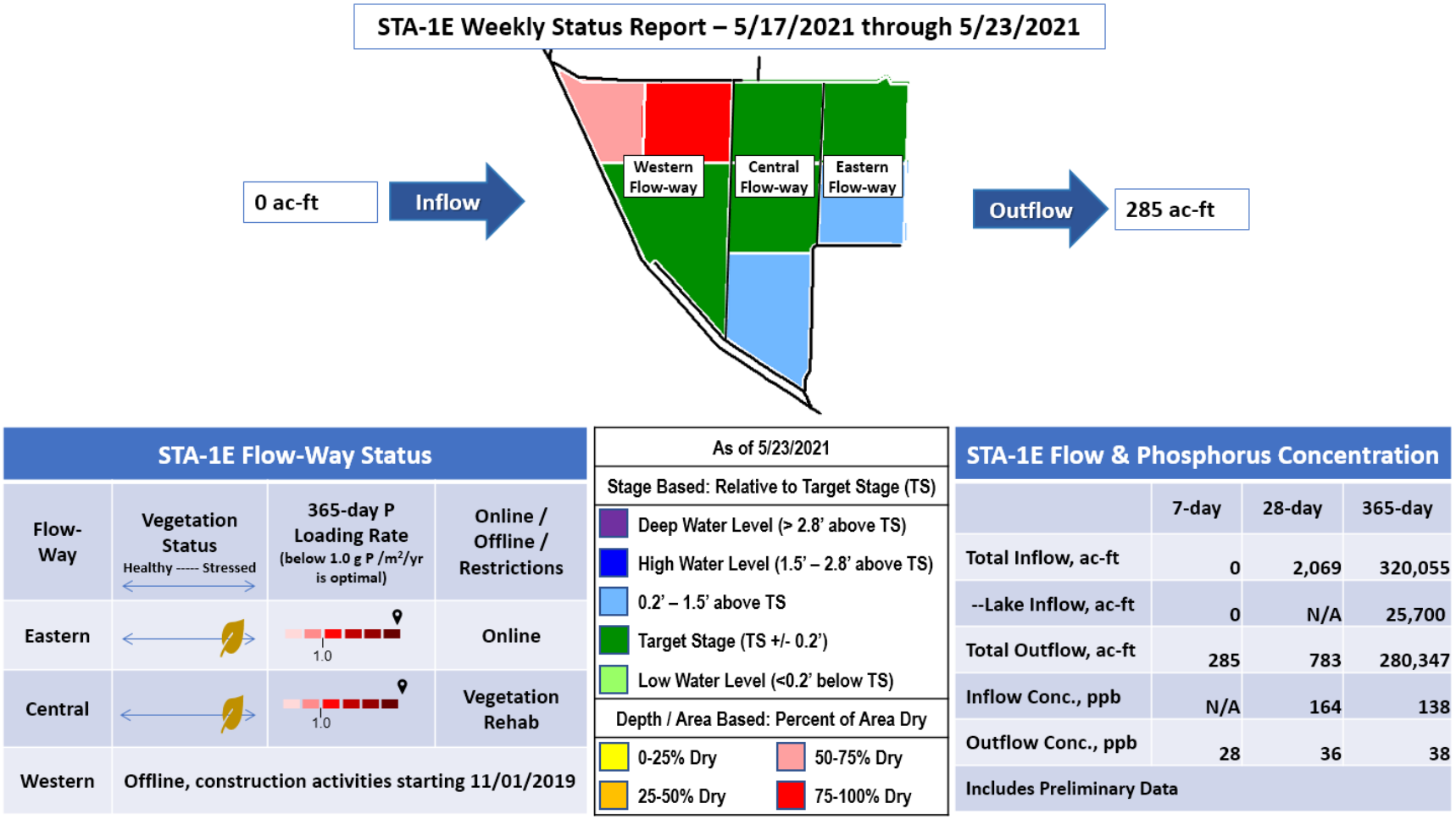


Figure S-1. STA-1E Weekly Status Report

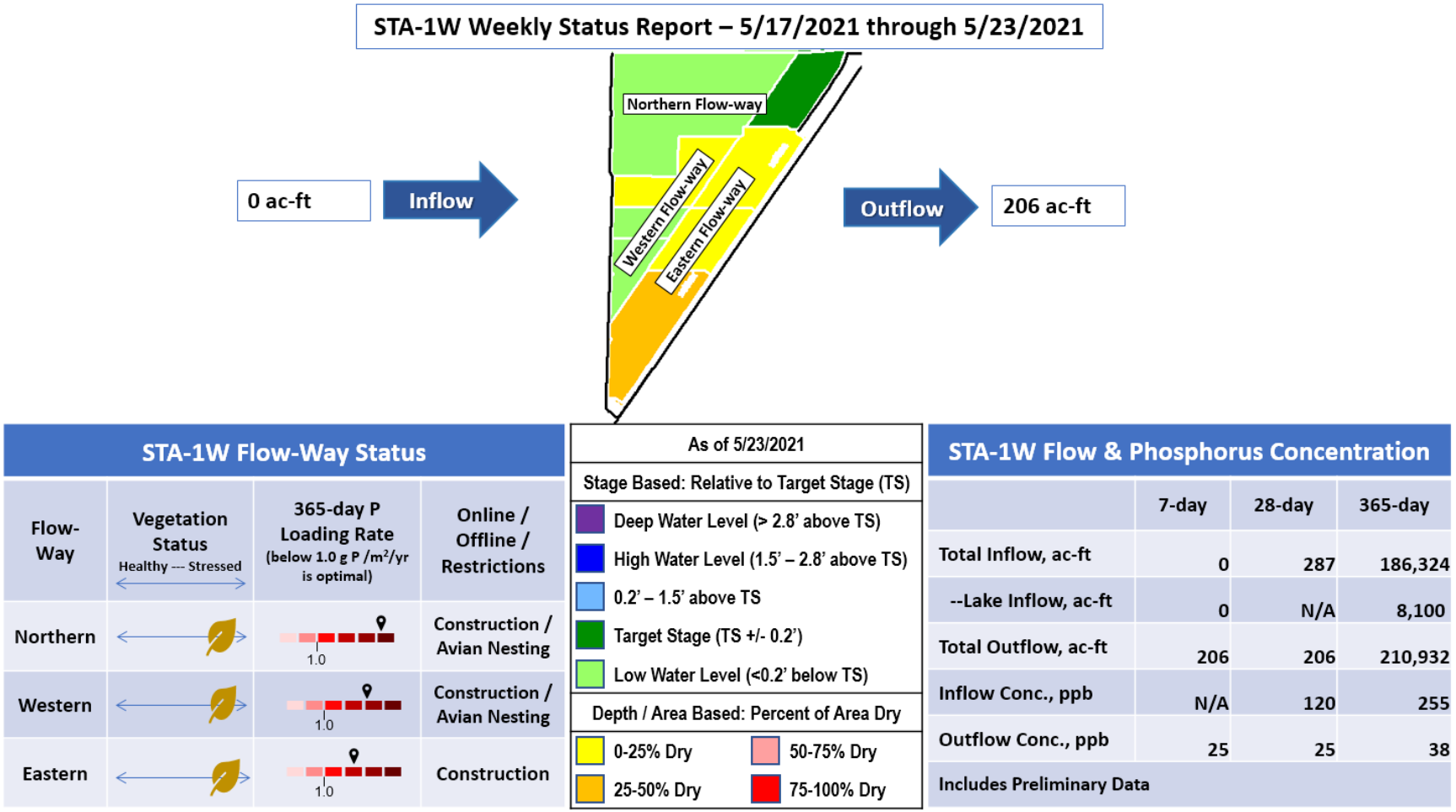


Figure S-2. STA-1W Weekly Status Report

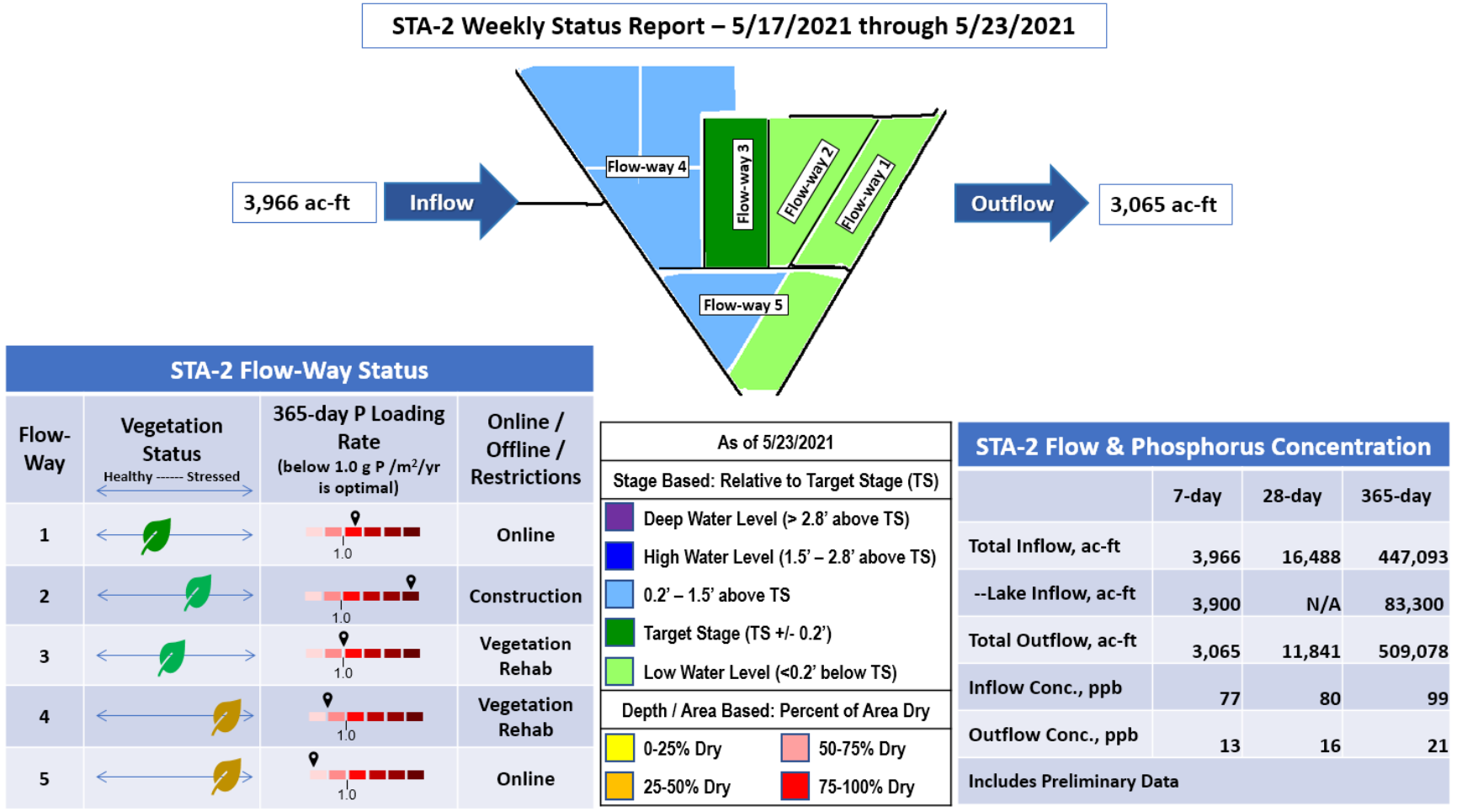
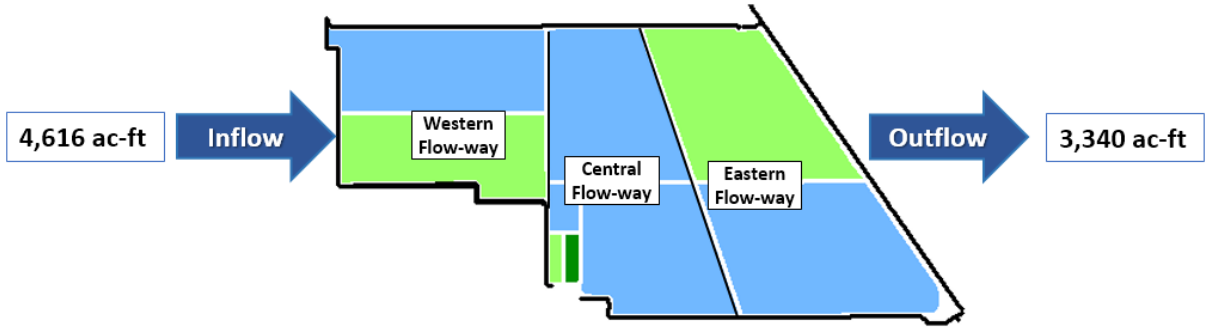


Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 5/17/2021 through 5/23/2021



STA-3/4 Flow-Way Status

Flow-Way	Vegetation Status (Healthy ------ Stressed)	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
Eastern	Offline, vegetation management drawdown as of 3/1/2021		
Central		1.0	Online
Western		1.0	Vegetation Rehab

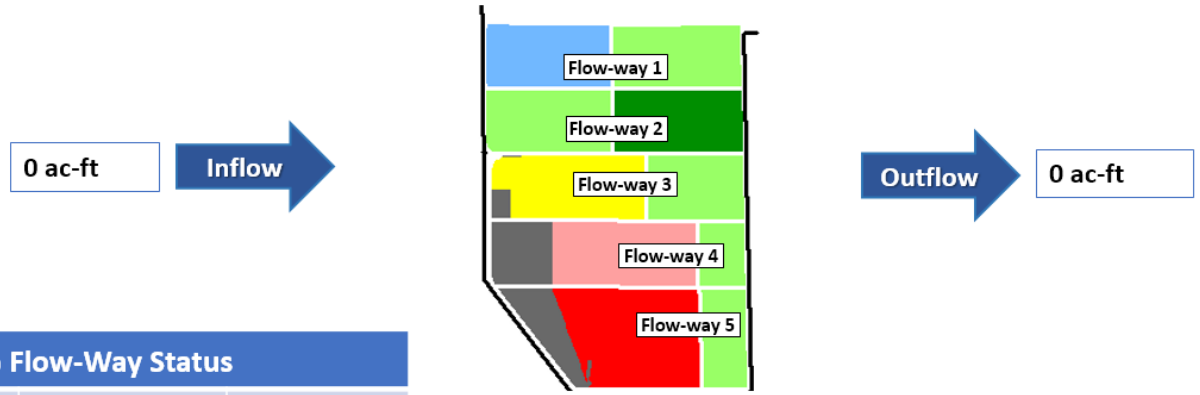
As of 5/23/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-3/4 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	4,616	19,346	563,718
--Lake Inflow, ac-ft	4,000	N/A	48,700
Total Outflow, ac-ft	3,340	13,725	537,551
Inflow Conc., ppb	90	76	57
Outflow Conc., ppb	13	17	12
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 5/17/2021 through 5/23/2021



STA-5/6 Flow-Way Status

Flow-Way	Vegetation Status (Healthy ------ Stressed)	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
1		1.0	Online
2		N/A	Post-construction
3		N/A	Post-construction
4		1.0	Online
5		1.0	Online

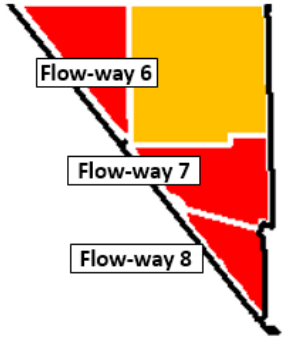
As of 5/23/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-5/6 Flow & Phosphorus Concentration

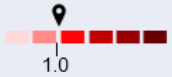
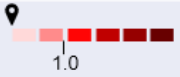
	7-day	28-day	365-day
Total Inflow, ac-ft	0	0	130,135
--Lake Inflow, ac-ft	N/A	N/A	N/A
Total Outflow, ac-ft	0	13	152,541
Inflow Conc., ppb	N/A	N/A	281
Outflow Conc., ppb	N/A	25	79
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 5/17/2021 through 5/23/2021



STA-5/6 Flow-Way Status

Flow-Way	Vegetation Status Healthy ------ Stressed	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
6			Online / Avian Nesting
7			Online
8			Online

As of 5/23/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

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

Everglades

Water Conservation Area Regulation Schedules

WCA-1: Stage at the 1-8C Gauge continued its previous track last week to fall below schedule. On Sunday stage was below the flat Zone A1 regulation line by 0.28 feet. WCA-2A: Stage at S11B-HW once again fell below the regulation line last week, 0.10 feet below on Sunday. WCA-3A: The Three Gauge Average continue to fall away from the Zone A regulation line last week. On Sunday stage was 0.93 feet below the falling Zone A line and the 3-69W gauge is below the water supply floor. Stage at gauge 62 (Northwest corner) continues a sharp decline. The average on Sunday was 2.2 feet below the rising Upper Schedule. (**Figures EV-1** through **EV-4**).

Water Depths

The WDAT tool for spatial interpolation of water depth monthly snapshots indicate that WCA-3A North is getting very dry, much of the sub-basin has water depths significantly below ground. North to South hydrologic connectivity maintained in Shark River Slough in ENP as conditions dry down in the Taylor Slough area and in Big Cypress National Preserve (BCNP). (**Figure EV-5**). Over the last month stages fell significantly in central WCA-1 and WCA-3A from Mullet Slough in the west to the upper reaches of the L-67 levees. Looking back one-year conditions are now trending drier in the central Everglades for the first time this dry season. Depths in WCA-3A, BCNP and western ENP are well below average for this time of year. (**Figure EV-6**).

Wading Birds

Nesting continues and foraging conditions near all the major colonies are currently excellent, despite dry conditions at the Alley North colony the birds there have moved south of I-75 into WCA-3A South where tens of thousands of birds are currently feeding. The likely only constraint to nesting success will be the timing of the start of the wet season and the first major reversal. In ENP, older juvenile Wood Storks and Roseate Spoonbills are now beginning to leave their nests for the nearby marshes. The provisional estimate of total nests in the Everglades in 2021 is approximately 81,000 nests, which is more than double the 10-year average, and since the 1940s, is second only in magnitude to the record-breaking nesting effort of 2018.

Taylor Slough and Florida Bay

About 0.29 inches of patchy rain fell over Taylor Slough and Florida Bay for the week ending Sunday (5/23). The Slough averaged a decrease of 0.20 feet over the week (**Figure EV-7**), and now the only area with above ground water levels is Craighead Pond (CP) which is below sea level (**Figure EV-8**). Depths continue to be 2 inches higher than the historical average for this time of year overall. But the northern areas of the slough are 6 inches below average, since the typical rains and water deliveries have not yet started. The northern slough area would be the first to respond to those waters. The drier that the Slough gets, the longer it will take to rehydrate the marsh to facilitate transference of freshwater to Florida Bay once the wet season starts.

Salinities in Florida Bay averaged an increase of 0.4 over the week ending Sunday (5/23) and was still 3 lower than the average condition for this time of year (**Figure EV-9**). However, individual station changes ranged from -6 to +5 (**Figure EV-7**). The central and western Bay areas have experienced only moderate rises in salinity so far this year, with only the shallowest station showing consistent values above 40 for the last few weeks. The Bay is positioned very well to minimize hyper-salinity extremes and duration before the rainy season begins.

The Taylor River (TR) station in the mangrove zone (tracked for the Florida Bay Minimum Flows and Levels (MFL)) stayed at 3 for the week ending 5/23 (**Figure EV-10**). The 30-day moving average decreased 2.8 over the week to end at 5.2. The lower than average salinity downstream and continued low flow from the slough is helping to keep the salinity at this station low. Weekly flow from the 5 creeks monitored for the Florida Bay MFL totaled about +3,700 acre-feet with small positive flows persisting most of the week (see inset on **Figure EV-10**). The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) increased 8,000 acre-feet over the week to end at 430,193 acre-feet on Sunday, 5/23. 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 duration of the wading bird nesting season will prevent potential large-scale nestling mortality. Flows into northern WCA-3A, with a particular focus on the northeastern region downstream of S -150 have a great ecological benefit at this time in the dry season. Maintaining and moderating the current recession rates in WCA-3A South will continue to provide good foraging conditions for wading birds nesting in the colonies within that basin as the drying front moves from the northwest to the southeast, concentrating prey. Maintaining a moderate recession in WCA-2B may prove important to wading birds over the next few weeks as they remain foraging in that basin last week. Inflows that delay the drying down of northern Taylor Slough have within and downstream ecological benefit.

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

Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	0.09	−0.15
WCA-2A	0.08	−0.13
WCA-2B	0.03	−0.22
WCA-3B	0.01	−0.20
ENP	0.01	−0.16

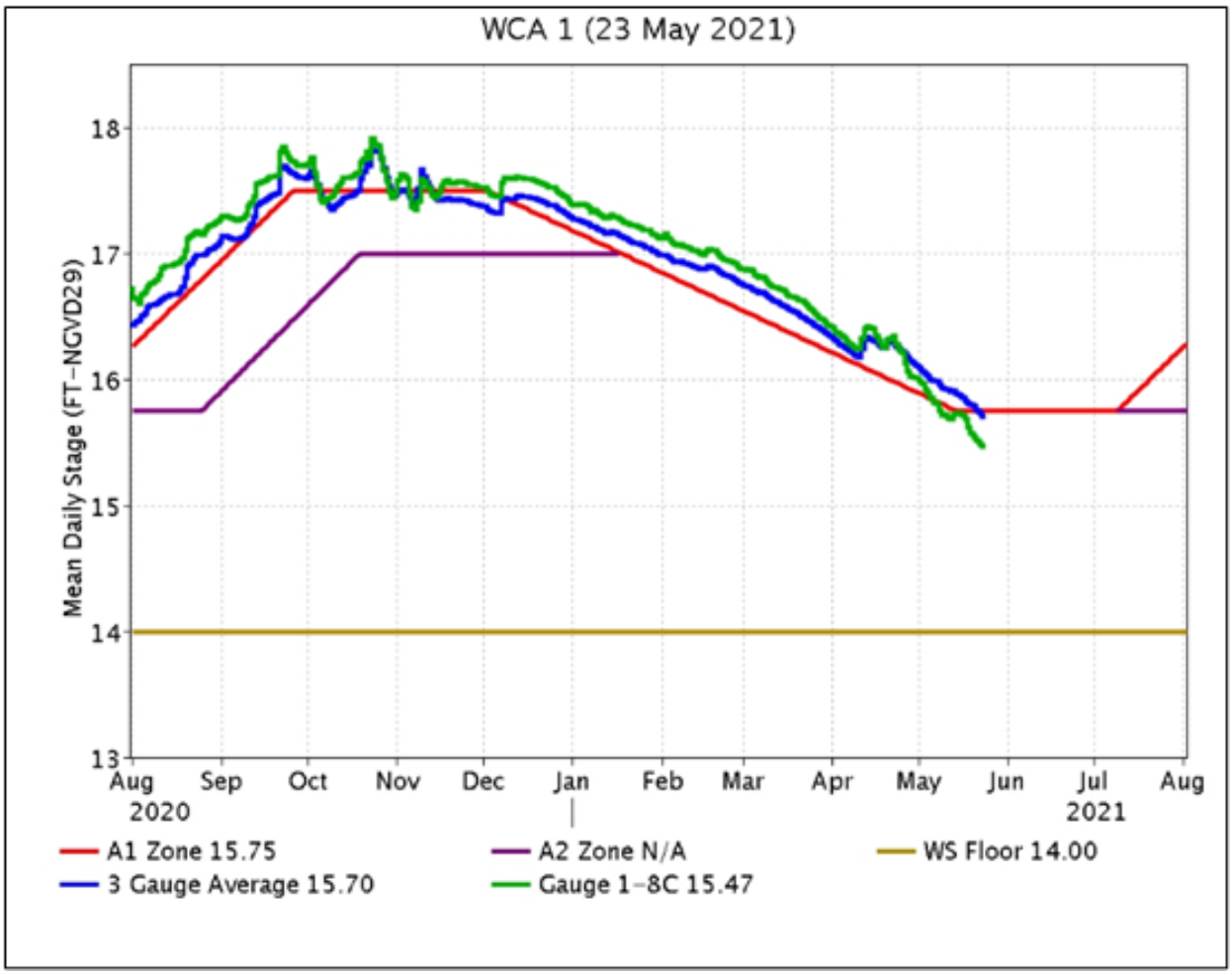


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

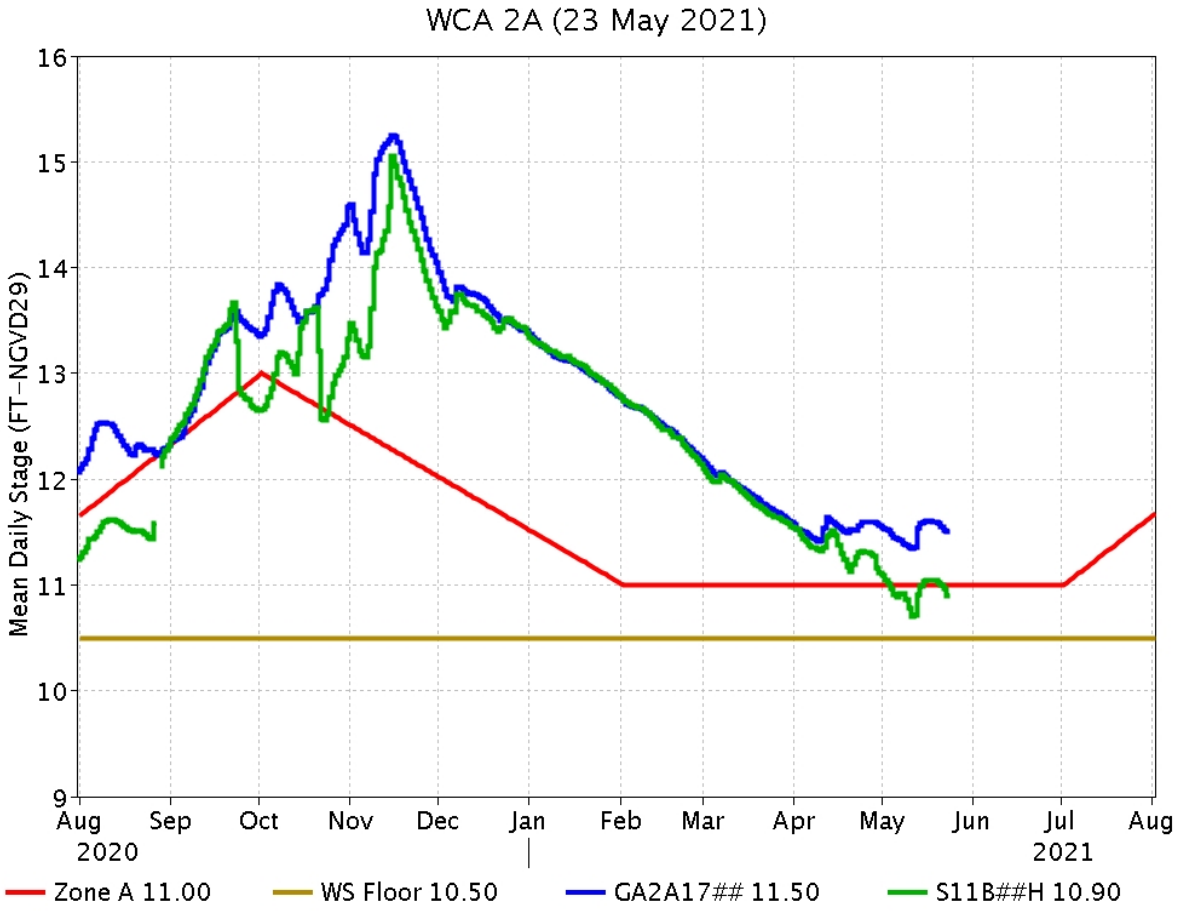


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

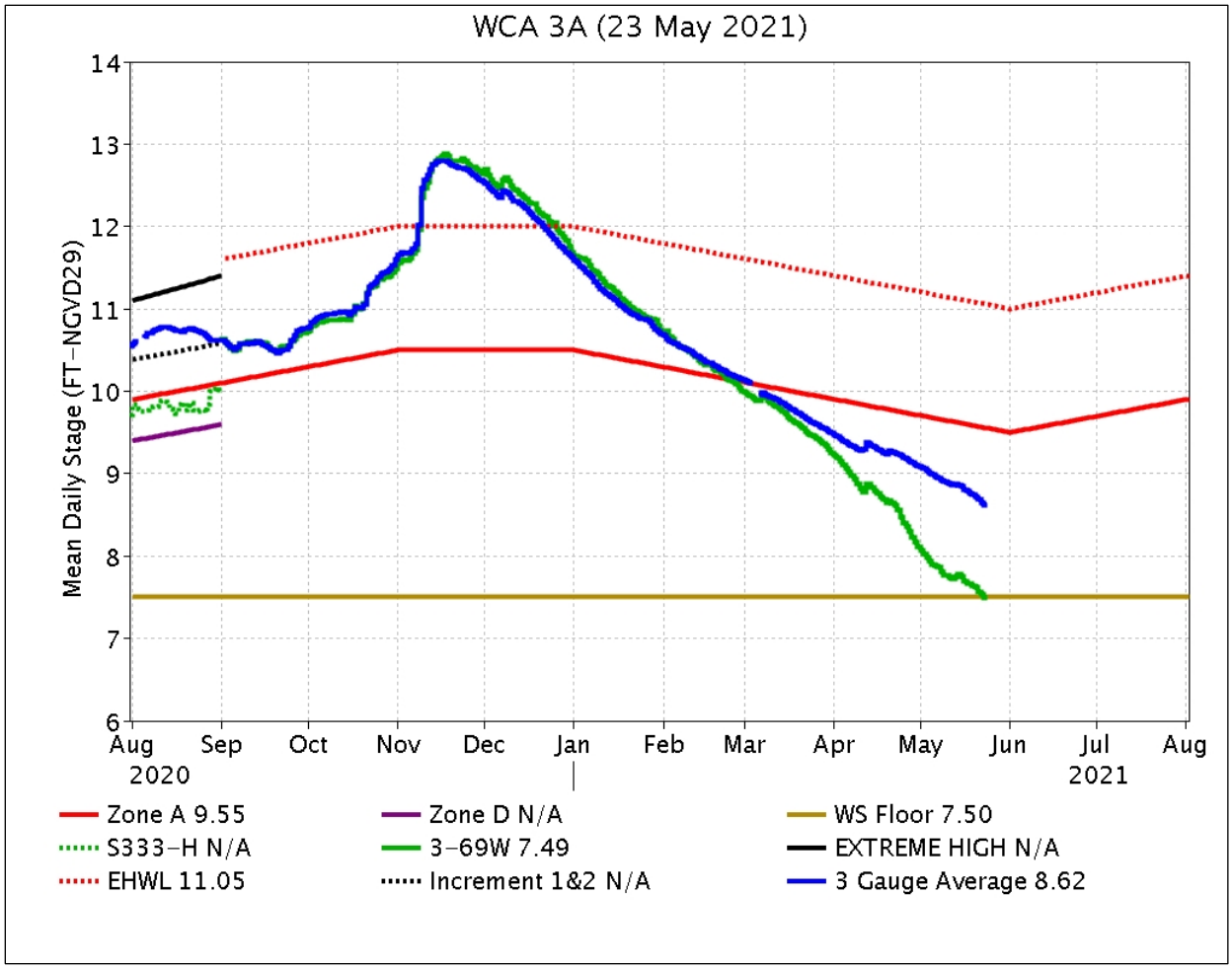


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

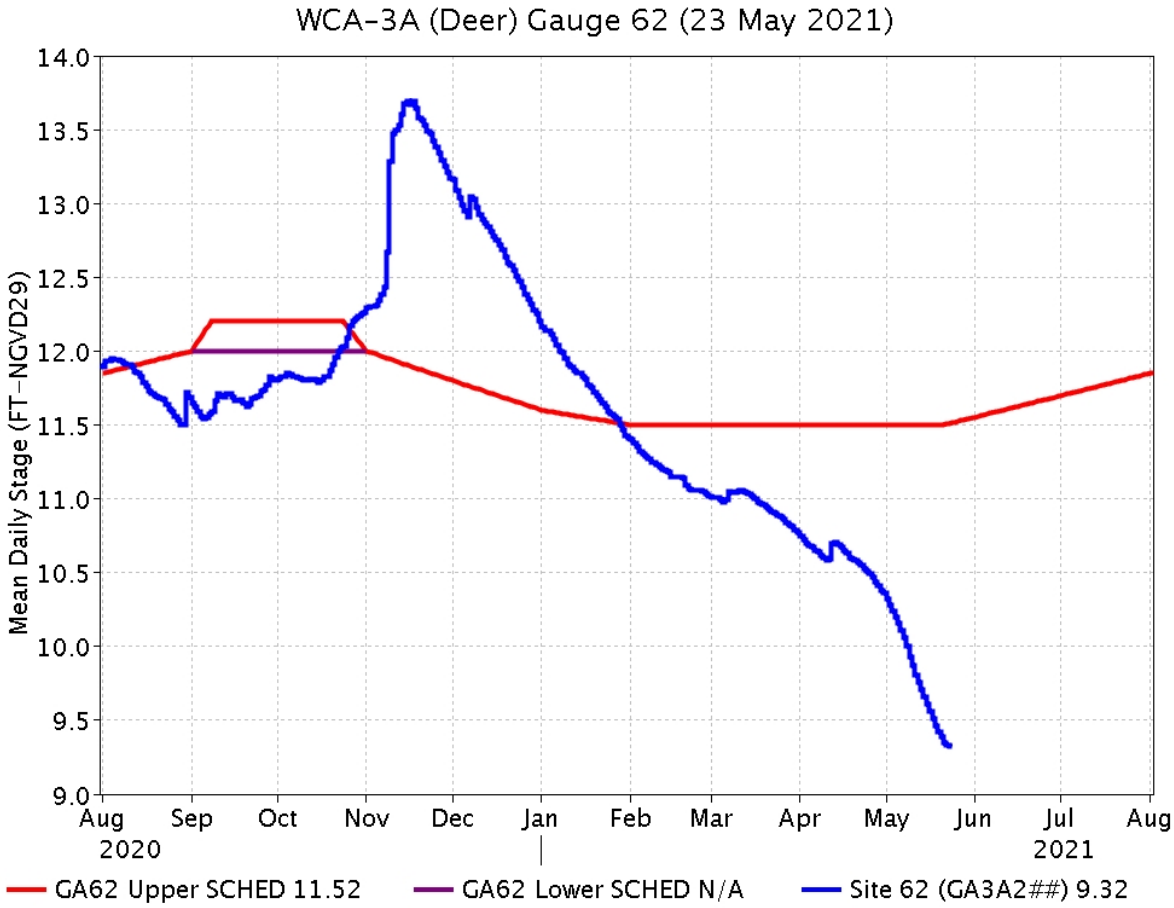


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

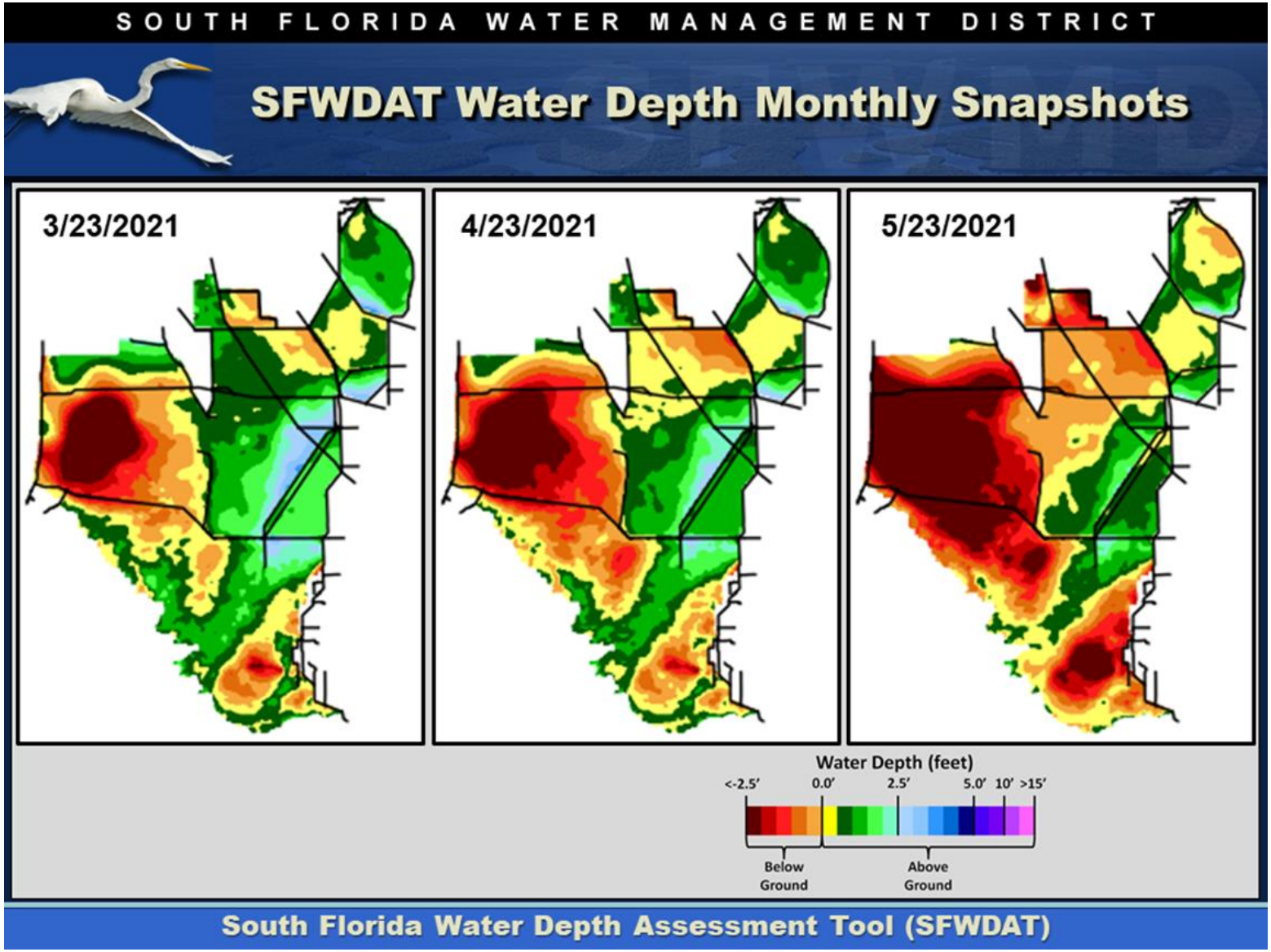


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

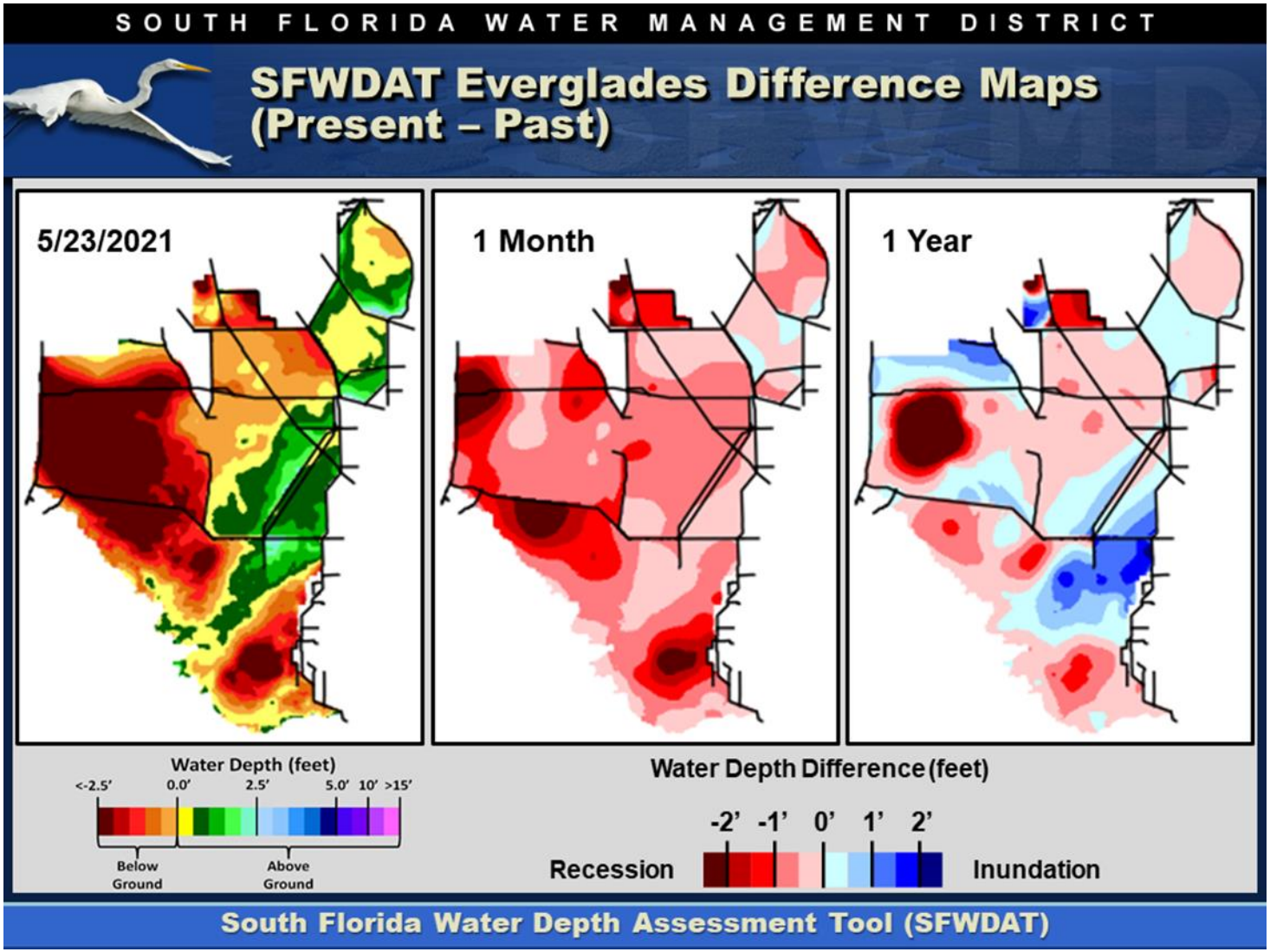


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

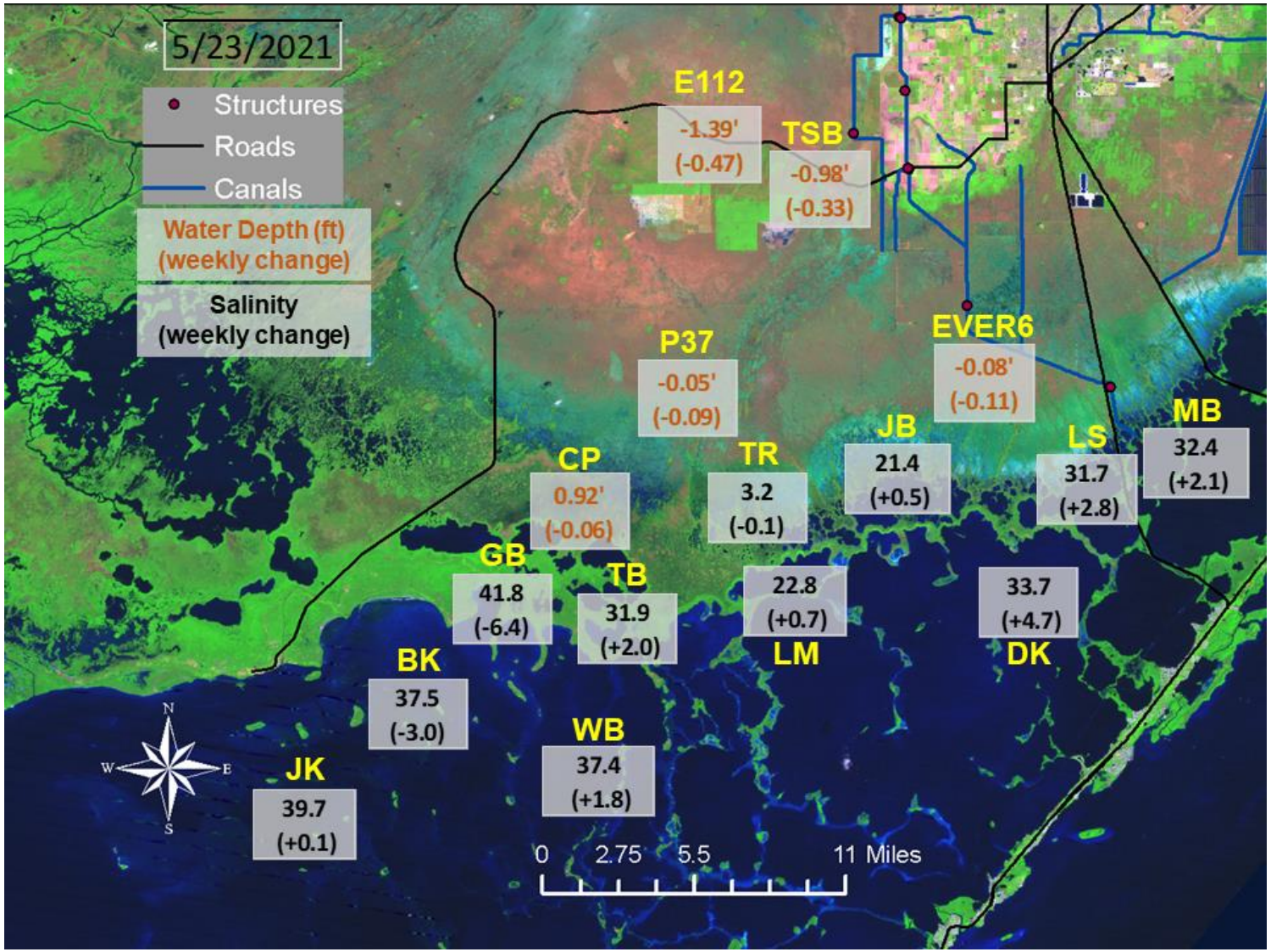


Figure EV-7. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

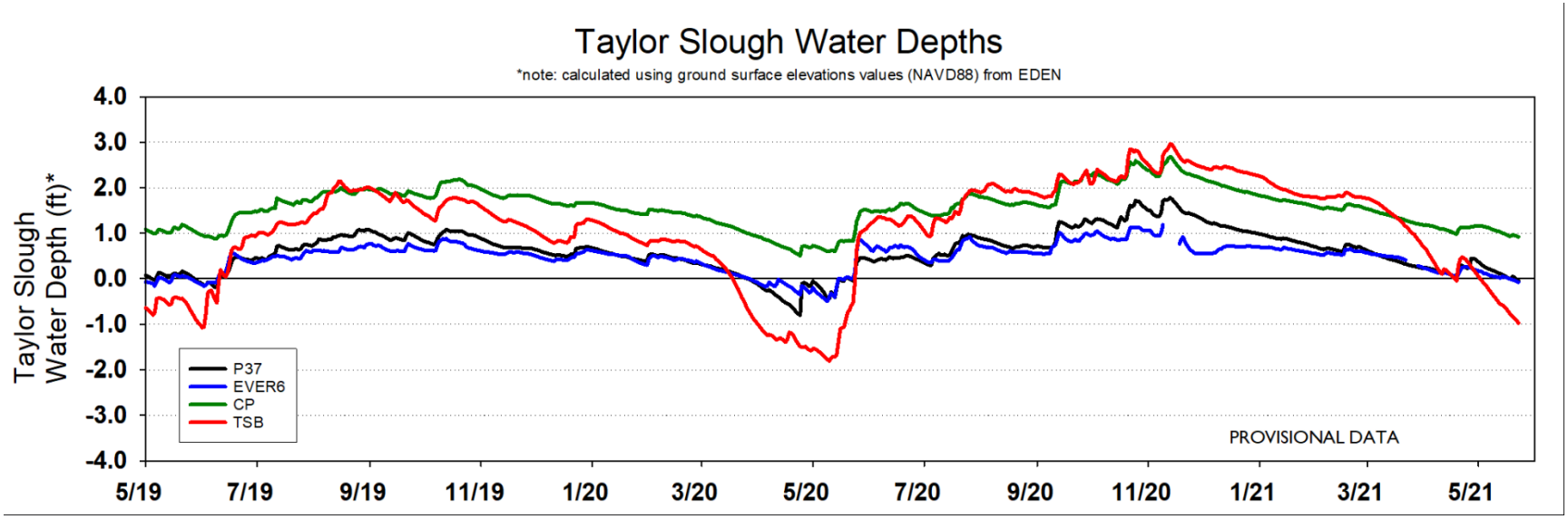


Figure EV-8. Taylor Slough water depth time series.

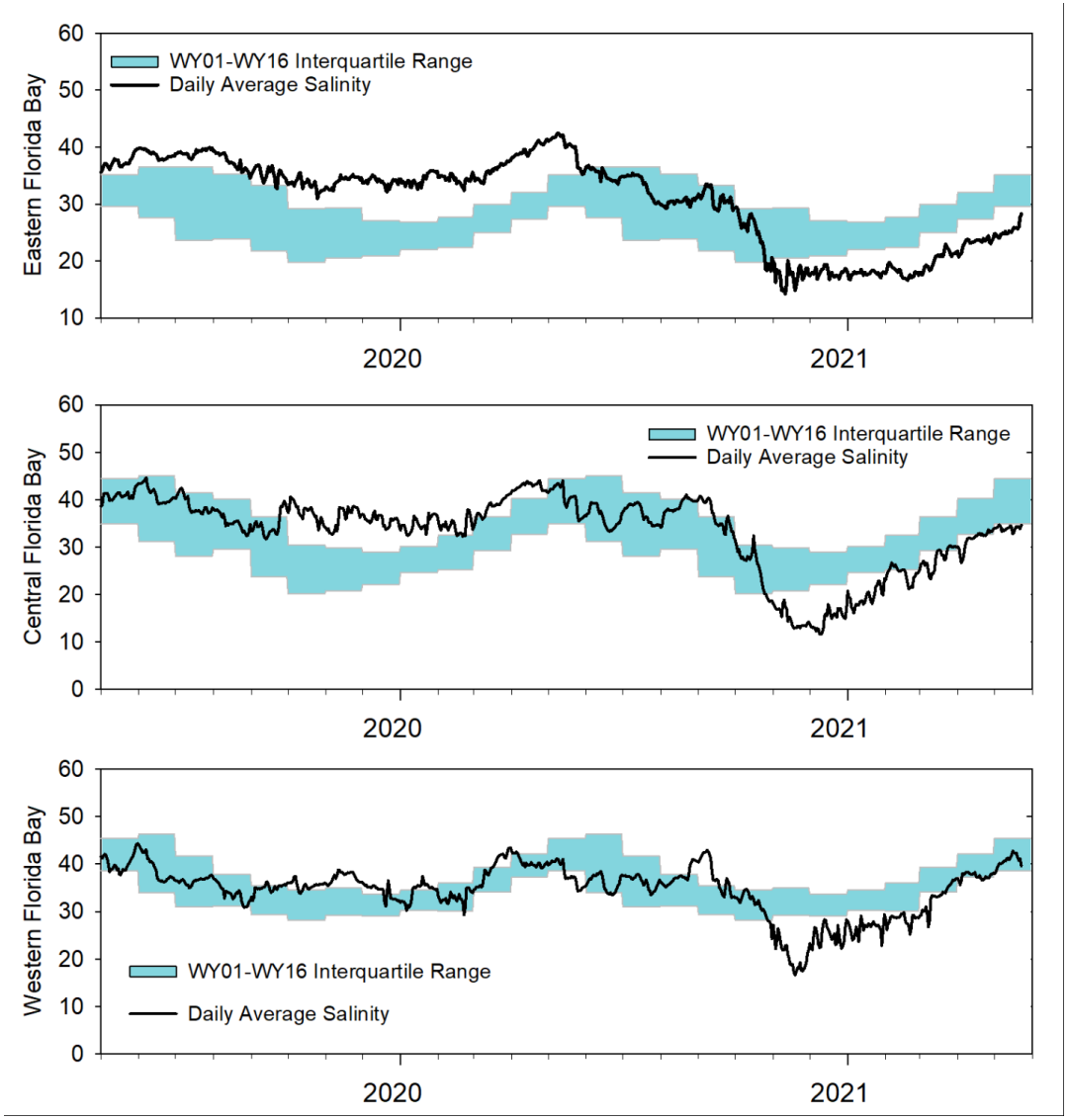


Figure EV-9. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

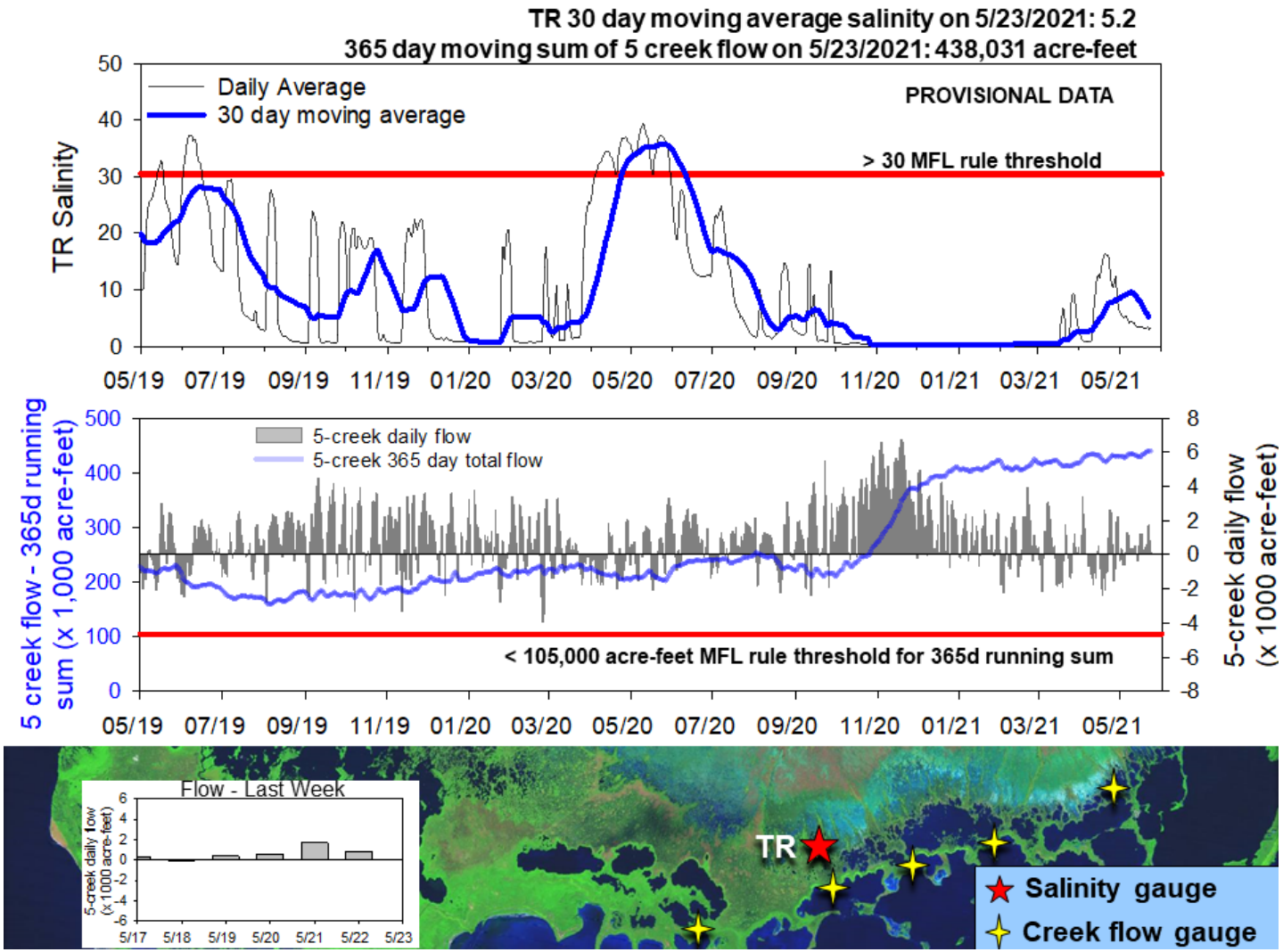


Figure EV-10. Top panel: Taylor River 30-day moving average salinity (blue), daily average salinity (gray) with salinity threshold; middle panel: Five-creek total flow for past 365 days (blue), daily flow (gray) with 365-day flow threshold; bottom panel: map of monitoring locations for the five creeks.

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

SFWMD Everglades Ecological Recommendations, May 25th, 2021 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.15'	Maintain marsh stage slightly above and parallel to the regulation schedule. Moderate any reversal as possible.	Protect within basin and downstream habitat and wildlife. Protect wading bird foraging.
WCA-2A	Stage decreased by 0.13'	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 0.22'	Moderate the recession rate to near 0.05 to 0.07 feet per week.	Protect within basin wading bird foraging.
WCA-3A NE	Stage decreased by 0.18'	Moderate the recession rate to near 0.05 to 0.07 feet per week.	Protect within basin habitat and wildlife. Inflows and optimal recession rates preserve peat soils.
WCA-3A NW	Stage decreased by 0.22'	Moderate the recession rate to near 0.05 to 0.07 feet per week.	
Central WCA-3A S	Stage decreased by 0.25'	Moderate the recession rate to near .10 feet per week.	Protect within basin wading bird foraging.
Southern WCA-3A S	Stage decreased by 0.15'		
WCA-3B	Stage decreased by 0.16'	Moderate the recession rate to near .05 to .07 feet per week.	Protect within basin habitat and wildlife.
ENP-SRS	Stage decreased by 0.21'	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 −0.06' to −0.47'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −6.4 to +4.7	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.