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 5, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Upper level wind flow is not expected to be favorable for shower development Tuesday and Wednesday, but daytime heating should generate some daily widely scattered shower activity mainly over the interior each afternoon. A cold front is forecast to push into the area Thursday evening and Friday producing mainly light to moderate rainfall with some locally heavy rainfall amounts north and east. Drier air is then forecast to spread over most of the District Friday evening, limiting shower development to the southern end of the District Saturday before expanding northward over the western interior Sunday. Total rainfall is forecast to be below the historical average during the first 7-day period (Week 1) and then near the historical average again during the second 7-day period (Week 2).

Kissimmee

With dryer conditions, stages in East Lake Toho and Toho have returned to their target recession lines, which are projected to bring lake stages to their regulation lows on June 1 at a rate of 0.17 feet/week. Kissimmee-Cypress-Hatchineha began receding again; stage is declining at a rate of about 0.13 feet/week. Flow at S-65A continues to be too low for extensive inundation of the Kissimmee River floodplain, and mean floodplain depth decreased to 0.15 feet on May 2, down from 0.29 feet the week before. Dissolved oxygen concentration in the Kissimmee River averaged 6.7 mg/L for the week, well above the 2.0 mg/L threshold considered harmful to sportfish.

Lake Okeechobee

Lake Okeechobee stage was 13.97 feet NGVD on May 2, 2021, 0.20 feet lower than last week and 0.40 feet lower than a month ago. The Lake is currently in the Low Sub-band. Stage had been above or near the top of the preferred ecological envelope since August 1, 2020, reentered the envelope on March 30, 2021, and is currently within the envelope but following along the upper threshold. The Lake has been within the envelope only 19% of the time since January 1, 2021. Recent satellite imagery (May 1, 2021) suggests there is an increased algal bloom risk over the entire Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged approximately 128 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities increased at all sites within the estuary. Salinity at the US1 Bridge was in the good range (10-26) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 2,079 cfs over the past week with approximately 1,563 cfs coming from the Lake. Mean salinities remained the same at S-79, decreased at Val I-75 and Cape Coral, and increased at the remaining sites in the estuary. 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.

Water Management Recommendations

Lake stage is in the Low Sub-Band of 2008 LORS. Tributary hydrological conditions are normal. The LORS2008 Release Guidance suggests up to 3,000 cfs release at S-79 to the Caloosahatchee Estuary and up to 1,170 cfs release at S-80 to the St. Lucie Estuary.

Stormwater Treatment Areas

Over the past week, approximately 4,700 ac-ft of Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2021 (since May 1, 2020) is approximately 154,100 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 1,639,000 ac-feet. Most STA cells are near target stage, with the exception of EAV 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. 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

The reversal last week in the northern WCAs caused a reduction in foraging behavior but it appears to be short lived as birds returned to foraging in most areas due to the return of a suitable recession rate, and all the colonies in the Everglades continue to thrive as numbers build even late into nesting season. Very dry conditions dominate WCA-3A North causing ecological concern, however at the southern end of the system Florida Bay remains well positioned to minimize hypersalinity before the wet season begins.

Supporting Information

Kissimmee Basin

Upper Kissimmee

Lake stages on May 2, 2021 were 55.7 feet NGVD (0.4 feet below schedule) in East Lake Toho, 52.7 feet NGVD (0.4 feet below schedule) in Lake Toho, and 51.4 feet NGVD (1.5 feet above schedule) in Kissimmee-Cypress-Hatchineha (KCH) waterbodies (**Table KB-1**, **Figures KB-1-3**). Stages in East Lake Toho and Toho have returned to their target recession lines, which are projected to bring the lakes' stages to their regulation lows on June 1 at a rate of 0.17 feet/week. Kissimmee-Cypress-Hatchineha began receding again and stage is declining at a rate of about 0.13 feet/week.

Lower Kissimmee

Kissimmee River (headwater) stages were 46.4 feet NGVD at S-65A and 25.8 feet NGVD at S-65D on May 2, 2021, while discharges were 830 cfs at S-65, 680 cfs at S-65A, 920 cfs at S-65D and 1,040 cfs at S-65E (**Table KB-2**). Dissolved oxygen concentration in the Kissimmee River averaged 6.7 mg/L for the week ending May 2, well above the 2.0 mg/L threshold considered harmful to sportfish (**Figure KB-4**). While flow at S-65A remains too low for extensive inundation of the Kissimmee River floodplain, mean floodplain depth decreased to 0.15 feet on May 2, down from 0.29 feet the week before (**Figure KB-5**).

Water Management Summary

With dryer conditions, stages in East Lake Toho and Toho have returned to their target recession lines, which are projected to bring lake stages to their regulation lows on June 1 at a rate of 0.17 feet/week. Kissimmee-Cypress-Hatchineha began receding again; stage is declining at a rate of about 0.13 feet/week. Flow at S-65A continues to be too low for extensive inundation of the Kissimmee River floodplain, and mean floodplain depth decreased to 0.15 feet on May 2, down from 0.29 feet the week before. Dissolved oxygen concentration in the Kissimmee River averaged 6.7 mg/L for the week, well above the 2.0 mg/L threshold considered harmful to sportfish.

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. Continue to 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)	
							5/2/21	4/25/21
Lakes Hart and Mary Jane	S-62	LKMJ	122	59.8	R	60.1	-0.3	-0.1
Lakes Myrtle, Preston and Joel	S-57	S-57	20	60.3	R	60.3	0.0	0.0
Alligator Chain	S-60	ALLI	74	62.7	R	62.8	-0.1	0.0
Lake Gentry	S-63	LKGT	87	60.3	R	60.3	0.0	-0.1
East Lake Toho	S-59	TOHOE	376	55.7	R	56.2	-0.5	-0.5
Lake Toho	S-61	TOHOW S-61	674	52.7	R	53.2	-0.5	-0.5
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	902	51.0	R	50.0	1.0	1.0

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.

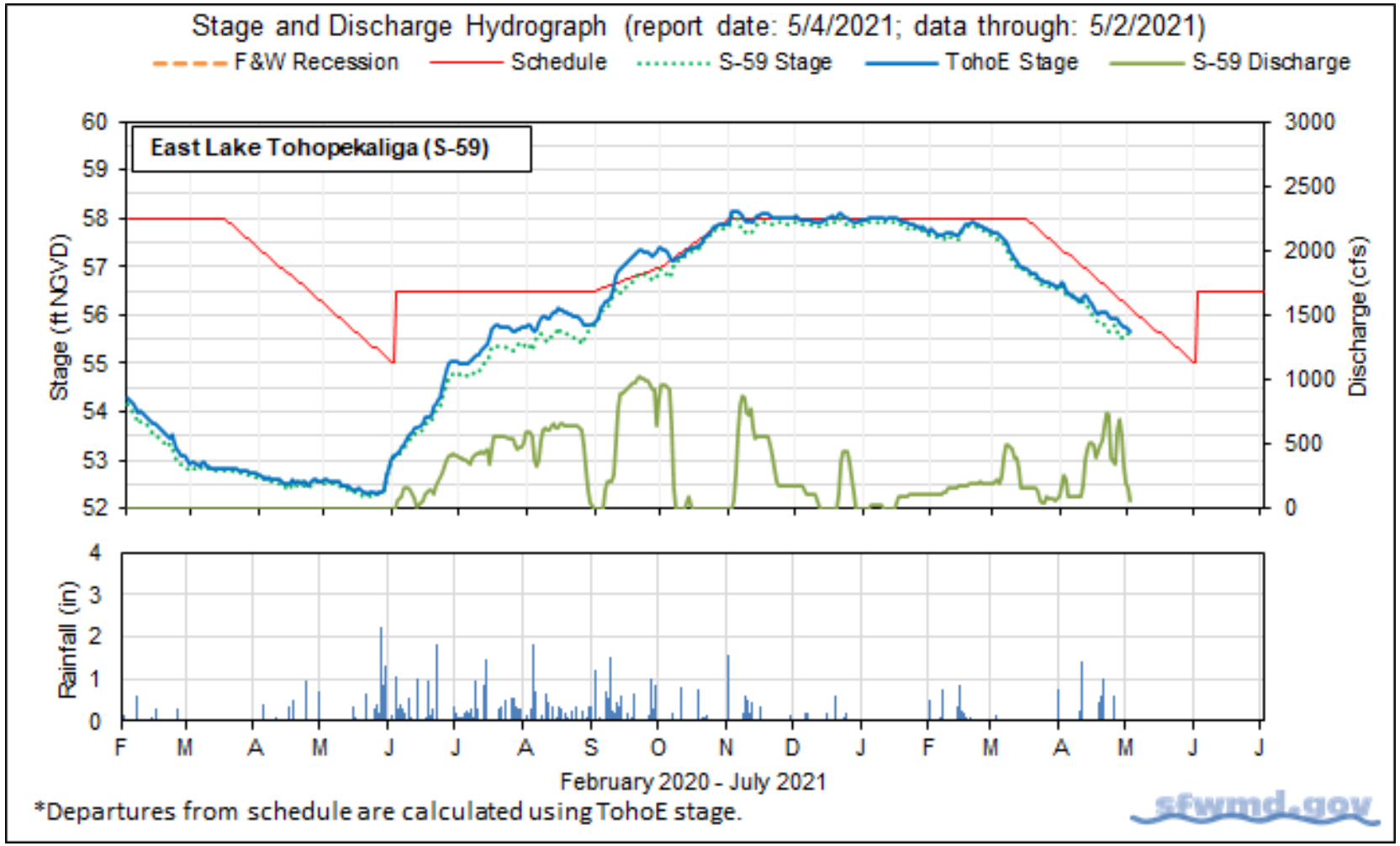


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

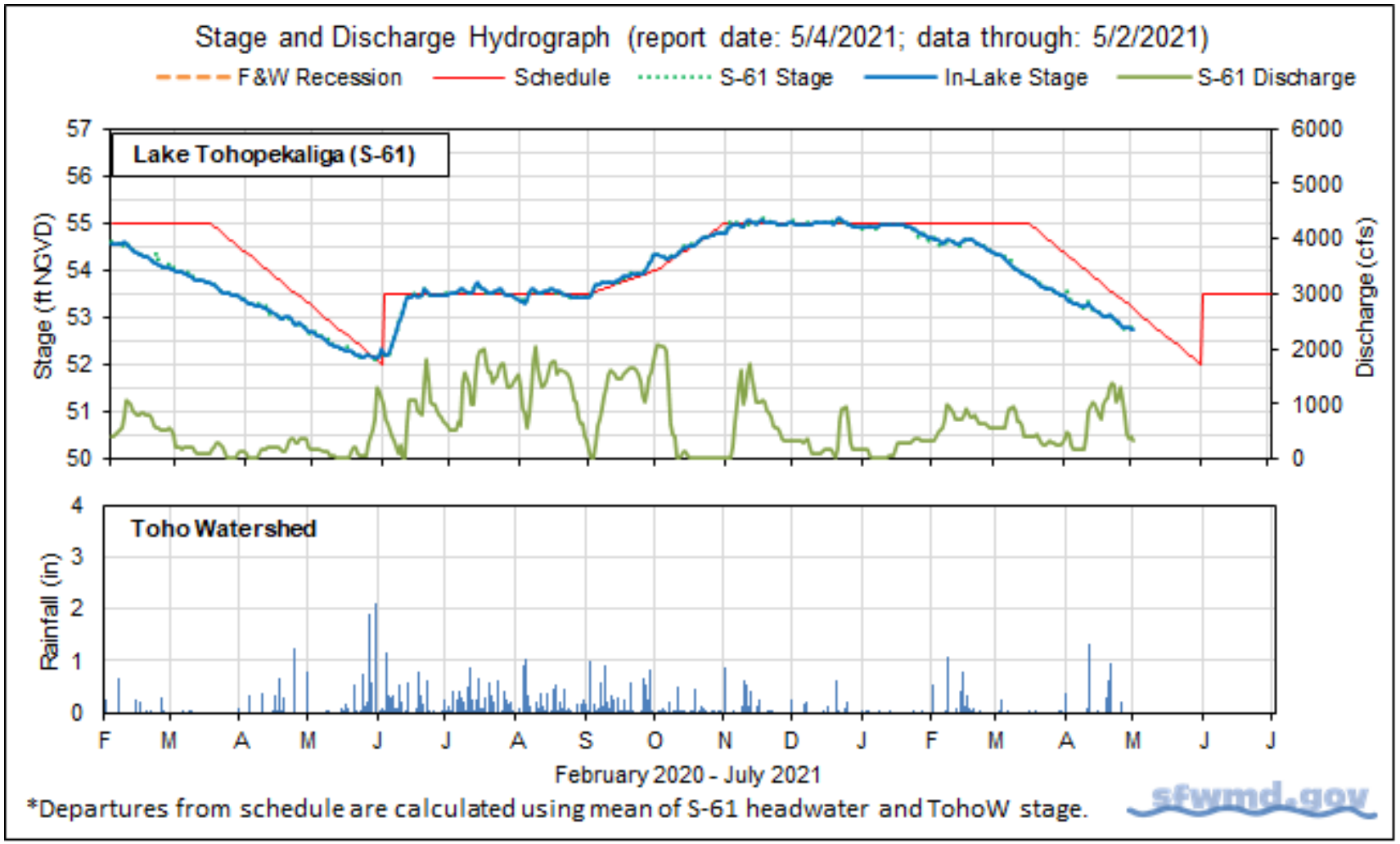


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

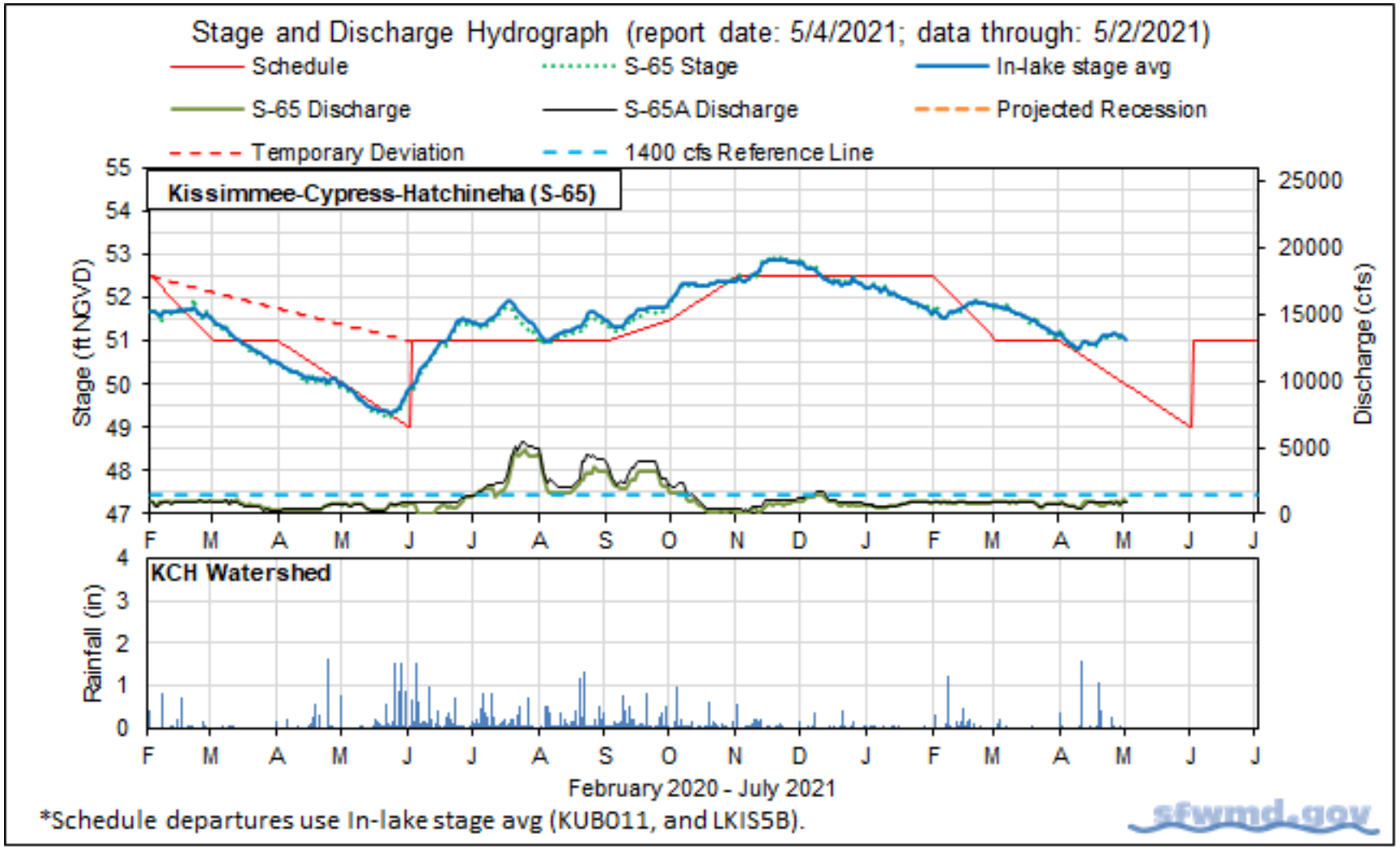


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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	Average	Average for Previous Seven Day Periods			
		5/2/21	5/2/21	4/25/21	4/18/21	4/11/21
Discharge	S-65	879	902	757	929	531
Discharge	S-65A[a]	854	836	881	842	492
Discharge	S-65D[b]	934	941	968	707	636
Headwater Stage (feet NGVD)	S-65D[c]	25.77	25.85	25.86	25.85	25.77
Discharge (cfs)	S-65E[d]	824	857	957	697	635
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) [e]	Phase I, II/III river channel	7.1	6.7	6.5	7.6	7.9
Mean depth (feet) [f]	Phase I floodplain	0.15	0.19	0.29	0.22	0.13

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).

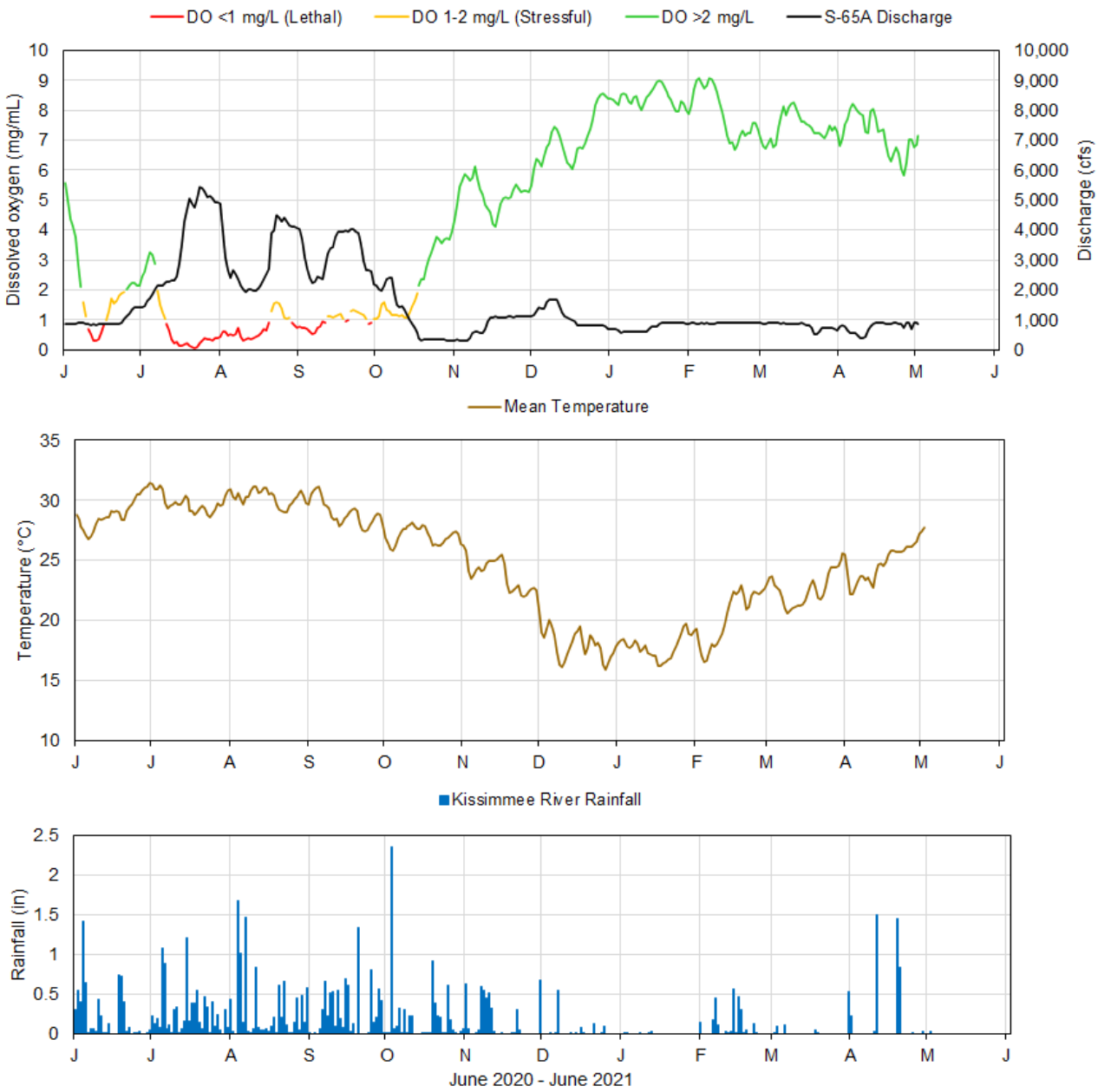


Figure KB-4. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRBN, PC33, PD62R, and PD42R with an average of four stations reporting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

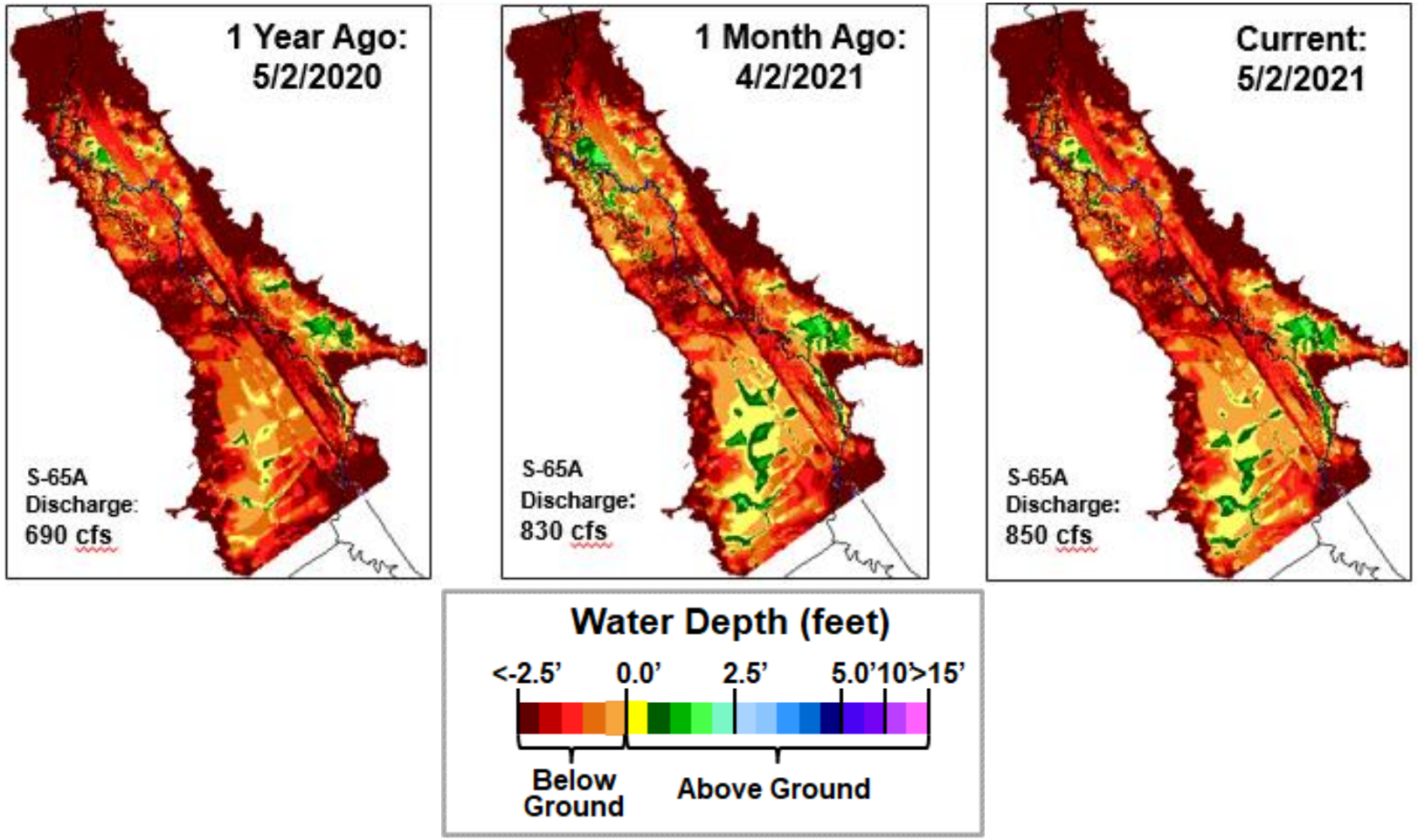


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

Lake Okeechobee

Lake Okeechobee stage was 13.97 feet NGVD on May 2, 2021, 0.40 feet lower than a month ago, and 2.56 feet higher than one year ago (**Figure LO-1**). Lake stages rose into the lower portion of the preferred ecological envelope on June 2, 2020 (**Figure LO-2**) and had been above the envelope since August 1, 2020. Lake stage reentered the envelope on March 30, 3021, and is currently within the envelope but following along the upper threshold. The Lake has been within the envelope only 19% of the time since January 1, 2021. Lake stage reached a low of 10.99 feet on May 17 and a high of 16.45 feet on November 12 (post Tropical Storm Eta), a difference of 5.5 feet (**Figure LO-3**). Lake stage declined slowly from mid-November through mid-February, then recession rates increased until early April. Lake stage has been steady for the past two weeks. According to NEXRAD, 0.45 inches of rain fell directly on the Lake.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 1,694 cubic feet per second (cfs) to 986 cfs. Outflows (excluding evapotranspiration) increased, going from 1,733 cfs to 5,049 cfs. The majority of the inflow came from the Kissimmee River (857 cfs through S-65E & S-65EX1). Releases to the west via S-77 increased from 500 cfs the prior week to 2,053 cfs, and releases east via S-308 also increased, going from 48 cfs to 129 cfs. Releases south through the S-350 structures increased from 1,076 cfs to 2,746 cfs. Average inflows and outflows through water control structures surrounding the Lake for the previous two weeks (cfs) are shown in **Table LO-1**. The resultant Lake elevation change in inches (in) due to each structure's flow for the past week is also shown in **Table LO-1**. **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.

On April 29, 2021, approximately 3,000 wading birds were observed in five flocks around Lake Okeechobee (**Figure LO-5**). This is a decrease of almost 3,880 birds observed during the survey two weeks ago (**Figure LO-6**). The recent reversal of stage may be limiting the amount of suitable habitat available to short-legged birds like White Ibis so they may be seeking alternative locations such as the Everglades which is currently experiencing near-record nesting of White Ibis.

The most recent satellite image (May 1, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed an increased bloom potential in the southwestern region of the Lake and mid to high bloom potential across other regions of the Lake (**Figure LO-7**).

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

Inflows	Previous Week's Average Daily Flow (cfs)	This Week's Average Daily Flow (cfs)	Equivalent Depth Week Total (in)
S-65E & S-65EX1	985	857	0.4
S-71 & S-72	222	0	0.0
S-84 & S-84X	325	87	0.0
Fisheating Creek	30	39	0.0
S-154	0	0	0.0
S-191	0	0	0.0
S-133 P	27	0	0.0
S-127 P	9	0	0.0
S-129 P	22	0	0.0
S-131 P	35	3	0.0
S-135 P	40	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	2884	1217	0.5
Totals	4578	2202	0.9

Outflows	Previous Week's Average Daily Flow (cfs)	This Week's Average Daily Flow (cfs)	Equivalent Depth Week Total (in)
S-77	500	2053	0.8
S-308	48	129	0.1
S-351	555	1228	0.5
S-352	84	534	0.2
S-354	436	982	0.4
L-8 Outflow	109	122	0.1
Evapotranspiration	2138	3084	1.3
Totals	3870	8133	3.4

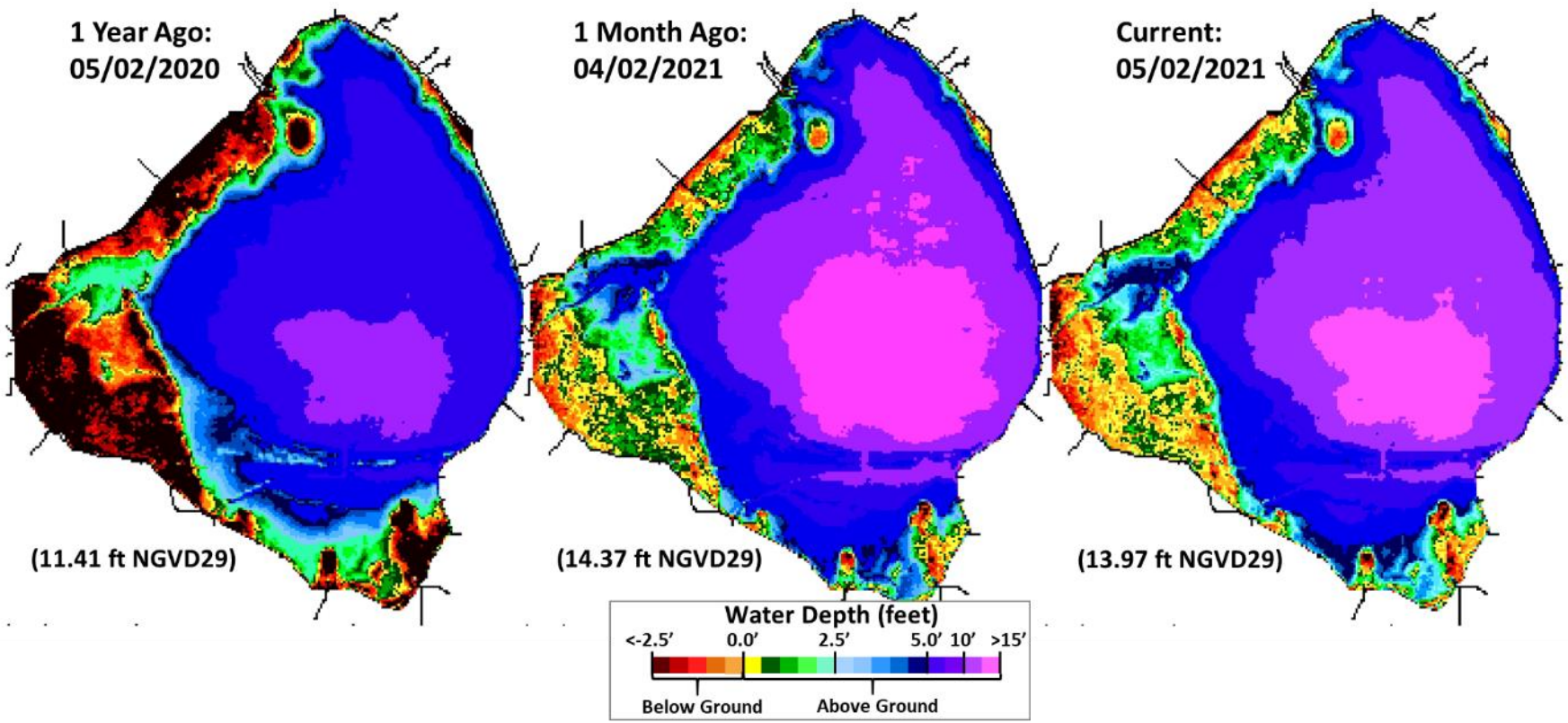


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

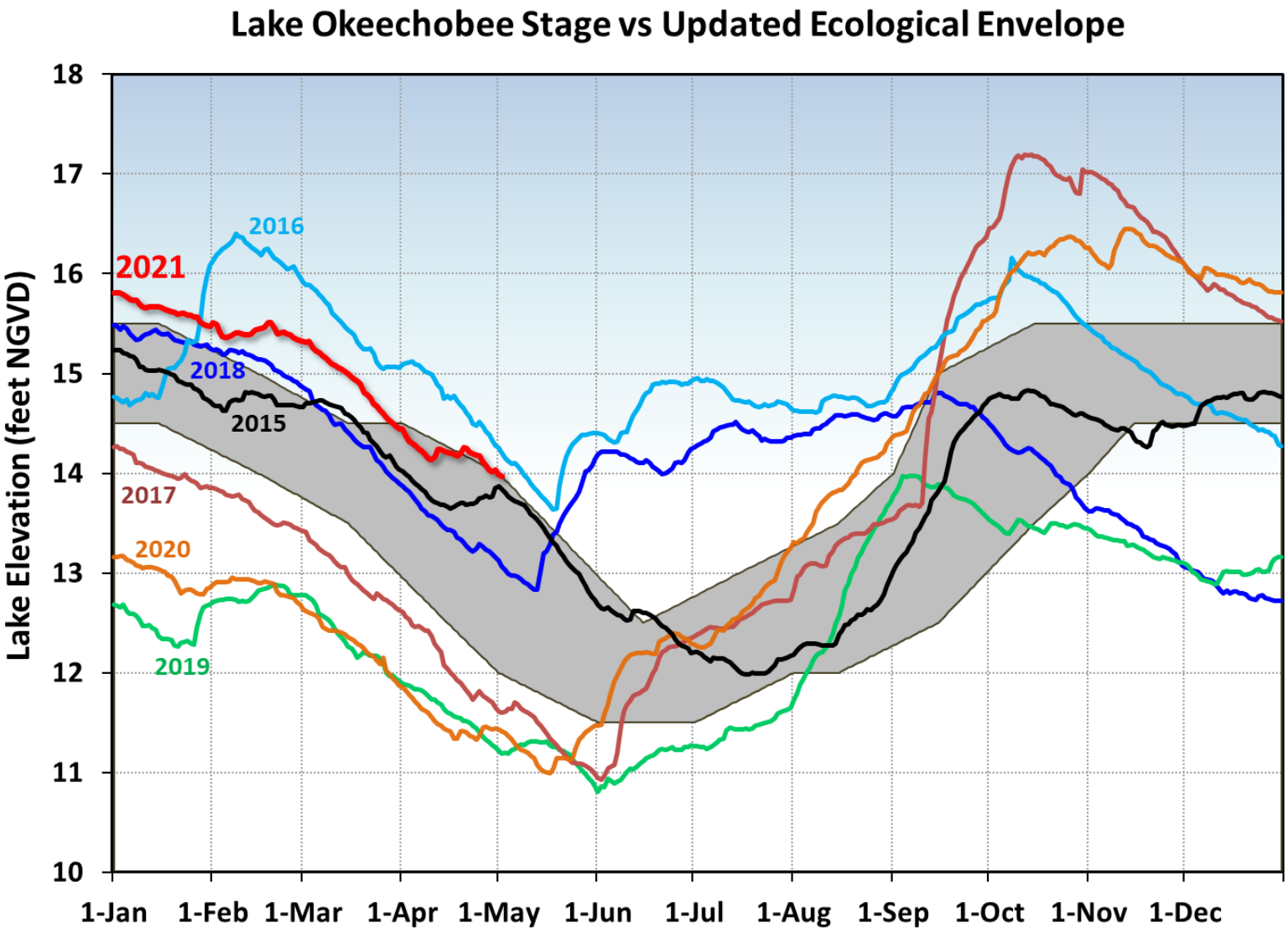


Figure LO-2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated ecological envelope.

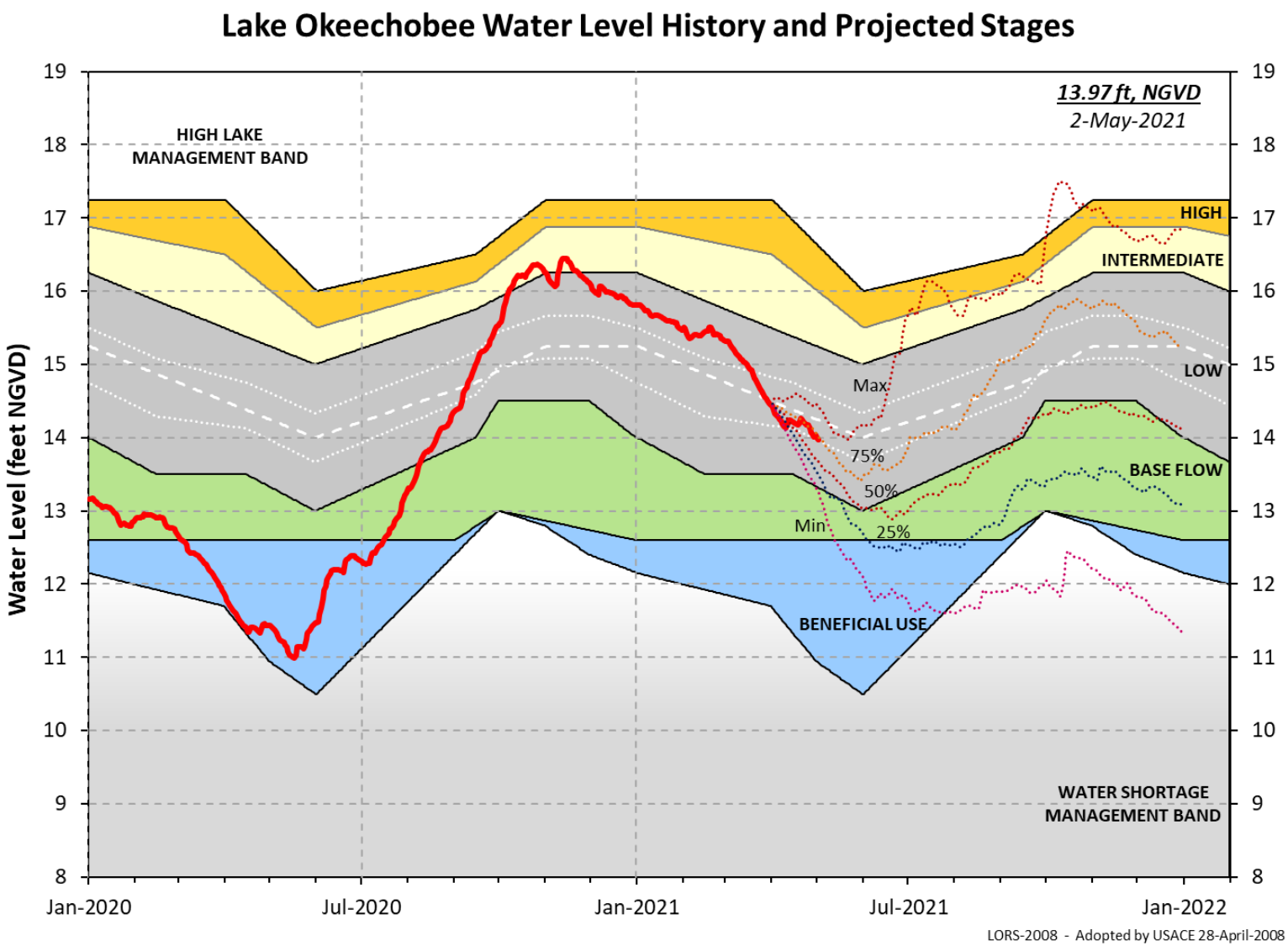


Figure LO-3. Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

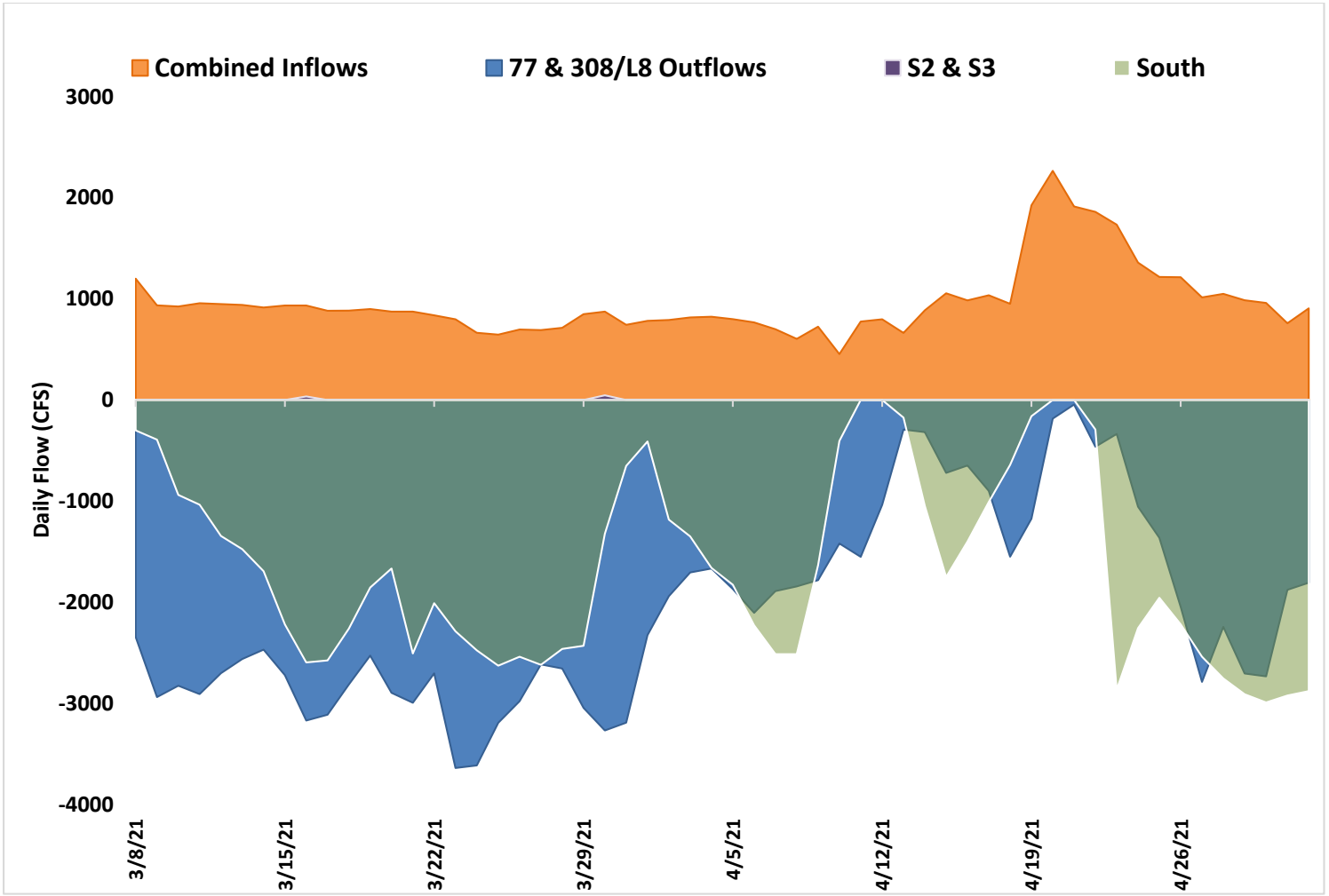


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) are included as inflows. Conversely, flows from Lake Okeechobee into the L-8 Canal are included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

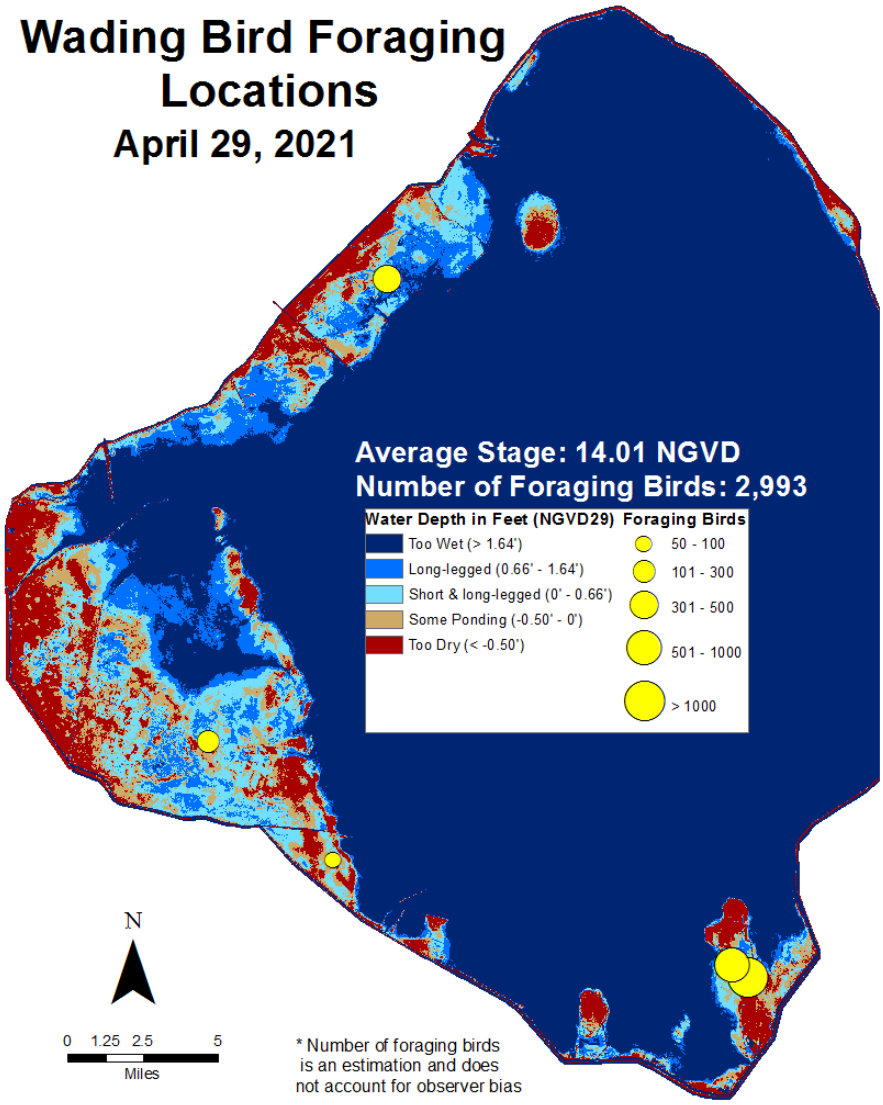


Figure LO-5. Wading bird foraging locations and abundance during April 29, 2021 survey of Lake Okeechobee.

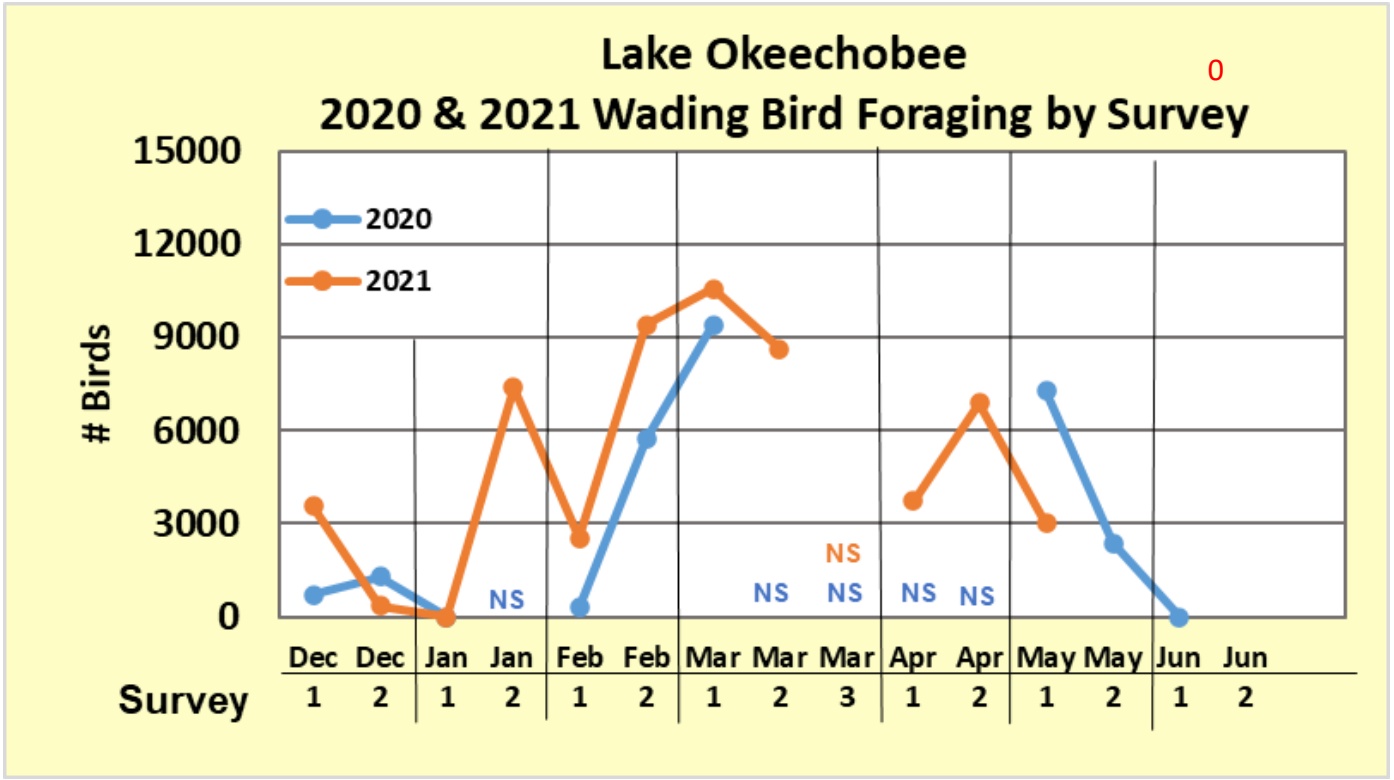


Figure LO-6. Foraging wading bird abundance by survey during the 2020 (red bars) and 2021 (blue bars) breeding seasons on Lake Okeechobee.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was approximately 128 cfs (**Figures ES-1** and **ES-2**) and the previous 30-day mean inflow was approximately 437 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, mean 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 20.9. Salinity conditions in the middle estuary were estimated to be within the good range for adult eastern oysters (**Figure ES-4**).

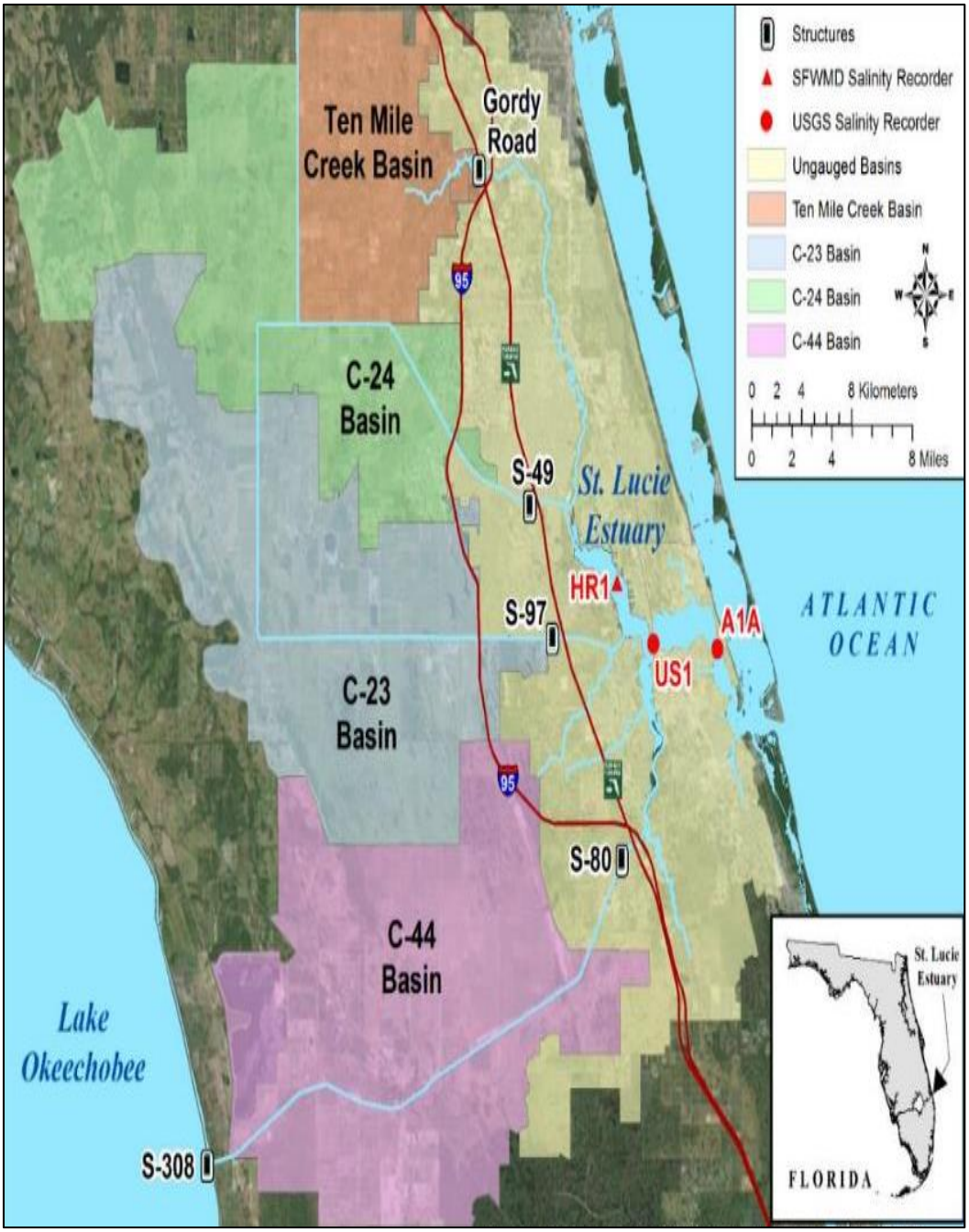


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

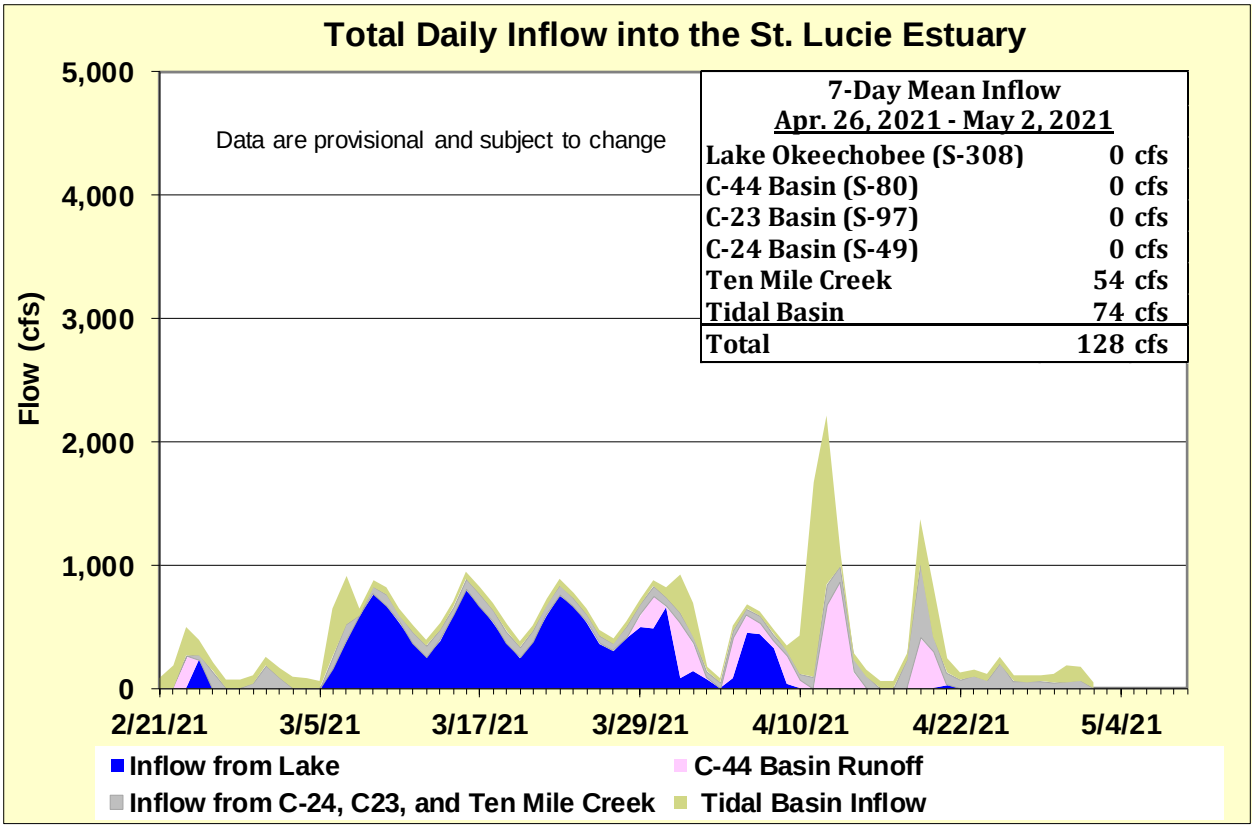


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	**16.1** (13.3)	**18.2** (17.0)	NA [a]
US1 Bridge	**20.4** (17.5)	**21.5** (19.9)	10.0 – 26.0
A1A Bridge	**28.7** (25.6)	**30.5** (28.2)	NA [a]

a. The envelope is not applicable.

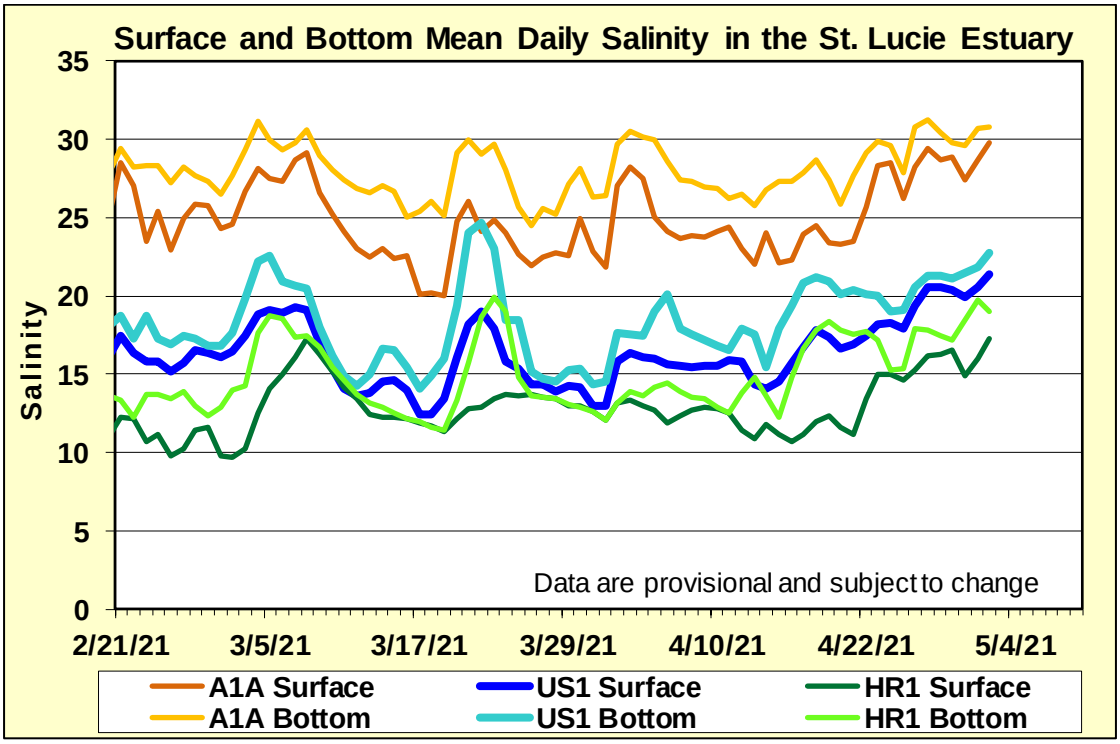


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

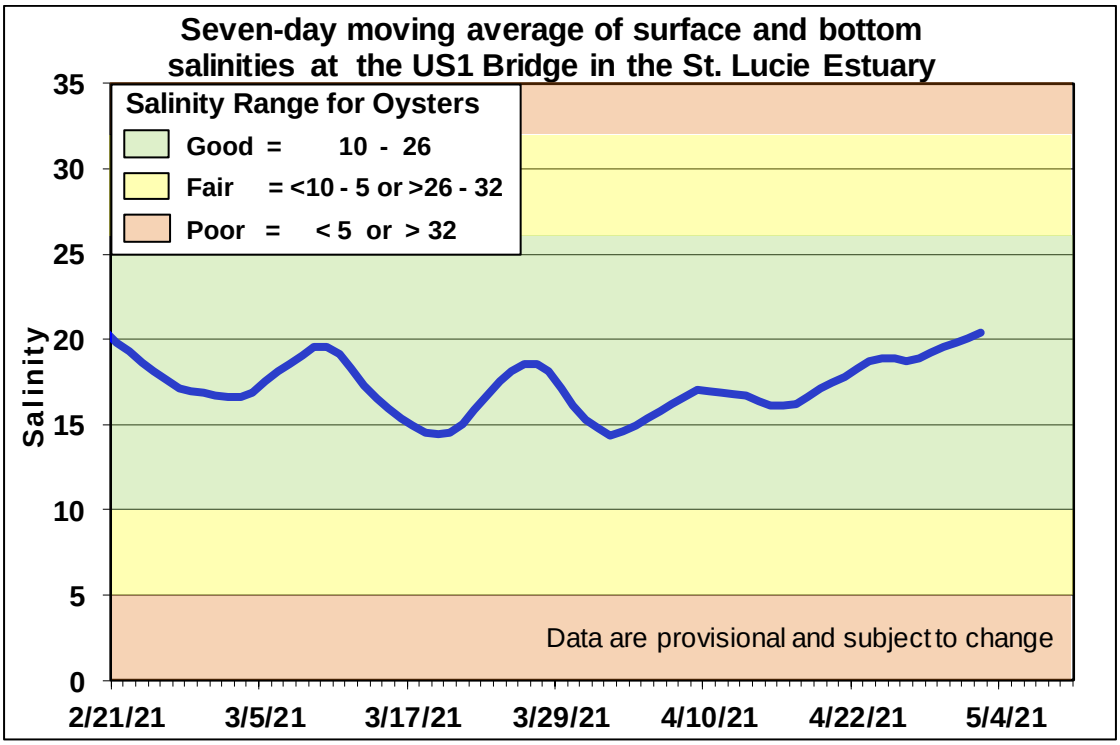


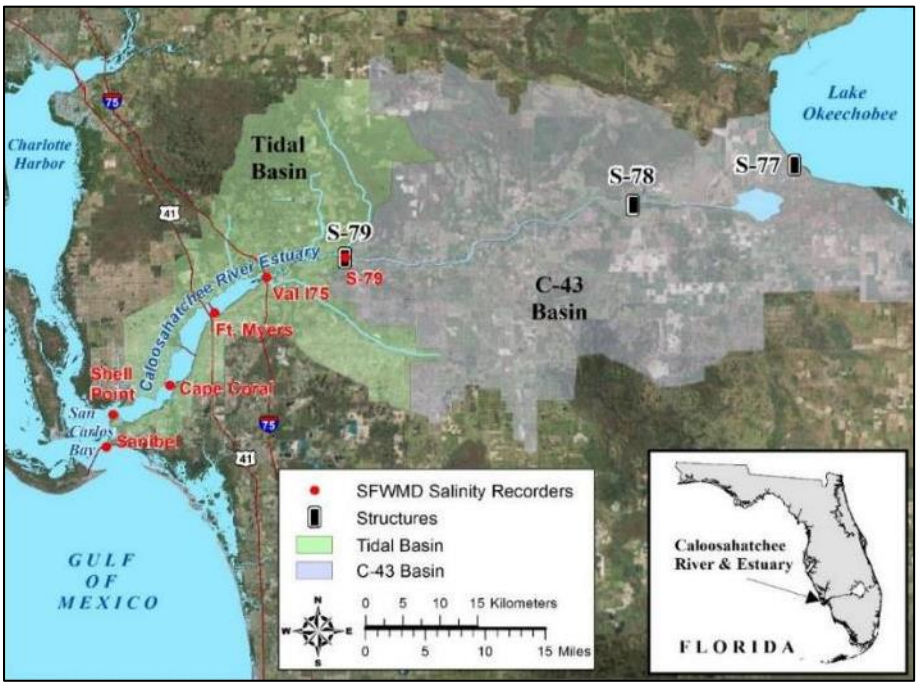
Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was approximately 2,079 cfs (**Figures ES-5** and **ES-6**) and the previous 30-day mean inflow was approximately 1,458 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, decreased at Val I-75 and Cape Coral, and increased at the remaining sites in the estuary (**Table ES-2** and **Figures ES-7** and **ES-8**). The seven-day mean surface salinities (**Table ES-2**) were in the good range (0-10) for tape grass at Val I-75 and at Ft. Myers. The seven-day mean surface salinity values were within the good range for adult eastern oysters at Cape Coral and Shell Point, and in the fair range at Sanibel (**Figure ES-9**).

Surface salinity at Val I-75 was forecasted for the next two weeks, using an autoregression model (Qiu and Wan, 2013[1]) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1,500 cfs and a steady release at S-79 of 2,000 cfs with estimated tidal basin inflows of 115 cfs. Model results from all scenarios predict daily salinity to be 2.1 or lower and the 30-day moving average surface salinity to be 0.7 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).



[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.

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

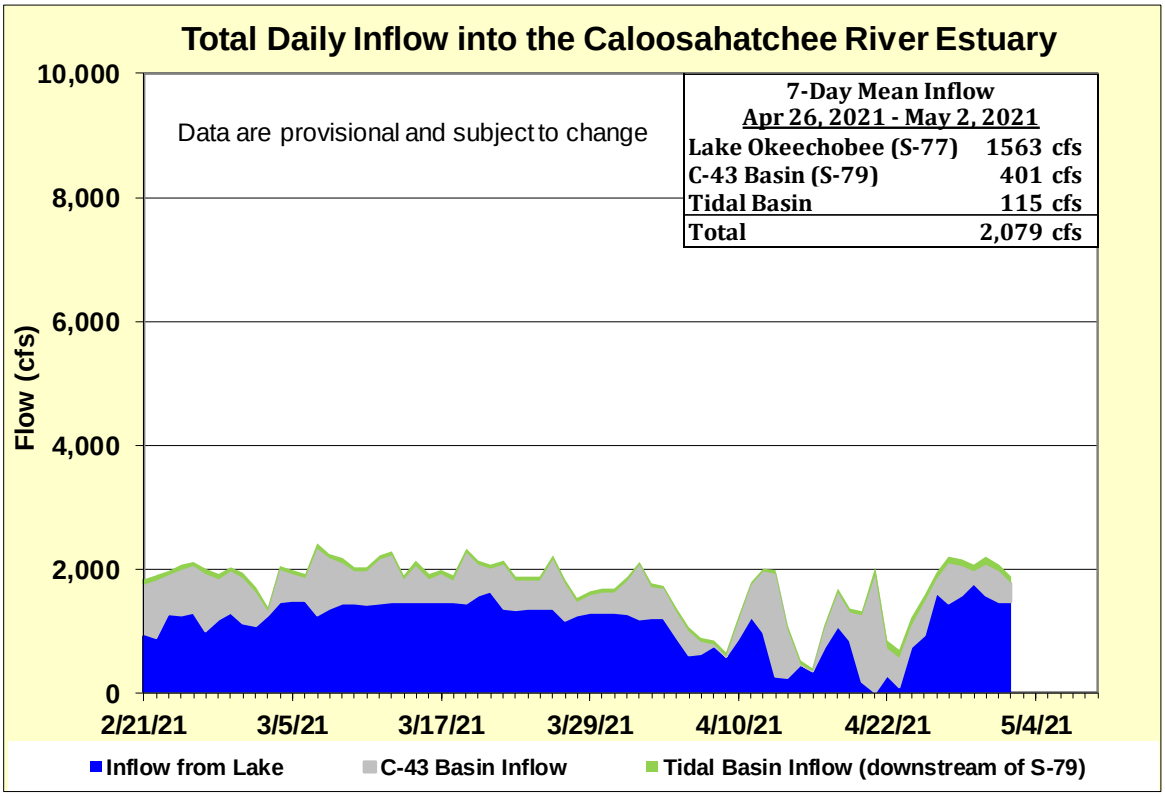


Figure ES-6. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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)	**0.2** (0.2)	**0.2** (0.2)	NA
Val I-75	**0.4** (0.6)	**0.4** (0.7)	0.0 – 5.0[a]
Fort Myers Yacht Basin	**4.1** (2.9)	**5.8** (3.8)	NA
Cape Coral	**13.0** (13.2)	**14.6** (15.2)	10.0 – 30.0
Shell Point	**27.3** (26.1)	**28.1** (27.4)	10.0 – 30.0
Sanibel	**32.7** (29.4)	**33.0** (31.8)	10.0 – 30.0

a. The envelope is based on the predicted 30-day mean for the next two weeks.

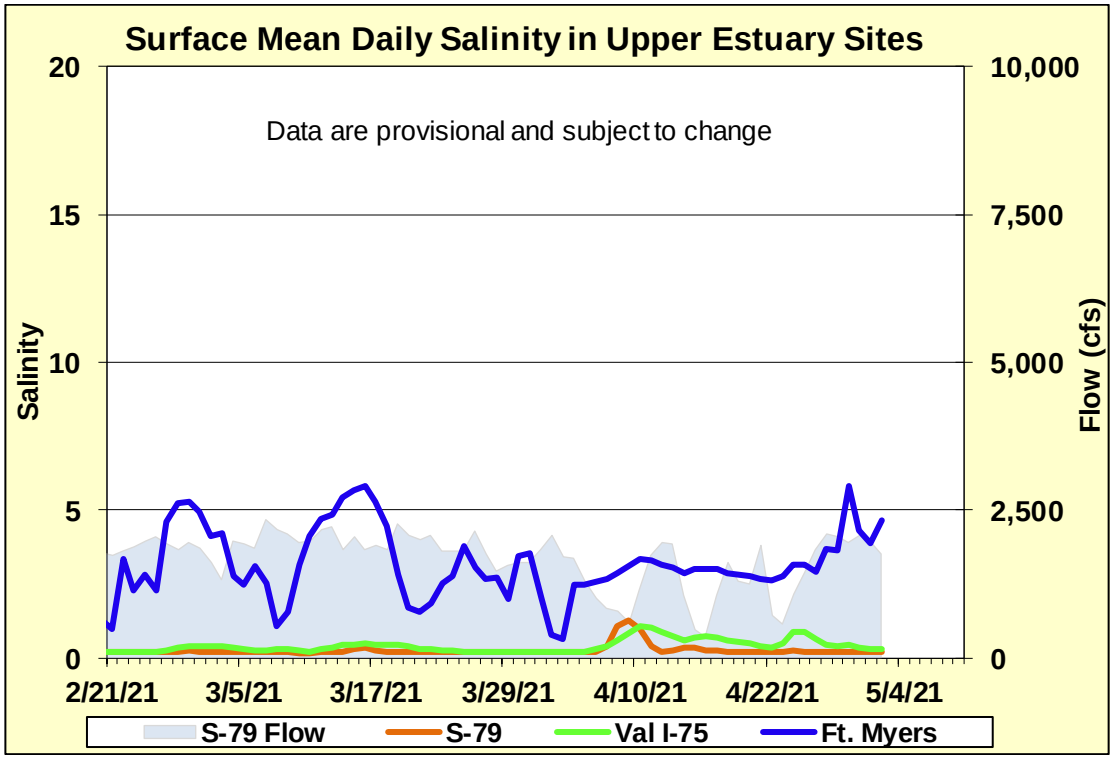


Figure ES-7. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

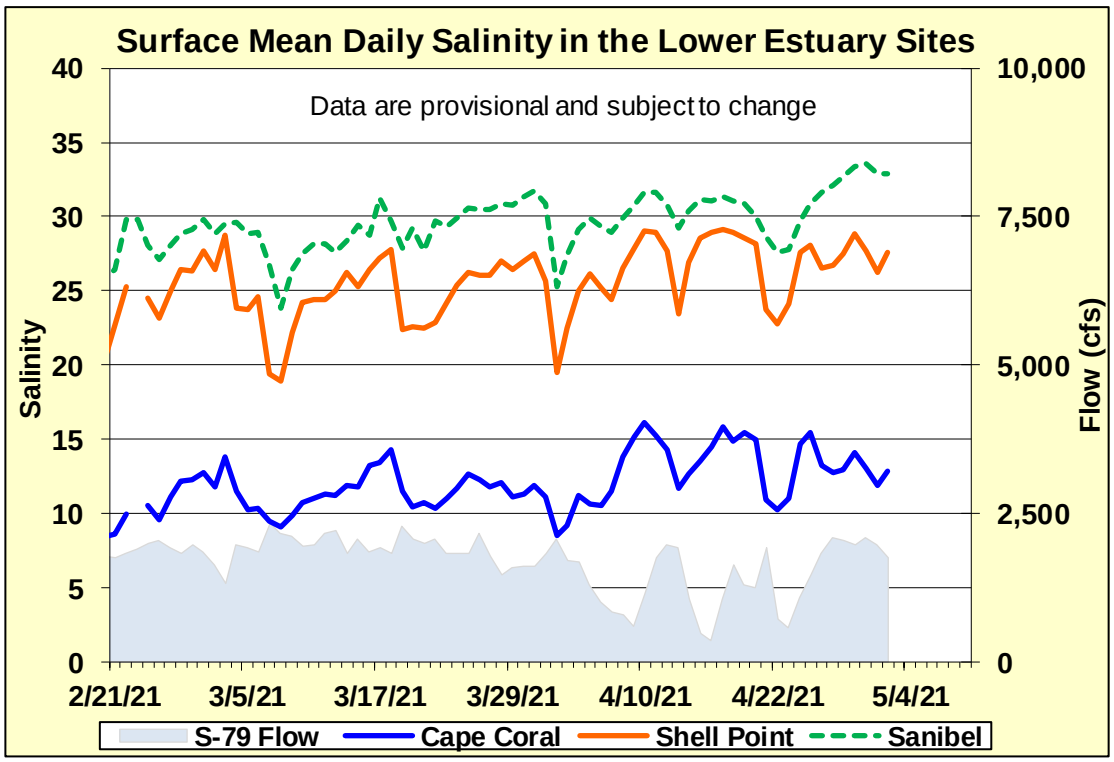


Figure ES-8. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

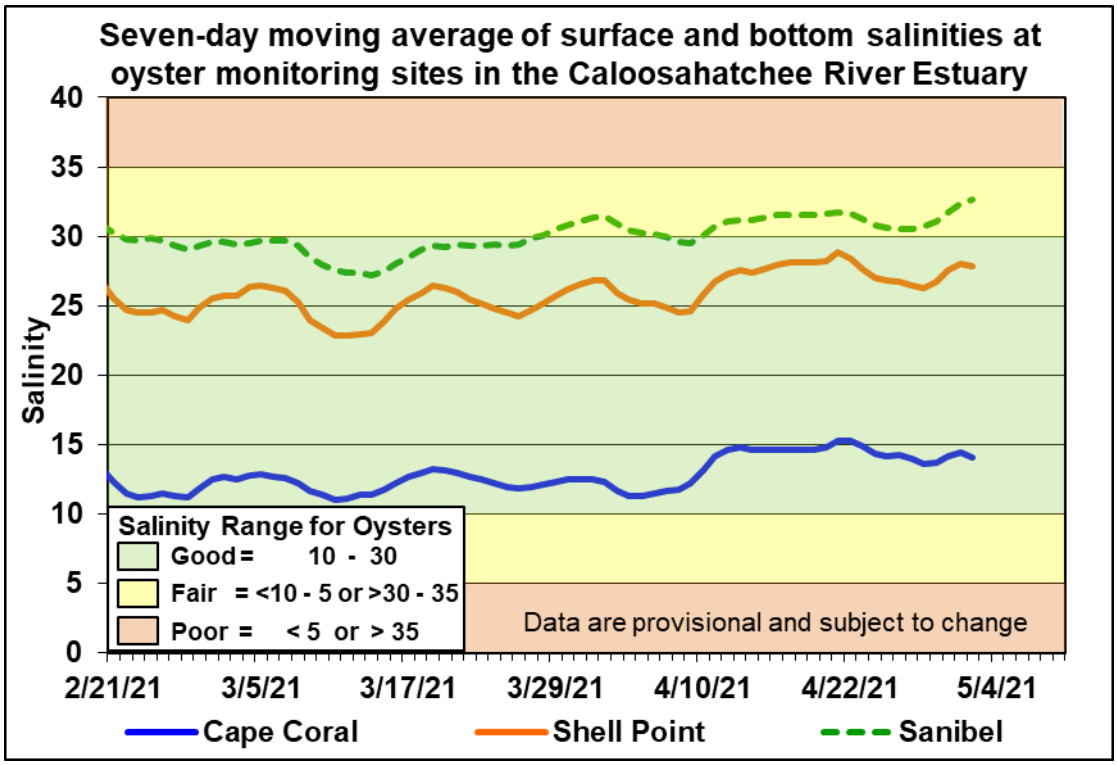


Figure ES-9. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

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	115	2.1	0.7
B	450	115	1.2	0.5
C	1000	115	0.4	0.4
D	1500	115	0.3	0.4
E	2000	115	0.3	0.4

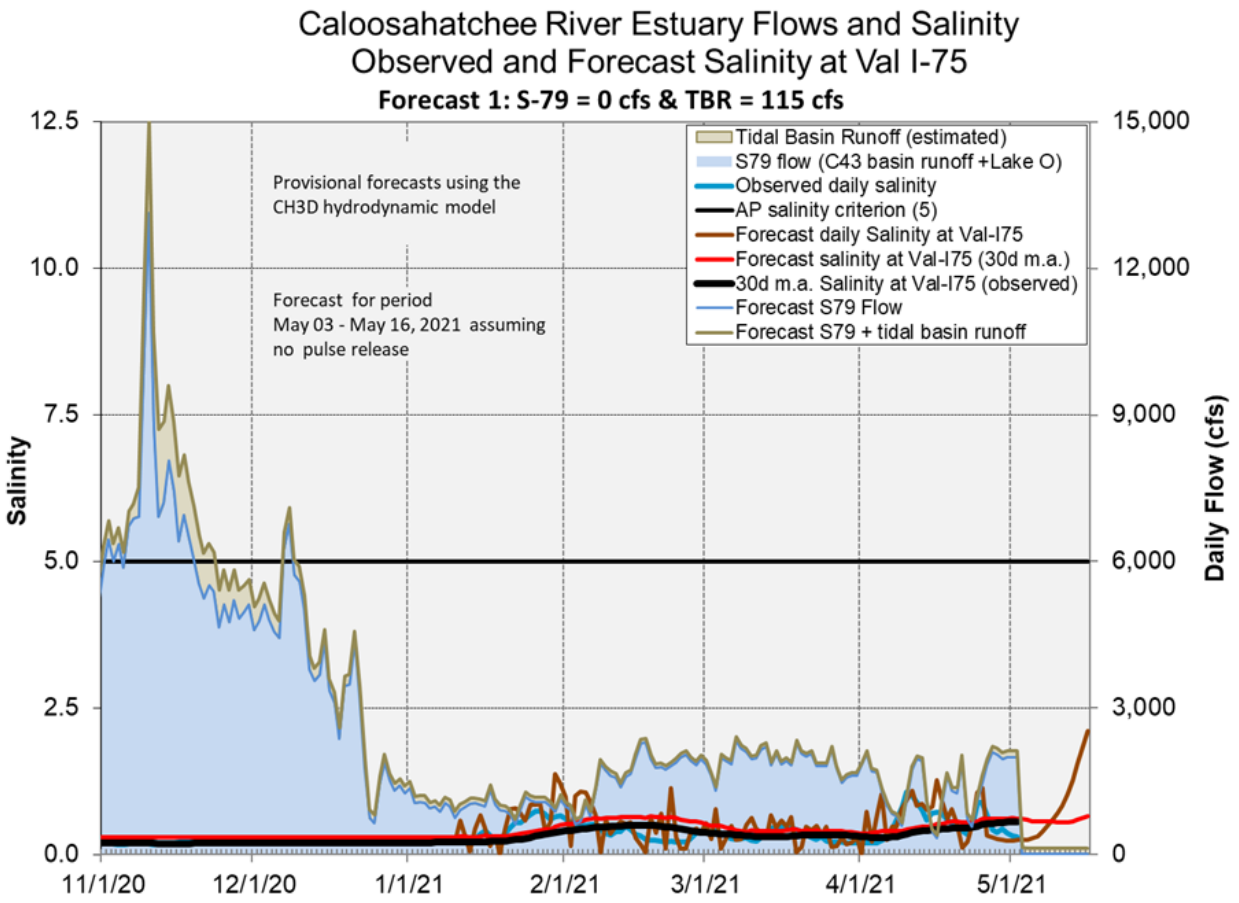


Figure ES-10. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

Red Tide

The Florida Fish and Wildlife Research Institute reported on April 30, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at low to high concentrations inshore of Charlotte County, background to low concentrations in and offshore of Lee County, background to medium concentrations in and offshore of Collier County, and very low to low concentrations offshore of Monroe County. On the east coast, red tide was not observed in samples from Broward County.

Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are normal. The LORS2008 release guidance suggests up to 3,000 cfs release at S-79 to the Caloosahatchee River Estuary and up to 200 cfs release at S-80 to the St. Lucie Estuary.

Stormwater Treatment Areas

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

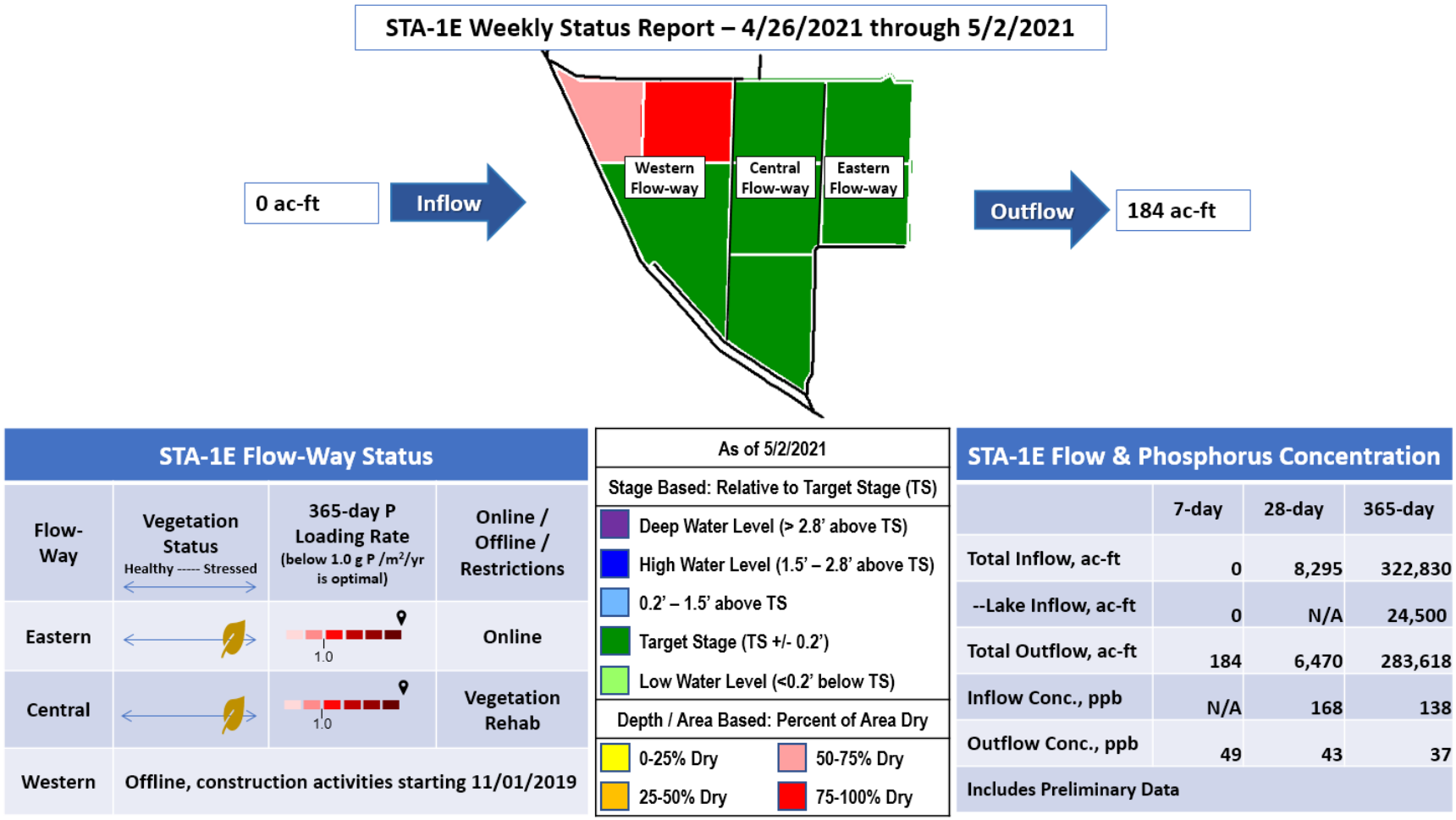
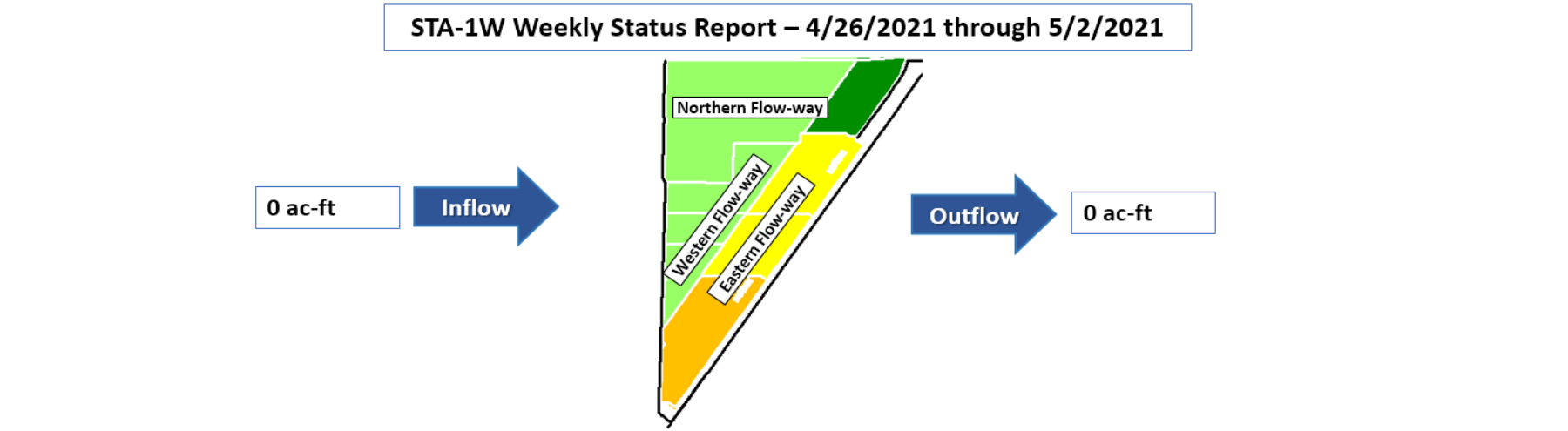


Figure S-1. STA-1E Weekly Status Report



STA-1W Flow-Way Status

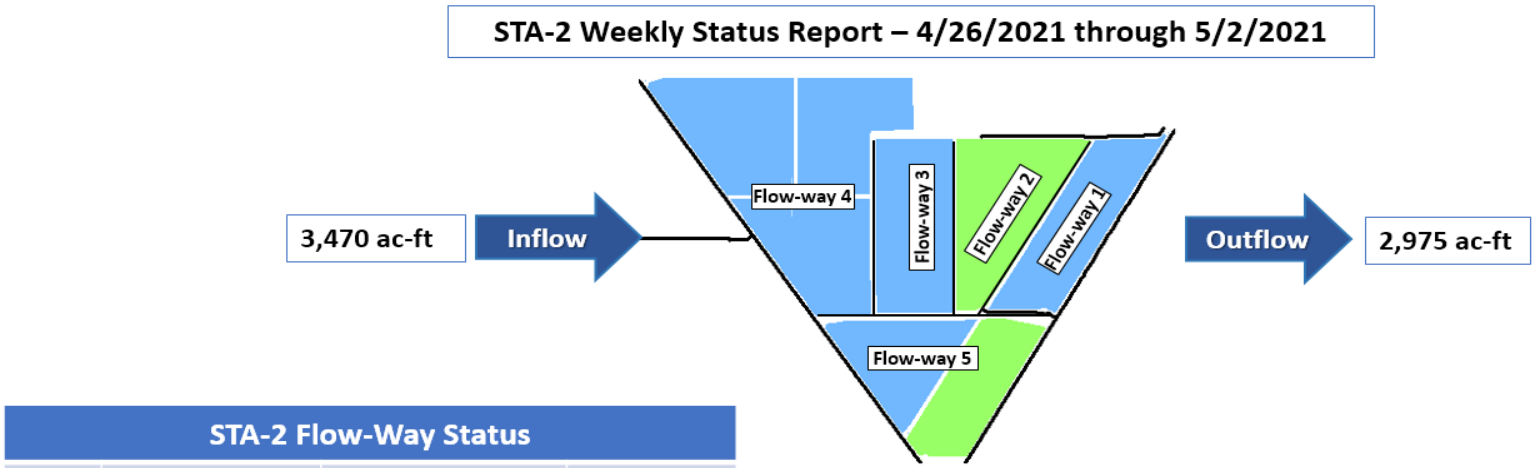
Flow-Way	Vegetation Status (Healthy --- Stressed)	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
Northern		1.0	Construction / Avian Nesting
Western		1.0	Construction / Avian Nesting
Eastern		1.0	Construction

As of 5/2/2021	
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-1W Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	0	5,465	191,732
--Lake Inflow, ac-ft	0	N/A	8,200
Total Outflow, ac-ft	0	0	216,375
Inflow Conc., ppb	N/A	140	254
Outflow Conc., ppb	N/A	N/A	38
Includes Preliminary Data			

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



STA-2 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		1.0	Construction
3		1.0	Vegetation Rehab
4		1.0	Vegetation Rehab
5		1.0	Online

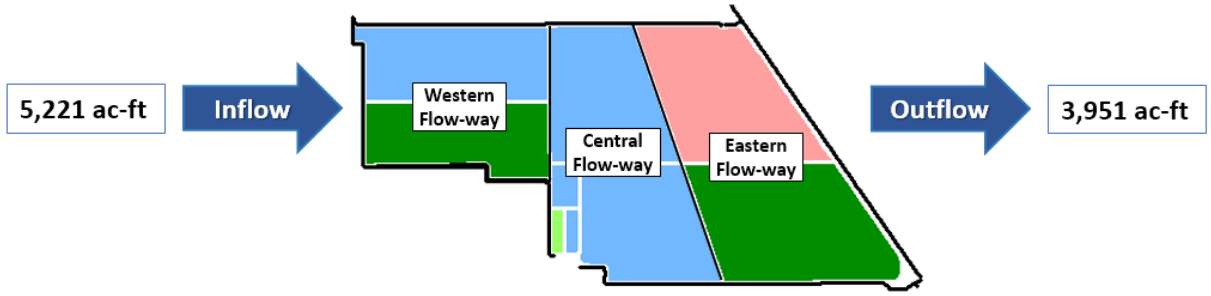
As of 5/2/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-2 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	3,470	28,421	437,640
--Lake Inflow, ac-ft	3,400	N/A	72,800
Total Outflow, ac-ft	2,975	23,619	503,125
Inflow Conc., ppb	85	67	101
Outflow Conc., ppb	18	17	21
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 4/26/2021 through 5/2/2021



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

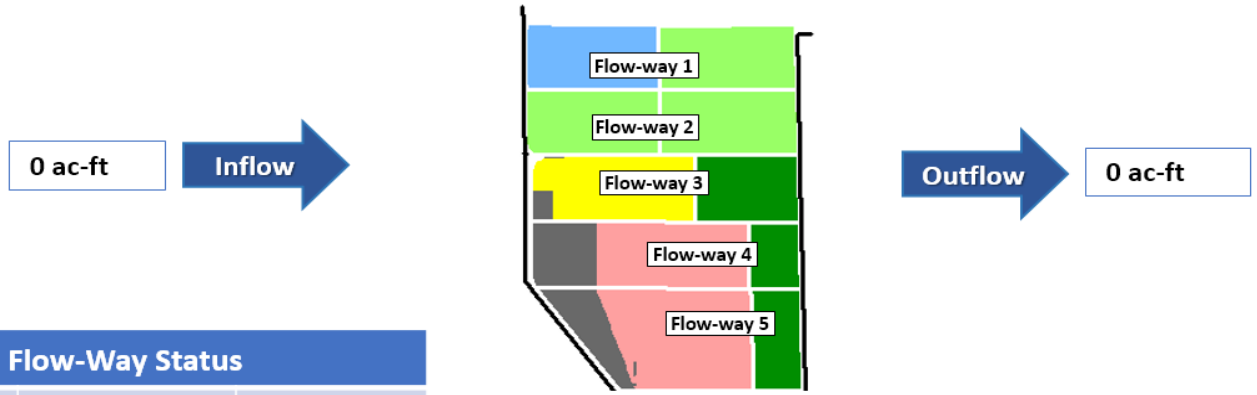
As of 5/2/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-3/4 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	5,221	17,170	560,849
--Lake Inflow, ac-ft	4,700	N/A	42,500
Total Outflow, ac-ft	3,951	8,448	536,519
Inflow Conc., ppb	49	47	57
Outflow Conc., ppb	16	20	12
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 4/26/2021 through 5/2/2021



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

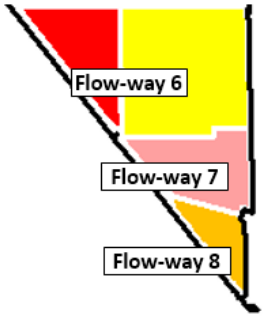
As of 5/2/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-5/6 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	0	8	130,134
--Lake Inflow, ac-ft	N/A	N/A	N/A
Total Outflow, ac-ft	0	67	152,529
Inflow Conc., ppb	N/A	107	281
Outflow Conc., ppb	N/A	68	79
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 4/26/2021 through 5/2/2021



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		1.0	Online
7		1.0	Online
8		1.0	Online

As of 5/2/2021	
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 remained just above and paralleling the schedule last week. On May 2 (Sunday), the stage was above the falling Zone A1 regulation line by 0.10 feet. WCA-2A: Stage at S11B-HW fell near the flat regulation line last week, only 0.05 feet above by May 2. WCA-3A: The Three Gauge Average stages receded, trending just slightly away from the Zone A regulation line last week. On Sunday stage was 0.63 feet below the falling Zone A line. WCA-3A: Stage at gauge 62 (Northwest corner) continues to fall farther below the regulation schedule. The average on Sunday was 1.22 feet below the Upper Schedule. (See **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 that sub-basin has water depths significantly below ground. North to South hydrologic connectivity remains established within Taylor Slough and well maintained in Shark River Slough in Everglades National Park (ENP) as conditions dry down to the west and east (**Figure EV-5**). Over the last month stages fell significantly across northern WCA-3A and along the L-67 levees. Looking back one year, conditions are significantly wetter across the Everglades system south of Alligator Alley, most dramatically in eastern ENP (**Figure EV-6**).

Tree Islands

Three (0.08%) of the 371 tree Islands of known elevation within WCA-3A, WCA-3B, and ENP Shark Slough are currently inundated (down from % the week prior), and all of those islands have been inundated for more than 120 days. Inundation for more than 120 days will cause ecological harm to sensitive islands. The maximum number of days the remaining tree islands have been inundated is 327 days.

Wading Birds

Large numbers of birds continue to forage throughout the Greater Everglades, especially in the drying margins of Lostmans Slough, northern WCA-2A, Western Shark River Slough near the Loop Trail, and WCA-1. There are few feeding birds in WCA-3A South and numbers have declined considerably in WCA-3A North as the open areas in the north are now too dry for foraging. Wood Stork, White Ibis and Great Egret nests continue to increase in both the water conservation areas and ENP for a grand total of about 52,000 nests for these three species, which would amount to the third highest nesting effort in the Everglades protection area in recent decades.

Taylor Slough and Florida Bay

About 0.75 inches of patchy rain fell over Taylor Slough and Florida Bay for the week ending Sunday (5/2). The Slough averaged a decrease of 0.15 feet over the week with the northern part of the slough drying out again after decreasing 0.44 feet over the week (**Figure EV-7**). Central and southwestern Taylor Slough experienced increases over the last week (**Figure EV-8**) that are likely related to the relatively high rainfall that fell over the central Taylor Slough area (2 inches for the week ending Sunday, May 2). Depths continue to be about 7 inches higher than the historical average for this time of year.

Salinities in Florida Bay increased by an average of 1 over the week ending May 2, and are maintaining a lower than average condition for this time of year (**Figure EV-9**). Bay-wide salinity is still 4 lower than the historical average for this time of year while the eastern Bay is 5 lower. The central and western Bay areas are within the range of standard seawater (34 through 36) and the shallow western nearshore (GB) is the only hypersaline station. The Bay is positioned very well to minimize hypersalinity before the rainy season begins.

The Taylor River (TR) station in the mangrove zone (tracked for the Florida Bay Minimum Flows and Levels) decreased to 5 by Sunday, May 2 (**Figure EV-10**). The 30-day moving average increased 0.9 from the previous week to end the week at 8.6. Weekly flow from the 5 creeks monitored for the Florida Bay MFL totaled about +2,400 acre-feet with the positive flows from the beginning of the week outweighing the negative flows at the end 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) ended at 427,908 acre-feet on Sunday, which is a 2,000 acre-feet increase from the previous week. 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 any reversal (between 0.05 and 0.07 feet per week) in WCA-1 or WCA-2A has ecological benefit, with a priority on conserving conditions in WCA-1. Flows into northeastern WCA-3A have a great ecological benefit at this time of dry season. Maintaining a moderate recession in WCA-2B may prove important to wading birds over the next few weeks as they began 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	0.16	−0.16
WCA-2A	0.01	−0.08
WCA-2B	0.03	−0.20
WCA-3B	0.04	−0.16
ENP	0.24	−0.12

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

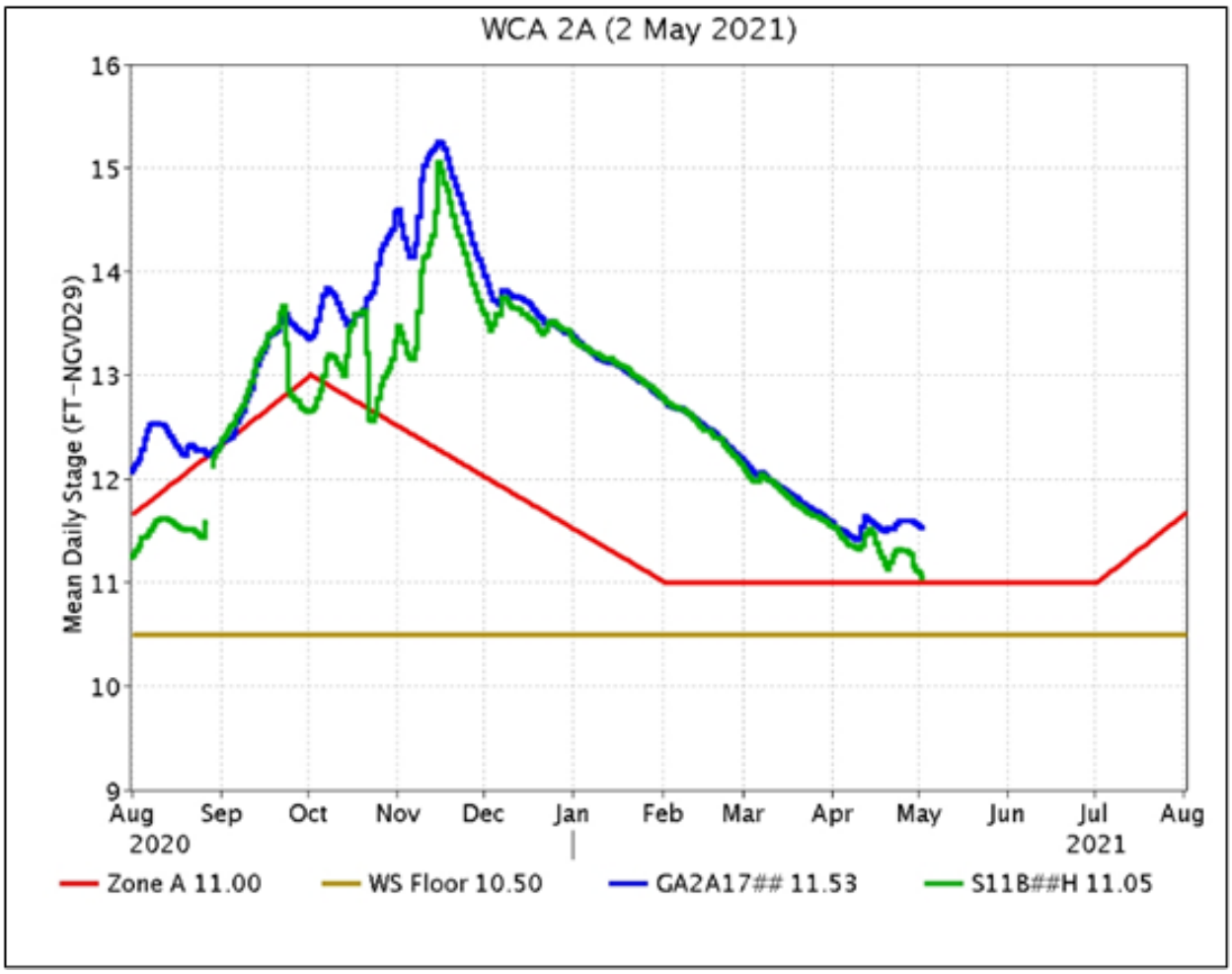


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

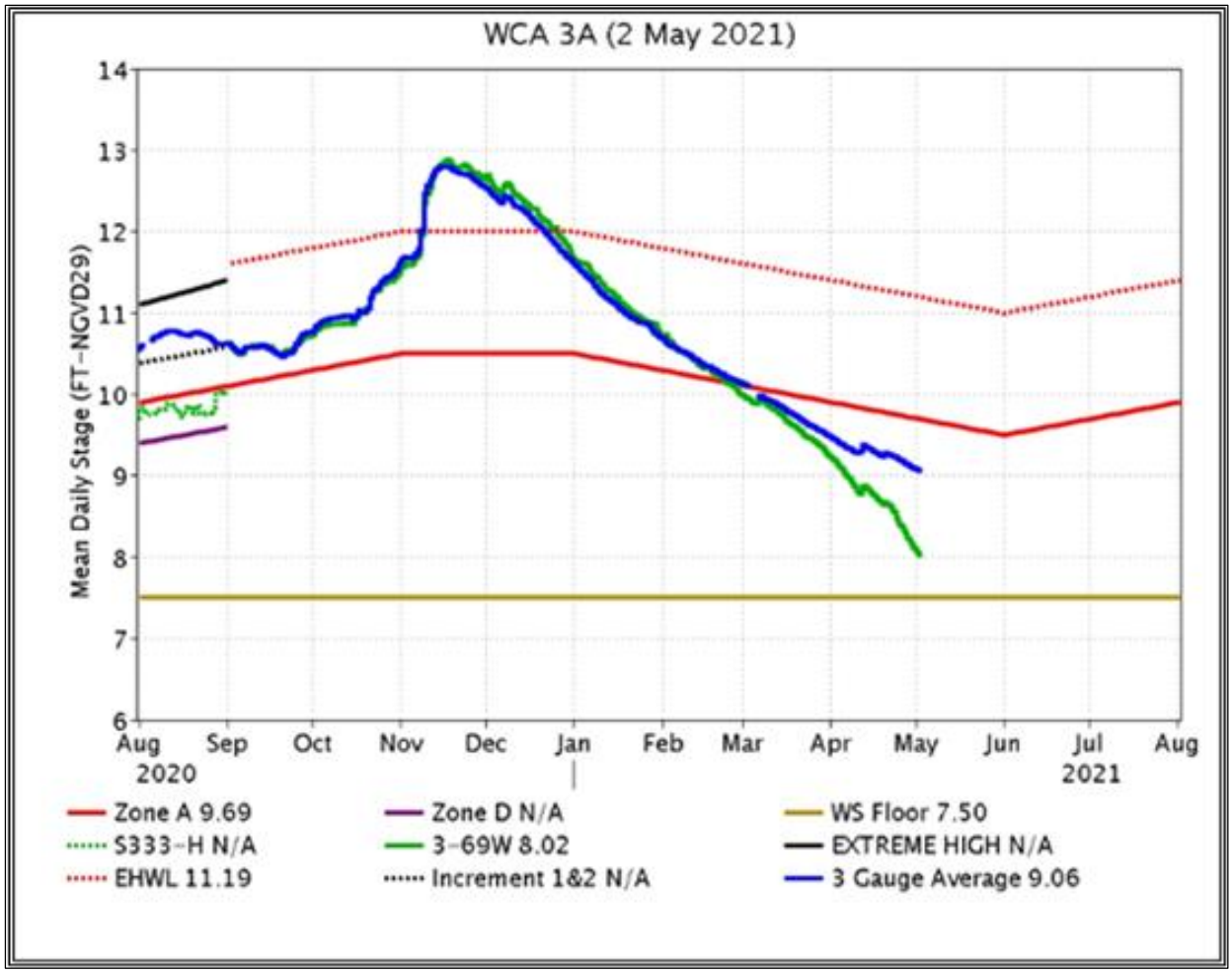


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

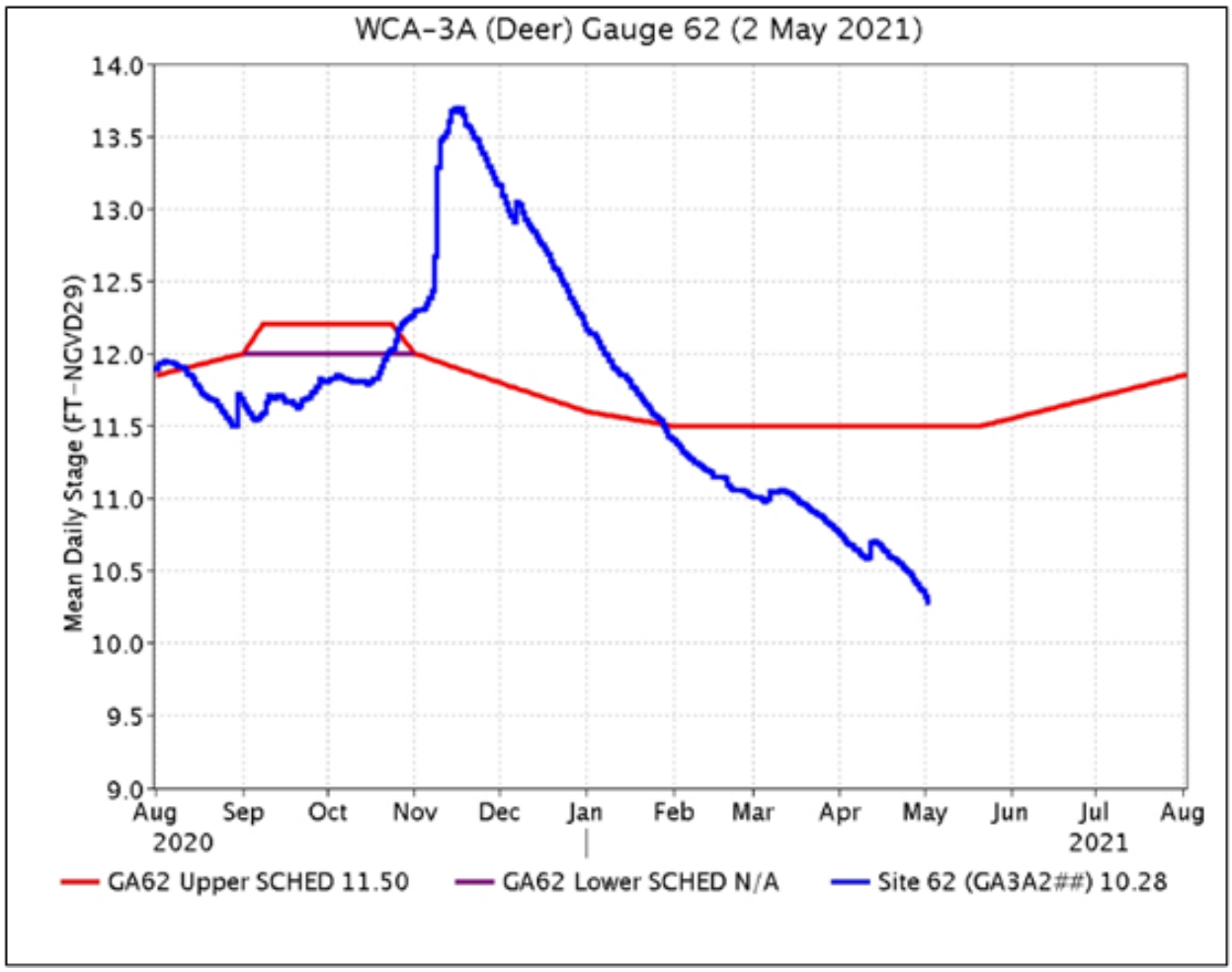


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

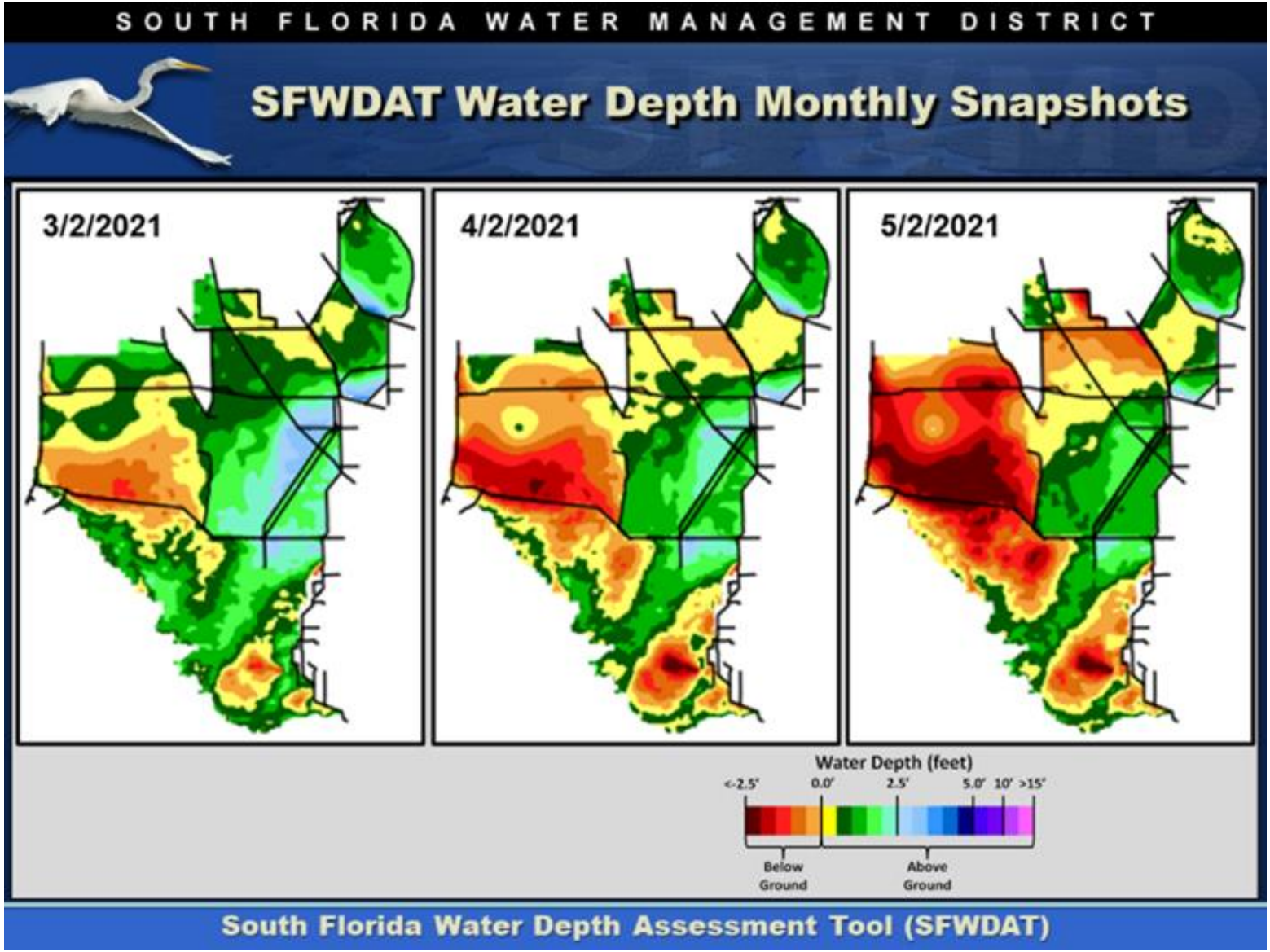


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

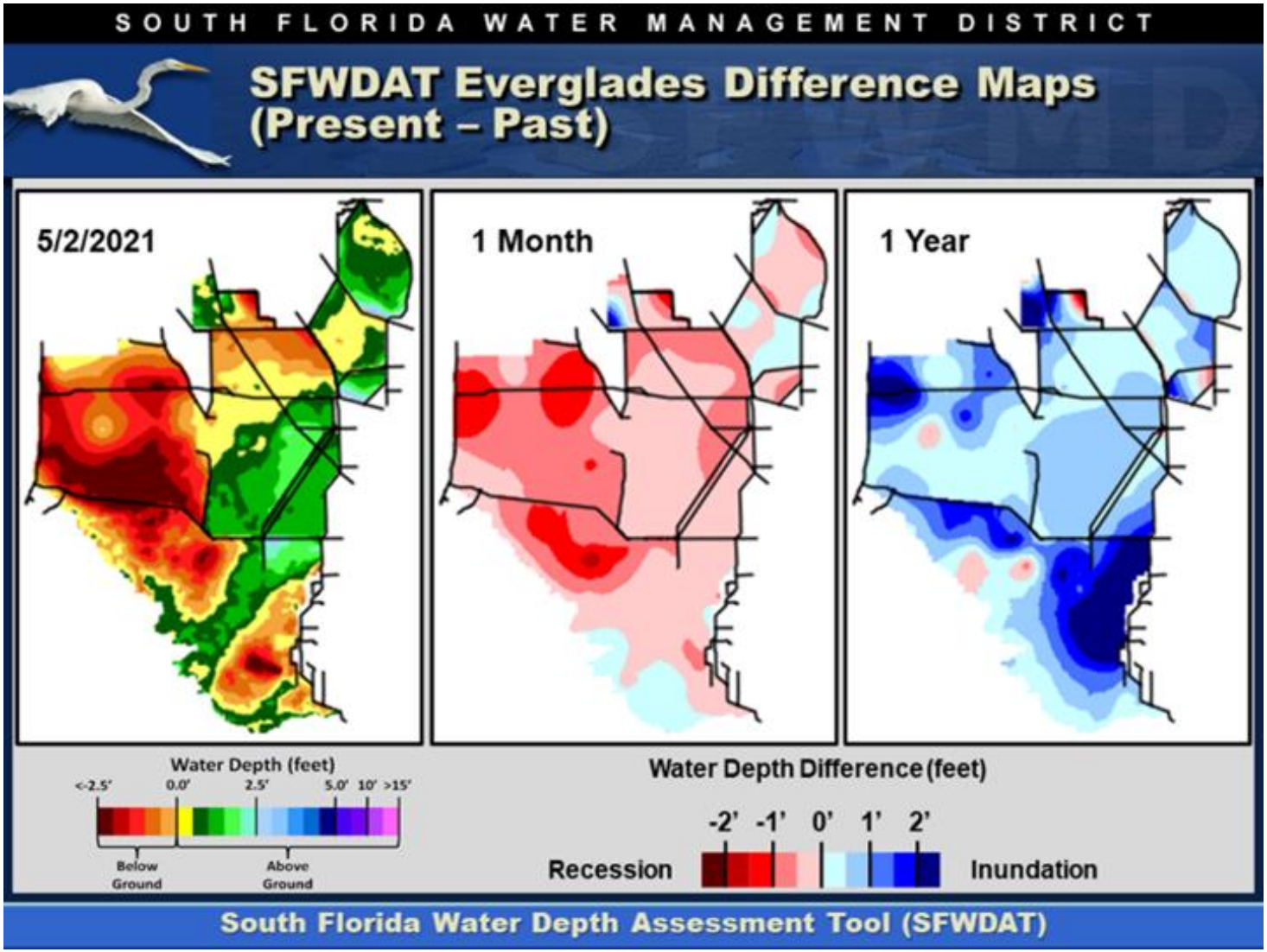


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

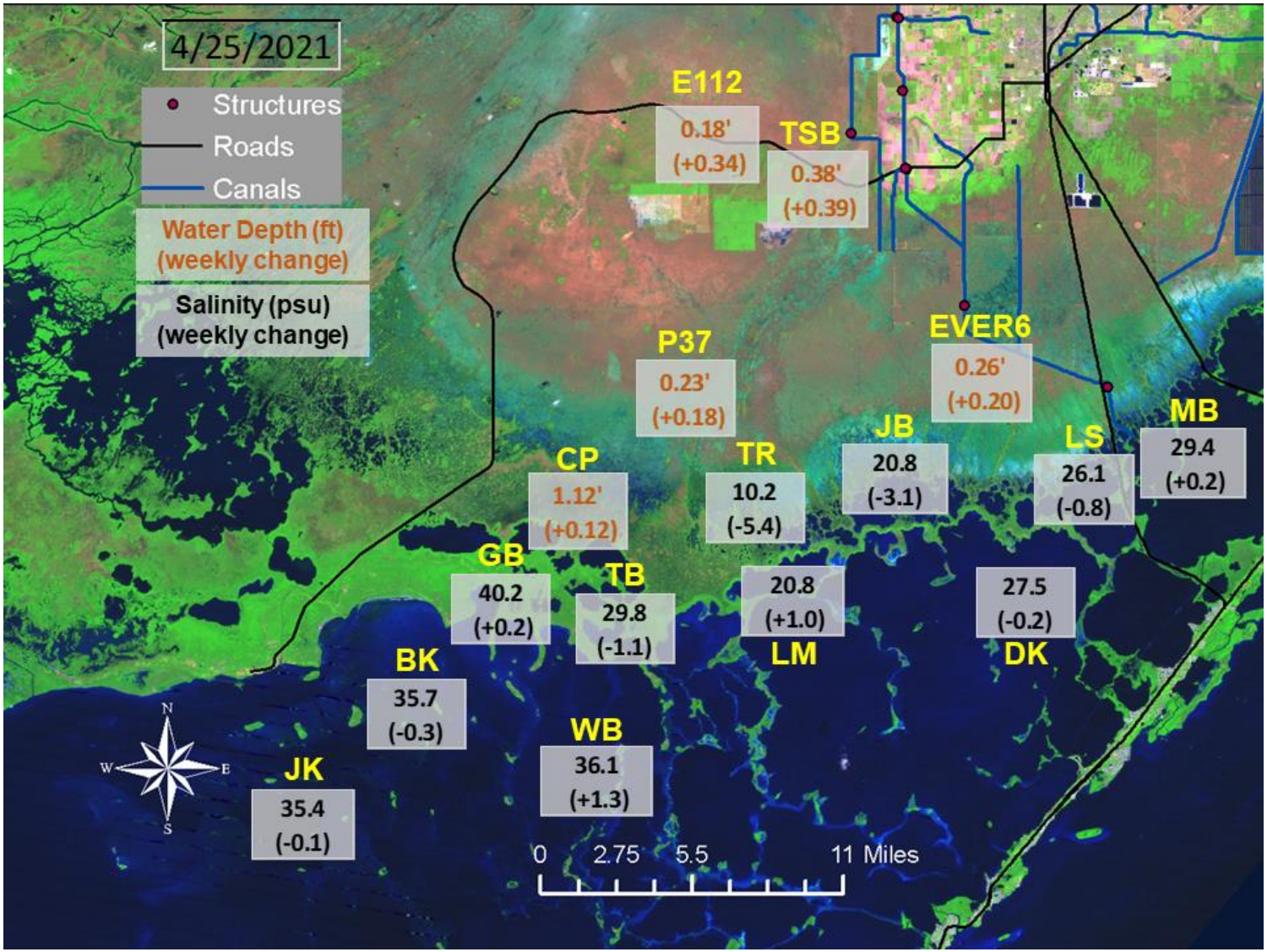


Figure EV-7. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

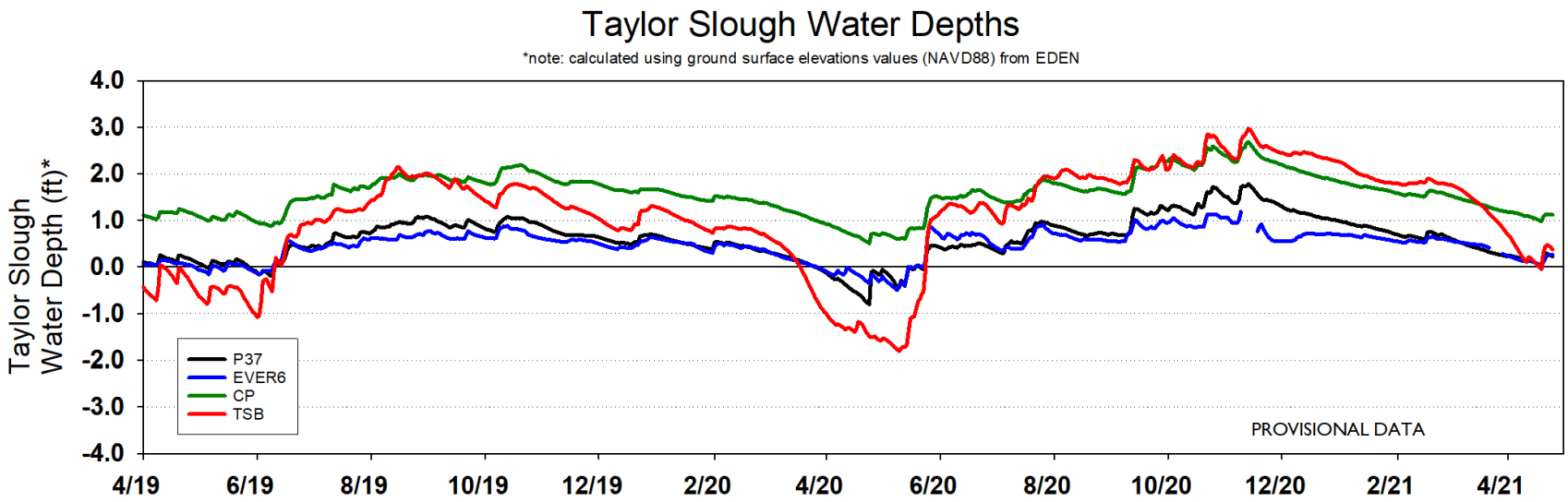


Figure EV-8. Taylor Slough water depth time series.

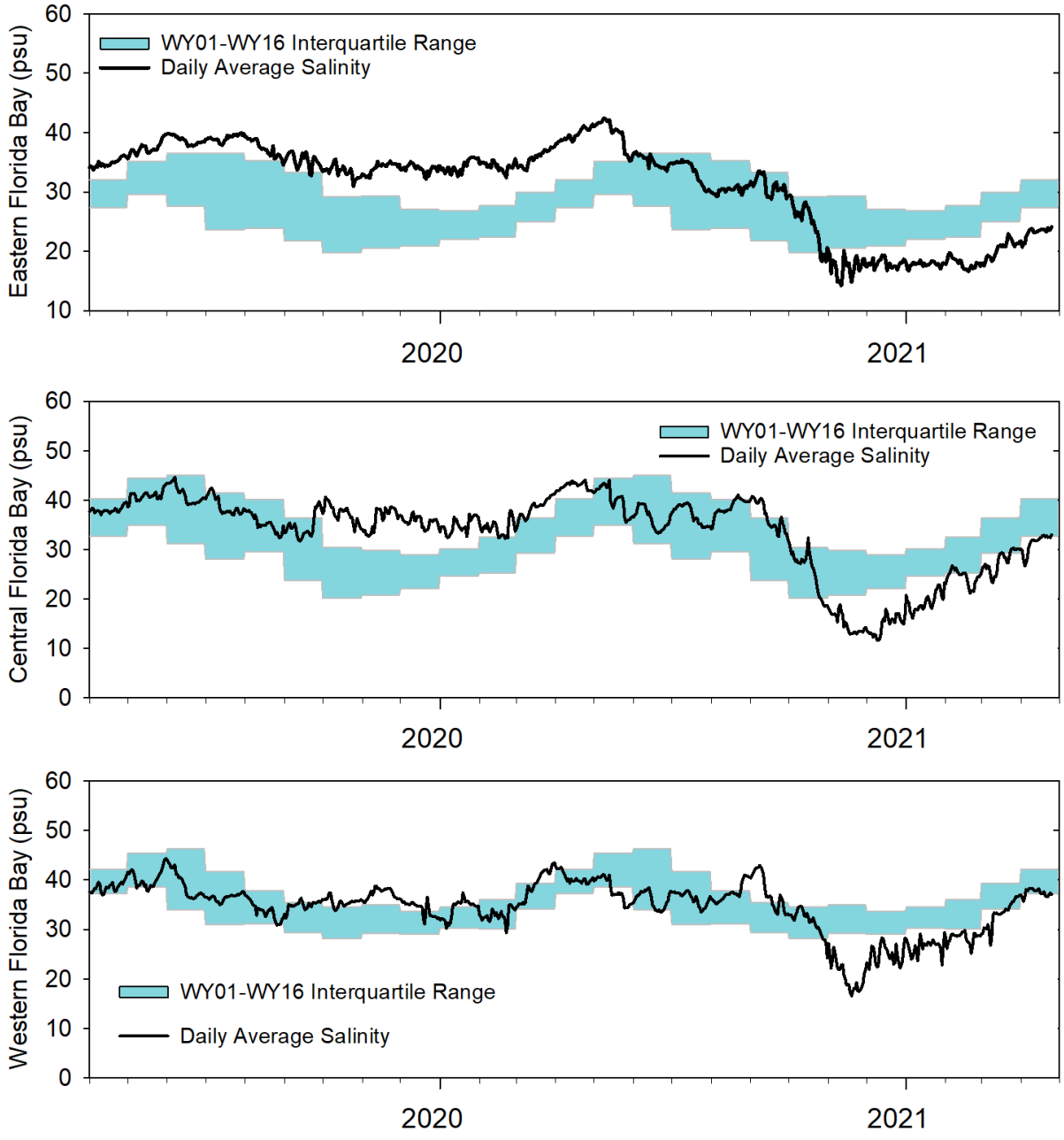


Figure EV-9. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

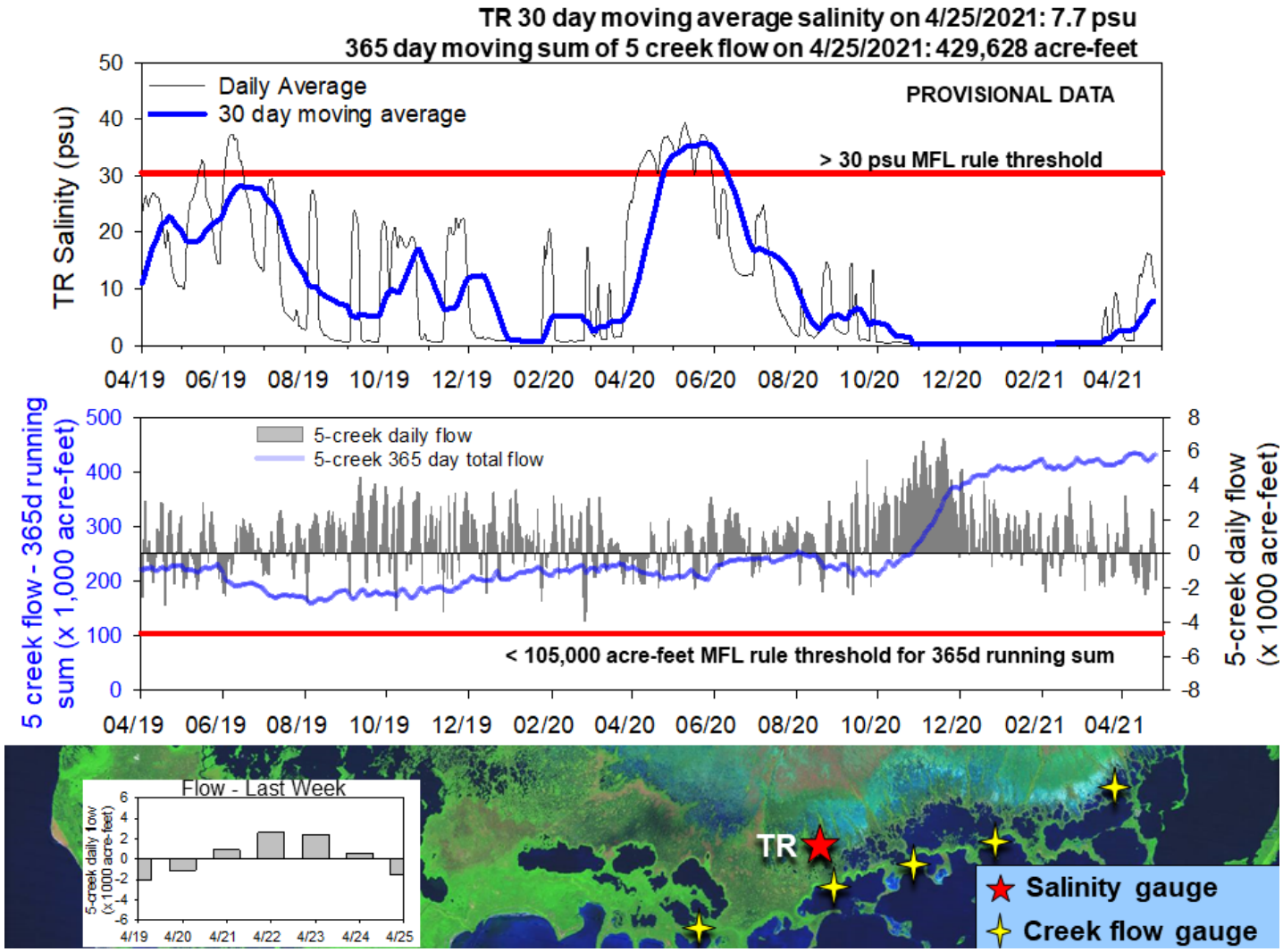


Figure EV-10. Top panel: Taylor River 30-day moving average salinity (blue), daily average salinity (gray) with salinity threshold; middle panel: Five-creek total flow for past 365 days (blue), daily flow (gray) with 365-day flow threshold; bottom panel: map of monitoring locations for the five creeks.

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

SFWMD Everglades Ecological Recommendations, May 4th, 2021 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.16'	Maintain marsh stage slightly above and parallel to the regulation schedule.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage increased by 0.08'	Maintain marsh stage above and parallel to the regulation schedule.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage decreased by 0.20'	Moderate the recession rate to near .05 to .07 feet per week.	Protect (expected) within basin wildlife and downstream habitat and wildlife from flooding stress.
WCA-3A NE	Stage decreased by 0.19'	Moderate the recession rate to near .05 to .07 feet per week.	Protect within basin and downstream habitat and wildlife. Optimal recession rates preserve peat soils and extends the time that foraging is optimal on the landscape.
WCA-3A NW	Stage decreased by 0.22'	Moderate the recession rate to near .05 to .07 feet per week.	
Central WCA-3A S	Stage decreased by 0.13'	Maintain the recession rate at near .10 feet per week.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage decreased by 0.11'		
WCA-3B	Stage decreased by 0.12'	Moderate the recession rate to near .05 to .07 feet per week.	Protect within basin and downstream habitat and wildlife from flooding stress. Tree island ecology is diminished by flooding
ENP-SRS	Stage decreased by 0.15'	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 −0.43’ to +0.10’	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −0.4 to +2.0 psu	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.