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: February 10, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

The front and moisture, which had been across the District, lifted back north of the area with only light shower activity mainly north and east expected through Wednesday. An increase in moisture is forecast to result in a moderate increase in shower activity mainly over the interior and west Thursday and then north and east Friday. Beyond that, the front is forecast to move back southward over northcentral Florida and then over the District bringing the potential for moderate rainfall days Saturday through next Tuesday. Total rainfall is forecast to be above the historical average during the first 7-day period (Week 1) and then near the historical average during the second 7-day period (Week 2).

Kissimmee

Tuesday morning stages were 57.7 feet NGVD (0.3 feet below schedule) in East Lake Toho, 54.7 feet NGVD (0.3 feet below schedule) in Toho, and 51.7 feet NGVD (0.4 feet below schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.5 feet NGVD at S-65A and 25.9 feet NGVD at S-65D. Tuesday morning discharges were 900 cubic feet per second (cfs) at S-65, 890 cfs at S-65A, 910 cfs at S-65D, and 900 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 8.9 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 0.39 feet. Today's recommendation is to continue following the USACE request to keep S-65A discharge below 800-900 cfs to facilitate construction in the Lower Kissimmee Basin. Requests from USFWS and FWC for snail kite recessions and habitat are as follows: Priority 1: reduce stage to 54.5 feet NGVD on West Toho on or about February 11; Priority 2: target 51 feet NGVD on Kissimmee on or about March 18; Priority 3: target recession rate of ~0.14 ft/week on East Toho as other priorities allow.

Lake Okeechobee

Lake Okeechobee stage was 15.39 feet NGVD on February 7, 2021, 0.08 feet lower than last week and 0.34 feet lower than a month ago. The Lake is currently in the Low Sub-band. Stage has been above or near the top of the preferred ecological envelope since August 1, 2020 and is currently 0.26 feet above. Nearly 2,550 wading birds were recorded using the lake on February 4, 2021 compared to approximately 300 wading birds recorded at this time last year when lake stage was almost 2.5 feet lower and most of the marsh was dry. Recent satellite imagery and water quality results suggest there is little to no algal bloom activity on the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged more than 423 cfs over the past week with no flow coming from Lake Okeechobee. The seven-day average surface salinities increased throughout the estuary over the past week. Salinity at the US1 Bridge is in the good range (10-26) for adult eastern oysters. Total inflow to the Caloosahatchee Estuary averaged 1,002 cfs over the past week with approximately 365 cfs coming from the Lake. Seven-day average salinities decreased at S-79 and Val I-75 but increased at the remaining sites in the estuary over the past week. Salinities are in the good range (0-10) for tape grass at Val I-75 and Ft. Myers. Salinities are in the good range (10-30) for adult eastern oysters at Cape Coral and Shell Point but in the fair range at Sanibel. Lake stage is in the Low Sub-Band of 2008 LORS. Tributary hydrological conditions are normal. The LORS2008 Release Guidance suggests up to 450 cfs release at S-79 to the Caloosahatchee Estuary and up to 200 cfs release at S-80 to the St. Lucie Estuary.

Stormwater Treatment Areas

Over the past week, 200 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 98,400 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 1,537,000 ac-feet. Most STA cells are near target stage. STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7, and STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to discharge canal plug construction activities, in STA-1E Central Flow-way, STA-2 Flow-ways 3, 4 and 5, STA-3/4 Eastern, Central, and Western Flow-ways for vegetation management activities, in STA-3/4 Eastern Flow-way for drawdown preparation activities, and in STA-5/6 Flow-ways 2 and 3 following the Restoration Strategies project to grade non-effective treatment areas. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2.

Everglades

At all the gauges monitored for this report, the WCA weekly stage changes fell within the good or fair early dry season Water Year 21 ecological recession recommendations. Those recommendations are likely to change next week as depths fall below 2.5 feet in southern WCA-3A. Wading birds continue to forage along the southern coast, but their numbers there are dwindling. Larger flocks of wading birds are now foraging within the center of WCA-3A North as more birds move into optimal foraging habitat along the drying fronts. The number of nesting wading birds is increasing across the Everglades. Depths remain above average in Taylor Slough, and salinities in Florida Bay remain below the historical average for this time of year, continuing good positioning for early 2021.

Supporting Information

KISSIMMEE BASIN

Rainfall

The Upper Kissimmee Basin received 1.15 inches of rainfall in the past week, and the Lower Basin received 0.65 inches (SFWMD Daily Rainfall Report 02/08/2021).

Upper Kissimmee

Table 1 lists stage and discharge for several Kissimmee Chain of Lakes (KCL) water bodies using data from lake outfall structures. KCL stage hydrographs with respective regulation schedules and rainfall are shown in Figures 1-3.

Table 1. Average discharge for the preceding seven days, stage (feet NGVD), and departures from KCL flood regulation (R) or temporary schedules (T, A, or S); provisional, real-time data are from SFWMD.

Report Date: 2/9/2021

Water Body	Structure	7-day Average Discharge (cfs)[1]	Stage Monitoring Site[2]	Lake Stage (feet)	Schedule Type[3]	Schedule Stage (feet)	Daily Departure (feet)						
							2/7/21	1/31/21	1/24/21	1/17/21	1/10/21	1/3/21	12/27/20
Lakes Hart and Mary Jane	S-62	21	LKMJ	61.0	R	61.0	**0.0**	0.0	0.0	0.0	0.0	0.0	-0.1
Lakes Myrtle, Preston, and Joel	S-57	12	S-57	61.4	R	61.3	**0.1**	0.0	0.1	0.0	-0.1	0.0	0.0
Alligator Chain	S-60	6	ALLI	64.1	R	64.0	**0.1**	-0.1	-0.1	0.0	0.0	0.0	0.0
Lake Gentry	S-63	29	LKGT	61.6	R	61.5	**0.1**	0.0	0.0	0.0	0.0	0.1	0.0
East Lake Toho	S-59	119	TOHOE	57.7	R	58.0	**-0.3**	-0.3	-0.1	0.0	0.0	0.0	-0.1
Lake Toho	S-61	481	TOHOW, S-61	54.6	R	55.0	**-0.4**	-0.3	-0.1	0.0	0.0	-0.1	0.0
Lakes Kissimmee, Cypress, and Hatchineha	S-65	894	KUB011, LKIS5B	51.6	R	52.2	**-0.6**	-0.8	-0.6	-0.5	-0.3	-0.2	-0.1

[1] Seven-day average of weighted daily means through midnight.
[2] Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.
[3] A = projected ascension line, R = USACE regulation schedule, S = temporary recession target line, T = temporary schedule, N/A= not applicable or data not available.
DATA ARE PROVISIONAL

Lower Kissimmee

Discharges at lower basin structures are shown in Table 2. Figure 4 compares floodplain inundation depths from one year and one month ago with current inundation depths in the Phase I restored area of the Kissimmee River. Figure 5 shows dissolved oxygen concentration along with S-65A discharge, water temperature, and rainfall. Figure 6 is the current guide for operation of S-65 and S-65A, called the “Preferred Discharge Plan IS-14-50.0”. This is developed collaboratively each year between ecologists and SFWMD water managers based on prevailing ecological and hydrologic conditions. A preferred discharge plan and the interim regulation schedule (Figure 7) will be used until the Headwaters Lakes Revitalization regulation schedule is implemented. Figure 8 is a map of the Kissimmee Basin showing Central and Southern Florida (C&SF) flood control project structures and color-coded watersheds.

Table 2. One- and seven-day average discharge at lower basin structures, dissolved oxygen concentration in phases I and II/III area river channel, and depth in the Phase I area floodplain using provisional, real-time data from SFWMD.

Report Date: **2/9/2021**

Metric	Location	1-Day Average	Average for the Preceeding 7-Days[1]								
		2/7/2021	2/7/21	1/31/21	1/24/21	1/17/21	1/10/21	1/3/21	12/27/20	12/20/20	12/13/20
Discharge (cfs)	S-65	826	**894**	894	869	644	540	676	729	848	1,382
Discharge (cfs)	S-65A[2]	879	**882**	892	856	641	600	733	809	974	1,566
Discharge (cfs)	S-65D[2]	957	**934**	914	838	701	770	944	1,317	1,704	1,605
Headwater Stage (feet NGVD)	S-65D[2]	25.80	**25.79**	25.83	25.79	25.87	25.85	25.80	25.73	26.08	26.40
Discharge (cfs)	S-65E[2]	945	**940**	873	849	719	808	944	1,314	1,710	1,687
Discharge (cfs)	S-67	0	**0**	0	0	0	0	0	0	0	0
DO (mg/L)[3]	Phases I & II/III river channel	9.1	**8.9**	8.1	8.8	8.3	8.4	8.4	7.5	6.4	7.2
Mean depth (feet)[4]	Phase I floodplain	0.39	**0.38**	0.38	0.36	0.33	0.40	0.50	0.68	1.00	1.01

[1]Seven-day average of weighted daily means through Sunday midnight.
[2]S-65A discharge combines S-65A with auxillary strucutures; S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2; S-65D stage averages stage at S-65D and S-65DX1; S-65E discharge combines S-65E and S-65EX1.
[3]DO is the average for sondes at KRBN, PC62, PC33, PD62R, and PD42R.
[4]1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).
DATA ARE PROVISIONAL; N/A indicates that data were not available.

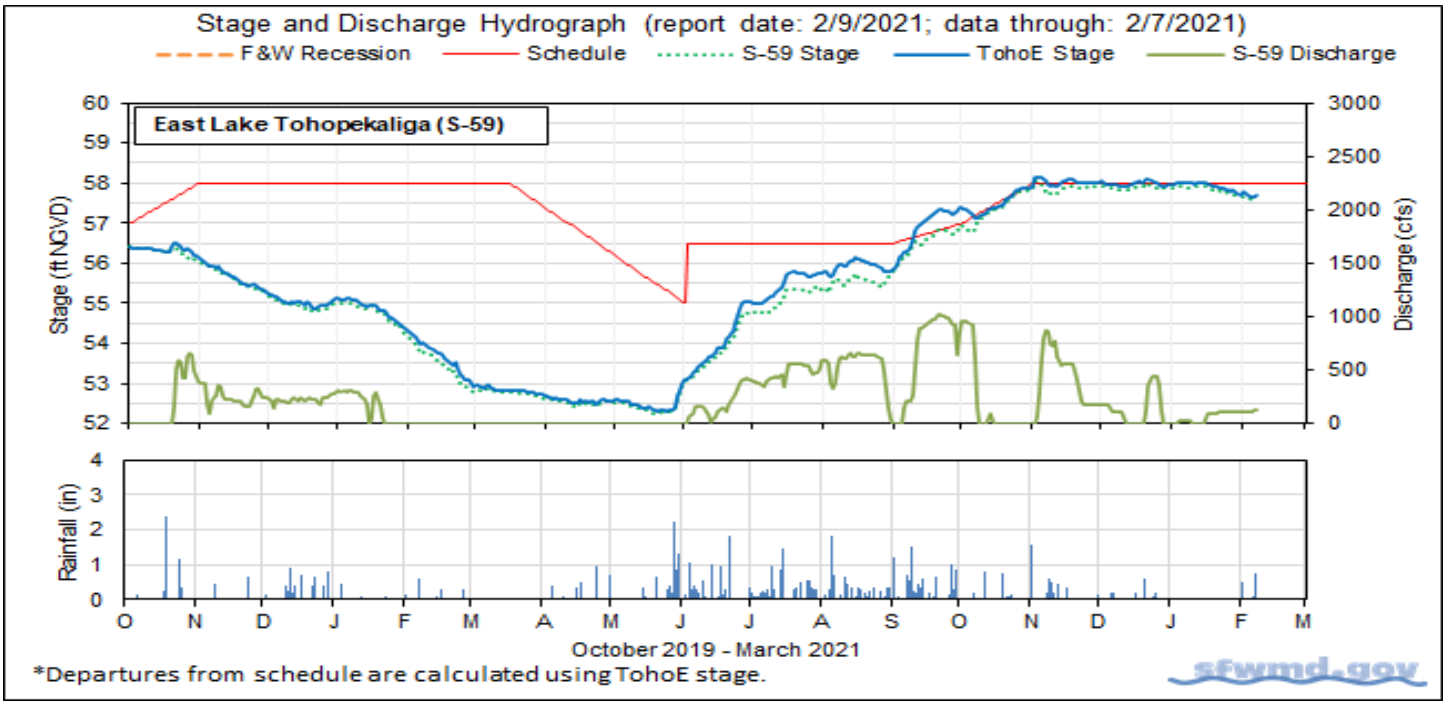


Figure 1. East Lake Toho regulation schedule, stage, discharge and rainfall.

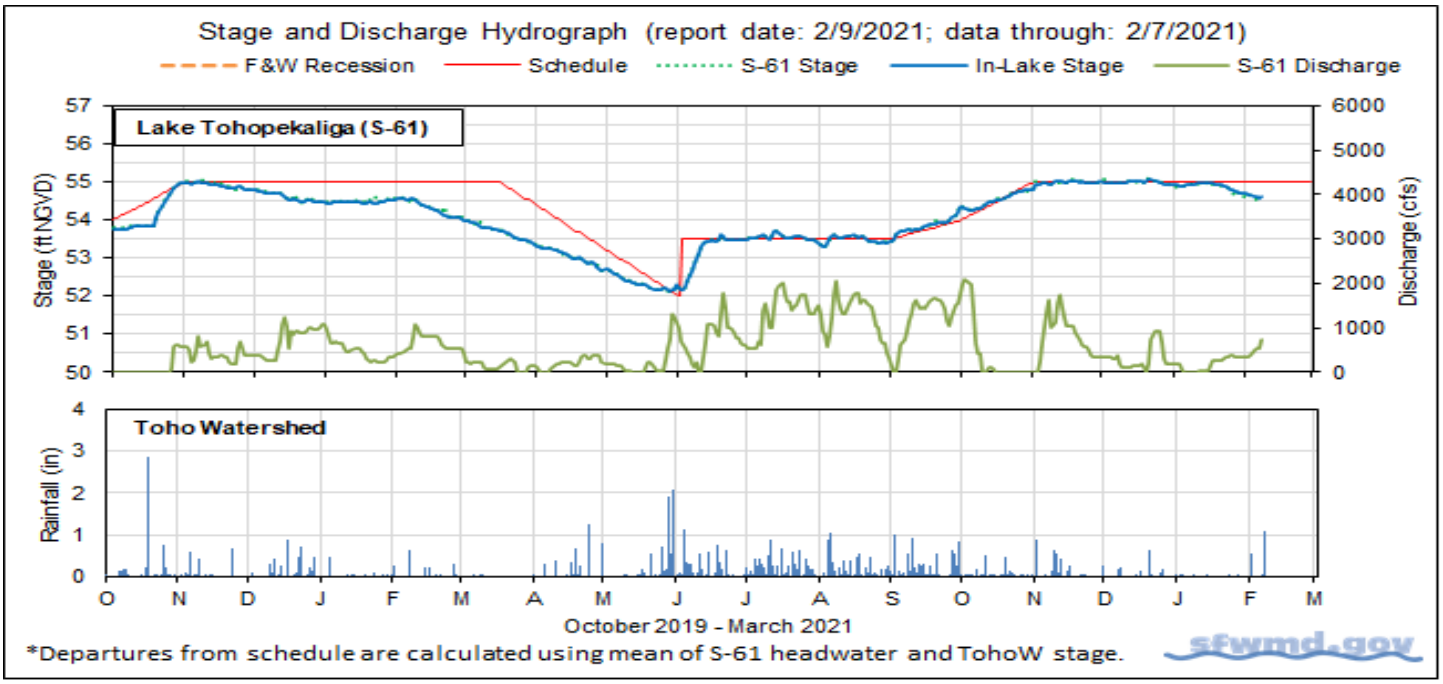


Figure 2. Lake Toho regulation schedule, stage, discharge and rainfall.

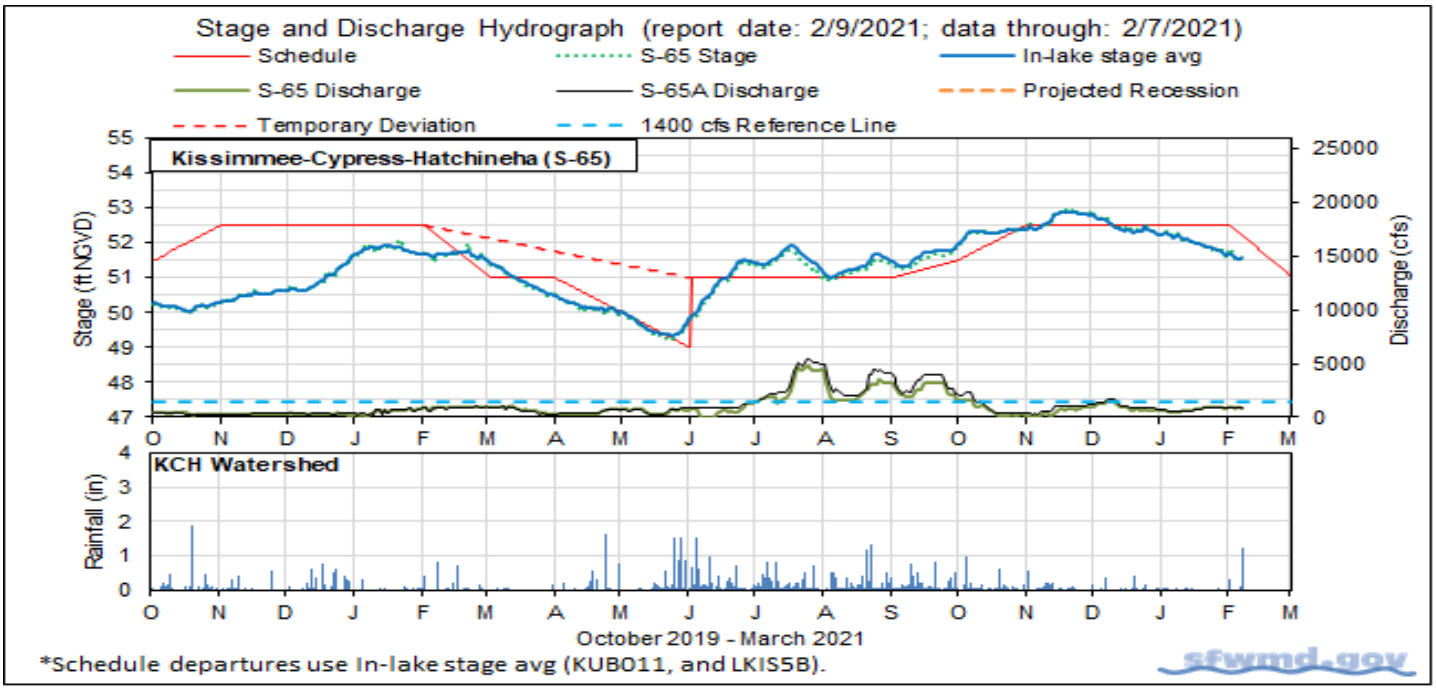


Figure 3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

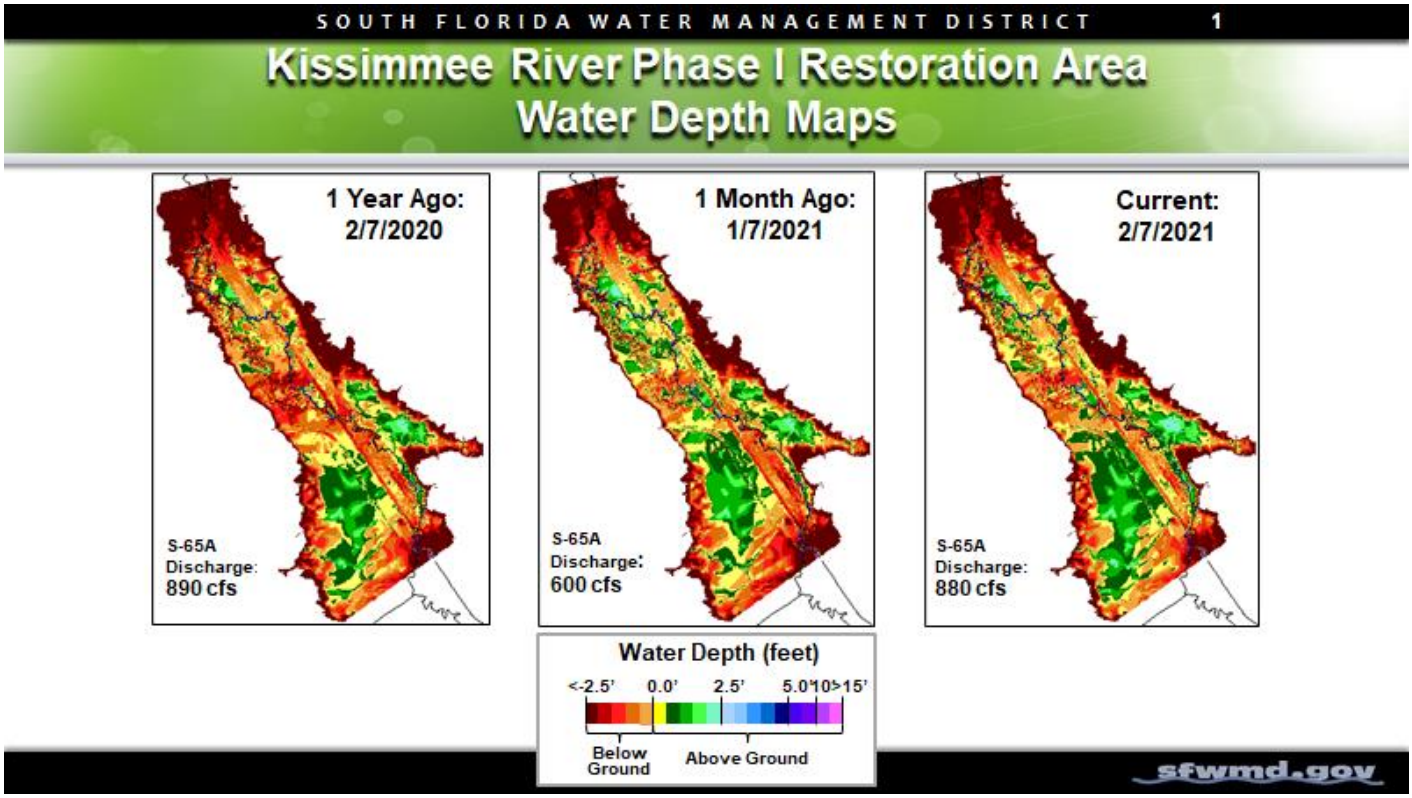


Figure 4. Phase I area floodplain water depths (from left to right) one year ago, one month ago and current. Color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

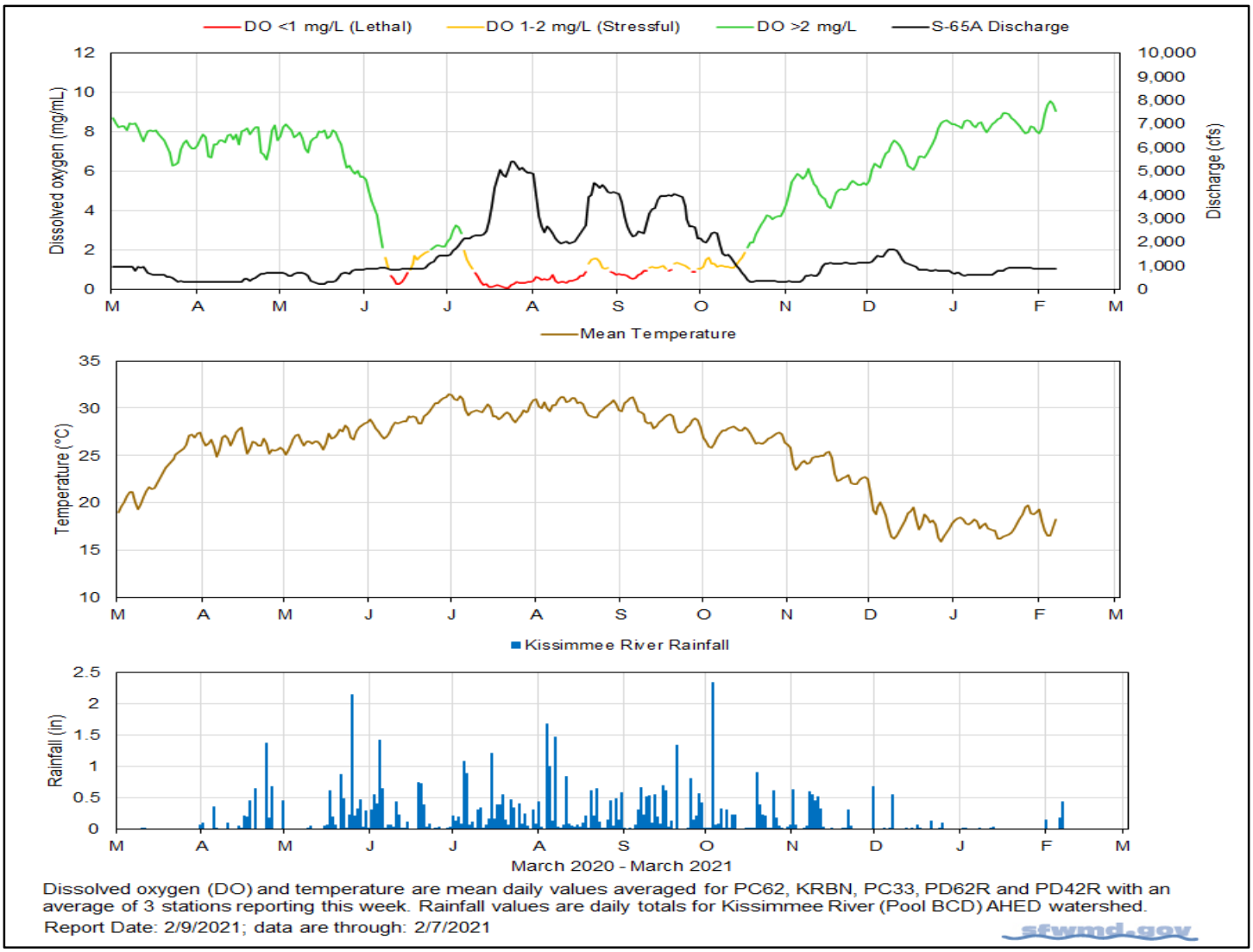


Figure 5. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches)

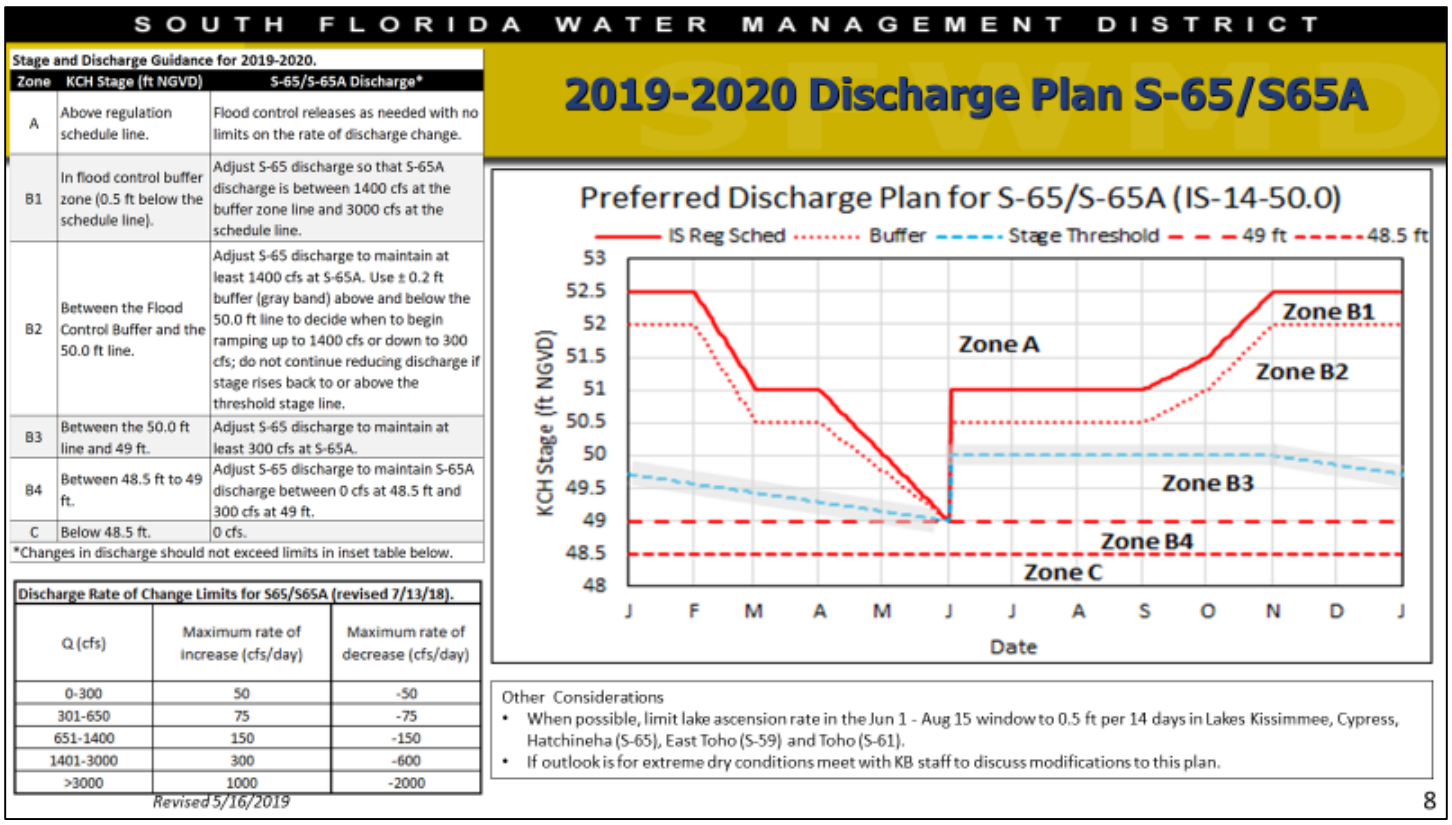


Figure 6. The 2019-2020 Discharge Plan for S-65/S-65A.

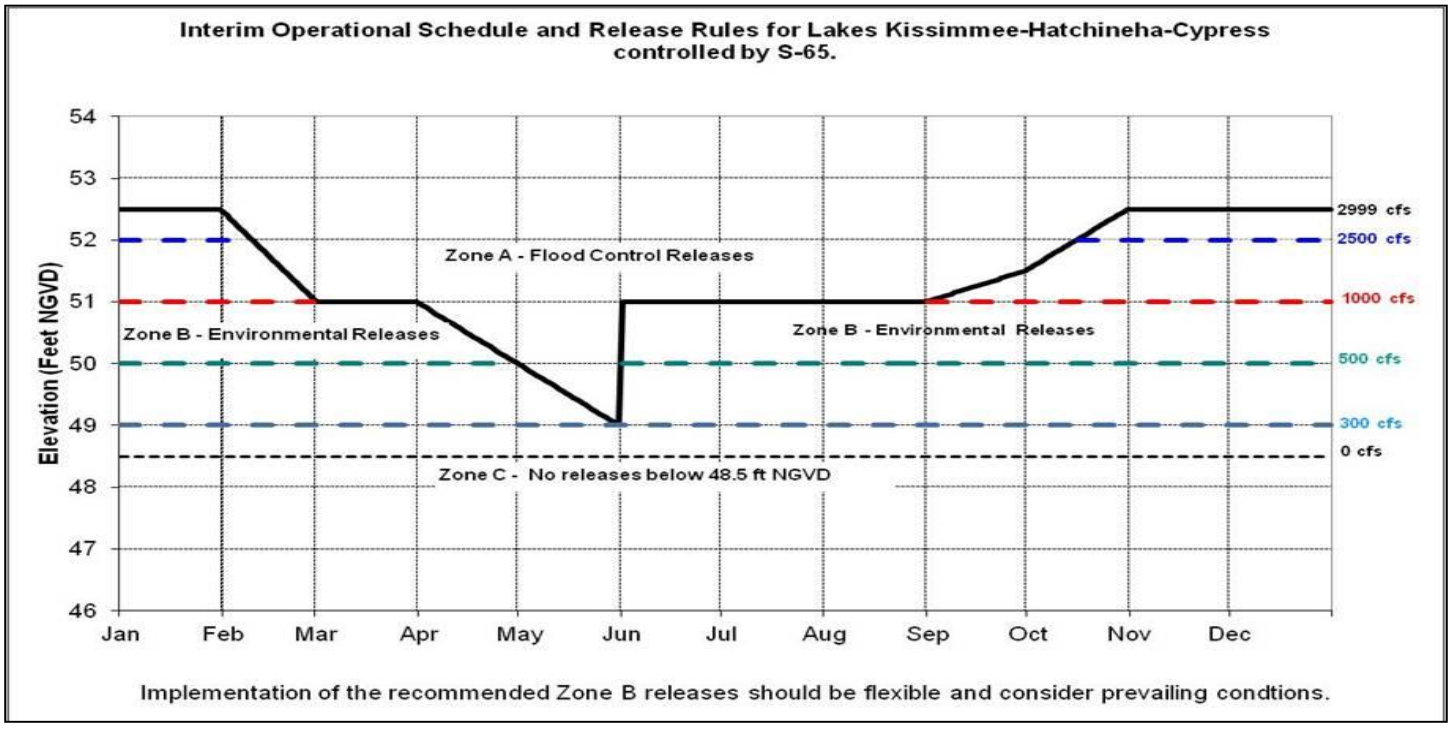


Figure 7. Interim operations schedule for S-65 (solid black line). The discharge schedule shown to the right has not been used in recent years.

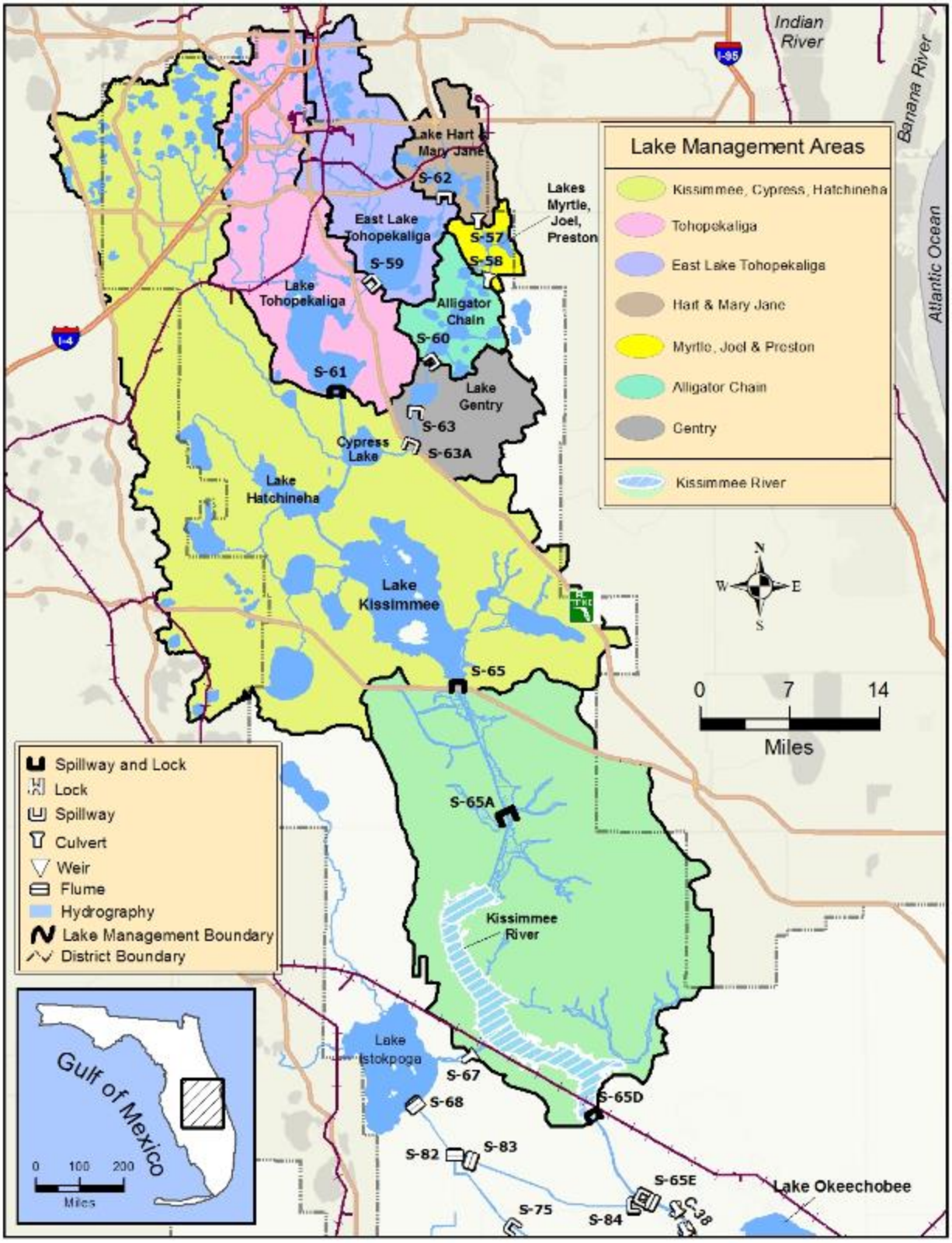


Figure 8. The Kissimmee Basin.

LAKE OKEECHOBEE

Lake Okeechobee stage was 15.39 feet NGVD on February 7, 2021, 0.34 feet lower than a month ago, and 2.44 feet higher than one year ago (Figure 1). Lake stages rose into the lower portion of the preferred ecological envelope on June 2, 2020 (Figure 2) but have been above the envelope since August 1, 2020; currently 0.26 feet above. 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 3). Lake stage has declined since mid-November and is currently in the Low sub-band. According to RAINDAR, 0.63 inches of rain fell directly on the Lake while the northern watershed received up to 3 inches and most of the southern watershed received less than 0.5 inches (Figure 4).

Average daily inflows (excluding rainfall) increased slightly from the previous week going from 971 cfs to 1,000 cfs. Outflows (excluding evapotranspiration) decreased from 1,839 cfs to 1,497 cfs. Most of the inflows came from the Kissimmee River (940 cfs through S-65E & S-65EX1). Releases to the west via S-77 decreased from 666 cfs to 493 cfs from the prior week, while releases east via S-308 increased from 0 cfs to 79 cfs. Releases south through the S-350 structures decreased from approximately 1,050 cfs to 743 cfs. Average inflows and outflows through water control structures surrounding the Lake for the previous two weeks (cfs) are shown in Table 1. The resultant lake elevation change in inches (in) due to each structure's flow for the past week is also shown in Table 1. Figure 5 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 fourth wading bird survey of the 2021 breeding season (conducted February 4, 2021) reported approximately 2,530 foraging wading birds on the Lake compared to about 7,400 on the January 21st survey, about 350 on December 17th, and 3,500 on December 3rd (Figure 6). The first four surveys of this year have averaged roughly 3,450 wading birds per survey compared to less than 600 per survey over the same period last year when lake stage was nearly 2.5 feet lower and most of the marsh was dry (Figure 2). Suitable foraging habitat is currently limited due to deep water levels throughout the marsh, especially for the short-legged wading birds. Higher lake stages throughout the summer and fall of 2020 followed two years of low winter stages; the combination of which has likely sparked prey production in the marsh and led to more wading bird foraging activity than would be expected at 15.5 – 16.0 feet in lake stage this time of year. If lake stages continue to decline and stay near the top of the ecological envelope throughout the spring, there should be good foraging and nesting conditions for wading birds on the Lake this breeding season.

The most recent satellite image (February 5, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed continued low bloom potential on the Lake (Figure 7).

Water Management Summary

Lake Okeechobee stage was 15.39 feet NGVD on February 7, 2021, 0.08 feet lower than last week and 0.34 feet lower than a month ago. The Lake is currently in the Low Sub-band. Stage has been above or near the top of the preferred ecological envelope since August 1, 2020 and is currently 0.26 feet above. Nearly 2,550 wading birds were recorded using the Lake on February 4, 2021 compared to approximately 300 wading birds recorded in early February 2020 when lake stage was almost 2.5 feet lower and most of the marsh was dry. Recent satellite imagery and water quality results suggest there is little to no algal bloom activity on the Lake.

Table 1. Average daily inflows and outflows for the most recent two weeks and approximate depth equivalents on Lake Okeechobee for various structures.

INFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-65E & S-65EX1	873	940	0.4
S-71 & S-72	0	27	0.0
S-84 & S-84X	0	5	0.0
Fisheating Creek	31	28	0.0
S-154	0	0	0.0
S-191	0	0	0.0
S-133 P	35	0	0.0
S-127 P	8	0	0.0
S-129 P	5	0	0.0
S-131 P	4	0	0.0
S-135 P	14	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	0	0	0.0
Total	**971**	**1000**	**0.4**

OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-77	666	493	0.2
S-308	0	79	0.0
S-351	604	355	0.1
S-352	205	142	0.1
S-354	247	246	0.1
L-8 Outflow	119	181	0.1
ET	2067	2192	0.9
Total	**3906**	**3689**	**1.4**

Provisional Data

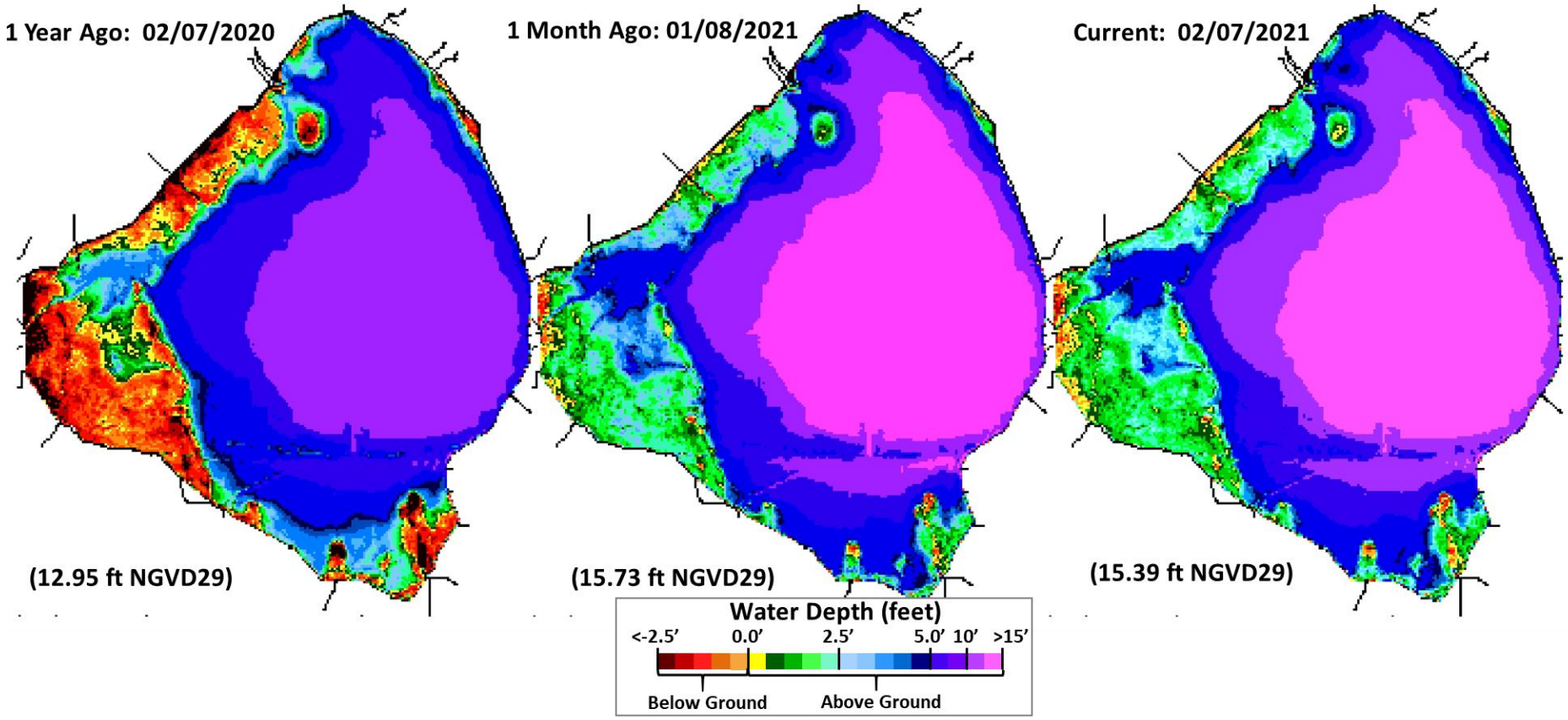


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

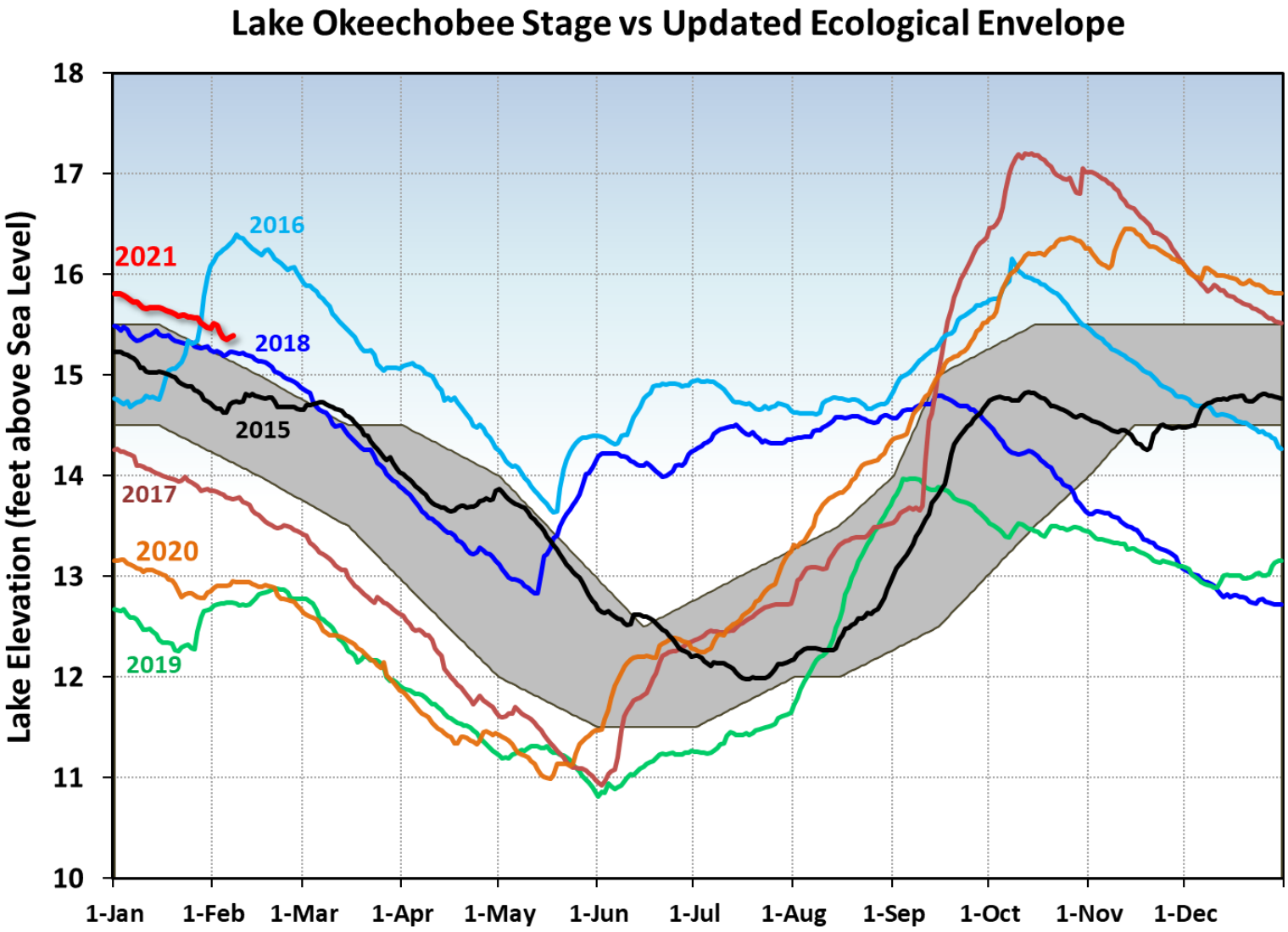


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated Ecological Envelope.

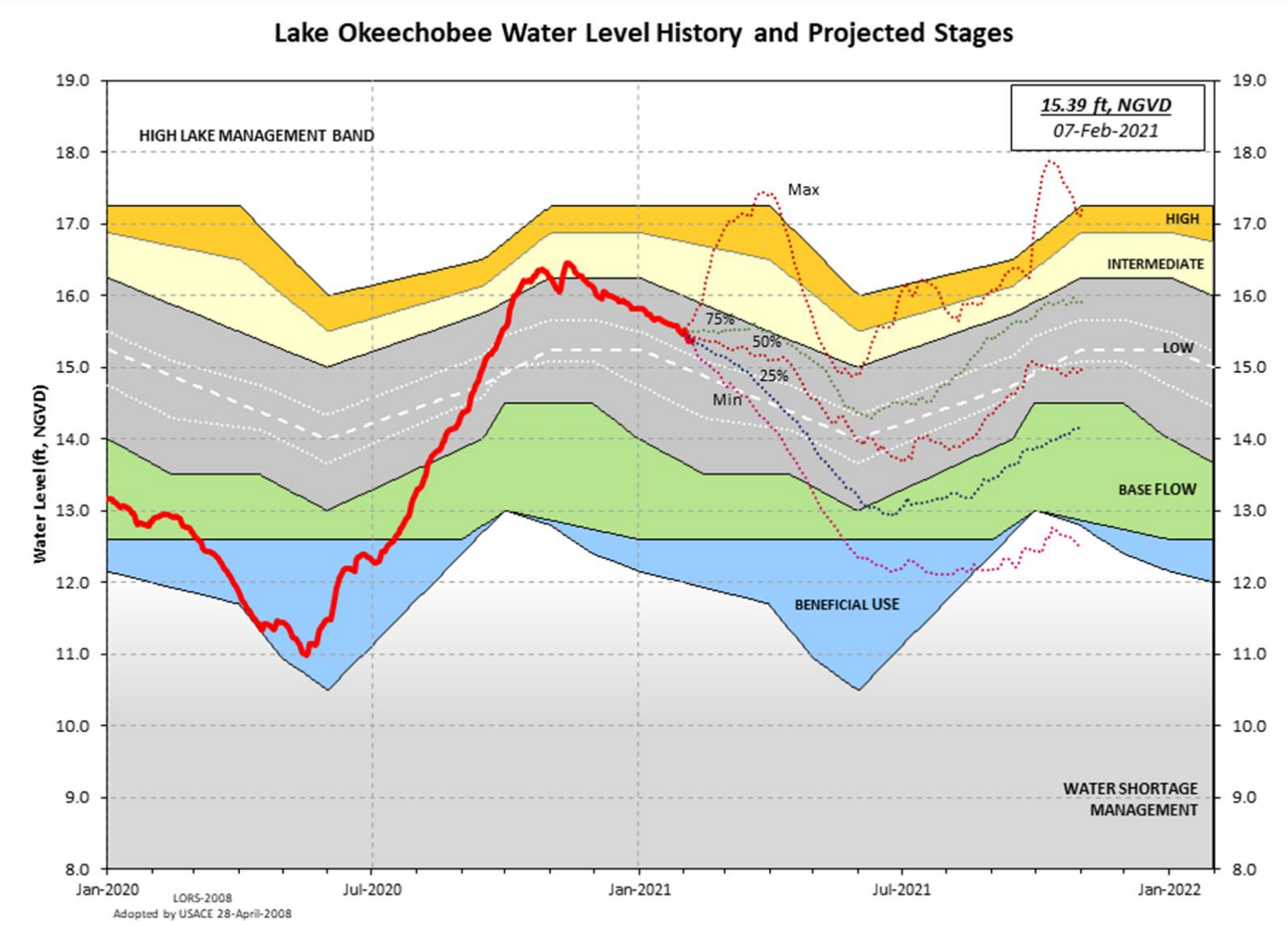


Figure 3. Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

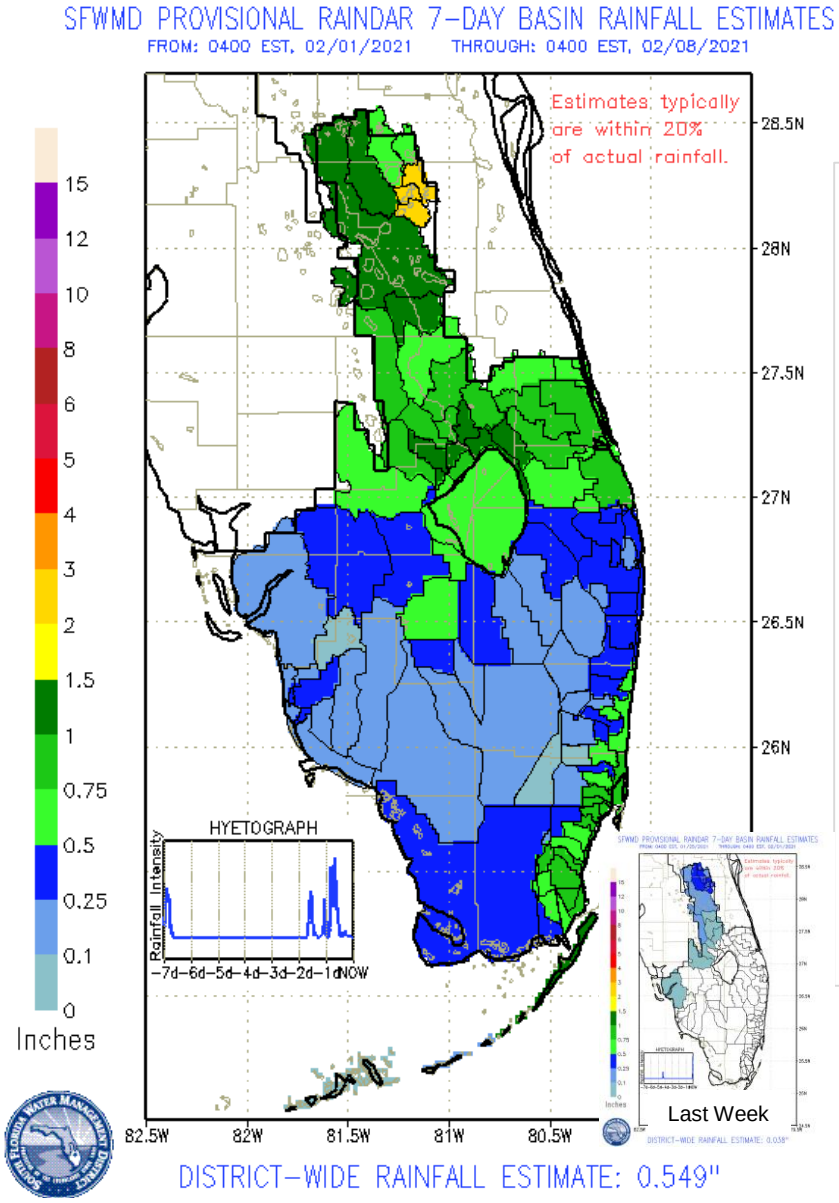


Figure 4. 7-Day rainfall estimates by RAINDAR.

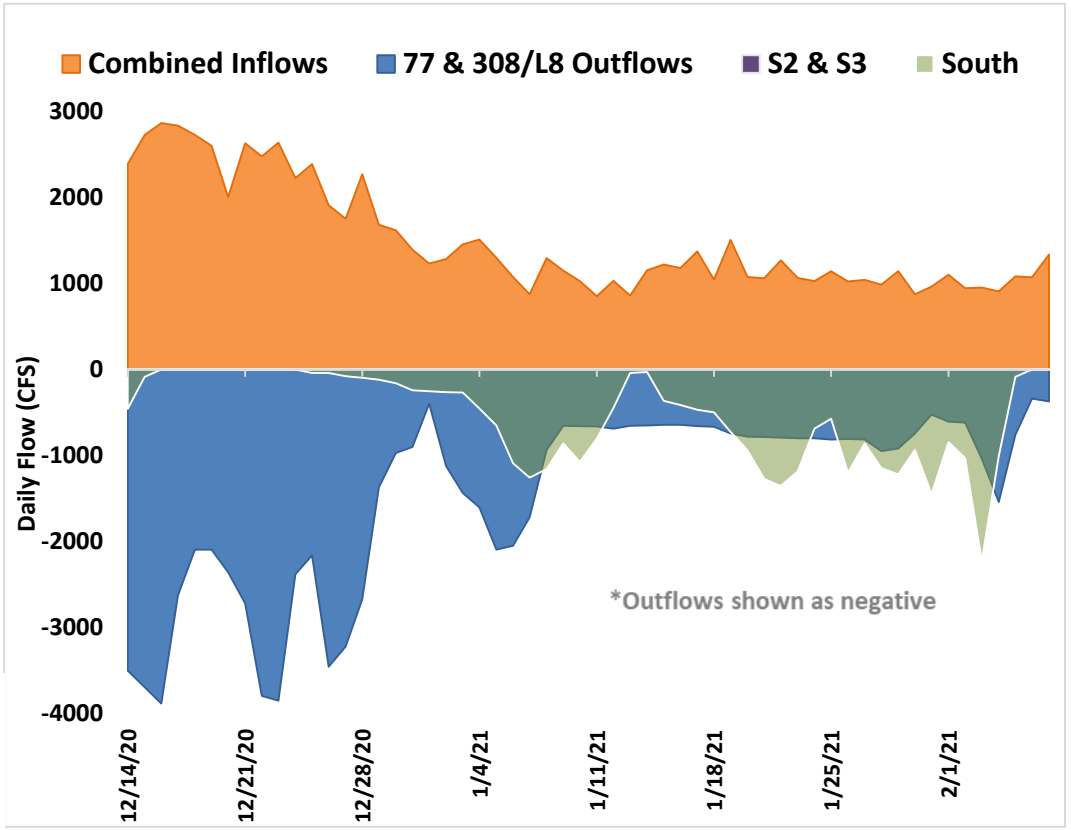


Figure 5. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive and negative, respectively, for visual purposes. Outflows through the S-77 and S-308 structures are shown based on their downstream gauges to account for lock openings for navigation.

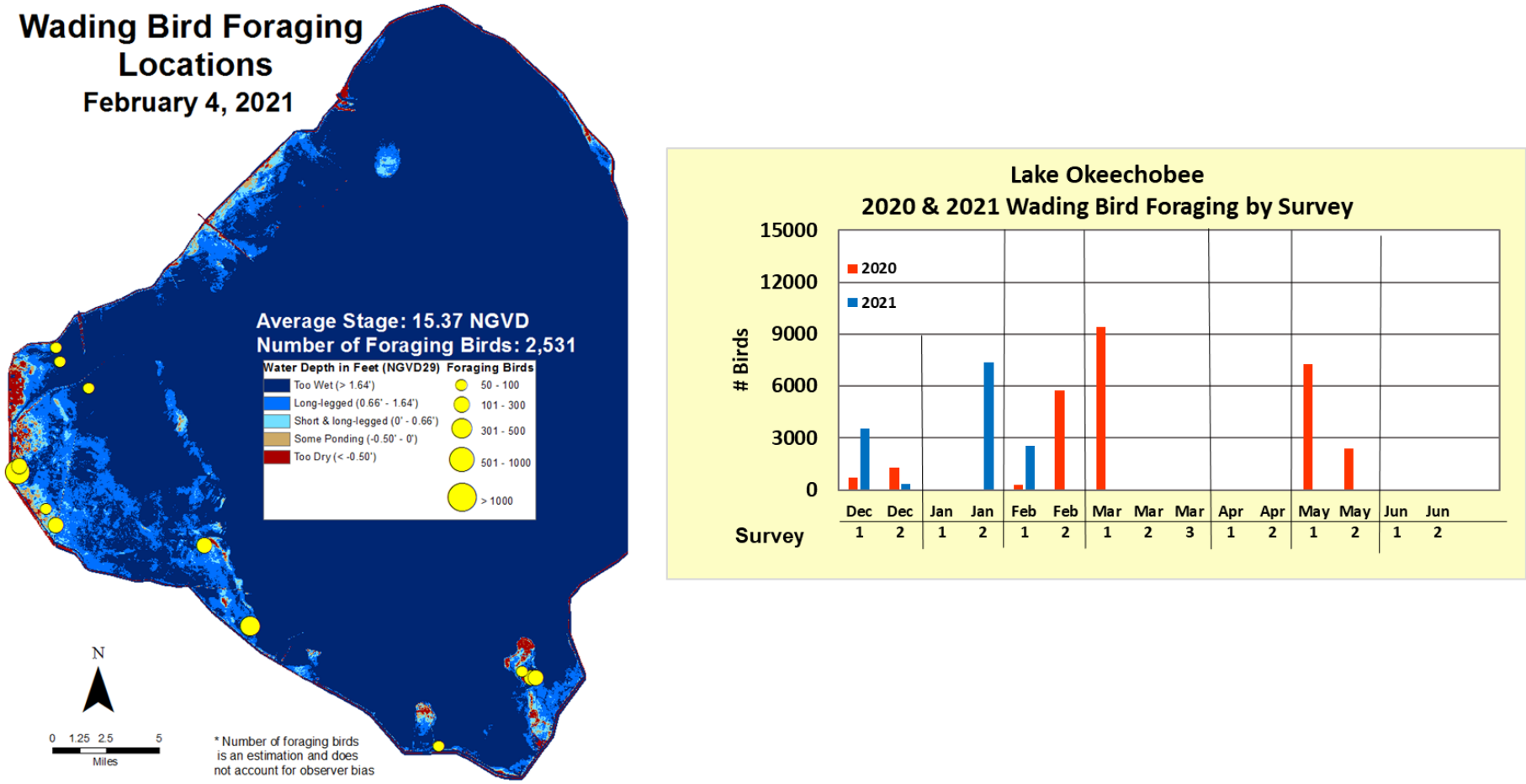


Figure 6. Locations of foraging flocks of wading birds observed during a monitoring flight on February 4, 2021 are shown in yellow, with circle sizes representing the size of the flocks. Previous survey totals from last year's breeding season are compared in the bar graph.

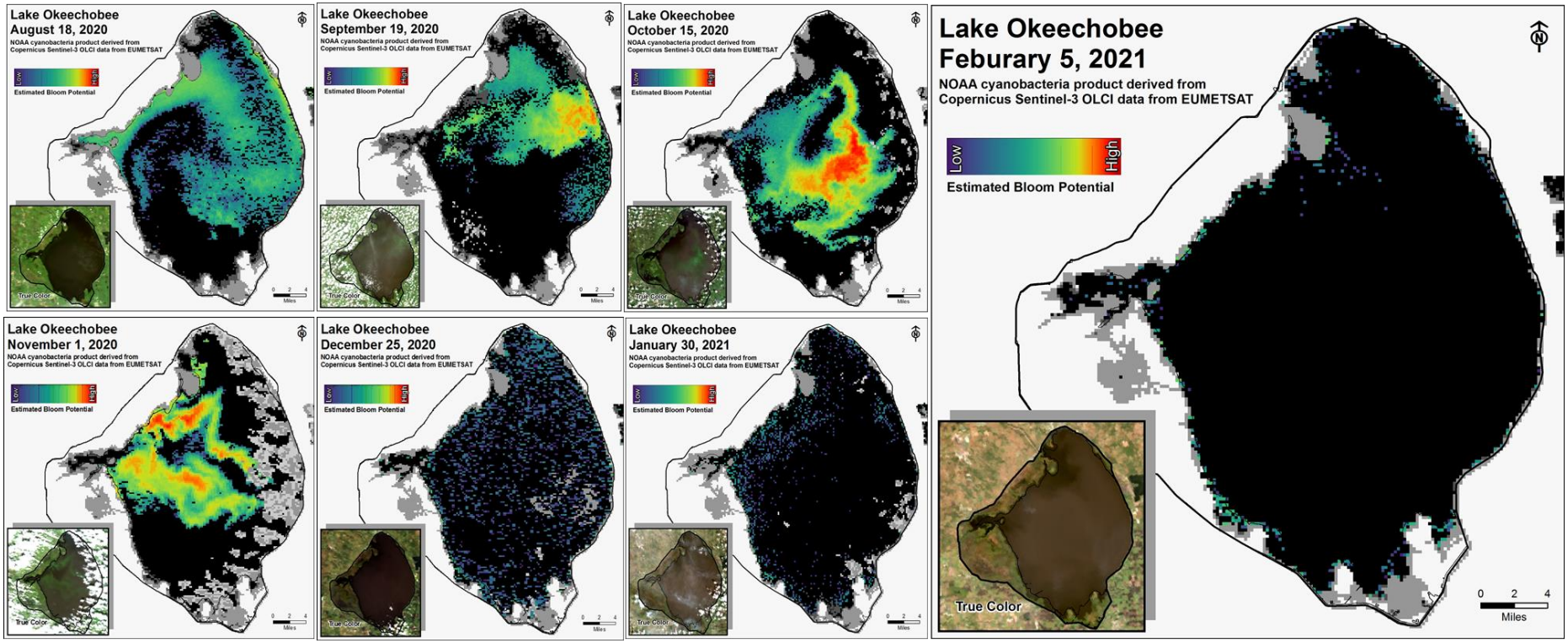


Figure 7. Cyanobacteria bloom potential based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged more than 423 cfs (Figures 1 and 2), and last month inflow averaged more than 215 cfs. Note these numbers do not include contributions from the Gordy Road Structure due to missing data. Last week's provisional averaged inflows from the tidal basin and the structures are shown in Table 1. (Note: Recorder at Gordy Road structure was removed due to bridge construction)

Table 1. Weekly average inflows (data are provisional).

Location	Flow (cfs)
Tidal Basin Inflow	115
S-80	0
S-308	79
S-49 on C-24	276
S-97 on C-23	32
Gordy Rd. structure on Ten Mile Creek	Not reporting

Over the past week, salinity increased throughout the estuary (Table 2, Figures 3 and 4). The seven-day moving average of the water column (an average of the surface and bottom salinity) at the US1 Bridge was 23.0. Salinity conditions in the middle estuary are estimated to be within the good range for adult eastern oysters (Figure 3).

Table 2. Seven-day average salinity at three monitoring sites in the St. Lucie Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary.

Sampling Site	Surface	Bottom	Envelope
HR1 (North Fork)	**18.9** (16.8)	**20.7** (18.4)	NA[1]
US1 Bridge	**22.4** (20.8)	**23.5** (21.9)	10.0-26.0
A1A Bridge	**28.9** (28.5)	**30.0** (29.9)	NA[1]

[1]Envelope not applicable

Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged approximately 1,002 cfs (Figures 5 and 6), and last month inflow averaged about 1,074 cfs. Last week's provisional averaged inflows from the structures and the tidal basin are shown in Table 3.

Table 3. Weekly average inflows (data is provisional).

Location	Flow (cfs)
S-77	493
S-78	646
S-79	903
Tidal Basin Inflow	99

Over the past week, salinity decreased at S-79 and Val I-75 but increased at the remaining sites in the estuary (Table 4, Figures 7 & 8). The seven-day average surface salinity values were within the good range for adult eastern oysters at Cape Coral and Shell Point but have increased at Sanibel moving into the fair range (Figure 9). The seven-day average surface salinities (Table 4) are in the good range (0-10) for tape grass at Val I-75 and at Ft. Myers.

Table 4. Seven-day average salinity at six monitoring stations in the Caloosahatchee Estuary. Current average is in bold, previous average in parentheses. The envelope at Val I-75 is for the protection of tape grass in the upper estuary and the envelope in the lower estuary reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*).

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	**0.2** (0.3)	**0.2** (0.3)	NA[1]
Val I-75	**0.5** (0.7)	**0.7** (0.9)	0.0-5.0[2]
Ft. Myers Yacht Basin	**4.9** (4.8)	**6.2** (5.6)	NA[1]
Cape Coral	**14.4** (12.7)	**15.7** (13.9)	10.0-30.0
Shell Point	**26.3** (24.6)	**26.9** (25.2)	10.0-30.0
Sanibel	**29.7** (29.6)	**31.1** (30.2)	10.0-30.0

[1]Envelope not applicable and [2]Envelope is based on a 2-week forecast 30-day average

Forecast of surface salinity (Table 5 and Figure 10) at Val I-75 for the next two weeks using the autoregression model (Qiu and Wan, 2013) coupled with a linear reservoir model for the tidal basin predicts daily salinity to be 3.4 or lower at the end of the two week period for pulse release at S-79 ranging from 0 to 1500 cfs and estimated Tidal Basin inflows of 85 cfs. The 30-day moving average surface salinity at Val I-75 is forecast to be 1.2 or lower (Table 5). The current salinity conditions at Val I-75 are within the envelope of salinity 0.0-5.0 for this site (Table 4).

Table 5. Predicted salinity at Val I-75 at the end of forecast period

Scenario	Q79 (cfs)	TB runoff (cfs)	Daily salinity	30 day Mean
A	0	85	3.4	1.2
B	300	85	2.2	1.0
C	450	85	1.8	0.9
D	650	85	1.2	0.8
E	800	85	1.0	0.7
F	1000	85	0.7	0.7
G	1500	85	0.3	0.6

Red tide

The Florida Fish and Wildlife Research Institute reported on February 5, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background to medium concentrations in 18 samples from Lee County, and low concentrations in two samples from Collier County. Bloom concentrations were observed in only one sample collected from Lee County. On the east coast, red tide was not observed in samples from Brevard or Palm Beach counties.

Water Management Recommendations

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

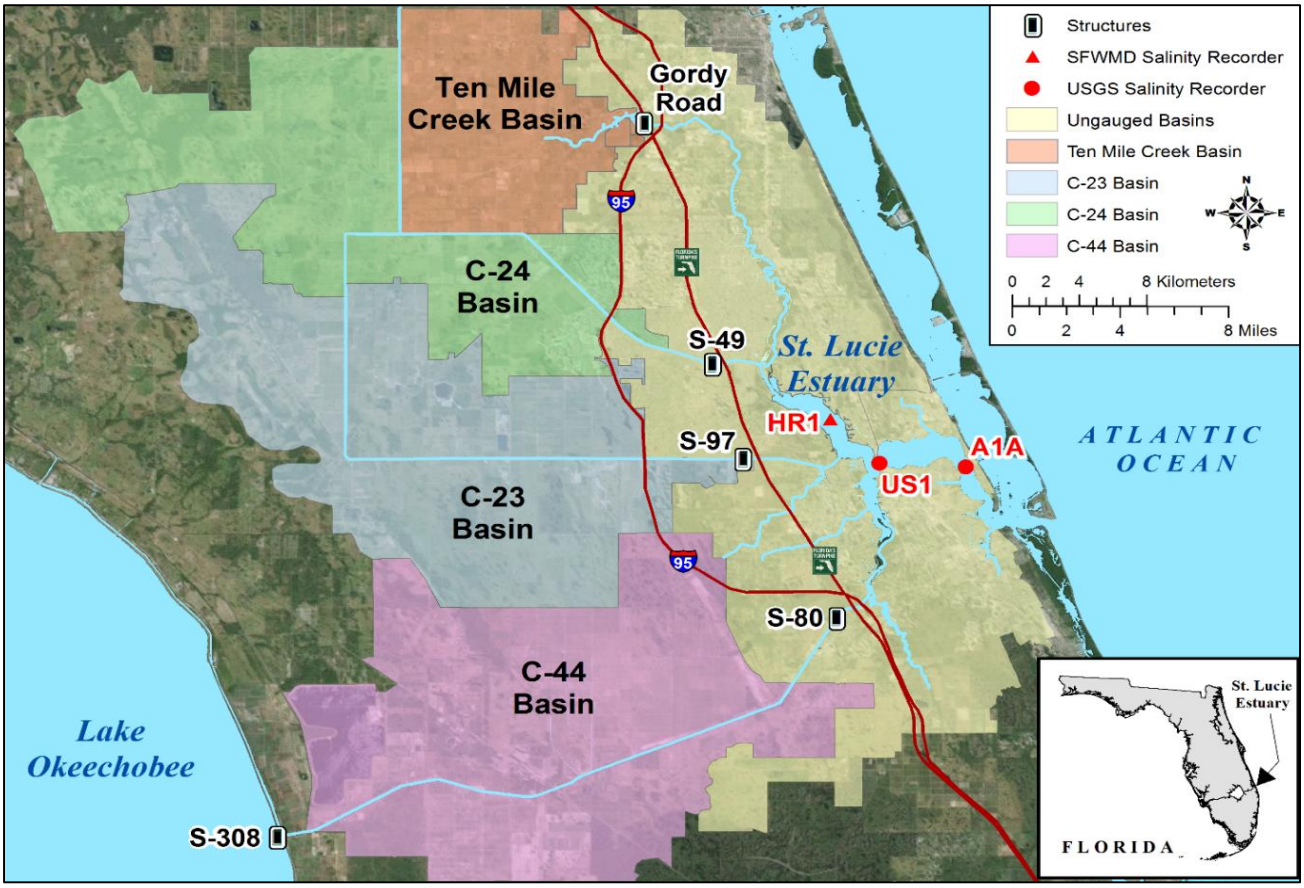


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

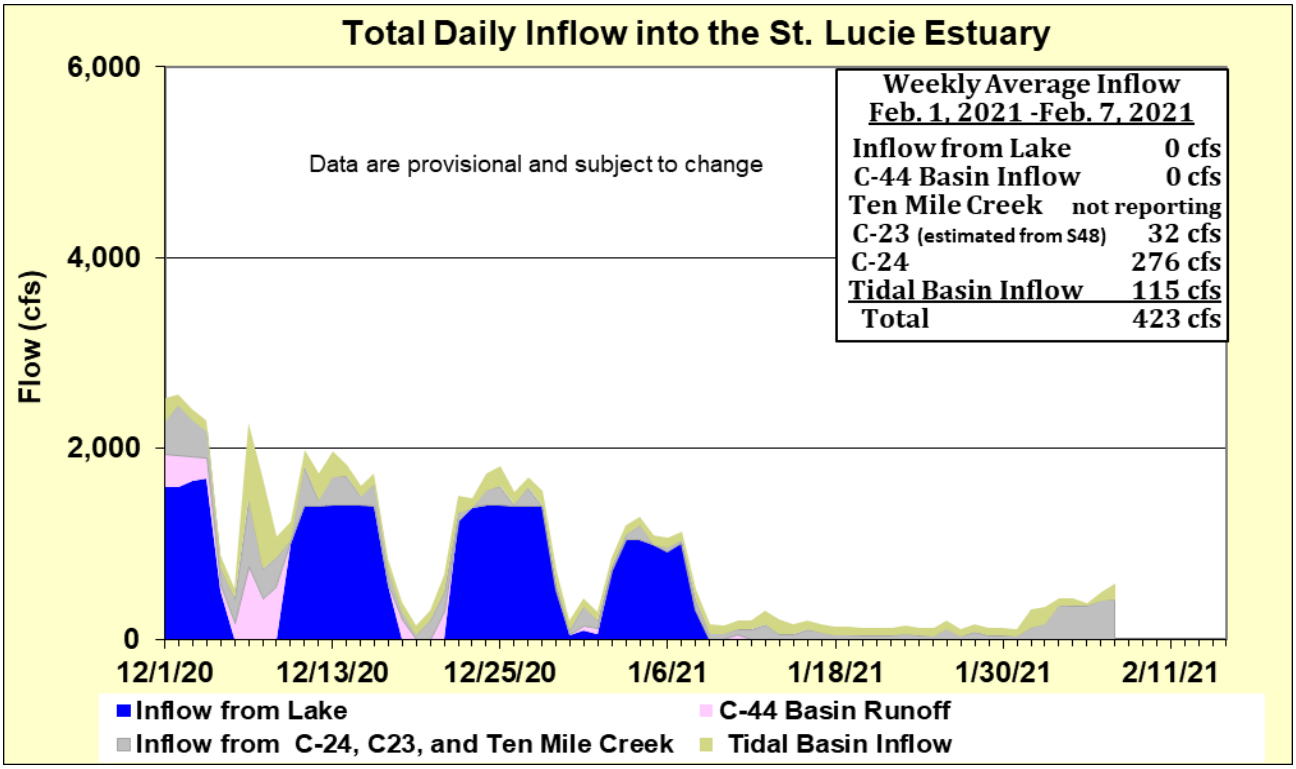


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin into the St. Lucie Estuary.

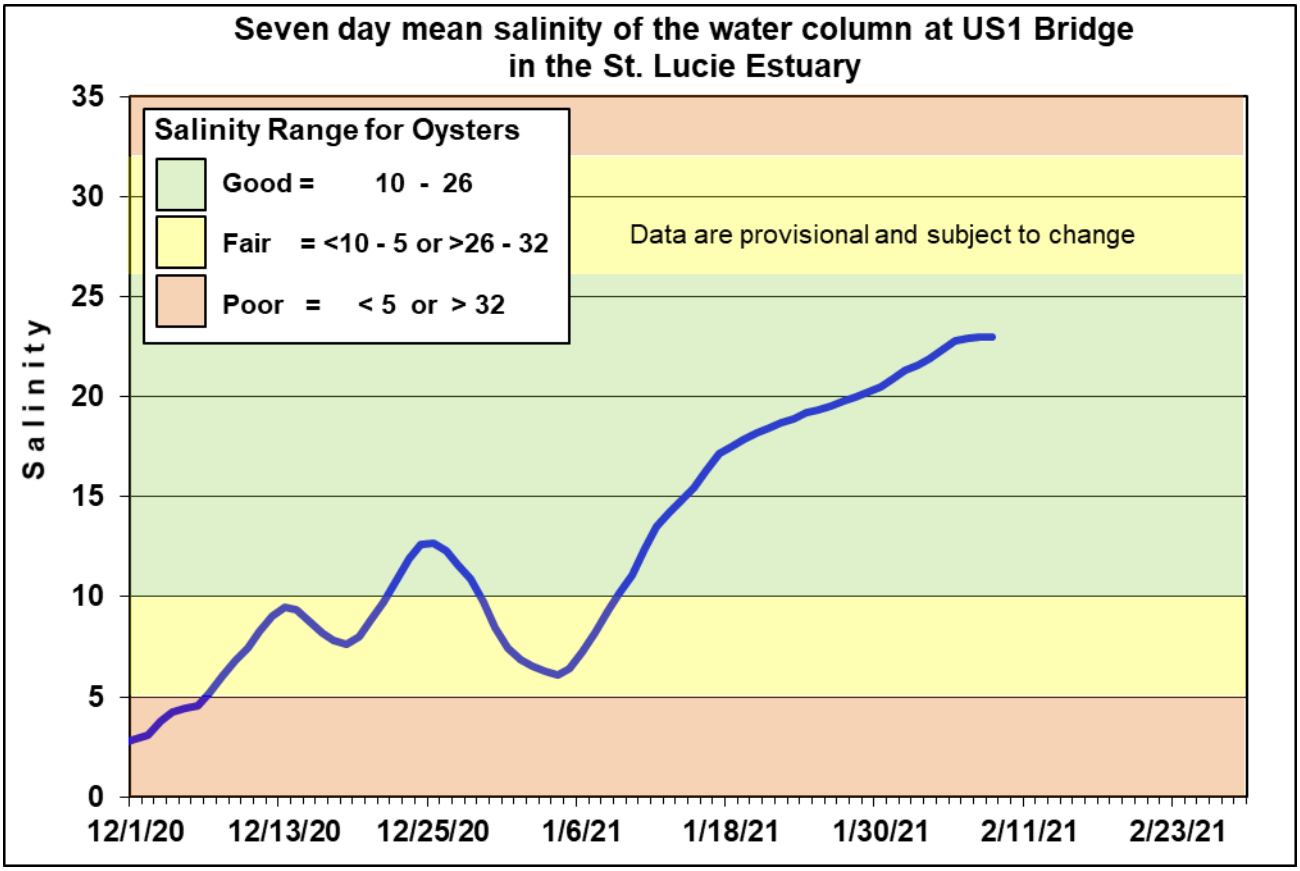


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

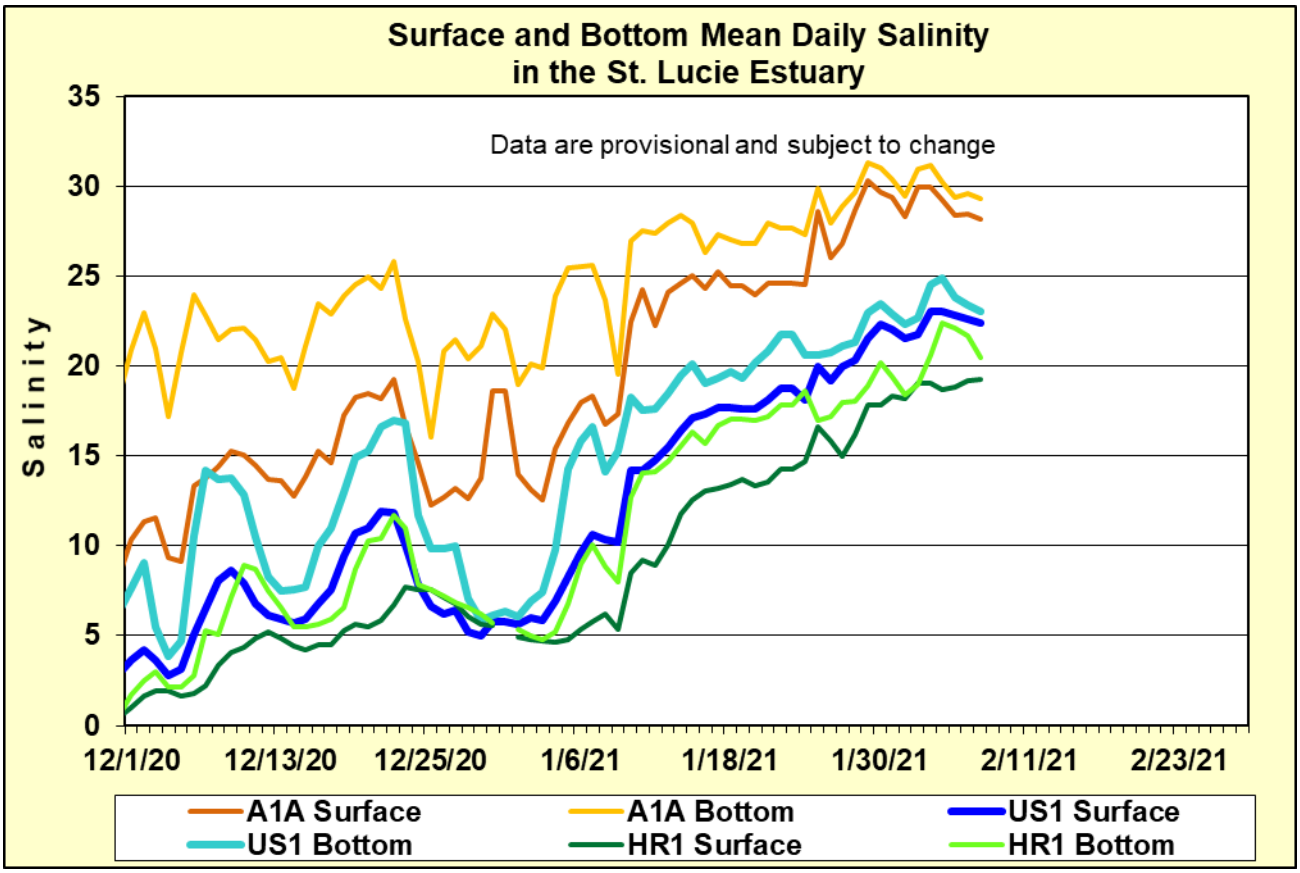


Figure 4. Daily mean salinity at the A1A, US1, and HR1 stations.

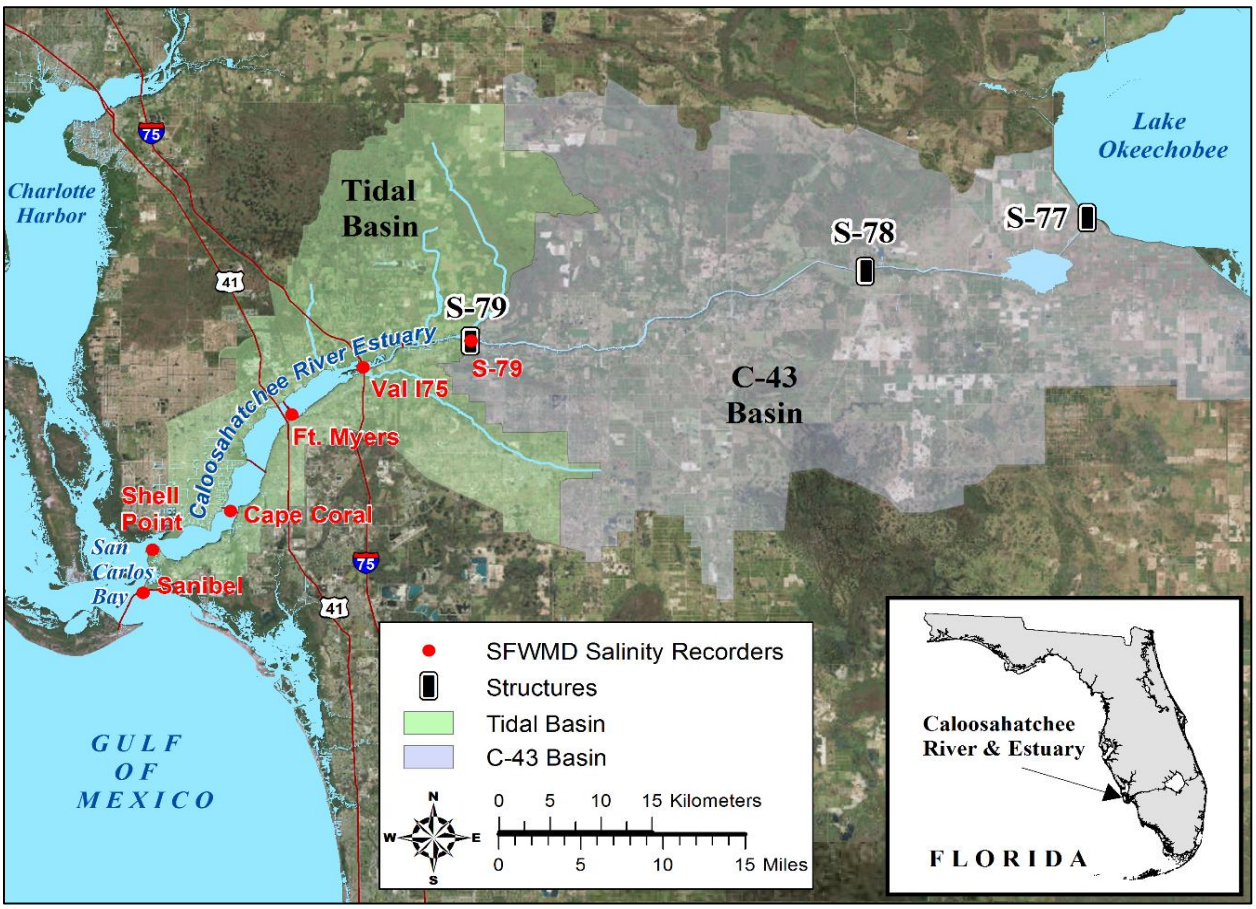


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

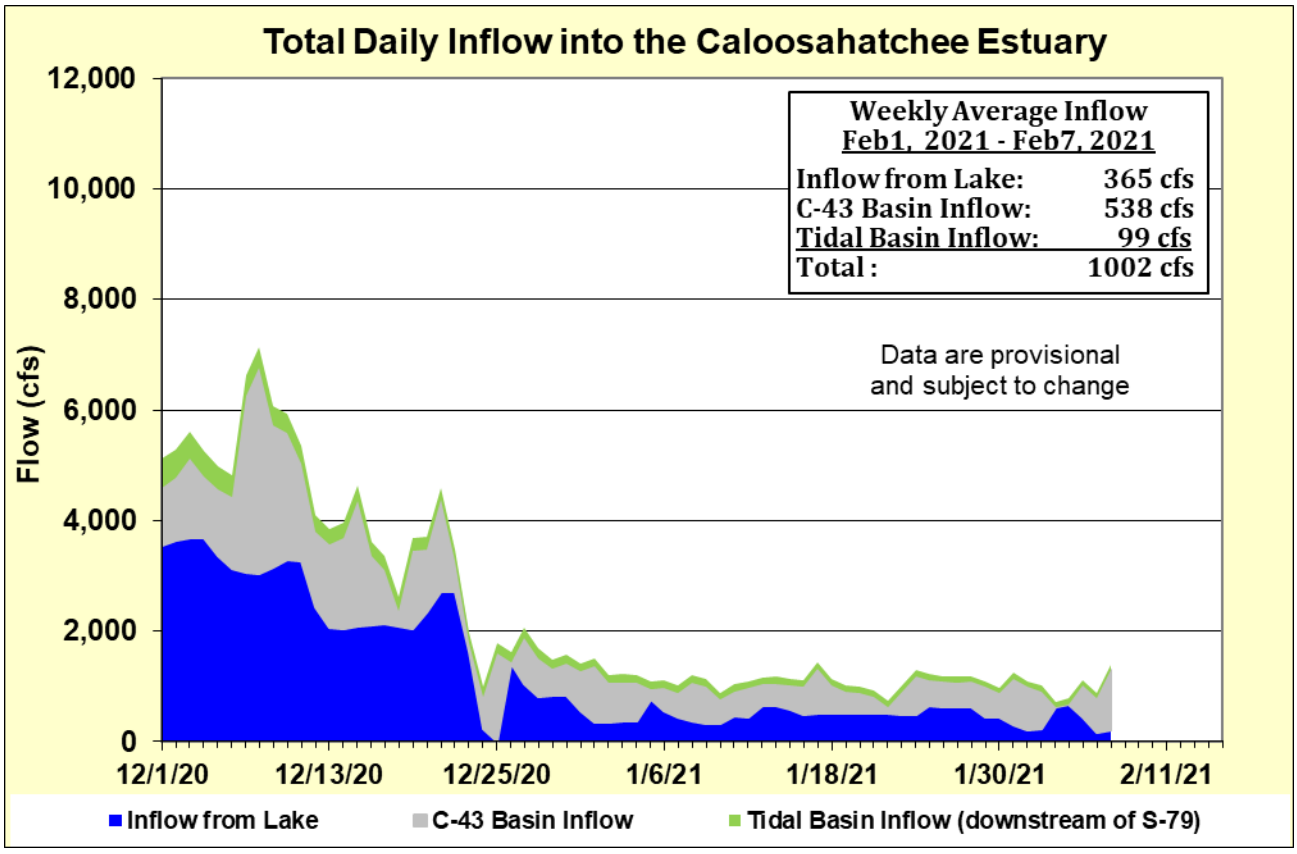


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin and tributaries in the tidal basin into the Caloosahatchee River Estuary.

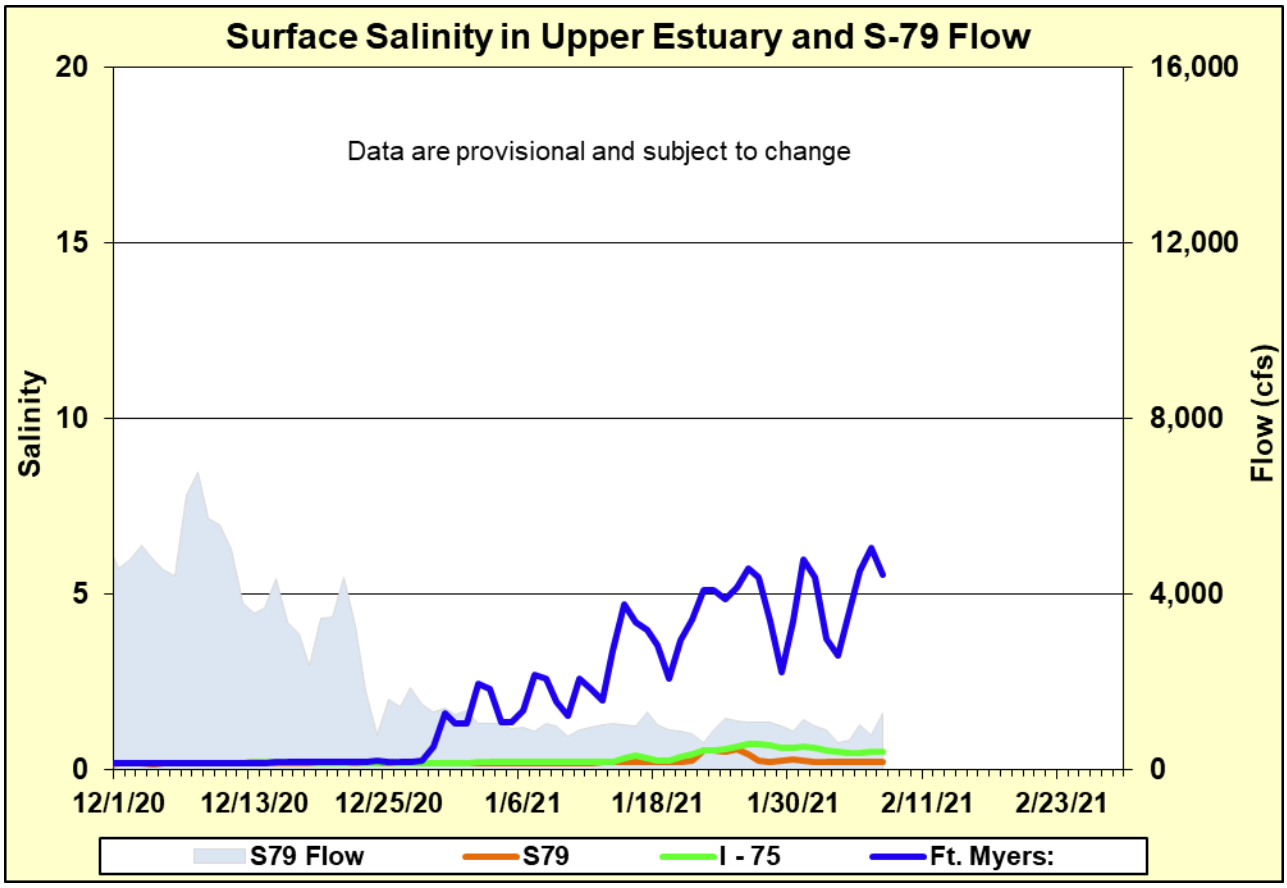


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

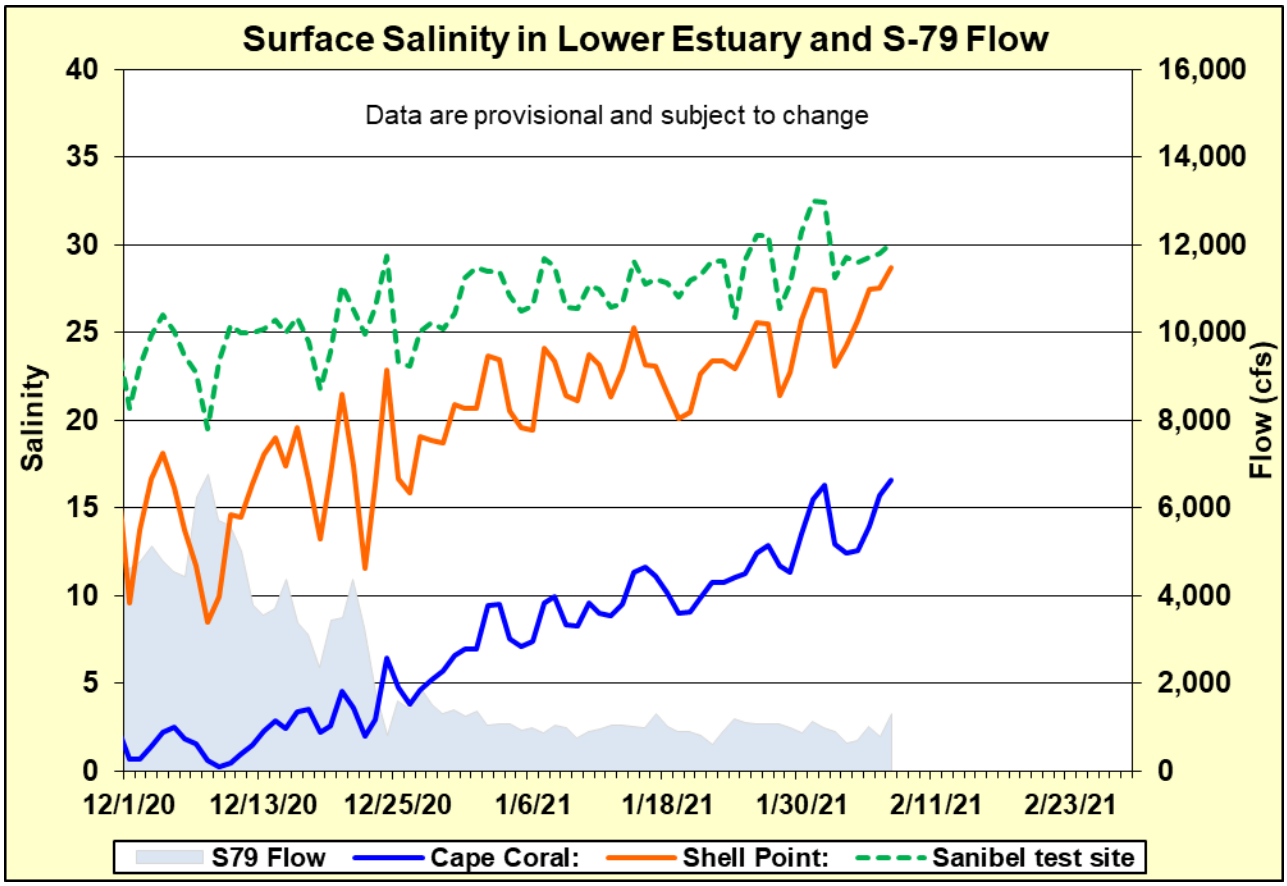


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

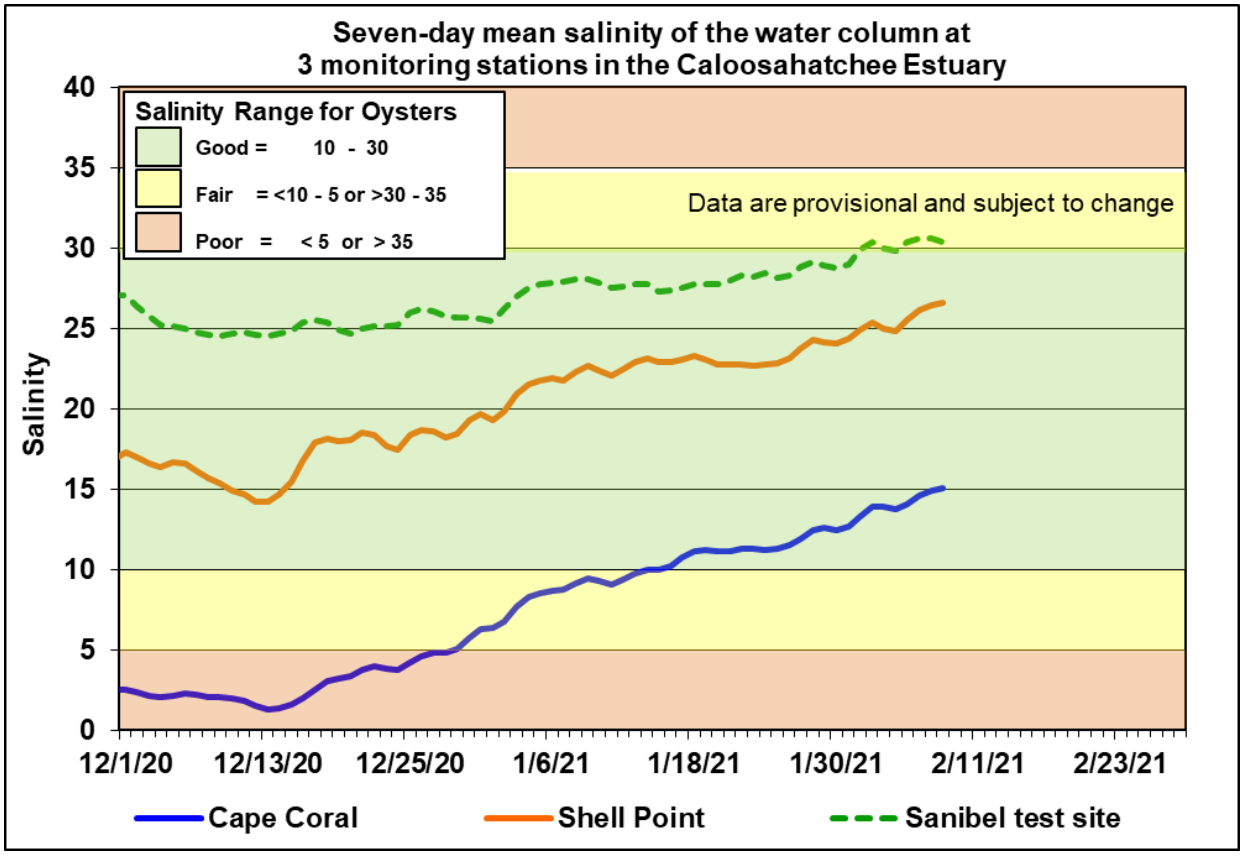


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

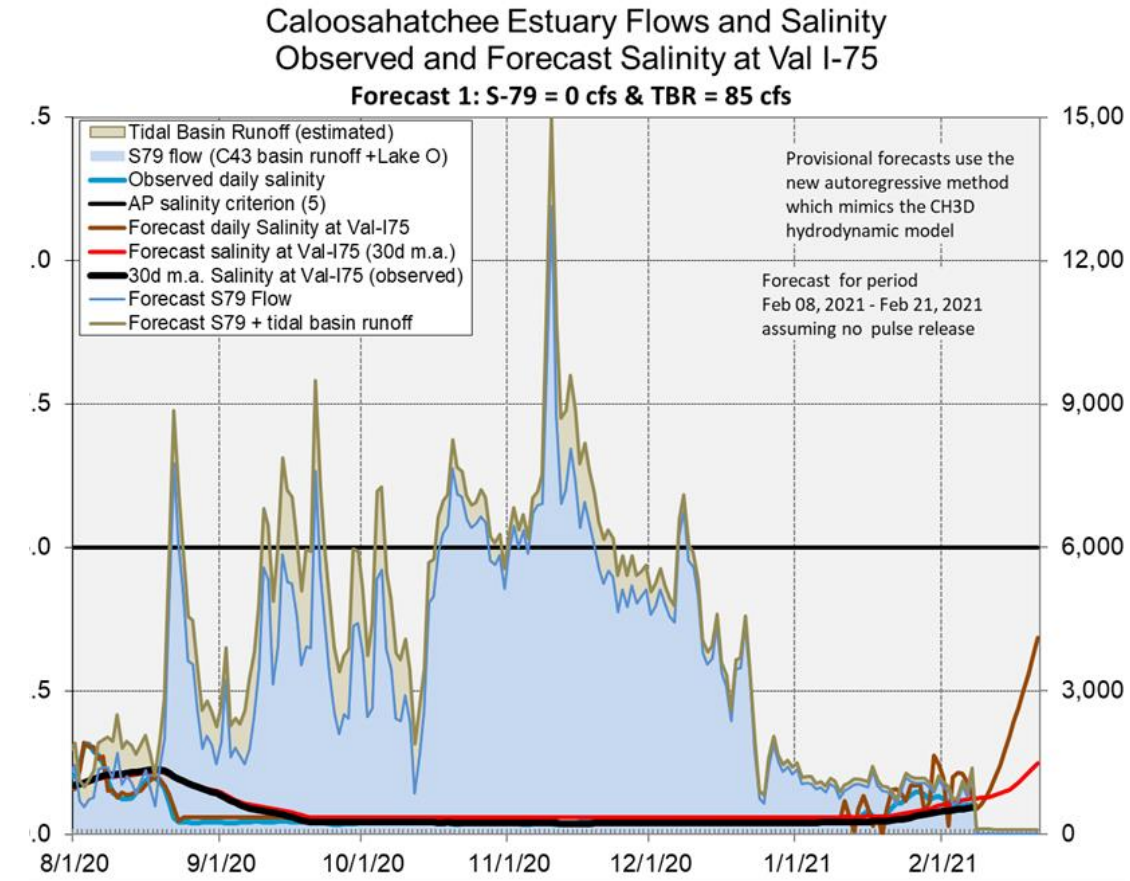


Figure 10. Forecasted Val I-75 surface salinity assuming no pulse release at S79.

Stormwater Treatment Areas (STAs)

Over the past week, 200 acre-feet (ac-ft) of Lake Okeechobee water was delivered to the Flow Equalization Basins (FEBs)/STAs. The total amount of lake releases sent to the FEBs/STAs in WY2021 (since May 1, 2020) is approximately 98,400 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 1,537,000 ac-feet. This week, if 2008 LORS recommends lake releases to the water conservation areas (WCAs) and conditions allow, releases will be sent to STA-2. For definitions on STA operational language see glossary following figures.

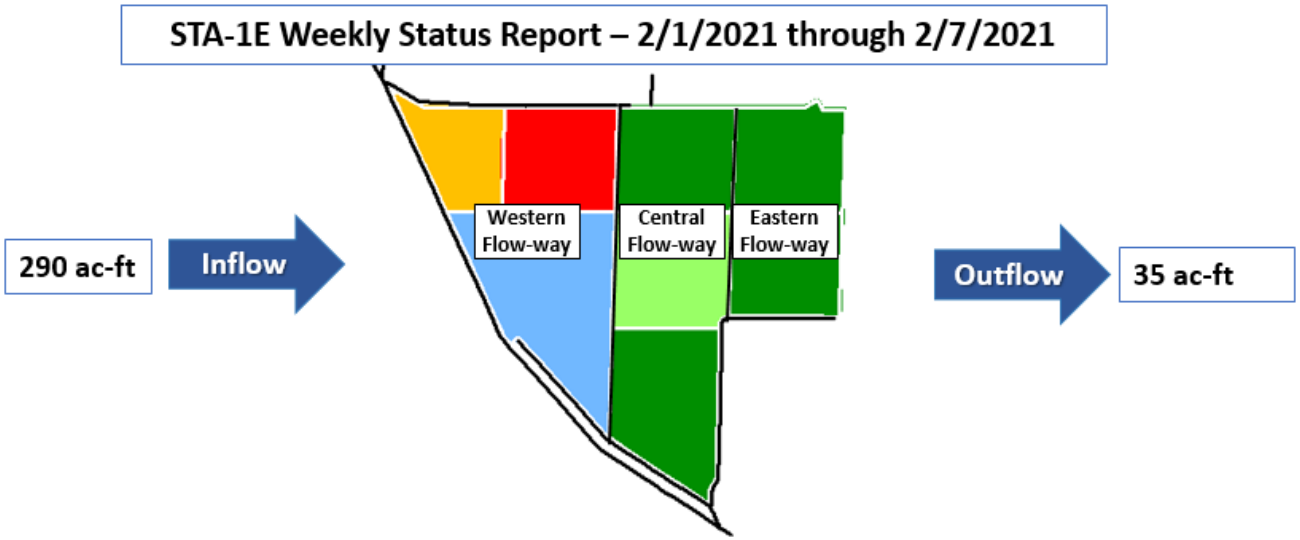
STA-1E: STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7. Operational restrictions are in place in STA-1E Central Flow-way for vegetation management activities. Online treatment cells are at or near target stage. However, vegetation in these cells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

STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to discharge canal plug construction activities. Treatment cells are at or near target stage, except the Eastern Flow-way downstream cells, which are below target stage. Vegetation in all flow-ways is highly stressed, and the 365-day PLRs for all flow-ways are high to very high (Figure 2).

STA-2: STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-2 Flow-ways 3, 4, and 5 for vegetation management activities. On-line treatment cells are at or near target stage. Vegetation in Flow-way 1 is healthy, in Flow-way 3 is stressed, and in Flow-ways 4 and 5 is highly stressed. The 365-day PLRs for all flow-ways are at or below 1.0 g/m^2/year. (Figure 3).

STA-3/4: Operational restrictions are in place in STA-3/4 Eastern, Central, and Western Flow-ways for vegetation management activities and in the Eastern Flow-way for drawdown preparation activities. Most treatment cells are above target stage. Vegetation in the Eastern and Central Flow-ways is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for all flow-ways are below 1.0 g/m^2/year (Figure 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. All treatment cells are at or above target stage, except the Flow-way 5 upstream cell, which is below target stage. The 365-day PLRs for all 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 5 and 6).



STA-1E 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		1.0	Online
Central		1.0	Vegetation Rehab
Western	Offline, construction activities starting 11/01/2019		

As of 2/7/2021	
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-1E Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	290	2,685	317,227
--Lake Inflow, ac-ft	0	N/A	21,900
Total Outflow, ac-ft	35	35	275,858
Inflow Conc., ppb	36	65	136
Outflow Conc., ppb	33	33	37
Includes Preliminary Data			

Figure 1. STA-1E Weekly Status Report

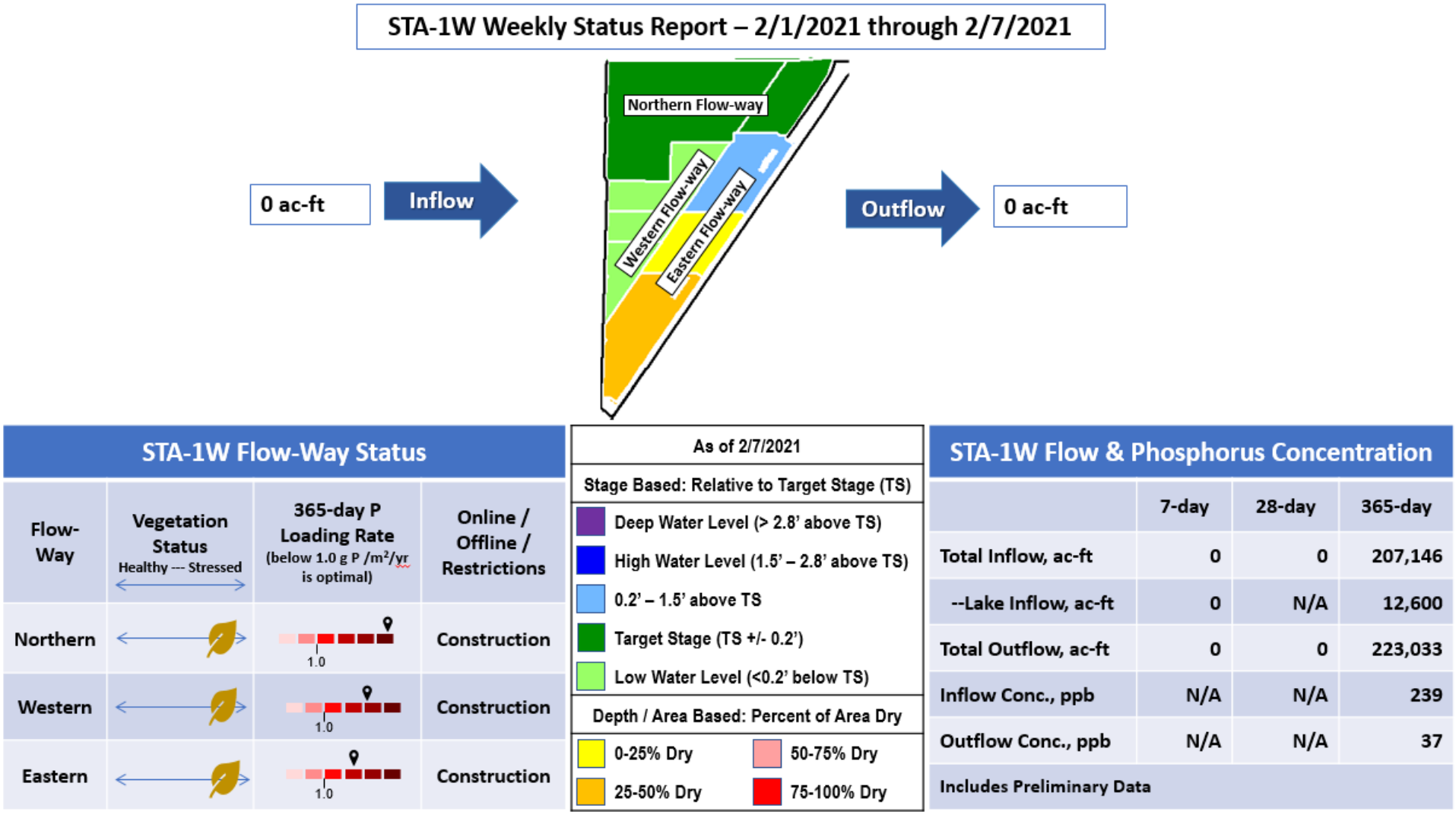


Figure 2. STA-1W Weekly Status Report

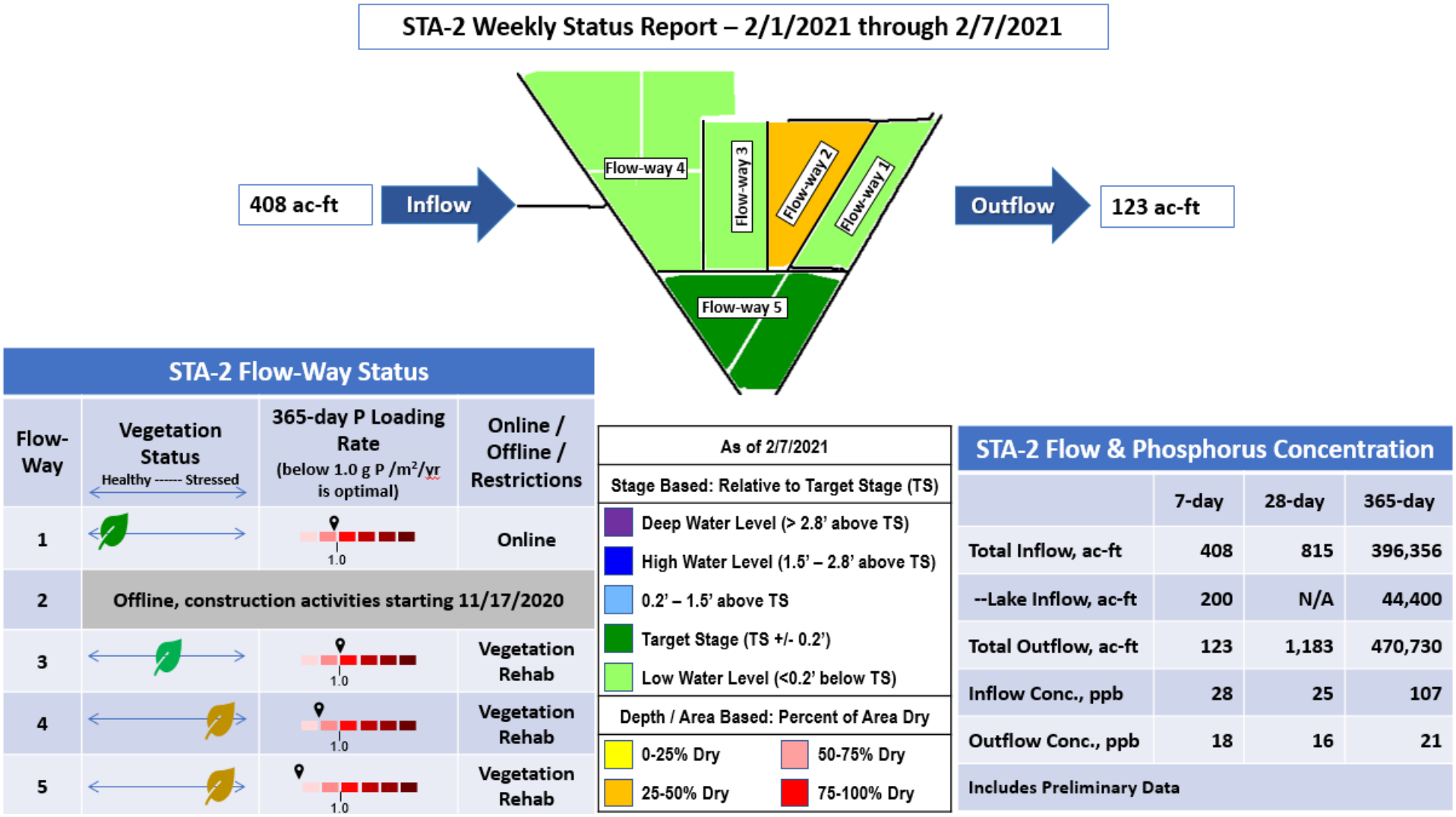
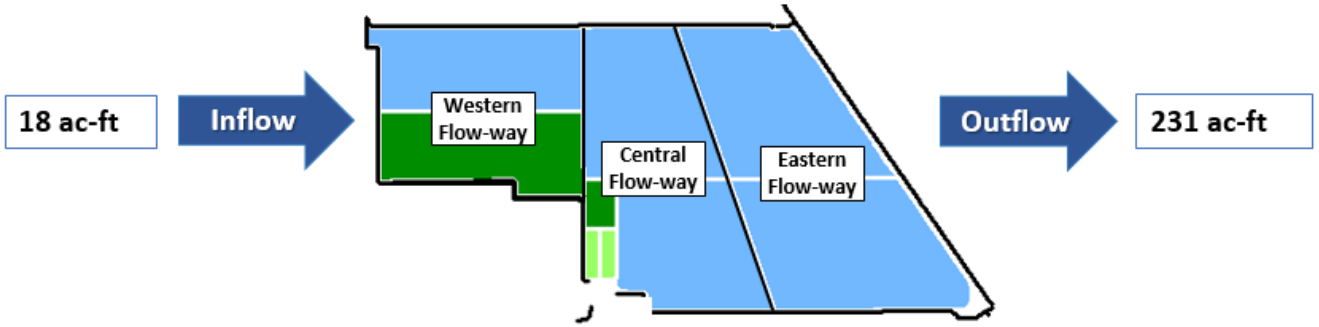


Figure 3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 2/1/2021 through 2/7/2021



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		1.0	Vegetation Rehab
Central		1.0	Vegetation Rehab
Western		1.0	Vegetation Rehab

As of 2/7/2021	
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	18	47	618,975
--Lake Inflow, ac-ft	0	N/A	72,700
Total Outflow, ac-ft	231	2,840	592,379
Inflow Conc., ppb	36	38	58
Outflow Conc., ppb	16	19	12
Includes Preliminary Data			

Figure 4. STA-3/4 Weekly Status Report

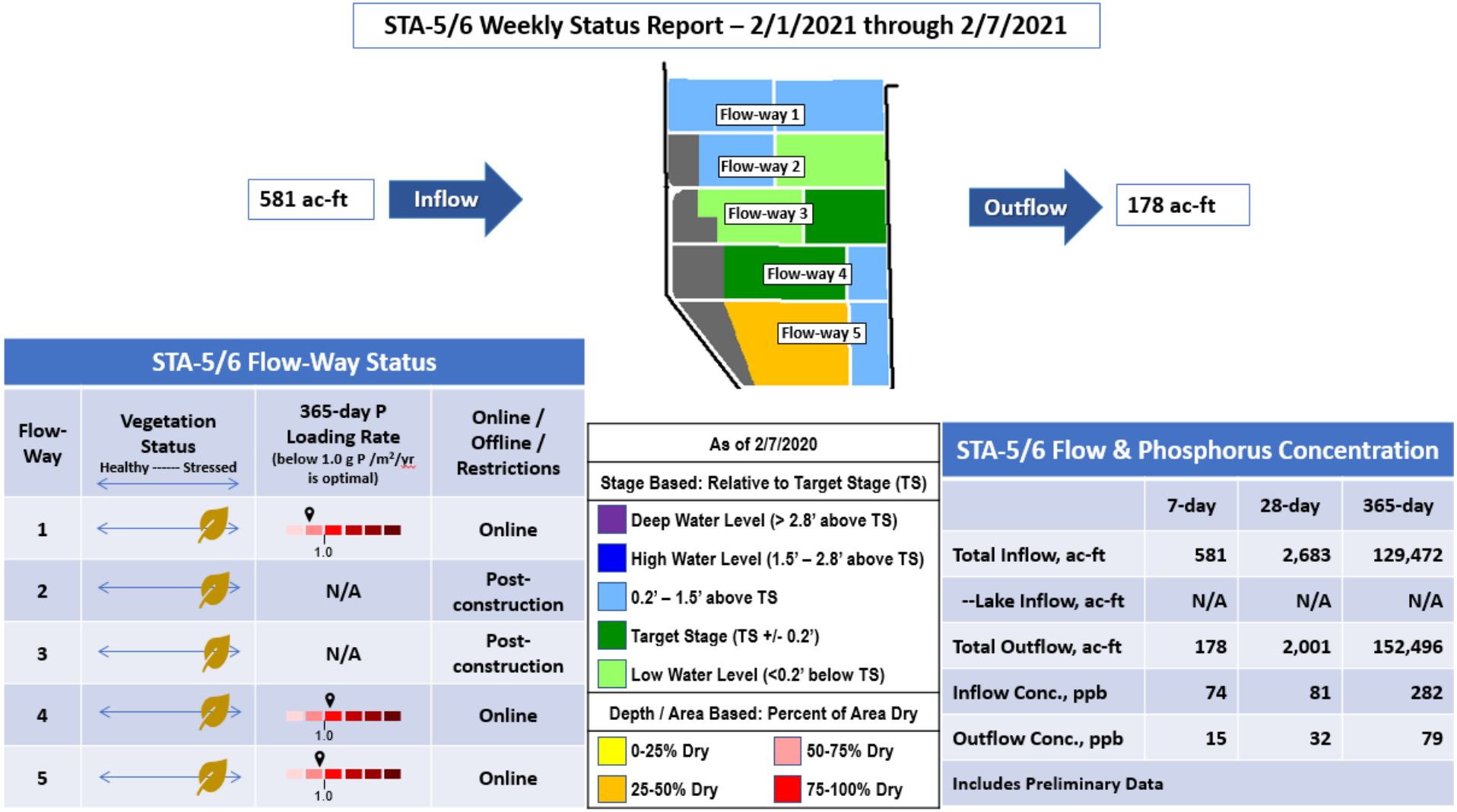


Figure 5. STA-5/6 Weekly Status Report (Flow-ways 1 – 5)

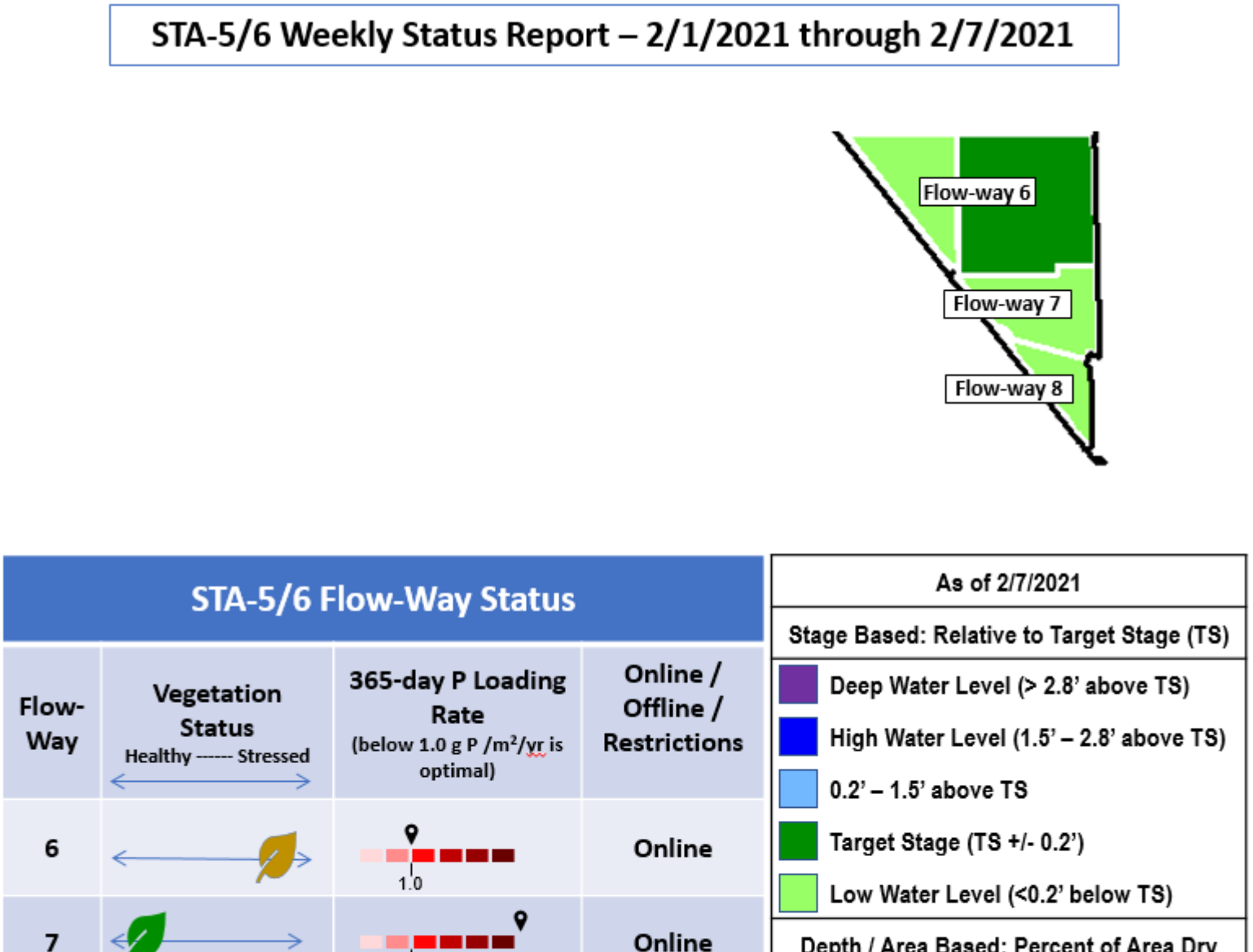


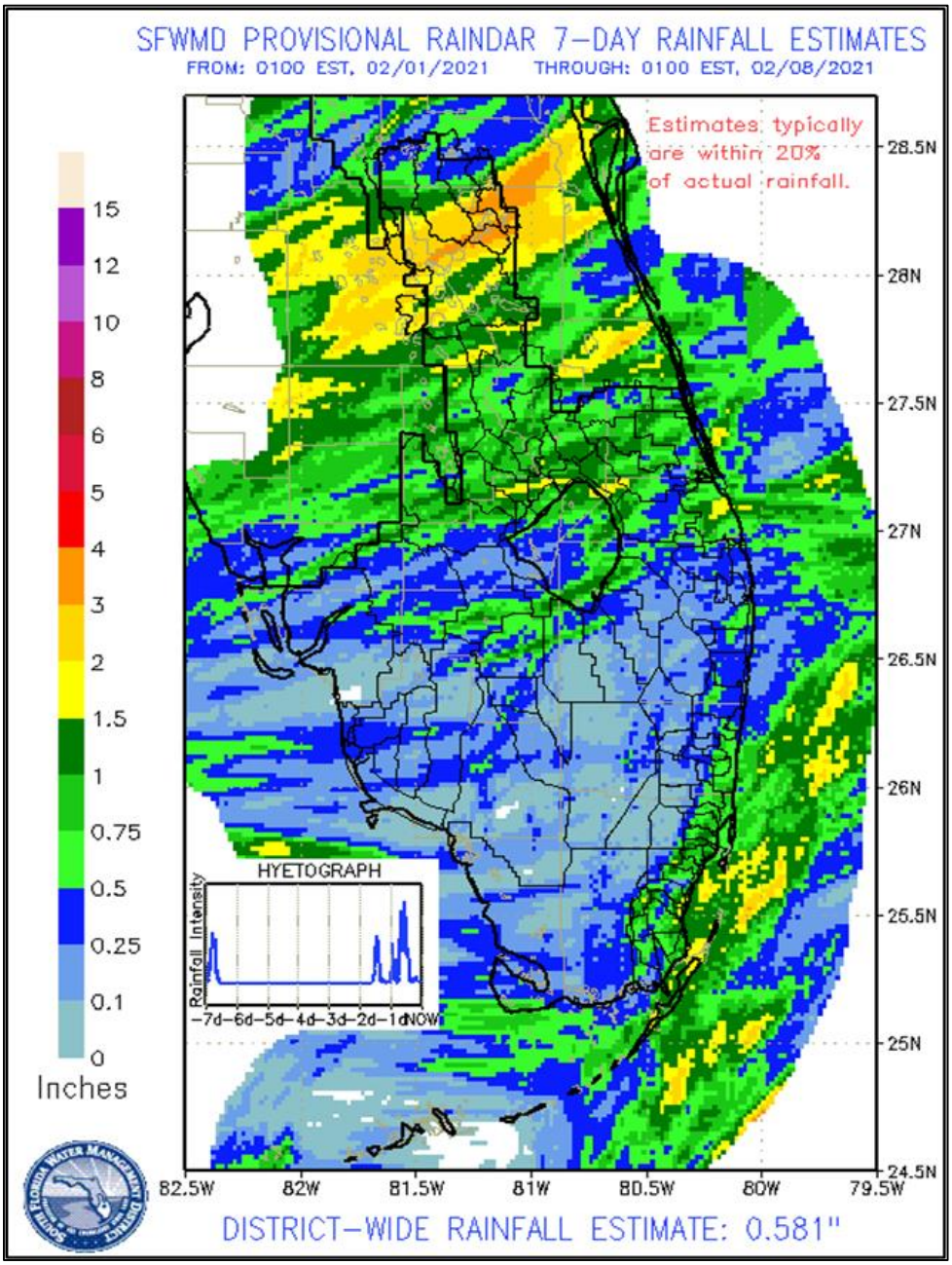
Figure 6. STA-5/6 Weekly Status Report (Flow-ways 6 – 8)

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. At risk means the vegetation health is so poor that the cell is near failure and may require substantial repair or restart. 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.

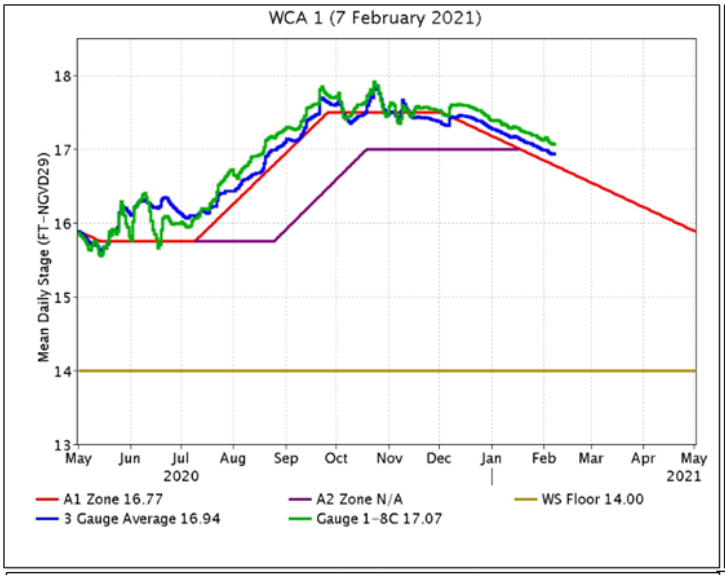
EVERGLADES

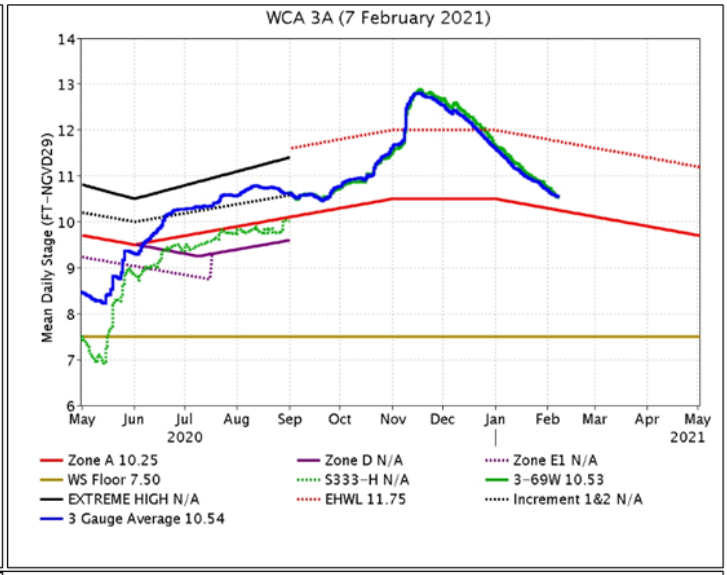
The Everglades received widespread rainfall over the last week, and recession rates slowed in the WCAs. At the gauges monitored for this report, stages fell 0.10 feet on average last week. Evaporation was 1.06 inches last week, a 0.26-inch increase over the last two weeks.

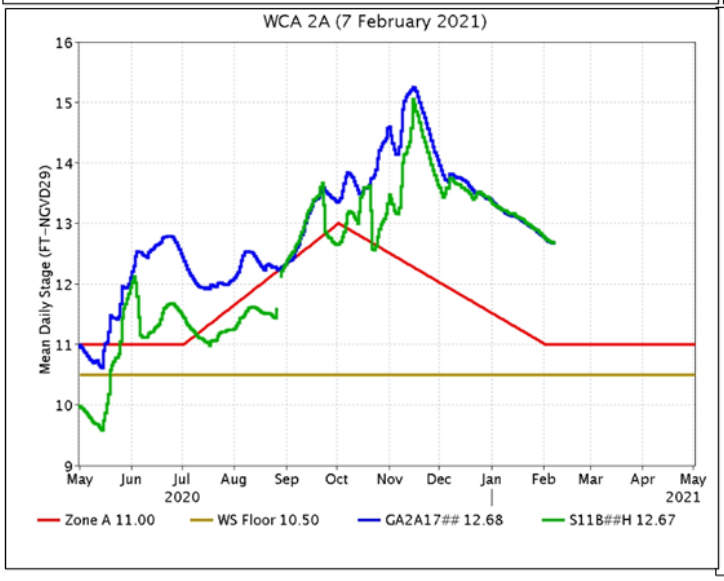


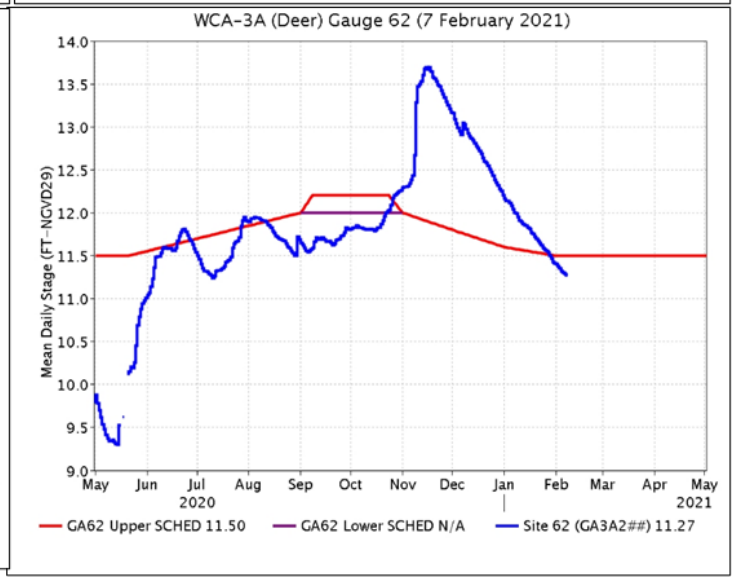
Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.18	−0.06
WCA-2A	0.19	−0.11
WCA-2B	0.15	−0.13
WCA-3A	0.14	−0.15
WCA-3B	0.08	−0.13
ENP	0.23	+0.10

Regulation Schedules: WCA-1: Stage at the 1-8C Gauge is trending parallel with the regulation schedule, now 0.30 feet above the falling Zone A1 regulation line. WCA-2A: The recession in stage at S11B-HW remained parallel to the regulation line last week; 1.67 feet above the flat schedule. WCA-3A: The Three-Gauge average stage continued its steady recession towards the falling Zone A regulation line last week, currently 0.29 feet above. WCA-3A: Stage at gauge 62 (Northwest corner) continues a steady decline, now below the steady Upper Schedule by 0.23 feet.

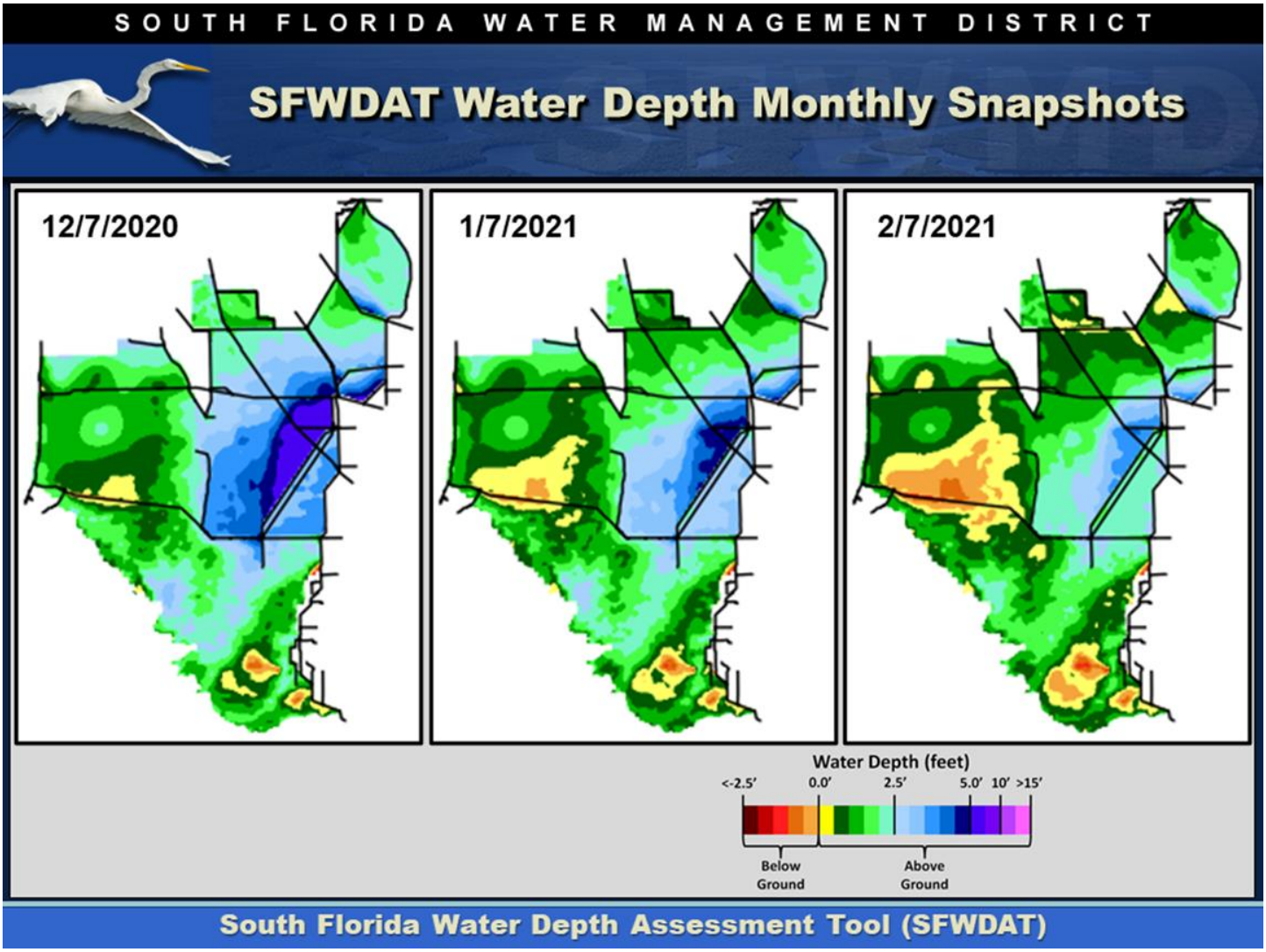


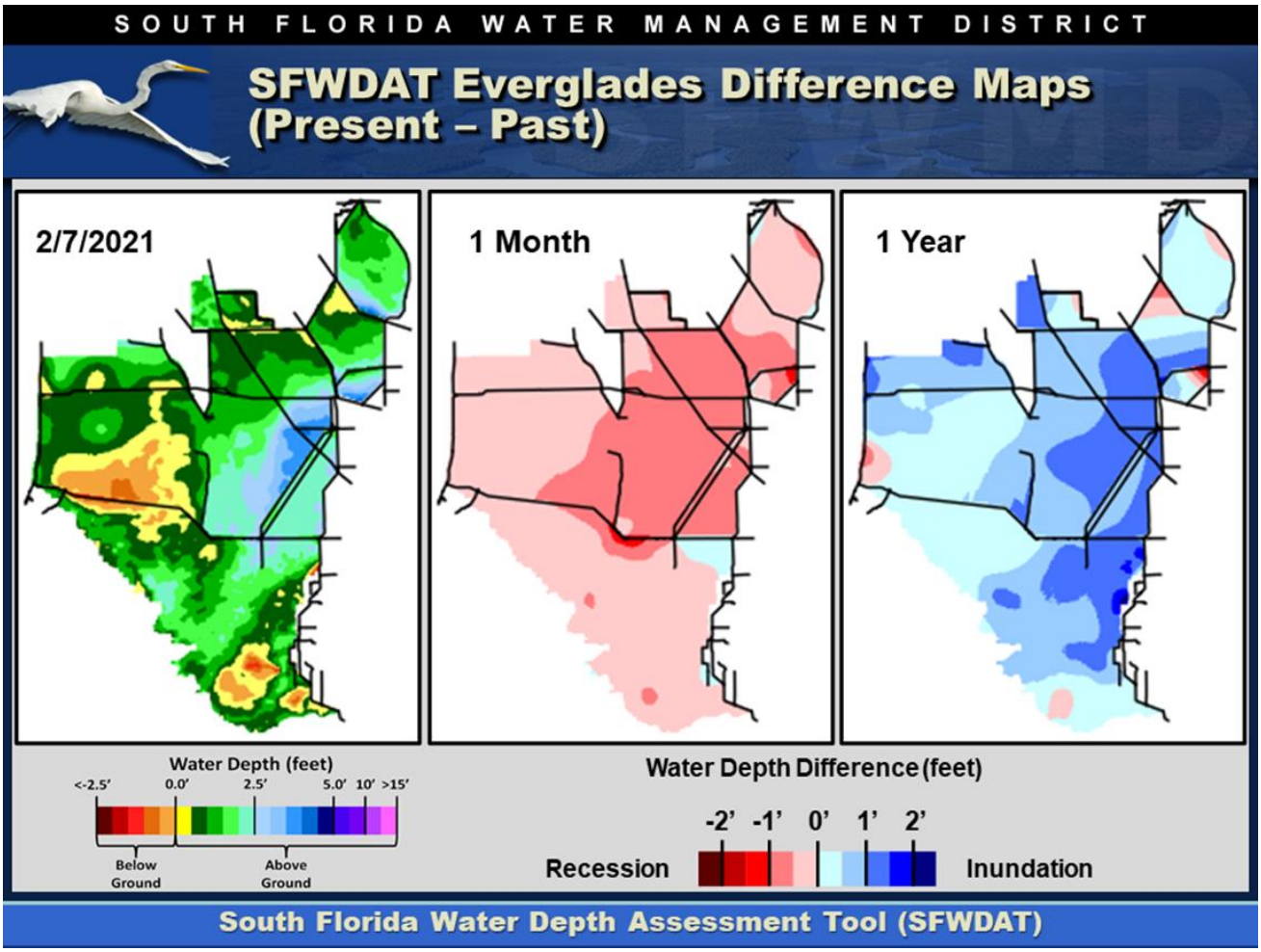






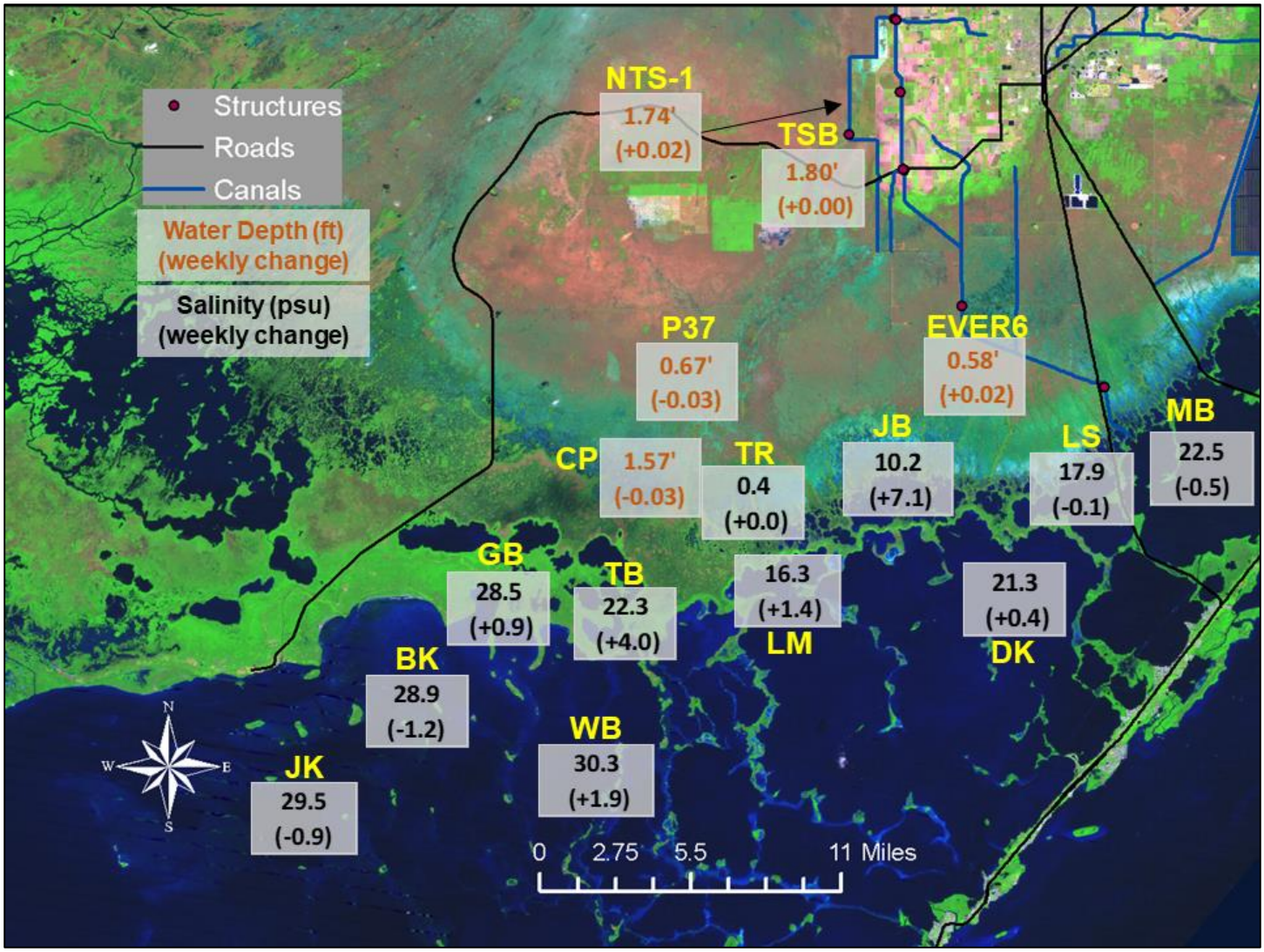
The water depth assessment tool (WDAT) for spatial interpolation of depth monthly snapshots indicate that WCA-2A is drying down quickly in the north with depths potentially at the soil surface. The northern half of WCA-3A North, particularly west of the Miami Canal, is now potentially within 1.0 feet of the soil surface, and depths in the northeast are beginning to reach soil surface. Hydrologic connectivity remains established within the major sloughs in Everglades National Park (ENP), as conditions begin to dry down in the western marl prairies and large portions of southwestern Big Cypress National Preserve (BCNP). Comparing WDAT water levels from present, over the last month stages fell significantly across WCA-3A and southern WCA-2A more so downstream of S-12A in ENP. Looking back one year, the stage difference patterns are strikingly different than one month ago. Compared to one year ago, WCA-3A is deeper, most significantly on eastern side along the L-67-S. Northern WCA-2A is trending shallower, and the southern end is deeper than it was a year ago.

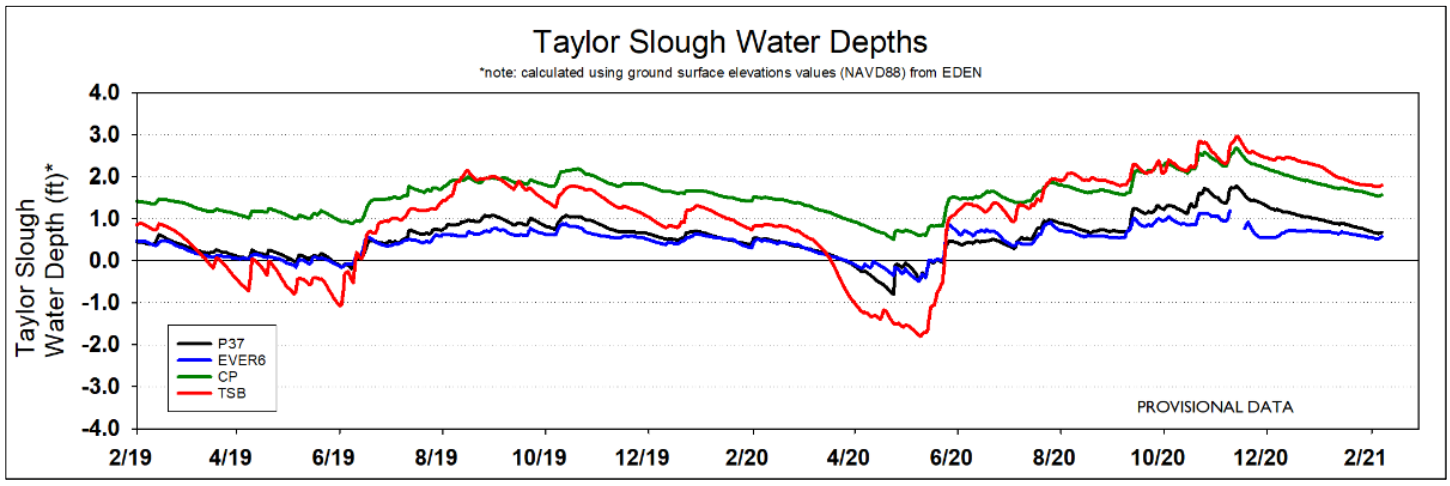




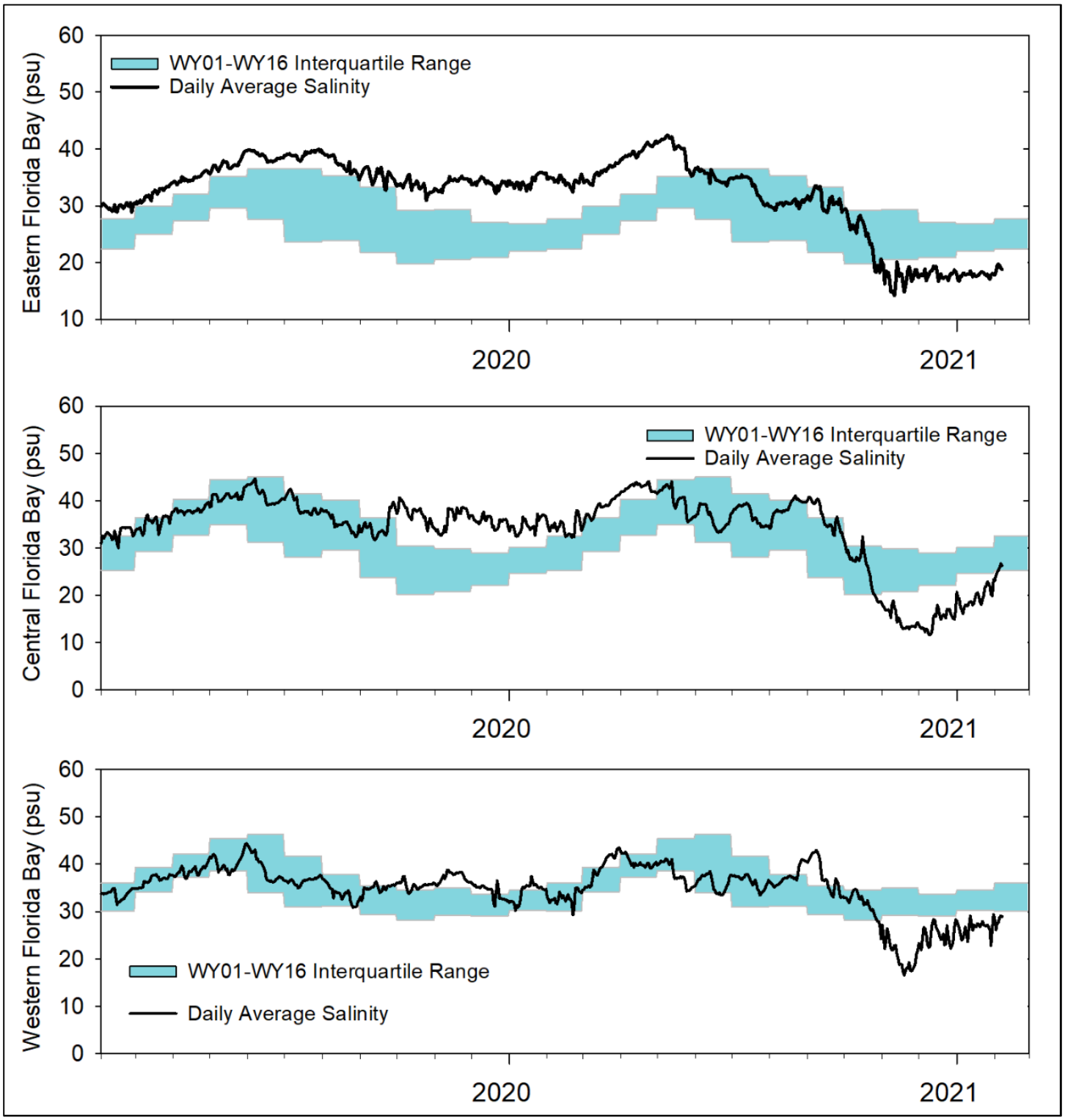
Tree island inundation in WCA-3A, WCA-3B and ENP: 371 Tree Islands of known elevation within WCA-3A, -3B, and ENP's Shark Slough. Current preliminary estimates using WDAT indicate that 42% or 156 of the tree islands are currently inundated (down from 46% the week prior), and 42% of those islands have been inundated for more than 120 days. Inundation for more than 120 days will cause ecological harm to sensitive islands.

Taylor Slough Water Levels: An average of 0.36 inches of rain fell over Taylor Slough and Florida Bay this week, and water levels in Taylor Slough decreased by only 0.004 feet over the week. The only stations that increased over the week were the ones closest to the L31W (example: NTS-1) or the C-111 canal (example: EVER6). Taylor Slough is still averaging 9 inches higher than the historical average for this time of year, and the northern portion of the slough is 20 inches higher than the average for this time of year, which is a good position for early 2021. Downstream water levels are slowly receding at a rate of 0.03 feet per week.

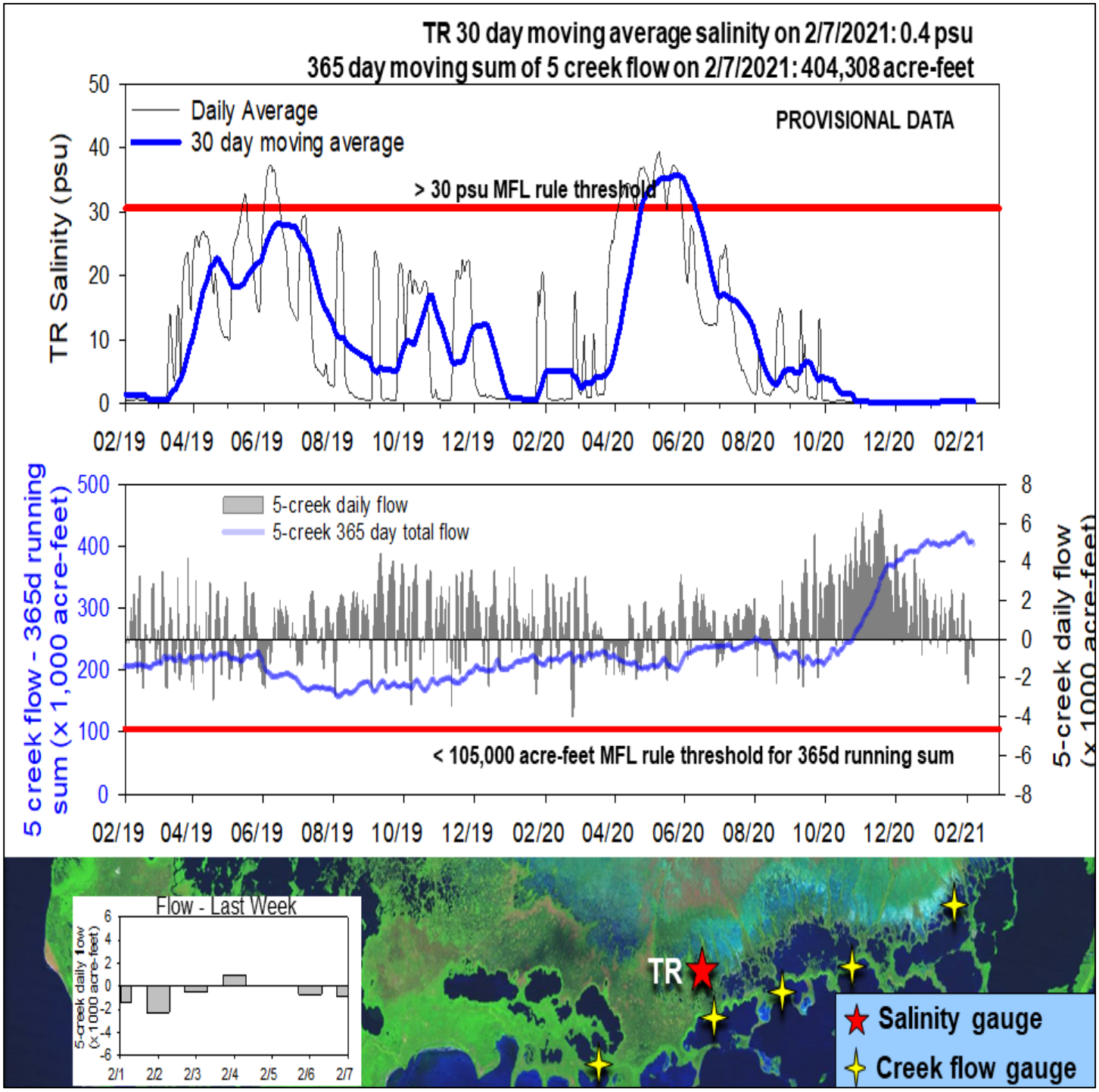

Structures
Roads
Canals
Water Depth (ft) (weekly change)
Salinity (psu) (weekly change)
NTS-1
1.74'
(+0.02)
TSB
1.80'
(+0.00)
P37
0.67'
(-0.03)
EVER6
0.58'
(+0.02)
CP
1.57'
(-0.03)
TR
0.4
(+0.0)
JB
10.2
(+7.1)
LS
17.9
(-0.1)
MB
22.5
(-0.5)
GB
28.5
(+0.9)
TB
22.3
(+4.0)
16.3
(+1.4)
LM
21.3
(+0.4)
DK
BK
28.9
(-1.2)
WB
30.3
(+1.9)
JK
29.5
(-0.9)
N
W
E
S
0
2.75
5.5
11 Miles


Taylor Slough Water Depths
*note: calculated using ground surface elevations values (NAVD88) from EDEN
Taylor Slough Water Depth (ft)*
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
2/19
4/19
6/19
8/19
10/19
12/19
2/20
4/20
6/20
8/20
10/20
12/20
2/21
P37
EVER6
CP
TSB
PROVISIONAL DATA

Florida Bay Salinities: Salinities in Florida Bay averaged a 1.5 increase over the week with individual station changes ranging from -1.2 in the western Bay to +7.1 in the northeastern nearshore. Bay-wide salinity is 4 lower than the historical average for this time of year. All stations are at or below their historical averages with the eastern Bay (DK) being the furthest from the average (6 lower). The nearshore area averages 3 below the historical average for this time of year.



Florida Bay MFL: The salinity at the TR station in the mangrove zone (tracked for the Florida Bay Minimum Flows and Levels (MFL)) has continued to be near fresh (<0.4) but is very slowly rising, as is normal for this time of year. The 30-day moving average has also remained low at 0.4. Weekly flow from the 5 creeks identified by yellow stars on the map totaled about -4,600 ac-ft. This is the first time that weekly flow totals have been negative since August 2020. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) ended at 404,308 ac-ft this week, which is 14,000 ac-ft less than last week. Conditions are still higher than the 95th percentile of historical data (390,830 ac-ft). Creek flows are provisional USGS data.



Water Management Recommendations

As expected, wading birds are responding to the nearly optimal foraging conditions in WCA-3A North and northern WCA-2A. Moderating the recession rates in those areas to 0.05 - 0.07 feet per week would have ecological benefit, as it would extend the time that foraging conditions will remain optimal in those areas. Slower recession rates in the northern Everglades conserves water and protects peat soils later in the dry season.

At this point in the dry season, maintaining the recession where possible in WCA-3A South and Central, even when faster than traditional (but less than 0.20 feet per week) ecological recession rate recommendations, has ecological benefit of reducing tree island flooding stress.

Reversals in northeastern Shark River Slough are not ecologically detrimental at this point in the season, as wading bird foraging can remain favorable along the fringes of the slough. Continued flows towards Taylor Slough and Florida Bay maintain hydration in the marshes and lower salinity conditions within the nearshore areas of Florida Bay and will provide a freshwater buffer against the drier-than-average dry season that is expected, which would delay the start of the salinity increases that occur within the dry season and possibly prevent the occurrence of extreme hypersalinity towards the end of the dry season.

More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

SFWMD Everglades Ecological Recommendations, February 9th, 2021 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.06'	Maintain marsh stage slightly above and parellel to the regulation schedule.	Protect within basin and downstream habitat and wildlife. Maintaining optimal recession rates prepares the habitat for conducive wading bird foraging.
WCA-2A	Stage decreased by 0.11'	Maintian the recession rate near -.05 to -.07 feet per week and maintain marsh stage above and parallel to the falling regulation schedule.	Protect within basin and downstream habitat and wildlife. Maintaining optimal recession rates prepares the habitat for conducive wading bird foraging.
WCA-2B	Stage decreased by 0.13'	Moderate the recession rate to near -.05 to -.07 feet per week.	Protect within basin and downstream habitat and wildlife from flooding stress.
WCA-3A NE	Stage decreased by 0.15'	Moderate the recession rate to near -.05 to -.07 feet per week.	Protect within basin and downstream habitat and wildlife. Moderating the recession preserves peat soils and extends the time that foraging is optimal on the landscape.
WCA-3A NW	Stage decreased by 0.14'	Moderate the recession rate to near -.05 to -.07 feet per week.	
Central WCA-3A S	Stage decreased by 0.19'	Maintain the recession rate up to 0.20 feet per week to return marsh stage to more average conditions.	Protect within basin, upstream/downstream habitat and wildlife. Tree island ecology is diminished by flooding
Southern WCA-3A S	Stage decreased by 0.13'		
WCA-3B	Stage decreased by 0.13'	Maintain the recession rate to lower marsh stage.	Protect within basin and downstream habitat and wildlife from flooding stress. Tree island ecology is diminished by flooding
ENP-SRS	Stage increased by 0.10'	Make discharges to the Park according to COP protocol as soon as conditions allow.	Protect within basin and upstream habitat and wildlife from flooding stress.
Taylor Slough	Stage changes ranged from −0.03' to +0.02'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −1.2 to +7.1 psu	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.