

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:** March 3, 2021

**SUBJECT:** Weekly Environmental Conditions for Systems Operations

### **Summary**

#### **Weather Conditions and Forecast**

A cold front associated with a low-pressure system will push into the northwestern half of the District Wednesday morning, preceded by very fast-moving, light to possibly moderately heavy rains. The rains are forecast to diminish in coverage and intensity by the time the cold front reaches an upper-east coast-Lake Okeechobee-Naples line by early afternoon. Generally light areal average rainfall is expected over parts of the southeastern half of the District during the afternoon before the front moves south. Breezy southwesterly winds ahead of it will cause temperatures to rise into the upper 80's in the southeast prior to the frontal passage, while a marked cooling and drying occurs behind the front over the northwestern half of the District. The cooler and drier conditions will overspread the remainder of the District after dark along with gusty northwesterly winds. Cool and dry weather is on tap for Thursday, and dry weather with slightly warmer temperatures is predicted on Friday. A notable rebound of moisture could occur ahead of a new cold front Saturday afternoon creating an environment favorable for rain. Although an increase of rain seems certain, there are large model differences about how much to rain to expect. Today's quantitative precipitation forecast (QPF) for Saturday has been noticeably reduced in agreement with the latest model output. Regardless of the exact outcome on Saturday, the cold front is likely to sweep across the District by Saturday evening. Sunday and Monday appear largely dry. However, some model solutions show moisture wrapping around the departing low pressure system in the Atlantic affecting the east coast of Florida early on Sunday before diminishing.

#### **Kissimmee**

Tuesday morning stages were 57.7 feet NGVD (0.3 feet below schedule) in East Lake Toho, 54.3 feet NGVD (0.7 feet below schedule) in Toho, and 51.8 feet NGVD (0.8 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.3 feet NGVD at S-65A and 25.9 feet NGVD at S-65D. Tuesday morning discharges were 850 cfs at S-65, 900 cfs at S-65A, 990 cfs at S-65D and 980 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 7.5 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 0.5 feet. Today's recommendation is to continue to follow the USACE request to keep S-65A discharge below 800-900 cfs to facilitate construction in the Lower Kissimmee Basin. Continue the stage recessions in Lakes Toho and East Lake Toho at ~0.18 feet/week to reach low pool on June 1. As possible, continue the recession in Kissimmee-Cypress-Hatchineha at up to 0.18 feet/week until 51 feet NGVD is reached.

#### **Lake Okeechobee**

Lake Okeechobee stage was 15.33 feet NGVD on February 28, 2021, 0.07 feet lower than last week and 0.16 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 0.56 feet above. Recent satellite imagery suggests there is little to no algal bloom activity on the Lake.

## **Estuaries**

Total inflow to the St. Lucie Estuary averaged more than 212 cfs over the past week with 33 cfs coming from Lake Okeechobee. The seven-day average salinities decreased 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 2,003 cfs over the past week with approximately 1,171 cfs coming from the Lake. Seven-day average surface salinities remained the same at S-79, Val I-75 and Cape Coral, and 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 also in the good range (10-30) for adult eastern oysters at Cape Coral, Shell Point and 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, approximately 4,600 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 107,000 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 1,552,000 ac-feet. Most STA cells are near target stage. STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7, and STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways, and STA-2 Flow-ways 2 and 3 for construction activities, in STA-1E Central Flow-way, STA-2 Flow-ways 3 and 4, STA-3/4 Central and Western Flow-ways for vegetation management 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**

Wading birds are feeding in large flocks in the western marl prairies & the northern marshes of the WCAs. Wood Storks and other wading birds continue to nest in greater numbers at colonies within ENP and WCA-3A. White Ibis in numbers are staging early at the Alley North colony. Hydrologic, foraging and current nesting conditions are indicative of a good nesting season to come. The ecology of the coast/bay continues to benefit from the freshwater flow, as those volumes decrease a slow recession has ecological benefit.

## Supporting Information

### KISSIMMEE BASIN

#### Rainfall

The Upper Kissimmee Basin received 0.02 inches of rainfall in the past week and the Lower Basin received 0.26 inches (SFWMD Daily Rainfall Report 03/01/2021).

#### Upper Kissimmee

**Table 1** lists stage and discharge for several 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 (cfs) 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: 3/2/2021

Water Body	Structure	7-day Average Discharge (cfs) <sup>1</sup>	Stage Monitoring Site <sup>2</sup>	Lake Stage (feet)	Schedule Type <sup>3</sup>	Schedule Stage (feet)	Daily Departure (feet)						
							2/28/21	2/21/21	2/14/21	2/7/21	1/31/21	1/24/21	1/17/21
Lakes Hart and Mary Jane	S-62	52	LKMJ	60.8	R	61.0	-0.2	-0.2	0.0	0.0	0.0	0.0	0.0
Lakes Myrtle, Preston, and Joel	S-57	27	S-57	61.1	R	61.0	0.1	0.0	0.1	0.1	0.0	0.1	0.0
Alligator Chain	S-60	10	ALLI	64.0	R	64.0	0.0	0.0	0.1	0.1	-0.1	-0.1	0.0
Lake Gentry	S-63	12	LKGT	61.4	R	61.5	-0.1	-0.1	0.0	0.1	0.0	0.0	0.0
East Lake Toho	S-59	200	TOHOE	57.7	R	58.0	-0.3	-0.1	-0.2	-0.3	-0.3	-0.1	0.0
Lake Toho	S-61	604	TOHOW, S-61	54.4	R	55.0	-0.6	-0.4	-0.4	-0.4	-0.3	-0.1	0.0
Lakes Kissimmee, Cypress, and Hatchineha	S-65	856	KUB011, LKIS5B	51.8	R	51.1	0.7	0.4	0.0	-0.6	-0.8	-0.6	-0.5

<sup>1</sup> Seven-day average of weighted daily means through midnight.

<sup>2</sup> Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.

<sup>3</sup> 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. **Figures 6-8** are included for reference: **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: 3/2/2021

Metric	Location	1-Day Average	Average for the Preceding 7-Days <sup>1</sup>								
		2/28/2021	2/28/21	2/21/21	2/14/21	2/7/21	1/31/21	1/24/21	1/17/21	1/10/21	1/3/21
Discharge (cfs)	S-65	914	856	835	880	894	894	869	644	540	676
Discharge (cfs)	S-65A <sup>2</sup>	895	897	901	887	882	892	856	641	600	733
Discharge (cfs)	S-65D <sup>2</sup>	933	1,012	1,038	946	934	914	838	701	770	944
Headwater Stage (feet NGVD)	S-65D <sup>2</sup>	25.85	25.80	25.80	25.87	25.79	25.83	25.79	25.87	25.85	25.80
Discharge (cfs)	S-65E <sup>2</sup>	914	1,015	1,049	942	940	873	849	719	808	944
Discharge (cfs)	S-67	0	0	0	0	0	0	0	0	0	0
DO (mg/L) <sup>3</sup>	Phases I & II/III river channel	7.7	7.5	7.0	8.7	8.7	8.1	8.8	8.3	8.4	8.4
Mean depth (feet) <sup>4</sup>	Phase I floodplain	0.49	0.53	0.59	0.41	0.38	0.38	0.36	0.33	0.40	0.50

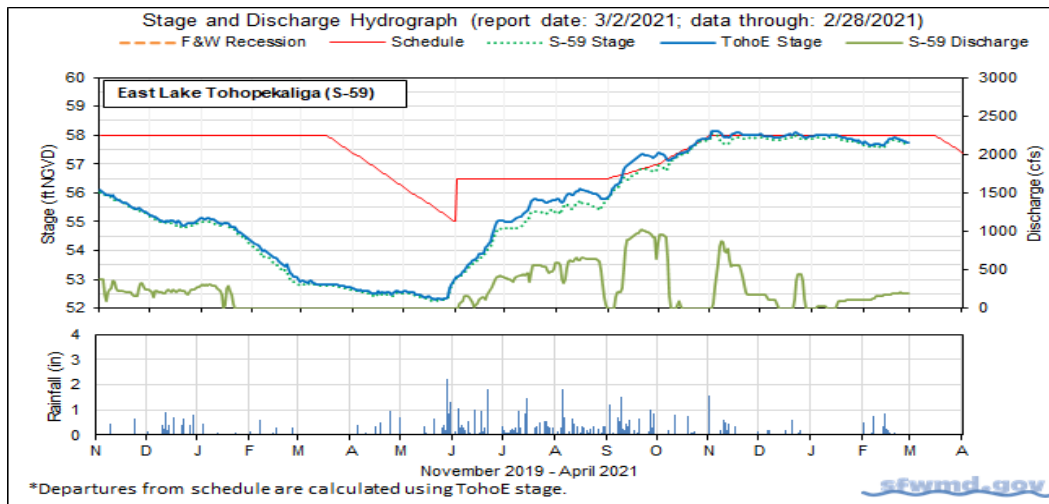
<sup>1</sup>Seven-day average of weighted daily means through Sunday midnight.

<sup>2</sup>S-65A discharge combines S-65A with auxiliary structures; 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.

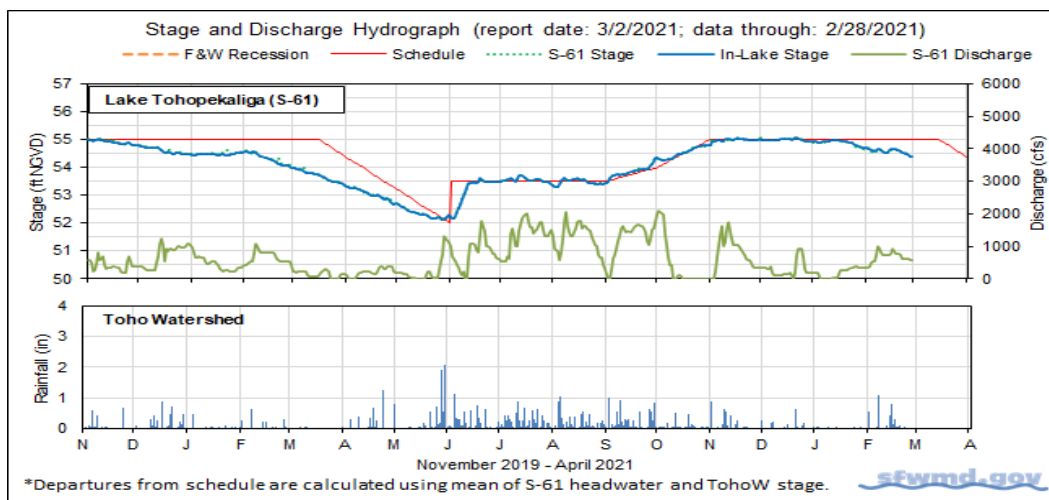
<sup>3</sup>DO is the average for sondes at KRBN, PC62, PC33, PD62R, and PD42R.

<sup>4</sup>1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).

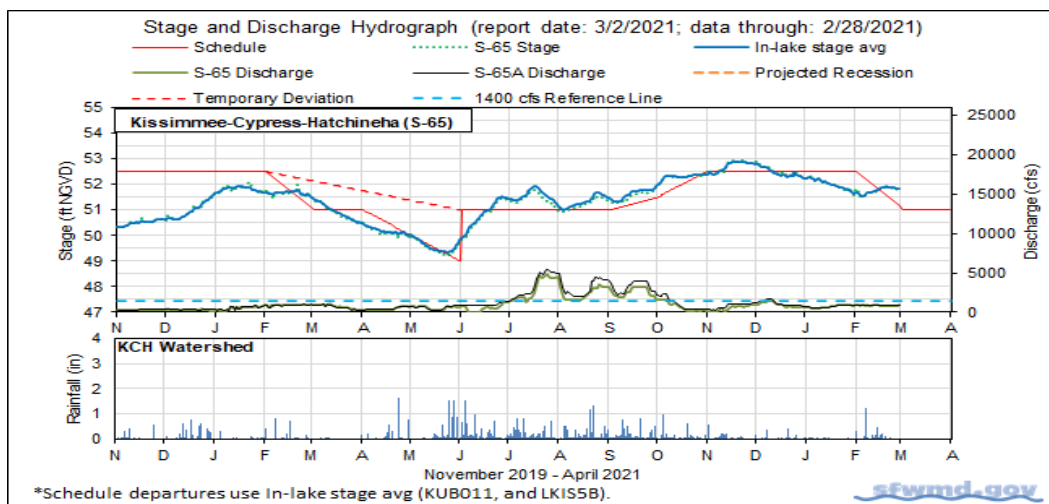
DATA ARE PROVISIONAL; N/A indicates that data were not available.



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

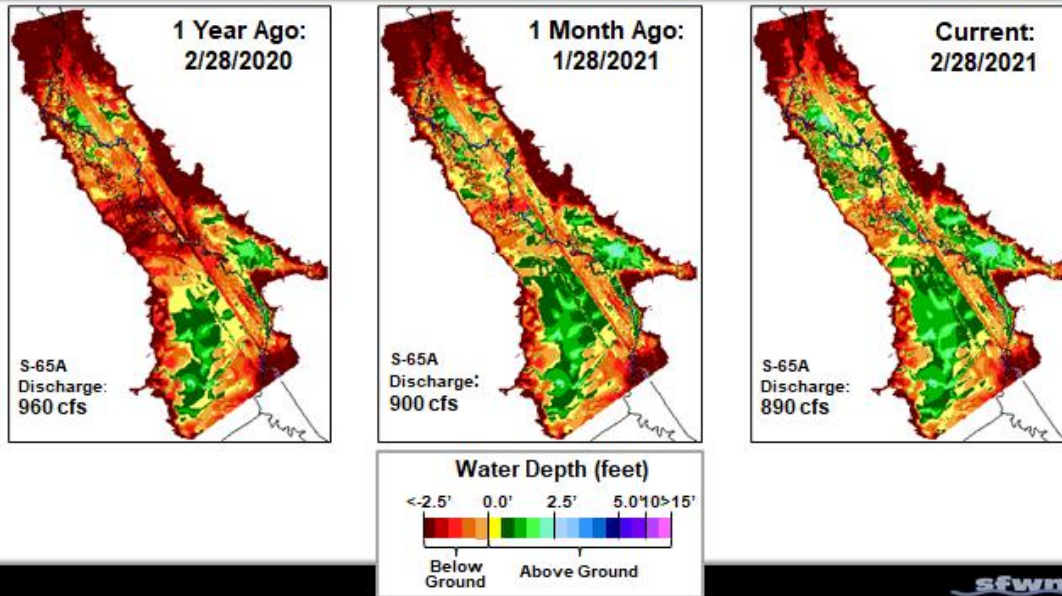


**Figure 2.** Lake Toho regulation schedule, stage, discharge and rainfall.

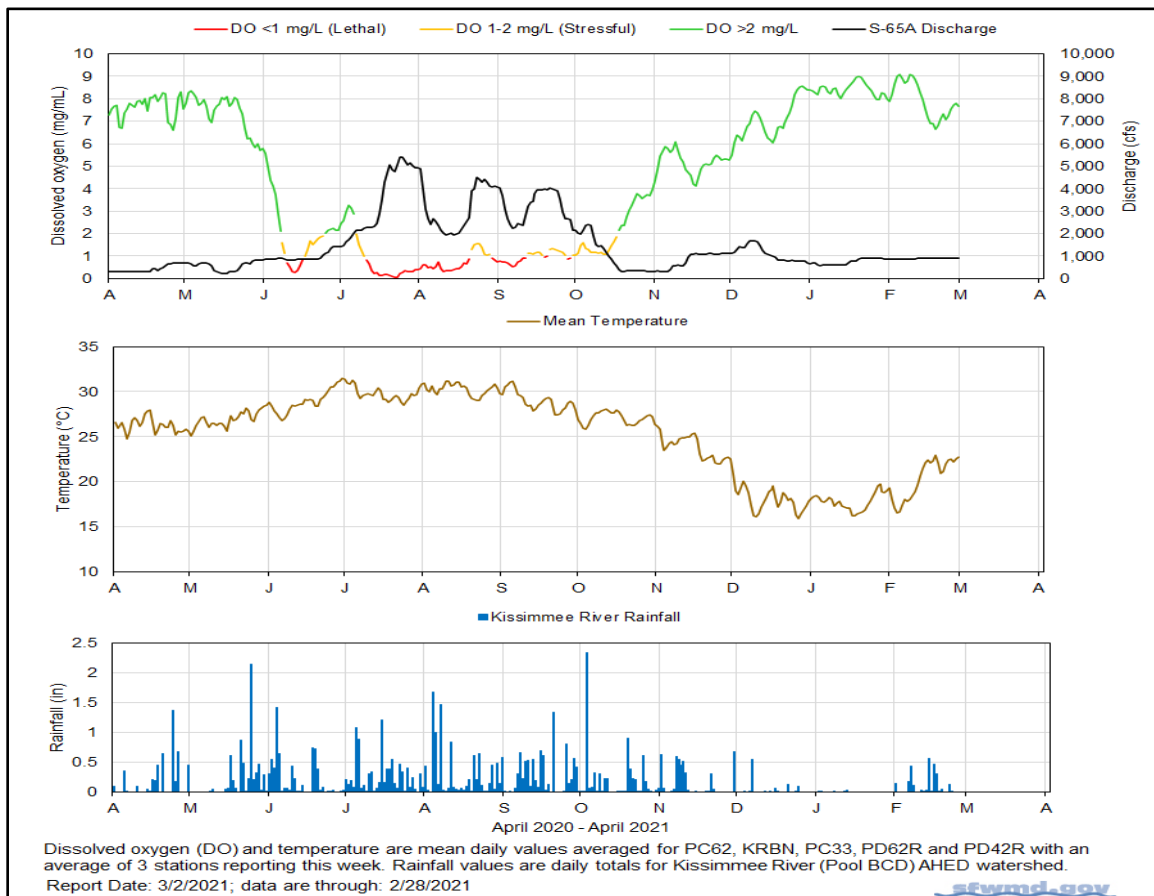


**Figure 3.** Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

## Kissimmee River Phase I Restoration Area Water Depth Maps

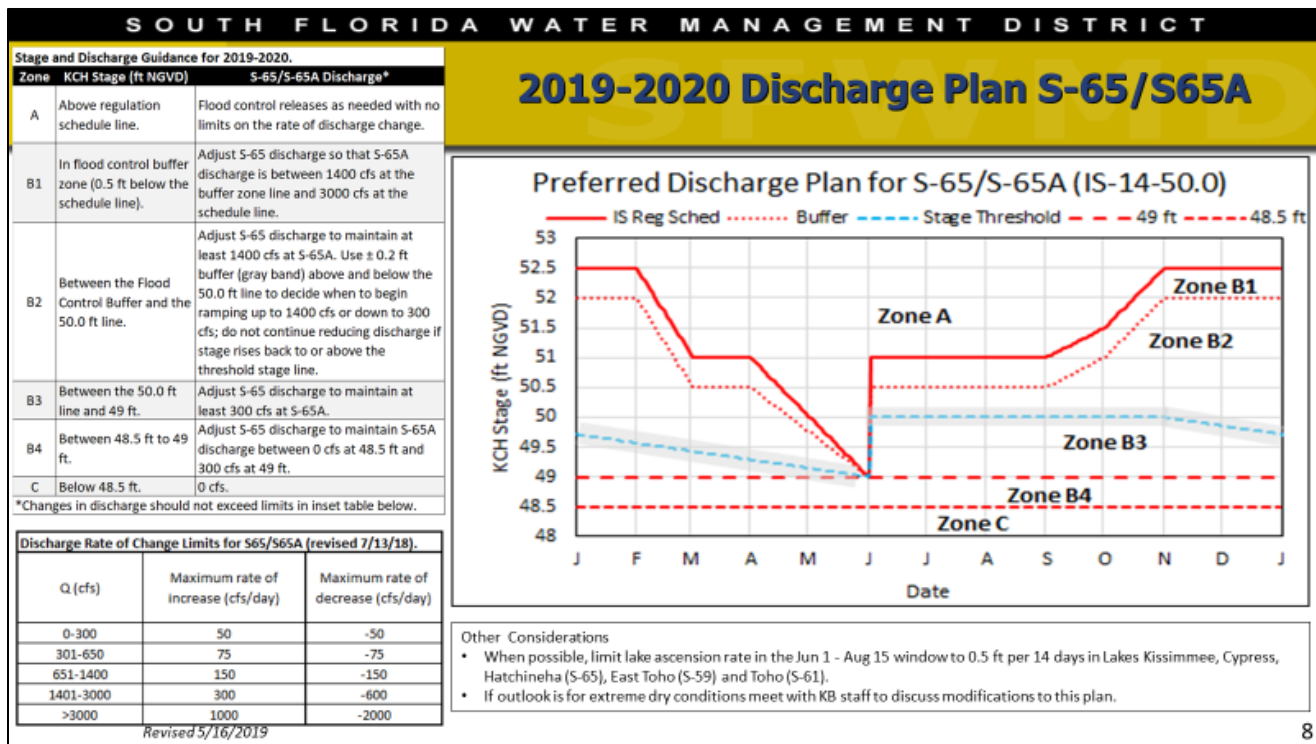


**Figure 4.** Phase I area floodplain water depths (from left to right) one year ago, one month ago and current. Color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

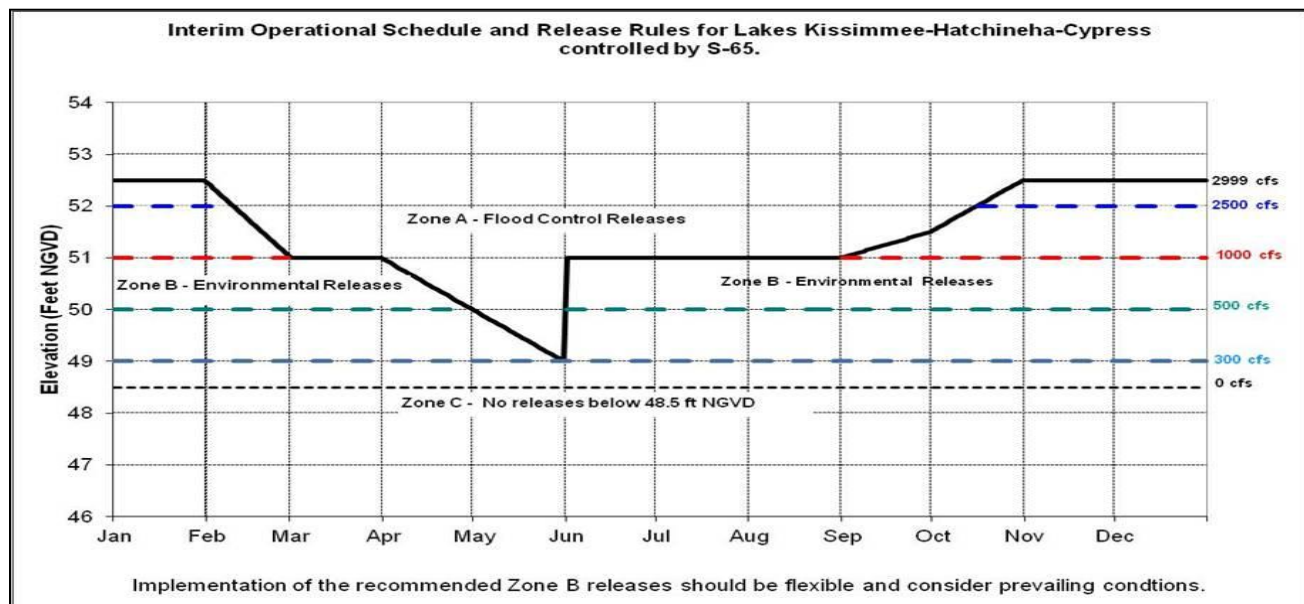


**Figure 5.** Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches)





**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.

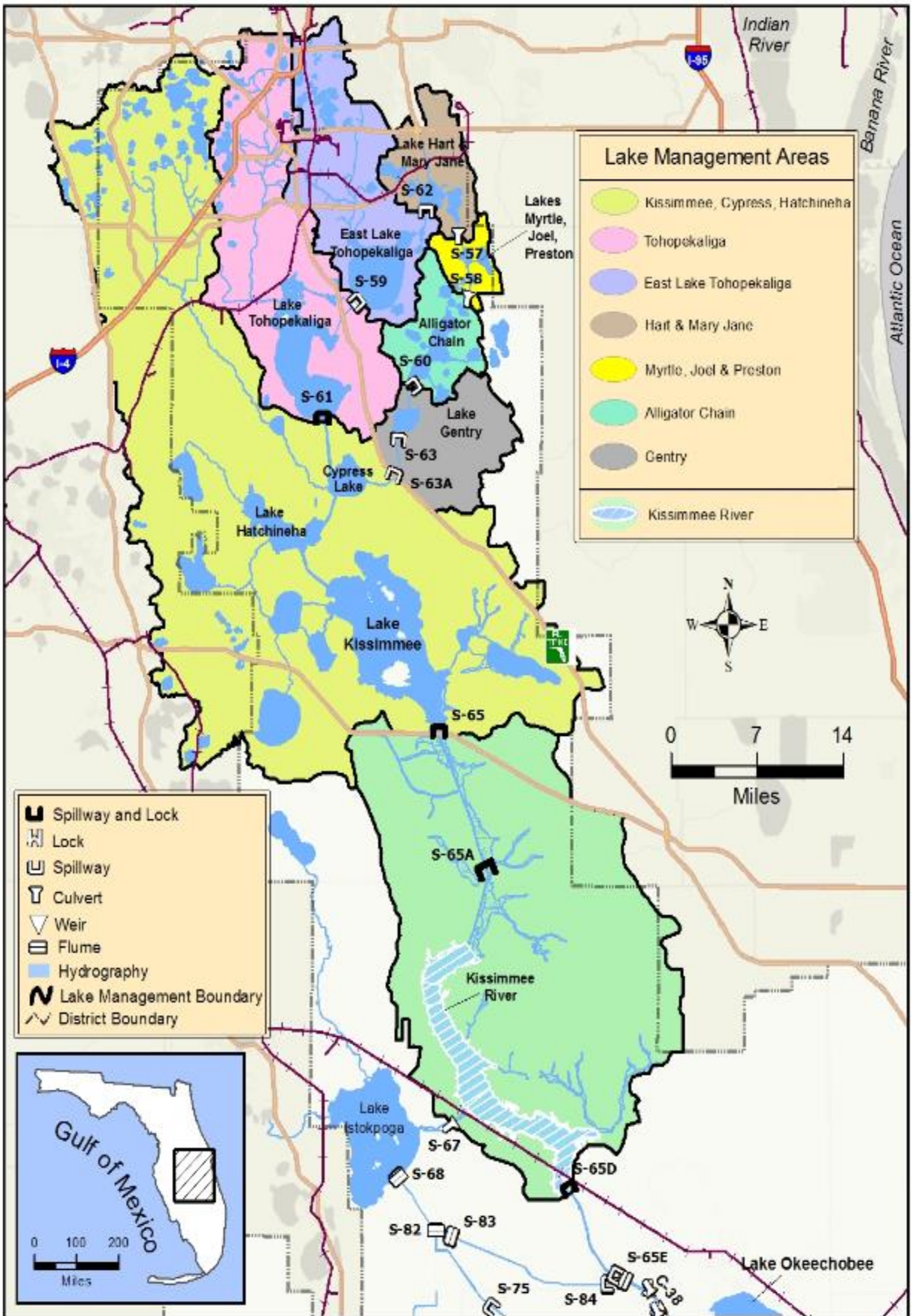


Figure 8. The Kissimmee Basin.



## **LAKE OKEECHOBEE**

Lake Okeechobee stage was 15.33 feet NGVD on February 28, 2021, 0.16 feet lower than a month ago, and 2.62 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 0.56 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 slowly since mid-November and is currently in the Low sub-band. According to NEXRAD, 0.10 inches of rain fell directly on the Lake while the Lower Kissimmee basin and the lower east coast received up to 1.5 inches (Figure 4).

Average daily inflows (excluding rainfall) decreased from the previous week going from 2,370 cubic feet per second (cfs) to 1,282 cfs. Outflows (excluding evapotranspiration) increased from 1,566 cfs to 2,784 cfs. Most of the inflows came from the Kissimmee River (1,014 cfs through S-65E & S-65EX1). Releases to the west via S-77 increased, going from 993 cfs the prior week to 1,357 cfs, while releases east via S-308 increased from 0 cfs to 154 cfs. Releases south through the S-350 structures more than doubled, going from 474 cfs to 1,111 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 most recent satellite image (February 27, 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 6).

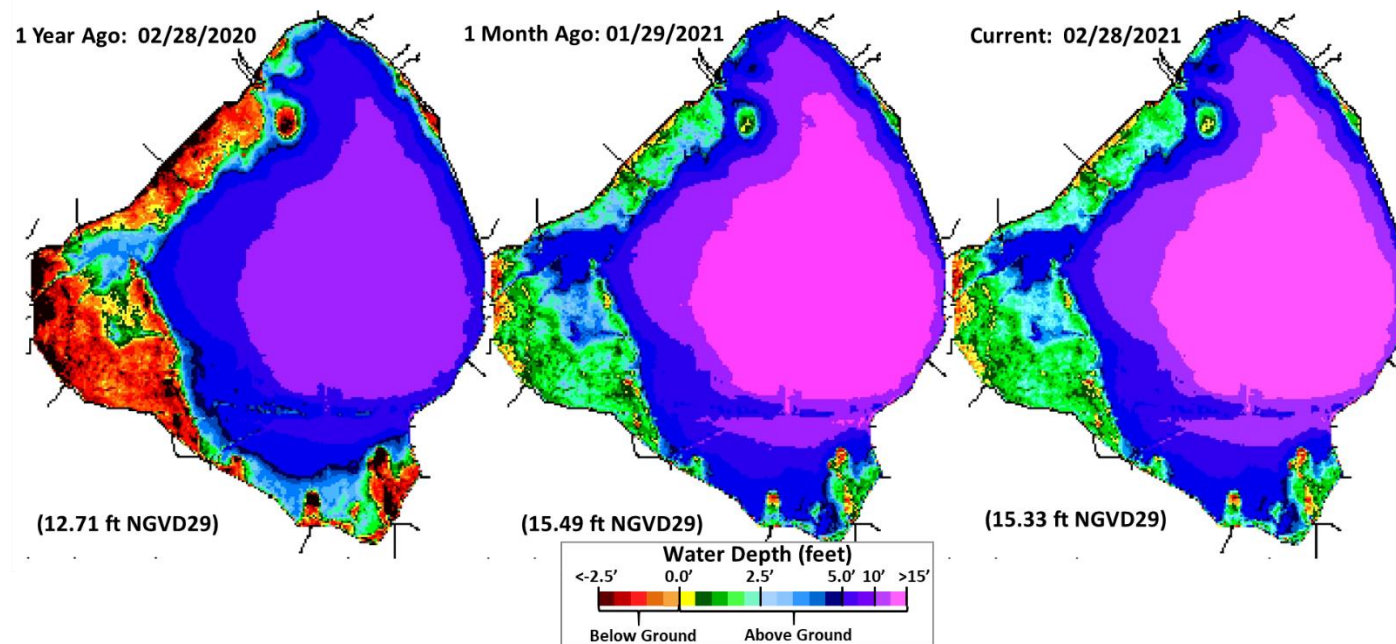
## **Water Management Summary**

Lake Okeechobee stage was 15.33 feet NGVD on February 28, 2021, 0.07 feet lower than last week and 0.16 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 0.56 feet above. Recent satellite imagery suggests there is little to no algal bloom activity on the Lake.

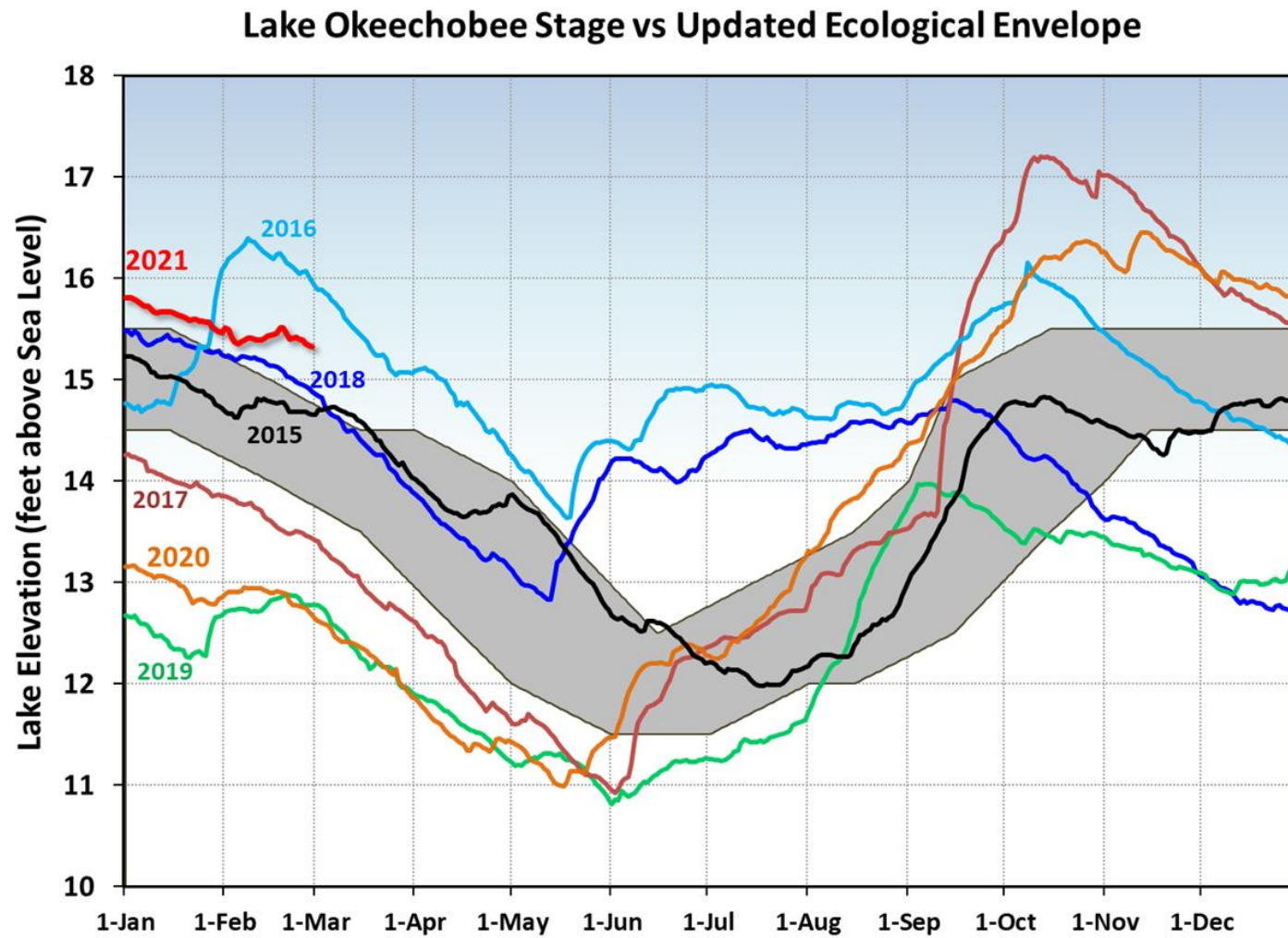
**Table 1.** Average daily inflows and outflows for the most recent two weeks and approximate depth equivalents on Lake Okeechobee for various structures.

INFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)	OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-65E & S-65EX1	1049	1014	0.4	S-77	993	1357	0.5
S-71 & S-72	193	4	0.0	S-308	0	154	0.1
S-84 & S-84X	785	11	0.0	S-351	158	97	0.0
Fisheating Creek	33	69	0.0	S-352	34	116	0.0
S-154	7	7	0.0	S-354	282	898	0.3
S-191		0	0.0	L-8 Outflow	100	161	0.1
S-133 P	56	60	0.0	ET	1645	2241	0.9
S-127 P	18	21	0.0	<b>Total</b>	<b>3212</b>	<b>5024</b>	<b>2.0</b>
S-129 P	12	6	0.0				
S-131 P	9	5	0.0				
S-135 P	205	84	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	2114	277	0.1				
<b>Total</b>	<b>4480</b>	<b>1558</b>	<b>0.6</b>				

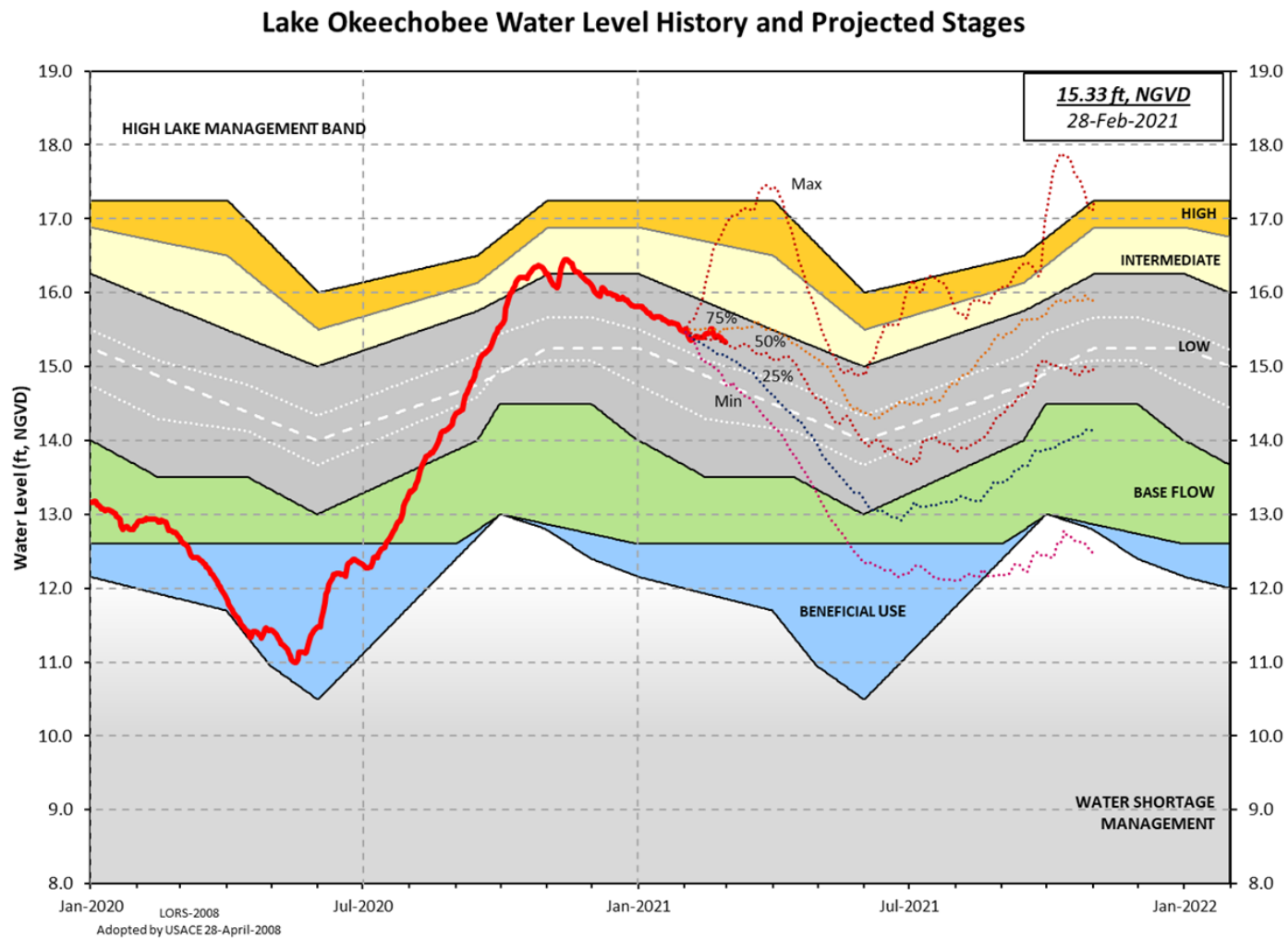
Provisional Data



**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.



SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES  
FROM: 0400 EST, 02/22/2021 THROUGH: 0400 EST, 03/01/2021

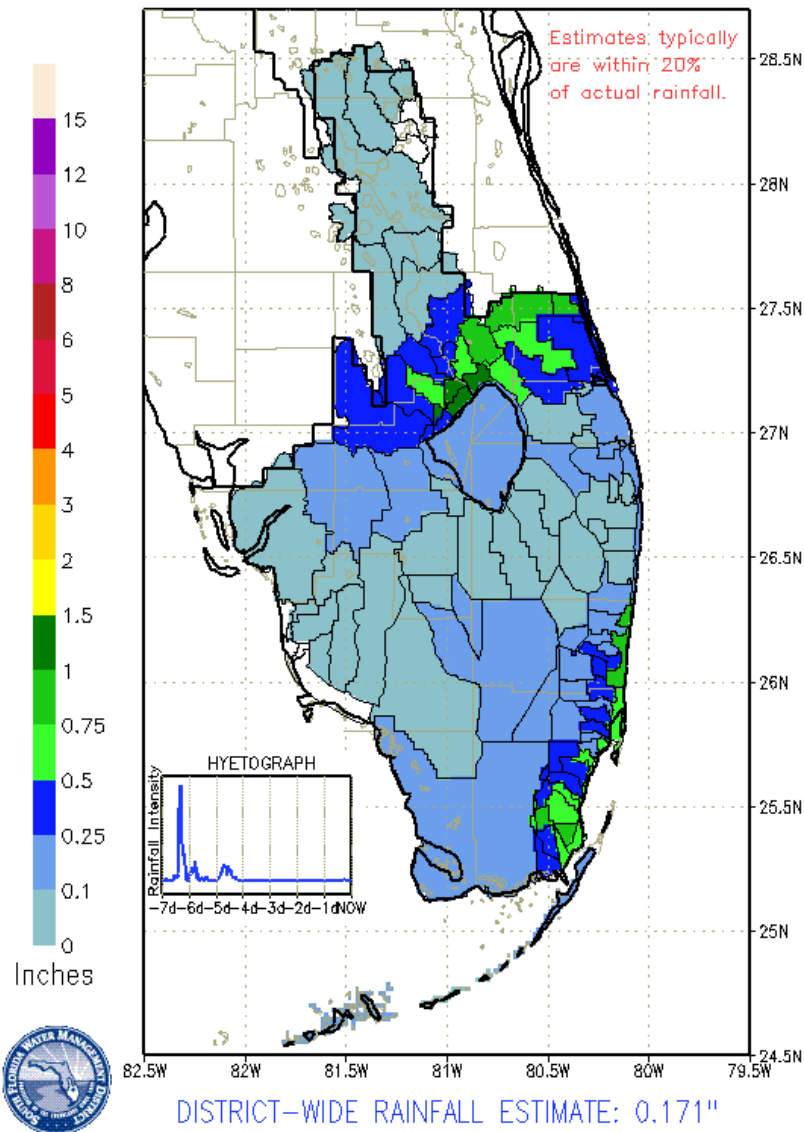


Figure 4. 7-Day rainfall estimates by RAINDAR.

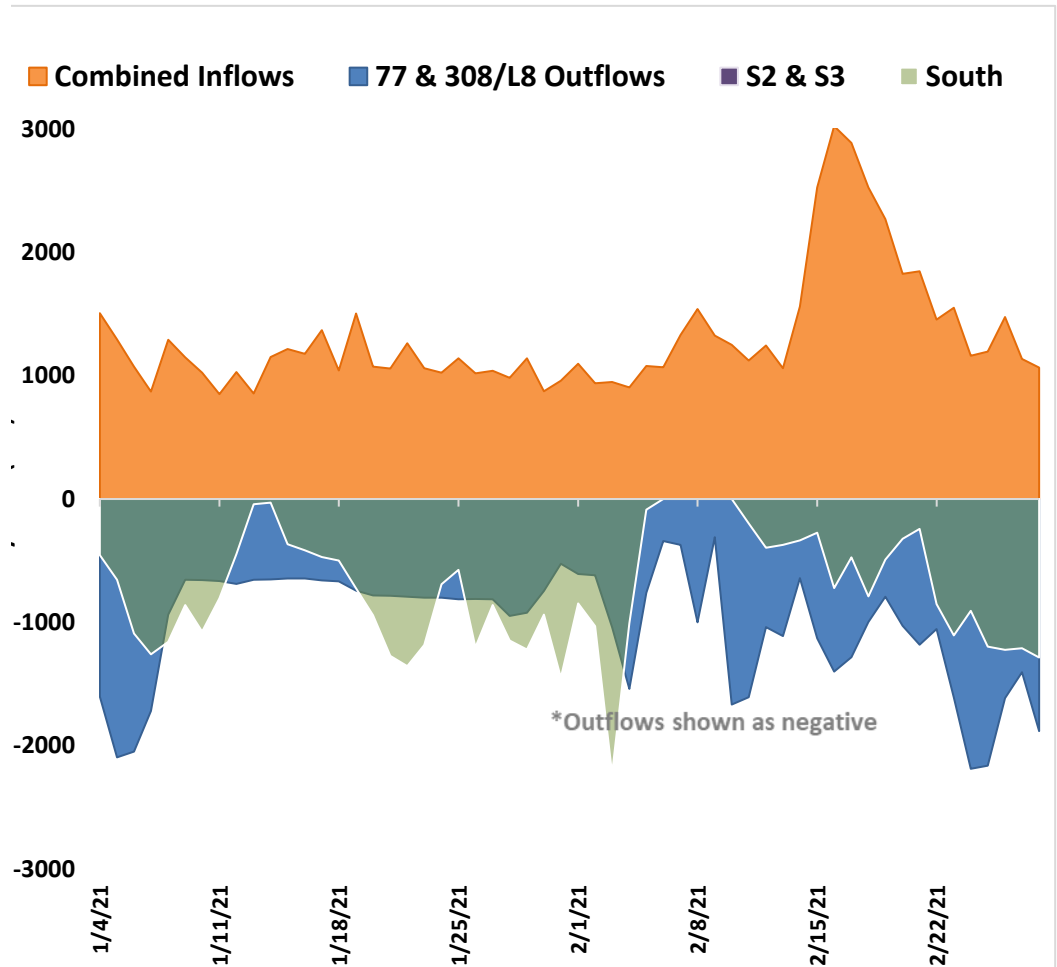
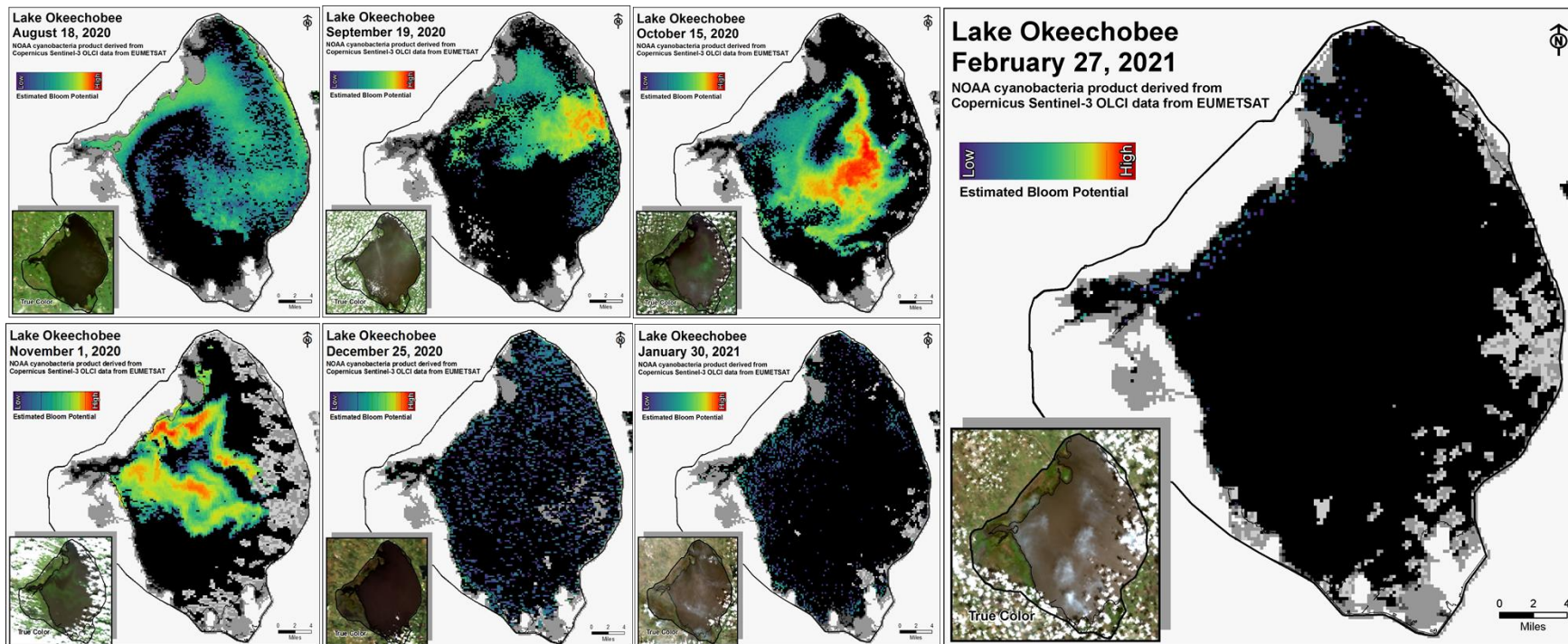


Figure 5. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive 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.** 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 approximately 212 cfs (Figures 1 and 2) and the previous 30-day inflow averaged about 415 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.

**Table 1.** Weekly average inflows (data are provisional). Note: flows for S-97 were estimated using S-48 and the Gordy Road structure was removed due to bridge construction.

<b>Location</b>	<b>Flow (cfs)</b>
S-308	154
S-80	70
S-97 on C-23	27
S-49 on C-24	0
Gordy Rd. structure on Ten Mile Creek	Not reporting
Tidal Basin Inflow	115

Over the past week, salinity decreased 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 16.7. Salinity conditions in the middle estuary are estimated to be within the good range for adult eastern oysters (Figure 4).

**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.

<b>Sampling Site</b>	<b>Surface</b>	<b>Bottom</b>	<b>Envelope</b>
HR1 (North Fork)	<b>11.0</b> (12.0)	<b>13.2</b> (16.6)	NA <sup>1</sup>
US1 Bridge	<b>16.0</b> (18.4)	<b>17.4</b> (20.2)	10.0-26.0
A1A Bridge	<b>25.1</b> (26.1)	<b>27.9</b> (28.2)	NA <sup>1</sup>

<sup>1</sup>Envelope not applicable

### **Caloosahatchee Estuary:**

Last week total inflow to the Caloosahatchee Estuary averaged approximately 2,003 cfs (Figures 5 and 6) and the previous 30-day inflow averaged about 1,656 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).

<b>Location</b>	<b>Flow (cfs)</b>
S-77	1357
S-78	1285
S-79	1921
Tidal Basin Inflow	82

Over the past week, surface salinity remained the same at S-79, Val I75 and Cape Coral, and 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, Shell Point, and Sanibel (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)	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	NA <sup>1</sup>
Val I-75	<b>0.3</b> (0.3)	<b>0.3</b> (0.3)	0.0-5.0 <sup>2</sup>
Ft. Myers Yacht Basin	<b>3.7</b> (2.5)	<b>6.0</b> (3.3)	NA
Cape Coral	<b>10.9</b> (10.9)	<b>14.0</b> (12.0)	10.0-30.0
Shell Point	<b>25.1</b> (24.5)	<b>25.9</b> (25.0)	10.0-30.0
Sanibel	<b>28.7</b> (28.6)	<b>30.6</b> (31.0)	10.0-30.0

<sup>1</sup>Envelope not applicable and <sup>2</sup>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 0.7 or lower at the end of the two week period for pulse release at S-79 ranging from 0 to 1500 cfs and steady release at S-79 of 2000 cfs. Tidal Basin inflows are estimated to be 70 cfs. The 30-day moving average surface salinity at Val I-75 is forecast to be 0.4 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

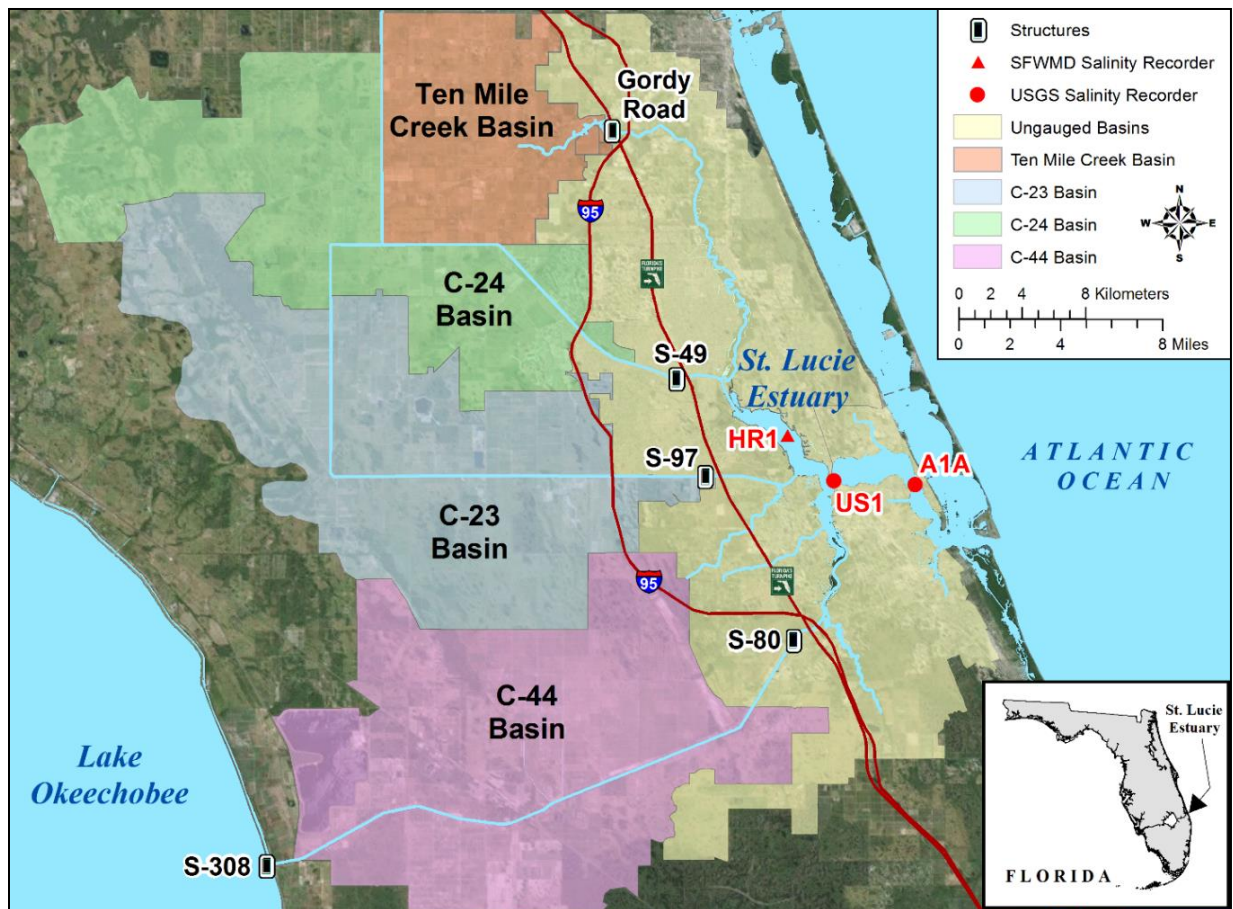
Scenario	Q79 (cfs)	TB runoff (cfs)	Daily salinity	30 day Mean
A	0	70	0.7	0.4
B	300	70	0.4	0.3
C	450	70	0.3	0.3
D	650	70	0.3	0.3
E	800	70	0.2	0.3
F	1000	70	0.2	0.3
G	1500	70	0.2	0.3
H	2000	70	0.2	0.3

### Red tide

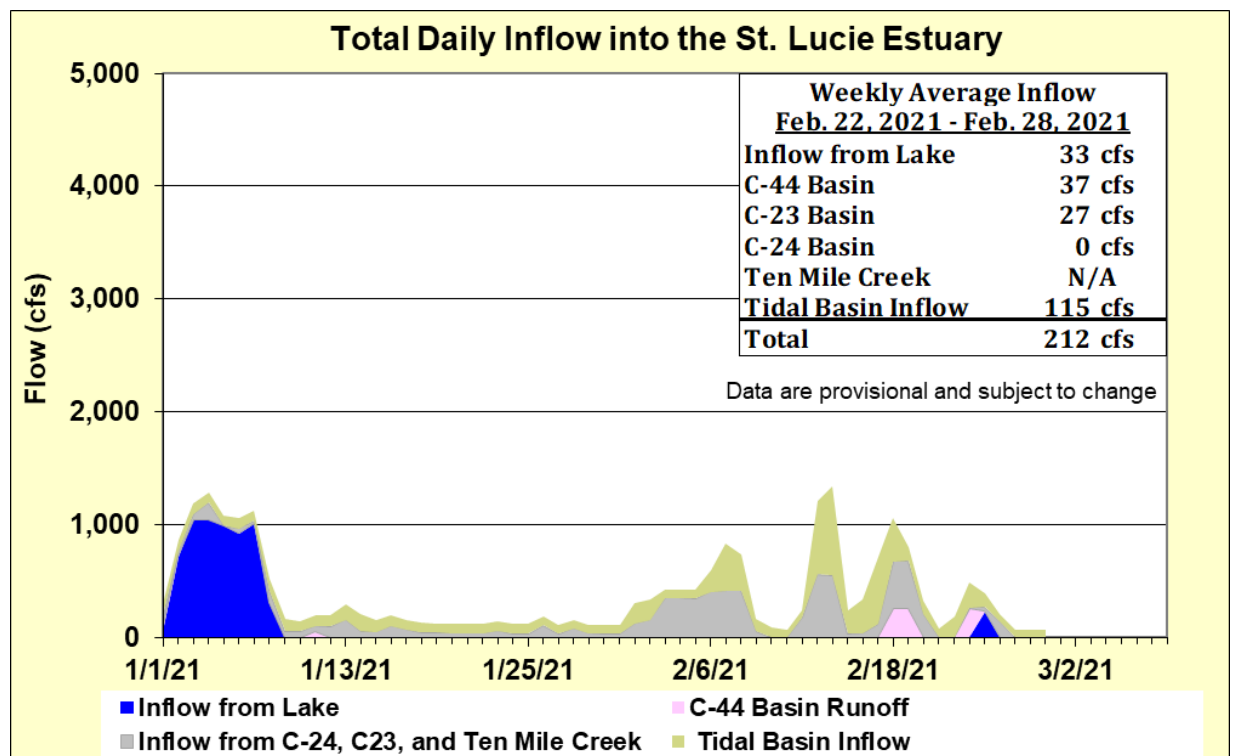
The Florida Fish and Wildlife Research Institute reported on February 26, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background to medium concentrations in and offshore of Lee County, and background to very low concentrations in Collier County. On the east coast, red tide was not observed in samples from Brevard, St. Lucie, Martin, 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.

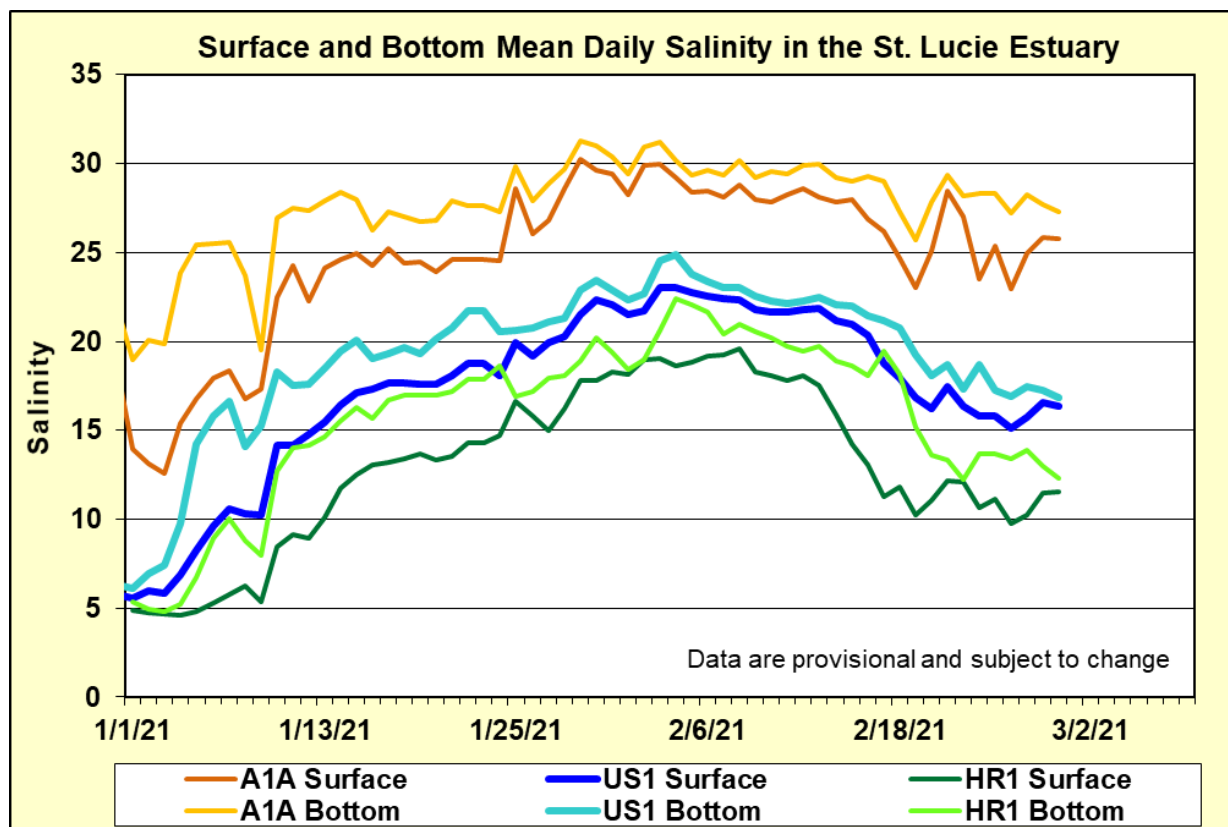


**Figure 1.** Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

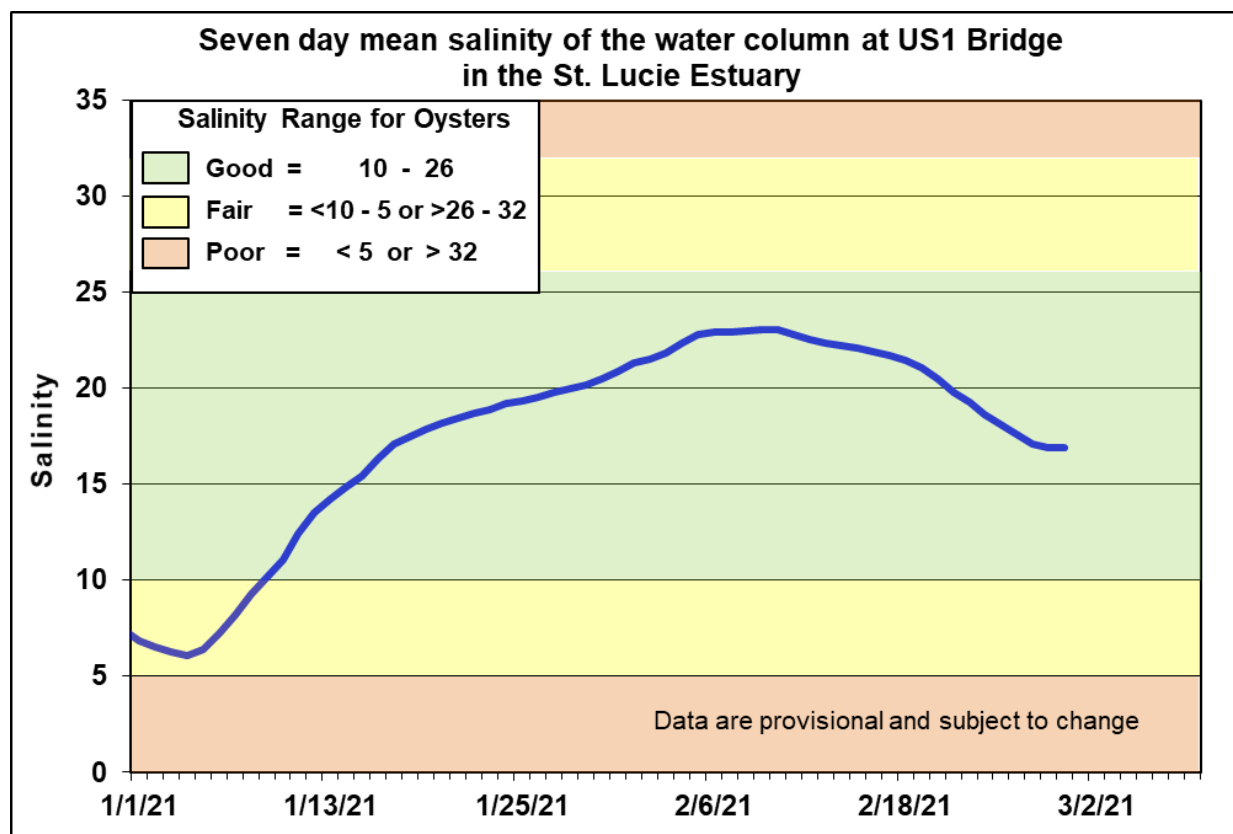


**Figure 2.** Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin into the St. Lucie Estuary. Note: C-23 Basin inflows were estimated using S-48 and the Ten Mile Creek Basin inflows are not being calculated at this time.

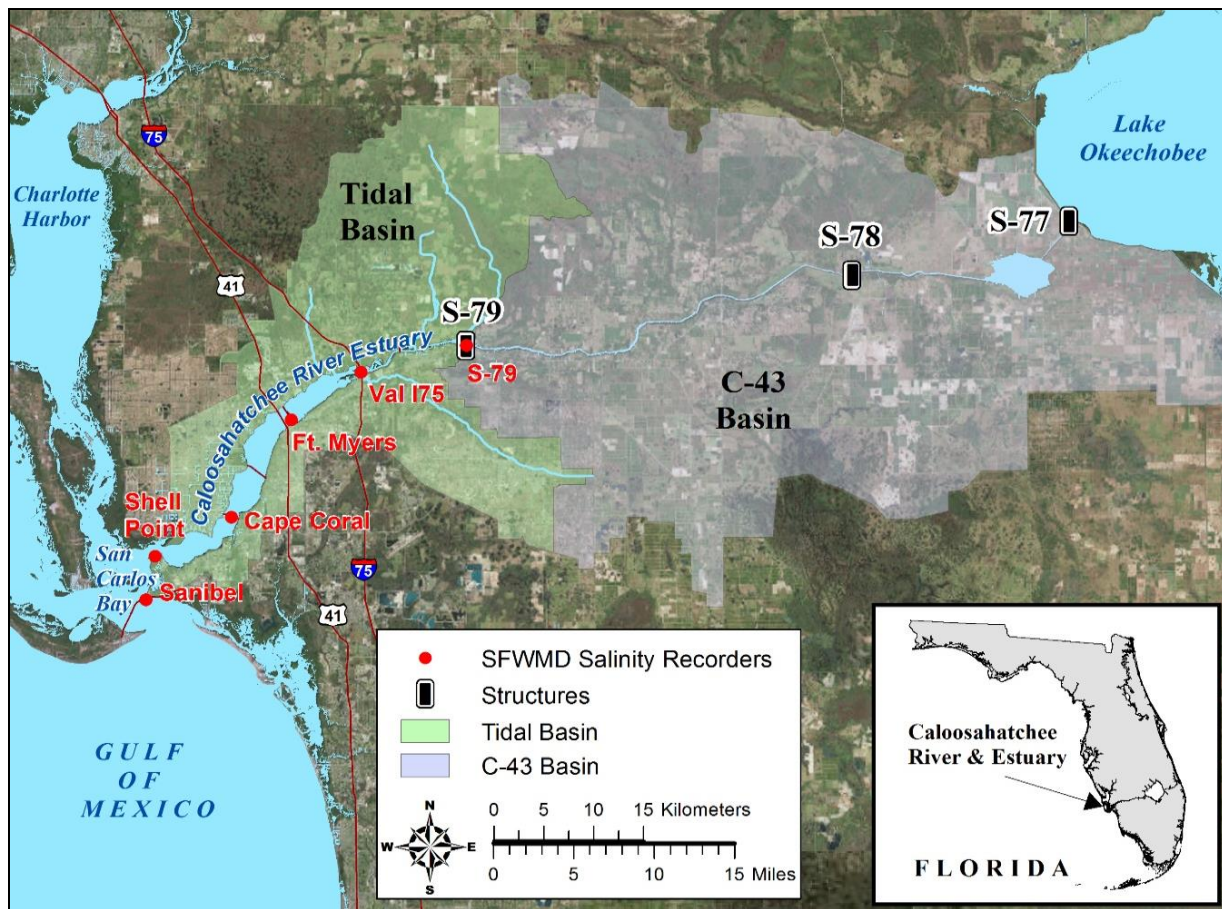




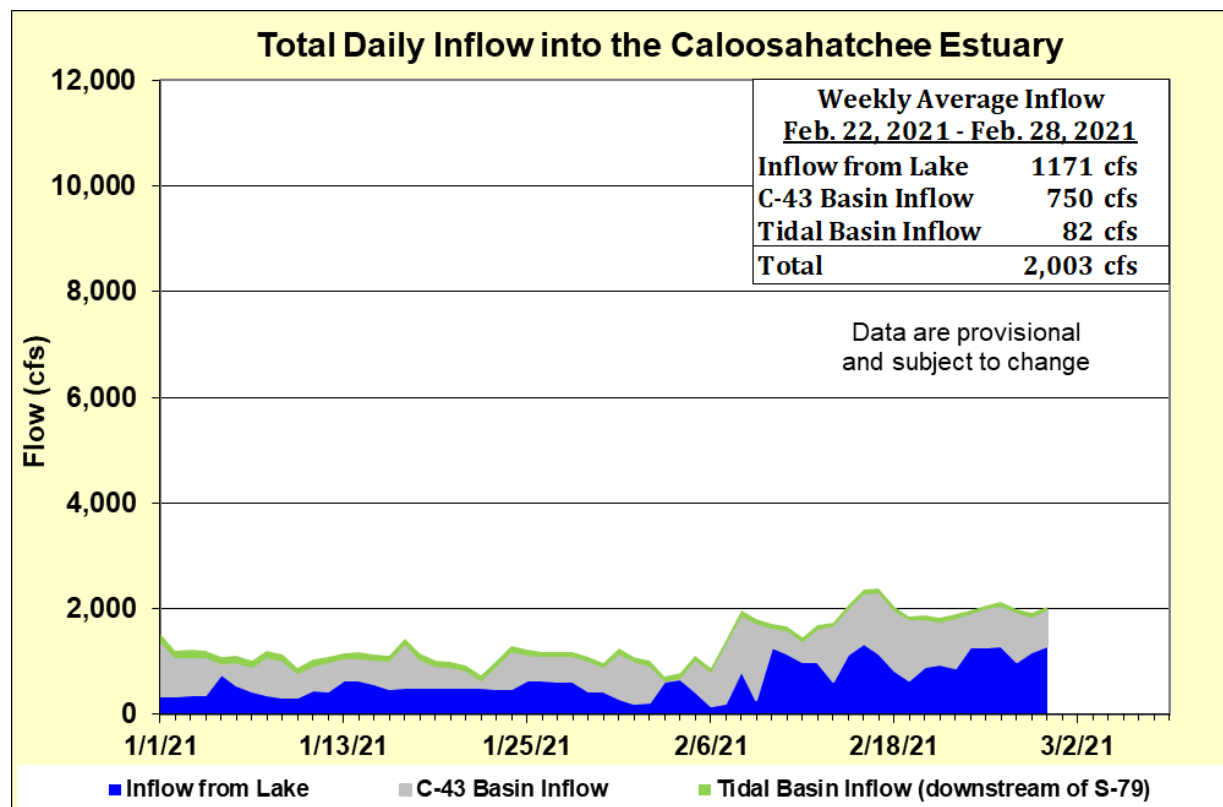
**Figure 3.** Daily mean salinity at the A1A, US1, and HR1 stations.



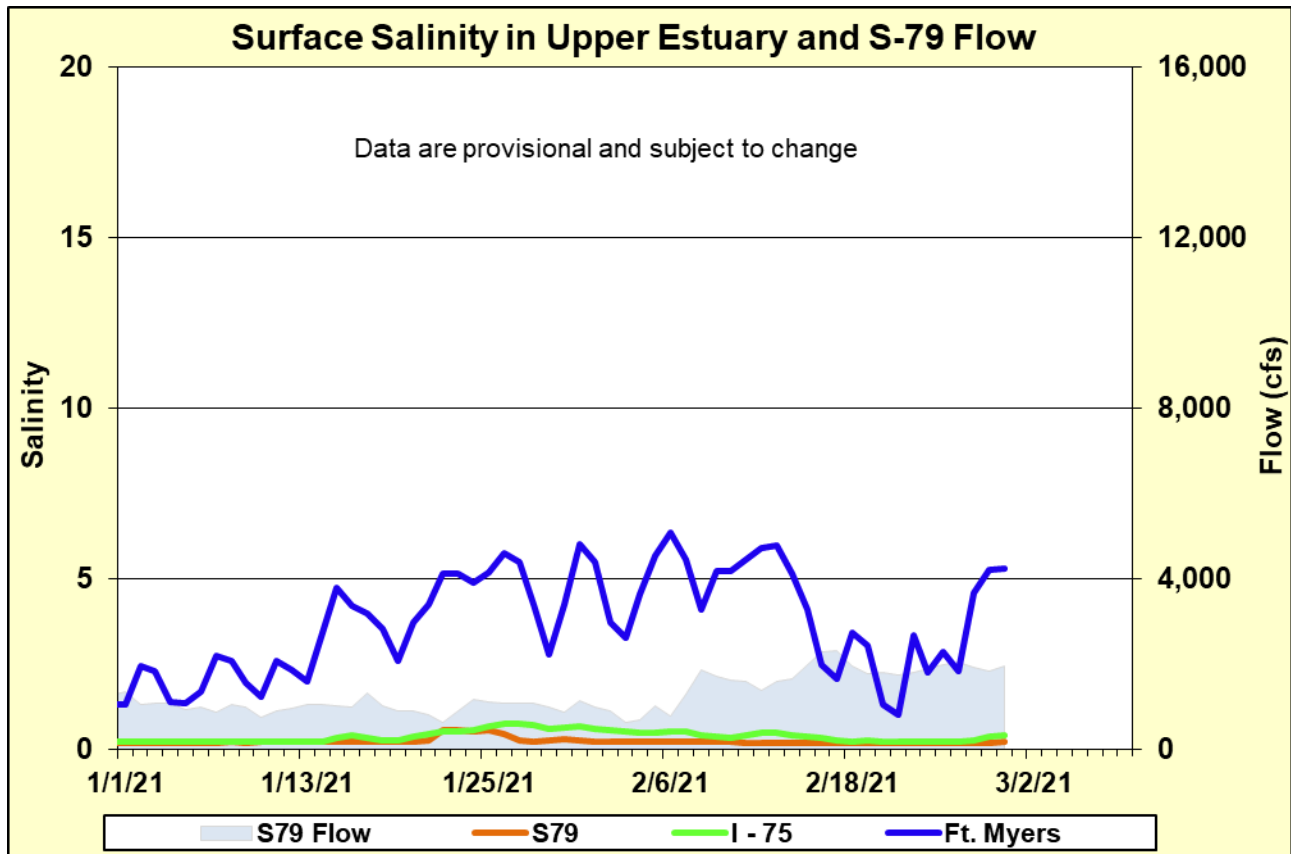
**Figure 4.** Seven-day mean salinity of the water column at the US1 Bridge.



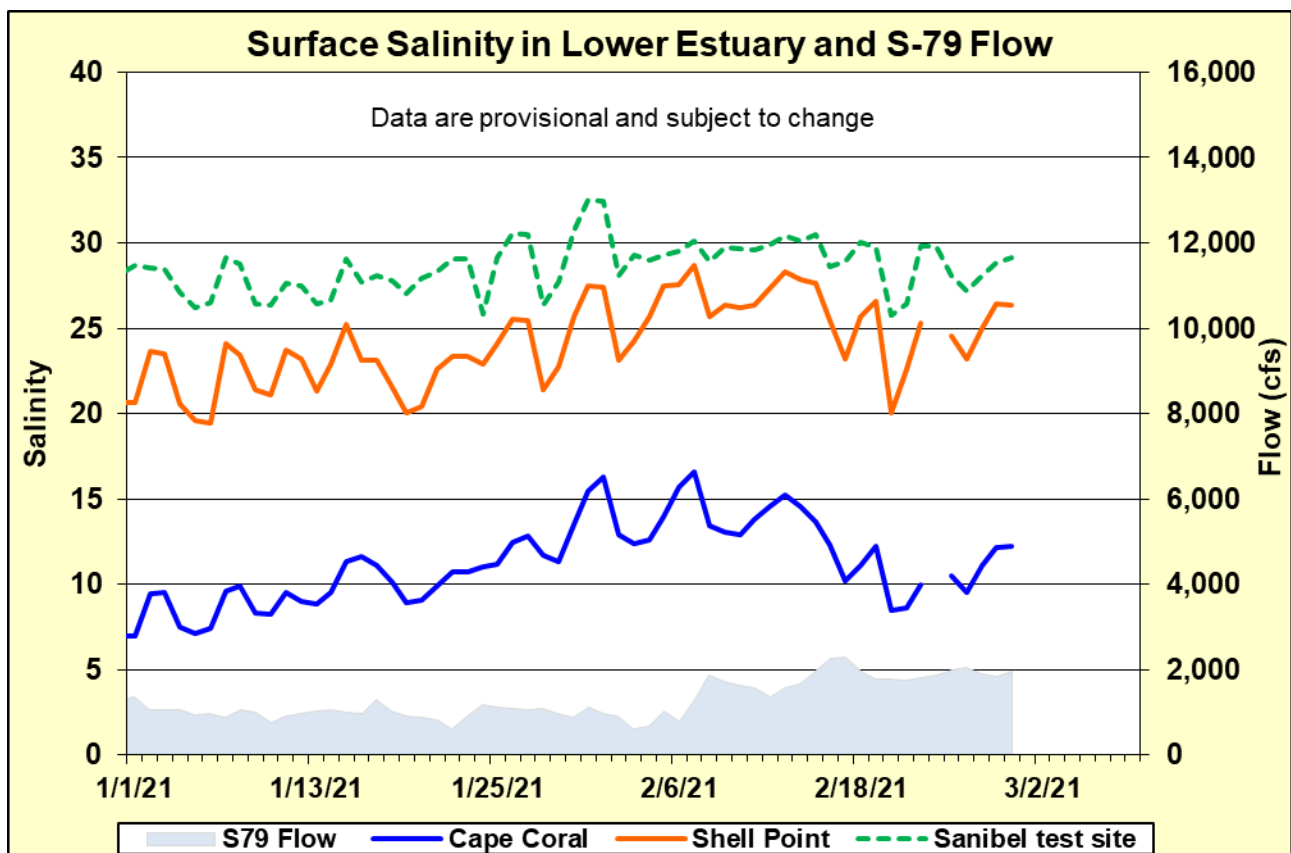
**Figure 5.** Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.



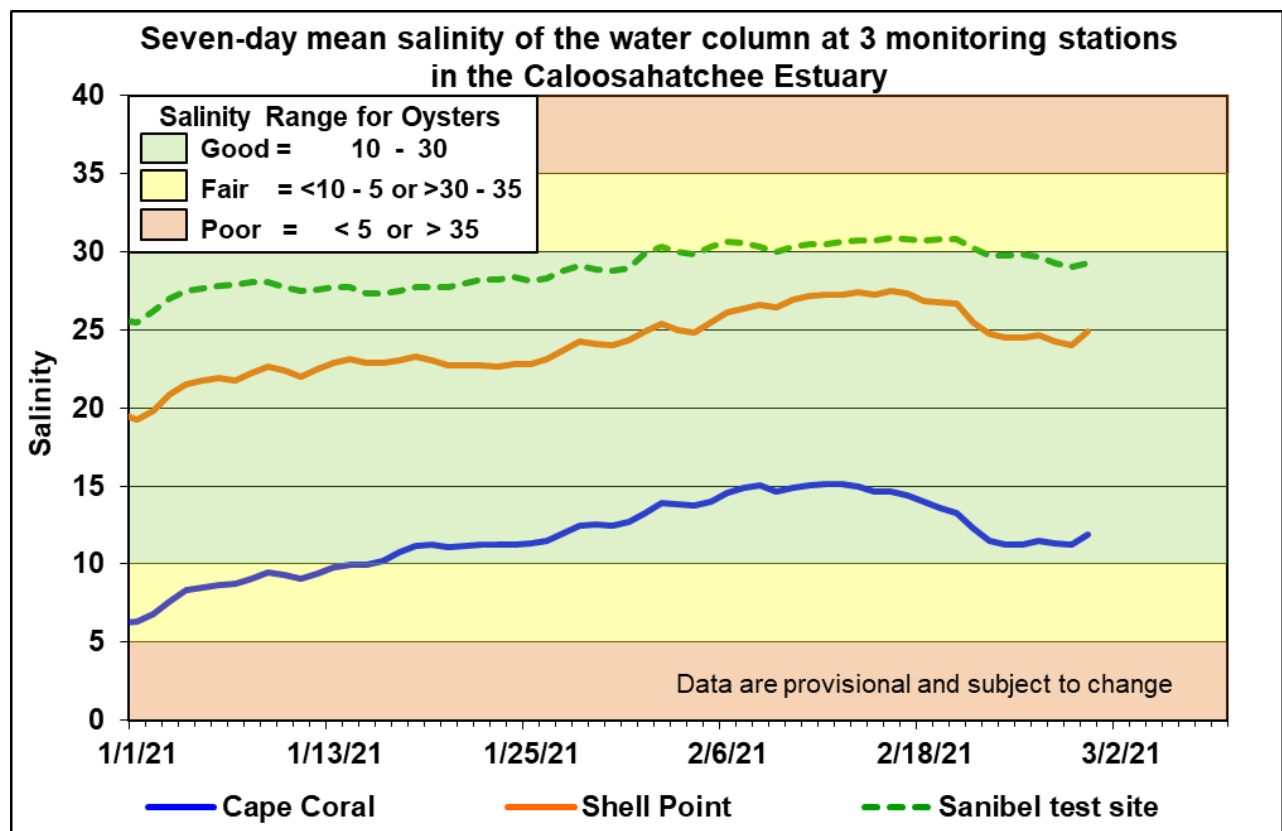
**Figure 6.** Total daily inflows from Lake Okeechobee, runoff from the C-43 basin and tributaries in the tidal basin into the Caloosahatchee River Estuary.



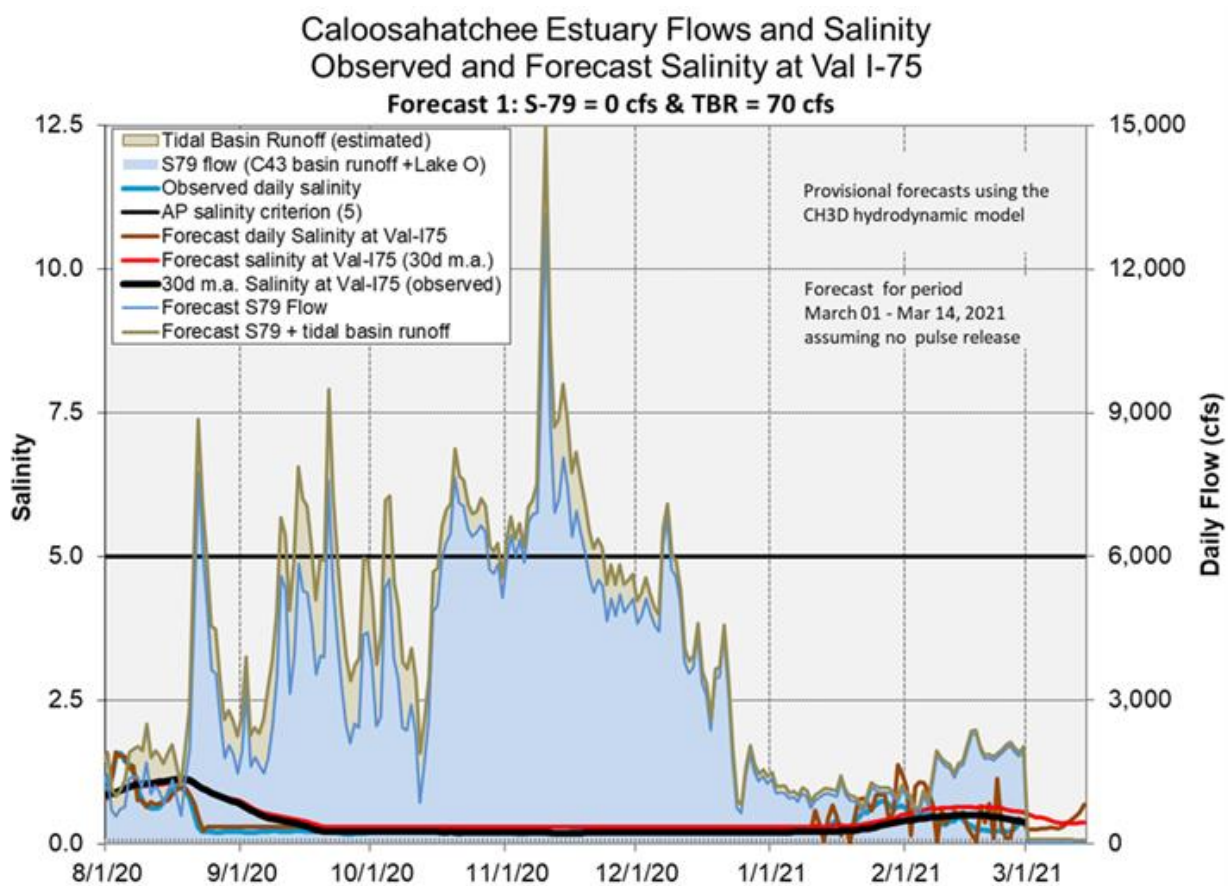
**Figure 7.** Daily mean flows at S-79 and salinity at upper estuary monitoring stations.



**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 S-79.

## **Stormwater Treatment Areas**

Over the past week, approximately 4,600 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 107,000 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 1,552,000 ac-feet. This week, if 2008 LORS recommends Lake releases to the 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, vegetation in these cells is highly stressed and the 365-day phosphorus loading rates (PLR) 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 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).

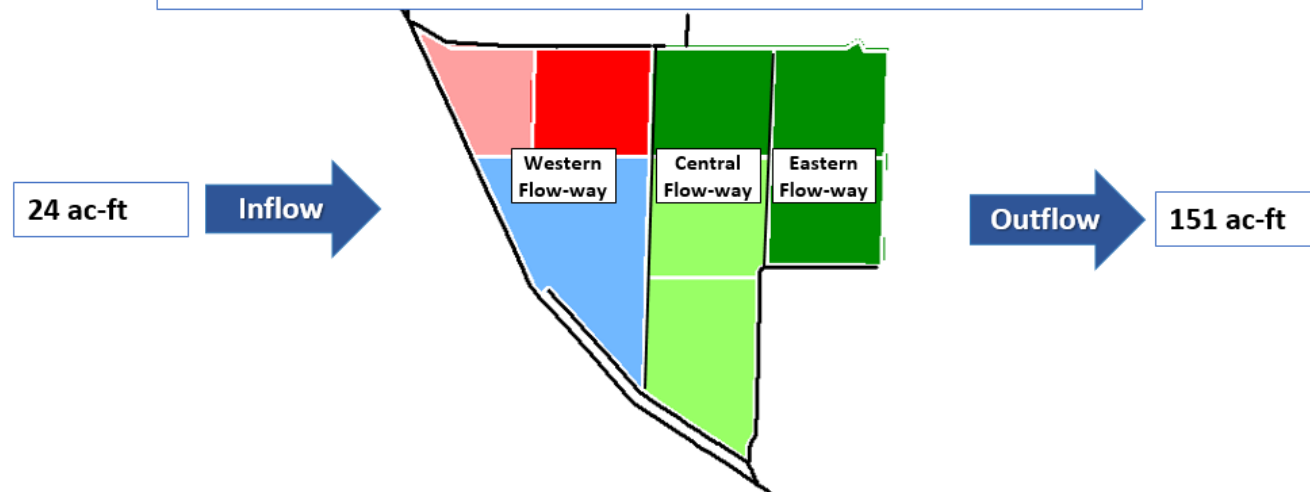
**STA-2:** Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities and in Flow-ways 2 and 3 for construction activities. Treatment cells are at or near target stage except Flow-way 2 which is below target stage. Vegetation in Flow-way 1 is healthy, in Flow-ways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



# STA-1E Weekly Status Report – 2/22/2021 through 2/28/2021



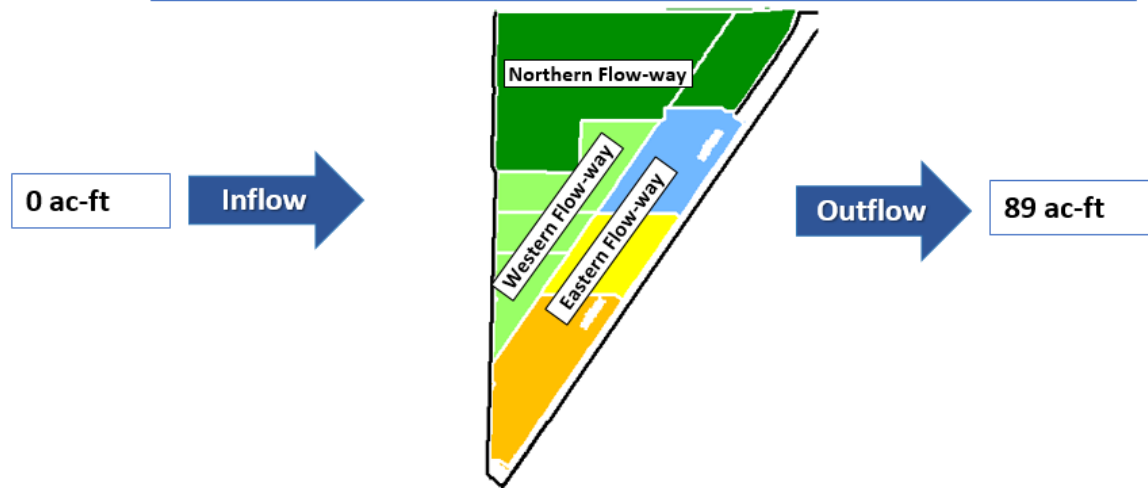
STA-1E Flow-Way Status			
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small> 	365-day P Loading Rate <small>(below 1.0 g P / m<sup>2</sup>/yr is optimal)</small> 	Online / Offline / Restrictions
Eastern	 		Online
Central	 		Vegetation Rehab
Western	Offline, construction activities starting 11/01/2019		

As of 2/28/2021			
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	24	2,049	316,280
--Lake Inflow, ac-ft	0	N/A	21,500
Total Outflow, ac-ft	151	1,179	277,193
Inflow Conc., ppb	77	91	136
Outflow Conc., ppb	34	37	37
Includes Preliminary Data			

Figure 1. STA-1E Weekly Status Report

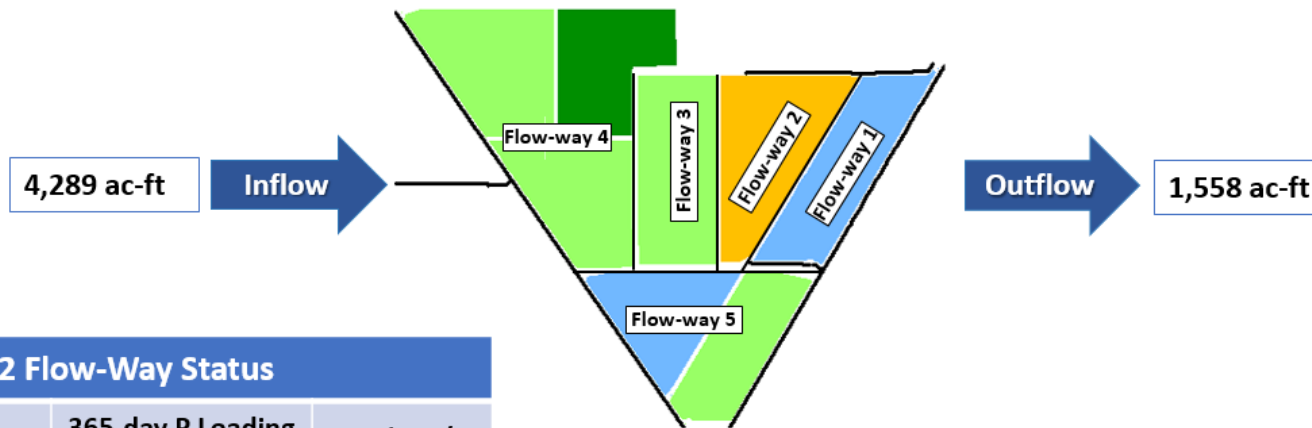
# STA-1W Weekly Status Report – 2/22/2021 through 2/28/2021



STA-1W Flow-Way Status				STA-1W Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy — Stressed ←→	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions	As of 2/28/2021			
				Stage Based: Relative to Target Stage (TS)			
Northern	←→		Construction	<div> <div>Deep Water Level (&gt; 2.8' above TS)</div> <div>High Water Level (1.5' – 2.8' above TS)</div> <div>0.2' – 1.5' above TS</div> <div>Target Stage (TS +/- 0.2')</div> <div>Low Water Level (&lt;0.2' below TS)</div> </div>			
				<div> <div>Depth / Area Based: Percent of Area Dry</div> <div> <div>0-25% Dry</div> <div>25-50% Dry</div> <div>50-75% Dry</div> <div>75-100% Dry</div> </div> </div>			
Western	←→		Construction				
Eastern	←→		Construction				
				<div> <div>7-day</div> <div>28-day</div> <div>365-day</div> </div>			
Total Inflow, ac-ft				0	0	204,503	
--Lake Inflow, ac-ft				0	N/A	11,600	
Total Outflow, ac-ft				89	89	220,634	
Inflow Conc., ppb				N/A	N/A	241	
Outflow Conc., ppb				59	59	38	
				Includes Preliminary Data			

Figure 2. STA-1W Weekly Status Report

## STA-2 Weekly Status Report – 2/22/2021 through 2/28/2021



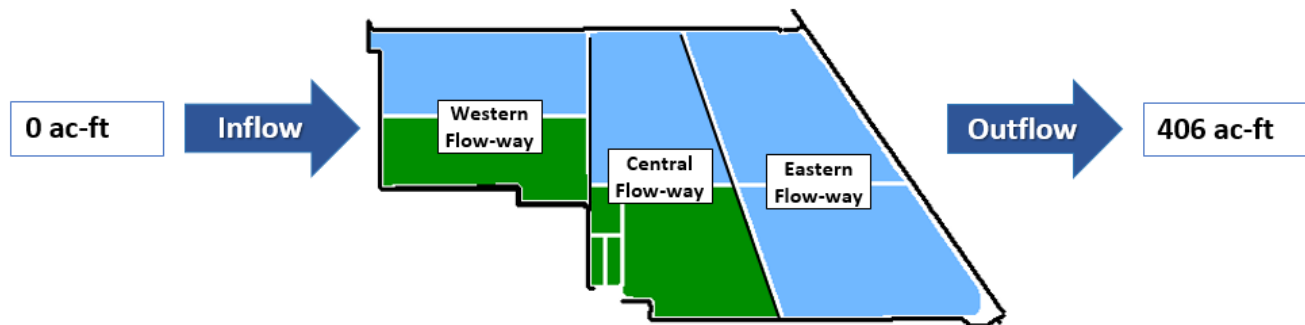
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P / m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
1			Online
2			Construction
3			Construction & Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 2/28/2021	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-2 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	4,289	9,061	389,306
--Lake Inflow, ac-ft	3,400	N/A	41,600
Total Outflow, ac-ft	1,558	2,215	460,317
Inflow Conc., ppb	15	22	107
Outflow Conc., ppb	15	16	21
Includes Preliminary Data			

**Figure 3.** STA-2 Weekly Status Report

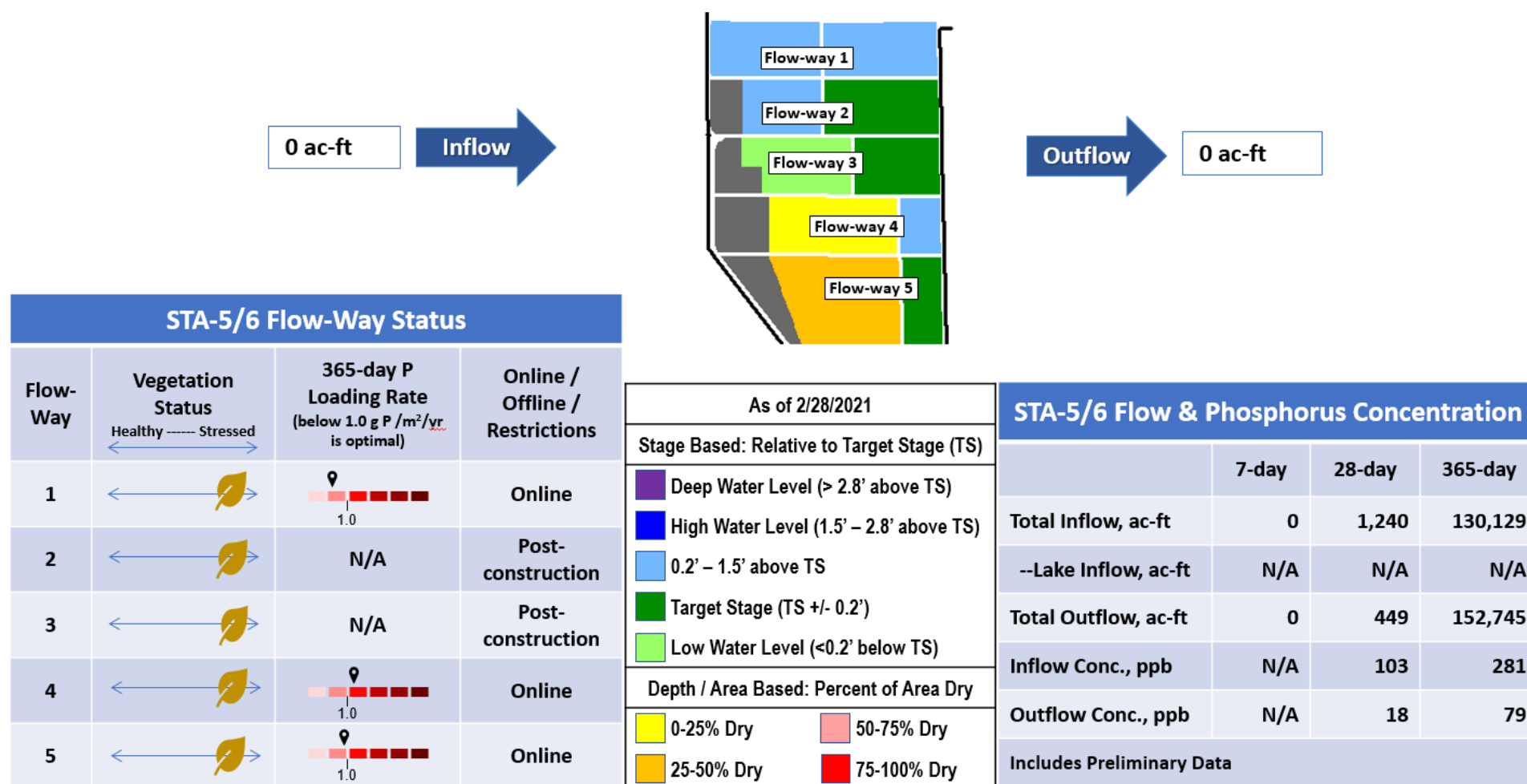
# STA-3/4 Weekly Status Report – 2/22/2021 through 2/28/2021



STA-3/4 Flow-Way Status				As of 2/28/2021		STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status <div>Healthy ----- Stressed</div>	365-day P Loading Rate (below 1.0 g P / m <sup>2</sup> /yr. is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)			7-day	28-day	365-day
				<div>Deep Water Level (&gt; 2.8' above TS)</div>	<div>High Water Level (1.5' – 2.8' above TS)</div>				
				<div>0.2' – 1.5' above TS</div>	<div>Target Stage (TS +/- 0.2')</div>				
				<div>Low Water Level (&lt;0.2' below TS)</div>					
				Depth / Area Based: Percent of Area Dry					
				<div>0-25% Dry</div>	<div>50-75% Dry</div>				
				<div>25-50% Dry</div>	<div>75-100% Dry</div>				
Eastern	Offline, vegetation rehabilitation/drawdown as of 3/1/2021					Total Inflow, ac-ft	0	1,410	588,411
Central	<div></div>	<div></div>	Vegetation Rehab			--Lake Inflow, ac-ft	0	N/A	56,100
Western	<div></div>	<div></div>	Vegetation Rehab			Total Outflow, ac-ft	406	1,356	562,513
						Inflow Conc., ppb	N/A	18	58
						Outflow Conc., ppb	23	24	12
						Includes Preliminary Data			

Figure 4. STA-3/4 Weekly Status Report

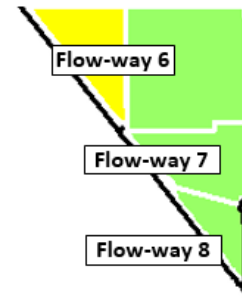
# STA-5/6 Weekly Status Report – 2/22/2021 through 2/28/2021






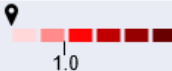


**Figure 5.** STA-5/6 Weekly Status Report (Flow-ways 1 – 5)



## STA-5/6 Weekly Status Report – 2/22/2021 through 2/28/2021



STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed ↔	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
6	↔ 		Online
7	 ↔		Online
8	 ↔		Online

As of 2/28/2021

Stage Based: Relative to Target Stage (TS)

Deep Water Level (> 2.8' above TS)

High Water Level (1.5' – 2.8' above TS)

0.2' – 1.5' above TS

Target Stage (TS +/- 0.2')

Low Water Level (<0.2' below TS)

Depth / Area Based: Percent of Area Dry

0-25% Dry

25-50% Dry

50-75% Dry

75-100% Dry

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

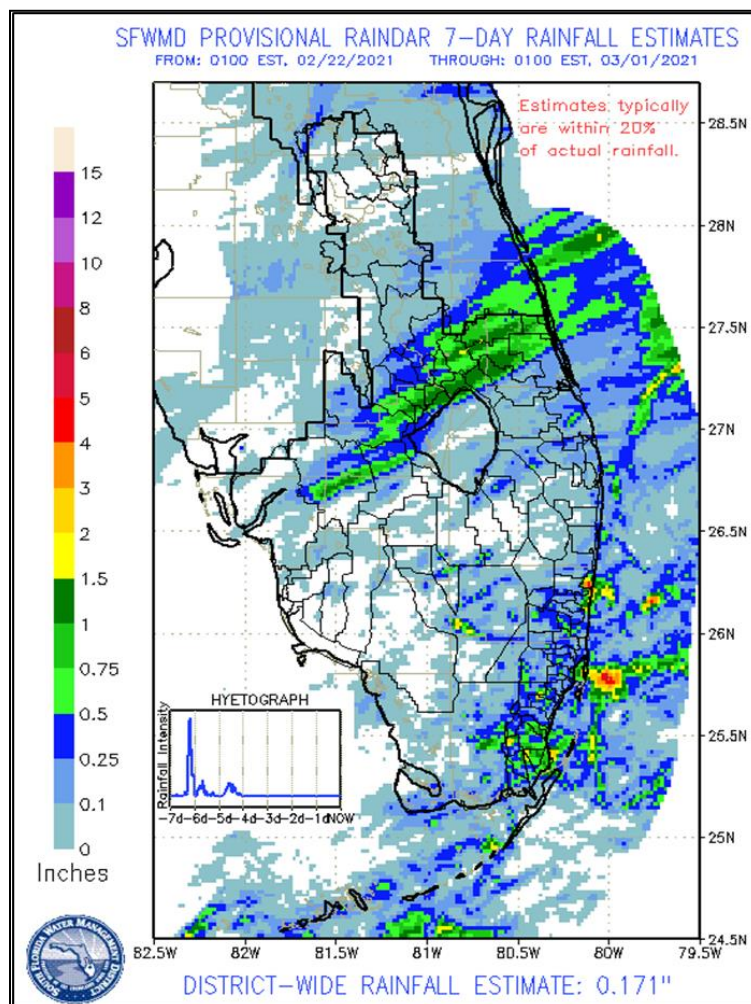
## Basic Concepts and Definitions for STA Weekly Status Report

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

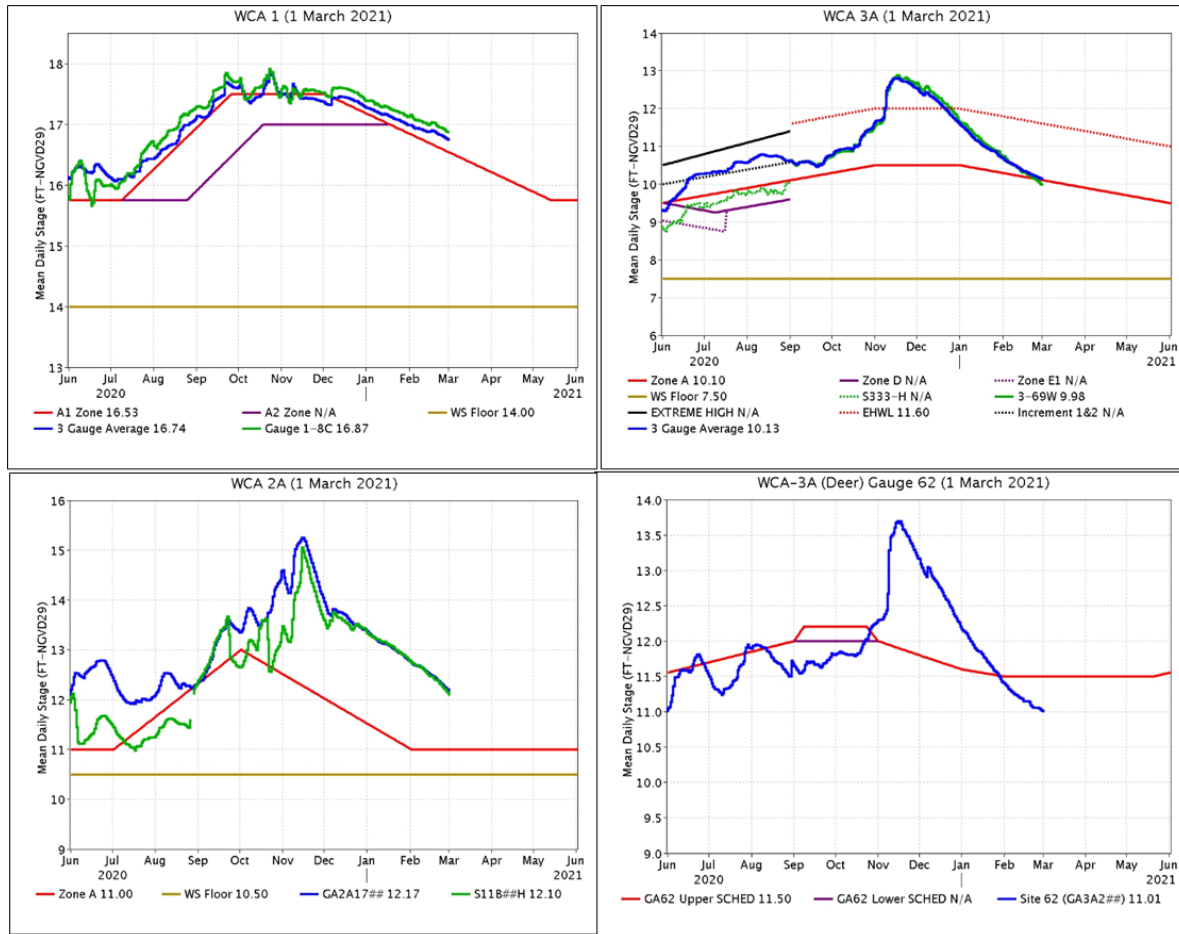
## EVERGLADES

The Everglades received minimal rainfall last week, primarily at the beginning of the week. At the gauges monitored for this report stages fell 0.10 feet on average last week, a slight increase from the week prior. Evaporation was 1.01 inches last week, a 0.13 inch increase from the previous week.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.02	-0.08
WCA-2A	0.04	-0.18
WCA-2B	0.18	-0.12
WCA-3A	0.12	-0.10
WCA-3B	0.11	-0.13
ENP	0.11	-0.01



Regulation Schedules: WCA-1: Stage at the 1-8C Gauge continues to follow just above and parallel with schedule, now 0.34 feet above the falling Zone A1 regulation line. WCA-2A: The recession in stage at S11B-HW continues a steady recession to the flat regulation line, currently 1.10 feet above. WCA-3A: The Three Gauge Average stages continue a steady recession towards the falling Zone A regulation line last week, currently just 0.03 feet above. WCA-3A: Stage at gauge 62 (Northwest corner) continued a steady but decreasing rate of decline last week, the average on Sunday was 0.49 feet below the stable Upper Schedule.

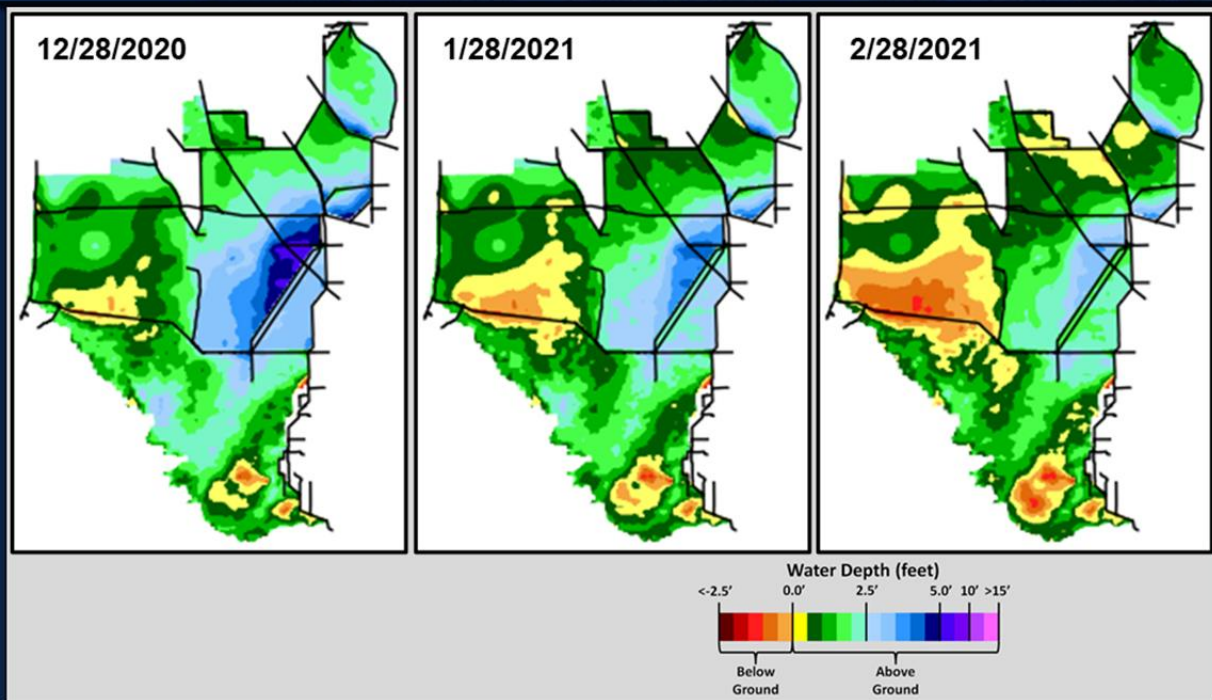


The WDAT tool for spatial interpolation of depth monthly snapshots indicate that WCA-3A is drying down in the northwest with depths potentially at the soil surface along northern perimeter and downstream of S-150. Northern WCA-2A is also drying down to soil surface. Hydrologic connectivity remains established within SRS and Taylor slough in Everglades National Park as conditions begin to dry down in Lostman's Slough and the western marl prairie. Large portions of southern and southwestern BCNP are drying down to below soil surface. Comparing WDAT water levels from present, over the last month stages fell significantly across WCA-3A and southern WCA-2A. Looking back one year the stage difference patterns are strikingly different than one month ago, with most of the system wetter. Compared to one year ago WCA-3A is deeper than it was a year ago, most significantly on eastern side. Northern WCA-2A is trending shallower and the southern end of that basin is deeper than it was a year ago.





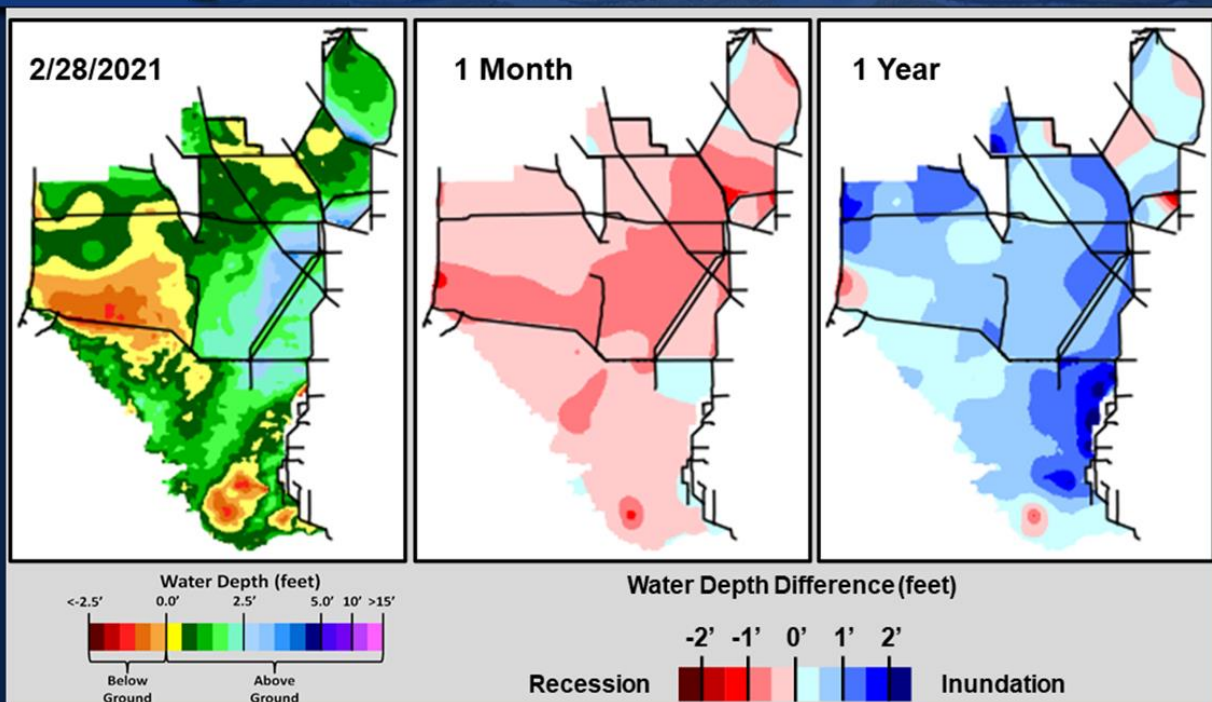
## SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)



## SFWDAT Everglades Difference Maps (Present – Past)



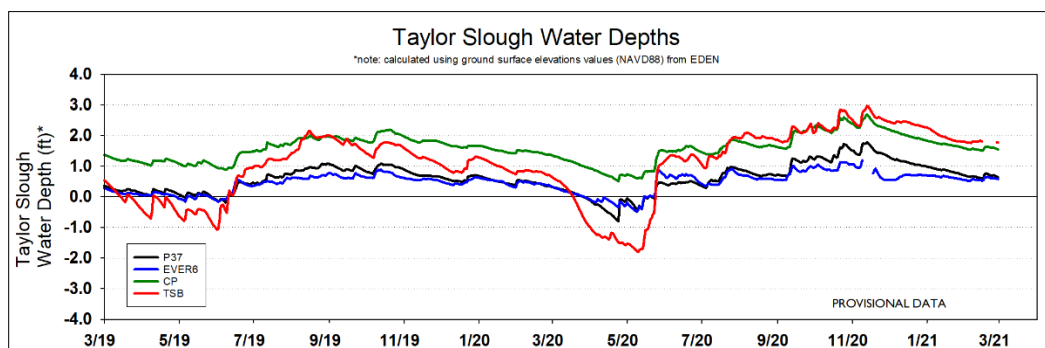
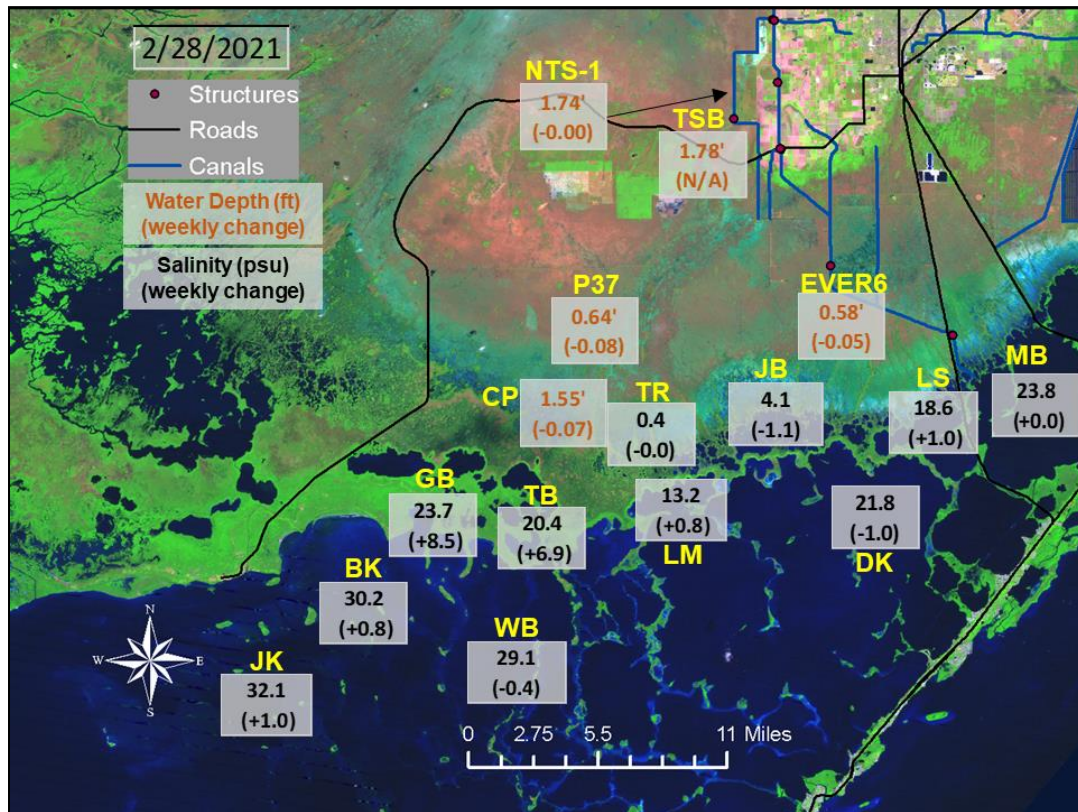
South Florida Water Depth Assessment Tool (SFWDAT)

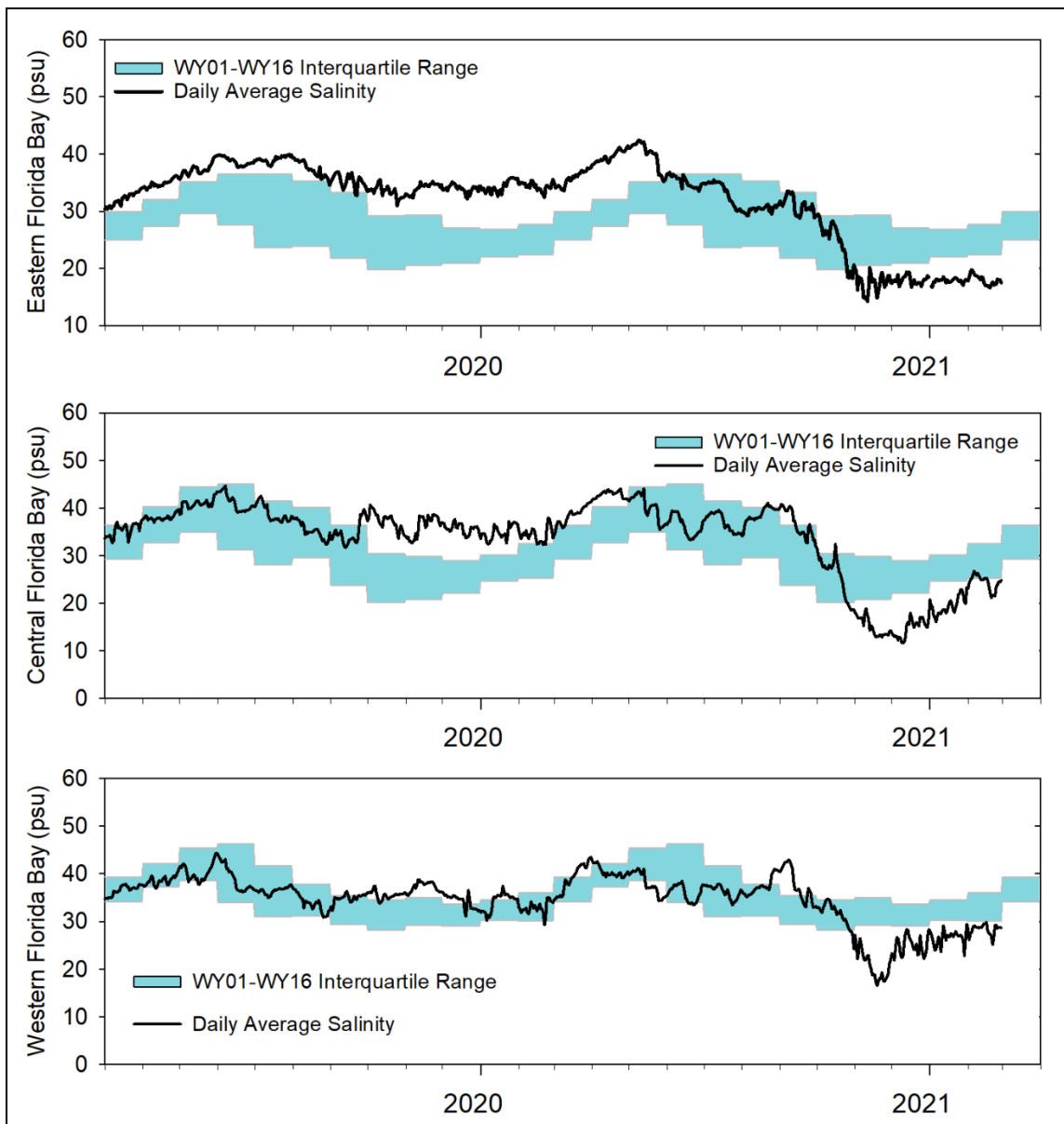


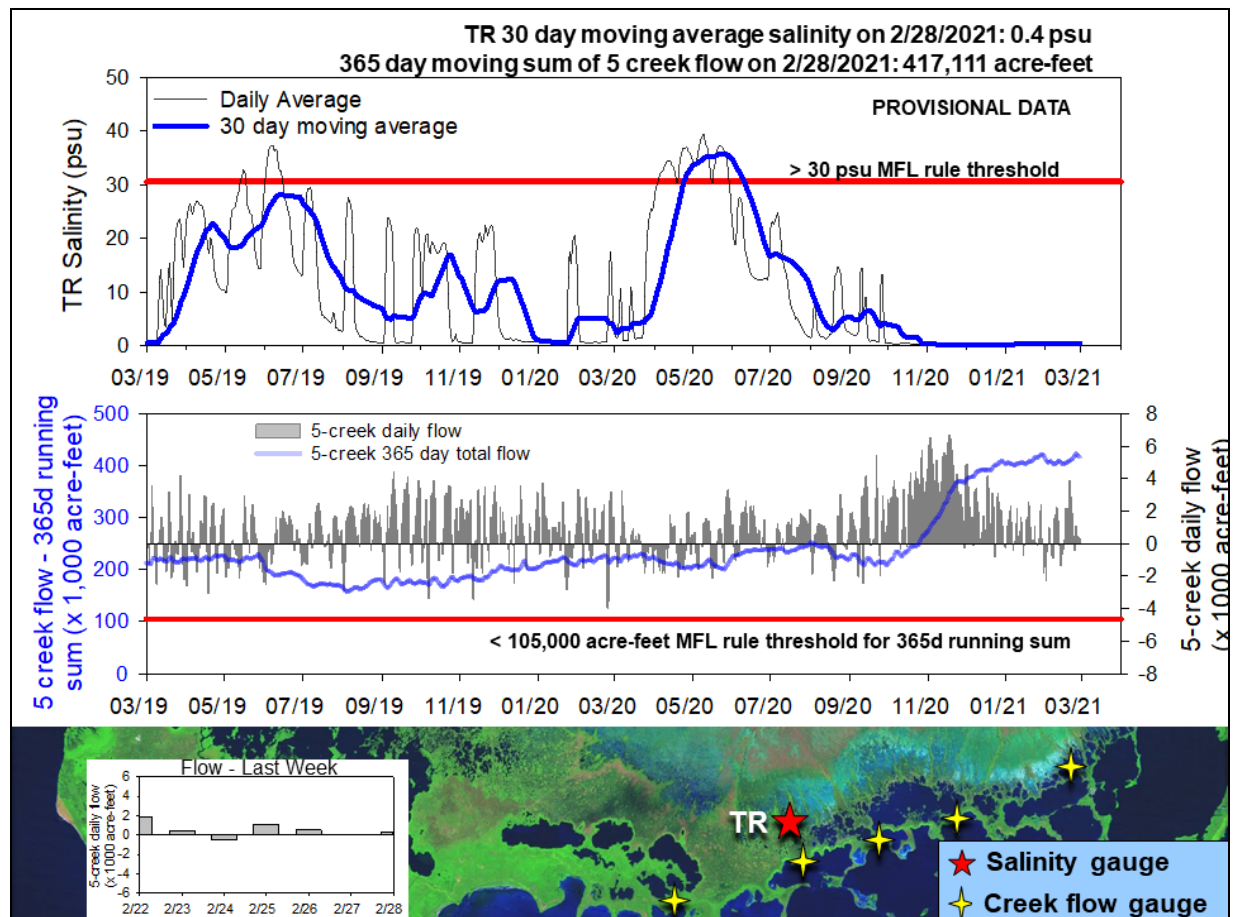
Tree island inundation in WCA-3A, WCA-3B and ENP: 371 Tree Islands of known elevation within WCA-3A, -3B, and Everglades National Park's Shark Slough. Current preliminary estimates using WDAT indicate that 27% or 101 of the tree islands are currently inundated (down from 32% the week prior), and all of those islands have been inundated for more than 120 days. Inundation for more than 120 days will cause ecological harm to sensitive islands.

Wading bird foraging/nesting: Large numbers of wading birds foraging in the western marl prairies and the northern marshes of WCA-3A. Nesting continues to increase at multiple colonies (Wood Storks, Roseate Spoonbills and Great Egrets). Very large aggregations of pre-breeding White Ibis (8000 birds) at Alley North colony.

Taylor Slough Water Levels: An average of 0.25 inches of rain fell over Taylor Slough and Florida Bay this week, and water levels in Taylor Slough decreased by 0.05 feet on average over the week. Lowest recession rates were in the northern part of the Slough while the highest weekly recession (0.08 feet) occurred in the central Slough. Taylor Slough is averaging 10 inches higher than the historical average for this time of year, and the northern portion of the slough is 24 inches higher than the average for this time of year. Conditions are wetter than a year ago and have been maintaining relatively high conditions thus far into the dry season.







Florida Bay Salinities: Salinities in Florida Bay averaged a 1.9 psu increase over the week with individual station changes ranging from -1.1 psu in the western shoreline to +8.5 psu in the eastern Bay. Bay-wide salinity is 6 psu lower than the historical average for this time of year. All stations are at least 2 psu lower than their historical averages. The largest increase in salinity over the week occurred at Garfield Bight (GB; increase of 8.5 psu) as it stabilized from the previous week's large rainfall event. The nearshore area is now 7 psu below the historical average for this time of year (was 11 psu below last week).

Florida Bay MFL: The salinity at the TR station in the mangrove zone (tracked for the Florida Bay MFL) has continued to be near fresh (<0.5 psu) 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 psu. Weekly flow from the 5 creeks identified by yellow stars on the map totaled nearly 3,900 acre-feet which is a decrease of 9,100 acre-feet from last week. Flows over the week were mostly slosh with no strong positive or negative pattern. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) ended at 417,111 acre-feet this week which is 7,000 acre-feet more than last week. Conditions are still higher than the 95th percentile of historical data (390,830 acre-feet). Creek flows are provisional USGS data.

### **Water Management Recommendations**

Slowing the recession rates in all regions to 0.05 to 0.07 feet per week would have ecological benefit, particularly in WCA-3A North and WCA-2A. Slower recession rates in the northern Everglades extends the time that wading bird foraging conditions remain optimal, conserves water and protects peat soils later in the dry season. Distributing flows across the northern perimeter of WCA-3A and into that basin promotes sheet flow, prevents landscape scale peat loss and extends the window of time that wading bird foraging is optimal. Based on current conditions 70% of flows into northwestern WCA-3A and 30% into northeastern WCA-3A has ecological benefit.

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 delays the start of the salinity increases that occur within the dry season and possibly prevent the occurrence of extreme hyper-salinity towards the end of the dry season. Delaying the start of salinity increases in Florida Bay has ecological benefit.

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

SFWMD Everglades Ecological Recommendations, March 2nd, 2021 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.08'	Maintain marsh stage slightly above and parallel 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 0.18'	Moderate the recession rate to near -.05 to -.07 feet per week and maintain marsh stage above the regulation schedule targeting 11.6' NGVD 29.	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 0.12'	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 0.05'	Maintain 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 0.18'	Moderate the recession rate to near -.05 to -.07 feet per week.	
Central WCA-3A S	Stage decreased by 0.14'	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.
Southern WCA-3A S	Stage decreased by 0.01'		
WCA-3B	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. Tree island ecology is diminished by flooding
ENP-SRS	Stage decreased by 0.01'	Make discharges to the Park according to COP and TTFF protocol.	Protect within basin and upstream habitat and wildlife from flooding stress.
Taylor Slough	Stage changes ranged from -0.00' to -0.08'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -1.1 to +8.5 psu	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.