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 10, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

SUMMARY

Weather Conditions and Forecast

A high pressure ridge located across the southeastern US will help produce breezy northeast to east winds, which will bring moisture and some widely scattered light showers to eastern areas each day through Sunday. A weak frontal boundary is forecast to come from the northeast Sunday night and Monday increasing the potential for scattered shower activity on Monday. The next opportunity for more meaningful rainfall is currently forecast to be the second half of next week when a frontal system is forecast to increase moisture and shower activity over the District. Total rainfall is forecast to be below the historical average during the first 7-day period (Week 1) and then above the historical average during the second 7-day period (Week 2).

Kissimmee

Tuesday morning stages were 57.4 feet NGVD (0.6 feet below schedule) in East Lake Toho, 54.1 feet NGVD (0.9 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 25.8 feet NGVD at S-65D. Tuesday morning discharges were 940 cfs at S-65, 880 cfs at S-65A, 940 cfs at S-65D, and 910 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 7.0 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 0.45 feet. Today's recommendation is to continue to manage S-59 and S-61 discharge to reduce stage in East Lake Toho by 0.5 feet and Lake Toho by 0.25 feet by March 13. The purpose is to reduce stage recession rates in East Lake Toho and Lake Toho. Continue to follow the USACE request to keep S-65A discharge below 800-900 cfs to facilitate construction for the Kissimmee River Restoration Project.

Lake Okeechobee

Lake Okeechobee stage was 15.18 feet NGVD on March 07, 2021, 0.15 feet lower than last week and 0.18 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 0.54 feet above. The wading bird flight on March 4, 2021 counted approximately 10,576 birds foraging within the Lake, and recent Snail Kite surveys found 11 nests around the Lake. 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 283 cfs over the past week with 77 cfs coming from Lake Okeechobee. The seven-day average 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 1,917 cfs over the past week with approximately 1,307 cfs

coming from the Lake. Seven-day average surface salinities remained the same at S-79 and Val I-75, decreased at Ft. Myers and Shell Point, and increased at Cape Coral and Sanibel 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 4,400 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 111,400 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 1,559,000 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 and the northern marshes of the Water Conservation Areas (WCAs). Wood Storks and other wading birds continue to nest in greater numbers at colonies within Everglades National Park (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 0.32 inches of rainfall in the past week and the Lower Basin received 0.24 inches (SFWMD Daily Rainfall Report 03/08/2021).

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 (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: 3/9/2021

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)						
							3/7/21	2/28/21	2/21/21	2/14/21	2/7/21	1/31/21	1/24/21
Lakes Hart and Mary Jane	S-62	45	LKMJ	60.7	R	61.0	-0.3	-0.2	-0.2	0.0	0.0	0.0	0.0
Lakes Myrtle, Preston, and Joel	S-57	24	S-57	60.9	R	60.9	0.0	0.1	0.0	0.1	0.1	0.0	0.1
Alligator Chain	S-60	0	ALLI	64.0	R	64.0	0.0	0.0	0.0	0.1	0.1	-0.1	-0.1
Lake Gentry	S-63	0	LKGT	61.5	R	61.5	0.0	-0.1	-0.1	0.0	0.1	0.0	0.0
East Lake Toho	S-59	277	TOHOE	57.5	R	58.0	-0.5	-0.3	-0.1	-0.2	-0.3	-0.3	-0.1
Lake Toho	S-61	641	TOHOW, S-61	54.2	R	55.0	-0.8	-0.6	-0.4	-0.4	-0.4	-0.3	-0.1
Lakes Kissimmee, Cypress, and Hatchineha	S-65	903	KUB011, LKIS5B	51.8	R	51.0	0.8	0.7	0.4	0.0	-0.6	-0.8	-0.6

[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. **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: 3/9/2021

Metric	Location	1-Day Average	Average for the Preceeding 7-Days[1]								
		3/7/2021	3/7/21	2/28/21	2/21/21	2/14/21	2/7/21	1/31/21	1/24/21	1/17/21	1/10/21
Discharge (cfs)	S-65	890	903	856	835	880	894	894	869	644	540
Discharge (cfs)	S-65A[2]	892	888	897	901	887	882	892	856	641	600
Discharge (cfs)	S-65D[2]	952	961	1,012	1,038	946	934	914	838	701	770
Headwater Stage (feet NGVD)	S-65D[2]	25.79	25.80	25.80	25.80	25.87	25.79	25.83	25.79	25.87	25.85
Discharge (cfs)	S-65E[2]	941	949	1,015	1,049	942	940	873	849	719	808
Discharge (cfs)	S-67	0	0	0	0	0	0	0	0	0	0
DO (mg/L)[3]	Phases I & II/III river channel	7.0	7.0	7.3	7.0	8.7	8.7	8.1	8.8	8.3	8.4
Mean depth (feet)[4]	Phase I floodplain	0.45	0.46	0.53	0.59	0.41	0.38	0.38	0.36	0.33	0.40

[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.

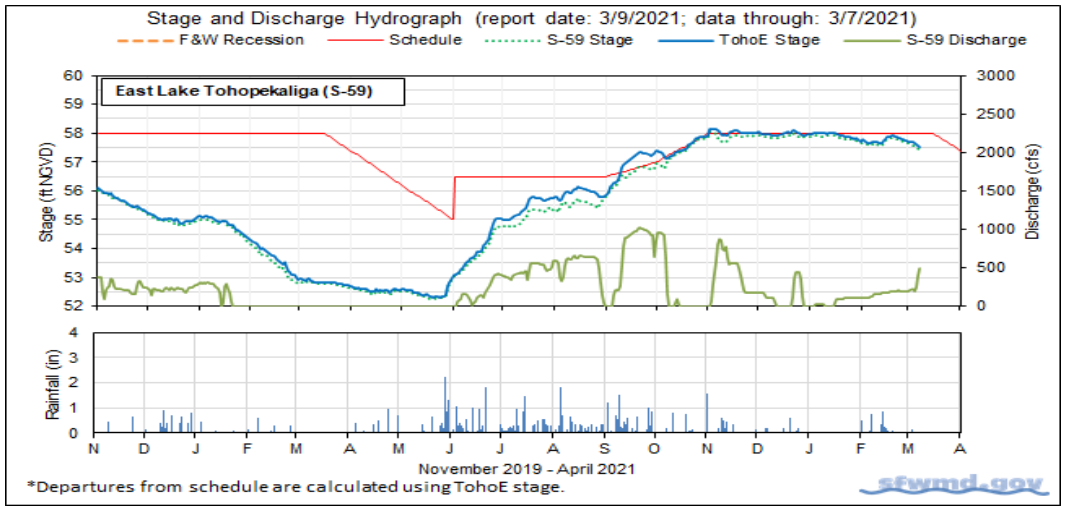


Figure 1. East Lake Toho regulation schedule, stage, discharge and rainfall.

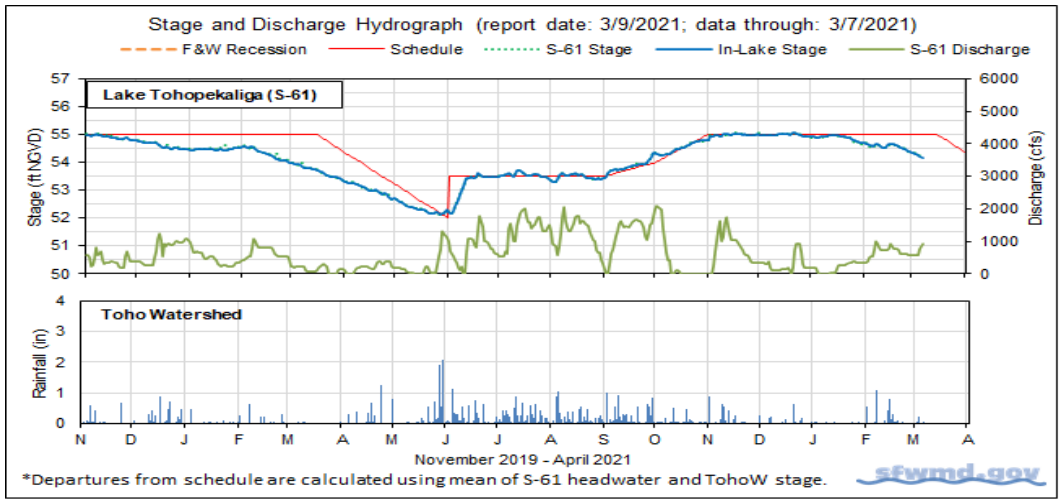


Figure 2. Lake Toho regulation schedule, stage, discharge and rainfall.

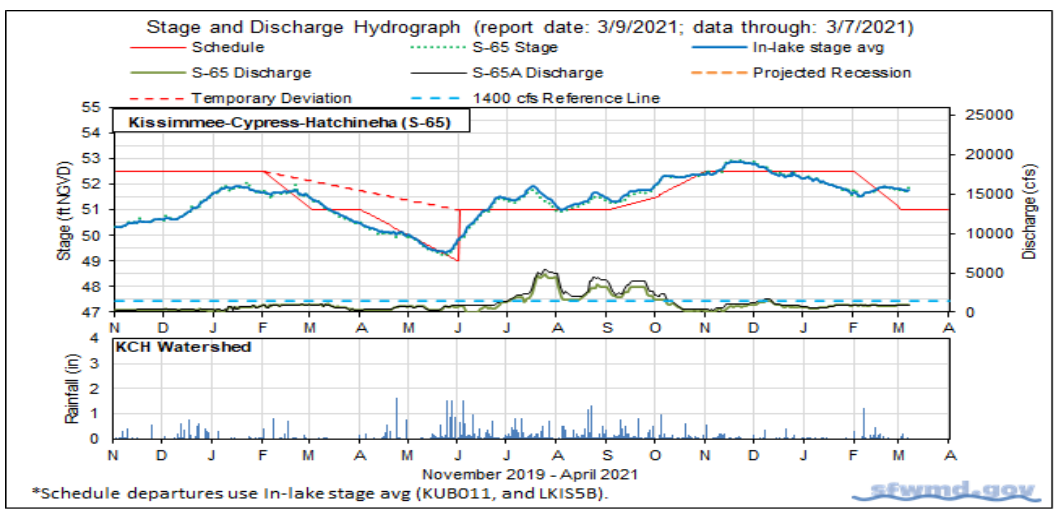


Figure 3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

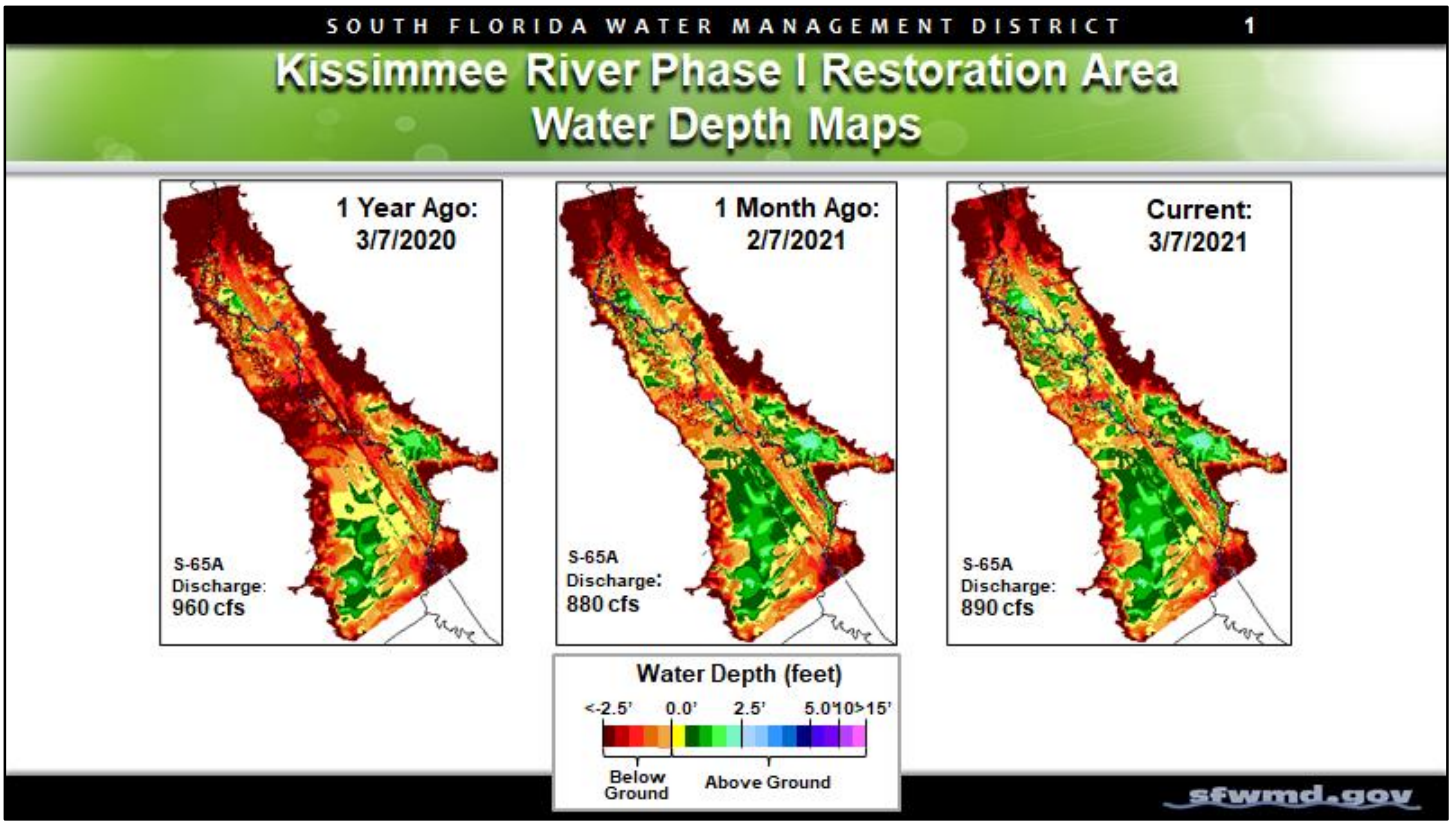


Figure 4. Phase I area floodplain water depths (from left to right) one year ago, one month ago and current. Color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

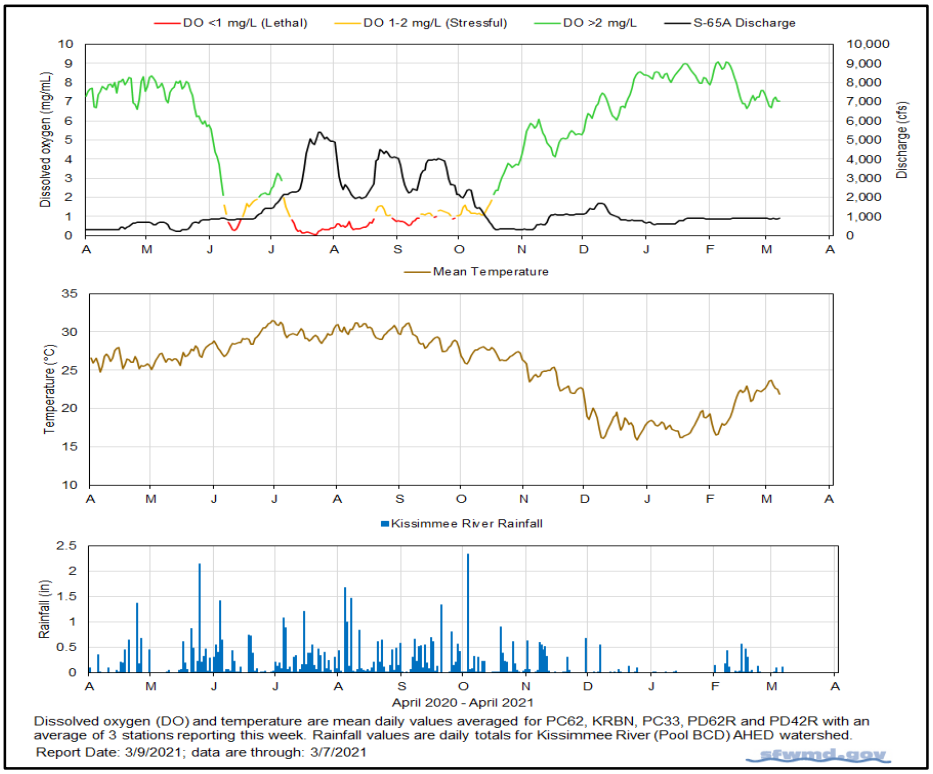


Figure 5. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches)

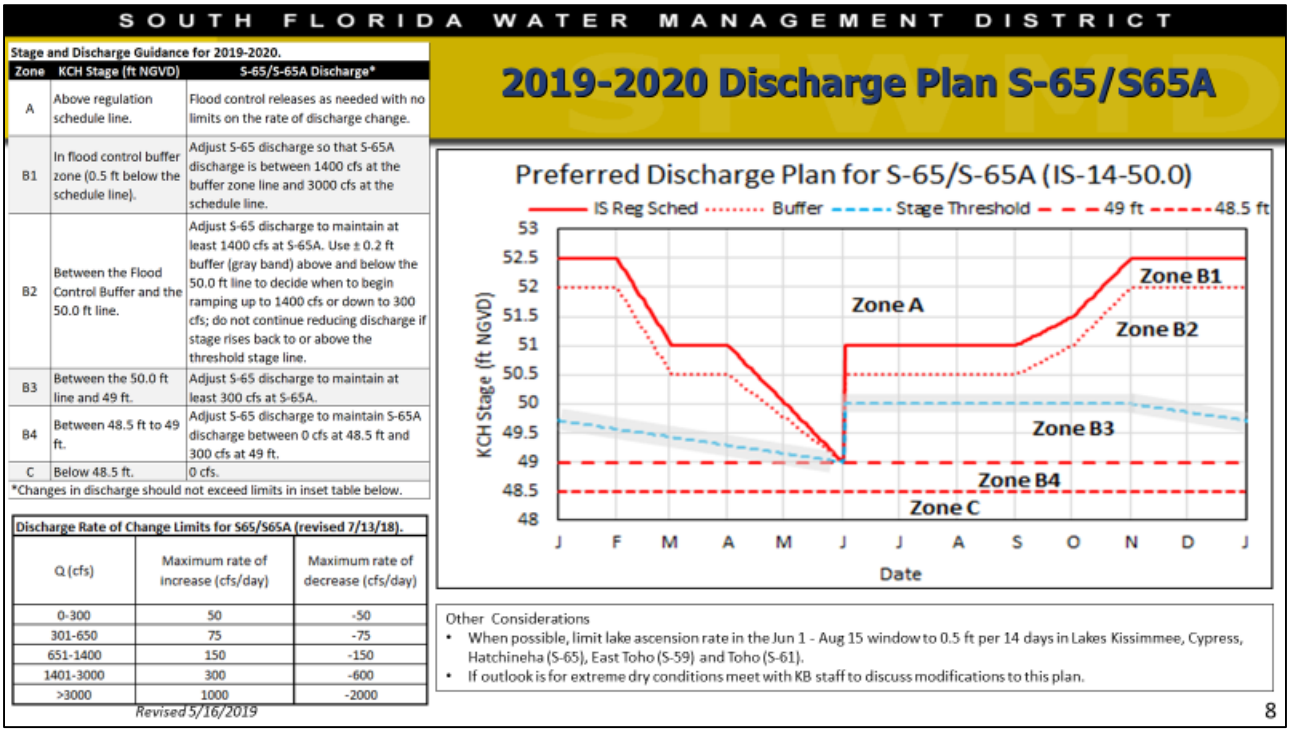


Figure 6. The 2019-2020 Discharge Plan for S-65/S-65A.

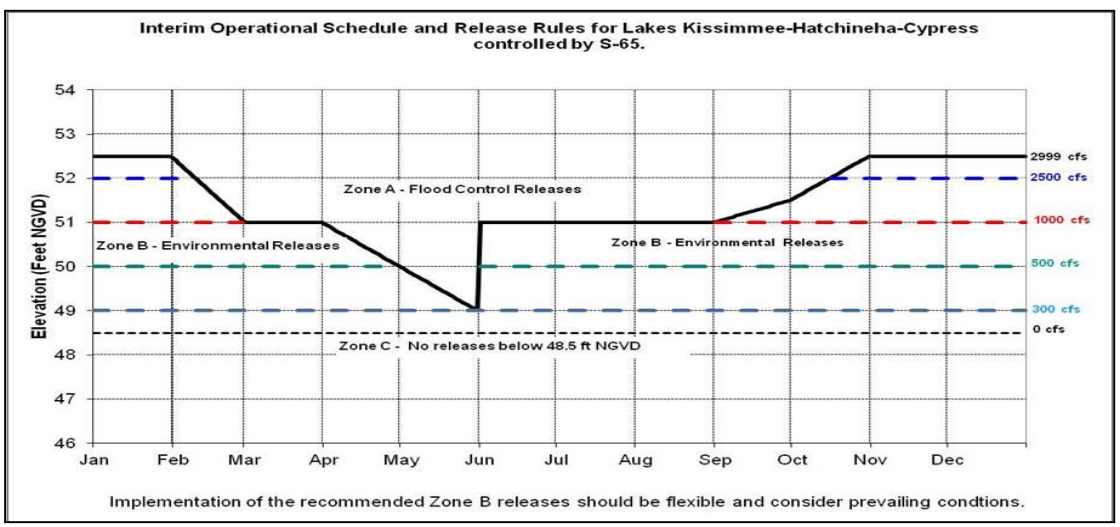


Figure 7. Interim operations schedule for S-65 (solid black line). The discharge schedule shown to the right has not been used in recent years.

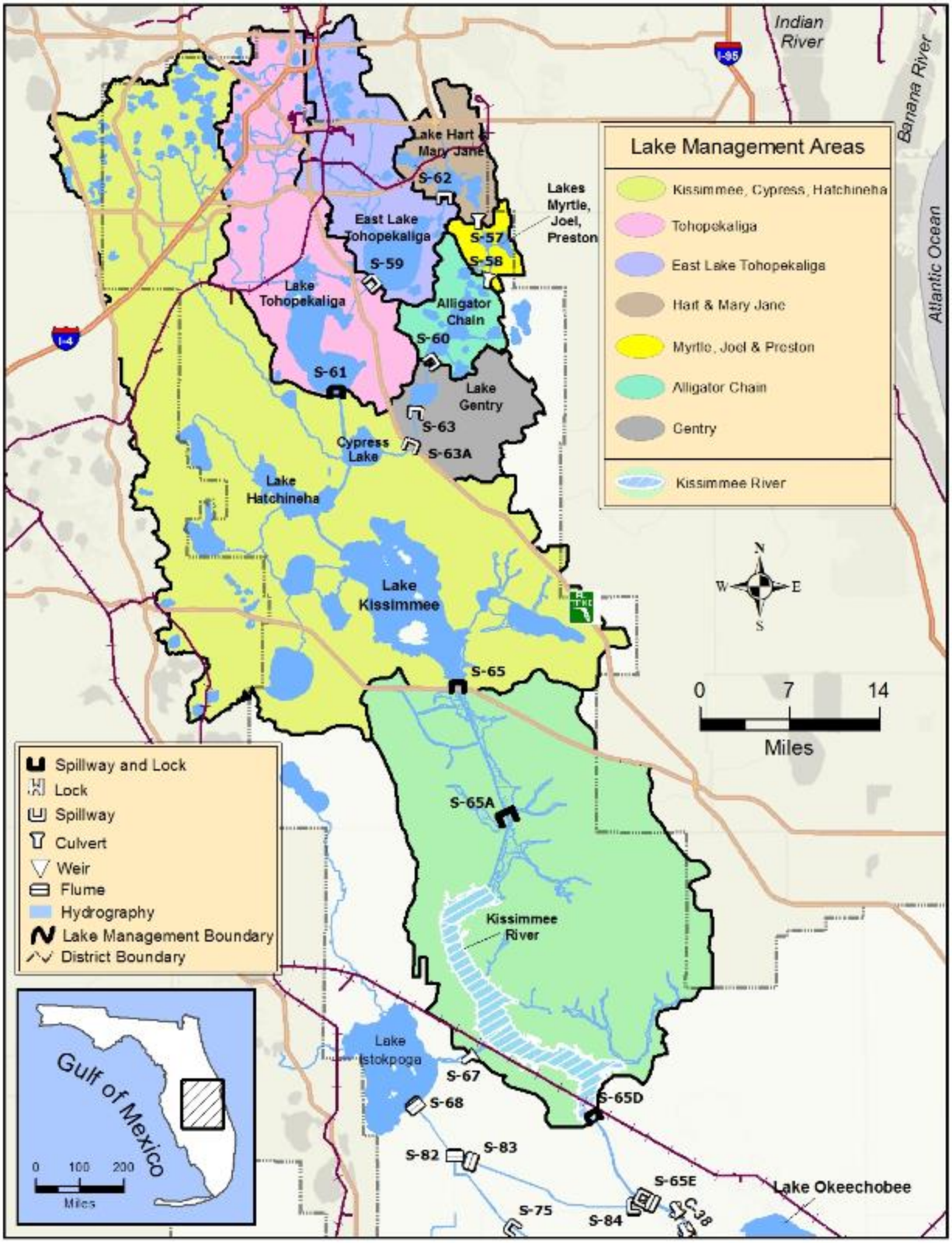


Figure 8. The Kissimmee Basin.

LAKE OKEECHOBEE

Lake Okeechobee stage was 15.18 feet NGVD on March 07, 2021, 0.18 feet lower than a month ago, and 2.72 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 0.54 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, 0.68 inches of rain fell directly on the Lake while much of the northern district saw less than 0.5 inches, and some parts of the lower east coast received over 1.5 inches (**Figure 4**).

Average daily inflows (excluding rainfall) were similar to the previous week, dropping from 1,282 cubic feet per second (cfs) to 1,117 cfs. Outflows (excluding evapotranspiration) were also similar, increasing slightly from 2,783 cfs to 2,863 cfs. Most of the inflows came from the Kissimmee River (949 cfs through S-65E & S-65EX1). Releases to the west via S-77 increased slightly from 1,357 cfs the prior week to 1,545 cfs, and releases east via S-308 were similar at 178 cfs. Releases south through the S-350 structures decreased, going from 1,111 cfs to 937 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.

On March 4, 2021, approximately 10,576 wading birds were observed in 10 flocks (**Figure 6**). High numbers of small white herons were noted, which were predominantly Snowy Egrets, with lower numbers of White Ibis. Lake stages are possibly still too high for Ibis to fully exploit foraging conditions on the Lake, or other foraging areas outside of the Lake may be currently preferred. At least 7 active nesting colonies were observed, and the entire Lake was not surveyed, therefore there are potentially more active colonies. Nesting colonies were observed at high elevation sites like Liberty Point, as well as lower elevation sites like Moonshine Bay and Eagle Bay, which is unusual when lake stage is higher than 15 feet. Having this many nesting sites already active across a broad range of elevations should be a good indicator of an above average year for nesting productivity. However, peak nesting season is April and May, so productivity is contingent on what happens with recession rates and rainfall in the next 1-3 months.

There are now 11 Snail Kite nests on Lake Okeechobee, the first nests in the lake since 2018. Of the currently known nests, 98% are in either Lake Hicpochee Impoundment, C-44 STA or Lake Okeechobee (**Figure 7**). Crews will be surveying the northern areas later this month.

The most recent satellite image (March 7, 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 8**).

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	1014	949	0.4
S-71 & S-72	4	0	0.0
S-84 & S-84X	11	16	0.0
Fisheating Creek	69	41	0.0
S-154	7	0	0.0
S-191	0	49	0.0
S-133 P	61	30	0.0
S-127 P	21	12	0.0
S-129 P	6	4	0.0
S-131 P	4	3	0.0
S-135 P	83	13	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	277	1815	0.7
Total	**1559**	**2933**	**1.1**

OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-77	1357	1545	0.6
S-308	154	178	0.1
S-351	97	488	0.2
S-352	116	135	0.1
S-354	898	314	0.1
L-8 Outflow	161	204	0.1
ET	2187	2134	0.8
Total	**4970**	**4997**	**2.0**

Provisional Data

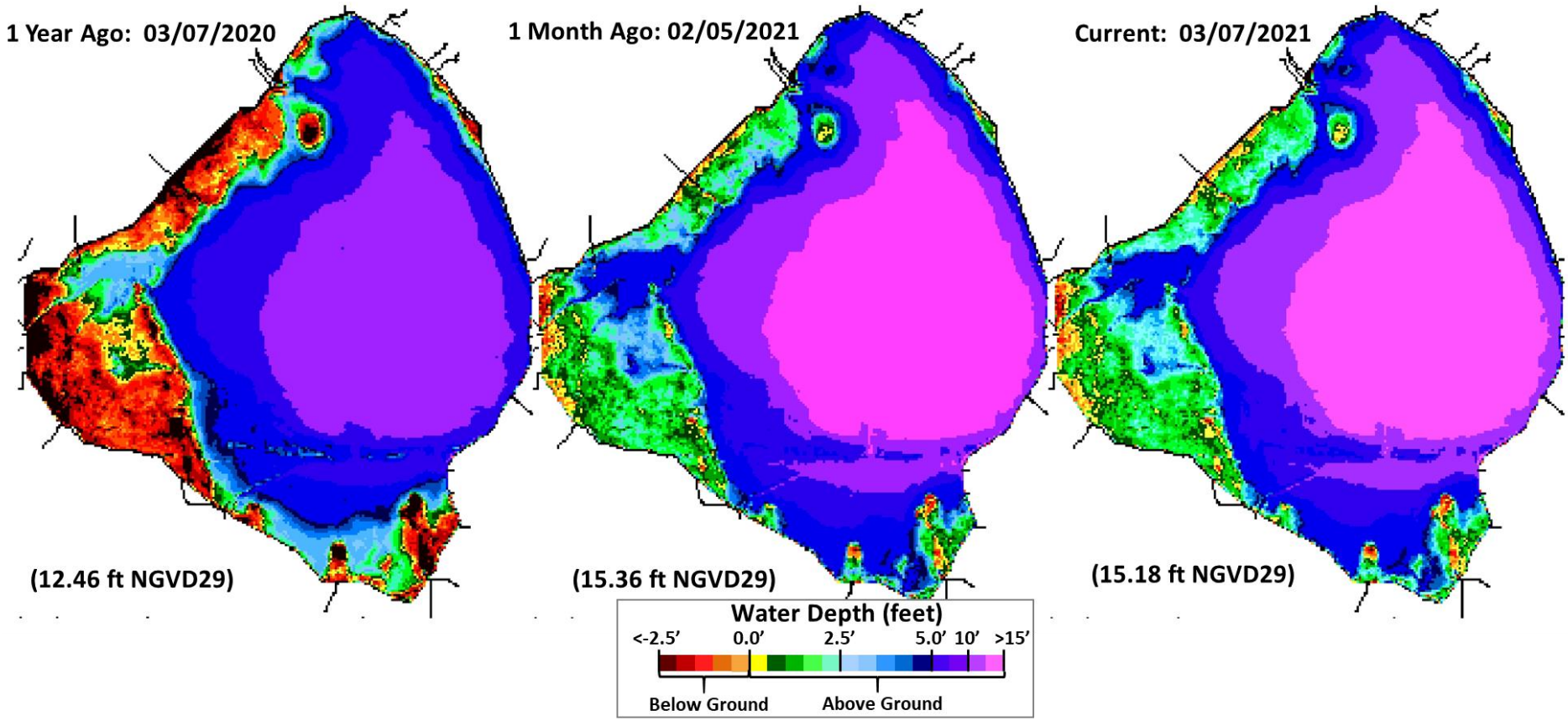


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

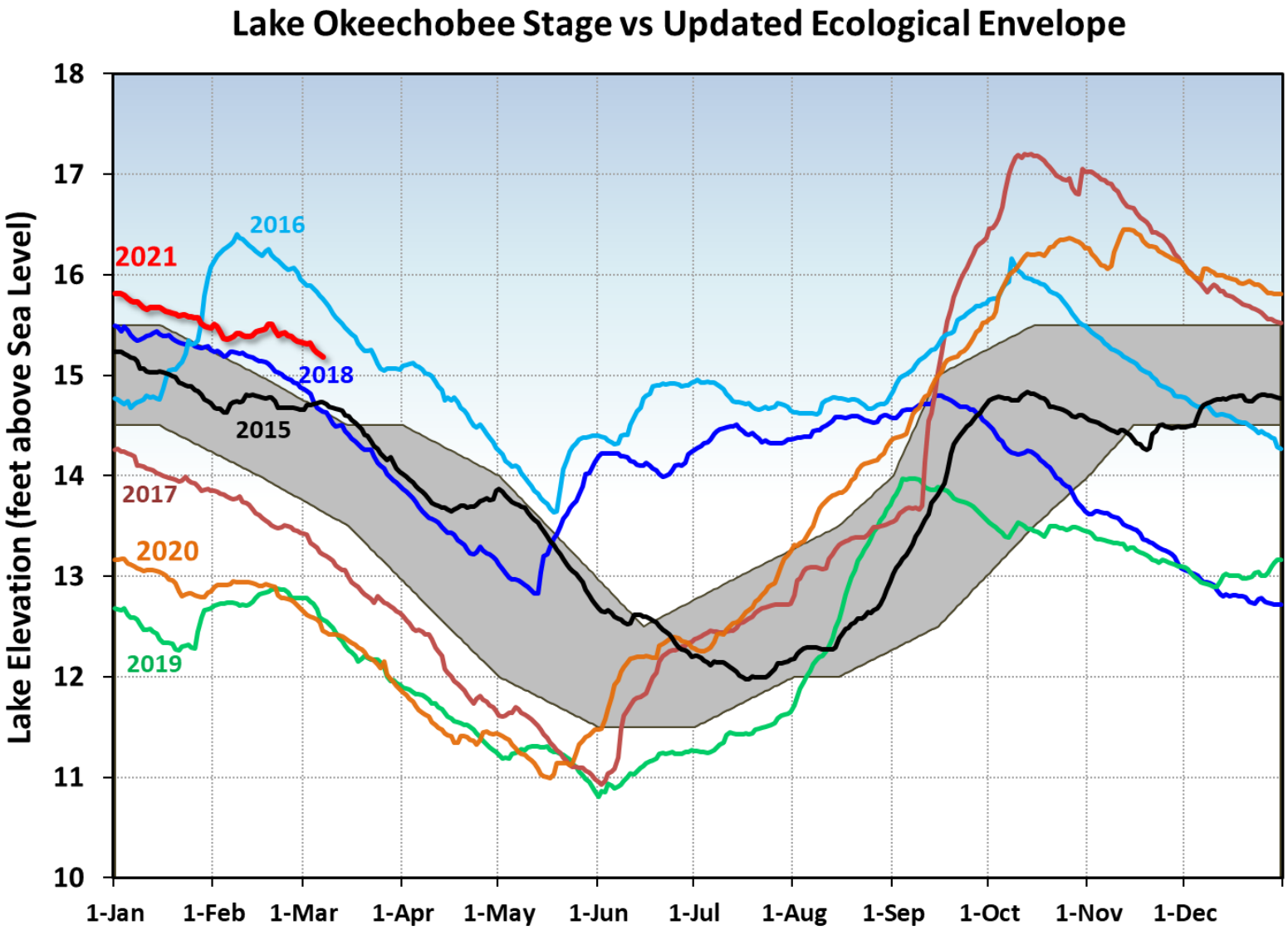


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated Ecological Envelope.

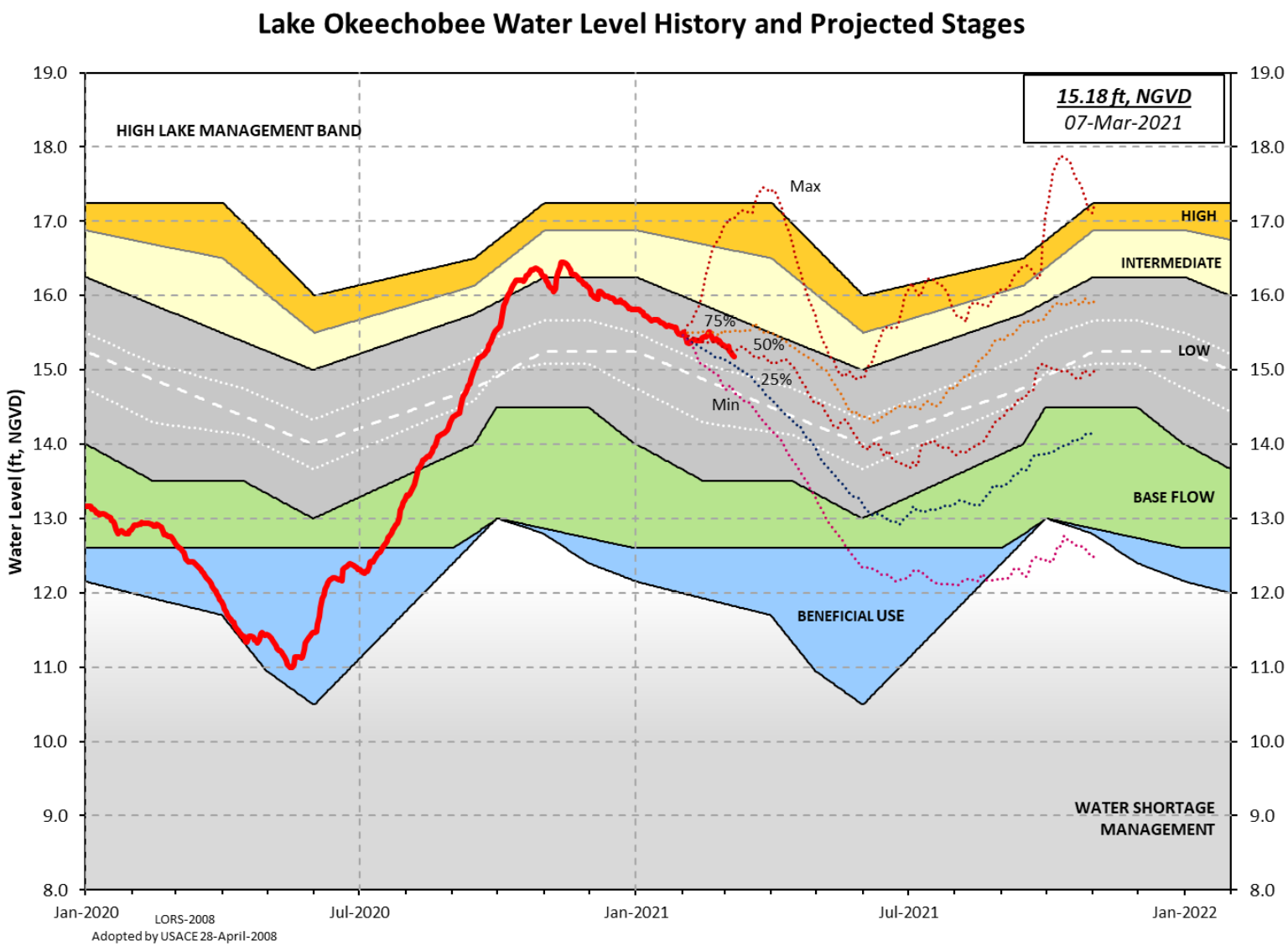


Figure 3. Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

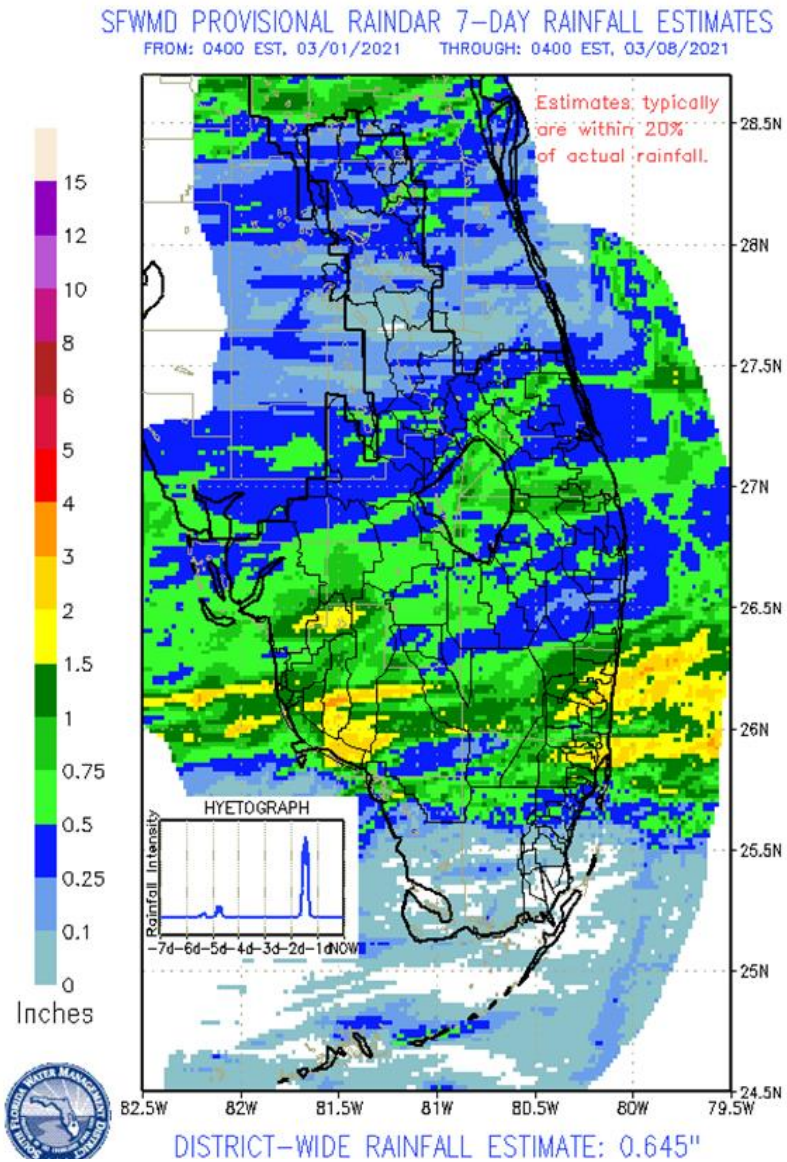


Figure 4. 7-Day rainfall estimates by RAINDAR.

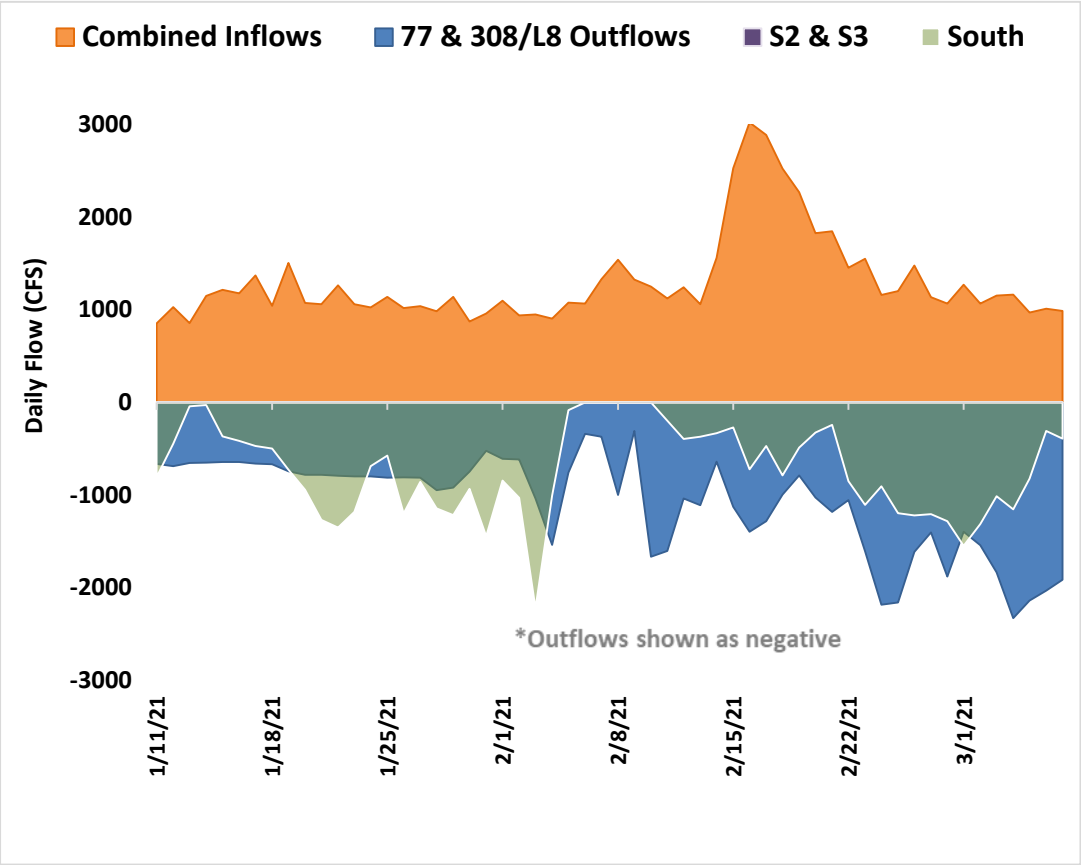
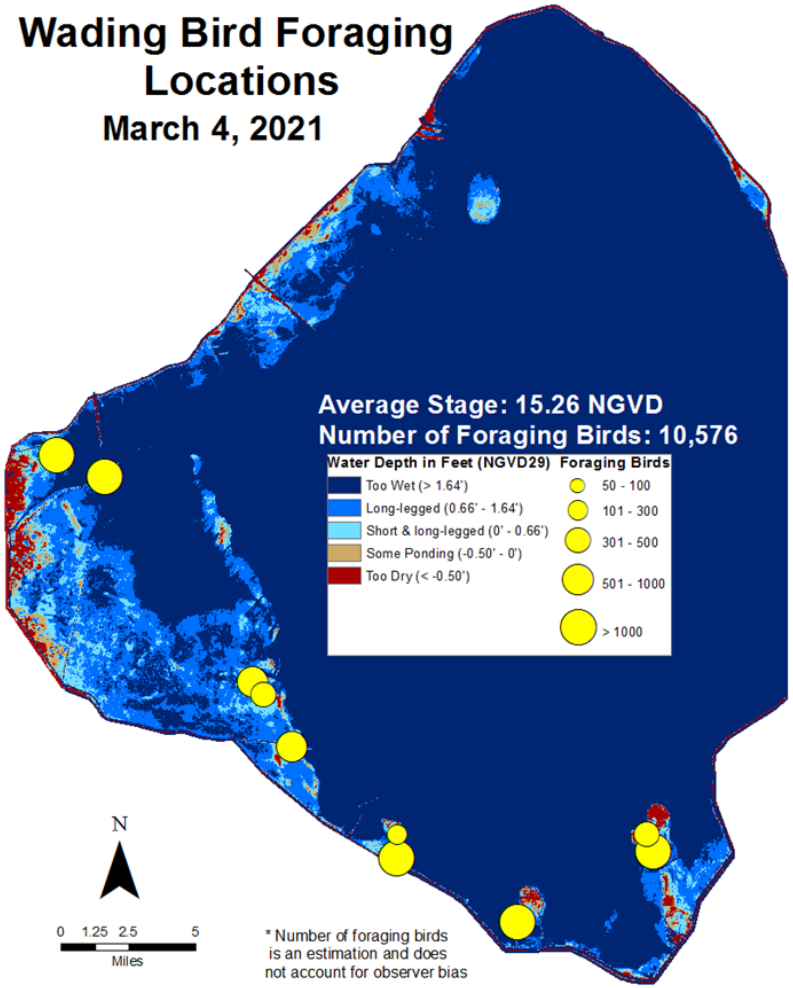


Figure 5. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive 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.



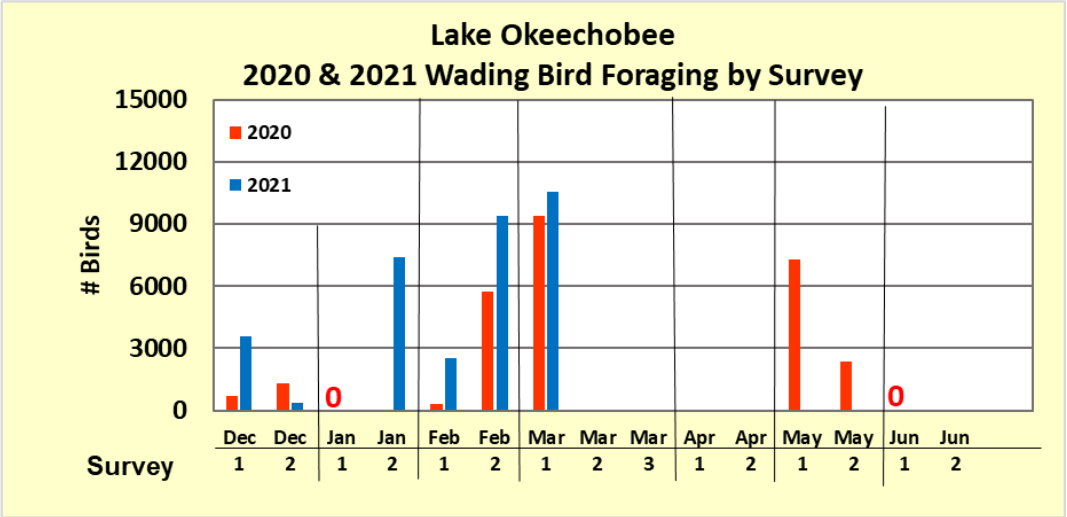
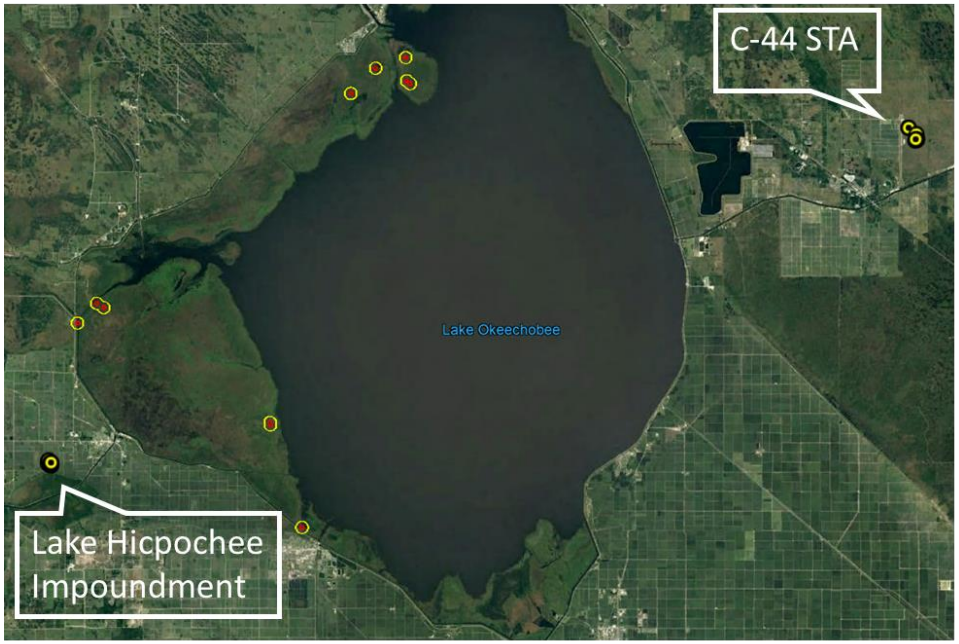


Figure 6. Map based results of most recent (March 4, 2021) wading bird survey, and bar graph comparing 2021 surveys with 2020.



- 16 nests in Hicpochee Impoundment area
- 22 in C-44 STA
- 11 on Lake Okeechobee, first since 2018
- 98% of currently known nests in state are in these 3 locations, but many kites in KCOL

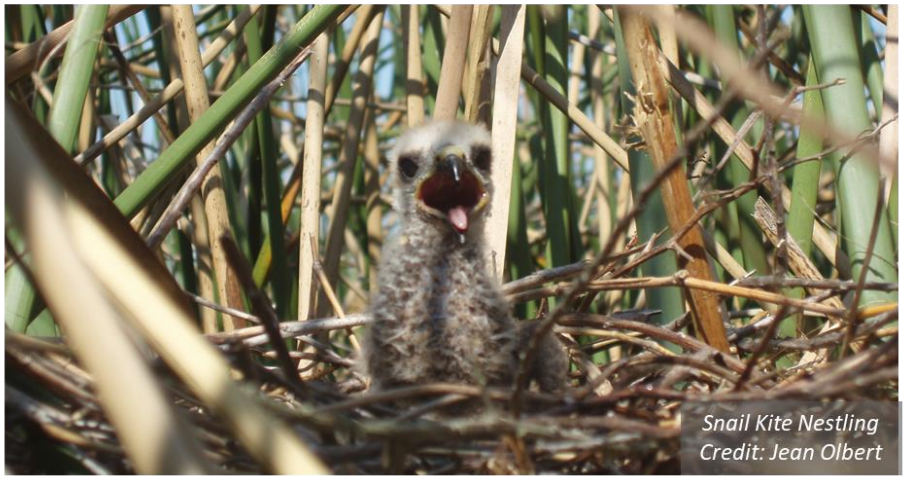


Figure 7. Current abundance of Snail Kite nests in and around Lake Okeechobee

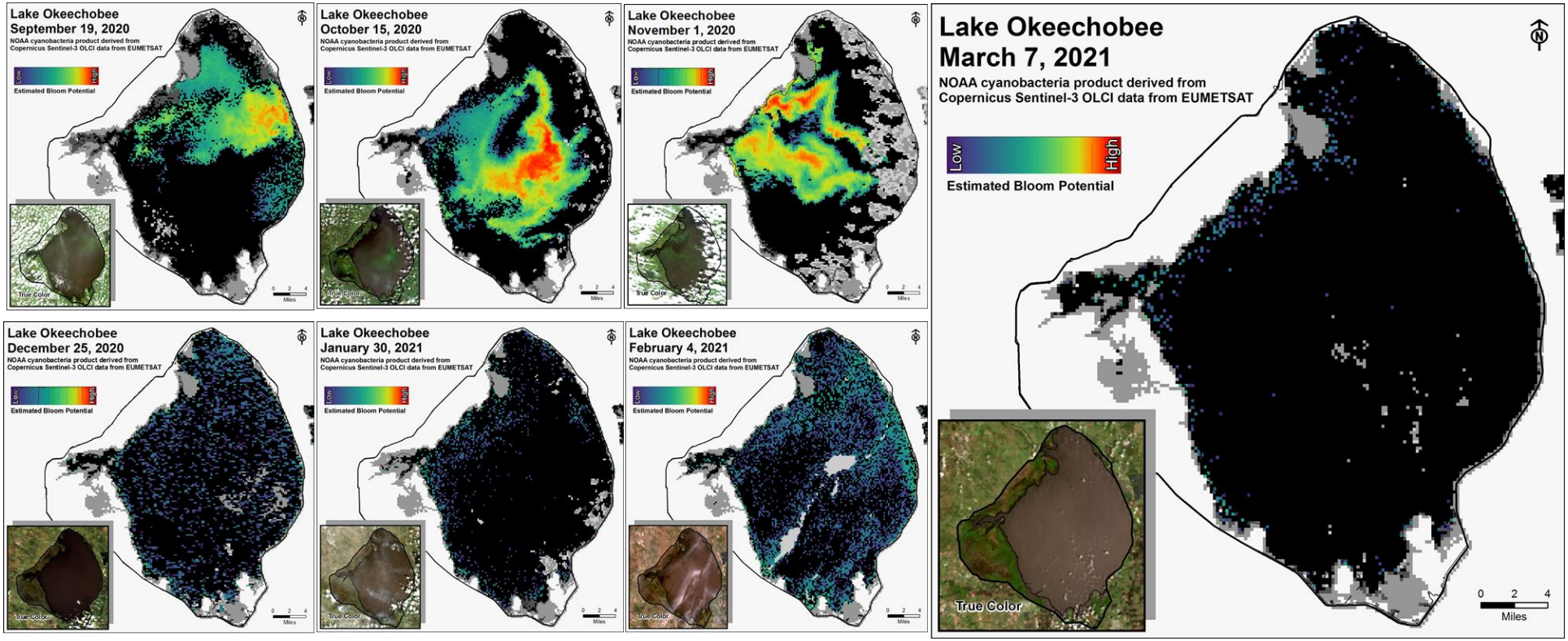


Figure 8. Cyanobacteria bloom potential based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged approximately 283 cfs (**Figures 1** and **2**) and the previous 30-day inflow averaged about 411 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.

Location	Flow (cfs)
S-308	192
S-80	77
S-97 on C-23	1
S-49 on C-24	39
Gordy Rd. structure on Ten Mile Creek	Not reporting
Tidal Basin Inflow	166

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 19.0. 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.

Sampling Site	Surface	Bottom	Envelope
HR1 (North Fork)	**12.5** (11.0)	**16.2** (13.2)	NA[1]
US1 Bridge	**18.0** (16.0)	**20.1** (17.4)	10.0-26.0
A1A Bridge	**26.8** (25.1)	**29.1** (27.9)	NA[1]

[1]Envelope not applicable

Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged approximately 1,917 cfs (**Figures 5** and **6**) and the previous 30-day inflow averaged about 1,872 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	1545
S-78	1340
S-79	1840
Tidal Basin Inflow	77

Over the past week, surface salinities remained the same at S-79 and Val I-75, decreased at Ft. Myers and Shell Point, and increased at Cape Coral and Sanibel (**Table 4**, **Figures 7** and **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)	**0.2** (0.2)	**0.2** (0.2)	NA[1]
Val I-75	**0.3** (0.3)	**0.4** (0.3)	0.0-5.0[2]
Ft. Myers Yacht Basin	**3.5** (3.7)	**4.7** (6.0)	NA[1]
Cape Coral	**11.4** (10.9)	**13.1** (14.0)	10.0-30.0
Shell Point	**24.9** (25.1)	**25.5** (25.9)	10.0-30.0
Sanibel	**28.9** (28.7)	**29.7** (30.6)	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 0.9 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 65 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	65	0.9	0.4
B	300	65	0.5	0.3
C	450	65	0.4	0.3
D	650	65	0.3	0.3
E	800	65	0.3	0.3
F	1000	65	0.2	0.3
G	1500	65	0.2	0.3
H	2000	65	0.2	0.3

Red tide:
The Florida Fish and Wildlife Research Institute reported on March 5, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background to medium concentrations in Charlotte and Lee counties, and background to low concentrations in and offshore of Collier County. On the east coast, red tide was not observed in samples from Brevard, Palm Beach or Broward 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.

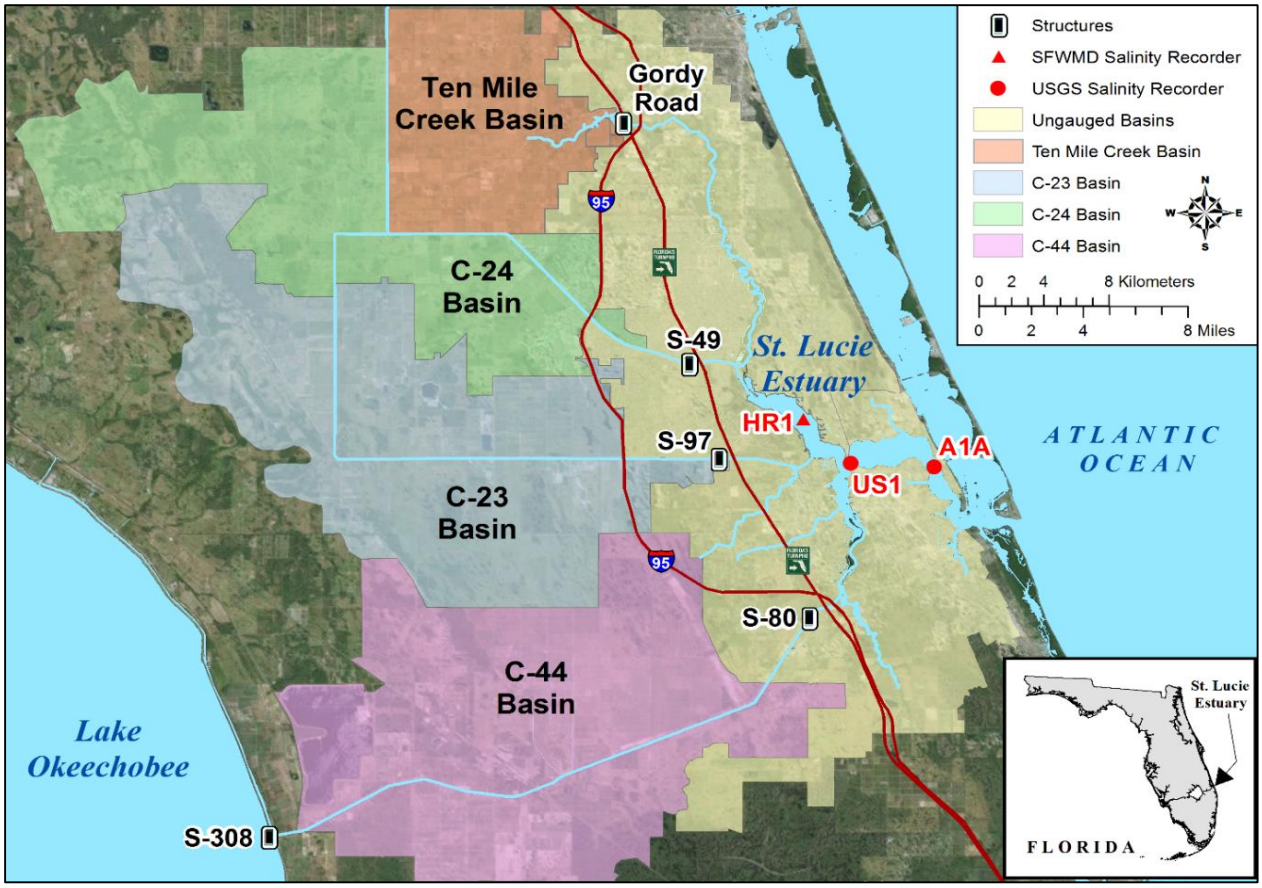


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

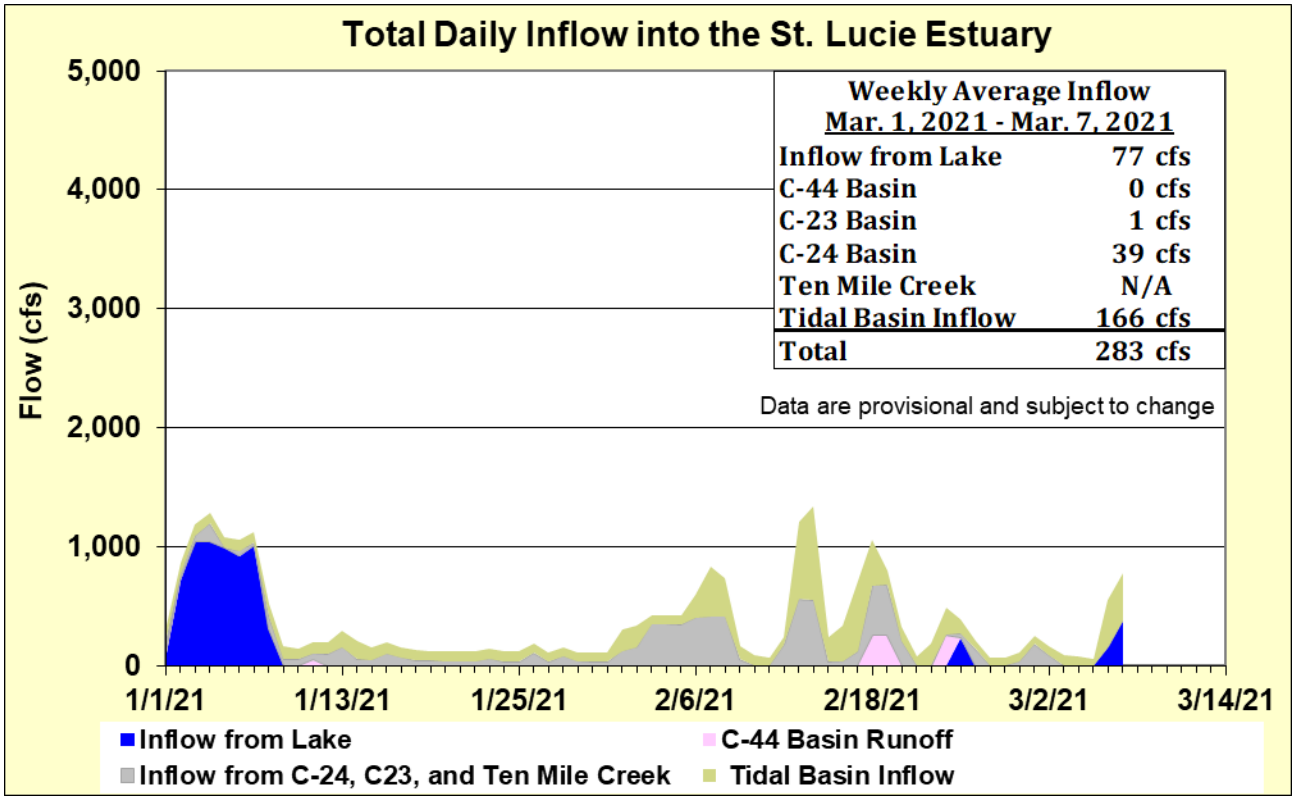


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin into the St. Lucie Estuary. Note: C-23 Basin inflows were estimated using S-48 and the Ten Mile Creek Basin inflows are not being calculated at this time.

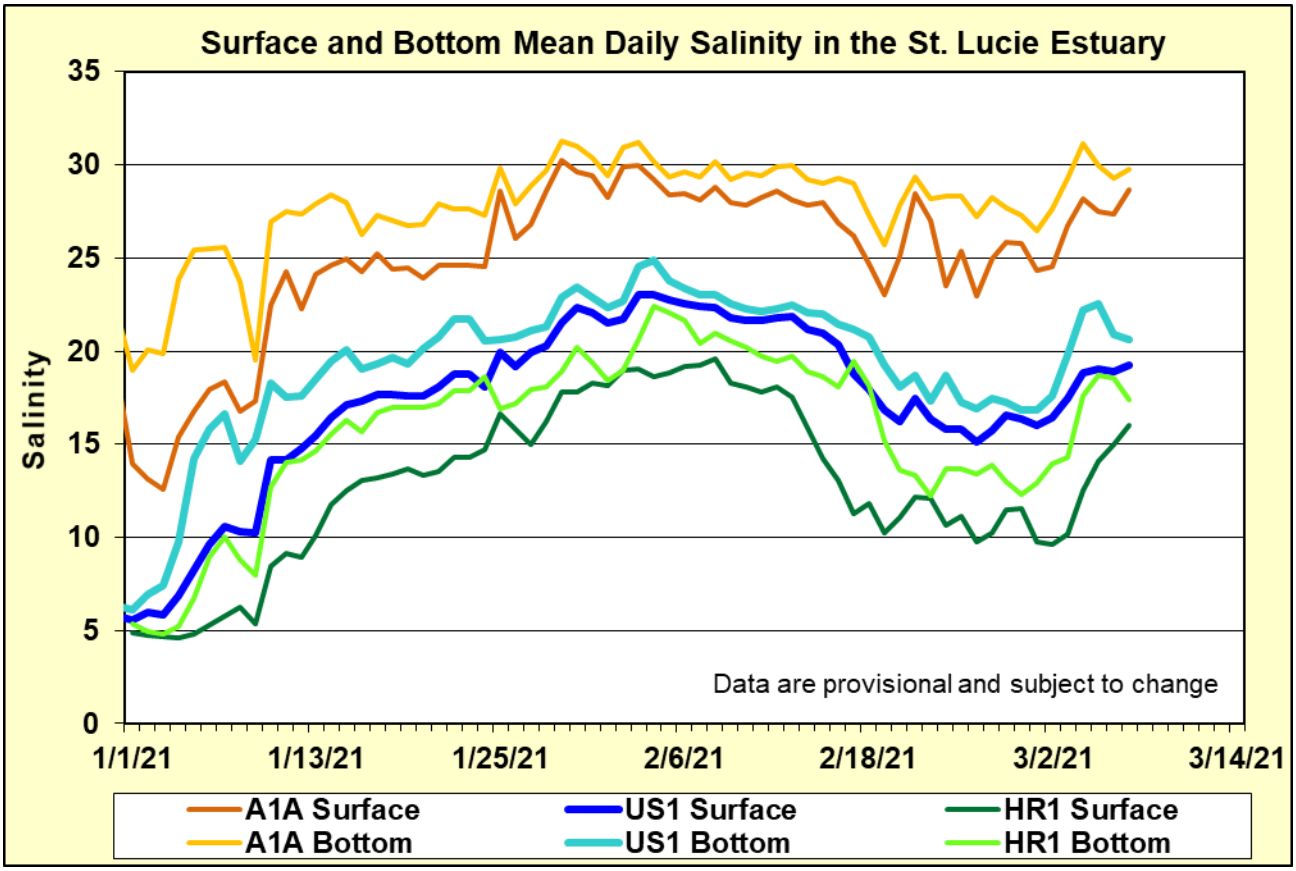


Figure 3. Daily mean salinity at the A1A, US1, and HR1 stations.

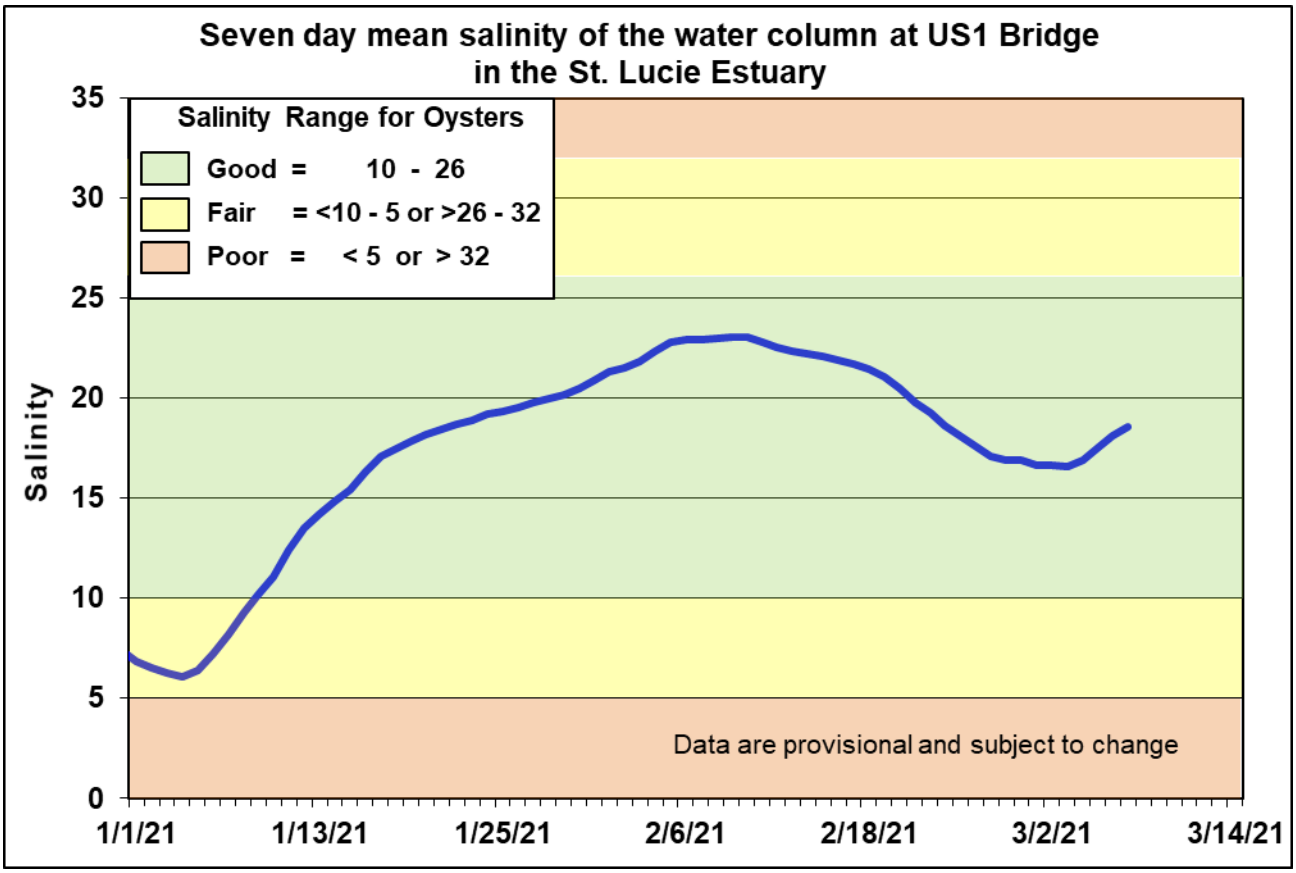


Figure 4. Seven-day mean salinity of the water column at the US1 Bridge.

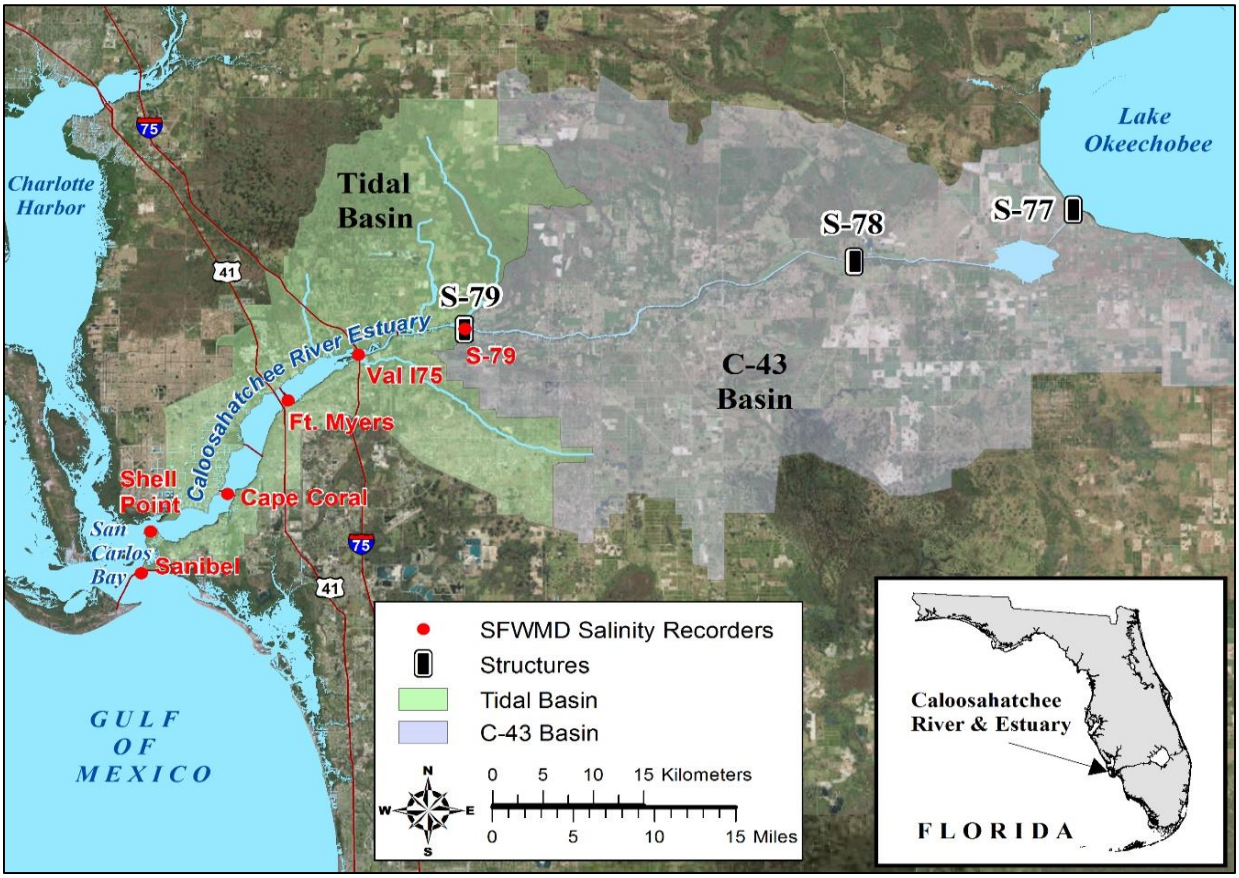


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

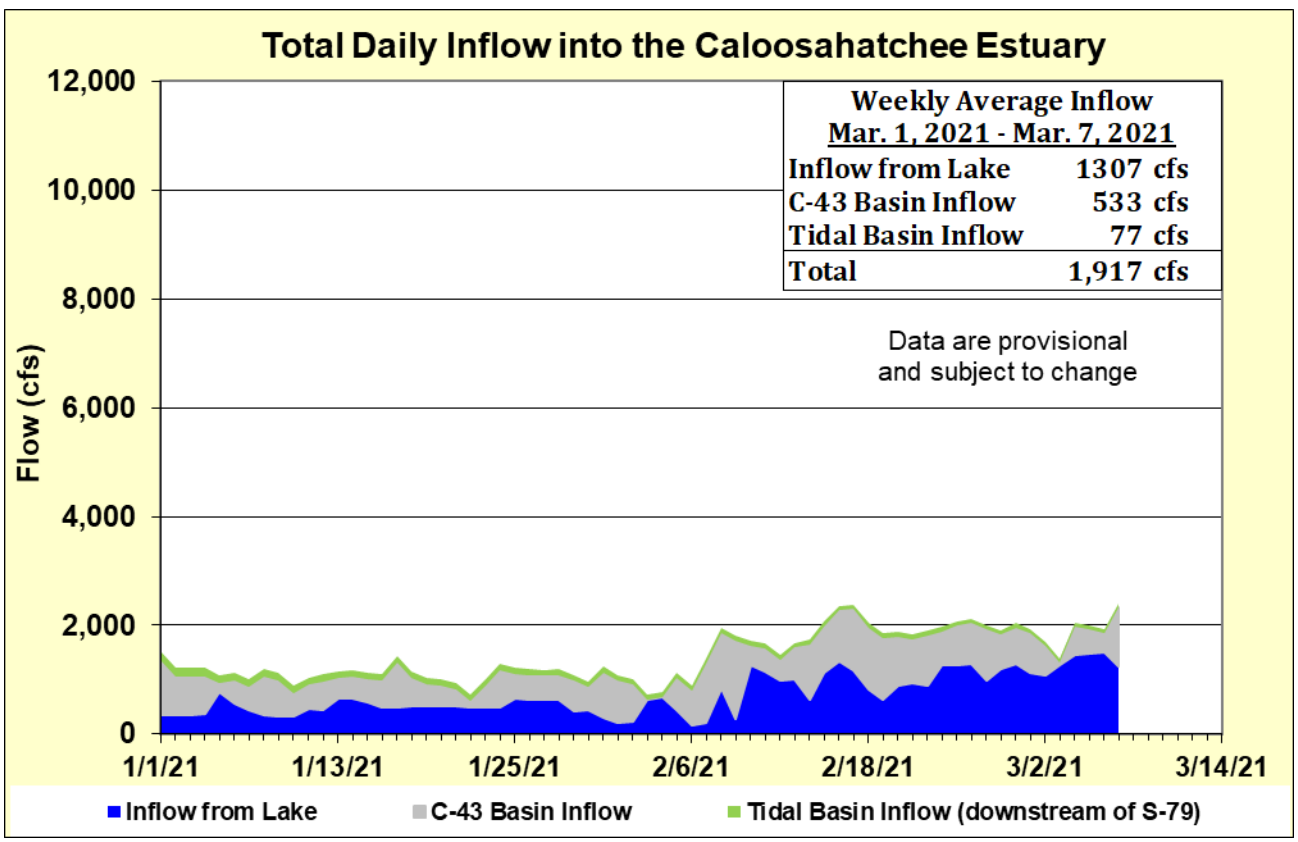


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin and tributaries in the tidal basin into the Caloosahatchee River Estuary.

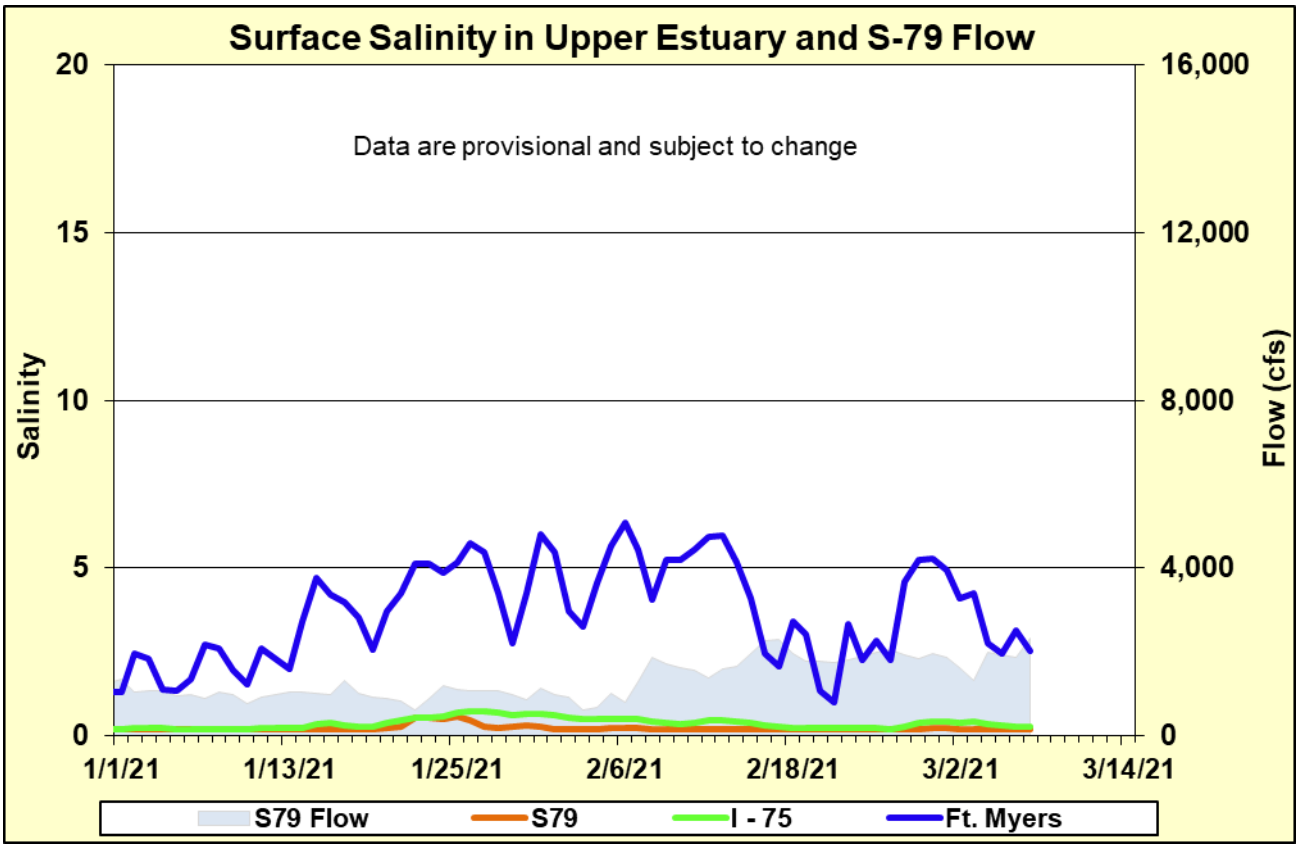


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

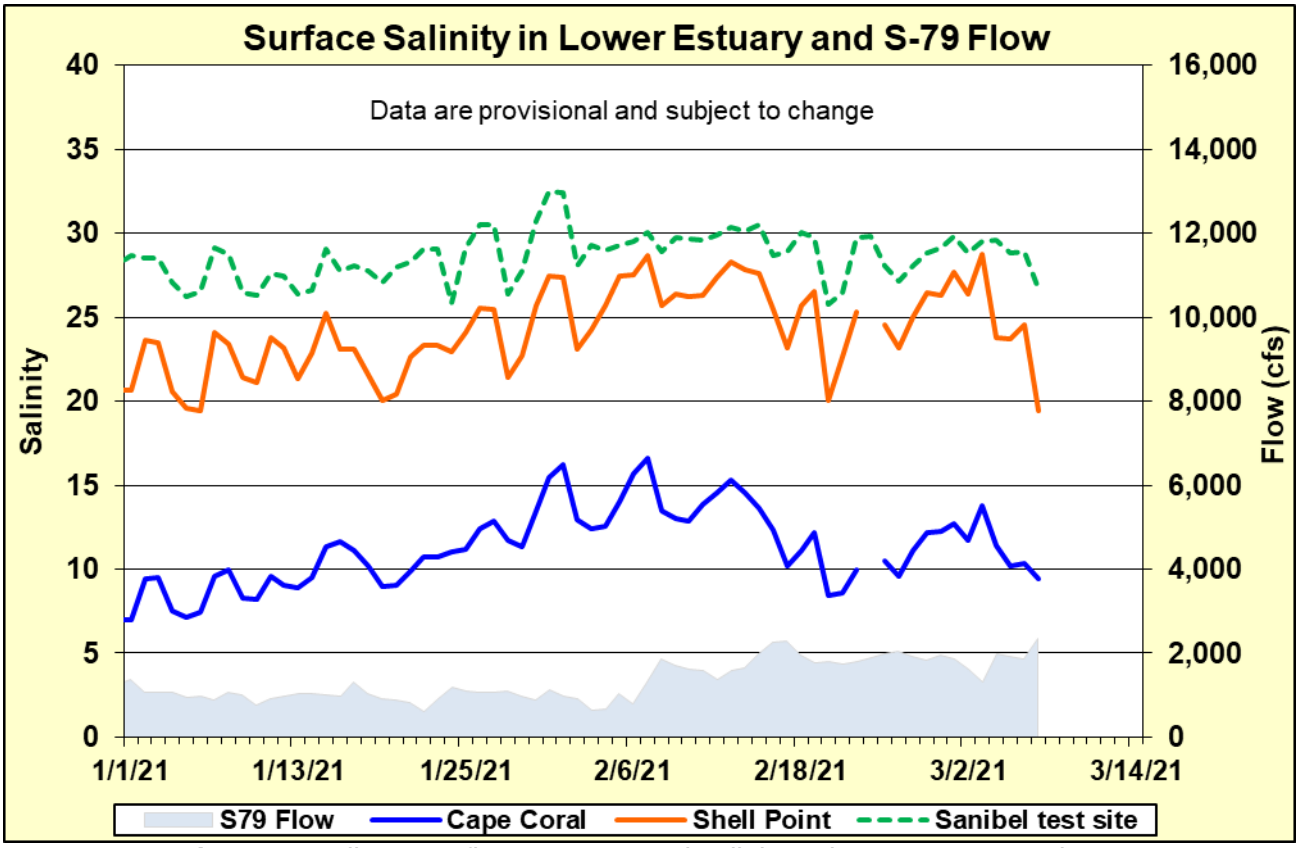


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

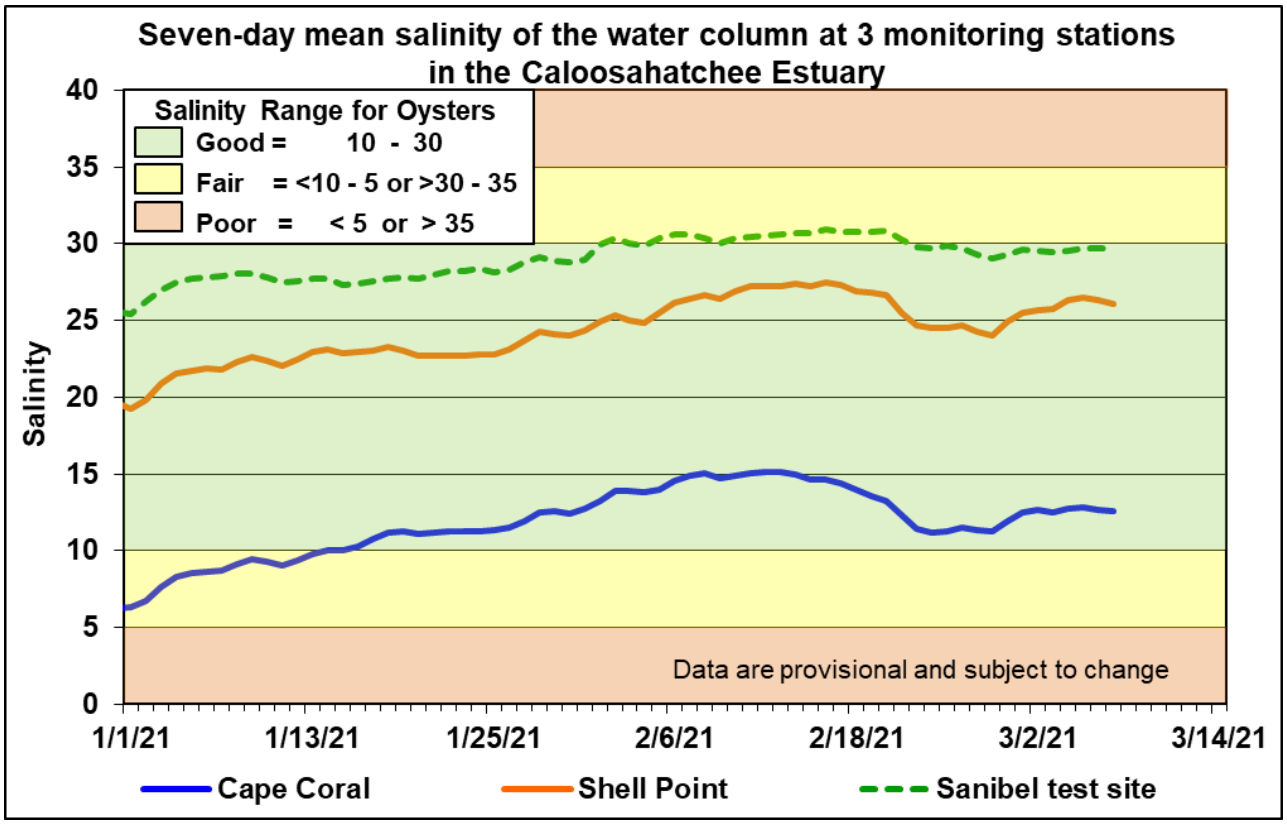


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

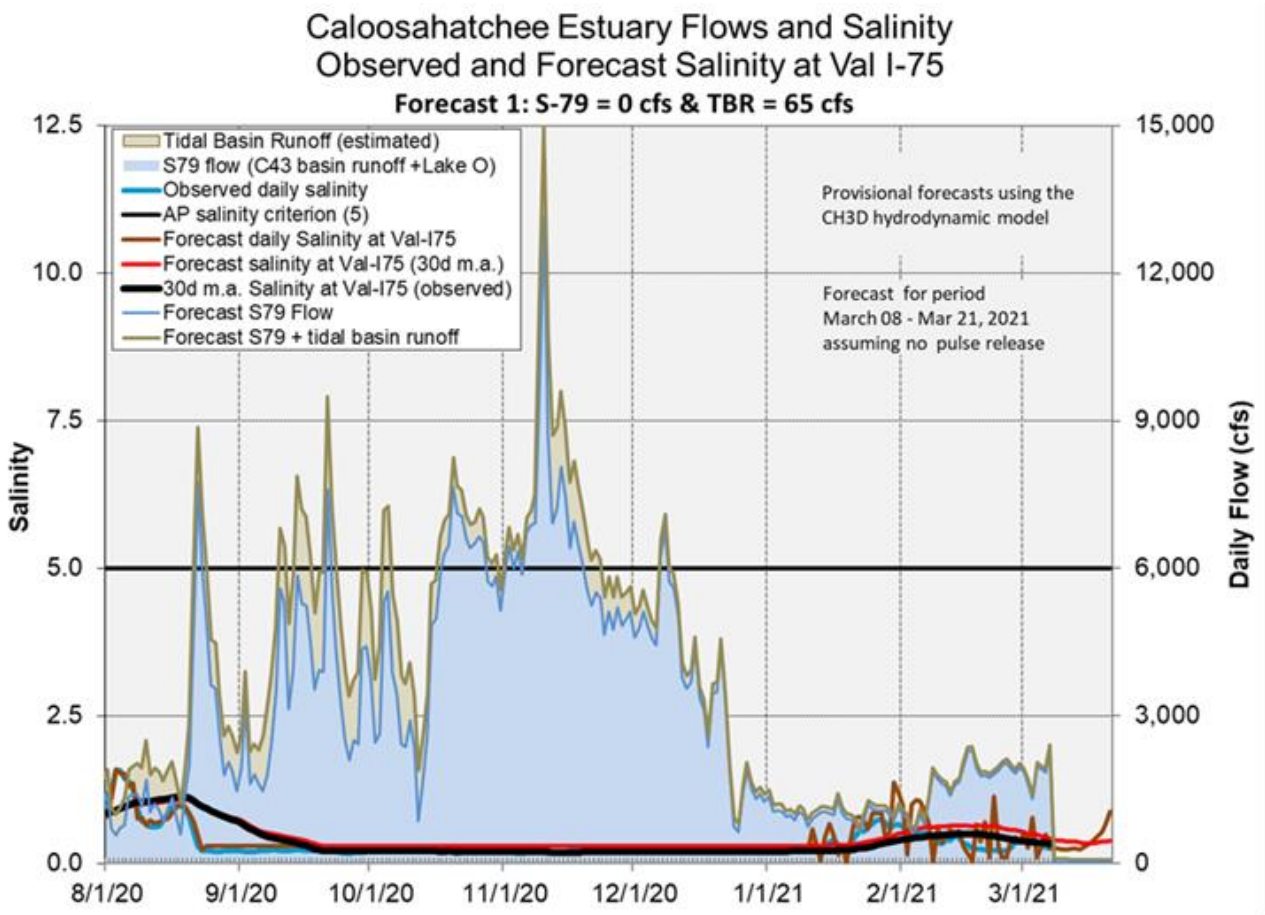


Figure 10. Forecasted Val I-75 surface salinity assuming no pulse release at S79.

Stormwater Treatment Areas

Over the past week, approximately 4,400 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 111,400 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 1,559,000 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 below 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**).

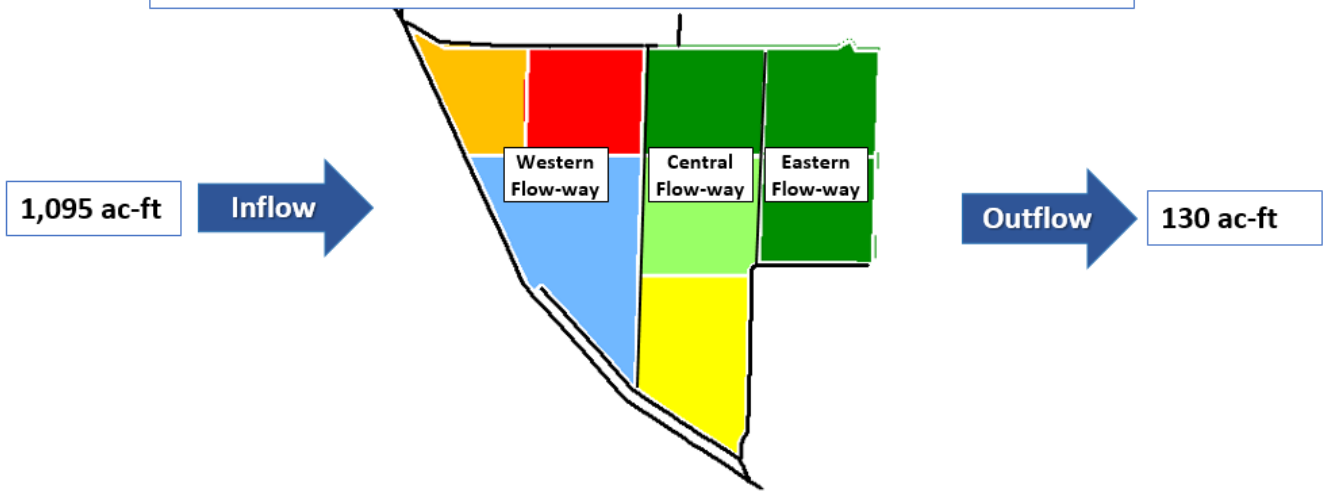
STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to construction activities. Treatment cells are at or near target stage except the Eastern Flow-way downstream cells which are below target stage. Vegetation in all flow-ways is highly stressed and the 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^2/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^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. 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^2/year. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8 which are healthy (**Figures 5** and **6**).

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



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 3/7/2021	
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	1,095	2,895	317,229
--Lake Inflow, ac-ft	0	N/A	21,500
Total Outflow, ac-ft	130	1,212	277,010
Inflow Conc., ppb	81	90	136
Outflow Conc., ppb	33	38	37
Includes Preliminary Data			

Figure 1. STA-1E Weekly Status Report.

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

0 ac-ft → Inflow

Outflow → 0 ac-ft

STA-1W Flow-Way Status

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

As of 3/7/2021

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

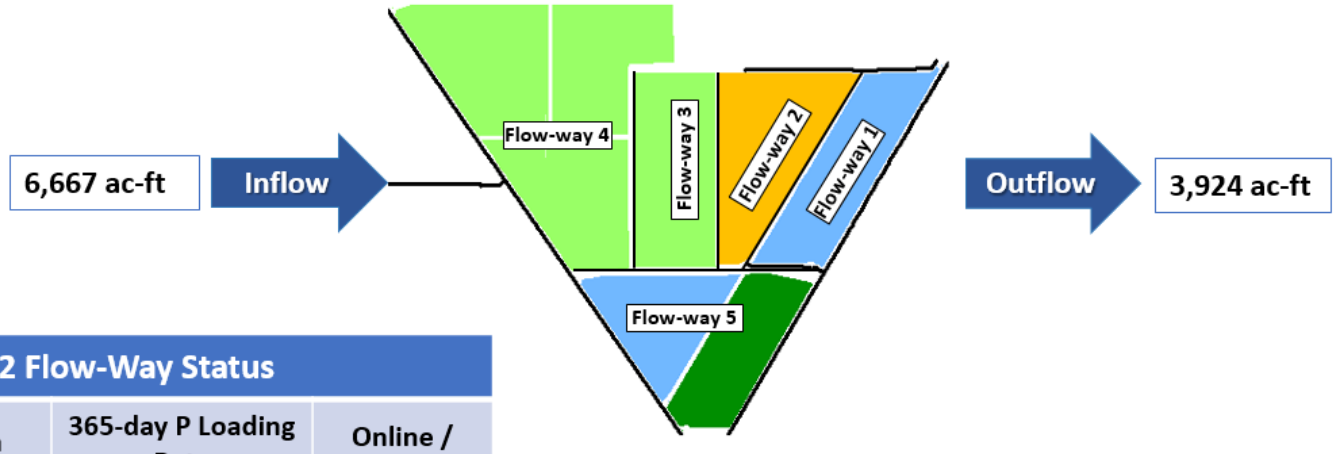
STA-1W Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	0	0	204,503
--Lake Inflow, ac-ft	0	N/A	11,600
Total Outflow, ac-ft	0	89	220,634
Inflow Conc., ppb	N/A	N/A	241
Outflow Conc., ppb	N/A	59	38

Includes Preliminary Data

Figure 2. STA-1W Weekly Status Report.

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



STA-2 Flow-Way Status

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

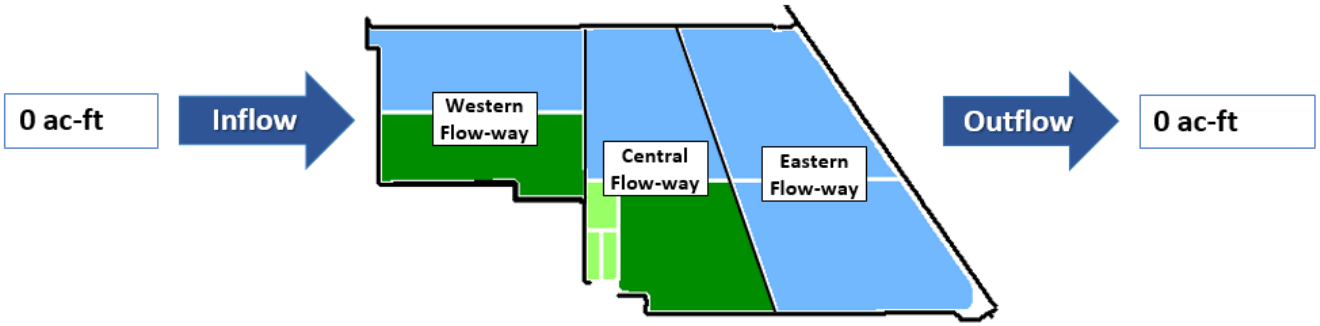
As of 3/7/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-2 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	6,017	14,068	390,859
--Lake Inflow, ac-ft	4,300	N/A	41,200
Total Outflow, ac-ft	3,924	6,156	459,639
Inflow Conc., ppb	16	20	105
Outflow Conc., ppb	17	18	21
Includes Preliminary Data			

Figure 3. STA-2 Weekly Status Report.

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



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	Offline, vegetation management drawdown as of 3/1/2021		
Central		1.0	Vegetation Rehab
Western		1.0	Vegetation Rehab

As of 3/7/2021
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

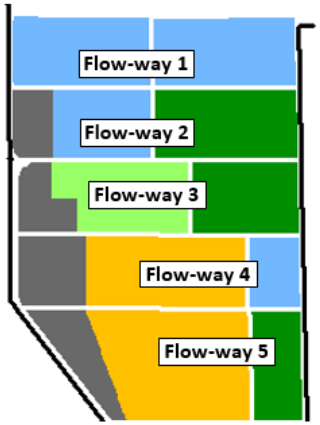
STA-3/4 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	0	497	578,988
--Lake Inflow, ac-ft	0	N/A	48,100
Total Outflow, ac-ft	0	1,125	553,958
Inflow Conc., ppb	N/A	19	58
Outflow Conc., ppb	N/A	25	12
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 3/1/2021 through 3/7/2021

0 ac-ft → Inflow



Outflow → 0 ac-ft

STA-5/6 Flow-Way Status

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

As of 3/7/2021
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

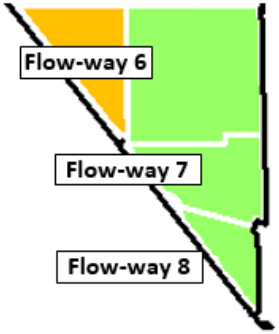
STA-5/6 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	0	666	130,129
--Lake Inflow, ac-ft	N/A	N/A	N/A
Total Outflow, ac-ft	0	281	152,445
Inflow Conc., ppb	N/A	113	281
Outflow Conc., ppb	N/A	20	79

Includes Preliminary Data

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

STA-5/6 Weekly Status Report – 3/1/2021 through 3/7/2021



STA-5/6 Flow-Way Status

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

As of 3/7/2021

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
- 25-50% Dry
- 50-75% Dry
- 75-100% Dry

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

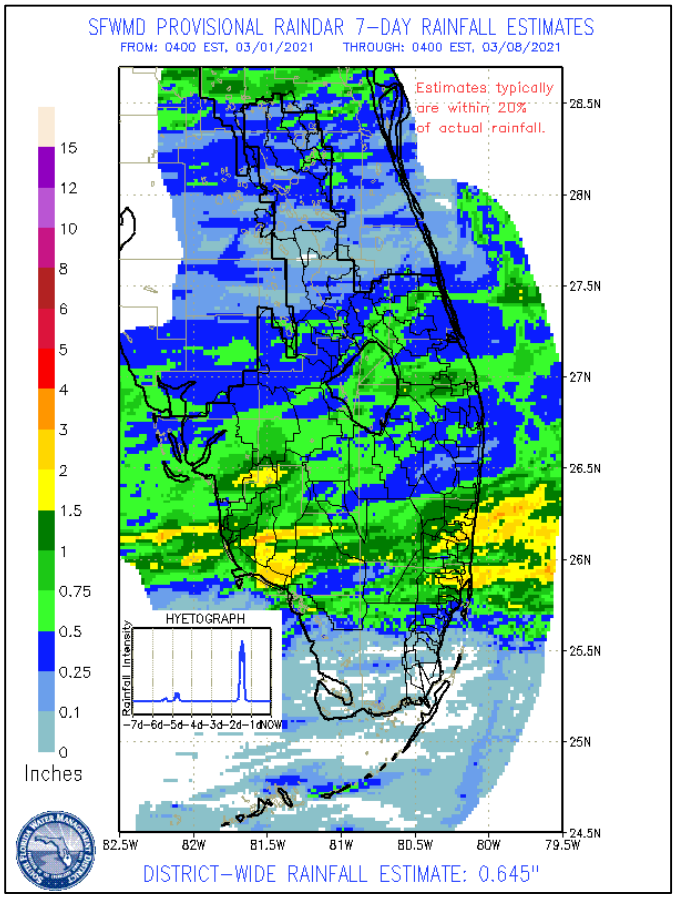
Basic Concepts and Definitions for STA Weekly Status Report

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

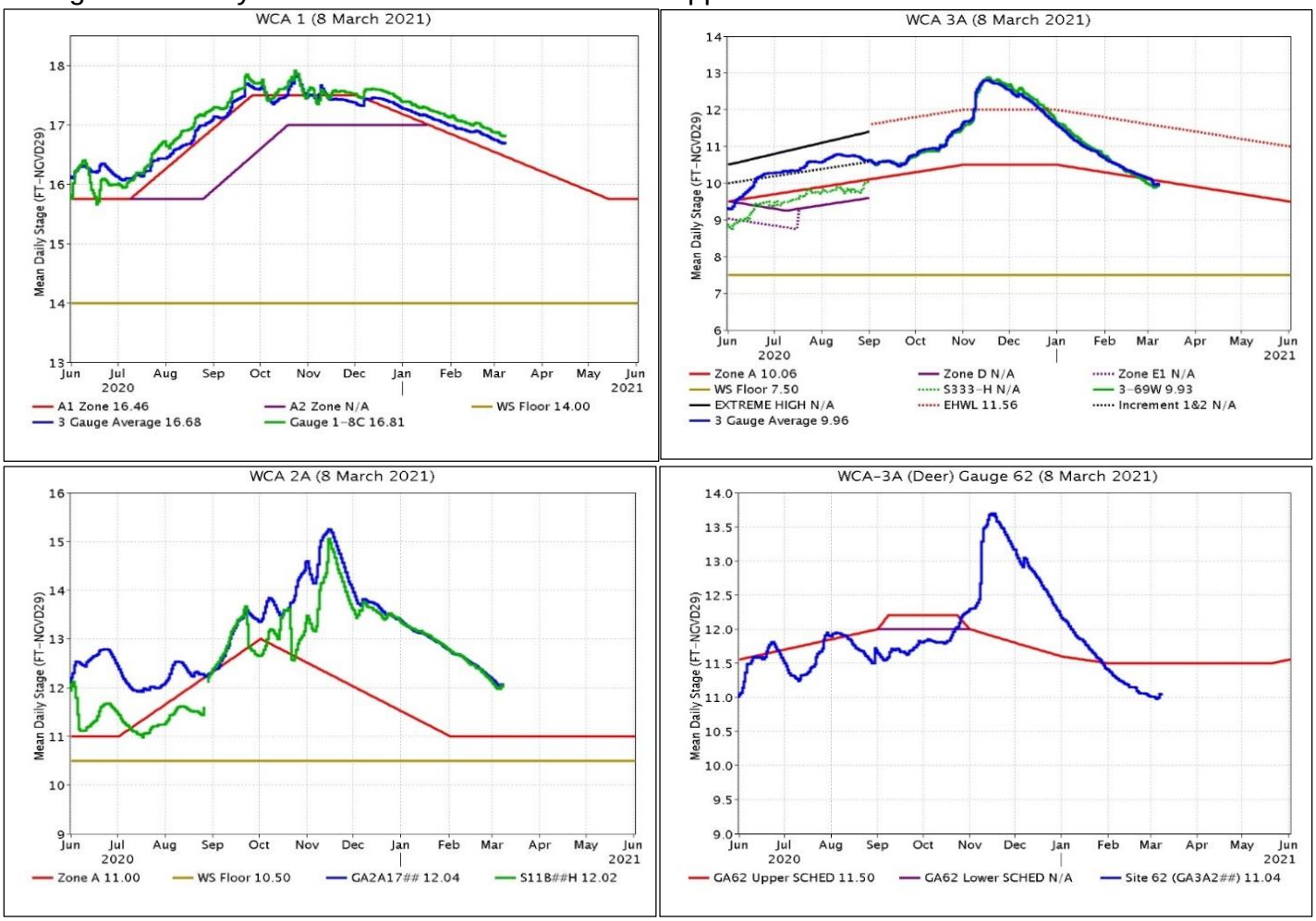
EVERGLADES

Frontal rains over the weekend slowed recession within the WCAs and Everglades National Park. At the gauges monitored for this report, stages fell 0.07 feet on average last week, a slight decrease from the week prior and within a desired range. Evaporation was 1.05 inches last week, a 0.04-inch increase from the previous week.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.34	−0.06
WCA-2A	0.78	−0.13
WCA-2B	1.32	−0.02
WCA-3A	0.84	−0.12
WCA-3B	0.90	−0.05
ENP	0.19	+0.03



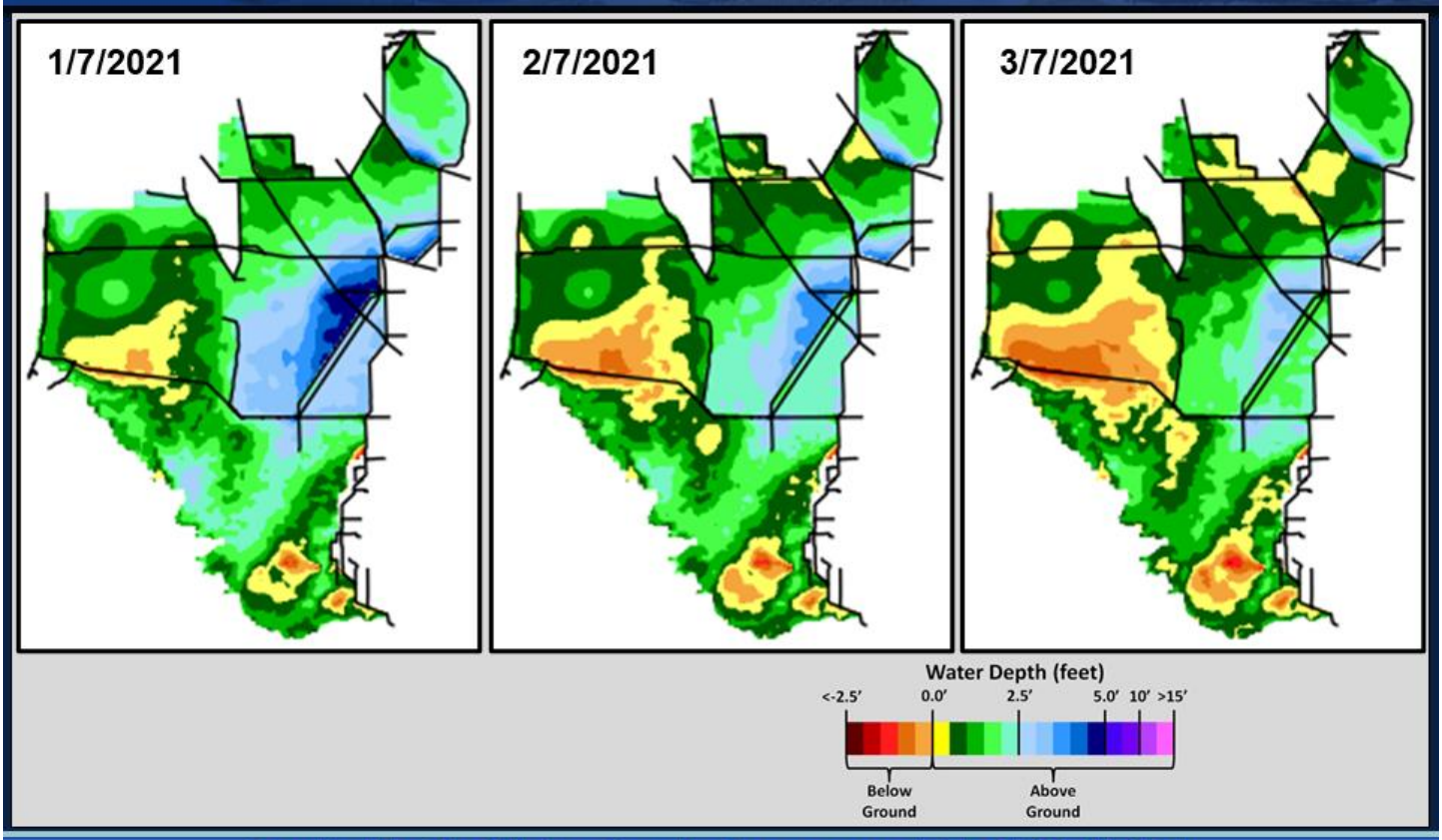
Regulation Schedules: WCA-1: Stage at the 1-8C Gauge continues to follow just above and parallel with schedule, now 0.35 feet above the falling Zone A1 regulation line. WCA-2A: The recession in stage at S11B-HW slowed this week and is currently 1.02 feet above the regulation line. WCA-3A: The Three Gauge Average stages finally fell beneath the Zone A regulation line and is currently just 0.10 feet below. Stage at gauge 62 (Northwest corner) also showed a slight uptick at the end of the week. The average on Sunday was 0.46 feet below the stable Upper Schedule.



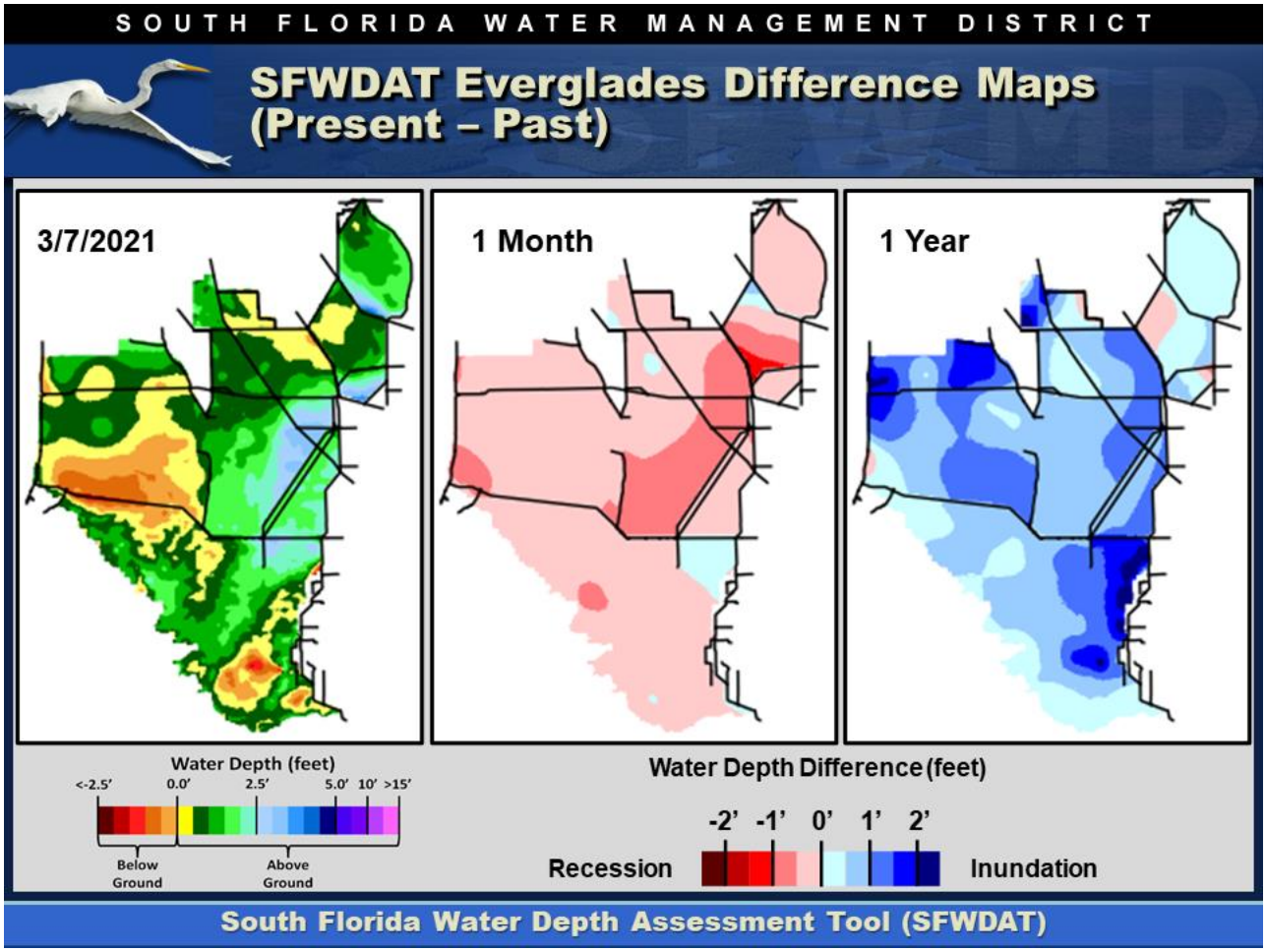
The WDAT tool for spatial interpolation of depth monthly snapshots indicate that WCA-3A is drying down in the northwest with depths potentially at the soil surface along northern perimeter and downstream of S-150. Northern WCA-2A is also drying down to soil surface. North to south hydrologic connectivity remains established within Shark River Slough (SRS) and Taylor slough in Everglades National Park (ENP) while conditions begin to dry down in Lostman's Slough and the western marl prairie. Large portions of southern and southwestern Big Cypress National Preserve (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 at the stage difference patterns, most of the system remains wetter. Compared to one year ago, WCA-3A is deeper, 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. The eastern boundary of Everglades National Park is also much wetter than a year ago.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

SFWDAT Water Depth Monthly Snapshots



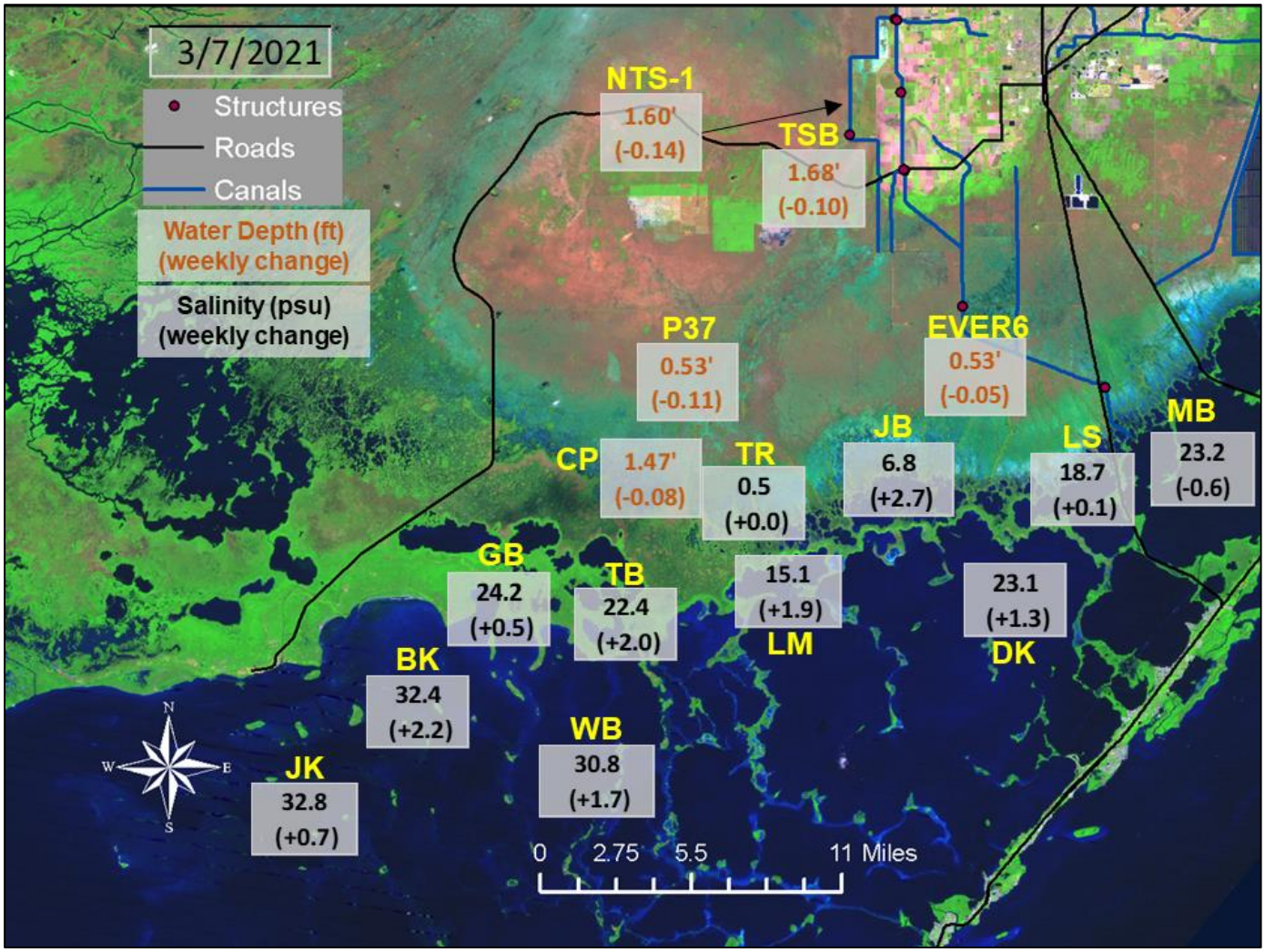
South Florida Water Depth Assessment Tool (SFWDAT)

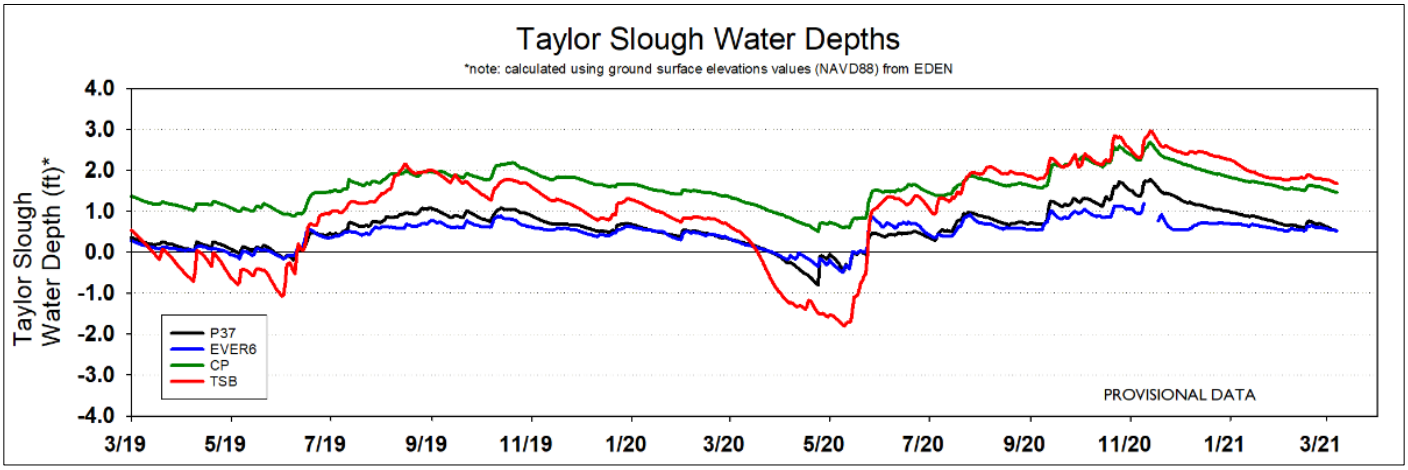


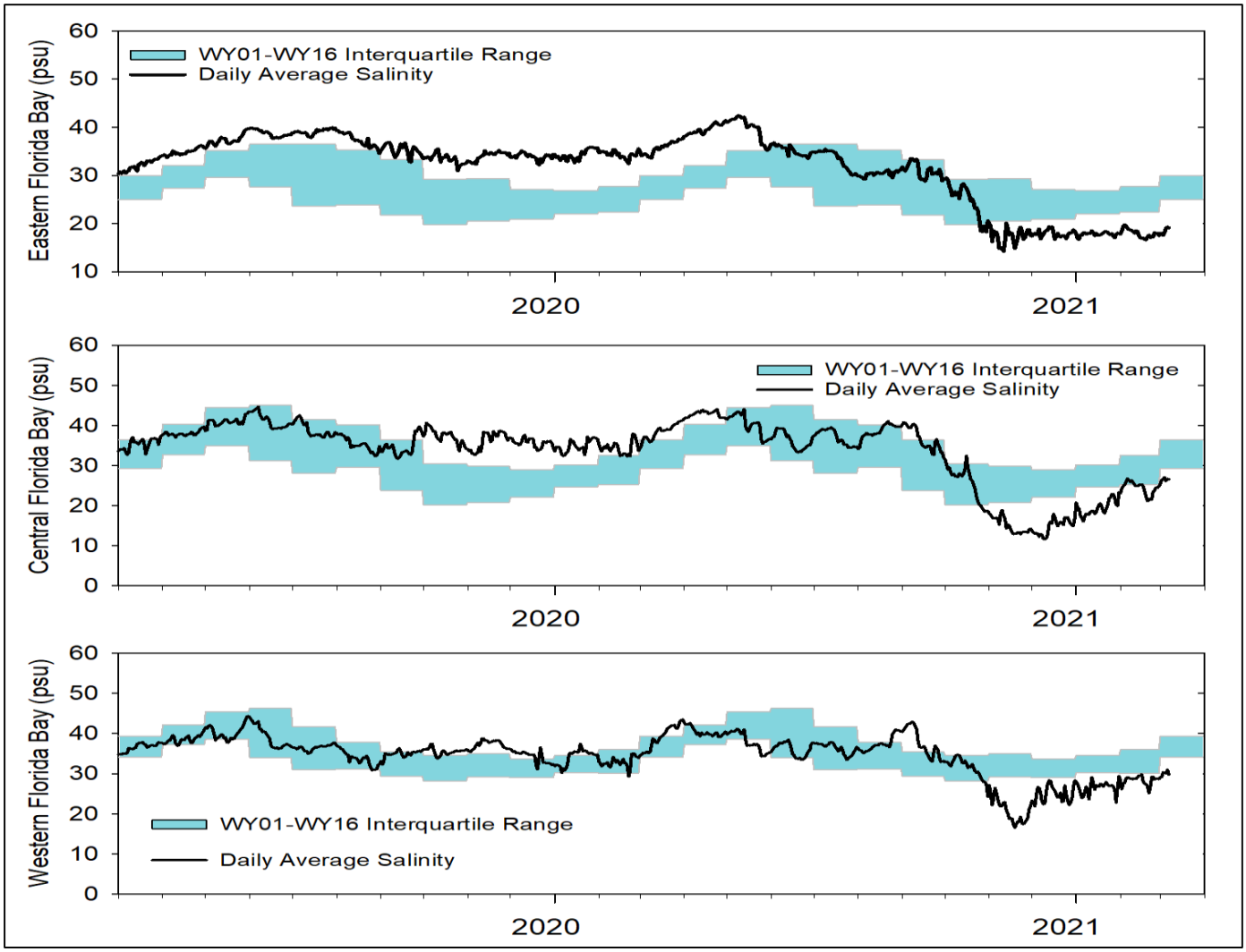
Tree island inundation in WCA-3A, WCA-3B and Everglades National Park (ENP): 371 Tree Islands of known elevation within WCA-3A, -3B, and Everglades National Park's Shark Slough. Current preliminary estimates using WDAT indicate that 22% or 81 of the tree islands are currently inundated (down from 27% the week prior), and almost 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 are 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 (20,000 birds) are at the Alley North colony.

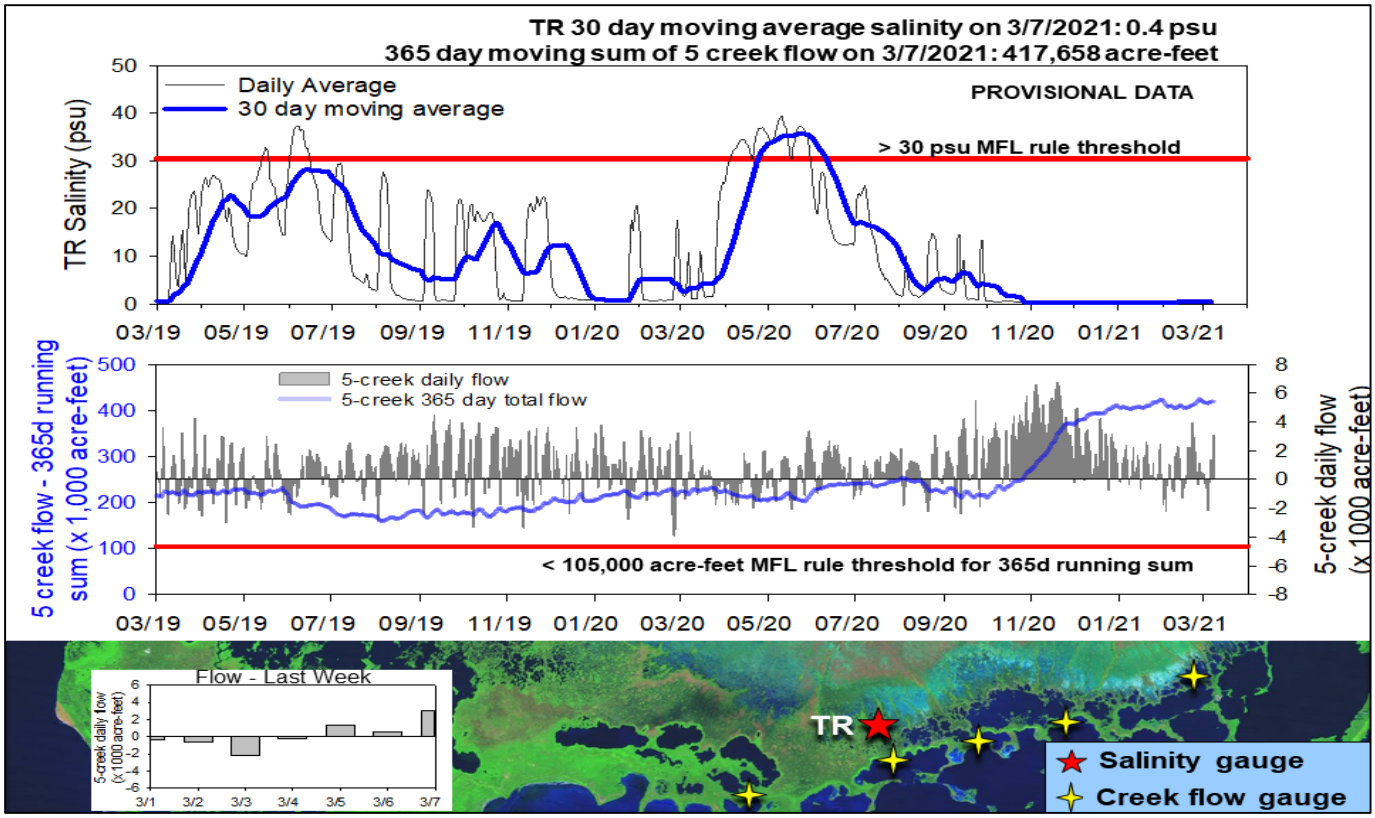
Taylor Slough Water Levels: An average of 0.08 inches of rain fell over Taylor Slough and Florida Bay this week, and water levels in Taylor Slough decreased by 0.1 feet on average over the week. Highest recession rates were in the northern parts of the slough. Taylor Slough is still averaging 10 inches higher than the historical average for this time of year, and the northern portion of the slough is 25 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.


3/7/2021
Structures
Roads
Canals
Water Depth (ft)
(weekly change)
Salinity (psu)
(weekly change)
NTS-1
1.60'
(-0.14)
TSB
1.68'
(-0.10)
P37
0.53'
(-0.11)
EVER6
0.53'
(-0.05)
CP
1.47'
(-0.08)
TR
0.5
(+0.0)
JB
6.8
(+2.7)
LS
18.7
(+0.1)
MB
23.2
(-0.6)
GB
24.2
(+0.5)
TB
22.4
(+2.0)
15.1
(+1.9)
LM
23.1
(+1.3)
DK
BK
32.4
(+2.2)
WB
30.8
(+1.7)
JK
32.8
(+0.7)
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
P37
EVER6
CP
TSB
PROVISIONAL DATA
3/19
5/19
7/19
9/19
11/19
1/20
3/20
5/20
7/20
9/20
11/20
1/21
3/21



Florida Bay Salinities: Salinities in Florida Bay averaged a 1.5 psu increase over the week with individual station changes ranging from +0.1 psu in the US Highway 1 corridor to +2.7 psu in the northeastern shoreline. Bay-wide salinity is 5 psu lower than the historical average for this time of year. All stations are at least 1 psu lower than their historical averages with Johnson Key Basin being the closest to its historical average. The nearshore area is still 7 psu 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 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 about 1,600 acre-feet which is a 2,400 acre-feet decrease from last week. Flows began the week as negative, but positive flows returned for the latter half. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) ended at 417,658 acre-feet this week which is essentially the same as 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 hypersalinity 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 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 0.13'	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 0.02'	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 increased by 0.04'	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 0.10'	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 0.05'	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 increased by 0.03'	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 −0.05' to −0.14'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged +0.1 to +2.7 psu.	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.