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 31, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Overall, little measurable total rainfall is expected Tuesday with most basins registering a few or several hundredths of an inch of areal-averaged rainfall at most. The Upper Kissimmee Valley could receive slightly more rain. On Wednesday, moisture, well above average temperatures, and a local sea breeze could result in afternoon rains around and north/west of Lake Okeechobee. Within this area, the rains Wednesday afternoon could be significant, with a half inch to three quarters of an inch over parts of the Kissimmee Valley. A strong cold front will sweep through the District Thursday. Ahead of the front, a large increase of rains is anticipated, perhaps the greatest single-day District total rainfall since early March, with more rain in the east than the west. The heavy rainfall could cause localized significant rainfall accumulations, with between three quarters and a little over an inch in basins from the eastern interior to the east coast of Florida. Cooler and much drier conditions will follow the frontal passage by Thursday evening, with the last of any rains in the east either diminishing or pushing offshore not long after dark. Dry conditions, except for some minor east coast light showers, and below normal temperatures are expected through week 2, with below normal total rainfall and below normal temperatures gradually warming to close to normal by week's end.

Kissimmee

Tuesday morning stages were 56.6 feet NGVD (0.9 feet below schedule) in East Lake Toho, 53.5 feet NGVD (1.0 feet below schedule) in Toho, and 51.5 feet NGVD 0.5 feet below schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.6 feet NGVD at S-65A and 25.6 feet NGVD at S-65D. Tuesday morning discharges were 830 cfs at S-65, 730 cfs at S-65A, 760 cfs at S-65D and 830 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 7.4 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 0.18 feet. Today's recommendation is to recede stage in East Lake Toho and Lake Toho at a rate of approximately -0.17 ft/week to target reaching their low pools on June 1. Allow stage to continue receding in KCH but keep the recession rate below -0.18 ft/week by reducing S-65 discharge as needed. 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 14.53 feet NGVD on March 28, 2021, 0.26 feet lower than last week and 0.83 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 0.03 feet above. Latest water quality surveys (March 9-11, 2021) found no detectable cyanotoxins and no dominant cyanobacteria taxa at any of the nine sites sampled; chlorophyll results are still pending. Recent Snail Kite surveys found 49 total nests around the Lake; 38 active, 1 successful with nestlings and 10 failed. Recent satellite imagery suggests there is little algal bloom activity on the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged more than 564 cfs over the past week with 518 cfs coming from Lake Okeechobee. The seven-day average surface salinities increased throughout the estuary over the past week. Salinity at the US1 Bridge is in the good range (10-26) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 1,909 cfs over the past week with approximately 1,313 cfs coming from Lake Okeechobee. Seven-day average surface salinities remained the same at S-79, decreased at Val I-75, Ft. Myers 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 in the good range (10-30) for adult eastern oysters at Cape Coral and Shell Point, and in the fair range at Sanibel.

Lake stage is in the Low Sub-Band of 2008 LORS. Tributary hydrologic 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 7,200 ac-ft of Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2021 (since May 1, 2020) is approximately 128,900 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 1,581,000 ac-feet. Most STA cells are near target stage, except for EAV cells in STA-5/6 that are starting to dry out. STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7, and STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways, and STA-2 Flow-ways 2 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

Recession rates remain elevated as dry conditions pervade the Everglades Protection Area. Conditions continue to indicate a productive wading bird nesting season to come. Birds continue to feed in large flocks in the western marl prairies & the northern marshes of the WCAs. Nesting numbers continue to increase for all wading birds throughout the Everglades Protection Area. Many wood stork nests within Everglades National Park have visible nestlings. Recession rates in Taylor Slough are typical for when freshwater flows from structures cease, and salinities in Florida Bay are increasing. Moderating the recession rate in northern Taylor Slough would be beneficial to speed up getting flows to Florida Bay once the wet season begins to moderate salinity increases in the Bay.

Supporting Information

KISSIMMEE BASIN

Rainfall

The Upper Kissimmee Basin received 0.01 inches of rainfall in the past week and the Lower Basin received 0.00 inches (SFWMD Daily Rainfall Report 03/29/2021).

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: 3/30/2021

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)						
							3/28/21	3/21/21	3/14/21	3/7/21	2/28/21	2/21/21	2/14/21
Lakes Hart and Mary Jane	S-62	0	LKMJ	60.5	R	60.8	**-0.3**	-0.4	-0.5	-0.3	-0.2	-0.2	0.0
Lakes Myrtle, Preston, and Joel	S-57	4	S-57	60.6	R	60.7	**-0.1**	-0.1	-0.1	0.0	0.1	0.0	0.1
Alligator Chain	S-60	50	ALLI	63.7	R	63.7	**0.0**	-0.1	-0.1	0.0	0.0	0.0	0.1
Lake Gentry	S-63	62	LKGT	61.3	R	61.2	**0.1**	0.0	-0.1	0.0	-0.1	-0.1	0.0
East Lake Toho	S-59	69	TOHOE	56.6	R	57.5	**-0.9**	-1.0	-1.0	-0.5	-0.3	-0.1	-0.2
Lake Toho	S-61	276	TOHOW, S-61	53.5	R	54.5	**-1.0**	-1.1	-1.1	-0.8	-0.6	-0.4	-0.4
Lakes Kissimmee, Cypress, and Hatchineha	S-65	736	KUB011, LKIS5B	51.2	R	51.0	**0.2**	0.4	0.6	0.8	0.7	0.4	0.0

[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: **3/30/2021**

Metric	Location	1-Day Average	Average for the Preceeding 7-Days[1]								
		3/28/2021	3/28/21	3/21/21	3/14/21	3/7/21	2/28/21	2/21/21	2/14/21	2/7/21	1/31/21
Discharge (cfs)	S-65	841	**736**	907	906	903	856	835	880	894	894
Discharge (cfs)	S-65A[2]	728	**652**	837	883	888	897	901	887	882	892
Discharge (cfs)	S-65D[2]	761	**724**	901	926	961	1,012	1,038	946	934	914
Headwater Stage (feet NGVD)	S-65D[2]	25.87	**25.83**	25.66	25.76	25.80	25.80	25.80	25.87	25.79	25.83
Discharge (cfs)	S-65E[2]	702	**702**	879	906	949	1,015	1,049	942	940	873
Discharge (cfs)	S-67	0	**0**	0	0	0	0	0	0	0	0
DO (mg/L)[3]	Phases I & II/III river channel	7.7	**7.4**	7.6	9.3	8.9	7.3	7.0	8.7	8.7	8.1
Mean depth (feet)[4]	Phase I floodplain	0.18	**0.23**	0.36	0.41	0.46	0.53	0.59	0.41	0.38	0.38

[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.

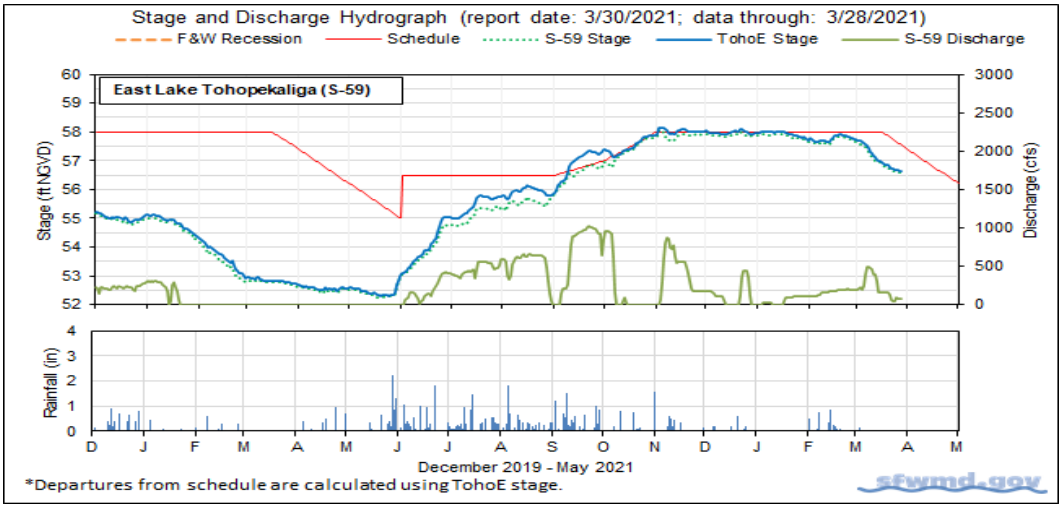


Figure 1. East Lake Toho regulation schedule, stage, discharge and rainfall.

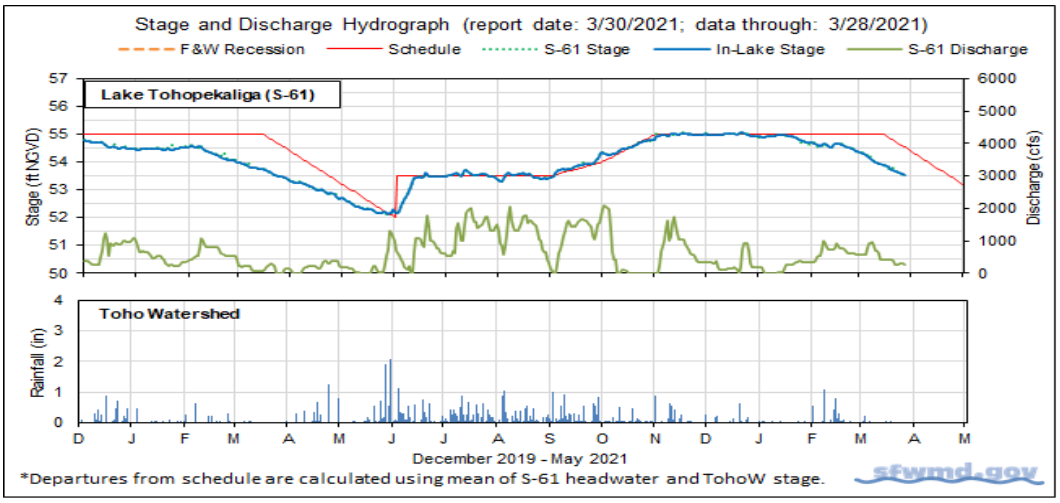


Figure 2. Lake Toho regulation schedule, stage, discharge and rainfall.

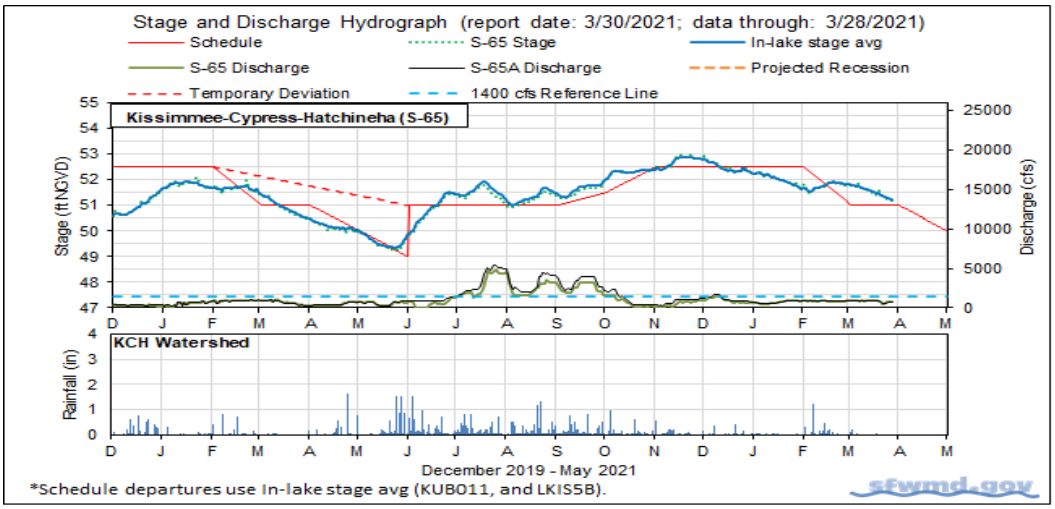


Figure 3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

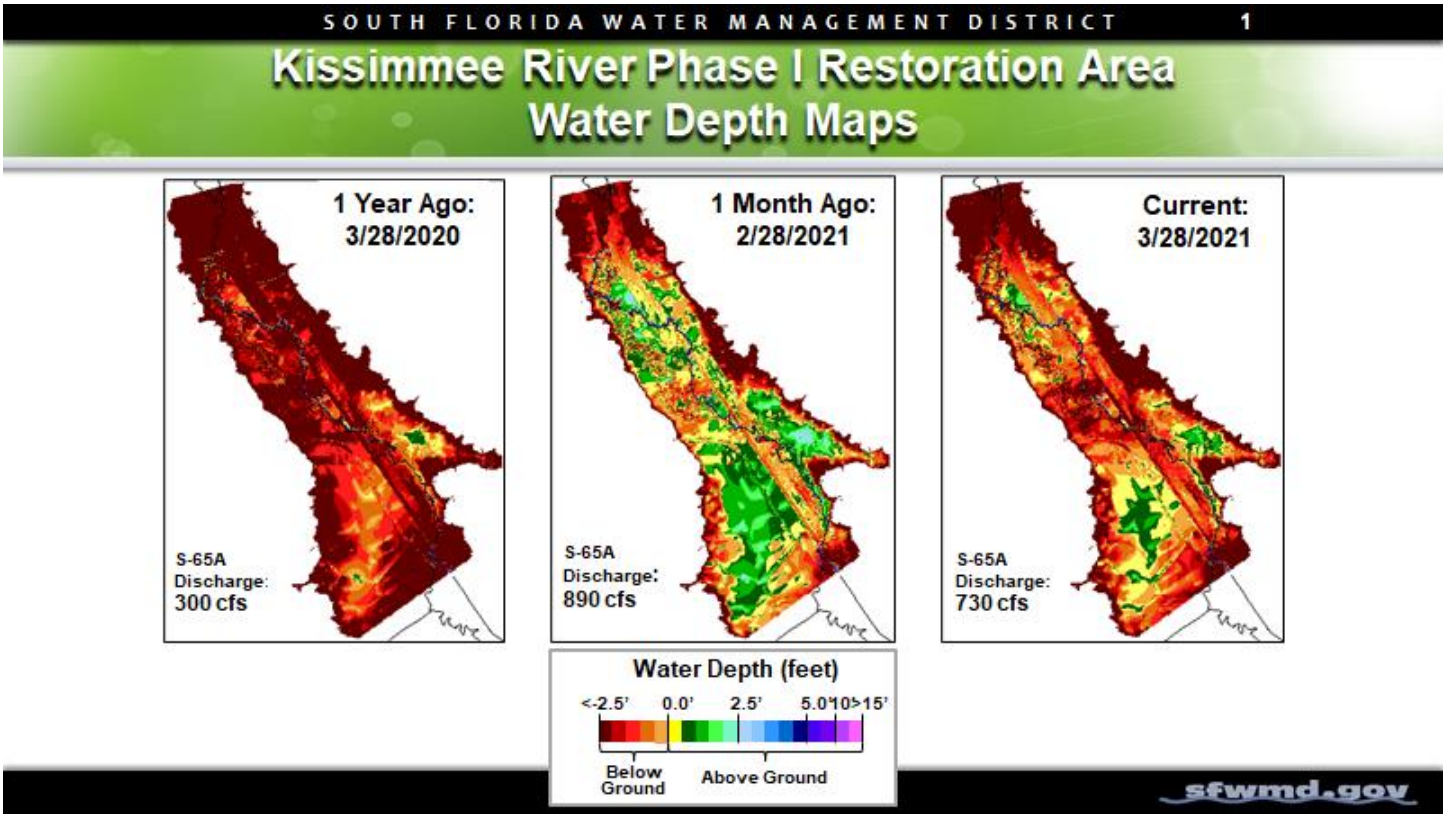


Figure 4. Phase I area floodplain water depths (from left to right) one year ago, one month ago and current. Color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

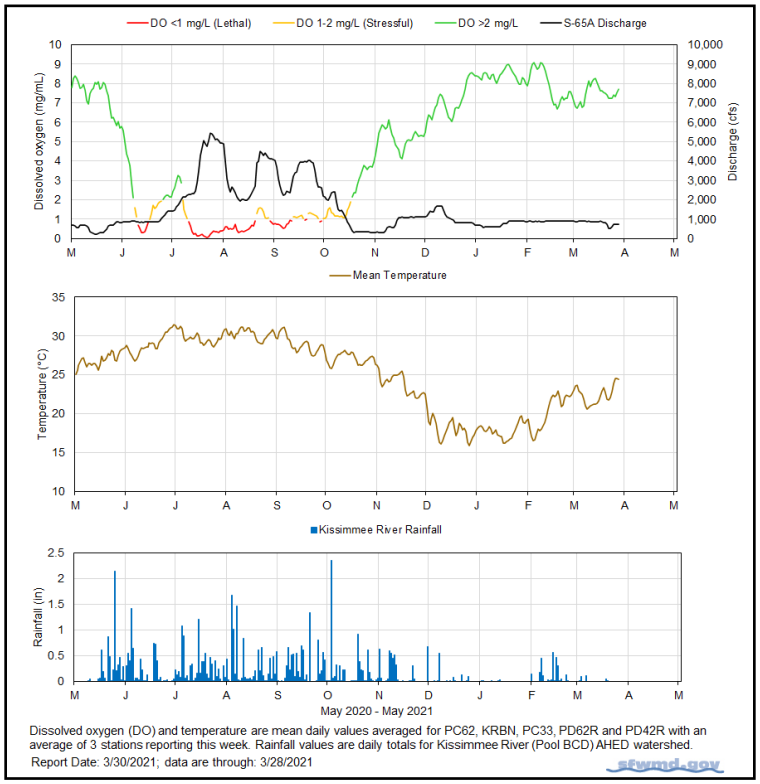


Figure 5. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches)

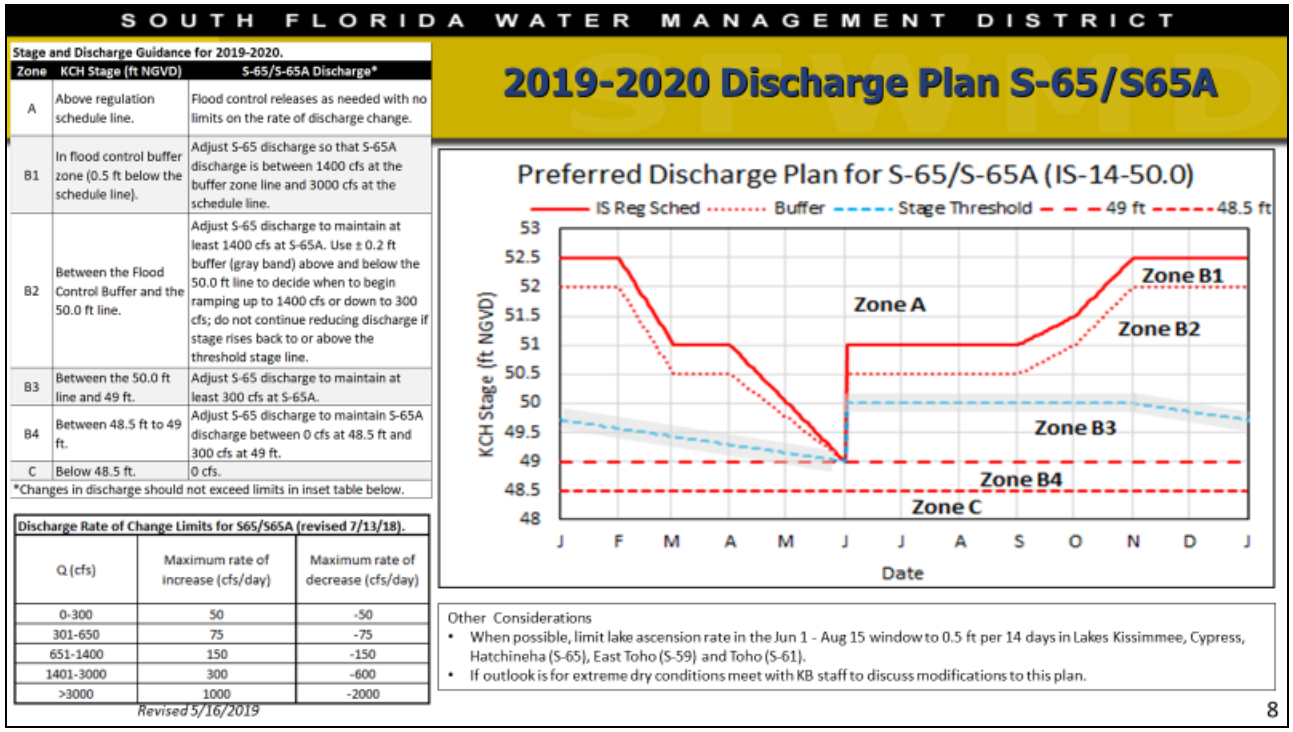


Figure 6. The 2019-2020 Discharge Plan for S-65/S-65A.

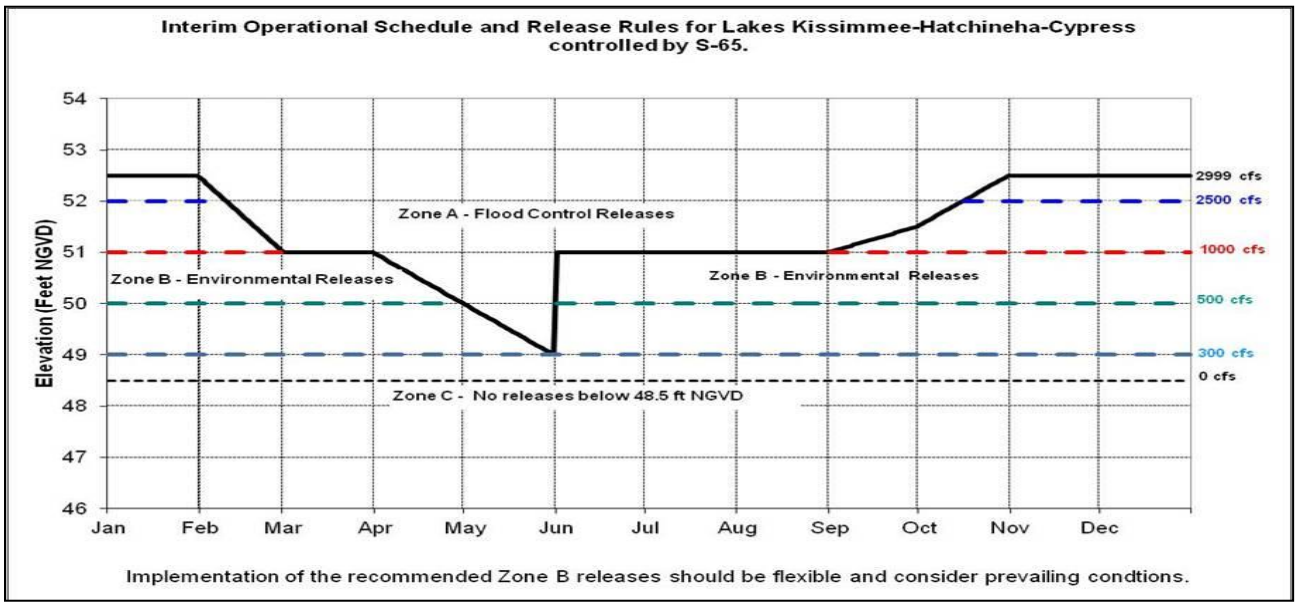


Figure 7. Interim operations schedule for S-65 (solid black line). The discharge schedule shown to the right has not been used in recent years.

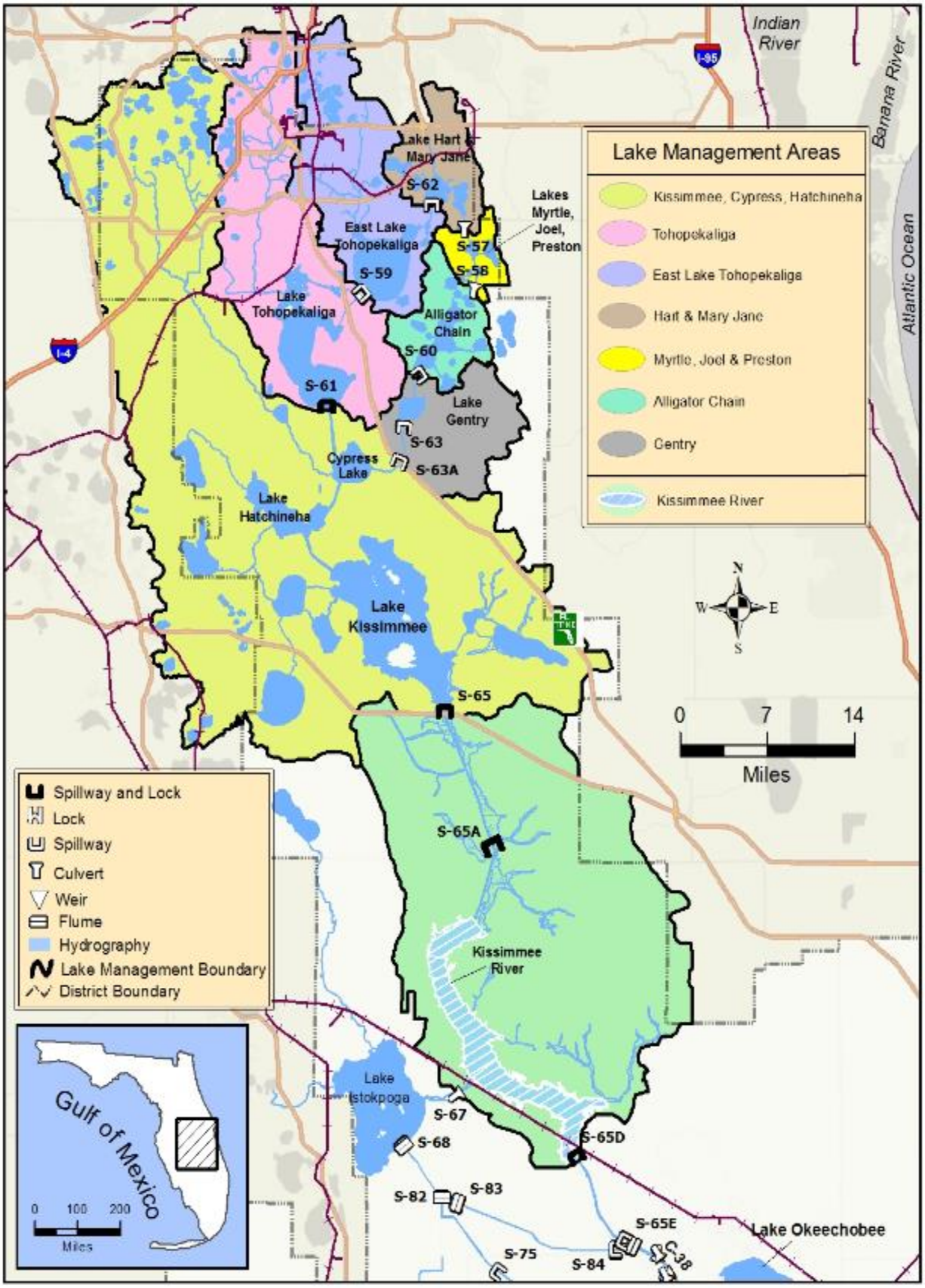


Figure 8. The Kissimmee Basin.

LAKE OKEECHOBEE

Lake Okeechobee stage was 14.53 feet NGVD on March 28, 2021, 0.83 feet lower than a month ago, and 2.55 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 0.03 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 declined slowly from mid-November through mid-February but began declining quickly over the past several weeks, with stages currently in the Low sub-band. According to NEXRAD, no rain fell directly on the Lake and much of the District saw less than 0.1 inches (Figure 4).

Average daily inflows (excluding rainfall) decreased from the previous week, dropping from 893 cubic feet per second (cfs) to 715 cfs. Outflows (excluding evapotranspiration) increased from 5,107 cfs to 5,355 cfs. Over 98% of the inflows came from the Kissimmee River (702 cfs through S-65E & S-65EX1). Releases to the west via S-77 decreased slightly from 1,890 cfs the prior week to 1,822 cfs, while releases east via S-308 increased slightly going from 670 cfs to 711 cfs. Releases south through the S-350 structures increased, going from 2,240 cfs to 2,433 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.

Water quality sampling is now on the non-bloom season schedule (November – April), occurring once monthly at approximately 30 stations for chlorophyll-*a,* and at 9 stations for taxonomic identification and toxin analyses. The March sampling occurred on the 10th and 11th. None of the samples from the nine algal ID stations had detectable levels of cyanotoxins, and all algal communities were described as mixed, i.e. no dominant cyanobacteria taxa; chlorophyll results are still pending (Figure 6).

There are now 38 active Snail Kite nests on Lake Okeechobee for a total of 49 nests (1 successful, 10 failed) (Figure 7). These results are encouraging, however, if water levels in the marsh continue to decline at a rate greater than 0.50 feet per month, water depths below nests could be at risk of drying up, providing sub-optimal foraging conditions and exposing nests to potential predators.

The most recent satellite image (March 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 8).

Water Management Summary

Lake Okeechobee stage was 14.53 feet NGVD on March 28, 2021, 0.26 feet lower than last week and 0.83 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 0.03 feet above. Latest water quality surveys (March 9-11, 2021) found no detectable cyanotoxins and no dominant cyanobacteria taxa at any of the nine sites sampled; chlorophyll results are still pending. Recent Snail Kite surveys found 49 total nests around the Lake; 38 active, 1 successful with nestlings and 10 failed. Recent satellite imagery suggests there is little algal bloom activity on the Lake.

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

INFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-65E & S-65EX1	879	702	0.3
S-71 & S-72	0	0	0.0
S-84 & S-84X	0	0	0.0
Fisheating Creek	14	14	0.0
S-154	0	0	0.0
S-191	0	0	0.0
S-133 P	0	0	0.0
S-127 P	0	0	0.0
S-129 P	0	0	0.0
S-131 P	0	0	0.0
S-135 P	0	0	0.0
S-2 P	0	0	0.0
S-3 P	0	0	0.0
S-4 P	0	0	0.0
L-8 Backflow			
Rainfall	0	0	0.0
Total	**893**	**715**	**0.3**

OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-77	1890	1822	0.7
S-308	670	711	0.3
S-351	958	1115	0.4
S-352	418	752	0.3
S-354	864	566	0.2
L-8 Outflow	306	389	0.2
ET	2902	2872	1.2
Total	**8009**	**8227**	**3.3**

Provisional Data

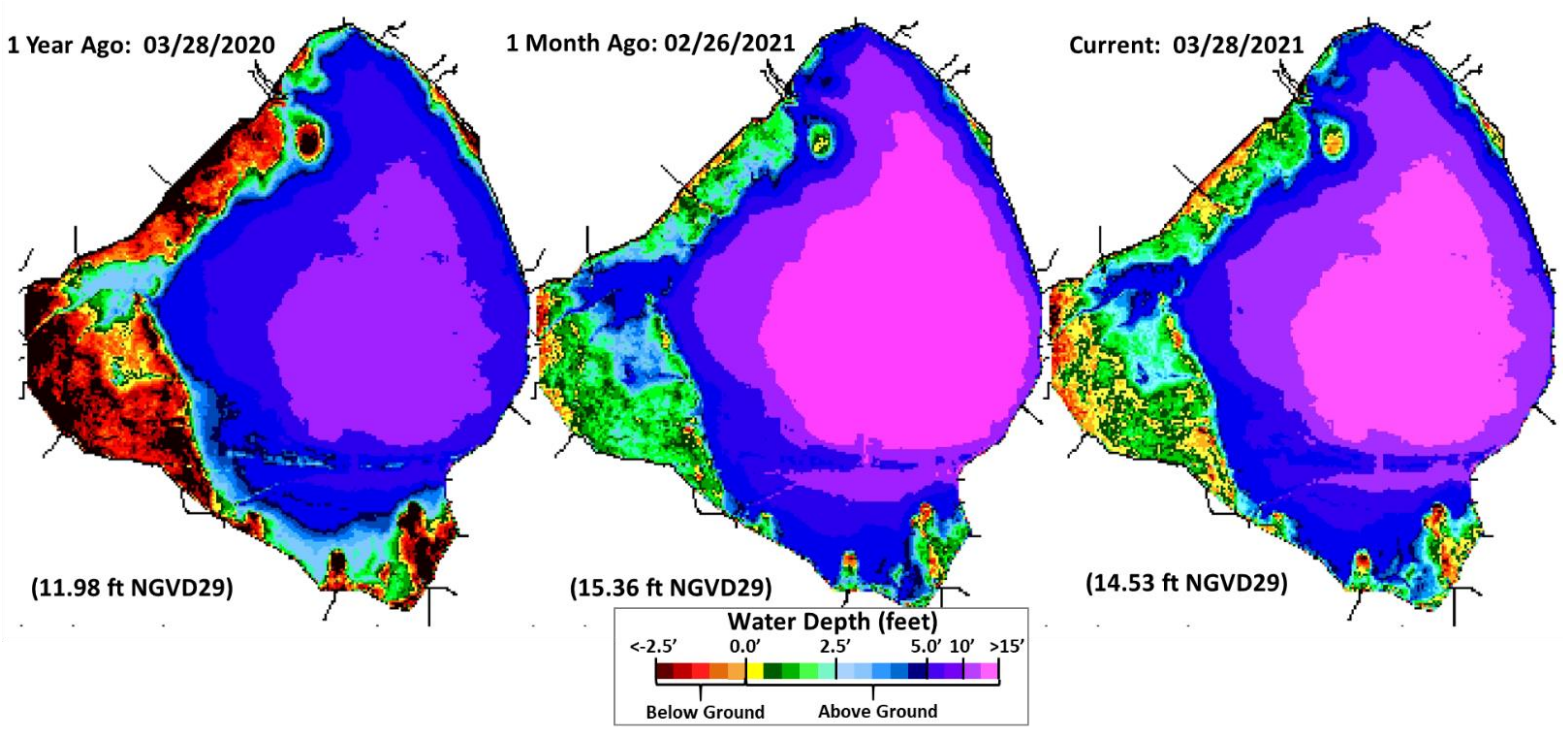


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

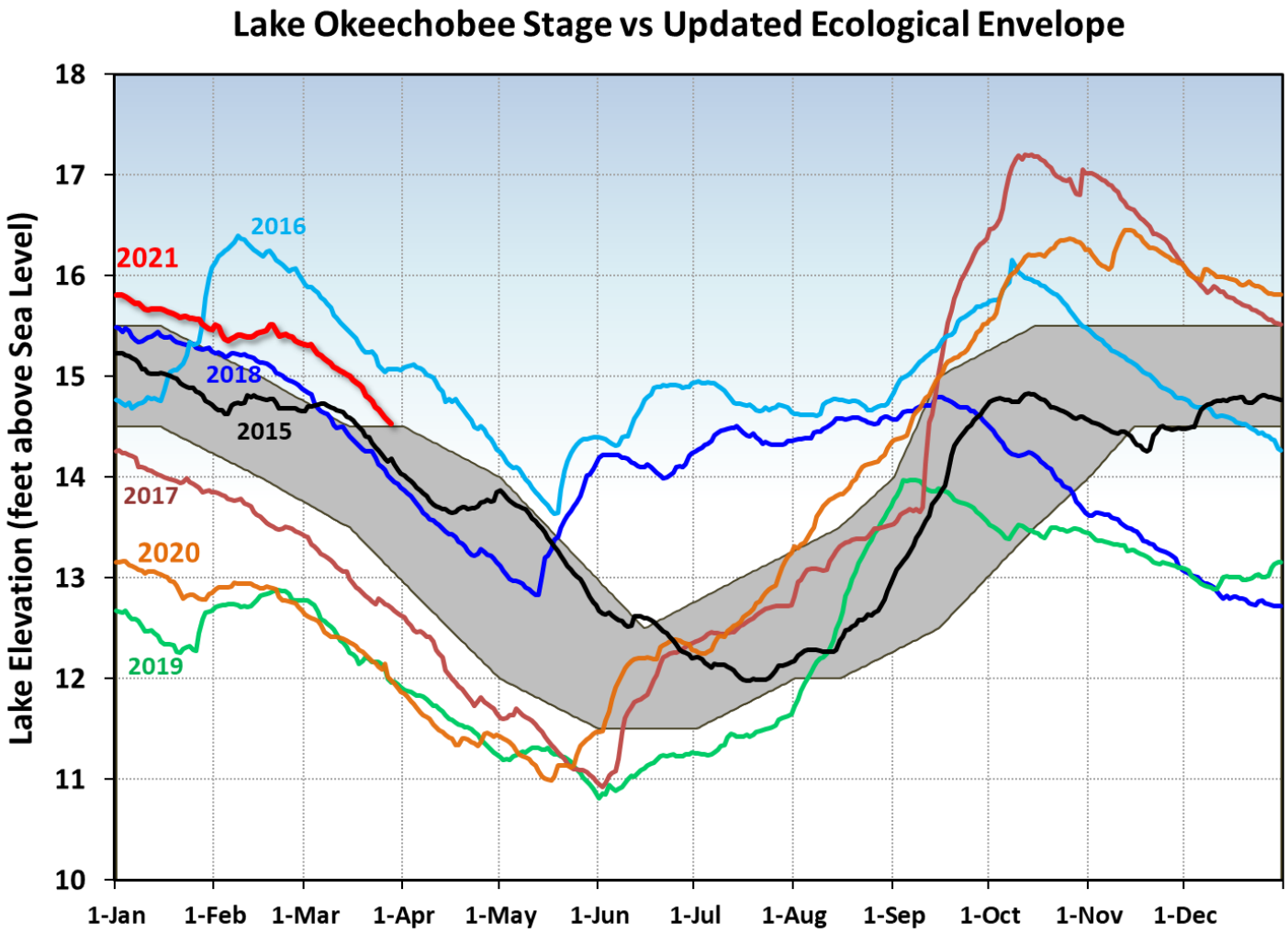


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated Ecological Envelope.

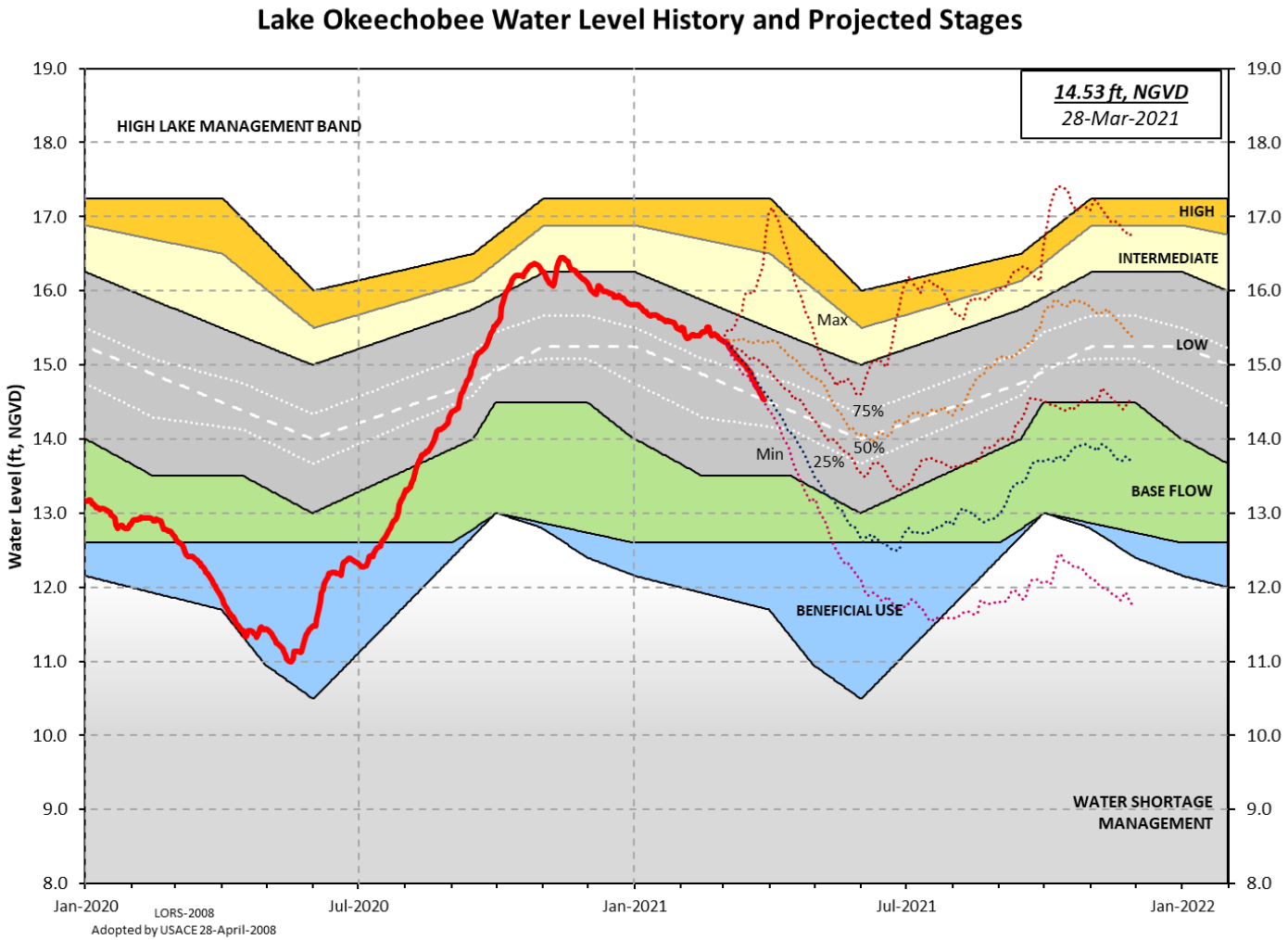


Figure 3. Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

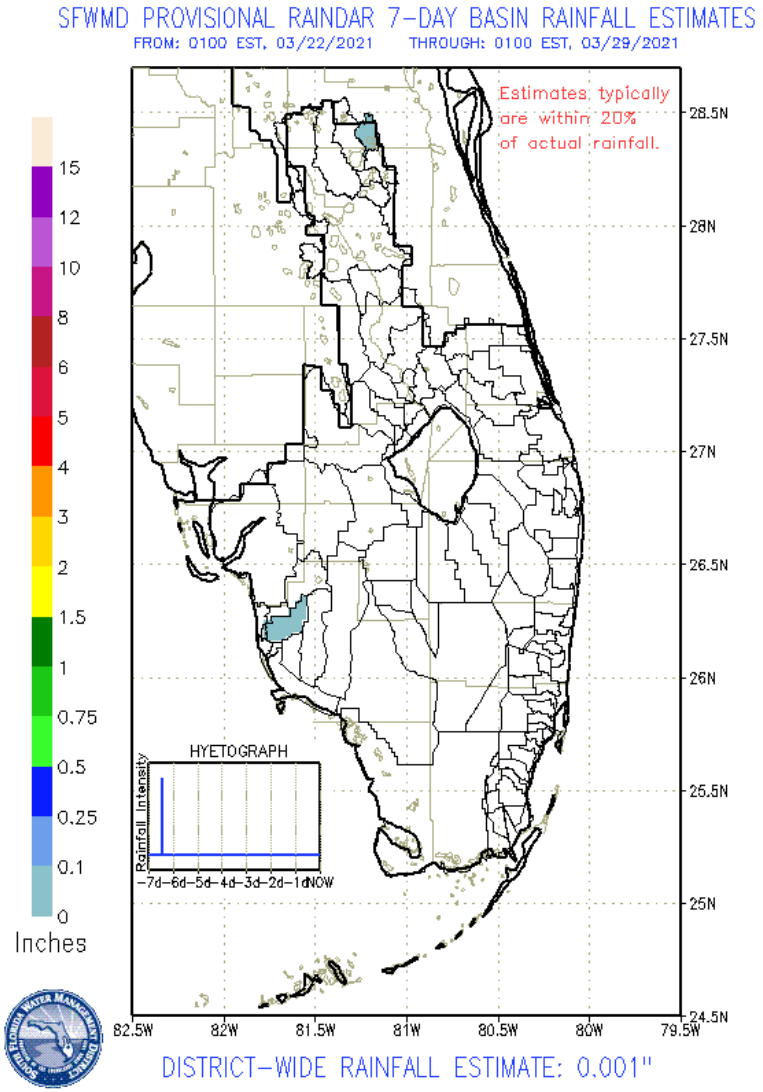


Figure 4. 7-Day rainfall estimates by RAINDAR.

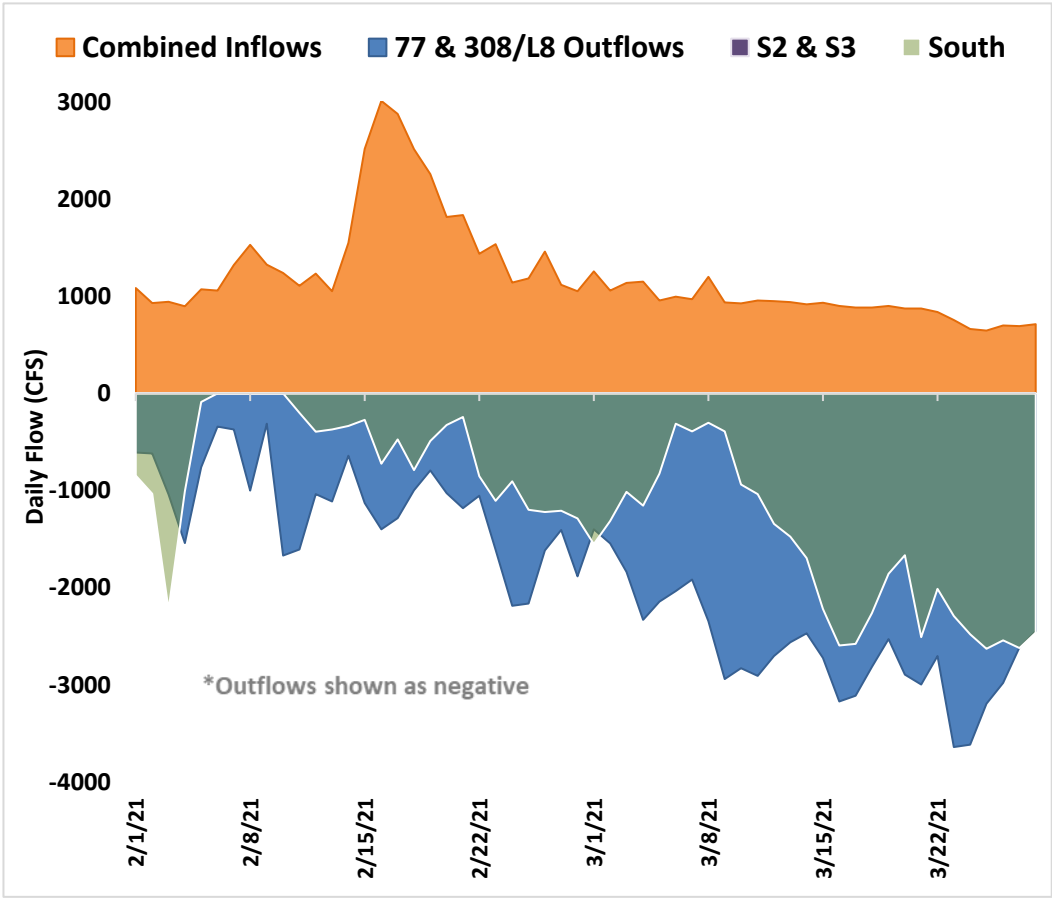


Figure 5. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive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

Collection Date: March 9-11, 2021

Station	CHL*a* (ug/L)	TOXIN (ug/L)	TAXA
FEBIN (3/1)	42.1		
FEBOUT (3/1)	38.1		
KISSR0.0		BDL	mixed
L005		BDL	mixed
LZ2		BDL	mixed
KBARSE			
RITTAE2		BDL	mixed
PELBAY3			
POLE3S			
LZ25A			
PALMOUT		BDL	mixed
PALMOUT1			
PALMOUT2			
PALMOUT3			
POLESOUT		BDL	mixed
POLESOUT1			
POLESOUT2			
POLESOUT3			
EASTSHORE			
NES135			
NES191			

Station	CHL*a* (ug/L)	TOXIN (ug/L)	TAXA
L001			
L004			
L006			
L007			
L008			
LZ30		BDL	mixed
LZ40			
CLV10A		BDL	mixed
NCENTER			
S308C	16.0	BDL	mixed
S77	12.0		

- SFWMD considers >40 µg/L Chlorophyll *a* (Chl*a*) an algal bloom
- BDL – Below Detectable Limit of **0.25** µg/L
- ND – No Dominant taxa
- P – Pending
- NS – Not Sampled
- Bold – crew observed possible BGA
- Chlorophyll *a* analyzed by SFWMD
- Toxin and Taxa analyzed by FDEP

Cylindro = Cylindrospermopsis
Planktol = Planktolyngbya
Dolicho = Dolichospermum

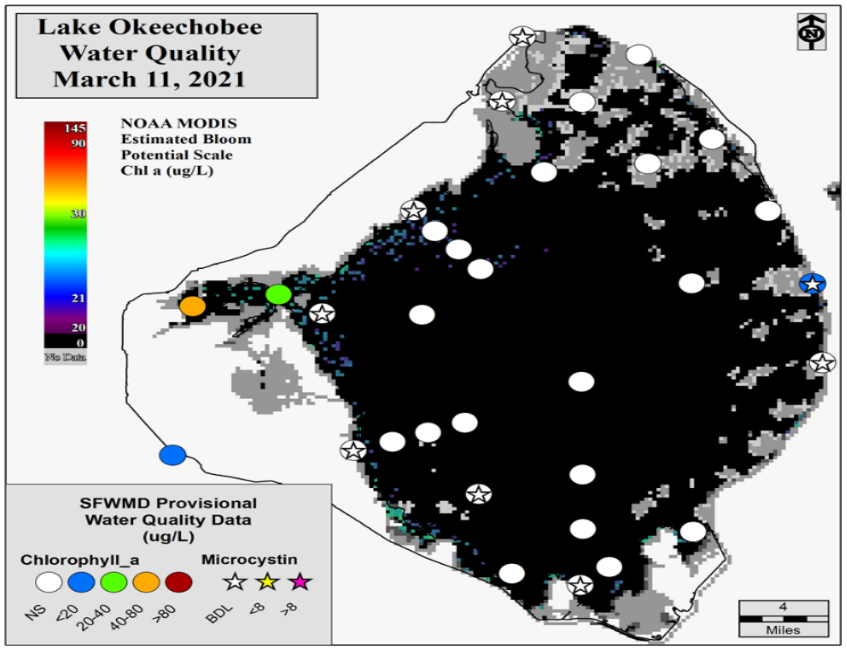


Figure 6. Provisional results from the expanded monitoring sampling trips March 9 - 11, 2021.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged approximately 564 cfs (Figures 1 and 2) and the previous 30-day inflow averaged about 476 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	711
S-80	518
S-97 on C-23	0
S-49 on C-24	0
Gordy Road structure on Ten Mile Creek	Not reporting
Tidal Basin Inflow	46

Over the past week, surface 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 17.1. 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)	**13.5** (12.0)	**16.1** (12.7)	NA[1]
US1 Bridge	**15.8** (14.5)	**18.4** (17.2)	10.0-26.0
A1A Bridge	**23.2** (22.3)	**26.8** (26.8)	NA[1]

[1]Envelope not applicable

Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged approximately 1,909 cfs (Figures 5 and 6) and the previous 30-day inflow averaged about 2,004 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	1822
S-78	1313
S-79	1845
Tidal Basin Inflow	65

Over the past week, surface salinities remained the same at S-79, decreased at Val I-75, Ft. Myers and Cape Coral, and increased at the remaining sites in the estuary (Table 4, Figures 7 & 8). The seven-day average surface salinity values are within the good range for adult eastern oysters at Cape Coral and Shell Point, and in the fair range at 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** (0.3)	NA[1]
Val I-75	**0.2** (0.4)	**0.2** (0.5)	0.0-0.5[2]
Ft. Myers Yacht Basin	**2.8** (3.9)	**3.7** (4.6)	NA[1]
Cape Coral	**11.7** (12.2)	**13.0** (13.2)	10.0-30.0
Shell Point	**25.4** (24.9)	**26.0** (26.1)	10.0-30.0
Sanibel	**30.2** (29.1)	**30.9** (29.5)	10.0-30.0

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

Forecast of surface salinity (Table 5 and Figure 10) at Val I-75 for the next two weeks using the autoregression model (Qiu and Wan, 2013) coupled with a linear reservoir model for the tidal basin predicts daily salinity to be 3.1 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 55 cfs. The 30-day moving average surface salinity at Val I-75 is forecast to be 0.7 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	55	3.1	0.7
B	450	55	1.9	0.5
C	1000	55	0.7	0.4
D	1500	55	0.4	0.3
E	2000	55	0.3	0.3

Red tide

The Florida Fish and Wildlife Research Institute reported on March 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 low concentrations in and offshore of 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.

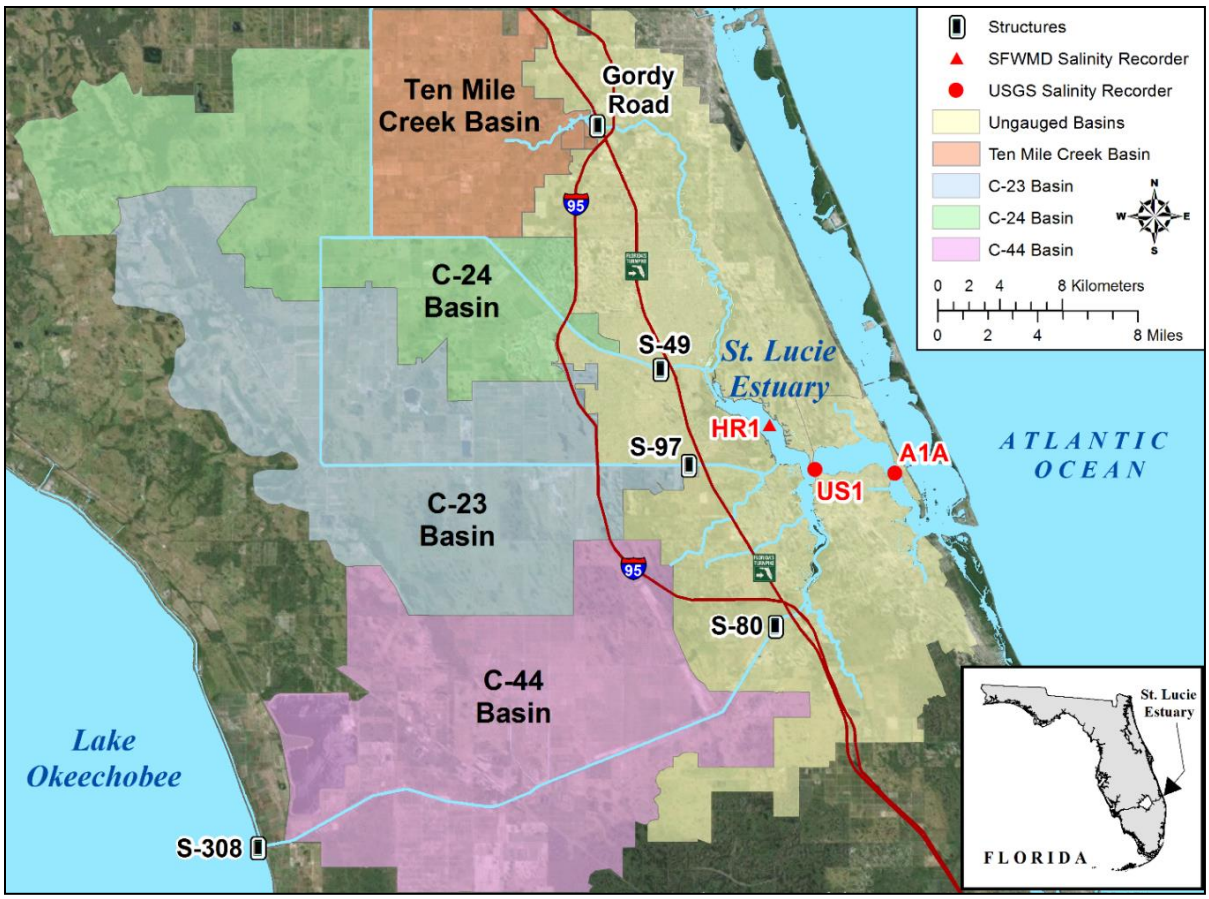


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

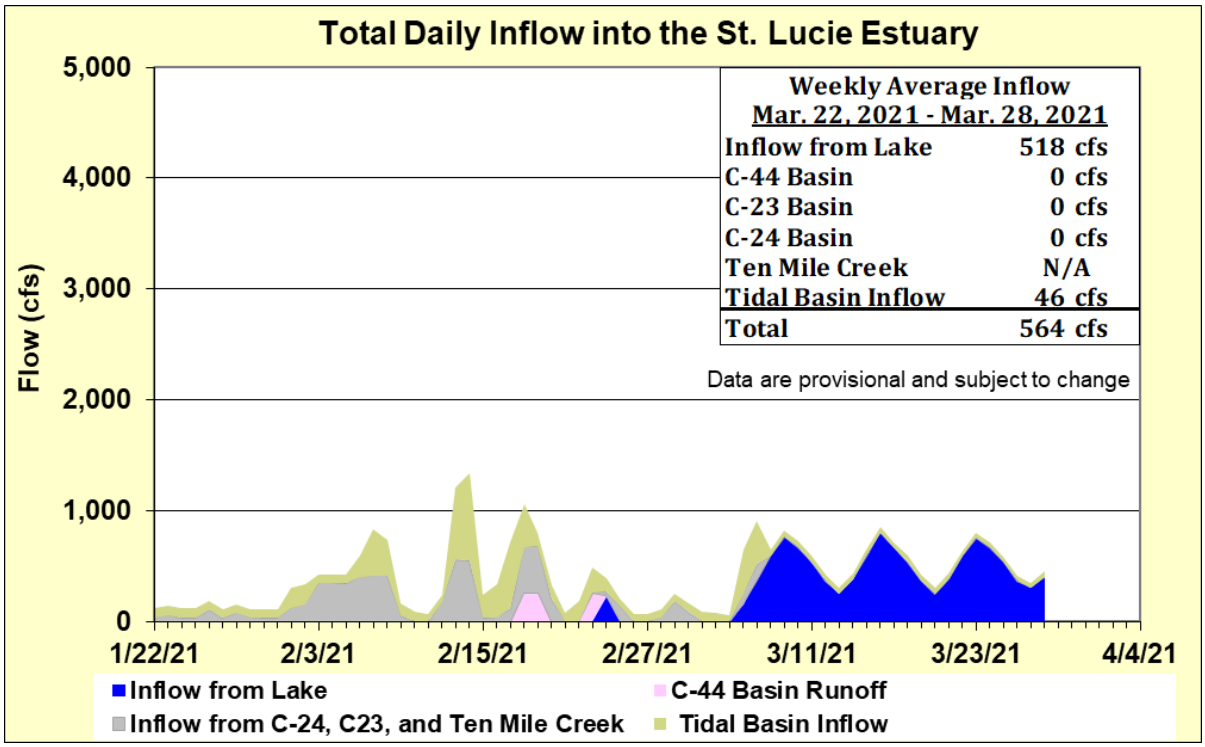


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin into the St. Lucie Estuary. Note: C-23 Basin inflows were estimated using S-48 and the Ten Mile Creek Basin inflows are not being calculated at this time.

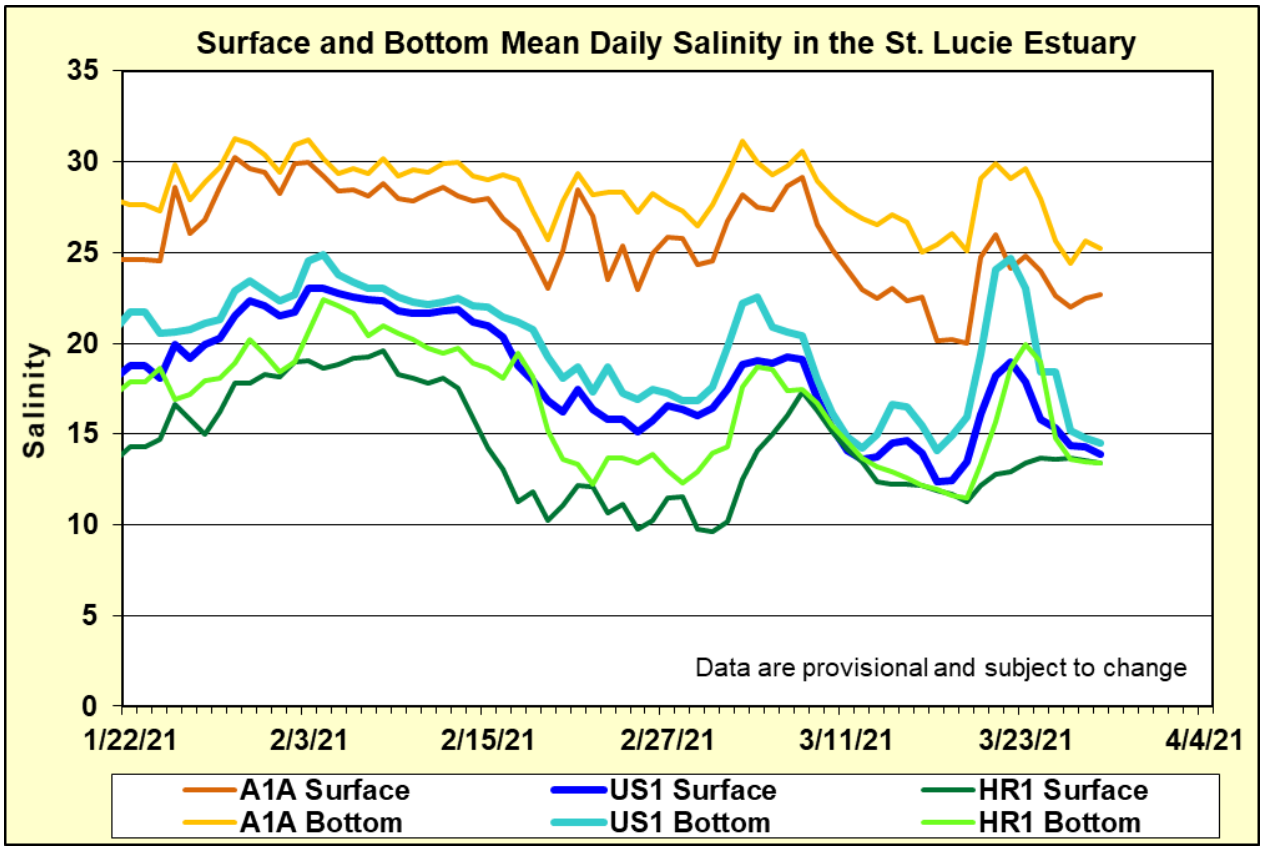


Figure 3. Daily mean salinity at the A1A, US1, and HR1 stations.

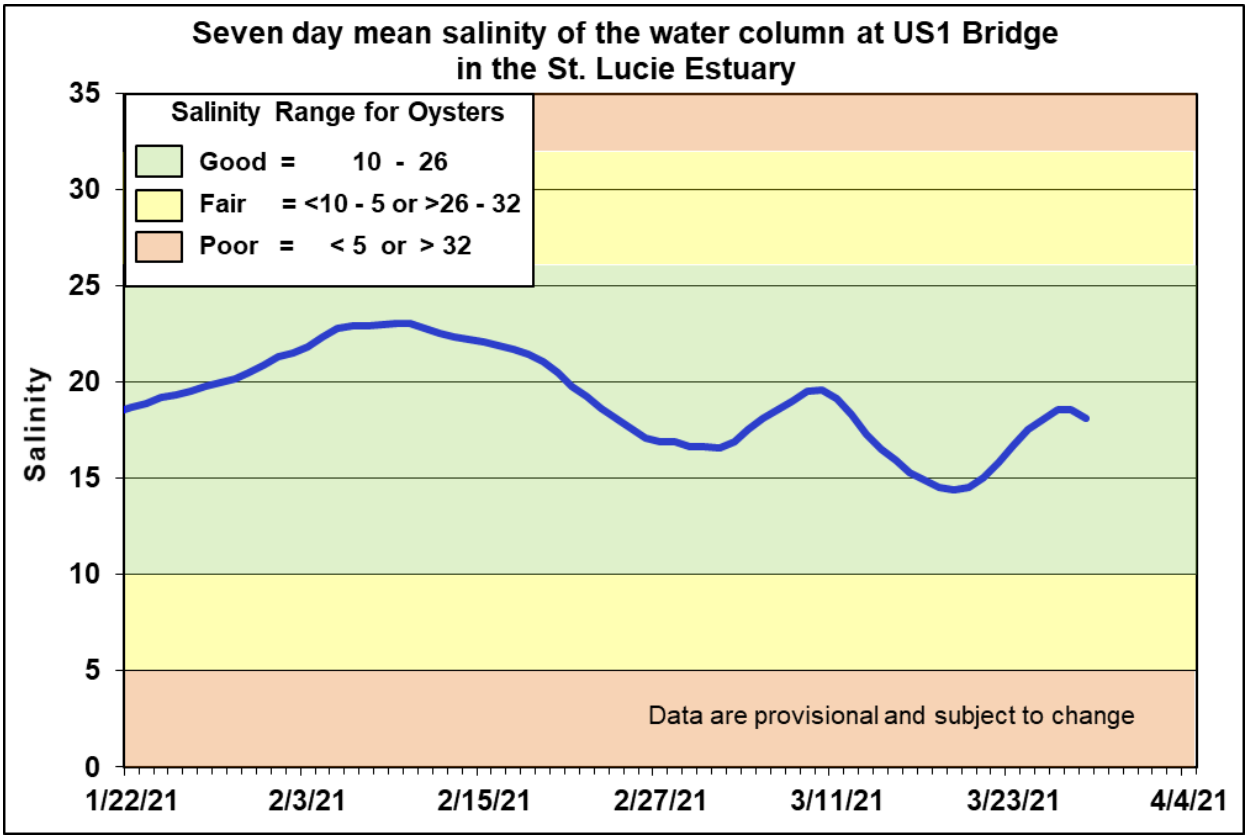


Figure 4. Seven-day mean salinity of the water column at the US1 Bridge.

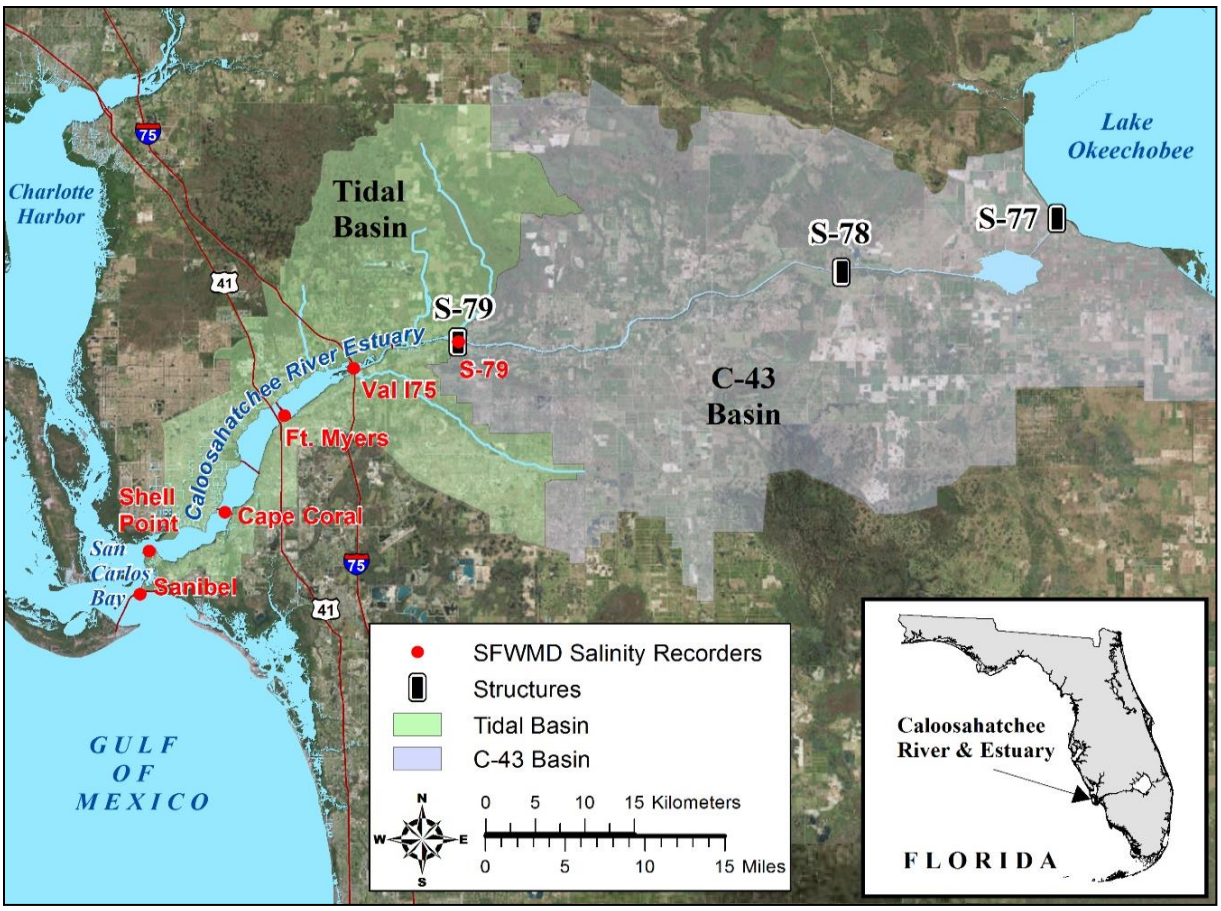


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

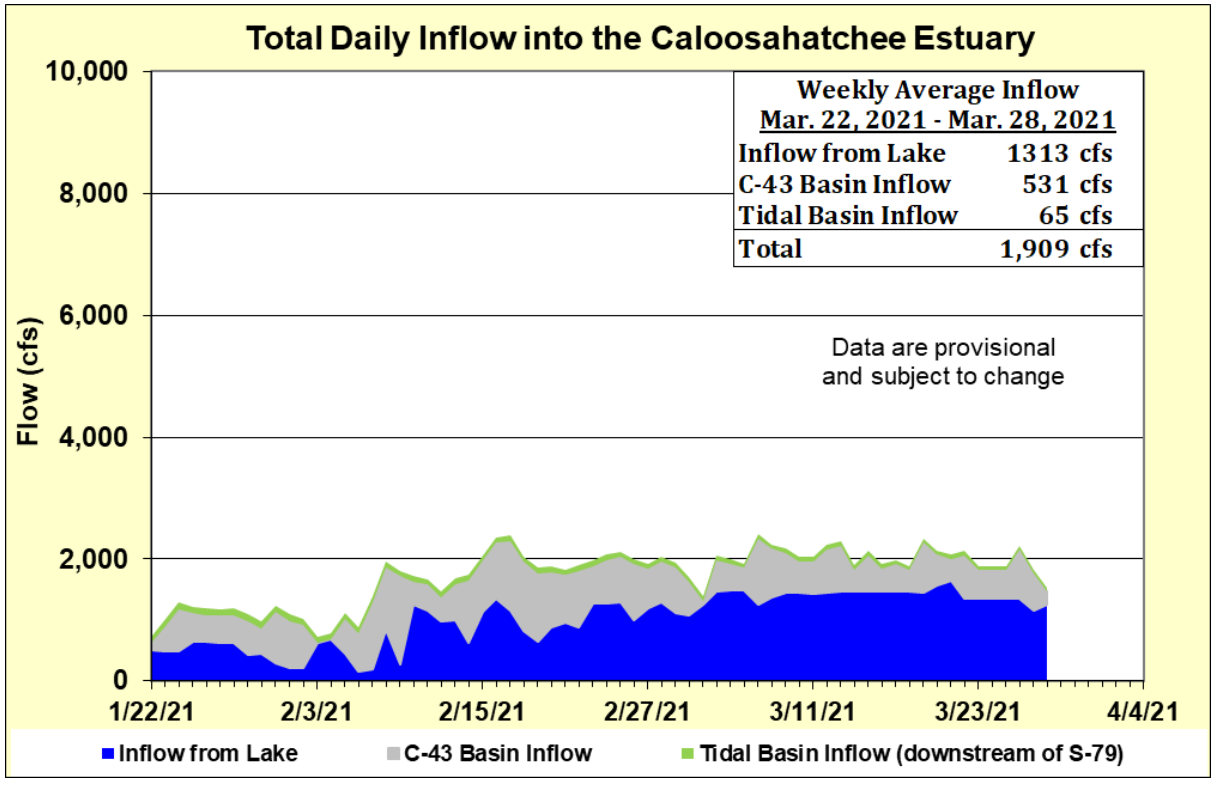


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin and tributaries in the tidal basin into the Caloosahatchee River Estuary.

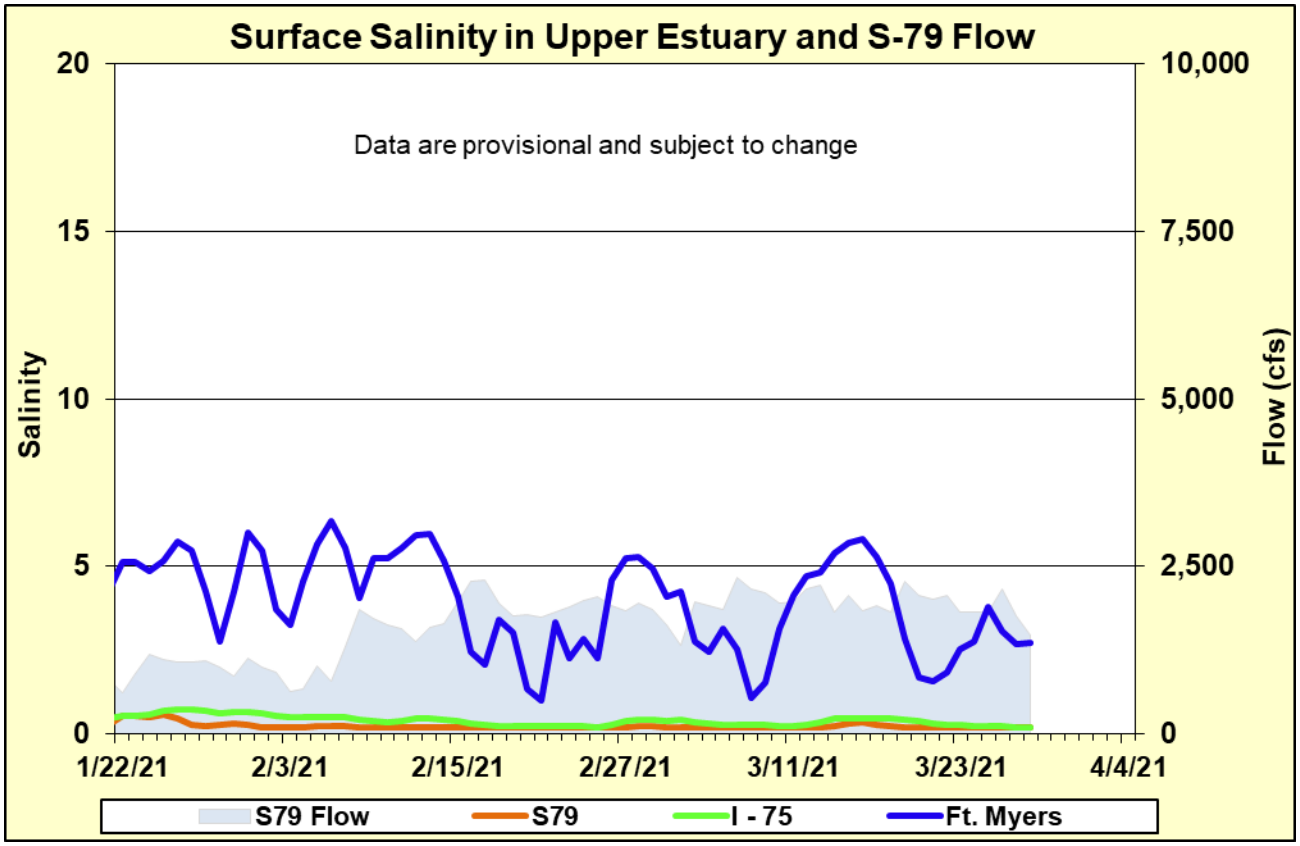


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

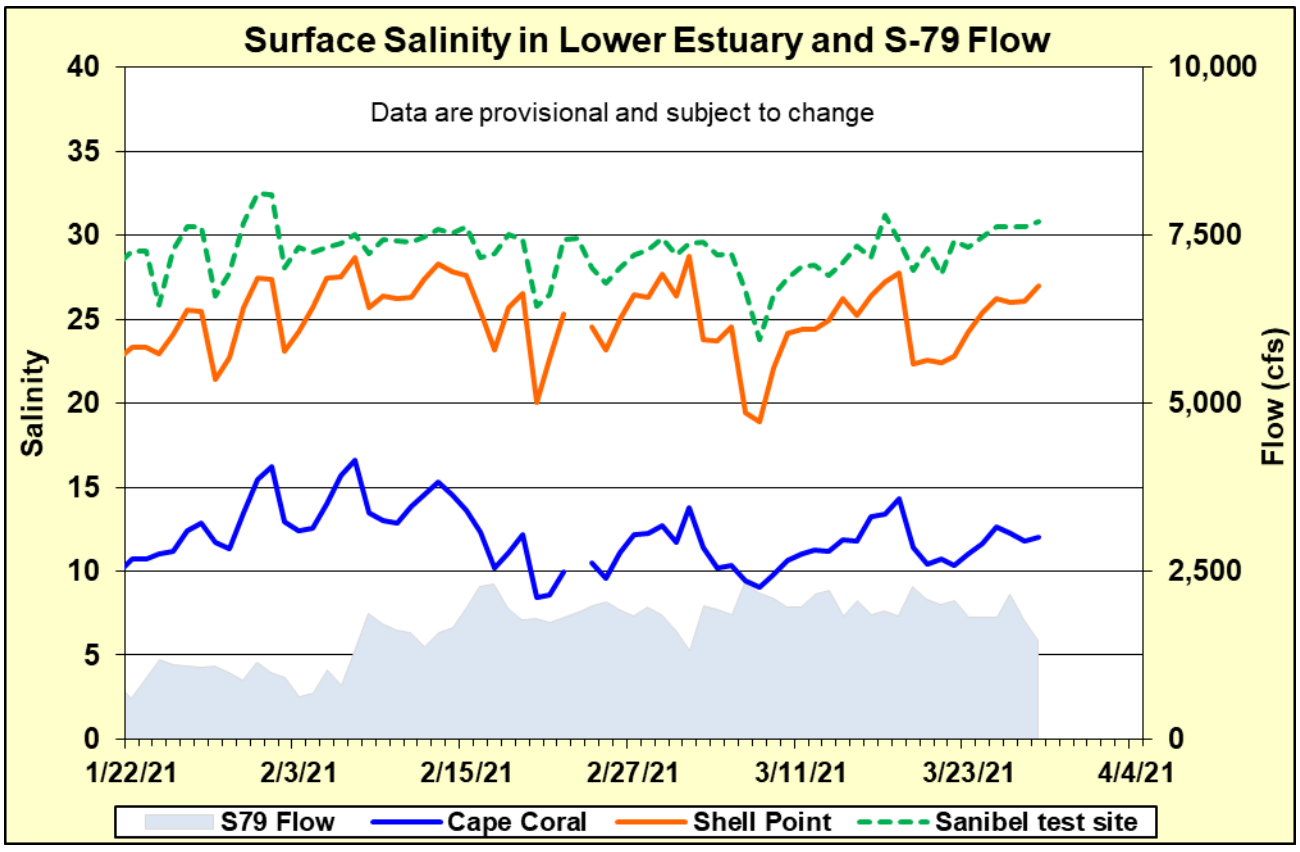


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

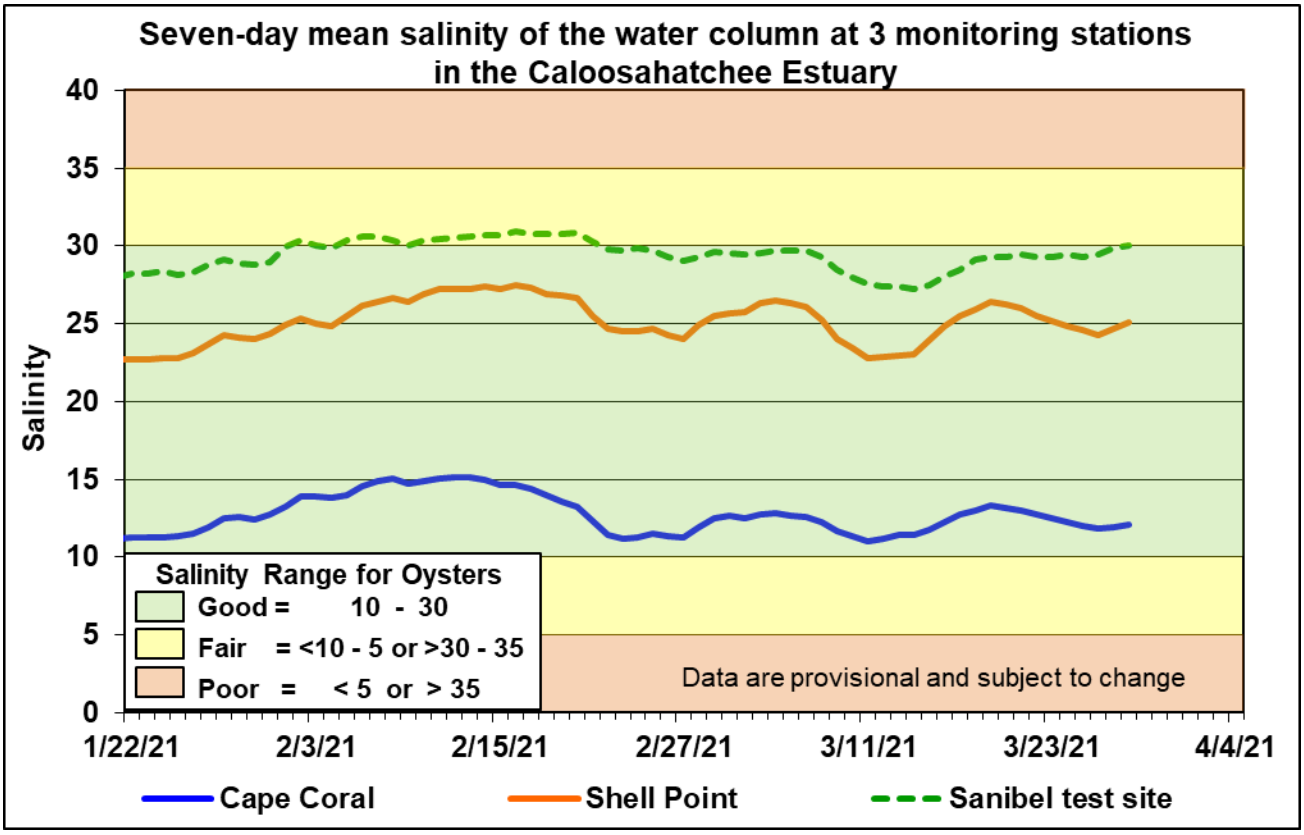


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

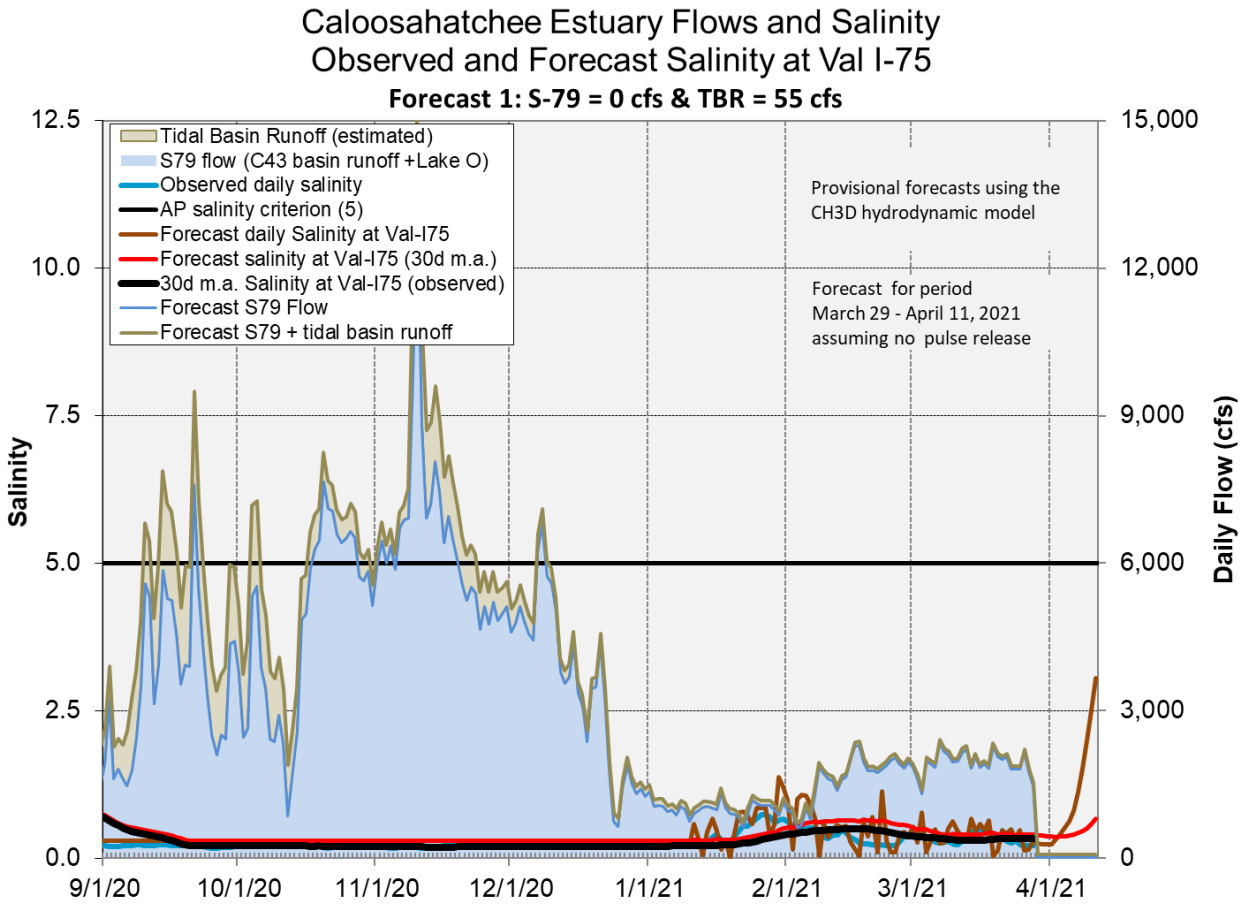


Figure 10. Forecasted Val I-75 surface salinity assuming no pulse release at S-79.

Stormwater Treatment Areas

Over the past week, approximately 7,200 ac-ft of Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2021 (since May 1, 2020) is approximately 128,900 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 1,581,000 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 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. All treatment cells 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-way 2 for construction activities. Treatment cells are 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 about 1.0 g/m^2/year except Flow-way 2 which is very high (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. All treatment cells are at 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 while several cells are starting to dry out. The 365-day PLRs for most flow-ways are near 1.0 g/m^2/year. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8 which are healthy (Figure 5 and 6).

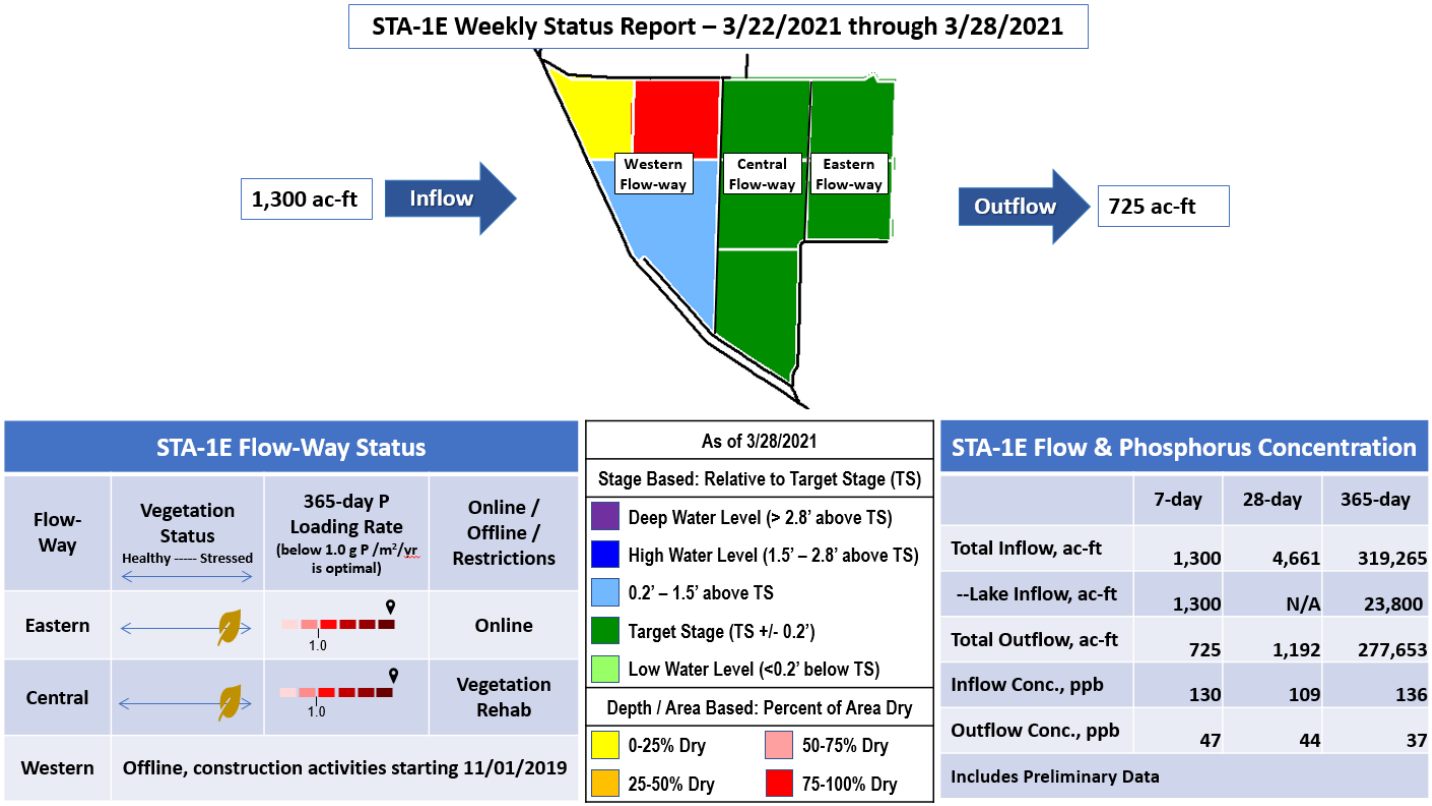


Figure 1. STA-1E Weekly Status Report

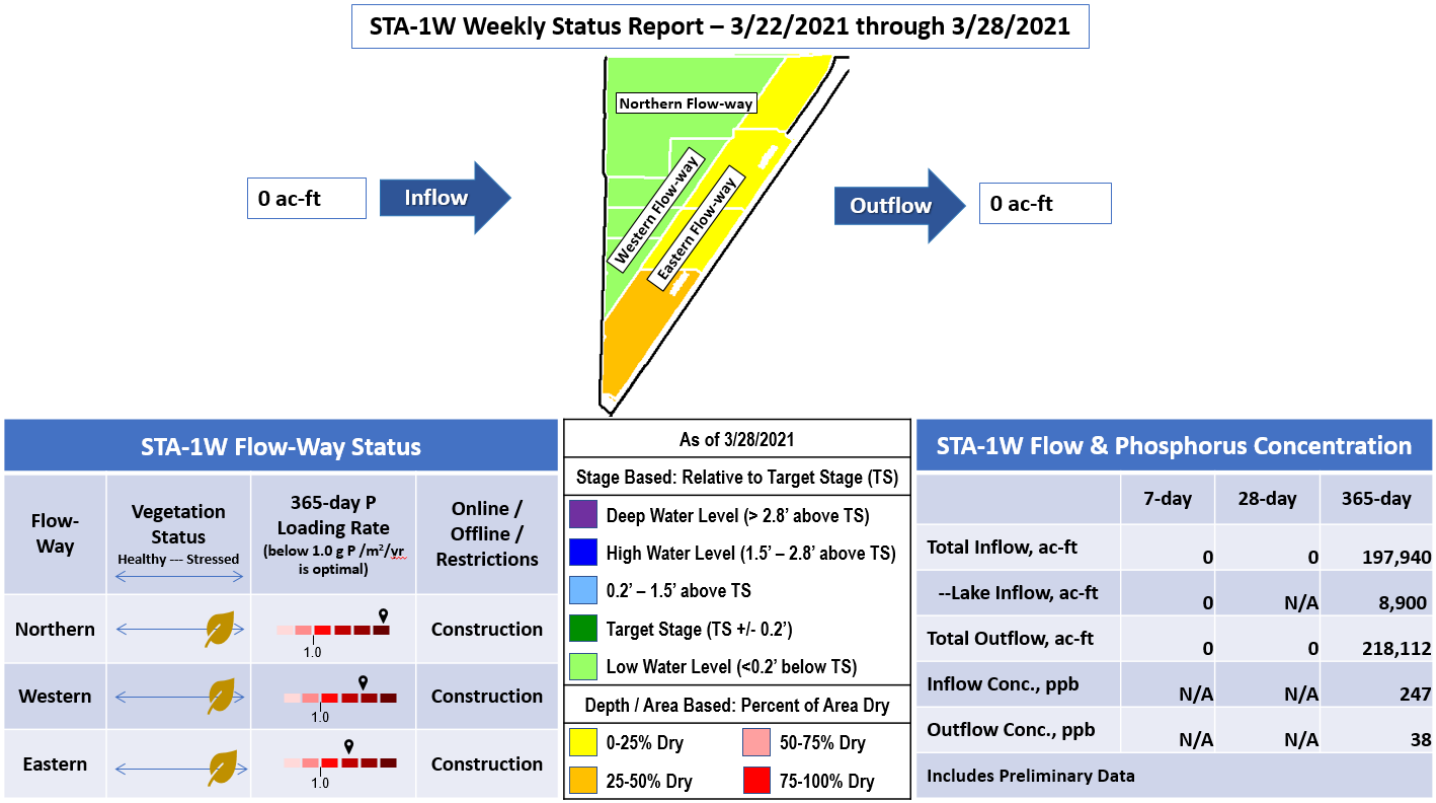


Figure 2. STA-1W Weekly Status Report

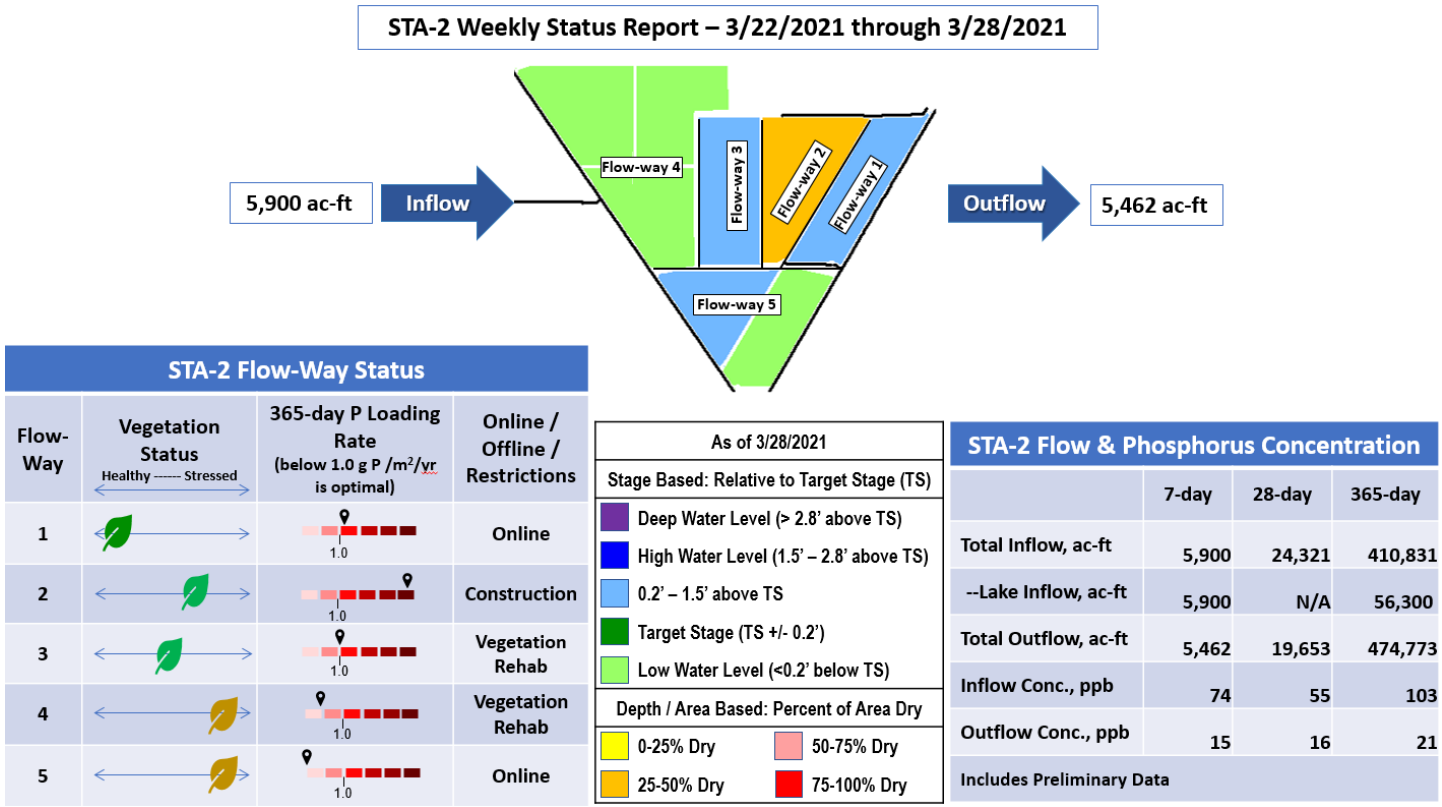


Figure 3. STA-2 Weekly Status Report

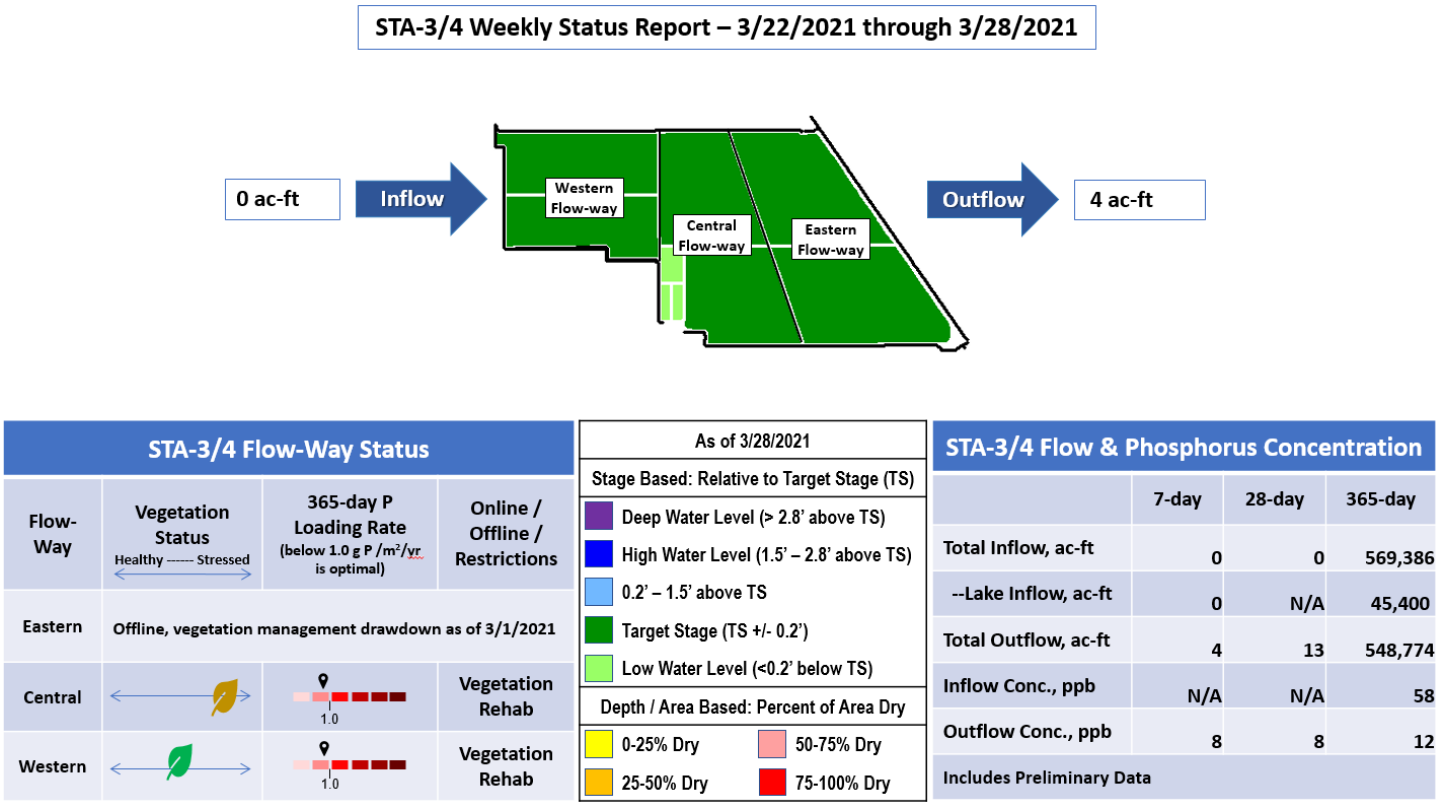


Figure 4. STA-3/4 Weekly Status Report

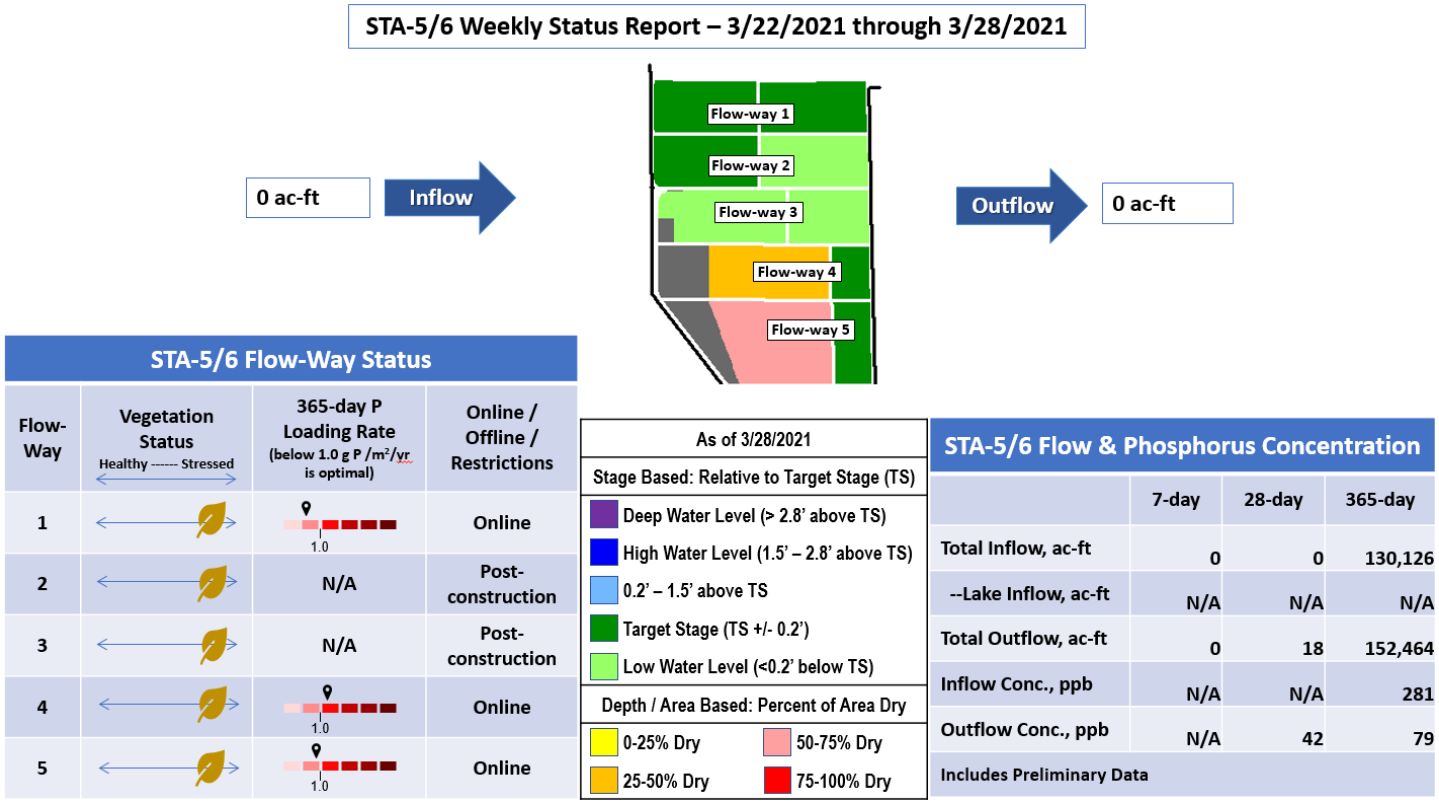
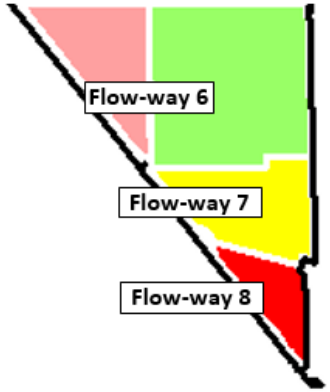
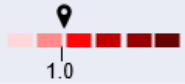
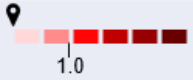


Figure 5. STA-5/6 Weekly Status Report (Flow-ways 1 – 5)

STA-5/6 Weekly Status Report – 3/22/2021 through 3/28/2021



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 3/28/2021	
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

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

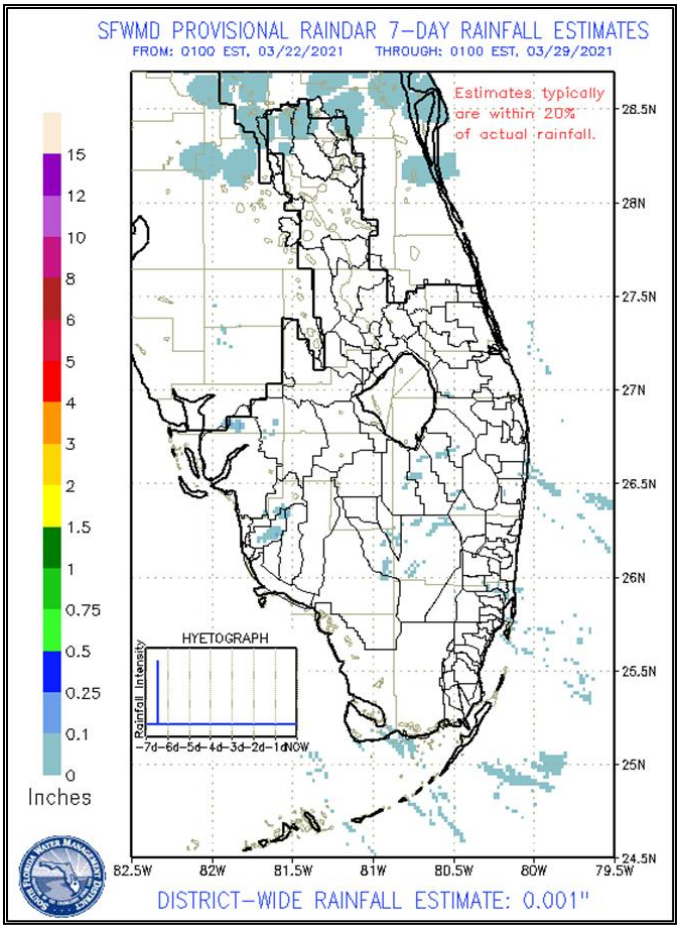
Basic Concepts and Definitions for STA Weekly Status Report

- **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.

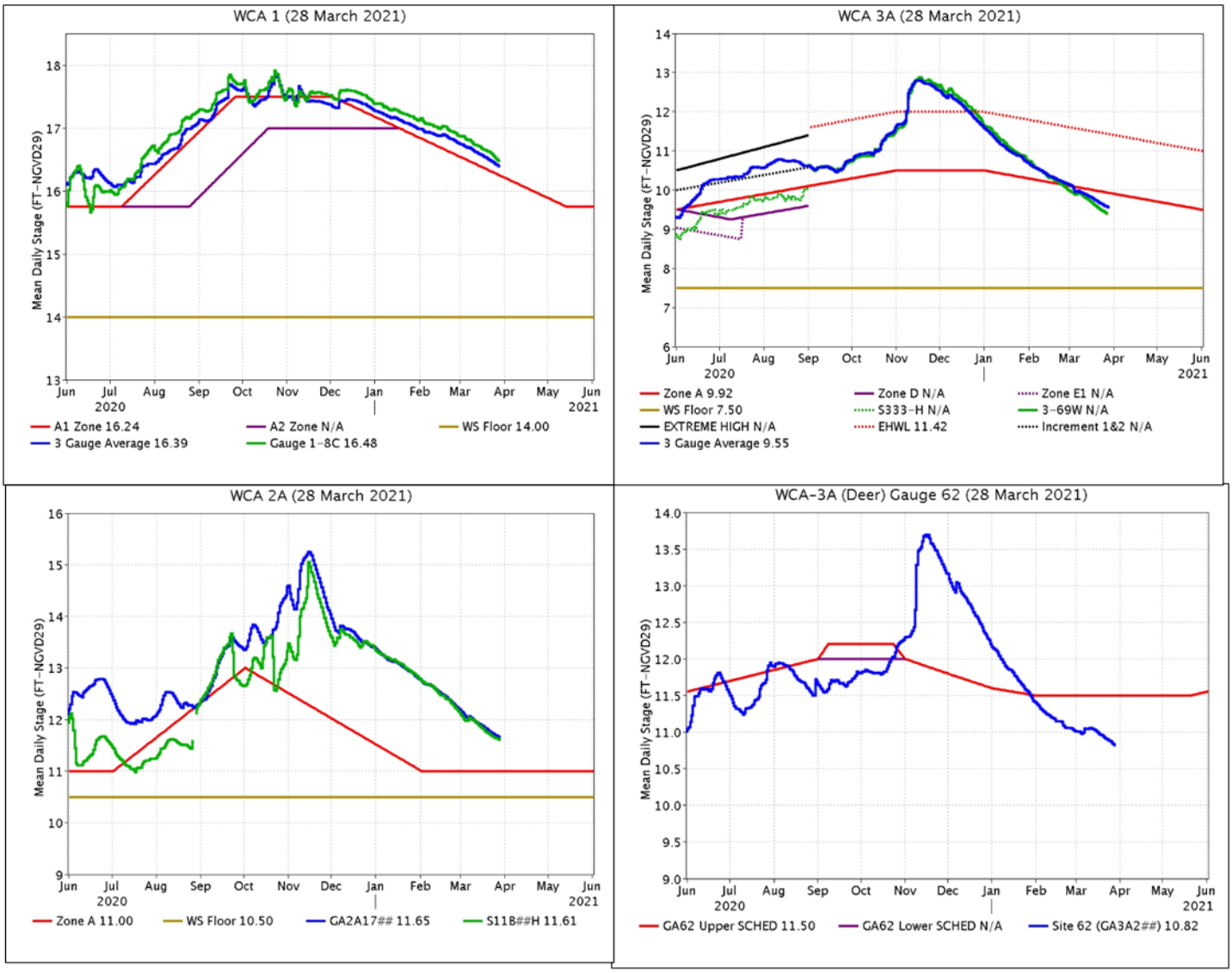
EVERGLADES

Effectively no rainfall fell within the WCAs and Everglades National Park last week. At the gauges monitored for this report, stages fell 0.13 feet on average last week, the same as the week prior. Evaporation was 1.17 inches last week. The Tamiami Trail Flow Formula (TTFF) - Target Flow from WCA-3A to ENP this week is 1289 cfs.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.00	−0.11
WCA-2A	<0.01	−0.13
WCA-2B	0.00	−0.16
WCA-3A	<0.01	−0.13
WCA-3B	0.00	−0.13
ENP	0.00	−0.11



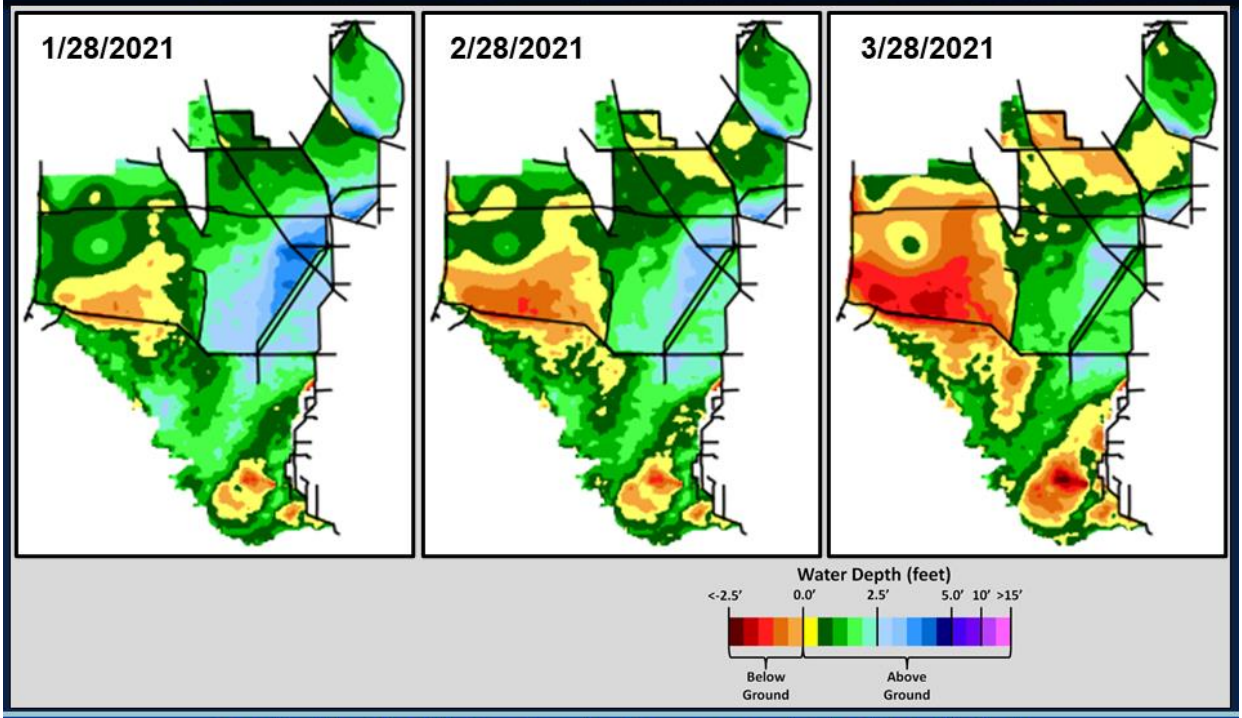
Regulation Schedules: WCA-1: Stage at the 1-8C Gauge continues to follow just above and parallel with schedule, now 0.24 feet above the falling Zone A1 regulation line. WCA-2A: The recession in stage at S11B-HW continues a steady decline, now 0.61 feet above the stable regulation line and has reached 11.6 NGVD. WCA-3A: The Three Gauge Average stages continue to drop steadily below the falling Zone A regulation line and is currently 0.37 feet below. WCA-3A: Stage at gauge 62 (Northwest corner) continues to fall. The average on Sunday was 0.68 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 northeast, areas containing depths potentially at the soil surface or below downstream of S-150 continue to expand. North-South hydrologic connectivity remains established within SRS in ENP as conditions begin to dry down in Lostman's and Taylor Sloughs. The southern one-third of Big Cypress National Preserve has dried down to up to 1.0 foot below soil surface. Comparing WDAT water levels from present, over the last month stages fell significantly across eastern WCA-3A from the S-11s to the S-12s, southern WCA-2A and along the eastern boundary of the ENP. Looking back one year the stage difference patterns are very different than one month ago with most of the southern system wetter. Compared to one year ago WCA-3A is deeper on eastern side. The eastern boundary of Everglades National Park and west of the L-28S into BCNP is also significantly wetter than a year ago.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

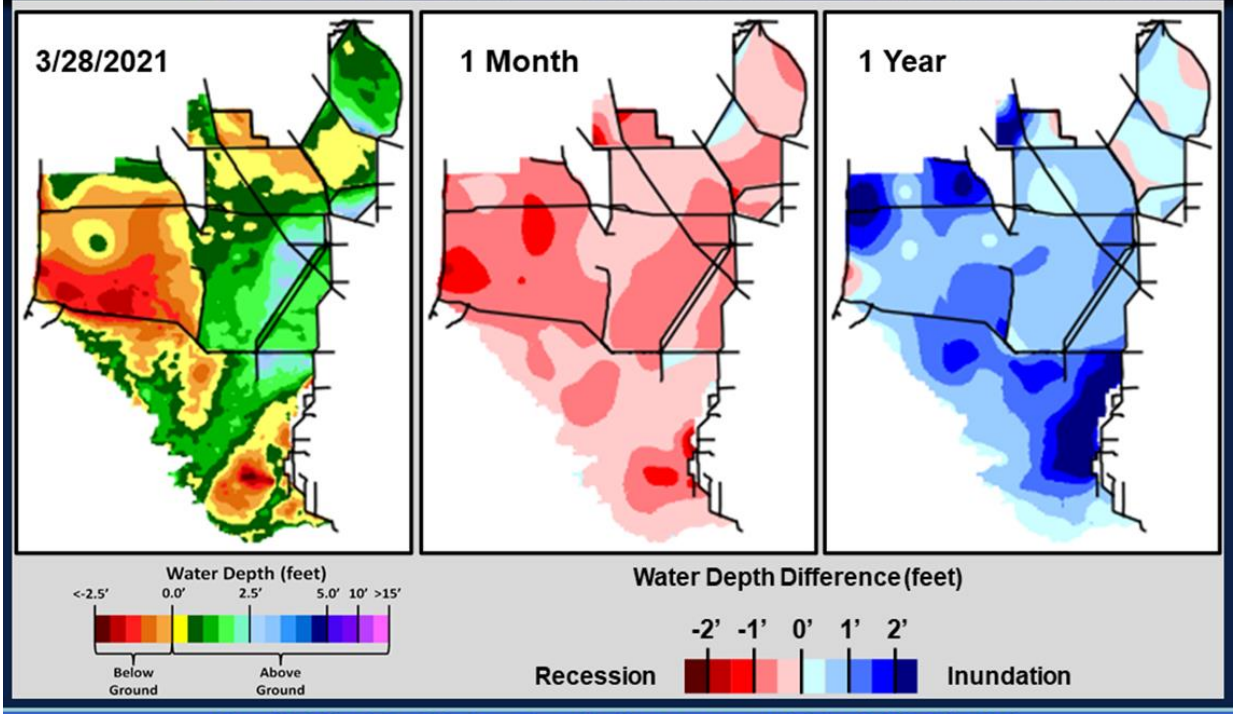
SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

SFWDAT Everglades Difference Maps (Present – Past)

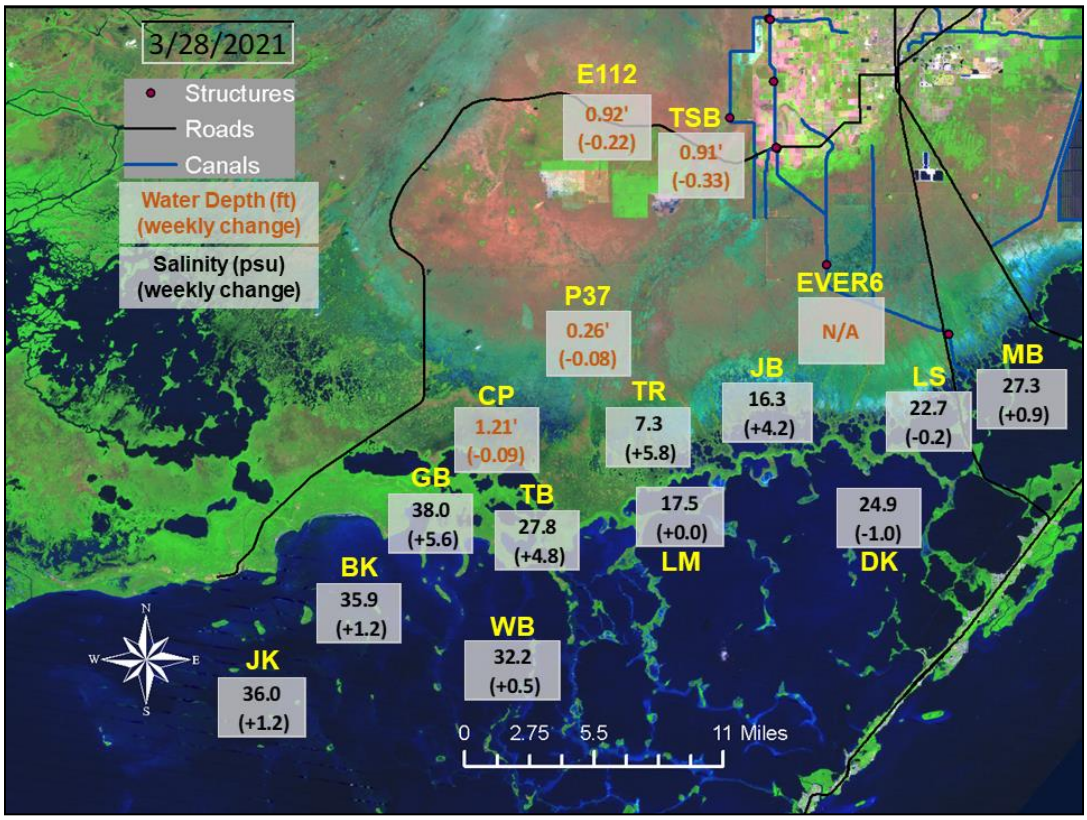


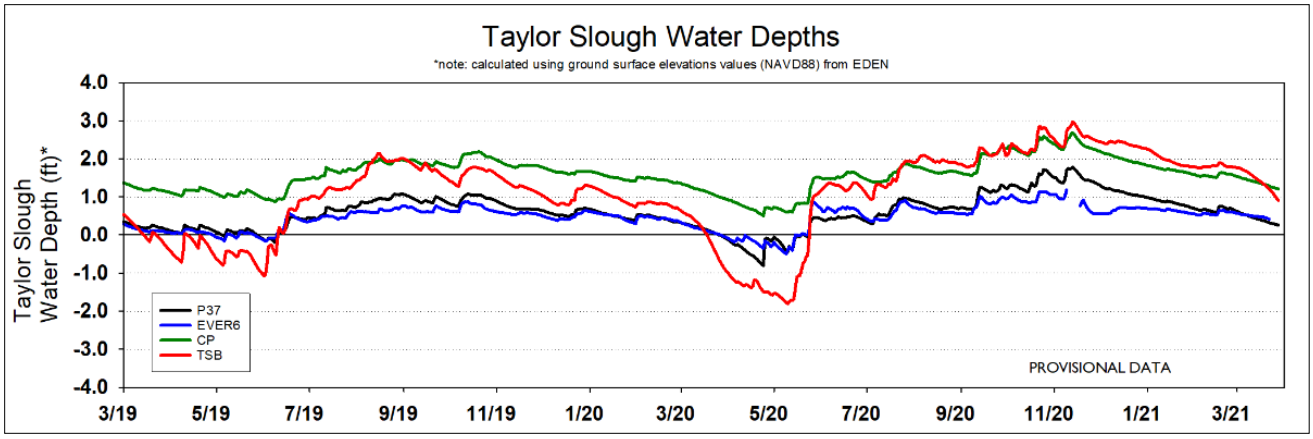
South Florida Water Depth Assessment Tool (SFWDAT)

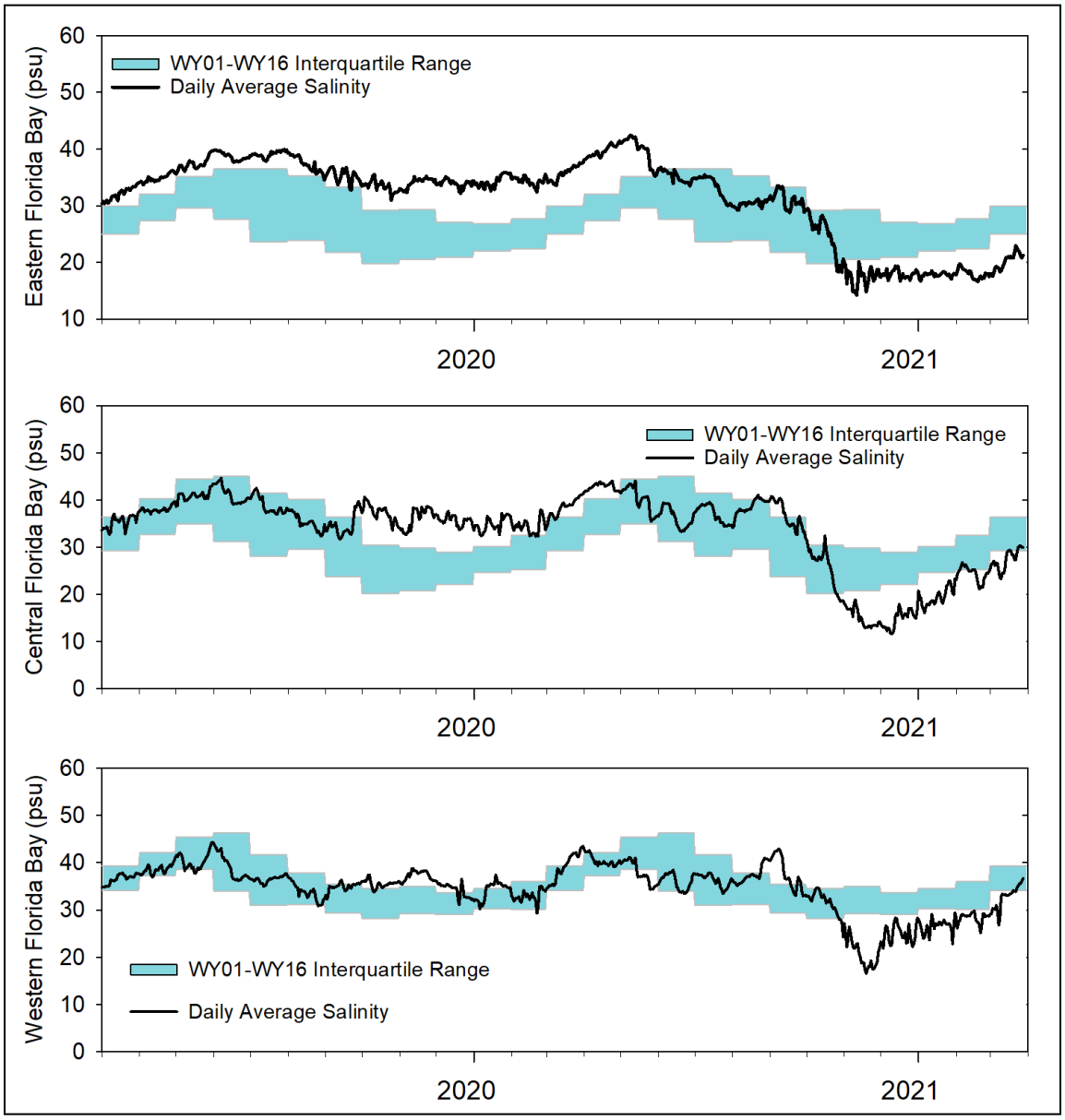
Tree island inundation in WCA-3A, WCA-3B and ENP: 371 Tree Islands of known elevation within WCA-3A, -3B, and Everglades National Park's Shark Slough. Current preliminary estimates using WDAT indicate that 11% or 44 of the tree islands are currently inundated (down from 15% the week prior), and all of those islands have been inundated for more than 120 days. Inundation for more than 120 days will cause ecological harm to sensitive islands.

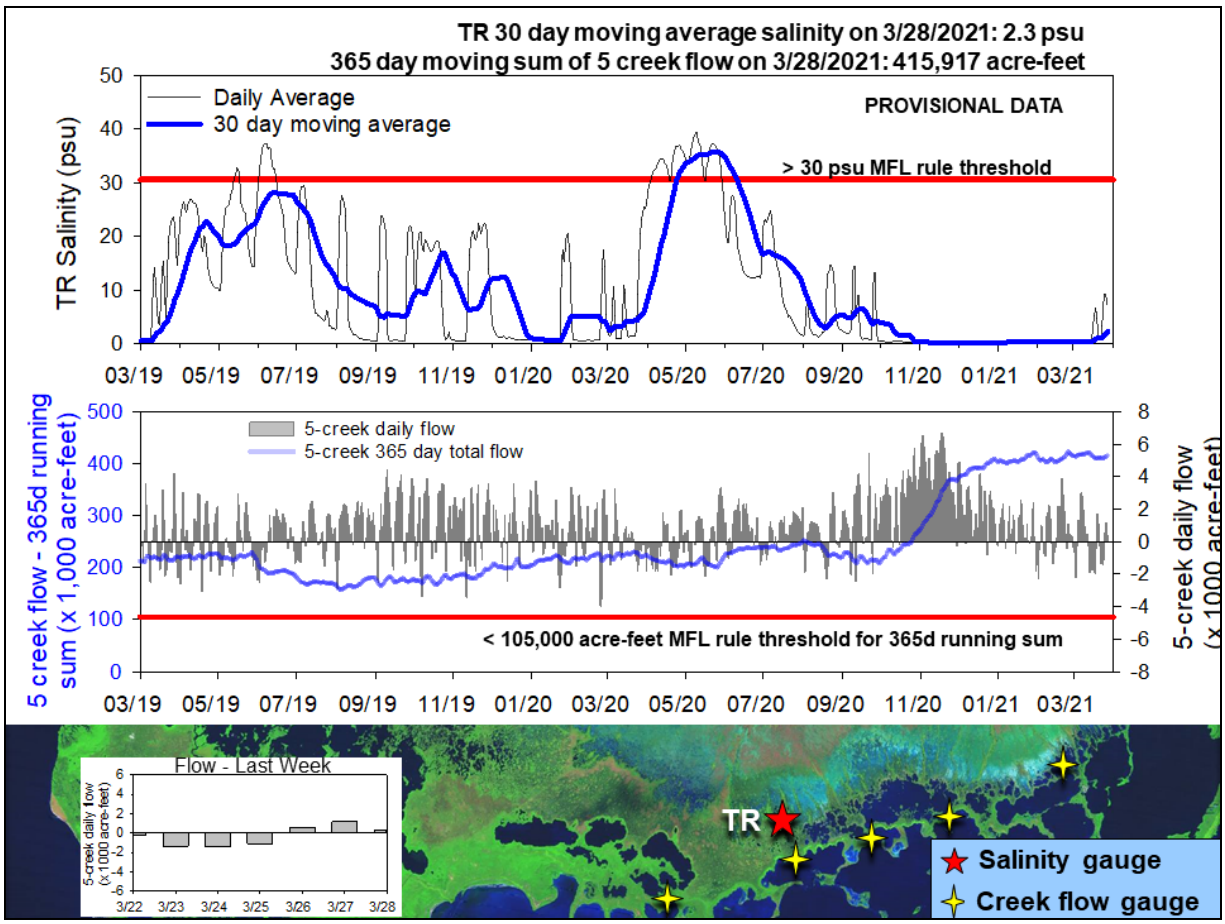
Wading bird foraging/nesting: Large numbers of wading birds continue to forage in the western marl prairies, WCA-1, WCA-2, and the northern marshes of WCA-3A. Nesting continues to increase at multiple colonies (Wood Storks (1700 nests), Roseate Spoonbills and Great Egrets (>6,000 nests). White Ibis are nesting in large numbers (approximately 43,000 nests) throughout the WCAs and ENP. Many Wood Storks nestlings are now visible in ENP.

Taylor Slough Water Levels: Next to no rain fell over Taylor Slough and Florida Bay this week again allowing Taylor Slough to decrease by 0.22 feet on average over the week. Highest recession rates continued to be in the northern parts of the slough as expected for this time of year. Taylor Slough is averaging 7 inches higher than the historical average for this time of year, and the northern portion of the slough is 19 inches higher than the average for this time of year. We are reaching the time of year when recession rates increase, especially in the northern part of the slough, but the northern part of the slough is also typically dry by now. At current rates, northern Taylor Slough will dry out in mid- to late- April, roughly a month and a half later than what has been typical in previous years.




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


Eastern Florida Bay (psu)
WY01-WY16 Interquartile Range
Daily Average Salinity
60
50
40
30
20
10
2020
2021
Central Florida Bay (psu)
WY01-WY16 Interquartile Range
Daily Average Salinity
60
50
40
30
20
10
0
2020
2021
Western Florida Bay (psu)
WY01-WY16 Interquartile Range
Daily Average Salinity
60
50
40
30
20
10
0
2020
2021



Florida Bay Salinities: Salinities in Florida Bay averaged a 1.8 psu increase over the week with individual station changes ranging from -1.0 psu in the eastern Bay to +5.6 psu in the western nearshore. Bay-wide salinity is 2.5 psu lower than the historical average for this time of year. The western stations are within 1 psu of their historical averages, while the central and eastern Bay areas are 3-6 psu below average still. The central and western nearshore areas are increasing as is typical once large freshwater flows cease.

Florida Bay MFL: The TR station in the mangrove zone (tracked for the Florida Bay MFL) received another saline pulse this past week. The daily average salinity peaked at 9 psu before decreasing to 7 psu on Sunday. The 30-day moving average increased to 2.3 psu as a result. Weekly flow from the 5 creeks identified by yellow stars on the map totaled about -2,000 acre-feet which is half of last week. Flows were negative for more than half the week again. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) ended at 415,917 acre-feet this week which is an 4,000 acre-feet increase from 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 central WCA-2A and WCA-3A North. For this upcoming week the ecology of the Everglades continues to dictate prioritizing WCA-2A foraging conditions over WCA-3A North for limited available inflows. Slowing the recession rate in that basin by conserving or increasing inflows allows for a greater utilization of the available forage and less stranding or “wasting” of prey due to an elevated recession rate.

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.

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.

Water management changes have improved nesting conditions within the subpopulations along the eastern boundary of ENP. The 40% dry metric has been reached in sub-population D. Allowing low flows towards Taylor Slough and Florida Bay would be beneficial to slow the marsh dry-down, which would allow for faster rehydration and propagation of flows to Florida Bay when the wet season begins.

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

SFWMD Everglades Ecological Recommendations, March 30th, 2021 (red is new)

Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.11'	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 0.16'	Moderate the recession rate to near -.05 to -.07 feet per week.	Protect within basin and downstream habitat and wildlife from flooding stress.
WCA-3A NE	Stage decreased by 0.15'	Moderate the recession rate to near -.05 to -.07 feet per week.	Protect within basin and downstream habitat and wildlife. Moderating the recession preserves peat soils and extends the time that foraging is optimal on the landscape.
WCA-3A NW	Stage decreased by 0.10'	Moderate the recession rate to near -.05 to -.07 feet per week.	
Central WCA-3A S	Stage decreased by 0.14'	??	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 0.13'		
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 0.11'	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 −0.08' to −0.40'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −1.0 to +5.6 psu.	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.