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: January 27, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

The next cold front will bring some scattered light showers beginning over northern areas Wednesday night with activity decreasing in coverage as it progresses southeastward overnight and Thursday morning. Building high pressure will then bring dry conditions Thursday afternoon through Saturday. Some spotty light showers will pop up over the Florida Keys Saturday night as some limited moisture begins to return from the south and southeast, and then some widely scattered light showers are expected Sunday. A cold front with limited rainfall potential is then forecast for next Monday. Beyond that, another cold front is forecast to push into the District the following weekend, and it may have a little better moisture associated with it. Total rainfall is forecast to be well below the historical average during the first 7-day period (Week 1) and then below the historical average during the second 7-day period (Week 2).

Kissimmee

Tuesday morning stages were 57.8 feet NGVD (0.2 feet below schedule) in East Lake Toho, 54.8 feet NGVD (0.2 feet below schedule) in Toho, and 51.8 feet NGVD (0.7 feet below schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.6 feet NGVD at S-65A and 25.8 feet NGVD at S-65D. Tuesday morning discharges were 900 cfs at S-65, 890 cfs at S-65A, 1,060 cfs at S-65D and 940 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 9.0 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 0.38 feet. Today's recommendation is to continue to follow the USACE request to keep S-65A discharge below 800-900 cfs to facilitate construction in the Lower Kissimmee Basin. Requests from USFWS and FWC for snail kite recessions and habitat are as follows: Priority 1: reduce stage to 54.5' on West Toho on or about Feb 11; Priority 2: target 51' on Kissimmee on or about March 18; Priority 3: target recession rate of ~0.14 feet/week on East Toho as other priorities allow.

Lake Okeechobee

Lake Okeechobee stage was 15.58 feet NGVD on January 24, 2021, 0.06 feet lower than last week and 0.30 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 0.22 feet above. Avian monitoring projects recorded nearly 7,400 wading birds using the lake on January 21, and 40 snail kites in the western marshes in mid-January. Recent satellite imagery and water quality results suggest there is little to no algal bloom activity on the Lake, though three stations near the shoreline had chlorophyll *a* values near 20 - 30 µg/L in early January.

Estuaries

Total inflow to the St. Lucie Estuary averaged more than 126 cfs over the past week with no flow coming from Lake Okeechobee. The seven-day average surface salinities increased throughout the estuary over the past week. Salinity at the US1 Bridge is in the good range (10-26) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 889 cfs over the past week with approximately 504 cfs coming from the Lake. Seven-day average surface salinities increased at three most upstream sites (S-79, Val I-75 and Ft. Myers) but remained similar at the three downstream sites 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, no 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 97,900 acre-feet. The total amount of inflows to the STAs in WY2021 is approximately 1,533,000 acre-feet. Most STA cells are near target stage. STA-1E Western Flow-way is offline for a Restoration Strategies project to fill and grade Cells 5 and 7, and STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to discharge canal plug construction activities, in STA-1E Central Flow-way, STA-2 Flow-ways 3, 4 and 5, STA-3/4 Eastern, Central, and Western Flow-ways for vegetation management activities, in STA-3/4 Eastern Flow-way for drawdown preparation activities, and in STA-5/6 Flow-ways 2 and 3 following a Restoration Strategies project to grade non-effective treatment areas. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2.

Everglades

At all the gauges monitored for this report the Water Conservation Areas (WCA) weekly stage changes fell within the good or early dry season WY21 ecological recession recommendations. Depths remain above average in Taylor Slough and salinities in Florida Bay remain below the historical average for this time of year, continued good positioning for early 2021. Large numbers of wading birds continue to forage along the southern coast, and nesting has begun in colonies across the Everglades. Flocks of wading birds are now foraging along the northern border of WCA-3A North east of the Miami Canal.

Supporting Information

KISSIMMEE BASIN

The Upper Kissimmee Basin received 0.02 inches of rainfall in the past week and the Lower Basin received 0.00 inches (SFWMD Daily Rainfall Report January 24, 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: 1/26/2021

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)						
							1/24/21	1/17/21	1/10/21	1/3/21	12/27/20	12/20/20	12/13/20
Lakes Hart and Mary Jane	S-62	0	LKMJ	61.0	R	61.0	**0.0**	0.0	0.0	0.0	-0.1	0.0	0.1
Lakes Myrtle, Preston, and Joel	S-57	8	S-57	61.5	R	61.4	**0.1**	0.0	-0.1	0.0	0.0	0.0	0.0
Alligator Chain	S-60	0	ALLI	63.9	R	64.0	**-0.1**	0.0	0.0	0.0	0.0	0.0	0.0
Lake Gentry	S-63	21	LKGT	61.5	R	61.5	**0.0**	0.0	0.0	0.1	0.0	0.0	0.1
East Lake Toho	S-59	105	TOHOE	57.9	R	58.0	**-0.1**	0.0	0.0	0.0	-0.1	0.0	-0.1
Lake Toho	S-61	300	TOHOW, S-61	54.9	R	55.0	**-0.1**	0.0	0.0	-0.1	0.0	0.0	0.0
Lakes Kissimmee, Cypress, and Hatchineha	S-65	869	KUB011, LKIS5B	51.8	R	52.5	**-0.7**	-0.3	-0.2	-0.1	0.0	0.0	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: **1/26/2021**

Metric	Location	1-Day Average	Average for the Preceeding 7-Days[1]								
		1/24/2021	1/24/21	1/17/21	1/10/21	1/3/21	12/27/20	12/20/20	12/13/20	12/6/20	11/29/20
Discharge (cfs)	S-65	904	**869**	644	540	676	729	848	1,382	1,083	842
Discharge (cfs)	S-65A[2]	892	**856**	641	600	733	809	974	1,566	1,275	1,108
Discharge (cfs)	S-65D[2]	921	**838**	701	770	944	1,317	1,704	1,605	1,497	1,541
Headwater Stage (feet NGVD)	S-65D[2]	25.80	**25.79**	25.87	25.85	25.80	25.73	26.08	26.40	26.82	26.99
Discharge (cfs)	S-65E[2]	950	**849**	719	808	944	1,314	1,710	1,687	1,545	1,657
Discharge (cfs)	S-67	0	**0**	0	0	0	0	0	0	0	0
DO (mg/L)[3]	Phases I & II/III river channel	8.8	**9.0**	8.4	8.4	8.4	7.5	6.4	7.2	6.0	5.3
Mean depth (feet)[4]	Phase I floodplain	0.38	**0.37**	0.38	0.41	0.50	0.68	1.00	1.01	0.90	0.93

[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.

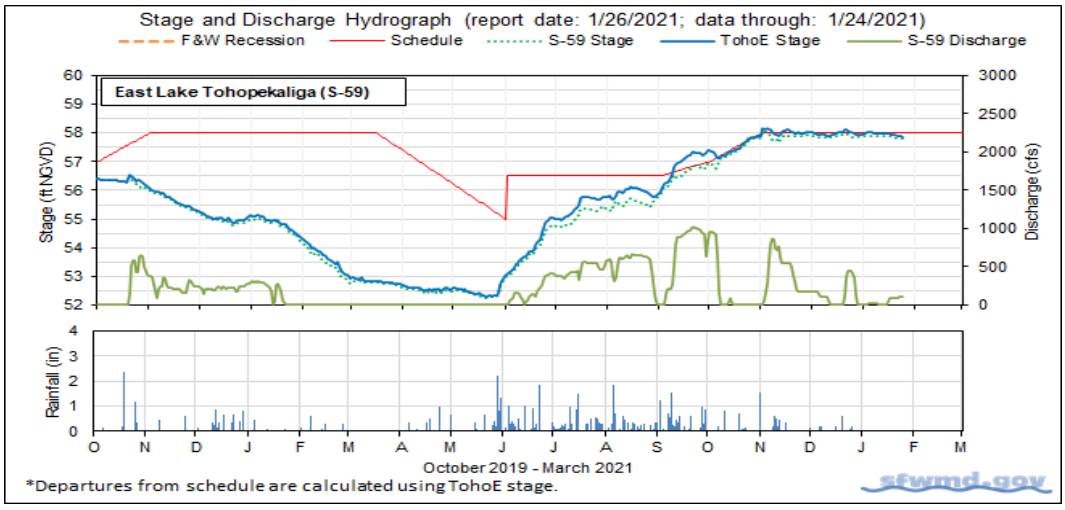


Figure 1. East Lake Toho regulation schedule, stage, discharge and rainfall.

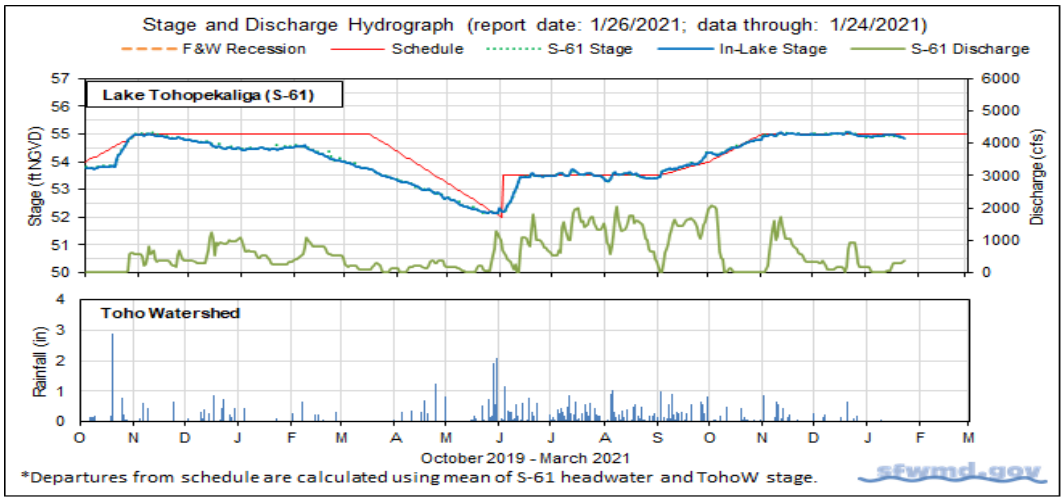


Figure 2. Lake Toho regulation schedule, stage, discharge and rainfall.

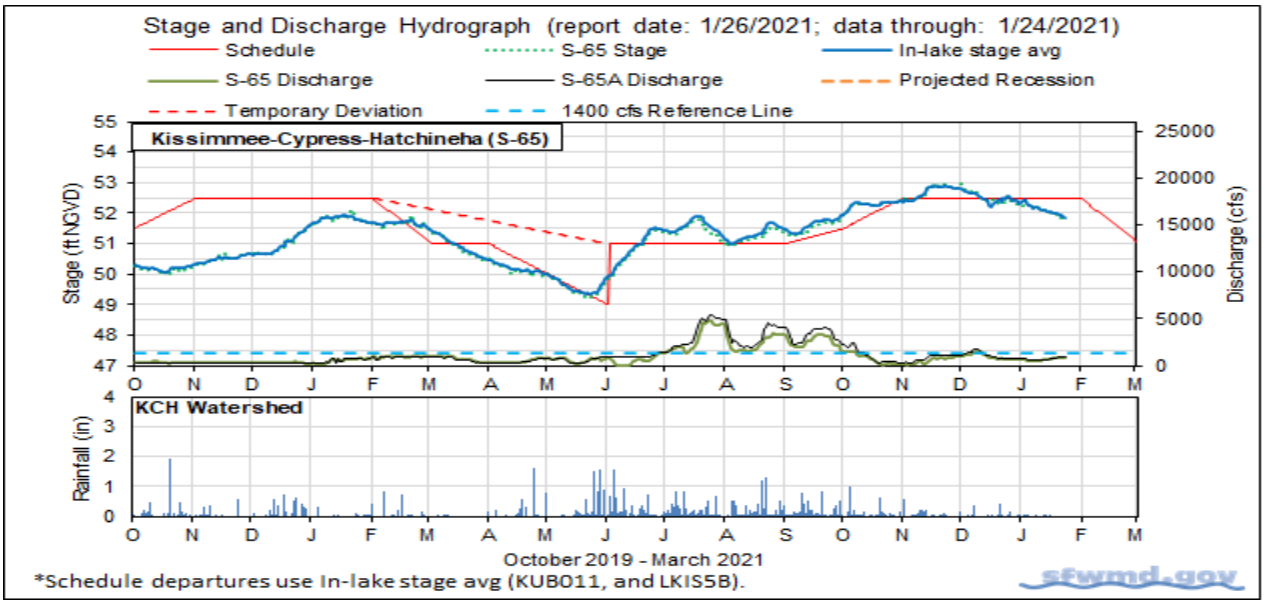


Figure 3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

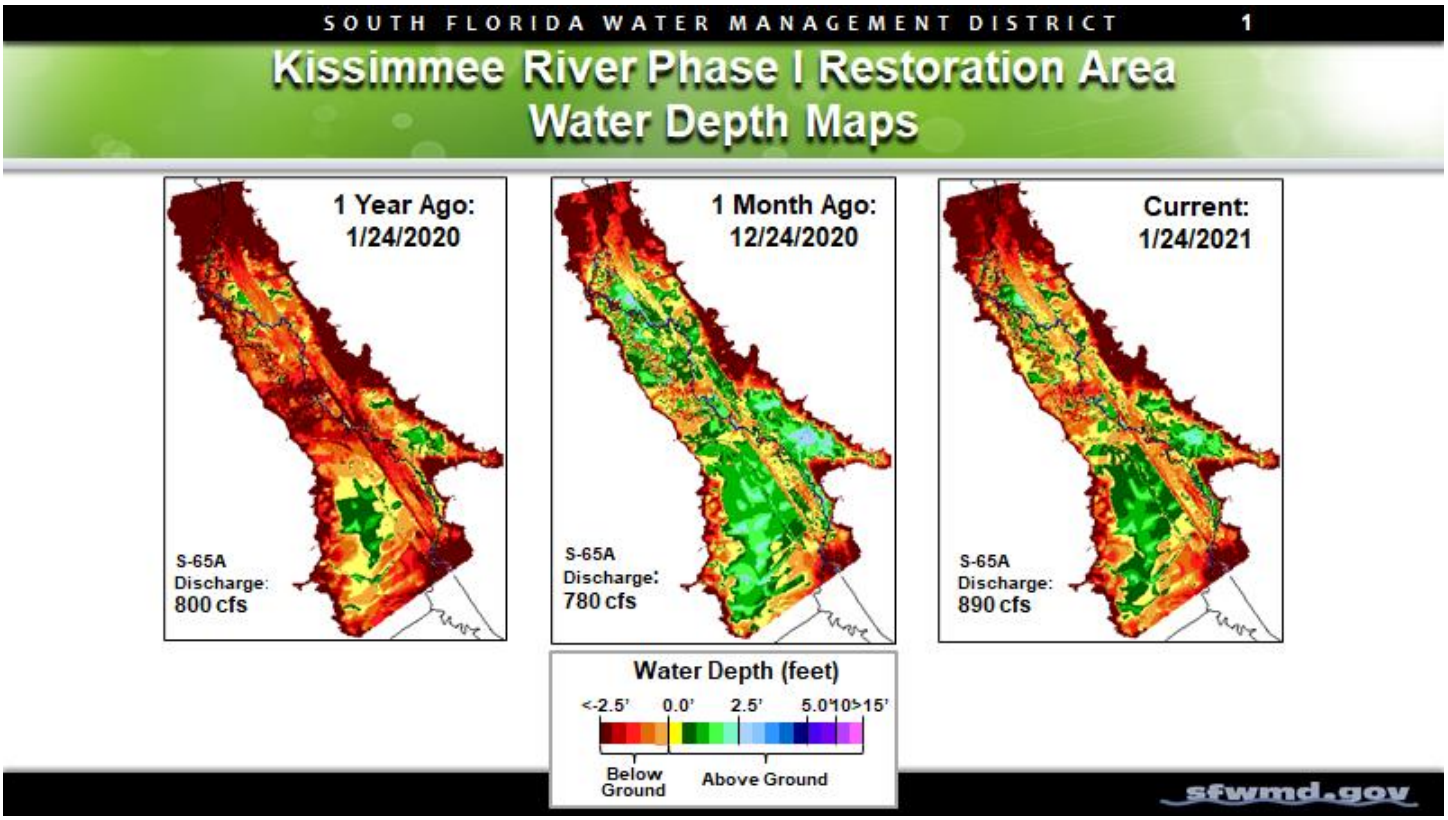


Figure 4. Phase I area floodplain water depths (from left to right) one year ago, one month ago and current. Color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

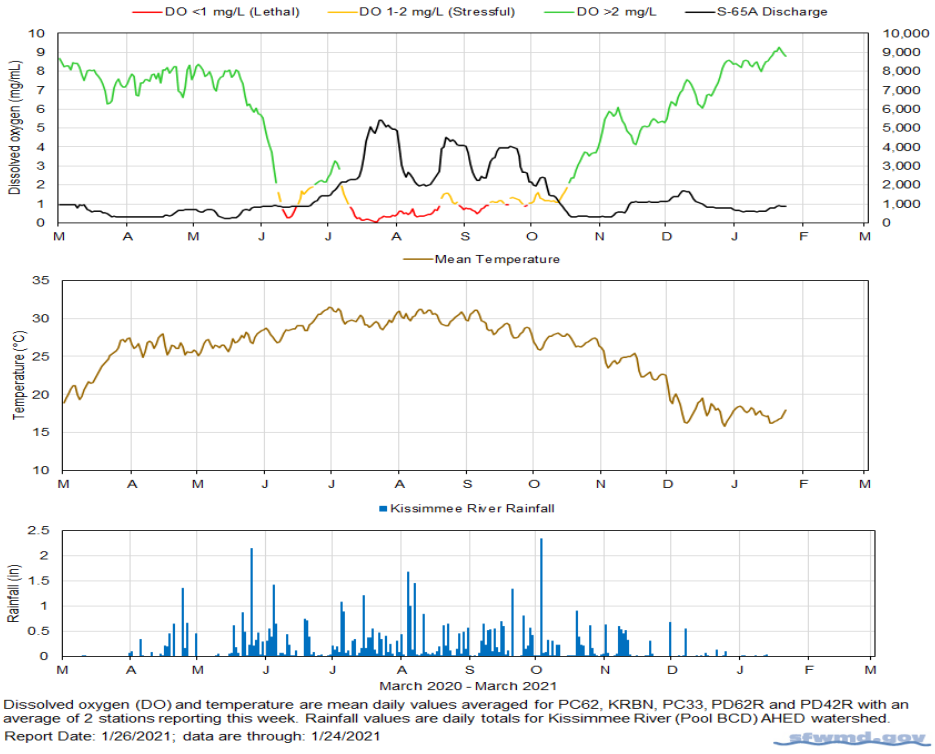


Figure 5. Restored Kissimmee River channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches)

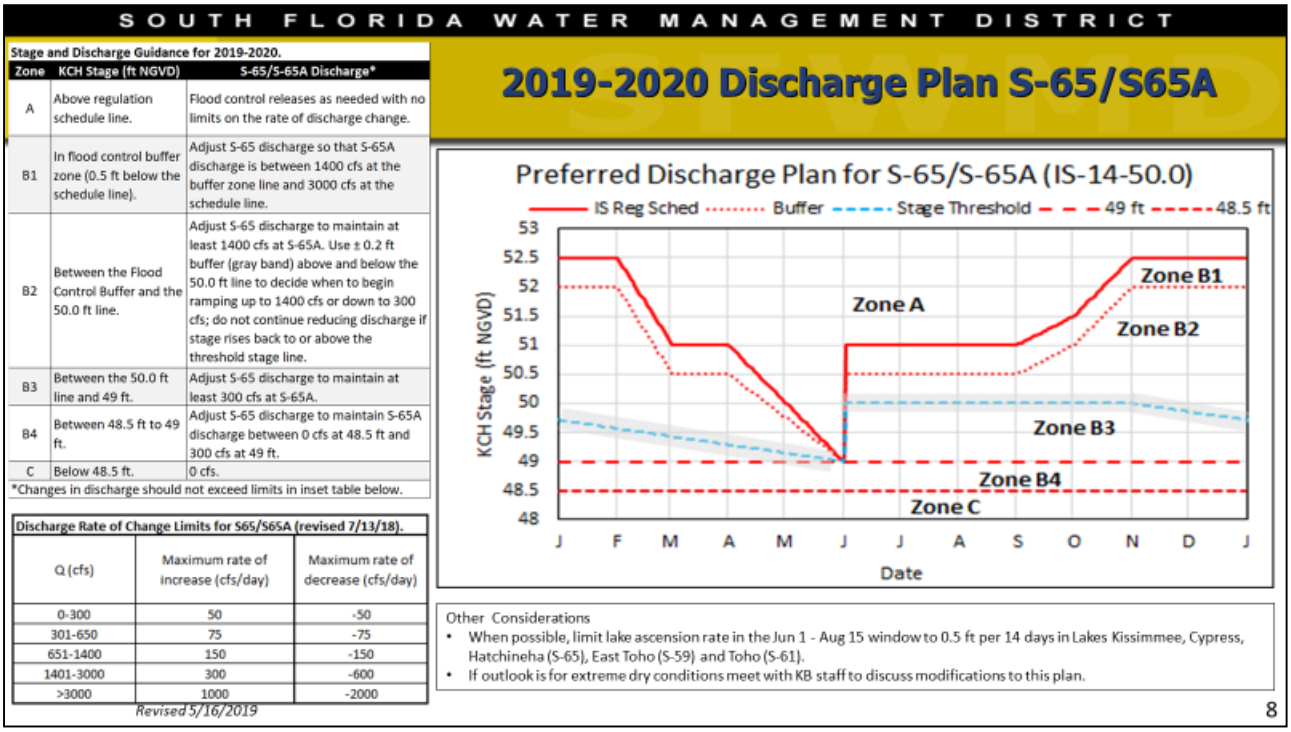


Figure 6. The 2019-2020 Discharge Plan for S-65/S-65A.

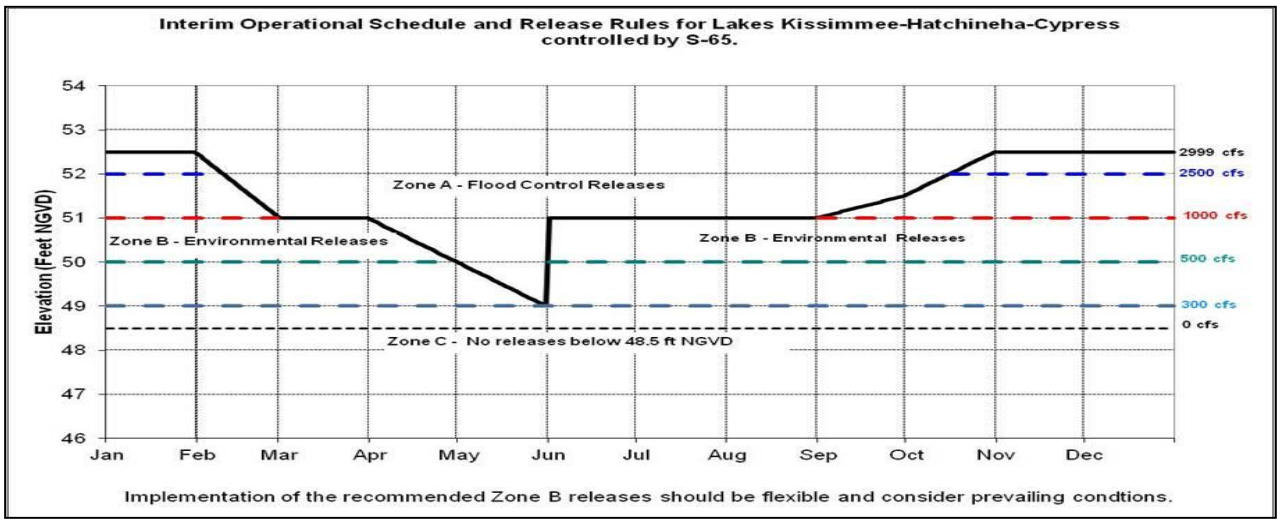


Figure 7. Interim operations schedule for S-65 (solid black line). The discharge schedule shown to the right has not been used in recent years.

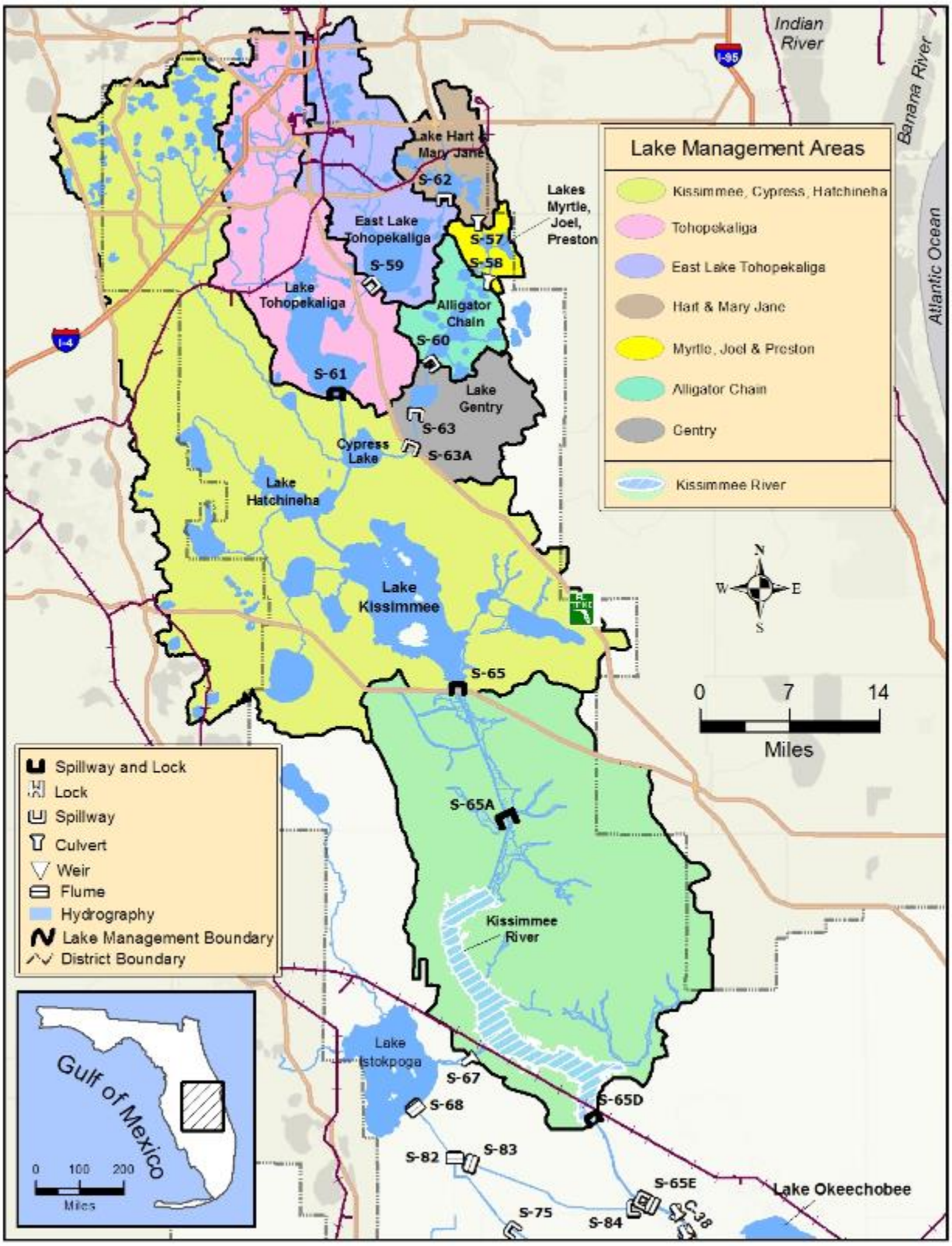


Figure 8. The Kissimmee Basin.

LAKE OKEECHOBEE

Lake Okeechobee stage is 15.58 feet NGVD, 0.30 feet lower than a month ago, and 2.75 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 0.22 feet above. Lake stage reached a low of 10.99 feet on May 17 and a high of 16.45 feet on November 12 (post Tropical Storm Eta), a difference of 5.5 feet (**Figure 3**). Lake stage has declined since mid-November and is currently in the Low sub-band. According to RAINDAR, no rain fell on the Lake or most of the watershed (**Figure 4**).

Average daily inflows (excluding rainfall) were like the previous week at 1,080 cubic feet per second (cfs). Outflows (excluding evapotranspiration) increased from 1,025 cfs to 1,606 cfs. Most of the inflows came from the Kissimmee River (849 cfs through S-65E & S-65EX1) and Lake Istokpoga via the C-41A canal (135 cfs through S-84 & S-84X). Releases to the west via S-77 were like the prior week at 652 cfs, while there have been no releases east via S-308 since January 9. Releases south through the S-350 structures increased from approximately 370 cfs to around 950 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) due to each structure's flow for the past week is also shown in **Table 1. Figure 5** shows the combined average daily cfs for inflows and outflows for the Lake over the past eight weeks. These data are provisional and are subject to change.

The third wading bird survey of the 2021 breeding season (conducted January 21, 2021) reported approximately 7,400 foraging wading birds on the Lake, compared to about 3,500 on the December 3rd survey and about 350 on December 17 (**Figure 6**). The first three surveys of this year have averaged roughly 3,750 wading birds per survey, compared to less than 700 per survey over the same period last year when lake stage was nearly 3 feet lower (**Figure 2**). Suitable foraging habitat is currently limited due to deep water levels throughout the marsh, especially for the short-legged wading birds. Higher lake stages throughout the summer and fall of 2020 followed two years of low winter stages; the combination of which has likely sparked prey production in the marsh and lead to more wading bird foraging activity than would be expected at 15.5 – 16 feet in lake stage this time of year. If lake stages continue to decline and stay near the top of the ecological envelope throughout the spring, there should be good foraging and nesting conditions for wading birds on the Lake this breeding season.

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 January sampling occurred on the 5th and 6th; no samples had detectable levels of cyanotoxins, and algal communities were described as mixed, with no dominant taxa (**Figure 7**). Results for chlorophyll *a* showed three stations near or above 20 µg/L, with one station on the western shore having 30.5 µg/L.

The most recent satellite image (January 24, 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 15.58 feet NGVD on January 24, 2021, 0.06 feet lower than last week and 0.30 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 0.22 feet above. Avian monitoring projects recorded nearly 7,400 wading birds using the Lake on January 21, and 40 snail kites in the western marshes in mid-January. Recent satellite imagery and water quality results suggest there is little to no algal bloom activity on the Lake, though three stations near the shoreline had chlorophyll *a* values near 20 - 30 µg/L in early January.

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	719	849	0.3
S-71 & S-72	64	0	0.0
S-84 & S-84X	162	135	0.1
Fisheating Creek	57	34	0.0
S-154	0	0	0.0
S-191	0	0	0.0
S-133 P	28	18	0.0
S-127 P	7	7	0.0
S-129 P	6	5	0.0
S-131 P	2	2	0.0
S-135 P	9	26	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	6	4	0.0
Rainfall	403	0	0.0
Total	**1463**	**1080**	**0.4**

OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-77	657	652	0.3
S-308	0	0	0.0
S-351	216	518	0.2
S-352	77	176	0.1
S-354	75	260	0.1
L-8 Outflow			
ET	1138	2419	0.9
Total	**2164**	**4025**	**1.6**

Provisional Data

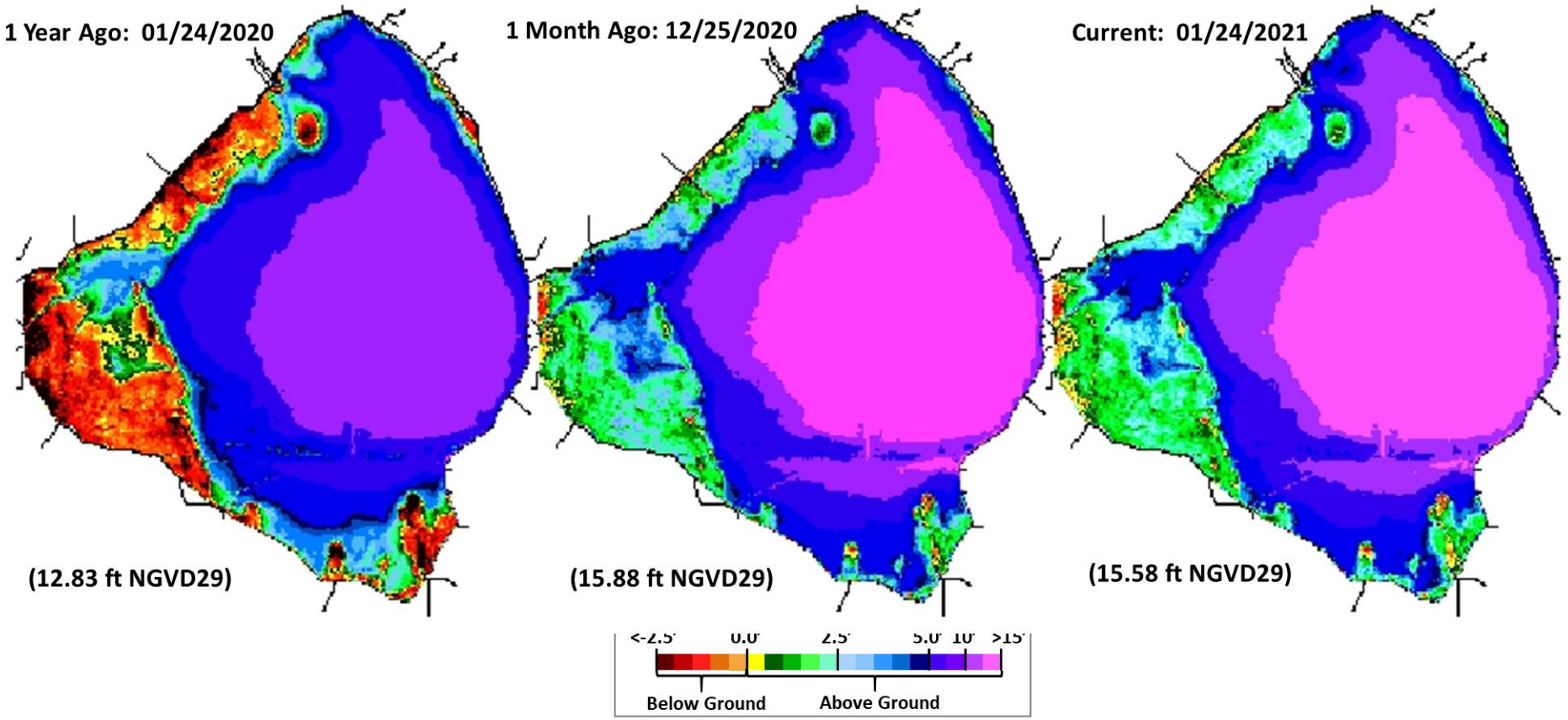


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

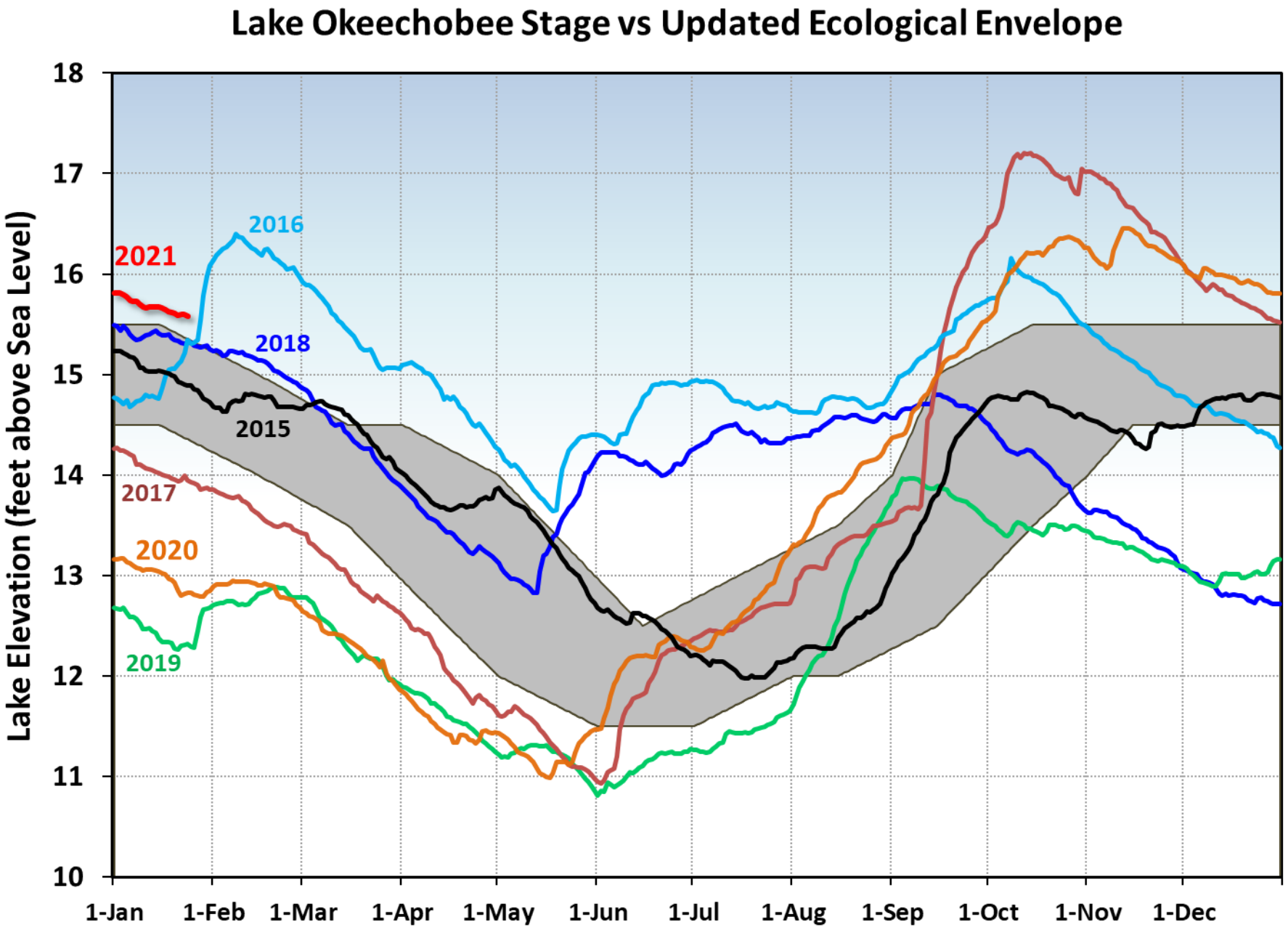


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated Ecological Envelope.

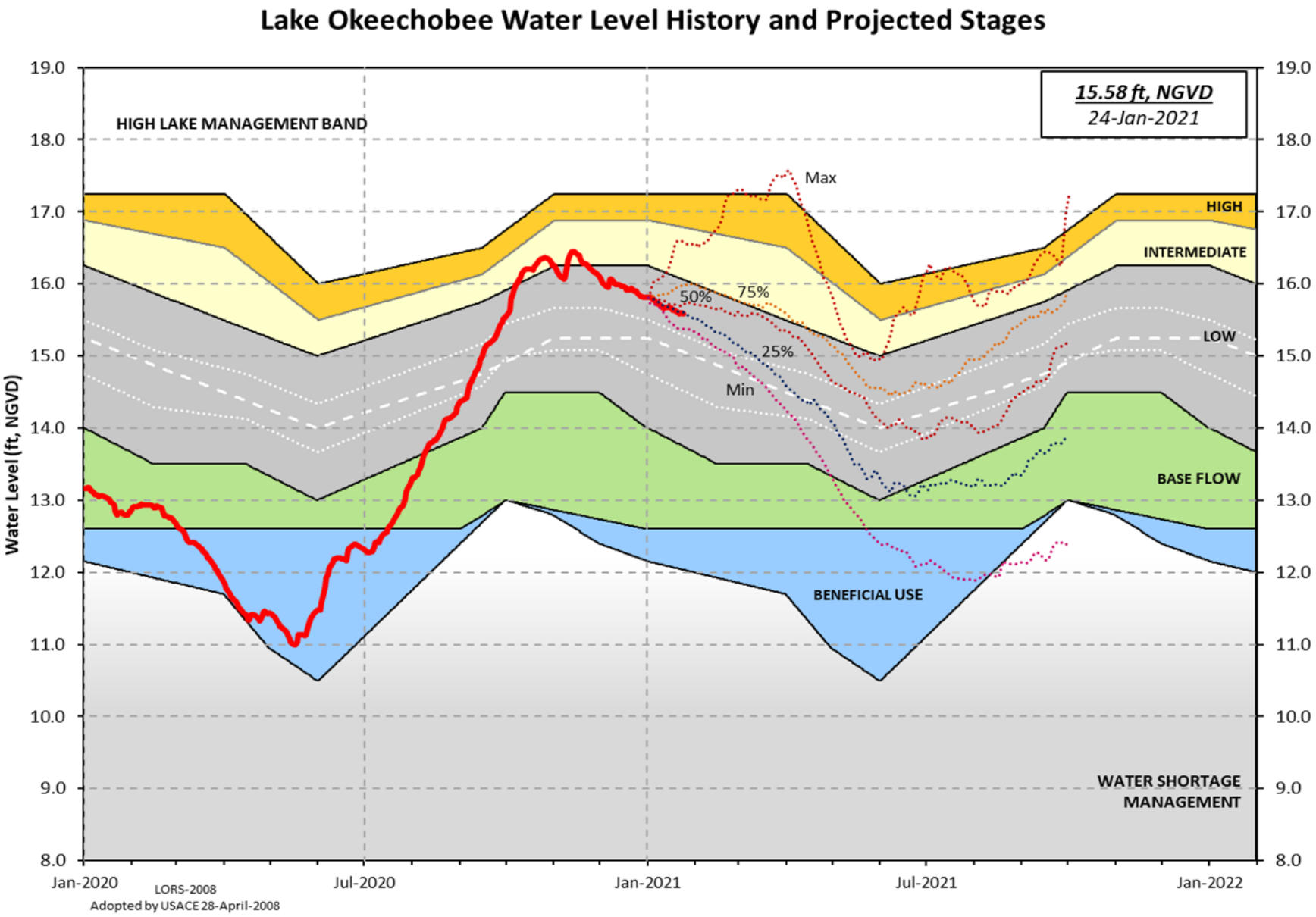


Figure 3. Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

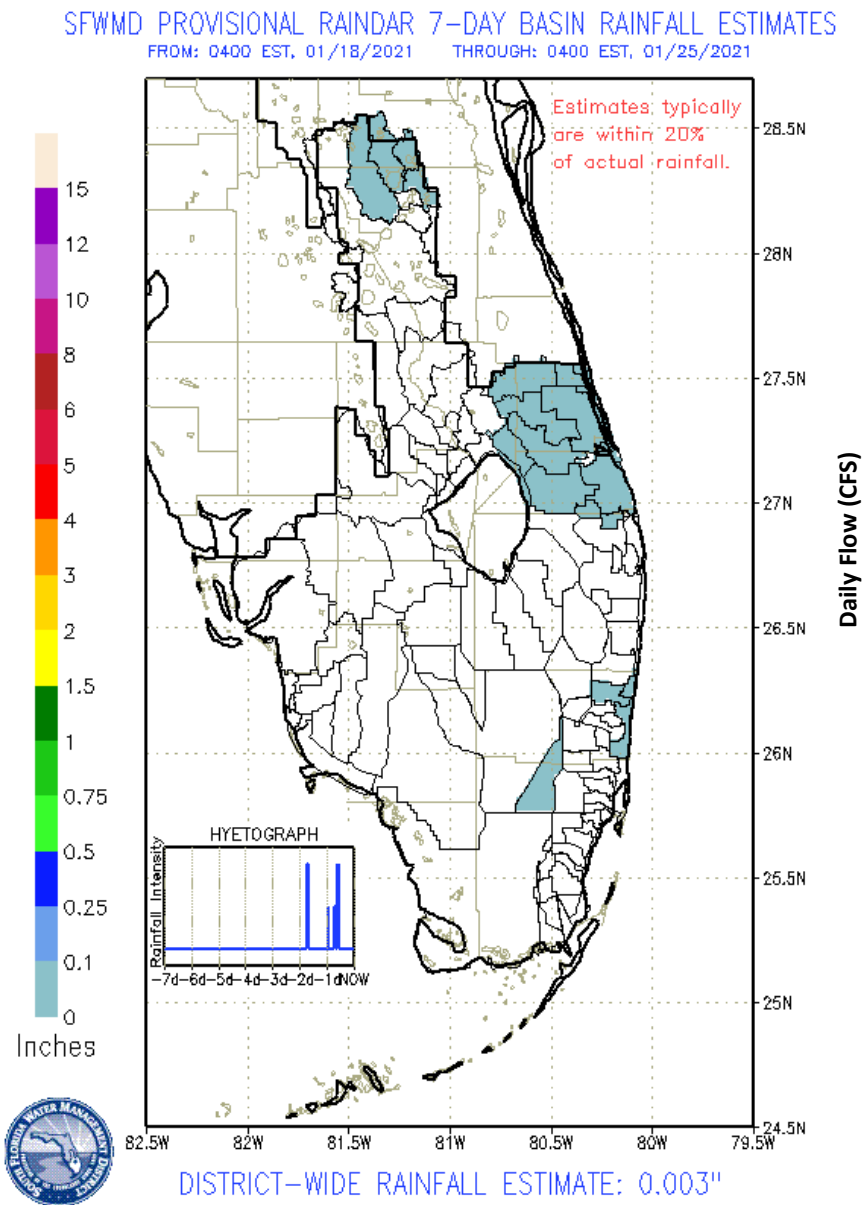


Figure 4. 7-Day rainfall estimates by RAINDAR.

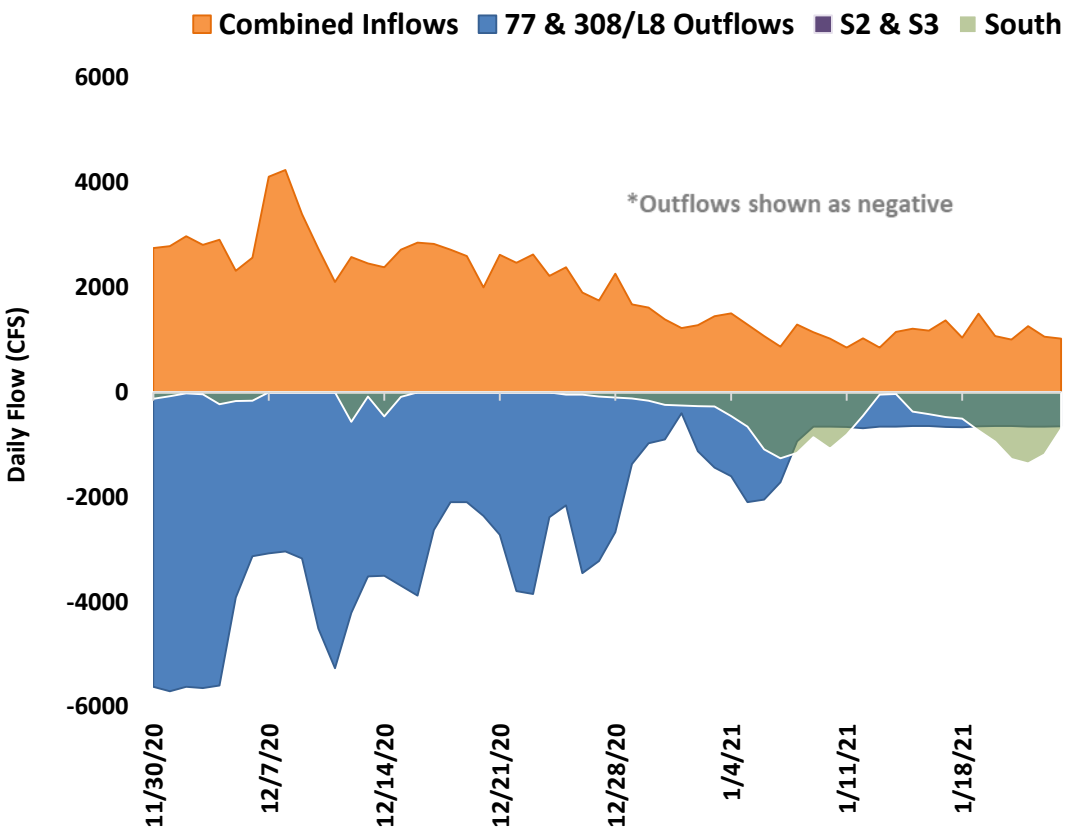
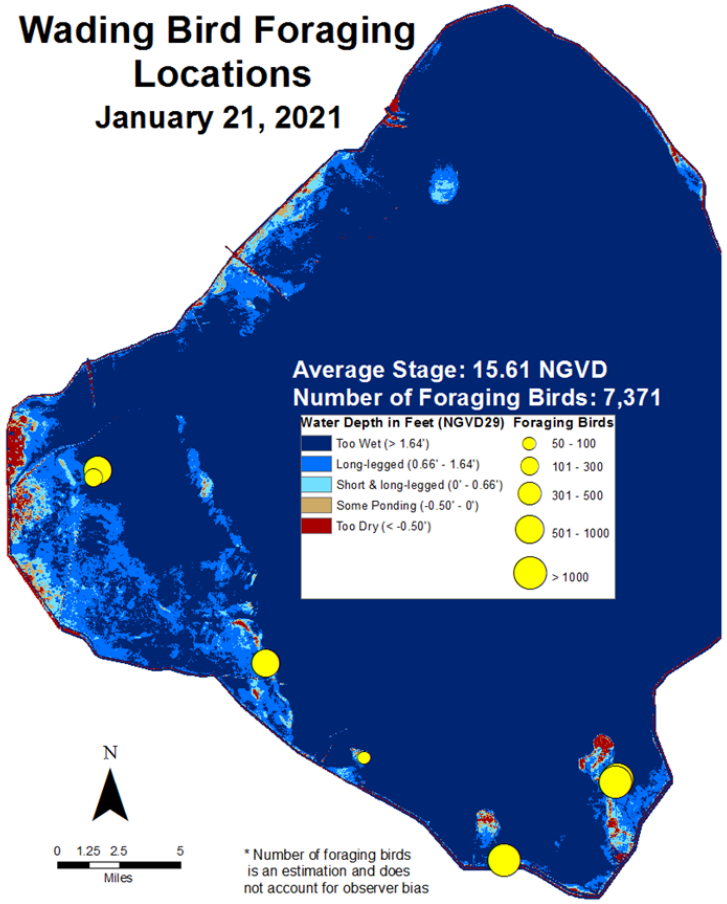


Figure 5. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive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



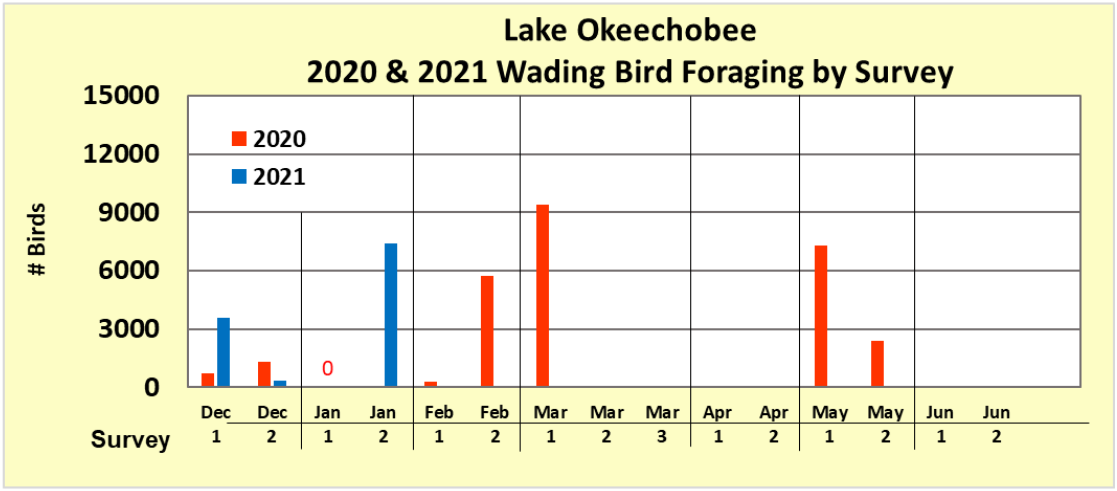


Figure 6. Locations of foraging flocks of wading birds observed during a monitoring flight on January 21, 2021 are shown in yellow, with circle sizes representing the size of the flocks. Previous survey totals from last year's breeding season are compared in the bar graph.

Collection Date: January 5-6, 2021

Station	CHL*a* (ug/L)	TOXIN (ug/L)	TAXA
FEBIN (1/4)	P		
FEBOUT (1/4)	P		
KISSR0.0	17.8	BDL	mixed
L005	5.9	BDL	mixed
LZ2	11.0	BDL	mixed
KBARSE	8.6		
RITTAE2	7.8	BDL	mixed
PELBAY3	5.5		
POLE3S	6.6		
LZ25A	6.7		
PALMOUT	19.5	BDL	mixed
PALMOUT1	7.0		
PALMOUT2	5.7		
PALMOUT3	5.3		
POLESOUT	**30.5**	BDL	mixed
POLESOUT1	15.8		
POLESOUT2	9.4		
POLESOUT3	8.4		
EASTSHORE	3.9		
NES135	4.1		
NES191	6.0		

Station	CHL*a* (ug/L)	TOXIN (ug/L)	TAXA
L001	5.2		
L004	6.2		
L006	4.4		
L007	7.8		
L008	9.2		
LZ30	7.0	BDL	mixed
LZ40	4.5		
CLV10A	4.0	BDL	mixed
NCENTER	4.8		
Sampled 1/11			
S308C	P	BDL	mixed
S77	P		

- 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

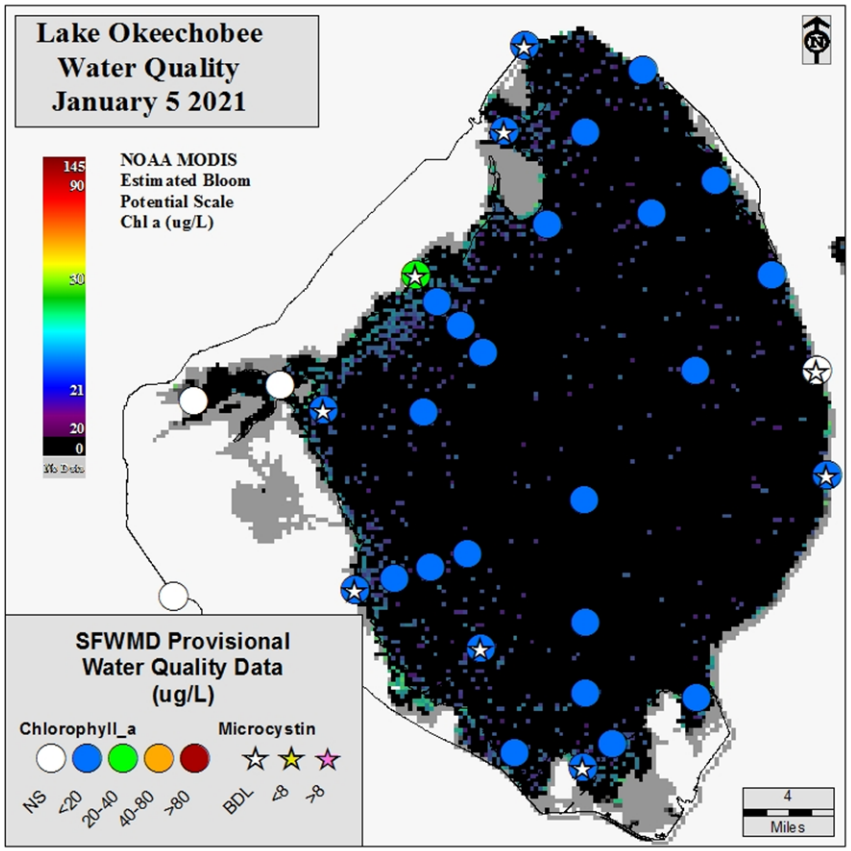


Figure 7. Provisional results from the expanded monitoring sampling trips January 5 - 6, 2021.

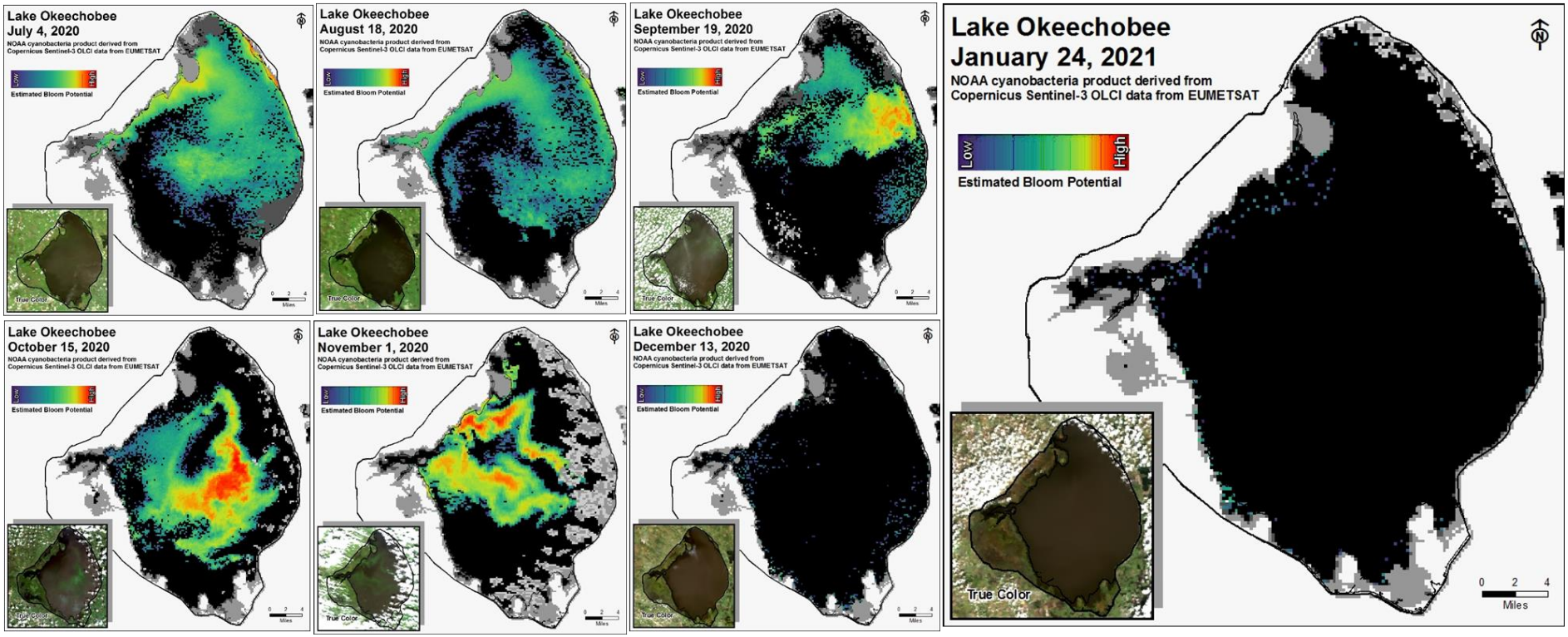


Figure 8. Cyanobacteria bloom potential based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged more than 126 cfs (**Figures 1 and 2**) and last month inflow averaged more than 538 cfs. Note these numbers do not include contributions from the Gordy Road Structure due to missing data. The structure was removed due to bridge construction. 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).

Location	Flow (cfs)
Tidal Basin Inflow	85
S-80	0
S-308	0
S-49 on C-24	38
S-97 on C-23	3
Gordy Rd. structure on Ten Mile Creek	Not reporting

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 is 19.4. Salinity conditions in the middle estuary are estimated to be within the good range for adult eastern oysters **(Figure 3**).

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

Sampling Site	Surface	Bottom	Envelope
HR1 (North Fork)	**13.9** (11.3)	**17.5** (15.3)	NA[1]
US1 Bridge	**18.1** (16.1)	**20.6** (18.8)	10.0-26.0
A1A Bridge	**24.5** (24.3)	**27.3** (27.5)	NA[1]

[1]Envelope not applicable

Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged approximately 889 cfs (**Figures 5 and 6**) and last month inflow averaged about 1,230 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	653
S-78	504
S-79	775
Tidal Basin Inflow	114

Over the past week, salinity increased at the S-79, Val I75 and Ft. Myers sites but remained similar at the three downstream sites (**Table 4, Figures 7 & 8**). The seven-day average salinity values are 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)	**0.4** (0.2)	**0.4** (0.2)	NA[1]
Val I75	**0.4** (0.3)	**1.0** (0.3)	0.0-5.0[2]
Ft. Myers Yacht Basin	**4.2** (3.3)	**6.5** (4.7)	NA[1]
Cape Coral	**10.1** (10.1)	**12.6** (12.2)	10.0-30.0
Shell Point	**22.0** (23.2)	**23.6** (23.3)	10.0-30.0
Sanibel	**27.9** (27.6)	**28.4** (27.9)	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 2.6 or lower at the end of the two week period for pulse release at S-79 ranging from 0 to 800 cfs and estimated Tidal Basin inflows of 95 cfs. The 30-day moving average surface salinity at Val I-75 is forecast to be 0.8 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	95	2.6	0.8
B	300	95	1.6	0.6
C	450	95	1.2	0.6
D	650	95	0.8	0.5
E	800	95	0.6	0.4

Red tide

The Florida Fish and Wildlife Research Institute reported on January 22, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background to high concentrations on and offshore of Lee County, and background to medium concentrations on and offshore of Collier County. Bloom concentrations were observed in 6 samples collected from Lee and Collier counties. On the east coast, red tide was not observed in samples from Brevard, St. Lucie, Martin or Palm Beach counties.

Water Management Recommendations

The LORS2008 release guidance suggests up to 450 cfs release at S-79 to the Caloosahatchee Estuary and up to 200 cfs release at S-80 to the St. Lucie Estuary.

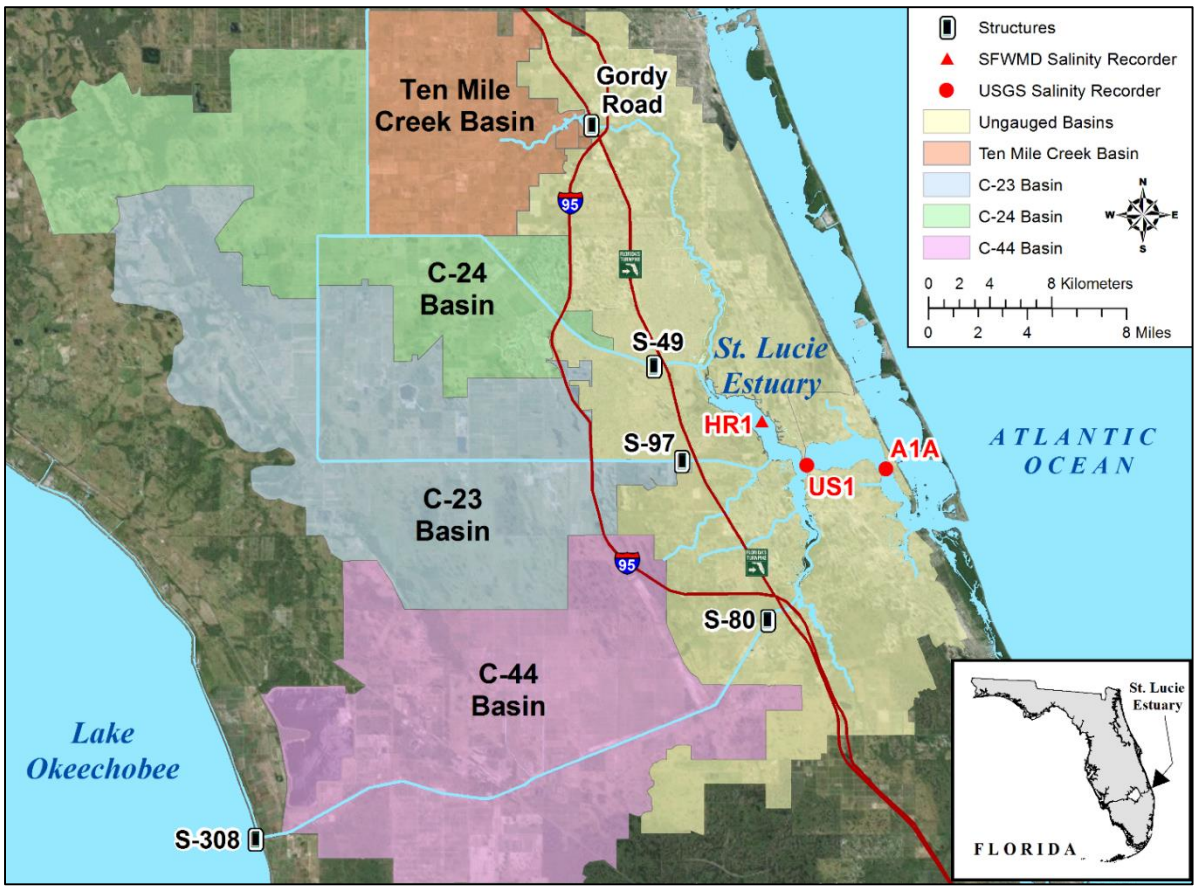


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

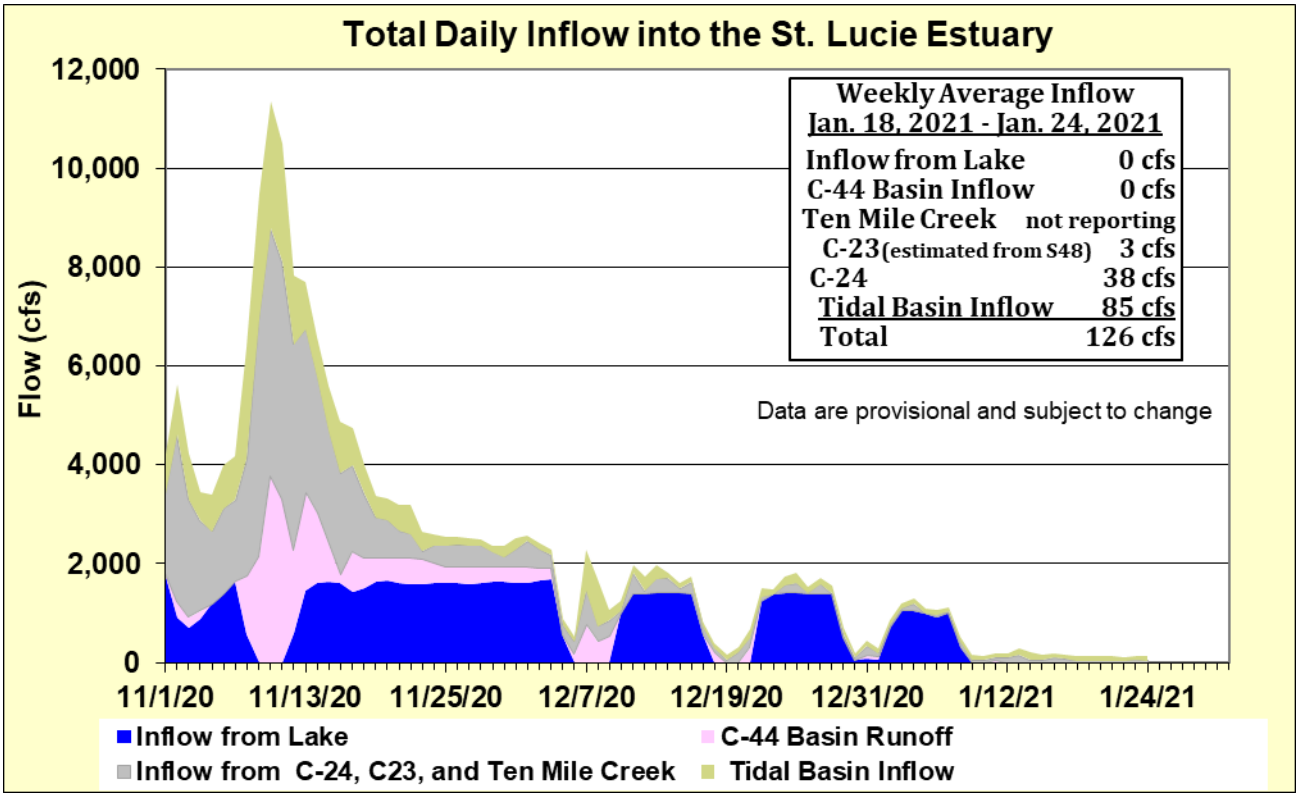


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin into the St. Lucie Estuary.

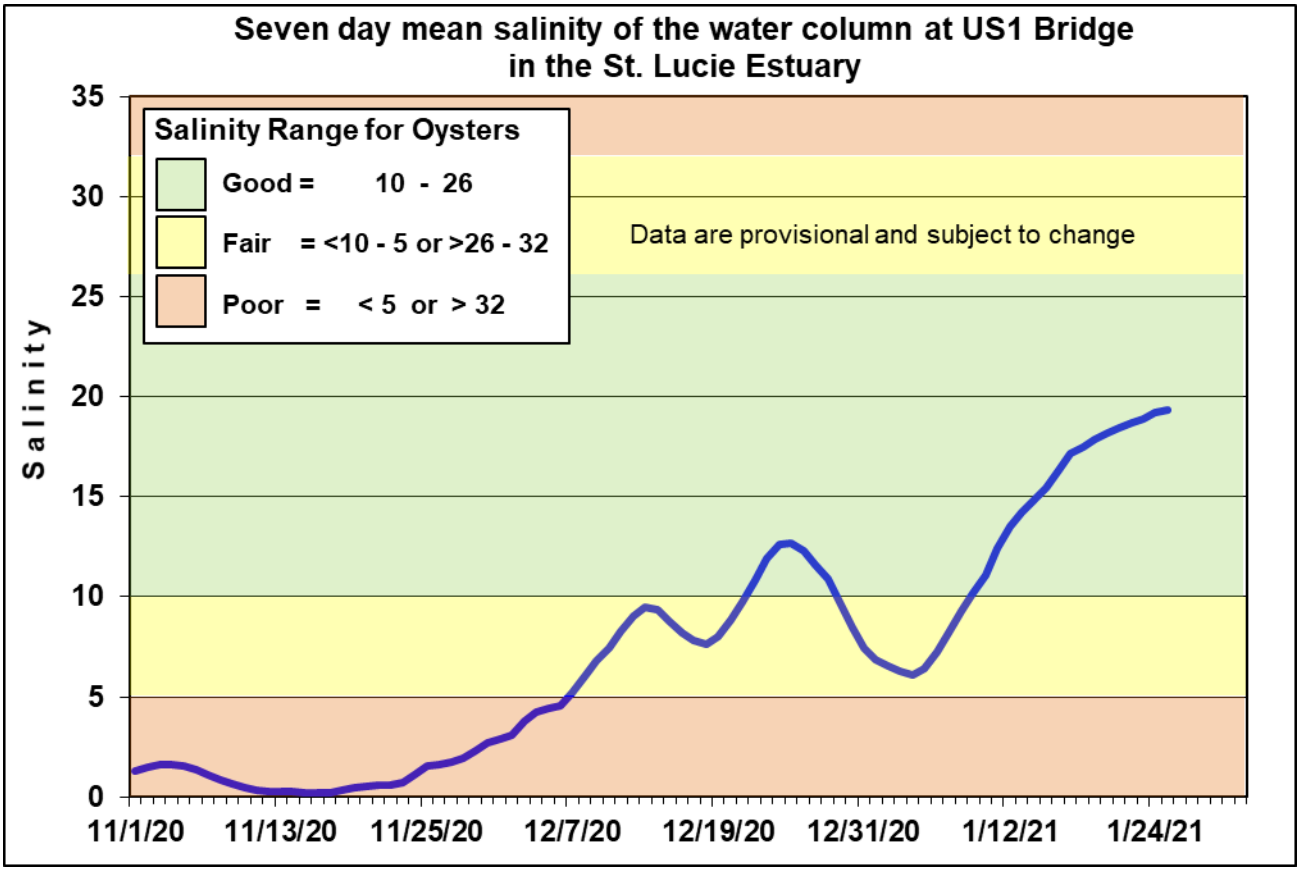


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

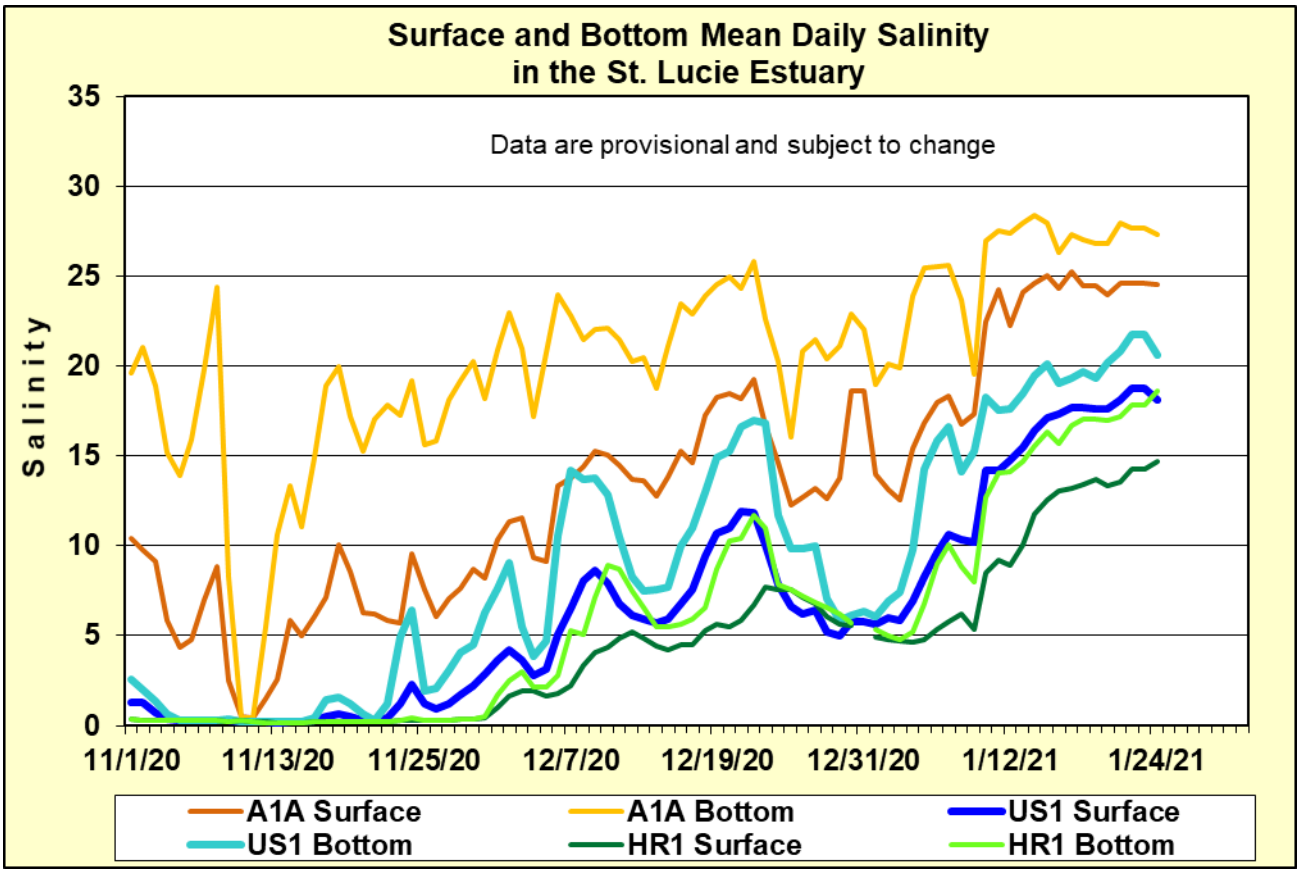


Figure 4. Daily mean salinity at the A1A, US1, and HR1 stations.

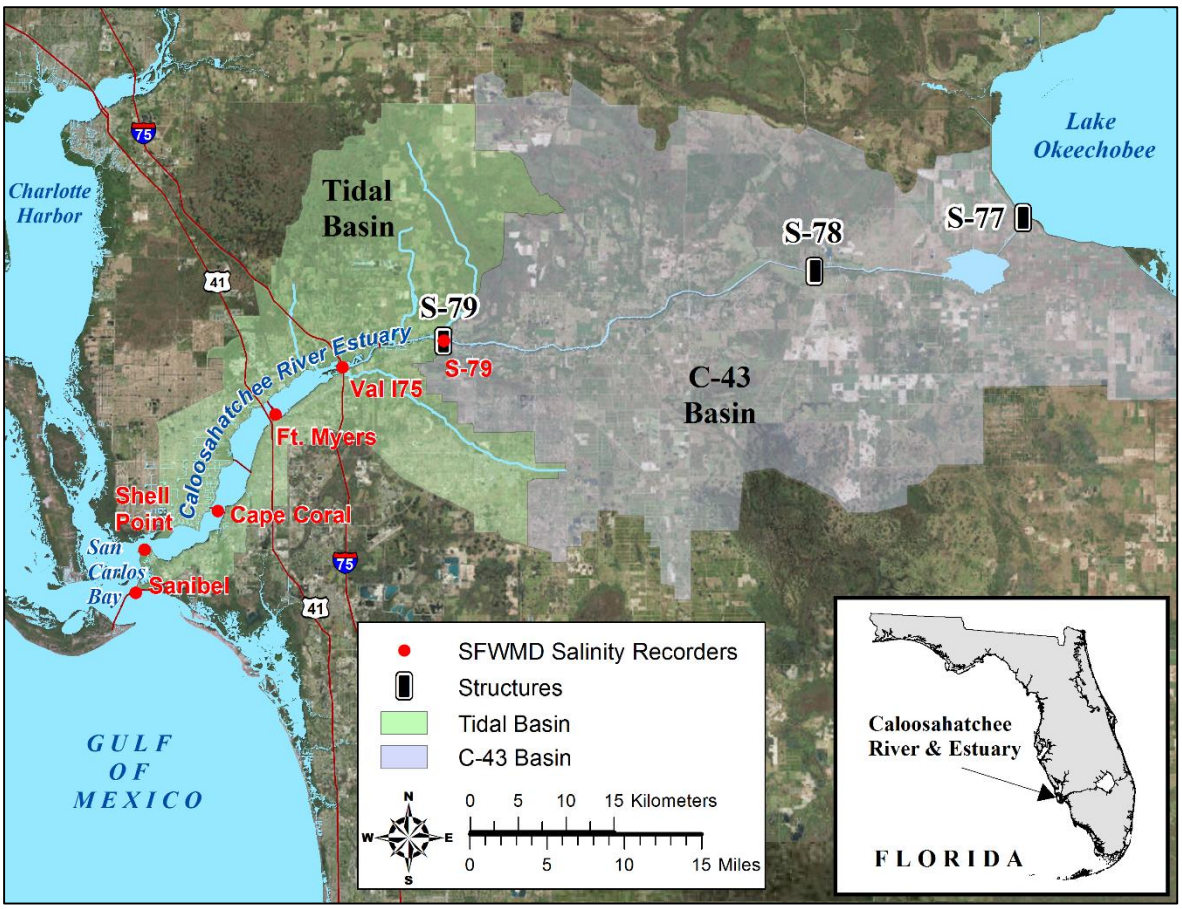


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

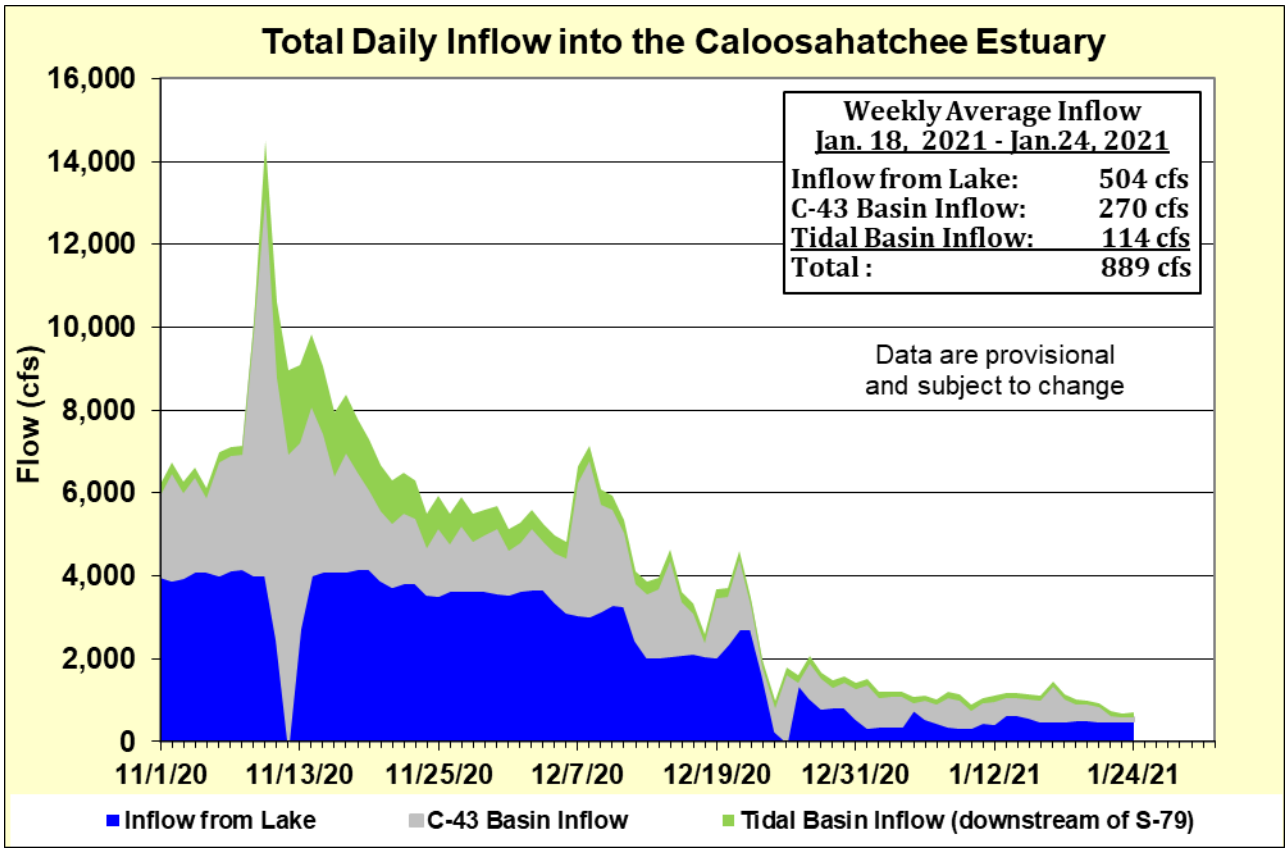


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin and tributaries in the tidal basin into the Caloosahatchee River Estuary.

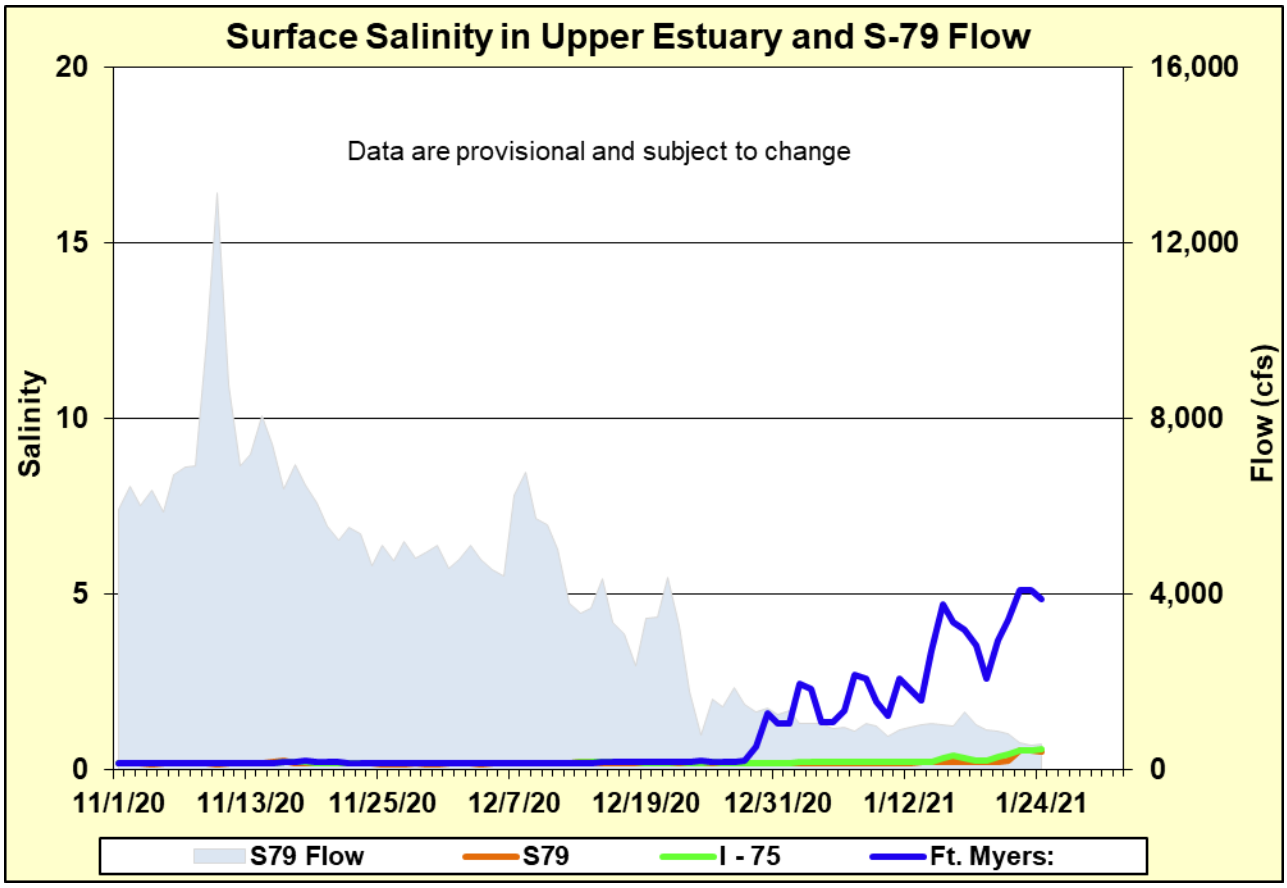


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

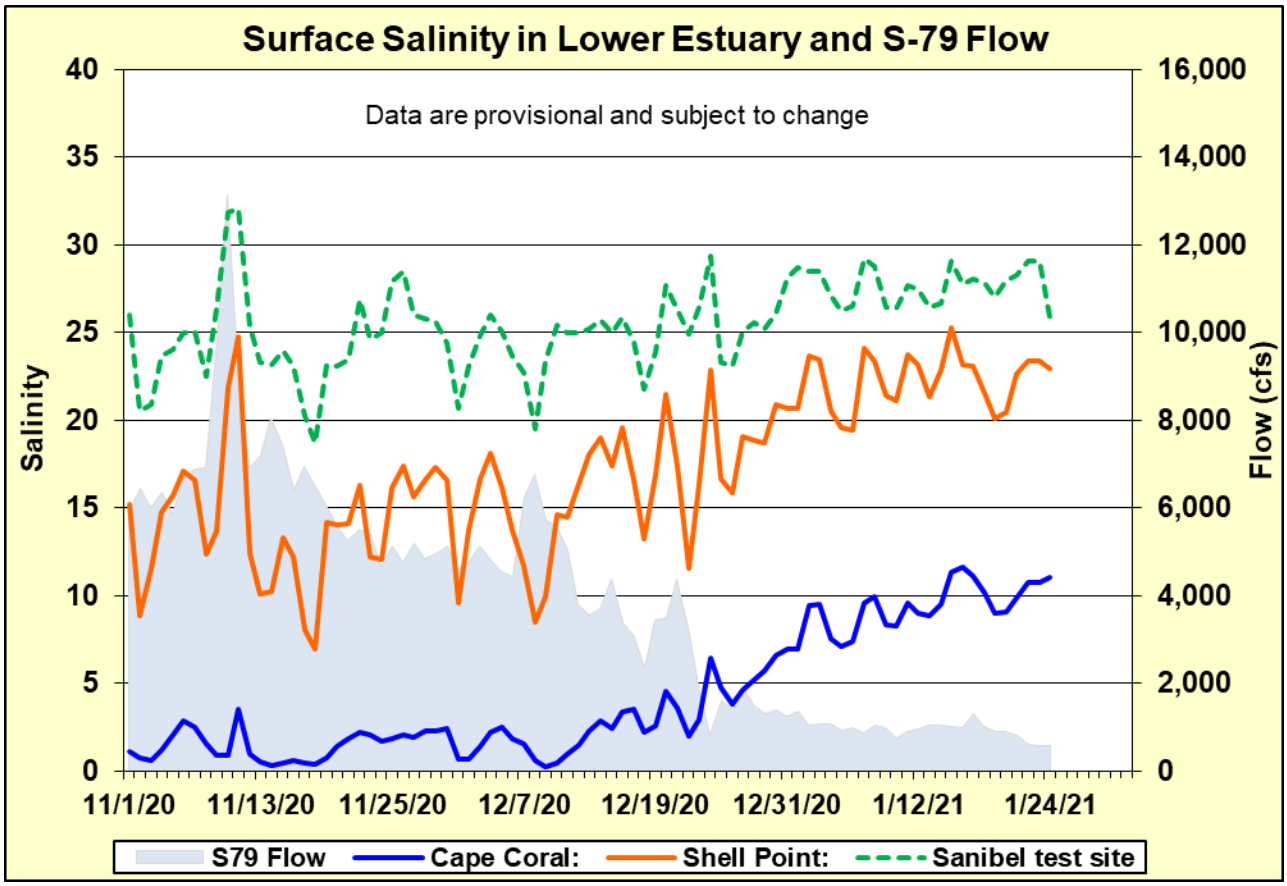


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

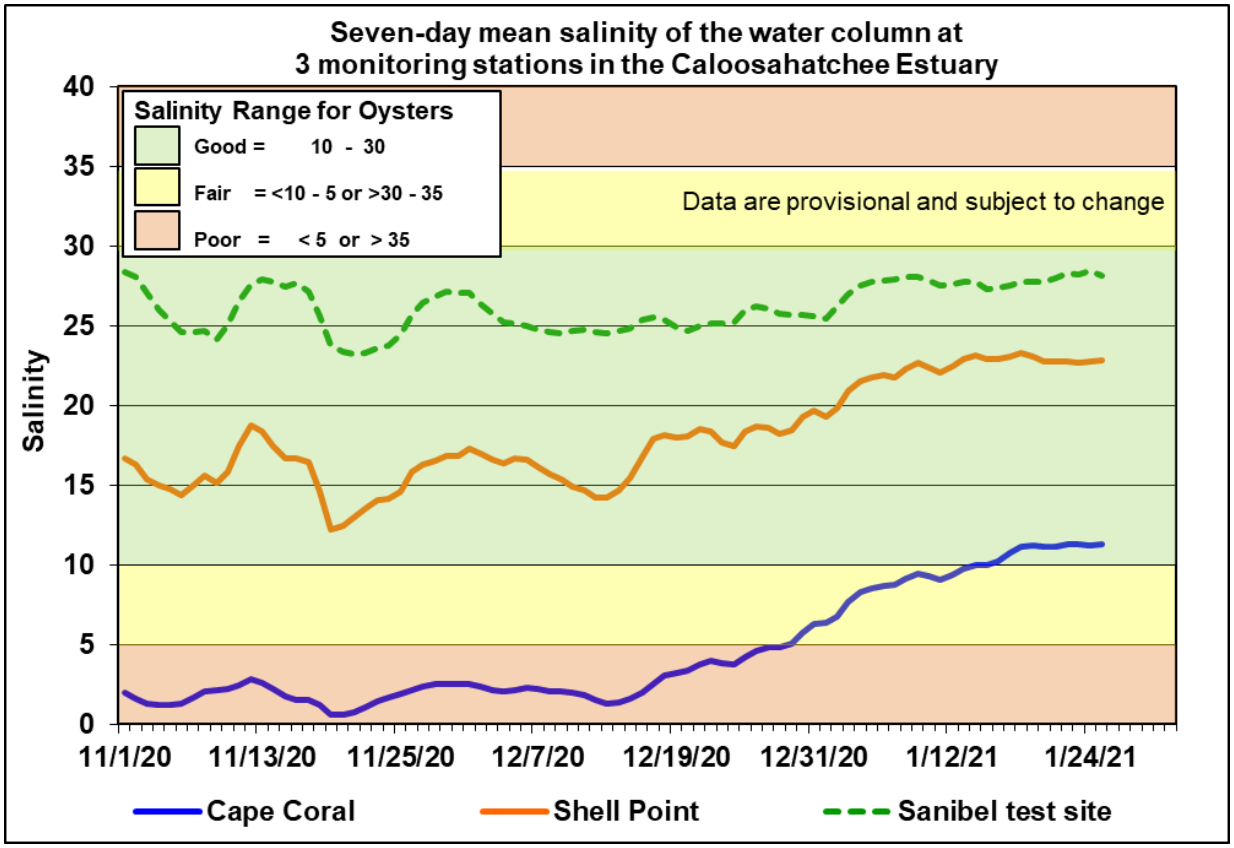


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

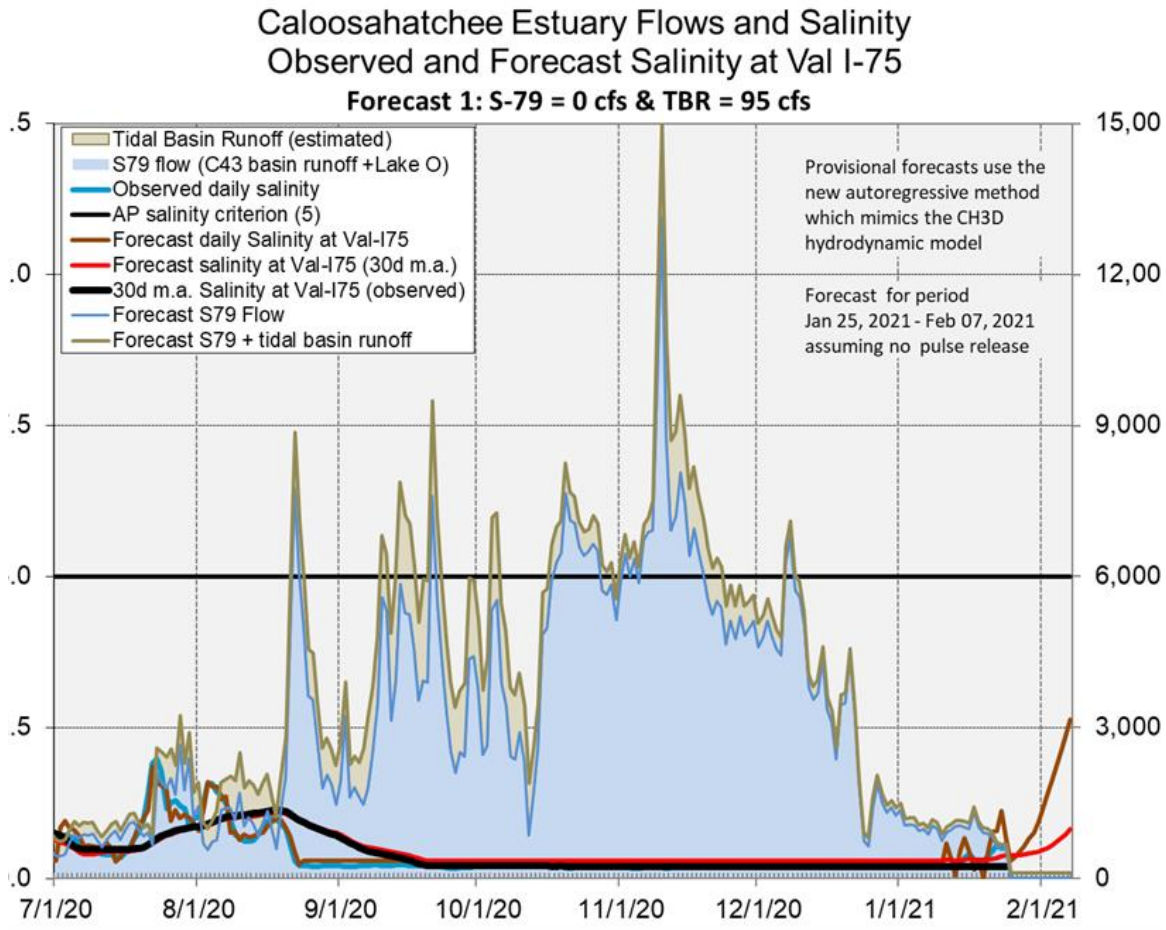
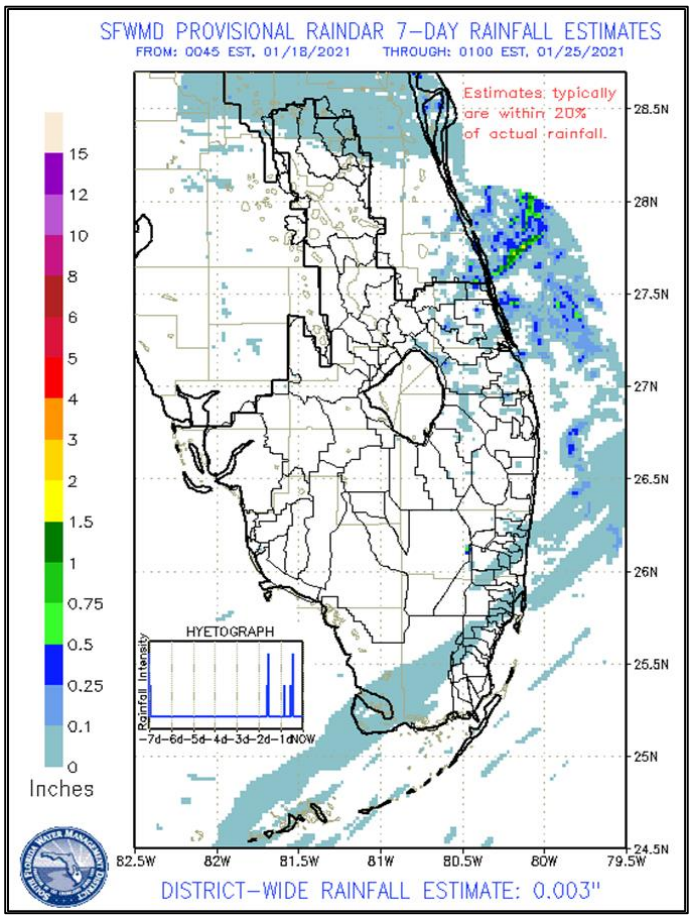


Figure 10. Forecasted Val I-75 surface salinity assuming no pulse release at S79.

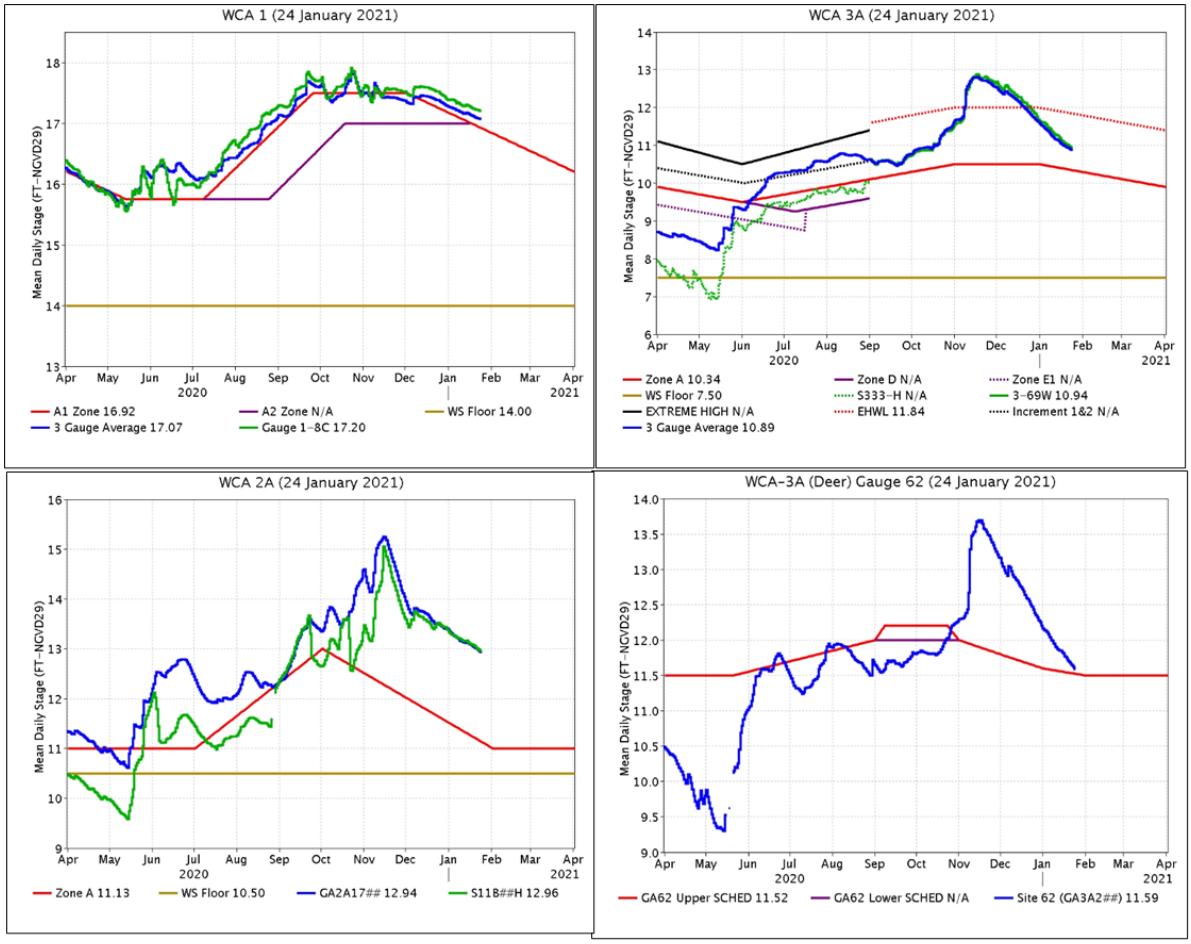
EVERGLADES

The Everglades received essentially no rainfall over the last week. At the gauges monitored for this report stages fell 0.13 feet on average last week. Evaporation was 0.82 inches last week, a 0.2-inch increase.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	<0.01	−0.07
WCA-2A	0.00	−0.14
WCA-2B	0.00	−0.13
WCA-3A	<0.01	−0.15
WCA-3B	<0.01	−0.15
ENP	0.00	−0.17



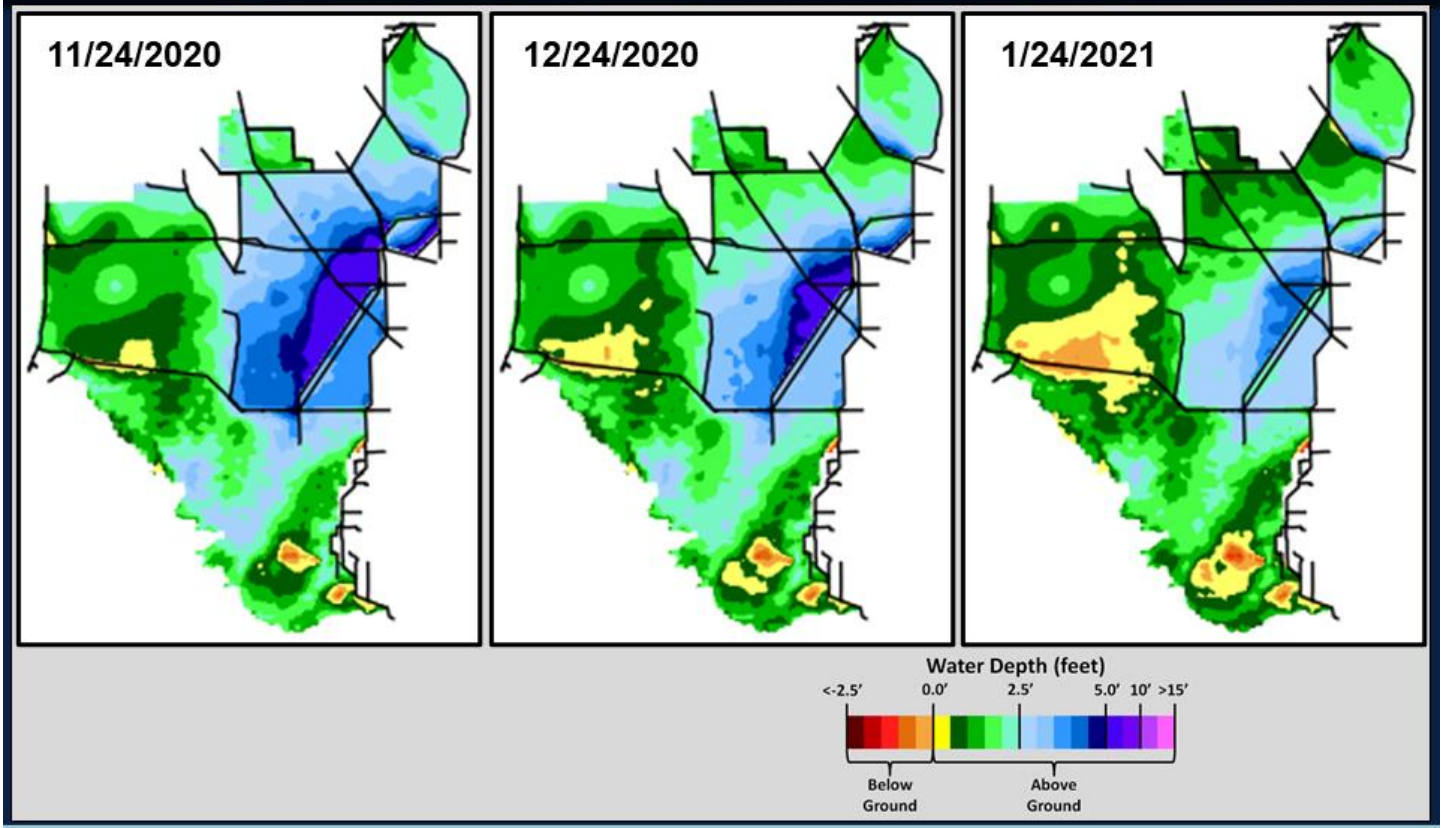
Regulation Schedules: WCA-1: Stage at the 1-8C Gauge is trending parallel with schedule, remaining 0.28 feet above the falling Zone A1 regulation line. WCA-2A: The recession in stage at Gauge 2-17 remained parallel to the regulation line last week remaining at 1.81 feet above the falling schedule. WCA-3A: The Three Gauge Average stages continued to recede towards the falling Zone A regulation line last week, currently 0.55 feet above. WCA-3A: Stage at gauge 62 (Northwest corner) continues a sharp decline, now approaching the falling Upper Schedule, above by only 0.07 feet.



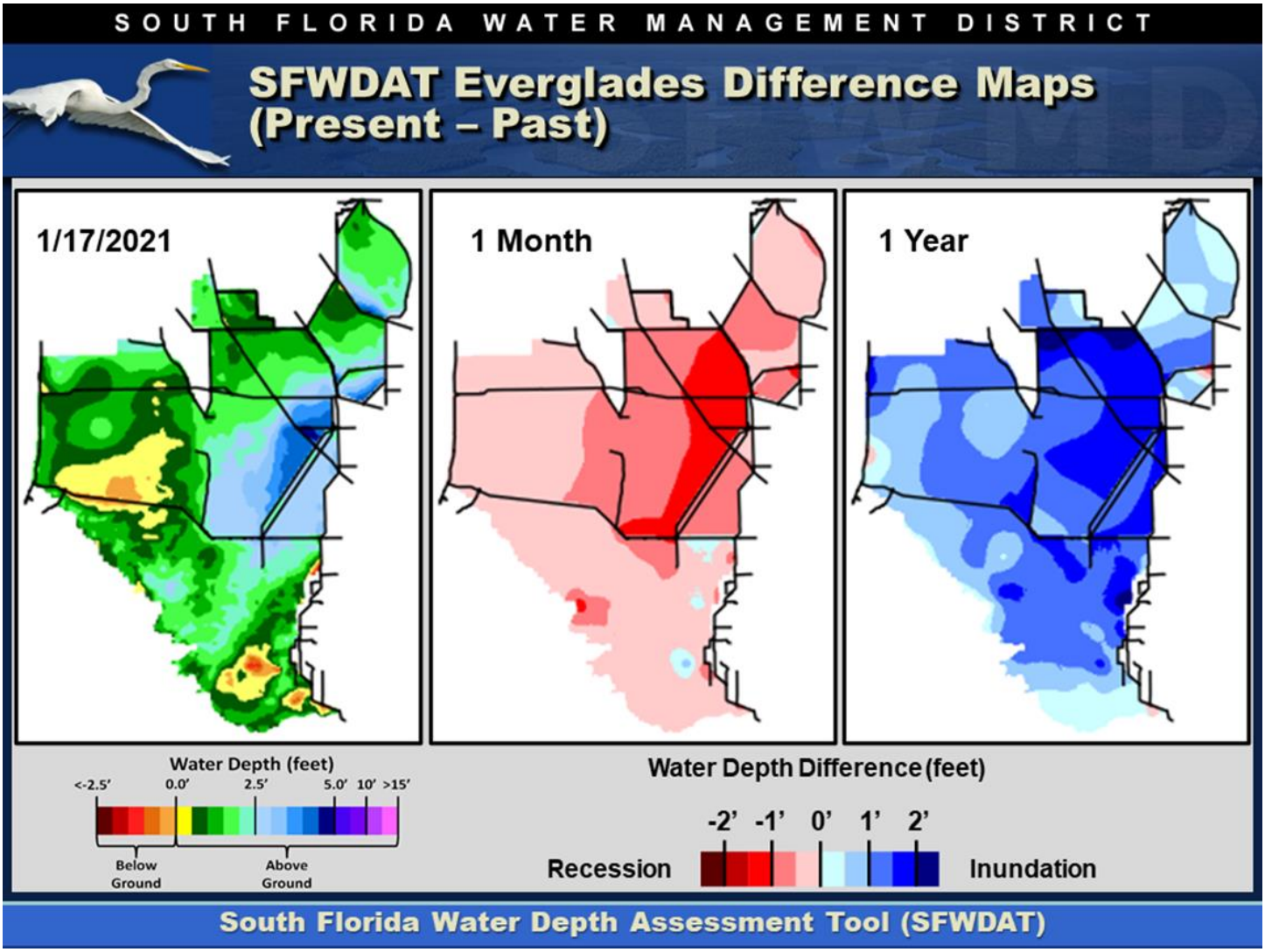
Water Depths: The WDAT tool for spatial interpolation of depth monthly snapshots indicate that flooding stress is becoming less ecologically detrimental as depths are retreating in the north of the WCAs. Northern WCA-2A is drying down quickly with depths potentially at the soil surface. The northern half of WCA-3AN particularly west of the Miami Canal is now potentially within 1.0 feet of the soil surface. Comparing WDAT water levels from present, over the last month stages fell significantly across western WCA-3A (up to -1.5 feet downstream of the S-11s). Looking back one year the stage difference patterns are strikingly different than one month ago. The entire Everglades region is significantly deeper than it was a year ago.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

SFWDAT Water Depth Monthly Snapshots

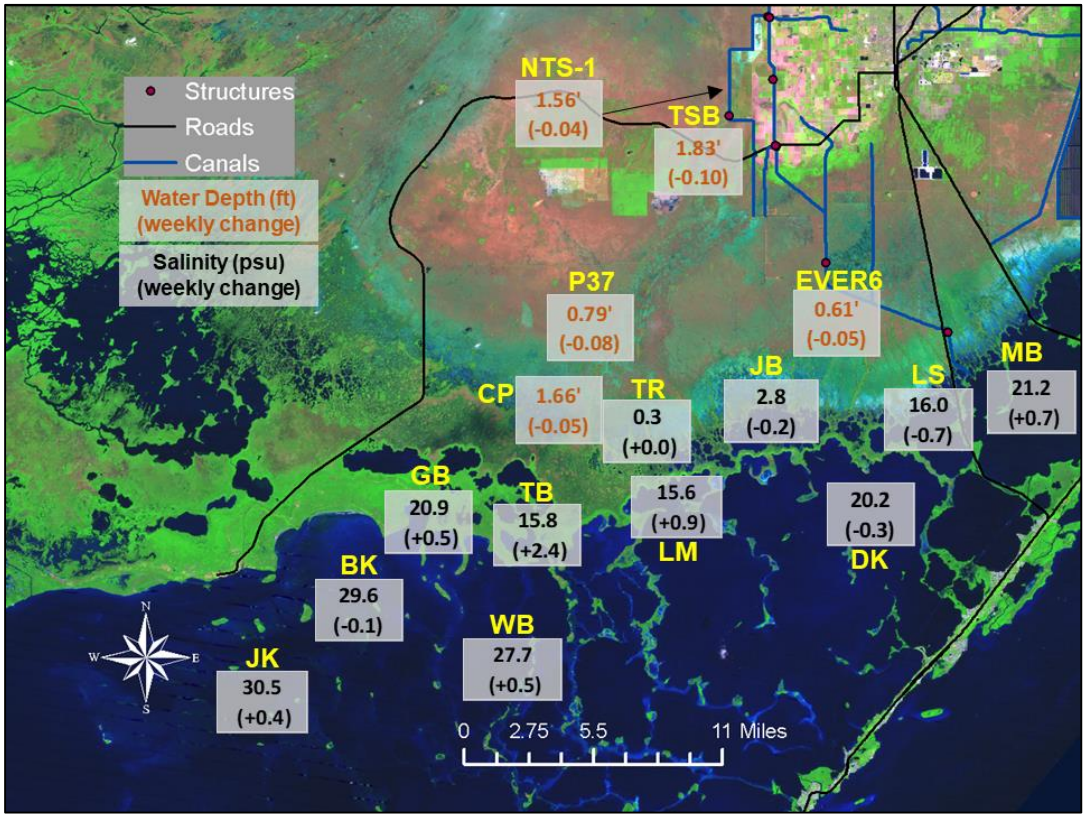


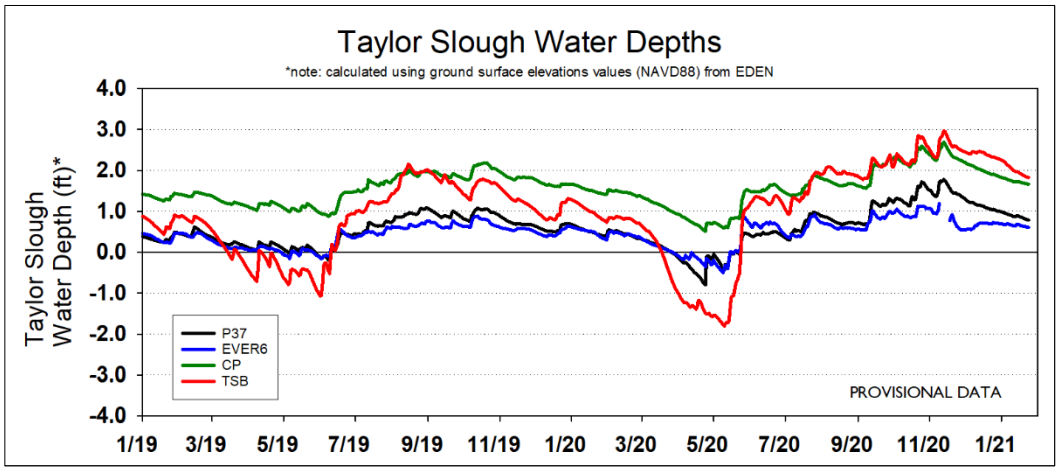
South Florida Water Depth Assessment Tool (SFWDAT)

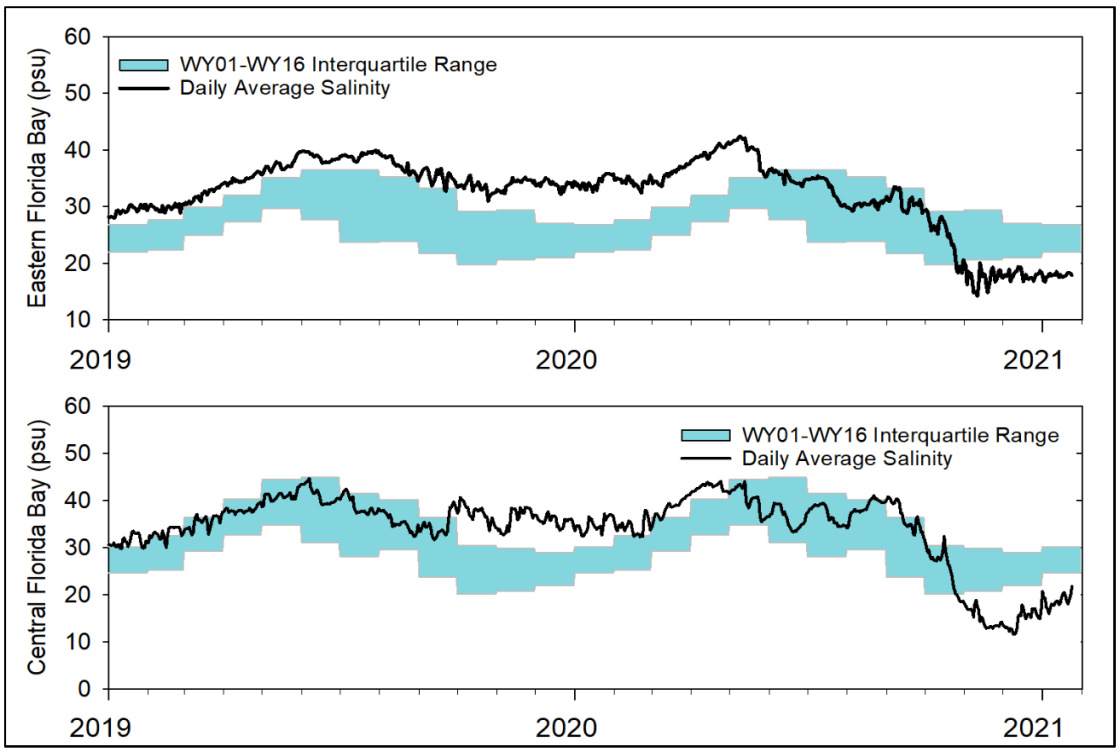


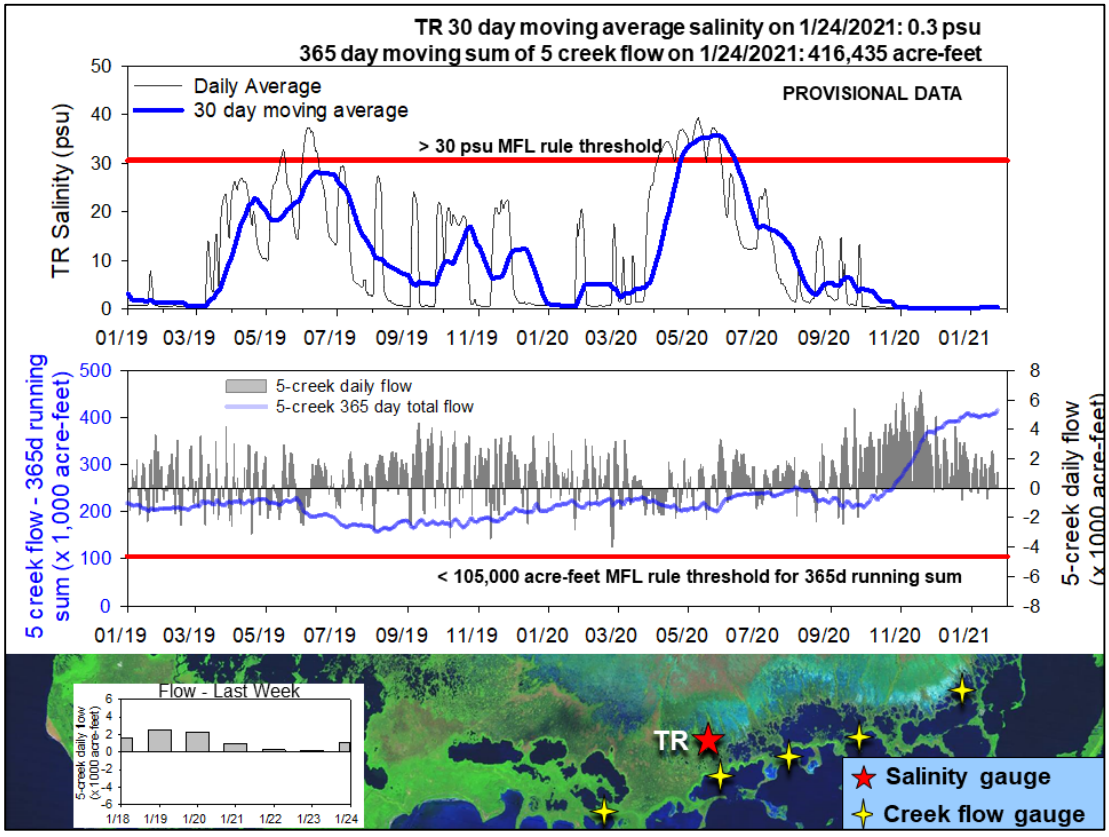
371 tree islands of known elevation within WCA-3A, -3B, and Everglades National Park's Shark Slough. Current preliminary estimates using WDAT indicate that 56% or 209 of the tree islands are currently inundated (down from 58% the week prior), and 43% of those islands continue to have been inundated for more than 120 days. Inundation for more than 120 days will cause ecological harm to sensitive islands.

An average of 0.18 inches of rain fell over Taylor Slough and Florida Bay this week, and water levels in Taylor Slough decreased by 0.06 feet over the week. Taylor Slough is averaging 9 inches higher than the historical average for this time of year, and the northern portion of the slough is 18 inches higher than the average for this time of year which is a good position for early 2021.









Salinities in Florida Bay averaged a 0.4 psu increase over the week with individual station changes ranging from -0.7 psu in the eastern Bay to +2.4 psu in the central nearshore. Bay-wide salinity is 5 psu lower than the historical average for this time of year. All stations are lower than their historical averages with the far eastern nearshore area being the furthest from the average (8 psu lower).

The salinity at the Taylor River station in the mangrove zone (tracked for the Florida Bay MFL) has continued to be near fresh (0.3 psu or less) and the 30-day moving average has also remained low at

0.3 psu. Weekly flow from the 5 creeks identified by yellow stars on the map totaled just over 9,000 acre-feet (double of last week's total). The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) ended at 416,435 acre-feet this week which is 12,000 acre-feet more than last week. That is still higher than the 95th percentile of historical data (390,830 acre-feet). These values have not seen since October of 2012. Creek flows are provisional USGS data.

Water Management Recommendations

As expected wading birds are responding to the nearly optimal foraging conditions in WCA-3A North east of the Miami canal and conditions to the west of that canal are drying down rapidly (an average recession rate of 0.26 feet per week over the last 5 weeks).

Stage conditions are very high in WCA-2A, falling in northeastern WCA-3A and getting dry in northwestern WCA-3A. The current recommendation from the STA group is that only STA-2 has capacity for Lake Okeechobee discharges, and STA 3/4 is currently discharging very little. These conditions would suggest that moving water south from STA-2/WCA-2A by way of the S7 as opposed to the S-11s into WCA-3A would make ecological sense, should that need become reality. This logic could also support the restriction of discharges to tide from WCA-2A if those necessary flows could be routed to northwestern WCA-3A.

Recession rates within the recommended range of 0.05 to 0.12 feet per week have ecological benefit in WCA-1, WCA-2 and WCA-3A Northwest in order to preserve water high in the system and reap the ecological benefit to wading birds of a long dry down. Recession rates between 0.12 and 0.18 feet per week for the next week or two in Northeastern WCA-3A would provide an increase in habitat suitable for foraging early in the nesting season.

At this point in the dry season, maintaining the recession where possible in WCA-3A South and Central even when faster than traditional (but less than 0.25 feet per week) ecological recession rate recommendations has ecological benefit as long as there is no downstream deleterious ecological impact.

Continued flows towards Taylor Slough and Florida Bay maintain hydration in the marshes and lower salinity conditions within the nearshore areas of Florida Bay and will provide a freshwater buffer against the drier than average dry season that is expected which would delay the start of the salinity increases that occur within the dry season and possibly prevent the occurrence of extreme hypersaljnity towards the end of the dry season.

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

SFWMD Everglades Ecological Recommendations, January 26th, 2021 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.07'	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 0.14'	Moderate the recession rate to near -.05 to -.12 feet per week and maintain marsh stage above and parallel to the falling regulation schedule.	Protect within basin and downstream habitat and wildlife. Maintaining optimal recession rates prepares the habitat for conducive wading bird foraging.
WCA-2B	Stage decreased by 0.13'	Moderate the recession rate to near -.05 to -.12 feet per week.	Protect within basin and downstream habitat and wildlife from flooding stress.
WCA-3A NE	Stage decreased by 0.21'	Target recession rates to near .17 feet per week.	Protect within basin and downstream habitat and wildlife. Maintaining a slightly faster than traditional recession rates to the east of the Miami canal increases the habitat for conducive wading bird foraging.
WCA-3A NW	Stage decreased by 0.18'	Moderate the recession rate to near -.05 to -.12 feet per week.	
Central WCA-3A S	Stage decreased by 0.19'	Maintain the recession rate up to 0.25 feet per week to return marsh stage to more average conditions.	Protect within basin, upstream/downstream habitat and wildlife. Tree island ecology is diminished by flooding
Southern WCA-3A S	Stage decreased by 0.03'		
WCA-3B	Stage decreased by 0.15'	Maintain the recession rate to lower marsh stage.	Protect within basin and downstream habitat and wildlife from flooding stress. Tree island ecology is diminished by flooding
ENP-SRS	Stage decreased by 0.17'	Make discharges to the Park according to the current deviation with a return to COP protocol as soon as high water conditions are alleviated in the upstream WCAs	Protect within basin and upstream habitat and wildlife from flooding stress.
Taylor Slough	Stage changes ranged from −0.003' to −0.105'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −1.2 to +9.4 psu	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.