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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 20, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Dry conditions will be reinforced when a cold front pushes into the western Atlantic (*but does not pass through the District*) around mid-week. This pattern should keep near-seasonable temperatures across the District and ensure no rainfall through Friday, with a warming trend likely beginning late in the week. A cold front is forecast to push into north Florida on Friday, reaching the northern part of the District Saturday afternoon or evening and Lake Okeechobee during the early morning hours on Sunday. Light showers, likely producing little areal average rainfall, are predicted along and ahead of the front Saturday afternoon through the overnight north and east of Lake Okeechobee. The weakening front is then forecast to settle to the southern Florida by Sunday afternoon, accompanied by light shower activity over the eastern half of the District from the morning through the early evening. The best chance of rain on Sunday appears to be along and near the east coast, but with little areal average rainfall. The front will likely dissipate by later Sunday or Monday, with dry conditions returning starting on Monday next week. For the week ending next Tuesday morning, much-below normal total rainfall is forecast. During the week 2 period (26 January – 2 February), there is a strong signal for much below normal total rain continuing, with some chance that the only rain of substance would be in association with a frontal passage on Thursday next week. Following the frontal passage, there is an increasing likelihood of cold and dry weather across Florida late from Friday through early the following week.

Kissimmee

Tuesday morning stages were 58.0 feet NGVD (at schedule) in East Lake Toho, 55.0 feet NGVD (at schedule) in Toho, and 52.2 feet NGVD (0.3 feet below schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.5 feet NGVD at S-65A and 25.9 feet NGVD at S-65D. Tuesday morning discharges were 790 cfs at S-65, 780 cfs at S-65A, 750 cfs at S-65D and 880 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 8.5 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 0.38 feet. Today's recommendation is to continue S-59 discharge at ~100 cfs and S-61 at ~300 cfs. Adjust both as needed to keep S-65 discharge below 800 cfs without reducing the recession rate in KCH. Recession rates should be approximately as follows: East Toho and Toho: ~0.13 ft/week; KCH: ~0.17 feet/week.

Lake Okeechobee

Lake Okeechobee stage was 15.64 feet NGVD on January 17, 2021, 0.03 feet lower than last week and 0.28 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 0.17 feet above. Recent satellite imagery and water quality results suggest there is no algal bloom activity on the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged more than 199 cfs over the past week with no flow coming from Lake Okeechobee. The seven-day average salinities increased throughout the estuary over the past week. Salinity at the US1 Bridge is in the good range (10-26) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 1,166 cfs over the past week with approximately 543 cfs coming from the Lake. Seven-day average surface salinities remained almost fresh (0.2) at the most upstream site (S-79) and increased at the remaining sites in the estuary over the past week. Salinities are in the good range (0-10) for tape grass at Val I-75 and Ft. Myers. Salinities are also in the good range (10-30) for adult eastern oysters at Cape Coral, Shell Point and Sanibel.

Lake stage is in the Low Sub-Band of 2008 LORS. Tributary hydrological conditions are normal. The LORS2008 Release Guidance suggests up to 450 cfs release at S-79 to the Caloosahatchee Estuary and up to 200 cfs release at S-80 to the St. Lucie Estuary.

Stormwater Treatment Areas

Over the past week, 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 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 1,533,000 ac-feet. Most STA cells are near target stage. STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7, and STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to discharge canal plug construction activities, in STA-1E Central Flow-way, STA-2 Flow-ways 3, 4 and 5, STA-3/4 Eastern, Central, and Western Flow-ways for vegetation management activities, in STA-3/4 Eastern Flow-way for drawdown preparation activities, and in STA-5/6 Flow-ways 2 and 3 following the Restoration Strategies project to grade non-effective treatment areas. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2.

Everglades

At most of the gauges monitored for this report, the WCA stages fell within the early dry season WY2021 ecological recession recommendations, the one exception being Northeast Shark River Slough which experienced a reversal. Depths remain above average in Taylor Slough and salinities in Florida Bay remain below the historical average for this time of year; this is good positioning to begin 2021. High concentrations of wading birds remain along the southern coast, and wood storks have begun nesting in the southern colonies. If optimal recession rates are achieved, many more wading birds are expected in high numbers within the central Everglades as water levels recede.

Supporting Information

KISSIMMEE BASIN

Rainfall

The Upper Kissimmee Basin received 0.05 inches of rainfall in the past week and the Lower Basin received 0.05 inches (SFWMD Daily Rainfall Report 01/17/2021).

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: 1/19/2021

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)						
							1/17/21	1/10/21	1/3/21	12/27/20	12/20/20	12/13/20	12/6/20
Lakes Hart and Mary Jane	S-62	0	LKMJ	61.0	R	61.0	0.0	0.0	0.0	-0.1	0.0	0.1	-0.1
Lakes Myrtle, Preston, and Joel	S-57	0	S-57	61.5	R	61.5	0.0	-0.1	0.0	0.0	0.0	0.0	-0.1
Alligator Chain	S-60	0	ALLI	64.0	R	64.0	0.0	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	0.1	0.0	0.0	0.1	-0.1
East Lake Toho	S-59	21	TOHOE	58.0	R	58.0	0.0	0.0	0.0	-0.1	0.0	-0.1	0.0
Lake Toho	S-61	85	TOHOW, S-61	55.0	R	55.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0
Lakes Kissimmee, Cypress, and Hatchineha	S-65	644	KUB011, LKIS5B	52.2	R	52.5	-0.3	-0.2	-0.1	0.0	0.0	0.0	0.2

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: 1/19/2021

Metric	Location	1-Day Average	Average for the Preceding 7-Days ¹								
		1/17/2021	1/17/21	1/10/21	1/3/21	12/27/20	12/20/20	12/13/20	12/6/20	11/29/20	11/22/20
Discharge (cfs)	S-65	796	644	540	676	729	848	1,382	1,083	842	784
Discharge (cfs)	S-65A ²	787	641	600	733	809	974	1,566	1,275	1,108	1,095
Discharge (cfs)	S-65D ²	728	701	770	944	1,317	1,704	1,605	1,497	1,541	1,685
Headwater Stage (feet NGVD)	S-65D ²	25.66	25.87	25.85	25.80	25.73	26.08	26.40	26.82	26.99	26.98
Discharge (cfs)	S-65E ²	843	719	808	944	1,314	1,710	1,687	1,545	1,657	1,835
Discharge (cfs)	S-67	0	0	0	0	0	0	0	0	0	0
DO (mg/L) ³	Phases I & II/III river channel	8.9	8.5	8.4	8.4	7.5	6.4	7.2	6.0	5.3	4.7
Mean depth (feet) ⁴	Phase I floodplain	0.37	0.38	0.41	0.50	0.68	1.00	1.01	0.90	0.93	0.94

¹Seven-day average of weighted daily means through Sunday midnight.

²S-65A discharge combines S-65A with auxiliary structures; S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2; S-65D stage averages stage at S-65D and S-65DX1; S-65E discharge combines S-65E and S-65EX1.

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

⁴1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).

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

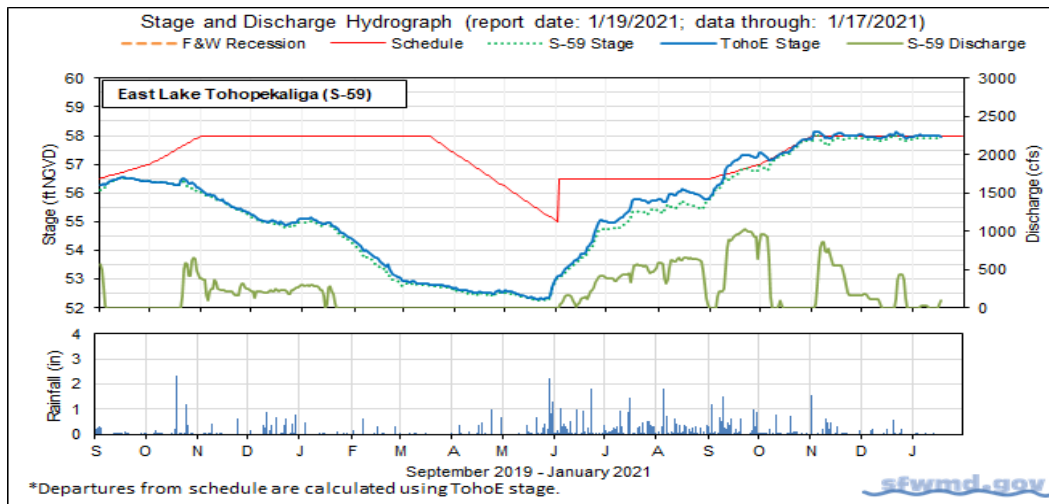


Figure 1. East Lake Toho regulation schedule, stage, discharge and rainfall.

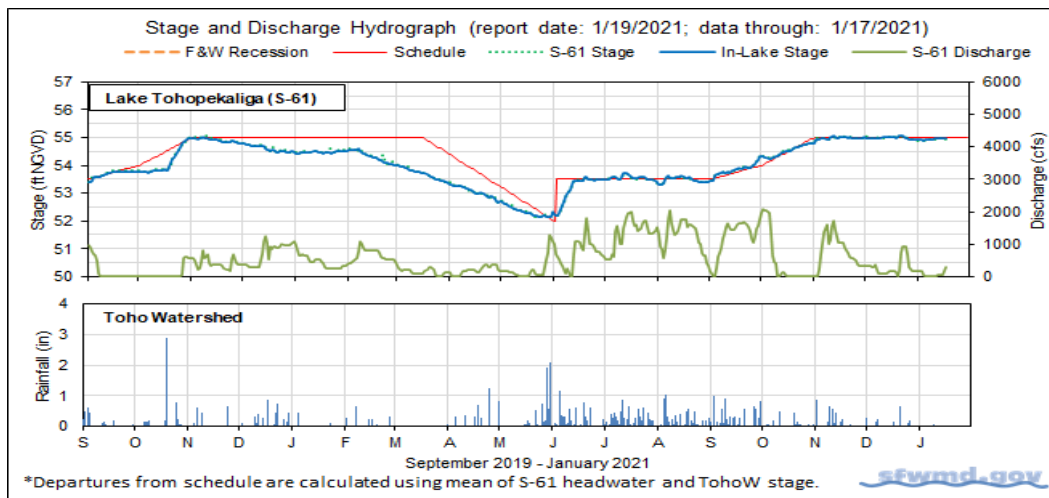


Figure 2. Lake Toho regulation schedule, stage, discharge and rainfall.

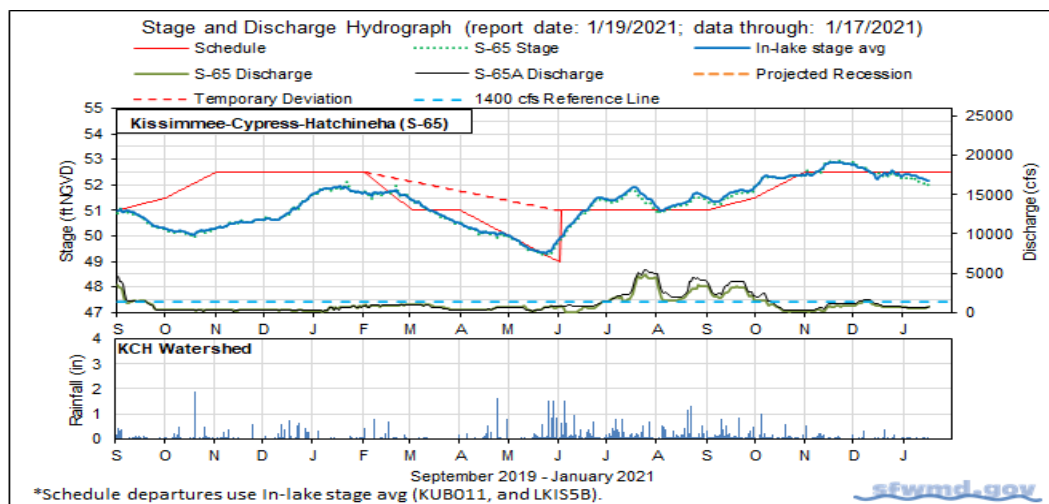


Figure 3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

Kissimmee River Phase I Restoration Area Water Depth Maps

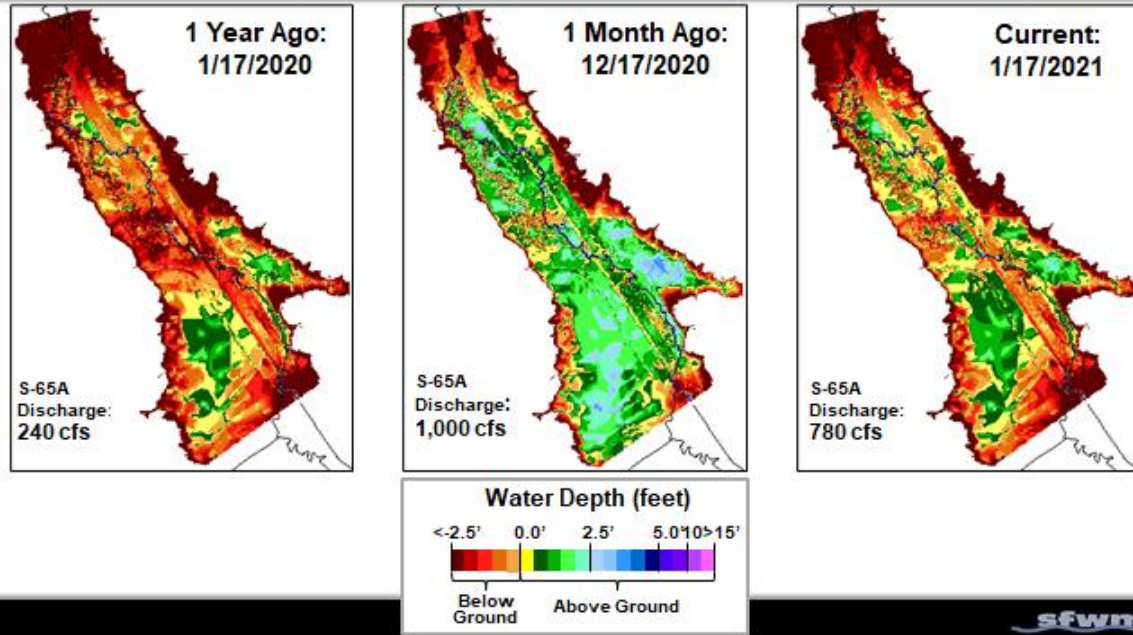


Figure 4. Phase I area floodplain water depths (from left to right) one year ago, one month ago and current. Color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

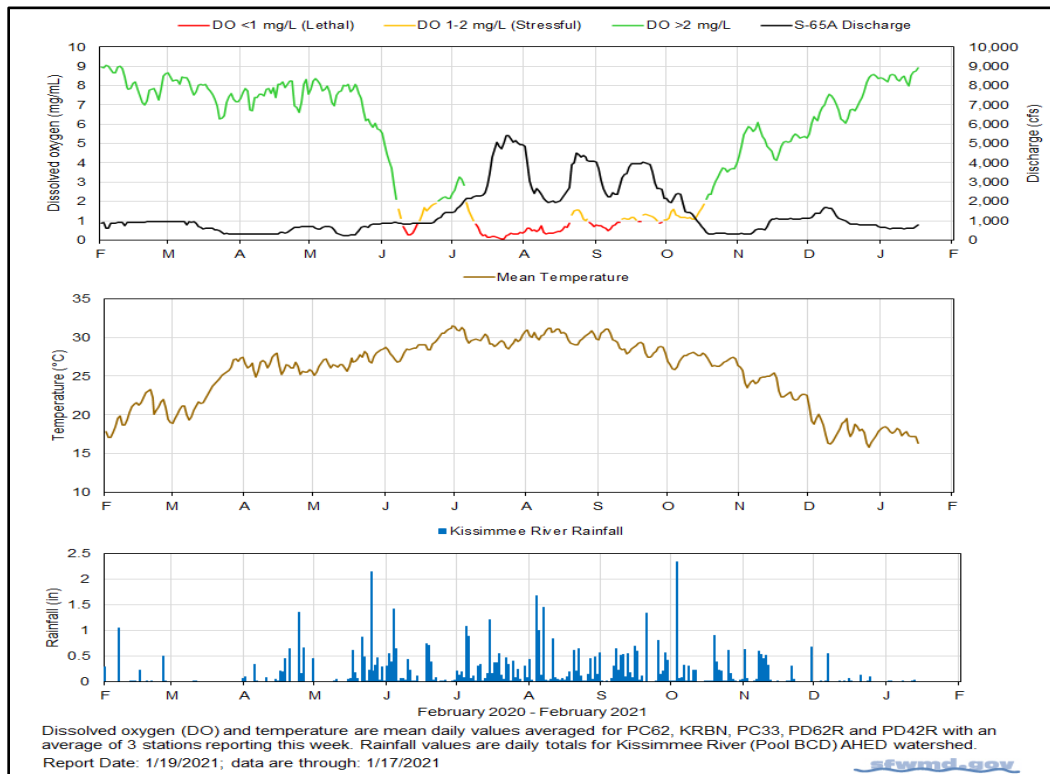


Figure 5. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches)

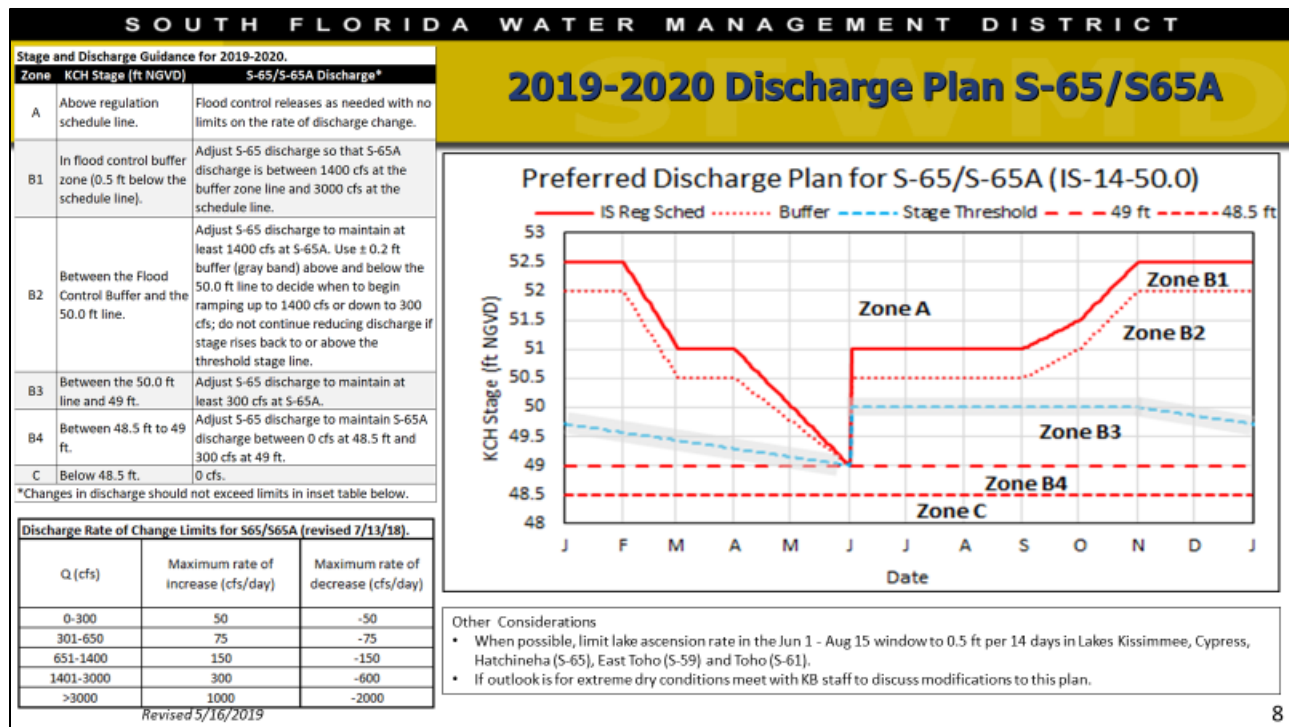


Figure 6. The 2019-2020 Discharge Plan for S-65/S-65A.

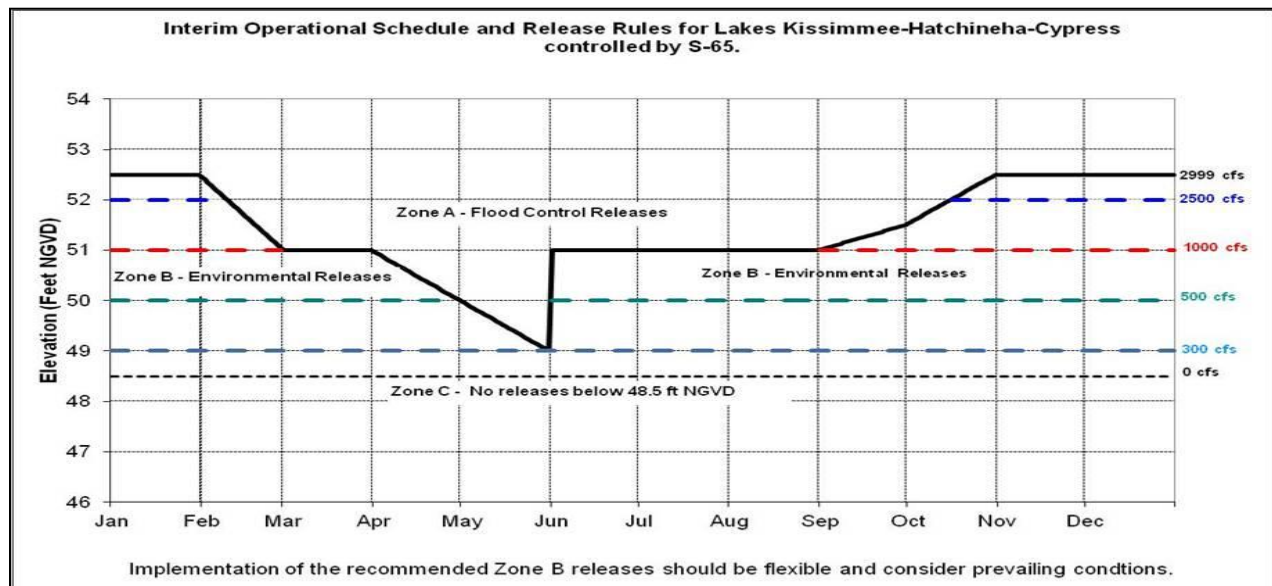


Figure 7. Interim operations schedule for S-65 (solid black line). The discharge schedule shown to the right has not been used in recent years.

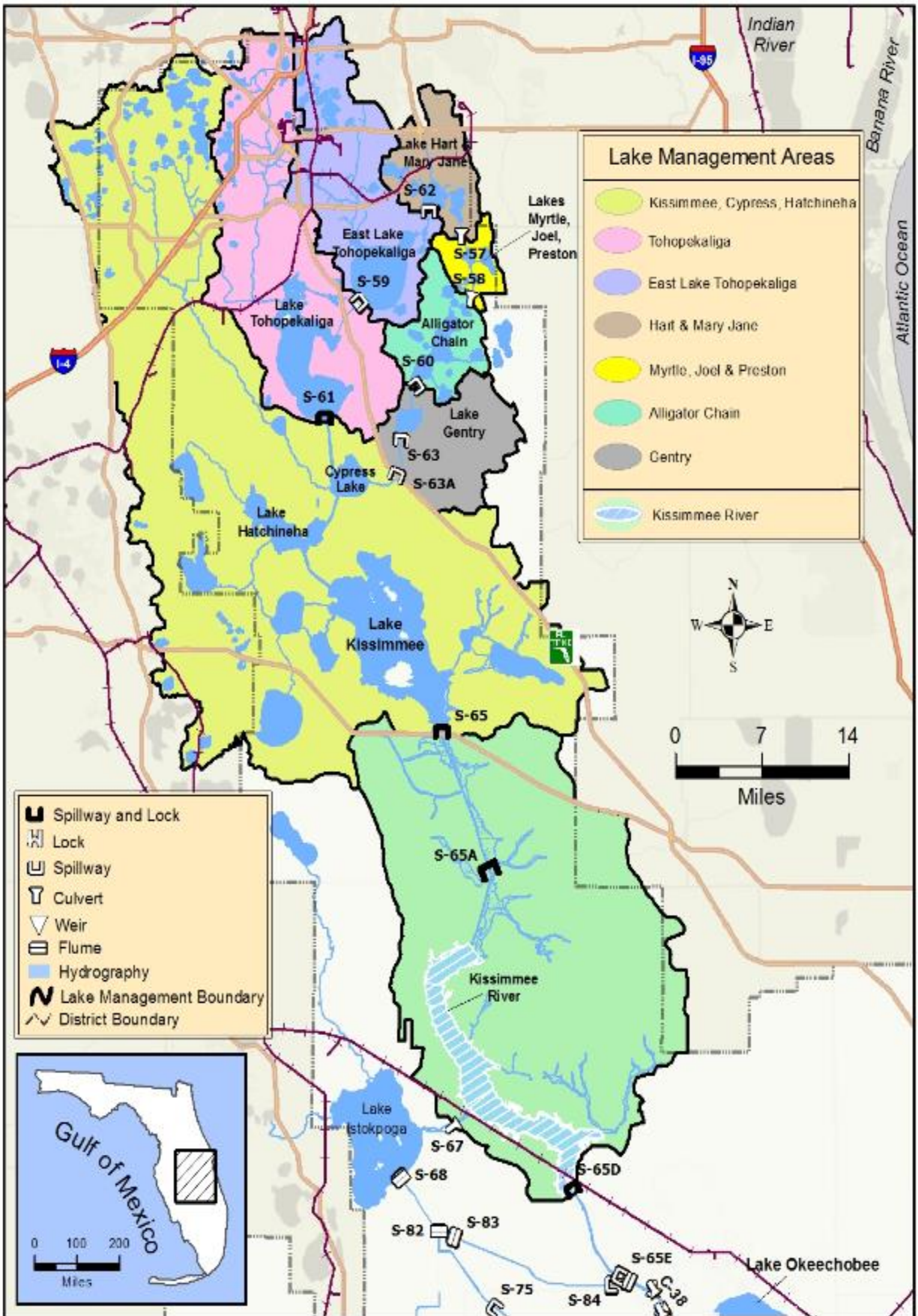


Figure 8. The Kissimmee Basin.

LAKE OKEECHOBEE

Lake Okeechobee stage is 15.64 feet NGVD, 0.28 feet lower than a month ago, and 2.63 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 0.17 feet above. Lake stage reached a low of 10.99 feet NGVD on May 17 and a high of 16.45 feet NGVD 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 RAINДАР, 0.15 inches of rain fell on the Lake, and most of the watershed received less than 0.1 inches (Figure 4).

Average daily inflows (excluding rainfall) were slightly lower than the previous week, dropping from 1,151 cubic feet per second (cfs) to 1,062 cfs. Outflows (excluding evapotranspiration) decreased substantially, from 2,300 cfs to 1,025 cfs. Most of the inflows came from the Kissimmee River (719 cfs through S-65E & S-65EX1) and Lake Istokpoga via the C-41a canal (162 cfs through S-84 & S-84X). Releases to the west via S-77 were similar to the prior week at 657 cfs, while there have been no releases east via S-308 since January 9th. Releases south through the S-350 structures decreased from approximately 930 cfs to around 370 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.

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 6). Results for chlorophyll-*a* and other water quality parameters are still pending.

The most recent satellite image (January 11, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed continued low bloom potential on the Lake (Figure 7).

Water Management Summary

Lake Okeechobee stage was 15.64 feet NGVD on January 17, 2021, 0.03 feet lower than last week and 0.28 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 0.17 feet above. Recent satellite imagery and water quality results suggest there is no algal bloom activity on the Lake.

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

INFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)	OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-65E & S-65EX1	808	719	0.3	S-77	673	657	0.3
S-71 & S-72	135	67	0.0	S-308	691	0	0.0
S-84 & S-84X	18	162	0.1	S-351	537	216	0.1
Fisheating Creek	84	57	0.0	S-352	272	77	0.0
S-154	8	0	0.0	S-354	127	75	0.0
S-191	0	0	0.0	L-8 Outflow			
S-133 P	42	28	0.0	ET	1705	1138	0.4
S-127 P	7	7	0.0	Total	4005	2163	0.8
S-129 P	5	6	0.0				
S-131 P	2	2	0.0				
S-135 P	39	9	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	2	6	0.0				
Rainfall	27	411	0.2				
Total	1177	1473	0.6				

Provisional Data

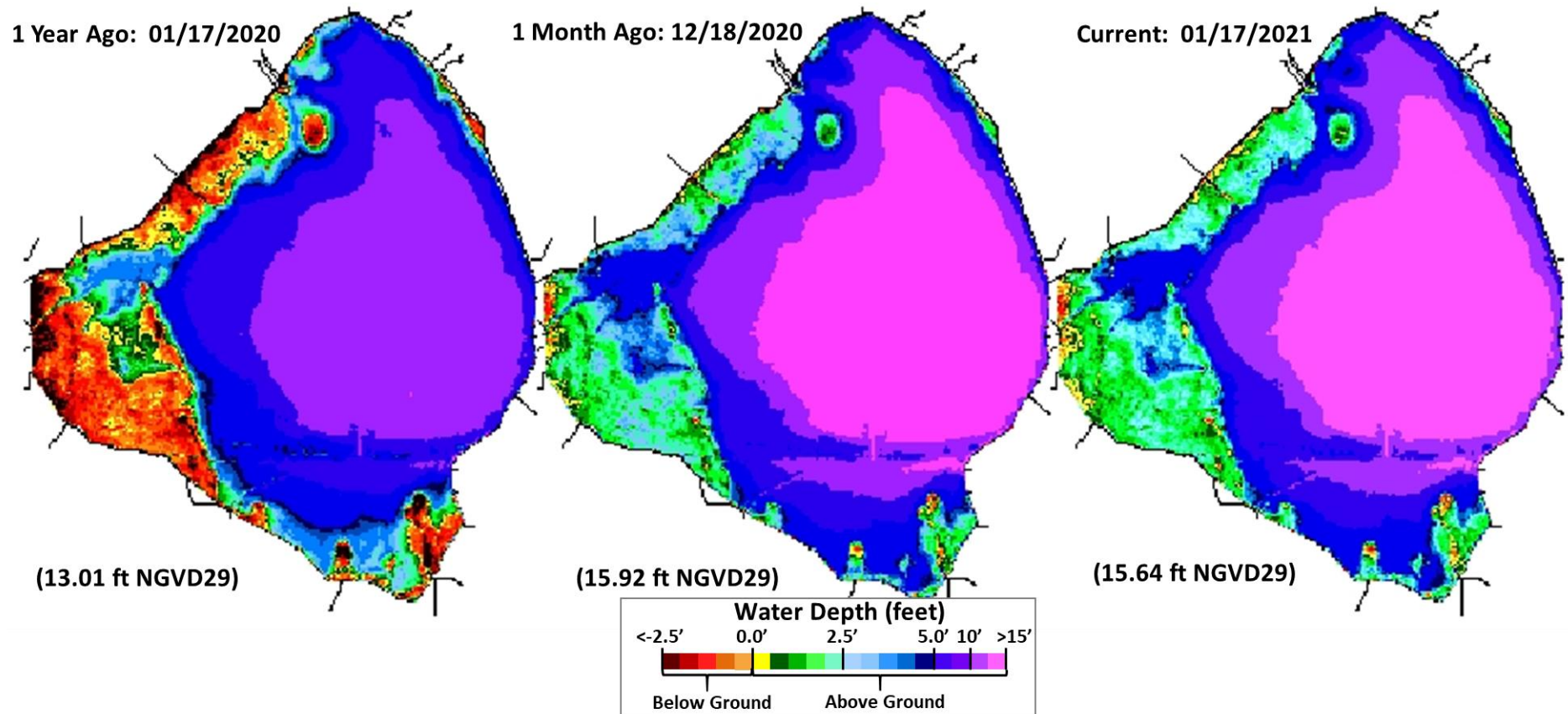


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

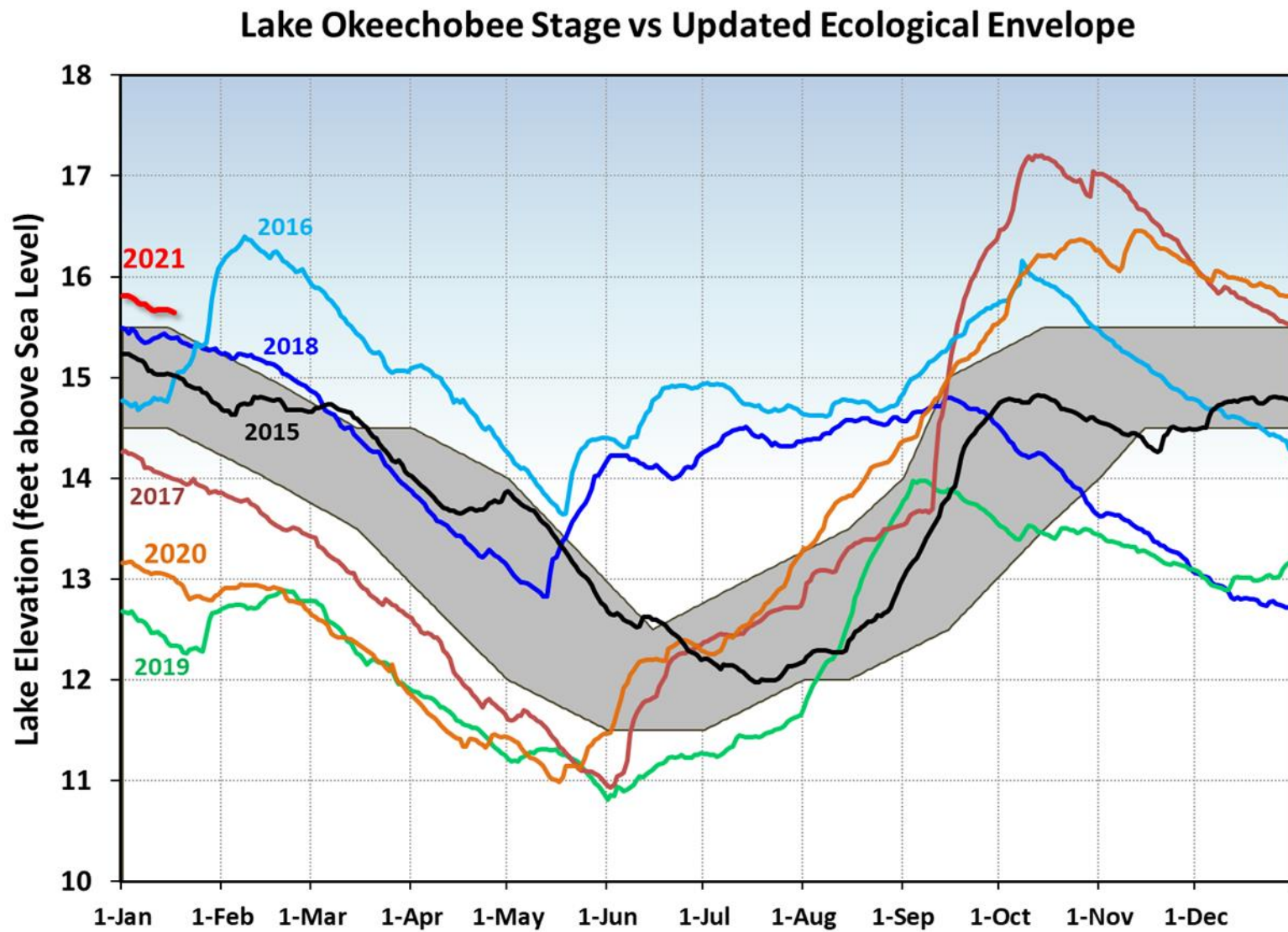


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated Ecological Envelope.

Lake Okeechobee Water Level History and Projected Stages

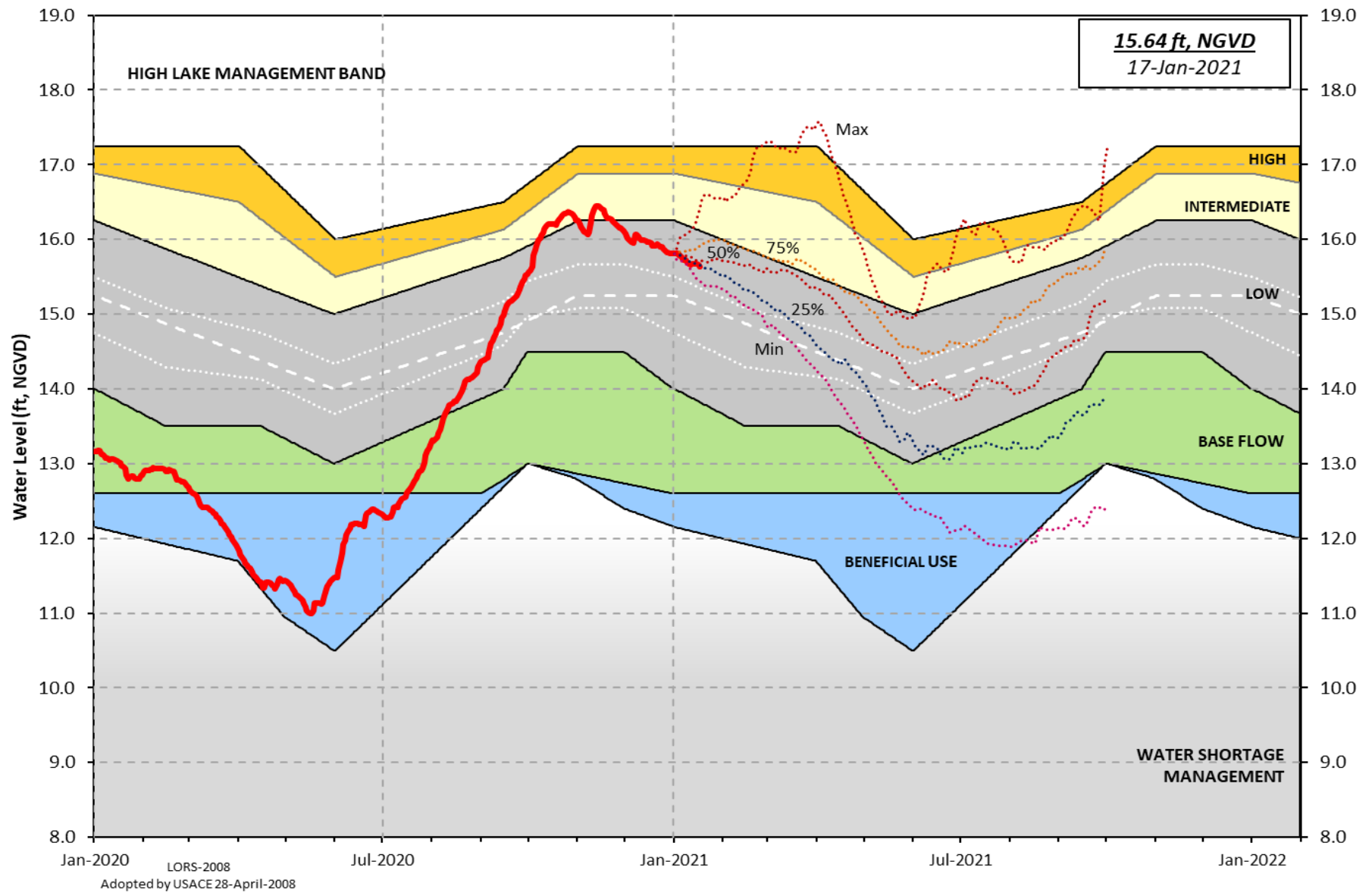


Figure 3. Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES
FROM: 0400 EST, 01/11/2021 THROUGH: 0400 EST, 01/18/2021

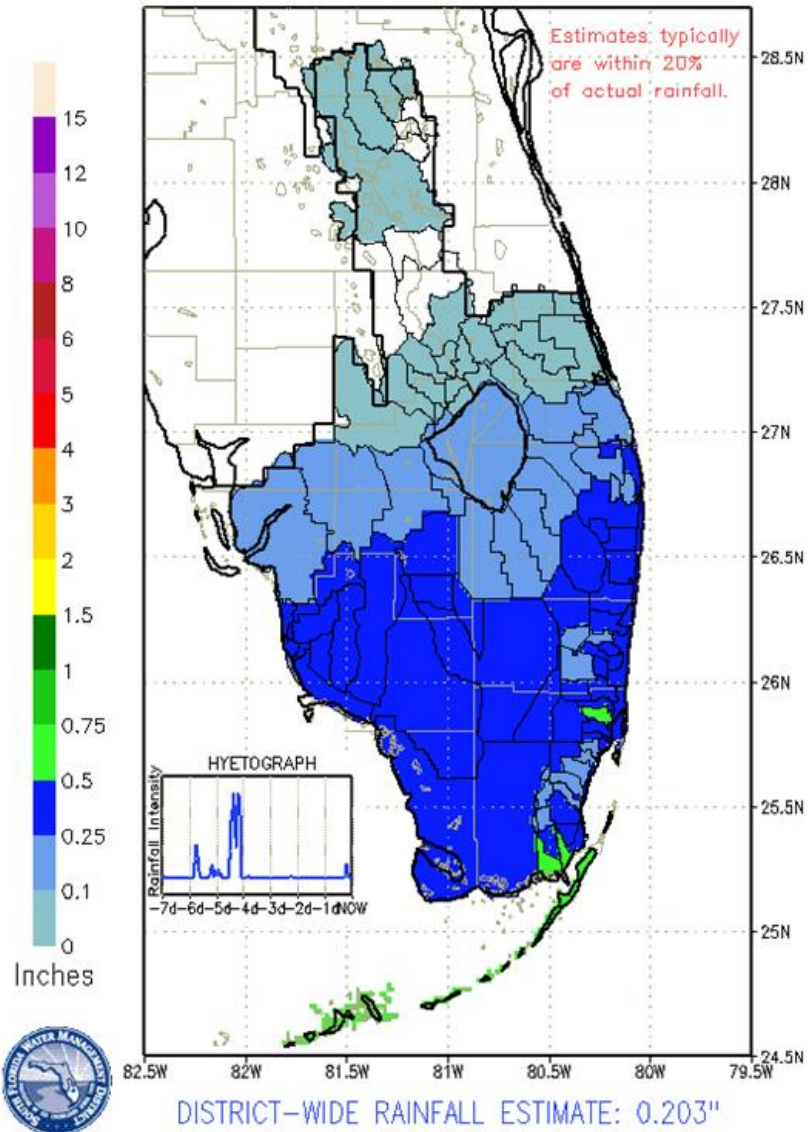


Figure 4. 7-Day rainfall estimates by RAINDAR.

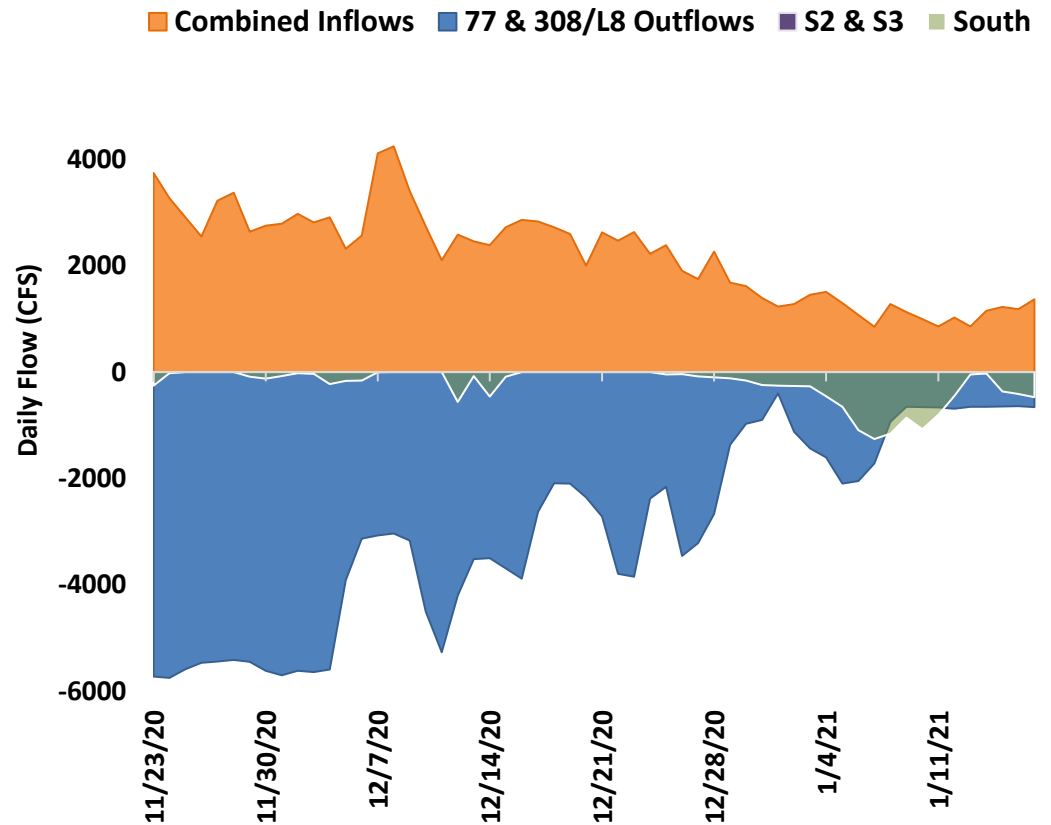


Figure 5. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive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

Collection Date: January 5-6, 2021

Station	CHL _a (ug/L)	TOXIN (ug/L)	TAXA
FEBIN _(1/4)	P		
FEBOU _(1/4)	P		
KISSR0.0	P	BDL	mixed
L005	P	BDL	mixed
LZ2	P	BDL	mixed
KBARSE	P		
RITTAE2	P	BDL	mixed
PELBAY3	P		
POLE3S	P		
LZ25A	P		
PALMOUT	P	BDL	mixed
PALMOUT1	P		
PALMOUT2	P		
PALMOUT3	P		
POLESOUT	P	BDL	mixed
POLESOUT1	P		
POLESOUT2	P		
POLESOUT3	P		
EASTSHORE	P		
NES135	P		
NES191	P		

Station	CHL _a (ug/L)	TOXIN (ug/L)	TAXA
L001	P		
L004	P		
L006	P		
L007	P		
L008	P		
LZ30	P	BDL	mixed
LZ40	P		
CLV10A	P	BDL	mixed
NCENTER	P		

Sampled 1/4

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*

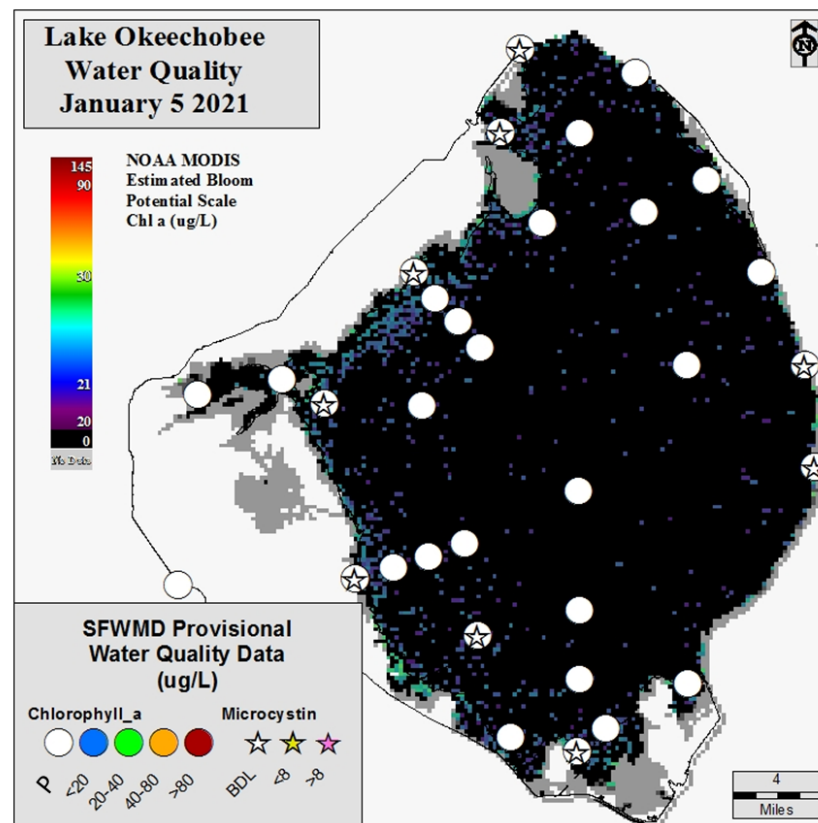


Figure 6. Provisional results from the expanded monitoring sampling trips January 5 - 6, 2021.

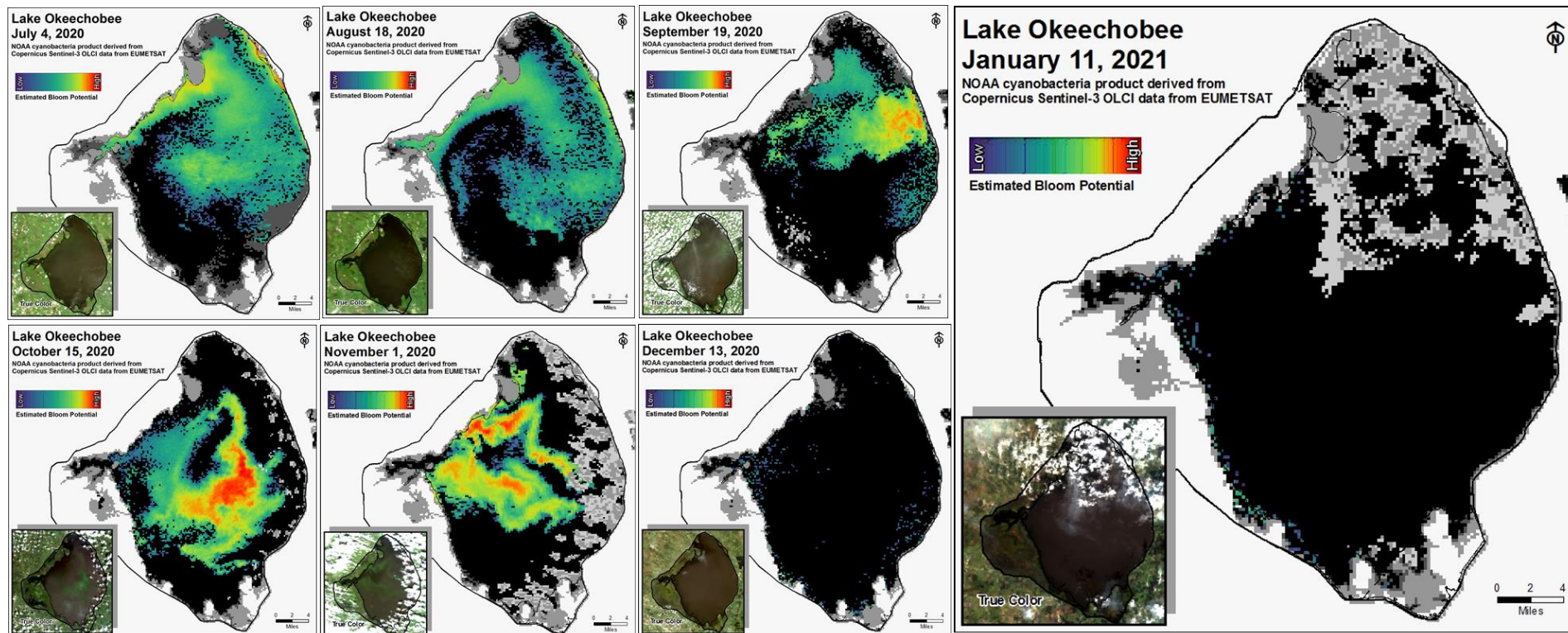


Figure 7. Cyanobacteria bloom potential based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged more than 199 cfs (Figures 1 and 2) and last month inflow averaged more than 764 cfs. Note these numbers do not include contributions from the Gordy Road Structure due to missing data. Last week's provisional averaged inflows from the tidal basin and the structures are shown in Table 1. (Note: Recorder at Gordy Road structure was removed due to bridge construction)

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

Location	Flow (cfs)
Tidal Basin Inflow	108
S-80	7
S-308	0
S-49 on C-24	50
S-97 on C-23	34
Gordy Rd. structure on Ten Mile Creek	Not reporting

Over the past week, salinity increased throughout the estuary (Table 2, Figures 3 and 4). The seven-day moving average of the water column (an average of the surface and bottom salinity) at the US1 Bridge is 17.5. 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)	11.3 (5.8)	15.3 (8.6)	NA ¹
US1 Bridge	16.1 (10.0)	18.8 (14.9)	10.0-26.0
A1A Bridge	24.3 (17.9)	27.5 (24.4)	NA ¹

¹Envelope not applicable

Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged approximately 1,166 cfs (Figures 5 and 6) and last month inflow averaged about 1,699 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	657
S-78	570
S-79	1,041
Tidal Basin Inflow	125

Over the past week, salinity remained the same at the most upstream site and increased at the remaining sites in the estuary (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)	0.2 (0.2)	0.2 (0.2)	NA ¹
Val I75	0.3 (0.2)	0.3 (0.2)	0.0-5.0 ²
Ft. Myers Yacht Basin	3.3 (1.9)	4.7 (2.5)	NA ¹
Cape Coral	10.1 (8.3)	12.2 (9.4)	10.0-30.0
Shell Point	23.2 (21.4)	23.3 (22.7)	10.0-30.0
Sanibel	27.6 (27.3)	27.9 (27.8)	10.0-30.0

¹Envelope not applicable and ²Envelope 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 2.1 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 100 cfs. The 30-day moving average surface salinity at Val I-75 is forecast to be 0.5 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	100	2.1	0.5
B	300	100	1.2	0.4
C	450	100	0.9	0.4
D	650	100	0.6	0.3
E	800	100	0.4	0.3

Red tide

The Florida Fish and Wildlife Research Institute reported on January 15, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at very low to high concentrations nearshore of Lee County, and medium to high concentrations in and offshore of Collier County. Bloom concentrations were observed in 26 samples collected from Lee and Collier counties. Respiratory irritation and fish kills (suspected to be related to red tide) were also reported in Lee and Collier counties. On the east coast, red tide was not observed in samples from Brevard, Indian River, Palm Beach or Miami-Dade counties.

Water Management Recommendations

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

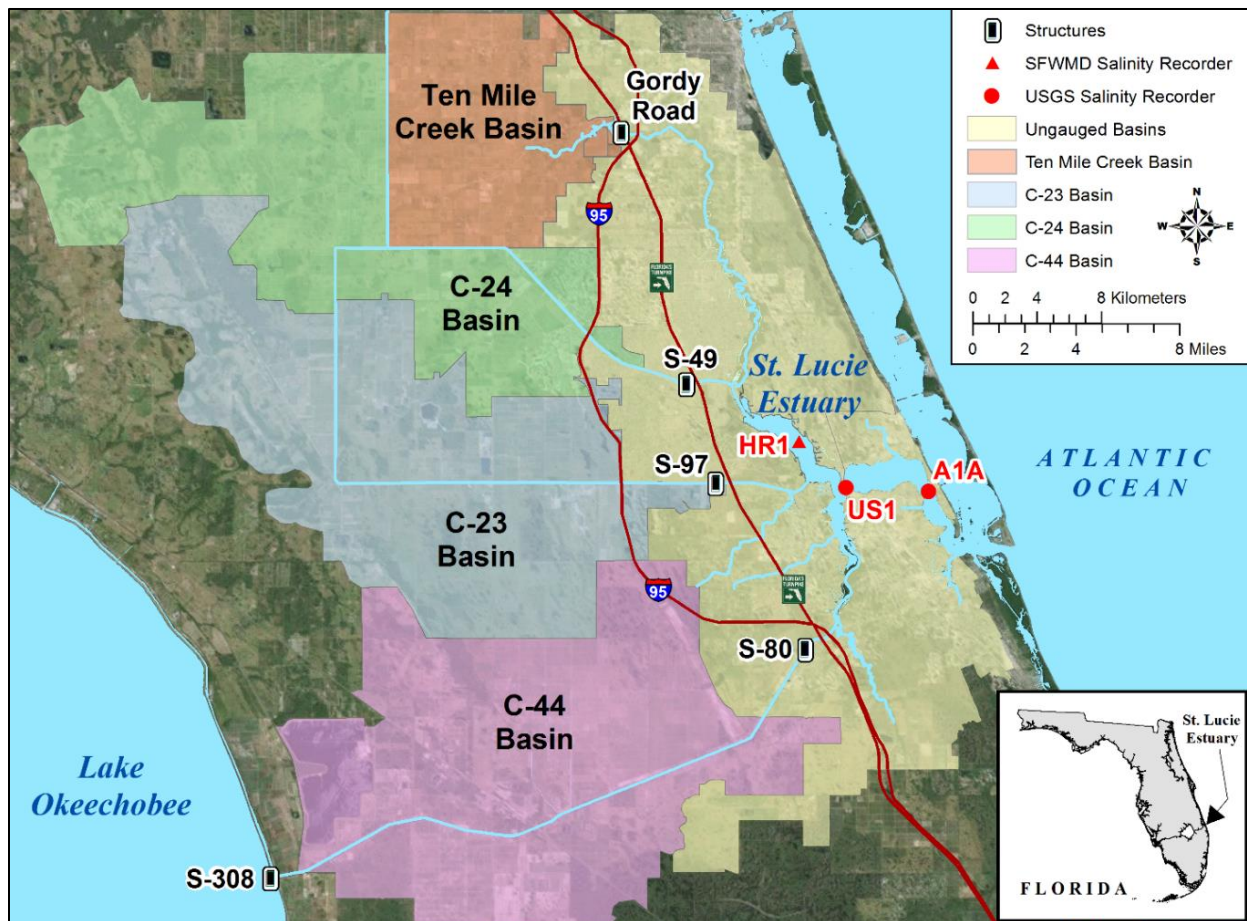


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

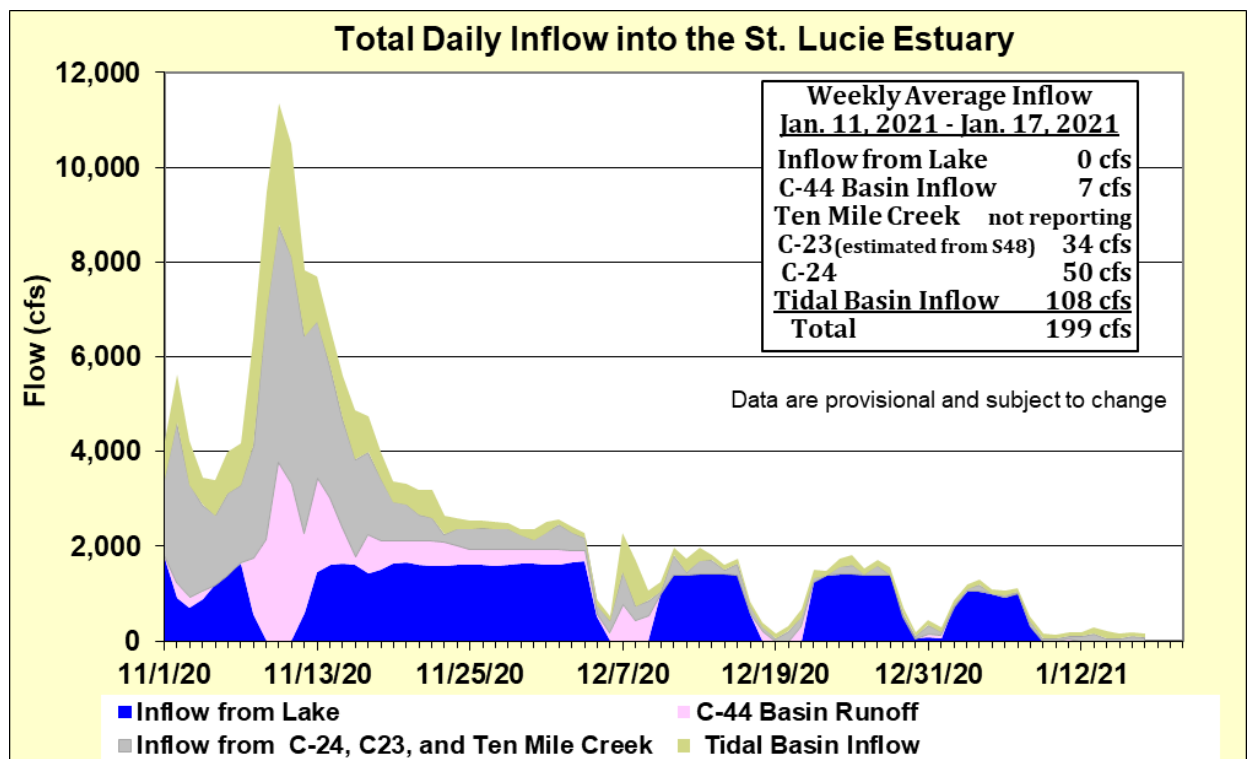


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin into the St. Lucie Estuary.

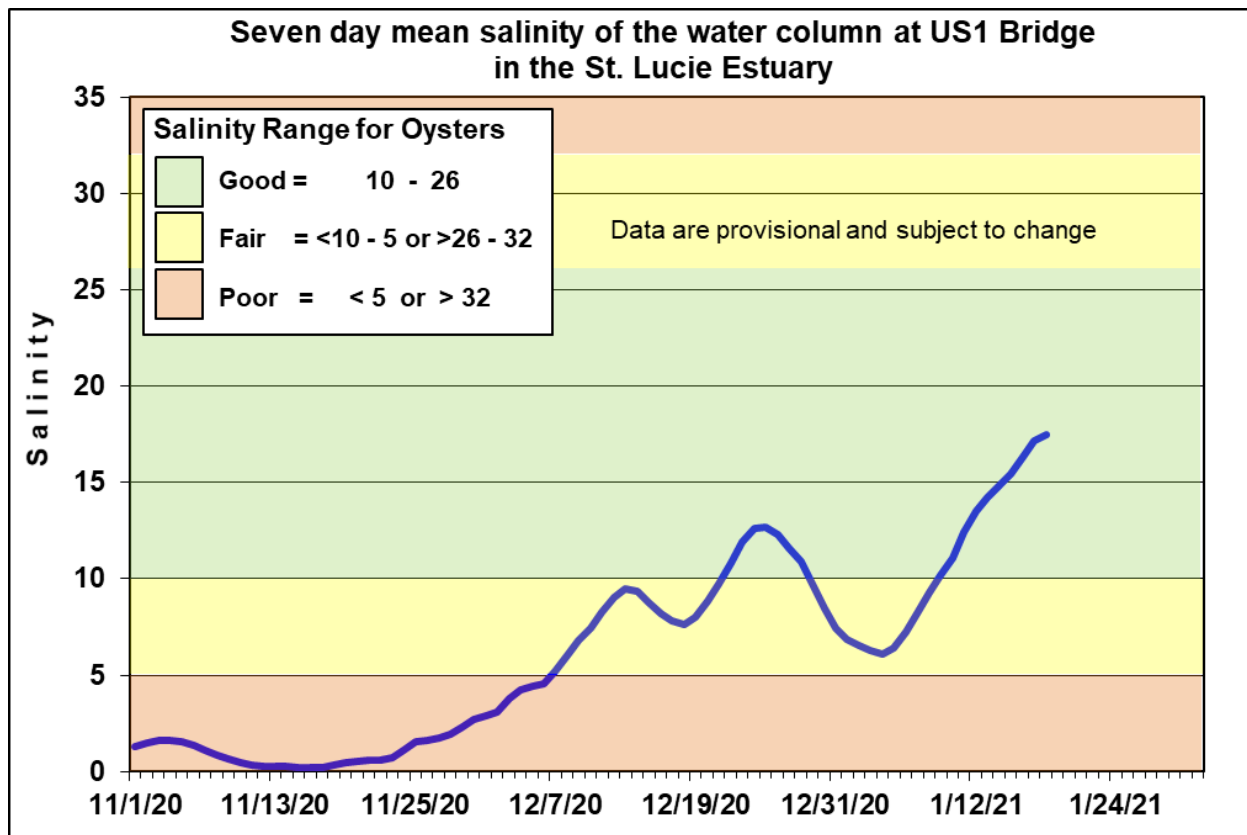


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

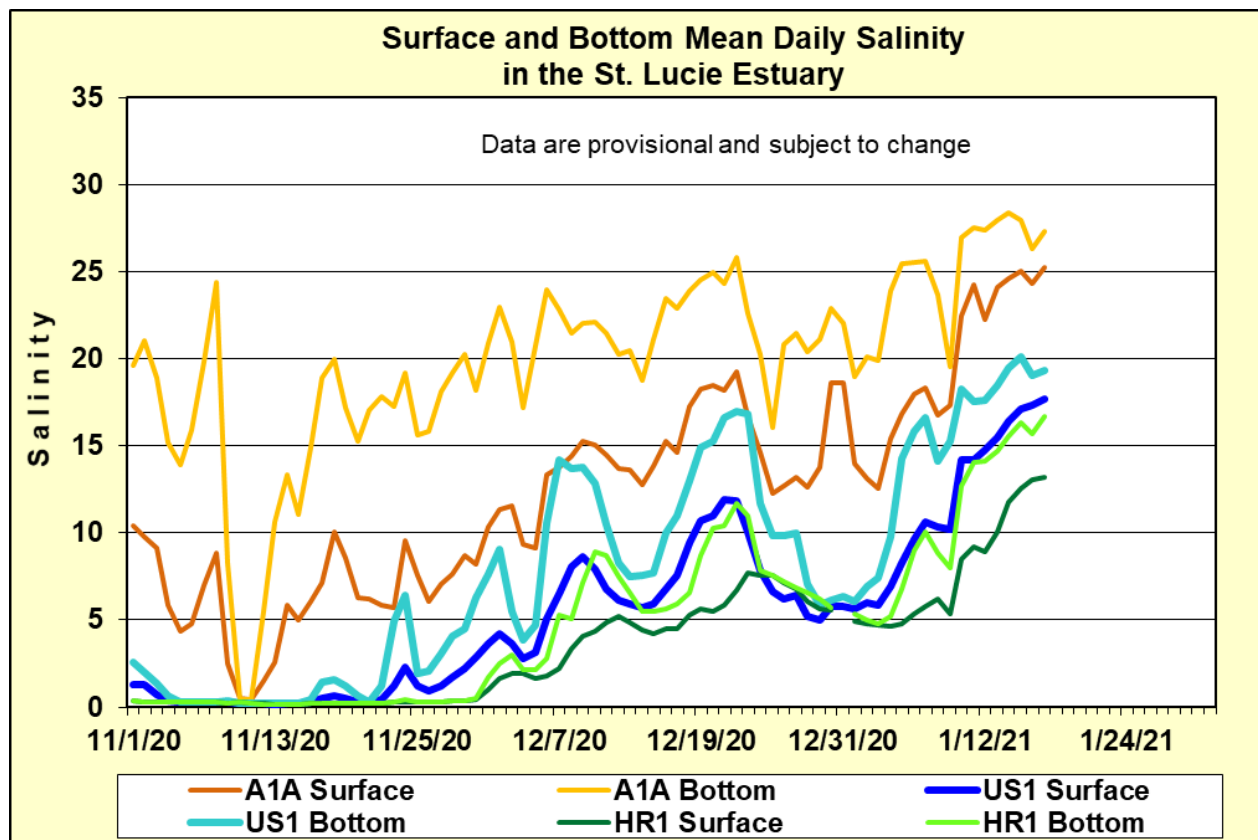


Figure 4. Daily mean salinity at the A1A, US1, and HR1 stations.

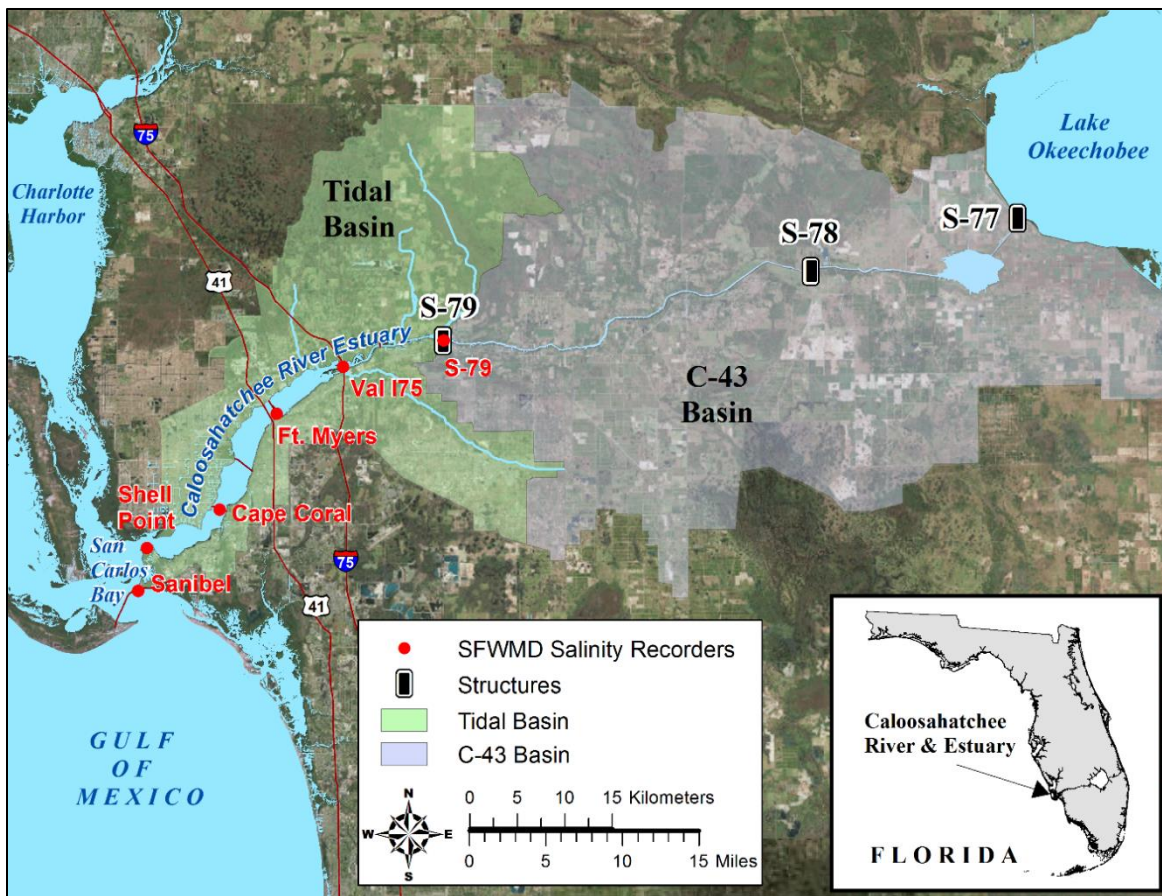


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

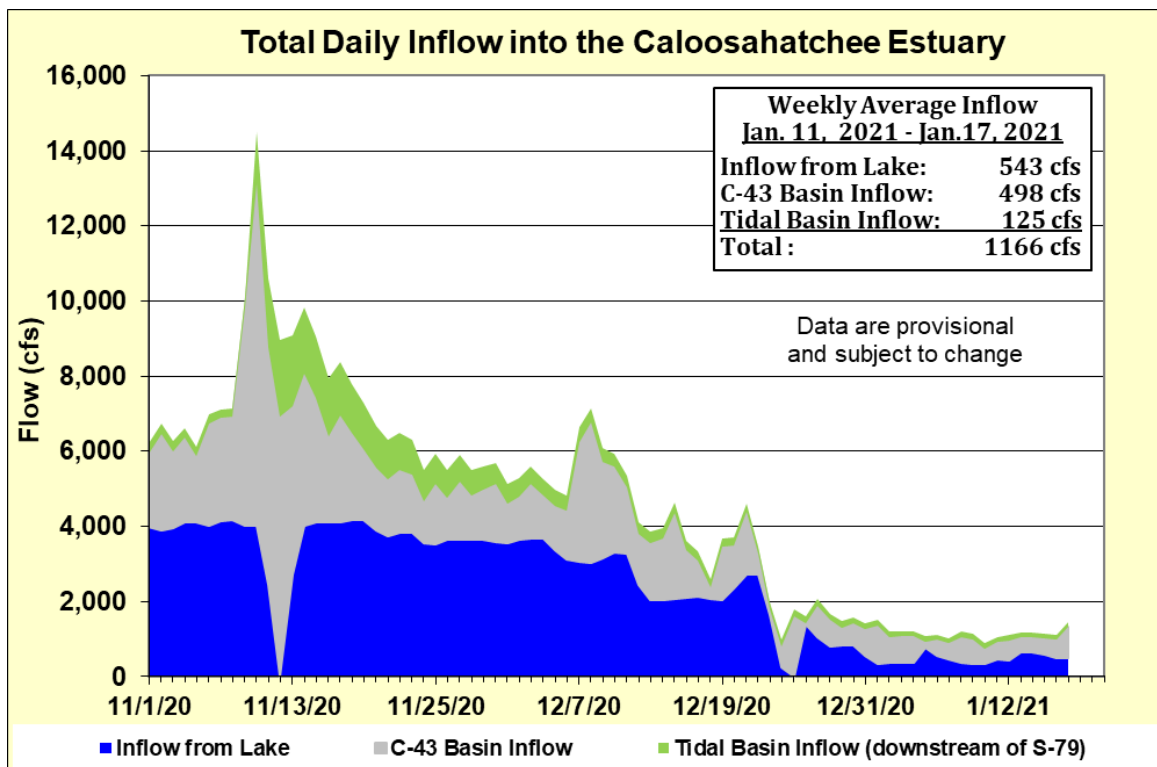


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin and tributaries in the tidal basin into the Caloosahatchee River Estuary.

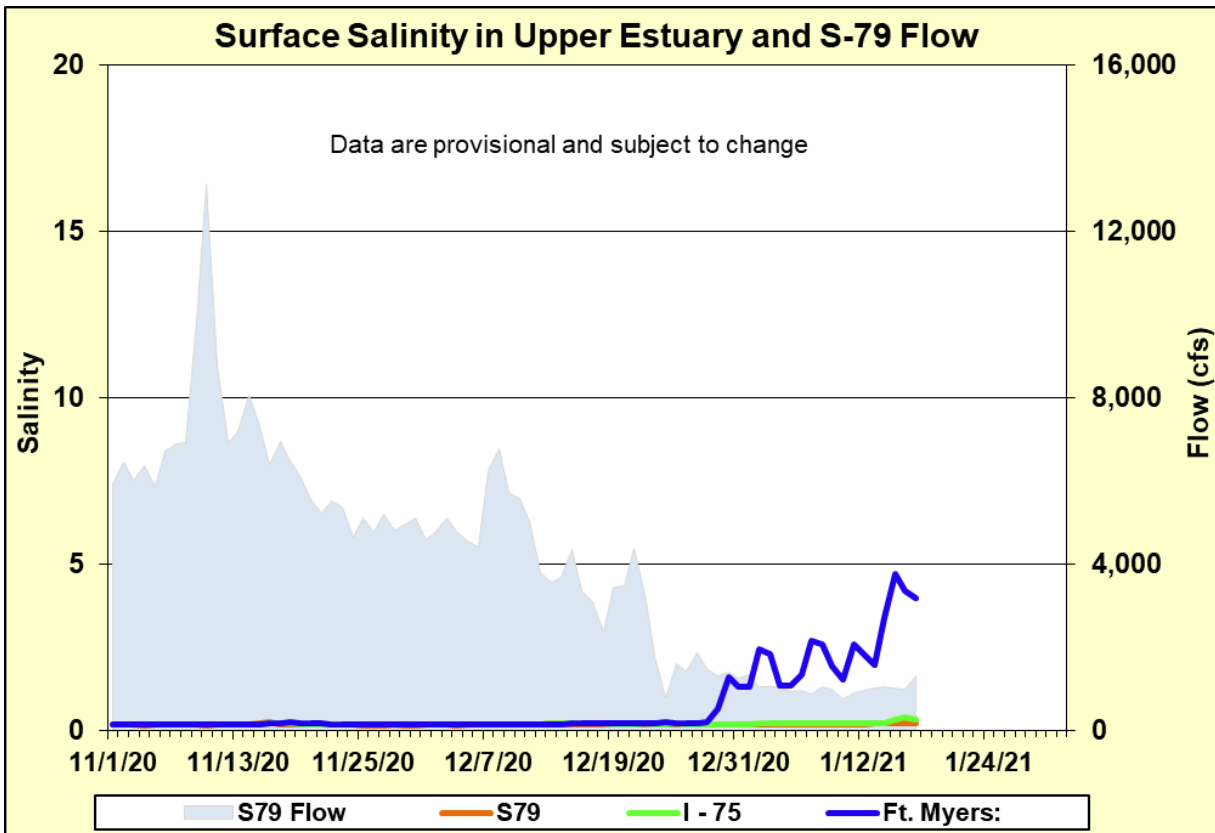


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

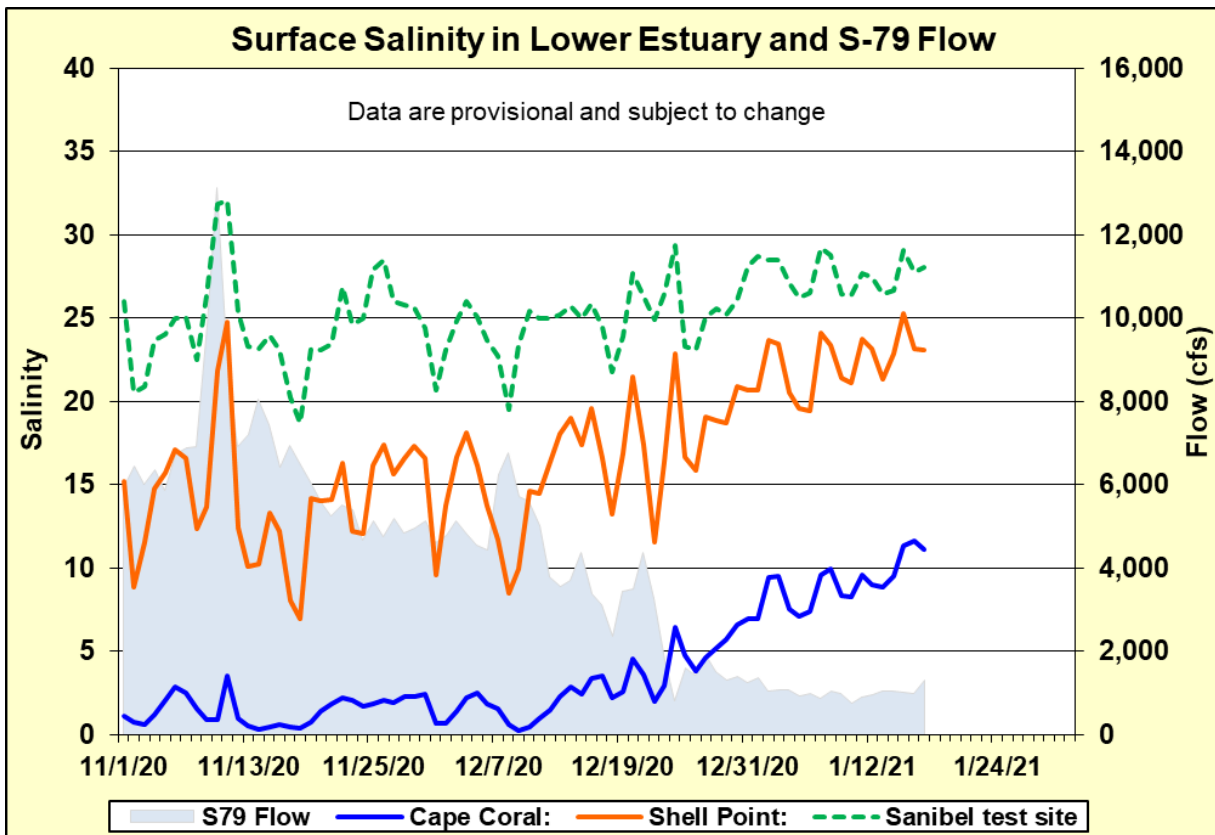


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

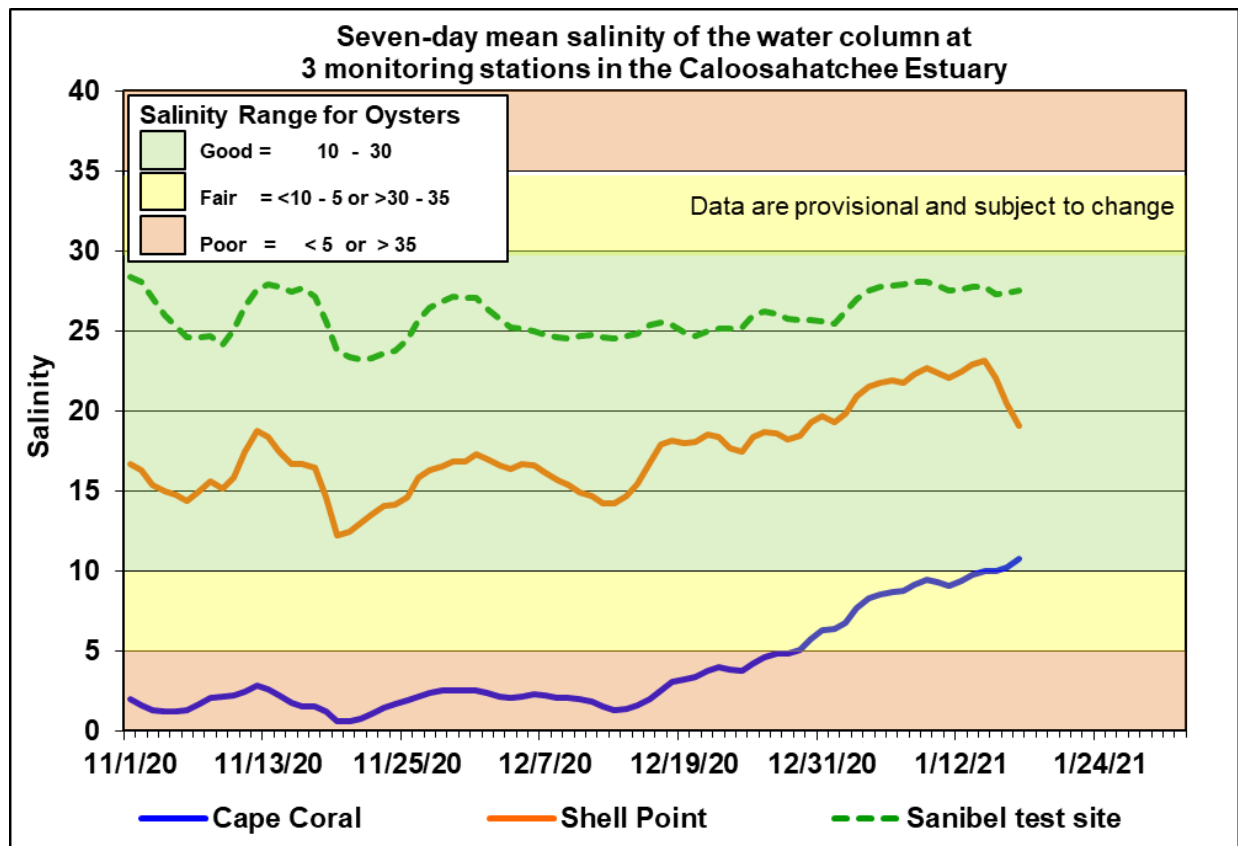


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

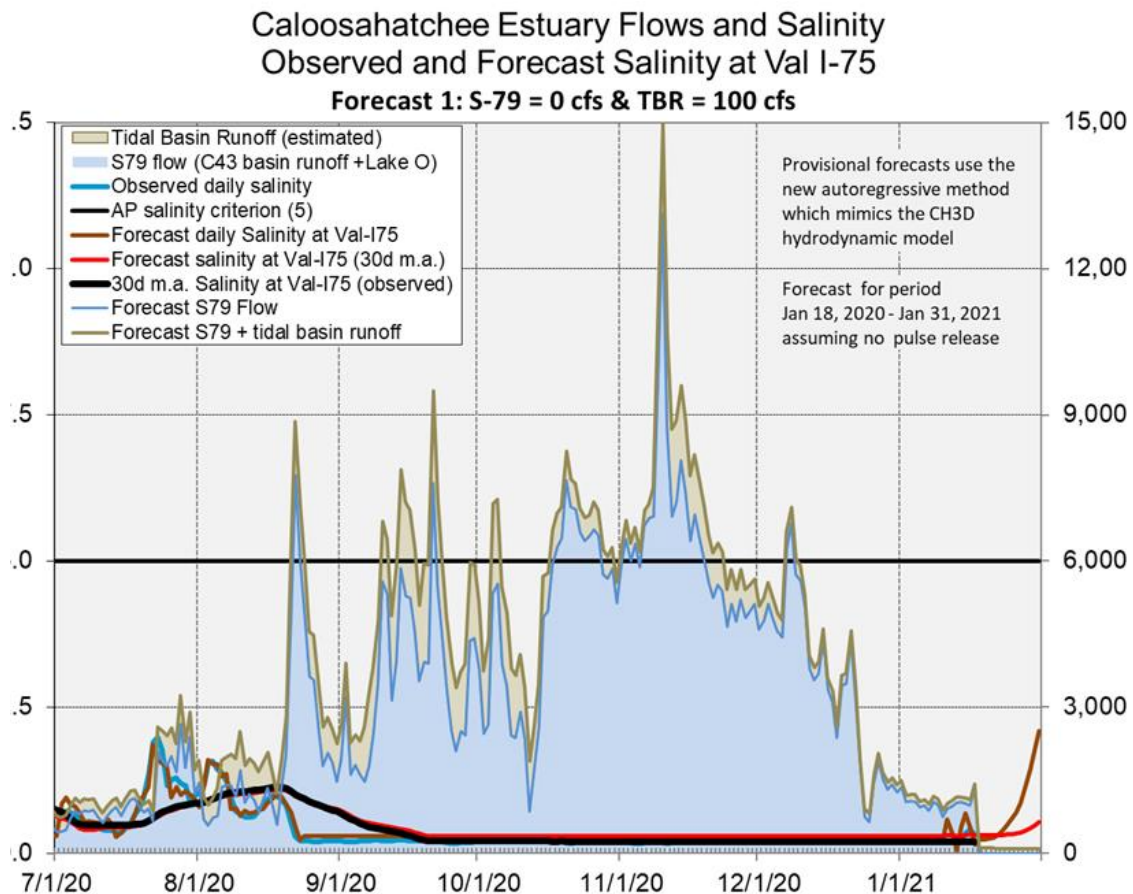
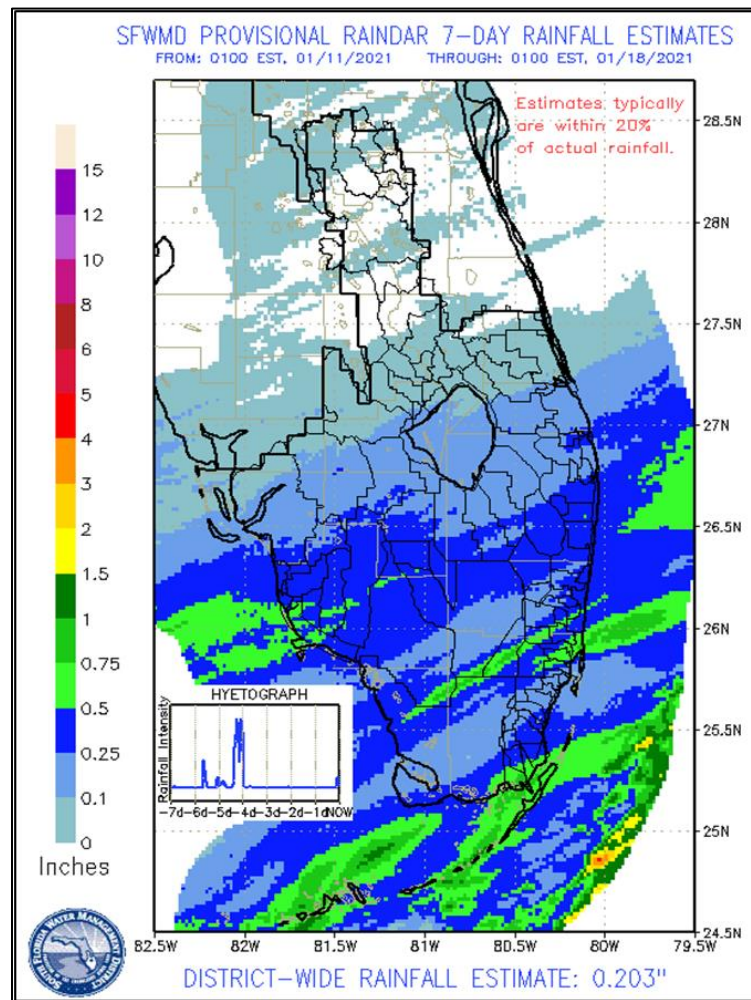


Figure 10. Forecasted Val I-75 surface salinity assuming no pulse release at S-79.

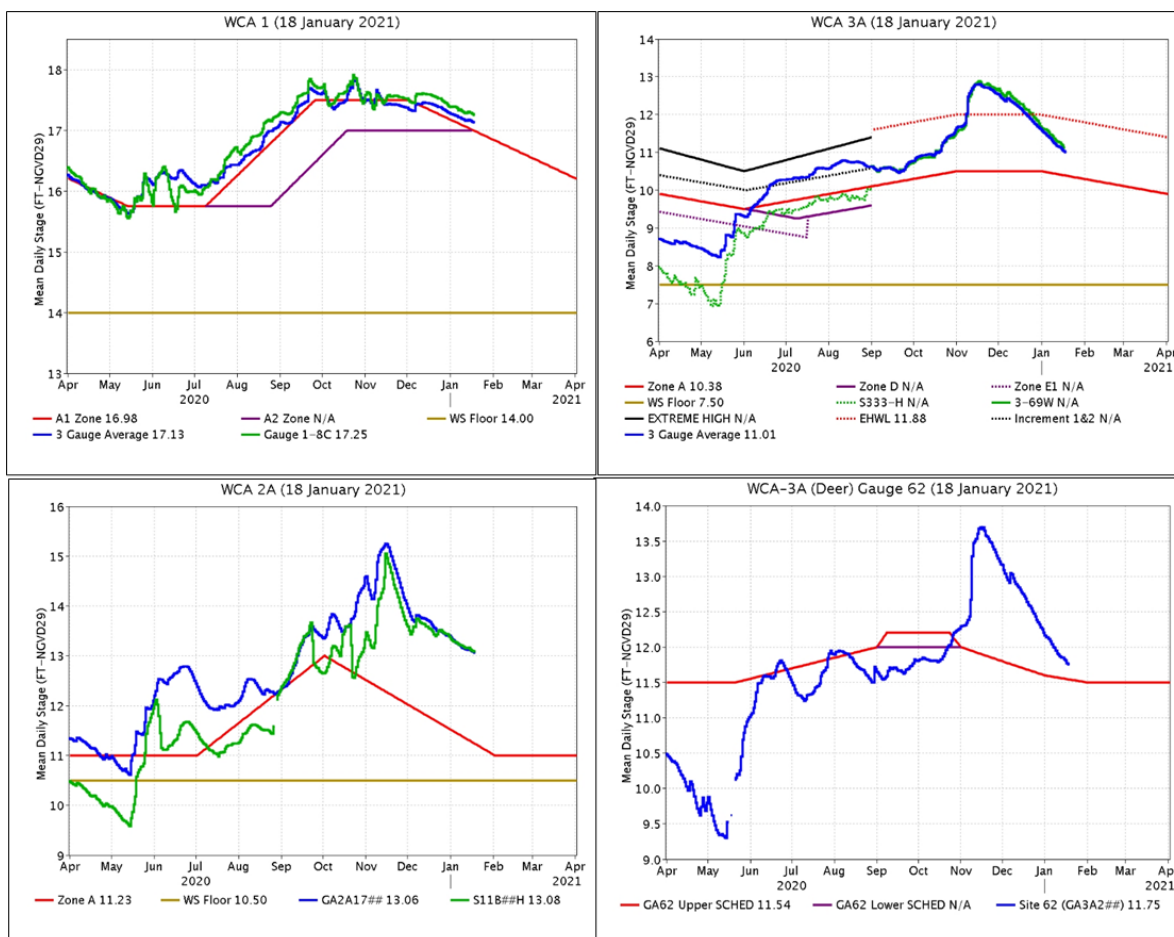
EVERGLADES

The WCAs received widespread rainfall over the last week, less to the south. At the gauges monitored for this report, stages fell 0.09 feet on average last week, and for the fourth consecutive week stages fell the most in WCA-3A. Evaporation was 0.62 inches last week, and the Tamiami Trail Flow Formula (TTFF) continues to call for maximum releases from WCA-3A.

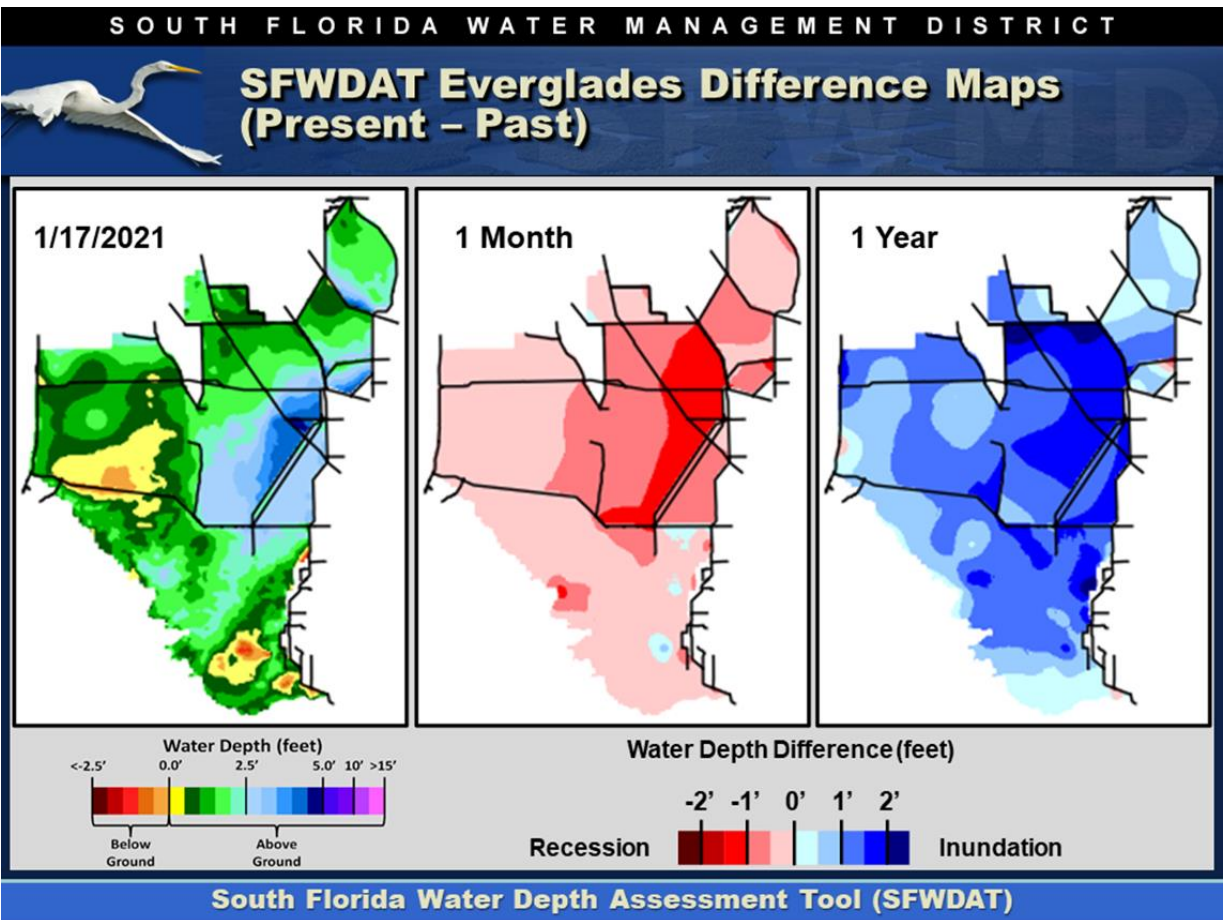
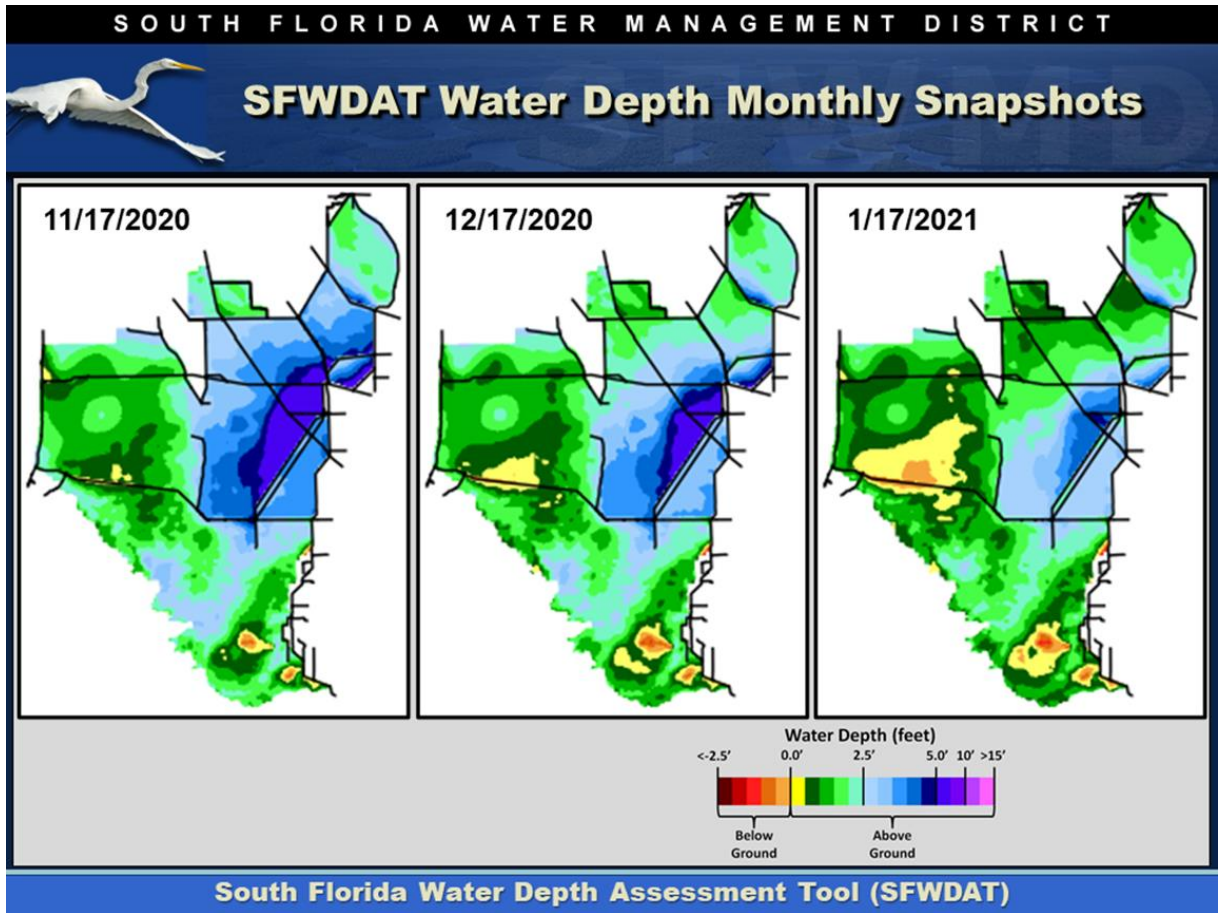
Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.32	-0.04
WCA-2A	0.35	-0.08
WCA-2B	0.23	-0.09
WCA-3A	0.28	-0.19
WCA-3B	0.46	-0.08
ENP	0.29	+0.17



Regulation Schedules: WCA-1: Stage at the 1-8C Gauge is trending parallel with schedule, remaining 0.27 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 at 1.83 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 0.63 feet above. WCA-3A: Stage at gauge 62 (Northwest corner) continues a sharp decline, now approaching the falling Upper Schedule, above by only 0.21 feet.

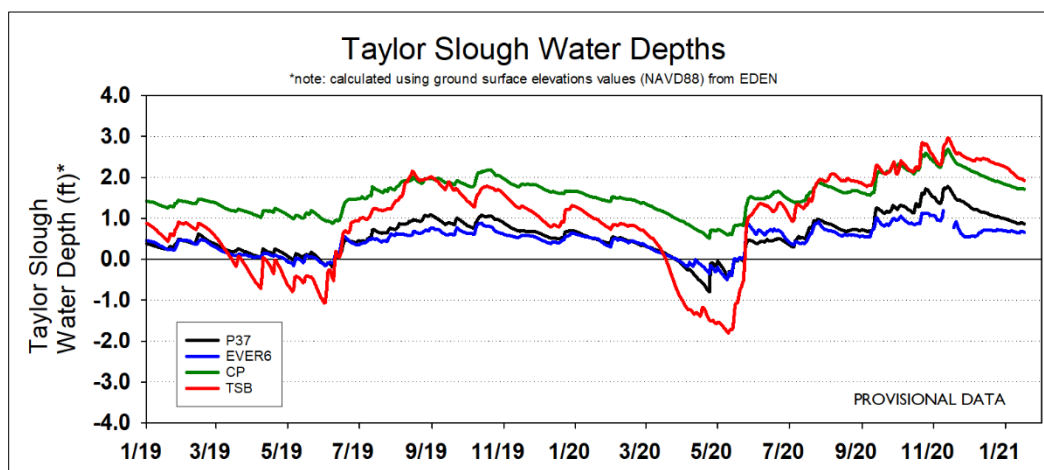
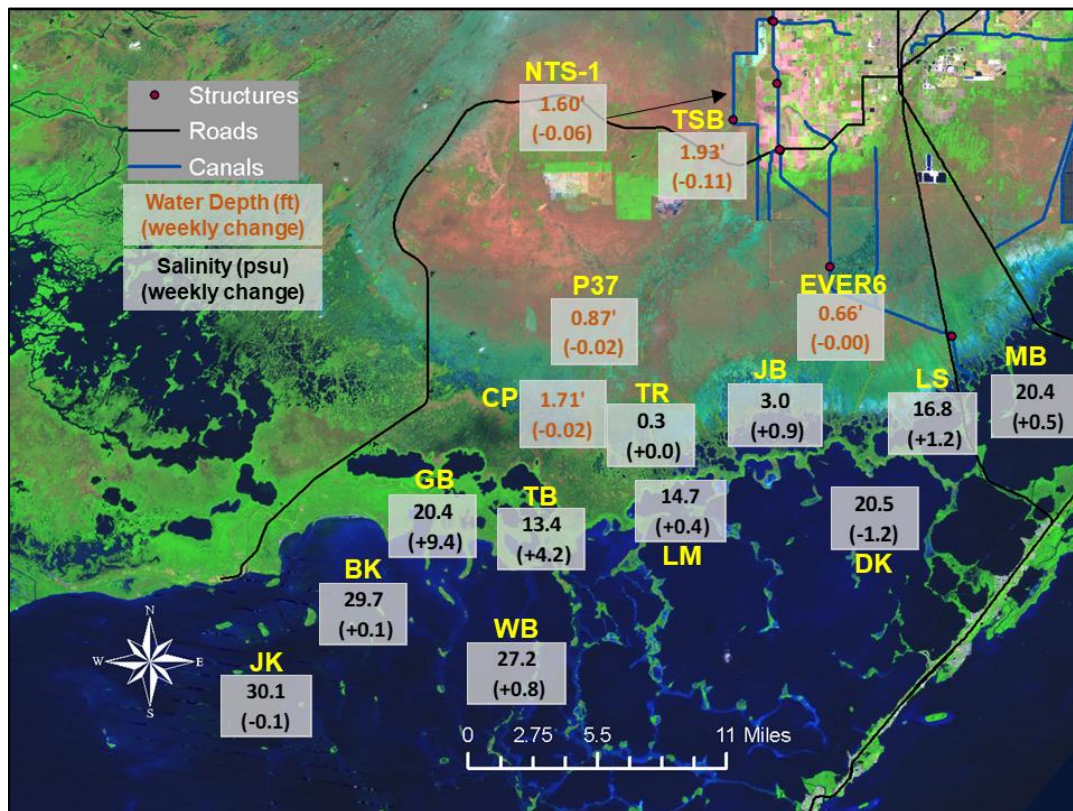


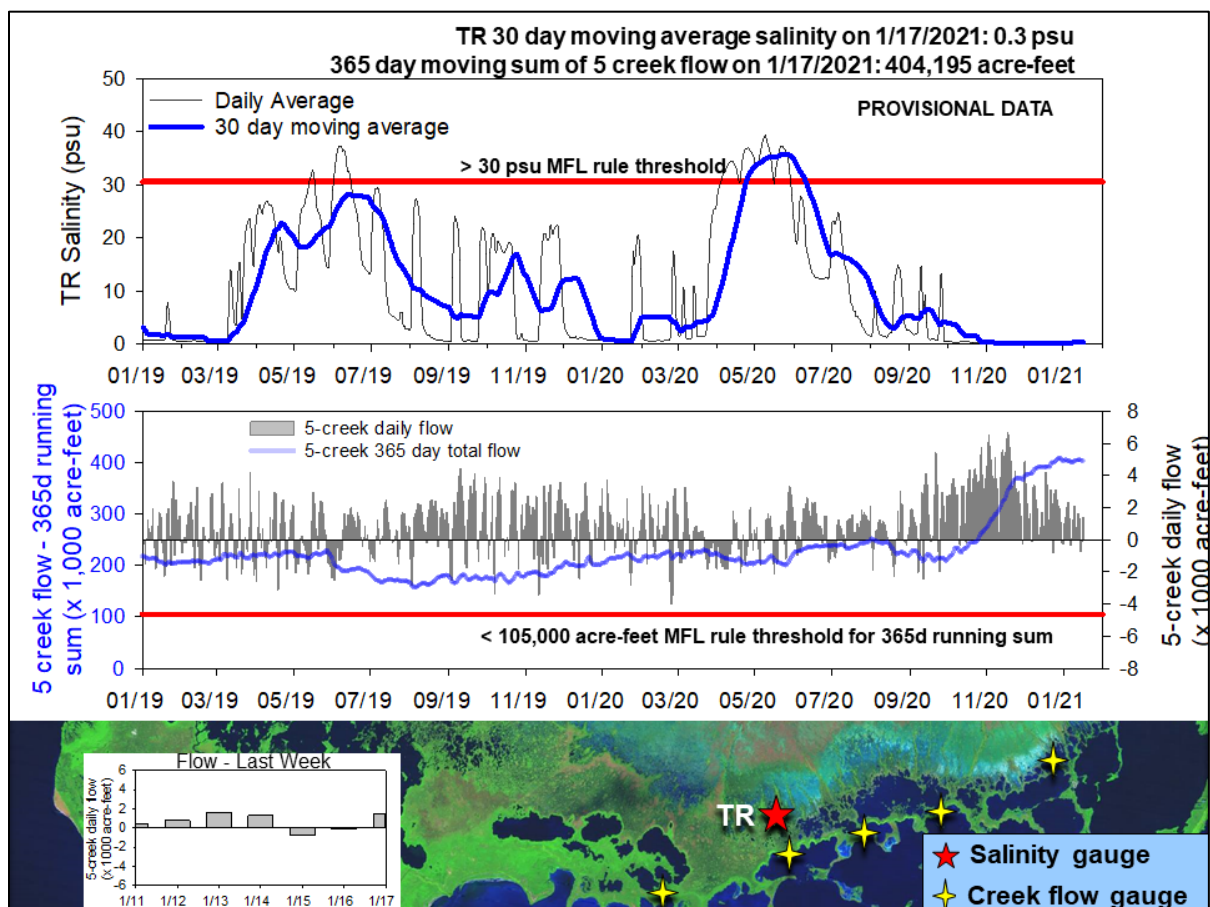
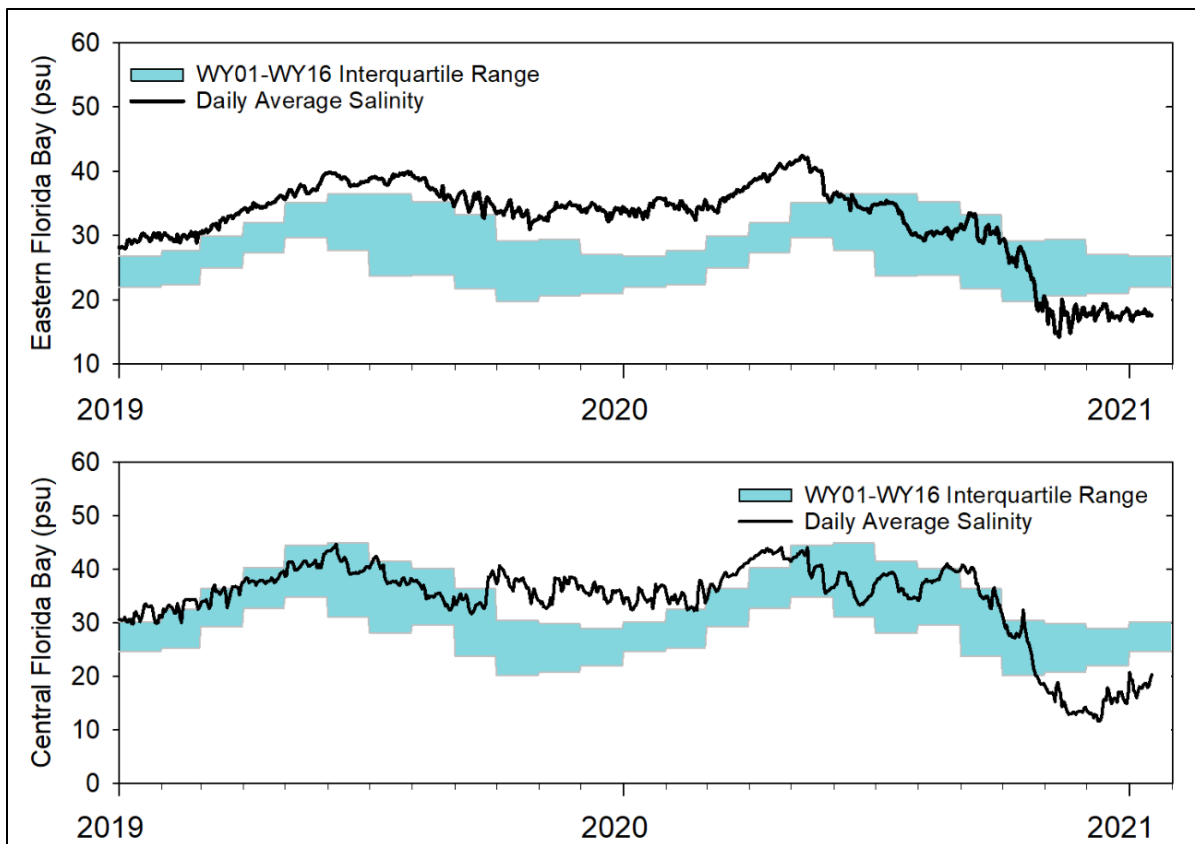
Water Depths: The WDAT tool for spatial interpolation of depth monthly snapshots indicate that there are no longer depths in excess of 5.0 feet in WCA-3A South. Flooding stress is becoming less ecologically detrimental as depths are retreating in the north of the WCAs. Northern WCA-2A is drying down quickly with depths potentially at the soil surface. The northern half of WCA-3AN is now potentially within 1.0 feet of the soil surface. Hydrologic connectivity remains established within the major sloughs in ENP as conditions dry down in BCNP. 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. Compared to one year ago, the entire region is significantly deeper.



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 58% or 216 of the tree islands are currently inundated (down from 65% the week prior), and now 43% of those islands have been inundated for more than 120 days, a significant increase from the prior. Inundation for more than 120 days will cause ecological harm to sensitive islands.

Taylor Slough Water Levels: An average of 0.45 inches of rain fell over Taylor Slough and Florida Bay this week, and water levels in Taylor Slough decreased by 0.04 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.





Florida Bay Salinities: Salinities in Florida Bay averaged a 1.7 psu increase over the week with individual station changes ranging from -1.2 psu in the eastern Bay to +9.4 psu in the western 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 central nearshore area being the furthest from the average (7 psu lower).

Florida Bay MFL: The salinity at the TR station in the mangrove zone (tracked for the Florida Bay MFL) has continued to be near fresh (0.3 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 4,800 acre-feet (4,000 acre-feet less than last week). The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) ended at 404,195 acre-feet this week which is 200 acre-feet less than last week. That is still higher than the 95th percentile of historical data (390,830 acre-feet). These values have not been seen since October of 2012. Creek flows are provisional USGS data.

Water Management Recommendations

Few wading birds were detected in the central Everglades, where stages are high and stress is continuing to diminish to terrestrial wildlife. Very high numbers of wading birds were noted along the southern coast last week and conditions are indicative of a good nesting season to come. As water levels continue to recede, large numbers of ibis are expected to descend on the WCAs.

Recession rates near the high end of the recommended range of 0.05 to 0.12 feet per week have ecological benefit where depths are not in excess of 2.5 feet in WCA-1, WCA-2 and WCA-3A North. Any changes in discharges out of WCA-2A should be offset by a reduction in outflows to tide to conserve water in the system and provide water south as conditions dry down.

Moderating the recession rate in WCA-3A North to within those determined to be optimal for wading bird foraging (0.05 to 0.12 feet per week), has ecological benefit for both preserving foraging opportunities and protect peat soils as conditions dry down.

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.

Managing inflows/outflows within WCA-3A South that decreases ponding in both spatial extent and the amount of time the region is inundated has benefit to the ecology of tree islands. When considering the status of tree islands in WCA-3A as a whole, the last two years of low flooding stress created a resilience to flooding stress for a single wet season. If these high stages should persist long into the dry season, ecological harm to tree islands is likely, but given the low precipitation predictions for the upcoming dry season this persistence seems tolerable and why at this time SFWMD Everglades ecologists are recommending a careful conservation of water in WCA-3A, once conditions move closer to average.

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 hyper-salinity 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 19th, 2021 (red is new)

Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.04'	Maintain marsh stage slightly above and parallel to the regulation schedule.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage decreased by 0.08'	Maintain 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 from flooding stress.
WCA-2B	Stage decreased by 0.10'	Maintain 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 0.20'	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 NW	Stage decreased by 0.14'	Moderate the recession rate to near -.05 to -.12 feet per week.	
Central WCA-3A S	Stage decreased by 0.20'	Maintain the recession rate 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 0.20'		
WCA-3B	Stage decreased by 0.08'	Maintain the recession rate to lower marsh stage.	Protect within basin and downstream habitat and wildlife from flooding stress. Tree island ecology is diminished by flooding
ENP-SRS	Stage increased by 0.17'	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.