Disclaimer: Information contained in the report addresses environmental conditions only and is not the official South Florida Water Management District operations recommendation or decision.

MEMORANDUM

TO: John Mitnik, Assistant Executive Director, Executive Office Staff

FROM: SFWMD Staff Environmental Advisory Team

DATE: April 7, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Strong atmospheric stability and lack of available moisture should mean no rainfall the next several days, except perhaps for a few light showers over the southern interior late in the afternoon. The relatively dry air will also favor cool mornings but with a definite warming trend during the afternoons. Daytime maximum temperatures should rise to near or around 90°F from Thursday through Saturday over the interior sections with low relative humidity. Combined with the high April sun angle, greater-than-normal rates of evapotranspiration for this time of year are expected. Rain on Sunday and Monday may result from a possible cold front moving into the area, primarily over the northern half or two-thirds of the area on Sunday and then southern half of the area on Monday. While the median areal average rainfall by Tuesday morning next week is a third to half of an inch over a broad area, there is a wide distribution of possible outcomes in terms of the expected rainfall Sunday and Monday. Consequently, the QPFs for those two days are rated with lower-than-average confidence at this time. For the week ending next Tuesday morning, the total median weekly District rainfall is below normal despite the forecast rains early next week. However, the large spread or degree of differences in the model guidance concerning the early-week cold front suggests some possibility that total rainfall would result close to normal.

Kissimmee

Tuesday morning stages were 56.4 feet NGVD (0.8 feet below schedule) in East Lake Toho, 53.3 feet NGVD (0.9 feet below schedule) in Toho, and 51.4 feet NGVD (0.6 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.5 feet NGVD at S-65A and 25.8 feet NGVD at S-65D. Tuesday morning discharges were 590 cfs at S-65, 560 cfs at S-65A, 770 cfs at S-65D and 760 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 7.6 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 0.16 feet. Today's recommendation is to recede stage in East Lake Toho and Lake Toho at a rate of approximately 0.17 feet/week to target reaching their low pools on June 1. Allow stage to continue receding in Kissimmee-Cypress-Hatchineha (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 14.30 feet NGVD on April 4, 2021, 0.23 feet lower than last week and 0.93 feet lower than a month ago. The Lake is currently in the Low Sub-band. Stage had been above or near the top of the preferred ecological envelope since August 1, 2020 but reentered the envelope this week. Latest water quality surveys (March 9-11, 2021) found no detectable cyanotoxins and no dominant cyanobacteria taxa at any of the nine sites sampled; four of the 32 sites had chlorophyll *a* values greater than 20 µg/L. Recent snail kite surveys found 65 total nests around the Lake; 48 active,

1 successful with nestlings and 16 failed. The April 1, 2021 wading bird survey counted approximately 3,700 birds across five flocks foraging within the Lake. Recent satellite imagery suggests there is minimal algal bloom activity on the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged approximately 618 cfs over the past week with 278 cfs coming from Lake Okeechobee. The seven-day average salinities decreased at the HR1 and US1 Bridge sites but increased at the A1A Bridge site 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 1,787 cfs over the past week with approximately 1,255 cfs coming from the Lake. Seven-day average surface salinities remained the same at S-79 and Val I-75 and decreased 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.

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 5,500 ac-ft of Lake Okeechobee water was delivered to the flow equalization basins (FEBs) and STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2021 (since May 1, 2020) is approximately 134,700 acre-feet. The total amount of inflows to the STAs in WY2021 is approximately 1,588,000 acre-feet. Most STA cells are near target stage, except for EAV cells in STA-5/6 that are drying 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

Predicted, very dry conditions (increasing recession rates and ET) dominate the ecological conditions across the Everglades Protection Area, highlighting the need to maintain moderate recession rates where possible. Wading birds are feeding in large flocks in Lostman's Slough, WCA-2A, and western SRS. The focus of wading bird foraging is likely to shift to WCAs -1, -2B and -3A South as these areas continue to dry in the next few weeks but excessive drying in WCA-2A and WCA-3A North could incur other ecological costs for aquatic wildlife as well as increased risk of peat oxidation and fire risk. All wading bird nesting numbers continue to build as a very productive, near record, nesting season progresses.

Supporting Information

KISSIMMEE BASINS Rainfall

The Upper Kissimmee Basin received 0.41 inches of rainfall in the past week and the Lower Basin received 0.68 inches (SFWMD Daily Rainfall Report 04/05/2021).

Upper Kissimmee

Table 1 lists stage and discharge for several Kissimmee Chain of Lakes (KCL) water bodies using data from lake outfall structures. KCL stage hydrographs with respective regulation schedules and rainfall are shown in **Figures 1-3**.

Table 1. Average discharge (cfs) for the preceding seven days, stage (feet NGVD), and departures from KCL flood regulation (R) or temporary schedules (T, A, or S); provisional, real-time data are from SFWMD.

		7-day				Schedule			Dail	y Departur	e (feet)		
Water Body	Structure	Average Discharge (cfs) ¹	Stage Monitoring Site ²	Lake Stage (feet)	Schedule Type ³	Stage (feet)	4/4/21	3/28/21	3/21/21	3/14/21	3/7/21	2/28/21	2/21/21
Lakes Hart and Mary Jane	S-62	2	LKMJ	60.4	R	60.6	-0.2	-0.3	-0.4	-0.5	-0.3	-0.2	-0.2
Lakes Myrtle, Preston, and Joel	S-57	1	S-57	60.5	R	60.6	-0.1	-0.1	-0.1	-0.1	0.0	0.1	0.0
Alligator Chain	S-60	54	ALLI	63.5	R	63.5	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0
Lake Gentry	S-63	93	LKGT	61.0	R	61.0	0.0	0.1	0.0	-0.1	0.0	-0.1	-0.1
East Lake Toho	S-59	143	TOHOE	56.5	R	57.3	-0.8	-0.9	-1.0	-1.0	-0.5	-0.3	-0.1
Lake Toho	S-61	333	TOHOW, S-61	53.3	R	54.3	-1.0	-1.0	-1.1	-1.1	-0.8	-0.6	-0.4
Lakes Kissimmee, Cypress, and Hatchineha	S-65	805	KUB011, LKIS5B	51.0	R	50.9	0.1	0.2	0.4	0.6	0.8	0.7	0.4

Report Date: 4/6/2021

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

²Names 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:	4/6/2021										
Motric	Location	1-Day Average			Avera	ge for the Pre	ceeding 7-l	Days ¹			
Wethe	Location	4/4/2021	4/4/21	3/28/21	3/21/21	3/14/21	3/7/21	2/28/21	2/21/21	2/14/21	2/7/21
Discharge (cfs)	S-65	690	805	736	907	906	903	856	835	880	894
Discharge (cfs)	S-65A ²	644	729	652	837	883	888	897	901	887	882
Discharge (cfs)	S-65D ²	811	755	724	901	926	961	1,012	1,038	946	934
Headwater Stage (feet NGVD)	S-65D ²	25.81	25.76	25.83	25.66	25.76	25.80	25.80	25.80	25.87	25.79
Discharge (cfs)	S-65E ²	807	792	702	879	906	949	1,015	1,049	942	940
Discharge (cfs)	S-67	0	0	0	0	0	0	0	0	0	0
DO (mg/L) ³	Phases I & II/III river channel	8.0	7.6	7.4	7.6	9.3	8.9	7.3	7.0	8.7	8.7
Mean depth (feet) ⁴	Phase I floodplain	0.16	0.17	0.22	0.34	0.41	0.46	0.53	0.59	0.41	0.38

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

'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.

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.



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)



tage and Discharge Guidance for 2019-2020.

Zone	KCH Stage (ft	NGVD)	NGVD) S-65/S-65A Discharge*					
A	Above regulat schedule line.	ion	Flood control relea limits on the rate	ases as needed with no of discharge change.				
81	In flood contro zone (0.5 ft be schedule line).	ol buffer low the	Adjust S-65 discha discharge is betwe buffer zone line ar schedule line.	rge so that S-65A een 1400 cfs at the nd 3000 cfs at the				
82	Between the F Control Buffer 50.0 ft line.	lood and the	Adjust S-65 discha least 1400 cfs at S buffer (gray band) 50.0 ft line to deci ramping up to 140 cfs; do not continu stage rises back to threshold stage lin	Adjust S-65 discharge to maintain at least 1400 cfs at S-65A. Use ± 0.2 ft buffer (gray band) above and below the 50.0 ft line to decide when to begin ramping up to 1400 cfs or down to 300 cfs; do not continue reducing discharge if stage rises back to or above the threshold stage line.				
B3	Between the 5	0.0 ft	Adjust S-65 discha		0.0			
84	line and 49 ft. Between 48.5 ft to 49 ft.		Adjust 5-65 discha discharge betwee 300 cfs at 49 ft.		KCH Sta			
С	Below 48.5 ft.		0 cfs.	1				
*Chan	ges in discharge	e should	not exceed limits in	n inset table below.				
Disch	arge Rate of C	hange Li	mits for \$65/\$65A	(revised 7/13/18).				
	Q (cfs)	Max	timum rate of ease (cfs/day)	Maximum rate of decrease (cfs/day)				
	0-300		50	-50	0	ther		
	301-650		75	-75		W		
	651-1400		150	-150		Hat		
1	401-3000		300	-600	•	lf o		
	1 2000		1000	2000				

Revised 5/16/2019

2019-2020 Discharge Plan S-65/S65A



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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 14.30 feet NGVD on April 4, 2021, 0.93 feet lower than a month ago, and 2.59 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) and had been above the envelope since August 1, 2020. Lake stage reentered the envelope this week and is still in the Low sub-band. 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 recession rate has increased over the past several weeks. According to NEXRAD, 0.69 inches of rain fell directly on the Lake; some northern regions received more than 1.5 inches of rain, while less than 0.25 fell in most southern portions. The district-wide average was 0.43 inches (Figure 4).

Average daily inflows (excluding rainfall) increased slightly from the previous week, rising from 722 cubic feet per second (cfs) to 805 cfs. Outflows (excluding evapotranspiration) decreased from 5,383 cfs to 3,429 cfs. Over 98% of the inflows came from the Kissimmee River (792 cfs through S-65E & S-65EX1). Releases to the west via S-77 decreased from 1,852 cfs the prior week to 1,524 cfs, and releases east via S-308 dropped from 711 cfs to 279 cfs. Releases south through the S-350 structures also decreased, going from 2,431 cfs to 1,288 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 32 stations for chlorophyll *a*, and at 9 stations for taxonomic identification and toxin analyses. Most of 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. For the chlorophyll *a* results, four sites exhibited values above 20 μ g/L, one of which (FEBIN) was over 40 μ g/L (Figure 6).

There are now 48 active Snail Kite nests on Lake Okeechobee for a total of 65 nests (1 successful, 16 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.

On April 1, 2021, approximately 3,700 wading birds were observed in five flocks around Lake Okeechobee (Figure 8). Over six surveys from January to April, an average of over 7,000 wading birds were observed foraging in 2021, compared to an average of 3,900 over four surveys from the same period in 2020. The number of birds nesting on the Lake also continues to increase, suggesting this could be a productive nesting year for wading birds on Lake Okeechobee.

The most recent satellite image (April 2, 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 9).

Water Management Summary

Lake Okeechobee stage was 14.30 feet NGVD on April 4, 2021, 0.23 feet lower than last week and 0.93 feet lower than a month ago. The Lake is currently in the Low Sub-band. Stage had been above or near the top of the preferred ecological envelope since August 1, 2020 but reentered the envelope this week. Latest water quality surveys (March 9-11, 2021) found no detectable cyanotoxins and no dominant cyanobacteria taxa at any of the nine sites sampled; four of the 32 sites had chlorophyll *a* values greater than 20 μ g/L. Recent Snail Kite surveys found 65 total nests around the Lake; 48 active,

1 successful with nestlings and 16 failed. The April 1, 2021 wading bird survey counted approximately 3,700 birds across five flocks foraging within the Lake. Recent satellite imagery suggests there is minimal 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	701	792	0.3	S-77	1852	1524	0.6
S-71 & S-72	0	0	0.0	S-308	711	279	0.1
S-84 & S-84X	0	0	0.0	S-351	1114	570	0.2
Fisheating Creek	14	13	0.0	S-352	751	557	0.2
S-154	0	0	0.0	S-354	566	160	0.1
S-191	0	0	0.0	L-8 Outflow	389	338	0.1
S-133 P	0	0	0.0	ET	2872	2671	1.1
S-127 P	0	0	0.0	Total	8255	6100	2.5
S-129 P	0	0	0.0				
S-131 P	0	0	0.0				

0

0

0

7

0

722

S-135 P

S-2 P

S-3 P S-4 P

L-8 Backflow Rainfall

Total

0

0

0

0

1861

2666

0.0

0.0

0.0

0.0

0.8

1.1

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.







Collection Date: March 9-11, 2021

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



65 nests on Lake Okeechobee 48 active 1 successful 16 failed

Snail Kite Nestling

Credit: Jean Olbert

Figure 7. Current Snail Kite nesting sites on Lake Okeechobee.



Figure 8. Wading bird foraging abundance during April 1, 2021 survey of Lake Okeechobee.





ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged approximately 618 cfs (Figures 1 and 2) and the previous 30-day inflow averaged about 643 cfs. 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.

Location	Flow (cfs)
S-308	279
S-80	428
S-97 on C-23	0
S-49 on C-24	0
Gordy Road structure on Ten Mile Creek	72
Tidal Basin Inflow	118

Over the past week, salinity decreased at the HR1 and US1 Bridge sites but increased at the A1A Bridge site (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 15.3. Salinity conditions in the middle estuary are estimated to be within the good range for adult eastern oysters (Figure 4).

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

Sampling Site	Surface	Bottom	Envelope		
HR1 (North Fork)	12.9 (13.5)	13.0 (16.1)	NA ¹		
US1 Bridge	14.7 (15.8)	16.0 (18.4)	10.0-26.0		
A1A Bridge	25.0 (23.2)	28.3 (26.8)	NA ¹		

¹Envelope not applicable

Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged approximately 1,787 cfs (Figures 5 and 6) and the previous 30-day inflow averaged approximately 1,986 cfs. Last week's provisional averaged inflows from the structures and the tidal basin are shown in Table 3.

Location	Flow (cfs)
S-77	1524
S-78	1261
S-79	1726
Tidal Basin Inflow	61

 Table 3.
 Weekly average inflows (data is provisional).

Over the past week, surface salinities remained the same at S-79 and Val I-75 and decreased at the remaining sites in the estuary (Table 4, Figures 7 & 8). The seven-day average salinity values were 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 salinities (Table 4) were in the good range (0-10) for tape grass at Val I-75 and at Ft. Myers.

Table 4. Seven-day average salinity at six monitoring stations in the Caloosahatchee Estuary. Current average is in bold, previous average in parentheses. The envelope at Val I-75 is for the protection of tape grass in the upper estuary and the envelope in the lower estuary reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*).

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	0.2 (0.2)	0.2 (0.2)	NA ¹
Val I-75	0.2 (0.2)	0.2 (0.2)	0.0-0.5 ²
Ft. Myers Yacht Basin	1.9 (2.8)	2.0 (3.7)	NA ¹
Cape Coral	10.6 (11.7)	12.0 (13.0)	10.0-30.0
Shell Point	24.8 (25.4)	25.6 (26.0)	10.0-30.0
Sanibel	29.5 (30.2)	31.0 (30.9)	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 1.0 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 52 cfs. The 30-day moving average surface salinity at Val I-75 is forecast to be 0.4 or lower (Table 5). The current salinity conditions at Val I-75 are within the envelope of salinity (0.0-5.0) for this site (Table 4).

Scenario	Q79 (cfs)	TB Runoff (cfs)	Daily Salinity	30-Day Mean
А	0	52	1.0	0.4
В	450	52	0.5	0.3
С	1000	52	0.3	0.3
D	1500	52	0.3	0.3
Ē	2000	52	0.3	0.3

Table 5. Predicted salinity at Val I-75 at the end of forecast period.

Red tide

The Florida Fish and Wildlife Research Institute reported on April 2, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background to high concentrations in Charlotte County, and at background to low concentrations in and offshore of Lee and Collier counties. On the east coast, red tide was not observed in samples from Brevard or Broward counties.

Water Management Recommendations

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



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



Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin into the St. Lucie Estuary. Note: C-23 Basin inflows were estimated using S-48.



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



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



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



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



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



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



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



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

Stormwater Treatment Areas

Over the past week, approximately 5,500 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 134,700 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 1,588,000 ac-feet. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2. For definitions on STA operational language see glossary following figures.

STA-1E: STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7. Operational restrictions are in place in STA-1E Central Flow-way for vegetation management activities. Online treatment cells are at or near target stage, vegetation in these cells is highly stressed and the 365-day phosphorus loading rates (PLR) for these flow-ways are extremely high (Figure 1).

STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to construction activities. 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/m²/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 online treatment cells are at or near 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/m²/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. Some 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/m²/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



	STA-1W Flow-Way Status			As of 4/	/4/2021	STA-1W Flow & Phosphorus Concentration			
		26E day D		Stage Based: Relative	Stage Based: Relative to Target Stage (TS)		7-dav	28-dav	365-dav
Flow-	Vegetation	Loading Rate	Online /	Deep Water Level	(> 2.8' above TS)		, au	20 ady	505 uuy
Way	Status Healthy Stressed	(below 1.0 g P /m ² /yr is optimal)	Restrictions	High Water Level	(1.5' – 2.8' above TS)	Total Inflow, ac-ft	0	0	194,880
	\longleftrightarrow	is optimaly		0.2' – 1.5' above T	S	Lake Inflow, ac-ft	0	N/A	8,200
Northern	$\leftarrow \checkmark \checkmark$	1.0	Construction	Target Stage (TS +	+/- 0.2')	Total Outflow, ac-ft	0	0	216,924
Western	<∕>	•	Construction	Low Water Level (<0.2 below TS) Percent of Area Drv	Inflow Conc., ppb	N/A	N/A	250
	~~	1.0		0.25% Dry	50 75% Dry	Outflow Conc., ppb	Ν/Δ	Ν/Δ	38
Eastern	<∕∕>	1.0	Construction	25-50% Dry	75-100% Dry	Includes Preliminary Da	ita	NA	50

Figure 2. STA-1W Weekly Status Report



Figure 3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 3/29/2021 through 4/4/2021



STA-3/4 Flow-Way Status			As of 4/4/2021 STA-3/4 Flow & Phosphorus Cone				us Conce	ntration	
		act day D		Stage Based: Relative to Targe	et Stage (TS)		7 day	28 day	365 day
Flow-	Vegetation	Joading Rate	Online /	Deep Water Level (> 2.8' at	bove TS)		7-uay	20-uay	303-uay
Way	Status Healthy Stressed	(below 1.0 g P /m ² /yr is optimal)	Restrictions	High Water Level (1.5' – 2.8	8' above TS)	Total Inflow, ac-ft	35	35	566,078
	\leftarrow	is optimity		0.2' – 1.5' above TS		Lake Inflow, ac-ft	0	N/A	44,100
Eastern	Eastern Offline, vegetation management drawdown as of 3/1/2021		Target Stage (TS +/- 0.2')		Total Outflow, ac-ft	0	13	545,848	
Central	$\leftarrow \rightarrow$	°	Vegetation	Low Water Level (<0.2' below	ow TS)	Inflow Conc., ppb	38	38	58
	/ -	1.0	Rehab	Depth / Area Based: Percent (of Area Dry	Outflow Conc. nnh			
		Ŷ	Vegetation	0-25% Dry 50-7	75% Dry	Outflow conc., ppb	N/A	8	12
Western		1.0	Rehab	25-50% Dry 🛛 📕 75-1	100% Dry	Includes Preliminary Da	ita		

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 – 3/29/2021 through 4/4/2021



	STA-5/6 F	low-Way Status	As of 4/4/2021			
		Stage Based: Relative to Target Stage (TS)				
Flow	Vegetation	365-day P Loading	Online /	Deep Water Level (> 2.8' above TS)		
Way	Status	Rate (below 1.0 g P /m²/vr is	Restrictions	High Water Level (1.5' – 2.8' above TS)		
	<	optimal)		0.2' – 1.5' above TS		
6	←>	•	Online	Target Stage (TS +/- 0.2')		
	~	1.0		Low Water Level (<0.2' below TS)		
7	$\langle \rangle \longrightarrow$		Online	Depth / Area Based: Percent of Area Dry		
		1.0		0-25% Dry 50-75% Dry		
8	$\langle \rangle$	1.0	Online	25-50% Dry 75-100% Dry		

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 flowweighted 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 365day 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

Very little rainfall fell within Everglades last week but more than previous weeks. At the gauges monitored for this report, stages fell 0.14 feet on average last week, a slight increase from the week prior. Evaporation was 1.29 inches last week. The Tamiami Trail Flow Formula (TTFF) - Target Flow from WCA-3A to Everglades National Park (ENP) this week is 1168 cfs.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.04	-0.13
WCA-2A	0.06	-0.14
WCA-2B	0.03	-0.19
WCA-3A	0.13	-0.15
WCA-3B	0.10	-0.14
ENP	0.09	-0.08



Regulation Schedules: WCA-1: Stage at the 1-8C Gauge continues to follow just above and parallel with schedule, now 0.17 feet above the falling Zone A1 regulation line. WCA-2A: The recession in stage at S11B-HW continues a steady decline, now 0.44 feet above the stable regulation line. WCA-3A: The Three Gauge Average stages continue to drop steadily below the falling Zone A regulation line and is currently 0.48 feet below. WCA-3A: Stage at gauge 62 (Northwest corner) continues to fall. The average on Sunday was 0.83 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. WCA-2A has now drawn down across most of that basin. North-South hydrologic connectivity remains established within Shark River Slough (SRS) in Everglades National Park (ENP) as conditions dry down in the western marl prairies and 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, and southern WCA-2A. Looking back one year the stage difference patterns are different than one month ago with central WCA-3A significantly wetter. Compared to one year ago the eastern boundary of Everglades National Park is significantly wetter than a year ago.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

SFWDAT Water Depth Monthly Snapshots





Tree island inundation in WCA-3A, WCA-3B and Everglades National Park (ENP): 371 Tree Islands of known elevation within WCA-3A, -3B, and Everglades National Park's Shark Slough. Current preliminary estimates using WDAT indicate that 8% or 30 of the tree islands are currently inundated (down from 11% 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 birds continue to forage throughout the Greater Everglades, especially in the drying margins of Lostman's Slough, WCA-2A, Western Shark River Slough near the Loop Trail, and WCA-1. There are few feeding birds in WCA-3A South and numbers have declined considerably in WCA-3A North as the open areas in the north are now too dry for foraging. Of concern, the continued rapid drying rates and now relatively dry conditions in WCAs -2A and -3A North, which are unlikely to support sustained foraging. The focus of wading bird foraging is likely to shift to WCAs -1, -2B and -3AS as these areas continue to dry over the next few weeks. Wood Stork, white ibis and Great Egret nests continue to increase in both the WCAs and ENP for a grand total of about 52,000 nests for these three species, which would amount to the third highest nesting effort in the Everglades protection area in recent decades.

Taylor Slough Water Levels: Upper Taylor Slough and the area near where US Highway-1 intersects the Florida Bay coastline received about 0.45 inches of rain this past week, but it was not enough to stop the decrease in water levels. Taylor Slough decreased by 0.24 feet on average over the week (+0.02 feet faster than last 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. Northern Taylor Slough is rapidly decreasing now as is typical when water deliveries stop and at the current rate will be dry within 2 weeks. That would be a month and a half later than when the upper slough would dry out in a typical year.









Florida Bay Salinities: Salinities in Florida Bay averaged a 0.9 psu decrease over the week because of local rainfall and associated flows. Individual station changes ranged from -7.3 psu in the central nearshore to +2.4 psu in the western Bay. Bay-wide salinity is 4 psu lower than the historical average for this time of year. The nearshore stations average 7 psu lower than the historical average for this time of year, and the western Bay stations are within 1 psu higher than their long-term averages. The Bay is positioned very well to minimize hypersalinity before the rainy season brings the freshwater front back to the Bay. Attention will be on the western Bay this year to see if water quality concerns exacerbate conditions this summer and fall.

Florida Bay MFL: The Taylor River (TR) station in the mangrove zone (tracked for the Florida Bay MFL) was able to return to a near fresh condition by the end of the week with a daily average salinity of 0.8 psu on Sunday. The 30-day moving average increased to 2.7 psu as a result. Weekly flow from the 5 creeks identified by yellow stars on the map totaled about 8,700 acre-feet which is a large increase from the negative totals of the prior weeks. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) ended at 428,895 acre-feet this week which is a 13,000 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. Excessive drying in WCA-2A and WCA-3A North could incur other ecological costs for aquatic wildlife as well as increased risk of peat oxidation and fire risk.

Distributing flows across the northern perimeter of WCA-3A and into that basin promotes sheet flow and prevents landscape scale peat loss.

Inflows that prolong the drying down of northern Taylor Slough have within and downstream ecological benefit.

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

SFWMD Everglades Ecological Recommendations, April 6th, 2021 (red is new)				
Area	Weekly change	Recommendation	Reasons	
WCA-1	Stage decreased by 0.13'	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 near05 to07 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 0.19'	Moderate the recession rate to near05 to07 feet per week.	Protect (expected) within basin wildlife and downstream habitat and wildlife from flooding stress.	
WCA-3A NE	Stage decreased by 0.15'	Moderate the recession rate to near05 to07 feet per week.	Protect within basin and downstream habitat and wildlife. Moderating	
WCA-3A NW	Stage decreased by 0.14'	Moderate the recession rate to near05 to07 feet per week.	is optimal on the landscape.	
Central WCA-3A S	Stage decreased by 0.16'	Moderate the recession rate to near05 to07 feet per	Protect within basin and downstream habitat and wildlife. Moderating	
Southern WCA-3A S	Stage decreased by 0.16'	week.	is optimal on the landscape.	
WCA-3B	Stage decreased by 0.14'	Moderate the recession rate to near05 to07 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 0.08'	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 -0.04' to -0.49'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.	
FB- Salinity	Salinity changes ranged -7.3 to +2.4 psu	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.	