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, Chief, Operations, Engineering and Construction Bureau Paul Linton, Chief, Operations Section
- **FROM:** SFWMD Staff Environmental Advisory Team
- **DATE:** March 6, 2018
- SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

The forecast is for showers with a cold front predawn through tomorrow afternoon, then showers/storms with another front on Sunday/Monday. High pressure will move away as a cold front sweeps through the District tomorrow with some light to moderate showers. Widespread light to locally moderate rainfall is expected before activity exits around sunset. Dry and cool conditions will then prevail Thursday and Friday. Warmer and more moist air will arrive on Saturday, but it will likely take until Sunday before showers and probably some thunderstorms focus north of Lake Okeechobee through Monday. The models disagree a fair bit with respect to timing and strength of Sunday's system, so its associated rains are rated with relatively low confidence at this point.

Kissimmee

Tuesday morning stages were 56.9 feet NGVD (1.1 feet below schedule) in East Lake Toho, 53.8 feet NGVD (1.2 feet below schedule) in Toho, and 50.1 feet NGVD (0.9 feet below schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.5 feet NGVD at S65A and 25.9 feet NGVD at S65D. Mean recession rates for the last seven-days in East Lake Toho, Toho, and Kissimmee-Cypress-Hatchineha were 0.17, 0.18, and 0.18 feet per week, respectively (preferred maximum rate is 0.2 feet per week). Tuesday morning discharges were: 439 cfs at S65, 305 cfs at S65A, and 534 cfs at S65E. Dissolved oxygen concentration in the Kissimmee River averaged 6.0 milligrams per liter (mg/L) for the week. Kissimmee River mean floodplain depth on Sunday was 0.11 feet.

Lake Okeechobee

Lake Okeechobee stage is 14.66 feet NGVD having decreased 0.26 feet over the past week and 0.53 feet over the last month. Lake stages have receded approximately 2.5 feet from the October peak following Hurricane Irma, but exceeded 15.0 feet NGVD for 161 days, the longest period since the winter of 2005/06. The high water and associated turbidity have had substantial impacts on the submerged aquatic and emergent vegetation coverage in the nearshore areas of the Lake, which would benefit from lower stages near the end of the 2018 dry season. Higher lake stages in the summer are correlated with algal blooms on the Lake, and total phosphorus values remained elevated in February due to continued resuspension of sediments that were disturbed during Hurricane Irma. As a result, conditions will likely be favorable for algal blooms this spring and summer as turbidity declines and water temperatures rise.

Estuaries

Total inflow to the St. Lucie Estuary averaged 136 cfs over the past week with no flow coming from Lake Okeechobee. Salinity increased throughout the estuary. The seven-day average salinity at the US1 Bridge is in the good range for adult oysters. Average weekly dissolved oxygen levels at HR1 station in the North Fork were 4.54 mg/L near the surface and 3.45 mg/L near the bottom. The highest weekly ranges of chlorophyll *a* were between $5.62 - 12.43 \mu g/L$ in the South Fork.

Total inflow to the Caloosahatchee Estuary averaged 772 cfs over the past week with 559 cfs coming from the Lake. Salinity stayed about same throughout the estuary. The 30-day moving average surface salinity is 3.8 at Val I-75 and 10.1 at Ft. Myers. The 30-day moving average salinity at Val I-75 is forecast to be 4.9 in two weeks with no flow through S-79. Salinity conditions between Val I-75 and Ft. Myers are good for tape grass. Salinity conditions are in the good range for adult oysters at Shell Point and at Cape Coral. Chlorophyll *a* concentrations are relatively low to medium near Beautiful Island (7.34 – 24.13 µg/L), Ft. Myers (5.40 – 8.58 µg/L), and Shell Point (1.64 – 3.88 µg/L) over the last week. Dissolved oxygen levels at Beautiful Island were 5.91 – 10.10 mg/L, at Ft. Myers were 5.39 – 7.64 mg/L, and at Shell Point were 4.51 – 8.69 mg/L. Given the current estuarine conditions, there are no ecological benefits associated with freshwater releases from Lake Okeechobee.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 6,300 acre-feet of Lake releases. The total amount of Lake releases sent to the STAs/FEBs in WY2018 (since May 1, 2017) is approximately 79,000 acre-feet. Most STA cells are at or above target depths, except many of the STA-5/6 cells which are below target. Operational restrictions are in place for vegetation rehabilitation in STA-1E and STA-2, and for construction related activities in STA-1W. This week, if 2008 LORS recommends Lake releases to the WCAs and the conditions allow, releases will be sent to STA-1E Eastern Flow-way, STA-2 Flow-way 1, and the A-1 FEB/STA-3/4 Western Flow-way.

Everglades

Basin-wide water depths and recession rates across most of the Everglades are creating mostly fair foraging conditions for wading birds. At this point in the season there is little need for manipulation of recession rate or depths, with the exception being northeastern WCA-3A. Maintaining open water conditions around the Alley North wading bird nesting colony is important to protect nests from terrestrial predators. Slowing recession rates to a range of 0.07 to 0.10 feet per week generates good foraging conditions. In Taylor slough, water levels remain 2 to 17 inches above the historical average for this time of year. In Florida Bay, salinities range from 3 psu below the historical average in the west to 3 psu above average in the east. Recommendations for individual areas are presented at the end of this report.

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.02 inches of rainfall in the past week and the Lower Basin received no rainfall (SFWMD Daily Rainfall Report 3/5/2018).

Upper Kissimmee Basin

Stages and departures in the Kissimmee Chain of Lakes (KCOL) are shown in Table 1.

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

 Report Date: 3/6/2018

		7-day				Schedule	Daily Departure (feet)						
Water Body	Structure	Average Discharge (cfs) ¹	Stage Monitoring Site ²	Lake Stage (feet)	Schedule Type ³	Stage (feet)	3/4/18	2/25/18	2/18/18	2/11/18	2/4/18	1/28/18	1/21/18
Lakes Hart and Mary Jane	S62	3	LKMJ	60.7	R	61.0	-0.3	-0.2	-0.1	0.1	0.0	0.0	0.0
Lakes Myrtle, Preston, and Joel	S57	0	S57	60.9	R	61.0	-0.1	-0.1	0.0	0.0	0.1	0.0	0.1
Alligator Chain	S60	0	ALLI	63.7	R	64.0	-0.3	-0.2	-0.1	0.0	-0.1	-0.1	-0.1
Lake Gentry	S63	2	LKGT	61.4	R	61.5	-0.1	0.0	0.0	0.0	0.1	0.1	0.0
East Lake Toho	S59	77	TOHOE	56.9	R	58.0	-1.1	-0.9	-0.7	-0.6	-0.4	-0.3	-0.1
Lake Toho	S61	228	TOHOW, S61	53.9	R	55.0	-1.1	-1.0	-0.8	-0.6	-0.4	-0.3	-0.2
Lakes Kissimmee, Cypress, and Hatchineha	S65	715	KUB011, LKIS5B	50.2	R	51.0	-0.8	-0.9	-1.0	-1.3	-1.7	-1.8	-1.8

¹Seven-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.

³T = temporary schedule, R = USACE flood control schedule, S = temporary snail kite schedule, A = projected ascension line, N/A= not applicable or data not available. DATA ARE PROVISIONAL

Lower Kissimmee Basin

Discharges at Lower Basin structures are shown in Table 2. SFWDAT depth maps for the Phase I restoration area are shown in Figure 8. Kissimmee River floodplain stages at selected stations are shown in Figure 9.

 Table 2. One-day and seven-day averages of discharge at S-65x structures, of dissolved oxygen concentration in the Phase I area river channel, and water depth in the Phase I area floodplain. Data are provisional real-time data from SFWMD.

Report Date:	3/6/2018											
		1-Day Average Average for the Preceeding 7-Days ¹										
Metric	Location	3/4/2018	3/4/18	2/25/18	2/18/18	2/11/18	2/4/18	1/28/18	1/21/18	1/14/18	1/7/18	12/31/17
Discharge (cfs)	S-65	570	715	968	1,000	810	785	583	572	567	540	517
Discharge (cfs)	S-65A	400	539	764	796	647	625	468	506	446	452	443
Discharge (cfs)	S-65D ²	400	730	1,047	1,018	940	857	656	692	764	696	718
Stage (feet NGVD)	S-65D ²	25.65	25.67	25.79	25.87	25.80	25.82	25.76	25.72	25.85	25.74	25.77
Discharge (cfs)	S-65E ²	400	733	1,088	1,059	978	899	712	730	837	751	777
Discharge (cfs)	S-67	0	0	133	389	350	346	241	97	404	396	399
DO (mg/L) ³	Phase I river channel	6.5	6.0	6.0	6.2	7.8	8.7	9.7	9.5	8.8	7.7	6.5
Mean depth (feet) ⁴	Phase I floodplain	0.11	0.14	0.19	0.22	0.23	0.26	0.19	0.21	0.24	0.22	0.23

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

²S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2; S-65D stage averages stage at S65D and S65DX1; S65E discharge combines S65E and S65EX1.

 ^{3}DO is the average for sondes at PC62 and PC33.

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

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

KCOL Hydrographs (through Sunday midnight)











Figure 3.







Figure 5.



Figure 6.







Figure 8. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT 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 9. Mean water depth in the northern Phase I, southern Phase I, northern Phase II/III, and southern Phase II/III areas in relation to the S65A discharge and S65D headwater stage.



Report Date: 3/6/2018; data are through: 3/4/2018.

Figure 10. Mean daily dissolved oxygen, discharge, temperature and rainfall in the Phase I river channel.



Figure 11. Phase I river channel dissolved oxygen and water temperature (measured at 15 minute intervals) and Pool BC daily rainfall.

Water Management Recommendations

Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
3/6/2018	No new recommendations.		N/A	
2/27/2018	No new recommendations.		N/A	
2/20/2018	No new recommendations.		N/A	
2/13/2018	No new recommendations.		N/A	
2/6/2018	No new recommendations.		N/A	
1/30/2018	No new recommendations.		N/A	
1/23/2018	No new recommendations.		N/A	
1/16/2018	No new recommendations.		N/A	
1/9/2018	No new recommendations.		N/A	

12/19/2017Begin discharge of 400 cfs from S67 into Istokpoga
Canal.Increase navigability by scouring channel and
reducing sandbar at canal mouth. KB Ops/SFWMD Water Implemented Mgt

12/19/2017	Begin a stage recession on January 1 in Lakes Kissimmee-Cypress-Hatchineha starting at stage on January 1 to reach low pool on May 31. Recession rate not to exceed 0.2 ft/week as possible. Subject to SFWMD planned operations hierarchy.	Achieve fish and wildlife benefits by slowing lake stage recession rates relative to the regulation schedule recession rates.	-	KB Ops/SFWMD Water Mgt
12/19/2017	Begin stage recessions on January 15 in Lakes East Toho and Toho starting at stage on January 15, to reach low pools on May 31. Recession rate not to exceed 0.2 ft/week if possible. Subject to SFWMD planned operations hierarchy.	Achieve fish and wildlife benefits by slowing lake stage recession rates relative to the regulation schedule recession rates.	-	KB Ops/SFWMD Water Mgt
12/12/2017	No new recommendations.		N/A	
12/5/2017	No new recommendations.		N/A	
11/28/2017	No new recommendations.		N/A	
11/21/2017	No new recommendations.		N/A	
11/13/2017	No new recommendations.		N/A	
11/1/2017	No new recommendations.		N/A	
10/24/2017	No new recommendations.		N/A	
10/17/2017	No new recommendations.		N/A	
10/10/2017	No new recommendations.		N/A	
10/3/2017	No new recommendations.		N/A	
9/25/2017	No new recommendations.		N/A	
9/19/2017	No new recommendations.		N/A	
9/5/2017	No new recommendations.		N/A	
8/29/2017	No new recommendations.		N/A	
8/22/2017	No new recommendations.		N/A	
8/15/2017	No new recommendations.		N/A	
8/4/2017	Increase S65A discharge by 150 cfs to about 1400	Reduce rate of stage rise in KCH		SFWMD Water Mgt, KB
0/4/201/	cfs.	Neutre rate of Stage fise III NCH.		Ops



Figure 12. Limits on rate of discharge change at S65/S65A starting with the 2016-2017 Dry Season.



Figure 13. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years.



Figure 14. The Kissimmee Basin.

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 14.66 feet NGVD for the period ending at midnight on March 5, 2018. This value is based on the use of four interior lake stations (L001, L005, L006 and LZ40) and four perimeter stations (S308, S352, S4 and S133). The Lake is now 0.53 feet lower than it was a month ago, 2.54 feet lower than its peak in mid-October, but still 1.38 feet higher than a year ago (Figure 1). The Lake is now in the Low sub-band (Figure 2). According to RAINDAR, 0.01 inches of rain fell over the Lake during the week February 27, 2018 – March 5, 2018 with most of the watershed receiving similar amounts (Figure 3).

Average daily inflows to the Lake decreased from 1,105 cfs last week to 838 cfs this week, primarily through reductions in Kissimmee River flows. Only 691 average daily cfs came from the Kissimmee River via the S65E structures this week, compared to 1,045 the previous week. The S71 and S72 structures and Fisheating Creek contributed a combined 138 average daily cfs as well.

Average daily outflows for the Lake also increased from the previous week, going from 3,088 cfs to 3,623 cfs, primarily through increases in S77 discharges and flows south through the S350 structures. S77 discharges increased from 785 cfs the previous week to 1,045 cfs this past week, while the S308 structure went from 145 cfs the previous week to 97 average daily cfs this past week. Discharges south through the S350 structures increased from an average of 1,925 cfs the previous week to 2,203 cfs this past week, and discharges to the L8 canal via Culvert 10A this week averaged 278 daily cfs compared to 234 daily cfs the previous week. The corrected evapotranspiration value for the week based on the L006 weather platform solar radiation data was 0.15 inches.

Total Lake inflows and outflows for the last week are detailed in Table 1, as well as the approximate change in Lake stage from each major structure's total flows over the period. Figure 4 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 turbidity (ntu) and total phosphorous (TP) (in ppb) levels in mid-February remained elevated, but were more similar to initial post-Hurricane Irma (September) values (Figure 5). The pelagic turbidity and TP values were still slightly higher than in September across the pelagic stations in mid-February, while the nearshore TP values were lower than September or January. The nearshore turbidity was similar to September and January values, but still well elevated above the October-December levels. The higher lake stages and high TP values could lead to algal blooms as turbidity declines and water temperatures rise later in the spring.

Chlorophyll *a* and microcystin values remained low throughout the Lake despite high TP levels, likely due to cool temperatures and high turbidity (Figure 6). The most recent satellite imagery using the cyanobacteria monitoring product derived from NOAA's OLCI satellite sensor showed cyanobacteria bloom potential has remained very low over the past five months. The potential for elevated cyanobacterial levels was last observed in the northern portion of the Lake in early September 2017 (Figure 7).

Based on the Lake Okeechobee wading bird habitat suitability index, there are approximately 55,257 acres of suitable foraging habitat for long-legged birds and 21,648 acres for long and short-legged birds on the Lake, as of March 5 (Figure 8). A helicopter survey of foraging wading bird flocks on March 1 found approximately 2,400 individuals, which was a decrease from nearly 9,500 in early January (Figure 9). These reductions correspond with a considerably slower recession rate in early-mid February, which may have affected wading bird presence through lower prey concentrations. However, three of the last four surveys have been similar to those in 2017, despite deeper water levels and roughly half the available foraging habitat for short-legged wading birds. If conditions are supportive of nesting, more foraging wading birds should be observed in the next few surveys.

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

INFLOWS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)		
S65E & S65EX1	691	0.3		
S71 & 72	120	0.0		
S84 & 84X	3	0.0		
Fisheating Creek	18	0.0		
S154	6	0.0		
S191	0	0.0		
S133 P	0	0.0		
S127 P	0	0.0		
S129 P	0	0.0		
S131 P	0	0.0		
S135 P	0	0.0		
S2 P	0	0.0		
S3 P	0	0.0		
S4 P	0	0.0		
C5	0	0.0		
Rainfall	14	0.0		
Total	852	0.3		

OUTFLOWS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S77	1045	0.4
S308	97	0.0
S351	1163	0.5
\$352	682	0.3
S354	358	0.1
L8	278	0.1
ET	2976	1.2
Total	6600	2.6

PROVISIONAL DATA

Water Management Recommendations

The Lake stage is 14.66 feet NGVD having decreased 0.26 feet from the week prior and 0.53 feet over the past month. Lake stages have been >16.0 feet NGVD three times in 2016 and 2017, exceeded 15.5 feet NGVD for 105 consecutive days this water year, and were >15.0 feet NGVD for 161 consecutive days. The high water and associated turbidity have had substantial impacts on the submerged aquatic and emergent vegetation coverage in the nearshore areas of the Lake, which would benefit from lower stages near the end of the 2018 dry season. Higher Lake stages in the summer are also correlated with algal blooms on the Lake, and TP values remained elevated in February due to continued resuspension of sediments that were disturbed during Hurricane Irma. Lower Lake stages near the end of WY2018 would help to mitigate impacts to nearshore vegetation communities and potentially reduce algal bloom severity and duration. Long, steady recessions of water levels throughout the dry season may help promote another productive year for wading birds on the Lake as well.



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



Lake Okeechobee Water Level History and Projected Stages

Figure 2. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.



Figure 3. Rainfall estimates by basin.

Figure 4. Major inflows and outflows of Lake Okeechobee, including the S350 structures designated as South. Inflows and outflows are shown as positive and negative, respectively, for visual purposes.



Figure 5. Turbidity (ntu) and total phosphorus (ppb) values from mid-February for nearshore (purple), pelagic (yellow), and lake-wide average (gray). Fisheating Bay stations were not included due to sporadic sampling across the period of record.



February 6 - 7, 2018						
Site	Chlorophyll <i>a</i> (µg/L)	Microcystin (µg/L)				
Nearshore Sta	ations					
FEBIN	NS					
FEBOUT	NS					
KISSR0.0	8.8	BDL				
LZ2	8.0	BDL				
LZ25A	4.3					
PALMOUT	7.9					
PELBAY3	3.0					
POLE3S	5.9					
POLESOUT	9.4	BDL				
RITTAE2	4.5					
Pelagic Statio	ns					
L001	4.0					
L004	3.3					
L005	5.6	BDL				
L006	4.0					
L007	5.2					
L008	5.9					
LZ30	6.5	BDL				
LZ40	4.6					
CLV10A	4.2	BDL				

Figure 6. Chlorophyll *a* (μ g/L) and microcystin (μ g/L) values for nearshore and pelagic stations for mid-February. Microcystin values below 0.20 μ g/L are below detection limit (BDL).

NOAA cyanobacteria product derived from Copernicus Sentinel-3 OLCI data from EUMETSAT



Figure 7. Potential for cyanobacterial blooms on Lake Okeechobee based on NOAA's harmful algal bloom monitoring system derived from Copernicus Sentinel-3 OLCI data from EUMETSAT.



Figure 8. Wading bird habitat suitability index for Lake Okeechobee based on the South Florida Water Depth Assessment Tool.



Figure 9. Wading bird foraging locations on March 1, 2018, and numbers per survey from Dec 2017 through Mar 1, 2018.

LAKE ISTOKPOGA

Lake Istokpoga stage is 39.17 feet NGVD as of midnight March 5, 2018 and is currently 0.33 feet below its regulation schedule to accommodate construction on downstream structures (Figure 10). Average daily inflows to the lake from Josephine Creek for the week February 27, 2018 –March 5 were slightly lower than the previous week, going from 44 cfs to 33 cfs. No data have been reported for Arbuckle Creek since July 4, 2017 as the gauge is being recalibrated after construction in the area. There was only 32 average daily cfs discharged via the S68 and S68X structures, as opposed to 0 daily cfs the previous week. According to RAINDAR, 0.001 inches of rain fell in the Lake Istokpoga basin over the past week.



Figure 7. Recent stages on Lake Istokpoga.

ESTUARIES

St. Lucie Estuary:

Last week total inflow into the St. Lucie Estuary averaged about 136 cfs (Figures 1 and 2) and last month inflow averaged about 189 cfs. Last week's provisional averaged inflows from the tidal basin and the structures are shown in Table 1.

Location	Flow (cfs)
Tidal Basin Inflow	68
S-80	0
S-308	97
S-49 on C-24	0
S-97 on C-23	0
Gordy Rd. structure on Ten Mile Creek	68

Table 1. Weekly average inflows (data is provisional)	I).
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Over the past week, salinity increased throughout the estuary (Table 2, Figures 3 and 4). The sevenday moving average salinity of the water column (an average of the surface and bottom salinity) at the US1 Bridge is 23.4. Salinity conditions in the middle estuary are in 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)	18.3 (15.2)	22.1 (17.2)	NA ¹
US1 Bridge	22.7 (20.0)	24.2 (20.8)	10.0-26.0
A1A Bridge	30.7 (28.5)	32.2 (30.3)	NA ¹

¹Envelope not applicable.

Continuous monitoring of water quality is conducted at HR1 in the North Fork. Weekly dissolved oxygen data are summarized in Table 3.

Table 3. Weekly dissolved oxygen conditions at HRT in the North Fork of the St. Lucie Estua

Location	Depth	Average DO (mg/l)	Minimum DO (mg/l)	Maximum DO (mg/l)
HR1	surface	4.54	1.37	6.68
HR1	bottom	3.45	1.10	6.06

Continuous monitoring of water quality is conducted at five Land/Ocean Biogeochemical Observatory (LOBO) stations located in the St. Lucie Estuary and maintained by Florida Atlantic University/Harbor Branch Oceanographic Institute (FAU-HBOI). Data are summarized in Table 4 and station location map is shown in Figure 5.

Table 4. Weekly ranges of instrument depth, chlorophyll *a* (a measure of algal biomass) and dissolved oxygen concentrations at five FAU-HBOI LOBO stations located in the St. Lucie Estuary.

Location	Depth (m)	Chlorophyll <i>a</i> (µg/l)	Average DO (mg/l)	Minimum DO (mg/l)	Maximum DO (mg/l)
SF2	2.79	5.62 - 12.43	1.61	0.50	3.14
SF	1.67	3.87 - 8.42	7.20	5.89	8.79
NF	2.19	3.25 - 5.8	4.09	3.02	4.84
ME	1.96	2.93 - 5.61	6.65	6.01	7.51
IRL-SLE	3.63	0.29 - 5.17	6.58	6.18	7.18

NOAA satellite imagery indicates no visible cyanobacteria bloom potential in the St. Lucie Estuary this week (Figure 12).

Caloosahatchee Estuary:

Last week total inflow into the Caloosahatchee Estuary averaged about 772 cfs (Figures 6 and 7) and last month inflow averaged about 759 cfs. Last week's provisional averaged inflows from the structures are shown in Table 5.

Location	Flow (cfs)
S-77	1045
S-78	599
S-79	707

 Table 5.
 Weekly average inflows (data is provisional).

Over the past week, salinity decreased throughout the estuary except the surface salinity at Cape Coral and Shell Point (Table 6, Figures 8 & 9). The seven-day average salinity values are within the good range for adult eastern oysters at Cape Coral and at Shell Point (Figure 10). Salinity data were not available at Sanibel. The 30-day moving average surface salinity is 4.2 at Val I-75 and 10.6 at Ft. Myers. With no flow through S-79, daily salinity at Val I-75 is forecast in two weeks to be 5.9, and the 30-day moving average is forecast to be 4.9 (Figure 11). Salinity conditions between Val I-75 and Ft. Myers are good for tape grass.

Table 6. Seven-day average salinity at six monitoring stations in the Caloosahatchee Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for tape grass (*Vallisneria americana*) at Val I-75 and for adult eastern oysters (*Crassostrea virginica*) elsewhere.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	3.3 (4.1)	3.4 (4.3)	NA ¹
*Val 175	4.5 (4.8)	6.8 (7.6)	0.0-5.0 ²
Ft. Myers Yacht Basin	11.2 (11.9)	12.5 (13.6)	NA
Cape Coral	19.7 (18.5)	20.8 (21.0)	10.0-30.0
Shell Point	29.4 (30.1)	28.6 (29.5)	10.0-30.0
Sanibel	NR ³ (NR)	NR (NR)	10.0-30.0

¹Envelope not applicable, ²Envelope is based on a 30-day average, and ³Not Reporting. *Val I75 is temporarily unavailable (salinity values are estimated using models developed for this site).

Monitoring data collected by the River, Estuary and Coastal Observing Network of Sanibel-Captiva Conservation Foundation using continuous sensors are summarized in Table 7 as concentration ranges of chlorophyll *a* and dissolved oxygen at Beautiful Island, Ft. Myers, and Shell Point in the Caloosahatchee Estuary.

Table 7. Weekly ranges of chlorophyll *a* (a measure of algal biomass) and dissolved oxygen concentrations at three monitoring stations maintained by the Sanibel-Captiva Conservation Foundation.

Baramatar Nama	RECON Monitoring Stations			
Farameter Name	Beautiful Island	Ft. Myers	Shell Point	
Chlorophyll <i>a</i> (µg/l)	7.34 – 24.13	5.40 – 8.58 one spike to 24.31	1.64 – 3.88	
Dissolved Oxygen (mg/l)	5.91 – 10.10	5.39 - 7.64	4.51 - 8.69	

The Florida Fish and Wildlife Research Institute reported on March 2, 2018, that *Karenia brevis, the Florida red tide dinoflagellate,* was observed at background to medium concentrations in fifteen samples collected from or offshore of Lee County. Fish kills were reported in Lee County; areas impacted include Big Carlos Pass, Big Hickory Island, Bonita Beach, Captiva Island, Carlos Point, Cayo Costa, Estero Island, Fort Myers Beach, Little Hickory Island, Lovers Key State Park, Pine Island Sound, San Carlos Bay, Sanibel, and offshore of St. James City.

NOAA satellite imagery indicates no visible cyanobacteria bloom potential in the Caloosahatchee Estuary this week (Figure 12).

Water Management Recommendations

Lake stage is in the Low sub-band of 2008 LORS. Tributary hydrological conditions are normal. The 2008 LORS recommends up to 450 cfs at S-79 and up to 200 cfs at S-80. Given the current estuarine conditions, there are no ecological benefits associated with freshwater releases from Lake Okeechobee.



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



Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins 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 estimated HR1 stations.



Figure 5. Location of FAU-HBOI LOBO water quality stations in the St. Lucie Estuary.



Figure 6. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.



Figure 7. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.







Figure 9. Daily mean flows at S-79 and salinity at lower estuary stations.



Figure 10. Seven-day mean salinity at Cape Coral Bridge, Shell Point, and Sanibel Bridge monitoring stations.



Figure 11. 14-day salinity forecast at Val I-75 assuming no releases at S-79.





Figure 12. Sentinel 3a Satellite imagery provided by NOAA uses Ocean and Land Color Instrument (OLCI) to estimate cyanobacteria bloom potential in Caloosahatchee Estuary.

EVERGLADES

At the gauges monitored for this report, the water depth across the Everglades fell an average of 0.11 feet last week, an increase from the week prior. Individual gauge changes in the WCAs ranged from 0.0 feet (WCA-1) to -0.17 feet (WCA-2B). Pan evaporation increased again and was estimated at 1.90 inches last week.

Everglades Region	Rainfall (Inches)	Stage Change (feet)		
WCA-1	0.10	-0.06		Good
WCA-2A	0.02	-0.09		Fair
WCA-2B	0.04	-0.17		Poor
WCA-3A	0.07	-0.12		
WCA-3B	0.10	-0.09		
ENP	0.18	-0.12		



Regulation Schedules: WCA-1 three-gauge average continues trending along the Zone A1 schedule, with the three-gauge average at 0.06 feet below. WCA-2A (subject to a temporary deviation – see inset) canal stage at gauge S11B is 0.04 feet above Zone A1, well below the temporary schedule, and falling away from the temporary schedule. WCA-3A three-gauge average stage is 0.01 feet below Zone E1 and falling away from the regulation line. WCA-3A at gauge 62 (northwest corner) stage is 0.59 feet below the upper schedule and falling away from regulation schedule.



Water Depths and Changes: The WDAT tool for spatial interpolation of depth monthly snapshots indicate a drying front in WCA-3A moving north to south, drying conditions prevailing in central WCA-2A, and deeper water conditions in WCA-1. The northeast corner of WCA-3A continues to elicit concern as the model shows depths are 0.5 to 1.0 feet below ground. Comparing WDAT water levels from present, water depths over the last week fell across most of the Everglades. Only the perimeter of southwestern WCA-2A rose slightly over the past week. Of note, the northwestern portion of WCA-2A is significantly wetter than it was a month ago, but WCA-2B is significantly drier.



Wading bird flight conducted by SFWMD on March 5, 2018:

- Building numbers in WCA-1
- Birds foraging in central WCA-2A
- Up to 20,000 birds foraging along burned area in WCA-3A North
- 20,000 pairs of white ibis nesting at the Alley North colony in northeast WCA-3A
- 1,000 wood stork nests in WCA-3A South
- 10,000 pairs of white ibis in ENP

Taylor Slough Stages: Data from ENP were only available through 3/2/2018 due to a database update. Stages decreased from 0.02 to 0.07 feet over the past week continuing the week over week decreases as the dry season progresses. Water depths range from 0.22 feet to 1.24 feet, and are 2 to 17 inches above the historical averages.

Florida Bay Salinities: Salinities mostly showed small increases this past week with changes ranging from -0.6 psu to +3.8 psu. Salinities ranged from 15 psu in the northeast to 34 psu in the western bay. This range is 3 psu below the historical average in the west to 3 psu above average in the east.







Florida Bay MFL: Mangrove zone daily average salinity remains near fresh at 0.8 psu and is slowly rising. The 30-day moving average is 0.7 psu. The weekly cumulative flow from the five creeks denoted by yellow stars on the map decreased by almost 5,000 acre-feet over the last week to end at -2,400 acre-feet. Daily flows were negative most of last week with positive flow resuming over the weekend. The 365-day moving sum of flow from the five creeks decreased over 11,000 acre-feet over the last week to end at 326,294 acre-feet (still greater than the long-term average of 257,628 acre-feet). Creek flow is provisional data from the USGS and is highly variable.



Water Management Recommendations

At this point in the season, there is little ecological need for manipulation of recession rate or depths within the WCAs, with the exception being northeastern WCA-3A. Maintaining open water conditions around the Alley North wading bird nesting colony in northeast WCA-3A is important to protect nests from terrestrial predators. Peat soils may also be protected from fire risk by extending the dry season recession in that region. Inflows to Taylor Slough continue to provide ecological benefit by slowing the recession rate in that region. Slowing recession rates across the Everglades to the optimal range for wading birds, between 0.07 and 0.10 feet per week would have an ecological benefit. More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

	SFWMD Ev	erglades	Ecological Recommendations, N	/arch 6, 2018 (red is new)
Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages decreased by 0.06'	Rainfall, ET, management	Maintain 0.07 to 0.10 feet per week recession rates.	Protect habitat and facilitate invasive plant treatments.
WCA-2A	Stages decreased by 0.09'	Rainfall, ET, management	Maintain current recession rates.	Foster conditions for wildlife and optimal wading bird foraging.
WCA-2B	Stages decreased by 0.17'	Rainfall, ET, management	Maintain depths at regulation schedule or slightly above.	Protect upstream/downstream habitat and wildlife. Foster conditions for wading bird foraging.
WCA-3A NE	Stages decreased by 0.13'	Rainfall, ET, management	Slower recession rates with additional inflows would be beneficial.	Protect habitat and wildlife, foster conditions for wading bird foraging and
WCA-3A NW	Stages decreased by 0.12'	Rainfall, ET, management	Manage for 0.07 to 0.10 feet per week recession rates.	protect nesting habitat.
Central WCA-3A S	Stages decreased by 0.16'	Rainfall, ET, management	Manage for 0.07 to 0.40 feet nor week second in other	Period ad bability and wildlife factor and time for undire bird face rise
Southern WCA-3A S	Stages decreased by 0.08'	Rainfall, ET, management	manage for 0.07 to 0.10 red per week recession rates.	Protect nabilat and wildlife, loster conditions for wading bird loraging.
WCA-3B	Stages decreased by 0.09'	Rainfall, ET, management	Maintain depths at regulation schedule.	Protect habitat and wildlife.
ENP-SRS	Stages decreased by 0.12'	ET, rainfall, topography, management	Make discharges to the Park according to the 2012 WCP rainfall plan.	Keep peat wet to promote native habitat and maintain wetland plant and animal communities.
Taylor Slough	Stage changes ranged from -0.02' to -0.07'	Rain, ET, inflows	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -0.6 to +3.8 psu	Rain, ET, inflows, wind	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.