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:** June 19, 2018
- SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

An extremely dry and stable low to mid-level air mass is forecast to dominate the District's weather during the next couple of days, inhibiting shower and thunderstorm activity typical of June. In fact, over most of the northern and eastern part of the District, little to no rain is expected. The only rain of consequence is forecast near or inland of the lower east coast during the morning to possibly the early afternoon each day and, with prevailing northeasterly winds, the rains should migrate inland over the far south and west and approach the coast. The District rains of no more than a few hundredths of an inch on these two days should result in well below normal rainfall (the climatological average is around 0.29" per day). As the low to mid-level winds shift southwesterly to westerly, some increase in low-level moisture is likely even though the dry mid-level air will be slow to mix out. As a result, only a marginal and gradual increase in shower and thunderstorm activity is forecast on Thursday and Friday, with the area-average rainfall still expected to be below normal. When high pressure builds into Florida from the western Atlantic beginning Saturday, a southeasterly wind flow will transport greater moisture into the District. This change should pave the way for a more typical pattern for June, with near to above normal precipitation likely from the weekend into early next week. Sunday appears to be the wettest of the days during this period, and with the probabilistic guidance showing at least a 25% chance of well above normal rains on that day, it is possible that the current forecast would have to be modified upward in future forecast cycles. For the week ending next Tuesday morning, the deterministic quantitative precipitation forecast (QPF) is a little over 50% of normal for the District, but with considerable uncertainty regarding exactly when the rains late this week or weekend will begin to ramp up as well as the magnitude of the change, it is guite possible that the week-long District rains could be higher.

Kissimmee

Tuesday morning stages were 55.5 feet NGVD (1.0 feet below schedule) in East Lake Toho, 52.6 feet NGVD (0.9 feet below schedule) in Toho, and 50.1 feet NGVD (0.9 feet below schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.3 feet NGVD at S-65A and 26.7 feet NGVD at S-65D. Tuesday morning discharges were: 1,050 cfs at S-65, 1,036 cfs at S-65A, and 2,553 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 1.4 mg/L for the week. Kissimmee River mean floodplain depth on Sunday was 0.85 feet. The recommendation this week is to reduce discharge at S-65A by 150-300 cfs over the weekend to slow or stop the dissolved oxygen decline in the Kissimmee River.

Lake Okeechobee

Lake Okeechobee stage is 14.07 feet NGVD having decreased 0.08 feet over the past week and 0.15 feet over the past two weeks. The Lake was below 13.0 feet NGVD for just 10 days and likely rose too quickly for many recovering submerged aquatic vegetation (SAV) communities to stay in optimal light conditions. The seasonal low for the 2018 growing season of 12.83 feet NGVD was the third highest since 2011, and the third time in six years that stage did not reach the bottom of the preferred stage envelope (12.5 – 15.5 feet NGVD). Due to record rainfall in May, the SAV coverage on the Lake will likely remain at minimal levels throughout the growing season and well into next year, prolonging impacts from high stages in 2016 and Hurricane Irma in 2017. Cyanobacteria bloom potential increased rapidly over the past week, and will likely remain elevated throughout the summer, particularly during stretches of fewer storms and low winds.

Estuaries

Last week total inflow to the St. Lucie Estuary averaged 3,911 cfs with 1,432 cfs coming from Lake Okeechobee. Salinity increased over the last week throughout the estuary, though remained low. The seven-day moving average salinity at the US1 bridge was estimated at 2.3, which is in the poor range for the adult eastern oyster. NOAA satellite imagery from June 12, 2018 indicates slight visible cyanobacteria bloom potential in the South Fork of the St. Lucie Estuary this week. Total inflow last week to the Caloosahatchee River Estuary averaged 8,121 cfs with 4,129 cfs coming from Lake Okeechobee. Salinity was similar to last week in the upstream portion of the estuary, with averages below 1, and there was a slight increase in the downstream stations over the past week. At a seven-day average salinity of <1, the more upstream site of Cape Coral is in the poor salinity range for the adult eastern oyster, but further downstream at Shell Point salinity is in the fair range with seven-day bottom salinity average of 9.7. NOAA satellite imagery indicates no visible cyanobacteria bloom

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 2,800 acre-feet of Lake releases. The total amount of Lake releases sent to the STAs/FEBs in WY2019 (since May 1, 2018) is approximately 6,500 acre-feet. Most STA cells are at or above target depths. Operational restrictions are in place for vegetation rehabilitation in STA-1E, STA-2, and STA-3/4. The nest of an Endangered Species Act protected species has been observed in STA-1E. This week, if 2008 LORS recommends Lake releases to the WCAs and the conditions allow, releases will be sent to the A-1 FEB/STA-3/4 and STA-2.

Everglades

Marsh stages within WCA-1 and WCA-2A have fallen towards the regulation schedule while the 3gauge average stage in WCA-3A continues to increase above the schedule. Keeping depths below 2.5 feet at gauge 65 in WCA-3A is important to moderate the stress to tree islands caused by flooding when durations last longer than 60-90 days. Depths equaled that mark on June 13 (5 days earlier than last year). The depth on Sunday at that location was 2.59 feet. In Taylor Slough, water depths increased on average by 0.06 feet and are 5 to 8 inches above the historical averages. Salinities increased 0.1 psu on average in Florida Bay, and are 3 to 12 psu below the historical averages.

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 1.68 inches of rainfall in the past week and the Lower Basin received 1.90 inches (SFWMD NEXRAD 6/18/2018).

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: 6/19/2018

		7-day				Schedule	Daily Departure (feet)						
Water Body	Structure	Average Discharge (cfs) ¹	Stage Monitoring Site ²	Lake Stage (feet)	ke Stage Schedule (feet) Type ³	Schedule Stage Type ³ (feet)	6/17/18	6/10/18	6/3/18	5/27/18	5/20/18	5/13/18	5/6/18
Lakes Hart and Mary Jane	S-62	150	LKMJ	60.0	R	60.0	0.0	0.0	0.0	-0.1	0.0	-0.2	-0.2
Lakes Myrtle, Preston, and Joel	S-57	0	S-57	61.0	R	61.0	0.0	-0.4	-0.7	0.0	0.0	-0.2	-0.1
Alligator Chain	S-60	0	ALLI	63.1	R	63.2	-0.1	-0.6	-1.0	0.0	0.0	0.0	0.0
Lake Gentry	S-63	0	LKGT	60.4	R	61.0	-0.6	-1.0	-1.3	0.1	0.2	0.0	0.0
East Lake Toho	S-59	340	TOHOE	55.5	R	56.5	-1.0	-1.2	-1.4	-0.2	-0.1	-0.3	-0.4
Lake Toho	S-61	778	TOHOW, S-61	52.6	R	53.5	-0.9	-1.2	-1.4	-0.1	-0.2	-0.3	-0.4
Lakes Kissimmee, Cypress, and Hatchineha	S-65	1,110	KUB011, LKIS5B	50.1	R	51.0	-0.9	-0.9	-1.1	0.4	0.1	-0.7	-0.8

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:	6/19/2018											
		1-Day Average Average for the Preceeding 7-Days ¹										
Metric	Location	6/17/2018	6/17/18	6/10/18	6/3/18	5/27/18	5/20/18	5/13/18	5/6/18	4/29/18	4/22/18	4/15/18
Discharge (cfs)	S-65	1,061	1,110	915	1,092	1,271	854	381	338	354	372	424
Discharge (cfs)	S-65A ²	1,138	1,224	1,043	1,139	1,142	700	272	245	248	258	324
Discharge (cfs)	S-65D ²	2,070	2,062	1,925	1,869	1,495	781	323	304	341	362	384
Headwater Stage (feet NGVD)	S-65D ²	26.74	26.82	26.86	27.00	26.08	25.72	25.83	25.89	25.81	25.77	25.86
Discharge (cfs)	S-65E ²	2,239	2,261	2,107	2,082	1,623	824	290	263	304	318	355
Discharge (cfs)	S-67	272	273	278	282	298	332	71	0	0	0	1
DO (mg/L) ³	Phase I river channel	1.5	1.4	1.7	3.4	4.8	5.7	7.5	7.9	7.1	7.2	6.2
Mean depth (feet) ⁴	Phase I floodplain	0.85	0.84	0.75	0.65	0.46	0.17	0.06	0.06	0.06	0.07	0.07

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

²S-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 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 2.



Figure 3.















Figure 7.



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 at stage recorders in the northern Phase I, southern Phase I, northern Phase II/III, and southern Phase II/III areas in relation to the S-65A discharge and S-65D headwater stage.





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

Water Management Recommendations

Kissimmee Basin Adaptive Per	ommendations and (Derational Actions
Kissimmee basin Adaptive Reco	ommendations and C	operational Actions

Recommendation Date	Recommendation	Purpose	Outcome	Source	Report Date
6/15/2018	Reduce S-65A discharge by 150-300 cfs over the weekend.	Slow or stop DO decline in Kissimmee River.	Implemented	KB Ops	6/19/2018
6/12/2018	No new recommendations.		N/A		6/12/2018
6/5/2018	No new recommendations.		N/A		6/5/2018
5/29/2018	Begin implementation of the 2018 Wet Season Discharge Plan for S-65/S-65A on June 1 (see figure).	Provide variable flow from S-65/S-65A to balance Kissimmee River and Headwaters Lakes objectives including Kissimmee River floodplain inundation, moderated rates of change in discharge, and constrained rate of stage rise in the lakes.	Planned	KB Ops/SFWMD Water Mgt/FWC/FWS	5/29/2018
5/22/2018	Hold Kissimmee-Cypress-Hatchineha at current stage of approximately 49.5 ft until June 1.	(a) Reduce impacts of rising water on DO in the Kissimmee River; and (b) limit stage reversal in KCH to <1 foot to protect snail kite nests.	Implemented	KB Ops/SFWMD Water Mgt	5/29/2018
5/18/2018- 5/20/2018	Increase discharge gradually in response to rainfall in consultation with KB staff.	(a) Reduce impacts of rising water on DO in the Kissimmee River; and (b) limit stage reversal in KCH to <1 foot to protect snail kite nests.	Implemented	KB Ops	5/22/2018
5/15/2018	Adjust S-65/S-65A discharge over the next few days to avoid additional stage rise in Kissimmee- Cypress-Hatchineha. Make any needed discharge changes gradually in consultation with Kissimmee Basin staff to reduce potential effects on Kissimmee River dissolved oxygen.	Protect Lake Kissimmee snail kite nests from rising water if there is additional rainfall.	N/A	KB Ops	5/22/2018
5/8/2018	No new recommendations.		N/A		5/8/2018
5/1/2018	No new recommendations.		N/A		5/1/2018
4/24/2018	No new recommendations.		N/A		4/24/2018
4/17/2018	No new recommendations.		N/A		4/17/2018
4/10/2018	No new recommendations.		N/A		4/10/2018
4/3/2018	No new recommendations.		N/A		4/3/2018
3/27/2018	No new recommendations.		N/A		3/27/2018
3/20/2018	No new recommendations.		N/A		3/20/2018
3/13/2018	No new recommendations.		N/A		3/13/2018
3/6/2018	No new recommendations.		<u>N/A</u>		3/6/2018
2/27/2018	No new recommendations.		N/A		2/2//2018
2/20/2018	No new recommendations.		N/A		2/20/2018
2/13/2018	No new recommendations.		N/A		2/13/2018
2/6/2018	No new recommendations.		N/A		2/6/2018
1/30/2018	No new recommendations.		N/A		1/30/2018
1/23/2018	No new recommendations.		N/A		1/23/2018
1/16/2018	No new recommendations.		N/A		1/16/2018
1/9/2018	No new recommendations.		N/A		1/9/2018
12/19/2017	Begin discharge of 400 cfs from S67 into Istokpoga Canal.	Increase navigability by scouring channel and reducing sandbar at canal mouth.	Implemented	KB Ops/SFWMD Water Mgt	12/19/2017
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
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	12/19/2017
12/12/2017	No new recommendations.		N/A		12/12/2017
12/5/2017	No new recommendations.		N/A		12/5/2017
11/28/2017	No new recommendations.		N/A		11/28/2017
11/21/2017	No new recommendations.		N/A		11/21/2017
11/13/2017	No new recommendations.		N/A		11/14/2017
11/1/2017	No new recommendations.		N/A		11/7/2017
10/24/2017	No new recommendations.		N/A		10/24/2017
10/17/2017	No new recommendations.		N/A		10/17/2017



Figure 11. The 2018 Wet Season Discharge Plan for S-65/S-65A.



Figure 12. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years.



Figure 13. The Kissimmee Basin.

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 14.07 feet NGVD for the period ending at midnight on June 18, 2018. This value is based on the use of four interior Lake stations (L001, L005, L006 and LZ40) and four perimeter stations (S-308, S-352, S-4 and S-133). The Lake is now 0.66 feet higher than it was a month ago and 2.02 feet higher than a year ago (Figure 1). The Lake is now in the Low sub-band (Figure 2). According to RAINDAR, 0.81 inches of rain fell over the Lake during the week June 12 – June 18, 2018. Much of the northern watershed received between 1 – 3 inches (Figure 3).

Average daily inflows to the Lake decreased slightly from the previous week, going from 4,713 cfs to 4,416 cfs. The largest inflow was from the Kissimmee River through the S-65E structures, averaging 2,281 cfs for the week, about 180 cfs higher than the previous week. The Istokpoga and Indian Prairie basins, with a combined 1,480 average daily cfs through the S-84 and S-71 & S-72 structures had the second highest inflows, similar to the previous week. Backflows through Culvert 10A from the L-8 Canal declined for the second straight week, from 1,089 cfs three weeks ago to 438 cfs for the previous week, and to 131 cfs for this past week (Table 1). There have been no inflows from the S-2 or S-3 pumps during the wet season thus far.

Discharges via the S-77 and S-308 structures were similar to the previous week, but total outflows increased slightly from 5,383 average daily cfs to 5,846 this past week. S-77 flows averaged slightly higher at 4,129 cfs versus 4,067 cfs the previous week, while S-308 increased from 1,315 cfs to 1,432 cfs this past week. Outflows to the south began through the S-354 structure on June 14, averaging 284 daily cfs for the week. The corrected average daily evapotranspiration value for the week based on the L006 weather platform solar radiation increased from the previous week to 0.18 inches.

Total Lake inflows and outflows for the past 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.

Quarterly monitoring of submerged aquatic vegetation (SAV) took place in late May to early June and found that SAV coverage on the Lake is exceptionally low, similar to post-hurricane levels in 2006. Only one location near King's Bar on the northwest side of the Lake, which is generally protected from wind and wave action and higher turbidity levels, had SAV (Figure 5). Water quality samples collected on June 5 – June 6, 2018 showed chlorophyll *a* (Chla) values were elevated in several areas of the Lake, with five stations having values $22 - 35 \mu g/L$ and one with $44 \mu g/L$ (Figure 6). Algal blooms are defined by the District as having Chla values >40 $\mu g/L$. No sites had detectable levels of microcystin. The most recent satellite imagery using the cyanobacteria monitoring product derived from NOAA's OLCI satellite sensor showed the potential for a cyanobacteria bloom rapidly increased over the past week, going from low lake-wide to high and moderate potential through much of the southern lobe, as well as along the shore of the Indian Prairie marsh (Figure 7).

Water Management Recommendations

Lake Okeechobee stage is 14.07 feet NGVD having decreased 0.08 feet over the past week and 0.15 feet over the past two weeks. The Lake was below 13.0 feet NGVD for just 10 days and likely rose too quickly for many recovering SAV communities to stay in optimal light conditions. The seasonal low for the 2018 growing season of 12.83 feet NGVD was the third highest since 2011, and the third time in six years that stage did not reach the bottom of the preferred stage envelope (12.5 – 15.5 feet NGVD). Avoiding a seventh consecutive year with stages greater than 15.5 feet NGVD would be beneficial to the struggling nearshore SAV communities. Given the lack of substantial low-water levels this dry season, SAV coverage on the Lake will likely remain at minimal levels throughout the growing season and well into next year, prolonging impacts from high stages in 2016 and Hurricane Irma in 2017.

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

INFLOWS	Previous Week Avg Daily cfs	Avg Daily Inflow cfs	Equivalent Depth Week Total (in)
S65E & S65EX1	2103	2281	0.9
S71 & 72	272	415	0.2
S84 & 84X	1159	1065	0.4
Fisheating Creek	138	226	0.1
S154	81	41	0.0
S191	293	159	0.1
S133 P	114	49	0.0
S127 P	27	12	0.0
S129 P	36	12	0.0
S131 P	6	3	0.0
S135 P	45	21	0.0
S2 P	0	0	0.0
S3 P	0	0	0.0
S4 P	0	1	0.0
L8 Backflow	438	131	0.1
Rainfall	3059	2227	0.8
Total	7772	6643	2.6

OUTFLOWS	Previous Week Avg Daily cfs	Avg Daily Outflow cfs	Equivalent Depth Week Total (in)
S77	4067	4129	1.7
S308	1315	1432	0.6
S351	0	0	0.0
S352	0	0	0.0
S354	0	284	0.1
L8 Outflow	0	0	0.0
ET	3031	3445	1.4
Total	8414	9290	3.8

PROVISIONAL DATA



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.



SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES FROM: 0530 EST, 06/12/2018 THROUGH: 0530 EST, 06/19/2018

Figure 3. Rainfall estimates by basin.



Figure 4. Major inflows and outflows of Lake Okeechobee, including the S-350 structures designated as South. The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the lake. Inflows and outflows are shown as positive and negative, respectively, for visual purposes.



Figure 5. Results of quarterly submerged aquatic vegetation sampling conducted in late May to early June. Yellow indicates presence of plants and red indicates no plants were sampled.

		June 5-6, 2018	3
Water Quality Stations June 2018	Site	Chlorophyll <i>a</i> (µg/L)	Microcystin (µg/L)
KISSR0.0	Nearshore St	ations	
	FEBIN	Not sampled	
	FEBOUT	Not sampled	
	KISSR0.0	12.8	BDL
POLESOUI	LZ2	23.8	BDL
	LZ25A	13.9	
FFBOUT L004	PALMOUT	13.5	
L005 L008	PELBAY3	17.3	
FEBIN +	POLE3S	9.2	
CLV10A	POLESOUT	29.4	BDL
	RITTAE2	12.9	
	Pelagic Static	ons	
PALMOUT	L001	19.6	
+ L006	L004	10.8	
SFWMD Instantanous Water Quality Data	L005	28.4	BDL
	L006	13.8	
+ PELBAY3	L007	12.0	
+ 20 - 40 ●>0.2 POLE3S	L008	31.2	
× 40 - 80	LZ30	22.2	BDL
RITTAE2	LZ40	35.3	
Site not sampled	CLV10A	44.2	BDL

Figure 6. Chlorophyll *a* (μ g/L) and microcystin (μ g/L) values for nearshore and pelagic stations for early June 2018. Microcystin values below 0.20 μ g/L are below detection limit (BDL).



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

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged about 3,911 cfs (Figures 1 and 2) and last month inflow averaged about 5,719 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	264
S-80	1,811
S-308	1,432
S-49 on C-24	571
S-97 on C-23	397
Gordy Rd. structure on Ten Mile Creek	868

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

Over the past week, surface salinity increased throughout the estuary (Table 2, Figures 3 and 4). The seven-day moving average salinity of the water column (an average of the surface and bottom salinity) at the US1 Bridge is estimated to be 2.3. Salinity conditions in the middle estuary are within the poor 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)	0.5 (0.4)	0.5 (0.4)	NA ¹
US1 Bridge	1.7 (1.3)	2.8 (NR)	10.0-26.0
A1A Bridge	8.0 (5.8)	17.3 (17.4)	NA ¹

¹Envelope not applicable, NR=not reporting

NOAA satellite imagery indicates slight cyanobacteria bloom potential in the St. Lucie Estuary this week (Figure 5).

Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged about 8,121 cfs (Figures 6 and 7) and last month inflow averaged about 6,878 cfs. Last week's provisional averaged inflows from the structures are shown in Table 3.

Table 5. Weekly average minowe	s (uata 13 provisional).
Location	Flow (cfs)
S-77	4,129
S-78	4,827
S-79	6,852
Tidal Basin Inflow	1,269

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

Over the past week in the estuary, surface salinity remained about the same to Cape Coral and increased slightly downstream (Table 4, Figures 8 & 9). The seven-day average salinity values are in the good range for adult eastern oysters at Shell Point and in the poor range at Cape Coral (Figure 10). Salinity data were not available at Sanibel. The 30-day moving average surface salinity is 0.6 at Val I-75 and 2.3 at Ft. Myers. Salinity conditions between Val I-75 and Ft. Myers are good for tape grass.

Table 4. 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.

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Sampling Site	Surface	Bottom	Envelope	
S-79 (Franklin Lock)	0.2 (0.2)	0.2 (0.2)	NA ¹	
Val 175	0.2 (0.2)	0.2 (0.3)	0.0-5.0 ²	
Ft. Myers Yacht Basin	0.3 (0.3)	0.3 (0.3)	NA	
Cape Coral	0.7 (0.6)	0.8 (0.6)	10.0-30.0	
Shell Point	10.9 (8.7)	9.7 (9.7)	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.

The Florida Fish and Wildlife Research Institute reported on June 15, 2018, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background to medium concentrations in seven samples collected from or offshore of Lee County. Fish kills and respiratory irritation were reported in Lee County over the past week.

NOAA satellite imagery indicates low cyanobacteria bloom potential in the Caloosahatchee Estuary this week (Figure 11).

Water Management Recommendations

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. Total daily 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 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.



Figure 5. Sentinel 3a Satellite imagery provided by NOAA uses Ocean and Land Color Instrument (OLCI) to estimate cyanobacteria bloom potential in St. Lucie Estuary.



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



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

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

Figure 11. 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, stages in WCA-1, WCA-2A and WCA-2B fell an average of 0.15 feet last week while the remainder of the Everglades basins rose an average of 0.10 feet. Individual gauge changes within the WCAs ranged from -0.52 feet (WCA-2A) to +0.23 feet (WCA-3A central). Pan evaporation was estimated at 1.64 inches.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	1.42	-0.11
WCA-2A	1.20	-0.52
WCA-2B	1.06	-0.02
WCA-3A	0.72	+0.11
WCA-3B	1.25	+0.12
ENP	1.11	+0.06

Regulation Schedules: WCA-1 three-gauge average stage is 0.78 feet above Zone A1 and is trending towards the regulation schedule. Stage at gauge 1-8C is above Zone A1. WCA-2A marsh stage is 2.43 feet above Zone A and S-11B headwater stage is 1.41 above. WCA-3A three-gauge average stage continues to steadily increase and is now 1.25 feet above Zone A. WCA-3A stage at gauge 62 (northwest corner) is following the upper schedule.

Water Depths and Changes: The WDAT tool for spatial interpolation of depth monthly snapshots indicates rapidly hydrating WCA-3A, ponding in southern WCA-2A and somewhat drier conditions in northeast WCA-1. In northern WCA-3A, water depths range from 0.0 feet in the northeast to greater than 2.5 feet in the southeast corner. Deep water conditions are occurring near northern reaches of L-67 in WCA-3A South. Comparing WDAT water depths from present, last week the depths decreased across WCA-1 and in WCA-2A and northwest WCA-3A. WCA-3A is considerably wetter at this time than it was a month ago, significantly so in the eastern half of northern WCA-3A. Looking back one year, northwest WCA-3A is drier while WCA-3B is wetter. WCA-2A is significantly drier.

Taylor Slough Water Levels: An average of 0.8 inches of rain fell on Taylor Slough and Florida Bay with a maximum of 3.6 inches falling on northern Taylor Slough. Stage changes this week ranged from -0.03 feet to +0.29 feet and averaged +0.06 feet. The decrease occurred in the panhandle region of Everglades National Park. Water depths are 5 to 8 inches above the historical averages.

Florida Bay Salinities: Salinities increased 0.1 psu on average in Florida Bay, with changes ranging from -3.2 psu to +3.8 psu. Salinities ranged from 12 psu in the northeast to 34 psu in the western bay. This range is 3 to 12 psu below the historical averages.

Florida Bay MFL: Mangrove zone daily average salinity stayed at 2 psu this week with only minor fluctuations within 0.3 psu occurring during the week. The 30-day moving average decreased 4.2 psu this week to end at 10.2 psu. The weekly cumulative flow from the five creeks denoted by yellow stars on the map totaled 4,500 acre-feet for the last week. The 365-day moving sum of flow from the five creeks ended the week at 344,332 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

Inflows to northern WCA-3A create the least ecological stress when compared to flows into southern WCA-3A or to WCA-2A. The stage at gauge 3-65 in southern WCA-3A reached the 2.5-foot depth threshold on June 13, 2018. Depths above 2.5 feet result in tree island flooding which has a negative impact on ecological functioning when the duration of flooding exceeds 60 to 120 days. Incremental change in the rate of structural flows (i.e. when changing flow rates from 0 cfs to 1,000 cfs, make 500 cfs adjustment per week) into the WCAs is more ecologically sensitive than abrupt rate changes. Ascension rates are now critical for apple snail reproduction in the Everglades. The current recommended stage ascension rate is less than 0.25 feet per week (or 0.5 feet per 2 weeks). More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

SFWMD Everglades Ecological Recommendations, June 19th, 2018 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.13'	Maintain depths at regulation schedule.	Protect upstream/downstream habitat and wildlife.
WCA-2A	Stage decreased by 0.52'	Maintain depths at or above regulation schedule.	Protect upstream/downstream habitat and wildlife.
WCA-2B	Stage decreased by 0.02'	Maintain depths at regulation schedule. Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect upstream/downstream habitat and wildlife.
WCA-3A NE	Stage increased by 0.06'	Maintain depths at regulation schedule. Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect upstream/downstream habitat and wildlife.
WCA-3A NW	Stage decreased by 0.04'	Maintain depths at regulation schedule. Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	
Central WCA-3A S	Stage increased by 0.23'	Maintain depths at regulation schedule. Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect upstream/downstream habitat and wildlife.
Southern WCA-3A S	Stage increased by 0.17'		
WCA-3B	Stage increased by 0.12'	Maintain depths at regulation schedule. Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect upstream/downstream habitat and wildlife.
ENP-SRS	Stage increased by 0.06'	Make discharges to the Park according to the 2012 WCP rainfall plan.	Protect upstream/downstream habitat and wildlife.
Taylor Slough	Stage changes ranged from -0.03' to +0.29'	Move water southward as possible. Limit increases in the L- 31W to less than 3 inches per day for 3-4 weeks to allow for reductions in phosphorus concentrations.	When available, provide freshwater buffer for downstream conditions. Decrease potential for high phosphorus input to ENP.
FB- Salinity	Salinity changes ranged -3.2 to +3.8 psu.	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.