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

M E M O R A N D U M

TO: John Mitnik, Chief, Operations, Engineering and Construction Bureau
Paul Linton, Chief, Operations Section

FROM: SFWMD Staff Environmental Advisory Team

DATE: June 5, 2018

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Increasing atmospheric instability and near average moisture over the District should set the stage for a greater coverage of rainfall today relative to the last couple of days. The one negative factor, however, continues to be the presence of dry mid-level air, which may frustrate shower and thunderstorm development until at least late morning or possibly early afternoon. The convective inhibition should be lower in a zone extending from the west-central Florida coast through Lake Okeechobee and surrounding areas to portions of the middle and upper east coast, and these areas are likely to see the greatest concentration of showers and thunderstorms. With a still anomalous westerly flow across the state, the cells that form should move from west to east across the District. A well-defined mid- to upper-level trough over the eastern third of the United States is forecast to dig southward into the Gulf of Mexico tonight and Wednesday, and the strong upper-level diffluence accompanying this feature should result in substantially greater rain coverage and rainfall intensity on Wednesday. The rains could start over portions of the Kissimmee valley Wednesday morning, and then intensify and possibly become widespread around and north of Lake Okeechobee; scattered to occasionally numerous showers and thunderstorms are likely south of Lake Okeechobee, especially closer to the east coast. Above normal rainfall is predicted on Thursday as the long tail of the trough in the eastern United States remains in a favorable position to enhance rains over Florida. The rains should begin to ease Friday as the axis of the upper trough swings east of the District, but near average rainfall is still expected. Drying is forecast to commence by the weekend, with a likelihood of slightly below to below average rains from Saturday-Monday. For the week ending next Tuesday morning, rainfall should be near to above average near and north of Lake Okeechobee, with near to below average rains south of the Lake (generally drier farther south).

Kissimmee

Tuesday morning stages were 55.1 feet NGVD (1.4 feet below schedule) in East Lake Toho, 52.1 feet NGVD (1.4 feet below schedule) in Toho, and 49.8 feet NGVD (1.2 feet below schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.3 feet NGVD at S-65A and 26.9 feet NGVD at S-65D. Mean recession rates for the last seven days ending on 5/31/18 were 0.14 and 0.08 feet per week in East Lake Toho and Toho, respectively (preferred range of 0.15-0.2 feet per week); the recession in Kissimmee-Cypress-Hatchineha ended due to unseasonal rainfall, with a low stage of 48.92 feet NGVD on 5/13/2018. Tuesday morning discharges were: 1,106 cfs at S-65, 1,128 cfs at S-65A, and 2,076 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 4.1 mg/L for the week. Kissimmee River mean floodplain depth on Sunday was 0.69 feet.

Lake Okeechobee

Lake Okeechobee stage is 14.22 feet NGVD having increased 1.18 feet over the past three weeks, although it stabilized over the past four days. The Lake was below 13.0 feet NGVD for only 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 the 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. Additionally, wading bird foraging activity has essentially ceased on the Lake, falling to under 400 individuals for the second consecutive survey, compared to nearly 15,000 in mid-May of 2017 when water levels were still quickly receding. The remaining colonies now appear dependent on foraging habitat outside the Lake to support nesting activity.

Estuaries

Total inflow to the St. Lucie Estuary averaged 5,496 cfs over the past week with 583 cfs coming from Lake Okeechobee. Salinity remained low throughout the estuary. The seven-day average salinity at the US1 Bridge is in the poor range for adult eastern oysters. The highest weekly ranges of chlorophyll *a* were 1.29 – 10.83 µg/L in the middle Estuary. The lowest weekly ranges of dissolved oxygen levels were 4.26 – 6.95 mg/L in the North Fork. Total inflow to the Caloosahatchee Estuary averaged 7,337 cfs over the past week with 1,901 cfs coming from the Lake. Salinity decreased throughout the estuary. The 30-day moving average surface salinity is 2.3 at Val I-75 and 7.4 at Ft. Myers. Salinity conditions between Val I-75 and Ft. Myers are good for tape grass. Salinity conditions are in the good range for adult eastern oysters at Cape Coral and at Shell Point. The highest weekly ranges of chlorophyll *a* were 1.52 – 14.38 µg/L at Ft. Myers. The lowest weekly ranges of dissolved oxygen levels were 3.70 – 6.75 mg/L at Ft. Myers. 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 did not receive Lake releases. The total amount of Lake releases sent to the STAs/FEBs in WY2019 (since May 1, 2018) is approximately 3,800 acre-feet. Most STA cells are at or above target depths, including STA-5/6 cells which were previously in dryout. Operational restrictions are in place for vegetation rehabilitation in STA-1E, STA-2, and STA-3/4. The nests of Endangered Species Act (ESA) protected species and Migratory Bird Treaty Act (MBTA) protected species have been observed in STA-1E, and the nests of MBTA protected species have been observed in STA-5/6. Due to recent basin runoff, it is recommended that no Lake Releases be sent to the STAs/FEBs this week.

Everglades

Water depths in WCA-2A have risen quickly. Stage at gauge 2-17 increased 1.25 feet over the last two weeks and is 3.0 feet above schedule. Water depths in WCA-3A have also increased, primarily at the northernmost gauges. In the northwest at gauge 62, water depths have risen 1.09 feet over the last two weeks and the depth is 1.42 feet. In the northeast at gauge 63, water depths have risen 1.53 feet and the depth is 2.34 feet. In the central region at gauge 64, water depths have risen 0.66 feet and the depth is 1.91 feet. In the southern region at gauge 65, water depths have risen 0.19 feet and the depth is 2.25 feet. In Taylor Slough, water depths are 7 to 13 inches above the historical averages (compared to 12 to 20 inches above average from last week). Salinities decreased 2.6 psu on average in Florida Bay.

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 2.27 inches of rainfall in the past week and the Lower Basin received 1.67 inches (SFWMD NEXRAD 6/4/2018).

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: 6/5/2018

Water Body	Structure	7-day Average Discharge (cfs)[1]	Stage Monitoring Site[2]	Lake Stage (feet)	Schedule Type[3]	Schedule Stage (feet)	Daily Departure (feet)						
							6/3/18	5/27/18	5/20/18	5/13/18	5/6/18	4/29/18	4/22/18
Lakes Hart and Mary Jane	S-62	7	LKMJ	60.0	R	60.0	**0.0**	-0.1	0.0	-0.2	-0.2	-0.2	-0.2
Lakes Myrtle, Preston, and Joel	S-57	5	S-57	60.3	R	61.0	**-0.7**	0.0	0.0	-0.2	-0.1	-0.1	0.0
Alligator Chain	S-60	95	ALLI	62.2	R	63.2	**-1.0**	0.0	0.0	0.0	0.0	-0.1	0.1
Lake Gentry	S-63	144	LKGT	59.7	R	61.0	**-1.3**	0.1	0.2	0.0	0.0	0.0	0.0
East Lake Toho	S-59	158	TOHOE	55.1	R	56.5	**-1.4**	-0.2	-0.1	-0.3	-0.4	-0.6	-0.7
Lake Toho	S-61	816	TOHOW, S-61	52.1	R	53.5	**-1.4**	-0.1	-0.2	-0.3	-0.4	-0.6	-0.7
Lakes Kissimmee, Cypress, and Hatchineha	S-65	1,092	KUB011, LKIS5B	49.9	R	51.0	**-1.1**	0.4	0.1	-0.7	-0.8	-0.8	-0.9

[1] Seven-day average of weighted daily means through midnight.
[2] Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.
[3] T = 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: **6/5/2018**

Metric	Location	1-Day Average	Average for the Preceeding 7-Days[1]									
		6/3/2018	6/3/18	5/27/18	5/20/18	5/13/18	5/6/18	4/29/18	4/22/18	4/15/18	4/8/18	4/1/18
Discharge (cfs)	S-65	952	**1,092**	1,271	854	381	338	354	372	424	340	373
Discharge (cfs)	S-65A[2]	1,125	**1,139**	1,142	700	272	245	248	258	324	259	245
Discharge (cfs)	S-65D[2]	1,888	**1,869**	1,495	781	323	304	341	362	384	301	324
Headwater Stage (feet NGVD)	S-65D[2]	26.94	**27.00**	26.08	25.72	25.83	25.89	25.81	25.77	25.86	25.77	25.86
Discharge (cfs)	S-65E[2]	2,077	**2,082**	1,623	824	290	263	304	318	355	297	325
Discharge (cfs)	S-67	281	**282**	298	332	71	0	0	0	1	0	0
DO (mg/L)[3]	Phase I river channel	3.4	**4.1**	5.1	5.7	7.5	7.9	7.1	7.2	6.2	6.8	7.5
Mean depth (feet)[4]	Phase I floodplain	0.69	**0.65**	0.46	0.17	0.06	0.06	0.06	0.07	0.07	0.06	0.07

[1]Seven-day average of weighted daily means through Sunday midnight.
[2]S-65A discharge combines S-65A with auxillary strucutures; S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2; S-65D stage averages stage at S-65D and S-65DX1; S-65E discharge combines S-65E and S-65EX1.
[3]DO is the average for sondes at PC62 and PC33.
[4]1-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)

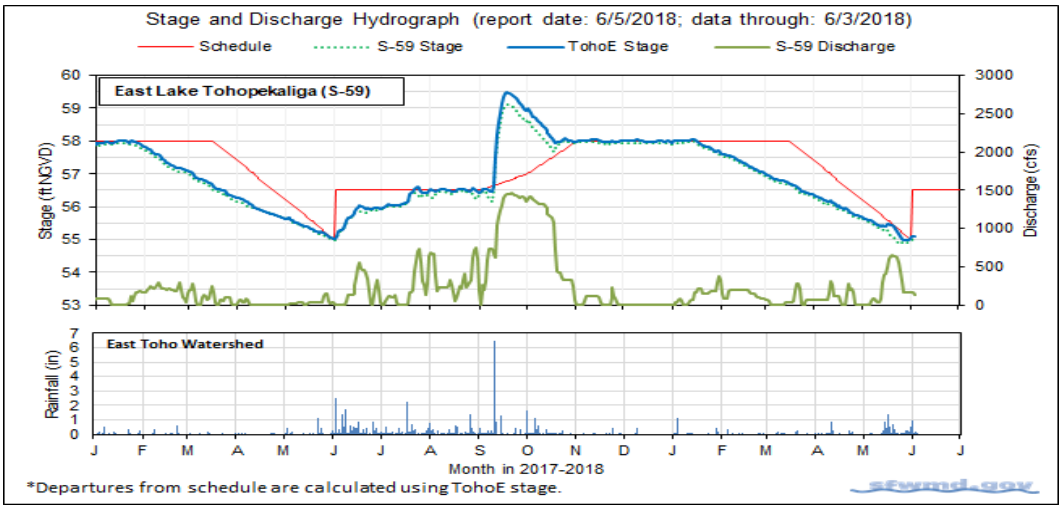


Figure 1.

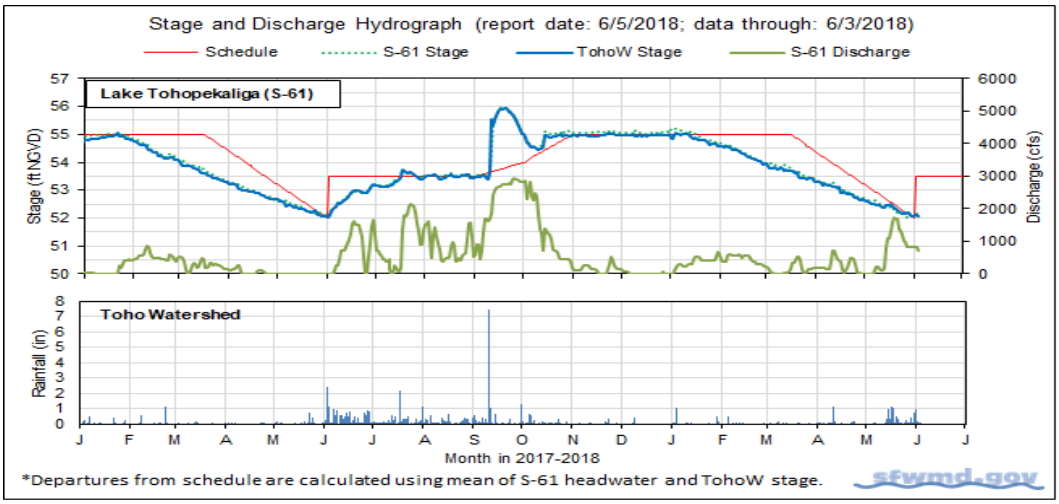


Figure 2.

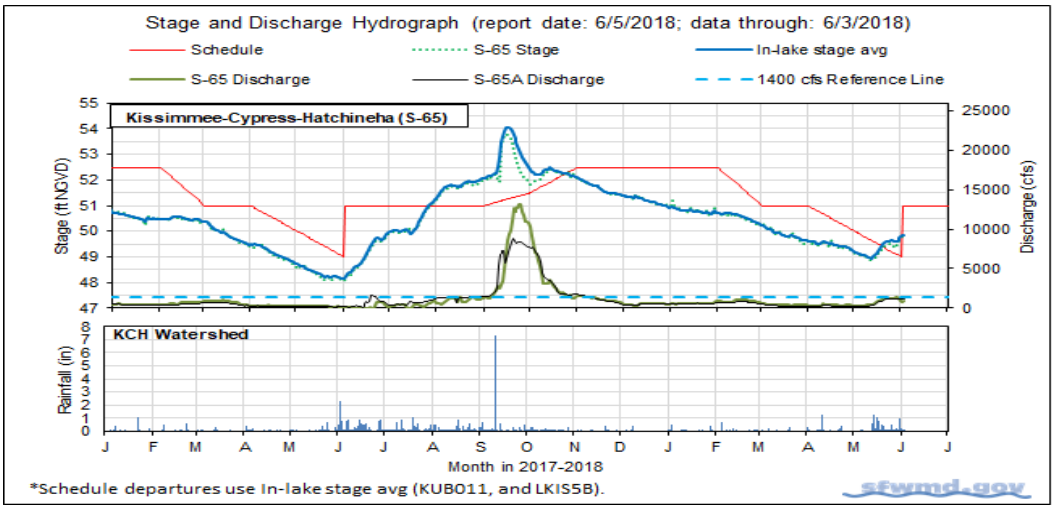


Figure 3.

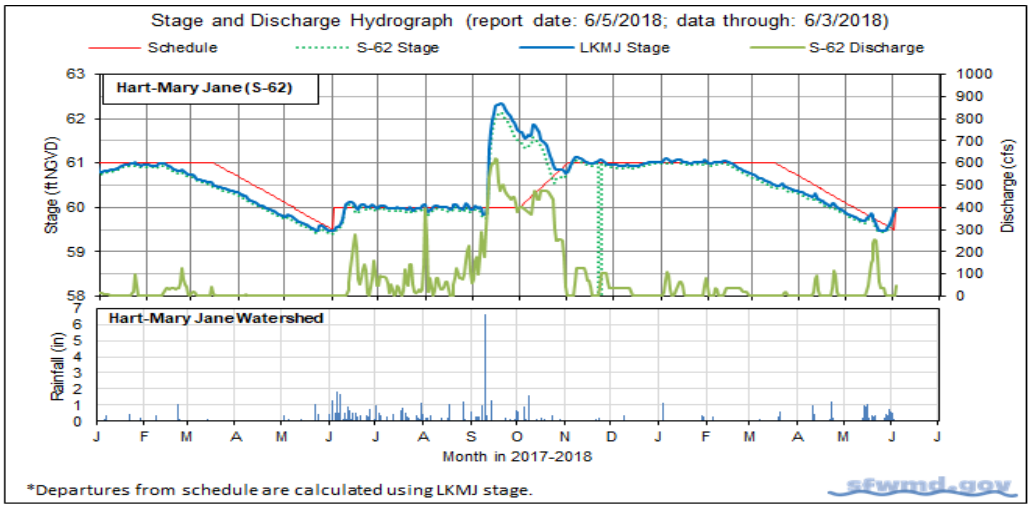


Figure 4.

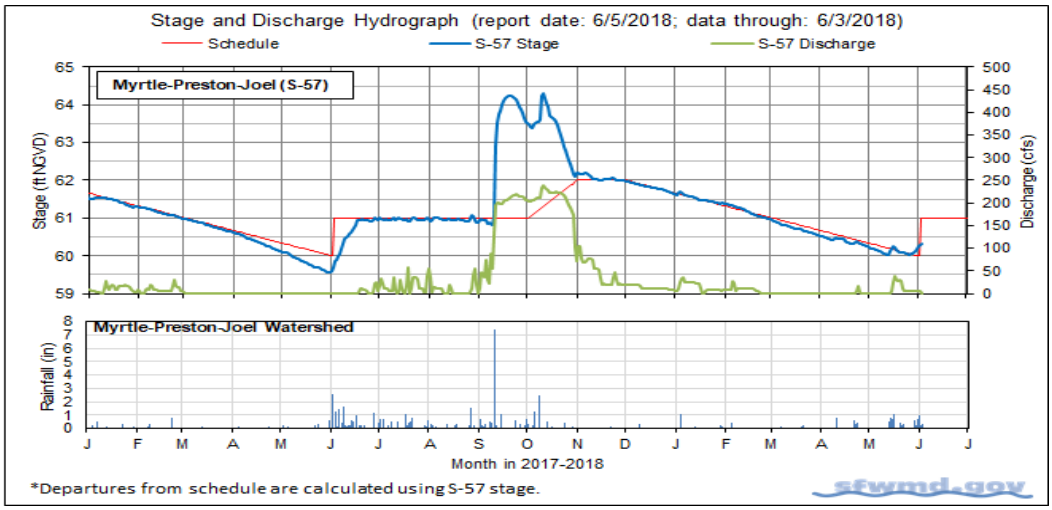


Figure 5.

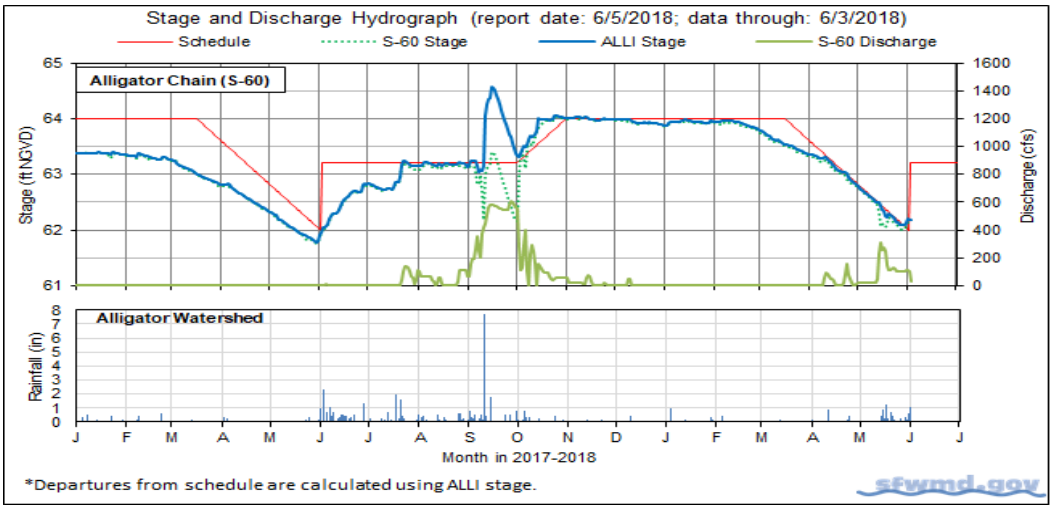


Figure 6.

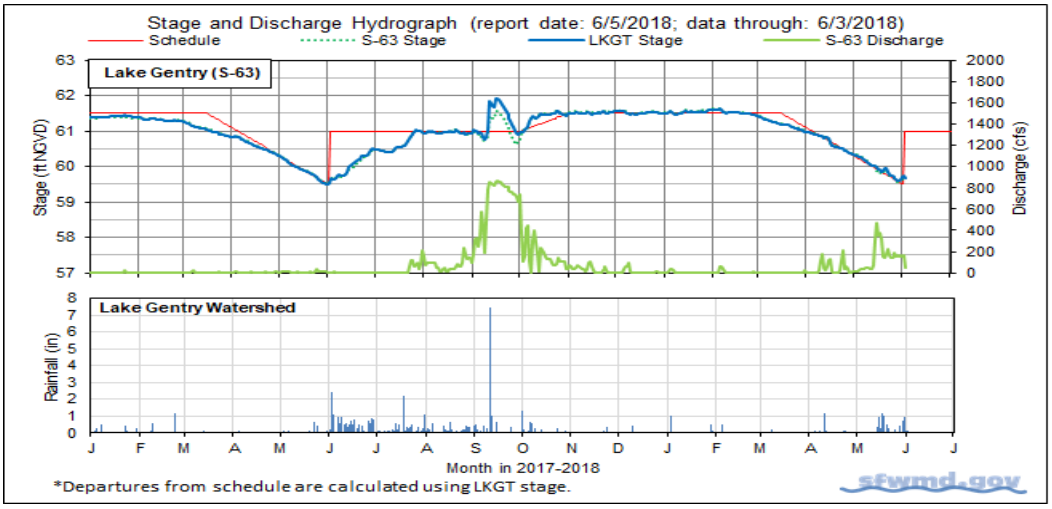


Figure 7.

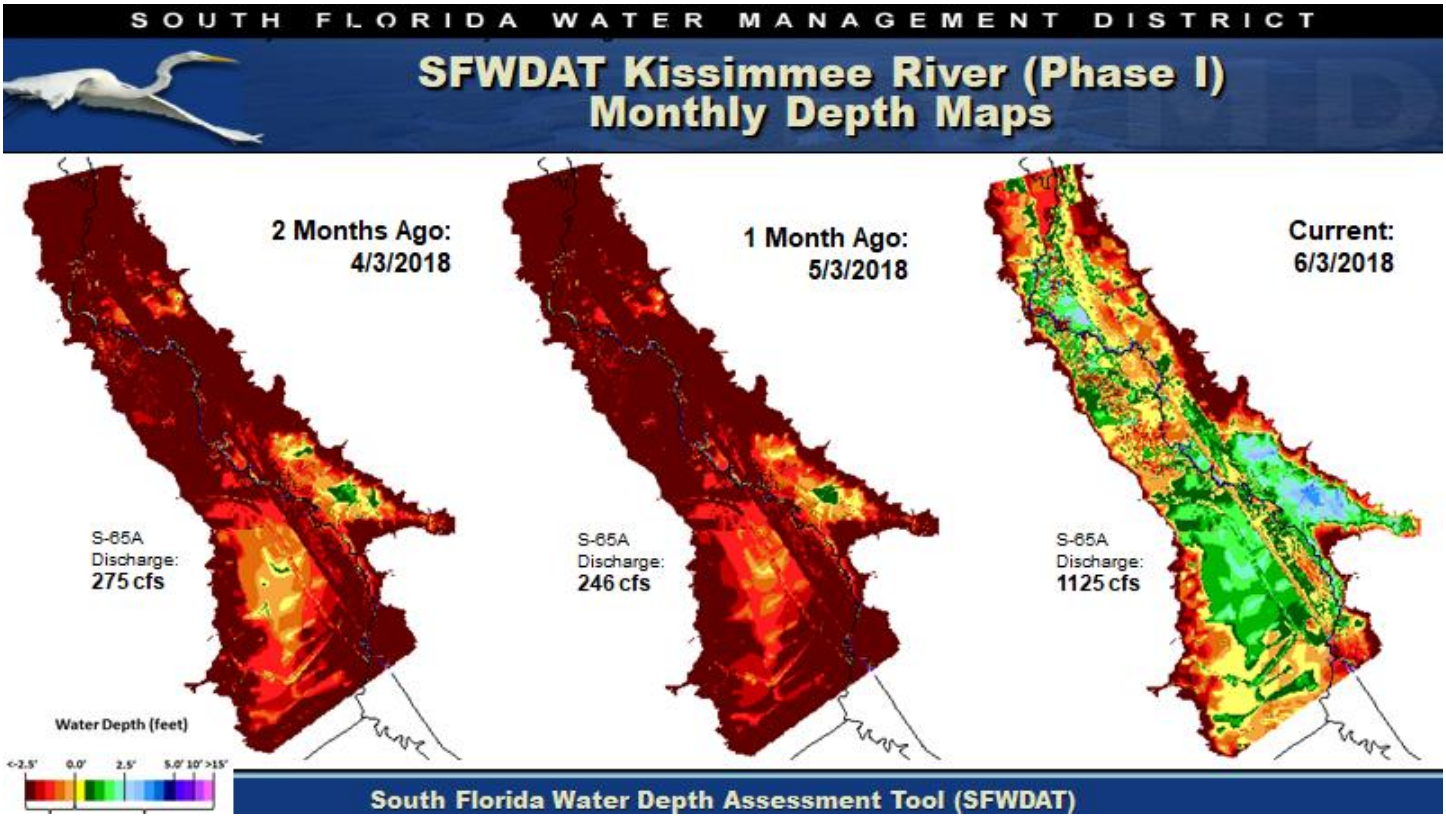


Figure 8. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

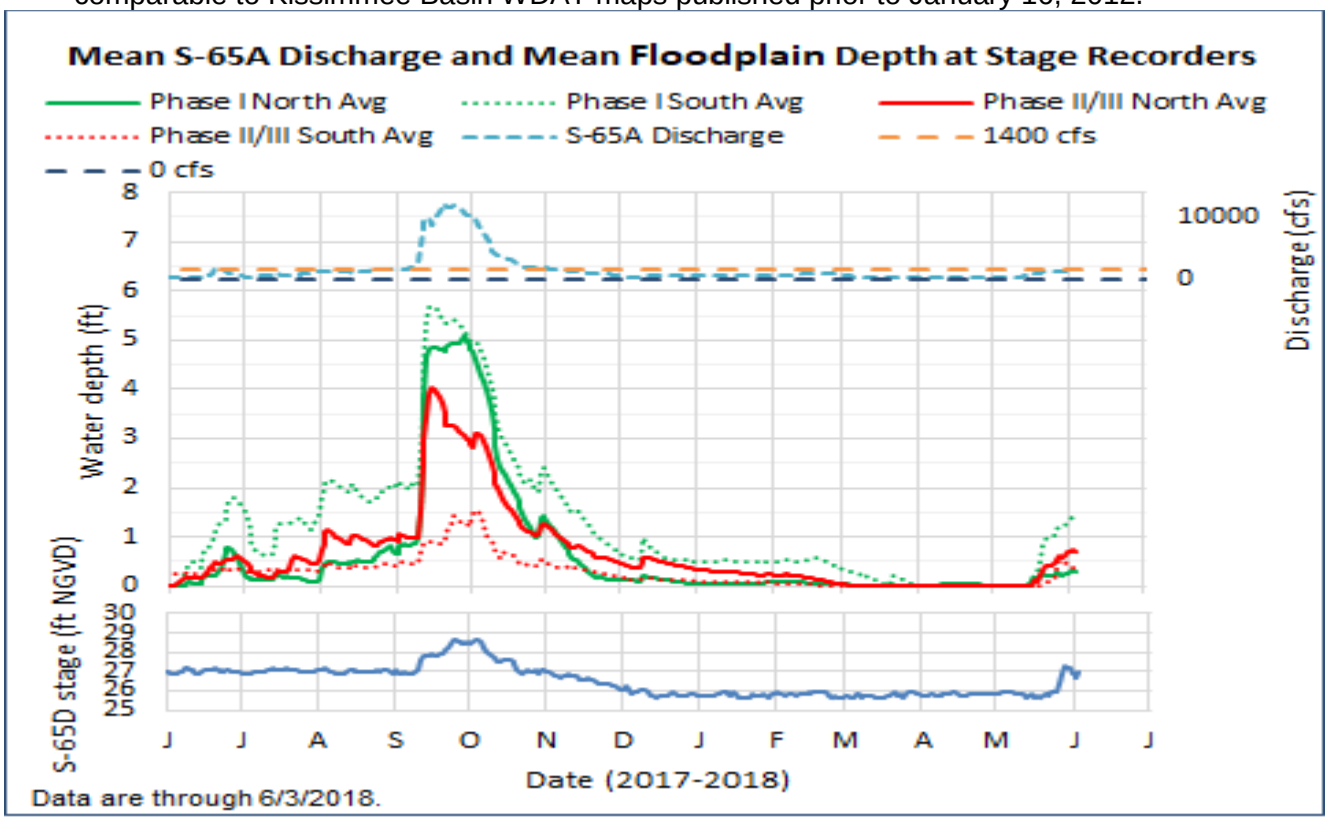


Figure 9. Mean water depth at stage recorders in the northern Phase I, southern Phase I, northern Phase II/III, and southern Phase II/III areas in relation to the S-65A discharge and S-65D headwater stage.

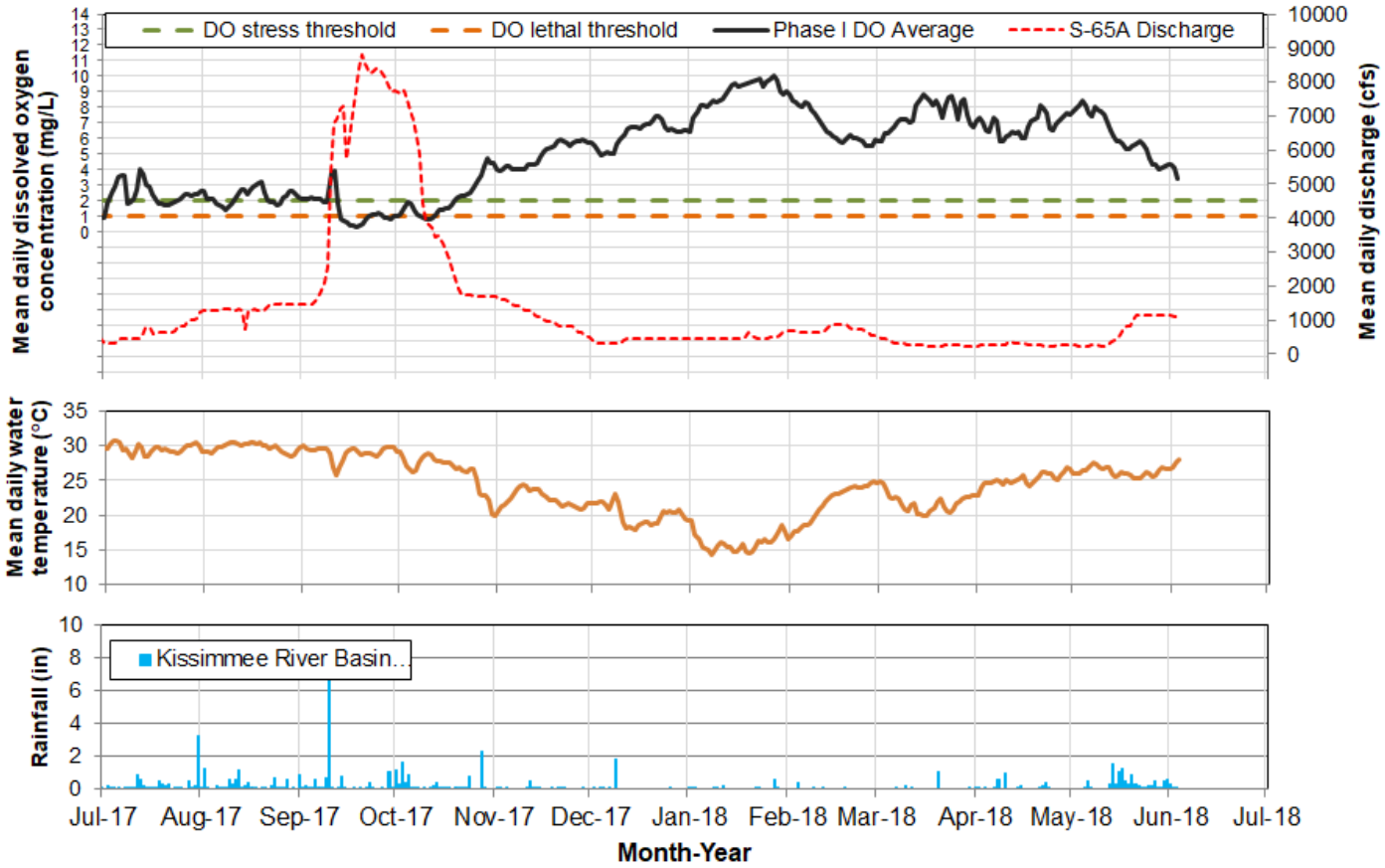


Figure 10. Mean daily dissolved oxygen, discharge, temperature and rainfall in the Phase I river channel.

Water Management Recommendations

Recommendation Date	Recommendation	Purpose	Outcome	Source	Report Date
6/5/2018	No new recommendations.		N/A		5/8/2018
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	5/15/2018
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	5/15/2018
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.		N/A		3/6/2018
2/27/2018	No new recommendations.		N/A		2/27/2018
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

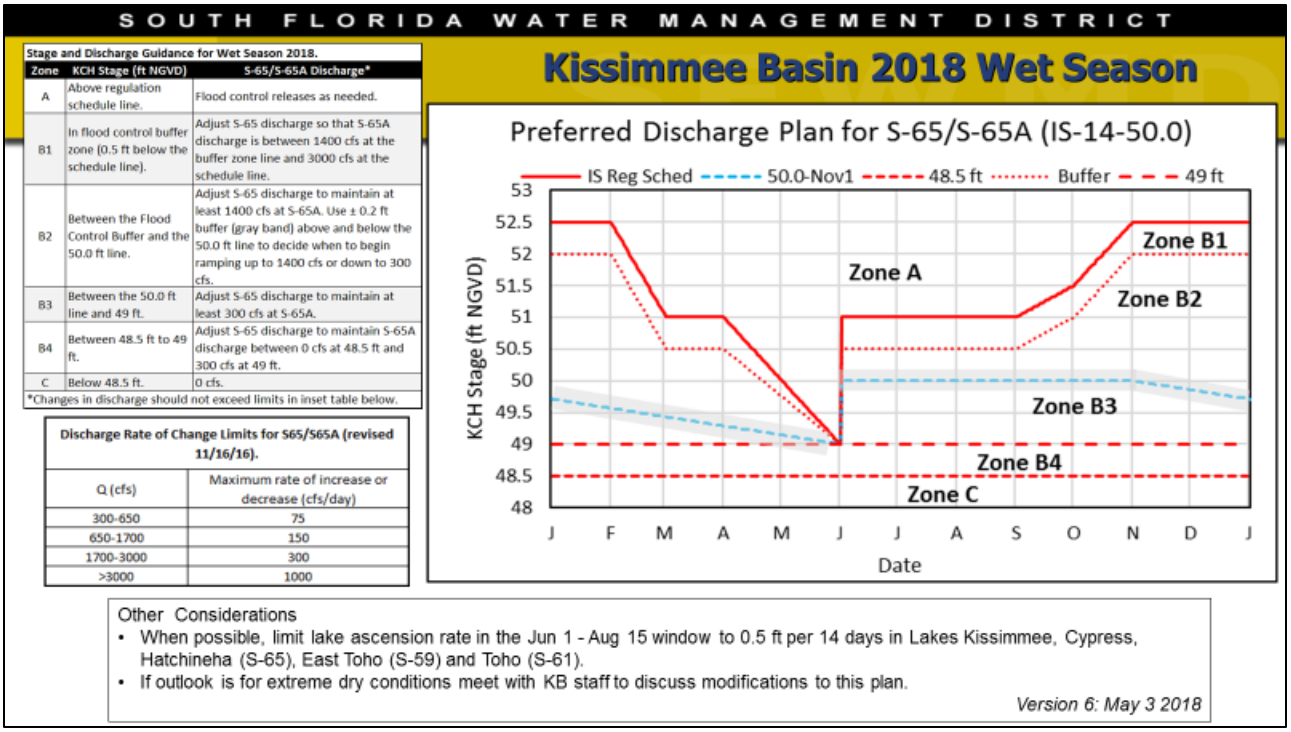


Figure 11. The 2018 Wet Season Discharge Plan for S-65/S-65A.

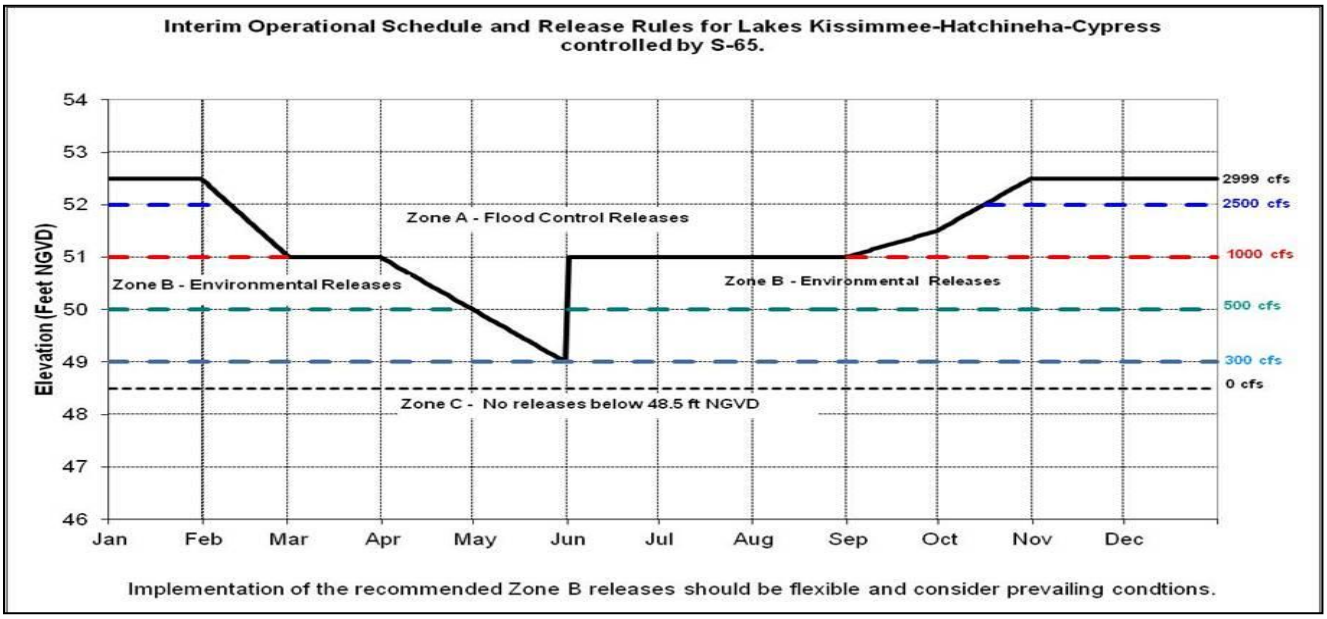


Figure 12. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years.

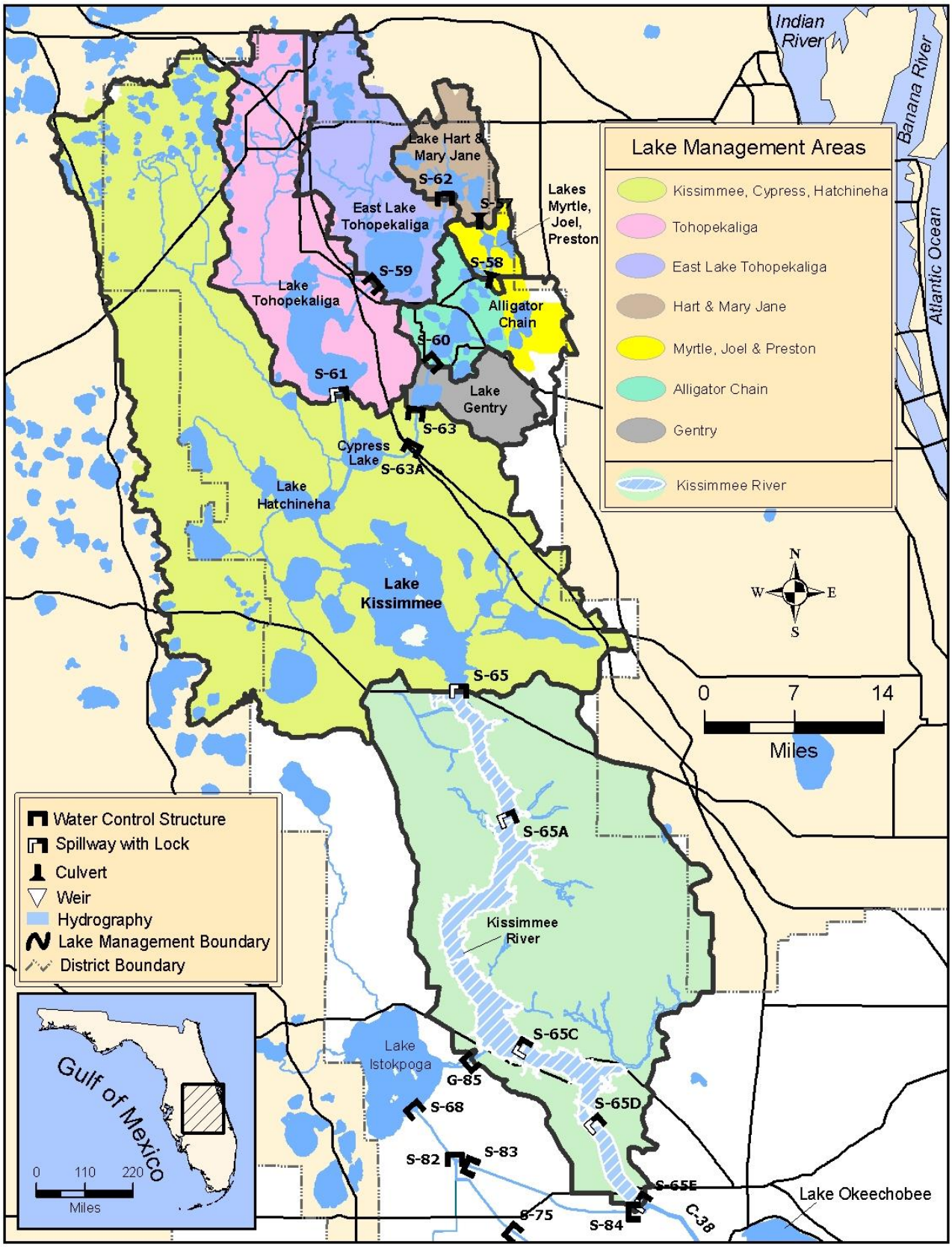


Figure 13. The Kissimmee Basin.

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 14.22 feet NGVD for the period ending at midnight on June 04, 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 1.25 feet higher than it was a month ago and 3.13 feet higher than a year ago (Figure 1). The Lake is now in the Low sub-band (Figure 2). According to RAINDAR, 1.54 inches of rain fell over the Lake during the week May 29, 2018 – June 4, 2018. Most of the northern watershed received similar or less rainfall, between 0.75 – 1.5 inches, while the Kissimmee Basin received more, between 1.5 – 3.0 inches (Figure 3).

Average daily inflows to the Lake increased slightly from the previous week, going from 6,239 cfs to 6,597 cfs. The largest inflow was from the Kissimmee River through the S-65E structures, averaging 2,114 cfs for the week; an increase of roughly 400 cfs from the previous week. The Istokpoga and Indian Prairie basins, with a combined 1,882 average daily cfs through the S-84 and S-71 & S-72 structures had the second highest inflows, down just slightly from the previous week's flow of 1,907 cfs. Backflows through Culvert 10A from the L-8 canal were the third largest inflows, averaging 1,089 cfs for the week, down slightly from 1,163 cfs the previous 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 began on June 1, averaging 2,484 cfs for the week. S-77 flows averaged 1,901 cfs while S308 averaged 583 cfs. The corrected average daily evapotranspiration value for the week based on the L006 weather platform solar radiation data nearly doubled from the previous week, to 0.15 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.

A helicopter survey of foraging wading birds on May 31, 2018 found only 376 individuals, marking the second consecutive survey under 400. The last survey before the heavy rains and subsequent stage reversal found many active nesting colonies and nearly 7,600 individuals (Figure 5). The remaining large nesting colony on Eagle Bay Island is located near the edge of the marsh and birds there were observed leaving the Lake to forage. It is unknown whether nesting will continue at this location for much longer.

Samples collected on May 1 – May 2, 2018 showed chlorophyll *a* (Chla) and microcystin values were relatively low throughout the Lake, with the exception of a few sites along the western shore. L005 samples near the mouth of Fisheating Bay had slightly elevated Chla levels of 33 µg/L, while the KISSR0.0 site at the mouth of the Kissimmee River had the highest values of 37.6 µg/L, as well as detectable amounts of microcystin, though at just 0.47 µg/L (Figure 6). The most recent satellite imagery using the cyanobacteria monitoring product derived from NOAA's OLCI satellite sensor showed cyanobacteria bloom potential remained low lake-wide, despite reports of visible algae wind-rowed along the eastern shoreline and in the pelagic area in the latter part of the week (Figure 7).

Water Management Recommendations

Lake Okeechobee stage is 14.22 feet NGVD having increased 1.18 feet over the past three weeks. The Lake was below 13.0 feet NGVD for only 10 days and 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; the third time in six years that stage has not reached the bottom of the preferred stage envelope (12.5 – 15.5 feet NGVD); and the sixth consecutive Water Year that stages have exceeded the top of the stage envelope. Avoiding a seventh consecutive Water 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, 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.

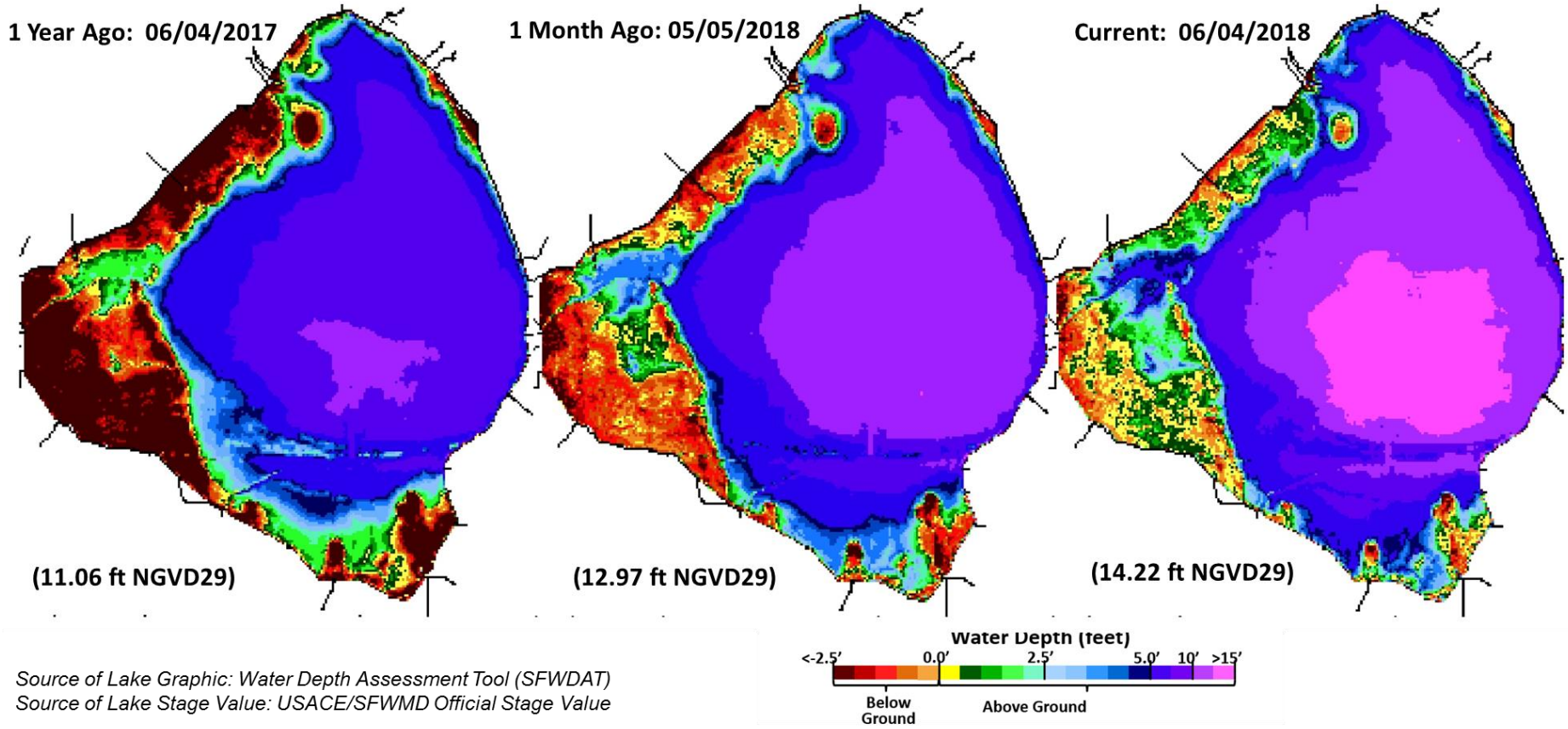
Table 1. Average daily inflows and outflows and the approximate depth equivalents on Lake Okeechobee for various structures

.

INFLOWS	Previous Week Avg Daily cfs	Avg Daily Inflow cfs	Equivalent Depth Week Total (in)
S65E & S65EX1	1687	2114	0.9
S71 & 72	604	484	0.2
S84 & 84X	1303	1398	0.6
Fisheating Creek	30	96	0.0
S154	203	146	0.1
S191	576	454	0.2
S133 P	329	223	0.1
S127 P	37	66	0.0
S129 P	28	73	0.0
S131 P	28	27	0.0
S135 P	203	134	0.1
S2 P	0	2	0.0
S3 P	0	0	0.0
S4 P	48	291	0.1
L8 Backflow	1163	1089	0.4
Rainfall	6283	4244	1.5
Total	**12522**	**10841**	**4.2**

OUTFLOWS	Previous Week Avg Daily cfs	Avg Daily Outflow cfs	Equivalent Depth Week Total (in)
S77	0	1901	0.8
S308	0	583	0.2
S351	0	0	0.0
S352	0	0	0.0
S354	0	0	0.0
L8 Outflow	0	0	0.0
ET	1598	2894	1.2
Total	**1598**	**5378**	**2.2**

PROVISIONAL DATA



Source of Lake Graphic: Water Depth Assessment Tool (SFWDAT)
Source of Lake Stage Value: USACE/SFWMD Official Stage Value

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

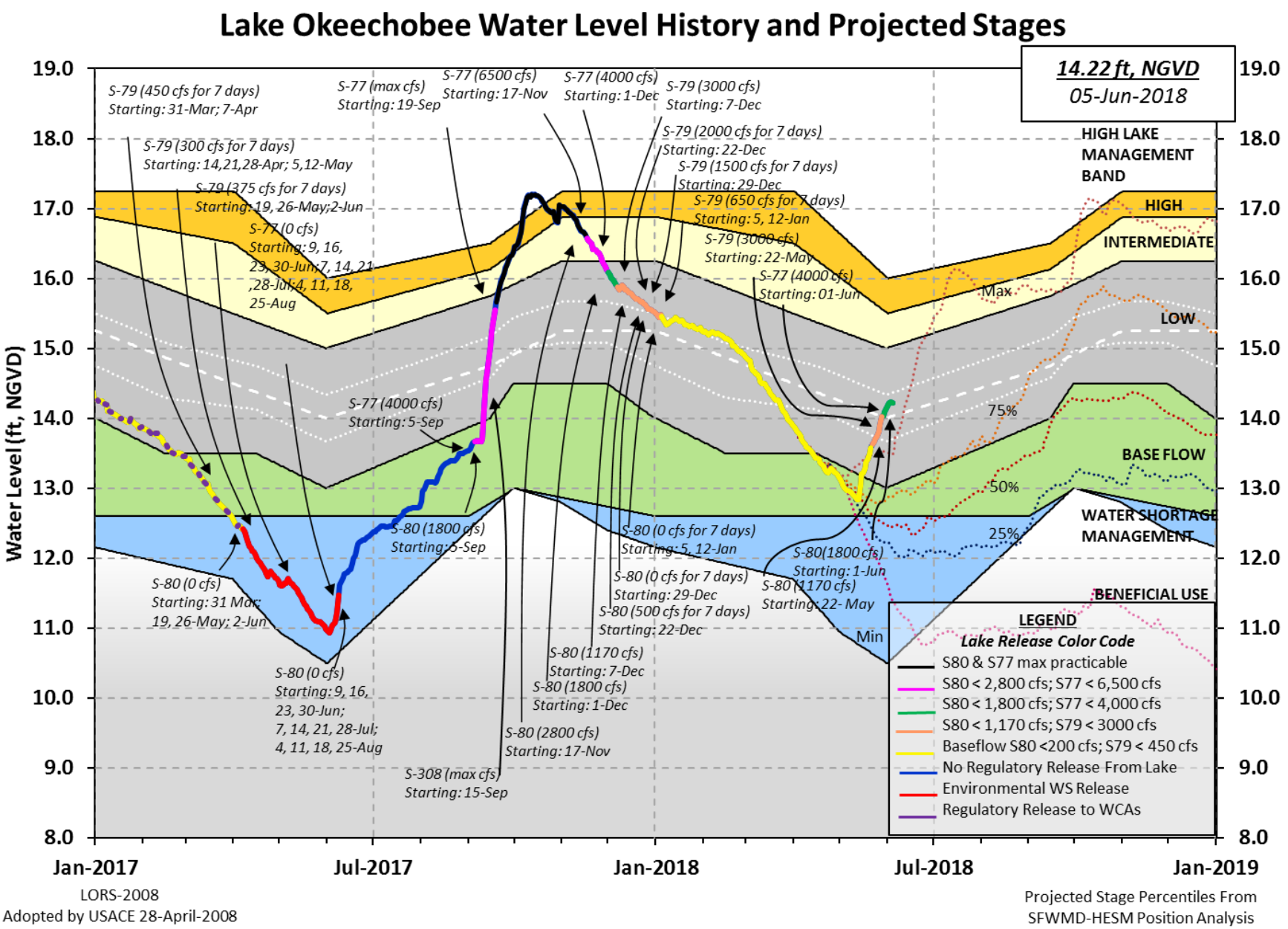


Figure 2. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

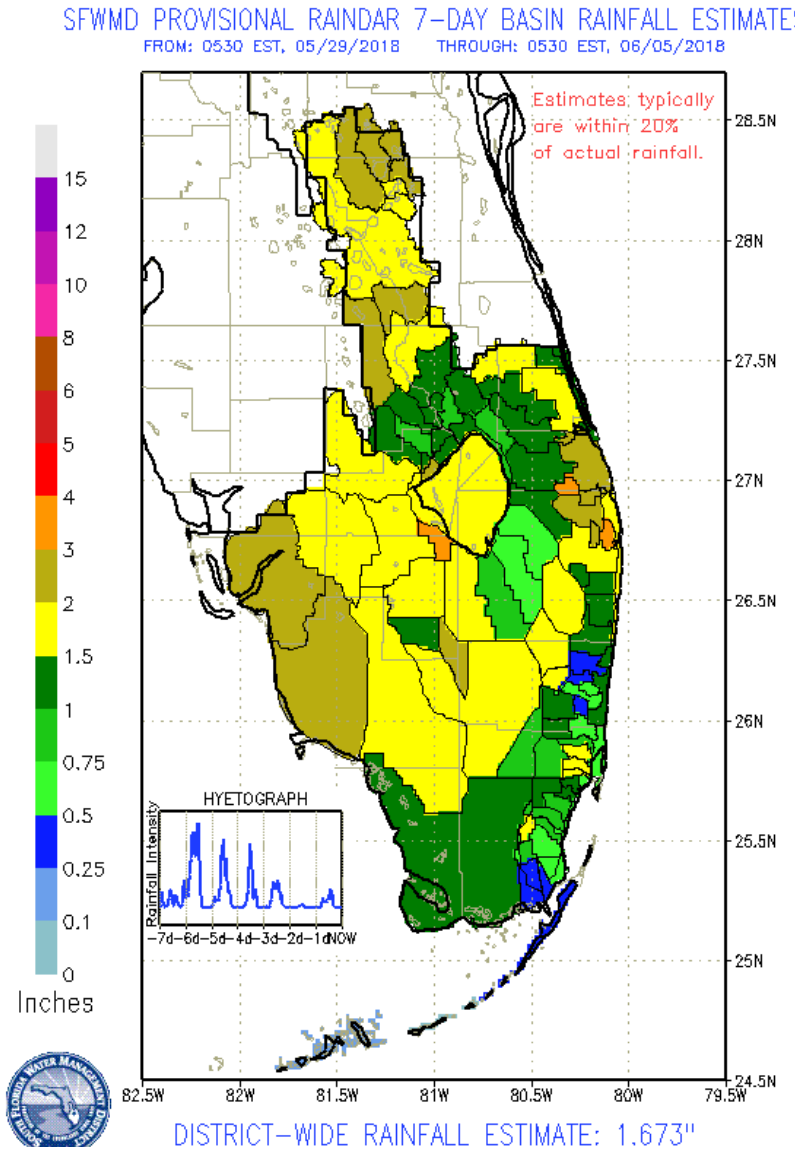


Figure 3. Rainfall estimates by basin.

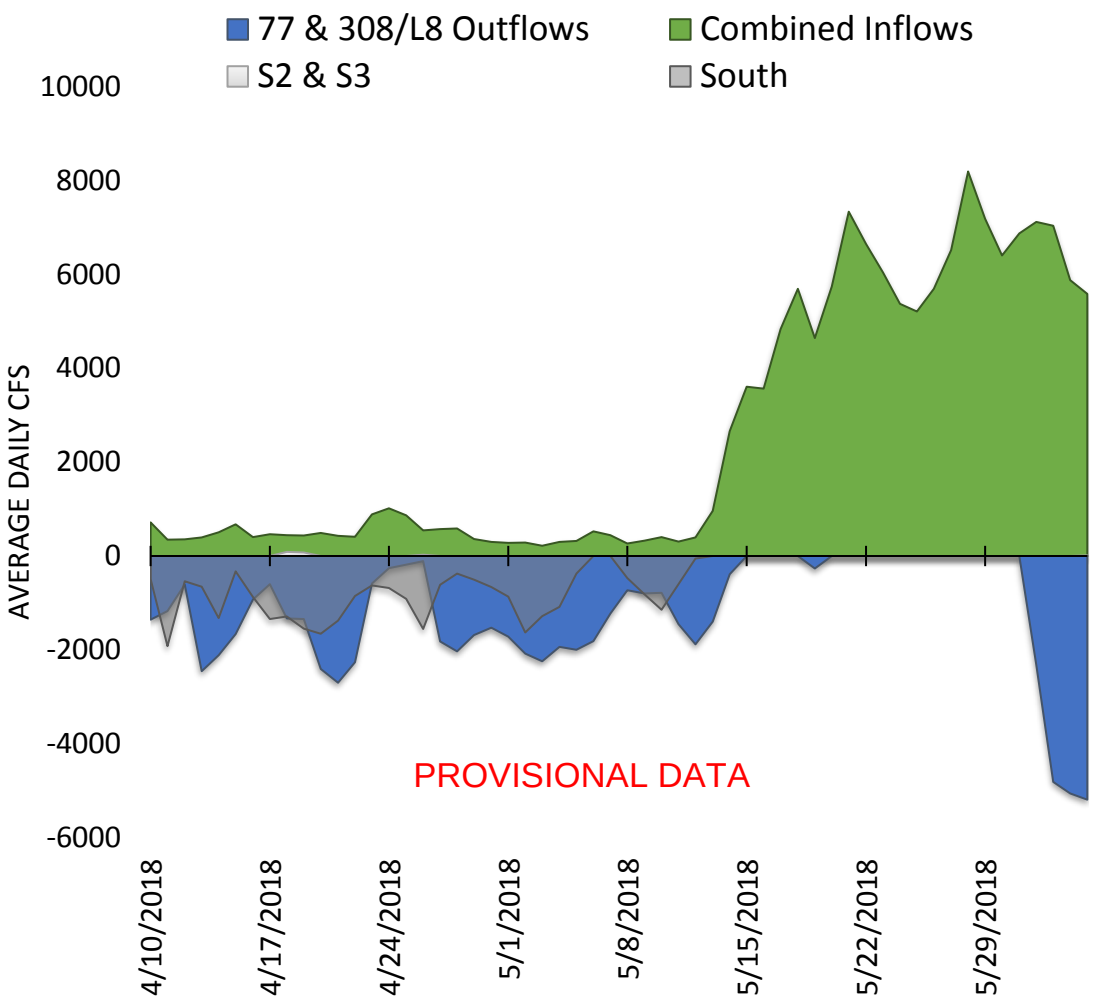


Figure 4. Major inflows and outflows of Lake Okeechobee, including the S350 structures designated as South. The L8 canal flows through culvert 10A are included as outflows when positive, and as inflows when backflowing into the lake. Inflows and outflows are shown as positive and negative, respectively, for visual purposes.

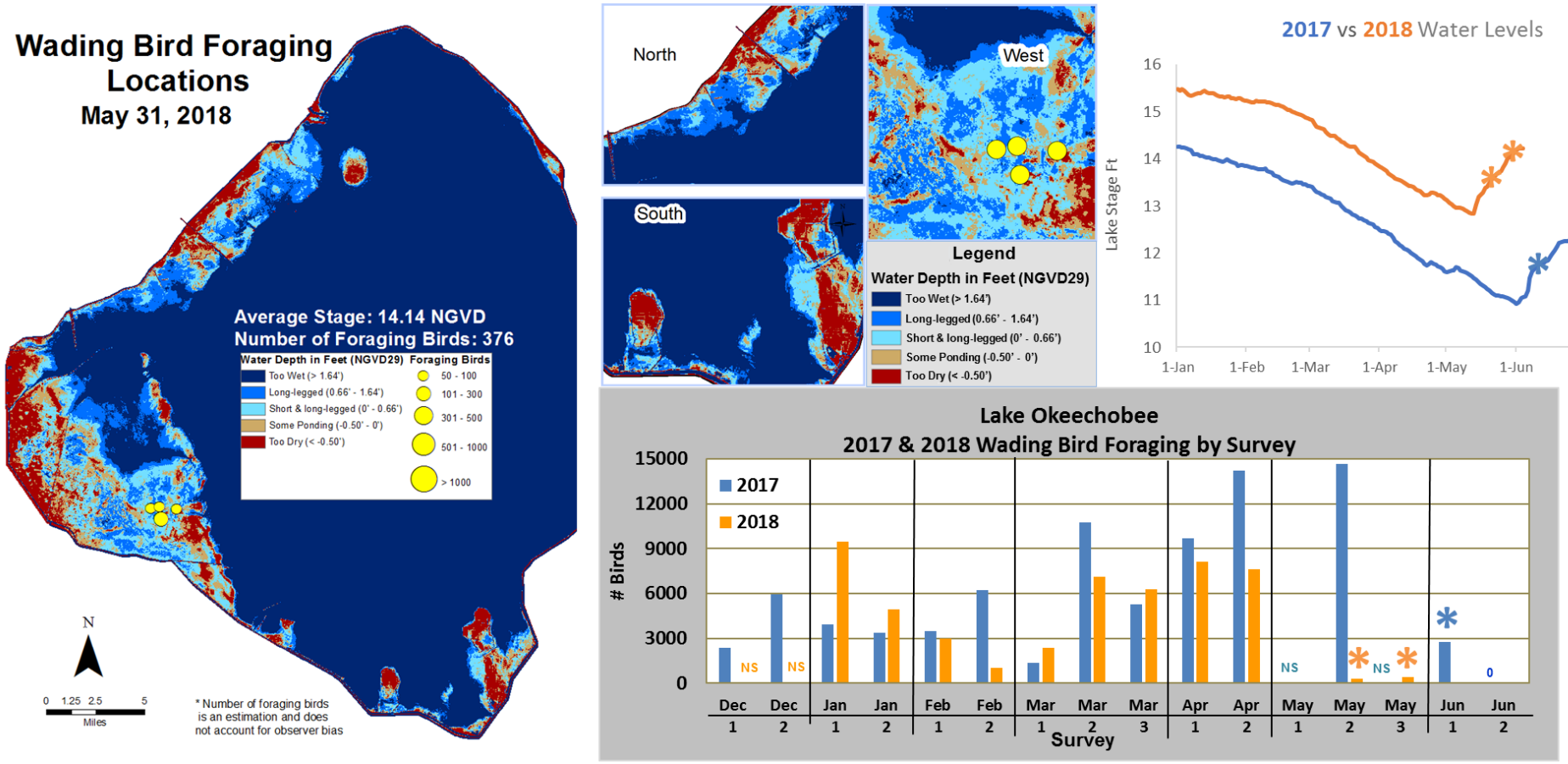
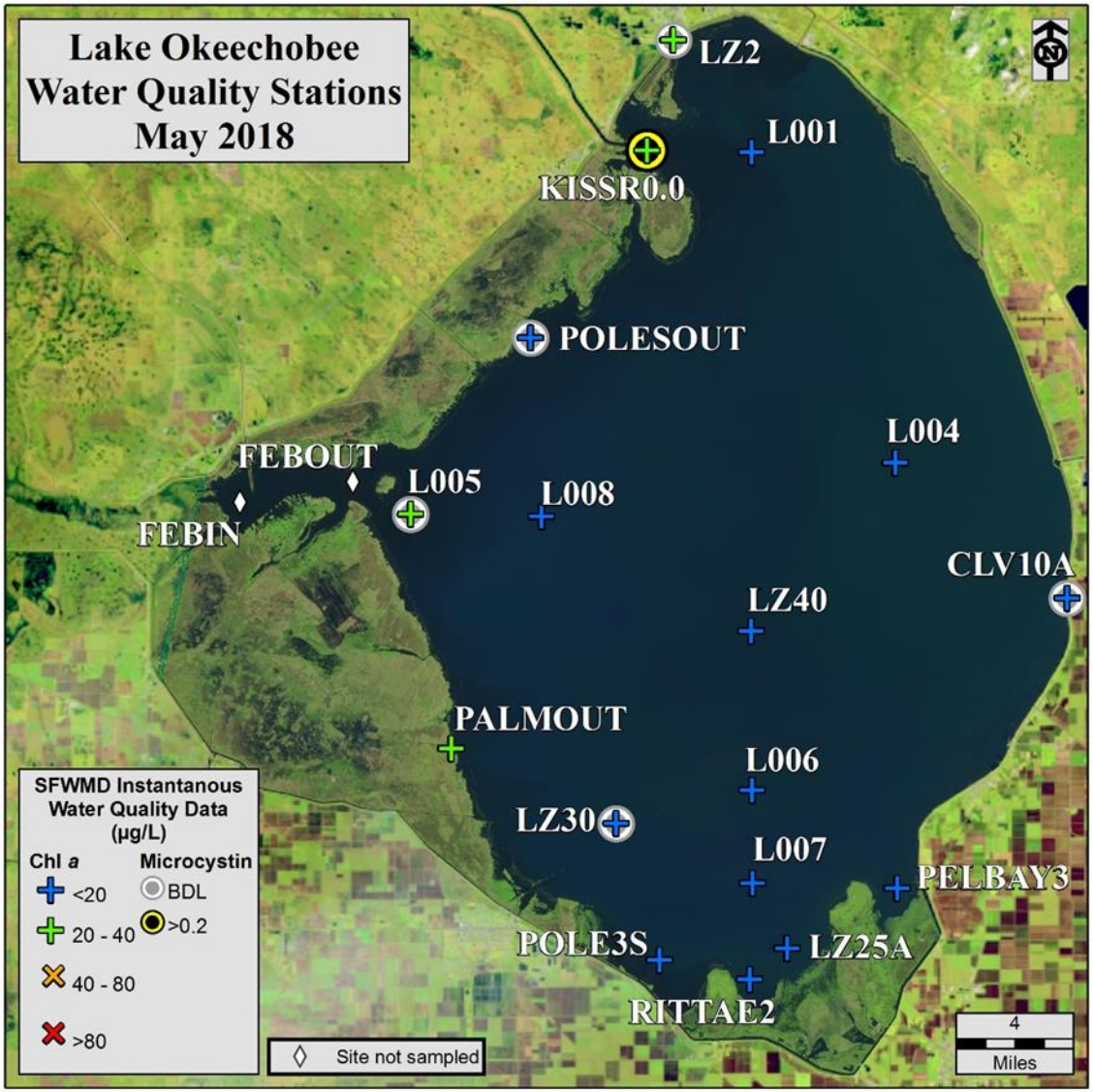


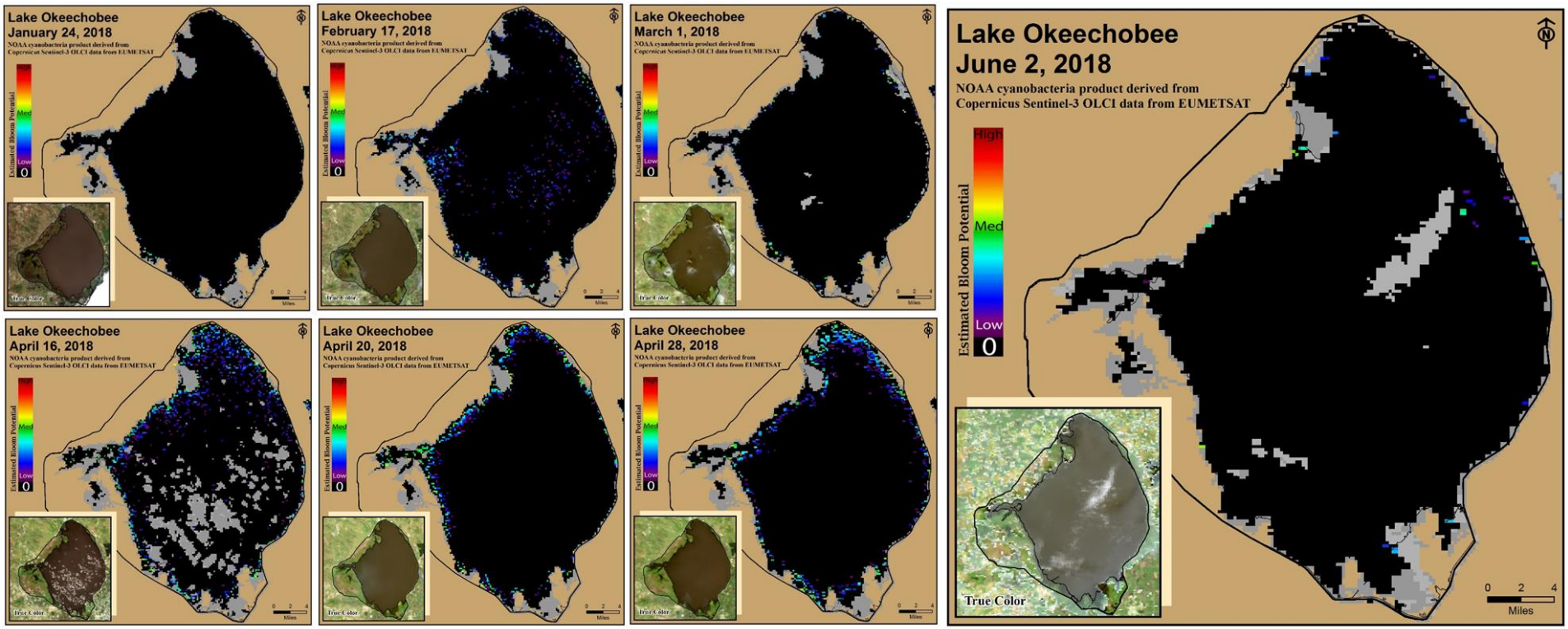
Figure 5. Locations of foraging flocks of wading birds observed during a monitoring flight on May 31, 2018 are shown in yellow, with circle sizes representing the size of the flocks. Previous survey totals from 2018 and 2017 are compared in the bar graph. Hydrographs show the lake stages and how low counts from both 2017 and 2018 corresponded with significant reversals.



May 1-2, 2018		
Site	**Chlorophyll *a* (µg/L)**	**Microcystin (µg/L)**
Nearshore Stations		
FEBIN	Not sampled	
FEBOUT	Not sampled	
KISSR0.0	33.0	0.47
LZ2	21.5	BDL
LZ25A	7.0	
PALMOUT	25.3	
PELBAY3	4.4	
POLE3S	9.1	
POLESOUT	18.0	BDL
RITTAE2	11.5	
Pelagic Stations		
L001	8.8	
L004	5.7	
L005	37.6	BDL
L006	5.3	
L007	5.4	
L008	7.8	
LZ30	8.1	BDL
LZ40	6.4	
CLV10A	7.0	BDL

BDL = Below Detectable Limit of 0.2 µg/L

Figure 6. Chlorophyll *a* (µg/L) and microcystin (µg/L) values for nearshore and pelagic stations for early May 2018. Microcystin values below 0.20 µg/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.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged about 5,496 cfs (Figures 1 and 2) and last month inflow averaged about 4,701 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 is provisional).

Location	Flow (cfs)
Tidal Basin Inflow	1049
S-80	1984
S-308	583
S-49 on C-24	955
S-97 on C-23	1031
Gordy Rd. structure on Ten Mile Creek	477

Over the past week in the estuary, surface salinity remained the same to US1 Bridge and increased at A1A Bridge (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 less than 5. 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)	**0.3** (0.3)	**0.3** (0.3)	NA[1]
US1 Bridge	**0.3** (.03)	**NR** (NR)	10.0-26.0
A1A Bridge	**1.8** (0.9)	**10.0** (2.6)	NA[1]

[1]Envelope not applicable, NR=not reporting

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 3 and station location map is shown in Figure 5.

Table 3. 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 *a* (µg/l)	Average DO (mg/l)	Minimum DO (mg/l)	Maximum DO (mg/l)
SF2	2.67	6.27 - 7.56	6.28	5.91	6.68
SF	1.52	6.57 - 8.42	5.61	4.97	6.48
NF	1.83	6.9 - 12.32	5.31	4.26	6.95
ME	1.64	6.86 - 10.31	5.25	4.70	6.29
IRL-SLE	3.39	1.29 - 10.83	6.74	5.23	9.92

NOAA satellite imagery indicates minimal visible cyanobacteria bloom potential in the St. Lucie Estuary this week (Figure 6).

Caloosahatchee Estuary:
Last week total inflow to the Caloosahatchee Estuary averaged about 7,337 cfs (Figures 7 and 8) and last month inflow averaged about 3,955 cfs. Last week's provisional averaged inflows from the structures are shown in Table 4.

Table 4. Weekly average inflows (data is provisional).

Location	Flow (cfs)
S-77	1901
S-78	3637
S-79	5555
Tidal Basin Inflow	1782

Over the past week, salinity decreased throughout the estuary, (Table 5, Figures 9 & 10). The seven-day average salinity values are in the good range for adult eastern oysters at Shell Point and in the fair range at Cape Coral (Figure 11). Salinity data were not available at Sanibel. The 30-day moving average surface salinity is 2.3 at Val I-75 and 7.4 at Ft. Myers. Salinity conditions between Val I-75 and Ft. Myers are good for tape grass.

Table 5. 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)	**0.3** (0.4)	**0.3** (0.5)	NA[1]
*Val I75	**0.5** (1.1)	**0.7** (3.9)	0.0-5.0[2]
Ft. Myers Yacht Basin	**1.7 (**5.8)	**1.7** (10.7)	NA
Cape Coral	**5.9** (11.5)	**6.3** (14.0)	10.0-30.0
Shell Point	**16.4** (24.3)	**17.4** (23.7)	10.0-30.0
Sanibel	**NR**[3](NR)	**NR** (NR)	10.0-30.0

[1]Envelope not applicable, [2]Envelope is based on a 30-day average, and [3]Not 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 6 as concentration ranges of chlorophyll *a* and dissolved oxygen at Beautiful Island, Ft. Myers, and Shell Point in the Caloosahatchee Estuary.

Table 6. 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.

Parameter Name	RECON Monitoring Stations		
	Beautiful Island	Ft. Myers	Shell Point
Chlorophyll *a* (µg/l)	6.43 – 10.40	3.17 – 20.07	1.52 – 14.38
Dissolved Oxygen (mg/l)	4.02 – 5.41	4.61 – 9.31	3.70 – 6.75

The Florida Fish and Wildlife Research Institute reported on June 1, 2018, that *Karenia brevis, the Florida red tide dinoflagellate,* was observed at background to very low concentrations in six samples collected from Lee County. Fish kills were reported in Lee County (Bonita Beach) over the past week.

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 very wet. The 2008 LORS recommends up to 4,000 cfs at S-77 and up to 1,800 cfs at S-80. Given the current estuarine conditions, there are no ecological benefits associated with freshwater releases from Lake Okeechobee.

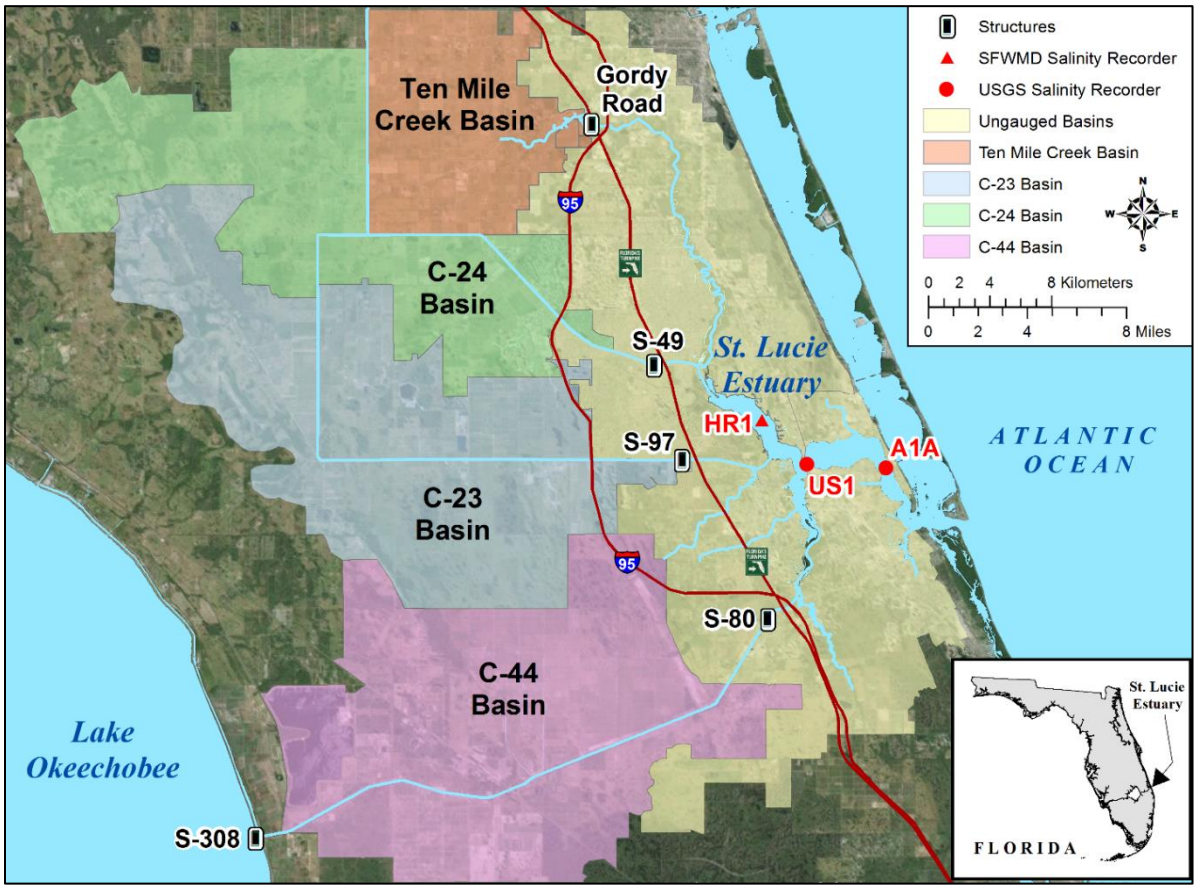


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

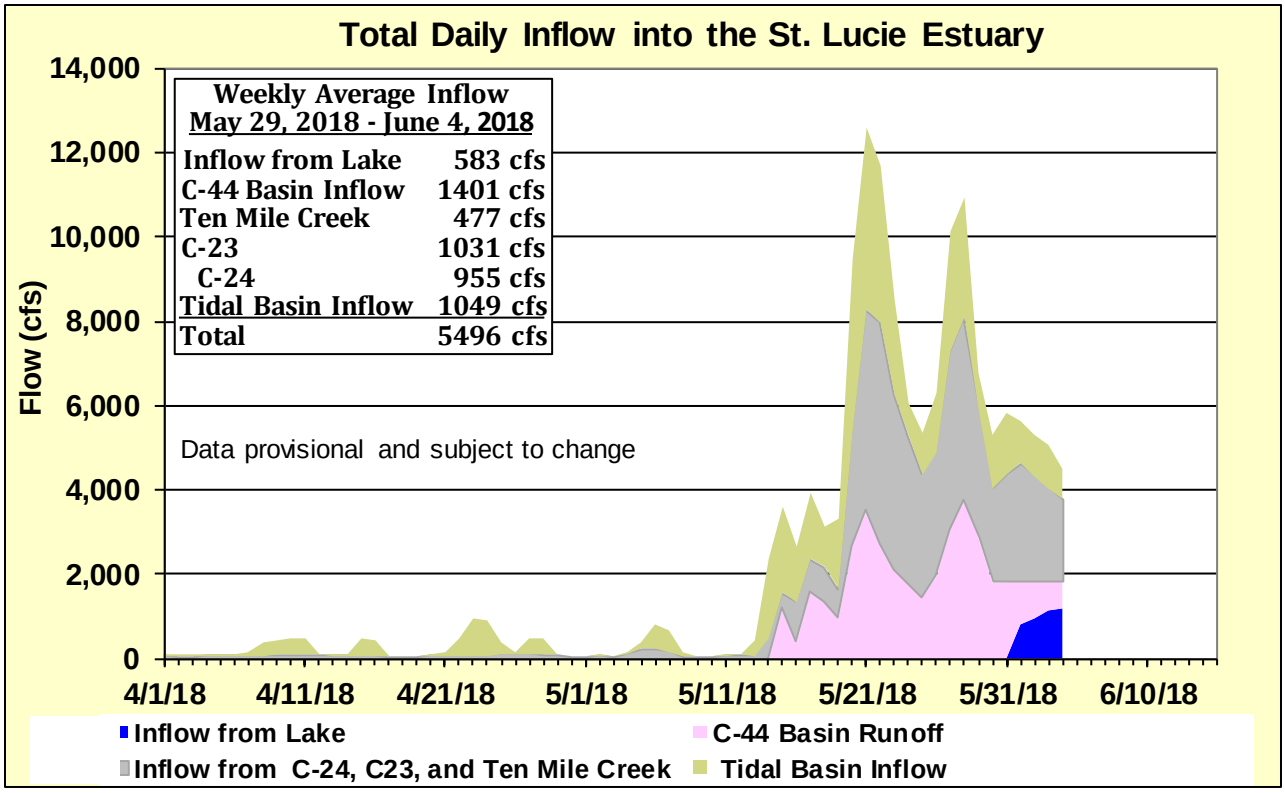


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

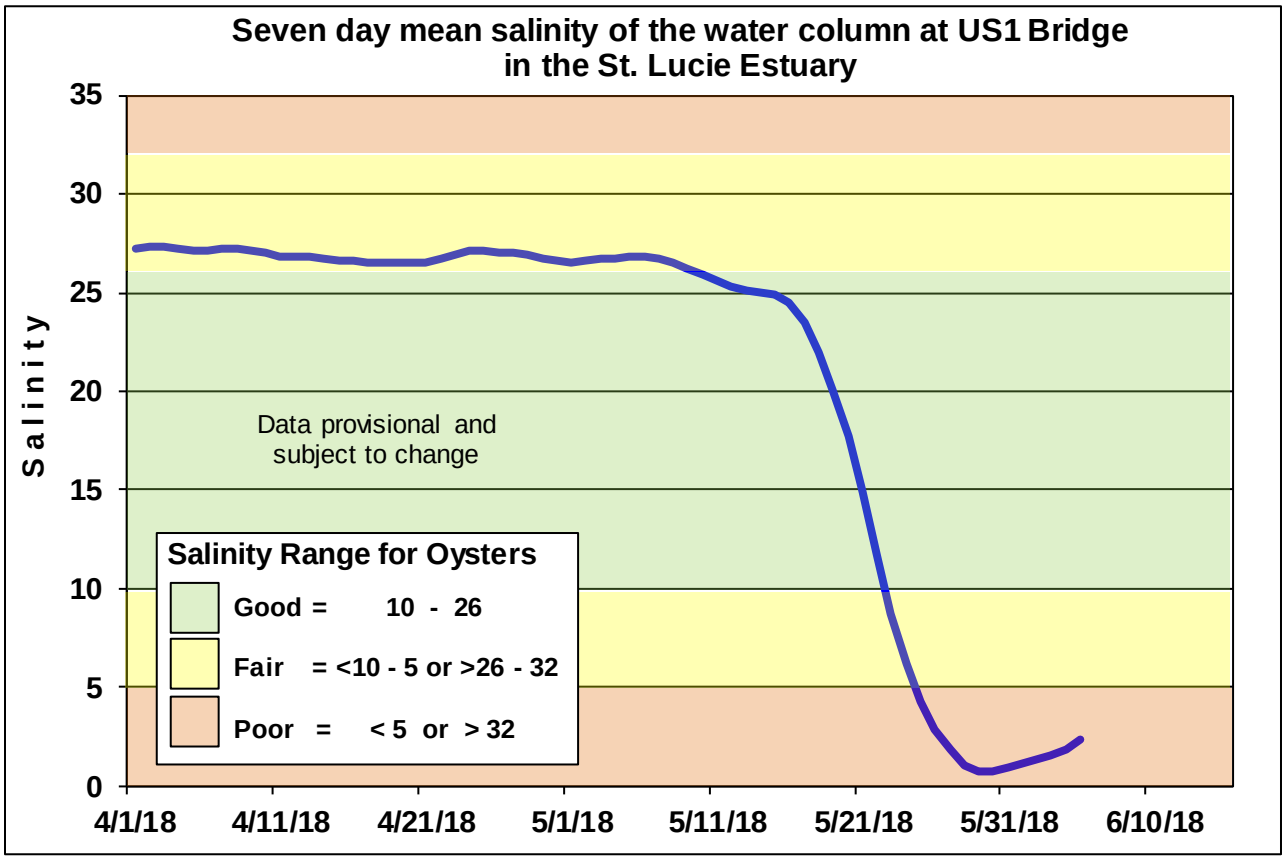


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

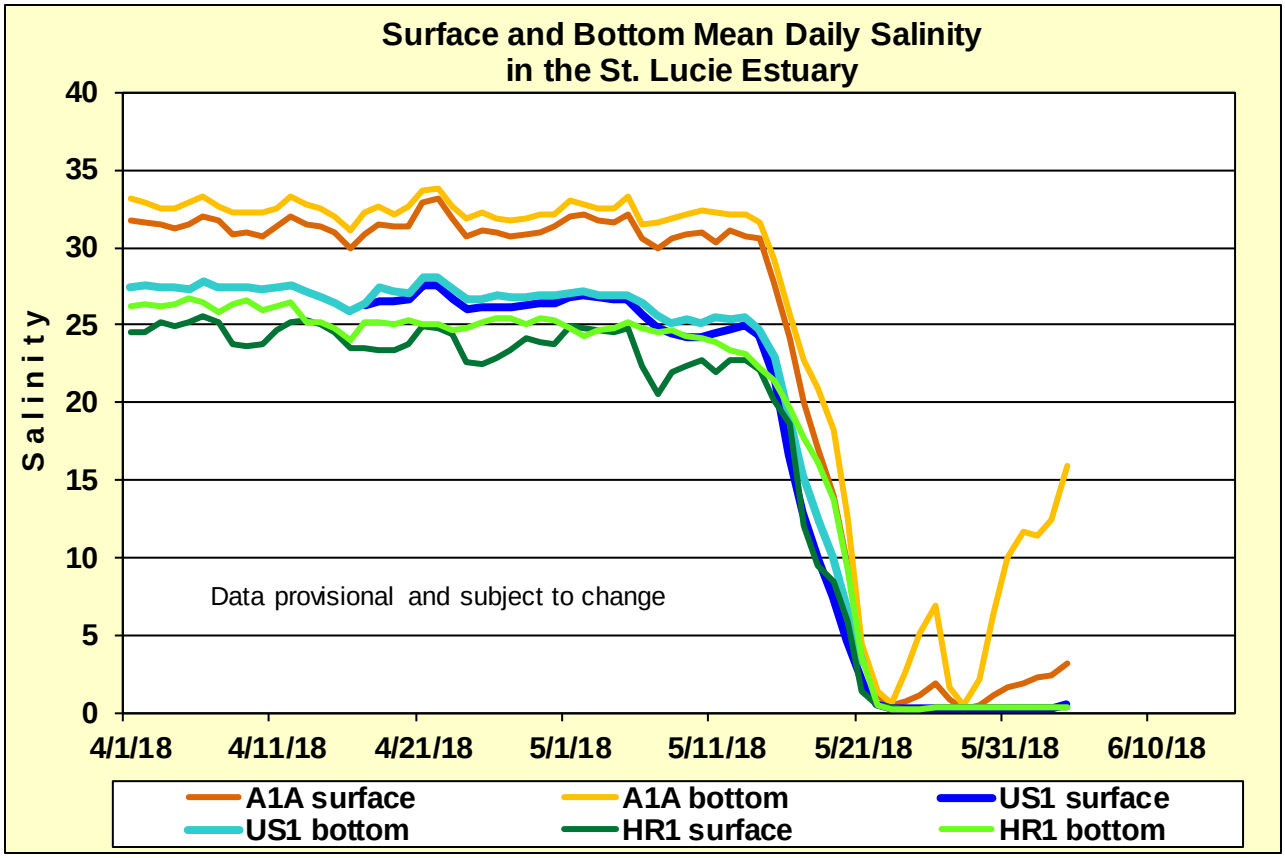


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

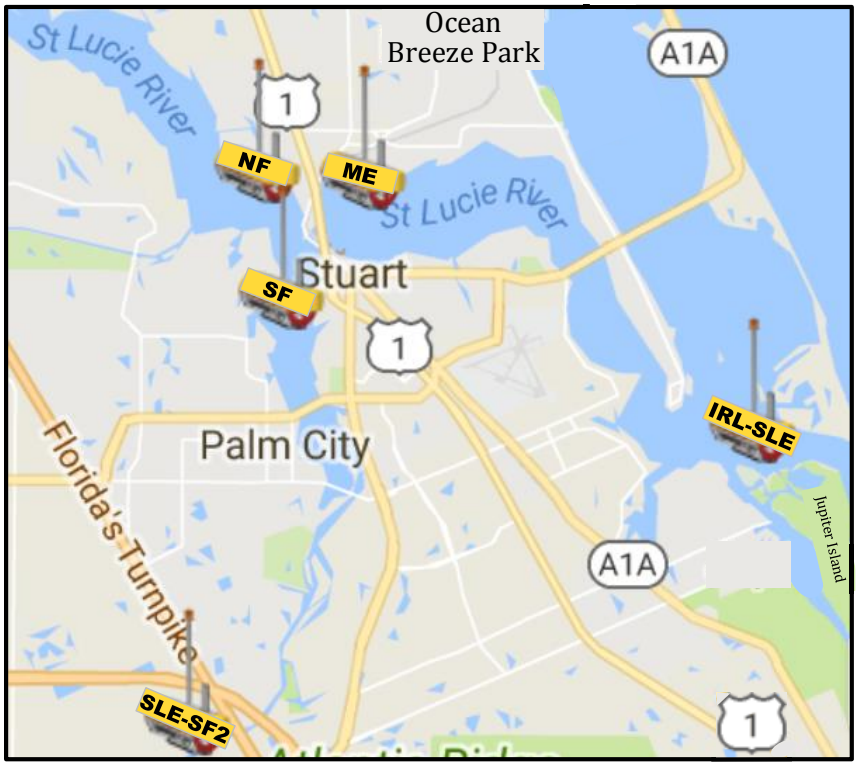


Figure 5. Location of FAU-HBOI LOBO water quality stations in the St. Lucie Estuary.

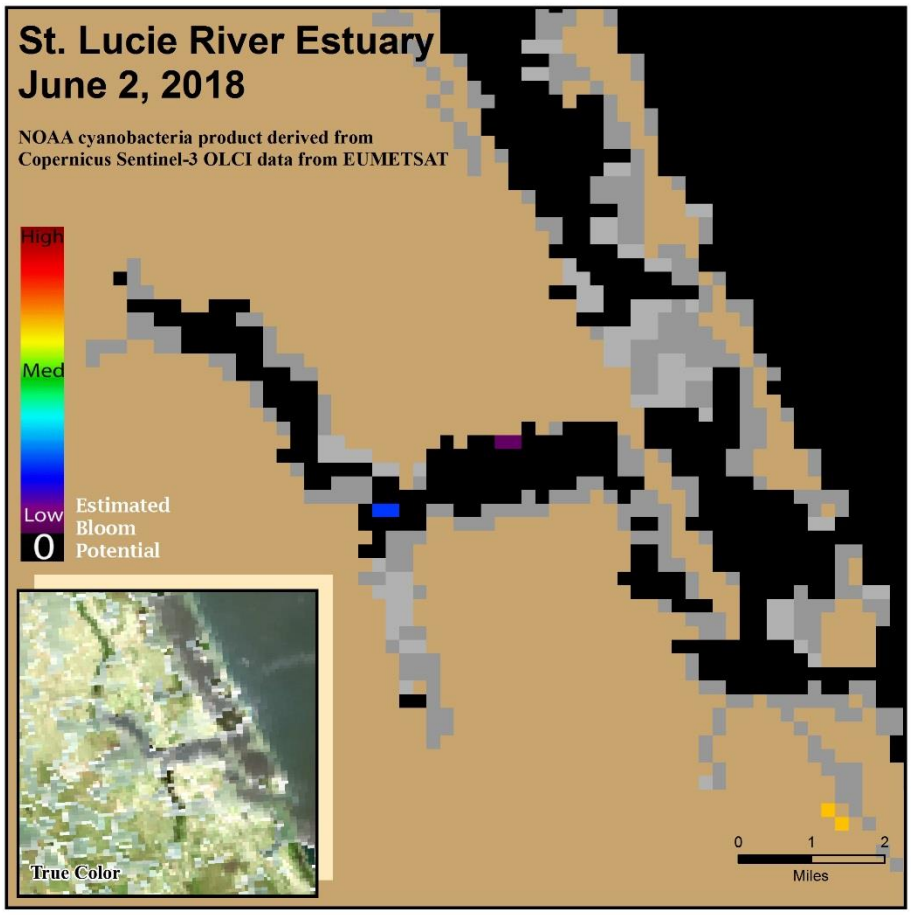


Figure 6. Sentinel 3a Satellite imagery provided by NOAA uses Ocean and Land Color Instrument (OLCI) to estimate cyanobacteria bloom potential in St. Lucie Estuary.

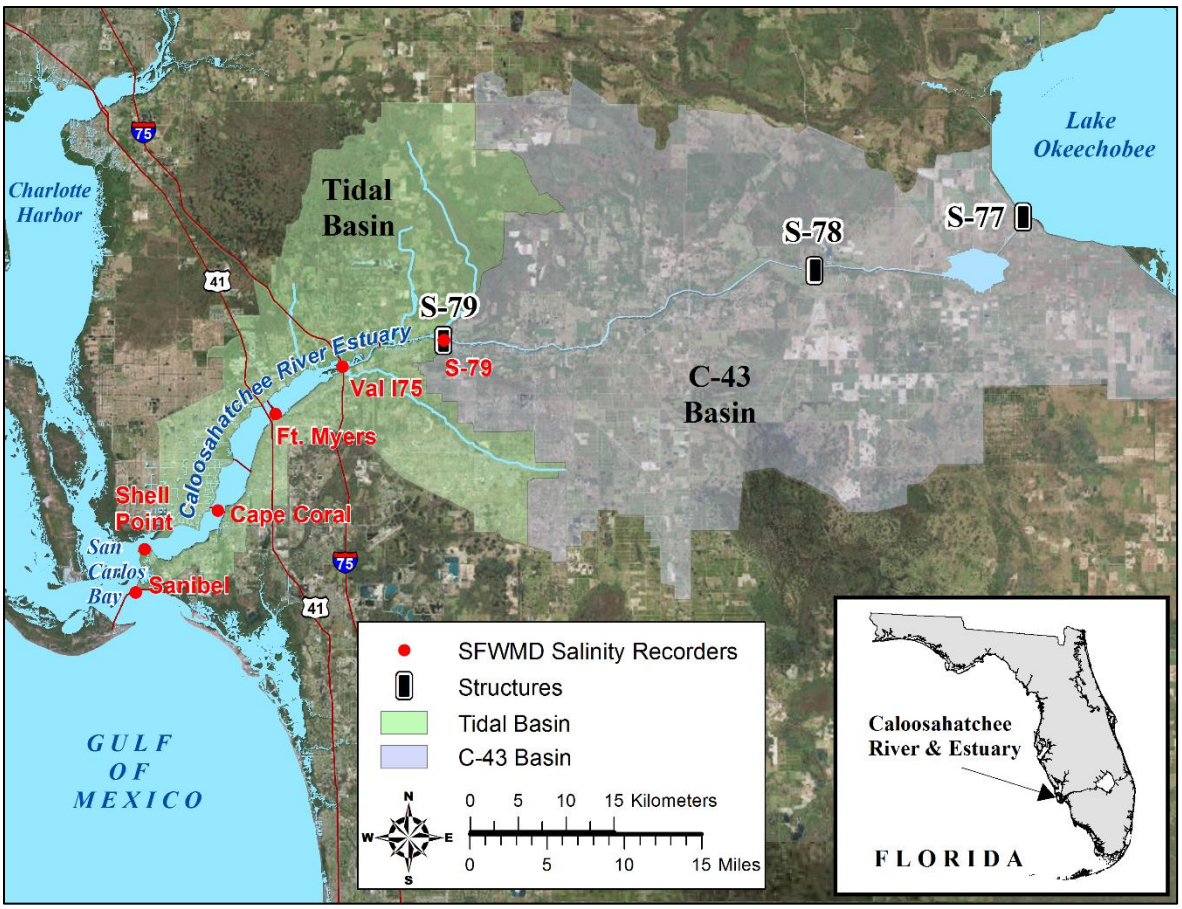


Figure 7. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

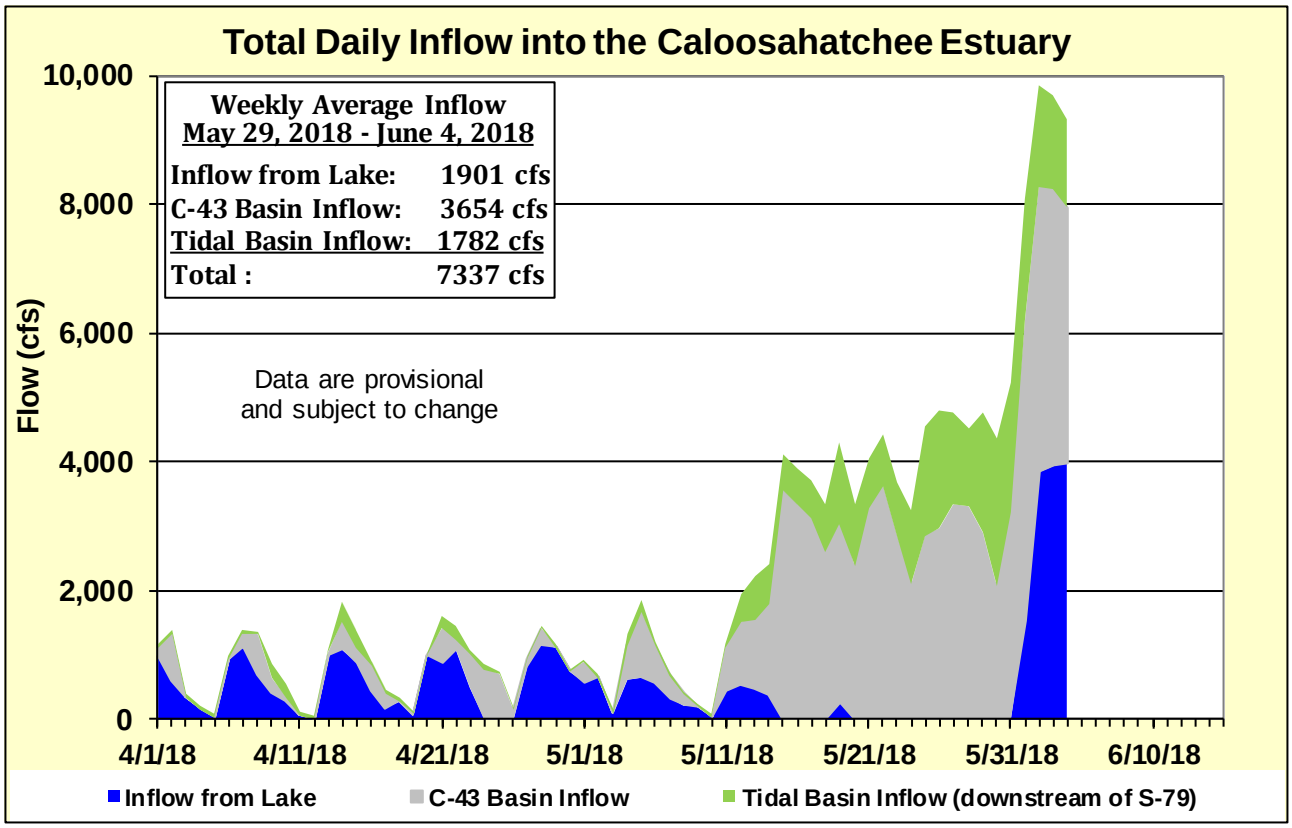


Figure 8. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

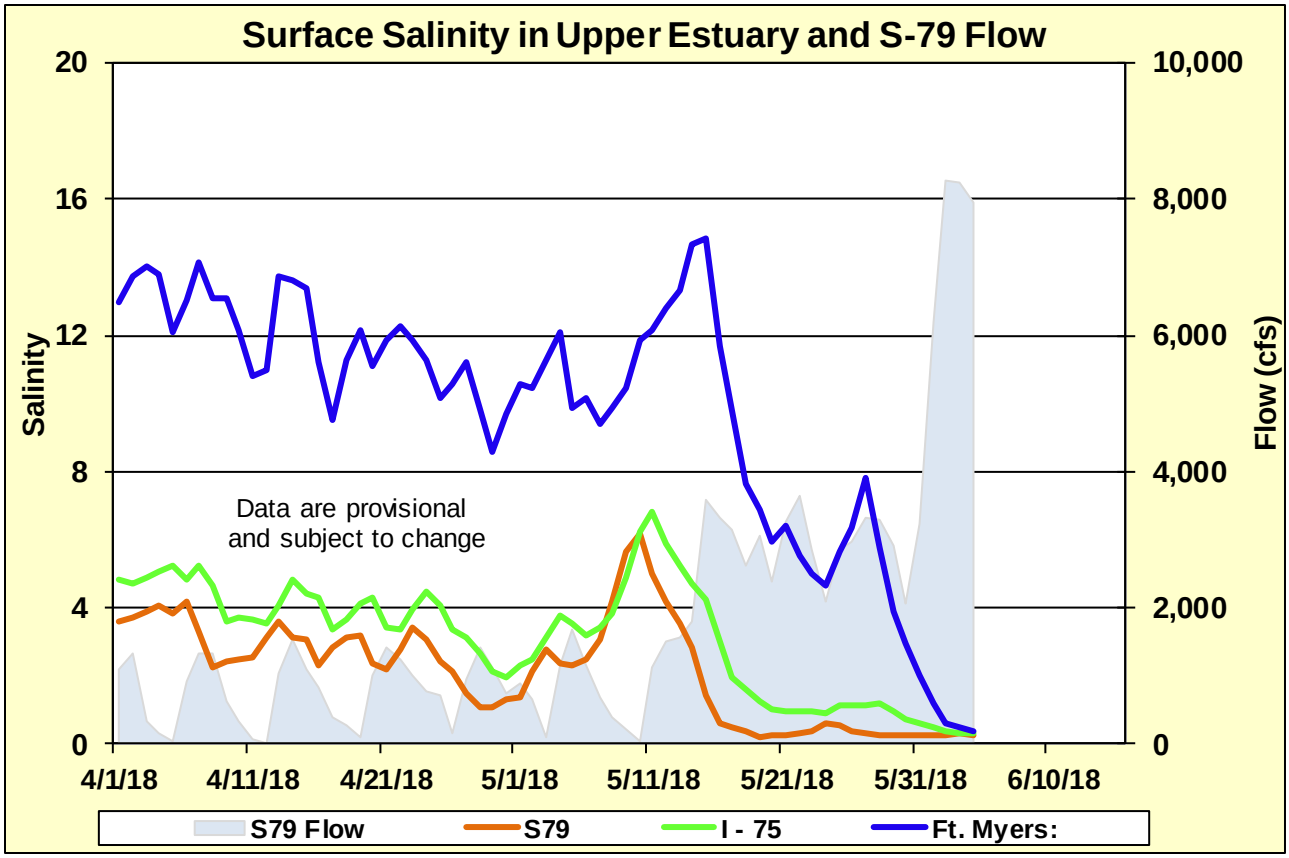


Figure 9. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

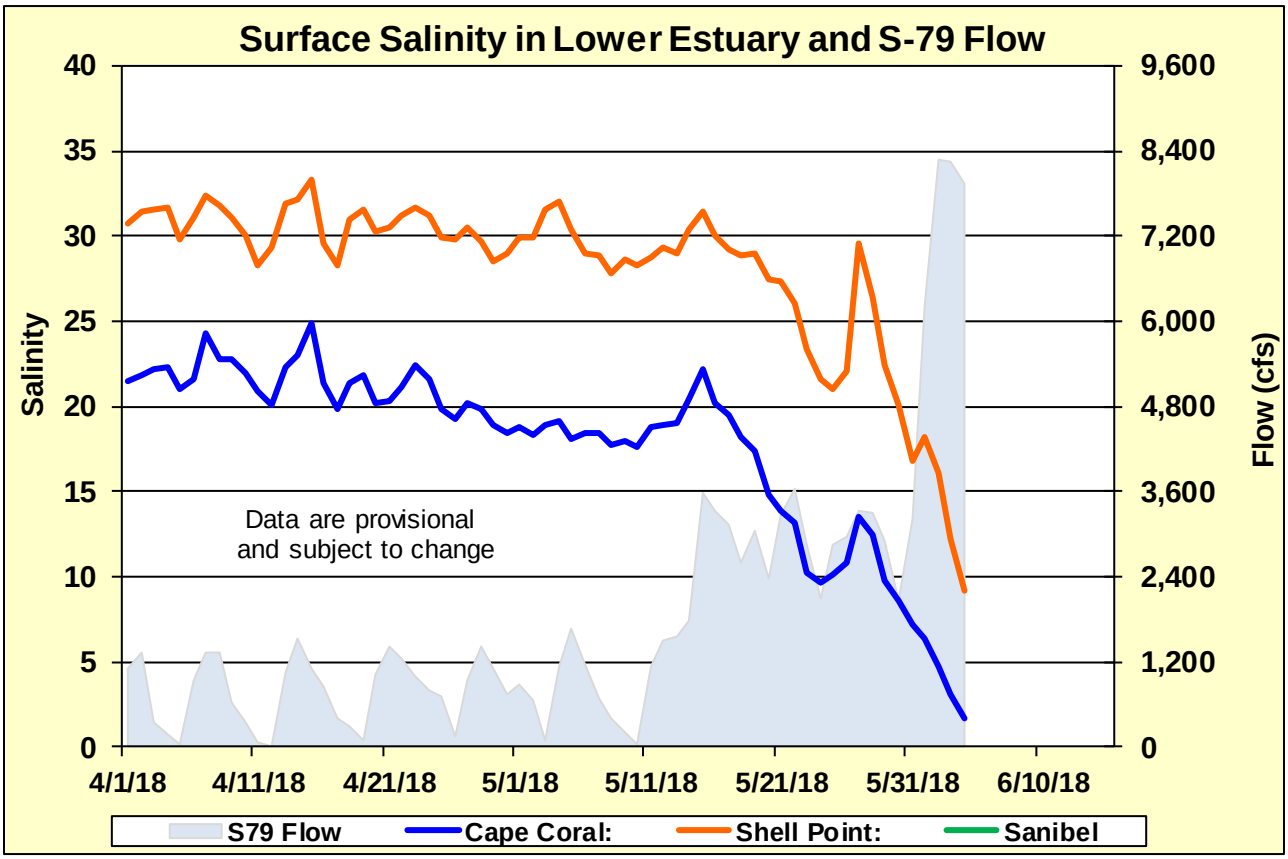


Figure 10. Daily mean flows at S-79 and salinity at lower estuary stations.

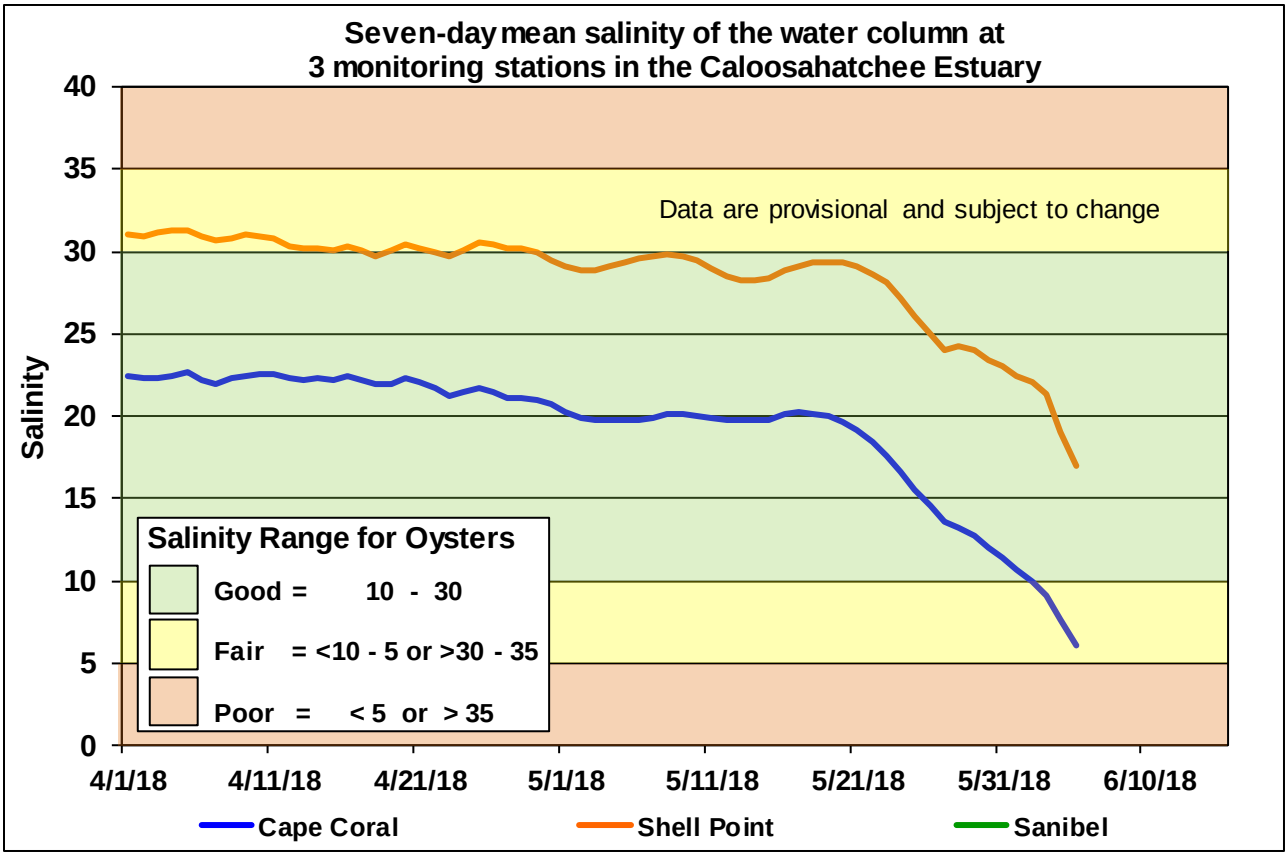


Figure 11. Seven-day mean salinity at Cape Coral Bridge, Shell Point, and Sanibel Bridge monitoring stations.

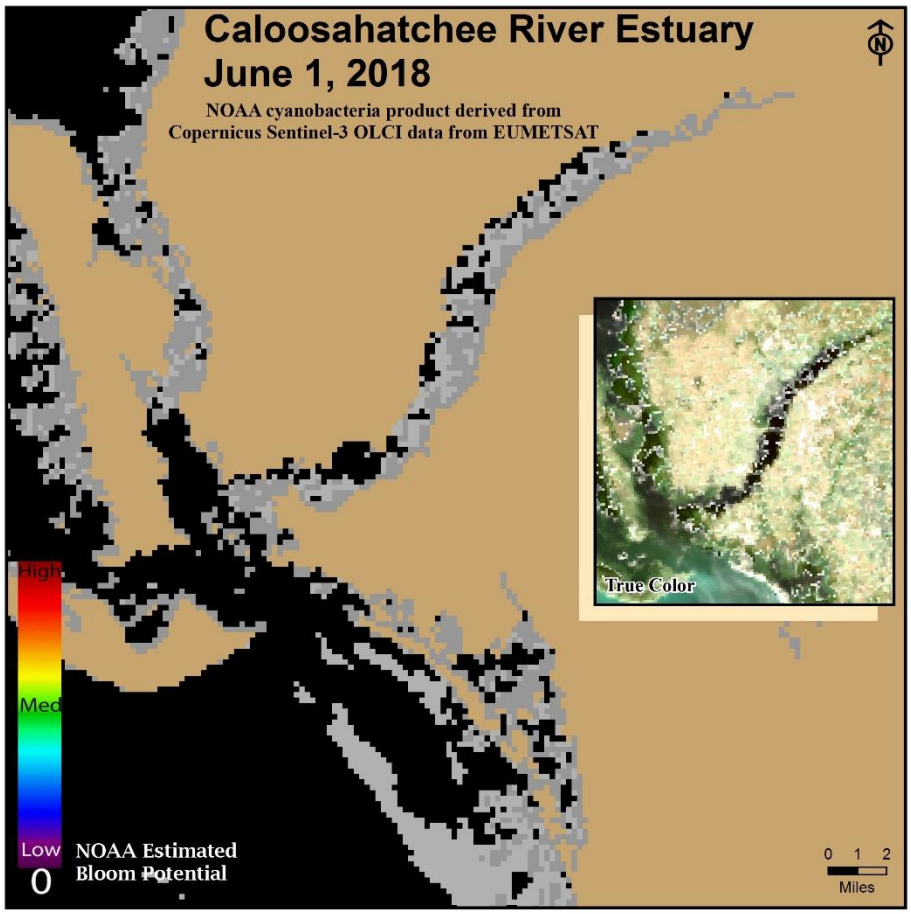
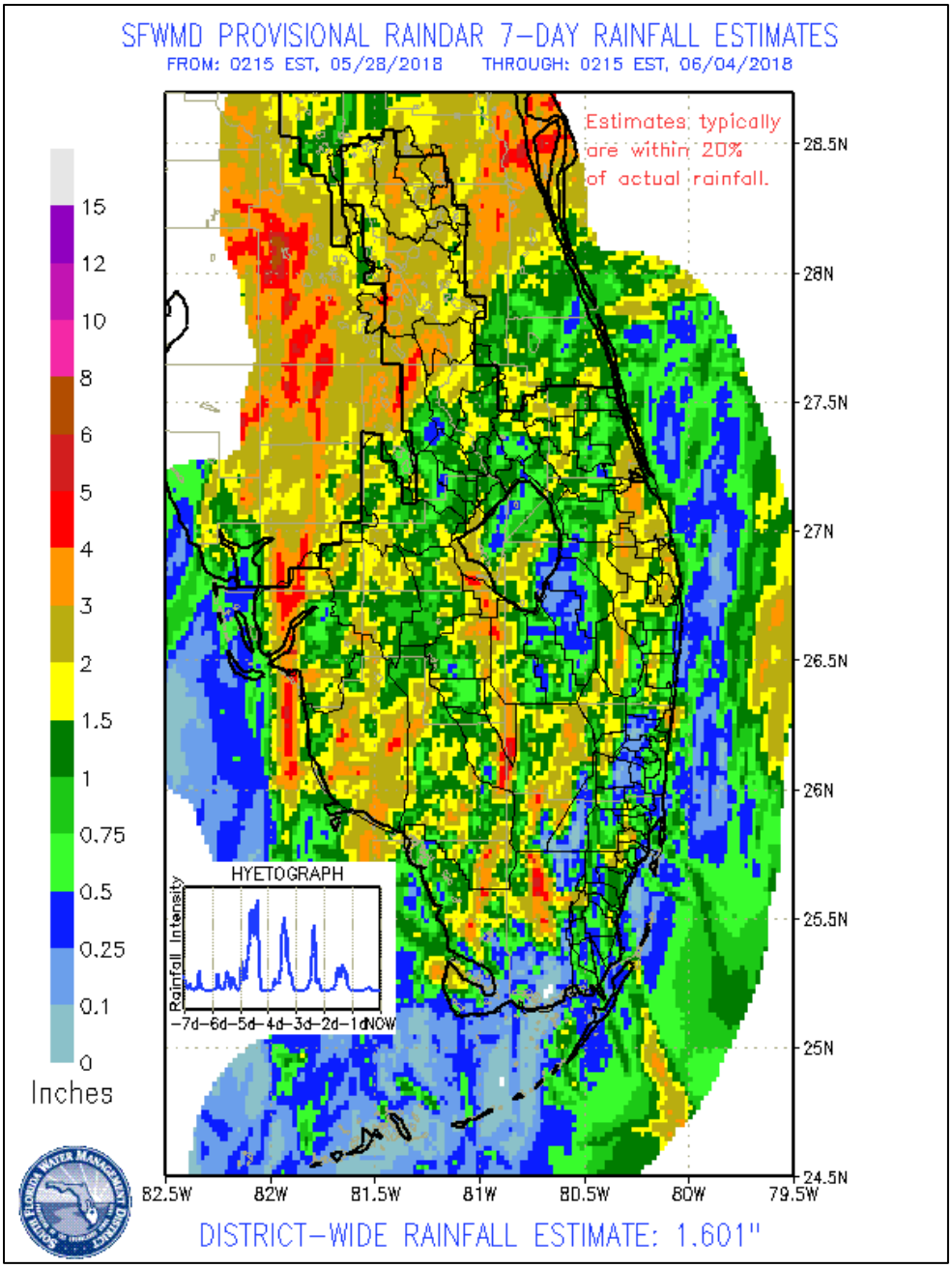


Figure 12. Sentinel 3a Satellite imagery provided by NOAA uses Ocean and Land Color Instrument (OLCI) to estimate cyanobacteria bloom potential in St. Lucie Estuary.

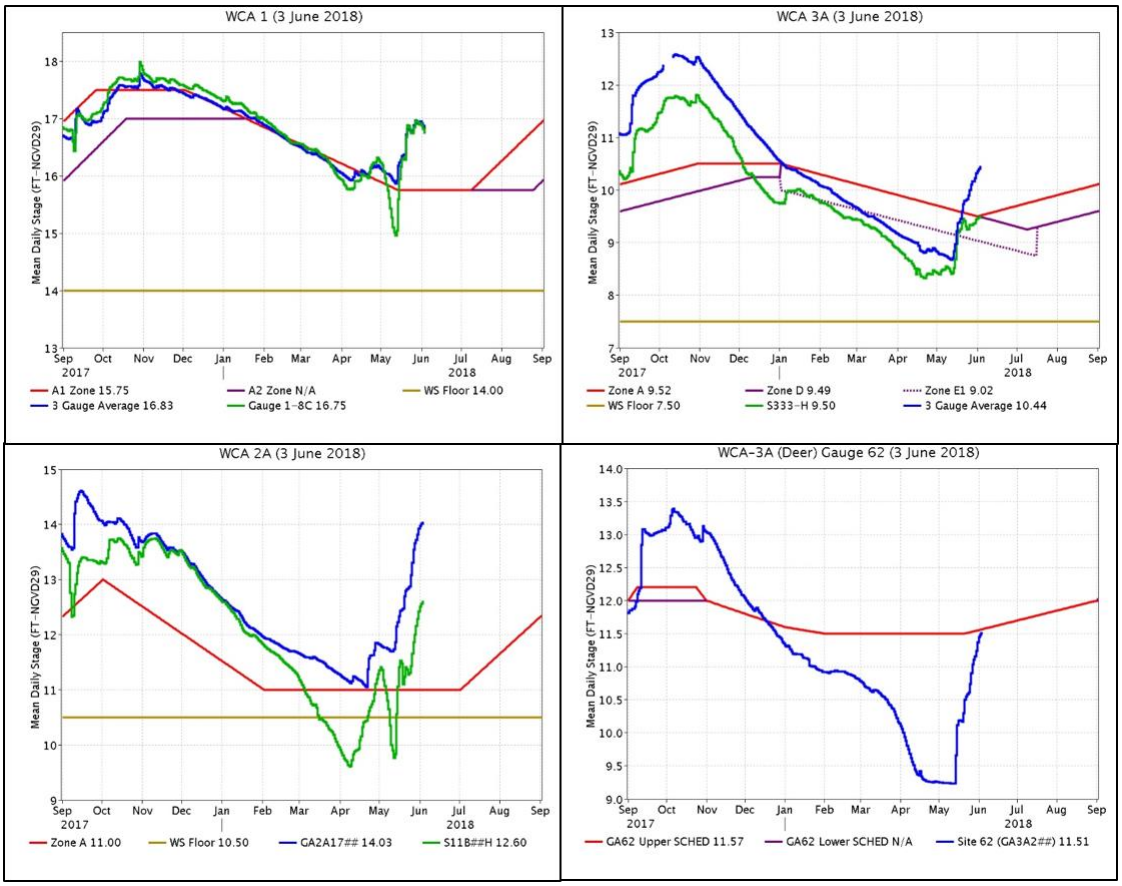
EVERGLADES

At the gauges monitored for this report, water depths across Everglades rose an average of 0.09 feet last week (down from 0.36 feet per week the previous week). Individual gauge changes within the WCAs ranged from +0.62 feet (NE WCA-3A) to -0.23 feet (WCA-1). Pan evaporation was estimated at 2.05 inches.

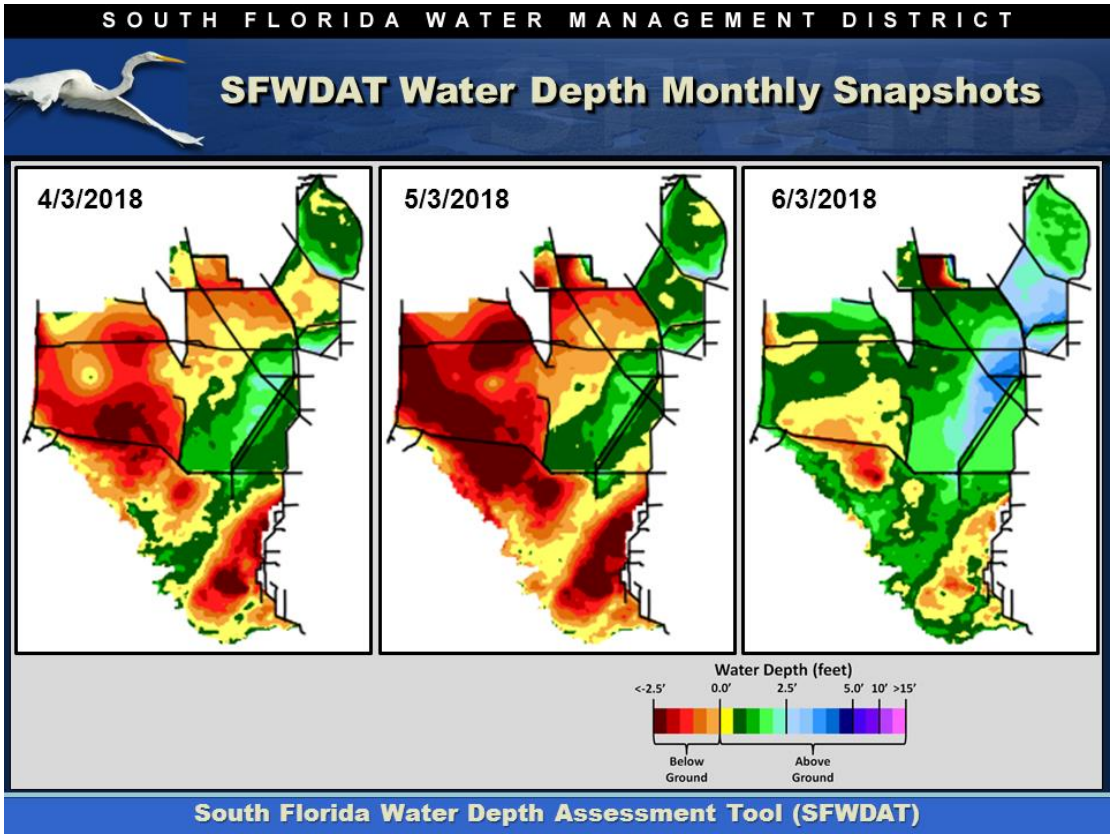
Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	1.60	−0.17
WCA-2A	1.56	+0.42
WCA-2B	1.60	+0.04
WCA-3A	1.76	+0.34
WCA-3B	0.63	−0.03
ENP	1.17	+0.04

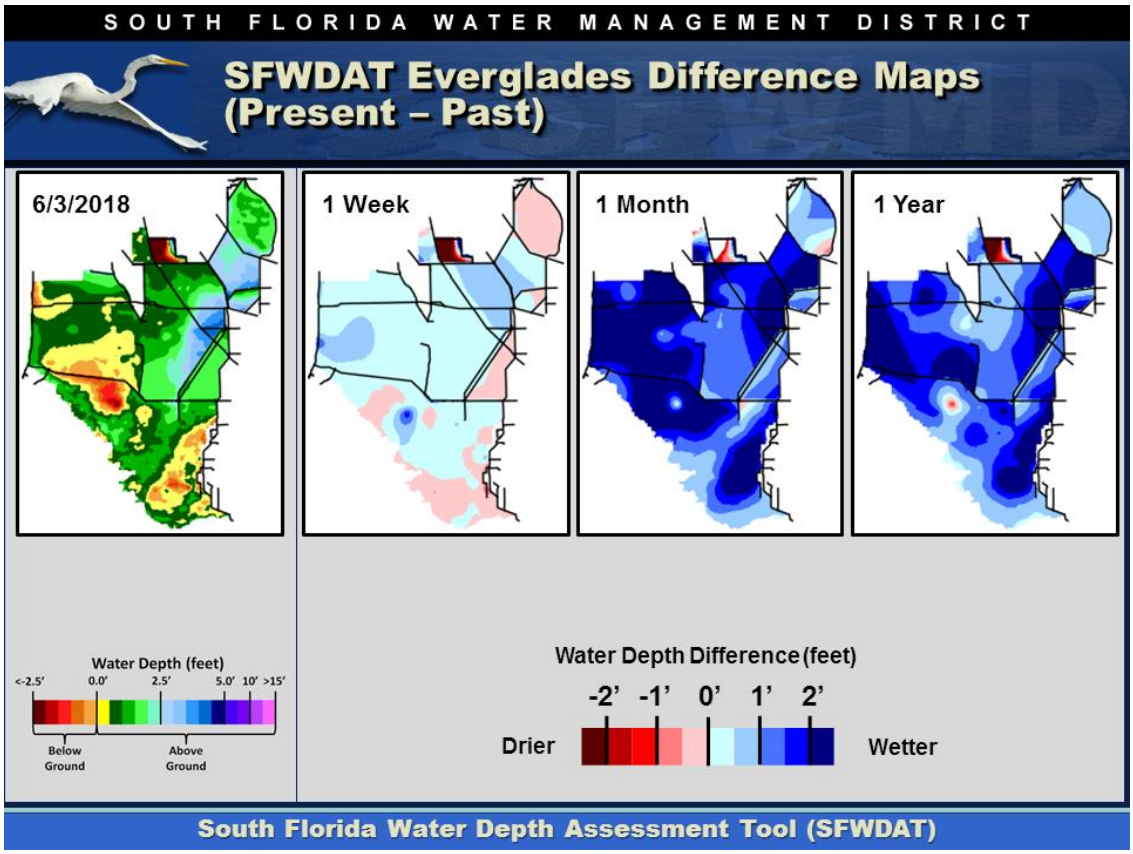


Regulation Schedules: WCA-1 three-gauge average stage is now 1.08 feet above Zone A1 and falling towards the regulation schedule. WCA-2A stages continues to sharply increase with marsh stage now 3.03 feet above Zone A. WCA-3A three-gauge average stage is steadily increasing and is now 0.92 feet above Zone A. WCA-3A at gauge 62 (northwest corner) stage is increasing steadily and is now 0.06 feet below the upper schedule.



Water Depths and Changes: The WDAT tool for spatial interpolation of depth monthly snapshots indicates rapidly rehydrating conditions across Everglades. In northern WCA-3A, water depths are now above ground surface at 0.5 to 1.0 feet, and deeper near the northern reaches of the L67. Depths in WCA-2A remain significantly deeper than the rest of the WCAs. Comparing WDAT water levels from present, water levels rose significantly in southwestern WCA-2A and northeastern WCA-3A North and fell within WCA-1 and WCA-3B. The Everglades is currently considerably wetter than it was a month and one year ago.


SOUTH FLORIDA WATER MANAGEMENT DISTRICT
SFWDAT Water Depth Monthly Snapshots
4/3/2018
5/3/2018
6/3/2018
Water Depth (feet)
<-2.5'
0.0'
2.5'
5.0'
10'
>15'
Below Ground
Above Ground
South Florida Water Depth Assessment Tool (SFWDAT)


SOUTH FLORIDA WATER MANAGEMENT DISTRICT
SFWDAT Everglades Difference Maps
(Present – Past)
6/3/2018
1 Week
1 Month
1 Year
Water Depth (feet)
<-2.5'
0.0'
2.5'
5.0'
10'
>15'
Below Ground
Above Ground
Water Depth Difference (feet)
-2'
-1'
0'
1'
2'
Drier
Wetter
South Florida Water Depth Assessment Tool (SFWDAT)

Wading Bird flight on June 4, 2018.

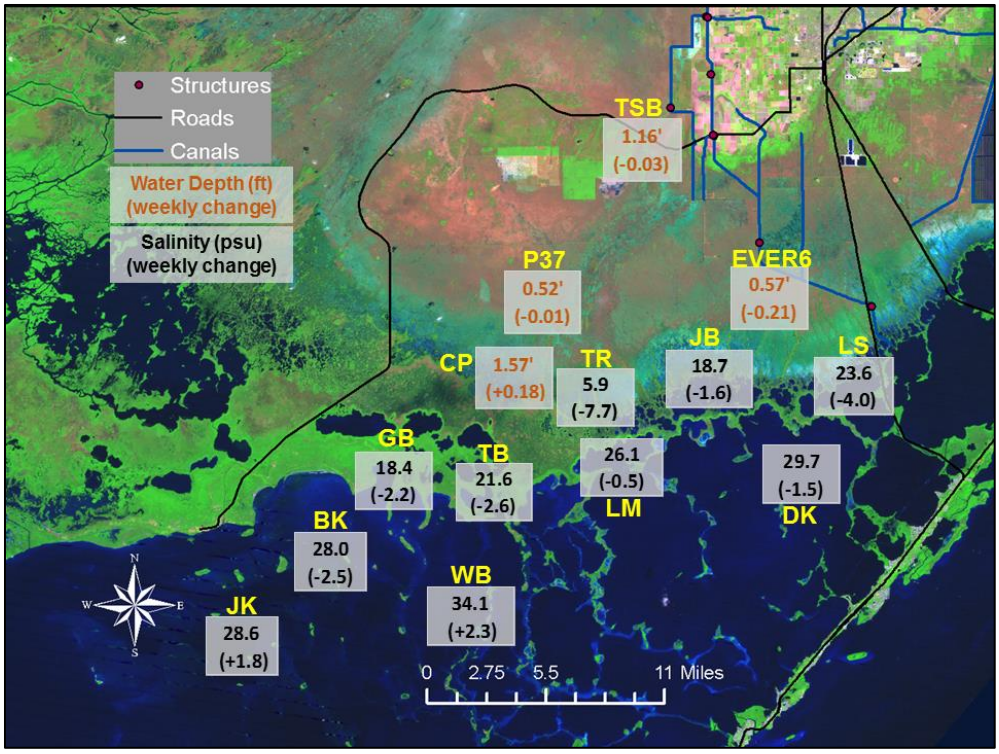
- Water depths are currently too deep for foraging birds across the WCAs. Despite this, adult birds are finding food somewhere because many of the nesting colonies in this region are still active with hundreds of late stage nestlings (White Ibis, Snowy Egret, Tricolored Herons and Little Blue Herons). Most Great Egret nestlings have now fledged.

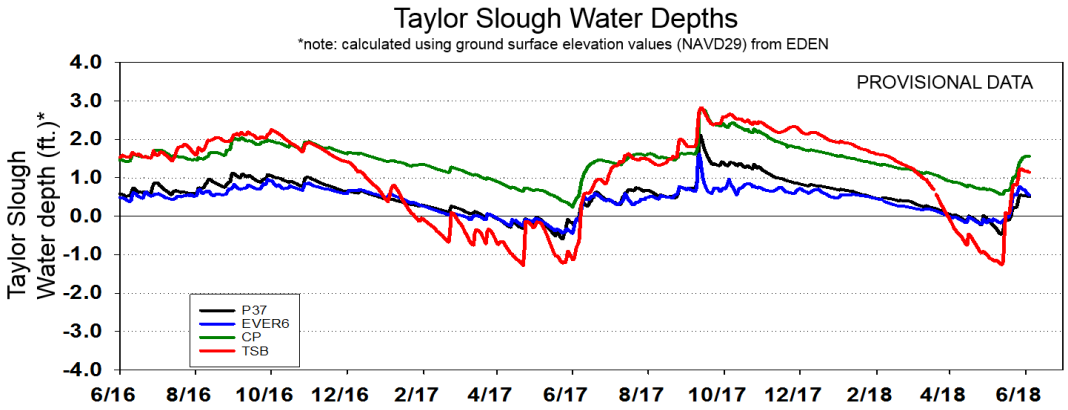
- Recent new nesting attempts by White Ibis (1,000 nests in WCA-1 and 1,500 nests in WCA-3A North) have all abandoned except for 150 nests in WCA-1.

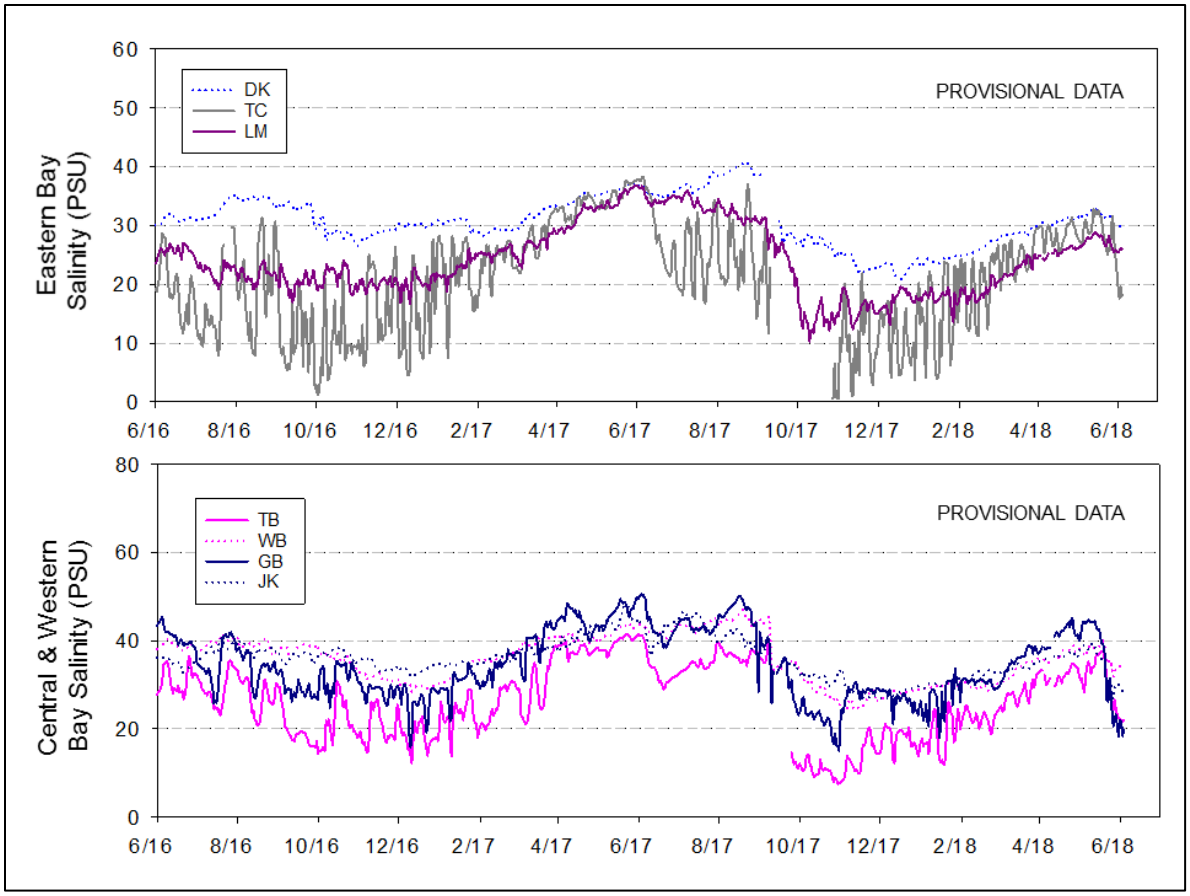
- Wood Stork colonies in WCA-3A South will be monitored on June 6.

Taylor Slough Water Levels: An average of 0.5 inches of rain fell on Taylor Slough and Florida Bay with a maximum of 1.1 inches falling over the western nearshore. Stage changes this week ranged from −0.21 feet to +0.18 feet. Water depths are 7 to 13 inches above the historical averages (compared to 12 to 20 inches above average from last week).

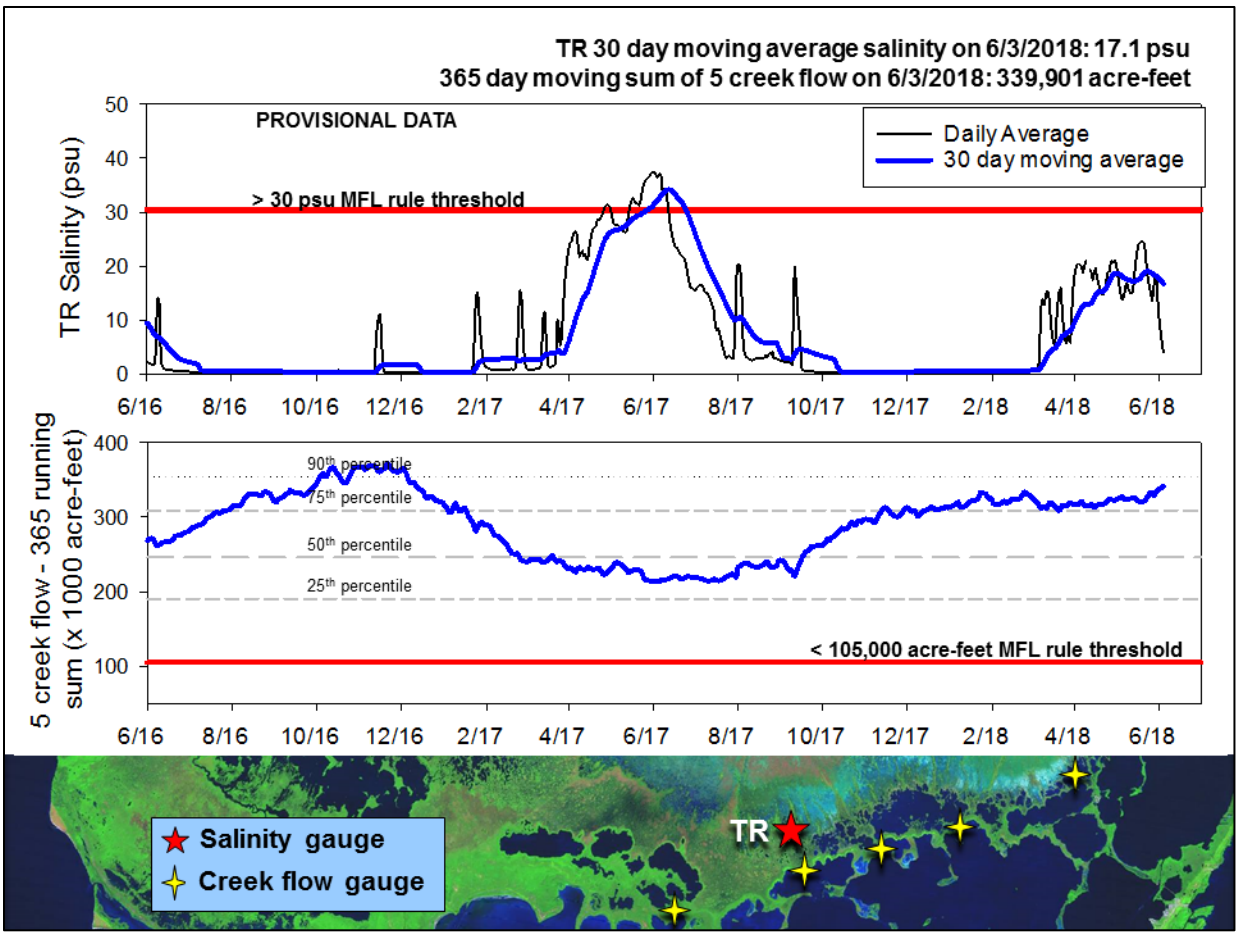
Florida Bay Salinities: Salinities decreased 2.6 psu on average in Florida Bay, with changes ranging from −4.0 psu to +2.3 psu. Salinities ranged from 19 psu in the northeast to 34 psu in the central bay. This range is 4 to 23 psu below the historical averages. Garfield Bight (GB) is the station that is 23 psu below average, and all the western stations are at least 11 psu below average.







Florida Bay MFL: Mangrove zone daily average salinity decreased 8 psu this past week to end at 6 psu. The 30-day moving average decreased 1.4 psu this week to end at 17.1 psu. The weekly cumulative flow from the five creeks denoted by yellow stars on the map totaled 11,000 acre-feet for the last week. The 365-day moving sum of flow from the five creeks increased 9,600 acre-feet over the last week to end at 339,901 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

As stages have risen quickly across the Everglades. Inflows to northernmost WCA-3A create the least ecological stress when compared to flows into more southern WCA-3A. Gauge 3-65 in southern WCA-3A nears the depth threshold for tree island flooding and WCA-2A is significantly over its regulation schedule. Incremental change in the rate of structure flows (i.e. when changing flow rates from 0 cfs to 1,000 cfs, make +500 cfs adjustment per week) to 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 rehydration rate is 0.25 feet or less per week (or 0.5 feet per 2 weeks). Due to elevated levels of phosphorus upstream of S-332, a recommendation is being made to limit the increase in depths within the L31W to no more than 3 inches per day over the course of 3 to 4 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 5th, 2018 (red is new)

Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.17'	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-2A	Stage increased by 0.42'	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-2B	Stage increased 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.	Protect upstream/downstream habitat and wildlife.
WCA-3A NE	Stage increased by 0.62'	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 increased by 0.43'	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 0.26'	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 0.04'		
WCA-3B	Stages decreased by 0.03'	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 0.04'	Make discharges to the Park according to the 2012 WCP rainfall plan.	Protect upstream/downstream habitat and wildlife.
Taylor Slough	Stage changes ranged from −0.21' to +0.18'	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 −4.0 to +2.3 psu.	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.