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: May 8, 2018

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A diffuse cold front extending from the central Bahamas through north-central Cuba should remain stationary until mid-week and then gradually lift northwestward over the Florida Straits and be near the Florida Keys early on Thursday. Drier and more stable air behind the front should ensure dry conditions across nearly the whole District through Wednesday. The only exception will be over the southeastern third of the area, where some overnight or morning showers are possible near or just inland from the coast each and over the extreme south-central or southwestern interior during the afternoon when showers and a few thunderstorms could occur. The front should begin to lose its identity on Thursday but not before dragging greater moisture northward over the southern half of Florida. The influx of moisture and leftover convergence along the boundary should result in greater rain chances over the southeastern half of the District, especially south and east of the Fort Lauderdale-Everglades City line. Although areal averages totals are not expected to be much above 0.25 or 0.5 inches, there could still be a few pockets of heavier rainfall producing local maxima of 1.0 to 2.0 inches. High pressure over the western Atlantic is forecast to build into Florida Friday and continue to influence the weather into early next week. A moist southeasterly wind flow around this weather feature, in combination with an upper-air disturbance, should enhance rain chances beginning over the weekend and likely into the coming week. The pattern that sets up starting then should include morning rains, some heavy, over the eastern half of the District overnight or in the morning; daytime heating/destabilization of the atmosphere and local sea breeze circulations/interactions should then result in afternoon rains inland, especially over the southern and western interior. Some significant rainfall accumulations are possible. District-wide areal average rainfall is predicted to be about 1.33 inches from Saturday-Monday, and even though this aggregate value may vary some in the next few days as the forecast is refined, there is some potential for this to be the greatest 3-day rainfall total this year. It is possible that these rains would mark the beginning of this year's rainy season, but it is still too early to be definitive.

Kissimmee

Tuesday morning stages were 55.5 feet NGVD (0.4 feet below schedule) in East Lake Toho, 52.5 feet NGVD (0.4 feet below schedule) in Toho, and 49.0 feet NGVD (0.8 feet below schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.3 feet NGVD at S-65A and 25.8 feet NGVD at S-65D. Mean recession rates for the last seven days were 0.11 and 0.11 feet per week in East Lake Toho and Toho, respectively (preferred range of 0.15-0.2 feet per week) and 0.23 feet per week in Kissimmee-Cypress-Hatchineha (preferred rate is to not exceed 0.2 feet per week). Tuesday morning discharges were: 330 cfs at S-65, 257 cfs at S-65A, and 91 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 7.9 mg/L for the week. Kissimmee River mean floodplain depth on Sunday was 0.06 feet.

Lake Okeechobee

Lake Okeechobee stage is 12.96 feet NGVD having decreased 0.20 feet over the past week and 0.66 feet over the last month. Recession rates had slowed over recent weeks but increased again this past week. The Lake stage is now below 13.0 feet NGVD for the first time in nine months. Coupled with recent decreases in turbidity in the nearshore zone, the submerged aquatic vegetation (SAV) and emergent vegetation should have ideal conditions for recovering from Hurricane Irma's impacts. While there are still a few areas of pooled water in the upper marshes, most of the wading bird foraging activity is moving downslope toward areas like Moonshine Bay.

Estuaries

Total inflow to the St. Lucie Estuary averaged 312 cfs over the past week with no flow coming from Lake Okeechobee. Salinity remained about the same as last week's level throughout the estuary. The seven-day average salinity at the US1 Bridge is in the fair range for adult eastern oysters. The highest weekly ranges of chlorophyll *a* were 3.45–10.42 µg/L in the South Fork. Total inflow to the Caloosahatchee Estuary averaged 985 cfs over the past week with 506 cfs coming from the Lake. Salinity slightly increased at S-79 and Shell Point and remained about the same as last week's in the middle estuary. Bottom salinity increased throughout the estuary. The 30-day moving average surface salinity is 3.6 at Val I-75 and 11.3 at Ft. Myers. The 30-day moving average salinity at Val I-75 is forecast to be 4.6 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 eastern oysters at Cape Coral and at Shell Point. Chlorophyll *a* concentrations were relatively low to medium over the last week near Beautiful Island (4.25–21.37 µg/L), Ft. Myers (3.23–18.05 µg/L), and Shell Point (1.21– .35 µg/L). Dissolved oxygen levels at Beautiful Island were 4.42–7.69 mg/L, at Ft. Myers were 3.64–7.46 mg/L, and at Shell Point were 3.90–9.68 mg/L. Although the Caloosahatchee is not in need of water at this time based on the Val I-75 forecast, the continuation of the current Lake releases does provide benefits to the estuary.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 4,100 acre-feet of Lake releases. The total amount of Lake releases sent to the STAs/FEBs in WY2019 (since May 1, 2018) is approximately 3,400 acre-feet. Most STA cells are at or near target depths, except many of the STA-5/6 cells which have dried out. Operational restrictions are in place for vegetation rehabilitation in STA-1E, STA-2, and STA-3/4; a Restoration Strategies Science Plan study in STA-3/4; and for construction related activities in STA-1W. The nests of Migratory Bird Treaty Act (MBTA) protected species have been observed in STA-1E, STA-2, STA-3/4, and STA-5/6. This week, if Lake releases are sent to the WCAs, they will be sent to STA-1E Eastern Flow-way and STA-2 Flow-way 4.

Everglades

Water management resulting in the recommended recession rates (see table of recommendations at the end of the report) would generate the most pronounced ecological benefit for wildlife in Rotenberger Wildlife Management Area and northern WCA-3A. Over drying in the northern portions of WCA-3A puts those regions' peat soils at risk and increases the likelihood of damaging wild fires. Inflows to those areas continue to provide ecological benefit and there is little risk of a negative impact to wading bird foraging conditions. The recent reversals due to rainfall have had little to no noticeable detrimental impact on wading bird nesting or foraging. System-wide, both wood storks and white ibis are nesting, fledging, and foraging at near record levels. Water depths in Taylor Slough range from 8 inches below to 3 inches above the historical averages. Salinity changes in Florida Bay ranged from −1.8 to +2.9 psu and are within 3 psu of the historical average for this time of year. Mangrove zone daily average salinity decreased this week to end at 14 psu on Sunday.

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.14 inches of rainfall in the past week and the Lower Basin received 0.12 inches (SFWMD Daily Rainfall Report 5/6/2018).

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: 5/8/2018

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)						
							5/6/18	4/29/18	4/22/18	4/15/18	4/8/18	4/1/18	3/25/18
Lakes Hart and Mary Jane	S-62	0	LKMJ	59.8	R	60.0	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.4
Lakes Myrtle, Preston, and Joel	S-57	0	S-57	60.2	R	60.3	-0.1	-0.1	0.0	0.0	-0.2	-0.2	-0.2
Alligator Chain	S-60	19	ALLI	62.7	R	62.7	0.0	-0.1	0.1	0.0	-0.1	-0.2	-0.4
Lake Gentry	S-63	19	LKGT	60.2	R	60.2	0.0	0.0	0.0	0.1	0.0	-0.1	-0.2
East Lake Toho	S-59	0	TOHOE	55.6	R	56.0	-0.4	-0.6	-0.7	-0.8	-0.9	-1.1	-1.2
Lake Toho	S-61	0	TOHOW, S-61	52.6	R	53.0	-0.4	-0.6	-0.7	-0.7	-0.9	-1.1	-1.2
Lakes Kissimmee, Cypress, and Hatchineha	S-65	343	KUB011, LKIS5B	49.1	R	49.9	-0.8	-0.8	-0.9	-1.0	-1.3	-1.4	-1.2

[1] Seven-day average of weighted daily means through midnight.
[2] Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.
[3] 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: **5/8/2018**

Metric	Location	1-Day Average	Average for the Preceeding 7-Days[1]									
		5/6/2018	5/6/18	4/29/18	4/22/18	4/15/18	4/8/18	4/1/18	3/25/18	3/18/18	3/11/18	3/4/18
Discharge (cfs)	S-65	327	343	348	392	406	340	376	361	400	461	715
Discharge (cfs)	S-65A	239	248	246	270	313	257	246	245	258	319	539
Discharge (cfs)	S-65D[2]	239	304	341	362	384	301	324	329	343	430	730
Stage (feet NGVD)	S-65D[2]	25.94	25.89	25.81	25.77	25.86	25.77	25.86	25.80	25.66	25.73	25.67
Discharge (cfs)	S-65E[2]	239	263	304	318	355	297	325	348	317	441	733
Discharge (cfs)	S-67	0	0	0	0	1	0	0	0	0	0	0
DO (mg/L)[3]	Phase I river channel	7.7	7.9	7.1	7.2	6.2	6.8	7.5	8.2	8.3	7.0	5.9
Mean depth (feet)[4]	Phase I floodplain	0.06	0.06	0.06	0.07	0.07	0.06	0.07	0.09	0.07	0.09	0.14

[1] Seven-day average of weighted daily means through Sunday midnight.
[2] 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)

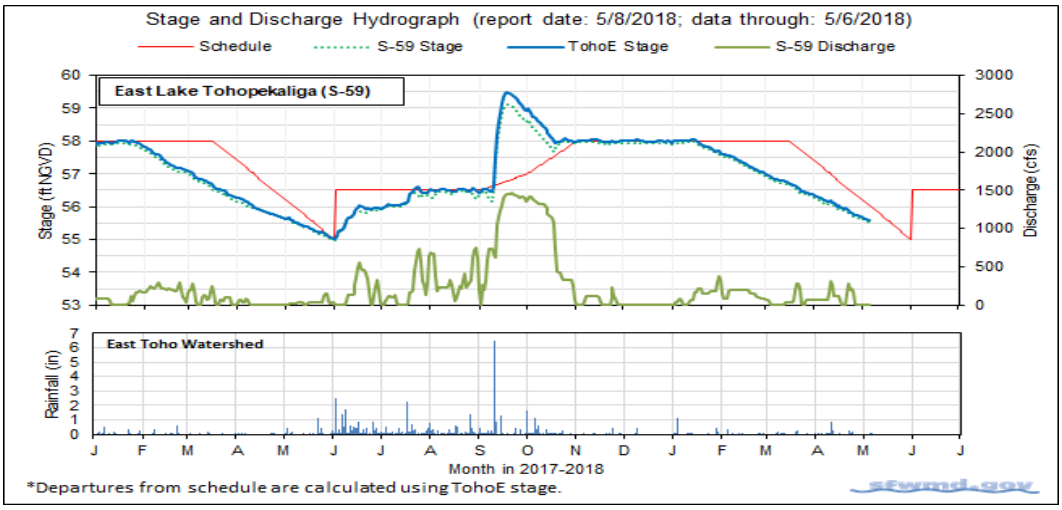


Figure 1.

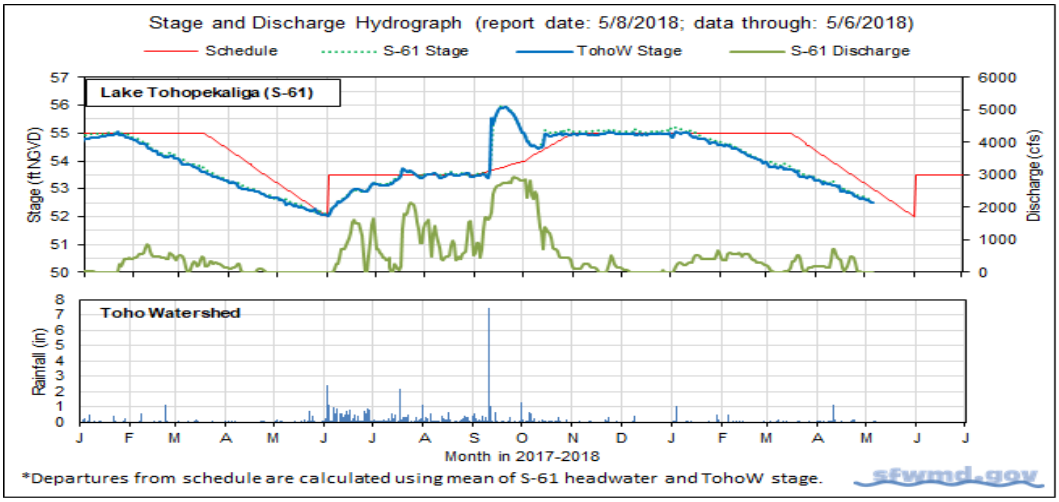


Figure 2.

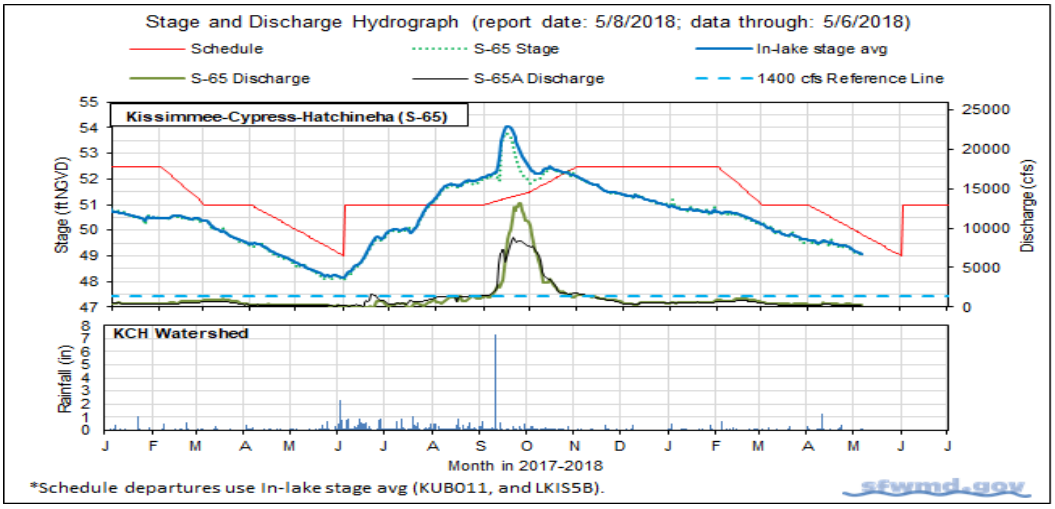


Figure 3.

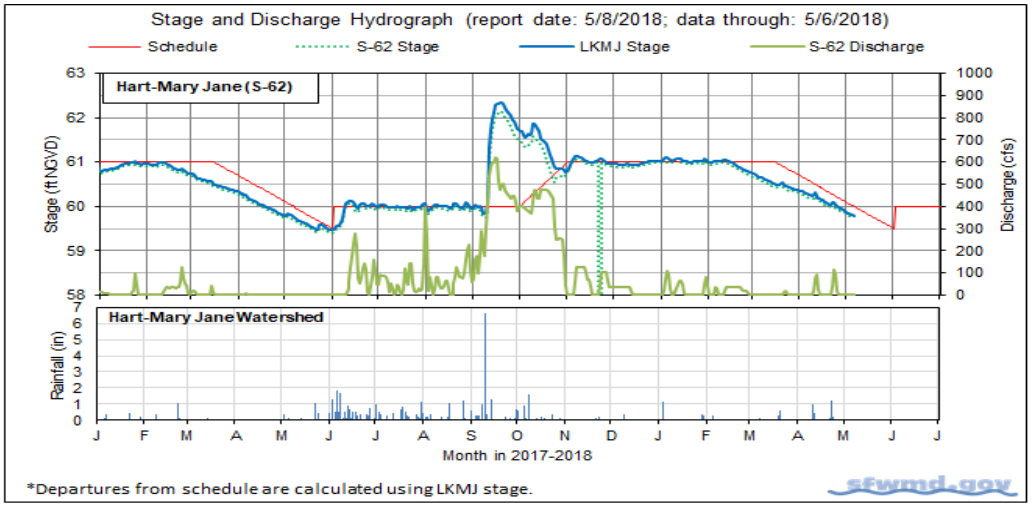


Figure 4.

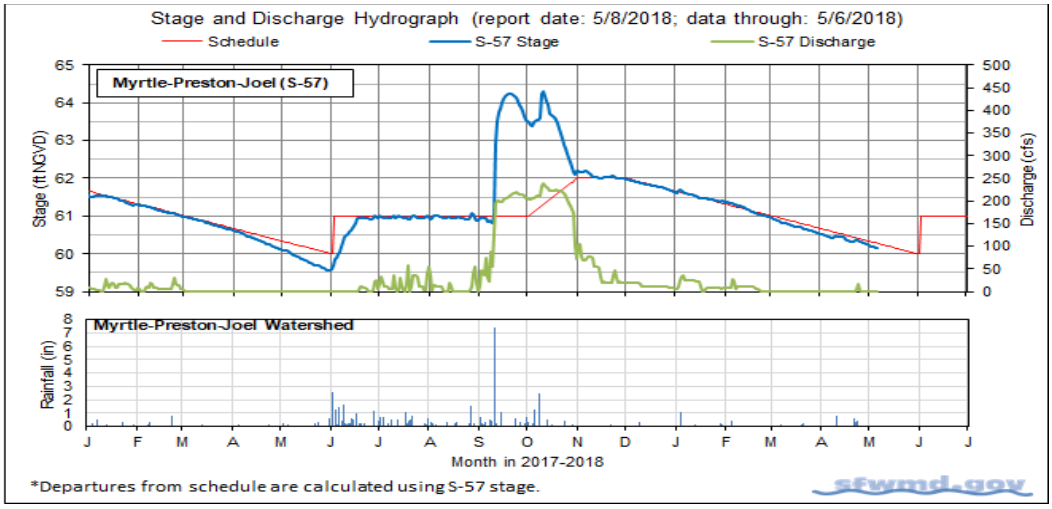


Figure 5.

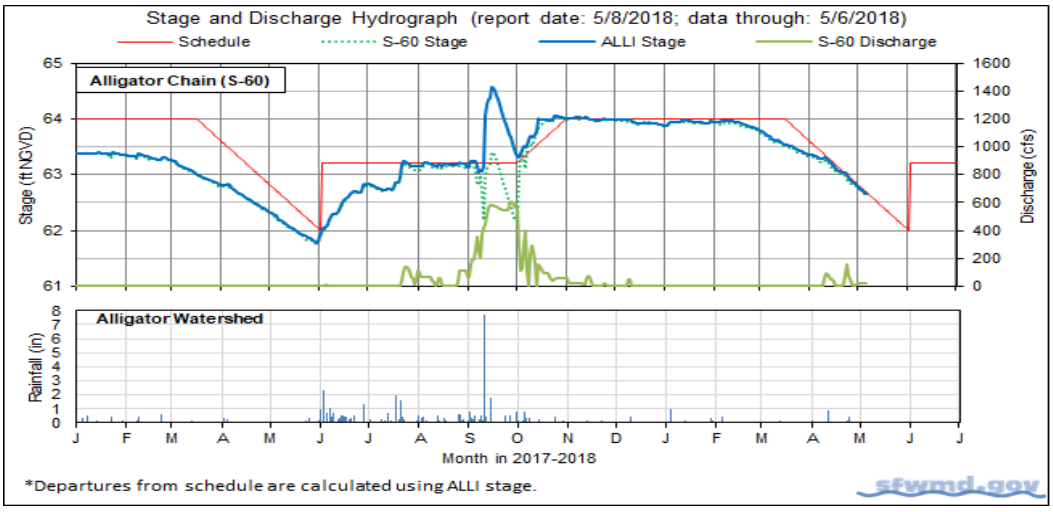


Figure 6.

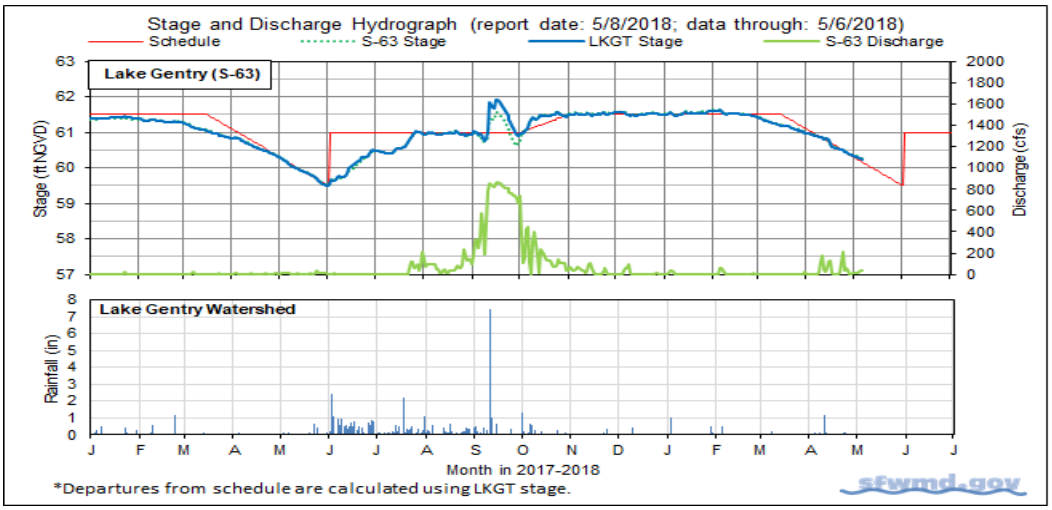


Figure 7.

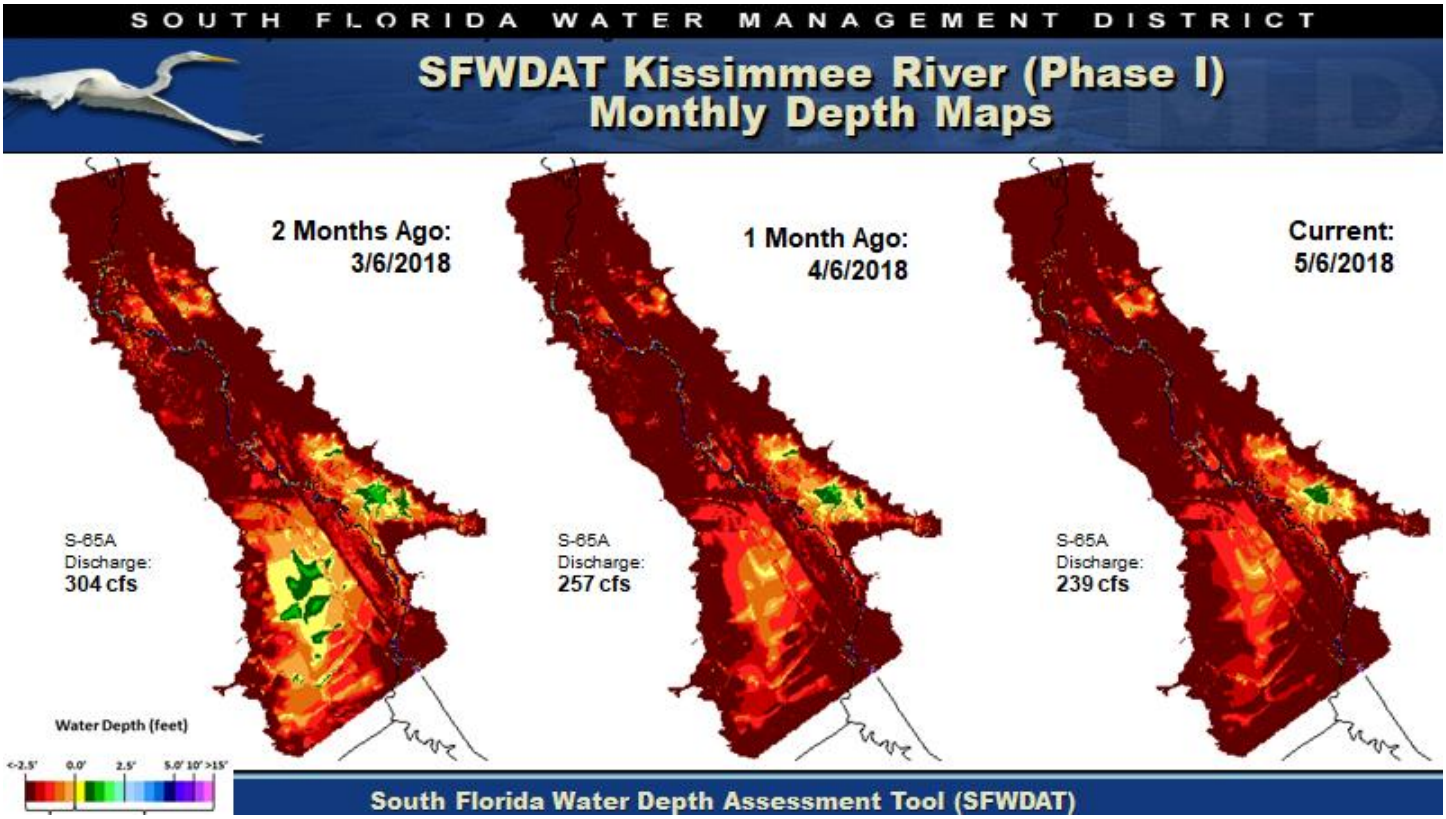


Figure 8. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

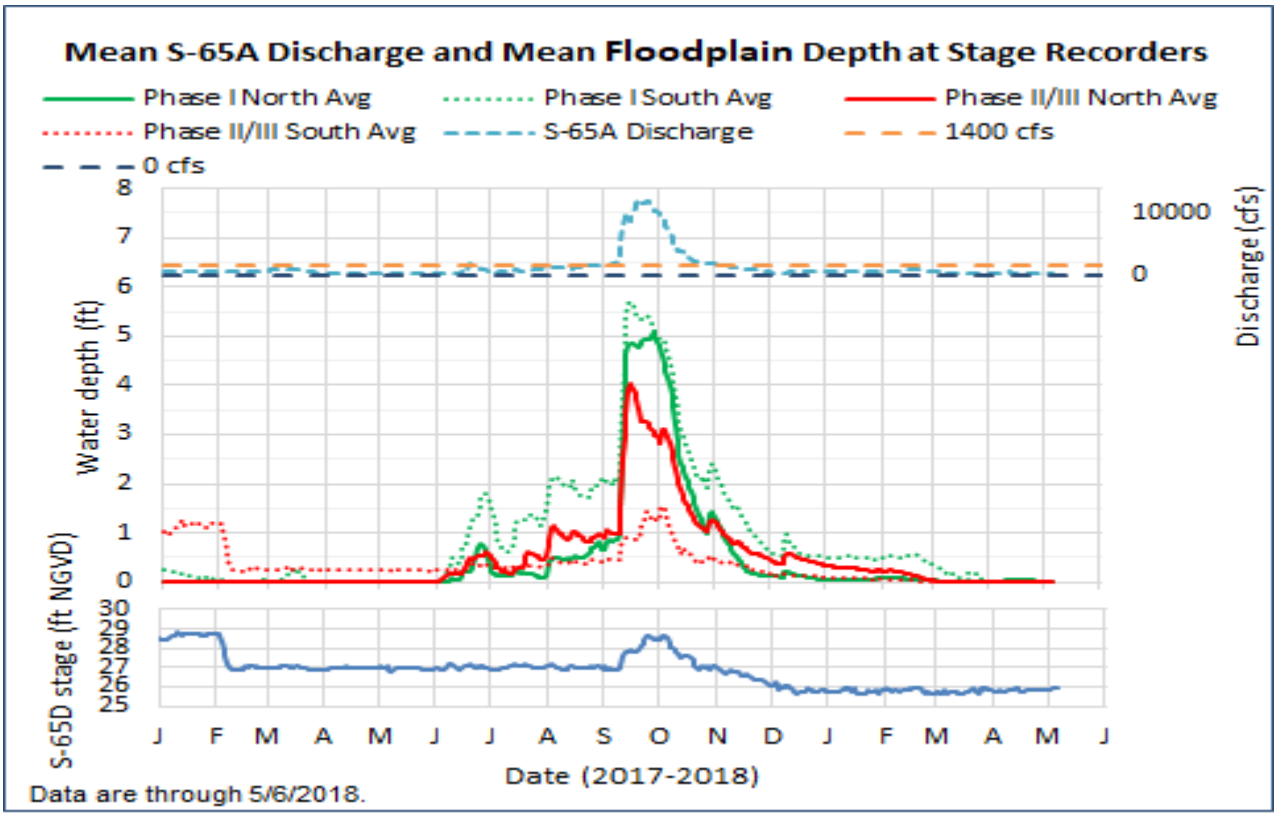


Figure 9. Mean water depth at stage recorders in the northern Phase I, southern Phase I, northern Phase II/III, and southern Phase II/III areas in relation to the S-65A discharge and S-65D headwater stage.

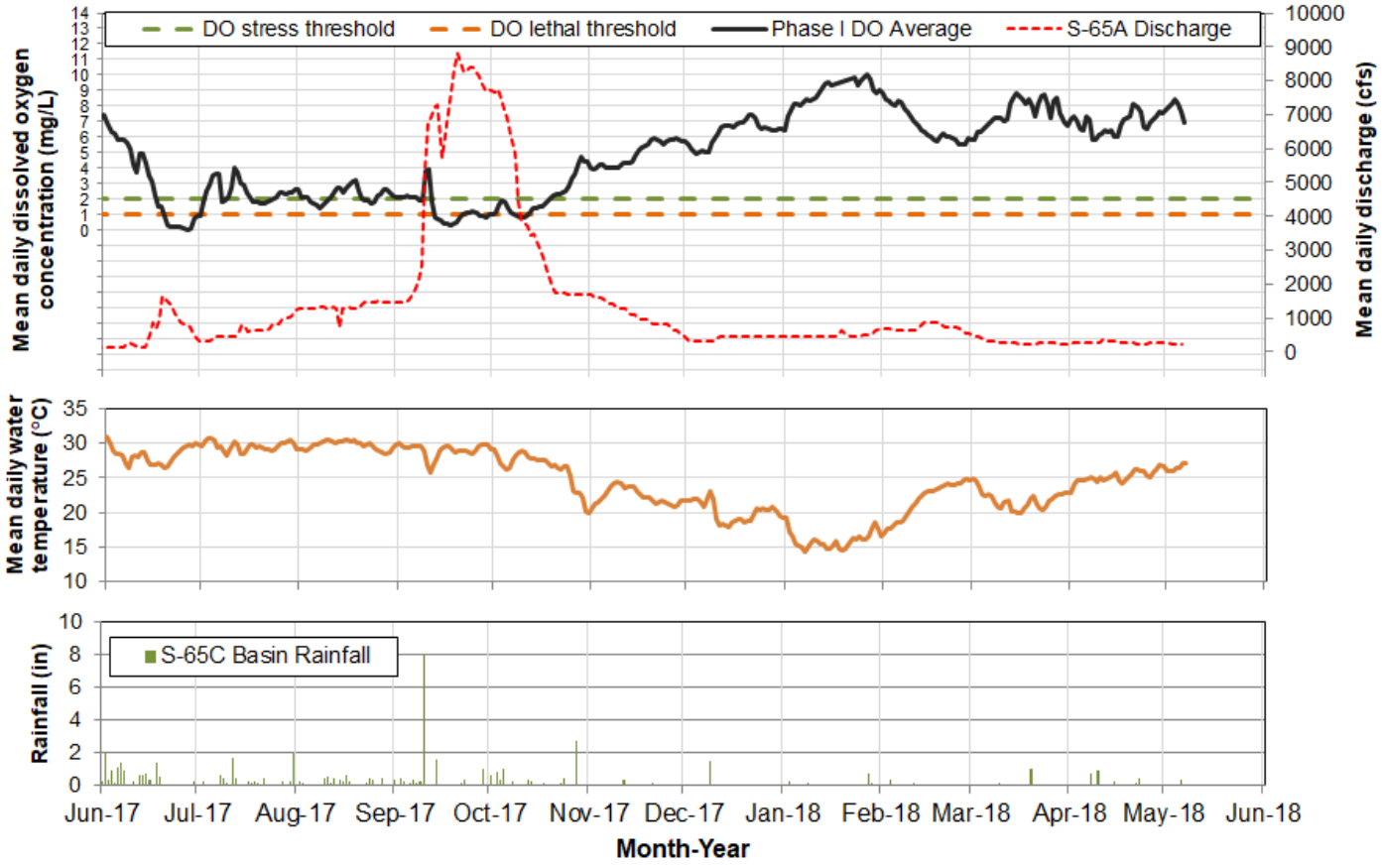


Figure 10. Mean daily dissolved oxygen, discharge, temperature and rainfall in the Phase I river channel.

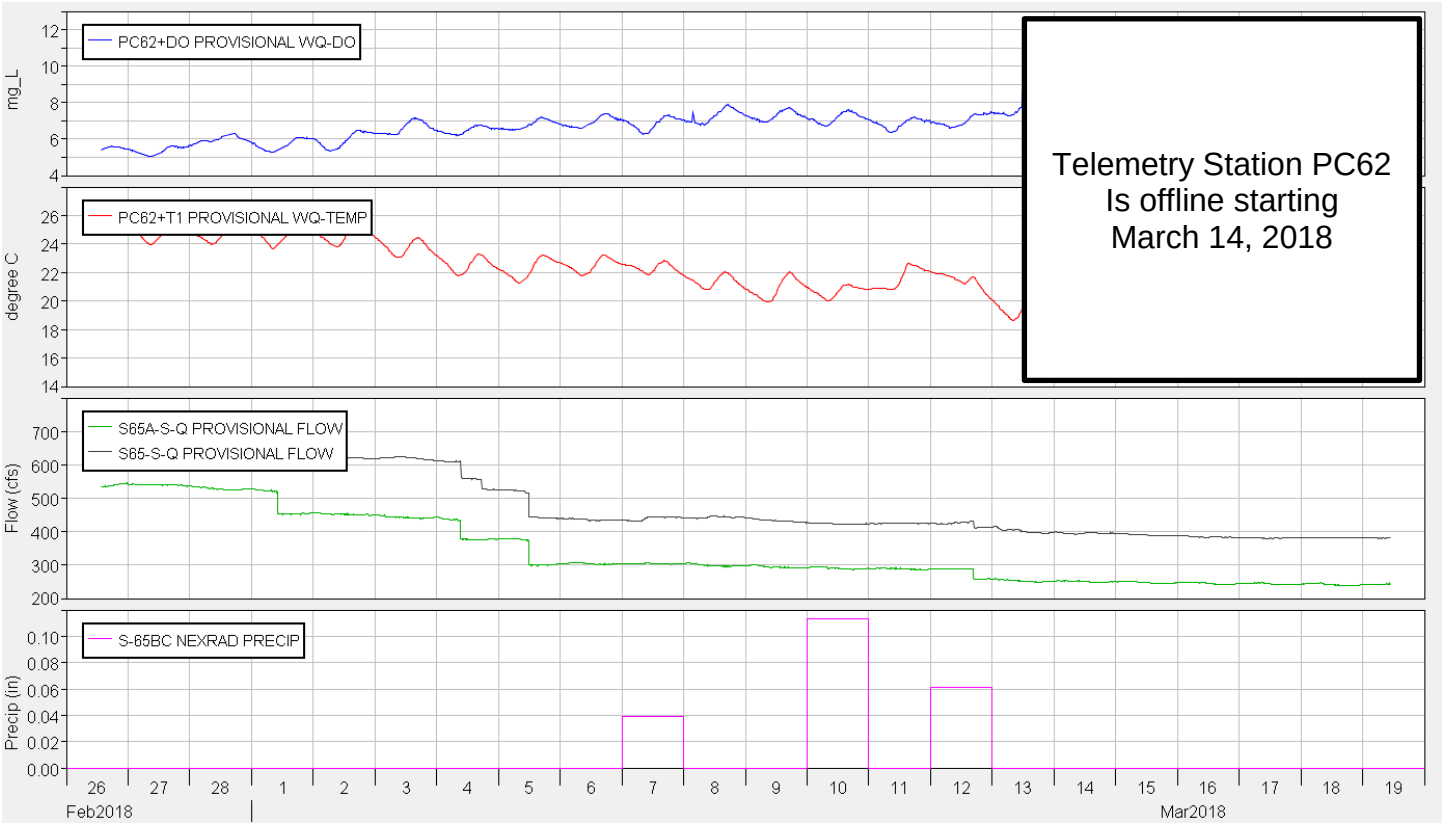


Figure 11. Phase I river channel dissolved oxygen and water temperature (measured at 15-minute intervals) and Pool BC daily rainfall.

Water Management Recommendations

Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
5/8/2018	No new recommendations.		N/A	
5/1/2018	No new recommendations.		N/A	
4/24/2018	No new recommendations.		N/A	
4/17/2018	No new recommendations.		N/A	
4/10/2018	No new recommendations.		N/A	
4/3/2018	No new recommendations.		N/A	
3/27/2018	No new recommendations.		N/A	
3/20/2018	No new recommendations.		N/A	
3/13/2018	No new recommendations.		N/A	
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	
12/19/2017	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	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 cfs.	Reduce rate of stage rise in KCH.		SFWMD Water Mgt, KB Ops
8/1/2017	No new recommendations.		N/A	

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

S-65/S-65A Limits on Rate of Change in Discharge

Q (cfs)	Maximum rate of increase or decrease (cfs/day)
300-650	75
650-1700	150
1700-3000	300
>3000	1000

Figure 12. Limits on rate of discharge change at S-65/S-65A starting with the 2016-2017 Dry Season. Revised 11/16/16

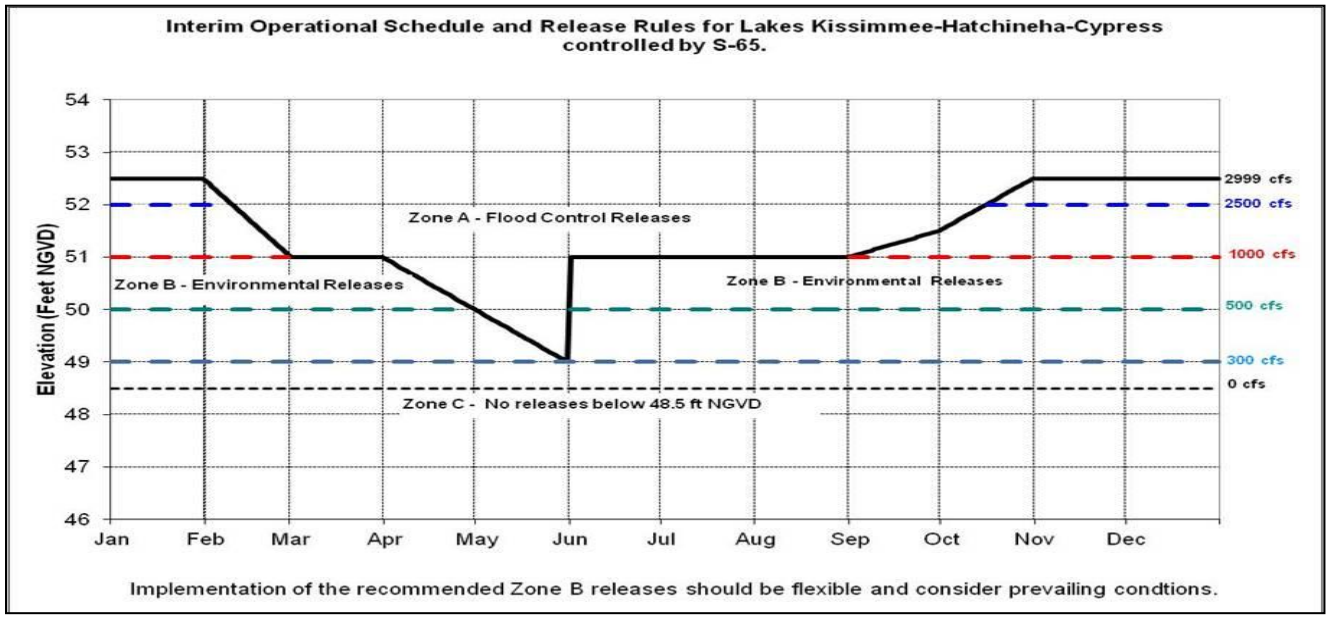


Figure 13. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years.

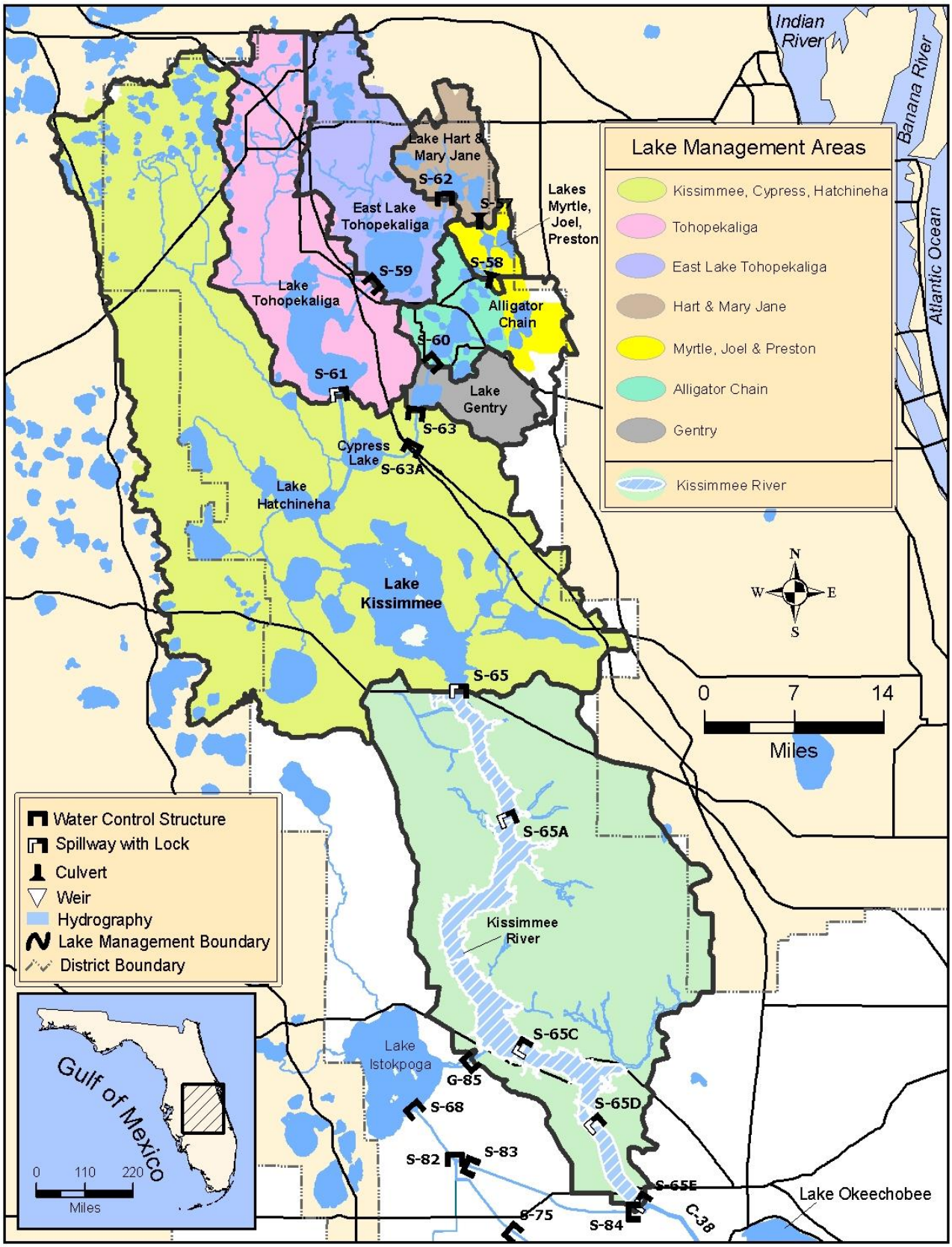


Figure 14. The Kissimmee Basin.

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 12.96 feet NGVD for the period ending at midnight on May 7, 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 lower than it was a month ago, 4.2 feet lower than its peak in mid-October 2017, and 1.55 feet higher than a year ago (Figure 1). The Lake is now in the Base Flow sub-band (Figure 2). According to RAINDAR, 0.50 inches of rain fell over the Lake during the week May 1, 2018 – May 7, 2018 with much of the Kissimmee Basin receiving similar rainfall, while areas on the northern shore received between 0.5 – 2.0 inches (Figure 3).

Average daily inflows to the Lake were slightly lower than the previous week at 340 cfs vs 536 cfs. Kissimmee River discharges through the S-65E structures were similar to the previous week at just 278 cfs. The S-71, S-72, and S-84 structures contributed a combined 51 cfs compared to 232 cfs the previous week, while Fisheating Creek contributed an average daily flow of 3 cfs.

Average daily outflows for the Lake were the same as the previous week, at 1,724 cfs. Discharges through the S-77 decreased from 794 cfs the previous week to 612 cfs this past week, while discharges through S-308 increased slightly from 219 cfs to 241 cfs. Discharges south through the S-350 structures were similar to the previous week at 747 cfs. Flows to the L-8 canal via Culvert 10A increased from the previous week, going from 50 cfs to 123 cfs this past week. The corrected average daily evapotranspiration value for the week based on the L006 weather platform solar radiation data was 0.19 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.

Based on the Lake Okeechobee wading bird habitat suitability index, there was a decrease of approximately 1,800 acres in habitat with suitable foraging depths for long-legged wading birds from the previous week, with 27,261 acres of suitable depth on May 7, 2018. There was also a loss of roughly 1,600 acres of suitable foraging depths for short or long-legged wading birds, going from 13,699 acres the previous week to 12,115 acres this past week as foraging habitats continue to dry out (Figure 5).

Turbidity (ntu), a measure of water clarity, declined substantially for the third straight month after reaching a near record high in January following Hurricane Irma's resuspension of mud sediments and strong winds during cold fronts in the beginning of 2018 (Figure 6). The average turbidity from pelagic stations went from a high of 185 ntu to 44 ntu in mid-April, reaching levels similar to March and April of 2017. The average of nearshore stations, while peaking at roughly 75 ntu in January and February of 2018, followed a similar pattern of decline and is now 27 ntu, also similar to April of 2018.

Total phosphorus (TP) concentrations followed a similar pattern, declining for the third straight month after January, but have not yet returned to pre-Hurricane Irma levels in either the nearshore or pelagic zones, at 163 µg/L and 184 µg/L, respectively (Figure 6).

Chlorophyll *a* (Chla) and microcystin values remain low throughout the Lake, despite relatively high TP values and low turbidity (Figure 7). The highest chlorophyll *a* occurred in the nearshore zone by Indian Prairie, with a value of 29.2 µg/L. The most recent satellite imagery using the cyanobacteria monitoring product derived from NOAA's OLCI satellite sensor also suggests cyanobacteria bloom potential remains low, although there was some cloud cover over portions of the pelagic zone (Figure 8). Last summer, the potential for elevated cyanobacterial levels increased in early July, when winds subsided and turbidity values plummeted.

Water Management Recommendations

Lake Okeechobee stage is 12.96 feet NGVD having decreased 0.20 feet over the past week and 0.66 feet over the last month. Recession had slowed over recent weeks but increased again this last week. The Lake is now below 13.0 feet NGVD for the first time in nine months. Coupled with recent decreases in turbidity in the nearshore zone, the submerged aquatic vegetation (SAV) and emergent vegetation should have ideal conditions for recovering from Hurricane Irma's impacts. Prolonging the duration of similar or lower Lake stages this summer will increase recovery potential of these communities.

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	278	0.1
S71 & 72	51	0.0
S84 & 84X	0	0.0
Fisheating Creek	3	0.0
S154	0	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	9	0.0
C5	0	0.0
Rainfall	1372	0.5
Total	**1713**	**0.6**

OUTFLOWS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S77	612	0.3
S308	241	0.1
S351	170	0.1
S352	32	0.0
S354	545	0.2
L8	123	0.1
ET	3693	1.6
Total	**5417**	**2.4**

PROVISIONAL DATA

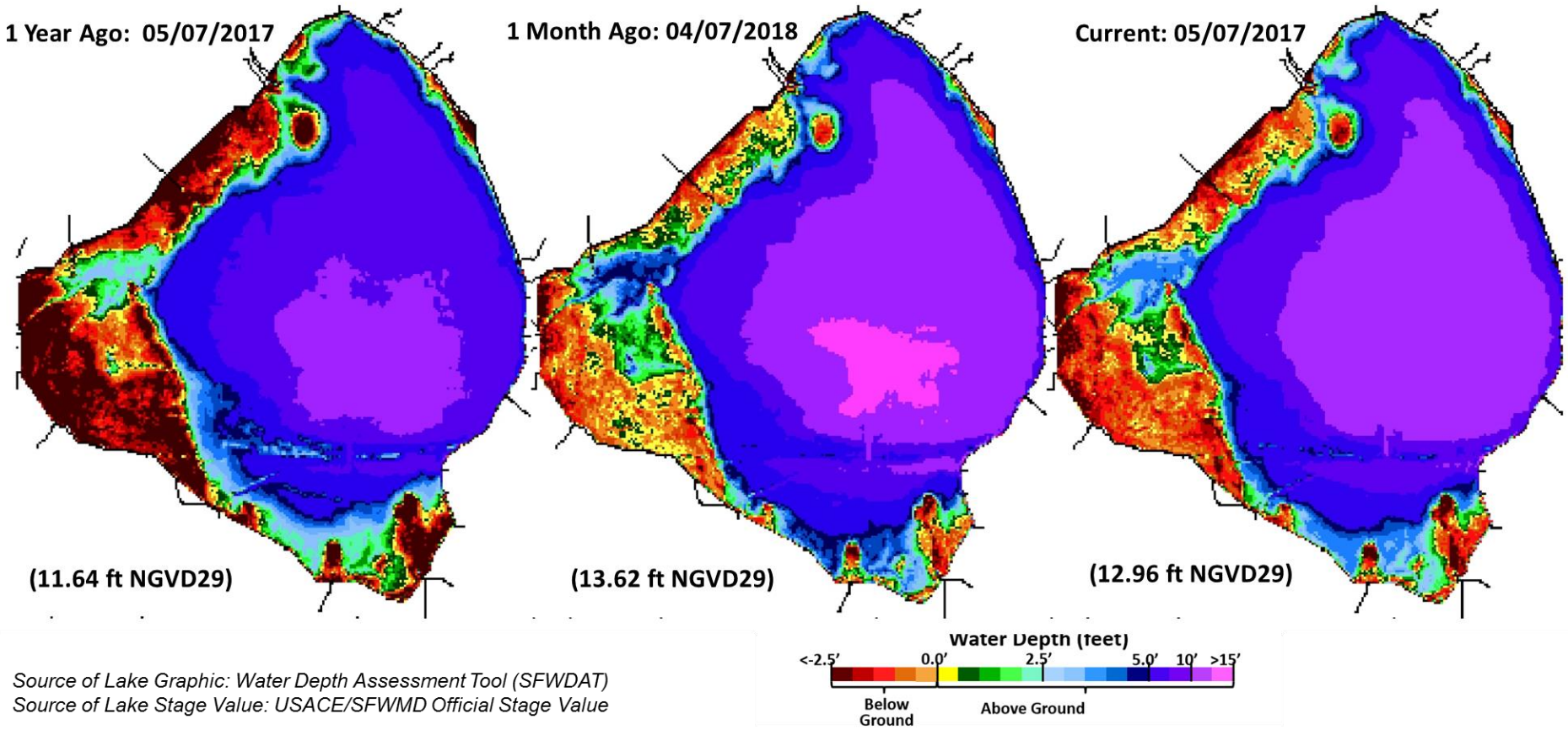


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

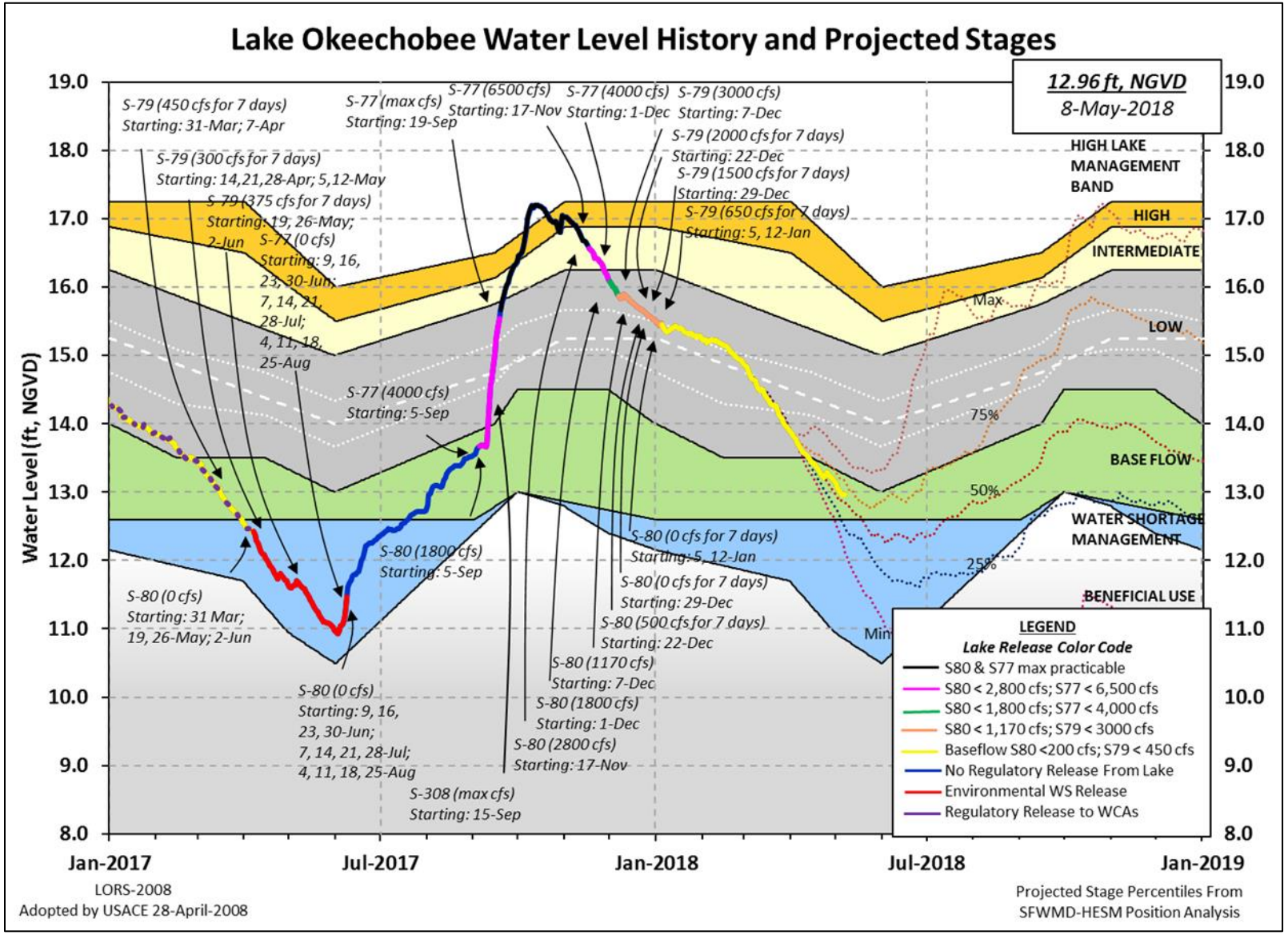


Figure 2. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

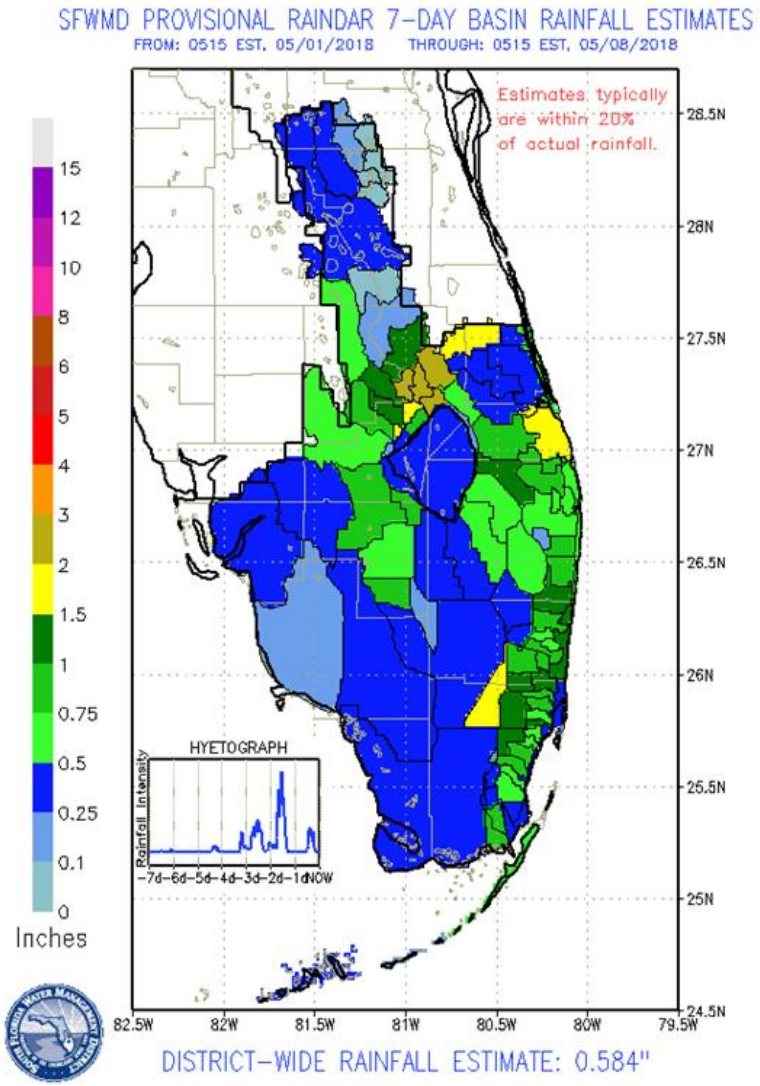


Figure 3. Rainfall estimates by basin.

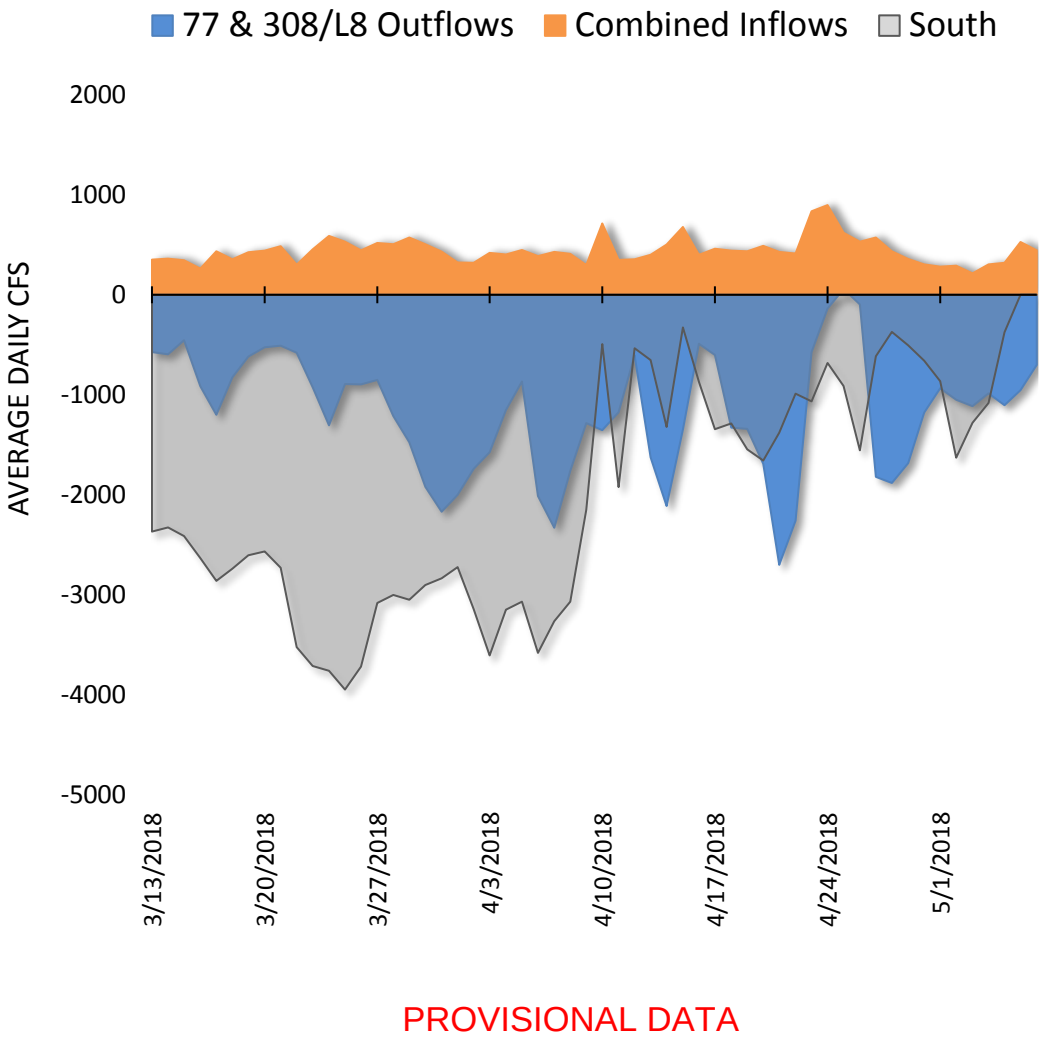
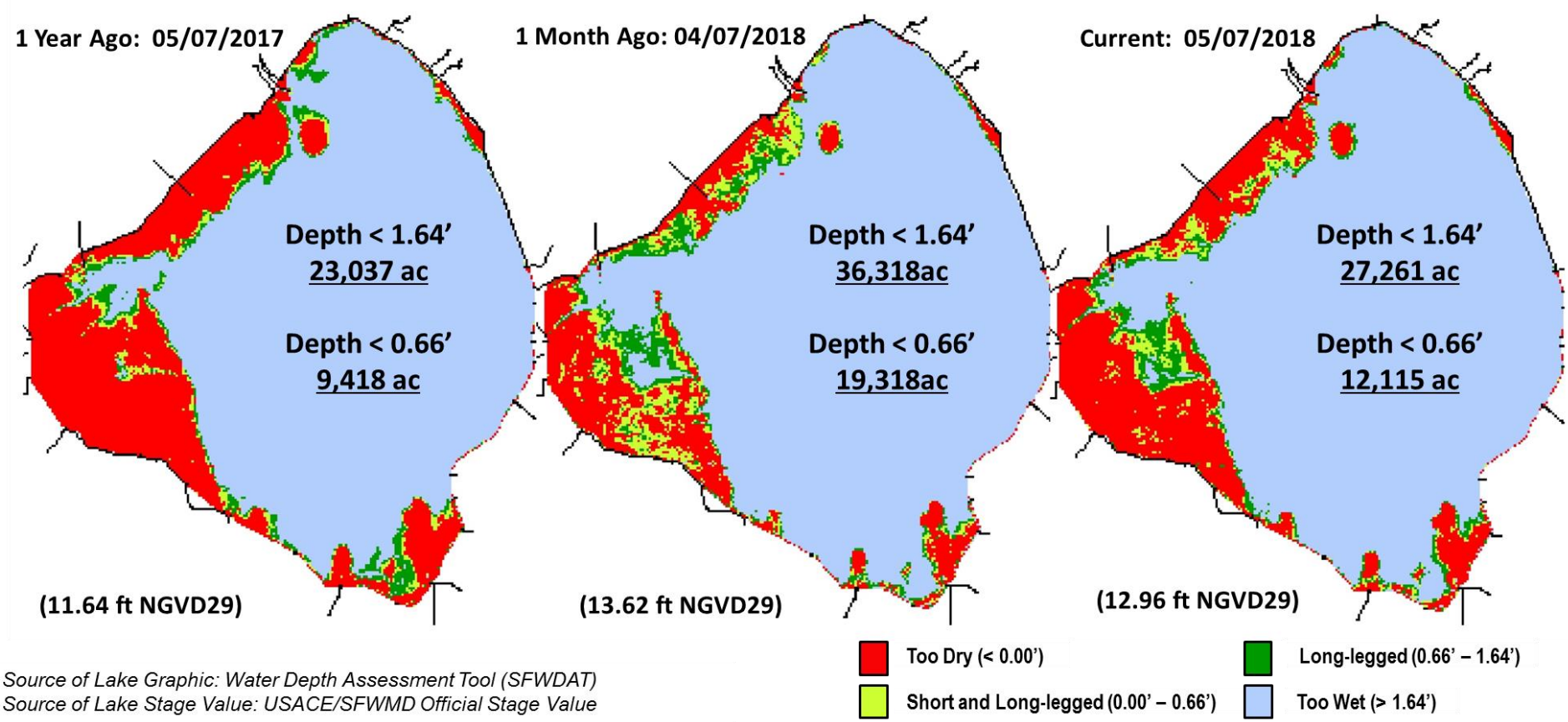


Figure 4. Major inflows and outflows of Lake Okeechobee, including the S350 structures designated as South. Inflows and outflows are shown as positive and negative, respectively, for visual purposes.



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

Figure 5. Wading bird habitat suitability index for Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

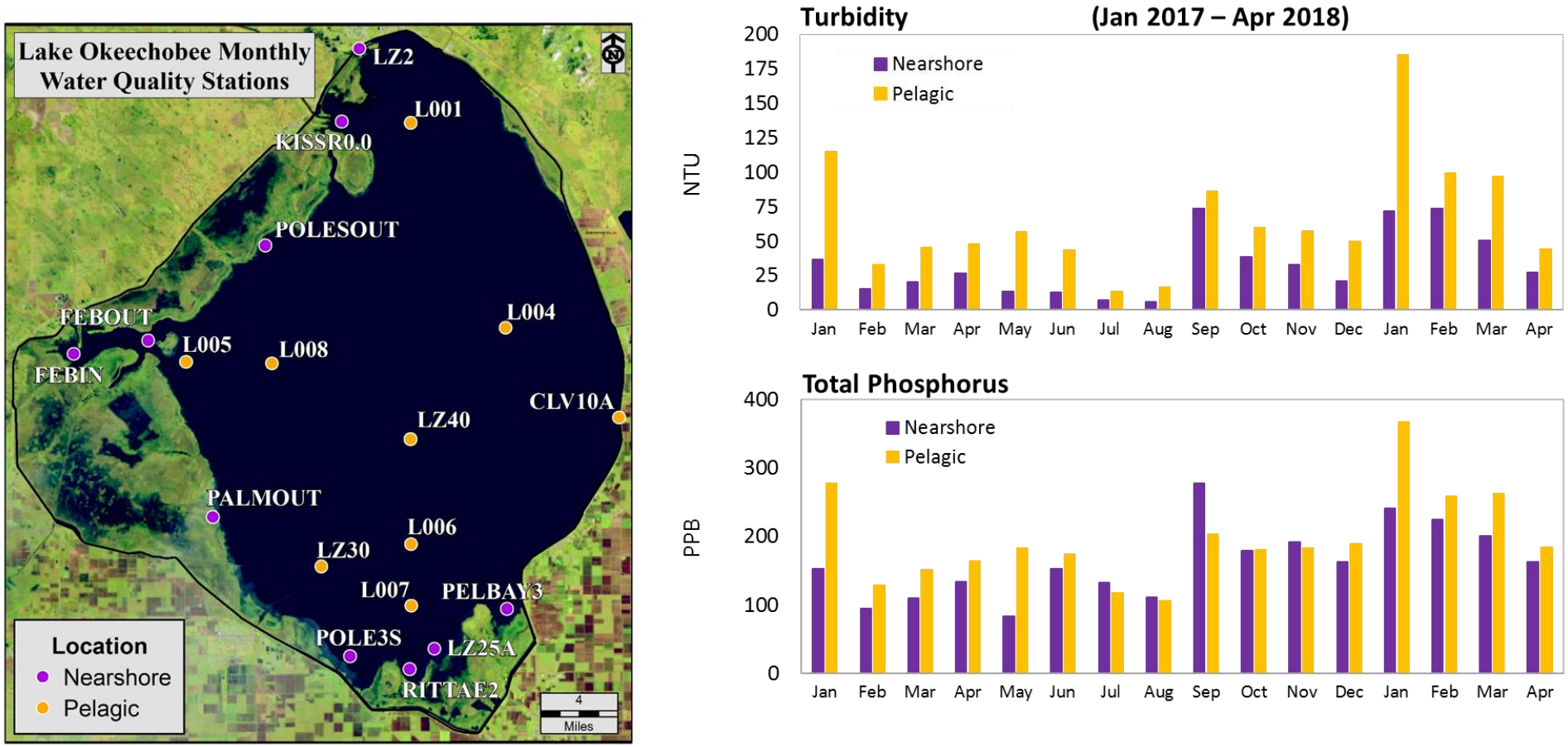
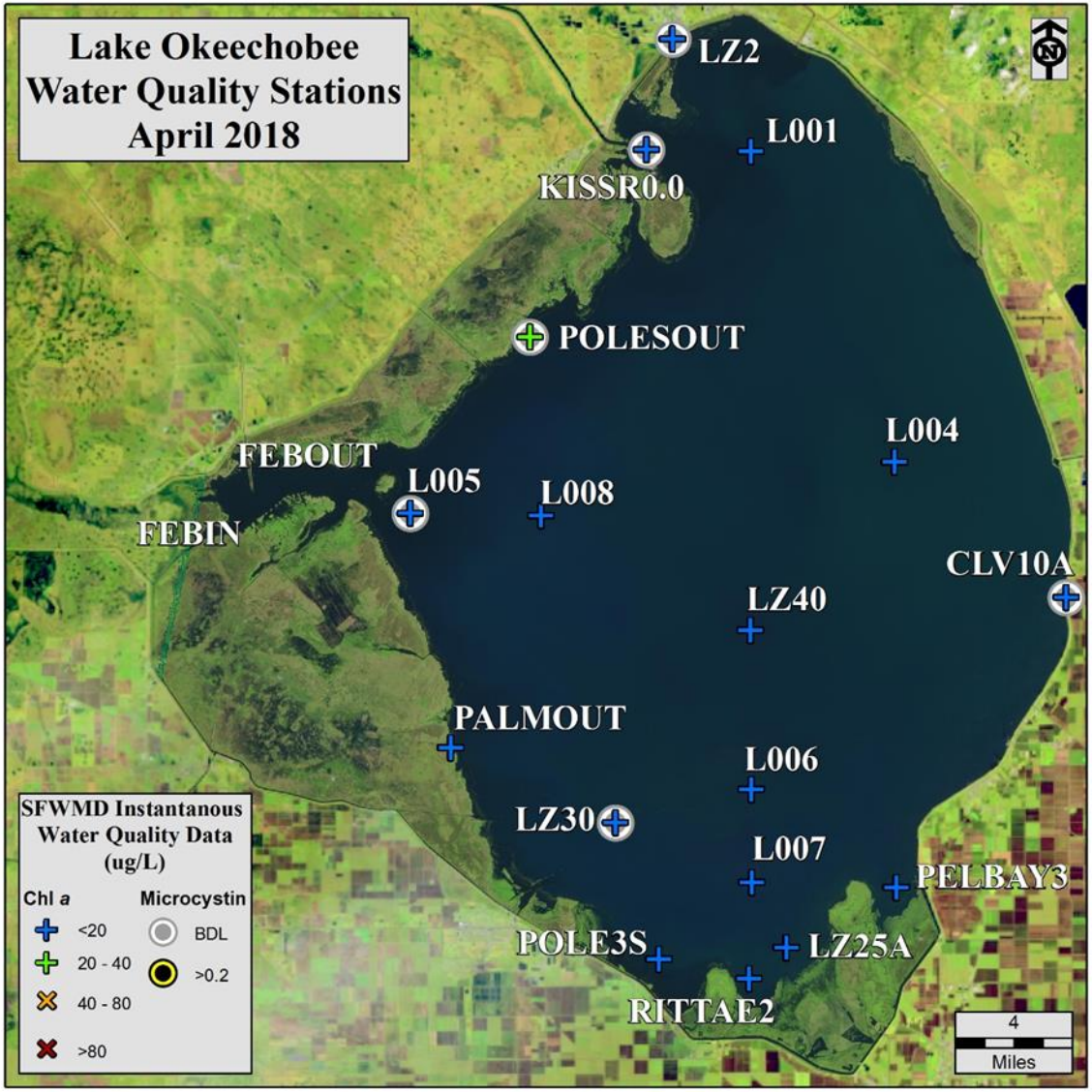


Figure 6. Turbidity (ntu) and Total Phosphorus (µg/L) values from mid-January 2017 through mid-April 2018 for nearshore (purple) and pelagic (yellow) zones. Fisheating Bay stations were not included due to sporadic sampling across the period of record.



April 3 - 4, 2018		
Site	**Chlorophyll *a* (µg/L)**	**Microcystin (µg/L)**
Nearshore Stations		
FEBIN		
FEBOUT		
KISSR0.0	16.4	BDL
LZ2	19.0	BDL
LZ25A	2.7	
PALMOUT	12.9	
PELBAY3	2.3	
POLE3S	6.4	
POLESOUT	29.2	BDL
RITTAE2	10.9	
Pelagic Stations		
L001	8.3	
L004	5.2	
L005	10.4	BDL
L006	8.4	
L007	4.6	
L008	10.1	
LZ30	6.4	BDL
LZ40	6.6	
CLV10A	6.8	BDL

Figure 7. Chlorophyll *a* (µg/L) and microcystin (µg/L) values for nearshore and pelagic stations for mid-March. Microcystin values below 0.20 µg/L are below detection limit (BDL).

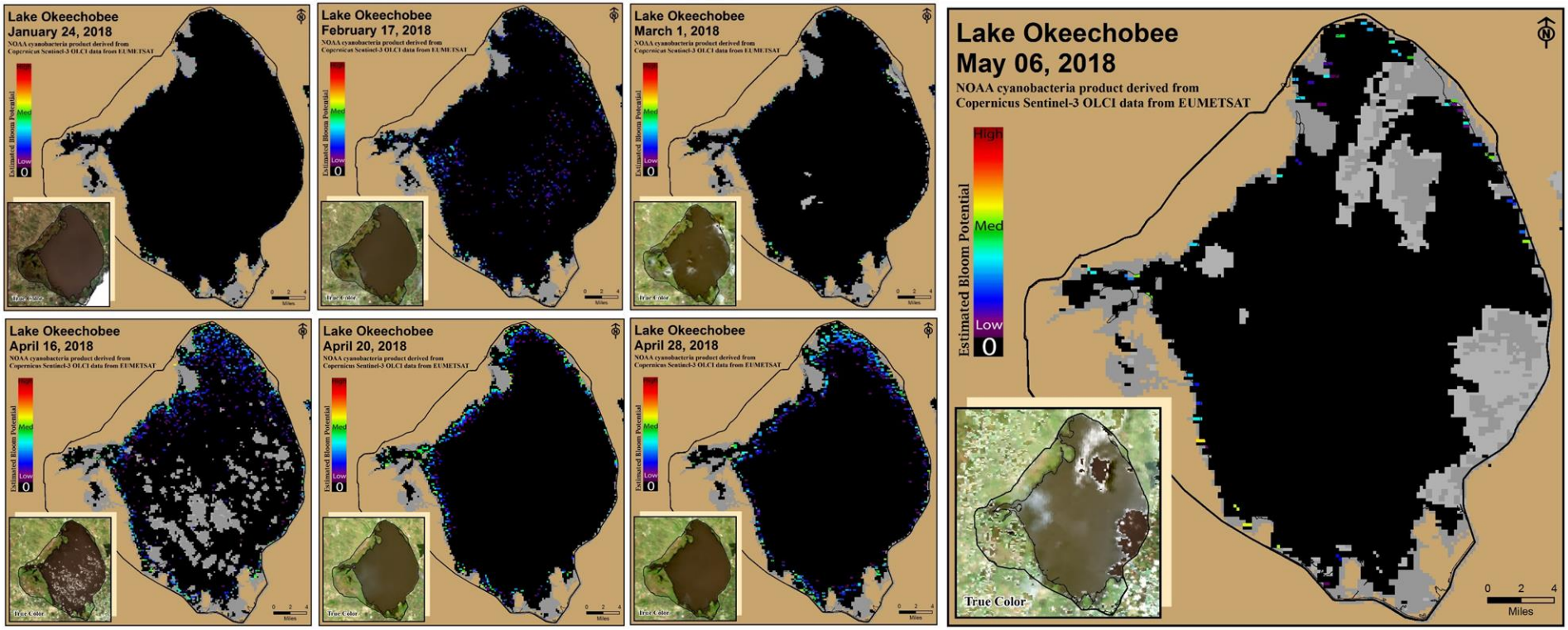


Figure 8. Potential for cyanobacterial blooms on Lake Okeechobee based on NOAA's harmful algal bloom monitoring system derived from Copernicus Sentinel-3 OLCI data from EUMETSAT.

LAKE ISTOKPOGA

Lake Istokpoga stage is 38.79 feet NGVD as of midnight May 7, 2018 and is currently 0.03 feet below its regulation schedule (Figure 9). Average daily inflows to the lake from Josephine and Arbuckle Creeks for the week May 1 – May 7, 2018 were slightly lower than the previous week, at 99 average daily cfs vs 112 cfs. Discharges via the S-68 and S-68X structures were also lower than the previous week, at 50 cfs compared to 91 cfs. According to RAINDAR, 0.55 inches of rain fell in the Lake Istokpoga basin over the past week.

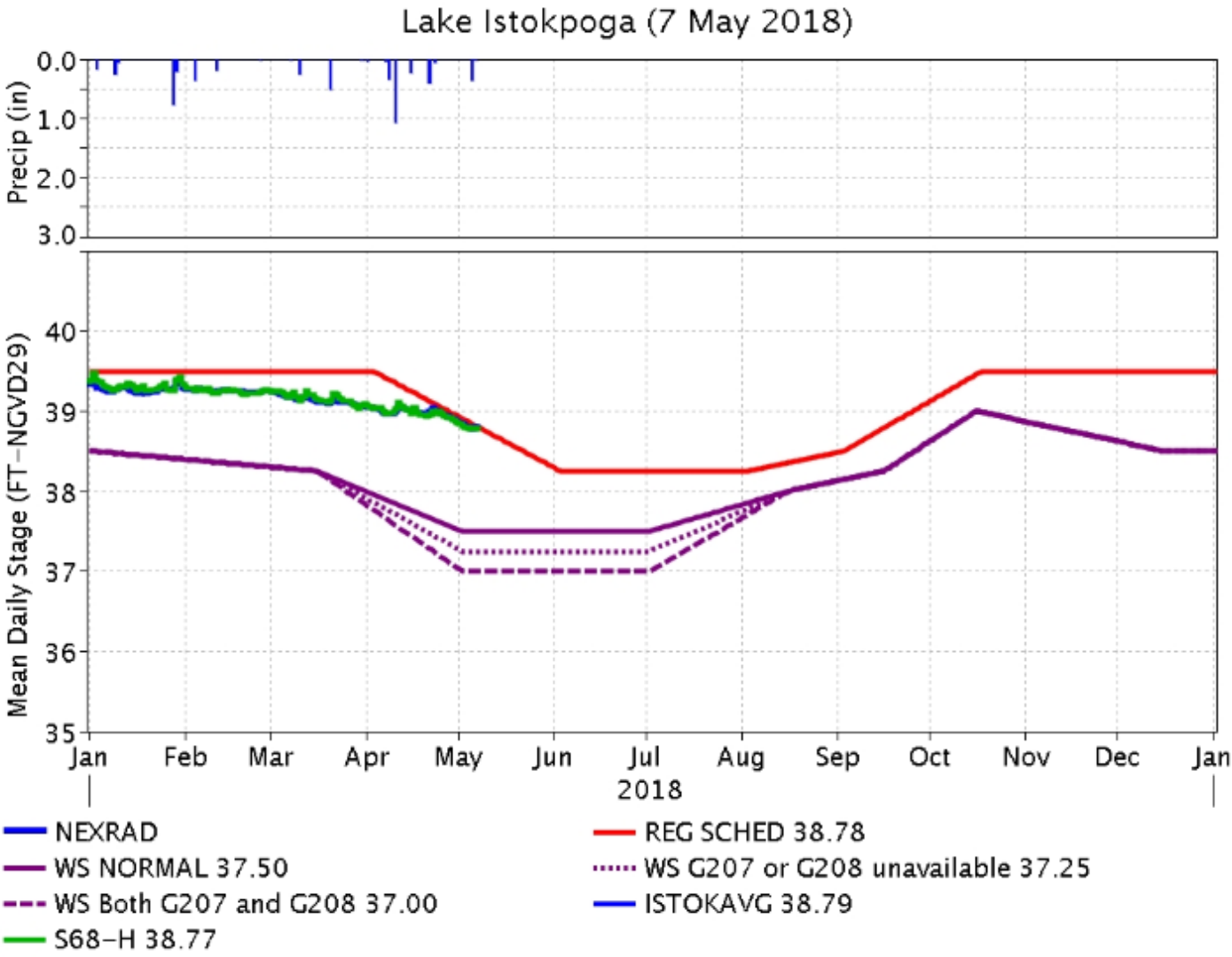


Figure 9. Recent stages on Lake Istokpoga.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged about 312 cfs (Figures 1 and 2) and last month inflow averaged about 323 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	180
S-80	0
S-308	241
S-49 on C-24	0
S-97 on C-23	0
Gordy Rd. structure on Ten Mile Creek	132

Over the past week in the estuary, salinity remained about the same (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 26.3. Salinity conditions in the middle estuary are just within the fair 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)	**23.8** (23.3)	**24.7** (25.2)	NA[1]
US1 Bridge	**NR** (NR)	**26.7** (26.8)	10.0-26.0
A1A Bridge	**31.5** (31.0)	**32.5** (32.0)	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	2.61	3.45 - 10.42	1.43	0.51	2.28
SF	1.58	3.65 - 9.28	6.48	4.56	7.85
NF	1.91	3.63 - 8.27	6.27	4.81	7.86
ME	1.78	3.15 - 7.96	6.45	5.62	8.21
IRL-SLE	3.54	0.38 - 3.72	6.18	5.68	6.68

NOAA satellite imagery indicates no 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 985 cfs (Figures 7 and 8) and last month inflow averaged about 904 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	612
S-78	1206
S-79	905
Tidal Basin Inflow	80

Over the past week, surface salinity slightly increased at S-79 and Shell Point and remained about the same in the middle estuary but bottom salinity increased throughout the estuary (Table 5, Figures 9 & 10). The seven-day average salinity values are in the good range for adult eastern oysters at Cape Coral and at Shell Point (Figure 11). Salinity data were not available at Sanibel. The 30-day moving average surface salinity is 3.6 at Val I-75 and 11.3 at Ft. Myers. With no flow through S-79, daily salinity at Val I-75 is forecast in two weeks to be 7.6, and the 30-day moving average is forecast to be 4.6 (Figure 13). 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)	**2.4** (1.8)	**2.5** (1.9)	NA[1]
*Val I75	**3.1** (3.1)	**7.1** (5.6)	0.0-5.0[2]
Ft. Myers Yacht Basin	**10.6** (10.2)	**15.8** (12.1)	NA
Cape Coral	**18.6** (19.7)	**21.7** (20.7)	10.0-30.0
Shell Point	**30.2** (29.8)	**29.4** (28.3)	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)	4.25 – 21.37	3.23 – 18.05	1.21 – 3.35
Dissolved Oxygen (mg/l)	4.42 – 7.69	3.64 – 7.46	3.90 – 9.68

The Florida Fish and Wildlife Research Institute reported on May 4, 2018, that *Karenia brevis, the Florida red tide dinoflagellate,* was observed at background to high concentrations in 16 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 minimal visible cyanobacteria bloom potential in the Caloosahatchee Estuary this week (Figure 12).

Water Management Recommendations

Lake stage is in the Base Flow sub-band of 2008 LORS. Tributary hydrological conditions are dry. The 2008 LORS recommends up to 450 cfs at S-79 and up to 200 cfs at S-80. Although the Caloosahatchee is not in need of water at this time based on the Val I-75 forecast, the continuation of the current releases does provide benefits to the estuary.

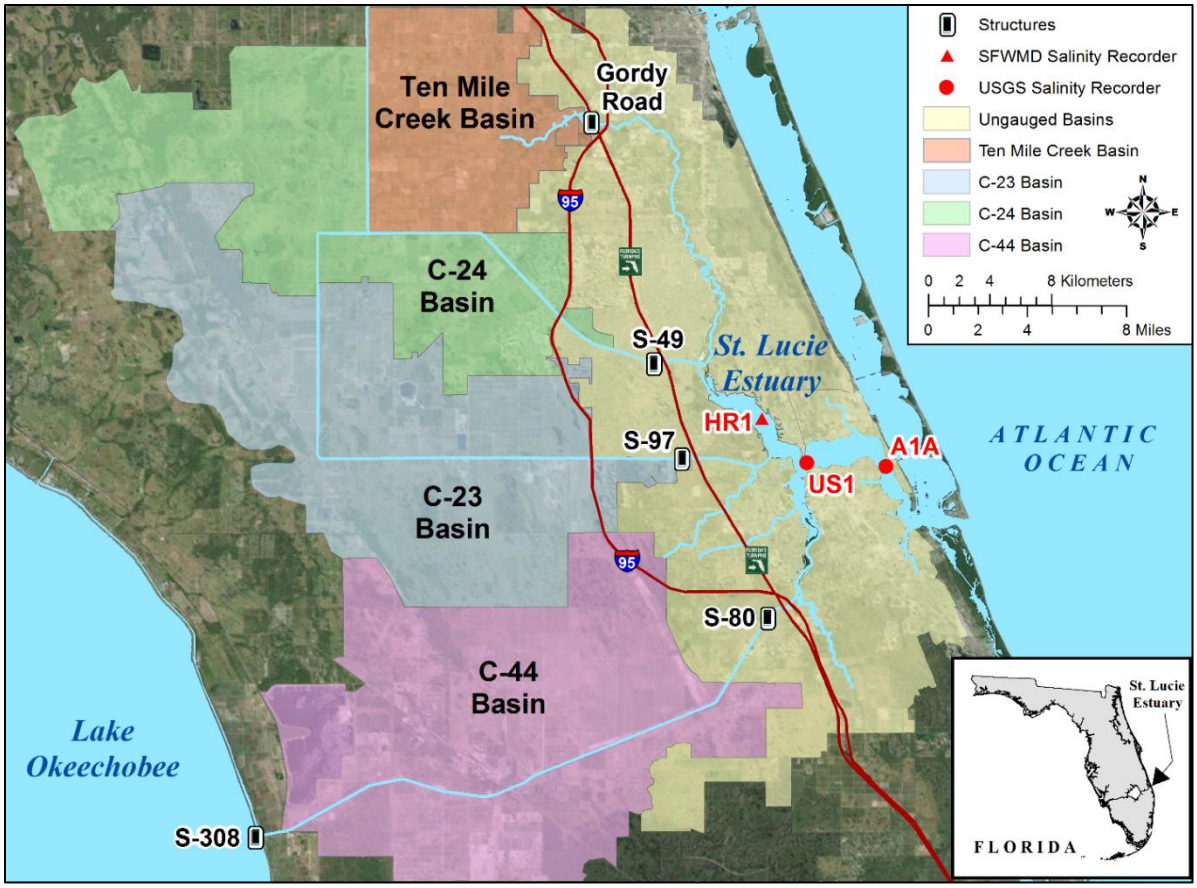


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

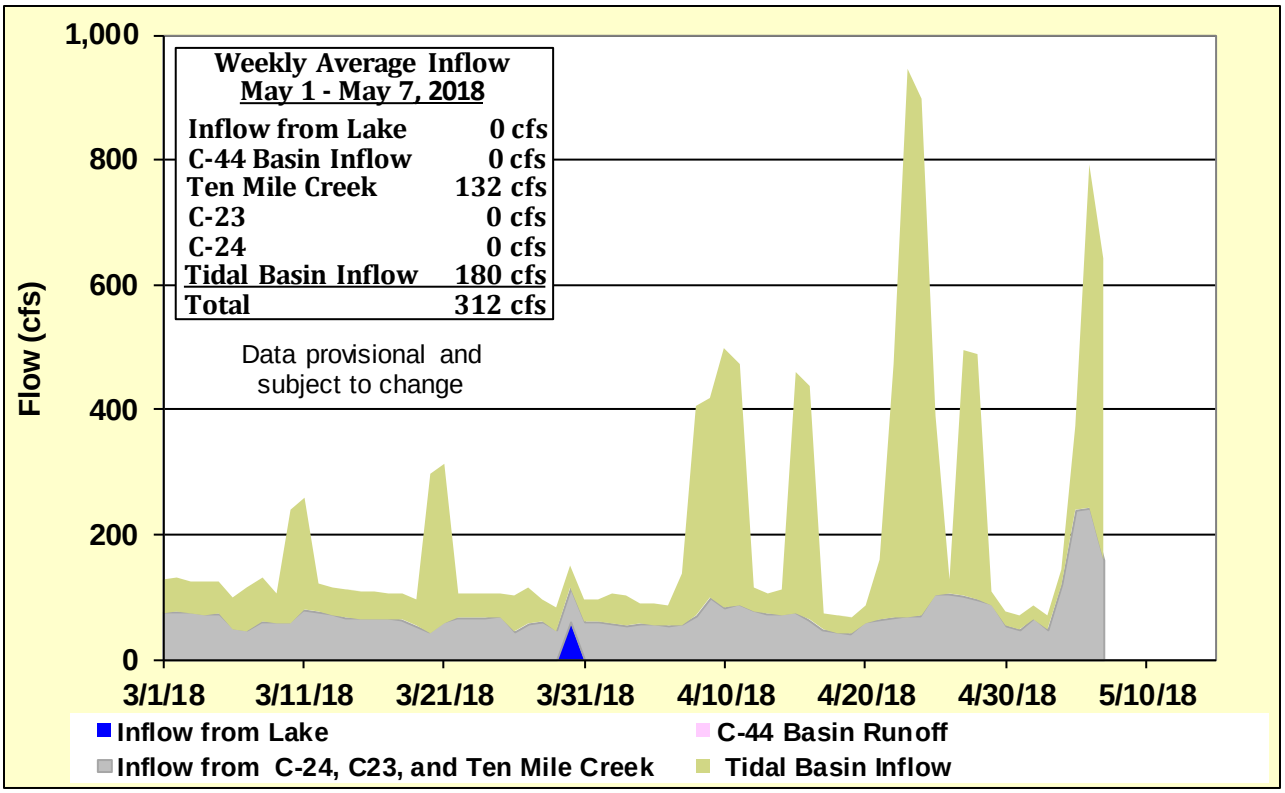


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

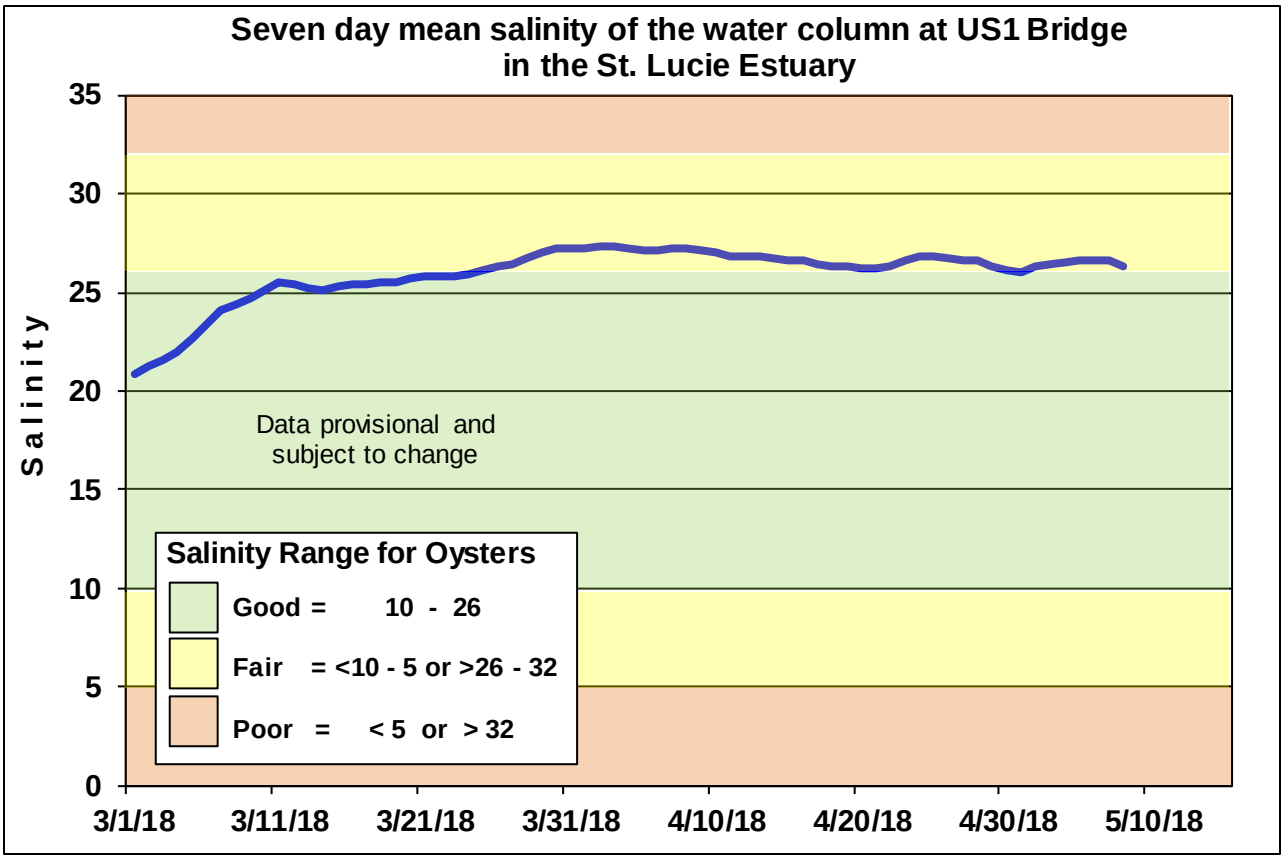


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

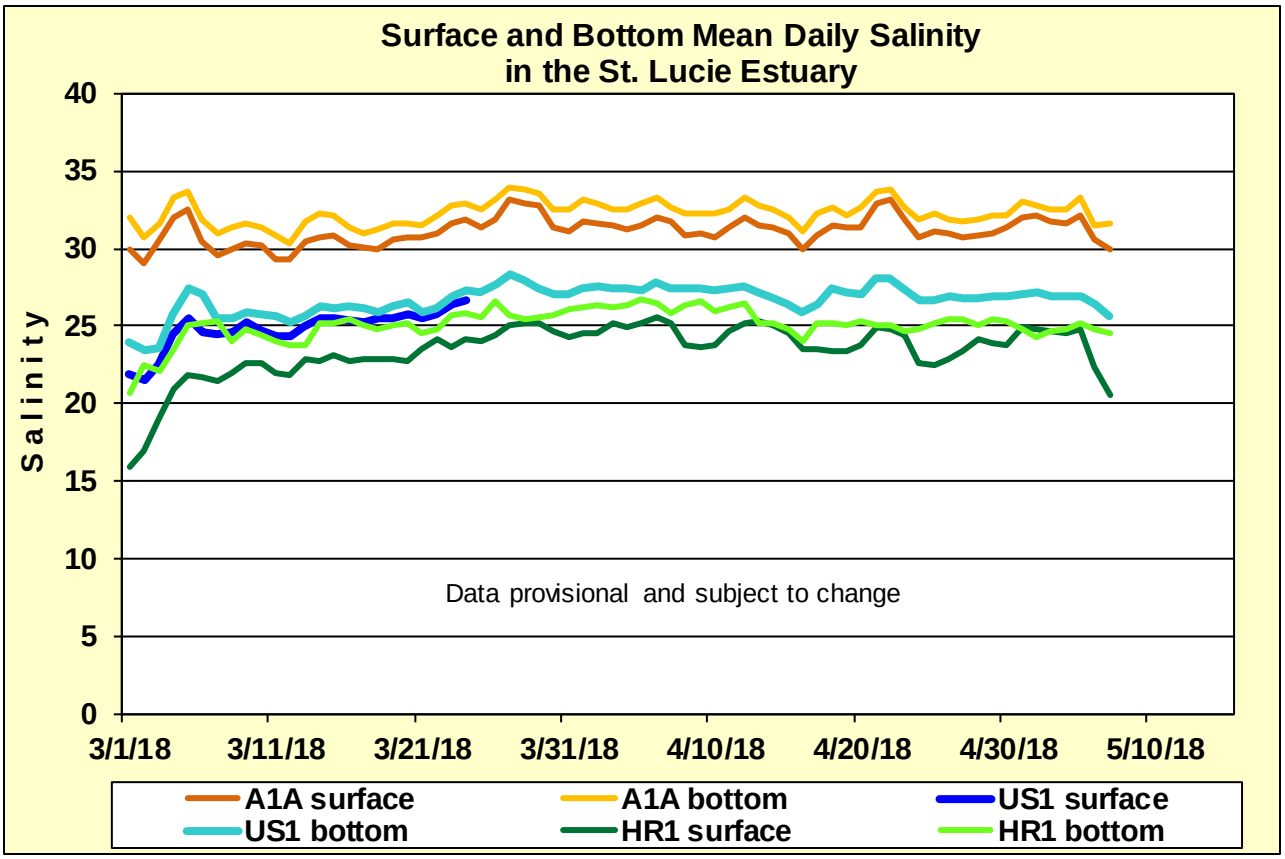


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

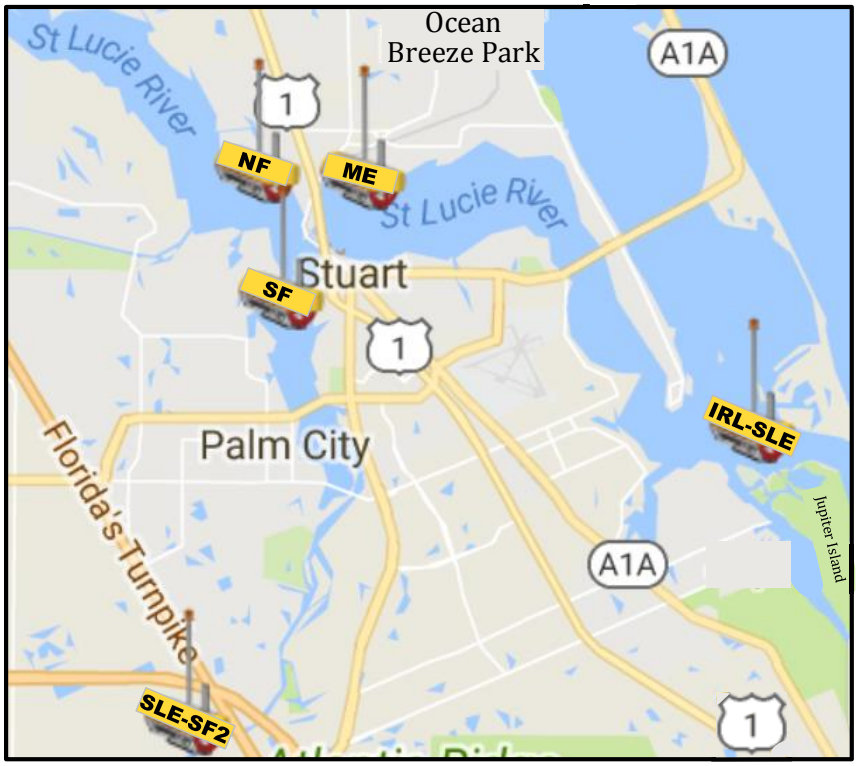


Figure 5. Location of FAU-HBOI LOBO water quality stations in the St. Lucie Estuary.

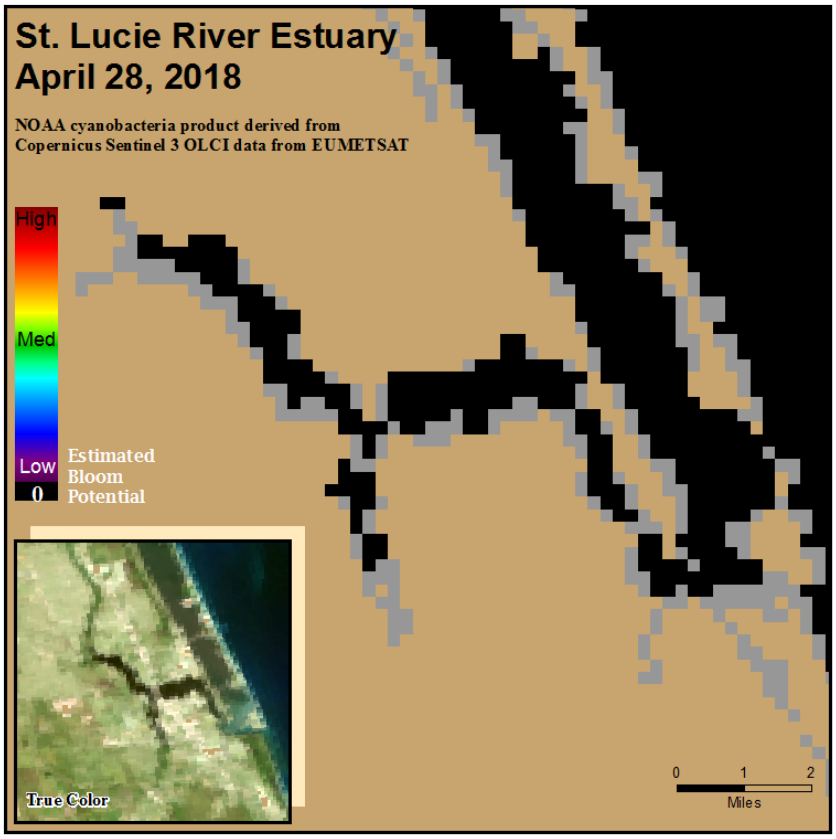


Figure 6. Sentinel 3a Satellite imagery provided by NOAA uses Ocean and Land Color
Instrument (OLCI) to estimate cyanobacteria bloom potential in St. Lucie Estuary.

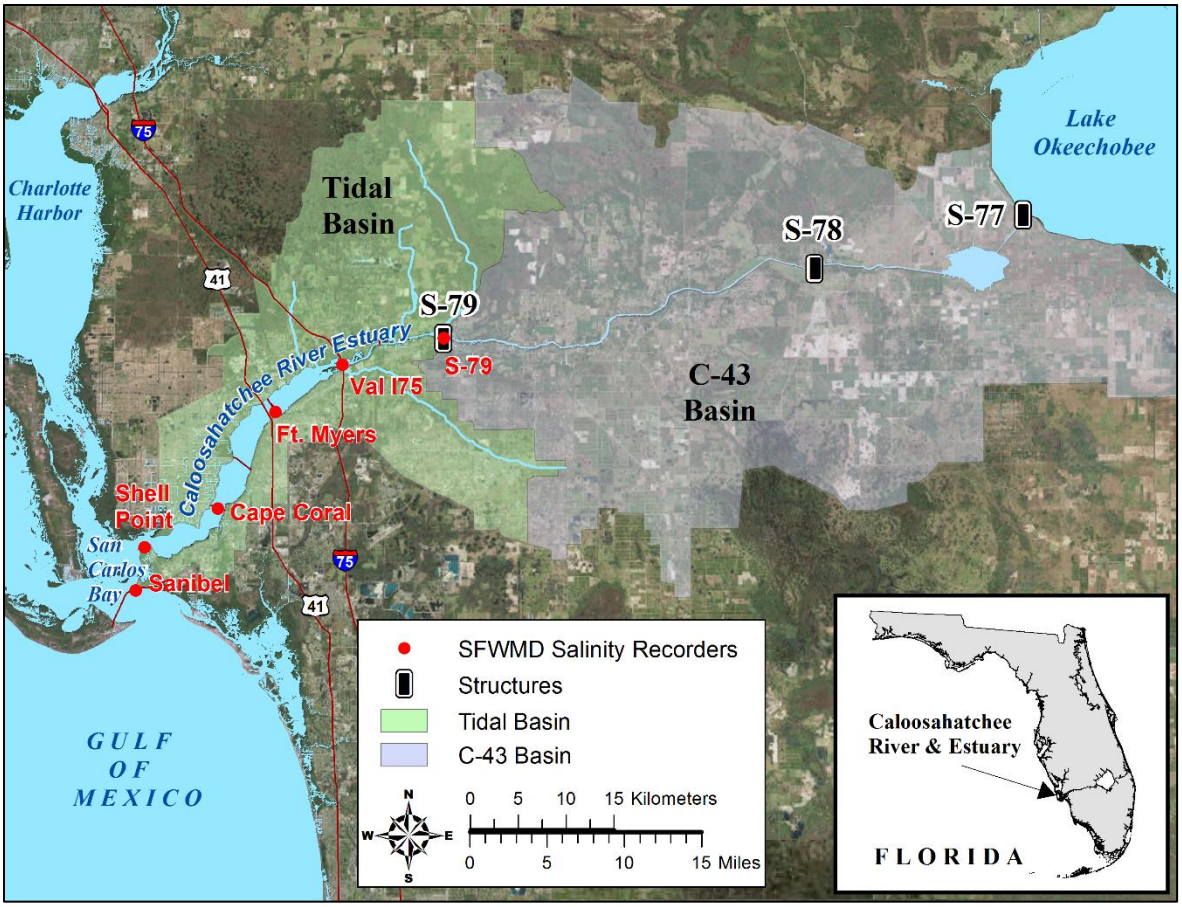


Figure 7. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

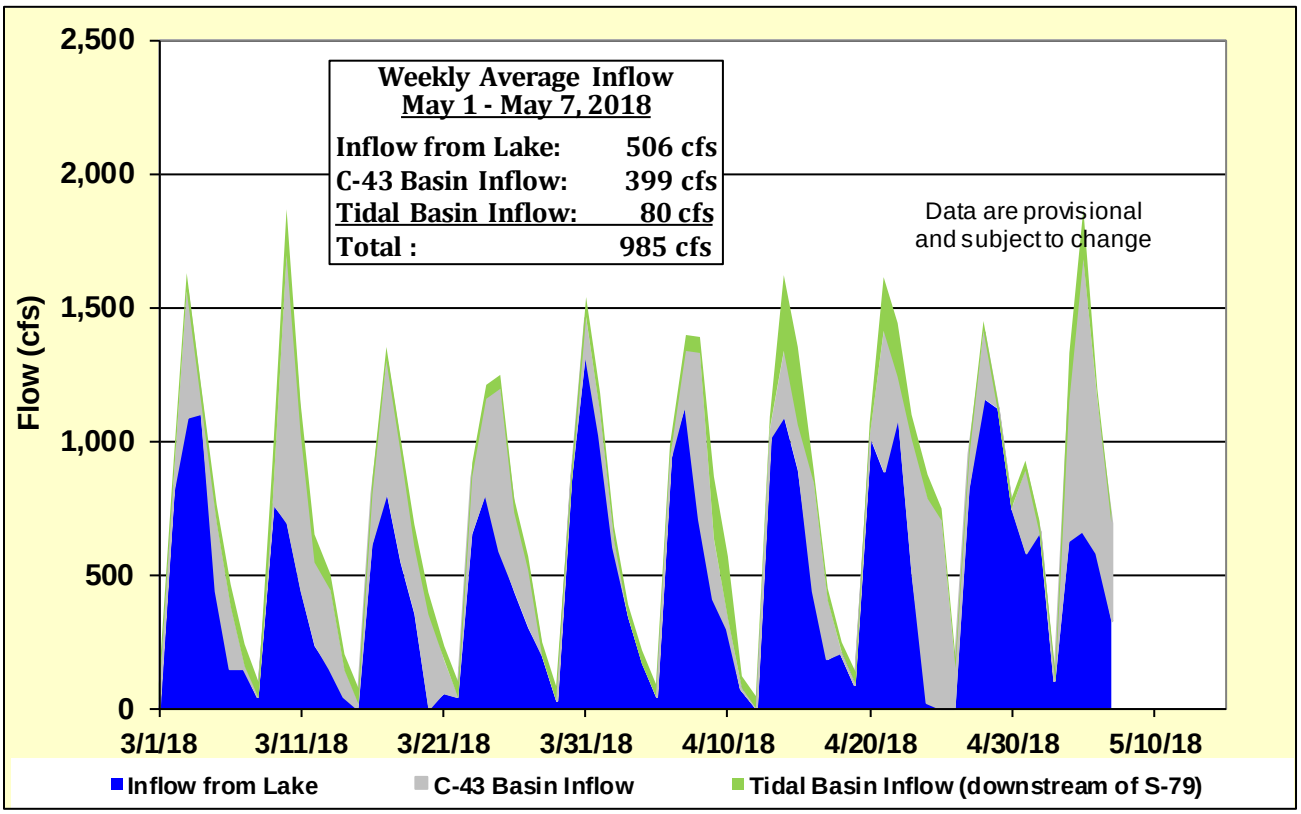


Figure 8. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin,
and tributaries in the tidal basin into the Caloosahatchee River Estuary.

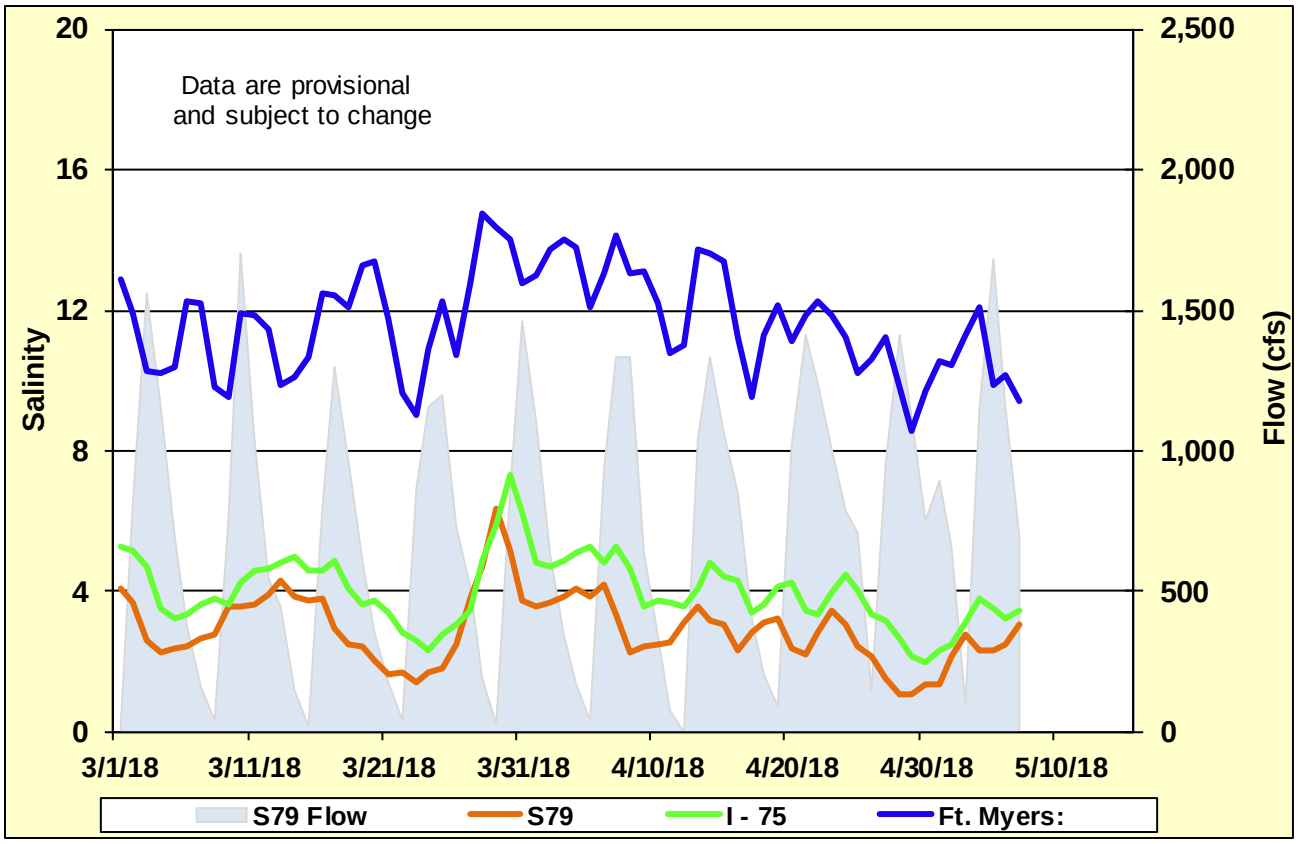


Figure 9. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

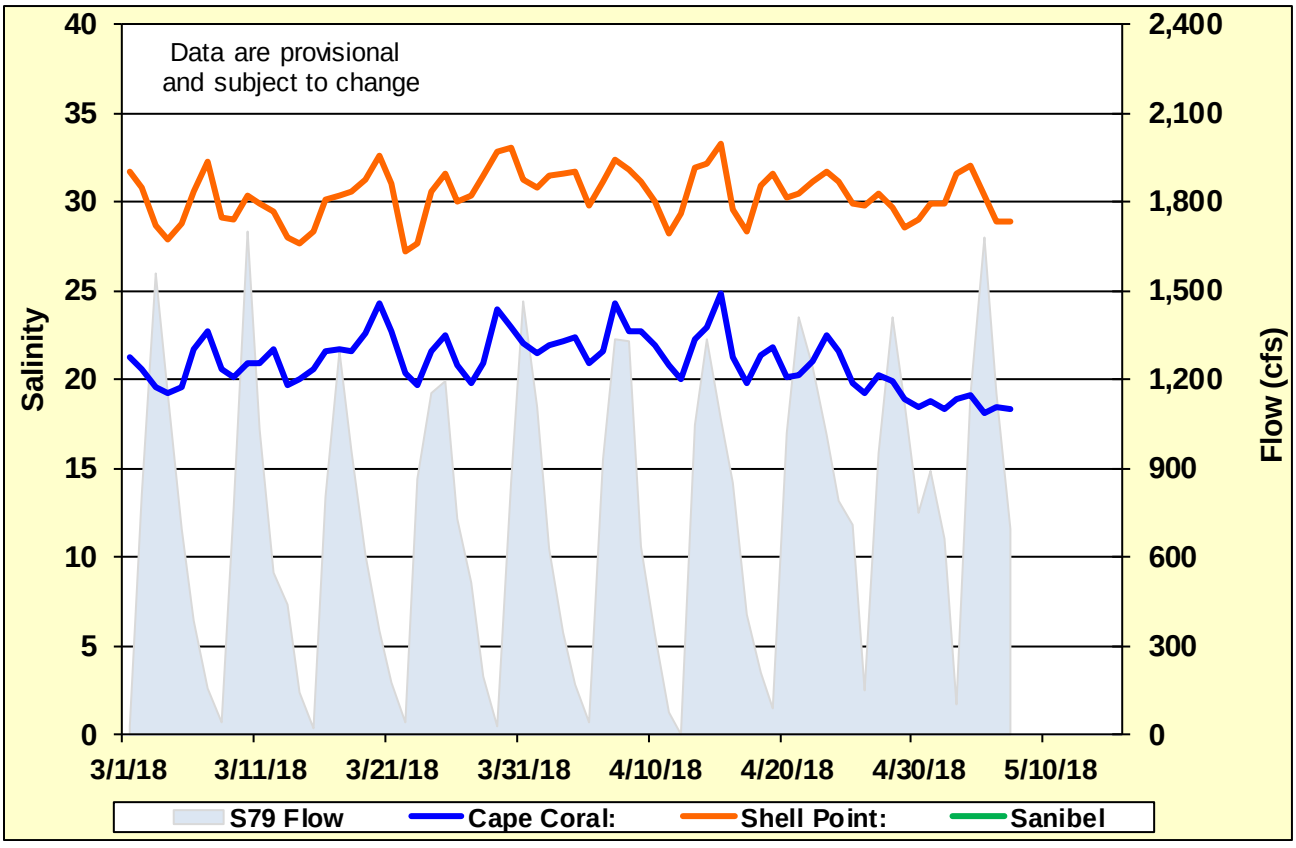


Figure 10. Daily mean flows at S-79 and salinity at lower estuary stations.

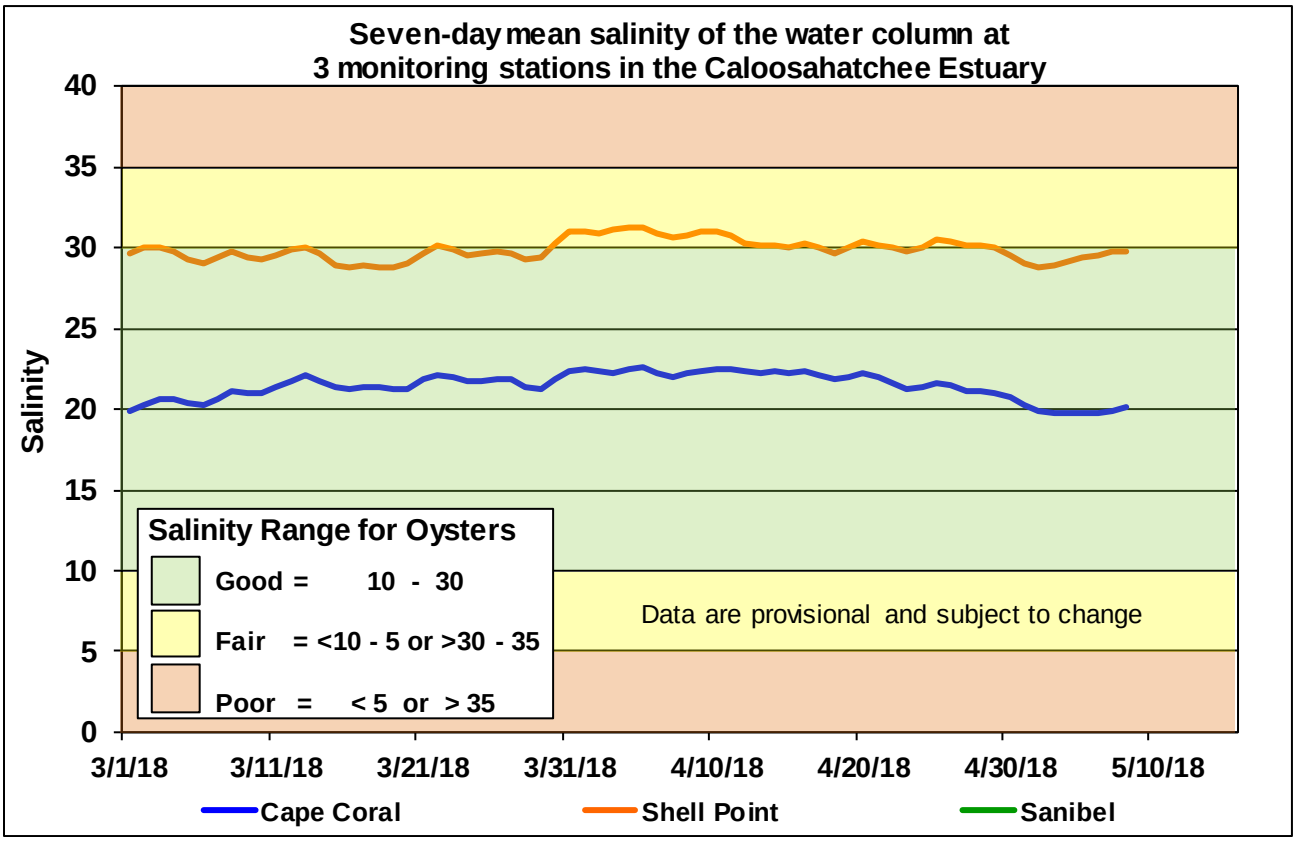


Figure 11. Seven-day mean salinity at Cape Coral Bridge, Shell Point,
and Sanibel Bridge monitoring stations.

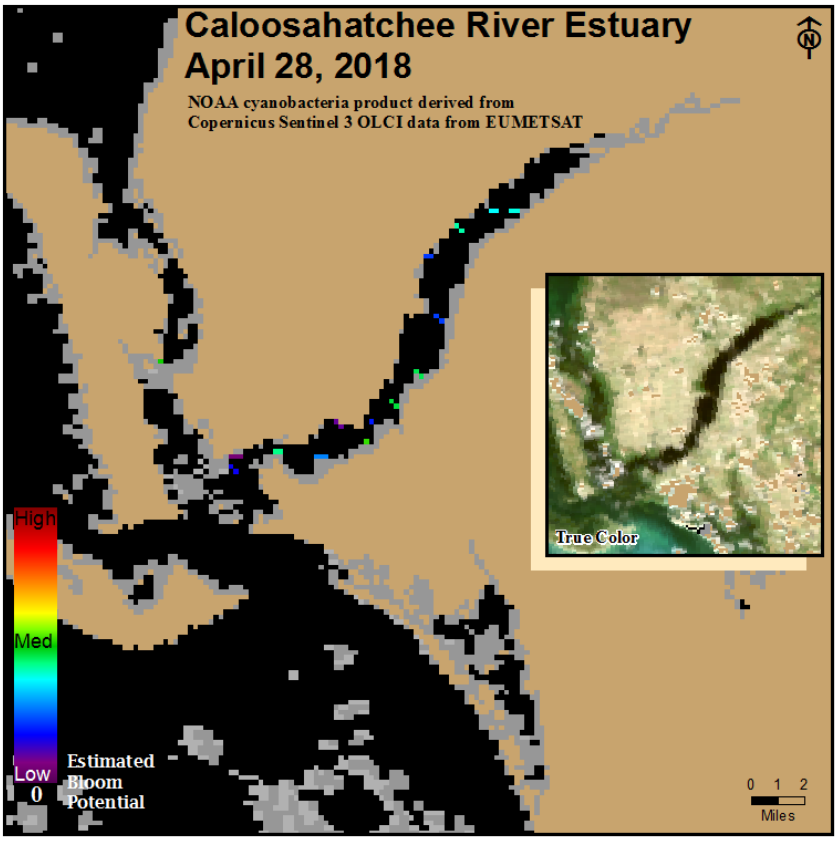


Figure 12. Sentinel 3a Satellite imagery provided by NOAA uses Ocean and Land Color Instrument (OLCI) to estimate cyanobacteria bloom potential in St. Lucie Estuary.

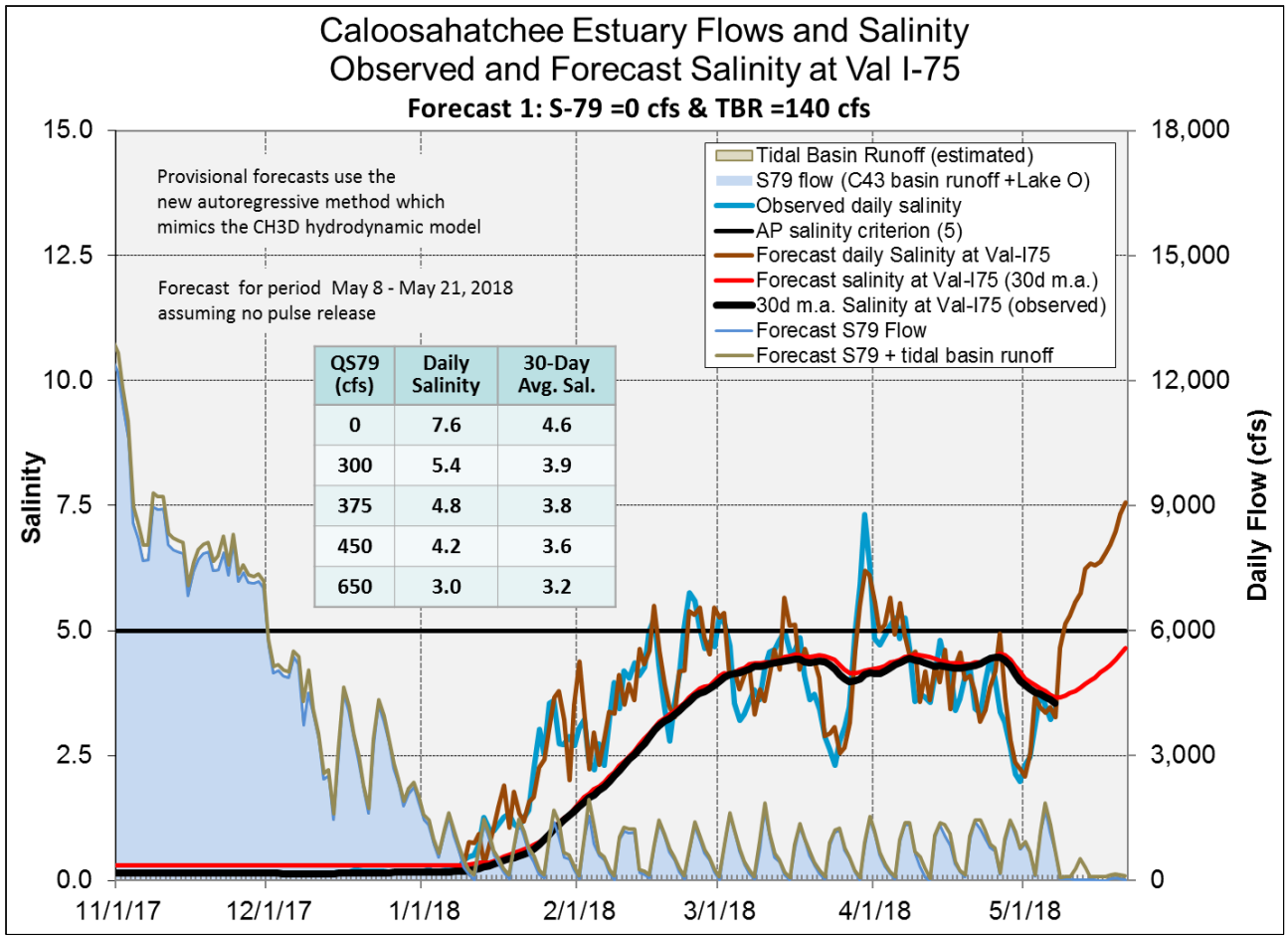


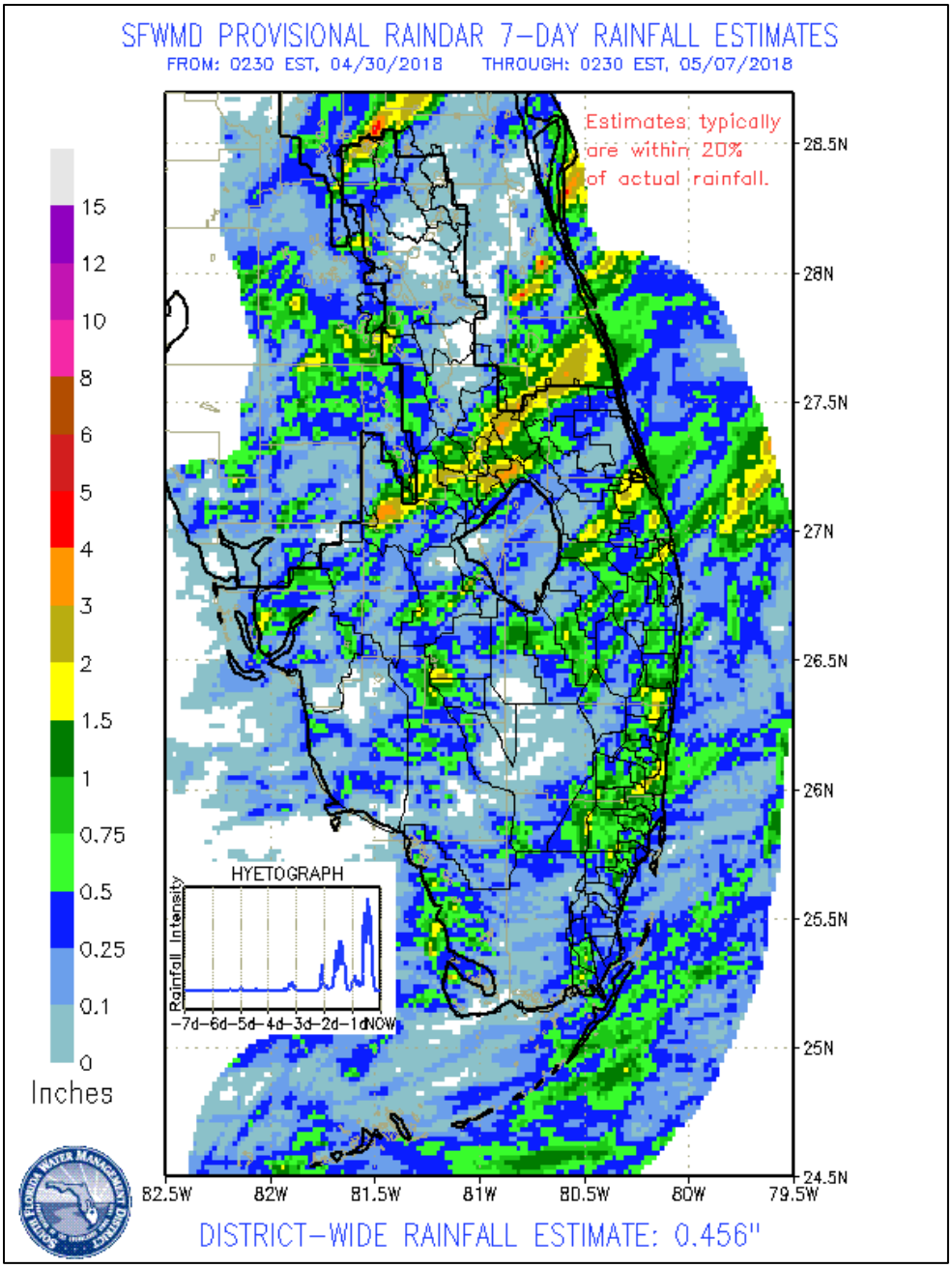
Figure 13. 14-day salinity forecast at Val I-75 assuming no releases at S-79.

EVERGLADES

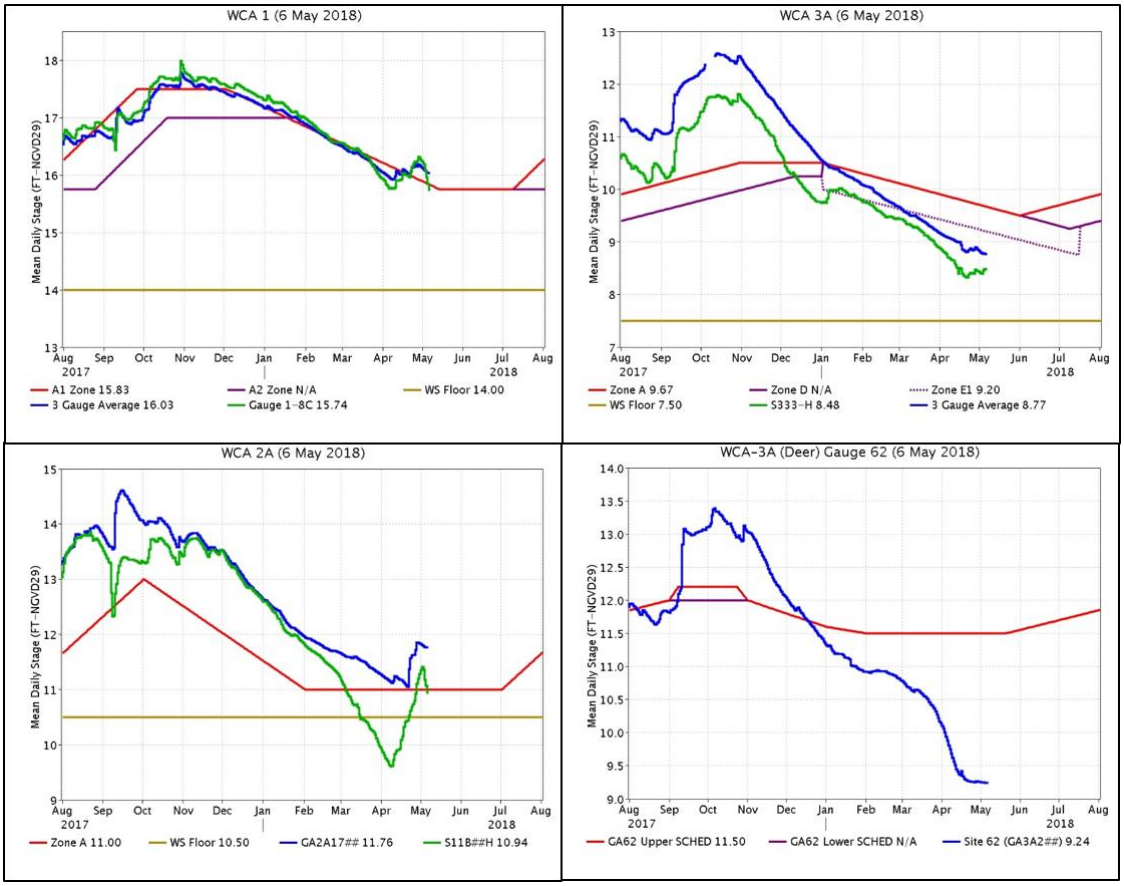
At the gauges monitored for this report, water depths across the Everglades fell an average of 0.09 feet last week. Individual gauge changes within the WCAs ranged from -0.01 feet (WCA-3B) to −0.17 feet [Everglades National Park (ENP)]. Pan evaporation was estimated at 3.08 inches, an increase from last week.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.42	−0.11
WCA-2A	0.33	−0.09
WCA-2B	0.29	−0.14
WCA-3A	0.16	−0.08
WCA-3B	0.77	−0.05
ENP	0.25	−0.17

Good
Fair
Poor



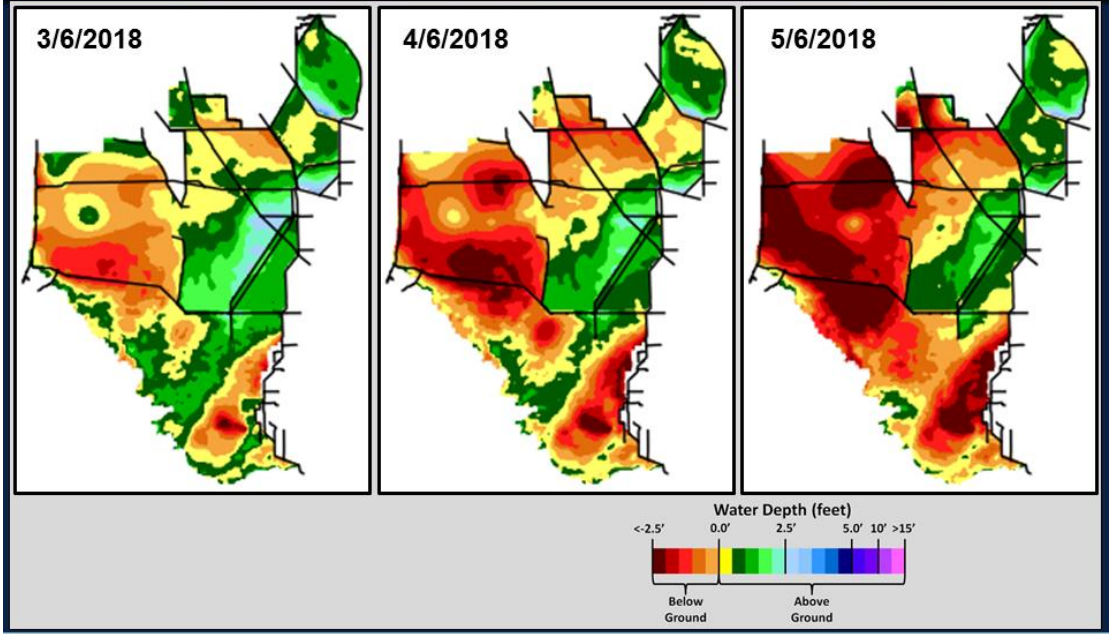
Regulation Schedules: WCA-1 three-gauge average is now 0.20 feet above Zone A1, while the canal stage is 0.09 feet below. WCA-2A canal stage took a sharp turn downwards with gauge S11B stage now 0.06 feet below Zone A, and the marsh gauge is 0.76 above Zone A. WCA-3A three-gauge average stage is 0.43 feet below Zone E1. WCA-3A at gauge 62 (northwest corner) stage is 2.26 feet below the upper schedule and has been stable for the last two weeks.



Water Depths and Changes: The WDAT tool for spatial interpolation of depth monthly snapshots indicates stable to drying conditions across the Everglades. Within WCA-3A, the drying front has generally moved from the northwest to southeast over the last two months. Northern WCA-3A continues a more extreme draw down with a significant portion of the northwest with water levels between 1.5 to 2.0 feet below ground. Comparing WDAT water levels from present, last week water levels dropped across WCA-3A. Depths across WCA-2A and WCA-1 fell slightly. The entirety of WCA-2A is wetter than it was a month ago.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

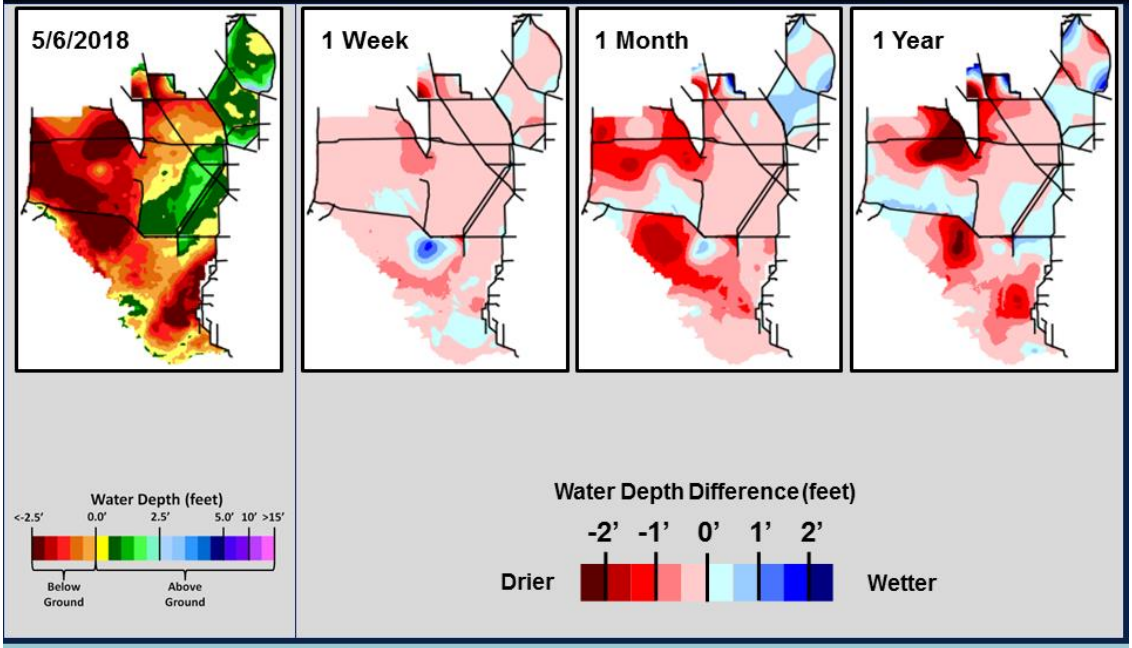
SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

SFWDAT Everglades Difference Maps (Present – Past)



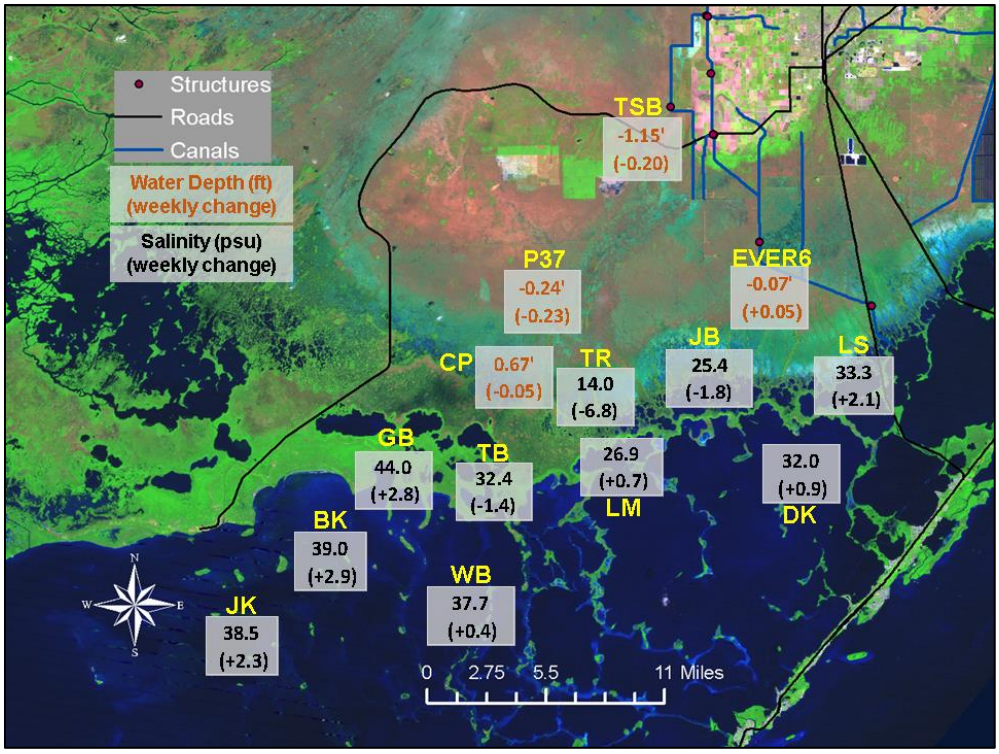
South Florida Water Depth Assessment Tool (SFWDAT)

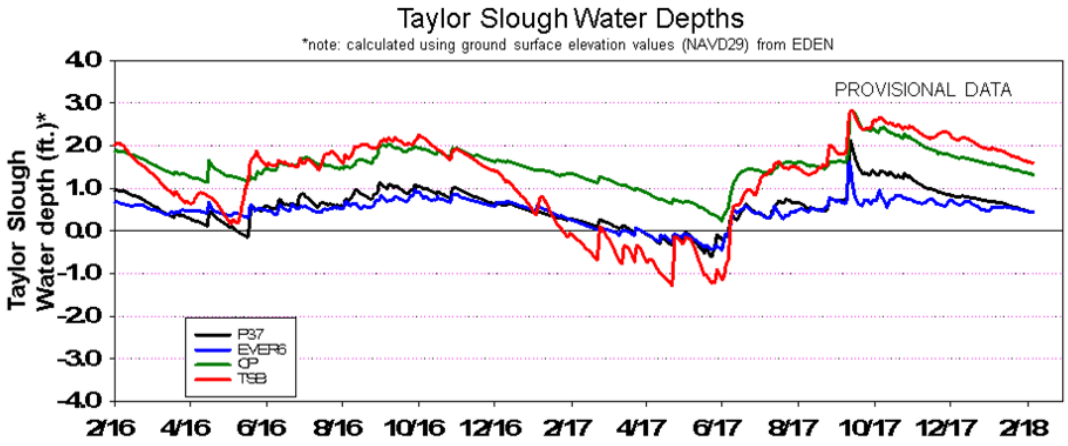
SFWMD WCA wading bird flight (May 7, 2018):

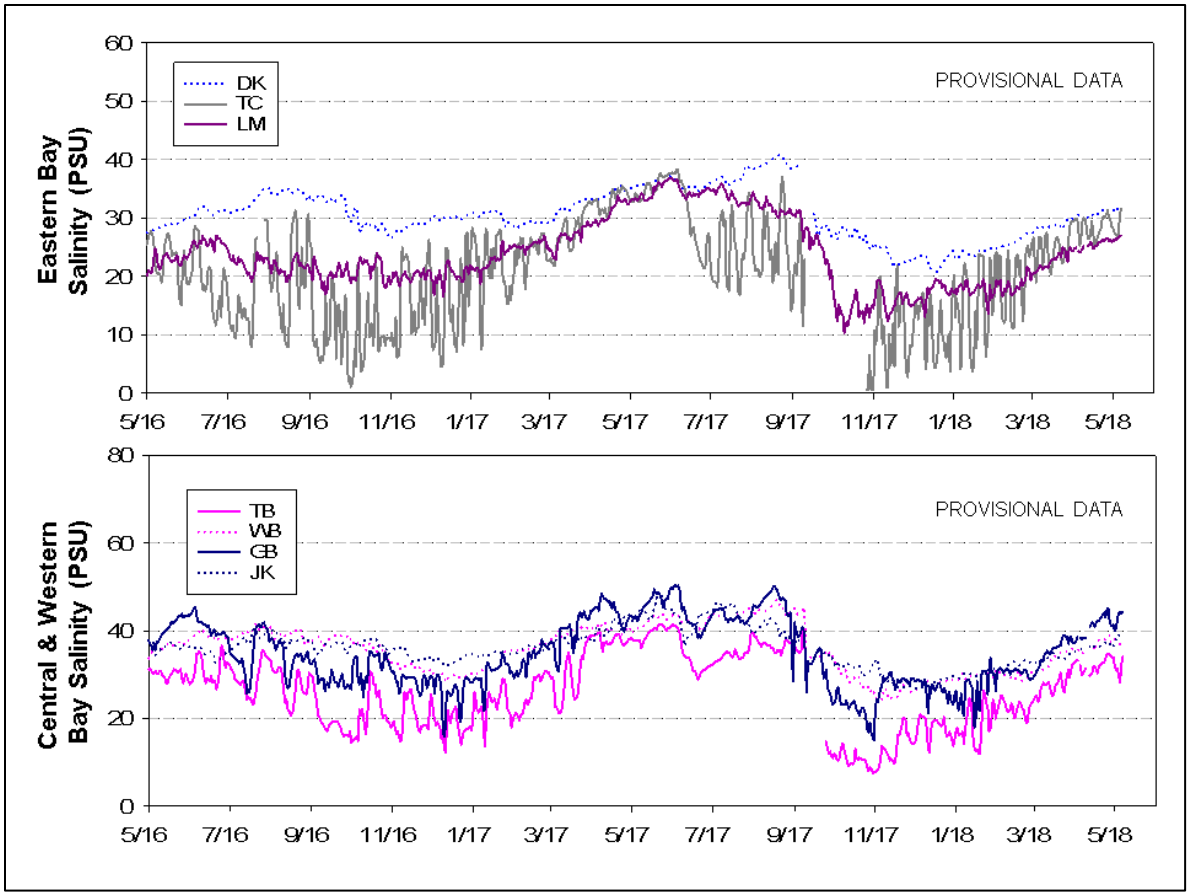
- Approximately 1,000 white ibis nesting in WCA-1 and more birds foraging in central WCA-1
- Few birds foraging in southern WCA-2A
- Large mixed flocks feeding just south of the WCA-3A Alley North colony and in WCA-3A South
- 5,000+ white ibis nesting in WCA-3A Alley North colony; this number is down from the record 18,000+ nests as many of the nests have successfully produced chicks
- Wood stork juveniles beginning to forage in WCA-3A
- Recent stage reversals had little impact on foraging or nesting conditions

Taylor Slough Water Levels: An average of 0.4 inches of rain fell over Taylor Slough and Florida Bay with the highest amount of 2.4 inches over the panhandle region which is also the only area where stages increased. Stage changes this week ranged from −0.20 feet to +0.05 feet. Water depths range from −1.15 to +0.67 feet and are 8 inches below to 3 inches above the historical averages.

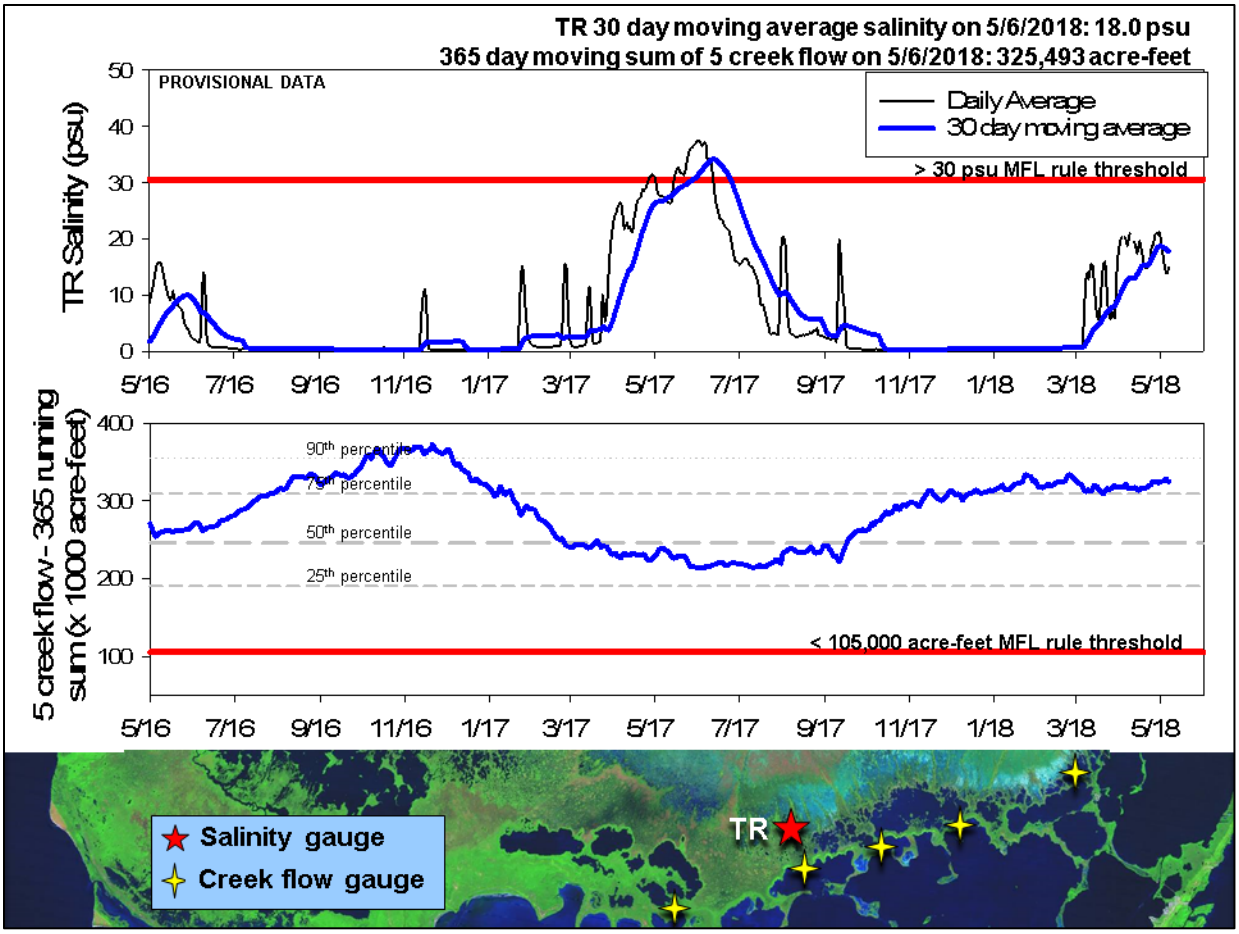
Florida Bay Salinities: Salinity changes in Florida Bay ranged from −1.8 to +2.9 psu. Salinities ranged from 25 psu in the northeast to 44 psu in the western nearshore. This range is 3 psu below to 2 psu above the historical averages.


Structures
Roads
Canals
Water Depth (ft) (weekly change)
Salinity (psu) (weekly change)
TSB
-1.15'
(-0.20)
P37
-0.24'
(-0.23)
EVER6
-0.07'
(+0.05)
CP
0.67'
(-0.05)
TR
14.0
(-6.8)
JB
25.4
(-1.8)
LS
33.3
(+2.1)
GB
44.0
(+2.8)
TB
32.4
(-1.4)
26.9
(+0.7)
LM
32.0
(+0.9)
DK
BK
39.0
(+2.9)
WB
37.7
(+0.4)
JK
38.5
(+2.3)
N
W
E
S
0 2.75 5.5 11 Miles


Taylor Slough Water Depths
*note: calculated using ground surface elevation values (NAVD29) from EDEN
PROVISIONAL DATA
Taylor Slough Water depth (ft.)*
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
P37
EVER6
CP
TSB
2/16
4/16
6/16
8/16
10/16
12/16
2/17
4/17
6/17
8/17
10/17
12/17
2/18



Florida Bay MFL: Mangrove zone daily average salinity decreased this week to end at 14 psu on Sunday due to the rain. The 30-day moving average decreased 0.4 psu to 18.4 psu. The weekly cumulative flow from the five creeks denoted by yellow stars on the map totaled about 5,600 acre-feet for the last week. The 365-day moving sum of flow from the five creeks increased 2,000 acre-feet over the last week to end at 325,493 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

Water management that maintains the current recession rates along the regulation schedule or slightly above in Rotenberger Wildlife Management Area has great ecological benefit for wildlife. The continuation of inflows that hydrate the northern sections of WCA-3A provides ecological benefit by protecting those area's peat soils and lessening the risk of damaging wildfires. The continuation of inflows into northeast WCA-3A may also still be providing wildlife benefit by slowing the recession rates near the Alley North Colony where wading birds are currently foraging in great numbers. Given little evidence that recent rain driven reversals have had a negative impact on wading bird foraging and nesting, there is little chance that water management would have a negative impact on wading bird populations in WCA-3A. Water management that results in optimal recession rates in WCA-1 and WCA-2A (between 0.05 feet and 0.09 feet per week) while returning stages to target has ecological benefit. Due to elevated levels of total phosphorus (TP) upstream of S-332, a recommendation is being made to limit the increase in depths within the L-31W 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, May 8th, 2018 (red is new)

Area	Weekly change	Cause(s)	Recommendation	Reasons
WCA-1	Stage decreased by 0.11'	Rainfall, ET, management	Manage recession rates between 0.05 and 0.09 feet per week to return depths to regulation schedule.	Foster conditions for wildlife and optimal wading bird foraging.
WCA-2A	Stage decreased by 0.09'	Rainfall, ET, management	Manage recession rates between 0.05 and 0.09 feet per week to return depths to regulation schedule.	Foster conditions for optimal wading bird foraging.
WCA-2B	Stage decreased by 0.14'	Rainfall, ET, management	Maintain depths at regulation schedule.	Protect upstream/downstream habitat and wildlife. Foster conditions for wading bird foraging.
WCA-3A NE	Stage decreased by 0.12'	Rainfall, ET, management	Moderate current recession rates, water management that provides inflows generates ecological benefit	Protect peat soils and lower risk of damaging wildfire.
WCA-3A NW	Stages decreased by 0.02'	Rainfall, ET, management	Maintain current recession rates, water management that provides inflows generates ecological benefit	
Central WCA-3A S	Stage decreased by 0.08'	Rainfall, ET, management	Maintain current recession rates near 0.05 and 0.09 feet per week	Protect habitat and wildlife, foster conditions for wading bird foraging.
Southern WCA-3A S	Stages decreased by 0.09'	Rainfall, ET, management		
WCA-3B	Stages decreased by 0.05'	Rainfall, ET, management	Maintain depths at regulation schedule.	Protect habitat and wildlife.
ENP-SRS	Stage decreased by 0.17'	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 −0.20' to +0.05'	Rain, ET, inflows	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 −2.2 to +1.1 psu.	Rain, ET, inflows, wind	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.