

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: April 10, 2018

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

The heaviest rainfall in several months is forecast over the northern and eastern portions of the District today. A stationary cold front over north-central Florida this morning will gradually push down the peninsula today and tonight. Ahead of it atmospheric conditions will be favorable for widespread showers and thunderstorms over the northeastern third of the District this afternoon and evening, where areal average rainfall of 0.5-1 inches is likely. Local maxima over this area could be as high as 3 inches, with the best chance for the heaviest totals farthest north from the Kissimmee valley to the east coast. Much lower amounts are expected farther southwest over the District, with some areas over the far southwest seeing little to no rain. Lingering rains could affect the southeastern part of the District Wednesday morning before the cold front exits the state, but rainfall accumulations are expected to be light. Much drier air behind the front should bring two days of essentially no rainfall over the District Thursday and Friday. A gradual increase in moisture is forecast by the weekend ahead of another cold front. As a result, rain chances should increase slightly on Saturday ahead of the front, primarily over the eastern zones. Overall rainfall is expected to be light that day, but isolated areas of heavier rainfall are expected over the southeastern corner of the District. A second rainfall event is likely from Sunday into Monday, although this event should be significantly less than today's rains. In general, 0.1-0.33 inches of rain is forecast to fall across the District during this period, but confidence in rainfall amounts and locations is low.

Kissimmee

Tuesday morning stages were 56.2 feet NGVD (0.8 feet below schedule) in East Lake Toho, 53.2 feet NGVD (0.8 feet below schedule) in Toho, and 49.5 feet NGVD (1.3 feet below schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.6 feet NGVD at S-65A and 25.8 feet NGVD at S-65D. Mean recession rates for the last week were 0.16 and 0.16 feet per week in East Lake Toho and Toho, respectively (preferred range of 0.15-0.2 feet per week) and 0.11 feet per week in Kissimmee-Cypress-Hatchineha (preferred rate is to not exceed 0.2 feet per week). Tuesday morning discharges were: 297 cfs at S-65, 248 cfs at S-65A, and 296 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 6.8 mg/L for the week. Kissimmee River mean floodplain depth on Sunday was 0.06 feet.

Lake Okeechobee

Lake Okeechobee stage is 13.57 feet NGVD having decreased 0.24 feet over the past week and 0.92 feet over the last month. Lake stages have receded approximately 3.6 feet from the October 2017 peak following Hurricane Irma, but exceeded 15.0 feet NGVD for 161 days, the longest period since the winter of 2005/06. The high water and associated turbidity have had substantial impacts on the submerged aquatic and emergent vegetation coverage in the nearshore areas of the Lake which would

benefit from lower stages near the end of the 2018 dry season. The rapid recession rate of nearly one foot per month is not ideal for fish and wildlife breeding season conditions but will hasten the return of light penetration to the sediments in the nearshore region for important habitat recovery. It will also help avoid higher stages in the summer, which are correlated with algal blooms on the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged 198 cfs over the past week with no flow coming from Lake Okeechobee. Salinity remained about the same 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 3.91 – 8.61 µg/L in the South Fork.

Total inflow to the Caloosahatchee Estuary averaged 766 cfs over the past week with 525 cfs coming from the Lake. Salinity decreased in the upper part of the estuary and stayed about the same in the lower part. The 30-day moving average surface salinity is 4.4 at Val I-75 and 12.4 at Ft. Myers. The 30-day moving average salinity at Val I-75 is forecast to be 5.2 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 in the fair range at Shell Point. Chlorophyll a concentrations over the last week were relatively low to medium near Beautiful Island (6.53 – 24.33 µg/L), Ft. Myers (4.59 – 32.89 µg/L), and Shell Point (0.97 – 14.19 µg/L). Dissolved oxygen levels at Beautiful Island were 4.51 – 10.89 mg/L, at Ft. Myers were 4.71 – 8.17 mg/L and at Shell Point were 4.16 – 9.48 mg/L. The 2008 LORS recommends up to 450 cfs at S-79 and up to 200 cfs at S-80, and the Adaptive Protocols indicate that the estuary needs water. The District recommends that the USACE follow the 2008 LORS schedule.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 11,400 acre-feet of Lake releases. The total amount of Lake releases sent to the STAs/FEBs in WY2018 (since May 1, 2017) is approximately 124,800 acre-feet. Most STA cells are at or above target depths, except many of the STA-5/6 EAV cells which are drying out. Operational restrictions are in place for vegetation rehabilitation in STA-1E, STA-2, and STA-3/4, and for construction related activities in STA-1W. This week, if Lake releases are sent to the WCAs, they will be sent to STA-1E Eastern Flow-way, STA-2 Flow-way 4 and the A-1 FEB/STA-3/4 Western Flow-way.

Everglades

Maintaining recommended recession rates across the entire system would have ecological benefit, but the most pronounced benefit would be in Rotenberger Wildlife Management Area, northern WCA-3A, and southern WCA-2A. Maintaining open water conditions around the near record number of wading birds nesting at the Alley North colony in WCA-3A is important to protect those nests from terrestrial predators. Wading bird foraging within the sloughs in the southern portions of WCA-2A is building and is predicted to be even more important in upcoming weeks. Moderating the recession rates in southern WCA-2A would prolong conditions favorable to foraging. Over drying in the northern portions of WCA-2A puts that region's peat soils at risk and increases the likelihood of damaging wild fires. Inflows into those areas continue to provide ecological benefit. Water depths in Taylor Slough range from -0.45 feet to +0.87 feet and are 1 to 3 inches above the historical averages. Salinities in Florida Bay increased 0.4 psu on average this past week and remain near the historical average for this time of year.

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.28 inches of rainfall in the past week and the Lower Basin received 0.55 inches (SFWMD Daily Rainfall Report 4/9/2018).

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: 4/10/2018

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)						
							4/8/18	4/1/18	3/25/18	3/18/18	3/11/18	3/4/18	2/25/18
Lakes Hart and Mary Jane	S62	0	LKMJ	60.3	R	60.6	-0.3	-0.3	-0.4	-0.5	-0.4	-0.3	-0.2
Lakes Myrtle, Preston, and Joel	S57	0	S57	60.4	R	60.6	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1
Alligator Chain	S60	0	ALLI	63.3	R	63.4	-0.1	-0.2	-0.4	-0.5	-0.4	-0.3	-0.2
Lake Gentry	S63	0	LKGT	60.9	R	60.9	0.0	-0.1	-0.2	-0.3	-0.2	-0.1	0.0
East Lake Toho	S59	63	TOHOE	56.2	R	57.1	-0.9	-1.1	-1.2	-1.2	-1.2	-1.1	-0.9
Lake Toho	S61	182	TOHOW, S61	53.2	R	54.1	-0.9	-1.1	-1.2	-1.2	-1.2	-1.1	-1.0
Lakes Kissimmee, Cypress, and Hatchineha	S65	340	KUB011, LKISSB	49.5	R	50.8	-1.3	-1.4	-1.2	-1.2	-1.1	-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: 4/10/2018

Metric	Location	1-Day Average		Average for the Preceding 7-Days ¹								
		4/8/2018	4/8/18	4/1/18	3/25/18	3/18/18	3/11/18	3/4/18	2/25/18	2/18/18	2/11/18	2/4/18
Discharge (cfs)	S-65	334	340	376	361	400	461	715	968	1,000	810	785
Discharge (cfs)	S-65A	253	257	246	245	258	319	539	764	796	647	625
Discharge (cfs)	S-65D ²	253	301	324	329	343	430	730	1,047	1,018	940	857
Stage (feet NGVD)	S-65D ²	25.77	25.77	25.86	25.80	25.66	25.73	25.67	25.79	25.87	25.80	25.82
Discharge (cfs)	S-65E ²	253	297	325	348	317	441	733	1,088	1,059	978	899
Discharge (cfs)	S-67	0	0	0	0	0	0	0	133	389	350	346
DO (mg/L) ³	Phase I river channel	5.8	6.8	7.5	8.2	8.3	7.0	5.9	6.0	6.2	7.8	8.7
Mean depth (feet) ⁴	Phase I floodplain	0.06	0.06	0.07	0.09	0.07	0.09	0.14	0.19	0.22	0.23	0.26

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 S65D and S65DX1; S65E discharge combines S65E and S65EX1.

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)

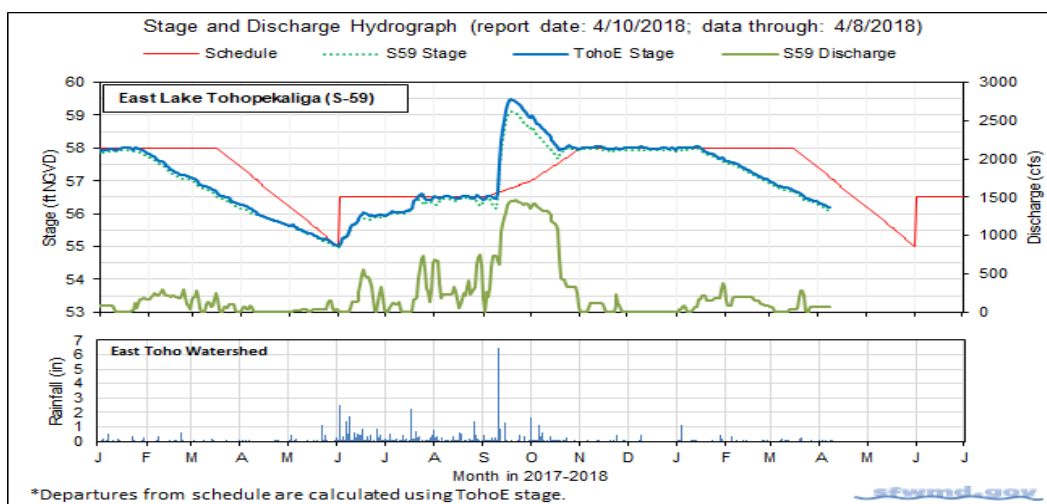


Figure 1.

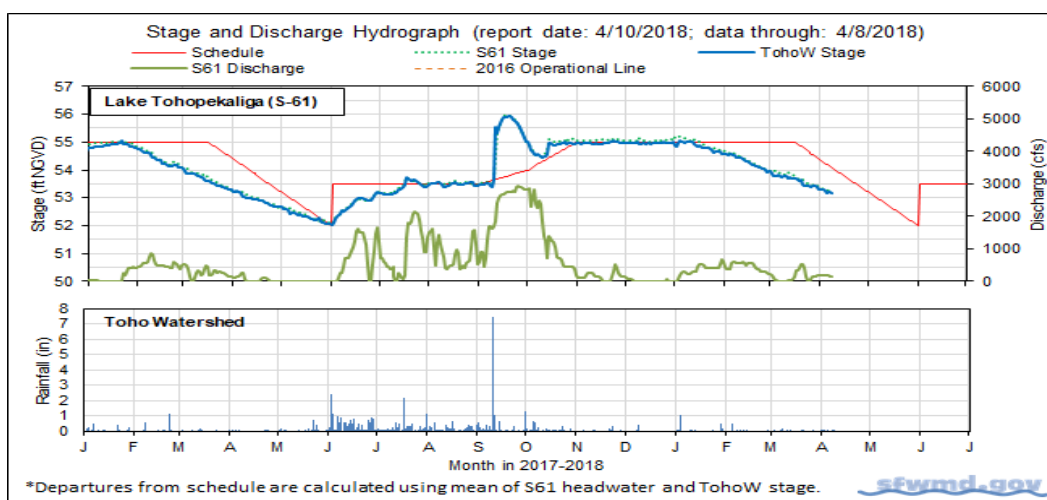


Figure 2.

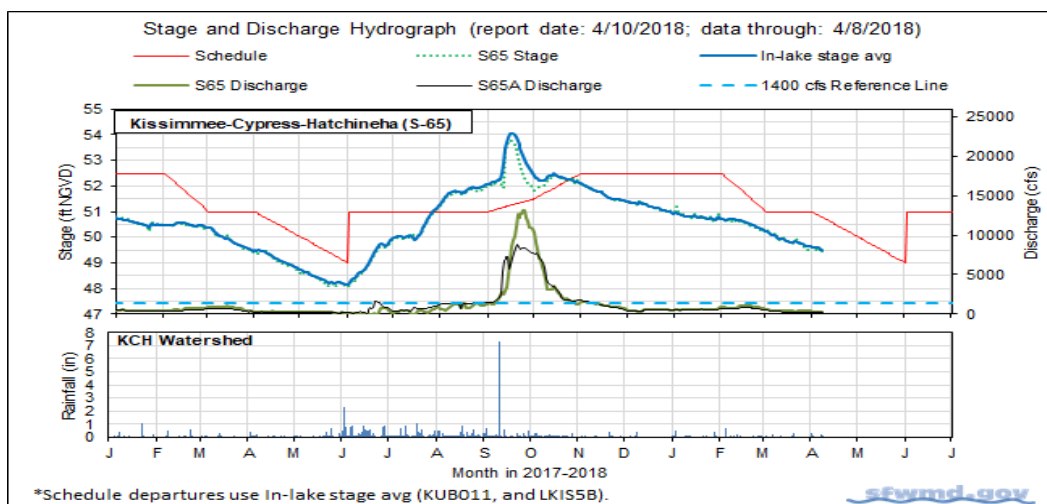


Figure 3.

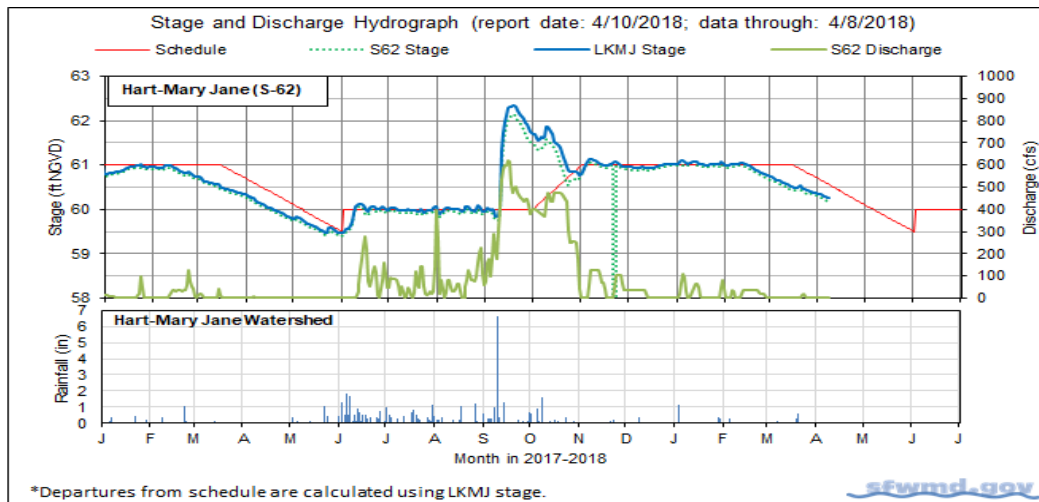


Figure 4.

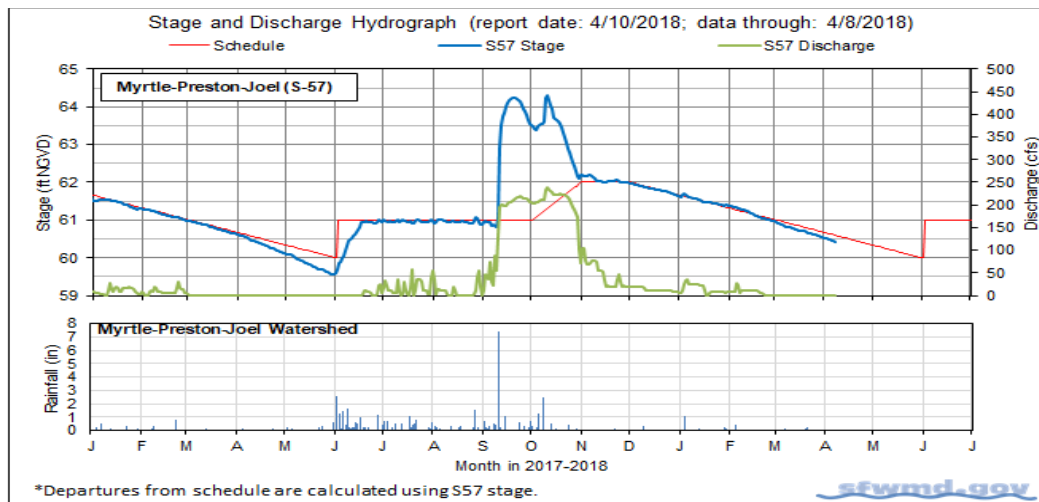


Figure 5.

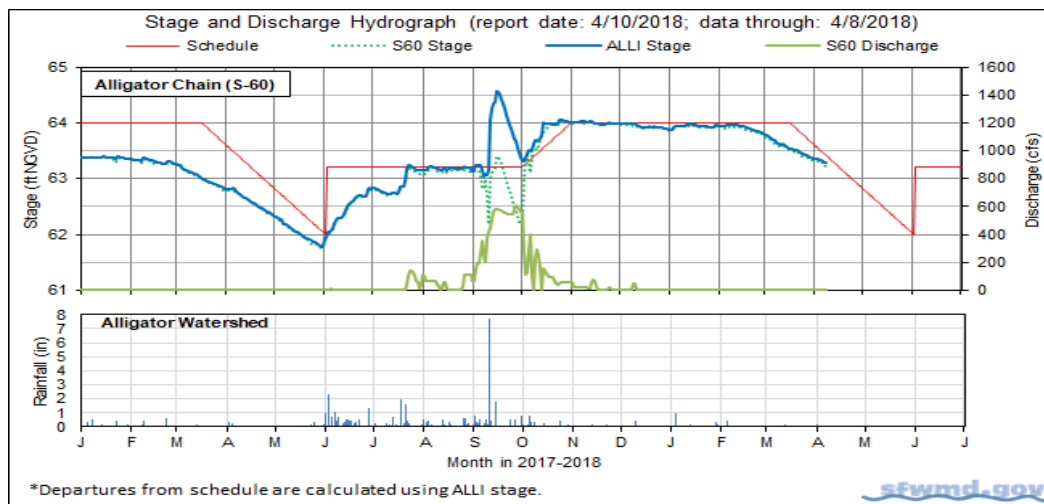


Figure 6.

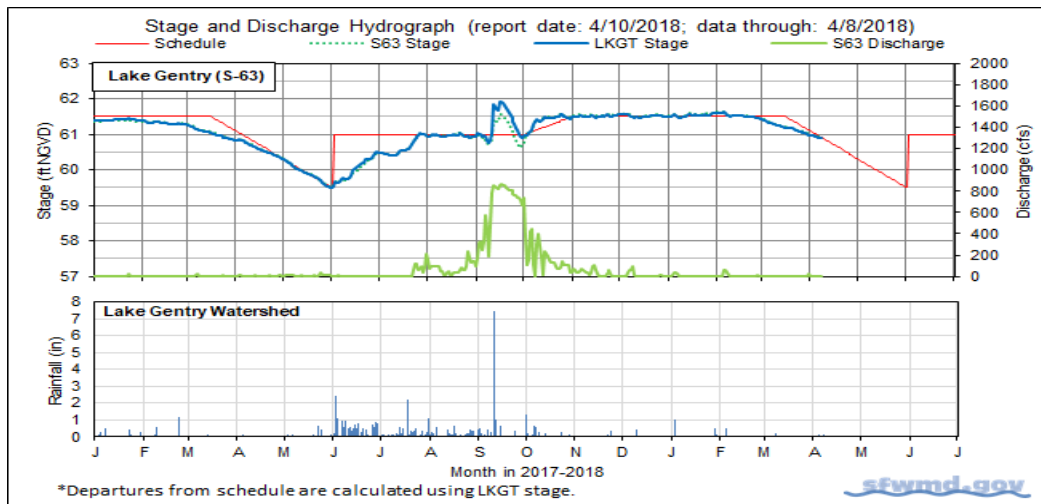


Figure 7.

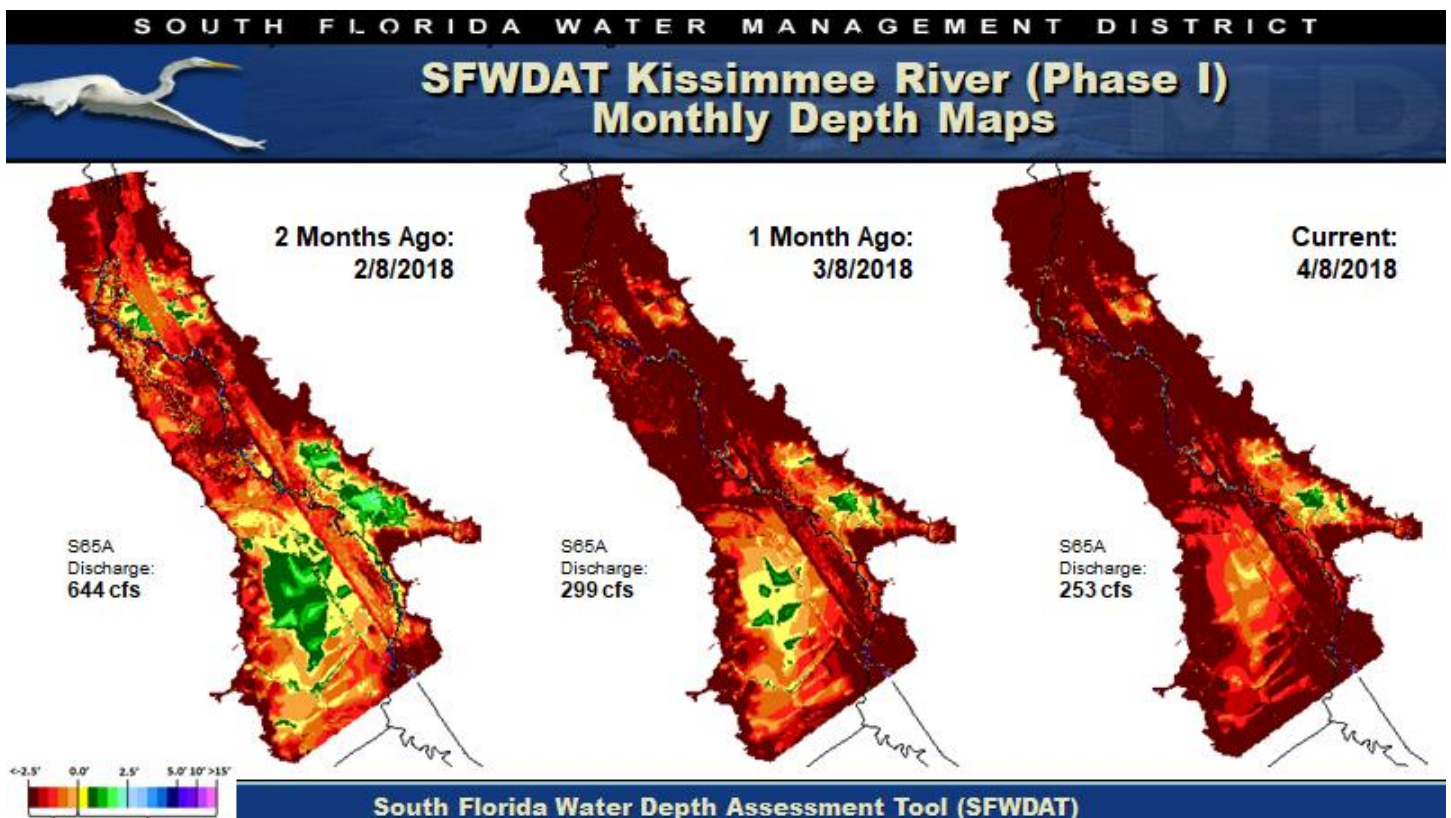


Figure 8. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

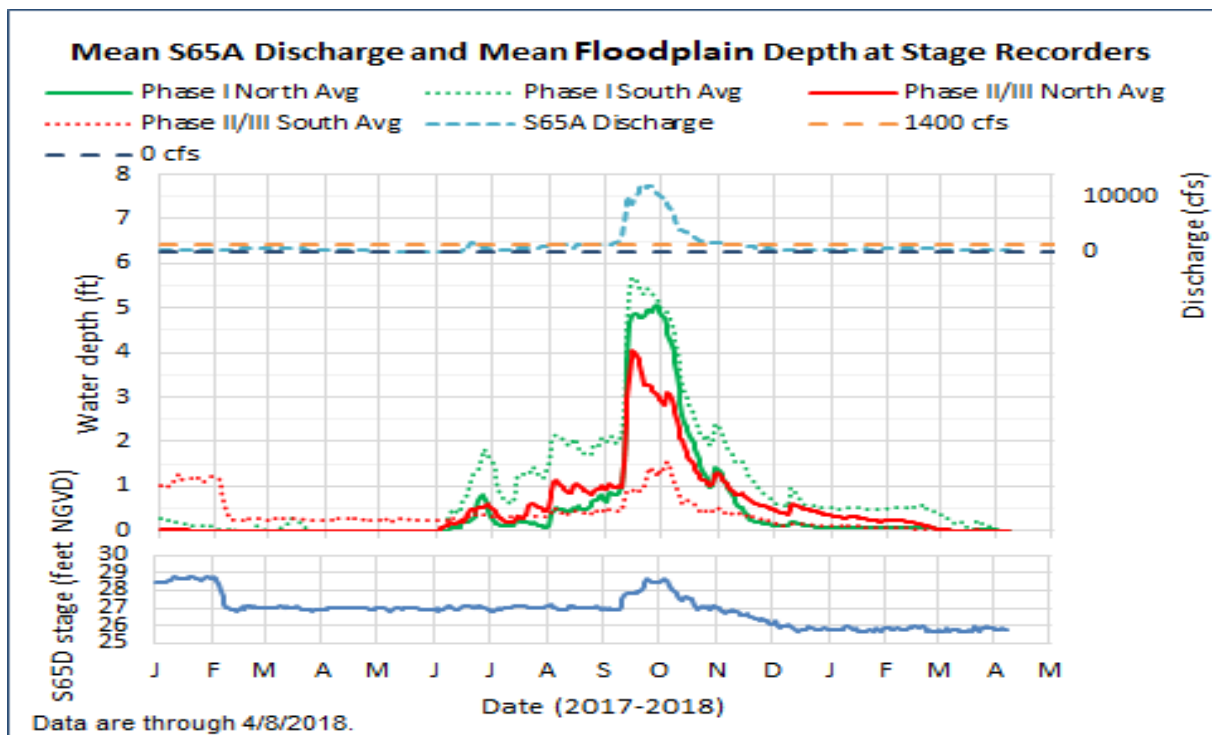
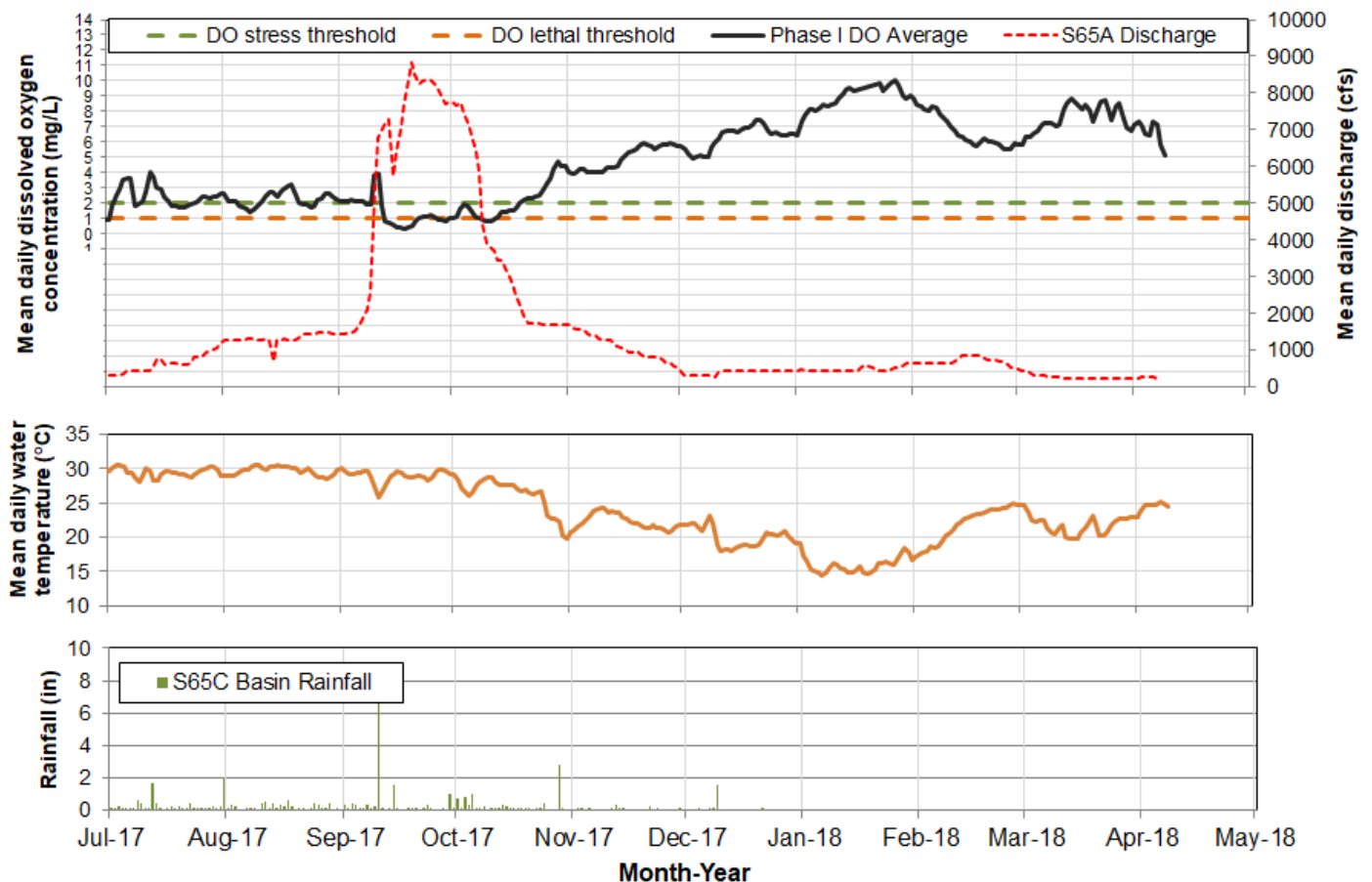


Figure 9. Mean water depth at stage recorders in the northern Phase I, southern Phase I, northern Phase II/III, and southern Phase II/III areas in relation to the S65A discharge and S65D headwater stage.



Report Date: 4/10/2018; data are through: 4/8/2018.

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

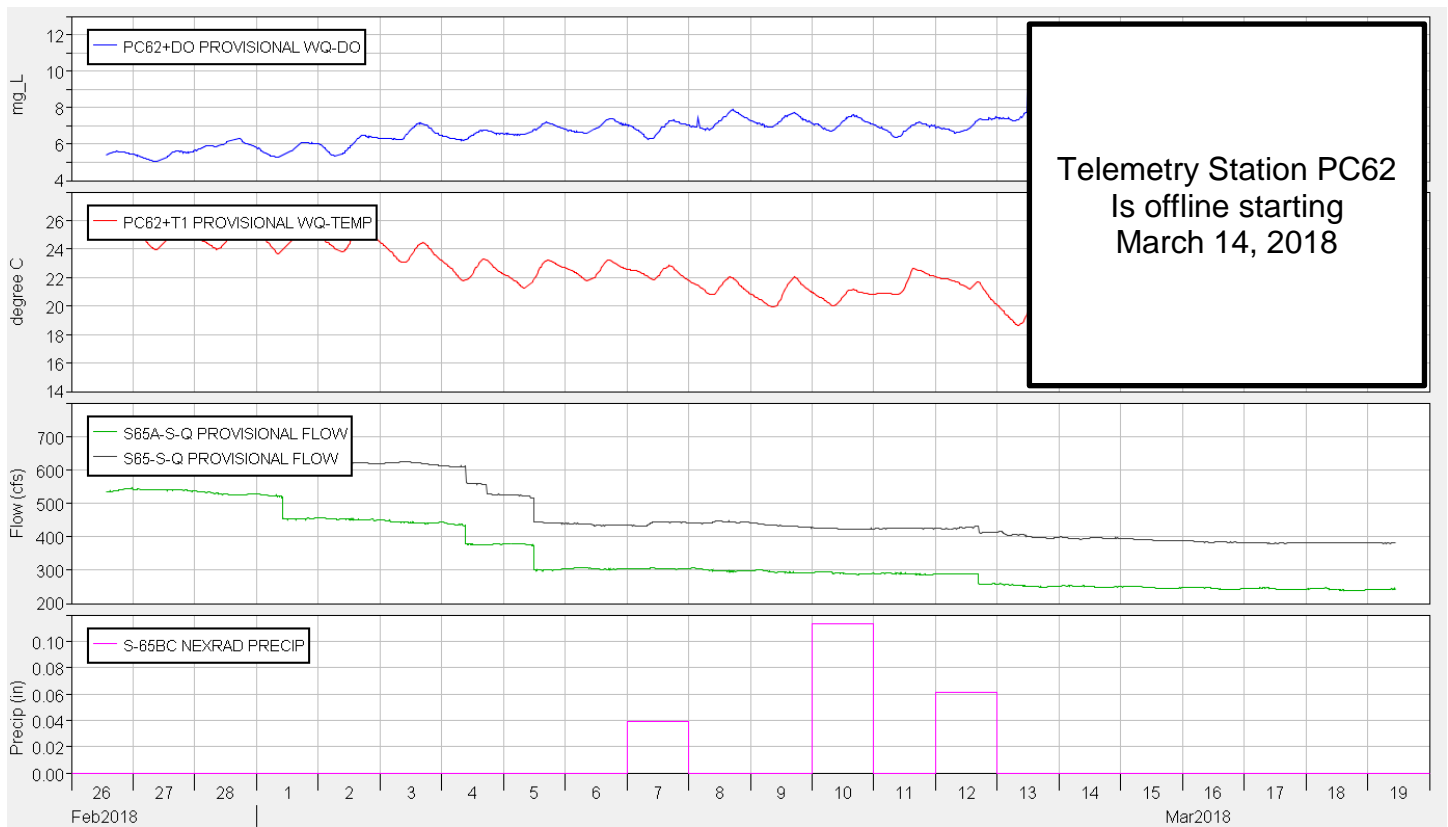


Figure 11. Phase I river channel dissolved oxygen and water temperature (measured at 15-minute intervals) and Pool BC daily rainfall.

Water Management Recommendations

Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
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

S65/S65A Limits on Rate of Change in Discharge

Discharge Rate of Change Limits for S65/S65A (revised 11/16/16).	
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 S65/S65A starting with the 2016-2017 Dry Season.

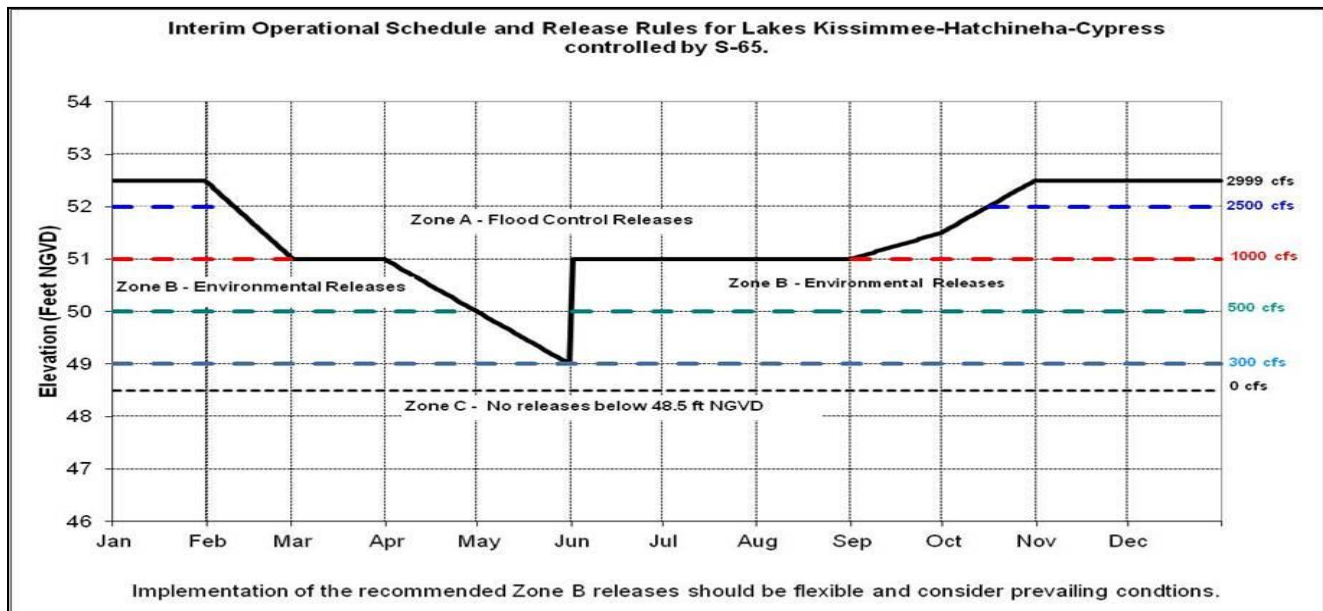


Figure 13. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years.



Figure 14. The Kissimmee Basin.

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 13.57 feet NGVD for the period ending at midnight on April 9, 2018. This value is based on the use of four interior Lake stations (L001, L005, L006 and LZ40) and four perimeter stations (S308, S352, S4 and S133). The Lake is now 0.92 feet lower than it was a month ago, 3.6 feet lower than its peak in mid-October 2017, and 1.36 feet higher than a year ago (Figure 1). The Lake is now in the Low sub-band (Figure 2). According to RAINДАР, 0.22 inches of rain fell over the Lake during the week April 3, 2018 – April 9, 2018 with most of the watershed receiving more rainfall, between 0.25 – 1.5 inches (Figure 3).

Average daily inflows to the Lake were similar to the previous week at 401 cfs. Kissimmee River discharges were similar to the previous week as well, at 296 average daily cfs. The S-71 and S-72 structures and Fisheating Creek contributed a combined 105 average daily cfs compared to 132 cfs the previous week.

Average daily outflows for the Lake increased slightly from the previous week, going from 4,586 cfs to 4,695 cfs. Discharges through S-77 decreased slightly from 1,131 cfs the previous week to 1,090 cfs this past week, while discharges through S-308 were similar at 206 cfs. Discharges south through the S-350 structures increased slightly from an average of 2,962 cfs the previous week to 3,126 cfs this past week. Discharges to the L-8 canal via Culvert 10A were similar to the previous week at 272 average daily cfs. The corrected average daily evapotranspiration value for the week based on the L006 weather platform solar radiation data increased slightly to 0.18 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 6,000 acres in habitat with suitable foraging depths for long-legged wading birds from the previous week, with 35,308 acres of suitable depth on April 9. There was also a loss of roughly 5,000 acres of suitable foraging depths for short or long-legged wading birds, going from 22,584 acres the previous week to 18,572 acres this past week as foraging habitats continue to dry out (Figure 5). Snail kite nesting effort increased on the second breeding season survey of the Lake, with 52 potential nests found so far; six of which already fledged young, and 14 of which have already failed. The nesting effort through March is similar to recent years on the Lake.

The Florida Forest Service, Florida Fish and Wildlife Conservation Commission, and the SFWMD have coordinated management efforts to conduct approximately 5,000 acres of prescribed burns on the Lake in the last month, in both the Indian Prairie and the western Moore Haven marsh areas (Figure 6). Another, potentially larger burn is planned for the eastern Moore Haven marsh if weather permits. These burns have targeted encroaching upland vegetation, decaying material that died during high water from Hurricane Irma, and years of accumulated organic material from lack of prescribed fire in recent years.

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	296	0.1
S71 & 72	94	0.0
S84 & 84X	0	0.0
Fisheating Creek	11	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	0	0.0
C5	0	0.0
Rainfall	615	0.2
Total	1015	0.4

OUTFLOWS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S77	1090	0.5
S308	206	0.1
S351	1582	0.7
S352	743	0.3
S354	801	0.3
L8	272	0.1
ET	3527	1.5
Total	8222	3.5

PROVISIONAL DATA

Water Management Recommendations

Lake Okeechobee stage is 13.57 feet NGVD having decreased 0.24 feet over the past week and 0.92 feet over the last month. Lake stages have receded approximately 3.6 feet from the October 2017 peak following Hurricane Irma, but have exceeded 15.0 feet NGVD for 161 days, the longest period since the winter of 2005/06. The high water and associated turbidity have had substantial impacts on the submerged aquatic and emergent vegetation coverage in the nearshore areas of the Lake, which would benefit from lower stages near the end of the 2018 dry season. The rapid recession rate of nearly one foot per month is not ideal for fish and wildlife breeding season conditions but will hasten the return of light penetration to the sediments in the nearshore region for important habitat recovery. It will also help avoid higher Lake stages in the summer, which are correlated with algal blooms on the Lake. Long, steady recessions of water levels throughout the dry season may help promote another productive year for wading birds on the Lake as well.

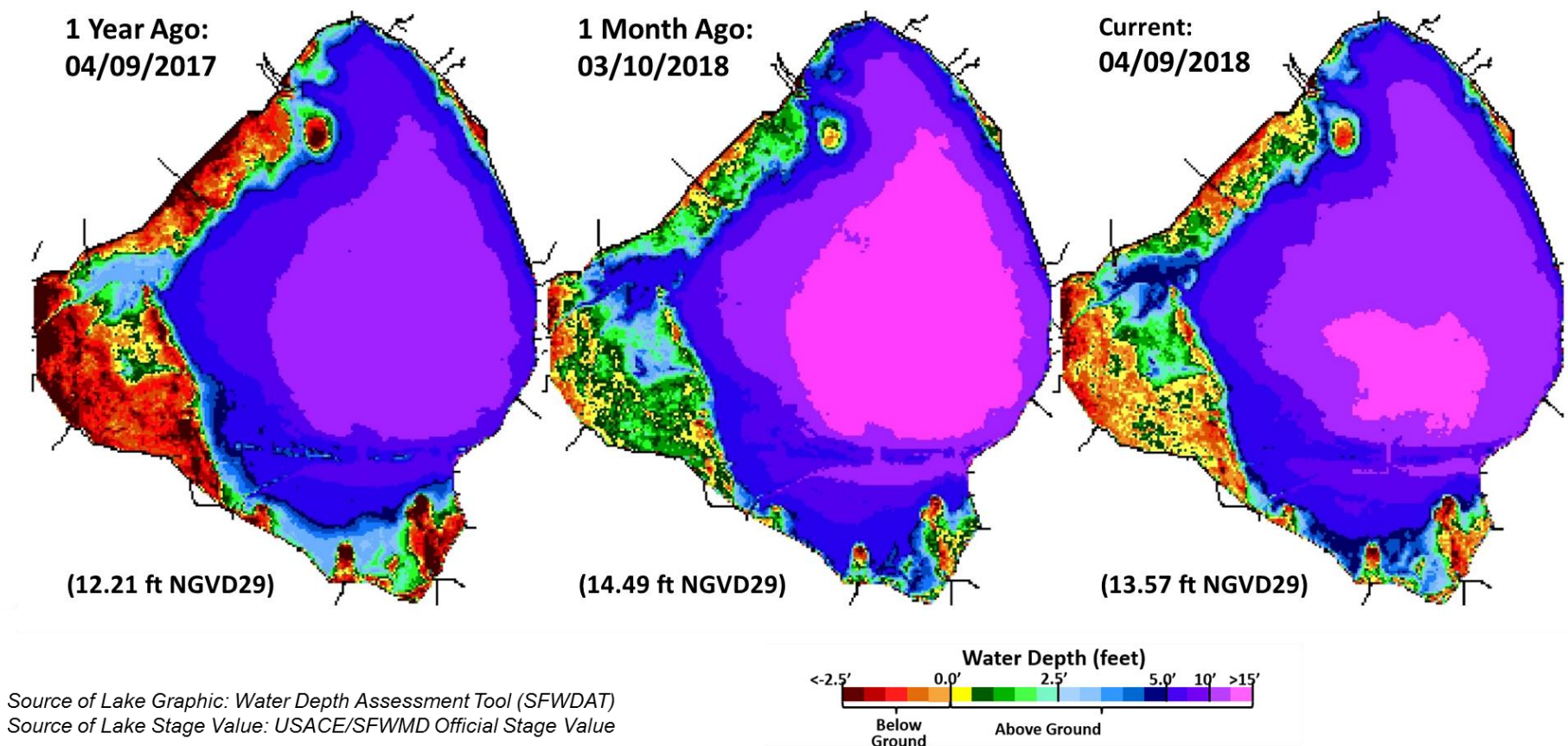


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

Lake Okeechobee Water Level History and Projected Stages

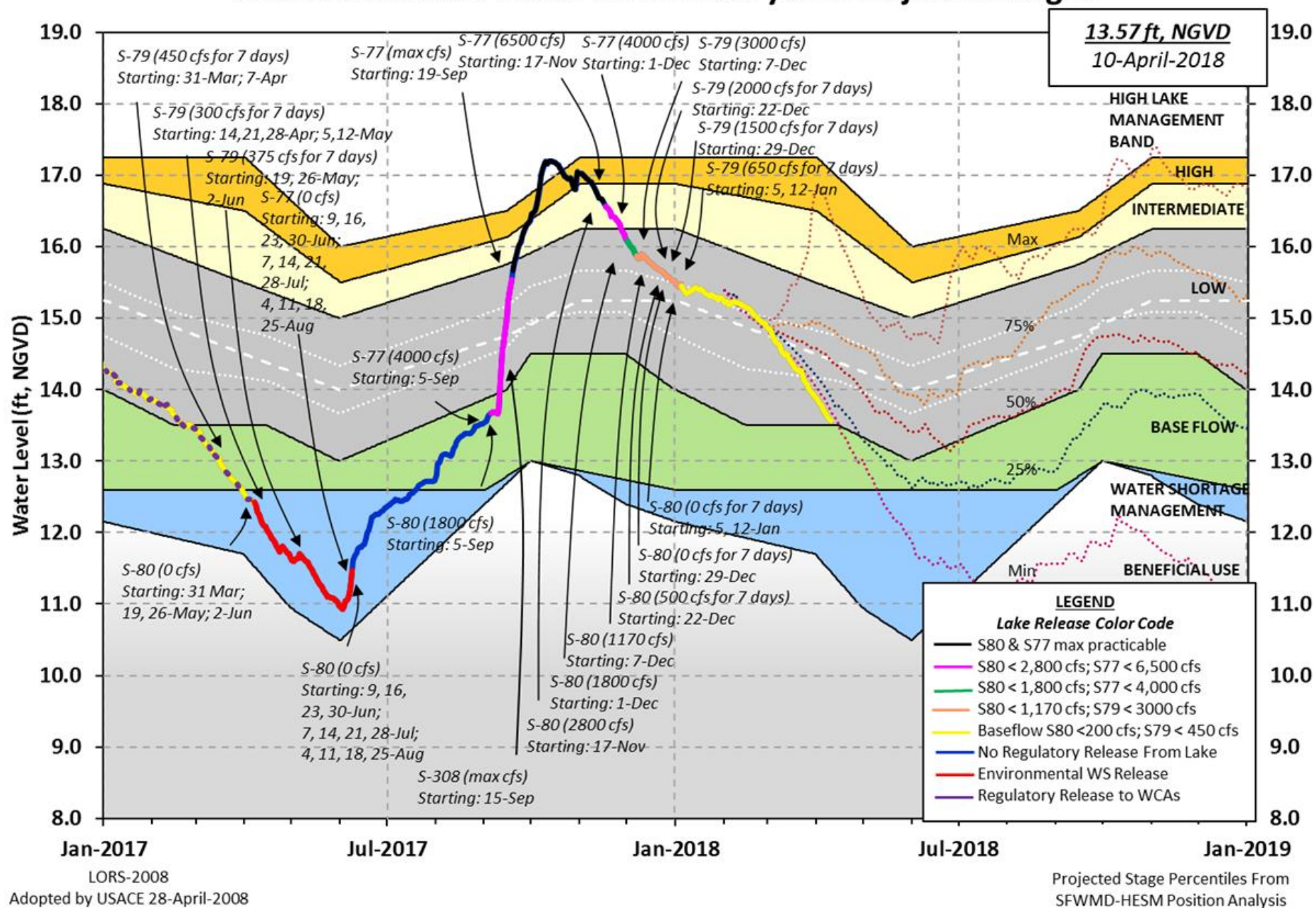


Figure 2. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 0830 EST, 04/03/2018 THROUGH: 0830 EST, 04/10/2018

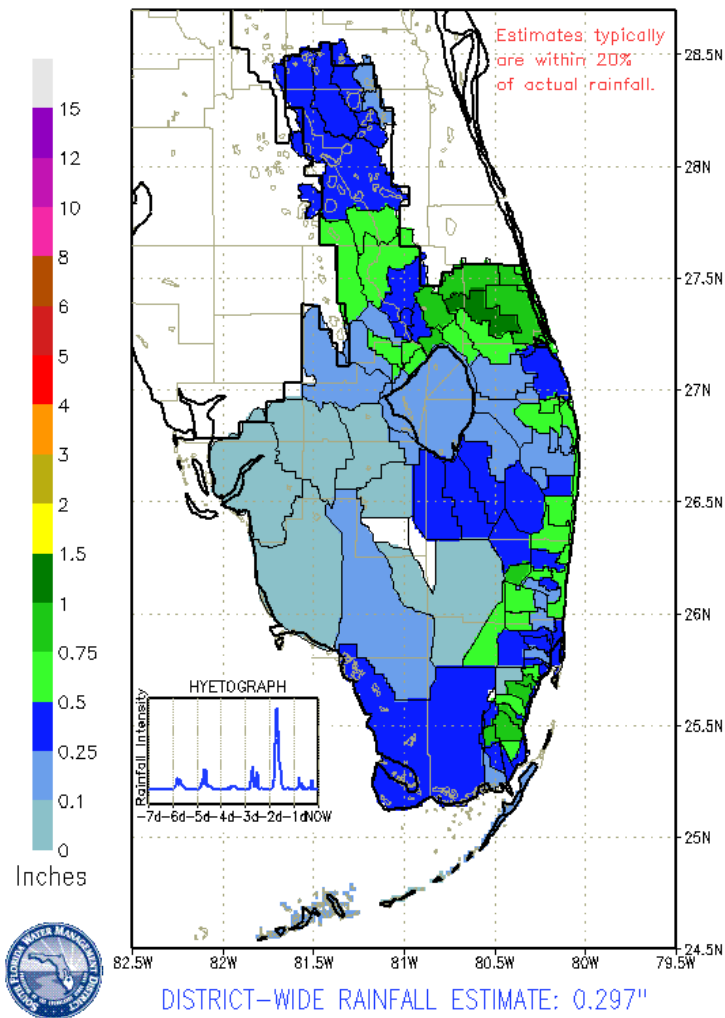


Figure 3. Rainfall estimates by basin.

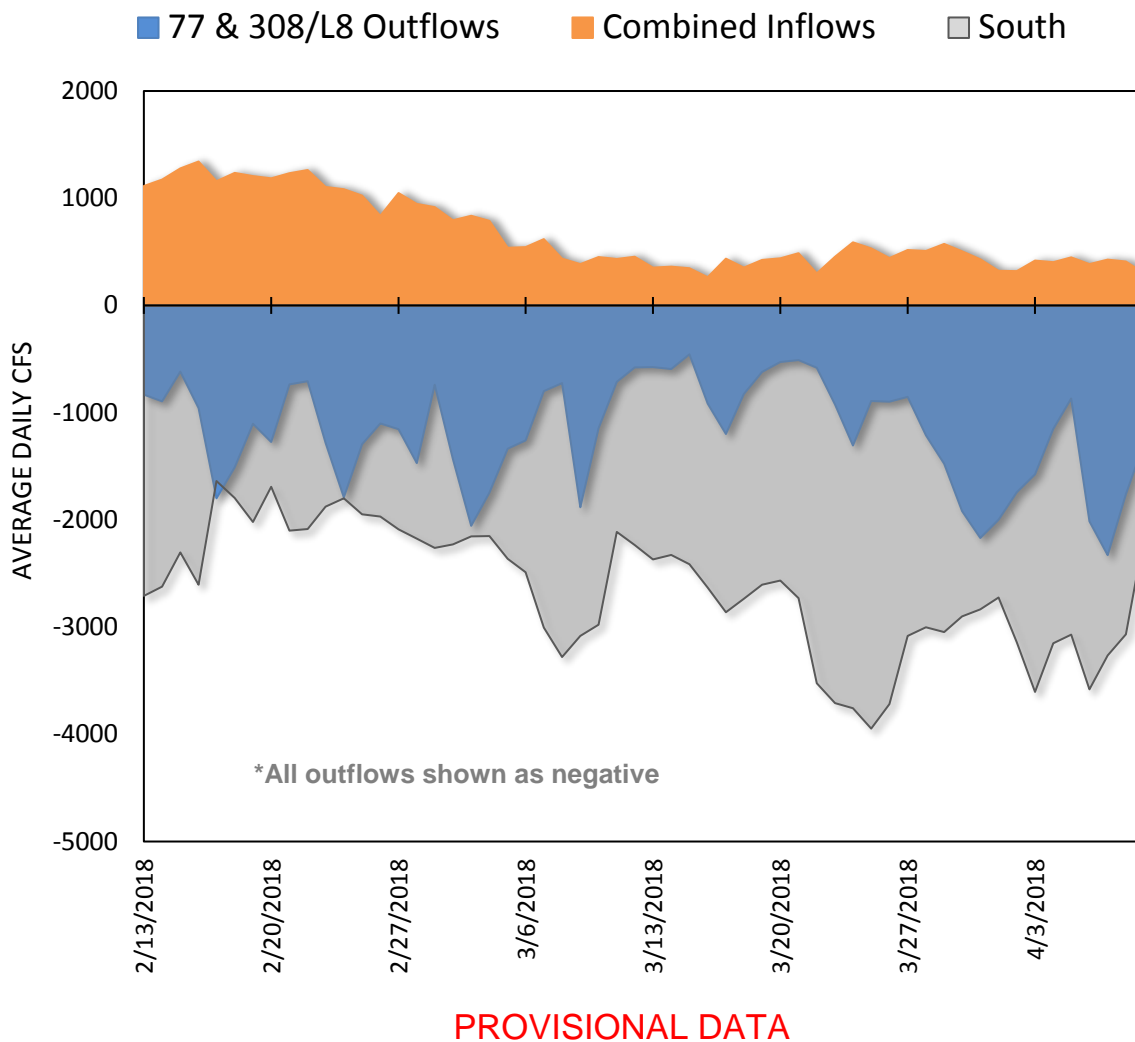


Figure 4. Major inflows and outflows of Lake Okeechobee, including the S350 structures designated as South. Inflows and outflows are shown as positive and negative, respectively, for visual purposes.

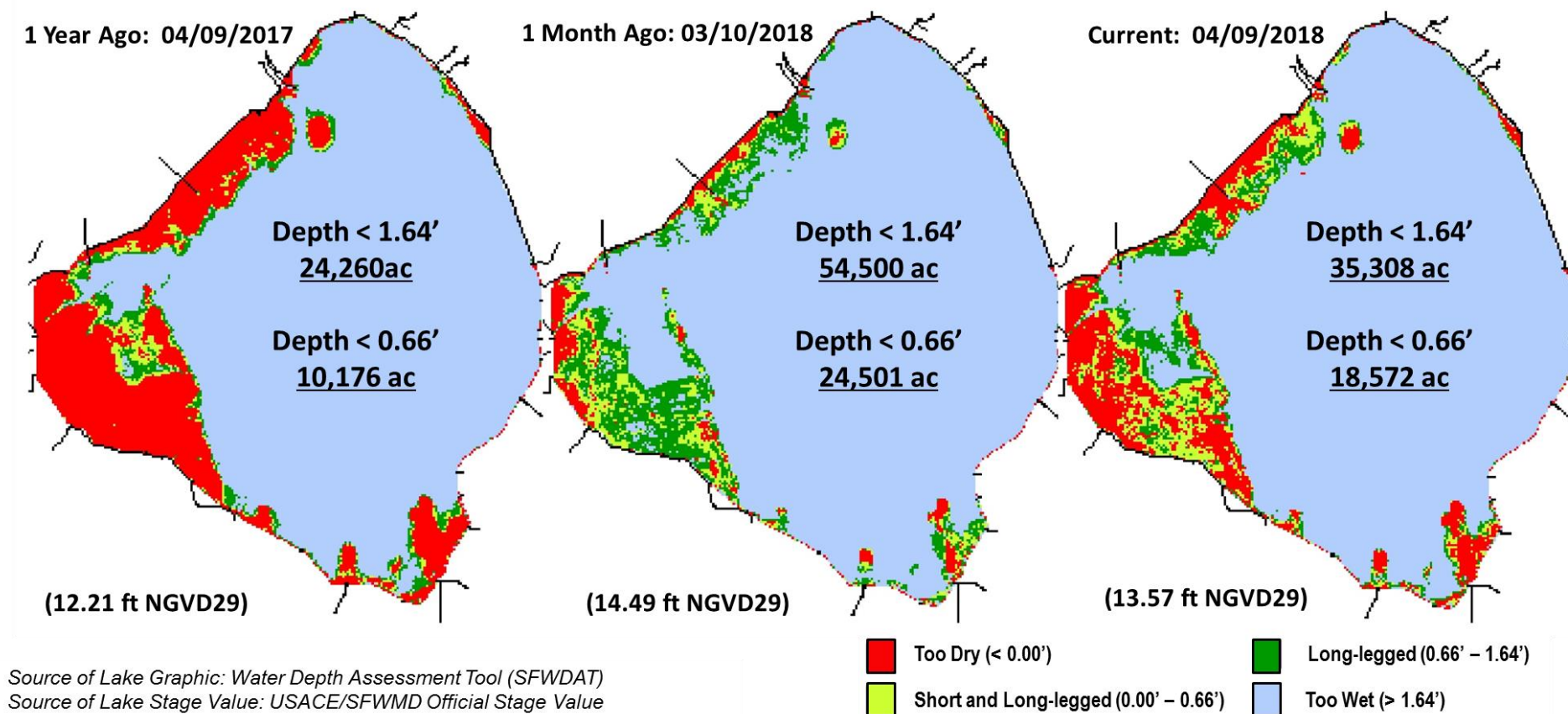


Figure 5. Wading bird habitat suitability index for Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

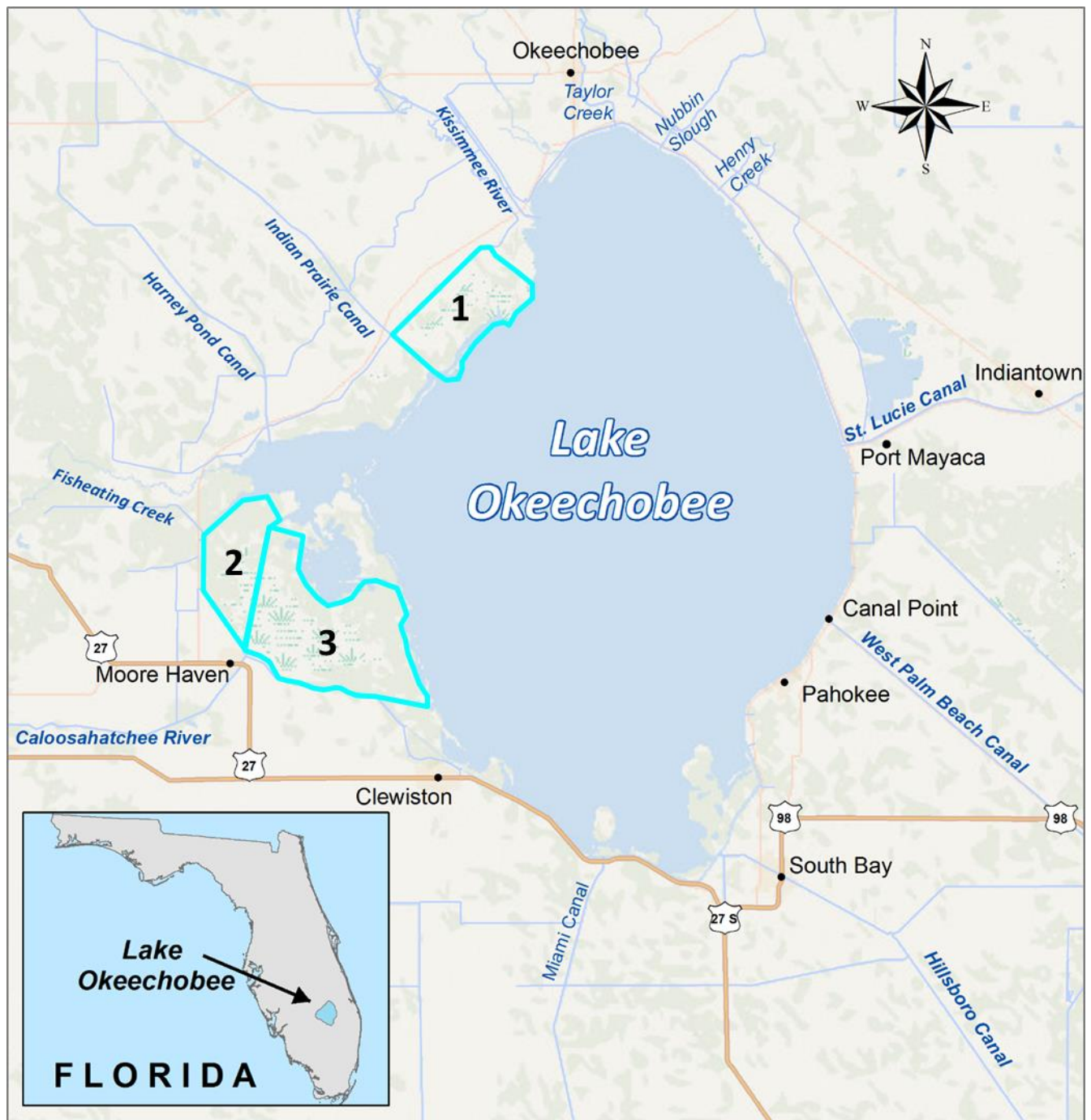


Figure 6. Locations of prescribed burns on the Lake conducted by the Florida Forest Service, Florida Fish and Wildlife Conservation Commission, and the SFWMD. Portions of Areas 1 and 2 have burned while Area 3 is planned but may not take place this season due to dry and windy conditions prevailing.

LAKE ISTOKPOGA

Lake Istokpoga stage is 38.95 feet NGVD as of midnight April 9, 2018 and is currently 0.39 feet below its regulation schedule to accommodate construction on downstream structures (Figure 7). Average daily inflows to the lake from Josephine and Arbuckle Creeks for the week April 3 – April 9, 2018 decreased slightly from the previous week, going from 83 cfs to 68 cfs this past week. Discharges via the S68 and S68X structures were again minimal, at just 27 average daily cfs. According to RAINDAR, approximately 0.65 inches of rain fell in the Lake Istokpoga basin over the past week.

Snail kites have also resumed nesting efforts on Lake Istokpoga, with 10 nests found after completion of the second breeding season survey, compared to 11 at this time last year.

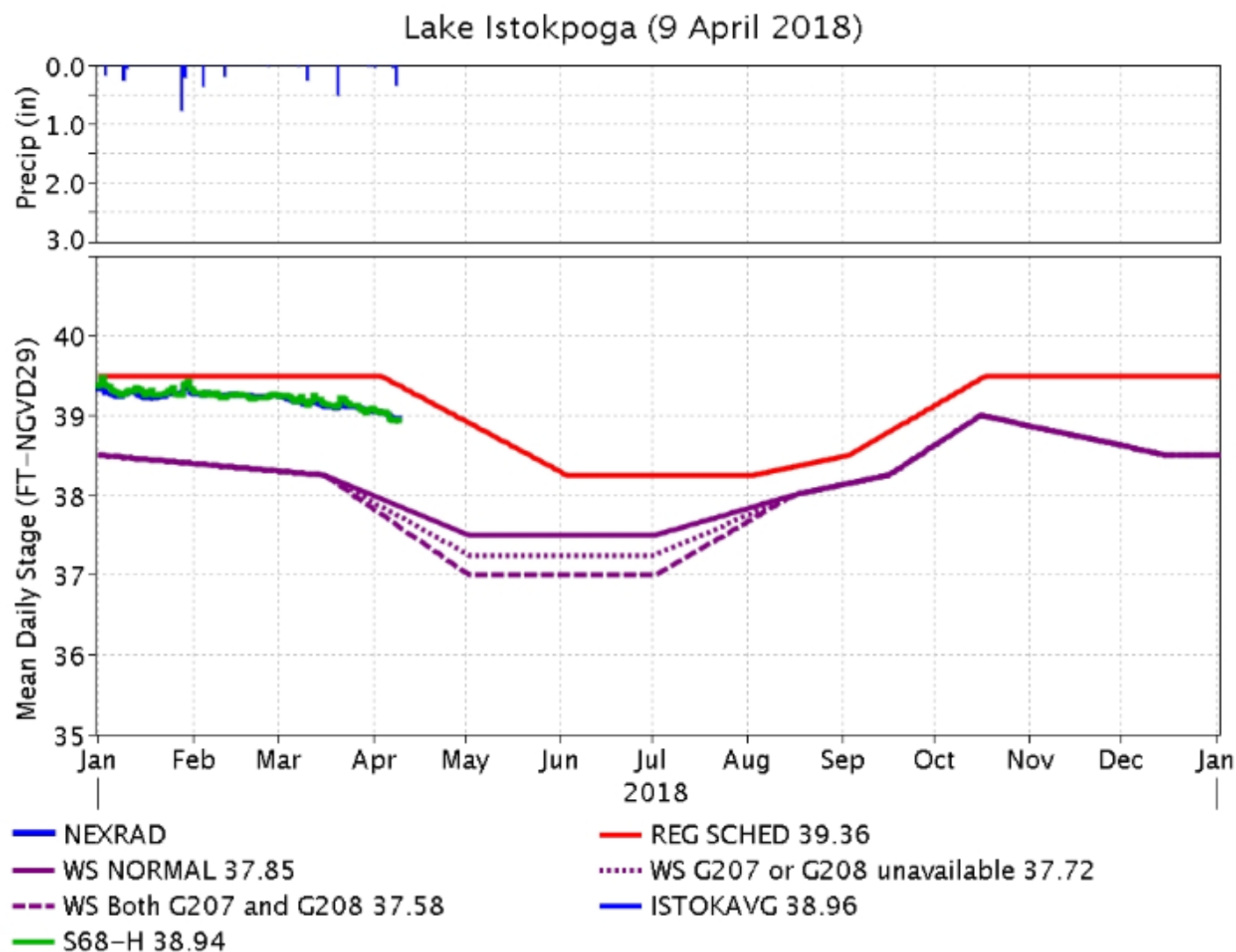


Figure 7. Recent stages on Lake Istokpoga.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged about 198 cfs (Figures 1 and 2) and last month inflow averaged about 147 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	127
S-80	0
S-308	206
S-49 on C-24	0
S-97 on C-23	9
Gordy Rd. structure on Ten Mile Creek	62

Over the past week, salinity remained about the same throughout the estuary (Table 2, Figures 3 and 4). The seven-day moving average salinity of the water column (an average of the surface and bottom salinity) at the US1 Bridge is estimated to be 27.0. Salinity conditions in the middle estuary are in 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)	24.8 (24.8)	26.4 (25.9)	NA ¹
US1 Bridge	NR (27.1)	27.5 (27.5)	10.0-26.0
A1A Bridge	31.4 (32.1)	32.7 (33.2)	NA ¹

¹Envelope 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 <i>a</i> (µg/l)	Average DO (mg/l)	Minimum DO (mg/l)	Maximum DO (mg/l)
SF2	2.63	3.91 - 8.61	1.30	0.49	2.16
SF	1.52	2.78 - 9.96	6.59	4.92	8.19
NF	1.94	2.55 - 6.31	6.54	4.68	7.46
ME	1.78	2.52 - 7.02	6.38	5.44	7.91
IRL-SLE	3.56	0.17 - 3.39	6.38	6.09	6.82

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 766 cfs (Figures 7 and 8) and last month inflow averaged about 734 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	1090
S-78	664
S-79	685
Tidal Basin Inflow	81

Over the past week in the estuary, salinity decreased to Ft. Myers Yacht Basin and remained about the same downstream (Table 5, Figures 9 & 10). The seven-day average salinity values are in the good range for adult eastern oysters at Cape Coral and in the fair range at Shell Point (Figure 11). Salinity data were not available at Sanibel. The 30-day moving average surface salinity is 4.4 at Val I-75 and 12.4 at Ft. Myers. With no flow through S-79, daily salinity at Val I-75 is forecast in two weeks to be 7.4, and the 30-day moving average is forecast to be 5.2 (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)	3.4 (4.4)	3.6 (4.8)	NA ¹
*Val I75	4.8 (5.3)	7.9 (8.7)	0.0-5.0 ²
Ft. Myers Yacht Basin	13.3 (13.6)	14.8 (15.3)	NA
Cape Coral	22.4 (21.9)	22.6 (22.7)	10.0-30.0
Shell Point	31.4 (31.6)	30.6 (30.6)	10.0-30.0
Sanibel	NR ³ (NR)	NR (NR)	10.0-30.0

¹Envelope not applicable, ²Envelope is based on a 30-day average, and ³Not Reporting.

*Val I75 is temporarily unavailable (salinity values are estimated using models developed for this site).

Monitoring data collected by the River, Estuary and Coastal Observing Network of Sanibel-Captiva Conservation Foundation using continuous sensors are summarized in Table 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 <i>a</i> (µg/l)	6.53 – 24.33	4.59 – 32.89	0.97 – 14.19
Dissolved Oxygen (mg/l)	4.51 – 10.89	4.71 – 8.17	4.16 – 9.48

The Florida Fish and Wildlife Research Institute reported on April 6, 2018, that *Karenia brevis*, the *Florida red tide dinoflagellate*, was observed at background to medium concentrations in 16 samples collected from Lee County. Fish kills and respiratory irritation were reported in Lee County over the past week.

NOAA satellite imagery indicates low to medium cyanobacterial bloom potential this week in a few locations in the Caloosahatchee Estuary between Ft. Myers and Cape Coral (Figure 12).

Water Management Recommendations

Lake stage is in the Low 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, and the Adaptive Protocols indicate that the estuary needs water. The District recommends that the USACE follow the 2008 LORS schedule.

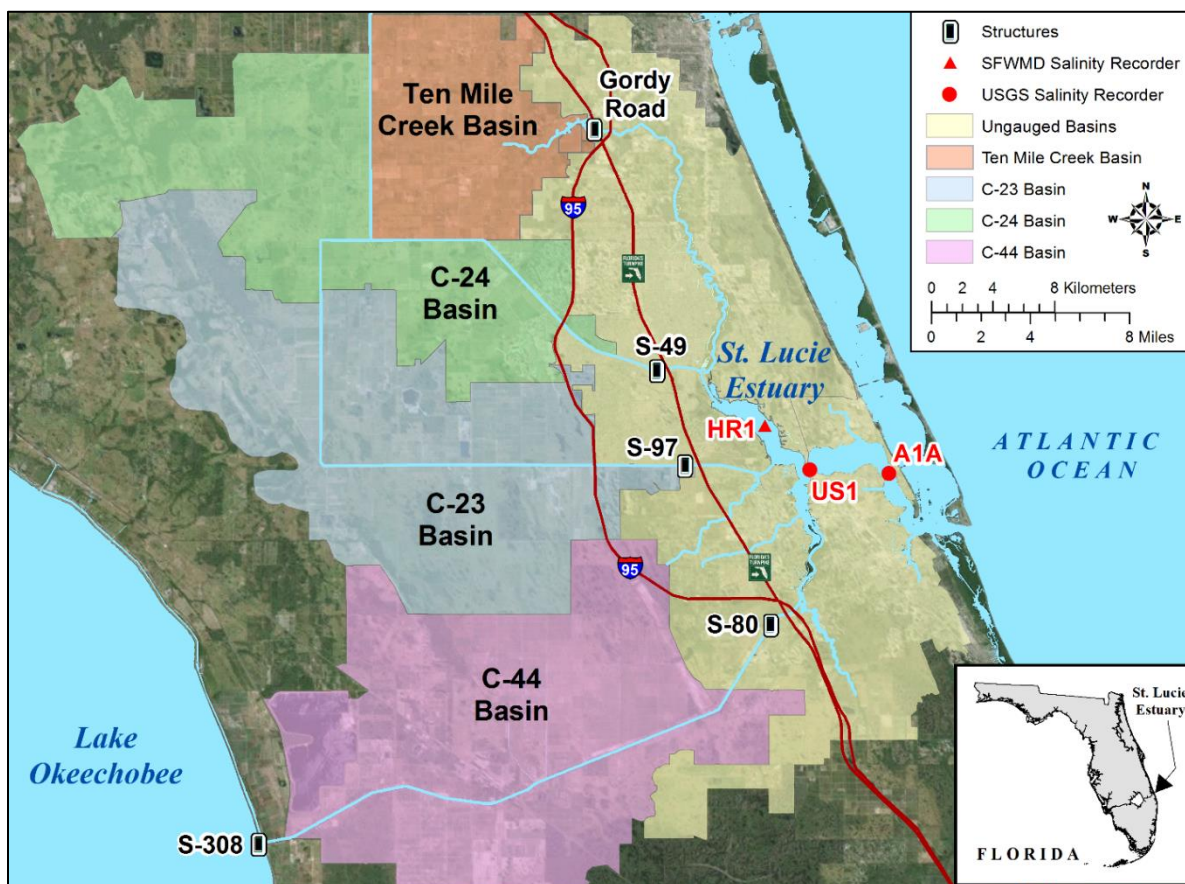


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

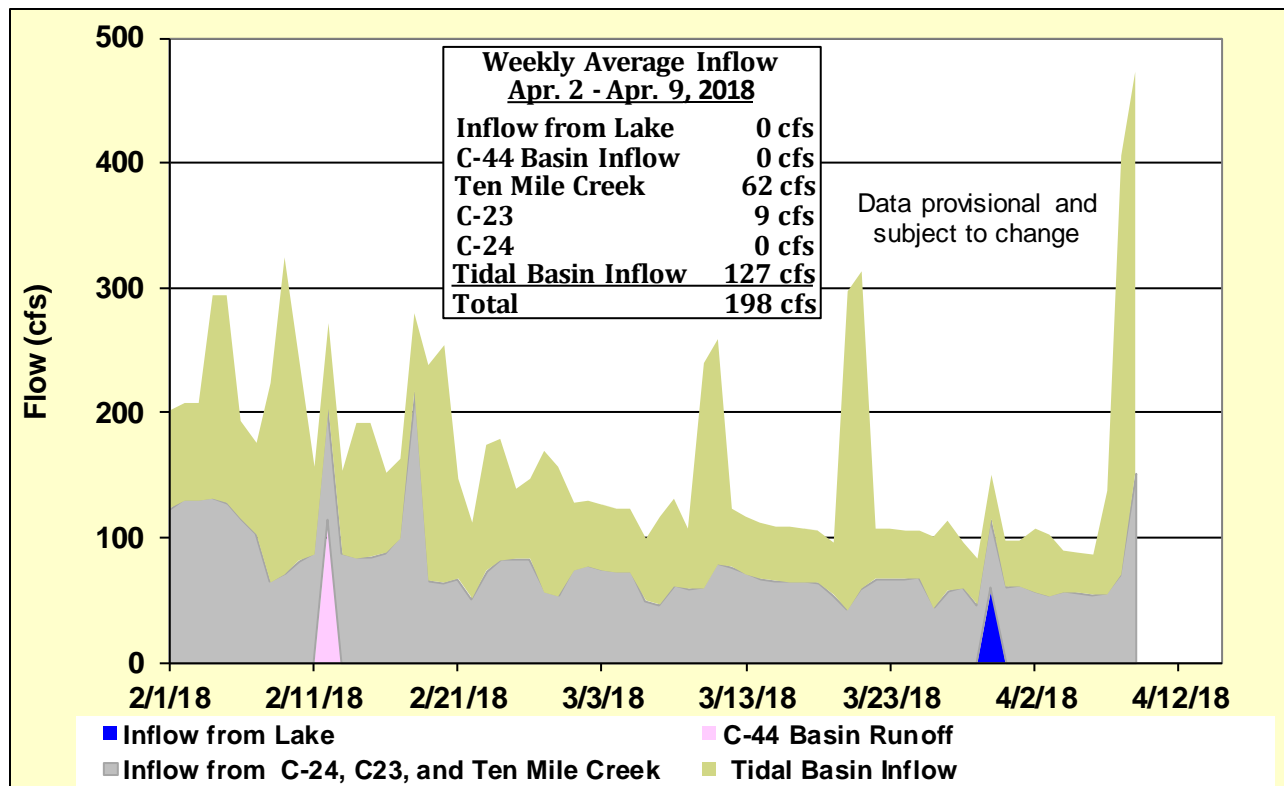


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

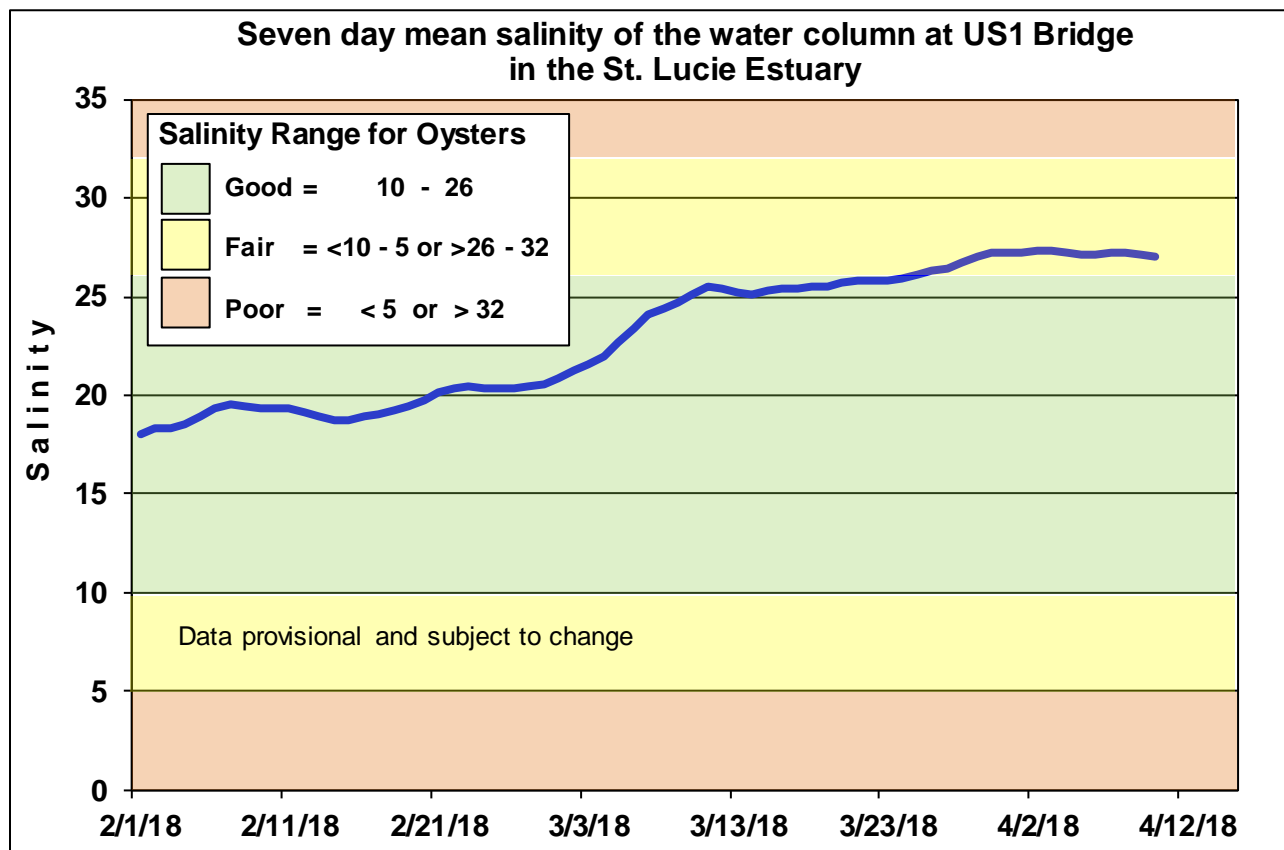


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

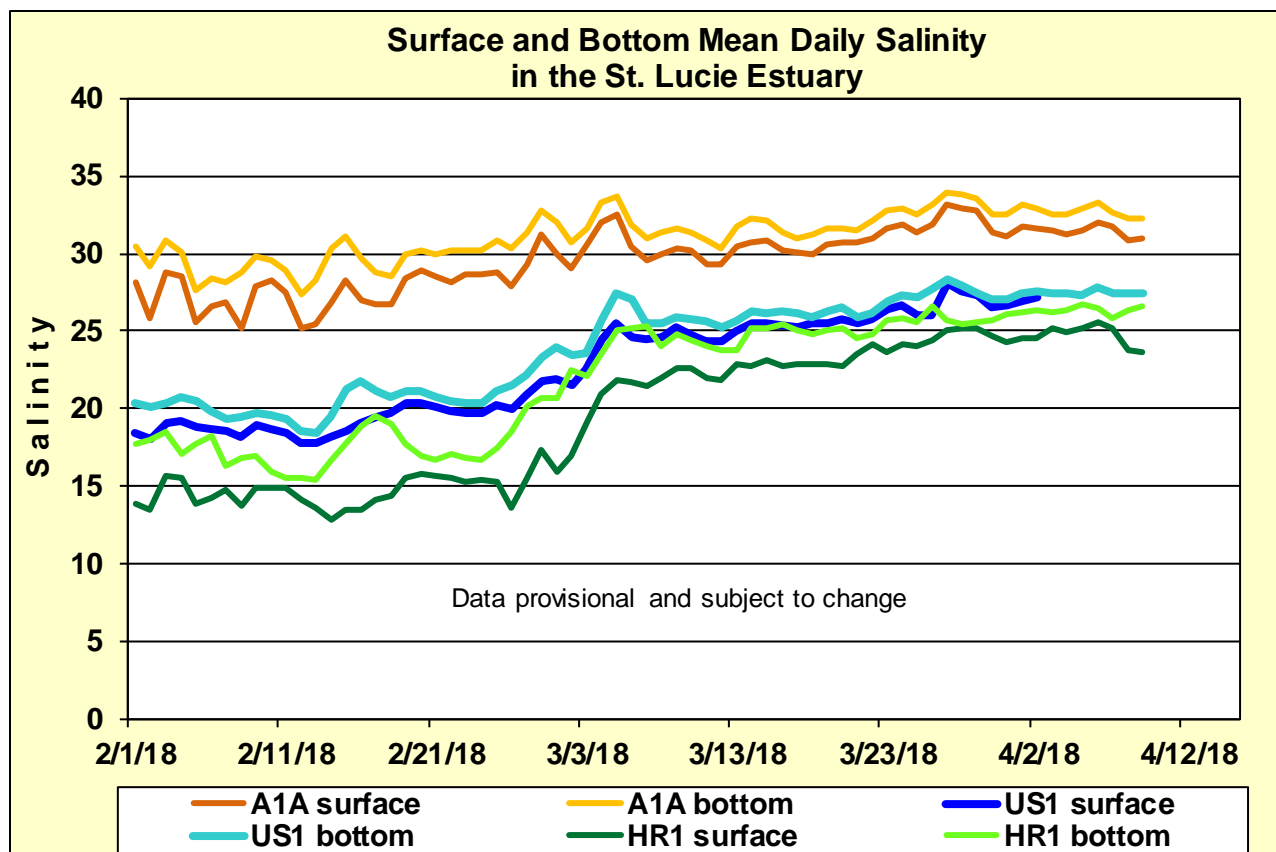


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

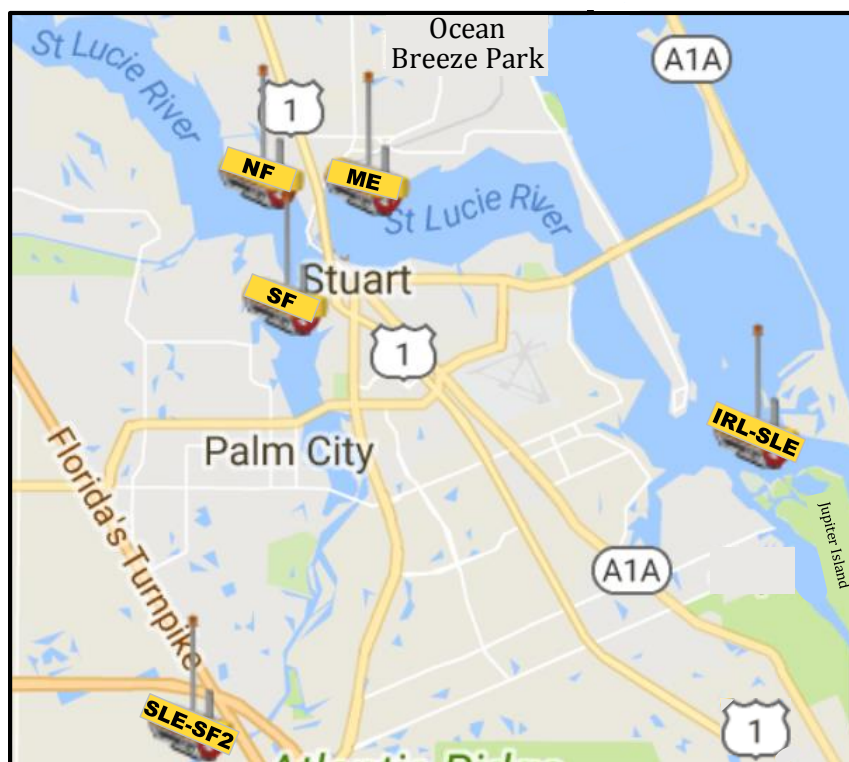


Figure 5. Location of FAU-HBOI LOBO water quality stations in the St. Lucie Estuary.

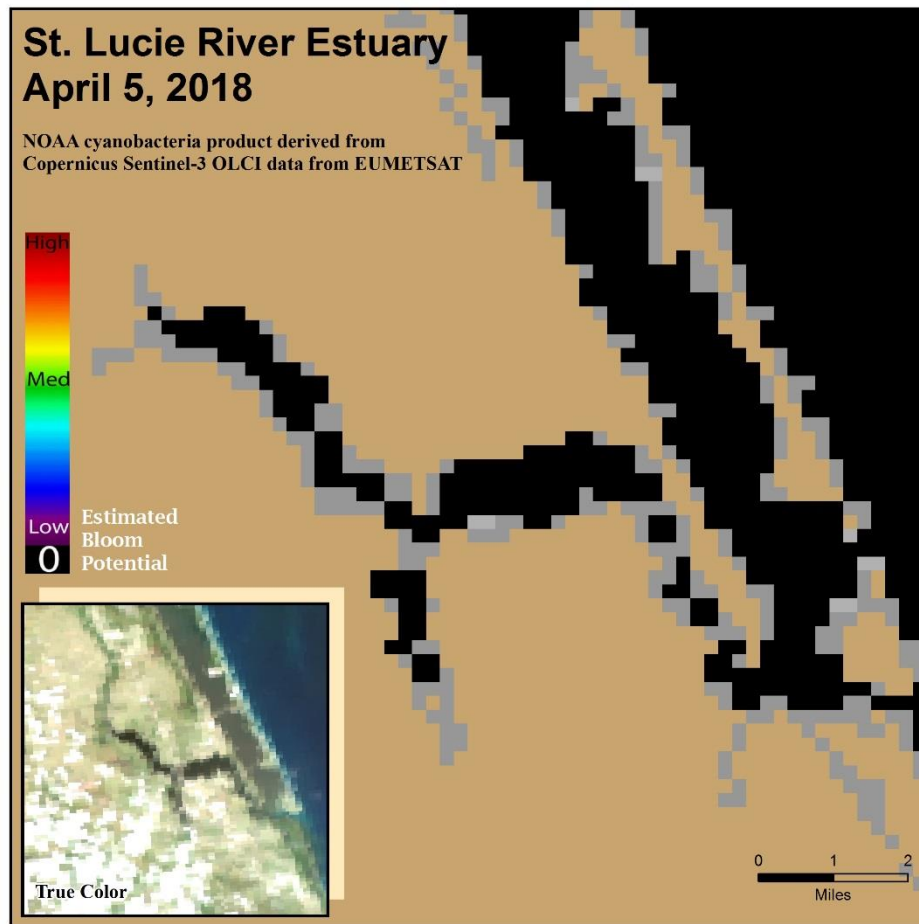


Figure 6. Sentinel 3a Satellite imagery provided by NOAA uses Ocean and Land Color Instrument (OLCI) to estimate cyanobacteria bloom potential in St. Lucie Estuary.

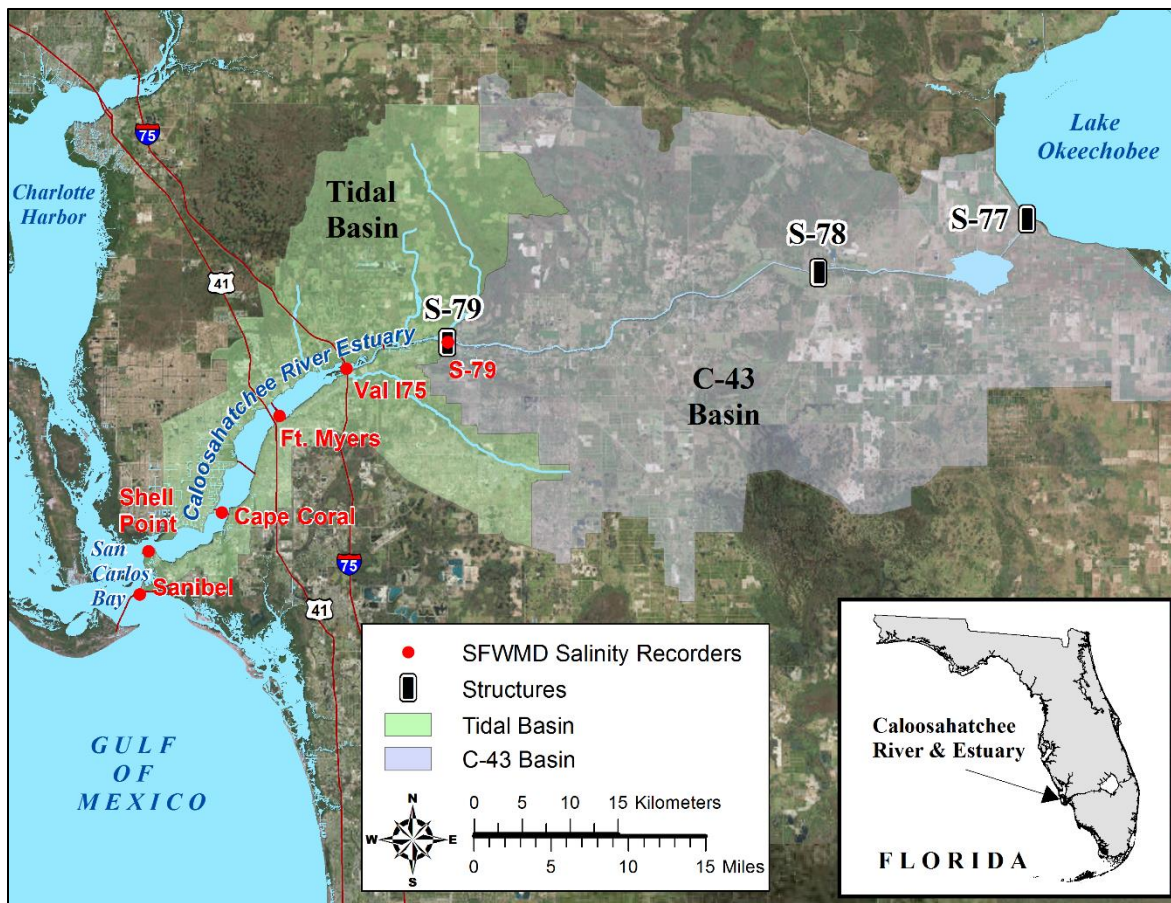


Figure 7. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

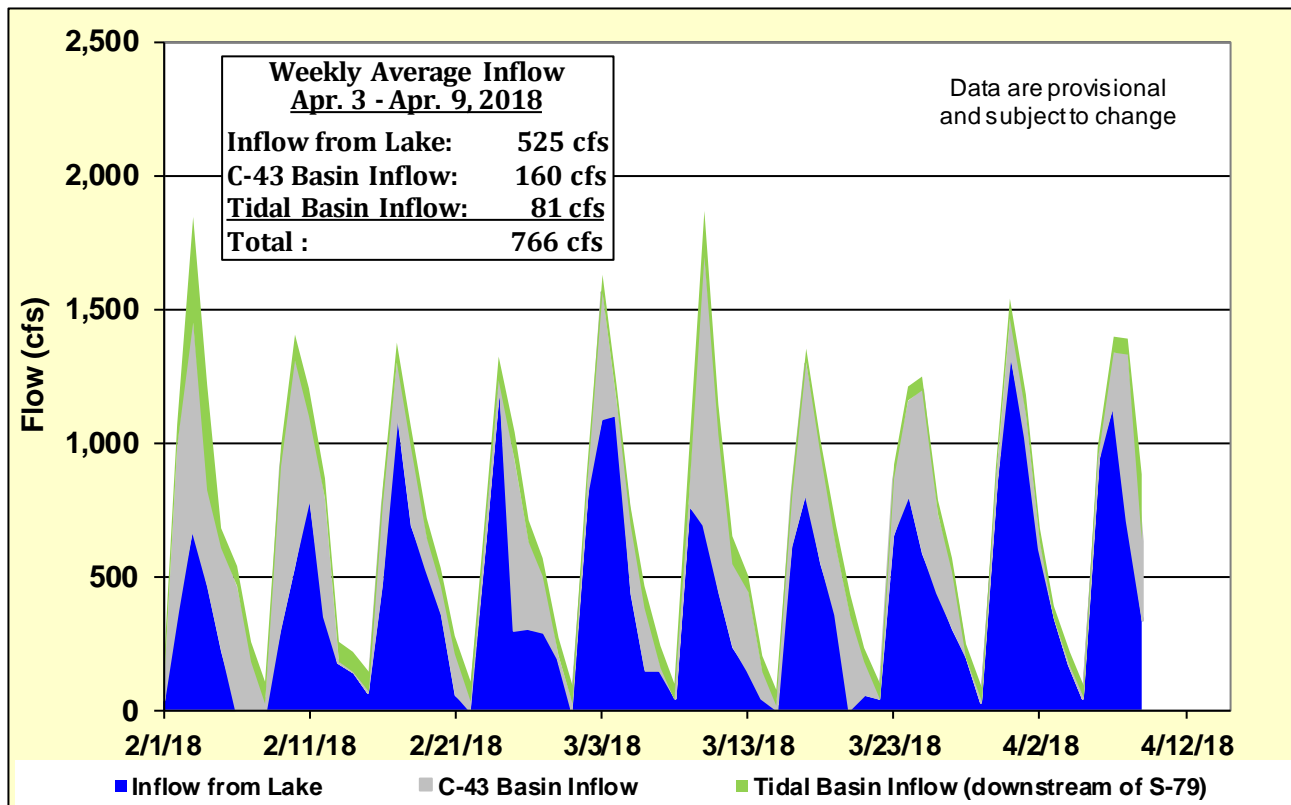


Figure 8. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

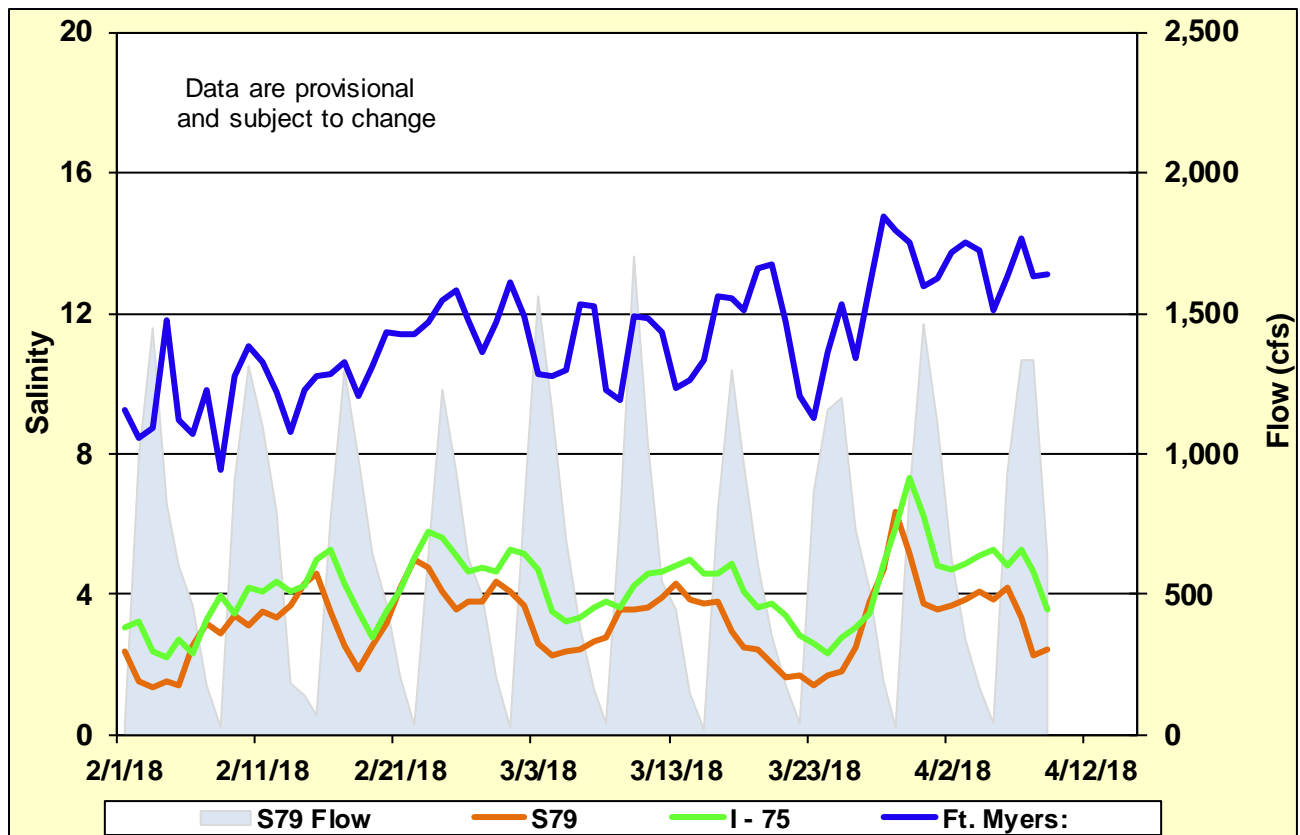


Figure 9. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

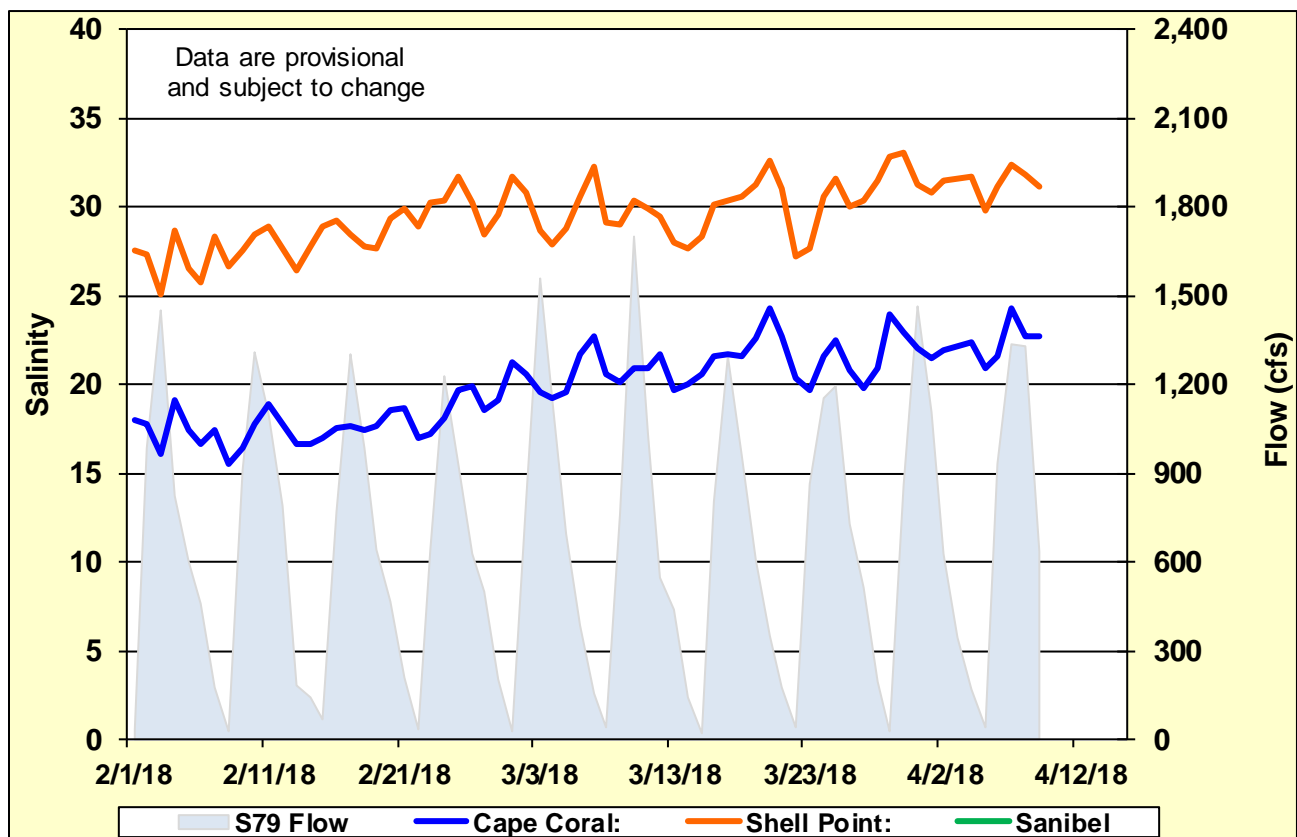


Figure 10. Daily mean flows at S-79 and salinity at lower estuary stations.

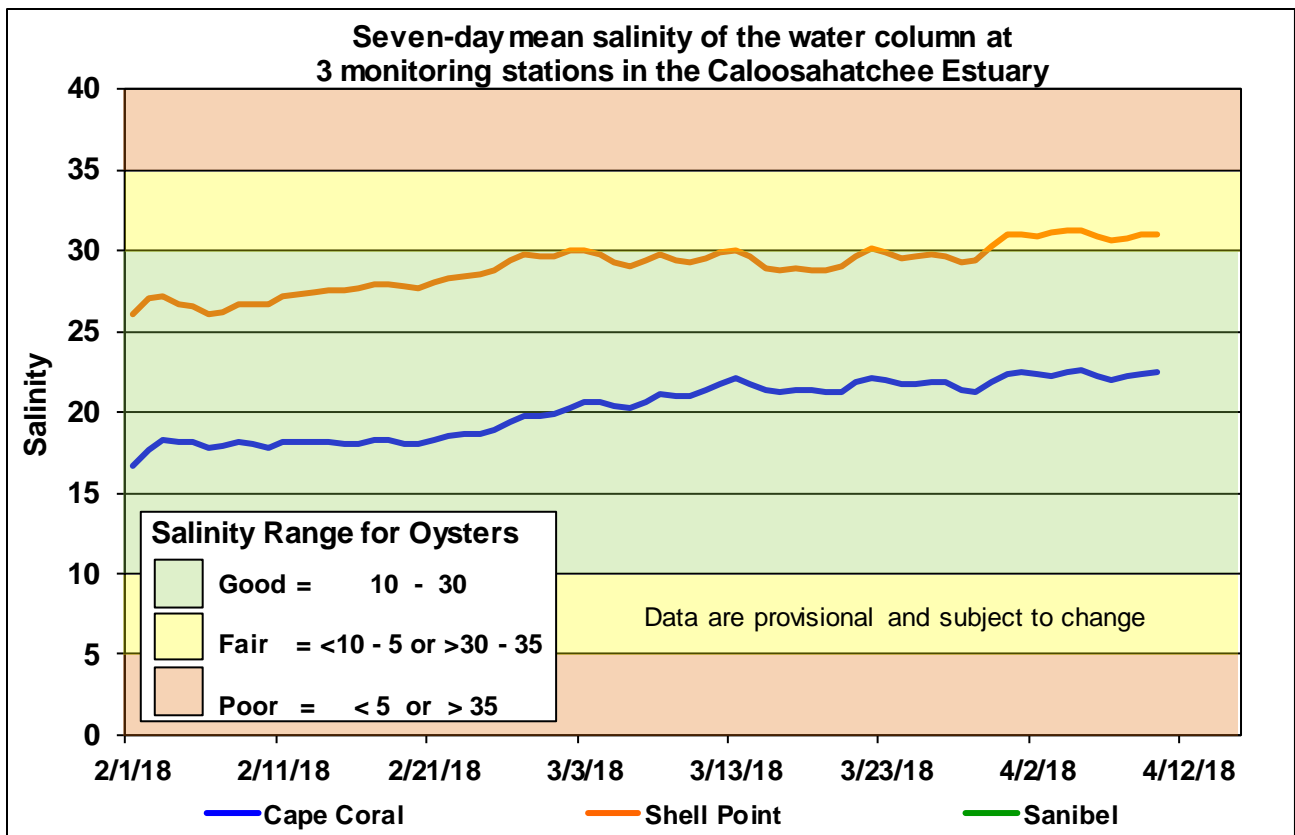


Figure 11. Seven-day mean salinity at Cape Coral Bridge, Shell Point, and Sanibel Bridge monitoring stations.

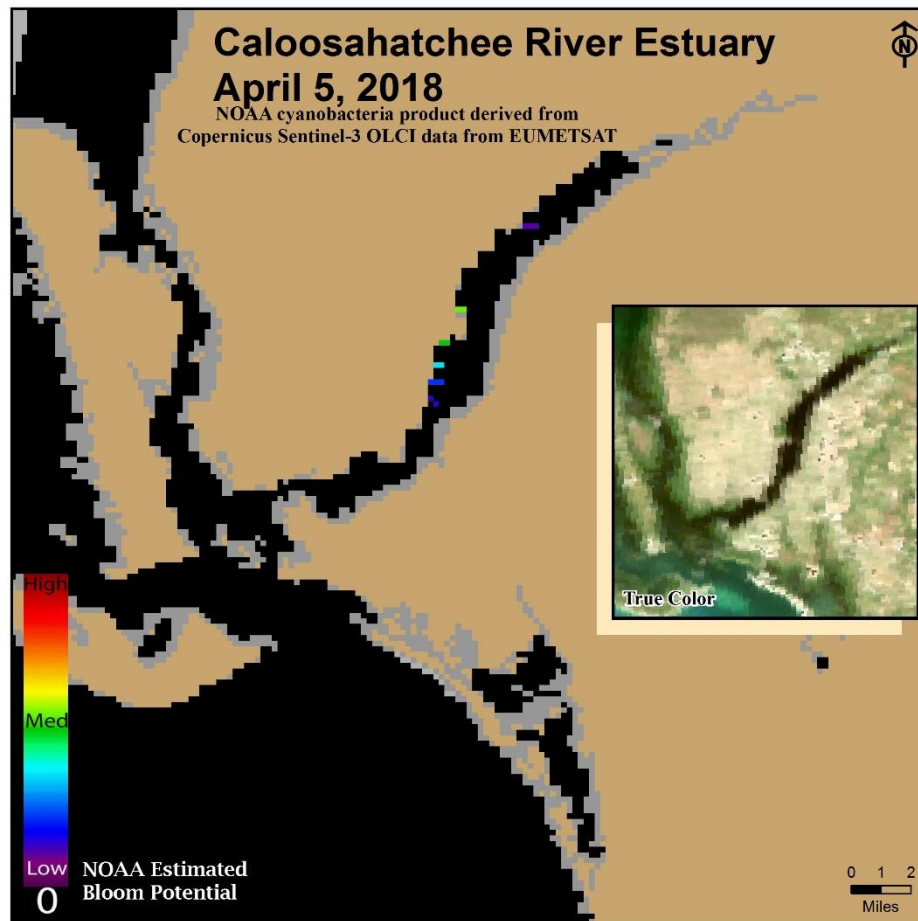


Figure 12. Sentinel 3a Satellite imagery provided by NOAA uses Ocean and Land Color Instrument (OLCI) to estimate cyanobacteria bloom potential in St. Lucie Estuary.

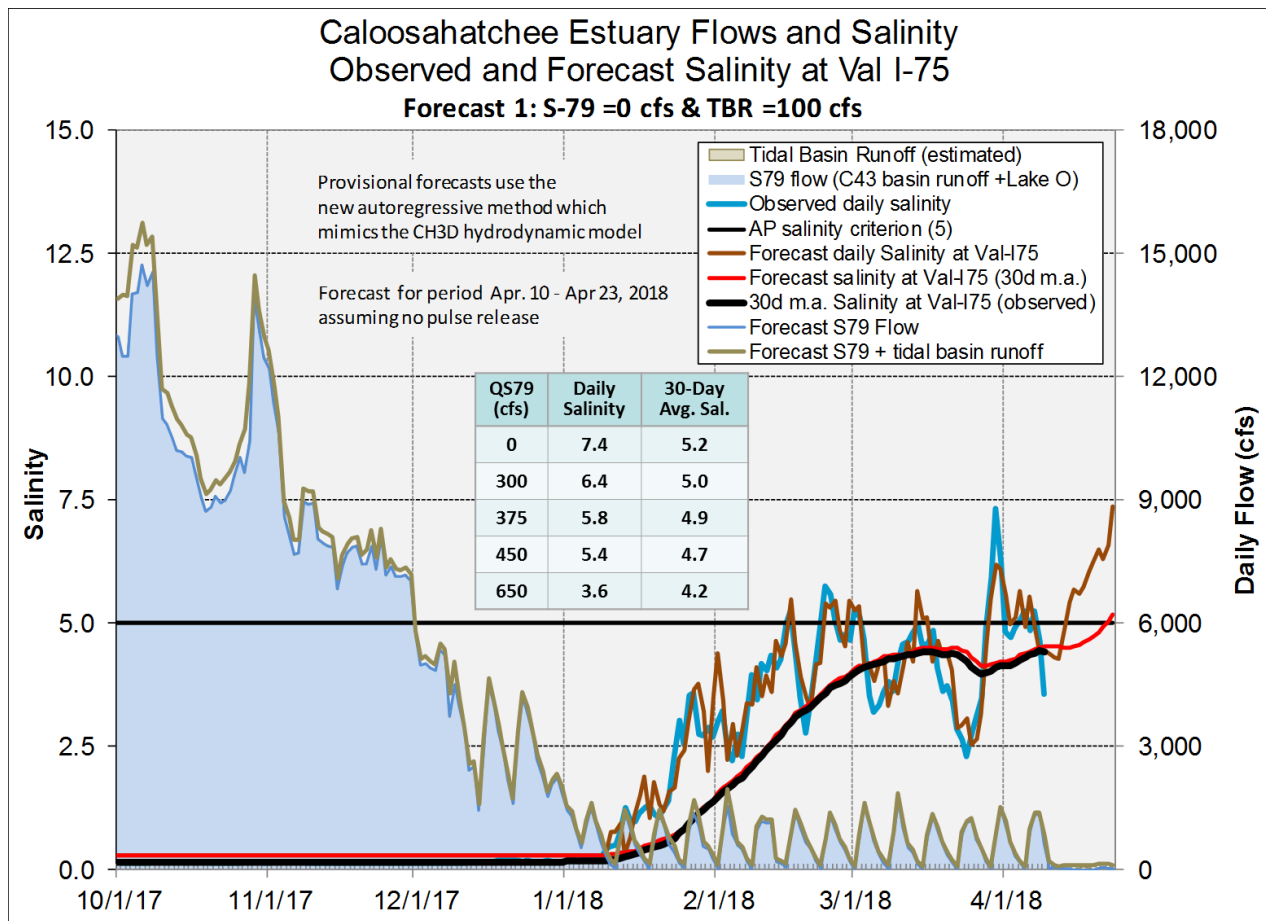
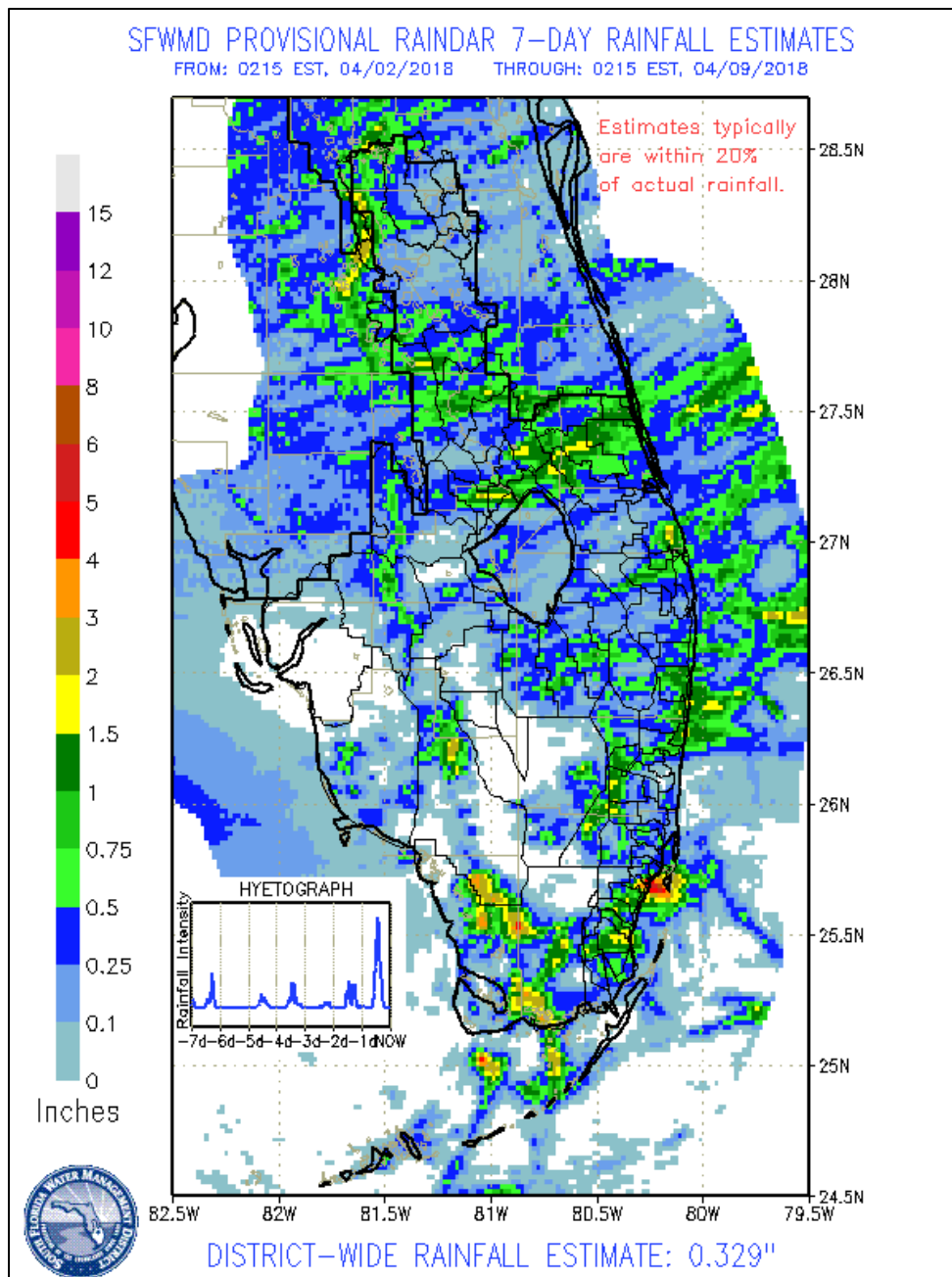


Figure 13. 14-day salinity forecast at Val I-75 assuming no releases at S-79.

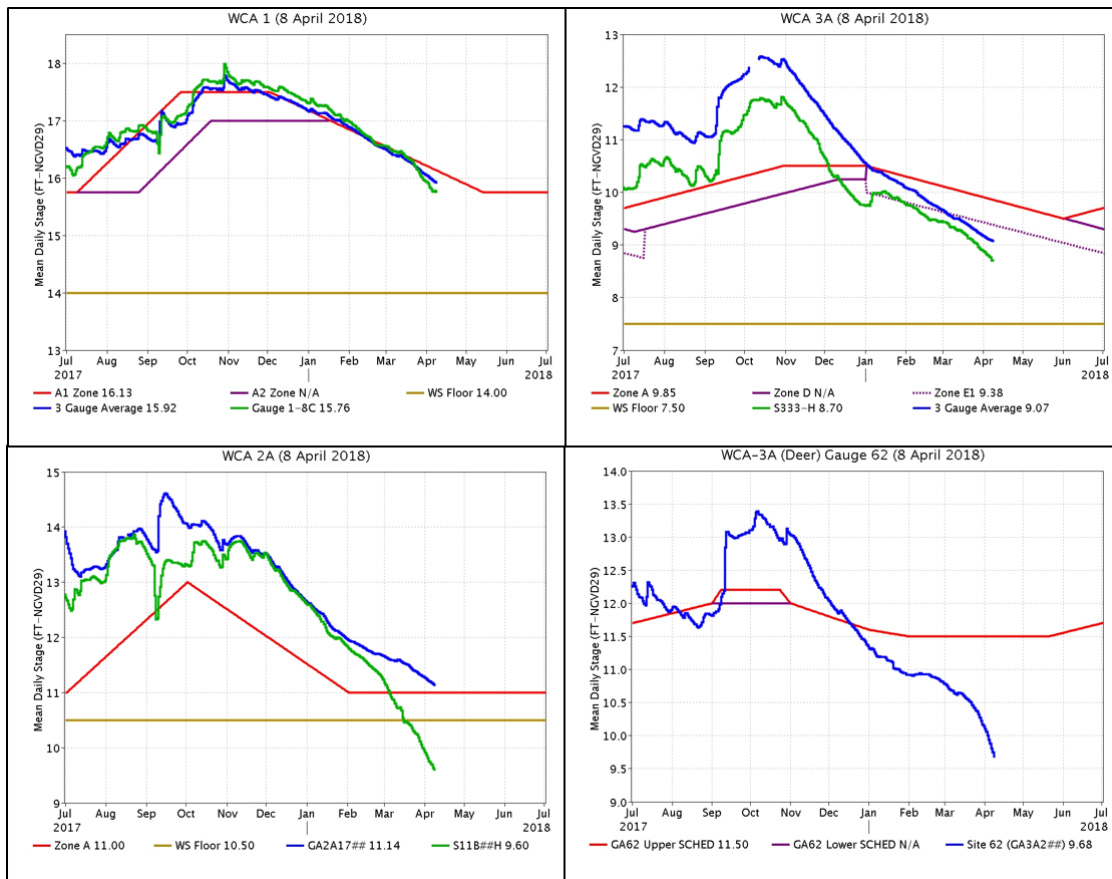
EVERGLADES

At the gauges monitored for this report, the water depth across the Everglades fell an average of 0.11 feet last week, a slower rate than the prior week. Individual gauge changes in the WCAs ranged from 0.0 feet (WCA-3B) to -0.44 feet (WCA-3A NW). Pan evaporation increased again and was estimated at 2.36 inches last week.

Everglades Region	Rainfall (Inches)	Stage Change (feet)	
WCA-1	0.36	-0.10	<div style="display: inline-block; width: 15px; height: 15px; background-color: #90EE90; border: 1px solid black; margin-bottom: 5px;"></div> Good <div style="display: inline-block; width: 15px; height: 15px; background-color: #FFFF00; border: 1px solid black; margin-bottom: 5px;"></div> Fair <div style="display: inline-block; width: 15px; height: 15px; background-color: #FF69B4; border: 1px solid black;"></div> Poor
WCA-2A	0.38	-0.12	
WCA-2B	0.78	-0.12	
WCA-3A	0.12	-0.17	
WCA-3B	0.53	-0.04	
ENP	0.51	-0.13	



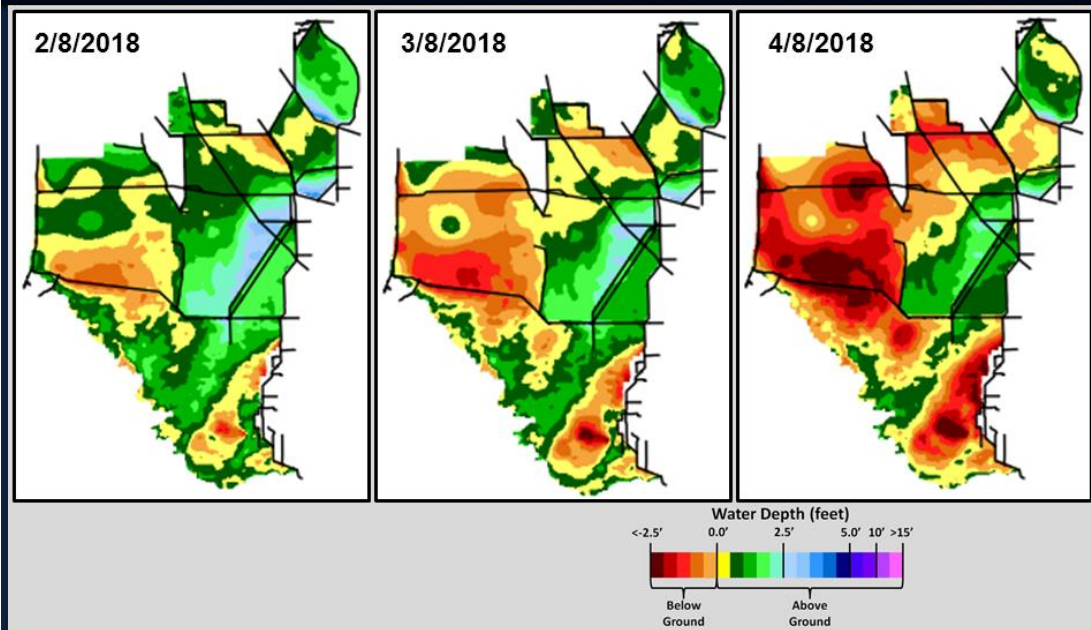
Regulation Schedules: WCA-1 three-gauge average is now trending slightly away from the Zone A1 schedule, with the three-gauge average 0.21 feet below schedule. WCA-2A canal stage at gauge S11B is 0.90 feet below the floor and continues a steep decline. WCA-3A three-gauge average stage is 0.31 feet below Zone E1 and is falling away from the regulation line. WCA-3A at gauge 62 (northwest corner) stage is 1.82 feet below the upper schedule and is falling away from regulation schedule (0.44-foot drop last week).



Water Depths and Changes: The WDAT tool for spatial interpolation of depth monthly snapshots indicate drying conditions across the Everglades generally moving from north to south within the WCAs. Northern WCA-3A continues a more extreme draw down with a significant portion of that landscape with water levels greater than 1.0 feet below ground. Comparing WDAT water levels from present, water levels dropped significantly in northwestern WCA-3A, but rose slightly in the northeastern portion of that basin (which contains the important Alley North wading bird colony). The northwestern portion of WCA-3A is currently more than a foot lower than a month ago, yet higher than one year ago.



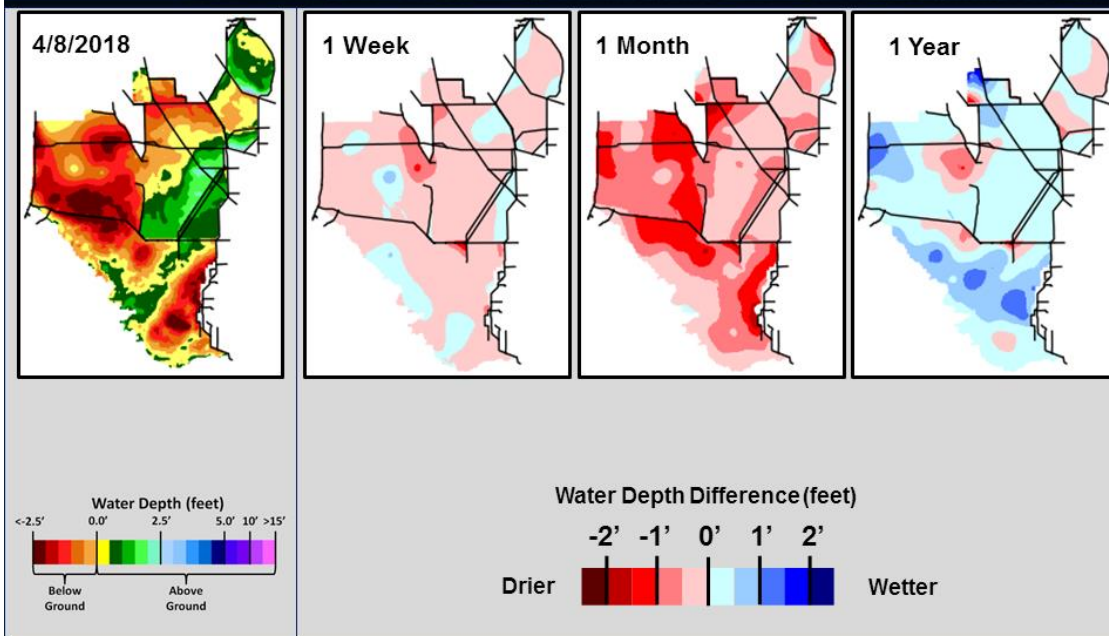
SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)



SFWDAT Everglades Difference Maps (Present - Past)



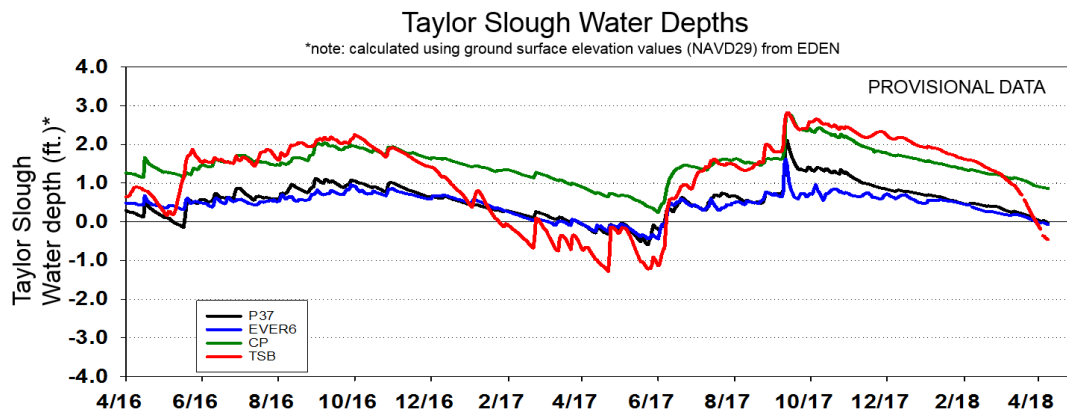
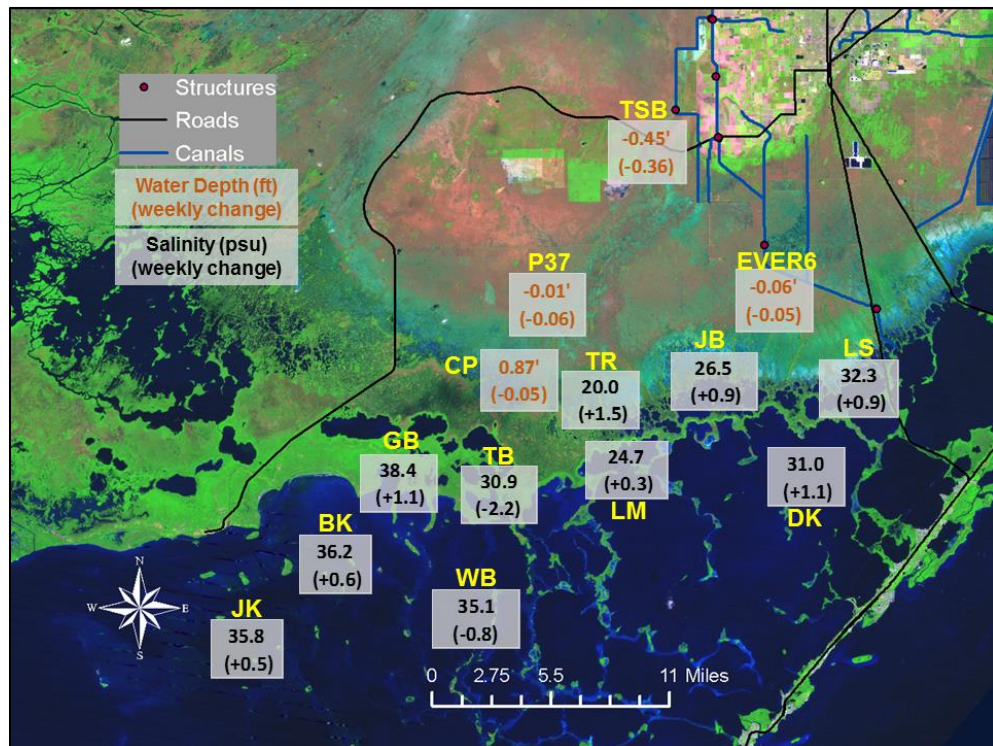
South Florida Water Depth Assessment Tool (SFWDAT)

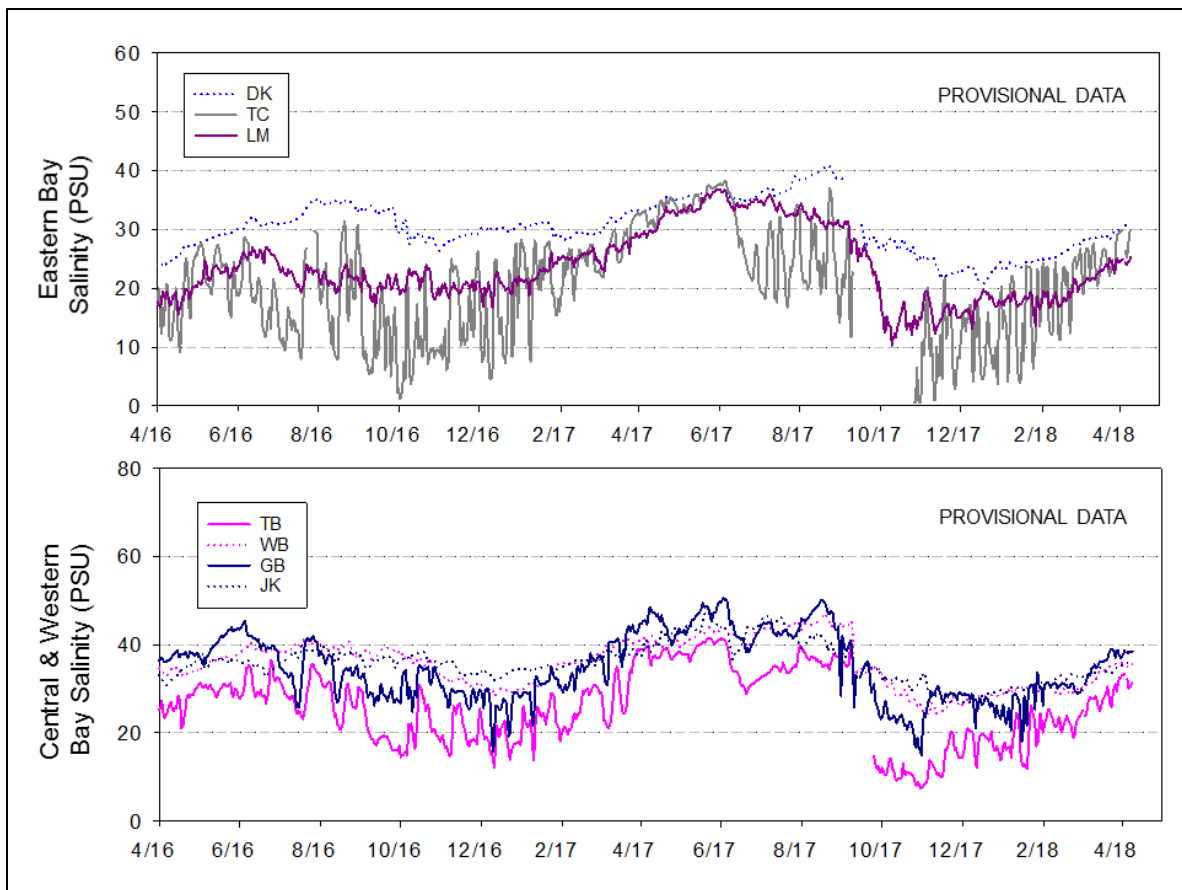
Wading bird flight conducted by SFWMD on April 9, 2018:

- Increasing number of wading birds are foraging in northern and central WCA-1
- Large mixed flocks feeding in WCA-2A, near the Alley North colony, and in WCA-3A South
- 18,000+ white ibis nesting in Alley North colony, ibis chicks are starting to hatch

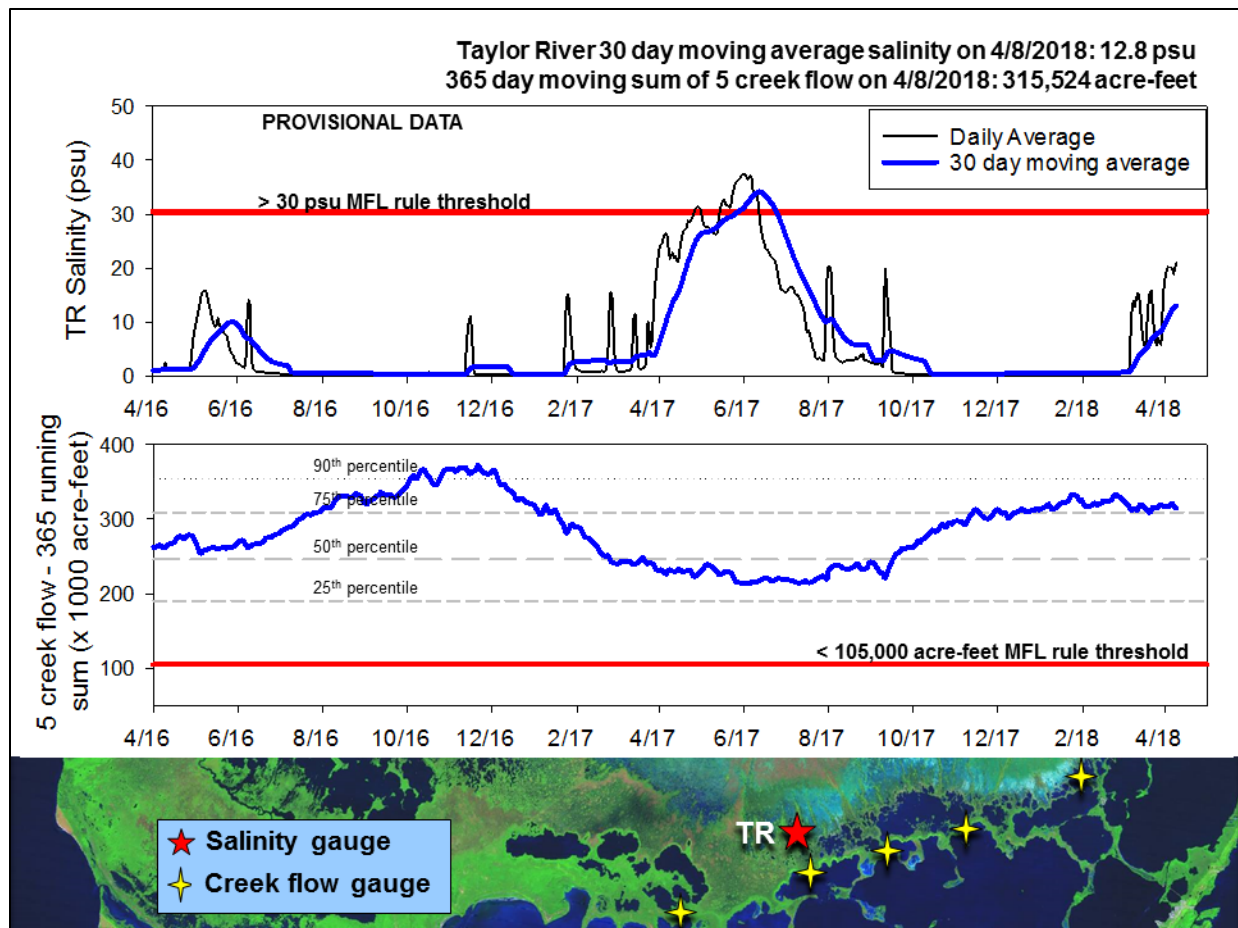
Taylor Slough Stages: A pulse of rain (average 0.3 inches) in the middle of the week halved the weekly stage decreases in Taylor Slough and the Everglades National Park panhandle (0.1 feet) compared to last week. Stage has gone below ground at all stations except CP which is below sea level. Water depths range from -0.45 feet to +0.87 feet and are 1 to 3 inches above the historical averages.

Florida Bay Salinities: Salinities in Florida Bay increased 0.4 psu on average this past week with individual station changes ranging from -2.2 psu to +1.1 psu. Salinities ranged from 25 psu in the northeast to 38 psu in the western nearshore. This range is 2 psu below to 3 psu above the historical averages.





Florida Bay MFL: Mangrove zone daily average salinity was near 20 psu all week. The 30-day moving average rose to 12.8 psu. At this time of the year, the salinity will continue to increase until the rains start. The weekly cumulative flow from the five creeks denoted by yellow stars on the map totaled about -1,700 acre-feet for the last week. The 365-day moving sum of flow from the five creeks decreased about 2,000 acre-feet over the last week to end at 315,524 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 results in slowing the recession rate in northern WCA-3A and Rotenberger Wildlife Management Area continues to have great ecological benefit. Inflows into the southern canal within WCA-2A that lessen the recession rate in the sloughs upstream would benefit wading bird foraging conditions in that region. The continuation of inflows into the northern region of WCA-2A generates ecological benefit by protecting the peat soils in that region and lessening the risk of damaging wildfires. Inflows into Taylor Slough continue to provide ecological benefit by slowing the recession rate in that region. More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

SFWMD Everglades Ecological Recommendations, April 10th, 2018 (red is new)

Area	Weekly change	Cause(s)	Recommendation	Reasons
WCA-1	Stage decreased by 0.10'	Rainfall, ET, management	Maintain current recession rates, following regulation schedule.	Foster conditions for wildlife and optimal wading bird foraging.
WCA-2A	Stage decreased by 0.12'	Rainfall, ET, management	Maintain inflows to the northern region and raise southern canal stage	Protect peat soils and foster conditions for optimal wading bird foraging.
WCA-2B	Stages decreased by 0.12'	Rainfall, ET, management	Maintain depths at regulation schedule.	Protect upstream/downstream habitat and wildlife. Foster conditions for wading bird foraging.
WCA-3A NE	Stages decreased by 0.03'	Rainfall, ET, management	maintain current recession rates, water management that provides inflows generates ecological benefit	Protect peat soils and nesting habitat.
WCA-3A NW	Stages decreased by 0.44'	Rainfall, ET, management	Slow current recession rates to between 0.05 and 0.09 feet per week, water management that provides inflows generates ecological benefit	
Central WCA-3A S	Stages decreased by 0.10'	Rainfall, ET, management	Maintain moderate 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 0.12'	Rainfall, ET, management		
WCA-3B	Stages decreased by 0.04'	Rainfall, ET, management	Maintain depths at regulation schedule.	Protect habitat and wildlife.
ENP-SRS	Stages decreased by 0.13'	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 -0.05' to -0.36'	Rain, ET, inflows	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
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.