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 29, 2018

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Areas of heavy rain are forecast to occur south and east today. The remnant low of Alberto is moving northward through Alabama and a tail of moisture associated with the system extends southward along the Florida peninsula. Favorable upper level wind flow and daytime heating should tap this moisture and generate showers and thunderstorms over portions of the District today with heaviest activity expected along the east coast and across the Kissimmee Valley. Drier air will begin working its way in from the east on Wednesday so expect a decrease in daily thunderstorm coverage with activity focused over the interior and north Wednesday afternoon. A drier pattern of below average afternoon thunderstorm activity should then begin Thursday and continue through the weekend. Activity will be focused west and north Thursday and Friday and then a trough moving into central Florida will shift the focus to the interior and east Saturday through Monday.

Kissimmee

Tuesday morning stages were 55.0 feet NGVD (0.1 feet above schedule) in East Lake Toho, 52.1 feet NGVD (at schedule) in Toho, and 49.6 feet NGVD (0.5 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.3 feet NGVD at S-65A and 27.2 feet NGVD at S-65D. Mean recession rates for the last seven days were 0.44 and 0.20 feet per week in East Lake Toho and Toho, respectively (preferred range of 0.15 to 0.2 feet per week); the recession in Kissimmee-Cypress-Hatchineha ended due to recent rainfall, with a low stage of 48.92 feet NGVD on May 13. Tuesday morning discharges were: 1,263 cfs at S-65, 1,142 cfs at S-65A, and 1,526 cfs at S-65E. Dissolved oxygen (DO) concentration in the Kissimmee River averaged 5.1 mg/L for the week. Kissimmee River mean floodplain depth on Sunday was 0.57 feet. A recommendation was made on May 22 to hold stage in Kissimmee-Cypress-Hatchineha at approximately 49.5 ft NGVD until June 1; the purpose was to reduce impacts of rising water on DO in the Kissimmee River and to limit stage reversal in Kissimmee-Cypress-Hatchineha to less than 1.0 feet to protect snail kite nests. A recommendation was then made on May 29 to begin implementation of the 2018 Wet Season Discharge Plan for S-65/S-65A on June 1; the purpose of this recommendation is to provide variable flow from S-65/S-65A to balance Kissimmee River and Headwaters Lakes objectives including Kissimmee River floodplain inundation, moderated rates of change in discharge, and constrained rate of stage rise in the lakes.

Lake Okeechobee

Lake Okeechobee stage is 14.02 feet NGVD having increased 0.98 feet over the past two weeks. There was considerable rainfall over the Lake and its watershed beginning approximately May 13, bringing the first substantial stage reversal to the marsh since late October 2017. The Lake was below 13.0 feet NGVD for just 10 days and is rising too quickly for many recovering submerged aquatic vegetation (SAV) communities to stay in optimal light conditions. The seasonal low for the 2018 SAV growing

season of 12.83 feet NGVD was the third highest since 2011, and the third time in six years that stage did not reach the bottom of the preferred stage envelope (12.5 – 15.5 feet NGVD). Due to record rainfall in May, the SAV coverage on the Lake will likely remain at minimal levels throughout the growing season and well into next year, prolonging impacts from high stages in 2016 and Hurricane Irma in 2017. Additionally, wading bird foraging activity has essentially ceased on the Lake, falling to under 300 individuals compared to nearly 15,000 at this time last year when water levels were still quickly receding. The remaining colonies now appear dependent on foraging habitat outside the Lake to support nesting activity.

Estuaries

Total inflow to the St. Lucie Estuary averaged 8,114 cfs over the past week with no flow coming from Lake Okeechobee. Salinity decreased throughout the estuary. The seven-day average salinity at the US1 Bridge is in the poor range for adult eastern oysters. The highest weekly ranges of chlorophyll *a* were 6.68 – 9.38 µg/L in the Middle Estuary. The lowest weekly ranges of dissolved oxygen levels were 4.62 – 6.76 mg/L in the North Fork. Total inflow to the Caloosahatchee Estuary averaged 4,239 cfs over the past week with no flow coming from the Lake. Salinity decreased throughout the estuary. The 30-day moving average surface salinity is 2.8 at Val I-75 and 9.4 at Ft. Myers. Salinity conditions between Val I-75 and Ft. Myers are good for tape grass. Salinity conditions are in the good range for adult eastern oysters at Cape Coral and at Shell Point. The highest weekly ranges of chlorophyll *a* at Ft. Myers were 3.23 – 24.93 µg/L. The lowest weekly ranges of dissolved oxygen levels at Ft. Myers were 1.83 – 7.70 mg/L. Given the current estuarine conditions, there are no ecological benefits associated with freshwater releases from Lake Okeechobee to the estuaries.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs did not receive Lake releases. The total amount of Lake releases sent to the STAs/FEBs in WY2019 (since May 1, 2018) is approximately 3,800 acre-feet. Most STA cells are above target depths, except many of the STA-5/6 cells which are below target following a period of dryout. Operational restrictions are in place for vegetation rehabilitation in STA-1E, STA-2, and STA-3/4. The nests of Migratory Bird Treaty Act (MBTA) protected species have been observed in STA-5/6. Due to recent basin runoff, it is recommended that no Lake Releases be sent to the STAs/FEBs this week.

Everglades

Water depths in WCA-2A have risen quickly; stage at gauge 2-17 increased 1.6 feet over the last two weeks and is well above schedule. Water depths across WCA-3A have also increased. In the northwest at gauge 62, stages have risen 1.65 feet over the last two weeks and the depth is about 0.99 feet. In the northeast at gauge 63, stages have risen 1.94 feet and the depth is about 1.72 feet. In the central region at gauge 64, stages have risen 1.07 feet and the depth is about 1.65 feet. In the southern region at gauge 65, stages have risen 1.12 feet and the depth is about 2.21 feet. In Taylor Slough, stage changes this week ranged from +0.55 to +0.91 feet; water depths in all areas are above ground and are 12 to 20 inches above the historical averages. Salinities decreased in Florida Bay and the mangrove zone.

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.71 inches of rainfall in the past week and the Lower Basin received 1.21 inches (SFWMD NEXRAD 5/28/2018).

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: 5/29/2018

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)						
							5/27/18	5/20/18	5/13/18	5/6/18	4/29/18	4/22/18	4/15/18
Lakes Hart and Mary Jane	S-62	121	LKMJ	59.5	R	59.6	-0.1	0.0	-0.2	-0.2	-0.2	-0.2	-0.2
Lakes Myrtle, Preston, and Joel	S-57	14	S-57	60.1	R	60.1	0.0	0.0	-0.2	-0.1	-0.1	0.0	0.0
Alligator Chain	S-60	116	ALLI	62.1	R	62.1	0.0	0.0	0.0	0.0	-0.1	0.1	0.0
Lake Gentry	S-63	165	LKGT	59.7	R	59.6	0.1	0.2	0.0	0.0	0.0	0.0	0.1
East Lake Toho	S-59	551	TOHOE	55.0	R	55.2	-0.2	-0.1	-0.3	-0.4	-0.6	-0.7	-0.8
Lake Toho	S-61	1,330	TOHOW, S-61	52.1	R	52.2	-0.1	-0.2	-0.3	-0.4	-0.6	-0.7	-0.7
Lakes Kissimmee, Cypress, and Hatchineha	S-65	1,243	KUB011, LKIS5B	49.6	R	49.2	0.4	0.1	-0.7	-0.8	-0.8	-0.9	-1.0

[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: **5/29/2018**

Metric	Location	1-Day Average	Average for the Preceeding 7-Days[1]									
		5/27/2018	5/27/18	5/20/18	5/13/18	5/6/18	4/29/18	4/22/18	4/15/18	4/8/18	4/1/18	3/25/18
Discharge (cfs)	S-65	1,278	1,243	771	357	343	348	392	406	340	376	361
Discharge (cfs)	S-65A	1,147	1,119	614	252	248	246	270	313	257	246	245
Discharge (cfs)	S-65D[2]	1,147	1,495	781	323	304	341	362	384	301	324	329
Stage (feet NGVD)	S-65D[2]	26.85	26.08	25.72	25.83	25.89	25.81	25.77	25.86	25.77	25.86	25.80
Discharge (cfs)	S-65E[2]	1,147	1,623	824	290	263	304	318	355	297	325	348
Discharge (cfs)	S-67	285	298	332	71	0	0	0	1	0	0	0
DO (mg/L)[3]	Phase I river channel	4.3	5.1	5.7	7.5	7.9	7.1	7.2	6.2	6.8	7.5	8.2
Mean depth (feet)[4]	Phase I floodplain	0.57	0.46	0.17	0.06	0.06	0.06	0.07	0.07	0.06	0.07	0.09

[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)

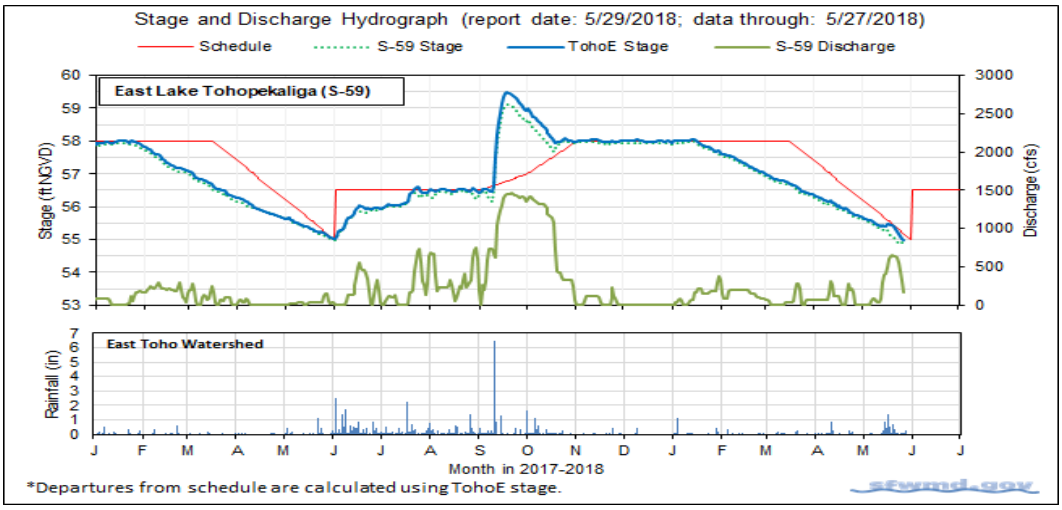


Figure 1.

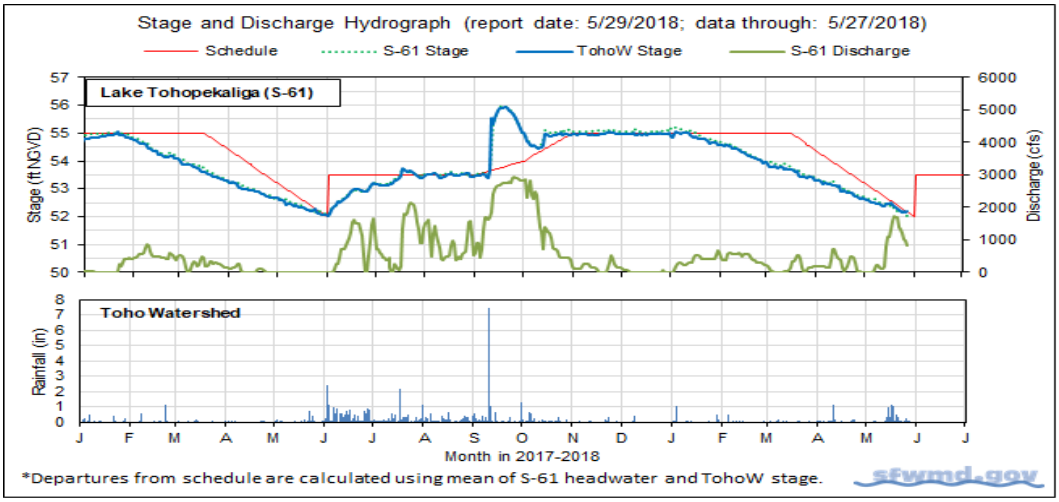


Figure 2.

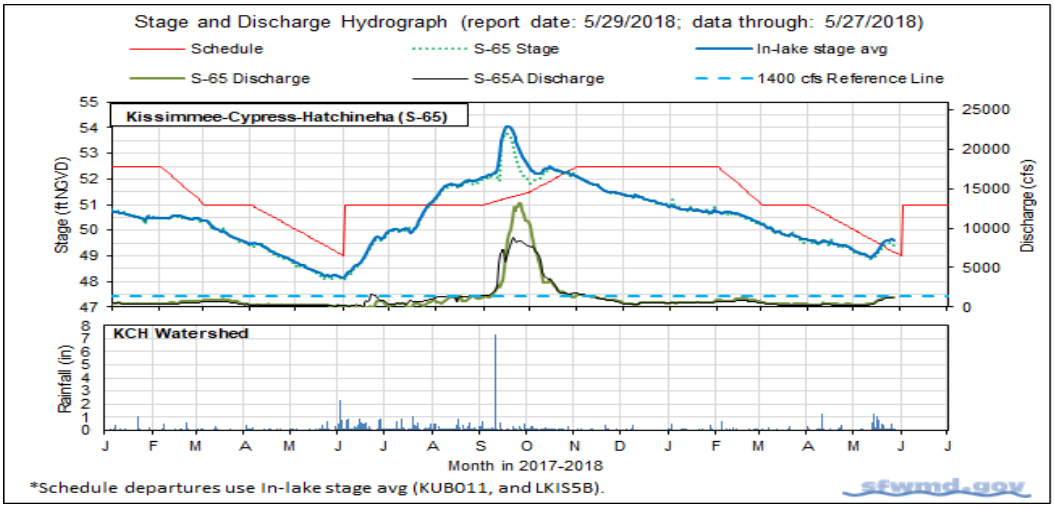


Figure 3.

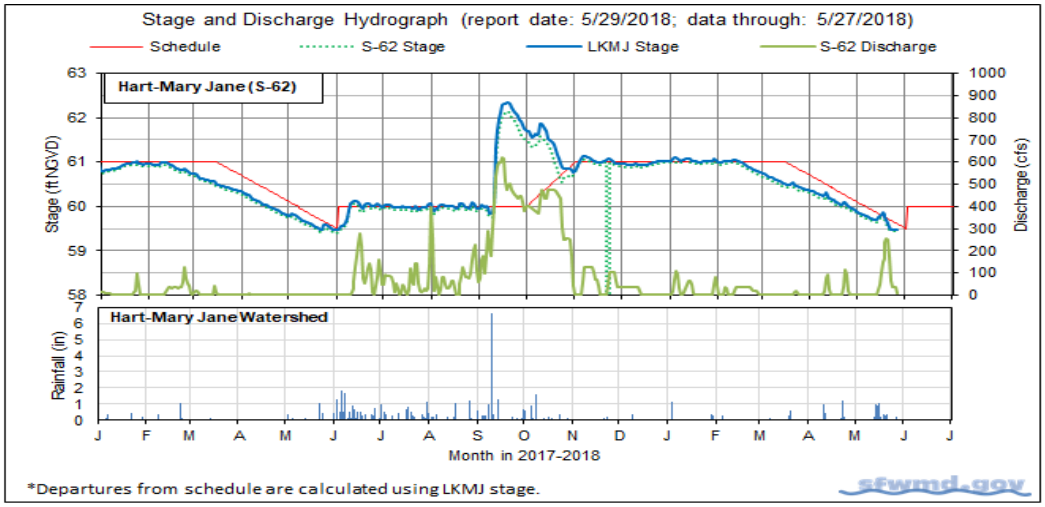


Figure 4.

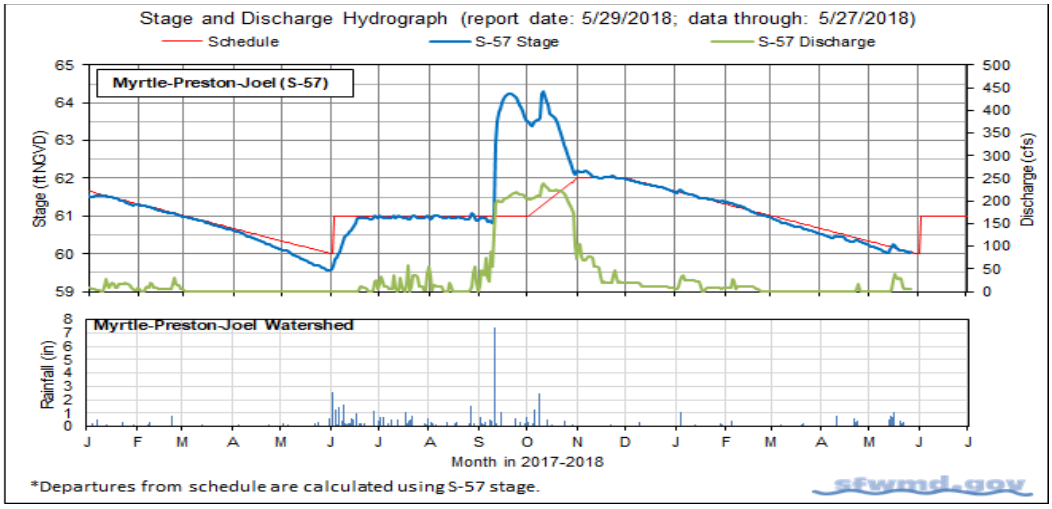


Figure 5.

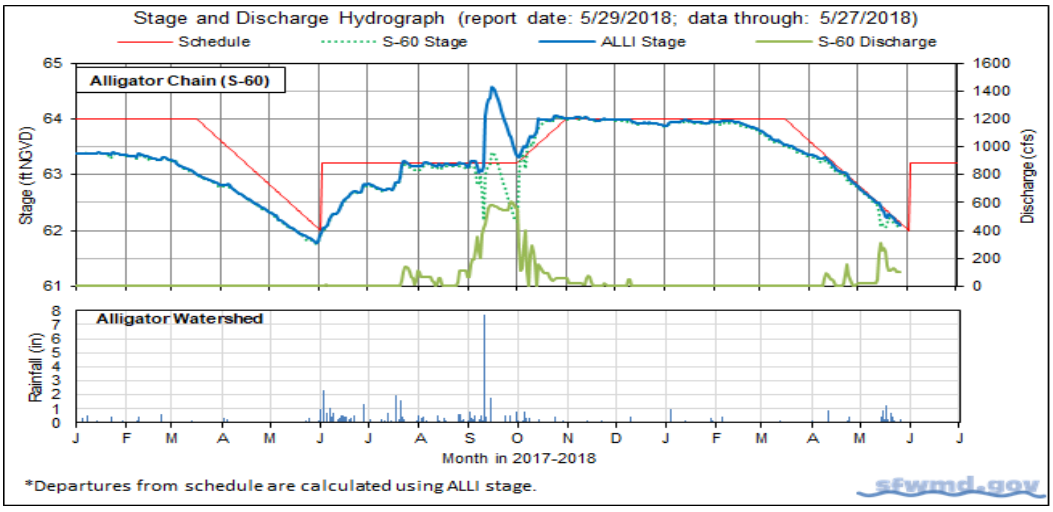


Figure 6.

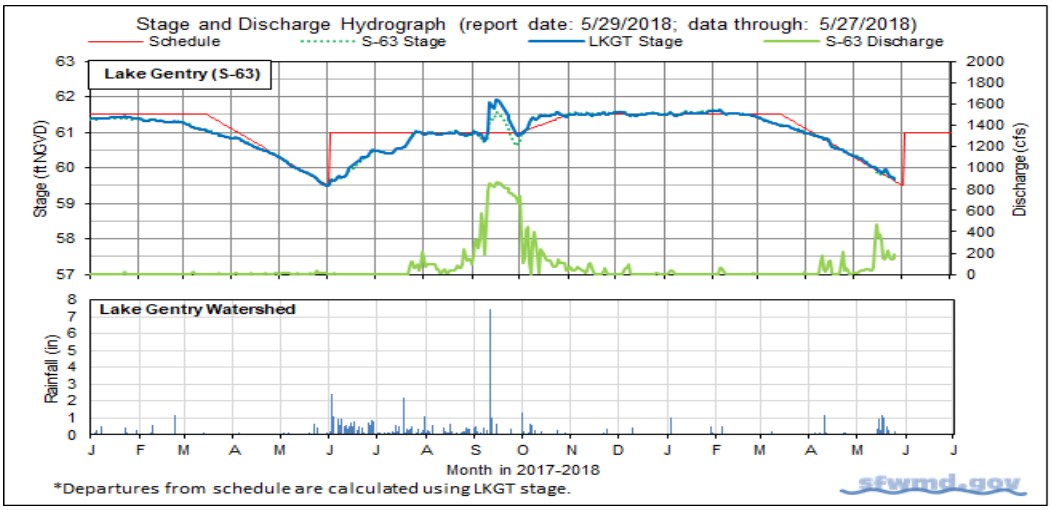


Figure 7.

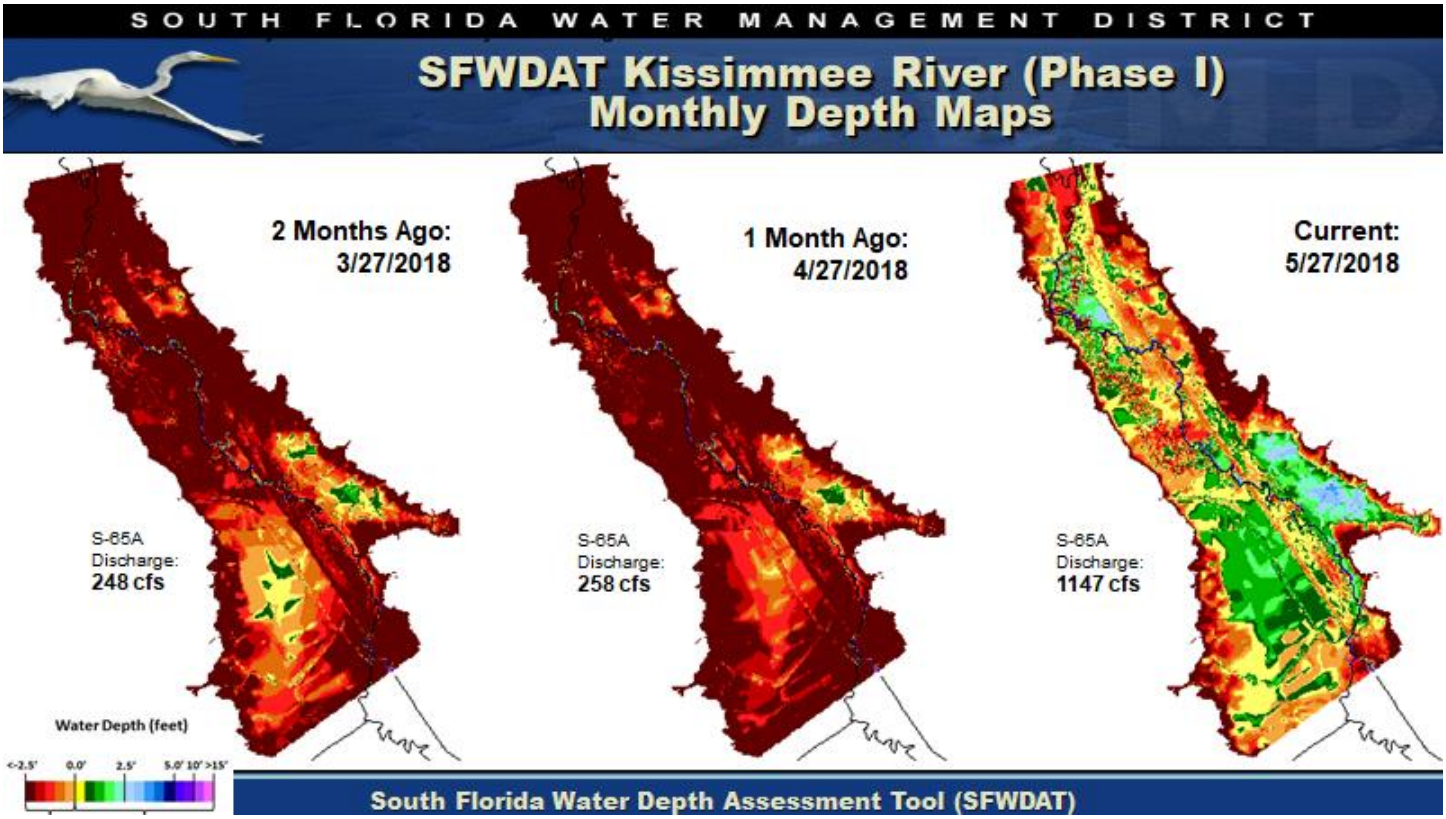


Figure 8. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

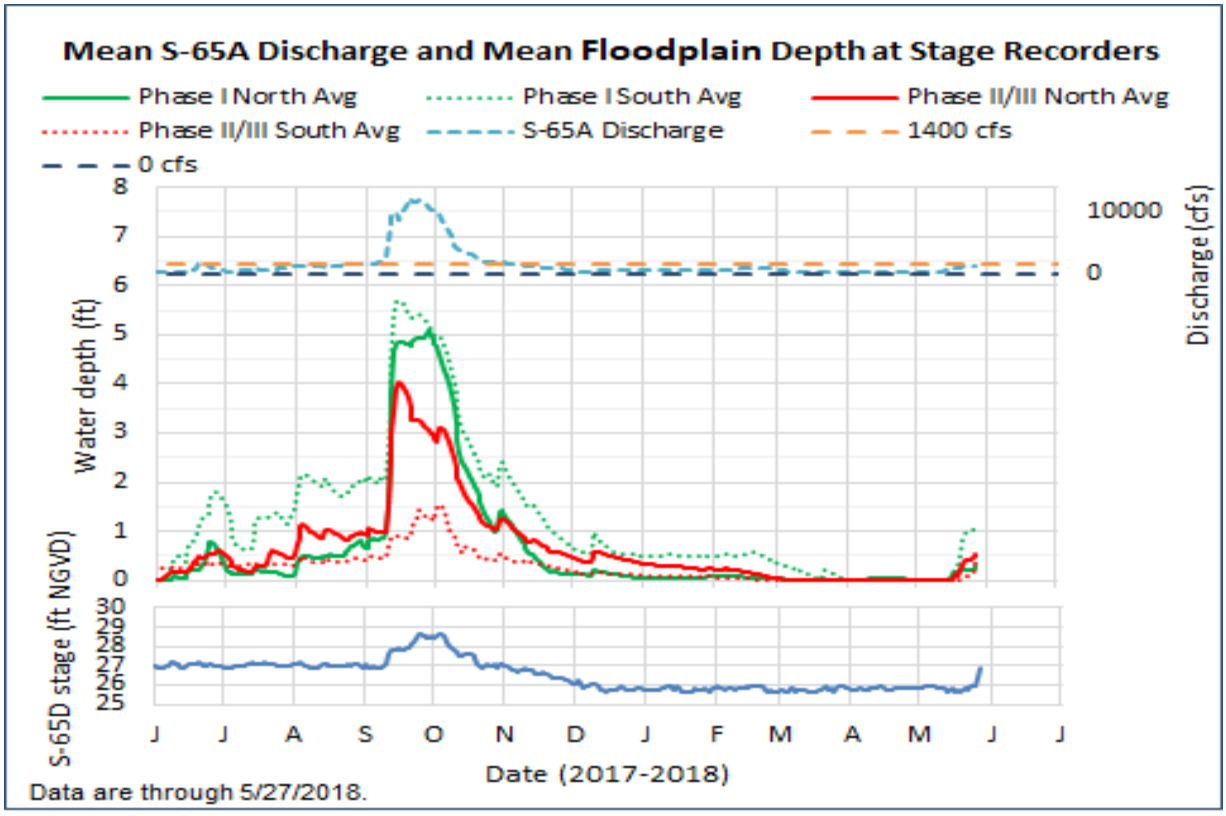


Figure 9. Mean water depth at stage recorders in the northern Phase I, southern Phase I, northern Phase II/III, and southern Phase II/III areas in relation to the S-65A discharge and S-65D headwater stage.

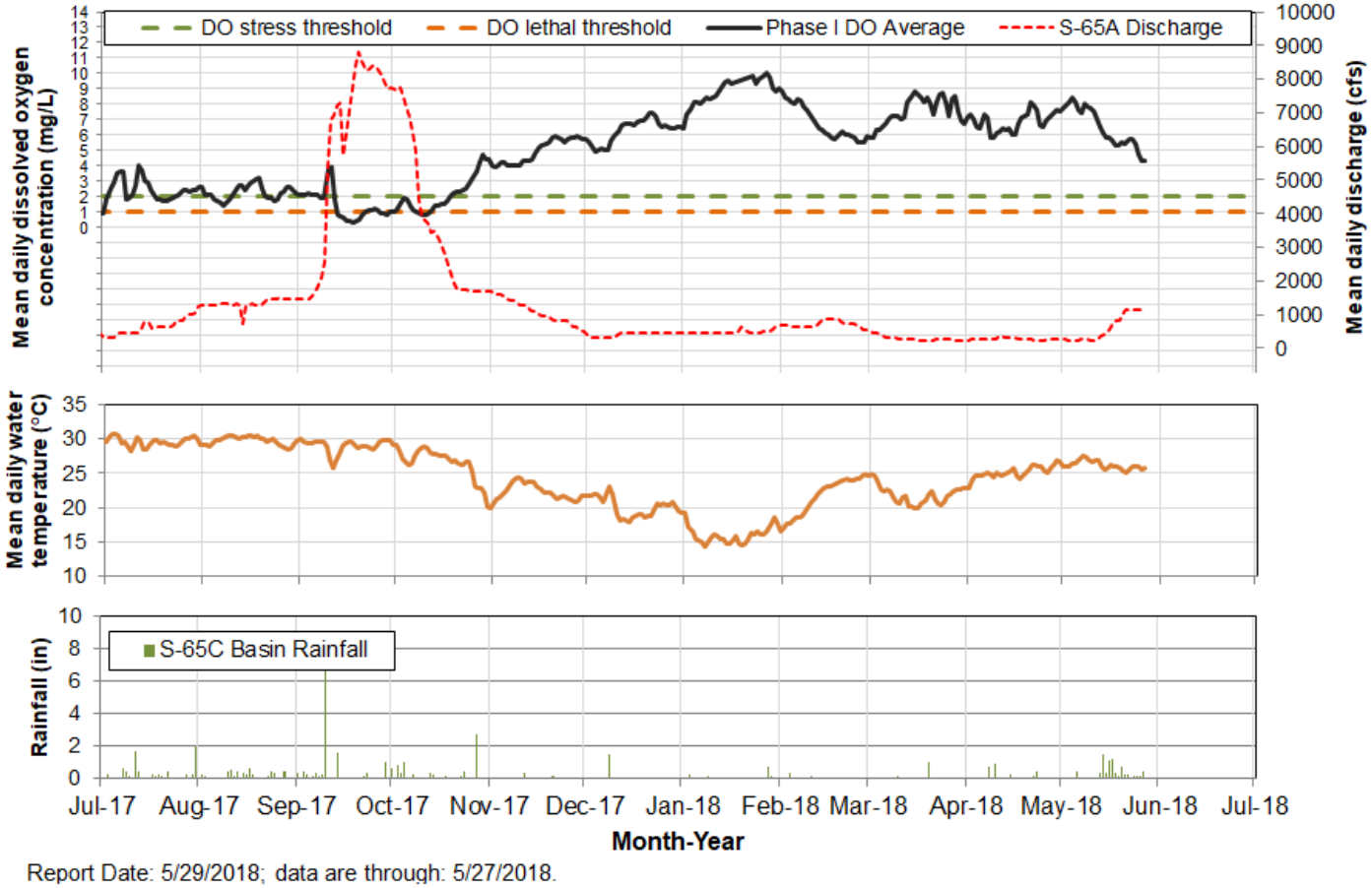


Figure 10. Mean daily dissolved oxygen, discharge, temperature and rainfall in the Phase I river channel.

Water Management Recommendations

Kissimmee Basin Adaptive Recommendations and Operational Actions

Recommendation Date	Recommendation	Purpose	Outcome	Source	Report Date
5/29/2018	Begin implementation of the 2018 Wet Season Discharge Plan for S-65/S-65A on June 1 (see figure).	Provide variable flow from S-65/S-65A to balance Kissimmee River and Headwaters Lakes objectives including Kissimmee River floodplain inundation, moderated rates of change in discharge, and constrained rate of stage rise in the lakes.	Planned	KB Ops/SFWMD Water Mgt/FWC/FWS	5/29/2018
5/22/2018	Hold Kissimmee-Cypress-Hatchineha at current stage of approximately 49.5 ft until June 1.	(a) Reduce impacts of rising water on DO in the Kissimmee River; and (b) limit stage reversal in KCH to <1 foot to protect snail kite nests.	Implemented	KB Ops/SFWMD Water Mgt	5/29/2018
5/18/2018-5/20/2018	Increase discharge gradually in response to rainfall in consultation with KB staff.	(a) Reduce impacts of rising water on DO in the Kissimmee River; and (b) limit stage reversal in KCH to <1 foot to protect snail kite nests.	Implemented	KB Ops	5/15/2018
5/15/2018	Adjust S-65/S-65A discharge over the next few days to avoid additional stage rise in Kissimmee-Cypress-Hatchineha. Make any needed discharge changes gradually in consultation with Kissimmee Basin staff to reduce potential effects on Kissimmee River dissolved oxygen.	Protect Lake Kissimmee snail kite nests from rising water if there is additional rainfall.	N/A	KB Ops	5/15/2018
5/8/2018	No new recommendations.		N/A		5/8/2018
5/1/2018	No new recommendations.		N/A		5/1/2018
4/24/2018	No new recommendations.		N/A		4/24/2018
4/17/2018	No new recommendations.		N/A		4/17/2018
4/10/2018	No new recommendations.		N/A		4/10/2018
4/3/2018	No new recommendations.		N/A		4/3/2018
3/27/2018	No new recommendations.		N/A		3/27/2018
3/20/2018	No new recommendations.		N/A		3/20/2018
3/13/2018	No new recommendations.		N/A		3/13/2018
3/6/2018	No new recommendations.		N/A		3/6/2018
2/27/2018	No new recommendations.		N/A		2/27/2018
2/20/2018	No new recommendations.		N/A		2/20/2018
2/13/2018	No new recommendations.		N/A		2/13/2018
2/6/2018	No new recommendations.		N/A		2/6/2018
1/30/2018	No new recommendations.		N/A		1/30/2018
1/23/2018	No new recommendations.		N/A		1/23/2018
1/16/2018	No new recommendations.		N/A		1/16/2018
1/9/2018	No new recommendations.		N/A		1/9/2018
12/19/2017	Begin discharge of 400 cfs from S67 into Istokpoga Canal.	Increase navigability by scouring channel and reducing sandbar at canal mouth.	Implemented	KB Ops/SFWMD Water Mgt	12/19/2017
12/19/2017	Begin a stage recession on January 1 in Lakes Kissimmee-Cypress-Hatchineha starting at stage on January 1 to reach low pool on May 31. Recession rate not to exceed 0.2 ft/week as possible. Subject to SFWMD planned operations hierarchy.	Achieve fish and wildlife benefits by slowing lake stage recession rates relative to the regulation schedule recession rates.	-	KB Ops/SFWMD Water Mgt	12/19/2017
12/19/2017	Begin stage recessions on January 15 in Lakes East Toho and Toho starting at stage on January 15, to reach low pools on May 31. Recession rate not to exceed 0.2 ft/week if possible. Subject to SFWMD planned operations hierarchy.	Achieve fish and wildlife benefits by slowing lake stage recession rates relative to the regulation schedule recession rates.	-	KB Ops/SFWMD Water Mgt	12/19/2017
12/12/2017	No new recommendations.		N/A		12/12/2017
12/5/2017	No new recommendations.		N/A		12/5/2017
11/28/2017	No new recommendations.		N/A		11/28/2017

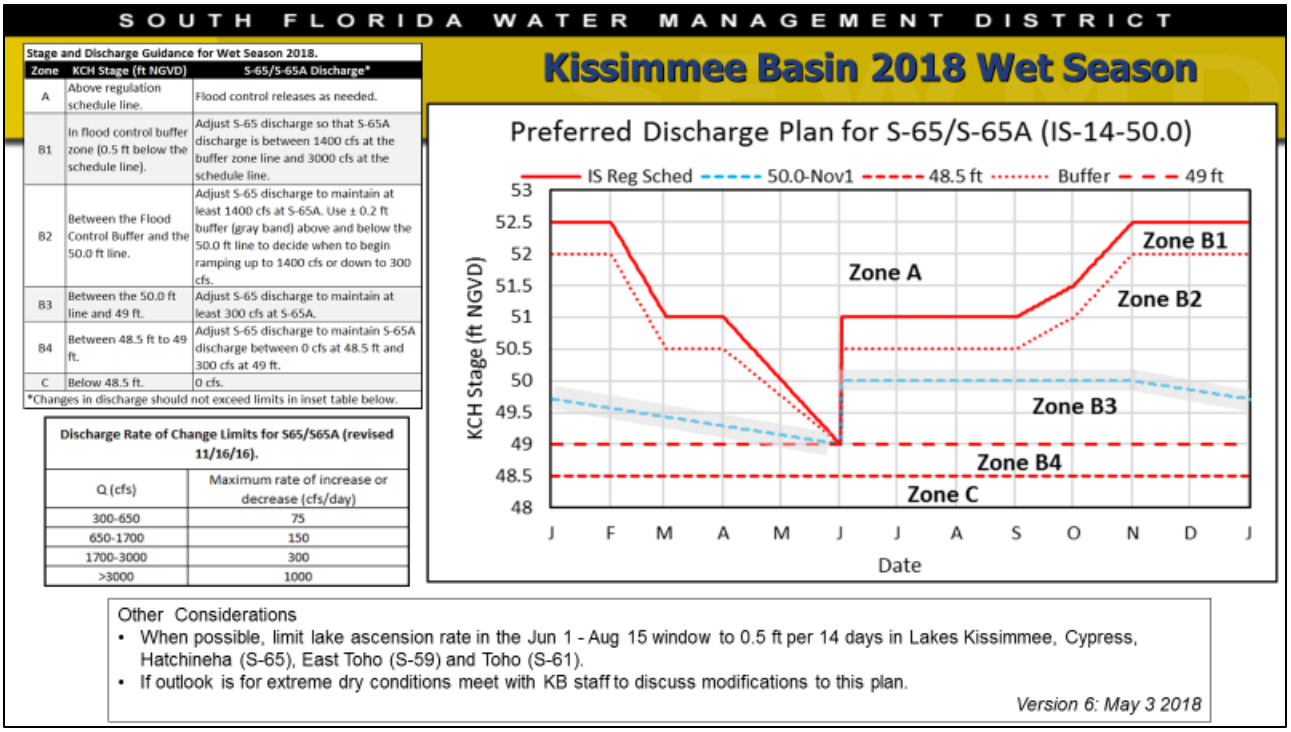


Figure 11. The 2018 Wet Season Discharge Plan for S-65/S-65A.

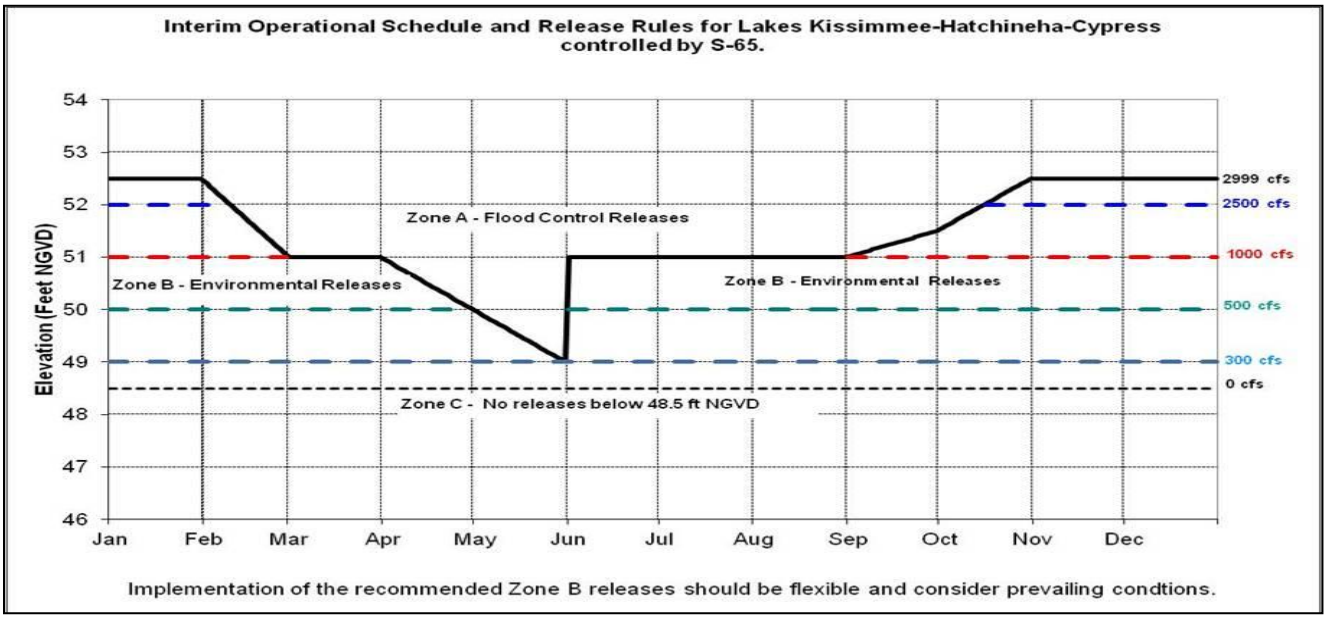


Figure 12. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years.

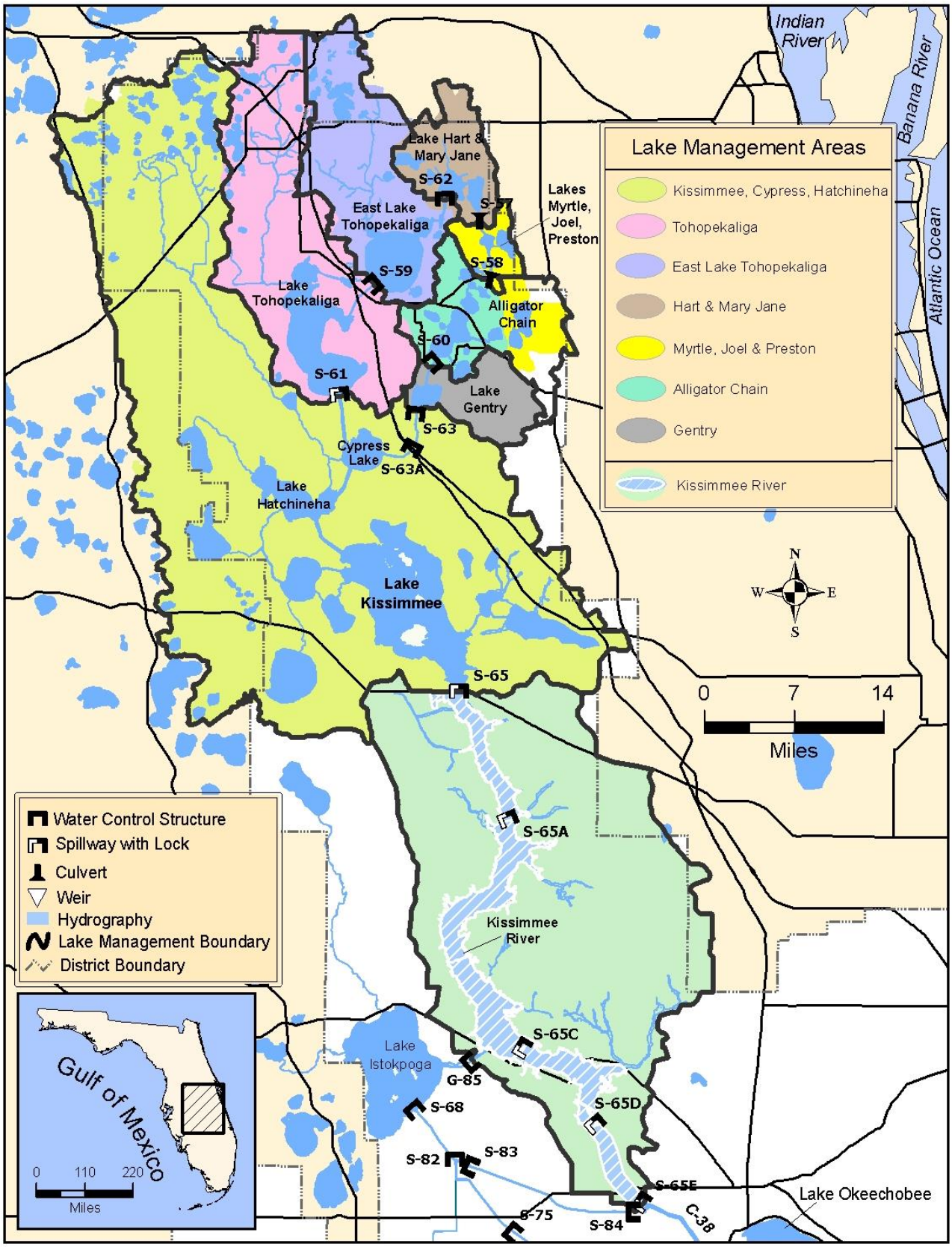


Figure 13. The Kissimmee Basin.

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 14.02 feet NGVD for the period ending at midnight on May 28, 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 0.80 feet higher than it was a month ago and 2.97 feet higher than a year ago (Figure 1). The Lake is now in the Low Flow sub-band and is rising quickly (Figure 2). According to RAINDAR, 2.3 inches of rain fell over the Lake during the week May 22 – May 28, 2018. Most of the northern watershed received less rainfall, between 1.0 – 2.0 inches, while the Kissimmee Basin received the least, between 0.5 – 1.0 inches (Figure 3).

Average daily inflows to the Lake were higher than the previous week, going from 5,060 cfs to 6,239 cfs. The largest inflow was from the Istokpoga and Indian Prairie basins, with a combined 1,907 average daily cfs through the S-84, S-71, and S-72 structures. The Kissimmee River discharges were the second highest inflow with 1,687 average daily cfs, while backflows through Culvert 10A from the L-8 canal were third, averaging 1,163 cfs for the week (Table 1). There have been no inflows from the S-2 or S-3 pumps during this wet season thus far.

Average daily outflows for the Lake decreased from just 38 cfs the previous week to 0 cfs this past week. The corrected average daily evapotranspiration value for the week based on the L006 weather platform solar radiation data fell again to just 0.08 inches.

Total Lake inflows and outflows for the past week are detailed in Table 1, as well as the approximate change in Lake stage from each major structure's total flows over the period. Figure 4 shows the combined average daily cfs for inflows and outflows for the Lake over the past eight weeks. These data are provisional and are subject to change.

Based on the Lake Okeechobee wading bird habitat suitability index, there were substantial increases in habitat with appropriate depth for wading bird foraging, but rapidly rising water levels dramatically reduced the quality of that habitat. Receding water levels concentrate prey, while rising stages do the opposite. Therefore, despite approximately 46,500 acres of habitat with suitable foraging depths for long-legged wading birds and 25,500 acres of suitable foraging depths for short or long-legged wading birds, only 280 individuals were observed foraging on the Lake during a survey flight on May 23 (Figure 5). This was over 7,000 fewer birds than the last survey in late April, and 14,500 fewer birds than the same time last year when water levels were rapidly receding during a drought. However, when rains caused a stage reversal last year in early June of 2017, a similar decline in foraging numbers was seen, with approximately 12,000 fewer birds observed after the reversal. The remaining large nesting colony on Eagle Bay Island is located near the edge of the marsh and birds there were observed leaving the Lake to forage. It is not known if nesting will continue at this location for much longer.

Water Management Recommendations

Lake Okeechobee stage is 14.02 feet NGVD having increased 0.98 feet over the past two weeks. There was considerable rainfall over the Lake and its watershed beginning approximately May 13, bringing the first substantial stage reversal to the marsh since late October 2017. The Lake was below 13.0 feet NGVD for just 10 days and is rising too quickly for many recovering SAV communities to stay in optimal light conditions. The seasonal low for the 2018 SAV growing season of 12.83 feet NGVD was the third highest since 2011; the third time in six years that stage has not reached the bottom of the preferred stage envelope (12.5 – 15.5 feet NGVD); and the sixth consecutive water year (WY) that stages have exceeded the top of the stage envelope. Avoiding a seventh consecutive WY with stages greater than 15.5 feet NGVD would be beneficial to the struggling nearshore SAV communities. Given the lack of substantial low-water levels this dry season, the SAV coverage on the Lake will likely remain at minimal levels throughout the growing season and well into next year, prolonging impacts from high stages in 2016 and Hurricane Irma in 2017.

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

INFLOWS	Previous Week Avg Daily cfs	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S65E & S65EX1	939	1687	0.7
S71 & 72	693	604	0.2
S84 & 84X	1724	1303	0.5
Fisheating Creek	11	30	0.0
S154	117	203	0.1
S191	399	576	0.2
S133 P	218	329	0.1
S127 P	34	37	0.0
S129 P	24	28	0.0
S131 P	20	28	0.0
S135 P	113	203	0.1
S2 P	0	0	0.0
S3 P	0	0	0.0
S4 P	54	48	0.0
L8 Backflow	714	1163	0.5
Rainfall	7248	6283	2.3
Total	**12308**	**12522**	**4.9**

OUTFLOWS	Previous Week Avg Daily cfs	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S77	38	0	0.0
S308	0	0	0.0
S351	0	0	0.0
S352	0	0	0.0
S354	0	0	0.0
L8 Outflow	0	0	0.0
ET	1984	1598	0.7
Total	**2022**	**1598**	**0.7**

PROVISIONAL DATA

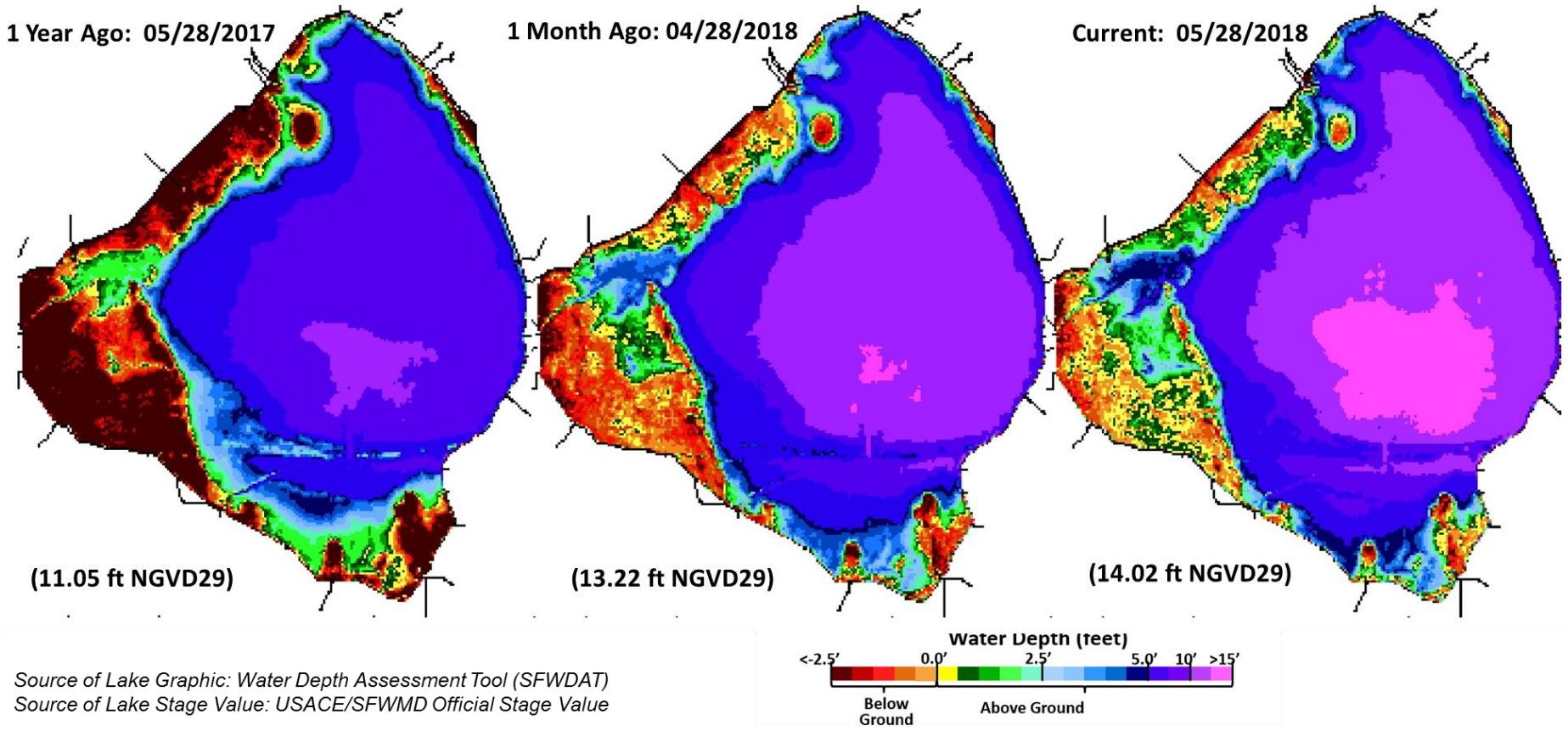


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

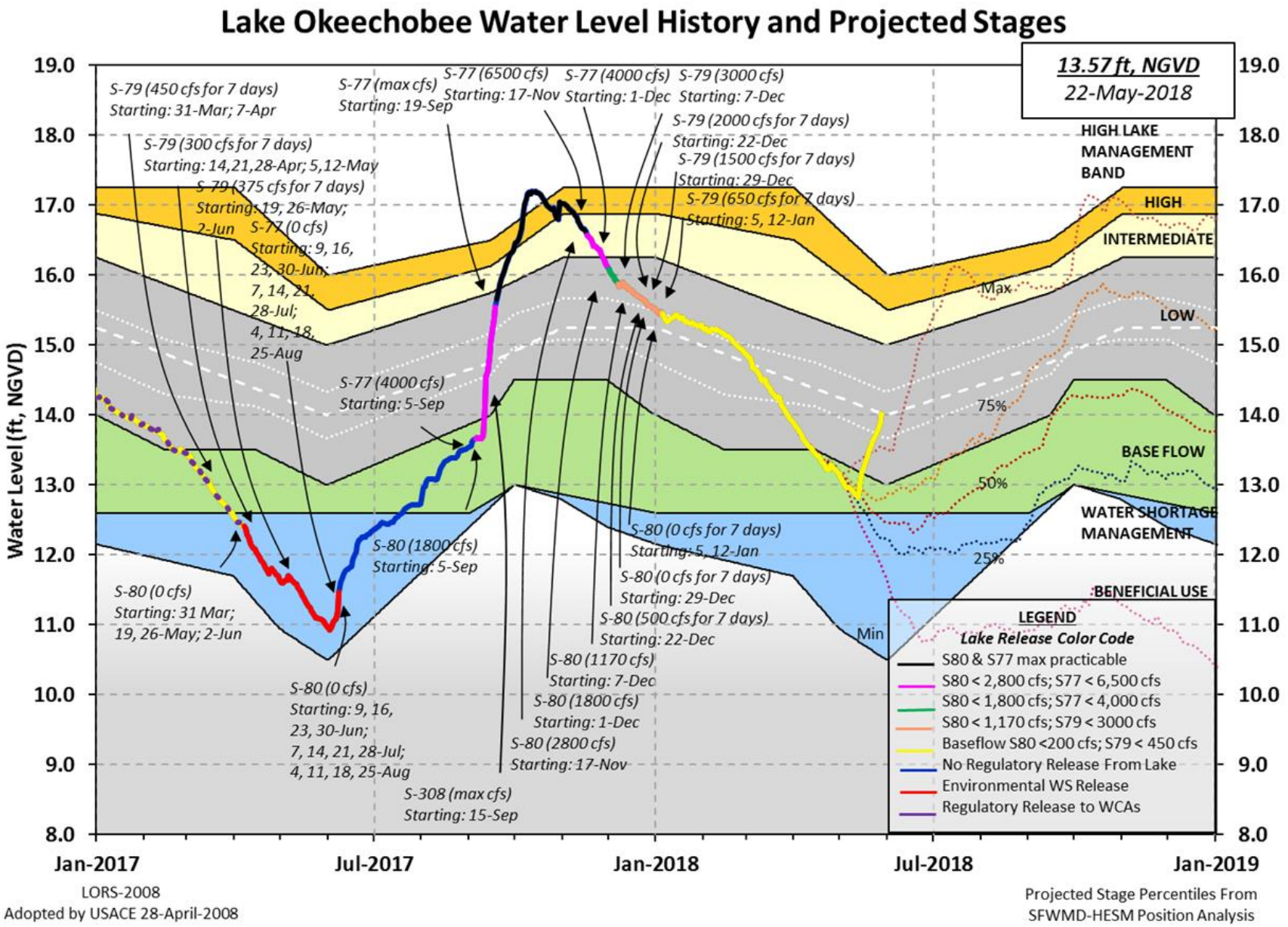


Figure 2. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

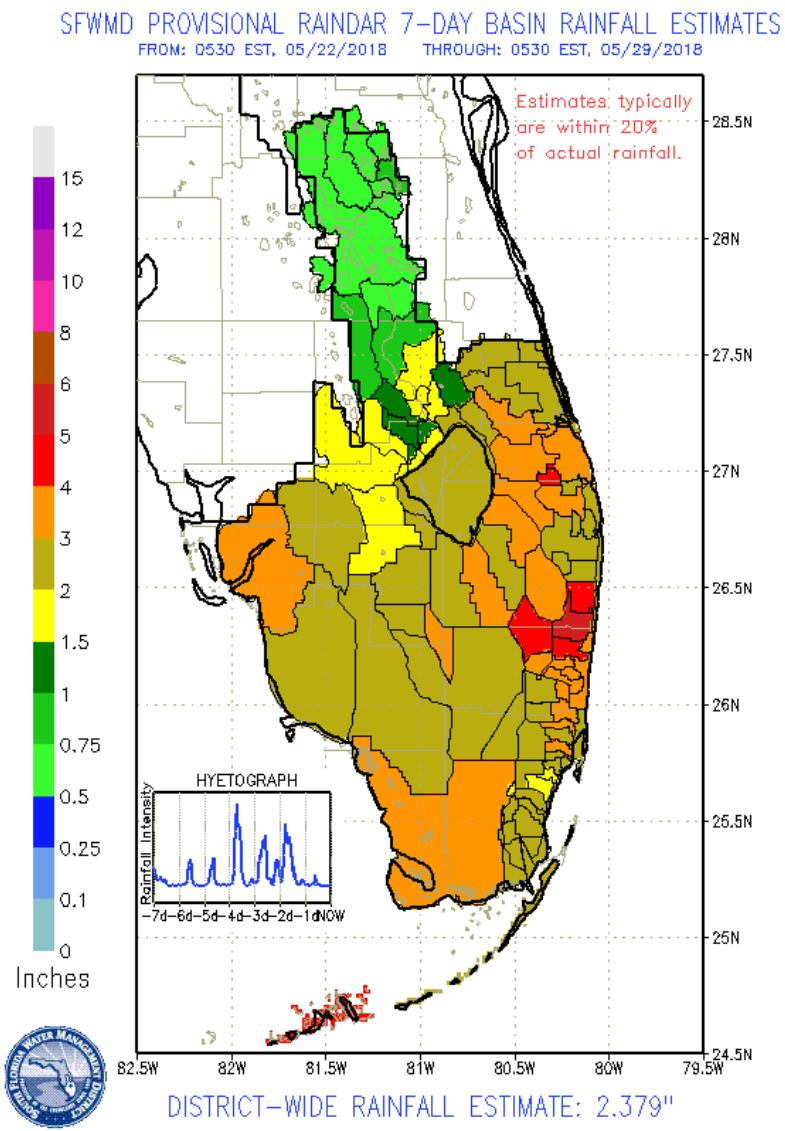


Figure 3. Rainfall estimates by basin.

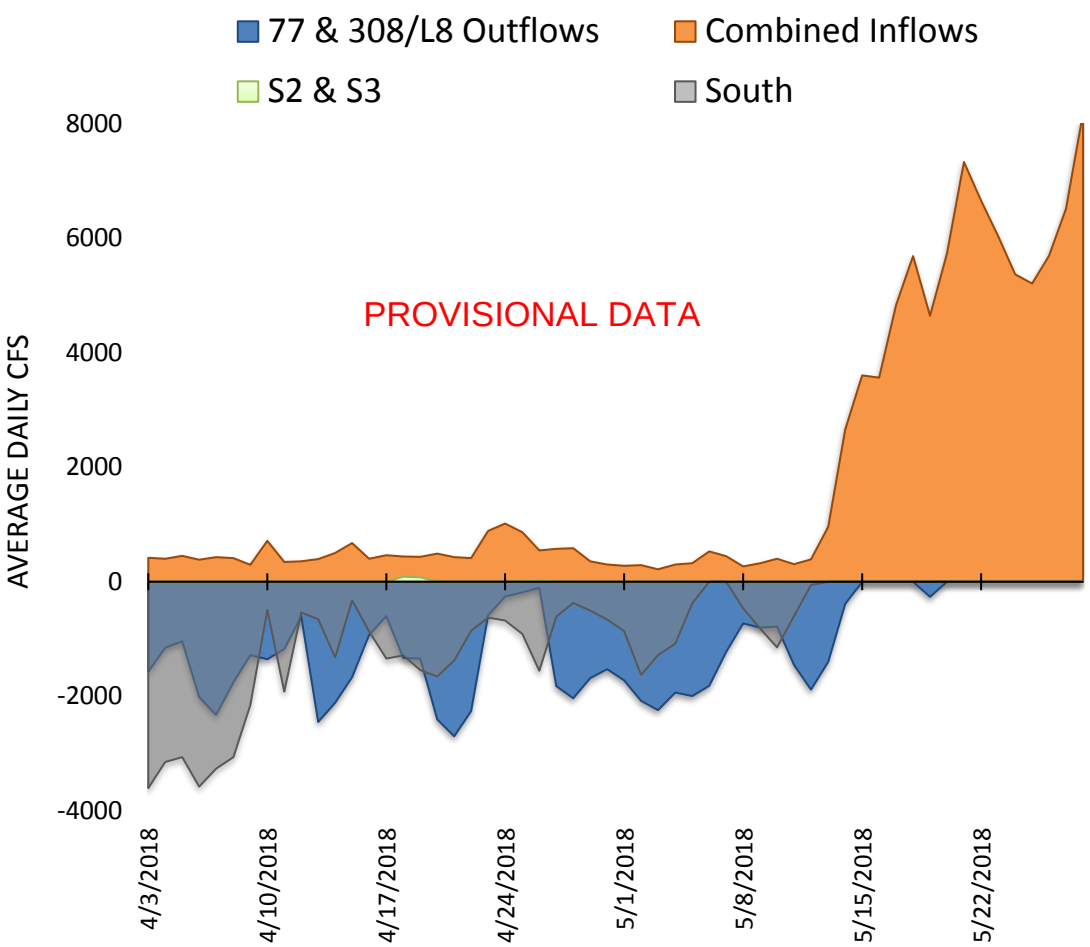


Figure 4. Major inflows and outflows of Lake Okeechobee, including the S350 structures designated as South. The L-8 canal flows through culvert 10A are included as outflows when positive, and as inflows when backflowing into the lake. Inflows and outflows are shown as positive and negative, respectively, for visual purposes.

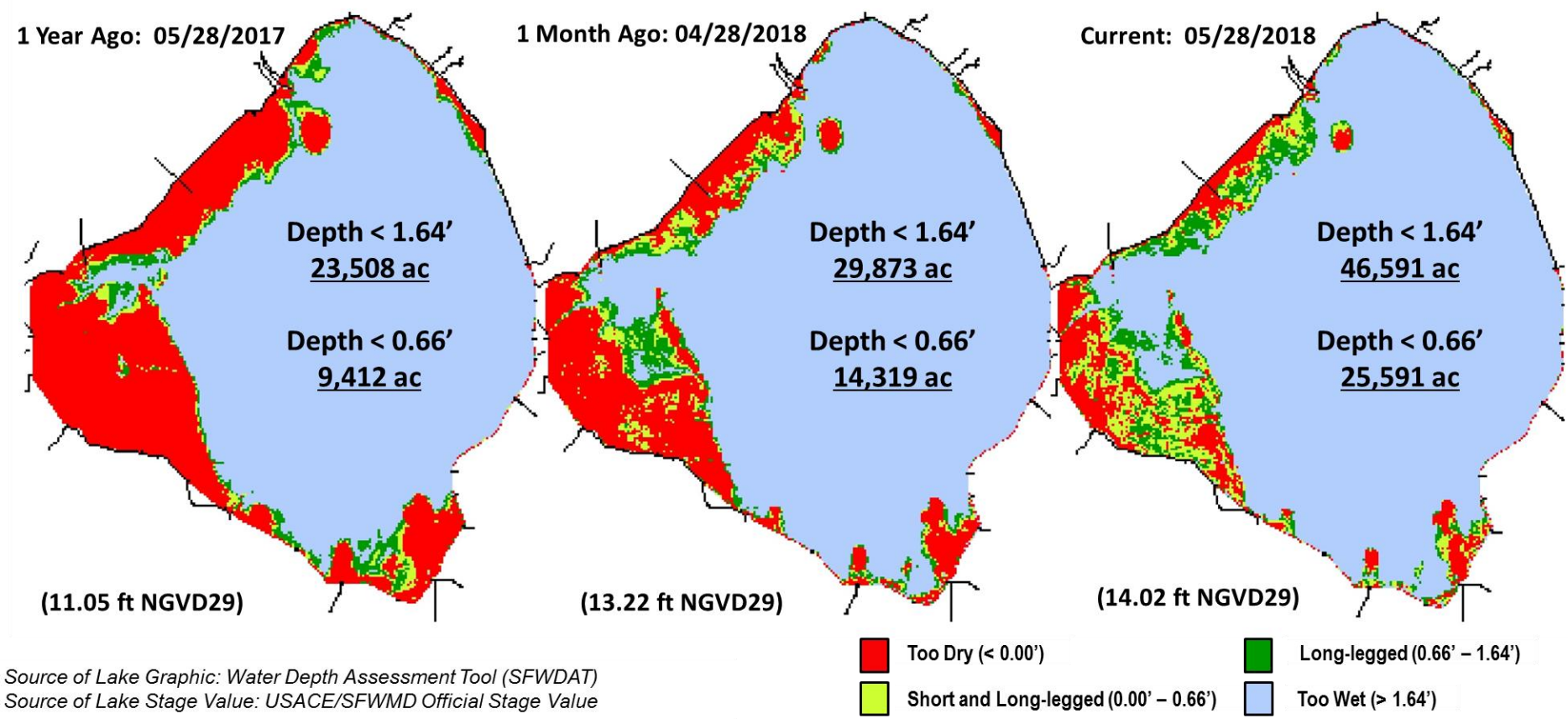


Figure 5. Wading bird habitat suitability index for Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

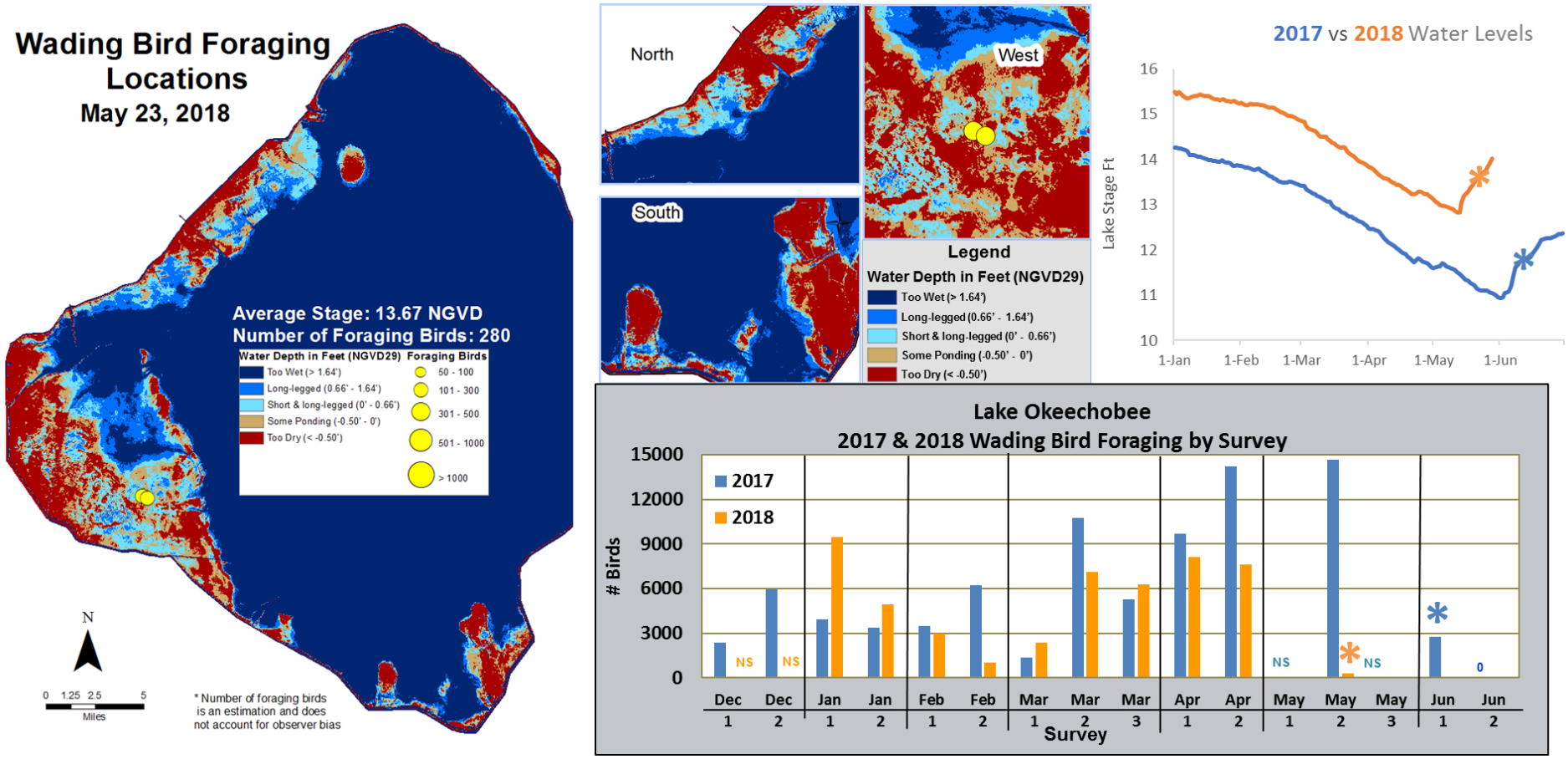


Figure 6. Locations of foraging flocks of wading birds observed during a monitoring flight on May 23, 2018 are shown in yellow, with circle sizes representing the size of the flocks. Previous survey totals from 2018 and 2017 are compared in the bar graph. Hydrographs show Lake Okeechobee stages and how low counts from both 2017 and 2018 corresponded with significant reversals.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged about 8,114 cfs (Figures 1 and 2) and last month inflow averaged about 3,351 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	1990
S-80	2140
S-308	0
S-49 on C-24	1707
S-97 on C-23	1672
Gordy Rd. structure on Ten Mile Creek	605

Over the past week, salinity decreased 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 0.9. Salinity conditions in the middle estuary are within the poor range for adult eastern oysters (Figure 3).

Table 2. Seven-day average salinity at three monitoring sites in the St. Lucie Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary.

Sampling Site	Surface	Bottom	Envelope
HR1 (North Fork)	**0.3** (10.8)	**0.3** (14.5)	NA[1]
US1 Bridge	**0.3**[2] (NR)	**1.5**[2] (12.9)	10.0-26.0
A1A Bridge	**0.9** (16.6)	**2.6** (19.1)	NA[1]

[1]Envelope not applicable, [2]Estimated from other recorders, 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	2.84	6.05 - 7.05	7.10	6.22	8.01
SF	1.65	6.38 - 7.39	6.12	5.14	7.19
NF	1.97	5.77 - 9.19	5.58	4.62	6.76
ME	1.76	6.68 - 9.38	5.80	5.04	6.84
IRL-SLE	3.46	1.05 - 6.83	5.95	5.44	6.41

NOAA satellite imagery to indicate cyanobacteria bloom potential in the St. Lucie Estuary was unavailable this week due to cloud coverage.

Caloosahatchee Estuary:
Last week total inflow to the Caloosahatchee Estuary averaged about 4,239 cfs (Figures 6 and 7) and last month inflow averaged about 2,461 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	0
S-78	1602
S-79	3007
Tidal Basin Inflow	1232

Over the past week, salinity decreased throughout the estuary, (Table 5, Figures 8 & 9). The seven-day average salinity values are in the good range for adult eastern oysters at Cape Coral and at Shell Point (Figure 10). Salinity data were not available at Sanibel. The 30-day moving average surface salinity is 2.8 at Val I-75 and 9.4 at Ft. Myers. Salinity conditions between Val I-75 and Ft. Myers are good for tape grass.

Table 5. Seven-day average salinity at six monitoring stations in the Caloosahatchee Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for tape grass (*Vallisneria americana)* at Val I-75 and for adult eastern oysters (*Crassostrea virginica*) elsewhere.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	**0.4** (0.5)	**0.5** (0.6)	NA[1]
*Val I75	**1.1** (2.0)	**3.9** (4.5)	0.0-5.0[2]
Ft. Myers Yacht Basin	**5.8** (9.0)	**10.7** (12.1)	NA
Cape Coral	**11.5** (18.0)	**14.0** (18.8)	10.0-30.0
Shell Point	**24.3** (29.1)	**23.7** (28.2)	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)	4.75 – 11.48	3.23 – 24.93 One spike to 77.54	1.27 – 9.50 One spike to 64.14
Dissolved Oxygen (mg/l)	4.14 – 5.91	1.83 – 7.70	4.95 – 6.83

The Florida Fish and Wildlife Research Institute reported on May 18, 2018, that *Karenia brevis, the Florida red tide dinoflagellate,* was observed at background to medium concentrations in 17 samples collected from Lee County. Fish kills and respiratory irritation were reported in Lee County over the past week.

NOAA satellite imagery to indicate cyanobacteria bloom potential in the Caloosahatchee Estuary was unavailable this week due to cloud coverage.

Water Management Recommendations

Lake stage is in the Low sub-band of 2008 LORS. Tributary hydrological conditions are very wet. The 2008 LORS recommends up to 3,000 cfs at S-79 and up to 1,170 cfs at S-80. Given the current estuarine conditions, there are no ecological benefits associated with freshwater releases from Lake Okeechobee to the estuaries.

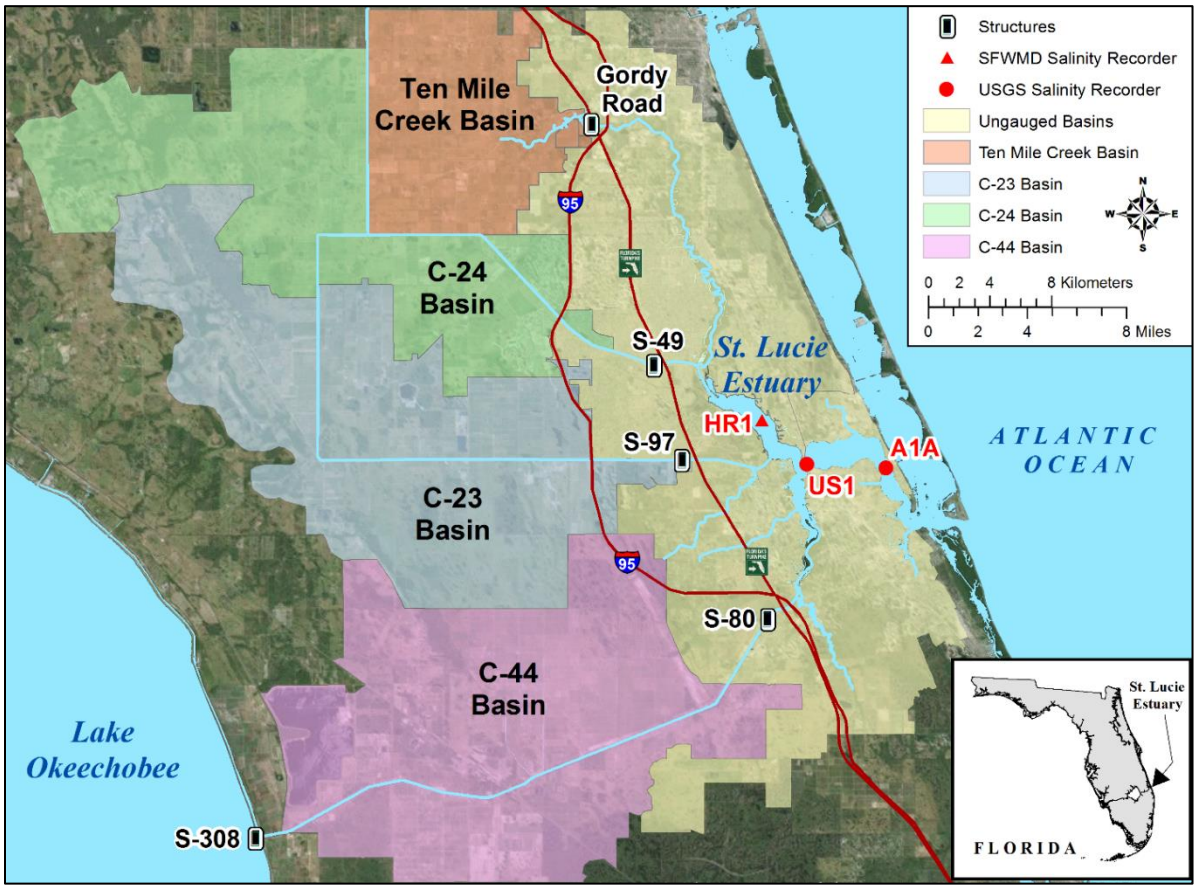


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

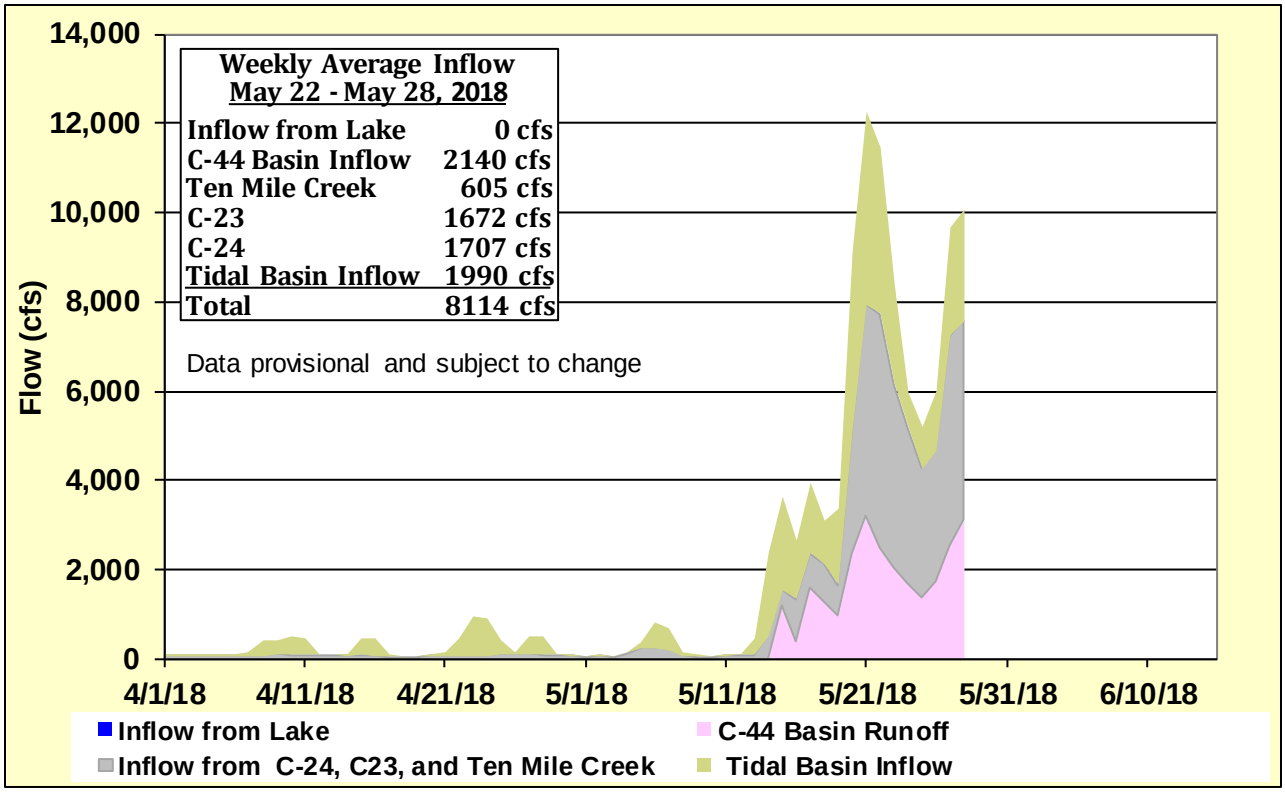


Figure 2. Daily surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

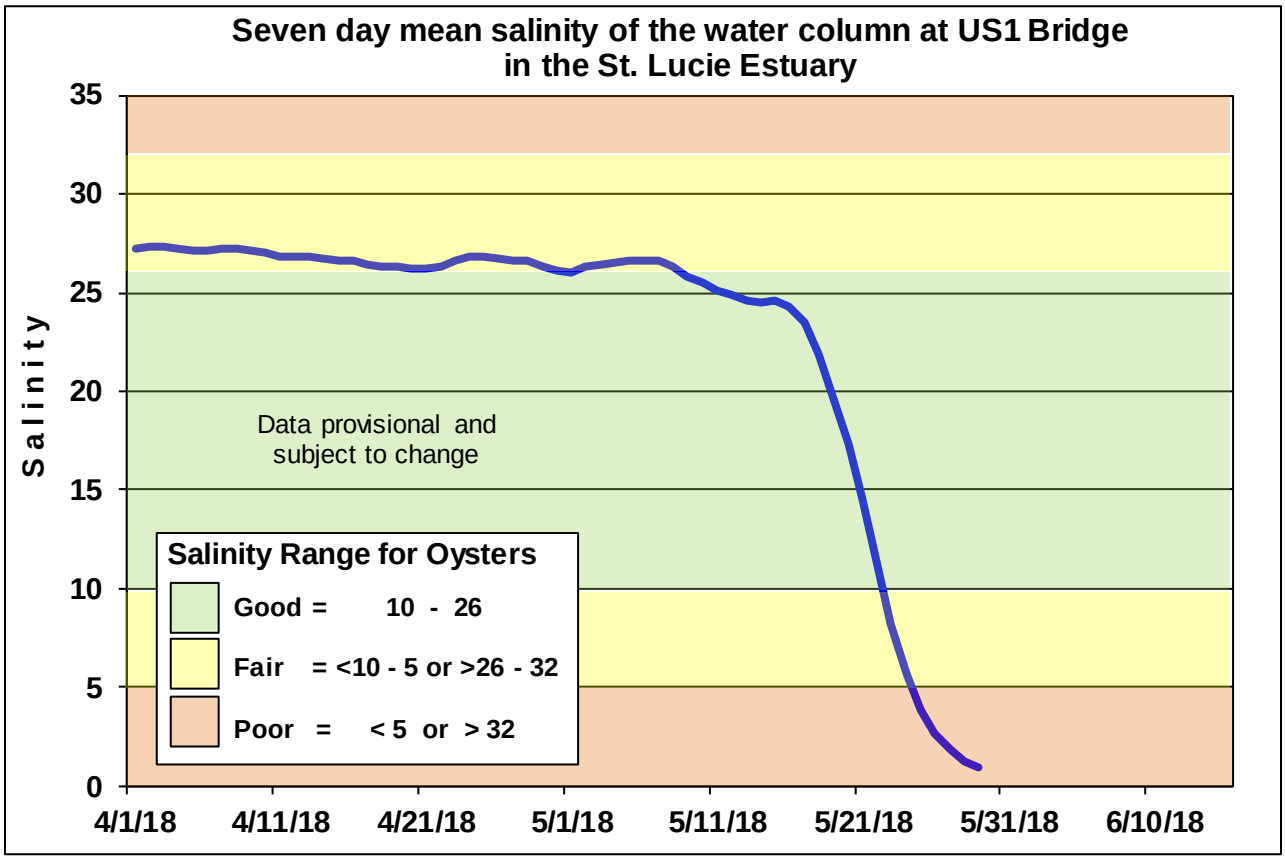


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

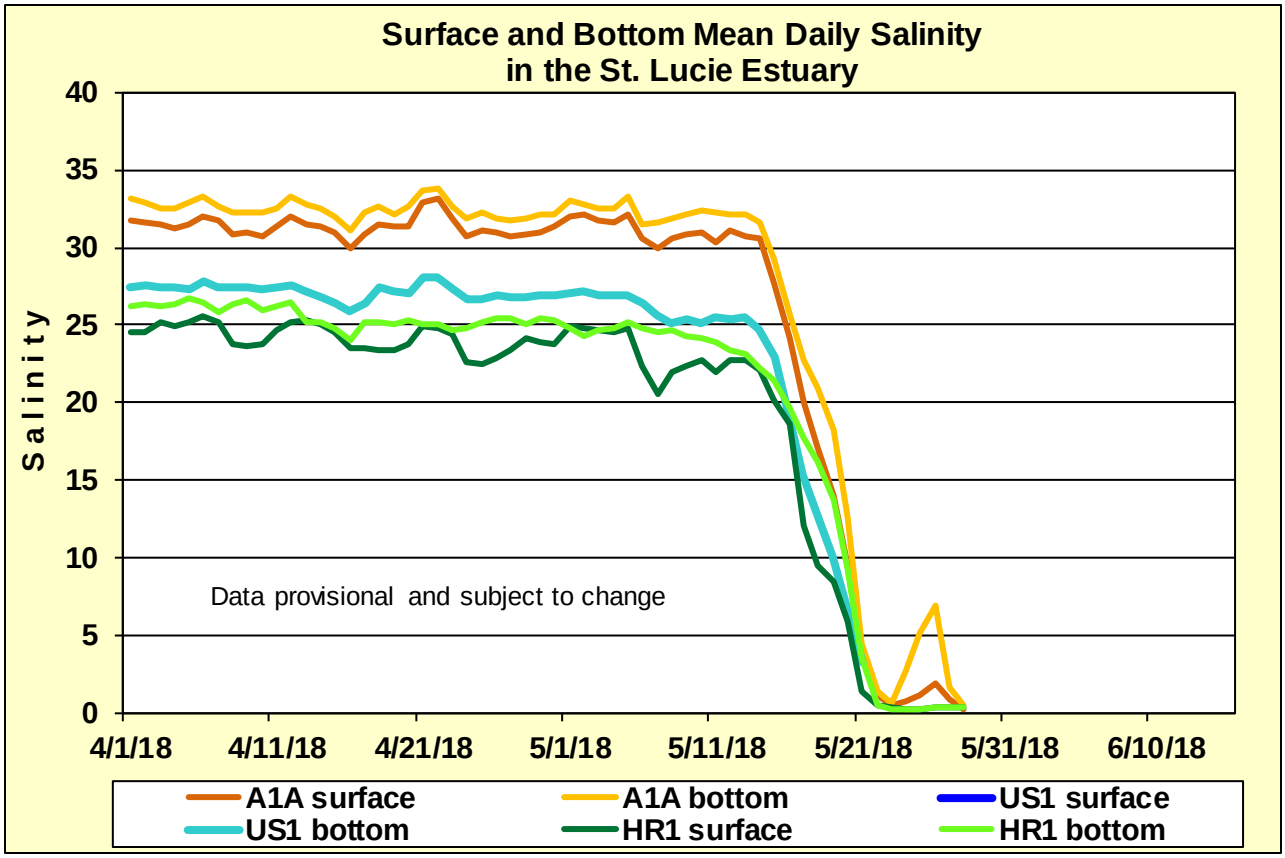


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

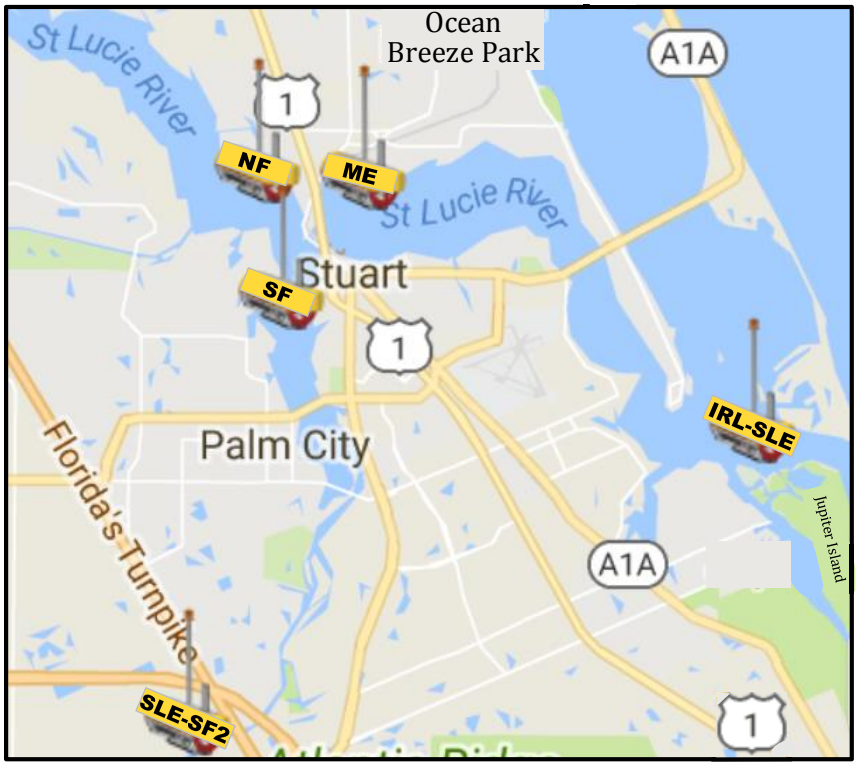


Figure 5. Location of FAU-HBOI LOBO water quality stations in the St. Lucie Estuary.

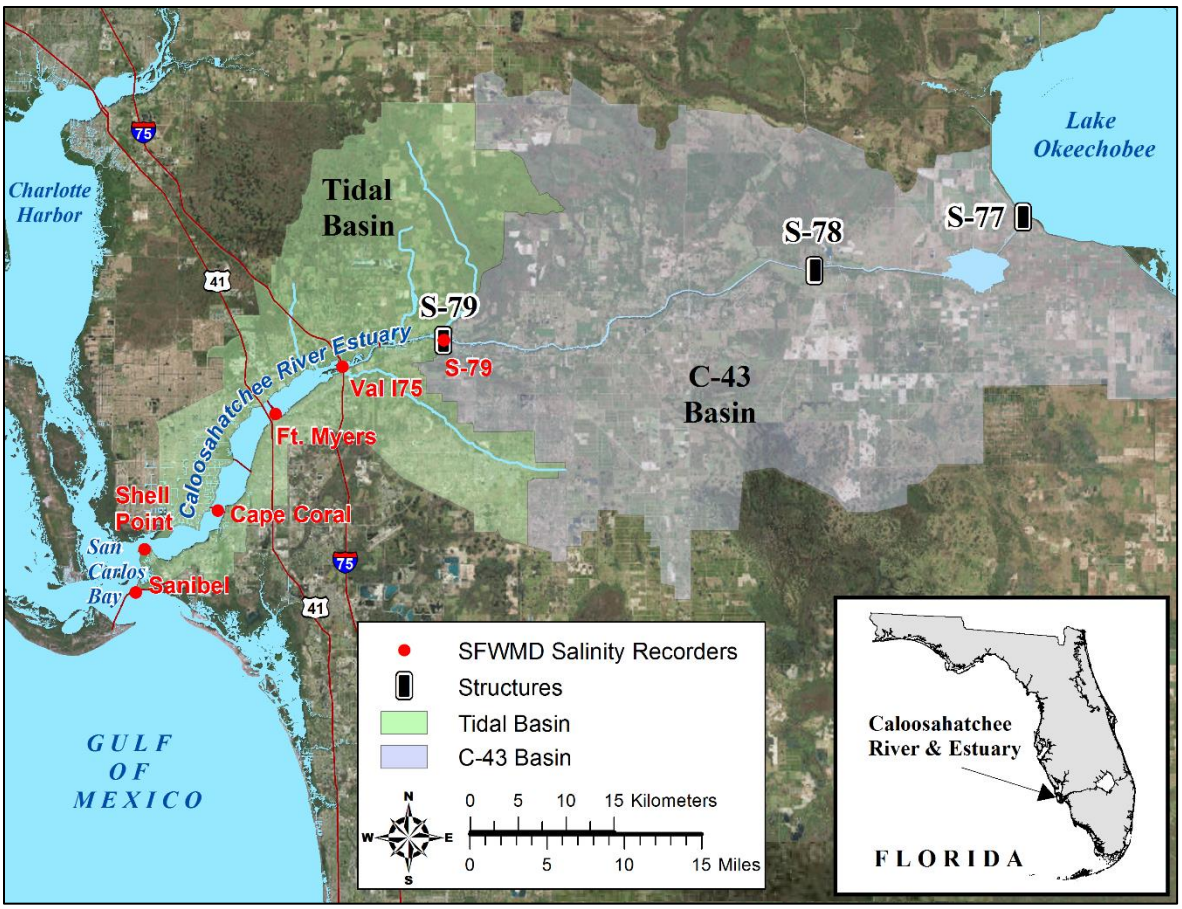


Figure 6. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

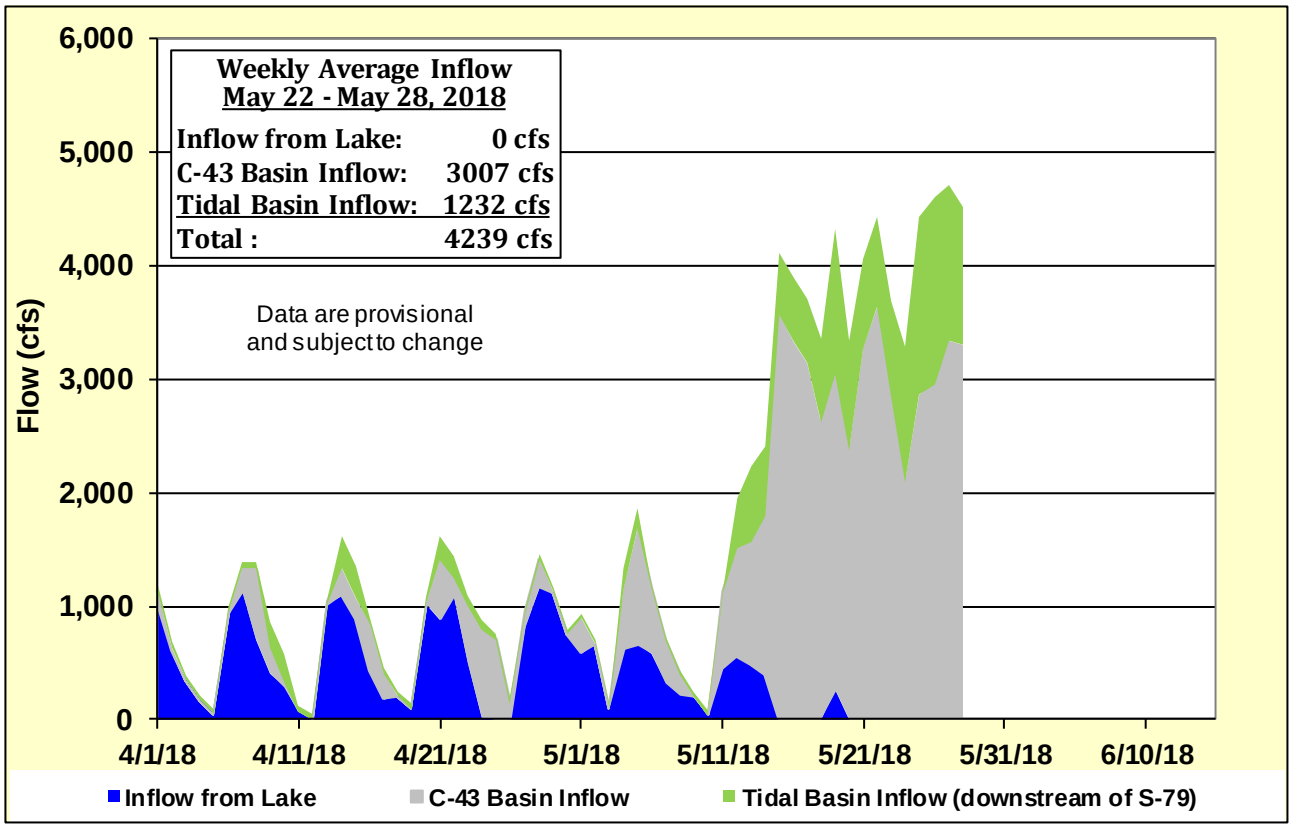


Figure 7. Daily surface freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

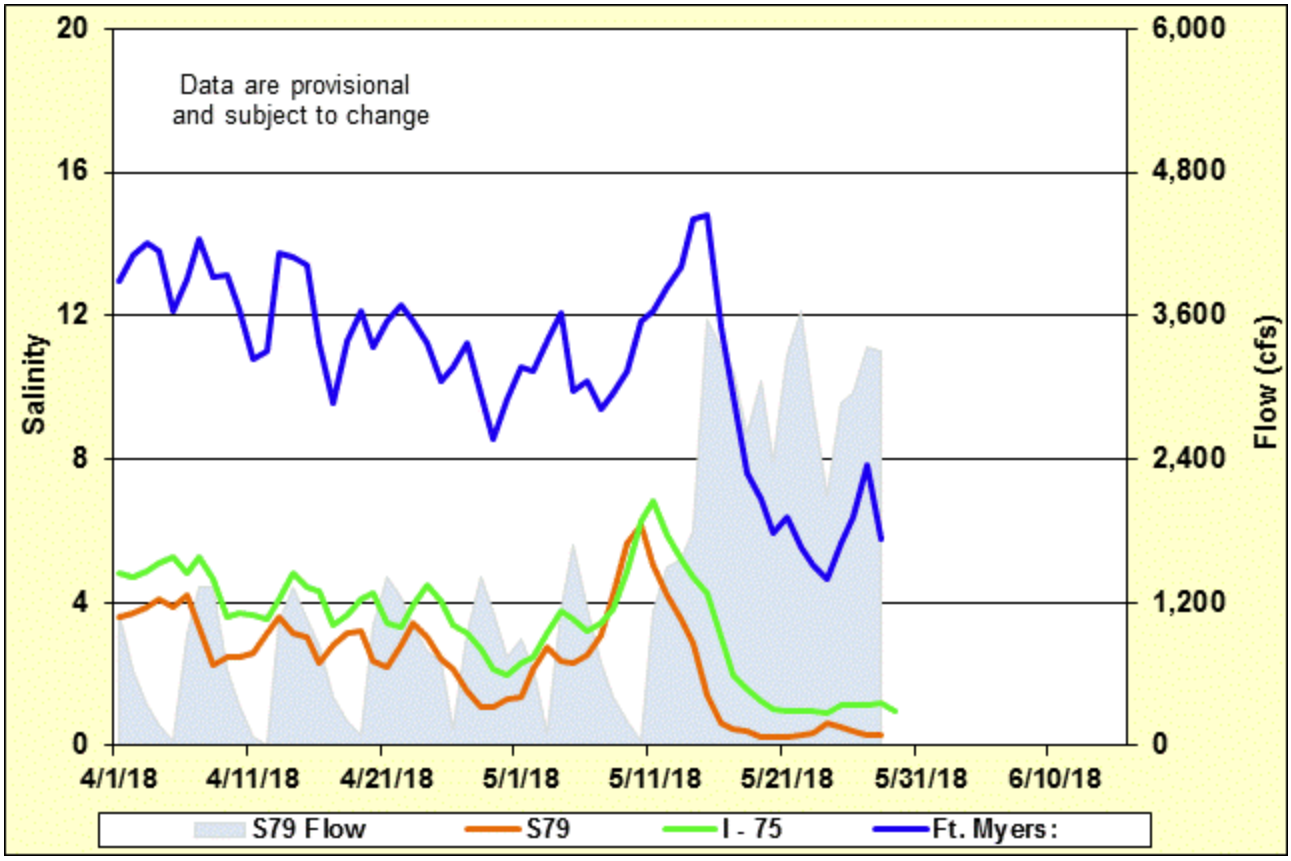


Figure 8. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

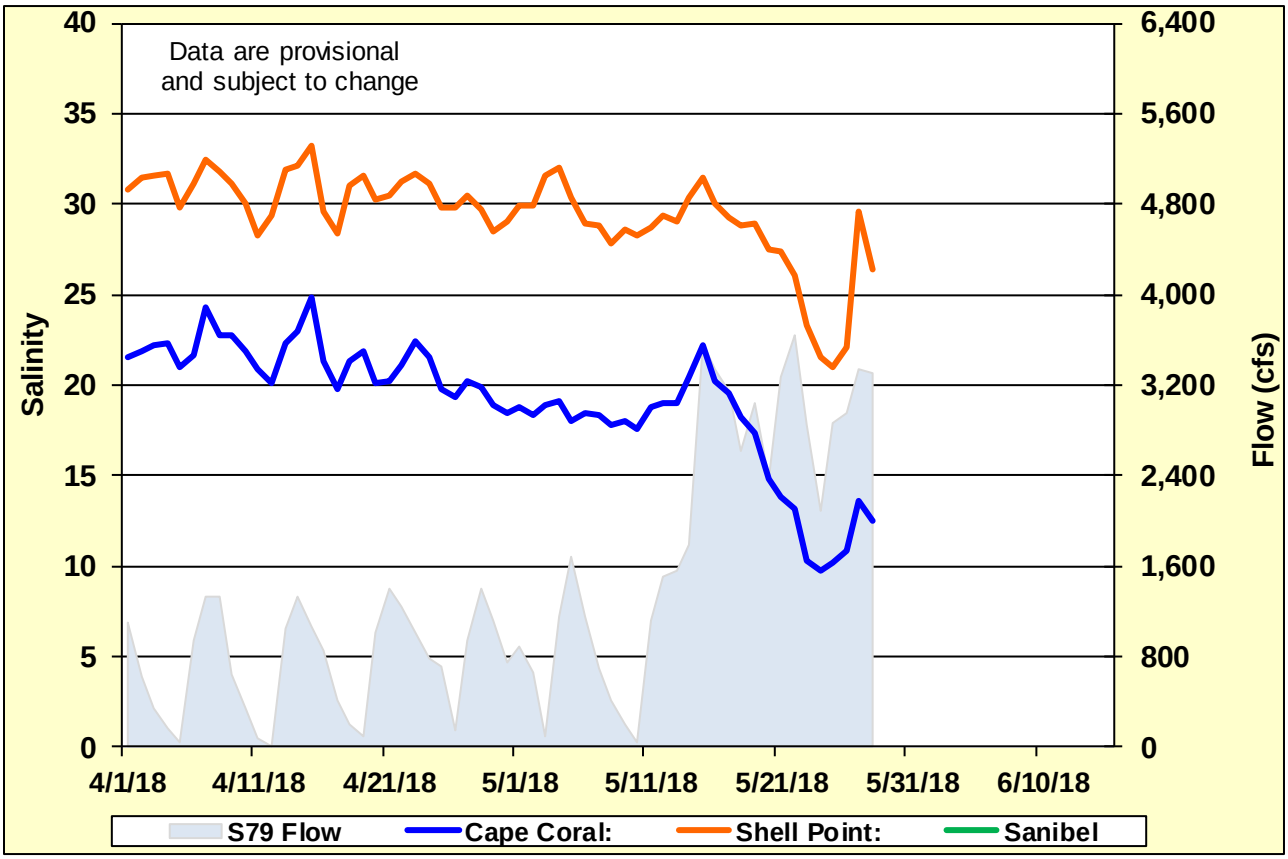


Figure 9. Daily mean flows at S-79 and salinity at lower estuary stations.

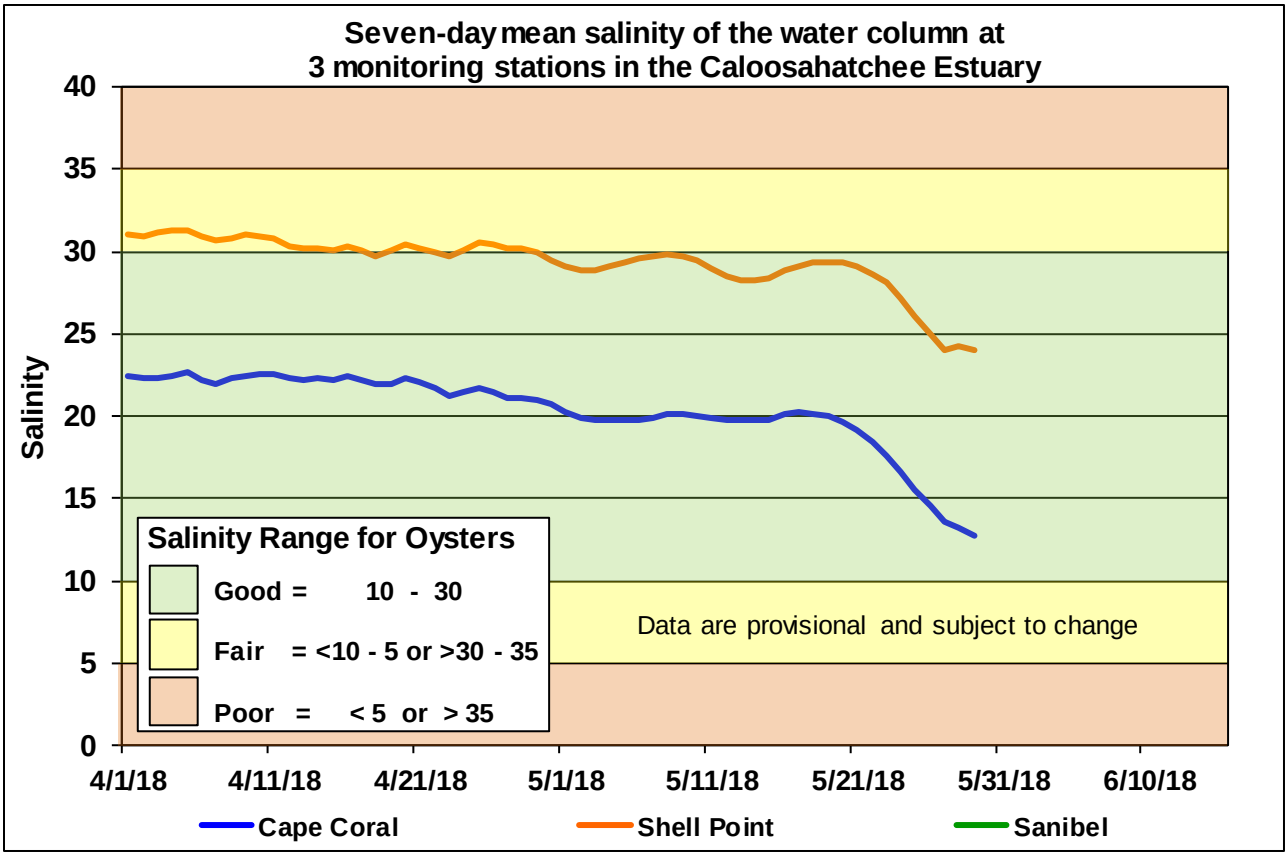
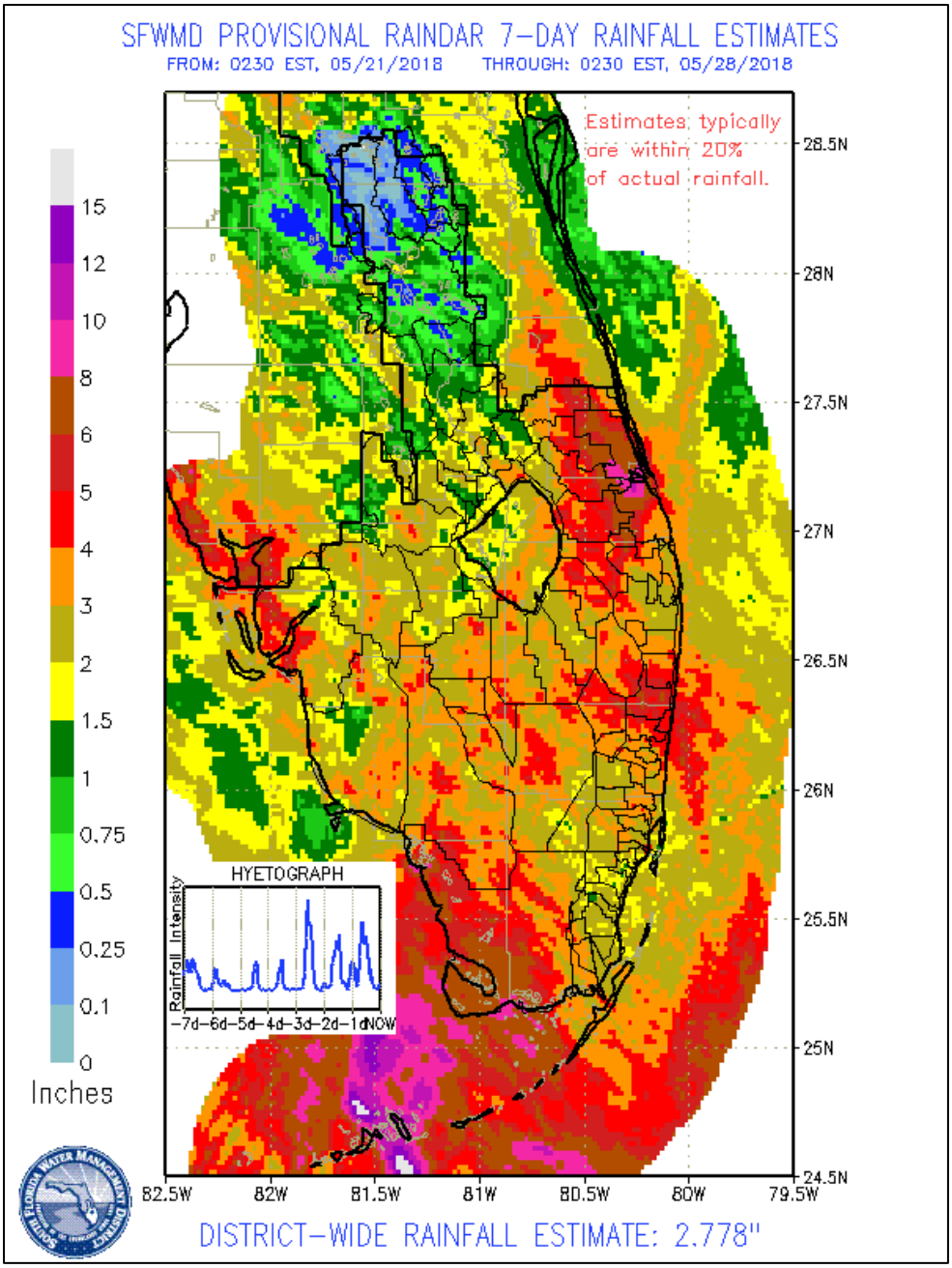


Figure 10. Seven-day mean salinity at Cape Coral Bridge, Shell Point, and Sanibel Bridge monitoring stations.

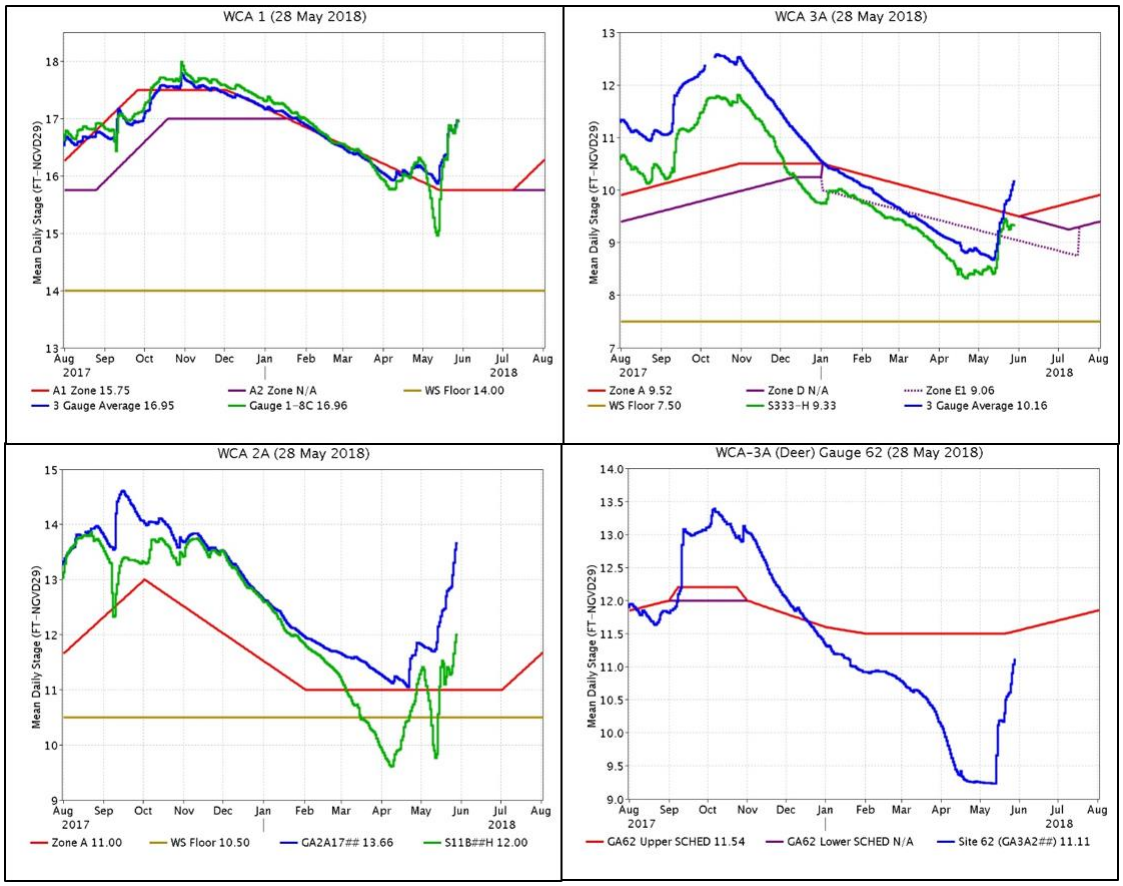
EVERGLADES

At the gauges monitored for this report, water depths across Everglades rose an average of 0.36 feet last week (down from +0.83 feet the previous week). Individual gauge changes within the WCAs ranged from +0.91 feet (northeast WCA-3A) to +0.09 feet (WCA-1).

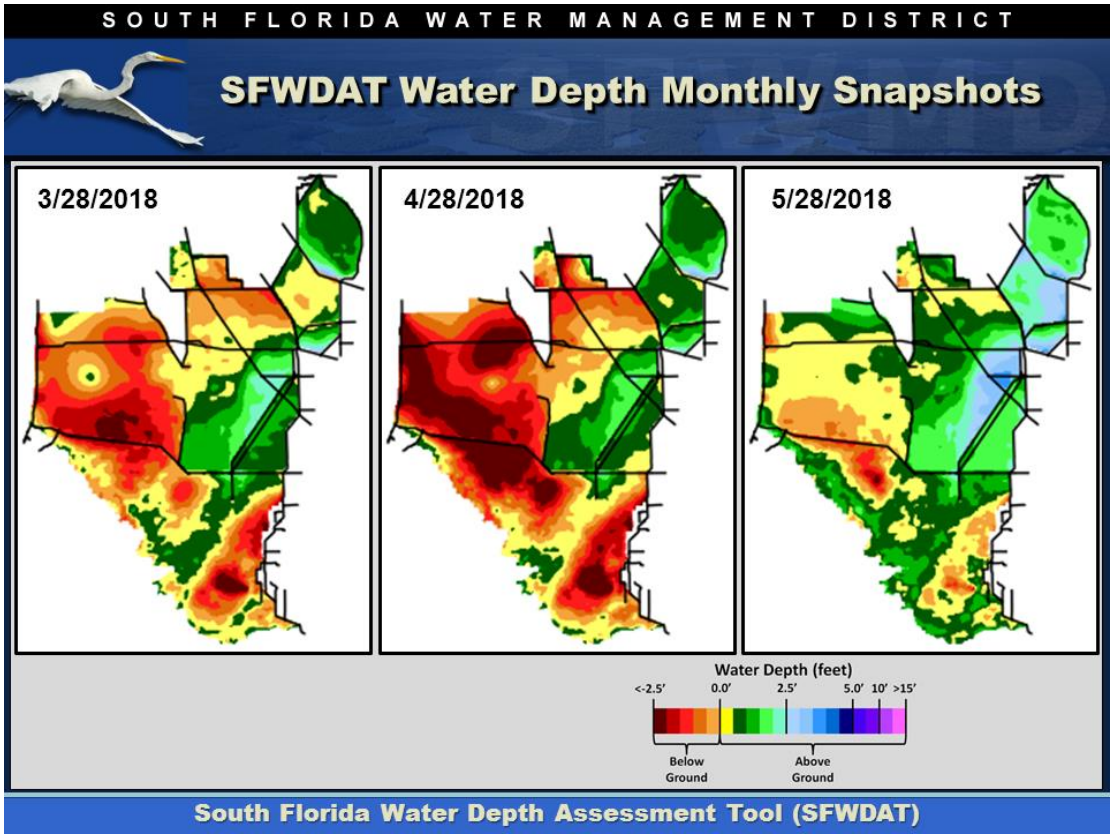
Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	3.83	+0.16
WCA-2A	4.32	+0.83
WCA-2B	3.49	+0.35
WCA-3A	3.29	+0.53
WCA-3B	2.39	+0.15
ENP	5.09	+0.37

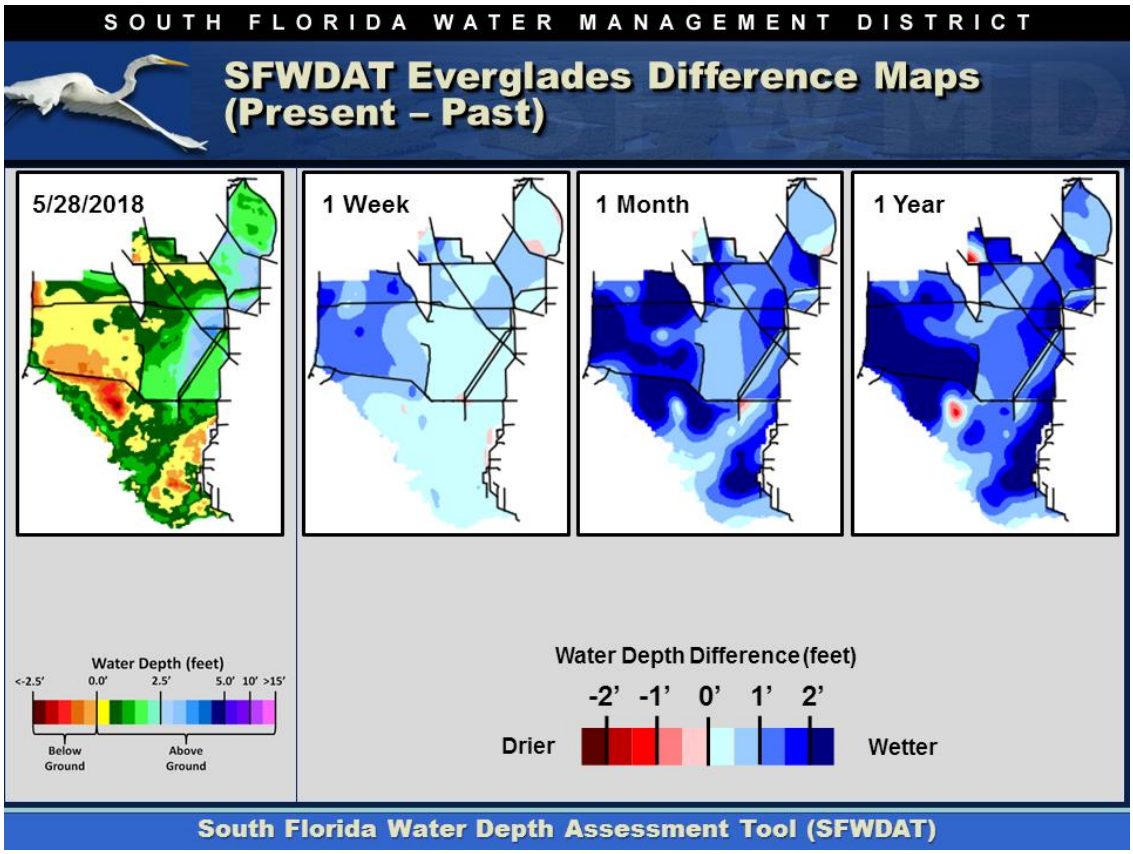


Regulation Schedules: WCA-1 three-gauge average stage is now 1.20 feet above Zone A1, and the canal and marsh stage have equalized. WCA-2A stage continues to sharply increase with marsh stage now 2.66 feet above Zone A. WCA-3A three-gauge average stage is steadily increasing and is now 0.64 feet above Zone A. WCA-3A stage at gauge 62 (northwest corner) is increasing steadily and is now 0.43 feet below the upper schedule.



Water Depths and Changes: The WDAT tool for spatial interpolation of depth monthly snapshots indicates rapidly rehydrating conditions across Everglades. In northern WCA-3A, water depths remain near ground surface. Water depths in WCA-2A are significantly greater than the rest of the WCAs. Comparing WDAT water levels from present, last week the only place water depths decreased was in the extreme southern end of WCA-1, while depths rose significantly in WCA-2A and the east-central portion of WCA-3A. The Everglades is considerably wetter currently than it was a month ago and last year.


SOUTH FLORIDA WATER MANAGEMENT DISTRICT
SFWDAT Water Depth Monthly Snapshots
3/28/2018
4/28/2018
5/28/2018
Water Depth (feet)
<-2.5'
0.0'
2.5'
5.0'
10'
>15'
Below Ground
Above Ground
South Florida Water Depth Assessment Tool (SFWDAT)

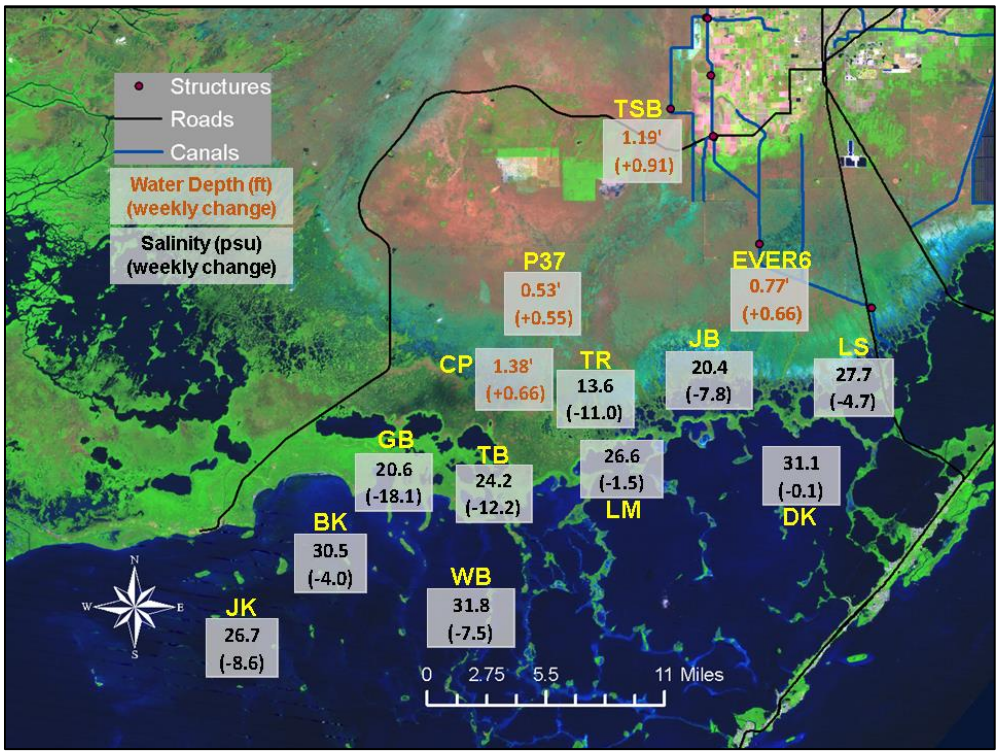

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
SFWDAT Everglades Difference Maps
(Present – Past)
5/28/2018
1 Week
1 Month
1 Year
Water Depth (feet)
<-2.5'
0.0'
2.5'
5.0'
10'
>15'
Below Ground
Above Ground
Water Depth Difference (feet)
-2'
-1'
0'
1'
2'
Drier
Wetter
South Florida Water Depth Assessment Tool (SFWDAT)

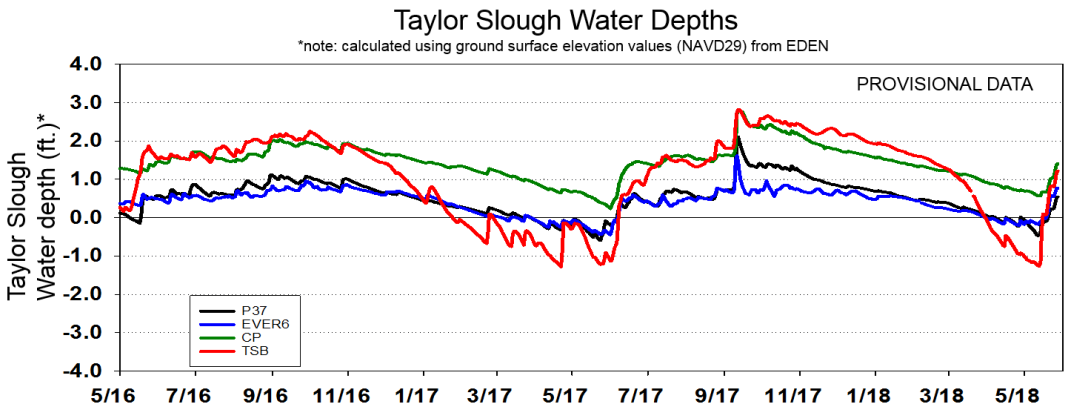
Wading Bird Update:

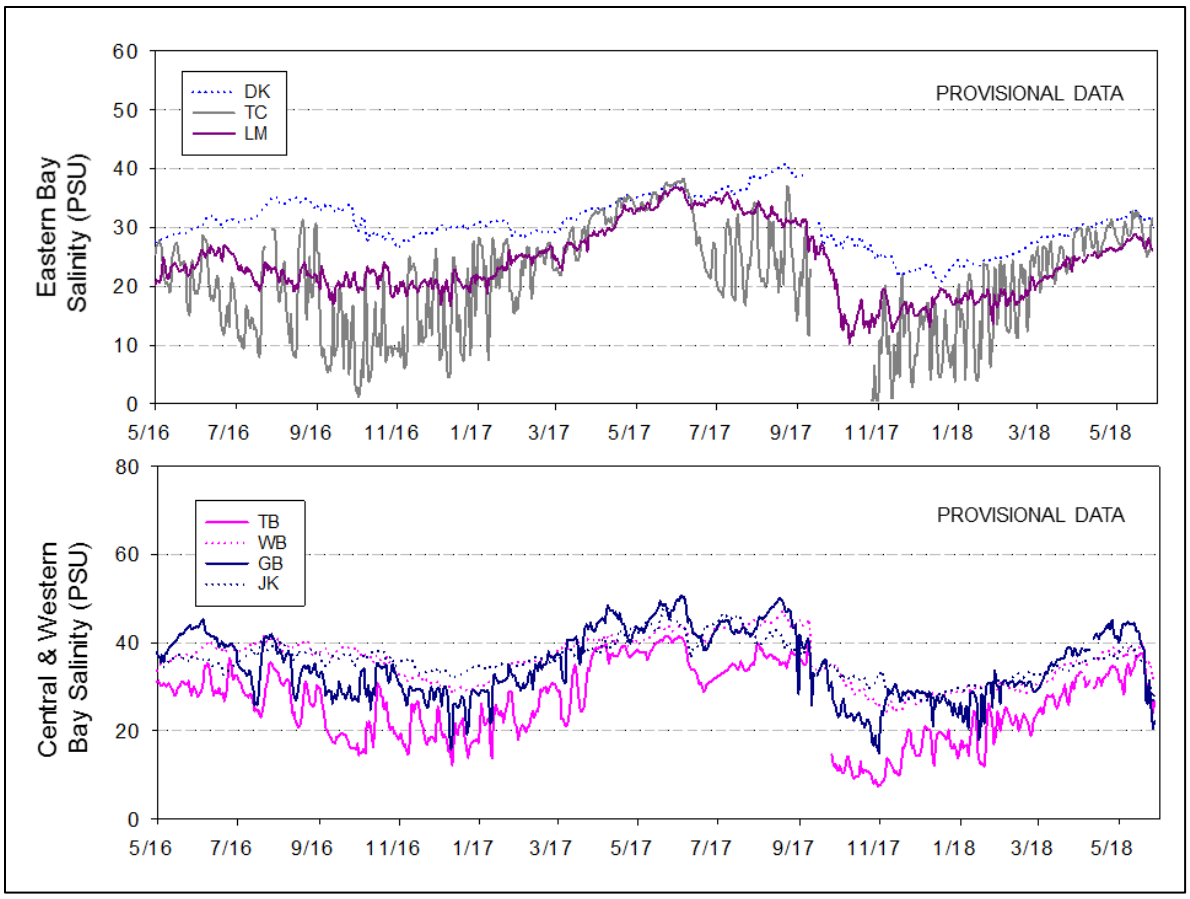
- No foraging observed in WCAs during May 21, 2018 flight. No flight this week.

Taylor Slough Water Levels: An average of 5 inches of rain fell on Taylor Slough and Florida Bay with a maximum of 8.4 inches falling over western Florida Bay. Stage changes this week ranged from +0.55 feet to +0.91 feet, and water depths in all areas are above ground. Water depths are 12 to 20 inches above the historical averages.

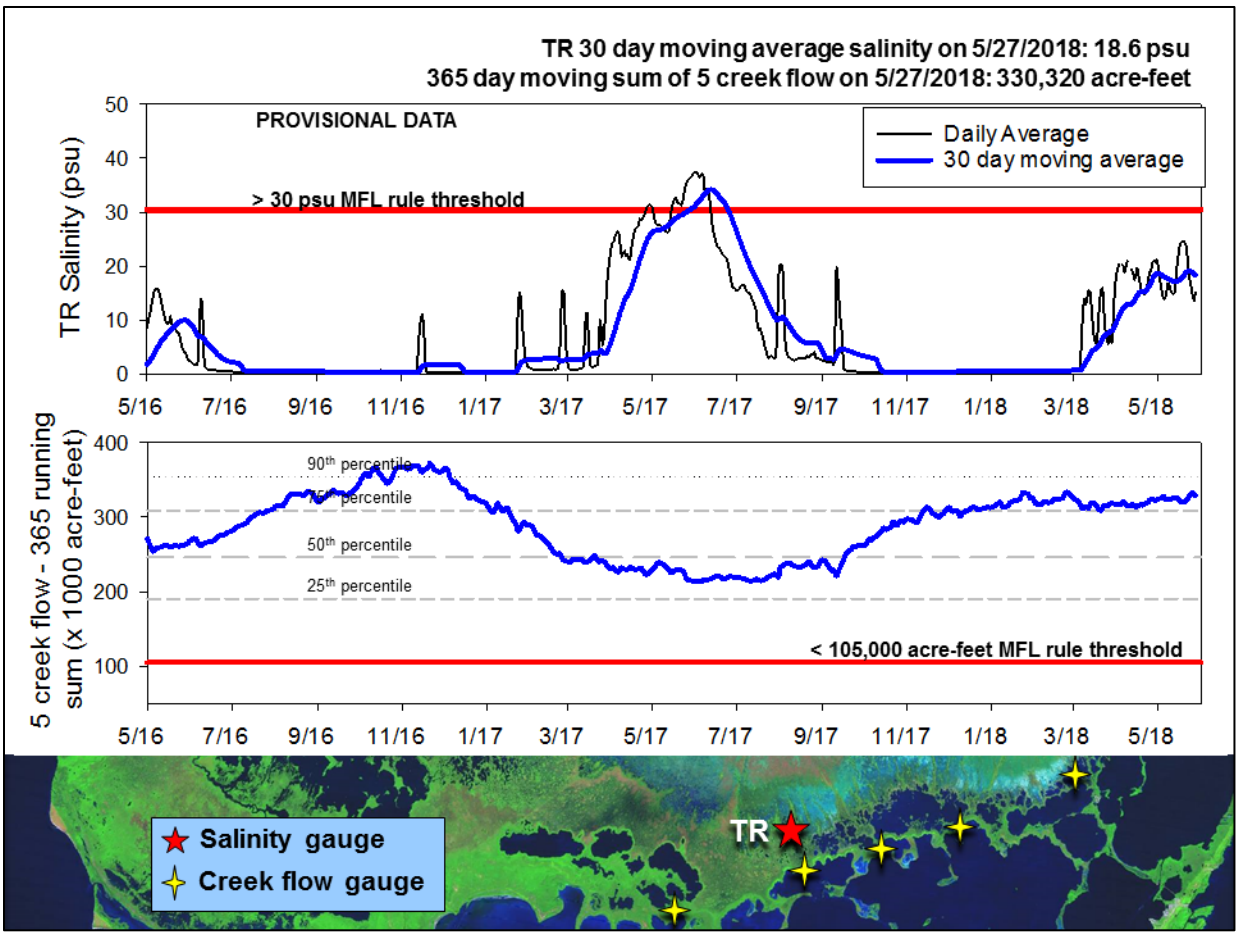
Florida Bay Salinities: Salinities decreased in Florida Bay, with changes ranging from −0.1 psu to −18.1 psu. Salinities ranged from 20 psu in the northeast to 32 psu in the central bay. This range is 3 to 22 psu below the historical averages. Garfield Bight (GB) is the station that is 22 psu below average, and all the central and western stations are at least 9 psu below average.







Florida Bay MFL: Mangrove zone daily average salinity decreased 11 psu this past week to end at 14 psu. The 30-day moving average peaked at 19.1 psu this past week before decreasing to 18.6 psu. The weekly cumulative flow from the five creeks denoted by yellow stars on the map totaled 1,800 acre-feet for last week but flows over the weekend were moving upstream. The 365-day moving sum of flow from the five creeks increased 10,000 acre-feet over the last week to end at 330,320 acre-feet (still greater than the long-term average of 257,628 acre-feet). Creek flow is provisional data from the USGS and is highly variable.



Water Management Recommendations

As stages have risen quickly across the Everglades, inflows to northernmost WCA-3A create the least ecological stress when compared to flows into more southern WCA-3A. Gauge 3-65 in southern WCA-3A nears the depth threshold for tree island flooding and WCA-2A is significantly over the regulation schedule. Incremental change in the rate of structural flows (i.e. when changing flow rates from 0 cfs to 1,000 cfs) making 500 cfs adjustments per week into the WCAs is more ecologically sensitive than abrupt rate changes. Stage ascension rates are now critical for apple snail reproduction in the Everglades. The current recommended rehydration rate is 0.25 feet or less per week (or 0.5 feet per 2 weeks). As water levels have increased significantly in the Everglades National Park, flows via the S-332D structure no longer provide an ecological benefit. Due to elevated levels of phosphorus 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 29th, 2018 (red is new)

Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.16'	Maintain depths at regulation schedule. Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect upstream/downstream habitat and wildlife.
WCA-2A	Stage increased by 0.83'	Maintain depths at regulation schedule. Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect upstream/downstream habitat and wildlife.
WCA-2B	Stage increased by 0.35'	Maintain depths at regulation schedule. Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect upstream/downstream habitat and wildlife.
WCA-3A NE	Stage increased by 0.91'	Maintain depths at regulation schedule. Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect upstream/downstream habitat and wildlife.
WCA-3A NW	Stage increased by 0.66'	Maintain depths at regulation schedule. Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	
Central WCA-3A S	Stage increased by 0.40'	Maintain depths at regulation schedule. Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect downstream wading bird foraging conditions.
Southern WCA-3A S	Stage increased by 0.15'		
WCA-3B	Stages increased by 0.71'	Maintain depths at regulation schedule. Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect upstream/downstream habitat and wildlife.
ENP-SRS	Stage increased by 0.37'	Make discharges to the Park according to the 2012 WCP rainfall plan.	Protect upstream/downstream habitat and wildlife.
Taylor Slough	Stage changes ranged from +0.55' to +0.91'	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 −0.1 to −18.1 psu.	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.