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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: August 7, 2018

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Below average rainfall to continue this week. Unfavorable upper level wind flow around a high-pressure ridge across Georgia and into a trough across the northern Caribbean will produce below average thunderstorm coverage again today with afternoon activity focused over western areas by steering winds out of the east-northeast. A tropical wave is expected to pass to the south of the District Tuesday which should bring some moisture over southern areas and help generate an increase in scattered shower activity over the southern half of the District beginning predawn Tuesday. An upper level low in the upper trough is forecast to move from eastern Cuba to near the Florida Straits on Wednesday. While generally sinking air on the west side of the low will help continue to the trend of below average shower development over the area, increased instability near the low should kick off a few areas of thunderstorms over the District Wednesday afternoon and evening. Daily thunderstorm activity is forecast to begin rebounding Thursday through Sunday, but overall coverage is expected to remain below average for early August.

Kissimmee

Tuesday morning stages were 56.8 feet NGVD (0.3 feet above schedule) in East Lake Toho, 53.7 feet NGVD (0.2 feet above schedule) in Lake Toho, and 51.6 feet NGVD (0.6 feet above schedule) in Lakes Kissimmee-Cypress-Hatchineha; headwater stages were 46.3 feet NGVD at S-65A and 26.7 feet NGVD at S-65D. Tuesday morning discharges were: 4,692 cfs at S-65, 5,038 cfs at S-65A, and 4,818 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 3.3 mg/L for the week. Kissimmee River mean floodplain depth on Sunday was 2.07 feet. No new recommendations were made this week.

Lake Okeechobee

Lake Okeechobee stage is 14.39 feet NGVD, just 0.03 feet higher than last week and 0.03 feet lower than 30 days ago. The seasonal low for 2018 (12.83 feet NGVD) was the third highest since 2011, and the third time in six years that lake stage did not reach the bottom of the preferred stage envelope (12.5 – 15.5 feet NGVD). Due to record rainfall in May, the submerged aquatic vegetation (SAV) coverage on the Lake will likely remain at minimal levels into next summer, prolonging impacts from high water levels associated with El Niño in 2016 and Hurricane Irma in 2017. Cyanobacteria bloom potential remained lower from mid-July to early August, with NOAA's analysis of satellite data (see supporting information below) suggesting most of the pelagic zone had much reduced potential for blooms. The latest image (August 6) suggests the chances for another bloom may be increasing slightly, with a concentration occurring in the center of the lake on August 5 and breaking apart somewhat on August 6, though cloud cover obscured some of the view. Conditions will likely remain favorable for some level

of recurring blooms throughout the remainder of the summer, particularly after more nutrient inputs from the watershed after rain events, or during stretches of low wind and high temperature on the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged 1,900 cfs over the past week with 1,057 cfs coming from Lake Okeechobee. Surface salinity decreased throughout the estuary. The seven-day average salinity at the US1 Bridge is in the poor range for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 4,169 cfs over the past week with 370 cfs coming from the Lake. Salinity remained near 0 down to Ft. Myers Yacht Basin and increased downstream. The 30-day moving average surface salinity is 0.2 at Val I-75 and 0.2 at Ft. Myers. Salinity conditions between Val I-75 and Ft. Myers are good for tape grass. Salinity conditions are in the poor range for adult eastern oysters at Cape Coral and in good range at Shell Point. Given the current estuarine conditions, there are no ecological benefits associated with freshwater releases from Lake Okeechobee.

Stormwater Treatment Areas

Over the past week, the STAs received approximately 49,400 acre-feet of inflows (which includes approximately 16,700 acre-feet of Lake releases). The total amount of inflows to the STAs in WY2019 (since May 1, 2018) is approximately 694,200 acre-feet, which includes approximately 78,400 acre-feet of Lake Okeechobee releases. Most STA cells are at or above target depths. Operational restrictions are in place for vegetation rehabilitation in STA-2 and for construction related activities in STA-1W. STA-5/6 Flow-ways 2 and 3 are offline for initiation of a Restoration Strategies project to grade non-effective treatment areas. The nests of Endangered Species Act protected species have been observed in STA-1E. This week, if 2008 LORS recommends Lake releases to the WCAs and the conditions allow, releases will be sent to the STA-1E, A-1 FEB/STA-3/4 and STA-2.

Everglades

Conditions within the Everglades remains stable. Stage on average decreased slightly across the Water Conservation Areas. Keeping depths below 2.5 feet at gauge 65 in WCA-3A is important to moderate the stress to tree islands caused by flooding when durations last longer than 60-90 days. Depths exceeded that mark from June 13 to August 4. The depth on Sunday at that location had receded to 2.4 feet. In Taylor Slough water depths are 3 to 4 inches above the historical average. Florida Bay salinities remain mostly stable and below historical average, decreasing 1.0 psu on average over last week.

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 1.21 inches of rainfall in the past week and the Lower Basin received 1.14 inches (SFWMD Daily Rainfall Report 8/6/2018).

Upper Kissimmee Basin

Stages and departures in the Kissimmee Chain of Lakes (KCOL) are shown in **Table 1**. KCOL stage hydrographs with respective regulation schedules and rainfall are shown in Figures 1-7.

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: 8/7/2018

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)						
							8/5/18	7/29/18	7/22/18	7/15/18	7/8/18	7/1/18	6/24/18
Lakes Hart and Mary Jane	S-62	260	LKMJ	60.0	R	60.0	0.0	0.0	0.1	0.1	0.1	0.2	0.0
Lakes Myrtle, Preston, and Joel	S-57	63	S-57	61.0	R	61.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Alligator Chain	S-60	223	ALLI	63.3	R	63.2	0.1	0.1	0.0	0.1	0.1	0.2	0.0
Lake Gentry	S-63	305	LKGT	61.1	R	61.0	0.1	0.0	0.0	0.0	0.0	0.1	-0.5
East Lake Toho	S-59	1,023	TOHOE	57.0	R	56.5	0.5	0.7	0.1	-0.1	-0.1	-0.5	-0.9
Lake Toho	S-61	2,333	TOHOW, S-61	53.8	R	53.5	0.3	0.6	-0.1	0.0	-0.1	-0.4	-0.9
Lakes Kissimmee, Cypress, and Hatchineha	S-65	4,407	KUB011, LKIS5B	51.7	R	51.0	0.7	0.6	0.2	0.1	0.3	-0.4	-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: 8/7/2018

Metric	Location	1-Day Average		Average for the Preceding 7-Days ¹								
		8/5/2018	8/5/18	7/29/18	7/22/18	7/15/18	7/8/18	7/1/18	6/24/18	6/17/18	6/10/18	6/3/18
Discharge (cfs)	S-65	4,562	4,407	4,179	1,567	2,561	1,287	514	834	1,110	915	1,092
Discharge (cfs)	S-65A ²	4,976	4,980	4,267	1,479	2,615	1,294	466	801	1,224	1,043	1,139
Discharge (cfs)	S-65D ²	4,711	4,458	2,264	2,641	2,226	1,774	1,608	2,094	2,062	1,925	1,869
Headwater Stage (feet NGVD)	S-65D ²	26.75	26.78	26.75	26.68	26.77	26.80	26.79	26.79	26.82	26.86	27.00
Discharge (cfs)	S-65E ²	5,012	4,619	2,400	2,764	2,399	2,000	1,834	2,347	2,261	2,107	2,082
Discharge (cfs)	S-67	154	157	209	183	217	292	298	277	273	278	282
DO (mg/L) ³	Phase I river channel	3.4	3.3	4.2	2.3	2.7	2.9	3.4	2.0	1.4	1.7	3.4
Mean depth (feet) ⁴	Phase I floodplain	2.07	2.08	1.22	1.05	1.20	0.60	0.46	0.75	0.84	0.76	0.66

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

²S-65A discharge combines S-65A with auxiliary structures; S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2; S-65D stage averages stage at S-65D and S-65DX1; S-65E discharge combines S-65E and S-65EX1.

³DO is the average for sondes at PC62 and PC33.

⁴1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).

DATA ARE PROVISIONAL; N/A indicates that data were not available.

KCOL Hydrographs (through Sunday midnight)

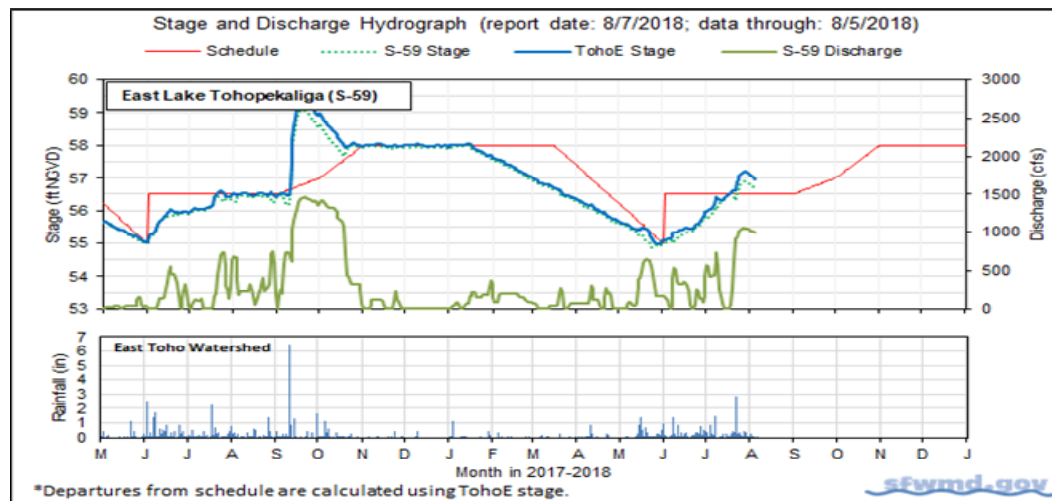


Figure 1.

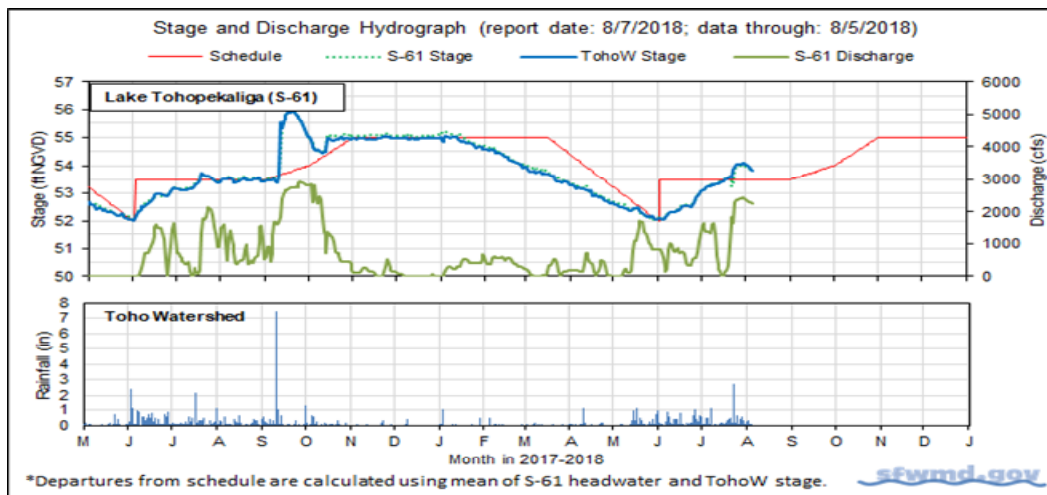


Figure 2.

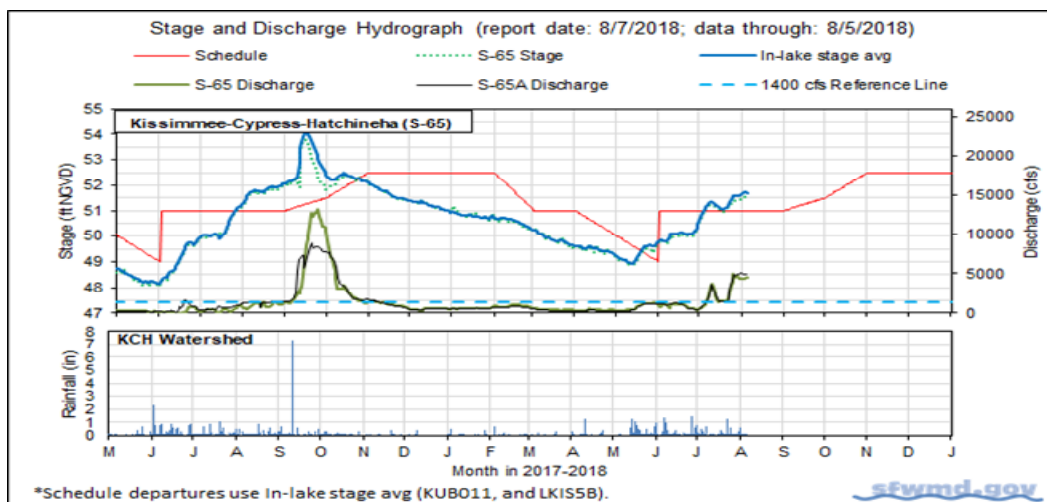


Figure 3.

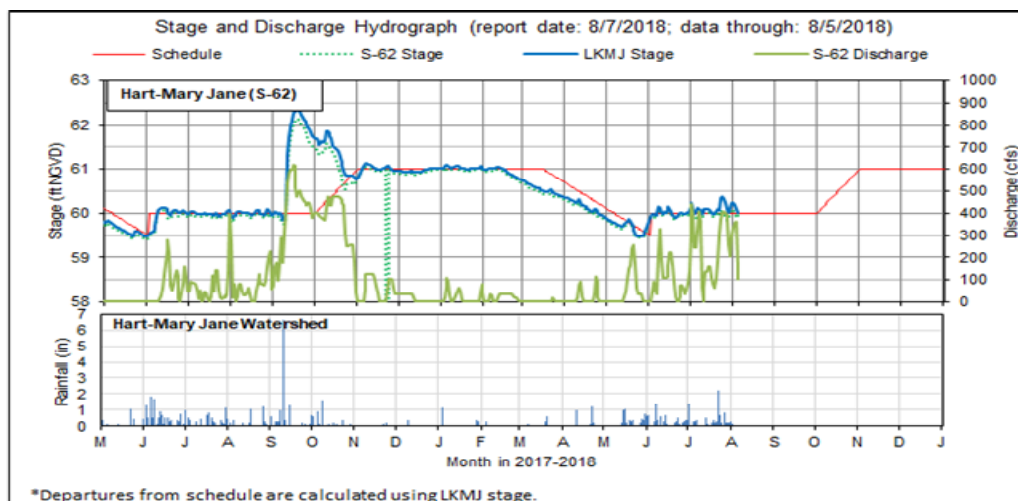


Figure 4.

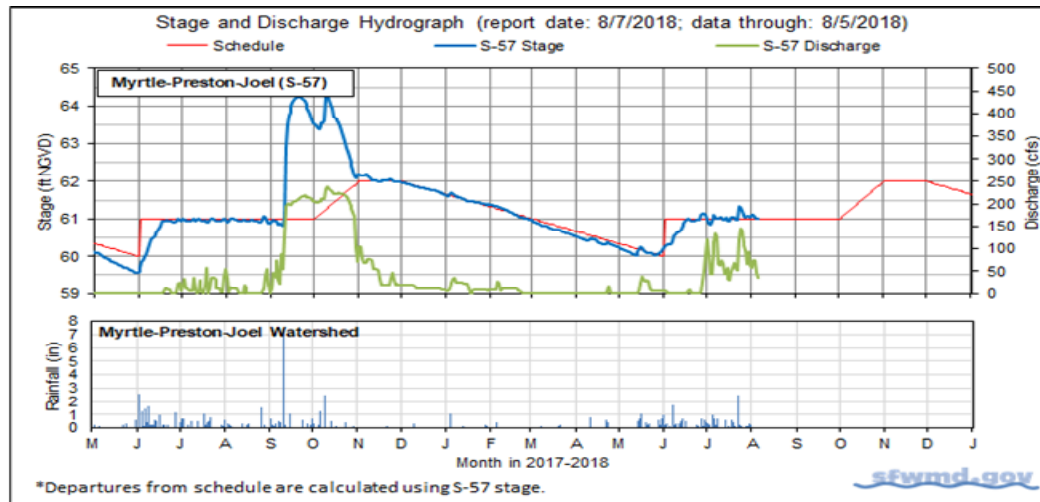


Figure 5.

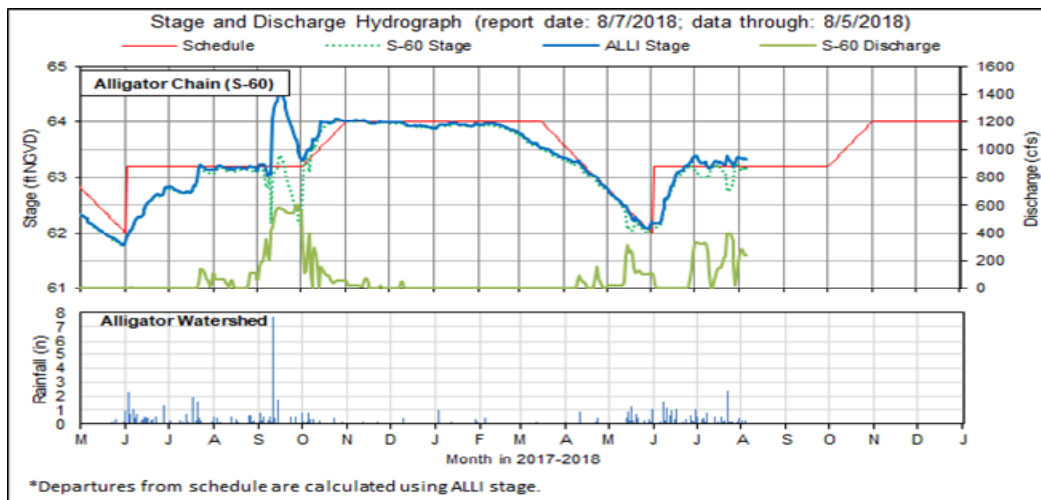


Figure 6.

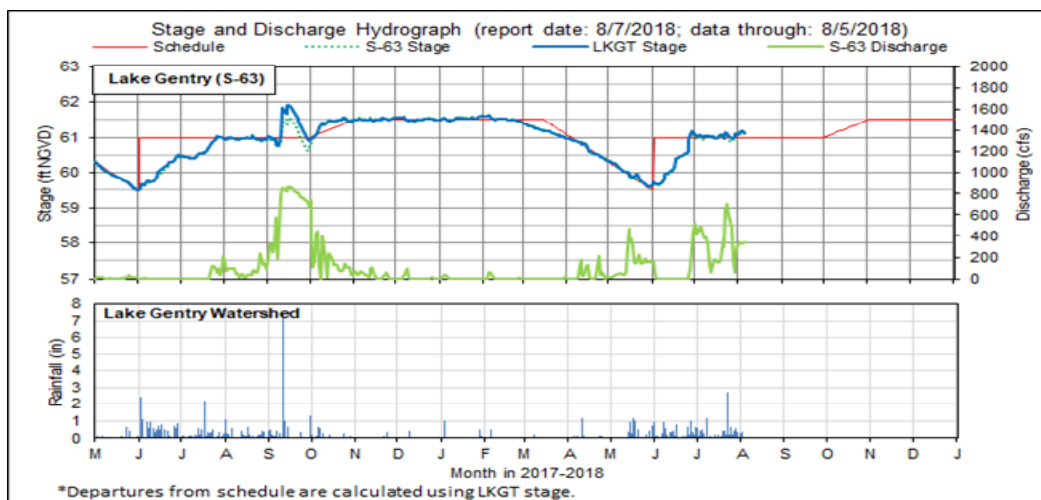


Figure 7.

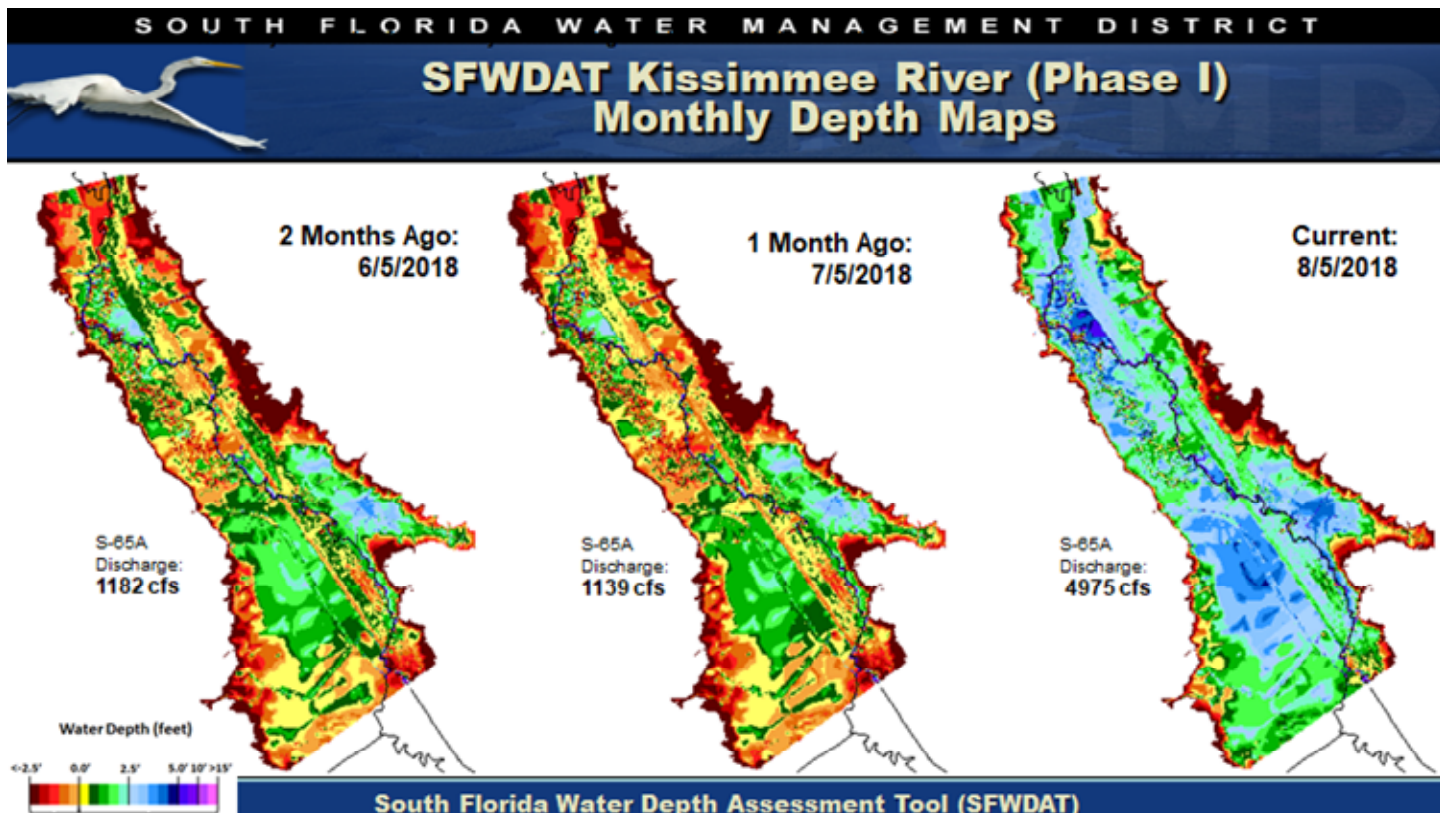


Figure 8. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

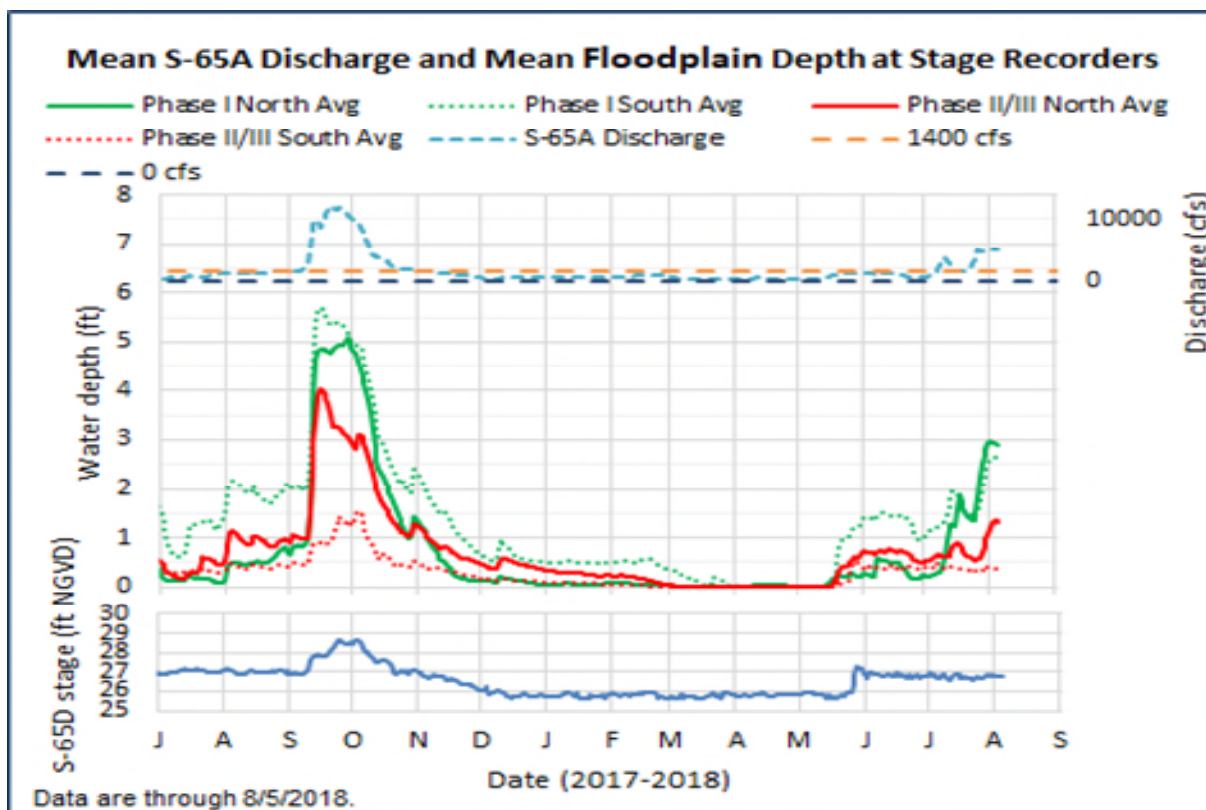
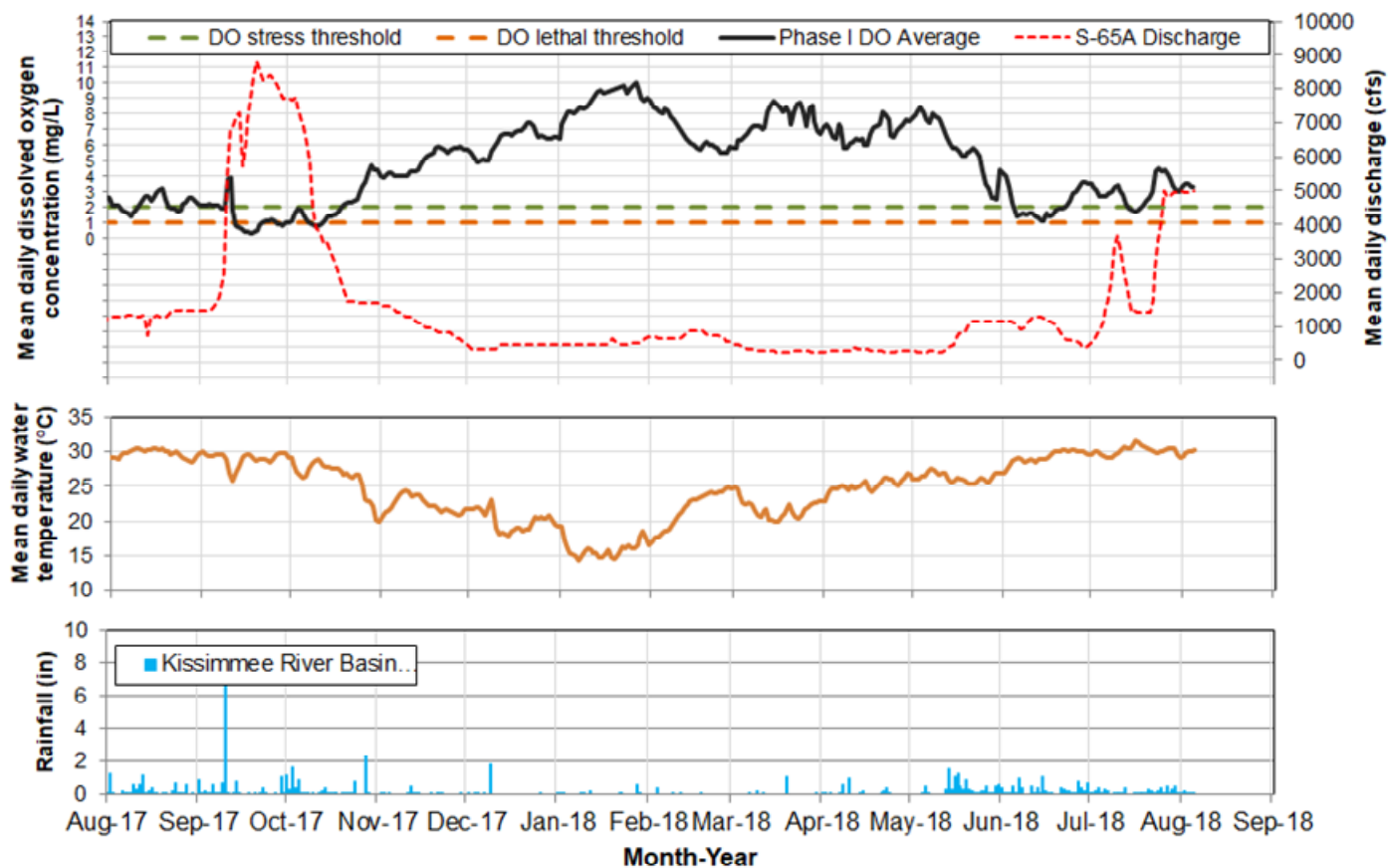


Figure 9. Mean water depth at stage recorders in the northern Phase I, southern Phase I, northern Phase II/III, and southern Phase II/III areas in relation to the S-65A discharge and S-65D headwater stage.



Report Date: 8/7/2018; data are through: 8/5/2018.

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

Water Management Recommendations

Recommendation Date	Recommendation	Purpose	Outcome	Source	Report Date
8/7/2018	No new recommendations.		N/A		8/7/2018
7/23/2018-7/24/2018	Increase discharge from 1400 cfs to 3000 cfs, then 3200 cfs and 3500 cfs.	For flood control in Lake Kissimmee.	Implemented	SFWMD Water Mgt/KB Ops	7/31/2018
7/19/2018	Follow Revised (X2) 2018 Wet Season Discharge Plan to the extent possible, including 50 foot stage threshold and 0.5 foot flood control buffer.	To the extent possible, maintain sufficient discharge to keep areas under snail kite nests in Pool D hydrated until nests fledge, while avoiding large increases in discharge that might flood the nests.	N/A	KB Ops	7/24/2018
7/13/2018	Maintain at least 1400 cfs at S-65A while Lake Kissimmee stage is above 50 feet. (See revised 2018 discharge plan).	To the extent possible, maintain sufficient discharge to keep areas under snail nest kites in Pool D hydrated until nests fledge.	N/A	KB Ops	7/17/2018
7/13/2018	Reduce S-65/S-65A discharge by 600 cfs/day until 1400 cfs is reached. (See revised 2018 discharge plan, below).	Reach 1400 cfs faster to help stabilize Lake Kissimmee stage.	Implemented	SFWMD Water Mgt/KB Ops	7/17/2018
7/9/2018	Increase S-65/S-65A discharge by 300 cfs if needed.	Stabilize Lake Kissimmee stage.	N/A	SFWMD Water Mgt/KB Ops	7/10/2018
7/8/2018	Increase S-65/S-65A discharge by 900 cfs today in 3 increments of 300 cfs each.	Stabilize Lake Kissimmee stage.	Implemented	KB Ops	7/10/2018
7/5/2018	Increase S-65/S-65A discharge by 300 cfs/day (double the prescribed rate of increase) Thursday through Sunday.	Stabilize Lake Kissimmee stage.	Implemented	SFWMD Water Mgt	7/10/2018
7/2/2018	Increase S-65/S-65A discharge by 150 cfs/day (double the prescribed rate of increase).	Stabilize Lake Kissimmee stage.	Implemented	SFWMD Water Mgt/KB Ops	7/10/2018
6/30/2018	Increase S-65/S-65A discharge as slowly as feasible	Slow stage ascension in Kissimmee-Cypress-Hatchineha	Implemented	KB Ops/SFWMD Water Mgt	7/3/2018
6/28/2018	Continue to reduce discharge at S-65/S-65A as slowly as feasible.	Prevent stage decline in Kissimmee-Cypress-Hatchineha.	Implemented	KB Ops/SFWMD Water Mgt	7/3/2018
6/21/2018	Reduce discharge at S-65/S-65A as slowly as feasible.	Prevent stage decline in Kissimmee-Cypress-Hatchineha.	Implemented	KB Ops/SFWMD Water Mgt	6/26/2018
6/15/2018	Reduce S-65A discharge by 150-300 cfs over the weekend.	Slow or stop DO decline in Kissimmee River.	Implemented	KB Ops	6/19/2018
6/12/2018	No new recommendations.		N/A		6/12/2018
6/5/2018	No new recommendations.		N/A		6/5/2018
5/29/2018	Begin implementation of the 2018 Wet Season Discharge Plan for S-65/S-65A on June 1 (see figure).	Provide variable flow from S-65/S-65A to balance Kissimmee River and Headwaters Lakes objectives including Kissimmee River floodplain inundation, moderated rates of change in discharge, and constrained rate of stage rise in the lakes.	Planned	KB Ops/SFWMD Water Mgt/FWC/FWS	5/29/2018
5/22/2018	Hold Kissimmee-Cypress-Hatchineha at current stage of approximately 49.5 ft until June 1.	(a) Reduce impacts of rising water on DO in the Kissimmee River; and (b) limit stage reversal in KCH to <1 foot to protect snail kite nests.	Implemented	KB Ops/SFWMD Water Mgt	5/29/2018
5/18/2018-5/20/2018	Increase discharge gradually in response to rainfall in consultation with KB staff.	(a) Reduce impacts of rising water on DO in the Kissimmee River; and (b) limit stage reversal in KCH to <1 foot to protect snail kite nests.	Implemented	KB Ops	5/22/2018
5/15/2018	Adjust S-65/S-65A discharge over the next few days to avoid additional stage rise in Kissimmee-Cypress-Hatchineha. Make any needed discharge changes gradually in consultation with Kissimmee Basin staff to reduce potential effects on Kissimmee River dissolved oxygen.	Protect Lake Kissimmee snail kite nests from rising water if there is additional rainfall.	N/A	KB Ops	5/22/2018
5/8/2018	No new recommendations.		N/A		5/8/2018
5/1/2018	No new recommendations.		N/A		5/1/2018
4/24/2018	No new recommendations.		N/A		4/24/2018
4/17/2018	No new recommendations.		N/A		4/17/2018
4/10/2018	No new recommendations.		N/A		4/10/2018
4/3/2018	No new recommendations.		N/A		4/3/2018
3/27/2018	No new recommendations.		N/A		3/27/2018
3/20/2018	No new recommendations.		N/A		3/20/2018
3/13/2018	No new recommendations.		N/A		3/13/2018
3/6/2018	No new recommendations.		N/A		3/6/2018

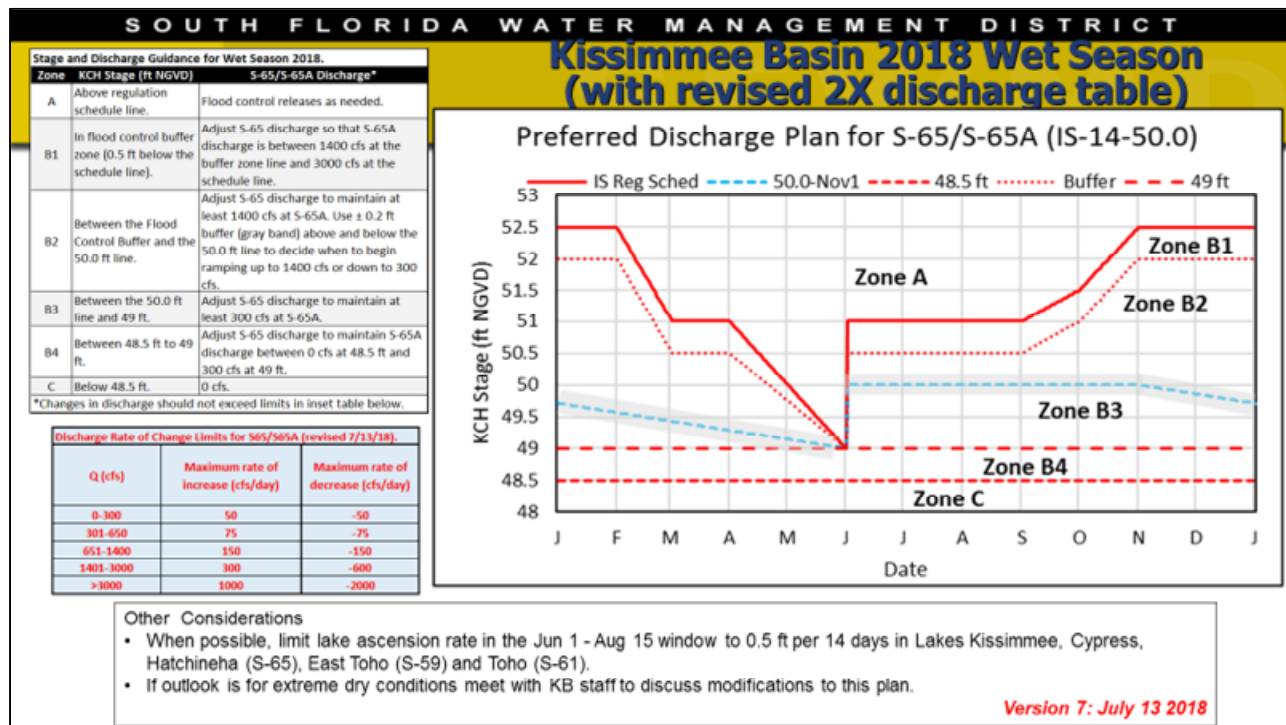


Figure 11. The 2018 Wet Season Discharge Plan for S-65/S-65A.

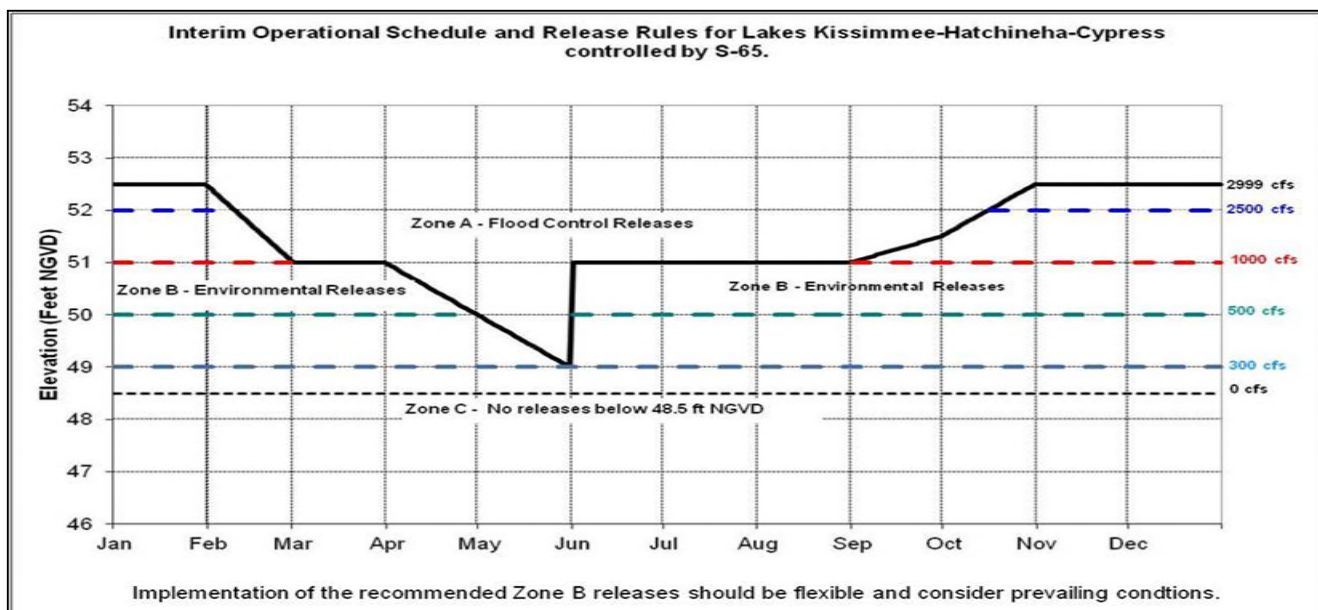


Figure 12. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years.

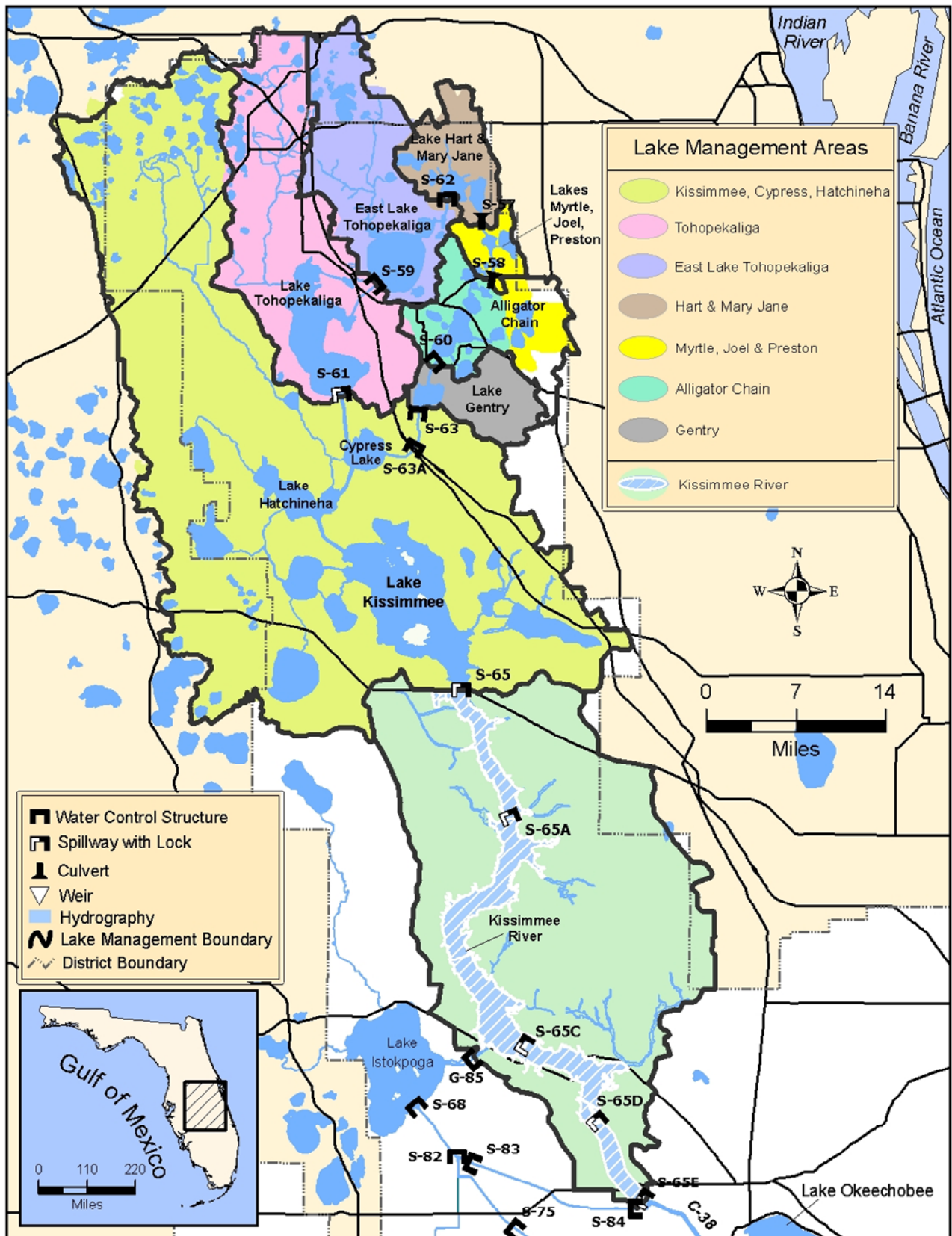


Figure 13. The Kissimmee Basin.

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 14.39 feet NGVD for the period ending at midnight on August 6, 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 0.03 feet lower than it was a month ago and 1.3 feet higher than a year ago (Figure 1). The Lake remains in the Low sub-band (Figure 2). The August 6 lake stage was the third highest since 2011, with only 2013 and 2016 having higher stages, at 1.60 feet and 0.23 feet higher, respectively (Figure 3). According to RAINDAR, 0.97 inches of rain fell over the Lake during the week July 31, 2018 – August 6, 2018. Most of the watershed received similar rainfall, between 0.25 – 1.5 inches (Figure 4).

Average daily inflows to the Lake increased considerably from the previous week, rising to 6,621 cfs, from 3,979 cfs. Most of the increase in inflows was from the Kissimmee River (S-65E structures) and Lake Istokpoga (S-84 structures), going from 2,680 cfs and 566 cfs the previous week, respectively, to 4,790 cfs and 1,042 cfs this past week, respectively (Table 1). Fisheating Creek flows, as measured at Lakeport, also increased slightly from 122 cfs to 233 cfs this past week. There have been no back-pumping operations from the S-2 or S-3 pumps during the wet season thus far.

Total outflows also increased from the previous week, though to a lesser extent. Total outflows rose from 2,011 cfs the previous week to 2,932 cfs this past week, primarily from increases in discharge south. Discharges west via the S-77 structure decreased due to basin runoff, going from 1,041 cfs to just 370 cfs this past week, while S-308 discharges to the east increased from just 344 cfs to 1,129 cfs this past week. Outflows to the south through the S-350 structures increased from 625 cfs average daily cfs the previous week to 1,431 cfs this past week. The corrected average daily evapotranspiration value for the week based on the L006 weather platform solar radiation increased slightly to 0.17 inches this past week.

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 5 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.

The most recent satellite imagery (August 6) using the cyanobacteria monitoring product derived from NOAA's analysis of EUMETSAT's OLCI satellite sensor showed the potential for a cyanobacteria bloom remains elevated in the central portion of the lake (Figure 6).

Snail kite nesting has returned in earnest on the Lake in late June and July, bringing the year's total to 170 so far. Ninety-eight of the nests are currently active and are heavily concentrated in the Moonshine Bay areas that were managed by the Florida Fish and Wildlife Conservation Commission and the District in 2015 to reduce cattail coverage and restore a less dense, open water marsh in the area (Figure 7). This is the second summer that snail kites have established 100-plus nests (the other year was 2016) in and around the managed portion of the Bay, making it extremely successful in terms of restoring wading bird and snail kite use of the marsh.

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

INFLOWS	Previous Week Avg Daily cfs	Avg Daily Inflow cfs	Equivalent Depth Week Total (in)
S65E & S65EX1	2680	4790	1.9
S71 & 72	363	371	0.2
S84 & 84X	566	1042	0.4
Fisheating Creek	122	233	0.1
S154	40	17	0.0
S191	77	70	0.0
S133 P	70	37	0.0
S127 P	46	27	0.0
S129 P	10	34	0.0
S131 P	8	2	0.0
S135 P	0	0	0.0
S2 P	0	0	0.0
S3 P	0	0	0.0
S4 P	0	0	0.0
L8 Backflow	0	0	0.0
Rainfall	2287	2684	1.0
Total	6266	9305	3.7

OUTFLOWS	Previous Week Avg Daily cfs	Avg Daily Outflow cfs	Equivalent Depth Week Total (in)
S77	1041	370	0.2
S308	344	1129	0.5
S351	243	754	0.3
S352	0	0	0.0
S354	382	677	0.3
L8 Outflow	1	2	0.0
ET	2811	3224	1.3
Total	4822	6156	2.5

PROVISIONAL DATA

Water Management Recommendations

Lake Okeechobee stage is 14.39 feet NGVD, just 0.03 feet higher than last week and 0.03 feet lower than 30 days ago. The seasonal low for 2018 (12.83 feet NGVD) was the third highest since 2011, and the third time in six years that lake stage did not reach the bottom of the preferred stage envelope (12.5 – 15.5 feet NGVD). Due to record rainfall in May, the submerged aquatic vegetation (SAV) coverage on the Lake will likely remain at minimal levels well into the summer of next year, prolonging impacts from high water levels associated with El Niño in 2016 and Hurricane Irma in 2017. Recovery of SAV in the nearshore zone will require low lake stages in the summer of 2019, so efforts to prepare for such an event will help speed the rebound of this important community.

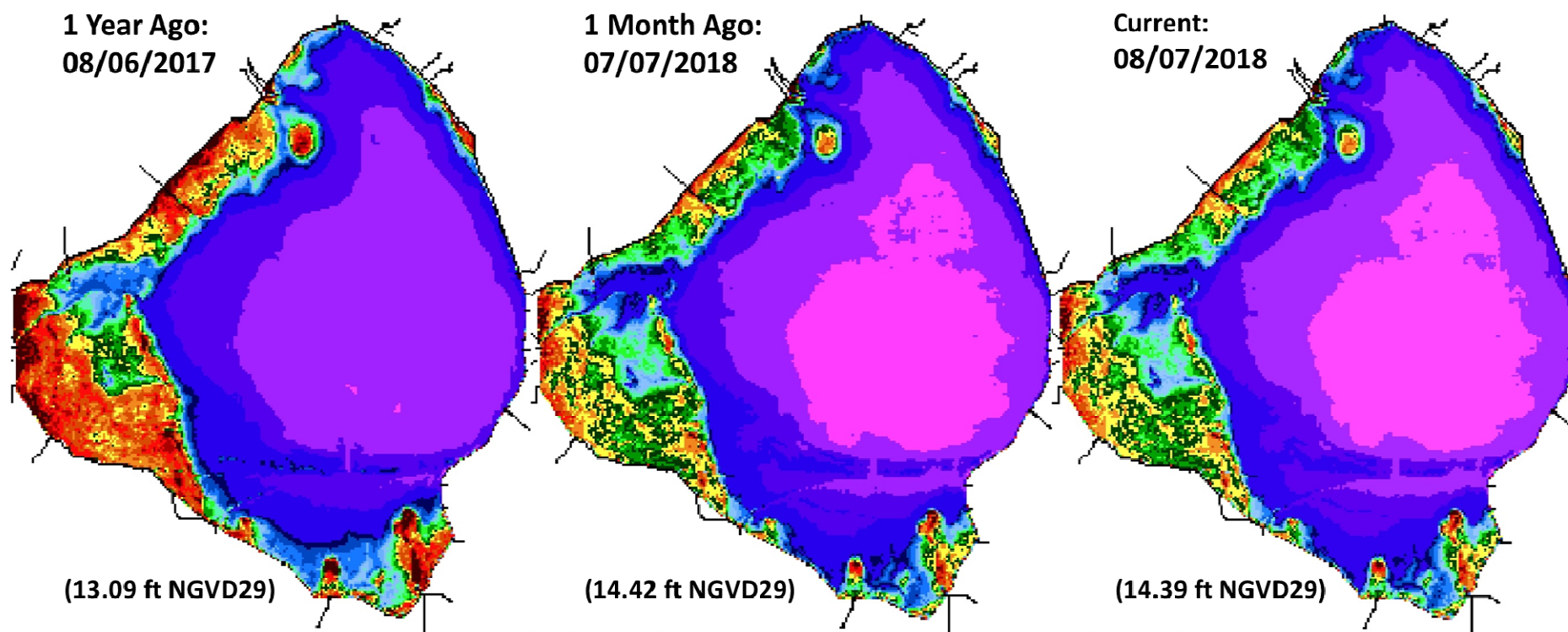


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

Lake Okeechobee Water Level History and Projected Stages

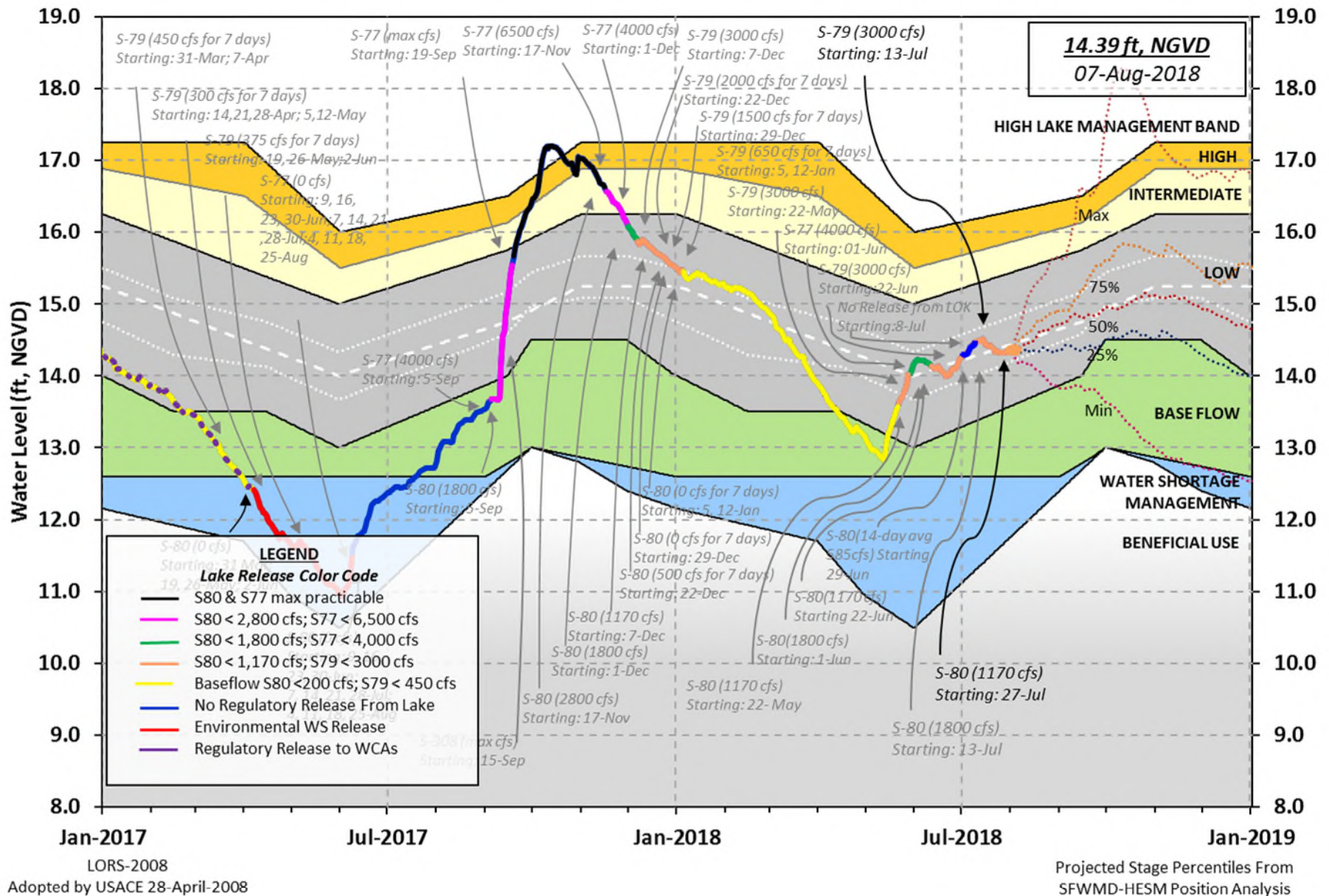


Figure 2. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

Lake Okeechobee Water Level Comparison

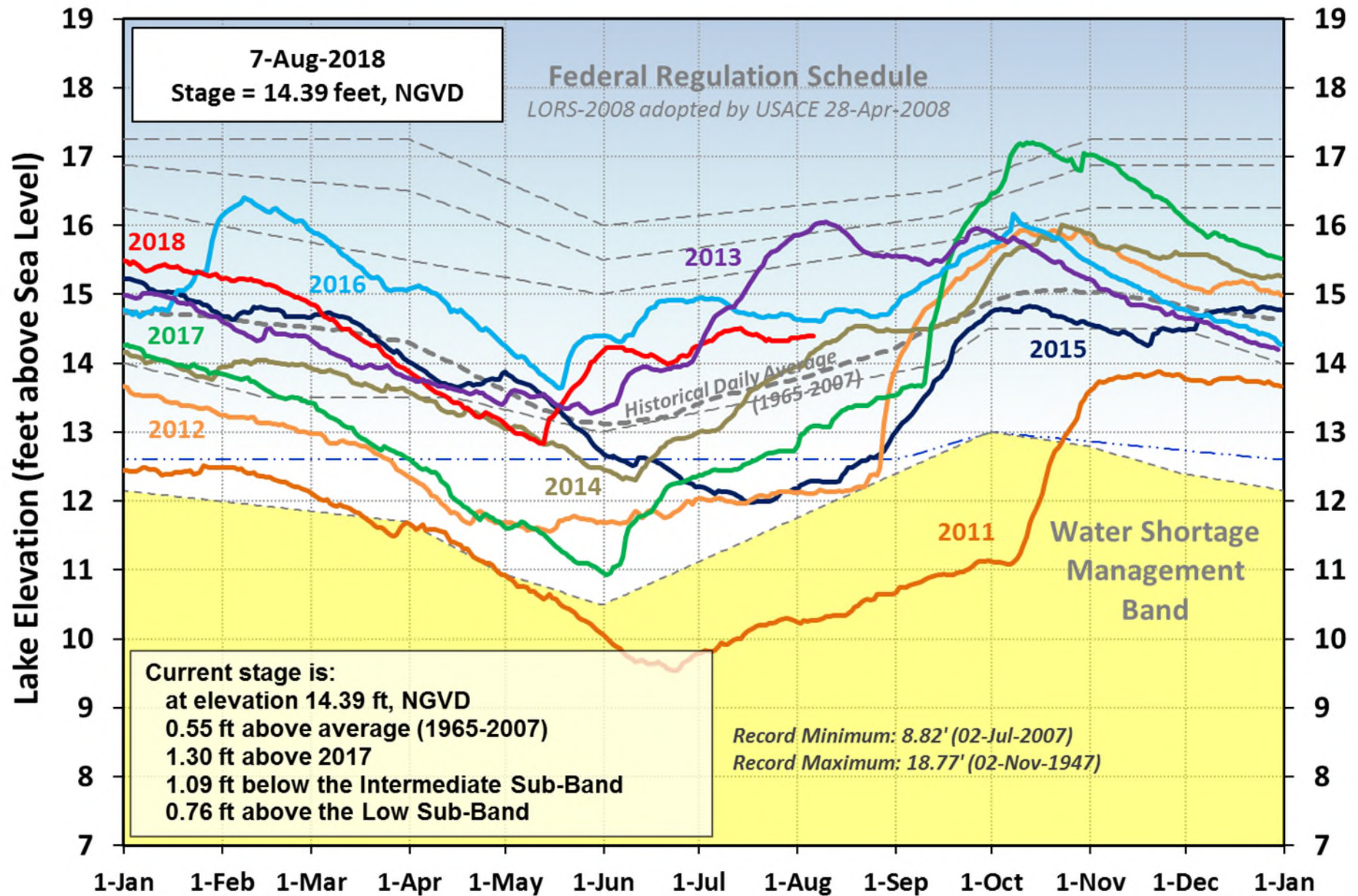


Figure 3. Annual stage hydrographs for Lake Okeechobee from 2011 – 2018.

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES
FROM: 0530 EST. 07/31/2018 THROUGH: 0530 EST. 08/07/2018

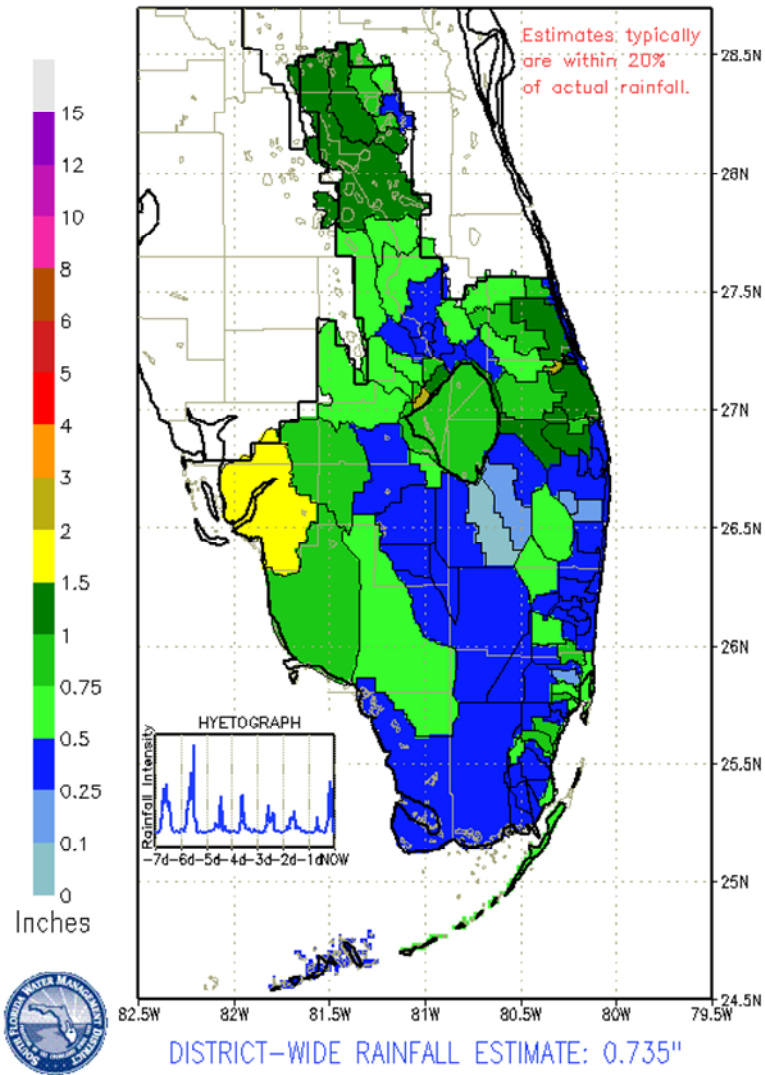


Figure 4. Rainfall estimates by basin.

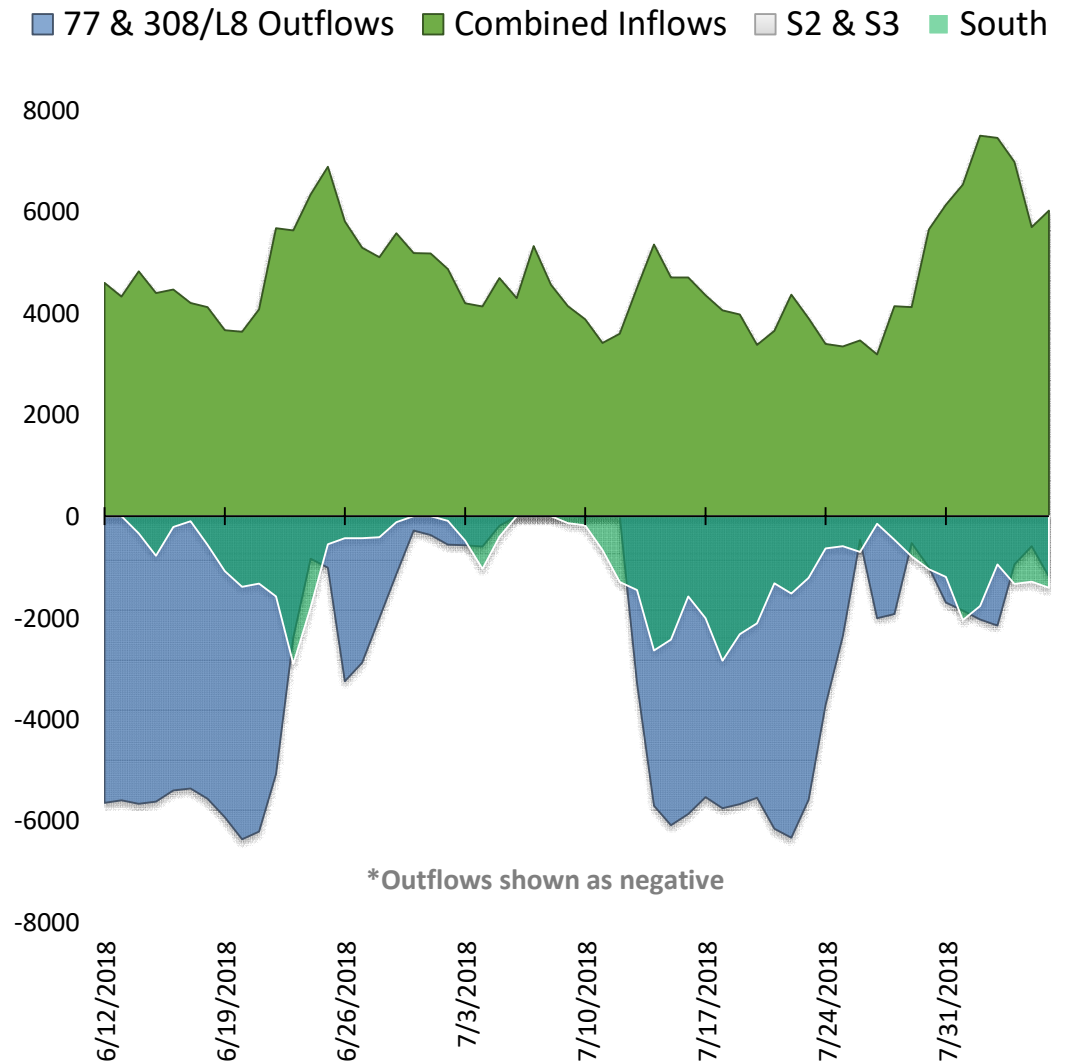
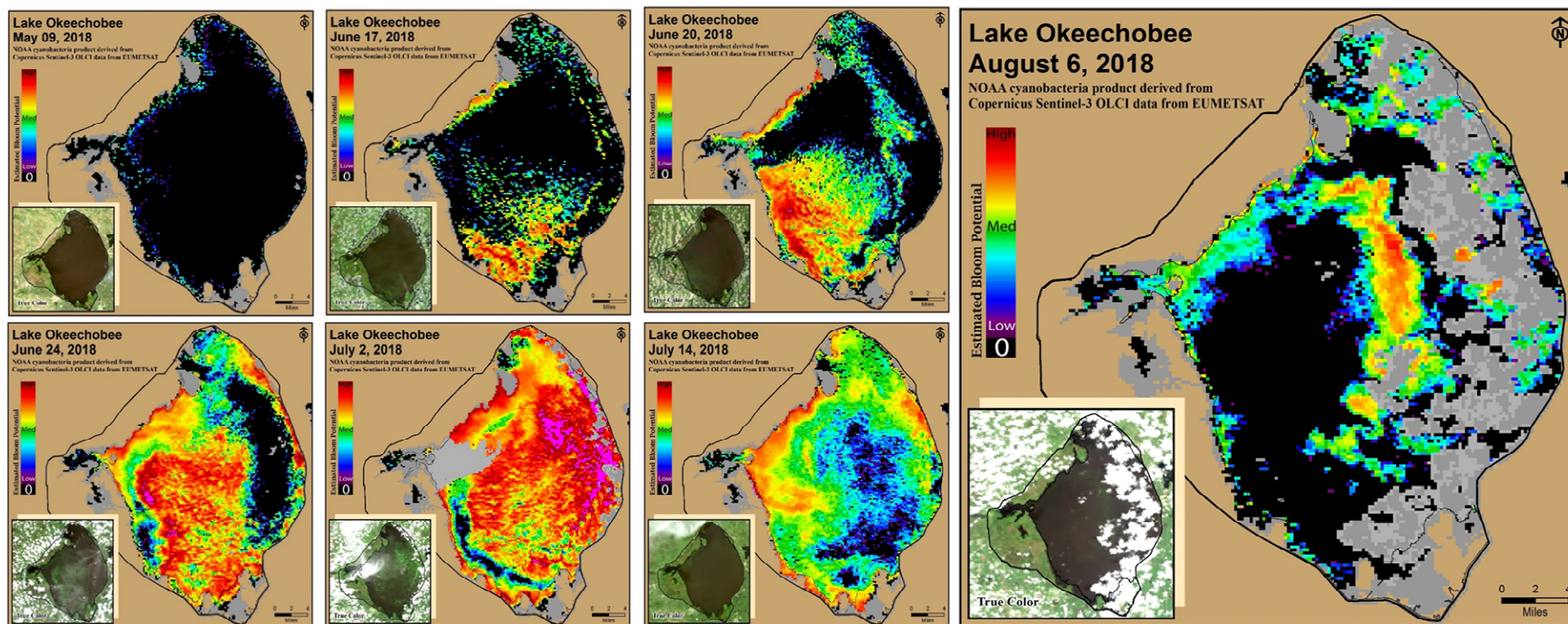


Figure 5. Major inflows and outflows of Lake Okeechobee, including the S350 structures designated as South. The L-8 canal flows through culvert 10A are included as outflows when positive, and as inflows when backflowing into the lake. Inflows and outflows are shown as positive and negative, respectively, for visual purposes.



NOAA cyanobacteria product derived from Copernicus Sentinel-3 OLCI data from EUMETSAT

Unvalidated and Experimental Data

Figure 6. 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. Gray indicates cloud cover. All data are experimental and unvalidated at this point in product development.

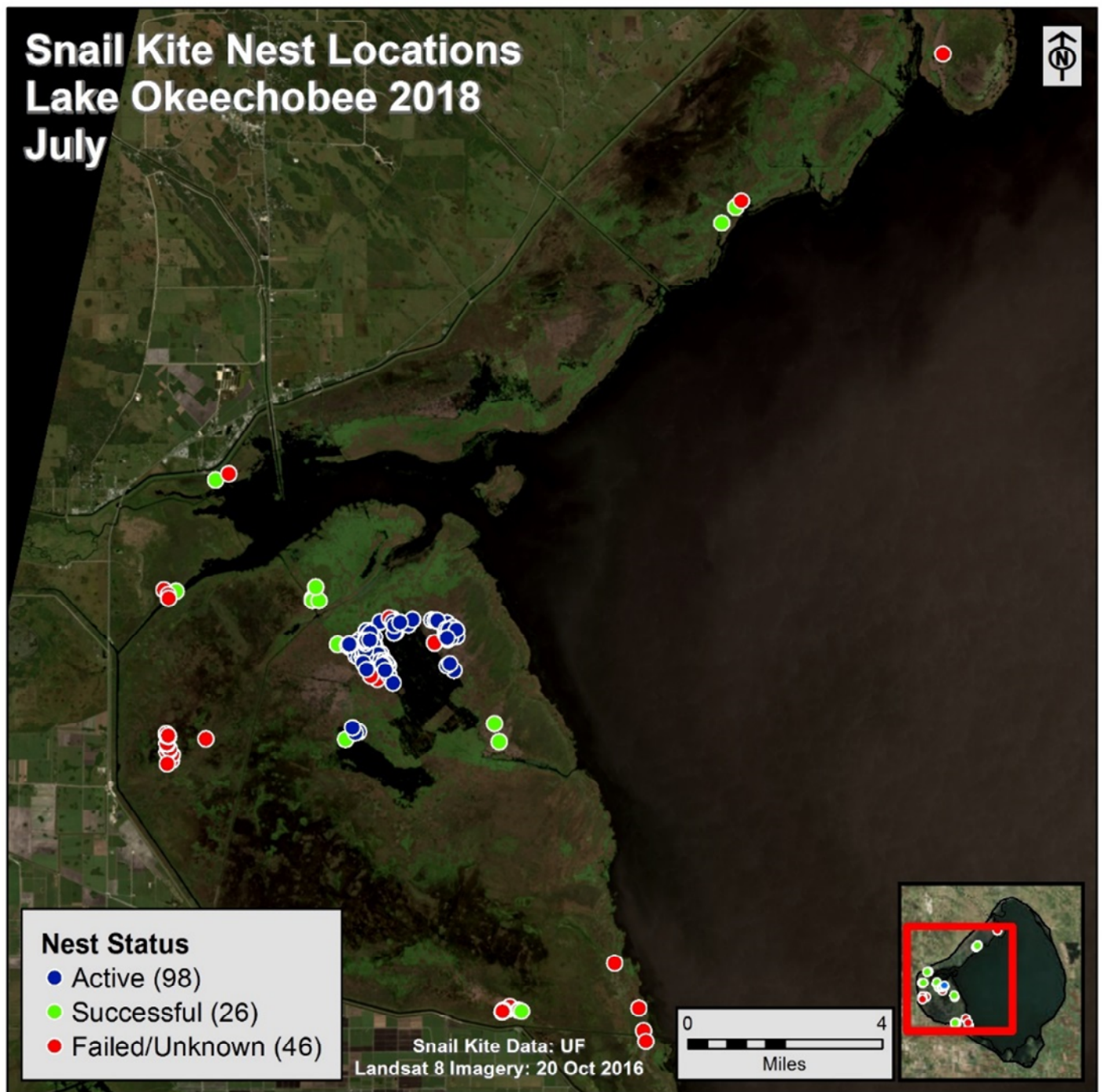


Figure 7. Snail

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged about 1,900 cfs (Figures 1 and 2) and last month inflow averaged about 2,230 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 are provisional).

Location	Flow (cfs)
Tidal Basin Inflow	359
S-80	1144
S-308	1129
S-49 on C-24	8
S-97 on C-23(estimate)	161
Gordy Rd. structure on Ten Mile Creek	228

Over the past week in the estuary, 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 4.2. 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)	2.2 (2.7)	2.7 (4.5)	NA ¹
US1 Bridge	3.8 (6.0)	4.7 (NR ²)	10.0-26.0
A1A Bridge	12.2 (13.6)	20.0 (21.1)	NA ¹

¹Envelope not applicable and ²Not Reporting.

Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged about 4,169 cfs (Figures 5 and 6) and last month inflow averaged about 5,233 cfs. Last week's provisional averaged inflows from the structures are shown in Table 3.

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

Location	Flow (cfs)
S-77	370
S-78	1,278
S-79	3,614
Tidal Basin Inflow	555

Over the past week, salinity was near 0 down to Ft. Myers Yacht Basin and increased downstream (Table 4, Figures 7 & 8). The seven-day average salinity values are estimated to be in the poor range for adult eastern oysters at Cape Coral, in the good range at Shell Point, and were not available at Sanibel (Figure 9). The 30-day moving average surface salinity is 0.2 at Val I-75 and 0.2 at Ft. Myers. Salinity conditions between Val I-75 and Ft. Myers are good for tape grass.

Table 4. Seven-day average salinity at six monitoring stations in the Caloosahatchee Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for tape grass (*Vallisneria americana*) at Val I-75 and for adult eastern oysters (*Crassostrea virginica*) elsewhere.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	0.2 (0.2)	0.2 (0.2)	NA ¹
Val I75	0.2 (0.2)	0.2 (0.2)	0.0-5.0 ²
Ft. Myers Yacht Basin	0.2 (0.2)	0.2 (0.2)	NA
Cape Coral	1.3 (0.9)	2.03 (1.1)	10.0-30.0
Shell Point	13.4 (~12.0)	13.4 (~12.0)	10.0-30.0
Sanibel	NR ³ (NR)	NR (NR)	10.0-30.0

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

The Florida Fish and Wildlife Research Institute reported on July 27, 2018, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background to high concentrations in 27 samples collected from or offshore of Lee County. Fish kills and respiratory irritation were reported in Lee County over the past week.

Water Management Recommendations

Lake stage is in the Low sub-band of 2008 LORS. Tributary hydrological conditions are 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.

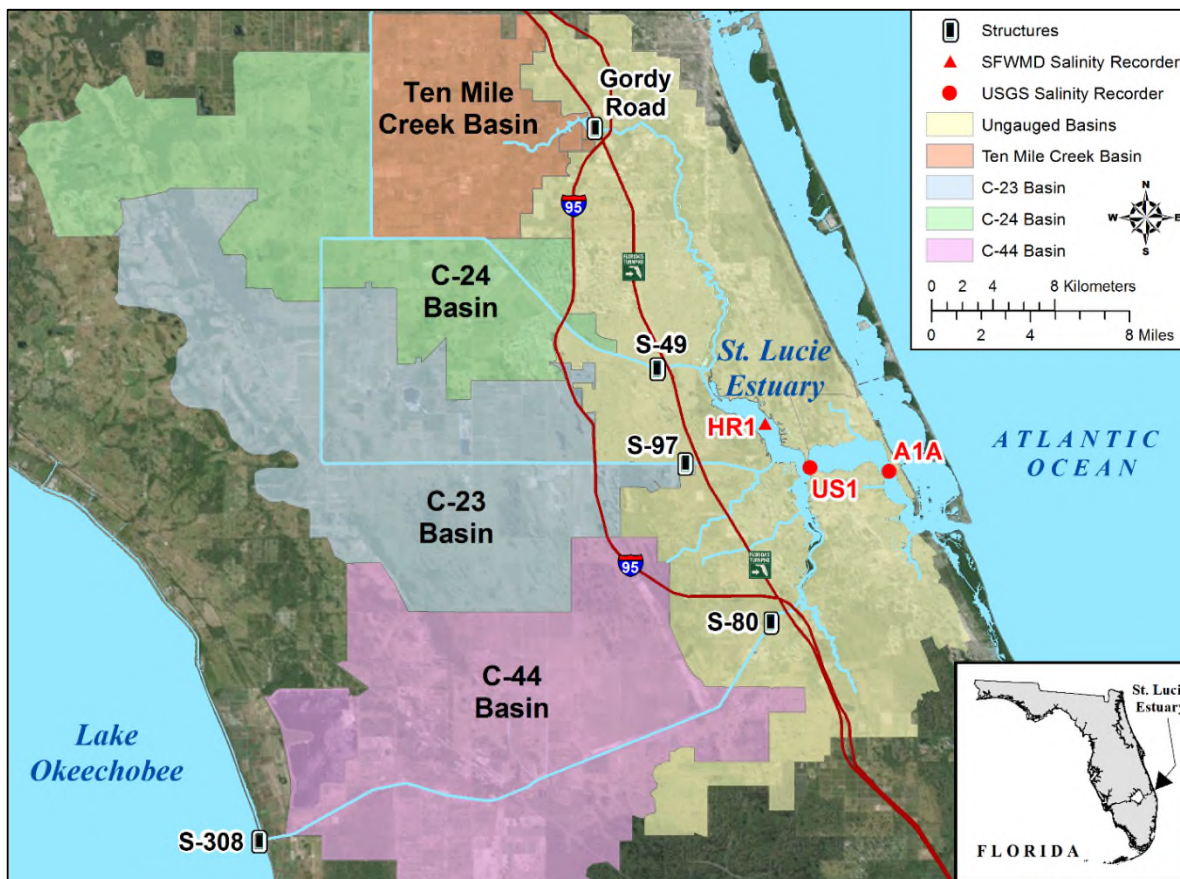


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

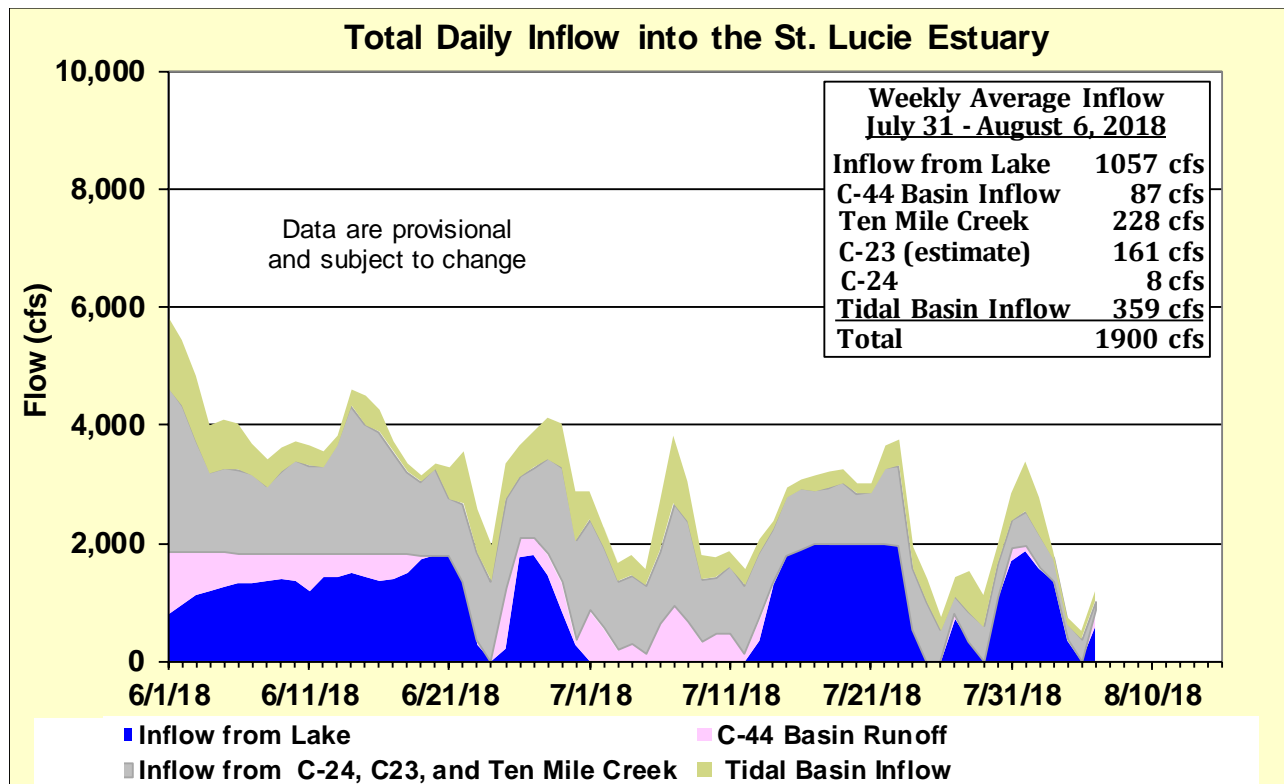


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary. (* Beginning July 14th most flows from S-308 were greater than flows from S-80. No run-off was detected from C-44 during this period)

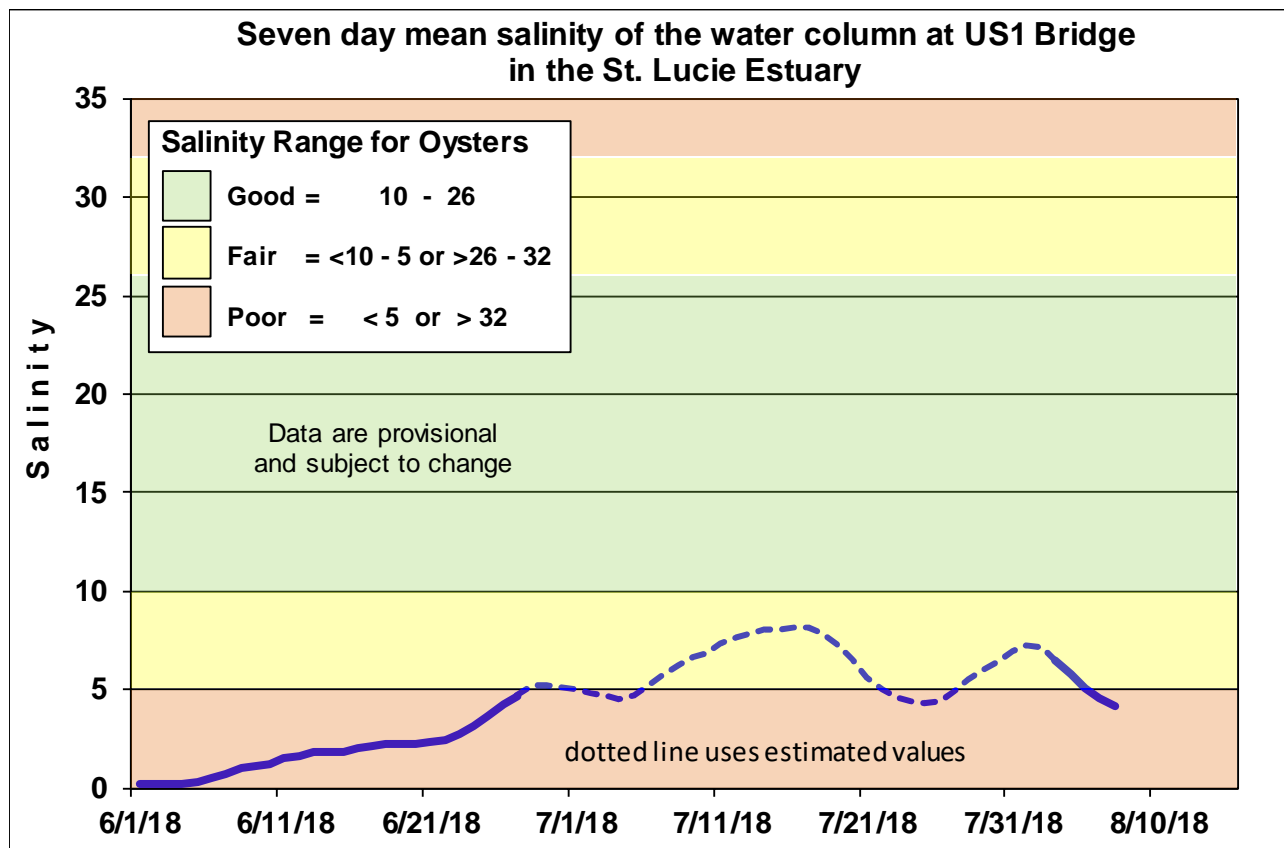


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

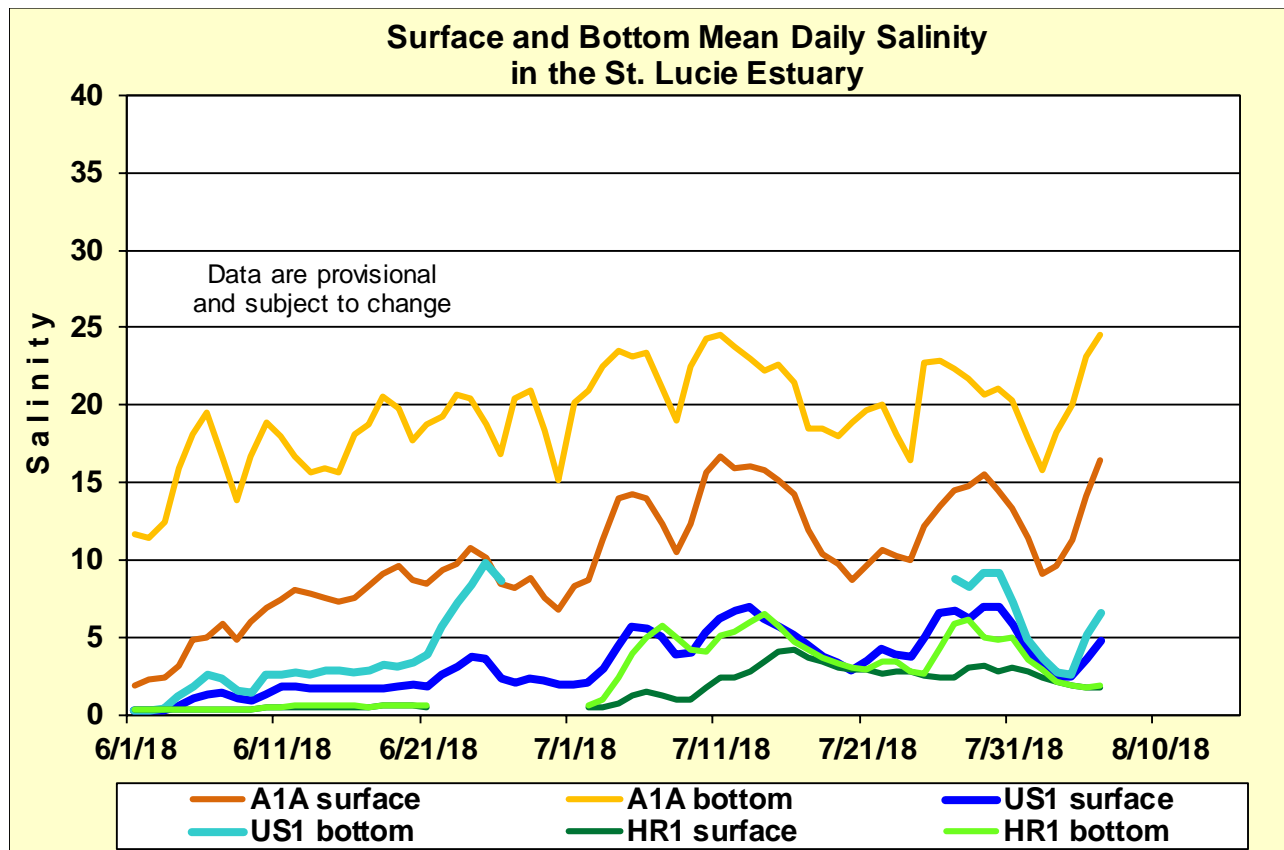


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

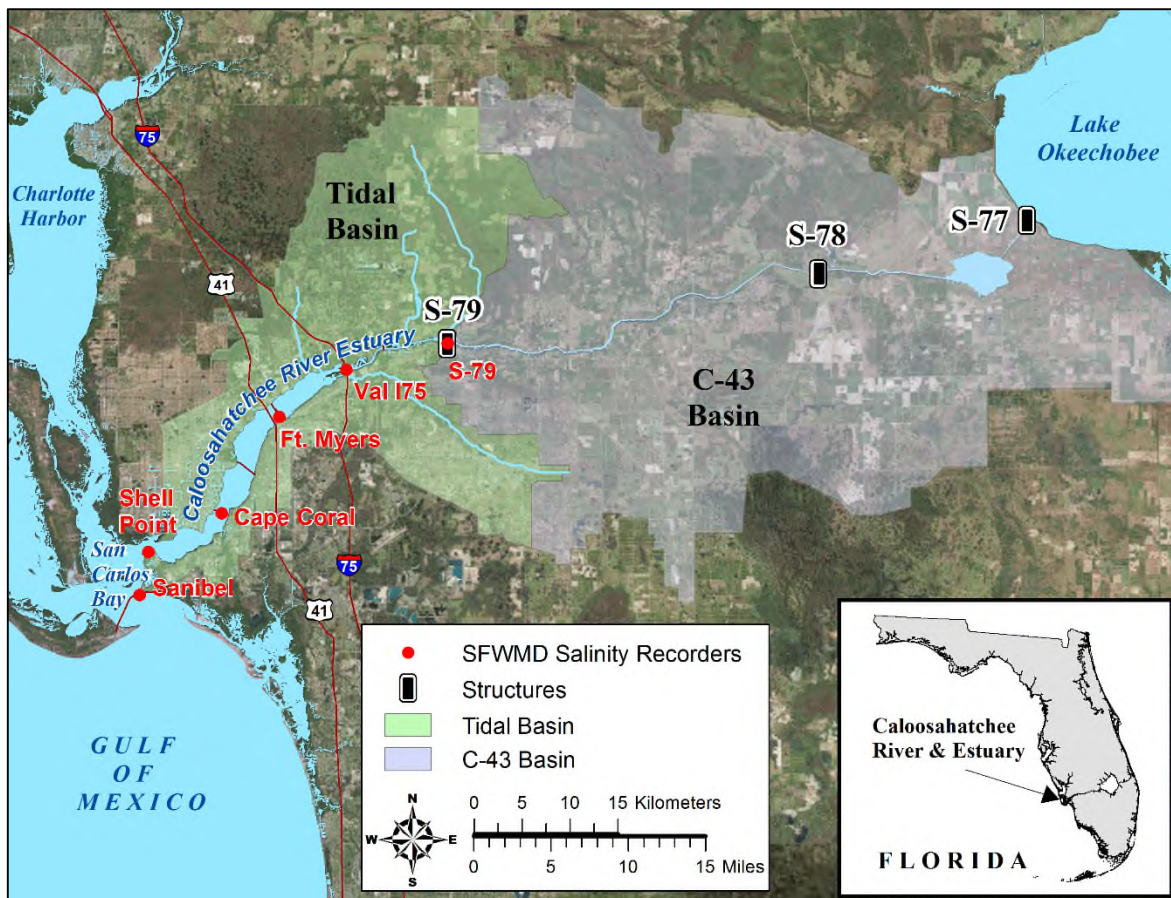


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

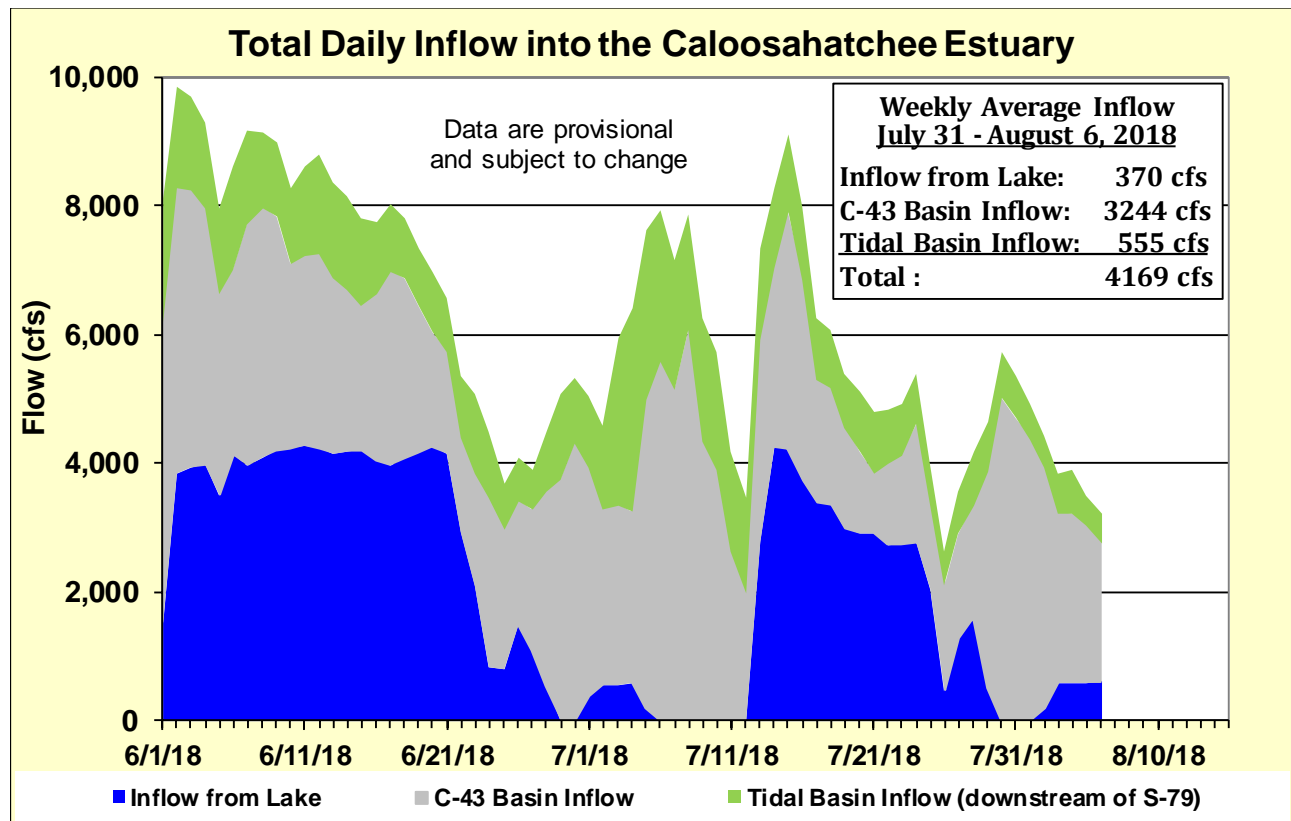


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

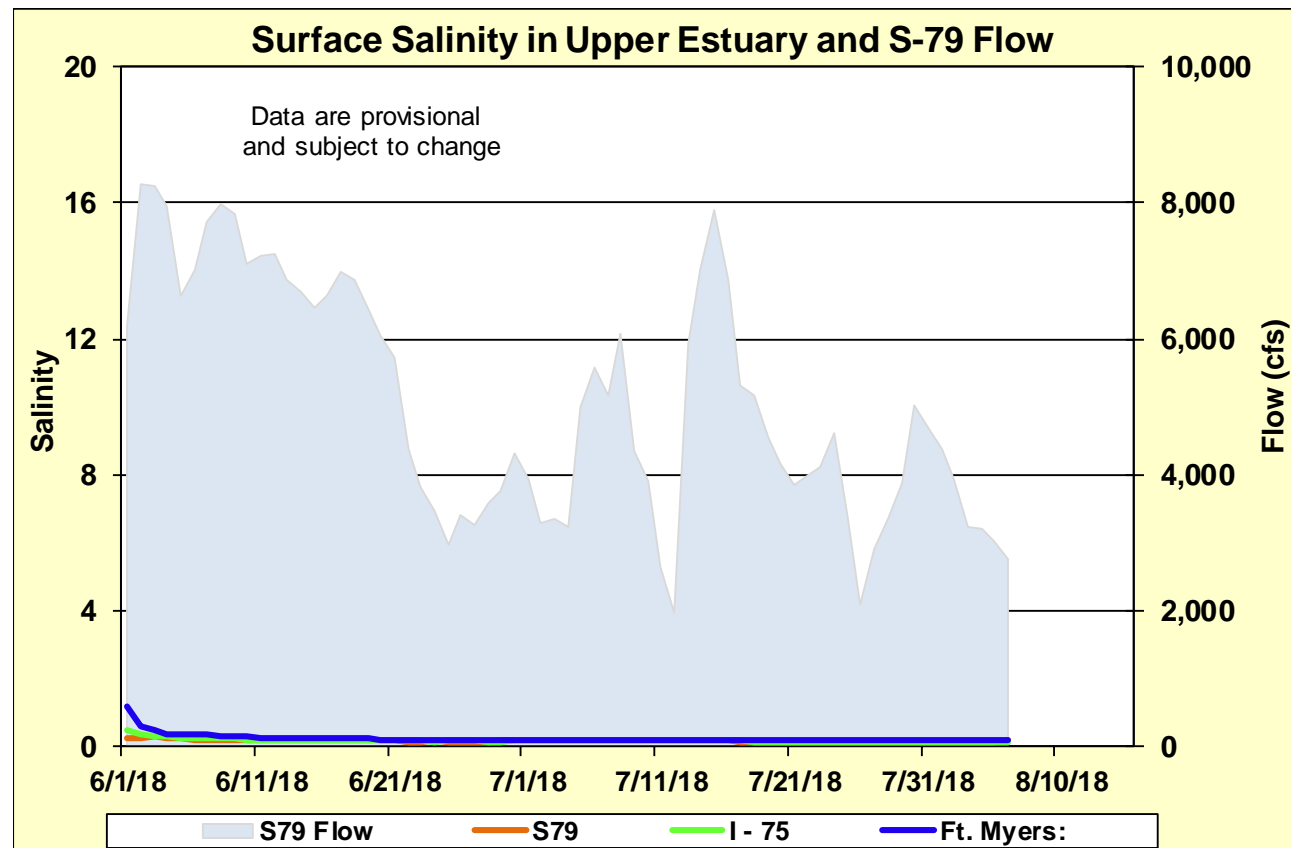


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

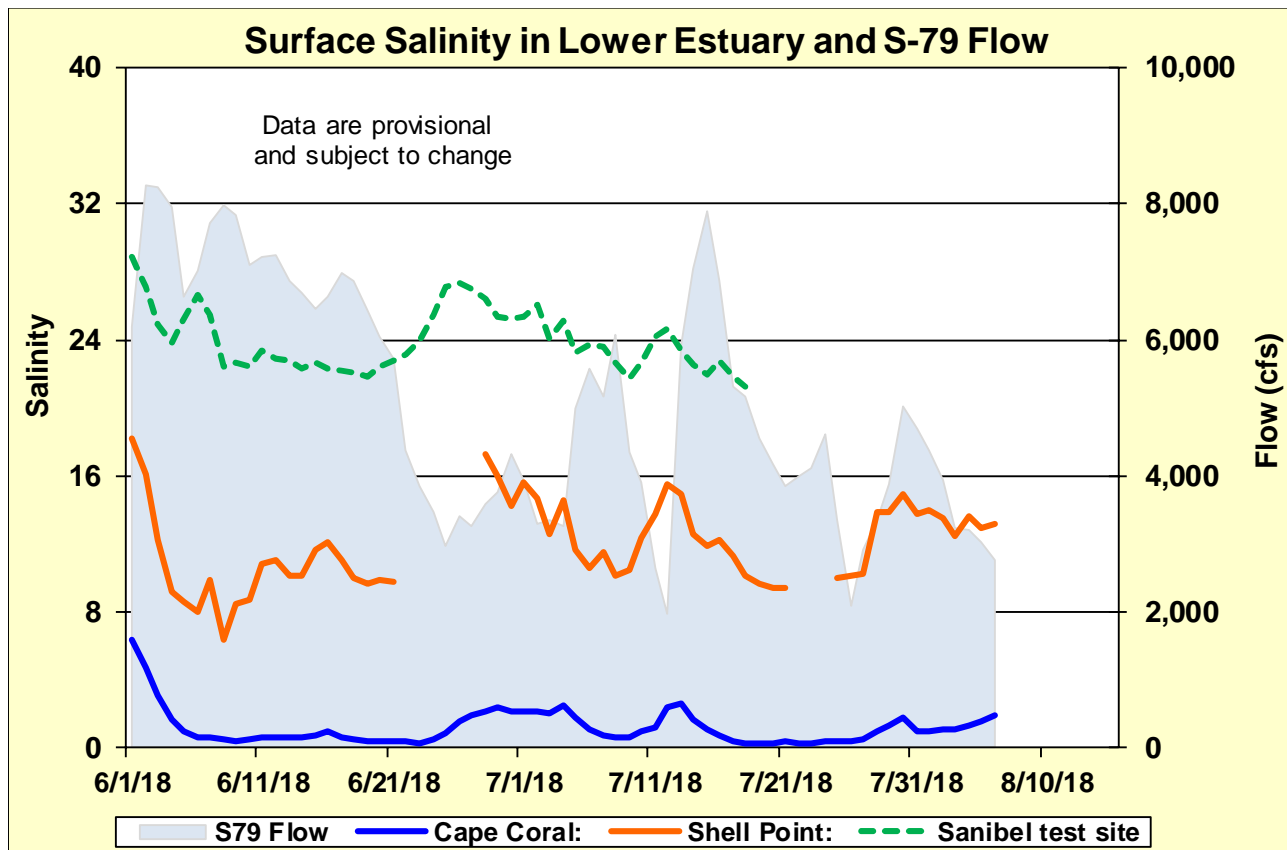


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

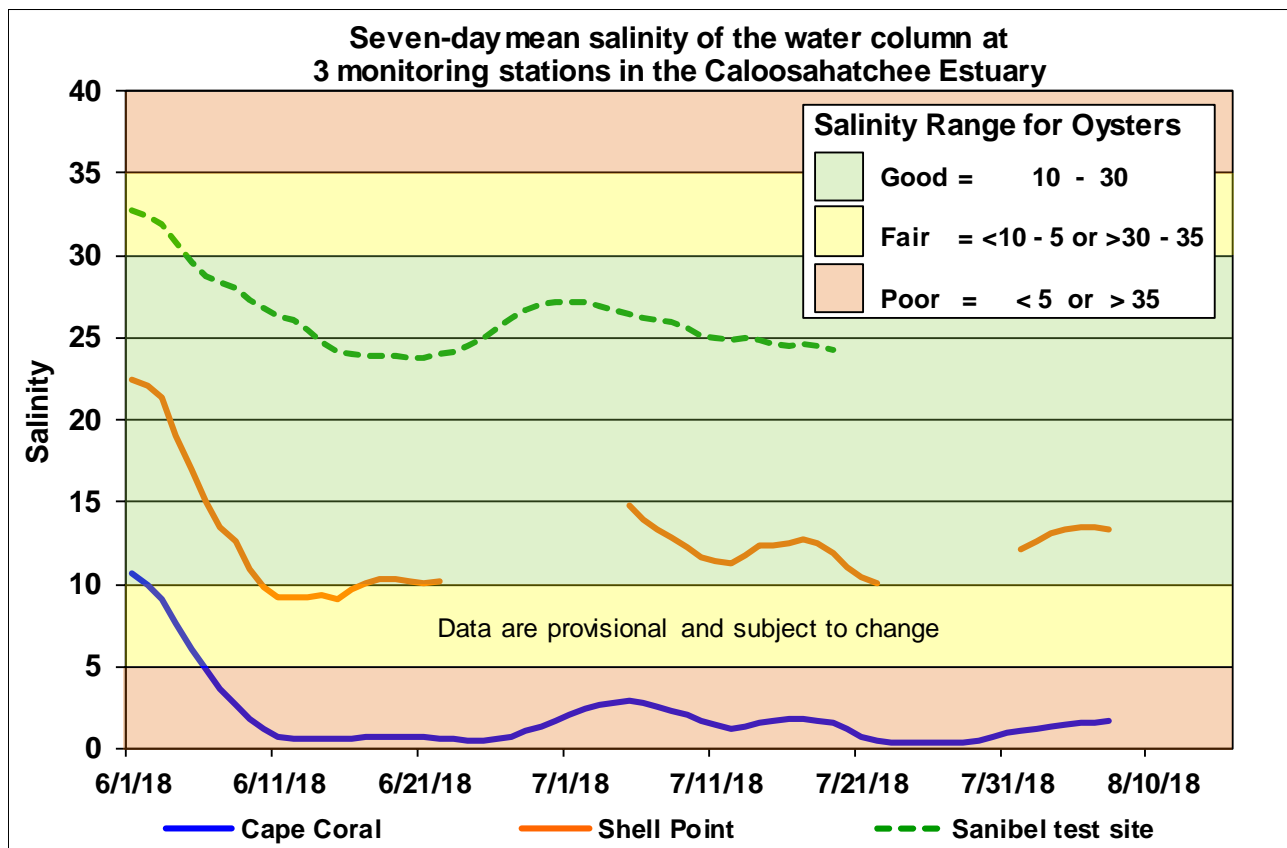
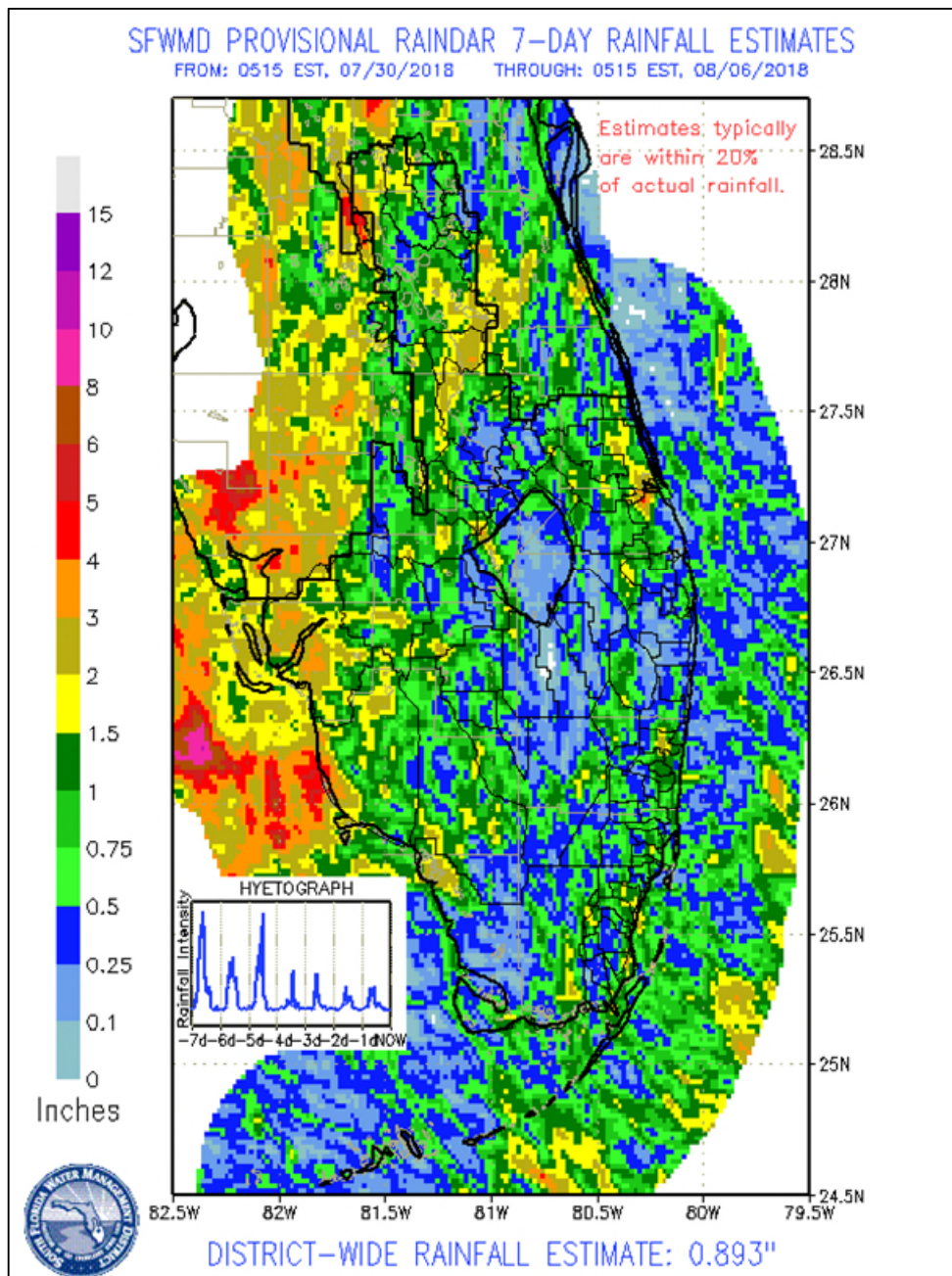


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

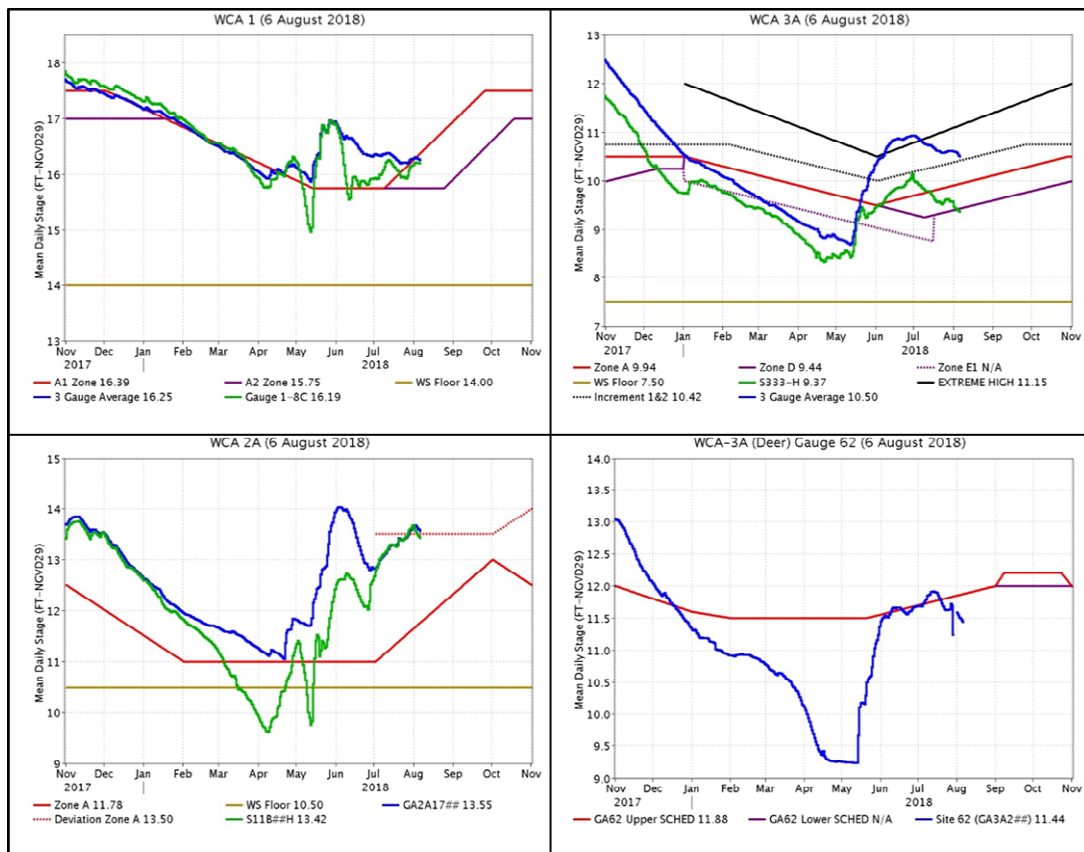
EVERGLADES

The gauge locations monitored for this report stages within the WCAs decreased on average 0.08 feet. The most extreme individual gauge changes within the WCAs ranged from -0.19 feet (WCA-2A) to +0.03 feet (WCA-1). Pan evaporation was estimated at 1.80 inches.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.61	-0.02
WCA-2A	0.76	+0.00
WCA-2B	0.51	-0.19
WCA-3A	0.60	-0.11
WCA-3B	0.57	-0.05
ENP	0.66	+0.09



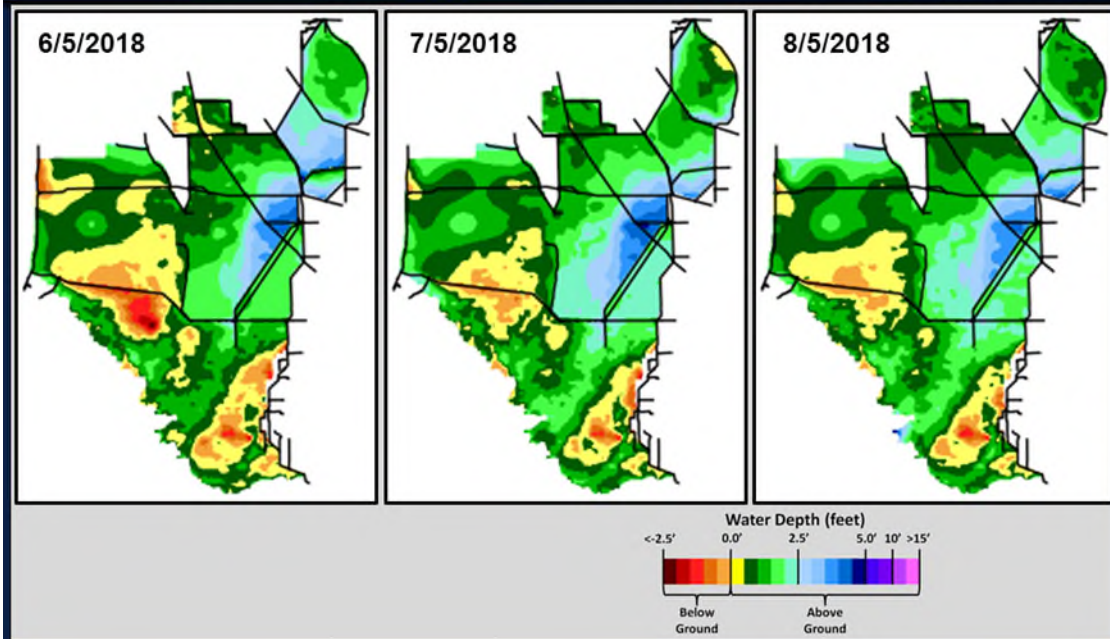
Regulation Schedules: WCA-1 three-gauge average stage is 0.14 feet above Zone A1, gauge 1-8C is 0.20 feet below. WCA-2A marsh stage is 0.05 feet above Deviation Zone A. S-11B Headwater stage is 0.08 below the temporary deviation schedule. WCA-3A three-gauge average stage is now 0.56 feet above Zone A and continues to trend favorably towards schedule. WCA-3A stage at gauge 62 (northwest corner) stage is 0.44 feet below the upper schedule.



Water Depths and Changes: The WDAT tool for spatial interpolation of depth monthly snapshots indicate that habitat with depths from 0.5 feet to 1.0 feet has expanded across WCA-3A North over the last month, with lower depths along the northern reaches of the L-67 in WCA-3A South. In WCA-2A habitat with water depths in excess of 2.0 feet have increased in spatial extent over the last month. WDAT output indicates that water levels significantly decreased in the previous month in northeastern WCA-3A. Water depths are significantly deeper in central WCA-2A. WCA-3A is significantly drier at this time than it was a year ago along the L-67 and central WCA-3A South.



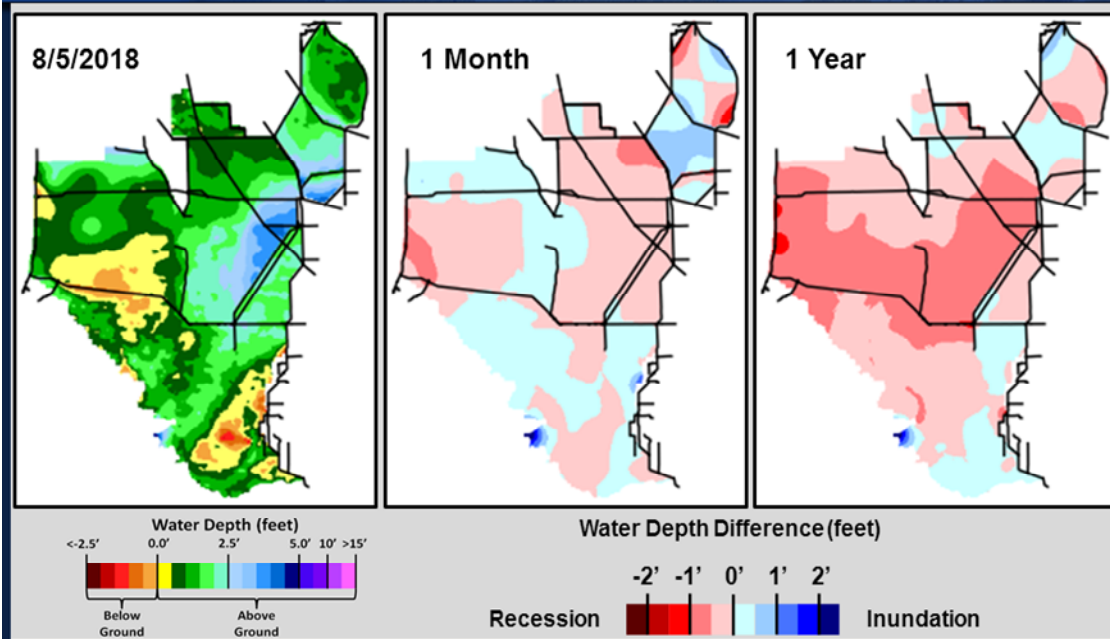
SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)



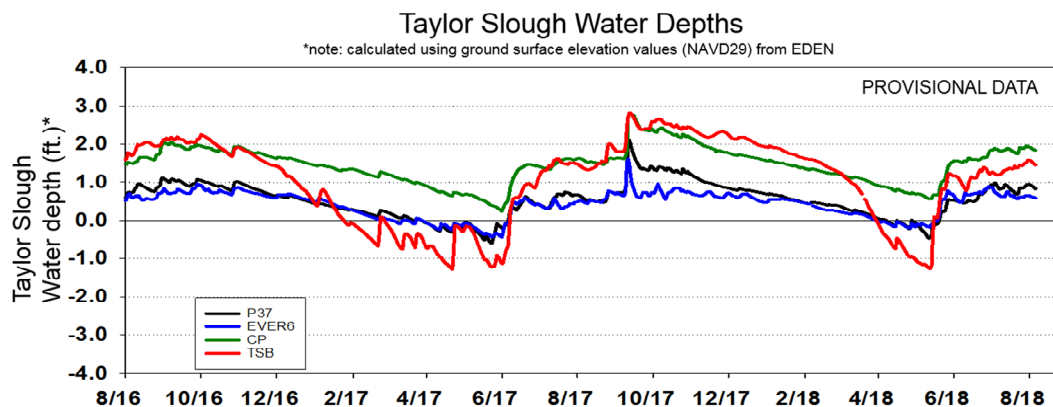
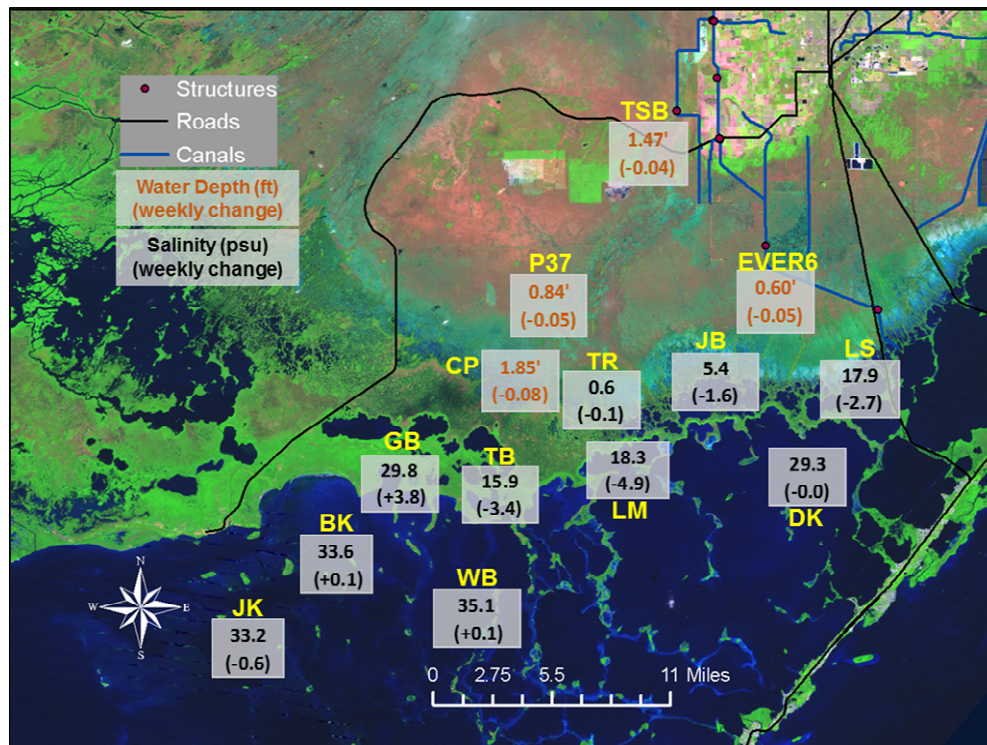
SFWDAT Everglades Difference Maps (Present - Past)

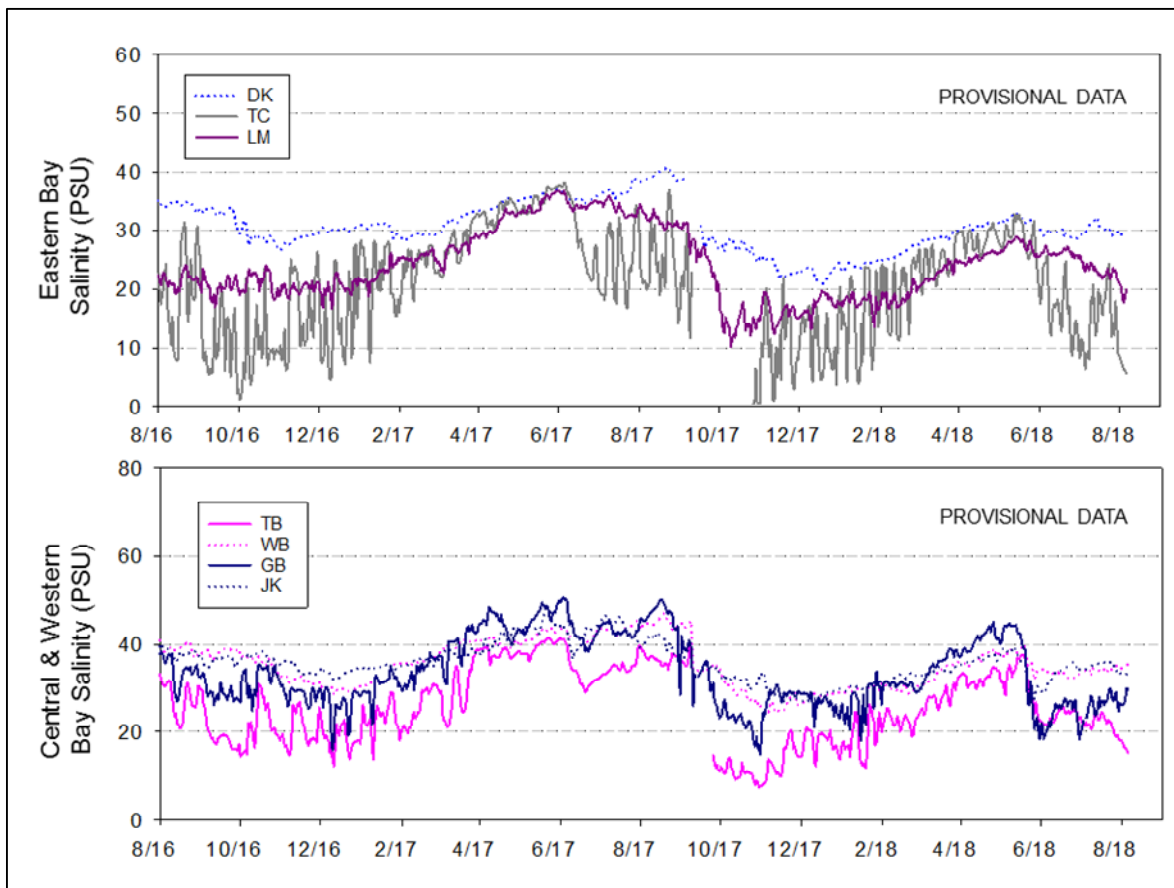


South Florida Water Depth Assessment Tool (SFWDAT)

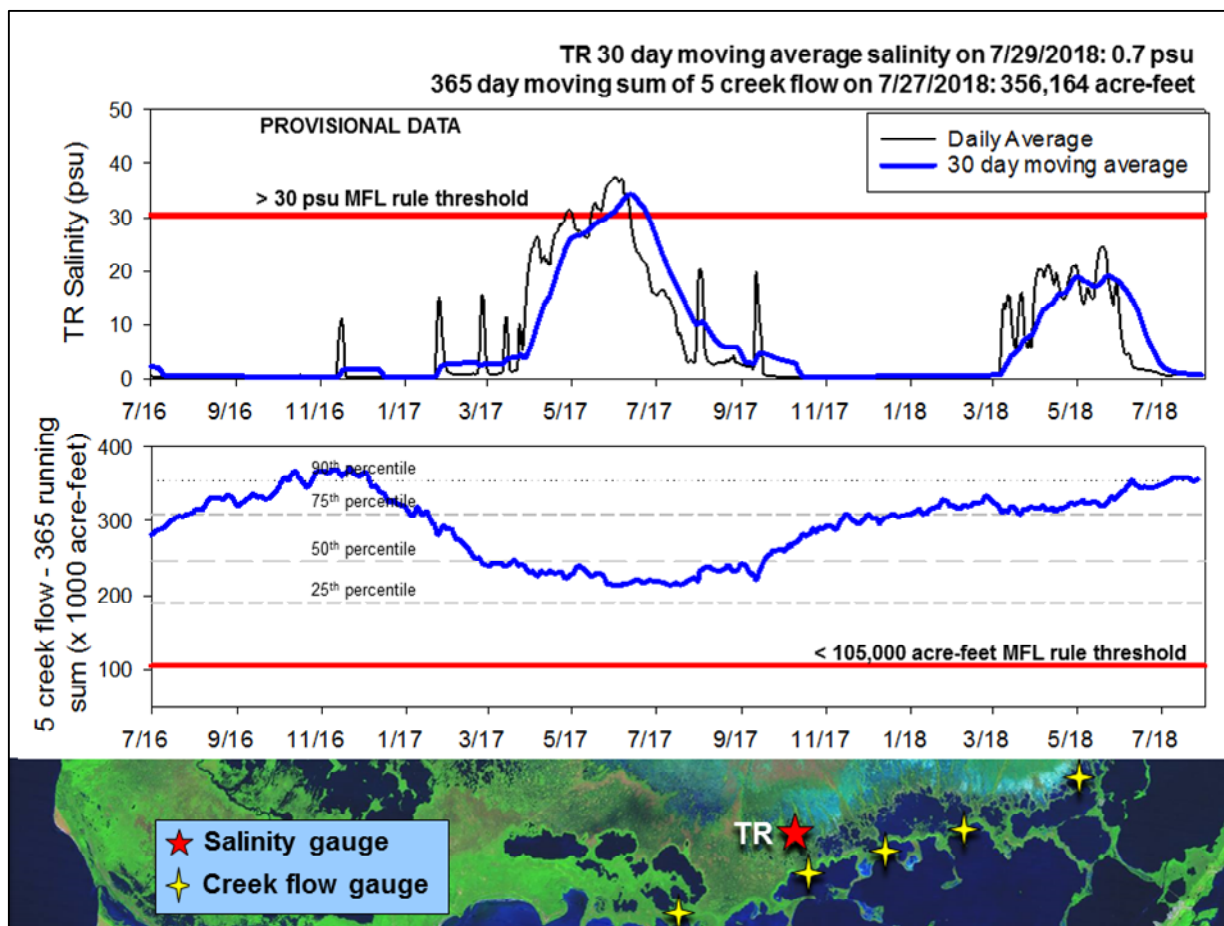
Taylor Slough Water Levels: An average of 0.9 inches of rain fell on Taylor Slough and Florida Bay. Stages decreased an average of 0.05 feet this past week with individual station changes ranging from -0.04 feet to -0.08 feet. Water depths are 3 to 4 inches above the historical averages.

Florida Bay Salinities: Salinities are mostly stable across Florida Bay with the average weekly decrease of 1 psu and individual station changes ranging from -4.9 psu to +3.8 psu. Salinities ranged from 5 psu in the northeast to 35 psu in the central bay. This is average to 13 psu below average at the individual stations for an average of 4 psu below average in Florida Bay. The central nearshore area is the furthest from average for this time of year.





Florida Bay MFL: Mangrove zone daily average remains near fresh this week at 0.6 psu. The 30-day moving average remains at 0.7 psu. The weekly cumulative flow from the five creeks denoted by yellow stars on the map totaled about 9,200 acre-feet for the last week, which is twice the average five-creek flow for this time of year. The 365-day moving sum of flow from the five creeks ended the last week at 366,008 acre-feet (still greater than the long-term average of 257,628 acre-feet and above the 90th percentile). Creek flow is provisional data from the USGS and is highly variable.



Water Management Recommendations

Inflows to northernmost WCA-3A create lower ecological stress when compared to flows to more southern WCA-3A. After last year's above average wet season depth conditions in WCA-3A South, maintaining lower stages within that basin has ecological benefit to tree islands that have been stressed by flooding. WCA-2A has also experienced relatively deep-water conditions over the past two wet seasons. Water management that minimizes high water stress may have increased ecological benefit this water year by allowing ecological processes time to recover from flooding. Incremental change in the rate of structure flows (i.e., when changing flow rates from 0 cfs to 1,000 cfs, make 500 cfs adjustment per week) to the WCAs is more ecologically sensitive than abrupt rate changes. Ascension rates are now critical for apple snail reproduction in the Everglades. The current recommended stage ascension rate is less than 0.25 feet per week (or 0.5 feet per 2 weeks).

Due to elevated levels of phosphorus in the S-332D detention area and the Frog Pond detention area, 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 when S-332D, S-328, and/or G-737 are opened. More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

SFWMD Everglades Ecological Recommendations, August 7th, 2018 (red is new)

Area	Weekly change	Recommendation	Reasons
WCA-1	Stage changes from +0.03' to -0.06'	Maintain depths at regulation schedule. Manage for a rate of ascension less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect habitat and wildlife.
WCA-2A	Stage remained unchanged	Maintain depths at temporary regulation schedule. Manage for a rate of ascension less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect upstream/downstream habitat and wildlife.
WCA-2B	Stage decreased by 0.19'	Maintain depths at temporary regulation schedule. Manage for a rate of ascension less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect upstream/downstream habitat and wildlife.
WCA-3A NE	Stage decreased by 0.02'	Maintain depths at regulation schedule. Manage for a rate of ascension less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect habitat including peat soil development, tree islands and wildlife.
WCA-3A NW	Stage decreased by 0.16'	Maintain depths at regulation schedule. Manage for a rate of ascension less than +0.25' per week, or less than +0.5 per 2 weeks.	
Central WCA-3A S	Stage decreased by 0.11'	Maintain depths at regulation schedule. Manage for a rate of ascension less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect habitat including peat soil development, tree islands and wildlife.
Southern WCA-3A S	Stage decreased by 0.15'		
WCA-3B	Stage decreased by 0.05'	Maintain depths at or above regulation schedule. Manage for a rate of ascension 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 0.09'	Make discharges to the Park according to the 2012 WCP rainfall plan.	Protect upstream/downstream habitat and wildlife.
Taylor Slough	Stage changes ranged from -0.08' to -0.04'	Move water southward as possible. Limit increases in the L-31W to less than 3 inches per day for 3-4 weeks to allow for reductions in phosphorus concentrations.	When available, provide freshwater buffer for downstream conditions. Decrease potential for high phosphorus input to ENP.
FB- Salinity	Salinity changes ranged -4.9 to +3.8 psu.	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.