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: January 9, 2018

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

The potential exists for some areas of heavy rain today and Wednesday. An upper level low and its associated surface low are over the eastern Gulf of Mexico and these systems are pulling moisture northward over the District. This moisture and favorable upper level wind flow should help generate showers and thunderstorms focused over the eastern portion of the District today and again Wednesday as the upper trough shifts eastward and the surface low moves southeastward and weakens. As the low moves east and then northeast away from the District, shower activity should decrease in coverage and intensity but remain focused east Thursday. A cold front is forecast to move through the area Friday and early Saturday but it should only produce light showers since moisture should still be focused around the trough/low east of the District.

Kissimmee

Tuesday morning stages were 58.0 feet NGVD (at schedule) in East Lake Toho, 55.1 feet NGVD (0.1 foot above schedule) in Toho, and 50.8 feet NGVD (1.7 feet below schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.3 feet NGVD at S65A and 25.83 feet NGVD at S65D. Recessions in East Lake Toho and Toho are scheduled to begin on January 15, 2018; recession in Kissimmee-Cypress-Hatchineha began on January 1, 2018 with a rate of 0.1 feet per 7-days (preferred maximum rate is 0.2 feet per 7-days). Tuesday morning discharges were: 572 cfs at S65, 448 cfs at S65A, and 776 cfs at S65E. S-67 releases to Istokpoga Canal have been ~400 cfs for 22 days and have improved navigation in the canal by increasing the area of canal cross-section at the sandbar by 66%. Dissolved oxygen concentration in the Kissimmee River averaged 8.3 milligrams per liter (mg/L) for the week. Kissimmee River mean floodplain depth on Sunday was 0.21 feet.

Lake Okeechobee

Lake Okeechobee stage is 15.35 feet NGVD having decreased 0.13 feet over the past week and 0.55 feet over the last month. Following Hurricane Irma, stages exceeded 16.0 feet NGVD for 72 days, the longest period since late 2004, which was 73 days. Stages also exceeded 15.5 feet NGVD for 105 days, the longest period since late 2004. The first wading bird foraging survey of the season was conducted on January 4, 2018 and approximately 9,451 birds were seen foraging in areas close to the levee. Almost half of the birds were foraging in an open water area in the western Moore Haven marsh that was treated to control torpedograss in 2017. The submerged aquatic and emergent vegetation coverage in the nearshore areas of the Lake are expected to decline over the coming months and possibly years due to the high water and turbidity from resuspended Lake sediment. The high inflows and resuspended Lake sediment associated with Hurricane Irma also increased water column total phosphorus, which could lead to algal blooms as turbidity continues to decline and water temperatures rise.

Estuaries

Total inflow to the St. Lucie Estuary averaged 582 cfs over the past week with 0 cfs coming from Lake Okeechobee. Salinity increased throughout the estuary. The 7-day average salinity at the US1 Bridge is in the good range for adult oysters. Average weekly dissolved oxygen levels at the HR1 station in the North Fork were 8.88 mg/L near the surface and 7.69 mg/L near the bottom.

Total inflow to the Caloosahatchee Estuary averaged 1,140 cfs over the past week with 656 cfs (57.5 %) coming from the Lake. Salinity stayed the same in the upper part of the estuary up to Val I-75 and increased slightly downstream. The 30-day moving average surface salinity is 0.2 at Val I-75 and 0.4 at Ft. Myers. Salinity at Val I-75 is forecast to be 2.8 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 oysters at Shell Point and in the fair range at Cape Coral. Chlorophyll *a* measurements show low chlorophyll *a* concentration levels near Shell Point (2.65 – 5.31 µg/L) over the last week. Dissolved oxygen levels at Shell Point were 7.29 – 9.99 mg/L. *Karenia brevis* (Florida red tide dinoflagellate) was observed in low concentrations in one sample collected from Lee County. Numerous reports of fish kills and respiratory irritation were reported along Lee County over the past week. Given the current estuarine conditions, there are no ecological benefits associated with freshwater releases from Lake Okeechobee.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs did not receive Lake regulatory releases. The total amount of Lake releases sent to the STAs/FEBs in WY2018 (since May 1, 2017) is approximately 21,900 acre-feet. Most STA cells are at or near target depths. Operational restrictions are in place for vegetation rehabilitation in STA-1E and STA-2. This week, if 2008 LORS recommends Lake releases to the WCAs and the conditions allow, releases will be sent to STA-1E Eastern Flow-way, STA-2 Flow-way 1, and STA-3/4 Western Flow-way.

Everglades

Stages have dropped significantly in WCA-3A over the last 2 months. While there continues to be a need to relieve high water conditions in the southern part of that basin, depths in northern WCA-3A, as indicated by modeling and direct gauge readings, are reaching levels of ecological importance. Slowing the recession rates in northern WCA-3A could help to protect foraging habitat and the important Alley North colony. 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. The depth on Sunday at that location was 2.65 feet, and has exceeded 2.5 feet for 206 days. In Taylor Slough, water levels remain 3 to 16 inches above the historic average for this time of year, and Florida Bay salinities are lower than the historic averages for this time of year with the largest divergence occurring in the central nearshore. Area-specific recommendations are summarized in the table at the end of this report.

Supporting Information

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.90 inches of rainfall in the past week and the Lower Basin received 0.24 inches (SFWMD Daily Rainfall Report 1/8/2018).

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: 1/9/2018

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)						
							1/7/18	12/31/17	12/24/17	12/17/17	12/10/17	12/3/17	11/26/17
Lakes Hart and Mary Jane	S62	46	LKMJ	61.0	R	61.0	**0.0**	0.0	0.0	-0.1	0.0	0.0	0.0
Lakes Myrtle, Preston, and Joel	S57	20	S57	61.6	R	61.6	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0
Alligator Chain	S60	0	ALLI	63.9	R	64.0	**-0.1**	-0.1	-0.1	-0.1	0.0	0.0	0.0
Lake Gentry	S63	16	LKGT	61.5	R	61.5	**0.0**	0.0	0.0	0.0	0.0	0.1	0.0
East Lake Toho	S59	38	TOHOE	58.0	R	58.0	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0
Lake Toho	S61	156	TOHOW, S61	55.1	R	55.0	**0.1**	0.0	0.0	0.0	0.0	0.0	0.0
Lakes Kissimmee, Cypress, and Hatchineha	S65	540	KUB011, LKIS5B	50.8	R	52.5	**-1.7**	-1.6	-1.4	-1.3	-1.1	-1.1	-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: **1/9/2018**

Metric	Location	1-Day Average	Average for the Preceeding 7-Days[1]									
		1/7/2018	1/7/18	12/31/17	12/24/17	12/17/17	12/10/17	12/3/17	11/26/17	11/19/17	11/12/17	11/5/17
Discharge (cfs)	S-65	550	**540**	517	553	540	368	586	925	1,097	1,349	1,439
Discharge (cfs)	S-65A	449	**452**	443	446	441	306	486	817	1,038	1,346	1,638
Discharge (cfs)	S-65D[2]	449	**696**	718	770	796	595	989	1,425	1,925	2,467	3,714
Stage (feet NGVD)	S-65D[2]	25.76	**25.74**	25.77	25.82	25.77	25.97	26.16	26.38	26.60	26.79	26.94
Discharge (cfs)	S-65E[2]	449	**751**	777	857	865	658	980	1,436	1,988	2,519	3,938
Discharge (cfs)	S-67	392	**396**	399	322	0	0	0	0	0	0	0
DO (mg/L)[3]	Phase I river channel	8.3	**7.7**	6.5	7.1	6.6	5.2	5.7	5.8	5.0	4.1	4.2
Mean depth (feet)[4]	Phase I floodplain	0.21	**0.22**	0.24	0.27	0.31	0.26	0.34	0.53	0.82	1.09	1.48

[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)

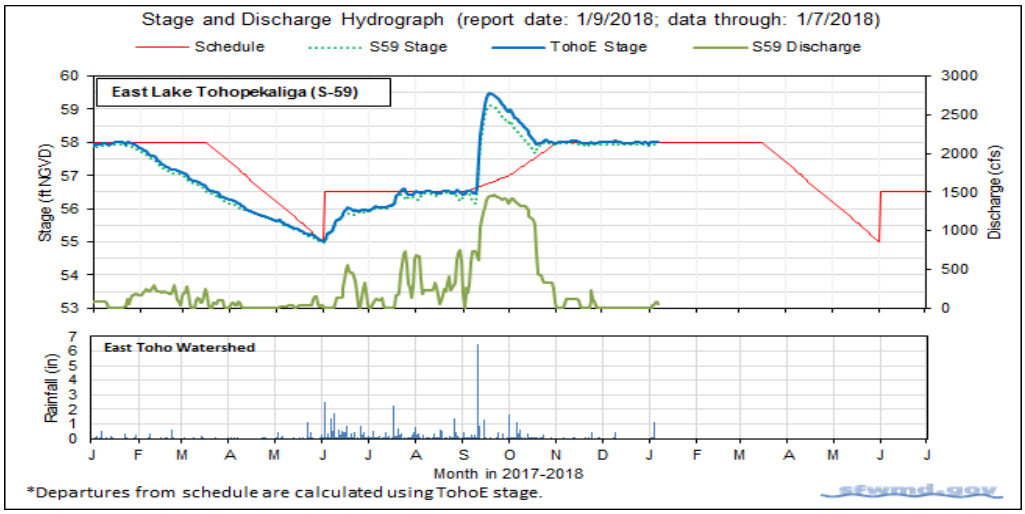


Figure 1.

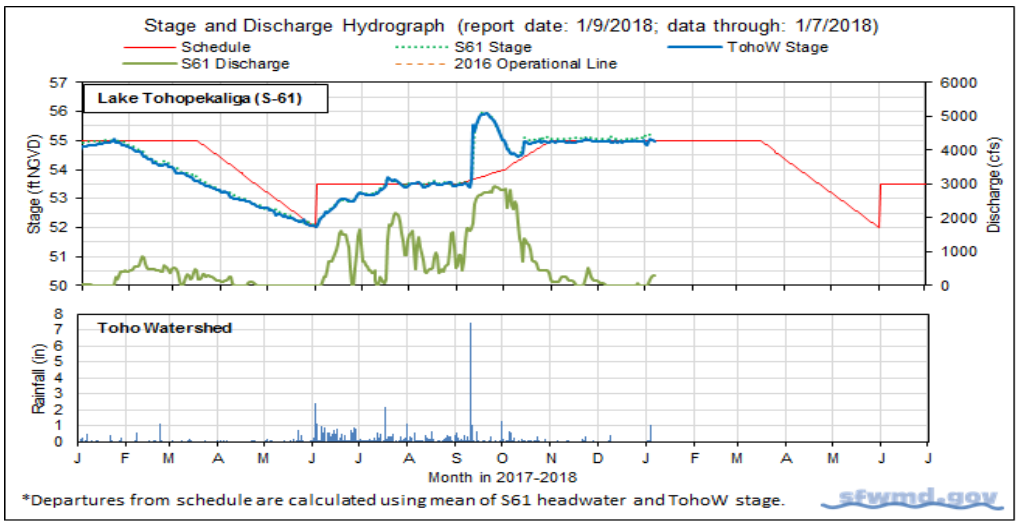


Figure 2.

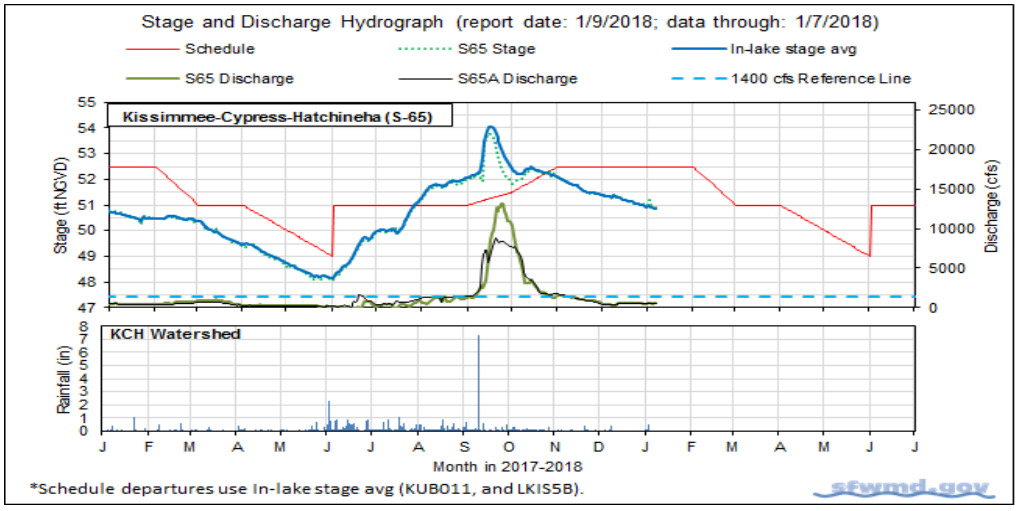


Figure 3.

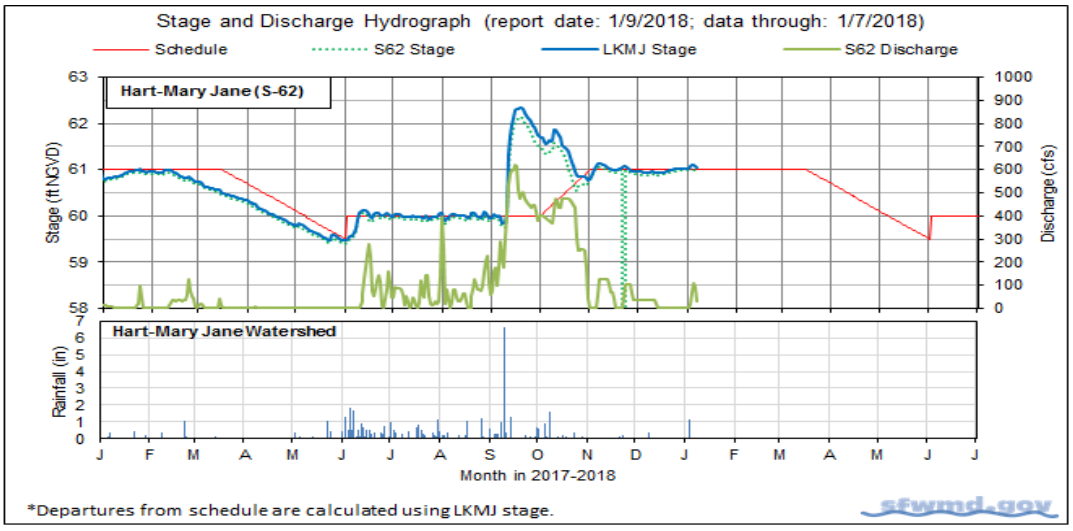


Figure 4.

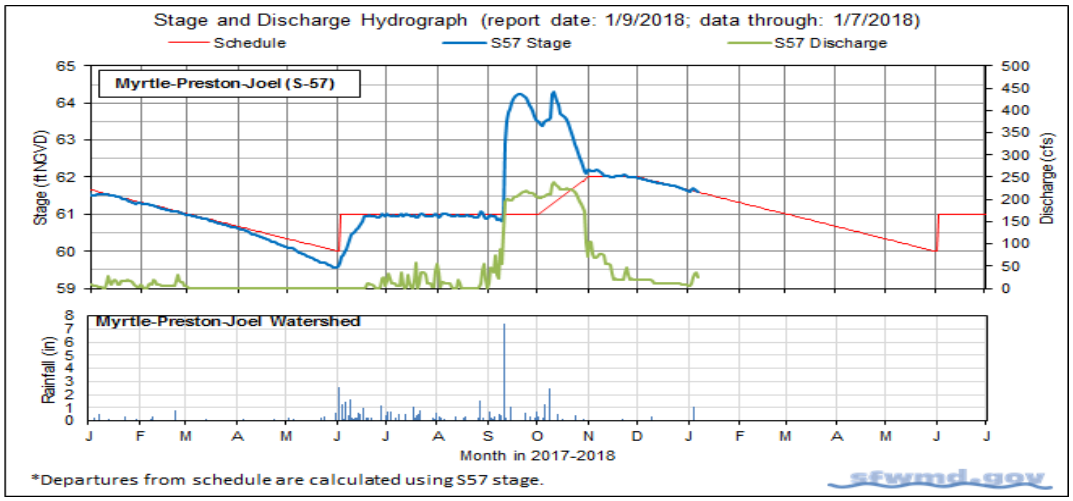


Figure 5.

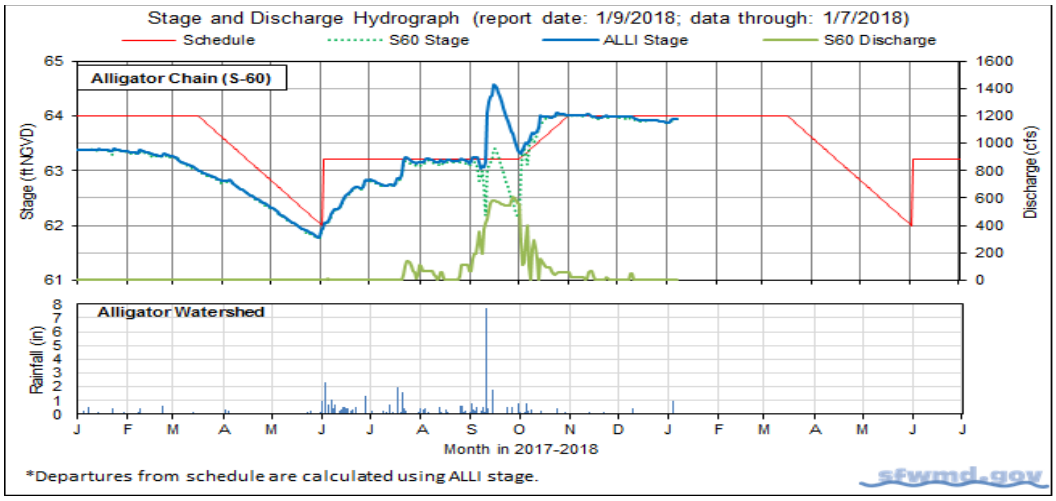


Figure 6.

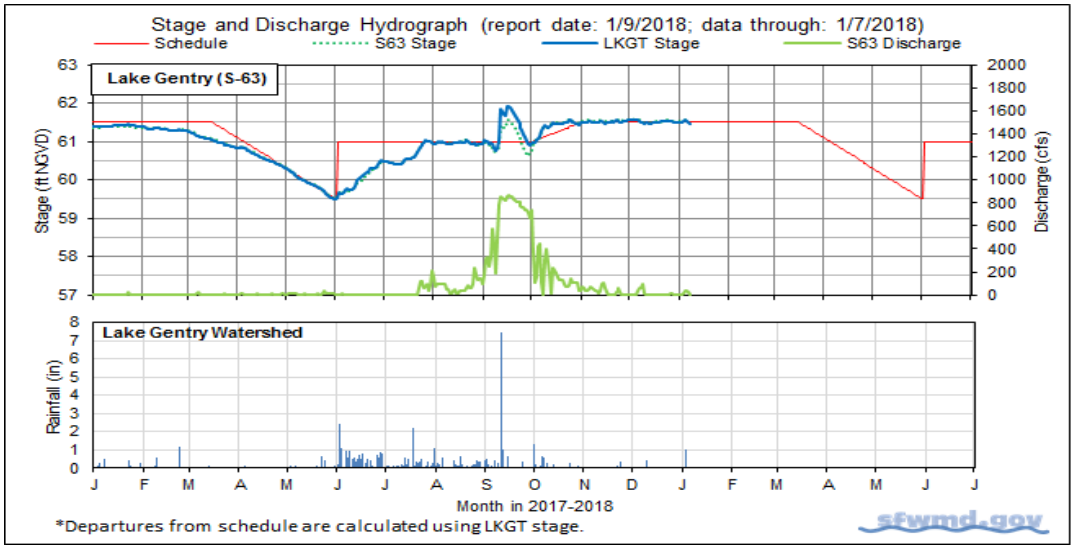


Figure 7.

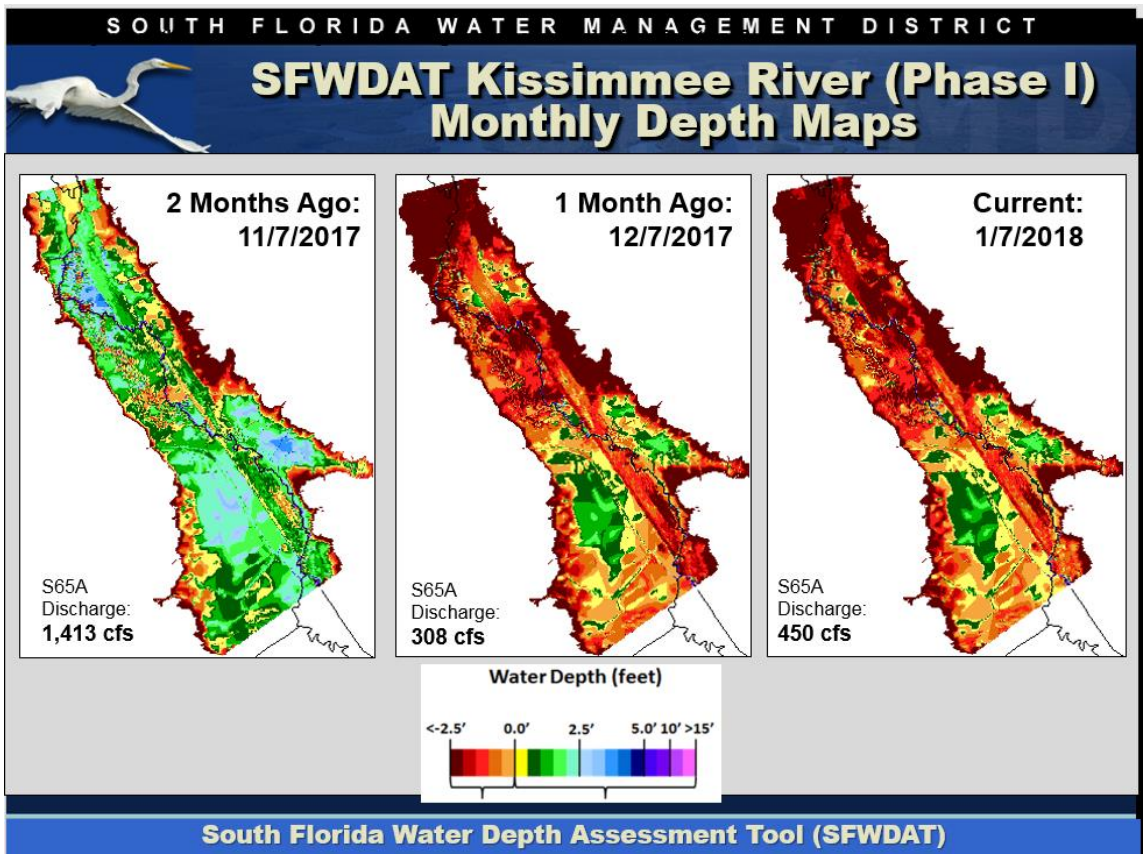


Figure 8. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

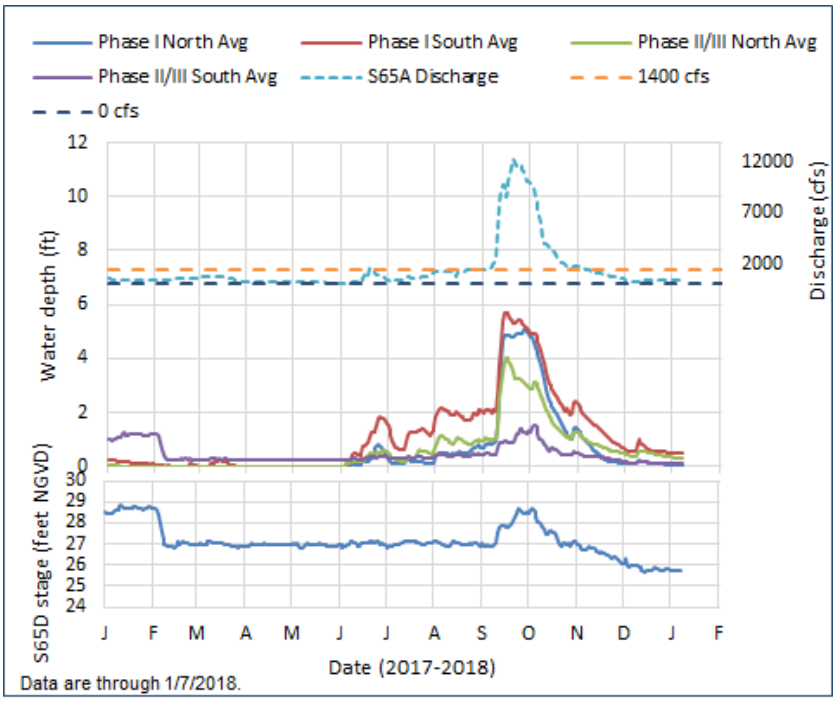


Figure 9. Mean water depth in the northern Phase I, southern Phase I, northern Phase II/III, and southern Phase II areas in relation to the S65A discharge and S65D headwater stage.

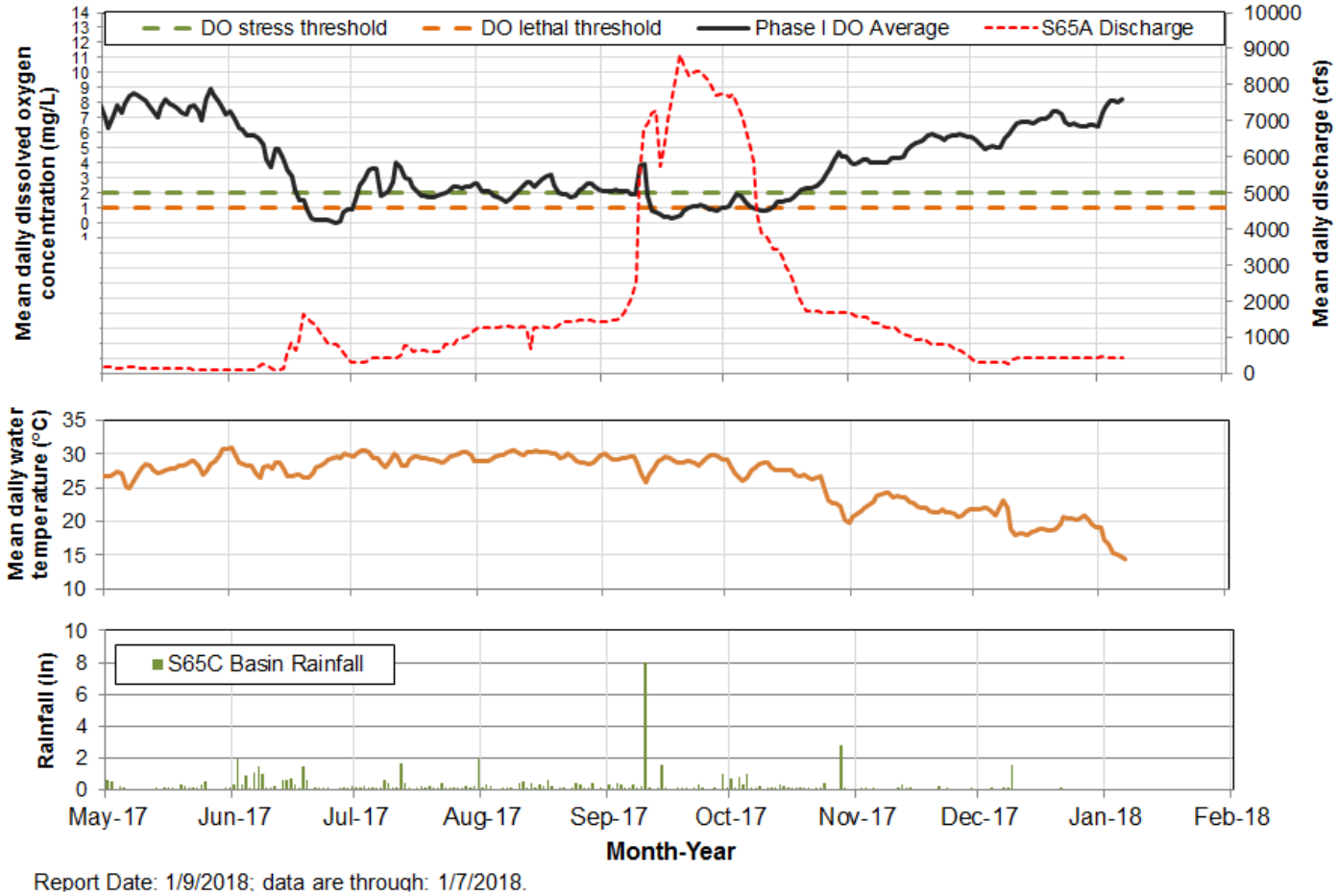


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.

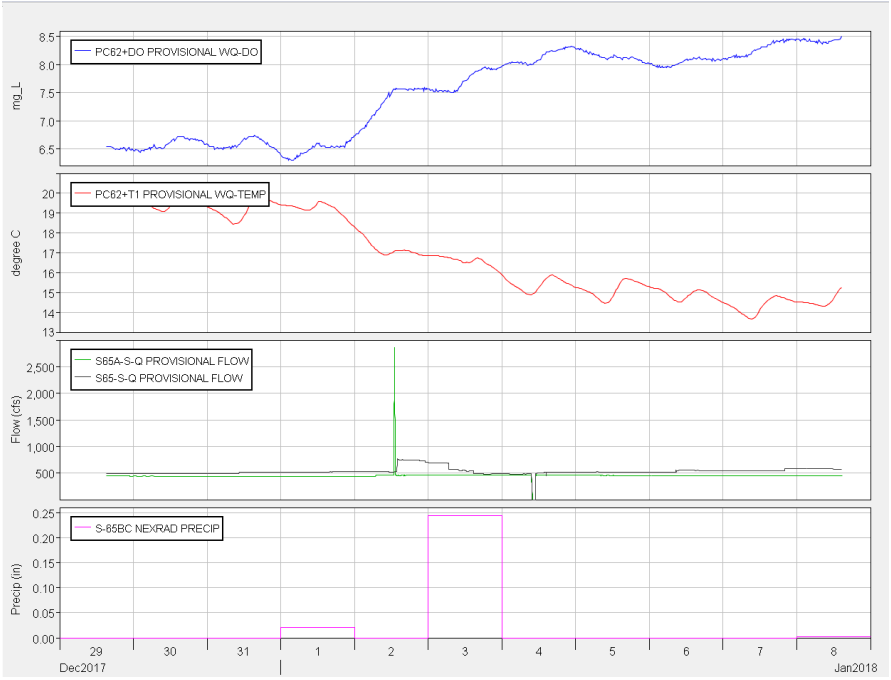


Figure 11. Phase I river channel dissolved oxygen and water temperature (measured at 15 minute intervals) and Pool BC daily rainfall.

Water Management Recommendations

Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
1/9/2018	No new recommendations.		N/A	
12/19/2017	Begin discharge of 400 cfs from S67 into Istokpoga Canal.	Increase navigability by scouring channel and reducing sandbar at canal mouth.	Implemented	KB Ops/SFWMD Water Mgt
12/19/2017	Begin a stage recession on January 1 in Lakes Kissimmee-Cypress-Hatchineha starting at stage on January 1 to reach low pool on May 31. Recession rate not to exceed 0.2 ft/week as possible. Subject to SFWMD planned operations hierarchy.	Achieve fish and wildlife benefits by slowing lake stage recession rates relative to the regulation schedule recession rates.	-	KB Ops/SFWMD Water Mgt
12/19/2017	Begin stage recessions on January 15 in Lakes East Toho and Toho starting at stage on January 15, to reach low pools on May 31. Recession rate not to exceed 0.2 ft/week if possible. Subject to SFWMD planned operations hierarchy.	Achieve fish and wildlife benefits by slowing lake stage recession rates relative to the regulation schedule recession rates.	-	KB Ops/SFWMD Water Mgt
12/12/2017	No new recommendations.		N/A	
12/5/2017	No new recommendations.		N/A	
11/28/2017	No new recommendations.		N/A	
11/21/2017	No new recommendations.		N/A	
11/13/2017	No new recommendations.		N/A	
11/1/2017	No new recommendations.		N/A	
10/24/2017	No new recommendations.		N/A	
10/17/2017	No new recommendations.		N/A	
10/10/2017	No new recommendations.		N/A	
10/3/2017	No new recommendations.		N/A	
9/25/2017	No new recommendations.		N/A	
9/19/2017	No new recommendations.		N/A	
9/5/2017	No new recommendations.		N/A	
8/29/2017	No new recommendations.		N/A	
8/22/2017	No new recommendations.		N/A	
8/15/2017	No new recommendations.		N/A	
8/4/2017	Increase S65A discharge by 150 cfs to about 1400 cfs.	Reduce rate of stage rise in KCH.		SFWMD Water Mgt, KB Ops
8/1/2017	No new recommendations.		N/A	

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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.

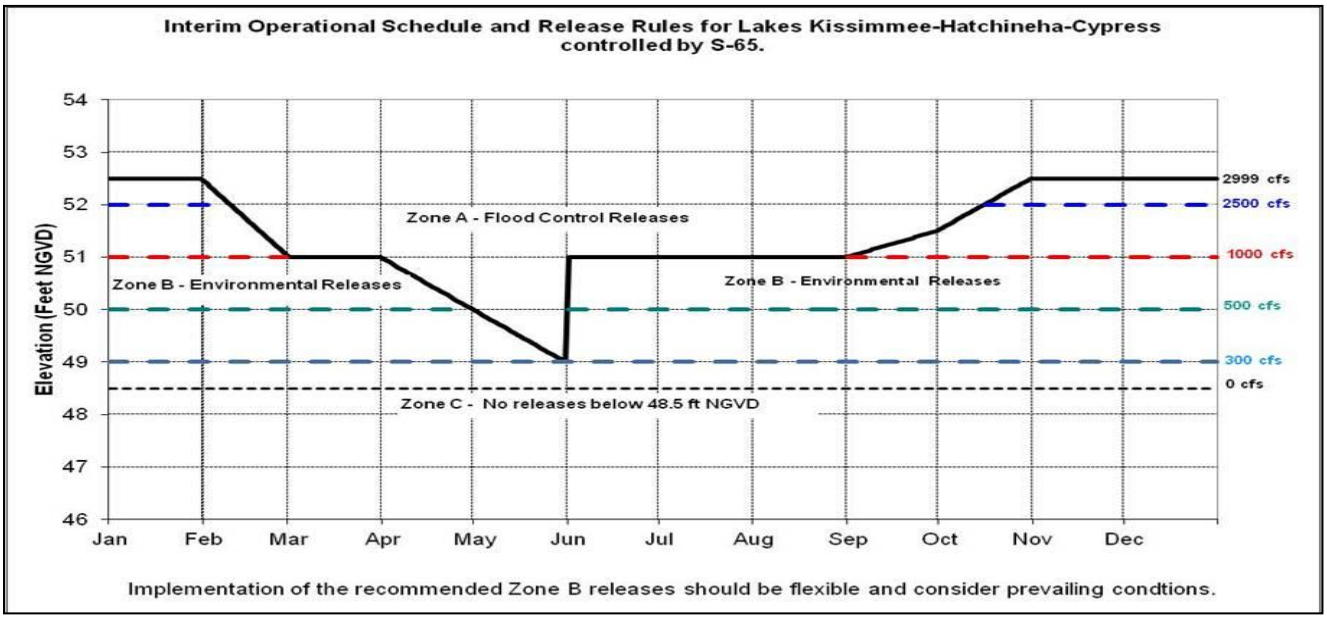


Figure 13. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years.

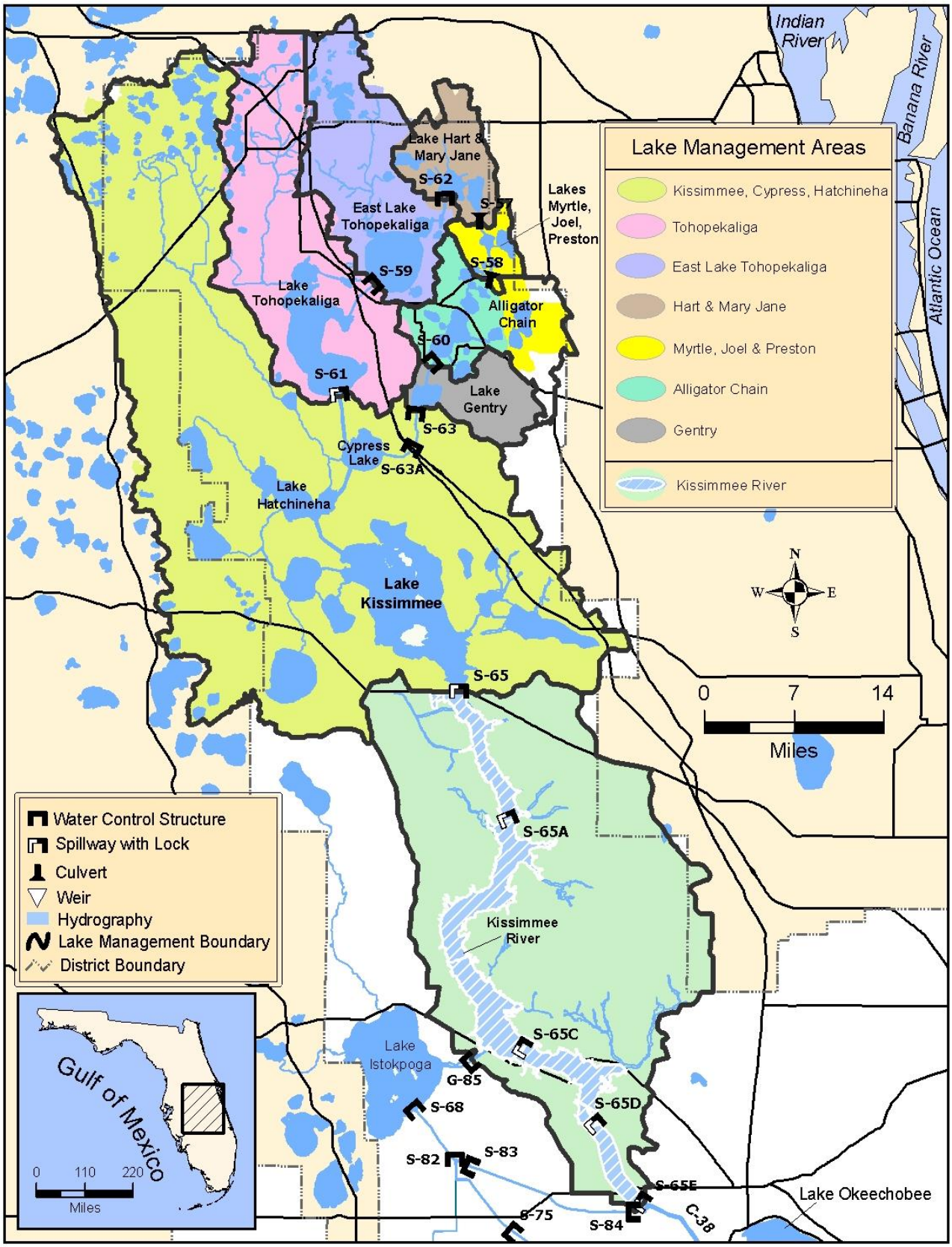


Figure 14. The Kissimmee Basin.

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 15.35 feet NGVD for the period ending at midnight on January 8, 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). Lake stage last peaked at 17.20 feet NGVD on October 13, 2017 before declining to 16.8 feet NGVD on October 28, 2017 and then back up to 17.02 feet NGVD. The Lake is now 0.55 feet lower than it was a month ago, but 1.25 feet higher than a year ago (Figure 1). The Lake is now in the Low sub-band (Figure 2). According to RAINDAR, only 0.07 inches of rain fell over the Lake during the week January 2, 2018 – January 8, 2018 with greater amounts in the upper Kissimmee Valley and along the east coast (Figure 3).

Average daily inflows to the Lake decreased over the past week, from 1,381 cfs to 1,208 cfs. Most of the inflows were from the Kissimmee River via the S65E and S84 structures, which averaged 754 cfs and 231 cfs daily, respectively. S71 and S72 structures, along with Fisheating Creek, contributed a combined 129 average daily cfs as well.

Average daily outflows for the Lake also decreased from the previous week, going from 2,258 cfs to 1,294 cfs, from reductions in S77 and S308 discharges. S77 discharges decreased from 1,693 cfs the previous week to 748 cfs this past week, while S308 discharges went from 181 cfs to 0 cfs. Discharges south through the S350 structures increased from an average of 379 cfs the previous week to 547 cfs this past week. There were no discharges to the L8 canal via Culvert 10A. The corrected evapotranspiration value based on the L006 weather platform solar radiation data was 0.08 inches for the past two weeks.

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 (midnight January 2, 2018 to midnight January 8, 2018). 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.

Satellite imagery indicates that algal bloom potential has remained very low over the past four months, based on NOAA's cyanobacteria monitoring product derived from the OLCI satellite sensor. Potential for elevated cyanobacterial levels were last observed in the northern portion of the Lake in early September 2017 (Figure 5). Along with decreasing temperatures, high winds from Hurricane Irma may have further reduced bloom potential on the Lake by increasing turbidity, but elevated TP levels from high inflows and resuspended Lake sediment are expected to produce high bloom potentials next year as turbidity continues to decline and temperatures increase.

Table 1

INFLOWS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S65E & S65EX1	754	0.3
S71 & 72	81	0.0
S84 & 84X	231	0.1
Fisheating Creek	48	0.0
S154	8	0.0
S191	11	0.0
S133 P	25	0.0
S127 P	10	0.0
S129 P	6	0.0
S131 P	0	0.0
S135 P	26	0.0
S2 P	0	0.0
S3 P	0	0.0
S4 P	7	0.0
C5	0	0.0
Rainfall	190	0.1
Total	**1398**	**0.5**

OUTFLOWS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S77	748	0.3
S308	0	0.0
S351	283	0.1
S352	25	0.0
S354	239	0.1
L8	-1	0.0
ET	1598	0.6
Total	**2893**	**1.1**

PROVISIONAL DATA

Based on the Lake Okeechobee wading bird habitat suitability index, there are currently approximately 42,987 acres of suitable foraging habitat for long-legged birds and 8,873 acres for long and short legged birds on the Lake (Figure 6). The first wading bird foraging survey of the season was conducted on January 4, 2018 and approximately 9,451 birds were seen foraging in areas close to the levee (Figure 7). Almost half of the birds were foraging in an open water area in the western Moore Haven marsh that was treated to control torpedograss in 2017 (Figure 8, red outline).

Water Management Recommendations

The Lake stage is 15.35 feet NGVD having decreased 0.13 feet from the week prior, and 0.55 feet over the past month. Submerged and emergent vegetation communities in the nearshore region have experienced stages >16.0 feet NGVD three times in less than two years, and stages >15.5 feet NGVD for 105 consecutive days this water year, the longest period since late 2004 (112 consecutive days). These stages, combined with turbid conditions from Hurricane Irma's winds, will likely cause substantial declines in these communities over the coming months and/or years. Lower Lake stages near the end of WY2018 would help to recover these important communities, and long, steady recessions of water levels throughout the dry season may help promote another productive year for wading birds on the Lake as well.

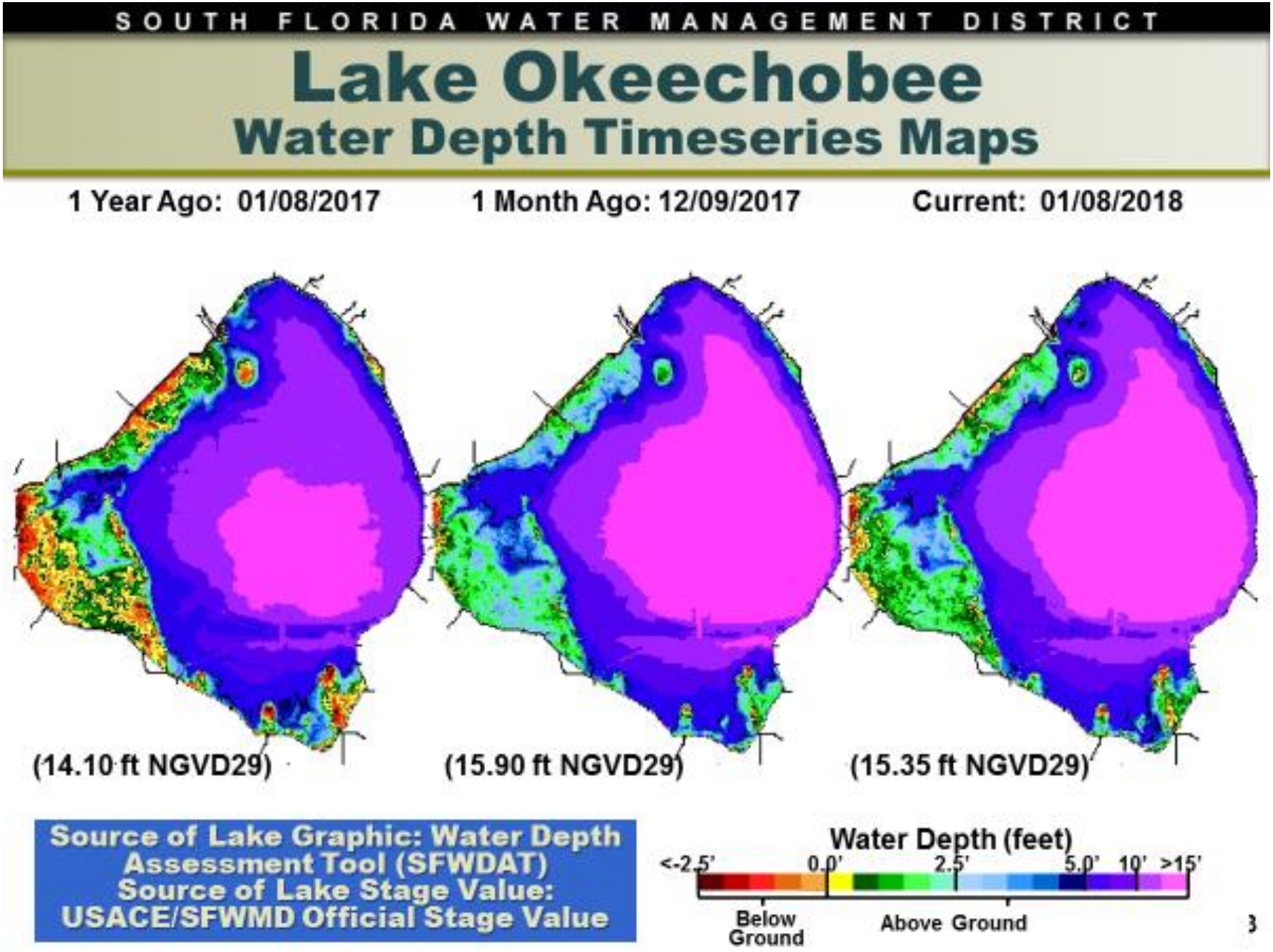

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
Lake Okeechobee
Water Depth Timeseries Maps
1 Year Ago: 01/08/2017
1 Month Ago: 12/09/2017
Current: 01/08/2018
(14.10 ft NGVD29)
(15.90 ft NGVD29)
(15.35 ft NGVD29)
Source of Lake Graphic: Water Depth Assessment Tool (SFWDAT)
Source of Lake Stage Value: USACE/SFWMD Official Stage Value
Water Depth (feet)
<-2.5'
0.0'
2.5'
5.0'
10'
>15'
Below Ground
Above Ground

Figure 1

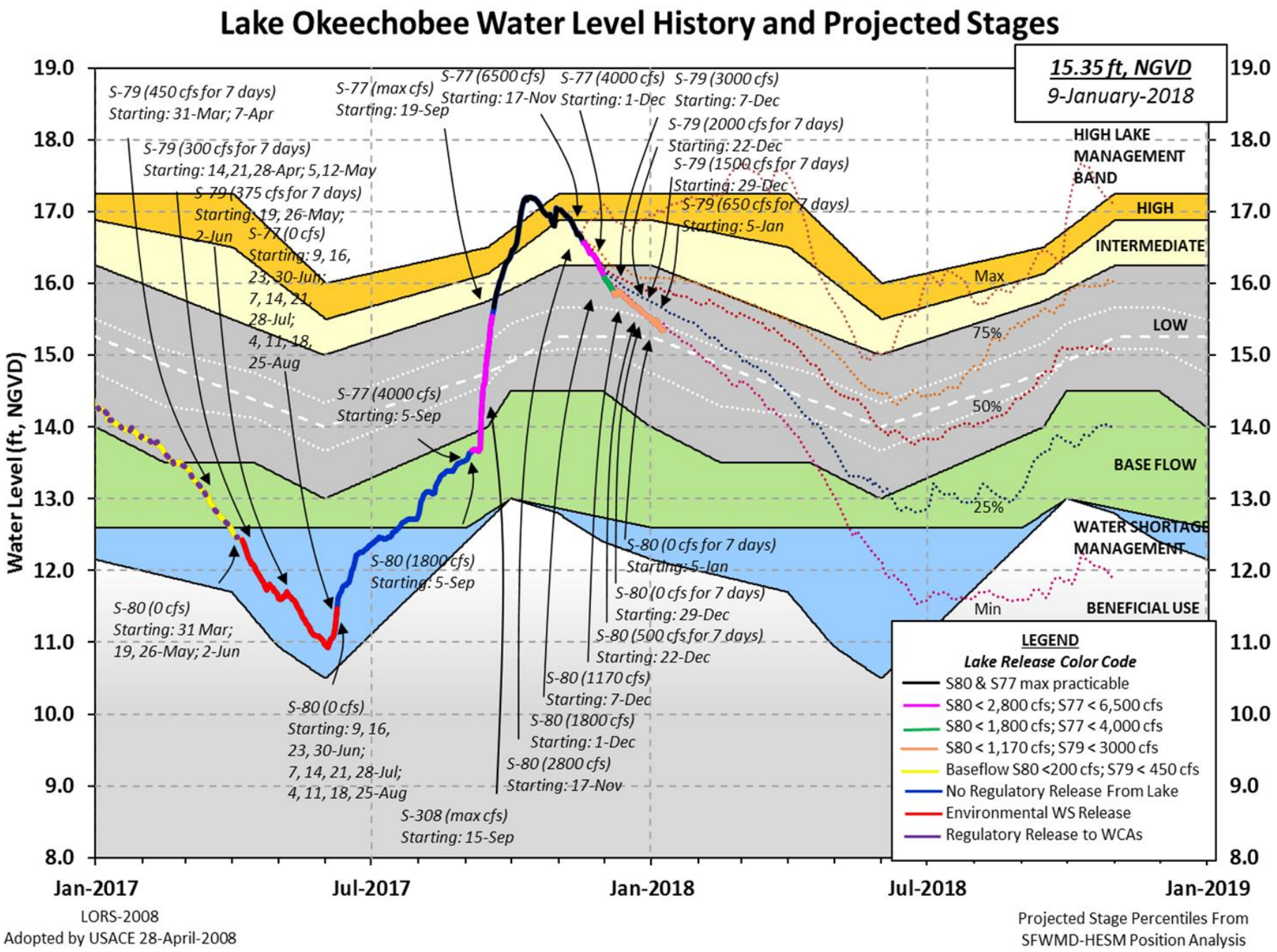

Lake Okeechobee Water Level History and Projected Stages
15.35 ft, NGVD
9-January-2018
Water Level (ft, NGVD)
19.0
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
Jan-2017
Jul-2017
Jan-2018
Jul-2018
Jan-2019
S-79 (450 cfs for 7 days) Starting: 31-Mar; 7-Apr
S-79 (300 cfs for 7 days) Starting: 14,21,28-Apr; 5,12-May
S-79 (375 cfs for 7 days) Starting: 19, 26-May; 2-Jun
S-77 (0 cfs) Starting: 9, 16, 23, 30-Jun; 7, 14, 21, 28-Jul; 4, 11, 18, 25-Aug
S-77 (max cfs) Starting: 19-Sep
S-77 (6500 cfs) Starting: 17-Nov
S-77 (4000 cfs) Starting: 1-Dec
S-79 (3000 cfs) Starting: 7-Dec
S-79 (2000 cfs for 7 days) Starting: 22-Dec
S-79 (1500 cfs for 7 days) Starting: 29-Dec
S-79 (650 cfs for 7 days) Starting: 5-Jan
S-77 (4000 cfs) Starting: 5-Sep
S-80 (0 cfs) Starting: 31 Mar; 19, 26-May; 2-Jun
S-80 (1800 cfs) Starting: 5-Sep
S-80 (0 cfs) Starting: 9, 16, 23, 30-Jun; 7, 14, 21, 28-Jul; 4, 11, 18, 25-Aug
S-308 (max cfs) Starting: 15-Sep
S-80 (2800 cfs) Starting: 17-Nov
S-80 (1800 cfs) Starting: 1-Dec
S-80 (1170 cfs) Starting: 7-Dec
S-80 (500 cfs for 7 days) Starting: 22-Dec
S-80 (0 cfs for 7 days) Starting: 29-Dec
S-80 (0 cfs for 7 days) Starting: 5-Jan
HIGH LAKE MANAGEMENT BAND
HIGH
INTERMEDIATE
LOW
BASE FLOW
WATER SHORTAGE MANAGEMENT
BENEFICIAL USE
Max
75%
50%
25%
Min
LEGEND
Lake Release Color Code
S80 & S77 max practicable
S80 < 2,800 cfs; S77 < 6,500 cfs
S80 < 1,800 cfs; S77 < 4,000 cfs
S80 < 1,170 cfs; S79 < 3000 cfs
Baseflow S80 <200 cfs; S79 < 450 cfs
No Regulatory Release From Lake
Environmental WS Release
Regulatory Release to WCAs
LORS-2008
Adopted by USACE 28-April-2008
Projected Stage Percentiles From
SFWMD-HESM Position Analysis

Figure 2

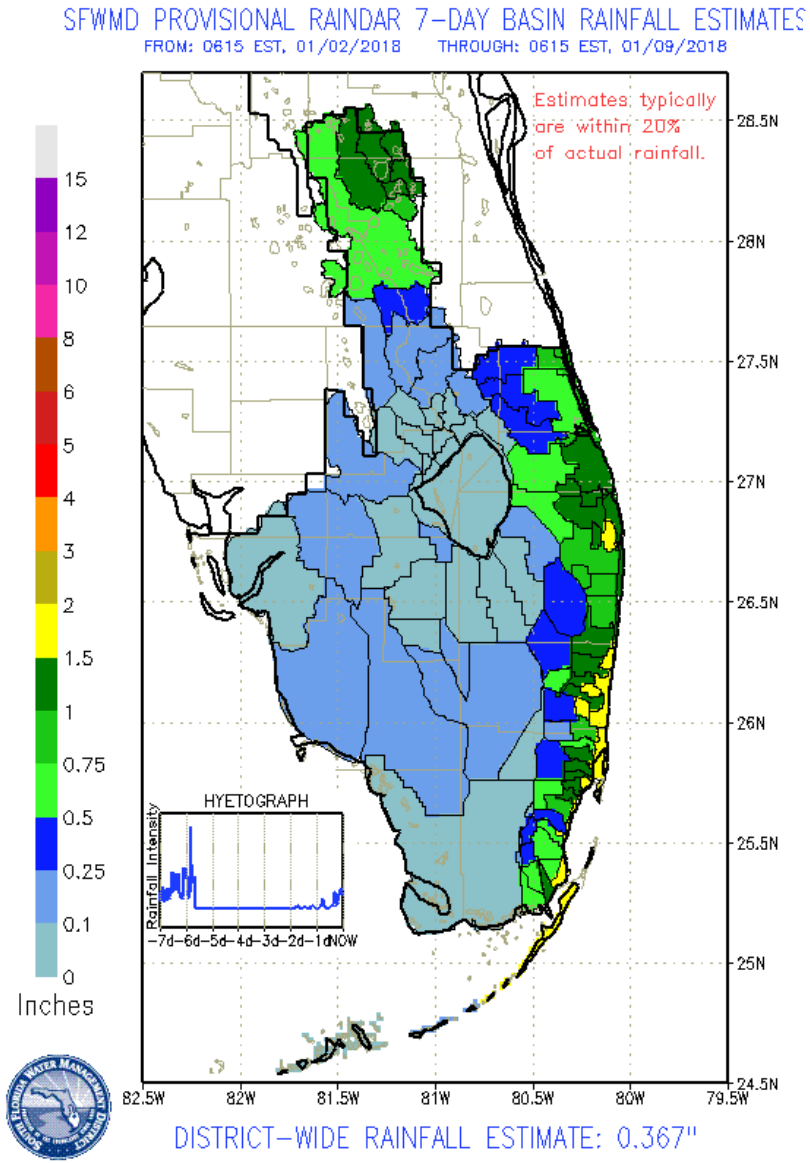


Figure 3

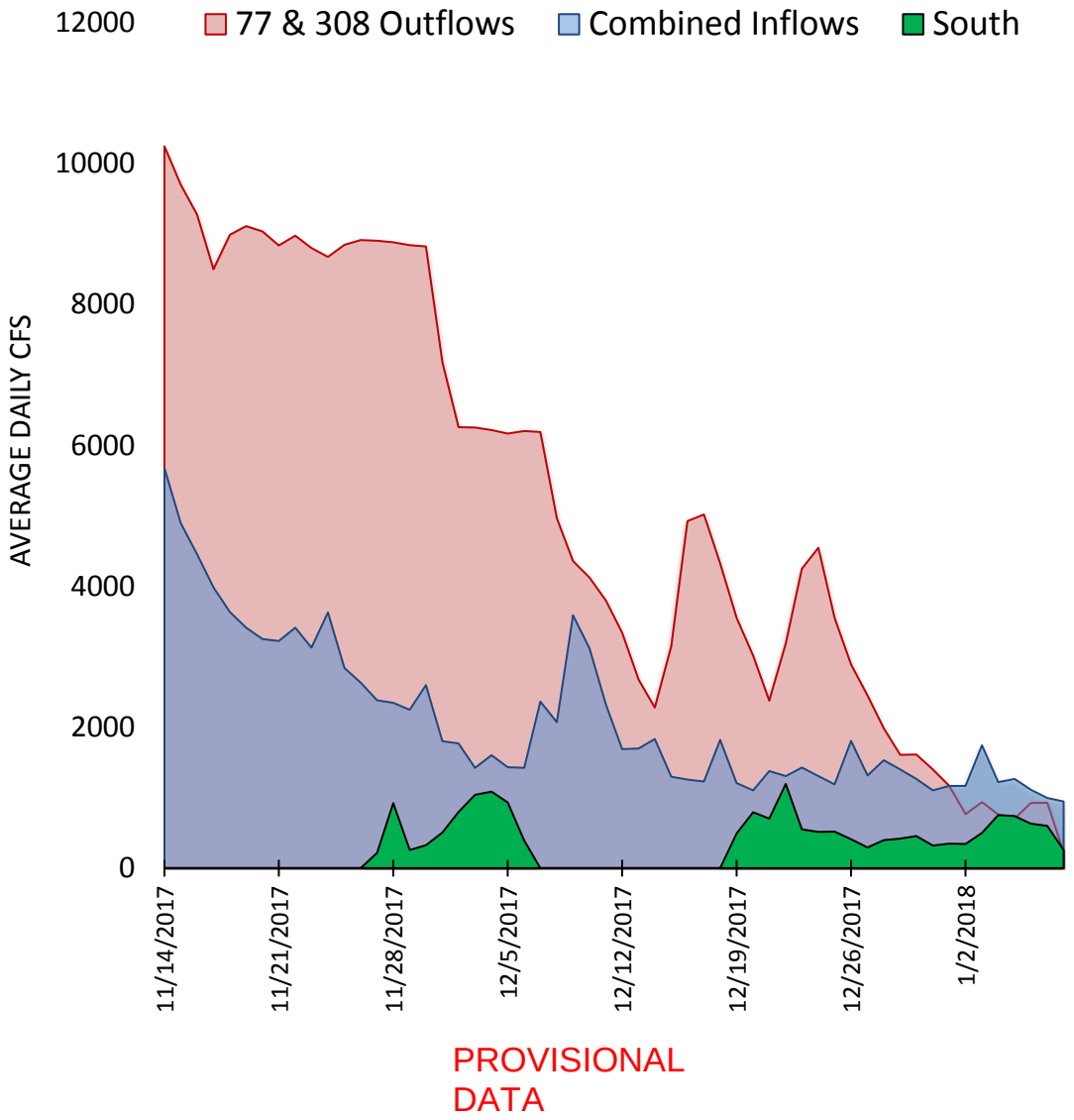


Figure 4

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee
Cyanobacteria Bloom Potential

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

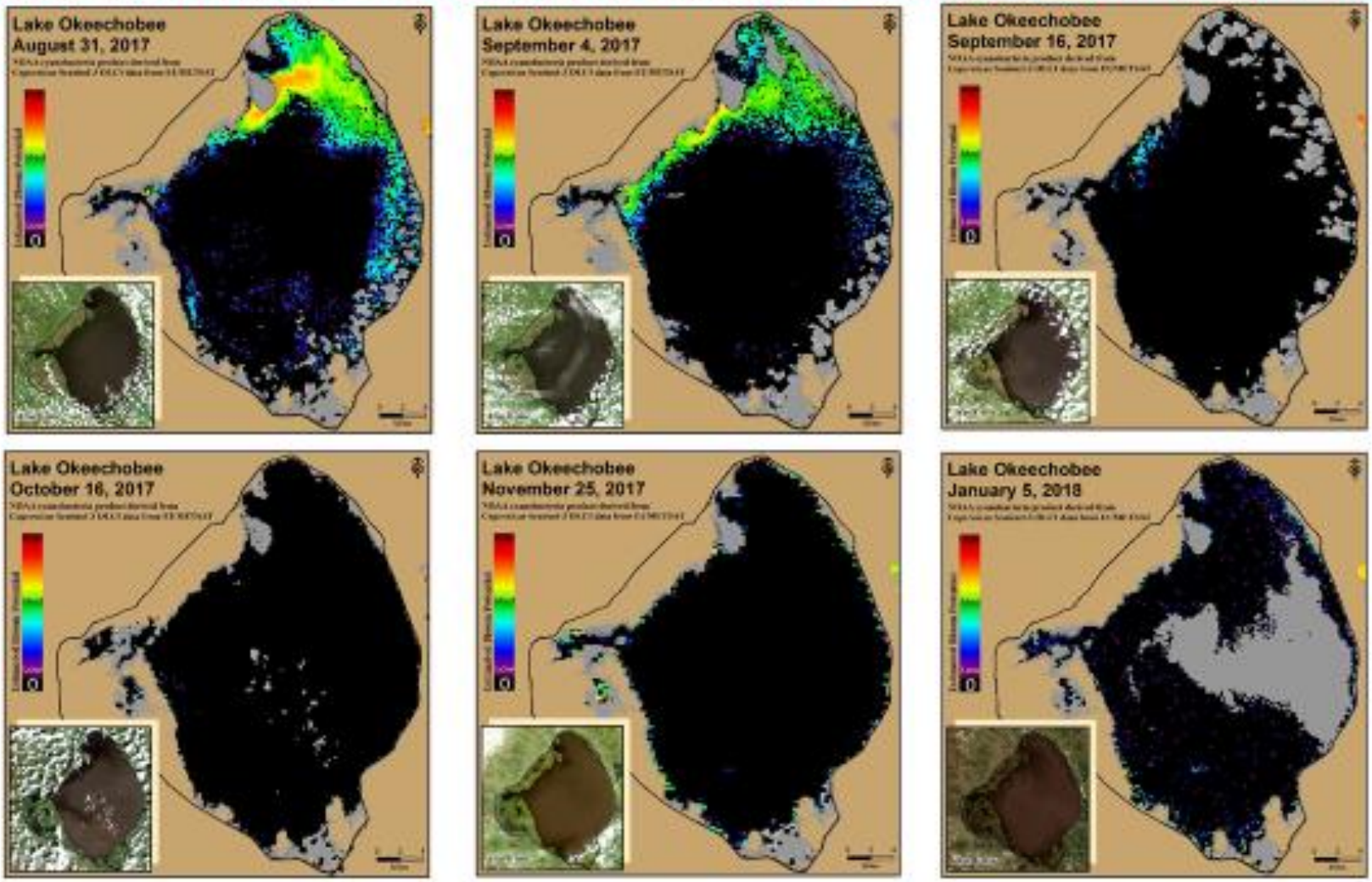


Figure 5

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee
Wading Bird Habitat Suitability Index

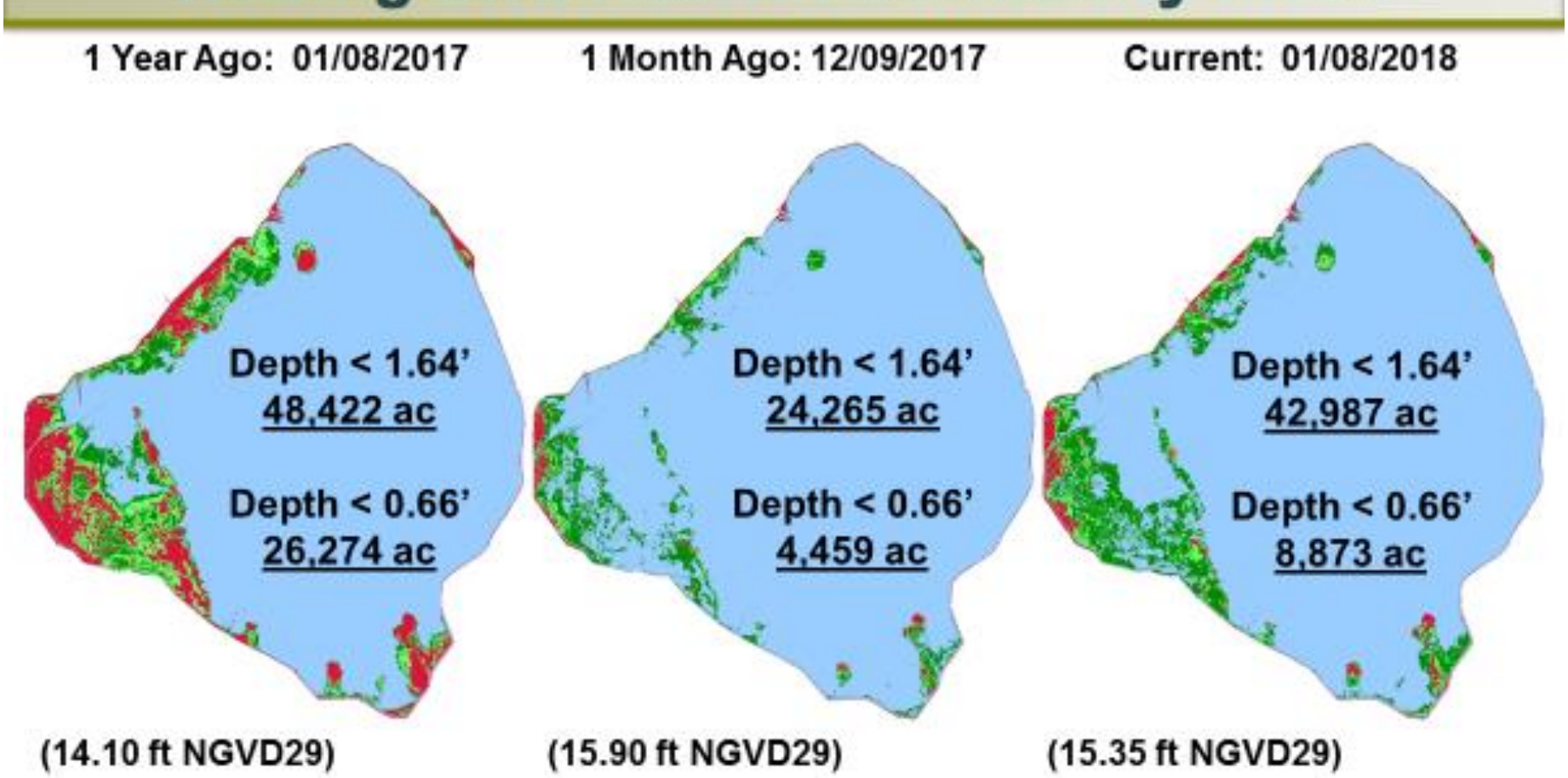


Figure 6

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee
Wading Birds

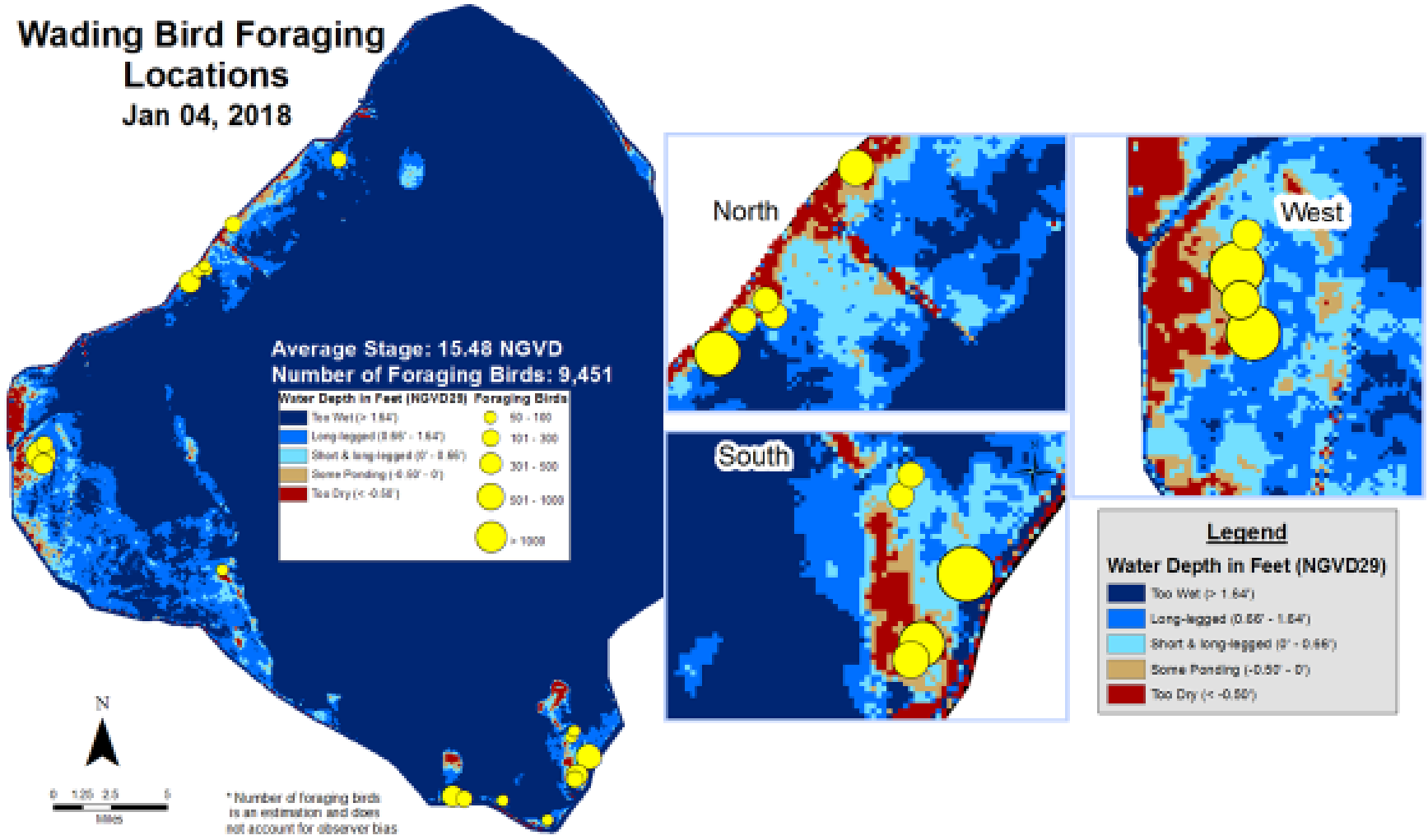
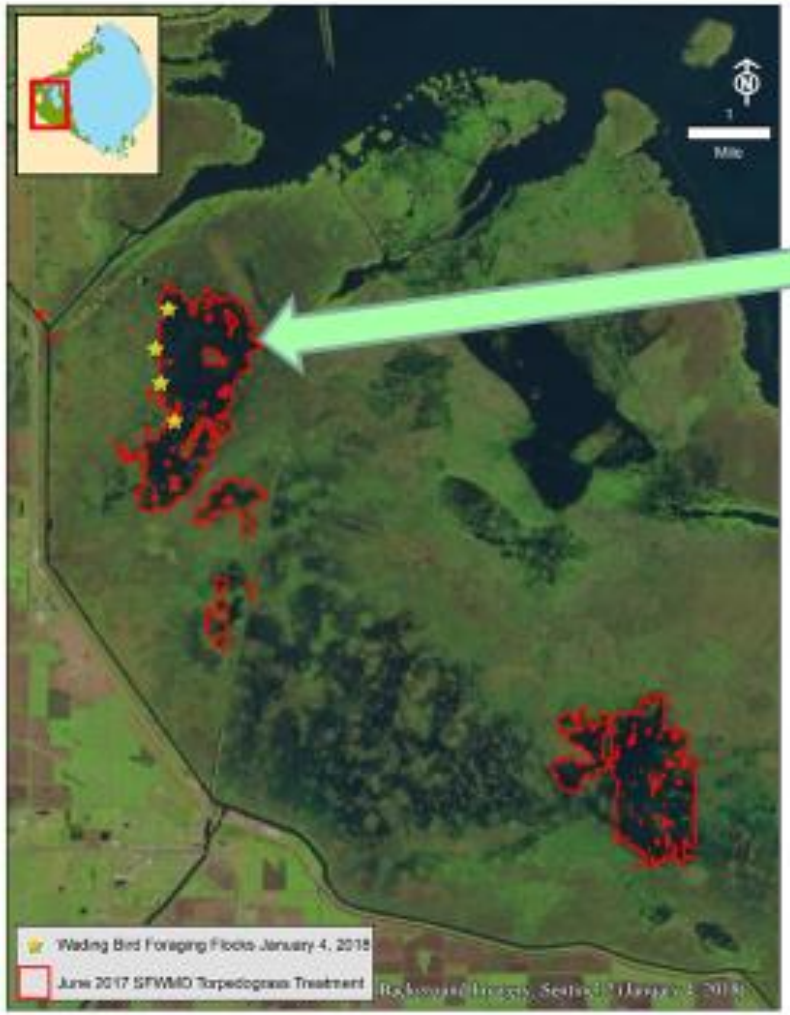


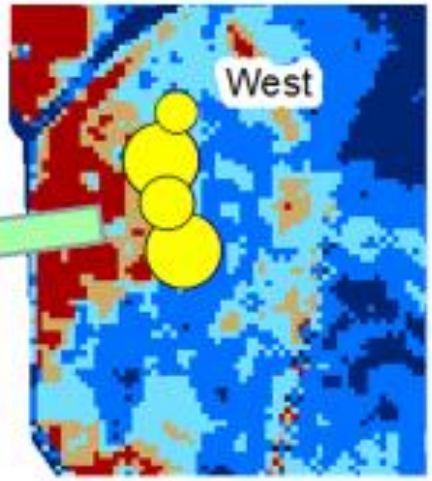
Figure 7

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee

Wading Bird Habitat and Torpedograss Treatment





~4500 wading birds foraging in 2017 SFWMD torpedograss treatment (~1900 acres) in Moore Haven Marsh

Figure 8

LAKE ISTOKPOGA

Lake Istokpoga stage is 39.24 feet NGVD as of midnight January 8, 2018 and is currently 0.26 feet below its regulation schedule to accommodate construction on downstream structures (Figure 9). Average daily flows into the lake from Josephine Creek for the week January 2, 2018 – January 8, 2018 were down from the previous week, at 45 cfs. No data have been reported for Arbuckle Creek since July 4, 2017 as the gauge is being recalibrated after construction in the area. Average daily discharge from S68 and S68X over the past week was 325 cfs, decreased from 518 cfs the week prior. According to RAINDAR, only 0.25 inches of rain fell in the Lake Istokpoga basin over the past week.

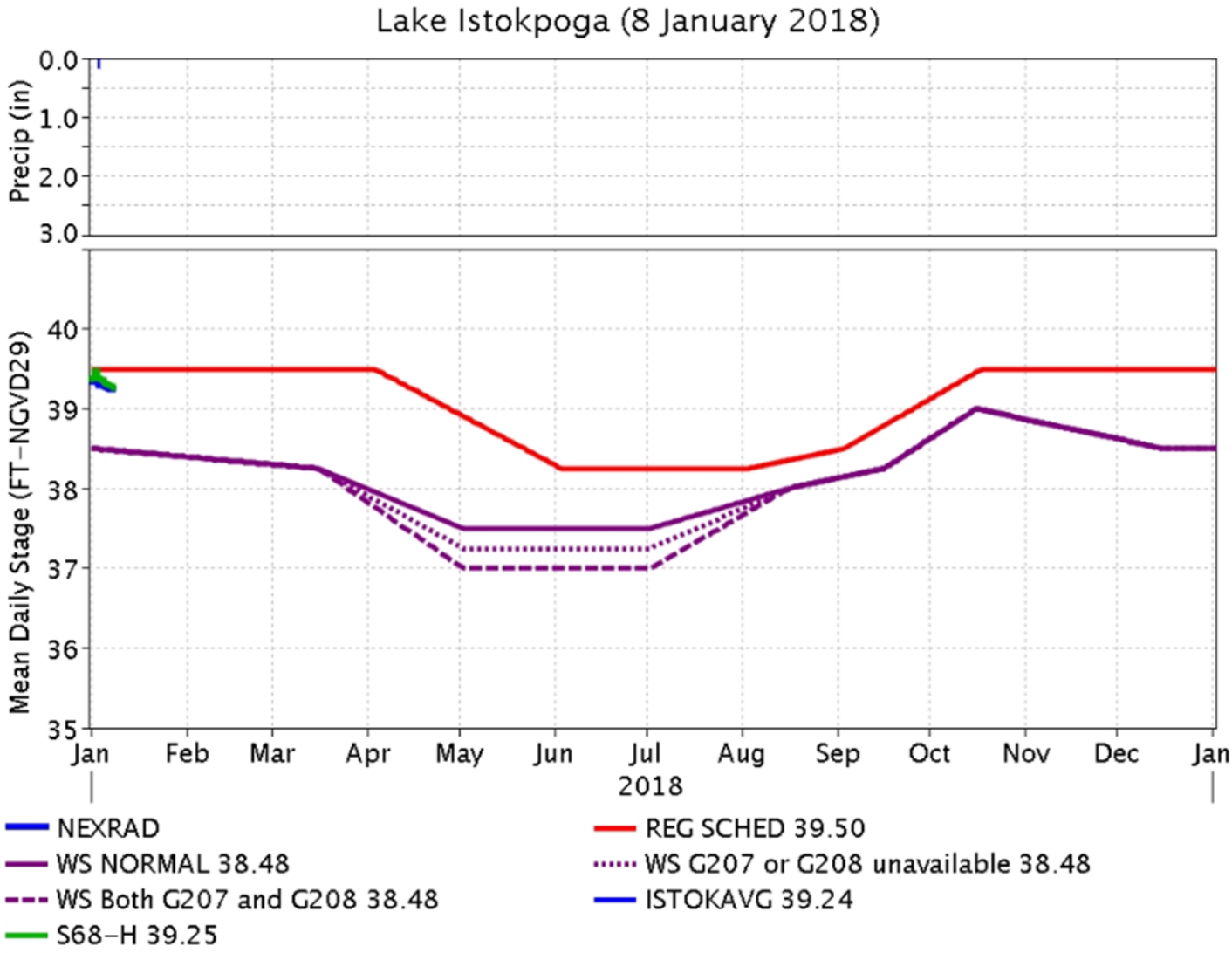


Figure 9

ESTUARIES

St. Lucie Estuary:

Last week total inflow into the St. Lucie Estuary averaged about 582 cfs (Figures 1 and 2) and last month inflow averaged about 1,187 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	293
S-80	30
S-308	0
S-49 on C-24	70
S-97 on C-23	72
Gordy Rd. structure on Ten Mile Creek	117

Over the past week, salinity increased 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 18.3. Salinity conditions in the middle estuary are in the good 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)	**13.5** (7.4)	**16.3** (12.1)	NA[1]
US1 Bridge	**16.3** (11.0)	**20.3** (17.7)	10.0-26.0
A1A Bridge	**24.9** (20.6)	**26.9** (26.0)	NA[1]

[1]Envelope not applicable.

Continuous monitoring of water quality is conducted at HR1 in the North Fork. Weekly dissolved oxygen data are summarized in Table 3.

Table 3. Weekly dissolved oxygen conditions at HR1 in the North Fork of the St. Lucie Estuary.

Location	Depth	Average DO (mg/l)	Minimum DO (mg/l)	Maximum DO (mg/l)
HR1	surface	8.88	3.81	11.07
HR1	bottom	7.69	3.33	10.36

Caloosahatchee Estuary:
Last week total inflow into the Caloosahatchee Estuary averaged about 1,140 cfs (Figures 6 and 7) and last month inflow averaged about 2,514 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	748
S-78	760
S-79	1,024

Over the past week, salinity stayed the same at Val I75 and increased downstream (Table 5, Figures 8 & 9). The seven-day average salinity values are within the fair range for the adult eastern oysters at Cape Coral and in the good range at Shell Point (Figure 10). Salinity data were not available at Sanibel. The 30-day moving average surface salinity is 0.2 at Val I-75 and 0.4 at Ft. Myers. Salinity at Val I-75 is forecast to be 2.8 in two weeks with no flow through S-79 (Figure 11). 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)	**0.2** (0.2)	**0.2** (0.2)	NA[1]
*Val I75	**0.2** (0.2)	**0.4** (0.2)	0.0-5.0[2]
Ft. Myers Yacht Basin	**0.7** (0.4)	**1.7** (0.5)	NA
Cape Coral	**7.1** (4.7)	**9.0** (6.4)	10.0-30.0
Shell Point	**18.5** (15.9)	**18.0** (16.6)	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)	Down for maintenance	No Data	2.65 – 5.31
Dissolved Oxygen (mg/l)	Down for maintenance	No Data	7.29 – 9.99

The Florida Fish and Wildlife Research Institute reported on January 5, 2018, that *Karenia brevis, the Florida red tide dinoflagellate,* was observed in low concentrations in one sample collected from Lee County. Numerous reports of fish kills and respiratory irritation were reported along Lee County over the past week.

Water Management Recommendations

Lake stage is in the Low sub-band of 2008 LORS. Tributary hydrological conditions are normal. The 2008 LORS recommends up to 450 cfs at S-79 and up to 200 cfs at S-80. Given the current estuarine conditions, there are no ecological benefits associated with freshwater releases from Lake Okeechobee.

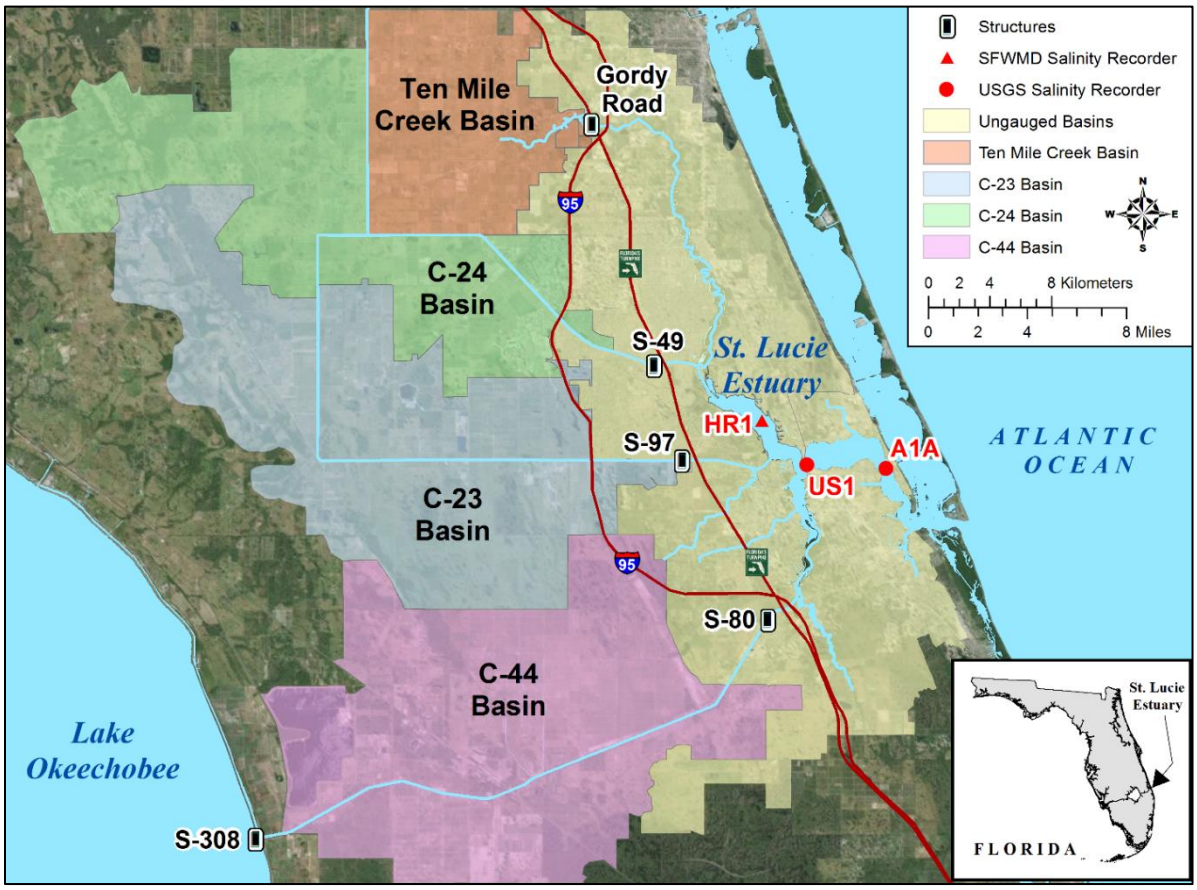


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

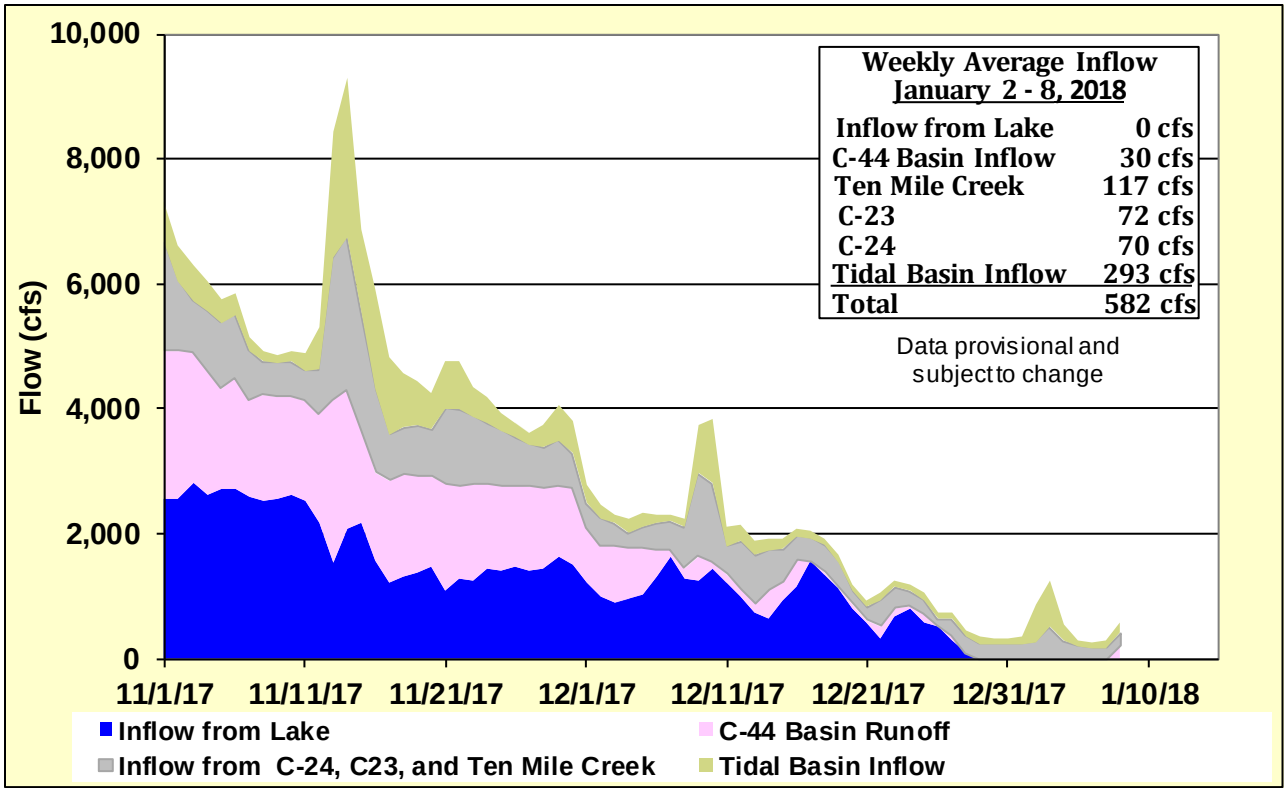


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

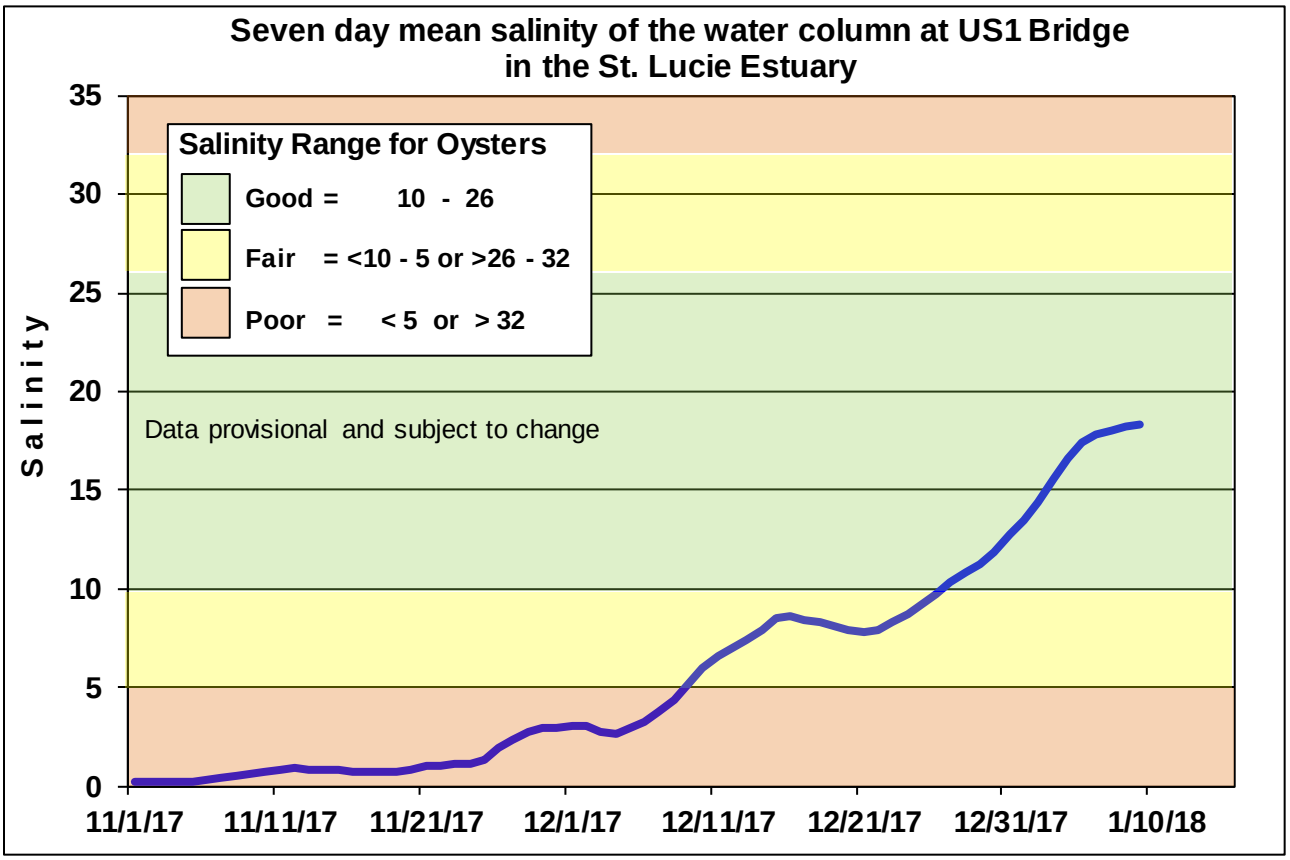


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

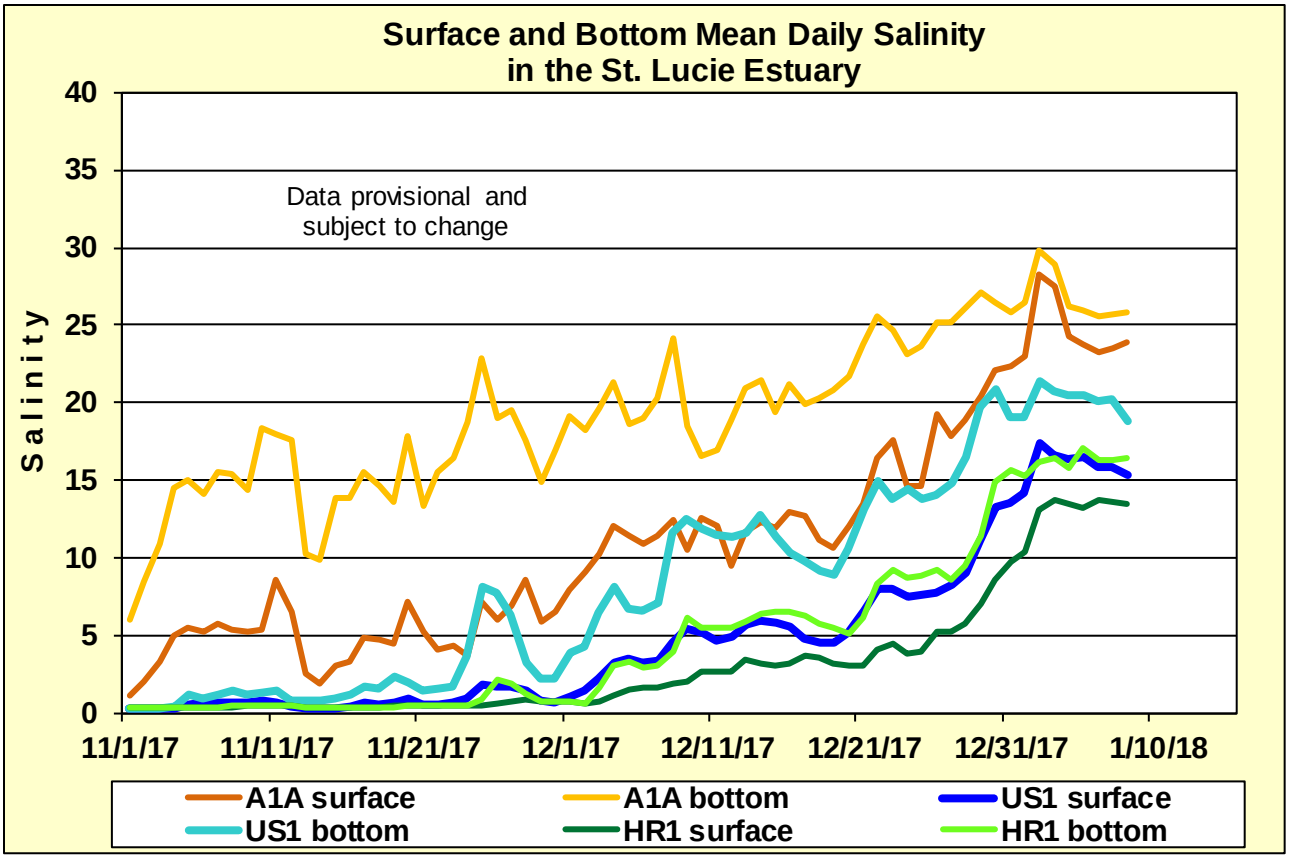


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

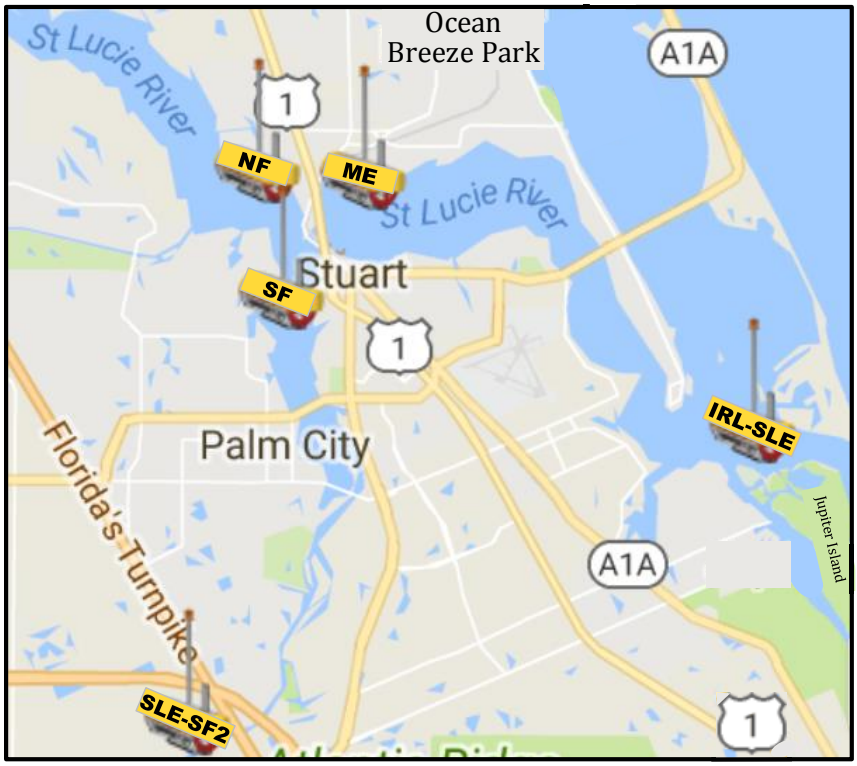


Figure 5. Location of FAU-HBOI LOBO water quality stations in the St. Lucie Estuary.

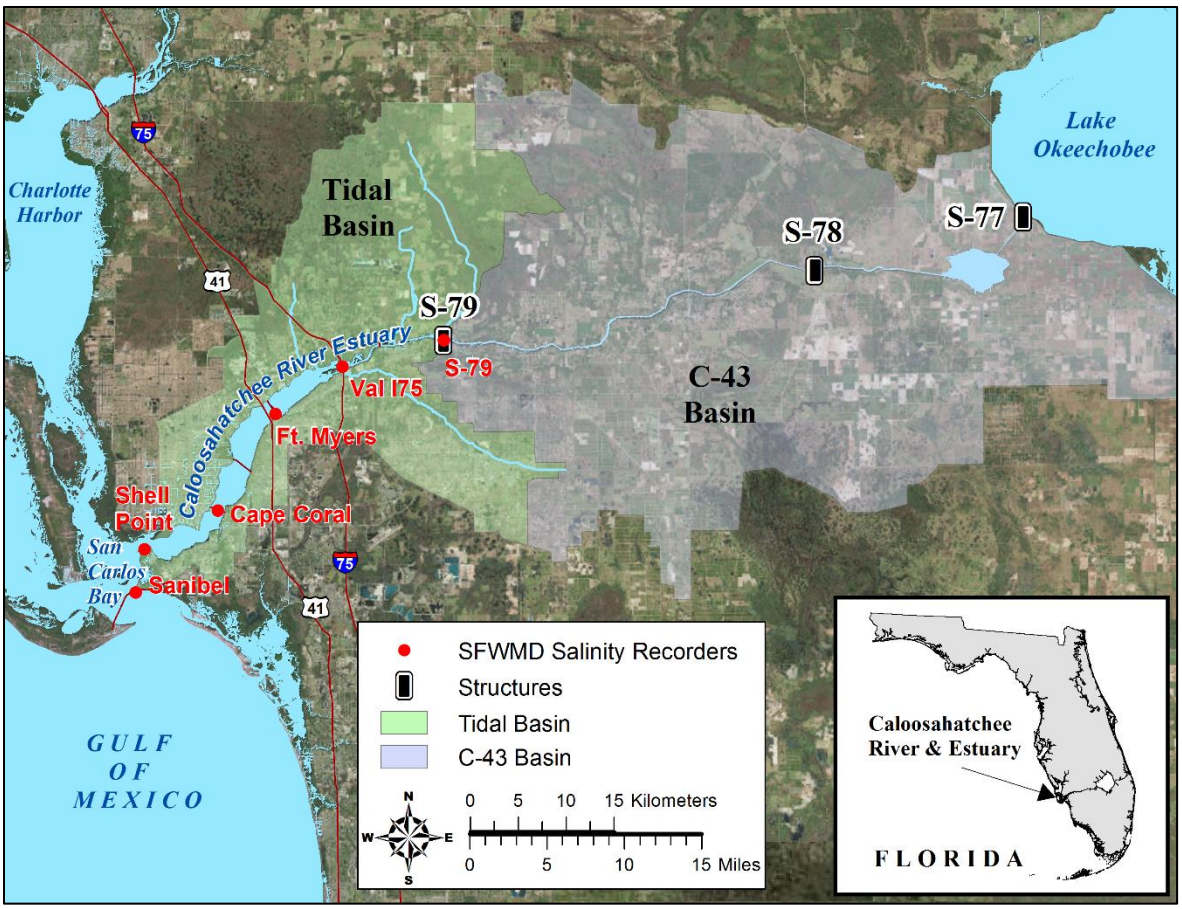


Figure 6. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

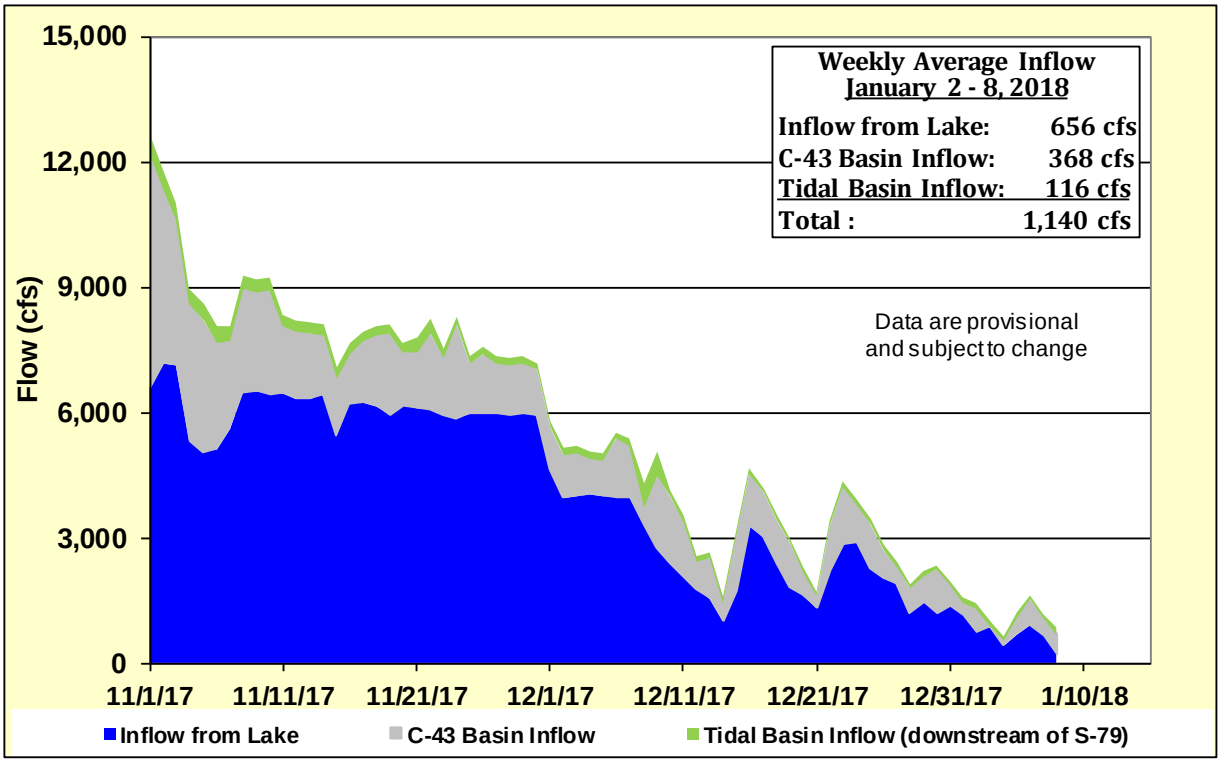


Figure 7. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

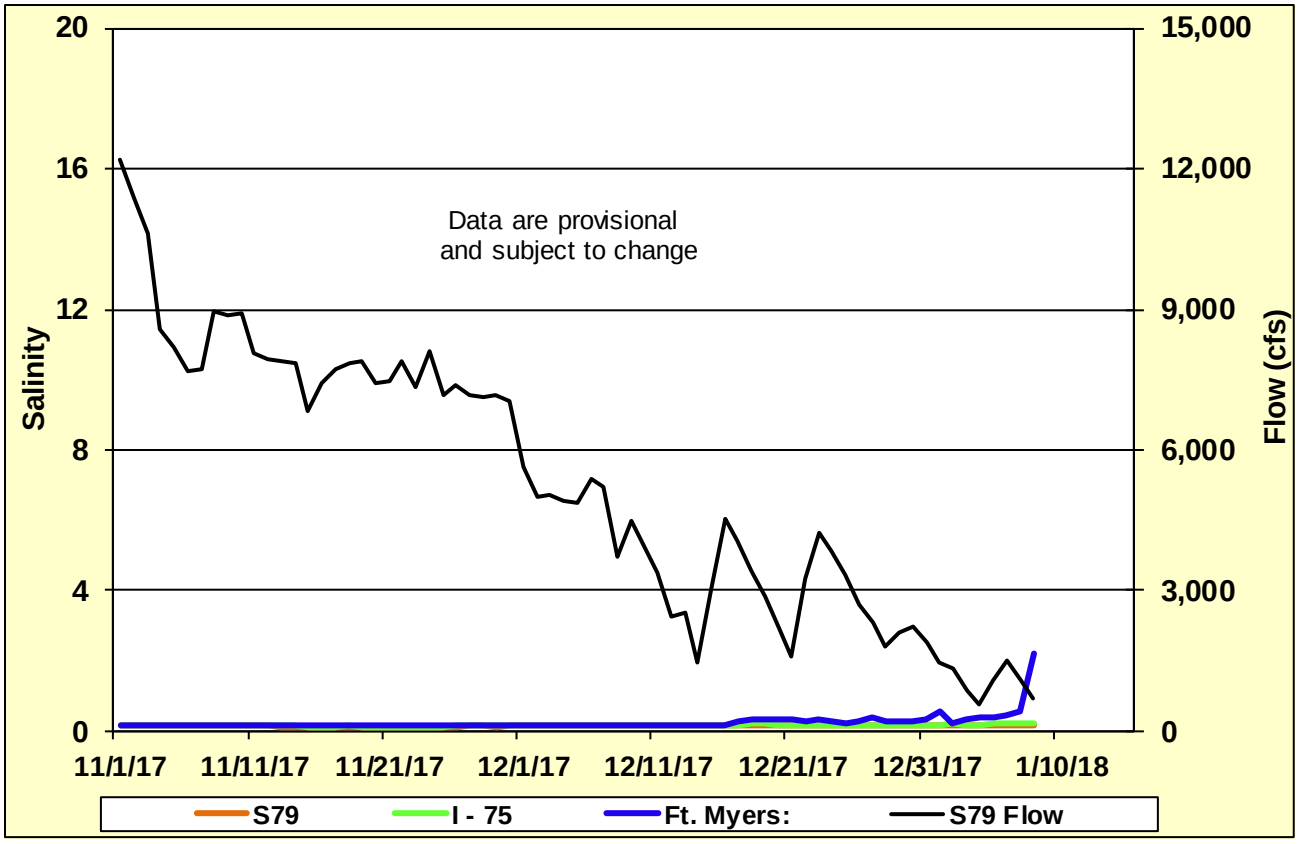


Figure 8. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

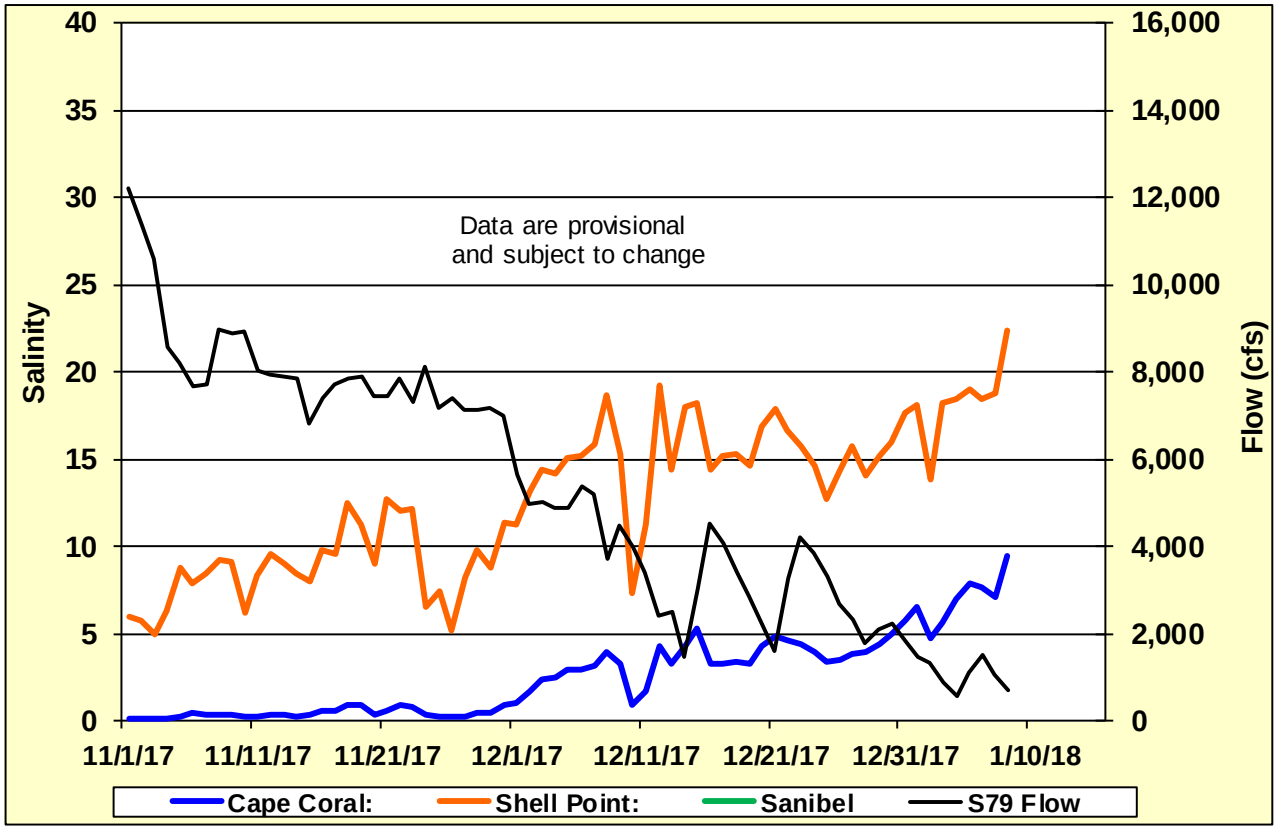


Figure 9. Daily mean flows at S-79 and salinity at lower estuary stations.

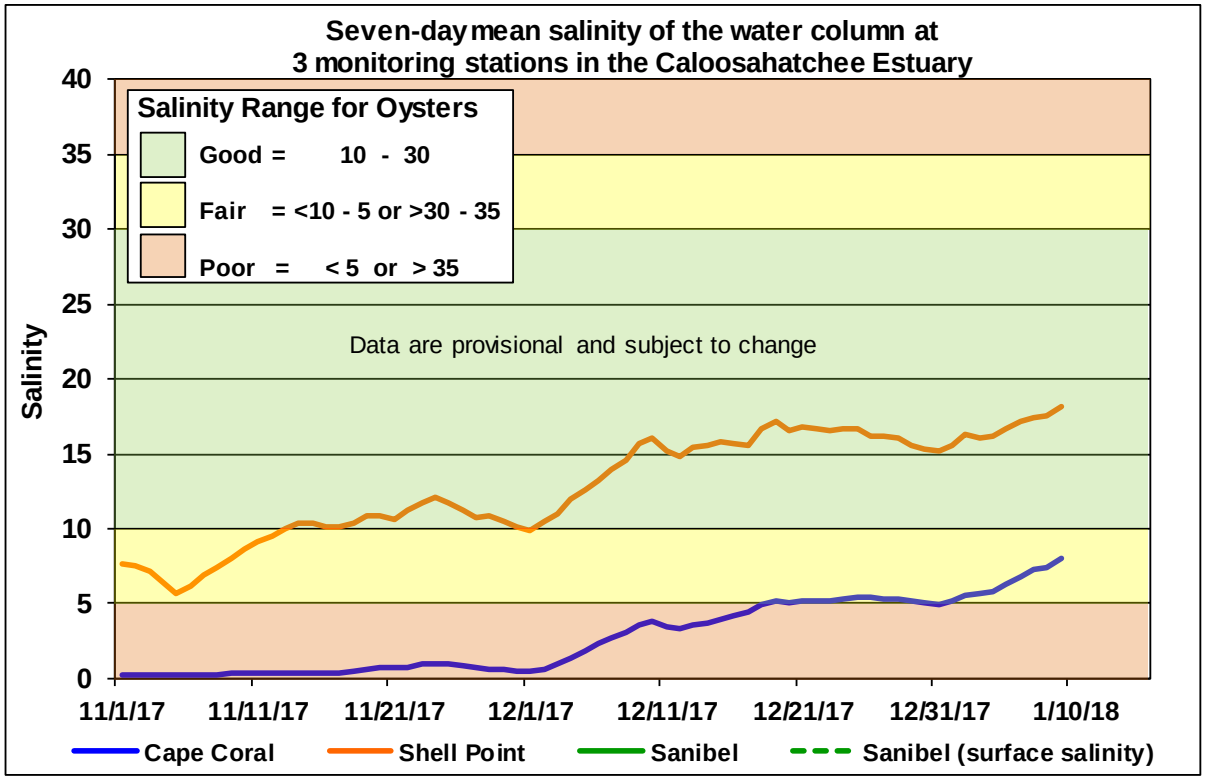


Figure 10. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

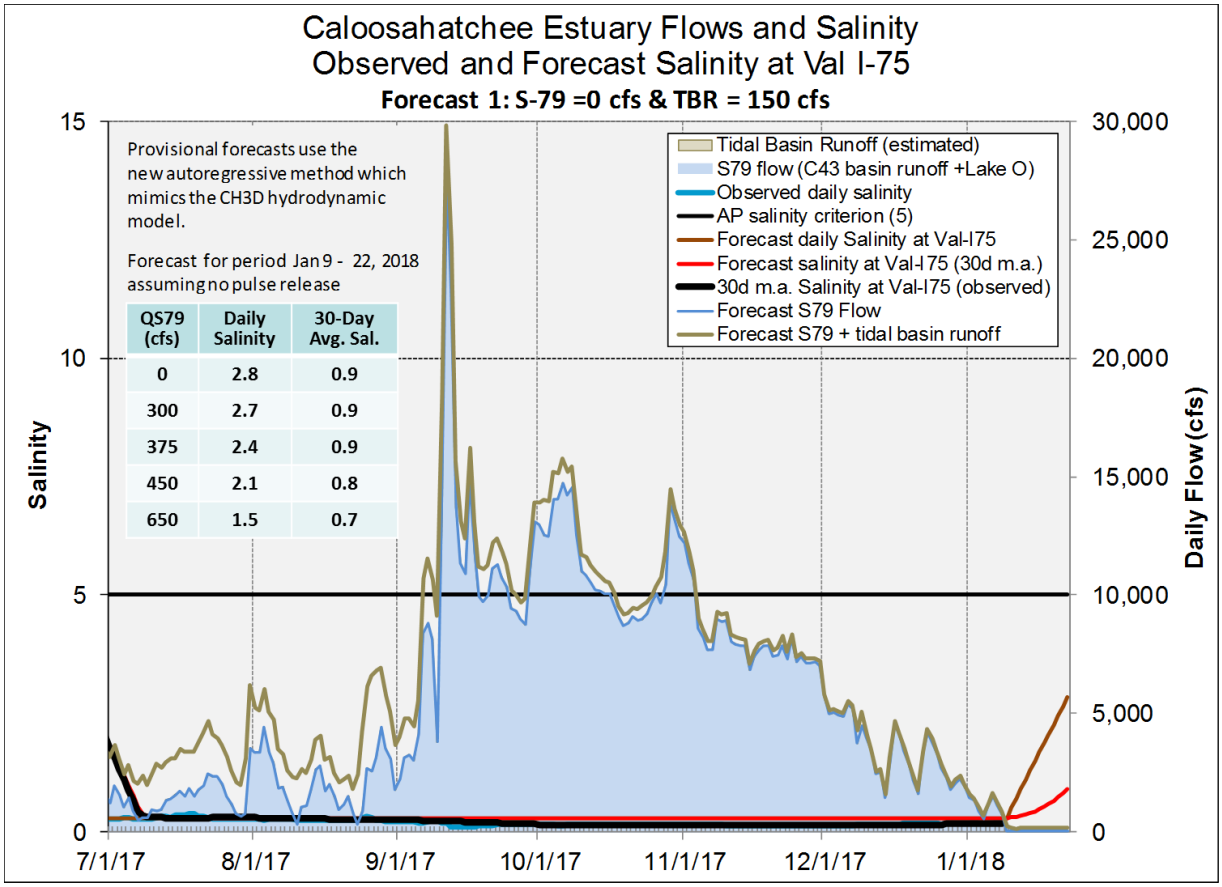
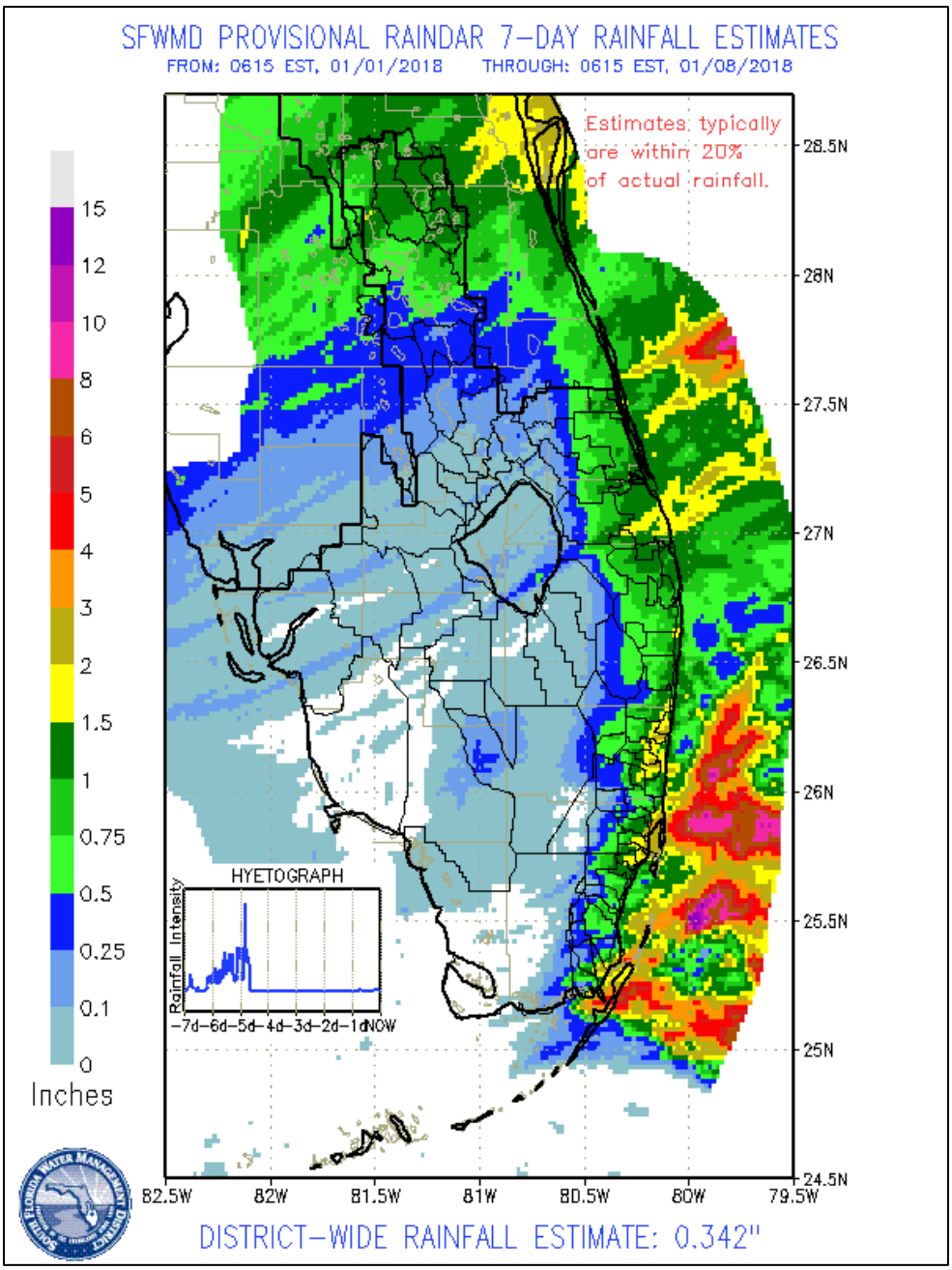


Figure 11. 14-day salinity forecast at Val I-75 assuming no releases at S-79.

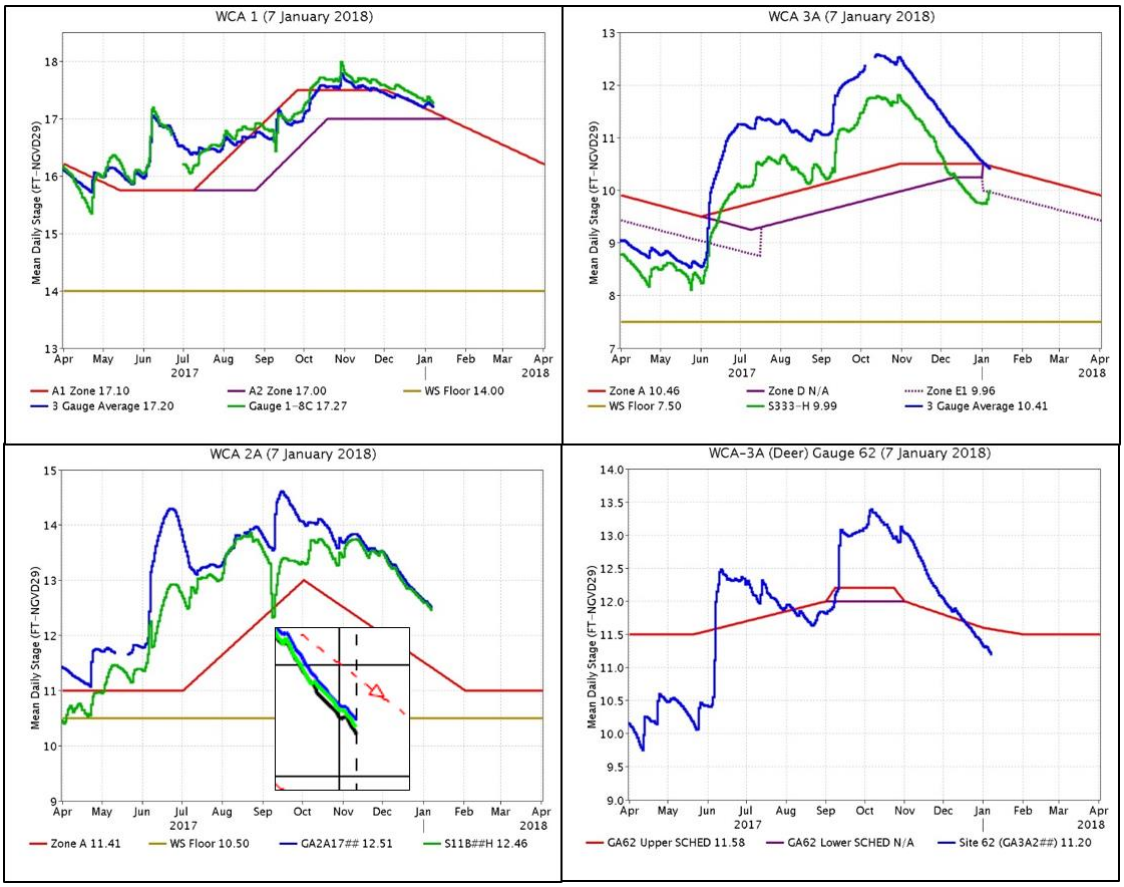
EVERGLADES

Over the last week, individual gauge changes in the WCAs ranged from −0.03 feet (southern WCA-3A) to −0.20 feet (northeast WCA-3A).

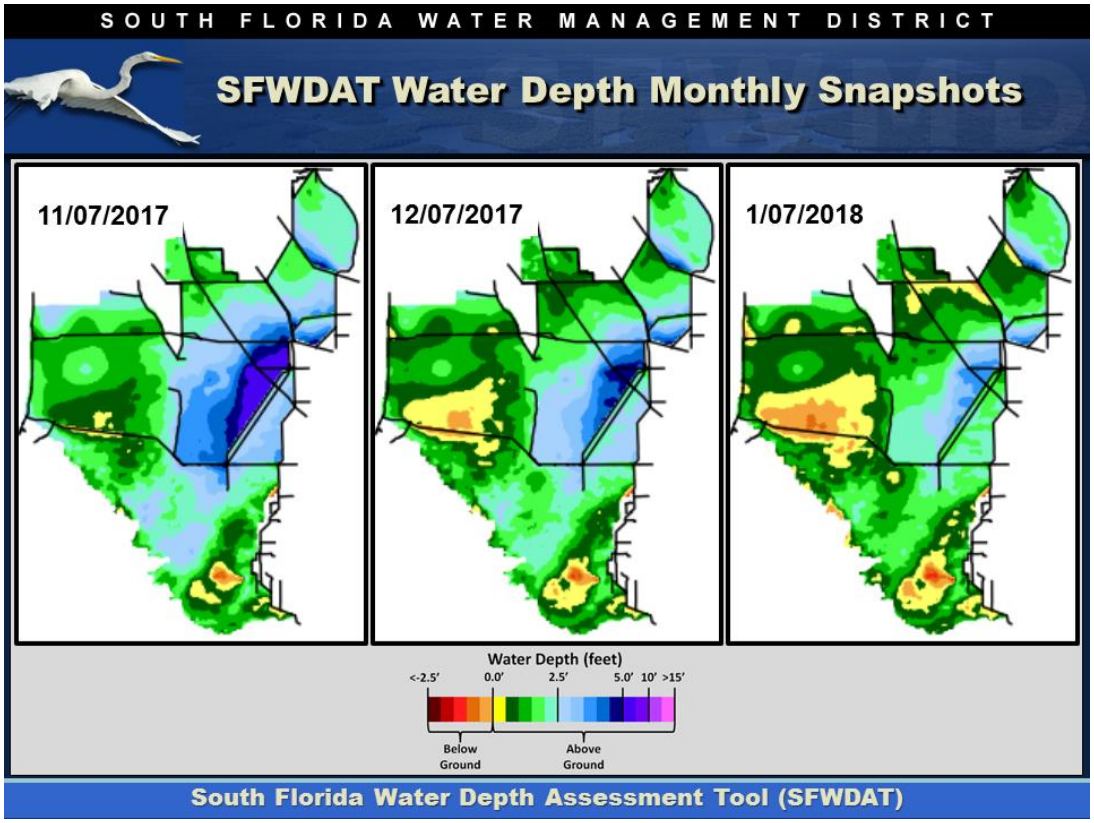
Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.42	−0.05
WCA-2A	0.34	−0.15
WCA-2B	0.64	−0.08
WCA-3A	0.10	−0.14
WCA-3B	0.05	−0.12
ENP	0.04	−0.14

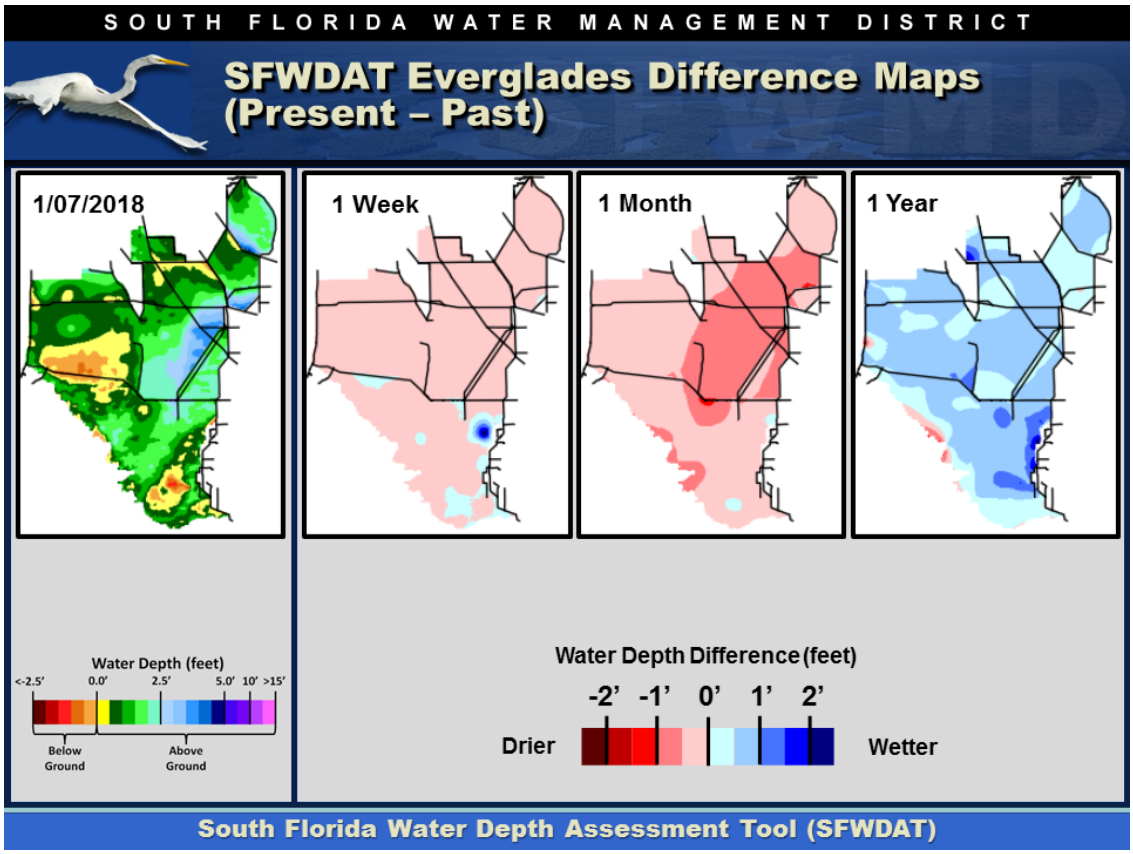


Regulation Schedules: WCA-1 three-gauge average continues trending along the top of the Zone A1 schedule, at 0.10 feet above. WCA-2A (subject to a temporary deviation – see inset) marsh stage at gauge GA2A17 is 1.10 feet above Zone A1, below the temporary schedule, and continues trending away from temporary schedule. WCA-3A three-gauge average stage is 0.05 feet below Zone A and continues to decrease. The stage difference between the marsh and the canal is 0.42 feet. WCA-3A at gauge 62 (northwest corner) is 0.38 feet below the upper schedule.



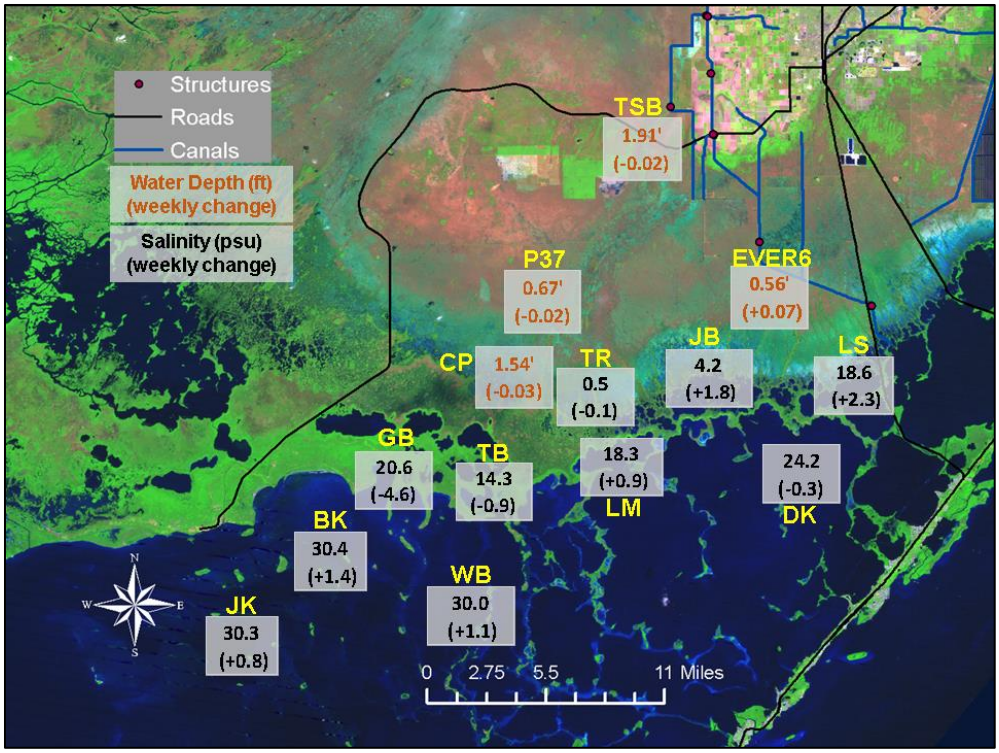
Water Depths and Changes: The WDAT tool for spatial interpolation of depth indicates a range from a low of 0.0 feet to 0.5 feet along the northern perimeter of WCA-3A and northern WCA-2A, to a high of 3.5 feet to 4.0 feet along the northern L-67A canal in southern WCA-3A. Comparing WDAT water depths from present, water depths over the last week decreased across the entire Everglades. Looking back one month, depths in all of WCAs are lower, with a majority of WCA-3A and WCA-2A being significantly lower. Pan evaporation was estimated at 0.85 inches last week.

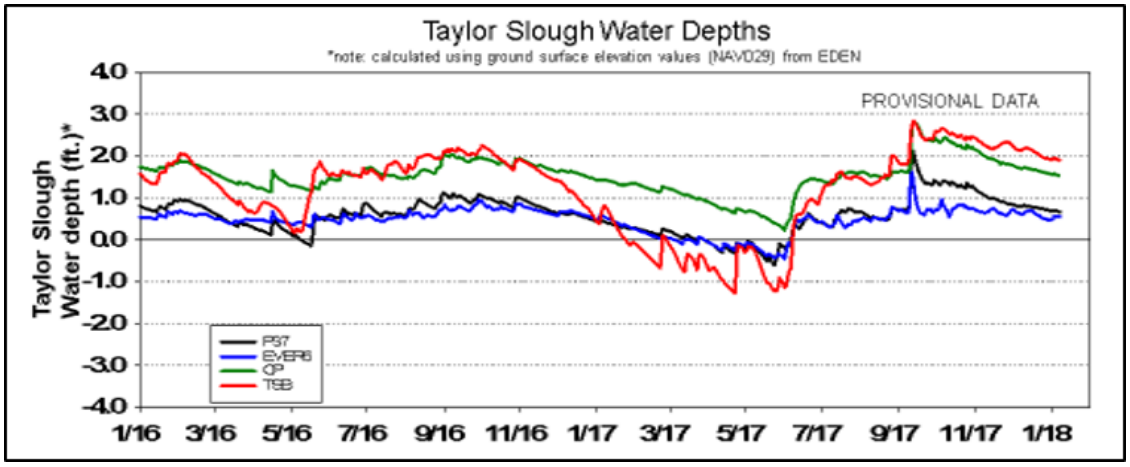


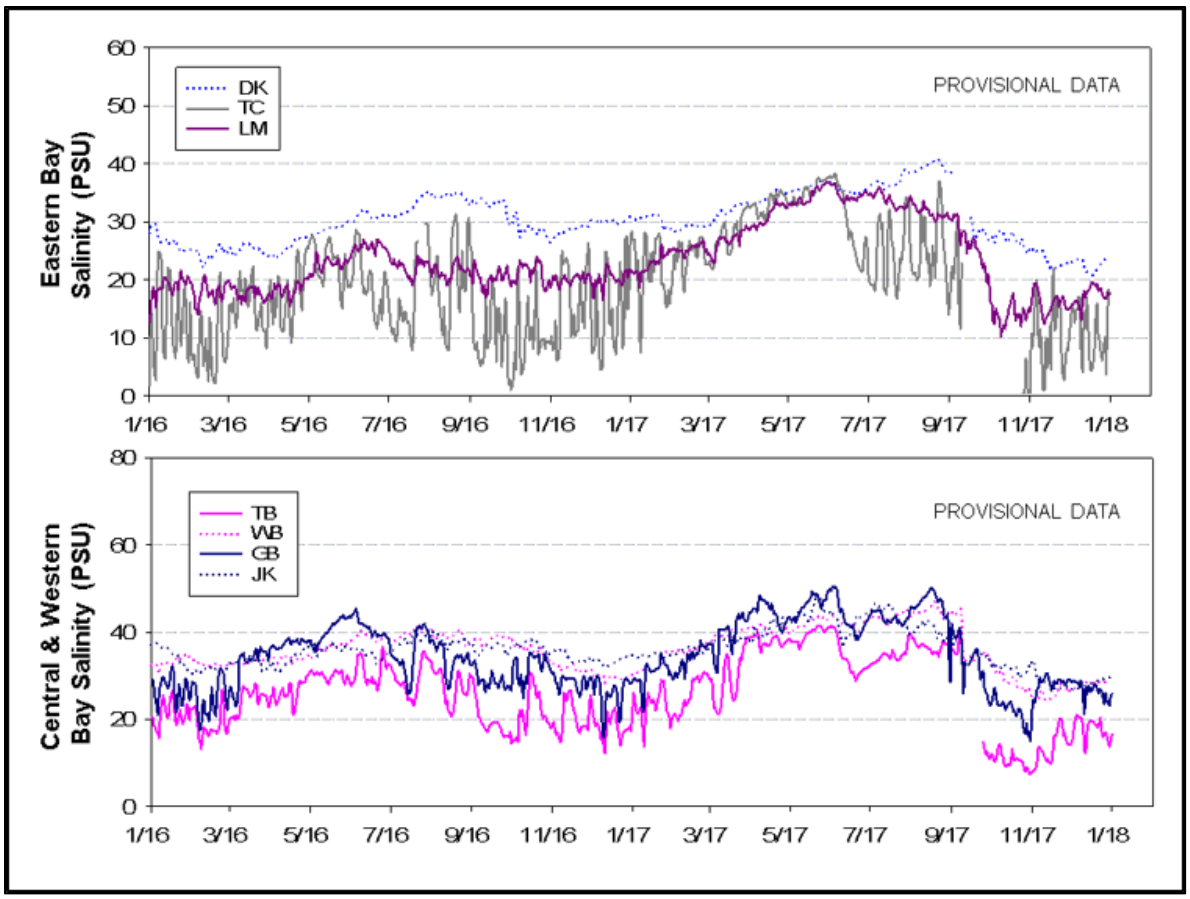


Taylor Slough stages: This past week's rainfall was focused along the eastern areas, and the water depth changes responded to this with decreases of 0.02 feet to 0.03 feet in the western areas, but an increase of 0.07 feet in the Everglades National Park panhandle. Water depths are 3 to 16 inches above the historic average for this time of year with the highest divergence occurring in northern Taylor Slough.

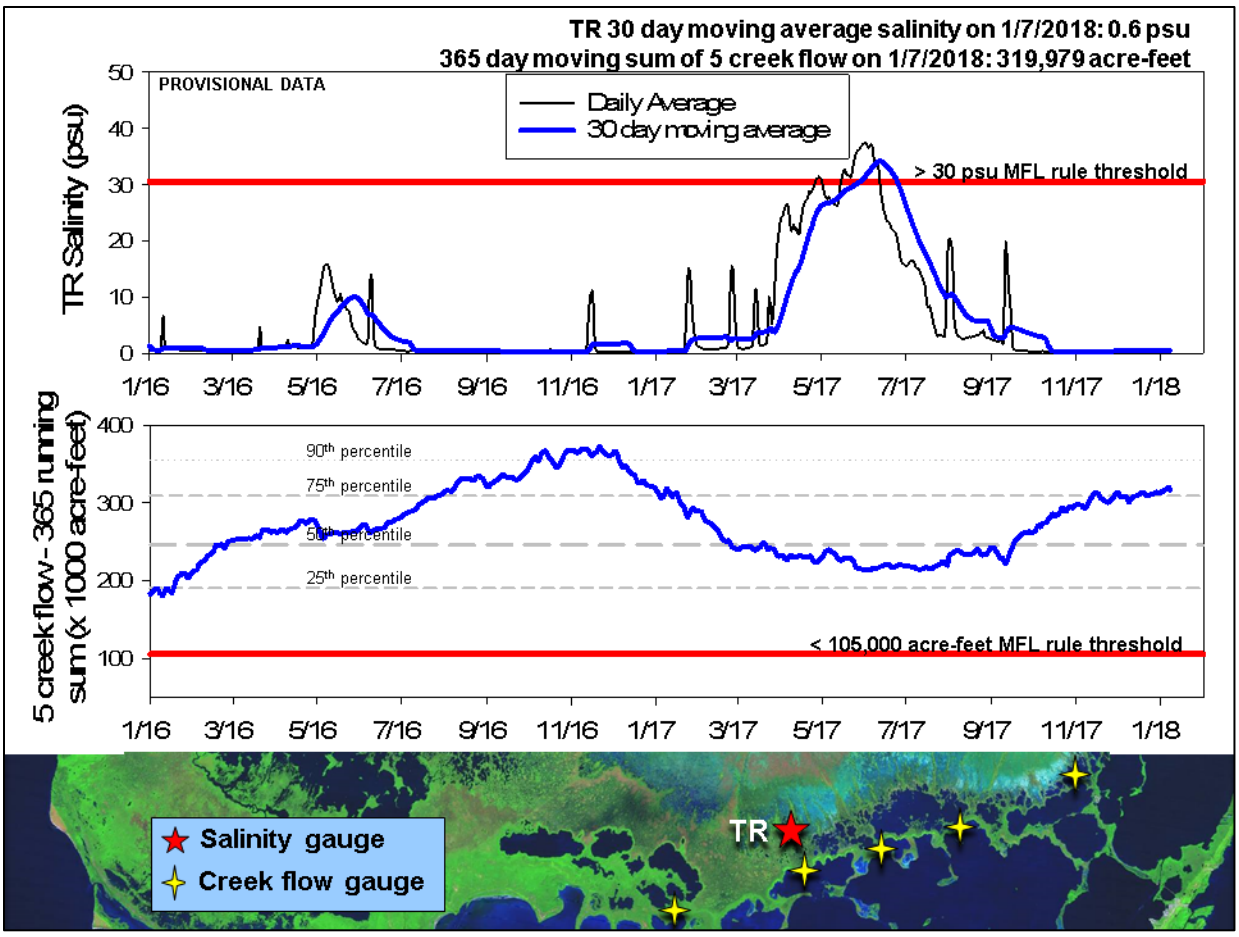
Florida Bay Salinities: Salinity changes for the last week were less than 5 psu. Current salinities range from 4 psu in the northeastern embayments to 30 in the western bay. Salinities are as much as 6 psu lower than the historic averages for this time of year with the largest divergence occurring in the central nearshore.







Florida Bay MFL: Mangrove zone daily average salinity remains near fresh at 0.5 psu, and has decreased slowly over the last week. The 30-day moving average is 0.6 psu. The weekly cumulative flow from the five creeks denoted by yellow stars on the map decreased by 400 acre-feet over the last week to end at just over 6,550 acre-feet. This is 2,600 acre-feet greater than the historical average for this time of year. Flows are expected to decrease as the dry season progresses. The 365-day moving sum of flow from the five creeks identified by yellow stars on the map increased almost 8,000 acre-feet over the last week to end at 319,979 acre-feet (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

Deep water conditions persist in southern WCA-3A causing stress to tree islands, however the severity is lessening. Water managers should continue using all practicable means to lower water levels in southern WCA-3A until that region reaches depths appropriate depths for wading bird foraging. However, northern WCA-3A stages are receding to depths of ecological importance as the wading bird nesting season begins. Slowing the recession rates in northern WCA-3A from – 0.20 feet per week to − 0.10 feet per week could help to protect foraging habitat and the important Alley North colony by maintaining open water around the historic colony tree islands.

More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

Everglades Ecological Recommendations, January 9th, 2018 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages decreased −0.05'	Rainfall, ET, management	Maintain depths at high end of regulation schedule or slightly above.	Protect habitat and facilitate invasive plant treatments.
WCA-2A	Stages decreased −0.15'	Rainfall, ET, management	Maintain depths at temporary regulation schedule or slightly above.	Protect downstream habitat and wildlife from high water stress.
WCA-2B	Stages decreased −0.08'	Rainfall, ET, management	Maintain depths at regulation schedule or slightly above.	Protect downstream habitat and wildlife from high water stress.
WCA-3A NE	Stages decreased −0.20'	Rainfall, ET, management	Moderate recession rates as stages reach regulation schedule.	Protect habitat and wildlife, foster conditions for optimal wading bird foraging and protect nesting habitat.
WCA-3A NW	Stages decreased −0.14'	Rainfall, ET, management		
Central WCA-3A S	Stages decreased −0.19'	Rainfall, ET, management	Moderate recession rates as stages reach regulation schedule. Manage for relief of high water conditions.	Water depths above 2.5 feet at gauge 65 are indicative that tree islands are flooded and under stress. Depths exceeded that mark on 18 June, meaning the tree islands have been flooded for **206** days.
Southern WCA-3A S	Stages decreased −0.03'	Rainfall, ET, management		
WCA-3B	Stages decreased −0.12'	Rainfall, ET, management	Maintain depths at regulation schedule.	Protect habitat and wildlife from high water stress.
ENP-SRS	Stages decreased −0.14'	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. Protect habitat and wildlife, including apple snail reproduction.
Taylor Slough	Stage changes ranged from −0.03' to +0.07'	Rain, ET, inflows	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −4.6 to +2.3 psu.	Rain, ET, inflows, wind	Move water southward as possible	When available, provide freshwater to main low salinity buffer and promote water movement.