

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, Assistant Executive Director, Executive Office Staff

**FROM:** SFWMD Staff Environmental Advisory Team

**DATE:** January 12, 2022

**SUBJECT:** Weekly Environmental Conditions for Systems Operations

### **Summary**

#### **Weather Conditions and Forecast**

Cooler weather with a continuation of shower activity along and near the east coast will continue into Wednesday as the winds gradually diminish. Shower activity could also extend well inland south of Lake Okeechobee, producing much lighter areal average rainfall than east-coast basins. A secondary cold front is forecast to pass through Florida on Thursday, causing substantially drier and cool air to overspread the District by Friday. Below average temperatures and dry weather associated with the air mass arriving on Friday will extend through the day Saturday. An upper-air disturbance gathering strength over the Mississippi and Tennessee River Valleys will dive southeastward by Sunday. This weather system will introduce a cold front across the Gulf of Mexico and cause low pressure to form along it late Saturday and Sunday. Although moisture will initially be limited, the strong dynamics associated with the vigorous upper-air impulse will cause *forced ascent* as it gathers moisture. The result will be light to moderately heavy, fast-moving rains arriving north and west of Lake Okeechobee overnight Saturday or early Sunday, with the rains possibly extending into Sunday. Widespread rainfall is likely after the passage of this system. The associated cold front will push through the District during the day on Sunday, followed by the arrival of the coldest and driest air mass so far this winter early next week.

#### **Kissimmee**

Flow at S-65A has been reduced to minimum discharge (~300 cfs) and water depth on the Kissimmee River floodplain is declining. Mean depth decreased to 0.19 feet as of January 9, 2022. The concentration of dissolved oxygen in the Kissimmee River has remained well above the region of concern, with an average of 8.0 mg/L for the week ending on January 9, 2022.

#### **Lake Okeechobee**

Lake Okeechobee stage was 15.29 feet NGVD on January 9, 2022 and it was 0.53 feet lower than a month ago (**Figure LO-1**). Lake stage fell back to within the ecological envelope on January 1, 2022, after being above the envelope since late September, 2021, and having spent a total of 279 days (79%) in 2021 above the envelope (**Figure**

**LO-2).** Average daily inflows (excluding rainfall) increased from the previous week, going from 440 cfs to 545 cfs. Average daily outflows (excluding evapotranspiration) also increased from the previous week, going from 2,883 cfs to 3,729 cfs. Recent satellite imagery (January 8, 2022) showed low to medium bloom potential along the western shorelines (**Figure LO-6**).

### **Estuaries**

Total inflow to the St. Lucie Estuary averaged approximately 177 cfs over the past week with no flow coming from Lake Okeechobee. Mean surface salinities increased at all sites in the estuary over the past week. Salinity at the US1 Bridge was in the good range (10-26) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 2,192 cfs over the past week with 1,624 cfs coming from the Lake. Mean surface salinities remained low at S-79 and decreased at all remaining sites in the estuary over the past week. Salinities were in the good range (0-10) for tape grass at Val I-75 and Ft. Myers. Salinities were also in the good range (10-30) for adult eastern oysters at Cape Coral, Shell Point, and Sanibel.

### **Stormwater Treatment Areas**

For the week ending Sunday, January 9, 2022, approximately 4,200 ac-ft of Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2022 (since May 1, 2021) is approximately 70,200 ac-feet. The total amount of inflows to the STAs in WY2022 is approximately 957,000 ac-feet. Most STA cells are at or near target stage, except STA-5/6 cells that are starting to dry out. STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7; STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown; and STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways for construction activities. Operational restrictions are in effect in STA-1E Central Flow-way and STA-2 Flow-ways 3 and 4 for vegetation management activities. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2.

### **Everglades**

Rates of stage decrease across the Everglades were generally faster than desired except where precipitation fell. Depths are low in northern WCA-3A and stages are well below the median at the central and southern gauges in that conservation area. In Florida Bay salinities decreased last week, and stages increased slightly in Taylor Slough. Salinities in the central region fell below the 75th percentile but conditions remain less than ideal to tolerate a potentially drier than average dry season.

## **Supporting Information**

### **Kissimmee Basin**

#### ***Upper Kissimmee***

On January 9, 2022, lake stages were 57.9 feet NGVD (0.1 feet below schedule) in East Lake Toho, 54.5 feet NGVD (0.5 feet below schedule) in Lake Toho, and 50.2 feet NGVD (2.3 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

#### ***Lower Kissimmee***

Discharges to the Kissimmee River on January 9, 2022 were 370 cfs at S-65 and 310 cfs at S-65A; discharges from the Kissimmee River were 330 cfs at S-65D and 330 cfs at S-65E (**Table KB-2**). Headwater stages were 46.3 feet NGVD at S-65A and 26.6 feet NGVD at S-65D on January 9, 2022. With lower water temperatures, little rainfall, and reduced discharge at S-65A, the concentration of dissolved oxygen has remained well above the region of concern, with an average of 8.0 mg/L for the week ending on January 9, 2022 (**Table KB-2, Figure KB-4**). Flow at S-65A has been reduced to minimum discharge (~300 cfs) and water depth on the Kissimmee River floodplain is declining. Mean depth decreased to 0.19 feet as of January 9, 2022 (**Figure KB-5**).

#### ***Water Management Recommendations***

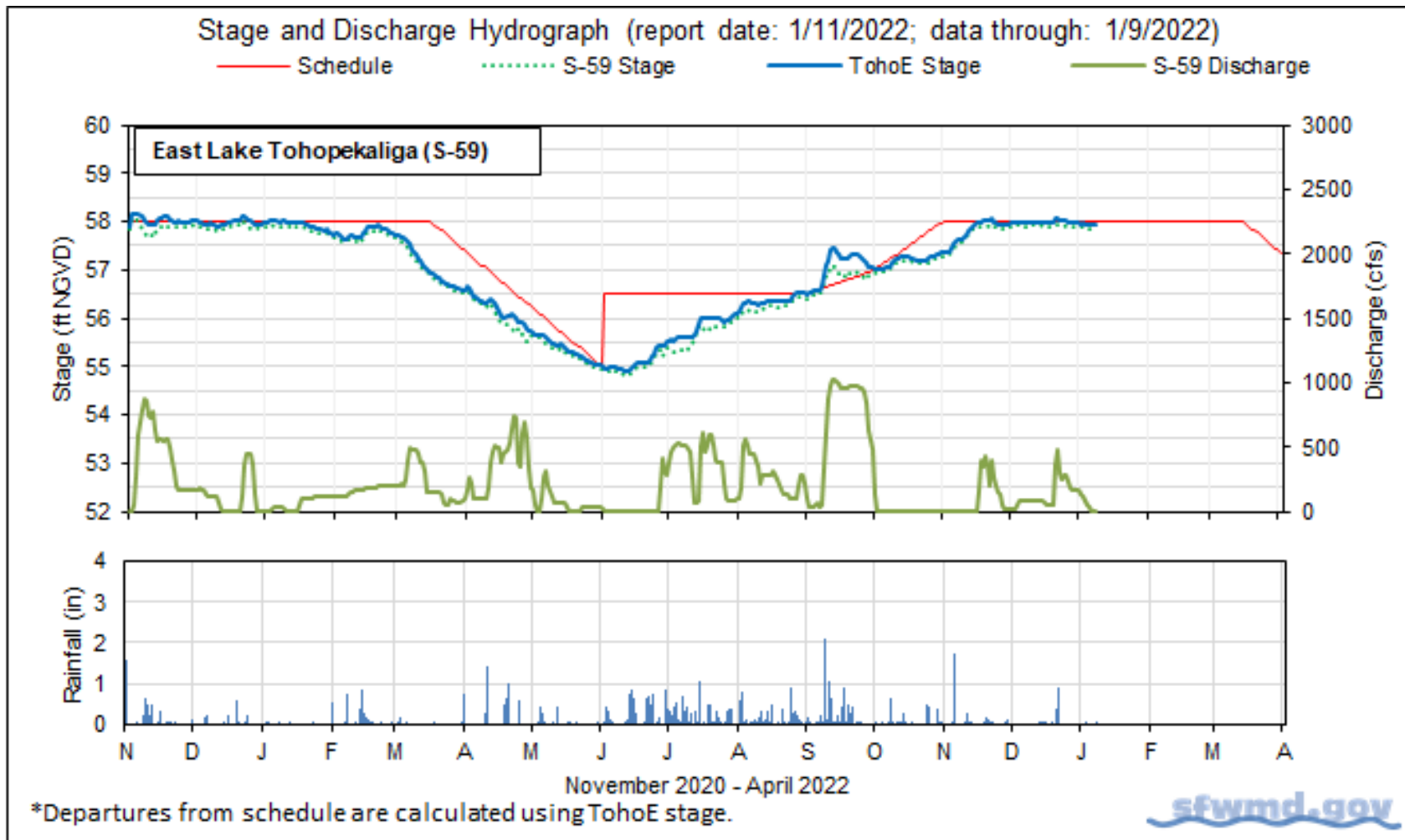
Managed stage recessions for snail kite nesting season will be started on Lakes Toho and East Toho on January 15, 2022. In preparation, stage is being reduced in Lake Toho to 54.5 ft by January 14, 2022 (this operation was started on December 17, 2021). Continue to maintain at least 300 cfs at S-65A and follow the IS-14-50 discharge plan (**Figure KB-6**) for S-65 and S-65A for the remainder of dry season.

**Table KB-1.** Average discharge for the preceding seven days and Sunday's average daily stage and departures from KCL flood regulation or temporary schedules. All data are provisional.

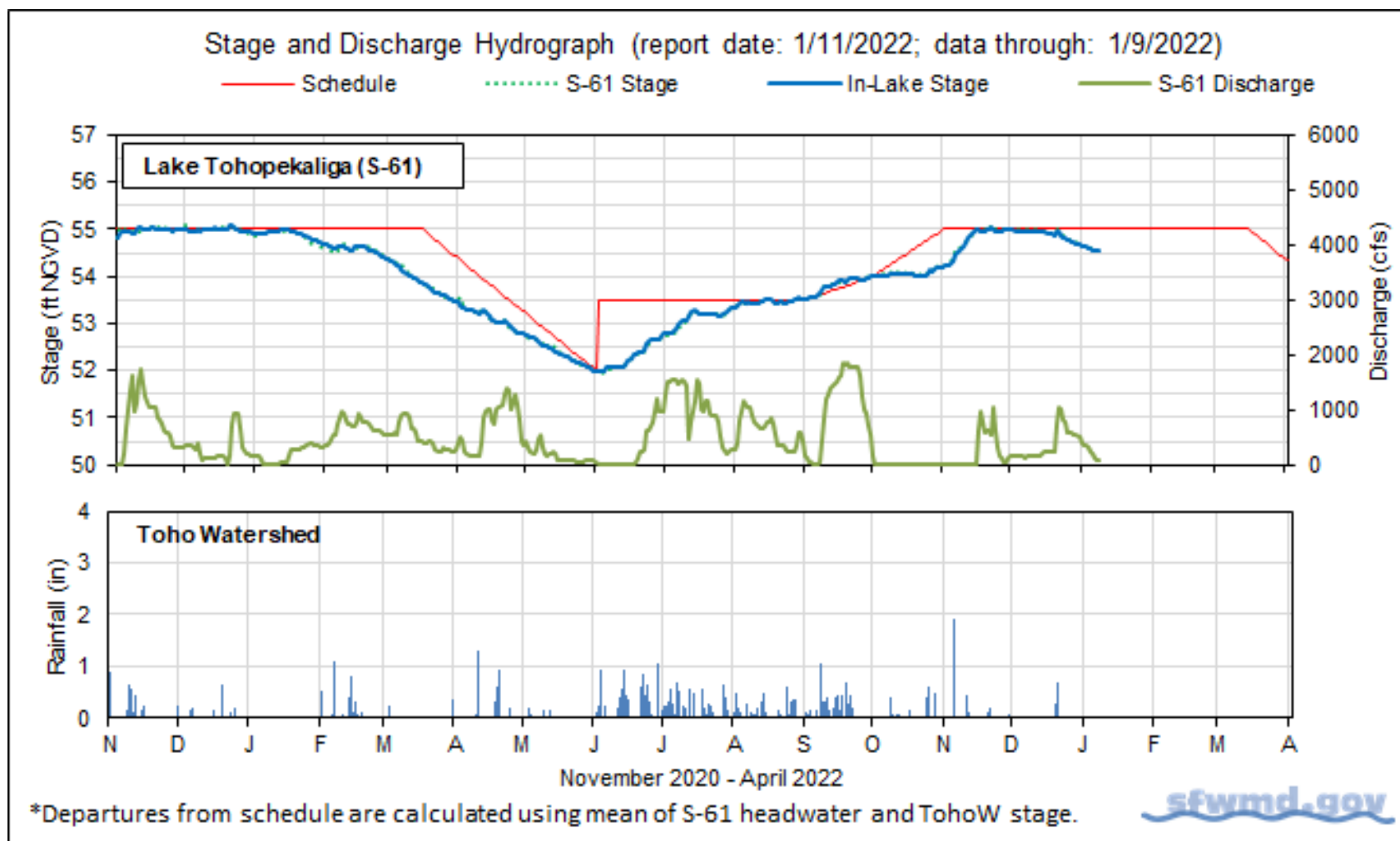
Water Body	Structure	Stage Monitoring Site	7-Day Average Discharge (cfs)	Lake Stage (feet NGVD) <sup>a</sup>	Schedule Type <sup>b</sup>	Schedule Stage (feet NGVD)	Departure from Regulation (feet)	
							1/9/22	1/2/22
Lakes Hart and Mary Jane	S-62	LKMJ	17	61.0	R	61.0	0.0	0.0
Lakes Myrtle, Preston and Joel	S-57	S-57	16	61.5	R	61.6	-0.1	-0.1
Alligator Chain	S-60	ALLI	9	63.9	R	64.0	-0.1	0.0
Lake Gentry	S-63	LKGT	12	61.5	R	61.5	0.0	0.0
East Lake Toho	S-59	TOHOE	43	57.9	R	58.0	-0.1	0.0
Lake Toho	S-61	TOHOW S-61	198	54.5	R	55.0	-0.5	-0.3
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	355	50.2	R	52.5	-2.3	-2.2

a. Names of in-lake monitoring sites and structures used to determine lake stage. If more than one site is listed, an average is reported.

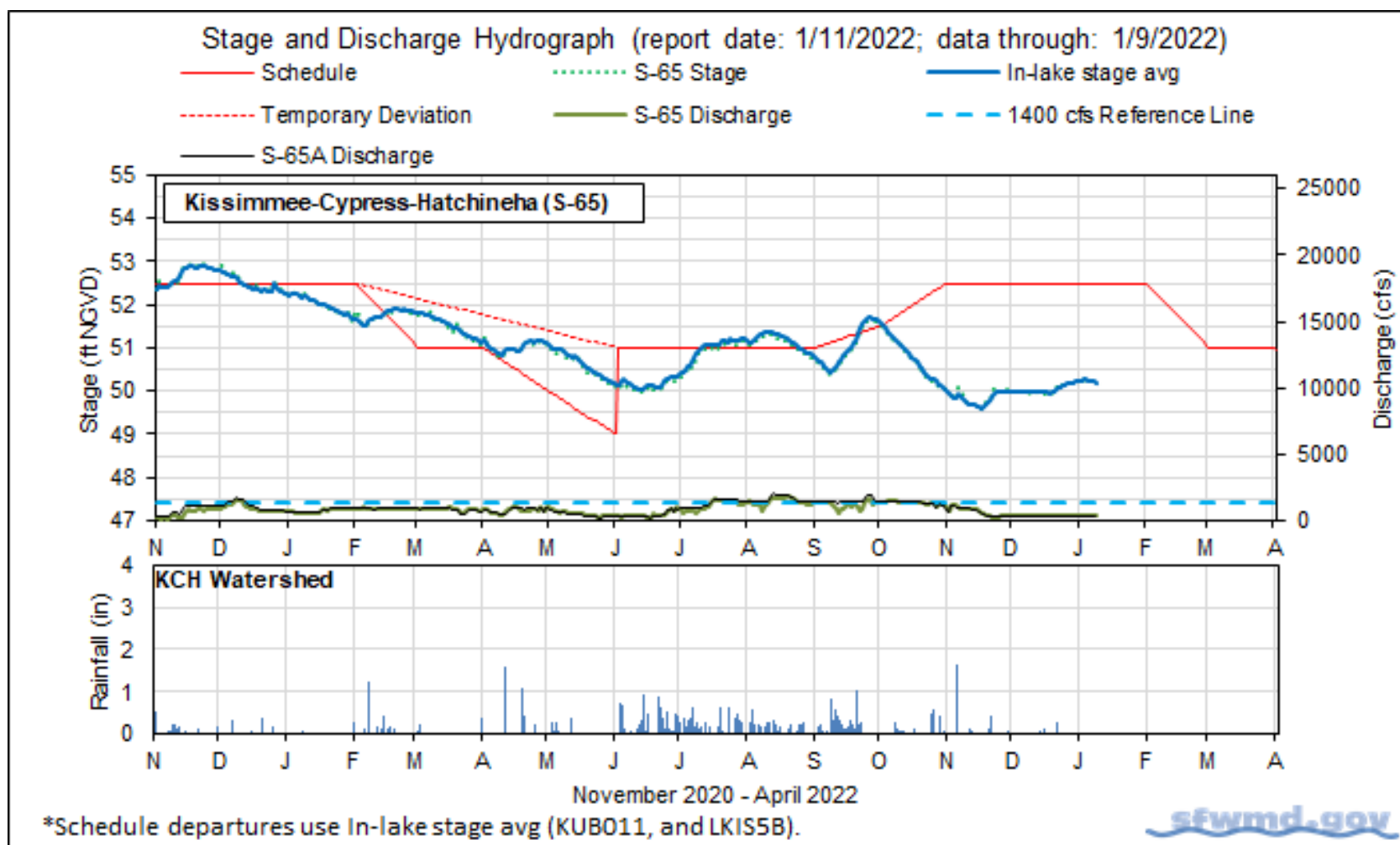
b. A: projected recession line; R: USACE regulation schedule; S: temporary recession target line; T: temporary schedule; NA: not applicable or not available.



**Figure KB-1.** East Lake Toho regulation schedule, stage, discharge and rainfall.



**Figure KB-2.** Lake Toho regulation schedule, stage, discharge and rainfall.



**Figure KB-3.** Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

**Table KB-2.** One- and seven-day average discharge and stage at Lower Kissimmee basin structures, river channel dissolved oxygen concentrations and water depths in the Phase I area floodplain. All data are provisional.

Metric	Location	Daily Average 1/9/22	Average for Previous Seven Day Periods			
			1/9/22	1/2/22	12/26/21	12/19/21
Discharge	S-65	370	360	380	370	370
Discharge	S-65A <sup>a</sup>	310	290	310	310	310
Headwater Stage (feet NGVD)	S-65A	46.3	46.3	46.3	46.3	46.3
Discharge	S-65D <sup>b</sup>	330	340	370	380	410
Headwater Stage (feet NGVD)	S-65D <sup>c</sup>	26.6	26.5	26.5	26.4	26.5
Discharge (cfs)	S-65E <sup>d</sup>	330	340	380	380	400
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) <sup>e</sup>	Phase I, II/III river channel	7.9	8.0	7.5	7.4	7.5
Mean depth (feet) <sup>f</sup>	Phase I floodplain	0.19	0.20	0.23	0.26	0.26

a. Combined discharge from main and auxiliary structures.

b. Combined discharge from S-65D, S-65DX1 and S-65DX2.

c. Average stage from S-65D and S-65DX1.

d. Combined discharge from S-65E and S-65EX1.

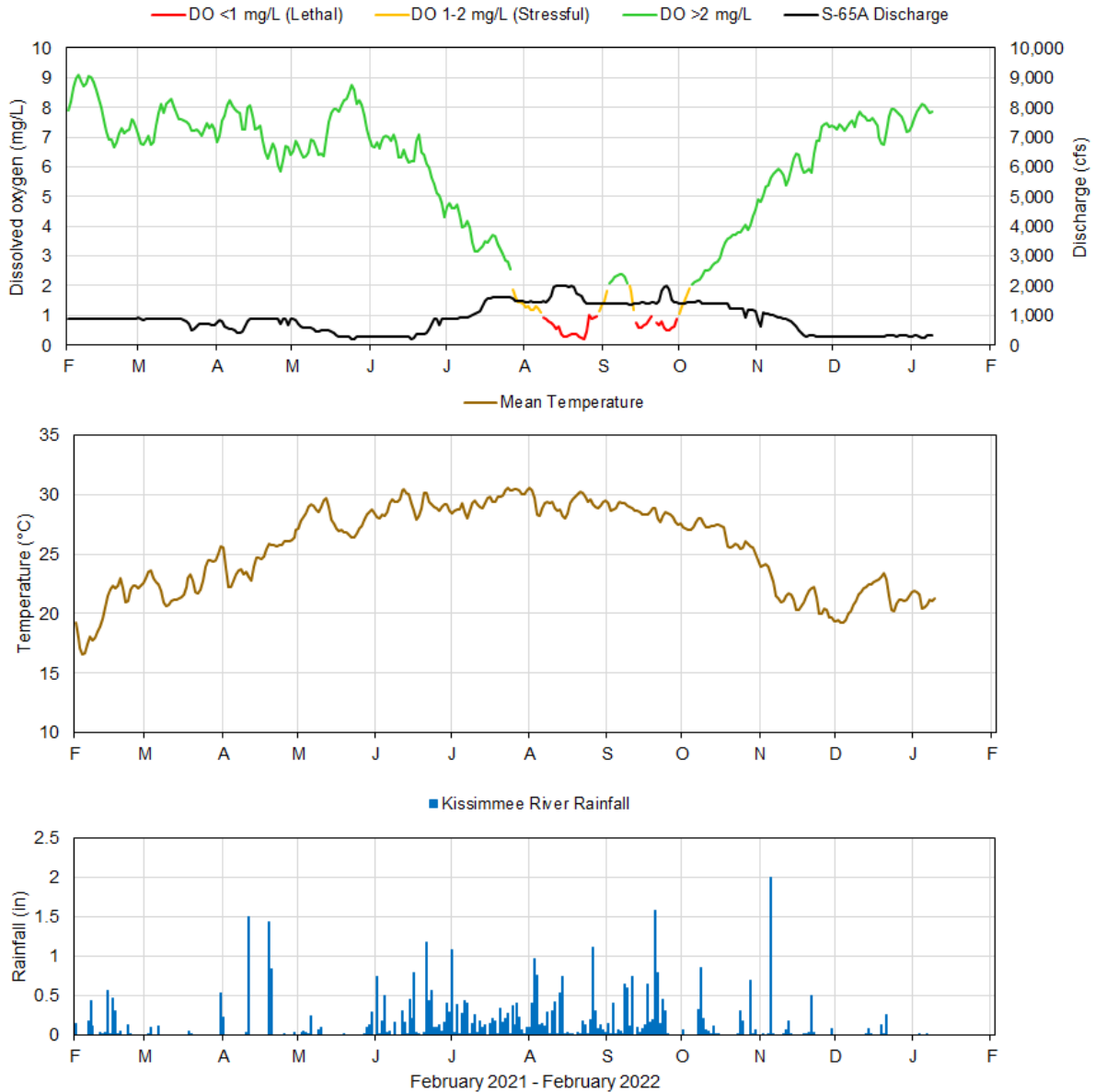
e. Dissolved oxygen is the average of values from sondes KRBN, PC62, PC33, PD62R and PD42R.

f. One-day spatial average obtained from the South Florida Water Depth Assessment Tool (SFWDAT).

**Table KB-3.** Discharge rate of change limits for S65/S-65A (revised 1/14/19).

Discharge (cfs)	Maximum Rate of Increase (cfs/day)	Maximum Rate of Decrease (cfs/day)
0-300	100	-50
301-650	150	-75
651-1,400	300	-150
1,401-3,000	600	-600
>3,000	1,000	-2,000

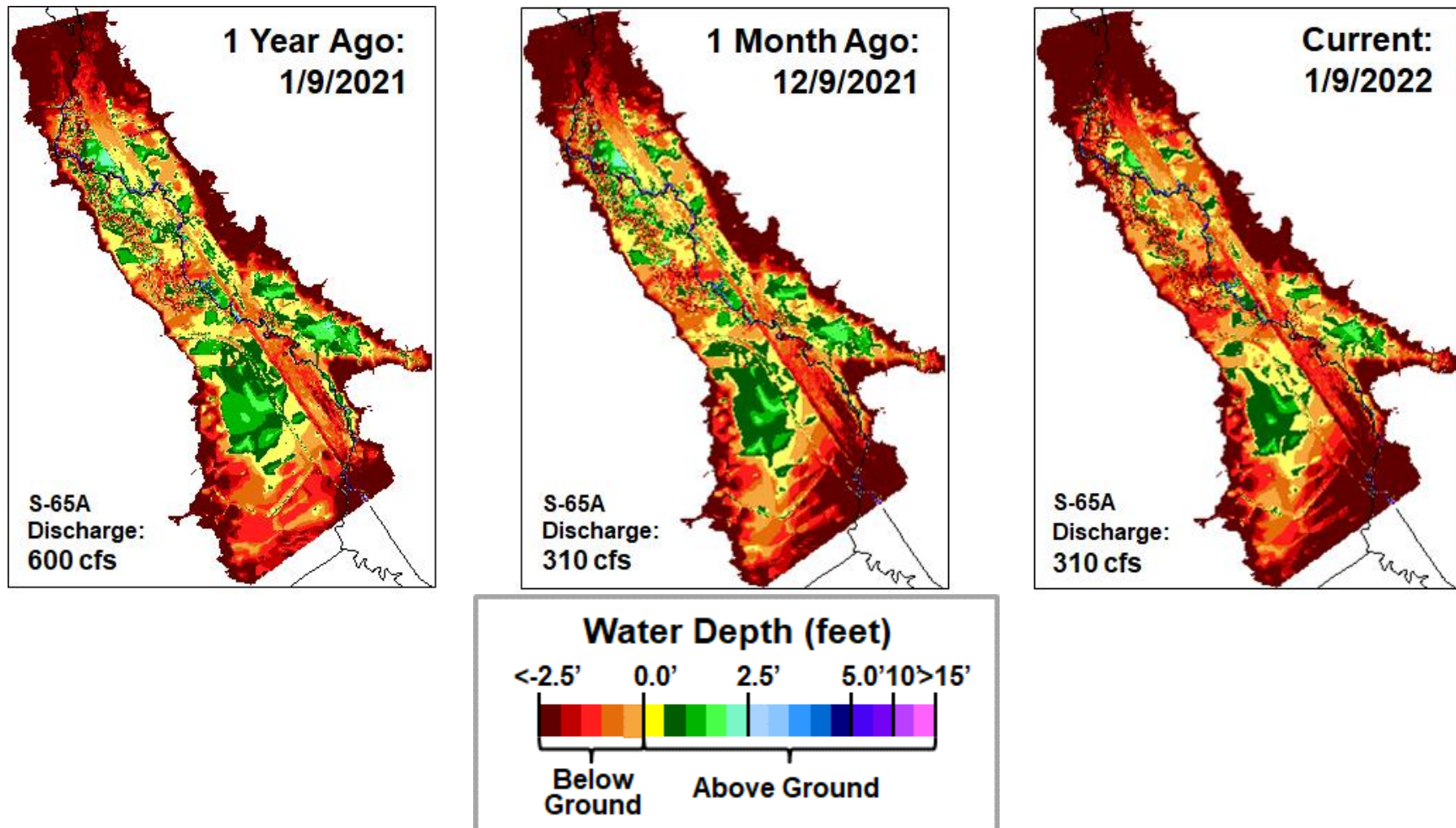




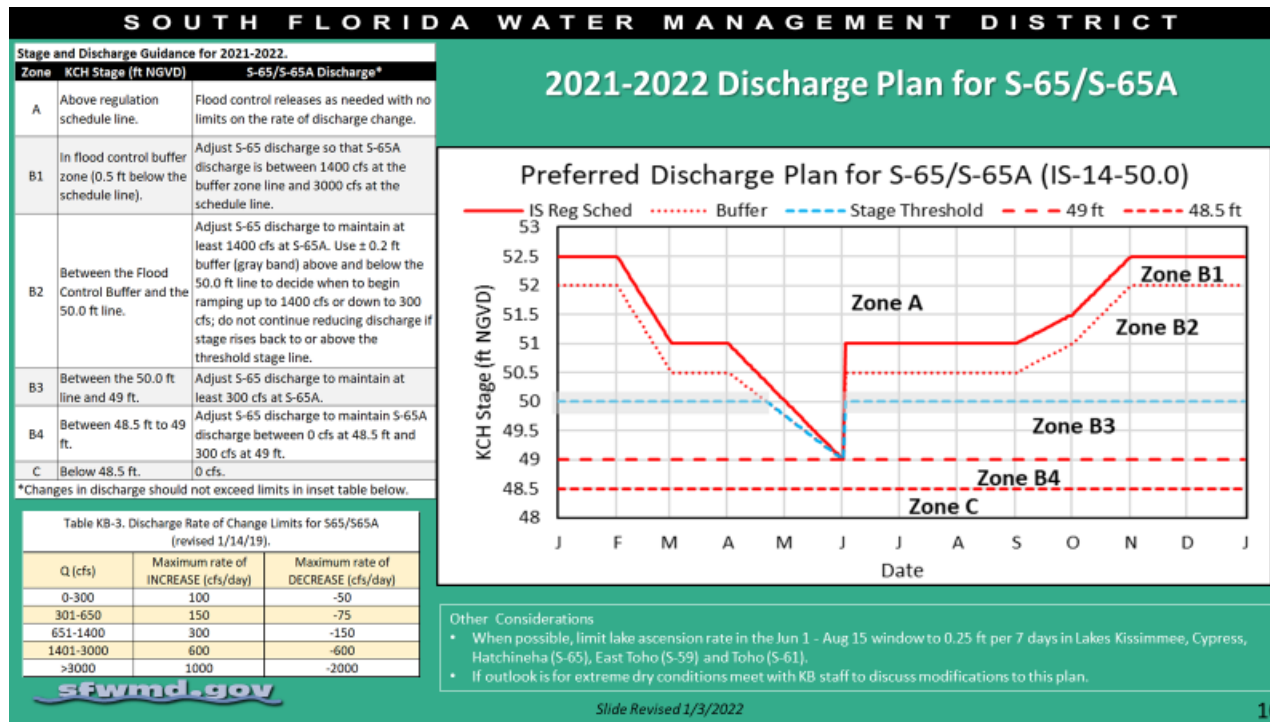
Report Date: 1/11/2022; data are through: 1/9/2022

[sfwmd.gov](http://sfwmd.gov)

**Figure KB-4.** Restored Kissimmee River channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRBN, PC33, PD62R, and PD42R with an average of three stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.



**Figure KB-5.** Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.



**Figure KB-6.** IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

## Lake Okeechobee

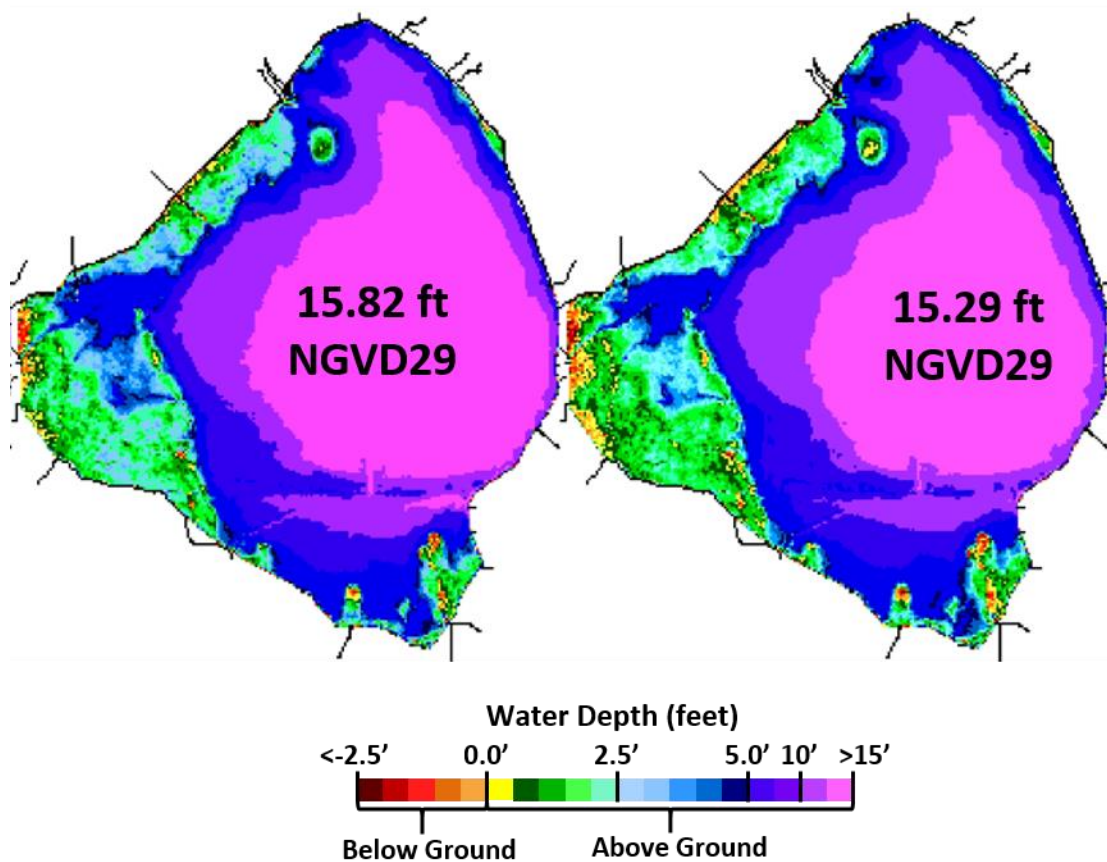
Lake Okeechobee stage was 15.29 feet NGVD on January 9, 2022, with water levels 0.53 feet lower than a month ago (**Figure LO-1**). Lake stage remains in the Low sub-band and is now back within the ecological envelope (**Figure LO-2**), having spent 279 days (79%) of the last year above the envelope (**Figure LO-3**). According to NEXRAD, 0.04 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) increased from the previous week, going from 440 cfs to 545 cfs. Average daily outflows (excluding evapotranspiration) also increased from the previous week, going from 2,883 cfs to 3,729 cfs. Highest inflows came from the Kissimmee River through the S-65E structure (343 cfs). The highest outflow (1,747 cfs) was to the west via the S-77 structure, while 1,350 cfs flowed south via the S-350 structures (S-351, 866 cfs; S-352, 177 cfs; S-354, 307 cfs). After an extended period of backflow into the Lake from the L-8 canal, an average of 135 cfs flowed out through the S-271 structure over the last week. There was 496 cfs of outflow to the east via the S-308 structure. **Figures LO-4 and LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively. These data are provisional and are subject to change.

The most recent satellite image (January 8, 2022) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor showed low to medium bloom potential along the western shorelines (**Figure LO-6**).

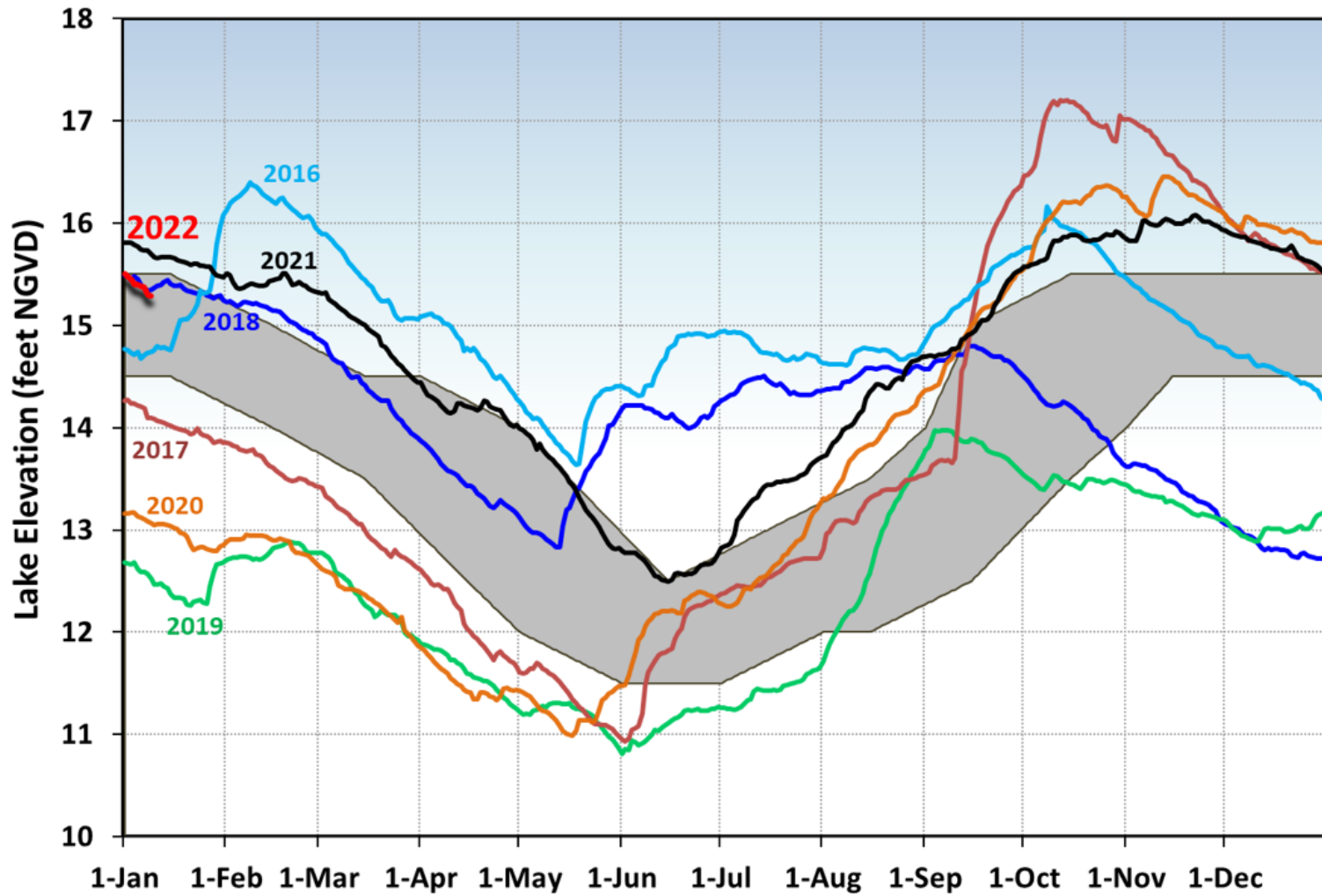
1 Month Ago:  
12/10/2021

Current:  
01/09/2022

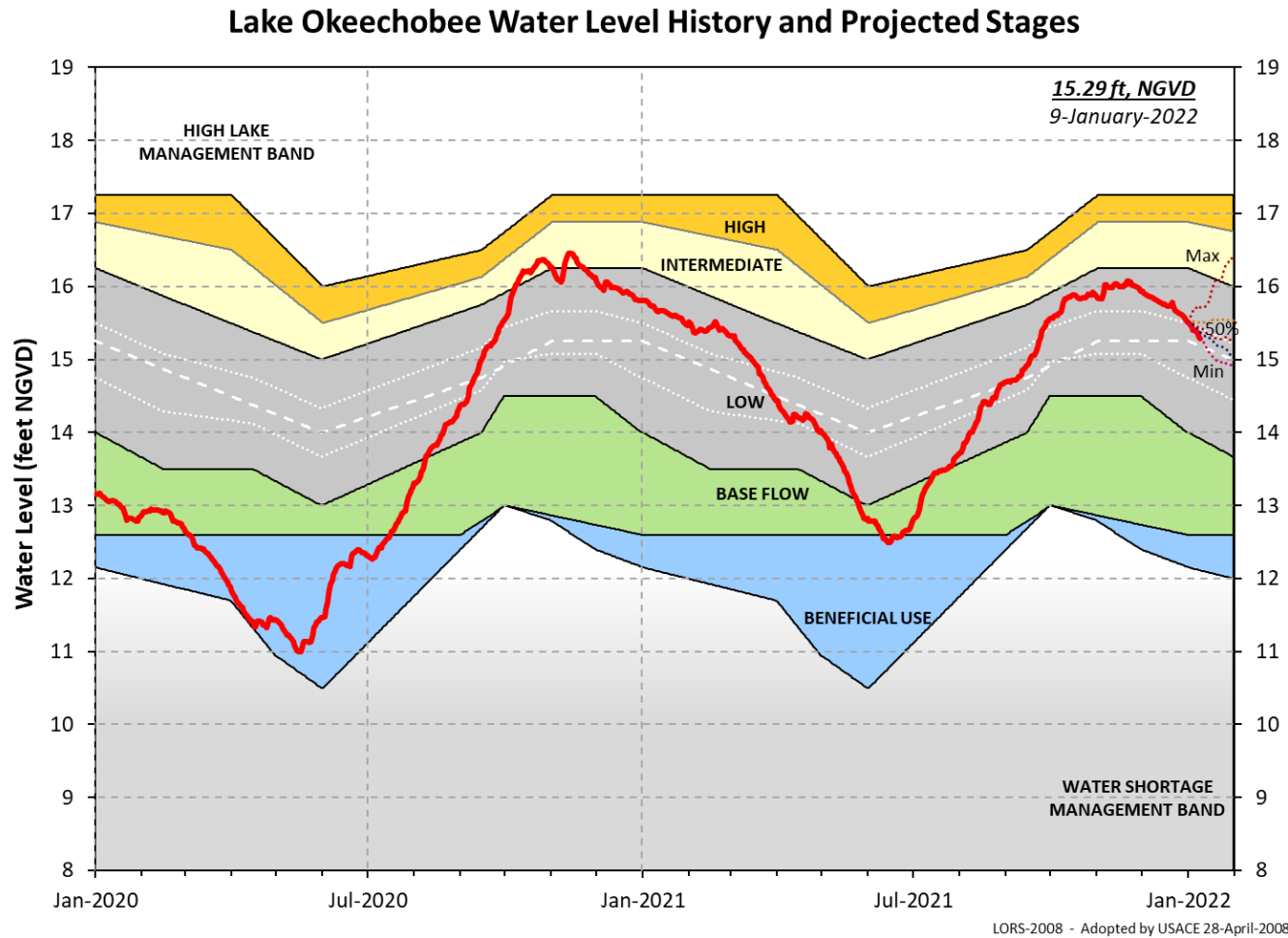


**Figure LO-1.** Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

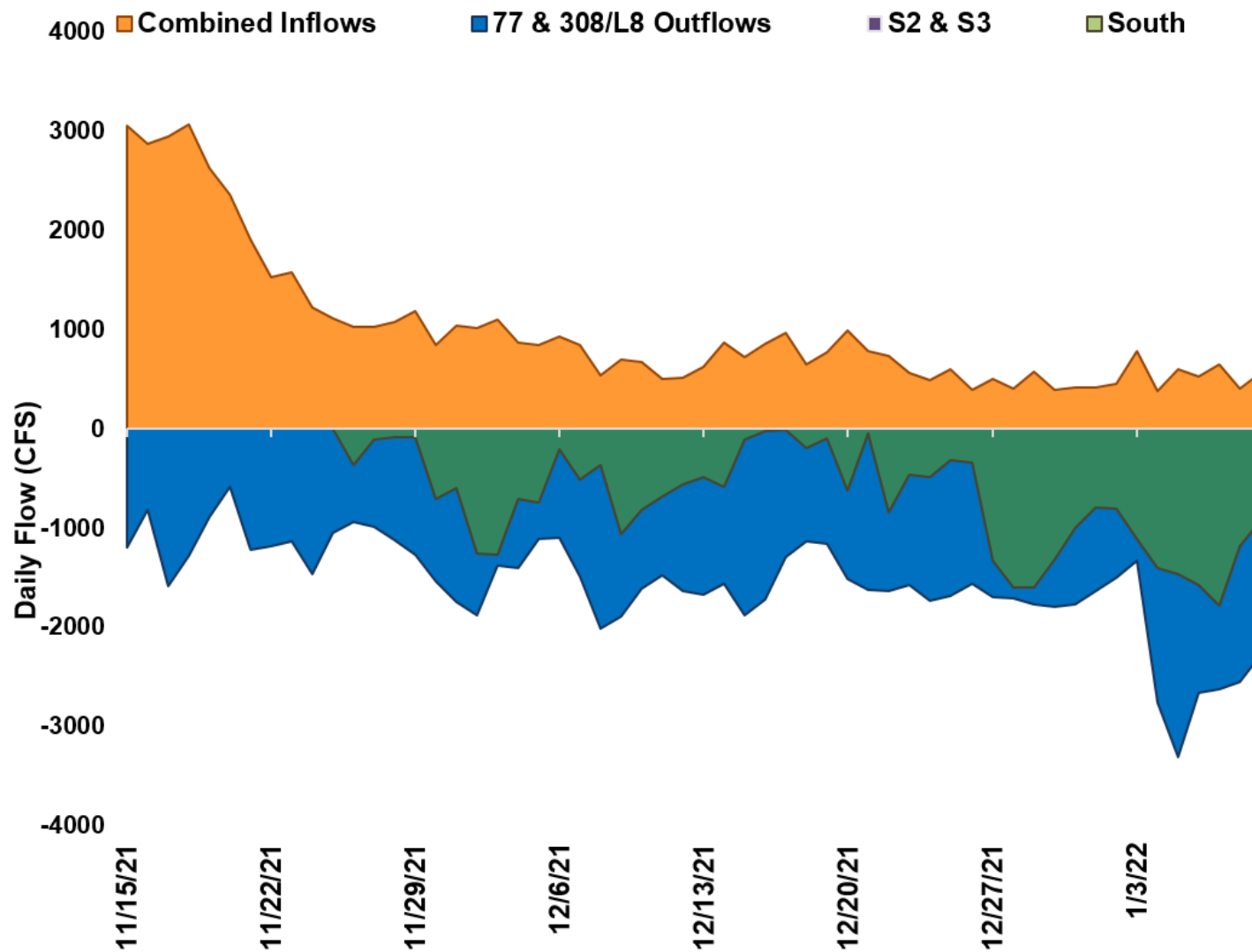
## Lake Okeechobee Stage vs Updated Ecological Envelope



**Figure LO-2.** The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope of preferred stages.

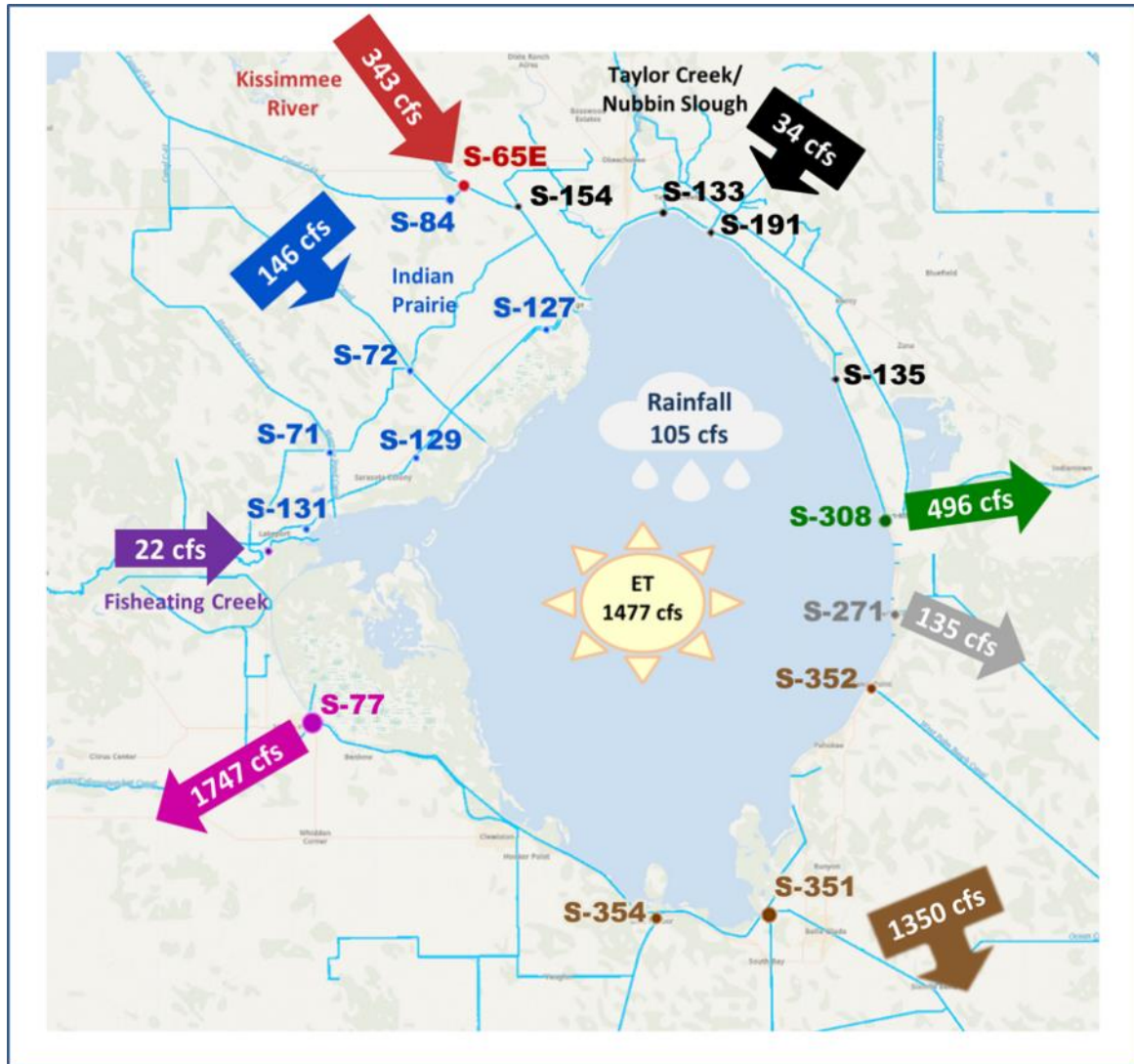


**Figure LO-3.** Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

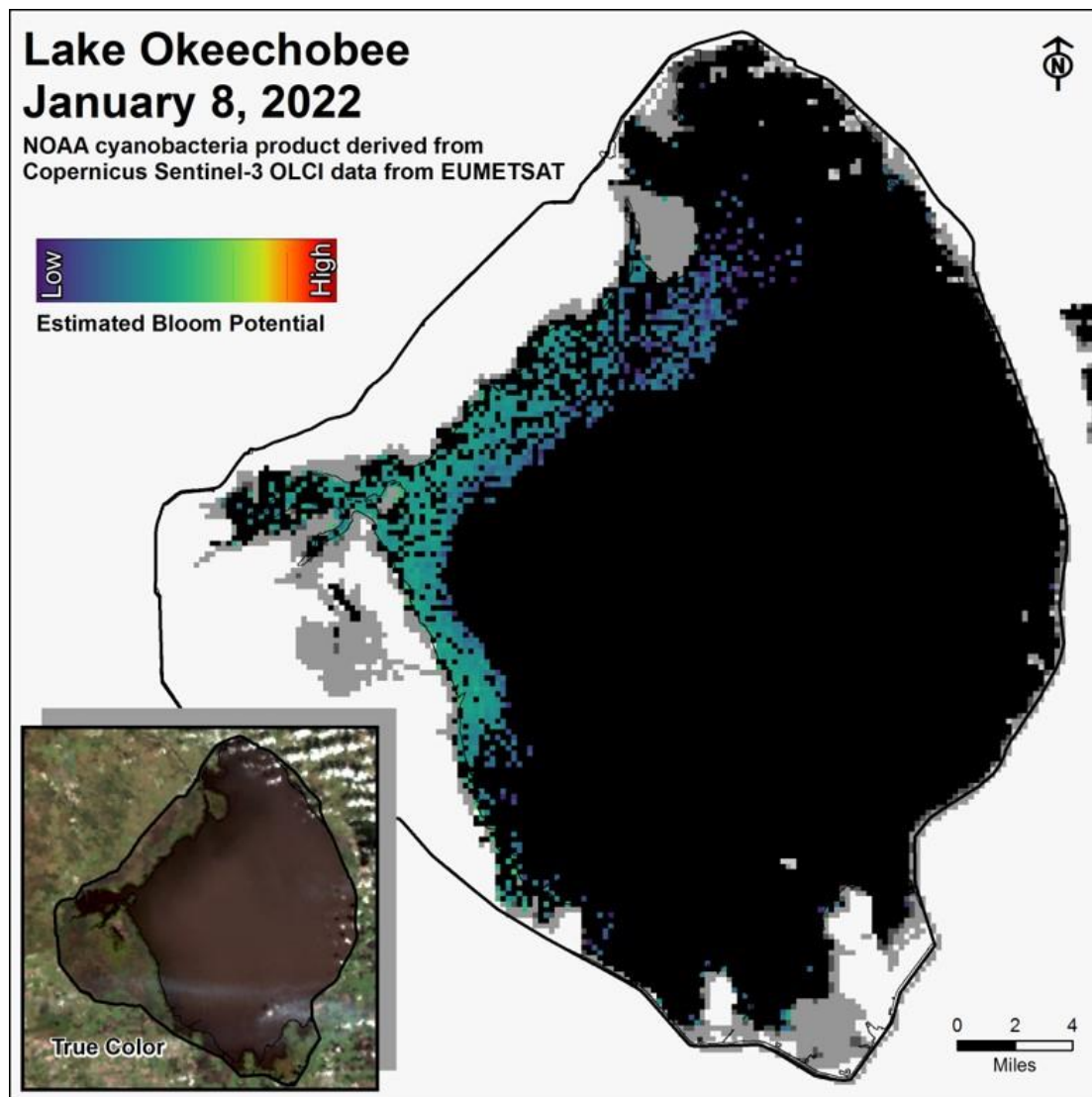


**Figure LO-4.** Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from Lake Okeechobee into the L-8 or C-44 canals are included with outflows. Inflows are shown as positive values; outflows are negative. Outflows through the S-77 (Caloosahatchee) and S-308 (C-44 Canal) structures are based on downstream gauges to include flows to lock openings for navigation.





**Figure LO-5.** Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of January 3, 2022 – January 9, 2022.



**Figure LO-6.** Cyanobacteria bloom potential on January 8, 2022 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

## Estuaries

### ***St. Lucie Estuary***

Over the past week, mean total inflow to the St. Lucie Estuary was approximately 177 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was approximately 480 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities increased at all sites in the estuary (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 22.0. Salinity conditions in the middle estuary were estimated to be within the good range for adult eastern oysters (**Figure ES-4**).

### ***Caloosahatchee River Estuary***

Over the past week, mean total inflow to the Caloosahatchee River Estuary was approximately 2,192 cfs (**Figures ES-5 and ES-6**) and the previous 30-day mean inflow was approximately 2,148 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-6**.

Over the past week, salinities remained the same at S-79 and decreased at the remaining sites in the estuary (**Table ES-2 and Figures ES-7 and ES-8**). The seven-day mean surface salinities (**Table ES-2**) were in the good range (0-10) for tape grass at Val I-75 and at Ft. Myers. The seven-day mean surface salinity values were within the good range for adult eastern oysters at Cape Coral, Shell Point, and Sanibel (**Figure ES-9**).

Surface salinity at Val I-75 was forecasted for the next two weeks, using an autoregression model (Qiu and Wan, 2013<sup>1</sup>) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1,500 cfs and a steady release at 2,000 cfs with estimated tidal basin inflows of 96 cfs. Model results from all scenarios predict daily salinity to be 1.0 or lower and the 30-day moving average surface salinity to be 0.4 or lower at Val I-75 at the end of the two-week period (**Table ES-3 and Figure ES-10**). This keeps predicted salinities at Val I-75 within the LORS 2008 salinity range (0.0-5.0).

### ***Red Tide***

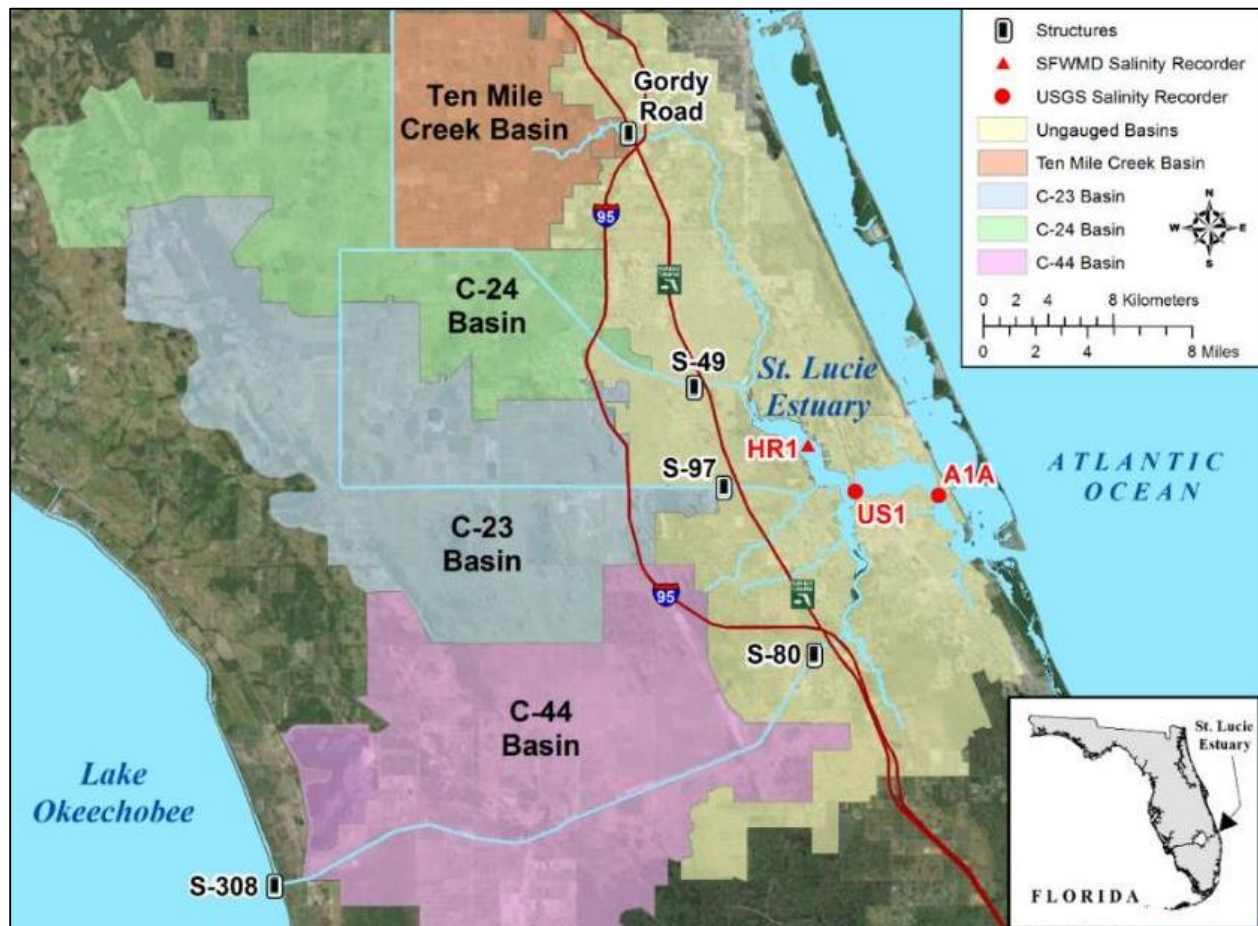
The Florida Fish and Wildlife Research Institute reported on January 7, 2022, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in samples collected statewide. On the east coast, red tide was not observed in samples from Palm Beach County.

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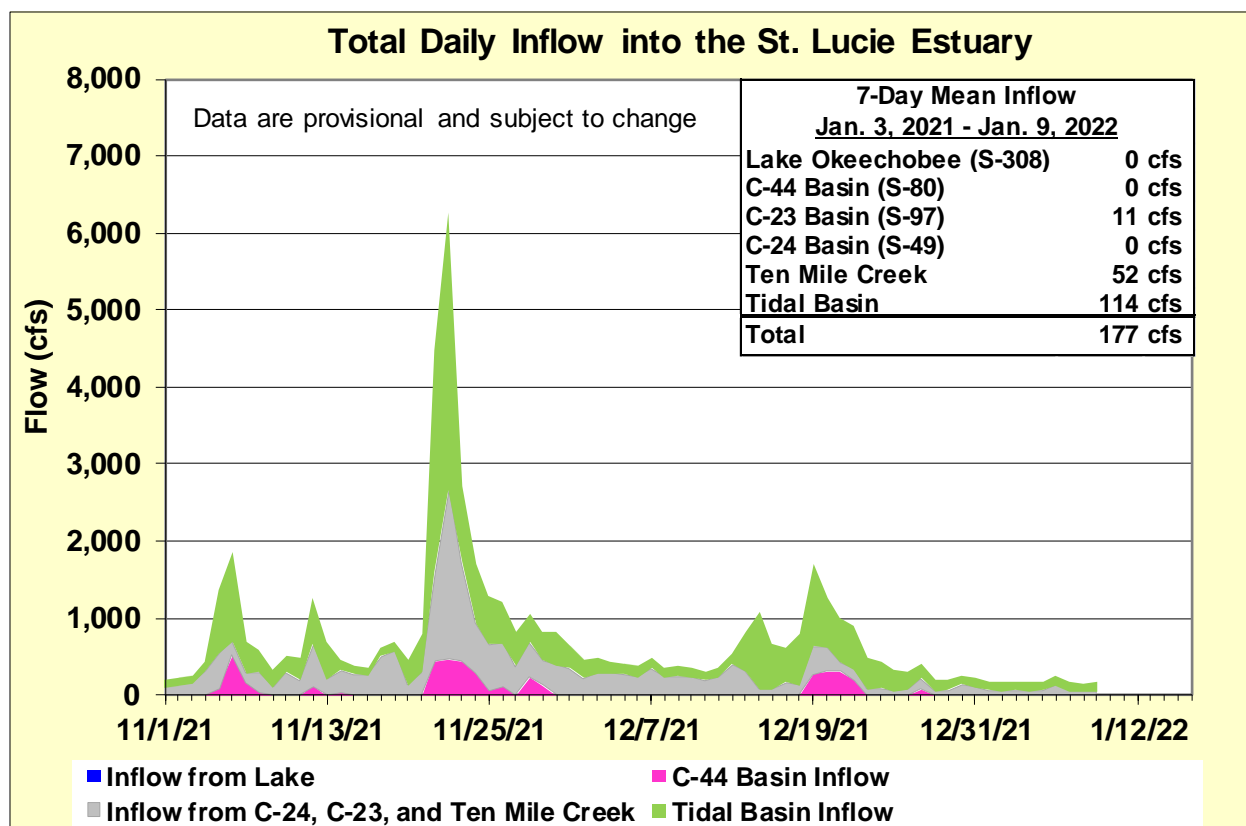
<sup>1</sup> Qiu, C., and Y. Wan. 2013. Time series modeling and prediction of salinity in the Caloosahatchee River Estuary. *Water Resources Research* 49:5804-5816.

### **Water Management Recommendations**

Lake stage is in the Low Sub-Band. Tributary conditions are Dry. The LORS2008 release guidance suggests up to 450 cfs release at S-79 to the Caloosahatchee River Estuary and up to 200 cfs release at S-80 to the St. Lucie Estuary.



**Figure ES-1.** Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

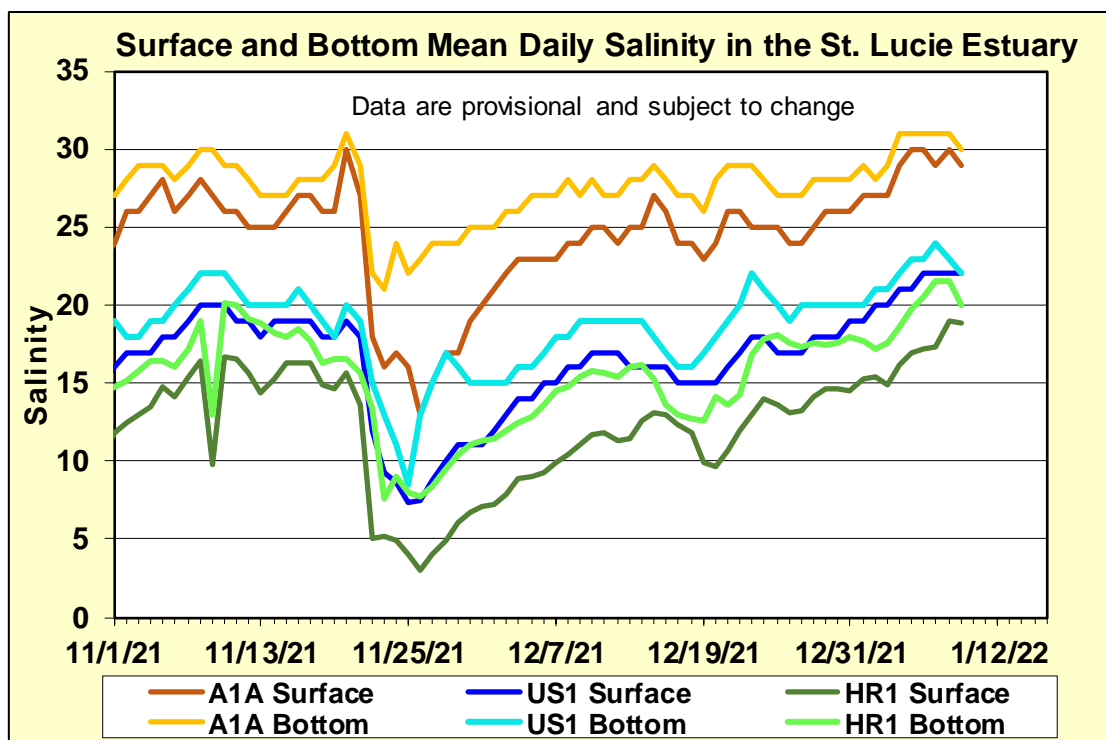


**Figure ES-2.** Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

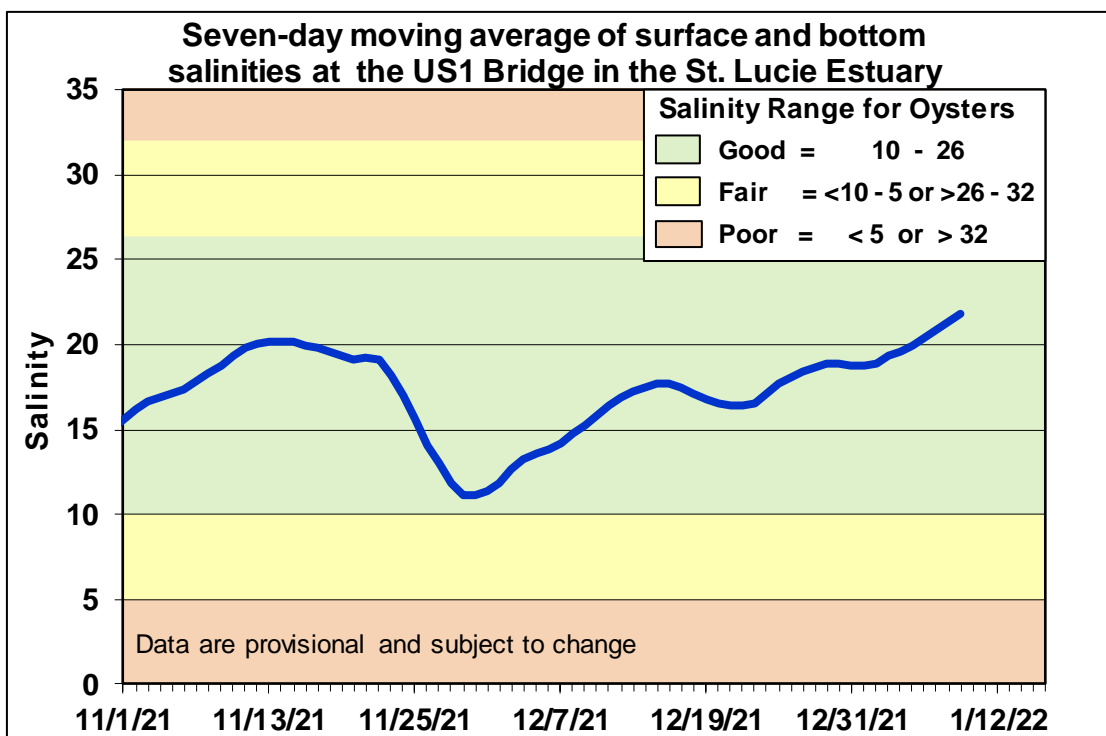
**Table ES-1.** Seven-day mean salinity at oyster monitoring sites in the St. Lucie Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary. Data are provisional.

Sampling Site	Surface	Bottom	Envelope
HR1 (North Fork)	<b>17.2</b> (14.6)	<b>19.9</b> (17.5)	NA <sup>a</sup>
US1 Bridge	<b>21.4</b> (18.4)	<b>22.6</b> (20.1)	10.0 – 26.0
A1A Bridge	<b>29.1</b> (25.9)	<b>30.6</b> (28.0)	NA <sup>a</sup>

a. The envelope is not applicable.

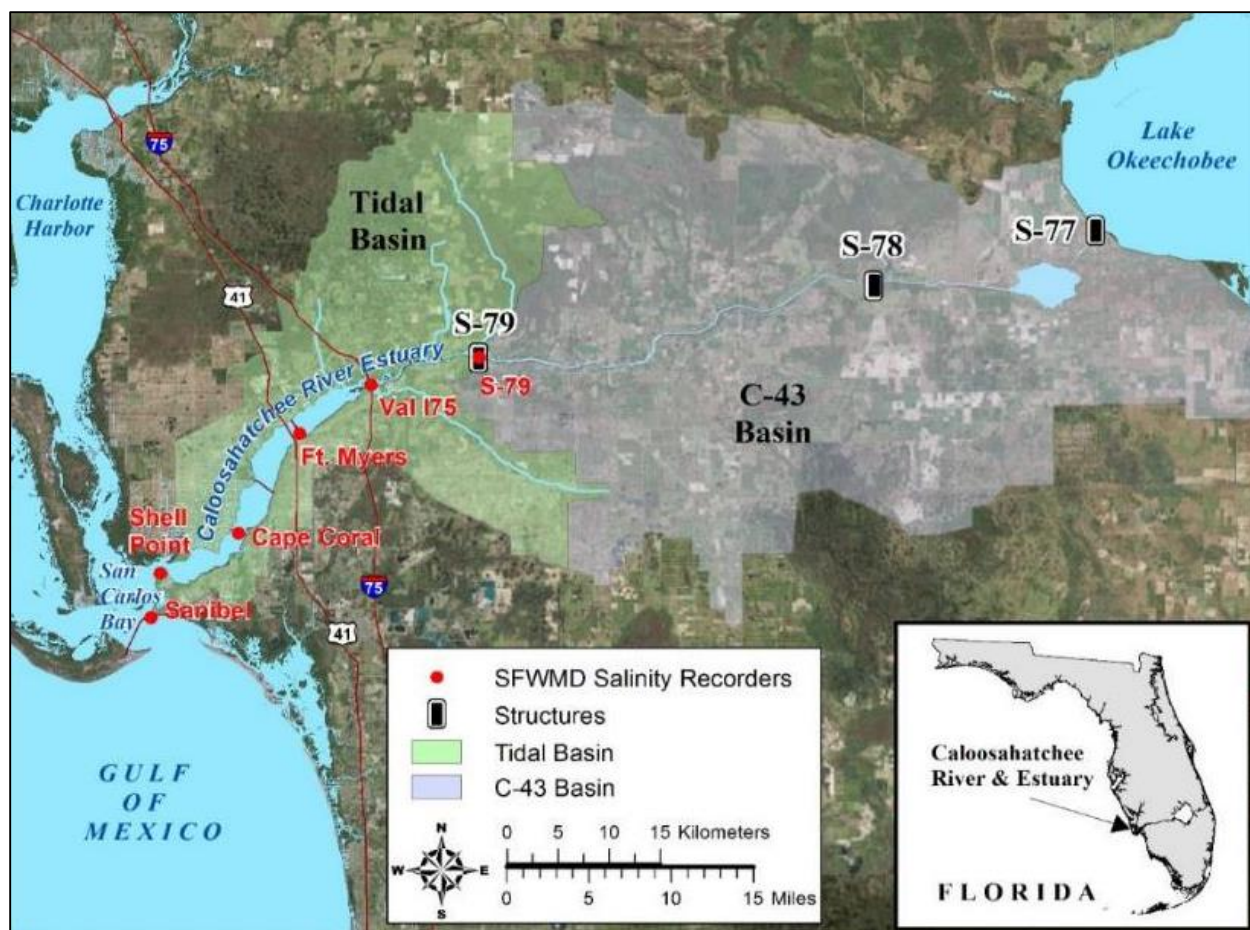


**Figure ES-3.** Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

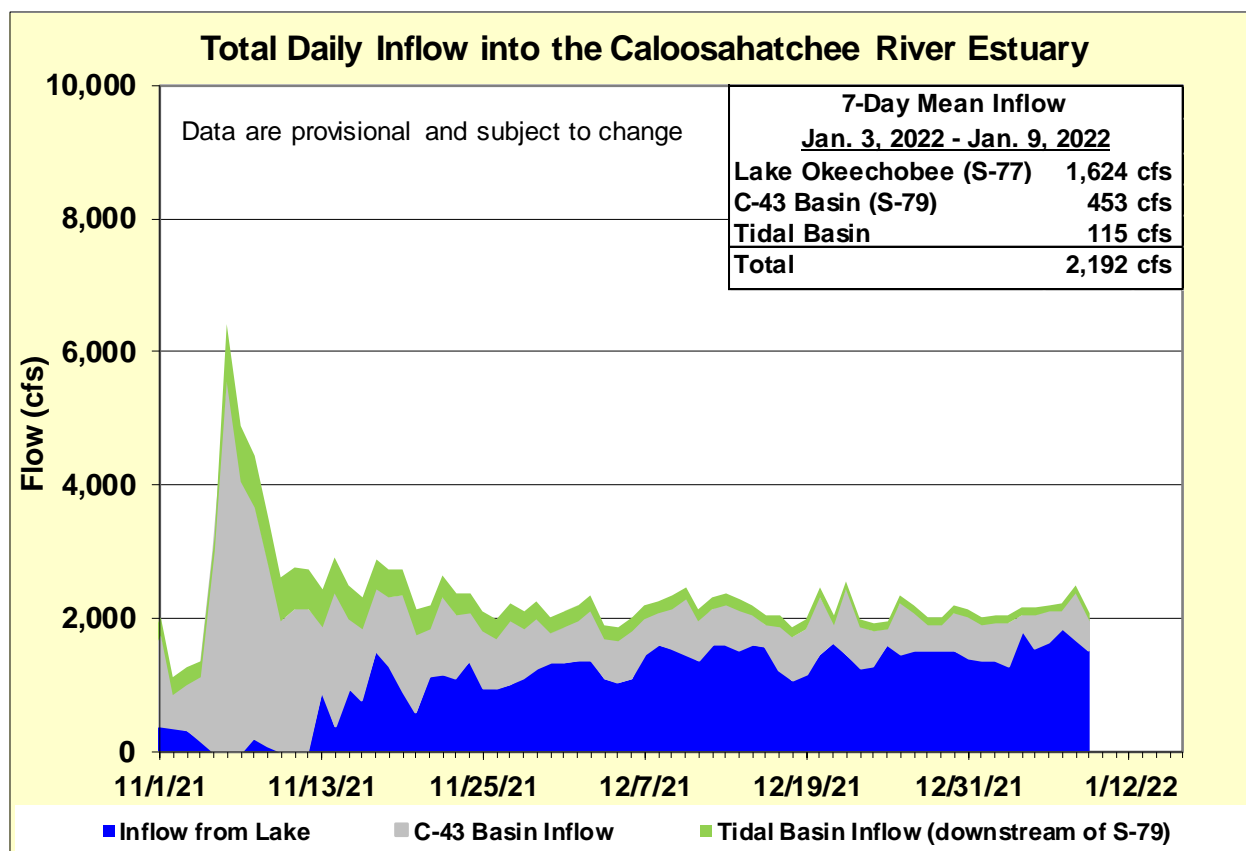


**Figure ES-4.** Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.





**Figure ES-5.** Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.



**Figure ES-6.** Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

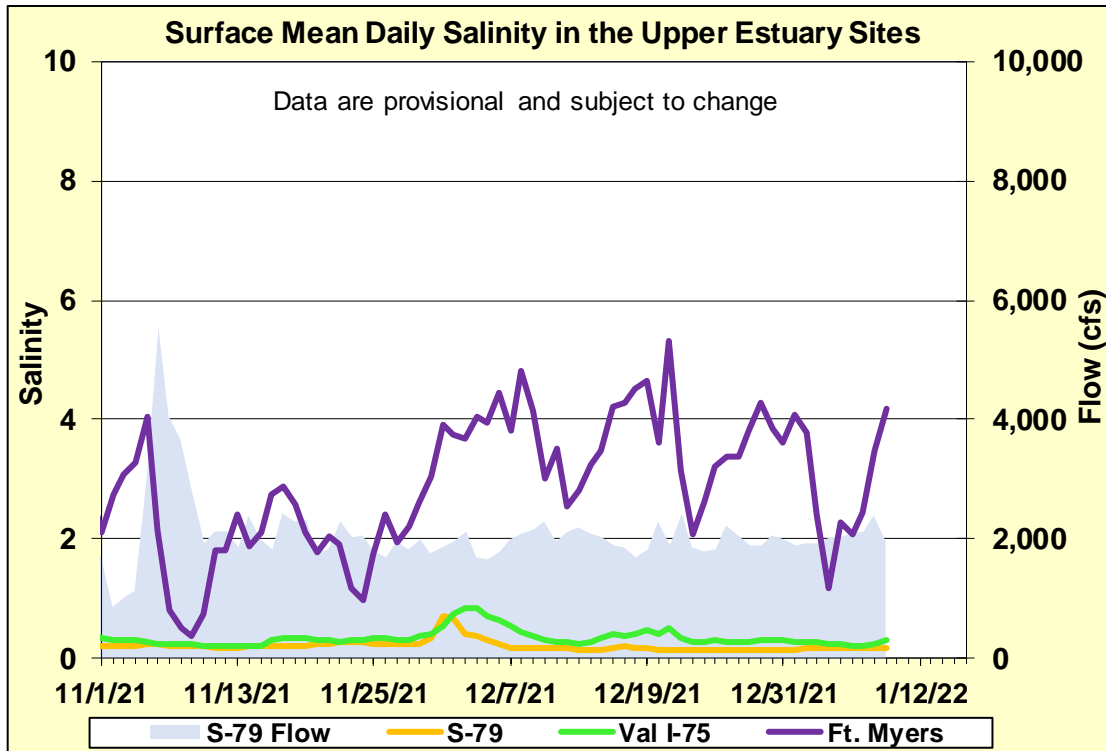
**Table ES-2.** Seven-day mean salinity at six monitoring sites in the Caloosahatchee River Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope at I-75 is for the protection of tape grass in the upper estuary and the envelope in the lower estuary is the preferred salinity range for adult eastern oysters (*Crassostrea virginica*). Data are provisional.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	NA <sup>a</sup>
Val I-75	<b>0.2</b> (0.3)	<b>0.3</b> (0.4)	0.0 – 5.0 <sup>b</sup>
Fort Myers Yacht Basin	<b>2.6</b> (3.8)	<b>4.5</b> (5.4)	NA <sup>a</sup>
Cape Coral	<b>10.3</b> (11.2)	<b>11.7</b> (12.8)	10.0 – 30.0
Shell Point	<b>22.4</b> (23.8)	<b>24.7</b> (26.0)	10.0 – 30.0
Sanibel	<b>29.2</b> (30.2)	<b>29.9</b> (30.6)	10.0 – 30.0

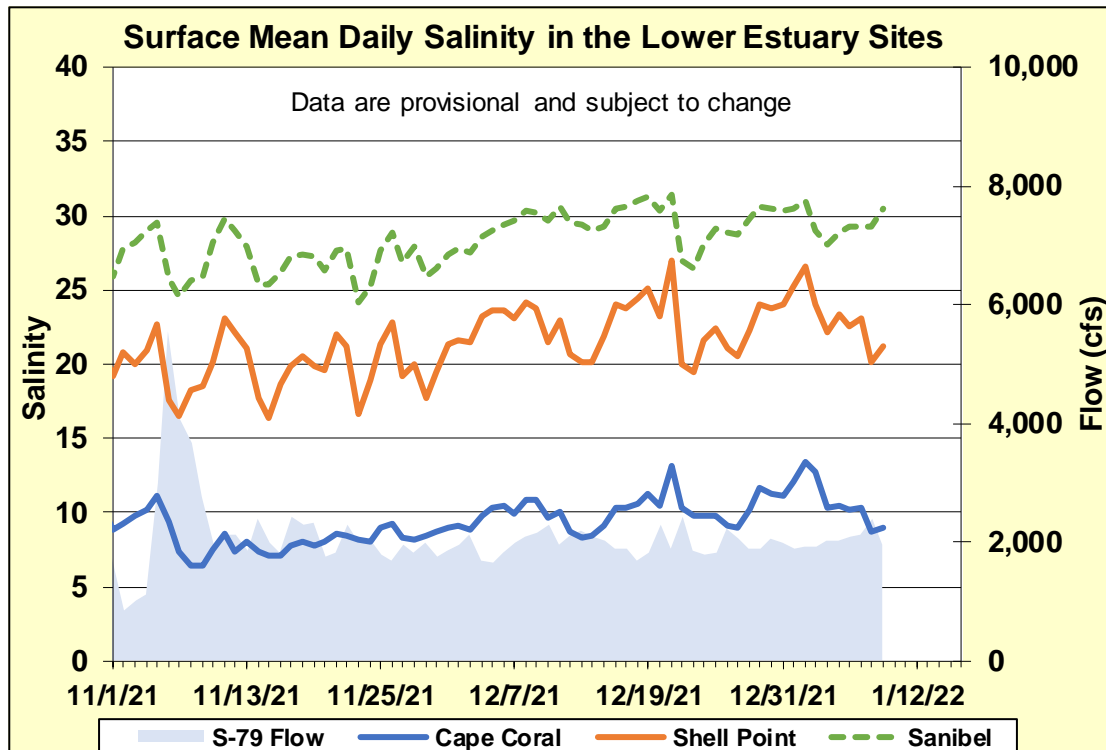
a. The envelope is not applicable.

b. The envelope is based on the predicted 30-day mean for the next two weeks.

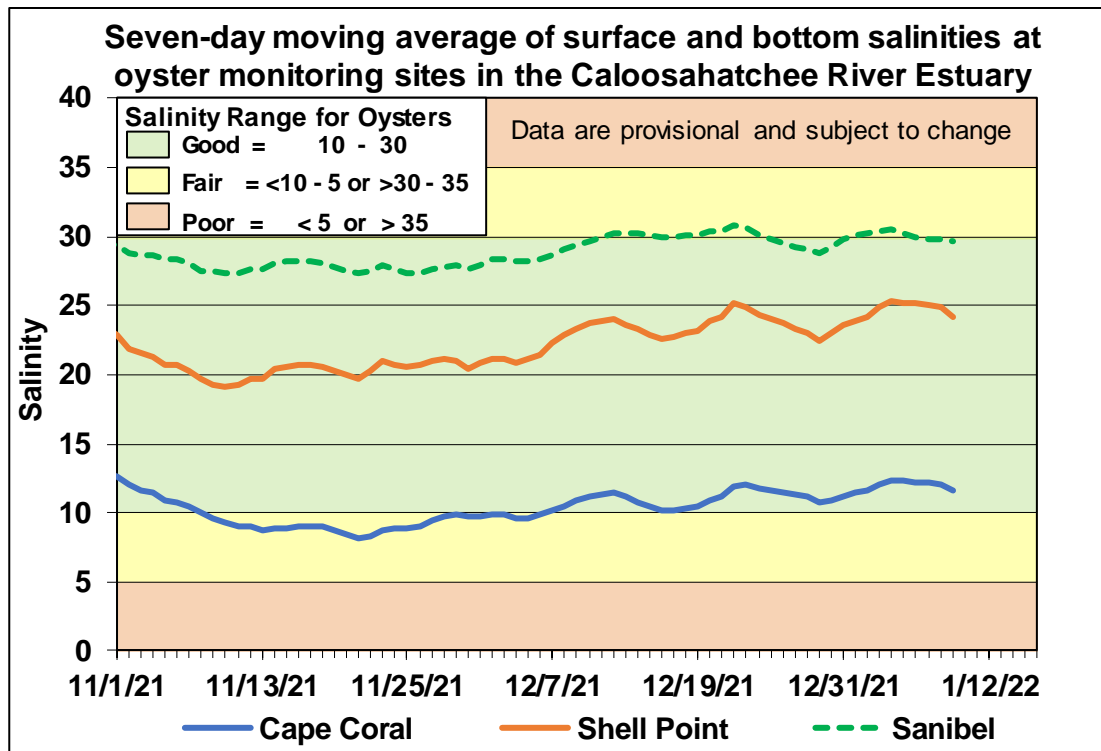




**Figure ES-7.** Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.



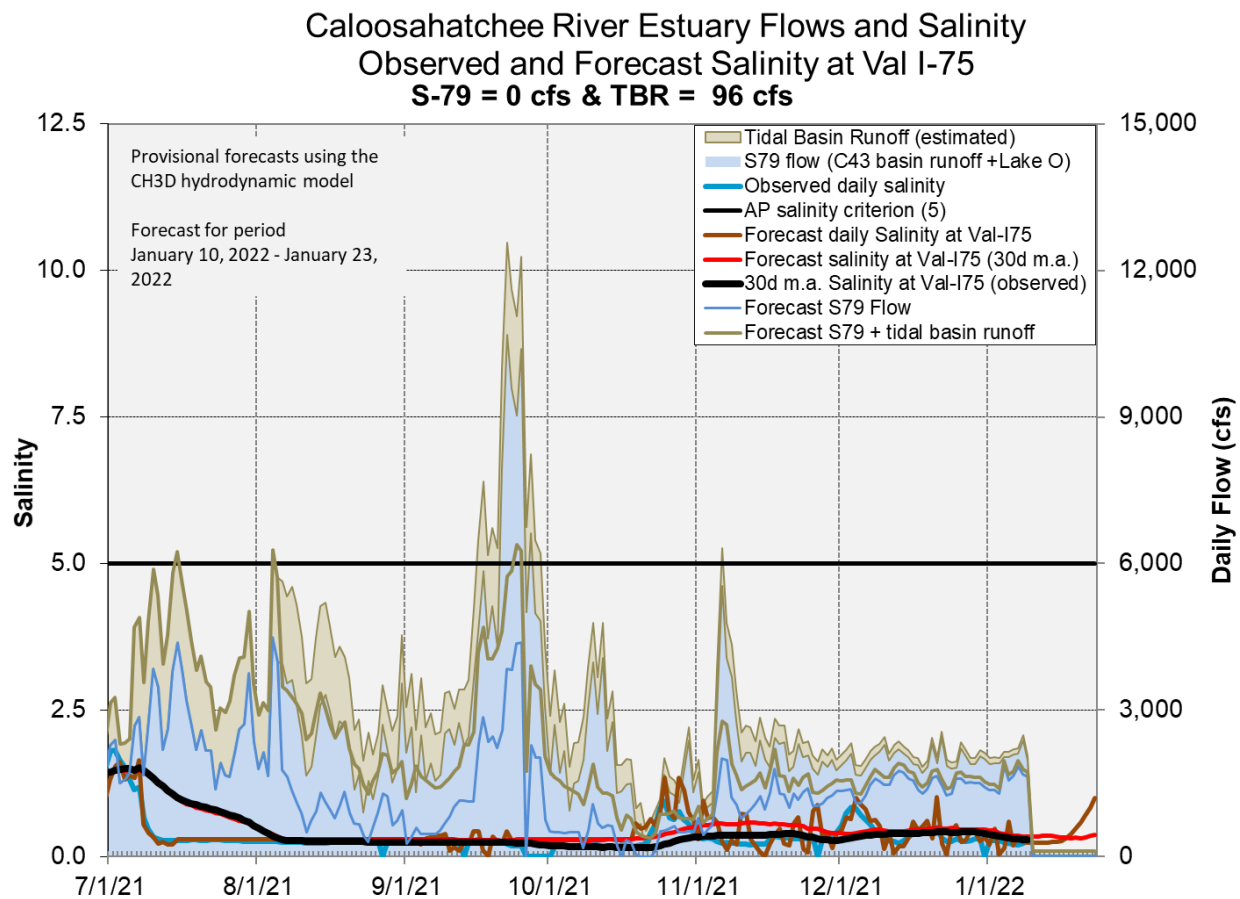
**Figure ES-8.** Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.



**Figure ES-9.** Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

**Table ES-3.** Predicted salinity at Val I-75 in the Caloosahatchee River Estuary at the end of the forecast period for various S-79 flow release scenarios.

Scenario	Simulated S-79 Flow (cfs)	Tidal Basin Runoff (cfs)	Daily Salinity	30-Day Mean Salinity
A	0	96	1.0	0.4
B	450	96	0.4	0.3
C	800	96	0.3	0.3
D	1000	96	0.3	0.3
E	1500	96	0.3	0.3
F	2000	96	0.3	0.3



**Figure ES-10.** Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

## Stormwater Treatment Areas

**STA-1E:** STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7. Operational restrictions are in place in STA-1E Central Flow-way for vegetation management activities. Online treatment cells are at or above target stage and vegetation in these cells is stressed and highly stressed. The 365-day phosphorus loading rates (PLRs) are high for the Eastern and Central Flow-ways (**Figure S-1**).

**STA-1W:** Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to construction activities. Most treatment cells are at or near target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for the Northern, Western, and Eastern Flow-ways are below 1.0 g/m<sup>2</sup>/year (**Figure S-2**).

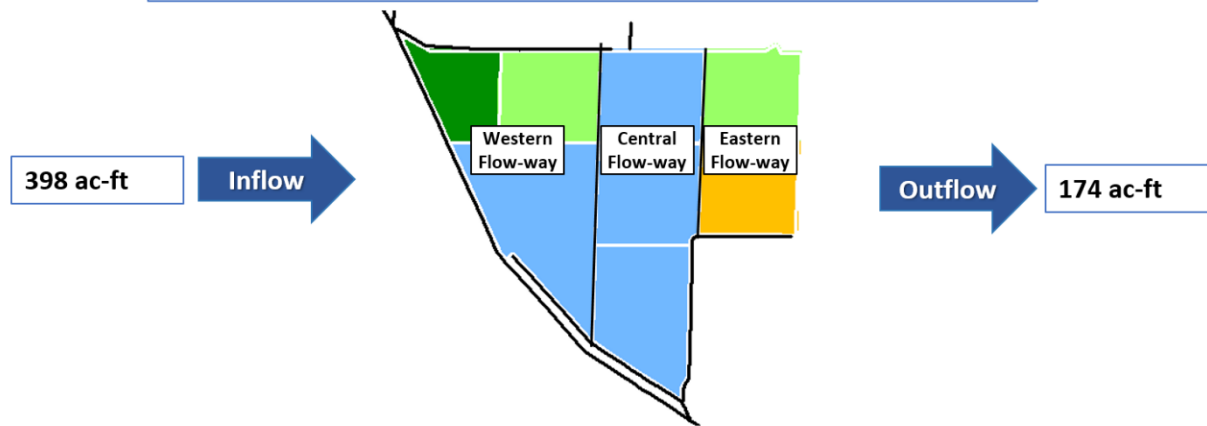
**STA-2:** STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Online treatment cells are at or near target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4, and 5 is highly stressed. The 365-day PLRs for Flow-ways 1, 4, and 5 are below 1.0 g/m<sup>2</sup>/year. The 365-day PLR for Flow-way 3 is high (**Figure S-3**).

**STA-3/4:** STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Most online treatment cells are at or near target stage. Vegetation in the Eastern and Central Flow-ways is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for the Central and Western Flow-ways are below 1.0 g/m<sup>2</sup>/year (**Figure S-4**).

**STA-5/6:** All Flow-ways are online. Most treatment cells are below target stage. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8 which are healthy. The 365-day PLRs for flow-ways 1, 6, 7, and 8 are below 1.0 g/m<sup>2</sup>/year. The 365-day PLRs for flow-ways 4 and 5 are high. (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

# STA-1E Weekly Status Report – 01/03/2022 through 01/09/2022












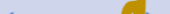
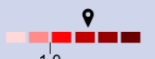




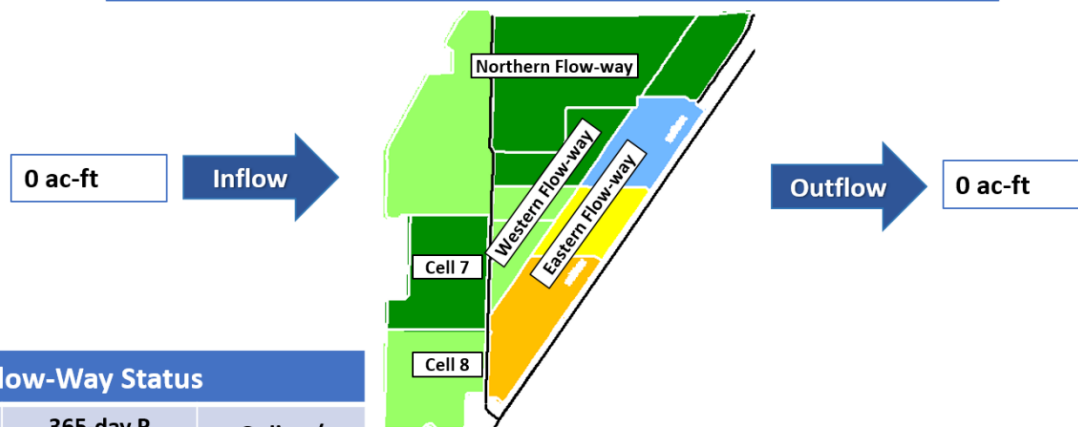
STA-1E Flow-Way Status				As of 01/09/2022				STA-1E Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small> 	365-day P Loading Rate <small>(below 1.0 g P /m²/yr is optimal)</small> 	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)					7-day	28-day	365-day
				 Deep Water Level (> 2.8' above TS)	 High Water Level (1.5' – 2.8' above TS)	 0.2' – 1.5' above TS	 Target Stage (TS +/- 0.2')				
Eastern			Online	 Low Water Level (<0.2' below TS)							
Central			Vegetation Rehab	Depth / Area Based: Percent of Area Dry							
Western	Offline, construction activities starting 11/01/2019			 0-25% Dry	 50-75% Dry						
				 25-50% Dry	 75-100% Dry						
								Includes Preliminary Data			
Total Inflow, ac-ft								398	5,311	179,148	
--Lake Inflow, ac-ft								0	N/A	5,800	
Total Outflow, ac-ft								174	4,867	150,863	
Inflow Conc., ppb								41	61	122	
Outflow Conc., ppb								29	27	23	

Figure S-1. STA-1E Weekly Status Report

# STA-1W Weekly Status Report – 01/03/2022 through 01/09/2022



## STA-1W Flow-Way Status

Flow-Way	Vegetation Status Healthy --- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
Northern			Construction
Western			Construction
Eastern			Construction
Cell 7		N/A	Construction
Cell 8		N/A	Construction

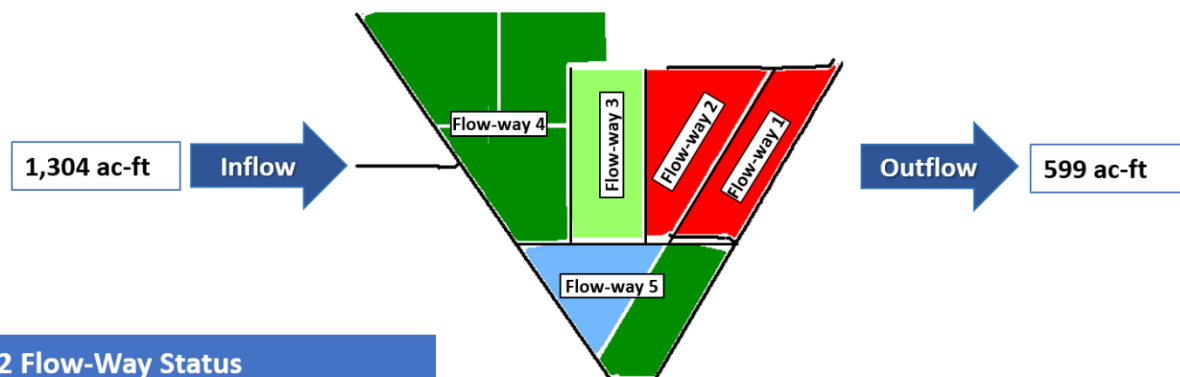
As of 01/09/2022	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

## STA-1W Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	0	1,343	51,527
--Lake Inflow, ac-ft	0	N/A	4,500
Total Outflow, ac-ft	0	992	52,279
Inflow Conc., ppb	N/A	138	171
Outflow Conc., ppb	N/A	19	24
Includes Preliminary Data			

**Figure S-2.** STA-1W Weekly Status Report

# STA-2 Weekly Status Report – 01/03/2022 through 01/09/2022



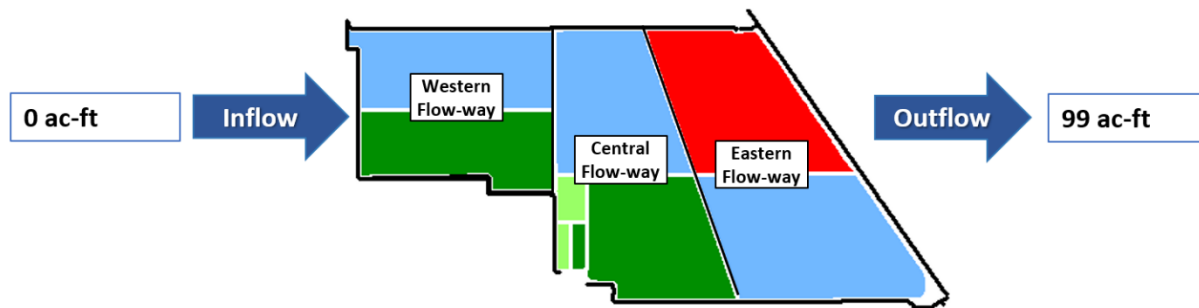
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
1			Online
2	Offline, construction activities as of 9/7/2021		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 01/09/2022	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-2 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	1,304	3,824	322,320
--Lake Inflow, ac-ft	1,400	N/A	67,100
Total Outflow, ac-ft	599	2,701	331,688
Inflow Conc., ppb	64	46	87
Outflow Conc., ppb	19	20	16
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 01/03/2022 through 01/09/2022

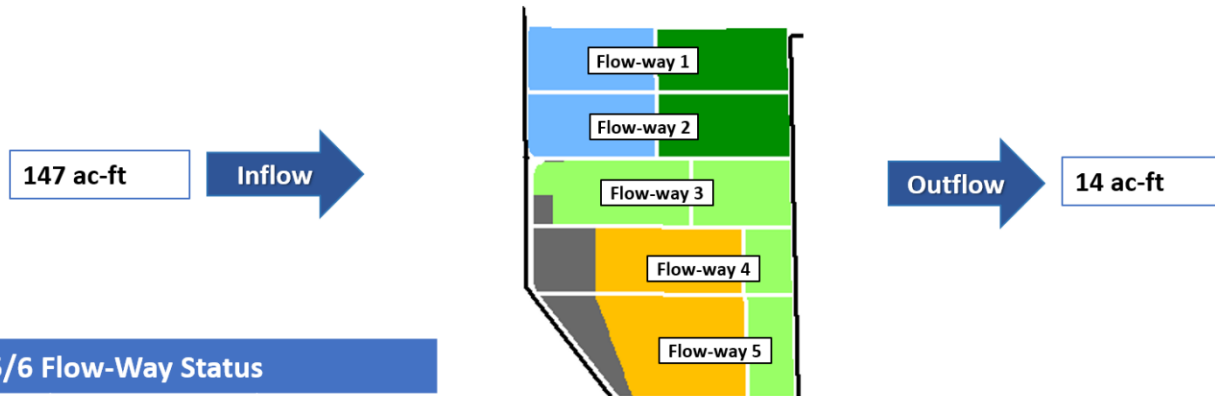


STA-3/4 Flow-Way Status				As of 01/09/2022				STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)					7-day	28-day	365-day
Eastern	Offline, vegetation management drawdown as of 3/1/2021			Deep Water Level (> 2.8' above TS)				Total Inflow, ac-ft	0	0	361,995
				High Water Level (1.5' – 2.8' above TS)				--Lake Inflow, ac-ft	0	N/A	38,600
				0.2' – 1.5' above TS				Total Outflow, ac-ft	99	289	317,693
				Target Stage (TS +/- 0.2')				Inflow Conc., ppb	N/A	N/A	65
				Low Water Level (<0.2' below TS)				Outflow Conc., ppb	19	19	15
Central			Online	Depth / Area Based: Percent of Area Dry				Includes Preliminary Data			
				0-25% Dry		50-75% Dry					
				25-50% Dry		75-100% Dry					
Western			Online								

Figure S-4. STA-3/4 Weekly Status Report



STA-5/6 Weekly Status Report – 01/03/2022 through 01/09/2022



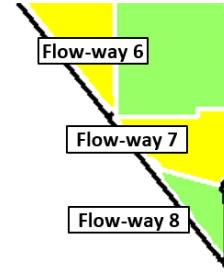
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P / m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
1			Online
2		N/A	Online
3		N/A	Online
4			Online
5			Online

As of 01/09/2022	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-5/6 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	147	2,018	178,201
--Lake Inflow, ac-ft	0	N/A	9,000
Total Outflow, ac-ft	14	1,301	170,150
Inflow Conc., ppb	104	98	243
Outflow Conc., ppb	73	21	50
Includes Preliminary Data			

Figure S-5. STA-5/6 Weekly Status Report (Flow-ways 1 – 5)

STA-5/6 Weekly Status Report – 01/03/2022 through 01/09/2022



STA-5/6 Flow-Way Status				As of 01/09/2022	
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)	
6	←-----→	1.0	Online	Deep Water Level (> 2.8' above TS)	
7	←-----→	1.0	Online	High Water Level (1.5' – 2.8' above TS)	
8	←-----→	1.0	Online	0.2' – 1.5' above TS	
				Target Stage (TS +/- 0.2')	
				Low Water Level (<0.2' below TS)	
				Depth / Area Based: Percent of Area Dry	
				0-25% Dry	50-75% Dry
				25-50% Dry	75-100% Dry

Figure S-6. STA-5/6 Weekly Status Report (Flow-ways 6 – 8)

## Basic Concepts and Definitions for STA Weekly Status Report

- **Inflow:** Sum of flow volume at all inflow structures to an STA.
- **Lake Inflow:** Portion of the STA total inflow volume that originates from Lake Okeechobee.
- **Outflow:** Sum of flow volume at outflow structures from an STA.
- **Total Phosphorus (TP):** Total mass of phosphorus in all its forms; including particulate, dissolved, etc.
- **Inflow Concentration:** TP concentration is the mass of TP in micrograms per liter of water,  $\mu\text{g/L}$  or ppb. Inflow concentration refers to the flow-weighted mean TP from all inflow structures over a period of time.
- **Outflow Concentration:** The flow-weighted mean TP from all outflow structures over a period of time. The outflow concentration represents the reduction of inflow TP achieved by STA treatment of the inflow water.
- **WQBEL:** The STA outflow concentration that is required upon completion of the Restoration Strategies projects by December 2025. The outflow concentration shall not exceed 13 ppb as an annual flow weighted mean in more than 3 out of 5 water years on a rolling basis and shall not exceed 19 ppb as an annual flow weighted in any water year.
- **Flow-Way (FW):** One or more treatment cells connected in series. Cells typically have emergent aquatic vegetation (EAV) in the front portion of the flow-way followed by a mix of EAV and submerged aquatic vegetation (SAV)
- **Vegetation Status:** Healthy means the vegetation condition is good and will allow the STA to perform as designed. Stressed means the vegetation is showing signs of poor health, such as browning or areas of vegetation die-off, or the cell contains undesirable vegetation such as floating exotic vegetation requiring treatment. The TP reduction capability of the STA is affected when the vegetation condition is poor.
- **Phosphorus Loading Rate (PLR):** Mass of inflow TP in grams, divided by total treatment area of STA in square meters, per year. In general, a 365-day value of less than 1.0 is needed for an STA to perform optimally. A PLR of 2.0 is considered very high and a PLR of 3.0 is considered extremely high. The TP reduction capability of the STA is affected when the PLR is high, very high and extremely high.
- **Online:** Online status means the FW can receive and treat inflow.
- **Online with Restriction:** The FW can receive and treat inflow, but the amount of flow or water level may be limited temporarily. For example, a vegetation rehabilitation effort may require reduced flows through an area while the new plants are establishing, or nesting by protected species may require a certain water level not to be exceeded.
- **Offline:** The FW is unable to receive and treat inflow due to repairs, construction, or other prohibitive reasons.
- **Depth:** Difference between the average surface water level in a cell and the average ground elevation in that cell. Target depths, or depths between flow events, are between 1.25 ft to 1.5 ft. As depth approaches or drops below zero, an increasing percentage of the cell is considered dry and STA conditions deteriorate. An increase in depth above target depth is expected with increasing flow. However, as depth increases much above the target depth and is sustained over a period of time, it can be detrimental to vegetation health and overall STA treatment performance.
- **Note:** The data provided in this summary report were developed using a combination of provisional and quality-assured flow and water quality data. In some cases, best professional judgment was used to estimate missing data and revise questionable data. Values provided are not considered final but are appropriate for use in STA operational decision-making.

## **Everglades**

### ***Water Conservation Area Regulation Schedules***

WCA-1: The 1-8C stage continues to fall in parallel with the Zone A1 regulation line last week. The average on Sunday was 0.26 feet above. WCA-2A: Stage at 2A-17 continues to fall faster than the slope of the Zone A regulation line last week; the average on Sunday was 1.19 feet higher than that line. WCA-3A: Last week the Three Gauge Average stage continues to fall away from the stable Zone A regulation line; average stage was 0.58 feet below that line on Sunday (compared to 0.52 and 0.42 feet the two weeks prior). WCA-3A: Stage at gauge 62 (Northwest corner) continues to fall faster than the slope of the falling Upper Schedule; the average on Sunday was 0.88 feet below the regulation line. (**Figures EV-1 through EV-4**).

### ***Water Depths***

The SFWDAT tool indicates that water depths in the WCAs remain the lowest in northeastern WCA-3A, where the spatial extent of the potential for water below the soil surface continues to expand just south of the S-150. North to South hydrologic connectivity has diminished but remains in Taylor Slough in eastern Everglades National Park while in the west in Lostman's slough the connection has diminished more significantly. The western marl prairies and southern BCNP are dry. (**Figure EV-5**). Comparing current WDAT water depths to the depth one month ago, stages are decreasing in most areas, most significantly in southern WCA-2A and in the upper reaches of the L-67. Looking back one year, most of the EPA is significantly lower in depth (particularly eastern WCA-3A) with only WCA-1 and northeastern ENP close to the same depth as last year. (**Figure EV-6**). Comparing depths over the past 20 years, most of WCA-3A is below the 50 percentile while WCA-1, southern WCA-2A, and northeastern ENP remain well above. (**Figure EV-7**).

### ***Taylor Slough and Florida Bay***

A spatial average of 0.68 inches of rain fell over Taylor Slough and Florida Bay over the week ending Sunday, January 9th, which caused stages to increase an average of 0.03 feet (**Figure EV-8** and **Figure EV-9**). The weekly stage increases estimated by SFWDAT are similar to the pattern of radar estimated rainfall suggesting that the stage increases were driven by the weekend rains, and the timing of the increases in the individual gauge data also supports the conclusion that the weekend rains caused the stage increases (**Figure EV-9**). However, the weekly recession rates prior to this past week which are slower than previous years suggest that the continued water deliveries from the South Dade area have been slowing recession rates. Taylor Slough stage is still averaging 4 inches lower than a year ago after the high-water event associated with Tropical Storm Eta. Given the expectation of a drier than average dry season, maintaining water deliveries to the area would help to slow the recession in the slough so water movements south can be expedited when the wet season starts.

Salinities in Florida Bay averaged a decrease of 1.8 over the week ending January 9th, with individual station changes ranging from -5.0 to +0.4 (**Figure EV-8**). The largest changes were in decreases along the shoreline area. The central Bay average has

decreased below its 75th percentile this week (**Figure EV-10**) putting the region into a better condition. However, conditions are not ideal for enduring a potentially drier than average dry season. Bay-wide salinity is averaging 1 higher than the historical average while there is less water in the upstream Slough compared to last year.

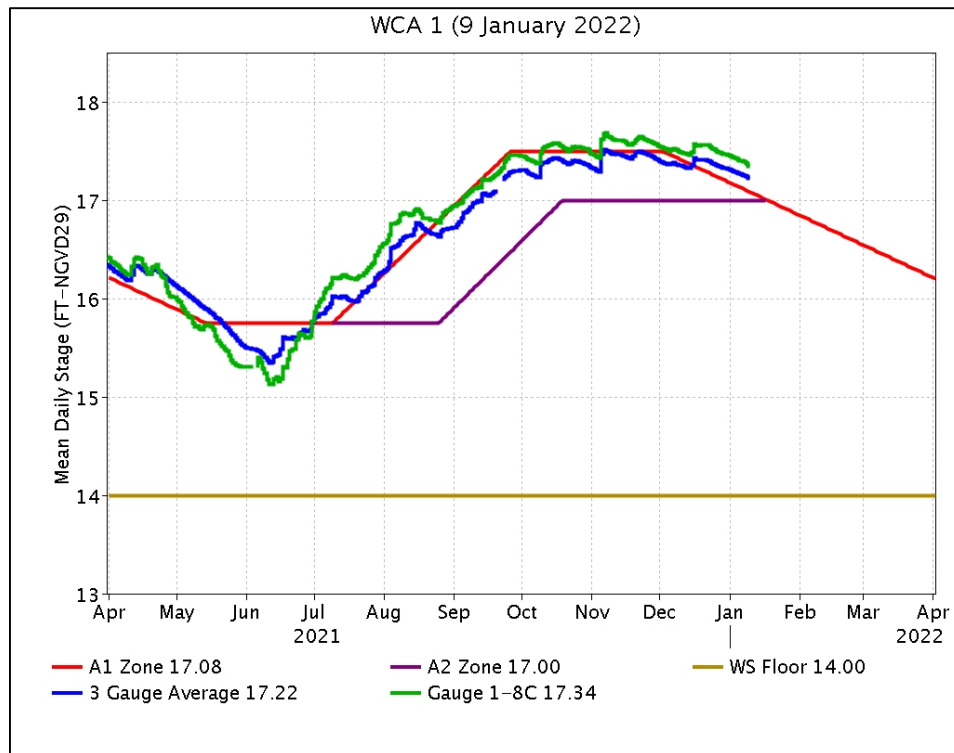
### ***Water Management Recommendations***

Flows directed across the northern perimeter of WCA-3A that would slow recession rates in that sub-basin then move downstream would have an ecological benefit. If conditions allow, discharges into both the western (to assist in maintaining current foraging conditions) and the eastern (i.e. S-150 to help maintain stage around the Alley North colony) WCA-3A water control structures would have greater benefit than discharges to the west alone. Continued freshwater to the Taylor Slough area, enough that maintains stage will help expedite deliveries to the south when the wet season begins. Individual regional recommendations can be found in **Table EV-2**.

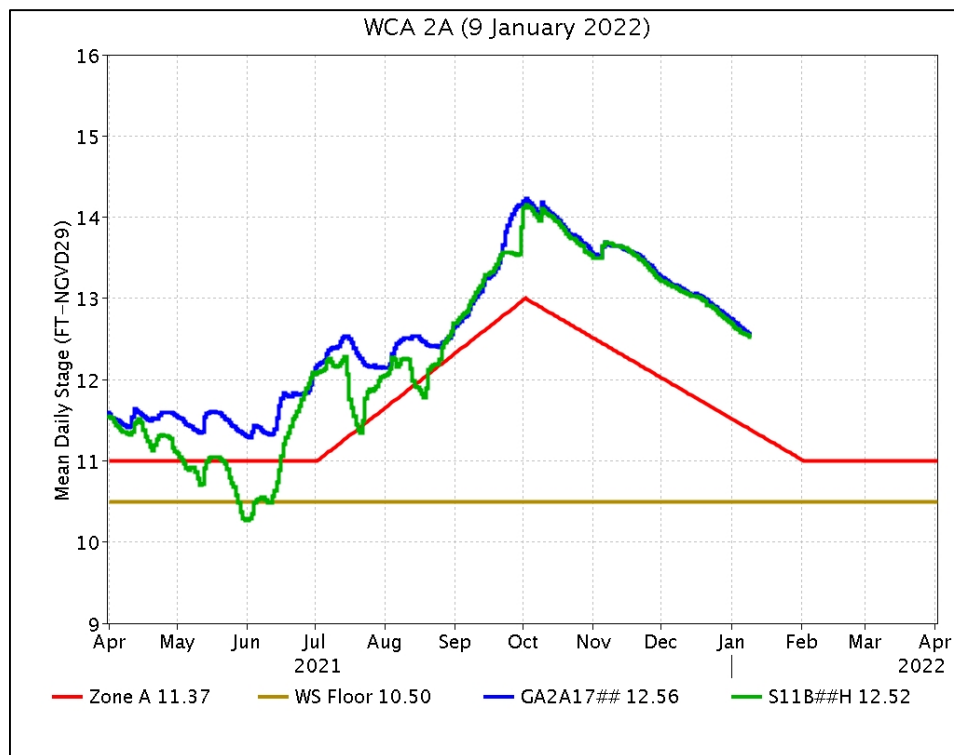
**Table EV-2.** Previous week's rainfall and water depth changes in Everglades regions.

Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	0.04	-0.07
WCA-2A	0.02	-0.15
WCA-2B	0.08	-0.10
WCA-3A	0.05	-0.11
WCA-3B	0.20	ERROR
ENP	0.41	+0.04

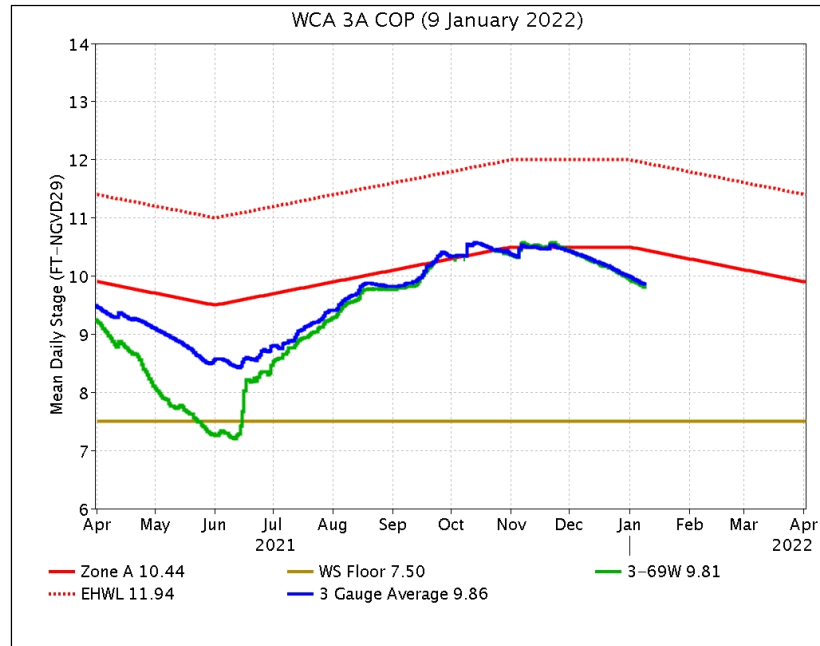
\* sensor not reporting (other two gauges report -0.05)



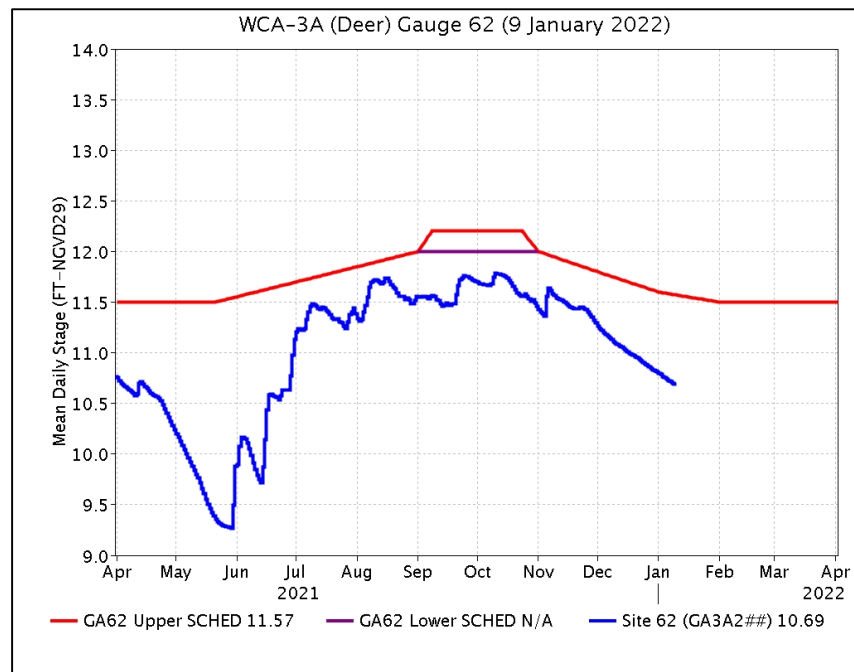
**Figure EV-1.** WCA-1 stage hydrographs and regulation schedule.



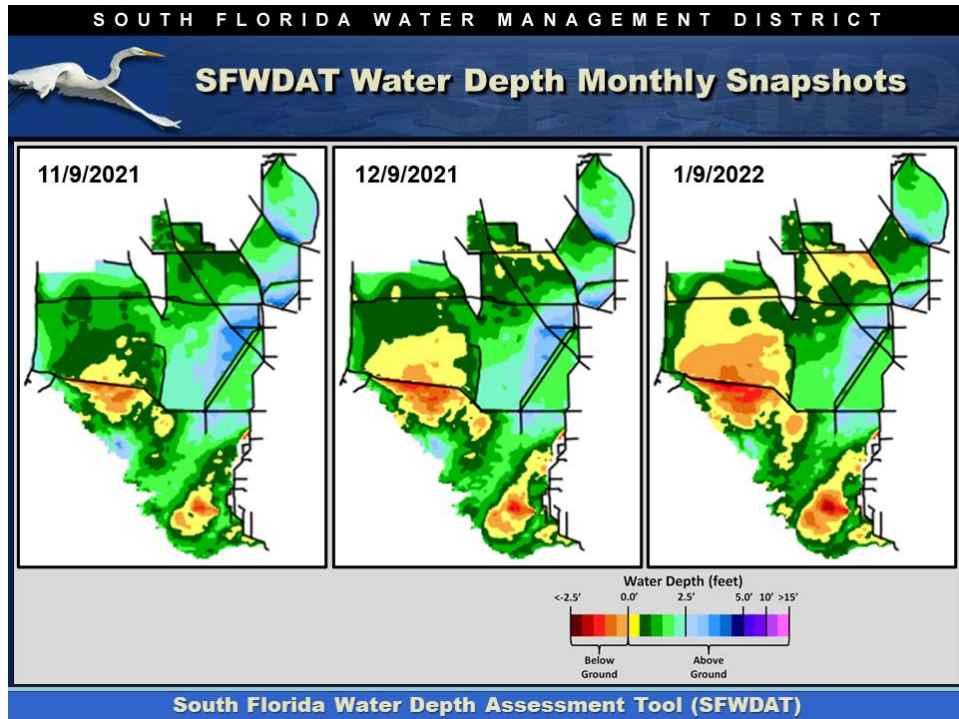
**Figure EV-2.** WCA-2A stage hydrographs and regulation schedule.



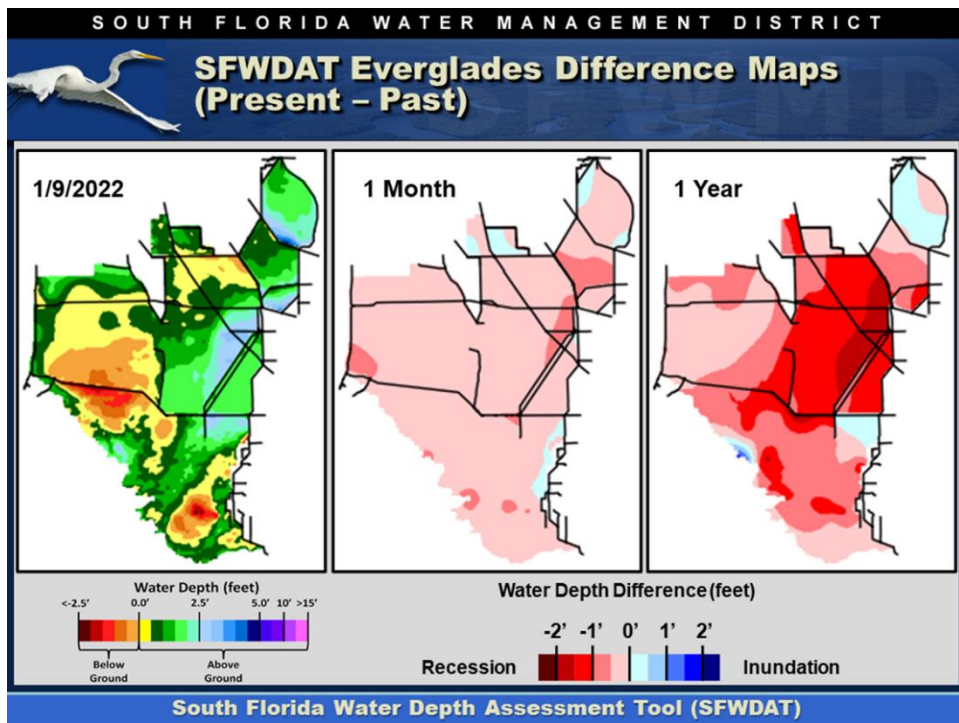
**Figure EV-3.** WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.



**Figure EV-4.** WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

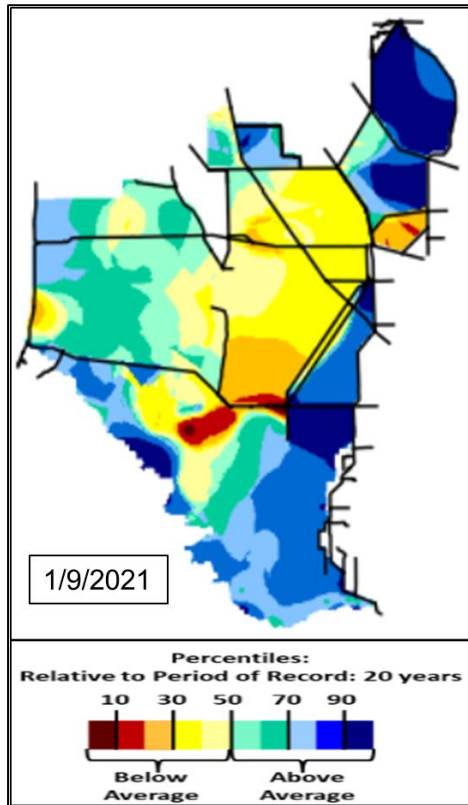


**Figure EV-5.** Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

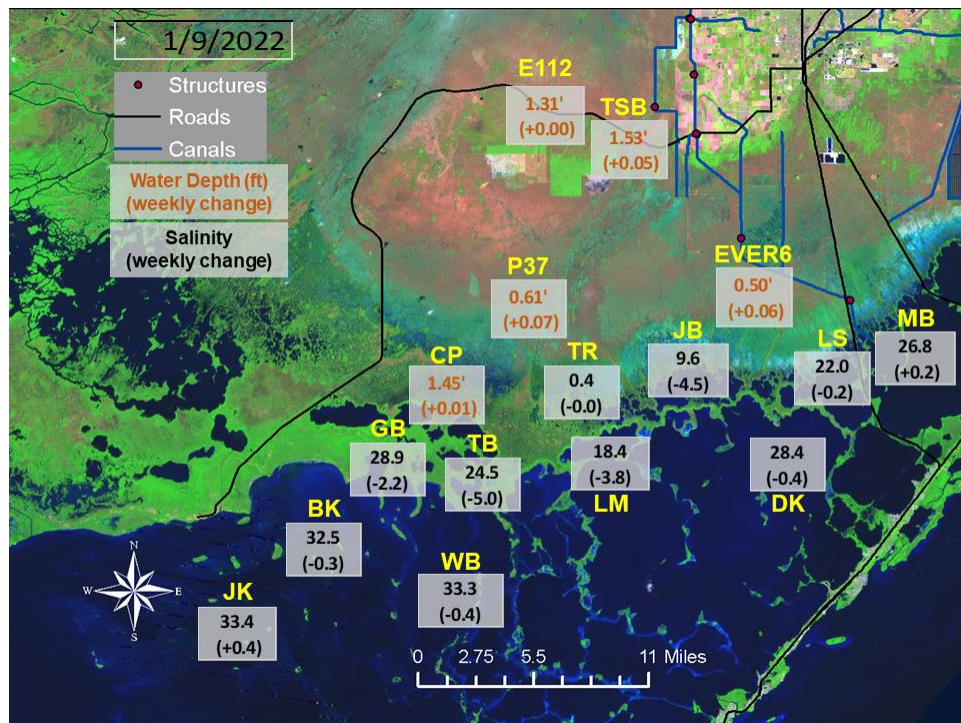


**Figure EV-6.** Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

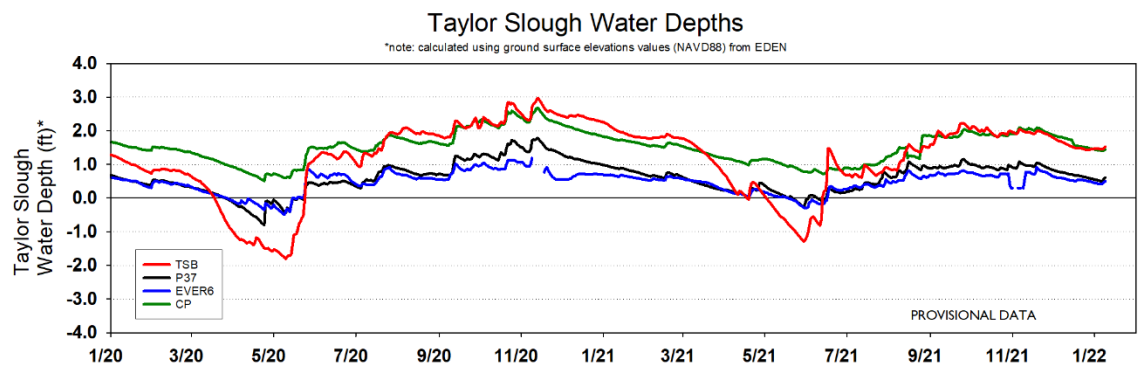




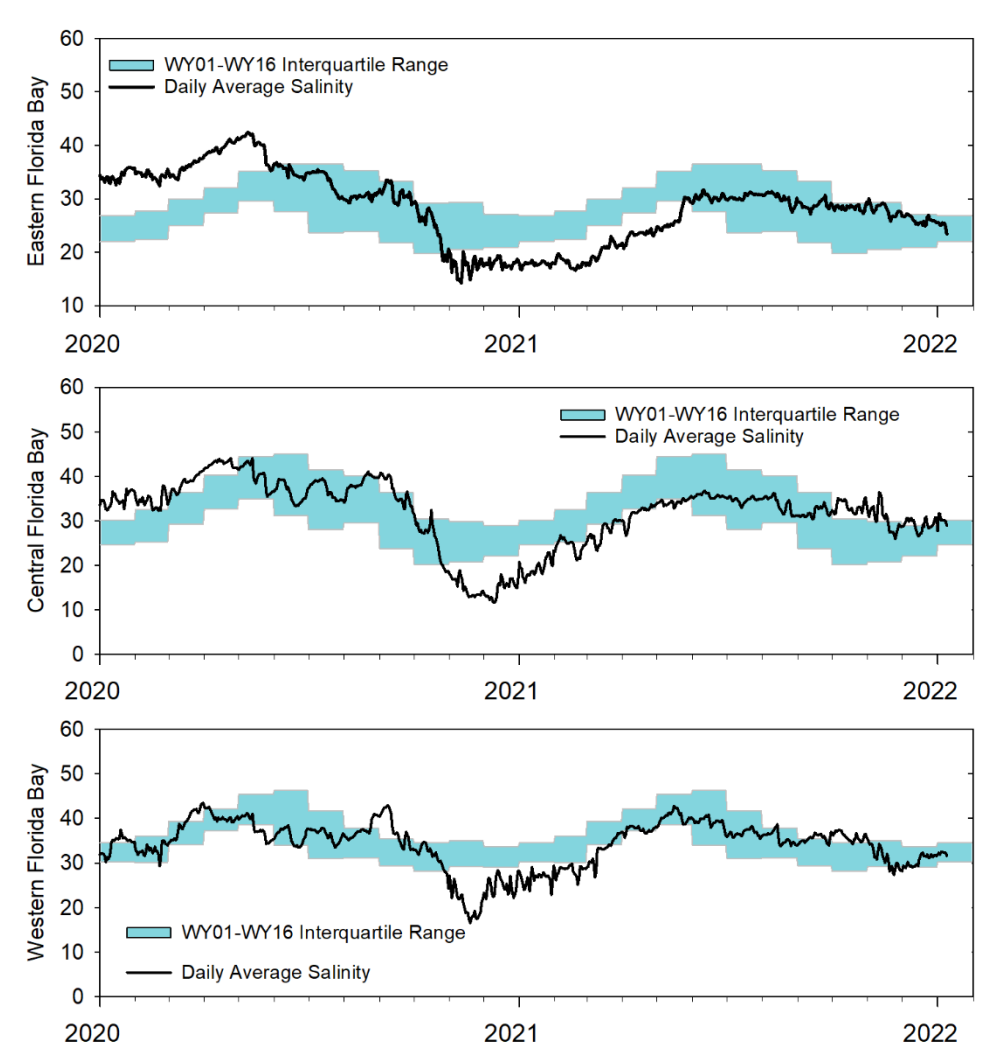
**Figure EV-7.** Present water depths compared to the day of year median over the previous 20 years.



**Figure EV-8.** Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.



**Figure EV-9.** Taylor Slough water depth time series.



**Figure EV-10.** Eastern (top panel), Central (middle panel), and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

**Table EV-2.** Weekly water depth changes and water management recommendations

<b>SFWMD Everglades Ecological Recommendations, December 28, 2021 (red is new)</b>			
<b>Area</b>	<b>Weekly change</b>	<b>Recommendation</b>	<b>Reasons</b>
<b>WCA-1</b>	Stage decreased by 0.07'	Conserve water in this basin letting the water move south when conditions allow.	Protect within basin and downstream habitat and wildlife. Anticipated La Nina dry season.
<b>WCA-2A</b>	Stage decreased by 0.15'	Conserve water in this basin letting the water move south when conditions allow, with northern WCA-3A as the priority for receiving discharge. Keeping a recession rate less than 0.10 feet per week has an ecological benefit.	Protect within basin and downstream habitat and wildlife. Protect wading bird foraging conditions in WCA-3A North.
<b>WCA-2B</b>	Stage decreased by 0.10'	Conserve water in this basin, maintain a minimum input to maintain stage while moving water south when conditions allow.	Protect within basin and downstream habitat and wildlife.
<b>WCA-3A NE</b>	Stage decreased by 0.13'	Conserve water in this basin letting the water move south when conditions allow. Keeping a recession rate less than 0.10 feet per week has an ecological benefit.	Protect within basin peat soils, wading bird foraging and downstream habitat and wildlife.
<b>WCA-3A NW</b>	Stage decreased by 0.10'	Conserve water in this basin letting the water move south when conditions allow. Keeping a recession rate less than 0.10 feet per week has an ecological benefit.	
<b>Central WCA-3A S</b>	Stage decreased by 0.10'	Conserve water in this basin letting the water move south when conditions allow. Keeping a recession rate less than 0.10 feet per week has an ecological benefit.	Protect within basin and downstream habitat and wildlife.
<b>Southern WCA-3A S</b>	Stage decreased by 0.10'		
<b>WCA-3B</b>	Stage decreased by 0.05'	Conserve water in this basin letting the water move south when conditions allow.	Protect within basin and downstream habitat and wildlife.
<b>ENP-SRS</b>	Stage increased by 0.04 feet	Make discharges to the Park according to COP and TTFF protocol while considering upstream and downstream ecological conditions.	Protect within basin and upstream habitat and wildlife.
<b>Taylor Slough</b>	Stage changes ranged from -0.01' to +0.07'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
<b>FB- Salinity</b>	Salinity changes ranged -5.0 to +0.4	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.