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: December 1, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Dry conditions will persist through Wednesday; then onshore winds will bring light shower activity to eastern areas Thursday through Sunday. A mostly dry frontal boundary is forecast to bring light shower activity to the District as it stalls over north-central Florida Monday. In the extended outlook, a second cold front is forecast to bring light shower activity during the latter part of next week. Total rainfall is forecast to be well below the historical average during the first 7-day period (Week 1) and then below the historical average during the second 7-day period (Week 2).

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 0.35 feet as of November 28, 2021. The concentration of dissolved oxygen in the Kissimmee River has remained well above the region of concern, with an average of 7.0 mg/L for the week ending on November 28, 2021.

Lake Okeechobee

Lake Okeechobee stage was 15.98 feet NGVD on November 28, 2021 and it was 0.06 feet higher than a month ago (**Figure LO-1**). Lake stage is currently 0.48 feet above the ecological envelope, having been either above or at the very top of the envelope for all of 2021 (**Figure LO-2**). Average daily inflows (excluding rainfall) decreased from the previous week, going from 2,684 cubic feet per second (cfs) to 1,219 cfs. Recent satellite imagery (November 28, 2021) showed low to medium bloom potential along the southern and western shorelines (**Figure LO-6**).

Estuaries

Total inflow to the St. Lucie Estuary averaged approximately 2,150 cfs over the past week with no flow coming from Lake Okeechobee. Mean surface salinities decreased at all sites within 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 2,255 cfs over the past week with 1,061 cfs coming from the Lake. Mean surface salinity decreased at Ft. Myers and salinities decreased at all remaining sites within 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 Shell Point and Sanibel, and in the fair range at Cape Coral.

Stormwater Treatment Areas

For the week ending Sunday, November 28, 2021, no 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 61,100 ac-feet. The total amount of inflows to the STAs in WY2022 is approximately 937,000 ac-feet. Most STA cells are at or near target stage. 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, there is no capacity for Lake releases in the STAs.

Everglades

Recession rates across the Everglades were a little too rapid this past week, with only northeastern WCA-3A and northeastern Everglades National Park in preferred ranges. Depths in WCA-3A North remained above the historical median and tree island model output indicates near average conditions, but depths in the western sloughs of Everglades National Park are in the lowest 10th percentile of their historical distribution. Florida Bay salinities increased slightly over the last week and stages decreased in Taylor Slough due to the lack of rainfall. Salinities in the eastern and central areas of the Bay remain elevated compared to historical distributions despite the rainfall and flows of the last month.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On November 28, 2021, lake stages were 57.9 feet NGVD (0.1 feet below schedule) in East Lake Toho, 55.0 feet NGVD (at schedule) in Lake Toho, and 50.0 feet NGVD (2.5 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1**, **Figures KB-1-3**).

Lower Kissimmee

Discharges to the Kissimmee River on November 28, 2021 were 340 cfs at S-65 and 310 cfs at S-65A; discharges from the Kissimmee River were 560 cfs at S-65D and 530 cfs at S-65E (**Table KB-2**). Headwater stages were 46.3 feet NGVD at S-65A and 27.0 feet NGVD at S-65D on November 28, 2021. 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 7.0 mg/L for the week ending on November 28, 2021 (**Table KB-2**, **Figure KB-4**). Flow at S-65A has been reduced to minimum (~300 cfs) and water depth on the Kissimmee River floodplain is declining. Mean depth decreased to 0.35 feet as of November 28, 2021 (**Figure KB-5**).

Water Management Recommendations

Continue to maintain at least 300 cfs at S-65A per the IS-14-50 discharge plan (Figure KB-6).

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)[a]	Schedule Type[b]	Schedule Stage (feet NGVD)	Departure from Regulation (feet)	
							11/28/21	*11/21/21*
Lakes Hart and Mary Jane	S-62	LKMJ	63	61.0	R	61.0	0.0	0.0
Lakes Myrtle, Preston and Joel	S-57	S-57	34	62.0	R	62.0	0.0	0.0
Alligator Chain	S-60	ALLI	59	64.0	R	64.0	0.0	0.0
Lake Gentry	S-63	LKGT	86	61.5	R	61.5	0.0	0.0
East Lake Toho	S-59	TOHOE	199	57.9	R	58.0	-0.1	0.0
Lake Toho	S-61	TOHOW S-61	412	55.0	R	55.0	0.0	0.0
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	280	50.0	R	52.5	-2.5	-2.7

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.

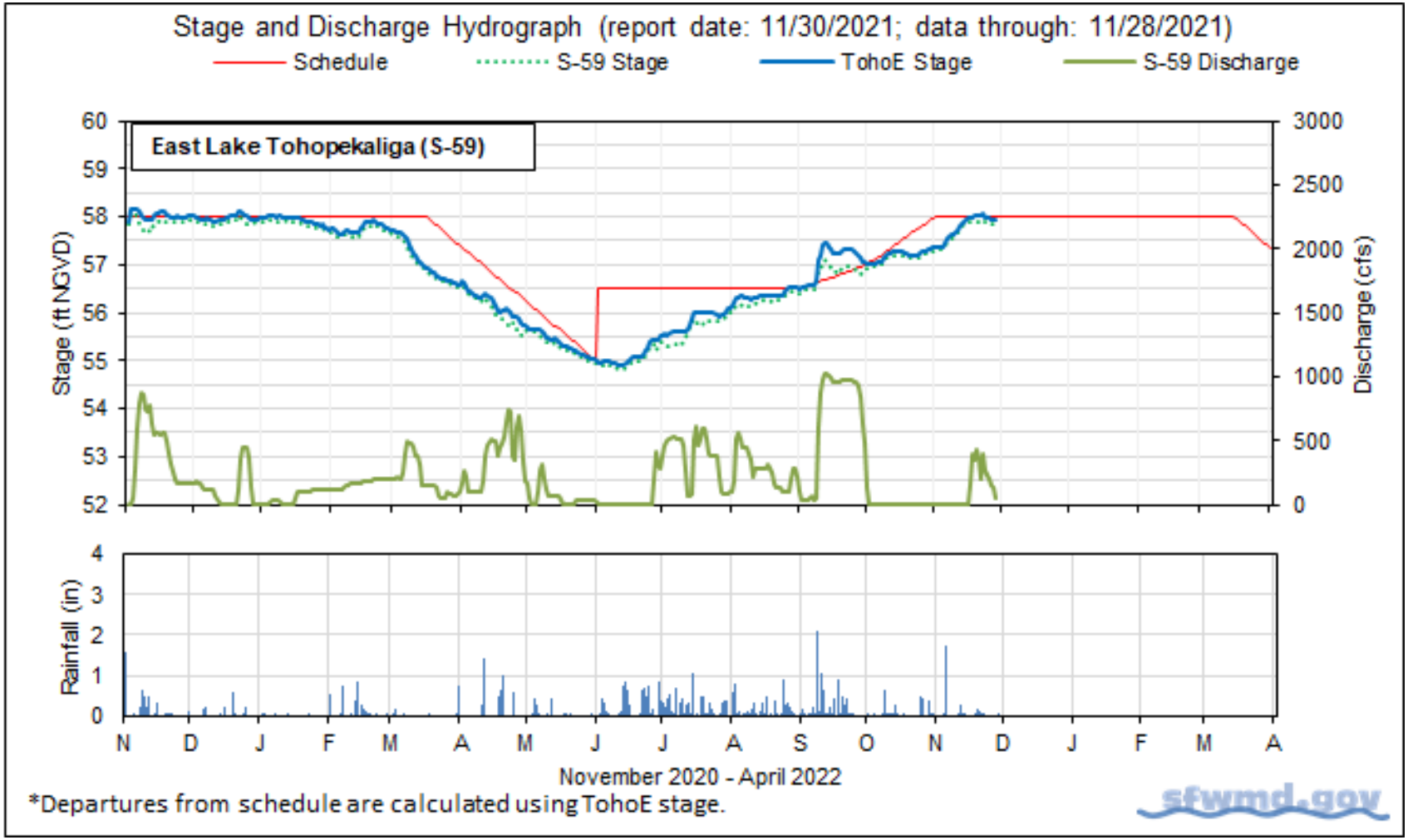


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

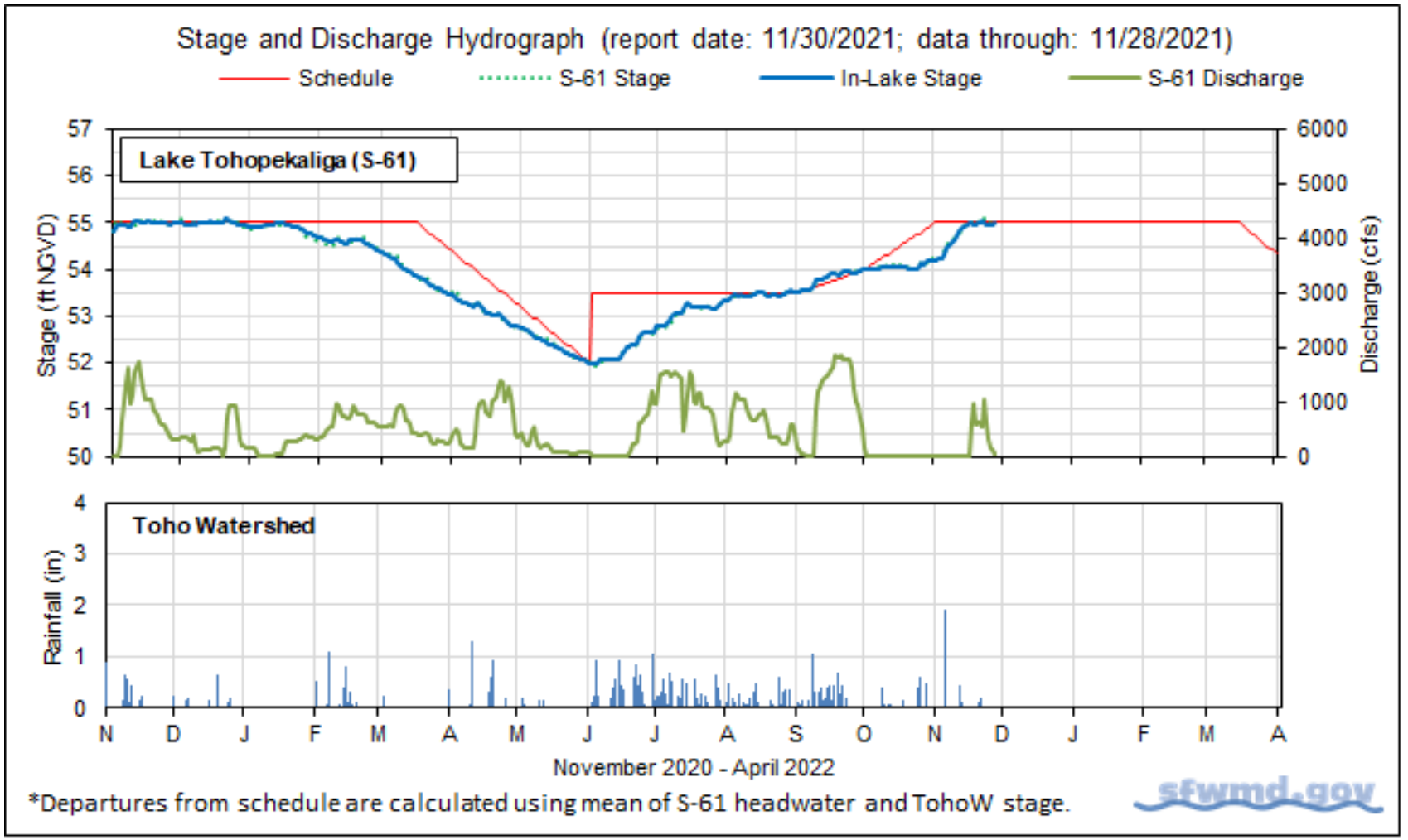


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

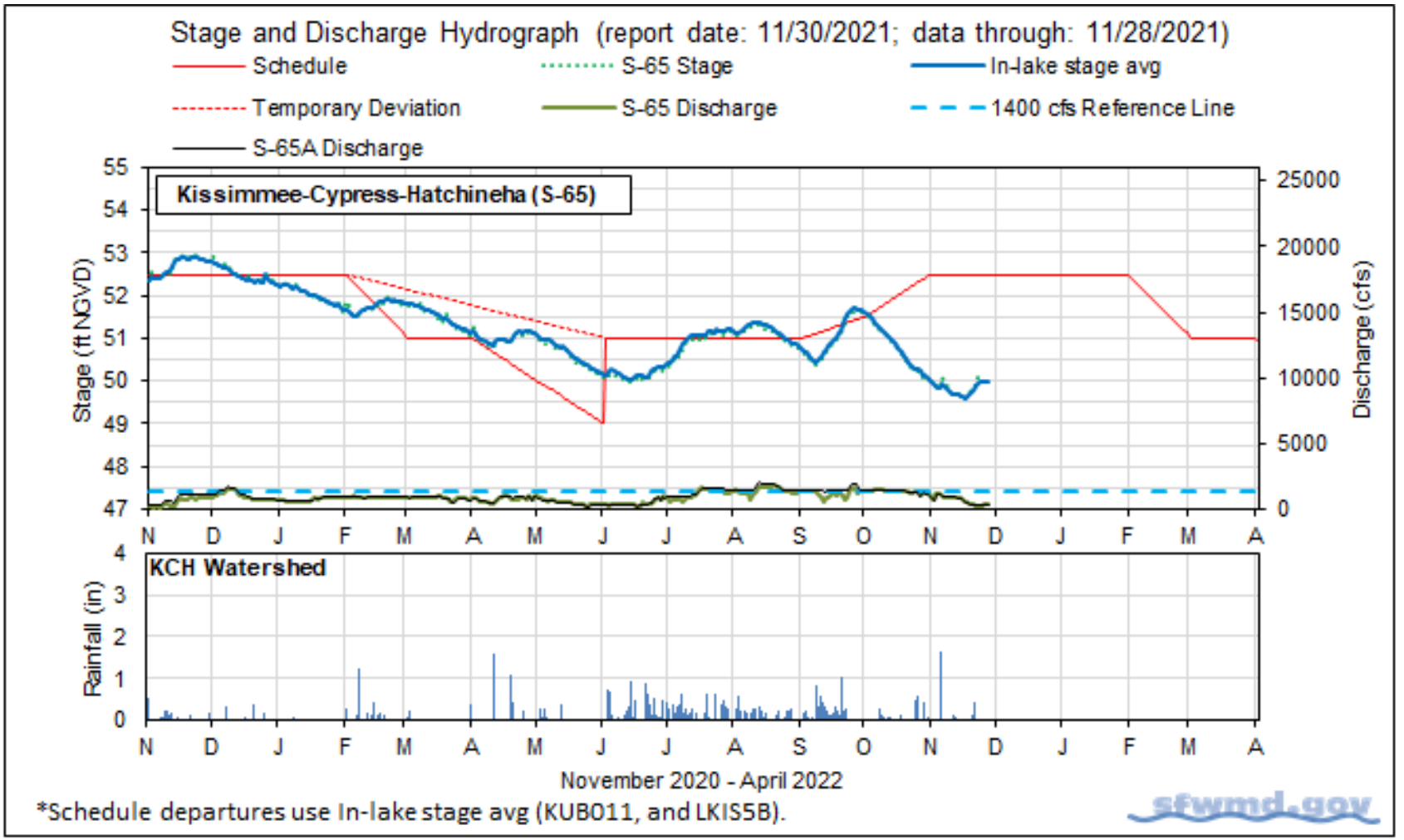


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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	Average for Previous Seven Day Periods			
		11/28/21	11/28/21	11/21/21	11/14/21	11/7/21
Discharge	S-65	340	280	520	910	1,020
Discharge	S-65A[a]	310	310	460	900	960
Headwater Stage (feet NGVD)	S-65A	46.3	46.4	46.4	46.3	46.4
Discharge	S-65D[b]	560	630	1,120	1,410	1,390
Headwater Stage (feet NGVD)	S-65D[c]	27.0	27.0	27.0	27.0	27.0
Discharge (cfs)	S-65E[d]	530	590	1,210	1,470	1,460
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) [e]	Phase I, II/III river channel	7.7	7.0	6.0	5.6	5.2
Mean depth (feet) [f]	Phase I floodplain	0.35	0.39	0.57	0.83	0.78

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

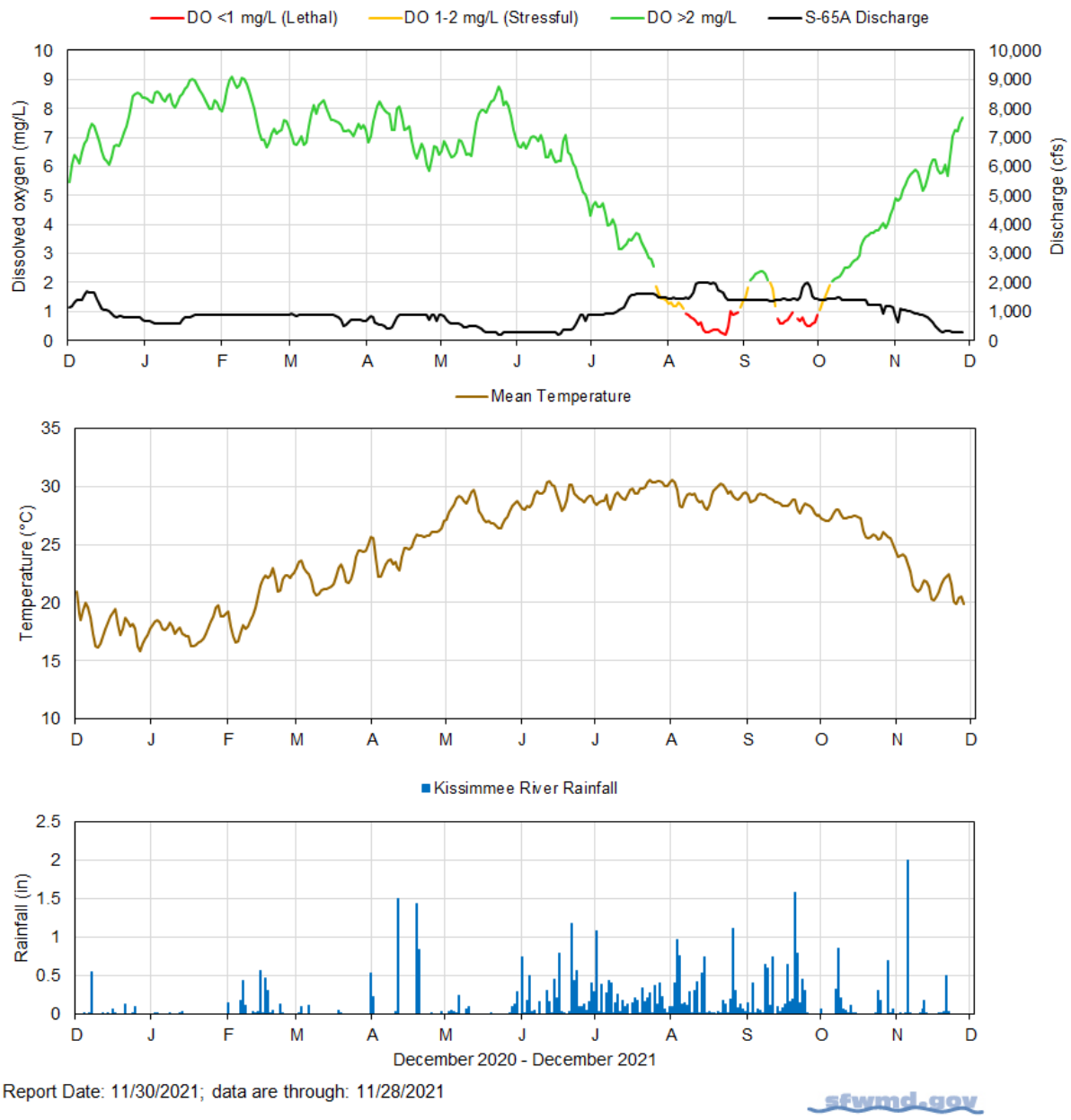


Figure KB-4. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRBN, PC33, PD62R, and PD42R with an average of two stations reporting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

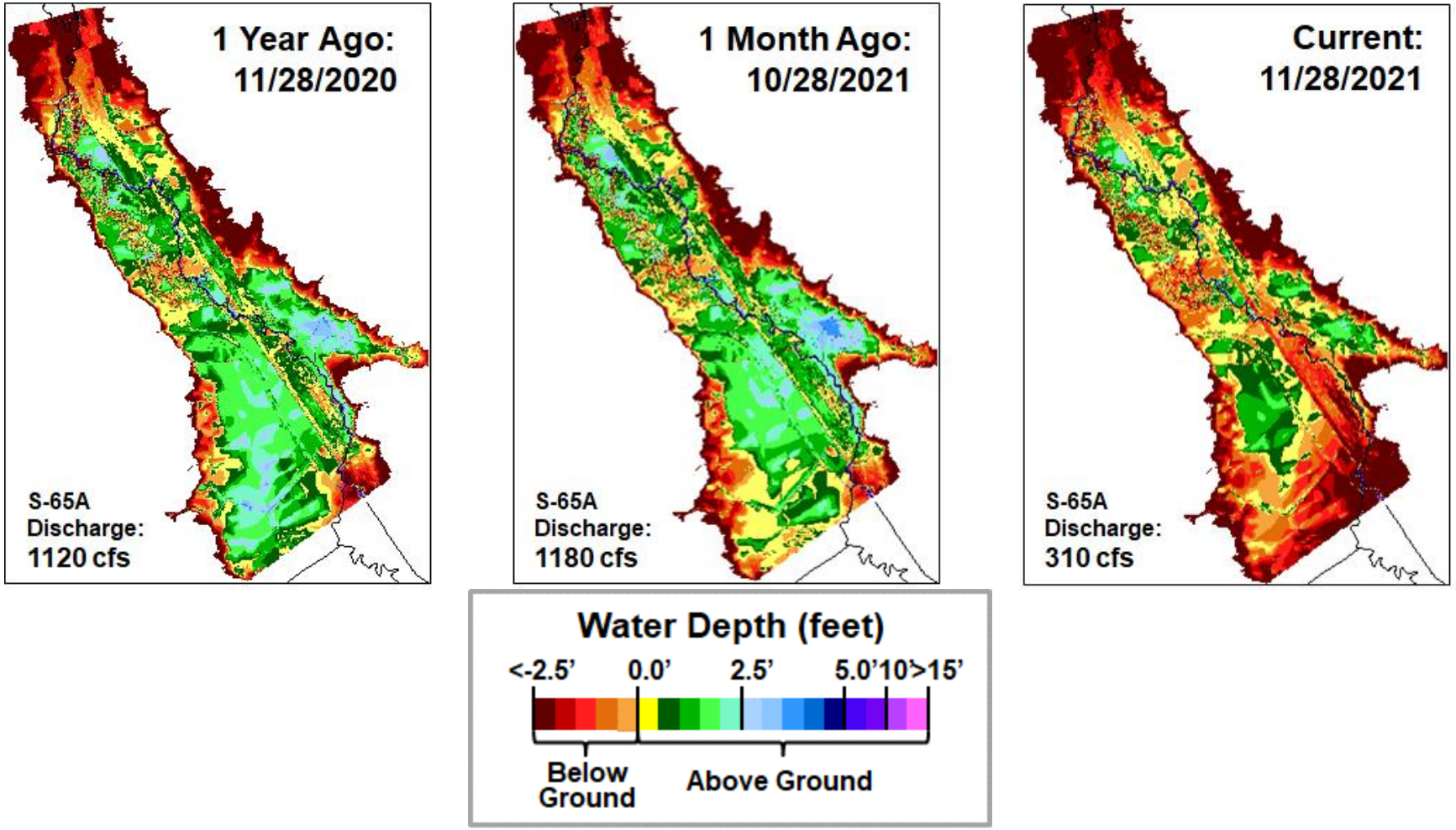


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

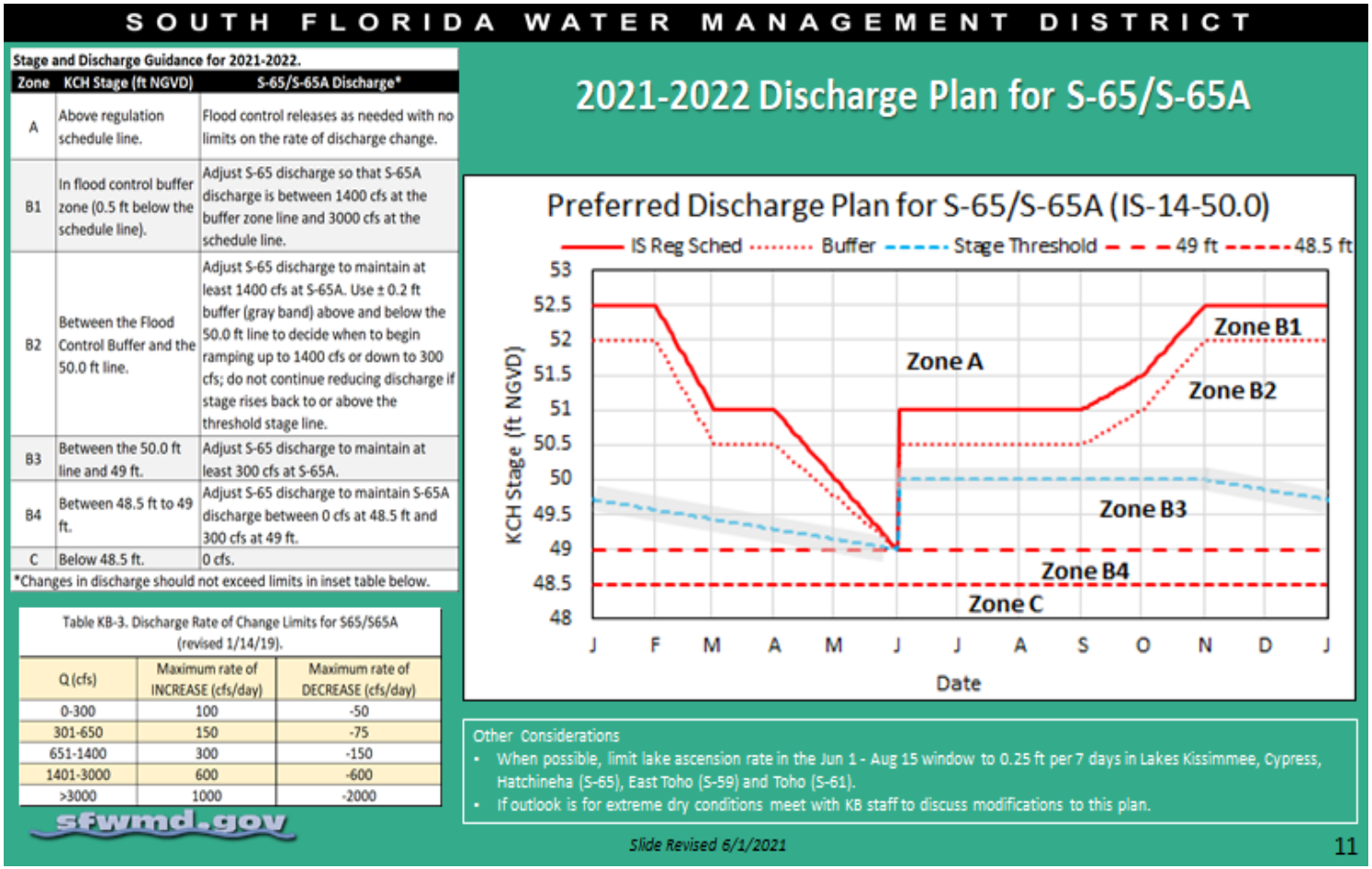


Figure KB-6. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

Lake Okeechobee

Lake Okeechobee stage was 15.98 feet NGVD on November 28, 2021, with water levels 0.06 feet higher than a month ago (**Figure LO-1**). Lake stage was approximately 0.48 feet above the ecological envelope, having been either above or at the very top of the envelope for all of 2021 (**Figure LO-2**). Lake stage remained in the Low sub-band, and was 0.27 feet below the Intermediate sub-band (**Figure LO-3**). According to NEXRAD, 0.01 inches of rain fell directly on the Lake last week, a decrease of 0.39 inches compared to the previous week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 2,684 cubic feet per second (cfs) to 1,219 cfs. Average daily outflows (excluding evapotranspiration) increased slightly from the previous week, going from 1,048 cfs to 1,146 cfs. Most of the inflows (586 cfs) came from the Kissimmee River through the S-65E structure. The second highest inflow was received via backflow from the L-8 canal through the S-271 structure, at the average daily rate of 306 cfs. There was an outflow of 1,062 cfs to the west via S-77, and 84 cfs south via the S-350 structures, but zero outflow to the east via S-308. **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 (November 28, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor showed low to medium bloom potential along the southern and western shorelines (**Figure LO-6**).

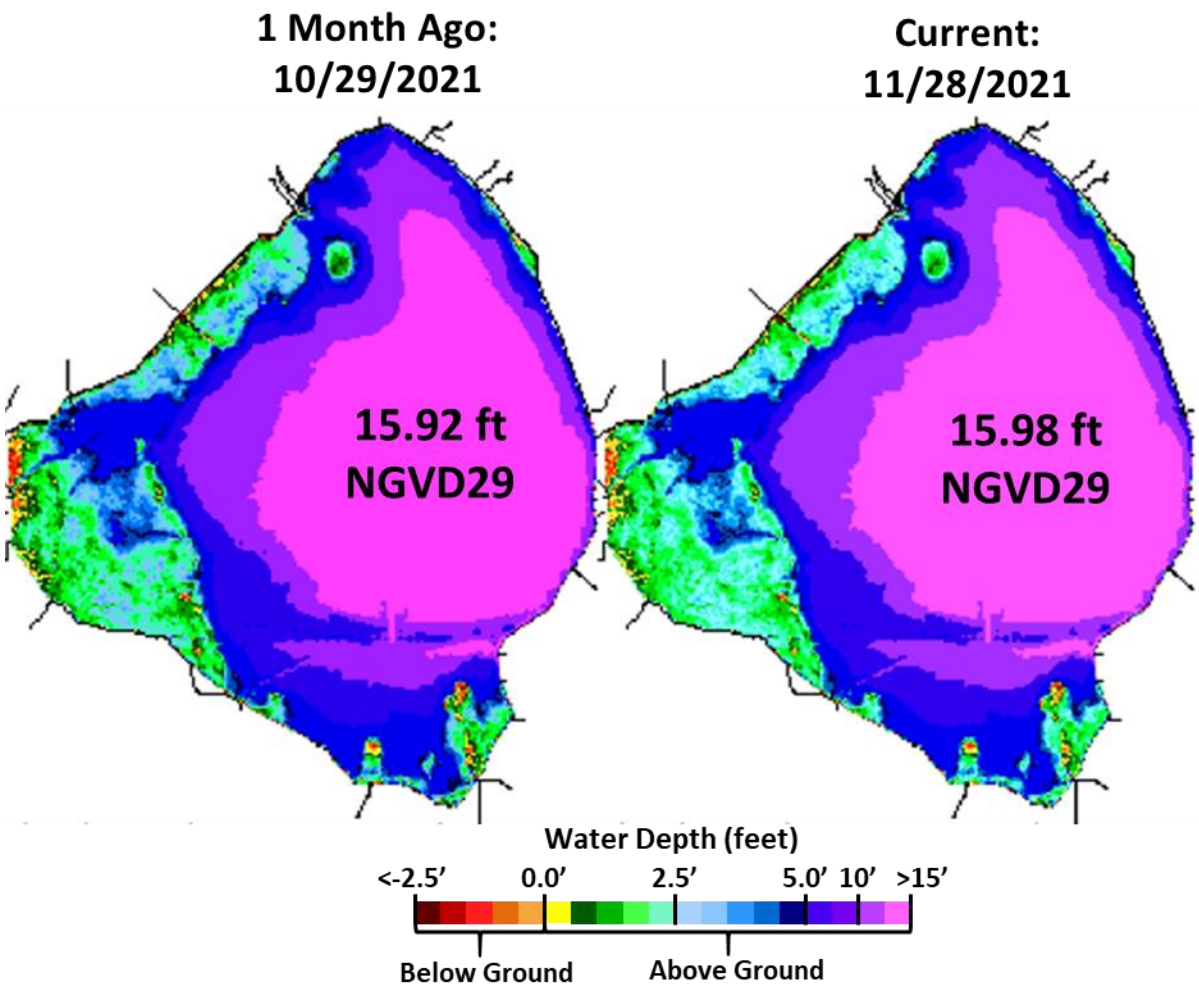


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

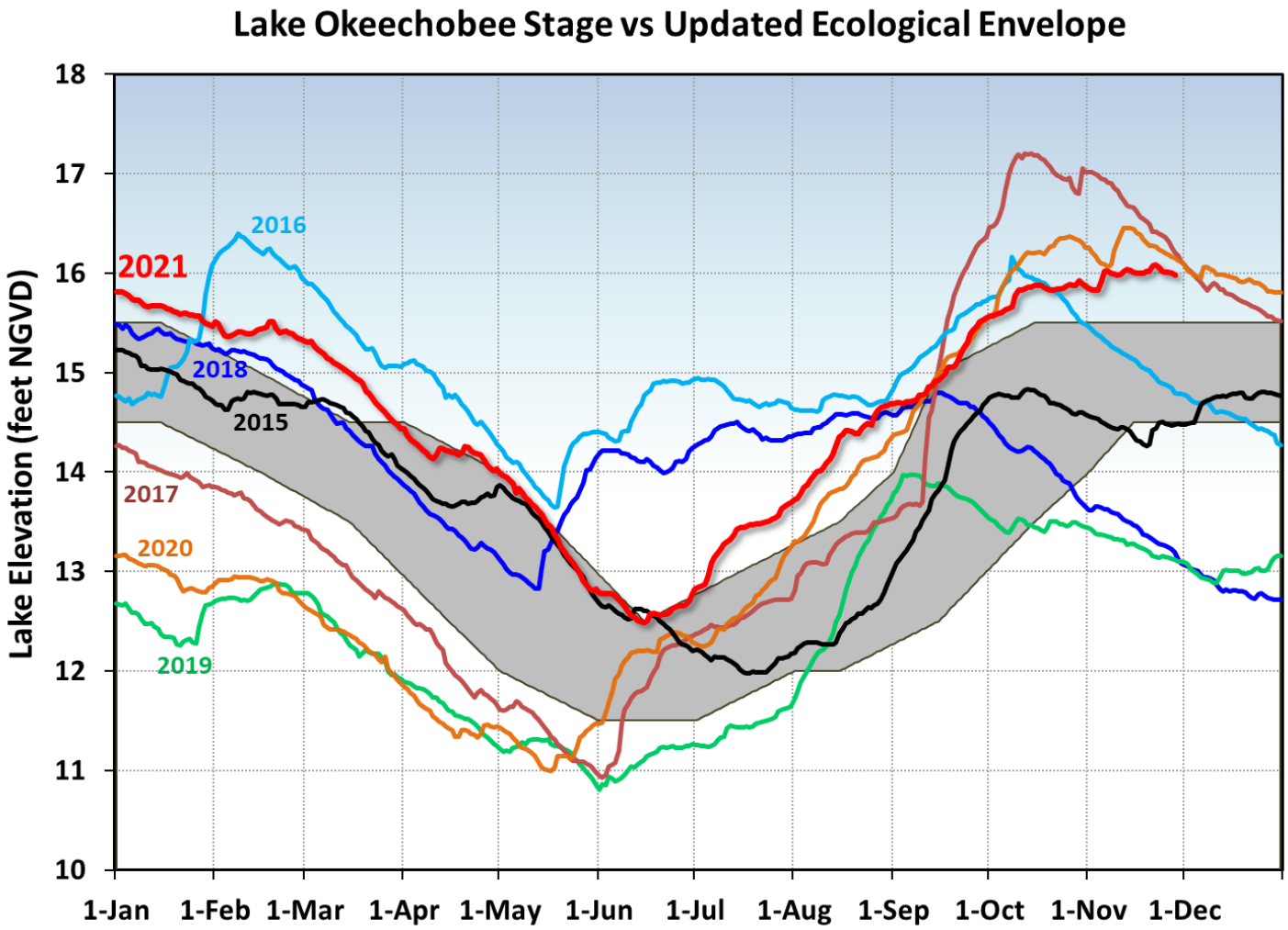


Figure LO-2. The prior seven years of annual stage hydrographs for Lake Okeechobee in comparison to the updated ecological envelope.

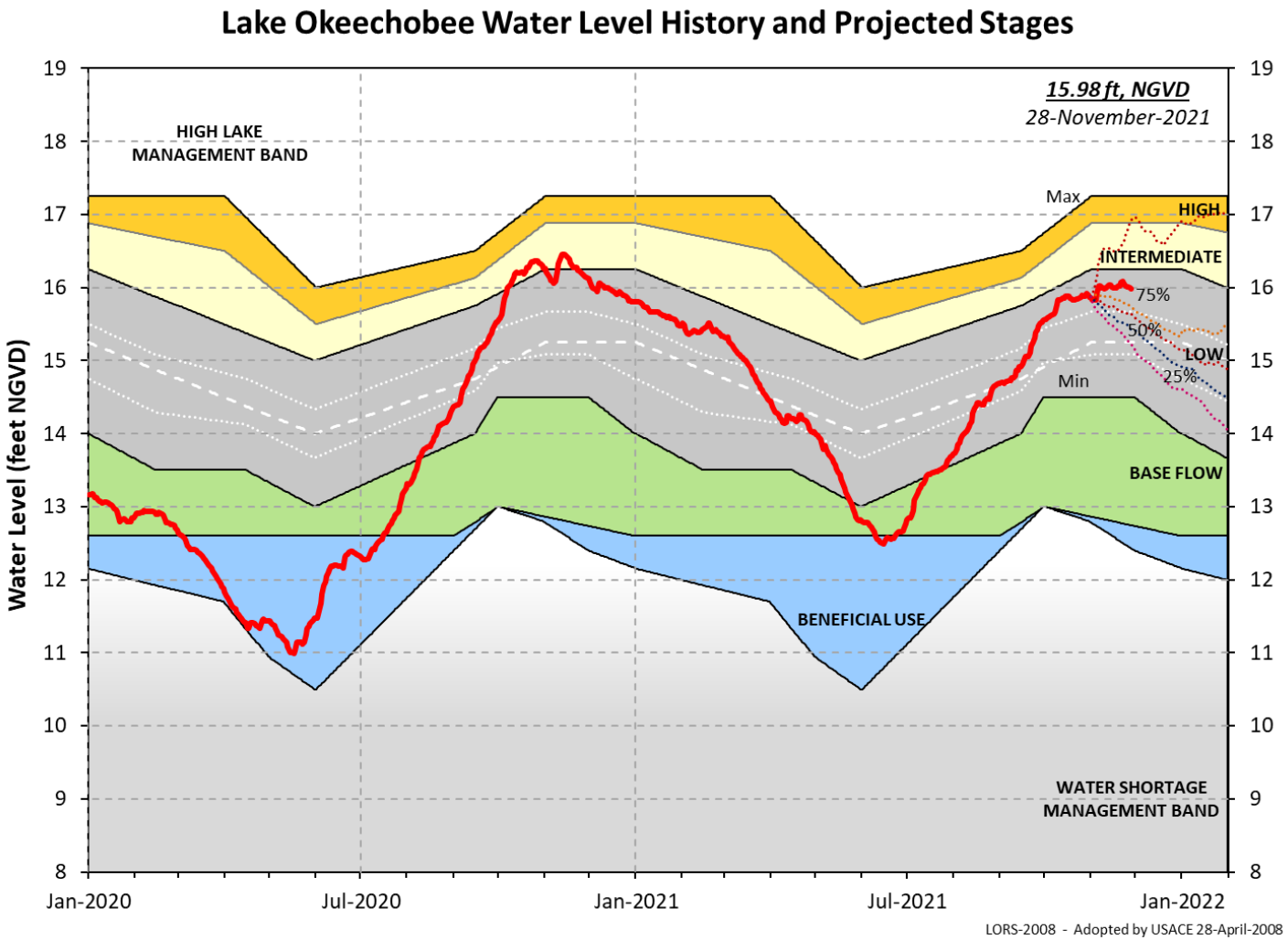


Figure LO-3. Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

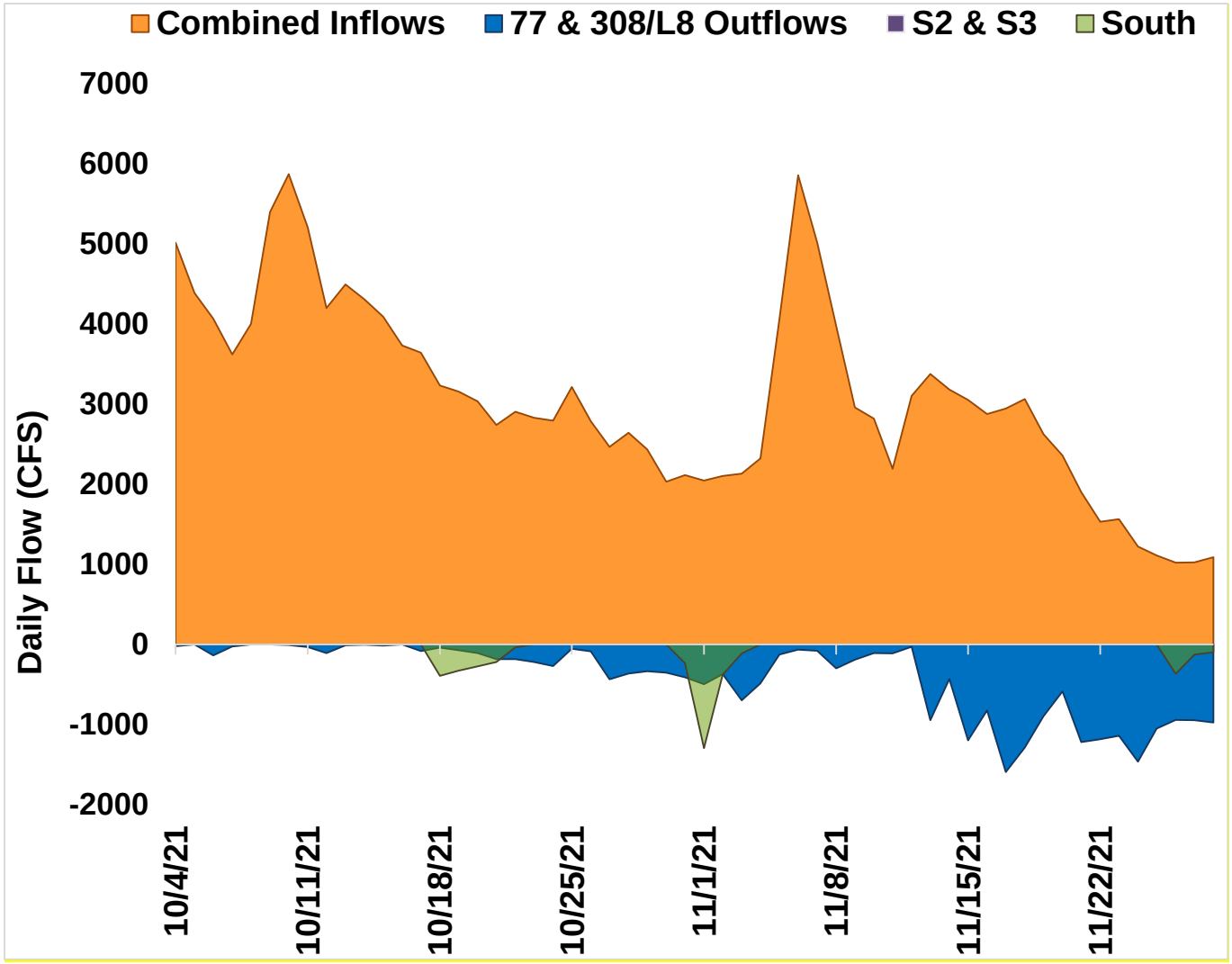


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from 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.

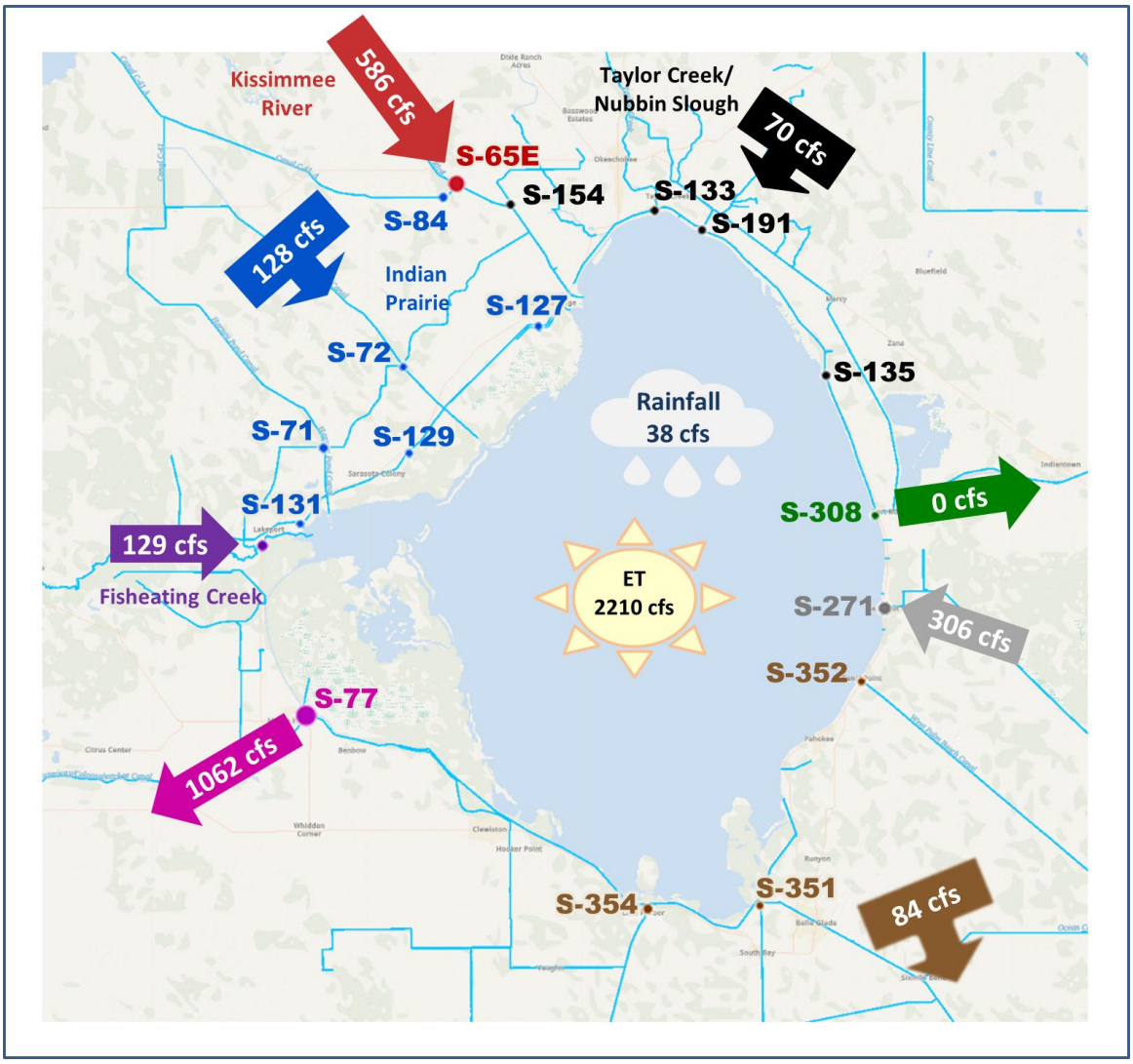


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of November 22 – 28, 2021.

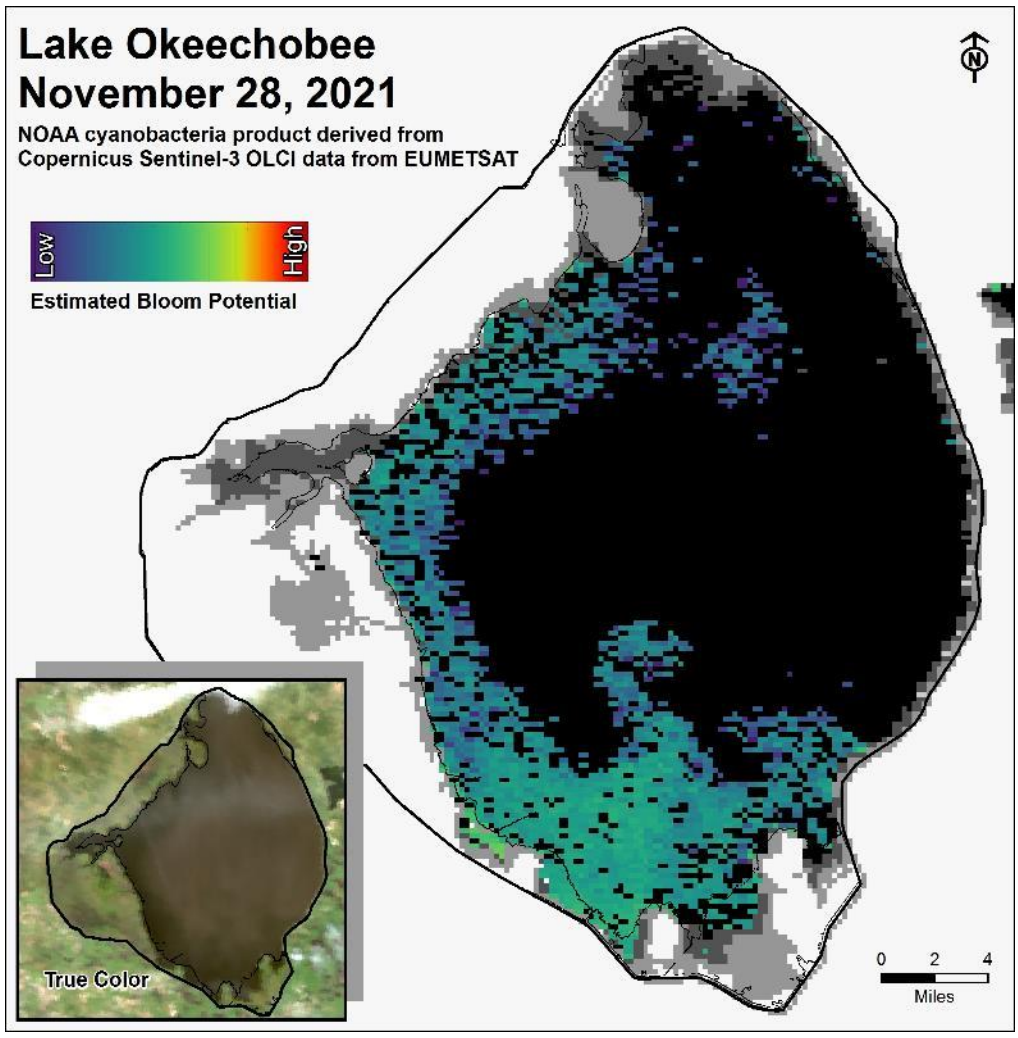


Figure LO-6. Cyanobacteria bloom potential on November 28, 2021 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was approximately 2,152 cfs (**Figures ES-1** and **ES-2**) and the previous 30-day mean inflow was approximately 1,061 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities decreased at all sites within 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 11.2. 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 2,255 cfs (**Figures ES-5** and **ES-6**) and the previous 30-day mean inflow was approximately 2,638 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-6**.

Over the past week, surface salinity decreased at Ft. Myers and salinities increased at all 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 Sanibel and Shell Point, and in the fair range at Cape Coral (**Figure ES-9**).

Surface salinity at Val I-75 was forecasted for the next two weeks, using an autoregression model (Qiu and Wan, 2013[1]) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1500 cfs and steady releases at 2,000 cfs with estimated tidal basin inflows of 189 cfs. Model results from all scenarios predict daily salinity to be 1.1 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 November 24, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed within the District region. On the east coast, red tide was not observed in samples from St. Lucie, Martin, Palm Beach or Miami-Dade counties.

[1] Qui, 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.

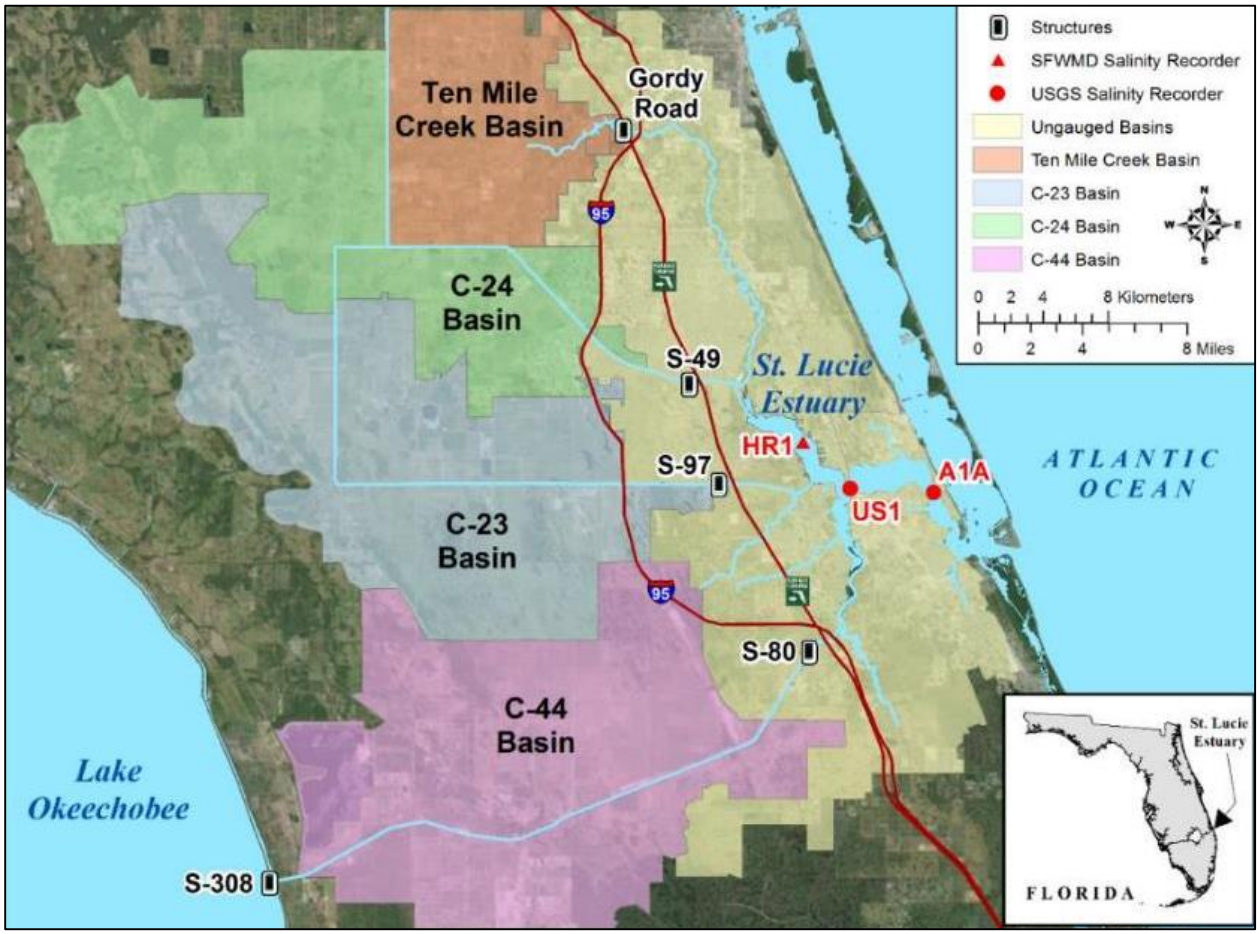


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

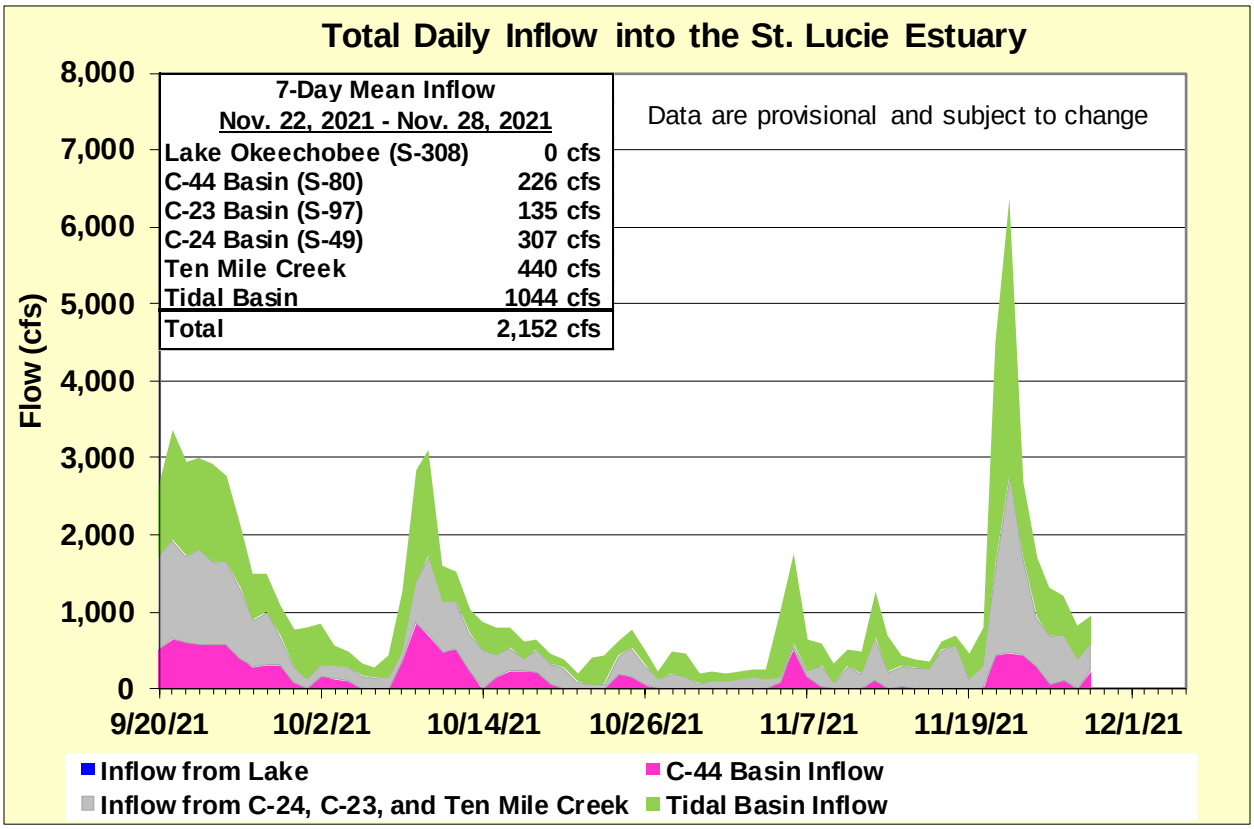


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	**4.5** (15.4)	**9.1** (17.0)	NA [a]
US1 Bridge	**9.1** (18.6)	**13.2** (19.6)	10.0 – 26.0
A1A Bridge	**16.0** (27.0)	**22.9** (28.6)	NA [a]

a. The envelope is not applicable.

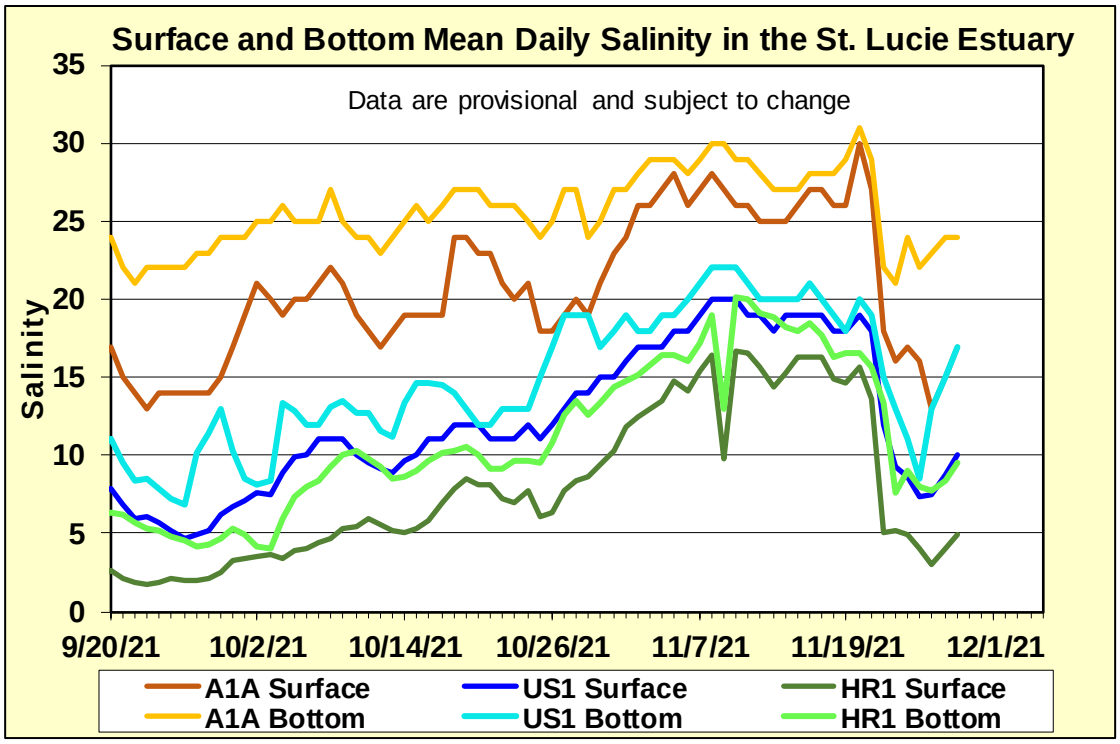


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

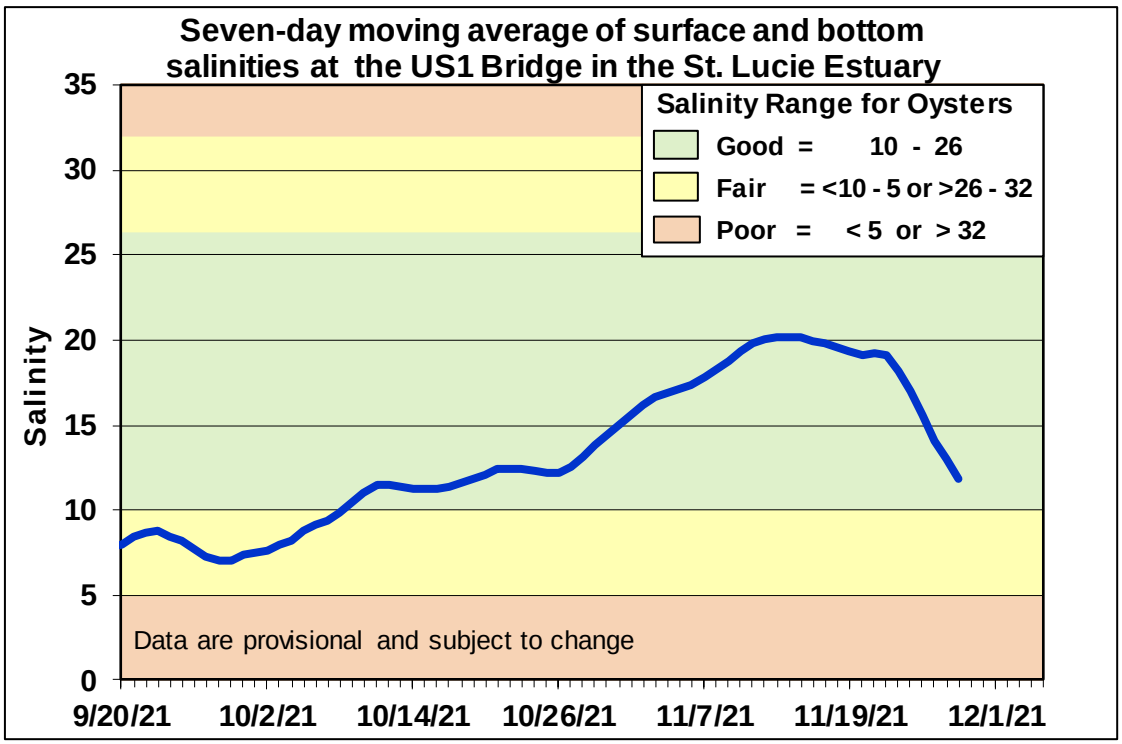


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

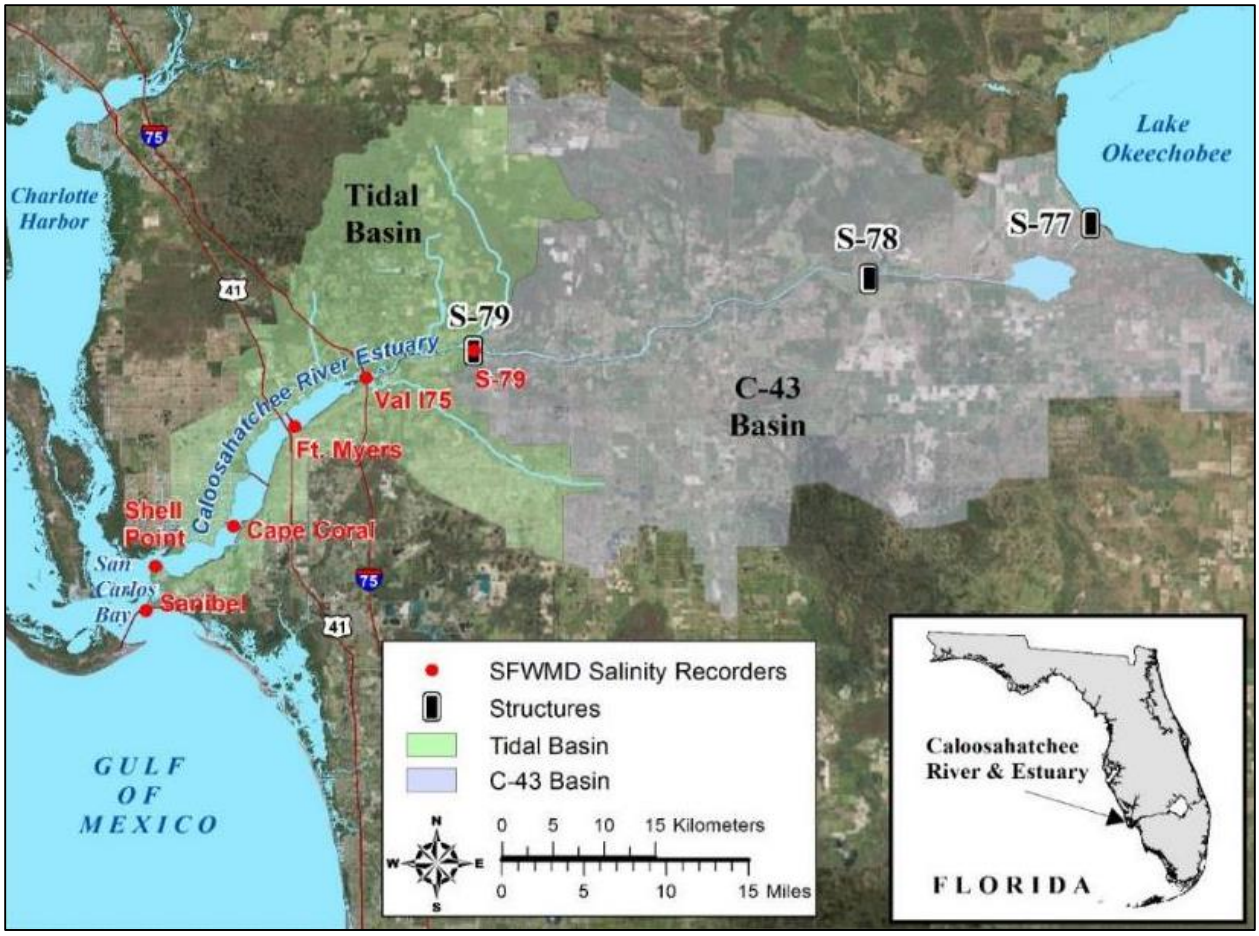


Figure ES-5. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

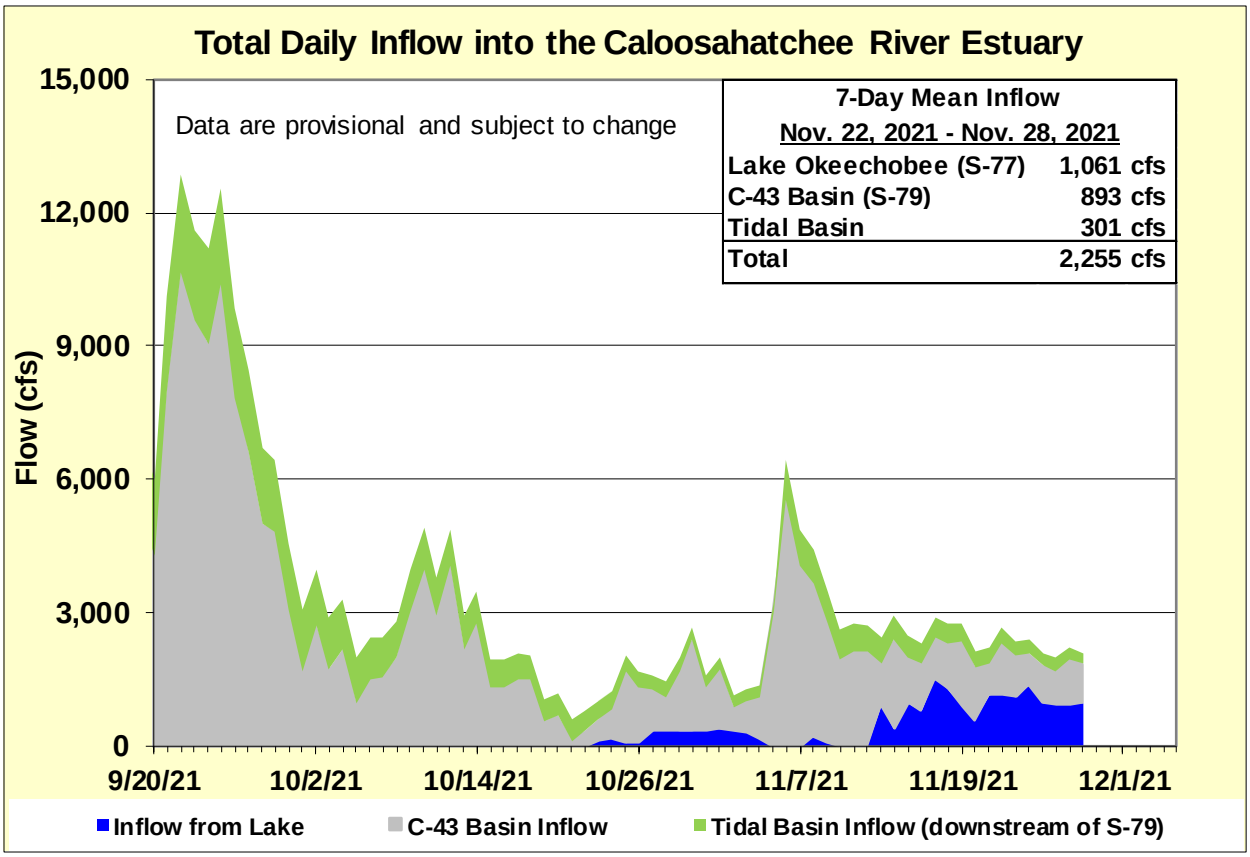


Figure ES-6. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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)	**0.3** (0.2)	**0.3** (0.2)	NA [a]
Val I-75	**0.3** (0.3)	**0.4** (0.3)	0.0 – 5.0 [b]
Fort Myers Yacht Basin	**1.8** (2.3)	**3.4** (3.4)	NA [a]
Cape Coral	**8.5** (7.8)	**11.2** (8.8)	10.0 – 30.0
Shell Point	**20.0** (19.6)	**22.0** (20.9)	10.0 – 30.0
Sanibel	**26.9** (26.8)	**28.9** (28.3)	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.

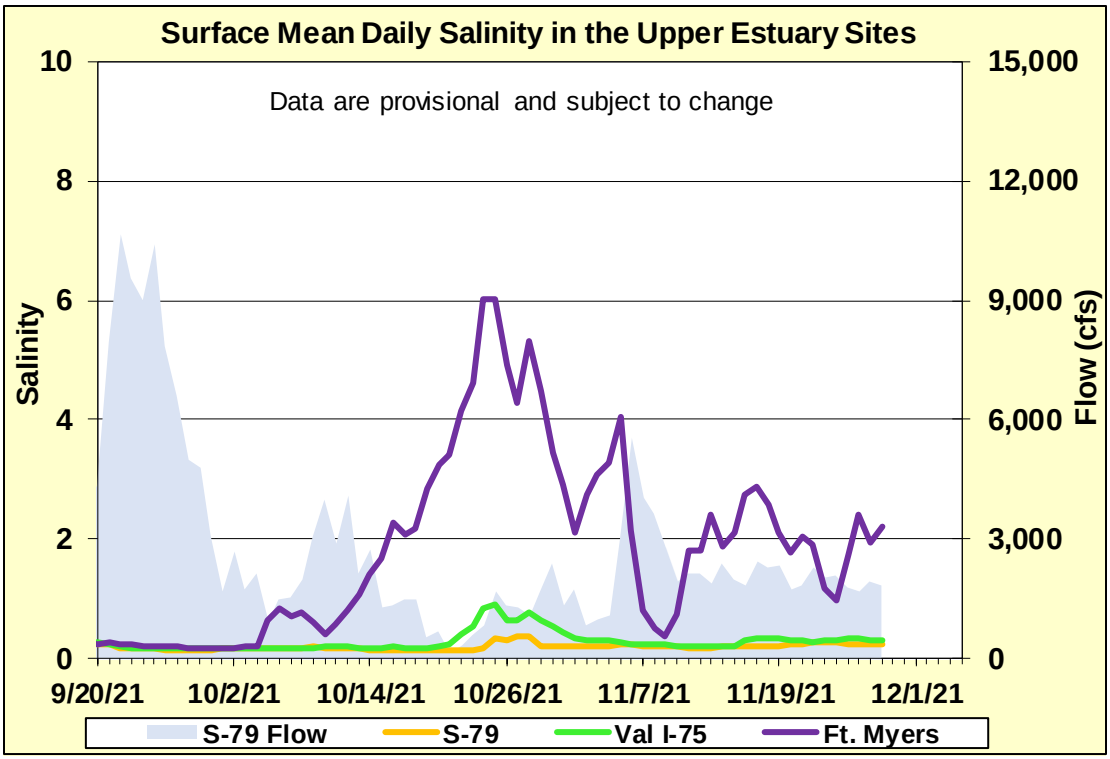


Figure ES-7. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

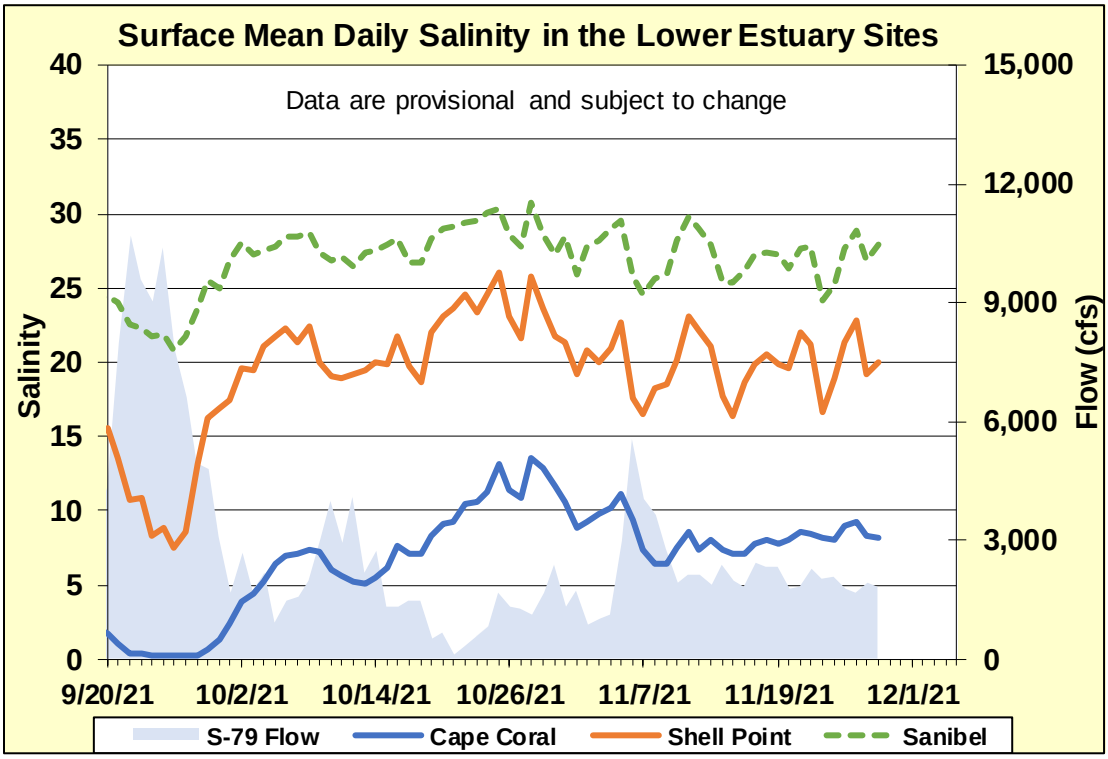


Figure ES-8. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

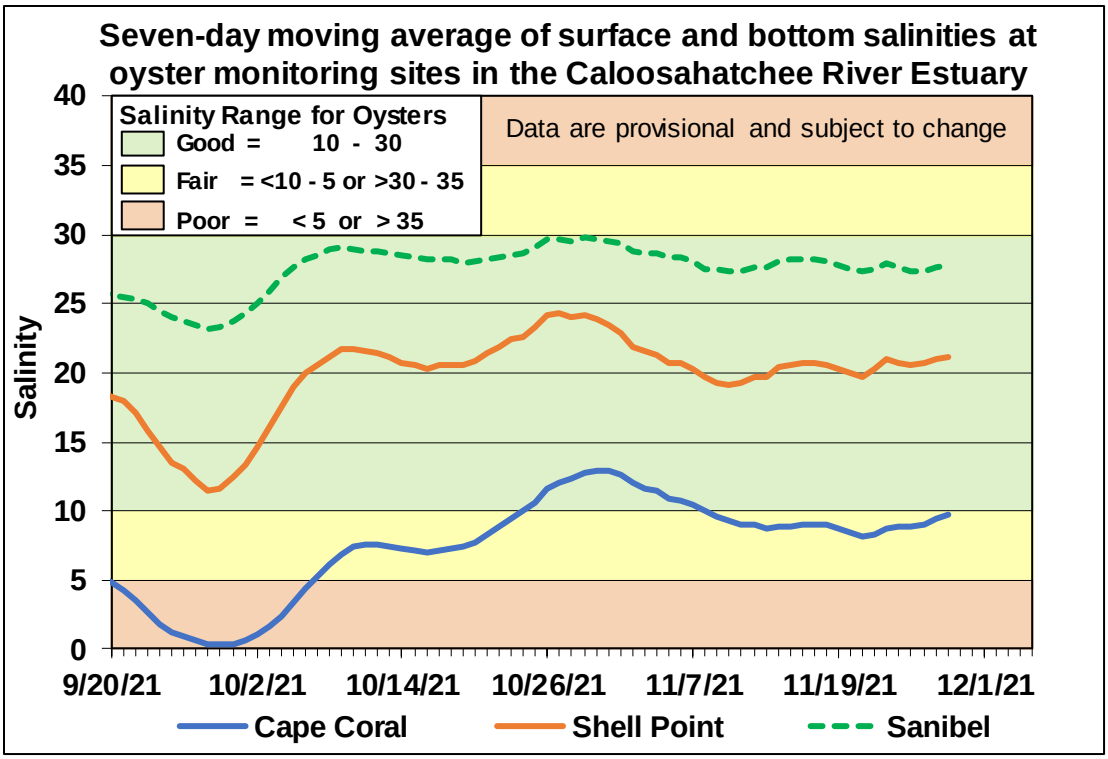


Figure ES-9. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

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	189	1.1	0.4
B	450	189	0.5	0.3
C	800	189	0.3	0.3
D	1000	189	0.3	0.3
E	1500	189	0.3	0.3
F	2000	189	0.3	0.3

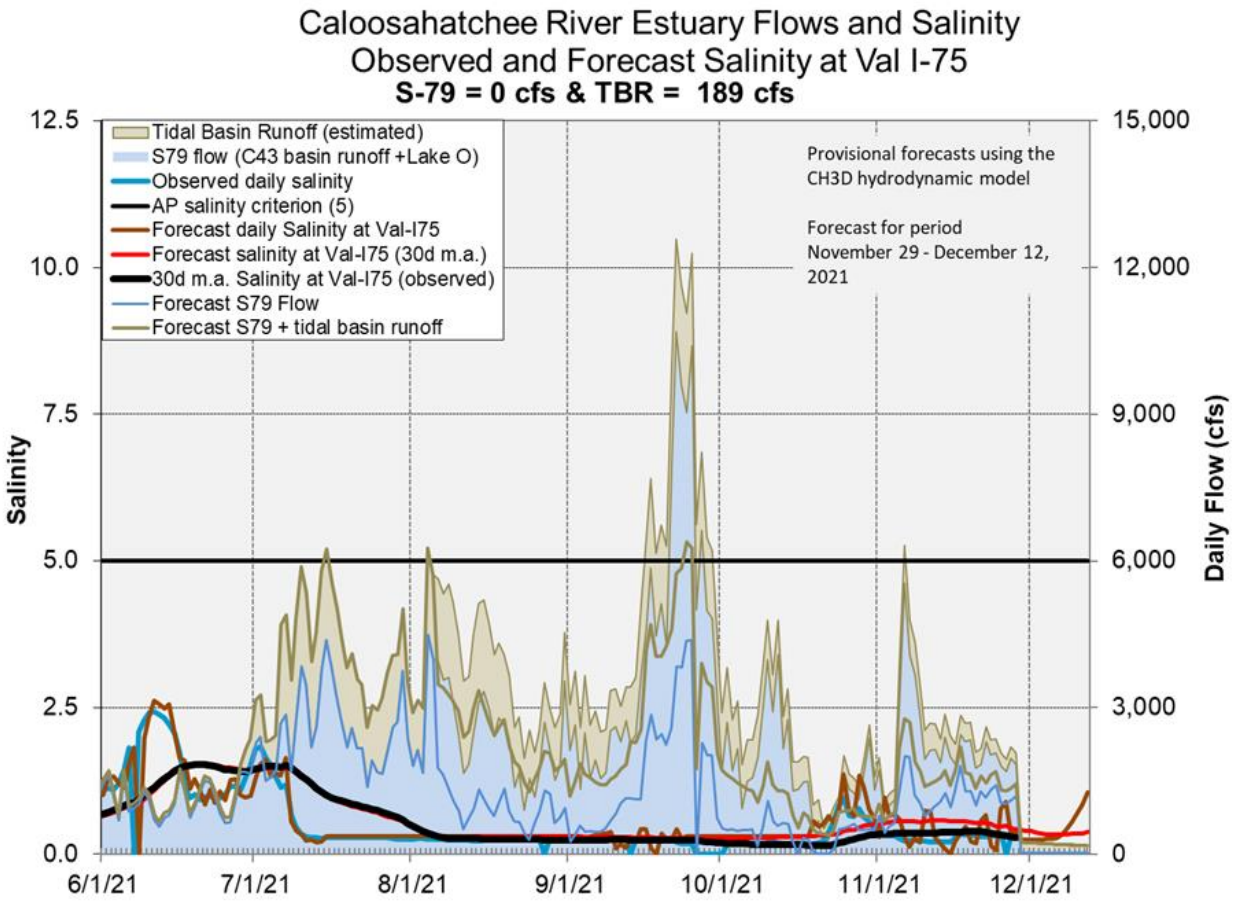


Figure ES-10. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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^2/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^2/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^2/year (**Figure S-4**).

STA-5/6: All Flow-ways are online. Most treatment cells are near or 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 most flow-ways are high (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

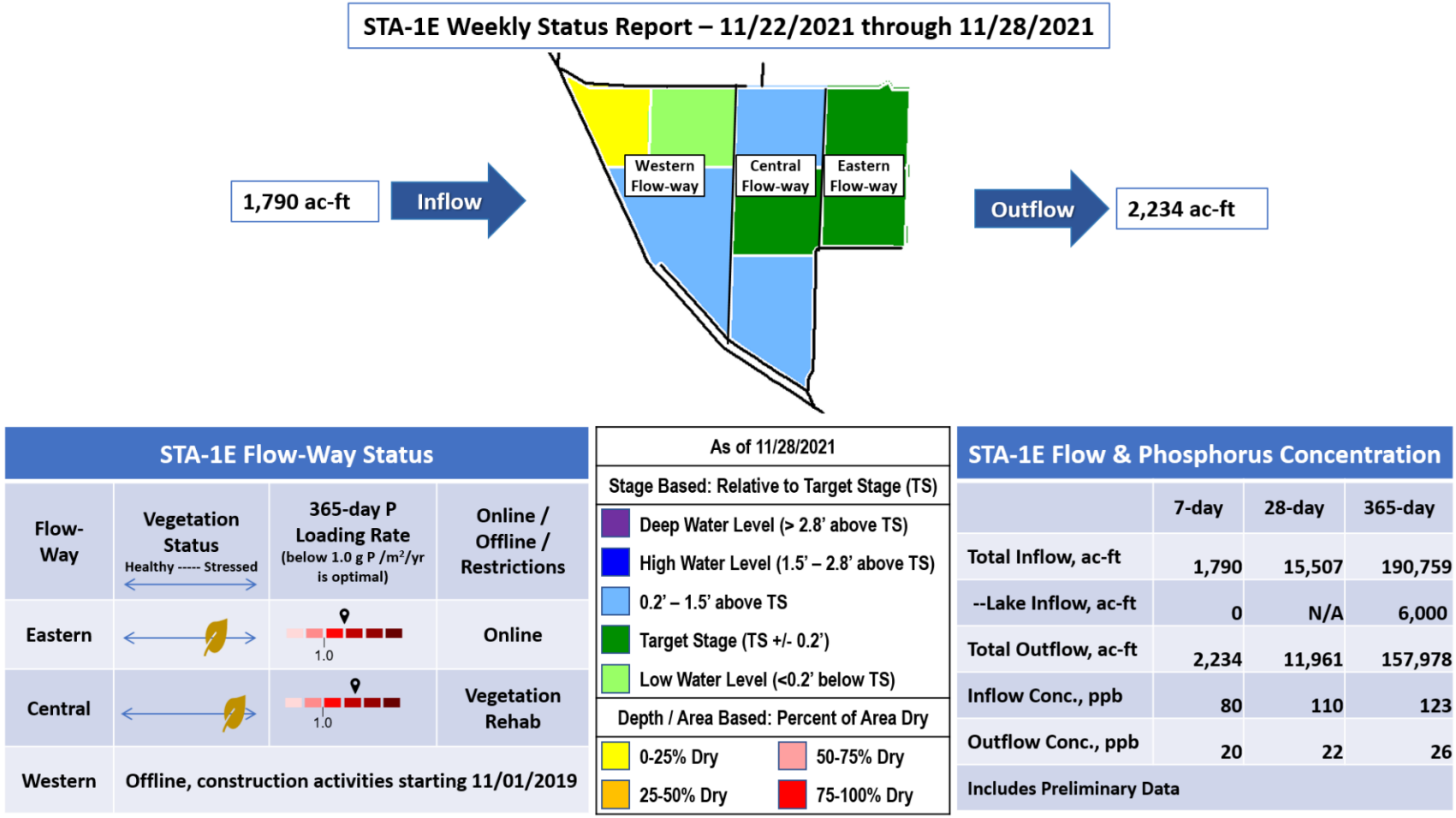


Figure S-1. STA-1E Weekly Status Report

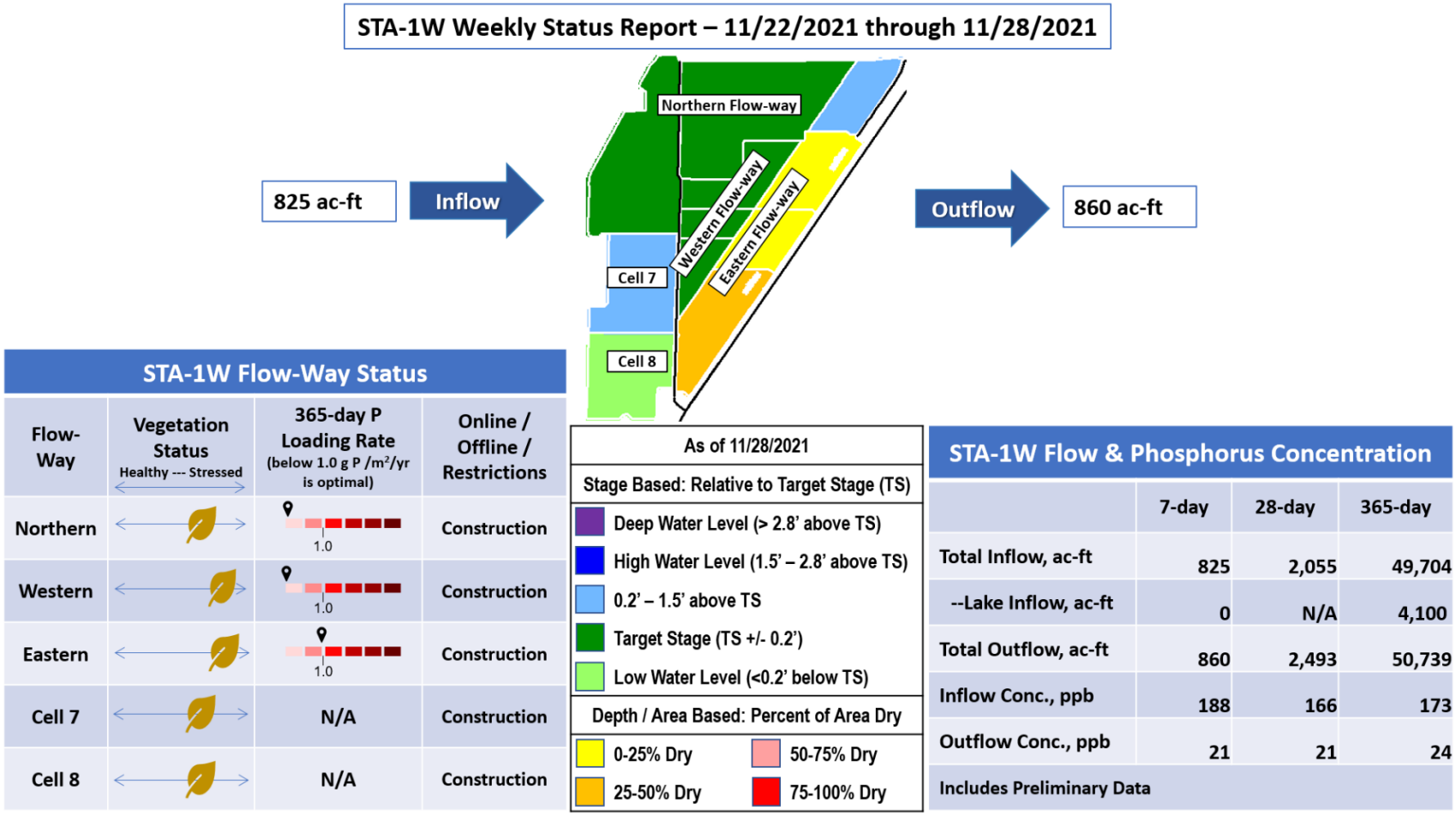


Figure S-2. STA-1W Weekly Status Report

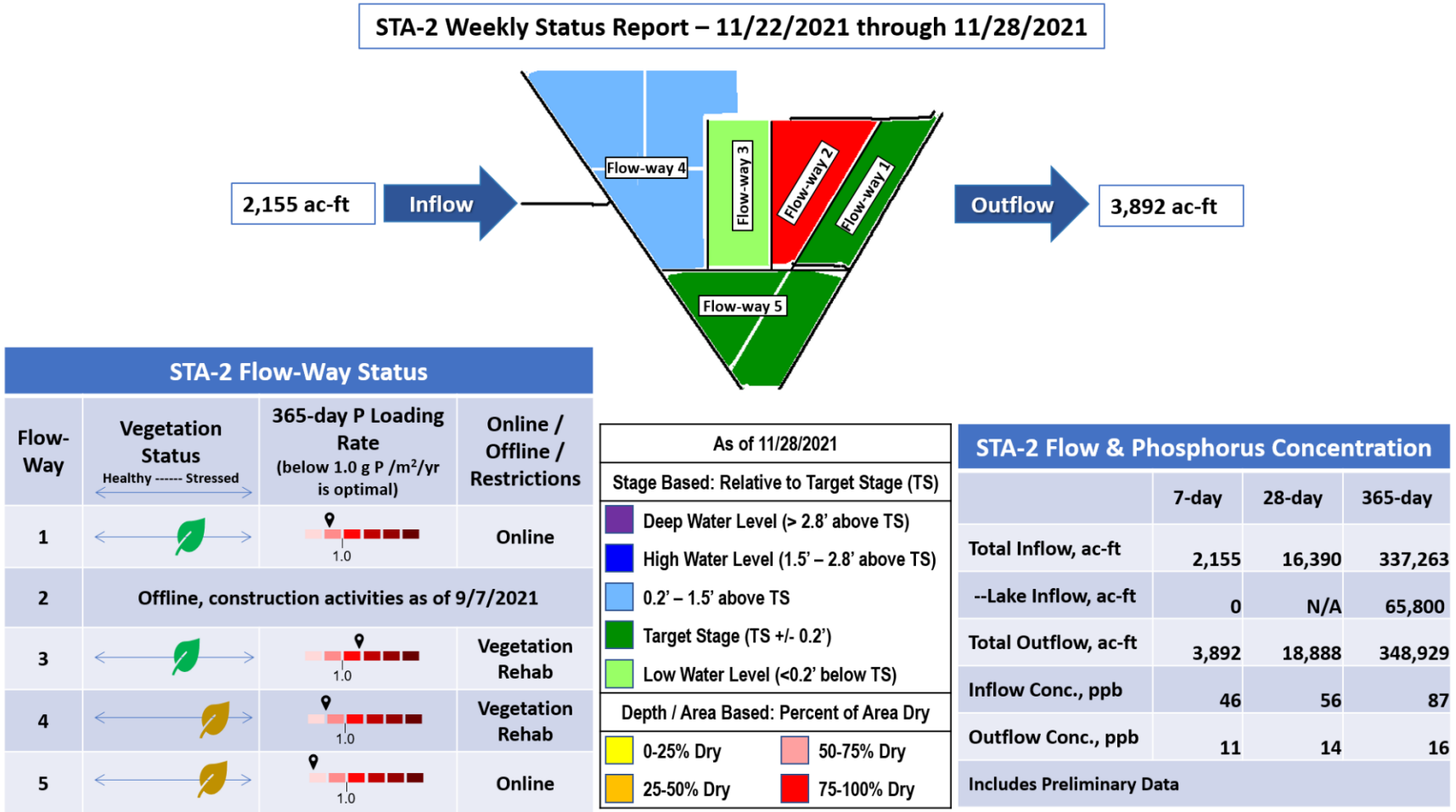
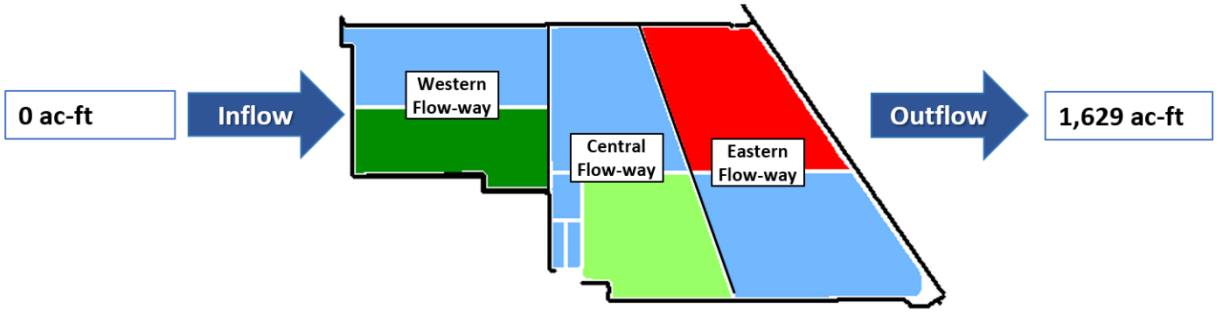


Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 11/22/2021 through 11/28/2021



STA-3/4 Flow-Way Status

Flow-Way	Vegetation Status (Healthy ------ Stressed)	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
Eastern	Offline, vegetation management drawdown as of 3/1/2021		
Central		1.0	Online
Western		1.0	Online

As of 11/28/2021
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 / 50-75% Dry
25-50% Dry / 75-100% Dry

STA-3/4 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	0	19,710	388,909
--Lake Inflow, ac-ft	0	N/A	39,100
Total Outflow, ac-ft	1,629	17,200	349,040
Inflow Conc., ppb	N/A	60	65
Outflow Conc., ppb	11	14	15

Includes Preliminary Data

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

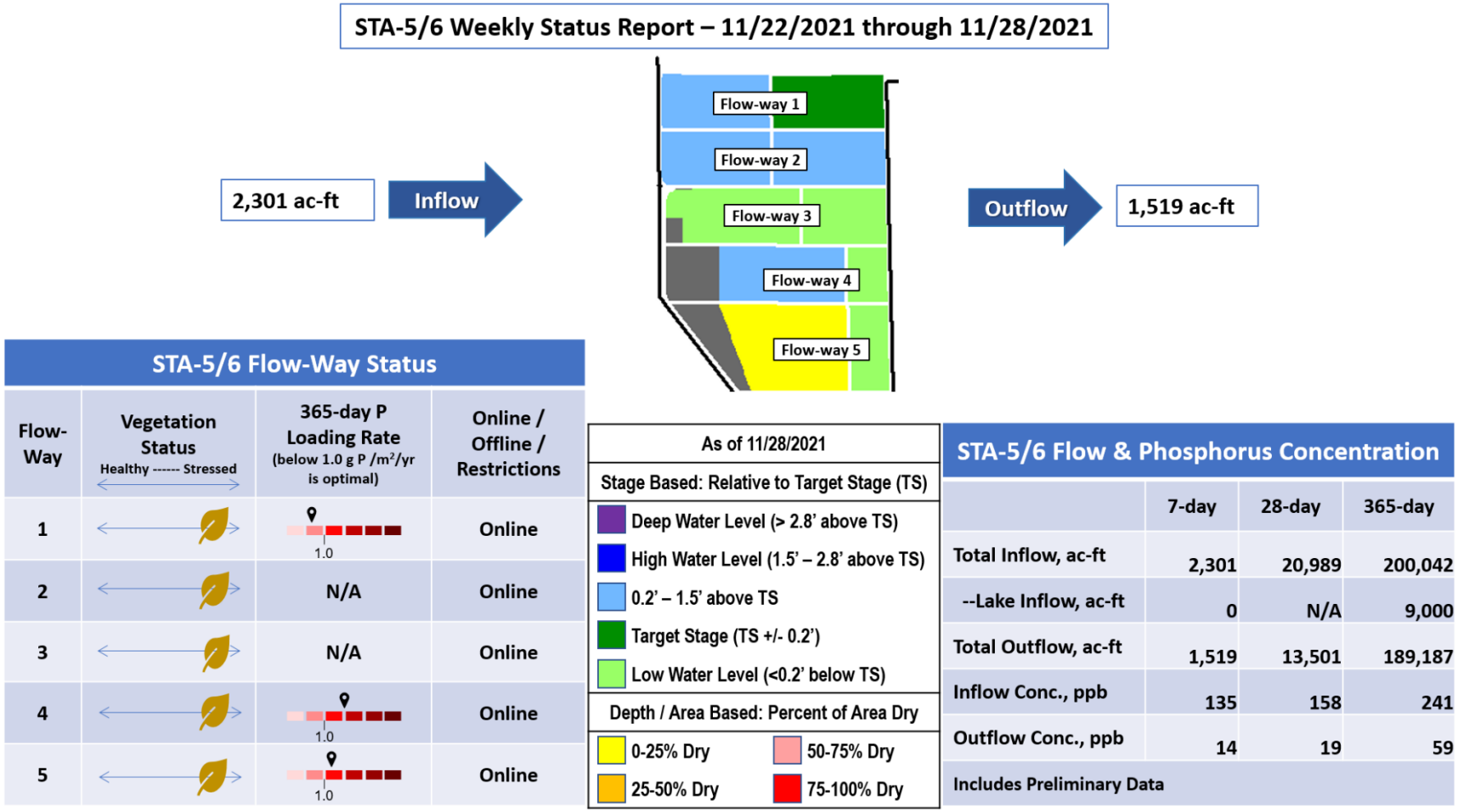
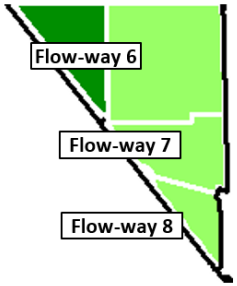


Figure S-5. STA-5/6 Weekly Status Report (Flow-ways 1 – 5)

STA-5/6 Weekly Status Report – 11/22/2021 through 11/28/2021



STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ------ Stressed	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
6		1.0	Online
7		1.0	Online
8		1.0	Online

As of 11/28/2021	
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	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, µg/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 decreased towards the Zone A1 regulation line last week. The average on Sunday was 0.08 feet above that line. WCA-2A: Stage at 2A-17 continued to decrease last week; the average on Sunday was 1.28 feet higher than the falling Zone A regulation line. WCA-3A: The Three Gauge Average stage continued to hover around the stable Zone A regulation line last week; average stage was 0.04 feet below the Zone A line on Sunday. WCA-3A: Stage at gauge 62 (Northwest corner) fell over the last week and remains below the falling Upper Schedule; the average on Sunday was 0.46 feet below the regulation line. (**Figures EV-1** through **EV-4**).

Water Depths

The SFWDAT tool indicates that water depths in the WCAs are continuing to be lowest in northeastern WCA-3A and have been decreasing over the last month in most areas except for WCA-1 and southern WCA-3A. North to South hydrologic connectivity is diminishing within all of the sloughs in Everglades National Park. (**Figure EV-5**). Comparing WDAT water levels from present over the last month, stages are decreasing in most areas excepting southern WCA-3A and WCA-1 as noted before (**Figure EV-6**). Looking back one year, most of the Everglades, except WCA-1, is still significantly lower in depth. Comparing depths over the past 20 years, most of the WCAs remains in the upper half of that historical range (**Figure EV-7**). Much of ENP has fallen below the median with the western sloughs now falling below the 10th percentile. Western BCNP, WCA-1, and northeastern ENP are above 80th percentile.

Taylor Slough and Florida Bay

No rain for Taylor Slough and Florida Bay over the week ending Sunday (11/28) which caused stages to decrease an average of 0.13 feet (faster than preferred for wading bird foraging based on spoonbill studies for the area; **Figure EV-8** and **Figure EV-9**). The Slough average is 7 inches above the historical average for this time of year while the northern parts of the Slough are 10 inches above its historical average. The early dry-season frontal rains had helped to maintain water levels in the Slough and provide water downstream, but stages are still 3.5 inches lower than this time last year after the rains of 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 an increase of 1 over the week ending 11/28, with individual stations changes ranging from −1.9 to +3.4 (**Figure EV-8**). The largest changes were in the nearshore area like last week. All areas are within their interquartile ranges for this time of year (**Figure EV-10**), but the eastern and central areas are near their respective 75th percentiles and the ranges shrink in December. The nearshore and eastern areas of the Bay remain polyhaline (18-30) which is good, but conditions are not as low as last year after Tropical Storm Eta and there is much less water available from upstream compared to last year.

Water Management Recommendations

Conserving water in the northern basins, then allowing that water to move downstream maximizes the ecological benefit of freshwater on the landscape. Flows into northern WCA-3A that move downstream continue to have an ecological benefit. Continued freshwater into Florida Bay will maintain an estuarine front along the northern shoreline of the Bay helping to buffer potentially elevated dry season salinity conditions. 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	0.05	−0.06
WCA-2A	0.06	−0.19
WCA-2B	0.06	−0.14
WCA-3A	0.04	−0.09
WCA-3B	0.05	−0.06
ENP	<0.01	+0.15

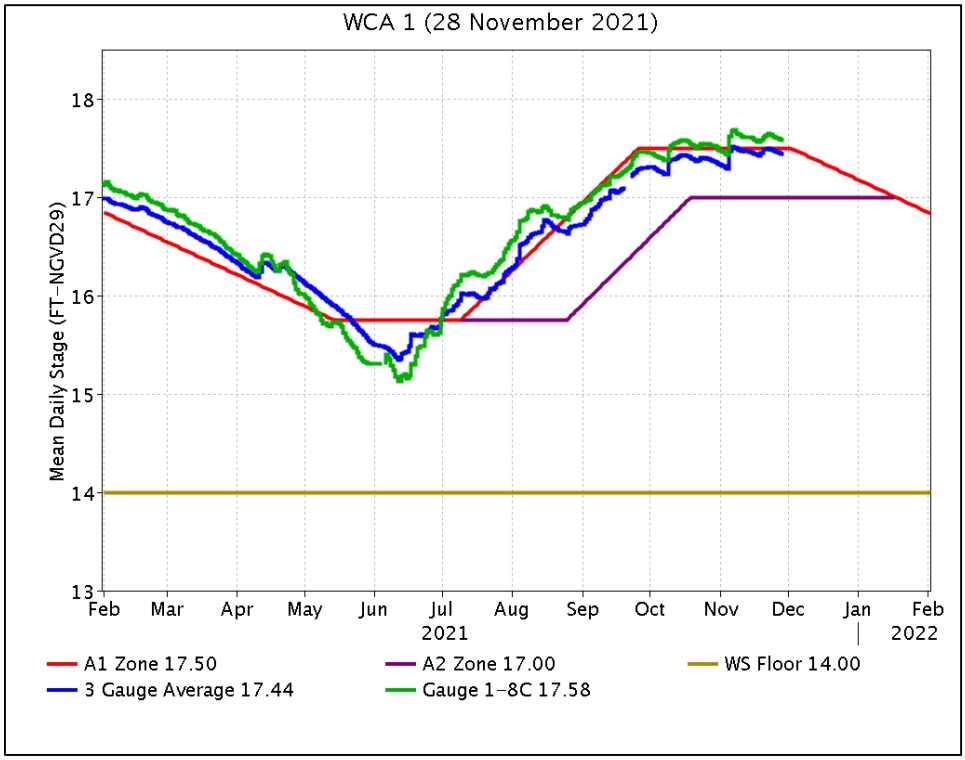


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

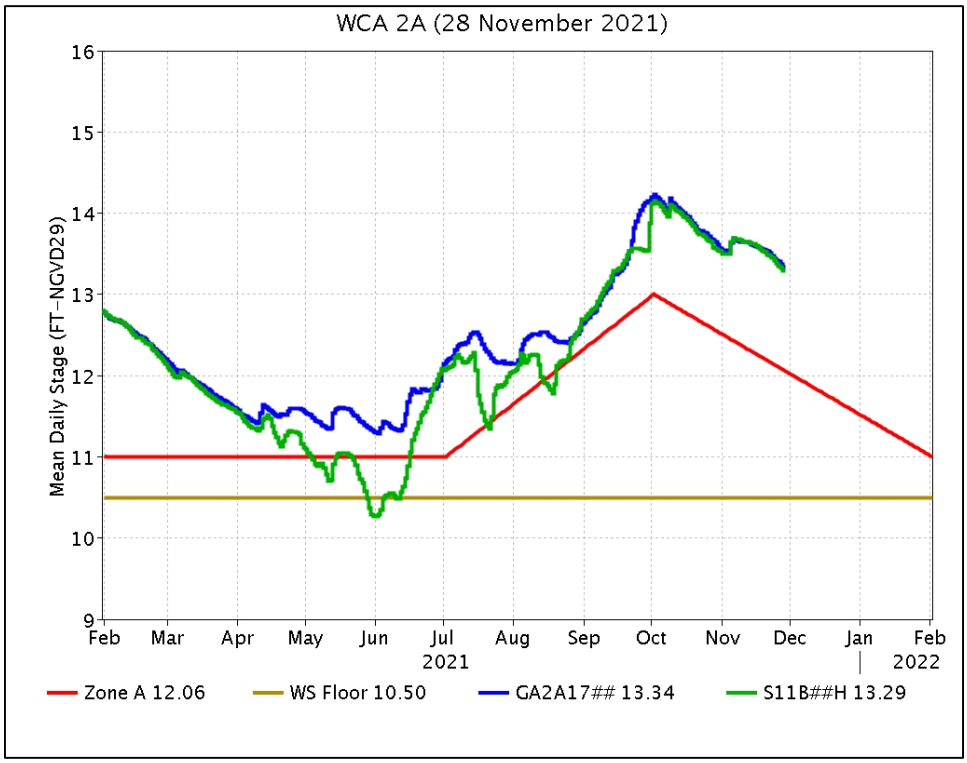


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

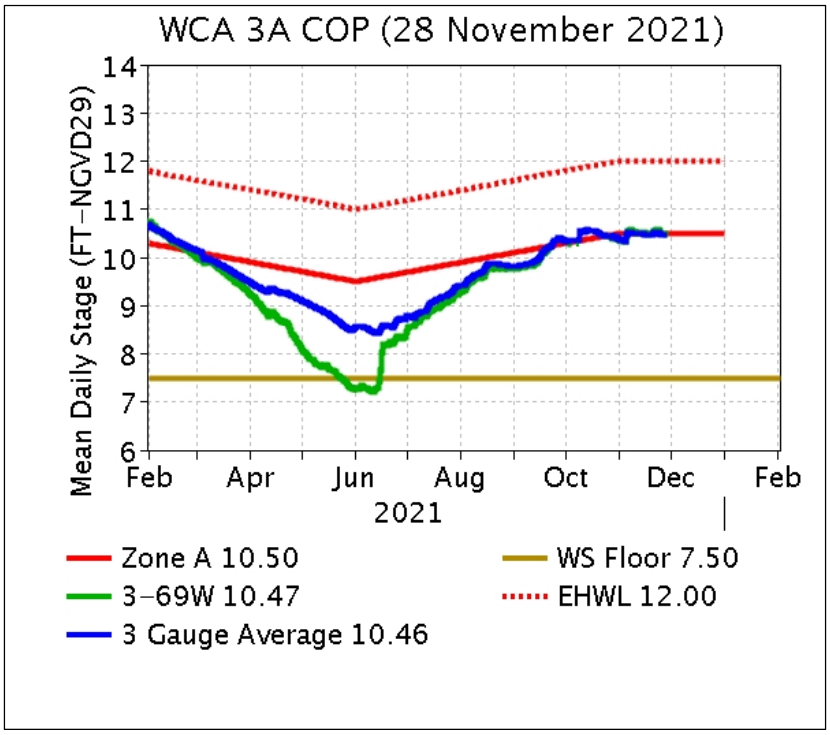


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

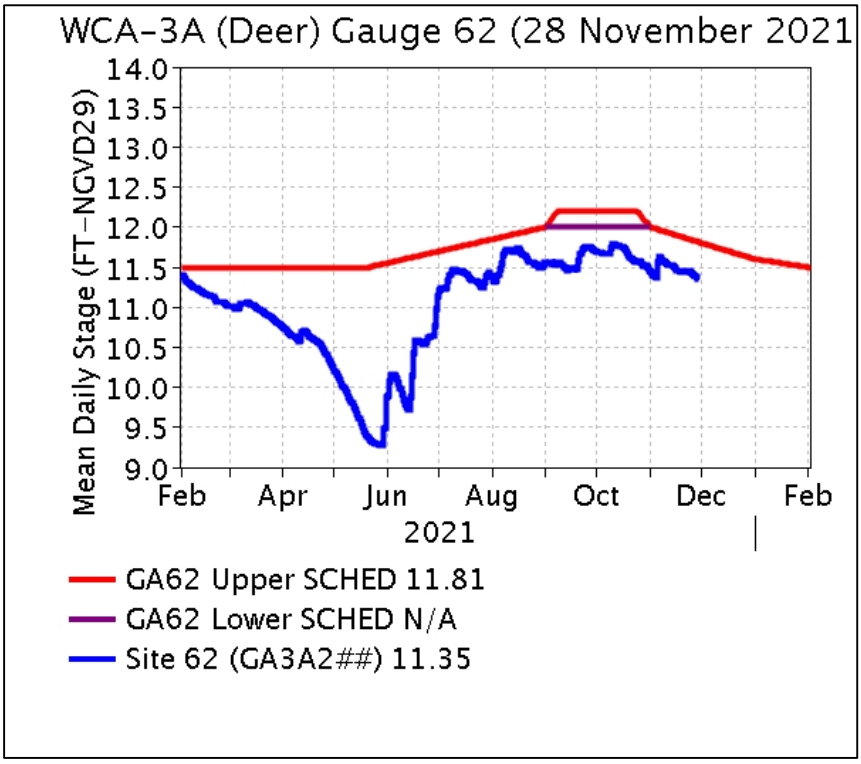


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

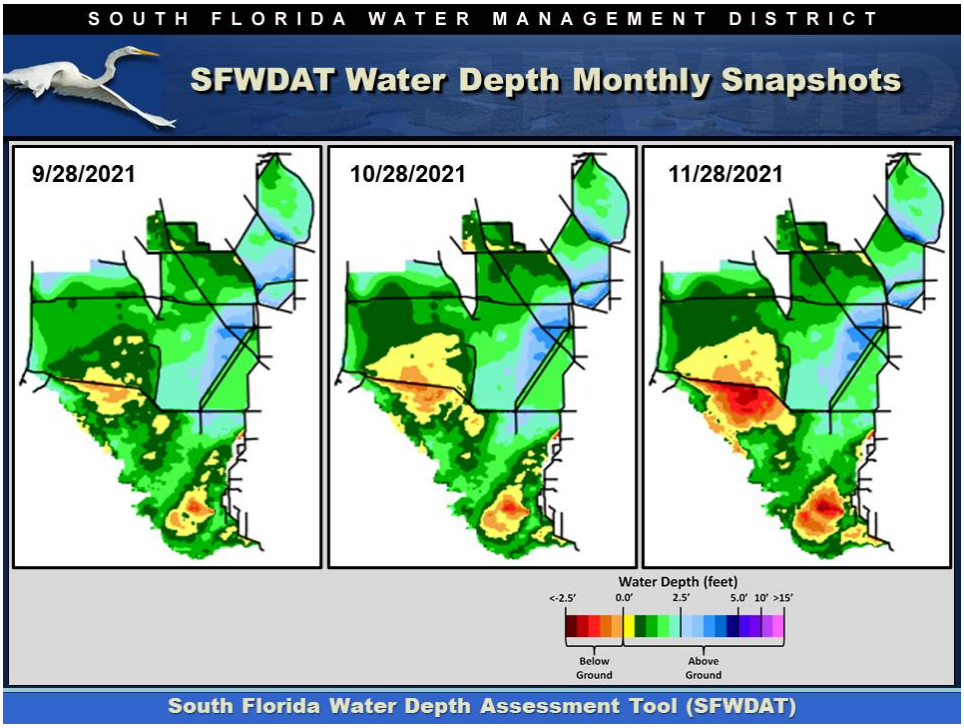


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

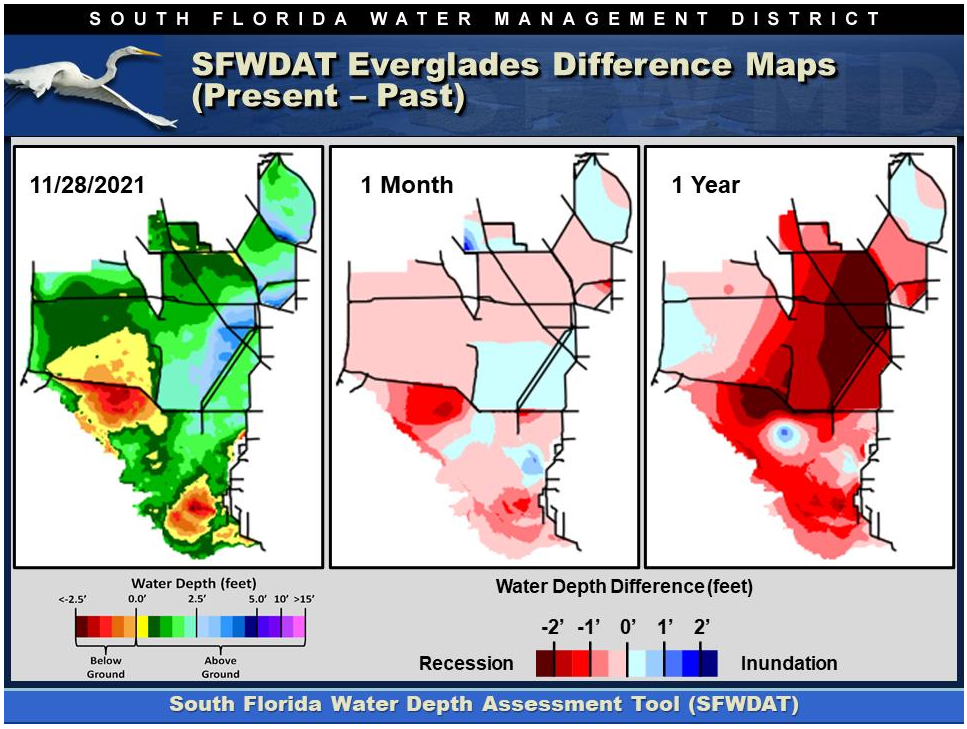


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

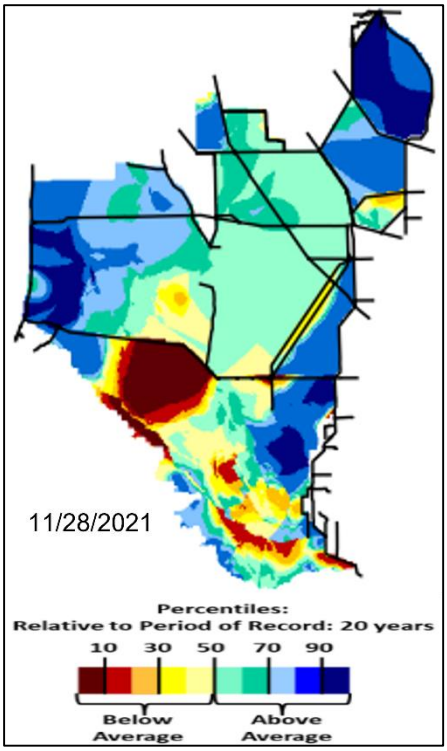


Figure EV-7. Present water depths compared to the day of year median over the previous 20 years.

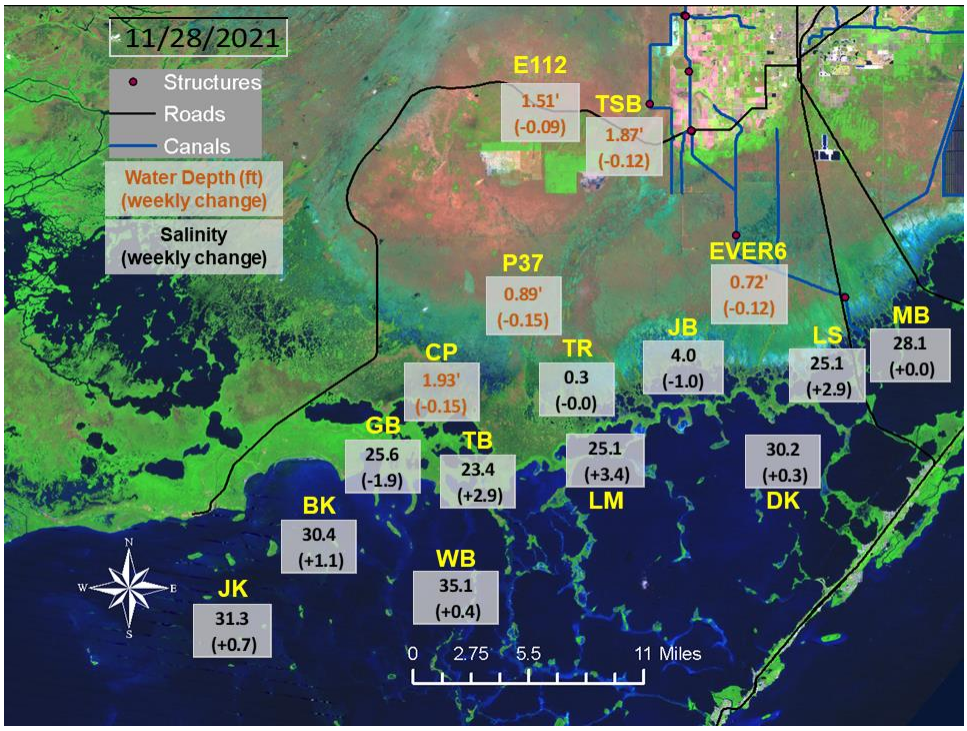


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

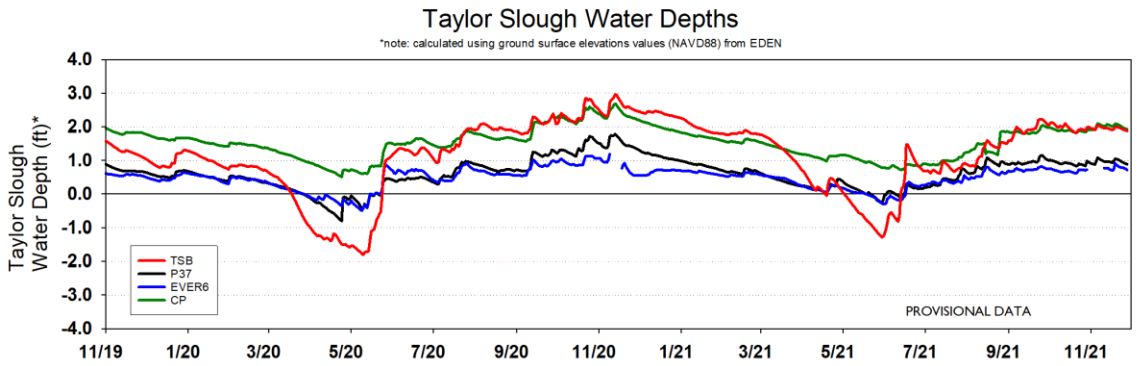


Figure EV-9. Taylor Slough water depth time series.

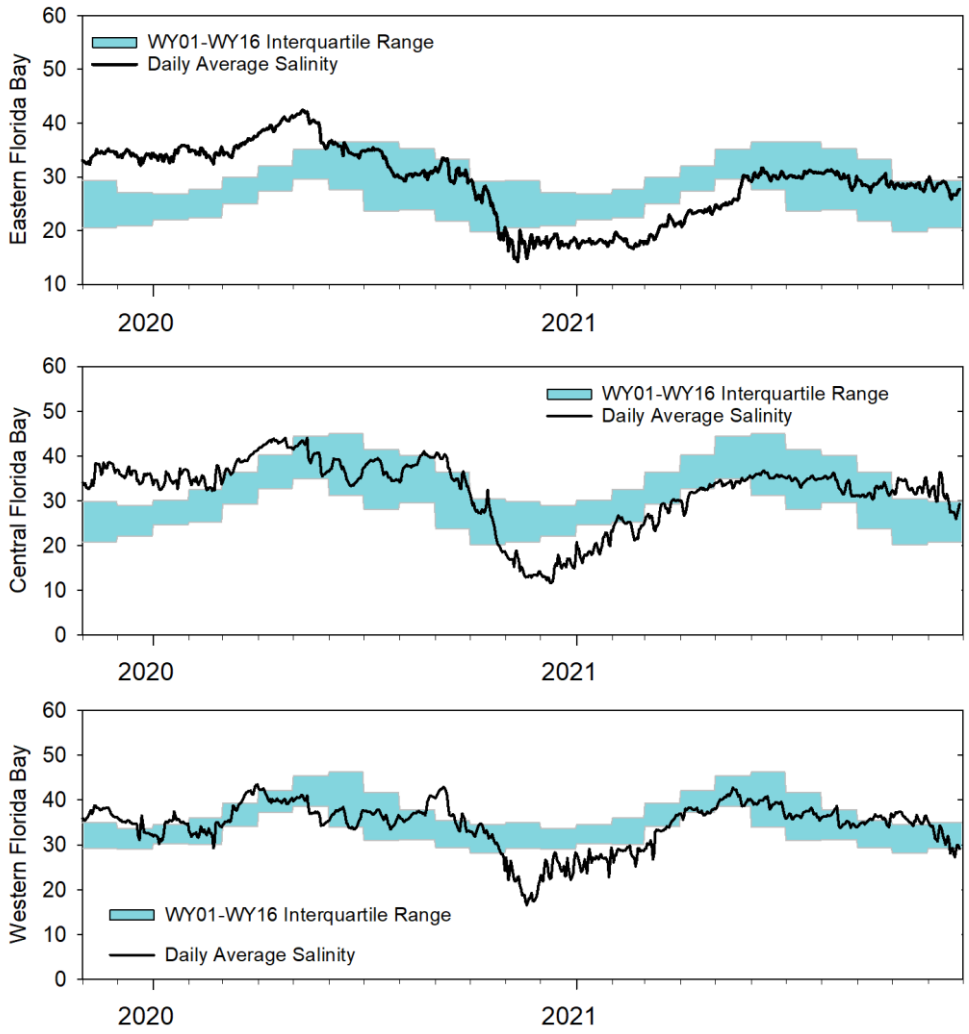


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, November 23, 2021 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.06'	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. Anticipated La Nina dry season.
WCA-2A	Stage decreased by 0.19'	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.
WCA-2B	Stage decreased by 0.14'	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. Depths in excess of 4.0 feet.
WCA-3A NE	Stage increased by 0.05'	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 and downstream habitat and wildlife.
WCA-3A NW	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.	
Central WCA-3A S	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.
Southern WCA-3A S	Stage decreased by 0.11'		
WCA-3B	Stage decreased by 0.06'	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.
ENP-SRS	Stage increased by 0.15 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.
Taylor Slough	Stage changes ranged from −0.09' to −0.15'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −1.9 to +3.4	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.