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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: September 22, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Southeast and east winds are forecast to spread over the area and focus afternoon thunderstorm activity over the interior on Wednesday. A cold front is forecast to move into north Florida Wednesday night and creep southward over the District Thursday before stalling across the area Friday through Sunday. This frontal boundary will help generate shower and thunderstorm activity over the District each day. Steering winds should focus afternoon thunderstorm activity over the interior and east Thursday, across the mid-section of the District Friday and Saturday, and then over the southern portion of the District Sunday. There is the potential for the frontal boundary to move southward into the Florida Straits next week, which would bring drier conditions over portions of the District, particularly over northern areas. Total rainfall is forecast to be above average during the first 7-day period (Week 1). During the second 7-day period (Week 2), total rainfall is forecast to be below average over northern areas and near the historical average over the southern end of the District.

Kissimmee

Flow at S-65A continues to be too low for complete inundation of the Kissimmee River floodplain, and mean floodplain water depth increased to 1.23 feet by September 19, 2021. Following discharge reductions in late August, dissolved oxygen concentrations in the Kissimmee River rose above 2 mg/L, but declined again this week to below 1 mg/L.

Lake Okeechobee

Lake Okeechobee stage was 15.06 feet NGVD on September 19, 2021, 0.62 feet higher than a month ago, and 0.11 feet lower than a year ago (**Figure LO-1**). Lake stages were above the ecological envelope from August 1, 2020 to March 30, 2021, and near or within the upper threshold of the envelope until mid-June. Lake stages were again above the ecological envelope from early-July until mid-September. The stage recently returned to within the envelope on September 14th (**Figure LO-2**). There have been essentially no

outflows from the lake since late June 2021. Recent satellite imagery (September 19, 2021) showed medium to high bloom potential in the NW, NE and central parts of the Lake. The bloom potential increased compared to the previous week (**Figure LO-5**).

Estuaries

Total inflow to the St. Lucie Estuary averaged approximately 1,861 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities decreased at all sites in the estuary over the past week. Salinity at the US1 Bridge was in the fair range (10-26) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 5,564 cfs over the past week with no flow coming from the Lake. Mean surface salinities remained the same at Val I-75 and Ft. Myers, increased at S-79, and decreased at Cape Coral and Shell Point 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 Sanibel and Shell Point and in the fair range at Cape Coral.

Stormwater Treatment Areas

For the week ending Sunday, September 19, 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 61,000 ac-feet. The total amount of inflows to the STAs in WY2022 is approximately 636,000 ac-feet. Most STA cells are above target stage, especially STA-3/4 EAV cells. 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. Operational restrictions are also in effect in STA-5/6 Flow-ways 2 and 3 following the Restoration Strategies project to grade non-effective treatment areas. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2.

Everglades

Rehydration rates were good across most of the Everglades Protection Area. Depth conditions in WCA-3A North are stable and remain below the historical median across that sub-basin. In Florida Bay salinities increased (nearshore) and stages increased in Taylor Slough on average. Florida Bay salinities are now averaging 4 higher than the historical average for this time, and most of the bay remains above 35. More freshwater will be needed before the dry season begins to buffer salinity conditions.

SUPPORTING INFORMATION

Kissimmee Basin

Upper Kissimmee

On September 19, 2021, lake stages were 57.2 feet NGVD (0.4 feet above schedule) in East Lake Toho, 53.9 feet NGVD (0.1 feet above schedule) in Lake Toho, and 51.1 feet NGVD (0.2 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

Discharges to the Kissimmee River on September 19, 2021 were 1,170 cfs at S-65 and 1,410 cfs at S-65A; discharges from the Kissimmee River were 2,040 cfs at S-65D and 2,010 cfs at S-65E (**Table KB-2**). Headwater stages were 46.3 feet NGVD at S-65A and 28.6 feet NGVD at S-65D on September 19, 2021. The concentration of dissolved oxygen in the Kissimmee River improved briefly, then declined again due to rainfall and associated runoff, with the average for the week ending on September 19, 2021 at 0.8 mg/L (**Table KB-2, Figure KB-4**). Flow at S-65A remains too low for complete inundation of the Kissimmee River floodplain, and mean floodplain depth increased to 1.23 feet by September 19, 2021 (**Figure KB-5**).

Water Management Recommendations

Maintain at least 1,400 cfs at S65/S65A after September 1 per the IS-14-50 discharge plan.

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)	
							9/19/21	9/12/21
Lakes Hart and Mary Jane	S-62	LKMJ	246	60.5	R	60.0	0.5	0.2
Lakes Myrtle, Preston and Joel	S-57	S-57	68	61.1	R	61.0	0.1	0.0
Alligator Chain	S-60	ALLI	181	63.5	R	63.2	0.3	0.1
Lake Gentry	S-63	LKGT	284	61.2	R	61.0	0.2	0.1
East Lake Toho	S-59	TOHOE	978	57.2	R	56.8	0.4	0.8
Lake Toho	S-61	TOHOW S-61	1,620	53.9	R	53.8	0.1	0.1
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	1,020	51.1	R	51.3	-0.2	-0.5

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.

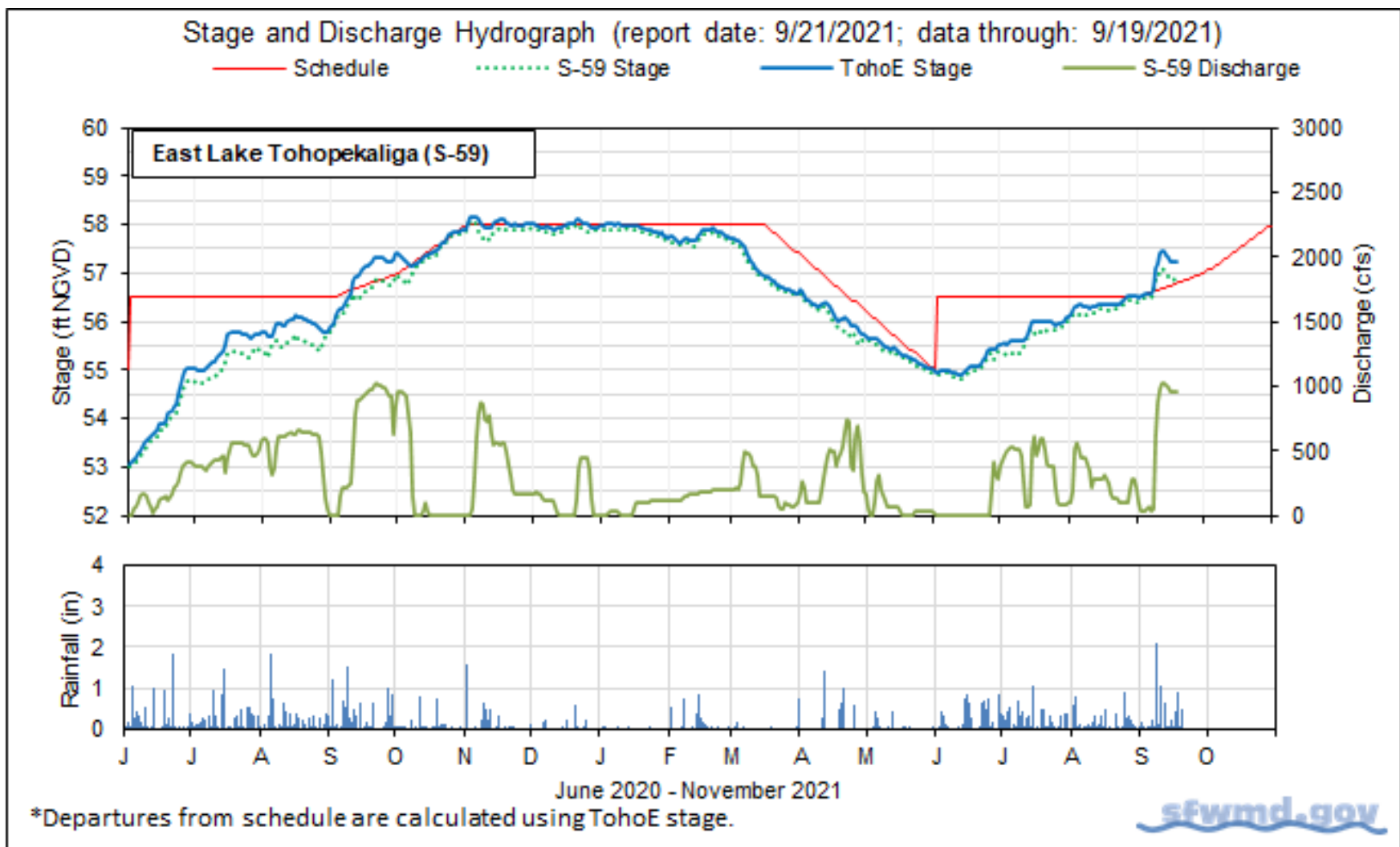


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

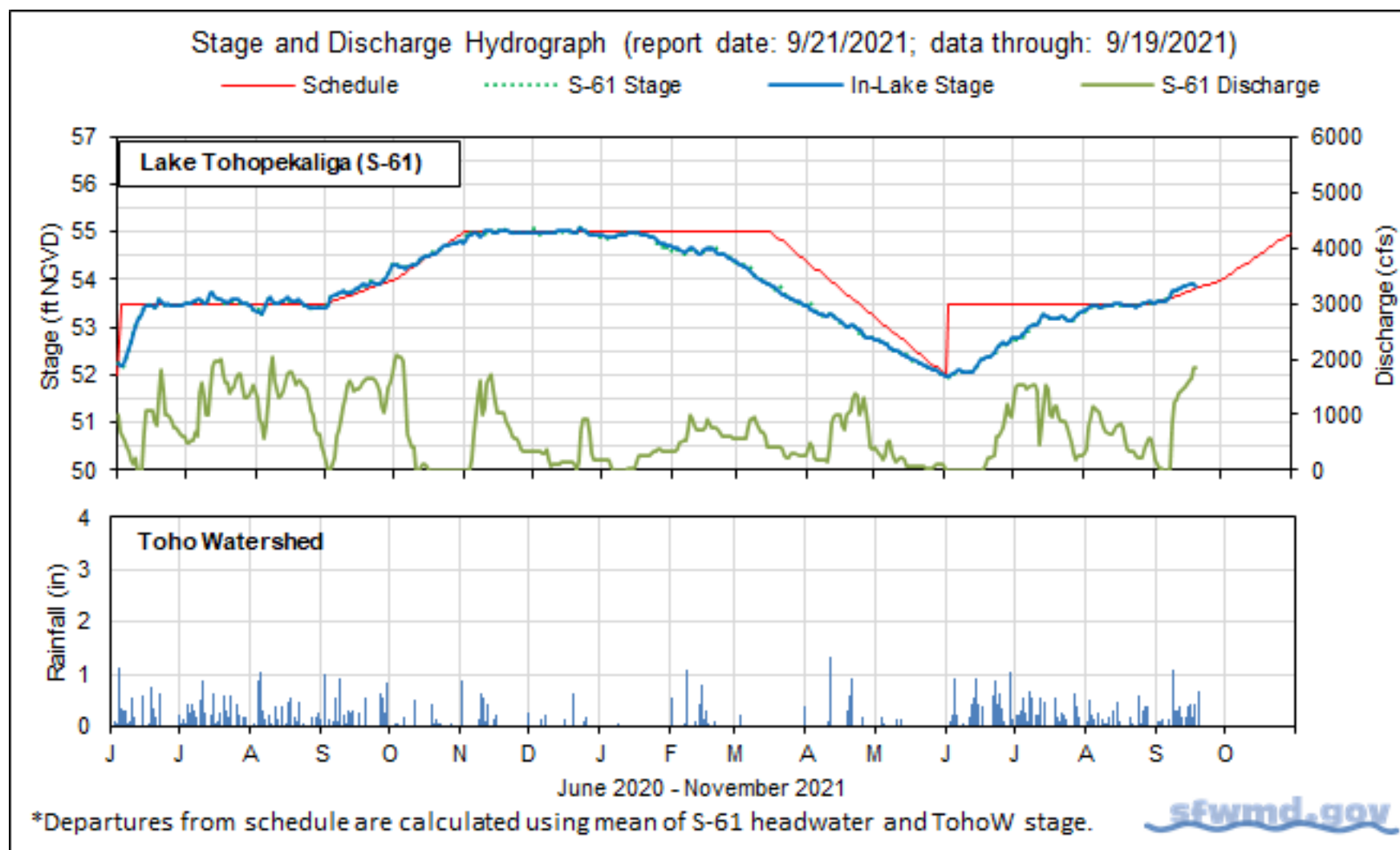


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

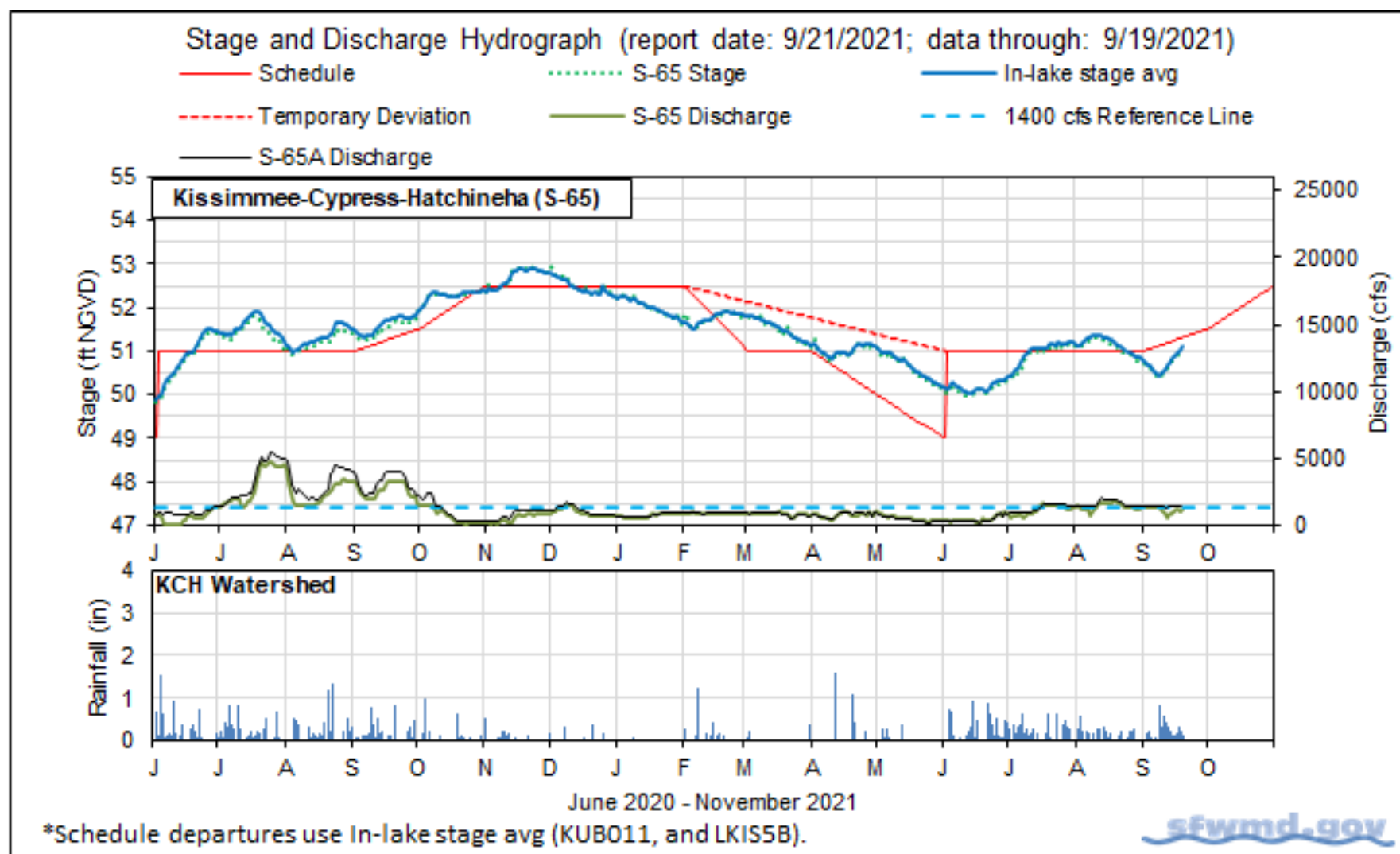


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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 9/19/21	Average for Previous Seven Day Periods			
			9/19/21	9/12/21	9/5/21	8/29/21
Discharge	S-65	1,170	1,020	1,110	1,360	1,360
Discharge	S-65A ^a	1,410	1,420	1,400	1,410	1,450
Headwater Stage (feet NGVD)	S-65A	46.3	46.3	46.5	46.3	46.3
Discharge	S-65D ^b	2,040	1,680	1,570	1,770	2,030
Headwater Stage (feet NGVD)	S-65D ^c	28.6	28.5	28.4	28.4	28.5
Discharge (cfs)	S-65E ^d	2,010	1,730	1,640	1,840	2,100
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	0.8	0.8	2.2	1.8	0.7
Mean depth (feet) ^f	Phase I floodplain	1.23	1.21	0.94	0.98	1.11

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.

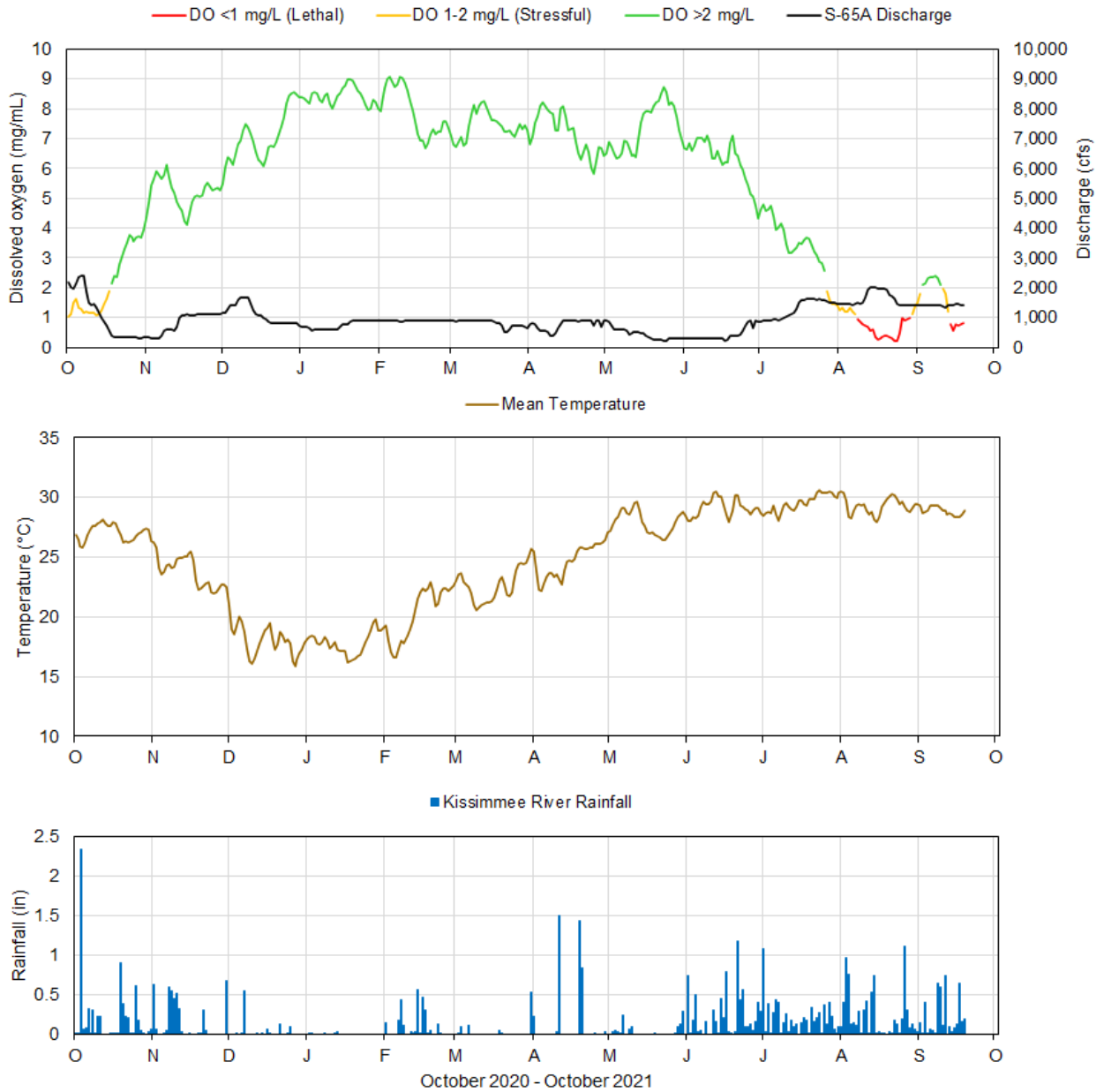
d. Combined discharge from S-65E and S-65EX1.

e. Dissolved oxygen is the average of values from sondes KRBN, PC62, PC63, 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: 9/21/2021; data are through: 9/19/2021

stwmnd.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 four stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

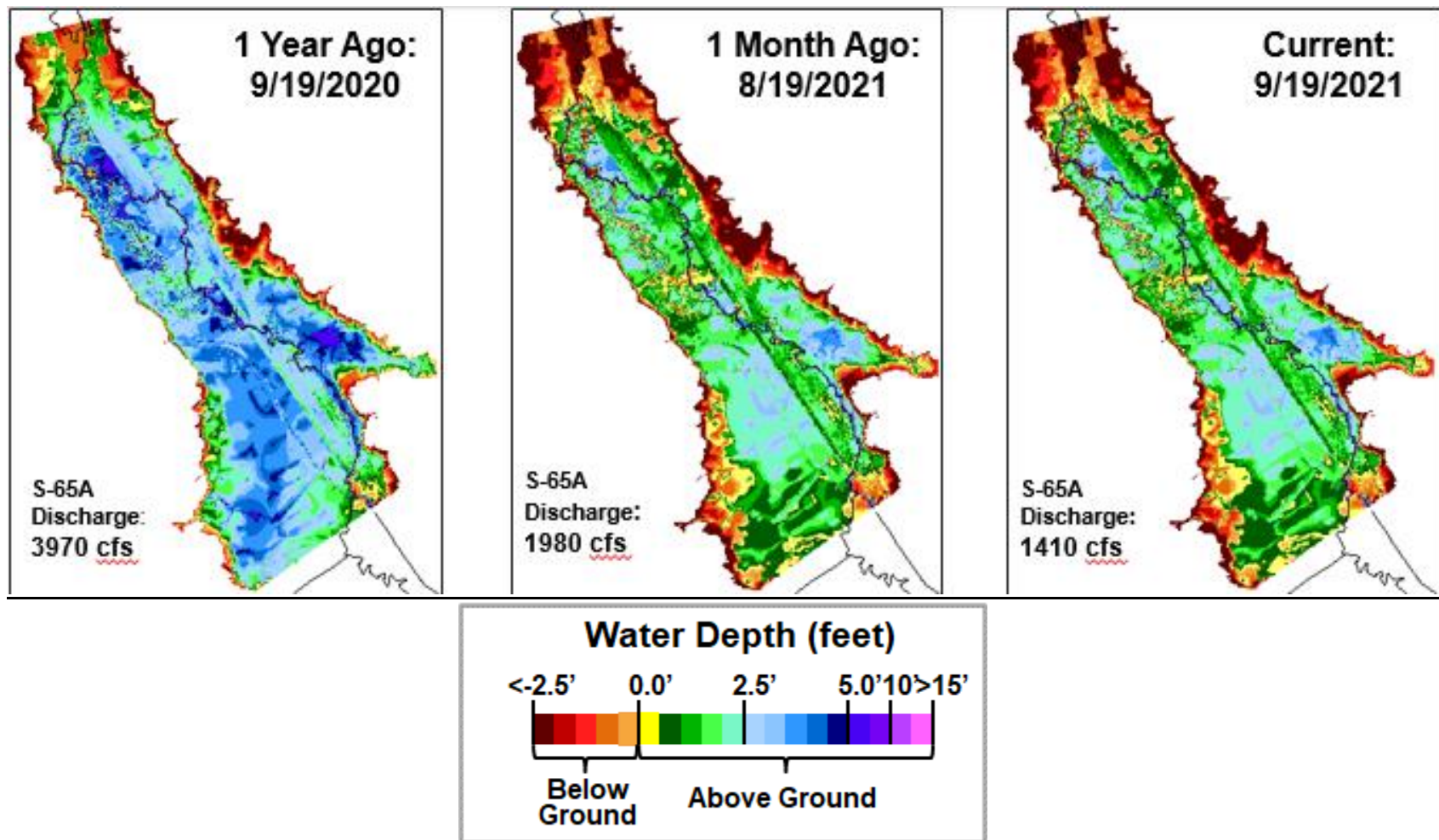


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

Lake Okeechobee

Lake Okeechobee stage was 15.06 feet NGVD on September 19, 2021, 0.62 feet higher than a month ago, and 0.11 feet lower than a year ago (**Figure LO-1**). Lake stages were above the ecological envelope from August 1, 2020 to March 30, 2021, and near or within the upper threshold of the envelope until late-June, 2021. Lake stages have increased over the last several weeks due to increased precipitation and inflows, and were above the ecological envelope again from early-July until mid-September. The stage returned to within the envelope on September 14th (**Figure LO-2**). Lake stage remained in the Low sub-band last week (**Figure LO-3**). According to NEXRAD, 1.73 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) increased from the previous week, going from 3,071 cubic feet per second (cfs) to 3,916 cfs. Average daily outflows (excluding evapotranspiration) remained 0 cfs. There have been essentially no outflows from the Lake since late June 2021. Most of the inflows (~44 % of the total or 1,729 cfs) came from the Kissimmee River through S-65E & S-65EX1 structures. The second highest inflow came from the C-41A canal via S-84 and S-84X structures (~23 % of the total or 894 cfs) and the third highest inflow came from the C-40 & C-41 canals (~9 % of the total or 345 cfs) through S-71 & S-72 structures. There was no outflow to the west via S-77, to the east via S-308 or to the south via S-351, S-352 and S-354 structures. There was a backflow from L-8 canal via the S-271 structure at the average rate of 142 cfs. Average inflows and outflows through water control structures surrounding the Lake for the previous two weeks (cfs) are shown in **Table LO-1**, as is the resultant Lake elevation change in inches (in) due to each structure's flow for the past week. **Figure LO-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.

The most recent satellite image (September 19, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed medium to high bloom potential in the NW, NE and central parts of the Lake. The bloom potential increased compared to the previous week (**Figure LO-5**).

In early September, phytoplankton biomass was highest in the northern and western parts of the Lake. Blooms ($\text{chl } a > 40 \mu\text{g/L}$) were recorded at only two sites. The highest biomass ($45.7 \mu\text{g/L}$) was recorded at LZ2 in the northern part of the Lake. The number of sites with bloom conditions decreased by 3% since late August. This was the lowest number of sites with bloom conditions since May. A total of 31 sites (or 97%) had microcystin concentrations below the EPA recommended human health recreational standard ($8 \mu\text{g/L}$). The highest toxin concentration ($36 \mu\text{g/L}$) was recorded at L004 in the central-east part of the Lake. Overall, the number of sites with toxin concentrations below the EPA threshold increased by 3% since late August. A total of 20 sites (or 63%) had communities dominated by *Microcystis aeruginosa* and 11 sites (or 34%) had mixed communities. Site LZ25A had communities dominated by *Cylindrospermopsis raciborskii*. The percentage of sites dominated by *M. aeruginosa* was 13% higher compared to early August and was the highest since early June. The September 7-9, 2021 survey results are shown in **Table LO-2** and **Figure LO-6**.

Table LO-1. Weekly Lake Okeechobee inflows and outflows (cfs) and as change in elevation (in).

Provisional data.

INFLOWS	Previous week Avg Daily (cfs)	Avg Daily Flow (cfs)	Equivalent Depth Week Total (in)	OUTFLOWS	Previous week Avg Daily (cfs)	Avg Daily Flow (cfs)	Equivalent Depth Week Total (in)
S-65E & S-65EX1	1636	1729	0.7	S-77	0	0	0.0
S-71 & S-72	360	345	0.1	*S-308	0	0	0.0
S-84 & S-84X	280	894	0.4	S-351	0	0	0.0
Fisheating Creek	210	249	0.1	S-352	0	0	0.0
S-154	88	87	0.0	S-354	0	0	0.0
S-191	24	34	0.0	*L-8 (S-271)	-109	-142	-0.1
S-133 P	113	87	0.0	ET	2726	2483	1.0
S-127 P	7	14	0.0	Total	2726	2483	1.0
S-129 P	29	50	0.0				
S-131 P	27	53	0.0				
S-135 P	191	233	0.1				
S-2 P	0	0	0.0				
S-3 P	0	0	0.0				
S-4 P	0	0	0.0				
*Backflow	109	142	0.1				
Rainfall	5879	4909	1.9				
Total	8952	8825	3.5				

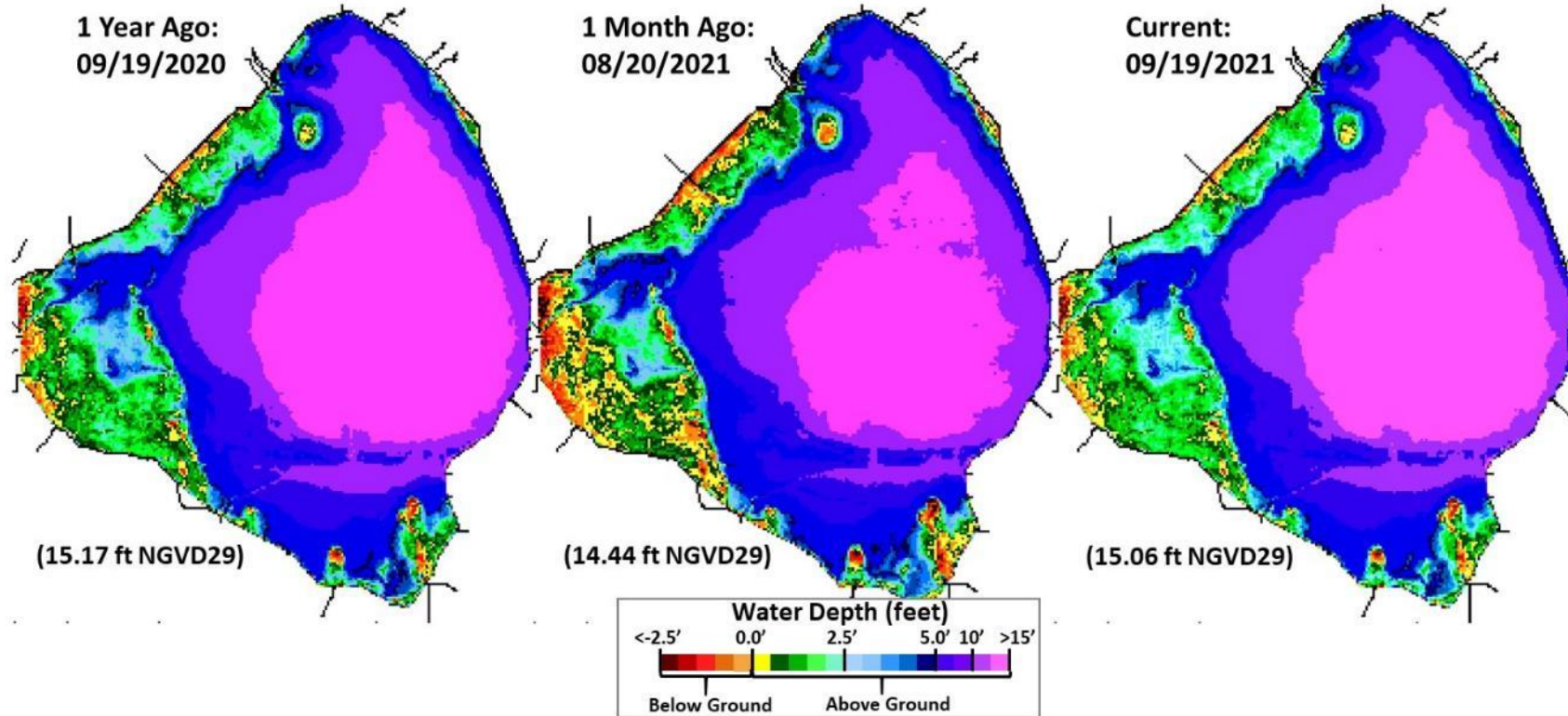


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

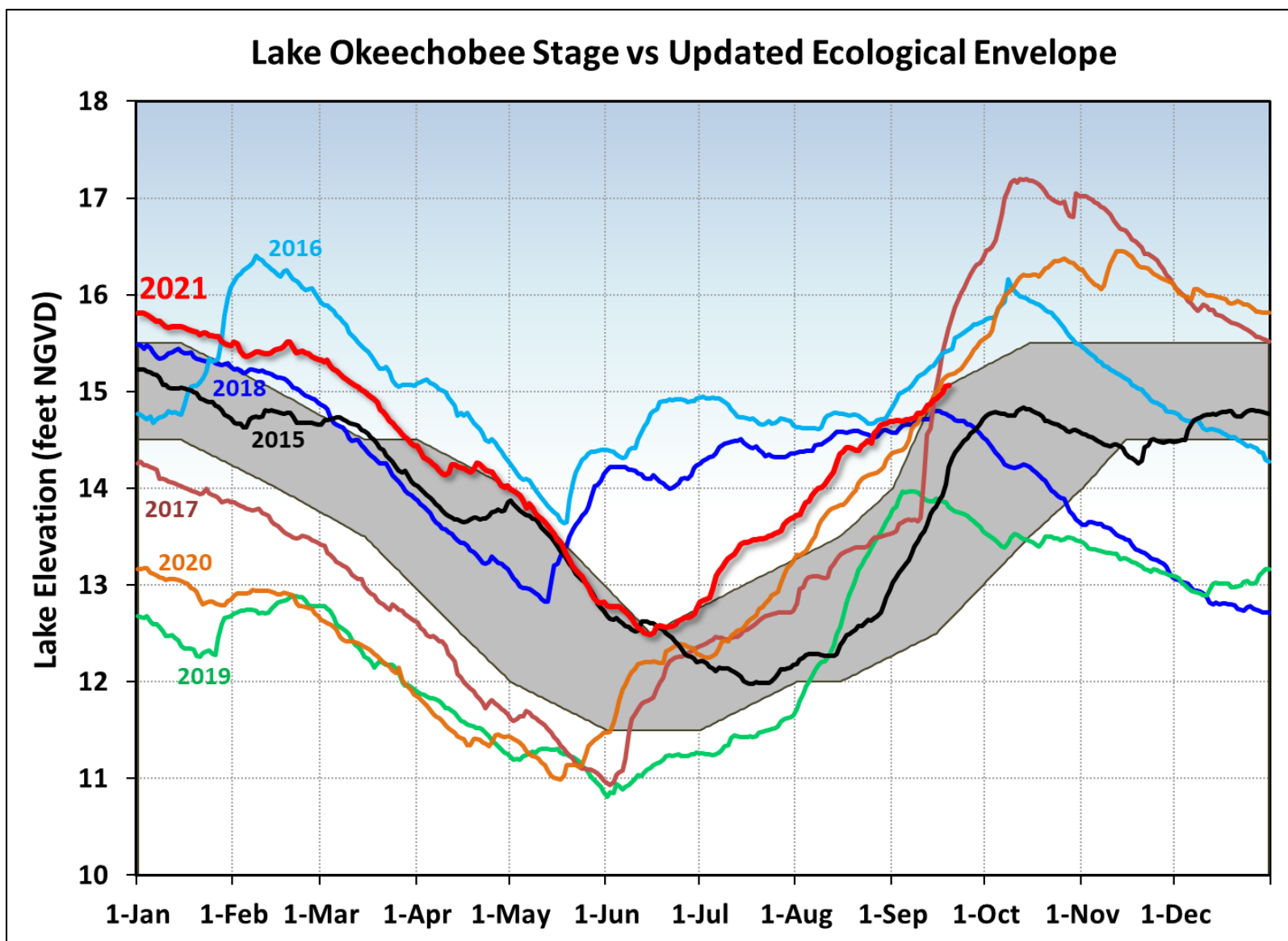


Figure LO-2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated ecological envelope.

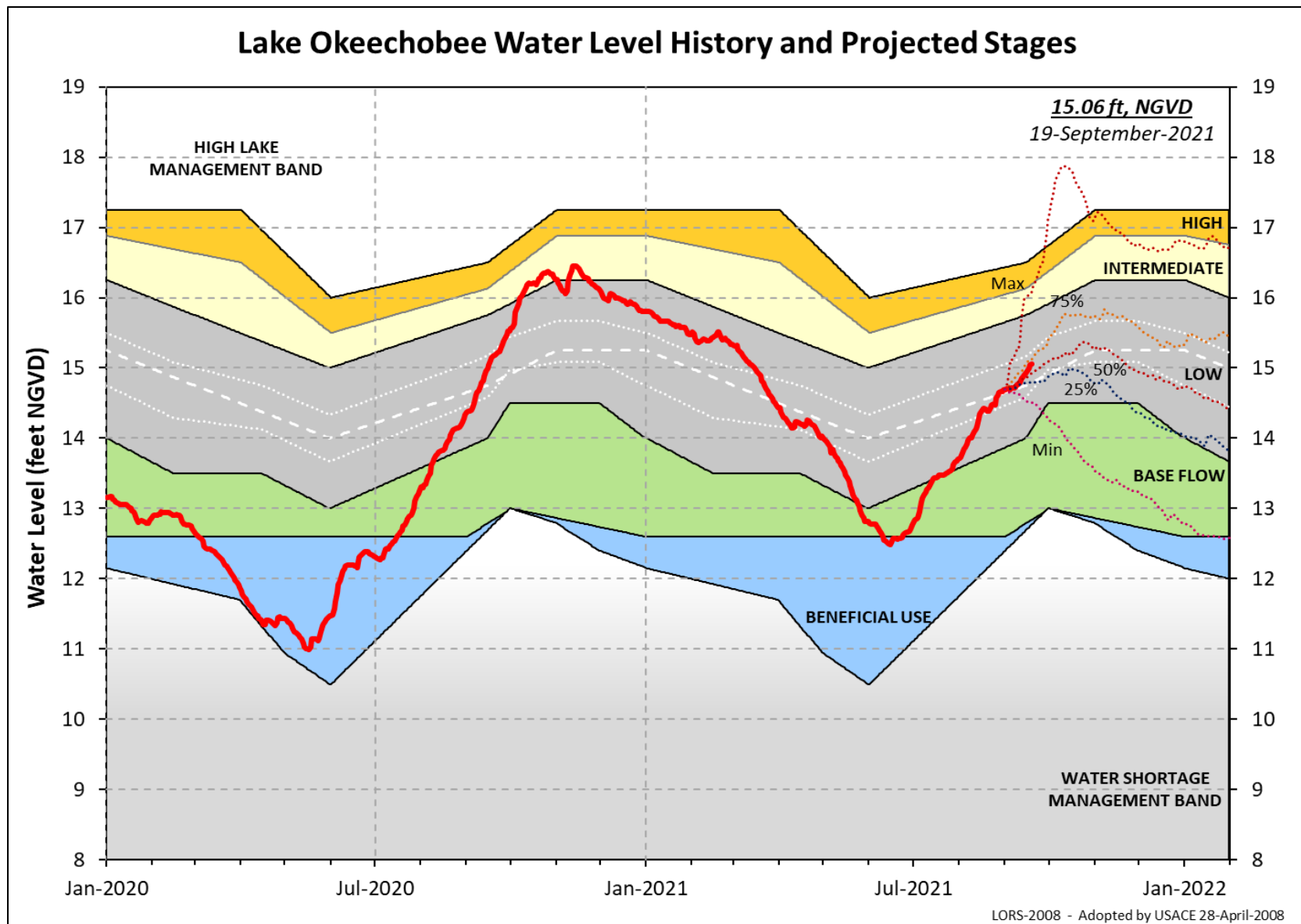


Figure LO-3. Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

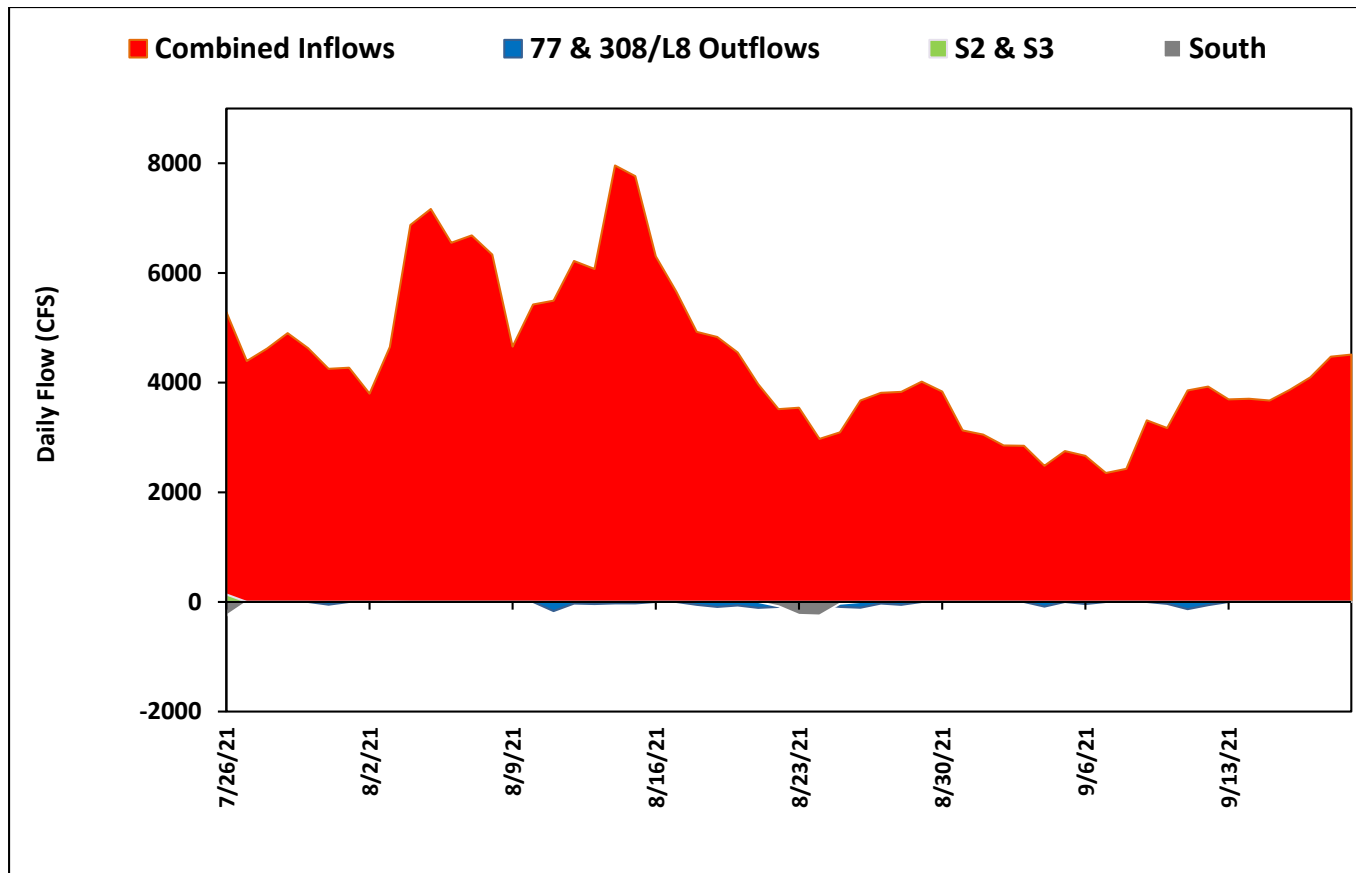
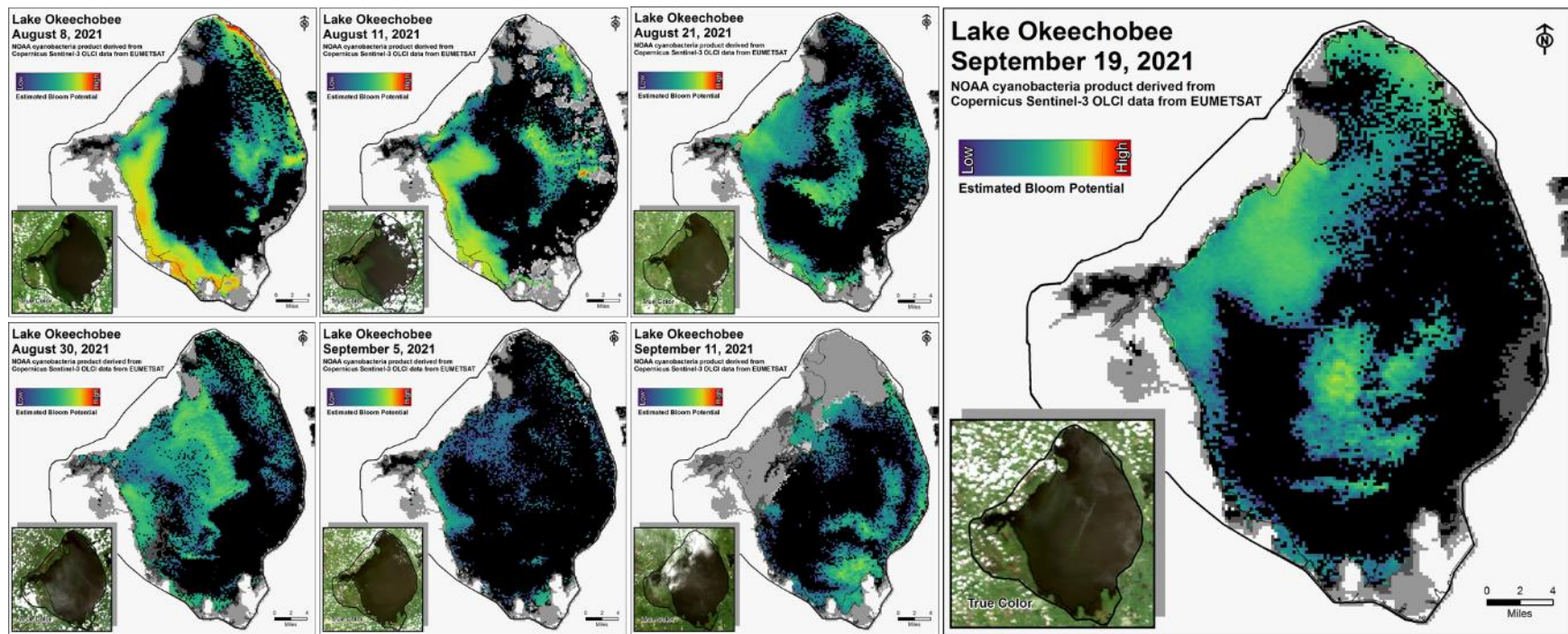


Figure LO-4. Major inflows (red) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in gray. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from Lake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



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

Figure LO-5. Cyanobacteria bloom potential based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Table LO-2. Provisional results of chlorophyll *a* concentrations and cyanobacteria taxa from sampling trips on September 7 - 9, 2021. Color coding generally follows the legend in **Figure LO-6**.

Collection Date: September 7-9, 2021

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
FEBIN	3.0	BDL	<i>mixed</i>
FEBOUT	42.4	0.5	<i>mixed</i>
KISSR0.0	11.6	BDL	<i>mixed</i>
L005	14.8	0.5	<i>Microcys</i>
LZ2	45.7	BDL	<i>mixed</i>
KBARSE	24.2	BDL	<i>Microcys</i>
RITTAE2	22.8	BDL	<i>mixed</i>
PELBAY3	18.4	1.0	<i>Microcys</i>
POLE3S	21.1	BDL	<i>mixed</i>
LZ25A	34.6	BDL	<i>Cylindro</i>
PALMOUT	12.8	BDL	<i>mixed</i>
PALMOUT1	12.5	BDL	<i>mixed</i>
PALMOUT2	10.0	BDL	<i>Microcys</i>
PALMOUT3	8.3	0.8	<i>Microcys</i>
POLESOUT	29.3	BDL	<i>Microcys</i>
POLESOUT1	23.3	BDL	<i>Microcys</i>
POLESOUT2	25.4	0.3	<i>Microcys</i>
POLESOUT3	29.4	0.3	<i>Microcys</i>
EASTSHORE	23.2	BDL	<i>Microcys</i>
NES135	31.1	BDL	<i>mixed</i>
NES191	31.5	BDL	<i>Microcys</i>

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
L001	20.1	0.3	<i>mixed</i>
L004	18.1	36	<i>Microcys</i>
L006	4.9	0.8	<i>Microcys</i>
L007	8.9	2.2	<i>Microcys</i>
L008	21.3	BDL	<i>Microcys</i>
LZ30	6.1	0.3	<i>Microcys</i>
LZ40	11.2	1	<i>Microcys</i>
CLV10A	21.5	BDL	<i>Microcys</i>
NCENTER	14.7	0.5	<i>Microcys</i>

S308C	22.8	BDL	<i>mixed</i>
S77	2.6	BDL	<i>mixed</i>

- SFWMD considers >40 µg/L Chlorophyll *a* (Chla) an algal bloom
- BDL – Below Detectable Limit of **0.25** µg/L
- ND – No Dominant taxa
- P – Pending
- NS – Not Sampled
- Station bold font – crew observed possible BGA
- Chlorophyll *a* analyzed by SFWMD
- Toxin and Taxa analyzed by FDEP:
Microcys = *Microcystis*; *Cylindro* = *Cylindrospermopsis*; *Planktol* = *Planktolyngbya*;
Dolicho = *Dolichospermum*

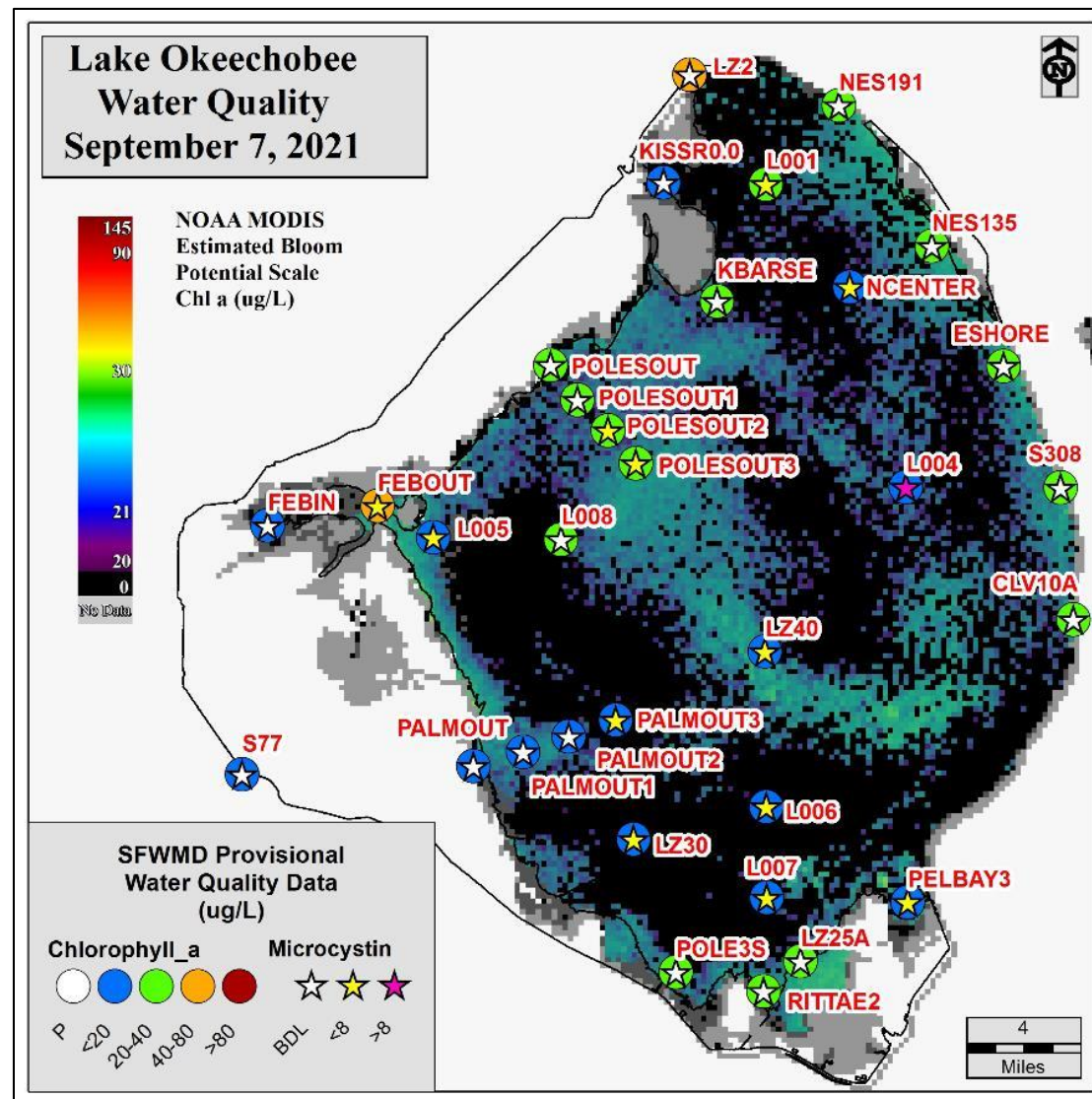


Figure LO-6. Expanded monitoring network and provisional results from samples collected September 7 - 9, 2021.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was approximately 1,861 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was approximately 2,023 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 8.0. Salinity conditions in the middle estuary were estimated to be within the fair 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 5,564 cfs (**Figures ES-5 and ES-6**) and the previous 30-day mean inflow was approximately 3,634 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-6**.

Over the past week, surface salinities remained the same at Val I-75 and Ft. Myers, increased at S-79, and decreased at Cape Coral and Shell Point (**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, 2013¹) 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 steady releases at 2,000 and 3,000 cfs with estimated tidal basin inflows of 1,352 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 0.3 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 September 17, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background concentrations in Charlotte County, and background and low concentrations in and offshore of Lee County. On the east coast, red tide was not observed in samples from Palm Beach or Miami-Dade counties.

¹ 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 Wet. 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.

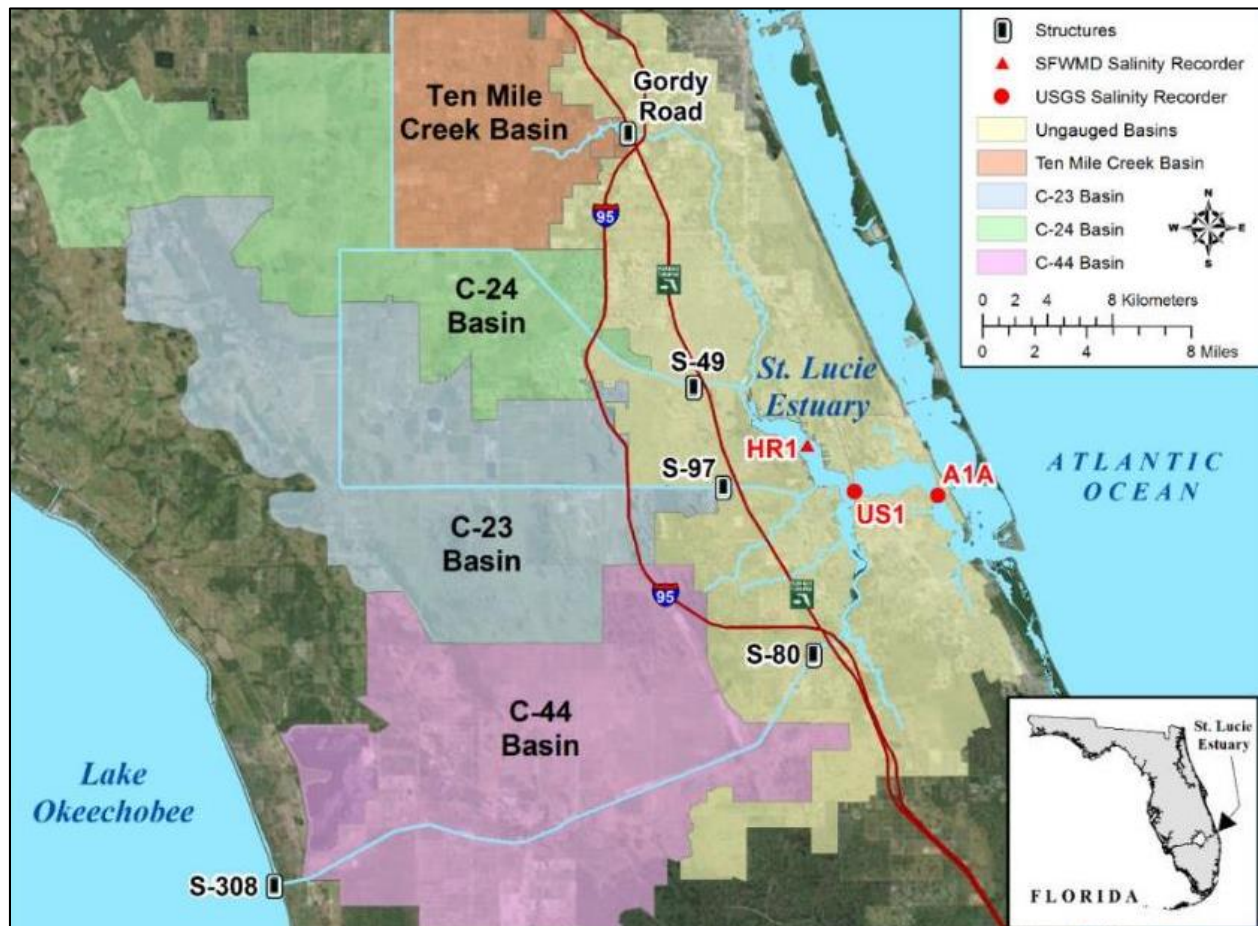


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

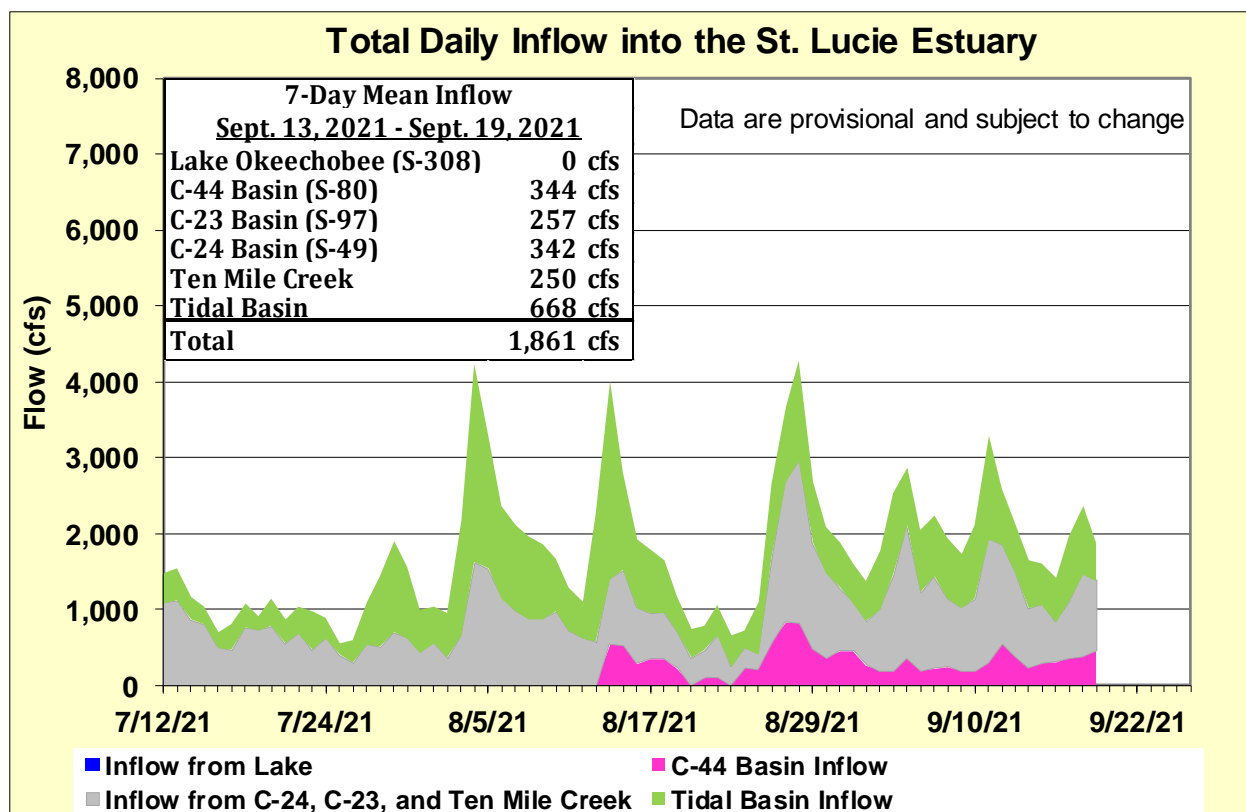


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	1.9 (2.6)	5.3 (6.6)	NA ^a
US1 Bridge	6.7 (7.8)	9.3 (10.1)	10.0 – 26.0
A1A Bridge	15.4 (16.4)	22.9 (23.3)	NA ^a

a. The envelope is not applicable.

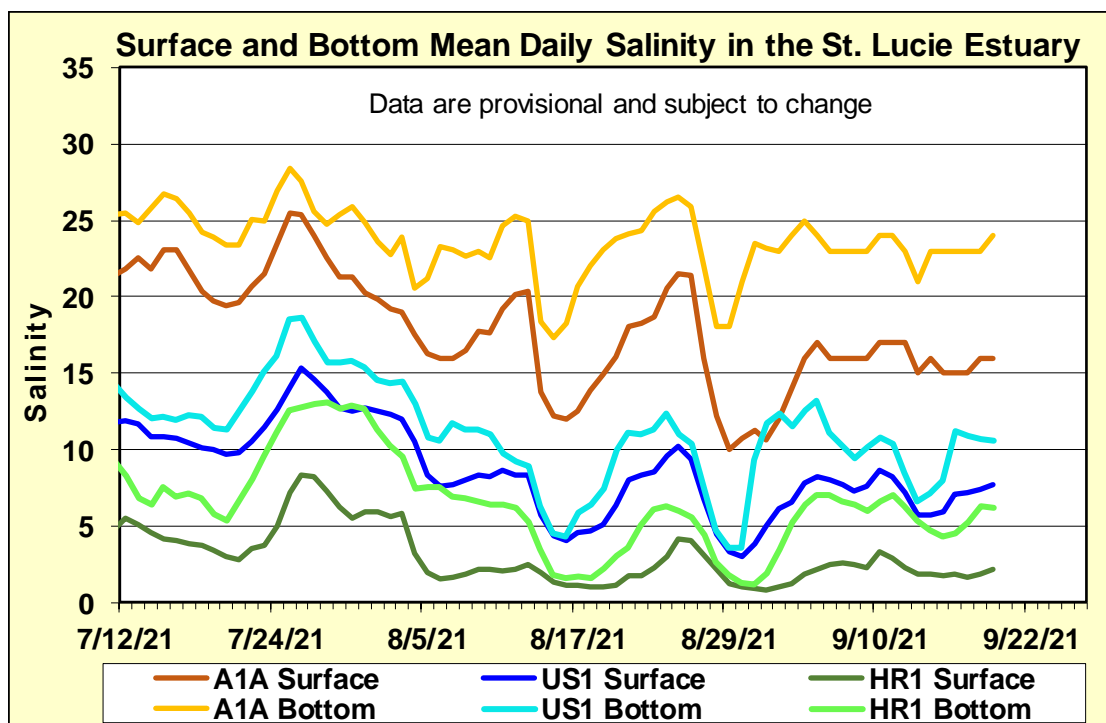


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

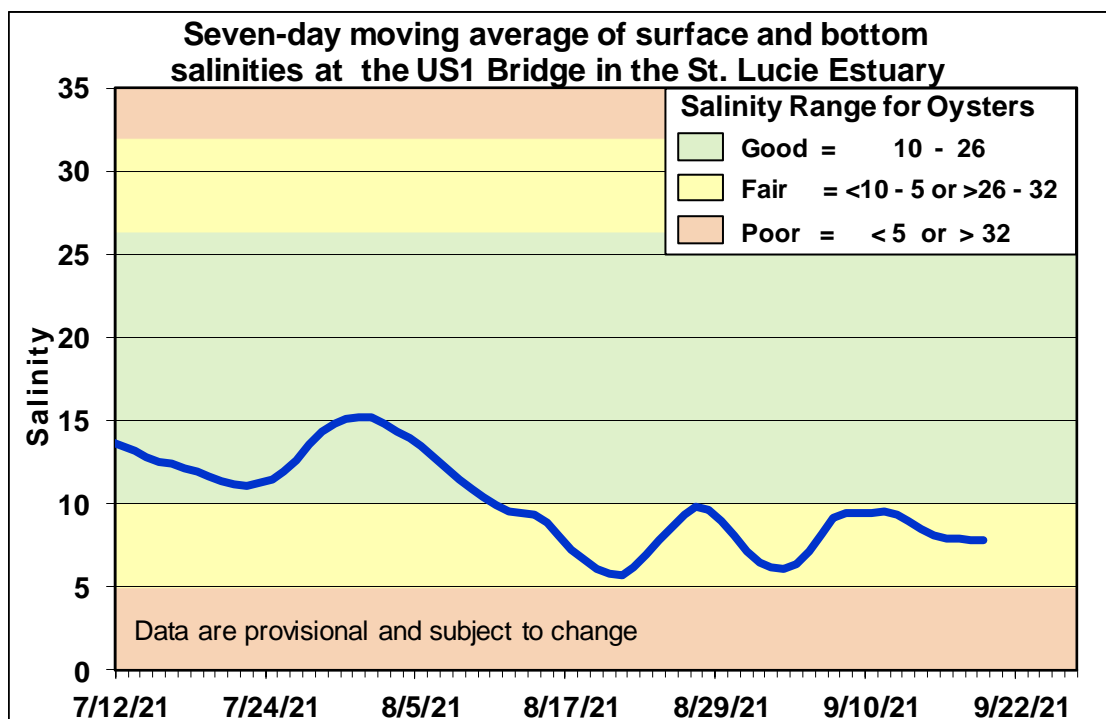


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

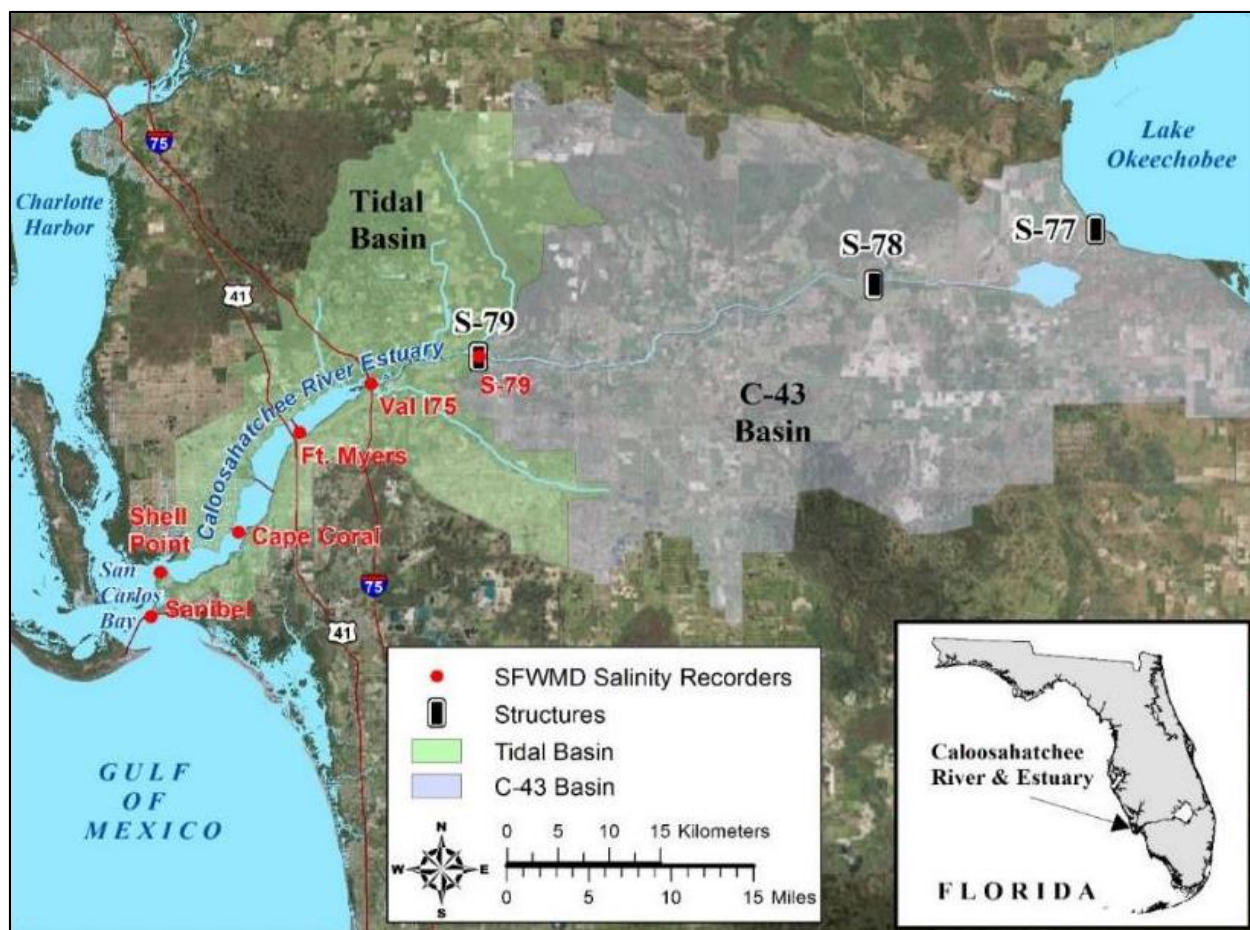


Figure ES-5. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

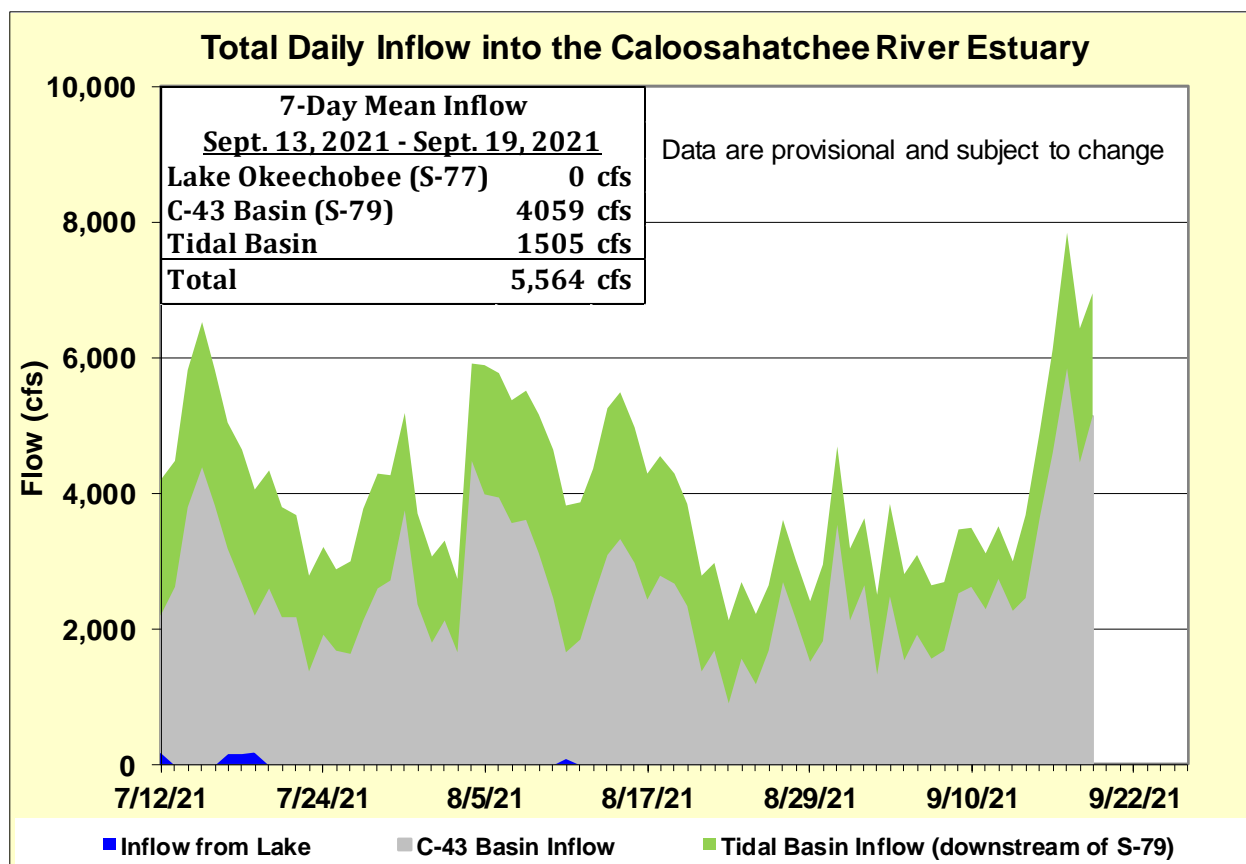


Figure ES-6. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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)	0.3 (0.3)	0.0 – 5.0 ^b
Fort Myers Yacht Basin	0.3 (0.3)	0.6 (0.4)	NA ^a
Cape Coral	4.1 (5.3)	5.5 (6.7)	10.0 – 30.0
Shell Point	17.1 (17.9)	19.4 (21.7)	10.0 – 30.0
Sanibel ^c	25.2 -	26.1 -	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.

c. Sanibel data missing from August 18 to September 15, 2021

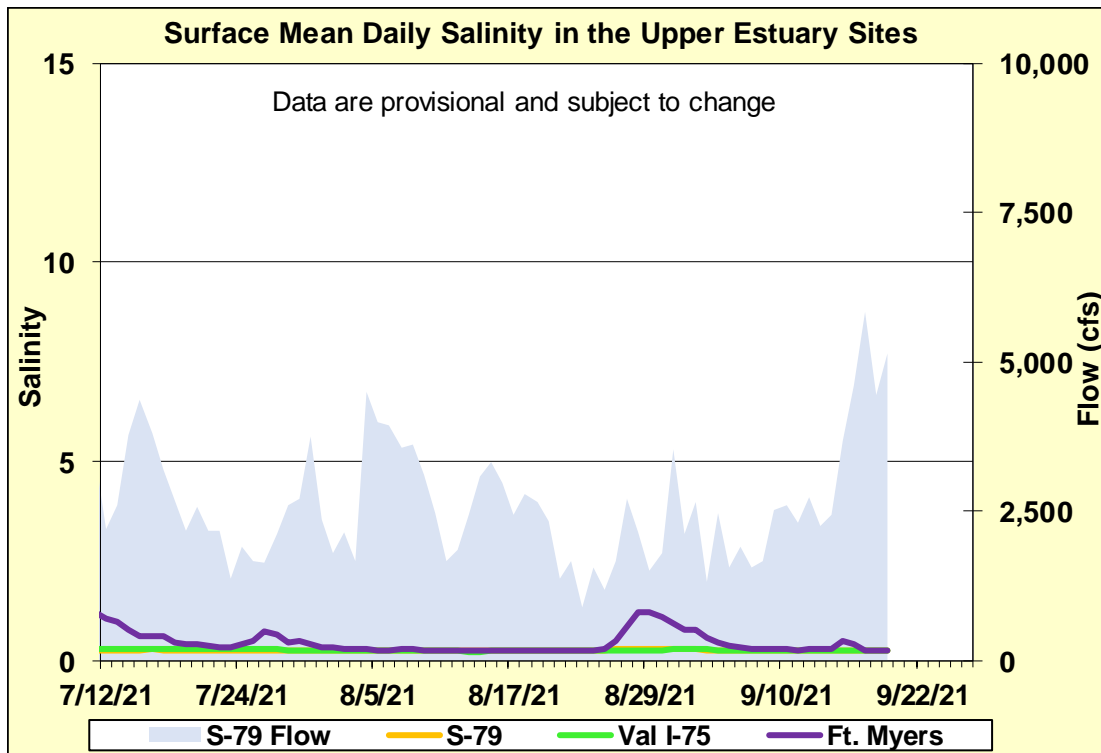


Figure ES-7. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

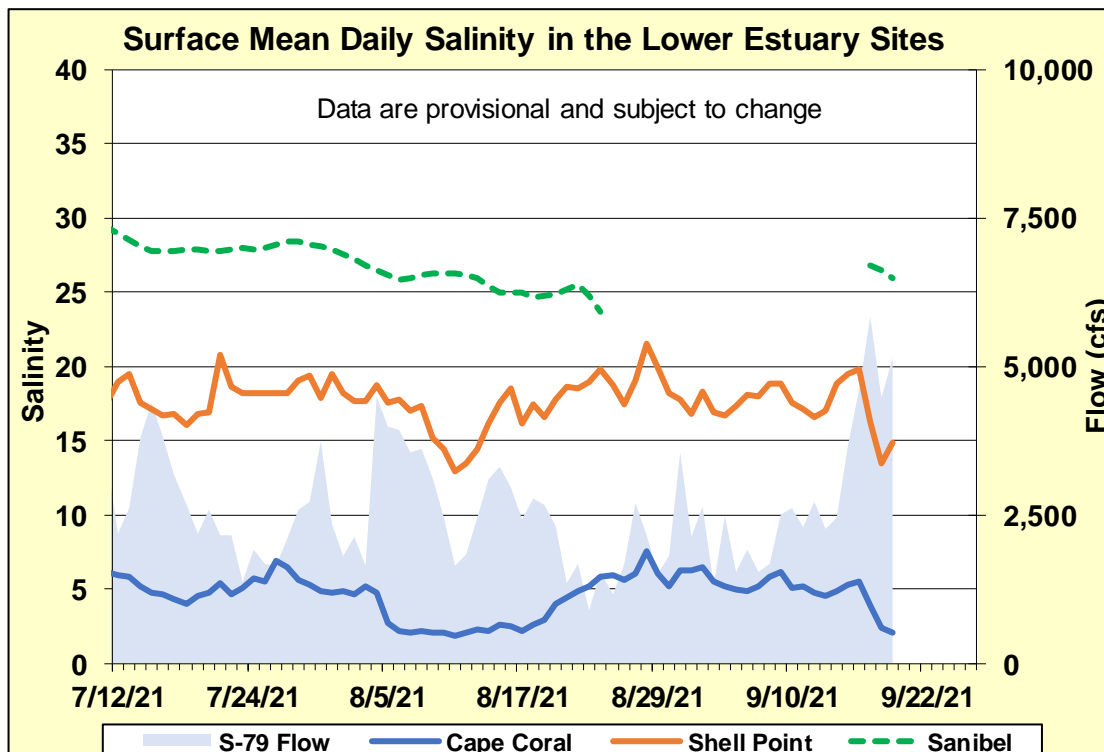


Figure ES-8. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

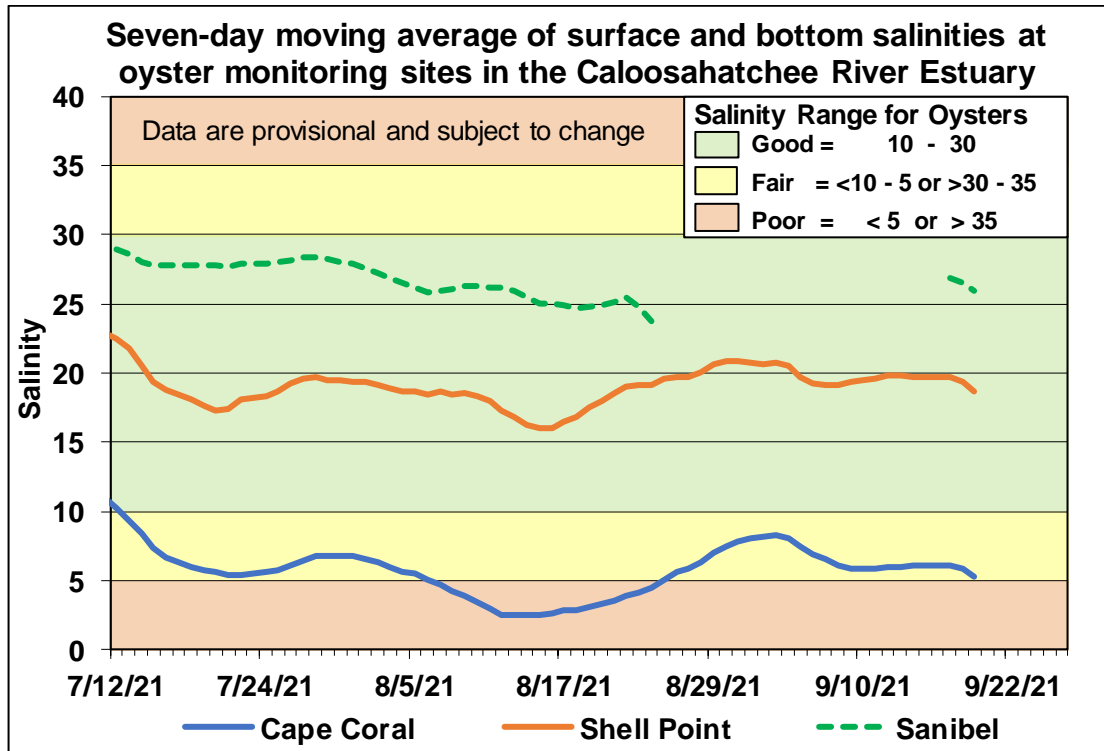


Figure ES-9. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

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	1352	1.0	0.3
B	450	1352	0.5	0.3
C	1000	1352	0.3	0.3
D	1500	1352	0.3	0.3
E	2000	1352	0.3	0.3
F	3000	1352	0.3	0.3

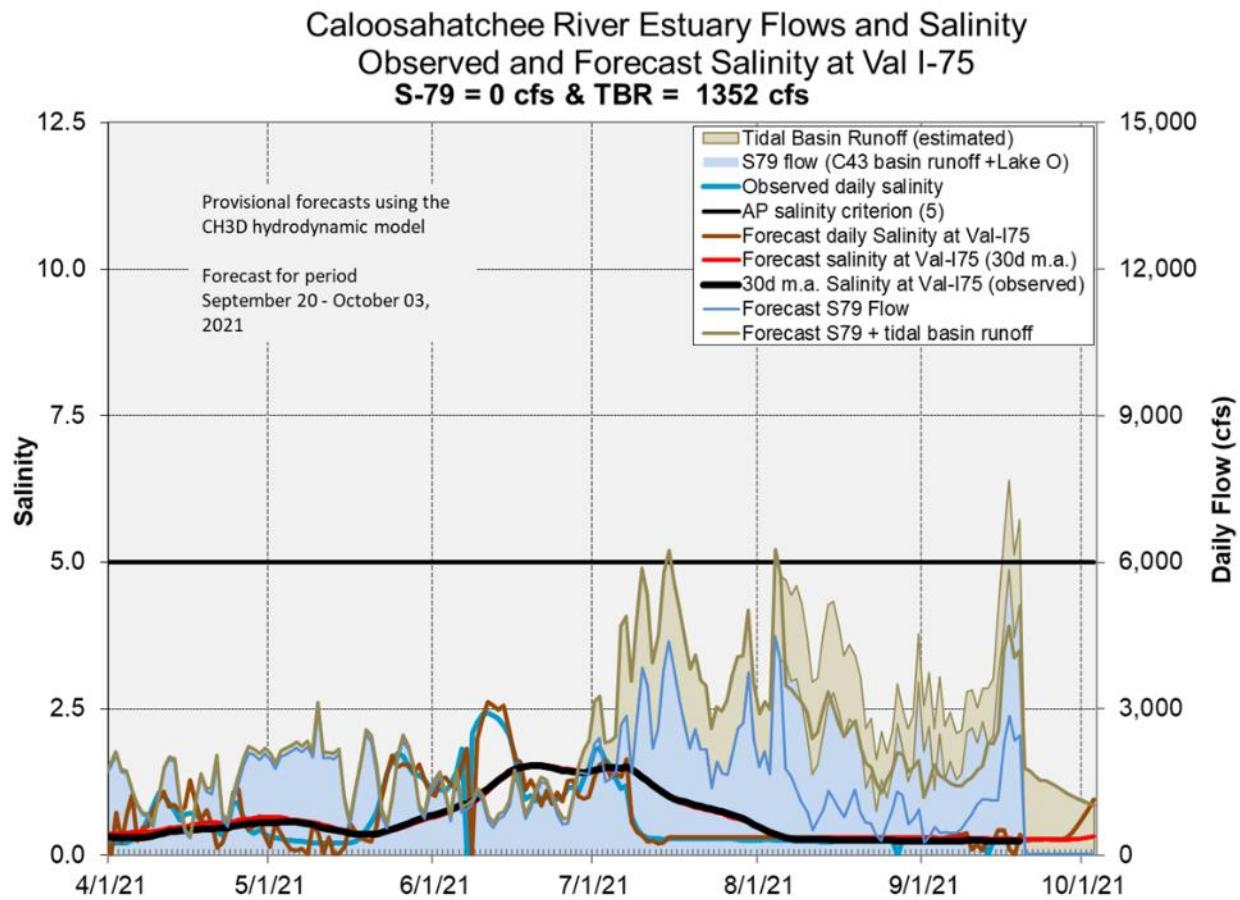


Figure ES-10. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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, vegetation in these cells is stressed and highly stressed and the 365-day phosphorus loading rates (PLR) for these flow-ways are very high (**Figure S-1**).

STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to construction activities. All treatment cells are at or above target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for most flow-ways are below 1.0 g/m²/year (**Figure S-2**).

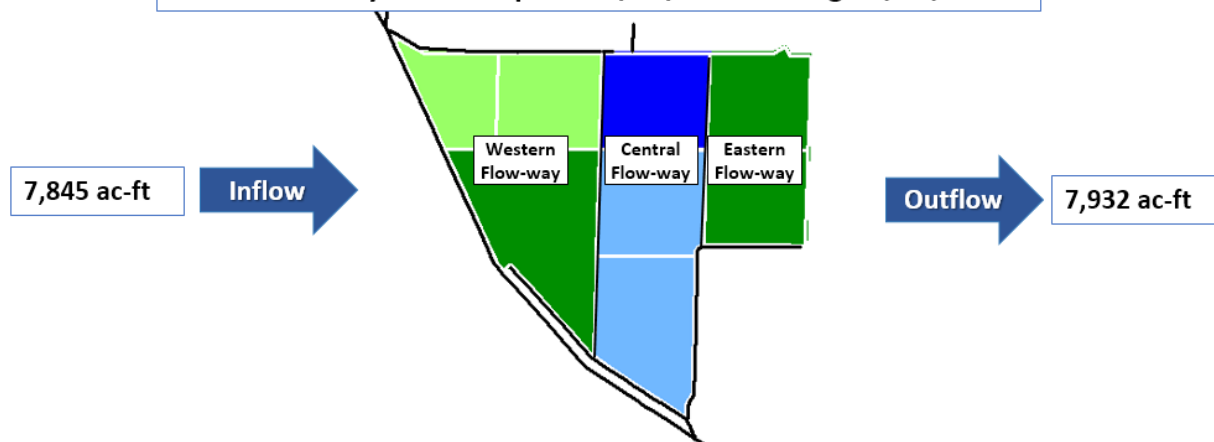
STA-2: STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Most treatment cells are above target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4 and 5 is highly stressed. The 365-day PLRs for Flow-ways 1, 4 and 5 are below 1.0 g/m²/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. All online treatment cells are above 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 all flow-ways are below 1.0 g/m²/year (**Figure S-4**).

STA-5/6: Operational restrictions are in place in STA-5/6 Flow-ways 2 and 3 following the Restoration Strategies project to grade non-effective treatment areas. All treatment cells are at or above 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.

STA-1E Weekly Status Report – 9/13/2021 through 9/19/2021











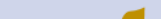






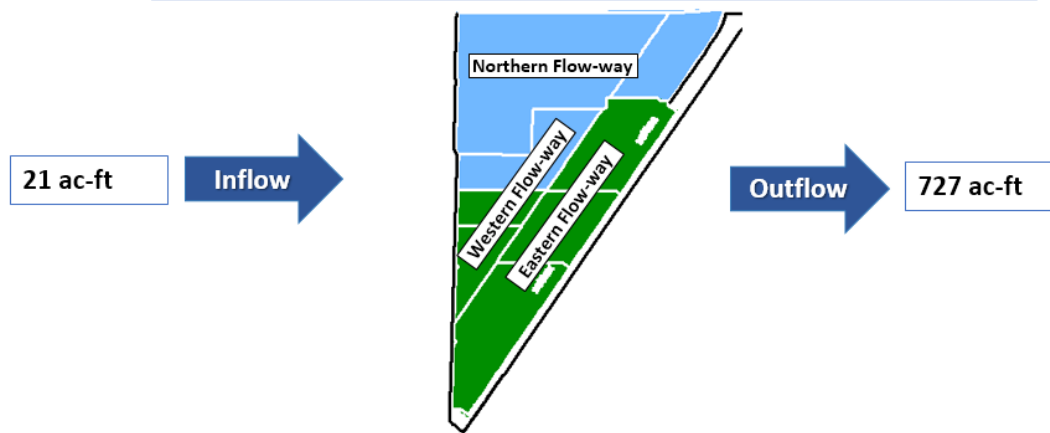
STA-1E Flow-Way Status				As of 9/19/2021		STA-1E Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small> 	365-day P Loading Rate <small>(below 1.0 g P / m²/yr is optimal)</small> 	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)		Total Inflow, ac-ft	7-day	28-day	365-day
				 Deep Water Level (> 2.8' above TS)	 High Water Level (1.5' – 2.8' above TS)				
Eastern			Online	 0.2' – 1.5' above TS	 Target Stage (TS +/- 0.2')	Total Outflow, ac-ft	7,845	33,367	275,667
Central			Vegetation Rehab	 Low Water Level (<0.2' below TS)		--Lake Inflow, ac-ft	0	N/A	25,800
Western	Offline, construction activities starting 11/01/2019			Depth / Area Based: Percent of Area Dry		Inflow Conc., ppb	84	125	140
				 0-25% Dry	 50-75% Dry				
				 25-50% Dry	 75-100% Dry	Outflow Conc., ppb	16	19	42
Includes Preliminary Data									

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

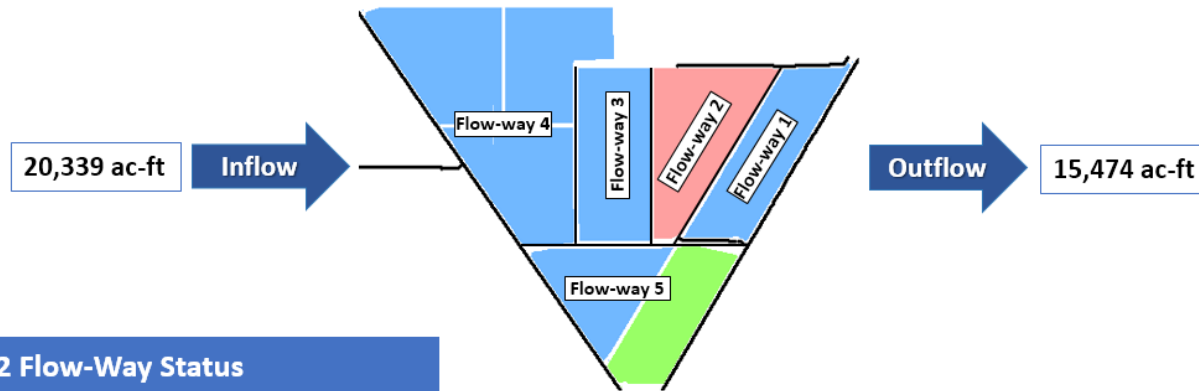
STA-1W Weekly Status Report – 9/13/2021 through 9/19/2021



STA-1W Flow-Way Status				As of 9/19/2021		STA-1W Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy — Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)			7-day	28-day	365-day
				<div>Deep Water Level (> 2.8' above TS)</div>	<div>High Water Level (1.5' – 2.8' above TS)</div>				
Northern			Construction	<div>0.2' – 1.5' above TS</div>	<div>Target Stage (TS +/- 0.2')</div>				
				<div>Low Water Level (<0.2' below TS)</div>					
				Depth / Area Based: Percent of Area Dry					
Western			Construction	<div>0-25% Dry</div>	<div>50-75% Dry</div>				
				<div>25-50% Dry</div>	<div>75-100% Dry</div>				
Eastern			Construction						
				Includes Preliminary Data					
Total Inflow, ac-ft						21	2,320	103,491	
--Lake Inflow, ac-ft						0	N/A	7,500	
Total Outflow, ac-ft						727	4,786	113,843	
Inflow Conc., ppb						77	172	248	
Outflow Conc., ppb						22	25	41	

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

STA-2 Weekly Status Report – 9/13/2021 through 9/19/2021



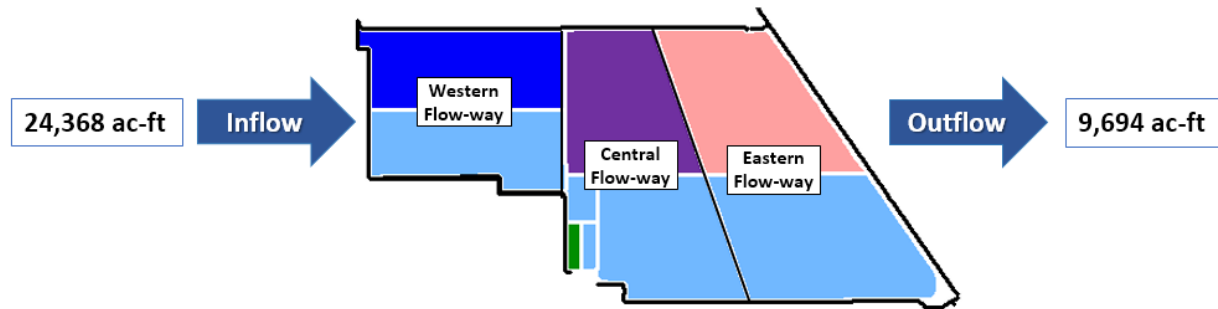
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2	Offline, construction activities as of 9/7/2021		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 9/19/2021	
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
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-2 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	20,339	48,953	419,153
--Lake Inflow, ac-ft	0	N/A	89,200
Total Outflow, ac-ft	15,474	41,801	457,192
Inflow Conc., ppb	76	84	89
Outflow Conc., ppb	13	15	20
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

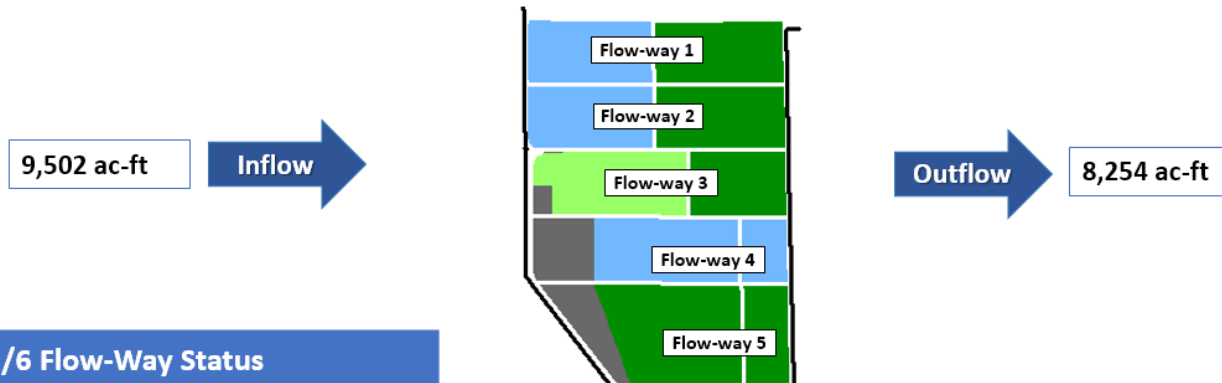
STA-3/4 Weekly Status Report – 9/13/2021 through 9/19/2021



STA-3/4 Flow-Way Status				As of 9/19/2021		STA-3/4 Flow & Phosphorus Concentration				
Flow-Way	Vegetation Status <div>Healthy ----- Stressed</div> <div>↔</div>	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)		Total Inflow, ac-ft	7-day	28-day	365-day	
				<div>Deep Water Level (> 2.8' above TS)</div>	<div>High Water Level (1.5' – 2.8' above TS)</div>					
Eastern	<div>↔</div>	<div>1.0</div>	Offline, vegetation management drawdown as of 3/1/2021	<div>0.2' – 1.5' above TS</div>	<div>Target Stage (TS +/- 0.2')</div>	--Lake Inflow, ac-ft	0	N/A	60,700	
				<div>Low Water Level (<0.2' below TS)</div>						
				Depth / Area Based: Percent of Area Dry						
				<div>0-25% Dry</div> <div>25-50% Dry</div>	<div>50-75% Dry</div> <div>75-100% Dry</div>					
Central	<div>↔</div>	<div>1.0</div>	Online			Total Outflow, ac-ft	9,694	29,314	477,814	
Western	<div>↔</div>	<div>1.0</div>	Online			Inflow Conc., ppb	59	54	64	
						Outflow Conc., ppb	16	21	15	
				Includes Preliminary Data						

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

STA-5/6 Weekly Status Report – 9/13/2021 through 9/19/2021



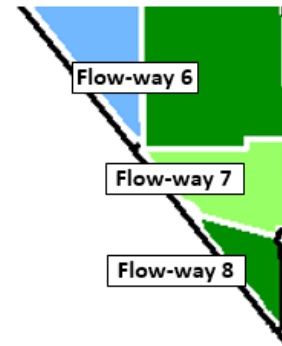
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P / m ² /yr is optimal)	Online / Offline / Restrictions
1	←-----→	1.0	Online
2	←-----→	N/A	Post-construction
3	←-----→	N/A	Post-construction
4	←-----→	1.0	Online
5	←-----→	1.0	Online




As of 9/19/2021	
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-5/6 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	9,502	28,862	164,660
--Lake Inflow, ac-ft	0	N/A	9,000
Total Outflow, ac-ft	8,254	27,618	176,259
Inflow Conc., ppb	198	228	292
Outflow Conc., ppb	42	54	73
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 9/13/2021 through 9/19/2021



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

As of 9/19/2021	
Stage Based: Relative to Target Stage (TS)	
<div></div>	Deep Water Level (> 2.8' above TS)
<div></div>	High Water Level (1.5' – 2.8' above TS)
<div></div>	0.2' – 1.5' above TS
<div></div>	Target Stage (TS +/- 0.2')
<div></div>	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
<div></div>	0-25% Dry
<div></div>	25-50% Dry
<div></div>	50-75% Dry
<div></div>	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 Three Gauge Average stages remained following just below the Zone A1 regulation line last week. WCA-2A: Stage at 2A-17 rose slightly faster than the slope of the schedule line last week, average on Sunday was 0.63 feet higher than the Zone A regulation line. WCA-3A: The Three Gauge Average stage quickly rose to just the top of zone B last week. Stage ended the week Sunday at 0.05 feet below the rising schedule line. WCA-3A: Stage at gauge 62 (Northwest corner) was stable over the last two weeks. The Sunday average remained 0.72 feet below the flat Upper Schedule. (**Figures EV-1 through EV-4**).

Water Depths

The WDAT tool indicates that water depths in northeastern WCA-3A are unchanged over the last month but deeper than two months ago. While in the upper reaches of the L-67s and the Miami canal depths have reached 3.5 to 4.0 feet. North to South hydrologic connectivity remains within Everglades National Park (ENP) sloughs. Portions of eastern ENP and southern BCNP remain drier than surrounding areas (**Figure EV-5**). Comparing WDAT water levels from present over the last month, stages generally increased, except in northwestern WCA-3A. Compared to a year ago, the WCA-2B and -3B basins are significantly drier. Most of EPA remains drier than a year ago (**Figure EV-6**). Compared to the 20-year median water depths, most of the central Everglades and the western sloughs in ENP are currently in the lower 20%-30% of the historical median, except for northeastern ENP and WCA-1. Stage conditions moved toward the median last week in WCA-3A. (**Figure EV-7**).

Taylor Slough and Florida Bay

An average of 1.18 inches of rain fell over Taylor Slough and Florida Bay over the week ending Sunday (9/19) and stage increased an average of 0.09 feet over the week with the largest increases in the northern part of the slough as a result of increased water movement and rainfall (**Figure EV-7** and **Figure EV-8**). The individual stations in northern Taylor Slough are 4 to 6 inches above their historical averages while the Slough as a whole is 1.8 inches above the historical average for this time of year.

Salinities in Florida Bay increased 1.1 over the week ending 9/19, but individual stations had weekly changes ranging from -1.8 to +3.0 (**Figure EV-7**). The stations in the nearshore area had the largest increases for the week and have helped to increase the regional averages (**Figure EV-9**). More freshwater is still needed to push the estuarine front out into the Bay before the dry season begins. Most of the Bay is still marine (35) or higher and is now 4 higher than the historical average for this time of year.

Water Management Recommendations

Ascension rates that do not exceed 0.25 feet per week or 0.50 feet per two weeks are considered ecologically healthy. Flows into Florida Bay and northeastern WCA-3A continue to have an ecological benefit. 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	2.08	+0.10
WCA-2A	2.16	+0.31
WCA-2B	2.06	+0.06
WCA-3A	2.94	+0.23
WCA-3B	1.79	+0.11
ENP	2.09	+0.16

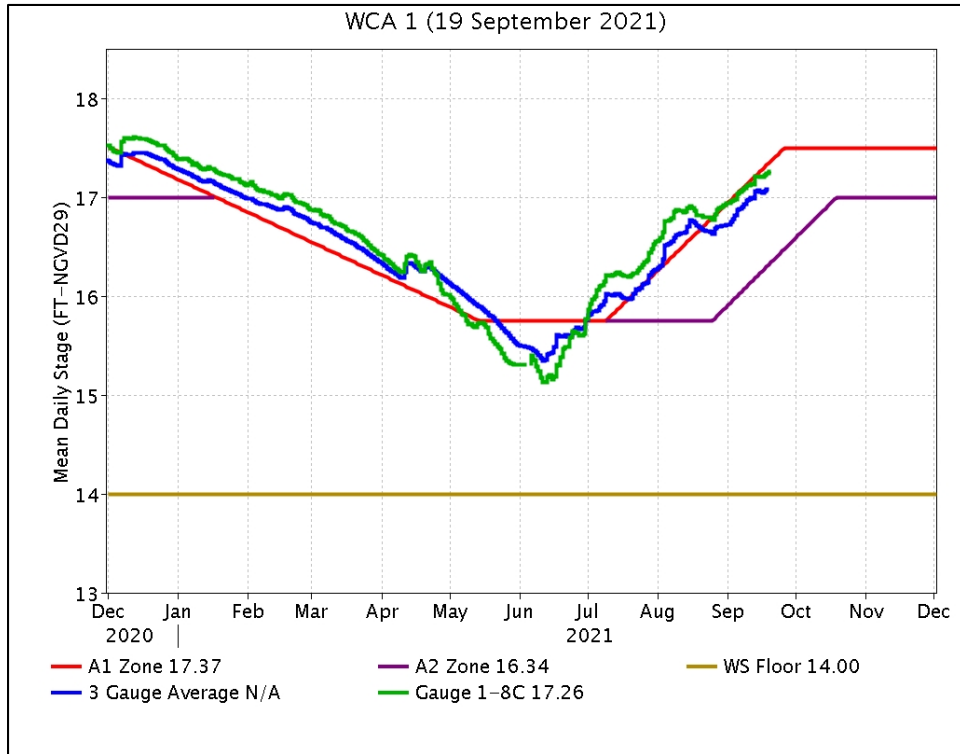


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

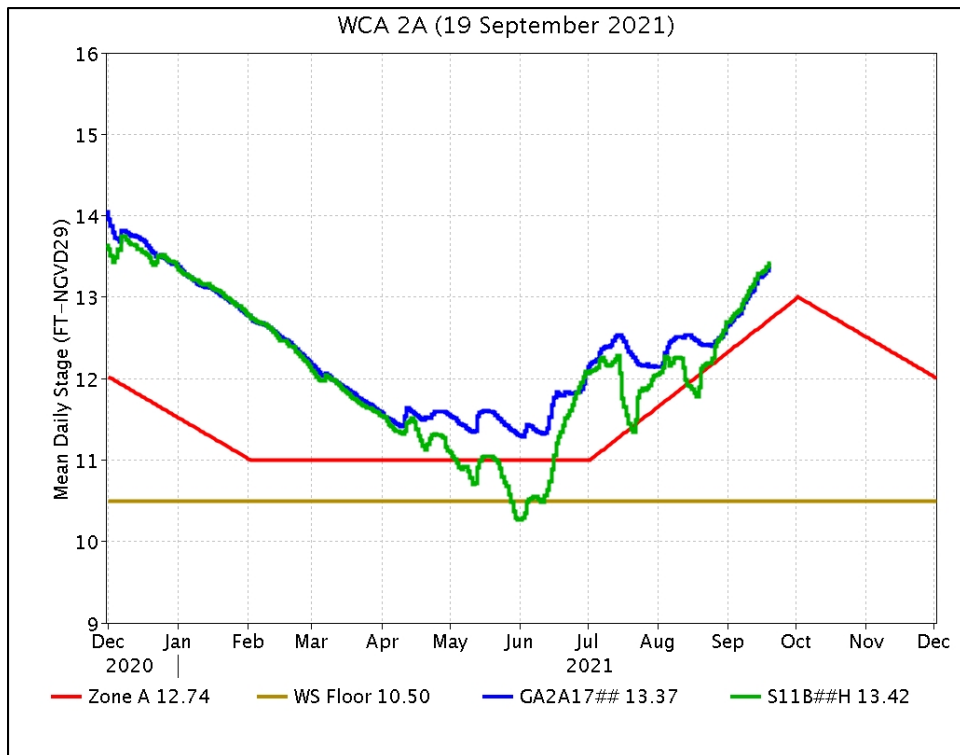


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

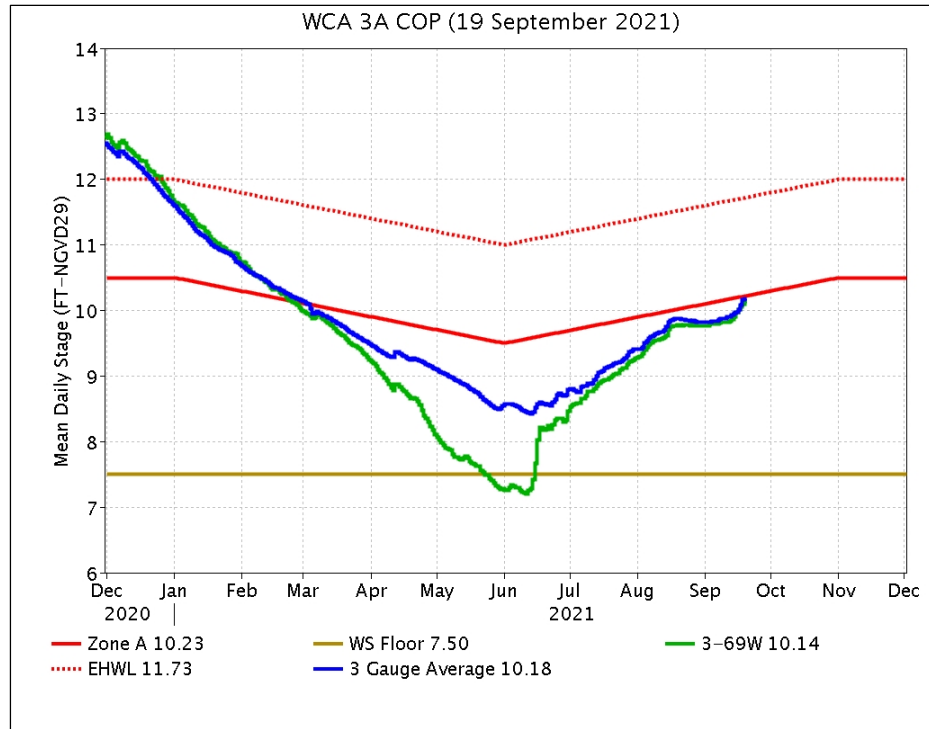


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

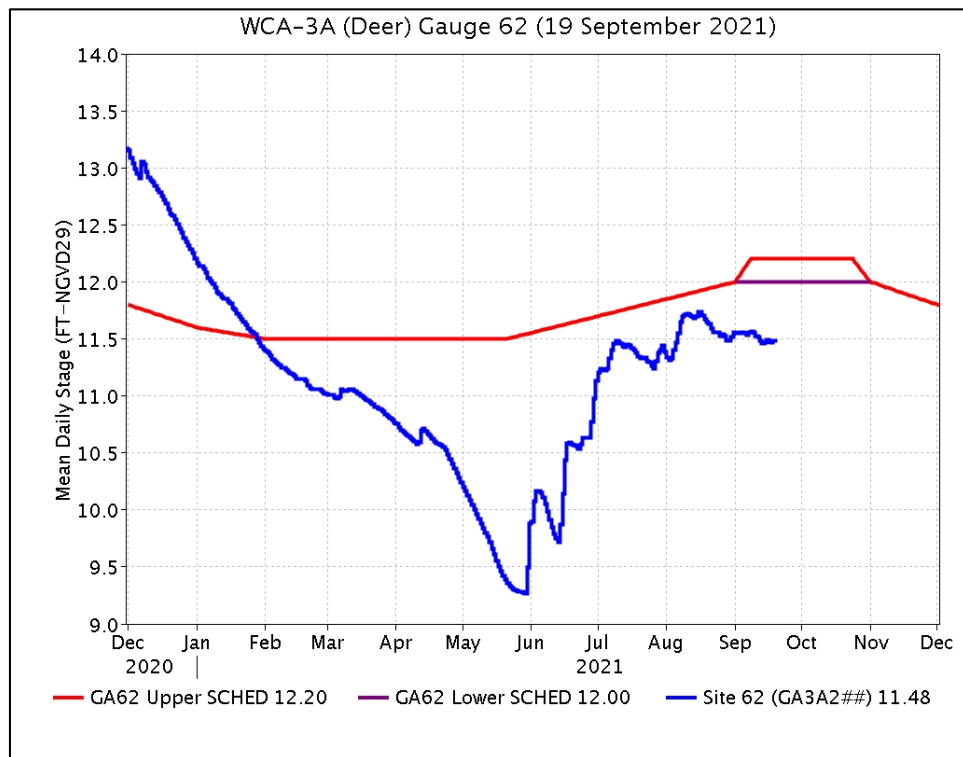


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

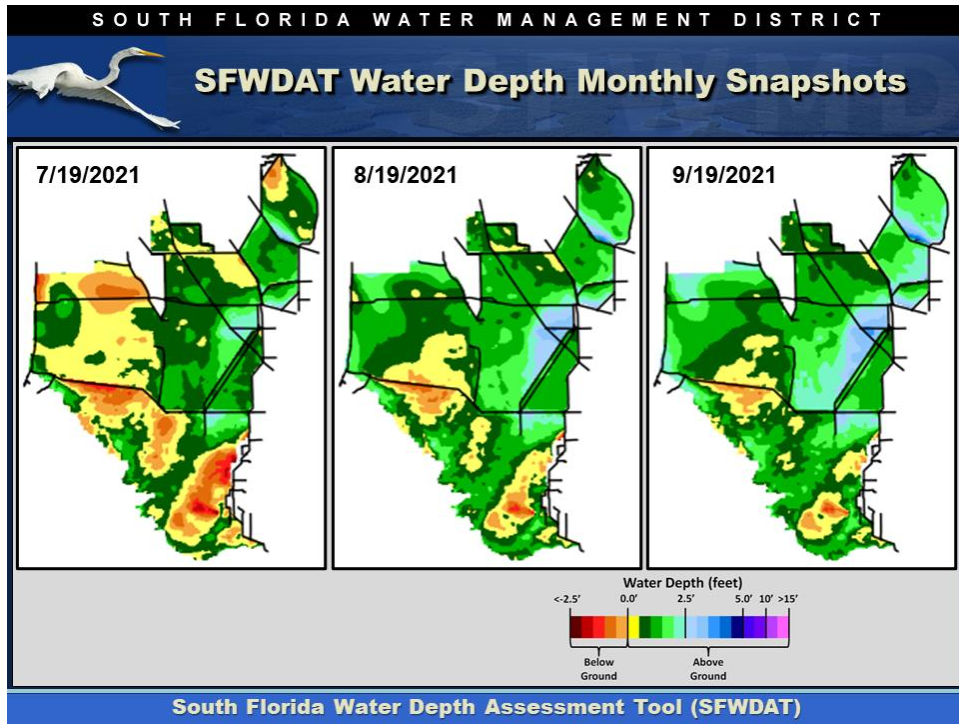


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

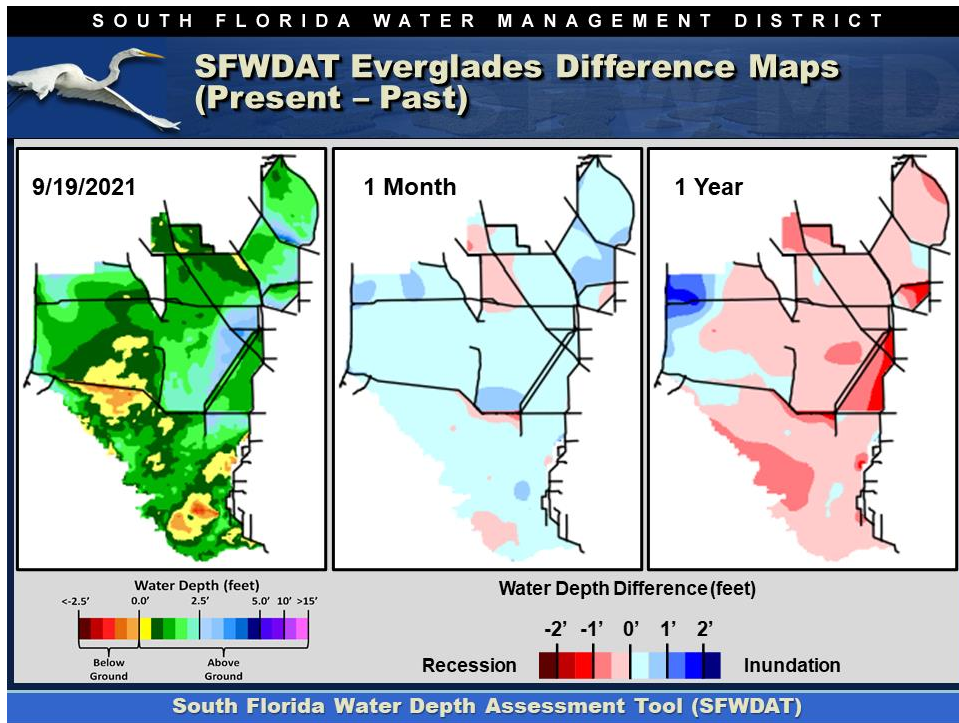


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

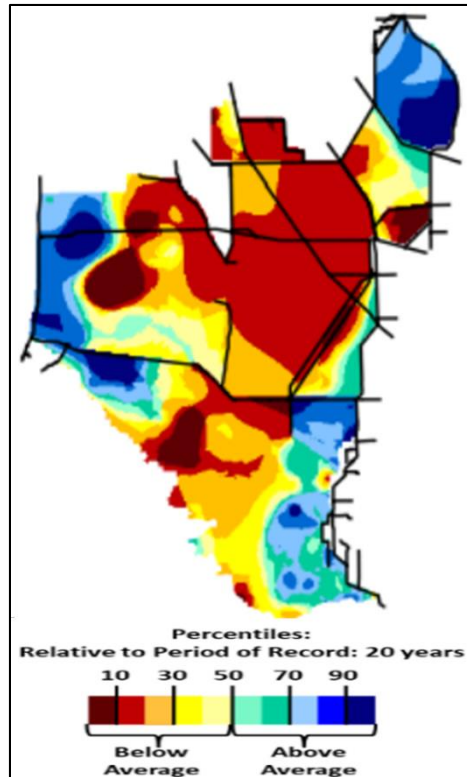


Figure EV-7. Present water depths compared to the day of year median over the previous 20 years.

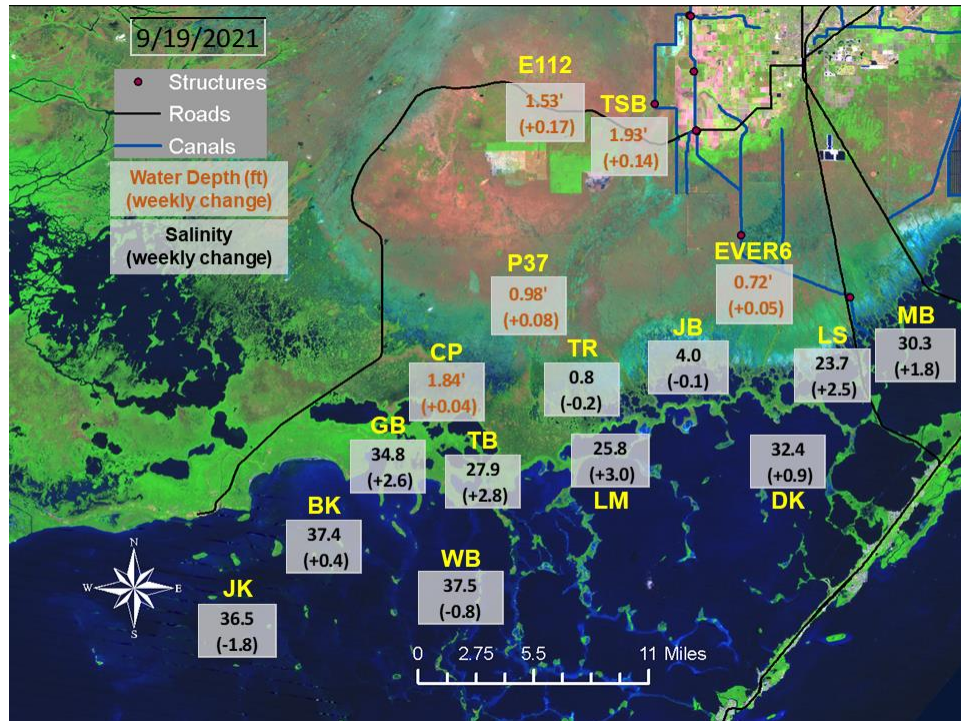


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

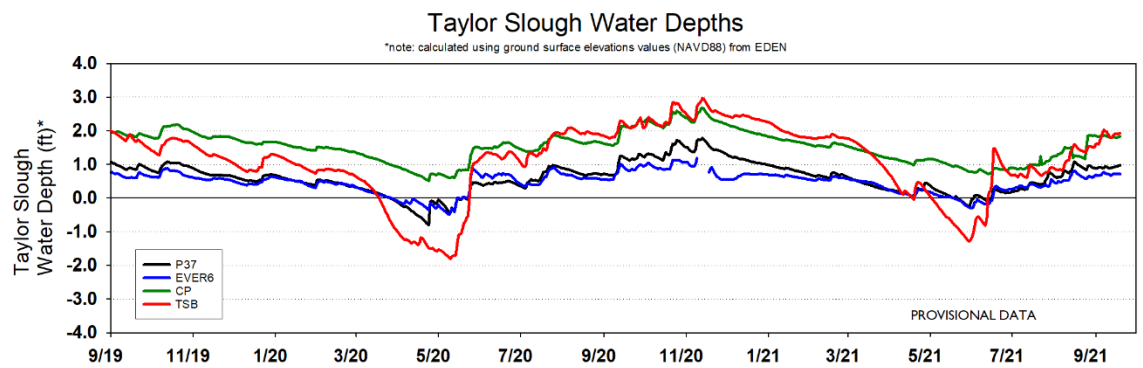


Figure EV-9. Taylor Slough water depth time series.

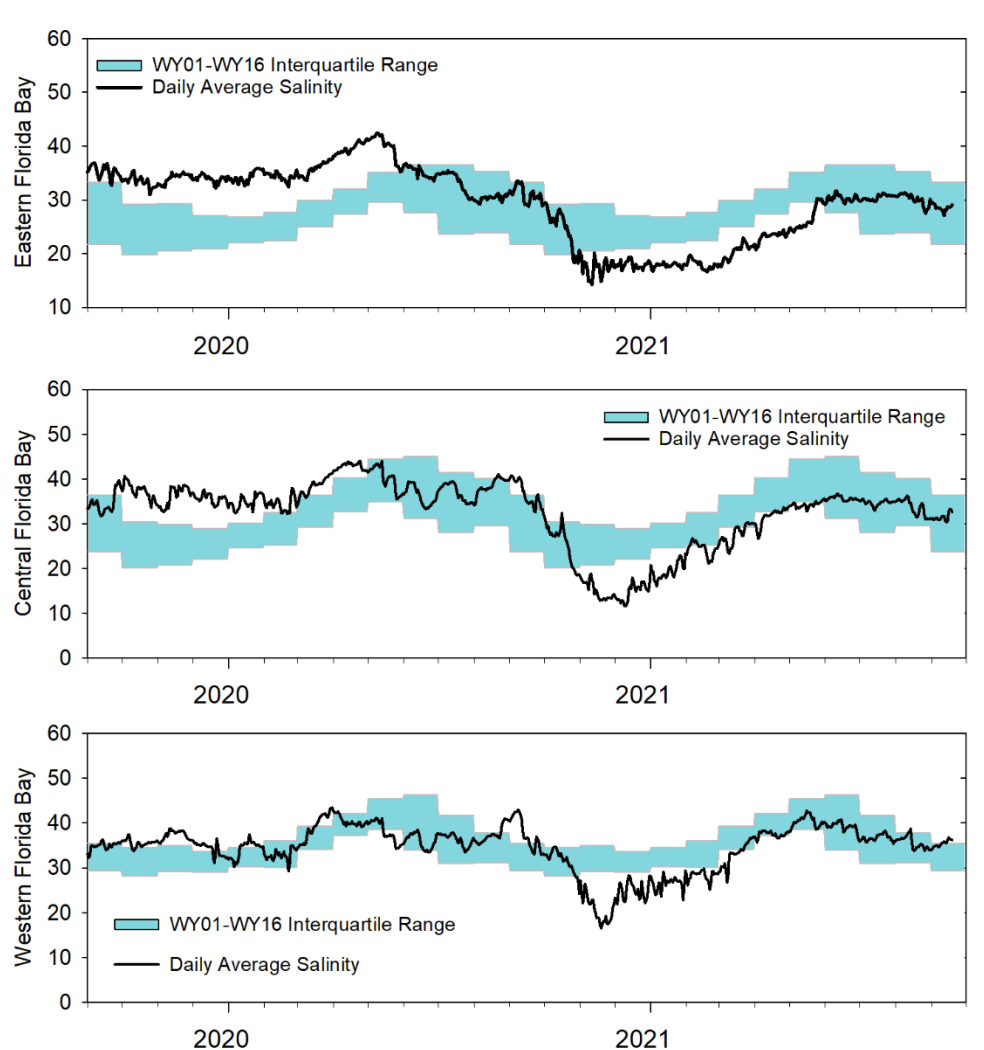


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, September 21, 2021 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.10'	Maintain ascension rates of less than 0.25 feet per week or 0.50 feet per two weeks.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage increased by 0.31'	Moderate ascension rate to less than 0.50 feet per two weeks.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage increased by 0.06'	Maintain ascension rates of less than 0.25 feet per week or 0.50 feet per two weeks	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage increased by 0.23'	Maintain an ascension rates of less than 0.50 feet per two weeks.	Protect within basin peat soils and downstream habitat and wildlife.
WCA-3A NW	Stage decreased by 0.06'	Initiate an ascension rates of less than 0.25 feet per week or 0.50 feet per two weeks.	
Central WCA-3A S	Stage increased by 0.18'	Maintain an ascension rates of less than 0.25 feet per week or 0.50 feet per two weeks.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage increased by 0.45'		
WCA-3B	Stage increased by 0.11'	Maintain ascension rates of less than 0.25 feet per week or 0.50 feet per two weeks.	Protect within basin and downstream habitat and wildlife.
ENP-SRS	Stage increased by 0.16'	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 +0.02' to +0.17'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -1.8 to +3.0	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.