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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 15, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Strong sinking air most likely favors total below normal rainfall on Wednesday. The leading edge of greater moisture from Nicholas could support a good coverage of afternoon rains over the south and southwest of Lake Okeechobee, especially over inland areas. However, there is a high degree of uncertainty regarding the likelihood of rains over this region. Moderately heavy or heavy rains over the Florida Keys and along and near the southwest coast overnight Wednesday are likely. Late this week, copious moisture from what was Nicholas will be brought over the District. The result should be an increase of rain late this week, with the focus of the rains around and southwest to west of Lake Okeechobee. Some of the rainfall totals Thursday and Friday over the western half of the District could be substantial. Rainfall could still be enhanced on Saturday over the interior but with a shift toward the east. Late in the weekend, an easterly steering wind regime is seen developing, and although there could be a temporary reduction in available moisture, a new surge of greater moisture could occur by Monday when another tropical wave moves into southern and central Florida from the Bahamas. The increasingly deep moisture by Monday could result in a widespread coverage of rainfall and with an elevated risk of localized, significant rainfall. For the week ending next Tuesday morning, total District rainfall is predicted to be somewhat above normal and should be at least near normal. The heaviest weekly rains are most likely to occur around and southwest or west of Lake Okeechobee through the west coast.

Kissimmee

Flow at S-65A continues to be too low for complete inundation of the Kissimmee River floodplain. Mean floodplain water depth increased to 1.04 feet by September 12, 2021. Following discharge reductions in late August, dissolved oxygen concentrations in the Kissimmee River have risen above 2 mg/L, the threshold below which considered harmful to sunfish.

Lake Okeechobee

Lake Okeechobee stage was 14.80 feet NGVD on September 12, 2021, 0.63 feet higher than a month ago, and 0.01 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 have been above the ecological envelope since early July and are approximately 0.02 feet above (**Figure LO-2**). There have been little to no outflows from the Lake since late June 2021. Recent satellite imagery (September 11, 2021) showed medium bloom potential in the western, northeastern and southern parts of the Lake, and low to medium bloom potential in the west-central region (**Figure LO-5**).

Estuaries

Total inflow to the St. Lucie Estuary averaged 2,189 cfs over the past week with no flow coming from Lake Okeechobee. Mean surface salinities increased at all sites in the estuary over the past week. Salinity at the US1 Bridge was in the fair range (10-26) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 3,143 cfs over the past week with no flow coming from the Lake. Mean surface salinities remained the same at Val I-75, increased at Shell Point, and decreased at the remaining sites in the estuary over the past week. Salinities were in the good range (0-10) for tape grass at Val I-75 and Ft. Myers. Salinities were also in the good range (10-30) for adult eastern oysters at Shell Point and in the fair range at Cape Coral.

Stormwater Treatment Areas

For the week ending Sunday, September 12, 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 593,000 ac-feet. Most STA cells are above 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. 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 to fair across most of the Everglades Protection Area, the exceptions were northwestern and southern WCA-3A. Depth conditions in WCA-3A North are stable and remain below the historical median across that sub-basin. In Florida Bay salinities again remained unchanged and stages increased in Taylor Slough on average. Florida Bay is averaging 2 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 12, 2021, lake stages were 57.5 feet NGVD (0.8 feet above schedule) in East Lake Toho, 53.8 feet NGVD (0.1 feet above schedule) in Lake Toho, and 50.7 feet NGVD (0.5 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

Discharges to the Kissimmee River on September 12, 2021 were 530 cfs at S-65 and 1,350 cfs at S-65A; discharges from the Kissimmee River were 1,540 cfs at S-65D and 1,600 cfs at S-65E (**Table KB-2**). Headwater stages were 46.6 feet NGVD at S-65A and 28.5 feet NGVD at S-65D on September 12, 2021. The concentration of dissolved oxygen in the Kissimmee River continued to improve, with the average for the week ending on September 12, 2021 at 2.2 mg/L after a few weeks below the 1.0 mg/L threshold considered potentially lethal for sunfish (**Table KB-2, Figure KB-4**). Discharge at S-65/S-65A was reduced in late August; the resulting reduction in water depth was a factor in the improvements in dissolved oxygen. Flow at S-65A remains too low for complete inundation of the Kissimmee River floodplain, and mean floodplain depth increased to 1.04 feet by September 12, 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)	
							9/12/21	9/5/21
Lakes Hart and Mary Jane	S-62	LKMJ	257	60.2	R	60.0	0.2	0.1
Lakes Myrtle, Preston and Joel	S-57	S-57	54	61.0	R	61.0	0.0	0.1
Alligator Chain	S-60	ALLI	105	63.3	R	63.2	0.1	0.0
Lake Gentry	S-63	LKGT	156	61.1	R	61.0	0.1	0.0
East Lake Toho	S-59	TOHOE	519	57.5	R	56.7	0.8	0.0
Lake Toho	S-61	TOHOW S-61	681	53.8	R	53.7	0.1	0.0
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	1,109	50.7	R	51.2	-0.5	-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.

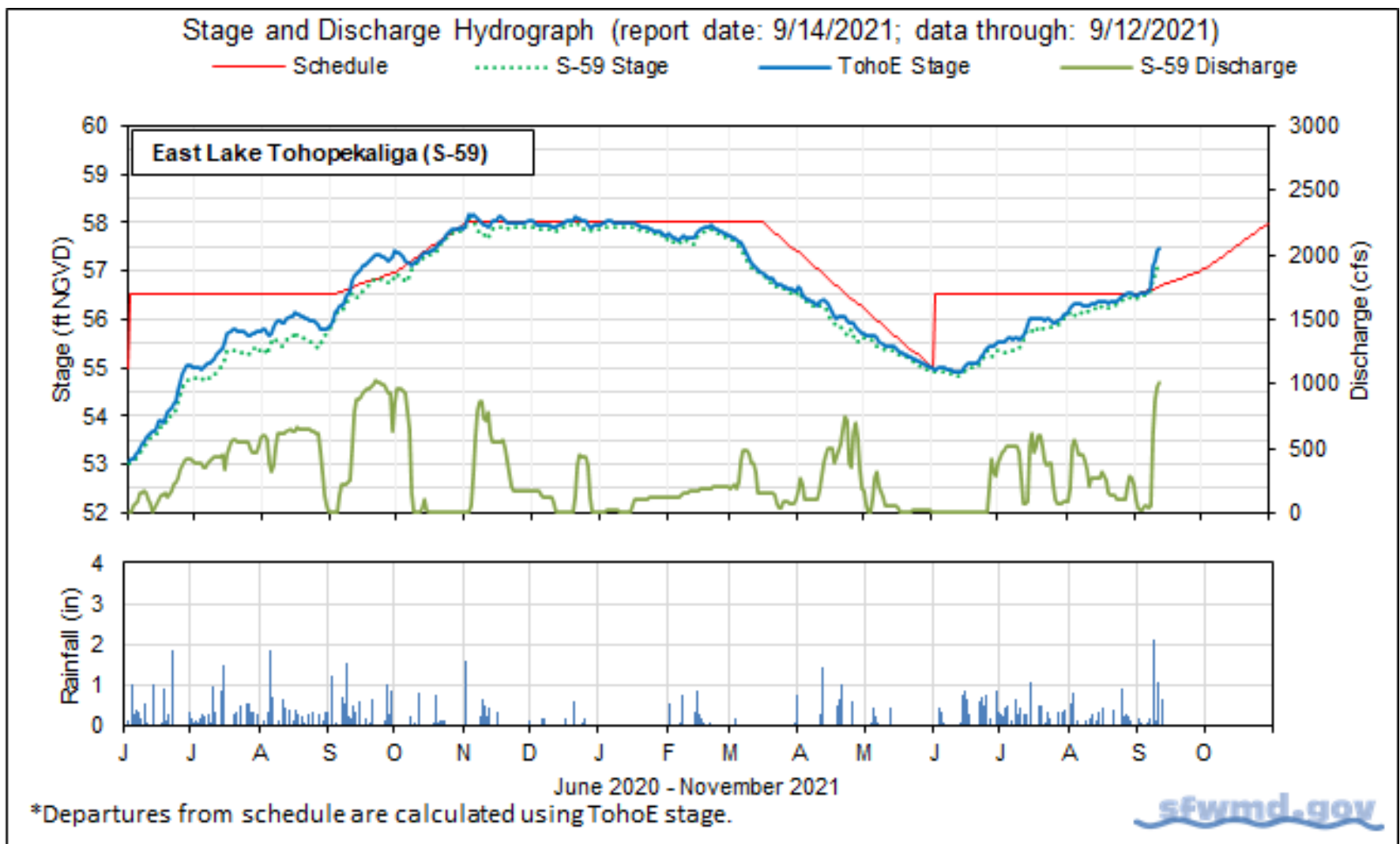


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

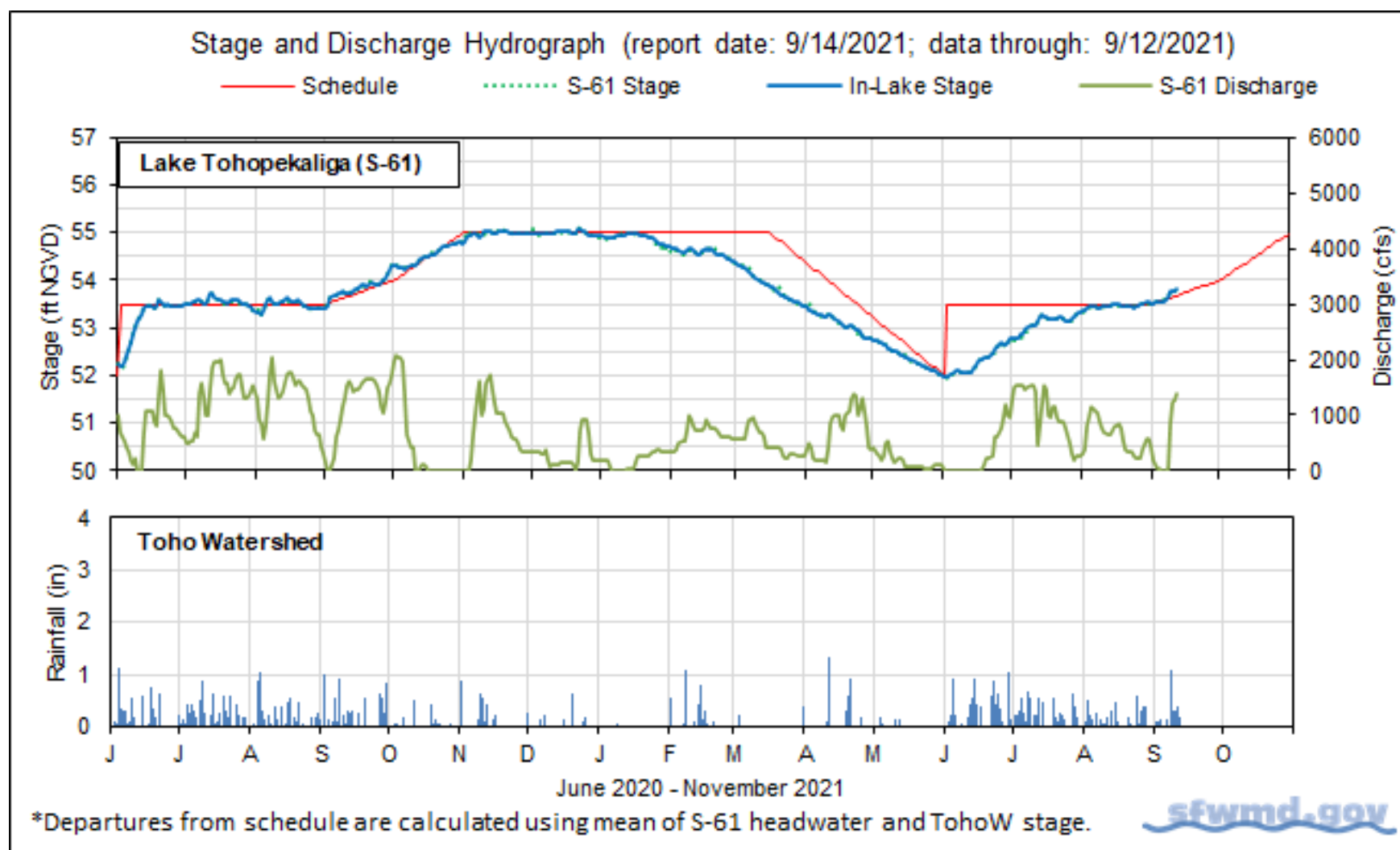


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

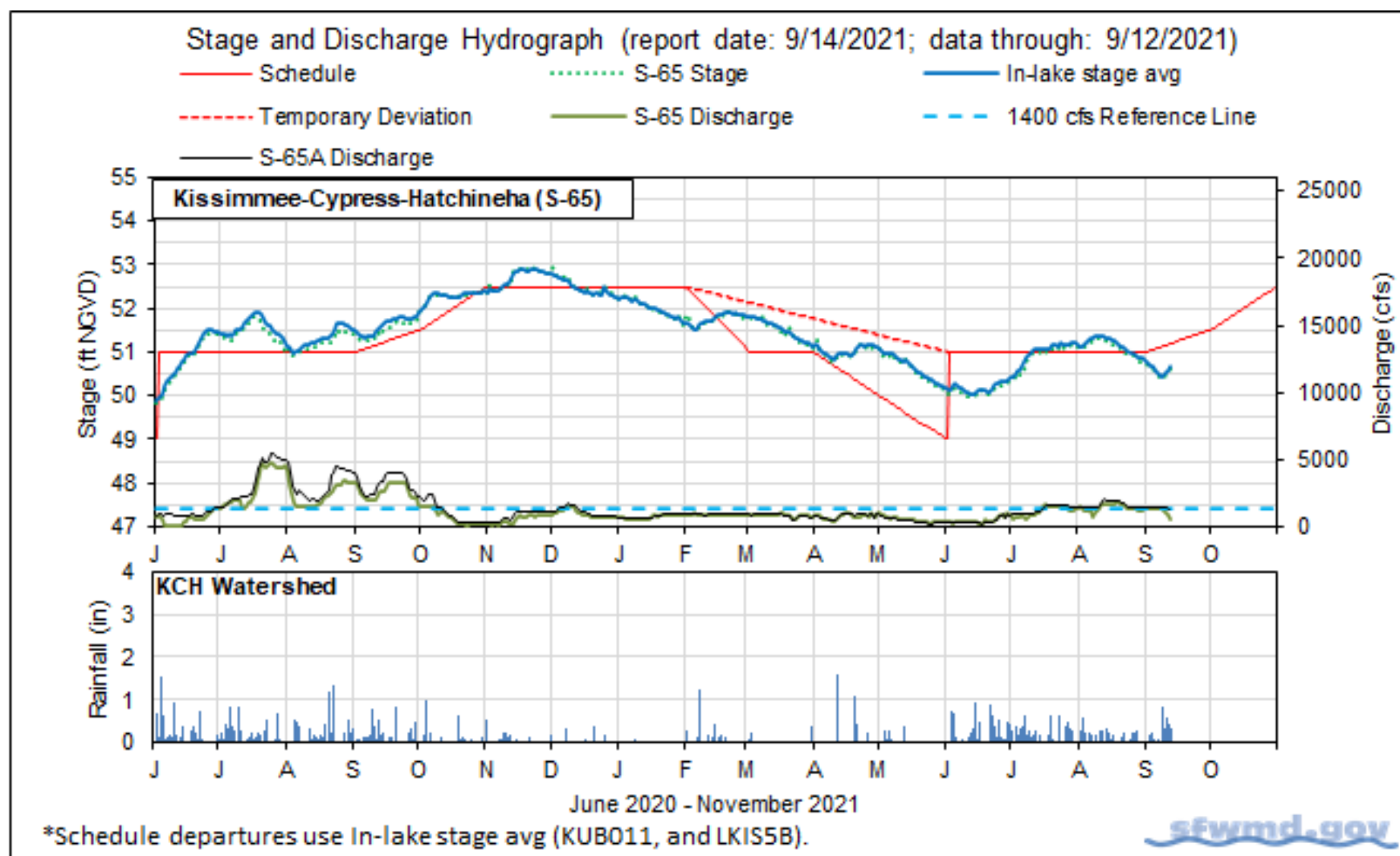


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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 9/12/21	Average for Previous Seven Day Periods			
			9/12/21	9/5/21	8/29/21	8/22/21
Discharge	S-65	530	1,110	1,360	1,360	1,700
Discharge	S-65A ^a	1,350	1,400	1,410	1,450	1,900
Headwater Stage (feet NGVD)	S-65A	46.6	46.5	46.3	46.3	46.3
Discharge	S-65D ^b	1,540	1,570	1,770	2,030	2,040
Headwater Stage (feet NGVD)	S-65D ^c	28.5	28.4	28.4	28.5	28.5
Discharge (cfs)	S-65E ^d	1,600	1,640	1,840	2,100	2,260
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	1.9	2.2	1.6	0.7	0.3
Mean depth (feet) ^f	Phase I floodplain	1.04	0.94	0.99	1.11	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.

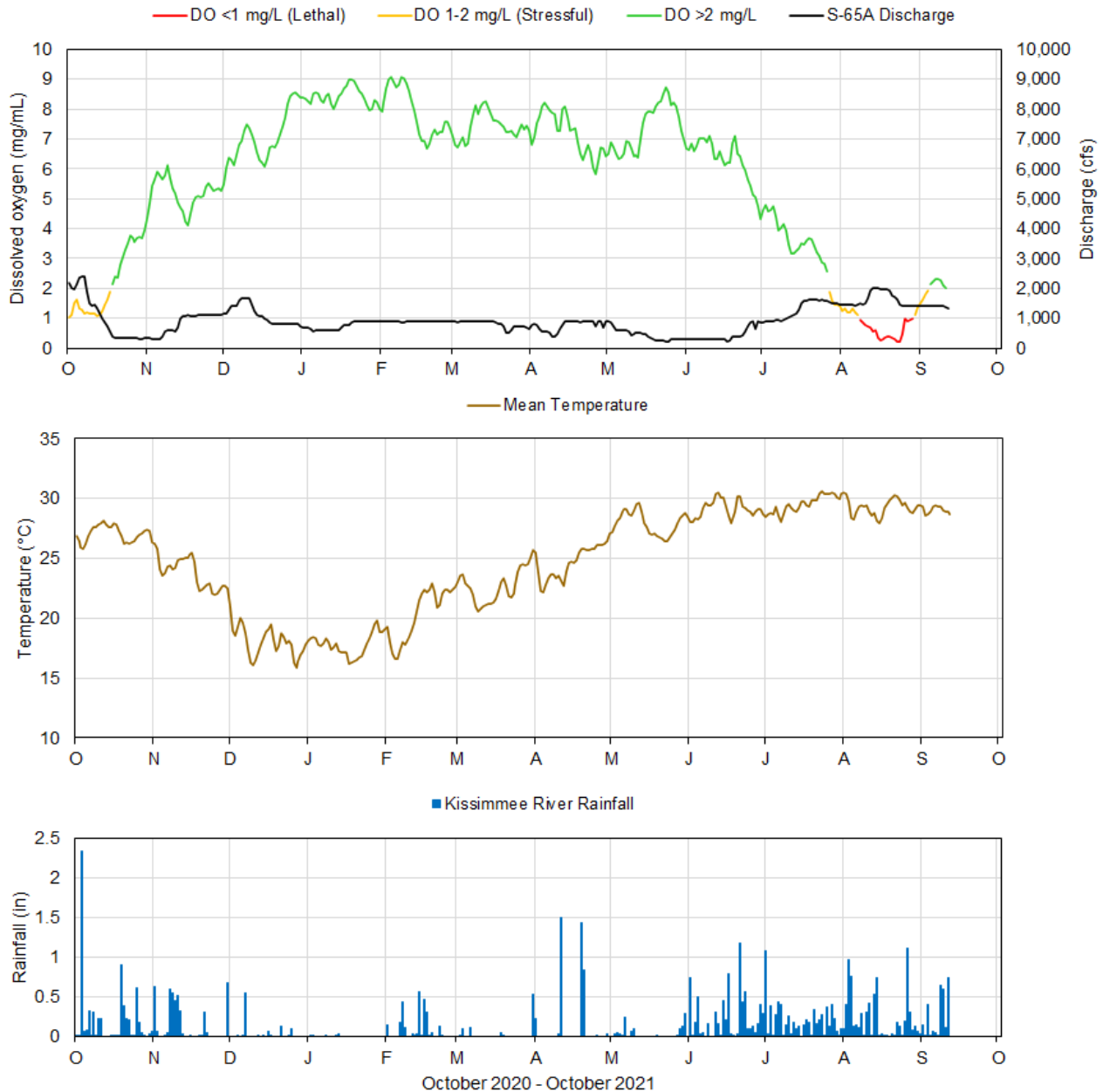
d. Combined discharge from S-65E and S-65EX1.

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: 9/14/2021; data are through: 9/12/2021

sfwmd.gov

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

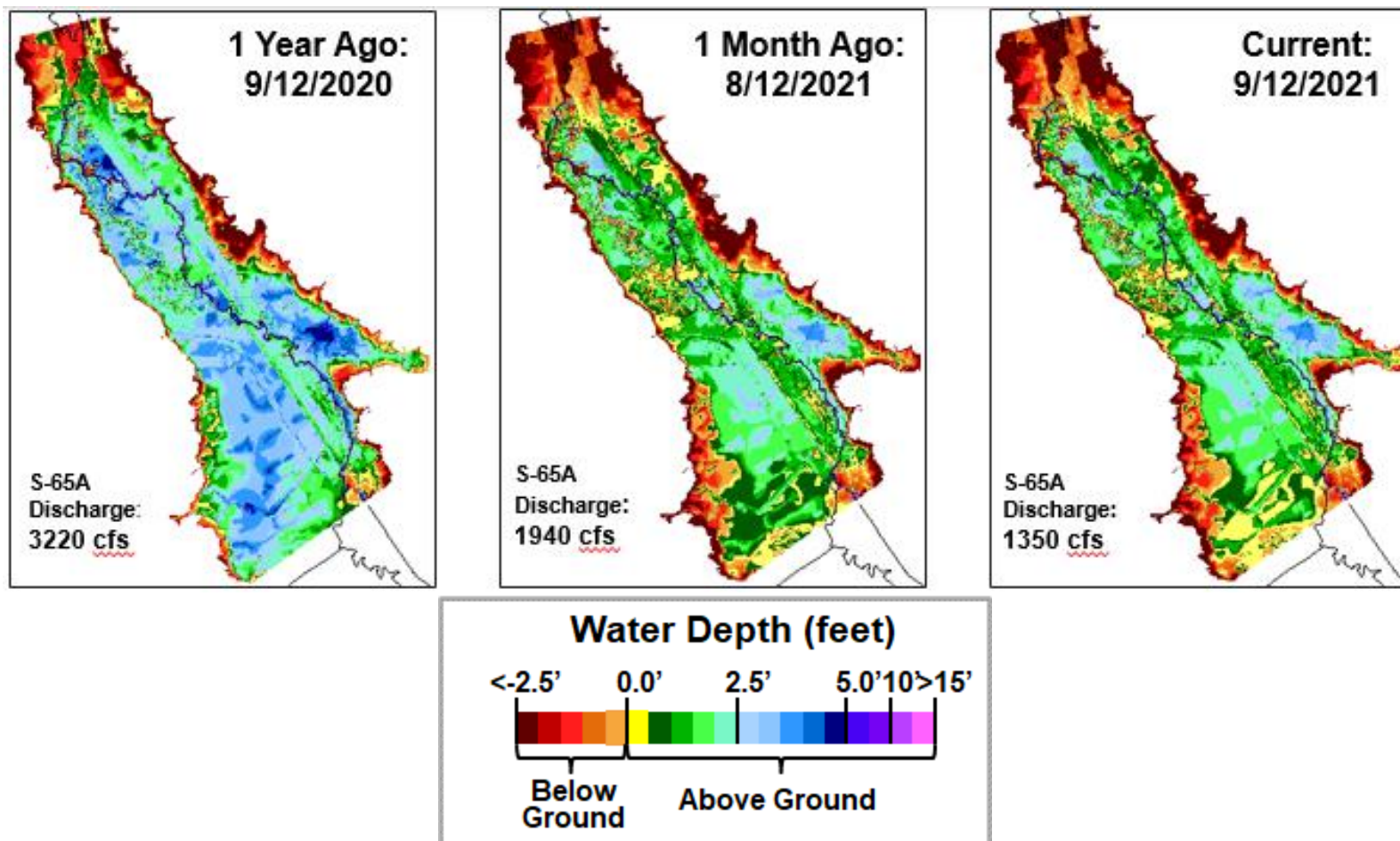


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

Lake Okeechobee

Lake Okeechobee stage was 14.80 feet NGVD on September 12, 2021, 0.63 feet higher than a month ago, and 0.01 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 recently due to increased precipitation and inflows over the last several weeks and have been above the ecological envelope since early-July, now approximately 0.02 foot above (**Figure LO-2**). Lake stage remained in the Low sub-band last week (**Figure LO-3**). According to NEXRAD, 2.08 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) increased from the previous week, going from 2,928 cubic feet per second (cfs) to 3,071 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 (~37 % of the total or 1,636 cfs) came from the Kissimmee River through S-65E & S-65EX1 structures, C-40 & C-41 canals (~8 % of the total or 360 cfs) through S-71 & S-72 structures, and C-41A canal via S-84 and S-84X structures (~6 % of the total or 280 cfs). 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 109 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 11, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed medium bloom potential in the western, northeastern and southern parts of the Lake, and low to medium bloom potential in the west-central region (**Figure LO-5**).

In late August, phytoplankton biomass was highest in the southern part of the Lake, and along the northern and western nearshore areas of the Lake. Blooms (chl a > 40 µg/L) were recorded at only 3 sites (or 9%). The highest biomass (90.4 µg/L) was recorded at RITTAE2 in the southern part of the Lake. The number of sites with bloom conditions decreased by 19% (from 9 to 3 sites) since early August. In early September, a total of 20 sites (or 63 %) had communities dominated by *Microcystis aeruginosa* and 11 sites (or 34 %) had mixed communities. LZ25A site had communities dominated by *Cylindrospermopsis raciborskii*. The number of sites dominated by *M. aeruginosa* was 13 % higher compared to early August and was the highest since early June. The incomplete results for the September 7-9, 2021 survey are shown in **Table LO-2** and **Figure LO-6**.

Preliminary 2021 Submerged Aquatic Vegetation (SAV) survey results revealed a roughly 75% (12,000 acres) decline in total SAV areal coverage and up to a 50% decline in vascular SAV coverage (drop to approximately 4,000 – 5,000 acres; level similar to 2018). Most of the biomass losses were recorded at deeper Lake locations **Figure LO-7**.

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	1839	1636	0.7	S-77	0	0	0.0
S-71 & S-72	264	360	0.1	*S-308	0	0	0.0
S-84 & S-84X	105	280	0.1	S-351	0	0	0.0
Fisheating Creek	221	210	0.1	S-352	0	0	0.0
S-154	55	88	0.0	S-354	0	0	0.0
S-191	0	24	0.0	*L-8 (S-271)	-99	-109	0.0
S-133 P	56	113	0.0	ET	2176	2720	1.1
S-127 P	11	7	0.0	Total	2176	2720	1.1
S-129 P	28	29	0.0				
S-131 P	26	27	0.0				
S-135 P	225	189	0.1				
S-2 P	0	0	0.0				
S-3 P	0	0	0.0				
S-4 P	0	0	0.0				
*Backflow	99	109	0.0				
Rainfall	1627	5879	2.3				
Total	4555	8949	3.6				

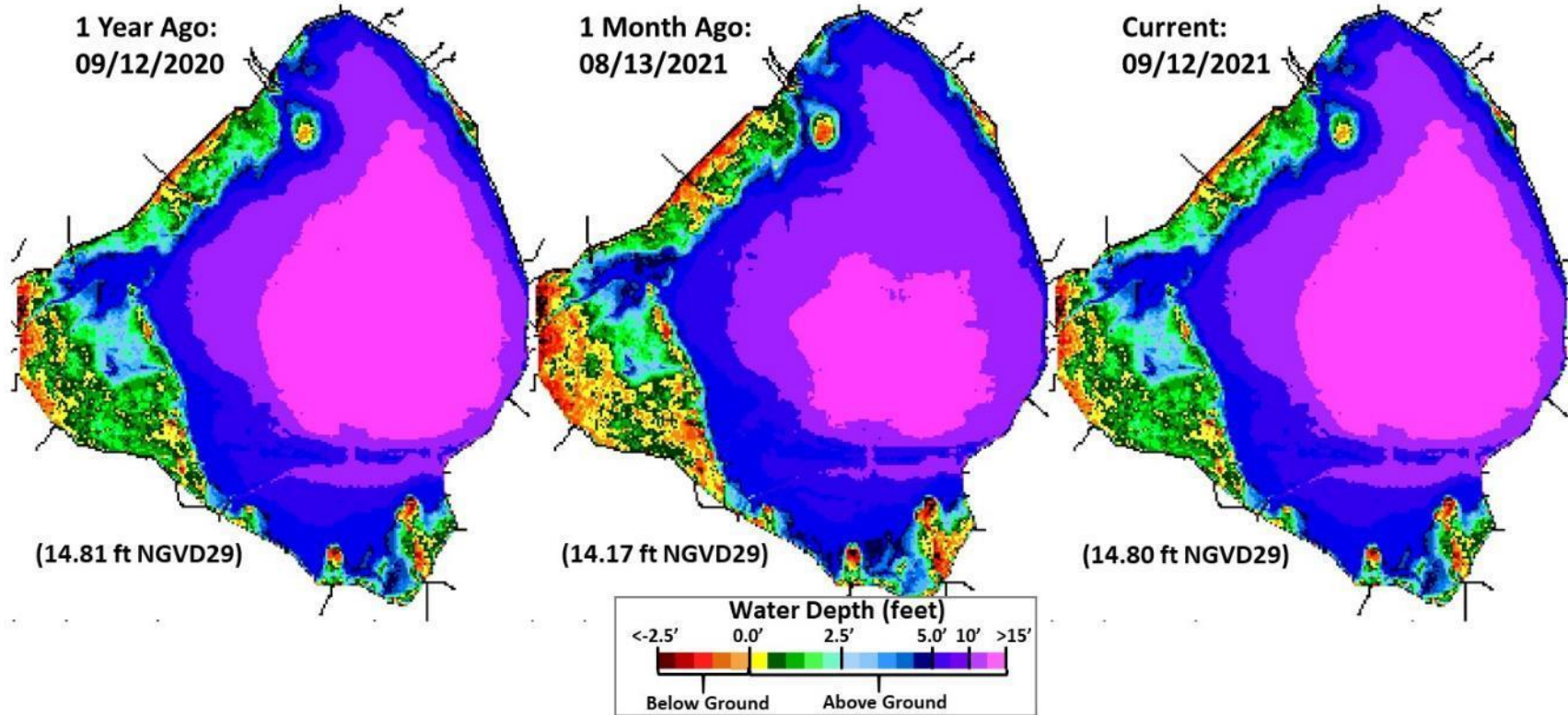


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

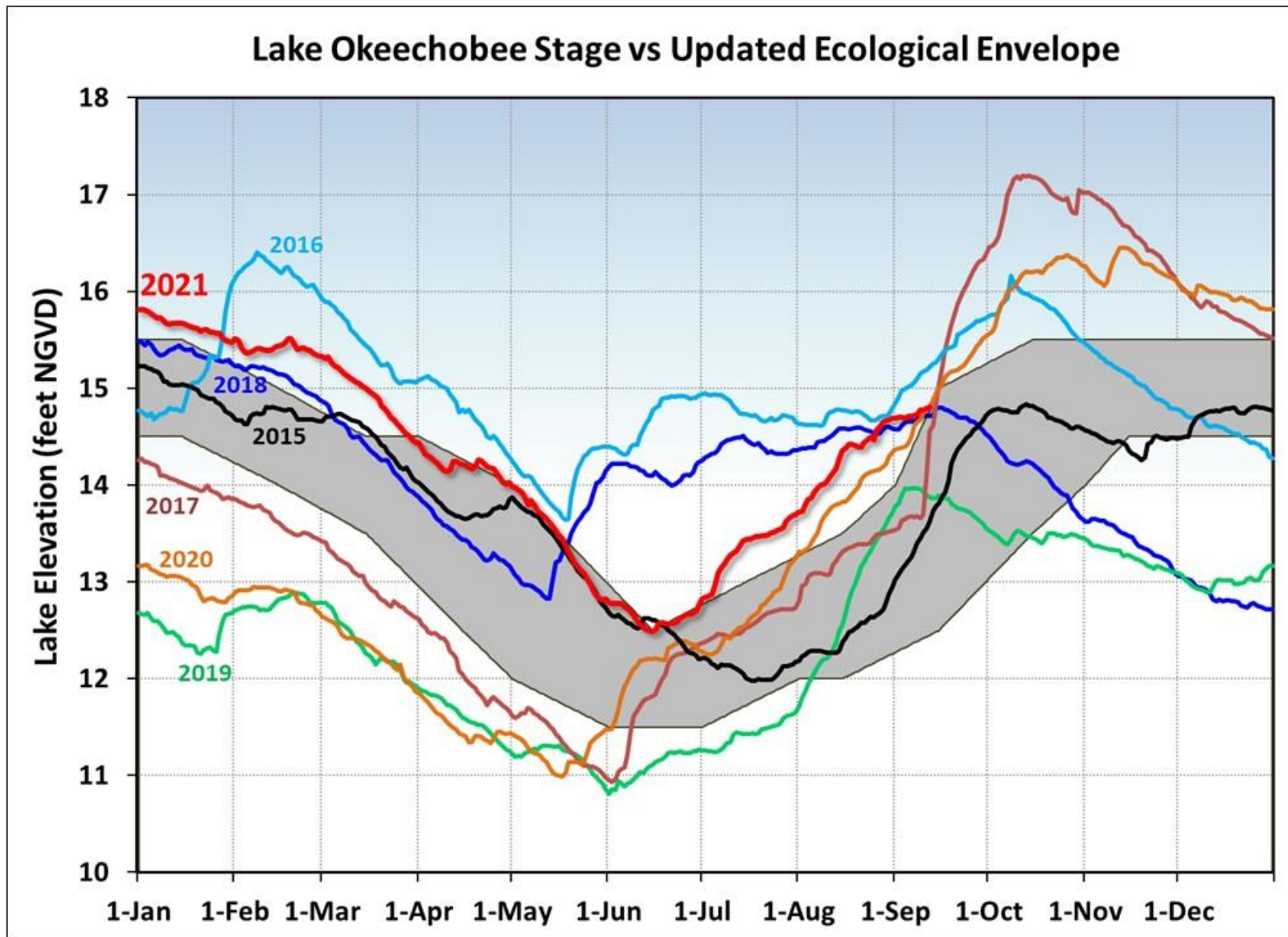


Figure LO-2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated ecological envelope.

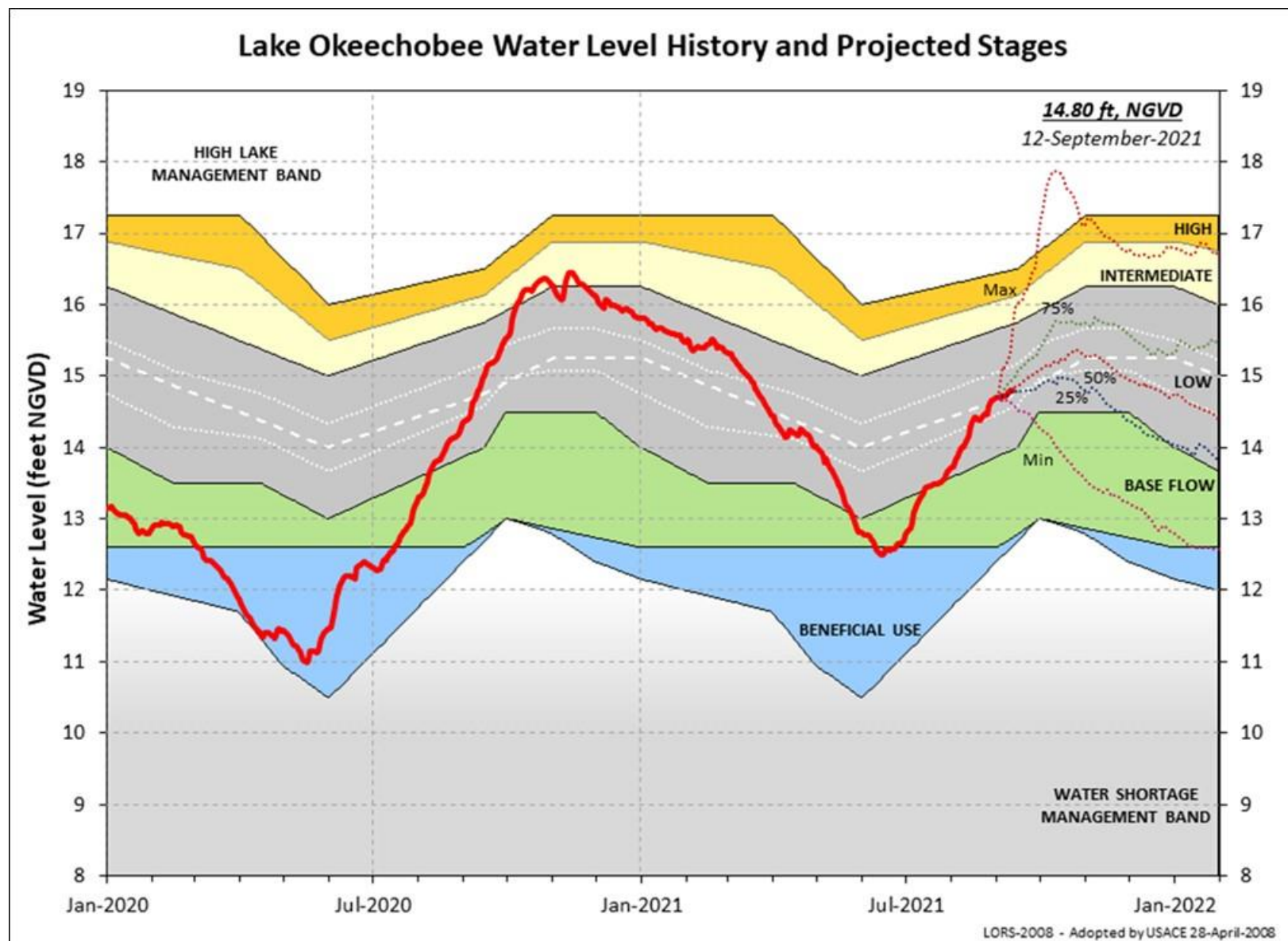


Figure LO-3. Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

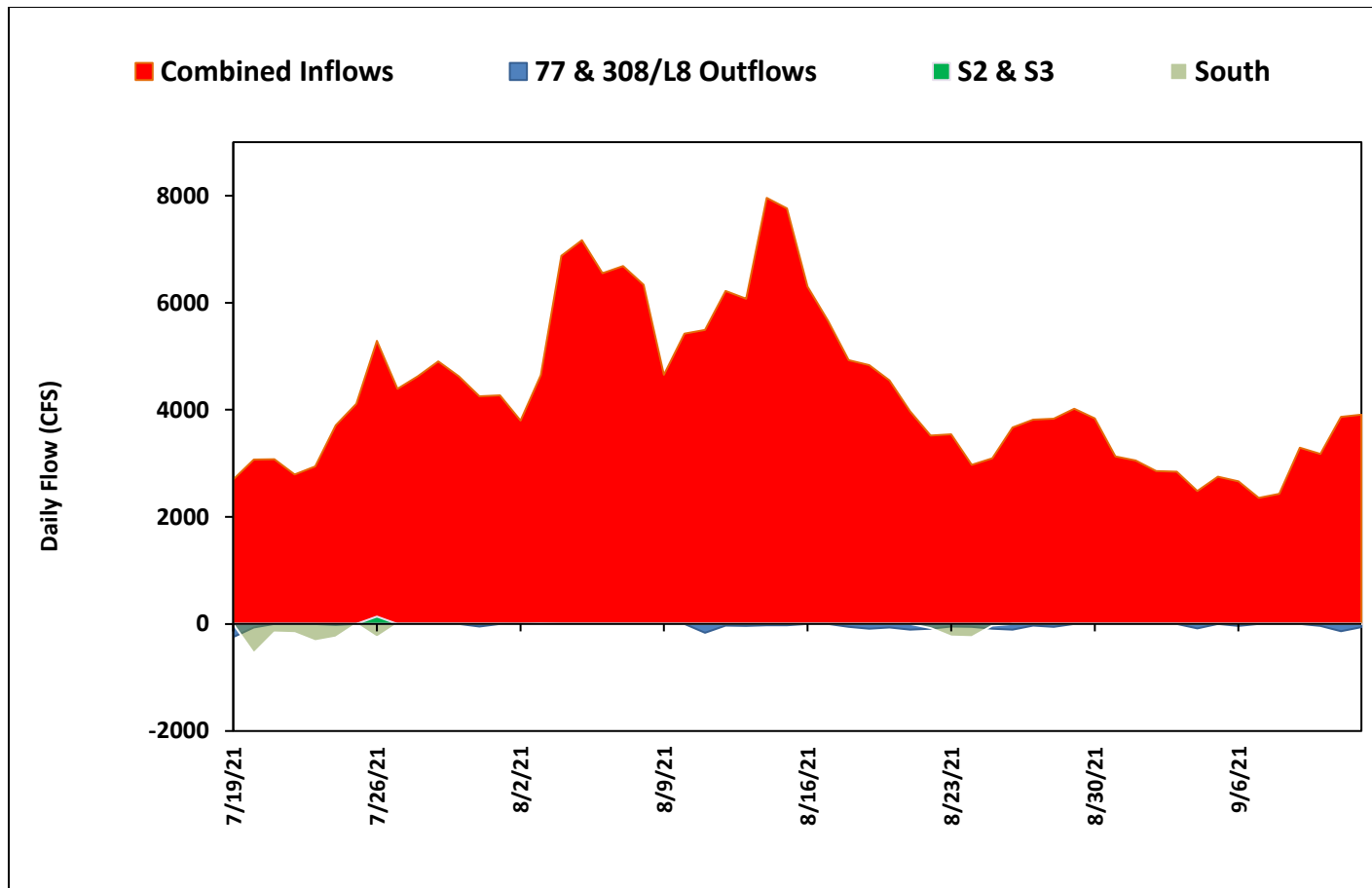
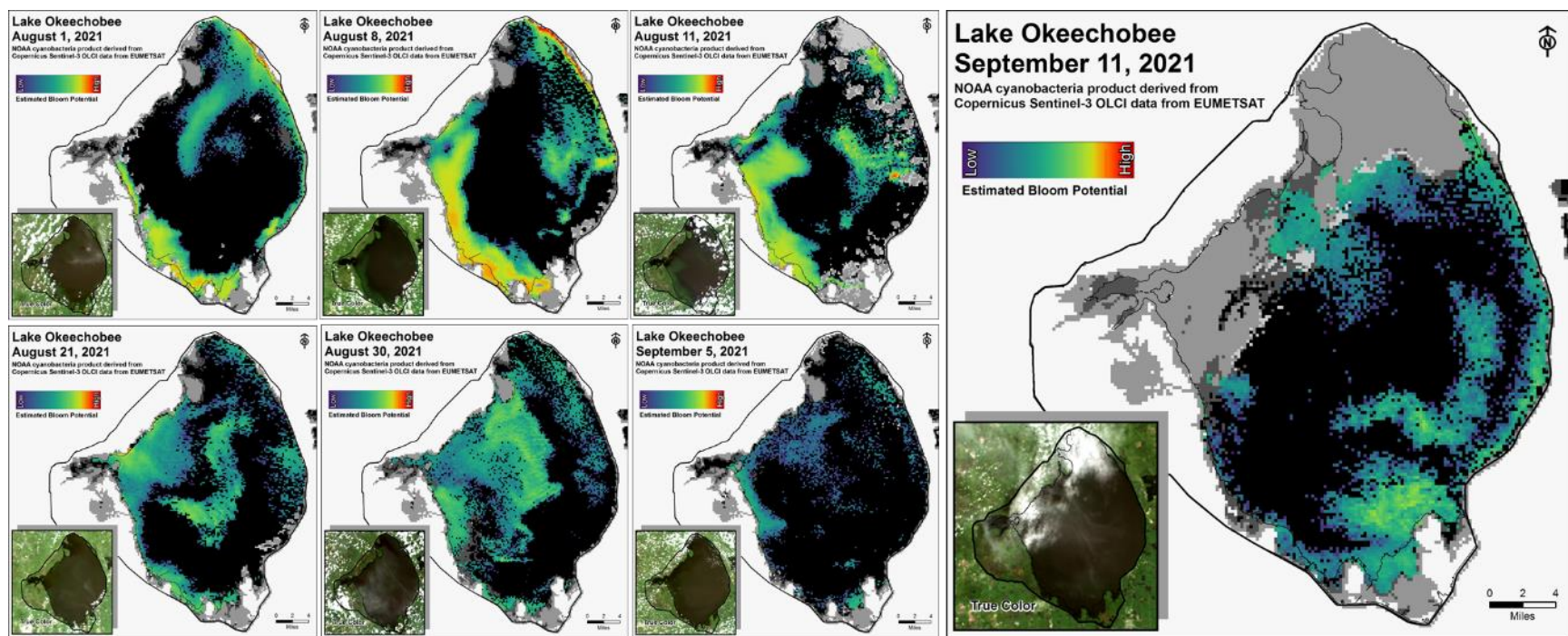


Figure LO-4. Major inflows (red) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in gray. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from Lake 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			
FEBOUT			
KISSR0.0	P	BDL	<i>mixed</i>
L005	P	4.3	<i>Microcys</i>
LZ2	P	BDL	<i>mixed</i>
KBARSE	P	BDL	<i>Microcys</i>
RITTAE2	P	BDL	<i>Cylindro</i>
PELBAY3	P	BDL	<i>mixed</i>
POLE3S	P	BDL	<i>mixed</i>
LZ25A	P	BDL	<i>mixed</i>
PALMOUT	P	0.4	<i>Microcys</i>
PALMOUT1	P	BDL	<i>Microcys</i>
PALMOUT2	P	BDL	<i>mixed</i>
PALMOUT3	P	0.3	<i>Microcys</i>
POLESOUT	P	BDL	<i>Microcys</i>
POLESOUT1	P	0.5	<i>mixed</i>
POLESOUT2	P	BDL	<i>mixed</i>
POLESOUT3	P	1.2	<i>Microcys</i>
EASTSHORE	P	0.4	<i>Microcys</i>
NES135	P	0.6	<i>Microcys</i>
NES191	P	0.3	<i>Microcys</i>

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
L001	P	0.3	<i>mixed</i>
L004	P	36	<i>Microcys</i>
L006	P	P	<i>Microcys</i>
L007	P	P	<i>Microcys</i>
L008	P	BDL	<i>Microcys</i>
LZ30	P	P	<i>Microcys</i>
LZ40	P	P	<i>Microcys</i>
CLV10A	P	P	<i>Microcys</i>
NCENTER	P	0.5	<i>Microcys</i>

S308C	P	BDL	<i>Microcys</i>
S77	P	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*

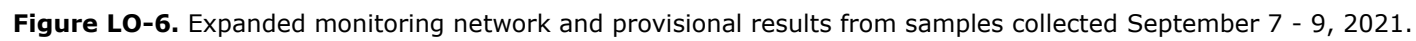


Figure LO-6. Expanded monitoring network and provisional results from samples collected September 7 - 9, 2021.

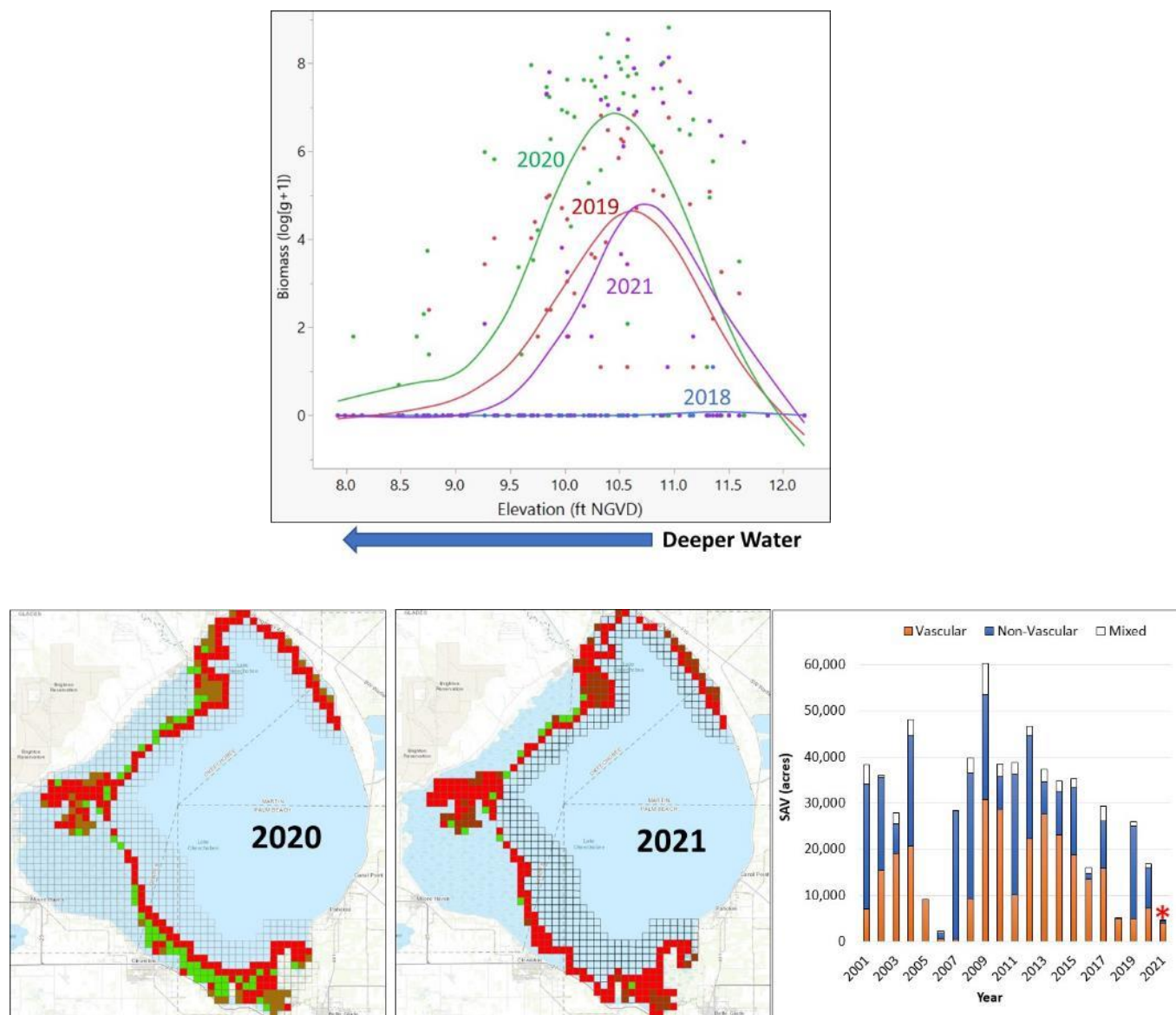


Figure LO-7. Changes in submersed aquatic vegetation (SAV) biomass along land elevation (graph on top), and shifts in spatial cover of SAV in nearshore regions of the Lake in 2021 compared to 2020 and temporal (period between 2001 and 2021) shifts in vascular, non-vascular and mixed SAV community cover across the Lake (maps and graph on the bottom).

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 2,189 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was approximately 2,035 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, surface salinities increased 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 9.0. 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 3,143 cfs (**Figures ES-5 and ES-6**) and the previous 30-day mean inflow was approximately 3,426 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-6**.

Over the past week, salinities remained the same at Val I-75, increased at Shell Point, and decreased at the remaining sites in the estuary (**Table ES-2 and Figures ES-7 and ES-8**). Salinities for Sanibel are missing since August 18, 2021. The seven-day mean surface salinities (**Table ES-2**) were in the good range (0-10) for tape grass at Val I-75 and Ft. Myers. The seven-day mean surface salinity values were within the good range for adult eastern oysters at 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 1500 cfs and steady releases at 2,000 cfs with estimated tidal basin inflows of 605 cfs. Model results from all scenarios predict daily salinity to be 0.8 or lower and the 30-day moving average surface salinity to be 0.3 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 September 10, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at very low to high concentrations in Charlotte County, and background to medium concentrations in and

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.

offshore of Lee County. On the east coast, red tide was not observed in samples from St. Lucie, Martin, or Palm Beach counties.

Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are Normal. 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.

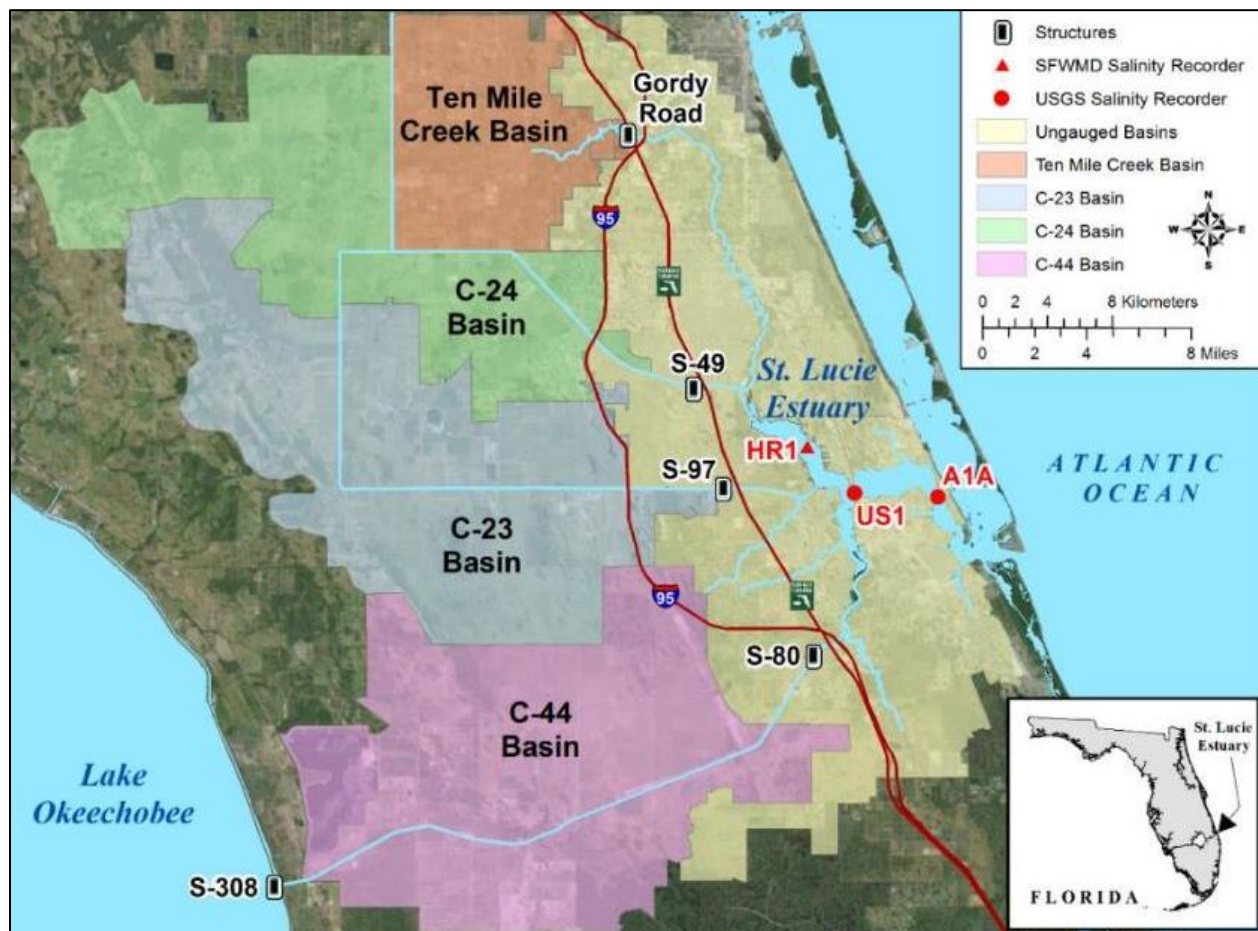


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

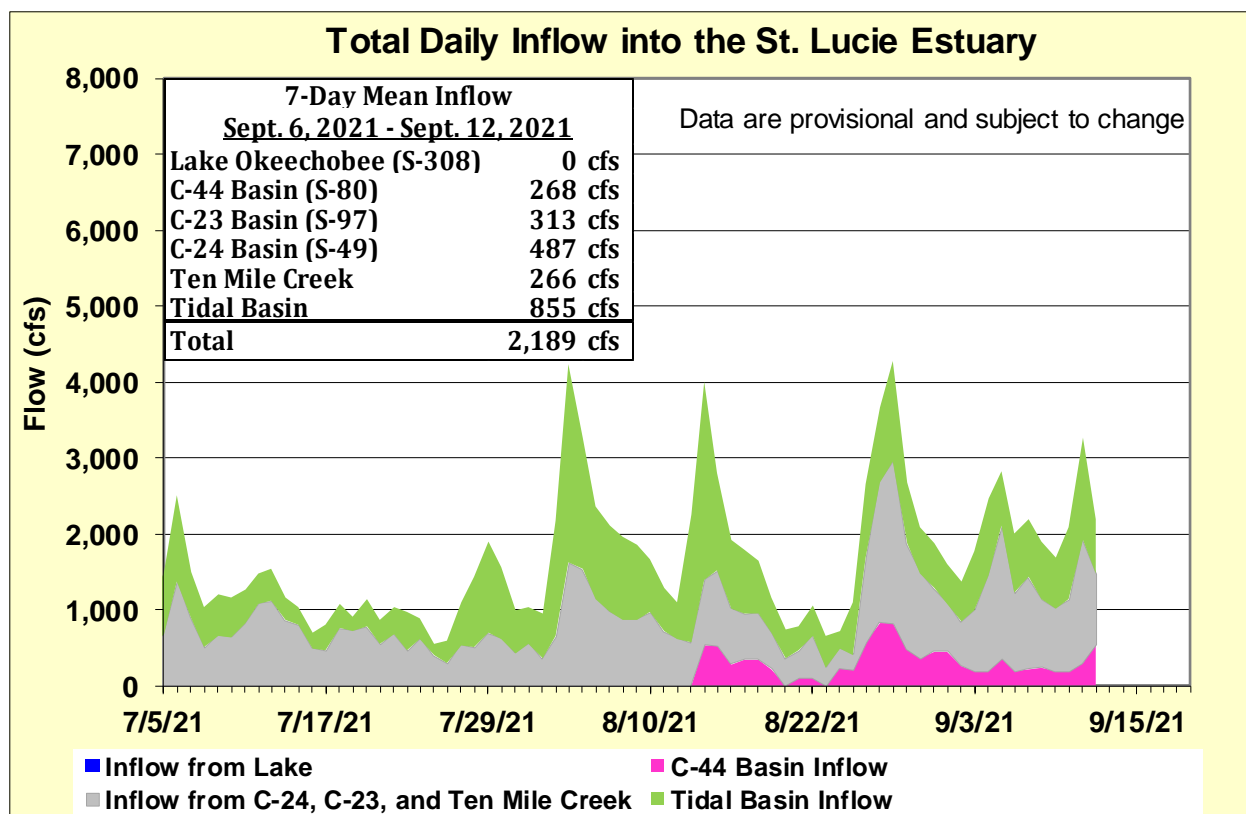


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	2.6 (1.3)	6.6 (3.8)	NA ^a
US1 Bridge	7.8 (5.8)	10.1 (10.6)	10.0 – 26.0
A1A Bridge	16.4 (13.1)	23.3 (23.4)	NA ^a

a. The envelope is not applicable.

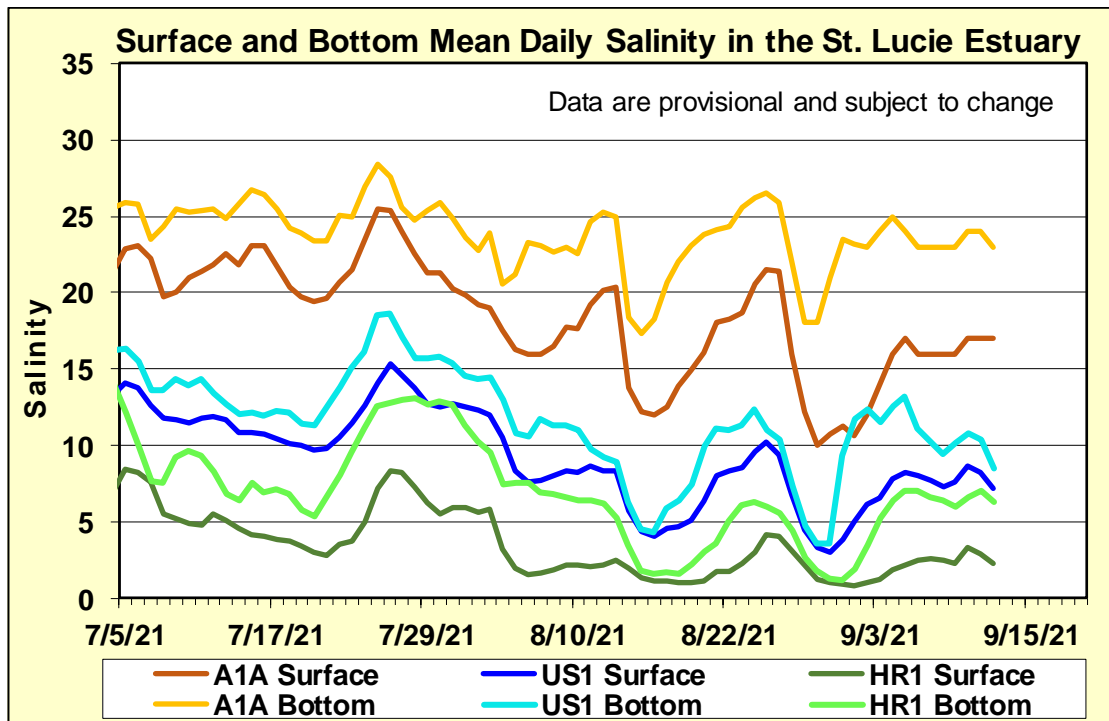


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

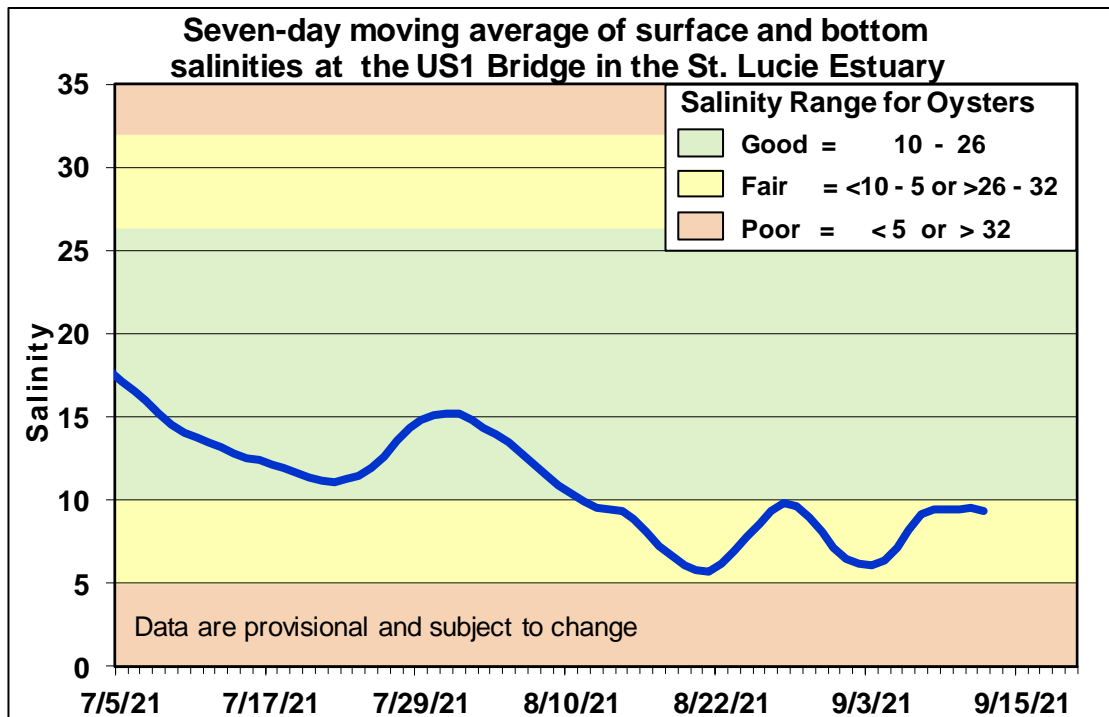


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

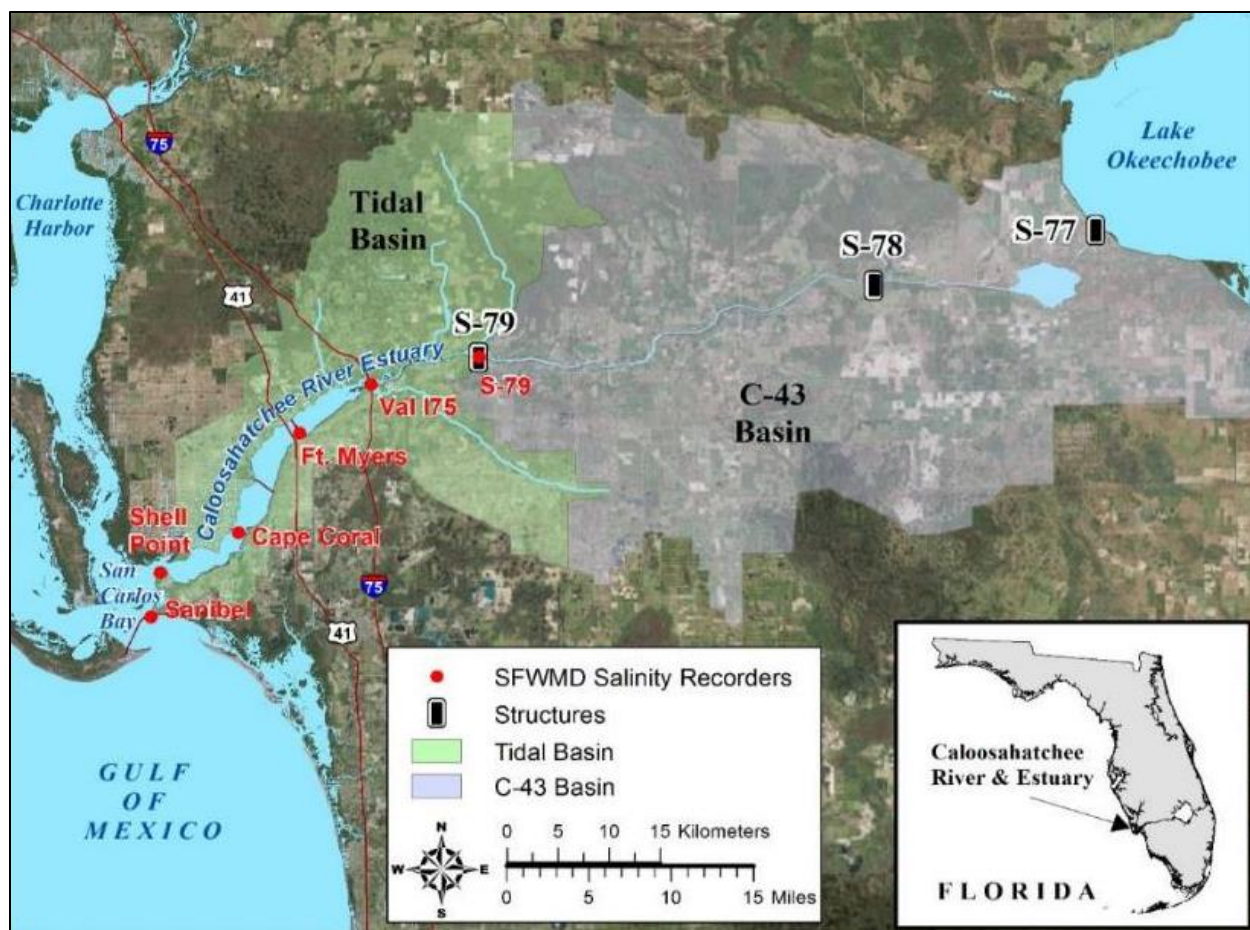


Figure ES-5. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

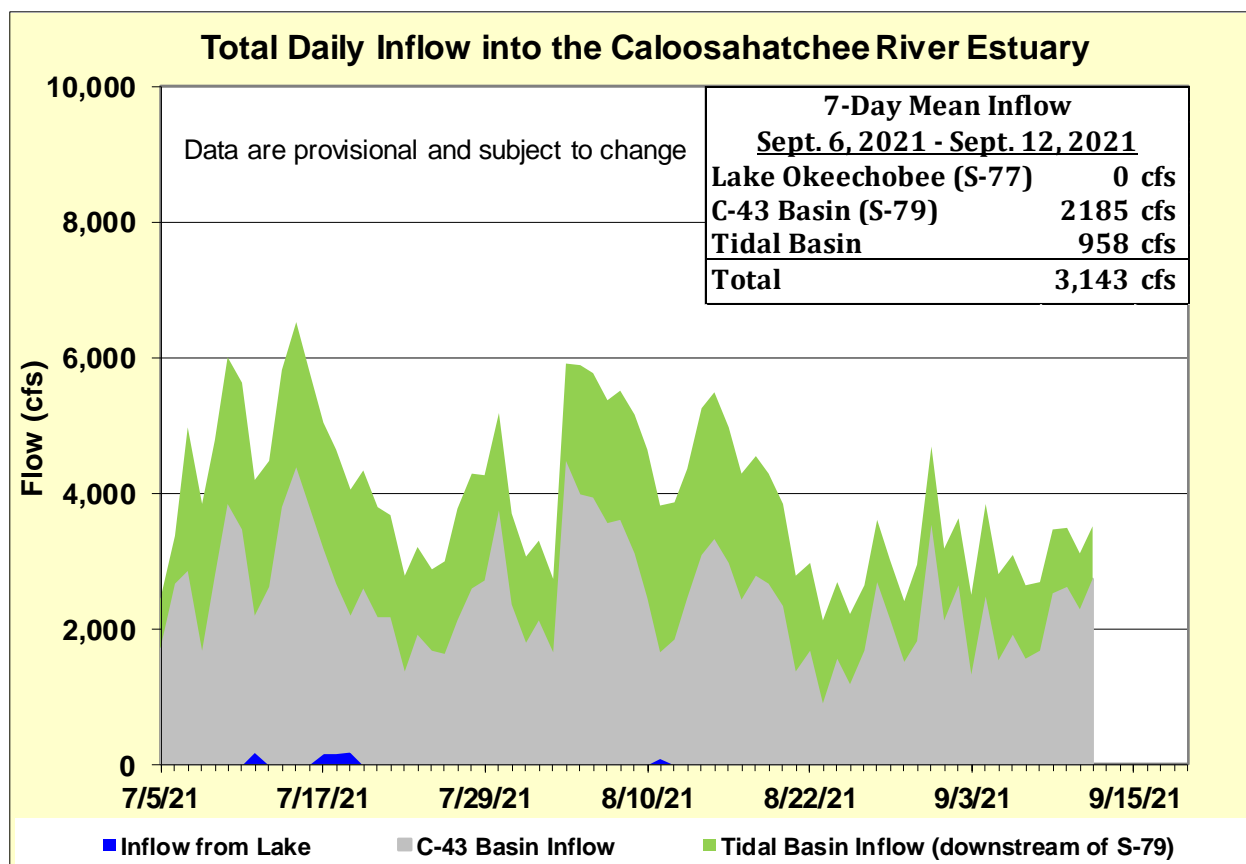


Figure ES-6. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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)	0.2 (0.3)	0.2 (0.3)	NA ^a
Val I-75	0.3 (0.3)	0.3 (0.3)	0.0 – 5.0 ^b
Fort Myers Yacht Basin	0.3 (0.7)	0.4 (3.0)	NA ^a
Cape Coral	5.3 (5.7)	6.7 (8.2)	10.0 – 30.0
Shell Point	17.9 (17.4)	21.7 (21.0)	10.0 – 30.0
Sanibel ^c	- -	- -	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 since August 18, 2021 due to issues with salinity recorder.

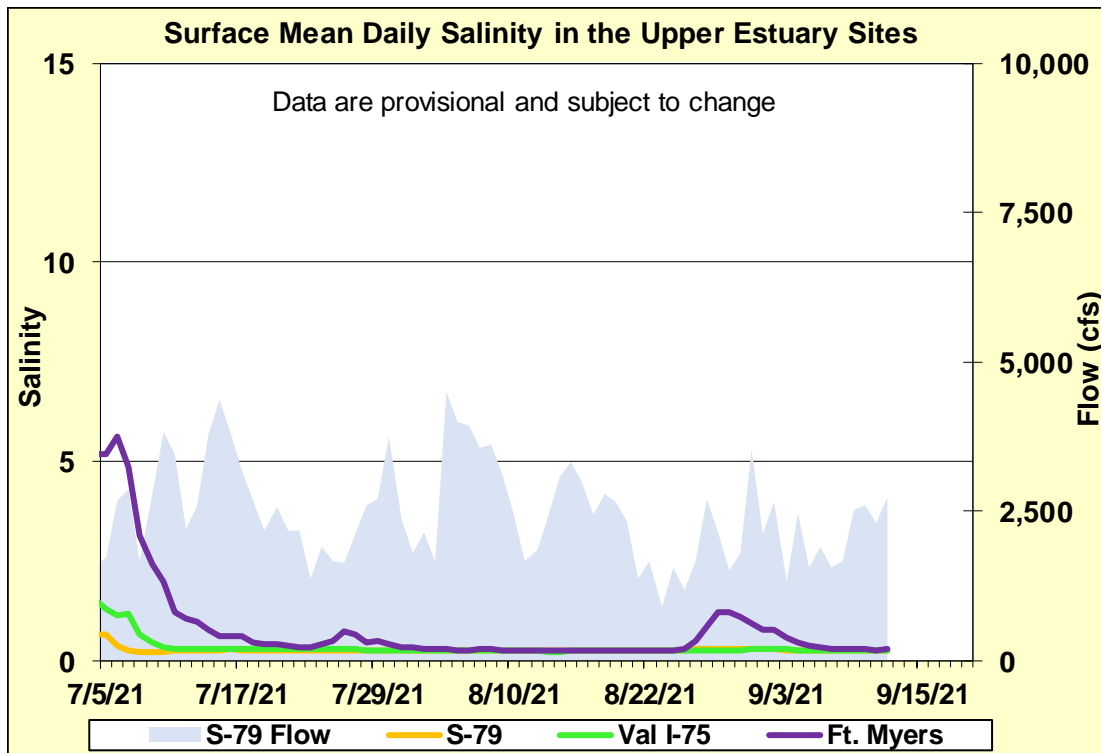


Figure ES-7. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

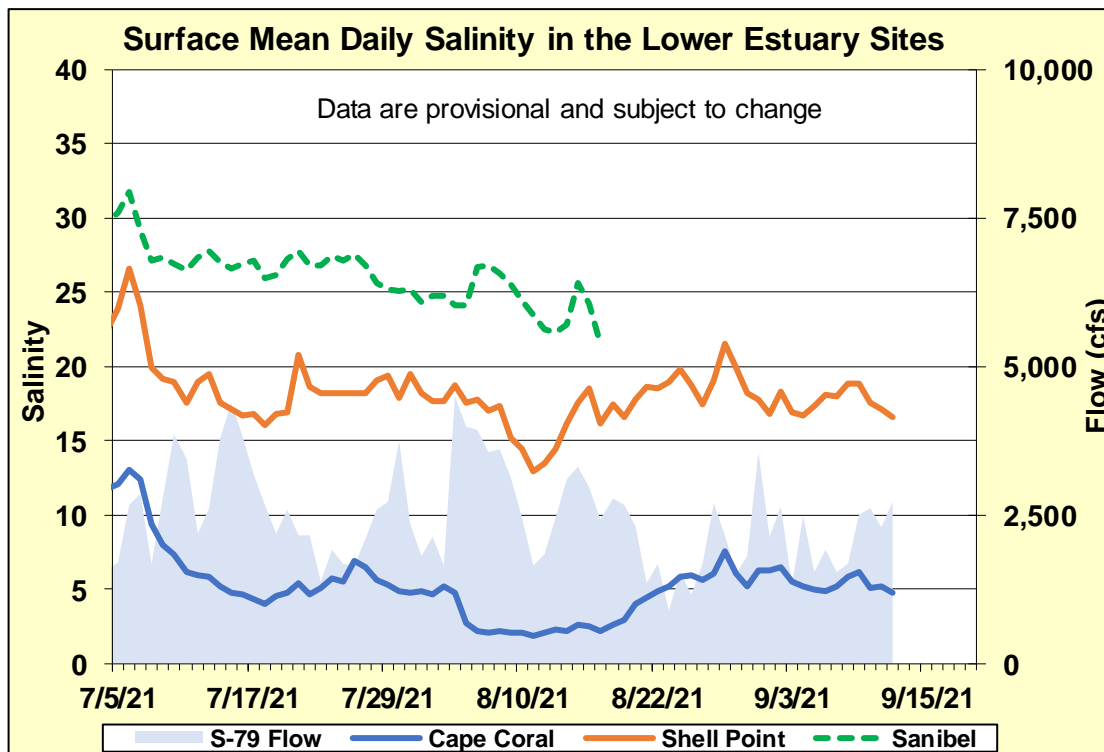


Figure ES-8. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

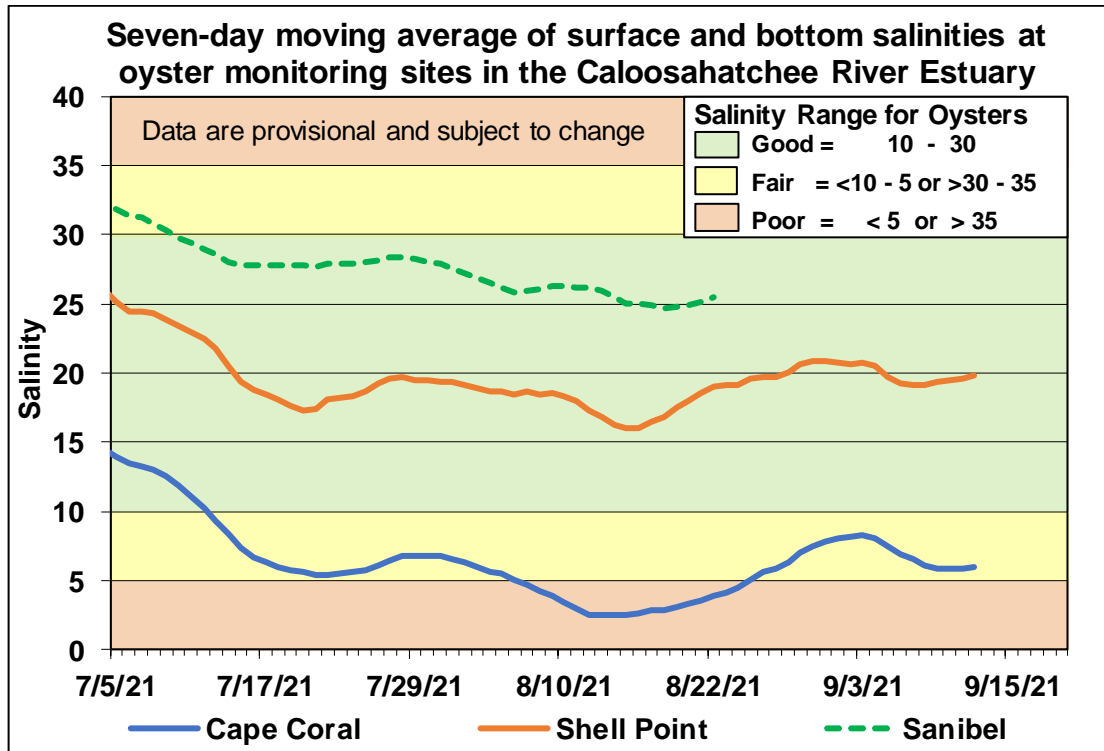


Figure ES-9. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

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	605	0.8	0.3
B	450	605	0.5	0.3
C	800	605	0.3	0.3
D	1000	605	0.3	0.3
E	1500	605	0.3	0.3
F	2000	605	0.3	0.3

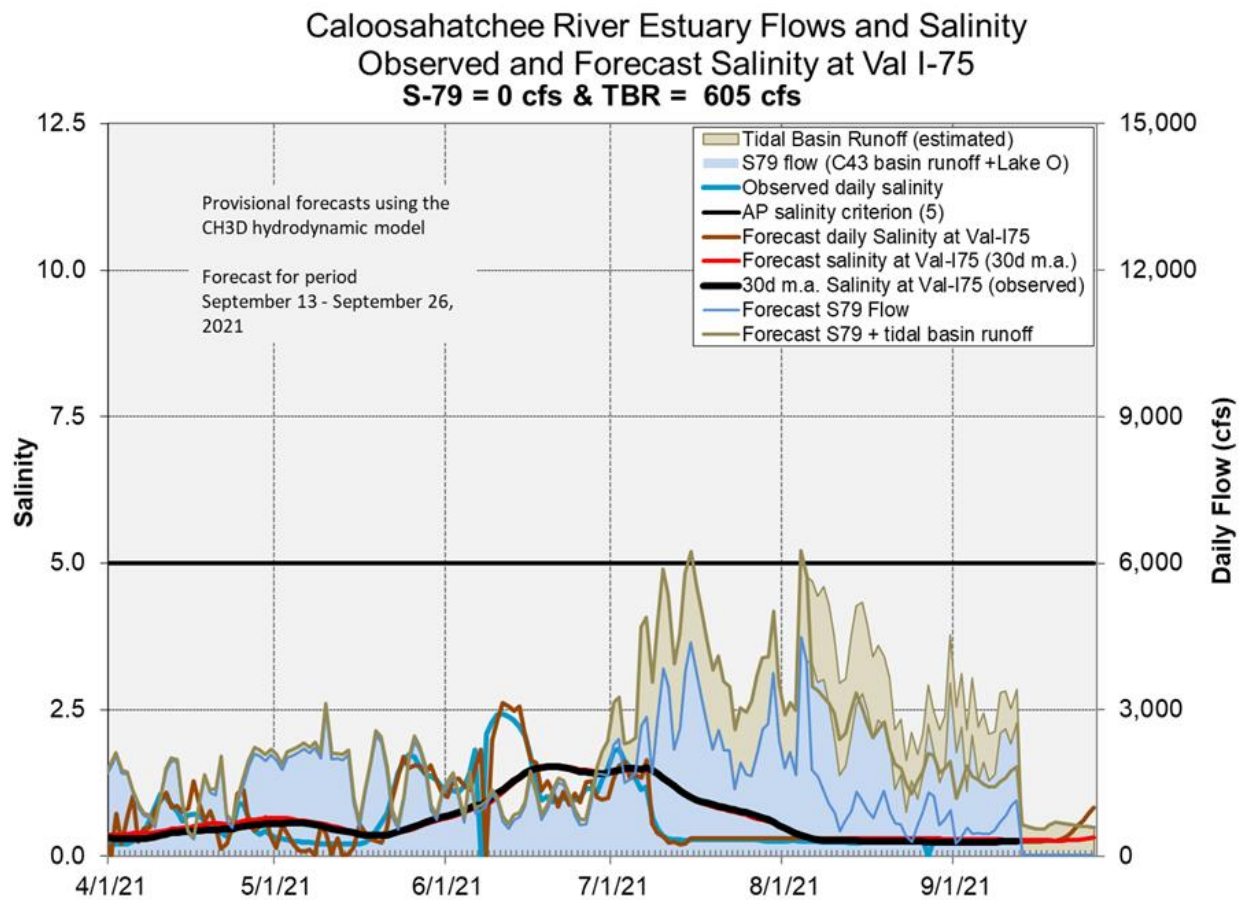


Figure ES-10. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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. Most 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.

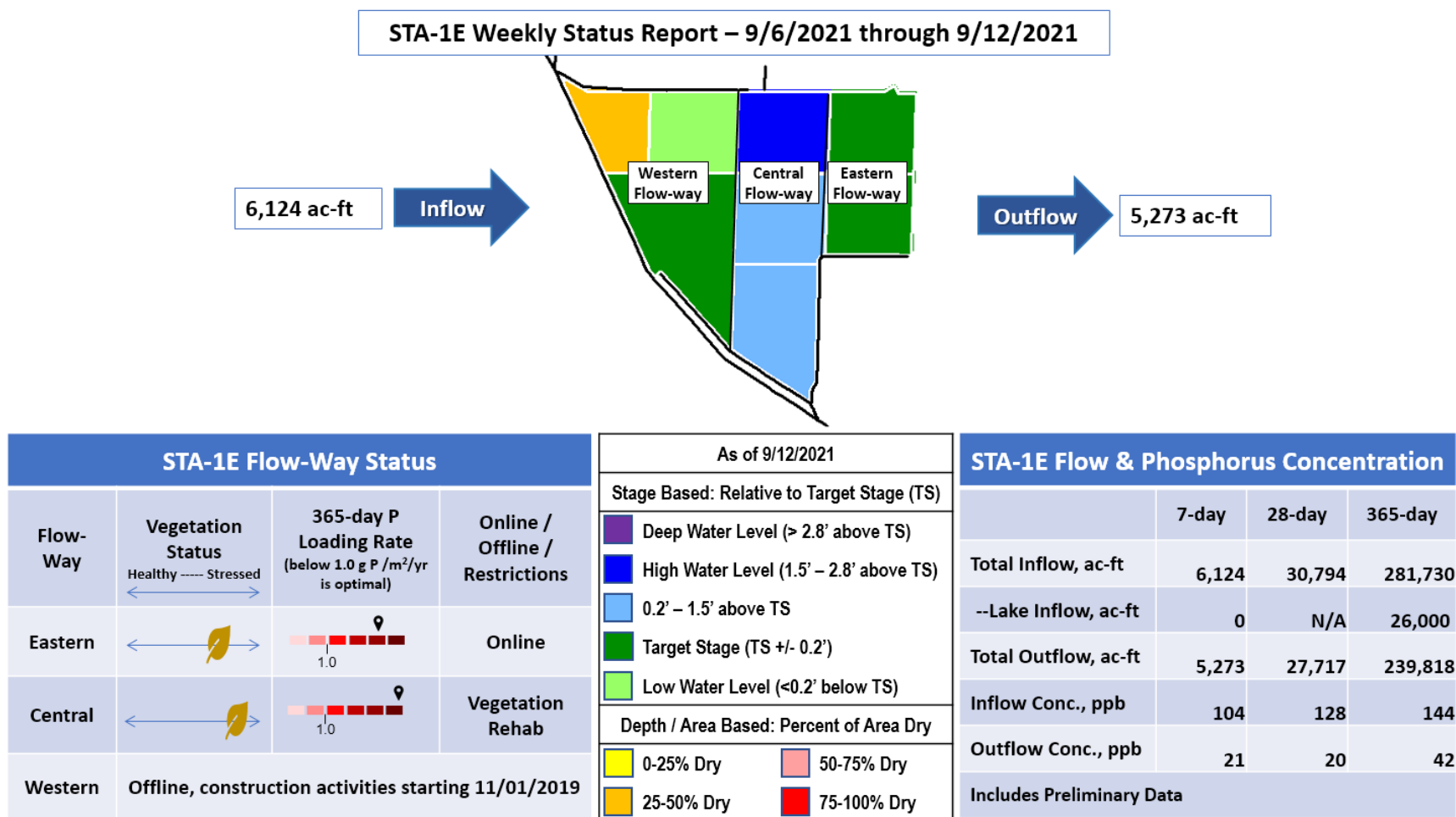
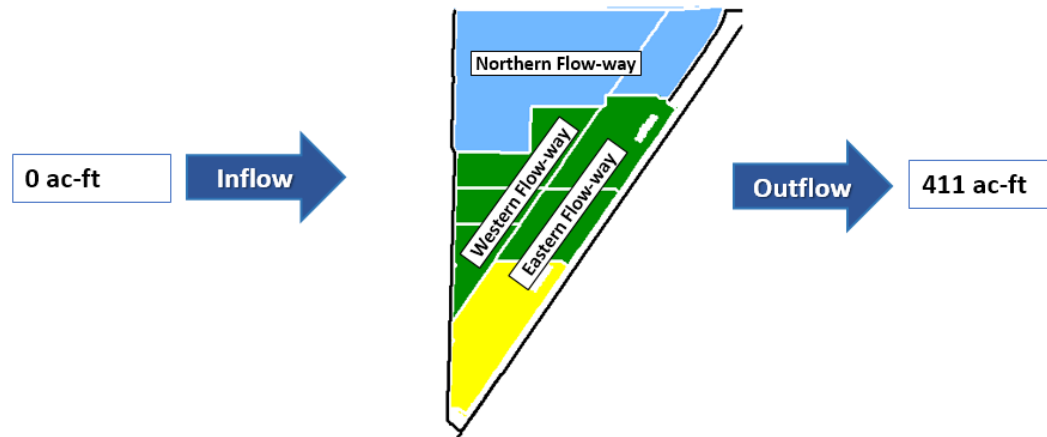


Figure S-1. STA-1E Weekly Status Report

STA-1W Weekly Status Report – 9/6/2021 through 9/12/2021


















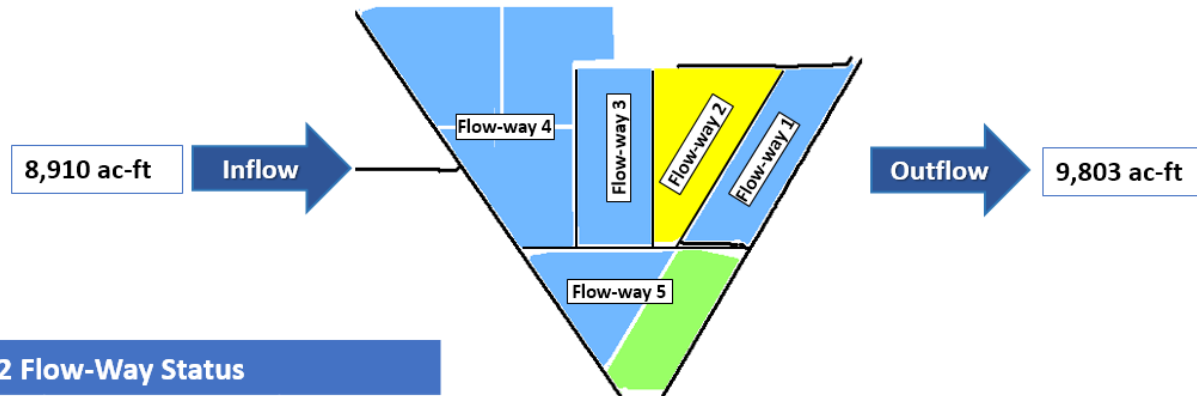
STA-1W Flow-Way Status				As of 9/12/2021		STA-1W Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status <small>Healthy --- Stressed</small>	365-day P Loading Rate <small>(below 1.0 g P /m²/yr is optimal)</small>	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)		7-day	28-day	365-day	
				 Deep Water Level (> 2.8’ above TS)					
				 High Water Level (1.5’ – 2.8’ above TS)					
				 0.2’ – 1.5’ above TS					
				 Target Stage (TS +/- 0.2’)					
				 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				
Northern			Construction			Total Inflow, ac-ft	0	4,135	108,621
Western			Construction			--Lake Inflow, ac-ft	0	N/A	7,600
Eastern			Construction			Total Outflow, ac-ft	411	4,393	122,898
						Inflow Conc., ppb	N/A	171	249
						Outflow Conc., ppb	22	26	41
						Includes Preliminary Data			

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

STA-2 Weekly Status Report – 9/6/2021 through 9/12/2021



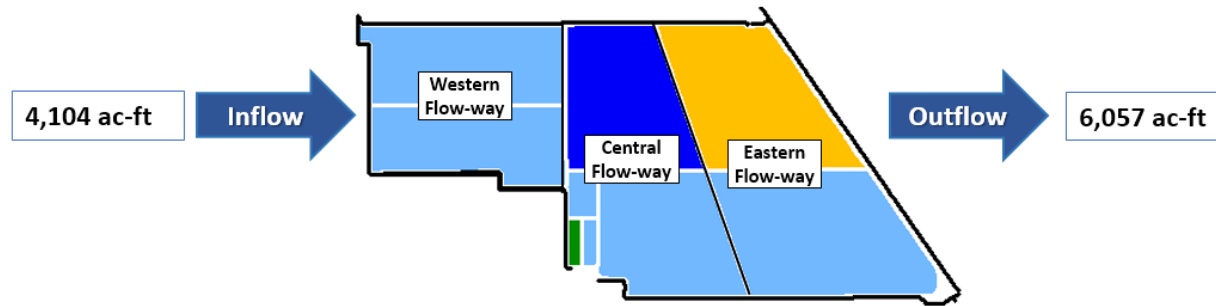
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2	Offline, construction activities as of 9/7/2021		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 9/12/2021	
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	8,910	29,612	419,074
--Lake Inflow, ac-ft	0	N/A	90,800
Total Outflow, ac-ft	9,803	28,870	462,115
Inflow Conc., ppb	70	86	90
Outflow Conc., ppb	14	16	20
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

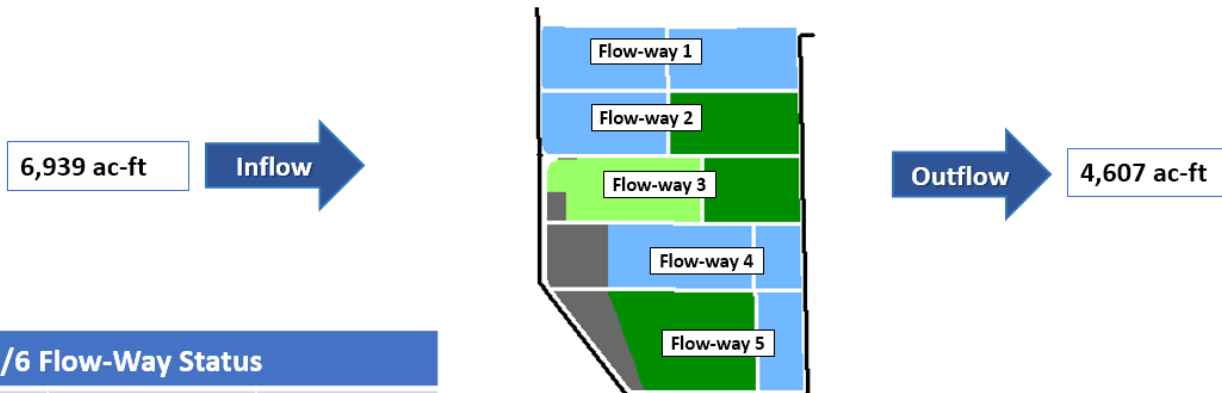
STA-3/4 Weekly Status Report – 9/6/2021 through 9/12/2021


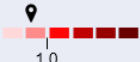








STA-3/4 Flow-Way Status				As of 9/12/2021				STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P / m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)					7-day	28-day	365-day
Eastern	Offline, vegetation management drawdown as of 3/1/2021			Deep Water Level (> 2.8' above TS)				Total Inflow, ac-ft	4,104	27,532	521,495
Central	←-----→	1.0	Online	High Water Level (1.5' – 2.8' above TS)				--Lake Inflow, ac-ft	0	N/A	61,000
Western	←-----→	1.0	Online	0.2' – 1.5' above TS				Total Outflow, ac-ft	6,057	32,510	486,211
				Target Stage (TS +/- 0.2')				Inflow Conc., ppb	42	51	64
				Low Water Level (<0.2' below TS)				Outflow Conc., ppb	12	22	15
				Depth / Area Based: Percent of Area Dry				Includes Preliminary Data			
				0-25% Dry		50-75% Dry					
				25-50% Dry		75-100% Dry					

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

STA-5/6 Weekly Status Report – 9/6/2021 through 9/12/2021





STA-5/6 Flow-Way Status			
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
1			Online
2		N/A	Post-construction
3		N/A	Post-construction
4			Online
5			Online


Flow-way 5


As of 9/12/2021


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

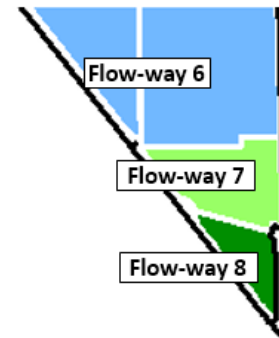
 50-75% Dry

 75-100% Dry

STA-5/6 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	6,939	27,435	157,993
--Lake Inflow, ac-ft	0	N/A	9,000
Total Outflow, ac-ft	4,607	26,746	170,285
Inflow Conc., ppb	221	266	295
Outflow Conc., ppb	49	59	72
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 9/6/2021 through 9/12/2021



STA-5/6 Flow-Way Status				As of 9/12/2021	
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)	
				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
6	←-----→	 1.0	Online		
7	←-----→	 1.0	Online		
8	←-----→	 1.0	Online		

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. Stage on Sunday, September 12 averaged 0.23 feet below the line. WCA-2A: Stage at 2A-17 rose slightly faster than the slope of the schedule line last week, average on Sunday was 0.49 feet higher than the Zone A regulation line. WCA-3A: The Three Gauge Average stage followed just below the top of zone B last week. Stage ended the week at 0.28 feet below the rising schedule line. WCA-3A: Stage at gauge 62 (Northwest corner) fell over the last week. The Sunday average was 0.72 feet below the 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 and remain drier than the surrounding regions. While in the upper reaches of the L-67s depths have reached 3.0 to 3.5 feet. Some North to South hydrologic connectivity was regained within Everglades National Park (ENP) over the last month in Taylor and Shark River sloughs, but less so in Lostman's Slough. Portions of eastern ENP and southern Big Cypress National Preserve (BCNP) remain dry. (**Figure EV-5**). Comparing WDAT water levels from present over the last month, stages generally increased, except in northern WCA-3A and southern BCNP. Compared to a year ago, the WCA-3A and 3B basins are significantly drier, especially in the southeast. Most of ENP remains drier than a year ago. (**Figure EV-6**). Compared to the 20-year median water depths, most of the central and western Everglades is in the lower 20% of the historical median, and the western sloughs in ENP/BCNP now in the 10%; significant exceptions in northeastern ENP and WCA-1. (**Figure EV-7**).

Taylor Slough and Florida Bay

An average of 0.76 inches of rain fell over Taylor Slough and Florida Bay over the week ending Sunday (9/12) and stage decreased an average of 0.03 feet over the week with the decreases being fairly uniform over the slough (**Figure EV-7**). Water depth in northern Taylor Slough is twice as deep as central Taylor Slough suggesting that southward flows will continue in the near term (**Figure EV-8**). The individual stations in northern Taylor Slough are 2 to 4 inches above their historical averages while the rest of the slough is average to 1 inch above average. The Slough is 1.3 inches above its historical average.

Salinities in Florida Bay again averaged no change for the week ending 9/12, but individual stations had weekly changes ranging from -2.9 to +2.3 (**Figure EV-7**). The western nearshore station (GB) increased 2.3 this week to end at 32.2 and helping to drive the western Bay average up above the 75th percentile (**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 2 psu 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	2.08	+0.31
WCA-2B	1.59	+0.10
WCA-3A	1.35	+0.03
WCA-3B	0.96	+0.04
ENP	0.73	+0.03

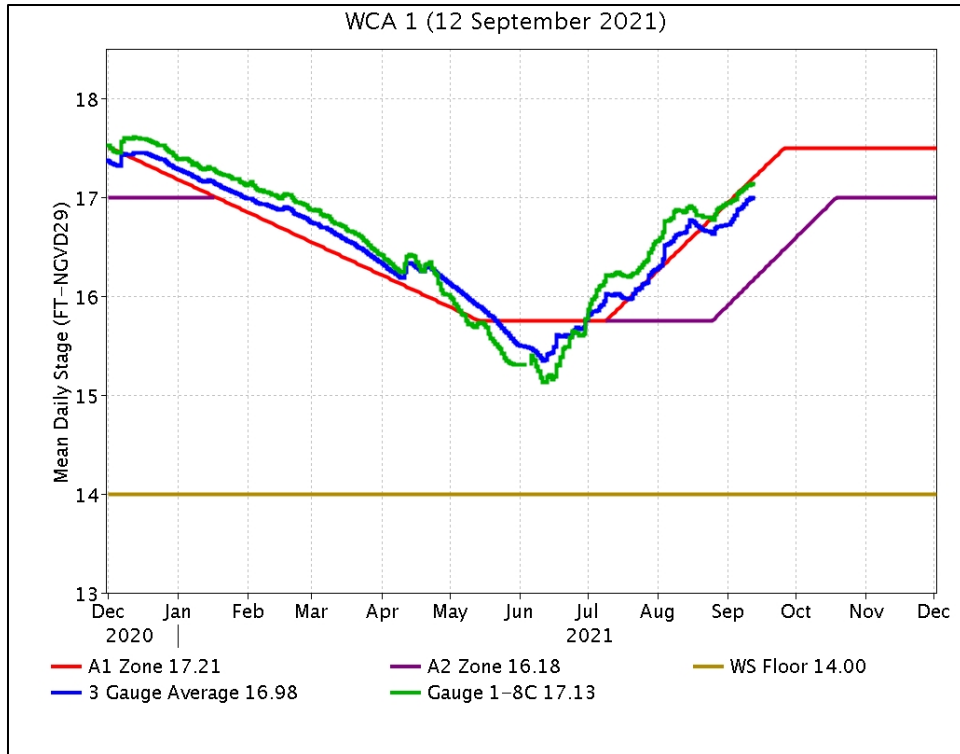


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

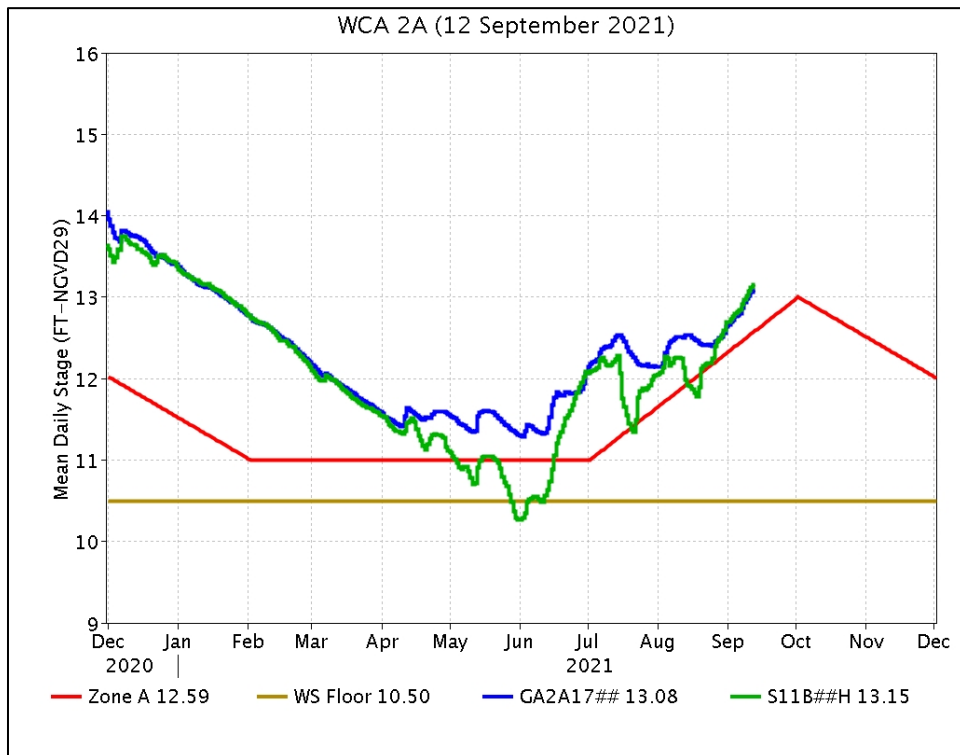


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

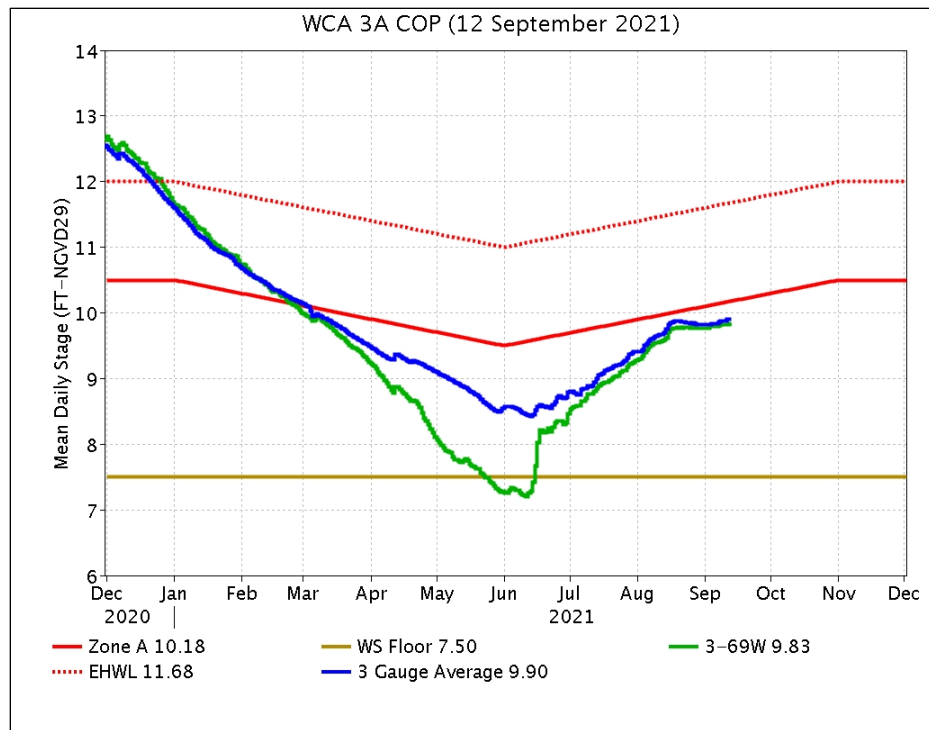


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

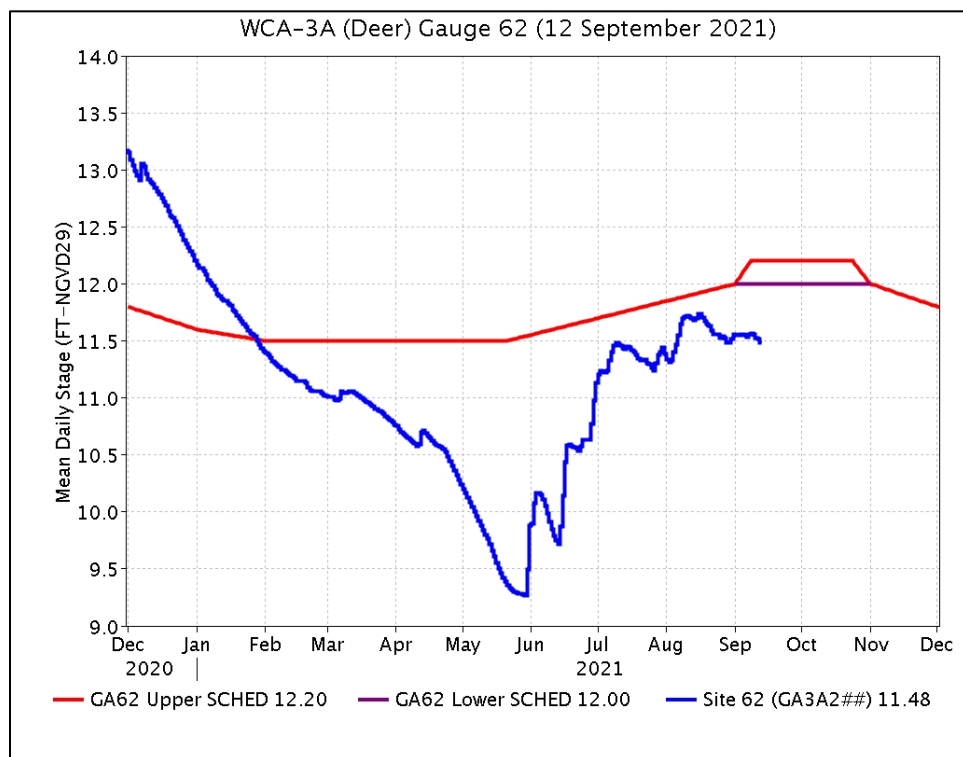


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

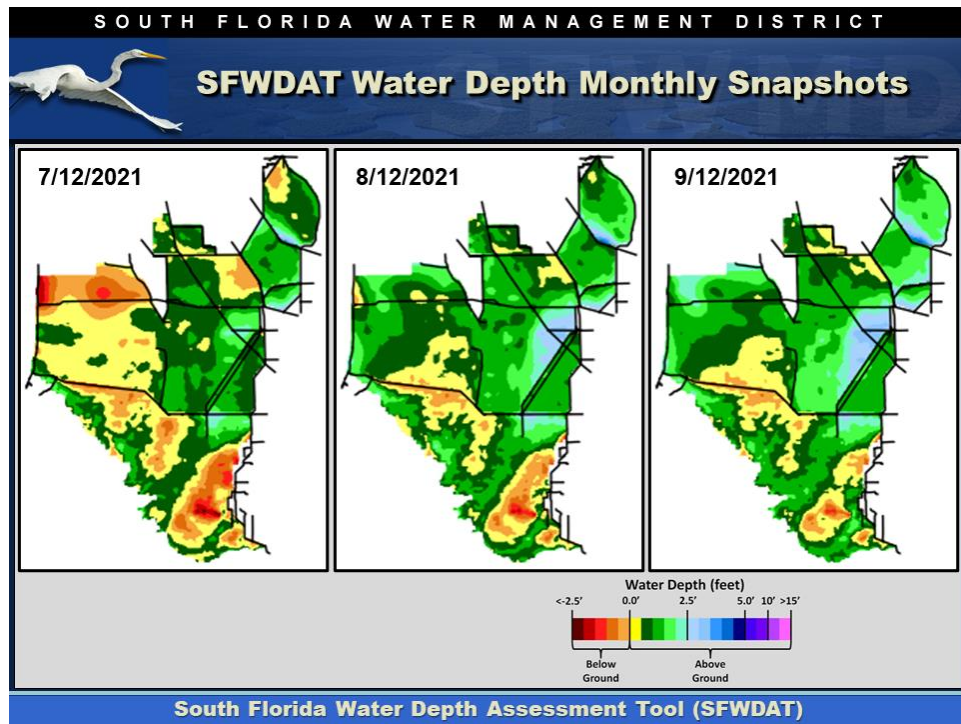


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

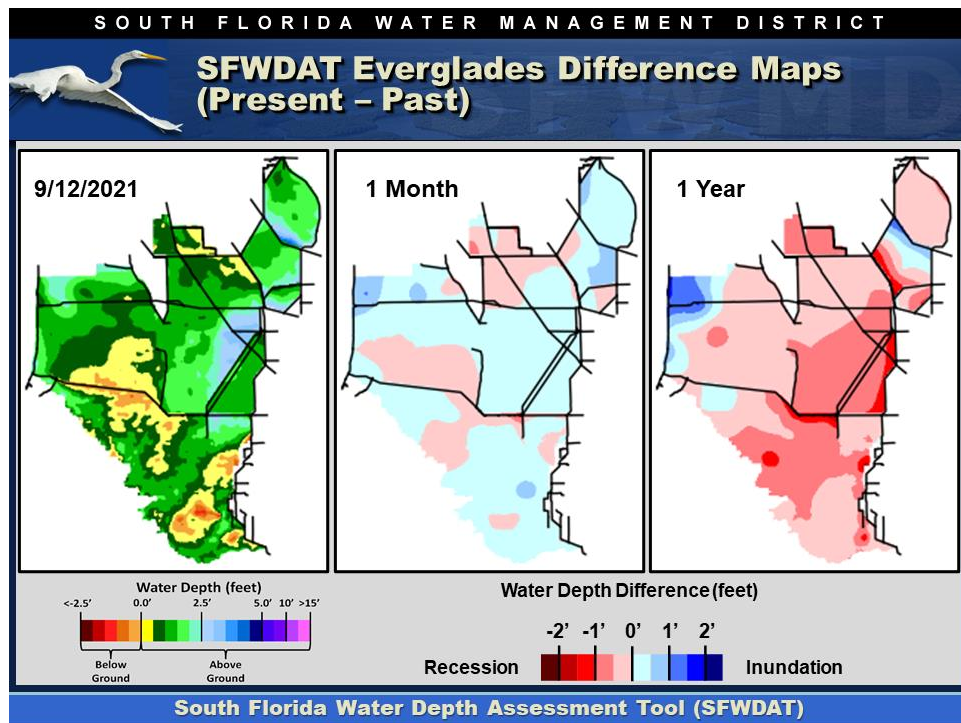


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

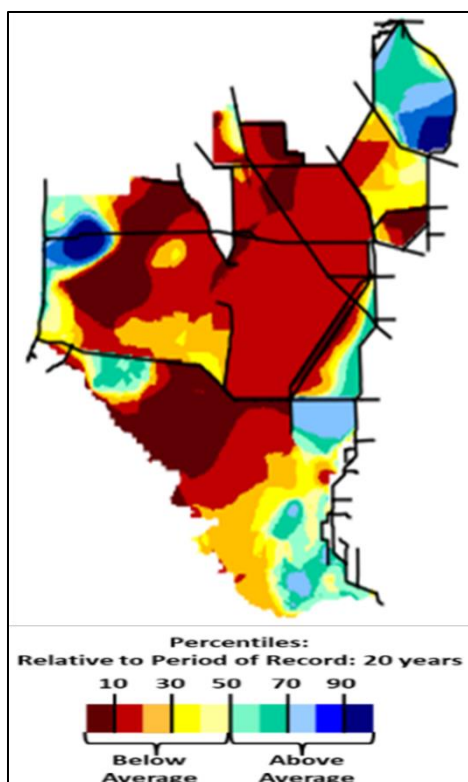


Figure EV-7. Present water depths compared to the day of year median over the previous 20 years.

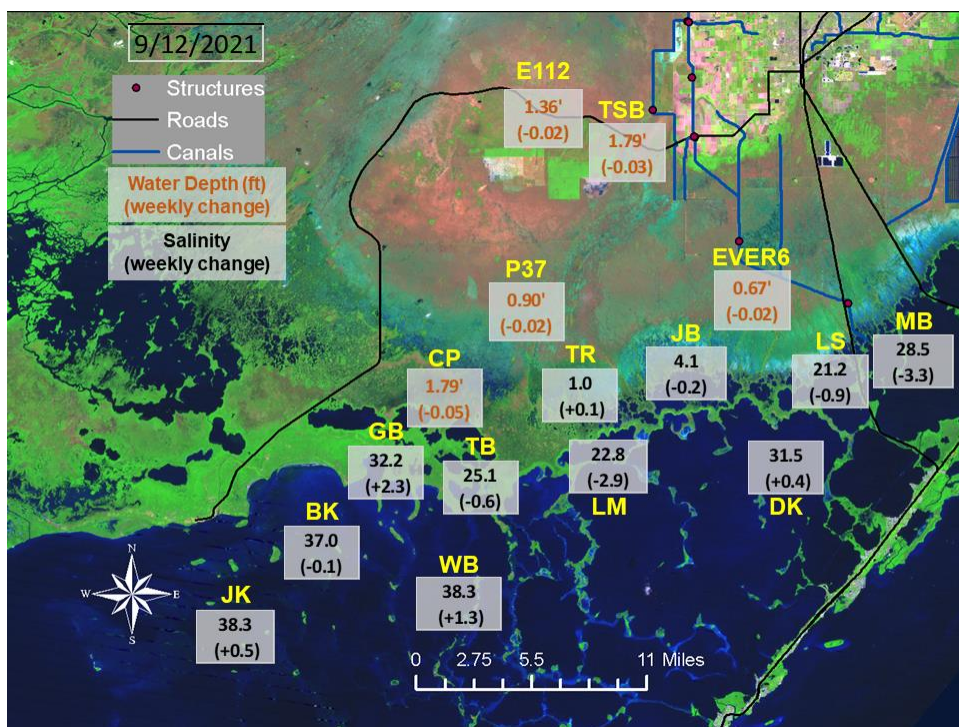


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

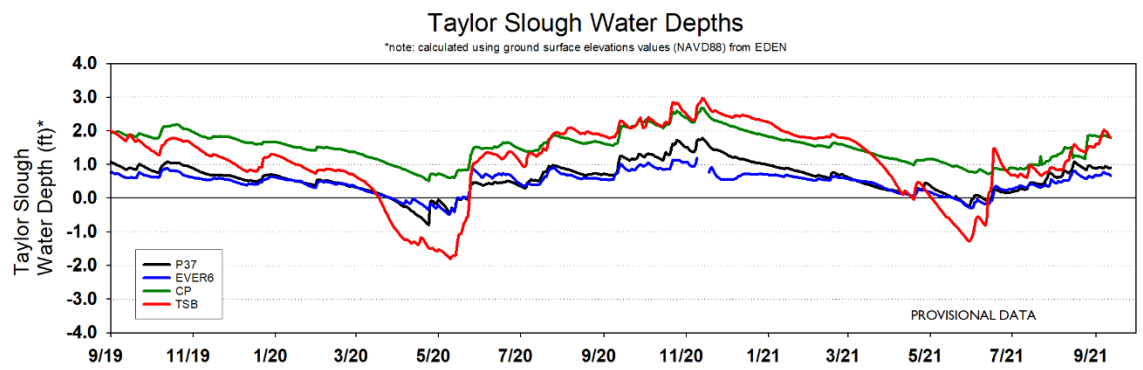


Figure EV-9. Taylor Slough water depth time series.

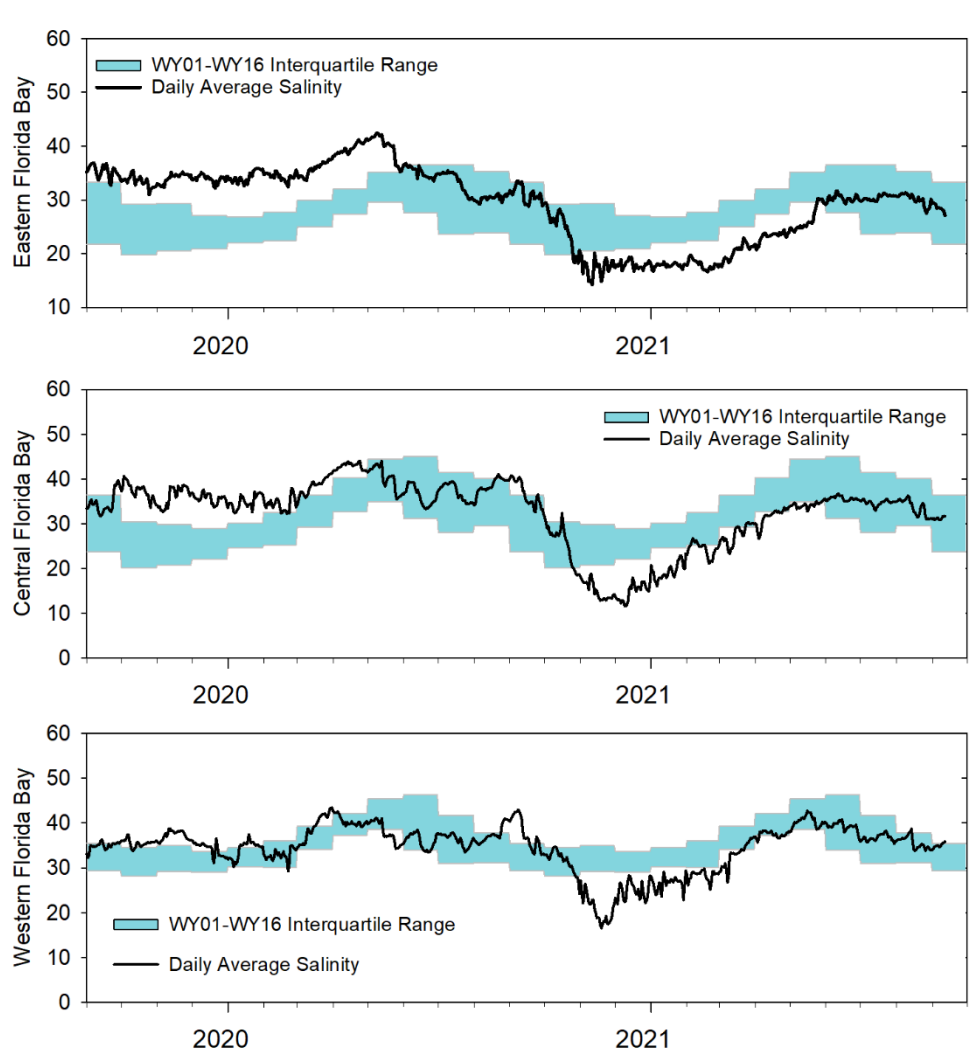


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, September 7th 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 0.10'	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-3A NE	Stage increased by 0.09'	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 0.07'	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 0.11'	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 remain unchanged		
WCA-3B	Stage increased by 0.04'	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 0.03'	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 -0.01' to -0.05'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -2.9 to +2.3	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.