Disclaimer: Information contained in the report addresses environmental conditions only and is not the official South Florida Water Management District operations recommendation or decision.

# MEMORANDUM

TO: John Mitnik, Assistant Executive Director, Executive Office Staff

**FROM:** SFWMD Staff Environmental Advisory Team

**DATE:** October 19, 2022

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

#### Summary

#### Weather Conditions and Forecast

Daytime temperatures on Wednesday might struggle to approach 70 F due to overcast conditions with occasional light showers. A stalled cold front off the southeast coast of Florida will keep the interior mostly dry, except for some light shower activity along the lower east coast. The model guidance suggest that a secondary disturbance coming down from British Columbia could initiate the development of a weak surface low from the stalled frontal boundary this weekend. Because Florida will be located on the western side of this low, cooler, drier, and stable conditions will keep precipitation totals low. Mostly dry conditions are forecast over the west and northern interior, while light shower activity is likely along the lower east coast where shallow moisture is available. Well below normal rainfall is expected for the 7-day period ending next Tuesday morning.

#### Kissimmee

Water levels remained high in the Kissimmee Basin because of Hurricane Ian, with lake stages declining but still above their respective regulation schedules. Discharges at their outlet structures are being adjusted to continue reducing water levels. S-65 and S-65A discharge averaged 13,000 cfs and 12,000 cfs, respectively, for the second consecutive week. Average weekly water depth on the Kissimmee River floodplain increased slightly to a mean depth of 5.16 feet but was trending downward, with a mean daily depth of 5.11 feet on October 16, 2022. The average concentration of dissolved oxygen in the Kissimmee River decreased from 1.1 mg/L to 1.0 mg/L for the week, ending with a daily value of 0.9 mg/L on October 16, 2022: below the potentially lethal level for largemouth bass and other sensitive species.

#### Lake Okeechobee

Lake Okeechobee stage was 15.17 feet NGVD on October 16, 2022, with water levels 0.64 feet higher than the previous week and 2.47 feet higher than a month ago. Lake stage was in the Low sub-band and within the ecological envelope. Average daily inflows (excluding rainfall) decreased from the previous week and there were no outflows

(excluding evapotranspiration) recorded. The most recent satellite image (October 17, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed low to no bloom potential throughout the lake. Bloom potential decreased in the western part of the Lake since last week.

# Estuaries

Total inflow to the St. Lucie Estuary averaged 2,607 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities increased at all sites over the past week. Salinity in the middle estuary was in the optimal range (10-25) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 3,920 cfs over the past week with no flow coming from Lake Okeechobee. All SFWMD water quality sensors deployed in the estuary were affected by the storm and ceased to function on September 28, 2022. Salinity was only reported for the entire week at Val I-75 and part of the week at Cape Coral. Salinity at Val I-75 was 0.3 on the surface and bottom, and Cape Coral was 3 on the surface and 4 on the bottom.

# **Stormwater Treatment Areas**

For the week ending Sunday, October 16, 2022, no Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2023 (since May 1, 2022) is approximately 12,500 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 840,000 ac-feet. STA cells are above target stage. STA-1E Western Flow-way is offline for post-construction vegetation grow in, 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 effect in STA-1E Central and Eastern Flow-ways, STA-1W Eastern, Western, and Northern Flow-ways, and STA-2 Flow-ways 3 and 4 for vegetation management activities. This week, there is no capacity for Lake releases in the STAs.

# Everglades

Last week rates of stage change remained in the "fair" or "good" category as rates of change slowed in the aftermath of rainfall from Hurricane Ian. Depths remain above average for this time of year in WCA-3A North, which is favorable for wading bird nesting in that region, though success will depend on prey production. Stages are rising in southern WCA-2A and – 3A. Taylor slough stages rose significantly last week in the south just upstream of the nearshore. On average salinities fell last week in Florida Bay; however, the western region of the Bay went above the inter-quartile range.

# **Biscayne Bay**

Total inflow to Biscayne Bay averaged 881 cfs and the previous 30-day mean inflow averaged 1,582 cfs. The seven-day mean salinity was 24.3 at BBCW8 and 19.5 at BBCW10, both below the preferred maximum salinity of 35. Salinity data provided as a courtesy by Biscayne National Park.

# **Supporting Information**

# **Kissimmee Basin**

# Upper Kissimmee

On October 16, 2022, lake stages were 59.9 feet NGVD (2.4 feet above schedule) in East Lake Toho, 55.8 feet NGVD (1.3 feet above schedule) in Lake Toho, and 53.0 feet NGVD (1.0 feet above schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1**, **Figures KB-1-3**).

# Lower Kissimmee

On October 16, 2022, average daily discharge was maintained at 13,000 cfs at S-65 and 12,000 cfs at S-65A to manage water levels in KCH and Pool A, respectively. Average daily discharge from the Kissimmee River was 14,000 cfs at S-65D and 14,000 cfs at S-65E (**Table KB-2**). Headwater stages were 50.7 feet NGVD at S-65A and 28.1 feet NGVD at S-65D on October 16, 2022. As S-65A discharge was maintained and local runoff decreased, mean river channel stage decreased by 0.12 feet (**Figure KB-4**) through the week, with mean water depth on the Kissimmee River floodplain decreasing to 5.11 feet on October 16, 2022 (**Figure KB-5**). The average concentration of dissolved oxygen in the Kissimmee River decreased from 1.1 mg/L to 1.0 mg/L for the week, with a daily value of 0.9 mg/L on October 16, 2022 (**Table KB-2**, **Figure KB-6**).

# Water Management Recommendations

Per the IS-14-50.0 discharge plan, adjust S-65 discharge to maintain a minimum flow of at least 1,400 cfs at S-65A to the Kissimmee River. Note general guidance for discharge and maximum rates of change in discharge (**Figure KB-7**).

**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	7-Day Average	Lake Stage	Schedule	Schedule Stage	Departu Regulat	ure from ion (feet)
		Site	Discharge (cfs)	(feet NGVD) <sup>a</sup>	Types	(feet NGVD)	10/16/22	10/9/22
Lakes Hart and Mary Jane	S-62	LKMJ	450	62.8	R	60.5	2.3	3.5
Lakes Myrtle, Preston and Joel	S-57	S-57	0	65.0	R	61.5	3.5	4.4
Alligator Chain	S-60	ALLI	680	64.2	R	63.6	0.6	1.4
Lake Gentry	S-63	LKGT	950	61.4	R	61.2	0.2	0.9
East Lake Toho	S-59	TOHOE	1800	59.9	R	57.5	2.4	3.4
Lake Toho	S-61	TOHOW S-61	2000	55.8	R	54.5	1.3	2.4
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	13000	53.0	R	52.0	1.0	2.1

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.

Metric	Location	Daily Average	Ave	erage for Previou	s Seven Day Peri	ods
		10/16/22	10/16/22	10/9/22	10/2/22	9/25/22
Discharge	S-65	13,000	13,000	13,000	7,000	5,900
Discharge	S-65A <sup>a</sup>	12,000	12,000	12,000	8,700	6,700
Headwater Stage (feet NGVD)	S-65A	50.7	50.9	51.0	49.2	47.9
Discharge	S-65D <sup>b</sup>	14,000	14,000	12,000	7,800	2,200
Headwater Stage (feet NGVD)	S-65D <sup>c</sup>	28.5	28.5	28.7	28.6	27.5
Discharge (cfs)	S-65E <sup>d</sup>	14,000	14,000	12,000	7,600	2,100
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) <sup>e</sup>	Phase I, II/III river channel	0.9	1.0	1.1	1.0	1.0
Mean depth (feet) <sup>f</sup>	Phase I floodplain	5.11	5.16	5.11	3.81	2.15

**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.

a. Combined discharge from main and auxiliary structures.

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

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

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

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

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



Figure KB-4. Kissimmee River stage, discharge and rainfall.



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



**Figure KB-6.** 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, KRDR02, KRBN, PC33, PC11, PD62R, and PD42R with an average of five stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.



Figure KB-7. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

#### Lake Okeechobee

Lake Okeechobee stage was 15.17 feet NGVD on October 16, 2022, with water levels 0.64 feet higher than the previous week and 2.47 feet higher than a month ago (**Figure LO-1**). Lake stage remains within the Low sub-band (**Figure LO-2**) and the ecological envelope (**Figure LO-3**). According to NEXRAD, 1.38 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 19,609 cfs to 17,930 cfs. There were no outflows (excluding evapotranspiration) for the fifth consecutive week. The highest inflow came from the Kissimmee River (C-38 Canal; 13,942 cfs), followed by the S-84 & S-84X structures from the C-41A Canal (1,794 cfs), and Fisheating Creek (1,477 cfs). Back flow was recorded from the L-8 Canal via the S-271 structure at an average daily rate of 194 cfs. **Figures LO-4 and LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively. These data are provisional and are subject to change.

The October 3-5, 2022 routine water quality monitoring on the lake revealed an increase in total phosphorus and dissolved inorganic nitrogen concentrations in the nearshore and off-shore regions, and in soluble reactive phosphorus concentrations in the nearshore regions, following Hurricane Ian.

The most recent satellite image (October 17, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed there was little to no bloom potential in the lake, decreasing slightly since last week (**Figure LO-6**).



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



# Lake Okeechobee Water Level History and Projected Stages

Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.



Lake Okeechobee Stage vs Ecological Envelope

**Figure LO-3.** The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.



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



**Figure LO-5.** Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of October 10 - 16, 2022.



Figure LO-6. Cyanobacteria bloom potential on October 17, 2022 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

# Estuaries

#### St. Lucie Estuary

The St. Lucie estuary was impacted by Hurricane Ian on September 27 and 28, 2022 with most of the freshwater inflow coming from the basins (**Figure ES-2**). This inflow resulted in a rapid decrease in salinity throughout the estuary, but salinity began recovering quickly (**Figure ES-3**). Long-term impacts to oyster populations are unlikely but will be monitored.

Over the past week, mean total inflow to the St. Lucie Estuary was 2,607 cfs (**Figures ES-1** and **ES-2**) and the previous 30-day mean inflow was 3,895 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities increased at all sites in the estuary (**Table ES-1** and **Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 10.6. Salinity conditions in the middle estuary were estimated to be within the optimal range for adult eastern oysters (**Figure ES-4**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute in September was 2.5 spat/shell (**Figure ES-5**).

#### Caloosahatchee River Estuary

The Caloosahatchee River Estuary received system-wide impacts from damaging winds and large storm surge following the landfall of Hurricane Ian 20 miles WNW of Fort Myers, Florida at 3:05 PM Wednesday, September 28, 2022 as a category 4 storm. All SFWMD water quality sensors in the estuary were affected by the storm and ceased to function on September 28, 2022. The sensor at the Val I-75 station began functioning and reporting again on October 5, 2022 and the sensor at S-79 began functioning again on October 14, 2022.

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 3,920 cfs (**Figures ES-6** and **ES-7**) and the previous 30-day mean inflow was 7,997 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Salinities were reported for Val I-75 from October 5-16, 2022 and for S-79 from October 14-16, 2022 (**Table ES-2** and **Figures ES-8** and **ES-9**). Salinities were not reported for Fort Myers, Cape Coral, Shell Point, or Sanibel (**Table ES-2** and **ES-10**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute in September was 2.6 spat/shell at Iona Cove and 6.4 spat/shell at Bird Island (**Figures ES-11 and ES-12**). Surface salinity at Val I-75 was forecasted for the next two weeks using an autoregression model (Qiu and Wan, 2013<sup>1</sup>) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1,500 cfs,

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

and steady releases at 2,000 cfs with estimated tidal basin inflows of 376 cfs. Model results from all scenarios predict daily salinity to be 0.4 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-13**). This keeps predicted salinities in the upper estuary within the optimal salinity range (0-10) for tape grass.

#### Red Tide

The Fish and Wildlife Research Institute reported on October 14, 2022, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed at bloom concentrations in any samples collected within the District region, but samples were not collected from Charlotte or Lee counties in southwest Florida. On the east coast, red tide was not observed in samples from St. Lucie, Martin, Palm Beach or Miami-Dade counties.

#### Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are Very Wet. The LORS2008 release guidance suggests up to 3,000 cfs release at S-79 to the Caloosahatchee River Estuary and up to 1,170 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 optimum salinity range for adult eastern oysters (*Crassostrea virginica*) in the estuary. Data are provisional.

Sampling Site	Surface	Bottom	Optimum Envelope
HR1 (North Fork)	<b>4.3</b> (1.9)	<b>7.0</b> (3.8)	10.0 – 25.0
US1 Bridge	<b>8.9</b> (6.2)	<b>12.3</b> (10.6)	10.0 – 25.0
A1A Bridge	<b>18.3</b> (15.7)	<b>24.7</b> (24.0)	10.0 – 25.0



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. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.



Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.



**Figure ES-7.** Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

**Table ES-2.** Mean salinity at six monitoring sites in the Caloosahatchee River Estuary. Current means are in bold font; previous week's means are in parentheses. No salinity data (NR) were available at any sites after 9/28/2022 when Hurricane Ian damaged equipment; however, the sensor at Val I-75 began reporting again on 10/5/2022 and the sensor at S-79 began reporting again on 10/14/2022. Average salinity at the S-79, Ft Myers and Cape Coral monitoring stations reflects the period 10/14/2022-10/16/2022. The envelope in the upper estuary sites is for the protection of tape grass and the envelope in the lower estuary is the optimum salinity range for adult eastern oysters (*Crassostrea virginica*). Data are provisional.

Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	<b>0.2</b> (NR)	<b>0.2</b> (NR)	0.0 - 10.0
Val I-75	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	0.0 - 10.0
Fort Myers Yacht Basin	<b>0.3</b> (NR)	<b>0.3</b> (NR)	0.0 - 10.0
Cape Coral	<b>3.4</b> (NR)	4.4 (NR)	10.0 – 25.0
Shell Point	NR (NR)	NR (NR)	10.0 – 25.0
Sanibel	NR (NR)	NR (NR)	10.0 – 25.0



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



Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.



**Figure ES-10.** Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.



Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.



Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

Scenario	Simulated S-79 Flow (cfs)	Tidal Basin Runoff (cfs)	Daily Salinity	30-Day Mean Salinity
А	0	376	0.4	0.3
В	450	376	0.3	0.3
С	800	376	0.3	0.3
D	1000	376	0.3	0.3
Е	1500	376	0.3	0.3
F	2000	376	0.3	0.3

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

#### Caloosahatchee River Estuary Flows and Salinity Observed and Forecast Salinity at Val I-75 S-79 = 0 cfs & TBR = 376 cfs



Figure ES-13. 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 post-construction vegetation grow in. Operational restrictions are in place in STA-1E Central and Eastern Flow-ways for vegetation management activities. Online treatment cells are at or near target stage and vegetation in the flow-ways is stressed and highly stressed. The 365-day phosphorus loading rates (PLRs) are high for the Eastern and Central Flow-ways (**Figure S-1**).

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

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

**STA-3/4:** STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. 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 the Central and Western Flow-ways are below 1.0 g/m<sup>2</sup>/year (**Figure S-4**).

**STA-5/6:** All flow-ways in STA-5/6 are online. Treatment cells are near 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 below 1.0 g/m<sup>2</sup>/year, except Flow-way 4 which is high (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.



	STA-1E Flo	ow-Way Status		As of 10/16/2022	STA-1E Flow & P	hosphor	us Conce	ntration
		365-day P		Stage Based: Relative to Target Stage (TS)		7-day	28-day	365-day
Flow-	Vegetation	Loading Rate	Online /	Deep Water Level (> 2.8' above TS)		7 duy	20 uuy	505 day
Way	Status Healthy Stressed	(below 1.0 g P /m²/yr is optimal)	Restrictions	High Water Level (1.5' – 2.8' above TS)	Total Inflow, ac-ft	118	27,612	138,446
	$\leftarrow$	•		0.2' – 1.5' above TS	Lake Inflow, ac-ft	0	N/A	2 600
Eastern	$\leftarrow / \rightarrow$	1.0	Vegetation management	Target Stage (TS +/- 0.2')	Total Outflow, ac-ft	349	27,615	111,200
Central	← />		Vegetation	Low Water Level (<0.2' below TS)	Inflow Conc., ppb	42	138	108
	~	1.0	renabilitation	0.25% Dry	Outflow Conc., ppb	50	27	24
Western Offline, post-construction grow in starting 3/28/2022			arting 3/28/2022	25-50% Dry 75-100% Dry	Includes Preliminary D	ata		

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



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



Figure S-3. STA-2 Weekly Status Report

# STA-3/4 Weekly Status Report – 10/10/2022 through 10/16/2022



	STA-3/4 FI	ow-Way Status		As of 10/16/2022	STA-3/4 Flow & I	Phosphor	us Conce	ntration
				Stage Based: Relative to Target Stage (TS)		7 day	20 day	2CE day
Flow-	Vegetation	365-day P	Online /	Deep Water Level (> 2.8' above TS)		7-day	28-day	305-day
Way	Status Healthy Stressed	(below 1.0 g P /m <sup>2</sup> /yr is optimal)	Offline / Restrictions	High Water Level (1.5' – 2.8' above TS)	Total Inflow, ac-ft	20,292	125,830	303,329
				0.2' – 1.5' above TS	Lake Inflow, ac-ft	0	N/A	5,300
Eastern	Offline, vegetation r	nanagement drawdow	n as of 3/1/2021	Target Stage (TS +/- 0.2')	Total Outflow, ac-ft	15,820	118,239	286,157
Central	←>	<b>°</b>	Online	Low Water Level (<0.2' below TS)	Inflow Conc., ppb	71	111	93
	~	1.0			Outflow Conc., ppb			
Western	$\leftarrow$	•	Online	0-25% Dry 50-75% Dry		9	16	16
western		1.0	Online	25-50% Dry 75-100% Dry	Includes Preliminary Da	ata		

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



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

# STA-5/6 Weekly Status Report – 10/10/2022 through 10/16/2022





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

# Basic Concepts and Definitions for STA Weekly Status Report

- Inflow: Sum of flow volume at all inflow structures to an STA.
- Lake Inflow: Portion of the STA total inflow volume that originates from Lake Okeechobee.
- Outflow: Sum of flow volume at outflow structures from an STA.
- Total Phosphorus (TP): Total mass of phosphorus in all its forms; including particulate, dissolved, etc.
- Inflow Concentration: TP concentration is the mass of TP in micrograms per liter of water, µg/L or ppb. Inflow concentration refers to the flowweighted 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 365day 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 Water Levels

WCA-1: Stage at the 1-8C gauge rose slowly again last week. The average on Sunday was 0.18 feet below the flat Zone A1 regulation line. WCA-2A: Stage at the 2-17 gauge receded at the end of last week. The average on Sunday was 1.12 feet above the falling regulation line. WCA-3A: Last week the Three Gauge Average remained flat for most of the week. The average stage was 0.38 feet above the rising regulation line on Sunday. WCA-3A North: At gauge 62 (Northwest corner) stage continued to fall last week, the average on Sunday matched the flat Lower schedule line (**Figures EV-1** through **EV-4**).

#### Water Depths

The SFWDAT illustrates the change in water depths from tropical rainfall when comparing depths over the last two months. WCA-2A depths are above 2.5 feet in the southern region. Along the northern reach of the L-67s depths continue to increase and the spatial extent of those deeper conditions has expanded. Connectivity in the western sloughs of ENP continues to strengthen, while remaining strong in the east. Comparing current water depths to one month ago, conditions within the EPA are much wetter (eastern BCNP the exception), with significantly deeper conditions in eastern WCA-3A and southern WCA-2A. Looking back a year ago, WCA-1 and -2A are shallower; conditions are significantly deeper east of the Miami Canal in WCA-3A (**Figure EV-5 and Figure EV-6**). Comparing current conditions to the 20-year median: Above average conditions. ENP continues to experience drier than average conditions to the west and wetter than average in northeast Shark River Slough (**Figure EV-7**).

# Taylor Slough and Florida Bay

Taylor Slough and Florida Bay received an average of 1.62 inches of total rainfall this past week based on 18 gauges. This was over three times more than the previous week (0.45 inches). Precipitation ranged from 0.30 inches at Buoy Key (BK) in western Florida Bay to 3.18 inches in western Taylor Slough (P37). After decreasing at all sites last week, Taylor Slough stages increased at most sites, especially those in the southern slough just upstream of the Florida Bay nearshore area. The average change was +0.031 feet (**Figure EV-8 and Figure EV-9**). Taylor Slough water levels remain above the historical average for this time of year by +5.65 inches compared to before the Florida Bay initiative (starting in 2017), an increase of +0.5 inches from last week.

Average Florida Bay salinity is 27.6, a decrease of nearly -1.0 from the previous week. Salinity changes ranged from a decrease of -5.8 at Trout Creek (TC) just downstream of Joe Bay (JB) in the eastern nearshore region to an increase of +3.2 at Garfield Bight (GB) in the Western Bay on 10/16 (**Figure EV-8**). Salinities decreased at most stations except in the Western Bay at GB and Buoy Key (BK) and Central nearshore region at Terrapin Bay (TB). Salinities are well within the 2001-2016 Interquartile Range (IQR) in the Central Bay and at the 75<sup>th</sup> percentile in the Eastern region. The Western region exceeds the IQR, despite the short-lived salinity decrease following precipitation from Hurricane Ian (**Figure EV-10**). Florida Bay salinity is 4.38 above its historical average for this time of

year, a decrease of -0.2 from last week. For much of the week, positive daily flows were measured at the five major creeks into the Bay.

#### Water Management Recommendations

We continue to recommend high level discussions on strategies that could prevent further degradation of NE-WCA3A. Conserving water in this region may prove critical for the upcoming wading bird nesting season. Maintaining a moderate rate of stage change within the marsh of WCA-2A and northern WCA-3A, avoiding large abrupt changes in water depth as flow through diminishes has an ecological benefit. Steady flows into northern perimeter WCA-3A would continue to benefit the ecology of that region by helping to provide enough water to protect recession rates needed to sustain surface water in the Alley North region in the dry season. When water is available discharge downstream through Taylor Slough. Individual regional recommendations can be found in **Table EV-2**.

Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	1.01	+0.02
WCA-2A	1.60	+0.01
WCA-2B	0.48	+0.24
WCA-3A	0.61	+0.02
WCA-3B	0.51	+0.05
ENP	1.91	-0.05

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



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 (10/10/2022) 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.

SFWMD Everglades E	cological Recomn	nendations, October 11th, 2022	(red is new)
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.02'	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage increased by 0.01'	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage increased by 0.24'	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage decreased by 0.09'	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife. Lower fire risk.
WCA-3A NW	Stage decreased by 0.16'	Ascension rate of less than 0.25 feet per week.	
Central WCA-3A S	Stage increased by 0.13'	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage increased by 0.20'		
WCA-3B	Stage increased by 0.05'	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife. Lower fire risk.
ENP-SRS	Stage decreased by 0.05'	Make discharges to ENP according to COP and TTFF protocol while adaptively considering upstream and downstream ecological conditions. Discussions on water management within the system should be continued.	Protect within basin and upstream habitat and wildlife.
Taylor Slough	Stage changes ranged from -0.03' to +0.11'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged from -4.7 to +3.2	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.

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

#### **Biscayne Bay**

As shown in **Figure BB-1**, mean total inflow to Biscayne Bay was 881 cfs and the previous 30-day mean inflow was 1,582 cfs. The seven-day mean salinity was 24.3 at BBCW8 and 19.5 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Data provided by Biscayne National Park.



**Figure BB-1.** Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.