

# Settlement Agreement Report

Third Quarter 2022  
July - September

Prepared for the  
Technical Oversight Committee

July 28, 2023

(Original: February 27, 2023)



This report has been revised from earlier versions to include Shark River Slough compliance results using the final approved flow data for federal Water Year 2022 (October 1, 2021 - September 30, 2022).

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## **PURPOSE**

The South Florida Water Management District has prepared this report to provide a quarterly update to the Everglades Technical Oversight Committee on the compliance status with total phosphorus levels or limits defined in the 1991 Settlement Agreement, entered as a Consent Decree in 1992, and modified in 1995. The areas of interest in this report include the interior marsh stations in the Arthur R. Marshall Loxahatchee National Wildlife Refuge and two discharges to Everglades National Park: inflows to Shark River Slough and inflows to Taylor Slough and Coastal Basins.

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## ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
cfs	cubic feet per second
EAA	Everglades Agricultural Area
ENP	Everglades National Park
Exp.	Expansion
FEB	flow equalization basin
ft NGVD29	elevation in feet relative to the National Geodetic Vertical Datum of 1929
FWMC	flow-weighted mean concentration
kac-ft	thousand acre-feet
kac-ft/yr	thousand acre-feet per year
OFW	Outstanding Florida Waters

ppb	parts per billion
Refuge	Arthur R. Marshall Loxahatchee National Wildlife Refuge
STA	stormwater treatment area
TOC	Everglades Technical Oversight Committee
TP	total phosphorus
USACE	United States Army Corps of Engineers
WCA	water conservation area
WMA	Wildlife Management Area
WY	Water Year

## EXECUTIVE SUMMARY

This report fulfills the South Florida Water Management District’s reporting requirements under the 1991 Settlement Agreement, entered as a Consent Decree in 1992 and modified in 1995, for the third quarter of 2022 (July – September 2022). Total phosphorus (TP) compliance highlights for this period are summarized below for the Arthur R. Marshall Loxahatchee National Wildlife Refuge (Refuge) and inflows to Everglades National Park (ENP) (**Table 1** and **Figure 1**):

- **Refuge:** The geometric mean TP concentrations were below the long-term levels for July, August, and September 2022.
- **Shark River Slough:** The TP flow-weighted mean concentration (FWMC) was above the long-term limit (LTL) for the 12-month period ending on September 30, 2022. Therefore, SRS TP FWMC did not meet the LTL during the federal Water Year (WY), WY2022 (October 1, 2021 – September 30, 2022).
- **Taylor Slough and Coastal Basins:** All three 12-month TP FWMCs were below the 12-month long-term limit of 11 parts per billion (ppb) during the third quarter.

**Table 1.** Third quarter 2022 TP compliance results for the Refuge, TP calculation provisional tracking results for Shark River Slough, and TP calculation tracking results for Taylor Slough and Coastal Basins.

Month	Geometric Mean TP Concentration (ppb)	Long-Term Level (ppb)	Mean Stage (ft NGVD29)	Number of Samples	
<b>Arthur R. Marshall Loxahatchee National Wildlife Refuge</b>					
Jul 2022	7.6	10.3	16.36	12	
Aug 2022	6.7	9.4	16.56	13	
Sept 2022	7.3	10.1	16.41	11	
12-Month Period Ending	Total Flow (kac-ft)	12-Month TP FWMC (ppb)	Long-Term Limit (ppb)	Percent of Sampling Events Greater than 10 ppb	
				Observed (%)	Guideline (%)
<b>Everglades National Park – Shark River Slough</b>					
Jul 2022	1,055.7	10.4	7.7	53.8	40.2
Aug 2022	1,082.5	10.2	7.6	46.2	39.7
Sep 2022	1,066.0	10.2	7.6	50.0	40.1
<b>Everglades National Park – Taylor Slough and Coastal Basins</b>					
Jul 2022	300.2	5.1	11.0	4.2	53.1
Aug 2022	315.2	5.2	11.0	4.2	53.1
Sep 2022	323.0	5.1	11.0	4.2	53.1

**Notes:**

- Key to units: ppb – parts per billion (values are actually in micrograms per liter [ $\mu\text{g/L}$ ], which, for the purposes of this report, are equivalent to ppb); ft NGVD29 – elevation in feet relative to the National Geodetic Vertical Datum of 1929; and kac-ft – thousand-acre feet.
- Compliance for inflows to ENP (Shark River Slough; Taylor Slough and Coastal Basins) is evaluated annually based on the 12-month TP FWMC for the federal water year ending on September 30. As adopted by the Everglades Technical Oversight Committee (TOC) in August 2020, the compliance calculation results shown used “Method 1.5” for Shark River Slough and “Method 3” for Taylor Slough and Coastal Basins. Details about these calculation methods are provided later in this report.

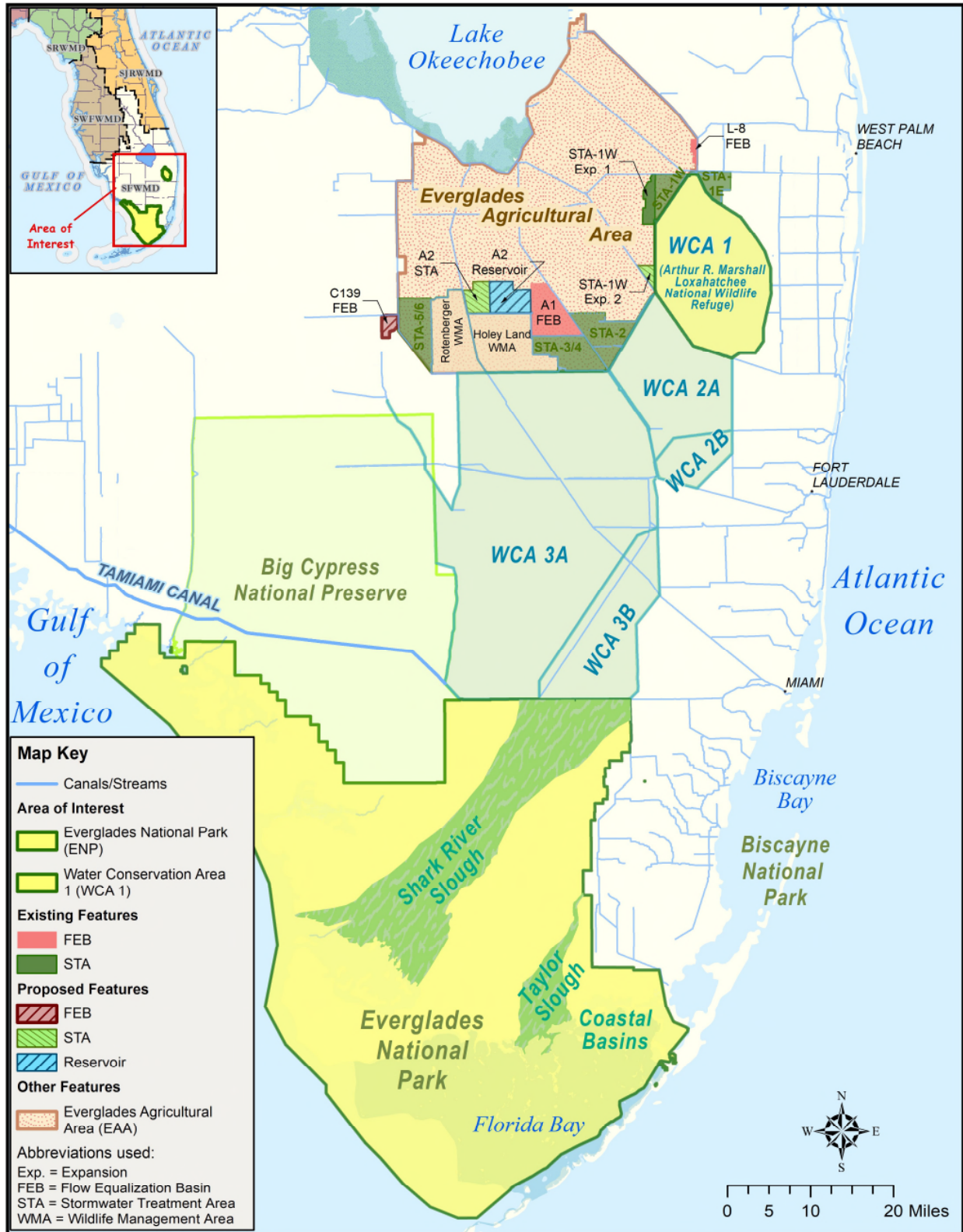


Figure 1. Areas of interest.

## ARTHUR R. MARSHALL LOXAHATCHEE NATIONAL WILDLIFE REFUGE

### Background

The 1991 Settlement Agreement ended the Everglades lawsuit and was entered into by the federal government, the State of Florida, and the South Florida Water Management District. The subsequent Consent Decree, as modified in 1995, specified that interim and long-term TP concentration levels for the Refuge must be met by February 1, 1999, and December 31, 2006, respectively. Both the interim and long-term concentration levels vary monthly because they are calculated as a function of water stage measured at gaging stations 1-7, 1-8C, and 1-9, within the Refuge. The stage range within which the interim and long-term concentration levels are applicable is 15.42 to 17.14 elevation in feet relative to the National Geodetic Vertical Datum of 1929 (ft NGVD29). The monthly TP concentrations are determined from water samples collected at 14 interior marsh stations, LOX3 through LOX16 (**Figure 2**). As required in the Consent Decree, the concentrations are converted to a geometric mean, which is compared to the long-term concentration level. Monthly TP data for each station for the past 36 months are provided in Appendix A. The calculation methods specified in the Consent Decree are provided in Appendix D.

### Reporting Period Update

Twelve stations were sampled in July, thirteen stations were sampled in August, and eleven stations were sampled in September 2022.

TP samples were not collected at LOX3 and LOX11 in July; LOX3 in August, and LOX3, LOX5, and LOX9 in September because the water depth was less than 0.1 meter at the time of sampling or had ponding conditions.

Sampling day average stages in the Refuge were 16.4, 16.6, and 16.4 ft NGVD29 in July, August, and September 2022, respectively (**Figure 3** and **Table 2**). The geometric means calculated from TP concentrations measured in water samples collected in July, August and September were 7.6, 6.7 and 7.3, ppb, respectively, which were below the long-term levels.



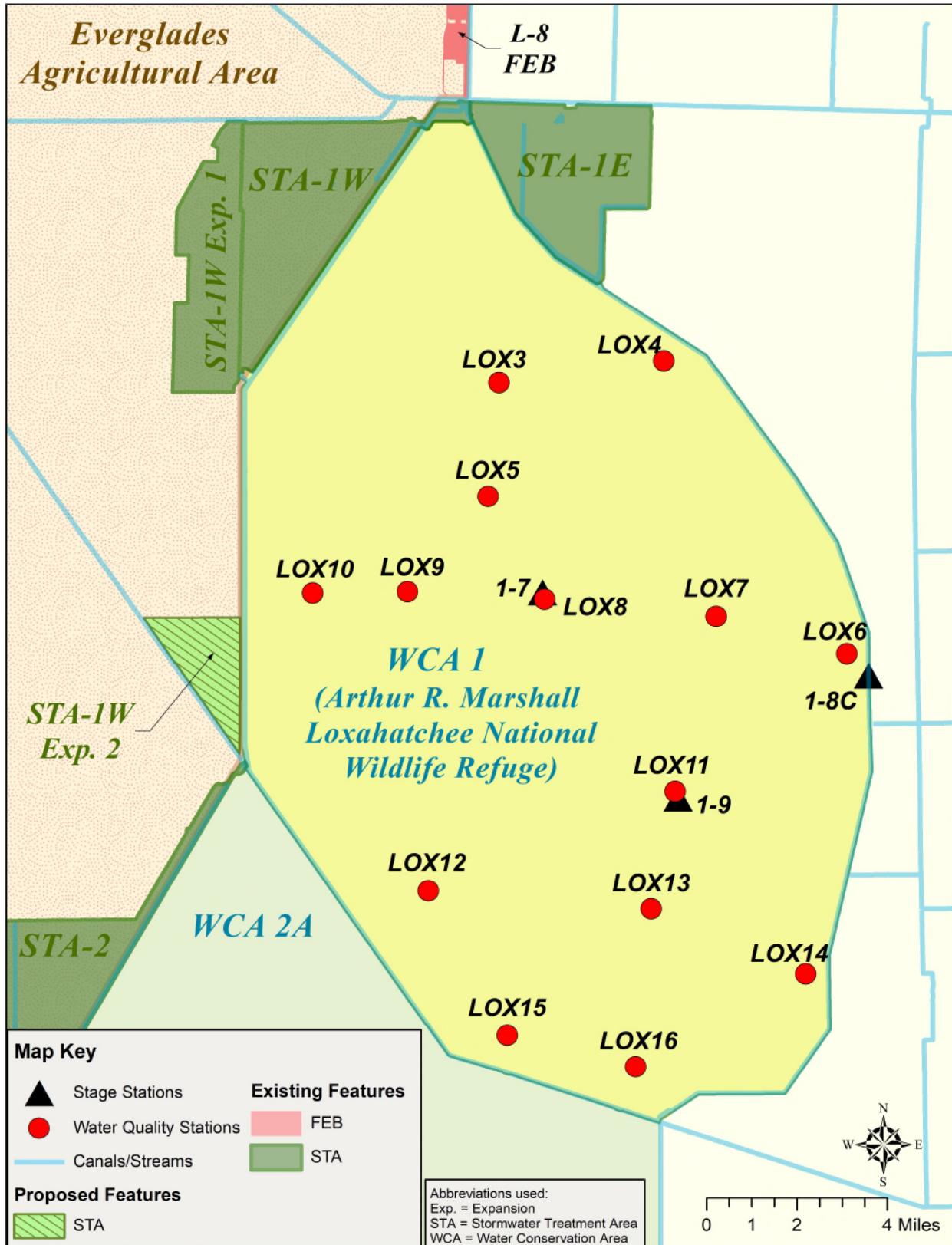
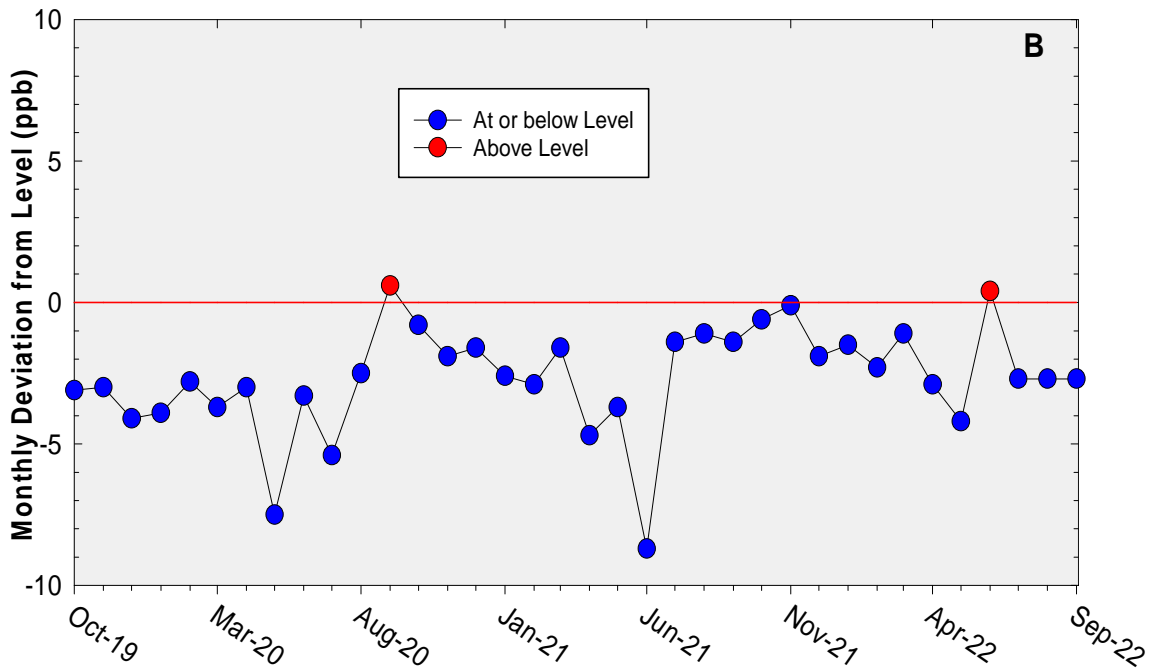
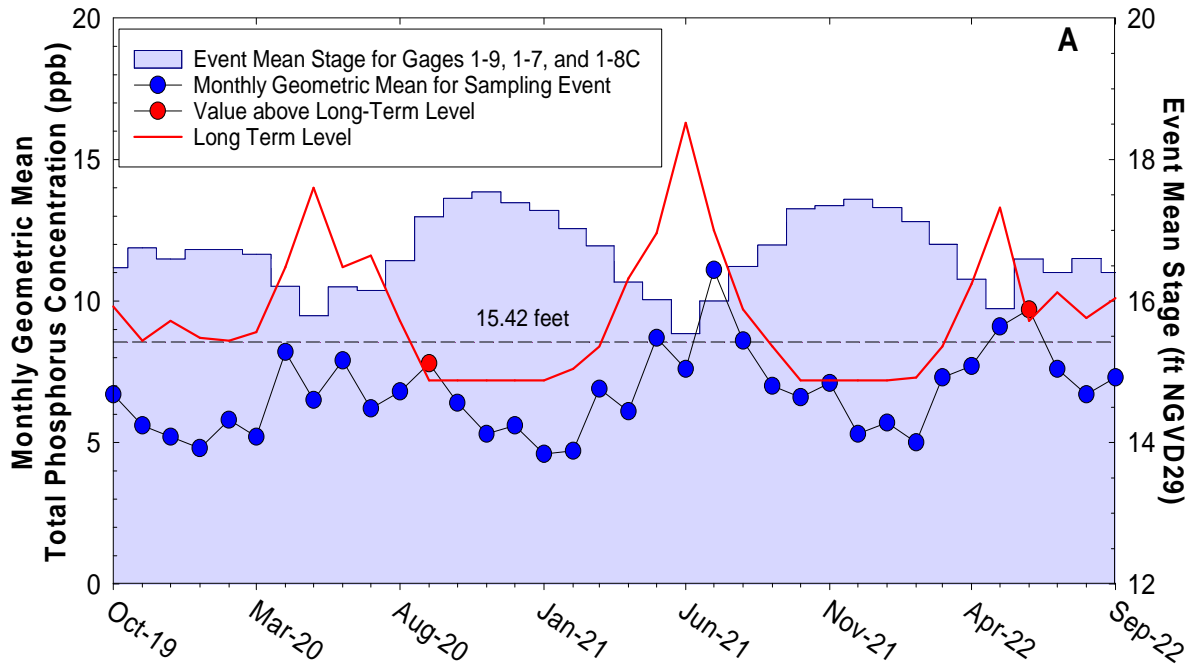


Figure 2. Refuge water quality sampling and stage measurement stations.



**Figure 3.** A. Monthly TP geometric mean concentrations for the Refuge compared to calculated long-term levels, which are adjusted for fluctuations in stage. The geometric mean TP concentration was above the long-term level in September 2020 and in June 2022. B. Deviation of monthly geometric mean TP concentrations from calculated long-term levels. Negative values indicate that the geometric mean was lower than the long-term level.

**Table 2.** Refuge TP compliance tracking.

Month	Geometric Mean TP Concentration (ppb)	Long-Term Level (ppb)	Average Stage (ft NGVD29)	Number of Samples
Oct-2019	6.7	9.8	16.47	13
Nov-2019	5.6	8.6	16.75	14
Dec-2019	5.2	9.3	16.59	14
Jan-2020	4.8	8.7	16.73	14
Feb-2020	5.8	8.6	16.73	14
Mar-2020	5.2	8.9	16.66	14
Apr-2020	8.2	11.2	16.21	11
May-2020	6.5	14.0	15.79	6
Jun-2020	7.9	11.2	16.20	12
Jul-2020	6.2	11.6	16.15	12
Aug-2020	6.8	9.3	16.57	14
<b><i>Sep-2020</i></b>	<b><i>7.8</i></b>	<b><i>7.2</i></b>	<b><i>17.19</i></b>	<b><i>14</i></b>
Oct-2020	6.4	7.2	17.45	14
Nov-2020	5.3	7.2	17.54	14
Dec-2020	5.6	7.2	17.39	14
Jan-2021	4.6	7.2	17.28	14
Feb-2021	4.7	7.6	17.02	14
Mar-2021	6.9	8.4	16.78	14
Apr-2021	6.1	10.8	16.27	11
May-2021	8.7	12.4	16.02	9
Jun-2021	7.6	16.3	15.54	5
Jul-2021	11.1	12.5	16.00	8
Aug-2021	8.6	9.7	16.49	13
Sep-2021	7.0	8.4	16.79	13
Oct-2021	6.6	7.2	17.30	14
Nov-2021	7.1	7.2	17.35	14
Dec-2021	5.3	7.2	17.44	14
Jan-2022	5.7	7.2	17.32	14
Feb-2022	5.0	7.3	17.12	13
Mar-2022	7.3	8.4	16.80	14
Apr-2022	7.7	10.6	16.31	13
May-2022	9.1	13.3	15.89	7
<b><i>Jun-2022</i></b>	<b><i>9.7</i></b>	<b><i>9.3</i></b>	<b><i>16.59</i></b>	<b><i>14</i></b>
Jul-2022	7.6	10.3	16.36	12
Aug-2022	6.7	9.4	16.56	13
Sep-2022	7.3	10.1	16.41	11

## Notes:

- Key to units: ppb – parts per billion (values are actually in micrograms per liter [ $\mu\text{g/L}$ ], which, for the purposes of this report, are equivalent to ppb); and ft NGVD29 – elevation in feet relative to the National Geodetic Vertical Datum of 1929.
- Highlighted row with bold, italicized text indicates an excursion over the long-term level.
- Average stage is calculated using the stage elevations at stations 1-7, 1-8C, and 1-9 for the given sampling dates.

## EVERGLADES NATIONAL PARK

### Shark River Slough

#### Background

The Settlement Agreement/Consent Decree (1995) specified that interim and long-term TP concentration limits for discharges into ENP (**Figure 4**) through Shark River Slough be met by October 1, 2003, and December 31, 2006, respectively. It was specified that the TP levels be presented as 12-month FWMCs. Only the TP concentrations for the water year ending on September 30 are evaluated for compliance with the Consent Decree limits (Appendix D). Inflow concentrations of TP through S12A, S12B, S12C, S12D, S333, S355A, and S355B were compared to the interim and long-term limits at the end of each federal water year (October 1 through September 30). The long-term limit went into effect in WY2007.

The frequency of routine monitoring was changed to weekly for all Shark River Slough sites beginning in August 2007. However, in accordance with Appendix A of the Consent Decree, from October 2007 forward only the grab concentration data from every other week for the FWMC calculations is being used. Weekly TP data for each station for the past 12-months are provided in Appendix B.

Pursuant to agreement among all Everglades Technical Oversight Committee (TOC) members at the May 14, 2013, TOC meeting, the following three changes were made to the quarterly Settlement Agreement Report: (1) publishing of the quarterly 12-month TP FWMCs for Shark River Slough is discontinued, (2) provisional quarterly 12-month TP FWMCs are posted separately to the TOC website, <https://www.sfwmd.gov/our-work/toc>, and (3) the annual 12-month TP FWMC for the water year ending on September 30 will be published once the final approved flow data for the S12A, S12B, S12C, and S12D structures become available. These changes were implemented beginning with the January – March 2013 first quarter report. Based on a vote by the TOC on July 19, 2016, provisional 12-month results are now included in the report.

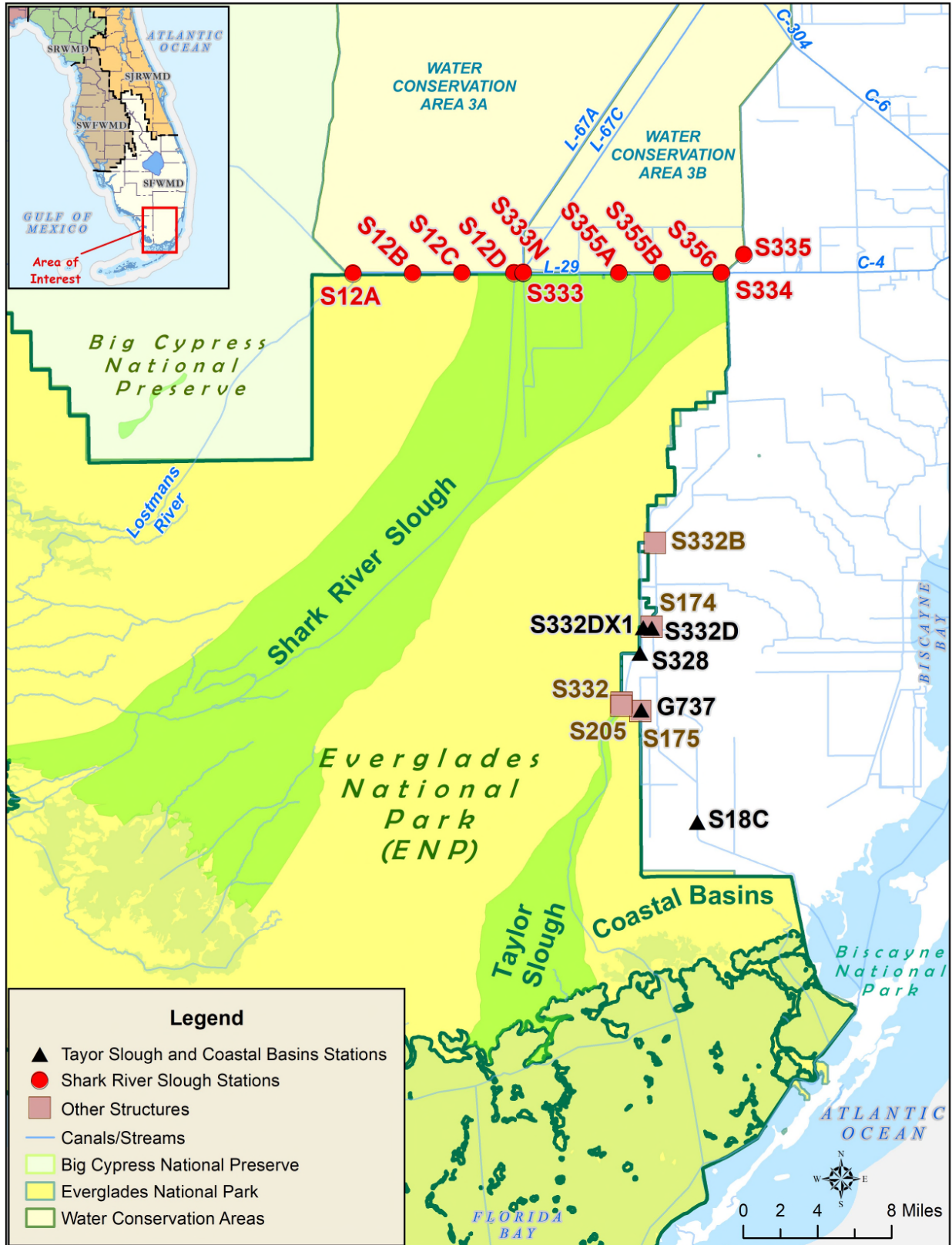
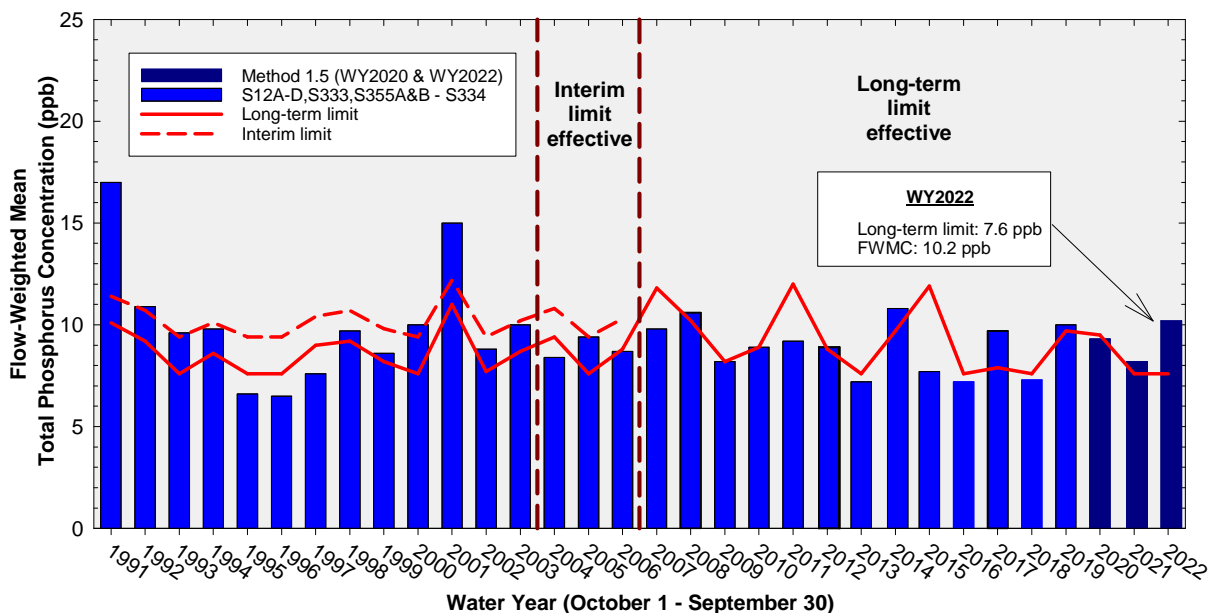


Figure 4. ENP flow structures.

The TOC has recognized that the S356 seepage return pump, which initiated operation under the United States Army Corps of Engineers (USACE) field test in fall 2015, has the ability to discharge water that originated from the water conservation areas (WCAs) to Shark River Slough. The Appendix A Subteam was tasked with recommending an appropriate method for incorporating S356 into the compliance calculation. Since adoption of a single appropriate method had not yet been made by the TOC prior to publication of provisional tracking through the second quarter of WY2020, this report contains results based on two calculation methods (Method 1 and Method 2) through the 12-month tracking period ending March 2020. On August 11, 2020, the TOC voted to accept Method 1.5 as the official reporting method for evaluating compliance for Shark River Slough under Appendix A. Method 1.5 describes a collective TP FWMC computed as the flow-weighted combination of each of the S12s' flow and TP together with each of the TP results and adjusted inflows through the L-29 Canal to Shark River Slough, including the portion of S356 flow from S335, all reduced by the proportional volume exiting S334. The gated spillway S333N, located north of S333, discharges water from L-67A to the L-29 Canal east of S333, and is integrated into Method 1.5. The entire S333N flow volume counts toward the annual flow total for long-term limit calculation. Incorporation of this structure's data into the Appendix A Shark River Slough water year compliance methodology was approved by the TOC at the May 2021 quarterly meeting.

TP grab results at S12A, S12B, S12C, S12D, S333, S333N, S355A, S355B, and S356 are applied to the respective flow (adjusted as described) on biweekly compliance sampling dates. S334 flow is not excluded from the total flow for long-term limit calculations. The gated spillway S333N, located north of S333, discharges water from L-67A to the L-29 Canal east of S333. It was integrated into Method 1.5 in the current report for tracking purposes on November 2020. TP FWMC is computed as  $S12s + [S333 + S333N + S355A + S355B + \text{minimum}(S356, S335) - S334]$ .

For the 12-month period ending on September 30, 2022, the 12-month TP FWMC calculated using Method 1.5 was 10.2 ppb, which is above the long-term limit of 7.6 ppb. Therefore, inflows to Shark River Slough did not meet the TP limit for WY2022 (October 1, 2021 – September 30, 2022). **Figure 5** represents the 12-month TP FWMCs from WY1991 through WY2022.



**Figure 5.** The 12-month TP FWMCs at inflows to ENP through Shark River Slough at the end of each water year compared to the interim and long term total phosphorus limits through WY2022.

## Reporting Period Update

**Table 3** presents the 12-month FWMCs for each month with the corresponding -long-term TP concentration limits calculated using the 12-month period flow.

For the 12-month periods ending in July, August, and September 2022, the 12-month TP FWMCs calculated using Method 1.5 were 10.4, 10.2, and 10.2 ppb, respectively. The 12-month long-term limits, based on the total flow into Shark River Slough, were 7.7, 7.6, and 7.6 ppb, respectively (Table 3). Because the TP FWMC for the 12-month period ending on September 30, 2022, was above the long-term limit, inflows to Shark River Slough did not meet the TP limit for WY2022.

The Consent Decree stipulates that the percentage of TP FWMCs greater than 10 ppb from each sampling event in any 12-month period must not exceed a guideline value based on flow into Shark River Slough for the same 12-month period. For the 12-month period of WY2022, the observed sampling event TP concentrations greater than 10 ppb were 50.0 percent, which was higher than the guideline of 40.1 percent.

The 12-month TP FWMCs and the TP FWMCs for individual sampling events are presented in **Figure 6**.

Daily flows through the individual Shark River Slough structures from October 2019 through September 2022 in cubic feet per second (cfs) are presented in **Figures 7 through 10**.

During WY2022, a total of 447 kac-ft of water was discharged through the S12 structures, 331 kac-ft of water was discharged through the S333, and 274 kac-ft through the S333N structure. There was no discharge through S355A or S355B. 14 kac-ft of water, which originated from S335, was

pumped at S356 into Shark River Slough. Very little (0.72 ac-ft) water from the L-29 Canal was discharged through S334 during WY2022 (**Figure 8**).

For additional information on the WCA-3A regulation schedule, please refer to the United States Army Corps of Engineers – Jacksonville District website<sup>1</sup>.

The sum of the daily flows and corresponding TP FWMCs for individual sampling events at Shark River Slough structures is presented in **Figure 11**.

The third quarter water quality data for Shark River Slough are available in Appendix B of this report; the WY2022 monitoring data are posted separately to the TOC website<sup>2</sup>.

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<sup>1</sup> <https://w3.saj.usace.army.mil/h2o/plots/wca3ahp.pdf>

<sup>2</sup> <https://www.sfwmd.gov/our-work/toc>

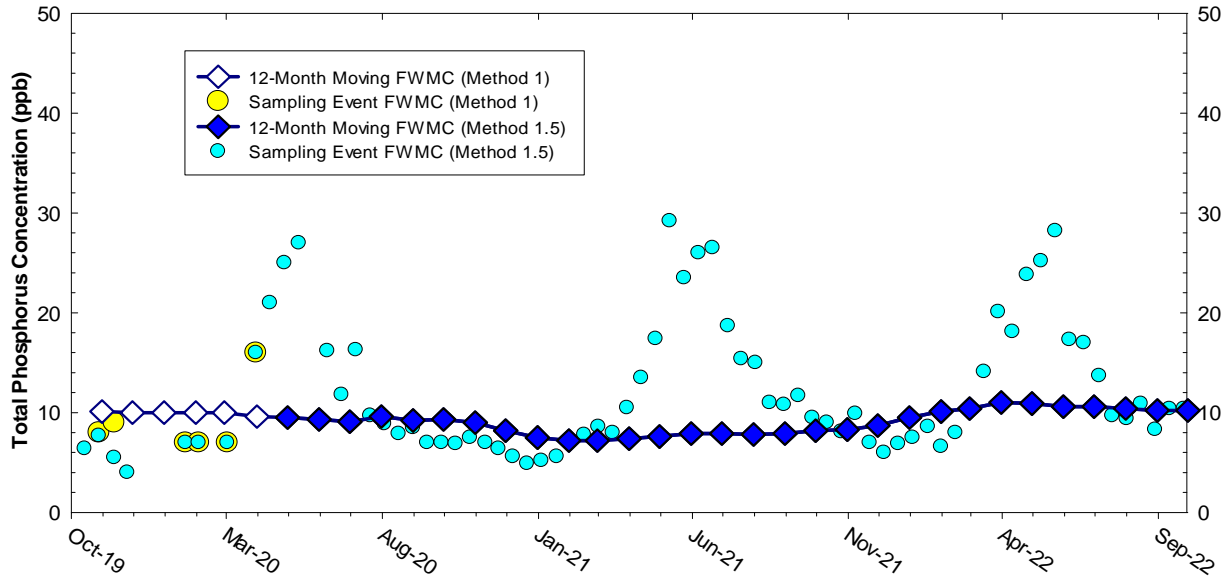


**Table 3.** Shark River Slough TP compliance tracking.

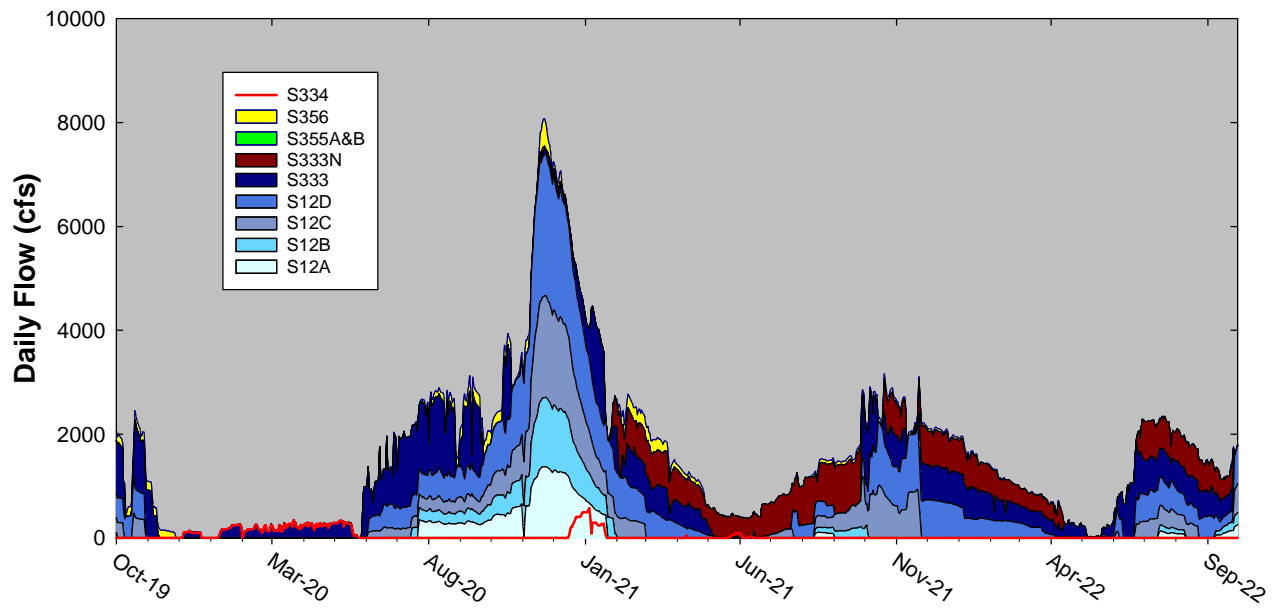
12-Month Period	Total Flow (kac-ft)	Flow-Weighted Mean TP Concentration (ppb)	Long-Term Limit (ppb)	Percent of Sampling Events Greater than 10 ppb	
				Observed (%)	Guideline (%)
Nov 2018 - Oct 2019	666.5 (693.2)	10.1 (9.8)	9.6 (953)	54.2 (50.0)	50.1 (49.3)
Dec 2018 - Nov 2019	682.6 (715.2)	10.0 (9.7)	9.5 (9.4)	48.0 (44.0)	49.6 (48.7)
Jan 2019 - Dec 2019	671.4 (704.1)	10.0 (9.7)	9.6 (9.4)	52.2 (47.8)	49.9 (49.0)
Feb 2019 - Jan 2020	666.7 (699.3)	10.0 (9.7)	9.6(9.4)	54.5 (50.0)	50.1 (49.1)
Mar 2019 - Feb 2020	643.0 (675.6)	10.0 (9.6)	9.7 (9.4)	52.4 (47.6)	50.8 (49.8)
Apr 2019 - Mar 2020	614.7 (647.3)	9.6 (9.3)	9.9 (9.6)	50.0 (47.8)	51.6 (50.7)
May 2019 - Apr 2020	598.3	9.5	10.0	47.6	52.1
Jun 2019 - May 2020	576.4	9.3	10.1	45.0	52.8
Jul 2019 - Jun 2020	603.5	9.1	10.0	45.0	52.0
Aug 2019 - Jul 2020	656.8	9.6	9.7	40.0	50.4
Sep 2019 - Aug 2020	690.7	9.2	9.5	33.3	49.4
<b>Oct 2019 - Sep 2020</b>	<b>692.7</b>	<b>9.3</b>	<b>9.5</b>	<b>35.0</b>	<b>49.3</b>
Nov 2019 - Oct 2020	780.2	9.0	9.0	35.0	46.9
Dec 2019 - Nov 2020	1,130.1	8.2	7.6	35.0	40.1
Jan 2020 - Dec 2020	1,492.1	7.5	7.6	31.8	40.1
Feb 2020 - Jan 2021	1,691.1	7.2	7.6	30.4	40.1
Mar 2020 - Feb 2021	1,819.7	7.2	7.6	29.2	40.1
Apr 2020 - Mar 2021	1,915.4	7.4	7.6	28.0	40.1
May 2020 - Apr 2021	1,967.2	7.6	7.6	28.0	40.1
Jun 2020 - May 2021	1,979.0	7.9	7.6	30.8	40.1
Jul 2020 - Jun 2021	1,931.9	7.9	7.6	30.8	40.1
Aug 2020 - Jul 2021	1,853.0	7.8	7.6	34.6	40.1
Sep 2020 - Aug 2021	1,780.0	7.9	7.6	46.2	40.1
<b>Oct 2020 - Sep 2021</b>	<b>1,733.0</b>	<b>8.2</b>	<b>7.6</b>	<b>50.0</b>	<b>40.1</b>
Nov 2020 - Oct 2021	1,710.7	8.3	7.6	50.0	40.1
Dec 2020 - Nov 2021	1,479.2	8.7	7.6	50.0	40.1
Jan 2021 - Dec 2021	1,238.5	9.5	7.6	50.0	40.1
Feb 2021 - Jan 2022	1,128.9	10.1	7.6	48.1	40.1
Mar 2021 - Feb 2022	1,055.1	10.4	7.7	51.9	40.3
Apr 2021 - Mar 2022	997.4	11.0	7.9	57.7	41.5
May 2021 - Apr 2022	954.1	10.9	8.1	57.7	42.5
Jun 2021 - May 2022	932.8	10.6	8.2	57.7	43.0
Jul 2021 - Jun 2022	974.1	10.6	8.0	57.7	42.1
Aug 2021 - Jul 2022	1,055.7	10.4	7.7	53.8	40.2
Sep 2021 - Aug 2022	1,082.5	10.2	7.6	46.2	39.7
<b>Oct 2021 - Sep 2022</b>	<b>1,066.0</b>	<b>10.2</b>	<b>7.6</b>	<b>50.0</b>	<b>40.1</b>

## Notes:

- Key to units: kac-feet – thousand acre-feet and ppb – parts per billion (values are in micrograms per liter [ $\mu\text{g/L}$ ], which, for the purposes of this report, are equivalent to ppb).
- Compliance is evaluated annually based on the 12-month TP FWMC for the federal water year ending on September 30. The compliance periods are shown as highlighted rows with bold, italicized text.
- Results of both Method 1 and Method 2 are presented through the first quarter of 2020 (12-month period ending March 2020):
  - Method 1 (left value) is computed as S12s + (S333 + S355A + S355B – S334).
  - Method 2 (right value in parentheses) is computed as S12s + (S333 + S355A + S355B + S356 – S334).
- Starting with the second quarter of 2020 (12-month periods ending April, May, and June 2020), the results of Method 1.5 for the corresponding 12-month periods are presented. Method 1.5 is computed as S12s + [S333 + S333N + S355A + S355B + minimum (S356, S335) – S334]. S333N was incorporated from November 2020 in this report.
- All methods use all flow and TP grabs on biweekly compliance sampling dates for FWM TP calculations and do not exclude S334 flow from the total flow for long-term limit calculations.



**Figure 6.** The 12-month TP FWMCs in inflows to ENP through Shark River Slough at the end of each month and TP FWMCs for each sampling event. Method 1 sampling event FWMCs and 12-month moving FWMCs are shown to the end of March 2020. Method 1.5 sampling event FWMCs are shown from May 2019, and 12-month moving FWMCs are shown from the period ending in April 2020.



**Figure 7.** Daily flows at Shark River Slough structures as a stacked sum of all inflows.

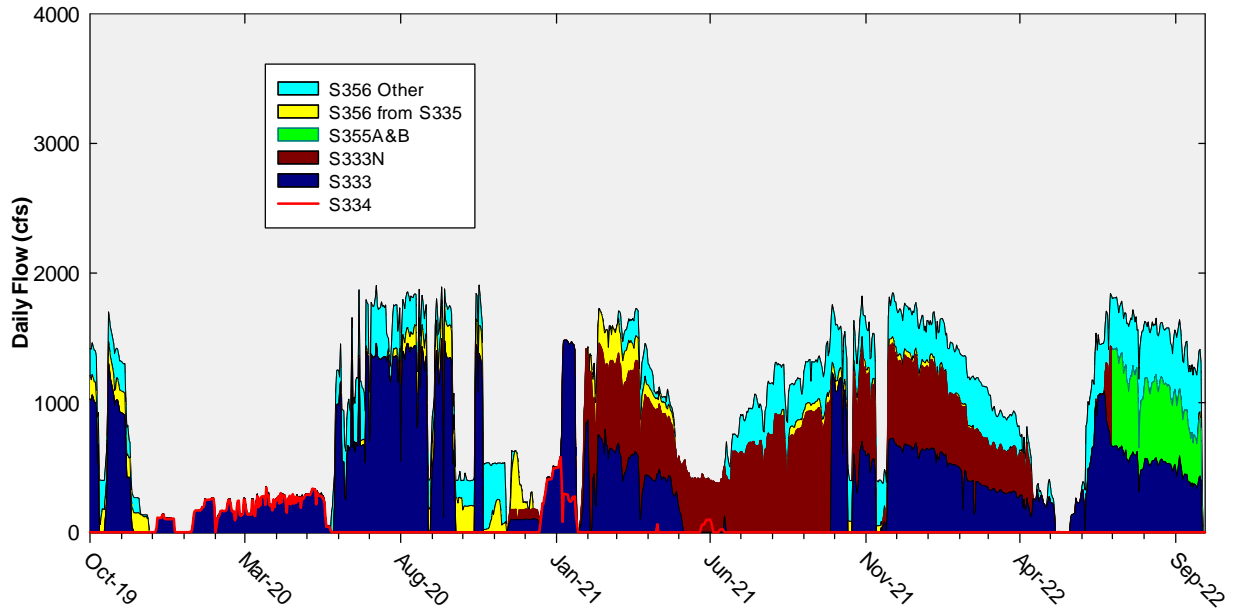


Figure 8. Daily flows into and out of the L-29 Canal.

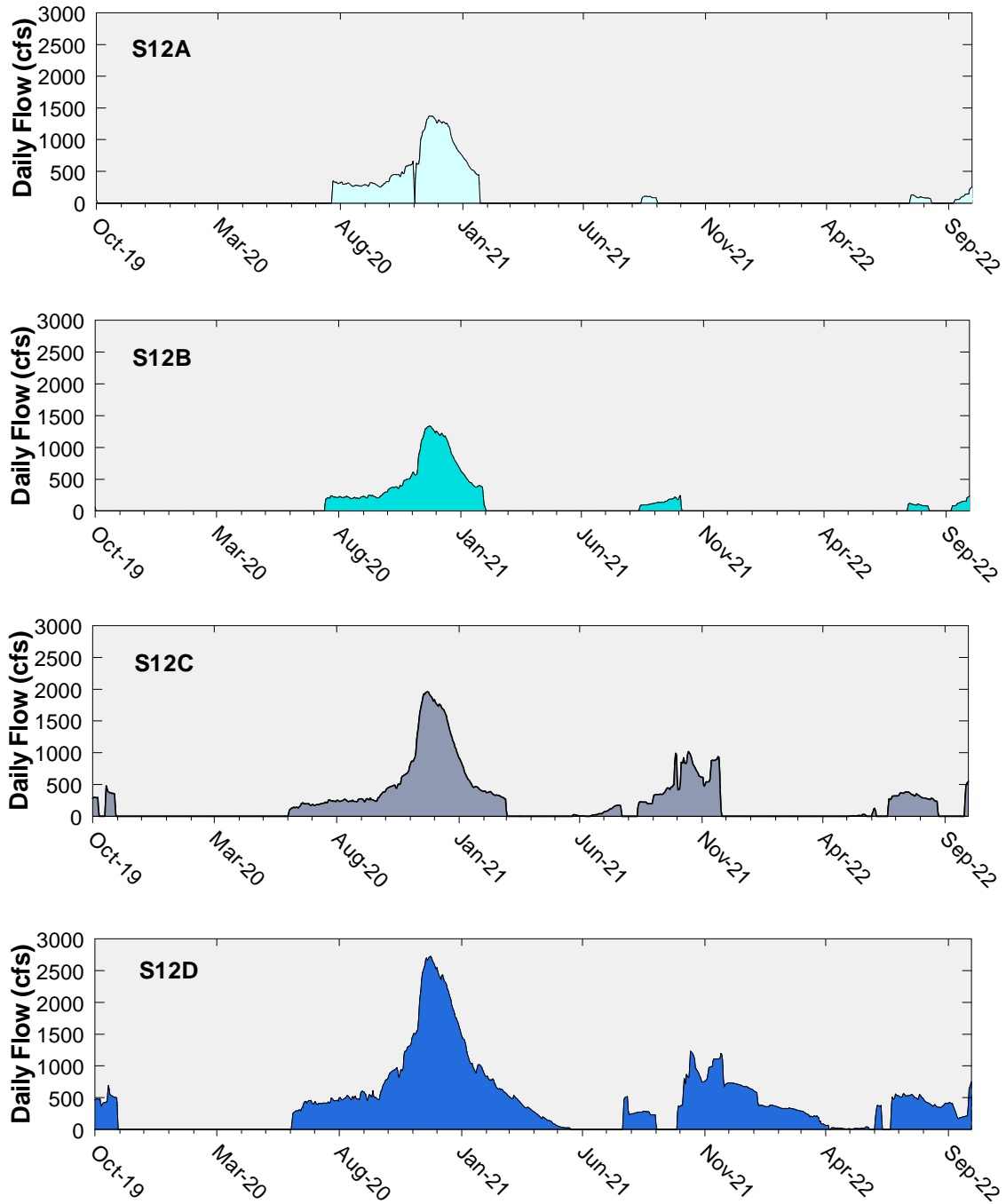


Figure 9. Daily flows at S12 structures to Shark River Slough.

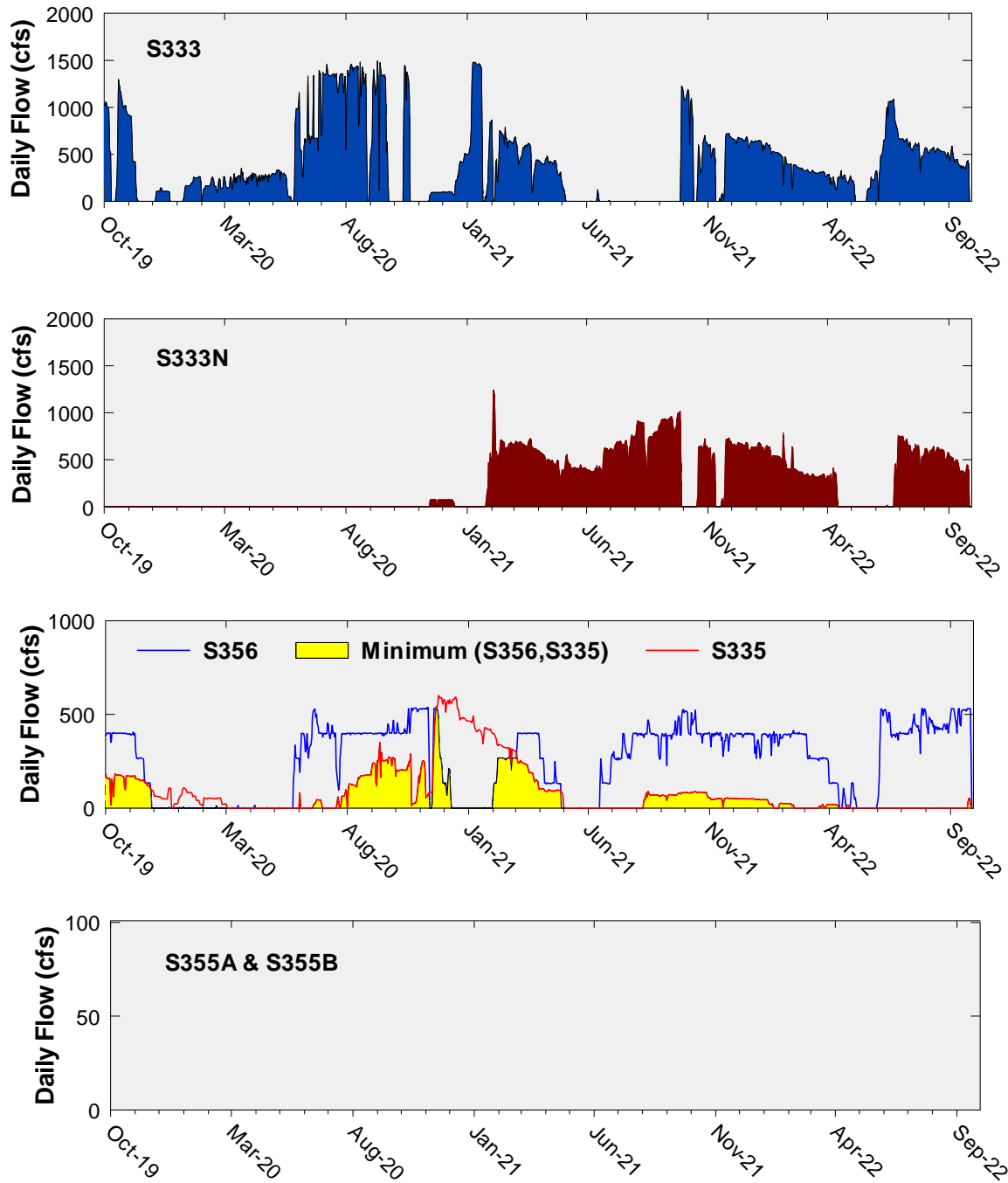
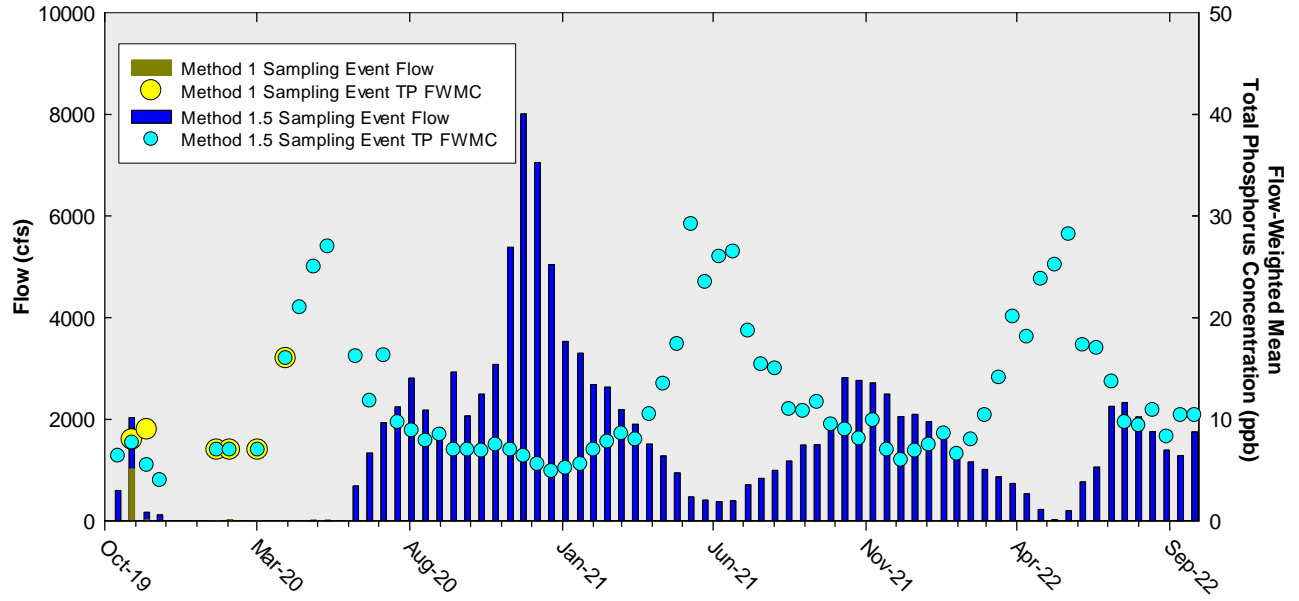


Figure 10. Daily flows at individual inflow structures to the L-29 Canal.



**Figure 11.** Flow to Shark River Slough on the day of sampling and the corresponding TP FWMCs for individual sampling events. Method 1 sampling event flows and FWMCs are shown to March 2020. Method 1.5 sampling event flows and FWMCs are shown beginning May 2019. For the period of May 2019 to March 2020, the results of both methods are shown overlapping.

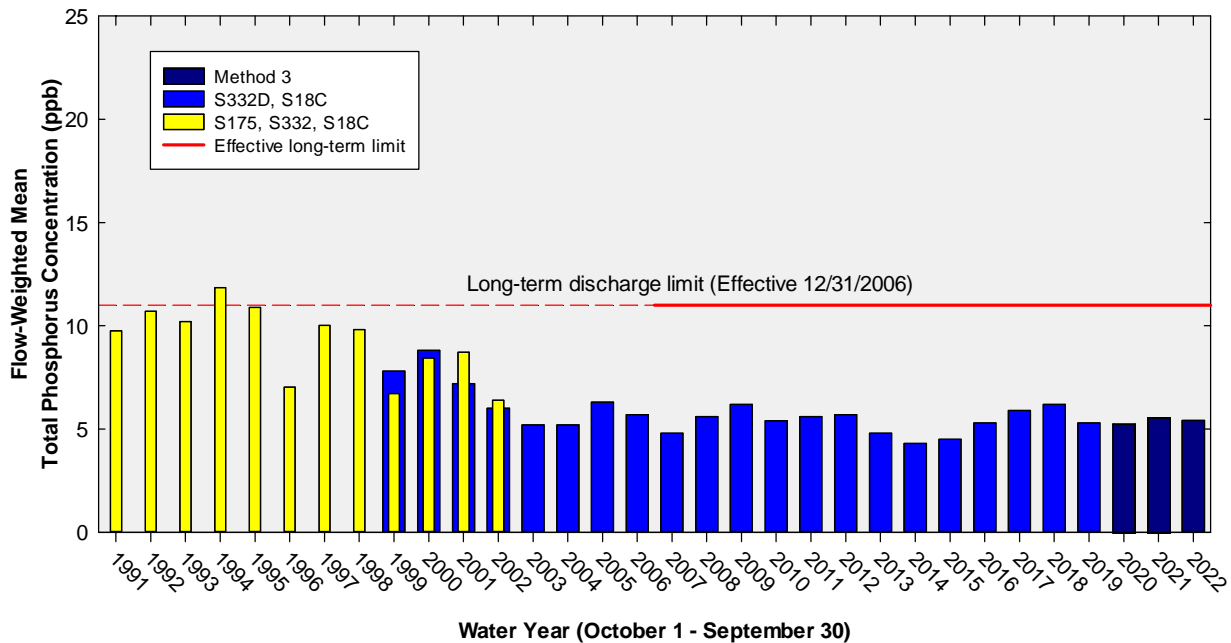
## Taylor Slough and Coastal Basins

### Background

Under the Consent Decree, a single TP longterm limit of 11 ppb, to be met by December 31, 2006, was set for the two points of inflow to Taylor Slough (S332 and S175) and the inflow point to Coastal Basins (S18C) (see Appendix C). The 12-month TP FWMCs have been consistently lower than the longterm limit of 11 ppb. Inflow TP concentrations to ENP through Taylor Slough and Coastal Basins are compared to the 11-ppb limit at the end of each water year using data from both the old and new (S174, S332D, and S18C) combinations of structures (**Figure 12**).

TP and flow data from both sets of structures presented in prior editions of this report through December 2001 (April 2002 report) showed that, beginning in October 2000, the 12-month moving total flow for S332D, S174, and S18C was consistently greater than flow at S332, S175, and S18C. There was also a shift in TP FWMC data whereby S332D, S174, and S18C concentrations became equal to, and then consistently lower than, the concentrations at S332, S175, and S18C. These changes reflected the switch from S332 to S332D for water delivery to Taylor Slough between July 3 and 5, 2000. Furthermore, the S174 site was plugged in September 2007, preventing any additional flow. Consequently, for WY2002 through WY2007, compliance tracking was represented by S332D, S174, and S18C. Since WY2008, S332D and S18C have represented the compliance tracking structures.

To facilitate tracking and comparison of the operation of the improved conveyance and delivery system to Taylor Slough and Coastal Basins, three alternative methods were proposed for the 12-month TP FWMC compliance tracking calculation for Taylor Slough and Coastal Basins. Method 1, computed as S332D + S18C; Method 2, computed as S332D + S18C + G737; and Method 3, computed as (S332D - S332DX1 - S328) + S328 + S18C + G737. Tracking of these three methods spanned June 2017 through March 2020. At the August 11, 2020, TOC meeting, the TOC representatives voted to use Method 3 as the official compliance method moving forward. Beginning with the second quarter of 2020, only Method 3 results are calculated and presented for Taylor Slough and Coastal Basins. Method 3 calculates FWMCs as [(S332D TP and S332D adjusted flow) + (S328 TP and flow) + (G737 TP and flow) + (S18C TP and flow)] using all flow and TP grabs on weekly compliance sampling dates. S332D adjusted flow is S332D - S332DX1 - S328.



**Figure 12.** The 12-month TP FWMCs in inflows to ENP through Taylor Slough and Coastal Basins at the end of each water year compared to the 11-ppb long term TP limit. Light blue bars show S332D, S174, and S18C for WY1999 through WY2007, and S332D and S18C (Method 1) from WY2008 to WY2019. Method 3 for WY2020 through WY2022, represented by dark blue bars, is (S332D – S332DX1 – S328) + S328 + G737 + S18C.

**Figure 12** demonstrates the comparison of Inflow TP concentrations for ENP through Taylor Slough and Coastal Basins to the concluding water year 11-ppb limit. The data used was from the old (S175, S332, and S18C) and new (S174, S332D, and S18C) structure combinations. The narrow bars in **Figure 12** represent the 12-month TP FWMCs from S332, S175, and S18C for WY1991 through WY2002. The wider bars for WY1999 and forward represent the new combination of structures, for example S333D, S18C, and S174 until September 2007 when S174 was plugged.

The result of Method 3 for TP FWMCs for the 12-month period ending on September 30, 2022, was 5.1 ppb, which is lower than the 11.0 ppb long-term limit. Therefore, inflows to ENP through Taylor Slough and Coastal Basins did not exceed the TP limit for WY2022.

### Reporting Period Update

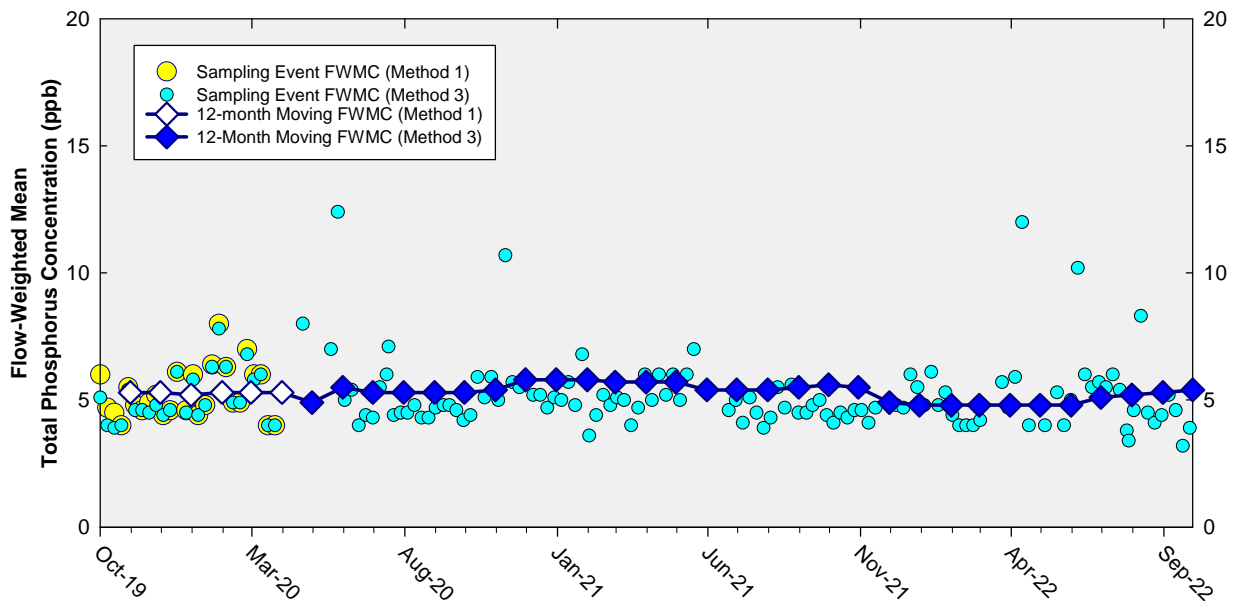
**Figure 13** presents 12-month and individual sampling event TP FWMCs at the TP compliance structures. All TP concentrations measured in grab samples collected on positive flow days reported for surface water monitoring at the sites were used for the compliance calculations.

The daily flows toward ENP through S332D (minus S332DX1 flow), G737, and S18C are presented in **Figure 14**. Daily flows from the S332D pumps and downstream structures are presented in **Figure 15**. Daily flows at individual Taylor Slough and Coastal Basins structures into ENP are resented in **Figure 16**.

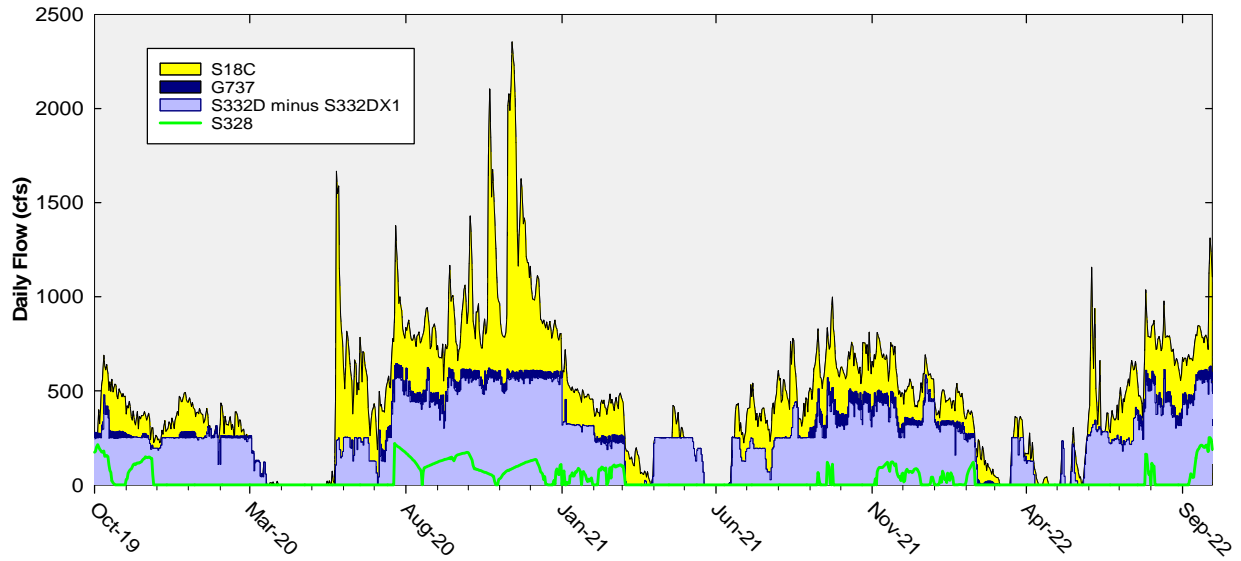


For the periods ending July, August, and September 2022, the 12-month TP FWMCs were 5.1, 5.2, and 5.1 ppb, respectively (**Table 4**). The percent of TP FWMCs greater than 10 ppb from each sampling event in any 12-month period has been much lower than the fixed guideline of 53.1% stipulated by the Consent Decree (**Table 4**). No sampling event FWMCs were higher than 10 ppb during the quarter.

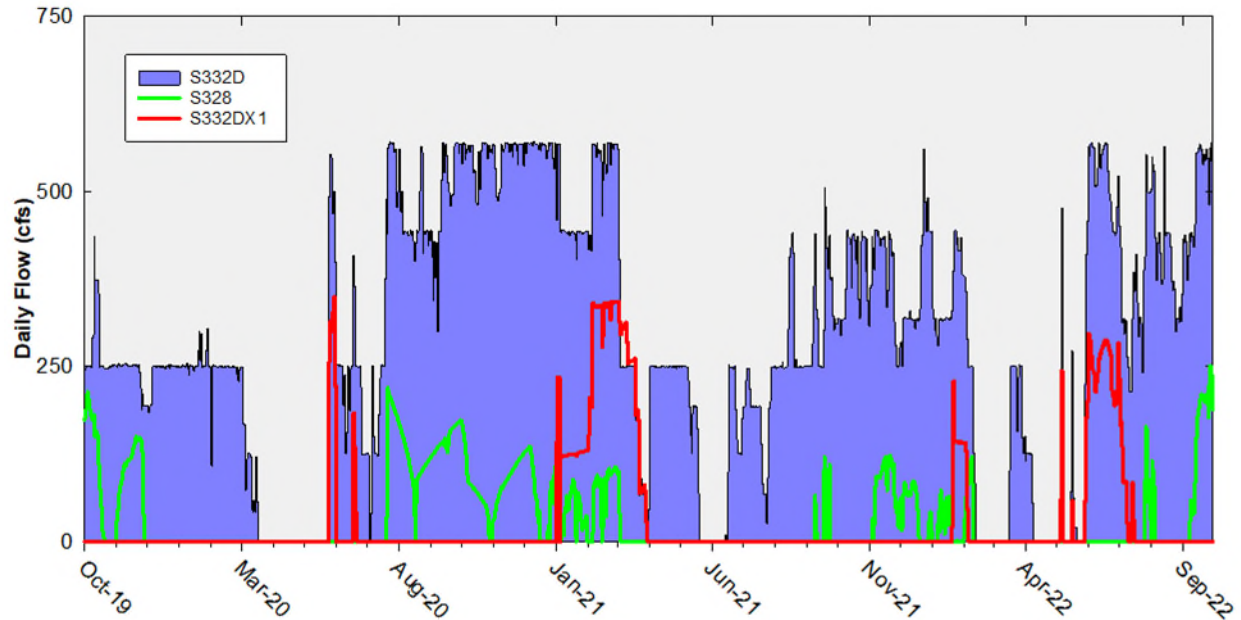
**Figure 17** shows daily inflows and the corresponding TP FWMCs for each sampling event. The sampling event TP FWMCs generally remained low, and the average of the sampling event TP FWMCs during the third quarter of 2022 was 4.9 ppb.



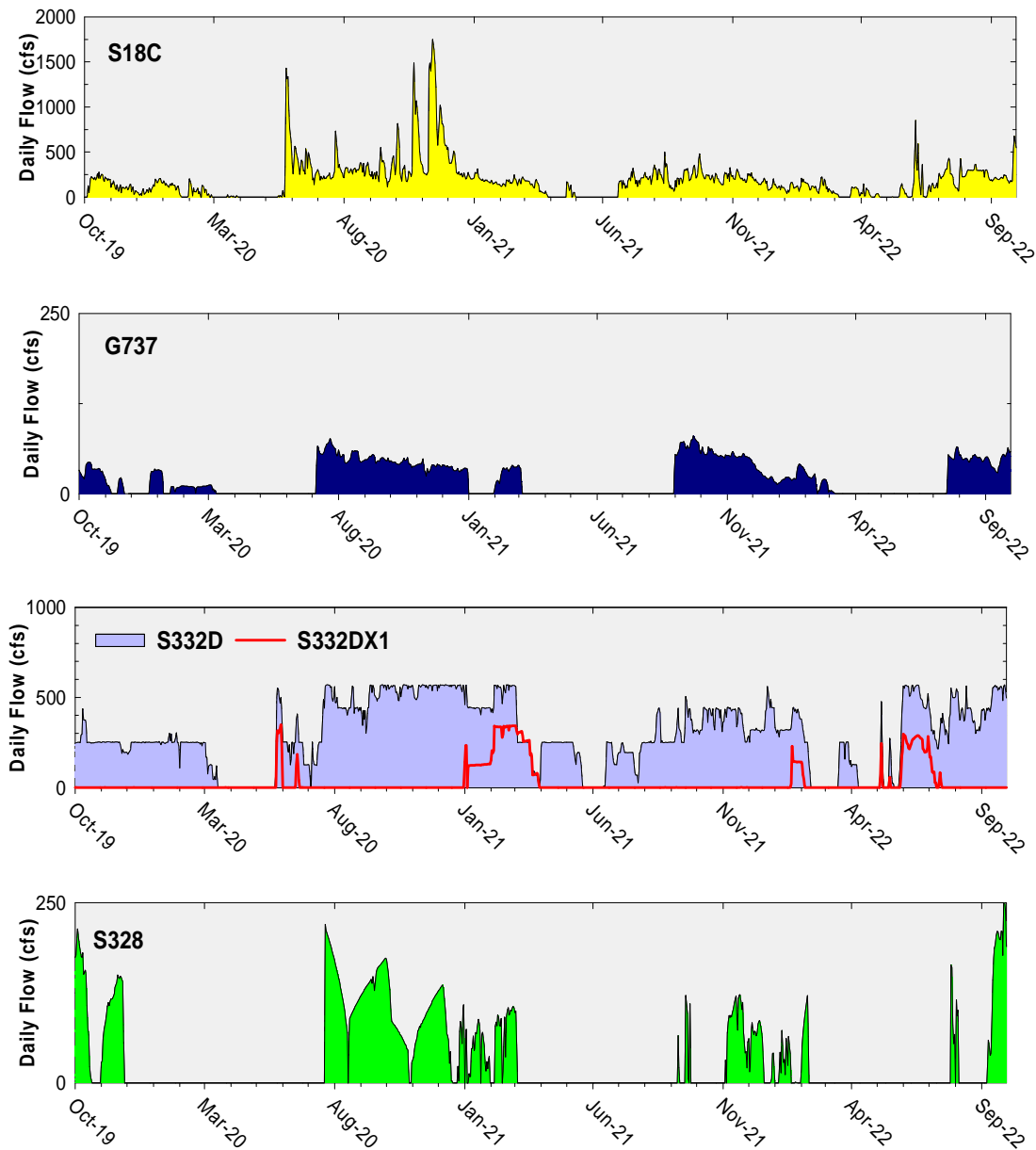
**Figure 13.** The 12-month TP FWMCs in inflows to ENP through Taylor Slough and Coastal Basins at the end of each month and the TP FWMC for each sampling event. Method 1 sampling event FWMCs and 12-month moving FWMCs are shown to the end of March 2020. Method 3 sampling event FWMCs are shown from May 2019, and Method 3 12-month moving FWMCs are shown from the period ending in April 2020.



**Figure 14.** Daily flows into ENP as a stacked sum of Taylor Slough (G737 and S332D minus S332DX1) and Coastal Basins (S18C). S328 flow is shown as an overlaid line, and flow at this station downstream of S332D is associated with its own TP data. Daily flow data are missing for S18C from September 23 to 30, 2019.



**Figure 15.** Daily flows into the detention area from the S332D pumps and monitored flow out of the detention area at two downstream structures.



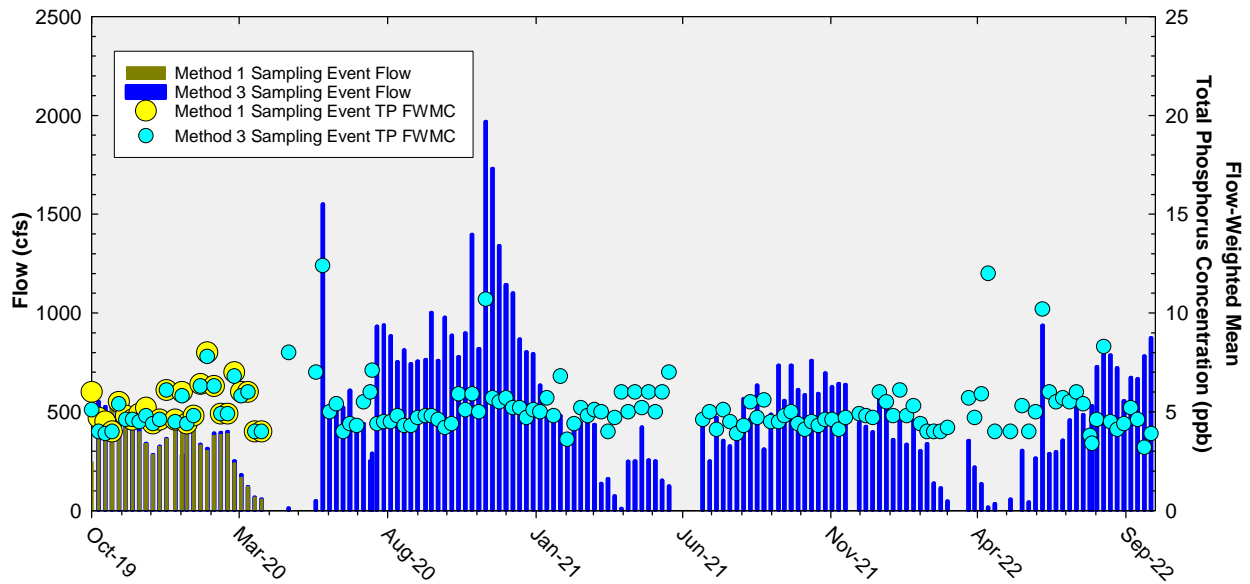
**Figure 16.** Daily flows in cubic feet per second (cfs) at individual Taylor Slough and Coastal Basins structures into ENP. G737 flow prior to October 1, 2018, is based on S200 pump flow on days when the G737 gates were open. Daily flow data are missing for S18C from September 23 to 30, 2019.

**Table 4.** Taylor Slough and the Coastal Basins TP compliance tracking.

12-Month Period	Total Flow (kac-ft)	Flow-Weighted Mean TP Concentration (ppb)	Long-Term Limit (ppb)	Percent of Sampling Events Greater than 10 ppb	
				Observed (%)	Guideline (%)
Nov 2018 - Oct 2019	229.8 (241.6, 239.8)	5.3 (5.2, 5.0)	11.0	1.9 (1.9, 1.9)	53.1
Dec 2018 - Nov 2019	228.4 (240.4, 238.6)	5.3 (5.2, 4.9)	11.0	1.9 (1.9, 1.9)	53.1
Jan 2019 - Dec 2019	231.5 (244.6, 242.8)	5.2 (5.1, 4.9)	11.0	1.9 (1.9, 1.9)	53.1
Feb 2019 - Jan 2020	242.3 (255.6, 253.8)	5.3 (5.2, 4.9)	11.0	1.9 (1.9, 1.9)	53.1
Mar 2019 - Feb 2020	249.4 (262.9, 261.1)	5.3 (5.2, 5.0)	11.0	1.9 (1.9, 1.9)	53.1
Apr 2019 - Mar 2020	248.7 (262.3, 260.5)	5.3 (5.2, 5.0)	11.0	1.9 (1.9, 1.9)	53.1
May 2019 - Apr 2020	255.9	4.9	11.0	2.1	53.1
Jun 2019 - May 2020	268.7	5.5	11.0	2.2	53.1
Jul 2019 - Jun 2020	282.8	5.3	11.0	2.1	53.1
Aug 2019 - Jul 2020	291.6	5.3	11.0	2.1	53.1
Sep 2019 - Aug 2020	297.5	5.3	11.0	2.1	53.1
<b>Oct 2019 - Sep 2020</b>	<b>318.5</b>	<b>5.3</b>	<b>11.0</b>	<b>2.1</b>	<b>53.1</b>
Nov 2019 - Oct 2020	357.0	5.4	11.0	2.1	53.1
Dec 2019 - Nov 2020	416.5	5.8	11.0	4.3	53.1
Jan 2020 - Dec 2020	449.1	5.8	11.0	4.2	53.1
Feb 2020 - Jan 2021	460.4	5.8	11.0	4.3	53.1
Mar 2020 - Feb 2021	463.6	5.7	11.0	4.3	53.1
Apr 2020 - Mar 2021	466.4	5.7	11.0	4.2	53.1
May 2020 - Apr 2021	482.9	5.7	11.0	3.9	53.1
Jun 2020 - May 2021	472.6	5.4	11.0	1.9	53.1
Jul 2020 - Jun 2021	447.3	5.4	11.0	2.0	53.1
Aug 2020 - Jul 2021	430.1	5.4	11.0	2.1	53.1
Sep 2020 - Aug 2021	410.1	5.5	11.0	2.0	53.1
<b>Oct 2020 - Sep 2021</b>	<b>399.5</b>	<b>5.6</b>	<b>11.0</b>	<b>2.1</b>	<b>53.1</b>
Nov 2020 - Oct 2021	371.1	5.5	11.0	2.1	53.1
Dec 2020 - Nov 2021	324.0	4.9	11.0	0.0	53.1
Jan 2021 - Dec 2021	300.9	4.8	11.0	0.0	53.1
Feb 2021 - Jan 2022	297.7	4.8	11.0	0.0	53.1
Mar 2021 - Feb 2022	285.7	4.8	11.0	0.0	53.1
Apr 2021 - Mar 2021	286.3	4.8	11.0	0.0	53.1
May 2021 - Apr 2022	273.2	4.8	11.0	2.3	53.1
Jun 2021 - May 2022	271.0	4.8	11.0	2.2	53.1
Jul 2021 - Jun 2022	288.6	5.1	11.0	4.3	53.1
Aug 2021 - Jul 2022	300.2	5.1	11.0	4.2	53.1
Sep 2021 - Aug 2022	315.2	5.2	11.0	4.2	53.1
<b>Oct 2021 - Sep 2022</b>	<b>323.0</b>	<b>5.1</b>	<b>11.0</b>	<b>4.2</b>	<b>53.1</b>

## Notes:

- Key to units: kac-ft – thousand acre-feet and ppb – parts per billion (values are in micrograms per liter [ $\mu\text{g/L}$ ], which, for the purposes of this report, are equivalent to ppb).
- Compliance is evaluated annually based on the 12-month TP FWMC for the federal water year ending on September 30. The compliance periods are shown as highlighted rows with bold, italicized text.
- Results of Method 1, Method 2, and Method 3 are presented up to the first quarter of 2020 (12-month period ending March 2020).
  - Method 1 (left value) is computed as S332D + S18C.
  - Method 2 (first value in parentheses) is computed as S332D + S18C + G737.
  - Method 3 (second value in parentheses) is computed as (S332D – S332DX1 – S328) + S328 + S18C + G737.
- Starting with the second quarter of 2020 (12-month periods ending April, May, and June 2020), the results of Method 3 for the corresponding 12-month periods are presented.



**Figure 17.** Flow from Taylor Slough and Coastal Basins structures on the days of sampling and the corresponding TP FWMCs for individual sampling events. Method 1 sampling event flows and FWMCs are shown to March 2020. Method 3 sampling event flows and FWMCs are shown beginning May 2019. For the period from May 2019 to March 2020, the results of both methods are shown overlapping.

## APPENDIX A

### MONTHLY TOTAL PHOSPHORUS CONCENTRATION DATA FOR THE ARTHUR R. MARSHALL LOXAHATCHEE NATIONAL WILDLIFE REFUGE

TP concentration data used in this report can be directly retrieved from the South Florida Water Management District's DBHYDRO database by copying and pasting the following link into the address field of a web browser:

[http://my.sfwmd.gov/dbhydroplsql/water\\_quality\\_data.report\\_full?v\\_where\\_clause=where+station\\_id+like+\('LOX%25'\)+and+station\\_id+not+like+\('LOXA%25'\)+and+test\\_number+=+25+and+date\\_collected+>='01-JUL-2022'+and+date\\_collected+<+'01-OCT-2022'+and+sample\\_type\\_new+=+'SAMP'&v\\_target\\_code=file\\_csv](http://my.sfwmd.gov/dbhydroplsql/water_quality_data.report_full?v_where_clause=where+station_id+like+('LOX%25')+and+station_id+not+like+('LOXA%25')+and+test_number+=+25+and+date_collected+>='01-JUL-2022'+and+date_collected+<+'01-OCT-2022'+and+sample_type_new+=+'SAMP'&v_target_code=file_csv)

The link above only generates data that have not been qualified. Qualified water quality data must be retrieved interactively via the DBHYDRO browser.

Stage data for stations 1-7, 1-8C, and 1-9 from the reporting quarter can be retrieved by copying and pasting the following link into the address field of a web browser:

[http://my.sfwmd.gov/dbhydroplsql/web\\_io.report\\_process?v\\_period=uspec&v\\_start\\_date=20220701&v\\_end\\_date=20220930&v\\_report\\_type=format7&v\\_target\\_code=file\\_csv&v\\_run\\_mode=onLine&v\\_js\\_flag=Y&v\\_dbkey=FE775/FE776/FE777](http://my.sfwmd.gov/dbhydroplsql/web_io.report_process?v_period=uspec&v_start_date=20220701&v_end_date=20220930&v_report_type=format7&v_target_code=file_csv&v_run_mode=onLine&v_js_flag=Y&v_dbkey=FE775/FE776/FE777)

**Table A-1.** Arthur R. Marshall Loxahatchee National Wildlife Refuge monthly TP data (in parts per billion).

Month-Year	LOX3	LOX4	LOX5	LOX6	LOX7	LOX8	LOX9	LOX10	LOX11	LOX12	LOX13	LOX14	LOX15	LOX16
Oct-2019	---	8	6	6	5	12	10	7	8	4	6	6	6	7
Nov-2019	7	6	5	5	5	6	7	7	6	5	4	6	6	5
Dec-2019	6	5	5	4	7	7	7	4	6	5	6	4	5	4
Jan-2020	4	6	6	4	3	6	6	4	6	4	5	5	4	6
Feb-2020	12	6	8	5	5	7	6	5	4	6	5	5	5	6
Mar-2020	6	6	7	5	5	4	5	4	6	5	5	7	4	5
Apr-2020	---	9	---	7	11	16	12	---	8	6	7	7	6	6
May-2020	---	---	---	---	---	---	---	---	7	5	8	8	5	7
Jun-2020	10	8	---	7	10	14	10	---	6	7	8	5	5	9
Jul-2020	7	---	6	5	7	9	7	---	4	5	6	6	7	7
Aug-2020	10	10	6	5	7	6	6	9	6	6	6	6	7	7
Sep-2020	6	11	7	6	8	8	7	8	8	9	7	7	8	11
Oct-2020	6	9	6	5	7	11	7	6	6	4	7	6	5	7
Nov-2020	6	9	6	4	4	8	5	4	4	5	5	6	5	6
Dec-2020	4	6	5	4	5	8	6	5	5	6	6	6	8	6
Jan-2021	4	4	5	4	5	6	4	4	4	6	4	5	5	5
Feb-2021	4	5	4	4	4	6	6	4	5	5	5	4	5	5
Mar-2021	8	9	8	6	8	9	7	8	6	6	5	5	6	7
Apr-2021	---	7	---	7	6	8	7	---	5	5	6	5	6	6
May-2021	---	---	---	8	10	12	---	---	10	6	8	7	8	11
Jun-2021	---	---	---	---	---	---	---	---	7	9	---	8	7	7
Jul-2021	---	30	---	15	---	---	---	---	10	8	9	9	8	10
Aug-2021	---	13	8	7	7	9	10	10	8	8	6	12	8	8
Sep-2021	7	12	7	7	6	6	7	6	---	7	6	7	7	8
Oct-2021	6	8	5	6	8	8	7	6	7	7	6	6	6	8
Nov-2021	6	10	9	6	7	10	8	8	6	6	6	6	6	7
Dec-2021	5	6	6	6	5	7	5	6	5	5	5	5	4	5
Jan-2022	5	7	5	6	6	8	6	6	5	5	5	6	5	6
Feb-2022	see note	6	7	5	5	6	6	6	3	5	4	3	4	7
Mar-2022	8	7	10	6	9	10	8	10	5	6	6	7	5	8
Apr-2022	---	8	6	8	8	9	7	8	9	7	7	9	6	9
May-2022	---	---	---	15	---	---	---	---	9	8	9	6	8	11
Jun-2022	12	26	9	14	12	12	10	10	8	7	6	7	7	7
Jul-2022	---	9	4	10	6	7	6	11	---	9	8	8	7	9
Aug-2022	---	10	4	7	6	7	6	9	4	9	5	8	7	9
Sep-2022	---	8	---	13	5	5	---	8	10	7	6	6	8	8

## Notes:

- “---” indicates sample was not collected due to insufficient water depth or dried out/ponding conditions at the site.
- TP samples collected at LOX3 in February 2022 was not analyzed because a live aquatic insect was found in the composite bucket.

## APPENDIX B

### WEEKLY GRAB TOTAL PHOSPHORUS CONCENTRATION DATA FOR SHARK RIVER SLOUGH

TP concentration data used in this report can be directly retrieved from the South Florida Water Management District's DBHYDRO database by copying and pasting the following link into the address field of a web browser:

[http://my.sfwmd.gov/dbhydroplsql/water\\_quality\\_data.report\\_full?v\\_where\\_clause=where+station\\_id+in+\('S12A','S12B','S12C','S12D','S333','S333N','S355A','S355B','S356-334'\)+and+test\\_number+=+25+and+collect\\_method+=+'G'+and+date\\_collected+>='01-JUL-2022'+and+date\\_collected+<+'01-OCT-2022'+and+sample\\_type\\_new+=+'SAMP'&v\\_target\\_code=file\\_csv](http://my.sfwmd.gov/dbhydroplsql/water_quality_data.report_full?v_where_clause=where+station_id+in+('S12A','S12B','S12C','S12D','S333','S333N','S355A','S355B','S356-334')+and+test_number+=+25+and+collect_method+=+'G'+and+date_collected+>='01-JUL-2022'+and+date_collected+<+'01-OCT-2022'+and+sample_type_new+=+'SAMP'&v_target_code=file_csv)

The link above only generates data that have not been qualified. Qualified water quality data must be retrieved interactively via the DBHYDRO browser.

The "Preferred DBKEY" daily mean flow data for stations S12A, S12B, S12C, S12D, S333 and S334 and the "Source DBKEY" daily mean flow data for stations S355A, S355B, S355B temporary pumps, S333N, S356, and S335 for the reporting quarter (third quarter of 2022) can be retrieved by copying and pasting the following link into the address field of a web browser:

[http://my.sfwmd.gov/dbhydroplsql/web\\_io.report\\_process?v\\_period=uspec&v\\_start\\_date=20220701&v\\_end\\_date=20220930&v\\_report\\_type=format7&v\\_target\\_code=file\\_csv&v\\_run\\_mode=onLine&v\\_js\\_flag=Y&v\\_dbkey=FE771/FE772/FE773/FE774/15042/FB752/MQ895/MQ896/AM173/40371/64136/91489](http://my.sfwmd.gov/dbhydroplsql/web_io.report_process?v_period=uspec&v_start_date=20220701&v_end_date=20220930&v_report_type=format7&v_target_code=file_csv&v_run_mode=onLine&v_js_flag=Y&v_dbkey=FE771/FE772/FE773/FE774/15042/FB752/MQ895/MQ896/AM173/40371/64136/91489)



**Table B-1.** Shark River Slough weekly grab TP data (in parts per billion).

Date	S12A	S12B	S12C	S12D	S333	S333N	S355A	S355B	S356	Remarks
10/04/2021	16	---	9	9	11	9	---	---	6	N/A
10/11/2021	16	---	8	9	10	7	---	---	5	Compliance date
10/18/2021	15	---	8	13	8	8	---	---	6	N/A
10/25/2021	14	---	7	10	8	7	8	10	6	Compliance date
11/01/2021	14	---	7	11	9	8	---	---	6	N/A
11/08/2021	11	---	7	10	12	11	---	---	5	Compliance date
11/15/2021	G	---	G	G	G	G	---	---	G	N/A
11/22/2021	17	---	6	8	7	6	5	8	5	Compliance date
11/29/2021	14	---	---	6	7	7	---	---	7	N/A
12/06/2021	11	---	---	6	NOB	6	5	6	6	Compliance date
12/13/2021	14	---	---	7	NOB	9	---	---	5	N/A
12/20/2021	12	---	---	6	NOB	8	---	---	5	Compliance date
12/27/2021	10	---	---	6	NOB	8	---	---	6	N/A
01/03/2022	12	---	---	6	NOB	9	---	---	5	Compliance date
01/10/2022	11	---	---	6	NOB	8	---	---	6	N/A
01/18/2022	11	---	---	6	NOB	10	5	7	8	Compliance date
01/24/2022	12	---	---	5	NOB	7	---	---	7	N/A
01/31/2022	11	---	---	6	NOB	7	5	6	6	Compliance date
02/07/2022	15	---	---	8	8	8	---	---	6	N/A
02/14/2022	17	---	---	7	8	9	---	---	6	Compliance date
02/21/2022	17	---	---	8	8	9	---	---	6	N/A
02/28/2022	19	---	---	9	10	12	10	11	6	Compliance date
03/07/2022	23	---	---	11	12	12	---	---	7	N/A
03/14/2022	25	---	---	13	16	13	---	---	7	Compliance date
03/21/2022	26	---	---	16	15	14	---	---	7	N/A
03/28/2022	23	---	---	16	15	26	10	12	7	Compliance date
04/04/2022	27	---	---	---	17	18	---	---	6	N/A
04/11/2022	29	---	---	15	18	19	---	---	6	Compliance date
04/18/2022	40	---	---	15	37	21	---	---	12	N/A
04/25/2022	35	---	---	19	24	21	18	26	7	Compliance date
05/02/2022	35	---	---	22	31	27	---	---	8	N/A
05/09/2022	27	---	23	26	23	22	---	---	9	Compliance date
05/16/2022	30	---	25	19	20	18	---	---	10	N/A
05/23/2022	28	---	25	31	28	20	23	62	12	Compliance date
05/31/2022	34	---	---	---	22	20	---	---	14	N/A
06/06/2022	27	---	16	16	19	17	---	---	7	Compliance date
06/13/2022	23	---	---	---	18	18	---	---	7	N/A
06/20/2022	27	---	---	---	17	14	13	16	6	Compliance date
06/27/2022	18	---	8	12	14	12	---	---	5	N/A
07/05/2022	24	---	8	11	16	16	---	---	4	Compliance date
07/11/2022	18	---	8	10	10	10	---	---	6	N/A
07/18/2022	10	8	9	11	10	9	10	10	5	Compliance date
07/25/2022	9	8	8	11	11	8	---	---	6	N/A
08/01/2022	8	8	9	10	10	9	---	---	5	Compliance date
08/08/2022	11	7	9	9	9	8	---	---	5	N/A
08/15/2022	13	---	10	11	10	12	15	17	5	Compliance date
08/22/2022	16	---	8	10	11	9	---	---	5	N/A
08/29/2022	14	---	---	9	8	8	---	---	5	Compliance date
09/06/2022	14	---	---	10	10	9	---	---	5	N/A
09/12/2022	9	8	---	11	10	11	---	---	5	Compliance date
09/19/2022	6	7	---	10	9	9	---	---	6	N/A
09/26/2022	13	9	8	13	9	11	7	10	5	Compliance date

## Notes:

- "----" indicates a water sample was not collected because the gate was closed and there was no flow at the site.
- "Compliance date" indicates biweekly sampling date for Consent Decree calculation.
- "N/A" indicates sampling data are presented for informational purposes only.
- "NOB" (No Bottle Sample): Attempt to collect a sample was unsuccessful due to external factors. Samples could not be collected at S333 from 12/6/2021 to 1/31/2022 due to unsafe sampling platform.
- "G" indicates the analyte was detected at or above the method detection limit in both the sample and the associated field blank, equipment blank, or trip blank, and the blank value was greater than 10% of the associated sample value.

## APPENDIX C

### WEEKLY GRAB TOTAL PHOSPHORUS CONCENTRATION DATA FOR TAYLOR SLOUGH AND COASTAL BASINS

TP concentration data used in this report can be directly retrieved from the South Florida Water Management District's DBHYDRO database by copying and pasting the following link into the address field of a web browser:

[http://my.sfwmd.gov/dbhydroplsql/water\\_quality\\_data.report\\_full?v\\_where\\_clause=where+station\\_id+in+\('S332DX','S18C','S328','G737'\)+and+test\\_number+=+25+and+collect\\_method+=+'G'+and+date\\_collected+>='01-JUL-2022'+and+date\\_collected+<+'01-OCT-2022'+and+sample\\_type\\_new+=+'SAMP'&v\\_target\\_code=file\\_csv](http://my.sfwmd.gov/dbhydroplsql/water_quality_data.report_full?v_where_clause=where+station_id+in+('S332DX','S18C','S328','G737')+and+test_number+=+25+and+collect_method+=+'G'+and+date_collected+>='01-JUL-2022'+and+date_collected+<+'01-OCT-2022'+and+sample_type_new+=+'SAMP'&v_target_code=file_csv)

The link above only generates data that have not been qualified. Qualified water quality data must be retrieved interactively via the DBHYDRO browser.

The daily mean flow data for stations at Taylor Slough and Coastal Basins (S332D, S18C, S328, G737, and S332DX1) during the reporting quarter can be retrieved by copying and pasting the following link into the address field of a web browser:

[http://my.sfwmd.gov/dbhydroplsql/web\\_io.report\\_process?v\\_period=uspec&v\\_start\\_date=20220701&v\\_end\\_date=20220930&v\\_report\\_type=format7&v\\_target\\_code=file\\_csv&v\\_run\\_mode=onLine&v\\_js\\_flag=Y&v\\_dbkey=15760/TA413/AN558/AN674/91484](http://my.sfwmd.gov/dbhydroplsql/web_io.report_process?v_period=uspec&v_start_date=20220701&v_end_date=20220930&v_report_type=format7&v_target_code=file_csv&v_run_mode=onLine&v_js_flag=Y&v_dbkey=15760/TA413/AN558/AN674/91484)

**Table C-1.** Taylor Slough and Coastal Basins weekly grab TP data (in parts per billion).

Date	S332DX	S18C	G737	S328	Date	S332DX	S18C	G737	S328
10/05/2021	5	3	3	4	04/05/2022	6	5	--	NOB
10/12/2021	5	4	3		04/12/2022	7	12	--	
10/19/2021	5	3	3	3	04/19/2022	6	4	--	J
10/26/2021	5	4	4		04/26/2022	5	5	--	
11/02/2021	5	4	4	4	05/05/2022	4	6	--	--
11/09/2021	5	3	3		05/10/2022	6	6	--	
11/16/2021	6	4	4	3	05/17/2022	6	4	--	--
11/23/2021	G	G	G		05/24/2022	4	4	--	
11/30/2021	6	4	--	3	05/31/2022	5	5	--	23
12/07/2021	6	3	--		06/07/2022	7	12	--	
12/14/2021	6	4	--	2	06/14/2022	6	6	--	7
12/21/2021	6	6	--		06/21/2022	6	4	--	
12/28/2021	6	4	--	4	06/28/2022	6	5	--	6
01/04/2022	5	3	--		07/05/2022	5	6	---	---
01/11/2022	7	5	--	2	07/12/2022	6	6	---	6
01/18/2022	5	4	--		07/19/2022	6	4	---	---
01/25/2022	6	4	--	2	07/26/2022	---	4	3	---
02/01/2022	5	3	--		07/28/2022	4	---	---	2
02/08/2022	5	4	3	3	08/02/2022	5	4	4	---
02/15/2022	7	4	3		08/09/2022	5	14	3	3
02/22/2022	11	4	4	J	08/16/2022	5	4	3	---
03/01/2022	--	4	6		08/23/2022	5	3	4	3
03/08/2022	--	5	--	--	08/30/2022	5	4	2	---
03/15/2022	--	4	--		09/06/2022	6	4	3	2
03/23/2022	6	5	--	12	09/13/2022	5	4	3	---
03/29/2022	5	4	--		09/20/2022	3	4	3	3
					09/27/2022	4	4	3	---

## Notes:

- "--" indicates a water sample was not collected because the gate was closed and there was no flow, or the water depth was too shallow.
- "G" indicates the analyte was detected at or above the method detection limit in both the sample and the associated field blank, equipment blank, or trip blank, and the blank value was greater than 10% of the associated sample value.
- S328 had been weekly sampling but changed to bi-weekly sampling schedule from 7/13/2021. Blank cell for the site indicates that it was not the sampling week. "J" indicates the value was qualified because the water sample was taken when the site was an isolated pool and not representative of surrounding area. "NOB" (No Bottle Sample) indicates the water sample was not collected because of the non-representative surrounding area condition.

## APPENDIX D

### CALCULATION METHODS

#### Long Term Marsh Concentration Levels for Loxahatchee National Wildlife Refuge

##### Long Term Marsh Concentration Levels:

$$C = 10.7172 - 0.541156S + 1.372\sqrt{7.5819 - 0.9310S + 0.02902216S^2}$$

##### Terms:

C = the natural log of the geometric mean total phosphorus concentration across 14 marsh stations.

S = average stage measured at gauges CA1-9, CA1-7, and CA1-8C on sampling date (feet).

This equation is applicable over a stage range of 15.42 to 17.14 feet. If the stage on any sampling date exceeds 17.14 feet, a stage of 17.14 feet should be used in calculating the long-term concentration levels. The equation shall not apply to dates when the average stage is less than 15.42 feet.

*(1991 Settlement Agreement entered as a Consent Decree in 1992 and modified in 1995, Exhibit B, Appendix B, Attachment II, page B-7)*

## Discharge Limits and OFW Standards for Shark River Slough

### Interim Discharge Limit:

$$C = 11.16 - 0.00465 Q + 1.397 \sqrt{6.377 - 0.00591 Q + 0.00000436 Q^2}$$

### Long-Term Discharge Limit & OFW Standard:

$$C = 11.38 - 0.00538 Q + 1.397 \sqrt{2.493 - 0.00231 Q + 0.00000170 Q^2}$$

### Frequency Exceedance:

$$F = 48.411 - 0.02896 Q + 1.397 \sqrt{330.1 - 0.3071 Q + 0.0002254 Q^2}$$

### Terms:

Water Year = October through September

Q = total inflow to Shark River Slough for water year, S-12s + S-333 + any additional inflow from the WCAs established in the future, thousand acre-feet per year (kac-ft/yr).

C = limit on maximum flow-weighted-mean inflow concentration for any Water Year, composite of all inflows to Shark Slough (ppb).

F = exceedance for maximum frequency (percent) of inflow concentrations exceeding 10 ppb, computed from the time series of concentrations composited across all inflow structures on each sampling date with positive flow in a given water year.

The range of flow (Q) used in deriving the limits is 117 to 1,061 kac-ft/yr. If the total flow for any water year exceeds 1,061 kac-ft/yr, a flow of 1,061 kac-ft/yr should be used in calculating the discharge limits.

*(1991 Settlement Agreement entered as a Consent Decree in 1992 and modified in 1995, Exhibit B, Appendix A, Attachment I, page A-5)*

### **Discharge Limits and OFW Standards for Taylor Slough and Coastal Basins**

Long-Term Flow-Weighted Discharge Limit & OFW Standard = 11.0 ppb

#### **Frequency Exceedance:**

Frequency of values > 10 ppb must be less than 53.1%.

#### **Terms:**

Limits are defined on a water year basis, October through September.

Basin flow is the total flow through structures S-332, S-175, and S-18C, plus any new release points from this basin established in the future, thousand acre-feet per year (kac-ft/yr).

Limits apply to the flow-weighted-mean concentration for any water year, composite of all inflows to Taylor Slough (S-332) and Coastal Basin (S-18C).

Frequency exceedance is the exceedance for maximum frequency (percent) of inflow concentrations exceeding 10 ppb, computed from the time series of concentrations composited across all inflow structures on each sampling date with positive flow in a given water year.

*(1991 Settlement Agreement entered as a Consent Decree in 1992 and modified in 1995, Exhibit B, Appendix A, Attachment II, page A-6)*

## APPENDIX E

### DOCUMENT REVISIONS

**Table E-1.** Revisions to this report since initial publication.

Page/Date	Original	Revision
Location of Revisions	Original	Revision
Cover	February 27, 2023  Shark River Slough compliance results are published annually in this report when the final approved flow data for a federal water year (WY) are available. The WY2022 (October 1, 2021 – September 30, 2022) results will be published at that time.	June xx, 2023 (Original: February 27, 2023)  This report has been revised from earlier versions to include Shark River Slough compliance results using the final approved flow data for federal Water Year 2022 (October 1, 2021 – September 30, 2022).
Contents		The Contents section was revised to reflect the revisions to the Shark River Slough section, the change of data from 'provisional' to 'final' in Table 3, and the addition of Figures 5 through 11.
Page 3 Executive Summary	<b>Shark River Slough:</b> Tracking results based on provisional data for the third quarter of 2022 are presented. When the final data are available, the final federal Water Year (WY) 2022 (October 1, 2021 – September 30, 2022) 12-month TP flow weighted mean concentrations (FWMCs) will be published separately as a revision to the third quarter 2022.	<b>Shark River Slough:</b> The TP flow-weighted mean concentration (FWMC) was above the long-term limit (LTL) for the 12-month period ending on September 30, 2022. Therefore, SRS TP FWMC did not meet the LTL during the federal Water Year (WY), WY2022 (October 1, 2021 – September 30, 2022).
Page 4 Table 1	Table 1. Third quarter 2022 TP compliance results for the Refuge, TP calculation provisional tracking results for Shark River Slough, and TP calculation tracking results for Taylor Slough and Coastal Basins.	<b>Table 1.</b> Third quarter 2022 TP compliance results for the Refuge, TP calculation tracking results for Shark River Slough, and TP calculation tracking results for Taylor Slough and Coastal Basins.
Pages 7 through 17 Everglades National Park Shark River Slough		The entire section was updated to present the third quarter of 2022, inclusive of WY2022 compliance values, calculated using the approved final flow data. Table 3 was modified to reflect the final flow data for S12s, and Figures 5 through 11 were added.
Pages 18 through 24 Everglades National Park Taylor Slough and Coastal Basins		Figure and table numbers were adjusted to reflect the addition of the figures and tables in the Shark River Slough section.
Page C-1		DBKEYS for flow data retrieval were changed from provisional data to final data.