Annual Environmental Flows Achievement Report

Submitted by: Brazos River Authority

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Reporting Period: November 1, 2018, through October 31, 2019

The Brazos River Authority System Operation Permit was approved by the Texas Commission on Environmental Quality (TCEQ) and was issued November 30, 2016. The conformed Water Management Plan (WMP) was subsequently approved on April 2, 2018. The Annual Environmental Flows Achievement Report is required in Support of the WMP.

This report summarizes environmental flow achievement for the reporting period from November 2018 through October 2019. If environmental flow conditions were not achieved, the report identifies if operations (i.e. water storage and/or diversion) under the System Operation Permit WMP caused the non-achievement, and if so, how further non-achievement will be prevented. Herein *WMP water use* refers to WMP water storage and/or diversion that is accounted against the System Operation Permit.

There was 0 ac-ft of WMP run-of-river diversion and 62,279 ac-ft of WMP lakeside diversions and storage under the System Operation Permit Water Management Plan (WMP) during this period. All water use reported in this annual report occurred during calendar year 2019. Table 1 is a summary of all WMP measurement points and if WMP water use impacted achievement of HFP, baseflow or subsistence environmental flow conditions during the reporting period.

Table 1. WMP Measurement Point Summary.

Measurement Point	Did WMP Water Use Impact HFP Achievement?	Did WMP Water Use Impact Baseflow Achievement?	Did WMP Water Use Impact Subsistence Achievement?
USGS 08088000 Brazos River near South Bend	No	No	No
USGS 08089000 Brazos River near Palo Pinto	No	No	No
USGS 08089100 Brazos River near Glen Rose	No	No	No
USGS 08089500 Brazos River near Waco	No	No	No
USGS 08100500 Leon River near Gatesville	No	No	No
USGS 08104500 Little River near Little River	No	No	No
USGS 08106500 Little River near Cameron	No	No	No
USGS 08108700 Brazos River at SH21 near Bryan	No	No	No
USGS 08110500 Navasota River near Easterly	No	No	No
USGS 08111500 Brazos River near Hempstead	No	No	No
USGS 08114000 Brazos River near Richmond	No	No	No
USGS 08116650 Brazos River near Rosharon	No	No	No

Measurement Points' Hydrologic Condition, Baseflow, & Subsistence

Table 2 lists each measurement point's seasonal hydrologic condition, total number of days per season that baseflow conditions were not met, and the total number of days subsistence conditions were not met.

Table 2. WMP Measurement points' hydrologic conditions, baseflow and subsistence days not met.

Measurement Point	Season	Hydrologic Condition	Total Number of Days Baseflow not Met	Total Number of Days Subsistence not Met	Did water storage or diversion under the WMP occur in applicable reach on any days not meeting criteria?
USGS 08088000 Brazos River near South Bend	Winter	Wet	0	0	No
	Spring	Wet	0	0	No
	Summer	Wet	42	0	No
USGS 08089000 Brazos River near Palo Pinto	Winter	Wet	5	0	No
	Spring	Wet	4	0	No
	Summer	Wet	61	0	No
USGS 08089100 Brazos River near Glen Rose	Winter	Wet	0	0	No
	Spring	Wet	6	0	No
	Summer	Wet	101	7	No
USGS 08089500 Brazos River near Waco	Winter	Wet	0	0	No
	Spring	Wet	7	0	No
	Summer	Wet	71	0	No
USGS 08100500 Leon River near Gatesville	Winter	Wet	0	0	No
	Spring	Wet	0	0	No
	Summer	Wet	41	0	No
USGS 08104500 Little River near Little River	Winter	Wet	0	0	No
	Spring	Wet	8	0	No
	Summer	Wet	103	0	No
USGS 08106500 Little River near Cameron	Winter	Wet	0	0	No
	Spring	Wet	7	0	No
	Summer	Wet	97	0	No
USGS 08108700 Brazos River at SH21 near Bryan	Winter	Wet	0	0	No
	Spring	Wet	1	0	No
	Summer	Wet	70	0	No
USGS 08110500 Navasota River near Easterly	Winter	Wet	0	0	No
	Spring	Wet	0	0	No
	Summer	Wet	79	0	No
USGS 08111500 Brazos River near Hempstead	Winter	Wet	0	0	No
	Spring	Wet	4	0	No
	Summer	Wet	61	0	No
USGS 08114000 Brazos River near Richmond	Winter	Wet	0	0	No
	Spring	Wet	4	0	No
	Summer	Wet	54	2	No
USGS 08116650 Brazos River near Rosharon	Winter	Wet	0	0	No
	Spring	Wet	5	0	No
	Summer	Wet	54	0	No

Measurement Points' High Flow Pulses & WMP Water Use

Table 3 lists each WMP measurement point and information related to achievement of HFP environmental flow conditions. At some measurement points during select hydrologic conditions, no pulse is required ("no pulse req'd").

Table 3. WMP Measurement Points' HFP events and WMP water use.

Measurement Point	Season	Were SB3 HFP Standards met?	During HFP did WMP water use occur at a rate greater than diversion rate trigger levels?[1]	Did WMP water use occur during HFP after all HFP criteria were met?	Total WMP water storage or diversion within applicable reaches during season (acre-ft)
USGS 08088000 Brazos River near South Bend	Winter	No pulse req'd	No	No	0
	Spring	Yes	No	Yes	1,434.0
	Summer	Yes	No	No	1,280.5
USGS 08089000 Brazos River near Palo Pinto	Winter	Yes	No	No	0
	Spring	Yes	No	Yes	13,417.8
	Summer	No	No	No	2,808.8
USGS 08089100 Brazos River near Glen Rose	Winter	Yes	No	No	0
	Spring	Yes	No	Yes	22.7
	Summer	No	No	No	4.2
USGS 08089500 Brazos River near Waco	Winter	Yes	No	No	0
	Spring	Yes	No	Yes	902.0
	Summer	No	No	No	822.2
USGS 08100500 Leon River at Gatesville	Winter	No	No	No	0
	Spring	Yes	No	Yes	9,505.6
	Summer	Yes	No	Yes	4,408.9
USGS 08104500 Little River near Little River	Winter	Yes	No	No	0
	Spring	Yes	No	Yes	2,136.6
	Summer	Yes	No	Yes	896.3
USGS 08106500 Little River near Cameron	Winter	Yes	No	No	0
	Spring	Yes	No	Yes	9,084.8
	Summer	No	No	No	1,758.8
USGS 08108700 Brazos River at SH21 near Bryan	Winter	Yes	No	No	0
	Spring	Yes	No	No	0
	Summer	No	No	No	0
USGS 08110500 Navasota River near Easterly	Winter	Yes	No	No	0
	Spring	Yes	No	Yes	6,180.8
	Summer	Yes	No	Yes	6,329.4
USGS 08111500 Brazos River near Hempstead	Winter	Yes	No	No	0
	Spring	Yes	No	Yes	599.3
	Summer	No	No	No	685.8

[1] Diversion rate trigger levels apply only to run-of-river diversions

Measurement Point	Season	Were SB3 HFP Standards met?	During HFP did WMP water use occur at a rate greater than diversion rate trigger levels?[1]	Did WMP water use occur during HFP after all HFP criteria were met?	Total WMP water storage or diversion within applicable reaches during season (acre-ft)
USGS 08114000 Brazos River near Richmond	Winter	Yes	No	No	0
	Spring	Yes	No	No	0
	Summer	No	No	No	0
USGS 08116650 Brazos River near Rosharon	Winter	Yes	No	No	0
	Spring	Yes	No	No	0
	Summer	No	No	No	0

Brazos River near South Bend

For the reporting period November 2018 through October 2019, data reported at USGS Gage 08088000 Brazos River near South Bend was used to determine if environmental flow conditions at the Brazos River near South Bend measurement point were achieved (see Table 2 and Table 3). The hydrologic condition for all three seasons was wet.

No run-of-river diversions were made during this period; therefore, no WMP diversion occurred at rates lower than diversion rate trigger levels during pulse events. There was 2,714.5 ac-ft of WMP lakeside diversion and storage during this period in the Possum Kingdom Lake reach associated with this applicable measurement point. Diversion rate trigger levels during pulse events do not apply to WMP lakeside diversions nor storage. Before pulse criteria were met, WMP lakeside diversions occurred during pulse events in the spring and summer seasons without decreasing downstream flow below the pulse trigger. After pulse criteria were met, WMP lakeside diversion occurred during pulse events in the spring season without affecting downstream pulse achievement.

WMP water use did not contribute to non-achievement of environmental flow conditions.

Brazos River near Palo Pinto

For the reporting period November 2018 through October 2019, data reported at USGS Gage 08089000 Brazos River near Palo Pinto was used to determine if environmental flow conditions at the Brazos River near Palo Pinto measurement point were achieved (see Table 2 and Table 3). The hydrologic condition for all three seasons was wet.

No run-of-river diversions were made during this period; therefore, no WMP diversion occurred at rates lower than diversion rate trigger levels during pulse events. There was 16,226.6 ac-ft of WMP lakeside diversion and storage during this period in the Lake Granbury reach associated with this applicable measurement point. Diversion rate trigger levels during pulse events do not apply to WMP lakeside diversions nor storage. Before the pulse criteria were met, WMP lakeside diversion occurred during pulse events in the spring and summer seasons without decreasing downstream flow below the pulse trigger. After the pulse criteria were met, WMP lakeside diversion occurred during pulse events in the spring season without affecting downstream pulse achievement.

WMP water use did not contribute to non-achievement of environmental flow conditions.

Brazos River near Glen Rose

For the reporting period November 2018 through October 2019, data reported at USGS Gage 08089100 Brazos River near Glen Rose was used to determine if environmental flow conditions at the Brazos River near Glen Rose

measurement point were achieved (see Table 2 and Table 3). The hydrologic condition for all three seasons was wet.

No run-of-river diversions were made during this period; therefore, no WMP diversion occurred at rates lower than diversion rate trigger levels during pulse events. There was 26.9 ac-ft of WMP lakeside diversion and storage during this period in the Lake Whitney reach associated with this applicable measurement point. Diversion rate trigger levels during pulse events do not apply to WMP lakeside diversions nor storage. Before pulse criteria were met, WMP lakeside diversion occurred during pulse events in the spring and summer seasons without decreasing downstream flow below the pulse trigger. After pulse criteria were met, WMP lakeside diversion occurred during pulse events in the spring season without affecting downstream pulse achievement.

WMP water use did not contribute to non-achievement of environmental flow conditions.

Brazos River near Waco

For the reporting period November 2018 through October 2019, data reported at USGS Gage 08089500 Brazos River near Waco was used to determine if environmental flow conditions at the Brazos River near Waco measurement point were achieved (see Table 2 and Table 3). The hydrologic condition for all three seasons was wet.

No run-of-river diversions were made during this period; therefore, no WMP diversion occurred at rates lower than diversion rate trigger levels during pulse events. There was 1,724.2 ac-ft of WMP lakeside diversion and storage during this period in the Lake Aquilla reach associated with this applicable measurement point. Diversion rate trigger levels during pulse events do not apply to WMP lakeside diversions nor storage. Before pulse criteria were met, WMP lakeside diversion occurred during pulse events in the spring and summer seasons without decreasing downstream flow below the pulse trigger. After pulse criteria were met, WMP lakeside diversion occurred during pulse events in the spring season without affecting downstream pulse achievement.

WMP water use did not contribute to non-achievement of environmental flow conditions.

Leon River at Gatesville

For the reporting period November 2018 through October 2019, data reported at USGS Gage 08100500 Leon River at Gatesville was used to determine if environmental flow conditions at the Leon River at Gatesville measurement point were achieved (see Table 2 and Table 3). The hydrologic condition for all three seasons was wet.

No run-of-river diversions were made during this period; therefore, no WMP diversion occurred at rates lower than diversion rate trigger levels during pulse events. There was 2,623.6 ac-ft of WMP lakeside diversion and storage during this period in the Lake Proctor reach associated with this applicable measurement point. There was 11,290.9 ac-ft of WMP lakeside diversion and storage during this period in the Lake Belton reach associated with this applicable measurement point. Diversion rate trigger levels during pulse events do not apply to WMP lakeside diversions nor storage. Before and after pulse criteria were met, WMP lakeside diversion occurred during pulse events in the spring and summer seasons within the Lake Proctor and Lake Belton reaches without affecting downstream pulse achievement.

WMP water use did not contribute to non-achievement of environmental flow conditions.

Little River near Little River

For the reporting period November 2018 through October 2019, data reported at USGS Gage 08104500 Little River near Little River was used to determine if environmental flow conditions at the Little River near Little River measurement point were achieved (see Table 2 and Table 3). The hydrologic condition for all three seasons was wet.

No run-of-river diversions were made during this period; therefore, no WMP diversion occurred at rates lower than diversion rate trigger levels during pulse events. There was 3,032.9 ac-ft of WMP lakeside diversion and storage during this period in the Lake Stillhouse Hollow reach associated with this applicable measurement point. Diversion rate trigger levels during pulse events do not apply to WMP lakeside diversions nor storage. Before and after pulse criteria were met, WMP lakeside diversion occurred during pulse events in the spring and summer seasons without affecting downstream pulse achievement.

WMP water use did not contribute to non-achievement of environmental flow conditions.

Little River near Cameron

For the reporting period November 2018 through October 2019, data reported at USGS Gage 08106500 Little River near Cameron was used to determine if environmental flow conditions at the Little River near Cameron measurement point were achieved (see Table 2 and Table 3). The hydrologic condition for all three seasons was wet.

No run-of-river diversions were made during this period; therefore, no WMP diversion occurred at rates lower than diversion rate trigger levels during pulse events. There was 9,505.3 ac-ft of WMP lakeside diversion and storage during this period in the Lake Georgetown reach associated with this applicable measurement point. There was 1,338.3 ac-ft of WMP lakeside diversion and storage during this period in the Lake Granger reach associated with this applicable measurement point. Diversion rate trigger levels during pulse events do not apply to WMP lakeside diversions nor storage. Before pulse criteria were met, WMP lakeside diversion occurred during pulse events in the spring and summer seasons within the Lake Georgetown reach and the Lake Granger reach without decreasing downstream flow below the pulse trigger. After pulse criteria were met, WMP lakeside diversion occurred during pulse events in the spring season within the Lake Georgetown and Lake Granger reaches without affecting downstream pulse achievement.

WMP water use did not contribute to non-achievement of environmental flow conditions.

Brazos River at SH121 near Bryan

For the reporting period November 2018 through October 2019, data reported at USGS Gage 08108700 Brazos River at SH21 near Bryan was used to determine if environmental flow conditions at the Brazos River at SH121 near Bryan measurement point were achieved (see Table 2 and Table 3). The hydrologic condition for all three seasons was wet.

There was no WMP water storage or diversion during this period in any reaches associated with this applicable measurement point. No WMP water storage or diversion occurred at rates lower than diversion rate trigger levels during pulse events. WMP water use did not contribute to non-achievement of environmental flow conditions.

Navasota River near Easterly

For the reporting period November 2018 through October 2019, data reported at USGS Gage 08110500 Navasota River near Easterly was used to determine if environmental flow conditions at the Navasota near Easterly measurement point were achieved (see Table 2 and Table 3). The hydrologic condition for all three seasons was wet.

No run-of-river diversions were made during this period; therefore, no WMP diversion occurred at rates lower than diversion rate trigger levels during pulse events. There was 12,510.2 ac-ft of WMP lakeside diversion and storage during this period in the Lake Limestone reach associated with this applicable measurement point. Diversion rate trigger levels during pulse events do not apply to WMP lakeside diversions nor storage, therefore during pulse events neither WMP lakeside diversions rates nor storage rates were greater than diversion rate trigger levels. Before pulse criteria were met, WMP lakeside diversion occurred during pulse events in the summer

season without affecting pulse achievement. After pulse criteria were met, WMP lakeside diversion occurred during pulse events in the spring and summer seasons without affecting downstream pulse achievement.

WMP water use did not contribute to non-achievement of environmental flow conditions.

Brazos River near Hempstead

For the reporting period November 2018 through October 2019, data reported at USGS Gage 08111500 Brazos River near Hempstead was used to determine if environmental flow conditions at the Brazos River near Hempstead measurement point were achieved (see Table 2 and Table 3). The hydrologic condition for all three seasons was wet.

No run-of-river diversions were made during this period; therefore, no WMP diversion occurred at rates lower than diversion rate trigger levels during pulse events. There was 1,285.1 ac-ft of WMP lakeside diversion and storage during this period in the Lake Somerville reach associated with this applicable measurement point. Diversion rate trigger levels during pulse events do not apply to WMP lakeside diversions nor storage. Before and after pulse criteria were met, WMP lakeside diversion occurred during pulse events in the spring season without affecting downstream pulse achievement.

WMP water use did not contribute to non-achievement of environmental flow conditions.

Brazos River near Richmond

For the reporting period November 2018 through October 2019, data reported at USGS Gage 08114000 Brazos River near Richmond was used to determine if environmental flow conditions at the Brazos River near Richmond measurement point were achieved (see Table 2 and Table 3). The hydrologic condition for all three seasons was wet. There was no WMP water storage or diversion during this period in any reaches associated with this applicable measurement point. No WMP water storage or diversion occurred at rates lower than diversion rate trigger levels during pulse events. WMP water use did not contribute to non-achievement of environmental flow conditions.

Brazos River near Rosharon

For the reporting period November 2018 through October 2019, data reported at USGS Gage 08116650 Brazos River near Rosharon was used to determine if environmental flow conditions at the Brazos River near Rosharon measurement point were achieved (see Table 2 and Table 3). The hydrologic condition for all three seasons was wet. There was no WMP water storage or diversion during this period in any reaches associated with this applicable measurement point. No WMP water storage or diversion occurred at rates lower than diversion rate trigger levels during pulse events. WMP water use did not contribute to non-achievement of environmental flow conditions.