
***Lake Thunderbird TMDL Monitoring Plan Implementation:
Sample Year (SY) 2022- October Report***



SY-2022 Monthly Report

Lake Thunderbird TMDL Monitoring Plan Implementation:

October 2022 Monitoring Report

Oklahoma Water Resources Board
Water Quality Programs Division
Monitoring and Assessment Section
3800 N. Classen, Oklahoma City, Oklahoma 73118
405-530-8800

Contact

Sarah Dexter, Project Leader, sarah.dexter@owrb.ok.gov
Lance Phillips, Streams Program Manager, lance.phillips@owrb.ok.gov
Bill Cauthron, Monitoring Coordinator, bill.cauthron@owrb.ok.gov



TABLE OF CONTENTS

TABLE OF CONTENTS	3
LIST OF TABLES.....	3
LIST OF FIGURES	3
SUMMARY OF OCTOBER WATER QUALITY SAMPLING	4
RESULTS.....	4

LIST OF TABLES

TABLE 1 FIELD DATA FORM	5
TABLE 2 LABORATORY ANALYSIS SUMMARY	6
TABLE 3 QA/QC DATA	6
TABLE 4 STATION DISCHARGE SUMMARY	6

LIST OF FIGURES

FIGURE 1 MONITORING STATION MAP	4
FIGURE 2 DISCHARGE MEASUREMENT SUMMARY CC-1.....	7
FIGURE 3 DISCHARGE MEASUREMENT SUMMARY LRC-1	7
FIGURE 4 DISCHARGE MEASUREMENT SUMMARY TG-1	8
FIGURE 5 MONTHLY HYDROGRAPH TG-1	9
FIGURE 6 MONTHLY HYDROGRAPH TE-1	9
FIGURE 7 MONTHLY HYDROGRAPH WC-1.....	10
FIGURE 8 MONTHLY HYDROGRAPH URC-2.....	10
FIGURE 9 MONTHLY HYDROGRAPH LRC-1	11
FIGURE 10 MONTHLY HYDROGRAPH LDB-1	11
FIGURE 11 MONTHLY HYDROGRAPH CC-1	12
FIGURE 12 MONTHLY HYDROGRAPH UDB-1	12
FIGURE 13 OCTOBER MESONET DATA	13

SUMMARY OF OCTOBER WATER QUALITY SAMPLING

Sampling for October 2022 occurred during base flow conditions on the eleventh. Water samples were collected at seven locations and discharge was measured at three locations. Samples were not collected at JB-1 due to construction activity, or LT-1 and TE-1 due to dry conditions. Mesonet shows 0.02 inches of precipitation on the eleventh, 0.15 inches of precipitation in the 72 hours prior to sampling, and no precipitation in the 72 hours after the sampling event. The total rainfall amount in Norman for the month of October was 2.43 inches. All water level gauges were operational for the month, except for JB-1 due to road construction. The gauge at LT-1 was removed in 2018 as a result of equipment malfunction. The equipment has not been replaced due to intermittent streamflow and dry conditions. Furthermore, this station is being reviewed for a possible location change.

RESULTS

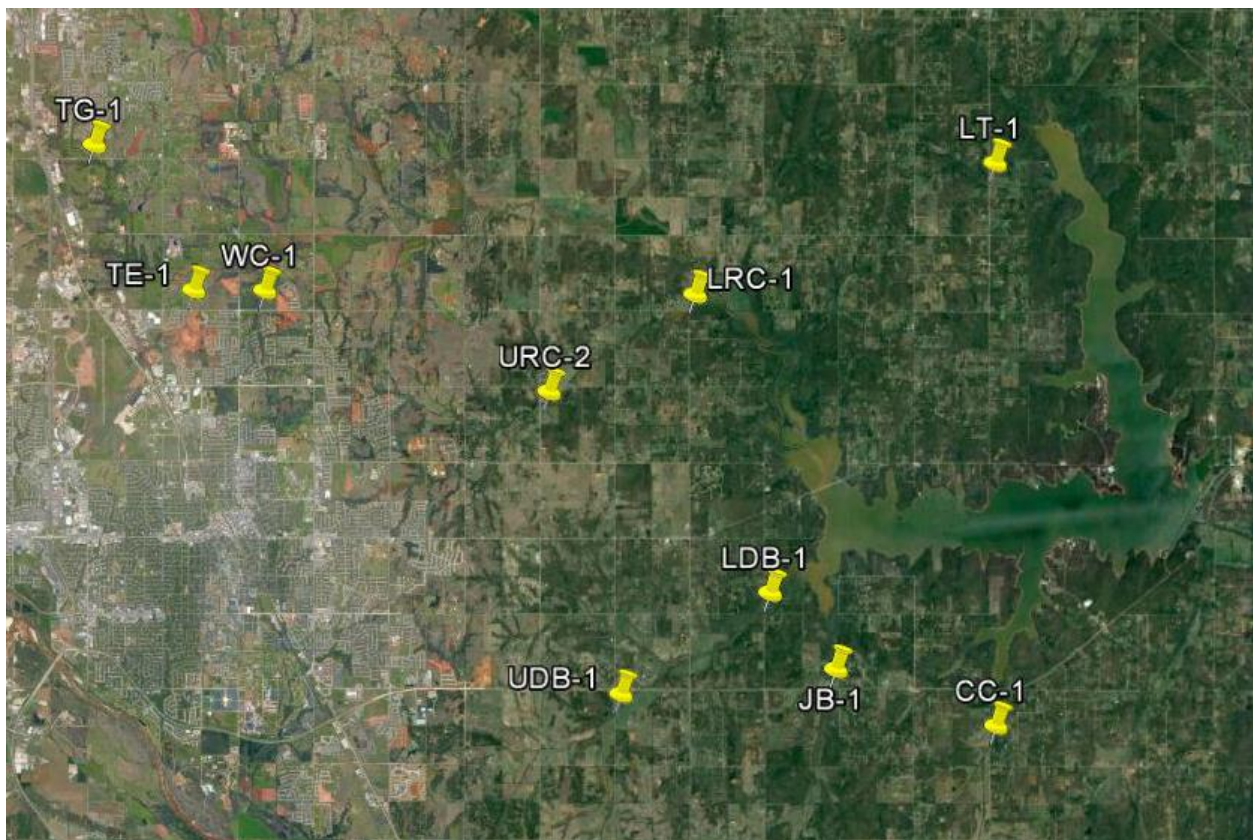


Figure 1 Monitoring Station Map

Monitoring Location ID	Monitoring Location Name	Date	Time	Field Crew	Water Temperature (°C)	Dissolved Oxygen (DO) (mg/L)	pH	Specific Conductance (mS/cm)	Turbidity (NTU)	Notes
CC-1	Clear Creek	10/11/2022	8:55	SD	17.1	6.90	7.78	662	6	Used RP4; lots of vegetation on banks and encroaching channel; orifice partially buried in sand; 22 sample collected at approx 10:15
JB-1	Jim Blue Creek	10/11/2022	9:35	SD	N/A	N/A	N/A	N/A	N/A	Did not sample; muddy water at culvert; disconnected from channel downstream; construction still ongoing
LDB-1	Lower Dave Blue Creek	10/11/2022	9:55	SD	18.0	3.70	7.94	472	62	Very low water level; turbid; floating debris was dead leaves
LRC-1	Lower Rock Creek	10/11/2022	10:55	SD	17.4	7.38	7.82	628	10	Orifice out of water approx 8in; solar panel stolen but DCP working; raining at arrival but stopped when leaving
LT-1	Lake Laterals	10/11/2022	10:35	SD	N/A	N/A	N/A	N/A	N/A	Completely dry, did not sample
TE-1	Little River Tributary	10/11/2022	14:10	SD	N/A	N/A	N/A	N/A	N/A	Neither RP over water, completely dry under bridge, orifice not in water; water approx 40ft downstream of bridge and small pool upstream of bridge approx 30ft; did not sample
TG-1	Little River	10/11/2022	14:33	SD	19.5	9.69	8.14	947	2	Low/normal flow conditions; orifice under water; floating debris is leaves
UDB-1	Upper Dave Blue Creek	10/11/2022	8:22	SD	17.2	4.12	7.72	613	78	Collected from medium sized pool under bridge; downstream dry until the bend in channel; upstream disconnected pools; orifice out of water a few inches; RP not over water
URC-2	Upper Rock Creek	10/11/2022	12:03	SD	18.3	2.92	7.37	914	24	RP2 barely over water, channel disconnected from downstream (dry), orifice out of water a few inches; barely connected under bridge, channel may have been disconnected upstream
WC-1	Woodcrest Creek	10/11/2022	13:48	SD	22.3	2.09	7.78	1038	94	Neither RP over water, under bridge dry; sampled upstream of bridge, downstream pool approx 50ft downstream of bridge; orifice out of water; tree debris in channel on downstream of bridge

Table 1 Field Data Form

Monitoring Location ID	Monitoring Location Name	Nitrate and Nitrite (mg/L)	Kjeldahl Nitrogen (mg/L)	Phosphorus (mg/L)	Total Suspended Solids (mg/L)
CC-1	Clear Creek	<0.05	0.27	0.036	<5.0
JB-1	Jim Blue Creek	N/A	N/A	N/A	N/A
LDB-1	Lower Dave Blue Creek	<0.05	1.18	0.095	45.0
LRC-1	Lower Rock Creek	<0.05	0.31	0.039	5.0
LT-1	Lake Laterals	N/A	N/A	N/A	N/A
TE-1	Little River Tributary	N/A	N/A	N/A	N/A
TG-1	Little River	<0.05	0.43	0.023	<5.0
UDB-1	Upper Dave Blue Creek	1.32	1.74	0.115	42.0
URC-2	Upper Rock Creek	<0.05	0.72	0.085	12.0
WC-1	Woodcrest Creek	<0.05	2.51	0.543	70.0

Table 2 Laboratory Analysis Summary

Monitoring Location Name	Nitrate and Nitrite (mg/L)	Kjeldahl Nitrogen (mg/L)	Phosphorus (mg/L)	Total Suspended Solids (mg/L)
Field Blank	<0.05	<0.10	<0.010	<5.0
Duplicate	<0.05	0.30	0.037	<5.0
Duplicate RPD	0%	10.53%	2.74%	0%

Table 3 QA/QC Data

Quality assurance/quality control (QA/QC) of the data includes a field blank and duplicate sample from each collection event and is qualified by the OWRB. Relative Percent Difference (RPD) of the duplicate sample can be categorized into four levels, where Level 1 likely has no QA issues and Level 4 has major QA issues and should be used with caution.

Monitoring Location ID	Monitoring Location Name	Discharge (cfs)	Stream Stage (ft)
CC-1	Clear Creek	0.22	20.37
JB-1	Jim Blue Creek	N/A	N/A
LDB-1	Lower Dave Blue Creek	0.11	14.26
LRC-1	Lower Rock Creek	0.06	3.75
LT-1	Lake Laterals	N/A	N/A
TE-1	Little River Tributary	N/A	N/A
TG-1	Little River	1.08	9.11
UDB-1	Upper Dave Blue Creek	N/A	N/A
URC-2	Upper Rock Creek	0.01	10.75
WC-1	Woodcrest Creek	N/A	N/A

Table 4 Station Discharge Summary

All rated stream discharges are provisional and subject to change.

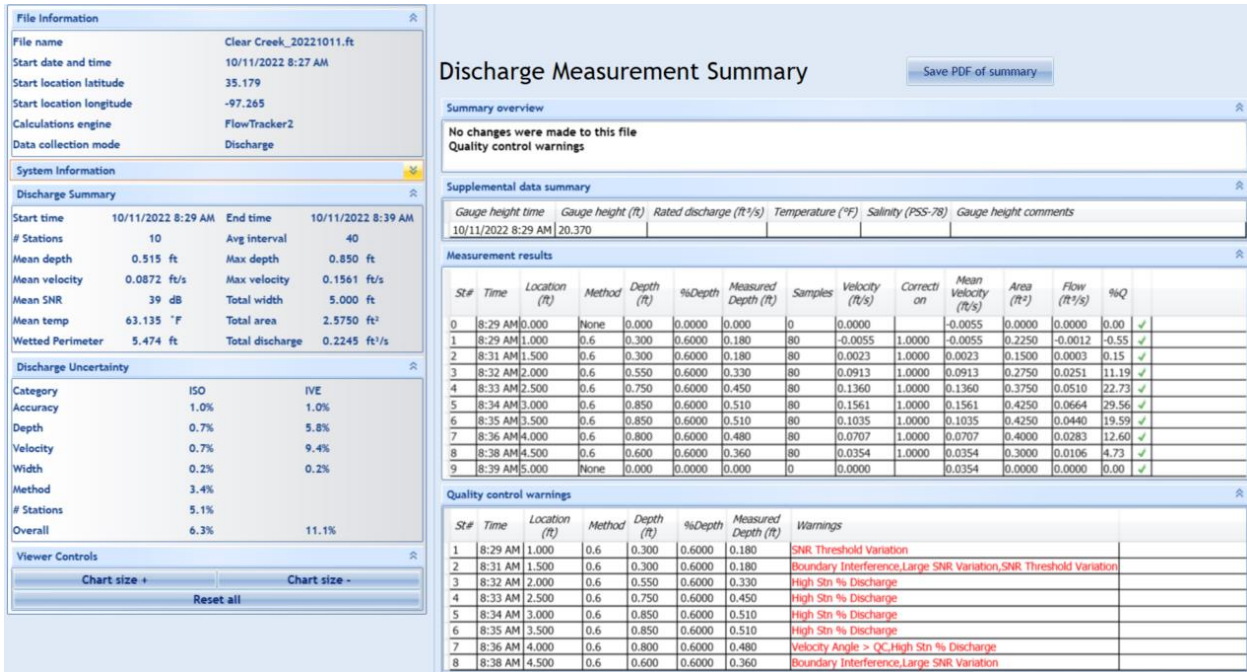


Figure 2 Discharge Measurement Summary CC-1

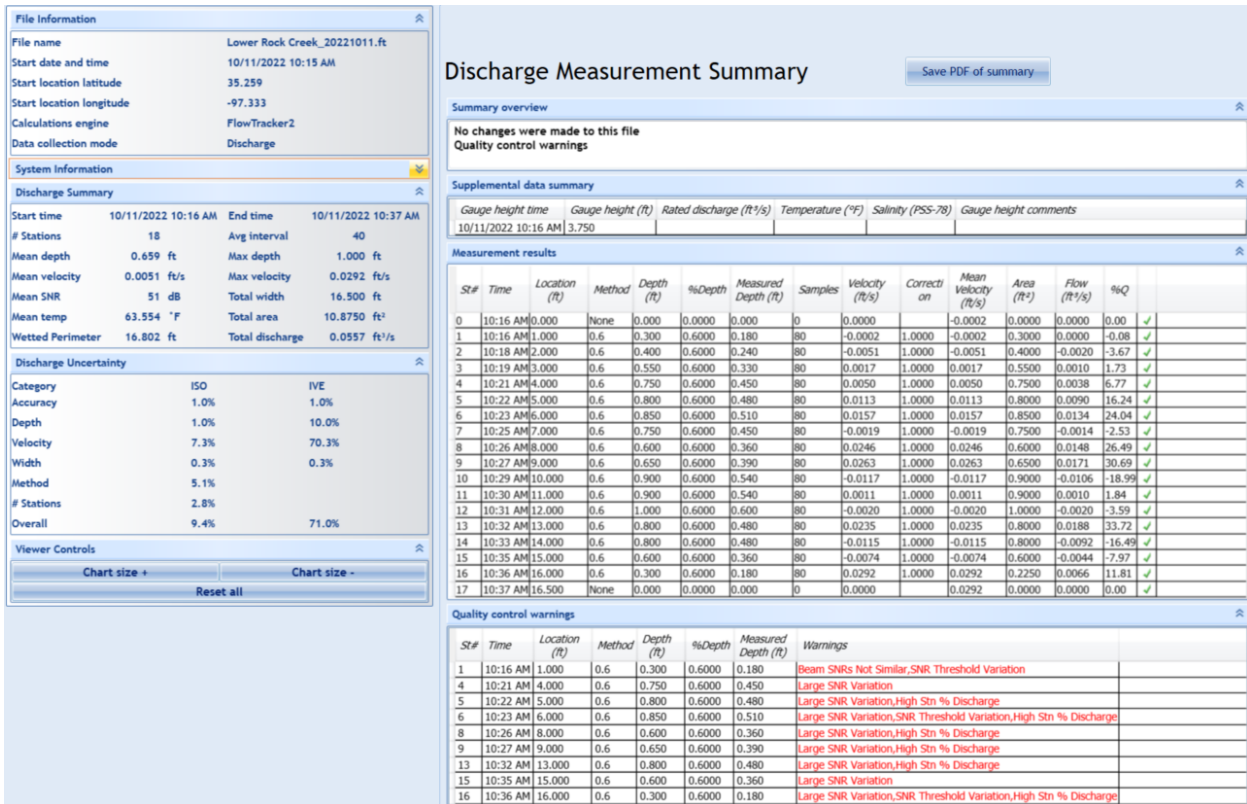


Figure 3 Discharge Measurement Summary LRC-1

File Information

File name: Little River_20221011.ft
 Start date and time: 10/11/2022 2:00 PM
 Start location latitude: 35.290
 Start location longitude: -97.478
 Calculations engine: FlowTracker2
 Data collection mode: Discharge

System Information

Discharge Summary

Start time: 10/11/2022 2:01 PM End time: 10/11/2022 2:27 PM
 # Stations: 22 Avg interval: 40
 Mean depth: 0.732 ft Max depth: 1.100 ft
 Mean velocity: 0.0773 ft/s Max velocity: 0.1180 ft/s
 Mean SNR: 29 dB Total width: 19.000 ft
 Mean temp: 67.548 °F Total area: 13.9125 ft²
 Wetted Perimeter: 19.262 ft Total discharge: 1.0757 ft³/s

Discharge Uncertainty

Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.2%	2.7%
Velocity	0.4%	4.1%
Width	0.1%	0.1%
Method	1.9%	
# Stations	2.3%	
Overall	3.2%	5.0%

Viewer Controls

Chart size + Chart size -
 Reset all

Discharge Measurement Summary

Save PDF of summary

Summary overview

No changes were made to this file
 Quality control warnings

Supplemental data summary

Gauge height time	Gauge height (ft)	Rated discharge (ft ³ /s)	Temperature (°F)	Salinity (PSS-78)	Gauge height comments
10/11/2022 2:15 PM	9.110				

Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correc-tion	Mean Velocity (ft/s)	Area (ft ²)	Flow (ft ³ /s)	%Q
0	2:01 PM	0.000	None	0.000	0.0000	0.000	0	0.0000		-0.0012	0.0000	0.0000	0.00
1	2:01 PM	1.000	0.6	0.400	0.6000	0.240	80	-0.0012	1.0000	-0.0012	0.4000	-0.0005	-0.04
2	2:03 PM	2.000	0.6	0.700	0.6000	0.420	80	0.0888	1.0000	0.0888	0.7000	0.0622	5.78
3	2:04 PM	3.000	0.6	1.050	0.6000	0.630	80	0.0837	1.0000	0.0837	1.0500	0.0879	8.17
4	2:06 PM	4.000	0.6	1.100	0.6000	0.660	80	0.1180	1.0000	0.1180	0.8250	0.0973	9.05
5	2:26 PM	4.500	0.6	1.100	0.6000	0.660	80	0.0989	1.0000	0.0989	0.5500	0.0544	5.06
6	2:07 PM	5.000	0.6	1.050	0.6000	0.630	80	0.0976	1.0000	0.0976	0.7875	0.0769	7.14
7	2:08 PM	6.000	0.6	1.100	0.6000	0.660	80	0.0821	1.0000	0.0821	1.1000	0.0903	8.39
8	2:10 PM	7.000	0.6	1.100	0.6000	0.660	80	0.0801	1.0000	0.0801	1.1000	0.0881	8.19
9	2:11 PM	8.000	0.6	1.100	0.6000	0.660	80	0.0803	1.0000	0.0803	0.8250	0.0662	6.16
10	2:27 PM	8.500	0.6	1.100	0.6000	0.660	80	0.0906	1.0000	0.0906	0.5500	0.0498	4.63
11	2:12 PM	9.000	0.6	1.100	0.6000	0.660	80	0.1043	1.0000	0.1043	0.8250	0.0860	8.00
12	2:13 PM	10.000	0.6	0.950	0.6000	0.570	80	0.0891	1.0000	0.0891	0.9500	0.0846	7.87
13	2:15 PM	11.000	0.6	0.800	0.6000	0.480	80	0.0878	1.0000	0.0878	0.8000	0.0702	6.53
14	2:16 PM	12.000	0.6	0.700	0.6000	0.420	80	0.0595	1.0000	0.0595	0.7000	0.0417	3.87
15	2:17 PM	13.000	0.6	0.650	0.6000	0.390	80	0.0584	1.0000	0.0584	0.6500	0.0380	3.53
16	2:18 PM	14.000	0.6	0.550	0.6000	0.330	80	0.0584	1.0000	0.0584	0.5500	0.0321	2.98
17	2:20 PM	15.000	0.6	0.500	0.6000	0.300	80	0.0422	1.0000	0.0422	0.5000	0.0211	1.96
18	2:21 PM	16.000	0.6	0.450	0.6000	0.270	80	0.0461	1.0000	0.0461	0.4500	0.0208	1.93
19	2:22 PM	17.000	0.6	0.400	0.6000	0.240	80	0.0294	1.0000	0.0294	0.4000	0.0118	1.09
20	2:23 PM	18.000	0.6	0.200	0.6000	0.120	80	-0.0159	1.0000	-0.0159	0.2000	-0.0032	-0.29
21	2:24 PM	19.000	None	0.000	0.0000	0.000	0	0.0000		-0.0159	0.0000	0.0000	0.00

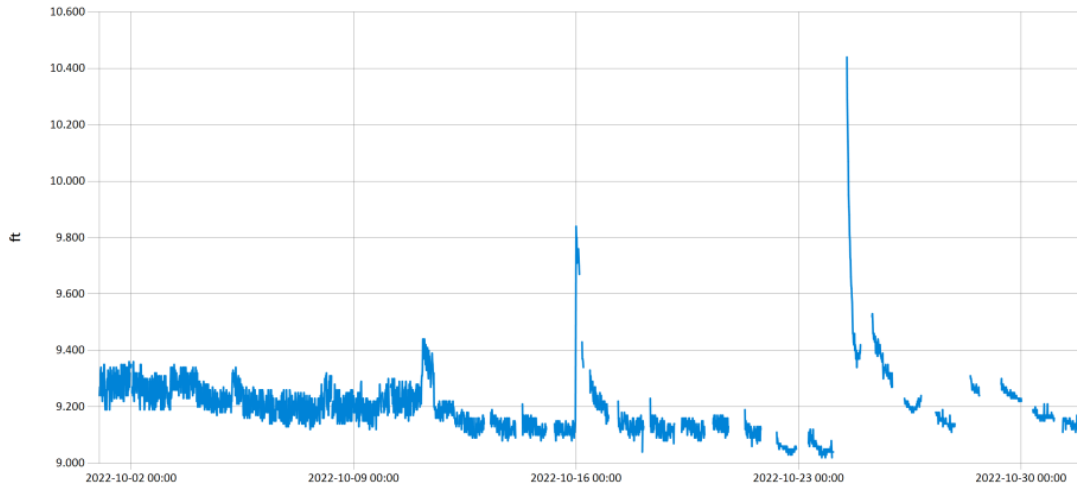
Quality control warnings

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
1	2:01 PM	1.000	0.6	0.400	0.6000	0.240	SNR Threshold Variation
2	2:03 PM	2.000	0.6	0.700	0.6000	0.420	Large SNR Variation, SNR Threshold Variation
7	2:08 PM	6.000	0.6	1.100	0.6000	0.660	Velocity Angle > QC
18	2:21 PM	16.000	0.6	0.450	0.6000	0.270	Large SNR Variation
19	2:22 PM	17.000	0.6	0.400	0.6000	0.240	SNR Threshold Variation
20	2:23 PM	18.000	0.6	0.200	0.6000	0.120	SNR Threshold Variation

Figure 4 Discharge Measurement Summary TG-1

Period Selected: 2022-10-01 00:00 - 2022-10-31 23:59

UTC Offs et: -06:00

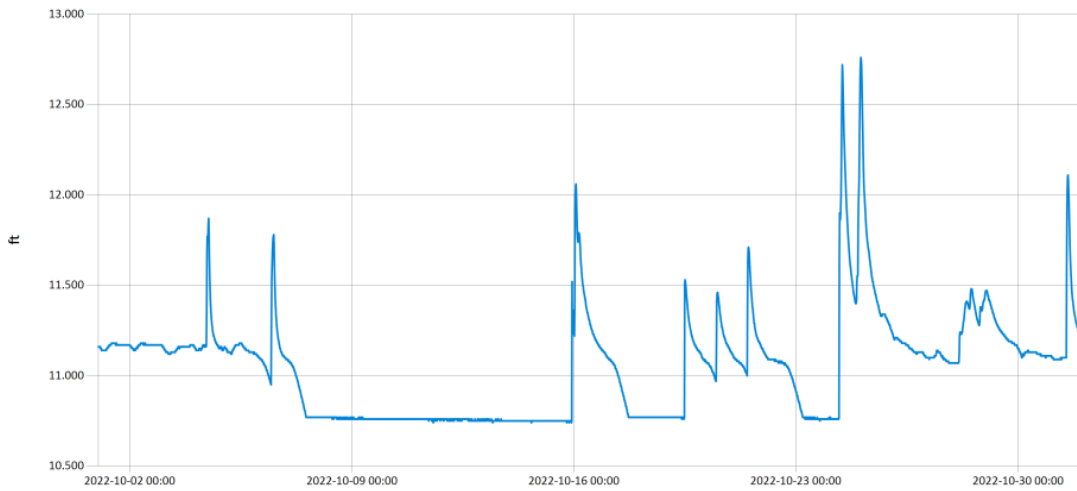


— Stage@TG

Figure 5 Monthly Hydrograph TG-1

Period Selected: 2022-10-01 00:00 - 2022-10-31 23:59

UTC Offs et: -06:00

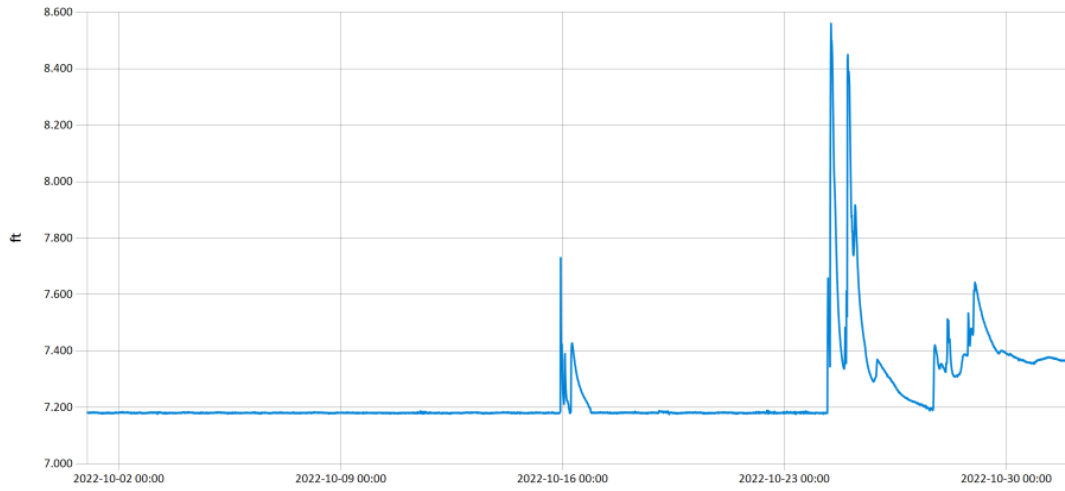


— Stage@TE

Figure 6 Monthly Hydrograph TE-1

Period Selected: 2022-10-01 00:00 - 2022-10-31 23:59

UTC Offs et: -06:00

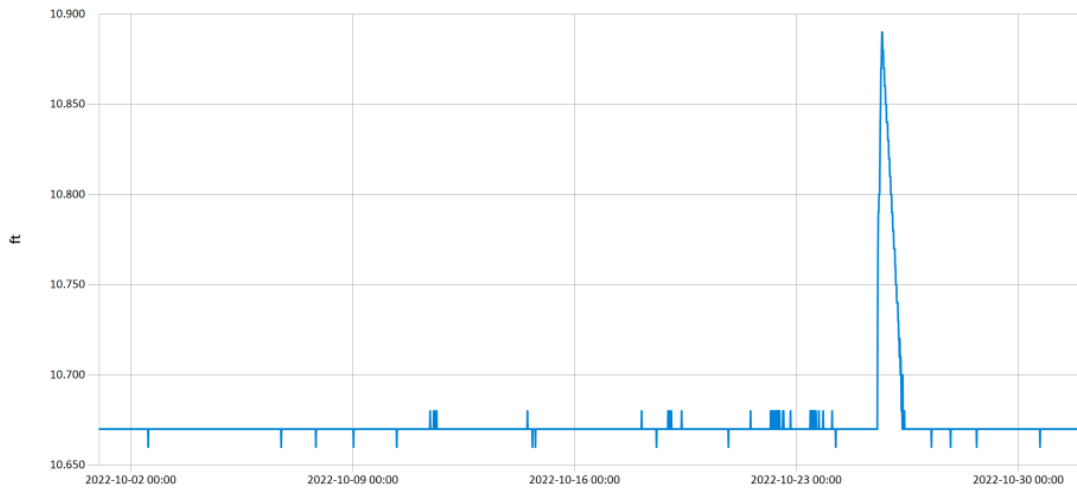


— Stage@WC

Figure 7 Monthly Hydrograph WC-1

Period Selected: 2022-10-01 00:00 - 2022-10-31 23:59

UTC Offs et: -06:00

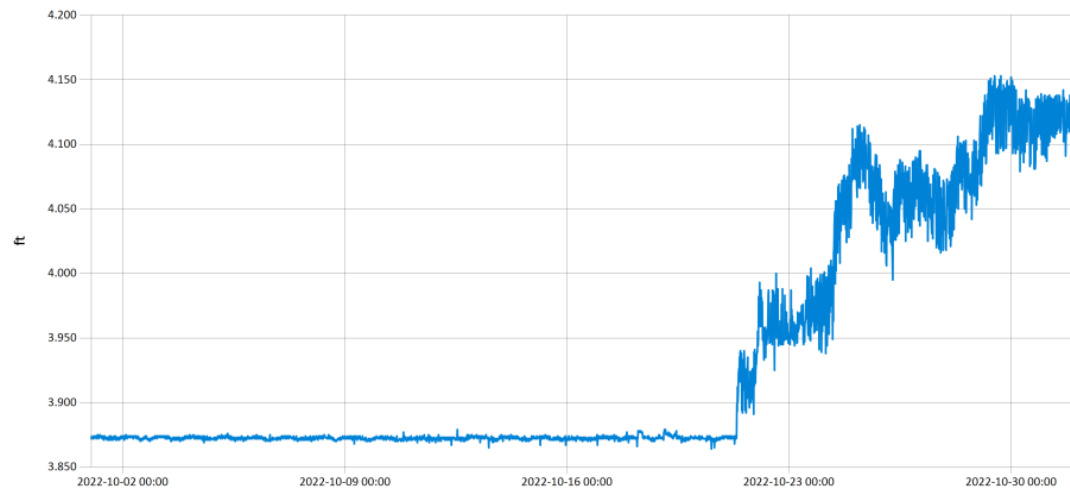


— Stage@URC

Figure 8 Monthly Hydrograph URC-2

Period Selected: 2022-10-01 00:00 - 2022-10-31 23:59

UTC Offs et: -06:00

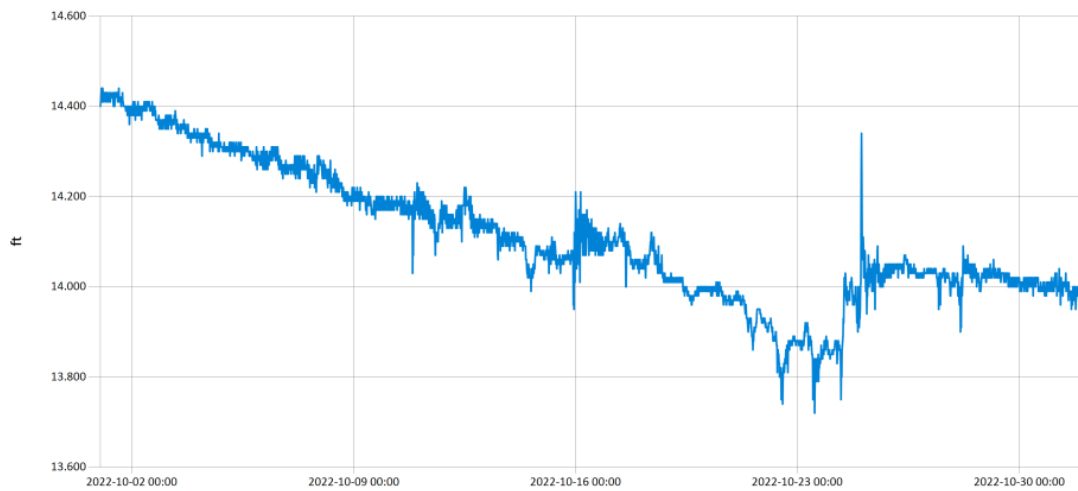


— Stage@LRC

Figure 9 Monthly Hydrograph LRC-1

Period Selected: 2022-10-01 00:00 - 2022-10-31 23:59

UTC Offs et: -06:00

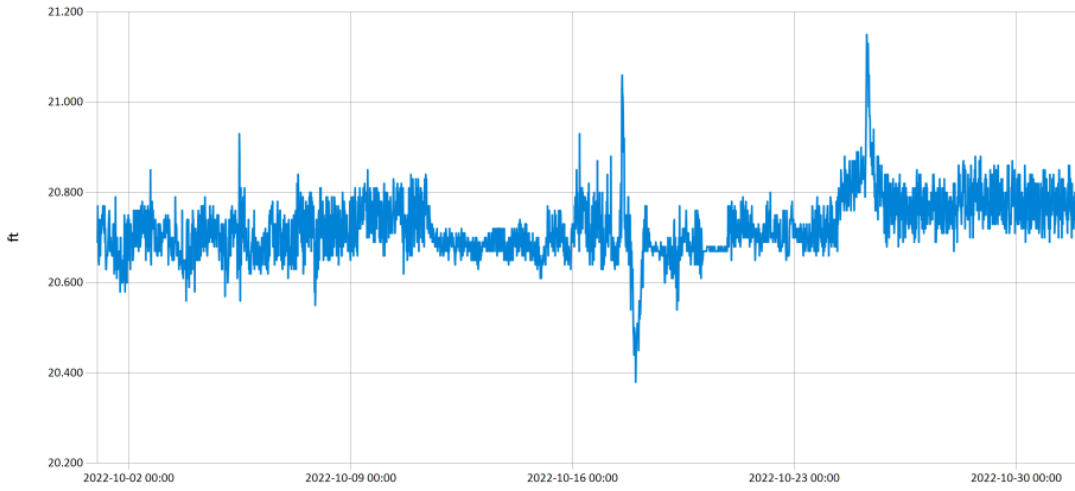


— Stage@LDB

Figure 10 Monthly Hydrograph LDB-1

Period Selected: 2022-10-01 00:00 - 2022-10-31 23:59

UTC Offs et: -06:00

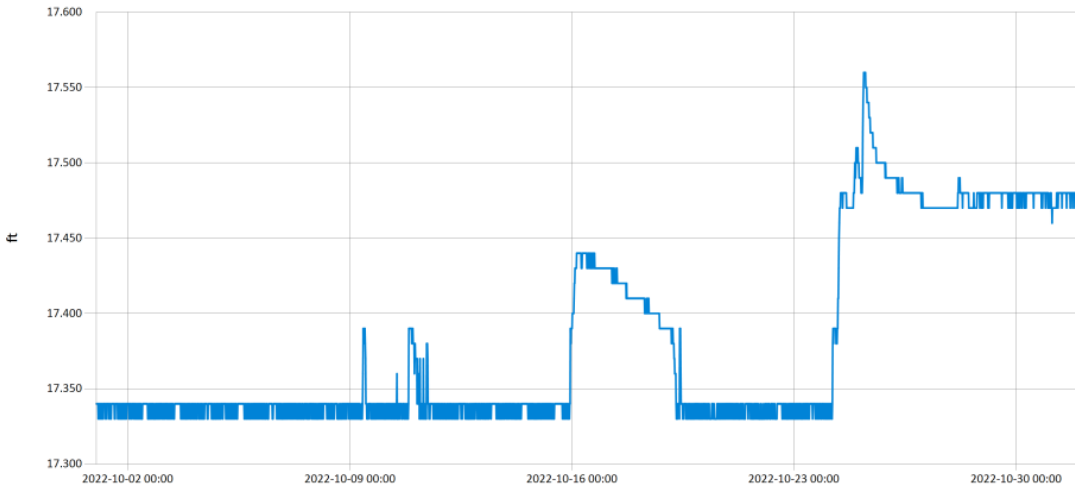


— Stage@CC

Figure 11 Monthly Hydrograph CC-1

Period Selected: 2022-10-01 00:00 - 2022-10-31 23:59

UTC Offs et: -06:00



— Stage@UDB

Figure 12 Monthly Hydrograph UDB-1

MESONET CLIMATOLOGICAL DATA SUMMARY		October 2022		Time Zone: Midnight-Midnight CST																
(NRMN) Norman		Nearest City: 2.1 NW Norman		County: Cleveland																
Latitude: 35-14-09		Longitude: 97-27-53		Elevation: 1171 feet																
DAY	TEMPERATURE (°F)				DEG DAYS HDD CDD	HUMIDITY (%)			RAIN (in)	PRESSURE (in)			WIND SPEED (mph)	SOLAR (MJ/m ²)	4" SOIL TEMPERATURES					
	MAX	MIN	AVG	DEWPT		MAX	MIN	AVG		STN	MSL	DIR			AVG	MAX	SOD	BARE	MAX	MIN
1	84	51	67.3	39.1	0	2	74	19	39	0.00	28.83	30.08	ESE	3.4	13.8	19.94	70.5	74.6	81	69
2	85	48	67.8	39.6	0	2	78	16	41	0.00	28.93	30.18	E	3.5	13.9	19.82	69.2	73.6	80	67
3	84	50	67.1	41.8	0	2	79	20	44	0.00	28.92	30.18	S	3.7	17.2	19.44	69.2	73.5	80	67
4	84	50	67.6	44.5	0	2	82	21	48	0.00	28.85	30.10	SSE	3.9	16.2	19.24	68.8	73.0	79	67
5	85	53	69.1	46.6	0	4	79	24	48	0.00	28.86	30.11	SSW	2.8	13.7	16.33	69.3	73.4	79	68
6	87	59	71.2	48.6	0	8	75	22	49	0.00	28.93	30.18	NE	3.1	17.9	16.26	70.4	74.5	80	70
7	66	55	63.3	47.5	4	0	70	29	57	0.00	29.06	30.31	N	7.7	20.9	4.71	68.5	71.1	73	69
8	69	49	56.3	38.6	6	0	72	32	53	0.00	29.13	30.39	NNE	6.2	18.3	10.44	66.2	68.2	72	65
9	73	55	61.5	54.3	1	0	91	55	78	0.05	29.00	30.26	SSW	4.8	15.9	10.22	66.5	67.9	71	66
10	77	60	67.1	58.3	0	3	96	53	75	0.10	28.89	30.14	SSE	4.3	16.7	8.55	67.6	69.0	73	66
11	78	62	67.9	60.2	0	5	95	49	78	0.02	28.73	29.97	S	9.7	32.6	12.08	68.1	69.6	73	67
12	82	53	69.1	49.4	0	2	85	21	54	0.00	28.69	29.93	N	8.3	23.2	17.81	67.9	70.5	76	66
13	75	45	60.8	33.6	5	0	72	17	40	0.00	28.83	30.08	N	6.7	20.9	17.90	64.0	67.6	73	62
14	85	45	67.1	39.0	0	0	81	18	40	0.00	28.67	29.91	SW	8.0	29.3	17.77	63.6	67.4	73	61
15	90	53	73.4	53.8	0	6	91	31	52	0.56	28.66	29.91	S	7.1	50.3	16.44	66.7	70.7	77	64
16	69	57	62.6	50.1	2	0	90	44	65	0.15	28.85	30.11	N	8.0	23.4	4.98	66.3	66.6	72	62
17	61	42	52.6	28.7	14	0	69	20	42	0.00	28.97	30.23	N	9.8	23.5	17.74	62.6	61.4	67	57
18	57	36	45.2	19.5	19	0	72	17	40	0.00	29.05	30.31	N	7.1	27.2	16.77	58.3	57.8	64	53
19	65	32	49.1	26.2	16	0	83	21	45	0.00	28.96	30.22	S	5.0	17.0	17.28	56.2	57.0	64	50
20	77	38	57.9	36.8	8	0	85	21	49	0.00	28.71	29.95	SSE	4.2	13.7	16.78	57.9	60.1	68	53
21	88	49	68.9	42.4	0	4	81	16	45	0.00	28.57	29.81	S	9.4	26.7	17.00	59.8	63.2	71	56
22	91	66	76.4	49.4	0	14	53	17	40	0.00	28.40	29.63	S	14.8	37.6	16.37	63.0	67.9	73	63
23	83	67	74.7	58.7	0	10	78	46	58	0.00	28.45	29.69	S	14.5	34.6	11.85	65.6	69.9	73	67
24	74	51	60.9	55.8	2	0	96	61	84	1.19	28.49	29.73	NNE	12.1	44.3	4.25	64.9	66.4	70	61
25	65	43	53.2	38.2	11	0	93	30	61	0.06	28.66	29.91	NW	12.3	40.7	16.37	60.8	58.5	62	56
26	69	41	55.7	36.2	10	0	91	30	51	0.00	28.80	30.05	SE	6.7	18.3	16.35	58.8	56.8	64	51
27	70	49	58.8	38.9	6	0	64	35	48	0.00	28.74	29.98	SE	11.2	27.0	14.34	59.1	58.6	64	53
28	58	50	54.0	47.3	11	0	93	56	79	0.30	28.91	30.17	NNE	6.7	16.8	4.08	59.2	58.0	60	57
29	64	51	56.6	49.1	8	0	91	60	77	0.00	28.84	30.09	N	7.1	19.6	5.81	59.3	57.3	60	56
30	67	46	56.3	48.1	8	0	95	48	76	0.00	28.72	29.97	NW	5.7	17.2	10.47	59.6	57.7	62	55
31	74	41	57.3	43.3	7	0	97	31	64	0.00	28.76	30.01	S	3.0	13.2	14.70	58.0	57.1	64	50
	75	50	62.5	44.0	<- Monthly Averages ->				28.80	30.05	S	7.1	50.3	13.94	64.1	65.8	71	61		
Temperature - Highest: 91					Degree Days - Total HDD: 138					Number of Days With:										
Lowest: 32					Total CDD: 63					Tmax ≥ 90: 2					Rainfall ≥ 0.01 inch: 8					
Rainfall: Monthly Total: 2.43 in.					Humidity - Highest: 97					Tmax ≤ 32: 0					Rainfall ≥ 0.10 inch: 5					
Greatest 24 Hr: 1.19 in.					Lowest: 16					Tmin ≤ 32: 1					Avg Wind Speed ≥ 10 mph: 5					
										Tmin ≤ 0: 0					Max Wind Speed ≥ 30 mph: 6					

© 1993-2022 Oklahoma Climatological Survey and the Oklahoma Mesonet

* Denotes incomplete record

Figure 13 October Mesonet Data