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

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**SY-2022 Monthly Report**

*Lake Thunderbird TMDL Monitoring Plan Implementation:*

*September 2022 Monitoring Report*

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Oklahoma Water Resources Board  
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**TABLE OF CONTENTS**

TABLE OF CONTENTS ..... 3  
LIST OF TABLES..... 3  
LIST OF FIGURES ..... 3  
SUMMARY OF SEPTEMBER 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 WHERE THE ASTERISK DENOTES RPD 2 ..... 6  
TABLE 4 STATION DISCHARGE SUMMARY ..... 6

**LIST OF FIGURES**

FIGURE 1 MONITORING STATION MAP ..... 4  
FIGURE 2 DISCHARGE MEASUREMENT SUMMARY LRC-1 ..... 7  
FIGURE 3 DISCHARGE MEASUREMENT SUMMARY TG-1 ..... 7  
FIGURE 4 DISCHARGE MEASUREMENT SUMMARY URC-2 ..... 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 SEPTEMBER MESONET DATA ..... 13

## SUMMARY OF SEPTEMBER WATER QUALITY SAMPLING

Sampling for September 2022 occurred during base flow conditions on the seventh. Water samples were collected at eight locations and discharge was measured at three locations. Samples were not collected at JB-1 due to construction activity, or LT-1 due to dry conditions. Mesonet shows no precipitation on the seventh, 0.12 inches of precipitation in the 72 hours prior to sampling, and 0.03 inches of precipitation in the 72 hours after the sampling event. The total rainfall amount in Norman for the month of September was 1.64 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

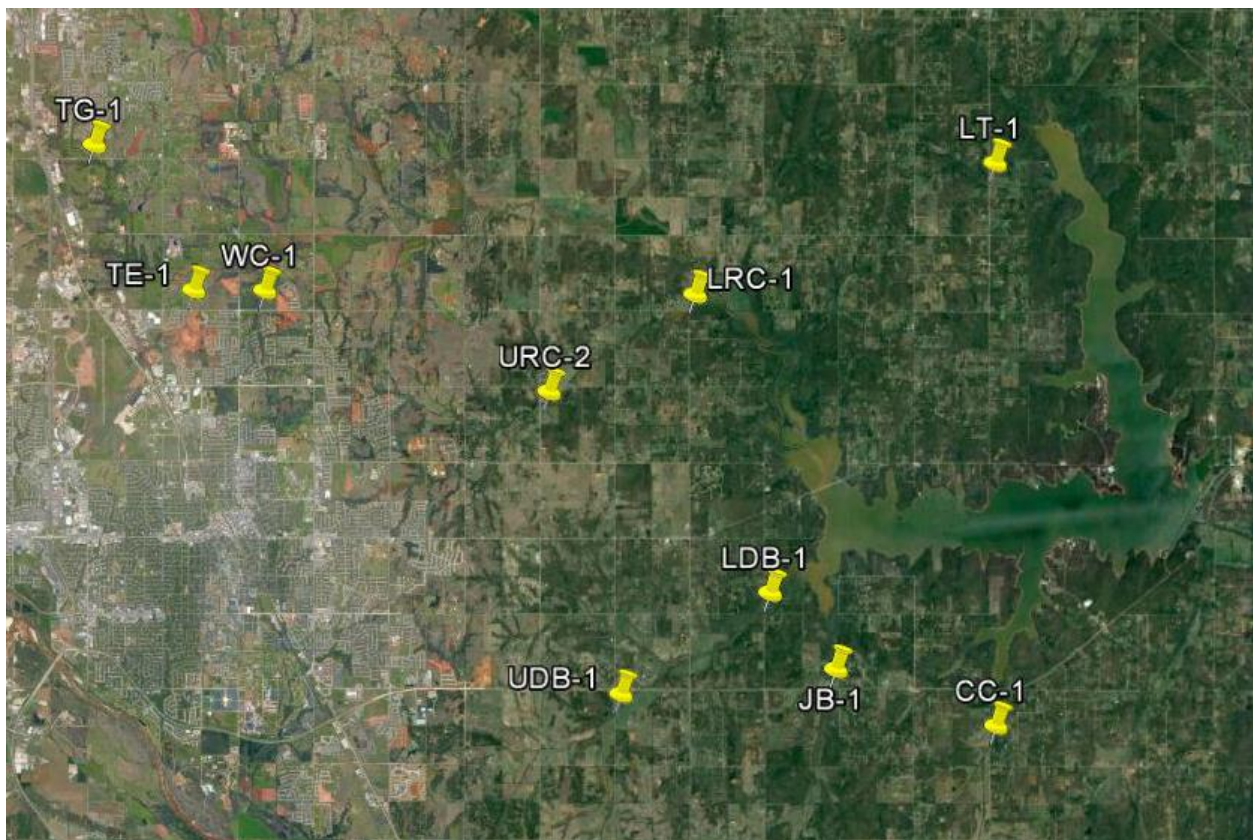


Figure 1 Monitoring Station Map

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	9/7/2022	9:05	JW	21.9	6.11	7.38	659	7	Used RP4; riparian vegetation dominates channel
JB-1	Jim Blue Creek	9/7/2022	9:15	JW	N/A	N/A	N/A	N/A	N/A	Construction - site inaccessible
LDB-1	Lower Dave Blue Creek	9/7/2022	9:35	JW	25.2	4.40	7.60	481	51	Site very low, visual flow was backwards
LRC-1	Lower Rock Creek	9/7/2022	10:55	JW	22.3	6.98	7.44	612	8	Site low; flow measurement taken upstream of bridge; DCP not responding
LT-1	Lake Laterals	9/7/2022	10:30	JW	N/A	N/A	N/A	N/A	N/A	Dry
TE-1	Little River Tributary	9/7/2022	14:05	JW	25.8	6.82	7.30	458	28	Disconnected under bridge
TG-1	Little River	9/7/2022	14:40	JW	26.4	10.31	7.71	509	6	Orifice not in water
UDB-1	Upper Dave Blue Creek	9/7/2022	8:20	JW	21.4	3.91	7.30	440	26	Extremely low flow, virtually no visible flow
URC-2	Upper Rock Creek	9/7/2022	12:30	JW	26.0	6.88	6.95	581	22	Orifice out of water; used RP2, RP1 not over water
WC-1	Woodcrest Creek	9/7/2022	13:25	JW	23.8	7.46	7.42	675	23	Orifice out of water

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	0.16	0.53	0.062	5.0
JB-1	Jim Blue Creek	N/A	N/A	N/A	N/A
LDB-1	Lower Dave Blue Creek	<0.05	1.02	0.104	38.0
LRC-1	Lower Rock Creek	<0.05	0.44	0.042	9.0
LT-1	Lake Laterals	N/A	N/A	N/A	N/A
TE-1	Little River Tributary	<0.05	0.66	0.080	10.0
TG-1	Little River	0.12	0.54	0.053	25.0
UDB-1	Upper Dave Blue Creek	0.08	0.56	0.081	20.0
URC-2	Upper Rock Creek	<0.05	0.75	0.098	20.0
WC-1	Woodcrest Creek	0.17	0.55	0.201	11.0

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	0.16	0.50	0.066	6.0
Duplicate RPD	0%	5.83%	6.25%	18.18%*

Table 3 QA/QC Data Where the Asterisk Denotes RPD 2

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	0.38	20.31
JB-1	Jim Blue Creek	N/A	N/A
LDB-1	Lower Dave Blue Creek	0.69	15.31
LRC-1	Lower Rock Creek	0.19	3.75
LT-1	Lake Laterals	N/A	N/A
TE-1	Little River Tributary	0.00	10.84
TG-1	Little River	0.71	9.84
UDB-1	Upper Dave Blue Creek	0.07	17.12
URC-2	Upper Rock Creek	0.05	10.81
WC-1	Woodcrest Creek	0.02	7.37

Table 4 Station Discharge Summary

All rated stream discharges are provisional and subject to change.

**File Information**

File name: LRC\_20220907-120637.ft  
 Start date and time: 9/7/2022 10:54 AM  
 Start location latitude: 35.261  
 Start location longitude: -97.336  
 Calculations engine: FlowTracker2  
 Data collection mode: Discharge

**System Information**

**Discharge Summary**

Start time: 9/7/2022 11:08 AM End time: 9/7/2022 12:06 PM  
 # Stations: 22 Avg interval: 40  
 Mean depth: 0.533 ft Max depth: 0.900 ft  
 Mean velocity: 0.0335 ft/s Max velocity: 0.0568 ft/s  
 Mean SNR: 32 dB Total width: 10.500 ft  
 Mean temp: 73.765 °F Total area: 5.6000 ft²  
 Wetted Perimeter: 11.032 ft Total discharge: 0.1876 ft³/s

**Discharge Uncertainty**

Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.4%	4.4%
Velocity	0.5%	6.5%
Width	0.1%	0.1%
Method	1.8%	
# Stations	2.3%	
Overall	3.1%	7.9%

**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

### Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft²)	Flow (ft³/s)	%Q
0	11:08 AM	0.000	None	0.000	0.0000	0.000	0	0.0000		0.0497	0.0000	0.0000	0.00
1	11:09 AM	0.500	0.6	0.300	0.6000	0.180	80	0.0497	1.0000	0.0497	0.1500	0.0075	3.97
2	11:13 AM	1.000	0.6	0.300	0.6000	0.180	80	0.0380	1.0000	0.0380	0.1500	0.0057	3.04
3	11:15 AM	1.500	0.6	0.300	0.6000	0.180	80	0.0202	1.0000	0.0202	0.1500	0.0030	1.62
4	11:17 AM	2.000	0.6	0.300	0.6000	0.180	80	0.0353	1.0000	0.0353	0.1500	0.0053	2.82
5	11:18 AM	2.500	0.6	0.300	0.6000	0.180	80	0.0562	1.0000	0.0562	0.1500	0.0084	4.49
6	11:20 AM	3.000	0.6	0.300	0.6000	0.180	80	0.0568	1.0000	0.0568	0.1500	0.0085	4.54
7	11:22 AM	3.500	0.6	0.350	0.6000	0.210	80	0.0237	1.0000	0.0237	0.1750	0.0041	2.21
8	11:29 AM	4.000	0.6	0.500	0.6000	0.300	80	0.0429	1.0000	0.0429	0.2500	0.0107	5.72
9	11:31 AM	4.500	0.6	0.500	0.6000	0.300	80	0.0449	1.0000	0.0449	0.2500	0.0112	5.99
10	11:32 AM	5.000	0.6	0.550	0.6000	0.330	80	0.0449	1.0000	0.0449	0.2750	0.0123	6.58
11	11:34 AM	5.500	0.6	0.600	0.6000	0.360	80	0.0396	1.0000	0.0396	0.3000	0.0119	6.33
12	11:36 AM	6.000	0.6	0.700	0.6000	0.420	80	0.0325	1.0000	0.0325	0.3500	0.0114	6.06
13	11:39 AM	6.500	0.6	0.700	0.6000	0.420	80	0.0322	1.0000	0.0322	0.3500	0.0113	6.01
14	11:40 AM	7.000	0.6	0.750	0.6000	0.450	80	0.0334	1.0000	0.0334	0.3750	0.0125	6.68
15	11:42 AM	7.500	0.6	0.900	0.6000	0.540	80	0.0245	1.0000	0.0245	0.4500	0.0110	5.87
16	11:43 AM	8.000	0.6	0.900	0.6000	0.540	80	0.0257	1.0000	0.0257	0.4500	0.0116	6.16
17	11:45 AM	8.500	0.6	0.850	0.6000	0.510	80	0.0202	1.0000	0.0202	0.4250	0.0086	4.56
18	11:59 AM	9.000	0.6	0.700	0.6000	0.420	80	0.0410	1.0000	0.0410	0.3500	0.0143	7.64
19	12:01 PM	9.500	0.6	0.700	0.6000	0.420	80	0.0254	1.0000	0.0254	0.3500	0.0089	4.75
20	12:02 PM	10.000	0.6	0.700	0.6000	0.420	80	0.0266	1.0000	0.0266	0.3500	0.0093	4.96
21	12:06 PM	10.500	None	0.000	0.0000	0.000	0	0.0000		0.0266	0.0000	0.0000	0.00

### Quality control warnings

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
7	11:22 AM	3.500	0.6	0.350	0.6000	0.210	Boundary Interference
17	11:45 AM	8.500	0.6	0.850	0.6000	0.510	Large SNR Variation
19	12:01 PM	9.500	0.6	0.700	0.6000	0.420	Large SNR Variation
20	12:02 PM	10.000	0.6	0.700	0.6000	0.420	Large SNR Variation
21	12:06 PM	10.500	None	0.000	0.0000	0.000	Water Depth > QC

Figure 2 Discharge Measurement Summary LRC-1

**File Information**

File name: TG20220907-150434.ft  
 Start date and time: 9/7/2022 2:45 PM  
 Start location latitude: 35.290  
 Start location longitude: -97.476  
 Calculations engine: FlowTracker2  
 Data collection mode: Discharge

**System Information**

**Discharge Summary**

Start time: 9/7/2022 2:46 PM End time: 9/7/2022 3:04 PM  
 # Stations: 12 Avg interval: 40  
 Mean depth: 0.568 ft Max depth: 1.000 ft  
 Mean velocity: 0.1139 ft/s Max velocity: 0.1609 ft/s  
 Mean SNR: 38 dB Total width: 11.000 ft  
 Mean temp: 80.156 °F Total area: 6.2500 ft²  
 Wetted Perimeter: 11.074 ft Total discharge: 0.7121 ft³/s

**Discharge Uncertainty**

Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.5%	5.3%
Velocity	0.5%	3.4%
Width	0.2%	0.2%
Method	2.6%	
# Stations	4.2%	
Overall	5.1%	6.4%

**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

### Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft²)	Flow (ft³/s)	%Q
0	2:46 PM	0.000	None	1.000	0.0000	0.000	0	0.0000		0.0830	0.5000	0.0415	5.83
1	2:47 PM	1.000	0.6	0.900	0.6000	0.540	80	0.0830	1.0000	0.0830	0.9000	0.0747	10.49
2	2:49 PM	2.000	0.6	0.800	0.6000	0.480	80	0.0925	1.0000	0.0925	0.8000	0.0740	10.40
3	2:51 PM	3.000	0.6	0.750	0.6000	0.450	80	0.1230	1.0000	0.1230	0.7500	0.0922	12.95
4	2:52 PM	4.000	0.6	0.700	0.6000	0.420	80	0.1605	1.0000	0.1605	0.7000	0.1123	15.77
5	2:54 PM	5.000	0.6	0.600	0.6000	0.360	80	0.1486	1.0000	0.1486	0.6000	0.0892	12.52
6	2:55 PM	6.000	0.6	0.550	0.6000	0.330	80	0.1609	1.0000	0.1609	0.5500	0.0885	12.43
7	2:57 PM	7.000	0.6	0.450	0.6000	0.270	80	0.1281	1.0000	0.1281	0.4500	0.0577	8.10
8	2:58 PM	8.000	0.6	0.400	0.6000	0.240	80	0.1011	1.0000	0.1011	0.4000	0.0405	5.68
9	2:59 PM	9.000	0.6	0.300	0.6000	0.180	80	0.0705	1.0000	0.0705	0.3000	0.0212	2.97
10	3:01 PM	10.000	0.6	0.300	0.6000	0.180	80	0.0679	1.0000	0.0679	0.3000	0.0204	2.86
11	3:04 PM	11.000	None	0.000	0.0000	0.000	0	0.0000		0.0679	0.0000	0.0000	0.00

### Quality control warnings

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
1	2:47 PM	1.000	0.6	0.900	0.6000	0.540	High Stn % Discharge
2	2:49 PM	2.000	0.6	0.800	0.6000	0.480	High Stn % Discharge
3	2:51 PM	3.000	0.6	0.750	0.6000	0.450	High Stn % Discharge
4	2:52 PM	4.000	0.6	0.700	0.6000	0.420	High Stn % Discharge
5	2:54 PM	5.000	0.6	0.600	0.6000	0.360	High Stn % Discharge
6	2:55 PM	6.000	0.6	0.550	0.6000	0.330	High Stn % Discharge

Figure 3 Discharge Measurement Summary TG-1

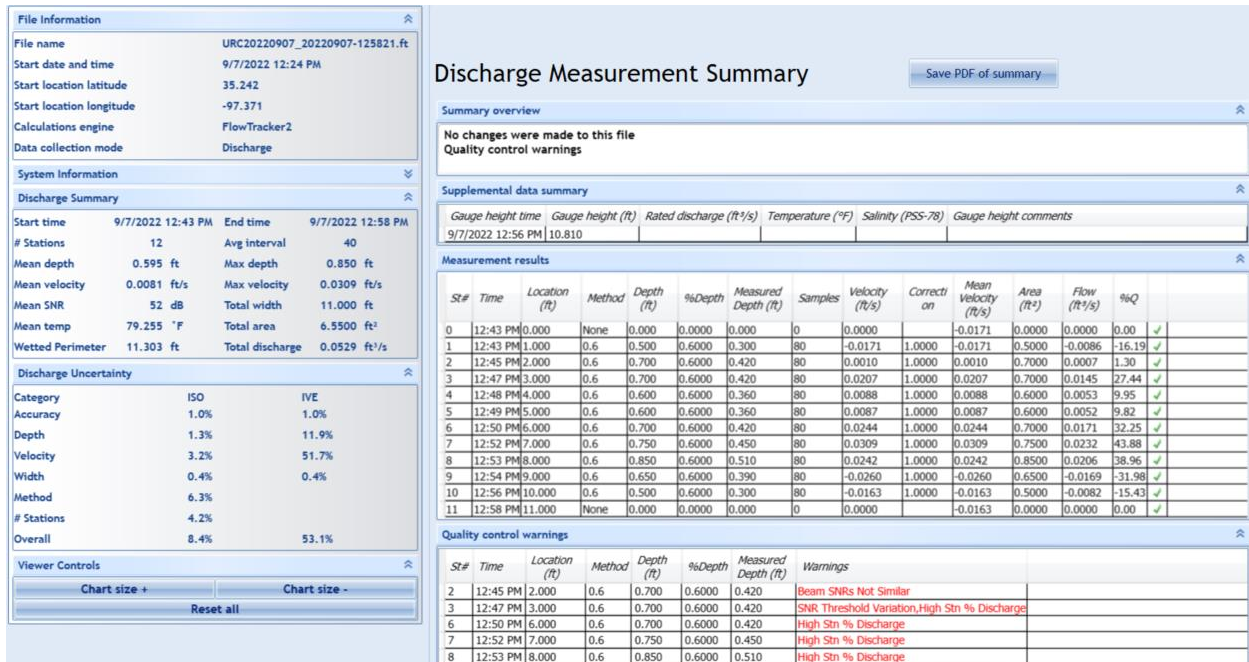
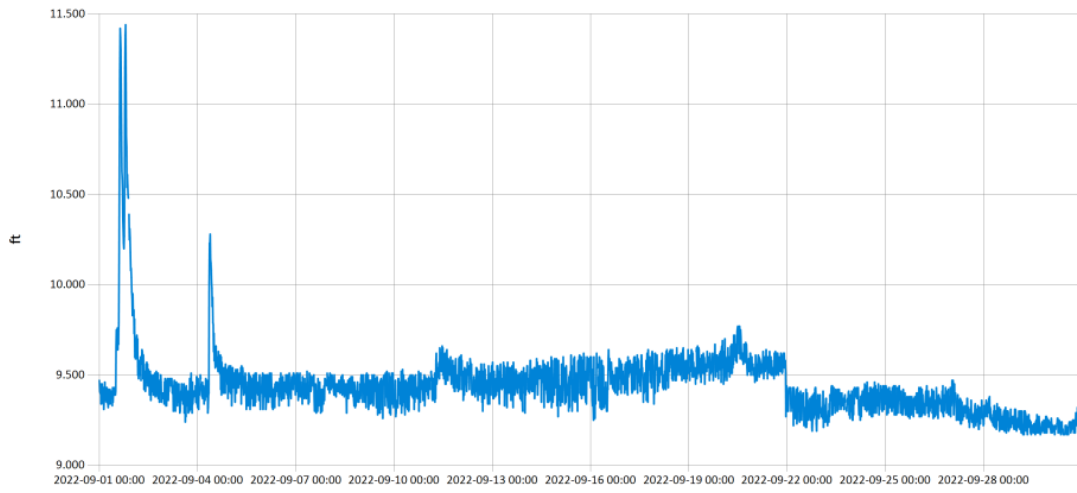


Figure 4 Discharge Measurement Summary URC-2



Period Selected: 2022-09-01 00:00 - 2022-09-30 23:59

UTC Offset: -06:00

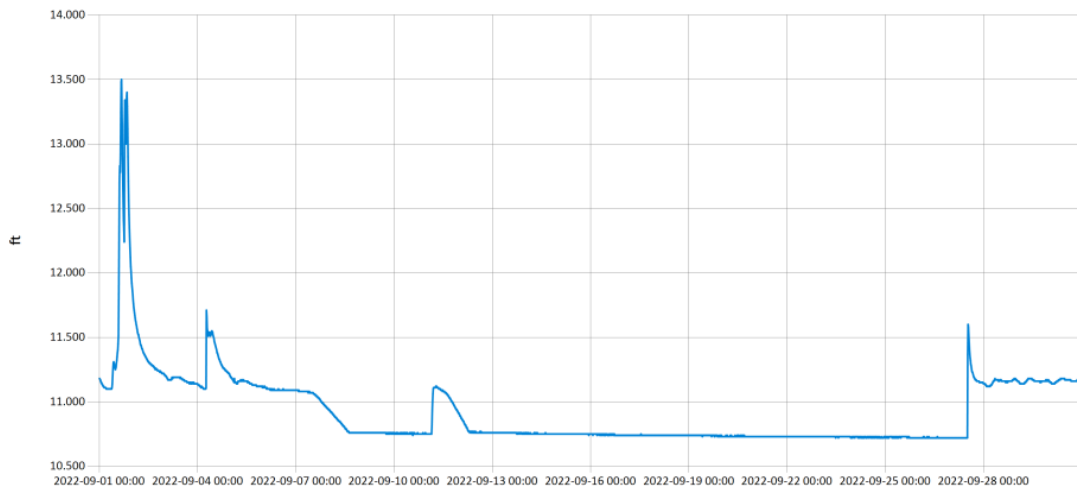


— Stage@TG

Figure 5 Monthly Hydrograph TG-1

Period Selected: 2022-09-01 00:00 - 2022-09-30 23:59

UTC Offset: -06:00

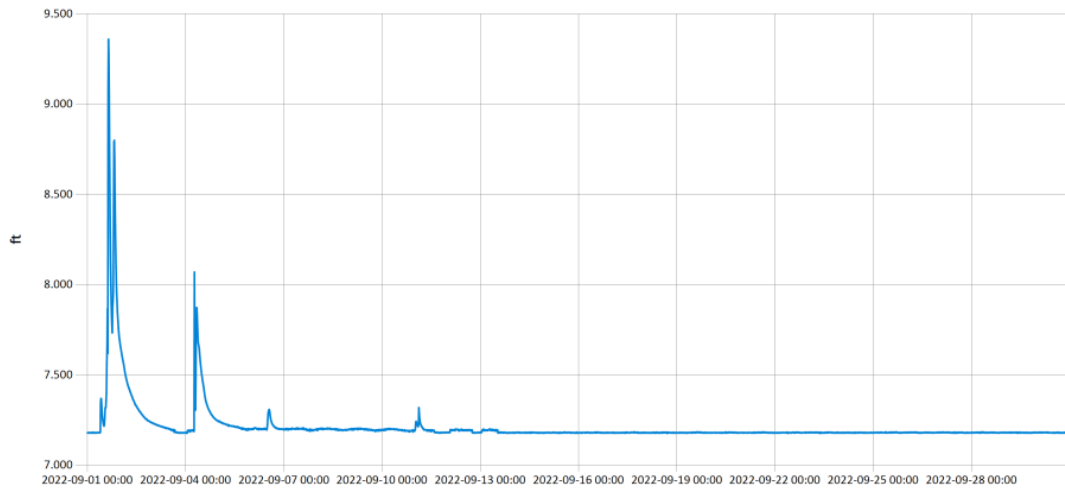


— Stage@TE

Figure 6 Monthly Hydrograph TE-1

Period Selected: 2022-09-01 00:00 - 2022-09-30 23:59

UTC Offset: -06:00

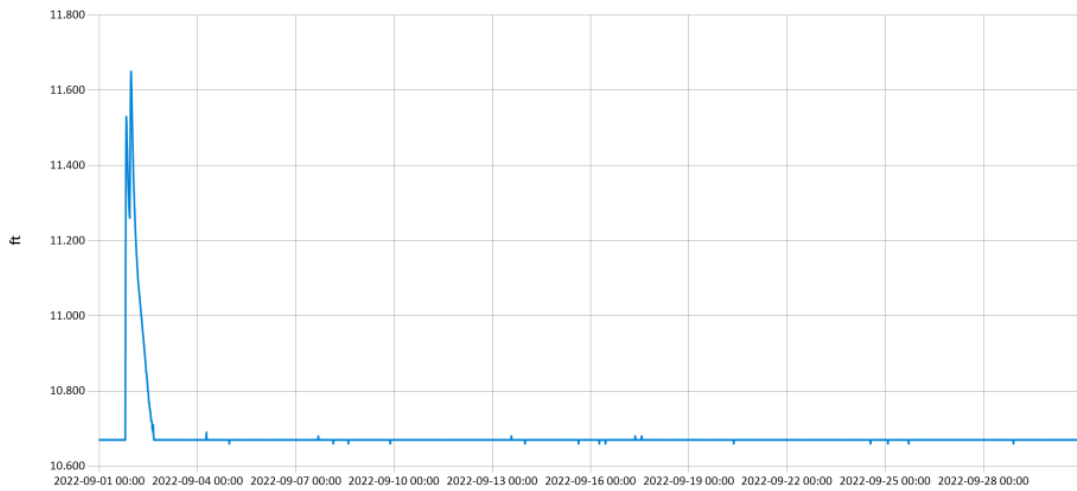


Stage@WC

Figure 7 Monthly Hydrograph WC-1

Period Selected: 2022-09-01 00:00 - 2022-09-30 23:59

UTC Offset: -06:00

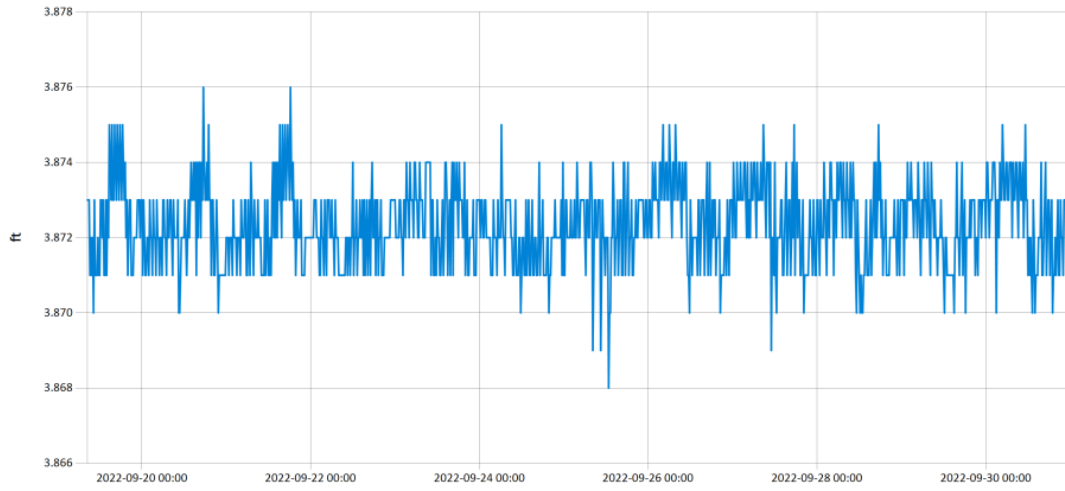


Stage@URC

Figure 8 Monthly Hydrograph URC-2

Period Selected: 2022-09-01 00:00 - 2022-09-30 23:59

UTC Offset: -06:00

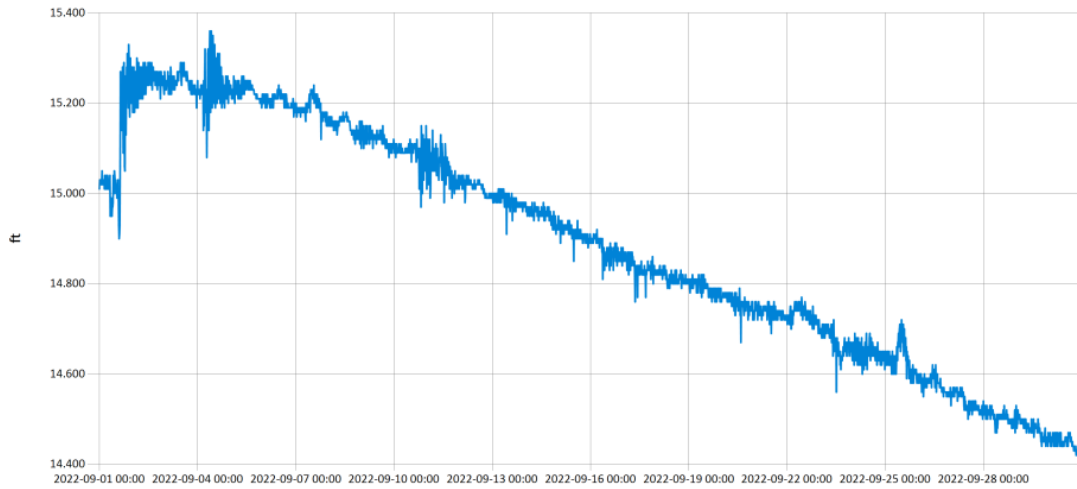


— Stage@LRC

Figure 9 Monthly Hydrograph LRC-1

Period Selected: 2022-09-01 00:00 - 2022-09-30 23:59

UTC Offset: -06:00

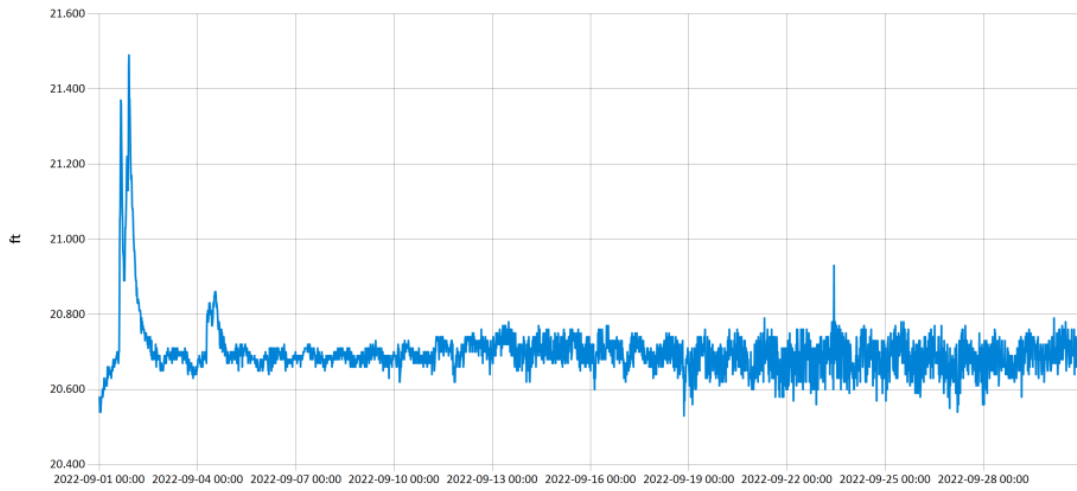


— Stage@LDB

Figure 10 Monthly Hydrograph LDB-1

Period Selected: 2022-09-01 00:00 - 2022-09-30 23:59

UTC Offset: -06:00

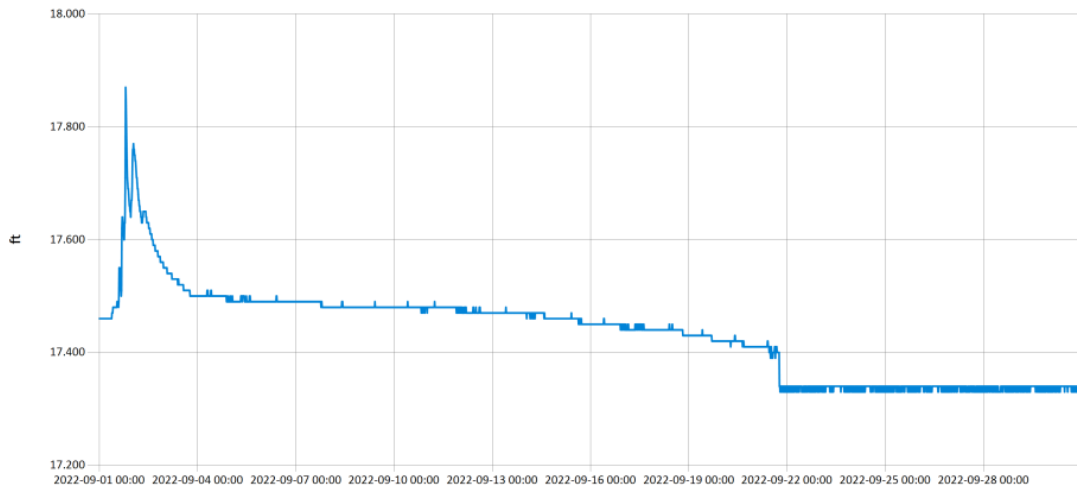


— Stage@CC

Figure 11 Monthly Hydrograph CC-1

Period Selected: 2022-09-01 00:00 - 2022-09-30 23:59

UTC Offset: -06:00



— Stage@UDB

Figure 12 Monthly Hydrograph UDB-1

MESONET CLIMATOLOGICAL DATA SUMMARY				September 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		HUMIDITY (%)			RAIN	PRESSURE (in)		WIND SPEED (mph)			SOLAR	4" SOIL TEMPERATURES			
	MAX	MIN	AVG	DEWPT	HDD	CDD	MAX	MIN	AVG	(in)	STN	MSL	DIR	AVG	MAX	(MJ/m <sup>2</sup> )	SOD	BARE	MAX	MIN
1	78	70	73.2	71.3	0	9	97	81	94	1.41	28.75	30.00	S	4.7	17.2	3.29	77.4	79.5	83	76
2	93	70	80.2	70.3	0	17	97	43	75	0.01	28.72	29.96	S	5.4	14.7	21.12	77.9	79.4	86	74
3	94	70	82.5	67.2	0	17	96	32	64	0.00	28.82	30.07	E	4.4	17.2	22.98	79.3	82.0	90	75
4	89	65	77.1	60.7	0	12	90	20	61	0.12	28.76	30.01	NNE	4.8	37.1	22.49	78.9	81.8	88	76
5	87	62	75.5	61.1	0	10	90	37	64	0.00	28.73	29.97	E	3.3	12.9	21.45	76.8	80.6	89	73
6	91	64	77.1	63.4	0	12	96	39	66	0.00	28.81	30.05	NE	4.0	13.4	22.39	76.6	82.0	90	74
7	90	65	77.6	63.1	0	12	91	40	64	0.00	28.83	30.08	NE	6.5	20.5	22.32	76.5	82.3	89	75
8	88	62	75.3	60.8	0	10	91	39	63	0.00	28.68	29.93	E	3.8	16.2	23.09	76.1	82.3	90	75
9	88	65	76.9	60.5	0	12	83	38	59	0.00	28.60	29.84	S	5.6	18.1	22.45	75.8	82.4	89	76
10	89	60	72.9	58.9	0	9	94	35	65	0.03	28.77	30.02	N	7.4	30.2	19.41	74.9	81.5	88	75
11	78	55	65.8	51.9	0	1	94	31	65	0.07	28.95	30.20	N	10.3	29.9	21.28	73.4	77.4	83	73
12	84	50	68.5	50.0	0	2	95	28	57	0.00	28.81	30.06	SSE	3.3	13.0	22.83	70.9	76.2	85	68
13	90	61	76.4	57.4	0	11	77	38	54	0.00	28.71	29.95	SSE	7.3	21.6	21.40	72.1	78.4	86	71
14	90	67	77.4	55.0	0	13	63	32	47	0.00	28.77	30.02	SSE	9.1	19.3	21.30	74.0	80.3	87	74
15	89	65	76.1	53.9	0	12	69	27	48	0.00	28.80	30.05	SSE	8.6	22.9	21.72	74.1	79.9	86	74
16	91	67	78.7	61.2	0	14	73	40	56	0.00	28.74	29.99	SSE	9.9	26.2	20.73	74.7	80.5	87	75
17	94	70	82.1	66.1	0	17	88	37	61	0.00	28.69	29.94	SSE	10.2	29.1	20.46	76.2	82.0	88	77
18	95	74	83.8	66.4	0	20	84	36	58	0.00	28.71	29.96	S	9.3	23.8	20.85	77.6	83.6	89	78
19	97*	71*	83.6*	63.1*	0*	19*	84*	25*	54*	0.00*	28.75*	30.00*	S	7.1*	18.5*	NA	77.8*	83.8*	89*	78*
20	97	72	84.3	63.2	0	20	79	28	52	0.00	28.75	30.00	S	7.5	22.4	20.70	78.1	83.9	89	79
21	98	75	84.7	62.4	0	21	69	30	49	0.00	28.74	29.99	S	6.7	21.5	17.40	78.3	83.9	89	80
22	84	61	73.3	57.4	0	7	80	42	59	0.00	28.82	30.07	NNE	9.7	19.7	19.58	76.9	82.2	86	79
23	94	57	75.0	55.4	0	10	80	27	55	0.00	28.75	30.00	SSW	7.5	23.0	20.20	75.3	79.9	86	74
24	92	69	79.5	58.4	0	15	74	30	51	0.00	28.71	29.96	S	5.4	15.6	10.67	75.7	80.0	83	76
25	89	62	75.0	50.4	0	10	93	21	48	0.00	28.80	30.05	NNE	8.9	27.8	20.35	74.6	79.1	84	75
26	85	53	69.7	42.8	0	4	71	21	41	0.00	28.90	30.15	NNE	4.4	16.1	20.69	72.4	76.8	83	71
27	91	55	75.0	43.3	0	8	63	18	35	0.00	28.87	30.12	S	6.6	22.2	19.83	72.1	76.6	83	71
28	91	57	74.8	46.7	0	9	75	22	40	0.00	28.93	30.18	S	4.9	18.6	19.75	72.8	77.5	84	72
29	81	60	69.4	42.8	0	5	57	26	40	0.00	28.94	30.19	SE	9.1	25.4	19.70	72.6	76.4	81	72
30	83	57	68.7	42.9	0	5	61	26	41	0.00	28.83	30.08	SSE	7.1	18.5	19.20	71.6	75.0	81	70
	89*	64*	76.3*	57.6*	<- Monthly Averages ->						28.78*	30.03*	S	6.8*	37.1*	19.99*	75.4*	80.2*	86*	74*
Temperature - Highest: 98*							Degree Days - Total HDD: 0*					Number of Days With:								
Lowest: 50*							Total CDD: 344*					Tmax ≥ 90: 16*								
Rainfall: Monthly Total: 1.64* in.							Humidity - Highest: 97*					Tmax ≤ 32: 0*								
Greatest 24 Hr: 1.41* in.							Lowest: 18*					Tmin ≤ 32: 0*								
												Tmin ≤ 0: 0*								
												Avg Wind Speed ≥ 10 mph: 2*								
												Max Wind Speed ≥ 30 mph: 2*								

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\* Denotes incomplete record

Figure 13 September Mesonet Data