
***Lake Thunderbird TMDL Monitoring Plan Implementation:
Sample Year (SY) 2019- September Report***



SY2019 Monthly Report

Lake Thunderbird TMDL Monitoring Plan Implementation:

September 2019 Monitoring Report

Oklahoma Water Resources Board
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SUMMARY OF SEPTEMBER WATER QUALITY SAMPLING

Sampling for September 2019 consisted of two collections. The first sampling event occurred on the sixteenth and was considered a base flow collection. Water samples were collected at nine locations, with the exclusion of LT-1 as a result of dry conditions. Discharge measurements were not collected due to average base flow water levels. Mesonet data shows no precipitation occurring on the sixteenth, 0.60 inches of precipitation in the 72 hours prior to sampling, and no precipitation in the 72 hours after the sampling event. A second sampling event was conducted on the twenty-fourth and was considered a high flow collection. Water samples were collected at three monitoring locations via autosampler, as well as two stormwater outfalls. Mesonet data shows 1.09 inches of precipitation occurring on the twenty-fourth, 0.95 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 September was 3.01 inches. All water level gauges were operational for the month, with the exception of LT-1 due to equipment malfunction.

RESULTS

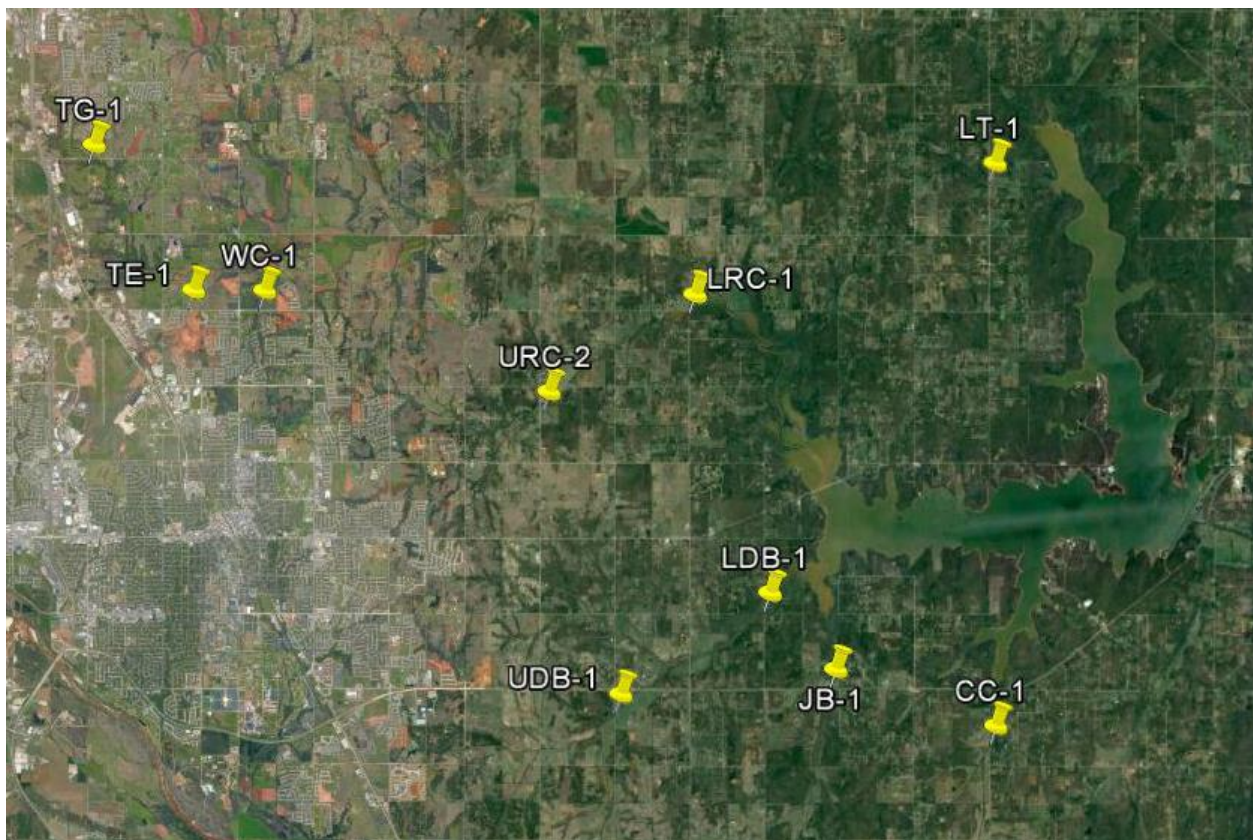


Figure 1 Monitoring Station Map

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	09-16-2019	11:10	SD	25.1	8.05	8.19	689	7	None of RPs over water, estimated stage
JB-1	Jim Blue Creek	09-16-2019	11:30	SD	N/A	N/A	N/A	N/A	N/A	Disconnected pool at bridge
LDB-1	Lower Dave Blue Creek	09-16-2019	11:50	SD	25.2	4.12	8.22	742	22	No visible flow
LRC-1	Lower Rock Creek	09-16-2019	12:35	SD	23.3	5.63	7.99	749	7	
LT-1	Lake Laterals	09-16-2019	12:15	SD	N/A	N/A	N/A	N/A	N/A	Completely dry
TE-1	Little River Tributary	09-16-2019	13:55	SD	25.5	4.25	7.62	753	13	
TG-1	Little River Tributary	09-16-2019	14:20	SD	26.1	7.78	7.96	637	5	
UDB-1	Upper Dave Blue Creek	09-16-2019	10:45	SD	23.9	5.27	8.00	933	6	
URC-2	Upper Rock Creek	09-16-2019	12:55	SD	26.6	6.34	7.64	754	9	Bubbler barely in water, very low flow
WC-1	Woodcrest Creek	09-16-2019	13:30	SD	24.9	6.93	7.65	641	6	

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	0.09	0.37	0.061	<5.0
JB-1	Jim Blue Creek	N/A	N/A	N/A	N/A
LDB-1	Lower Dave Blue Creek	<0.05	0.87	0.089	12
LRC-1	Lower Rock Creek	<0.05	0.32	0.040	<5.0
LT-1	Lake Laterals	N/A	N/A	N/A	N/A
TE-1	Little River Tributary	<0.05	0.60	0.036	<5.0
TG-1	Little River Tributary	0.07	0.50	0.057	<5.0
UDB-1	Upper Dave Blue Creek	<0.05	0.32	0.047	<5.0
URC-2	Upper Rock Creek	<0.05	0.70	0.062	<5.0
WC-1	Woodcrest Creek	0.05	0.37	0.059	<5.0

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	0.09	0.36	0.062	<5.0
Duplicate RPD	0%	2.74%	1.63%	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	1.00	20.83
JB-1	Jim Blue Creek	0.00	15.90
LDB-1	Lower Dave Blue Creek	2.65	16.14
LRC-1	Lower Rock Creek	0.50	18.24
LT-1	Lake Laterals	N/A	N/A
TE-1	Little River Tributary	0.05	11.53
TG-1	Little River Tributary	3.32	9.27
UDB-1	Upper Dave Blue Creek	0.06	17.32
URC-2	Upper Rock Creek	0.02	11.10
WC-1	Woodcrest Creek	0.02	7.89

Table 4 Station Discharge Summary

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
TE-1	Little River Tributary	09-24-2019	5:30	SD	N/A	N/A	8.52	384	626	T2 collected at 15.02, peak at 15.41 @ 05:45
TG-1	Little River Tributary	09-24-2019	5:45	SD	N/A	N/A	8.06	697	1000	T2 collected at 15.61, peak at 17.59 @ 06:30
WC-1	Woodcrest Creek	09-24-2019	5:35	SD	N/A	N/A	8.69	249	442	T1 collected at 10.24, peak at 10.30 @ 06:00
SW-10	Stormwater Outfall 10	09-25-2019	12:00	SD	N/A	N/A	7.83	420	7	
SW-11	Stormwater Outfall 11	09-25-2019	12:10	SD	N/A	N/A	7.75	94	49	

Table 5 Stormwater Field Data Form Where N/A Denotes a Sample from an Autosampler

Monitoring Location ID	Monitoring Location Name	Nitrate and Nitrite (mg/l)	Kjeldahl Nitrogen (mg/l)	Phosphorus (mg/l)	Total Suspended Solids (mg/l)
TE-1	Little River Tributary	0.20	1.17	0.360	420
TG-1	Little River Tributary	0.14	2.85	0.995	1660
WC-1	Woodcrest Creek	0.22	1.77	0.448	510
SW-10	Stormwater Outfall 10	0.11	1.09	0.153	254
SW-11	Stormwater Outfall 11	0.29	1.35	0.167	126

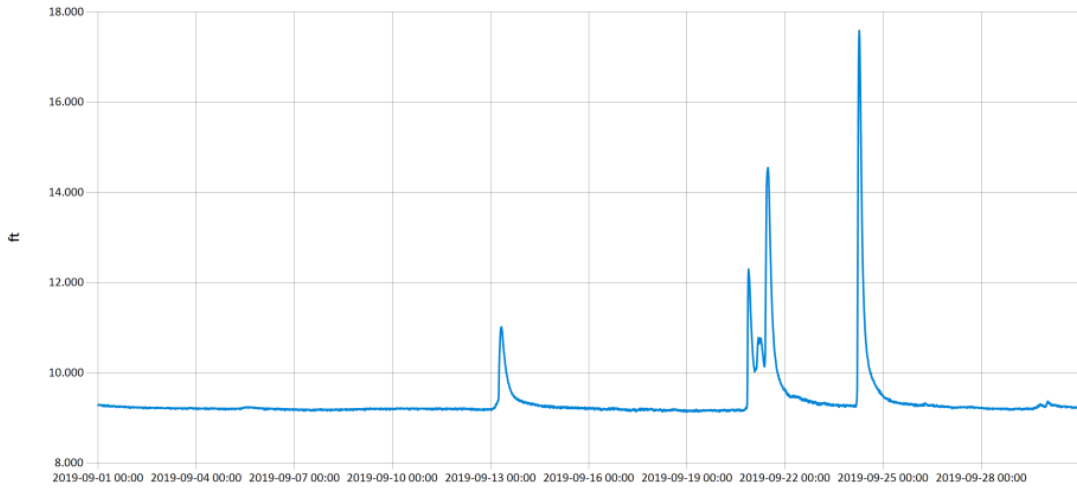
Table 6 Stormwater Laboratory Analysis Summary

Monitoring Location ID	Monitoring Location Name	Discharge (cfs)	Stream Stage (ft)
TE-1	Little River Tributary	207	15.02
TG-1	Little River Tributary	642	15.61
WC-1	Woodcrest Creek	41	10.24

Table 7 Stormwater Station Discharge Summary

Period Selected: 2019-09-01 00:00 - 2019-09-30 23:59

UTC Offs et: -06:00

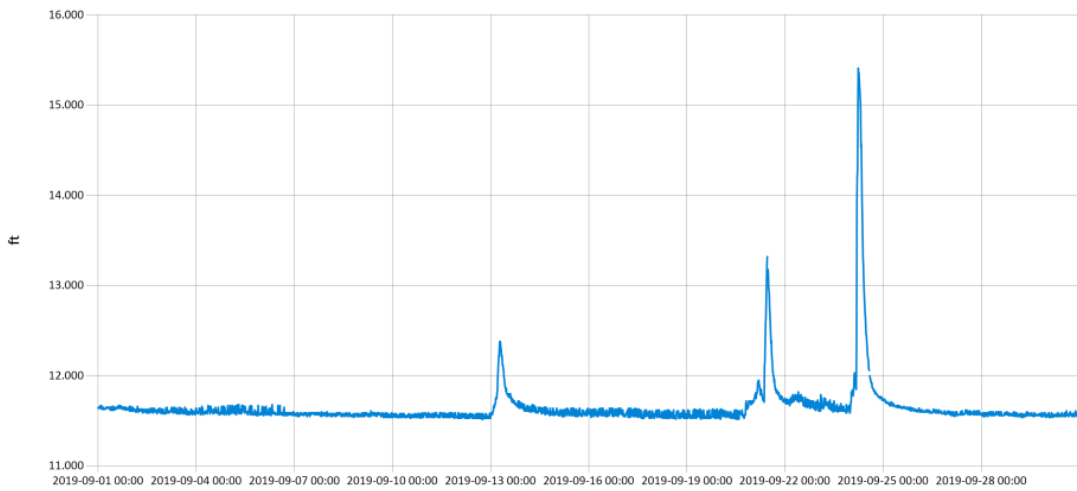


— Stage@TG-1

Figure 2 Monthly Hydrograph TG-1

Period Selected: 2019-09-01 00:00 - 2019-09-30 23:59

UTC Offs et: -06:00



— Stage@TE-1

Figure 3 Monthly Hydrograph TE-1

Period Selected: 2019-09-01 00:00 - 2019-09-30 23:59

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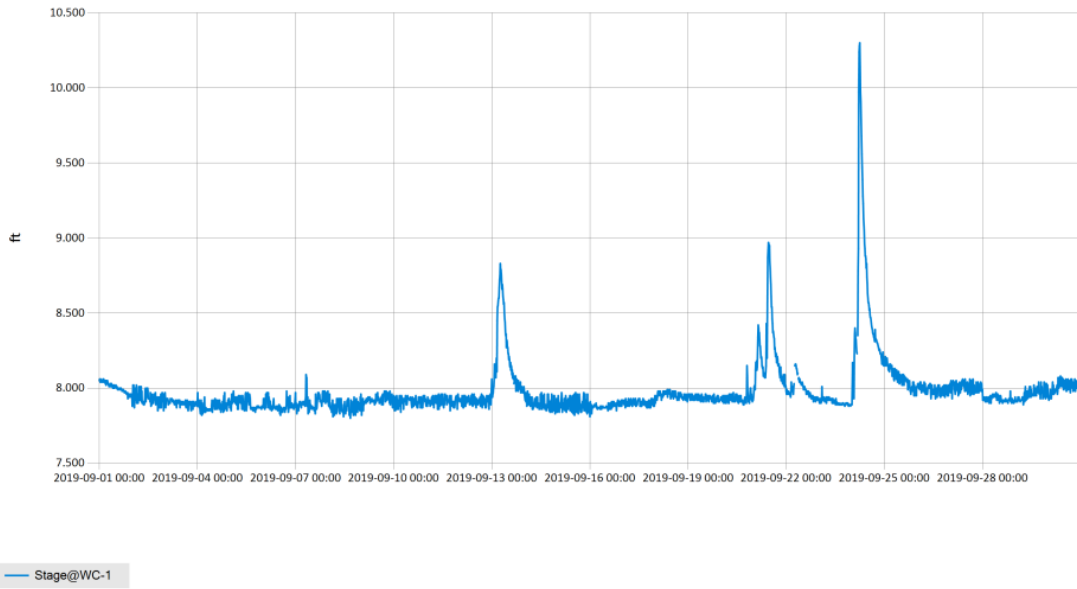


Figure 4 Monthly Hydrograph WC-1

Period Selected: 2019-09-01 00:00 - 2019-09-30 23:59

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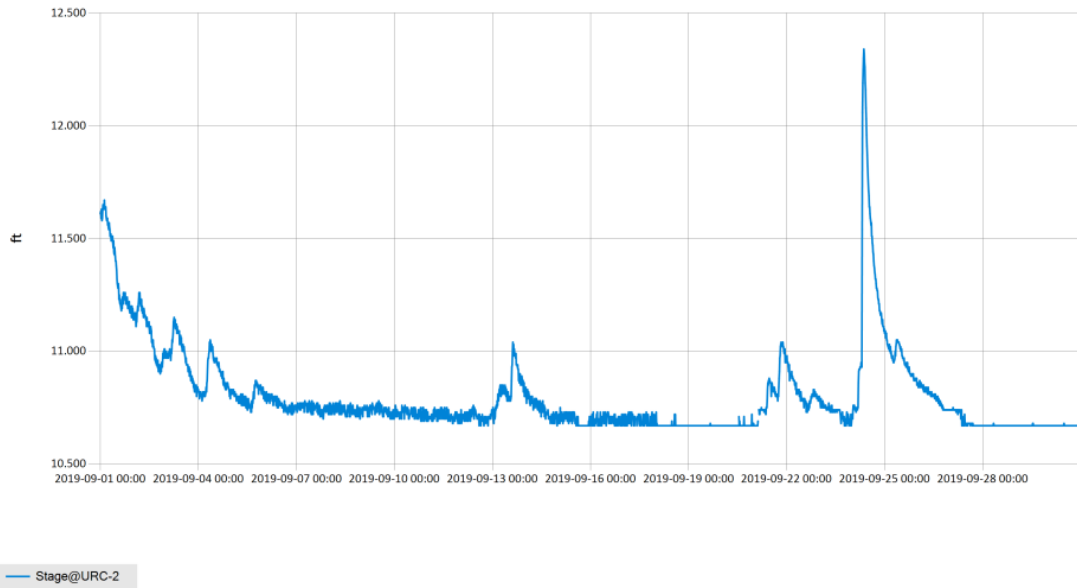
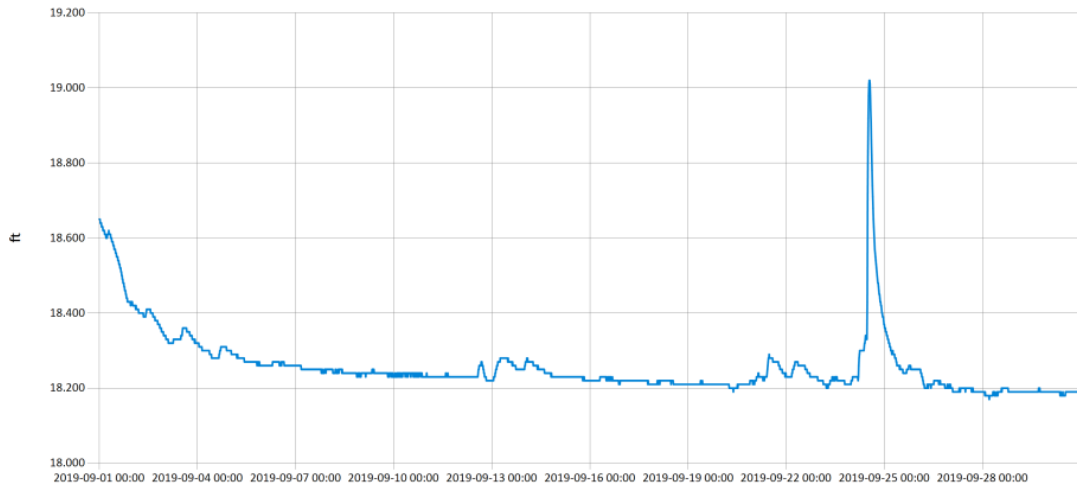


Figure 5 Monthly Hydrograph URC-2

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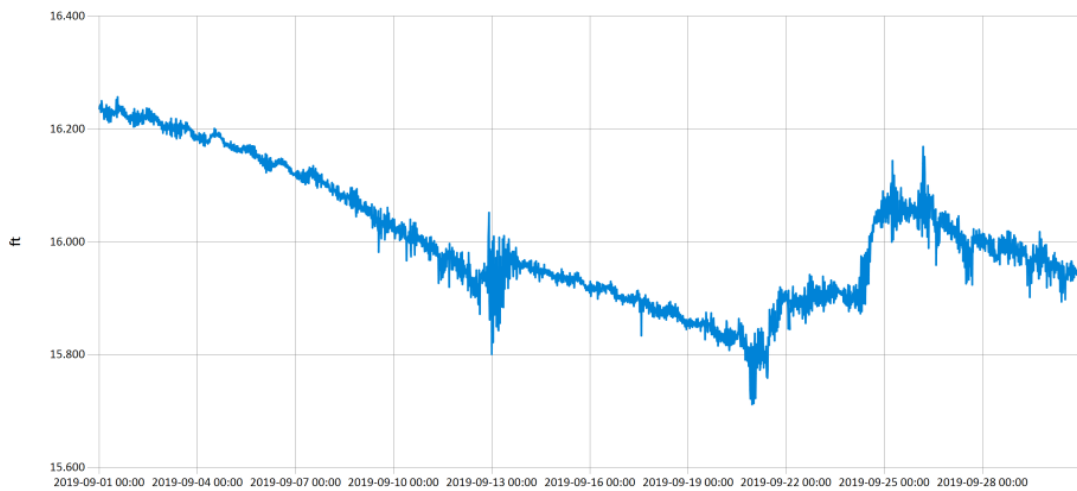


— Stage@LRC-1

Figure 6 Monthly Hydrograph LRC-1

Period Selected: 2019-09-01 00:00 - 2019-09-30 23:59

UTC Offs et: -06:00



— Stage@LDB-1

Figure 7 Monthly Hydrograph LDB-1

Period Selected: 2019-09-01 00:00 - 2019-09-30 23:59

UTC Offs et: -06:00

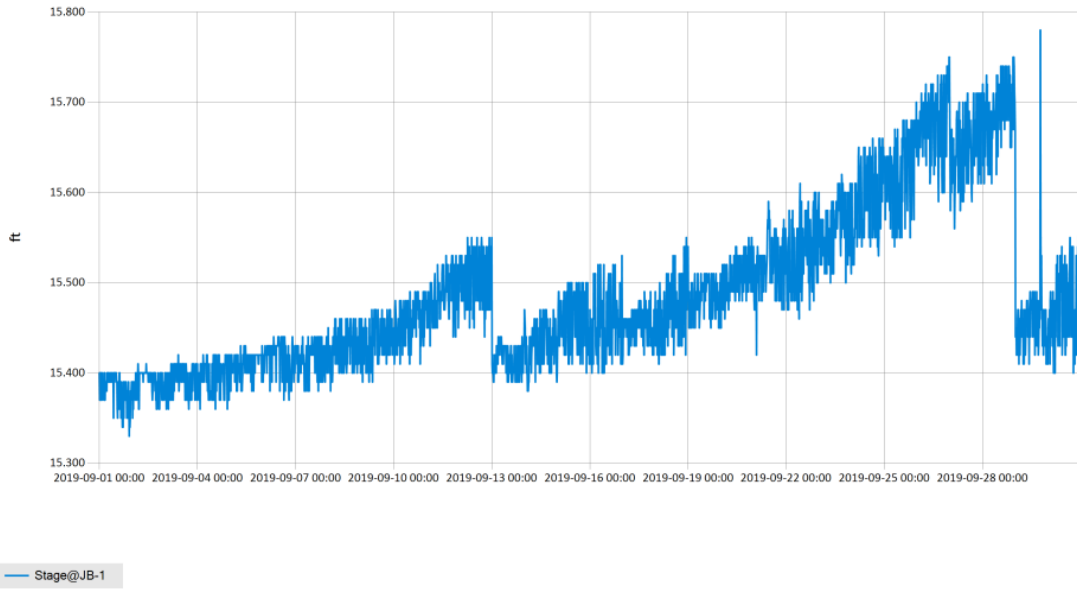


Figure 8 Monthly Hydrograph JB-1

Period Selected: 2019-09-01 00:00 - 2019-09-30 23:59

UTC Offs et: -06:00

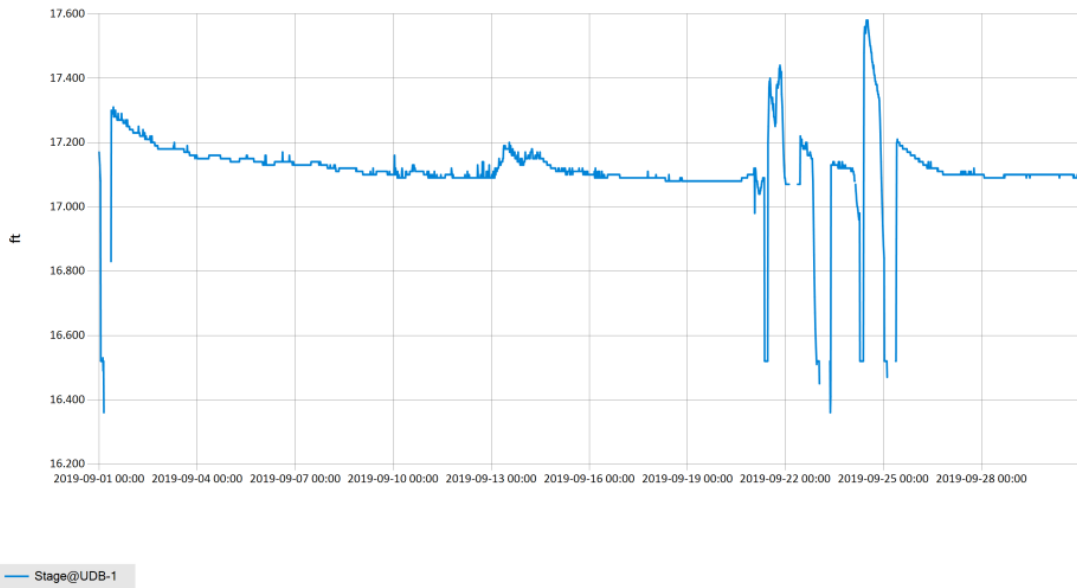


Figure 9 Monthly Hydrograph UDB-1

Period Selected: 2019-09-01 00:00 - 2019-09-30 23:59

UTC Offset: -06:00

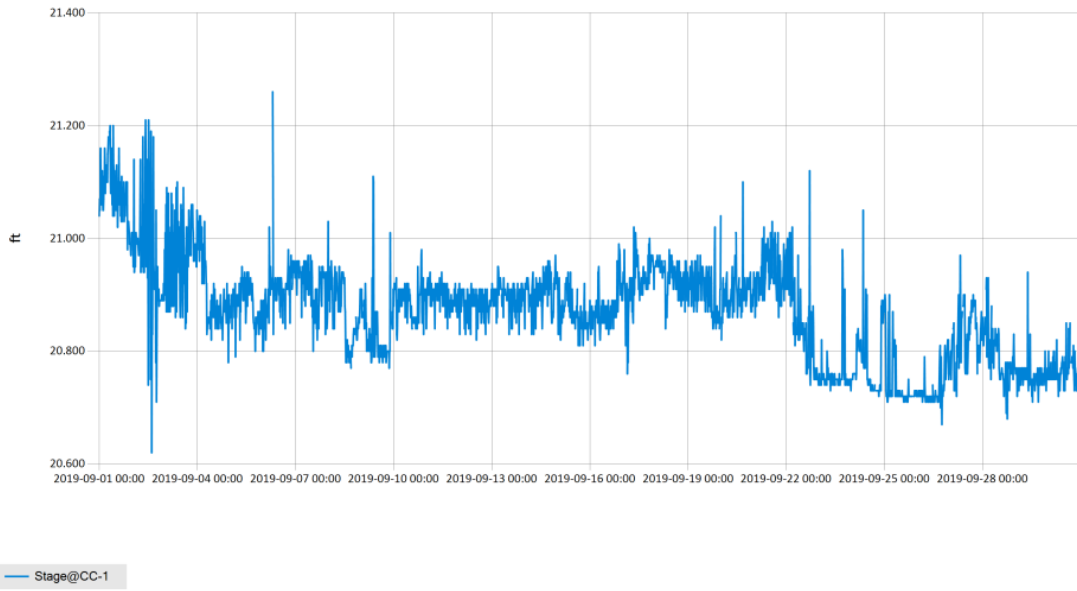


Figure 10 Monthly Hydrograph CC-1

MESONET CLIMATOLOGICAL DATA SUMMARY					September 2019					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 (in)		PRESSURE (in)			WIND SPEED (mph)			SOLAR (MJ/m ²)	4" SOIL TEMPERATURES			
	MAX	MIN	AVG	DEWPT	HDD	CDD	MAX	MIN	AVG		STN	MSL	DIR	AVG	MAX	SOD	BARE		MAX	MIN		
1	89	68	78.1	69.1	0	14	95	51	76	0.00	28.83	30.08	SE	4.3	11.8	23.56	78.9	78.9	85	73		
2	91	70	81.2	69.5	0	16	95	48	69	0.00	28.82	30.07	SSE	4.6	14.5	23.24	80.4	79.9	86	75		
3	92	70	81.1	68.5	0	16	94	42	68	0.00	28.77	30.01	S	5.4	17.5	24.03	80.7	79.4	85	74		
4	92	68	80.7	67.6	0	15	98	37	68	0.00	28.85	30.10	SE	3.6	15.3	23.84	80.9	79.8	86	74		
5	92	69	81.3	65.6	0	16	91	36	62	0.00	28.84	30.09	SSE	5.0	16.2	23.42	80.7	80.9	89	74		
6	95	69	82.4	65.3	0	17	84	34	59	0.00	28.80	30.05	S	5.1	16.2	23.50	80.5	82.8	91	75		
7	94	70	82.9	66.1	0	17	86	35	60	0.00	28.73	29.98	S	5.2	19.2	23.04	80.7	84.3	92	77		
8	93	70	82.1	63.9	0	17	73	31	55	0.00	28.68	29.93	SSE	8.6	22.5	21.28	79.9	84.0	90	78		
9	91	73	81.6	65.7	0	17	74	43	60	0.00	28.72	29.96	SSE	9.5	27.6	22.91	79.6	84.1	91	78		
10	90	73	81.0	68.1	0	16	83	48	66	0.00	28.78	30.03	SSE	10.0	23.8	22.14	79.8	84.7	91	79		
11	89	72	80.7	67.2	0	15	86	44	65	0.00	28.80	30.05	S	10.3	24.1	21.21	79.5	84.3	90	79		
12	91	69	79.9	68.0	0	15	95	48	69	0.10	28.80	30.05	S	10.2	27.0	20.72	79.5	84.4	90	79		
13	83	67	73.4	68.2	0	10	97	61	85	0.60	28.93	30.19	E	4.7	16.4	15.93	79.0	80.1	84	77		
14	90	68	79.0	67.5	0	14	98	45	71	0.00	28.89	30.15	SSE	5.8	18.1	20.95	79.2	78.7	83	74		
15	92	72	81.4	66.2	0	17	78	39	61	0.00	28.84	30.09	SSE	5.3	15.1	21.38	79.6	80.3	88	74		
16	91	72	81.3	67.2	0	17	82	45	63	0.00	28.80	30.05	SSE	5.4	17.0	21.44	79.9	82.7	91	76		
17	91	69	80.9	66.4	0	15	88	44	63	0.00	28.74	29.99	SSE	6.0	20.8	21.16	79.9	83.6	90	77		
18	91	69	80.1	68.5	0	15	93	49	69	0.00	28.71	29.96	SSE	5.2	18.2	21.48	80.0	84.3	92	77		
19	89	70	78.9	68.0	0	14	95	46	71	0.00	28.70	29.95	SE	7.1	21.5	21.07	80.1	84.4	91	78		
20	81	69	73.3	69.9	0	10	98	72	89	0.26	28.71	29.96	SSE	8.0	26.8	10.93	79.4	81.5	85	78		
21	86	69	76.8	70.4	0	13	97	57	82	0.70	28.74	29.98	S	10.0	23.6	12.32	77.9	77.5	81	75		
22	85	73	77.1	71.5	0	14	95	65	83	0.10	28.71	29.95	S	8.7	22.7	8.99	77.9	76.8	79	75		
23	87	70	77.1	72.4	0	14	99	65	86	0.15	28.77	30.02	SE	5.1	14.6	12.24	78.6	77.9	82	74		
24	86	73	77.8	71.6	0	14	99	58	83	1.09	28.65	29.89	S	6.6	21.3	14.51	78.9	78.8	83	76		
25	92	71	81.0	71.2	0	16	95	51	74	0.00	28.58	29.82	S	8.6	22.2	20.25	79.3	78.4	83	74		
26	87	68	78.0	67.6	0	13	90	55	71	0.00	28.63	29.87	SSE	11.2	27.6	18.37	79.3	77.2	80	74		
27	91	74	81.3	67.4	0	17	79	49	64	0.00	28.51	29.75	S	11.8	33.5	20.12	78.7	77.0	82	73		
28	88	74	79.6	70.8	0	16	90	58	75	0.00	28.62	29.87	S	9.4	21.9	15.02	78.9	78.6	84	75		
29	87	74	79.5	71.2	0	15	87	62	76	0.01	28.72	29.96	SSE	10.8	26.4	12.05	78.8	78.9	83	76		
30	87	74	79.5	69.9	0	15	84	58	73	0.00	28.73	29.97	S	11.0	25.3	14.49	78.5	79.7	85	75		
	89	71	79.6	68.3	<- Monthly Averages ->					28.75	29.99	SSE	7.4	33.5	19.19	79.5	80.8	86	76			
Temperature - Highest: 95					Degree Days - Total HDD: 0					Number of Days With:												
Lowest: 67					Total CDD: 448					Tmax ≥ 90: 17					Rainfall ≥ 0.01 inch: 8							
										Tmax ≤ 32: 0					Rainfall ≥ 0.10 inch: 7							
Rainfall: Monthly Total: 3.01 in.					Humidity - Highest: 99					Tmin ≤ 32: 0					Avg Wind Speed ≥ 10 mph: 8							
Greatest 24 Hr: 1.09 in.					Lowest: 31					Tmin ≤ 0: 0					Max Wind Speed ≥ 30 mph: 1							

Figure 11 September Mesonet Data