
***Lake Thunderbird TMDL Monitoring Plan Implementation:
Sample Year (SY) 2021- October Report***



SY2021 Monthly Report

Lake Thunderbird TMDL Monitoring Plan Implementation:

October 2021 Monitoring Report

Oklahoma Water Resources Board
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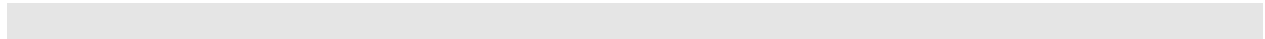


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SUMMARY OF OCTOBER WATER QUALITY SAMPLING

Sampling for October 2021 occurred on the eleventh and was a combination of base flow and high flow collections. Water samples were collected at eight locations and discharge measurements were collected at three locations. The water samples from TE-1 were collected via autosampler on the tenth. Samples were not collected at LT-1 because of dry conditions, or JB-1 due to construction activity. Mesonet data shows no precipitation on the eleventh, 1.57 inches of precipitation in the 72 hours prior to sampling, and 1.65 inches of precipitation in the 72 hours after the sampling event. A second water sample was collected from TG-1 via autosampler on the thirteenth. The total rainfall amount in Norman for the month of October was 4.48 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

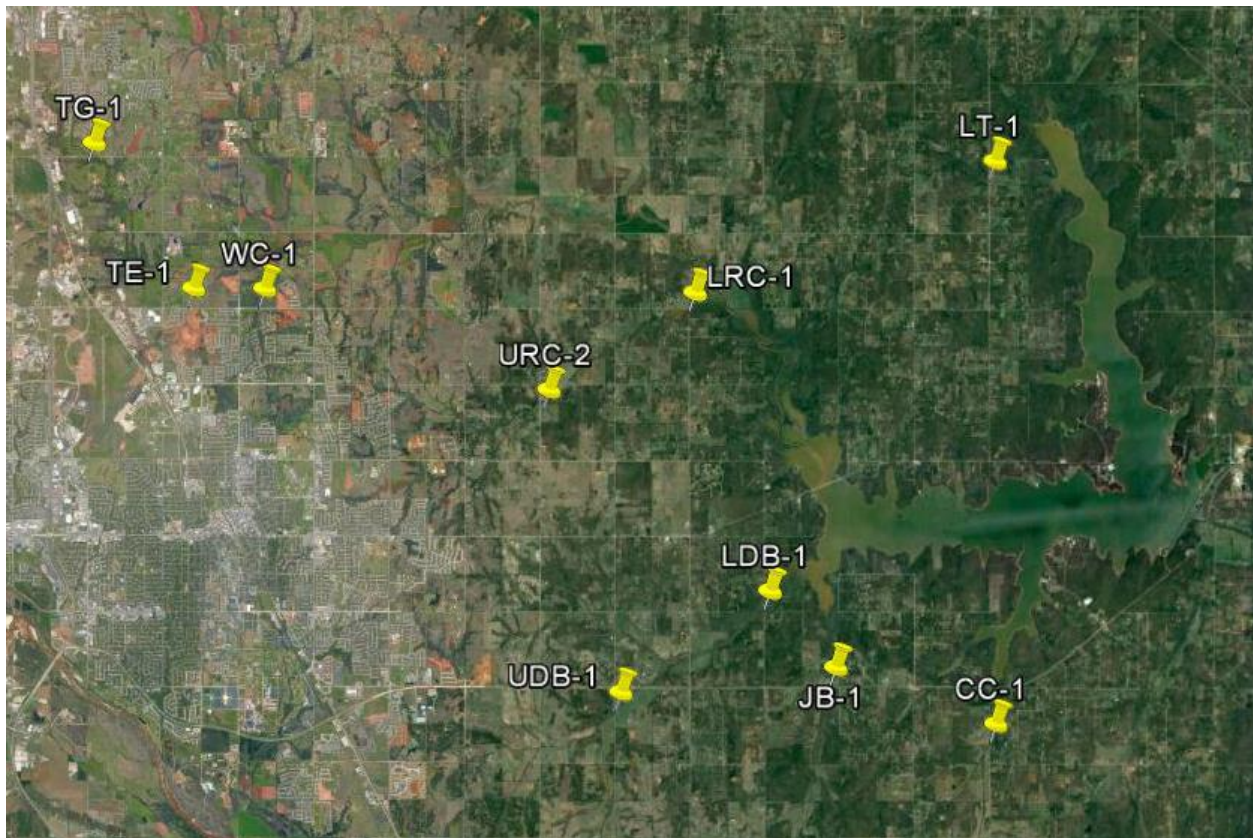


Figure 1 Monitoring Station Map

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	10/11/2021	9:25	SD	17.84	6.34	7.61	529	73	Used rp4, rp3 also over water, normal looking flow but turbid water (rain last night), orifice clear
JB-1	Jim Blue Creek	10/11/2021	10:00	SD	N/A	N/A	N/A	N/A	N/A	Construction activity at site, did not sample
LDB-1	Lower Dave Blue Creek	10/11/2021	10:15	SD	20.43	3.55	7.93	869	24	Negative visual flow, low water level, rain previous night but site looks normal, some med/large debris present
LRC-1	Lower Rock Creek	10/11/2021	11:20	SD	18.37	6.77	7.76	647	88	Water level slightly elevated, muddy and moderate debris from overnight rain, changed dcp
LT-1	Lake Laterals	10/11/2021	10:45	SD	N/A	N/A	N/A	N/A	N/A	Upstream/downstream dry with one medium size puddle (probably rainwater from previous night), did not sample
TE-1	Little River Tributary	10/10/2021	19:30	SD	*	*	7.97	566	1000	T1 collected, collected at peak; cleared out middle section of upstream beaver dam
TG-1	Little River Tributary	10/11/2021	14:40	SD	19.90	8.74	7.97	291	141	Rain overnight, above normal conditions
UDB-1	Upper Dave Blue Creek	10/11/2021	8:35	SD	18.62	5.57	7.83	936	11	Very low water level/flow, orifice just barely in water, changed offset
URC-2	Upper Rock Creek	10/11/2021	12:25	SD	20.32	4.75	7.47	156	347	Turbidity high from overnight rain event
WC-1	Woodcrest Creek	10/11/2021	13:05	SD	17.77	7.68	7.81	256	93	Normal visual flow but more turbid than usual due to overnight rain, autosampler should have collected but had power failure, orifice clear, changed dcp

Table 1 Field Data Form Where the Asterisk 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)
CC-1	Clear Creek	0.14	0.67	0.115	38.0
JB-1	Jim Blue Creek	N/A	N/A	N/A	N/A
LDB-1	Lower Dave Blue Creek	<0.05	0.66	0.094	18.0
LRC-1	Lower Rock Creek	0.08	0.68	0.148	68.0
LT-1	Lake Laterals	N/A	N/A	N/A	N/A
TE-1	Little River Tributary	0.25	3.19	1.37	980
TG-1	Little River Tributary	0.19	1.02	0.236	74.0
UDB-1	Upper Dave Blue Creek	<0.05	0.48	0.064	8.0
URC-2	Upper Rock Creek	0.42	1.18	0.282	116
WC-1	Woodcrest Creek	0.46	1.23	0.313	46.0

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	0.14	0.56	0.114	38.0
Duplicate RPD	0%	17.89%*	0.87%	0%

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	0.40	20.23
JB-1	Jim Blue Creek	N/A	N/A
LDB-1	Lower Dave Blue Creek	0.99	15.48
LRC-1	Lower Rock Creek	2.04	4.24
LT-1	Lake Laterals	N/A	N/A
TE-1	Little River Tributary	229.40	15.28
TG-1	Little River Tributary	3.57	9.28
UDB-1	Upper Dave Blue Creek	0.10	16.96
URC-2	Upper Rock Creek	0.31	10.81
WC-1	Woodcrest Creek	0.90	7.50

Table 4 Station Discharge Summary

All rated stream discharges are provisional and subject to change.

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
TG-1	Little River Tributary	10/13/2021	5:30	SD	*	*	6.87	174	833	T1 collected, peak at 17.89 @ 06:15

Table 5 Stormwater Field Data Form Where the Asterisk 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)
TG-1	Little River Tributary	0.32	2.45	0.999	2150

Table 6 Stormwater Laboratory Analysis Summary

Monitoring Location ID	Monitoring Location Name	Discharge (cfs)	Stream Stage (ft)
TG-1	Little River Tributary	335.70	16.39

Table 7 Stormwater Station Discharge Summary

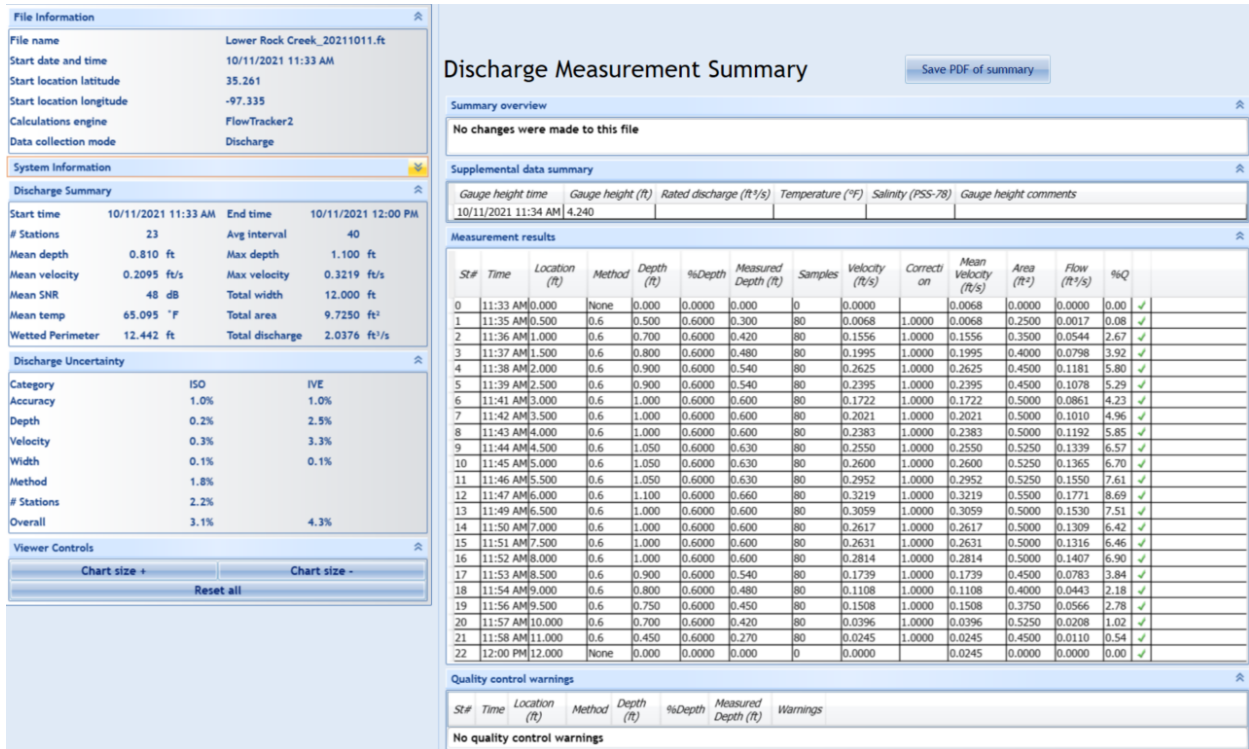


Figure 2 Discharge Measurement Summary LRC-1

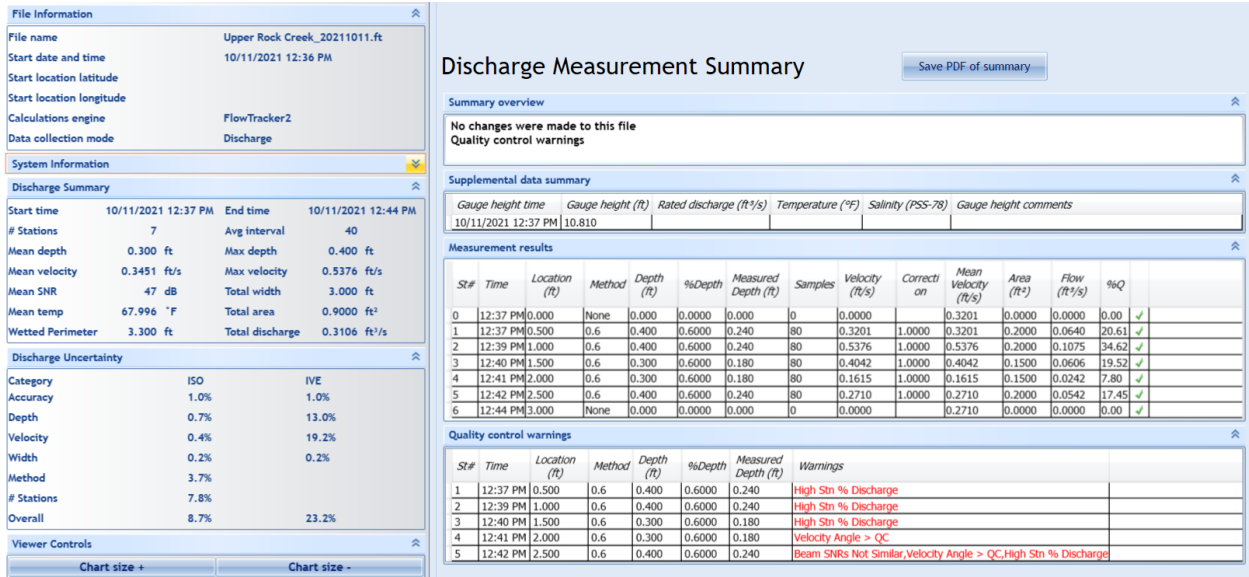


Figure 3 Discharge Measurement Summary URC-2

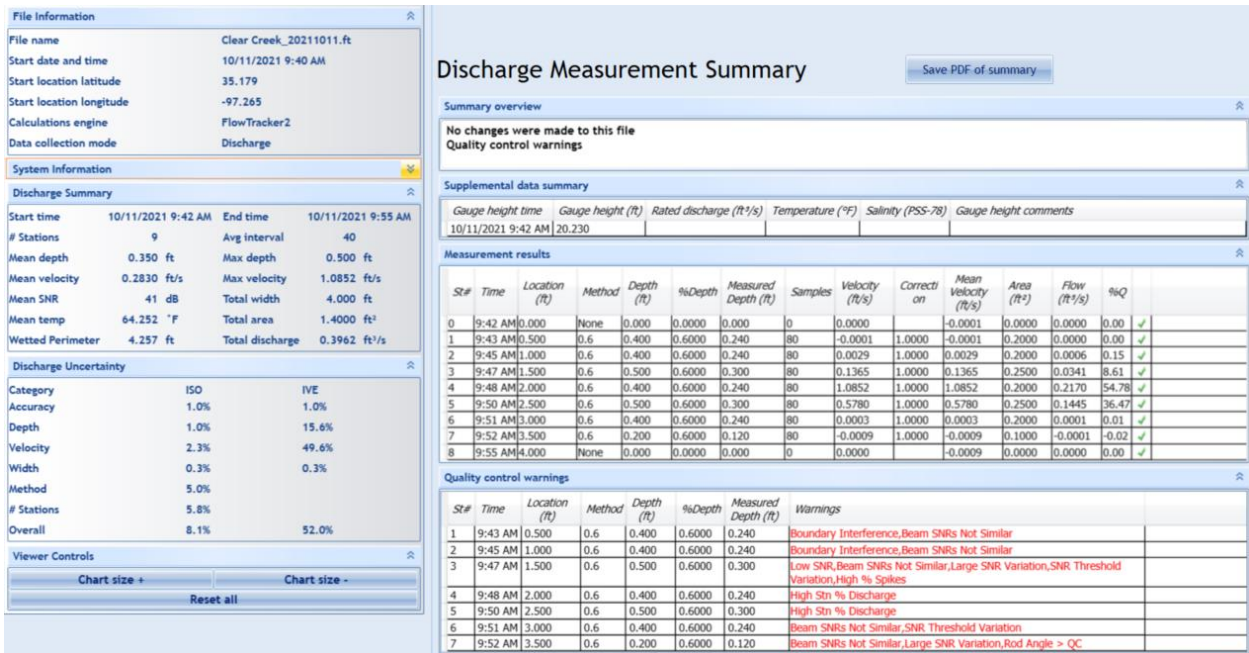
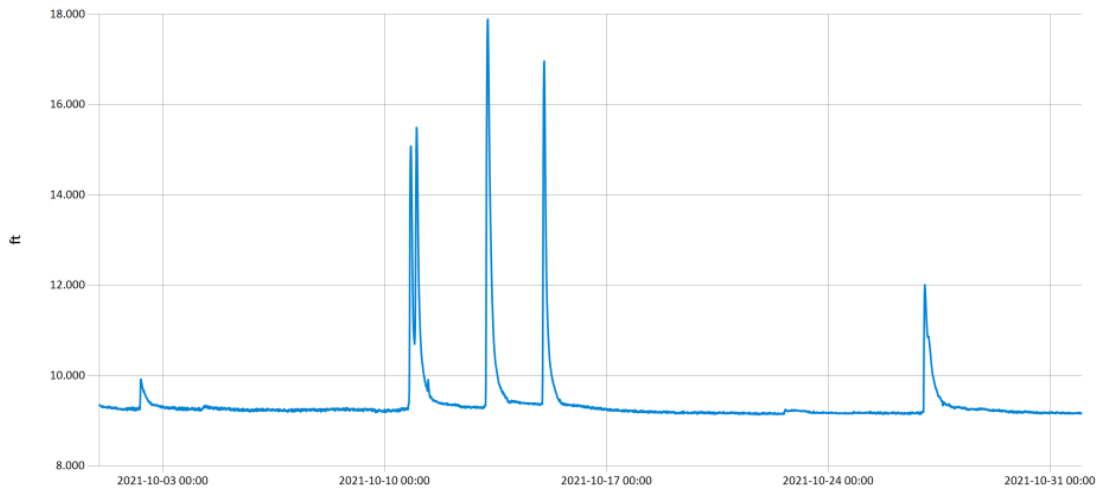


Figure 4 Discharge Measurement Summary CC-1

Period Selected: 2021-10-01 00:00 - 2021-10-31 23:59

UTC Offs et: -06:00

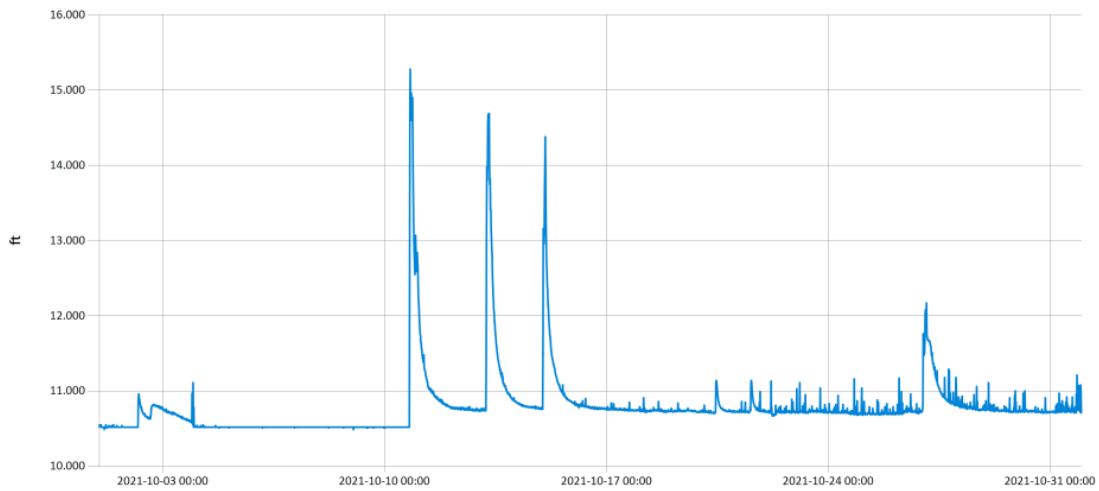


— Stage@TG

Figure 5 Monthly Hydrograph TG-1

Period Selected: 2021-10-01 00:00 - 2021-10-31 23:59

UTC Offs et: -06:00



— Stage@TE

Figure 6 Monthly Hydrograph TE-1

Period Selected: 2021-10-01 00:00 - 2021-10-31 23:59

UTC Offs et: -06:00

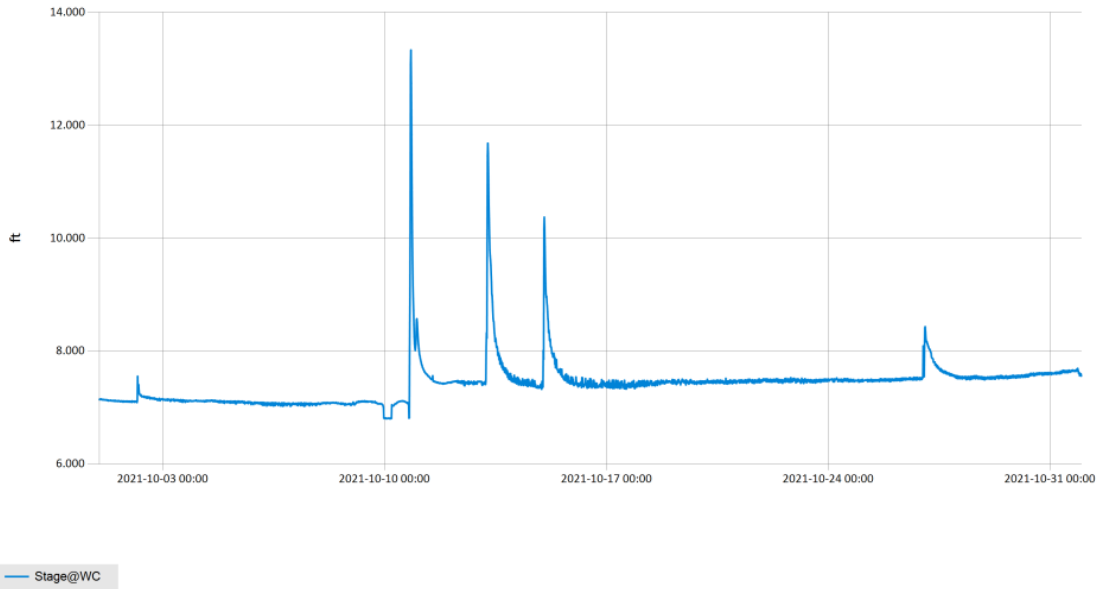


Figure 7 Monthly Hydrograph WC-1

Period Selected: 2021-10-01 00:00 - 2021-10-31 23:59

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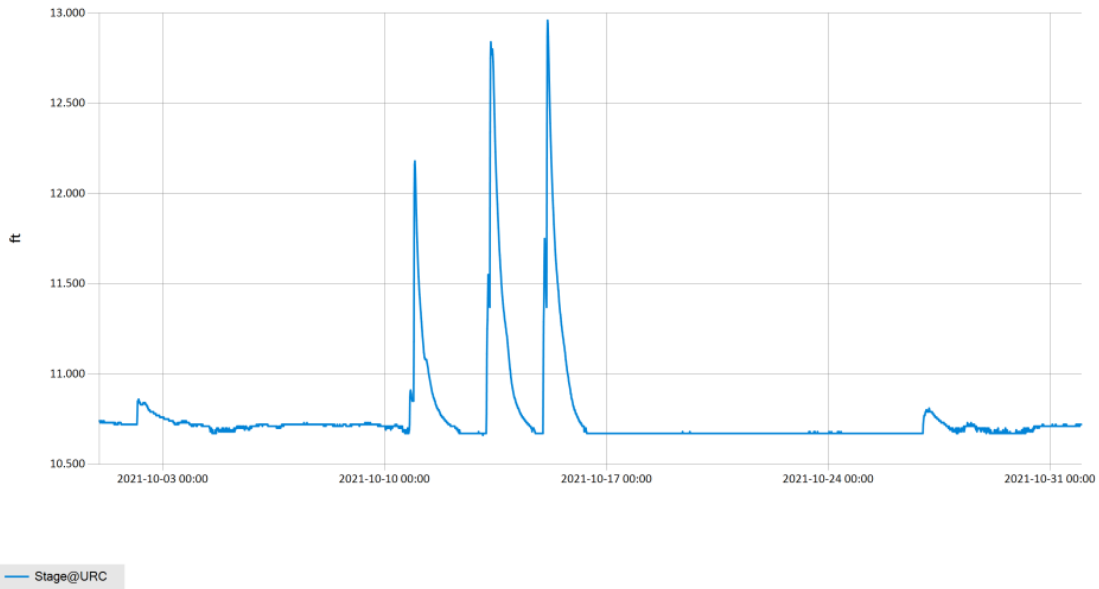
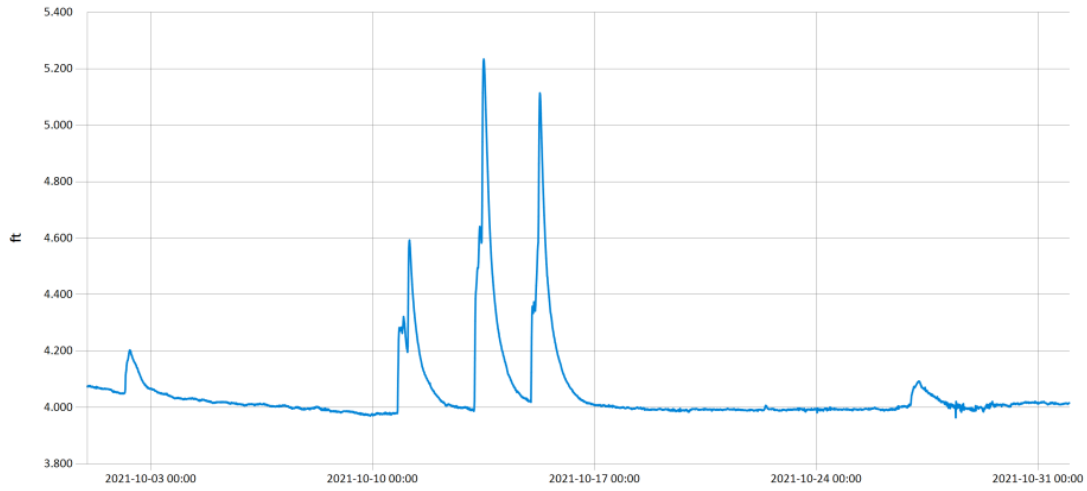


Figure 8 Monthly Hydrograph URC-2

Period Selected: 2021-10-01 00:00 - 2021-10-31 23:59

UTC Offs et: -06:00

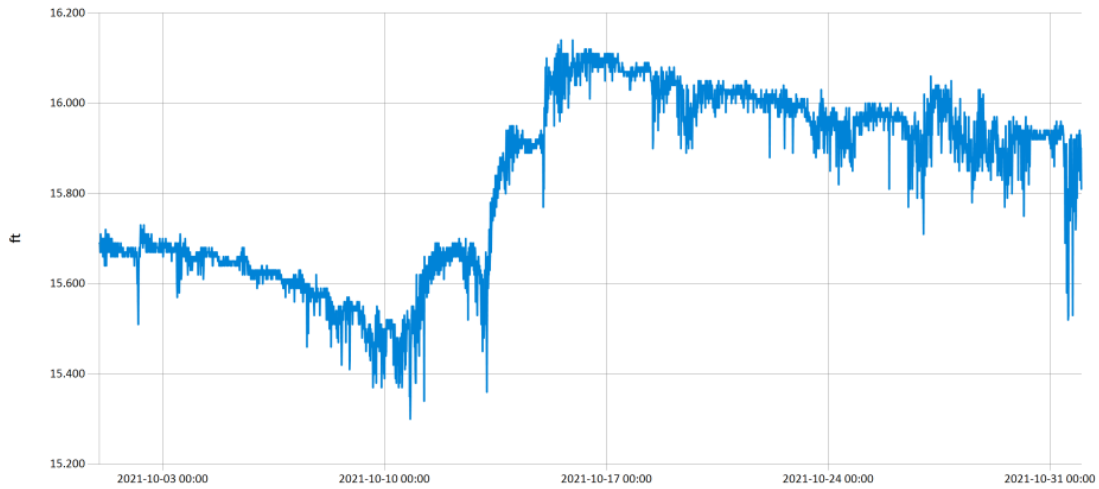


— Stage@LRC

Figure 9 Monthly Hydrograph LRC-1

Period Selected: 2021-10-01 00:00 - 2021-10-31 23:59

UTC Offs et: -06:00

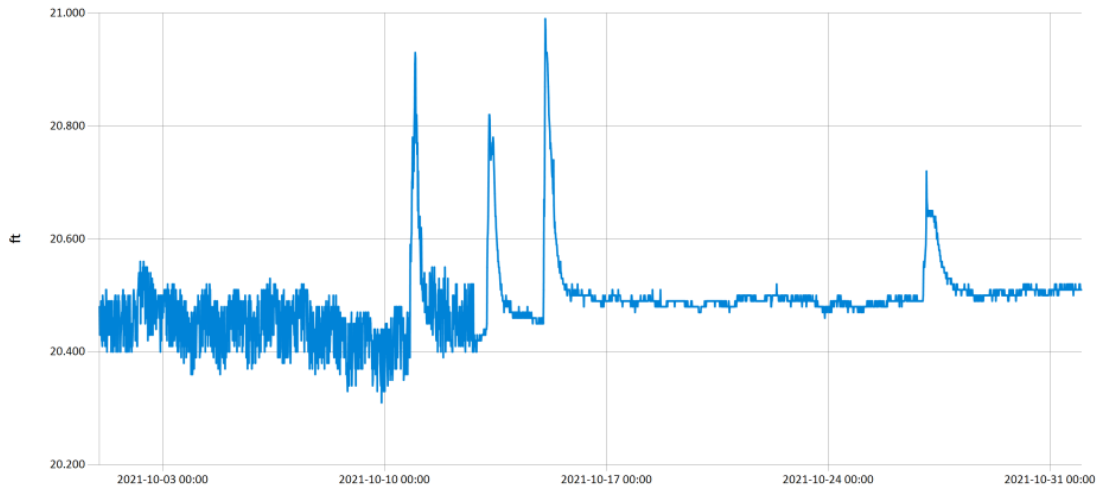


— Stage@LDB

Figure 10 Monthly Hydrograph LDB-1

Period Selected: 2021-10-01 00:00 - 2021-10-31 23:59

UTC Offs et: -06:00

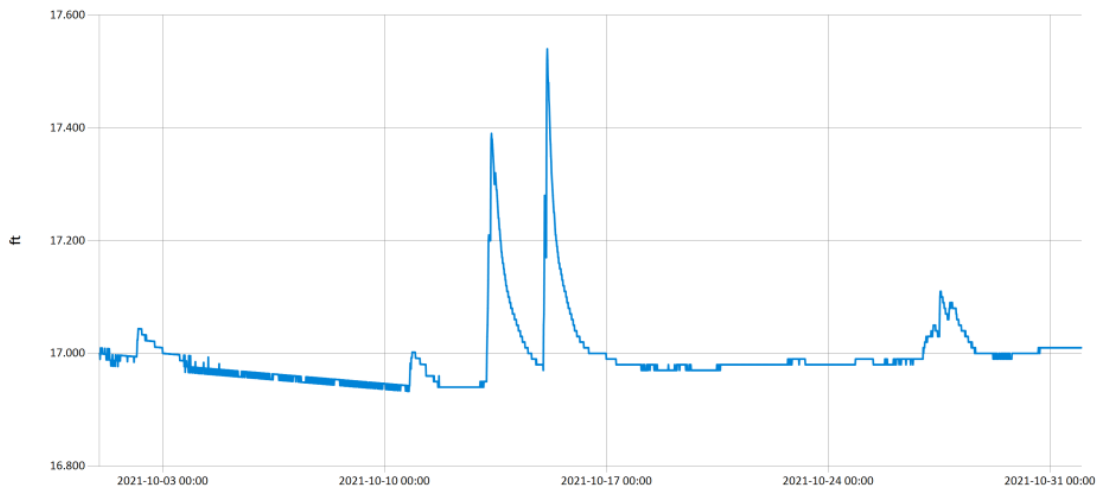


— Stage@CC

Figure 11 Monthly Hydrograph CC-1

Period Selected: 2021-10-01 00:00 - 2021-10-31 23:59

UTC Offs et: -06:00



— Stage@UDB

Figure 12 Monthly Hydrograph UDB-1

MESONET CLIMATOLOGICAL DATA SUMMARY		October 2021		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 ²)	SOD	BARE	MAX	MIN	
1	75	60	66.7	62.7	0	3	99	66	88	0.01	28.82	30.07	NNE	3.1	12.5	9.03	71.6	71.2	75	68	
2	79	62	68.9	61.8	0	5	98	50	80	0.22	28.79	30.04	WNW	4.0	14.2	16.94	71.5	71.9	77	68	
3	82	57	68.0	54.7	0	5	98	28	68	0.01	28.81	30.06	NNW	5.4	23.8	20.47	70.3	71.9	79	66	
4	86	54	69.1	49.2	0	5	90	20	56	0.00	28.82	30.07	E	3.8	15.1	20.27	68.4	72.0	81	64	
5	82	52	66.7	50.2	0	2	94	31	61	0.00	28.86	30.11	ENE	4.5	18.2	19.94	67.9	72.2	80	65	
6	82	53	66.9	53.3	0	3	93	33	65	0.00	28.82	30.07	NNW	3.8	16.4	18.84	67.6	72.5	81	65	
7	89	52	71.6	55.0	0	6	95	31	61	0.00	28.77	30.02	S	6.2	22.7	16.62	68.1	72.6	80	66	
8	94	67	79.3	58.0	0	16	73	27	51	0.00	28.68	29.93	S	11.0	27.0	18.14	70.7	75.4	82	70	
9	92	68	79.5	57.0	0	15	72	27	48	0.00	28.57	29.82	S	12.5	30.2	18.58	72.0	76.7	82	72	
10	85	57	72.3	62.0	0	6	98	49	72	1.57	28.41	29.64	S	13.5	56.7	13.76	71.4	75.5	80	71	
11	78	55	64.8	49.0	0	2	93	27	62	0.00	28.57	29.81	WNW	7.9	26.5	19.30	68.6	69.3	74	65	
12	78*	52*	67.0*	57.3*	0*	0*	90*	55*	72*	0.00*	28.59*	29.83*	SE *	12.0*	29.8*	10.19*	67.3*	66.8*	72*	61*	
13	76	59	67.2	59.9	0	2	97	53	78	1.25	28.53	29.77	S	8.8	34.8	11.60	68.9	69.5	72	66	
14	77	54	65.0	61.1	0	0	98	63	88	0.40	28.60	29.85	SSW	4.8	27.9	9.32	68.1	67.0	71	64	
15	68	48	60.1	46.3	7	0	97	33	64	0.41	28.84	30.09	N	12.5	33.8	17.89	66.7	65.0	68	60	
16	70	42	55.4	37.7	9	0	91	22	58	0.00	29.08	30.33	NW	4.2	22.0	18.89	63.1	59.9	66	54	
17	76	44	59.4	40.1	5	0	90	24	54	0.00	28.99	30.24	SSW	5.8	18.6	18.31	62.1	60.8	69	54	
18	73	47	60.3	41.8	5	0	78	31	53	0.00	28.82	30.07	S	8.0	23.4	17.68	62.2	61.8	69	55	
19	79	57	66.8	52.4	0	3	73	47	60	0.00	28.72	29.96	SSE	11.4	27.6	17.23	63.8	65.5	73	59	
20	73	49	63.2	52.5	4	0	88	43	70	0.00	28.83	30.08	S	7.6	21.6	9.91	64.5	65.8	70	63	
21	72	43	58.8	42.8	7	0	92	31	60	0.00	28.94	30.20	ENE	4.1	13.8	17.15	62.3	63.4	71	56	
22	78	51	63.6	50.5	1	0	88	44	64	0.01	28.79	30.04	SSE	5.8	19.6	10.61	62.6	64.0	69	60	
23	84	64	73.1	62.1	0	9	89	49	70	0.00	28.55	29.79	S	11.3	27.2	15.39	65.1	68.2	75	63	
24	82	53	69.6	59.4	0	3	93	44	72	0.00	28.54	29.78	S	10.9	30.9	12.55	66.8	70.2	75	66	
25	75	49	61.0	51.0	3	0	97	43	72	0.00	28.73	29.98	E	6.4	16.0	16.18	64.4	66.4	73	60	
26	78	55	68.7	60.5	0	2	96	64	75	0.34	28.51	29.75	SSE	13.3	44.8	9.93	65.3	67.5	72	63	
27	62	55	58.4	50.8	7	0	96	49	77	0.26	28.36	29.60	NW	15.0	45.6	4.79	64.6	63.9	70	58	
28	67	52	59.3	32.8	5	0	52	25	38	0.00	28.55	29.79	NW	25.3	53.7	16.15	60.4	57.6	61	54	
29	66	43	55.1	28.2	11	0	63	18	37	0.00	28.72	29.97	NNW	17.3	41.7	16.82	58.4	57.7	64	53	
30	73	36	53.1	35.4	11	0	88	25	56	0.00	28.68	29.92	S	3.1	12.9	16.30	57.1	57.0	65	49	
31	64	43	53.0	43.9	12	0	92	52	72	0.00	28.88	30.13	NE	7.9	21.2	15.48	57.5	58.0	65	53	
	77*	53*	64.9*	51.0*	<- Monthly Averages ->						28.72*	29.96*	S *	8.7*	56.7*	15.30*	65.8*	67.0*	73*	62*	
Temperature - Highest: 94*					Degree Days - Total HDD: 87*					Number of Days With:											
Lowest: 36*					Total CDD: 85*					Tmax ≥ 90: 2* Rainfall ≥ 0.01 inch: 10*											
Rainfall: Monthly Total: 4.48* in.					Humidity - Highest: 99*					Tmax ≤ 32: 0* Rainfall ≥ 0.10 inch: 7*											
Greatest 24 Hr: 1.57* in.					Lowest: 18*					Tmin ≤ 32: 0* Avg Wind Speed ≥ 10 mph: 12*											
										Tmin ≤ 0: 0* Max Wind Speed ≥ 30 mph: 9*											

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* Denotes incomplete record

Figure 13 October Mesonet Data