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

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**SY2019 Monthly Report**

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*Lake Thunderbird TMDL Monitoring Plan Implementation:*

*January 2020 Monitoring Report*

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Oklahoma Water Resources Board  
Water Quality Programs Division  
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**TABLE OF CONTENTS**

**Table of Contents**..... 3  
**List of Tables**..... 3  
**List of Figures** ..... 3  
**Summary of January Water Quality Sampling** ..... 4  
**Results**..... 4

**LIST OF TABLES**

TABLE 1 FIELD DATA FORM WHERE AN ASTERISK DENOTES A SAMPLE FROM AN AUTOSAMPLER ..... 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 JB-1 ..... 8  
FIGURE 5 DISCHARGE MEASUREMENT SUMMARY LT-1 ..... 9  
FIGURE 11 MONTHLY HYDROGRAPH TG-1 ..... 10  
FIGURE 12 MONTHLY HYDROGRAPH TE-1 ..... 10  
FIGURE 13 MONTHLY HYDROGRAPH WC-1..... 11  
FIGURE 14 MONTHLY HYDROGRAPH URC-2 ..... 11  
FIGURE 15 MONTHLY HYDROGRAPH LRC-1 ..... 12  
FIGURE 16 MONTHLY HYDROGRAPH LDB-1 ..... 12  
FIGURE 17 MONTHLY HYDROGRAPH JB-1 ..... 13  
FIGURE 18 MONTHLY HYDROGRAPH UDB-1 ..... 13  
FIGURE 19 MONTHLY HYDROGRAPH CC-1 ..... 14  
FIGURE 20 JANUARY MESONET DATA ..... 15

## SUMMARY OF JANUARY WATER QUALITY SAMPLING

Sampling for January 2020 occurred on two separate days. Four samples were collected on the seventeenth via autosampler, and the other six samples were collected on the twenty-first at base flow conditions. Discharge measurements were collected at three locations. Mesonet data shows 1.30 inches of precipitation on the seventeenth, 0.88 inches of precipitation in the 72 hours prior to sampling, and no precipitation in the 72 hours between sampling events. Mesonet shows 0.09 inches of precipitation on the twenty-first, and 0.37 inches of precipitation in the 72 hours after the sampling event. The total rainfall amount in Norman for the month of January was 3.63 inches. All water level gauges were operational for the month, with the exception of LT-1, CC-1, and UDB-1 due to equipment malfunction.

## RESULTS

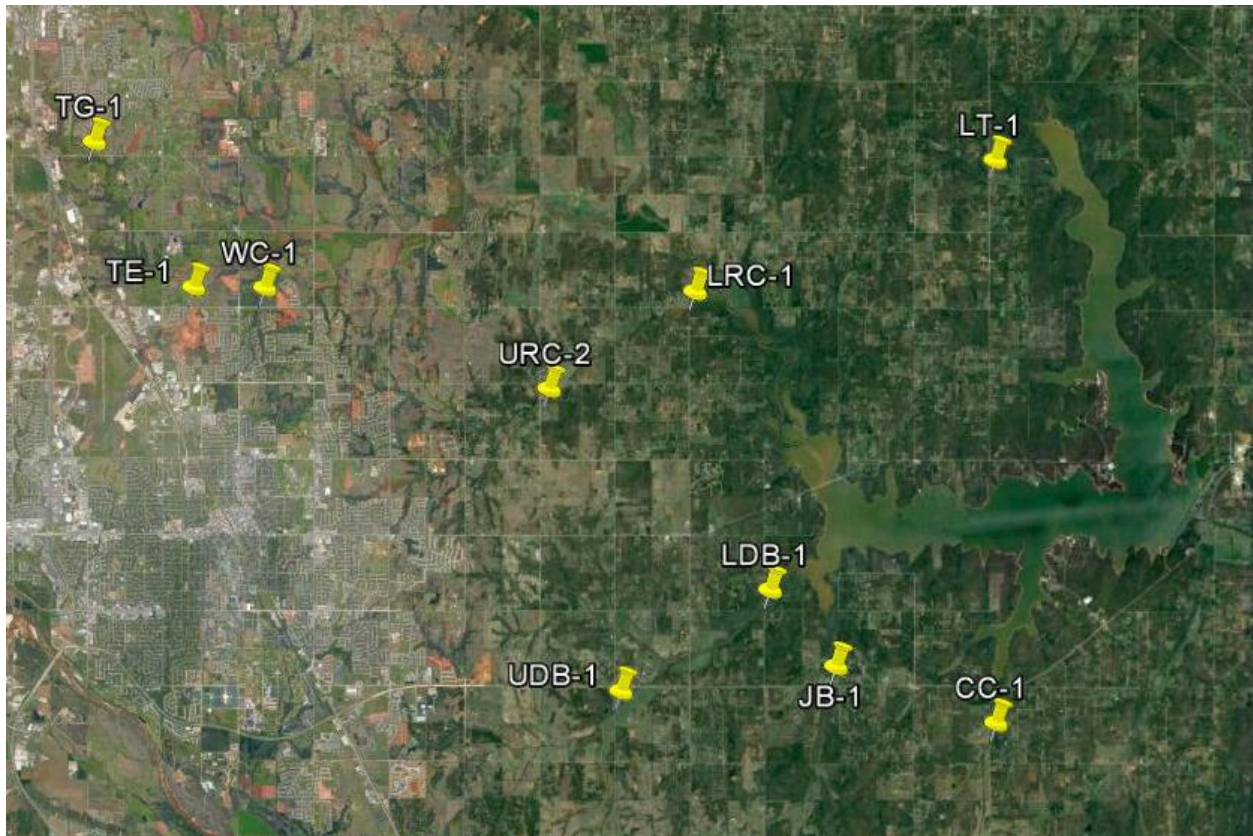


Figure 1 Monitoring Station Map

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	01-21-2020	10:45	SD	5.3	12.13	7.75	685	7	
JB-1	Jim Blue Creek	01-21-2020	12:00	SD	4.5	12.01	7.53	760	7	No RPs over water. Channel shifted far REW. LEW frozen pool. Same DCP as Dec.
LDB-1	Lower Dave Blue Creek	01-21-2020	12:50	SD	4.5	11.61	7.58	706	14	
LRC-1	Lower Rock Creek	01-17-2020	7:00	SD	*	*	7.71	219	1000	Autosampler collected T3 at 7:00 @ 22.09, peak at 8:15 @ 23.03
LT-1	Lake Laterals	01-21-2020	13:25	SD	5.1	9.96	7.35	377	15	Lots of limbs cut down on upstream
TE-1	Little River Tributary	01-17-2020	4:00	SD	*	*	7.55	328	361	Autosampler collected T1 at 4:00 @14.17, peak at 5:15 @ 14.95
TG-1	Little River Tributary	01-17-2020	5:00	SD	*	*	7.55	248	998	Autosampler collected T3 at 5:00 @ 16.92, peak at 6:15 @18.25
UDB-1	Upper Dave Blue Creek	01-21-2020	8:55	SD	3.7	11.76	7.30	826	8	DCP not working upon arrival. Same stage as July visit
URC-2	Upper Rock Creek	01-17-2020	5:30	SD	*	*	7.53	231	1000	Autosampler collected T3 at 5:30 @ 15.5, peak at 6:30 @ 16.08
WC-1	Woodcrest Creek	01-21-2020	15:40	SD	5.6	11.49	7.49	919	11	Autosampler tubing clogged, did not collect on 1/17; Triggered T3 at 5:00 @ 11.51, peak at 5:30 @11.72

Table 1 Field Data Form Where an 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	0.18	0.24	0.029	<5.0
JB-1	Jim Blue Creek	<0.05	0.30	0.028	10.0
LDB-1	Lower Dave Blue Creek	0.34	0.49	0.054	<5.0
LRC-1	Lower Rock Creek	0.38	3.12	0.935	967
LT-1	Lake Laterals	<0.05	0.40	0.029	6.0
TE-1	Little River Tributary	0.76	1.52	0.370	284
TG-1	Little River Tributary	0.46	3.02	0.915	1330
UDB-1	Upper Dave Blue Creek	0.17	1.88	0.036	12.0
URC-2	Upper Rock Creek	0.37	4.28	1.175	1790
WC-1	Woodcrest Creek	0.39	0.60	0.096	<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	0.19	0.27	0.028	<5.0
Duplicate RPD	5.41%	11.76%	3.51%	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	1.30	20.46
JB-1	Jim Blue Creek	1.45	15.94
LDB-1	Lower Dave Blue Creek	115.00	17.69
LRC-1	Lower Rock Creek	91.00	22.09
LT-1	Lake Laterals	0.50	4.44
TE-1	Little River Tributary	116.00	14.17
TG-1	Little River Tributary	924.00	16.92
UDB-1	Upper Dave Blue Creek	0.34	17.46
URC-2	Upper Rock Creek	86.00	15.50
WC-1	Woodcrest Creek	0.08	7.80

Table 4 Station Discharge Summary

# Discharge Measurement Summary

Date Generated: Wed Jan 22 2020

File Information		Site Details	
File Name	CC0121.WAD	Site Name	CC
Start Date and Time	2020/01/21 11:04:03	Operator(s)	SCD

System Information		Units (English Units)		Discharge Uncertainty		
Sensor Type	FlowTracker	Distance	ft	Category	ISO	Stats
Serial #	P4709	Velocity	ft/s	Accuracy	1.0%	1.0%
CPU Firmware Version	3.9	Area	ft^2	Depth	0.4%	1.8%
Software Ver	2.30	Discharge	cfs	Velocity	1.6%	6.9%
Mounting Correction	0.0%			Width	0.1%	0.1%
				Method	2.1%	-
				# Stations	3.3%	-
				<b>Overall</b>	<b>4.4%</b>	<b>7.2%</b>

Summary			
Averaging Int.	40	# Stations	15
Start Edge	LEW	Total Width	7.000
Mean SNR	48.0 dB	Total Area	2.099
Mean Temp	41.46 °F	Mean Depth	0.300
Disch. Equation	Mid-Section	Mean Velocity	0.6188
		<b>Total Discharge</b>	<b>1.2989</b>

Supplemental Data					
#	Time	Location	Gauge Height	Rated Flow	Comments
1	Tue Jan 21 11:06:17 CST 2020	1.500	20.460		

Measurement Results												
St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	11:04	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	<i>11:04</i>	<i>0.50</i>	<i>0.6</i>	<i>0.550</i>	<i>0.6</i>	<i>0.220</i>	<i>0.3963</i>	<i>1.00</i>	<i>0.3963</i>	<i>0.275</i>	<i>0.1090</i>	<i>8.4</i>
2	<i>11:05</i>	<i>1.00</i>	<i>0.6</i>	<i>0.350</i>	<i>0.6</i>	<i>0.140</i>	<i>0.7631</i>	<i>1.00</i>	<i>0.7631</i>	<i>0.175</i>	<i>0.1336</i>	<i>10.3</i>
3	11:06	1.50	0.6	0.300	0.6	0.120	0.8127	1.00	0.8127	0.150	0.1218	9.4
4	11:07	2.00	0.6	0.300	0.6	0.120	0.6995	1.00	0.6995	0.150	0.1049	8.1
5	<i>11:08</i>	<i>2.50</i>	<i>0.6</i>	<i>0.300</i>	<i>0.6</i>	<i>0.120</i>	<i>0.6647</i>	<i>1.00</i>	<i>0.6647</i>	<i>0.150</i>	<i>0.0997</i>	<i>7.7</i>
6	11:09	3.00	0.6	0.300	0.6	0.120	0.9252	1.00	0.9252	0.150	0.1387	10.7
7	<i>11:10</i>	<i>3.50</i>	<i>0.6</i>	<i>0.300</i>	<i>0.6</i>	<i>0.120</i>	<i>0.5925</i>	<i>1.00</i>	<i>0.5925</i>	<i>0.150</i>	<i>0.0888</i>	<i>6.8</i>
8	11:12	4.00	0.6	0.300	0.6	0.120	0.2556	1.00	0.2556	0.150	0.0383	3.0
9	11:13	4.50	0.6	0.300	0.6	0.120	0.7149	1.00	0.7149	0.150	0.1072	8.3
10	11:14	5.00	0.6	0.300	0.6	0.120	0.6860	1.00	0.6860	0.150	0.1029	7.9
11	11:14	5.50	0.6	0.300	0.6	0.120	0.5279	1.00	0.5279	0.150	0.0791	6.1
12	11:15	6.00	0.6	0.300	0.6	0.120	0.5643	1.00	0.5643	0.150	0.0846	6.5
13	11:16	6.50	0.6	0.300	0.6	0.120	0.6024	1.00	0.6024	0.150	0.0903	7.0
14	11:16	7.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0

Rows in italics indicate a QC warning. See the Quality Control page of this report for more information.

Figure 2 Discharge Measurement Summary CC-1

# Discharge Measurement Summary

Date Generated: Wed Jan 22 2020

## File Information

File Name JB0121.WAD  
 Start Date and Time 2020/01/21 12:14:38

## Site Details

Site Name JB  
 Operator(s) SCD

## System Information

Sensor Type FlowTracker  
 Serial # P4709  
 CPU Firmware Version 3.9  
 Software Ver 2.30  
 Mounting Correction 0.0%

## Units (English Units)

Distance ft  
 Velocity ft/s  
 Area ft<sup>2</sup>  
 Discharge cfs

## Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.6%	2.8%
Velocity	1.7%	9.5%
Width	0.2%	0.2%
Method	3.1%	-
# Stations	5.8%	-
<b>Overall</b>	<b>6.8%</b>	<b>9.9%</b>

## Summary

Averaging Int. 40 # Stations 9  
 Start Edge LEW Total Width 4.000  
 Mean SNR 45.3 dB Total Area 2.125  
 Mean Temp 39.96 °F Mean Depth 0.531  
 Disch. Equation Mid-Section Mean Velocity 0.6824  
**Total Discharge 1.4503**

## Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Tue Jan 21 12:14:09 CST 2020	1.000	15.940		

## Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	12:14	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	12:14	0.50	0.6	0.700	0.6	0.280	0.8638	1.00	0.8638	0.350	0.3024	20.9
2	12:15	1.00	0.6	0.600	0.6	0.240	1.1175	1.00	1.1175	0.300	0.3353	23.1
3	12:16	1.50	0.6	0.550	0.6	0.220	0.6486	1.00	0.6486	0.275	0.1783	12.3
4	12:17	2.00	0.6	0.600	0.6	0.240	0.6696	1.00	0.6696	0.300	0.2009	13.9
5	12:18	2.50	0.6	0.700	0.6	0.280	0.5942	1.00	0.5942	0.350	0.2080	14.3
6	12:19	3.00	0.6	0.600	0.6	0.240	0.5650	1.00	0.5650	0.300	0.1695	11.7
7	12:21	3.50	0.6	0.500	0.6	0.200	0.2234	1.00	0.2234	0.250	0.0559	3.9
8	12:21	4.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0

Rows in italics indicate a QC warning. See the Quality Control page of this report for more information.

Figure 3 Discharge Measurement Summary JB-1





Period Selected: 2020-01-01 00:00 - 2020-01-31 23:59

UTC Offs et: -06:00

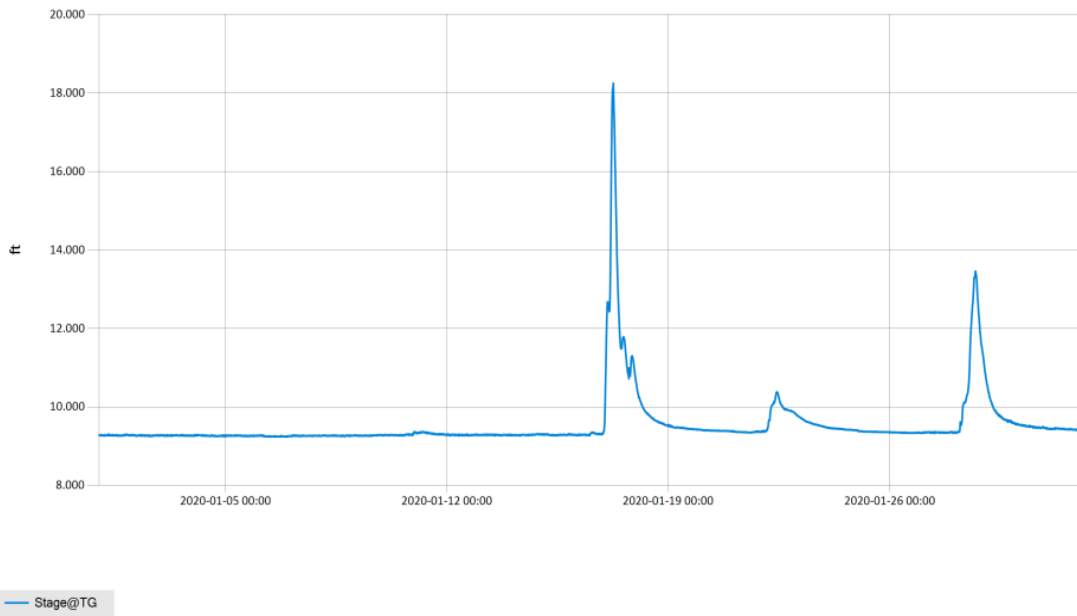


Figure 5 Monthly Hydrograph TG-1

Period Selected: 2020-01-01 00:00 - 2020-01-31 23:59

UTC Offs et: -06:00

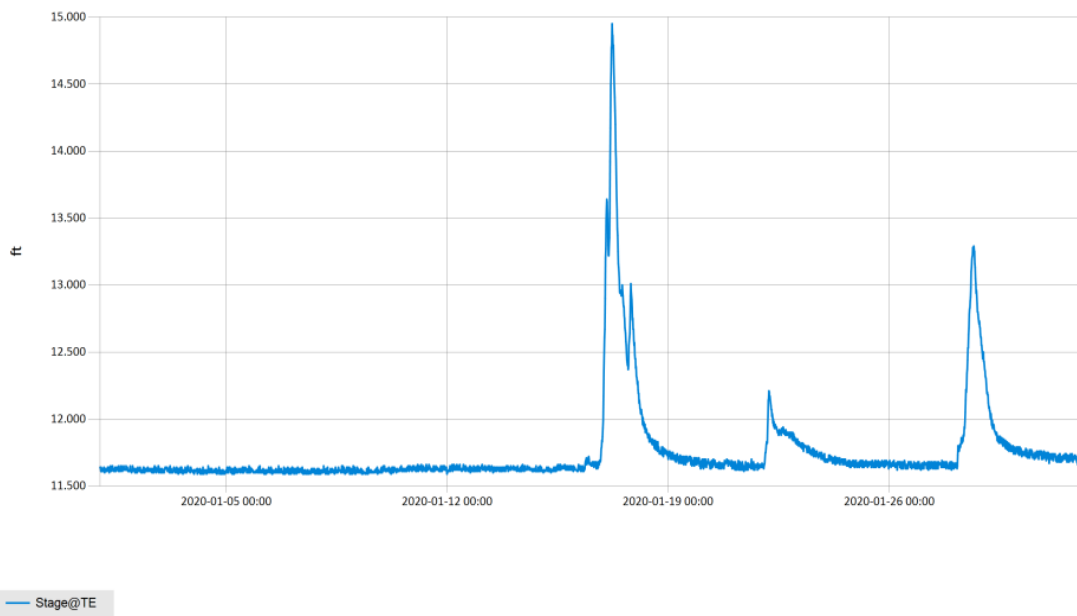
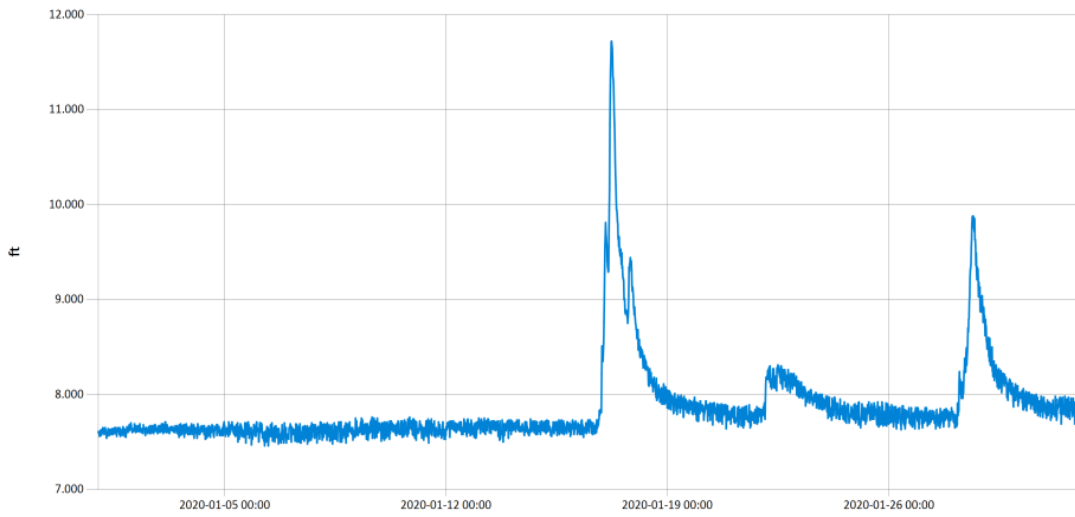


Figure 6 Monthly Hydrograph TE-1

Period Selected: 2020-01-01 00:00 - 2020-01-31 23:59

UTC Offs et: -06:00

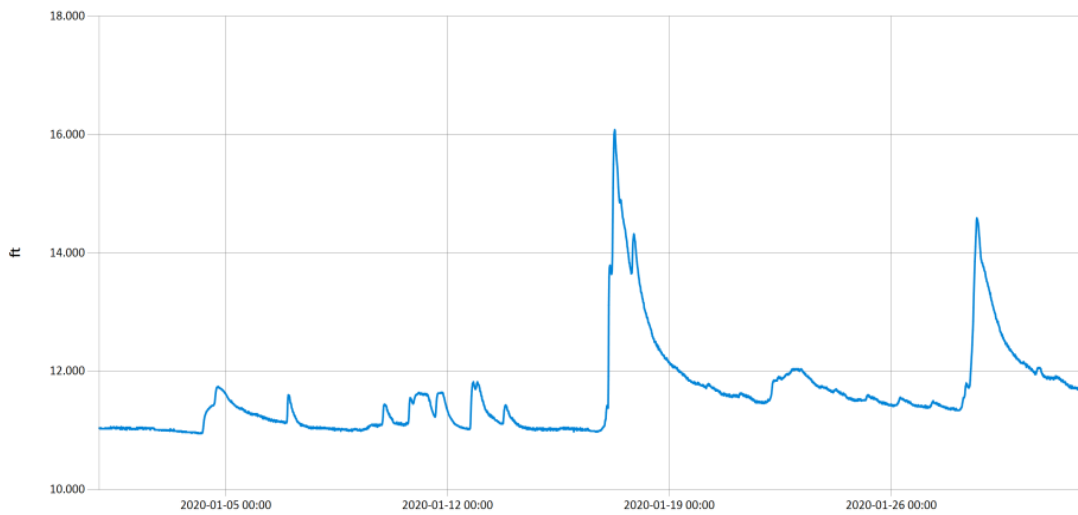


— Stage@WC

Figure 7 Monthly Hydrograph WC-1

Period Selected: 2020-01-01 00:00 - 2020-01-31 23:59

UTC Offs et: -06:00



— Stage@URC

Figure 8 Monthly Hydrograph URC-2

Period Selected: 2020-01-01 00:00 - 2020-01-31 23:59

UTC Offs et: -06:00

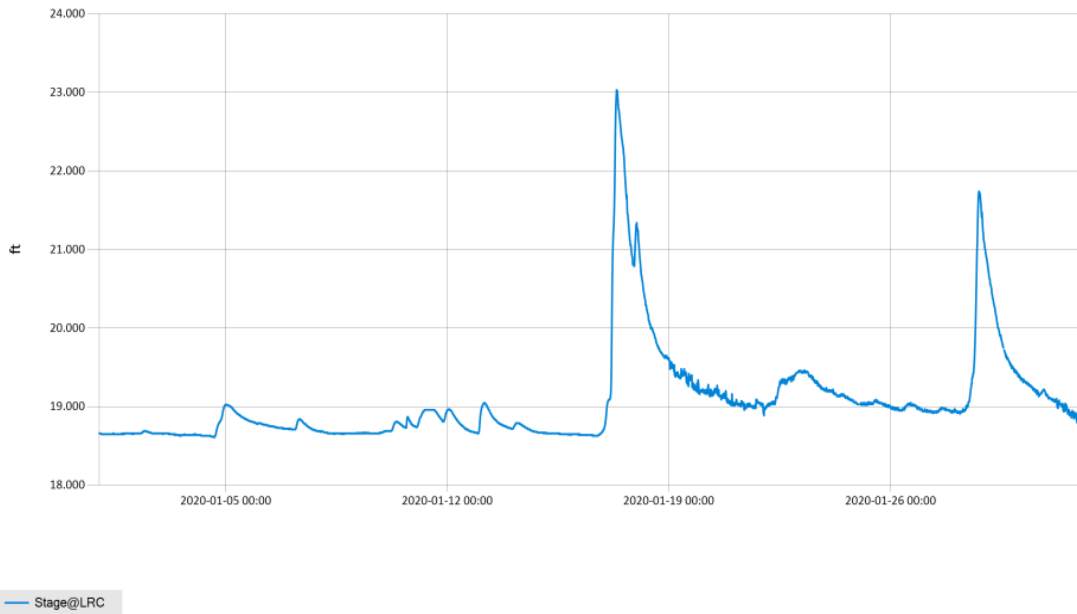


Figure 9 Monthly Hydrograph LRC-1

Period Selected: 2020-01-01 00:00 - 2020-01-31 23:59

UTC Offs et: -06:00

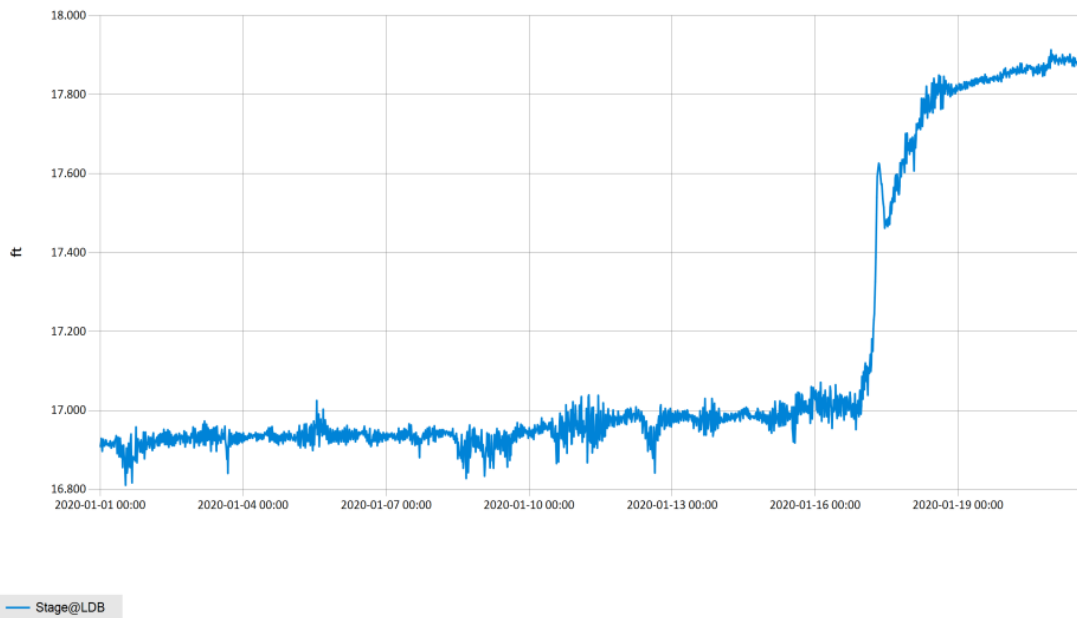


Figure 10 Monthly Hydrograph LDB-1

Period Selected: 2020-01-01 00:00 - 2020-01-31 23:59

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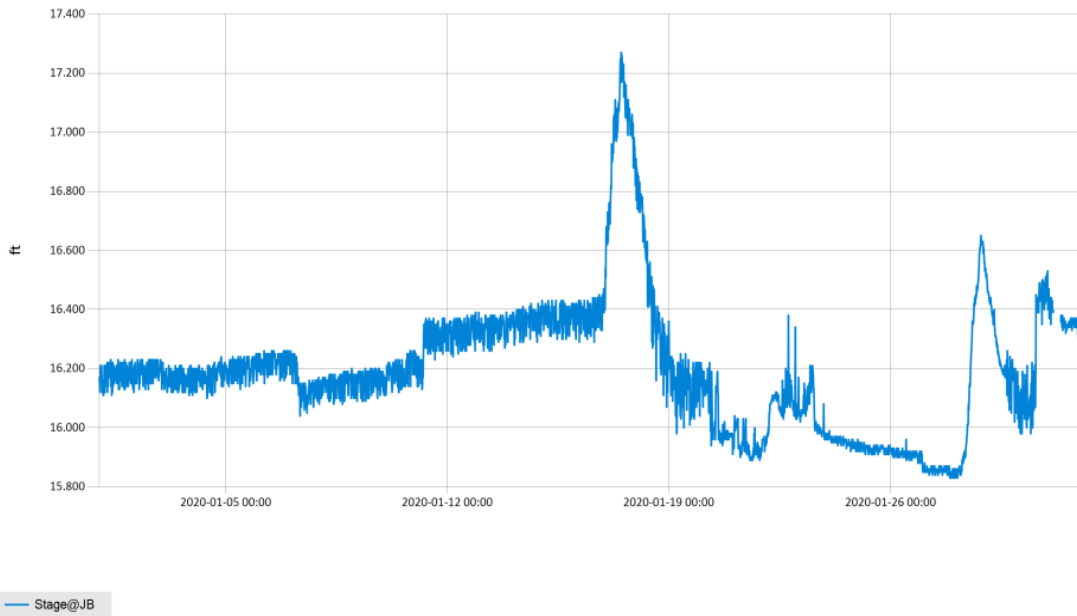


Figure 11 Monthly Hydrograph JB-1

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UTC Offs et: -06:00

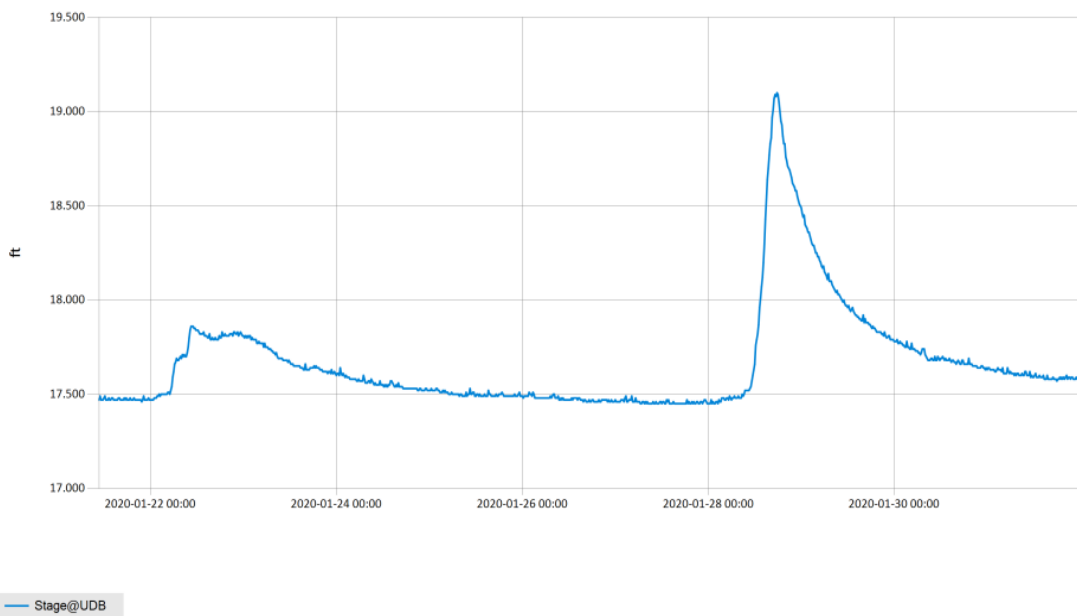


Figure 12 Monthly Hydrograph UDB-1

Period Selected: 2020-01-01 00:00 - 2020-01-31 23:59 UTC Offset: -06:00

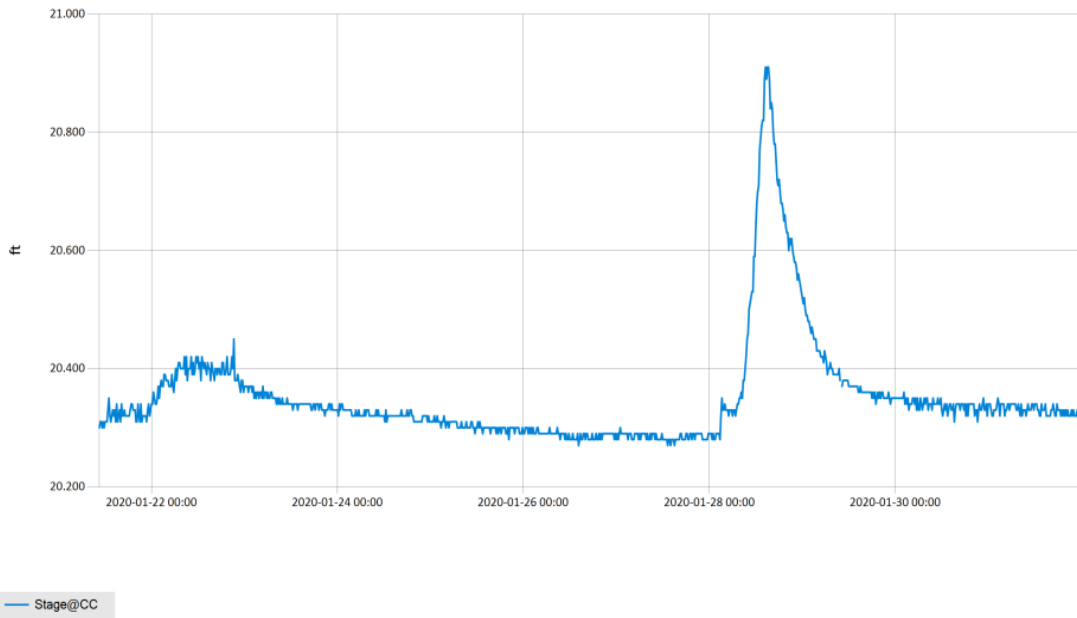


Figure 13 Monthly Hydrograph CC-1

MESONET CLIMATOLOGICAL DATA SUMMARY				January 2020				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 <sup>2</sup> )	4" SOIL TEMPERATURES				
	MAX	MIN	AVG	DEWPT	HDD	CDD	MAX	MIN	AVG		STN	MSL	DIR	AVG	MAX		SOD	BARE	MAX	MIN	
1	56	35	45.3	30.9	20	0	79	41	58	0.00	28.52	29.76	S	11.8	33.3	8.24	43.0	40.5	44	37	
2	58	44	49.8	42.4	14	0	93	50	77	0.00	28.34	29.57	SSE	6.7	21.3	7.57	46.0	45.5	50	43	
3	55	36	44.0	34.4	20	0	86	41	71	0.00	28.73	29.98	NNW	10.5	25.0	9.93	46.2	44.9	48	42	
4	53	27	40.7	24.8	25	0	89	28	57	0.00	29.01	30.26	SSE	5.2	19.2	12.34	44.0	42.2	47	38	
5	61	32	46.1	29.1	18	0	87	31	54	0.00	28.95	30.20	NNE	9.6	33.1	12.48	44.4	42.8	48	39	
6	59	27	41.2	25.4	22	0	83	31	56	0.00	28.93	30.18	NW	5.8	24.1	12.36	43.2	41.9	47	37	
7	62	25	44.5	20.7	21	0	81	16	44	0.00	29.04	30.30	S	6.1	21.1	12.82	42.4	41.5	47	37	
8	64	35	49.2	24.9	16	0	55	22	40	0.00	28.84	30.09	S	11.3	33.5	11.96	43.3	42.9	48	38	
9	70	53	60.0	52.6	4	0	97	54	77	0.00	28.63	29.88	S	11.8	30.7	6.12	47.8	49.7	54	45	
10	73	29	54.5	50.7	14	0	97	58	88	0.02	28.57	29.82	SSE	15.6	41.5	4.82	51.3	53.4	58	48	
11	38	23	28.2	20.5	35	0	91	51	74	0.00	28.83	30.08	NNW	12.3	34.9	9.08	44.6	43.0	48	40	
12	57	29	40.5	32.0	22	0	94	42	74	0.00	28.81	30.06	SSE	11.1	30.0	12.34	42.9	41.5	47	37	
13	54	36	45.0	44.0	20	0	99	88	96	0.02	28.82	30.07	SSE	9.4	21.8	2.78	44.6	43.8	47	41	
14	68	52	57.3	51.9	5	0	98	51	84	0.00	28.77	30.01	SSE	9.1	26.0	10.99	48.9	51.0	56	47	
15	61	42	53.8	48.2	14	0	99	58	82	0.00	28.84	30.09	NNE	11.7	26.4	8.32	51.1	53.1	55	51	
16	42	29	34.9	26.2	30	0	96	46	72	0.88	29.20	30.47	NNE	12.9	28.7	3.85	46.9	46.1	51	42	
17	50	36	42.6	41.8	22	0	98	95	97	1.30	28.87	30.13	S	9.9	30.7	1.78	44.9	44.0	46	42	
18	51	29	41.6	28.1	25	0	98	32	62	0.00	29.05	30.31	N	13.9	38.1	13.76	45.7	46.3	49	44	
19	51	24	36.3	23.2	27	0	92	29	63	0.00	29.26	30.52	WNW	4.0	14.5	9.95	42.0	43.3	46	41	
20	54	23	36.8	22.4	26	0	85	32	58	0.00	29.25	30.52	ENE	4.7	15.7	13.77	41.3	42.7	48	39	
21	44	25	34.1	24.7	31	0	93	54	69	0.09	29.12	30.38	SE	8.4	22.2	6.09	40.8	39.9	42	38	
22	38	34	37.2	36.3	29	0	99	93	97	0.37	28.73	29.97	SSE	11.6	29.0	1.38	41.1	40.1	41	39	
23	56	35	43.4	34.9	20	0	100	34	76	0.00	28.74	29.98	NW	9.6	27.7	11.68	42.8	43.6	48	41	
24	51	33	40.3	29.9	23	0	86	43	68	0.00	28.84	30.09	NW	10.5	28.8	14.23	42.5	44.1	48	41	
25	64	30	46.0	34.6	18	0	91	40	67	0.00	28.76	30.01	ESE	7.2	18.3	12.34	42.9	44.4	50	39	
26	62	36	46.6	36.9	16	0	95	39	72	0.00	28.75	30.00	NNW	4.8	16.4	14.01	45.0	46.9	53	42	
27	67	30	48.0	38.8	17	0	98	37	75	0.00	28.71	29.95	SE	5.8	18.9	13.94	44.7	45.5	52	39	
28	47	34	40.5	39.3	25	0	97	93	96	0.94	28.64	29.89	N	12.8	27.7	1.31	45.5	45.8	47	44	
29	40	33	35.7	32.0	29	0	95	78	86	0.00	28.86	30.11	N	11.4	26.7	5.07	42.6	43.4	45	42	
30	40	27	35.1	30.5	31	0	99	71	84	0.00	28.87	30.12	NNE	3.0	8.8	5.15	42.2	43.1	45	41	
31	52*	30*	38.9*	30.6*	24*	0*	97*	44*	74*	0.01*	28.87*	30.12*	NW *	5.9*	21.6*	NA	42.1*	44.0*	49*	40*	
55* 33* 43.2* 33.6*				←- Monthly Averages →-				28.84*		30.09*		SSE*		9.2* 41.5*		9.02*		44.4* 44.5* 48* 41*			
Temperature - Highest: 73*				Degree Days - Total HDD: 661*				Number of Days With:				Tmax ≥ 90: 0*				Rainfall ≥ 0.01 inch: 8*					
Lowest: 23*				Total CDD: 0*				Tmax ≤ 32: 0*				Rainfall ≥ 0.10 inch: 4*									
Rainfall: Monthly Total: 3.63* in.				Humidity - Highest: 100*				Tmin ≤ 32: 16*				Avg Wind Speed ≥ 10 mph: 14*									
Greatest 24 Hr: 1.30* in.				Lowest: 16*				Tmin ≤ 0: 0*				Max Wind Speed ≥ 30 mph: 9*									

Figure 14 January Mesonet Data