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***Lake Thunderbird TMDL Monitoring Plan Implementation:  
Sample Year (SY) 2020- February Report***

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**SY2020 Monthly Report**

*Lake Thunderbird TMDL Monitoring Plan Implementation:*

*February 2021 Monitoring Report*

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## SUMMARY OF FEBRUARY WATER QUALITY SAMPLING

Sampling for February 2021 occurred on the twenty-third and twenty-fourth and was considered a normal flow collection. Water samples were collected at all ten locations, and a discharge measurement was collected at one location. Mesonet data shows no precipitation on the twenty-third or twenty-fourth, 0.19 inches of precipitation in the 72 hours prior to sampling, and 0.12 inches of precipitation in the 72 hours after the sampling event. The total rainfall amount in Norman for the month of February was 0.80 inches. All water level gauges were operational for the month, except for LT-1 and URC-2 due to equipment malfunction.

## RESULTS

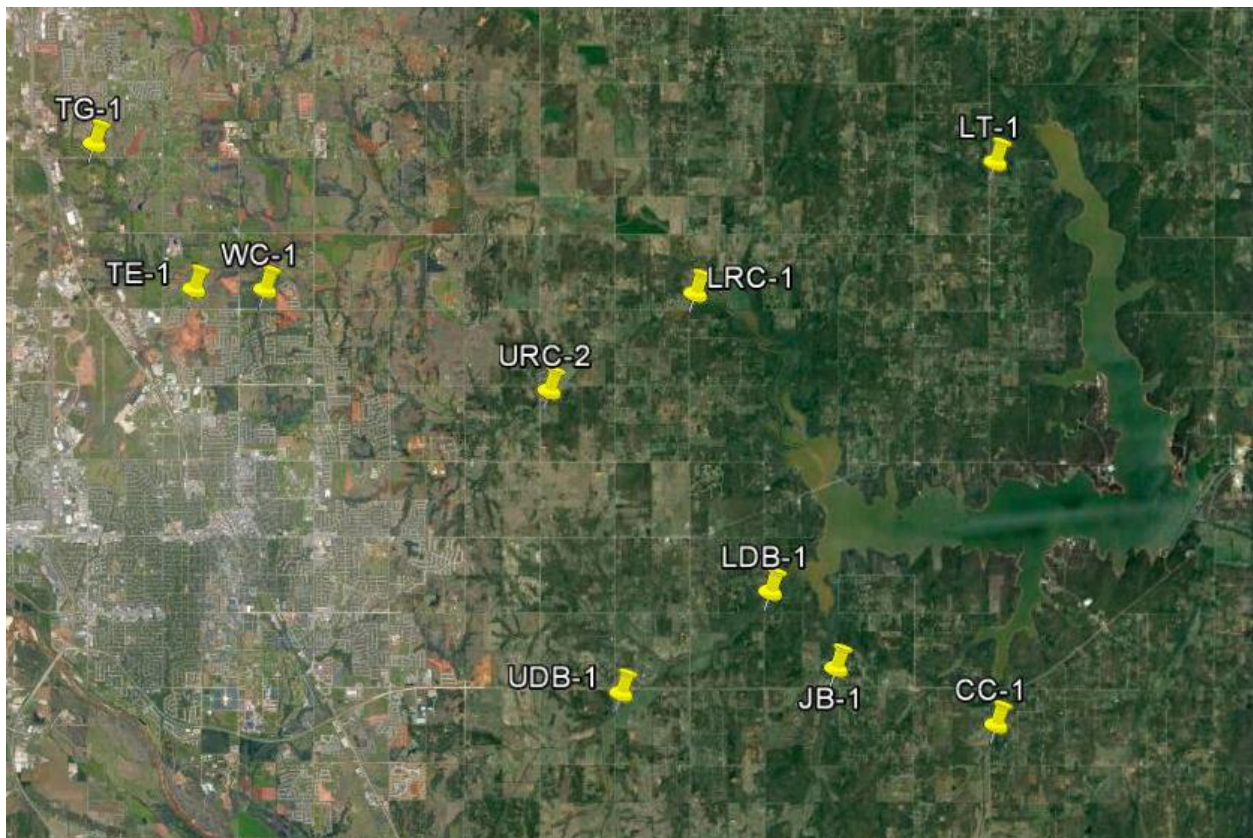


Figure 1 Monitoring Station Map

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	2/23/2021	11:35	SD	7.37	12.24	8.07	659	6	Same tapedown as December flow measurement/collection
JB-1	Jim Blue Creek	2/23/2021	12:50	SD	6.35	11.70	7.88	720	6	Neither RP over water, orifice in water, water visibly flowing, looks stable
LDB-1	Lower Dave Blue Creek	2/23/2021	13:45	SD	3.44	11.70	7.91	563	34	Box open, rain gauge hat on ground, lock missing. Up/downstream mostly frozen
LRC-1	Lower Rock Creek	2/23/2021	15:20	SD	7.29	12.20	8.11	573	18	Solar panel on gauge box stolen, battery 11.5V, verified tapedown
LT-1	Lake Laterals	2/23/2021	14:25	SD	6.23	10.73	7.78	370	4	Downstream partially frozen, heavy filamentous upstream
TE-1	Little River Tributary	2/24/2021	11:05	SD	8.34	11.65	7.94	673	45	Orifice clear, beaver dam upstream of bridge, water coming through small section (~1 ft), verified tapedown
TG-1	Little River Tributary	2/24/2021	11:45	SD	8.54	10.97	7.98	885	21	Wider than normal, but flow looked about normal. Large amount of trash dumped on upstream rew
UDB-1	Upper Dave Blue Creek	2/23/2021	10:40	SD	3.71	12.06	7.97	658	20	Slightly above base flow
URC-2	Upper Rock Creek	2/23/2021	16:30	SD	3.53	12.03	8.17	587	24	Lock cut on box, bubbler had not been working since 2/17
WC-1	Woodcrest Creek	2/24/2021	10:20	SD	8.28	10.06	7.95	816	12	Orifice clear, visible flow, verified tapedown

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	0.15	0.21	0.029	<5.0
JB-1	Jim Blue Creek	<0.05	0.19	0.019	<5.0
LDB-1	Lower Dave Blue Creek	0.32	0.60	0.073	12.0
LRC-1	Lower Rock Creek	0.14	0.52	0.057	10.0
LT-1	Lake Laterals	<0.05	0.32	0.022	6.0
TE-1	Little River Tributary	0.34	0.66	0.103	20.0
TG-1	Little River Tributary	0.60	2.27	0.122	14.0
UDB-1	Upper Dave Blue Creek	0.21	0.48	0.053	10.0
URC-2	Upper Rock Creek	0.15	0.68	0.060	20.0
WC-1	Woodcrest Creek	0.20	0.57	0.091	12.0

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	0.20	0.028	<5.0
Duplicate RPD	6.90%	4.88%	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	1.10	20.84
JB-1	Jim Blue Creek	0.09	15.51
LDB-1	Lower Dave Blue Creek	24.52	17.10
LRC-1	Lower Rock Creek	7.23	17.99
LT-1	Lake Laterals	0.65	4.55
TE-1	Little River Tributary	0.22	11.14
TG-1	Little River Tributary	0.19	9.08
UDB-1	Upper Dave Blue Creek	0.93	17.57
URC-2	Upper Rock Creek	1.30	11.45
WC-1	Woodcrest Creek	0.06	7.59

Table 4 Station Discharge Summary

# Discharge Measurement Summary

Date Generated: Fri Feb 26 2021

File Information				Site Details			
File Name	CC0223.WAD			Site Name	CC		
Start Date and Time	2021/02/23 11:32:47			Operator(s)	SCD		

System Information		Units (English Units)		Discharge Uncertainty		
Sensor Type	FlowTracker	Distance	ft	Category	ISO	Stats
Serial #	P4713	Velocity	ft/s	Accuracy	1.0%	1.0%
CPU Firmware Version	3.9	Area	ft <sup>2</sup>	Depth	0.5%	3.2%
Software Ver	2.30	Discharge	cfs	Velocity	1.2%	3.8%
Mounting Correction	0.0%			Width	0.2%	0.2%
				Method	2.3%	-
				# Stations	2.4%	-
				<b>Overall</b>	<b>3.7%</b>	<b>5.1%</b>

Summary			
Averaging Int.	40	# Stations	21
Start Edge	LEW	Total Width	11.000
Mean SNR	30.2 dB	Total Area	5.100
Mean Temp	46.09 °F	Mean Depth	0.464
Disch. Equation	Mid-Section	Mean Velocity	0.2159
		<b>Total Discharge</b>	<b>1.1013</b>

Supplemental Data					
#	Time	Location	Gauge Height	Rated Flow	Comments
1	Tue Feb 23 11:52:22 CST 2021	10.500	20.840		

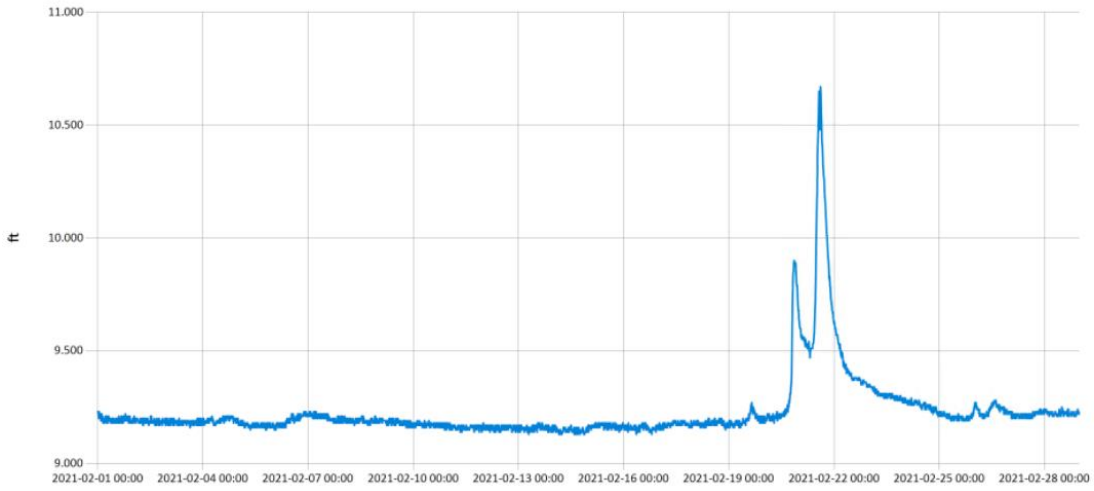
Measurement Results												
St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	11:32	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	11:32	1.00	0.6	0.400	0.6	0.160	0.0581	1.00	0.0581	0.300	0.0174	1.6
2	11:34	1.50	0.6	0.500	0.6	0.200	0.2349	1.00	0.2349	0.250	0.0587	5.3
3	11:35	2.00	0.6	0.400	0.6	0.160	0.3392	1.00	0.3392	0.200	0.0678	6.2
4	11:36	2.50	0.6	0.400	0.6	0.160	0.5069	1.00	0.5069	0.200	0.1014	9.2
5	11:37	3.00	0.6	0.450	0.6	0.180	0.5387	1.00	0.5387	0.225	0.1212	11.0
6	11:38	3.50	0.6	0.400	0.6	0.160	0.5906	1.00	0.5906	0.200	0.1181	10.7
7	11:39	4.00	0.6	0.350	0.6	0.140	0.6437	1.00	0.6437	0.175	0.1127	10.2
8	11:40	4.50	0.6	0.400	0.6	0.160	0.5472	1.00	0.5472	0.200	0.1094	9.9
9	11:41	5.00	0.6	0.400	0.6	0.160	0.4829	1.00	0.4829	0.200	0.0966	8.8
10	11:42	5.50	0.6	0.500	0.6	0.200	0.3799	1.00	0.3799	0.250	0.0950	8.6
11	11:43	6.00	0.6	0.600	0.6	0.240	0.3009	1.00	0.3009	0.300	0.0903	8.2
12	11:44	6.50	0.6	0.600	0.6	0.240	0.2356	1.00	0.2356	0.300	0.0707	6.4
13	11:45	7.00	0.6	0.800	0.6	0.320	0.1152	1.00	0.1152	0.400	0.0461	4.2
14	11:46	7.50	0.6	0.800	0.6	0.320	0.1414	1.00	0.1414	0.400	0.0566	5.1
15	11:47	8.00	0.6	0.750	0.6	0.300	0.0020	1.00	0.0020	0.375	0.0007	0.1
16	11:48	8.50	0.6	0.650	0.6	0.260	-0.0194	1.00	-0.0194	0.325	-0.0063	-0.6
17	11:49	9.00	0.6	0.500	0.6	0.200	-0.0650	1.00	-0.0650	0.250	-0.0162	-1.5
18	11:50	9.50	0.6	0.500	0.6	0.200	-0.0778	1.00	-0.0778	0.250	-0.0194	-1.8
19	11:51	10.00	0.6	0.400	0.6	0.160	-0.0646	1.00	-0.0646	0.300	-0.0194	-1.8
20	11:51	11.00	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

Period Selected: 2021-02-01 00:00 - 2021-02-28 23:59

UTC Offs et: -06:00

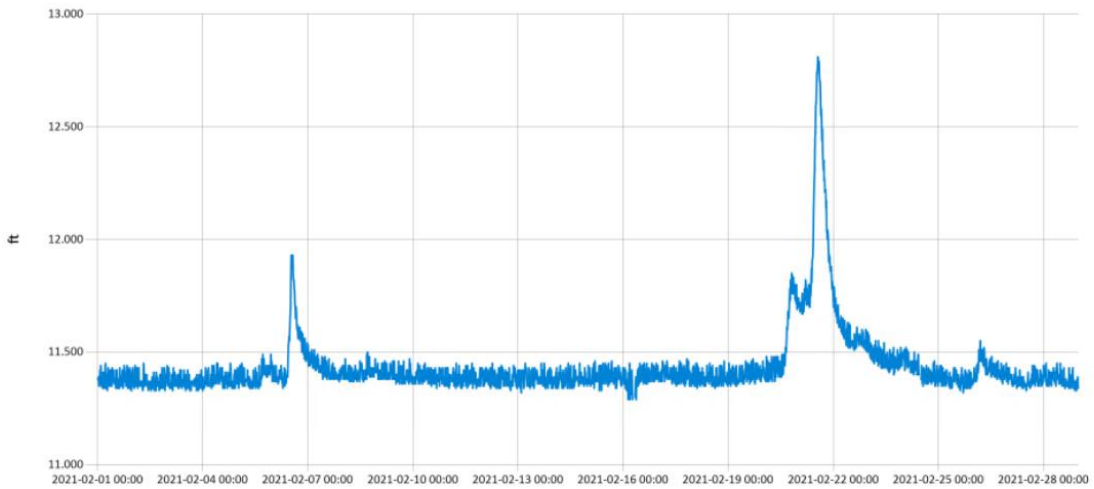


— Stage@TG

Figure 3 Monthly Hydrograph TG-1

Period Selected: 2021-02-01 00:00 - 2021-02-28 23:59

UTC Offs et: -06:00



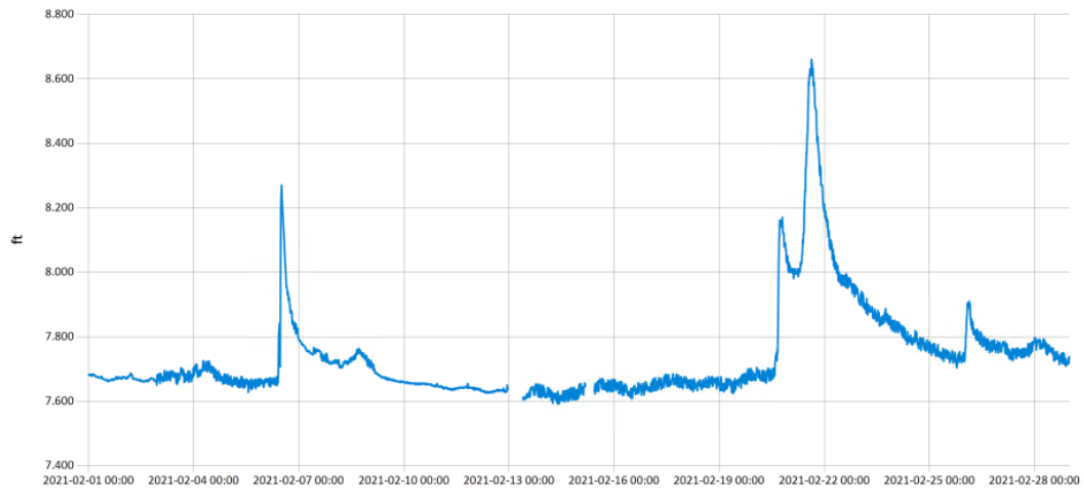
— Stage@TE

Figure 4 Monthly Hydrograph TE-1



Period Selected: 2021-02-01 00:00 - 2021-02-28 23:59

UTC Offset: -06:00

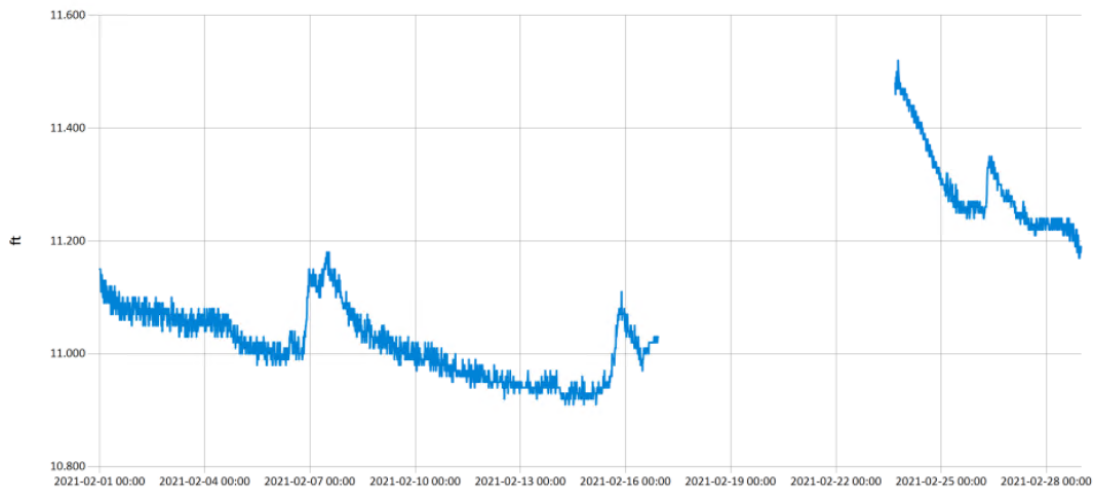


— Stage@WC

Figure 5 Monthly Hydrograph WC-1

Period Selected: 2021-02-01 00:00 - 2021-02-28 23:59

UTC Offset: -06:00

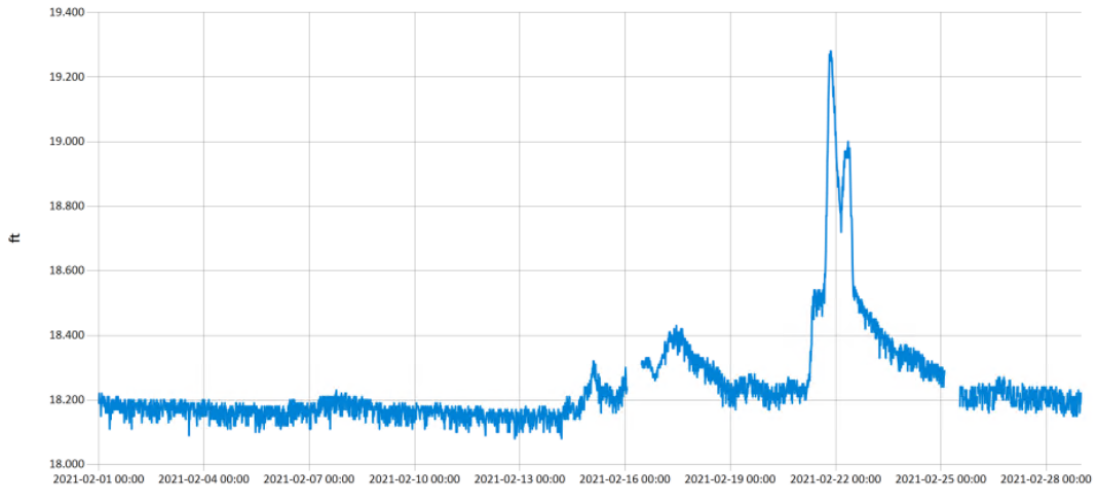


— Stage@URC

Figure 6 Monthly Hydrograph URC-2

Period Selected: 2021-02-01 00:00 - 2021-02-28 23:59

UTC Offs et: -06:00

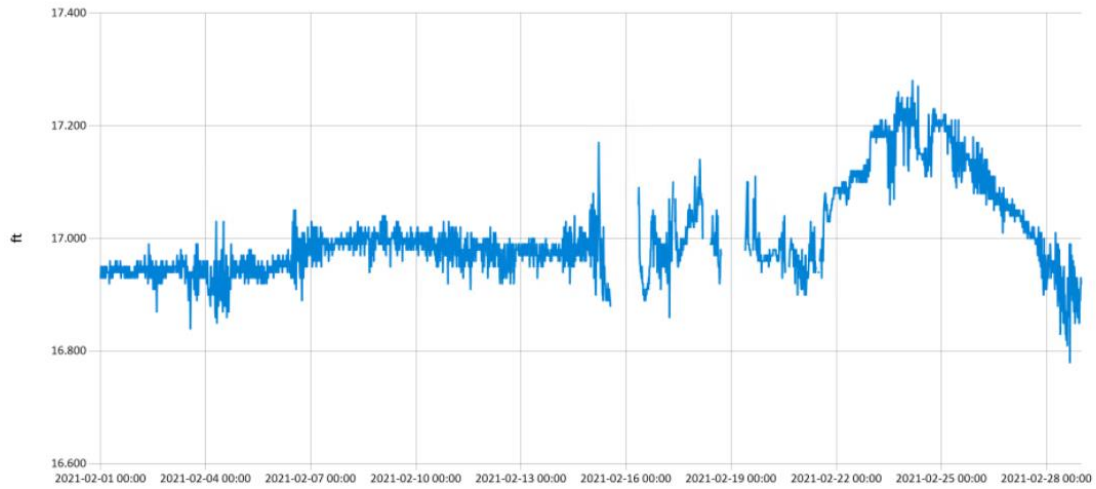


— Stage@LRC

Figure 7 Monthly Hydrograph LRC-1

Period Selected: 2021-02-01 00:00 - 2021-02-28 23:59

UTC Offs et: -06:00

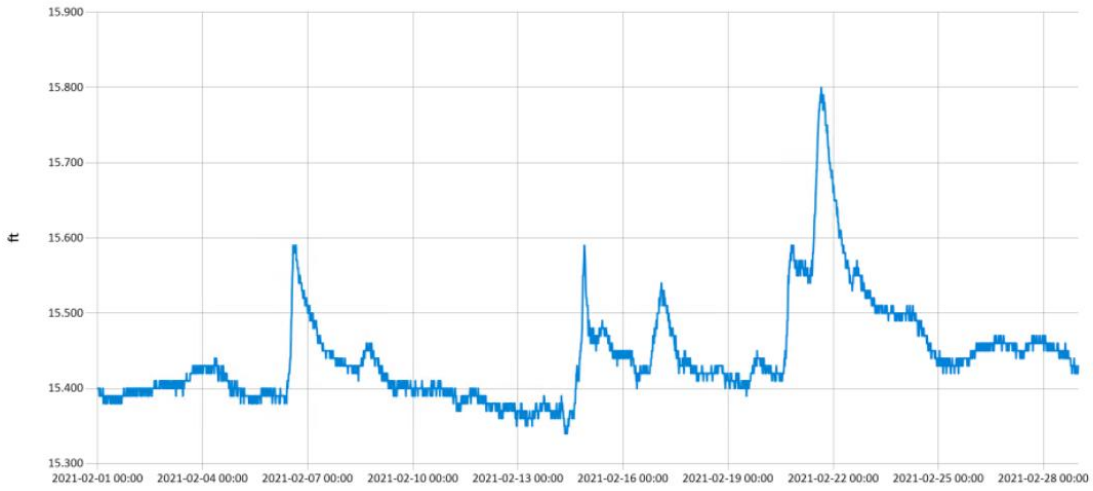


— Stage@LDB

Figure 8 Monthly Hydrograph LDB-1

Period Selected: 2021-02-01 00:00 - 2021-02-28 23:59

UTC Offs et: -06:00

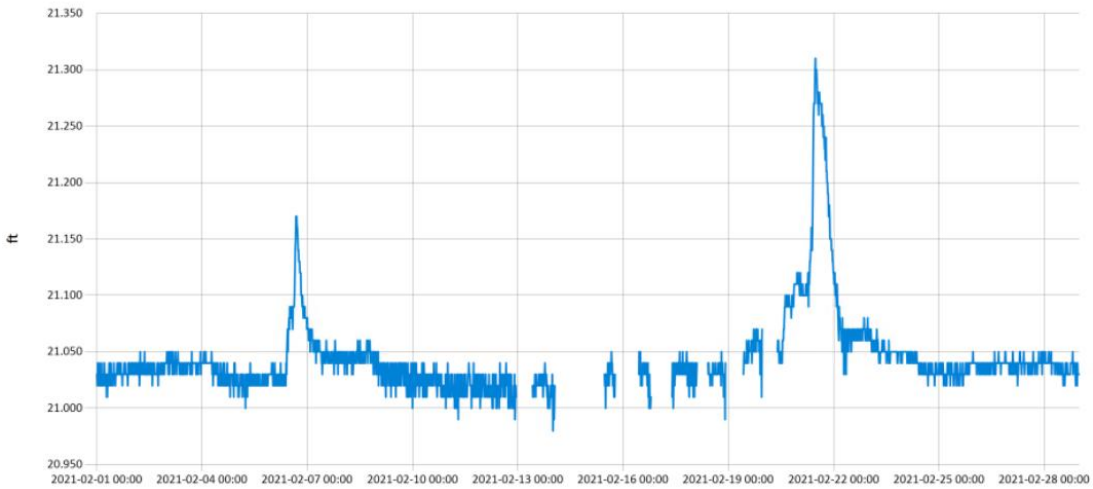


— Stage@JB

Figure 9 Monthly Hydrograph JB-1

Period Selected: 2021-02-01 00:00 - 2021-02-28 23:59

UTC Offs et: -06:00



— Stage@CC

Figure 10 Monthly Hydrograph CC-1

Period Selected: 2021-02-01 00:00 - 2021-02-28 23:59

UTC Offset: -06:00

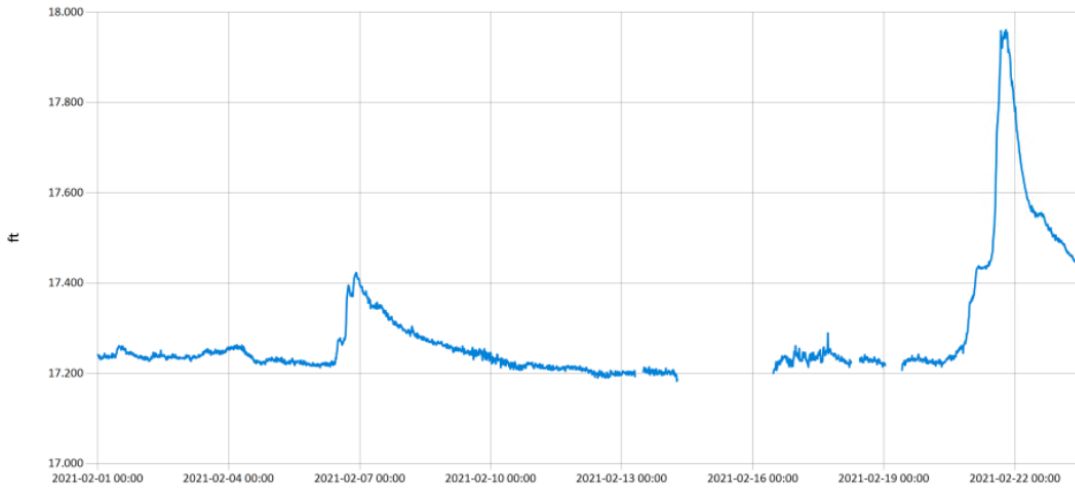


Figure 11 Monthly Hydrograph UDB-1

MESONET CLIMATOLOGICAL DATA SUMMARY				February 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 (MJ/m <sup>2</sup> )	4" SOIL TEMPERATURES			
	MAX	MIN	AVG	DEWPT	HDD	CDD	MAX	MIN	AVG	(in)	STN	MSL	DIR	AVG	MAX	SOD	BARE		MAX	MIN		
1	55	26	39.9	26.4	24	0	97	28	64	0.00	29.11	30.37	NW	3.9	10.7	15.08	43.3	41.7	49	37		
2	60	38	48.1	27.7	16	0	66	30	47	0.00	28.91	30.16	SSE	8.8	19.7	14.77	44.2	43.2	49	39		
3	65	39	51.6	37.2	13	0	72	43	59	0.00	28.62	29.86	SSE	11.1	28.9	13.25	45.6	44.5	50	39		
4	61	30	48.2	32.1	19	0	73	30	55	0.00	28.57	29.81	NNW	16.1	43.6	13.47	47.2	46.9	49	42		
5	57	26	43.0	19.8	23	0	83	16	44	0.00	28.68	29.93	SSW	5.8	19.0	13.06	44.4	42.2	48	38		
6	45	28	38.2	29.6	28	0	94	37	74	0.29	28.69	29.93	N	9.7	31.2	2.90	44.5	42.3	45	40		
7	38	28	32.8	29.1	32	0	94	80	86	0.00	28.75	29.99	E	7.8	22.2	2.97	42.8	38.7	40	37		
8	38	21	29.3	27.9	36	0	97	91	94	0.02	28.75	30.00	NE *	NA	18.3*	2.33	42.2	38.2	39	36		
9	21	17	19.4	17.5	46	0	95	89	92	0.00	28.95	30.20	NA	NA	NA	3.06	39.1	34.8	36	34		
10	22	18	20.1	18.2	45	0	94	87	92	0.00	28.96	30.21	NA	NA	NA	2.54	37.7	33.2	34	33		
11	20	16	18.1	15.2	47	0	91	84	88	0.00	29.00	30.26	NA	NA	NA	4.45	36.4	32.2	33	32		
12	19	12	15.0	11.3	49	0	90	80	85	0.00	29.06	30.32	NNE*	NA	16.4*	4.88	35.5	31.6	32	31		
13	20	9	13.4	6.5	51	0	84	61	74	0.00	29.04	30.30	NNE	12.0	22.8	13.84	34.6	31.3	32	31		
14	13	2	5.9	0.7	58	0	85	68	79	0.00	29.10	30.36	NNE	17.5	31.2	4.95	33.9	30.4	31	30		
15	4	-6	-1.1	-8.2	66	0	80	65	71	0.00	29.05	30.30	NNW	14.0	30.5	17.69	33.9	30.9	31	31		
16	12	-12	2.3	-3.6	65	0	88	57	77	0.00	28.88	30.14	E	4.4	15.0	9.45	34.3	31.1	31	31		
17	22	9	15.7	10.9	49	0	89	69	82	0.00	28.88	30.13	N	6.2	14.3	13.30	35.1	31.5	32	31		
18	26	4	15.5	9.2	50	0	93	61	76	0.00	29.14	30.40	N	8.7	24.1	18.24	36.0	31.6	32	31		
19	34	2	19.6	11.7	47	0	92	53	73	0.17	29.13	30.39	SSW	5.0	18.1	18.20	36.7	31.9	32	31		
20	47	14	32.9	24.4	35	0	92	52	72	0.19	28.89	30.14	SSE	8.8	27.6	18.60	37.0	32.2	33	32		
21	55	32	43.9	35.7	22	0	92	49	74	0.00	28.73	29.98	NW	11.3	31.0	16.56	37.7	32.5	33	32		
22	64	26	44.8	30.0	20	0	95	30	61	0.00	28.88	30.13	SW	7.3	29.6	19.09	38.6	36.9	43	33		
23	74	28	52.7	34.0	14	0	92	20	55	0.00	28.64	29.88	S	7.1	29.2	19.06	40.7	42.4	49	36		
24	61	39	52.0	31.8	15	0	67	29	47	0.00	28.77	30.02	N	15.3	32.1	19.18	44.1	46.0	50	43		
25	55	31	43.3	29.5	22	0	87	38	60	0.08	28.97	30.23	NE	10.2	22.2	12.75	43.0	42.2	46	37		
26	54	39	45.2	40.2	18	0	95	67	83	0.01	28.69	29.93	S	5.7	15.2	8.27	44.0	44.6	49	42		
27	58	41	50.0	49.3	15	0	99	88	98	0.03	28.59	29.83	SSE	7.7	20.7	3.02	45.0	45.8	50	43		
28	60	43	51.9	37.4	13	0	99	31	61	0.01	28.69	29.94	N	14.0	29.8	10.69	47.2	49.2	51	45		
	41	22	31.8	22.6	<- Monthly Averages ->						28.86	30.11	N *	9.5*	43.6*	11.27	40.2	37.9	40	36		
Temperature - Highest: 74 Lowest: -12				Degree Days - Total HDD: 940 Total CDD: 0				Number of Days With: Tmax ≥ 90: 0 Tmax ≤ 32: 10 Tmin ≤ 32: 22 Tmin ≤ 0: 2				Rainfall ≥ 0.01 inch: 8 Rainfall ≥ 0.10 inch: 3 Avg Wind Speed ≥ 10 mph: 9* Max Wind Speed ≥ 30 mph: 6*										
Rainfall: Monthly Total: 0.80 in. Greatest 24 Hr: 0.29 in.				Humidity - Highest: 99 Lowest: 16																		

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\* Denotes incomplete record

Figure 12 February Mesonet Data