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

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**SY-2022 Monthly Report**

*Lake Thunderbird TMDL Monitoring Plan Implementation:*

*April 2022 Monitoring Report*

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Oklahoma Water Resources Board  
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## SUMMARY OF APRIL WATER QUALITY SAMPLING

Sampling for April 2022 occurred during base flow conditions on the twelfth. Water samples were collected at nine locations and a discharge measurement was collected at one location. Samples were not collected at JB-1 due to construction activity. Mesonet data shows no precipitation on the twelfth, in the 72 hours prior to sampling, or in the 72 hours after the sampling event. The total rainfall amount in Norman for the month of April was 2.43 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

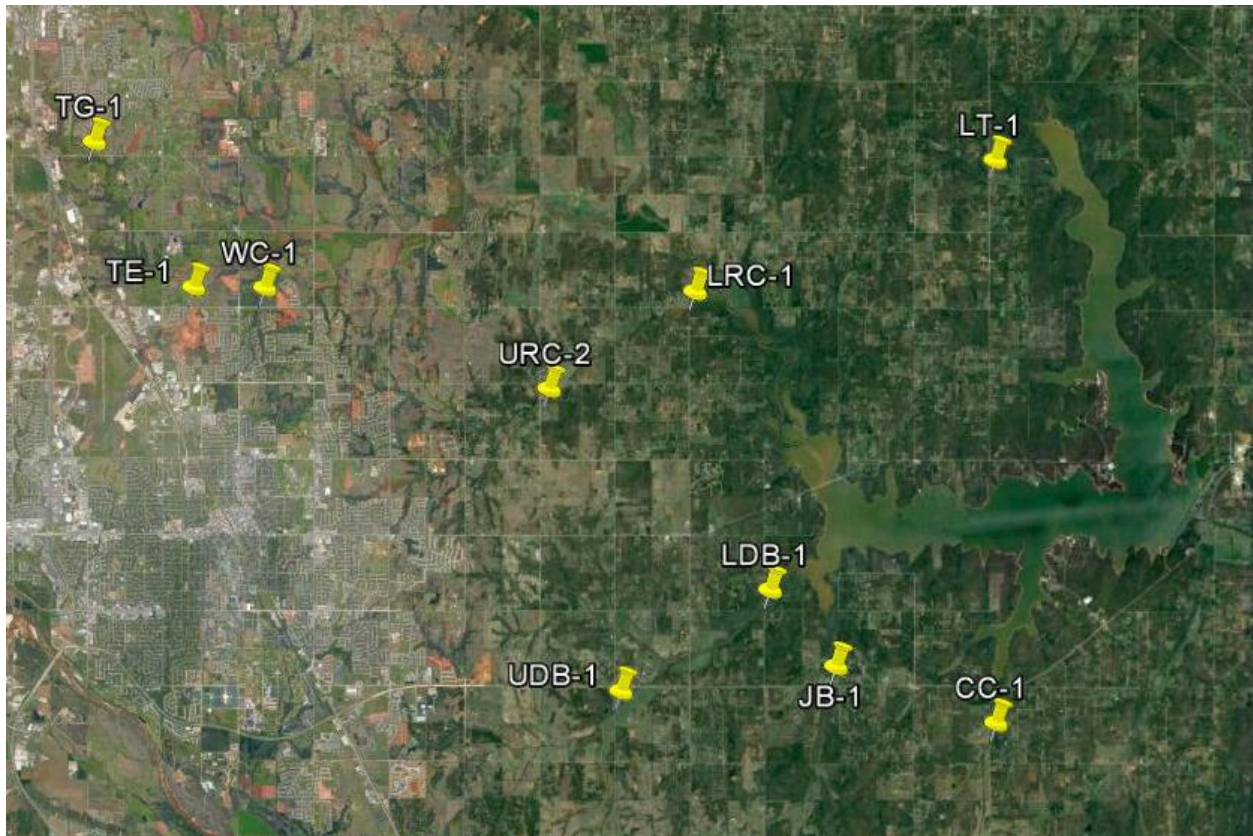


Figure 1 Monitoring Station Map

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	4/12/2022	9:15	SD	17.1	8.31	7.76	686	8	Used RP3, RP4 also over water; same tapedown as Feb collection, aquatic vegetation common
JB-1	Jim Blue Creek	4/12/2022	9:50	SD	N/A	N/A	N/A	N/A	N/A	Construction ongoing, did not sample; water very turbid, pool conditions on downstream
LDB-1	Lower Dave Blue Creek	4/12/2022	10:05	SD	17.0	8.14	7.79	860	66	Very turbid water, lots of small floating debris and scum under bridge, positive visual flow
LRC-1	Lower Rock Creek	4/12/2022	11:05	SD	18.0	7.98	7.78	712	4	Lower stage than expected, normal looking conditions, beaver sign still present on banks, dam broken on downstream
LT-1	Lake Laterals	4/12/2022	10:35	SD	18.0	5.00	7.44	606	4	Low/normal visual flow
TE-1	Little River Tributary	4/12/2022	14:10	SD	23.0	11.65	7.90	748	27	Lower stage than expected, beaver dam still present on upstream
TG-1	Little River Tributary	4/12/2022	15:00	SD	22.0	12.69	8.03	1166	5	Low/normal conditions, much lower stage than expected, floating debris present above bridge
UDB-1	Upper Dave Blue Creek	4/12/2022	8:40	SD	17.0	7.10	7.78	913	9	Orifice clear
URC-2	Upper Rock Creek	4/12/2022	11:55	SD	19.0	7.27	7.58	744	33	Similar stage to last month's visit, lower stage than expected, cow in channel upstream exited upon arrival
WC-1	Woodcrest Creek	4/12/2022	13:30	SD	21.2	9.63	7.65	1073	7	Very low stage, similar to Feb and Jan collections, small floating debris and scum present on upstream only

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	<0.05	0.25	0.039	<5.0
JB-1	Jim Blue Creek	N/A	N/A	N/A	N/A
LDB-1	Lower Dave Blue Creek	<0.05	0.56	0.080	48.0
LRC-1	Lower Rock Creek	<0.05	0.34	0.042	6.0
LT-1	Lake Laterals	<0.05	0.41	0.030	<5.0
TE-1	Little River Tributary	<0.05	0.59	0.050	16.0
TG-1	Little River Tributary	<0.05	0.42	0.039	<5.0
UDB-1	Upper Dave Blue Creek	<0.05	0.30	0.034	5.0
URC-2	Upper Rock Creek	<0.05	0.71	0.082	28.0
WC-1	Woodcrest Creek	<0.05	0.44	0.048	9.0

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	<0.05	0.22	0.039	<5.0
Duplicate RPD	0%	12.77%	0%	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	0.34	20.49
JB-1	Jim Blue Creek	N/A	N/A
LDB-1	Lower Dave Blue Creek	2.28	16.51
LRC-1	Lower Rock Creek	0.76	4.14
LT-1	Lake Laterals	0.35	4.30
TE-1	Little River Tributary	0.01	10.91
TG-1	Little River Tributary	0.60	8.97
UDB-1	Upper Dave Blue Creek	0.12	17.30
URC-2	Upper Rock Creek	0.05	10.85
WC-1	Woodcrest Creek	0.01	7.29

Table 4 Station Discharge Summary

All rated stream discharges are provisional and subject to change.

**File Information**

File name: Lrc\_20220412-113035.ft  
 Start date and time: 4/12/2022 11:11 AM  
 Start location latitude: 35.258  
 Start location longitude: -97.334  
 Calculations engine: FlowTracker2  
 Data collection mode: Discharge

**System Information**

**Discharge Summary**

Start time: 4/12/2022 11:12 AM    End time: 4/12/2022 11:29 AM  
 # Stations: 13    Avg interval: 40  
 Mean depth: 0.621 ft    Max depth: 0.850 ft  
 Mean velocity: 0.1021 ft/s    Max velocity: 0.1552 ft/s  
 Mean SNR: 41 dB    Total width: 12.000 ft  
 Mean temp: 65.553 °F    Total area: 7.4500 ft²  
 Wetted Perimeter: 12.234 ft    Total discharge: 0.7603 ft³/s

**Discharge Uncertainty**

**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

**Supplemental data summary**

Gauge height time	Gauge height (ft)	Rated discharge (ft³/s)	Temperature (°F)	Salinity (PSS-78)	Gauge height comments
4/12/2022 11:15 AM	4.140				

**Measurement results**

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correct on	Mean Velocity (ft/s)	Area (ft²)	Flow (ft³/s)	%Q
0	11:12 AM	0.000	None	0.000	0.0000	0.000	0	0.0000		0.0003	0.0000	0.0000	0.00
1	11:13 AM	1.000	0.6	0.500	0.6000	0.300	80	0.0003	1.0000	0.0003	0.5000	0.0002	0.02
2	11:15 AM	2.000	0.6	0.700	0.6000	0.420	80	0.0695	1.0000	0.0695	0.7000	0.0486	6.40
3	11:17 AM	3.000	0.6	0.700	0.6000	0.420	80	0.1000	1.0000	0.1000	0.7000	0.0700	9.21
4	11:18 AM	4.000	0.6	0.800	0.6000	0.480	80	0.0791	1.0000	0.0791	0.8000	0.0633	8.32
5	11:19 AM	5.000	0.6	0.800	0.6000	0.480	80	0.1236	1.0000	0.1236	0.8000	0.0989	13.00
6	11:20 AM	6.000	0.6	0.800	0.6000	0.480	80	0.1398	1.0000	0.1398	0.8000	0.1119	14.71
7	11:22 AM	7.000	0.6	0.850	0.6000	0.510	80	0.0488	1.0000	0.0488	0.8500	0.0415	5.45
8	11:23 AM	8.000	0.6	0.800	0.6000	0.480	80	0.1552	1.0000	0.1552	0.8000	0.1241	16.33
9	11:24 AM	9.000	0.6	0.700	0.6000	0.420	80	0.1471	1.0000	0.1471	0.7000	0.1030	13.54
10	11:26 AM	10.000	0.6	0.500	0.6000	0.300	80	0.1396	1.0000	0.1396	0.5000	0.0698	9.18
11	11:28 AM	11.000	0.6	0.300	0.6000	0.180	80	0.0972	1.0000	0.0972	0.3000	0.0292	3.84
12	11:29 AM	12.000	None	0.000	0.0000	0.000	0	0.0000		0.0972	0.0000	0.0000	0.00

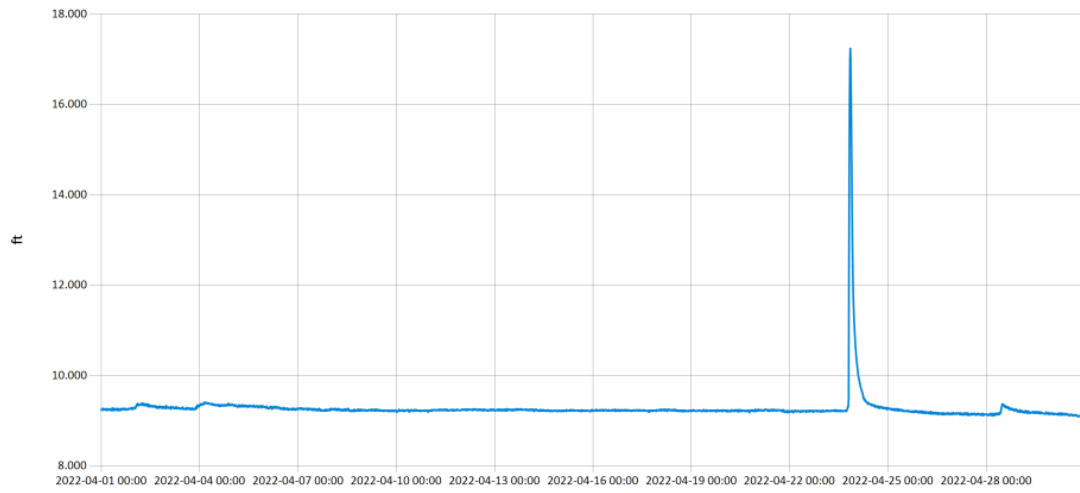
**Quality control warnings**

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
1	11:13 AM	1.000	0.6	0.500	0.6000	0.300	Large SNR Variation,SNR Threshold Variation,High % Spikes
5	11:19 AM	5.000	0.6	0.800	0.6000	0.480	High Strn % Discharge
6	11:20 AM	6.000	0.6	0.800	0.6000	0.480	High Strn % Discharge
8	11:23 AM	8.000	0.6	0.800	0.6000	0.480	High Strn % Discharge
9	11:24 AM	9.000	0.6	0.700	0.6000	0.420	High Strn % Discharge

Figure 2 Discharge Measurement Summary LRC-1

Period Selected: 2022-04-01 00:00 - 2022-04-30 23:59

UTC Offs et: -06:00

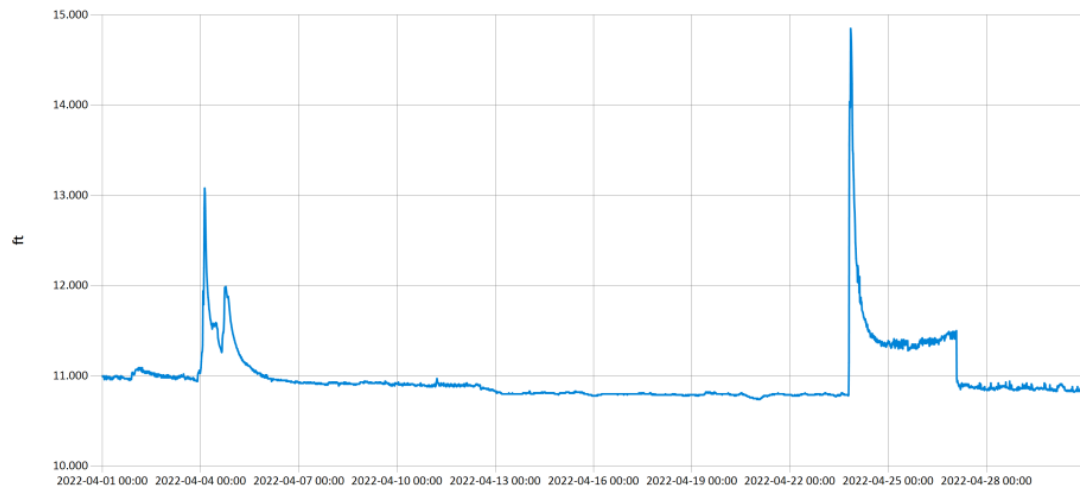


— Stage@TG

Figure 3 Monthly Hydrograph TG-1

Period Selected: 2022-04-01 00:00 - 2022-04-30 23:59

UTC Offs et: -06:00



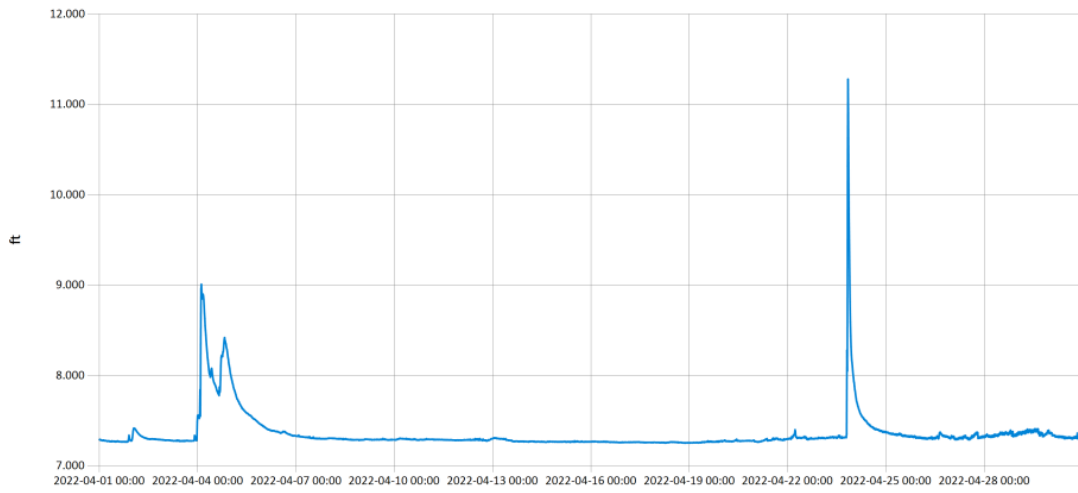
— Stage@TE

Figure 4 Monthly Hydrograph TE-1



Period Selected: 2022-04-01 00:00 - 2022-04-30 23:59

UTC Offs et: -06:00

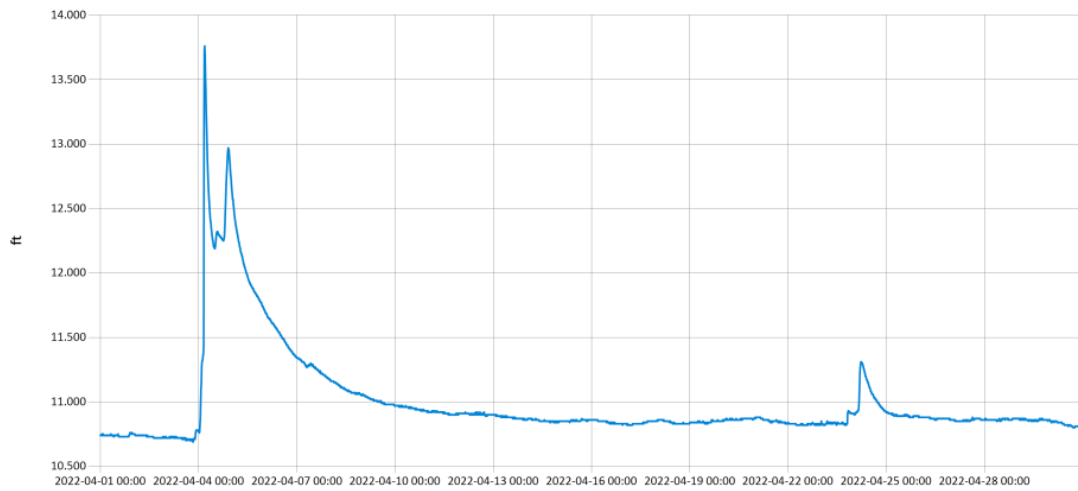


— Stage@WC

Figure 5 Monthly Hydrograph WC-1

Period Selected: 2022-04-01 00:00 - 2022-04-30 23:59

UTC Offs et: -06:00

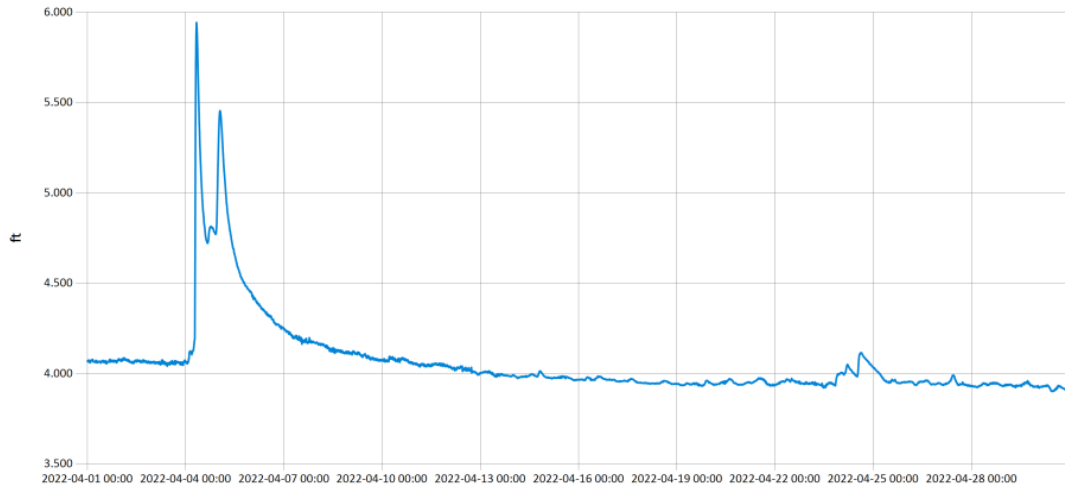


— Stage@URC

Figure 6 Monthly Hydrograph URC-2

Period Selected: 2022-04-01 00:00 - 2022-04-30 23:59

UTC Offs et: -06:00

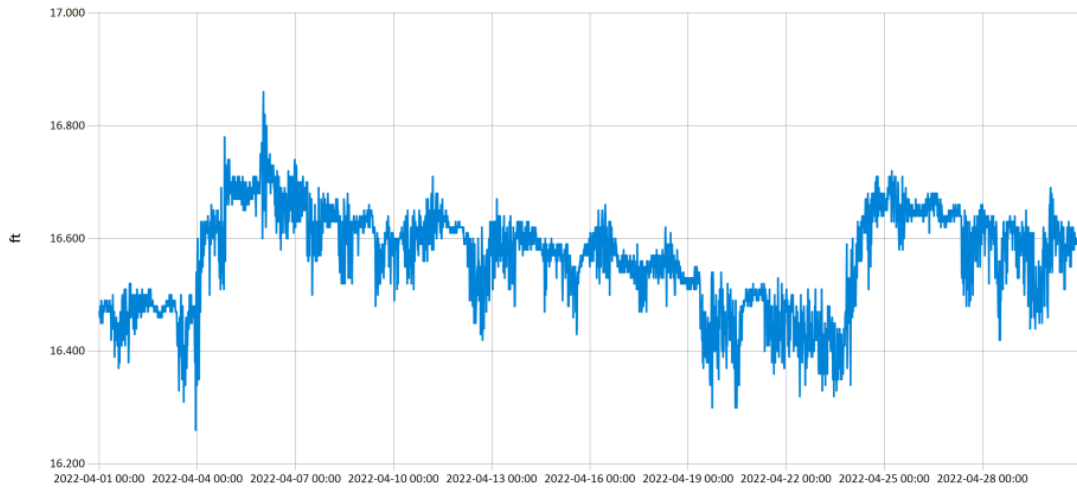


— Stage@LRC

Figure 7 Monthly Hydrograph LRC-1

Period Selected: 2022-04-01 00:00 - 2022-04-30 23:59

UTC Offs et: -06:00

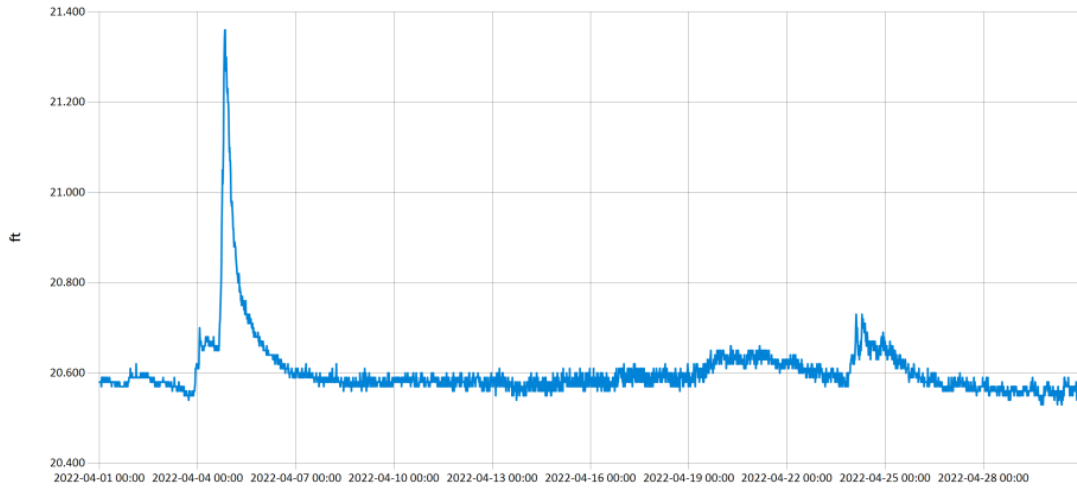


— Stage@LDB

Figure 8 Monthly Hydrograph LDB-1

Period Selected: 2022-04-01 00:00 - 2022-04-30 23:59

UTC Offs et: -06:00

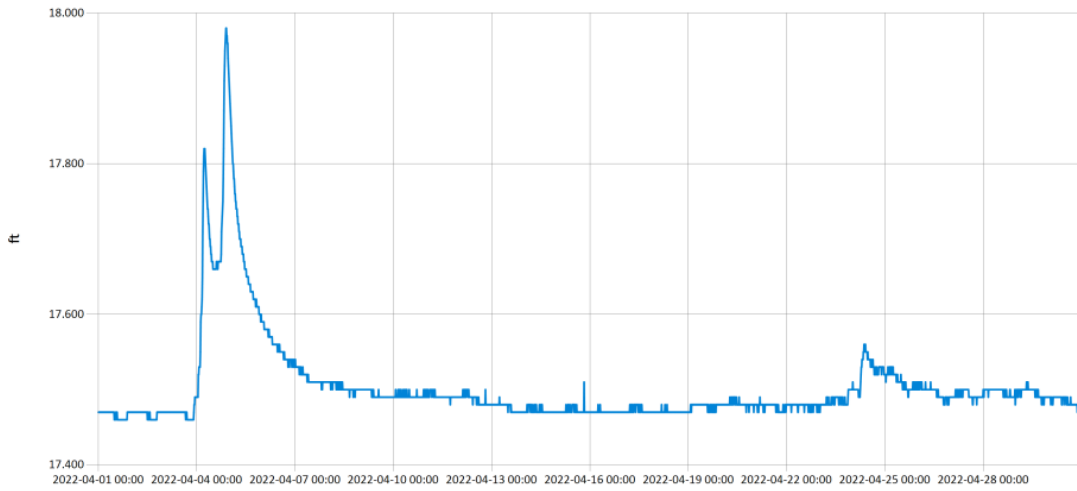


— Stage@CC

Figure 9 Monthly Hydrograph CC-1

Period Selected: 2022-04-01 00:00 - 2022-04-30 23:59

UTC Offs et: -06:00



— Stage@UDB

Figure 10 Monthly Hydrograph UDB-1

MESONET CLIMATOLOGICAL DATA SUMMARY					April 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 (in)		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	69	36	52.3	36.0	13	0	84	31	57	0.10	28.72	29.96	SE	9.3	23.5	19.82	52.3	54.2	63	46
2	73	41	58.6	43.5	8	0	98	28	62	0.02	28.80	30.05	NNE	5.5	19.1	24.51	54.8	58.3	67	50
3	82	51	66.5	47.6	0	2	88	30	53	0.13	28.63	29.87	S	11.2	43.1	23.17	56.6	61.7	71	53
4	59	52	57.0	54.8	9	0	98	81	93	1.28	28.56	29.80	NE	7.1	20.8	2.43	57.1	59.5	64	57
5	83	52	64.3	53.8	0	2	99	34	74	0.01	28.30	29.53	SSW	10.8	52.3	18.86	57.8	60.7	68	56
6	67	50	58.0	26.0	7	0	65	11	34	0.00	28.69	29.94	NW	18.0	49.8	25.07	56.7	57.6	63	53
7	63*	40*	52.2*	24.5*	14*	0*	67*	17*	37*	0.00*	28.88*	30.14*	NW	16.8*	41.7*	22.96*	53.6*	51.4*	56*	47*
8	62	38	50.0	22.4	15	0	69	18	36	0.00	28.90	30.15	NW	13.5	36.5	25.72	52.3	49.5	55	44
9	83	32	61.2	28.4	8	0	85	13	35	0.00	28.64	29.88	S	11.0	34.3	25.69	52.6	52.5	63	42
10	82	62	71.4	49.0	0	7	74	30	46	0.00	28.36	29.60	S	13.1	32.7	18.51	57.0	61.6	69	55
11	72	57	63.6	52.7	0	0	92	46	68	0.00	28.50	29.74	NE	9.2	24.8	15.84	59.1	64.0	70	60
12	83	60	73.3	63.7	0	6	93	53	73	0.00	28.35	29.58	S	16.3	38.3	20.32	61.7	67.2	75	61
13	69	40	56.6	32.5	10	0	74	25	41	0.00	28.56	29.80	N	15.0	41.2	23.84	60.9	66.0	71	61
14	70	35	55.3	26.4	13	0	71	17	37	0.00	28.80	30.05	SSE	8.0	24.6	25.30	57.3	61.3	70	52
15	86	57	70.5	49.5	0	6	78	31	49	0.00	28.56	29.80	S	12.9	35.4	25.10	59.9	66.1	75	58
16	71	51	54.9	39.5	4	0	81	42	57	0.00	28.74	29.99	NNE	14.3	33.2	8.93	59.7	64.4	69	60
17	68	47	57.9	43.6	7	0	79	42	60	0.00	28.74	29.98	NE	8.4	24.9	22.95	59.1	63.9	71	59
18	66	40	52.3	36.3	12	0	90	31	59	0.00	29.03	30.28	NNE	9.8	21.9	24.64	58.6	62.4	70	55
19	69	43	57.3	39.3	9	0	78	37	52	0.00	28.81	30.06	SSE	13.7	38.4	19.29	58.0	61.6	68	55
20	93	58	73.0	54.3	0	10	96	15	59	0.00	28.49	29.73	SSE	13.7	33.9	19.51	61.1	66.6	75	61
21	83	68	75.0	65.1	0	11	87	54	72	0.00	28.73	29.98	SSE	13.8	33.7	18.43	64.3	70.3	76	66
22	79	69	73.5	62.9	0	9	83	57	70	0.00	28.72	29.97	SSE	16.2	36.8	9.60	65.3	70.4	73	68
23	78	65	70.9	61.3	0	7	99	58	73	0.82	28.52	29.76	S	15.9	56.7	11.15	64.9	69.2	73	67
24	66	51	57.3	49.1	7	0	94	48	75	0.06	28.68	29.93	NNE	8.9	27.3	4.67	62.4	62.6	68	59
25	67	47	55.8	36.4	8	0	89	27	51	0.00	28.98	30.24	NNE	12.0	28.9	26.69	59.8	58.6	64	53
26	71	40	58.3	32.6	10	0	82	21	41	0.00	29.07	30.33	SSE	6.1	17.2	27.51	59.7	58.5	67	50
27	75*	48*	62.9*	48.9*	4*	0*	78*	47*	61*	0.00*	28.85*	30.10*	SSE*	10.2*	29.4*	NA	60.1*	60.5*	68*	53*
28	79	61	69.7	59.2	0	5	89	58	70	0.01	28.63	29.87	SSE	11.8	32.7	16.59	62.5	66.1	72	61
29	83	67	73.4	64.4	0	10	85	58	74	0.00	28.40	29.64	S	15.5	36.0	18.18	64.7	69.6	77	65
30	75	53	65.5	44.9	1	0	78	32	49	0.00	28.63	29.87	NW	9.7	27.8	26.12	64.8	70.5	78	64
	74*	50*	62.3*	44.9*	<- Monthly Averages ->						28.68*	29.92*	SSE*	11.9*	56.7*	19.70*	59.2*	62.2*	69*	56*
Temperature - Highest: 93*							Degree Days - Total HDD: 158*					Number of Days With:								
Lowest: 32*							Total CDD: 75*					Tmax ≥ 90: 1* Rainfall ≥ 0.01 inch: 8*								
Rainfall: Monthly Total: 2.43* in.							Humidity - Highest: 99*					Tmax ≤ 32: 0* Rainfall ≥ 0.10 inch: 4*								
Greatest 24 Hr: 1.28* in.							Lowest: 11*					Tmin ≤ 32: 1* Avg Wind Speed ≥ 10 mph: 20*								
												Tmin ≤ 0: 0* Max Wind Speed ≥ 30 mph: 18*								

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\* Denotes incomplete record

Figure 11 April Mesonet Data