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

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**OKLAHOMA**  
**Water Resources Board**

# Lake Thunderbird TMDL Monitoring Plan Implementation: January 2023 Monitoring Report

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Oklahoma Water Resources Board  
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## SUMMARY OF JANUARY SAMPLING

Sampling for January 2023 occurred during base flow conditions on the seventeenth. Water samples were collected at eight locations and discharge was measured at four locations. Samples were not collected at JB-1 due to pool conditions or LT-1 due to dry conditions. Mesonet shows no precipitation on the seventeenth or in the 72 hours prior to sampling, and 0.32 inches of precipitation in the 72 hours after the sampling event. The total rainfall amount in Norman for the month of January was 1.27 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

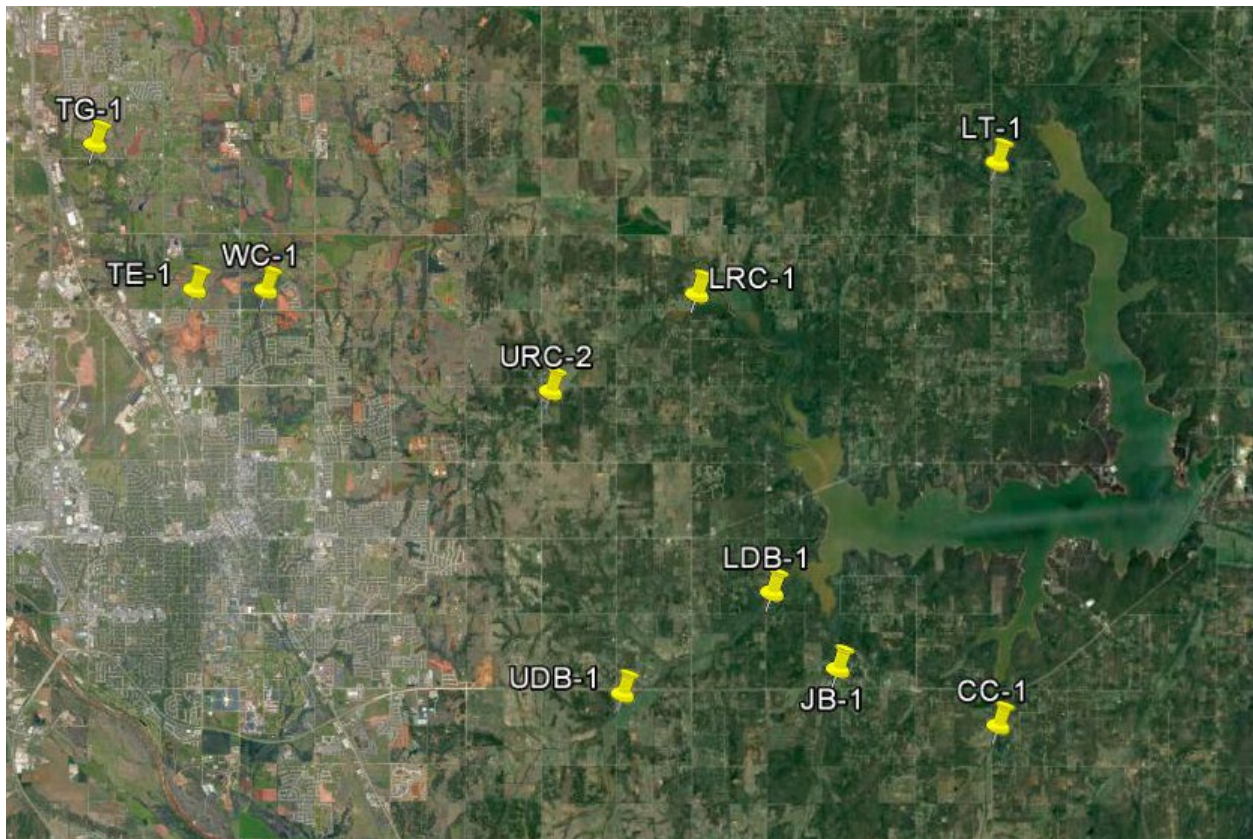


Figure 1 Monitoring Station Map

Monitoring Location ID	Monitoring Location Name	Date	Time	Field Crew	Water Temperature (°C)	Dissolved Oxygen (DO) (mg/L)	pH	Specific Conductance (µS/cm)	Turbidity (NTU)	Notes
CC-1	Clear Creek	1/17/2023	10:38	LS	8.5	9.34	7.73	686	8	Creek appearance is nominal
JB-1	Jim Blue Creek	1/17/2023	11:15	LS	N/A	N/A	N/A	N/A	N/A	Still basically a mud puddle; construction has changed site characteristics and flow . Did not sample
LDB-1	Lower Dave Blue Creek	1/17/2023	11:36	LS	8.2	8.68	7.93	878	11	Stagnant, no visual flow
LRC-1	Lower Rock Creek	1/17/2023	13:04	LS	7.2	8.95	7.70	723	7	Replaced batteries. Someone dumped trash upstream. Very low flow
LT-1	Lake Laterals	1/17/2023	12:05	LS	N/A	N/A	N/A	N/A	N/A	Site is dry. Did not sample
TE-1	Little River Tributary	1/17/2023	15:22	LS	9.1	10.49	7.86	1009	18	Orifice partially out of water
TG-1	Little River	1/17/2023	15:52	LS	9.4	14.67	8.08	1072	5	Pools upstream where huge overturned tree is. Less debris under bridge
UDB-1	Upper Dave Blue Creek	1/17/2023	8:42	LS	7.4	6.95	7.54	929	3	Basically a pool - very gross. Lots of oil and grease. Had film layer on top
URC-2	Upper Rock Creek	1/17/2023	13:54	LS	7.1	2.60	7.25	837	14	Stagnant; did not take flow . Lots of what appears to be iron precipitate/film/oil & Grease on surface of water
WC-1	Woodcrest Creek	1/17/2023	14:35	LS	9.5	7.03	7.17	986	13	Low flow

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	0.14	0.030	<5.0
JB-1	Jim Blue Creek	N/A	N/A	N/A	N/A
LDB-1	Lower Dave Blue Creek	<0.05	0.36	0.042	10.0
LRC-1	Lower Rock Creek	<0.05	0.19	0.027	<5.0
LT-1	Lake Laterals	N/A	N/A	N/A	N/A
TE-1	Little River Tributary	<0.05	0.43	0.028	<5.0
TG-1	Little River	<0.05	0.40	0.027	<5.0
UDB-1	Upper Dave Blue Creek	<0.05	0.28	0.033	<5.0
URC-2	Upper Rock Creek	<0.05	0.49	0.127	5.7
WC-1	Woodcrest Creek	<0.05	0.20	0.037	<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	<0.05	0.16	0.029	<5.0
Duplicate RPD	0%	13.33%	3.39%	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	0.48	20.30
JB-1	Jim Blue Creek	N/A	N/A
LDB-1	Lower Dave Blue Creek	0.18	14.14
LRC-1	Lower Rock Creek	0.30	4.64
LT-1	Lake Laterals	N/A	N/A
TE-1	Little River Tributary	0.01	10.69
TG-1	Little River	0.63	8.78
UDB-1	Upper Dave Blue Creek	0.05	17.13
URC-2	Upper Rock Creek	0.06	10.91
WC-1	Woodcrest Creek	0.02	7.34

Table 4 Station Discharge Summary

All rated stream discharges are provisional and subject to change.

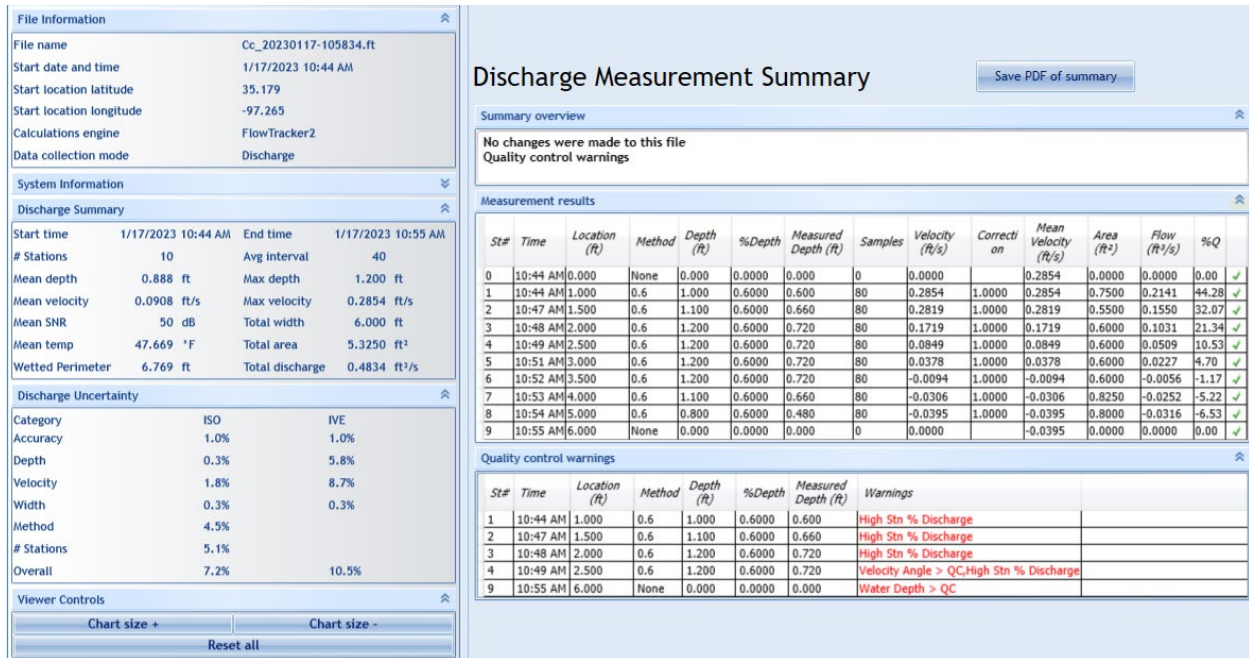


Figure 2 Discharge Measurement Summary CC-1

**File Information**

File name: LRC\_20230117-133640.ft  
 Start date and time: 1/17/2023 1:00 PM  
 Start location latitude: 35.261  
 Start location longitude: -97.335  
 Calculations engine: FlowTracker2  
 Data collection mode: Discharge

**System Information**

**Discharge Summary**

Start time: 1/17/2023 1:01 PM, End time: 1/17/2023 1:35 PM  
 # Stations: 19, Avg interval: 40  
 Mean depth: 1.378 ft, Max depth: 2.000 ft  
 Mean velocity: 0.0122 ft/s, Max velocity: 0.0420 ft/s  
 Mean SNR: 44 dB, Total width: 18.000 ft  
 Mean temp: 45.999 °F, Total area: 24.8000 ft<sup>2</sup>  
 Wetted Perimeter: 19.222 ft, Total discharge: 0.3028 ft<sup>3</sup>/s

**Discharge Uncertainty**

Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.2%	2.5%
Velocity	2.1%	16.9%
Width	0.2%	0.2%
Method	2.3%	
# Stations	2.6%	
Overall	4.3%	17.1%

**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 (ft <sup>3</sup> /s)	Temperature (°F)	Salinity (PSS-78)	Gauge height comments
1/17/2023 1:16 PM	4.640				

**Measurement results**

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft <sup>2</sup> )	Flow (ft <sup>3</sup> /s)	%Q	
0	1:01 PM	0.000	None	0.000	0.0000	0.000	0	0.0000		-0.0205	0.0000	0.0000	0.00	✓
1	1:01 PM	1.000	0.6	0.400	0.6000	0.240	80	-0.0205	1.0000	-0.0205	0.4000	-0.0082	-2.71	✓
2	1:04 PM	2.000	0.6	0.800	0.6000	0.480	80	0.0026	1.0000	0.0026	0.8000	0.0021	0.69	✓
3	1:06 PM	3.000	0.6	1.000	0.6000	0.600	80	0.0042	1.0000	0.0042	1.0000	0.0042	1.38	✓
4	1:08 PM	4.000	0.6	1.200	0.6000	0.720	80	0.0027	1.0000	0.0027	1.2000	0.0032	1.07	✓
5	1:09 PM	5.000	0.6	1.350	0.6000	0.810	80	0.0079	1.0000	0.0079	1.3500	0.0107	3.53	✓
6	1:11 PM	6.000	0.6	1.400	0.6000	0.840	80	0.0172	1.0000	0.0172	1.4000	0.0241	7.95	✓
7	1:12 PM	7.000	0.6	1.600	0.6000	0.960	80	0.0133	1.0000	0.0133	1.6000	0.0213	7.03	✓
8	1:14 PM	8.000	0.2/0.8	1.650	0.2000	0.330	80	0.0245	1.0000	0.0007	1.6500	0.0012	0.39	✓
8	1:14 PM	8.000	0.2/0.8	1.650	0.8000	1.320	80	-0.0230	1.0000	0.0007	1.6500	0.0012	0.39	✓
9	1:16 PM	9.000	0.6	1.600	0.6000	0.960	80	0.0166	1.0000	0.0166	1.6000	0.0266	8.77	✓
10	1:18 PM	10.000	0.6	1.400	0.6000	0.840	80	0.0374	1.0000	0.0374	1.4000	0.0524	17.30	✓
11	1:19 PM	11.000	0.6	1.600	0.6000	0.960	80	0.0242	1.0000	0.0242	1.6000	0.0388	12.80	✓
12	1:20 PM	12.000	0.2/0.8	2.000	0.2000	0.400	80	0.0351	1.0000	0.0229	2.0000	0.0458	15.12	✓
12	1:20 PM	12.000	0.2/0.8	2.000	0.8000	1.600	80	0.0106	1.0000	0.0229	2.0000	0.0458	15.12	✓
13	1:22 PM	13.000	0.2/0.8	2.000	0.2000	0.400	80	0.0324	1.0000	0.0227	2.0000	0.0455	15.01	✓
13	1:22 PM	13.000	0.2/0.8	2.000	0.8000	1.600	80	0.0131	1.0000	0.0227	2.0000	0.0455	15.01	✓
14	1:25 PM	14.000	0.2/0.8	1.800	0.2000	0.360	80	0.0335	1.0000	0.0162	1.8000	0.0291	9.61	✓
14	1:25 PM	14.000	0.2/0.8	1.800	0.8000	1.440	80	-0.0012	1.0000	0.0162	1.8000	0.0291	9.61	✓
15	1:27 PM	15.000	0.2/0.8	1.700	0.2000	0.340	80	0.0420	1.0000	0.0270	1.7000	0.0459	15.15	✓
15	1:27 PM	15.000	0.2/0.8	1.700	0.8000	1.360	80	0.0120	1.0000	0.0270	1.7000	0.0459	15.15	✓
16	1:29 PM	16.000	0.2/0.8	1.800	0.2000	0.360	80	0.0052	1.0000	-0.0041	1.8000	-0.0074	-2.44	✓
16	1:29 PM	16.000	0.2/0.8	1.800	0.8000	1.440	80	-0.0134	1.0000	-0.0041	1.8000	-0.0074	-2.44	✓
17	1:33 PM	17.000	0.6	1.500	0.6000	0.900	80	-0.0215	1.0000	-0.0215	1.5000	-0.0323	-10.65	✓
18	1:35 PM	18.000	None	0.000	0.0000	0.000	0	0.0000		-0.0215	0.0000	0.0000	0.00	✓

**Quality control warnings**

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
1	1:01 PM	1.000	0.6	0.400	0.6000	0.240	SNR Threshold Variation
5	1:09 PM	5.000	0.6	1.350	0.6000	0.810	SNR Threshold Variation
6	1:11 PM	6.000	0.6	1.400	0.6000	0.840	SNR Threshold Variation
7	1:12 PM	7.000	0.6	1.600	0.6000	0.960	Large SNR Variation
8	1:14 PM	8.000	0.2/0.8	1.650	0.2000	0.330	Large SNR Variation, SNR Threshold Variation
8	1:14 PM	8.000	0.2/0.8	1.650	0.8000	1.320	Large SNR Variation, SNR Threshold Variation
10	1:18 PM	10.000	0.6	1.400	0.6000	0.840	High Stn % Discharge
11	1:19 PM	11.000	0.6	1.600	0.6000	0.960	Large SNR Variation, SNR Threshold Variation, High Stn % Discharge
12	1:20 PM	12.000	0.2/0.8	2.000	0.2000	0.400	SNR Threshold Variation, High Stn % Discharge
12	1:20 PM	12.000	0.2/0.8	2.000	0.8000	1.600	SNR Threshold Variation, High Stn % Discharge
13	1:22 PM	13.000	0.2/0.8	2.000	0.2000	0.400	Large SNR Variation, SNR Threshold Variation, High Stn % Discharge
13	1:22 PM	13.000	0.2/0.8	2.000	0.8000	1.600	Large SNR Variation, SNR Threshold Variation, High Stn % Discharge
14	1:25 PM	14.000	0.2/0.8	1.800	0.2000	0.360	Large SNR Variation, SNR Threshold Variation
14	1:25 PM	14.000	0.2/0.8	1.800	0.8000	1.440	Large SNR Variation, SNR Threshold Variation
15	1:27 PM	15.000	0.2/0.8	1.700	0.2000	0.340	Large SNR Variation, SNR Threshold Variation, High Stn % Discharge
15	1:27 PM	15.000	0.2/0.8	1.700	0.8000	1.360	Large SNR Variation, SNR Threshold Variation, High Stn % Discharge
16	1:29 PM	16.000	0.2/0.8	1.800	0.2000	0.360	Large SNR Variation, SNR Threshold Variation
16	1:29 PM	16.000	0.2/0.8	1.800	0.8000	1.440	Large SNR Variation, SNR Threshold Variation
18	1:35 PM	18.000	None	0.000	0.0000	0.000	Water Depth > QC

Figure 3 Discharge Measurement Summary LRC-1



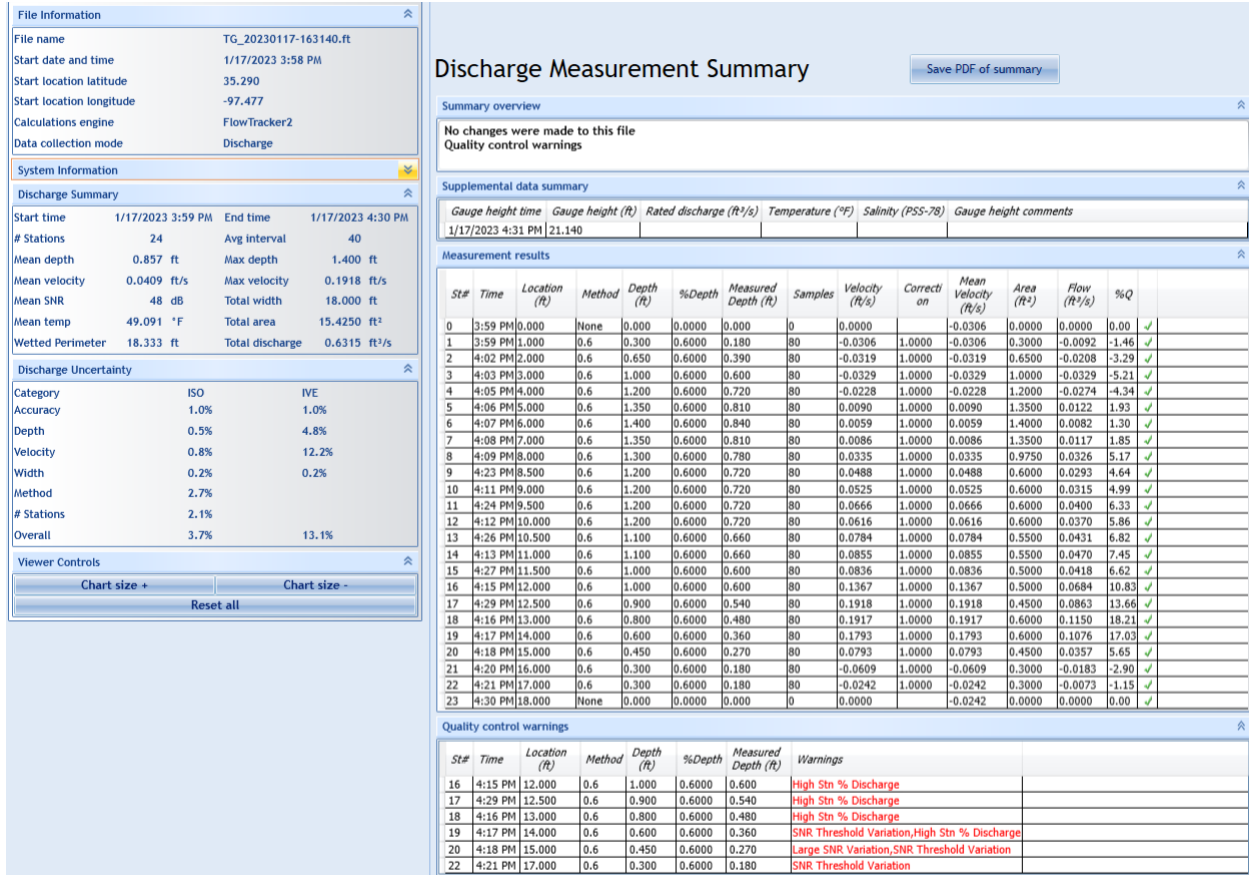


Figure 4 Discharge Measurement Summary TG-1

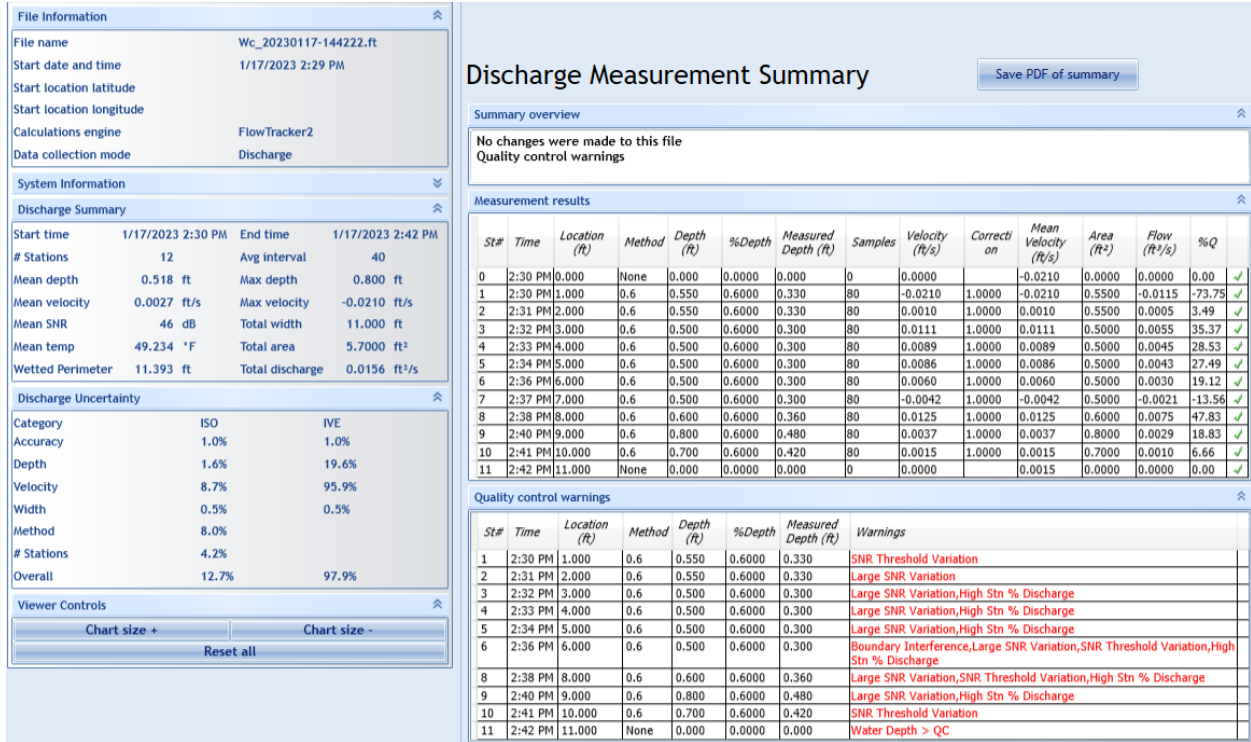


Figure 5 Discharge Measurement Summary WC-1

Period Selected: 2023-01-01 00:00 - 2023-01-31 23:59

UTC Offs et: -06:00

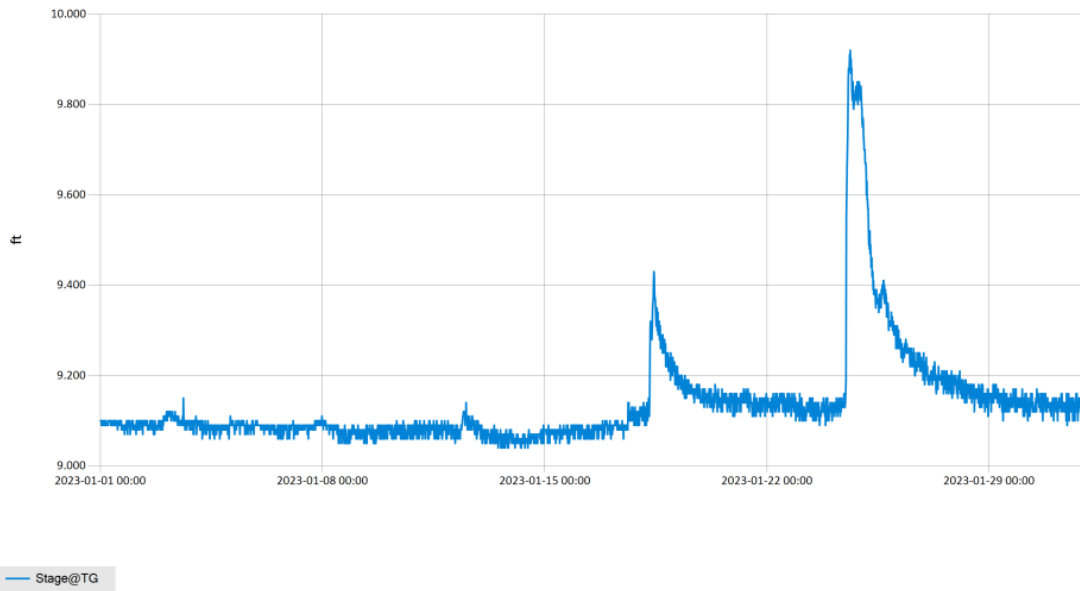


Figure 6 Monthly Hydrograph TG-1

Period Selected: 2023-01-01 00:00 - 2023-01-31 23:59

UTC Offset: -06:00

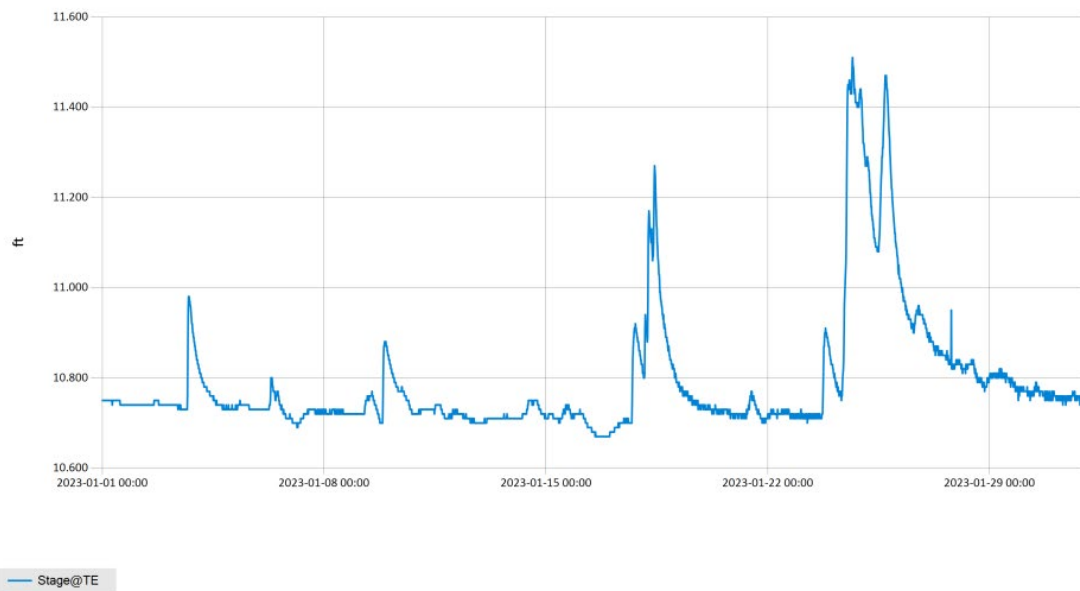
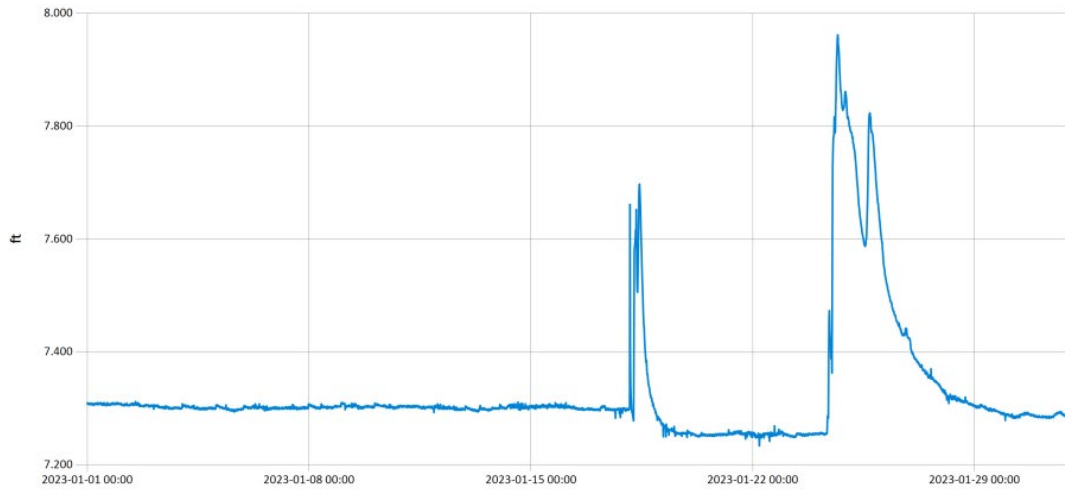


Figure 7 Monthly Hydrograph TE-1

Period Selected: 2023-01-01 00:00 - 2023-01-31 23:59

UTC Offset: -06:00

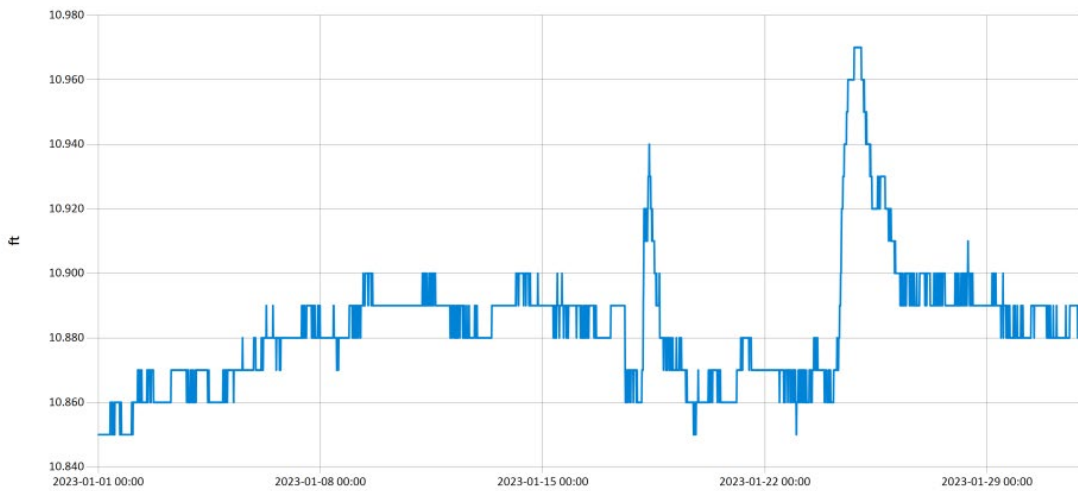


— Stage@WC

Figure 8 Monthly Hydrograph WC-1

Period Selected: 2023-01-01 00:00 - 2023-01-31 23:59

UTC Offset: -06:00

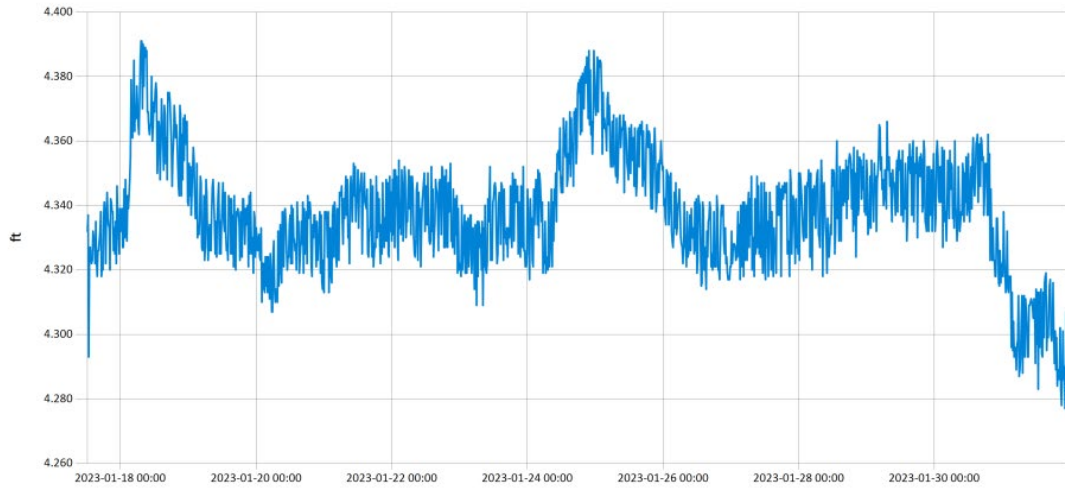


— Stage@URC

Figure 9 Monthly Hydrograph URC-2

Period Selected: 2023-01-01 00:00 - 2023-01-31 23:59

UTC Offset: -06:00

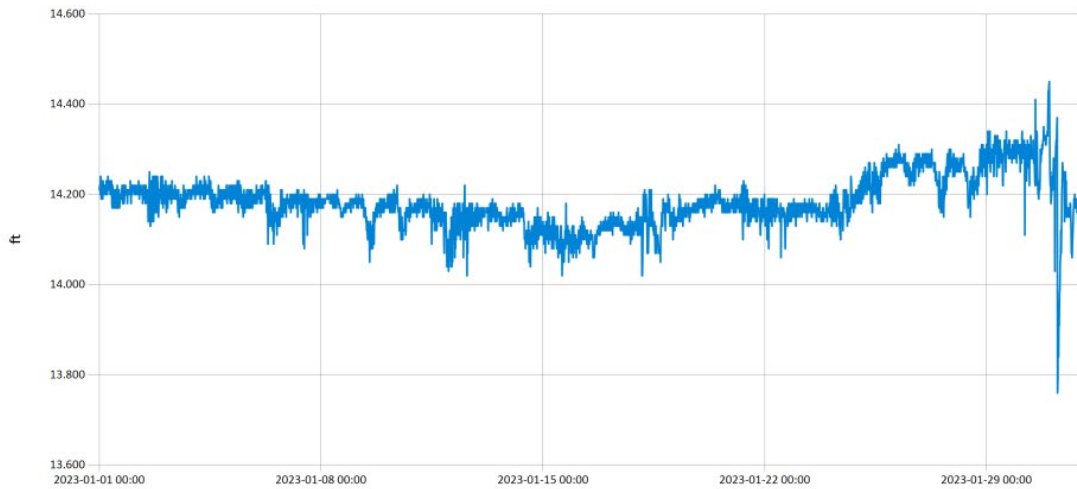


— Stage@LRC

Figure 10 Monthly Hydrograph LRC-1

Period Selected: 2023-01-01 00:00 - 2023-01-31 23:59

UTC Offset: -06:00



— Stage@LDB

Figure 11 Monthly Hydrograph LDB-1

Period Selected: 2023-01-01 00:00 - 2023-01-31 23:59

UTC Offset: -06:00



Figure 12 Monthly Hydrograph CC-1

Period Selected: 2023-01-01 00:00 - 2023-01-31 23:59

UTC Offset: -06:00

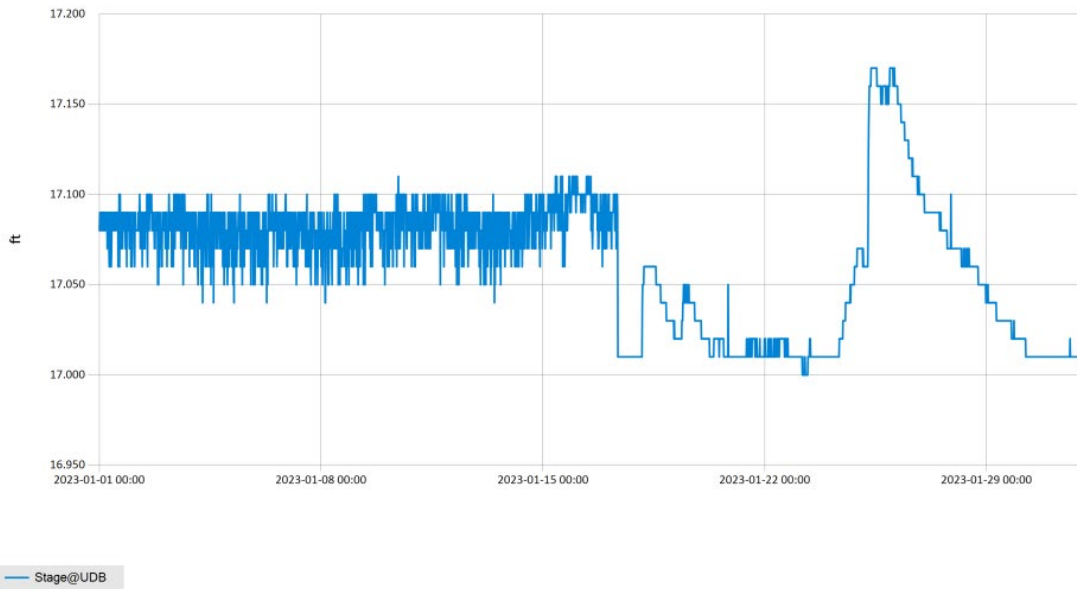


Figure 13 Monthly Hydrograph UDB-1

MESONET CLIMATOLOGICAL DATA SUMMARY				January 2023				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 <sup>2</sup> )	SOD	BARE	MAX	MIN	
1	73	39	55.1	40.8	9	0	92	30	62	0.00	28.53	29.77	SSW	5.5	15.6	10.17	45.3	46.9	53	43	
2	71	44	60.7	55.4	7	0	97	67	83	0.00	28.47	29.71	SSE	8.7	25.4	3.72	47.9	50.8	55	46	
3	57	33	46.0	30.4	20	0	92	38	56	0.00	28.56	29.80	WNW	9.1	20.3	11.20	48.0	49.2	53	46	
4	52	27	39.4	26.2	25	0	87	34	62	0.00	28.78	30.03	W	6.4	17.1	11.48	45.1	44.7	50	41	
5	55	29	40.5	21.9	23	0	75	23	51	0.00	28.97	30.23	WNW	6.3	17.2	11.52	44.2	43.4	49	39	
6	67	32	52.1	35.7	15	0	95	41	55	0.00	28.78	30.03	S	10.6	33.7	9.84	44.7	45.6	51	40	
7	52	34	42.2	30.8	22	0	98	43	65	0.00	28.94	30.20	NNW	9.8	24.1	10.57	45.6	46.2	49	43	
8	57	26	41.5	28.0	23	0	90	35	62	0.00	29.01	30.27	S	4.3	12.9	11.83	43.9	44.1	50	39	
9	66	37	48.9	32.0	13	0	75	31	54	0.00	28.83	30.08	S	8.7	29.0	11.81	44.7	45.7	51	41	
10	71	30	52.1	32.3	14	0	91	24	53	0.00	28.60	29.84	SSW	6.5	22.0	10.36	44.8	46.2	52	41	
11	70	40	55.9	29.9	10	0	67	19	39	0.00	28.49	29.73	WNW	8.2	38.1	8.12	46.0	48.2	52	44	
12	50	30	41.2	27.8	25	0	73	38	60	0.00	28.99	30.24	NNW	16.8	42.2	10.59	45.8	47.2	50	44	
13	53	23	37.4	24.8	27	0	89	37	63	0.00	29.11	30.37	NNW	4.1	11.5	11.94	43.2	43.2	49	38	
14	59	32	45.4	24.5	19	0	67	28	46	0.00	28.85	30.10	SSE	11.8	32.1	10.99	43.7	44.2	49	40	
15	63	45	54.3	40.7	11	0	80	44	60	0.00	28.49	29.73	S	15.2	31.9	6.59	45.6	47.4	51	44	
16	67	40	57.6	34.3	12	0	69	23	43	0.00	28.42	29.65	SSW	9.6	30.2	12.10	48.4	52.1	56	49	
17	60	33	49.8	35.0	18	0	86	40	59	0.00	28.49	29.73	ESE	3.1	12.1	5.37	46.8	48.5	51	45	
18	63	38	54.5	36.6	14	0	95	24	56	0.32	28.43	29.67	SW	12.0	35.0	11.47	48.5	50.3	53	47	
19	50	32	39.9	25.6	24	0	82	41	57	0.00	28.79	30.04	WNW	10.1	31.8	12.47	46.0	44.3	48	41	
20	58	25	42.7	26.9	24	0	91	27	58	0.00	28.94	30.19	ESE	5.1	17.3	12.98	44.4	43.6	50	38	
21	56	38	45.3	33.4	18	0	86	31	64	0.02	28.72	29.96	SSE	10.7	26.8	8.36	45.8	45.8	50	44	
22	45	27	37.3	28.1	29	0	90	47	70	0.00	28.75	30.00	NW	10.9	27.3	9.23	45.0	44.3	48	42	
23	49	20	36.4	23.7	31	0	94	32	64	0.00	28.97	30.23	ESE	3.3	12.1	13.10	42.7	41.8	48	37	
24	41	32	34.9	30.2	28	0	98	53	85	0.46	28.80	30.05	ENE	7.1	15.5	1.79	43.0	40.7	44	38	
25	44	29	35.4	30.7	28	0	97	59	84	0.47	28.83	30.08	NW	10.4	20.9	9.30	41.8	38.1	41	36	
26	50	25	36.3	26.1	28	0	93	39	69	0.00	29.01	30.27	WNW	8.2	27.3	13.71	40.9	38.6	44	36	
27	57	35	44.7	24.9	19	0	63	27	47	0.00	28.84	30.10	SW	11.7	30.9	13.90	41.5	39.5	45	36	
28	63	36	49.8	38.2	16	0	86	43	65	0.00	28.66	29.91	S	13.0	32.5	13.24	43.5	43.1	49	39	
29	36	20	24.0	20.8	37	0	95	79	87	0.00	28.92	30.17	N	15.8	28.4	2.61	41.8	38.4	45	36	
30	23	18	20.3	12.0	45	0	83	64	70	0.00	29.09	30.34	N	13.7	24.1	2.97	38.3	35.0	36	34	
31	25	17	21.3	9.1	44	0	77	48	59	0.00	29.11	30.38	N	10.4	25.0	4.21	37.0	33.3	34	33	
				←- Monthly Averages →-						28.78 30.03				S 9.3 42.2		9.60		44.3 44.2 48 41			
Temperature - Highest: 73 Lowest: 17							Degree Days - Total HDD: 680 Total CDD: 0					Number of Days With: Tmax ≥ 90: 0      Rainfall ≥ 0.01 inch: 4 Tmax ≤ 32: 2      Rainfall ≥ 0.10 inch: 3 Tmin ≤ 32: 18      Avg Wind Speed ≥ 10 mph: 14 Tmin ≤ 0: 0      Max Wind Speed ≥ 30 mph: 10									
Rainfall: Monthly Total: 1.27 in. Greatest 24 Hr: 0.47 in.							Humidity - Highest: 98 Lowest: 19														

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\* Denotes incomplete record

Figure 14 January Mesonet Data