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

SY2021 Monthly Report

Lake Thunderbird TMDL Monitoring Plan Implementation:

March 2021 Monitoring Report

Oklahoma Water Resources Board
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SUMMARY OF MARCH WATER QUALITY SAMPLING

Sampling for March 2021 consisted of two sampling events. The first collection occurred during base flow conditions on the fifteenth. Water samples were collected at all ten locations and a discharge measurement was collected at one location. Mesonet data shows no precipitation on the fifteenth, 0.23 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 second collection occurred during stormwater conditions on the twenty-second and twenty-third. Water samples were collected via autosampler at four locations on the twenty-second, and all seven stormwater outfalls and JB-1 were collected on the twenty-third. JB-1, however, was considered a high flow sample since it was collected too far past its peak to be categorized as a stormwater sample. Discharge measurements were also collected at three locations on the twenty-third. Mesonet data shows 1.64 inches of precipitation on the twenty-second, no precipitation in the 72 hours prior to sampling, and 0.48 inches of precipitation in the 72 hours after sampling occurred. The total rainfall amount in Norman for the month of March was 2.51 inches. All water level gauges were operational for the month, except for LT-1 and UDB-1 due to equipment malfunction. TG-1, URC-2, and CC-1 also experienced minor data gaps as a result of battery issues.

RESULTS

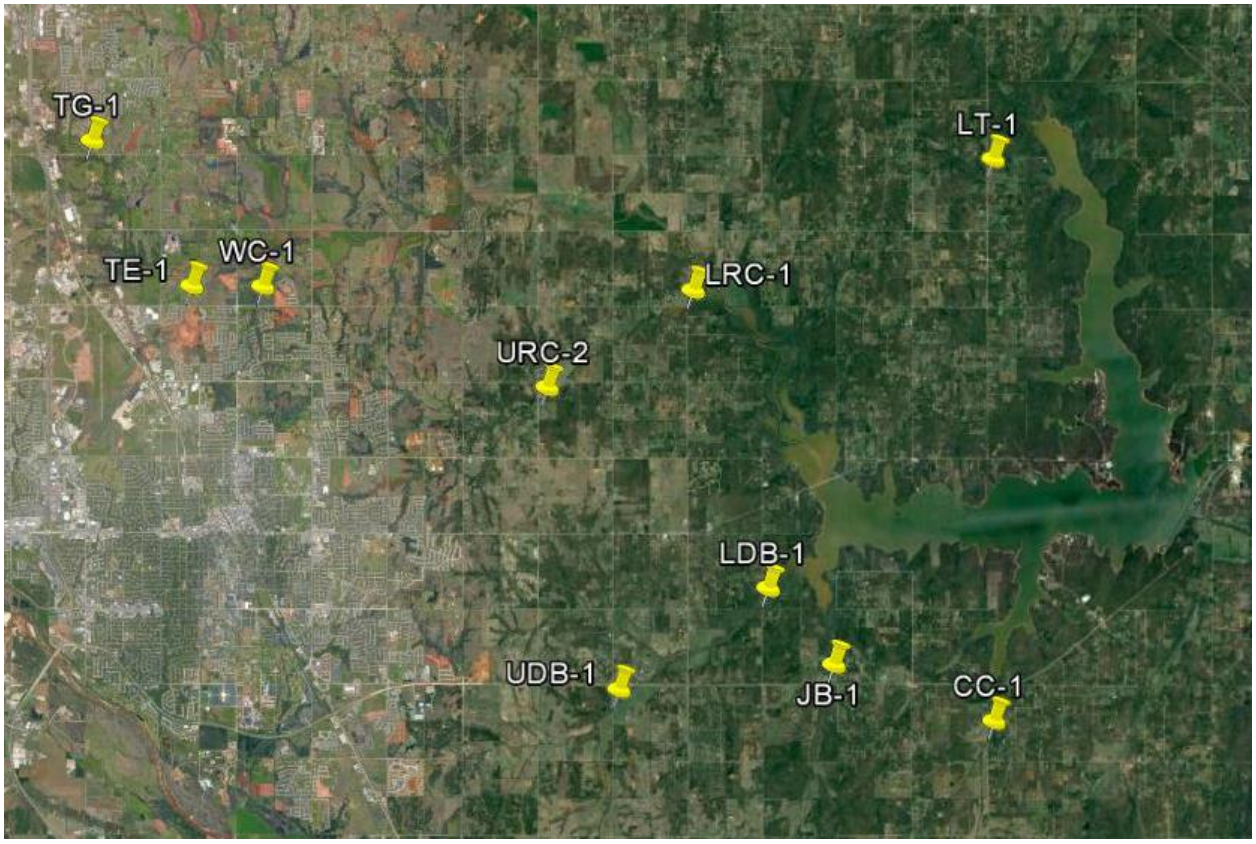

Figure 1 Monitoring Station Map

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	3/15/2021	10:50	SD	12.15	10.59	7.93	686	6	
JB-1	Jim Blue Creek	3/15/2021	12:05	SD	12.62	9.77	7.82	808	4	Neither RP over water, orifice clear, visible flow. Netting installed over bridge opening
LDB-1	Lower Dave Blue Creek	3/15/2021	12:35	SD	15.65	12.63	8.04	913	13	Positive visual flow, floating debris is algae mats
LRC-1	Lower Rock Creek	3/15/2021	13:55	SD	16.00	12.53	8.11	743	8	
LT-1	Lake Laterals	3/15/2021	13:15	SD	15.77	7.80	7.73	457	8	Most filamentous on upstream, no DCP
TE-1	Little River Tributary	3/15/2021	16:00	SD	19.69	15.25	8.20	1354	11	Moderate/abundant algae, low visual flow, low stage, small beaver dam still upstream, water not flowing through
TG-1	Little River Tributary	3/15/2021	16:35	SD	17.69	14.95	8.29	995	10	Trash gone from upstream rew
UDB-1	Upper Dave Blue Creek	3/15/2021	8:45	SD	12.14	8.30	7.79	833	9	Radar not reading stage (last stage transmission 3/14 @ 02:45)
URC-2	Upper Rock Creek	3/15/2021	14:40	SD	15.55	8.17	7.84	808	19	Verified RP, purged fine, some cow activity upstream, moderate/abundant algae
WC-1	Woodcrest Creek	3/15/2021	15:25	SD	16.46	11.61	7.79	880	18	Heavier algae presence upstream of bridge, moderate/abundant

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	0.24	0.027	<5.0
JB-1	Jim Blue Creek	<0.05	0.27	0.020	<5.0
LDB-1	Lower Dave Blue Creek	<0.05	0.32	0.032	<5.0
LRC-1	Lower Rock Creek	<0.05	0.23	0.066	<5.0
LT-1	Lake Laterals	<0.05	0.47	0.028	6.0
TE-1	Little River Tributary	<0.05	0.52	0.037	<5.0
TG-1	Little River Tributary	0.38	0.76	0.055	<5.0
UDB-1	Upper Dave Blue Creek	<0.05	0.32	0.023	8.0
URC-2	Upper Rock Creek	<0.05	0.48	0.051	12.0
WC-1	Woodcrest Creek	<0.05	0.47	0.058	6.0

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	0.23	0.027	<5.0
Duplicate RPD	0%	4.26%	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	0.82	21.08
JB-1	Jim Blue Creek	0.04	15.40
LDB-1	Lower Dave Blue Creek	6.18	16.78
LRC-1	Lower Rock Creek	7.52	18.01
LT-1	Lake Laterals	0.77	4.69
TE-1	Little River Tributary	0.39	11.25
TG-1	Little River Tributary	1.98	9.23
UDB-1	Upper Dave Blue Creek	1.63	17.64
URC-2	Upper Rock Creek	0.11	11.22
WC-1	Woodcrest Creek	0.06	7.64

Table 4 Station Discharge Summary

All rated stream discharges are provisional and subject to change.

Discharge Measurement Summary

Date Generated: Thu Mar 25 2021

File Information	
File Name	CC0315.WAD
Start Date and Time	2021/03/15 11:09:40

Site Details	
Site Name	CC
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^2
Discharge	cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.5%	2.5%
Velocity	1.3%	9.5%
Width	0.2%	0.2%
Method	2.4%	-
# Stations	2.4%	-
Overall	**3.8%**	**9.9%**

Summary

Averaging Int.	40	# Stations	21
Start Edge	LEW	Total Width	10.000
Mean SNR	30.9 dB	Total Area	5.225
Mean Temp	54.25 °F	Mean Depth	0.522
Disch. Equation	Mid-Section	Mean Velocity	0.1571
		Total Discharge	**0.8208**

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Mon Mar 15 11:31:06 CDT 2021	10.000	21.080		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	11:09	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	11:09	0.50	0.6	0.400	0.6	0.160	0.0003	1.00	0.0003	0.200	0.0001	0.0
2	*11:10*	*1.00*	*0.6*	*0.500*	*0.6*	*0.200*	*-0.0102*	*1.00*	*-0.0102*	*0.250*	*-0.0025*	*-0.3*
3	11:11	1.50	0.6	0.400	0.6	0.160	0.3747	1.00	0.3747	0.200	0.0749	9.1
4	*11:12*	*2.00*	*0.6*	*0.400*	*0.6*	*0.160*	*0.3517*	*1.00*	*0.3517*	*0.200*	*0.0703*	*8.6*
5	*11:13*	*2.50*	*0.6*	*0.400*	*0.6*	*0.160*	*0.4551*	*1.00*	*0.4551*	*0.200*	*0.0910*	*11.1*
6	*11:14*	*3.00*	*0.6*	*0.400*	*0.6*	*0.160*	*0.4501*	*1.00*	*0.4501*	*0.200*	*0.0900*	*11.0*
7	*11:15*	*3.50*	*0.6*	*0.300*	*0.6*	*0.120*	*0.4839*	*1.00*	*0.4839*	*0.150*	*0.0726*	*8.8*
8	11:16	4.00	0.6	0.350	0.6	0.140	0.4226	1.00	0.4226	0.175	0.0740	9.0
9	*11:17*	*4.50*	*0.6*	*0.500*	*0.6*	*0.200*	*0.3048*	*1.00*	*0.3048*	*0.250*	*0.0762*	*9.3*
10	*11:19*	*5.00*	*0.6*	*0.650*	*0.6*	*0.260*	*0.2717*	*1.00*	*0.2717*	*0.325*	*0.0883*	*10.8*
11	*11:20*	*5.50*	*0.6*	*0.700*	*0.6*	*0.280*	*0.2556*	*1.00*	*0.2556*	*0.350*	*0.0895*	*10.9*
12	*11:21*	*6.00*	*0.6*	*0.800*	*0.6*	*0.320*	*0.1988*	*1.00*	*0.1988*	*0.400*	*0.0795*	*9.7*
13	*11:22*	*6.50*	*0.6*	*0.850*	*0.6*	*0.340*	*0.1076*	*1.00*	*0.1076*	*0.425*	*0.0457*	*5.6*
14	*11:23*	*7.00*	*0.6*	*0.800*	*0.6*	*0.320*	*0.0046*	*1.00*	*0.0046*	*0.400*	*0.0018*	*0.2*
15	*11:24*	*7.50*	*0.6*	*0.750*	*0.6*	*0.300*	*-0.0184*	*1.00*	*-0.0184*	*0.375*	*-0.0069*	*-0.8*
16	*11:25*	*8.00*	*0.6*	*0.700*	*0.6*	*0.280*	*-0.0079*	*1.00*	*-0.0079*	*0.350*	*-0.0028*	*-0.3*
17	*11:26*	*8.50*	*0.6*	*0.650*	*0.6*	*0.260*	*-0.0312*	*1.00*	*-0.0312*	*0.325*	*-0.0101*	*-1.2*
18	*11:29*	*9.00*	*0.6*	*0.500*	*0.6*	*0.200*	*0.0007*	*1.00*	*0.0007*	*0.250*	*0.0002*	*0.0*
19	*11:30*	*9.50*	*0.6*	*0.400*	*0.6*	*0.160*	*-0.0545*	*1.00*	*-0.0545*	*0.200*	*-0.0109*	*-1.3*
20	11:30	10.00	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

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
JB-1	Jim Blue Creek	3/23/2021	13:30	SD	13.23	8.65	7.64	264	109	Foam mostly stuck in netting under bridge/ backwater on lew. Took flow: before td=17.13, after td=17.02, flow=22.888 cfs. Not considered storm sample: 2ft down from peak
LDB-1	Lower Dave Blue Creek	3/22/2021	21:15	SD	*	*	8.11	266	1000	T1 collected, peak at 17.67 @ 22:00 on 3/22
LRC-1	Lower Rock Creek	3/22/2021	22:00	SD	*	*	8.01	237	1000	T2 collected, peak at 23.24 @ 22:30 on 3/22. Took flow: before td=19.87, after td=19.77, flow=39.749 cfs
URC-2	Upper Rock Creek	3/22/2021	20:30	SD	*	*	7.88	364	1000	T1 collected, peak at 16.69 @ 21:15 on 3/22, neighbor across the street had over 2 in. of rain. Took flow: before td=13.1, after td=13.03, flow=26.819 cfs
WC-1	Woodcrest Creek	3/22/2021	19:30	SD	*	*	8.11	201	1000	T1 collected, peak at 13.15 @ 20:15 on 3/22
SW-08	Stormwater Outfall 08	3/23/2021	9:40	SD	11.17	9.95	7.88	183	76	Bottles had more floating debis than current, probably filled the previous night. Neighbor recorded over 3 in. of rain
SW-09	Stormwater Outfall 09	3/23/2021	12:05	SD	11.35	8.90	7.63	384	26	Collected from current conditions, most of floating debris is styrofoam trash, small amount of foam mostly near culvert opening
SW-10	Stormwater Outfall 10	3/23/2021	11:20	SD	10.76	10.67	8.65	262	31	More small floating debris in samplers than current, samplers probably filled previous night, stream was at least 1ft higher than current
SW-11	Stormwater Outfall 11	3/23/2021	11:40	SD	12.15	9.04	7.47	560	42	Collected from current conditions
SW-12	Stormwater Outfall 12	3/23/2021	10:05	SD	11.81	8.97	7.88	525	22	Collected from current conditions
SW-13	Stormwater Outfall 13	3/23/2021	10:45	SD	10.73	9.95	7.85	372	151	Stream was at least 1 ft higher than current conditions, samplers probably filled previous night
SW-14	Stormwater Outfall 14	3/23/2021	8:50	SD	11.00	9.49	7.77	291	117	Collected from current conditions

Table 5 Stormwater 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)
JB-1	Jim Blue Creek	0.17	1.20	0.174	46.0
LDB-1	Lower Dave Blue Creek	0.10	3.11	0.902	1380
LRC-1	Lower Rock Creek	0.17	6.32	2.00	4560
URC-2	Upper Rock Creek	0.41	4.71	1.42	4600
WC-1	Woodcrest Creek	0.70	3.12	1.08	1440
SW-08	Stormwater Outfall 08	1.16	2.28	0.660	236
SW-09	Stormwater Outfall 09	0.09	1.36	0.349	<5.0
SW-10	Stormwater Outfall 10	0.07	0.65	0.109	54.0
SW-11	Stormwater Outfall 11	1.27	0.85	0.127	20.0
SW-12	Stormwater Outfall 12	0.12	0.90	0.053	8.0
SW-13	Stormwater Outfall 13	0.30	1.29	0.161	116
SW-14	Stormwater Outfall 14	0.29	1.45	0.271	50.0

Table 6 Stormwater Laboratory Analysis Summary

Monitoring Location ID	Monitoring Location Name	Discharge (cfs)	Stream Stage (ft)
JB-1	Jim Blue Creek	22.89	17.08
LDB-1	Lower Dave Blue Creek	60.84	17.53
LRC-1	Lower Rock Creek	115.10	22.89
URC-2	Upper Rock Creek	135.30	16.48
WC-1	Woodcrest Creek	183.00	12.37

Table 7 Stormwater Station Discharge Summary

Discharge Measurement Summary

Date Generated: Thu Mar 25 2021

File Information	
File Name	JB0323.WAD
Start Date and Time	2021/03/23 11:23:58

Site Details	
Site Name	JB
Operator(s)	SCD

System Information	
Sensor Type	FlowTracker
Serial #	P4713
CPU Firmware Version	3.9
Software Ver	2.30
Mounting Correction	0.0%

Units	(English Units)
Distance	ft
Velocity	ft/s
Area	ft^2
Discharge	cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.2%	0.9%
Velocity	0.9%	2.8%
Width	0.1%	0.1%
Method	2.2%	-
# Stations	1.9%	-
Overall	**3.2%**	**3.1%**

Summary

Averaging Int.	40	# Stations	27
Start Edge	LEW	Total Width	14.000
Mean SNR	48.8 dB	Total Area	15.750
Mean Temp	54.29 °F	Mean Depth	1.125
Disch. Equation	Mid-Section	Mean Velocity	1.4532
		Total Discharge	**22.8881**

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Tue Mar 23 11:54:08 CDT 2021	13.500	17.130		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	11:23	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	*11:23*	*1.00*	*0.6*	*0.700*	*0.6*	*0.280*	*0.0062*	*1.00*	*0.0062*	*0.525*	*0.0033*	*0.0*
2	*11:26*	*1.50*	*0.6*	*0.950*	*0.6*	*0.380*	*0.0095*	*1.00*	*0.0095*	*0.475*	*0.0045*	*0.0*
3	*11:27*	*2.00*	*0.6*	*1.500*	*0.6*	*0.600*	*-0.0092*	*1.00*	*-0.0092*	*0.750*	*-0.0069*	*0.0*
4	11:28	2.50	0.6	1.700	0.6	0.680	0.0994	1.00	0.0994	0.850	0.0845	0.4
5	11:29	3.00	0.6	1.800	0.6	0.720	0.5843	1.00	0.5843	0.900	0.5258	2.3
6	11:30	3.50	0.6	1.900	0.6	0.760	0.7270	1.00	0.7270	0.950	0.6907	3.0
7	*11:32*	*4.00*	*0.6*	*2.100*	*0.6*	*0.840*	*1.4452*	*1.00*	*1.4452*	*1.050*	*1.5175*	*6.6*
8	11:33	4.50	0.6	2.100	0.6	0.840	1.6434	1.00	1.6434	1.050	1.7256	7.5
9	*11:34*	*5.00*	*0.6*	*2.100*	*0.6*	*0.840*	*2.2995*	*1.00*	*2.2995*	*1.050*	*2.4146*	*10.5*
10	11:35	5.50	0.6	2.000	0.6	0.800	2.4774	1.00	2.4774	1.000	2.4774	10.8
11	11:36	6.00	0.6	1.950	0.6	0.780	2.5358	1.00	2.5358	0.975	2.4725	10.8
12	11:37	6.50	0.6	1.800	0.6	0.720	2.7070	1.00	2.7070	0.900	2.4361	10.6
13	11:39	7.00	0.6	1.700	0.6	0.680	2.9203	1.00	2.9203	0.850	2.4824	10.8
14	11:40	7.50	0.6	1.500	0.6	0.600	2.9462	1.00	2.9462	0.750	2.2096	9.7
15	*11:41*	*8.00*	*0.6*	*1.400*	*0.6*	*0.560*	*2.3743*	*1.00*	*2.3743*	*0.700*	*1.6620*	*7.3*
16	11:42	8.50	0.6	1.200	0.6	0.480	2.1854	1.00	2.1854	0.600	1.3114	5.7
17	*11:43*	*9.00*	*0.6*	*0.900*	*0.6*	*0.360*	*1.3005*	*1.00*	*1.3005*	*0.450*	*0.5852*	*2.6*
18	*11:44*	*9.50*	*0.6*	*0.600*	*0.6*	*0.240*	*0.3963*	*1.00*	*0.3963*	*0.300*	*0.1189*	*0.5*
19	11:45	10.00	0.6	0.500	0.6	0.200	0.6063	1.00	0.6063	0.250	0.1516	0.7
20	*11:46*	*10.50*	*0.6*	*0.500*	*0.6*	*0.200*	*0.0335*	*1.00*	*0.0335*	*0.250*	*0.0084*	*0.0*
21	*11:47*	*11.00*	*0.6*	*0.500*	*0.6*	*0.200*	*0.0148*	*1.00*	*0.0148*	*0.250*	*0.0037*	*0.0*
22	*11:48*	*11.50*	*0.6*	*0.500*	*0.6*	*0.200*	*0.0184*	*1.00*	*0.0184*	*0.250*	*0.0046*	*0.0*
23	*11:50*	*12.00*	*0.6*	*0.400*	*0.6*	*0.160*	*0.0013*	*1.00*	*0.0013*	*0.200*	*0.0003*	*0.0*
24	*11:51*	*12.50*	*0.6*	*0.400*	*0.6*	*0.160*	*0.0052*	*1.00*	*0.0052*	*0.200*	*0.0010*	*0.0*
25	*11:52*	*13.00*	*0.6*	*0.300*	*0.6*	*0.120*	*0.0151*	*1.00*	*0.0151*	*0.225*	*0.0034*	*0.0*
26	11:52	14.00	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

Discharge Measurement Summary

Date Generated: Thu Mar 25 2021

File Information	
File Name	LRC0323.WAD
Start Date and Time	2021/03/23 13:45:06

Site Details	
Site Name	LRC
Operator(s)	SCD

System Information	
Sensor Type	FlowTracker
Serial #	P4713
CPU Firmware Version	3.9
Software Ver	2.30
Mounting Correction	0.0%

Units	(English Units)
Distance	ft
Velocity	ft/s
Area	ft^2
Discharge	cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.1%	1.3%
Velocity	0.4%	2.4%
Width	0.1%	0.1%
Method	1.5%	-
# Stations	1.6%	-
Overall	**2.4%**	**2.9%**

Summary

Averaging Int.	40	# Stations	33
Start Edge	LEW	Total Width	23.000
Mean SNR	53.3 dB	Total Area	38.300
Mean Temp	55.86 °F	Mean Depth	1.665
Disch. Equation	Mid-Section	Mean Velocity	1.0378
		Total Discharge	**39.7490**

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Tue Mar 23 14:17:42 CDT 2021	23.000	19.870		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	13:45	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	13:45	1.00	0.6	1.300	0.6	0.520	0.1102	1.00	0.1102	0.975	0.1075	0.3
2	13:46	1.50	0.6	1.900	0.6	0.760	0.1804	1.00	0.1804	0.950	0.1714	0.4
3	13:47	2.00	0.6	1.900	0.6	0.760	0.4396	1.00	0.4396	0.950	0.4176	1.1
4	13:48	2.50	0.6	1.750	0.6	0.700	0.7618	1.00	0.7618	0.875	0.6666	1.7
5	13:49	3.00	0.6	1.700	0.6	0.680	1.0446	1.00	1.0446	0.850	0.8880	2.2
6	13:50	3.50	0.6	2.700	0.6	1.080	0.3435	1.00	0.3435	1.350	0.4638	1.2
7	13:52	4.00	0.6	2.900	0.6	1.160	0.7165	1.00	0.7165	1.450	1.0390	2.6
8	13:53	4.50	0.6	2.900	0.6	1.160	0.9219	1.00	0.9219	1.450	1.3367	3.4
9	13:54	5.00	0.6	2.800	0.6	1.120	1.0794	1.00	1.0794	1.400	1.5111	3.8
10	13:55	5.50	0.6	2.800	0.6	1.120	1.3668	1.00	1.3668	1.400	1.9134	4.8
11	13:56	6.00	0.6	2.800	0.6	1.120	1.4137	1.00	1.4137	1.400	1.9791	5.0
12	13:57	6.50	0.6	2.700	0.6	1.080	1.3891	1.00	1.3891	1.350	1.8754	4.7
13	13:58	7.00	0.6	2.700	0.6	1.080	1.3681	1.00	1.3681	1.350	1.8470	4.6
14	13:59	7.50	0.6	2.600	0.6	1.040	1.3120	1.00	1.3120	1.300	1.7057	4.3
15	14:00	8.00	0.6	2.600	0.6	1.040	1.2510	1.00	1.2510	1.300	1.6263	4.1
16	14:01	8.50	0.6	2.450	0.6	0.980	1.2405	1.00	1.2405	1.225	1.5197	3.8
17	14:02	9.00	0.6	2.400	0.6	0.960	1.2270	1.00	1.2270	1.200	1.4724	3.7
18	14:03	9.50	0.6	2.250	0.6	0.900	1.2421	1.00	1.2421	1.125	1.3974	3.5
19	14:04	10.00	0.6	2.200	0.6	0.880	1.2274	1.00	1.2274	1.650	2.0253	5.1
20	14:05	11.00	0.6	2.000	0.6	0.800	1.2746	1.00	1.2746	2.000	2.5492	6.4
21	14:06	12.00	0.6	1.900	0.6	0.760	1.2297	1.00	1.2297	1.900	2.3363	5.9
22	14:07	13.00	0.6	1.700	0.6	0.680	1.1060	1.00	1.1060	1.700	1.8803	4.7
23	14:08	14.00	0.6	1.700	0.6	0.680	1.1312	1.00	1.1312	1.700	1.9232	4.8
24	14:09	15.00	0.6	1.400	0.6	0.560	1.1660	1.00	1.1660	1.400	1.6323	4.1
25	14:10	16.00	0.6	1.200	0.6	0.480	1.1647	1.00	1.1647	1.200	1.3978	3.5
26	14:11	17.00	0.6	1.000	0.6	0.400	1.0735	1.00	1.0735	1.000	1.0735	2.7
27	14:12	18.00	0.6	1.000	0.6	0.400	0.7825	1.00	0.7825	1.000	0.7825	2.0
28	14:13	19.00	0.6	0.900	0.6	0.360	1.0814	1.00	1.0814	0.900	0.9732	2.4
29	14:14	20.00	0.6	0.800	0.6	0.320	0.8189	1.00	0.8189	0.800	0.6550	1.6
30	14:15	21.00	0.6	0.750	0.6	0.300	0.6598	1.00	0.6598	0.750	0.4948	1.2
31	14:16	22.00	0.6	0.400	0.6	0.160	0.2188	1.00	0.2188	0.400	0.0875	0.2
32	14:16	23.00	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 4 Discharge Measurement Summary LRC-1

Discharge Measurement Summary

Date Generated: Thu Mar 25 2021

File Information	
File Name	URC0323.WAD
Start Date and Time	2021/03/23 15:18:35

Site Details	
Site Name	URC
Operator(s)	SCD

System Information	
Sensor Type	FlowTracker
Serial #	P4713
CPU Firmware Version	3.9
Software Ver	2.30
Mounting Correction	0.0%

Units	(English Units)
Distance	ft
Velocity	ft/s
Area	ft^2
Discharge	cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.1%	0.7%
Velocity	0.7%	1.5%
Width	0.1%	0.1%
Method	1.8%	-
# Stations	2.0%	-
Overall	**3.0%**	**1.9%**

Summary

Averaging Int.	40	# Stations	25
Start Edge	LEW	Total Width	21.000
Mean SNR	46.4 dB	Total Area	33.274
Mean Temp	56.93 °F	Mean Depth	1.584
Disch. Equation	Mid-Section	Mean Velocity	0.8060
		Total Discharge	**26.8185**

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Tue Mar 23 15:40:54 CDT 2021	21.000	13.100		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	15:18	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	*15:18*	*1.00*	*0.6*	*0.400*	*0.6*	*0.160*	*0.0745*	*1.00*	*0.0745*	*0.400*	*0.0298*	*0.1*
2	15:19	2.00	0.6	0.800	0.6	0.320	0.2539	1.00	0.2539	0.800	0.2031	0.8
3	15:20	3.00	0.6	1.000	0.6	0.400	0.3944	1.00	0.3944	1.000	0.3944	1.5
4	15:22	4.00	0.6	1.400	0.6	0.560	0.4485	1.00	0.4485	1.400	0.6279	2.3
5	15:23	5.00	0.6	1.400	0.6	0.560	0.6201	1.00	0.6201	1.400	0.8681	3.2
6	15:24	6.00	0.6	1.500	0.6	0.600	0.5755	1.00	0.5755	1.500	0.8632	3.2
7	15:25	7.00	0.6	1.700	0.6	0.680	0.5758	1.00	0.5758	1.700	0.9789	3.7
8	15:26	8.00	0.6	1.800	0.6	0.720	0.8455	1.00	0.8455	1.800	1.5217	5.7
9	15:27	9.00	0.6	2.000	0.6	0.800	0.9199	1.00	0.9199	2.000	1.8399	6.9
10	15:28	10.00	0.6	2.100	0.6	0.840	1.1073	1.00	1.1073	1.575	1.7440	6.5
11	15:42	10.50	0.6	2.200	0.6	0.880	1.1099	1.00	1.1099	1.100	1.2210	4.6
12	15:29	11.00	0.6	2.250	0.6	0.900	1.1965	1.00	1.1965	1.125	1.3461	5.0
13	15:44	11.50	0.6	2.300	0.6	0.920	1.3425	1.00	1.3425	1.150	1.5438	5.8
14	15:30	12.00	0.6	2.300	0.6	0.920	1.3038	1.00	1.3038	1.150	1.4993	5.6
15	15:45	12.50	0.6	2.300	0.6	0.920	1.2959	1.00	1.2959	1.150	1.4902	5.6
16	15:31	13.00	0.6	2.300	0.6	0.920	1.2874	1.00	1.2874	1.725	2.2206	8.3
17	15:31	14.00	0.6	2.300	0.6	0.920	1.1266	1.00	1.1266	2.300	2.5911	9.7
18	15:32	15.00	0.6	2.300	0.6	0.920	0.9163	1.00	0.9163	2.300	2.1075	7.9
19	15:34	16.00	0.6	2.000	0.6	0.800	0.7503	1.00	0.7503	2.000	1.5007	5.6
20	15:36	17.00	0.6	1.800	0.6	0.720	0.5230	1.00	0.5230	1.800	0.9413	3.5
21	15:37	18.00	0.6	1.600	0.6	0.640	0.4577	1.00	0.4577	1.600	0.7323	2.7
22	*15:38*	*19.00*	*0.6*	*1.300*	*0.6*	*0.520*	*0.2293*	*1.00*	*0.2293*	*1.300*	*0.2981*	*1.1*
23	*15:39*	*20.00*	*0.6*	*1.000*	*0.6*	*0.400*	*0.2556*	*1.00*	*0.2556*	*1.000*	*0.2556*	*1.0*
24	15:39	21.00	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 5 Discharge Measurement Summary URC-2

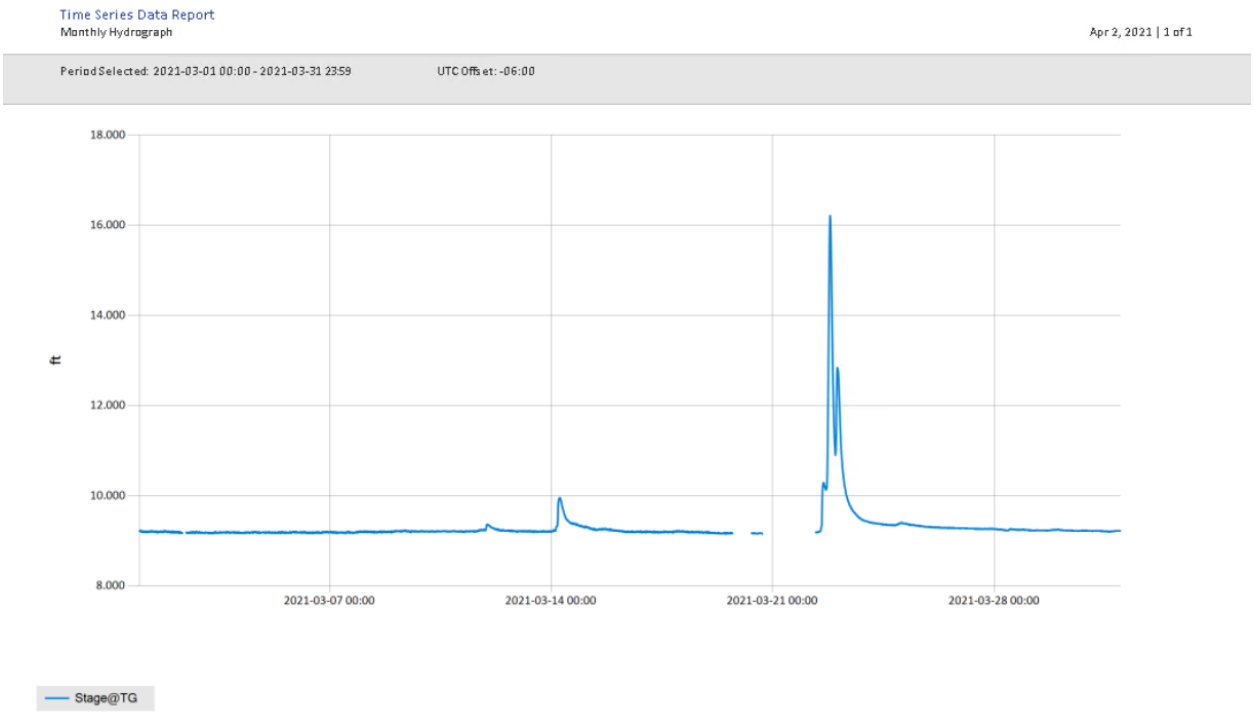

Figure 6 Monthly Hydrograph TG-1

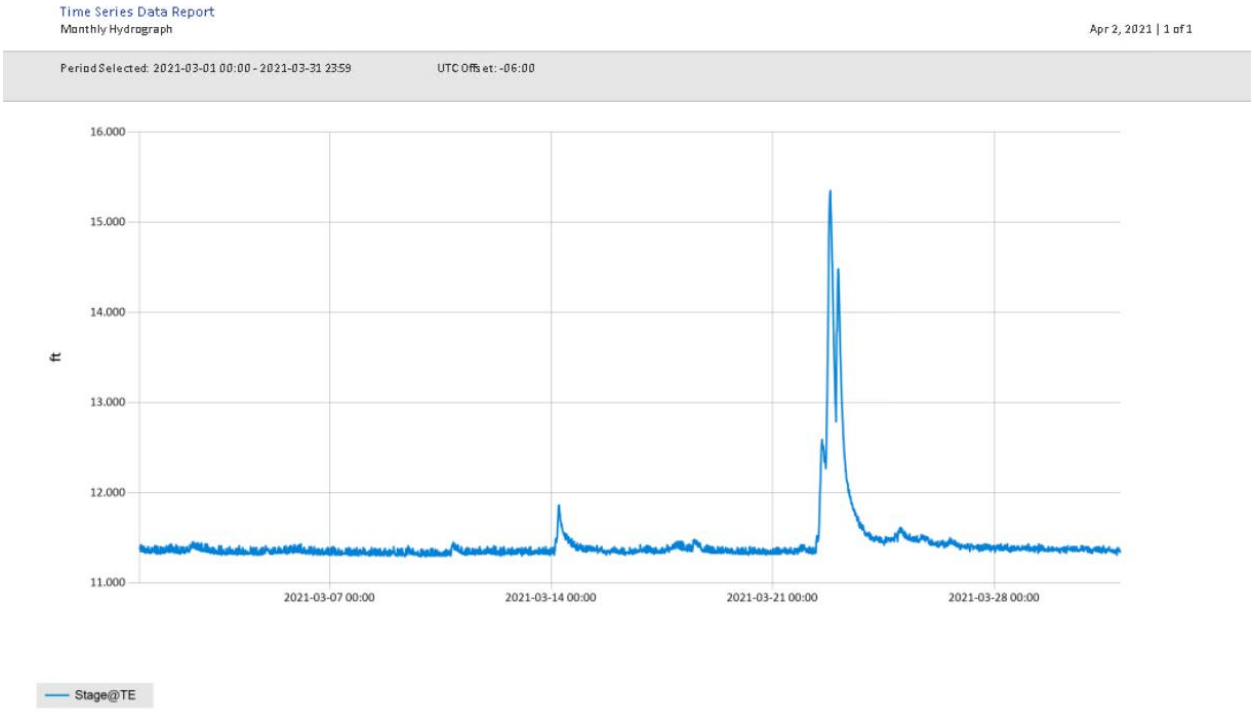

Figure 7 Monthly Hydrograph TE-1

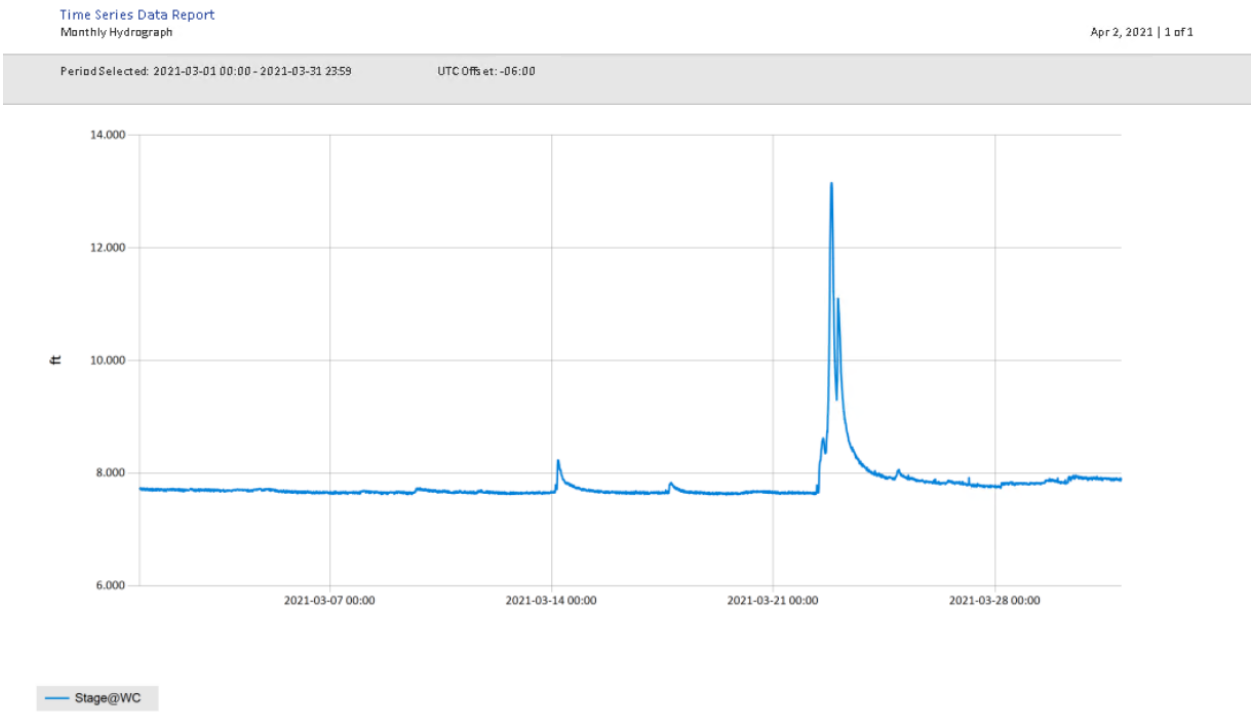

Figure 8 Monthly Hydrograph WC-1

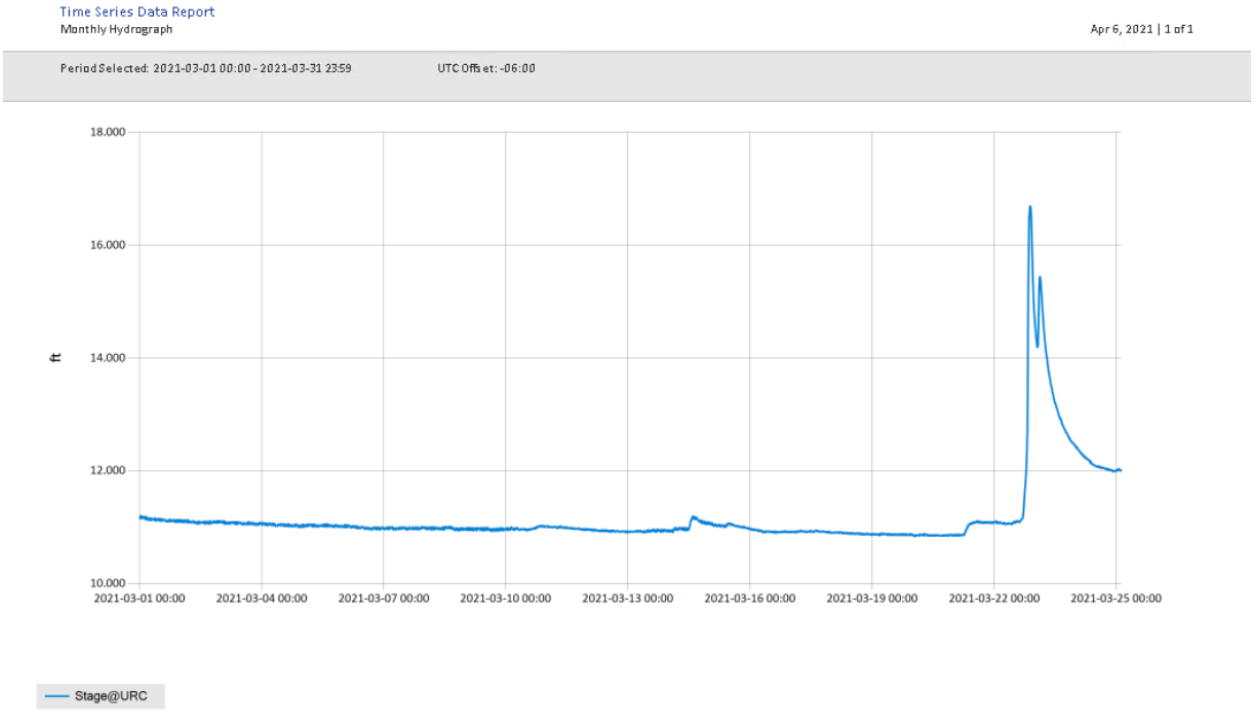

Figure 9 Monthly Hydrograph URC-2

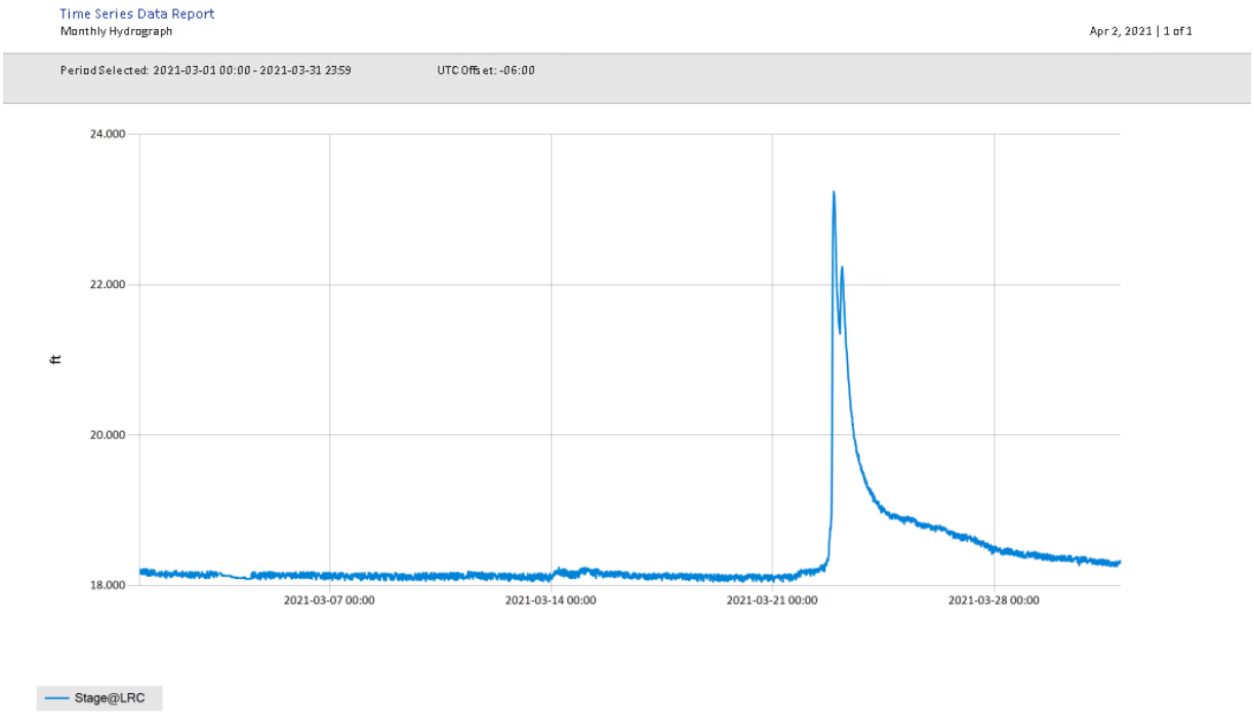

Figure 10 Monthly Hydrograph LRC-1

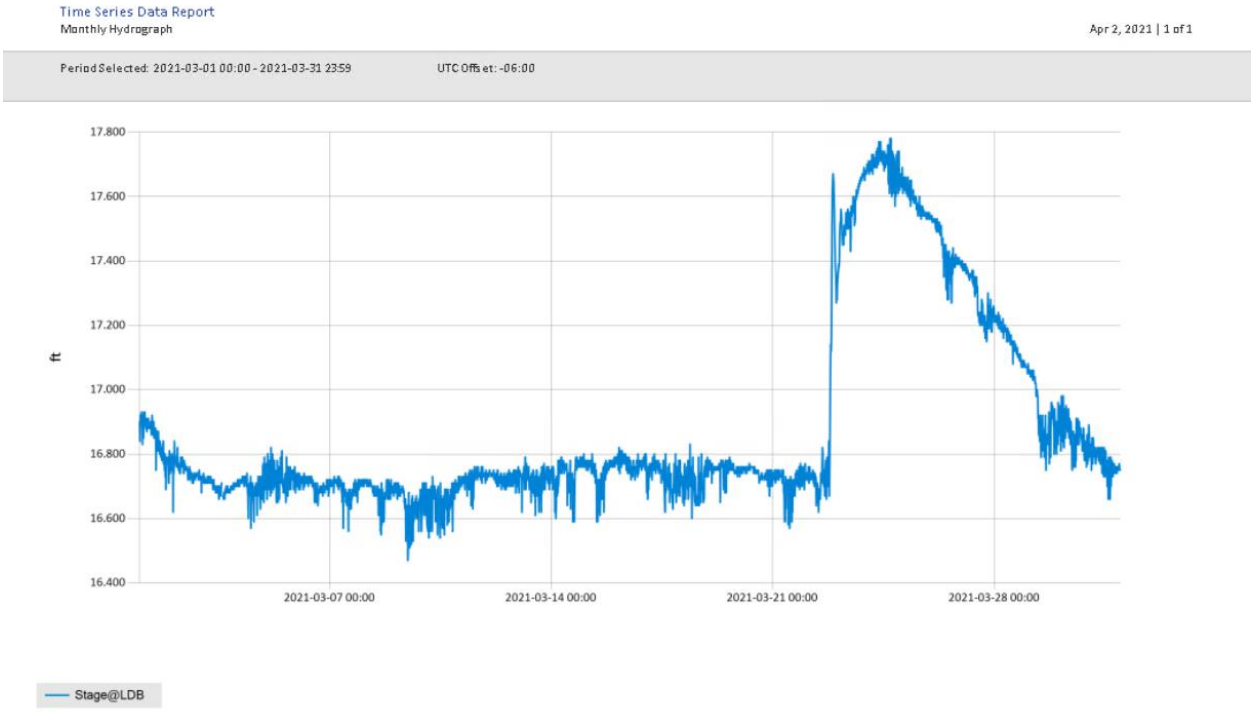

Figure 11 Monthly Hydrograph LDB-1

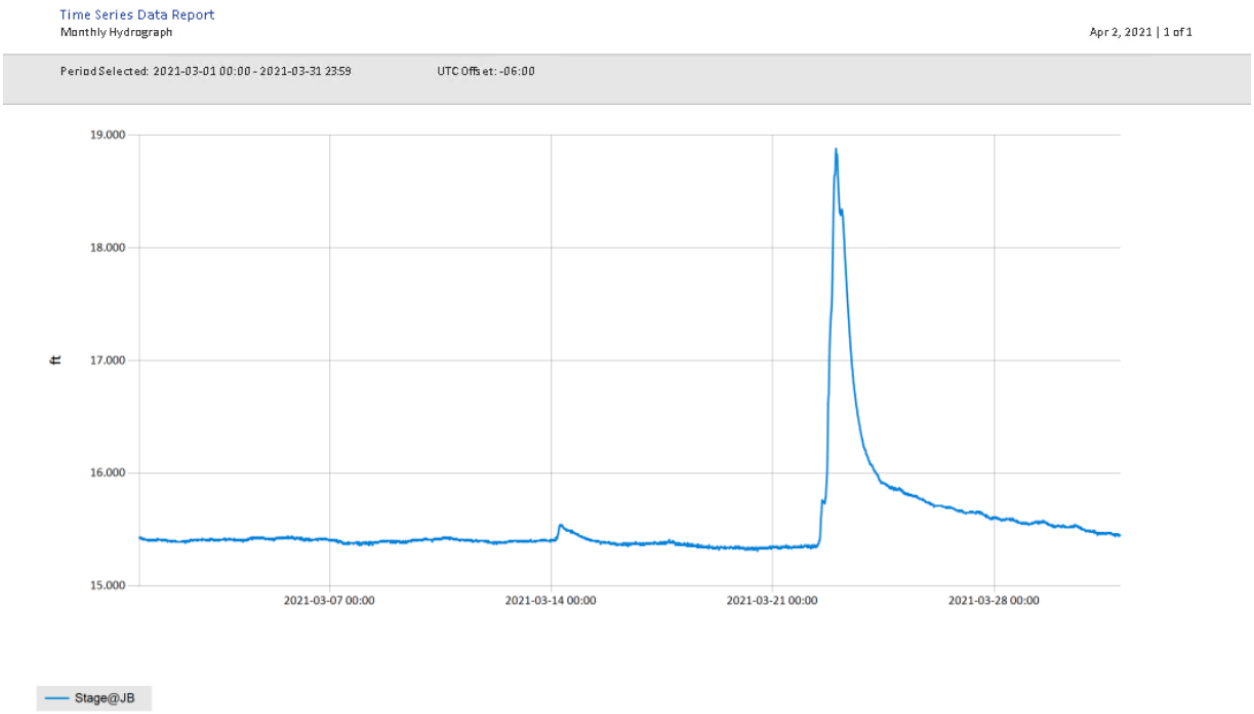

Figure 12 Monthly Hydrograph JB-1

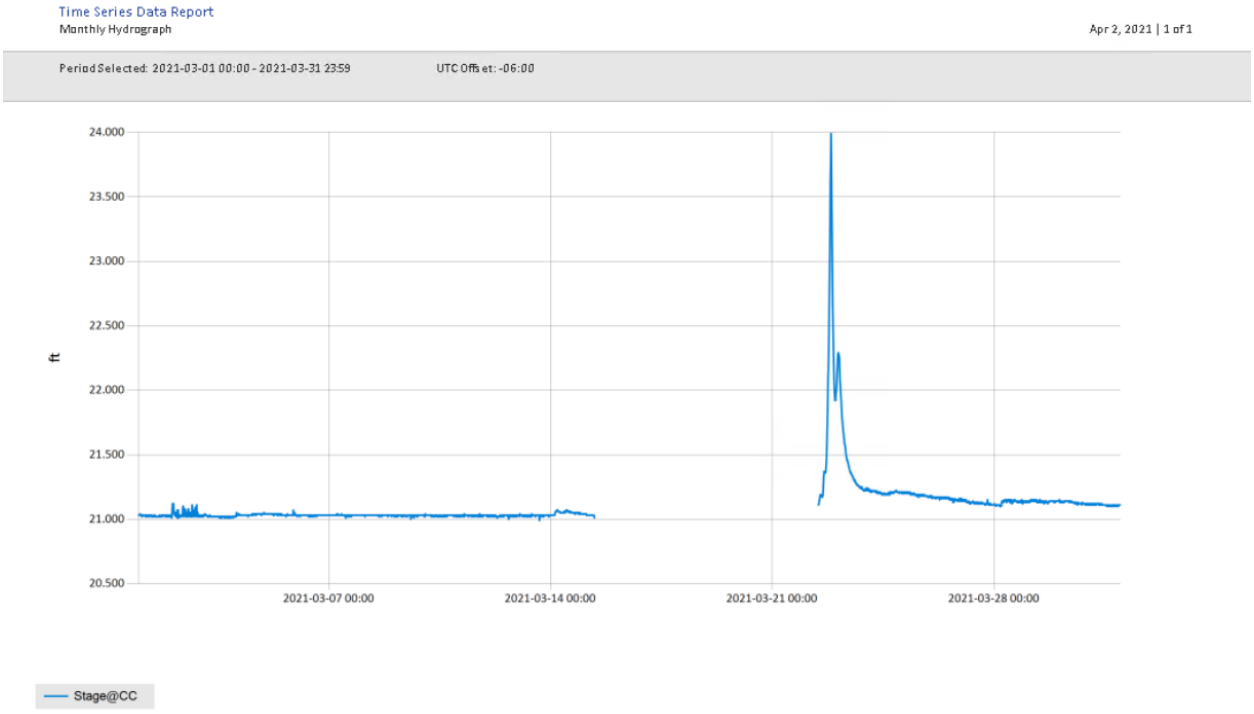

Figure 13 Monthly Hydrograph CC-1

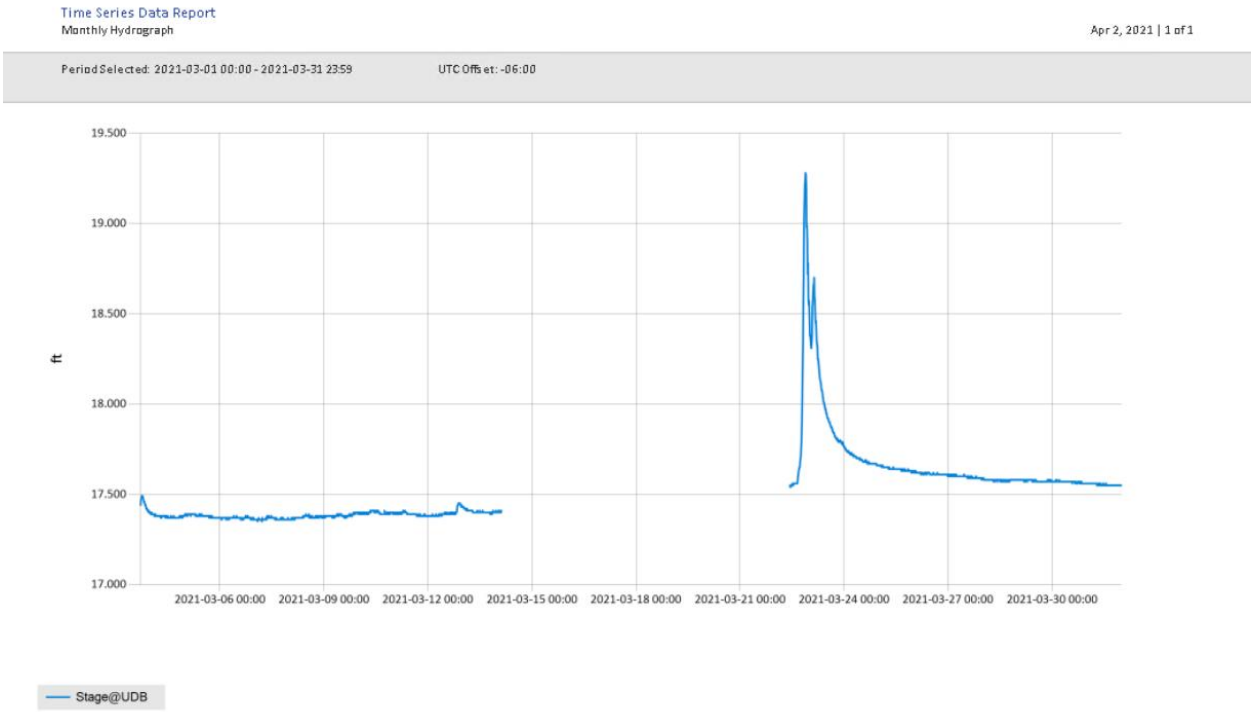

Figure 14 Monthly Hydrograph UDB-1

MESONET CLIMATOLOGICAL DATA SUMMARY — March 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) MAX	MIN	AVG	DEWPT	DEG DAYS HDD	CDD	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	PRESSURE (in) STN	MSL	WIND DIR	SPEED (mph) AVG	MAX	SOLAR (MJ/m^2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	58	34	44.6	26.2	19	0	82	21	52	0.00	29.04	30.30	NNE	9.2	23.2	19.11	45.9	45.4	51	41
2	63	30	47.6	24.0	19	0	87	18	46	0.00	28.95	30.20	SSW	5.6	17.3	20.56	45.3	45.2	52	38
3	70	39	53.9	29.8	11	0	65	22	42	0.00	28.82	30.07	S	8.6	24.0	20.79	46.6	46.3	54	39
4	75	47	59.6	39.4	4	0	63	31	48	0.01	28.75	30.00	SSE	11.6	27.2	17.60	48.7	49.2	55	43
5	59	42	53.6	41.5	15	0	85	52	64	0.00	28.82	30.07	NE	13.1	32.6	10.58	49.8	50.5	53	48
6	64	31	49.0	34.6	17	0	99	30	63	0.00	29.04	30.30	S	4.6	15.7	20.44	48.6	49.0	57	41
7	66	40	52.9	28.1	12	0	63	21	41	0.00	29.05	30.31	S	9.8	29.7	21.16	48.8	50.5	58	43
8	70	44	56.5	33.7	8	0	56	30	43	0.00	29.02	30.28	S	11.7	32.8	18.01	49.4	52.4	60	46
9	71	53	62.2	48.5	3	0	78	42	62	0.00	28.81	30.06	S	16.5	39.4	17.56	51.6	56.6	63	51
10	79	61	68.0	55.2	0	5	78	41	65	0.00	28.64	29.89	S	15.7	35.1	16.61	54.8	60.9	67	57
11	65	50	56.4	51.8	7	0	94	75	85	0.03	28.79	30.04	NE	9.2	21.6	9.03	55.3	59.4	62	56
12	71	50	61.0	57.8	4	0	96	75	90	0.01	28.88	30.13	ESE	5.9	20.0	5.79	54.6	57.7	61	54
13	71	54	64.2	58.6	3	0	99	63	83	0.00	28.77	30.02	SE	10.2	30.0	4.67	56.1	59.5	62	57
14	68	54	61.2	40.4	4	0	93	20	52	0.22	28.55	29.80	SSW	12.3	35.4	19.83	56.7	59.6	63	56
15	67	45	56.6	34.3	9	0	70	31	44	0.00	28.56	29.80	WSW	11.5	36.2	21.21	54.5	56.9	64	51
16	79	44	63.3	46.6	4	0	80	35	56	0.00	28.49	29.73	SE	9.9	26.5	16.45	54.3	58.2	66	52
17	68	39	51.7	46.1	11	0	95	44	82	0.12	28.48	29.72	NW	16.8	39.2	9.47	55.7	58.8	64	52
18	51	39	43.8	33.0	20	0	86	51	66	0.00	28.94	30.20	NNW	18.0	38.8	14.81	51.2	51.0	55	48
19	62	35	48.5	34.1	16	0	90	35	60	0.00	29.09	30.35	N	7.6	20.2	22.78	51.0	52.8	62	45
20	66	33	51.6	33.9	15	0	88	28	54	0.00	29.01	30.26	SSE	7.6	20.5	22.90	51.2	54.8	63	46
21	66	44	55.7	39.7	10	0	79	41	56	0.00	28.80	30.05	SSE	13.7	33.8	18.80	52.3	56.4	62	51
22	57	51	54.2	48.9	11	0	97	56	83	1.64	28.51	29.75	SSE	11.8	34.9	2.08	52.7	55.0	57	54
23	63	45	53.0	43.5	11	0	98	47	72	0.38	28.41	29.65	W	13.4	33.7	20.51	52.8	55.3	60	52
24	58*	42*	49.3*	41.0*	15*	0*	92*	56*	74*	0.10*	28.60*	29.84*	NNW*	8.3*	21.1*	10.97*	51.9*	53.3*	57*	49*
25	61	44	50.9	42.3	12	0	95	46	74	0.00	28.56	29.80	NW	7.3	23.0	16.07	52.2	54.1	59	50
26	77	44	61.1	42.5	5	0	83	29	53	0.00	28.62	29.87	SSE	11.2	31.1	23.56	52.8	55.0	61	49
27	74	49	61.8	45.3	4	0	85	35	56	0.00	28.69	29.93	N	11.1	28.2	21.48	55.2	56.8	63	51
28	68	40	55.1	33.8	11	0	87	20	50	0.00	29.00	30.26	NW	5.1	16.7	24.72	54.6	55.4	62	48
29	77	48	62.8	35.9	3	0	59	23	39	0.00	28.71	29.96	S	14.8	38.7	24.77	54.6	54.6	60	49
30	67	52	59.7	35.7	6	0	66	25	42	0.00	28.65	29.89	S	13.3	35.4	21.19	55.5	56.0	61	52
31	64	41	52.7	19.0	13	0	64	17	28	0.00	29.11	30.37	NNE	10.8	29.1	24.75	54.0	56.9	65	51
	67*	44*	55.6*	39.5*	<- Monthly Averages ->						28.78*	30.03*	S *	10.8*	39.4*	17.36*	52.2*	54.3*	60*	49*

Temperature - Highest: 79*
Lowest: 30*

Degree Days - Total HDD: 302*
Total CDD: 5*

Rainfall: Monthly Total: 2.51* in.
Greatest 24 Hr: 1.64* in.

Humidity - Highest: 99*
Lowest: 17*

Number of Days With:
Tmax ≥ 90: 0*
Tmax ≤ 32: 0*
Tmin ≤ 32: 2*
Tmin ≤ 0: 0*
Rainfall ≥ 0.01 inch: 8*
Rainfall ≥ 0.10 inch: 5*
Avg Wind Speed ≥ 10 mph: 18*
Max Wind Speed ≥ 30 mph: 15*

* Denotes incomplete record

Figure 15 March Mesonet Data