Lake Thunderbird TMDL Monitoring Plan Implementation: Sample Year (SY) 2017- February Report

SY2017 Monthly Report

Lake Thunderbird TMDL Monitoring Plan Implementation:

February 2018 Monitoring Report

Oklahoma Water Resources Board
Water Quality Programs Division
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SUMMARY OF FEBRUARY WATER QUALITY SAMPLING

Sampling for February 2018 occurred on the twenty-fourth and was considered a high flow collection. Water samples were collected at six locations via the autosamplers, and discharge was measured at two locations. The remaining four locations were sampled on the twenty-sixth, and were considered base flow collections. Discharge measurements and water samples were collected at these locations. Mesonet data shows 0.71 inches of precipitation occurring on the twenty-fourth, 1.62 inches of precipitation in the 72 hours prior to sampling, and 0.31 inches of precipitation in the 72 hours after the sampling event. The total rainfall amount in Norman for the month of February was 3.45 inches. All water level gauges were operational for the month, with the exception of LT-1 and CC-1 as a result of road construction activity.

RESULTS

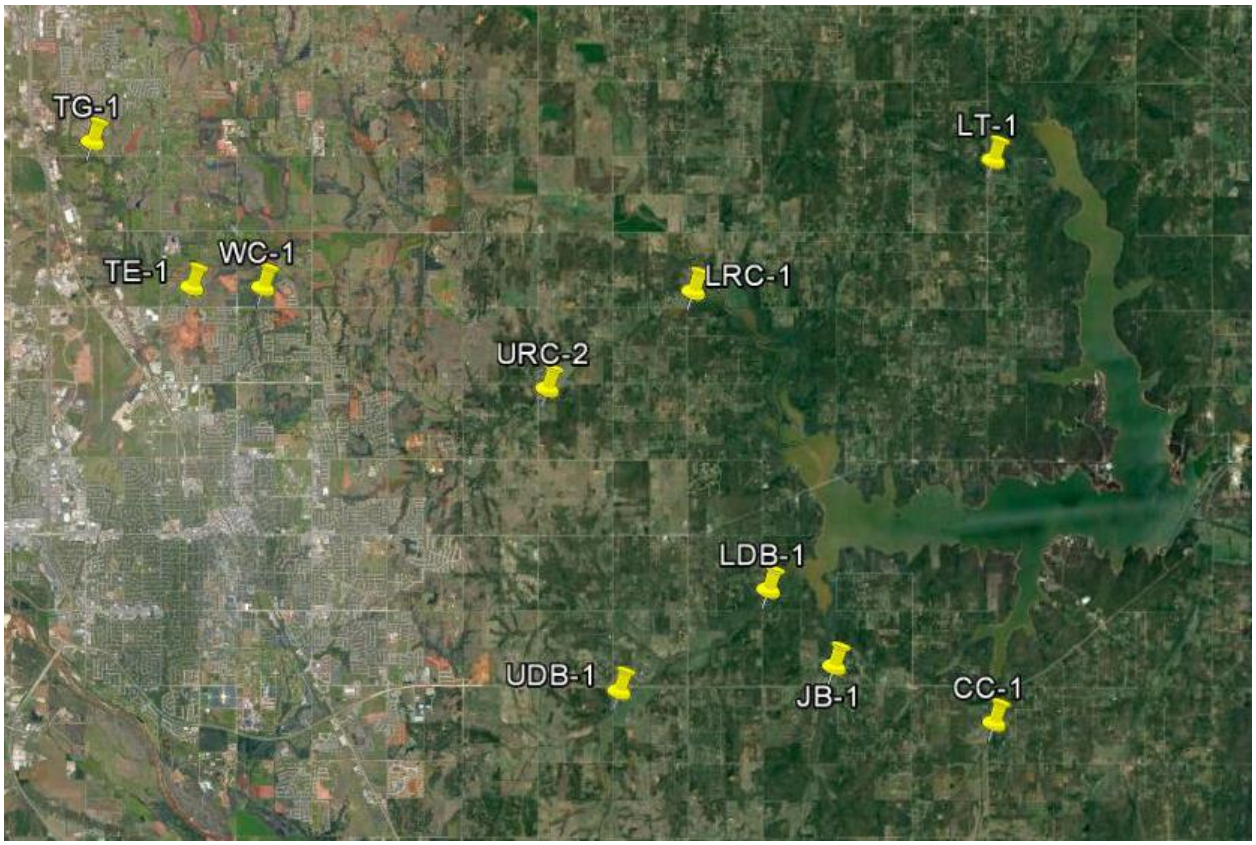

Figure 1 Monitoring Station Map

Field Data Form

Field Measurement Record **Reviewed By:_____JM_____**

Station	Date	Time	Field Crew	Temp C°	DO mg/L	SpC µS	pH	Turb (NTU)	Notes
cc-1	2/26/2018	10:10	LO	7.4	10.4	648.0	7.8	32.0	
lt-1	2/26/2018	12:45	LO	7.3	6.1	552.0	7.4	9.0	No gauges, construction ongoing
jb-1	2/23/2018	20:45	SD	*	*	418.0	7.9	127.0	Autosampler trigger 4 collected 2/24
udb-1	2/23/2018	17:45	SD	*	*	359.0	8.0	1000.0	Autosampler trigger 2 collected 2/24
ldb-1	2/26/2018	11:15	LO	7.4	10.1	555.0	7.7	30.0	
tg-1	2/26/2018	14:30	LO	11.1	10.6	605.0	7.8	33.0	
te-1	2/23/2018	16:30	SD	*	*	324.0	8.0	1000.0	Autosampler trigger 1 collected 2/24
wc-1	2/23/2018	15:45	SD	*	*	510.0	8.1	917.0	Autosampler trigger 1 collected 2/24 second td 11.66 @ 11:30
lrc-1	2/24/2018	12:15	SD	*	*	354.0	7.9	1000.0	Autosampler trigger 3 collected 2/24 second td 20.52 @ 13:40, 137.82 cfs
urc-2	2/24/2018	10:00	SD	*	*	368.0	7.9	1000.0	Autosampler trigger 3 collected 2/24

Table 1 Field Data Form Where the Asterisk Denotes a Sample from the Autosampler

Site Name	TKN (mg/L)	Nitrate/Nitrite (mg/L)	TP (mg/L)	TSS (mg/L)
TG-1	0.85	0.78	0.221	32.0
CC-1	0.44	0.17	0.062	6.3
JB-1	1.60	1.60	0.282	124
UDB-1	1.76	0.55	0.463	1240
LDB-1	0.68	0.49	0.113	7.5
LRC-1	3.58	0.47	0.855	2900
URC-2	2.66	0.44	0.610	2920
WC-1	2.56	1.04	0.745	1370
TE-1	1.47	0.79	0.530	600
LT-1	0.59	0.08	0.082	<5.0

Table 2 Laboratory Analysis Summary

Site Name	TKN	Nitrate/Nitrite	TP	TSS
Field Blank	<0.10 mg/L	<0.05 mg/L	<0.010 mg/L	<5.0 mg/L
Duplicate	0.46 mg/L	0.19 mg/L	0.063 mg/L	10.0 mg/L
Duplicate RPD	4.44%	$11.11\%_{*1}$	1.60%	$45.40\%_{*2}$

Table 3 QA/QC Data Where Subscript 1 Denotes a Level 2 RPD and Subscript 2 Denotes a Level 4 RPD

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.

SITE	TG-1	CC-1	JB-1	UDB-1	LDB-1	LRC-1	URC-2	WC-1	TE-1	LT-1
STAGE (ft)	9.26	0.50	16.47	18.92	17.09	20.82	16.39	12.86	13.58	N/A
DISCHARGE (ft^3/s)	3.86	1.37	7.17	45	8.82	199	120	40	100	0.56

Table 4 Station Discharge Summary

Discharge Measurement Summary

Date Generated: Tue Mar 13 2018

File Information

File Name	CC0226.WAD
Start Date and Time	2018/02/26 08:12:53

Site Details

Site Name	CC
Operator(s)	ZM

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	0.6%	2.0%
Velocity	1.8%	4.0%
Width	0.2%	0.2%
Method	3.2%	-
# Stations	3.6%	-
Overall	**5.3%**	**4.6%**

Summary

Averaging Int.	40	# Stations	14
Start Edge	LEW	Total Width	7.000
Mean SNR	36.2 dB	Total Area	4.000
Mean Temp	40.62 °F	Mean Depth	0.571
Disch. Equation	Mid-Section	Mean Velocity	0.3417
		Total Discharge	**1.3669**

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Mon Feb 26 08:41:19 CST 2018	7.000	0.500		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	08:12	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	*08:14*	*1.00*	*0.6*	*0.400*	*0.6*	*0.160*	*-0.1880*	*1.00*	*-0.1880*	*0.300*	*-0.0564*	*-4.1*
2	*08:16*	*1.50*	*0.6*	*0.500*	*0.6*	*0.200*	*-0.1568*	*1.00*	*-0.1568*	*0.250*	*-0.0392*	*-2.9*
3	*08:19*	*2.00*	*0.6*	*0.500*	*0.6*	*0.200*	*-0.0223*	*1.00*	*-0.0223*	*0.250*	*-0.0056*	*-0.4*
4	*08:20*	*2.50*	*0.6*	*0.500*	*0.6*	*0.200*	*0.0764*	*1.00*	*0.0764*	*0.250*	*0.0191*	*1.4*
5	*08:21*	*3.00*	*0.6*	*0.600*	*0.6*	*0.240*	*0.1624*	*1.00*	*0.1624*	*0.300*	*0.0487*	*3.6*
6	08:23	3.50	0.6	0.700	0.6	0.280	0.2467	1.00	0.2467	0.350	0.0864	6.3
7	08:24	4.00	0.6	0.800	0.6	0.320	0.2769	1.00	0.2769	0.400	0.1107	8.1
8	08:26	4.50	0.6	0.900	0.6	0.360	0.4718	1.00	0.4718	0.450	0.2123	15.5
9	08:27	5.00	0.6	0.800	0.6	0.320	0.7070	1.00	0.7070	0.400	0.2828	20.7
10	08:29	5.50	0.6	0.800	0.6	0.320	0.8100	1.00	0.8100	0.400	0.3240	23.7
11	08:32	6.00	0.6	0.700	0.6	0.280	0.6558	1.00	0.6558	0.350	0.2296	16.8
12	08:33	6.50	0.6	0.600	0.6	0.240	0.5151	1.00	0.5151	0.300	0.1545	11.3
13	08:33	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 Summary CC-1

Discharge Measurement Summary

Date Generated: Tue Mar 13 2018

File Information

File Name	LT0226.WAD
Start Date and Time	2018/02/26 11:00:21

Site Details

Site Name	LT
Operator(s)	ZM

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	0.4%	1.4%
Velocity	1.1%	6.2%
Width	0.1%	0.1%
Method	2.0%	-
# Stations	1.9%	-
Overall	**3.1%**	**6.5%**

Summary

Averaging Int.	40	# Stations	27
Start Edge	REW	Total Width	13.000
Mean SNR	22.1 dB	Total Area	8.850
Mean Temp	41.30 °F	Mean Depth	0.681
Disch. Equation	Mid-Section	Mean Velocity	0.0634
		Total Discharge	**0.5614**

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Mon Feb 26 12:09:43 CST 2018	13.000	2.600		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	11:00	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	11:03	0.50	0.6	0.500	0.6	0.200	0.0135	1.00	0.0135	0.250	0.0034	0.6
2	*11:04*	*1.00*	*0.6*	*0.400*	*0.6*	*0.160*	*0.0049*	*1.00*	*0.0049*	*0.200*	*0.0010*	*0.2*
3	*11:08*	*1.50*	*0.6*	*0.400*	*0.6*	*0.160*	*0.0259*	*1.00*	*0.0259*	*0.200*	*0.0052*	*0.9*
4	11:09	2.00	0.6	0.400	0.6	0.160	0.0404	1.00	0.0404	0.200	0.0081	1.4
5	*11:12*	*2.50*	*0.6*	*0.500*	*0.6*	*0.200*	*0.0007*	*1.00*	*0.0007*	*0.250*	*0.0002*	*0.0*
6	*11:16*	*3.00*	*0.6*	*0.600*	*0.6*	*0.240*	*0.0404*	*1.00*	*0.0404*	*0.300*	*0.0121*	*2.2*
7	*11:17*	*3.50*	*0.6*	*0.700*	*0.6*	*0.280*	*0.0531*	*1.00*	*0.0531*	*0.350*	*0.0186*	*3.3*
8	*11:20*	*4.00*	*0.6*	*0.800*	*0.6*	*0.320*	*0.0413*	*1.00*	*0.0413*	*0.400*	*0.0165*	*2.9*
9	*11:21*	*4.50*	*0.6*	*0.900*	*0.6*	*0.360*	*0.0732*	*1.00*	*0.0732*	*0.450*	*0.0329*	*5.9*
10	*11:27*	*5.00*	*0.6*	*0.900*	*0.6*	*0.360*	*0.0131*	*1.00*	*0.0131*	*0.450*	*0.0059*	*1.1*
11	*11:33*	*5.50*	*0.6*	*0.800*	*0.6*	*0.320*	*0.0164*	*1.00*	*0.0164*	*0.400*	*0.0066*	*1.2*
12	*11:34*	*6.00*	*0.6*	*0.800*	*0.6*	*0.320*	*0.0226*	*1.00*	*0.0226*	*0.400*	*0.0091*	*1.6*
13	*11:36*	*6.50*	*0.6*	*0.800*	*0.6*	*0.320*	*0.0043*	*1.00*	*0.0043*	*0.400*	*0.0017*	*0.3*
14	*11:38*	*7.00*	*0.6*	*0.900*	*0.6*	*0.360*	*0.0102*	*1.00*	*0.0102*	*0.450*	*0.0046*	*0.8*
15	*11:41*	*7.50*	*0.6*	*0.800*	*0.6*	*0.320*	*0.0840*	*1.00*	*0.0840*	*0.400*	*0.0336*	*6.0*
16	*11:42*	*8.00*	*0.6*	*0.900*	*0.6*	*0.360*	*0.0925*	*1.00*	*0.0925*	*0.450*	*0.0416*	*7.4*
17	11:44	8.50	0.6	0.900	0.6	0.360	0.0823	1.00	0.0823	0.450	0.0371	6.6
18	11:46	9.00	0.6	0.900	0.6	0.360	0.1348	1.00	0.1348	0.450	0.0607	10.8
19	11:49	9.50	0.6	0.900	0.6	0.360	0.1270	1.00	0.1270	0.450	0.0571	10.2
20	*11:54*	*10.00*	*0.6*	*0.800*	*0.6*	*0.320*	*0.1309*	*1.00*	*0.1309*	*0.400*	*0.0524*	*9.3*
21	11:57	10.50	0.6	0.700	0.6	0.280	0.1496	1.00	0.1496	0.350	0.0524	9.3
22	11:58	11.00	0.6	0.600	0.6	0.240	0.1227	1.00	0.1227	0.300	0.0368	6.6
23	*12:00*	*11.50*	*0.6*	*0.700*	*0.6*	*0.280*	*0.0830*	*1.00*	*0.0830*	*0.350*	*0.0291*	*5.2*
24	12:01	12.00	0.6	0.600	0.6	0.240	0.0863	1.00	0.0863	0.300	0.0259	4.6
25	12:05	12.50	0.6	0.500	0.6	0.200	0.0364	1.00	0.0364	0.250	0.0091	1.6
26	12:05	13.00	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 Summary LT-1

Station Number:
Station Name: lrc

Meas. No: 0
Date: 02/24/2018

Party: jmsd	Width: 37.7 ft	Processed by:
Boat/Motor:	Area: 153 ft²	Mean Velocity: 1.32 ft/s
Gage Height: 20.50 ft	G.H.Change: 0.000 ft	Discharge: 199 ft³/s

Area Method: Avg. Course	ADCP Depth: 0.270 ft	Index Vel.: 0.00 ft/s	Rating No.: 1
Nav. Method: Bottom Track	Shore Ens.:10	Adj.Mean Vel: 0.00 ft/s	Qm Rating: U
MagVar Method: None (0.0°)	Bottom Est: Power (0.1667)	Rated Area: 0.000 ft²	Diff.: 0.000%
Depth: Composite (BT)	Top Est: Power (0.1667)	Control1: Unspecified	
Discharge Method: None		Control2: Unspecified	
% Correction: 0.00		Control3: Unspecified	

Screening Thresholds:		ADCP:	
BT 3-Beam Solution: YES	Max. Vel.: 5.60 ft/s	Type/Freq.: RiverRay / 600 kHz	
WT 3-Beam Solution: YES	Max. Depth: 6.31 ft	Serial #: 645654	Firmware: 44.16
BT Error Vel.: 3.28 ft/s	Mean Depth: 4.08 ft	Bin Size: 10 cm	Blank: 16 cm
WT Error Vel.: 32.81 ft/s	% Meas.: 44.16	BT Mode: Auto	BT Pings: Dyn
BT Up Vel.: 32.81 ft/s	Water Temp.: None	WT Mode: Auto	WT Pings: Dyn
WT Up Vel.: 32.81 ft/s	ADCP Temp.: 41.9 °F	WZ : 5	
Use Weighted Mean Depth: YES			

Performed Diag. Test: NO
Performed Moving Bed Test: NO
Performed Compass Calibration: NO Evaluation: NO
Meas. Location:

Project Name: lrc1_0.mmt
Software: 2.17

Tr.#		Edge Distance		#Ens.	Discharge						Width	Area	Time		Mean Vel.		% Bad	
		L	R		Top	Middle	Bottom	Left	Right	Total			Start	End	Boat	Water	Ens.	Bins
000	*R*	*2*	*3*	*91*	*65.2*	*89.1*	*82.8*	*10.9*	*2.93*	*251*	*37*	*122*	*06:59*	*07:00*	*1.01*	*2.06*	*46*	*1*
001	*L*	*2*	*3*	*79*	*55.4*	*136*	*75.8*	*10.9*	*2.33*	*281*	*36*	*160*	*07:00*	*07:01*	*0.81*	*1.75*	*43*	*1*
002	*R*	*2*	*3*	*98*	*60.7*	*107*	*81.6*	*6.39*	*4.03*	*259*	*59*	*236*	*07:01*	*07:03*	*0.74*	*1.10*	*53*	*1*
003	*L*	*2*	*3*	*75*	*35.1*	*82.3*	*42.1*	*9.11*	*-0.777*	*168*	*32*	*126*	*07:03*	*07:04*	*0.87*	*1.33*	*17*	*2*
004	*R*	*2*	*3*	*69*	*15.1*	*50.7*	*22.2*	*9.50*	*1.59*	*99.2*	*31*	*128*	*07:04*	*07:05*	*0.81*	*0.77*	*45*	*1*
005	*L*	*2*	*3*	*132*	*31.8*	*62.2*	*37.1*	*5.47*	*-0.812*	*136*	*31*	*146*	*07:05*	*07:06*	*0.65*	*0.93*	*41*	*0*
Mean		2	3	90	43.9	87.9	56.9	8.71	1.55	199	38	153	**Total**	00:07	0.82	1.32	41	1
SDev		0	0	23	19.6	30.9	26.3	2.29	1.98	74.7	10.7	43.0			0.12	0.50		
SD/M		0.00	0.00	0.25	0.45	0.35	0.46	0.26	1.28	0.38	0.28	0.28			0.15	0.38		

Figure 4 Discharge Summary 1 LRC-1

Station Number:
Station Name: lrc

Meas. No: 2
Date: 02/24/2018

Party:	Width: 36.4 ft	Processed by:
Boat/Motor:	Area: 160 ft²	Mean Velocity: 0.894 ft/s
Gage Height: 20.52 ft	G.H.Change: 0.000 ft	Discharge: 138 ft³/s

Area Method: Avg. Course	ADCP Depth: 0.270 ft	Index Vel.: 0.00 ft/s	Rating No.: 1
Nav. Method: Bottom Track	Shore Ens.:10	Adj.Mean Vel: 0.00 ft/s	Qm Rating: U
MagVar Method: None (0.0°)	Bottom Est: Power (0.1667)	Rated Area: 0.000 ft²	Diff.: 0.000%
Depth: Composite (BT)	Top Est: Power (0.1667)	Control1: Unspecified	
Discharge Method: None		Control2: Unspecified	
% Correction: 0.00		Control3: Unspecified	

Screening Thresholds:		ADCP:	
BT 3-Beam Solution: YES	Max. Vel.: 5.72 ft/s	Type/Freq.: RiverRay / 600 kHz	
WT 3-Beam Solution: YES	Max. Depth: 6.16 ft	Serial #: 645654	Firmware: 44.16
BT Error Vel.: 3.28 ft/s	Mean Depth: 4.25 ft	Bin Size: 10 cm	Blank: 16 cm
WT Error Vel.: 32.81 ft/s	% Meas.: 47.95	BT Mode: Auto	BT Pings: Dyn
BT Up Vel.: 32.81 ft/s	Water Temp.: None	WT Mode: Auto	WT Pings: Dyn
WT Up Vel.: 32.81 ft/s	ADCP Temp.: 42.8 °F	WZ : 5	
Use Weighted Mean Depth: YES			

Performed Diag. Test: NO
Performed Moving Bed Test: NO
Performed Compass Calibration: NO Evaluation: NO
Meas. Location:

Project Name: lrc2_2.mmt
Software: 2.17

Tr.#		Edge Distance		#Ens.	Discharge						Width	Area	Time		Mean Vel.		% Bad	
		L	R		Top	Middle	Bottom	Left	Right	Total			Start	End	Boat	Water	Ens.	Bins
000	R	3	5	88	17.1	38.2	22.4	14.4	2.05	94.2	29	114	07:23	07:24	0.84	0.83	27	2
001	L	3	5	81	21.5	60.7	23.6	12.6	2.12	120	35	144	07:25	07:26	0.68	0.84	21	0
002	R	3	5	97	21.0	55.8	26.9	12.5	-2.83	113	25	95	07:26	07:27	0.61	1.19	25	0
003	L	3	5	116	21.3	60.4	23.7	13.4	0.424	119	37	158	07:27	07:28	0.61	0.76	28	1
004	R	3	5	73	40.3	110	61.1	13.1	17.6	242	58	302	07:29	07:30	1.22	0.80	49	1
005	L	3	5	71	25.5	71.2	26.0	12.4	2.12	137	35	144	07:30	07:31	0.75	0.95	21	0
Mean		3	5	87	24.5	66.1	30.6	13.1	3.58	138	36	160	**Total**	00:07	0.78	0.89	29	1
SDev		0	0	17	8.22	24.2	15.0	0.767	7.14	53.1	11.5	73.3			0.23	0.16		
SD/M		0.00	0.00	0.19	0.34	0.37	0.49	0.06	1.99	0.39	0.32	0.46			0.29	0.18		

Figure 5 Discharge Summary 2 LRC-1

Discharge Measurement Summary

Date Generated: Tue Mar 13 2018

File Information

File Name	TG0226.WAD
Start Date and Time	2018/02/26 12:56:16

Site Details

Site Name	TG
Operator(s)	ZM

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	0.3%	1.5%
Velocity	0.4%	1.5%
Width	0.1%	0.1%
Method	1.7%	-
# Stations	1.9%	-
Overall	**2.8%**	**2.3%**

Summary

Averaging Int.	40	# Stations	27
Start Edge	LEW	Total Width	13.000
Mean SNR	25.7 dB	Total Area	8.150
Mean Temp	48.19 °F	Mean Depth	0.627
Disch. Equation	Mid-Section	Mean Velocity	0.4734
		Total Discharge	**3.8578**

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Mon Feb 26 13:00:42 CST 2018	1.500	9.260		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	12:56	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	*12:57*	*0.50*	*0.6*	*0.200*	*0.6*	*0.080*	*-0.0016*	*1.00*	*-0.0016*	*0.100*	*-0.0002*	*0.0*
2	12:59	1.00	0.6	0.500	0.6	0.200	0.2569	1.00	0.2569	0.250	0.0642	1.7
3	13:00	1.50	0.6	0.500	0.6	0.200	0.2543	1.00	0.2543	0.250	0.0636	1.6
4	13:02	2.00	0.6	0.600	0.6	0.240	0.3547	1.00	0.3547	0.300	0.1064	2.8
5	13:03	2.50	0.6	0.600	0.6	0.240	0.4094	1.00	0.4094	0.300	0.1228	3.2
6	13:04	3.00	0.6	0.700	0.6	0.280	0.4990	1.00	0.4990	0.350	0.1747	4.5
7	13:05	3.50	0.6	0.800	0.6	0.320	0.4724	1.00	0.4724	0.400	0.1889	4.9
8	13:06	4.00	0.6	1.000	0.6	0.400	0.5052	1.00	0.5052	0.500	0.2526	6.5
9	13:07	4.50	0.6	1.000	0.6	0.400	0.4879	1.00	0.4879	0.500	0.2439	6.3
10	13:08	5.00	0.6	0.900	0.6	0.360	0.5928	1.00	0.5928	0.450	0.2668	6.9
11	13:09	5.50	0.6	0.900	0.6	0.360	0.6627	1.00	0.6627	0.450	0.2982	7.7
12	13:11	6.00	0.6	0.800	0.6	0.320	0.6857	1.00	0.6857	0.400	0.2742	7.1
13	13:12	6.50	0.6	0.800	0.6	0.320	0.6526	1.00	0.6526	0.400	0.2610	6.8
14	13:13	7.00	0.6	0.800	0.6	0.320	0.5676	1.00	0.5676	0.400	0.2270	5.9
15	13:14	7.50	0.6	0.800	0.6	0.320	0.5994	1.00	0.5994	0.400	0.2397	6.2
16	13:15	8.00	0.6	0.700	0.6	0.280	0.5837	1.00	0.5837	0.350	0.2043	5.3
17	13:16	8.50	0.6	0.700	0.6	0.280	0.5620	1.00	0.5620	0.350	0.1967	5.1
18	13:17	9.00	0.6	0.700	0.6	0.280	0.5220	1.00	0.5220	0.350	0.1827	4.7
19	13:18	9.50	0.6	0.600	0.6	0.240	0.4531	1.00	0.4531	0.300	0.1359	3.5
20	13:19	10.00	0.6	0.600	0.6	0.240	0.3524	1.00	0.3524	0.300	0.1057	2.7
21	13:21	10.50	0.6	0.500	0.6	0.200	0.3074	1.00	0.3074	0.250	0.0769	2.0
22	13:21	11.00	0.6	0.500	0.6	0.200	0.2379	1.00	0.2379	0.250	0.0595	1.5
23	13:22	11.50	0.6	0.500	0.6	0.200	0.2192	1.00	0.2192	0.250	0.0548	1.4
24	13:24	12.00	0.6	0.300	0.6	0.120	0.1913	1.00	0.1913	0.150	0.0287	0.7
25	13:25	12.50	0.6	0.300	0.6	0.120	0.1909	1.00	0.1909	0.150	0.0286	0.7
26	13:25	13.00	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 6 Discharge Summary TG-1

Discharge Measurement Summary

Date Generated: Tue Mar 13 2018

File Information

File Name	JB0224.WAD
Start Date and Time	2018/02/24 12:47:03

Site Details

Site Name	JB0224
Operator(s)	JM

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	0.3%	2.4%
Velocity	1.1%	12.7%
Width	0.2%	0.2%
Method	2.9%	-
# Stations	3.9%	-
Overall	**5.1%**	**13.0%**

Summary

Averaging Int.	40	# Stations	13
Start Edge	LEW	Total Width	12.000
Mean SNR	31.3 dB	Total Area	9.100
Mean Temp	45.30 °F	Mean Depth	0.758
Disch. Equation	Mid-Section	Mean Velocity	0.7883
		Total Discharge	**7.1733**

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Sat Feb 24 12:46:21 CST 2018	0.000	16.470		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	12:47	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	*12:47*	*1.00*	*0.6*	*0.600*	*0.6*	*0.240*	*-0.0007*	*1.00*	*-0.0007*	*0.600*	*-0.0004*	*0.0*
2	*12:48*	*2.00*	*0.6*	*0.700*	*0.6*	*0.280*	*0.0492*	*1.00*	*0.0492*	*0.700*	*0.0345*	*0.5*
3	*12:51*	*3.00*	*0.6*	*0.800*	*0.6*	*0.320*	*0.4498*	*1.00*	*0.4498*	*0.800*	*0.3598*	*5.0*
4	*12:52*	*4.00*	*0.6*	*0.900*	*0.6*	*0.360*	*1.1398*	*1.00*	*1.1398*	*0.900*	*1.0257*	*14.3*
5	12:54	5.00	0.6	1.000	0.6	0.400	1.3596	1.00	1.3596	1.000	1.3596	19.0
6	12:55	6.00	0.6	0.900	0.6	0.360	0.3615	1.00	0.3615	0.900	0.3254	4.5
7	12:56	7.00	0.6	1.000	0.6	0.400	0.4495	1.00	0.4495	1.000	0.4495	6.3
8	12:57	8.00	0.6	1.000	0.6	0.400	1.4774	1.00	1.4774	1.000	1.4774	20.6
9	*12:58*	*9.00*	*0.6*	*1.000*	*0.6*	*0.400*	*1.2713*	*1.00*	*1.2713*	*1.000*	*1.2713*	*17.7*
10	12:59	10.00	0.6	0.700	0.6	0.280	1.0249	1.00	1.0249	0.700	0.7176	10.0
11	*13:00*	*11.00*	*0.6*	*0.500*	*0.6*	*0.200*	*0.3061*	*1.00*	*0.3061*	*0.500*	*0.1531*	*2.1*
12	13:00	12.00	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 7 Discharge Summary JB-1

Station Number:
Station Name: ldb0226

Meas. No: 0
Date: 02/26/2018

Party: zm lo	Width: 39.6 ft	Processed by:
Boat/Motor:	Area: 149 ft²	Mean Velocity: 0.061 ft/s
Gage Height: 56.07 ft	G.H.Change: 0.000 ft	Discharge: 8.82 ft³/s

Area Method: Avg. Course	ADCP Depth: 0.886 ft	Index Vel.: 0.00 ft/s	Rating No.: 1
Nav. Method: Bottom Track	Shore Ens.:10	Adj.Mean Vel: 0.00 ft/s	Qm Rating: U
MagVar Method: None (0.0°)	Bottom Est: Power (0.1667)	Rated Area: 0.000 ft²	Diff.: 0.000%
Depth: Composite (VB)	Top Est: Power (0.1667)	Control1: Unspecified	
Discharge Method: None		Control2: Unspecified	
% Correction: 0.00		Control3: Unspecified	

Screening Thresholds:		ADCP:	
BT 3-Beam Solution: YES	Max. Vel.: 11.0 ft/s	Type/Freq.: RiverRay / 600 kHz	
WT 3-Beam Solution: YES	Max. Depth: 5.82 ft	Serial #: 645654	Firmware: 44.16
BT Error Vel.: 3.28 ft/s	Mean Depth: 3.78 ft	Bin Size: 10 cm	Blank: 16 cm
WT Error Vel.: 32.81 ft/s	% Meas.: 44.70	BT Mode: Auto	BT Pings: Dyn
BT Up Vel.: 32.81 ft/s	Water Temp.: None	WT Mode: Auto	WT Pings: Dyn
WT Up Vel.: 32.81 ft/s	ADCP Temp.: 49.4 °F	WZ : 5	
Use Weighted Mean Depth: YES			

Performed Diag. Test: NO
Performed Moving Bed Test: NO
Performed Compass Calibration: YES Evaluation: YES
Meas. Location:

Project Name: LDB_0.mmt
Software: 2.17

Tr.#		Edge Distance		#Ens.	Discharge						Width	Area	Time		Mean Vel.		% Bad	
		L	R		Top	Middle	Bottom	Left	Right	Total			Start	End	Boat	Water	Ens.	Bins
000	L	3	3	260	-0.600	3.14	2.30	0.671	-1.73	3.78	45	160	04:46	04:49	0.29	0.02	57	7
001	R	3	3	216	-0.141	2.22	1.91	0.318	-2.33	1.94	41	160	04:49	04:51	0.26	0.01	30	6
002	L	3	3	258	6.50	4.91	2.72	1.20	0.565	15.9	38	142	04:51	04:54	0.20	0.11	31	5
003	R	3	3	275	0.353	2.93	0.353	0.177	-0.600	3.18	39	147	04:54	04:57	0.21	0.02	33	10
004	L	3	3	335	4.77	4.84	2.05	-0.388	-0.636	10.6	40	146	04:58	05:02	0.18	0.07	40	8
005	R	0	3	263	7.42	5.65	5.76	0.000	-1.31	17.5	34	140	05:02	05:05	0.21	0.12	27	11
Mean		3	3	267	3.05	3.95	2.51	0.330	-1.01	8.82	40	149	**Total**	00:18	0.23	0.06	36	8
SDev		1	0	39	3.60	1.36	1.78	0.552	1.01	6.83	3.7	8.6			0.04	0.05		
SD/M		0.49	0.00	0.14	1.18	0.34	0.71	1.67	1.01	0.77	0.09	0.06			0.17	0.80		

Figure 8 Discharge Summary LDB-1

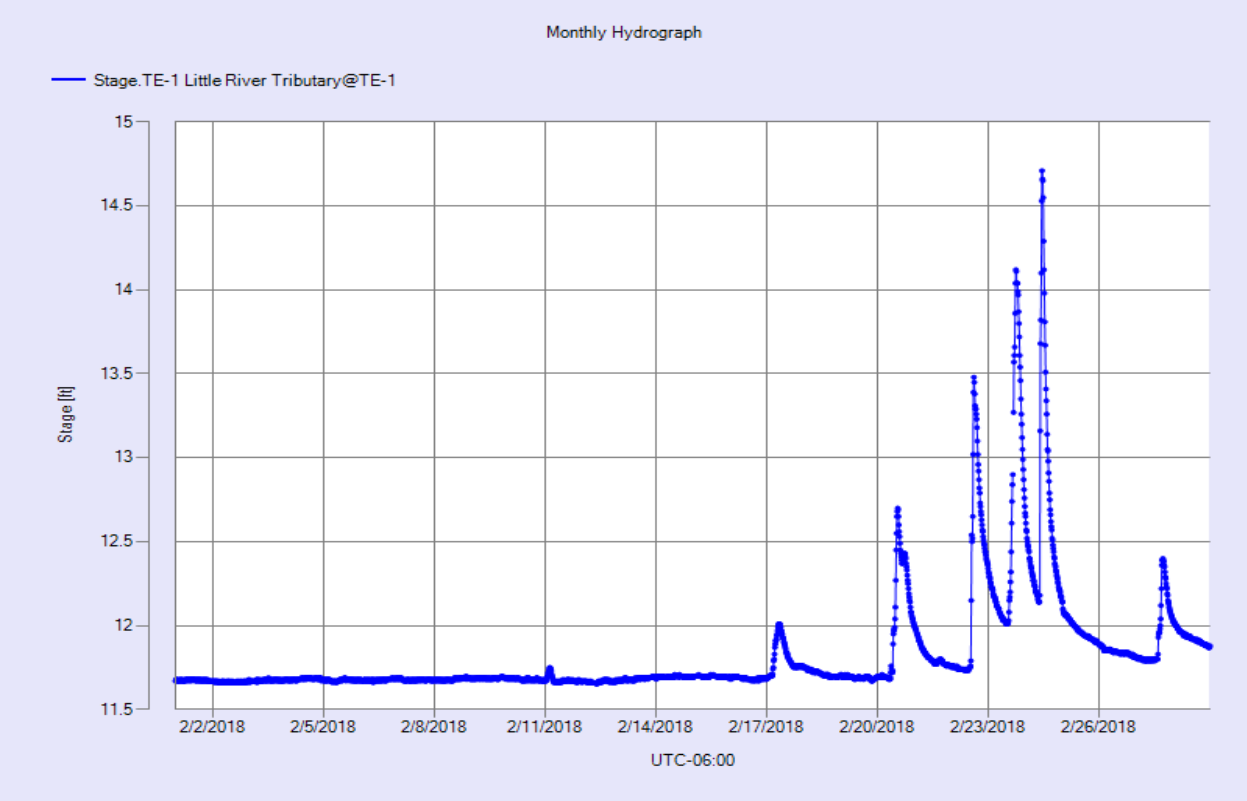

Figure 9 Monthly Hydrograph TE-1

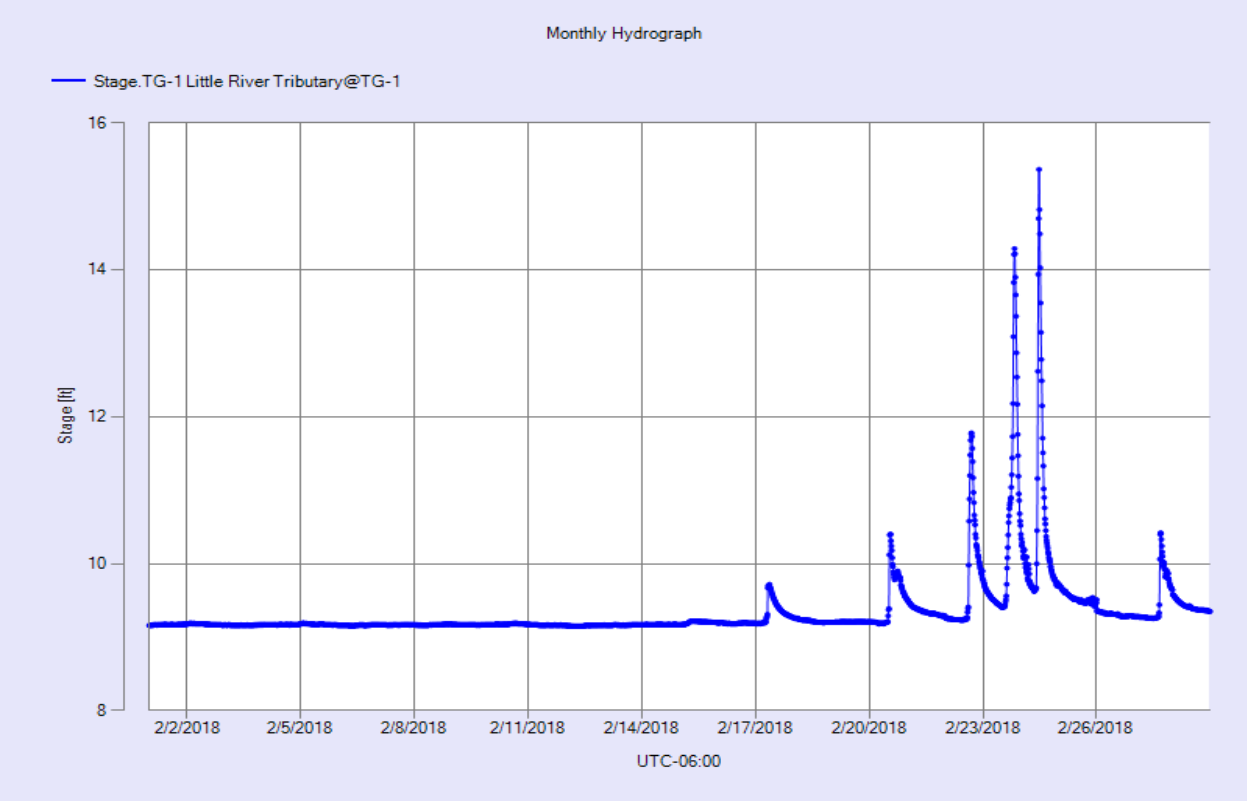

Figure 10 Monthly Hydrograph TG-1

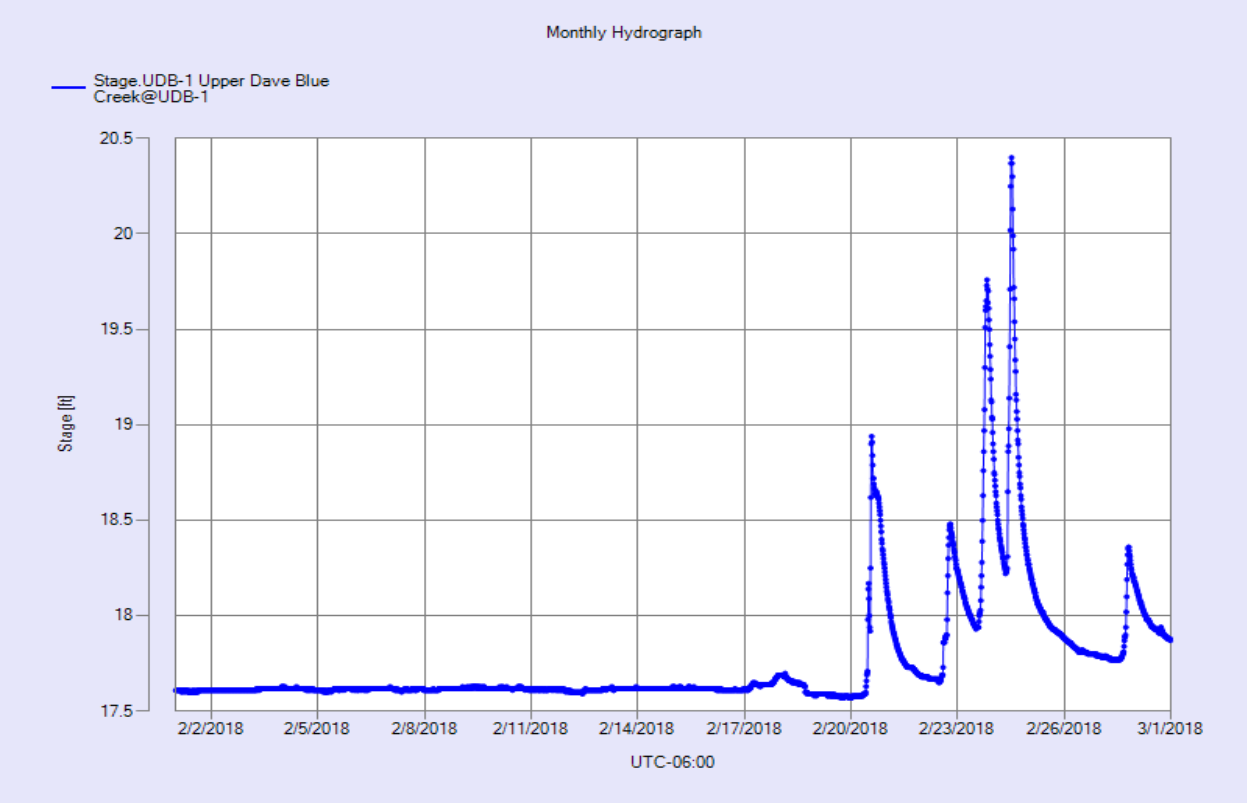

Figure 11 Monthly Hydrograph UDB-1

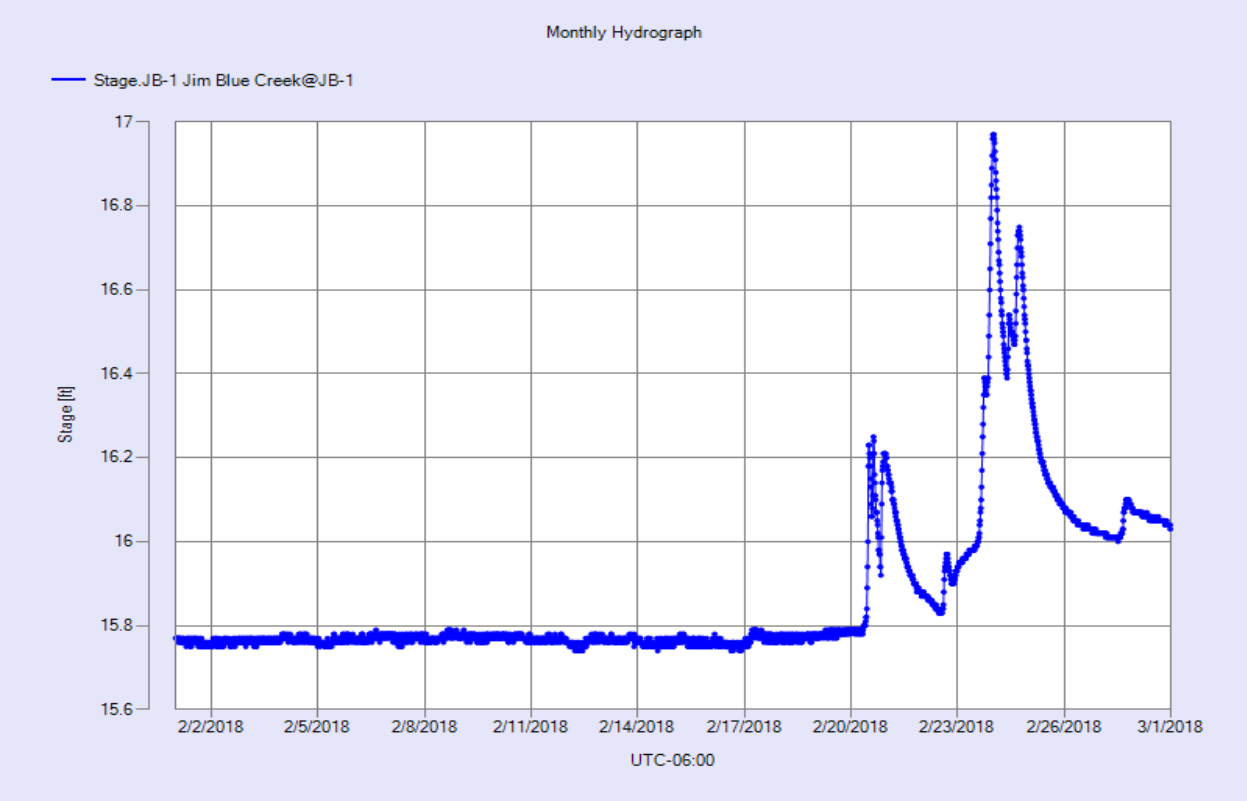

Figure 12 Monthly Hydrograph JB-1

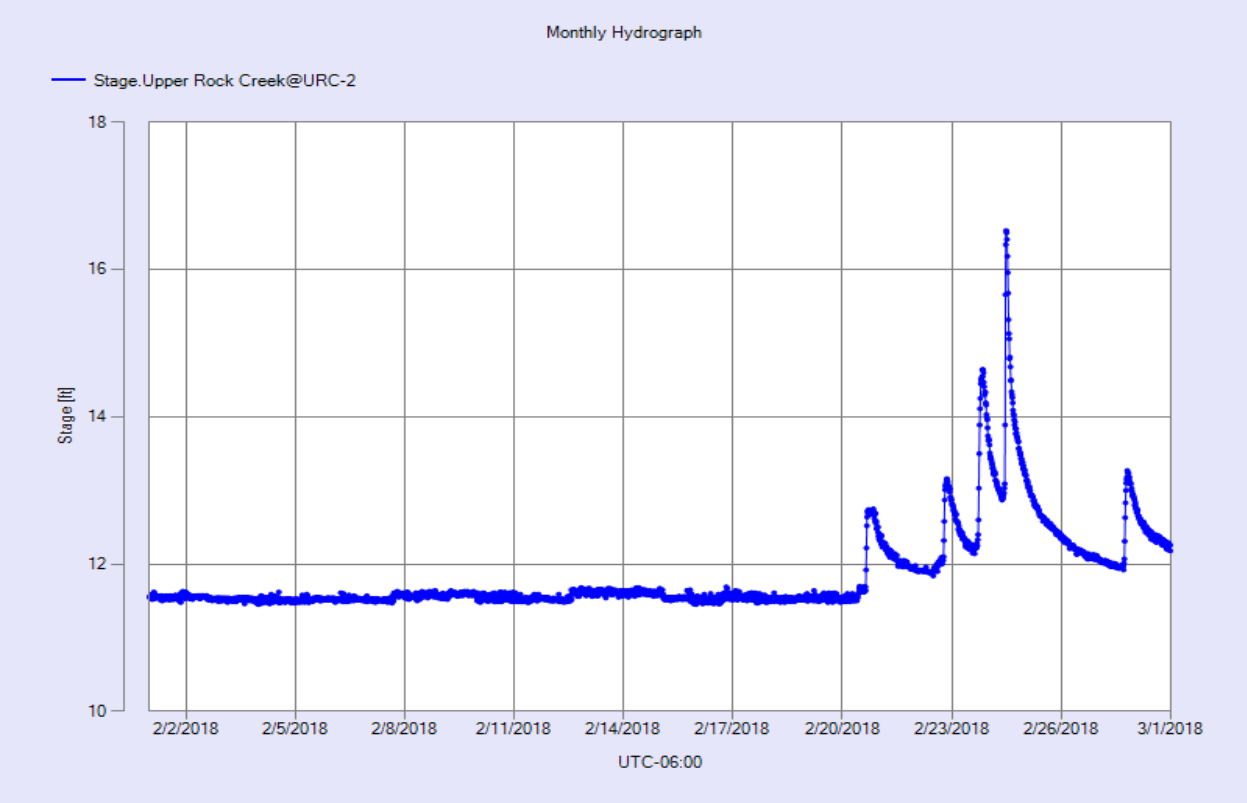

Figure 13 Monthly Hydrograph URC-2

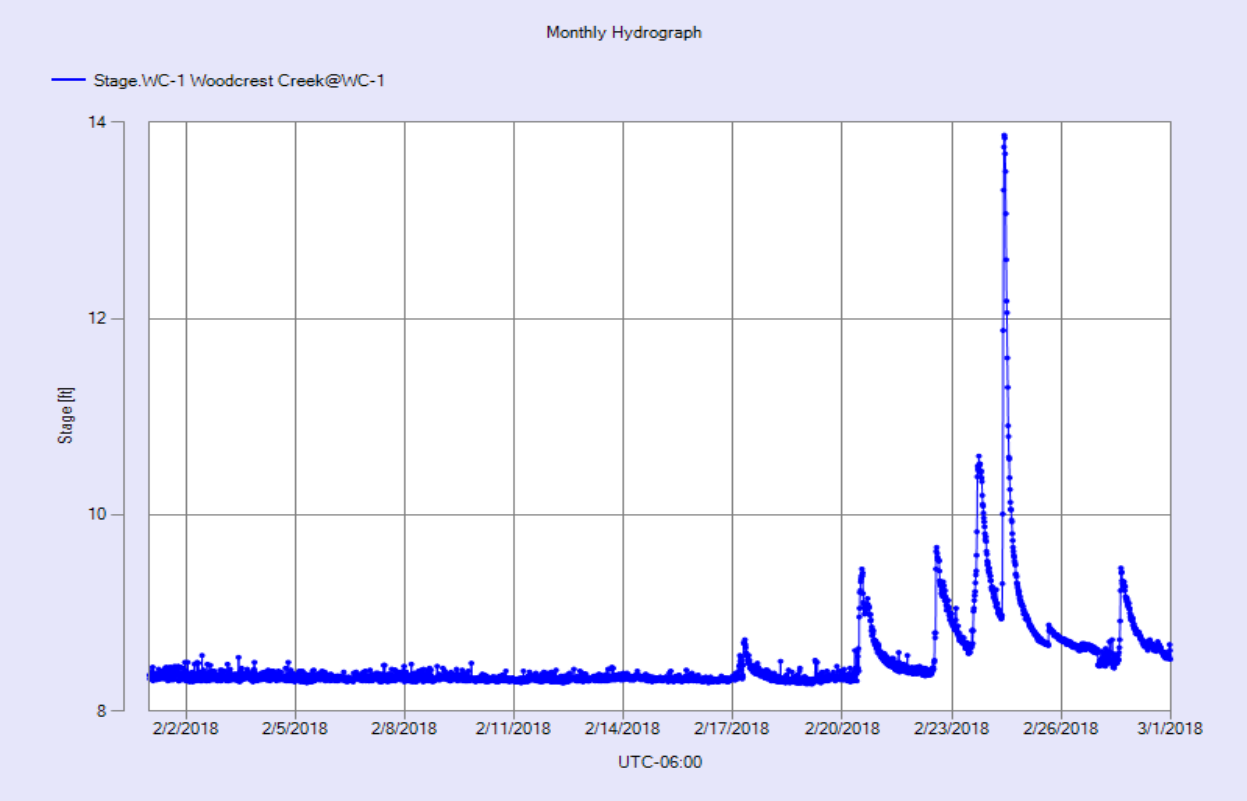

Figure 14 Monthly Hydrograph WC-1

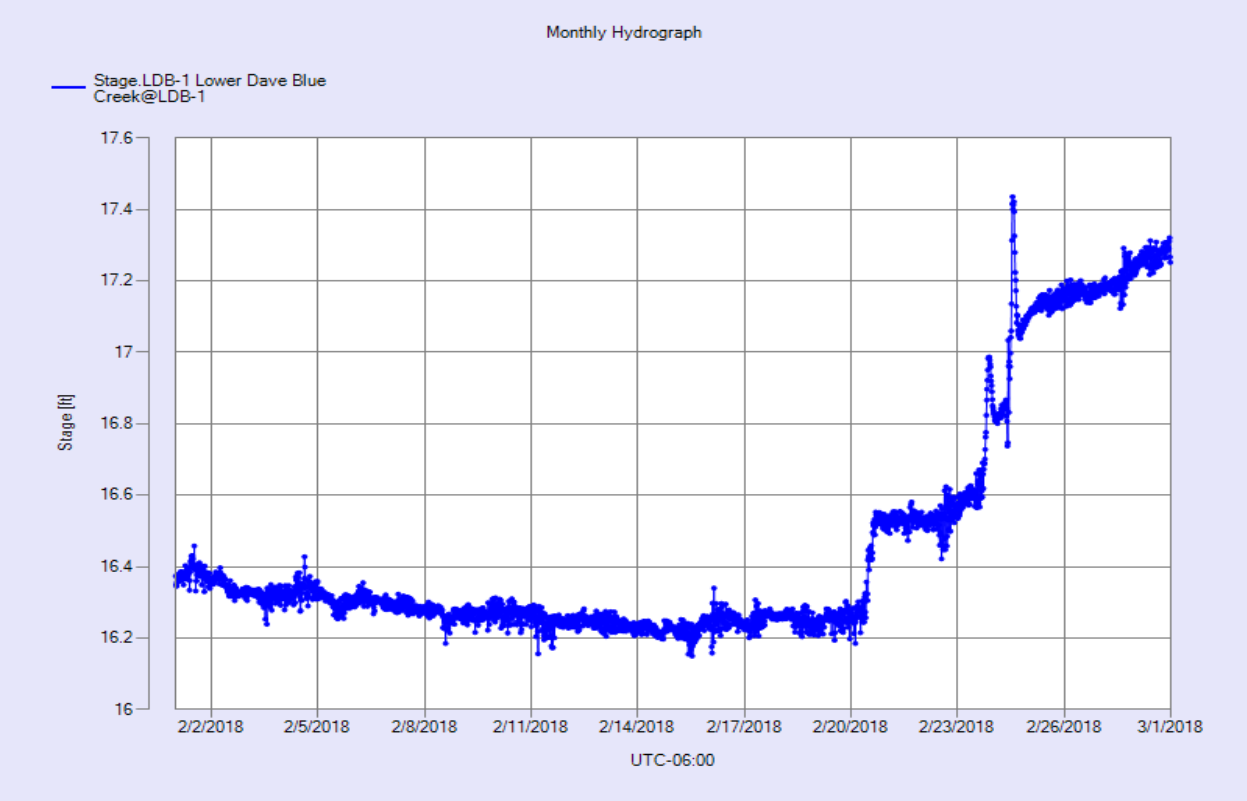

Figure 15 Monthly Hydrograph LDB-1

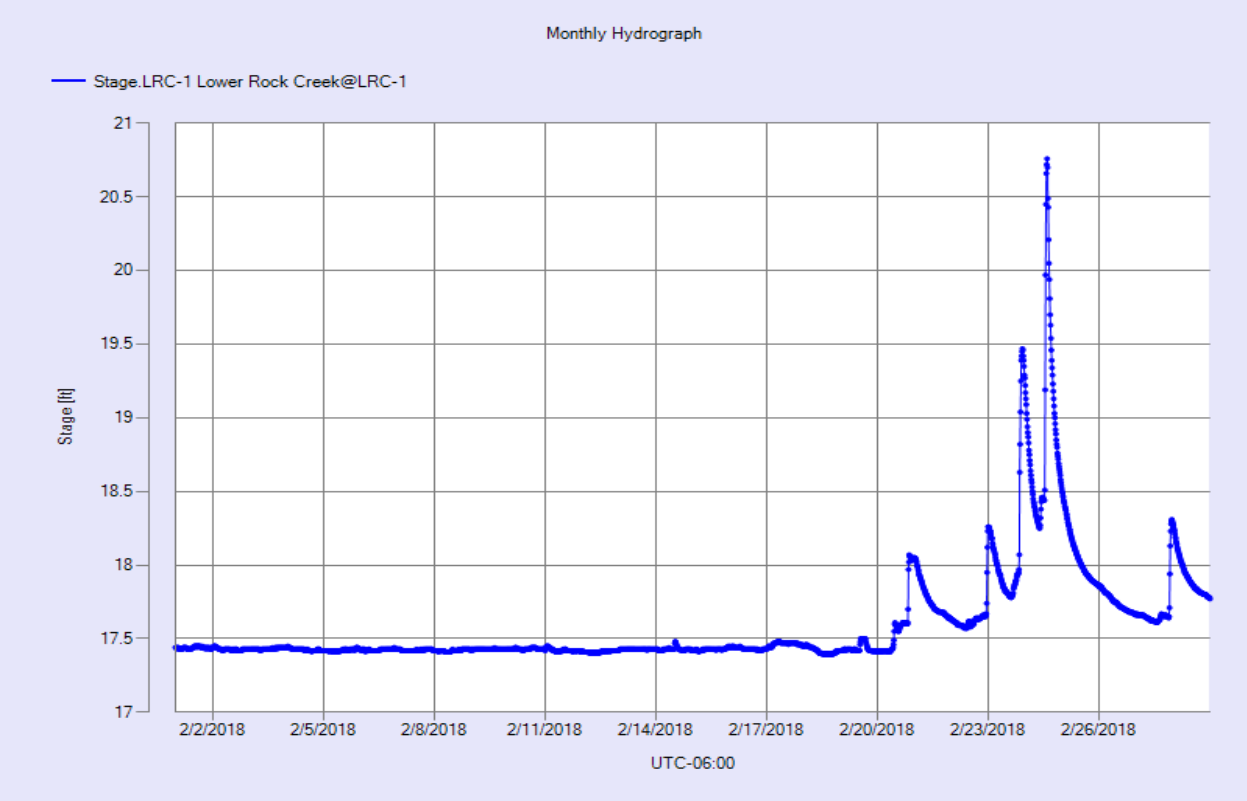

Figure 16 Monthly Hydrograph LRC-1

MESONET CLIMATOLOGICAL DATA SUMMARY — February 2018 — 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 SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m^2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	53	31	42.7	21.4	23	0	64	28	44	0.00	28.92	30.18	NNE	16.9	32.9	11.37	45.4	46.4	48	45
2	48	26	35.7	8.3	28	0	44	20	32	0.00	29.17	30.44	SSE	8.6	20.0	13.35	43.9	44.3	48	41
3	55	33	41.3	23.9	21	0	86	37	51	0.00	28.72	29.97	SSE	9.3	26.9	10.20	43.8	44.1	47	42
4	42	16	31.3	21.0	36	0	91	39	67	0.00	28.89	30.14	N	13.2	36.5	11.31	42.9	42.5	44	40
5	39	12	24.1	14.1	40	0	86	51	66	0.00	28.88	30.13	S	6.6	21.8	7.97	39.9	38.4	40	37
6	30	18	25.9	15.0	41	0	85	51	63	0.00	28.96	30.22	NNE	10.3	21.2	4.90	39.0	37.4	38	36
7	43	21	30.1	13.2	33	0	74	30	51	0.00	29.14	30.40	N	6.9	21.0	16.16	39.6	38.5	43	36
8	60	21	41.3	21.7	24	0	76	25	49	0.00	29.06	30.32	S	8.3	23.5	16.17	40.5	39.9	45	36
9	67	34	46.2	29.9	15	0	78	32	55	0.00	28.76	30.01	S	10.5	26.2	16.00	43.6	44.2	50	40
10	34	20	23.1	16.1	38	0	91	56	75	0.00	28.80	30.05	N	15.1	29.7	6.55	42.2	41.7	45	39
11	35	16	24.2	12.4	40	0	86	39	62	0.00	28.95	30.21	NNW	10.3	25.7	12.92	39.8	38.8	42	37
12	46	9	27.6	17.8	37	0	95	38	69	0.00	29.15	30.41	E	6.7	17.6	14.38	38.4	37.1	41	34
13	51	29	41.1	32.7	25	0	96	54	73	0.00	29.10	30.36	SSE	7.5	18.3	9.67	41.1	40.8	44	38
14	70	42	55.3	48.8	9	0	100	50	81	0.00	28.84	30.09	S	9.9	23.2	11.88	44.9	45.8	50	43
15	80	62	70.0	56.9	0	6	81	44	64	0.00	28.64	29.88	SSW	11.9	28.0	13.73	50.3	52.1	56	49
16	66	35	42.7	27.1	14	0	83	41	55	0.05	28.98	30.24	N	14.5	41.1	7.72	49.7	50.7	55	48
17	58	34	43.9	33.9	19	0	97	34	71	0.25	28.86	30.12	S	6.1	22.7	12.01	47.6	47.6	50	45
18	62	32	47.9	45.0	18	0	100	72	90	0.00	28.71	29.96	SSE	11.5	27.5	5.36	46.3	45.4	49	43
19	75	51	65.4	58.8	2	0	92	61	80	0.00	28.49	29.73	S	13.0	33.5	4.33	51.5	53.2	57	49
20	69	25	41.6	38.8	18	0	98	82	90	0.50	28.74	29.98	N	15.9	33.8	0.79	50.9	50.2	57	42
21	26	21	23.8	21.4	41	0	98	84	91	0.00	29.09	30.35	NNE	14.7	29.3	1.43	43.1	39.6	42	38
22	33	26	30.3	29.9	36	0	100	96	98	0.39	29.00	30.25	NNE*	NA	16.0*	2.38	40.5	36.9	38	36
23	39	33	35.7	35.5	29	0	100	98	99	1.23	28.90	30.16	NNE	5.5	15.3	2.03	40.7	37.4	39	36
24	54	33	41.8	38.5	22	0	100	63	89	0.71	28.67	29.91	NW	6.7	28.8	12.35	43.8	43.0	49	40
25	63	26	44.4	32.8	21	0	100	30	69	0.01	28.77	30.02	S	5.7	20.8	19.35	44.2	45.8	53	40
26	65	28	50.1	35.4	18	0	92	34	60	0.00	28.91	30.16	S	6.5	24.5	19.77	45.8	47.0	54	40
27	57	43	52.1	49.4	15	0	100	70	91	0.30	28.75	30.00	SSE	8.1	20.5	2.88	47.3	47.6	51	44
28	70	49	62.1	56.2	6	0	100	53	82	0.01	28.52	29.76	S	9.4	28.0	6.42	51.5	53.6	57	51
	53	29	40.8	30.6	<- Monthly Averages ->						28.87	30.12	S *	10.0*	41.1*	9.76	44.2	43.9	48	41

Temperature - Highest: 80
Lowest: 9

Degree Days - Total HDD: 670
Total CDD: 6

Number of Days With:
Tmax ≥ 90: 0
Tmax ≤ 32: 2
Tmin ≤ 32: 17
Tmin ≤ 0: 0
Rainfall ≥ 0.01 inch: 9
Rainfall ≥ 0.10 inch: 6
Avg Wind Speed ≥ 10 mph: 12*
Max Wind Speed ≥ 30 mph: 5*

Rainfall: Monthly Total: 3.45 in.
Greatest 24 Hr: 1.23 in.

Humidity - Highest: 100
Lowest: 20

* Denotes incomplete record

Monthly data generated at 2018-03-01 09:10:59 UTC

Figure 17 February Mesonet Data