
***Lake Thunderbird TMDL Monitoring Plan Implementation:
Sample Year (SY) 2018- April Report***



SY2018 Monthly Report

Lake Thunderbird TMDL Monitoring Plan Implementation:

April 2018 Monitoring Report

Oklahoma Water Resources Board
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SUMMARY OF APRIL WATER QUALITY SAMPLING

Sampling for April 2018 consisted of two separate collections. The first collection occurred on the twenty-seventh of March and was considered a high flow collection. Water samples were collected at nine locations, as well as two stormwater outfalls, and discharge was measured at four locations. Mesonet data shows 0.28 inches of precipitation occurring on the twenty-seventh, 0.34 inches in the 72 hours prior to sampling, and 0.10 inches in the 72 hours after the sampling event. The second collection was also a high flow collection on the twenty-first of April. Water samples were collected at eight of the locations, as well as six of the stormwater outfalls, and discharge was collected at four locations. Mesonet shows 1.70 inches of precipitation occurring on the twenty-first, and no precipitation in the 72 hours prior to or after the sampling event. The total rainfall amount in Norman for the month of April was 2.39 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

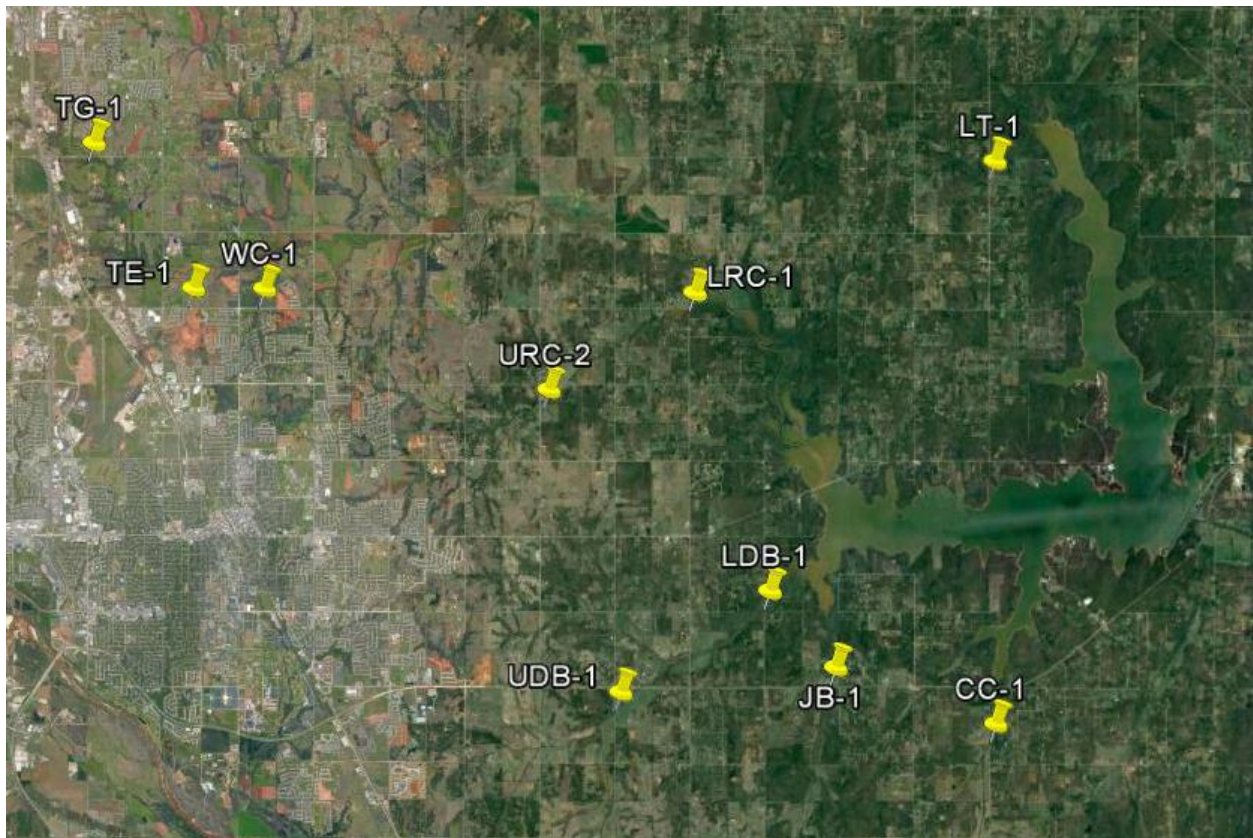


Figure 1 Monitoring Station Map

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	3/27/2018	9:15	SD	14.4	8.2	628.0	7.6	65.0	appears to be coming up slowly since arrival
lt-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not sampled
jb-1	3/27/2018	9:45	SD	14.3	8.4	667.0	7.8	37.0	visible runoff from road
udb-1	3/27/2018	10:30	SD	14.8	9.7	710.0	7.9	125.0	
ldb-1	3/27/2018	11:10	SD	16.1	8.7	925.0	7.9	41.0	
tg-1	3/27/2018	15:10	SD	14.8	9.9	496.0	7.9	100.0	
te-1	3/27/2018	14:45	SD	15.5	9.2	858.0	8.0	71.0	
wc-1	3/27/2018	14:25	SD	14.6	9.5	530.0	7.8	102.0	
lrc-1	3/27/2018	12:30	SD	15.4	8.3	739.0	7.8	21.0	
urc-2	3/27/2018	11:35	SD	15.1	8.3	569.0	7.8	108.0	
sw-01	3/27/2018	14:55	SD	N/A	N/A	551.0	N/A	102.0	collected via samplers
sw-04	3/27/2018	14:00	SD	N/A	N/A	337.0	N/A	>1000	collected via samplers

Table 1 Field Data Form 3/27/18

Site Name	TKN (mg/L)	Nitrate/Nitrite (mg/L)	TP (mg/L)	TSS (mg/L)
TG-1	1.11	0.48	0.180	71.0
CC-1	1.91	0.13	0.303	37.0
JB-1	0.86	0.11	0.092	20.0
UDB-1	0.72	0.05	0.104	141
LDB-1	0.54	0.12	0.053	39.0
LRC-1	0.39	<0.05	0.051	13.0
URC-2	0.82	0.14	0.111	81.0
WC-1	0.72	0.44	0.114	19.0
TE-1	0.87	0.24	0.090	41.0
LT-1	N/A	N/A	N/A	N/A
SW-01	1.27	0.42	0.161	69.0
SW-04	8.88	1.31	1.185	352

Table 2 Laboratory Analysis Summary 3/27/18

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	1.99 mg/L	0.13 mg/L	0.313 mg/L	38.0 mg/L
Duplicate RPD	4.10%	0%	3.25%	2.67%

Table 3 QA/QC Data 3/27/18

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)	9.55	0.54	16.22	18.23	17.095	17.76	13.53	8.58	11.88	N/A
DISCHARGE (ft ³ /s)	7.13	1.26	1.510	16.43	10	1.5	5.99	1	2	N/A

Table 4 Station Discharge Summary 3/27/18

Discharge Measurement Summary

Date Generated: Mon May 7 2018

File Information

File Name CC0327.WAD
Start Date and Time 2018/03/27 06:49:04

Site Details

Site Name CC
Operator(s) JM

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 ft²
Discharge cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.7%	4.8%
Velocity	2.9%	15.5%
Width	0.2%	0.2%
Method	3.7%	-
# Stations	3.6%	-
Overall	6.0%	16.2%

Summary

Averaging Int.	40	# Stations	14
Start Edge	LEW	Total Width	9.750
Mean SNR	45.5 dB	Total Area	4.887
Mean Temp	53.96 °F	Mean Depth	0.501
Disch. Equation	Mid-Section	Mean Velocity	0.2587
		Total Discharge	1.2643

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Tue Mar 27 06:48:21 CDT 2018	0.000	0.540		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	06:49	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	06:49	1.00	0.6	0.200	0.6	0.080	-0.0089	1.00	-0.0089	0.200	-0.0018	-0.1
2	06:49	2.00	0.6	0.200	0.6	0.080	0.1775	1.00	0.1775	0.200	0.0355	2.8
3	06:51	3.00	0.6	0.300	0.6	0.120	0.1056	1.00	0.1056	0.300	0.0317	2.5
4	06:51	4.00	0.6	0.500	0.6	0.200	0.0433	1.00	0.0433	0.500	0.0217	1.7
5	06:53	5.00	0.6	0.800	0.6	0.320	-0.0846	1.00	-0.0846	0.800	-0.0677	-5.4
6	06:54	6.00	0.6	0.700	0.6	0.280	-0.1194	1.00	-0.1194	0.700	-0.0836	-6.6
7	06:55	7.00	0.6	0.800	0.6	0.320	0.2487	1.00	0.2487	0.600	0.1492	11.8
8	06:56	7.50	0.6	0.750	0.6	0.300	0.6972	1.00	0.6972	0.375	0.2614	20.7
9	06:57	8.00	0.6	0.800	0.6	0.320	0.7188	1.00	0.7188	0.400	0.2875	22.7
10	06:58	8.50	0.6	0.800	0.6	0.320	0.9642	1.00	0.9642	0.400	0.3856	30.5
11	06:59	9.00	0.6	0.600	0.6	0.240	0.7451	1.00	0.7451	0.300	0.2235	17.7
12	07:00	9.50	0.6	0.300	0.6	0.120	0.1886	1.00	0.1886	0.112	0.0212	1.7
13	07:00	9.75	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 3/27/18

Discharge Measurement Summary

Date Generated: Mon May 7 2018

File Information		Site Details	
File Name	UDB0327.WAD	Site Name	UDB
Start Date and Time	2018/03/27 07:59:50	Operator(s)	JM
System Information		Units (English Units)	
Sensor Type	FlowTracker	Distance	ft
Serial #	P4713	Velocity	ft/s
CPU Firmware Version	3.9	Area	ft ²
Software Ver	2.30	Discharge	cfs
Mounting Correction	0.0%		
Discharge Uncertainty			
	Category	ISO	Stats
	Accuracy	1.0%	1.0%
	Depth	0.1%	2.3%
	Velocity	1.1%	4.4%
	Width	0.1%	0.1%
	Method	1.9%	-
	# Stations	2.1%	-
	Overall	3.2%	5.1%
Summary			
Averaging Int.	40	# Stations	24
Start Edge	LEW	Total Width	18.500
Mean SNR	46.8 dB	Total Area	22.325
Mean Temp	54.47 °F	Mean Depth	1.207
Disch. Equation	Mid-Section	Mean Velocity	0.7358
		Total Discharge	16.4274

Supplemental Data					
#	Time	Location	Gauge Height	Rated Flow	Comments
1	Tue Mar 27 07:59:13 CDT 2018	0.000	18.280		

Measurement Results												
St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	07:59	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	07:59	1.00	0.6	0.300	0.6	0.120	0.2805	1.00	0.2805	0.300	0.0841	0.5
2	08:00	2.00	0.6	0.800	0.6	0.320	0.1083	1.00	0.1083	0.800	0.0866	0.5
3	08:01	3.00	0.6	1.200	0.6	0.480	0.1657	1.00	0.1657	1.200	0.1988	1.2
4	08:03	4.00	0.6	1.700	0.6	0.680	0.3976	1.00	0.3976	1.700	0.6760	4.1
5	08:04	5.00	0.6	1.600	0.6	0.640	0.7060	1.00	0.7060	1.600	1.1297	6.9
6	08:05	6.00	0.6	1.550	0.6	0.620	0.9419	1.00	0.9419	1.550	1.4599	8.9
7	08:06	7.00	0.6	1.700	0.6	0.680	1.1578	1.00	1.1578	1.275	1.4763	9.0
8	08:07	7.50	0.6	1.400	0.6	0.560	1.2769	1.00	1.2769	0.700	0.8938	5.4
9	08:08	8.00	0.6	1.400	0.6	0.560	1.2871	1.00	1.2871	0.700	0.9009	5.5
10	08:09	8.50	0.6	1.800	0.6	0.720	0.7674	1.00	0.7674	0.900	0.6906	4.2
11	08:10	9.00	0.6	1.500	0.6	0.600	1.0902	1.00	1.0902	0.750	0.8177	5.0
12	08:11	9.50	0.6	1.800	0.6	0.720	1.0840	1.00	1.0840	0.900	0.9755	5.9
13	08:12	10.00	0.6	1.800	0.6	0.720	1.2989	1.00	1.2989	0.900	1.1689	7.1
14	08:12	10.50	0.6	1.700	0.6	0.680	1.1978	1.00	1.1978	0.850	1.0182	6.2
15	08:14	11.00	0.6	1.600	0.6	0.640	1.3888	1.00	1.3888	0.800	1.1111	6.8
16	08:15	11.50	0.6	1.300	0.6	0.520	1.2651	1.00	1.2651	0.650	0.8222	5.0
17	08:16	12.00	0.6	1.500	0.6	0.600	0.8563	1.00	0.8563	1.125	0.9633	5.9
18	08:17	13.00	0.6	1.500	0.6	0.600	0.7943	1.00	0.7943	1.500	1.1914	7.3
19	08:18	14.00	0.6	1.200	0.6	0.480	0.7110	1.00	0.7110	1.200	0.8532	5.2
20	08:19	15.00	0.6	1.100	0.6	0.440	0.0650	1.00	0.0650	1.100	0.0715	0.4
21	08:20	16.00	0.6	0.950	0.6	0.380	-0.0144	1.00	-0.0144	0.950	-0.0137	-0.1
22	08:21	17.00	0.6	0.700	0.6	0.280	-0.1699	1.00	-0.1699	0.875	-0.1487	-0.9
23	08:21	18.50	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 UDB-1 3/27/18

Discharge Measurement Summary

Date Generated: Mon May 7 2018

File Information		Site Details	
File Name	URC0327.WAD	Site Name	URC
Start Date and Time	2018/03/27 09:13:49	Operator(s)	JM

System Information		Units (English Units)	
Sensor Type	FlowTracker	Distance	ft
Serial #	P4713	Velocity	ft/s
CPU Firmware Version	3.9	Area	ft ²
Software Ver	2.30	Discharge	cfs
Mounting Correction	0.0%		

Discharge Uncertainty			
Category	ISO	Stats	
Accuracy	1.0%	1.0%	
Depth	0.3%	5.7%	
Velocity	3.2%	20.7%	
Width	0.3%	0.3%	
Method	1.8%	-	
# Stations	4.6%	-	
Overall	6.0%	21.5%	

Summary			
Averaging Int.	40	# Stations	11
Start Edge	LEW	Total Width	5.500
Mean SNR	44.6 dB	Total Area	8.625
Mean Temp	54.97 °F	Mean Depth	1.568
Disch. Equation	Mid-Section	Mean Velocity	0.6946
		Total Discharge	5.9905

Supplemental Data					
#	Time	Location	Gauge Height	Rated Flow	Comments
1	Tue Mar 27 09:35:01 CDT 2018	5.500	13.530		

Measurement Results												
St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	09:13	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	09:13	0.50	0.6	0.600	0.6	0.240	0.0020	1.00	0.0020	0.300	0.0006	0.0
2	09:15	1.00	0.6	0.500	0.6	0.200	-0.0328	1.00	-0.0328	0.250	-0.0082	-0.1
3	09:16	1.50	0.6	0.600	0.6	0.240	0.0115	1.00	0.0115	0.300	0.0034	0.1
4	09:20	2.00	0.8/0.2	1.400	0.2	1.120	0.1893	1.00	0.0948	0.700	0.0664	1.1
4	09:19	2.00	0.8/0.2	1.400	0.8	0.280	0.0003					
5	09:22	2.50	0.2/0.8	2.600	0.2	2.080	-0.0292	1.00	0.0349	1.300	0.0454	0.8
5	09:23	2.50	0.2/0.8	2.600	0.8	0.520	0.0991					
6	09:25	3.00	0.8/0.2	2.600	0.2	2.080	1.1785	1.00	0.8737	1.300	1.1358	19.0
6	09:24	3.00	0.8/0.2	2.600	0.8	0.520	0.5689					
7	09:26	3.50	0.2/0.8	2.500	0.2	2.000	0.7070	1.00	0.3547	1.250	0.4433	7.4
7	09:27	3.50	0.2/0.8	2.500	0.8	0.500	0.0023					
8	09:29	4.00	0.8/0.2	2.400	0.2	1.920	1.5180	1.00	1.2602	1.800	2.2682	37.9
8	09:28	4.00	0.8/0.2	2.400	0.8	0.480	1.0023					
9	09:30	5.00	0.2/0.6/0.8	1.900	0.2	1.520	1.2667	1.00	1.4285	1.425	2.0355	34.0
9	09:33	5.00	0.2/0.6/0.8	1.900	0.6	0.760	1.3904					
9	09:31	5.00	0.2/0.6/0.8	1.900	0.8	0.380	1.6663					
10	09:31	5.50	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 Summary URC-2 3/27/18

Discharge Measurement Summary

Date Generated: Mon May 7 2018

File Information

File Name JB0327.WAD
Start Date and Time 2018/03/27 07:16:36

Site Details

Site Name JB
Operator(s) JM

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 ft²
Discharge cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.7%	2.7%
Velocity	2.1%	22.8%
Width	0.2%	0.2%
Method	3.5%	-
# Stations	3.6%	-
Overall	5.6%	23.0%

Summary

Averaging Int. 40 # Stations 14
Start Edge LEW Total Width 10.500
Mean SNR 38.9 dB Total Area 5.669
Mean Temp 53.70 °F Mean Depth 0.540
Disch. Equation Mid-Section Mean Velocity 0.2667
Total Discharge 1.5119

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Tue Mar 27 07:17:49 CDT 2018	3.500	16.220		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	07:16	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	07:16	1.75	0.6	0.400	0.6	0.160	0.0000	1.00	0.0000	0.600	0.0000	0.0
2	07:18	3.00	0.6	0.550	0.6	0.220	0.0105	1.00	0.0105	0.619	0.0065	0.4
3	07:19	4.00	0.6	0.600	0.6	0.240	0.0000	1.00	0.0000	0.600	0.0000	0.0
4	07:20	5.00	0.6	0.700	0.6	0.280	0.2769	1.00	0.2769	0.700	0.1939	12.8
5	07:21	6.00	0.6	0.600	0.6	0.240	-0.0056	1.00	-0.0056	0.600	-0.0033	-0.2
6	07:22	7.00	0.6	0.700	0.6	0.280	0.5305	1.00	0.5305	0.525	0.2786	18.4
7	07:23	7.50	0.6	0.800	0.6	0.320	0.7001	1.00	0.7001	0.400	0.2800	18.5
8	07:24	8.00	0.6	0.800	0.6	0.320	1.2690	1.00	1.2690	0.400	0.5075	33.6
9	07:25	8.50	0.6	0.750	0.6	0.300	0.5223	1.00	0.5223	0.375	0.1959	13.0
10	07:26	9.00	0.6	0.700	0.6	0.280	0.1033	1.00	0.1033	0.350	0.0362	2.4
11	07:27	9.50	0.6	0.600	0.6	0.240	0.0161	1.00	0.0161	0.300	0.0048	0.3
12	07:28	10.00	0.6	0.400	0.6	0.160	0.0597	1.00	0.0597	0.200	0.0119	0.8
13	07:28	10.50	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 Summary JB-1 3/27/18

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	4/21/2018	15:55	SD	12.0	9.0	392.0	7.8	173.0	trees removed from ds side, some tree debris in water from removal
lt-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not sampled
jb-1	4/21/2018	16:40	SD	11.8	8.6	598.0	7.8	70.0	visual flow coming from drainage ditch from road
udb-1	4/21/2018	17:30	SD	12.2	10.1	278.0	8.0	606.0	
ldb-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not sampled
tg-1	4/21/2018	15:00	SD	N/A	N/A	258.0	8.3	649.0	autosampler collected T1 at 13.94, peak at 1530 at 14.37
te-1	4/21/2018	14:15	SD	N/A	N/A	360.0	8.1	926.0	autosampler collected T1 at 14.05, collected at peak
wc-1	4/21/2018	14:00	SD	N/A	N/A	254.0	8.0	528.0	autosampler collected T2 at 10.87, peak at 10.90 @ 1415, ysi taken from T1 collected at 1330 @ 10.16
lrc-1	4/21/2018	18:15	SD	N/A	N/A	704.0	8.0	204.0	autosampler collected T1 at 18.58, peak at 19.01 at 1930
urc-2	4/21/2018	16:45	SD	N/A	N/A	320.0	7.9	689.0	autosampler collected T1 at 14.25, peak at 14.28 @ 1715
sw-01	4/23/2018	8:45	SD	N/A	N/A	400.0	N/A	441.0	bottle filled on 4/21
sw-02	4/23/2018	9:35	SD	N/A	N/A	15700.0	N/A	755.0	bottle filled on 4/21
sw-03	4/23/2018	9:50	SD	N/A	N/A	969.0	N/A	136.0	bottle filled on 4/21
sw-04	4/23/2018	9:20	SD	N/A	N/A	398.0	N/A	>1000	bottle filled on 4/21
sw-05	4/23/2018	10:35	SD	N/A	N/A	882.0	N/A	258.0	bottle filled on 4/21
sw-06	4/23/2018	10:45	SD	N/A	N/A	534.0	N/A	175.0	bottle filled on 4/21
sw-07	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	sampler lost, no collection

Table 5 Field Data Form 4/21/18

Site Name	TKN (mg/L)	Nitrate/Nitrite (mg/L)	TP (mg/L)	TSS (mg/L)
TG-1	2.62	0.55	0.630	1110
CC-1	3.80	0.27	1.005	138
JB-1	1.26	0.32	0.155	58.0
UDB-1	2.57	0.54	0.445	624
LDB-1	N/A	N/A	N/A	N/A
LRC-1	1.13	<0.05	0.196	262
URC-2	2.81	0.85	0.428	688
WC-1	2.95	0.77	0.570	636
TE-1	2.70	0.70	0.467	525
LT-1	N/A	N/A	N/A	N/A
SW-01	3.29	0.57	0.386	680
SW-02	3.48	0.70	0.740	1390
SW-03	2.46	0.16	0.361	420
SW-04	14.1	0.07	2.230	1690
SW-05	6.68	0.36	1.135	1710
SW-06	1.85	0.58	0.248	30.0
SW-07	N/A	N/A	N/A	N/A

Table 6 Laboratory Analysis Summary 4/21/18

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	3.55 mg/L	0.26 mg/L	0.985 mg/L	142 mg/L
Duplicate RPD	6.80%	3.77%	2.01%	2.86%

Table 7 QA/QC Data 4/21/18

SITE	TG-1	CC-1	JB-1	UDB-1	LDB-1	LRC-1	URC-2	WC-1	TE-1	LT-1
STAGE (ft)	13.94	0.87	16.51	19.09	N/A	18.58	14.59	10.87	14.05	N/A
DISCHARGE (ft ³ /s)	378	6.86	5.69	97.88	N/A	16	31.24	26	80	N/A

Table 8 Station Discharge Summary 4/21/18

Discharge Measurement Summary

Date Generated: Mon May 7 2018

File Information

File Name URC0421.WAD
 Start Date and Time 2018/04/21 15:58:28

Site Details

Site Name URC
 Operator(s) JW

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 ft²
 Discharge cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.2%	2.8%
Velocity	0.7%	2.4%
Width	0.1%	0.1%
Method	1.9%	-
# Stations	2.2%	-
Overall	3.1%	3.9%

Summary

Averaging Int. 40 # Stations 23
 Start Edge LEW Total Width 14.000
 Mean SNR 49.0 dB Total Area 18.200
 Mean Temp 53.60 °F Mean Depth 1.300
 Disch. Equation Mid-Section Mean Velocity 1.7167
Total Discharge 31.2438

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Sat Apr 21 16:22:24 CDT 2018	14.000	14.590		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	15:58	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
<i>1</i>	<i>15:58</i>	<i>1.00</i>	<i>0.6</i>	<i>0.300</i>	<i>0.6</i>	<i>0.120</i>	<i>0.0128</i>	<i>1.00</i>	<i>0.0128</i>	<i>0.300</i>	<i>0.0038</i>	<i>0.0</i>
2	16:00	2.00	0.6	0.500	0.6	0.200	0.1818	1.00	0.1818	0.500	0.0909	0.3
3	16:01	3.00	0.6	0.600	0.6	0.240	0.7858	1.00	0.7858	0.600	0.4715	1.5
4	16:02	4.00	0.6	0.900	0.6	0.360	1.7369	1.00	1.7369	0.675	1.1723	3.8
5	16:03	4.50	0.6	0.900	0.6	0.360	1.7772	1.00	1.7772	0.450	0.7997	2.6
6	16:05	5.00	0.6	1.200	0.6	0.480	1.6211	1.00	1.6211	0.600	0.9727	3.1
7	16:06	5.50	0.6	1.300	0.6	0.520	1.5738	1.00	1.5738	0.650	1.0229	3.3
8	16:07	6.00	0.6	1.500	0.6	0.600	1.7438	1.00	1.7438	0.750	1.3078	4.2
9	16:08	6.50	0.6	1.500	0.6	0.600	1.6706	1.00	1.6706	0.750	1.2530	4.0
10	16:09	7.00	0.6	1.800	0.6	0.720	1.5961	1.00	1.5961	0.900	1.4364	4.6
11	16:10	7.50	0.6	2.100	0.6	0.840	2.1332	1.00	2.1332	1.050	2.2399	7.2
12	16:11	8.00	0.6	2.400	0.6	0.960	1.9475	1.00	1.9475	1.200	2.3369	7.5
13	16:12	8.50	0.6	2.600	0.6	1.040	1.8097	1.00	1.8097	1.300	2.3527	7.5
14	16:13	9.00	0.6	2.600	0.6	1.040	1.9199	1.00	1.9199	1.300	2.4960	8.0
15	16:14	9.50	0.6	2.700	0.6	1.080	2.1398	1.00	2.1398	1.350	2.8888	9.2
16	16:15	10.00	0.6	2.600	0.6	1.040	1.9892	1.00	1.9892	1.300	2.5860	8.3
17	16:16	10.50	0.6	2.600	0.6	1.040	1.9931	1.00	1.9931	1.300	2.5911	8.3
18	16:17	11.00	0.6	2.600	0.6	1.040	2.0197	1.00	2.0197	1.300	2.6257	8.4
19	16:18	11.50	0.6	1.000	0.6	0.400	1.6040	1.00	1.6040	0.500	0.8020	2.6
20	16:20	12.00	0.6	0.700	0.6	0.280	1.8724	1.00	1.8724	0.525	0.9832	3.1
21	16:21	13.00	0.6	0.900	0.6	0.360	0.9006	1.00	0.9006	0.900	0.8105	2.6
22	16:21	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 6 Discharge Summary URC-2 4/21/18

Discharge Measurement Summary

Date Generated: Mon May 7 2018

File Information

File Name JIMB0421.WAD
Start Date and Time 2018/04/21 14:04:50

Site Details

Site Name JB
Operator(s) JW

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 ft²
Discharge cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.2%	1.1%
Velocity	1.3%	8.8%
Width	0.1%	0.1%
Method	2.2%	-
# Stations	2.5%	-
Overall	3.7%	8.9%

Summary

Averaging Int. 40 # Stations 20
Start Edge LEW Total Width 12.000
Mean SNR 41.1 dB Total Area 9.525
Mean Temp 52.91 °F Mean Depth 0.794
Disch. Equation Mid-Section Mean Velocity 0.5971
Total Discharge 5.6874

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Sat Apr 21 14:01:10 CDT 2018	0.000	16.510		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	14:04	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	14:04	1.00	0.6	0.800	0.6	0.320	0.1775	1.00	0.1775	0.600	0.1065	1.9
2	14:07	1.50	0.6	0.800	0.6	0.320	0.1220	1.00	0.1220	0.600	0.0732	1.3
3	14:09	2.50	0.6	0.800	0.6	0.320	0.1263	1.00	0.1263	0.600	0.0758	1.3
4	14:10	3.00	0.6	0.900	0.6	0.360	0.0144	1.00	0.0144	0.450	0.0065	0.1
5	14:11	3.50	0.6	1.000	0.6	0.400	0.6499	1.00	0.6499	0.500	0.3250	5.7
6	14:12	4.00	0.6	1.000	0.6	0.400	0.3399	1.00	0.3399	0.500	0.1699	3.0
7	14:13	4.50	0.6	1.000	0.6	0.400	0.6775	1.00	0.6775	0.500	0.3387	6.0
8	14:14	5.00	0.6	1.000	0.6	0.400	0.7966	1.00	0.7966	0.500	0.3983	7.0
9	14:16	5.50	0.6	0.900	0.6	0.360	0.2211	1.00	0.2211	0.450	0.0995	1.7
10	14:17	6.00	0.6	0.900	0.6	0.360	0.3871	1.00	0.3871	0.450	0.1742	3.1
11	14:18	6.50	0.6	1.000	0.6	0.400	0.5302	1.00	0.5302	0.500	0.2651	4.7
12	14:19	7.00	0.6	1.100	0.6	0.440	0.9528	1.00	0.9528	0.550	0.5240	9.2
13	14:20	7.50	0.6	1.100	0.6	0.440	1.5515	1.00	1.5515	0.550	0.8534	15.0
14	14:21	8.00	0.6	1.000	0.6	0.400	1.2923	1.00	1.2923	0.500	0.6462	11.4
15	14:22	8.50	0.6	1.000	0.6	0.400	1.3583	1.00	1.3583	0.500	0.6791	11.9
16	14:23	9.00	0.6	1.000	0.6	0.400	1.2060	1.00	1.2060	0.500	0.6030	10.6
17	14:24	9.50	0.6	0.800	0.6	0.320	0.4583	1.00	0.4583	0.400	0.1833	3.2
18	14:25	10.00	0.6	0.700	0.6	0.280	0.1893	1.00	0.1893	0.875	0.1657	2.9
19	14:25	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 4/21/18

Discharge Measurement Summary

Date Generated: Mon May 7 2018

File Information		Site Details	
File Name	CC0421.WAD	Site Name	CLEAR CREEK
Start Date and Time	2018/04/21 13:21:23	Operator(s)	JW

System Information		Units (English Units)		Discharge Uncertainty		
Sensor Type	FlowTracker	Distance	ft	Category	ISO	Stats
Serial #	P4709	Velocity	ft/s	Accuracy	1.0%	1.0%
CPU Firmware Version		Area	ft^2	Depth	0.2%	1.1%
Software Ver	2.30	Discharge	cfs	Velocity	1.2%	3.8%
Mounting Correction	0.0%			Width	0.1%	0.1%
				Method	2.1%	-
				# Stations	2.4%	-
				Overall	3.6%	4.0%

Summary			
Averaging Int.	40	# Stations	21
Start Edge	LEW	Total Width	11.000
Mean SNR	52.4 dB	Total Area	9.700
Mean Temp	53.13 °F	Mean Depth	0.882
Disch. Equation	Mid-Section	Mean Velocity	0.7069
		Total Discharge	6.8572

Supplemental Data (Gauge Height Change = 0.020ft)					
#	Time	Location	Gauge Height	Rated Flow	Comments
1	Sat Apr 21 13:31:18 CDT 2018	6.000	0.870		
2	Sat Apr 21 13:42:06 CDT 2018	11.000	0.890		

Measurement Results												
St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	13:21	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
<i>1</i>	<i>13:21</i>	<i>1.00</i>	<i>0.6</i>	<i>1.200</i>	<i>0.6</i>	<i>0.480</i>	<i>-0.0325</i>	<i>1.00</i>	<i>-0.0325</i>	<i>0.900</i>	<i>-0.0292</i>	<i>-0.4</i>
2	13:22	1.50	0.6	1.200	0.6	0.480	0.1414	1.00	0.1414	0.600	0.0849	1.2
3	13:23	2.00	0.6	1.100	0.6	0.440	0.4948	1.00	0.4948	0.550	0.2721	4.0
<i>4</i>	<i>13:24</i>	<i>2.50</i>	<i>0.6</i>	<i>1.200</i>	<i>0.6</i>	<i>0.480</i>	<i>0.7808</i>	<i>1.00</i>	<i>0.7808</i>	<i>0.600</i>	<i>0.4686</i>	<i>6.8</i>
5	13:25	3.00	0.6	1.200	0.6	0.480	1.2569	1.00	1.2569	0.600	0.7542	11.0
6	13:26	3.50	0.6	1.200	0.6	0.480	1.4567	1.00	1.4567	0.600	0.8741	12.7
7	13:27	4.00	0.6	1.300	0.6	0.520	1.1096	1.00	1.1096	0.650	0.7212	10.5
8	13:28	4.50	0.6	1.200	0.6	0.480	1.0207	1.00	1.0207	0.600	0.6125	8.9
9	13:29	5.00	0.6	1.200	0.6	0.480	0.7192	1.00	0.7192	0.600	0.4315	6.3
<i>10</i>	<i>13:29</i>	<i>5.50</i>	<i>0.6</i>	<i>1.200</i>	<i>0.6</i>	<i>0.480</i>	<i>0.5043</i>	<i>1.00</i>	<i>0.5043</i>	<i>0.600</i>	<i>0.3026</i>	<i>4.4</i>
<i>11</i>	<i>13:31</i>	<i>6.00</i>	<i>0.6</i>	<i>1.100</i>	<i>0.6</i>	<i>0.440</i>	<i>0.6572</i>	<i>1.00</i>	<i>0.6572</i>	<i>0.550</i>	<i>0.3615</i>	<i>5.3</i>
12	13:32	6.50	0.6	1.000	0.6	0.400	0.8510	1.00	0.8510	0.500	0.4255	6.2
13	13:33	7.00	0.6	1.000	0.6	0.400	1.2175	1.00	1.2175	0.500	0.6088	8.9
14	13:34	7.50	0.6	0.900	0.6	0.360	1.1394	1.00	1.1394	0.450	0.5127	7.5
15	13:35	8.00	0.6	0.800	0.6	0.320	0.6427	1.00	0.6427	0.400	0.2570	3.7
<i>16</i>	<i>13:36</i>	<i>8.50</i>	<i>0.6</i>	<i>0.600</i>	<i>0.6</i>	<i>0.240</i>	<i>0.4829</i>	<i>1.00</i>	<i>0.4829</i>	<i>0.300</i>	<i>0.1449</i>	<i>2.1</i>
<i>17</i>	<i>13:37</i>	<i>9.00</i>	<i>0.6</i>	<i>0.400</i>	<i>0.6</i>	<i>0.160</i>	<i>0.2106</i>	<i>1.00</i>	<i>0.2106</i>	<i>0.200</i>	<i>0.0421</i>	<i>0.6</i>
<i>18</i>	<i>13:38</i>	<i>9.50</i>	<i>0.6</i>	<i>0.400</i>	<i>0.6</i>	<i>0.160</i>	<i>0.0617</i>	<i>1.00</i>	<i>0.0617</i>	<i>0.200</i>	<i>0.0123</i>	<i>0.2</i>
<i>19</i>	<i>13:39</i>	<i>10.00</i>	<i>0.6</i>	<i>0.400</i>	<i>0.6</i>	<i>0.160</i>	<i>0.0000</i>	<i>1.00</i>	<i>0.0000</i>	<i>0.300</i>	<i>0.0000</i>	<i>0.0</i>
20	13:39	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 8 Discharge Summary CC-1 4/21/18

Station Number:
Station Name: UDB

Meas. No: 0
Date: 04/21/2018

Party: jw	Width: 26.3 ft	Processed by:
Boat/Motor:	Area: 40.7 ft ²	Mean Velocity: 2.53 ft/s
Gage Height: 19.07 ft	G.H.Change: 0.000 ft	Discharge: 101 ft ³ /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 ft ²	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	Type/Freq.: RiverRay / 600 kHz
WT 3-Beam Solution: YES	Serial #: 645650 Firmware: 44.16
BT Error Vel.: 3.28 ft/s	Bin Size: 20 cm Blank: 16 cm
WT Error Vel.: 32.81 ft/s	BT Mode: Auto BT Pings: Dyn
BT Up Vel.: 32.81 ft/s	WT Mode: Auto WT Pings: Dyn
WT Up Vel.: 32.81 ft/s	WZ : 5
Use Weighted Mean Depth: YES	
Max. Vel.: 5.71 ft/s	
Max. Depth: 2.05 ft	
Mean Depth: 1.55 ft	
% Meas.: 16.87	
Water Temp.: None	
ADCP Temp.: 54.7 °F	

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

Project Name: UDB0.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	188	45.0	14.5	19.1	2.86	5.51	87.0	23	36	05:57	05:58	0.28	2.43	72	0
001	R	3	3	138	44.6	14.9	18.6	4.48	5.19	87.9	27	43	05:59	06:00	0.39	2.04	50	0
002	L	3	3	219	59.5	18.9	23.1	5.23	5.58	112	27	42	06:00	06:02	0.28	2.70	71	0
003	R	3	3	141	61.0	20.0	19.6	5.62	5.58	112	31	48	06:02	06:03	0.28	2.34	69	0
004	L	3	3	167	61.4	19.4	26.4	6.75	5.79	120	23	36	06:03	06:05	0.31	3.29	53	0
005	R	3	3	177	60.8	19.3	20.7	6.36	5.93	113	37	58	06:05	06:06	0.32	1.95	77	0
007	R	3	3	171	44.0	13.9	17.2	5.44	5.33	85.9	20	31	06:08	06:09	0.25	2.80	67	0
008	L	3	3	205	47.3	14.9	15.3	4.77	5.26	87.4	22	32	06:09	06:11	0.25	2.71	67	0
Mean		3	3	175	52.9	17.0	20.0	5.19	5.52	101	26	41	Total	00:13	0.29	2.53	66	0
SDev		0	0	28	8.33	2.60	3.46	1.20	0.257	14.7	5.6	9.0			0.05	0.44		
SD/M		0.00	0.00	0.16	0.16	0.15	0.17	0.23	0.05	0.15	0.21	0.22			0.15	0.17		

Figure 9 Discharge Summary UDB-1 4/21/18

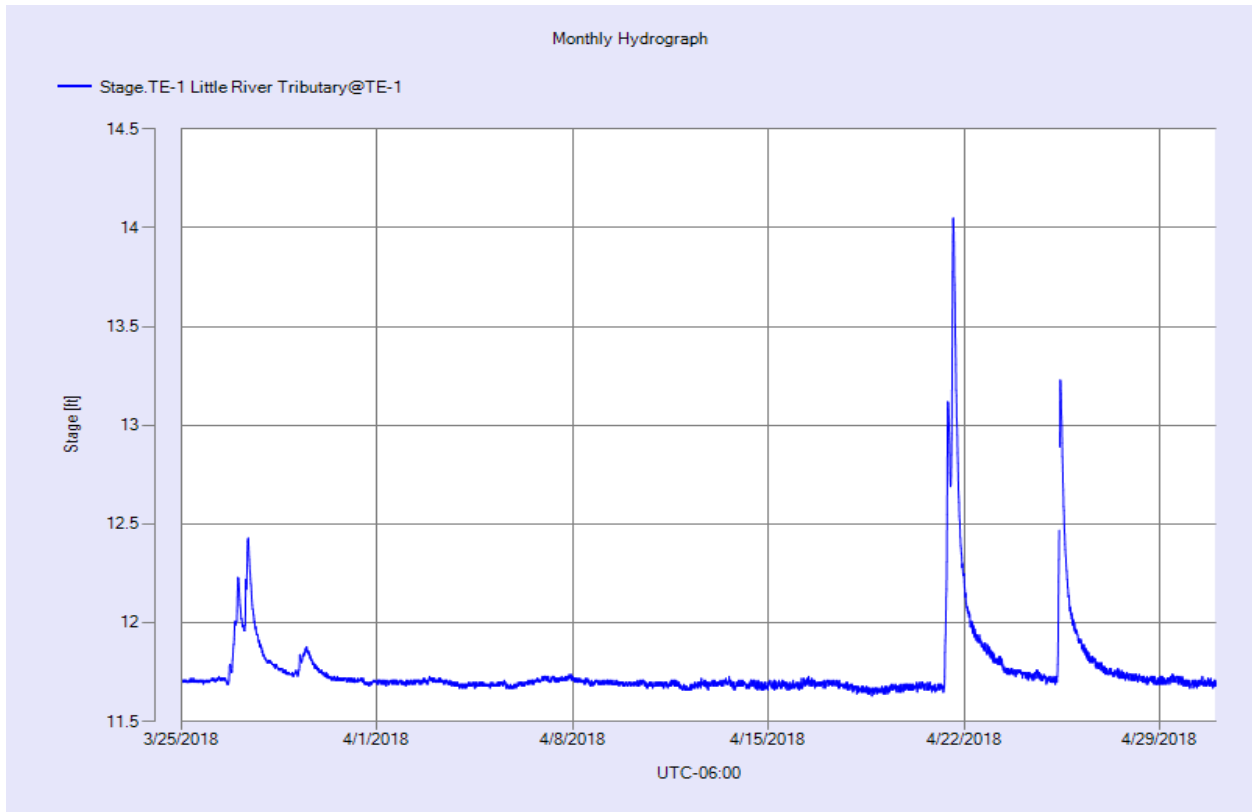


Figure 10 Monthly Hydrograph TE-1

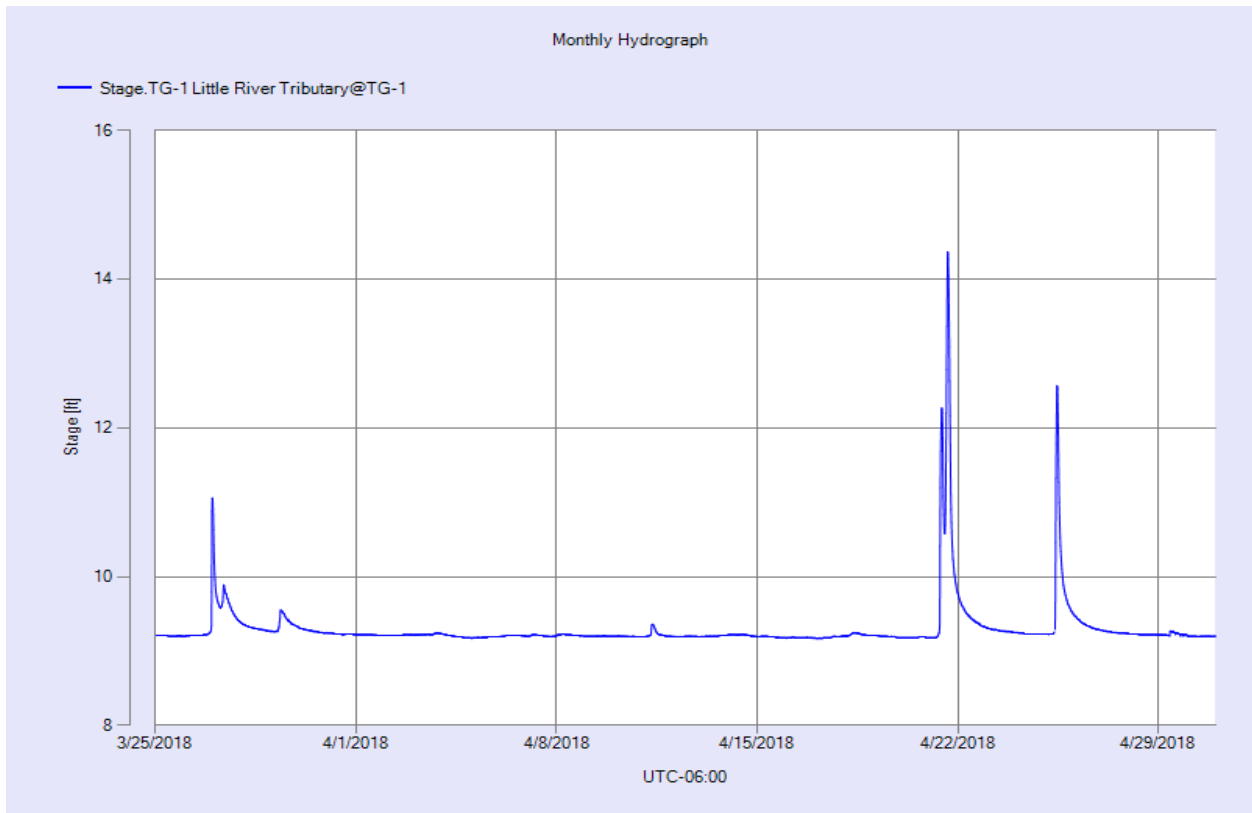


Figure 11 Monthly Hydrograph TG-1

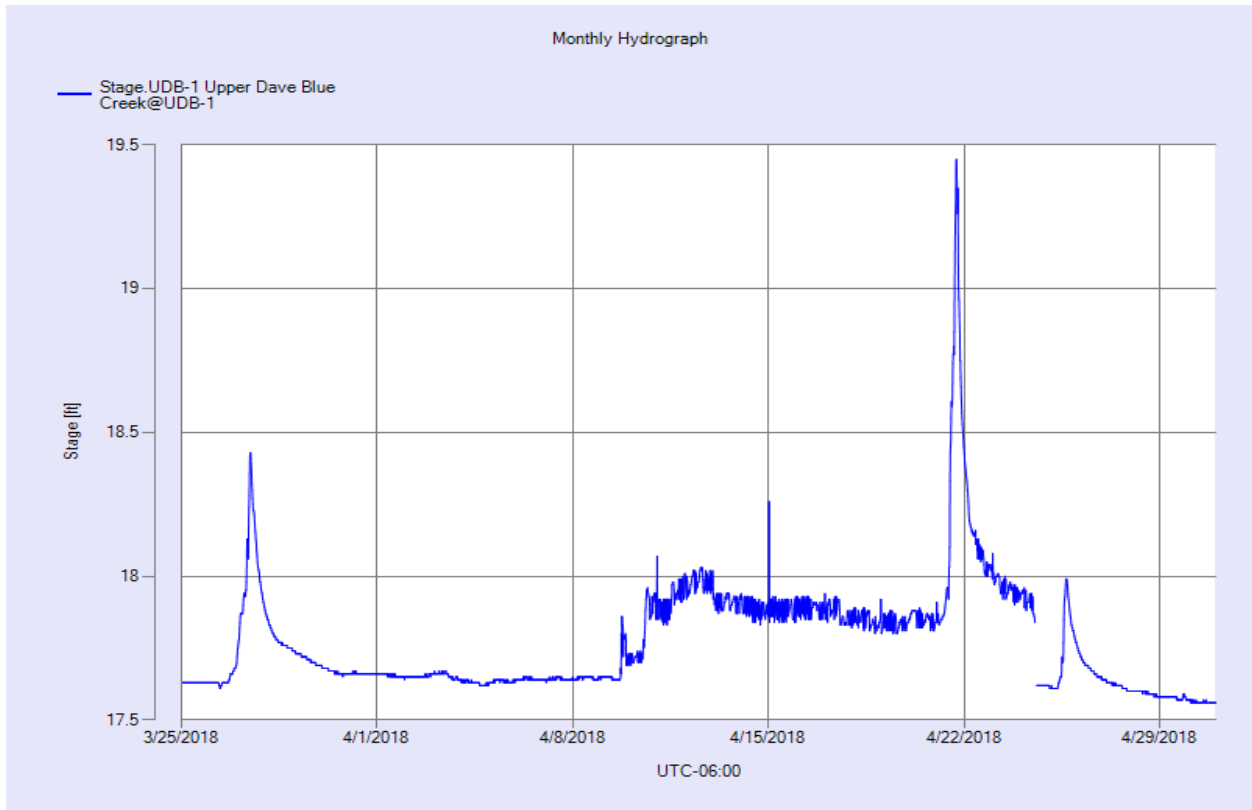


Figure 12 Monthly Hydrograph UDB-1

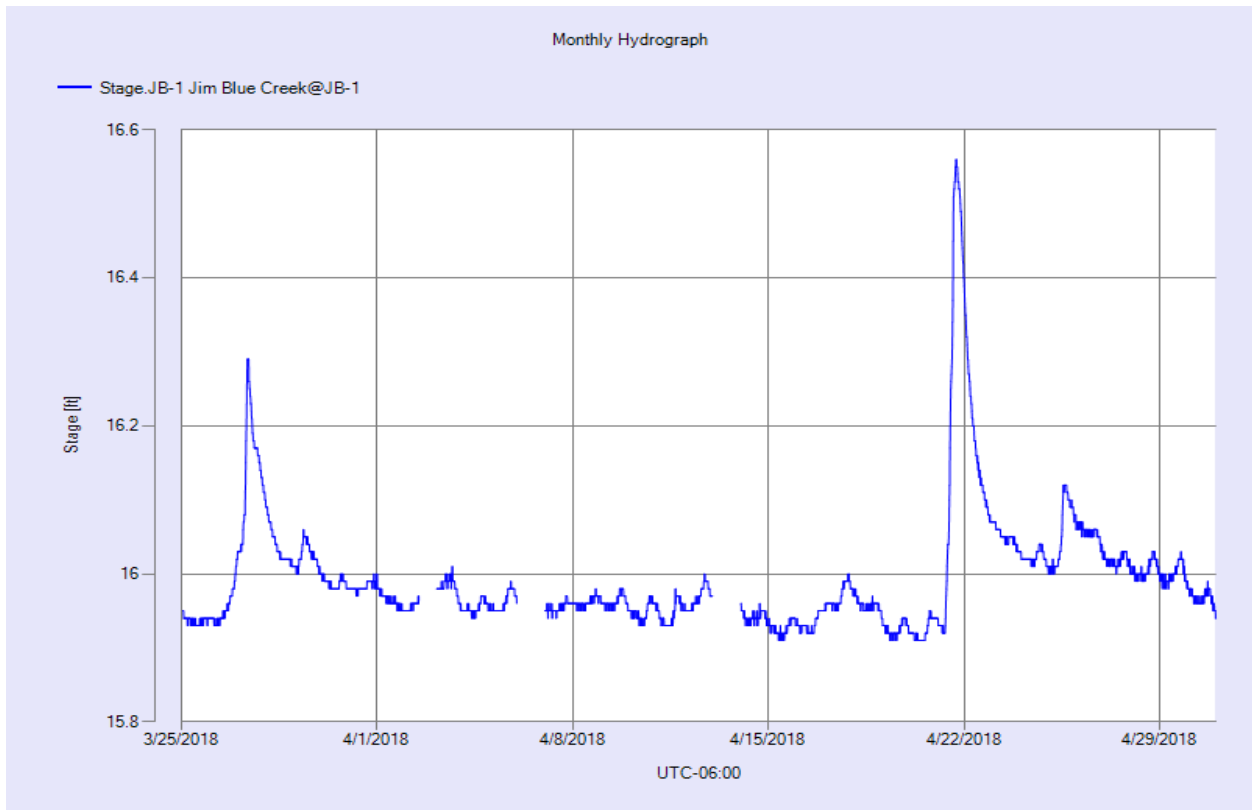


Figure 13 Monthly Hydrograph JB-1

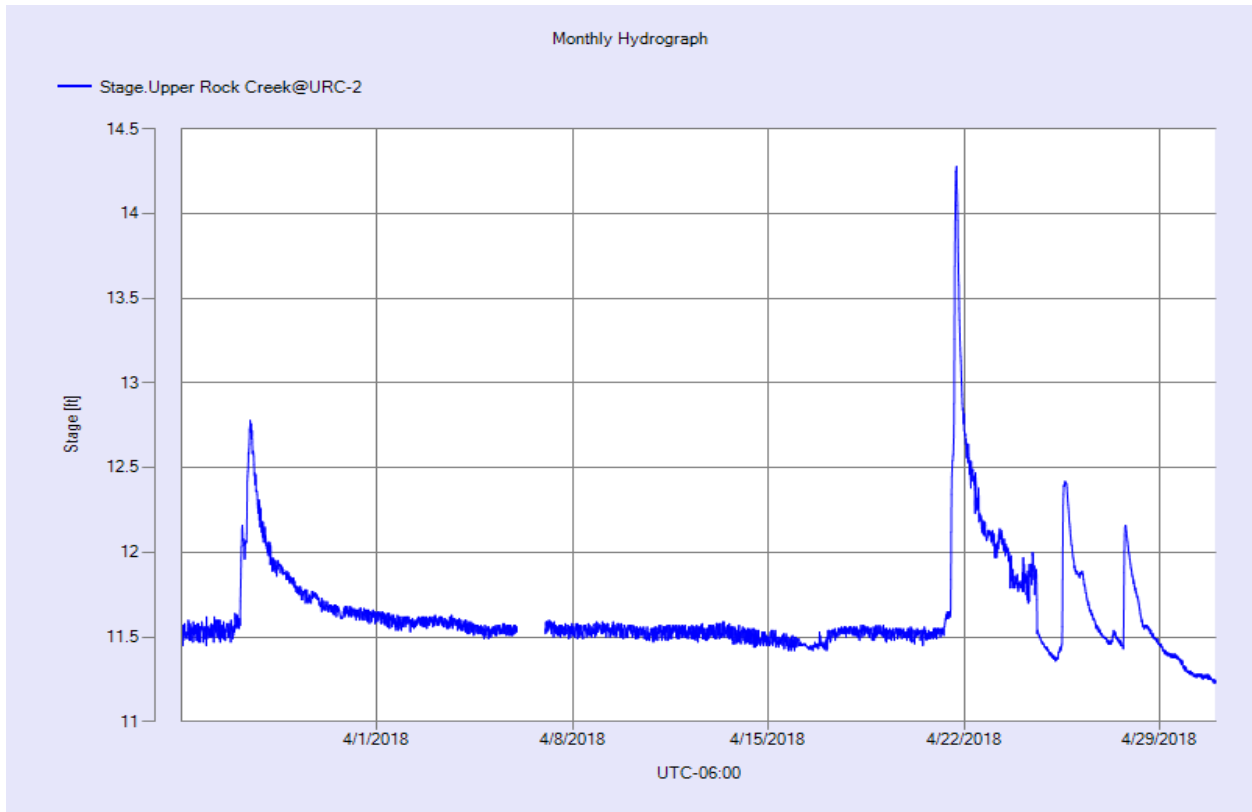


Figure 14 Monthly Hydrograph URC-2

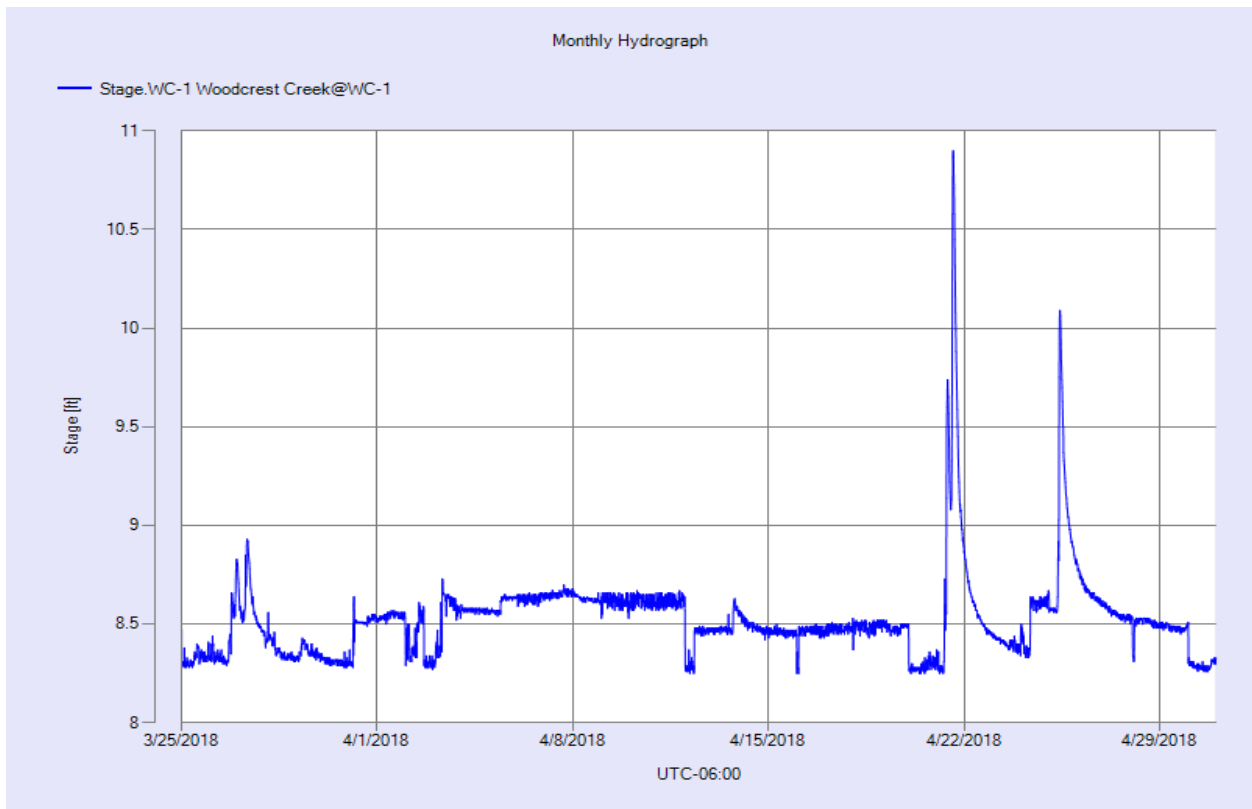


Figure 15 Monthly Hydrograph WC-1

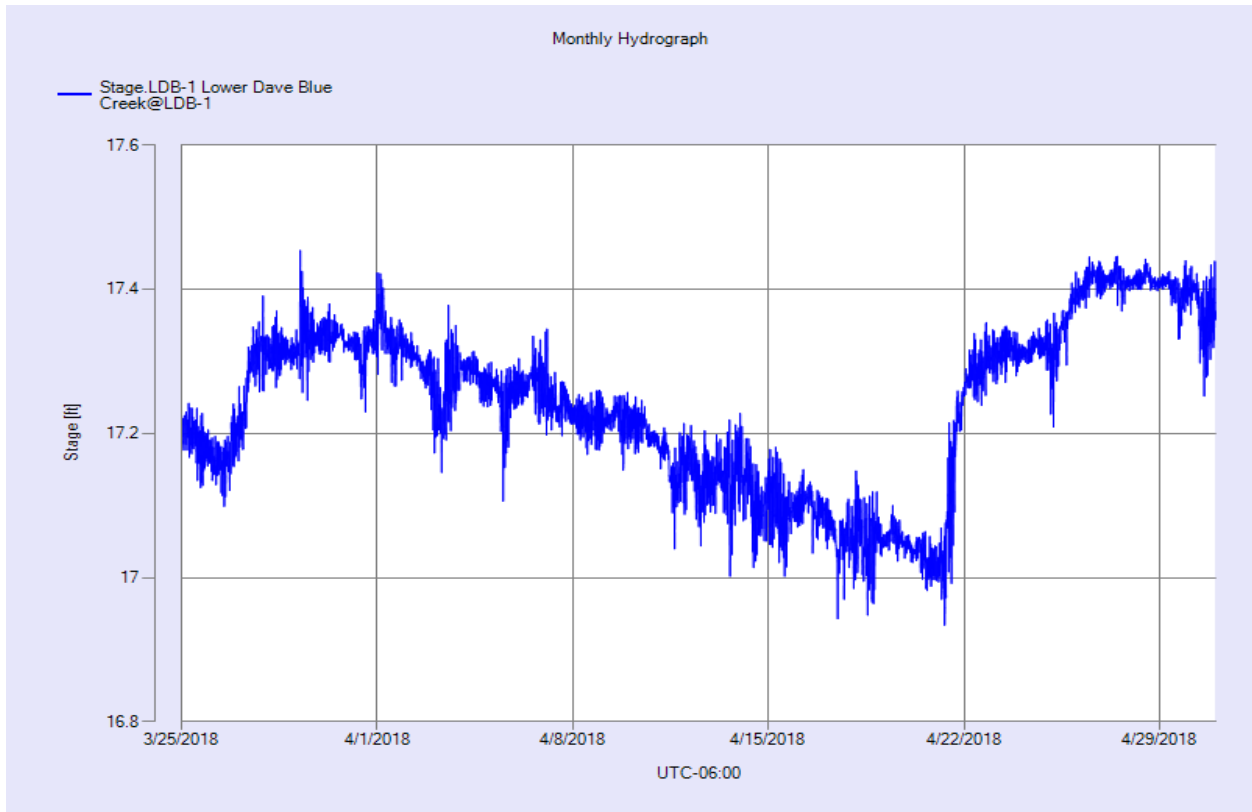


Figure 16 Monthly Hydrograph LDB-1

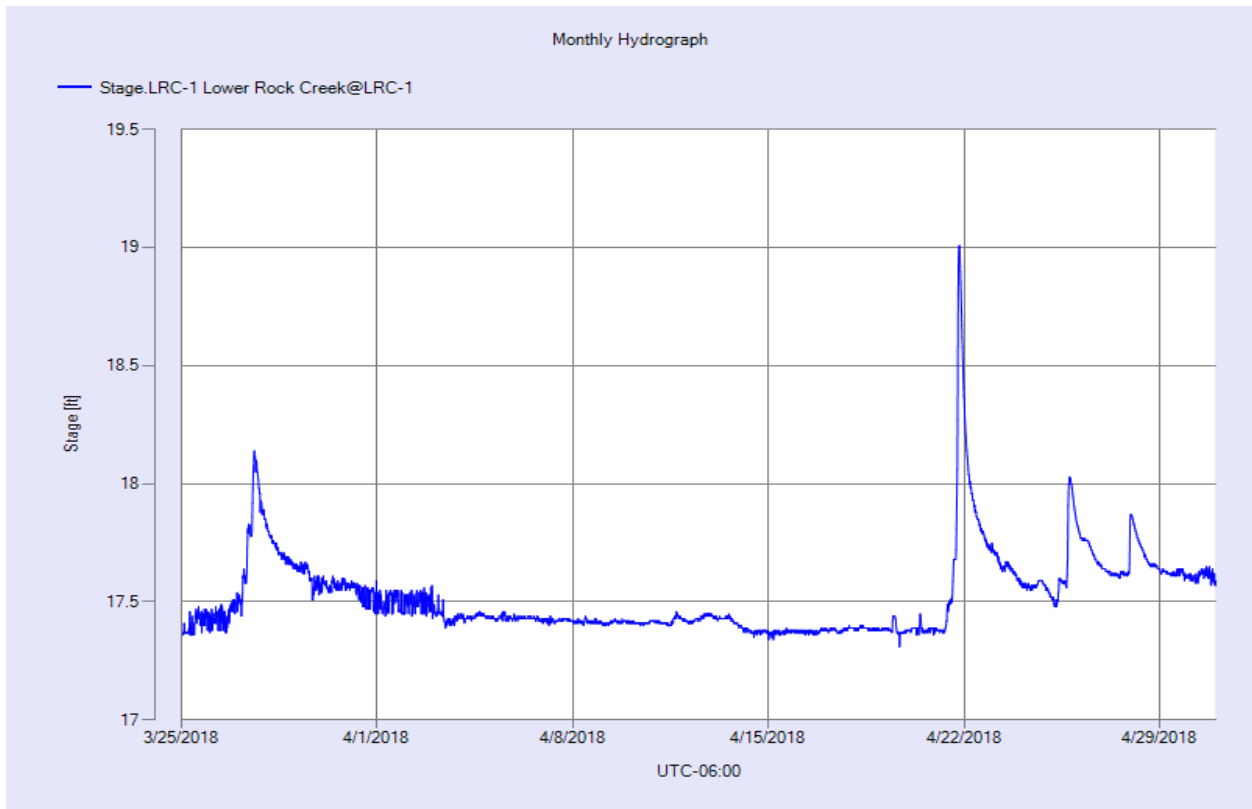


Figure 17 Monthly Hydrograph LRC-1

MESONET CLIMATOLOGICAL DATA SUMMARY
 (NRMN) Norman
 Latitude: 35-14-09

April 2018
 Nearest City: 2.1 NW Norman
 Longitude: 97-27-53

Time Zone: Midnight-Midnight CST
 County: Cleveland
 Elevation: 1171 feet

DAY	TEMPERATURE (°F)				DEG DAYS		HUMIDITY (%)			RAIN (in)	PRESSURE (in)		WIND SPEED (mph)			SOLAR (MJ/m ²)	4" SOIL TEMPERATURES				
	MAX	MIN	AVG	DEWPT	HDD	CDD	MAX	MIN	AVG		STN	MSL	DIR	AVG	MAX		SOD	BARE	MAX	MIN	
1	50	33	39.5	31.0	23	0	89	60	72	0.00	28.83	30.09	NNE	13.9	27.0	4.75	54.9	51.8	58	48	
2	58	32	43.4	37.6	20	0	93	72	80	0.00	28.57	29.82	S	8.8	27.9	9.21	52.1	49.6	54	46	
3	70	38	56.7	39.1	11	0	93	23	57	0.00	28.62	29.87	N	20.8	45.3	23.89	55.6	57.6	63	53	
4	59	30	45.4	20.9	21	0	65	22	40	0.00	29.01	30.27	SSE	7.0	22.7	25.49	53.6	54.2	63	46	
5	71	46	57.0	37.4	6	0	60	40	48	0.00	28.74	29.99	SSE	11.2	29.8	19.37	54.6	57.1	65	51	
6	61	31	50.0	43.4	19	0	97	59	79	0.02	28.64	29.89	NNE	15.1	37.6	4.15	55.6	56.8	59	50	
7	46	24	33.7	22.2	30	0	90	37	65	0.06	28.89	30.15	NNE	13.4	33.2	18.26	51.2	48.5	54	44	
8	49	33	40.8	32.0	24	0	82	62	71	0.00	28.67	29.92	SSE	6.3	25.4	10.66	50.0	48.7	53	45	
9	69	35	51.8	38.2	13	0	95	33	64	0.00	28.87	30.12	N	7.2	26.5	NA	52.6	54.3	64	46	
10	69*	33*	53.7*	34.4*	14*	0*	91*	26*	53*	0.00*	29.02*	30.28*	S *	6.2*	20.2*	NA	54.7*	57.4*	67*	48*	
11	81	53	67.0	43.1	0	2	53	31	43	0.00	28.70	29.95	S	15.4	36.9	24.81	56.8	61.7	69	55	
12	86	61	73.1	56.5	0	9	72	40	57	0.00	28.40	29.63	S	17.3	35.9	25.60	60.3	66.8	74	60	
13	86	47	71.3	47.4	0	1	88	10	53	0.04	28.31	29.55	S	19.0	43.8	20.82	62.6	68.5	73	65	
14	51	33	41.1	20.9	23	0	56	32	45	0.00	28.73	29.97	NW	22.1	42.9	22.65	56.7	58.8	65	54	
15	59	30	41.9	16.7	21	0	67	13	41	0.00	28.90	30.15	NW	14.4	32.9	27.72	53.3	54.2	61	48	
16	74	32	53.6	32.4	12	0	71	28	47	0.00	28.83	30.08	SE	8.8	25.5	26.86	54.3	56.7	66	48	
17	87	60	73.4	51.7	0	9	66	29	49	0.00	28.47	29.71	S	14.8	30.9	23.72	59.1	64.8	73	58	
18	73	45	62.4	31.6	6	0	57	18	33	0.00	28.81	30.07	NNW	16.9	37.8	27.52	60.4	65.9	71	61	
19	66	40	53.2	31.4	12	0	69	26	45	0.00	29.08	30.34	NNE	7.7	19.8	26.75	58.6	62.1	69	55	
20	69	40	55.6	35.5	11	0	74	30	49	0.00	28.93	30.19	SE	11.9	28.1	25.42	58.4	61.7	69	55	
21	57	48	49.9	46.4	13	0	98	55	89	1.70	28.80	30.05	N	9.9	32.3	1.90	56.5	57.2	62	54	
22	64	44	52.4	44.9	11	0	95	52	77	0.00	28.82	30.07	NNW	14.5	29.2	14.91	54.9	55.1	60	51	
23	74	48	60.5	48.3	4	0	93	41	67	0.00	28.81	30.06	N	8.2	23.4	24.26	57.8	58.5	66	52	
24	79	47	64.9	48.5	2	0	96	32	60	0.00	28.84	30.09	N	5.6	25.4	26.42	60.5	61.5	71	53	
25	61	44	50.1	44.4	12	0	96	65	81	0.57	28.90	30.16	NNW	13.8	33.1	5.44	58.7	56.5	62	54	
26	69*	38*	54.7*	42.9*	12*	0*	99*	39*	68*	0.00*	28.78*	30.03*	NW *	4.1*	14.5*	NA	57.6*	57.1*	66*	48*	
27	72	48	59.9	40.1	5	0	90	25	53	0.00	28.83	30.08	N	6.7	19.6	28.74	60.1	58.9	66	52	
28	81	44	65.8	41.6	2	0	88	22	46	0.00	28.79	30.04	SSE	5.0	17.1	28.45	61.1	60.2	69	51	
29	81	55	70.5	49.5	0	3	71	32	49	0.00	28.80	30.05	SSE	10.7	30.7	27.80	62.8	63.4	72	56	
30	79	60	69.6	55.9	0	4	76	37	63	0.00	28.72	29.96	SSE	13.5	36.0	25.05	63.9	67.3	74	60	
	68*	42*	55.4*	38.9*	←- Monthly Averages →-							28.77*	30.02*	SSE*	11.7*	45.3*	20.39*	57.0*	58.4*	65*	52*
Temperature - Highest: 87*					Degree Days - Total HDD: 327*					Number of Days With:											
Lowest: 24*					Total CDD: 29*					Tmax ≥ 90: 0* Rainfall ≥ 0.01 inch: 5*											
Rainfall: Monthly Total: 2.39* in.					Humidity - Highest: 99*					Tmax ≤ 32: 0* Rainfall ≥ 0.10 inch: 2*											
Greatest 24 Hr: 1.70* in.					Lowest: 10*					Tmin ≤ 32: 6* Avg Wind Speed ≥ 10 mph: 17*											
										Tmin ≤ 0: 0* Max Wind Speed ≥ 30 mph: 14*											

Figure 18 April Mesonet Data